Statement of Andrea Mary Kenafake

I, Andrea Mary Kenafake, Manager Development Assessment, City Planning & Sustainability Division, Brisbane City Council, of 266 George Street, Brisbane, in the State of Queensland, state on oath as follows:

A. Attachment **AMK-01** is a copy of a notice from the Commissioner of the Queensland Floods Commission of Inquiry (**Commission**) dated 16 November 2011 requiring me to provide certain information to the Commission in the form of a statement by 21 November 2011 (**Notice**). This Statement is provided in response to the Notice.

B. For the purposes of responding to the Notice and preparing this Statement I have, in my position as Manager Development Assessment, City Planning and Sustainability Division, Brisbane City Council (**Council**), had access to:

(a) the business records of Council; and

(b) Council officers,

to obtain information to provide a response to the Notice. Unless otherwise stated, the matters set out in this Statement are based on my own knowledge and the information derived from the above sources.

C. The documents from the above sources and attached to this Statement have been collated by Council officers under my instruction.

D. I set out below my responses to each of the questions set out in the Notice.

Qualifications and Background

1. I hold a Bachelor of Arts (Psych) and Master of Rehabilitation.

2. I have been employed by Council since 20 September 1993. The roles I have been engaged in since commencing employment in Council are Rehabilitation Development Officer (September 1993–March 1995); Program Manager – Rehabilitation and Workers' Compensation (March 1995 - September 1997); Principal Occupational Health and Safety Advisor (October 1997 - January 1998); WorkCover Manager (January 1998 – June 2001); Business Improvement Manager (July 2001 – November 2004); Work Environment Manager

[redacted] [redacted]

Andrea Mary Kenafake **Witness**

(November 2004 – June 2006); Manager Local Laws (June 2006 – October 2007); Manager Divisional Projects (November 2007 – May 2008); Manager Development Improvement Program (May 2008 – July 2010); and Manager Development Assessment (July 2010 – current).

3. I hold the position of Manager Development Assessment, City Planning & Sustainability Division of Council.

4. At the time of the development application for the site I was the WorkCover Manager. In this role I was responsible for managing Council's licenced self-insurance fund and liability for workplace injury.

General observations

5. Council files indicate that the Milton Zone Substation (**Substation**) is located at the Suncorp Stadium site which is described as 40 Castlemaine Street, Milton (**Site**).

6. At that time I was not employed within the Development Assessment Branch and had no involvement in the assessment of the development application.

Background to the redevelopment of Suucorp Stadium

7. By declaration gazetted on 17 December 1999, the Coordinator-General declared the Lang Park project to be a significant project for which an Environmental Impact Statement (**EIS**) is required under the *State Development and Public Works Organisation Act 1971* (**SDPWO Act**).

8. An EIS was prepared under the SDPWO Act and the Coordinator-General produced an evaluation report dated 17 August 2000 which contained the following recommendation in relation to the Substation:

"*the proponent discuss with Energex, relocating the originally intended electricity supply infrastructure for the property currently owned by Energex fronting Milton Road (and to be acquired for the stadium) to an alternative location within the redevelopment*"

Council files indicate that a copy of the evaluation report was given to Council, a copy of which is Attachment **AMK-02**.

[redacted]

Andrea Mary Kenafake

[redacted]

Witness

9. Council files indicate that on 11 September 2000, the Deputy Premier, Minister for State Development, and Minister for Trade made a Ministerial Designation of Land for Community Infrastructure under the *Integrated Planning Act 1997* (repealed), relating in summary to all of the lands and works required for the Lang Park Stadium proposal, with the exception of the stadium itself and part of the northern plaza. A copy of the gazette notice of the Ministerial designation is Attachment **AMK-03**.

10. Council did not receive a development application for the Substation at the Site.

11. Council received a development application for a material change of use of premises for Commercial Outdoor Recreation and Indoor Sport and Recreation dated 12 September 2000 (**Development Application**). A copy of the Development Application is Attachment **AMK-04**.

12. Council files indicate that on 6 November 2000, the Minister made an Amended Ministerial Designation of Land for Community Infrastructure under the *Integrated Planning Act 1997* (repealed) to amend the Ministerial designation made on 11 September 2000 to reflect certain changes to the lands and works required as a result of detailed design development (**first amended designation decision**). A copy of the gazette notice of the first amended designation decision is Attachment **AMK-05**.

13. By regulation made pursuant to sections 65 and 66 of the SDPWO Act (since renumbered to sections 108 and 109 of the Act) and commencing on 24 November 2000, the Coordinator-General was directed to undertake works specified in the report "Construction of Certain Works by the Coordinator-General Under the provisions of the *State Development and Public Works Organisation Act 1971*". Those works did not include the Substation and were primarily directed at public transport and walkway access to the Stadium. Attachment **AMK-06** is a copy of the report "Construction of Certain Works by the Coordinator-General Under the provisions of the *State Development and Public Works Organisation Act 1971*".

14. The Development Application was approved by Council by decision notice dated 6 March 2001 and negotiated decision notice dated 9 May 2001. The approved plans for the negotiated decision notice, in particular drawings A2-31-D2 and A2-32-D2, specifically excluded the Substation. A copy of the negotiated decision notice, conditions and drawings A2-31-D2 and A2-32-D2 is Attachment **AMK-07.**

[redacted]

Andrea Mary Kenafake

[redacted]

Witness

15. Following Council's negotiated decision notice, the Minister for State Development exercised his powers pursuant to the *Integrated Planning Act 1997* (repealed) to "call in" the development application and re-assess and re-decide the development application on 12 June 2001. Attachment **AMK-08** is a copy of the correspondence from the Minister to Council advising that the Minister was calling in the Development Application.

16. The Minister issued a decision notice for the Development Application dated 6 July 2001, a copy of which is Attachment **AMK-09**.

17. By notice dated 31 October 2001, the Minister for State Development indicated an intention to designate the Site for community infrastructure. A copy of the notice to Council is Attachment **AMK-10**. In particular, the community infrastructure designation identified that the development of the Site was for community infrastructure which included, amongst other things, operating works under the *Electricity Act 1994* for an electricity substation and ancillary works.

18. Council files indicate that on 19 December 2001, the Minister made an Amended Ministerial Designation of Land for Community Infrastructure under the *Integrated Planning Act 1997* (repealed) to amend the Ministerial designation made on 11 September 2000 and amended on 6 November 2000 to include an additional type of community infrastructure for the supply of a substation by Energex (**second amended designation decision**). A copy of the gazette notice of the second amended designation decision is Attachment **AMK-11**.

19. On 28 May 2003, the Minister for State Development made an Amended Ministerial Designation of Land for Community Infrastructure under the *Integrated Planning Act 1997* (repealed) to amend the Ministerial designation made on 11 September 2000 and amended on 6 November 2000 and 19 December 2001, to further vary the areas of land the subject of the designation decision (**third amended designation decision**). A copy of the gazette notice of the third amended designation decision is Attachment **AMK-12**.

[redacted]

Andrea Mary Kenafake

[redacted]

Witness

1.	**Council's knowledge of the decision to select the site for the Milton Zone Substation at Suncorp Stadium on the corner of Milton Road and Castlemaine Street ("the site");**
2.	**Council's knowledge of, or its own investigations into, other suitable sites for the substation;**
3.	**Council's knowledge of the factors that lead to the site being selected;**
4.	**Council's knowledge of Energex's role, if any, in the development of the substation at the site;**

20. It is convenient to respond to requirements 1 - 4 together.

21. As stated at paragraph 14 above, Council's assessment of the Development Application specifically excluded the Substation.

22. During the assessment process, Council had raised concerns regarding the location and design of the Substation. In addition, after the development approval, Council had some interactions with the State on the location of the Substation, primarily as a result of the implications of the location of the Substation on other matters relevant to Council, including amenity and provision of public transport. A copy of relevant documents from Council's files is Attachment **AMK-13**.

5.	**The defined flood level for the site;**
6.	**The flood inundation height at the site during the January 2011 floods;**

23. It is convenient to respond to requirements 5 and 6 together.

24. Attachment **AMK-14** is a copy of the current FloodWise Property Report for the Site. The FloodWise Property Report shows:

(a) the Defined Flood Level as 5.1m AHD;

(b) the Interim Residential Flood Level as 6.0m AHD.

7.	**Site flood risk information known to Council at the time of assessing the development application;**

[redacted]

Andrea Mary Kenafake

[redacted]

Witness

25. Condition 10 of the Negotiated Decision Notice dated 9 May 2001 (see Attachment AMK-07) indicates that the Q100 flood level at the time of the approval was 5.0m AHD.

26. Council files indicated that a draft memorandum was sent from Khondker Rahman, Senior Waterways Program Officer (Infrastructure) to Steven Adams, City Planning on 22 May 2000 which relevantly to flooding provided:

"***Waterway Issues***

Flooding

Lang Park is subject to Brisbane River Flooding, it was inundated during the 1893 and 1974 events. The overland flowpath from the site has been cut off with the construction of the western railway and Milton Road. The drainage network between the river and Lang Park (in a major event) conveys flood waters from the river to the park where it surcharges until such time it equalises with the river. Should such an event occur the anticipated Q100 is RL5.0 AHD.

Local flooding (Q2) in Hale Street has been identified in the drainage investigation 1996. This is not considered to be serious and can be rectified with relief works."

A copy of the draft memorandum is Attachment **AMK-15**.

8. The information provided to or obtained by Council in assessing the development application;

27. The information provided to or obtained by Council in assessing the development application included:

(a) the EIS for the Lang Park Project;

(b) the Coordinator-General's evaluation report dated 17 August 2000 (see Attachment AMK-02);

(c) the Development Application dated 12 September 2000 (see Attachment AMK-04); and

[redacted]

Andrea Mary Kenafake

[redacted]

Witness

(d) Development Application Supplementary Information dated 10 November 2000 (Attachment **AMK-16**).

9.	**The planning instruments against which Council assessed the development application;**
10.	**Whether those planning instruments specifically addressed the risk of flooding to substations;**

28. It is convenient to respond to requirements 9 and 10 together.

29. As stated in 14 above, Council did not assess a development application for the Substation.

30. The Development Application was assessed against the Town Plan for the City of Brisbane 1987 (now superseded by City Plan 2000). I am not aware of any provisions under the Town Plan for the City of Brisbane 1987 which specifically addressed the risk of flooding to substations.

11.	**Any development conditions imposed to minimise risk of the effects of flooding;**

31. Council's conditions on the negotiated decision notice (see Attachment AMK-07) relevantly included condition 10 which provided as follows:

"***Construct all new proposed building(s)*** *included in the approved drawings and documents, in accordance with Council's Subdivision and Development Guidelines to ensure that finished floor levels are above the Q100 flood level of 5.0 metres Australian Height Datum.*"

32. Condition 10 referred to in Paragraph 31 above was not included in the Minister's decision as referred to at Paragraph 16 above.

12.	**Council's attitude towards any of the following being utilised to require minimum flood protection standards with respect to zone substations or bulk supply substations:**
	i. amendments to the *Electricity Act* 1994;
	ii. amendments to State Planning Policy 1/03;
	iii. implementation of a State Planning Regulatory Provision;
	v. amendments to the Queensland Planning Provisions;

[redacted] [redacted]

Andrea Mary Kenafake **Witness**

	vi.	**amendments to the Building Code of Australia or the Queensland Development Code.**
13.	**If not addressed in response to paragraph 12, Council's opinion as to how development of zone substations or bulk supply substations can best be regulated to reduce the risks of impacts from flooding.**	

33. It is convenient to respond to requirements 12 and 13 together.

34. The construction and regulation of electricity substations is primarily a matter for the State and the distribution entities under the *Electricity Act 1994*.

35. A considerable amount of development for electricity infrastructure is exempt development under the *Sustainable Planning Act 2009* and cannot be made assessable under City Plan 2000. Further, where such development is not exempt, it is not uncommon for the Community Infrastructure Designation process under the *Sustainable Planning Act 2009* to be utilised to designate land for operating works under the *Electricity Act 1994*, which results in that development being exempt under City Plan 2000. Also, City Plan 2000 (Chapter 3, Section 2.3) exempts certain development for utility installation.

36. Council has an interest in, amongst other things:

(a) contributing to the effectiveness and efficiency of the development assessment system;

(b) maintaining the outcomes of its development assessments, despite other development that may occur on a site; and

(c) to the extent possible, ensuring continuity of electricity supply in terms of running essential utilities and services (both by Council and others).

37. Council therefore would support measures that contribute to the flood immunity or resilience of essential infrastructure, such as substations, while also being conscious of the range of other contributing factors that will determine the appropriate location of such infrastructure, such as amenity, design and serviceability.

[redacted] [redacted]

Andrea Mary Kenafake **Witness**

38. In Council's view, there should be a consistent State-wide approach, and Council would support the implementation of such measures through State planning instruments as outlined in requirement 12 of the Notice.

14.	**An overview of any investigations undertaken or any planning guidelines or policies considered or made since the January 2011 floods to increase protection to zone substations and bulk supply substations (including any collaboration or dialogue with Energex).**

39. Prior to the January 2011 floods, the Council's Subdivision and Development Guidelines 2008 included Table A1.4 which specifies flood immunity levels of 200 year ARI for substations.

40. As stated in paragraph 34 above, the construction and regulation of electricity substations is primarily a matter for the State and the distribution entities under the *Electricity Act 1994*.

41. I refer to QFCI Exhibit 630 which was tendered at the hearing held on 27 September 2011, which is an extract of the standard basement conditions for development approvals which has been taken from Council's DART conditions library. In particular, I refer to subsection (iii) which provides as follows:

"No essential electrical services (e.g. electrical switchboards or lift controls) are to be located within the basement unless situated above the DFL or 100 year ARI flood level."

42. I also refer to paragraph 15 of the Statement of Martin James Reason sworn on 1 September 2011 and Attachment **MJR-3** of that statement in relation to implementation of the *Temporary Local Planning Instrument 01/11 - Brisbane Interim Flood Response* (**TLPI**) by Council after the January 2011 floods.

I make this statement conscientiously believing the same to be true, and by virtue of the provisions of the Oaths Act 1867 (Qld).

Dated 21 November 2011

[redacted] [redacted]

Andrea Mary Kenafake **Witness**

Signed and declared by Andrea Mary Kenafake
at Brisbane in the State of Queensland
this 21st day of November 2011
Before me:

[redacted]

Signature of person before whom the declaration is made

[redacted] - Solicitor

Full name and qualification of person before whom the declaration is made

[redacted]

Signature of declarant

Our ref: Doc 1776403

16 November 2011

Ms Andrea Kenafake
Manager Development Assessment
Brisbane City Council
GPO Box 1434
Brisbane QLD 4001

REQUIREMENT TO PROVIDE STATEMENT TO COMMISSION OF INQUIRY

I, Justice Catherine E Holmes, Commissioner of Inquiry, pursuant to section 5(1)(b) of the *Commissions of Inquiry Act 1950* (Qld), require Ms Andrea Kenafake to provide a written statement, under oath or affirmation, to the Queensland Floods Commission of Inquiry, in which the said Ms Kenafake gives an account of:

Milton Zone Substation

1. Council's knowledge of the decision to select the site for the Milton Zone Substation at Suncorp Stadium on the corner of Milton Road and Castlemaine Street, Milton ("the site");

2. Council's knowledge of, or its own investigations into, other suitable sites for the substation;

3. Council's knowledge of the factors that lead to the site being selected;

4. Council's knowledge of Energex's role, if any, in the development of the substation at the site;

5. The defined flood level for the site;

6. The flood inundation height at the site during the January 2011 floods;

7. Site flood risk information known to Council at the time of assessing the development application;

8. The information provided to or obtained by Council in assessing the development application;

9. The planning instruments against which Council assessed the development application;

10. Whether those planning instruments specifically addressed the risk of flooding to substations; and

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11. Any development conditions imposed to minimise risk of the effects of flooding.

Planning issues

12. Council's attitude towards any of the following being utilised to require minimum flood protection standards with respect to zone substations or bulk supply substations:

    a. amendments to the *Electricity Act* 1994;

    b. amendments to State Planning Policy 1/03;

    c. implementation of a State Planning Regulatory Provision;

    d. amendments to the Queensland Planning Provisions;

    e. amendments to the Building Code of Australia or the Queensland Development Code.

13. If not addressed in response to paragraph 12, Council's opinion as to how development of zone substations or bulk supply substations can best be regulated to reduce the risks of impacts from flooding.

14. An overview of any investigations undertaken or any planning guidelines or policies considered or made since the January 2011 floods to increase protection to zone substations and bulk supply substations (including any collaboration or dialogue with Energex Limited).

In addressing these matters, Ms Kenafake is to:

- provide all information in her possession and identify the source or sources of that information;
- make commentary and provide opinions she is qualified to give as to the appropriateness of particular actions or decisions and the basis of that commentary or opinion.

Ms Kenafake may also address other topics relevant to the Terms of Reference of the Commission in the statement, if she wishes.

The statement is to be provided to the Queensland Floods Commission of Inquiry by Monday 21 November 2011

The statement can be provided by post, email or by arranging delivery to the Commission by emailing info@floodcommission.qld.gov.au.

C. E. Holmes

Commissioner
Justice C E Holmes

LANG PARK STADIUM REDEVELOPMENT

ASSESSMENT REPORT

by

THE COORDINATOR-GENERAL

August 2000

Compiled by the Department of State Development

TABLE OF CONTENTS

1. INTRODUCTION

Lang Park was declared a "significant project" on 16 December 1999. The purpose of this Assessment Report is to inform the Assessment Manager, the Brisbane City Council (BCC), of the findings of the Coordinator-General on the Environmental Impact Statement (EIS) prepared for the proposed redevelopment of the Lang Park Stadium.

This report examines the proposed development, outlines the EIS process followed, discusses the more significant issues addressed in the EIS, summarises the strategies and actions arising out of its findings, considers the necessary development approvals and licences identified and advises the Concurrence Agency conditions applicable to the development as determined by the Coordinator-General. A favourable Coordinator-General's Report will permit the project to proceed through to the *Integrated Planning Act 1997 (IPA)* process.

Lang Park was chosen by the Queensland Government on 31 August 1999 as its preferred site for the development of a rectangular pitch stadium. The provision of an international standard stadium has been a recognised priority of successive Queensland Governments and the BCC in recent years.

The redevelopment of the existing Lang Park Stadium is contingent on a number of factors including the successful completion of major planning studies, an Environmental Impact Statement (EIS) under the provisions of section 29 of the *State Development and Public Works Organisation Act 1971 (SDPWOA)* and development approval under the *IPA* and other relevant legislation. Final approval by the Queensland Government will be conditional on hiring agreements with major tenants.

Within the Queensland Government, the Department of Communication and Information, Local Government, Planning and Sport (DCILGPS) is the project manager of the impact assessment and other studies and the proponent for the project. The Lang Park Trust will be the applicant for the purpose of the approvals required. The Department of State Development coordinated the preparation of the EIS for the project on behalf of the Coordinator-General.

As the project has been declared a "significant project" under S29B of the *SDPWOA* by the Coordinator-General, the EIS and associated public consultation will satisfy part of the statutory requirements for development approvals required under the *IPA*.

Further public consultation will not apply to any future development application requiring impact assessment for this project. Any properly made submission received on the draft EIS will be considered a properly made submission for any future development application that requires impact assessment under the *IPA*.

If the project is to proceed, the Lang Park Trust will seek the relevant development approvals from the BCC in accordance with the requirements of the *IPA*.

This report is based on the following documentation lodged by the DCILGPS:

- Lang Park Stadium Proposal Review, Draft Environmental Impact Statement, Volume 1 (Executive Summary), prepared by Sinclair Knight Merz (May 2000).
- Lang Park Stadium Proposal Review, Draft Environmental Impact Statement, Volume 2 (Introduction, Description of Project, Alternatives to Proposal) prepared by Sinclair Knight Merz (May 2000).
- Lang Park Stadium Proposal Review, Draft Environmental Impact Statement, Volume 3 (Planning Context, Existing Environment), prepared by Sinclair Knight Merz (May 2000).
- Lang Park Stadium Proposal Review, Draft Environmental Impact Statement, Volume 4 (Environmental Impacts, Transport Impacts), prepared by Sinclair Knight Merz (May 2000).
- Lang Park Stadium Proposal Review, Draft Environmental Impact Statement, Volume 5 (Consultation, Mitigation & Management Plans, Approvals & Licencing), prepared by Sinclair Knight Merz (May 2000).
- Lang Park Stadium Proposal Review, Draft Environmental Impact Statement, Volume 6 (Conclusions, Appendices – A Terms of Reference & B Study Team), prepared by Sinclair Knight Merz (May 2000).
- Lang Park Stadium Proposal Review, Draft Environmental Impact Statement, Volume 7 (Technical Appendices), prepared by Sinclair Knight Merz (May 2000).
- Lang Park Stadium Proposal Review, Environmental Impact Statement, Volume 8 (Addendum Report) prepared by Sinclair Knight Merz (July 2000).

2. BACKGROUND

2.1 Existing facility

Lang Park is a cultural icon of long standing as the "home of rugby league" in Queensland. Since the commencement of the lease to the Queensland Rugby League in the mid 1950s, Lang Park has undergone a series of transformations with the objective of providing a high quality ground dedicated to the game of rugby league.

Lang Park is known nationally and internationally as a venue for rectangular pitch football games, such as rugby league, rugby union and soccer. The existing stadium at Lang Park has a capacity of approximately 42,000 patrons and in recent years, capacity crowds have only attended Lang Park for major events such as the State of Origin interstate rugby league matches and recent rugby union internationals.

The existing Lang Park Stadium is inadequate for staging major sporting events involving a large crowd. Even with a small crowd of less than 10,000 (eg Rugby 7s), the impacts on the local residential area are still significant. If the existing Lang Park Stadium was to increase its events schedule with the inclusion of additional major events, the impacts on the immediate residential areas would be severe.

2.2 Project need

In 1997, the Queensland Government determined that there was a need for a world class stadium for rectangular pitch sporting events in Brisbane to complement the redevelopment of "The Gabba" cricket ground. Upon completion of a site selection process in 1999, Lang Park was selected as the preferred site.

The EIS was conducted concurrently with a number of related investigations to assist the Queensland Government in making its final decision on the acceptance of this project including:

- transport strategy;
- commercial analysis and feasibility; and
- master planning and concept design analysis.

Lang Park is to be a part of a broader strategy that will:

- complement the Queensland Government's City West vision;
- provide a focus for a sports and entertainment precinct to operate 7 days per week; and
- provide a venue which will enhance Queensland's major events strategy.

The Stadium proposal will also assist the State Government's Integrated Regional Transport Plan aimed at reducing the public's reliance on private transport.

3. PROJECT DESCRIPTION

3.1 Site Location

The existing Suncorp-Metway Stadium (Lang Park) is on a site bounded by Hale Street, Caxton Street, Castlemaine Street and Chippendall Street. The site is in close proximity to the Brisbane CBD.

3.2 The design/development concept

The development concept considered in the EIS proposes that the stadium will be developed into a world class rectangular pitch with high quality public spectator facilities and seating for 52,500 patrons, excluding media, management and disabled patrons and their carers. It is to provide a fully enclosed seating bowl in three main tiers, supported by six internal levels within the building.

The proposal involves retaining the existing western grandstand and replacing the northern, eastern and southern facilities with a new continuous grandstand around the field to connect with the western stand. The stadium is to have at least 80% roof coverage with design provision for a future closing roof.

Two pedestrian plazas (northern and southern ends) are planned with concourses linked to dedicated pedestrian walkways to the CBD and Roma Street Station via Milton Road, Petrie Terrace and the rail corridor to the north of Roma Street, and via Caxton Street, Petrie Terrace and the rail corridor. These facilities are to provide all hours pedestrian movement through the precinct.

3.3 Public transport strategy

Maximising public transport and pedestrian access and circulation is a strategic priority. Consideration has been given to a range of new public transport infrastructure developments together with improved pedestrian facilities, based on the objectives outlined in the State Government's Integrated Regional Transport Plan.

The EIS and the consultation processes undertaken discussed the possible extension of light rail to service the stadium and also provided for a scenario of light rail not proceeding. This approach proved to be advantageous as the Queensland Government has recently announced a decision to defer the development of the Brisbane Light Rail Project.

Heavy rail is to be promoted as the major mode of travel to/from the stadium, potentially catering for 44% of patrons. Other modes of transport are to include special shuttle bus services, taxis and charter coaches. Service promotion initiatives are to include integrated event and public transport ticketing, pre-event publicity, parking restrictions around Lang Park and pre-event public education regarding public transport options and services. On-site car parking in the stadium is to be restricted in keeping with the public transport strategy.

The Queensland Government has accepted a number of project modifications (which had already been addressed in the EIS) to improve the overall performance of the proposal and greatly assist in mitigating the key impacts. These modifications include:

- a larger southern pedestrian plaza extending over Chippendall Street and the land between Chippendall Street and Milton Road;
- a larger integrated transport station to be situated under the southern pedestrian plaza, on land bounded by Chippendall, Hale and Castlemaine Streets and Milton Road; and
- direct flow pedestrian access from the enlarged southern pedestrian plaza to a walkway to Milton Station.

A further modification (also discussed in the EIS) involves the creation of a pedestrian plaza and public space on land situated between Petrie Terrace and the railway corridor to the south-east of the former Police Barracks, including the Hogs Breath Café. This modification is being examined along with other issues concerning the pedestrian walkways and are discussed later in this report.

3.4 Stadium usage

The anticipated events schedule for the proposed stadium is as follows:

Events	Frequency	Crowd Size
National Rugby League fixtures	13 per annum	25,000 – 35,000
State of Origin Rugby League	1 – 2 per annum	45,000 – 52,500
Rugby League international match	1 per annum	45,000 – 52,500
Rugby Union Super 12 fixtures	6 per annum	25,000 – 35,000
Rugby Union international match	1 – 2 per annum	35,000 – 45,000
Major cultural event	1 per 2 – 3 years	15,000 – 25,000
Other major cultural events	3 per annum	10,000 – 15,000

The stadium is to have the capacity to hold large-scale entertainment and public events. The stadium's corporate facilities may host small conferences and hospitality functions outside of the major event times.

Potential exists for the Stadium to be developed as an integrated community sport and recreation facility accommodating existing facilities (i.e. Ozsports and PCYC) and the beach volleyball courts adjacent to Sports House.

3.5 Project timing

If the proposal is to proceed, development approvals (refer to Attachment 4) are proposed to be sought from BCC as soon as practicable in 2000 with construction proposed to start in early 2001 and proceed over a 24 month period.

4. THE EIS PROCESS

The EIS was prepared in accordance with the *SDPWOA*. The project was declared a significant project under S29B and appropriate gazette notices were made. Accordingly, the Department of State Development was responsible for the coordination of the impact assessment process.

Draft Terms of Reference (TOR) for the EIS were made available to the community for comment from 30 November 1999 until 15 February 2000. During this preliminary stage, consultants were engaged to:

(a) assist the community to understand the nature of the proposal and assessment processes so that they could respond to the draft TOR for the EIS;

(b) identify all stakeholders and their respective concerns and suggestions and feed this information into the preliminary studies being conducted; and

(c) identify appropriate ways to consult with the community in the subsequent stages of the process.

A total of 100 submissions on the draft TOR were received from individuals, community groups, local businesses, Government agencies and the BCC. All submissions were considered in finalising the TOR which was approved by the Coordinator-General on 7 March 2000.

4.1 Preparation of EIS

The preliminary draft of the EIS was submitted to the Department of State Development on 9 May 2000. The preliminary draft EIS was assessed by the Coordinator-General and was found to adequately address the TOR. The draft EIS was subsequently released for public comment.

4.2 Public notification of EIS

The draft EIS was advertised in the *Courier Mail* on 15 May 2000 and the local *Westside News* on 17 May 2000 for public comment. Summary documentation on the proposal and a copy of the advertisement was placed on the Internet sites of the Department of State Development and the Department of Communication and Information, Local Government, Planning and Sport. All documentation was made available at no cost to the public. The public comment period closed on 26 June 2000. The proponent has complied with the process outlined in the *SDPWOA*.

4.3 Making submissions on EIS

During the submission period, 54 submissions were received. Of those, 46 were considered properly made submissions and 8 did not conform to the requirements outlined in the advertisement (see Attachment 3). All public submissions made on the draft EIS have been appropriately addressed in Volume 8 (EIS Addendum). It should be noted that only properly made submissions retain 3rd party appeal rights under the *IPA* should an application for impact assessment be lodged with BCC.

5. PROJECT IMPACTS

The project impacts described in the EIS documentation and the comments received thereon have raised many and varied issues. For the purposes of this report, these issues have been collated under generic headings reflective of their principal focus.

ONLY IN SITUATIONS WHERE IMPACTS ARE REGARDED AS BEING INSUFFICIENTLY MITIGATED OR WHERE FURTHER DETAILED DESIGN WORK IS REQUIRED, RECOMMENDATIONS HAVE BEEN MADE (REFER ATTACHMENT 1) OR CONCURRENCE AGENCY DEVELOPMENT CONDITIONS ESTABLISHED (REFER ATTACHMENT 2) BY THE COORDINATOR-GENERAL AS PART OF THE EVALUATION PROCESS.

This report uses certain terminologies in making recommendations and determining development conditions. The following information has been provided to assist in understanding these terminologies and their importance in progressing this development proposal.

Construction and Operation Environment Management Plans

Construction and Operation Environment Management Plans will need to be developed by the proponent to facilitate compliance of the project with the conditions of the development approval under the *IPA* and other environmental management approvals under relevant legislation, in particular the *Environmental Protection Act 1994*. This requirement is reflected in the Development Conditions attached to this report.

These plans will need to be approved by the relevant Agencies (principally the Environmental Protection Agency) prior to the commencement of both construction and operation activities. Recommendations have been made in the following sections of this report on the inclusion of impact mitigation strategies within the Construction and Operation Environment Management Plans.

Development Condition No3. refers to the need for the proponent to prepare a Site Management Plan (SMP). A SMP is a document recognised in the *Environmental Protection Act 1994* to deal specifically with the matters of managing contaminated land. The SMP in this instance could form part of the Construction Environment Management Plan mentioned above.

Liaison and Advisory Groups

It is concluded that there is an ongoing need to continue with community consultation through the establishment of both a Community Liaison Group and a Stadium Management Advisory Committee.

It is strongly suggested that the Community Liaison Group should:

- be representative of all views, interests and concerns in the local area;
- have a committee of about 5 members who are elected and are representative of those views etc;
- be formally incorporated in order for it to receive funds;
- be involved in any monitoring programs on operational matters; and
- receive support from Stadium Management for the maintenance of committee functions.

The functions of the Community Liaison Group would include meeting with stadium management on a regular basis in order to identify particular issues, discuss possible mitigation measures, monitor new initiatives, and to "debrief" after particular events.

The proposed Stadium Management Advisory Committee should be structured to provide effective stakeholder coverage in the ongoing development of the stadium. Its membership should include (but not be restricted to) representation from:

- City Police;
- BCC;
- Emergency Services;
- major user groups (eg QRL, QRU, ARU, ARL);
- a residents' association;
- a local business association;
- a member of the Community Liaison Group; as well as
- stadium management.

The function of the Stadium Management Advisory Committee would be to:

- assist in monitoring the effects of the construction phase on local residents;
- advise on the development of management plans as identified in the EIS;
- contribute to monitoring and evaluating the effectiveness of these management plans and recommend appropriate changes;
- advise on the coordination of local arrangements for Stadium events; and
- advance and promote other matters of mutual interest pertaining to stadium management including interpretation of hospitality management with local licensed venues.

Recommendation 1: That the proponent establish a Community Liaison Group and a Stadium Management Advisory Committee, prior to the commencement of demolition works.

5.1 Land Acquisitions

Land will need to be acquired to accommodate the southern plaza and pedestrian walkways following the Queensland Government's decision that the enhanced mitigation proposal is to proceed. Such acquisitions will also include "air rights" for pedestrian links over Hale Street, Chippendall Street and Milton Road.

Recommendation 2: That the proponent undertake to determine the appropriate legislation to acquire the identified properties and air rights in consultation with the Department of Natural Resources.

NOTE: Other issues affecting State land have been identified by the Department of Natural Resources. The Development Conditions attaching to this report address these issues.

5.2 Planning Issues

The Lang Park re-development is subject to the Brisbane Town Plan 1987. The site is zoned "Sport and Recreation", "Particular Development 92 – in accordance with the Lang Park Trust Act", "Service Trades", "Special Uses (Utility Installation)" and "Particular Development 52 – District Nurses Home". The proposed use of the stadium would be considered as "commercial outdoor sport and recreation", which is subject to an "impact assessable" development application.

Impact assessment confers appeal rights on third parties who have lodged "properly made submissions" to this EIS in respect of those components of the application requiring such assessment.

It is anticipated that the Brisbane City Plan 2000, a new IPA planning scheme, will come into effect in October 2000. The proposed planning scheme identifies the site as "Special Purpose Centres – Major Sporting Stadium" area. It is concluded the proposed use, as a major sports stadium, would be consistent under the Brisbane City Plan 2000 with the future planning intent for the site.

Under the Brisbane City Plan 2000, the proposed development would be subject to a "code assessable" development application. An application subject to code assessment does not confer appeal rights on third parties.

5.3 Noise and Vibration

The EIS concludes that noise levels at the source of earthmoving equipment used during construction would be above background levels. However, the consultants evaluation indicates that for nearby residents this construction noise will be below background levels. The noise impacts for nearby residents will be greatest during "out of hours" construction work.

It is concluded that the enclosed design of the stadium should assist in reducing noise impacts during events below those currently experienced by local residents and businesses. The walkways leading patrons to Milton Station, Roma Street or bus pick-up zones should also mitigate pedestrian noise as these walkways are to be located away from residential zones. Minimal noise impacts are expected from the public transport station located at the southern end of the stadium. Short-term noise impacts are anticipated from any access to the site by emergency helicopters.

NOTE: Noise, vibration and hours of operation issues have been identified by the Environmental Protection Agency. The Development Conditions attaching to this report address these issues.

5.3.1 Fireworks

The noise and smoke from fireworks will potentially impact on the residential areas surrounding Lang Park. The use, frequency and duration of fireworks is an operational issue that will need to be managed by the proponent in consultation with the Community Liaison Group.

The Community Liaison Group is also to be informed of the event schedule for fireworks and other forms of entertainment to ensure that this information is disseminated across the local community.

Recommendation 3: *That the Operation Environment Management Plan manage the use of fireworks, provide for the impacts to be monitored and if there are adverse impacts that the Stadium Management Advisory Committee in consultation with the Community Liaison Group develop strategies to minimise those impacts.*

5.4 Air Quality

The EIS concludes that the only likely operational air quality impact expected is fumes from long distance coaches stored in the non-residential areas immediately to the west of the stadium. This could be alleviated by requesting the drivers of these coaches to delay the starting of the motors for as long as possible.

Air and wind are to be monitored for certain activities and local residents advised of the findings.

Recommendation 4: *That the Operation Environmental Management Plan incorporate a strategy for the delayed starting of long distance coach motors and that it also, together with the Construction Environment Management Plan, monitor air quality and establish appropriate mitigation strategies.*

5.4.1 Dust Suppression

The EIS suggests that standard construction techniques of watering and truck baths are proposed to be used to minimise dust as a result of the construction work undertaken.

Recommendation 5: *That the Construction Environment Management Plan address dust suppression strategies.*

5.5 Flora and Fauna

The EIS concludes that as the area surrounding Lang Park is highly developed, there is a mix of native and exotic flora. Flora on Lang Park itself includes planted trees and shrubs commonly found in the area. There are two fig trees adjacent to the north-west corner of the stadium which are estimated to be in excess of 40 years old but are not covered by a vegetation protection order issued by the BCC.

The EIS identified that the Neal Macrossan Playground has a number of trees covered by a vegetation protection order issued by the BCC including small leafed fig, Queensland blue gum and hoop pine. The Baroona School on Milton Road contains some well established fig and frangipanni trees of cultural heritage value.

In the course of preparing the EIS, nineteen bird species were observed in and around the Lang Park area, none of which are listed in conservation agreements or conventions. According to Queensland Museum and Wildnet data, although not observed, flying foxes, gliders, bandicoots and possums are expected in the vicinity of the site. The above fauna species are typically found in urban Brisbane.

The EIS reports that the areas of greatest flora and fauna impact are expected to be in the grounds of Baroona Special School as one of the pedestrian walkways is to be constructed along the Milton Road side of that facility. All vegetation in Lang Park itself is to be removed with the exception of the fig trees identified in the north western corner which are to be relocated to the northern pedestrian plaza. As a result, the EIS suggests that some fauna species should be able to relocate but the ability of some less mobile species including reptiles, smaller mammals and amphibians to successfully locate new areas of habitat is likely to be limited.

To avoid damage to important vegetation in Milton Road, the EIS concludes that the detailed design avoid root zones. It is also proposed in the EIS to use nesting boxes for a variety of species and the establishment of locally occurring native species in landscaping to assist in minimising the impact on local animals once trees have been removed.

5.6 Heritage and related factors

The EIS reports that prior to urban development in the 1870's, this area was used by the Turrbal people. However, there is no record of it being used for ceremonies by indigenous people. From 1843 until 1900 the site was used as the major burial ground for Brisbane. Most of the headstones and remains have been relocated to the Toowong Cemetery, although several headstones remain as evidence of the earlier use of the site.

The EIS identifies that this area was also formerly used as a rubbish dump. As a consequence of previous uses, the land contamination may comprise warehouse rubbish, garbage, military waste and car bodies. No comprehensive site investigations have been undertaken to date.

NOTE: Contaminated land management issues have been identified by the Environmental Protection Agency. The Development Conditions attaching to this report address these issues.

The lease for the site was granted in 1954 to the Queensland Rugby League. In 1962 the Lang Park Trust Act commenced and has since been amended in 1994. The Trust continues to manage the site and stadium today.

Lang Park is not listed in the Queensland Heritage Register, however, its connection with rugby league and athletics over the years gives it considerable cultural heritage value.

The EIS discusses a number of sites in the immediate surrounding area which are included on the cultural heritage register and which will potentially be visually or materially affected by the proposed new stadium including:

- Christ Church and environs, abutting the site in Hale Street;
- Part of the Baroona Special School property required for the extension of a pedestrian walkway; and
- Former Police Barracks site on Petrie Terrace, part of which is required for the extension of a pedestrian walkway.

There is some concern regarding the potential for structural damage to the adjoining Christ Church (including the memorial reserve and rectory), Baroona Special School and the former Police Barracks. The EIS has recognised the need to undertake a structural audit of the Christ Church.

NOTE: Cultural Heritage and vibration issues have been identified by the Environmental Protection Agency including the development of a Conservation Management Plan for the Church. The Development Conditions attaching to this report address these issues.

The pedestrian flow around the church and via the Hale Street pedestrian plaza could reduce its cultural heritage value. However, the planned pedestrian plaza should restore a connection with Petrie Terrace. The EIS highlights the fact that the effects of overshadowing on the church and cemetery over the winter months is considerable and requires further investigation and discussion with the church administrators.

Recommendation 6: That the proponent establish an on-going consultative relationship with the Christ Church to undertake further investigation and detailed design to seek to minimise the impacts of overshadowing on the church, rectory and memorial reserve.

The noise levels expected during construction and event times could potentially have a detrimental effect on the flexibility of church services available. The proponent should liaise closely with the construction manager to minimise the negative impacts on the church and its congregation.

Recommendation 7: That the proponent provide the Christ Church with the anticipated construction schedule, which is as far as practicable, to be negotiated around church events.

Given the former use of the project site as a burial ground, potential exists to uncover human remains during the construction phase of the project.

NOTE: Cultural Heritage issues have been identified by the Environmental Protection Agency. The Development Conditions attaching to this report address these issues.

Concern has also been expressed that the proposed re-orientation of a classroom building at Baroona Special School and the planned construction of the pedestrian walkway could reduce the school's cultural heritage value unless care is taken to protect the architectural features of the building and the surrounding vegetation.

NOTE: The EPA requires the development of a Conservation Management Plan for the School. The Development Conditions attaching to this report address this issue.

The EIS also concludes that the pedestrian flow through the former Police Barracks site is unlikely to reduce its existing cultural heritage value given it is currently used as a car park site and night clubs immediately surround the site.

The recommended project modifications detailed in the EIS include the removal of the Hogs Breath Café. This building has some historical connections with the former Police Barracks site which is a listed place of cultural heritage significance. Detailed design studies may resolve the need to remove this building or may present a range of interpretive measures to ensure that the historical connection can be observed.

5.6.1 Brisbane Arts Theatre

The Brisbane Arts Theatre is the oldest surviving Arts Theatre in Brisbane and has been operating from its current location since 1936.

The EIS revealed that the proposed parking restrictions on event nights may compromise the viability of the Brisbane Arts Theatre. In particular, Saturday afternoon matinees usually attract a full house, representing a significant source of income for the Theatre. Given the demography of the Theatre's patronage, public transport is unlikely to be an attractive or viable option. The Theatre currently receives complaints from patrons about difficulties in finding parking on event nights at Lang Park.

During the consultation process it was revealed that car parking demand from the Brisbane Arts Theatre impacts upon local streets and that the behaviour of patrons from the theatre restaurant has impacted upon local residents.

As part of a broader mitigation strategy, it has been suggested that theatre patrons be issued with parking permits with theatre tickets to attend performances. Further consultation with the BCC will be required to determine the most appropriate and effective means of controlling car parking in the vicinity of local businesses such as the theatres and restaurants. There is a consultation process associated with the preparation of the local law necessary to implement the parking scheme. The Community Liaison Group and the wider community should be encouraged to participate in this process.

Recommendation 8: That the proponent negotiate an appropriate strategy for the parking of vehicles owned by theatre patrons in consultation with the Brisbane Arts Theatre and the BCC and that the Community Liaison Group monitor the effects of the proposed parking scheme on the theatre during the stadium construction and operation and report its findings to the Stadium Management Advisory Committee and the BCC.

Concerns regarding noise were also raised in the EIS. Disturbances of performances are already experienced on State of Origin evenings at Lang Park. The stage area would need to be soundproofed to prevent noise from events disrupting performances. This has been recognised in discussions between the proponent and the Brisbane Arts Theatre. The acoustic performance of the proposed stadium design is predicted to be a substantial improvement on the existing situation, such that noise nuisance at the theatre should not be as noticeable.

Board members of the Brisbane Arts Theatre felt that the future of the Theatre would be placed under considerable strain unless mitigation strategies were developed and implemented.

Recommendation 9: That the proponent continue to negotiate appropriate noise mitigation strategies with the Brisbane Arts Theatre.

5.6.2 La Boite Theatre

The EIS revealed that the La Boite Theatre is to be impacted by the proposed stadium during its construction and operation. The main concern by theatre management is competition for or restricted access to car parking, similar to the issues raised by the Brisbane Arts Theatre.

The proponent has suggested the possible issue of parking permits with theatre tickets for the duration of a theatre performance that coincides with an event at the stadium. This is similar to the arrangement discussed with the Brisbane Arts Theatre and covered in Section 5.6.1. Such an arrangement would appear to be acceptable to the management of La Boite Theatre. Further consultation with the BCC will be required to determine the most effective means of controlling car parking near the theatres.

It should be noted that car parking by theatre patrons has in the past and will possibly continue to impact upon the local streets of Petrie Terrace to the east of Hale Street.

The operational needs of the La Boite Theatre must be considered in the mitigation and management planning for the stadium redevelopment proposal. The potential impacts upon the La Boite Theatre will need to be resolved.

Recommendation 10: That the proponent negotiate an appropriate strategy for the parking of vehicles owned by theatre patrons in consultation with the La Boite Theatre and the BCC and that the Community Liaison Group monitor the effects of the proposed parking scheme on the theatre during the stadium construction and operation and report its findings to the Stadium Management Advisory Committee and the BCC.

5.7 Visual Amenity

The EIS has identified a number of visual impacts of the proposed stadium. It also predicts that the impacts on the local landscape values and access to vistas from certain localities adjacent to the site are to be significant.

For example, the residential area to the east of Hale Street will loose its views to regional landscape features (eg Mt Coot-tha, southern ranges) and some of the residences lower on the slopes of Red Hill are to have their views through the existing open stadium affected. The proposed stadium could also block some views of the CBD for residential properties to the west (eg Heussler Terrace area).

The EIS suggests that some measures to improve the visual amenity include the location of structural elements under the roof, which itself is reduced to a thin flat plane, the use of screens and a range of materials along the eastern and western facades to reduce the apparent height of the building, and the introduction of design elements relating to the building texture of the surrounding areas.

The visual aspects of the walkways have also been expressed in the EIS as a concern. Appropriate forms of landscaping along the pedestrian routes should be considered to provide visual relief and shade. Landscape concepts should be prepared which concentrate on introducing softer edges to the site and some of the other elements within the stadium proposal.

Other measures in the EIS suggest that the rear portion of the roof could be lowered and split from the main roof structure to reduce the height at the building perimeter, thus reducing the shadow cast by the elevations. The effects of the shadow cast over the Christ Church could be further reduced by cutting the roof back in the south-east corner and by utilising an elevation treatment comprising a glass curtain wall behind the church.

The heritage value of the church is to be affected by the proposed stadium, however the acquisition of land to the south of the church which is currently occupied by light industry and the development of the southern plaza should make the church more prominent from a number of view points.

Recommendation 11: *(a) That the proponent in finalising the master plan and concept design, together with the landscape design, seek to minimise the positive visual impacts of the proposed stadium on the local environs for inclusion with the development application/s to the BCC.*

(b) That the proponent, in consultation with church administrators, prepare a detailed design maximising the use of such alternative materials which would minimise the effects of the stadium on the church and which would also assist to maintain its cultural heritage values.

5.8 Lighting

The existing stadium is a shallow open bowl with lighting from four towers at each corner of the ground with additional lighting on the Ron McAuliffe Stand to the east of the ground. Consequently, this open design results in local residents, particularly in Hale and Castlemaine Streets, experiencing light spills.

The stadium design provides for a roof covering 80% of the stadium and with careful positioning of major light sources under the roof overhang, limited impacts from lighting should be experienced.

The EIS suggests that during construction, there is to be some light spill from security and flood lighting in particular during out of hours construction work. Careful positioning of lighting equipment should assist to minimise those impacts. Construction is proposed to be limited to 6.30am to 6.30pm on week days and 7.00am to 3.00pm on Saturday in keeping with the requirements of the EPA. A monitoring program is to be set in place to assess the impacts of light spill during out of hours construction work.

Recommendation 12: *That the Construction Environment Management Plan address the positioning of security and flood lighting during construction to minimise light spill impacts on surrounding residents.*

5.9 Electricity Infrastructure

There is a need to recognise future planning and infrastructure requirements for electricity supply as the Energex site fronting Milton Road is to be acquired to cater for the extension of the southern plaza. This site is strategically located in relation to a number of substations including the substations servicing the CBD and has potential for the development of a further major substation thereon.

The future planning and infrastructure development requirements for meeting power supply demands in the region should be discussed with Energex during the detailed design stage of the stadium. This could relate principally to the design and siting issues involving the southern plaza.

Recommendation 13: That the proponent discuss with Energex, relocating the originally intended electricity supply infrastructure for the property currently owned by Energex fronting Milton Road (and to be acquired for the stadium) to an alternative location within the redevelopment.

5.10 Stadium Management

The Stadium Management proposal identified in the EIS includes a professional approach to facility management and specifically crowd management. The key features to this approach include:

- Code of Behaviour to be implemented and monitored at all times;
- Evictions and arrests policy to ensure repeat violations of this code is minimised;
- Surveillance by Closed Circuit Television (CCTV) before, during and after events; and
- Strategy to manage the sale and use of alcohol on the premises.

Recommendation 14: That the Operation Environment Management Plan address the matters of crowd behaviour and control through the development of a "Code of Behaviour".

5.11 Parking

The EIS provides for a parking scheme to be implemented over the local area with resident visitor permits and extended stay areas for businesses. Parking arrangements for local theatre patrons were discussed earlier in this report.

The recommended car parking scheme detailed in the EIS is derived from experiences taken from a number of other stadia in Australia and New Zealand, borrowing on those aspects of greatest similarity to the circumstances of Lang Park. There has been extensive consultation on the car parking scheme and the statutory processes which accompany the making of local laws should provide a further opportunity for consultation.

Effective implementation of the car parking scheme is to entail monitoring the effects at the fringes of the controlled area, and monitoring the effects on local business areas. Some submissions have put forward good suggestions for improving the scheme in relation to the local business areas. These suggestions are considered worthy of support and should be discussed with the BCC.

Overall, the EIS suggests that the car parking scheme is considered to be workable, and represents a realistic measure for achieving the multiple objectives.

Recommendation 15: That the proponent continue discussions with the BCC on the refinement of the parking strategy to include monitoring the impacts immediately outside controlled parking zones and surrounding local businesses.

5.12 Transport Strategy

There is no dedicated public transport infrastructure directly servicing Lang Park. The closest railway stations to the stadium are Milton (650m) and Roma Street (1km). There are a range of regular buses that service the local area and the western corridor. Busway stations are planned at Roma Street and Countess Street as part of the Inner Northern Busway project due for completion by 2003.

The public transport strategy proposed in the EIS is based on the Integrated Regional Transport Plan which attempts to reduce the reliance of private vehicles. Under the strategy outlined in the EIS, heavy rail would cater for 44% of patrons (66% Roma Street and 44% Milton Station), 36% on coaches and 20% using private vehicles.

The EIS recognises the need for a strong education and marketing program which should actively encourage patrons to use public transport and the introduction of associated disincentives to deter private vehicle usage and parking in and around the stadium's vicinity.

The strategy is proposed to include event-based parking restrictions in local areas, special train services to/from Milton and Roma Street, direct bus services from regional centres, shuttle buses, charter coaches and taxis. An integrated ticketing system is proposed to be implemented for public transport and event entry, and pre-event publicity on parking restrictions and transport options available.

As a result of the deferment of the Brisbane Light Rail project, the conclusions drawn in the EIS remain valid such that a workable transport system can be provided to the Lang Park Stadium without light rail. Detailed transport and pedestrian planning and operational design of a "no light rail" transport strategy should now be conducted by Queensland Transport.

Recommendation 16: That the proponent continue to negotiate with Queensland Transport regarding the transport strategy excluding the light rail. This strategy is to include consideration of a strong education and marketing program and an integrated ticketing system.

5.13 Transport Infrastructure

The EIS concludes that the Roma Street Station's existing transport infrastructure is considered adequate to manage event crowds. Milton Station is expected to carry an increased volume of patrons and will require enhanced platform capacity and improved pedestrian access.

New structures suggested in the EIS include:

- Bus and coach facilities, including an 11 bay bus station under the southern pedestrian plaza for shuttle services to the CBD;
- Pedestrian route improvements surrounding the stadium and linking to Roma Street and Milton railway stations;
- Bus priority measures on Milton Road and Upper Roma Street on the route between the stadium and the CBD;
- Suitable facilities at the planned Countess Street busway station;
- Taxi facility in Castlemaine Street to the north Heussler Terrace intersection;
- Passenger set down facility in the northern plaza; and

- On-site carpark (200 capacity), including parking for the disabled.

5.14 Traffic

Lang Park is located in close proximity to two major arterial roads; Hale Street and Milton Road carrying 45,000 and 50,000 vehicles per day respectively. This traffic volume is expected to increase once the BCC's Inner City Bypass is completed in 2002. Milton Road already experiences congestion during peak hour traffic at a number of intersections. The stadium is also accessible from commercial areas such as Caxton Street, Given Terrace and Castlemaine Street. Many small residential streets in the area could potentially be used to access the stadium which could cause further traffic disruption during events at Lang Park.

The EIS provides for special traffic arrangements to be made to assist in minimising the local impacts of traffic congestion caused by on-street car parking for residents during major events at Lang Park. Over fifty percent of event patrons currently use private vehicles to travel to Lang Park. The most significant form of public transport used is rail, predominantly from Milton Station. For major events, 30% of patrons come from outside the Brisbane area. Buses are also an important mode of transport to Lang Park including shuttle buses, local buses and charter buses for regional areas. The existing set down areas for buses are kerbside locations in and around the stadium. The EIS suggests that an overflow of coach parking from the preferred area immediately to the west of the stadium could occur in the non-residential area accessed via Cribb Street. Coach parking in this area should not involve street closures and the street would remain open to normal traffic.

Considerable conflict and pedestrian congestion occurs after games due to inadequate footpaths to carry the volume of pedestrians particularly along the eastern boundary of the site, along Milton Road toward the CBD and around the station, and along Upper Roma Street to the CBD. Pedestrian spill over often occurs on traffic lanes on Milton Road and Upper Roma Street. This causes further traffic congestion and significant safety issues.

The preparation of a Traffic Management Operational Plan, Parking Management and Enforcement Operational Plan and Public Transport Operation Management Plan can alleviate these impacts.

Recommendation 17: That the proponent develop a Traffic Management Operational Plan, Parking Management and Enforcement Operational Plan and Public Transport Operation Management Plan in consultation with the BCC.

5.14.1 Construction Traffic

Possible construction traffic routes have been identified in the EIS, however a detailed plan indicating the haulage and vehicle movements and preferred routes have not been determined but are to be identified in the detailed design of the project.

Delivery routes and road conditions are to be designated and road conditions monitored with regard to noise impacts along Milton Road, Castlemaine Street, Hale Street and Coronation Drive. Local residents are to be advised of all late night deliveries.

***Recommendation 18:** That the proponent develop a Construction Traffic Management Plan in consultation with the BCC. The plan should limit delivery times during peak hour traffic flows in the area, determine means to reduce noise impacts of late night deliveries and determine appropriate shuttle bus transfer parking locations for construction personnel.*

5.14.2 Local Traffic

As Caxton Street is intended to provide pedestrian access post major event, the re-routing of the local bus service using Caxton Street is possible. The proposal as outlined in the EIS does not require any further road closures around the stadium that would impact on local buses. There could be potential for delays to bus services in the area of approximately one hour before and after events. However, it is noted in the EIS that the contra-flow bus priority lane on Upper Roma Street proposed to be constructed in conjunction with the stadium proposal should improve bus operations into the CBD.

The EIS concludes that a private vehicle set-down area within the northern plaza should assist to alleviate traffic congestion on Caxton Street and minimise the use of residential streets for this purpose.

Concerns were raised during public consultation on the vulnerability of local streets in the vicinity of Isaac Street for use by set-down and pick-up traffic particularly traffic approaching from the west. However, the EIS concludes that the barricading of these streets would represent a very restrictive measure which may impinge adversely on accessibility for residents.

The use of "No Standing" restrictions on vulnerable street sections in this precinct, where residential kerbside parking is not likely to occur should be examined further. The identification of temporary set-down/pick-up zones on Cribb Street to cater for western traffic could also be incorporated in this detailed plan.

The EIS also identified the Castlemaine Street – Milton Road intersection as in need of further examination to improve traffic flow. The development of the southern plaza provides this opportunity.

***Recommendation 19:** That an Operation Traffic Management Plan identify further temporary set-down/pick-up zones eg Cribb Street and include provision for further investigation and monitoring of the Castlemaine Street – Milton Road intersection for the purposes of developing an improved intersection to facilitate increased traffic flow.*

5.15 Pedestrian Walkways

The concerns raised in public consultation in relation to the pedestrian walkways relate to the possible safety risks associated with their use outside event times.

The safety concerns are recognised and the EIS suggests that these need to be considered further in the detailed design phase including the adoption of the principles of Crime Prevention Through Environmental Design (CPTED) for the walkways and pedestrian plazas. Any section of the walkway system and the plazas which cannot attain an acceptable level of public safety outside event times, should be closed to public use during those times.

The EIS also concludes that the urban design of the walkways and plazas should also take into account the potential visual impacts. The plazas especially should be designed to be open, attractive and friendly places to which the community can come for wider forms of recreation as well as to events at the proposed stadium.

Recommendation 20: That the proponent undertake further investigations in consultation with the BCC and the Community Liaison Group to ensure that the walkways and the southern and northern plazas are designed and constructed in full recognition of CPTED principles.

Concerns expressed in the EIS relating to the visual impact of the pedestrian walkways, particularly along Roma Street are also noted. Further design work to improve the appearance of the walkways is needed (refer to Section 5.9 in regard to landscaping).

5.16 Emergency Services and Public Safety

Road closures could potentially restrict access to local streets in emergency situations during the construction period. The EIS suggests that the Construction Manager should liaise with the BCC to ensure the availability of emergency vehicle access to local streets and adjacent areas.

Recommendation 21: That the Operation Environment Management Plan ensure that provision is made for emergency vehicle access to the area surrounding Lang Park at all times.

A number of submissions drew attention to public safety issues such as a spill over of loud and possibly inebriated patrons in the residential areas looking for their cars or waiting for taxis on Castlemaine Street. The perceived risk to public safety on the pedestrian walkways (discussed in Section 5.17 above) was also a concern.

Some of the strategies to limit local residents' exposure to the potential anti-social behaviour of patrons include:

- quickly moving patrons away from the area using public transport from the southern plaza which isolates them from nearby residents;
- controlling alcohol consumption during the game; and
- maintaining 24 hour surveillance cameras on walkways with direct reporting to City Police.

Details of crowd control have been covered in Recommendation 14.

5.17 Waste Management

Potential exists during construction for soil erosion and sedimentation, however, standard techniques are to be implemented to control its extent. The EIS suggests that a site Waste Management Strategy be established.

The EIS also highlighted the fact that during preparatory earthworks and demolition, there is potential for contaminated leachates and residues from landfill to be released.

The levels of nutrient enrichment from run-off waters and their impacts on surface and ground water is expected to be similar to other sporting facilities of this type. The EIS notes that a reduction from the current levels of runoff from the existing stadium is anticipated due to the extended roof and removal of landfill. Monitoring of runoff and groundwater conditions is to be undertaken to detect such impacts.

Recommendation 22: That the Construction and Operation Environment Management Plans provide for the monitoring of the water quality of groundwater and drainage with regard to leachate.

The consultation phase highlighted the need for a Pest Management Strategy to be developed to prevent the breeding of mosquitos and other biting insects, general insect pests and vermin given the number of food outlets proposed in the stadium and its close location to surrounding residential areas.

NOTE: Pest management issues have been identified by the Department of Health. The Development Conditions attaching to this report address these issues.

5.18 Socio-Economic

5.18.1 Social Impacts

There has been considerable objection to the socio-economic impacts of the proposed development on local residents. These issues have been appropriately addressed in the EIS Volume 8 Addendum Report.

The community consultation program also indicated that a number of local community members were in support of the project and actively participated in the developmental stages of the proposal.

Parking restrictions are proposed to be in place to assist in the reduction of the number of patrons using private vehicles and hence the number of patrons roaming the local neighbourhood and traffic congestion leaving the stadium.

There is some concern that parking restrictions will not work to deter private vehicle use which may result in local residents having to plan their activities around event times to a greater extent than they currently do.

Rubbish bins are also proposed to be located along the pedestrian walkways and a clean-up program is proposed to address the potential for litter in the nearby residential areas and walkways to public transport facilities.

No new retail outlets are expected to develop as a result of the proposed stadium. Restaurants and cafes may expect to experience a change in activity patterns of patrons due to the parking restrictions that may coincide with busy Friday and Saturday night trading.

The EIS notes that the temporary closure of Castlemaine Street may result in businesses located in this area suffering a reduced number of customers. Staff employed in those businesses may not be able to park close to their workplace during events. This should be further examined as part of the event parking strategy to be developed in consultation with the BCC.

Shuttle buses to off-site car parks are planned to be available and on-site parking is to be provided for up to 180 event staff.

5.18.2 Economic Impacts

The EIS notes that during construction, the proposed stadium should create 496 direct jobs and up to 836 associated jobs. During operation the project should create 15 full-time jobs and up to 400 part-time and casual jobs for events. Economic studies undertaken as part of the EIS indicate that new direct income for Queensland of $25million per major event could result from the proposed stadium redevelopment.

The EIS suggests that land and property rental values have been steadily increasing in the study area. The proposed stadium is not expected to have a significant influence on the long-term trend of increasing inner city residential property values, as architecturally the structure and immediate surrounds of the new stadium are to be better designed and visually more appealing than the existing facility.

There are three shopping precincts within a 300-metre radius. Cafes/restaurants, bars/hotels and specialty shops on Petrie Terrace and Given Terrace should benefit from event patrons while those businesses on Park Road and at Rosalie may receive some spill-over trade. However, there is a need to monitor parking restrictions on main roads and residential streets to ensure there are no adverse trading effects being experienced by these businesses on event days.

The EIS concludes that the Lang Park Stadium proposal could potentially enhance non-residential property values by encouraging higher value land uses that can exploit the inherent advantages of the area in terms of location, accessibility and existing profile as a specialty shopping/dining/entertainment precinct.

Properties involved in lower valued land uses (the workshops and warehouses in Chippendall Street) are to be resumed for the construction of the southern plaza. In the short term, this could mean a loss of business activity and jobs from the local area. However, these businesses are likely to be replaced by stadium-related activities.

5.19 Community Consultation Program

A preliminary community consultation program was undertaken in December 1999 and concluded in February 2000. One hundred submissions were received in relation to the TOR for the project. All comments were considered in finalising the TOR.

The EIS team undertook further extensive consultation. This involved workshops, consultation clinics, individual interviews with local residents, focus group discussion, newsletters, an information telephone line and a survey of local and Greater Brisbane residents. The work involved is considered to be in excess of that normally undertaken to meet statutory requirements.

Some community members expect that some of the current impacts (noise impacts and light spillage) may be improved by the proposed redevelopment and the proposal is to provide better quality facilities, more coherent pedestrian links, increased exposure for some businesses, and improved public transport options. The proposal may also provide a wider community benefit in terms of attracting better games and increasing the profile of sports.

It was also recognised in the EIS that events at a new Lang Park Stadium would be larger and more frequent than for the current stadium with the inevitable swell of people in and out of the suburb and that this could intensify current impacts such as traffic congestion, pedestrian flows, litter and pedestrian noise. Many residents are seriously concerned that the redevelopment is likely to have negative effects on their quality of life.

6. SUMMARY OF POSITIVE AND NEGATIVE IMPACTS

6.1 Positive Impacts of Proposed Redevelopment

The positive impacts of the Lang Park Stadium Proposal are expected to include infrastructure, economic and social benefits. These benefits are:

- increased capacity from 40,000 patrons to 52,500 patrons in individual seating, with approximately 80% of seats under cover of the roof.
- the expected economic benefits of the construction phase include approximately 496 jobs associated with direct income of $60 million. Special events at the proposed stadium, such as a Bledisloe Cup rugby union match, could result in economic benefits to Queensland in the order of $25 million.
- the proposed stadium is to provide vastly superior patron seating and viewing conditions, facilities, comfort, safety and levels of accessibility when compared with the existing stadium, and other venues in Brisbane.
- the increased capacity and vastly improved patron and hirer facilities and accessibility should position the proposed stadium as an attractive venue for a number of major events. These could include the Bledisloe Cup for rugby union internationals played between Australia and New Zealand and possibly soccer internationals, in addition to the rugby league internationals already held at the existing facility.
- the implementation of the public transport strategy and the provision of transport infrastructure is to result in substantial improvements in the accessibility of the proposed stadium. Benefits that would result from the proposed improvements to the transport infrastructure include:
    - convenient and accessible pedestrian linkages to the CBD and to Milton Station. These linkages should provide benefits to the local residents, provided that public safety issues are addressed in the detailed designs;
    - improvements to Milton Station, with benefits for everyday commuter use;
    - a bus station at the southern end of the proposed stadium is to represent a significant improvement to current provisions for bus travellers to Lang Park. Bus operations concentrated in this location have a minimal impact on road network efficiency;
    - Countess Street bus station facilities which should provide the local community with a quality busway station earlier than programmed;
    - improved pedestrian accessibility and safety between the proposed stadium and transport nodes;

- upgraded pedestrian routes for local community use and accessibility generally to the CBD and Southbank; and
- the provision of a contra-flow bus lane on Upper Roma Street, and associated bus-priority and pedestrian improvements at the intersection of Upper Roma Street/Milton Road/Petrie Terrace to the proposed stadium yield travel benefits for public transport vehicles for both stadium and general use.

- noise levels from events in the proposed stadium are predicted to be substantially improved on the existing facility and are considered to be acceptable;
- stadium lighting impacts are to be substantially improved on the existing facility and should be limited to a reflected glow from the pitch, with all lighting suspended within the arena and beneath the roof line, noting that security lighting and pedestrian lighting, if properly designed and installed, should not impact on adjoining properties;
- there are not expected to be any adverse impacts on air quality arising from the proposed stadium, noting that fireworks displays are of short duration and, with appropriate management, can be largely contained within the stadium;
- substantial improvement with car parking in the local street network with the effective implementation of the recommended parking control scheme;
- substantial improvement in the standard of crowd behaviour inside and outside the proposed stadium with the effective implementation of the recommended code of behaviour and the managed sale of alcohol;
- the provision of a pedestrian plaza over Hale Street is to have a beneficial impact on the Christ Church by making it more accessible, more visible, and by restoring its links back to the historic Petrie Terrace residential area;
- providing the principal address of the proposed stadium to the southern end and shifting the focus from the Caxton Street interface with the residential areas of Paddington and Red Hill;
- achieving improved control and management in pedestrian movements to and from the proposed stadium, such that surges and crowding should be able to be better managed and minimised;
- providing improved functionality for the integrated transport station and Milton Station;
- providing enhanced public spaces are to be available for community use outside event times;
- achieving high standards in urban design, particularly adjacent to the Christ Church precinct, Baroona Special School, the former Police Barracks at Petrie Terrace, and along the pedestrian walkways linking the proposed stadium with the CBD, Roma Street and Milton Station; and
- mitigating cultural heritage impacts by more effectively restoring the Christ Church precinct connections with the Petrie Terrace area and presenting the former Police Barracks site in an attractive public setting.

6.2 Negative Impacts of Proposed Redevelopment

The negative impacts of the Lang Park Stadium Proposal during construction are defined as follows:

- noise from plant and equipment if operated outside the standard work hours (6.30 am to 6.30 pm on weekdays and 7.00 am to 3.00pm on Saturdays), noting that background noise levels measured in the locality of the site are for the most part higher than the predicted noise levels from nominated plant and equipment;
- noise impacts could arise from heavy vehicles making special, over-night deliveries of major construction items;
- without adequate control and management, air quality impacts, particularly from dust, have the potential to extend across the immediate locality;
- traffic impacts from heavy vehicles accessing the site could affect Castlemaine Street and Milton Road, such that road surfaces may require regular maintenance and traffic management for early morning deliveries of major items will be required;
- without adequate control, construction workforce car parking could impact on the local street network;
- without effective site management and liaison, construction could impact severely on the activities of the Christ Church community with regards to access, noise, vibration, and dust;
- the cultural heritage values of Christ Church and the Baroona Special School could be affected by inappropriate construction techniques leading to structural damage, or irreparable damage to the setting of these places;
- without effective site management and liaison, the construction impacts set out above could severely affect the amenity and lifestyle of the residents of the immediate locality.

The negative impacts of the Lang Park Stadium Proposal during operation are defined as follows:

- potential widespread parking problems in local streets, including blocked or constrained access to streets and private properties and local businesses;
- widespread social impacts caused by inappropriate and offensive behaviour by patrons as they move through the local streets before and after the event;
- anti-social behaviour from patrons of Caxton Street and Given Terrace licensed premises well after the completion of an event when Police resources have left to attend other areas;
- excessive noise breakout from crowd noise, pre-match entertainment and the public address system;
- excessive intrusion from light spill, with particularly severe conditions for matches requiring lighting standards for television broadcasting;
- occasional use of helicopters for live broadcasting purposes;

- occasional noise impacts from crowds moving along the pedestrian walkways back to the CBD, where such impacts are likely to be most noticeable on the three residential buildings along Milton Road between Hale Street and Petrie Terrace;
- the over-shadowing of the Christ Church by the roof of the proposed stadium is to have an adverse impact on the utility, and the cultural heritage values, of the church;
- the visual impact of the proposed stadium upon the residential area immediately to the east of Hale Street is to be adverse and not readily mitigated, such that the proposed stadium could present a façade of overwhelming length, height and bulk; and
- the increased frequency of events at the proposed Lang Park Stadium is to impact adversely on some of the residents of the immediate locality because of:
  - the operation of the controlled parking scheme;
  - the crowds moving along the major thoroughfares during commuter times (for mid-week games);
  - the incidence of drunken behaviour well after events as patrons leave nearby bars and hotels, noting that such behaviour occurs at least twice weekly whether or not an event is staged at Lang Park; and
  - the change to the built environment and the loss of views presently available to some residents.

The traffic and transport impacts of the proposed stadium transport strategy are:

- the proposed controlled parking scheme is to impact on patrons and employees of businesses in the area who wish to park in the street for longer than 2 hours during an event and on businesses located in residential streets;
- regular rail services are to be more heavily utilised in conjunction with events and special train services should be required;
- provision of pre-event special direct bus services and shuttle services are to require use of some reserve buses from the Brisbane Transport fleet for events that coincide with commuter peaks;
- there is to be minimal overall impact on the regional road network however, there is to be localised congestion at the Milton Road/Cribb Street intersection before and after major events. Police control will be used to resolve traffic and pedestrian priorities at this and other key locations. Local traffic congestion is not forecast to occur on a widespread basis as experienced currently for major events;
- the management of traffic use of Caxton Street between Petrie Terrace and Hale Street both prior to and after events to provide pedestrian access improvements could possibly result in delays for local traffic for short periods;
- the proposed Caxton Street temporary traffic/pedestrian traffic management is to impose restrictions on accessibility to frontage properties. Accessibility for streets in the precinct south of Caxton Street such as between Petrie Terrace and the Hale Street service road including Chapel Street, Judge Street and Weetman Street would be maintained, although more difficult, during all events;

- the continued use of local streets west of Lang Park for coach parking may result in some adverse impacts on nearby residential local areas due to coach movements via Heussler Terrace post-event;
- the continued provision of a taxi rank on Castlemaine Street may result in some adverse impacts on nearby residences post-event due to the period of operation; and
- on-site car parking and access arrangements are to be improved compared to the current situation.

There are only a few impacts expected as a consequence of the development of the southern plaza. These impacts include:

- the economic and social losses caused by the resumption or acquisition of the existing businesses in Chippendall Street;
- the creation of a large public space which might not be used all of the year;
- the need for additional security to ensure that petty crime and vandalism does not arise in and around this space;
- the potential to attract undesirable elements in the absence of effective policing of the area;
- possible loss of views to Christ Church arising from the construction of bridges over Milton Road; and
- overly exposing the Christ Church to views and public interaction such that the privacy and spirituality of the place would be diminished.

7. CONCLUSION

The *State Development and Public Works Organisation Act 1971* states that the Coordinator-General must have regard to detailed information about the project, relevant planning schemes, the potential effect of the project, the level of investment necessary and the strategic significance of the project when considering the EIS process and outcomes. The Coordinator-General must also have regard to comment received in respect of draft Terms of Reference for an EIS and must accept properly made submissions in respect of an EIS.

Having regard to the extensive documentation and information provided to me, I consider the EIS prepared for the Lang Park Stadium Redevelopment to be a comprehensive, well researched and presented document that very effectively meets the requirements of the Queensland Government for impact assessment in accordance with the provisions of section 29 of the *State Development and Public Works Organisation Act 1971*.

I am convinced that the environmental impact assessment process undertaken in this instance will result in best practice environmental design leading to an acceptable outcome for the redevelopment of the stadium. However, it is essential that the recommendations of this report and the development conditions attached thereto be followed by the proponent in the development of the new stadium.

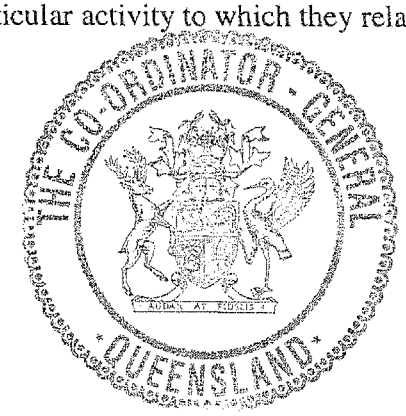
This report will be forwarded to the BCC, as stipulated in S29P of the *SDPWOA*, for consideration with the proponent's development application, pursuant to the *IPA*.

8. APPROVALS REQUIRED

Attachment 4 includes details of the approvals that will need to be obtained prior to the commencement of the particular activity to which they relate.

[redacted]

Ross Rolfe
Coordinator-General



ATTACHMENT 1: Summary of the Coordinator-General's EIS Assessment Report Recommendations

Recommendation 1: That the proponent establish a Community Liaison Group and a Stadium Management Advisory Committee, prior to the commencement of demolition works.

Recommendation 2: That the proponent undertake to determine the appropriate legislation to acquire the identified properties and air rights in consultation with the Department of Natural Resources.

NOTE: Other issues affecting State land have been identified by the Department of Natural Resources. The Development Conditions attaching to this report address these issues.

Recommendation 3: That the Operation Environment Management Plan manage the use of fireworks, provide for the impacts to be monitored and if there are adverse impacts that the Stadium Management Advisory Committee in consultation with the Community Liaison Group develop strategies to minimise those impacts.

Recommendation 4: That the Operation Environmental Management Plan incorporate a strategy for the delayed starting of long distance coach motors and that it also, together with the Construction Environment Management Plan, monitor air quality and establish appropriate mitigation strategies.

Recommendation 5: That the Construction Environment Management Plan address dust suppression strategies.

Recommendation 6: That the proponent establish an on-going consultative relationship with the Christ Church to undertake further investigation and detailed design to seek to minimise the impacts of overshadowing on the church, rectory and memorial reserve.

Recommendation 7: That the proponent provide the Christ Church with the anticipated construction schedule, which is as far as practicable, to be negotiated around church events.

Recommendation 8: That the proponent negotiate an appropriate strategy for the parking of vehicles owned by theatre patrons in consultation with the Brisbane Arts Theatre and the BCC and that the Community Liaison Group monitor the effects of the proposed parking scheme on the theatre during the stadium construction and operation and report its findings to the Stadium Management Advisory Committee and the BCC.

Recommendation 9: That the proponent continue to negotiate appropriate noise mitigation strategies with the Brisbane Arts Theatre.

Recommendation 10: That the proponent negotiate an appropriate strategy for the parking of vehicles owned by theatre patrons in consultation with the La Boite Theatre and the BCC and that the Community Liaison Group monitor the effects of the proposed parking scheme on the theatre during the stadium construction and operation and report its findings to the Stadium Management Advisory Committee and the BCC.

Recommendation 11: (a) That the proponent in finalising the master plan and concept design, together with the landscape design, seek to minimise the positive visual impacts of the proposed stadium on the local environs for inclusion with the development application/s to the BCC.

(b) That the proponent, in consultation with church administrators, prepare a detailed design maximising the use of such alternative materials which would minimise the effects of the stadium on the church and which would also assist to maintain its cultural heritage links.

Recommendation 12: That the Construction Environment Management Plan address the positioning of security and flood lighting during construction to minimise light spill impacts on surrounding residents.

Recommendation 13: That the proponent discuss with Energex, relocating the originally intended electricity supply infrastructure for the property currently owned by Energex fronting Milton Road (and to be acquired for the stadium) to an alternative location within the redevelopment.

Recommendation 14: That the Operation Environment Management Plan address the matters of crowd behaviour and control through the development of a "Code of Behaviour".

Recommendation 15: That the proponent continue discussions with the BCC on the refinement of the parking strategy to include monitoring the impacts immediately outside controlled parking zones and surrounding local businesses.

Recommendation 16: That the proponent continue to negotiate with Queensland Transport regarding the transport strategy excluding the light rail. This strategy is to include consideration of a strong education and marketing program and an integrated ticketing system.

Recommendation 17: That the proponent develop a Traffic Management Operational Plan, Parking Management and Enforcement Operational Plan and Public Transport Operation Management Plan in consultation with the BCC.

Recommendation 18: That the proponent develop a Construction Traffic Management Plan in consultation with the BCC. The plan should limit delivery times during peak hour traffic flows in the area, determine means to reduce noise impacts of late night deliveries and determine appropriate shuttle bus transfer parking locations for construction personnel.

Recommendation 19: That an Operation Traffic Management Plan identify further temporary set-down/pick-up zones eg Cribb Street and include provision for further investigation and monitoring of the Castlemaine Street – Milton Road intersection for the purposes of developing an improved intersection to facilitate increased traffic flow.

Recommendation 20: That the proponent undertake further investigations in consultation with the BCC and the Community Liaison Group to ensure that the walkways and the southern and northern plazas are designed and constructed in full recognition of CPTED principles.

Recommendation 21: That the Operation Environment Management Plan ensure that provision is made for emergency vehicle access to the area surrounding Lang Park at all times.

Recommendation 22: That the Construction and Operation Environment Management Plans provide for the monitoring of the water quality of groundwater and drainage with regard to leachate.

ATTACHMENT 2: The Coordinator-General (Concurrence Agency) Development Approval Conditions.

A. PRIOR TO DEVELOPMENT APPLICATION

1. That the proponent commit to developing the project in accordance with the Queensland Government's preferred Mitigation Strategy (enhanced southern plaza proposal) and incorporate the further impact mitigation issues identified through the EIS process into the ongoing detailed design of the stadium and the supporting transport infrastructure.

2. That the proponent pay a levy and fee for building and construction work to the Department of Employment, Training and Industry Relations in compliance with the Building and Construction Industry (Portable Long Service Leave) prior to the lodgement of a development application under the IPA.

B PRIOR TO COMMENCING OR UNDERTAKING WORKS

3. That the proponent prepare a Site Management Plan (SMP) and that this be approved by the Environmental Protection Agency (EPA) in accordance with Part 9B of the Environmental Protection Act (EP Act) 1994 prior to any demolition or construction works being conducted on the site,

(a) In order to have a SMP approved, the proponent is required to provide sufficient information in accordance with Part 9B of the EP Act and the draft Guidelines for the Assessment and Management of Contaminated Land in Queensland (DEH, 1998) to the EPA at least 60 days prior to the commencement of demolition; and
(b) The SMP is to specifically address the management of contaminated land issues during demolition, construction and post construction, including the works involving the removal of any contaminated soils.

4. That the proponent comply with the approved Site Management Plan before commencing or undertaking works in relation to the development, the subject of the application, and at all times thereof while the use continues and the land, the subject of the application is on the Environmental Management Register (EMR).

5. That the proponent undertake a cultural heritage survey in order to identify places and items of the Queensland Estate which may be impacted on before commencing works in relation to the redevelopment of the stadium site. A permit to undertake such a survey should be applied for pursuant to the provisions of the Cultural Record (Landscapes Queensland and Queensland Estate) Act 1987. A Cultural Heritage Management Plan is to be prepared to the satisfaction of the EPA and implemented as part of the Construction Environment Management Plan to avoid or minimise such impact.

6. *That the proponent carry out an audit of the structural condition of all structures on the Christ Church site and the Baroona Special School site before commencing any works. Similarly, a post construction audit of these structures is to be undertaken and a report prepared detailing any impact that has occurred to the structures. A copy of the report is to be provided to the Cultural Heritage Branch of the EPA.*

7. *That the proponent prepare Conservation Management Plans for the Christ Church site (including the rectory and graveyard) and the Baroona Special School site before commencing or undertaking works which would impact on these sites.*

8. *That the proponent note that if blasting is to occur, the effects of airblast overpressure on the structural integrity of structures on the Christ Church and Baroona Special School sites are to be predicted. Mitigation measures to minimise effects should be detailed in the Construction Environment Management Plan.*

9. *That the proponent establish, prior to the commencement of works, vibration criteria for heritage listed buildings which protect the structures from vibration related impacts.*

10. *That the proponent conduct and anaylyse, a baseline vibration survey at Christ Church and the Baroona Special School and sources of background vibration should be identified before commencing works in relation to the development.*

11. *That the proponent consult with the Department of Natural Resources on any issues involving the construction of structures above or below State land, including the road network.*

12. *That any application made by the proponent to the Department of Natural Resources to close road areas in strata be submitted in consultation with the Department of Natural Resources and contain the name(s) in which a lease in strata would be held and payment of any annual rental.*

13. *That the contractors responsible for the development at Lang Park be advised that as a requirement of the Queensland Government's "Breaking the Unemployment Cycle",*

    (a) 10% of the workforce on building and construction sites must be undertaken by apprentices, trainees or cadets engaged in structured training; and
    (b) compliance with the Queensland Code of Practice for the Building and Construction Industry which establishes minimum standards for training, safety and industrial relations in the industry and encourages best practice and value adding activity

14. *That the proponent develop and provide shade and protected queuing areas for entry and egress, footpaths, bridges and walkways.*

15. *That the proponent provide directional signs, notices and communication devices for emergency use by patrons.*

16. *That the proponent adopt the Queensland Government's Local Industry Policy and that full compliance be observed during the construction of the stadium. Further information is available from the Department of State Development.*

C DURING DEMOLITION AND CONSTRUCTIONCONSTRUCTION

17. *That the standard work hours for demolition and construction noise are to be limited to the hours between 6.30am and 6.30pm six days a week. No demolition or construction work to be carried out on Sundays and Public Holidays.*

18. *That the maximum adjusted sound pressure level (LAmax,adj) measured 4m from the façade of a noise sensitive place, over any period not less than 15 minutes when construction and/or demolition is in progress, must not exceed the background noise level measured as LA90, also over 15 minutes by more than 10 dBA.*

19. *That the proponent monitor ground vibration from construction activities such as blasting (if it occurs), piledriving, jackhammering and rock drilling at Christ Church and the Baroona Special School and compare this data with the criteria in Condition 9 and with the data from the baseline vibration survey established by Condition 10.*

D PRIOR TO COMMENCEMENT OF USE

20. *That the proponent ensure that the design and fit-out of all food catering outlets proposed are compliant with the Food Act 1981 and the Food Hygiene Regulation 1989.*

21. *That the proponent ensure all catering contractors are competent in food handling and that each develop and implement food safety programs compliant with the Food Act 1981.*

22. *That the proponent ensure the development of an integrated pest management strategy to prevent the breeding and harbourage of mosquitos and other biting insects, general insect pests and vermin to the satisfaction of the Department of Health.*

23. *That the proponent develop a strategy for restrictions on the supply and consumption of alcohol and tobacco and the provision of "Alcohol Free and Tobacco Free Zones" in the Stadium.*

ATTACHMENT 3: Responses to EIS

SUBMITTER BY GENERIC ISSUE

	Amenity	Community	Construction & Operation	Consultation Process	Cost	Cultural Heritage	Design	Economic	EIS & Assess Process	Environmental	Flora & Fauna	Mitigation Measures	Noise, Vibration & Light	Safety	Site Select & Project Justification	Town Planning	Transport, Traffic & Access
1. Ken Fraser		X															
2. Moffat & Norman																	X
3. James Meehan		X													X		X
4. Ellen O'Reilly													X	X	X		X
5. DNR		X															
6. Michael Yeates																	X
7. Terence Gill															X		
8. NP Assoc of Qld		X									X		X				X
9. CONFIDENTIAL																	X
10. DATSIPD		X															
11. Cent Hlth & Sports															X		
12. D Emerg Services			X														
13. QPS														X			X
14. G'borough & C'ello	X	X						X					X		X		X
15. Christ Church	X	X				X							X				X
16. Baroona ALP	X												X	X		X	X
17. P Tce Res Assoc		X	X	X	X										X	X	X
18. CONFIDENTIAL			X														
19. CONFIDENTIAL		X		X					X								
20. Sally Grimes	X		X	X	X						X		X	X	X		X
21. B & L Johnson	X	X											X				X
22. Dept of Education			X											X			
23. R & D Burns		X			X										X		X
24. F Burns		X			X										X		X
25. QP-CYWA		X												X			X
26. D Turnbull		X			X				X			X			X		X
27. B Purdon		X			X										X		
28. People for Padd'ton	X	X	X			X			X			X	X		X		X
29. RAPI (Qld)		X			X	X	X		X			X		X	X		X
30. QUT	X						X							X	X		X
31. S Fihelly															X		X
32. Dept of Housing													X	X		X	X
33. EPA			X			X				X			X				X
34. A Reid		X		X	X	X						X	X	X	X		X
35. Dept of Health			X						X					X			
36. R Groves		X			X	X	X		X					X	X		X
37. AIUS	X	X					X							X			X
38. B'bane Arts Theatre													X		X		X
39. M Christensen		X										X					X
40. G Aitchison	X	X				X	X	X	X		X	X	X		X	X	X
41. E M Exley					X	X									X		
42. M Shepherdson		X															X
43. DMR (no issues)																	
44. La Boite		X											X				X
45. D Scott	X	X													X		X
46. A Sinnamon															X		X
47. Property Cl Aust					X			X					X		X		X
48. Cr Hinchliffe	X																X
49. DETIR								X									
50. J Cannon	X			X	X	X			X					X	X	X	X
51. RAIA		X				X	X		X			X					X
52. P'ton Traders Assoc			X	X										X			X
53. Anthony Johns Grp																	X
54. BCC		X	X			X	X	X	X	X	X	X	X		X		X
	12	27	10	6	12	11	7	5	10	2	4	8	16	15	25	5	40

ATTACHMENT 3:Responses to EIS

PLANNING

(a) Strategic Planning

- Stronger links between City West vision, Town Plan 1987, draft City Plan and SEQ (RFGM) Regional Framework for Growth Management; and
- No coverage of stadium in relation to other major project including Roma Parklands and Inner Northern Busway.

(b) Planning Processes

- Should cover possibility of ministerial call in;
- Public notifications on code vs. impact assessment;
- Should be an opportunity for BCC to request more information other than in decision stage due to formative nature of proposal, allowing more room for public consultation; and
- The level of impacts identified for the proposal indicates site proposal is wrong.

(c) Local Planning Issues

- Comment on compliance with maximum building height and maximum plot ratios with reference to BCC Centres Code, also comment in relation to Centre Design Code Performance Criteria (sic) 6;
- Church, school and Hogs Breath proposals need another look re town plan;
- Include uses within the stadium for other interest groups;
- Revise assessment that urban character impacts will be offset by community amenity benefits;
- Should ensure that northern plaza is dedicated as park land;
- Funding for open space options throughout Paddington/Red Hill/Petrie Terrace; and
- Upgrade Ithaca Pool.

(d) Urban Design Issues

- Reconsider impact of scale of structure;
- Stronger architectural design to reduce visual impact;
- Consideration of visual impacts on the community of Petrie Terrace should be a primary consideration in design, in particular the design of the plaza over Hale Street;
- Relocate proposed Light Rail station to reduce visual impact;
- Design to ensure southern plaza is not a wasteland at non-event times;
- Pedestrian bridges must have quality design; and
- Improve pedestrian links along the Terraces.

LANDSCAPE & VISUAL IMPACT

(a) Landscape Issues

- Walkways should not screen school from view;
- Need to assess impacts on views to the CBD and vista to Mt Coot-tha;
- Should include a Landscape Concept Plan to depict internal and external screening, landscaping, retaining works; and
- Include streetscape design of Chippendall Street as part of redevelopment.

(b) Visual Impacts

- Design fails to mitigate visual appearance and bulk - if visual impact can't mitigate, it is an indication of over-development of the site;
- Need to assess visual impact of walkways;
- Light rail station and structures will impose significant visual impacts;
- Proposal and mitigation measures should have gone further to recommend that the design treatments on all sides are more sensitive to the particular combinations of impacts produced on each side; eg. bulk and noise refraction along Hale Street frontage, big dead plaza to the south, blank face to the north;
- Screening to facades of building may accentuate building length rather than mitigate visual impacts;
- Building facades need vertical elements in screens;
- Need graphics of shadows;
- Impacts on green edge along Milton Road;
- Recognise local qualities in streetscape, and quality of Castlemaine streetscape inadequately described; and
- Should graphically indicate detail of pedestrian environment particularly to address plinth, walkways and plazas.

CULTURAL HERITAGE

(a) Church

- Audit of structural condition of church and rectory;
- Measures to minimise damage to buildings and vegetation;
- Church requires an irrevocable guarantee to remedy any damage and clean up the site after construction;
- Consult with parish in design of construction schedule;
- Conservation of church, rectory, garden and fencing should be integrated with the redevelopment;
- Establish plaques or other means in the cemetery showing sites of all denominations and pioneers;
- Provide plaques on headstones and a sign to note that it is a Pioneer cemetery;
- Parking bays for parishioners within stadium;
- Insurance in perpetuity against all loss, damage and injury;
- Conditions on method and times of operation of lighting;
- Consultation with Parish re timing of events;
- Incorporation in stadium design of a community hall, conference reason and officers for use by Parish;
- Consider use of church as an interdenominational chapel for Lang Park;
- Dispute resolution processes should be established up front; and
- Negative impacts of shadowing on church.

(b) Baroona Special School

- Strongly oppose disturbance to buildings or trees within school site;
- Detailed cultural heritage assessment should be carried out, which would be subject to *Queensland Heritage Act 1992* provisions for public notice by Queensland Heritage Council prior to development;
- 9 metre walkway would also infringe on building on eastern end of school site;
- Impacts of re-orienting school buildings and the loss or relocation of historic tram shelter on Milton Road; and

- Need to adequately describe the extent of works proposed to various buildings, trees and structures – need better graphic representation.

(c) Other Heritage Issues

- The brick drain in Castlemaine Street (Cultural Record Act 1987) has heritage significance;
- Need to assess church, Baroona school, Jacksons' Granary and masonry structures on Police Barracks site for potential for damage from construction;
- Hogs Breath demolition and school re-orientation would be contrary to the planning scheme (transitional);
- Failed to consider impacts to bridge over Petrie Terrace and Milton Road corner which may be affected;
- Provide a display of the history of the site and surrounding area within the design; and
- Historic character of the local area should be valued more highly than the cultural value of Lang Park.

ECONOMIC

- No justification for the reduction in seating capacity from 60,000 to 52,500;
- Need better examination of impacts of weekday events on surrounding businesses;
- More consideration of impacts on IT industry – a cost benefit analysis is required;
- More consideration of impacts on businesses from temporary road closures and parking restrictions, including from temporary closures during construction;
- Assess economic impacts of parking restrictions on Given Terrace and La Trobe Terraces;
- Scale back the suggested estimate of 1241 jobs (due to under-utilisation of labour in Queensland post-GST and post-Olympics);
- Full time employment (operational) should account for existing staff;
- PCYC, La Boite and OzSports job losses should be identified;
- Further consideration needed on mitigation of parking impacts on businesses;
- Qualify the loss from resumption and demolition of heritage buildings;
- Project costs a serious omission; and
- Discussion of alternatives doesn't investigate a high cost alternative.

SOCIAL

- Identify social impacts of out-of-hours construction work;
- Identify cumulative social impacts;
- No mitigation possible for losses to local amenity (9.4.4);
- Cumulative impacts should be recognised and mitigated (eg. through provision of real green space, child care facilities, better access to transport, provision of new community facilities);
- Consideration should be given to restriction of alcohol consumption, alcohol free zones, tobacco free zones (Tobacco Act should be listed in Table 10.1);
- Mitigation for residents in Clifton Street fronting Milton Road walkway, particularly resumptions;
- Fails to discuss impacts on use of Ozsports and PCYC, and impacts of relocation (volleyball noise and lights etc.);
- Consideration of further community benefits within the stadium, eg other community uses to allow the building to be used more than event times;
- Removal of "icon" terminology in references to Lang Park;
- Upgrade to 50 metres and heat the Ithaca pool;

- On-going community involvement and regular community information through newspaper is required to be carried through during construction, and implemented in an ongoing fashion;
- Monitoring of patrons evicted from the stadium essential for all games and ensured in perpetuity;
- Consideration of impacts on property values of adjacent residential community;
- More consideration of the needs and constraints on young families in accessing Lang Park; and
- Consider and plan for minimisation of disruption to existing facilities (sports+theatres) during construction, and loss of revenue.

ACOUSTIC

- Need more monitoring sites and more frequent monitoring to get a true picture;
- Should assess and define appropriate pedestrian noise criteria;
- Should recommend that amplified entertainment (other than sporting events) be banned or recommend specifications for the public address system and provide an assessment of their impacts undertaken;
- Should assess noise impacts from goods trains operating later as a result of commuter rail congestion;
- Proposal should include state of the art public address systems to minimise intrusion of noise;
- The use of helicopters should be banned, or limitations on helicopters should be more detailed;
- Noise from Good Year Blimp should be assessed;
- Inclusion of double glazing and insulation to the dwellings of noise-affected residents;
- Impact of noise from light rail construction will be completely unacceptable, if working in the early hours;
- Fireworks assessment required;
- Location map for acoustic monitoring sites and describe monitoring equipment;
- For construction phase, management plans will need strict controls on vibrations;
- Consideration of parabolic effect part. on Hale Street to be provided;
- Question re use of acoustic baselines;
- Difficult to attenuate noise from waste collection dock due to size of openings in building;
- Noise criteria for haulage and construction activities out-of-hours;
- Mitigation of construction noise on Church and La Boite; and
- page 5-84, Table 5.4.2 acoustic levels require clarification and possible correction.

OTHER ENVIRONMENTAL ISSUES

(a) **Flora & Fauna**

- The removal of trees from Lang Park and the Baroona Special School;
- Affected vegetation should be identified on a layout plan;
- Mature trees should be relocated on site;
- Inadequate description of impact to vegetation;
- Fauna assessment lacking habitat analysis; and
- Impact on fauna from loss of vegetation.

(b) **Contaminated Land Issues**

- Contaminated land – up to 100 000 m3 of landfill – requirement for information request not received.

(c) **Lighting**

- more discretion (smaller range) in describing light spill (9-100 lux);
- lighting impacts from pedestrian walkways; and
- lighting from proposed stadium will affect nearby residences more often.

(c) **Miscellaneous Environmental Issues**

- Shadow diagrams need to be included in EIS; and
- Need for integrated pest management strategy.

INFRASTRUCTURE

- Need to coordinate power needs with the possible decommissioning date for Hale Street sub-station;
- Need to recognise future planning and infrastructure needs for power supply;
- While the concept of water reuse and storage is supported in principle, details should be included in the EIS; and
- if local drainage augmentation has not been committed to by BCC there will be storm water inundation.

TRAFFIC & TRANSPORT

(a) **Pedestrian Walkways**

- Pedestrian walkways require examination in relation to capacity and CPTED issues;
- Pedestrian connections to Roma St are considered unworkable and unacceptable due to the neglect of CPTED principles;
- The elevated walkway along Roma Street should be deleted – alternatives to be assessed include providing a connection via easement adjacent to the Transit Centre or closing traffic lanes during major events;
- Consider connecting the pedestrian bridge over Countess Street directly to rail platforms;
- Consider improving pedestrian access from southern plaza under the railway line to the Bicentennial Bikeway;
- Pedestrian path on north-western side of Milton Road should be deleted because the impacts on Baroona Special School will be unacceptable;
- Need to adequately discuss how the pedestrian walkway to Milton Station in the rail corridor is accommodated;
- Reference should be made to the long-term pedestrian connection from Victoria Barracks to Roma Street Parklands as proposed in the Parklands Master Plan;
- A pedestrian bridge between Petrie Terrace and Roma Street Parklands should be included;
- Pedestrian routes to Countess Street bus station are not clearly defined;
- Consider aligning the pedestrian bridge from the transition plaza to line with Skew Street to provide more direct link to William Jolly Bridge;
- Consider the impact of pedestrian furniture on walkway capacity calculations; and
- Pedestrian walkways are uncovered and will not provide adequate shelter.

(b) **Transport Infrastructure**

- Rail station upgrade should be of much better quality than recent upgrades;
- Impacts to Railway Terrace businesses from Milton Station upgrade not discussed;
- The strategic role of the contra-flow bus and light rail corridor in Upper Roma Street should be examined;

- Pedestrian movements at the bus station not adequately addressed;
- Inadequate space for public transport terminal;
- Ferry terminal at Park Road should be considered;
- Hale Street should remain open;
- Milton Road works that include widening of the road reserve on Milton Road are not described;
- The benefits of the Countess Street bus station are not considered; and
- Ensure improved transport options are permanent and not just for games.

(c) Traffic Impacts during Construction

- Allowable routes for construction vehicles & means of control to be identified;
- Haulage through residential and mixed use streets should be prohibited;
- Failed to assess impacts of construction traffic on local intersections;
- Specify the number of trucks accessing site out-of-hours;
- Deliveries by heavy vehicles are illegal out-of-hours;
- Measures should be proposed to prevent parking of construction vehicles in residential streets; and
- Details of the Contractor off-site parking arrangements should be provided now.

(d) Light Rail

(NOTE: light rail is not proceeding – this information is included only for completeness of detail)

- Evaluate viability of light rail;
- Reconsider or relocate light rail;
- Proposed light rail from Milton should have a separate impact assessment;
- Reconsider acceptance of QT policy on light rail;
- Further consideration of community benefits of light rail in planning and design; and
- Light rail benefits are questionable – there should be more emphasis on heavy rail access and associated connections to the stadium.

(e) Traffic Management and Impacts in the Local Environs

- Impact on local bus services not sufficiently addressed;
- Review set-down areas for passengers being dropped off – in particular, the passenger set-down area on the Caxton Street frontage should be omitted;
- Implement a ban on traffic except for residents before during and after events - provide barricades at Guthrie Street, Heussler Terrace, Hall Street, Nairne Street and Patrick Street;
- Review management of traffic approaching from north west and west, including Isaac Street's vulnerability to set-down and pick up traffic;
- Blaxland Street is inappropriate as a taxi feeder/limousine parking area due to its residential nature – consider alternatives;
- Taxi rank in Castlemaine Street should be reconsidered as it must bring people into residential areas;
- Heussler Terrace should not be used for a taxi rank;
- No definition provided of allowable routes for taxis;
- Capacity improvements should be considered at Caxton/Castlemaine and Milton/Castlemaine intersections;
- Identify the reasoning for banning the right turn out of Castlemaine Street post-event;

- Consider the right turn movement for returning shuttle buses from Milton Road to Castlemaine Street;
- Address the impacts of interference to traffic flow restricting from closures, increased traffic and parking and pedestrian flows;
- Road and pedestrian path upgrades on Given and Latrobe Terraces should be considered;
- Traffic activity in Castlemaine Street has not been addressed;
- Access and egress to off-street public parking stations in the Park Road retail precinct and Coronation Drive office park should be maintained – potential impacts of coach parking;
- Alternative on-site vehicle access should be provided from Hale Street;
- Mitigation could exacerbate impacts for businesses – eg, construction - closure of Castlemaine Street, pavement deterioration in Castlemaine Street; interruption to water service; also operational impacts;
- Details of implementation of traffic management plans are required;
- Adoption of traffic movement management plans which ensure local and industrial business issues are addressed, to be developed in consultation and to form part of construction and operation contracts; and
- Proposed mechanisms for dealing with public complaints should be included.

(f) Accessibility and Cyclists

- The provision of only 40 parking spaces for disabled patrons is disappointing;
- Cycling has been ignored in the design;
- Fails to consider legislation requiring equity of access;
- Walking connectivity and access for those with access disabilities and cyclists needs review;
- Links to Roma Street Parkland for pedestrians and cyclists should be included; and
- Links to the River should be included.

PARKING

- Council considers the introduction of the proposed parking restriction scheme to be very necessary, however, the cost of administering the scheme must be fully funded by the stadium operator;
- A special permit system for Rosalie Village and Paddington Traders should be considered;
- Parking restrictions in Petrie Terrace area would prevent regular audiences from attending the Brisbane Arts Theatre and La Boite Theatre;
- The impact of the parking scheme on employee parking needs should be assessed;
- The basis for selection of the parking cordon should be confirmed;
- Signs for parking must conform with the Manual of Uniform Traffic Control Devices to enable police enforcement;
- Legislative changes associated with the Transport Operations and Road Use Management Regulations (1995) may be required if Police are expected to support BCC Traffic Enforcement Officers in patrolling the parking area due to the quantum of the parking penalty;
- Integrate the proposed parking system with existing BCC residential parking scheme;
- Only impose restrictions on parking in streets where residents don't have off-street parking;

- There are some additional commercial areas that are suitable for 2 hour parking limits;
- Details on the monitoring of the parking scheme are required;
- Failed to consider illegal backyard parking; and
- On-site parking numbers – the plans and text feature inconsistencies.

POLICE AND EMERGENCY SERVICES

- Clear and unobstructed vantage point for Police and Emergency Services;
- Access to close and unobstructed parking;
- Command car parking operating from a structure vantage point with good communications;
- Effective monitoring capacity;
- CCTV and surveillance system essential;
- Recommend acceptance of mitigation measures for crowd control and traffic management;
- Review of the master plan to incorporate the above; and
- Recommend relocation of PCYC as per PCYC submission.

CONSTRUCTION

- No construction should be permitted on Saturdays, Sundays or after hours;
- No out-of-hours truck movements should be permitted;
- Noise impacts of construction will be unacceptable;
- There is an inconsistency in construction hours, construction workforce numbers and parking numbers in the draft EIS;
- Feasibility of moving dust monitoring equipment during construction;
- Important for objectives and criteria to be met by soil and erosion plan be proposed in the EIS;
- Need to develop drainage issues into mitigation strategies;
- Reiterate lighting standards in mitigation section; and
- No Construction or Environmental Management Plan (inc. cultural heritage management plan) included in the draft EIS.

DESIGN MITIGATION

General Design Issues

- Stadium design needs to change to ameliorate the social, environmental and economic & crime impacts of the structure, and better reflect the reality of its context & different environments on each side;
- Easy to achieve world-class stadium design but not easy to achieve world-class access to stadium – proposal fails on the latter designs;
- Some walkways do not provide convenient access for people with disabilities, and the location itself discourages people with disabilities from attending;
- Caxton Street frontage needs to present a living address and link with Given Terrace;
- Community art spaces should be considered, and use of artists in design treatments;
- Bulk, scale and lifelessness of building are aggressive;
- Northern plaza should reinforce "green buffer" between Caxton Street and Given Terrace;
- Church interface is over-whelming and needs redesign for vertical and horizontal separation;

- Building design should take into account the existing interruption to telecommunications reception – should be strengthened;
- Shade and protection from elements should be included; and
- Provide reasonable advertising/facilities within the ground to mitigate loss of advertising, increased operating costs and other costs.

GENERAL MITIGATION

- Government should guarantee that mitigation measures are reflected in final iterations, ...";
- (6.2.2) More clarity on "other events" and their impacts and outlaw concerts;
- Ensure there are no unmitigated issues (through financial reparation or design changes);
- Ensure light rail is a pre-requisite to development;
- Mitigation measures not measurable;
- No mitigation suggested for La Boite or Brisbane Arts Theatre;
- Need details re availability of toilet facilities and water supply (6-110 & 9-42); and
- Proposal should include food safety plans eg. Food Act 1981 & Food Hygiene Regulation 1989.

REQUESTS FOR FURTHER CONSULTATION

- Future consultation is required regarding structures to be placed over public roads;
- Consultation is sought regarding indigenous interests for interpretative measures for open space;
- Further consultation is sought regarding the need for pedestrian and cycling connectivity through the site, and the possible connectivity of the future light rail link;
- Further consultation is sought regarding future traffic disruption and economic impacts, especially during construction;
- Further consultation is sought regarding the impacts of construction and possible relocation of existing uses;
- Further consultation is sought regarding the preparation of Operational Management Plans and detailed design issues (police facilities, accessibility and surveillance);
- Ongoing consultation is sought regarding impacts on Christ Church;
- Further consultation is sought regarding the possible use of the Broadwalk on Hale architects concept;
- Further consultation is sought by the community regarding construction and operational impacts; and
- Further consultation is sought by La Boite and Brisbane Arts Theatre regarding construction and operational impacts.

COMMERCIAL STRATEGY

- Commercial justification for the proposal required with EIS for public scrutiny;
- Elaboration of financial arrangements, including a market feasibility study required;
- Need detailed synopsis of financial viability, suitability and conformity with local authority plans;
- Reconsider viability of major cultural events given supply of venues in the CBD;
- Material in EIS doesn't make a strong case for the redevelopment to proceed; and
- Re-examine conclusion of EIS, mitigation measures and total cost of the project.

ATTACHMENT 4: Significant Approvals, Licences/Permits and Statutory Requirements

APPROVALS

Environmental Protection Act 1994 Environmental Protection Regulations 1998 Planning, Design, Construction and Operation	Level 2 Environmentally Relevant Activity (ERA) Number 39 – Constructing Premises or Civil Engineering Structures (constructing or demolishing). "Notifiable activities" Schedule 3 of the EP Act likely to cause land contamination include landfill and included in Environmental Management Register (EMR). A Contaminated Land Register (CLR) is kept of actual contaminated land. "Change of landuse" is a trigger for investigation.	Approval for ERA devolved to Local Government. Contaminated site investigation in accordance with EP Act required and approved site management plan required. Approval for the removal of contaminated soil.
Queensland Heritage Act 1992 Planning, Design and Construction	Provides for a register of cultural heritage places and regulates their development. "Development" includes substantial alteration to the appearance of a registered place.	Development by the Crown requires the approval of the Heritage Council only to the extent of altering a place listed on the Register.
Land Act 1994 Planning, Design and Construction	Registration of land titles. Making State land available in fee simple/lease/permit/reserve.	Land titles and leases may restrict land use or have restrictive covenants or easements. Approvals to obtain unallocated State land in accordance with Chapter 4, Part 1 of the *Land Act 1994*.
Land Act 1994/Land Regulation 1995 Planning, design, construction	Permanent and temporary closure of roads.	Approvals to be obtained from the Minister under Chapter 3, Part 2, Division 2 of *the Land Act 1994* for the permanent or temporary closure of roads.
Transport Infrastructure Act 1994	Entering Railway land to carry out works (including pedestrian structure), temporary use of land.	Approvals required to enter QR land in accordance with the *Transport Infrastructure Act 1994*.
Transport Operation (Road Management) Act 1995 Construction and Operation	Regulation of transport of dangerous goods.	Approval processes and regulations as prescribed by Transport Operations (Road Use Management – Dangerous Goods) Regulation 1998.

Approvals continued

Integrated Planning Act 1997; *Building Act 1975;* City of Brisbane Town Plan 1987.	BCC – Assessment Manager under the Integrated Development Assessment System (IDAS).	1. Development Permit – Building work (Demolition) under *the Building Act 1975* (subject to Code Assessment). 2. Development Permit – material change of use and preliminary building work under the Planning Scheme (subject to impact assessment). 3. Development Permit – building work under the *Building Act 1975* (subject to Code Assessment).

LICENCES/PERMITS

Cultural Records (Landscape Queensland and Queensland Estate) Act 1987	Cultural heritage assessment survey Collection of artefacts.	Permit from EPA (s 27) for survey.
Local Government Act 1993 BCC Local Laws Operation	Responsibility covered by Local Laws include a wide range of powers to control issues such as: • street maintenance; • protection of vegetation; • control of advertisements; and entertainment venues and events.	The Local Law Policy (Entertainment and Events) 1999 is particularly relevant to the control of major sporting venues. All entertainment venues and events require a Permit. The permit covers health, safety, environment and amenity issues for the surrounding community. It is noted however, that if the owner ofthe venue holds a Liquor License, then a permit is not required.
Explosives Act 1952 Operation	Carriage, Storage and Use of explosives.	Licence or permit required for storage and carriage of explosives. Temporary storage approved by chief inspector of explosives in accordance with conditions. People using explosives are licensed.
Transport Operations (Road Use Management) Act 1995	Queensland Department of Transport and Department of Main Roads.	Wide Load permits if oversize equipment and machinery needs to be trucked to the site. This is obtained from the Dept of Main Roads office nearest to the point of departure. Permits may be required for mass transport by road or rail.

Licences/Permits continued

Liquor Act 1992 Operation	Sale of liquor.	General Purpose Permit (for Organisations which do not hold a liquor licence). Public Function Permit (for licensees catering for a one-off public event away from their main licensed premise). Permit issued by the Liquor Licensing Division, Department of Tourism and Racing.

STATUTORY REQUIREMENTS

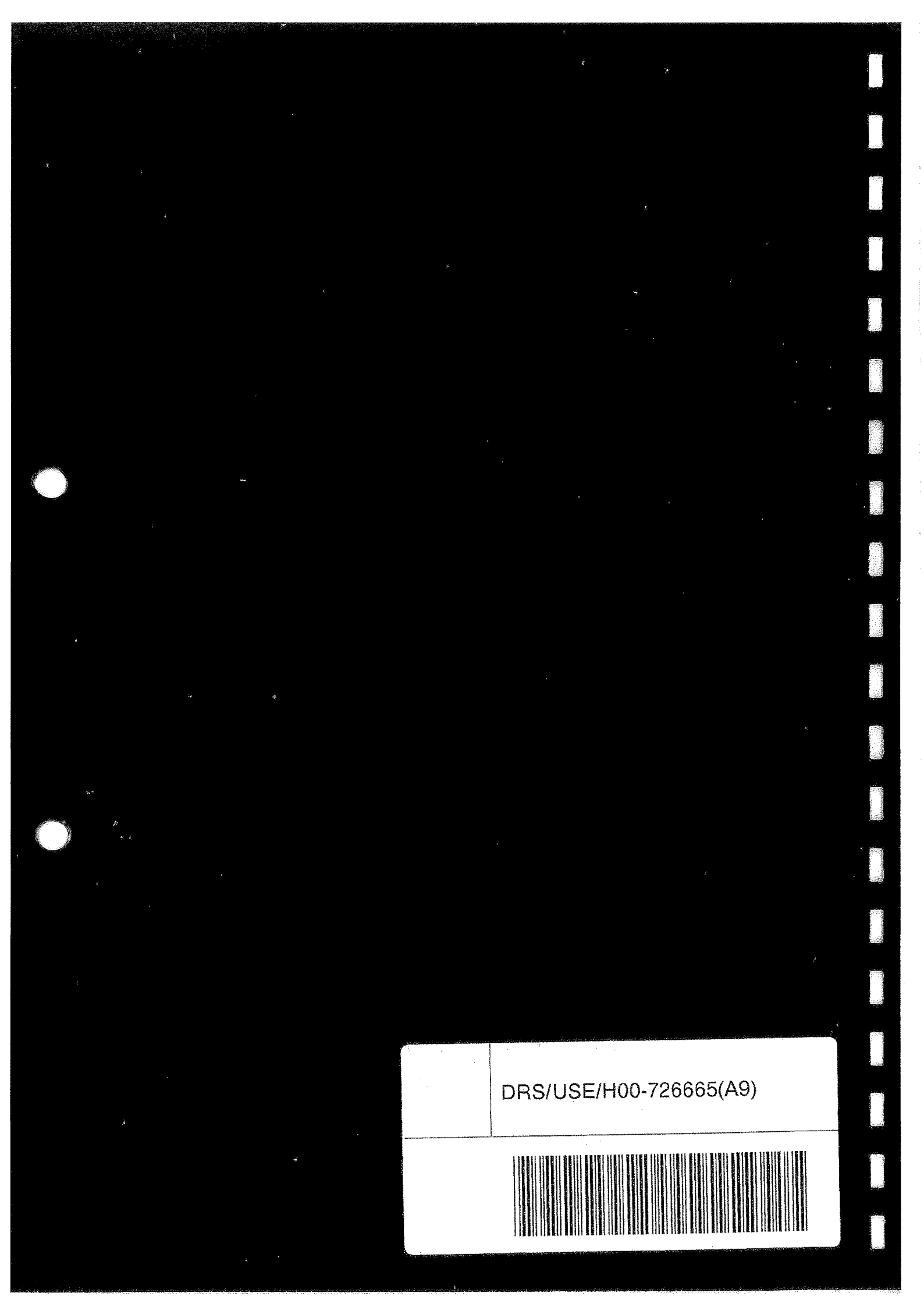
Environmental Protection Act 1994 Environmental Protection Regulations 1998	General Environmental Duty. Duty to Notify of Environmental Harm.	Reasonable and practicable measures to prevent or minimise environmental harm. The EPA must be notified of any event where environmental harm is caused or threatened.
Environmental Protection (Water) Policy 1997 Planning, Design, Construction and Operation	Management of wastewater and stormwater and contamination of water from specified agents, including build up of sediments. Section 31 prohibits the deposition, release or placement of identified waste materials and chemicals which could reasonably be washed into gutters, stormwater drains or watercourses. Section 32 prohibits the deposition of sand silt or mud which could reasonably be washed into gutters, stormwater drains or watercourses.	There are no specific approvals. Compliance with general environmental duty in accordance with the standards established in the EPP. EMP to specify actions to prevent pollution of waters from any activity associated with construction and operation of the stadium.
Environmental Protection (Air) Policy 1997 Planning, Design, Construction and Operation	Defines unreasonable release of contaminants. Establishes indicators and air quality goals for environmental values.	There are no specific approvals. Provides guidance to the approval of environmental authorities or ERAs. Administering authorities are obliged to respond to complaints. Provides for "show-cause" and "abatement notices". Compliance with general environmental duty in accordance with the indicators and goals established in the EPP.

Statutory Requirements continued

Environmental Protection (Nuisance) Regulation 1999 Construction and Operation	Unreasonable local or amenity interference with an environmental value caused by noise, dust, odour or light. Amenity is defined as "public, community and individual well-being and a pleasant, harmonious lifestyle". Qualities of an acceptable acoustic environment are: • Free from annoying intrusive noise; • Conducive to undisturbed sleep; • Conducive to passive recreation; and • Conducive to conversation without undue interference from noise.	Provides local and state governments with powers to resolve nuisance complaints. Does not apply to outdoor sporting events. Abatement notice can be issued for outdoor concerts if it exceeds 55dB(A) over a 15 minute interval outside an affected noise sensitive place. Unreasonable release of a contaminant from commercial premises such as smoke is an infringement notice offence. (Such an application could possibly apply to Firework displays).
Cultural Records (Landscape Queensland and Queensland Estate) Act 1987 Planning and Construction	A person shall not take, destroy, damage, deface, excavate, expose, conceal or interfere with an item of the Queensland Estate unless done under the authority of the Act (S.56 (2)). Item includes any structure or object that is evidence of man's occupation of Queensland at any time that is at least 30 years in the past. Penalties apply for unauthorised interference (s. 56).	Sites identification, risk management, Cultural Heritage Management Planning within the EMP. Work to stop and the EPA (Regional Manager, Cultural Heritage) notified of any sites found in the course of the project.
Acquisition of Land Act 1967/State Development & Public Works Organisation Act 1971 Planning, design, construction	Acquisition of land for public purposes.	Acquisition of land by the contracting authority pursuant to the *Acquisition of Land Act 1967* or, alternatively, by the Coordinator-General under Part 6, Division 78 *SDPWOA*.
Workplace Health and Safety Act	State Department of Employment, Training and Industrial Relations.	Registration of workplace with three or more employees. Portable Long Service Leave. Legislation provides for Construction Workplace Registration and Industrial Workplace Registration.
Health Act 1937 (and associated regulations) Design and Operation	Vermin Control.	Prevent the entry of vermin into buildings. Prevent access to food by vermin.
Lang Park Trust Act 1994	Restrictions on selling Trust land without Governor-in-Council approval.	Part 3, *Lang Park Trust Act 1994*.

Statutory Requirements continued

Transport Infrastructure Act 1994	Carry out changes to rail system.	In accordance with parameters and responsibilities under the *Transport Infrastructure Act.*
Traffic Act 1949 and Traffic Regulation 1962 Construction and operation	Use of motor vehicles in the construction and operation phase.	Regulation of motor vehicles and their use.
Liquor Act 1992 Operation	Patron behaviour, in and around an event's licensed or permitted area. Duty of care towards event patrons.	Penalties for licensees. Event Management Plans to minimise community disruption and harm.
Integrated Planning Act 1997	Minister/s.	Designation of community infrastructure.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EXTRAORDINARY

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Vol. CCCXXV] MONDAY, 11 SEPTEMBER, 2000 [No. 11

NOTICE OF A MINISTERIAL DESIGNATION OF LAND FOR COMMUNITY INFRASTRUCTURE MADE UNDER THE *INTEGRATED PLANNING ACT 1997*

I, Jim Elder, Deputy Premier, Minister for State Development and Minister for Trade, give notice that:

A Ministerial designation has been made

Pursuant to section 2.6.8 and Schedule 7 of the *Integrated Planning Act 1997*, on this day I make a Ministerial designation of land for community infrastructure that the Lang Park Trust, the Coordinator-General and/or the State intends to supply on the land.

Description of the land to which the designation applies

The Ministerial designation applies to those parts of Milton Road, Chippendall Street, Castlemaine Street, Caxton Street, Hale Street, Upper Roma Street, Roma Street and Countess Street generally identified as being designated on Attachments 1 to 6 and to the following land:

LOT	PLAN	APPROXIMATE AREA OF LOT AFFECTED	RELEVANT ATTACHMENT
Lot 2	RP 160559	563 m^2	2
Lot 2	RP 160557	390 m^2	2
Lot 3	RP 160557	85 m^2	2
Lot 42	RP 904552	2588 m^2	2
Lot 900	RP 904552	41 m^2	2
Lot 41	RP 904552	2020 m^2	2
Lot 1	RP 227053	1162 m^2	2
Lot 1	RP 493	503 m^2	2
Lot 2	RP 493	405 m^2	2
Lot 3	RP 493	405 m^2	2
Lot 4	B 3552	476 m^2	2
Lot 3	B 3207	533 m^2	2
Lot 2	B 3552	561 m^2	2
Lot 1	B 3552	458 m^2	2
Lot 1	AP 1748	834 m^2	2
Lot 654	SL 8308	377 m^2	3
Lot 1	CP 841301	48 m^2	3
Lot 11	SL 1126	2129 m^2	3
Lot 1	RP 10650	182 m^2	3
Lot 2	RP 10650	349 m^2	3
Lot 3	RP 809878	935 m^2	4
Lot 6	RP 826295	488 m^2	4
Lot 705	SL 12305	3865 m^2	4

Document No.: 650885

LOT	PLAN	APPROXIMATE AREA OF LOT AFFECTED	RELEVANT ATTACHMENT
Lot 475	SL 4479	32 m^2	4
Lot 706	SL 12305	581 m^2	4
Lot 1	RP 177961	217 m^2	4
Lot 27	SP 100555	180 m^2	4
Lot 16	RP 903097	1150 m^2	4
Lot 581	RP 227070	5068 m^2	5
Lot 4	RP 805871	72 m^2	5

Type of community infrastructure for which the land has been designated

The following forms of infrastructure form part of the Lang Park Stadium Redevelopment:

(a) bus interchange station;

(b) southern plaza;

(c) pedestrian walkways;

(d) associated access; and

(e) other infrastructure ancillary to the redevelopment;

The Ministerial designation is for the Lang Park Stadium Redevelopment and involves the following kinds of community infrastructure as listed in Schedule 5 of the *Integrated Planning Act 1997*:

(d) community and cultural facilities;

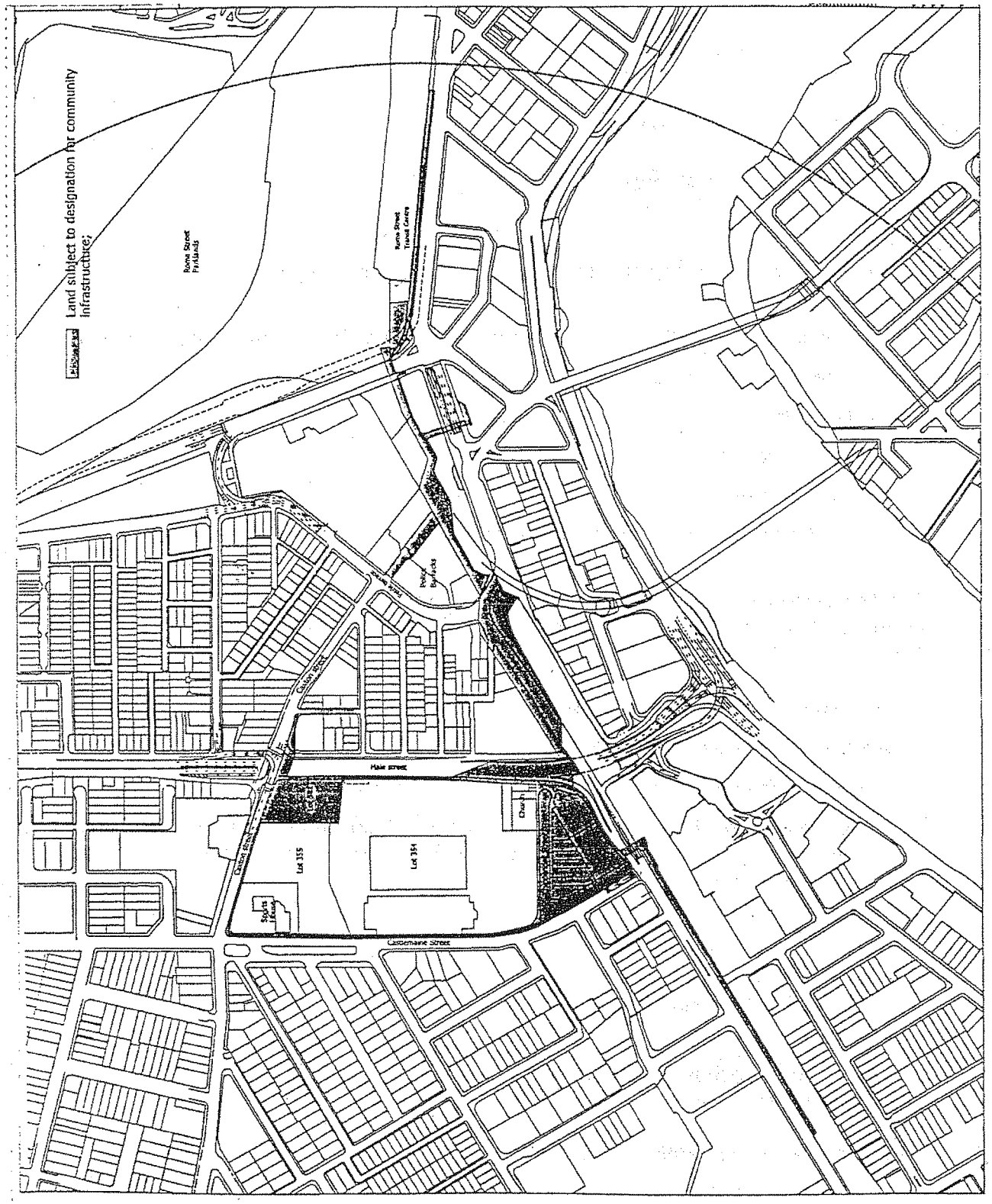
(l) parks and recreational facilities;

(o) transport infrastructure mentioned in section 5.1.1 of the IPA;

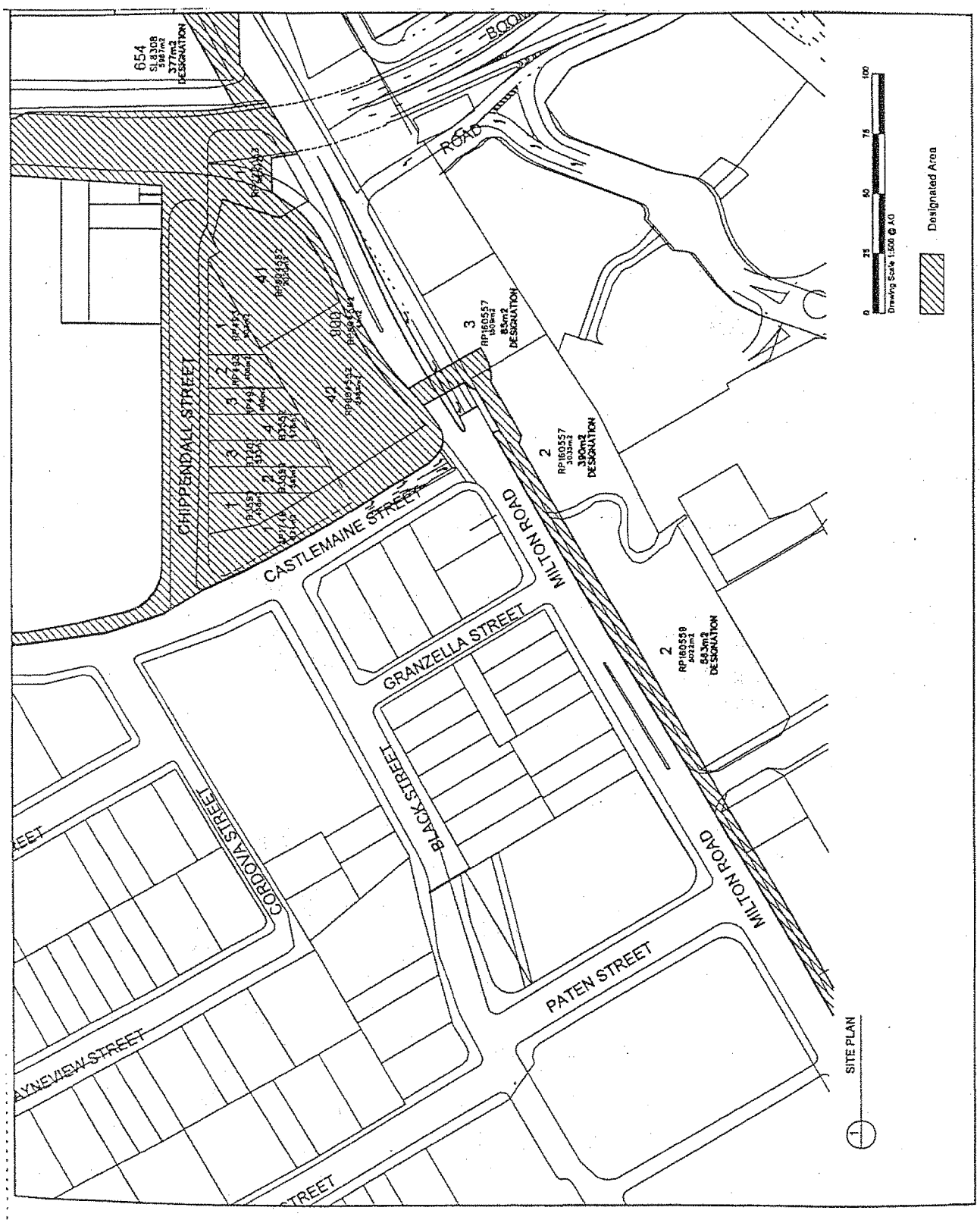
(r) storage and works depots and the like including administrative facilities associated with the provision or maintenance of the community infrastructure mentioned in paragraphs (d), (l) and (o) above.

Jim Elder
Deputy Premier, Minister for State Development and Minister for Trade

Dated: 11 September 2000



ATTACHMENT 1



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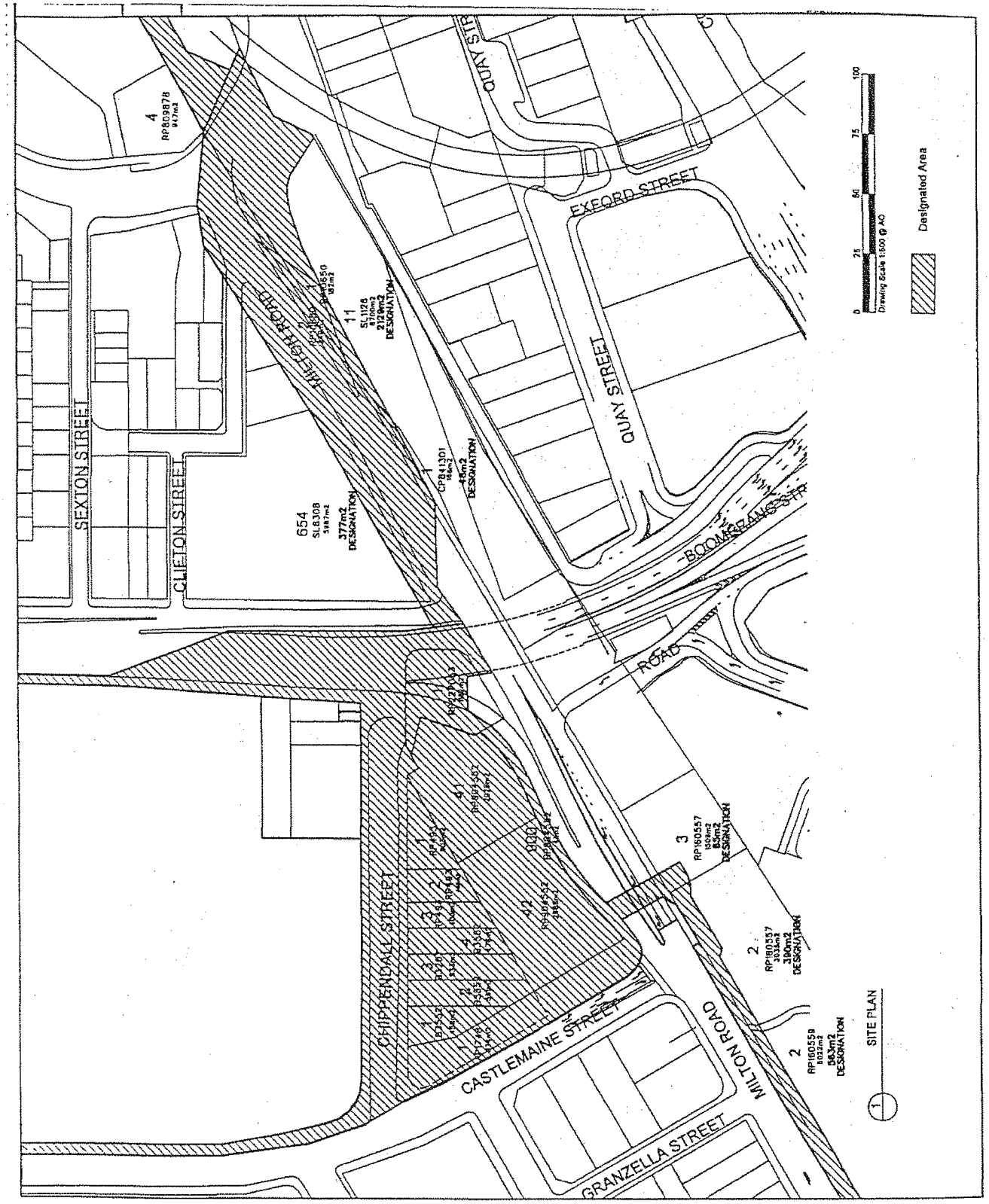

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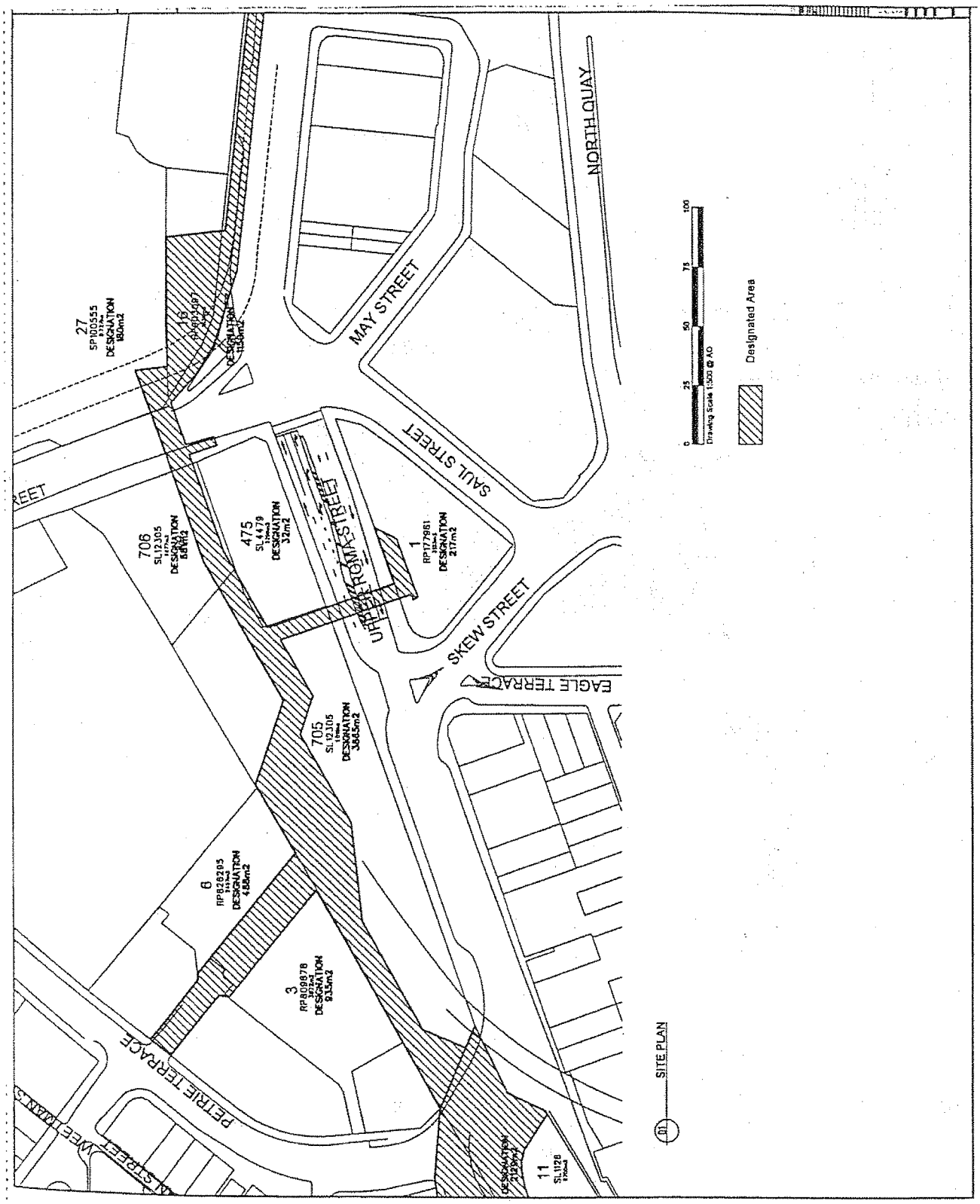

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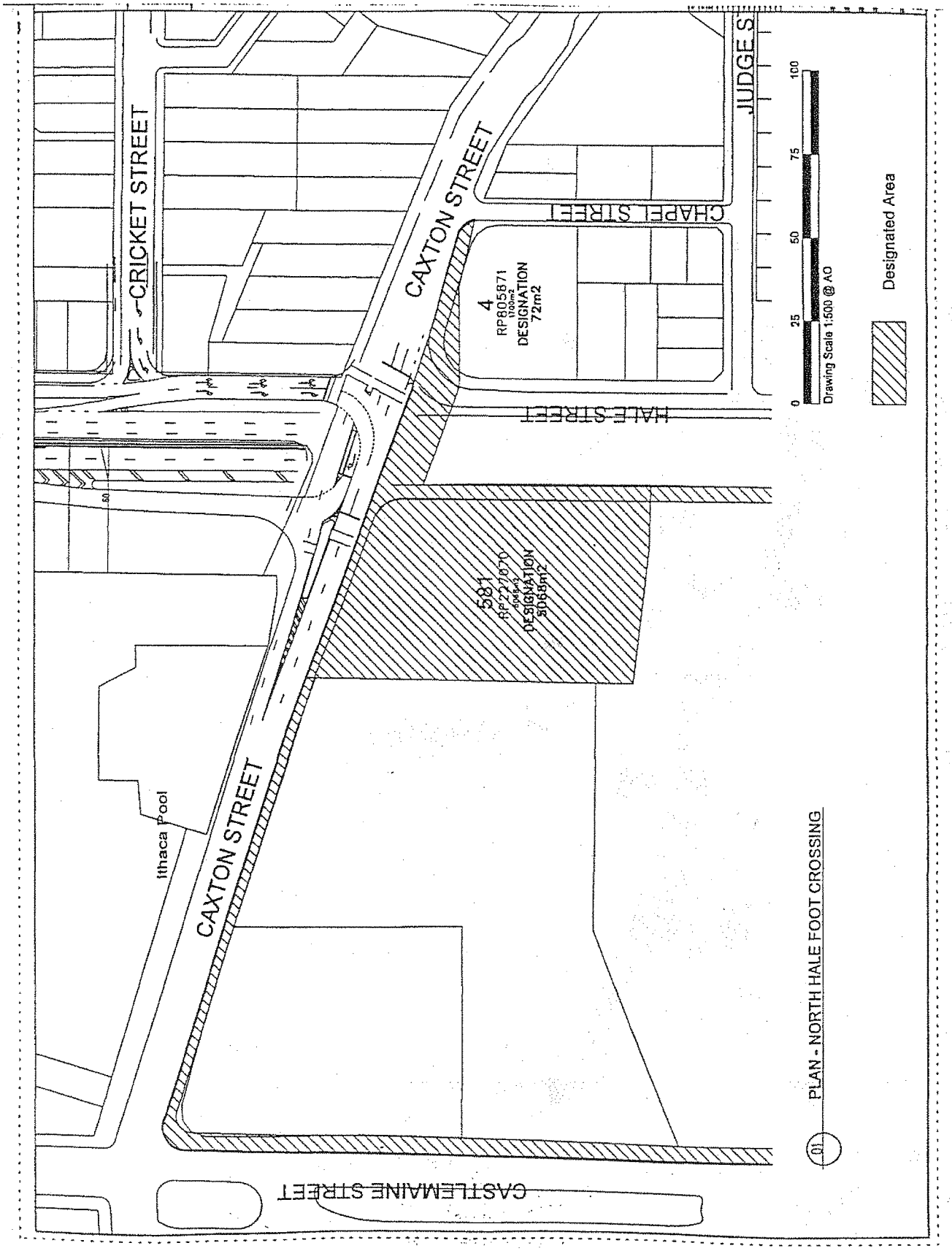
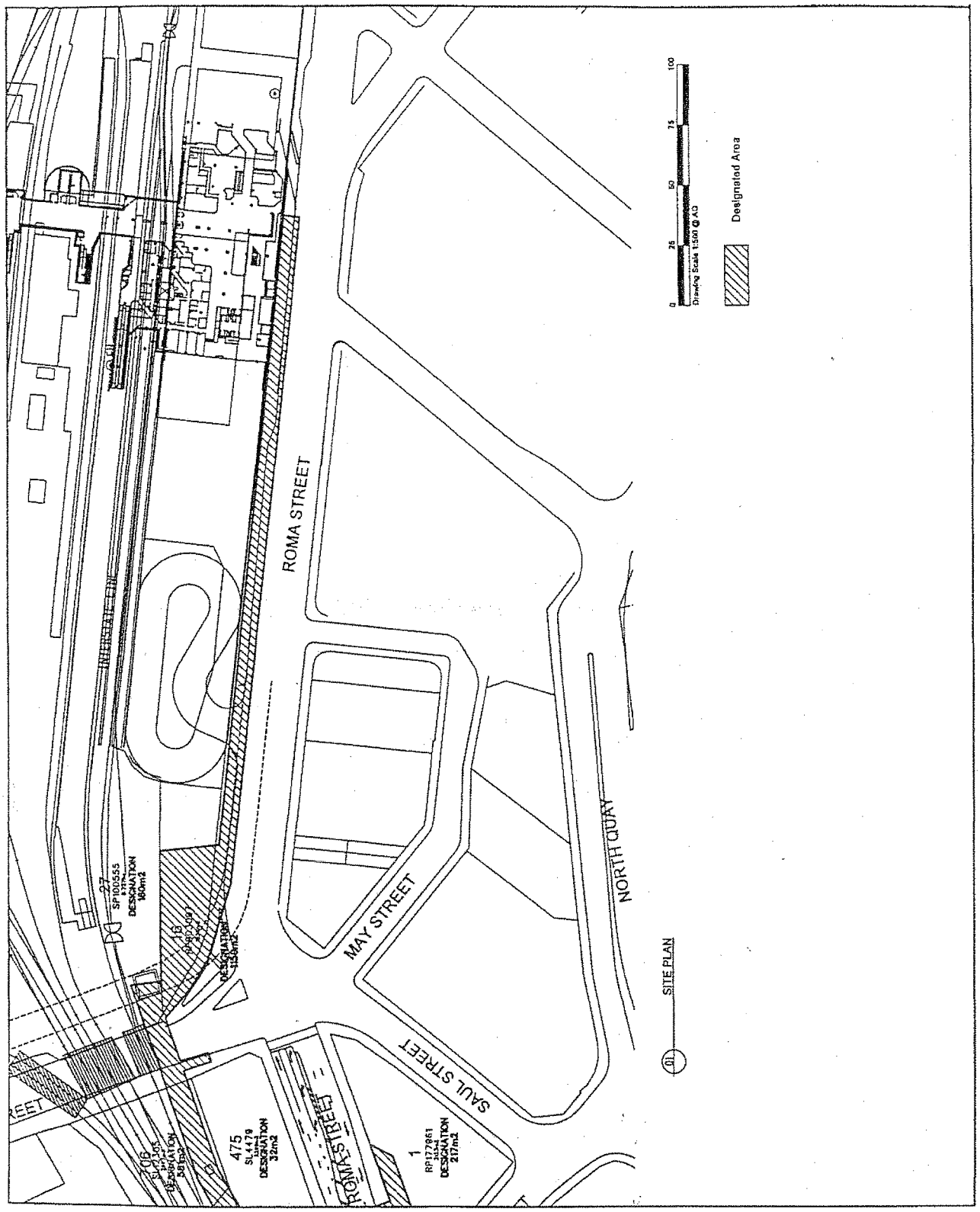


ATTACHMENT 5



ATTACHMENT 6

BRISBANE

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11 September, 2000

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BRISBANE QLD 4001

12 September, 2000
L623PRZ.Doc
RE07074

Attention: [redacted]
Senior Town Planner
Central Development Assessment

Dear Ms [redacted]

DEVELOPMENT APPLICATION FOR MATERIAL CHANGE OF USE & PRELIMINARY APPROVAL FOR CONCEPTUAL BUILDING WORK

Further to recent discussions, we submit this development application for material change of use and preliminary approval for conceptual building works in respect of the stadium component of the overall Lang Park Stadium Proposal.

As you know, we have been engaged by the Lang Park Trust to assist in the preparation of the development application and other material relating to the redevelopment of Lang Park Stadium.

The application is made in respect of land bounded by Hale, Caxton, Castlemaine and Chippendall Streets Milton, and described in section 3.1 of the attached planning report. The application has been constructed, on the basis of advice from the Queensland Government, including Crown Law, in a manner that seeks to address the issues raised by Ms Chadwick, Manager of Development Assessment, in her letter dated 25 August 2000 to the Lang Park Trust.

The application also is being made in the knowledge that a Ministerial designation has been made today, 12 September 2000, for community infrastructure for land external to the site the subject of the application. The designation is intended to give effect to the provision of community infrastructure required to support the overall Lang Park Stadium Proposal and is complementary to this development application.

Enclosed with the application is the following documentation:
- the Assessment Report of the Co-ordinator General;
- the Environmental Impact Statement (EIS) and Addendum Report to the EIS;
- a Planning Report setting out the background and the approach to the application;
- an Architectural Report;
- plans, sections and elevations of the proposed stadium; and
- the designation of land for community infrastructure.

Should you require any further information to assist the Council reach its decision, please call me on [redacted]

Yours faithfully

[redacted]

[redacted]

Principal
Environmental Planning

DRS/USE/H00 - 726665 Version 1.0

Form 1 Development Application

idas INTEGRATED DEVELOPMENT ASSESSMENT SYSTEM

X.REF 1611/0.1.40 NL365 KN180 LL160

PART A Common details for all applications

Impact

The completion of all questions on Part A is mandatory for all applications. For further information refer to the guide for completing the application form available from the assessment manager or on www.ipa.qld.gov.au

13 SEP 2000 INFORMATION MANAGEMENT ATTACH No. A

1. Description of land

The description must identify all land subject of the application including land/easements over which access is to be obtained.

The lot & plan details (eg. SP / RP) are shown on title documents or a rates notice.

If the plan is not registered by title, provide previous lot and plan details.

Street address *(include no., street, suburb / locality & postcode)*: HALE STREET, CAXTON STREET, CASTLEMAINE STREET CHIPPENDALL STREET, MILTON QLD Postcode 4064

Lot & plan details *(Attach list if necessary)*: REFER TO SECTION 4.1 OF ATTACHED REPORT

Shop / tenancy no. *(If applicable)*: N/A

Storey / level *(If applicable)*:

Total area of land *(m²/ha)*: 5.85HA

In which local government area is the land situated? BRISBANE CITY COUNCIL

2. Proposal

Provide details of the proposal *(eg. new house / apartment building etc, demolition / removal of a house, extension to existing shop, new carport etc).*

Details of the existing use of the land *(Attach proposal report if necessary)*: REFER TO ATTACHED EIS REPORT

Details of the proposal *(Attach proposal report if necessary)*: COMMERCIAL OUTDOOR RECREATION (STADIUM AND ASSOCIATED FACILITIES); INDOOR SPORT AND RECREATION; ALL AS DESCRIBED IN ATTACHED PLANNING REPORT (5.4)

3. Other parts of the form completed

Complete all other parts of the form applicable to your application.

What other parts of the form are attached *(E.g. Part B: if the application involves assessment against the Building Act, Part D: if the application involves assessment against the planning scheme for material change of use, Part F: if the application involves reconfiguring a lot)*: PART D & E

4. Applicant details

Clearly identify who is making the application. The applicant need not be the owner of the land.

If the applicant is a company, a contact person must be shown.

All correspondence will be mailed to this address.

Name: THE LANG PARK TRUST C/- SINCLAIR KNIGHT MERZ

Contact person: [redacted]

Phone no.: [redacted]

Mobile no.: [redacted]

Fax no.: [redacted]

Email address: [redacted]

Signature: [redacted]

Date: 12.9.00

Postal address: PO BOX [redacted] SPRING HILL QLD Postcode 4004

Project No. 56459
Application No. 726665
Compliance No. 726667

5. Consent of land owner/s

Completion of this section provides the owner's consent to the lodgement of this application.

If there are multiple owners, the consent of each owner is required.

If the owner is a company refer to the guide for completing the application form.

Name *(In full) (Attach list if necessary)*: LANG PARK TRUST AND OTHERS SPECIFIED IN THE ATTACHED REPORTS & LETTERS

Signature/s *(or if a company, the ACN plus signature/s or company seal & signatures)*: [redacted]

Date: 12.9.00

Contact details *(Optional)*: [redacted]

SEAL

OFFICE USE ONLY *(applicable to assessment manager, alternative assessment manager and private certifier)*

FEE ($)		DATE RECEIVED		RECEIVING OFFICER'S NAME/S		REFERENCE NUMBER/S	

Notification of Engagement of Private Certifier *(Optional format for private certifiers)*

To__________ Council. I have been engaged as a private certifier for the building work referred to in this application.

Date of engagement: / / Accreditation Number__________

Name:__________ Signature:__________

Form 1 Development Application

idas INTEGRATED DEVELOPMENT ASSESSMENT SYSTEM

PART D

Complete if this application involves ***assessment against the***

Planning Scheme

For material change of use of premises

Completion of all questions on Part D of this form is *mandatory* for all applications for a material change of use of premises including conceptual design for any associated works that require approval under the planning scheme.

Nature of the application

A development permit authorises development to occur, while a preliminary approval is a step in the approval process and does not authorise development to occur.

1. This application is for: *(Tick one or more if applicable)*

☐ **Preliminary approval** for a material change of use of premises including conceptual design for any associated works that require approval under the planning scheme *(ie consideration of the proposal concept)*

AND / OR

☑ **Development permit** for a material change of use of premises including conceptual design for any associated works that require approval under the planning scheme.

Referral triggers

This application may trigger referral to an IDAS referral agency. These questions help identify whether referral is required.
Referral coordination occurs - when an application involves 3 or more concurrence agencies; or under transitional arrangements.
Referral coordination is further explained in the Referrals Checklist.

2. Does the application trigger referral to an IDAS referral agency? *(Tick applicable box) (Use the Referrals Checklist to determine any possible referrals for this application).*

☑ NO SEE REPORT ☐ YES ***If yes, attach Referrals Checklist***

3. Does the application trigger referral coordination? *(Tick applicable box) (Use the Referrals Checklist to determine if this application triggers referral coordination).*

☑ NO SEE REPORT ☐ YES ***If yes, attach Referrals Checklist***

SPECIAL PURPOSES (UTILITY INSTALLATION)

Details of the land

For the definition of "gross floor area" refer to the planning scheme against which the application will be assessed.

4. How is the subject land identified in the planning scheme? *(Name the zone, precinct etc.)*

SPORT & RECREATION, PARTICULAR DEVELOPMENT 92 +

5. Existing gross floor area *(If applicable)* 16 143M^2

6. Are there any existing easements on the land? *(Tick applicable box)*

☑ NO ☐ YES Attach plans of the location & purpose

Proposal details

For the definition of "site cover" refer to the planning scheme against which the application will be assessed.

7. If the application is for preliminary approval for the use of the land, provide conceptual plans and other details / reports in support of the proposal.

8. If the application is for development permit for a material change of use of premises, including conceptual design for any associated works that require approval under the planning scheme, provide the following particulars on this application form, or alternatively clearly indicate on plans or in documents accompanying this application

Site cover 51.9%

Proposed gross floor area 66 026M^2

Number of on-site car parking spaces 400 MAX

Number of storeys / maximum height above natural ground 6

Number of employees 15 F/T SEE ATTACHED EIS

Hours and days the use will operate SEE ATTACHED EIS

Plans and documents

9. Is the application accompanied by: *(Tick applicable box/es)*

☑ Plans ☐ Proposal Report

☑ Other *(Specify)* EIS, COG REPORT

This application cannot be accepted by the assessment manager unless accompanied by Part A of the Development Application

OFFICE USE ONLY *(applicable to assessment manager)*

DATE RECEIVED		REFERENCE NUMBER/S	

Form 1 Development Application — idas INTEGRATED DEVELOPMENT ASSESSMENT SYSTEM

PART E

Complete if this application involves ***assessment against the***

Planning Scheme Works

Other than involving material change of use of premises

Completion of all questions on Part E of this form is *mandatory* for approval of any works required under the Planning Scheme including:

Detailed engineering plans and other plans **requiring approval under the planning scheme**[1];

Detailed engineering plans for subdivisional works;

Conceptual design plans for engineering work and building work **requiring approval under the planning scheme**[2] when the application does not involve assessment of a material change of use of premises.

Nature of the work

A development permit authorises development to occur, while a preliminary approval is a step in the approval process and does not authorise development to occur.

1. This application is for: *(Tick one or both if applicable)*
   - ☑ Preliminary approval

   AND / OR
   - ☐ Development permit
2. If both of the above boxes are ticked, provide details below
3. Are the works subsequent to a previous development approval?
   - ☑ NO
   - ☐ YES Provide previous file reference:

Referral triggers

This application may trigger referral to an IDAS referral agency. These questions help identify whether referral is required.

4. Does the application trigger referral to an IDAS referral agency? *(Tick applicable box) (Use the Referrals Checklist to determine any possible referrals for this application).*
   - ☑ NO
   - ☐ YES *If yes, attach Referrals Checklist*

Details of the work

The type of work which is assessable against the planning scheme is determined by the scheme for a particular local government and will vary across the State. These works may include roadworks, stormwater, water and sewerage infrastructure, etc.

To determine the types of work which are assessable under a particular planning scheme, contact the relevant local government. The local government may have information sheets available which list the assessable works under their planning scheme.

5. Describe the nature and extent of works proposed:

A STADIUM AND ASSOCIATED FACILITIES WHICH INCLUDE GRANDSTANDS, CAR PARKING, PUBLIC CONVENIENCES, KIOSKS, RESTAURANT AND ADMINISTRATIVE OFFICES AND PASSENGER SET DOWN AREAS.
PUBLIC PARKLAND, PEDESTRIAN WALKWAYS, PLAZAS AND MEETING SPACES
SPORTING FACILITIES INCL. GYMNASIA, COURTS, TRAINING ROOMS, CHANGE ROOMS & ADMINISTRATION OFICES.
UTILITIES INCLUDING AN ELECTRICITY TRANSFORMER
POLICE AND EMERGENCY SERVICES FACILITIES, BUS STATION AND DRIVERS' FACILITIES.
FACILITIES FOR LIVE RADIO AND TELEVISION BROADCASTS OF SPORTING AND OTHER EVENTS.

Plans and documents

6. Is the application accompanied by: *(Tick applicable box/es)*
   - ☑ Plans
   - ☐ Proposal report
   - ☐ Other *(Specify)* Architectural Report & EIS Report

This application cannot be accepted by the assessment manager unless accompanied by Part A of the Development Application

OFFICE USE ONLY *(applicable to assessment manager)*

DATE RECEIVED		REFERENCE NUMBER/S	

[1] This form is not mandatory for non-IDAS approvals such as engineering and other works plans required to be submitted and approved to comply with specific conditions of development approvals.

[2] If the application also seeks planning scheme approval for the change of use of the premises, Part D may be used instead for both the conceptual works design and the change of use. If the application also seeks development approval of building works assessed under the Building Act, Part B must be used together with this form.

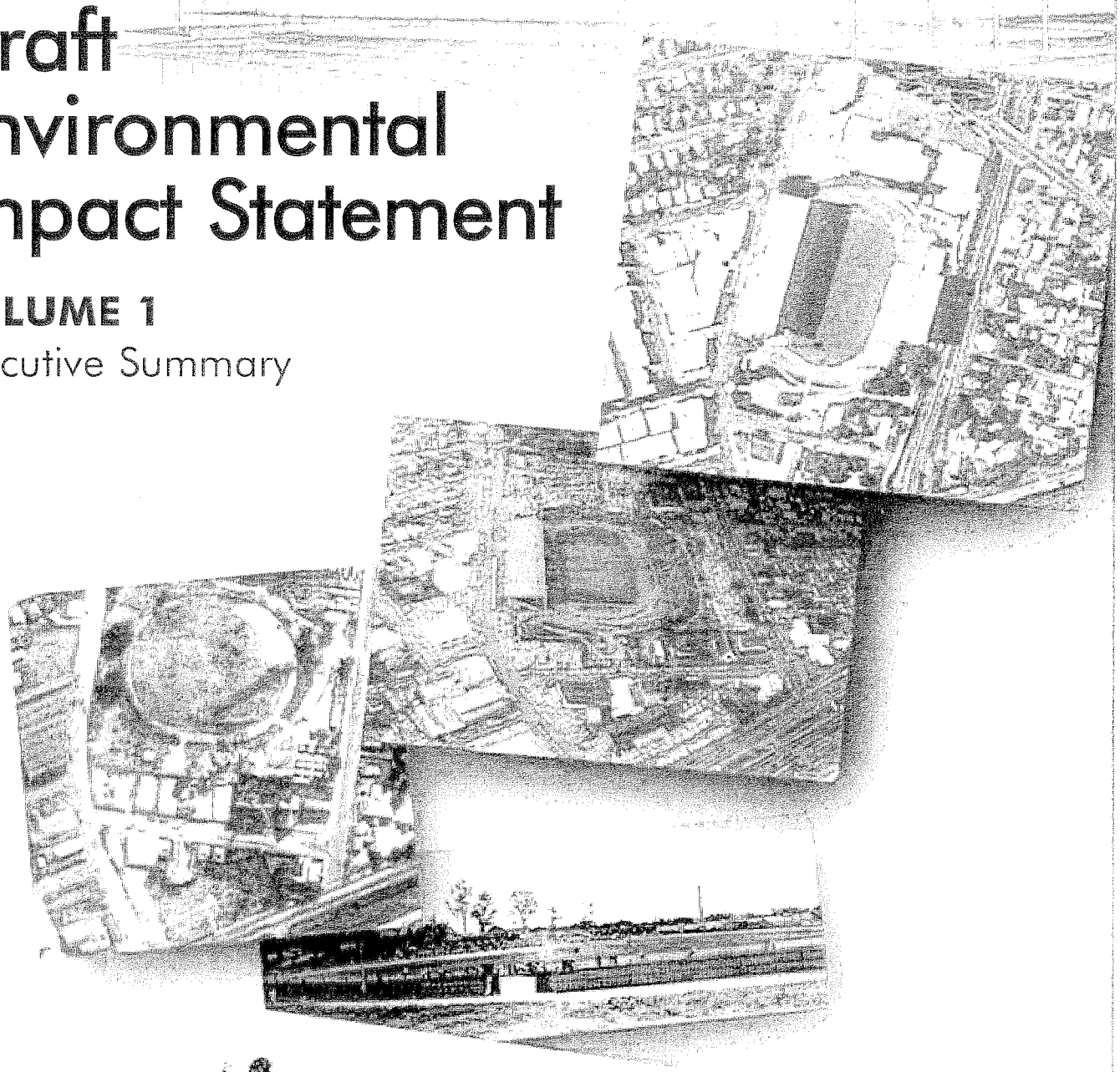
LANG PARK STADIUM PROPOSAL REVIEW

Queensland Government

Draft Environmental Impact Statement

VOLUME 1

Executive Summary



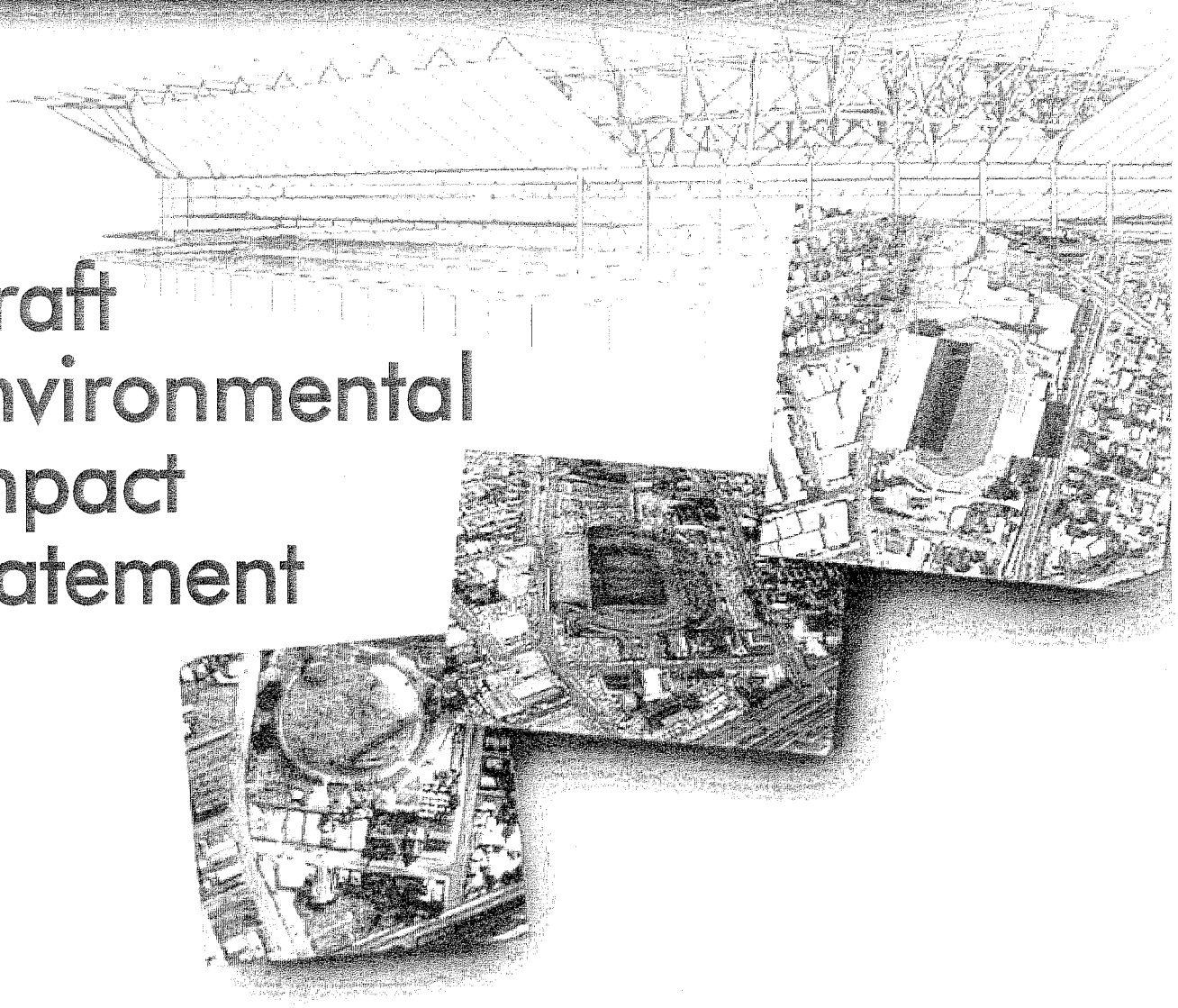
MAY 2000

SINCLAIR KNIGHT MERZ

BCC.186.0002

LANG PARK STADIUM PROPOSAL REVIEW

Queensland Government



Draft Environmental Impact Statement

SINCLAIR KNIGHT MERZ

A.C.N. 001 024 095
369 Ann Street, Brisbane, Qld. 4000
Ph: (07) 3244 7100 Fax: (07) 3244 7300

In association with

GEORGE FLOTH PTY LIMITED
CONSULTING ENGINEERS

IMPAXSIA

ELLIOTT WHITEING & ASSOCIATES

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Pacific Air & Environment

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EDAW

LANDINFO

BCC.186.0003

EIS OUTLINE

1. Executive Summary
2. Introduction
   - Description of Project
   - Alternatives to Proposal
3. Planning Context
   - Existing Environment
4. Environmental Impacts
   - Transport Impacts
5. Consultation
   - Mitigation & Management Plans
   - Approvals & Licensing
6. Conclusions
   - Appendix A Terms of Reference
   - Appendix B Study Team
7. Technical Appendices

1. Introduction & Background

On the basis of studies commenced in 1997, the Queensland Government determined that there was a need in Brisbane for a world-class stadium for rectangular pitch sporting events to complement the redeveloped world-class facilities at the Brisbane Cricket Ground, known as "The Gabba".

Following a site selection process in 1999, the Queensland Government identified Lang Park as the preferred location for a possible future rectangular pitch stadium.

In December 1999, the Queensland Government declared the Lang Park Stadium Proposal to be a project of State interest, under the State Development and Public Works Organisation Act 1971. As a consequence, an environmental impact statement was required to address the potential impacts of the proposal.

Also in December 1999, the Queensland Government issued draft terms of reference for the environmental impact statement (EIS), and then embarked upon a course of preliminary consultation to assist the community understand the proposal concept, the role of the EIS and the role of the terms of reference. The preliminary consultation also assisted members of the community in preparing submissions on the draft terms of reference.

The final terms of reference for the EIS were issued in March 2000, after the Queensland Government had considered the submissions received and made appropriate adjustments and amendments. This EIS has been prepared in response to the final terms of reference (TOR).

The investigations for the EIS have been conducted concurrently with a number of other investigations into the Lang Park Stadium Proposal. These investigations are:

- transport strategy;
- commercial analysis and feasibility; and
- master planning and concept design analysis.

Once all the investigations are complete, the Queensland Government will consider their findings and then decide whether or not to proceed with the development of the proposed stadium in this form.

The EIS investigations and the consultation process have addressed the transport strategy and the master planning and concept design analysis. The commercial analysis and feasibility investigations are the subject of commercial-in-confidence negotiations which have not been included in the EIS or the consultation process.

The integrated process has permitted community issues and certain predicted environmental impacts to be addressed and mitigated through the iterative design process. As a result, many aspects of the stadium proposal and design incorporate responses to anticipated impacts, such that these impacts either will not arise, or will be effectively mitigated.

While the iterative and integrated process has led to a sound master planning outcome, the nature of the process contributed directly to some frustration for participants in the consultation process. Specifically, the frustration arose due to the evolving approach to the form of the proposal and the overall design.

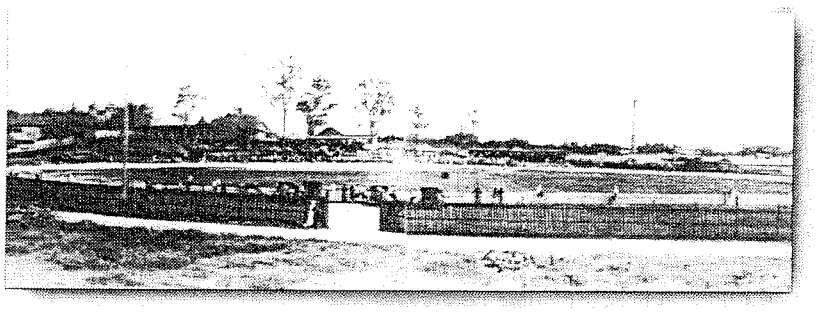
2. Description of the Proposal

2.1 Proposal Objectives

There are a number of objectives for the Lang Park Stadium Proposal. They are:

- to create a world class sports stadium with up to 60,000 seats for a range of uses including, but not limited to: rugby league, rugby union, soccer, grid iron, and entertainment events;

- to provide a focus for a sports and entertainment precinct that could be used for seven days a week through the integration of commercial and community facilities within the stadium design;



- to provide a major sports facility that will add to and enhance Queensland's major events strategy and accommodate a range of uses;

- to maximise the positive opportunities through the stadium's ancillary features and their integration with the community, as well as minimise any negative impacts of the stadium and its associated infrastructure on the local community;

  to maximise commercial investment in the stadium development to minimise its cost to the Government immediately and over time;

- to act as a catalyst for development of surrounding areas;

- to provide a transport system which safely and efficiently services the stadium for all events, creates strong pedestrian links to the CBD and maximises opportunities to enhance the amenity of the local area;

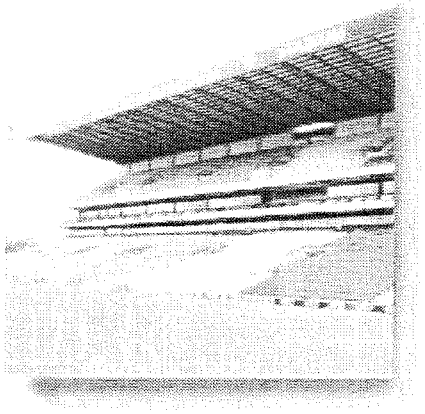
- to provide an icon building within the overall City West vision and master plan; and

- to be completed by early 2003, ready to host Rugby World Cup events.

2.2 Proposal Outline

The Lang Park Stadium Proposal includes several key elements. They are:

- a world-class rectangular pitch;
- a fully enclosed seating bowl in three main tiers, supported by six internal levels within the building. The seating bowl will have at least 80% coverage from a continuous roof on all sides of the pitch. The existing western grandstand will be retained, fitted with a new roof and refurbished to meet hirers' needs;



- two large pedestrian plazas to serve the entries and exits at the southern end and the northern end. There will be no entry or exit available at street level in Hale Street, which will mitigate crowd impacts on the nearby residential area and on traffic flows in Hale Street;
- a transport station situated under the southern pedestrian plaza and grandstand, with vehicular access off Castlemaine Street.
- pedestrian plazas and concourses extending through the stadium building to link with pedestrian walkways to the City, Milton Station and the possible light rail station in Milton Road;
- car parking for a maximum of 400 cars, in keeping with the public transport strategy; and
- dedicated pedestrian walkways to the City and Roma Street Station via Milton Road, Petrie Terrace and the rail corridor to the north of Roma Street, and via Caxton Street, Petrie Terrace and the rail corridor.

Initially, the facility design brief called for the investigation of a stadium with a seating capacity of 60,000 patrons. As a consequence of the iterative and integrated investigation process, the seating capacity has been reduced to 52,500 patrons, excluding media, management and disabled patrons and their carers.

If the Queensland Government decides to proceed with the project, the proposed stadium will be situated on land bounded by Hale, Caxton, Castlemaine and Chippendall Streets, Milton.

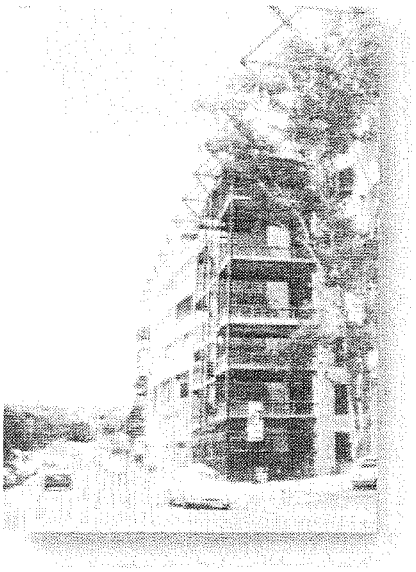
2.3 Timing & Construction

To meet the advance timing requirements of the International Rugby Board for the staging of the Rugby World Cup, the construction phase must commence early in 2001 and be completed early in 2003.

The construction phase will entail the following core activities:

- demolishing the existing Ron McAuliffe Stand on the Hale Street (eastern) side of the pitch, and demolition of the raised terraces at the northern, eastern and southern sides of the pitch;

- undertaking site preparation earthworks and the installation of deep services and some in-ground services;
- constructing the new grandstands on the northern, eastern and southern sides to link physically and functionally with the existing western grandstand;
- refurbishing the existing western grandstand;
- constructing a continuous roof over the entire stadium building, including the western grandstand;
- constructing the arena after building services;
- constructing the transport station and pedestrian plazas connecting to Milton Station, the pedestrian plaza over the southern end of Hale Street and the pedestrian plazas to the northern and southern ends of the stadium; and
- constructing of the pedestrian walkways from the stadium to the City, including structures over the rail corridor to the north of Roma Street.



If the proposed Brisbane Light Rail Project proceeds, construction of the light rail station at Milton Road and the light rail connection from Roma Street will be required at the time the light rail proposal commences in order to ensure completion prior to opening of the proposed stadium.

2.4 Proposed Transport Strategy

A public transport focussed planning strategy has been adopted based upon the objectives outlined in the State Government's Integrated Regional Transport Plan. The intention is to plan to reduce the reliance on private vehicle travel to the proposed stadium.

This EIS indicates that planning on the basis of a 20% mode split for private car would be workable in terms of public transport fleet and infrastructure requirements. To achieve this target, a strong education and marketing program would be needed to educate patrons and provide some incentive to use public transport as their means of travel to Lang Park events.

In conjunction with the education of patrons, there will need to be a mechanism introduced to actively discourage patrons from travelling by private vehicle and parking in the street system close to the proposed stadium.

Under the transport strategy, heavy rail would be promoted as the major mode of travel to the proposed stadium, potentially catering for 44% of patrons, with Roma Street Station catering for two-thirds of rail use and Milton Station the balance.

Other key components of the transport strategy required to complement the low car use strategy have been identified as:

- a travel demand management strategy involving an event-based parking restriction scheme to be implemented in local areas near the proposed stadium;

- transport infrastructure as described in Section 9.5 of this Executive Summary;

- public transport services including:
  - special train services for the event to/from Milton and Roma Street stations;
  - special direct bus services from regional centres to the bus station at the proposed stadium;
  - special shuttle bus services between the proposed stadium and the City and Southbank;
  - possible light rail distributor services between the proposed stadium and a range of locations in the CBD and Southbank; and
  - taxis and charter coaches.

- services promotions initiatives including:
  - integrated event and public transport ticketing;
  - pre-event publicity on the parking restrictions around Lang Park; and
  - pre-event public education regarding public transport options and services.

2.5 Traffic & Transport Infrastructure

The traffic & transport facilities which form part of the Lang Park Stadium Proposal include:

- rail facilities at Roma Street Station, which are considered adequate in their current form for the public transport task, and Milton Station which will require enhanced platform capacity and improved pedestrian access;

- bus and coach facilities, including an 11 bay bus station under the southern pedestrian plaza for shuttle services to the City and Southbank;

- possibly a light rail station over the outbound lanes of Milton Road. This would be served by an extension of light rail from the proposed Brisbane Light Rail Project (BLRP) in Roma Street. For operational reasons, the light rail track and station must be above and clear of the heavy rail adjacent to Milton Road, and Milton Road itself;

- pedestrian route improvements surrounding the proposed stadium and linking to Roma Street and Milton railway stations;

- bus priority measures on Milton Road and Upper Roma Street on the route between the proposed stadium and the city;

- provision of suitable facilities at the planned Countess Street busway station;

- a taxi facility in Castlemaine Street to the north of the Heussler Terrace intersection;

- a passenger set-down facility in the northern plaza, and

- an on-site carpark, including parking for persons with disabilities, for a maximum of 400 vehicles.

A traffic management and mitigation strategy recommended in this EIS is a controlled car parking scheme for the suburbs surrounding the site. This scheme is summarised in Section 9.4 of this Executive Summary and in Section 9.4 of the EIS.

2.6 Proposed Stadium Events

The anticipated events schedule for the proposed stadium, upon which this EIS has largely been based, is as follows:

Events	Frequency	Crowd Size
National Rugby League fixtures	13 per annum	25,000 – 35,000
State of Origin Rugby League	1-2 per annum	45,000 – 52,500
Rugby League international match	1 per annum	45,000 – 52,500
Rugby Union Super 12 fixtures	6 per annum	25,000 – 35,000
Rugby Union international match	1-2 per annum	35,000 – 45,000
Major cultural event	1 per 2-3 years	15,000 – 25,000
Other major cultural events	3 per annum	10,000 – 15,000

There could also be use of facilities within the proposed stadium for meetings, dinners and similar small-scale functions.

2.7 Proposed Management Arrangements

The Lang Park Stadium Proposal includes a professional approach to facility management, and specifically a crowd management strategy for counter-acting and reducing anti-social behaviour. The key features of this management approach are:

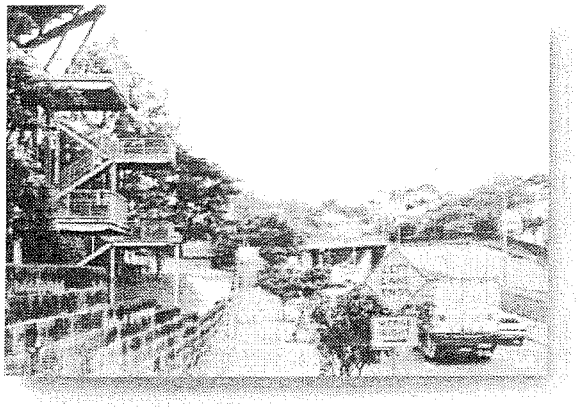
- a professional stadium management approach;
- a Code of Behaviour to be implemented and monitored at all times;
- surveillance by CCTV before, during and after events;
- an evictions and arrests policy to ensure repeat violations of the Code of Behaviour are minimised; and
- a strategy of responsible management of the sale and use of alcohol.

3. Alternatives to the Proposal

The terms of reference do not require the identification and evaluation of alternative uses of Lang Park. However, the EIS consultation process highlighted the community's desire for alternative uses to be explored.

The alternatives to the proposal evaluated in this EIS were raised by the community during the consultation process. The alternatives considered are:

- to retain Lang Park in its present form;
- to improve Lang Park with a range of low cost options; and
- to use Lang Park for activities other than sport and recreation.



Of these alternatives, the community input suggests that the use of Lang Park for open space and community uses would be likely to receive the most support (ie the use of Lang Park for activities other than sport and recreation).

At present, Lang Park is considered to be an under-utilised community resource. Also, in its present form it is considered to be unsatisfactory for the staging of frequent major sporting events due to the spill of impacts onto the immediate locality, traffic congestion and the extent of uncontrolled on-street car parking. Community input during the EIS consultation process indicated that the severity and nature of impacts arising from the existing facility are unacceptable to the local residents.

The low-cost improvement of Lang Park could entail:

- all seating accommodation for spectators, including seating for the northern and southern terraces;
- improved sports lighting for broadcast events;
- improved entries to the northern, eastern and southern stands; and
- improved bar and toilet facilities for general admission patrons, particularly those on the northern and southern terraces.

While these improvements are likely to lead to an increased utilisation of Lang Park, they would not resolve the spill of impacts onto the immediate locality.

From the consultation process, suggestions have been received for other uses of Lang Park. Suggestions have included:

- razing the existing facility and returning the site to public open space;
- redeveloping the site for multiple uses including sport and recreation (PCYC and Ozsports), residential and commercial (neighbourhood supermarket); and
- redeveloping part of the site to extend the "pub and café" character to link Given Terrace with Caxton Street.

None of these options recognise the status of Lang Park as a cultural heritage icon in terms of its links to rugby league and to the development of sporting facilities in Brisbane. All options are in conflict with the intentions of the City of Brisbane Town Plan (1987) and the draft Brisbane City Plan. Furthermore, and with the possible exception of the open space option, none of these options respond adequately to the environmental issues raised in consultation.

None of the alternatives raised are considered to present realistic and achievable uses of a substantial community resource of long standing.

4. Planning Context

The planning context of the Lang Park Stadium Proposal is affected by two planning instruments, being:

- Brisbane Town Plan 1987 (regarded as a transitional Planning Scheme in accordance with the Integrated Planning Act 1997 (IPA)); and
- The Modified Draft Brisbane City Plan (November 1999), which will be regarded as a fully compliant IPA scheme when finally adopted.

In the context of the Brisbane Town Plan 1987, the Lang Park site is zoned "Sport and Recreation", and "Particular Development (Development in accordance with the Lang Park Trust Act)". The proposed stadium use would be considered to be commercial outdoor sport and recreation equiring Impact Assessment for a development permit. Impact Assessment confers appeal rights on third parties that have made proper submissions to this EIS but only in respect of those components of the application requiring such assessment.

If land beyond the site is required for transport infrastructure, that development application also may involve Impact Assessment. Those components of transport infrastructure which are required other functions in addition to supporting the operations of the proposed stadium (eg light rail), may be exempt from assessment under the Integrated Planning Act.

In the Modified Draft City Plan, the site is a "Special Purpose Centres – Major Sporting Stadium" area. The proposed use for a major sports stadium would be consistent with the future planning for the site. Under the Modified Draft City Plan, the Lang Park Stadium Proposal would be assessable as "Code Assessment" for development in accordance with specified Codes for Special Purpose Centres.

The transport infrastructure situated on the site would also appear to be Code Assessment as an ancillary component of the primary use. Again, some elements of transport

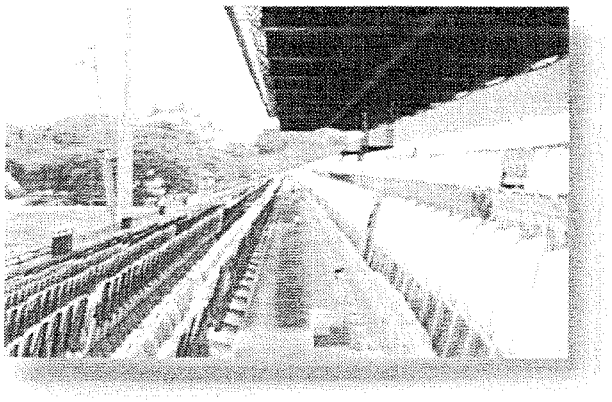
infrastructure may be exempt from assessment under the Integrated Planning Act. The code assessment process does not confer appeal rights on third parties who have lodged properly made submissions to the EIS.

There are fundamental differences in approach towards the possible future development of a stadium at Lang Park between the Town Plan 1987 and the Modified Draft City Plan.

A local area planning process for the Ithaca area is being undertaken by the Brisbane City Council. The Ithaca Local Area Plan had not been drafted at the time of preparation of this EIS.

The Modified Draft City Plan has recognised Lang Park as a suitable site for a major sporting stadium for which only code assessment would be required. In this sense, the proposed stadium is consistent with the intentions of the Modified Draft City Plan, which in turn is obliged to reflect the broad strategic directions of the Regional Framework for Growth Management (RFGM).

The RFGM is a primary outcome of the Queensland Government's SEQ2001 Project. The RFGM contains broad regional strategic planning elements which are difficult to apply directly to individual development proposals. However, as it is the output of a regional planning advisory committee, the RFGM has some weight as a matter for inclusion in the planning scheme (ie City Plan).



The City West Vision is an overview of the major projects in planning or underway in the City West precinct. While the vision has no binding statutory weight, it provides a conceptual framework for considering the cumulative effects of a number of major projects, and for weighing the opportunities for integration between them.

Key elements of the City West Vision include:

- a sports precinct for elite and recreational athletes (Lang Park);
- a world-class garden and park land (Roma Street);
- a cultural precinct embracing all of the art forms (Queensland Cultural Centre, Southbank);
- an integrated urban village (Gona Barracks at Kelvin Grove);
- a transport hub at Queensland Place and possible redevelopment of the Transit Centre; and
- the possible redevelopment of Victoria Barracks.

5. Description of the Existing Environment

The existing environment has been investigated to provide a background understanding of the existing conditions of Lang Park and the locality, and to describe the current impacts of operations of the existing stadium on the environment.

5.1 Location & Situation

Lang Park is situated on the western fringe of the Brisbane Central Business District. It is readily accessible, by a variety of transport modes, to the populations of Brisbane and South East Queensland. Population growth in the City and the region is expected to remain strong over the fifteen year period from 2001 to 2016 (Department of Communications and Information, Local Government and Planning 1999).

5.2 History of Lang Park

The site, prior to urban development in the 1870s, was a swampy area often inundated in prolonged wet weather. Prior to urban development, the area was part of the Turrbal People's area. There is no record of this area being used for ceremonial or other purposes by indigenous people.

From 1843 until approximately 1900, the site was used as the main burial ground for Brisbane. From that point, the burial grounds were not used and most of the headstones and remains were removed to the Toowong Cemetery. This task was substantially completed by mid 1914. Several headstones remain in the cemetery as evidence of the earlier use of the site.

The site then evolved into a sporting area with an oval for amateur athletics, cricket, football and tennis courts. The lease for Lang Park was granted in 1954 to the Queensland Rugby League, with the Queensland Amateur Athletics Association as sub-lessees. Since then, the site has been improved in terms of the playing surface and facilities. In 1962, the Lang Park Trust Act commenced and has since been amended in 1994. The Act established the Lang Park Trust which continues to administer the site and stadium today.

Several improvements to Lang Park have occurred since. The most notable of these improvement are the erection of the Frank Burke Stand in the early 1960s, the erection of the Ron McAuliffe Stand on the eastern side in the mid 1970s, and the redevelopment of the Frank Burke Stand to create the Suncorp Metway Stand in 1994-95. Throughout this period of development Lang Park has hosted many major athletics and football championships, interstate matches and international matches, or "tests".

Lang Park is synonymous with rugby league in Australia, Queensland and Brisbane. For many years it was also the venue for major athletics meetings, including international meetings. It is an important part of Brisbane's sporting and social fabric.

5.3 Existing Facility

The existing Lang Park Stadium has a total spectator capacity of 42,000, accommodated in two grandstands and an extensive area of terraces which do not provide individual seating.

The existing facility is a shallow open bowl, particularly at the northern and southern ends. Lighting of the playing surface is provided from four towers at the corners of the field, with additional lighting provided from the leading edge of the roof of the Ron McAuliffe Stand. Additional lighting is required for the broadcasting requirements of night matches.

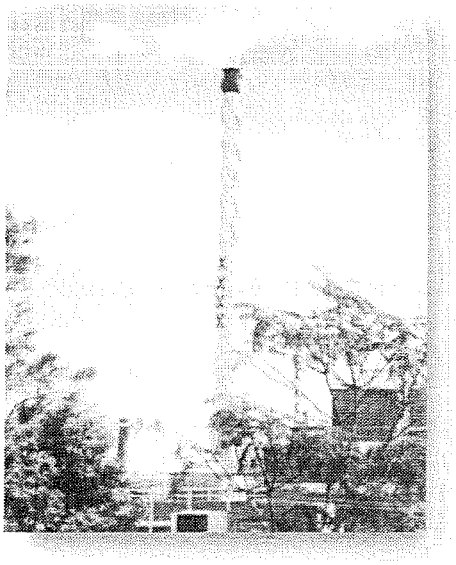
As a consequence, light spills from Lang Park and causes nuisance to the nearby residences, particularly in Hale Street and Castlemaine Street.

The open character of the existing facility also permits noise from crowds, public address systems and entertainment to 'break out' of the venue and affect residents in the nearby streets. Furthermore, the movement of crowds through the residential areas to parked cars can cause nuisance from noise, particularly after an event.

There is limited car parking available at Lang Park, with unsealed parking areas to the north and south of the western grandstand. For major events, patrons usually access the venue by private cars parked in the surrounding streets, public transport including trains to nearby Milton Station, long distance coaches, and by walking from the City.

5.4 Existing Land Uses

Lang Park is situated in the inner suburban belt of Brisbane. The diversity of the surrounding land uses reflect this location. There are residential areas, service trades areas, restaurant and entertainment precincts, industrial areas and institutional land uses.



Lang Park provides a demarcation between the historic residential area of Petrie Terrace and the industrial areas characterised by the landmark Castlemaine Perkins "XXXX" Brewery.

There is a shortage of public open space in the locality, with the most notable facility being the Neal Macrossan Playground to the north of Caxton Street.

5.5 Urban Landscape

The urban landscape setting of Lang Park has been assessed in terms of its regional and local context.

In the regional context, the urban form can be described as a major metropolitan area with Lang Park sitting in a disjointed open space network which includes the RNA Showgrounds, Victoria

Park and the developing Roma Street Parklands. The proximity of Lang Park to the Brisbane CBD is influential on the urban landscape, such that the existing structure becomes less visually significant.

In the local context, the Lang Park view shed is categorised into five precincts which vary in character from residential on steep to undulating land to historic residential. Beyond these precincts the industrial buildings, such as the Castlemaine Perkins Brewery, become visually significant.

The visual and landscape impact of the existing Lang Park Stadium is considered to be significant in the local context and much less so in the regional context. In particular, the nearby residential areas are impacted upon by the existing stadium buildings on Hale Street and Castlemaine Street.

5.6 Cultural Heritage

The site is situated in one of the older areas of Brisbane and has many connections with the early development of the City, including its use as the main burial grounds for a period of approximately 60 years in the nineteenth Century.

Lang Park is not listed on the Queensland Heritage Register. Even so, its long established use for sports and recreation, and since the mid 1950s for Rugby League and athletics, give it considerable cultural heritage importance.

There are a number of places in close proximity to the site which are included on the Queensland Heritage Register. These include:

- the Christ Church and environs, abutting the site in Hale Street;
- the Baroona Special School opposite the site on the corner of Hale Street and Milton Road, part of which is required for the extension of a pedestrian walkway to service the proposed stadium;
- the former Police Barracks site on Petrie Terrace, part of which is required for the extension of a pedestrian walkway to service the proposed stadium; and
  the Neal Macrossan Playground to the north of the site in Caxton Street;

There are a number of other places of cultural heritage significance in the locality, but which, because of their physical separation from the site, are not relevant to an assessment of the proposal.

5.7 Existing Traffic, Transport & Pedestrian Environment

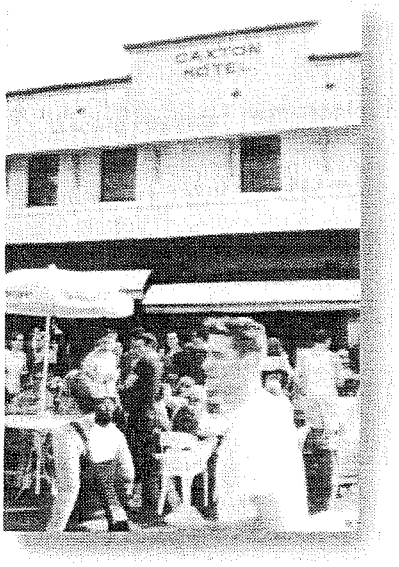
5.7.1 Existing Traffic Conditions

Lang Park is located in close proximity to two major arterial road links, Hale Street and Milton Road. Both roads carry major traffic volumes, 45 000 and 50 000 vehicles per day respectively, and are projected to carry increases in traffic use upon the completion of Brisbane City Council's Inner City Bypass in late 2002. Milton Road experiences congested operations at several intersections during peak periods.

The stadium is also accessible by the suburban route formed by Caxton Street and Given Terrace. Castlemaine Street, which serves the adjacent commercial/industrial precinct including the nearby brewery, fronts the western stand.

5.7.2 Existing Public Transport

There is no dedicated public transport infrastructure directly servicing Lang Park.



The Western Line operated by Queensland Rail runs adjacent to Milton Road. Milton and Roma Street Stations are the closest to the stadium being about a 650 metres and 1 kilometre walk respectively. Roma Street is a major CBD rail hub and is designed to cater for large volumes of passengers and trains. Milton is a suburban station with four platforms available for use.

There are a range of Brisbane Transport regular buses associated with local and western corridor services operating on roads around the Stadium.

Busway stations are planned at Roma Street and Countess Street in conjunction with the Inner Northern Busway project due for completion by 2003. A high frequency bus system is proposed to utilise these facilities. The planned Brisbane Light Rail Project system is intended to serve light rail stations at Roma Street, potentially Countess Street and at Milton to serve the proposed stadium.

5.7.3 Existing Traffic & Transport Operations for Lang Park Events

For major events at Lang Park special traffic arrangements are made in the locality to manage the traffic impacts and congestion caused by extensive on-street car parking.

The current mode split for major events is over 50% of travel occurs by private vehicles. Data indicates that private car use to Lang Park has probably increased over the last 6 years. Rail travel is the most important public transport mode, although currently the majority of use occurs from Milton Station. A small number of special trains are provided for major events.

For major matches around 30% of travel originates from outside the Brisbane area. Coaches are an important form of travel for this market segment. Coaches park in the adjacent streets around Cordova Street to the west of Castlemaine Street.

Some shuttle bus services are provided between Lang Park and the City, and some direct buses are provided to and from regional bus stations in suburban Brisbane. These buses set-down and pick-up at kerbside locations on the surrounding roads including Hale Street.

Hale Street, a major road in Brisbane's regional network, is closed to all north bound traffic except buses serving Lang Park for about a 2 hour period encompassing a major event finish. This is to provide for pedestrian safety in the area due the constrained area available for bus patrons and pedestrians exiting Lang Park towards Milton Road and Caxton Street.

Considerable conflicts and pedestrian congestion occur due to the lack of footway width to accommodate people travelling in opposite directions generally along this eastern frontage.

5.7.4 Existing Pedestrian Movements

Prior to a major event there are problems experienced with pedestrian movement along Caxton Street due to the physical constraints imposed by the footpaths and activity from adjacent hotels and venues.

Safety issues currently arise for pedestrian movement from the venue after a match, particularly along Milton Road and Upper Roma Street towards the City, and along Milton Road towards Milton Station where existing footpath widths are insufficient to cater for peak demands.

Long delays are experienced by pedestrians on the Hale Street overbridge and pedestrian flows spill over into the traffic lanes on Milton Road and Upper Roma Street at times. This in turn contributes to traffic congestion, management problems and safety issues.

Special duty Police officers are used post-event for traffic, pedestrian and crowd control activities.

5.8 Existing Social Environment

In order to gather information about community perceptions of the proposal for the social impact assessment, a series of face to face interviews with near neighbours, community members and local businesses was undertaken. Focus groups with identified communities of interest and a survey of the greater Brisbane area were also completed. In addition, the social impact assessment drew on the results of the EIS consultation process.

The study area for the social impact assessment is located in Brisbane's high-income, inner western suburbs. Community members value the support networks offered by a sense of community, although some long-term residents have reported a gradual decline in the cohesiveness of the community. The area is also frequented by people from surrounding areas attracted to the coffee shops, nightclubs and specialty shops in the area.

The community from the residential areas nearby Lang Park already experience effects from the existing stadium.

5.9 Existing Flora & Fauna

Because the site is situated in a highly developed and modified environment, the flora on and around the site is comprised of a mixture of native and exotic species.

The flora of Lang Park consists mainly of planted trees and shrubs. Most species planted are commonly found in the urban landscapes of Brisbane. Within Lang Park itself, there are several trees which are notable for their size and landscape value. These include two fig trees adjacent to the north-west corner of the existing stadium. These trees were planted in excess of 40 years ago. None of the trees within Lang Park are covered by a vegetation protection order issued by the Brisbane City Council.

In the vicinity of Lang Park there are some visually significant trees in Neal Macrossan Playground (small leafed fig, Queensland blue gum, hoop pine). These trees form a green portal to Given Terrace and Caxton Street. They are also covered by a vegetation protection order issued by the Brisbane City Council.

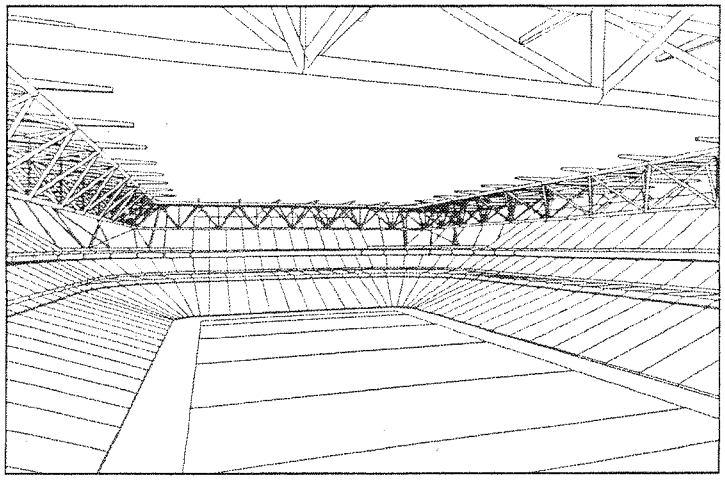
To the south on Milton Road, there is a cluster of trees in the grounds of the Baroona Special School. These trees include some well established fig trees and frangipanni. They also have landscape and cultural heritage values.

The fauna most likely to inhabit the neighbourhood of Lang Park include birds, small mammals, reptiles and insects. A total of nineteen bird species were observed on and around the Lang Park site. None of these species are listed in conservation agreements or conventions. Some of the mammals observed in the vicinity of Lang Park included gliders, flying foxes, possums and bandicoots. Although two species of reptile could be expected in the vicinity of Lang Park, according to Queensland Museum and Wildnet data, none were observed.

All of the species of fauna are common to the urban areas of Brisbane.

5.10 Impacts of Existing Lang Park Stadium

Major events at the existing stadium occur several times each year and include at least one State of Origin interstate rugby league match, and possibly one or more rugby union internationals. Major events at Lang Park currently impact upon the residents of the immediate locality by:

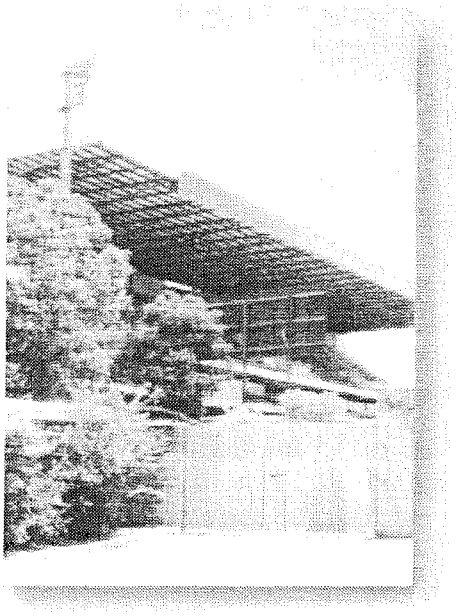


- causing light spill;
- noise from crowds, the public address system and pre-match entertainment;
- traffic congestion in local streets and on the arterial roads leading to and beyond the site;
- parking congestion in local streets, such that residents and businesses have difficulty in accessing their properties on some occasions;
- anti-social behaviour by patrons before and well after matches, as a consequence of excessive drinking, often at venues other than Lang Park;
- littering and property damage on some occasions, often as a consequence of excessive drinking; and
- general disruption to lifestyles in the period leading up to, during and immediately after a major event.

Smaller events, say with crowds less than 10,000 people, seem to be less intrusive, except for the light spill and noise.

6. Environmental Impacts of Lang Park Stadium Proposal

The assessment of impacts has been divided into stadium construction impacts and stadium operational impacts. The transport strategy and infrastructure impacts are discussed in Section 7 of this Executive Summary.



The predicted impacts of stadium construction, including construction of the transport station and possible light rail station include:

- air quality impacts;
- acoustic impacts;
- lighting impacts;
- site impacts;
- waste management impacts;
- transport impacts;
- social impacts;
- cultural heritage impacts;
- flora and fauna impacts;
- public safety and risk; and
- emergency services impacts.

The predicted impacts of stadium operation include:

- air quality impacts;
- acoustic impacts;
- lighting, electrical and telecommunications impacts;
- site impacts, including surface and ground water;
- waste management impacts;
- visual and landscape impacts;
- cultural heritage impacts;
- land use and urban character impacts;
- social impacts; and
- economic and business impacts.

6.1 Construction Impacts

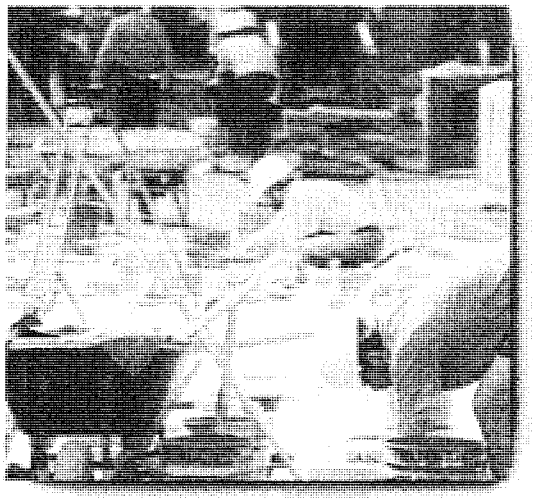
Without the implementation of common construction practices for dust suppression, there is the potential for **impacts on air quality** during construction, mostly from dust arising from demolition of the existing McAuliffe Stand, but also from the movement of heavy vehicles, earthmoving plant and equipment.

The potential exists for **acoustic impacts** from earthmoving plant and equipment, and tower cranes if they are used for construction. The impact assessment has predicted that

noise levels at the source for this equipment would be above background levels. The assessment also indicates that with the separation distances involved for most residential properties, the noise will be below background levels.

The potential for noise impact and nuisance is greatest for nearby residents with lesser separation distances, particularly when out of hours work is involved.

If the light rail project proceeds and the service extended to Lang Park, there will be construction out of hours to accommodate the operational requirements of Queensland Rail. Consequently, there will be the potential for noise impacts from infrastructure works for the light rail component.



With the careful positioning of appropriate forms of night lighting, it not expected that the construction phase will cause nuisance or impacts from light spill. Particular care is required with security lighting and flood lighting during periods of out of hours work.

With the implementation of standard site practices, the primary site impacts of soil erosion and sedimentation should be avoided. The potential exists during the preparatory earthworks and demolition to release contaminated leachates and residues from the former use of the site for a landfill. Monitoring of run-off and groundwater conditions will be required to detect these potential impacts.

To avoid the impacts of excessive waste, site waste management procedures will be required.

The potential **transport impacts** of the construction phase include:

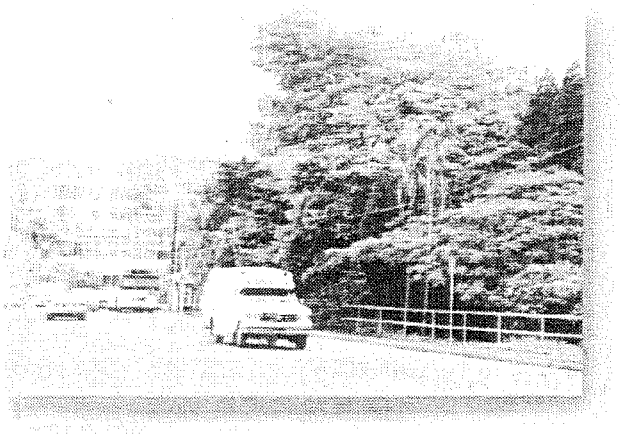
- the impacts of the construction workforce on the local street system in terms of capacity, safety and amenity and car parking demand;
- the impacts of the construction vehicles transporting materials to/from the site on the road network in terms of haul routes, network and intersection capacity, safety, amenity and the movement of over dimensional vehicles to/from the site;
- the specific needs of the various construction activities in terms of road closures and impacts on the existing rail network including coordination of the major traffic management activities with those of the other major projects in the CBD area; and
- the impacts of construction traffic on the life of pavements on the major access routes to/from the site.

The potential **social impacts** of the construction phase include disturbance from noise intrusion, extended working hours, traffic congestion and heavy vehicle movements at night. There are recommendations for managing these effects. However, the prolonged construction period is likely to affect people's satisfaction with their suburb and lifestyle.

The potential **cultural heritage impacts** include the potential for causing of structural damage or other forms of property damage to the adjoining Christ Church and the cemetery and rectory. It is also possible that construction works could impact upon the values of the Baroona Special School and the former Police Barracks if particular care is not taken. Damage to the buildings and their vegetation will affect the values of these places.

A structural audit of the Christ Church is warranted prior to the commencement of construction.

The potential for **impacts on the flora and fauna** of the locality is greatest in the grounds of the Baroona Special School along the Milton Road side of which a pedestrian walkway is proposed to be constructed. All the vegetation on Lang Park itself is to be removed, with the exception that the fig trees adjacent to the northern end of the western grandstand have been recommended for relocation to the northern pedestrian plaza.



The removal of trees from the site will result in the loss of shelter and refuge for some fauna species such as birds, arboreal mammals, reptiles and amphibians. The less mobile of these species are unlikely to relocate and could be lost without rescue.

The potential impacts of construction on **emergency service access** relate primarily to the local street network, particularly during periods of temporary road closures. With road closures, it is standard practice for the contractor to liaise with the Brisbane City Council and the relevant emergency service authorities to ensure that access to residential and other areas can be obtained freely at all times.

5.2 Operational Impacts

There are not expected to be any noticeable **impacts on air quality** from the proposed stadium other than the possible build-up of fumes from long distance coaches stored in the Cordova Street area to the west of the stadium. A simple operational strategy, such as the request for delayed start-up of these coaches, will alleviate any difficulties in this area.

The potential for **acoustic impacts** from a capacity crowd in the proposed stadium will be substantially less than for a capacity crowd in the existing facility. This will be a direct benefit of the enclosed bowl design adopted in the master planning process.

The design also directs pedestrian movement towards the dedicated walkways, transport station, possible light rail station and Milton Station, all of which are away from residential areas. The public transport strategy is intended to minimise the use of private vehicles to access the proposed stadium, thereby reducing the need for patrons to walk through residential streets, causing nuisance with their noise.

There should be no significant acoustic impact from the public transport station situated at the southern end of the proposed stadium.

With the adoption of modern and readily available technology, and proper stadium management practices, the use of helicopters for live television broadcasts should be discouraged. The only noise intrusion from helicopters should be in emergency situations.

The potential for **impacts from stadium lighting** should be substantially reduced in comparison with the existing facility, owing to the enclosed nature of the proposed seating bowl and the positioning of the major light sources under the enclosed roof.

With careful design in accordance with the measures recommended in this EIS, there should be little or no impact from night lighting and security lighting upon the nearby residential areas.

The potential for site **impacts upon the surface and ground water resources** includes possible nutrient enrichment of the run-off waters, to levels similar to other major sporting venues in Brisbane. Overall, it is expected that the impacts on water quality will be marginally less than for the existing facility due to the extended roof area and the removal of landfill and other material under the existing terraces.

With appropriate and modern management practices, there should be no impacts arising from the generation of wastes. The usual practices for **trade waste** collection will be engaged.

The proposed stadium and associated infrastructure will give rise to a number of **impacts on the urban landscape.** The stadium building will present a large bulky appearance to the Hale Street frontage, with significant visual impacts on the residents in this part of Petrie Terrace. The design treatments will succeed in reducing the visual impact to some extent, but will not succeed in reducing the walling effect of the building when viewed from the Petrie Terrace streets to the east of Hale Street.

The significance of the visual impact of the proposed building will be much lower in other places within the locality owing to the absence of many vantage points.

The height, scale and bulk of the proposed building will over-whelm the adjoining Christ Church without modification to the building design. The severity of this impact is subjective, when considering that contrasts in building form and size in other circumstances are often of interest (eg Ann Street Uniting Church, St Stephen's Cathedral).

The provision of the pedestrian plaza over the southern end of Hale Street will succeed in improving views of Hale Street that were lost with the construction of the Hale Street upgrade.

The possible light rail station over part of Milton Road and the extension of the light rail above the heavy rail corridor beside Milton Road will result in significant visual impacts for which there are no apparent or effective mitigation measures.

The potential for impacts on the **cultural heritage values** of significant places adjacent to the site is considerable.

The proximity of the proposed stadium and the movement of crowds nearby has the potential to reduce the cultural heritage value of the Christ Church and its environs. The provision of the Hale Street pedestrian plaza will enhance the utility of the church and will assist in restoring the connections between the church precinct and Petrie Terrace.

However the impact on the cultural heritage value of the church and the cemetery, through the great contrast in built form and prolonged over-shadowing in the winter months, needs to be further addressed in the detailed final design of the proposed stadium.

There is a potential impact on the cultural heritage values of the Baroona Special School, through the re-orientation of the classrooms and construction of the pedestrian walkway beside Milton Road. Particular care is required to ensure that architectural features of the building and vegetation within the grounds are protected during the construction phase and subsequently, during the operations phase, from the effects of pedestrian movement.

The movement of pedestrians through the former Police Barracks site is not likely to diminish the cultural heritage values of that place owing to its current use as a car park and the presence of nearby uses such as night clubs.

The proposed stadium, as a redevelopment of an existing land use will not **impact upon he land use pattern** of the locality. The proposal is in keeping with the existing and future planning intentions of the Brisbane City Council as reflected in the 1987 Town Plan and the Draft City Plan respectively.

The proposed stadium, through its physical presence will change the urban character of the immediate setting, particularly to the east of the site. However, this change will be off-set partially by the provision of a range of public amenities such as the public plaza and local park adjacent to Caxton Street, and the extension of the pedestrian environment through the site by concourses connecting Caxton Street with Milton Road and Milton Station.

The change in character should also be considered in the context of the continual evolution of Lang Park, and the development of non-residential activities to the west and south-west of the site. This cycle of change and evolution is characteristic of other elements of major infrastructure (eg the Brisbane Cricket Ground, or "the Gabba").

The **potential social impacts** of the operational phase of the proposed stadium include:

- effects on community character and cohesion.

  There is a section of the local community which does not want the proposed stadium to the redeveloped under any circumstances. For these groups there may be nothing that can mitigate the perceived loss of lifestyle and character associated with the proposed redevelopment.

  There are also a number of local community members who are supportive of the proposed stadium, and who would like to see the site better used. This group also see advantages for their lifestyle in the proposal. The use of extensive consultation during the developmental stages of the proposal has resulted in many of the activity needs of these interest groups being accommodated in the proposed stadium design.

- effects on nearest neighbours such as noise, dust, lights and night, crowd behaviour after an event, parking difficulties, litter, traffic congestion and parking.

  The proposed stadium is designed in such a way that noise and light spill will be significantly reduced in comparison with the impacts of operations of the existing

stadium. In addition, the proposed parking controls and integrated transport strategy are expected to have a positive effect on the current situation by eliminating existing problems.

Rubbish bins need to placed along the pedestrian walkways and a clean-up program for nearby streets is proposed to address community concerns regarding littering.

- Effects of potential parking restrictions on local residents.

  There remains a concern in the local community however, that the parking proposals will not work.The increased frequency of events may create a necessity for local residents to plan around the proposed event schedule more closely than they do at present.

- Effects on local businesses including parking restrictions and increased business in the area.

  No new retail opportunities are included in the Lang Park Stadium Proposal. Therefore there is not expected to be competition with the local business community.

  Some restaurants and cafes along Caxton Street and Given Terrace are concerned that their activity patterns may be affected when the proposed parking restrictions coincide with busy Friday and Saturday night trade for the food outlets. The temporary closure of Castlemaine Street may prevent or deter customers from visiting retail outlets in the light industrial area. As is the case with the existing situation, staff wishing to work on weekends may be unable to park close to their premises during events.

The proposed stadium will lead to a range of **economic impacts** including:

- the creation of at least 496 jobs through direct employment during construction, with direct income benefits of $60 million. The construction phase will create at least production-induced 340 jobs, with a total employment impact of 836 additional jobs;
- the operational phase will create 15 full time jobs and up to 400 part-time and casual jobs for events;
- the direct salary income generated by the operational phase is estimated to be $8-9 million with incremental employment for an additional 40 people; and
- the hosting of major events, such as the Bledisloe Cup for rugby union internationals between Australia and New Zealand will result in significant economic benefits in direct and flow-on income.

The potential impacts on the **emergency services and public safety and risk** are addressed through the proposed mitigation and management strategies. The impacts of the existing facility on the emergency services relate to traffic congestion and car parking in local streets. The impacts on public safety and risk are to be addressed in the detailed design phase of the project should it proceed. The relevant authorities have indicated their desire to participate in the detailed design process to ensure that the relevant safety standards can be and will be met.

7. Transport Impacts

The operational transport impacts associated with the proposed stadium and the proposed transport strategy are :

- the proposed controlled parking scheme will have impacts on patrons and employees of businesses in the area who wish to park for longer than 2 hours during an event;

- regular rail services will be more heavily utilized in conjunction with events and special train services will be required;

- improvements to Milton Station will provide benefits for everyday commuter use;

- the location of a bus station at the southern end of the proposed stadium will present a significant improvement to current provisions for bus travellers to the stadium. Bus operations concentrated in this location have a minimal impact on road network efficiency;

- provision of pre-event special direct bus services and shuttle services will require use of some reserve buses from the Brisbane Transport fleet for events that coincide with commuter peaks;

- provision of Countess Street bus station facilities will provide the local community with a quality busway station earlier than programmed for the Inner Northern Busway Project;

  pedestrian accessibility and safety between the proposed stadium and transport nodes will be vastly improved compared with the current situation;

- the upgraded pedestrian routes will be beneficial for local community use and improve pedestrian accessibility generally to the CBD, Roma Street Station and Southbank;

- the provision of elevated pedestrian bridge crossings of Milton Road near the proposed stadium, Countess Street and Upper Roma Street will provide for safer pedestrian links for everyday use across very busy arterial roads;

- there will be minimal overall impact on the regional road network. However, there will be localised congestion at the Milton Road/Cribb Street intersection before and after major events. Police control will be used to resolve traffic and pedestrian priorities at this and other key locations. Local traffic congestion is not forecast to occur on a widespread basis as experienced currently for major events;

- the provision of a contra-flow bus lane on Upper Roma Street, associated bus-priority and pedestrian improvements at the intersection of Upper Roma Street/Milton Road/Petrie Terrace in conjunction with the proposed Light Rail link to the proposed stadium will yield travel benefits for public transport vehicles for both the proposed stadium and general use;

- the management of traffic use of Caxton Street between Petrie Terrace and Hale Street to provide pedestrian access improvements, both prior to and after major stadium events, and after typical size events, will result in delays for local traffic for short periods;

- the proposed Caxton Street temporary traffic/pedestrian traffic management will impose restrictions on accessibility to frontage properties. Accessibility for streets in the precinct south of Caxton Street would be maintained during all events;

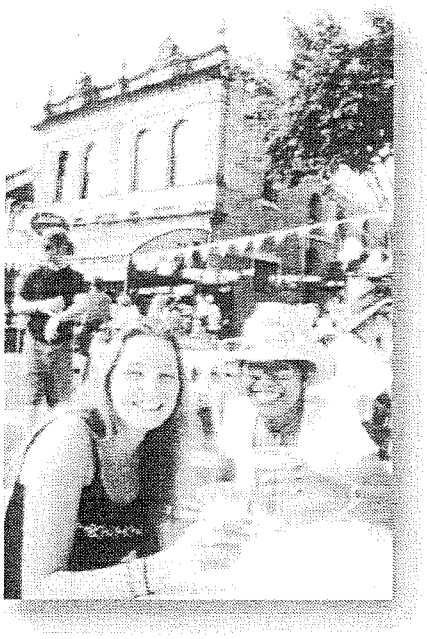
- the continued use of local streets west of the proposed stadium for coach parking may result in some adverse impacts on nearby residential local areas due to coach movements via Heussler Terrace post-event;

- the continued provision of a taxi rank on Castlemaine Street may result in some adverse impacts on nearby residences post-event due to the period of operation; and

- on-site car parking and access arrangements will be improved compared to the current situation.

8. Consultation

A preliminary programme of community consultation relating to the Lang Park Stadium Proposal, commenced in December 1999. The main purposes of this programme were to inform the community of the nature of the proposal, to obtain views in relation to the draft terms of reference for the EIS, and to assist the community to understand the EIS submissions process. This preliminary programme concluded in mid February 2000 with the closure of submissions to the draft TOR. A total of 100 submissions were received from community groups, individuals, State agencies and the Brisbane City Council.



The submissions were considered by the Department of State Development. A report was then presented to the Coordinator-General relating to the possible inclusion of the matters raised in the final terms of reference.

The EIS team committed to an extra-statutory consultation process, in recognition of the level of interest in the proposal, and the value of local experience in evaluating the existing environment and identifying potential impacts.

The consultation process provided regular information sessions and participation exercises with respect to the proposed design, impact assessment and development of mitigation strategies. Consultation strategies included:

- two workshops and seven consultation clinics;
- interviews with near neighbours and local businesses;
- meetings with stakeholders;
- discussions with focus groups;
- a survey of local and Greater Brisbane residents; and
- provision of newsletters and telephone information.

Key findings of the consultation included:

- the community's views on the proposal varied, with even support for, and disinterest in the proposal. Llocal opposition was slightly higher. The general population's support was slightly higher than in the local area, and higher than those who were opposed to the proposal;

- events held at the existing stadium produce negative impacts such as parking conflicts, traffic congestion, noise, and anti-social behaviour. Residents are concerned that the increased frequency and magnitude of events at a redeveloped stadium would increase negative impacts. These concerns relate to construction, operations and the physical existence of the stadium;

- the heritage, character and social environment of the area are highly valued. Residents who attended workshops and clinics held serious reservations about potential threats to the maintenance of these valued features. The majority of residents who attended the workshops and clinics were strongly opposed to redevelopment of the site. Other consultation participants identified both positive and negative impacts; and

- potential community benefits of the proposal include more integrated public transport, better pedestrian links, improved community facilities, and reduction of some current negative impacts.

Several design features were developed in response to community needs and concerns in order to improve community safety and amenity. Key mitigation strategies suggested by the community, should the proposal proceed, include:

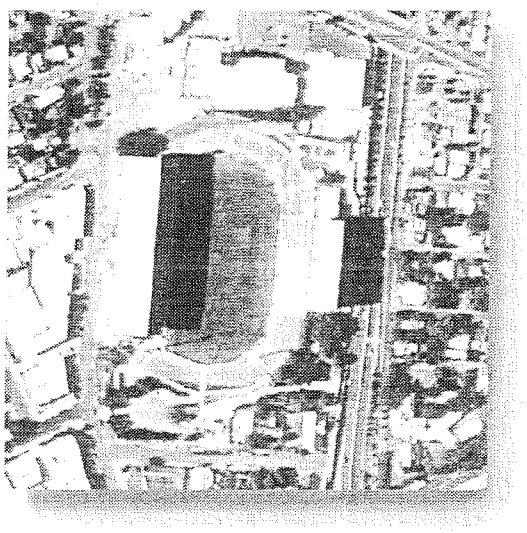
- ongoing involvement of residents in mitigation and monitoring;
- reduction and control of parking demand;
- better management of the consumption of alcohol and patron behaviour;
- sensitivity to the social and environmental values of the local area; and
- improved communication between residents and the stadium.

Further workshops and other consultation will continue throughout the public display period for the EIS.

9. Mitigation & Management of Impacts

9.1 Overview of Impacts & Mitigation Approach

The impact assessment has identified a range of construction impacts, operational impacts and transport impacts. These impacts have physical, functional and social implications for the environment, and, for some of these, there are no complete remedies or mitigation strategies available (eg visual impact to the east of Hale Street, social disruption from increased frequency of events, impacts on Christ Church precinct).



Consequently, the mitigation and management of impacts are addressed in terms of the construction impacts, the operational impacts and the transport impacts.

The proposed stadium is considered to present a workable solution in terms of its design, and proposed transport and pedestrian infrastructure. However, the overall proposal could be substantially improved to achieve better urban design outcomes, better amenity for nearby residents, and more desirable arrangements for pedestrian and public transport infrastructure.

For example, the stadium in its proposed form, will have its principal address to Caxton Street and in turn will attract a large proportion of pedestrian traffic and pre and post-match activity to the Caxton Street frontage. This frontage is the interface with the residential areas to the north. By changing the "address" to the south, the focus of activity can be relocated away from the residential interface. Also, an address to Milton Road and the rail corridor will enhance the presence the proposed stadium as a major regional sports and entertainment facility.

Further improvements could be made to the urban environment and to the functioning of proposed pedestrian infrastructure by establishing more generous civic spaces along the route from the CBD and Roma Street Station. As proposed, the project will have a generous public space and park land to Caxton Street, with a smaller public space in two parts off Chippendall and Hale Streets. These spaces need supplementary space for functional and urban design reasons.

For example, a public space situated at the confluence of the pedestrian network adjacent to the former Police Barracks on Petrie Terrace would provide greater opportunities for controlling surges in pedestrian flows, as well as achieving potential community benefits in terms of public space and outlooks. Also, the provision of a larger southern pedestrian plaza above a more

functional transport station and with more convenient links to the pedestrian and public transport networks.

Consequently, this EIS identifies a range of project modifications considered necessary to:

- achieve the stated proposal objectives;
- achieve substantial improvements in terms of functionality, urban design and community benefits; and
- achieve substantial reductions in the potential impacts upon the community, beyond those possible through the mitigation strategies.

9.2 Further Community Involvement

An important aspect of overall impact mitigation will be the establishment of a Community Liaison Group and a Stadium Management Advisory Committee as a mechanism for on-going community involvement for both the construction and the operational phases of development.

The Community Liaison Group, comprised of solely of representatives from the surrounding locality, would meet with stadium management on a regular basis in order to identify particular issues, discuss possible mitigation measures and to "debrief" after particular events. It is important for this group to have some autonomy from the Stadium Management Advisory Committee to permit clear community views to be formed and presented.

The Stadium Management Advisory Committee would be established for the development and implementation of management plans regarding potential operational effects of the proposed stadium and for monitoring social effects during construction and operation. The committee would have an advisory role only and would provide a formal vehicle for input from the Community Liaison Group.

9.3 Construction Mitigation Measures

The mitigation measures for construction impacts are summarised below.

Construction Impacts	Mitigation Measures
Hours of work.	Limit hours to 6.30 am – 6.30 pm on week days and 7.00 am – 3.00 pm on Saturday.
Diminished air quality.	Standard construction techniques for dust suppression (watering, truck baths etc); Monitor air & wind direction for certain activities; and Notify residents of particular activities.
Excessive noise.	Engage low noise plant & equipment; Use western stand to screen effects; Position & use of tower cranes & concrete pumps carefully; and Notify residents of particular activities.
Intrusive light spill (security lighting, out of hours work).	Position security lighting carefully; Select specialised lighting; and Monitor effects of out of hours work.
Ground water & surface pollution.	Engage standard construction techniques for soil erosion & sedimentation control; and Monitor ground water & drainage for leachates.
Work force car parking.	Provide shuttle buses to off-site car parks; and On-site parking for up to 180 employees.
Heavy vehicles movements.	Designate delivery routes (Milton Rd & Castlemaine St, Hale St & Coronation Dve); Monitor road conditions; and Notify residents of late night deliveries.
Damage to important vegetation (Milton Road).	Undertake detailed design to avoid root zones; and Monitor construction work.
Cultural heritage values (Christ Church, Baroona Special School).	Conduct structural audit and dilapidation survey of Christ Church, the rectory and cemetery prior to construction commencement; Maintain materials clear of church and cemetery at all times; Liaise with church as to activities & modify construction program to suit. Prepare a construction plan for re-orentation and suters classroom; and Site management for vegetation protection.

9.4 Operational Mitigation Measures

Not all impacts can be addressed completely through mitigation measures. Some impacts can only be minimised through detailed design and the implementation of the recommended mitigation measures. Mitigation measures are proposed for a number of potential operational impacts including:

Operational Impacts	Mitigation Measures
Car parking in local streets & businesses.	Implement parking scheme over local area, with resident visitor permits and & extended stay areas for businesses.
Anti-social behaviour.	Emphasise public transport to move crowds away stadium quickly, mostly via southern routes; Implement code of behaviour to control alcohol use in the proposed stadium; Provide litter bins along walkways and pedestrian plazas; and Maintan surveillance of walkways.
Public safety on walkways to City.	Maintain surveillance of walkways, including 24 hr surveillance with direct reporting to City Police.
Social impacts of stadium operations.	Notify event schedule to neighbours & businesses; Maintain good neighbour policy (litter clean up, hotline for complaints); Implement public transport, Code of Behaviour and car parking strategies; and Monitor effectiveness through Community Liaison Group & Stadium Management Advisory Committee.
Stadium noise breakout.	Limit use of fireworks and entertainment; Monitor and manage helecopter use for broadcasts; and Monitor noise during events;
Visual impacts of building & transport infrastructure.	Provide variations & landscaping to facades; Use materials & colours to reduce visual impacts; and Use specialised materials in light rail construction to reduce impacts.
Impacts on cultural heritage sites.	Consider transparent roofing to avoid over-shadowing of the church and cemetery; Reduce building size & bulk adjacent to church; Consider specialised design treatments (eg stained glass walls, etchings) to maintain cultural heritage links; Separation of pedestrians from school site; and Provide litter bins to walkways
Municipal drainage independently.	BCC to investigate urban drainage issue of stadium proposal.

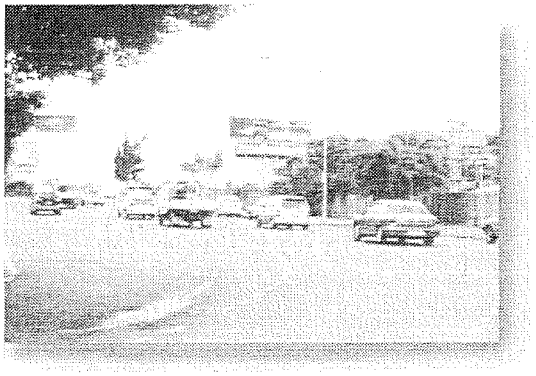
9.5 Transport Mitigation

The key mitigation measure for the operation of the proposed stadium is the provision of necessary transport infrastructure based on a public transport-focussed strategy.

To reduce the existing effects of traffic congestion and on-street car parking and to support the public transport-focussed strategy, the key mitigation strategy is to establish a car parking management scheme for the local street system around Lang Park. Recommended features of the controlled parking scheme are:

- the scheme should be implemented as a Brisbane City Council Local Law which defines The Lang Park Traffic Area. The object of the local law would be to provide for Council's regulation of parking by time in a particular part of the City (a "traffic area");
- the traffic area should extend approximately 1.5 kilometres around Lang Park (excluding the CBD);
- parking in the streets should be regulated by a 15 minute time limit during events;
- special 2 hour on-street parking zones in the vicinity of businesses during event times should be provided;
- an infringement penalty of $250 is recommended; and
- all necessary infrastructure including electronic signage that can be used to provide advance information regarding event parking restrictions should be provided.

The mitigation of traffic and transport related impacts also requires the implementation of public transport, traffic management and parking management and enforcement plans for each event, and commensurate with expected crowd size, to ensure that:



- special public transport services are provided;
- advertising of public transport options and parking restrictions is undertaken;
- temporary traffic management measures are implemented; and
- the local residential and business community is informed of the parking restriction times and traffic management arrangements to apply.

Intergrated event and transport ticketing arrangements should be considered in conjunction with Queensland Transport, Brisbane Transport and Queensland Rail.

9.6 Project Modifications

The proposal to increase the capacity of Lang Park from about 42,000 to 52,500 people requires substantial improvements to:

- create an address, or sense of place, at the southern entrance, so as to change the focus away from the northern focus on Caxton Street;
- provide greater capacity and operational flexibility in the use of transport infrastructure;

- improve the overall approach to crowd accommodation and management; and
- provide wider community benefits than those relating solely to three codes of football (eg improved public spaces, improved pedestrian connections).

The EIS consultation process, and the master planning and concept design processes have raised a number of key design, development and impact issues. These issues would be addressed, and the project objectives achieved, if the project modifications were adopted.

Impacts	Project Modifications
Need for southern address for pedestrian & transport strategies.	Expand the southern pedestrian plaza over an enlarged transport station between Chippendall Street & Milton Road by acquiring additional land.
Need for improved pedestrian space, particularly at the southern end.	
Need for improved access to Milton Station & possible light rail station.	Provide two integrated accessways from the expanded southern plaza over Milton Road to possible light rail & Milton Station.
Need for maximum capacity for transport station.	
Need to avoid pedestrian conflict from coach area & transport station.	Link expanded southern plaza into Hale Street pedestrian plaza.
Need to mitigate impacts on Christ Church.	
Desirability for crowd marshalling areas along route from City.	Extend the Milton Road pedestrian path through the Hogs Breath Café; Expand the pedestrian walkway through the Police Barracks site to form a large public space & pedestrian plaza linking with the Roma Street connection & the Milton Road walkway.

10. Approvals & Licenses

The Lang Park Stadium Proposal has been declared a project of State significance under the State Development and Public Works Organisation Act 1971. The proposal must be subject to an EIS, and, that EIS must be prepared in accordance with the terms of reference approved by the Coordinator-General.

The terms of reference state that the proposal will be the subject of a development application for material change of use, and other forms of development. That application will be made to the Brisbane City Council under the Integrated Planning Act 1997 and assessed either under the 1987 Brisbane Town Plan, or the new City Plan if it has commenced operation by then. Submissions made in relation to the EIS are taken to be submissions made in relation to the development application.

To the extent that any component of the proposal requires impact assessment, properly made submissions will then gain third party appeal rights in relation to the decision on the development application. If no part of the proposal requires impact assessment, then third party appeal rights do not arise.

There is a range of other approvals or permits required under the Environmental Protection Act 1994 and its Environmental Protection Regulations, the Queensland Heritage Act 1992, the Cultural Records (Landscape Queensland and Queensland Estate) Act 1987, the Land Act 1994 and Land Regulations, possibly the Acquisition of Land Act 1967 and the State Development and Public Works Organisation Act 1971, the Workplace Health and Safety Act, the Local Government Act 1993, the Explosives Act 1952, the Health Act 1937, the Transport Operations Act (Road Use Management) Act 1995, the Lang Park Trust Act 1994, the Transport Infrastructure Act 1994, the Traffic Act 1949, the Liquor Act 1992, and various Brisbane City Council local laws.

11. Conclusions

The Lang Park Stadium Proposal presents a workable solution to the provision of a world-class rectangular pitch sporting venue which is integrated with the metropolitan transport network and which can sit reasonably comfortably in its setting. There are a number of impacts for which there are no effective mitigation strategies. The relative importance of these impacts varies with the distance from the site.

A notable aspect of the social impact assessment, revealed through a community survey across South East Queensland, was that even though resistance to the proposed development was greatest in the immediate locality, the strength of resistance was not overwhelming. On the other hand, even though the support was greatest in the more distant communities, the level of support also was not overwhelming.

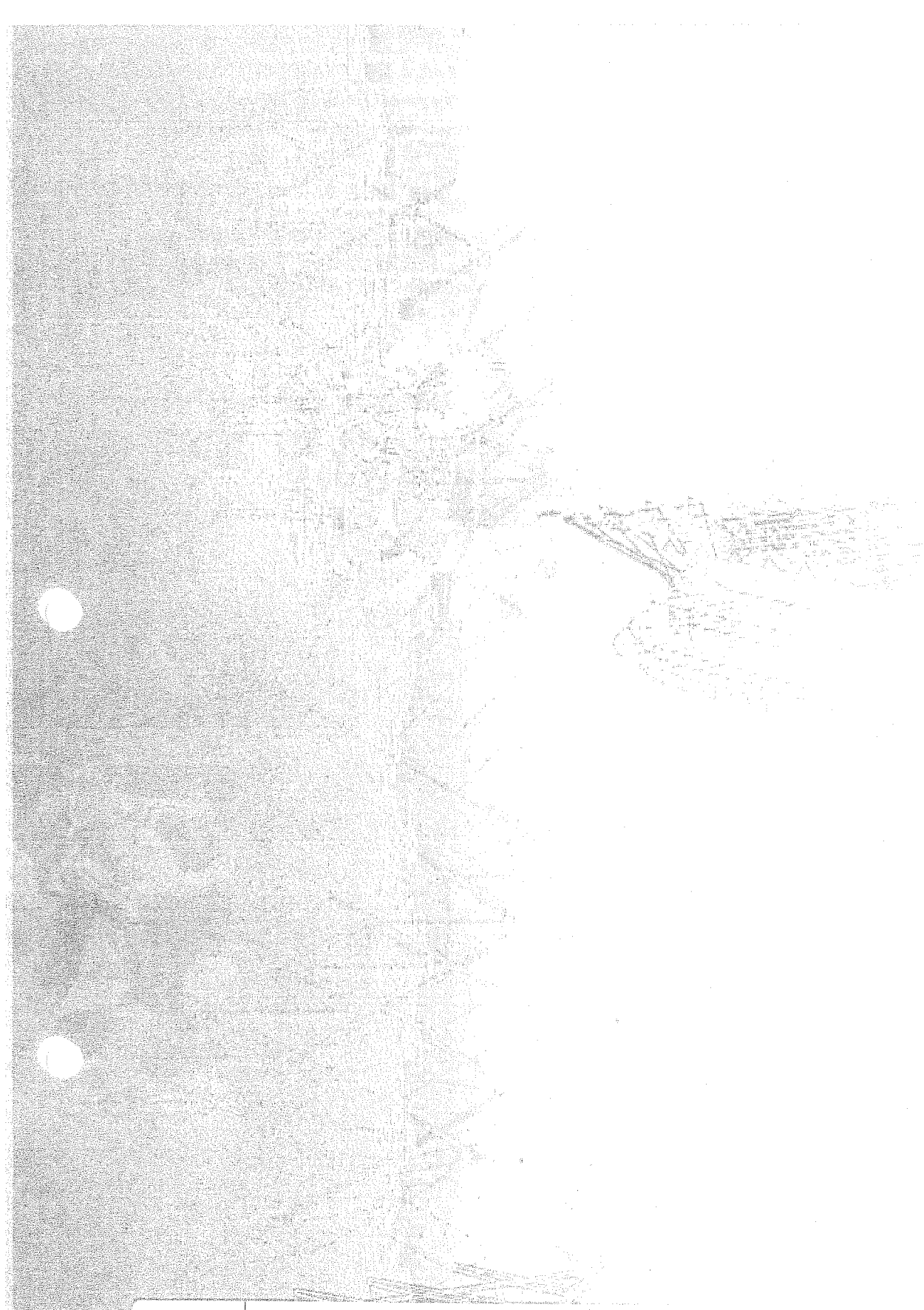
In terms of the predicted environmental impacts, the Lang Park Stadium Proposal depends on the successful implementation of the mitigation strategies recommended in this EIS, namely:

- the public transport strategy;
- the construction mitigation measures and management plans; and
- the operational mitigation measures and management plans.

The proposed project modifications will:

- achieve the stated project objectives;
- greatly assist with mitigation such that the proposed stadium has a substantially lesser effect on the local community; and
- contribute a number of community and infrastructure benefits to the City.

The proposed project modifications have been assessed in terms of their potential impacts and benefits. The identified benefits are substantial, particularly to the residents of the immediate locality, whereas the impacts, on balance, are considered acceptable. The Lang Park Stadium Proposal should incorporate these modifications.



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Produced by

SINCLAIR KNIGHT MERZ

MAY 2000

BCC.186.0036

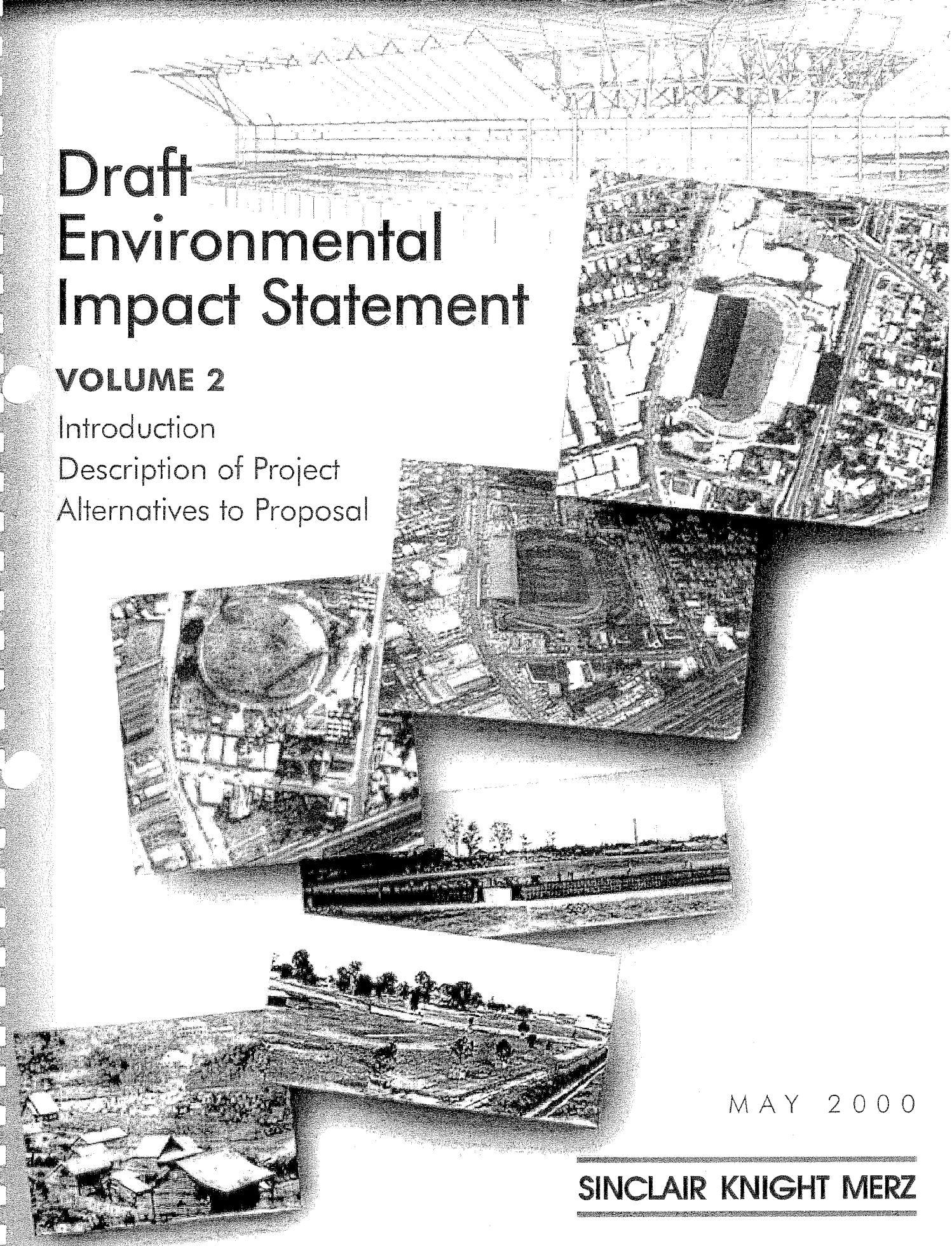
LANG PARK STADIUM
PROPOSAL REVIEW

Queensland Government

Draft Environmental Impact Statement

VOLUME 2

Introduction
Description of Project
Alternatives to Proposal



MAY 2000

SINCLAIR KNIGHT MERZ

BCC.186.0038

EIS OUTLINE

1. Executive Summary
2. Introduction
   - Description of Project
   - Alternatives to Proposal
3. Planning Context
   - Existing Environment
4. Environmental Impacts
   - Transport Impacts
5. Consultation
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   - Approvals & Licensing
6. Conclusions
   - Appendix A Terms of Reference
   - Appendix B Study Team
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1. INTRODUCTION

1. Introduction

1.1 Purpose of Report

This environmental impact study (EIS) was commissioned by the Office of Sport and Recreation, now within the Department of Communication and Information, Local Government, Planning and Sport (DCILGPS), to respond to terms of reference relating to a proposal to redevelop the Lang Park Stadium (the Proposal).

The purposes of the EIS process are:

- to inform the Queensland Government of the qualities of the existing environment and the possible impacts of the proposed redevelopment, as an input to the decision as to whether or not the proposal will proceed;
- to provide technical input to the formulation of the master plan and concept planning processes which are running in parallel with the EIS process;
- to provide an accurate description of the proposal and to identify the full range of impacts likely to be generated;
- to provide a comprehensive description of the existing environment and an assessment of the likely impacts of the proposal on the existing environment;
- to identify the range of approvals required for the redevelopment proposal to proceed; and
- to inform and include the community and stakeholders in the assessment process.

The EIS examines the Lang Park Stadium Proposal Review on the basis that Lang Park was selected by the Queensland Government as the preferred site for a world-class stadium for rectangular field sporting events. On this basis, the EIS examines a number of options including:

- the proposal to redevelop Lang Park; and
- the consequences of not redeveloping Lang Park.

Within the option entailing the redevelopment of Lang Park, the EIS examines a number of possible solutions to various commercial and design issues. These solutions include:

- redeveloping the existing stadium site;
- redeveloping Lang Park including the community facilities immediately to the north fronting Caxton Street; and
- redeveloping Lang Park and including other land to provide community benefits such as a transport interchange and integrated pedestrian linkages.

1.2 Legislative Requirements

The Queensland Government designated the proposal a project of "State significance" under the *State Development and Public Works Organisation Act 1971* (SDPWOA) on 16 December 1999. As a result, the legislation requires the preparation of an EIS to assist the Government in its decision whether or not to proceed with the redevelopment of Lang Park.

The Queensland Government also committed to a development assessment process under the *Integrated Planning Act 1997* (IPA) in the event that it decides to proceed with the redevelopment. This development assessment process is governed by the Integrated Development Assessment System (IDAS). The EIS process is accommodated in lieu of the more general impact assessment

processes available under IPA. Consequently, the public notification of the EIS replaces the public notification of a development application should impact assessment be required under the relevant planning scheme.

Submissions made in relation to the EIS are taken to be submissions under IDAS only for those components of the redevelopment proposal requiring impact assessment. In this way appeal rights bestowed by IPA in respect of these components are carried over to submitters to the EIS.

1.3 Study Methodology

1.3.1 Outline

The proposal to redevelop Lang Park entails a number of core assessment activities. These included:

- extensive community consultation and social impact assessment;
- investigation of a commercial strategy including tenancy negotiations, business planning and capital financial modelling, and securing private sector investment;
- development of a public transport and traffic strategy; and
- undertaking an environmental impact study.

The community consultation programme and the transport and traffic strategy were integrated with investigations for this EIS. The definition of the proposal has derived largely from the findings which gave rise to the commercial strategy, the environmental impact study and the outcomes of the master planning, concept design planning studies, and transport studies.

1.3.2 Community Consultation

Extensive community consultation has taken place as an integral component of both the EIS and the master planning and concept design processes.

The consultation process commenced in November 1999 when the then Department of Tourism, Sport and Racing established a preliminary consultation team to aid the community's understanding of the draft terms of reference and the EIS process by dealing with early inquiries and requests for information. This preliminary consultation team established a "shop front" in Given Terrace, Paddington to maximise the community's accessibility to information. The Department assisted with a web site and the publication of newsletters and fact sheets.

The preliminary consultation process, as it became known, concluded with the completion of the submission period for the draft terms of reference on 15 February 2000 submissions were considered and input into the final terms of reference (March 2000).

As an integral part of the EIS process, further consultation occurred both during the EIS and master planning processes and during the public notification period for the EIS. There were multiple objectives for this consultation process. Briefly, they included:

- enhancing community awareness and understanding of the proposal and the EIS process;
- identifying key stakeholders and their issues;
- providing an effective means of exchanging information between the community and the EIS team and the master planning team;

- identifying and addressing community issues and process updates;
- facilitating effective impact mitigation and management measures;
- providing opportunities for responses to the concept design; and
- reporting back to participants on the consultation process and their involvement in it.

Consultation activities during the preparation of the master plan, concept design and EIS included:

- community workshops;
- focus group meetings with particular groups in the community who otherwise might not have had access to the consultation process;
- newsletter mailouts dealing with specific issues;
- web site and hotline;
- personal face-to-face and stakeholder interviews;
- a community survey of 400 responses drawn from the locality of Lang Park, the Brisbane metropolitan area and South-East Queensland;
- focus groups and meetings with community facilitators; and
- regular community information clinics to provide updates on progress and detailed information on specific issues.

A complete review of the consultation process is provided in Chapter 8 of this EIS.

1.3.3 Transport & Traffic Strategy

Following the issue of a paper on *Preliminary analysis of Transport Issues* in August 1999, Queensland Transport commenced the preparation of a Preliminary Transport Strategy in mid November 1999. This strategy was finalised in February 2000, with the exception of a commitment to a possible extension of a light rail service from Roma Street to the stadium environs.

The strategy included a multi-modal transport response to the stadium redevelopment. The following transport modes were incorporated:

- heavy rail services at Roma Street and Milton stations;
- shuttle bus services to the City and suburban bus services elsewhere;
- a light rail service from Roma Street;
- coach services;
- taxi services;
- private car; and
- other modes (cycle, ferry).

Another aspect of the transport and traffic investigation is the movement and safety of pedestrians to and from the site. This issue has been examined from a design standpoint through the master planning and concept design planning processes and from an impact standpoint through the EIS process.

1.3.4 Master Plan & Concept Planning

A process of master planning and concept design planning was undertaken in parallel with the EIS studies. This permitted environmental issues and community concerns raised during the preliminary consultation and EIS consultation processes to be considered and accounted for in the master plan and concept design.

The master plan was derived to examine suitable means for integrating the proposed redevelopment, including the transport infrastructure, with the surrounding urban fabric and transport networks. The master plan examined issues such as desired operational needs and standards for a world-class stadium, pedestrian movement, transport requirements, urban character, integration with local community facilities and other major community infrastructure.

Early community input to the master planning and concept design process was sought from the preliminary consultation phase and from the first community workshop conducted as part of the EIS process. Subsequently, community input was fed into the master planning and concept planning as an integral part of the EIS process.

The concept design examined in greater detail the design aspects of the issues considered in the master plan, leading to a clearly defined development concept in terms of building form, scale and intensity, transport infrastructure, community facilities to be included within the complex, lighting, sound systems, drainage, and building services.

The concept design forms the basis of the proposal assessed in the EIS, and subsequently in the assessment of a development application, should the Government decide to proceed with the redevelopment proposal. Community input to the concept design was taken during the formative stages prior to completion of the EIS and subsequently during the period of notification of the EIS. This second input cycle enabled feedback and concept modification as necessary to respond to community-related design issues.

1.3.5 Environmental Impact Study

The EIS has been prepared in response to the terms of reference issued by the Co-ordinator General under the *State Development and Public Works Organisation Act 1971* having regard to the draft terms of reference and public submissions. The terms of reference were finally issued by the Co-ordinator General in March 2000 following a period of community input which commenced on 30 November 1999 and concluded on 15 February 2000.

The key objectives for the EIS were established in the terms of reference as:

- providing information on the Lang Park proposal and development process;
- identifying and evaluating all relevant issues associated with the proposal;
- providing advice regarding internal and external design features to address the issues, including preferred access arrangements;
- identifying potential environmental, social, transport and land use planning impacts of the stadium proposal, together with design and operational measures to minimise or compensate for adverse impacts and enhance benefits;
- recommending infrastructure and facilities needs;
- consulting with the community and relevant stakeholders in identifying, assessing and responding to proposal impacts;
- identifying all necessary licenses and approvals, including requirements under the *Integrated Planning Act, 1997*; and
- providing advice to the decision making process, assessing whether to accept or modify the proposal, approve it with conditions or carry out further studies.

An important aspect of the EIS process was the opportunity provided to integrate with and influence the master planning and concept design planning process prior to the proposal being finalised. This represents "best practice" use of the EIS process to influence and modify the

design. Consequently the EIS has been used to minimise and mitigate identified adverse environmental impacts and to enhance the benefits of the Lang Park Stadium Proposal Review.

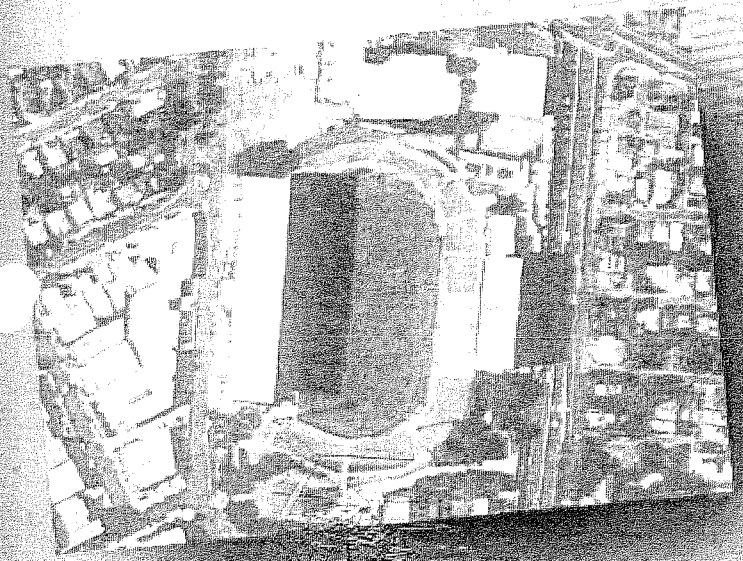
This approach has dealt with both the construction and operational aspect of the proposal as well as the potential off-site effects of transport and pedestrian infrastructure.

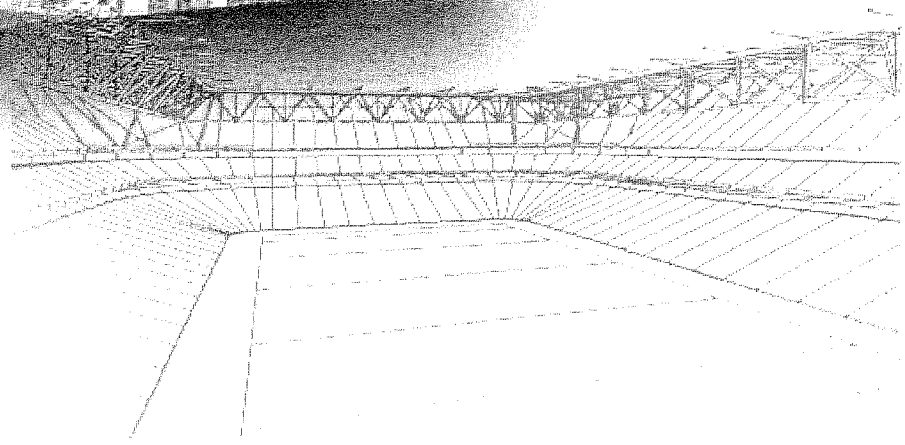
1.4 EIS Study Team

The EIS was undertaken by an independent, multi-disciplinary consulting team appointed by the Queensland Government through a public tendering process overseen by a probity auditor. The resources for the study team were drawn from:

Sinclair Knight Merz Pty Ltd	EIS project management, traffic and transport, planning, social impact and consultation, economics, flora and fauna, infrastructure, impact mitigation
Elliott Whiteing and Associates	Consultation program design and management, impact mitigation
ImpaxSIA Pty Ltd	Social impact and consultation, impact mitigation
EDAW Ltd	Landscape and visual impact, impact mitigation
McKerrell Lynch Pty Ltd	Visual impact and cultural heritage, impact mitigation
G B Floth Pty Ltd	Lighting, electrical and telecommunications, impact mitigation
Pacific Air and Environment Pty Ltd.	Air quality and acoustic impacts, impact mitigation

2. DESCRIPTION OF PROPOSAL





2. Description of the Proposal

2.1 Objectives of the Proposal

The objectives of the proposal for the redevelopment of Lang Park Stadium are:

- To create a world class sports stadium with up to 60,000 seats for a range of uses including, but not limited to: rugby league, rugby union, soccer, grid iron, and entertainment events;
- To provide a focus for a sports and entertainment precinct that could be used for seven days a week through the integration of commercial and community facilities within the stadium design;
- To provide a major sports facility that will add to and enhance Queensland's major events strategy and accommodate a range of uses;
- To maximise the positive opportunities through the stadium's ancillary features and their integration with the community as well as minimise any negative impacts of the stadium and its associated infrastructure on the local community;
- To maximise commercial investment in the stadium development to minimise its cost to the Government immediately and over time;
- To act as a catalyst for development of surrounding areas;
- To provide a transport system which adequately and efficiently services the stadium during peak times, creates strong pedestrian links to the CBD and maximises opportunities to enhance the amenity of the local area;
- To provide an icon building within the overall City West vision and master plan; and
- To be completed by early 2003, ready to host Rugby World Cup events.

If these objectives are achieved, the Lang Park Stadium Proposal could provide a suitable venue for major sporting and cultural events such as:

- the 2003 Rugby World Cup, the Bledisloe Cup for Rugby Union test matches between Australia and New Zealand, and Rugby Super 12 competition involving representative teams from Australia, New Zealand and South Africa;
- the Rugby League State of Origin inter-state competition and National Rugby League matches and finals;
- the National Soccer League matches and finals, and demonstration matches, including internationals and other elite competitions;
- American Football matches; and
- entertainment and other activities requiring large, high quality venues.

The seating capacity must be sufficient to attract major events operators, such as the Australian Rugby League, the Australian Rugby Union and the National Soccer League. While a seating capacity of 60,000 was initially considered for the proposal, the commercial model for the proposal indicates that a seating capacity of 52,500, nett of media, management and special needs seating, would achieve this objective.

To satisfy the selection requirements for major sporting and cultural events, the Lang Park Stadium must be able to respond to all hirer, patron and media needs. Also, the Lang Park Stadium must be capable of hosting major sporting and cultural events at competitive prices and with acceptable returns to hirers and the owner. The seating capacity, configuration and conditions, player facilities and pitch conditions, catering and servicing arrangements, and accessibility and transportation are critical success factors for the Lang Park Stadium Proposal.

Equally important, the Lang Park Stadium Proposal must not impose unsustainable and unacceptable impacts on the community, the environment and the transport infrastructure.

2.2 Description and Layout of Proposal

The outcome of the master planning and concept design phase for the development of Lang Park includes the preparation of concept plans for the proposed facility. The following section presents the key elements of the concept including staging and construction issues.

2.2.1 The Site

The Lang Park Stadium Proposal site, including land required for transport and pedestrian infrastructure is described as:

Location	Description
Land for Stadium Building	
Lang Park, Hale Street Milton	Lot 354 on RP898660;
Lang Park (Ozsports) Caxton Street Milton	Part of Lot 355 on PR898660;
Lang Park (PCYC) Hale Street Milton	Lot 581 on RP227070;
Lang Park (Energex) Hale Street Milton	Part of Lot 470 on SL4951;
Land for Pedestrian Linkages & Walkways:	
Part of Catholic Church, cnr Hale & Caxton Streets	Part of Lot 4 on RP805871;
Part of Baroona Special School site, cnr Hale & Milton Road	Part of Lot 654 on SL8308;
Part of Police Barracks site, Petrie Terrace	Part of Lot 6 on RP826295; Part of Lot 3 on RP809878;
Land over which Air Rights will be required:	
Western Railway east of Petrie Terrace	Part of Lot 705 on SL12305; Part of Lot 706 on SL12305;
Western Railway west of Petrie Terrace along Milton Road	Part of Lot 11 on SL1126
Chippendall & Castlemaine Streets to Milton Road; Hale Street, at Caxton Street & at Milton Road	

All land referred to above is situated in the Parish of North Brisbane, County of Stanley.

The **Site Plan** is shown as **Figure 2.1**

2.2.2 Plans Layouts & Elevations

Concept plans and elevations have been prepared as part of the master planning and concept design process. These plans should be read in conjunction with this document. The plans to which this EIS refer are set out in the schedule below:

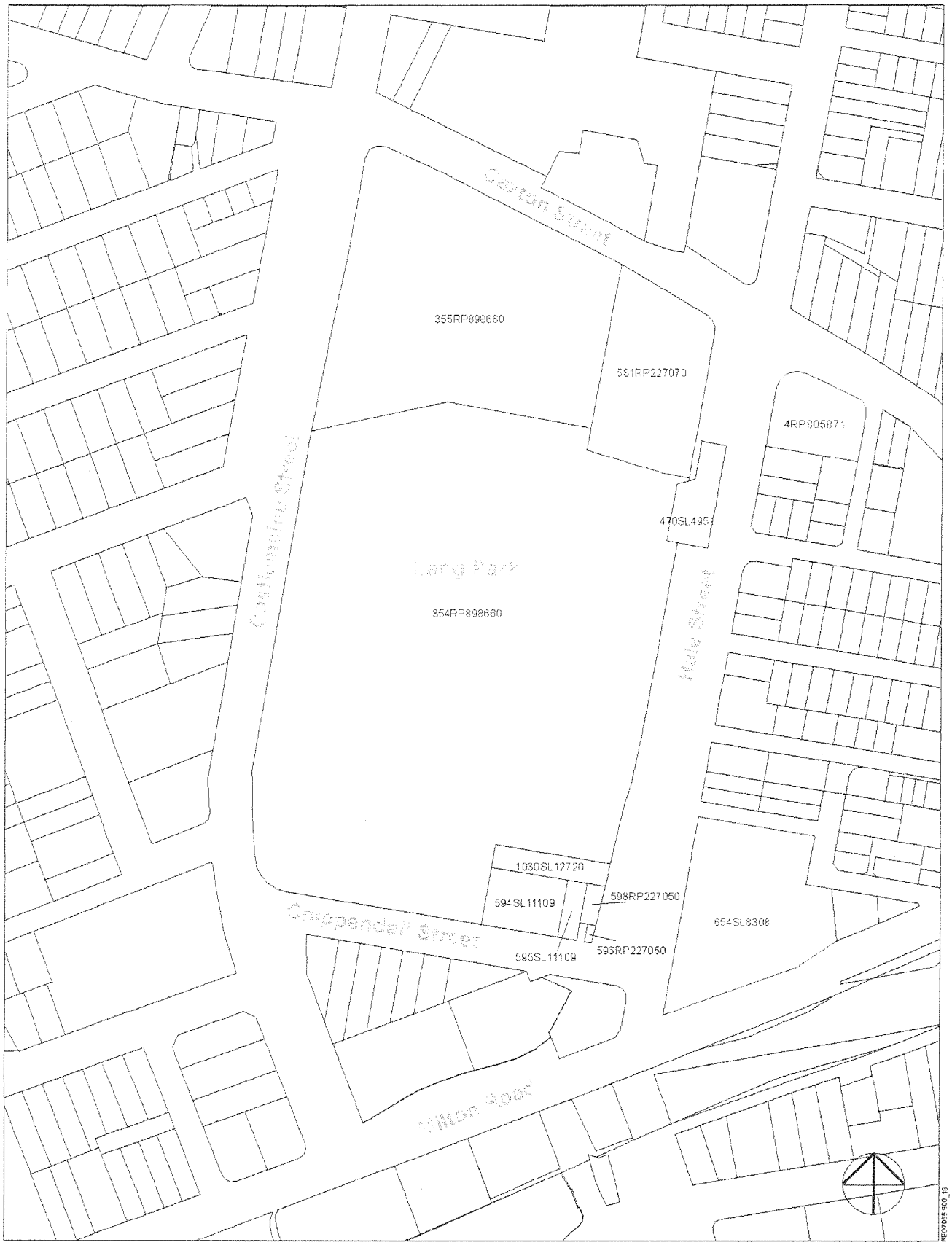


FIGURE 2.1
Site Plan

Plan Description	Plan No	Plan Author
Master Plan – Site Requirements	MP-SK-00-01 G	HoK + Lobb & PDT
Bowl Plan - Ground Level	A2 – 1: P2	HoK + Lobb & PDT
Bowl Plan – Mezzanine Level	A2 – 1.1 : P2	HoK + Lobb & PDT
Bowl Plan – Level 1	A2 –2 : P2	HoK + Lobb & PDT
Bowl Plan – Level 2	A2 – 3 : P2	HoK + Lobb & PDT
Bowl Plan – Level 3	A2 – 4 : P2	HoK + Lobb & PDT
Bowl Plan – Level 4	A2 – 5 : P2	HoK + Lobb & PDT
Bowl Plan – Level 5	A2 – 6 : P2	HoK + Lobb & PDT
Bowl Plan – Level 6	A2 – 7	HoK + Lobb & PDT
Roof Plan	A2 – 8 : P2	HoK + Lobb & PDT
Hale Street Crossing	MP – SK – 02 : A	HoK + Lobb & PDT
Milton Road Crossing	MP – SK – 04 : A	HoK + Lobb & PDT
Police Barracks – Roma St Pedestrian Route	MP – SK – 05 : A	HoK + Lobb & PDT
Master Planning Process	MP – SK – 06 : A	HoK + Lobb & PDT
Master Planning Process	MP – SK – 07 : A	HoK + Lobb & PDT
Lower Roma Street Pedestrian Route	MP – SK – 08 : A	HoK + Lobb & PDT
North & East Elevations	A5 – 1 : P2	HoK + Lobb & PDT
South & West Elevations	A5 – 2 : P2	HoK + Lobb & PDT
Sections	A7 – 2.1 :P4	HoK + Lobb & PDT
Perspective (Christ Church)	MP – PS – 01	HoK + Lobb & PDT
Perspective (Ithaca Pool)	MP – PS – 03	HoK + Lobb & PDT
Perspective (Petrie Terrace north)	MP – PS – 04	HoK + Lobb & PDT

2.2.3 Redevelopment Concept

The Lang Park Stadium Proposal will involve two areas of activity:

- stadium works within the immediate Lang Park site; and
- works external to the actual stadium site including transport infrastructure and pedestrian links.

2.2.4 Stadium Concept

The Lang Park Stadium Proposal will convert the existing structure into a world-class dedicated rectangular pitch stadium. The key elements of the proposed concept plan include:

- establishing a vertically enclosed world-class pitch surface with seating for 52,500 patrons under a roof designed to achieve a minimum coverage of 80% of all seating;
- constructing the new arena surface to optimise viewing conditions for all spectators as well as allowing access to new facilities;
- fully enclosing the back of seating areas at all levels;
- catering for pedestrian movement with a concourse extending from Caxton Street to Milton Road, including plazas both to the north (Caxton Street) and to the south (above Chippendall Street), as well as a plaza over the southern end of Hale Street but forming part of the stadium structure. This concourse will then allow pedestrian access back to both Petrie Terrace/Milton Road as well as Caxton Street to the north;
- providing a transport interchange incorporating bus and coach set-down and pick-up in the area of Chippendall Street, with integrated pedestrian connections to the proposed stadium, Milton Station and connections over Milton Road to a possible light rail station opposite in Milton Road;
- replacing the existing eastern grandstand with a new purpose built structure linked to the new northern and southern grandstands;

- replacing the existing northern and southern terraces with purpose built structures of a similar form to the new eastern grandstand. These grandstands will include six (6) levels of seating in a three-tier bowl configuration. It is proposed that the structure have enclosed corners to contain light spill and noise impacts;
- removing the roof of the western grandstand and providing a common roof form extending over the new eastern, southern and northern stands as well as the existing western grandstand, with provision for the possible addition of a fully closable roof at some future time;
- retaining and upgrading the existing western grandstand to include new internal facilities as well as upgraded building services and a new elevation to Castlemaine Street;
- accommodating existing community facilities and activities (eg PCYC and Ozsports including the beach volleyball courts) within the proposed stadium development site;
- providing parking within the stadium to accommodate a maximum of 400 cars;
- providing a generous and accessible public space consisting of:
  - park land and a pedestrian plaza between the northern end of the stadium and Caxton Street;
  - a pedestrian plaza between the southern end of the stadium and Chippendall Street; and
  - a pedestrian plaza over the southern end of Hale Street, opening up the address of Christ Church.
- retaining the existing Church and memorial cemetery to the south-east corner of the site with no infringement by the new facility.

2.2.5 External Infrastructure Concept

Apart from Milton Station, there is little off-site transport and pedestrian infrastructure to cater for the existing 42,000 capacity facility. Community input to the EIS process indicates that this is unacceptable and that continuation of the present situation is neither a desirable nor acceptable outcome for the redevelopment proposal. To respond to the forecast transport demand in a desirable and acceptable manner, the proposal will include the following off-site components (MP-SK-00-01 F):

- upgrading of Milton Railway Station to accommodate greater passenger numbers. The works proposed are to include increased platform space and improved pedestrian access.
- construction of a pedestrian plaza over Milton Road to link the stadium with Milton Station and the possible future light rail station. This structure will deposit patrons exiting the stadium at grade on the Milton Station side of Milton Road. The footpath on this side of Milton Road will be widened as well as separated from traffic on Milton Road.
- the pedestrian plaza over Milton Road will also provide access to the possible future light rail station on Milton Road.
- construction of a pedestrian plaza over the southern end of Hale Street to provide an 'at grade' connection to Milton Road, such that the plaza will rise in elevation towards the southern end;
- construction of various pedestrian access structures including bridges over the railways to the north of Upper Roma Street to allow improved access by foot to Roma Street Station and the City; and
- construction of new trunk services associated with the upgrading of existing services currently servicing the facility as may be required.

2.3 Land Acquisitions

In considering the need for land acquisitions, several preliminary determinations are required, namely:

- definition of the proposal to include or not to include off-site infrastructure such as transport infrastructure and pedestrian links;
- the extent to which off-site infrastructure is required solely for the Lang Park Stadium proposal or shared for wider city public transport applications; and
- in the context of the existing facility, the extent to which off-site infrastructure is required as a condition of any approval for impact mitigation purposes.

The external transport and pedestrian infrastructure is intended to be available for use as part of the public transport infrastructure of Brisbane outside event times. Such infrastructure is likely to be available exclusively for Brisbane's transport system for more than 300 days of each year.

To attain the desired levels of service, safety and amenity in the transport and pedestrian infrastructure, the external transport infrastructure should be provided. Consequently, the following land or air rights over land should be acquired:

Location	Area (m^2)	Purpose
1. Cnr Hale and Caxton Streets (Catholic Church)	190	Widen the pedestrian link
2. Hale Street, near Milton Road	560	Provide pedestrian plaza
3. Hale Street at Caxton street	240	Provide wider footpath
4. Energex site in Hale Street	192	Required for stadium building
5. Milton Road, near Baroona Special School	1190	Provide widened footpath
6. Milton Road near Castlemaine Street	1300	Elevated pedestrian crossing & light rail station
4. Petrie Terrace (Police Barracks)	980	Provide pedestrian route from Caxton Street to Upper Roma Street
5. Western Railway	6800	Provide light rail extension & pedestrian walkway

These acquisitions include "air rights" required for pedestrian links, routes over Hale Street in the vicinity of Milton Road and Caxton Street, Milton Road in the vicinity of Castlemaine Street, and over the Western Railway east of Petrie Terrace. They also include land or air rights required for the extension of light rail.

2.4 Project Staging

If the Queensland Government decides to proceed with the proposal, the proposed stadium will be constructed as one continuous project commencing in early 2001. Completion would need to be by early 2003 in order to satisfy the International Rugby Board of the venue's preparedness to host events during the 2003 Rugby World Cup.

2.5 Public Transport & Traffic Facilities

2.5.1 Public Transport Strategy

The Lang Park Stadium Proposal relies upon a strategy in which up to 80% of patrons will arrive and depart via public transport. The key element of the public transport strategy is the heavy rail network, supported then by direct bus services from the Stadium and shuttle bus services to operate between Roma Street, the City and Southbank bus stations and car parking stations.

The public transport strategy also includes the possible extension of light rail services to a new station at Milton, and the extension of major pedestrian walkways from the stadium to the City. These walkways will, for event times, be policed, and are physically separated from roads.

Taxis and long-distance coach services are also included in the public transport strategy, with set-down and crowd management strategies proposed to support their operation. A car parking management scheme is proposed to mitigate the effects of uncontrolled on-street car parking and to encourage patrons to use public transport.

The public transport strategy is fully described in Section 7 of this EIS.

2.5.2 Bus & Coach Facilities

The proposed stadium will include a number of key facilities for the use of partons accessing the stadium by either bus or coach. These facilities will include:

- An 11 bay bus station for shuttle services to Roma Street, the City and Southbank situated under the southern pedestrian plaza, with direct access by lifts and stairs to the plaza level;
- Coach parking areas provided in streets to the west of the stadium site in the vicinity of Cordova Street. A detailed pedestrian management strategy is proposed as a mitigation measure in Section 9 of this EIS.

2.5.3 Heavy Rail Facilities

Roma Street railway station, with its high level capacity and integrated bus-rail interchange, is the focus of the transportation strategy for the stadium proposal. The pedestrian infrastructure will link the station with Lang Park.

Milton Station is the closest railway station to Lang Park and will serve as a secondary rail connection for the stadium. Modifications to Milton Station are proposed to accommodate the increased demand during special events. These changes will include:

- improved, separated pedestrian and disabled access; and
- platform capacity upgrades.

2.5.4 Light Rail Facilities

If the Queensland Government decides to proceed with an extension of the proposed light rail network for Brisbane, and decides to proceed with the Lang Park Stadium Proposal, the stadium vill be served by the light rail network. The extension of the light rail network is considered by the Queensland Government to be an important element in the overall transport strategy for the stadium.

Light rail would improve access to the stadium while easing pressure on the transport system, particularly by reducing the movement of private vehicles to areas around the stadium. To support the strategy, additional light rail vehicles would be required.

The extension of a light rail service to the stadium will require a new station adjacent to the stadium, with the proposed site being on Milton Road. The light rail station will be supported on gantries extending partly over Milton Road to gain sufficient clearance to heavy vehicles on that road. The light rail route from Roma Street will cross Countess Street at grade and proceed along Upper Roma Street in a shared two-way bus lane past the Fire Station. The route proceeds along Upper Roma Street to the bridge over the rail tracks to an upgraded intersection at Upper Roma Street and Milton Road. After crossing via the traffic signals, the light rail proceeds in an elevated structure over the existing heavy rail corridor next to Milton Road. It continues in an elevated structure to a station which partially extends over Milton Road.

The pedestrian connection from the stadium to the light rail station will be via the southern plaza to an elevated walkway along Castlemaine Street before crossing Milton Road above grade. A second pedestrian bridge will connect from the Hale Street plaza. The plaza / platform connection at the light rail station will include stairs and a lift down to Milton Road, as part of the connection to Milton Station and the existing footpath connections to the Coronation Drive pedestrian path via Boomerang Street. Should the Brisbane Light Rail Project not proceed, there is sufficient capacity in the proposed bus station to cater for the additional transport load.

2.5.5 Car Access

While the use of private cars to access the proposed stadium is discouraged, an allowance for car parking is included in the development proposal. This car parking is primarily associated with:

- stadium administration and services;
- corporate sponsors and box holders;
- emergency vehicles;
- dignitaries; and
- patrons with disability.

In general terms, car parking will be provided on the basis of a car park space per corporate suite or box and one disabled bay per five wheelchair seats.

The concept plans incorporate 280 parking spaces on the proposed stadium site accessed from an internal on-site two-way circulation road around and below the entire stadium. Subject to detailed planning carparking supply may be increased to 400 spaces. For traffic impact assessment purposes, it has been assumed that 400 spaces could result.

The indicative breakdown of the parking space allocation shown would be:

- 40 parking spaces for vehicle occupants with disabilities
- 40 Staff/Management Spaces
- 195 to 315 VIP/Corporate Patron parking spaces
- 5 spaces for police vehicles

A light vehicle access point will be established on Chippendall Street below the southern plaza. This access point will connect with an internal circulation road and below the entire stadium. All new grandstands will also incorporate this access tunnel. A secondary carpark access point will be provided off Castlemaine Street north of Heussler Terrace. This will only be used to provide access to parking for community facilities out of event times.

- The access driveway for service vehicles will be located off Castlemaine Street north of Cordova Street. An emergency vehicle access point is provided directly off the Heussler Terrace roundabout.

2.5.6 Site Traffic Management

The entry and exit profiles for major events will create differing traffic management strategies. The indicative events schedule is presented in Section 2.8 of this EIS.

After events, Police will staff pedestrian crossings around the stadium. It is not intended that Caxton Street be closed prior to a major event, although the southern traffic lane would be converted for use by pedestrians and two-way traffic movements would occur in the two northern

lanes. However, Caxton Street will be closed temporarily after a major event to clear the peak pedestrian movement from the stadium. Castlemaine Street will not require closure to through traffic between Cordova Street and the Heussler Terrace roundabout during events.

2.6 Pedestrian & Cyclist Access

Primarily pedestrian access to the proposed stadium will be from both the north and the south of the site. Entry points will be provided at the southern and northern ends of the stadium depositing patrons at concourse level. The concourse allow patrons to make their way in and around the facility without mixing with vehicular traffic.

2.6.1 Pedestrian Management

The pedestrian concourse around the stadium will be designed to accommodate the forecast pedestrian flows at peak times immediately before and after a major event. The concourse also must be able to accommodate opposing pedestrian flows. The concourses on the northern, eastern and southern sides of the stadium have the greatest capacity for pedestrian movement.

The management of pedestrian movement around and in the stadium is a critical issue for the operation and safety of the facility. Stadium surveillance systems, including CCTV and constant monitoring by stadium management, will aid the free flow of pedestrians during peak periods such as through the identification of flow blockages.

2.6.2 Cyclist Access and Facilities

Cycle parking racks will be provided in the northern and southern pedestrian plazas. Facilities for employee bicycle parking and end-of-trip facilities (showers) will also be provided.

2.7 Operation & Usage Arrangements

2.7.1 Operation & Management

If it proceeds, the Lang Park Stadium Proposal will be operated and managed by a professional management team appointed by the Queensland Government.

The management team will be responsible for:

- operating the stadium efficiently and in a financially responsible manner;
- attracting and staging world-class and major domestic sporting and other events so as to ensure the operation is financially viable;
- ensuring the safety, comfort and security of patrons attending events;
- ensuring that sponsors' expectations and media requirements are being met within reasonable commercial and environmental limits;
- providing and maintaining facilities and services for competitors, officials and team management; and
- maintaining effective and responsive liaison with local businesses and residents to mitigate the operational impacts of events at the stadium.

The stadium management team is likely to include:

- a General Manager, reporting to the Government, and with overall responsibility for the operation and management of the facility;
- an Operations Manager, reporting to the General Manager, with responsibility for the day-to-day management of the facility, particularly leading up to, during and following events, including liaison with the Community Liaison Group and the Stadium Advisory Committee;
- a Security Manager, reporting to the Operations Manager, and with responsibility for the safety, comfort and security of patrons, the security of the facility and surveillance of the pedestrian walkways;
- administration staff providing office, financial and other support to the management team;
- a Contract Caterer responsible for the sale of food and beverages within the stadium; and
- maintenance staff reporting to the Operations Manager, and responsible for the maintenance of the pitch, the stadium facilities and the plazas and public spaces around the stadium building.

In all, the proposed stadium would employ a minimum of approximately 15 full-time staff, excluding the catering staff.

For capacity events, the stadium would require up to 400 staff engaged in catering, crowd management, traffic and parking management (not including any statutory duties), and general duties. Of the 400 staff for major events, it is likely that at least half would be required for crowd management and traffic and parking management duties.

In addition to the stadium staffing, support would be sought from the Queensland Police Service for the supply of additional officers for crowd management and traffic management duties. Support from 40 – 60 additional Police Officers would be required, depending upon the anticipated crowd size for particular events. Also, the assistance of the Brisbane City Council would be sought to ensure compliance with the controlled parking scheme in surrounding streets. At least 25 Parking Officers from the Brisbane City Council would be required for the initial events in which the controlled parking scheme was in operation. A dedicated ambulance service vehicle would also be on site during all major events.

The hirer of the stadium would bear the costs of event security, additional Police, dedicated and ambulance staff.

2.7.2 Usage

In terms of projected usage the master plan has been developed on the basis of the indicative annual event schedule described in **Table 2.1** for a 52,500 seat facility.

Table 2.1: Lang Park Stadium Proposal Event Schedule

Events	Frequency	Crowd Size
National Rugby League fixtures	13 per annum	25,000 – 35,000
State of Origin Rugby League	1-2 per annum	45,000 – 52,500
Rugby League international match	1 per annum	45,000 – 52,500
Rugby Union Super 12 fixtures	6 per annum	25,000 – 35,000
Rugby Union international match	1-2 per annum	35,000 – 45,000
Major cultural event	1 per 2-3 years	15,000 – 25,000
Other major cultural events	3 per annum	10,000 – 15,000

There could also be use of facilities within the proposed stadium for meetings, dinners, and similar small-scale functions.

The majority of events will occur in the cooler months, coinciding with the football seasons for the codes expected to use the facility. The frequency of events is likely to be greatest in the months from April to July.

2.8 Crowd Control Arrangements

The management of crowds inside and external to the stadium is a key aspect to achieving the objectives for the proposal. That is, patron safety and comfort are of great importance in both a design sense and in the operation of the stadium. These factors are important entering and leaving the stadium as well as for the time spent by patrons within it.

Also of importance is the management of crowds in the areas surrounding the stadium. With poor crowd management practices, there is potential for nuisance from unacceptable behaviour, property damage and loss of amenity.

2.8.1 Crowd Control Internal to Site

The stadium must be managed professionally to ensure the safety and comfort of patrons, players and match officials. A core element of professional stadium management is the framing of a Code of Behaviour and gaining acceptance of it from patrons, stakeholders and residents.

❑ Professional Stadium Management

From the standpoint of crowd management, professional stadium management will include:

- establishing and adhering to a Code of Behaviour, and ensuring that all staff engaged for an event are fully aware of the Code and its requirements;
- establishing an Event Plan for the management of the crowd, including emergency and evacuation situations;
- establishing an Emergency Management Plan and ensuring continuing effective liaison with the Queensland Police Service, Queensland Ambulance Service and the Queensland Fire and Rescue Authority;
- ensuring that all staff engaged for an event have appropriate training for their allotted tasks;
- Bar staff must be trained in the practices of responsible alcohol management, evacuations and emergencies;
- ensuring that security staff are fully briefed in their roles and the demarcation of responsibilities with the Queensland Police Service; and
- establishing effective and open communication with the Community Liaison Group, and if required, assisting this group in resourcing its activities (photocopying, mail-outs etc).

The management structure for the Lang Park Stadium Proposal is yet to be finalised. Irrespective of the management structure, the principles set out above will be adopted in the day-to-day operation and in the conduct of events.

❑ Code of Behaviour

The establishment of a Code of Behaviour for the stadium is a function usually undertaken as the facility moves towards the operational phase. While not presenting a Code of Behaviour for review in this EIS, the following principles are likely to be incorporated:

- there should be "zero tolerance" of intoxicated patrons either on entry to or during an event, with alcohol being sold on a managed basis to avoid public drunkenness;
- all alcohol sold should be either mid-strength or light strength alcohol, with there being no spirits available, apart from in corporate areas;
- patron education as to the alcohol policy should be established and maintained with adequate signage throughout the stadium;
- no alcohol, glass or cans should be brought into the stadium by patrons;
- obscene language, fighting and throwing of objects should not be permitted;
- mexican waves should not be encouraged;
- devices or mechanisms for amplifying sound should not be permitted within the stadium (eg megaphones, trumpets); and
- all patrons should have a seat for any event, with there being no standing permitted on seats or in aisles and stairs during events, and no entry to the pitch, arena and players' and officials' facilities.

❑ Surveillance

During events, continual surveillance of the crowd will be maintained by monitoring closed circuit television (CCTV) on the arena, seating bowl, concourses, entry and exit points, and public transport interchange and stairs. CCTV also will be installed along the pedestrian connections to Roma Street station.

An integrated management group consisting of stadium management staff, security staff, Police, Ambulance, and Fire Safety officers will maintain surveillance during events.

Radio contact with key surveillance and crowd management staff will be maintained at all times leading up to and during an event.

❑ Evictions & Arrests

Patrons will be evicted for any breach of the Code of Behaviour. A data base of evicted patrons will be established and maintained, with management reserving the right to refuse entry to patrons who have been evicted on more than three (3) occasions.

Offending patrons will be dealt with according to legislation and removed from the stadium premises by Police.

2.8.2 Crowd Control External to Site

Many of the principles for crowd management within the stadium apply to the external areas.

❑ Behaviour

The Code of Behaviour cannot be enforced by LPS (Local Park Stadium management) beyond the stadium, which includes the public transport interchange and the walkways connecting with it. The management of crowd behaviour in these areas is the responsibility of the Queensland Police Service. Upon an agreement with the Queensland Police Service, the stadium management may offer to provide security staff in designated areas around, or adjacent to the stadium. For example, security staff could be deployed to discourage patrons from leaving the designated walkways.

Temporary facilities, such as portable toilets, could be placed in strategic locations along the walkways back to the City, Caxton Street and other strategic pedestrian routes (eg Milton railway station, public transport interchange and long-distance coach parking areas). Such facilities should be removed by 10.00am on the day following a major event.

❑ Traffic & Pedestrian Flows

Police and security staff will be required to ensure uncontrolled pedestrian movements do not impede the flow of traffic, particularly in Milton Road and Given Terrace.

Surveillance and management of pedestrian concourses external to the stadium keep will ensure that crowding and resulting behaviour incidents do not arise. The design of these areas has taken this issue into account.

❑ Littering

Stadium management will provide litter bins in appropriate locations along the pedestrian walkways back to the City, in Caxton Street, and in other strategic locations (eg Milton railway station, public transport interchange, and long-distance coach parking areas). Stadium management will be responsible for a clean-up of walkways and local streets between the hours of 8.00am and 2.00pm on the day after an event. Hirers will be billed for this service. Pedestrian routes and areas within 400 metres of the proposed stadium will be cleaned.

❑ Lighting

Adequate lighting will be provided and maintained to all pedestrian walkways before, during, and after an event. Areas of public concourse, which remain open to public use at other times, will be illuminated for those times.

❑ Surveillance

Surveillance of the stadium and the pedestrian walkways will be maintained on a 24 hours basis by stadium security staff. Outside event times, stadium security staff will report any disturbances or incidents along the pedestrian walkways to the City Police station. However, stadium security staff will not be able to attend any incident outside event times and will not be responsible for the safety of pedestrians using the walkways.

If required, City Police and Brisbane City Council linkages into the CCTV network covering these walkways could be provided.

2.9 Public Safety & Emergency Procedures

Key elements of the public safety and emergency procedures include:

- ability to evacuate the whole of the stadium to free flowing exit points in 8 minutes and that those exiting assemble at nominated external holding and assembly points;
- emergency vehicle access to the site from Castlemaine Street; and
- provision of Early Warning Information Systems (EWIS).

An Emergency Evacuation Plan will be required and must be approved by the relevant authorities, such as the Queensland Police Service, the Queensland Fire and Rescue Authority, the

Queensland Ambulance Service and the CHEM Unit, prior to commencement of operations. These bodies also will need to conduct a full review of detailed design drawings prior to construction.

Particular consideration in the Emergency Evacuation Plan should be given to the evacuation of disabled people.

2.10 Personal Safety

External plaza levels are designed to ensure that non-defendable zones are minimised. The use of at grade solutions is preferred for public spaces to allow greater flexibility of escape. In conjunction with this the design will aim to minimise blind corners.

Closed circuit television will be used in critical areas to monitor public safety.

2.11 Stadium Sports Lighting

The sports lighting is to be installed below the roof leading edge level and along the edge of the roof. The system will be designed to meet broadcasting and national and international standards for stadia facilities. The design will focus on:

- establishing primary player view angles;
- reducing player glare;
- avoiding video board wash; and
- minimising environmental spill illumination.

The aim of the system is to provide the latest technology along with the best aiming strategy to minimise player shadows and avoid light spill to surrounding residential areas.

The sports lighting system is to be separate of the main building control systems or integrated into the Building Management Systems.

In the event that normal power is lost to the facility the sports lighting system will still be able to provide a minimum of 80% of fittings in operation.

The enclosed form of the stadium and the placement of lighting under the roof line will ensure that spill illumination outside of the stadium will be minimised. High efficiency light fittings as well as louvres will be added to further minimise light spill to the environment.

The shape of the stadium (ie enclosed bowl) will assist in limiting lighting spill to the outside of the stadium and surrounding areas. It is proposed that the installation will comply with AS4282 – Control of obtrusive effects of outdoor lighting.

Spill lighting from the external public access areas, external lighting, floodlighting of facades, advertising signage, will meet the requirements of AS4282, AS1158 – Pedestrian and Vehicular Areas may exceed the Brisbane Town Plan 1987 Clause 19.4 requirement. Compliance with AS4282 may be necessary in lieu.

2.12 Public Address System

The Public Address system (PA) comprises the Front of House (FoH) PA. The FoH system will incorporate speaker clusters with localised amplifiers and other signal processing equipment. These will be mounted on the catwalk under the front edge of the fixed roof, and driven by individual tielines.

Provision will be made to switch off or reduce the volume to unoccupied stand areas.

Delayed infill speakers will be mounted in the rear seating areas of Level 1, to ensure continuity with sound from the roof.

Selected seating will include electromagnetic loops for conveying sound to patrons with limited hearing who carry appropriate aids.

The design intent is to minimise sound spill from the stadium, and on to the playing surface.

2.13 Disabled and Special Needs Access

The proposed stadium is to be designed and constructed in accordance with the relevant Australian Standard for Disabled Access – AS1428.1-1993.

In particular a number of areas within the facility require specific attention. These areas include access/exit locations, seating, ticketing, toilet facilities, food and drink services, communications systems, public transport and car parking.

Key components of disabled access include:

- the path of travel being as level as is possible within the site and steps should be avoided wherever possible. Where steps are required access to an adjacent ramp or elevators will be provided;
- disabled car parking provided on the basis of one (1) carpark space per five (5) wheelchair positions;
- drop-off zones for vehicles delivering disabled persons in the immediate vicinity of the stadium;
- off-street passenger loading zones for the setting down and collection of passengers and in particular, disabled passengers;
- lifts as part of the continuous path of travel, located close to entrances; and
- convenient seating for carers of disabled people.

It is proposed that 1% of all seating be dedicated to disabled and special needs patrons. This figure is generally based upon 0.25% wheelchair usage and 0.75% enhanced amenity spaces.

2.14 Patron Support Infrastructure

Patrons attending the proposed stadium will have access to a wide range of facilities such as rest rooms, information kiosks, telecommunications facilities, automatic banking, food and beverage outlets, and safe areas.

2.14.1 Rest Rooms

Rest rooms will be provided for patrons and event personnel as well as stadium management including security and maintenance personnel.

2.14.2 Information

It is proposed that information service points will be provided in the form of Spectator Information Booths installed in the main public concourses, located near an entrance. It is proposed that these should:

- be in the form of recessed booths or kiosks which are situated in an alcove;
- provide each unit with electricity/phone/TV/data connections and a front counter, with each linked to security; and
- provide closure to the concourse by fire/security shutter.

Automatic Teller Machines will be provided on the concourse.

2.14.3 Telecommunications

Public phones will be provided at a number of locations throughout the facility and private phones will be installed throughout the administration, maintenance, media, security areas etc.

2.14.4 Safe Areas

The facility will be designed in accordance with Crime Prevention Through Environmental Design (CPTED) principles to minimise the possibility for personal injury.

The main security office will be at service level. The facility will also include interview rooms and secured equipment storage rooms. These spaces will be provided near the main security office.

In addition to these facilities the security office will have access to:

- a public waiting room suitable for four (4) persons;
- forward reception;
- two (2) interview rooms;
- office at reception;
- break room for 4-6 personnel; and
- amenities.

2.15 Design Options Considered

2.15.1 Design Principles

The master planning process approached the task of designing a possible stadium at Lang Park from a first principles position. A number of design studies were undertaken having regard to community input received during the preliminary consultation process, technical design issues, transport planning and pedestrian issues, and urban design and local character issues. The outcomes of these studies were a set of agreed design and planning principles. Those principles, in summary, are:

- minimise environmental impacts on the neighbouring community arising from pedestrian movement and activity, transport activity, and building scale and intensity, mostly through sensitive design and siting of key elements of the proposal;
- minimise operational and non-operational impacts on the neighbouring community arising from noise and light spill through an enclosed bowl;
- minimise uncontrolled pedestrian movements through the provision of attractive, high quality public transport facilities and direct high quality pedestrian links;
- minimise impacts on the character and cultural heritage values of places in close proximity to the stadium (eg Christ Church) and the locality (eg character housing of Petrie Terrace);
- attain a high level of community benefit through the provision of publicly accessible areas of park land and open space linking to Neal Macrossan playground and the Ithaca pool, through the inclusion of community facilities (PCYC, Ozsports) in modern accommodation within the stadium building, and through the establishment of an operating public transport station;
- provide a uniquely Queensland style to the building in the use of external areas and large outdoor plazas offering views to the City and the regional landscape;
- optimise viewing conditions for patrons to achieve world's best practice in terms of proximity to the pitch, shelter and comfort, and response to the Queensland climate; and
- optimise the commercial opportunities for corporate and institutional support of stadium activities through the provision of high quality corporate accommodation and entertainment facilities, and anchor facilities for major user groups.

2.15.2 Design Options

While many variations on particular design themes have been investigated, the master planning process centred on three (3) basic design options. These were:

❑ **Retaining the western (Frank Burke) grandstand, and:**

- the Broadwalk on Hale option entailing a bus station under the eastern grandstand accessed from Hale Street; or
- providing a transport station at the northern end of the site to link with a possible light rail and bus service in Caxton Street and with a reduced public space fronting Caxton Street; or
- providing a transport station under the southern grandstand to the north of Chippendall Street with dedicated pedestrian links, via Castlemaine Street, to the Milton Station and the possible future light rail station; and
- providing a large public open space and pedestrian plaza between the stadium building and Caxton Street.

❑ **Moving the western (Frank Burke) grandstand to the north by demolishing two southern bays and rebuilding them at the northern end, and:**

- providing a transport station under the southern grandstand to the north of Chippendall Street with dedicated pedestrian links, via Castlemaine Street, to the Milton Station and the possible future light rail station; and
- providing greater separation between the stadium building and the Christ Church and graveyard sites.

❑ **Retaining the western (Frank Burke) grandstand, and:**

- providing a transport station to the south of Chippendall Street, linking directly over Milton Road to the possible future light rail station and to the Milton Station;

- extending the southern pedestrian plaza over the transport station to link with the possible future light rail station and the pedestrian connections to Milton Station and the City; and
- providing a large public open space and pedestrian plaza between the stadium building and Caxton Street.

❑ Pedestrian Design Options

A number of options for pedestrian infrastructure also were considered. Each of them entailed the means of directing major pedestrian flows from the stadium back to the City via Milton Road and Caxton Street. Each of the options include:

- providing a widening of Milton Road towards the north between Hale Street and Petrie Terrace to incorporate a 10 metre wide thoroughfare along Milton Road to Petrie Terrace;
- providing an elevated walkway parallel to the railway but to the rear or north of the Fire Station in Upper Roma Street, connecting with the pedestrian system in Roma Street;
- providing a pedestrian plaza as an inclined deck over the southern end of Hale Street to meet both Milton Road and the stadium concourse at grade; and
- providing a pedestrian plaza at both the northern and southern ends of the stadium, with links via a concourse to the possible light rail station on Milton Road (south) and a widened pedestrian walkway over Hale Street to link with Caxton Street.

The variations considered all dealt with the means of transferring the pedestrian flow from Petrie Terrace and Milton Road to Roma Street. The options included:

- extending a 10 metre wide thoroughfare eastwards through the 'HogsBreath' site to link with a similar thoroughfare from Caxton Street. The walkway would then proceed above the rail lines to an elevated system located to the rear of the Fire Station on Upper Roma Street; and
- extending a 10 metre wide thoroughfare to link with a large public plaza to be created behind the Police Barracks site. The plaza would then discharge pedestrians to the walkway above the rail lines connecting with an elevated system located to the rear of the Fire Station on Upper Roma Street. The public plaza would be available as an open urban space, offering views down towards the Brisbane River and Southbank.

❑ Evaluation Summary

A full evaluation of each of these options is presented in the master planning and concept design. In summary, the evaluation outcomes were:

- The required size of the Hale Street bus station was such that it could not be accommodated under the eastern grandstand without encroaching on land required for the pitch. Furthermore, right-turning bus access to Hale Street would be undesirable. The Broadwalk on Hale concept was considered to fall below acceptable levels for pedestrian safety during peak traffic times (ie immediately post-match).
- The provision of a transport station on Caxton Street would not achieve the desired separation of noisy activities and brightly-lit transport facilities from residential areas. There are physical engineering constraints to providing a light rail connection in tunnel to a northern transport station. There are traffic flow and operational constraints to running light rail services at grade along Caxton Street.
- The relocation of the western (Frank Burke) grandstand to the north by approximately 30 metres was considered "not a cost effective option" (approximately $12 million). This option also would have the effect of greatly reducing the area available for open space and parkland

development along Caxton Street. However, it would have provided an effective separation between the stadium building and the heritage-listed Christ Church and graveyard. This option also would have provided greater area for a transport station under the southern stand, with an enlarged pedestrian plaza above.

- The option to retain the western (Frank Burke) stand and develop an integrated transport station between Chippendall Street and Milton Road would require the acquisition of land. However, it would permit the creation of generous pedestrian plazas for enhanced public safety and comfort, greater space in the vicinity of the Christ Church land, opportunities for outdoor activities to assist with staggered crowd dispersal, and an integrated response to public transport demand. This option would also attract a large proportion of the crowd to the south, reducing noise and congestion in sensitive residential areas.

2.16 Site Preparation & Construction Activities

2.16.1 Timing, Staging and Construction Hours

This section deals with the construction issues associated with the timing of the overall project, how the works will be programmed or staged and what hours of work are permissible and what could be expected.

2.16.2 Timing of Project Development Phases

❑ **Timing Constraints**

It is envisaged that the timing of the construction will be such as to meet the criteria of completion by March 2003 to allow involvement in the 2003 Rugby World Cup to be played in Australia and New Zealand. It would therefore require that major construction works would be underway by the beginning of 2001 to be completed by early 2003.

❑ **Staging**

The confines of the site will mean that construction and sports related activities will be difficult to co-exist during the construction period and that it is most likely that the facility will be closed to sporting activity for the full extent of the construction period. This full closure will allow the arena area to be used for construction staging as well as construction access and storage.

The external works would be undertaken in a staged format to ensure that all major access roads in the vicinity are open to traffic during peak periods. Periods when roads might be closed would be limited and would occur at times which cause the least inconvenience. This pertains in particular to Milton Road, Hale Street and Caxton Street. Where major construction work is required over any of the above major transport corridors, procedures would be put in place to provide partial road closures only during those periods of time when works are being performed overhead in consultation with Brisbane City Council and the Queensland Police Force.

When considering in detail the proposed works, the activities may be broken down to the following key areas:

- **Relocation of facilities**

  The proposed development will entail construction of major new elements as well as the retention of some existing elements. Staging will require that those activities currently

undertaken within the Western Stand ultimately be relocated for work to be undertaken in this area. It is possible that this relocation may occur sometime after site establishment.

- **Demolition works**

  With the likelihood that all existing facilities except the main Western Stand are demolished it will be necessary that these demolition works commence early in the program.

- **Earthworks**

  The staging of major earthworks will be co-ordinated with the site demolition works and the installation of deep services. The scope of major site earthworks will include the establishment of the construction platform once major demolition works are complete.

- **In-ground Services**

  Deep services will need to be installed. They include major new stormwater infrastructure as well as trunk sewer systems and major communications lines. This work has the potential to extend beyond the site dependent on existing infrastructure and levels.

- **Footings and Substructure**

  The staging of the footings and substructure works generally will align with the completion of the major earthworks for the platform construction.

- **Main Structure – East**

  The main structure east comprises the existing steel-framed grandstand. It is currently envisaged that this stand be demolished and replaced with a purpose built stand as part of the redevelopment. The demolition and removal of this stand will be a key item in the staging of the works.

- **Main Structure – North & South**

  The existing structures both north and south consist primarily of concrete faced earth embankments. These will be removed as part of the site demolition and the site bulk earthworks.

- **Existing Western Stand Redevelopment**

  The Western Stand will be retained but will undergo fitout and other changes. The staging of this work will be able to run in parallel with the main construction activity. This work should not form part of the early works staging.

- **Roof Structure**

  The development of the new roof structure will require construction of the new stands to the east, south and north to be well progressed before roof works in this area may commence on site. It is envisaged that most of the fabrication work will be undertaken in such a way as to minimise problems with transportation to the site, working within a confined space on the site and the lifting/jacking requirements on site. It is possible that early work on the roof of the

existing western stand could commence prior to commencement of the roof of the newer stands.

- **Building Services**

  The staging of building services works will occur in a number of phases. The initial phase will involve the installation of deep services, with connections to external trunk services occurring through the construction phase. Work will be planned to minimise disruption to those services. The second phase will involve set out of all systems as the structure progresses. The final phase will involve the completion of the works and testing and commissioning.

- **Arena Construction**

  Assuming that the construction methodology utilises the arena area as the main construction staging point it will be late in the staging of the project before any work commences on the arena itself. Works on the arena subgrade and finish will require all construction staging and storage to be relocated external to the arena prior to this area being required. It is anticipated that these areas will be within the building structure or on elevated gantries.

- **Main Structure Fitout**

  The fitout of the main structural elements will occur progressively once construction has progressed to a stage where internal services can be set out and safe-working conditions can be assured.

- **Plaza Level - Milton Station**

  The work to link the new stadium complex with Milton Railway station and a potential light rail station at Milton Road will require detailed staging and planning. Milton Road is a major arterial road for movement of traffic to the western suburbs. Where bridge or plaza works are required over Milton Road, it is proposed that all support structure works be completed with Milton Road open and only during placement of overhead bridge deck or precast spanning members, that Milton Road be temporarily closed during the early hours of the morning.

- **Work over Hale Street**

  Similar issues apply to those described for construction over Milton Road.

- **Forecourt to North**

  This area will provide alternate as well as additional construction staging capacity. It is possible that this will be one of the last areas of the site to be completed.

- **Link Structures and Light Rail Route to Roma Street**

  The construction of linking structures to the Roma Street transport node will be to some degree independent of the main stadium precinct works. These works will be programmed to minimise inconvenience to the neighbouring population.

- **Castlemaine Street Works**

Castlemaine Street provides a key access point for businesses in the commercial area of Milton as well as to the rear of the Castlemaine Brewery. It will be necessary to keep Castlemaine Street open during the works to allow access into the commercial areas. At various times during the project, staging requirements may require Castlemaine Street to be closed temporarily. Such closures will be of short duration and in off-peak periods.

2.16.3 Construction Hours

❑ Statutory Limitations

With the residential community in close proximity to the Stadium, it is proposed those hours of construction be in line with State Government (Environmental Protection Agency) requirements. This will restrict the ability to work to the hours of 6:30 a.m. till 6:30 p.m., Monday to Friday, 7.30 a.m. to 3.00 p.m. on Saturday and no work on Sundays and Public Holidays. These times may be amended in any Development Approval given.

❑ Working Out of Hours

If working out of hours is proposed, the agreement of the assessment manager, by way of the Development Application and support of the local community will be required. Out of hours work would be a breach of the Environmental Protection Regulation. It may be amended with the approval of the EPA and with appropriate notification to the surrounding community.

2.16.4 Construction Methodology

This section deals with the anticipated construction methodology for all key elements for the project.

❑ Relocation of facilities

Relocation of existing facilities will involve the movement of existing functions from the western and eastern grandstands to a location to be determined. This relocation will then permit either demolition works, earthworks or new fitout to occur and site offices to be constructed.

❑ Demolition works

Where major elements are to be demolished, this will occur through various means. The eastern grandstand consists of footings, substructure and main structure. The footings will, in many instances, be difficult to remove and may either be reused (where appropriate) or left in-situ. The existing substructure will be demolished as well as the steel/concrete-framed main structure. This demolition will involve the use of large excavators with rock breakers as well as jackhammers for major reinforced concrete elements. Where possible, concrete and steel components will be saw or flame cut and removed from the site in tip trucks.

The removal of major steelworks on the eastern grandstand and western grandstand roof will require the use of temporary cranes. The lift height required will necessitate these cranes being positioned close to the structure either in Hale Street, for the rear of the structure and within the arena for the front of the structure. Alternatively it may be possible to accommodate all cranes on the pitch.

Transportation of demolition materials may also require trucks to be parked in Hale Street as well as having access to the main arena. This may require particular permits to be obtained from the EPA and the Brisbane City Council.

❑ Earthworks

The extent of earthworks will involve primarily the new building platform, the new forecourt and works to Milton Road, the arena itself and earthworks required for the linkages back to the CBD. The construction methodology will require removal of existing materials as well as the installation of new materials.

❑ In-ground Services

The construction methodology for the in-ground services will involve two key elements: those services which are internal to the proposed stadium site, and secondly those external to the site.

Internal services will involve the excavation and placement of services such as stormwater, sewer, electrical and communications data as well as gas. These services will generally be of shallow construction.

Services external to the site will involve similar components to the internal services. However, the interfacing of these services to the existing infrastructure may require new works extending away from the new stadium to cater for increased capacity as well as potential problems associated with levels. This work may require temporary or partial closure of adjoining roads and streets as well as the construction of new infrastructure, eg. new water mains and stormwater pipework away from the site.

❑ Footings and Substructure

The footings will be a combination of both high level as well as deep footings. Deep footings will consist of either bored piers or driven piles. Where driven piles are used special precautions will need to be taken to minimise issues such as vibration induced by pile driving, noise and movement of equipment.

❑ Main Structure – East, North and South

The new grandstand structures to the east, south, and north are likely to consist of a combination of reinforced concrete, pre-cast concrete and structural steel. Seating will generally be of precast support structure. The construction methodology will involve the positioning of one or more major lifting cranes within the central arena from which they will have reach over all new works within the stadium footprint.

Concrete will be pre-mixed and delivered to site to be either craned or pumped into location. The volume of concrete to be placed will necessitate a designated number of un-loading points away from main traffic routes.

❑ Existing Western Grandstand Refurbishment

The construction methodology for the existing western grandstand will involve four key elements:

- the removal of the existing roof structure;
- removal of parts of the existing stand internal structure;

- structural modifications to the existing stand; and
- changes to the internal fitout of the western grandstand.

The internally located cranes in combination with external mobile cranes will carry out the removal of the existing roof structure. Demolished structure will be delivered down to Castlemaine Street level for transporting away from the site.

The removal of internal structure will be accomplished by hand or small machine in many cases, with all demolished materials being craned or hoist removed to Castlemaine Street level.

The structural modifications to the existing stand will require removal of existing structure by the use of jackhammers, concrete saws, and excavators with rock breaking equipment. Demolished material will be removed to trucks waiting in Castlemaine Street. New works will involve new foundations as well as the construction of both concrete and steel elements. This will once again require deliveries of concrete as well as structural steel elements.

❑ Roof Structure

The roof construction will require the coordinated lifting capacity of a number of cranes or temporary lifting towers. It may be expected that the roof structure will require long span trusses to achieve the column free clear spaces. Therefore not only will cranes or lifting jacks be required but the structure may also require temporary support during construction to allow all site connections to occur. It can be expected that the majority of roof structure lifting can occur from within the arena as long as suitable access is available for trucks to deliver the main elements to a point within reach of these cranes. The construction staging will therefore need to take into account the need to leave access to a position to facilitate lifting and erection of the main roof structure.

❑ Building Services

The construction methodology for the building services will involve the three key phases:

- in-ground and deep services installation;
- services rough in and major plant item installation; and
- final fitout and plant and equipment commissioning.

The key construction issues include the need to link new services to the existing infrastructure beyond the stadium site and the need to have all major items of plant installed as work progresses. This will require crane lifts of major items such as transformers, air conditioning units and main switchboards. Transport and road access will once again be key factors involved.

The need to shut down power supply to the general area to allow mains connections is considered to be of low impact. However, where these services impact upon neighbouring roads and streets, some disturbance may occur and traffic redirections will be required.

Live testing of building services, such as the sports lighting and PA systems, will be required as part of the commissioning phase. Nearby residents should be notified of testing procedures. Appropriate mitigation measures will be adopted as required.

❑ Arena Construction

The nature of the proposed construction methodology will necessitate the arena works being completed as one of the last items. This is not unusual. However, the need to minimise

construction impact outside of the stadium footprint may require the preliminary work on the arena to also be late in the program of works. It is envisaged that once all need for internal cranage is complete, the cranes would be removed, all remaining services would be installed into the arena area and, lastly, all site facilities as well as materials would be removed to an external location. This external location may be an adjoining site away from finishing works, or within the building, or on overhead gantries.

❑ Plaza Level to Milton Station

The construction of a plaza level over Milton Road to Milton Station will involve a number of key elements. These elements will include the construction of support structure beside and potentially on the centreline of Milton Road and the construction of precast structure leading to cast in-situ works over Milton Road.

The construction of foundations and columns will create some disruption to traffic on Milton Road and temporary traffic measures will be required. These measures could include temporary roadworks to allow construction activity either beside or on Milton Road.

❑ Forecourt to North

The possible forecourt to the north may be one of the last areas of construction, as this area will provide necessary construction storage and staging. The potential works in this area are primarily earthworks and plaza level works at grade.

❑ Link Structures to Roma Street

The construction of the link structures to Roma Street will potentially involve:

- bridges;
- road works; and
- excavation.

❑ Castlemaine Street Works

Castlemaine Street will provide a key access to the proposed construction site given that it is generally away from the main arterial roads on the other sides of the site, ie. Milton Road and Hale Street. It is intended that Castlemaine Street remain open to allow adjoining properties access to their sites. The full closure of Castlemaine Street would not be required as long as suitable loading and unloading areas are designated and temporary traffic works are undertaken to ensure suitable safe working areas are maintained. There will be the loss of some carpark areas in the vicinity of Castlemaine Street during the works.

2.16.5 Construction Equipment

The principal construction equipment required by element of work may be summarised as follows:

Demolition Equipment	Excavators, mobile cranes, bulldozers, front-end loaders, rock breakers, jackhammers, flame cutting equipment, dump trucks
Earthworks	Dump trucks, bulldozers, excavators
Materials and Waste Removal Equipment	Excavators, both rigid and articulated vehicles, mobile compacting vehicles
Materials Delivery Systems	Pre-mixed concrete trucks, rigid and articulated trucks, crane trucks, long vehicles
In Ground Services	Trench diggers, excavators, tip trucks, rigid and articulated vehicles, cranes
Footings and Substructure	Pile driving equipment, articulated and rigid vehicles, pre-mixed concrete trucks
Main Structure	Pre-mixed concrete trucks, cranes mobile and fixed (inc semi-fixed), rigid and articulated vehicles, small vehicles
Roof	Large semi fixed cranes, mobile cranes, low loaders, rigid and articulated vehicles
Major Building Services Plant	Cranes, rigid and articulated vehicles
Finishes	Rigid and articulated vehicles, cranes
Painting	Scissor lifts, swing stages, cranes, rigid vehicles

2.16.6 Construction Transport

As previously identified, most materials leaving or entering the site will come by road transport. It is envisaged that the majority of this material will be delivered via Castlemaine Street directly into the arena. The size of the vehicles will in consideration of access limitations to the area clearances under nearby bridges as well as available turning circles need to be determined.

2.16.7 Construction Access

Construction access will be primarily via Castlemaine Street with cranes removing materials for storage either within the arena or on the northern end of the site. Loading and unloading facilities will be provided in Castlemaine Street as well as to the north of the site. Vehicles off-loading in Castlemaine Street will access the area from either Milton Road or Caxton Street.

Vehicles with high loads approaching from Caxton Street will be restricted (except where required) due to the height of bridges on Hale Street, necessitating an approach either down Caxton Street from Paddington or down Caxton Street from Petrie Terrace.

The preferred access along Milton Road will be available to the site with few height restrictions (such as the railway line), along the Western Freeway, along Milton Road and into Castlemaine Street.

2.16.8 Waste Removal

Waste removal will be to trucks either positioned in Castlemaine Street or from within the arena.

The removal of any possible hazardous waste from the site would be to vehicles in the arena and then via Castlemaine Street to approved disposal facilities.

2.16.9 Construction Parking

Part of the area adjoining the site has parking restrictions in place and in general terms parking is normally difficult through the week. The additional load placed on the parking resources during the construction period will necessitate special parking strategies for the construction work force.

To avoid the incidence of on-street parking by the construction work force, the contractor will be required to provide specified on site construction parking and suitable means to transport workers to the site from designated off site areas away from the construction site. It will be the responsibility of the contractor to agree with off site car park operators and the Brisbane City Council on the use of existing facilities and/or other areas.

2.16.10 Project Earthworks

❑ Stadium Site Works

The extent of earthworks on the stadium site will generally involve demolition of existing earth embankments, creation of the building platforms, arena works, external plaza works, access and external road works.

❑ Internal Earthworks

The internal earthworks will involve elements such as:

- demolition works;
- site clearing after demolition;
- site preparation for foundation works;
- north end;
- south end;
- Hale Street;
- Castlemaine Street; and
- arena works.

❑ External Infrastructure Earthworks

The external infrastructure earthworks will involve elements such as:

- pedestrian access to Roma Street Station;
- Milton Road works for the possible connections to the light rail station;
- pedestrian access to Milton railway station; and
- external transport infrastructure works, such as the possible extension of light rail.

2.16.11 Construction Workforce

The size of the construction workforce over the duration of the project will vary. The following information addresses the issue of workforce by each of these particular stages.

❑ Demolition Phase

The estimated work force during the demolition phase is 30 personnel, not including site management etc.

❑ **Site Development Phase**

The site development phase may see the average daily work force increase to 100 personnel.

❑ **Major Element Construction Phase**

During the major element construction phase it is likely that the workforce may reach a total of 400 personnel or more.

❑ **External Transport Infrastructure**

External infrastructure works are likely to involve a further 100 personnel on an average day.

❑ **Finishing Stage**

The workforce during the finishing stage of the project may reach 300 on site.

These figures cover all trades and all levels. They are estimates only and subject to changes in the construction methodology, final project scope and time.

2.16.12 Site Pollution Issues

❑ **Types of Construction Pollution**

As with any construction site it is expected that various forms of construction "pollution" will be generated. The impact of each of these forms will differ and various actions will be taken to minimise their impact.

❑ **Noise Pollution**

The occurrence of noise pollution will derive from a number of sources on site, including equipment such as:

- pile driving equipment;
- cranes operating at height;
- excavators/rockbreakers;
- earthmoving equipment; and
- trucks.

All of these types of equipment generate noise. The control of working hours as discussed previously is aimed to ensure that any noise generated occurs during normal "working hours". However, even noise levels during normal working hours can create audible pollution. Adopting the approach of construction of the building from within will enhance the options for minimisation of noise, but once the north, south and eastern embankments/stands are removed construction noise will impact the surrounding community.

All equipment used should meet Workplace Health and Safety (WH&S) criteria for sound levels for operating equipment and, where extreme processes are required, sound level limits would be set and monitored to ensure levels away from the site are within acceptable bounds.

❑ Air Pollution

The incidence of construction site related air pollution relates primarily to the movement of dust away from the site. Dust can be controlled by the use of water trucks as well as site exit grids to remove excess mud and dirt before the trucks leave the site. In extreme cases truck washdown facilities can be provided to ensure trucks leaving the site do not spread dirt and potentially dust on neighbouring streets.

❑ Light Spill

The occurrence of light spill during construction will arise only if working out of normal working hours. Should this be permitted, special lighting design would be undertaken to ensure that light levels away from the site are kept at acceptable levels.

Where works are required on roads after hours to minimise disruption, the lighting will be nominated in accordance with either BCC or Department of Transport requirements.

❑ Run-off – Stormwater

Stormwater run-off during construction will be controlled through an internal system. This temporary system will be designed to trap sediments on the site and will also minimise the potential impact of other spills on site. All stormwater collected on site will be passed to the local stormwater system outside of the site.

❑ Run-off – Sediment Control

As mentioned above, particular care will be taken to ensure that all sediments are collected on site prior to stormwater leaving the site.

❑ Vibration Effects

With the likelihood that footing systems could include driven pile systems, the possibility exists for pile driving induced vibration to be noticed away from the site. Such vibration at worst may cause structural cracking in nearby masonry buildings but more generally can create annoying vibration sensations in neighbouring properties. A structural integrity and condition of building audit of the nearby Christ Church should be completed prior to construction commencing.

Where driven pile footing systems are used, vibration-monitoring procedures will be put in place to ensure vibrations do not reach either nuisance or damage-causing levels.

2.16.13 Road Closures

The proposed construction activity will impact to varying degrees on neighbouring roads and streets around the stadium site. The following analysis assesses the likely impact on these streets and roads and the need for road closures.

❑ Milton Road

Milton Road will be impacted by a number of factors, including:

- the partial and sometimes full closure of Castlemaine Street will result in changed traffic conditions on Milton Road; and

- the construction of a plaza level over Milton Road will result in temporary changes to traffic conditions on Milton Road.

It is envisaged that, while Milton Road will not be closed, it will at various times need to be relocated to allow for construction activity. This relocation will generally involve the temporary relocation of one lane or another to permit construction activity.

❑ Hale Street

It is not proposed to close Hale Street. However, there may be some occasions where partial closure may be required. The constructed form of Hale Street makes temporary road closures much more difficult than for other roads, as does its important regional role in the road network. It is proposed that minimal disruption to Hale Street occur.

❑ Castlemaine Street

Castlemaine Street is likely to form the major access point for construction activity for the site. It is proposed that generally Castlemaine Street will be open to normal traffic and will only need full or partial closure for special construction activity, such as the delivery to site of the main roof structure or the installation of below ground services.

❑ Caxton Street

The closure of Caxton Street is not proposed. Castlemaine Street may at certain times during the construction require partial or full closure for short periods of time. In such instances detours would be arranged into Castlemaine Street/Milton Road/Petrie Terrace/Caxton Street.

❑ Chippendall Street

The closure of Chippendall Street will depend on final detail. It is possible that, under certain circumstances, Chippendall Street may be closed for short periods during construction. Prior to such occurrences, consultation with affected landowners, including Christ Church, will be required to minimise impacts.

❑ Neighbouring Streets

Neighbouring streets in the vicinity of the site will remain open unless special issues arise necessitating full or partial closure of any street. Again, consultation with affected parties will be required to avoid or minimise impacts.

❑ Western Railway Line

While it is proposed that works over the railway line to Milton Station are required for pedestrian facilities at Milton Station, the Light Rail route and pedestrian link towards Roma Street, it is not envisaged that this will cause any major closures of the tracks. It is likely that, during critical phases of the construction work, programmed isolations will be required. These are only considered to be of short term in duration and necessary for safety and maintenance of service to all rail customers.

❑ **Coronation Drive/Hale Street Exit**

It is not envisaged that closures of the Coronation Drive/Hale Street intersection will be required during the works.

2.17 Electricity Supply

It is anticipated that the electrical demand for the proposed stadium will be in the range of 6 MVA to 7.5 MVA. The design connected capacity anticipated is 10 MVA to 15 MVA. These values will be further refined once the design is further developed.

High voltage (HV) supply is to be designed on the following basis:

- the site will be a High Voltage (HV) customer;
- multiple points of supply from the Energex network will be necessary to provide redundancy;
- the ability to automatically supply full load with the loss of one feeder will be required;
- dual internal networks will be provided to provide redundancy; and
- HV standby generators will be required to provide backup on loss of mains supply.

The reticulation around the stadium is to be provided with dual open 11 KV ring mains, with 11 KV/145V substations located in the four corner areas at ground level.

Uninterruptible Power Supply (UPS) will be provided to generator units to maintain patron safety and event-critical supplies during generator start up. The sports lighting system from each substation will be supported by UPS to allow for the automatic changeover in supply on loss of the HV feeder.

2.18 Energy Conservation Measures

It is proposed as part of the facility development, that concepts of ecological sustainability be adopted wherever practical and feasible. This may include but not be limited to such issues as:

- selection of inherent low energy/high efficiency plant and equipment;
  use of zero rated ODP refrigerants including commercial refrigerants;
- maximised use of natural ventilation including stack effects;
- maximum use of outside air cycles to provide "free" cooling during winter months;
- photo-voltaic cell power generation for operation of the facility during non match periods;
- collection of rainwater to source a re-use water reticulation system; and
- an integrated transport system.

2.19 Water Usage, Storage, Runoff & Recycling

Water usage will be managed in such a way as to minimise requirements and limit off-site disposal as well as to protect and improve water quality. In doing so the following operational and environmental performance standards are proposed as part of the development:

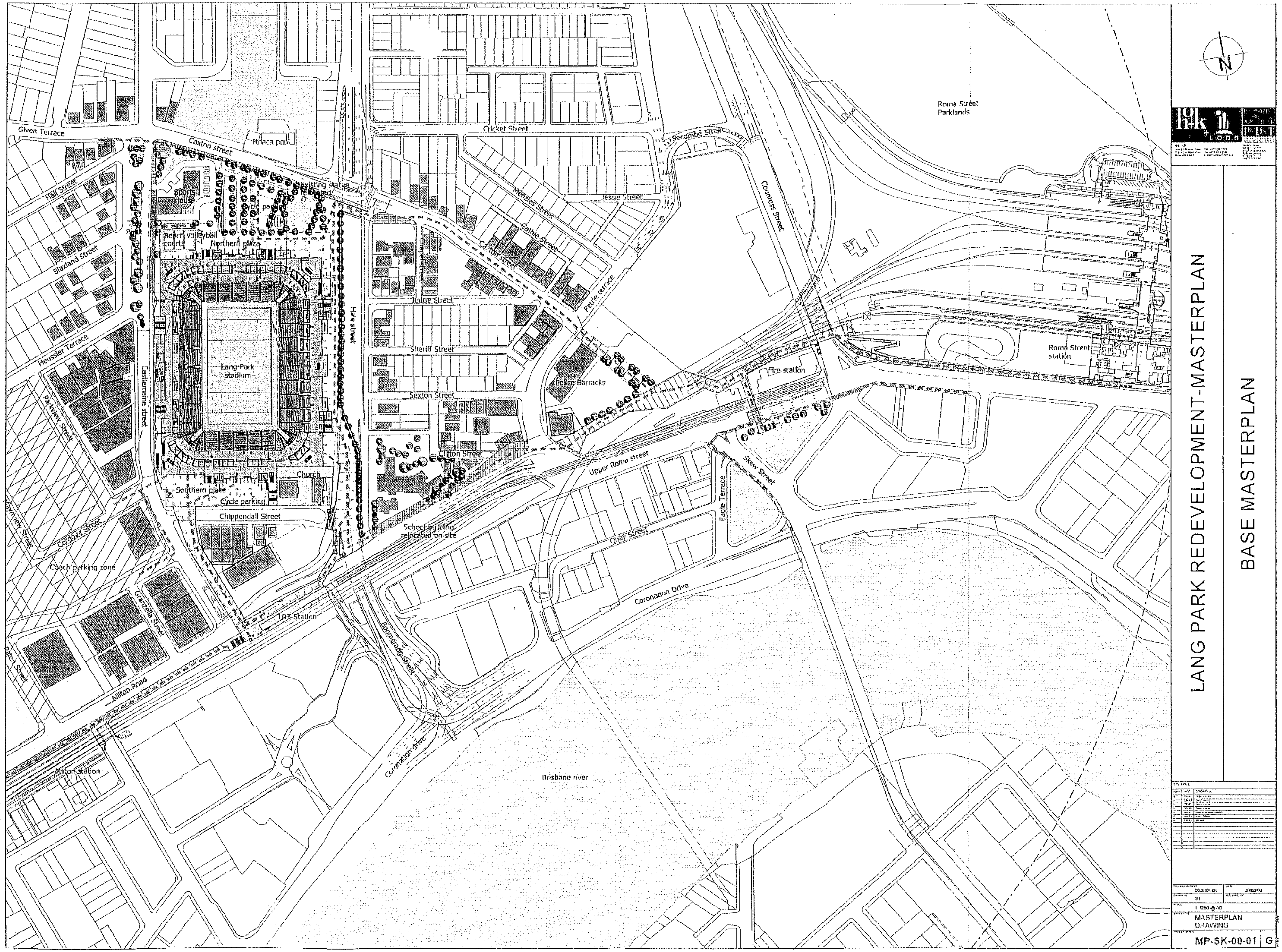
- the site and activities conducted on the site are to be managed to minimise the use and contamination of water, and to re-use/recycle water where possible, particularly during construction;
- the site should be managed to optimise the on-site infiltration of stormwater and to minimise the contamination of stormwater;

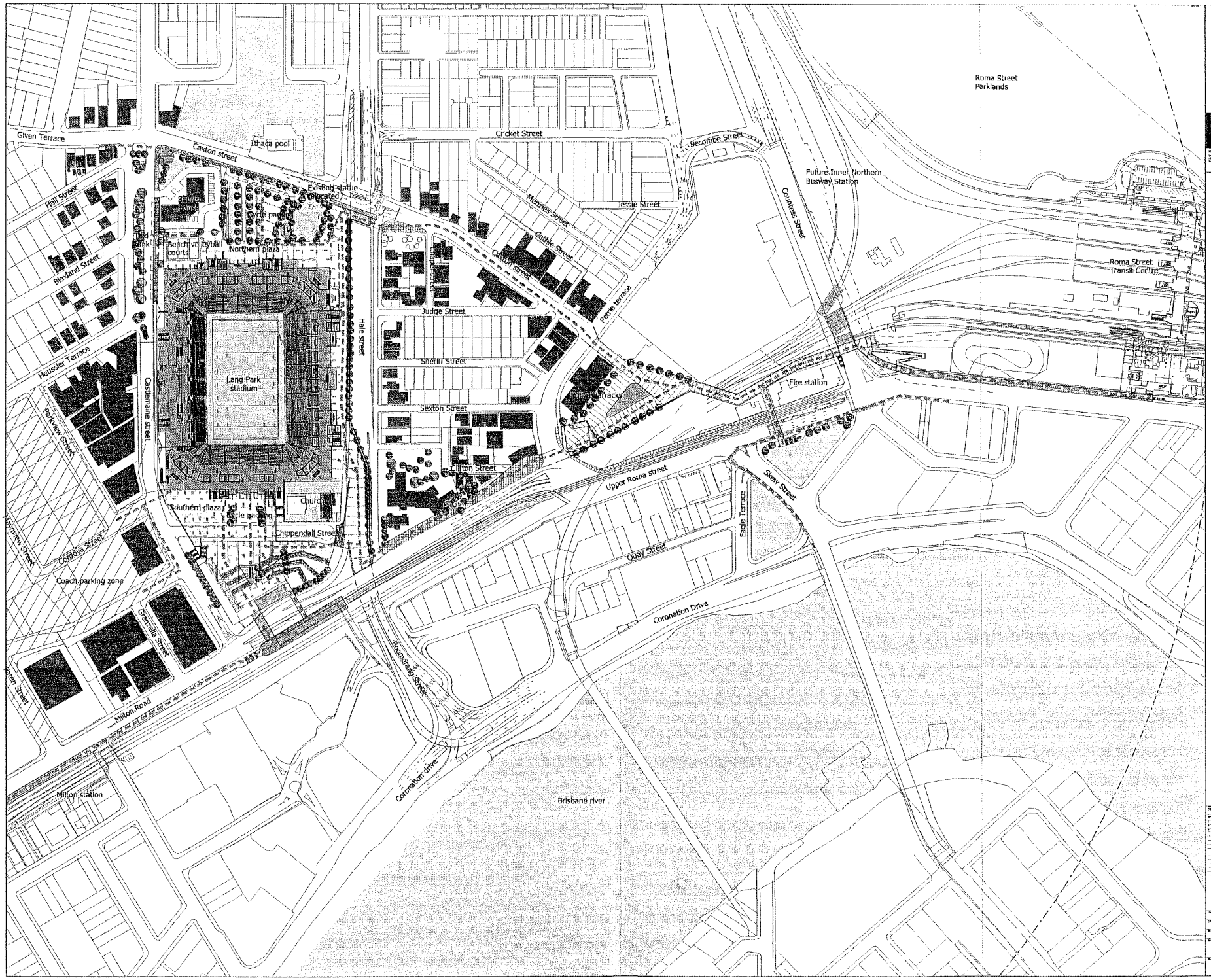
- discharge to the wastewater system must be operated, monitored and maintained in accordance with the relevant trade waste requirements;
- during construction, stormwater is to be managed to ensure that discharge quality complies with the requirement of the Environmental Protection Agency;
- facilities for the storage and handling of potentially contaminating substances must be managed to ensure that discharge to surface and ground water does not occur; and
- a Waste Management Plan will be required for the facility.

2.20 Waste Disposal & Recycling

Two trash compacters are to be provided. These will include one (1) wet and (1) dry compactor.

Recycling facilities will also be located in this area including recycling bins for appropriate materials ie glass, aluminium, clean paper, and cardboard. Waste management systems including a recycling policy for food services and for stadium operations will be provided by the stadium management.


LANG PARK REDEVELOPMENT-MASTERPLAN
BASE MASTERPLAN
Roma Street Parklands
Given Terrace
Caxton street
Ithaca pool
Cricket Street
Secombe Street
Hall Street
Sports House
Existing statue relocated
Jessie Street
Menzies Street
Cathie Street
Countess Street
Beach volleyball courts
Northern plaza
Blaxland Street
Petrie terrace
Judge Street
Hale street
Sheriff Street
Roma Street station
Heussler Terrace
Castlemaine street
Lang Park stadium
Fire station
Parkview Street
Police Barracks
Sexton Street
Milton Street
Church
Upper Roma street
Skew Street
Southern plaza
Cycle parking
Chippendall Street
Eagle Terrace
School building relocated on-site
Quay Street
Cordova Street
Coach parking zone
Coronation Drive
Granzella Street
LRT Station
Boomerang Street
Milton Road
Coronation drive
Milton station
Brisbane river
MASTERPLAN DRAWING
MP-SK-00-01
G


Given Terrace
Caxton street
Ithaca pool
Cricket Street
Secombe Street
Roma Street
Parklands
Future Inner Northern
Busway Station
Countess Street
Roma Street
Transit Centre
Hall Street
Blaxland Street
Existing statue
(relocated)
Cycle parking
Beach volleyball
courts
Northern plaza
Jessie Street
Menzies Street
Gethie Street
Caxton Street
Prairie terrace
Judge Street
Sheriff Street
Sexton Street
Hale street
Lang Park
stadium
Heussler Terrace
Castlemaine street
Parkview Street
Fire station
Upper Roma street
Skew Street
Eagle Terrace
Quay Street
Coronation Drive
Southern plaza
Cycle parking
Church
Chippendall Street
Normview Street
Cordova Street
Coach parking zone
Granville Street
Porter Street
Milton Road
Milton station
Boomerang Street
Coronation drive
Brisbane river
LANG PARK REDEVELOPMENT-MASTERPLAN
MITIGATION MASTERPLAN
MASTERPLAN
DRAWING
MP-SK-00-02
C

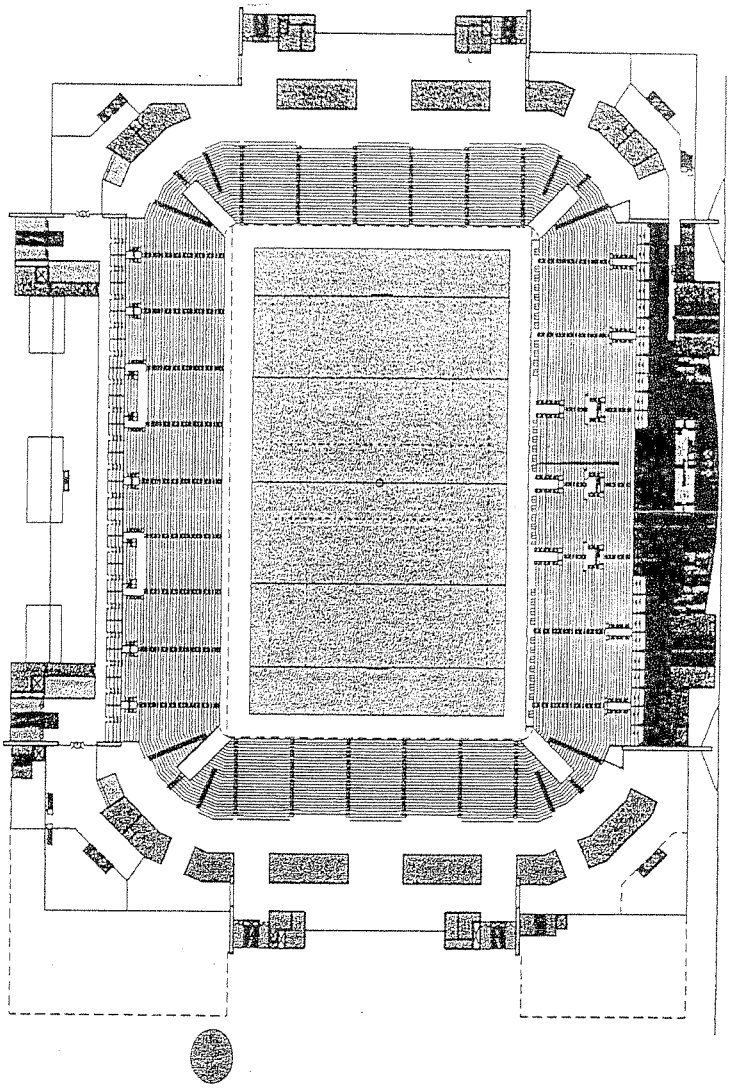
BCC.186.0083

COLOUR KEY
CATERING/ FOOD/ BEVERAGE
AMMENITIES
PUBLIC CIRCULATION
VEHICLE CIRCULATION
PLANT/ EQUIPMENT
MEDIA/ PRODUCTION
CORPORATE/ VIP
MEMBERS
TEAM FACILITIES
EVENT MANAGERS
STADIUM MANAGER
PUBLIC CONCOURSE
OFFICES
LANG PARK REDEVELOPMENT
FLOOR PLAN - GROUND LEVEL (RL. 6.00)
FLOOR PLAN
Ground Level (RL. 6.00)

BCC.186.0084

COLOUR KEY
CATERING/ FOOD/ BEVERAGE
AMMENITIES
PUBLIC CIRCULATION
VEHICLE CIRCULATION
PLANT/ EQUIPMENT
MEDIA/ PRODUCTION
CORPORATE/ VIP
MEMBERS
TEAM FACILITIES
EVENT MANAGERS
STADIUM MANAGER
PUBLIC CONCOURSE
OFFICES
LANG PARK REDEVELOPMENT
FLOOR PLAN - GROUND MEZZANINE LEVEL (RL. 9.00)
FLOOR PLAN
Ground Mezz. Level (RL. 9.00)

COLOUR KEY
CATERING/ FOOD/ BEVERAGE
AMMENITIES
PUBLIC CIRCULATION
VEHICLE CIRCULATION
PLANT/ EQUIPMENT
MEDIA/ PRODUCTION
CORPORATE/ VIP
MEMBERS
TEAM FACILITIES
EVENT MANAGERS
STADIUM MANAGER
PUBLIC CONCOURSE
OFFICES
LANG PARK REDEVELOPMENT
FLOOR PLAN - LEVEL 1 (RL. 13.00)
FLOOR PLAN
Level 1 (RL. 13.00)
A2
BCC.186.0086



COLOUR KEY

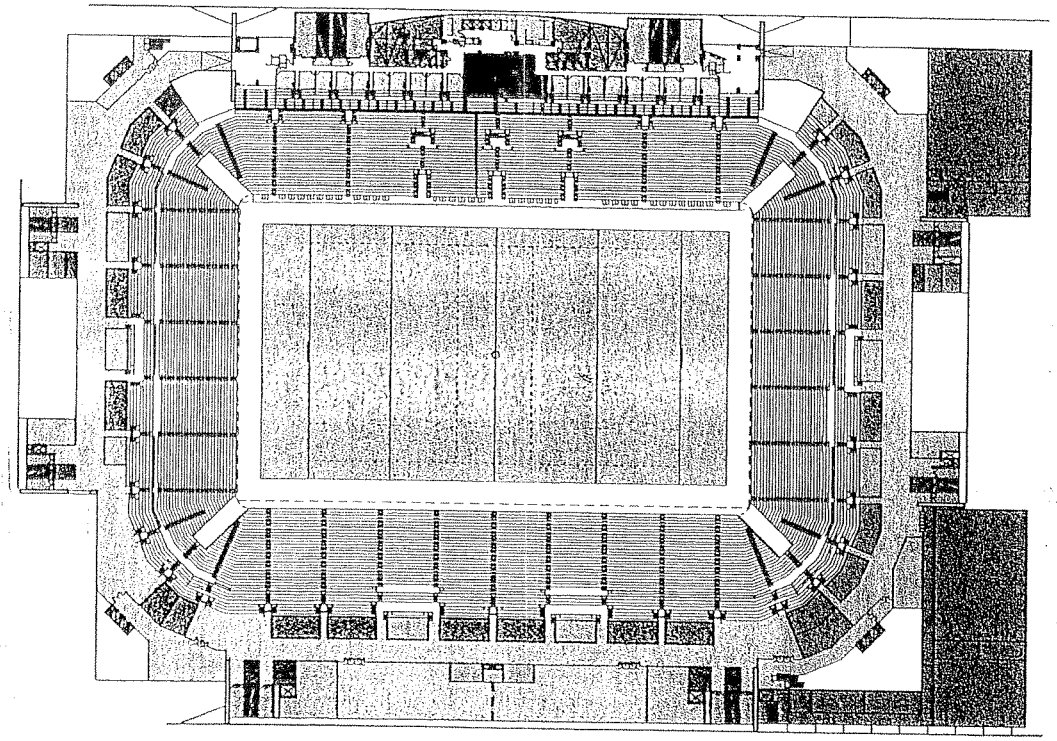
- CATERING/ FOOD/ BEVERAGE
- AMENITIES
- PUBLIC CIRCULATION
- VEHICLE CIRCULATION
- PLANT/ EQUIPMENT
- MEDIA/ PRODUCTION
- CORPORATE/ VIP
- MEMBERS
- TEAM FACILITIES
- EVENT MANAGERS
- STADIUM MANAGER
- PUBLIC CONCOURSE
- OFFICES

LANG PARK REDEVELOPMENT

FLOOR PLAN - LEVEL 2 (RL. 16.73)

BGG.186.0087

COLOUR KEY
CATERING/ FOOD/ BEVERAGE
AMMENITIES
PUBLIC CIRCULATION
VEHICLE CIRCULATION
PLANT/ EQUIPMENT
MEDIA/ PRODUCTION
CORPORATE/ VIP
MEMBERS
TEAM FACILITIES
EVENT MANAGERS
STADIUM MANAGER
PUBLIC CONCOURSE
OFFICES



LANG PARK REDEVELOPMENT

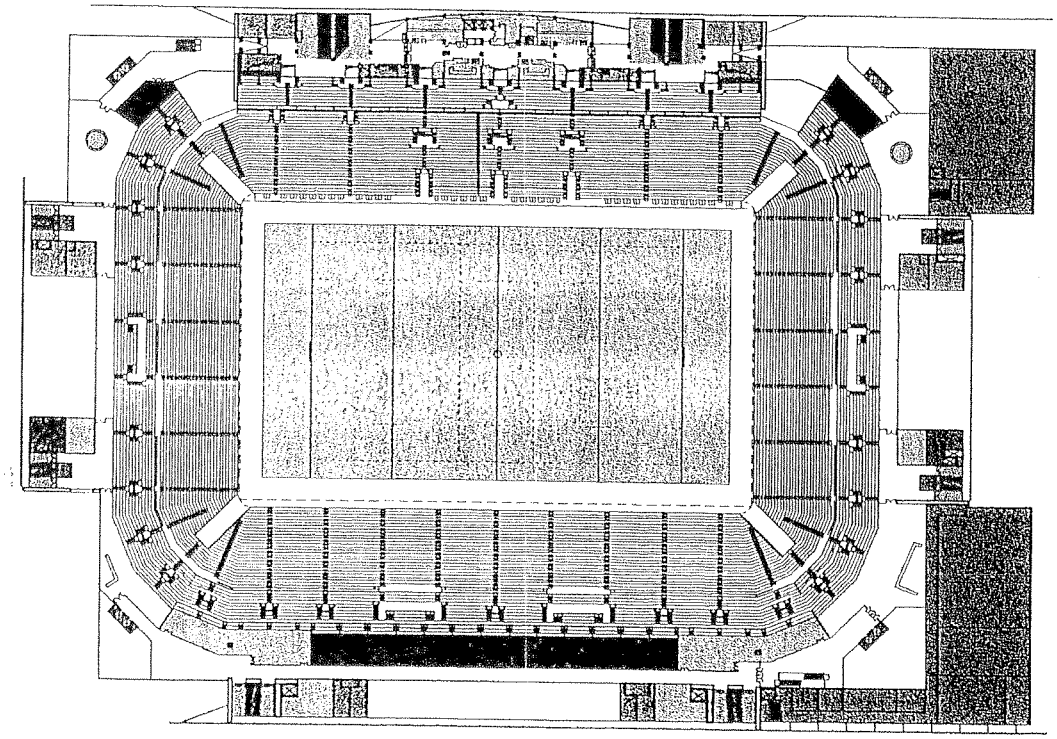
FLOOR PLAN - LEVEL 3 (RL. 20.05)

00.2001.01	06/03/00
1:500 @ A0	

FLOOR PLAN
Level 3 (RL. 20.05)

BCC.186.0088

COLOUR KEY
CATERING/ FOOD/ BEVERAGE
AMMENITIES
PUBLIC CIRCULATION
VEHICLE CIRCULATION
PLANT/ EQUIPMENT
MEDIA/ PRODUCTION
CORPORATE/ VIP
MEMBERS
TEAM FACILITIES
EVENT MANAGERS
STADIUM MANAGER
PUBLIC CONCOURSE
OFFICES



LANG PARK REDEVELOPMENT

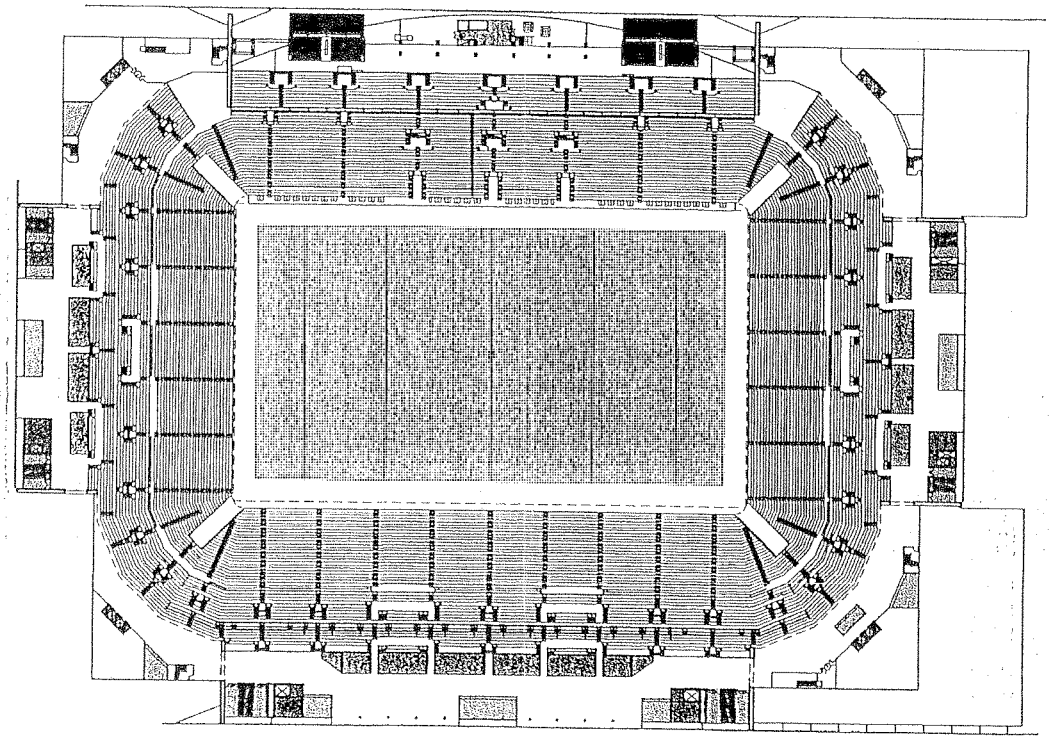
FLOOR PLAN - LEVEL 4 (RL. 24.75)

05.2001.01 05/03/10

1:600 @ A0

FLOOR PLAN
Level 4 (RL 24.75)

COLOUR KEY
CATERING/ FOOD/ BEVERAGE
AMMENITIES
PUBLIC CIRCULATION
VEHICLE CIRCULATION
PLANT/ EQUIPMENT
MEDIA/ PRODUCTION
CORPORATE/ VIP
MEMBERS
TEAM FACILITIES
EVENT MANAGERS
STADIUM MANAGER
PUBLIC CONCOURSE
OFFICES

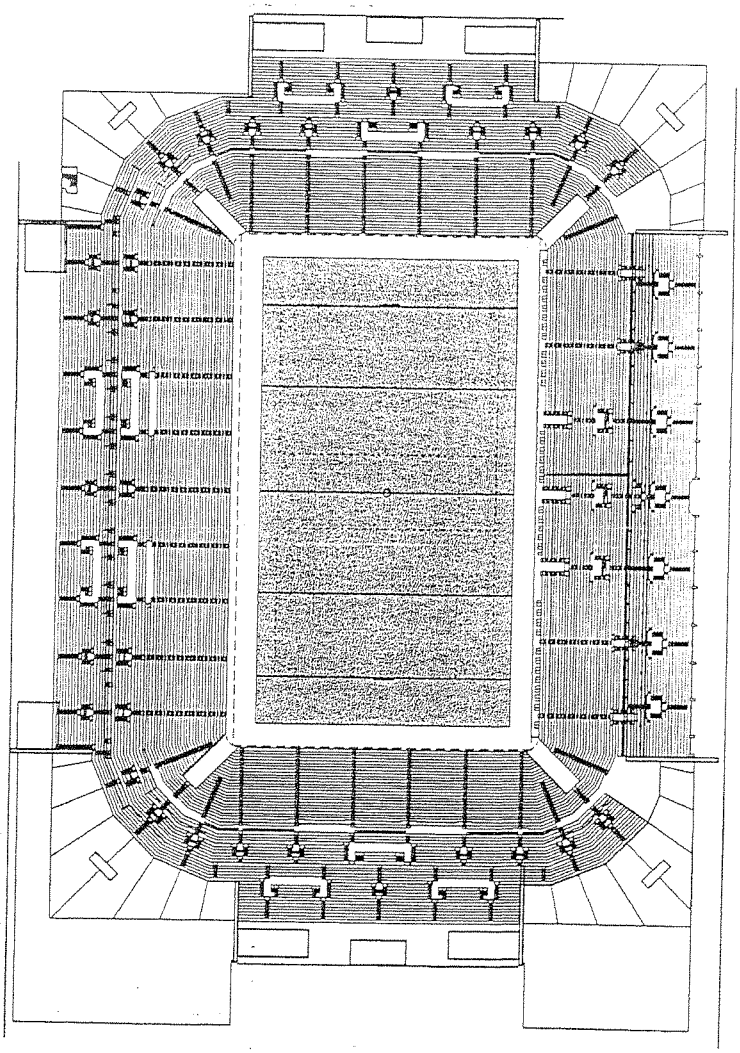


LANG PARK REDEVELOPMENT

FLOOR PLAN - LEVEL 5 (RL. 29.45)

FLOOR PLAN
Level 5 (RL 29.45)

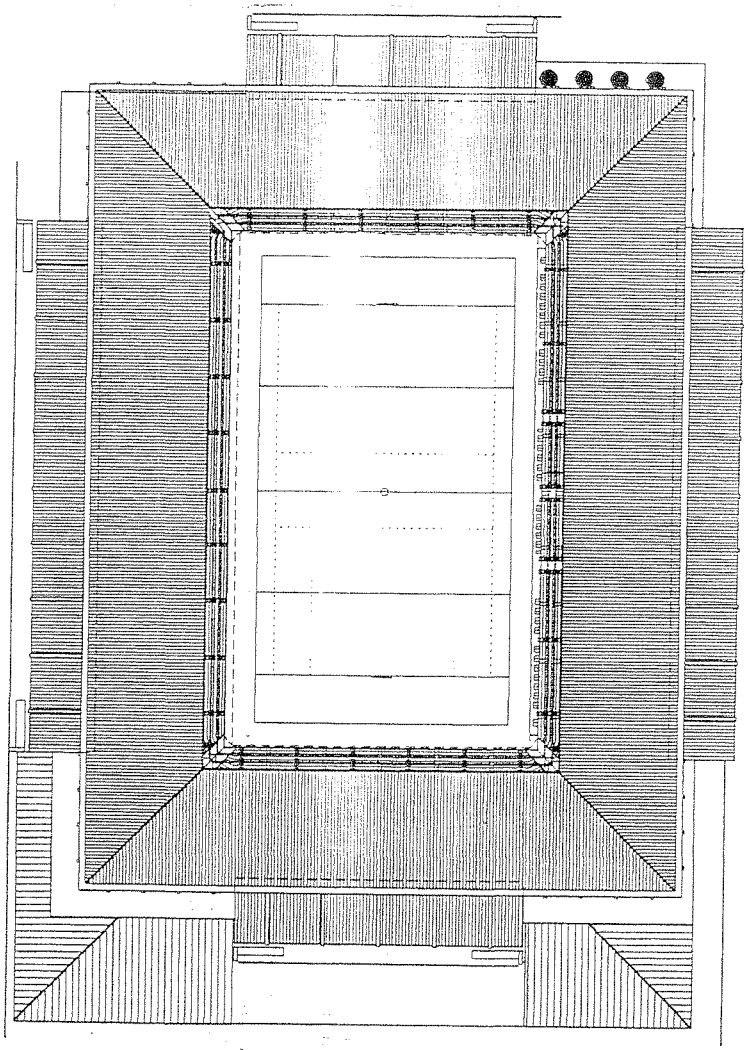
ABGC.186.0090



LANG PARK REDEVELOPMENT

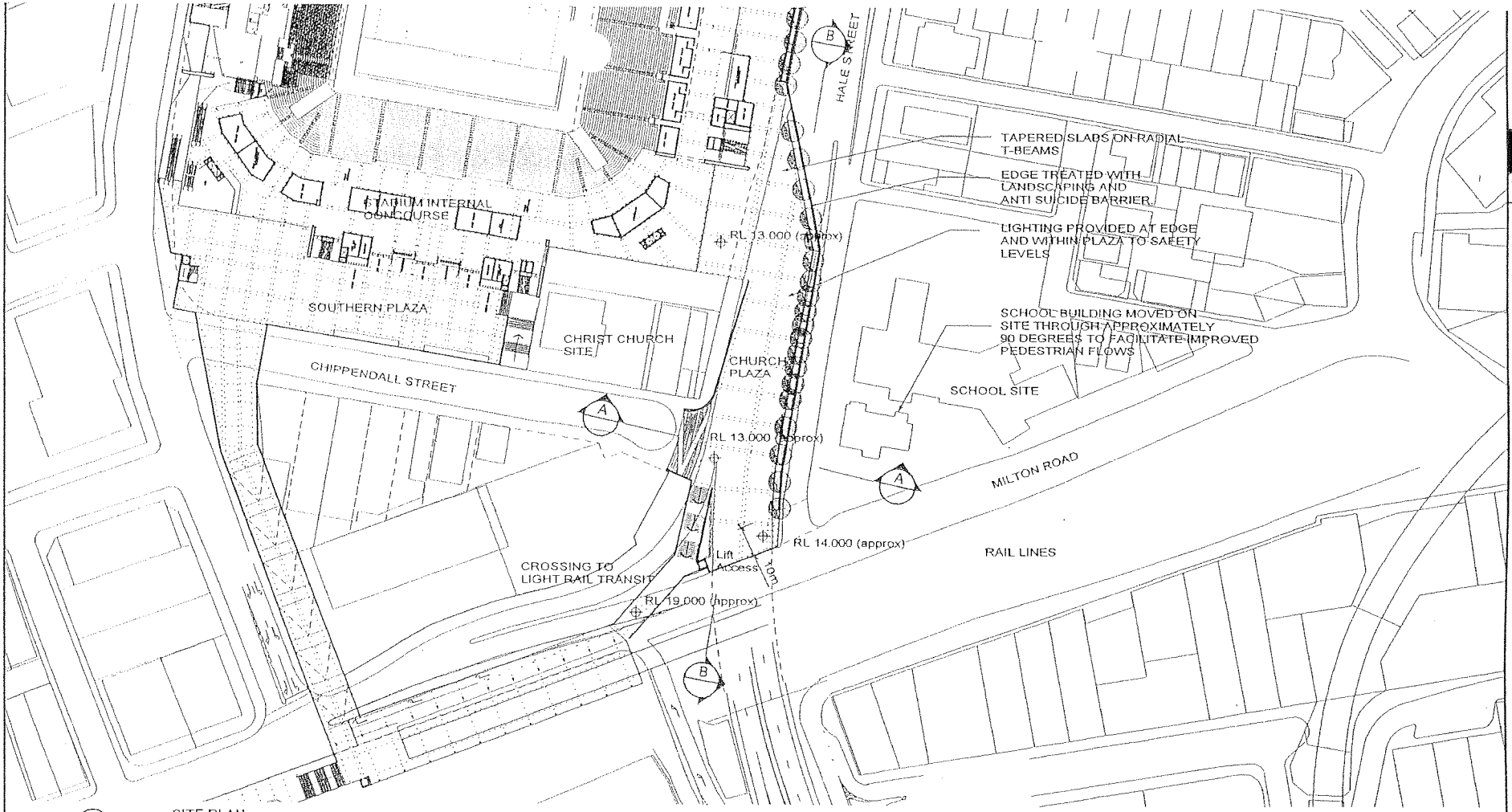
BOWL PLAN - LEVEL 6

BCC.186.0091

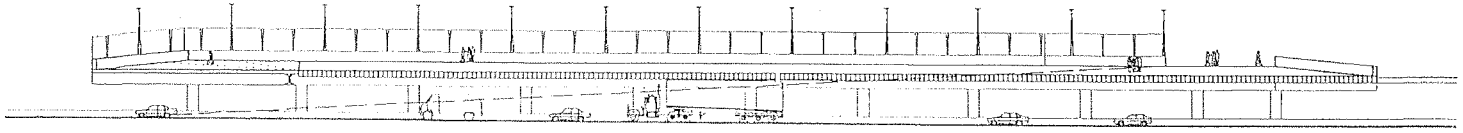


LANG PARK REDEVELOPMENT

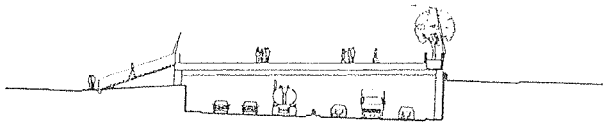
ROOF PLAN



A SITE PLAN



B SECTION A - A



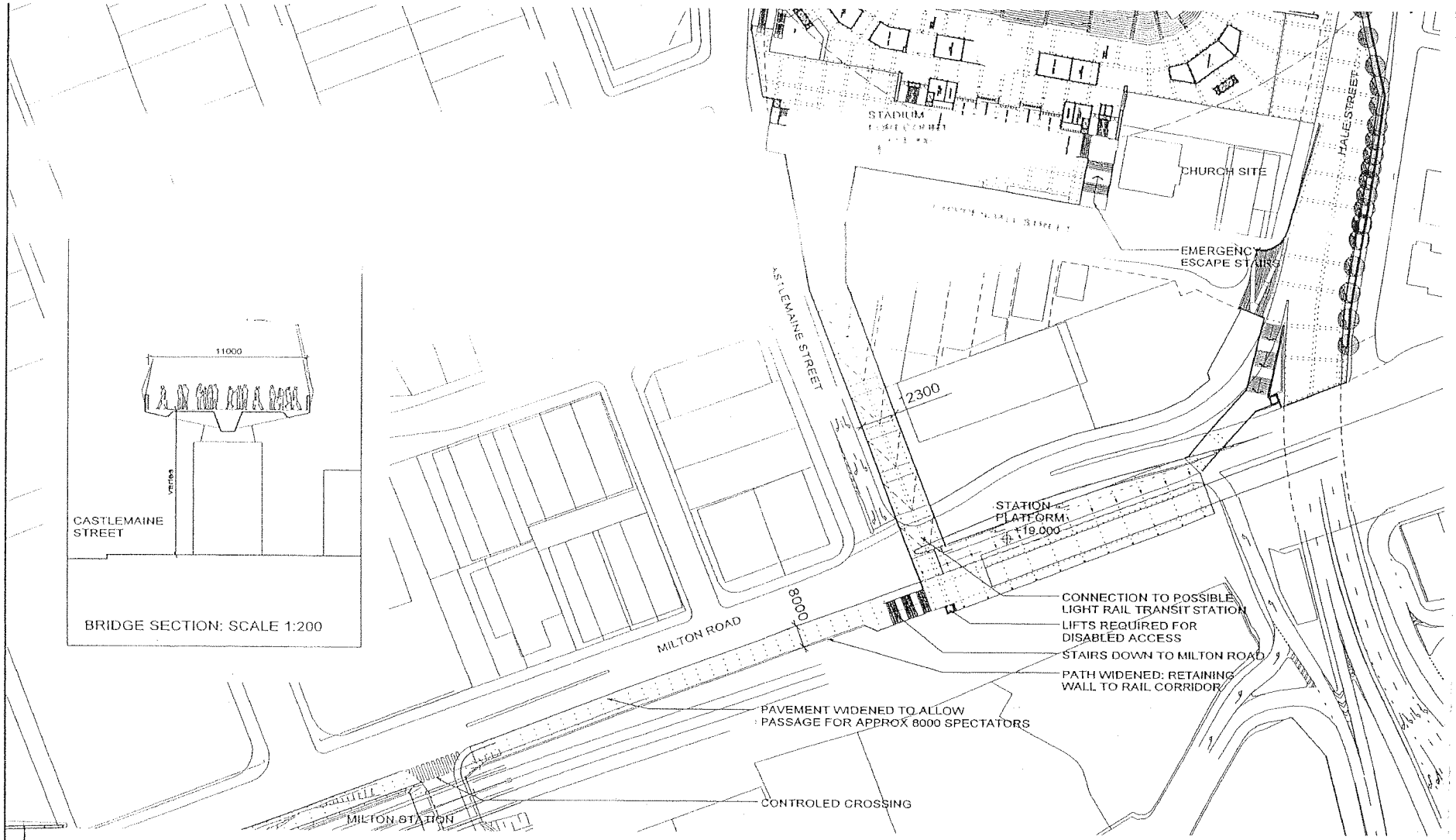
C SECTION B - B

LANG PARK REDEVELOPMENT

HALE STREET CROSSING

Plan

MP-SK-02



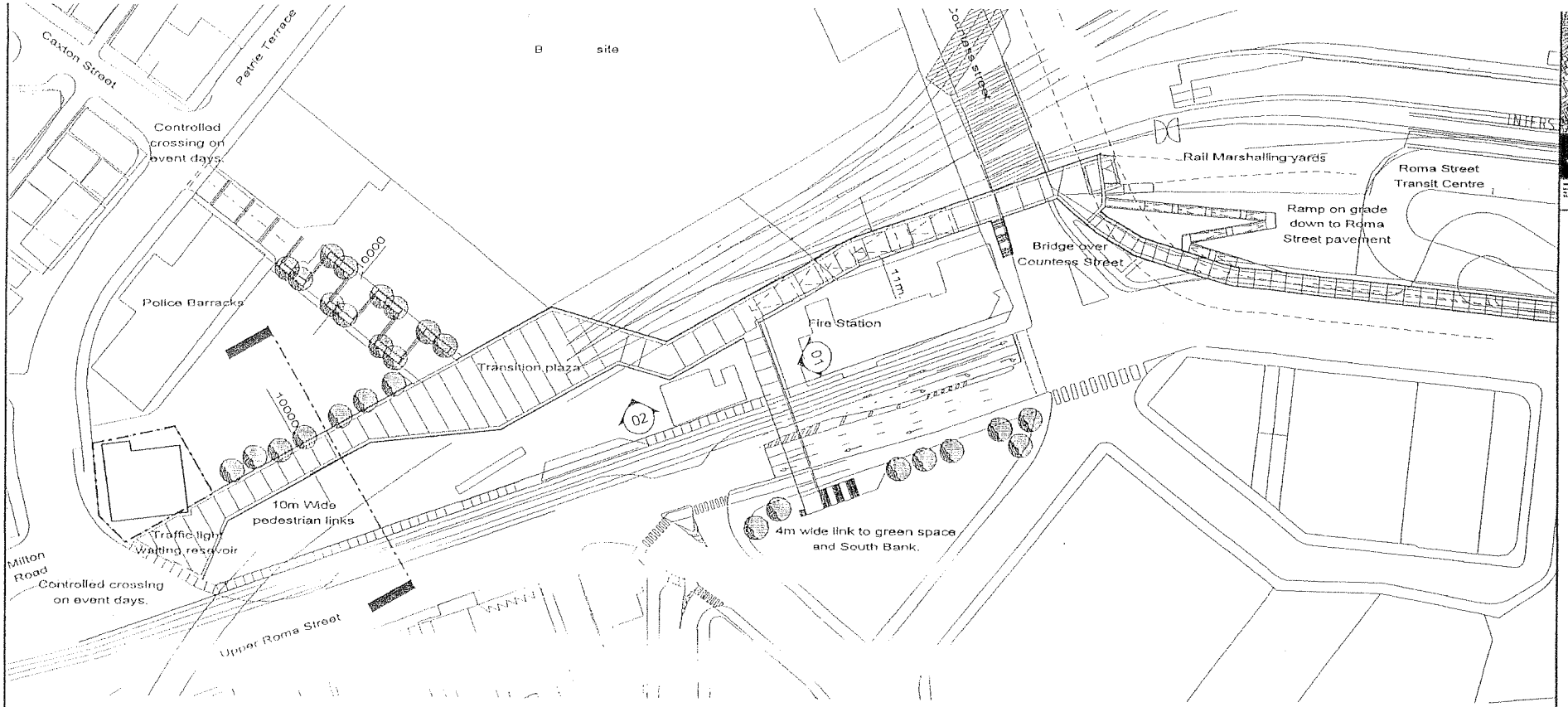
LANG PARK REDEVELOPMENT

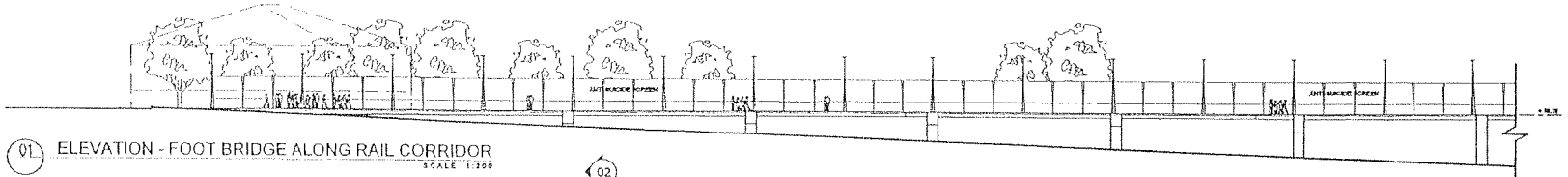
MILTON ROAD CROSSING

Milton Road Crossing

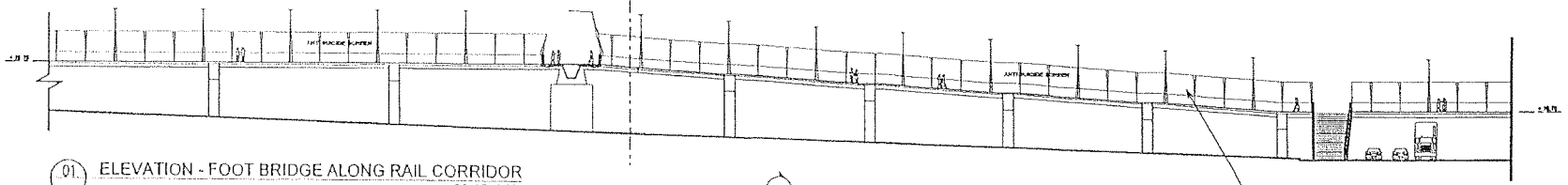
MP-SK-04

BCC.186.0094

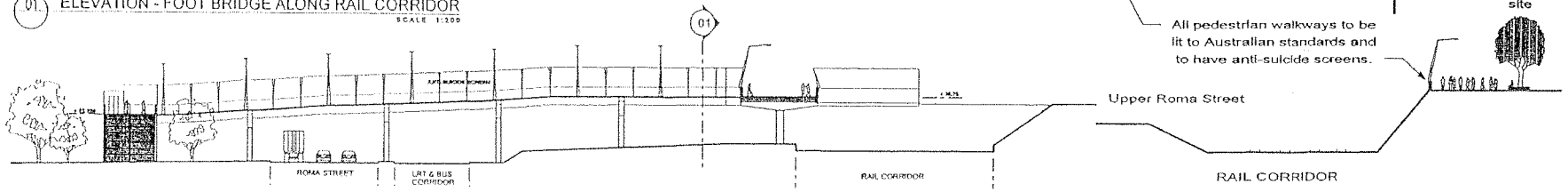




01 ELEVATION - FOOT BRIDGE ALONG RAIL CORRIDOR
SCALE 1:200



01 ELEVATION - FOOT BRIDGE ALONG RAIL CORRIDOR
SCALE 1:200



02 ELEVATION - FOOT BRIDGE OVER ROMA ST.
SCALE 1:200

03 SECTION - POLICE BARRACKS WALKWAY.
SCALE 1:200

LANG PARK REDEVELOPMENT

POLICE BARRACKS - ROMA ST PEDESTRIAN ROUTE

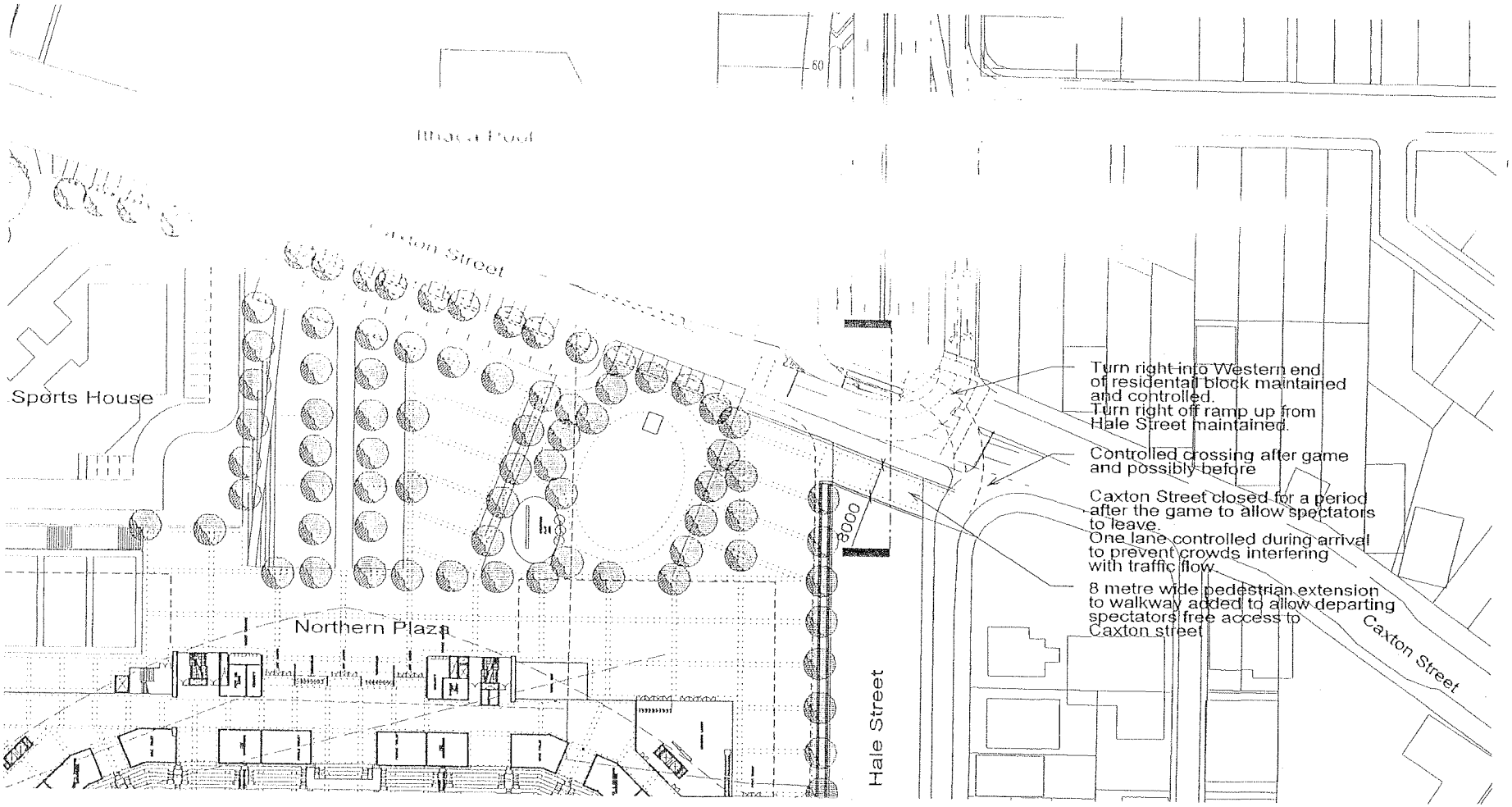
Plans, Sections & Elevations

MP-SK-05 B

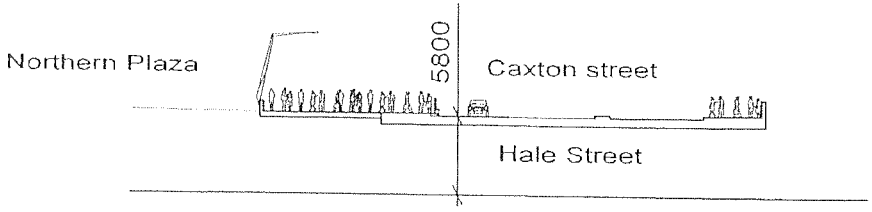
BCC.186.0095


Ithaca Pool
Caxton Street
Vehicle drop off / pick up
Sports House
Central landscaped avenue
Relocated "Wally" statue
park space
Pedestrian bridge over Hale Street
Beach Volleyball Courts
Castlemaine Street
Hale Street
LANG PARK REDEVELOPMENT
MASTERPLANNING PROCESS
00.2001.01
08/05/00
1:500 @ A1
NORTHERN PLAZA
MP-SK-06

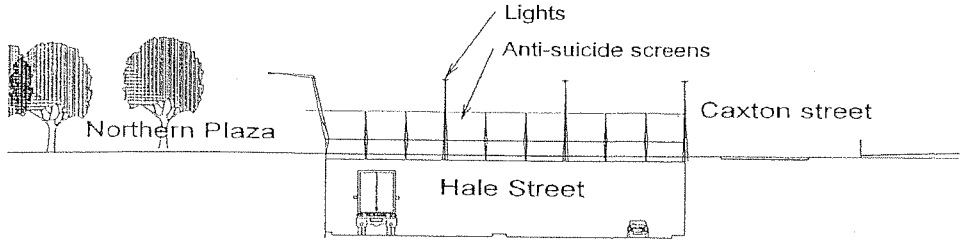
BCC.186.0096



01 PLAN - NORTH HALE FOOT CROSSING
SCALE 1:500



02 SECTION - NORTH HALE STREET CROSSING
SCALE 1:200



03 ELEVATION - NORTH HALE STREET CROSSING
SCALE 1:200

LANG PARK REDEVELOPMENT

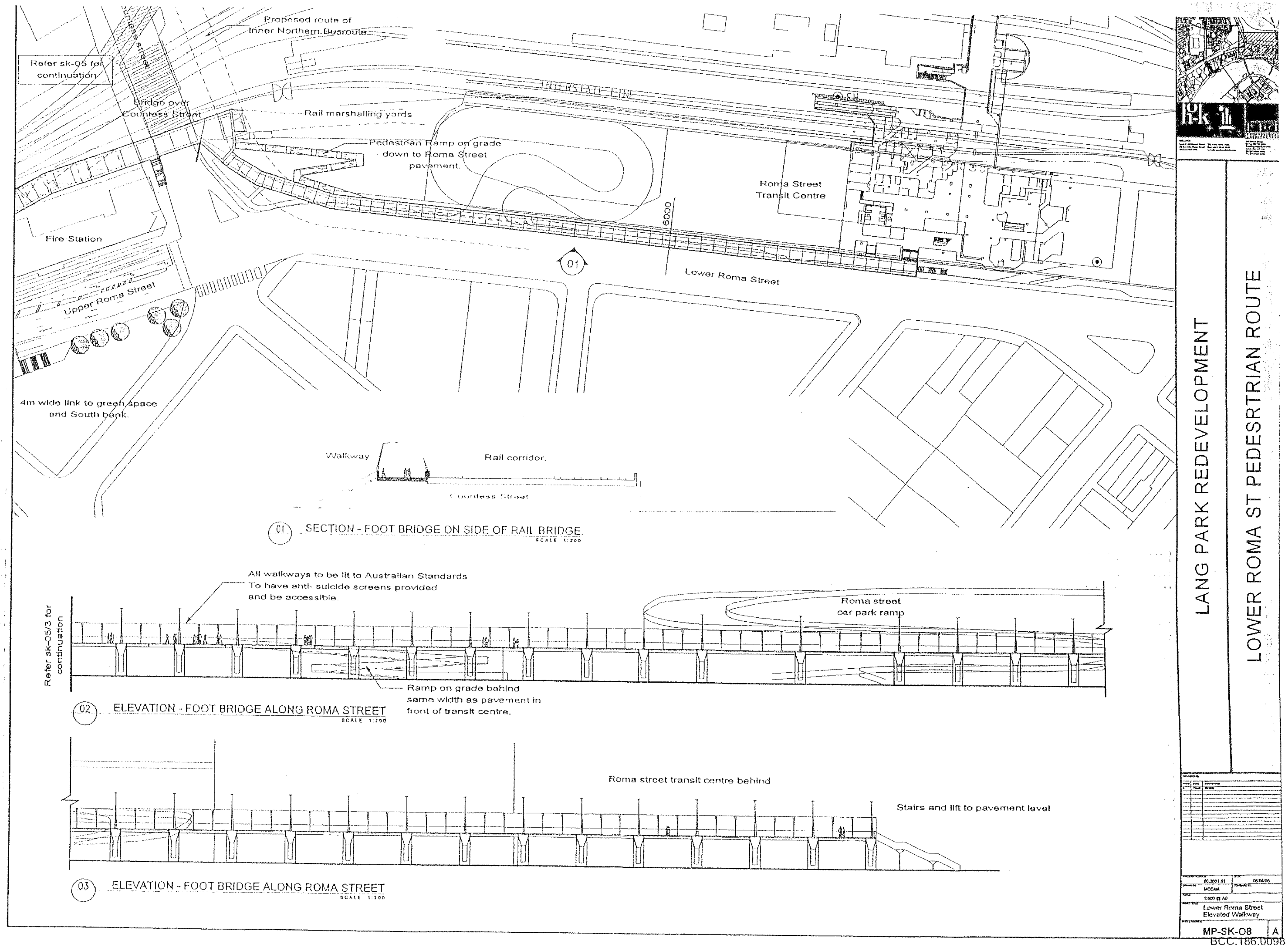
MASTERPLANNING PROCESS

PROJECT NUMBER	DATE
00.2001.01	08/05/00
DRAWN BY	REVIEWED BY
SCALE	1:500 @ A1

SHEET TITLE
NORTHERN HALE STREET CROSSING.

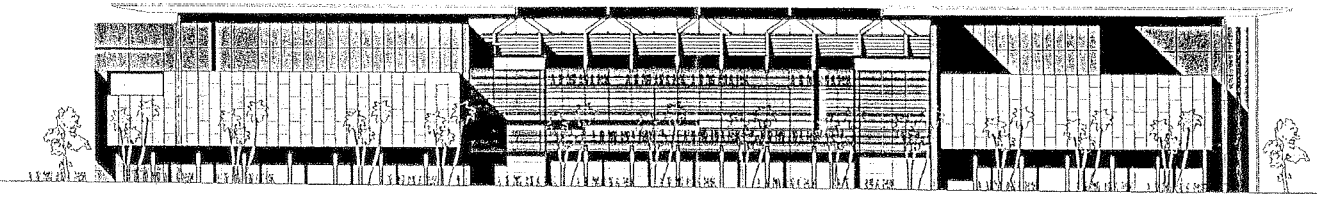
SHEET NUMBER
MP-SK-07 A

BCC.186.0097

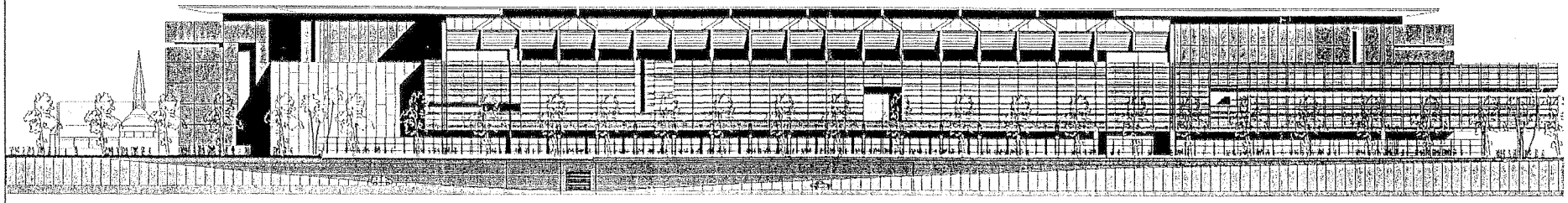


Proposed route of Inner Northern Busroute
Refer sk-05 for continuation
Bridge over Countess Street
Rail marshalling yards
INTERSTATE LINE
Pedestrian Ramp on grade down to Roma Street pavement.
Roma Street Transit Centre
6000
Fire Station
01
Lower Roma Street
Upper Roma Street
4m wide link to green space and South bank.
Walkway
Rail corridor.
Countess Street
01 SECTION - FOOT BRIDGE ON SIDE OF RAIL BRIDGE.
SCALE 1:200
All walkways to be lit to Australian Standards To have anti- suicide screens provided and be accessible.
Refer sk-05/3 for continuation
Roma street car park ramp
Ramp on grade behind same width as pavement in front of transit centre.
02 ELEVATION - FOOT BRIDGE ALONG ROMA STREET
SCALE 1:200
Roma street transit centre behind
Stairs and lift to pavement level
03 ELEVATION - FOOT BRIDGE ALONG ROMA STREET
SCALE 1:200
LANG PARK REDEVELOPMENT
LOWER ROMA ST PEDESRTRIAN ROUTE
Lower Roma Street Elevated Walkway
MP-SK-08
A

BCC.186.0098



NORTH ELEVATION



EAST ELEVATION

LANG PARK REDEVELOPMENT

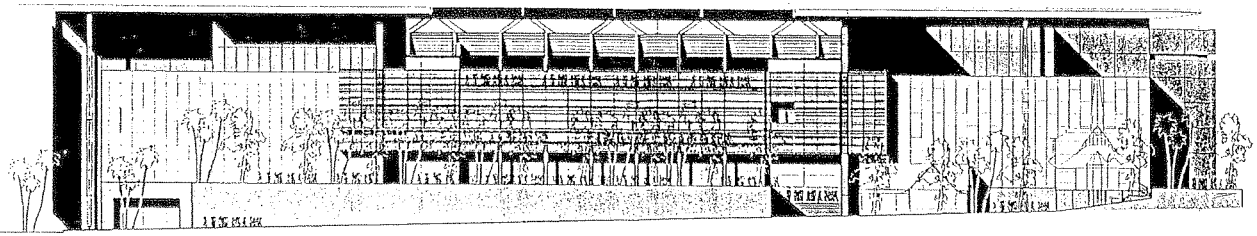
NORTH & EAST ELEVATIONS

NORTH & EAST ELEVATIONS

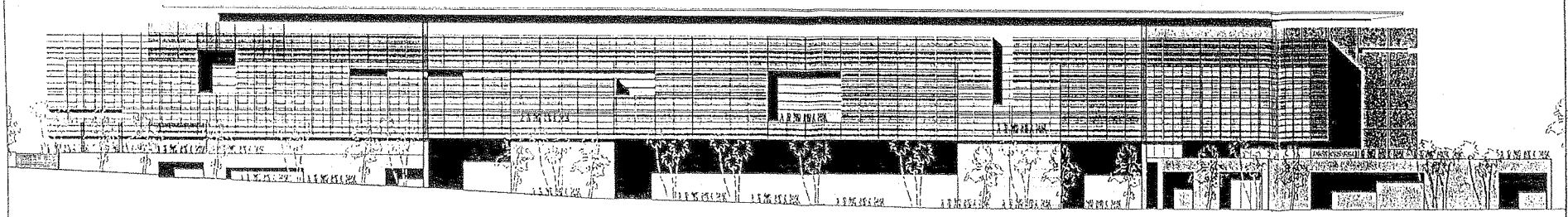
A5.1

P2

BCC.186.0099



SOUTH ELEVATION



WEST ELEVATION

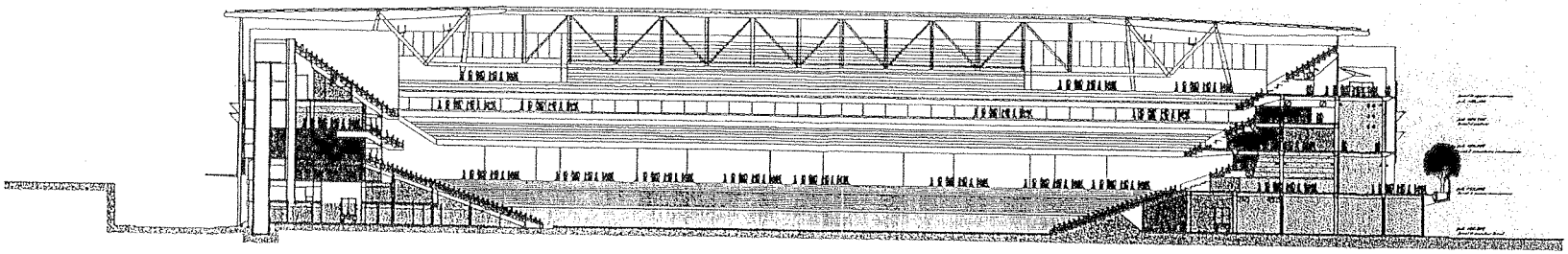
LANG PARK REDEVELOPMENT

SOUTH & WEST ELEVATIONS

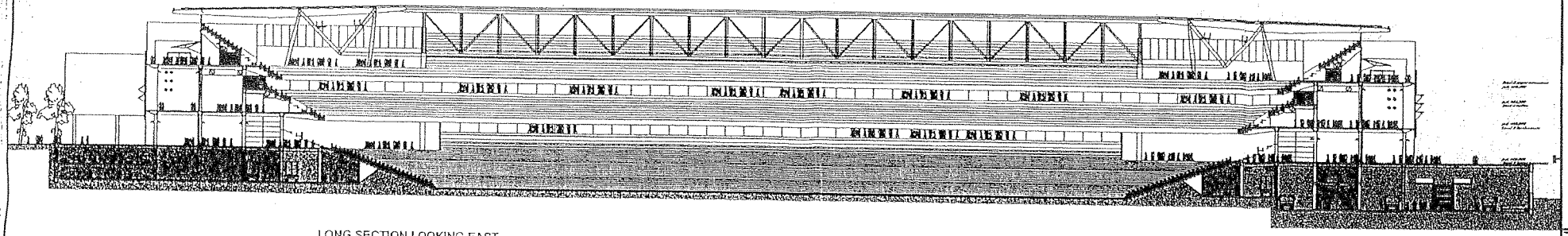
SOUTH & WEST ELEVATIONS

A5.2

P2



CROSS SECTION LOOKING NORTH



LONG SECTION LOOKING EAST

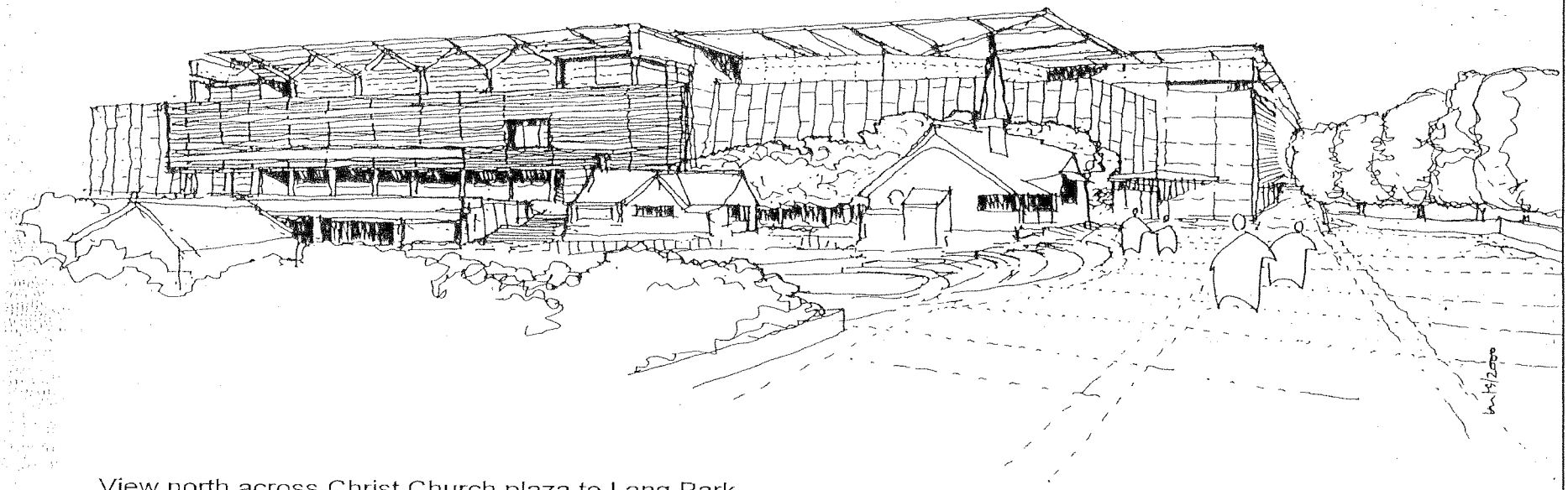
LANG PARK REDEVELOPMENT

SECTIONS

LONG & CROSS SECTIONS

A7-2.1

BCC.186.0101



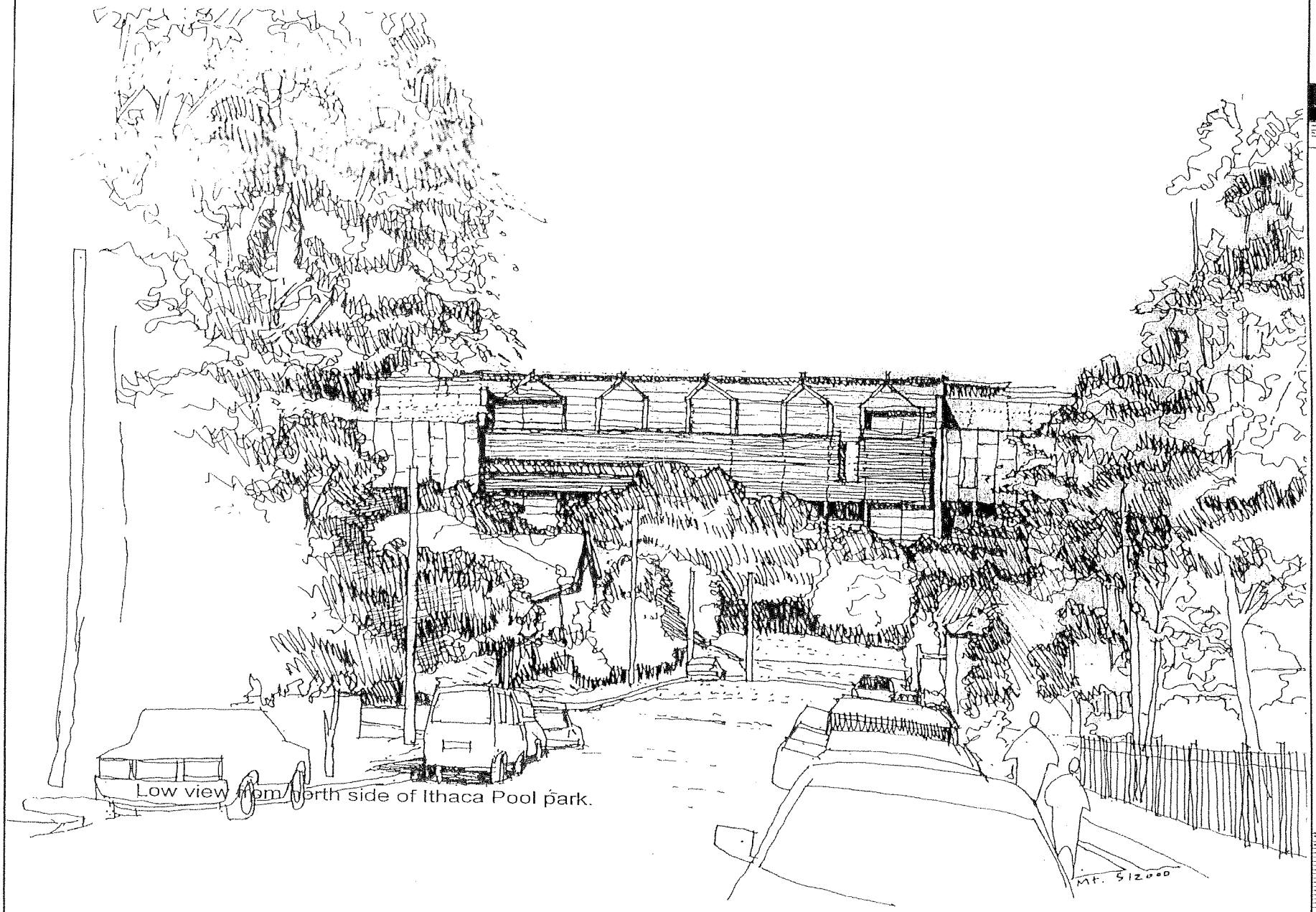
View north across Christ Church plaza to Lang Park.

LANG PARK REDEVELOPMENT

PERSPECTIVE

Church Plaza Perspective.

MP_PS_01

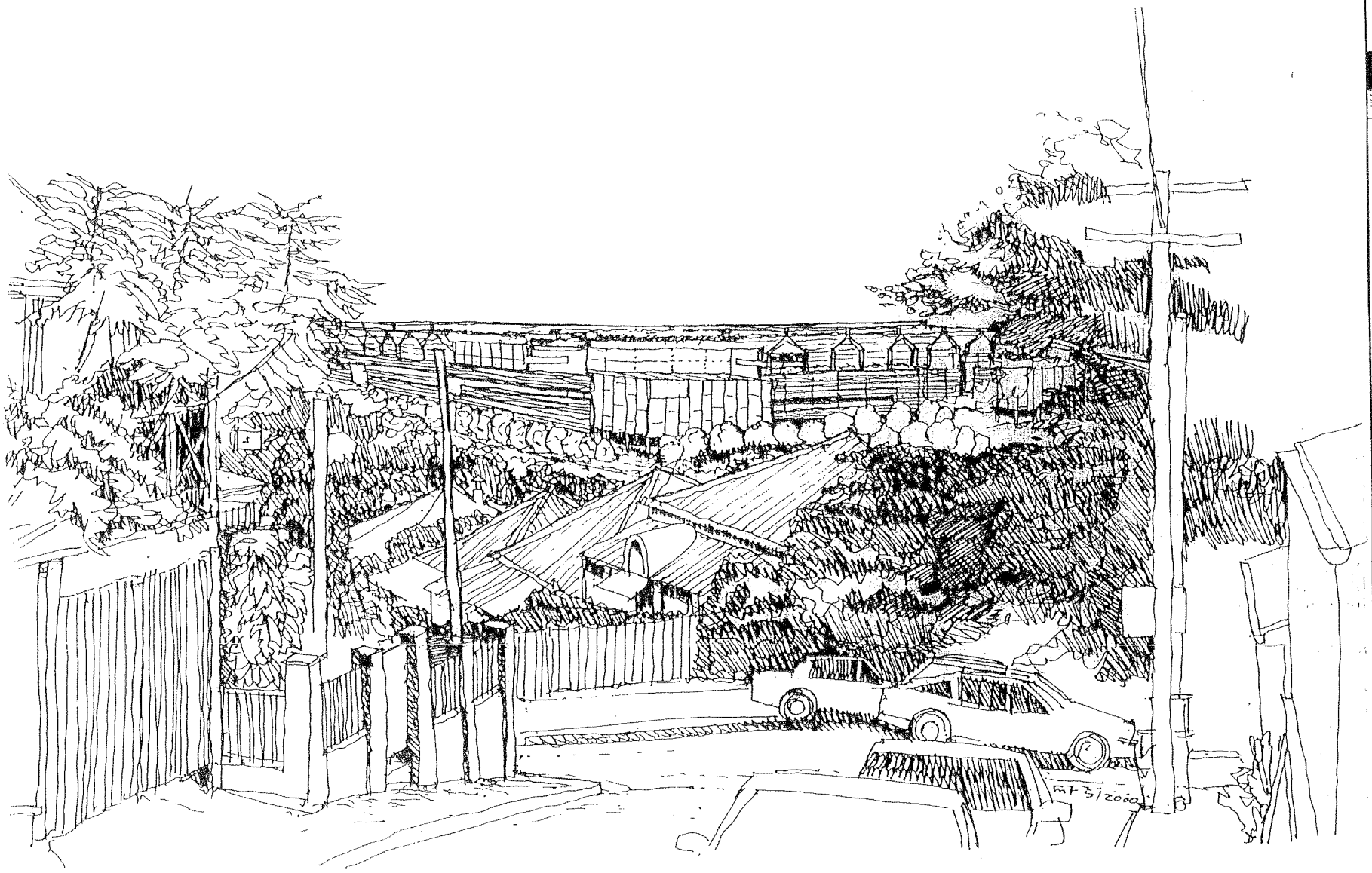


LANG PARK REDEVELOPMENT

PERSPECTIVE

Redhill Low Perspective.

MP-PS-03



High view from Petrie Terrace North.

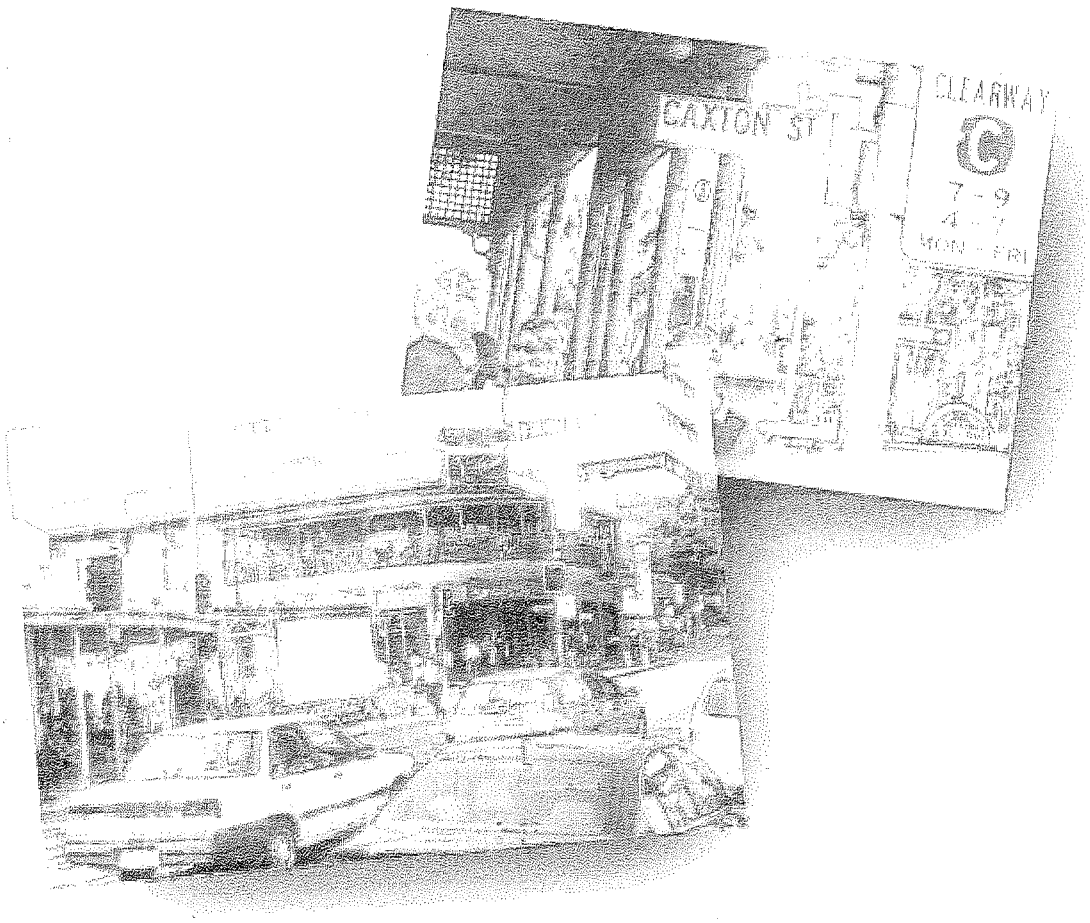
LANG PARK REDEVELOPMENT

PERSPECTIVE

Petrie Terrace
North Perspective.

MP-PS-04

3. ALTERNATIVES TO PROPOSAL



3. Alternatives to the Proposal

3.1 Scope

Lang Park was selected as the preferred site for a world-class rectangular pitch facility by the Queensland Government in 1999. The terms of reference for this EIS clearly require an examination of the proposal to develop such a facility at Lang Park. The terms of reference do not require an examination of the suitability of alternative sites.

The terms of reference do anticipate some consideration of the alternatives to the proposal at Lang Park.

3.2 Alternatives

The alternatives to the proposal are:

- to retain Lang Park in its present form;
- to improve Lang Park with a range of low cost options; or
- to use Lang Park for activities other than sport and recreation.

3.2.1 Retain Lang Park

Lang Park is recognised nationally and internationally as the home for Rugby League in Queensland. In recent years it has also hosted a number of landmark Rugby Union internationals, gaining recognition from a wider international audience. Lang Park is a sporting icon in Brisbane, Queensland and Australia.

❑ **Existing Facility**

The existing facility at Lang Park has a capacity of 42,000 patrons accommodated in a tiered western grandstand constructed in 1994 (approximately 14,500), an eastern grandstand constructed in the mid 1970s (approximately 8,000) and terraces for sitting and standing at the northern and southern ends of the rectangular pitch. Patrons' facilities at the northern, eastern and southern parts of the stadium are inadequate compared with modern stadia benchmarks for desirable levels of comfort, viewing position, safety and crowd management.

The arena is not enclosed so that noise and light spill affects nearby residents in Petrie Terrace, Paddington and Milton. Fixed lighting on four towers and on the leading edge of the Ron McAuliffe grandstand require augmentation for television broadcasting of major events.

The facility is serviced by the Milton railway station, Council buses in Hale Street, long-distance coaches parked in the industrial areas to the west of Castlemaine Street, and taxis feeding off a rank at the northern end of Castlemaine Street. There are no adequate pedestrian linkages for flows back to the City and the Roma Street railway station.

❑ Current Events

At present, the event schedule for Lang Park includes:

- one or two major Rugby League matches (State of Origin) where capacity is approached;
- one major Rugby Union international match where the crowd ranges from 35,000 to 40,000; and
- up to 17 soccer matches with crowds rarely exceeding 5,000; a number of special events such as the Rugby 7s tournament, and occasional religious gatherings.

In 1999, Lang Park hosted 21 events, including four major Rugby League events, one major Rugby Union event, 15 Soccer events with very small crowds, and the Brisbane River marathon.

In addition to the stadium, the Lang Park site contains the Police Citizens Youth Club (PCYC) and Ozsports, a community sport and recreation centre offering indoor sports and outdoor beach volleyball. Both facilities are well patronised, with beach volleyball matches being played well into each weeknight.

❑ Existing Impacts

From the consultation process for this EIS, it is known that major events at Lang Park presently result in a range of unacceptable impacts for the surrounding community and businesses. These impacts include:

- unacceptable crowd behaviour in the streets near Lang Park (drunkeness, loud and offensive language, urinating in the street, property damage, occasional property invasion);
- littering of nearby streets;
- major traffic congestion, particularly for mid-week events coinciding with evening peak hour traffic flows;
- on-street car parking blocking access to residential and commercial areas;
- unsafe pedestrian flows during pre-match and post-match peaks in Milton Road, Caxton Street and Upper Roma Street, as well as pedestrian conflict with commuter flows;
- highly intrusive and unacceptable light spill and noise in the residential areas surrounding the stadium; and
  unacceptable visual impacts, particularly with respect to the eastern (Ron McAuliffe) grandstand.

From the consultation process it is known that residents of the locality tolerate the existing facility because of the low frequency of events. However, the impacts are significant for each major event.

❑ Future Events

The possible future events schedule for Lang Park in its current state can not be forecast. It is likely however that Lang Park would retain the major Rugby League matches (State of Origin). It may not retain major Rugby Union matches in the face of competition from modern, larger capacity purpose-built venues in Sydney and Melbourne.

❑ **Evaluation**

At present, the existing facility is grossly under-utilised such that the community benefit is not sufficient. In any scenario, the facility and the land on which it is situated are not being used to their potential.

3.2.2 Low Cost Improvements

From the community consultation process, it has been suggested that Lang Park could be improved with considerably less expense than the proposed redevelopment. Options for upgrading the existing facility include:

- all seating accommodation for spectators, including seating for the northern and southern terraces;
- improved sports lighting for broadcast events;
- improved entries to the northern, eastern and southern stands; and
- improved bar and toilet facilities for general admission patrons, particularly those on the northern and southern terraces.

These improvements may have the effect of attracting major hirers, such as the National Rugby League, back to Lang Park for regular fixtures. However, the improvements will not resolve many of the existing impacts, such as:

- noise intrusion and light spill;
- undirected pedestrian movement through local streets;
- inadequate footpath widths in Milton Road, Upper Roma Street, Petrie Terrace and Caxton Street;
- unsustainable parking demand in local streets; and
- constrained opportunities for effective crowd management within and external to the venue.

While the provision of fixed seating on the terraces will lead to improvements in crowd behaviour, patrons' comfort and viewing conditions, there will also be a corresponding loss in stadium capacity.

3.2.3 Other Activities

From the consultation process, suggestions have been received for other uses of Lang Park. Suggestions have included:

- razing the existing facility and returning the site to public open space;
- redeveloping the site for multiple uses including sport and recreation (PCYC and Ozsports), and/or residential and/or commercial usage (eg. neighbourhood supermarket); and
- redeveloping part of the site to extend the "pub and café" character to link Given Terrace with Caxton Street.

❑ **Public Open Space**

Lang Park has been used for active recreation, such as football and cricket, since 1891 (refer Section 5 – Existing Environment). Since the 1950s, Lang Park has been leased to the Queensland Rugby League and the Queensland Amateur Athletics Association, with improvements in facilities occurring from then on. Lang Park has been closely associated with

Rugby League for nearly 50 years, and, as stated previously, has local, State-wide, national and international significance as a Rugby League venue.

Lang Park is a cultural icon of significance. To change the use of Lang Park to public open space would be to lose that cultural significance.

The loss of Lang Park as a dedicated rectangular pitch venue would also have impacts on the ability of Brisbane to attract major events requiring a rectangular pitch. Neither the Brisbane Cricket Ground, which is an oval pitch, nor the ANZ Stadium at Upper Mt Gravatt offer comparable viewing conditions in such proximity to the playing surface. Ballymore lacks the seating capacity and the proximity to major public transport to cater for larger events.

❑ Multiple Uses

The suggestion of putting Lang Park to a range of uses, including commercial, high density residential and sport and recreation, also would result in the loss of a significant cultural icon. Lang Park has at all times been put to public uses. The use of the land for commercial purposes, such as a shopping centre and housing, would result in the loss of public land and public facilities.

The retention of the sport and recreation facilities (PCYC and Ozsports) is commended and should be considered as a matter of local community importance.

Considering the inputs to the consultation process, it likely that only some elements of this suggestion (ie retention of the sport and recreation facilities) would gain wide community support.

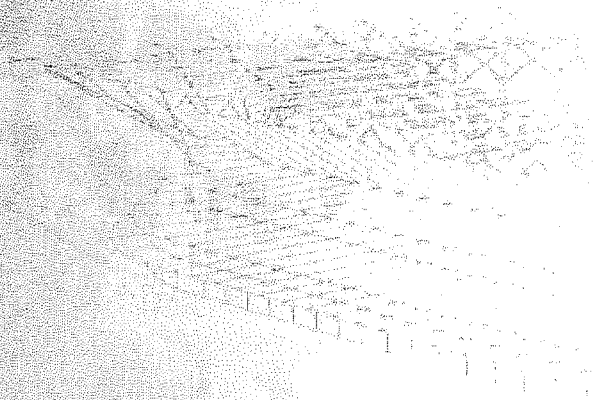
❑ Pubs & Cafes

From the consultation process, it is apparent that the existing pubs and cafes attract patronage from a wide area of Brisbane, resulting in uncontrolled car parking in local streets, public drunkeness and anti-social behaviour, and a loss of character in the immediate residential area.

If this option was to be pursued, the following issues would need to be addressed:

- the loss of the cultural significance of Lang Park;
- the loss or relocation of the existing sporting and recreation facilities fronting Caxton Street;
- the increased demand for car parking in the area; and
- the long-term social impacts of additional licensed premises for the adjacent residential areas.

Considering the issues raised in the consultation process, it is unlikely that this option would gain wide community support.



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Produced by

SINCLAIR KNIGHT MERZ

MAY 2000

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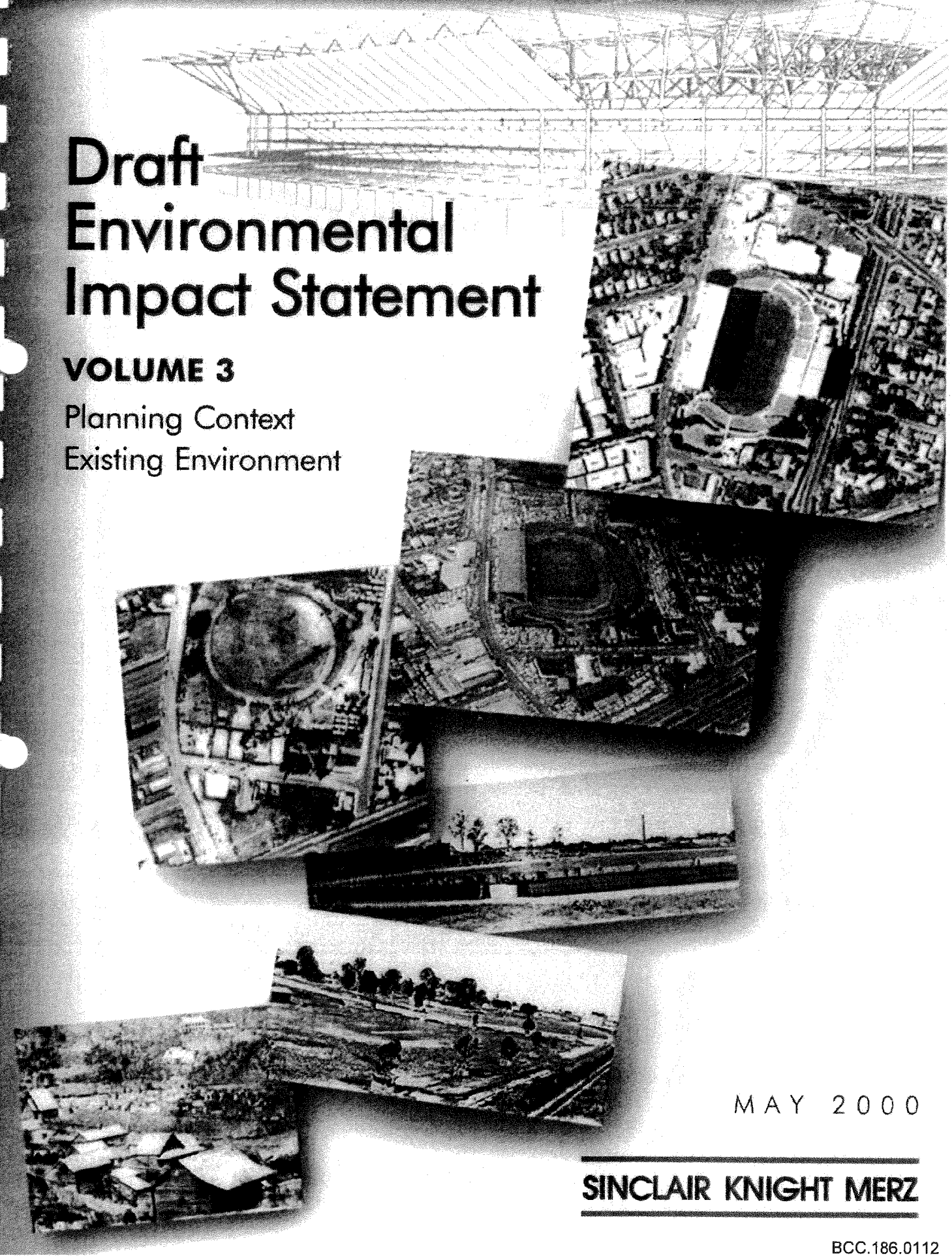
LANG PARK STADIUM PROPOSAL REVIEW

Queensland Government

Draft Environmental Impact Statement

VOLUME 3

Planning Context
Existing Environment



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EIS OUTLINE

VOLUME 1

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4. PLANNING CONTEXT

4. The Planning Context

4.1 Overview

The planning context of the Lang Park Stadium Proposal is primarily affected by which planning instrument will govern the assessment of the application for development approval should the Government decide to proceed with the proposal. There are currently two potential planning instruments relevant to any future application for a development permit, being:

- Brisbane Town Plan 1987 (regarded as a transitional Planning Scheme in accordance with the Integrated Planning Act 1997 (IPA)), and
- The Modified Draft Brisbane City Plan November 1999, (which will be regarded as a fully compliant IPA scheme when finally adopted).

4.1.1 Brisbane Town Plan 1987

In the context of the Brisbane Town Plan 1987, the Lang Park site is zoned "Sport and Recreation" and the proposed primary use for commercial outdoor sport and recreation would require "impact assessment" for development in accordance with the use of the Integrated Development Approval System (IDAS) under section 6.1.28 of IPA. If land beyond the stadium site is required for transport infrastructure, the development application may also involve impact assessment. Impact assessment confers appeal rights on third parties that have made proper submissions to the application only in respect of those components of the application requiring such assessment.

The planning context within the framework of the Brisbane Town Plan is very broad and includes consideration of the Strategic Plan (being part of the planning scheme), comprising "specific desired outcomes", a series of directions or objectives to achieve the outcomes, and implementation criteria to achieve the stated directions. For example – "a Well Designed and Culturally Dynamic City" is a specific desired outcome specified in the strategic plan. Relevant aspects of the strategic plan are therefore considered in some detail within the planning context for the proposal.

In accordance with IPA (Section 6.1.30), the Brisbane City Council (as the "assessment manager") decides the application in accordance with relevant sections of the repealed *Local Government (Planning and Environment) Act, 1990*. This section of the IPA, however, does not allow for the assessment manager to refuse the application. The application can only be refused under the direction of a "concurrence agency", in this case being the Coordinator-General.

4.1.2 Modified Draft Brisbane City Plan 1999

In the context of the Modified Draft Brisbane City Plan, the stadium site is in a "Special Purpose Centres "SP4" – Major Sporting Stadium" area and the proposed primary use for a major sports stadium is therefore consistent with the planned use of the area. To this extent, the Brisbane City Council has endorsed the Lang Park site as an appropriate area for a major sporting stadium. A "major sporting stadium" was defined in the previously exhibited Draft City Plan as the use of premises for major sporting events. In November 1999, under the Modified Draft City Plan, this definition was extended to include "occasional entertainment, including ancillary catering, light refreshments and sale of merchandise".

The redevelopment proposal would be consistent with the intended area classification of the land. The proposal is assessable as "Code Assessment" for development in accordance with specified Codes for Special Purpose Centres. The other major element of the proposal, being the transport infrastructure would also appear to be Code Assessment as an ancillary component of the primary use. Any transport infrastructure necessarily required for the redevelopment proposal, situated on other land may involve either code or impact assessment depending on the land use planning intention.

Code Assessment does not confer appeal rights on third parties that have made proper submissions to the EIS. Furthermore, the strategic elements of the proposed City Plan are not relevant to the assessment of the proposal under code assessment. This is a significant difference in the planning considerations for the proposed redevelopment.

In accordance with IPA (Section 3.5.13), the Brisbane City Council can only refuse an application for code assessment where the development does not comply with the applicable code(s), and where compliance with the code(s) can not be achieved through reasonable conditions.

There are fundamental differences from the Town Plan 1987 in the planning context surrounding the statutory planning approval for the proposed development depending on which planning scheme is in force at the time of making a development application.

Despite the fact that the desired environmental outcomes, or broader strategic planning issues from the Modified Draft City Plan, remain largely irrelevant to the assessment of this proposal under IPA, they have been included in the following discussion as required in the Terms of Reference for the EIS.

4.2 State Planning Policies

Consideration of relevant issues associated with State Planning Policies will be relevant to the assessment of the proposal under the Brisbane Town Plan. Current State Planning Policies are:

- State Planning Policy 1/97: Conservation of Koalas in the Koala Coast;
- State Planning Policy 2/92: Planning for Aerodromes and other Aeronautical Facilities; and
- State Planning Policy 1/92: Development and Conservation of Agricultural Land.

None of these Policies and associated "policy principles" are affected by, or affect the consideration of, the Lang Park Stadium Proposal.

4.3 Regional Strategies & Plans

4.3.1 South East Queensland Regional Framework for Growth Management

The Regional Framework for Growth Management (RFGM) 1998 was a primary outcome of the State Government's SEQ2001 Project. "*The RFGM 1998 has been endorsed as the primary regional planning strategy for South East Queensland which each agency will have regard to in its planning, budgetary and program activities and infrastructure provision.*" (Regional Coordination Committee Nov. 1998).

The Regional Coordination Committee (RCC) has produced the RFGM as the basis for managing growth in South East Queensland. The RCC reports to governments, (through its member

Ministers and to Local Government through the South East Queensland Regional Organisations of Councils (SEQROC) on matters relating to the management of growth at the regional level, including:

- infrastructure coordination; and
- regional sectoral strategies (such as transport, economic development, open space, air quality, water quality and supply).

The principal recommendations of the RFGM (Part 2) provides:

- a broad indicative future pattern of development for the region including its main structural elements;
- a policy framework and context for State and Local Governments with regard to statutory planning and development control;
- a policy framework and context for coordinated planning and infrastructure programs for all spheres of government;
- support for the principles of Ecologically Sustainable Development (ESD); and
- support for the principles of Social Justice.

The RFGM contains four major strategic planning elements which establish a regional planning context within which consideration of the Lang Park Stadium Proposal may have some relevance. These principles and strategies are necessarily broad and apply more to providing guidance for local government strategic planning than to the regulation of particular developments or sites.

These elements are:

- the vision statement;
- the regional overview;
- the regional outline plan; and
- institutional and implementation arrangement.

❑ The Vision Statement

The regional planning framework vision is necessarily broad and establishes longer term directions for regional growth. It is not intended that such a vision should be applied to individual development proposals. Nevertheless, **Table 4.1**contains an array of key statements from the vision statement that provide a broad context to the regional planning direction.

Table 4.1: The Vision for Future Regional Growth and Development In S.E. Queensland

- Livability
- Economic vitality
- Discrete, human scale urban areas – framed by a network of green open spaces
- Vibrant social and cultural lifestyle
- The means to fulfil basic human needs will be accessible to all
- Recreational facilities will be close to where people live to reduce the need for residents to travel long distances in private vehicles
- Clustering of mutually supportive economic activity
- Active citizen participation
- Secure neighbourhoods with a clear sense of identity and direction
- Significant elements of the built environment will be protected and managed
- Maintain a high standard of environmental quality and amenity
- The dynamic process of change will require constant monitoring
- Open creative and accessible governing structures
- Flexibility required to meet the challenge of rapid change

❑ The Regional Overview

The RFGM also contains a number of Key Regional Planning Principles within a Regional Overview Statement. Some of these Key Principles have broad regional planning relevance to the Lang Park Stadium proposal including:

- The Brisbane CBD will continue as the dominant centre in the region for commercial, retail, administrative, recreational and cultural facilities.
- The commitment to reducing the growth of, and dependence on, private motor vehicles provided for in the Integrated Regional Transport Plan (IRTP).

While transport planning is not a specific objective of the proposed development, there are recognised traffic and transport issues associated with the site location that will need to be carefully considered. The location of the proposed facility within the Brisbane City "centre" area, and the commitment to actively discourage private motor vehicle access to the site through a number of public transport initiatives, are positive reflections of these key regional planning principles.

❑ The Regional Outline Plan

The RFGM also contains a number of more specific objectives and planning actions that provide scope for a regional planning context to the proposal. Relevant objectives are considered to be:

- (Objective 10) – To develop communities, planning should be comprehensive, integrating land use and infrastructure with social, cultural and human resource issues (10.3).
- (Objective 13) – To improve the functioning of existing and future transport networks and facilities in terms of accessibility, costs and environmental impacts.

Recommended actions in relation to these objectives include:

- Planning should ensure that the impacts of benefits and costs of development to individuals, groups and communities are fully considered (10.6).

- The rigorous assessment of all significant transport proposals in terms of cost, benefit, social, environment, health, and maintenance (Action 13.5).
- Investigate, plan for and encourage the establishment of public transport at the first stage of major new urban development (Action 13.30).
- Develop a best practice method which incorporates the wider social benefits and costs in to transport investment decisions (Action 13.33).
- Ensure either compensation for adverse impacts of transport impacts or mitigation to the greatest extent possible. (Action 13.34).

Transport objectives and actions in the RFGM incorporate recommendations from the 1997, Integrated Regional Transport Plan (IRTP). The IRTP recently has been further developed with draft medium term targets for public transport, walking and cycling contained within a companion document called the "2007 Vision". Some of the identified policies and improvements to public transport infrastructure in the Draft Vision, and potentially related to the proposed Lang Park Stadium transport issues include:

- constructing light rail in the Brisbane CBD, with future extensions to Indooroopilly;
- supporting major centres with transport improvements; and
- concentrating development near major transport nodes.

❑ Institutional & implementation arrangements

The RFGM was endorsed for implementation by all spheres of government through a Memorandum of Agreement signed in 1995.

In August 1999, it was agreed that one of the roles of the Regional Coordination Committee is that it should operate as a Regional Planning Advisory Committee under the Integrated Planning Act, 1997 (IPA). This has now been endorsed by the Minister for Communication & Information, Local Government Planning and Sport in accordance with provisions of IPA. Consequently a statement has now been included in the RFGM that "the RFGM is a Regional Planning Advisory Committee report under the Integrated Planning Act" (RFGM New Part 6 - 2.2).

The importance of the RFGM being given the status of a regional planning advisory committee report is that the recommendations of such reports are recognised under the IPA as "regional dimensions of a planning scheme". As such, they must be satisfactorily addressed in the integration and coordination of core matters in the making of a local government planning scheme, such as the proposed City Plan.

4.3.2 City West "Vision"

In August 1999 the Premier of Queensland referred to the role offered by the Lang Park Stadium in a revitalisation plan for the city and its western fringe known as the "*City West Precinct*". The City West Precinct is shown on **Figure 4.1**. City West is described as a vision for the urban redevelopment and revitalisation of Brisbane's inner western suburbs, linking planned developments with new initiatives, such as:

- a sports precinct for elite and recreational athletes (Lang Park);
- a world class garden and parkland (Roma Street Parkland);
- a cultural precinct embracing all of the art forms (Queensland Cultural Centre extension, South Bank Masterplan, public art corridors); and
- an integrated urban village precinct (Gona Barracks at Kelvin Grove).

Other development proposals recognised within the City West Precinct include:

- Queensland Place;
- possible Transit Centre Redevelopment; and
- Victoria Barracks.

A key element of the City West "vision" is proposed to be the development of an "integrated transport system" based on the following principles:

- providing a sustainable transport system;
- maximising the use of public transport, walking and cycling to and around each development;
- using light rail as the catalyst for urban renewal in the City West area;
- planning public transport services to take people as close as possible to their destinations;
- making best use of existing infrastructure;
- minimising the impact on the community; and
- developing high-quality accessible linkages to facilities for the wider community.

Existing and planned City West transport infrastructure in relation to some of the key development areas associated with the proposed Lang Park Stadium redevelopment is shown on **Figure 4.2**.

City West is not a statutory planning instrument binding development assessment within its framework. It has been included in this assessment to provide a picture of the State Government's current thinking on significant development prospects within the locality of Lang Park Stadium. In this regard it is important not to view the proposed Lang Park Stadium re-development in isolation to its "City West" context.

❑ **Conclusion – Regional Strategies & Plans**

The RFGM is a broad regional planning framework which is difficult to apply directly to individual development proposals. It is not a matter that is specifically listed as being required to be considered (as are State Planning Policies). The RFGM is however required to be considered as a "regional dimension of a planning scheme", and therefore should become fully integrated into local government planning schemes being made under IPA, such as the proposed City Plan. Consideration of the Lang Park Stadium Proposal in the context of the RFGM is also relevant, given the regional function likely to be performed by the proposed stadium.

Section 6.2.8 of the EIS discusses the proposal's relationship to, and consistency with, these regional strategies and plans in terms of potential land use impacts.

4.4 Local Planning Controls, Local Laws, Policies

The planning scheme provides the most relevant context to the planning and development assessment framework for the proposed development. At the time of writing this EIS, (May-June 2000), the relevant planning scheme is the Brisbane City Council's Town Plan, 1987. This Plan is recognised as a transitional Planning Scheme in accordance with IPA. It is "transitional" until such time as a fully IPA based planning scheme is made by the Brisbane City Council and endorsed by the State Government.

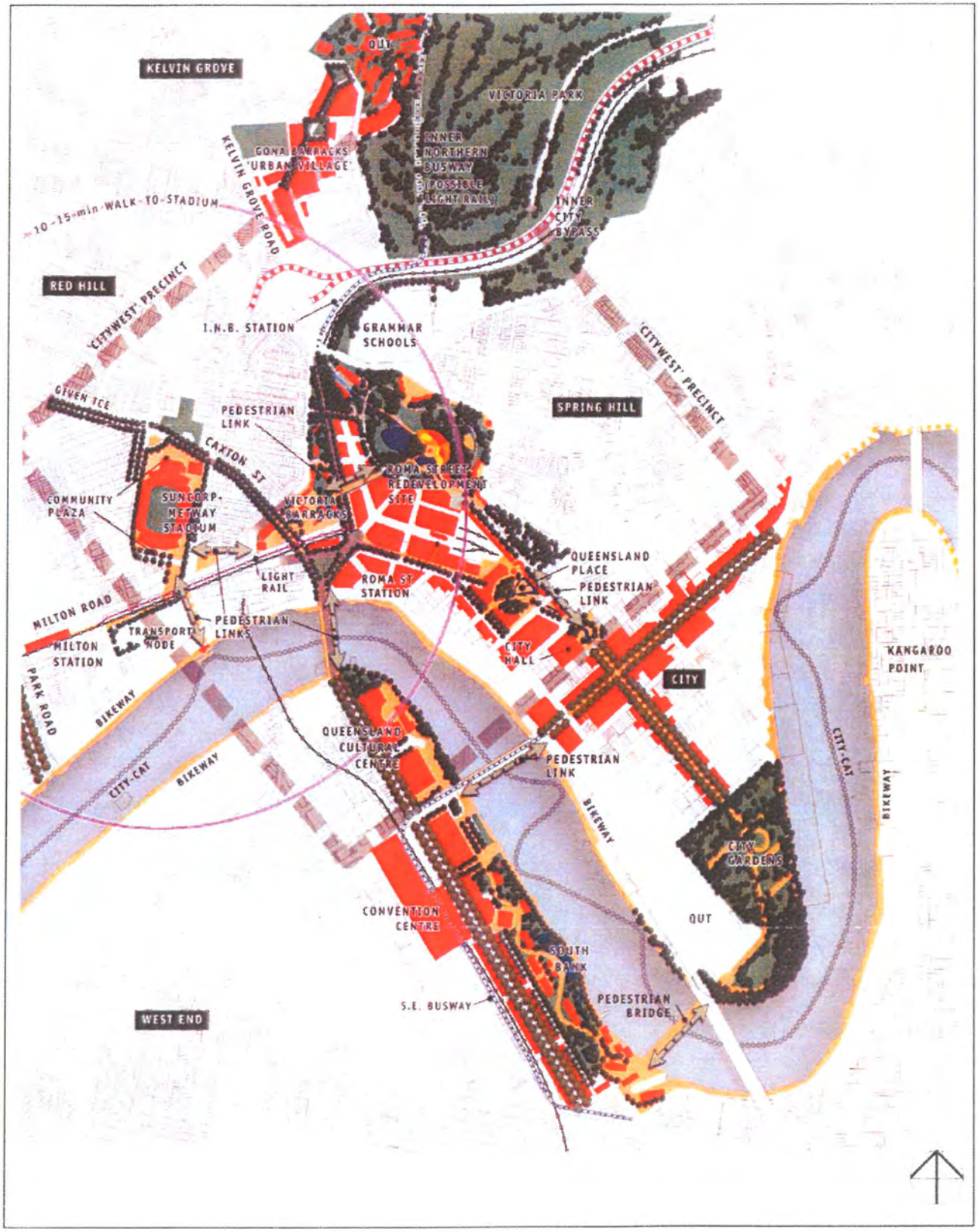


FIGURE 4.1
City West Precinct

A Draft Brisbane City Plan, in accordance with the principles of IPA, was placed on public exhibition in the first half of 1999. Having been placed on exhibition, this draft planning scheme, (now the Modified Draft City Plan), is potentially relevant to current considerations for development applications within the Brisbane City area. It is anticipated that the Modified Draft City Plan will come into effect some time in the second half of 2000. Should the development application be lodged following the gazettal of City Plan then it will become the relevant planning scheme for the assessment of the redevelopment proposal for the Lang Park Stadium. The following discussion explores the development assessment framework of both planning instruments.

4.4.1 Brisbane Town Plan 1987

The Brisbane Town Plan 1987 establishes a hierarchy of development control including:

- The Vision;
- The Strategic Plan;
- Development Zones;
- Development Plans;
- Development Standards; and
- Local Planning Policies.

❑ The Vision – 1987 Town Plan

The 1987 Town Plan "Vision" is stated to "provide an expression of the Brisbane's communities aspirations for the future development of the City." The Vision is a broad statement of the intended pattern of development and character which is aimed at securing and enhancing Brisbane's livability and ecological sustainability. The Vision consists of a set of principles which are intended to support statements on the future form or pattern of development, and the character, or identity, of the City. These principles include:

- environmental quality;
- social justice; and
- economic efficiency.

Relevant concepts related to the future pattern of development include:

- network of green open spaces;
- vibrant social and cultural lifestyle;
- retention of discrete communities; and
- green space will be retained and enhanced.

According to the 1987 Town Plan, all development in the City must contribute to the distinctive sub-tropical character and style of the City by:

- establishing, enhancing, maintaining and reinforcing natural and cultural landmarks and places which contribute to identity and sense of place;
- establishing, maintaining and reinforcing streetscapes and buildings which contribute to distinctive local area identity and sense of community;
- reinforcing the green space as a strong character element of the City;
- complementing the cultural diversity of our community, especially with places of heritage, celebration and public activity; and
- promoting living environments which support socially diverse communities.

Accepting the breadth of these principles, it can be argued that the proposed redevelopment of Lang Park Stadium is consistent with the stated strategic planning vision of the Brisbane Town Plan. With regard individual developments, the Lang Park Stadium proposal is considered capable of enhancing the existing Lang Park landmark as a place which contributes to the cultural identity of the City of Brisbane. The proposal can be seen as reinforcing a cultural landmark and associated "sense of place".

It should be recognised however, that what may be a sense of place for the sporting fraternity may equally represent a "non-sense of place" to others, such as those in the surrounding area potentially adversely affected by the proposed development. The proposal will need to ensure that an overall positive sense of place is preserved for a majority of people. In this regard, the assessment of the design and management of particular impact mitigation measures, will be critical to how the proposal achieves a positive contribution to local identity and sense of place.

The other aspect of the proposal in relation to achieving the town planning vision relates to the design of the proposed buildings and streetscapes in a manner which contributes to the distinctive identity and sense of community of the local area. The assessment of the specific building and streetscape design components of the proposal are considered elsewhere in this EIS. While it is considered that the current facility does not contribute greatly towards this local sense of community in a built form there are distinctive elements of the current built landscape that are strong parts of the local area identity. These elements include the existing outdoor volley ball courts and the social environment created. These elements should be retained as positive contributions to the distinctive local area identity and sense of community stated in the planning vision.

❑ The 1987 Strategic Plan

The Strategic Plan of the 1987 Brisbane Town Plan, is an important part of the planning scheme, establishing broad planning directions and objectives. Depending on the level of assessment required proposals can be assessed in relation to their consistency or otherwise in meeting these strategic planning objectives.

The specific desired outcomes (objectives) of the 1987 Strategic Plan are:

- An environmentally responsible city;
- An accessible city;
- A well serviced and equitable city;
- A well designed and culturally dynamic city; and
- An economically prosperous and progressive city.

A number of specific "direction statements" and "implementation criteria" are related to these outcomes. The degree of consistency with these statements will be relevant to the assessment of the proposal where it requires impact assessment in accordance with the transitional planning scheme. These statements include:

- separating uses which are sensitive to noise and/or light from activities which generate noise and/or light to a level unacceptable to these sensitive uses (An environmentally responsible city);
- promoting development which supports the accessibility, convenience and efficiency of public transport, including rail, bus and ferries (An accessible city);

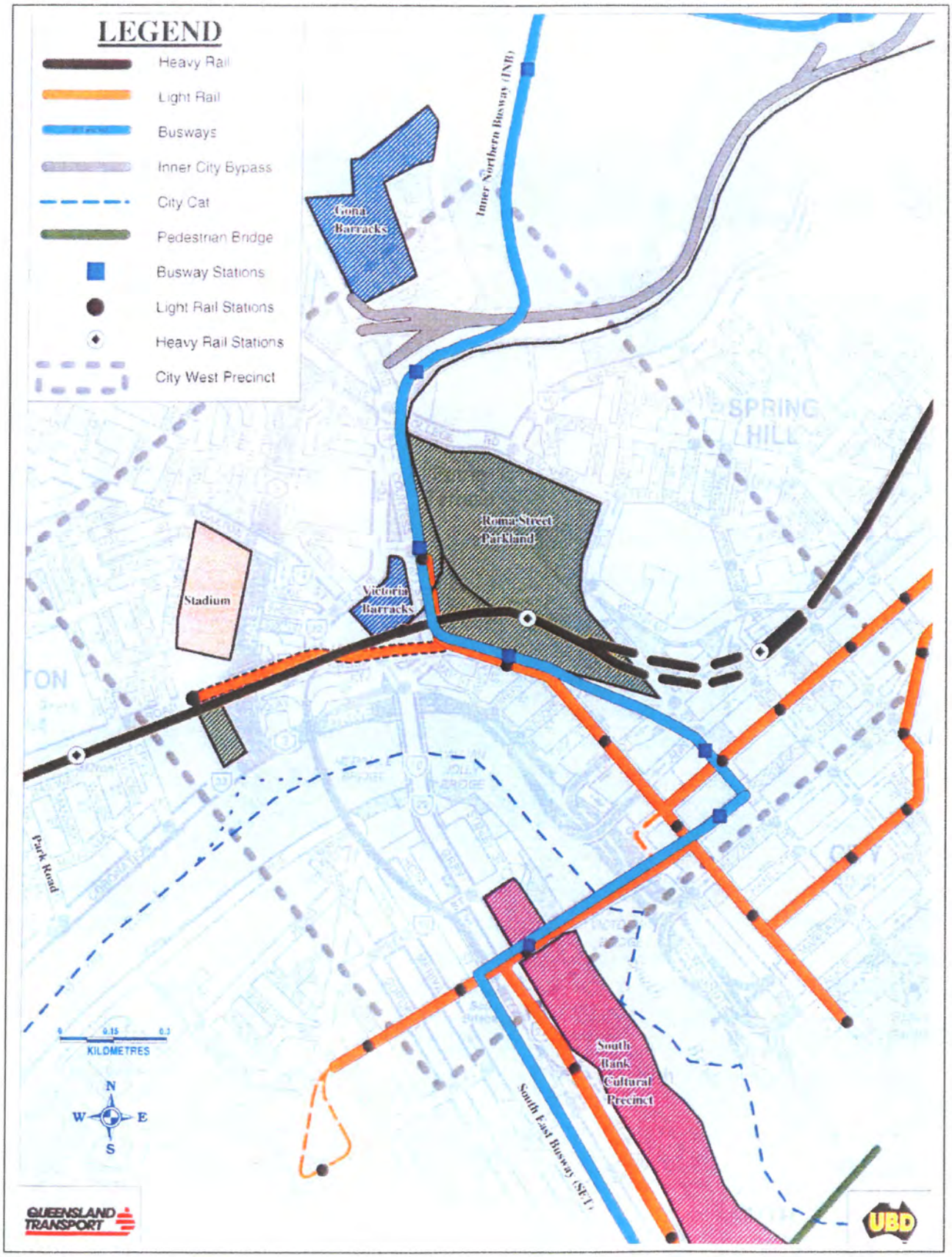


FIGURE 4.2
Existing and Planned City West Transport Infrastructure

- ensuring that higher density development that gives rise to a need to augment existing essential infrastructure provides for the cost of such augmentation (A well serviced and equitable city);
- ensuring the provision of sport and recreation facilities in strategic locations readily accessible to their population catchments, and designed and accessed so that impacts on the surrounding area are minimised (A well serviced and equitable city);
- ensuring development complements the character and style of the surrounding area (A well designed and culturally dynamic city);
- ensuring the physical separation of visually incompatible land uses through zoning provisions, buffering and/or screening as appropriate (A well designed and culturally dynamic city);
- requiring development to maintain and enhance the character, amenity and sense of place of urban areas, neighbourhoods and localities appropriate to the environmental and cultural contexts of those areas (A well designed and culturally dynamic city);
- ensuring that development in its design and function retains and supports social and cultural activity (A well designed and culturally dynamic city);
- ensuring that incompatible land uses do not intrude into residential areas and that residential amenity is maintained (A well designed and culturally dynamic city); and
- ensuring that residential areas are secure against the introduction of through traffic (A well designed and culturally dynamic city).

These statements, or directions are not specific, and can be interpreted in many ways depending on the readers outlook. The core of these statements is for development generally to respect, and be compatible with the "character" of the surrounding neighbourhood. Section 6.2.8 of the EIS addresses the potential impact of the proposal in relation to these principles.

❑ Preferred Dominant Land Uses

The Strategic Plan provides "directions" through the preferred dominant land uses as shown on the Strategic Plan Maps. The preferred dominant land use for the Lang Park area is "urban area" with a "proposed major busway corridor" to the east and south. It is difficult to tell from the strategic plan maps whether the Lang Park site is identified as a "major institution or public venue" as the area of Lang Park is engulfed by the busway corridor. Greenspace corridors are included along the river's edge. These maps very broadly indicate a preferred future land use pattern and do not allocate land use rights. Land use rights are dependant upon land being included within land use "zones" on the Town Plan Zoning Scheme Maps.

Non-residential activities in the Urban Areas are intended to serve local communities and their environmental and amenity impacts are to be managed to acceptable levels. "The co-location of these non-residential activities in "centres" will be encouraged to minimise potential amenity problems and to enhance opportunities for the use of public transport, walking and cycling." (BCC 1987 pp3-10).

The 1987 Town Plan states that "development within the Urban Areas is intended to maintain and enhance the character of the City generally and of neighbourhoods and localities. Council will assess development applications against the following requirements relating to social mix and character." Requirements relevant to the assessment of the Lang Park Stadium proposal in this regard include:

- Social Mix – as appropriate to the type of development proposed, it should:
  - be designed to integrate with, rather than be segregated from, existing development in the area; and

- promote access to the range of services, facilities and activities required to support the social and cultural needs of residents.

- Character – development will be required to respect and be compatible with the character of the neighbourhood in which it is located, particularly in developed areas.

The Strategic Plan's "statement of Intent" for identified Major Institutions and Public Venues, (and it is assumed that Lang Park is identified as such), includes specific requirements for any significant expansion. "*Any significant expansion of Major Institutions and Venues should be in accordance with a **concept master plan** guiding the long term development of the site, illustrating how integration is to be achieved*". Integration refers to insuring that all internal elements are integrated (including community spaces, retail, commercial, community services, public transport, landscaping, site access, emergency access and internal movement systems) and that they in turn are integrated into their immediate surrounds and into the movement system of the greater City. Furthermore, the statement of intent, requires the concept master plan to be available before any approval of significant development or redevelopment will be contemplated. The development of the concept master plan should involve effective community consultation as part of the process of preparing such a plan.

❑ City Frame Area

Lang Park is also contained within the "City Frame Area" which is the outer edge of the Central City "Centre" shown on Strategic Plan Map 4. The City Frame Structure Plan showing the preferred dominant land uses is shown on **Figure 4.3.**

The 1987 Town Plan states that owners or developers of major land holdings within these "centres" will be encouraged to prepare a concept plan for their sites before seeking approval for significant development or redevelopment. These concept plans must be consistent with any development control plan applicable to a particular centre. It further states "the Council will not support applications for centre development which do not achieve appropriate integration and co-ordination of centre components both within the centre and with the surrounding area." (BCC 1987 pp3-13).

The primary aim for the Central City which includes Lang Park, is:

- to ensure the continuation and strengthening of the viability and functions of the Central City in its role as metropolitan and regional centre for commerce, retailing and entertainment.

Relevant objectives derived from this primary aim include:

- the maintenance of the Central City as a major centre for entertainment by facilitating the establishment of venues which require a central location;
- the protection and enhancement of the amenity of existing and potential residential areas by:
  - minimising the intrusion of incompatible non-residential uses which cause high traffic generation, loss of privacy, increased kerbside parking and noise nuisance; and
  - discouraging through traffic in local streets.
- the maintenance of a high standard of mobility, accessibility and convenience throughout the Central City by:
  - ensuring the intensity of development is related to road and transport system capabilities; and

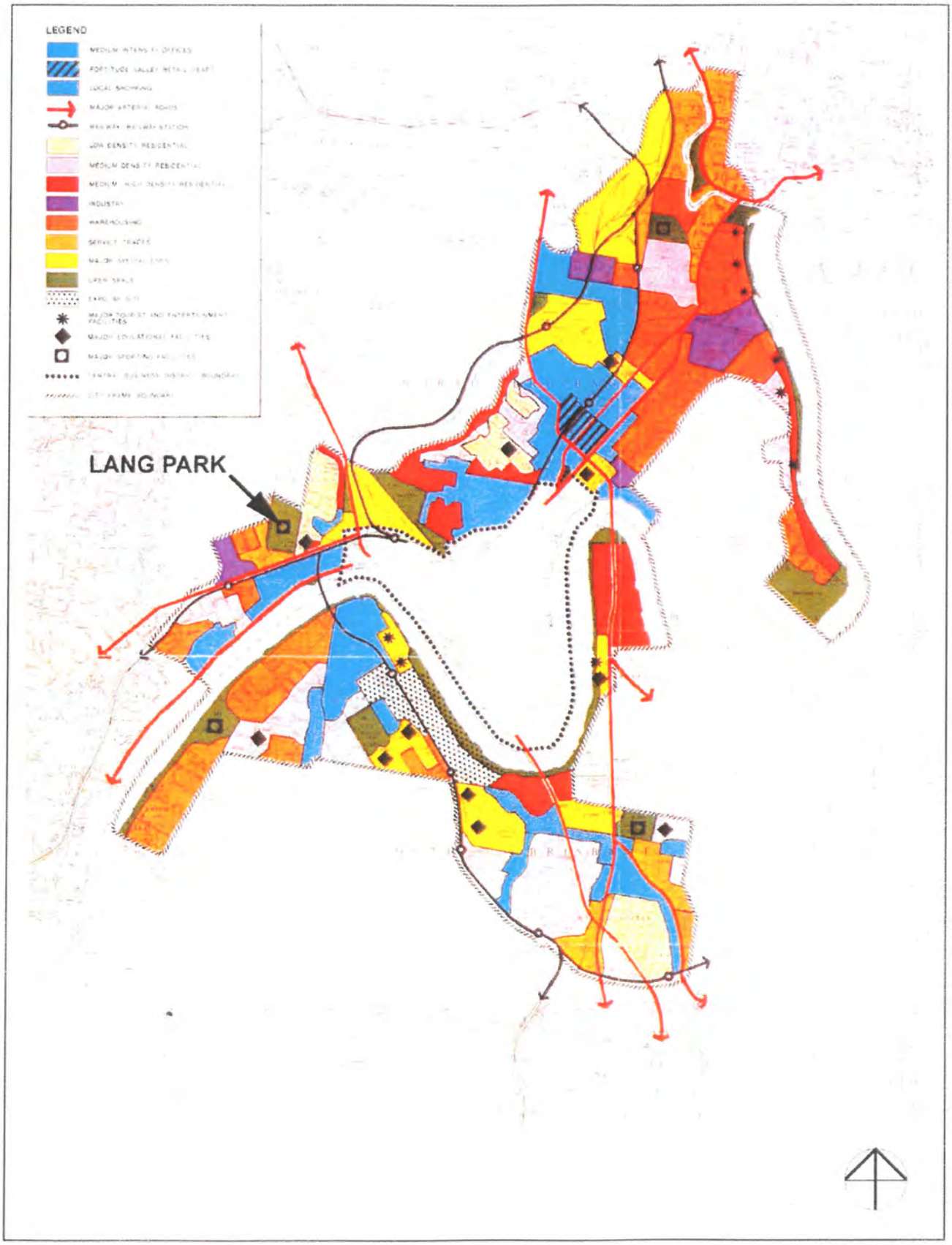


FIGURE 4.3
City Frame Structure Plan

- maintaining the City's arterial and sub-arterial road capacities by avoiding pedestrian and traffic conflicts wherever possible, and by discouraging the establishment of high traffic generating uses with direct access to these roads.

Development within the City Frame area will be assessed against the City Frame Structure Plan and relevant development control plans. Lang Park is identified on the Structure Plan as "Open Space" which, where publicly owned, is intended to be maintained and kept accessible to the public. The Structure Plan also identifies privately owned land, which are used for major organised sporting activities including:

- Lang Park;
- The Brisbane Cricket Ground (Gabba);
- Davies Park, and
- Perry Park.

These areas are claimed to "complement other existing public parkland in the CBD".

The City Frame Structure Plan also includes the Petrie Terrace and Spring Hill Special Development Area adjacent to Lang Park. This area is identified as an area with a unique heritage reflected in the style of existing residential buildings. Development principles in recognition of this character are contained within a Development Plan for the area.

❑ Zoning

For the purpose of defining land use rights and development assessment requirements, land within the 1987 Plan has been divided into "zones". These zones under the Town Plan of the City of Brisbane 1987 are shown on **Figure 4.4.**

As can be seen on the zoning map land, the area contained within Hale, Caxton, Castlemaine and Chippendall Streets is included in the following zones:

- **Sport and Recreation** - (the existing sports field and associated facilities)

  Land is intended to accommodate organised sports with associated facilities, commercial recreational establishments as well as less formal recreation activities. Land may be held privately and access may be restricted. Most uses, apart from Council owned or controlled clubs where limited to a small percentage of the total land area, will require the consent of Council. In IPA terminology, most development proposals will require "impact assessment".

  Factors which Council, as the assessment manager, will take into account in considering development within the Sport and Recreation zone include:

  - parking, servicing, ingress and egress, landscaping and the likely impact of the proposal on the existing and future amenity of adjoining sites and the surrounding area;
  - particular attention will be given to the potential for the development to restrict or enhance public access; and
  - consideration will also be given to the likely impact of the proposal on public utilities, the surrounding road system and pedestrian movement and safety.

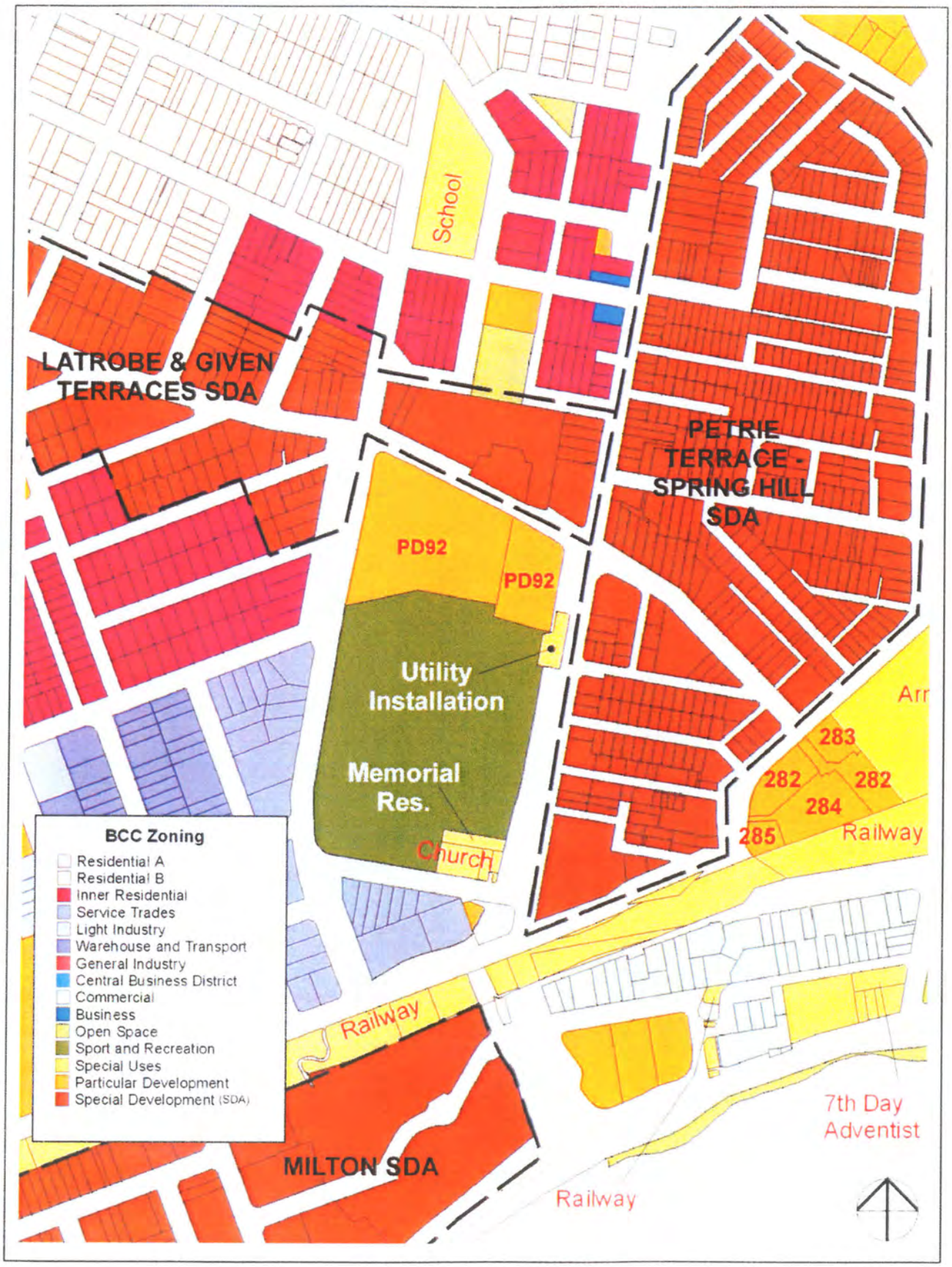


FIGURE 4.4
1987 Town Planning - Zoning

- **Particular Development 92** - (the Sports House, Ozsports and PCYC areas)

  The intent of this zone is to specify a particular type of development in detail, including to meet specific criteria. The zone also acknowledges existing development and provides for minor alteration, rebuilding or expansion without the need for consent (self-assessable development). The Particular Development (92) zone referred to in this zone is "development in accordance with the Lang Park Trust Act". The general objective of the *Lang Park Trust Act 1994*, is to hold land in trust for sporting and recreation purposes. The zoning could be interpreted therefore as a Sport and Recreation zone. Development other than for minor sport and recreation rebuilding, alteration or expansion would require consent (Impact Assessment).

- **Special Uses (Church)** – (land held by the existing Christ Church and rectory)

- **Special Uses (Memorial Reserve)** – (land to the north of the Church used as a graveyard)

- **Special Uses (Utility Installation)** – (land used for power cable and transformer purposes adjacent to Hale Street)

  Special Uses zoning is intended to be used for community facilities or public purposes (either privately or publicly administered). Where it can be demonstrated that there is no existing or likely future demand for any such use, consideration may be given to the rezoning ("material change of use") of that land for an alternative form of development. The preservation or enhancement of heritage buildings, semi-natural to natural habitats and/or landscape values of lands situated within the Special Uses Zone may be required as part of any development approval.

Between Chippendall Street and Milton Road the zones include:

- **Service Trades**

  The Service Trades zone is intended to accommodate industrial and related development that does not generate excessive traffic, impose undue strain on public utilities, or have a significant impact on the surrounding area. A utility installation would require Code Assessment. Utility installation is defined as a public utility installation, being a transport undertaking provided and maintained under the authority of some law which applies specifically to that undertaking.

- **Particular Development Zone 52 (District Nurses Home)**. – a small area of this site adjacent to Hale Street is zoned specifically for a district nurses home. Any use of this land would be impact assessable development.

Land use zones surrounding the site include:

- **Petrie Terrace – Spring Hill Special Development Area** to the east;

- **Police Barracks Precinct – Particular Development Zones 282, 283, 284 and 285**;

- **Latrobe and Given Terraces Special Development Area** to the north and north west;

- **Inner Residential** to the west along Heussler Terrace; and

- **Milton Special Development Area** to the south, on the southern side of the railway line and along the Brisbane River.

The Special Development Areas adjacent to the site are the subject of specific Development Control Plans which are discussed below. The Police Barracks Precinct is also discussed given its focus within the public access requirements for the proposed stadium redevelopment.

❑ Petrie Terrace and Spring Hill Development Plan

The Petrie Terrace and Spring Hill Development Plan provides a detailed planning framework for residential and commercial areas to the east of the proposed development site, off Hale Street. The Development Plan area plan includes the commercial and entertainment areas along Caxton Street. The Petrie Terrace area is further divided into "Petrie Terrace Precincts" as shown on **Figure 4.5**.

The intent of the Development Plan is to address planning issues common to older housing areas on the fringe of the CBD. These issues include:

- residential amenity suffering from pressure for commercial expansion;
- increasing through traffic;
- commuter parking; and
- a deteriorating housing stock.

The objectives of the plan are:

(a) To reverse the decline in population and attract people to live within walking distance of the CBD by improving the amenity and attractiveness of these areas, and encouraging an upgrading of the housing.
(b) To limit the expansion of commercial development outside the CBD.
(c) To generally adopt the objectives that apply in the rest of the city.

The major residential areas of Petrie Terrace follow the ridge line along and to the west of Petrie Terrace. These areas will remain as the residential heart and have been found to unsuitable for high intensity residential development for a number of reasons, including:

- the small size and narrow frontage of existing allotments;
- the difficulty of site amalgamation;
- the narrow undulating nature of the streets;
- the potential problems of overshadowing and loss of privacy; and
- the relative distance from the CBD.

Cohesive areas of heritage significance remain in most parts of Petrie Terrace providing unified streetscapes in terms of the age and integrity of buildings. The Development Plan contains two specific provisions aimed to retain the historic and architectural character of Petrie Terrace. These are:

- Protection precincts - all development and redevelopment to be consistent with the traditional character of the area. Demolition or removal of buildings with significant heritage or character value in residential precincts requires Council consent (impact assessment). The majority of housing within the Petrie terrace development area is within heritage protection permit areas (DH1p and LC4p) where it is intended to retain and reinforce the original character of the neighbourhood.
- Character requirements in design codes to ensure new development retains the scale and character of the original buildings which predominated in these areas from the period 1850 to 1920. "One of the most effective means of attracting people to live in the relevant suburbs is to

FIGURE 4.5
Petrie Terrace Precinct Plan

develop and protect the best of its historic nature, so that those rehabilitating properties or buildings can be reasonably certain that their investment will be protected, and that the area will not be spoilt by unsympathetic new development." (Petrie Terrace DP – 54).

Typical elements of detached housing character from 1850 to 1920 within the detached housing (DH1p) precinct immediately to the east of the Lang Park Proposal are shown in **Figure 4.6.**

❑ Latrobe and Given Terraces Development Control Plan

The Latrobe and Given Terraces Development Control Plan provides a detailed planning framework for land immediately north of Lang Park and along the Given Terrace ridge north west of Lang Park. The Given Terrace area is divided into "Precincts" as shown on **Figure 4.7,** where site specific controls apply in a similar way to land-use zones. The precincts directly relating to Lang Park are the "Open Space" precinct along Caxton Street and a "Residential' precinct along the northern end of Castlemaine Street.

The intent of the DCP includes:

(a) To reinforce the special character of the Terraces (including Ithaca Pool).
(b) To reinforce the role of the Terraces as a local service centre and a place for specialised shopping and entertainment for a city wide population.
(c) To protect the amenity of residential properties by constraining significant further commercialisation.
(d) To promote the area as a desirable residential location, featuring traditional housing mixed with appropriately designed infill housing.

Relevant principles of the Plan include:

- limiting the extent of the commercial uses so that the existing character and amenity is maintained; housing loss prevented; and parking and traffic problems minimised;
- preserving residential amenity;
- retain existing buildings;
- it is important that non-residential land uses fronting the Terraces should not lead to increased use of nearby residential streets for parking;
- Latrobe and Given Terraces must continue to perform a multi-purpose traffic role, catering for through traffic, performing as a local distributor and providing access to adjoining properties; and
- development on the Terraces should be such so as to minimise intrusion of traffic into nearby residential streets.

The intent of the Residential Precinct is to maintain existing character and amenity which is regarded as being of over-riding importance. The intent of the Open Space Precinct is to retain publicly owned land for recreation and community purposes and that facilities be made more accessible and attractive for use by the local community.

❑ Police Barracks Precinct – Particular Development Zones 282, 283, 284 and 285

This is a significant area of land between Petrie Terrace and the Roma Street Railway line at the top of where Milton Road meets Petrie Terrace and Upper Roma Street. The land is currently occupied by the "Hogs Breath Café", the former Police Barracks building and the former stables last used as the "Underground" nightclub. The area has been subject to individual spot rezonings reflected in the current range of particular developments allowed including:

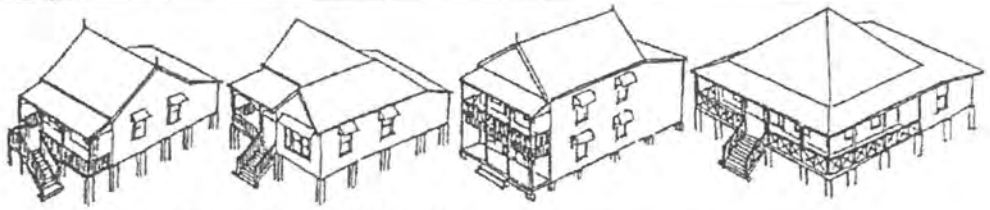


Figure 3.3; Illustrating typical houses, 1850 to 1920

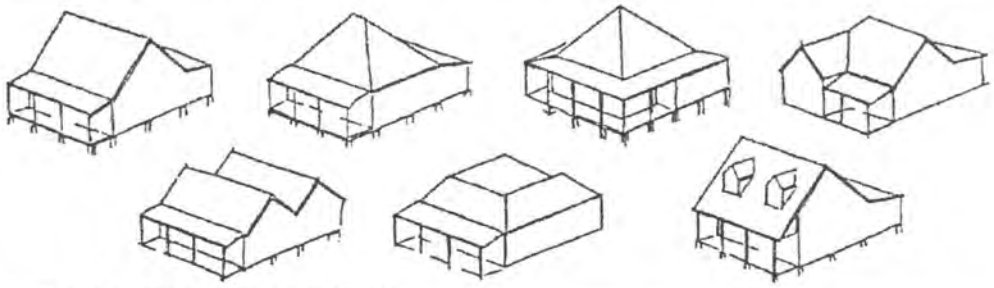


Figure 3.4; Illustrating variety of roof types

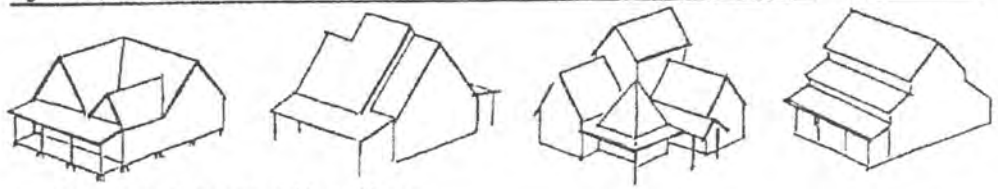


Figure 3.5; Illustrating compatable roof types

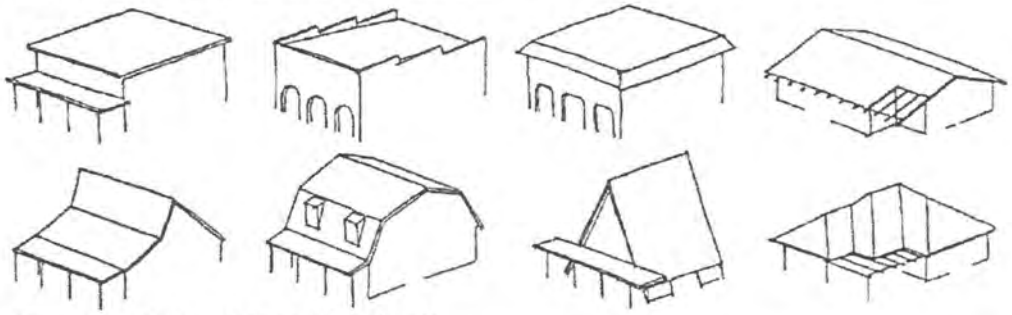


Figure 3.6; Illustrating inappropriate roof types

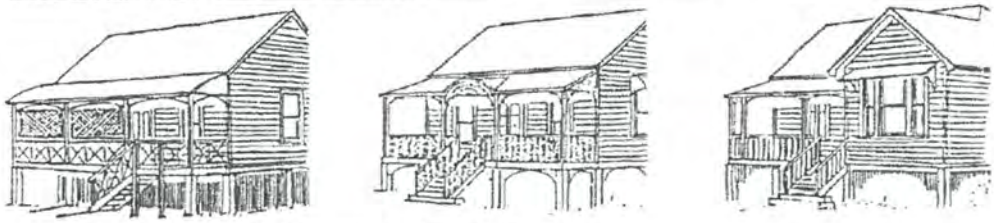


Figure 3.7; Illustrating variety of verandahs, 1850 to 1920

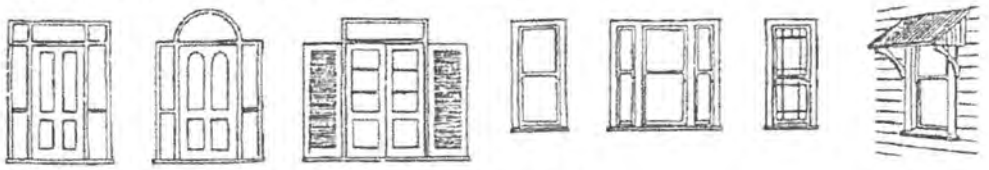


Figure 3.8; Illustrating variety of doors and windows, 1850 to 1920

FIGURE 4.6

Typical Elements of Detailed Housing Character 1850 – 1920

(Petrie Terrace & Spring Hill Development Plan)

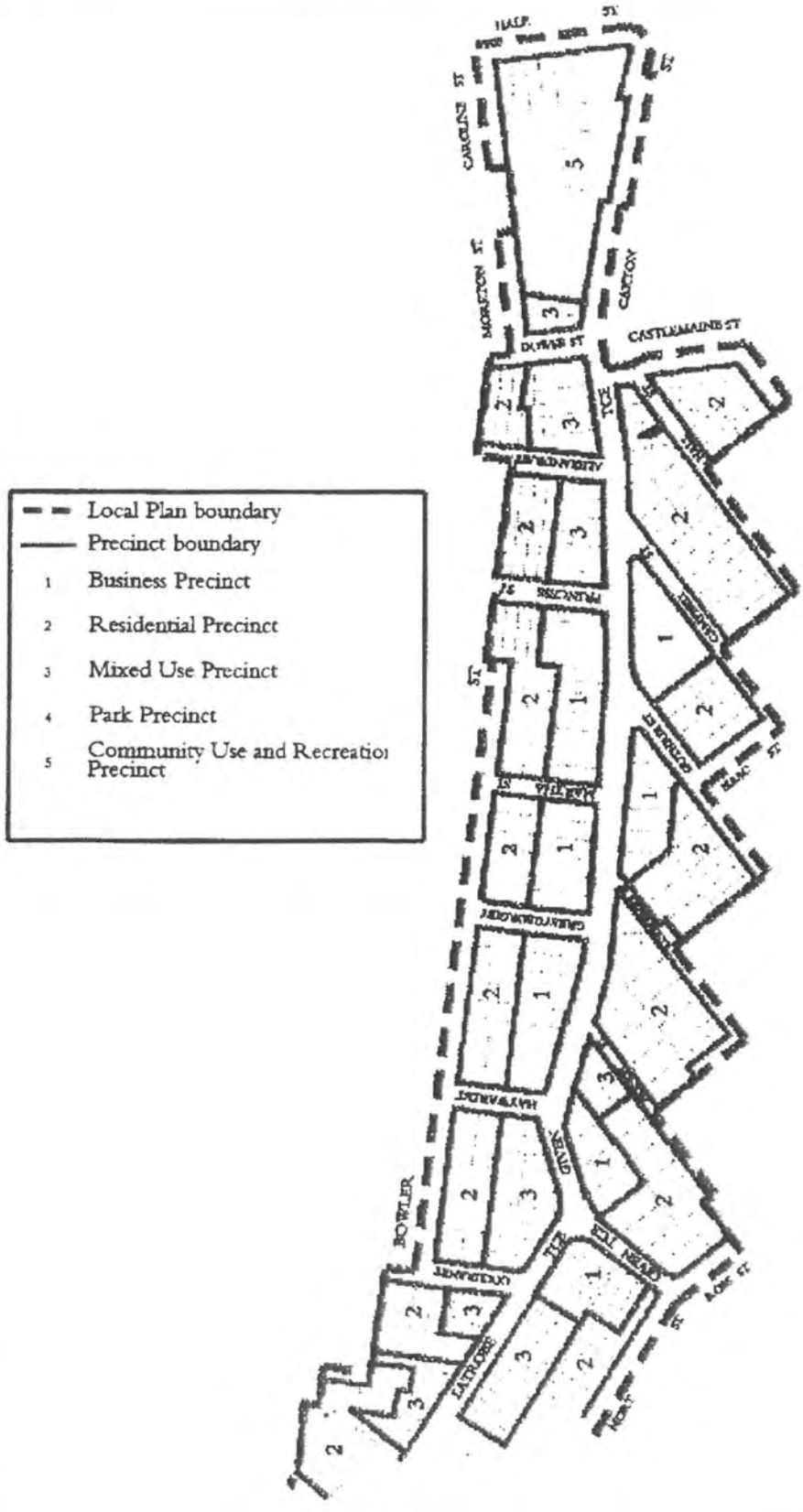


FIGURE 4.7
Latrobe and Given Terrace Development Control Plan

- PD 282 – The Police Barracks on Petrie Terrace with business premises approved in 1990 and requiring retention of the historic barracks. Also contains the site adjacent to the railway line and behind the "Underground". This land is presently vacant but has a Development Approval with Brisbane City Council in accordance with the zone being generally a 2 Storey Business Premises with underground parking for 130 vehicles. Vehicle access from Petrie terrace only.
- PD 283 – Place of Assembly and Restaurant approved 1989 – requires retention of the historic stables.
- PD 284 – vacant land with no effective street frontage adjacent to the railway land. Approval for a 14 storey tower apartment (60 metres above natural ground level). Access through lane between stables and police barracks only and with parking under business premises approved on PD 282. A wide ranges of uses is allowed on this site.
- PD 285 – Officers Mess (Hogs Breath Café). PD requires retention of existing historic building and allows for a range of uses including the current restaurant approved in 1992.

❑ Development Standards

Under the 1987 Town Plan there are a number of Development Standards that may also have an effect on the consideration of the proposed redevelopment of Lang Park Stadium.

Under Section 17, a number of external works will be required at the discretion of Council, to be carried out before the commencement of the development. Such external works may include for example: concrete kerbing, constructing a bikepath, and reconstruction of any damaged footpath or roadway.

The proposed site fronts a "Designated Road" as defined under Section 18.1 of the Town Plan. As such there are landscaping and parking requirements which may need to be regarded.

The provisions regarding vehicular access, vehicular movement within a site, and vehicle parking within a site should also be regarded. Car parking is to be provided to the satisfaction of the Council in relation to the location and layout of the parking area.

There are also a number of general requirements that need to be regarded. These include:

- **Lighting of Site**

  The level of vertical illumination at a distance of 1.5 metres outside the boundary of the site resulting from direct, reflected or other incidental light emanating for the site shall not exceed eight (8) lux measured at any level upwards from the ground. Council may also require that suitable screens, vegetation and other landscaping requirements be provided.

- **Maximum Site Cover**

  A maximum site cover of 75 % applies at the discretion of Council.

- **Drainage of Site**

  Adequate provision for the drainage of the site is required before development commences.

- **Distance from a Road Alignment**

  In general and subject to the Standard Building Regulations, the building shall not be erected closer than six metres to the alignment of a road.

- **Non-discriminatory Access**

  Non-discriminatory access must be provided in accordance with the all applicable laws and codes.

❑ **Local Planning Policies**

The following Local Planning Policies will need to be considered as part of the development permit application to Brisbane City Council:

- Number of vehicle Access Points for a Development (18.05)
- Design Guidelines for On-Site Car Parking Facilities (18.06)
- General Requirements – Site Cover and Distance from Road Alignment (19.01)
- Calculation of Site Cover (19.04)
- Prior Consultation with Other Government Authorities (19.05)
- Noise Assessment of New Commercial and Industrial Developments affecting existing or likely future residential uses in any of the Residential zones (19.10)
- Landscaping (19.15)
- Design for Personal Safety (19.20)
- Bikeways and Provision for Cyclists and their Bicycles (19.25)
- Shadows and Submission of Shadow Diagrams (24.01)

Compliance with these policies will be assessed by the assessment manager based on the information provided in the development application.

4.4.2 Modified Draft Brisbane City Plan

The Modified Draft City Plan is a proposed planning scheme for Brisbane City generally compliant with the intentions of IPA. The 1999 Draft Plan has been on public exhibition from 8 March to 4 June 1999. Consequently, the Modified Draft City Plan adopted by Council in November 1999 has some "weight" as an indication of Council's planning intentions and should be considered in an assessment of the Lang Park Stadium proposal.

Should the Government decide to proceed, the timing of a development application could occur after the City Plan is finally approved by Government. Should this be the case, then the final City Plan will be the relevant planning instrument affecting consideration of the development applications.

❑ **The Vision – Modified Draft City Plan**

The Modified Draft City Plan contains a Vision as an introduction to its Strategic Plan. This vision – "Brisbane the Livable City" underpins Council's corporate programs.

The Vision is to be the foundation for the overall desired environmental outcomes for the City. Key elements include:

- Quality of life makes Brisbane a desirable safe and healthy place to live, invest, work, play and visit.
- The living environment is human in scale, with a sense of place based on sub-tropical character.
- Infrastructure, including transport, is coordinated, integrated, efficient and equitably distributed.

❑ Desired Environmental Outcomes (DEOs)

Desired environmental outcomes were introduced by the IPA , and are expressions of planning policy which demonstrate how the planning scheme will seek to achieve ecological sustainability.

IPA specifies that development requiring impact assessment must not compromise the achievement of the DEOs for the planning scheme. Some of the more relevant objectives and specified means of achieving the DEOs that would apply to the consideration of the development should it require impact assessment under the new City Plan include:

- separation – separating uses sensitive to noise, light and or/air pollution from activities that generate these pollutants at unacceptable levels;
- sympathetic development – buildings, structures and landscaping that complement the surrounding character and style in both urban and rural areas;
- requiring development to enhance the amenity, environmental and cultural contexts of its locality; and
- promoting a pattern of development that reduces private vehicle dependency and increases potential for use of public transport, walking and cycling.

❑ Elements of the City of Brisbane

Land use "elements" as described in the Modified Draft City Plan are proposed to represent broad spatial allocations of land uses. The Strategic Plan map showing the proposed Draft City Structure includes the area where Lang Park is as a "Special Purpose Centre (Major institution or public venue)". The general elements surrounding this are "residential neighbourhoods" and "Greenspace corridors" along the Brisbane River. Proximity to the "City Centre" should also be noted.

It is proposed in the Modified Draft City Plan that the strategic directions of these "elements" will generally be used in impact assessment, particularly where larger development proposals have implications for the City's overall structure and operation, or where cumulative impacts of development need to be considered.

The primary focus of Special Purpose Centres is the particular purpose that gave rise to the current development. Ancillary uses will be encouraged, although the Modified Draft City Plan also states that these centres should not take on the role of a Multi-purpose Centre unless provided for specifically in a Local Plan.

The Modified Draft City Plan states that "planning for new special purposes facilities should ensure they are integrated into their immediate surrounds and the broader Movement System by:

- locating them centrally and conveniently to users;
- locating them so that they are accessible by public transport, cycling and walking;
- ensuring a correct relationship between the level of accessibility by all modes and the likely number of employees and visitors to the site;
- enabling co-location of complementary activities to benefit both employees and visitors;
- ensuring location and design limits adverse impacts on nearby areas to acceptable levels; and
- encouraging the efficient use of land". (MDCP pp20)

The Modified Draft City Plan further states that:

- "all development in a Centre must serve to integrate and reinforce the Centre through conceptualisation, design, delivery and on-going operation in accordance with a Centre Concept Plan;
- the design and operation of the Centre must be effective in mitigating adverse amenity impacts on adjoining land uses; and
- In-Centre development must contribute to increased accessibility to the Centre by public transport, bike and pedestrian modes" (BCP pp17,18).

❑ Land Use Areas

For the purpose of defining development assessment requirements, land within the Modified Draft City Plan has been divided into "areas" with associated preferred uses and development assessment tables. These areas defined in the Modified Draft City Plan for Lang Park and surrounding areas are shown on **Figure 4.8**.

The locality around Lang Park includes the following area classifications:

- **Special Purpose Centres (SP4) Major Sporting Stadium** – which includes Lang Park and those areas used by Ozsports and the PCYC. All development in this area requires the preparation of a centre concept plan to accompany the application for development permit. Development for a major sporting stadium is assessable development requiring Code Assessment. Relevant DEOs include integration with the City (abutting multi-purpose centre) by way of pedestrian, vehicular and public transport interconnection. Development may provide subordinate or ancillary uses. The specified relevant primary codes are:

  – Centre Amenity and Performance Code; and
  – Centre Design Code.

- **Park Land Area** – currently the memorial reserve adjacent to the Church. The DEOs relevant to this area are to provide for informal recreational, cultural and educational opportunities with low key developments designed to achieve maximum community benefit. These benefits are to be achieved without compromising the parkland qualities valued by residents in the area or causing undesirable impacts on surrounding land uses.

- **Community Use Area (CU2) Community Facilities** –the Church and associated rectory. The DEOs reflect protection of community benefits and any development on this land not in accordance with being a community facility would require impact assessment.

- **Light Industry Area**– (Chippendall Street to Milton Road). The relevant DEOs apply to the maintenance of a high standard of environmental performance and appearance with limited office activities and the accommodation of business unsuitable for location in Multi-purpose Centres. Code Assessable development includes "Utility Installation" which is defined under the Modified Draft City Plan as "a use of premises for transport services including... railway, tramway, road transport, air transport". Any other material change of use will require impact assessment. The specified relevant Codes include:

  – Industrial Amenity and Performance Code, and
  – Industrial Design Code.

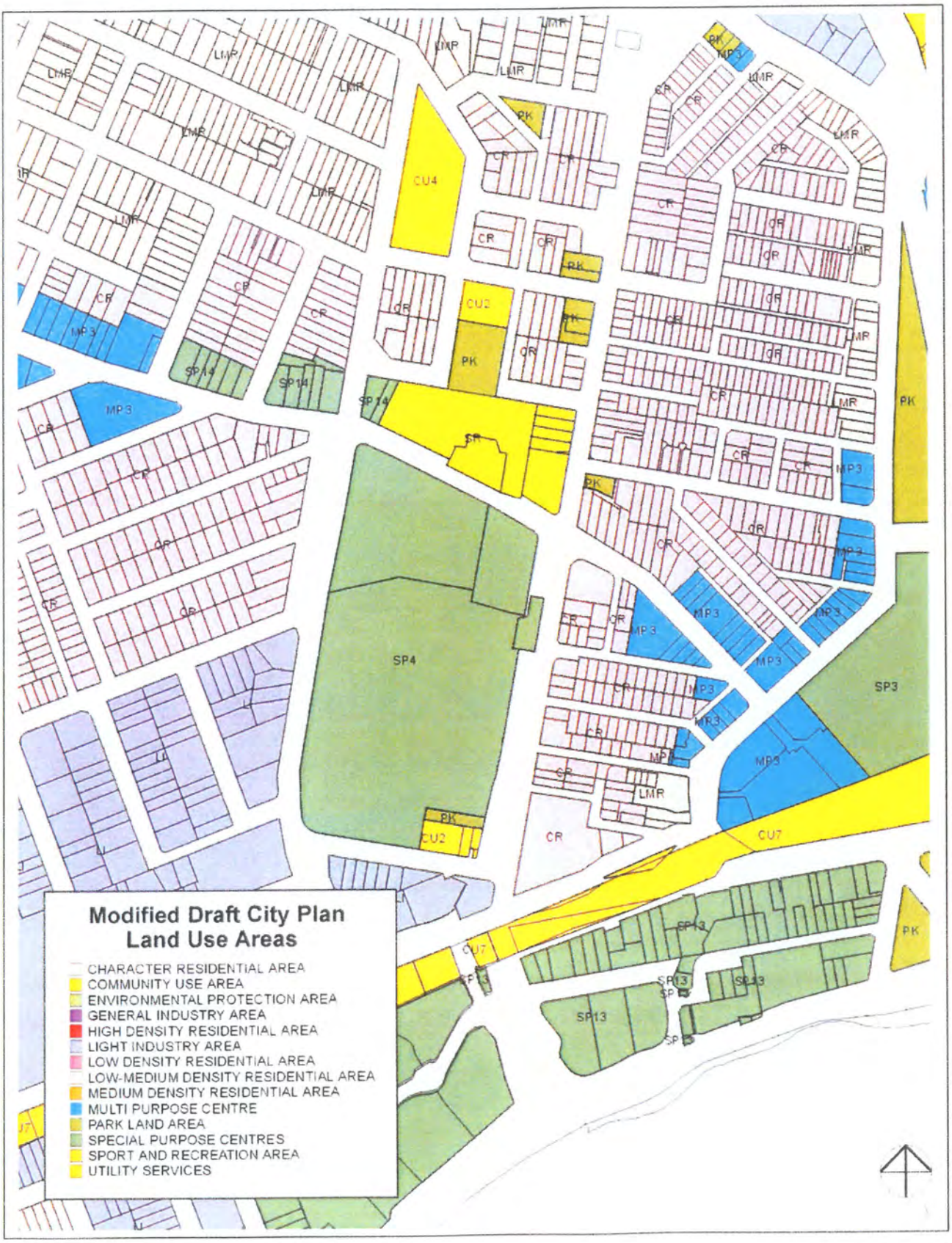


FIGURE 4.8
Modified Draft City Plan Land Uses

Advice from BCC is that development for uses other than a major sporting stadium, which would trigger impact assessment, would include club, conference centre, hotel and indoor sport and recreation.

❑ Petrie Terrace and Spring Hill Local Plan

The Petrie Terrace and Spring Hill Local Plan is an IPA version of the Petrie Terrace and Spring Hill Development Plan provided for under the 1987 Town Plan. The Development principles include:

- the Local Plan protects the character of the built environment by restricting the demolition of buildings that have either character or heritage significance. These buildings and areas make a significant contribution to the City's heritage and character and are to be retained.
- any new development is to be sympathetic to the scale and character of the original urban development pattern and buildings placed upon the land. Development in the identified heritage protection precincts retains and reinforces the original character of buildings predominating during the period 1850-1920.
- the high levels of innercity residential amenity prevalent in Petrie Terrace and Spring Hill is not to be reduced through commercial expansion, increase in non-local traffic movements, Central Business District commuter parking and general deterioration of housing stock; and
- traditional character is to be protected from unsympathetic development thereby attracting people to live within walking distance of the Central Business District by improving the amenity and attractiveness of the Local Plan area and encouraging an upgrading of traditional housing stock.

The new Petrie Terrace and Spring Hill Local Plan has also included a new area called the "Police Barracks Precinct". It is intended that development within this precinct integrates the existing significant buildings with any new development.

The Petrie Terrace local area Precincts and associated designated land use areas are shown in **Figure 4.9**.

❑ Latrobe and Given Terraces Local Plan

In a similar way to the Development Control Plan made under the 1987 Town Plan, the Development principles expressed under this Local Plan include:

- the Terraces are to retain their special character and urbanity provided by their physical setting, traditional built forms, traditional mixture of land uses, significant vegetation and views;
- the Terraces are to provide a local services centre and a place for specialised shopping and entertainment for a Citywide population;
- the Locality is to remain a desirable residential location for an increased number of people, featuring traditional housing and compatible infill housing (both along the Terraces and elsewhere) and the preservation of residential amenity;
- this locality is to accommodate boutique small scale retail and commercial activities (such as cottage shops, cottage craft shops, minor refreshment outlets and personal services offices) in some locations along the Terraces;
- existing buildings are to be retained to the greatest extent possible;
- Latrobe and Given Terraces are to continue to perform a multi-purpose traffic role, catering for through traffic as a local distributor and providing access to adjoining properties in an improved streetscape; and

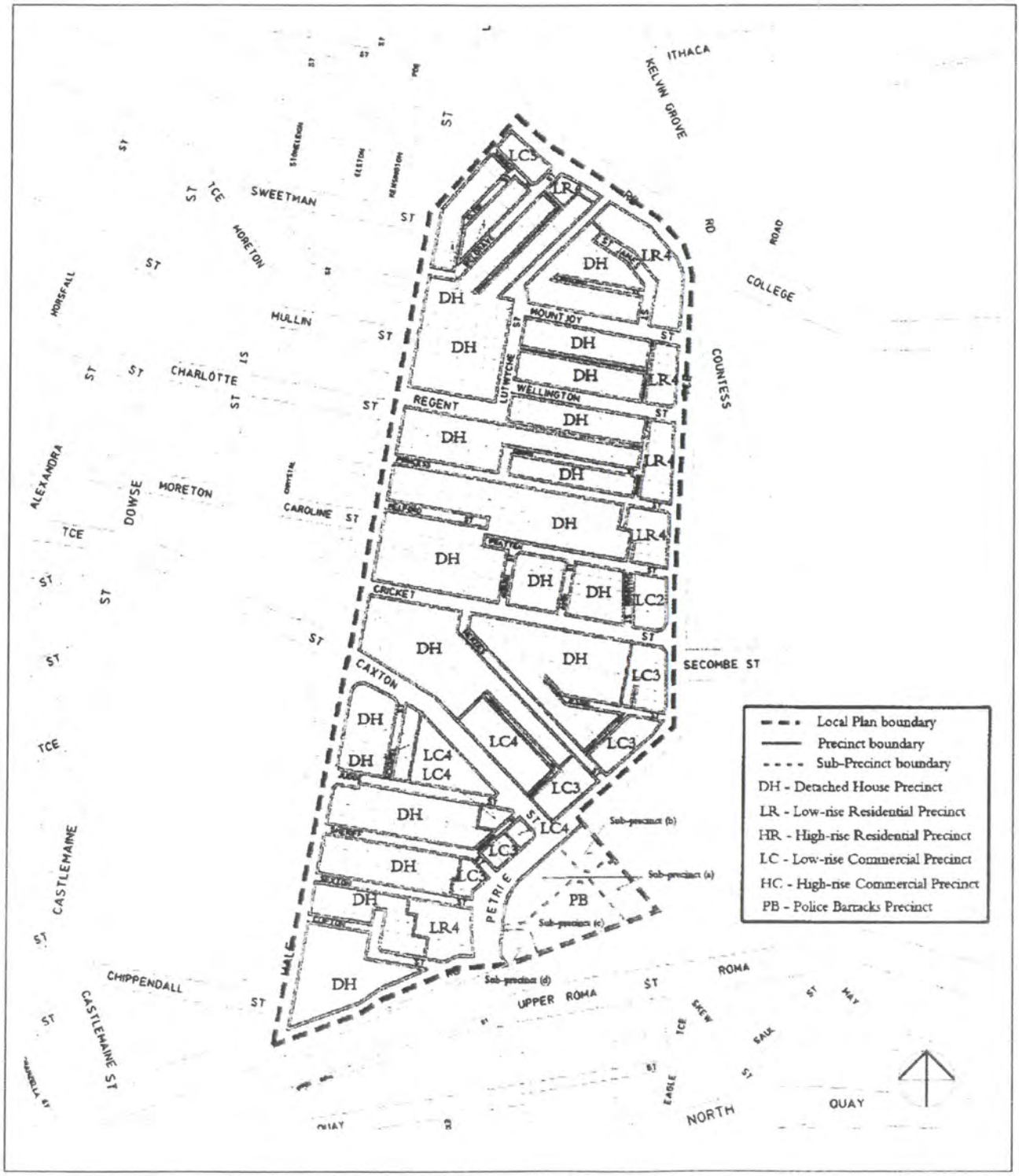


FIGURE 4.9
Petrie Terrace Precincts
(Spring Hill & Petrie Terrace Local Plan)

- on-site carparking should not be the driving force in development on the Terraces, provided this approach does not cause traffic intrusion into nearby residential streets and allows opportunities for residents to park on the Terraces.

Areas adjacent to Lang Park within the Development Control Plan Area include the Residential Precinct along Castlemaine Street and the Playground Precinct along Caxton Street which includes Ithaca swimming pool.

The Residential Precinct is intended to maintain the existing residential character and amenity, and the existing housing stock. The design and scale of elevation and building form of the rear of extended or new buildings consider the view of the building from surrounding areas and the impact on adjacent residential properties.

The Community Use and Recreation Precinct on land opposite Lang Park along Caxton Street (Neal Macrossan Park) is identified to make it more accessible and attractive for use by the local community. Key planning issues are:

- the scarceness of publicly owned land in this Local Plan area;
- the desirability of retaining such land for recreational use by the local community; and
- the impact development proposals could have on the amenity of nearby residential areas.

The Given Terrace local area Precincts are shown in **Figure 4.10**.

❑ **Ithaca District Local Area Plan – Draft Issues Paper**

A Local Area Planning process is currently underway for the Ithaca district. A draft issues paper released in March 2000 documents the issues raised by members of the community who have participated in the consultation process to that date. The paper recognises that the views expressed should not be interpreted as the general opinion of the whole Ithaca district community.

The proposed Ithaca Local Area Plan area covers the suburbs of Herston, Kelvin Grove, Paddington, Red Hill, Auchenflower, Milton and part of Bardon. Lang Park is contained within the eastern edge of the proposed Local Area Plan area, with its boundary along Hale Street. The extent of the proposed Local Area Plan is shown on **Figure 4.11**.

One of the most frequent requests reported in the draft issues paper was to reclassify areas designated for low to medium density housing (units) to character housing or low density areas. Planning issues reported in the draft issues paper, that provide an indication of community planning concerns relevant to the Lang Park Stadium proposal, include issues such as:

- **Urban Character and Heritage**

  - protecting character housing and heritage places from demolition;
  - ensuring new works are in keeping with local character and do not detract from views to these areas; and
  - retaining mature vegetation wherever possible.

- **Land Use Planning**

  - minimising the impact of Centre development on nearby residential areas; and

LEGEND

- Local Plan boundary
- Business Precinct
- Residential Precinct
- Mixed Use Precinct
- Park Precinct
- Playground Precinct
- Community Use Precinct
- Sub precinct 3
- Sub precinct 4
- Sub-precinct 5
- Sub precinct 6

FIGURE 4.10
Given Terrace Local Area Precincts

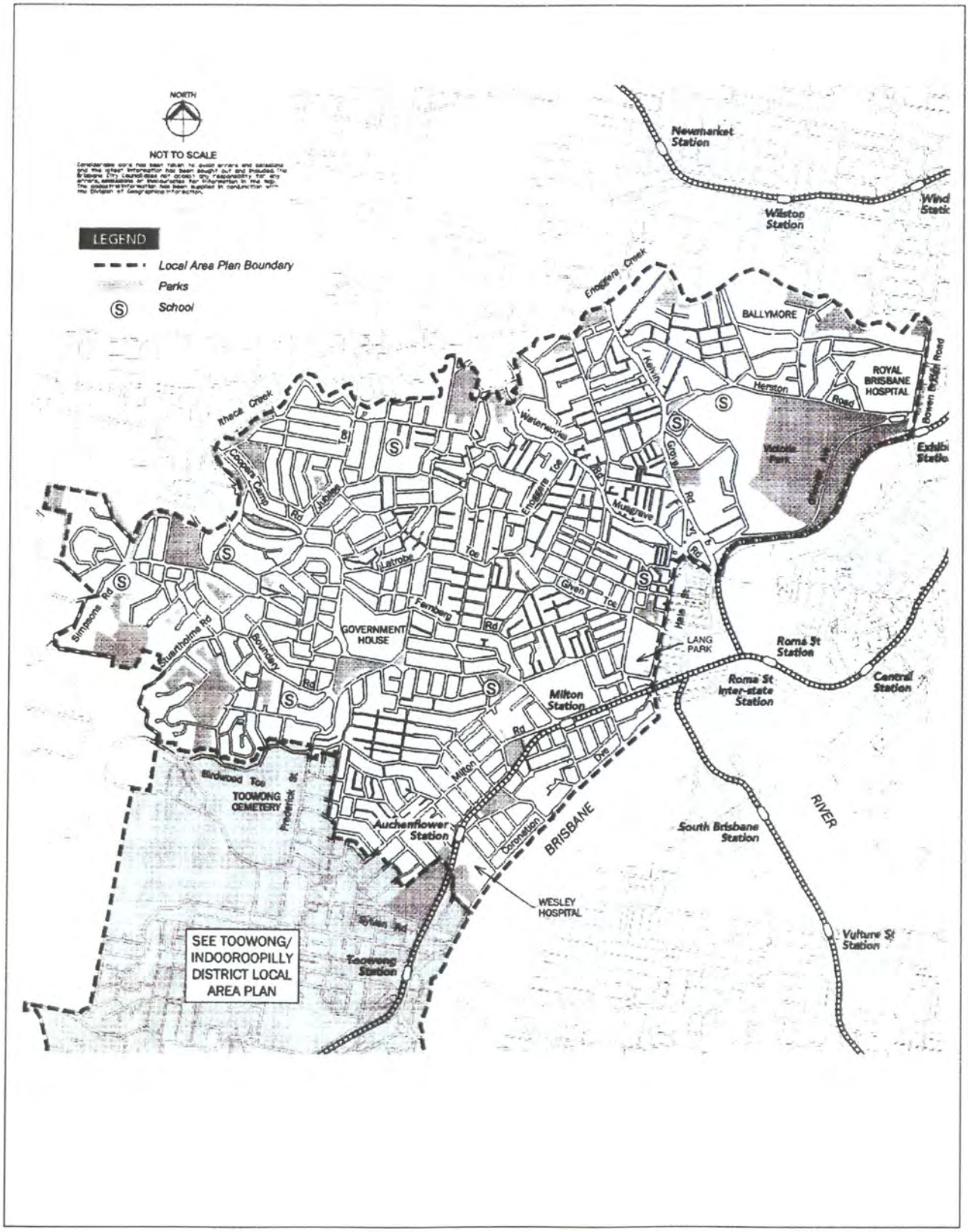


FIGURE 4.11
Ithaca District Local Area Plan

– reviewing the mix of land use in some areas to minimise conflict between them.

The issue of the Lang Park Stadium proposal was raised as being of concern to some residents on the basis of

– parking overspill impacts on surrounding residential streets;
– traffic congestion in local streets;
– impacts on adjoining residents during construction and the staging of events;
– provision of emergency services;
– unsatisfactory consultation; and
– concern about effects on Ozsports, PCYC, Ithaca Pool, Neal Macrossan Park, Skate Park, Christ Church and cemetery, and the La Boite theatre.

- **Access and Mobility**

– the need to improve alternative transport options through improvements to the cycle and pedestrian network and provision of community based transport;
– deterring non-local traffic from using local residential streets and reducing the numbers of speeding vehicles; and
– investigating solutions to parking problems around major sporting venues, commercial and entertainment precincts. In this regard the Local Area Plan is going to investigate the need for regulated parking in Paddington and Milton within a 1 km radius from Lang Park.

- **Environmental Quality**

– assessing air quality in "hot spots" along major roads particularly Hale Street; and
– monitoring the noise generated by major roads and sporting venues. In this regard the LAP process is investigating the effectiveness of the noise barrier along Hale Street, given that many homes are above the height of the wall.

- **Parks and Recreation**

– enhancing and maintaining existing park facilities;
– improving the range of recreation facilities and activities; and
– providing green space corridors between public facilities, major developments and areas of open space.

- **Community and Culture**

– providing community centres and informal meeting places;
– safety concerns at Milton train station, particularly the pedestrian underpass; and
– better management of public drunkenness in and around the entertainment precincts along Caxton Street and Given Terrace.

The Draft Issues Paper notes that the proposed redevelopment of Lang Park is an initiative of the State Government which will be assessed on its merits by Council, should an application for development approval be lodged.

❑ Codes

Codes are considered for self assessable and assessable development in accordance with the development table.

For development subject to self assessment the Code is the "Acceptable Solution".

For development subject to Code Assessment the Code is the Purpose, Performance Criteria, and the Acceptable Solutions. The Acceptable Solutions represent the preferred way of complying with the Performance Criteria, and in this regard are quite prescriptive. There may be alternative solutions to meeting the performance criteria and the application will need to demonstrate how these are met.

Generally a proposal that fails to satisfy the Performance Criteria (except in insignificant detail), will be refused where it cannot be conditioned to mitigate impacts.

Codes are also considered for Impact Assessment.

The relevant primary Codes according to the development assessment table for the Special Purpose Centres – Major Sporting Stadium area, and the Light Industry area, in relation to a proposal for a major sporting stadium include:

- Centre Amenity and Performance Code;
- Centre Design Code;
- Industrial Amenity and Performance Code;
- Industrial Design Code;
- Filling and Excavation Code (for operational works); and
- Heritage Place Code (site adjoins a Heritage Place listed in the City Plan).

Reference should be made to these Codes as well as the Industrial Codes should development permits be required for the Light Industry Area between Chippendall Street and Milton Road. The Centre Design Code and the Industrial Design Code contain a long list of design criteria that will need to be carefully considered.

Secondary Codes that may also be relevant include:

- Demolition Code
- Landscaping Code
- Light Nuisance Code
- Non-discriminatory Access and Use Code
- Stormwater Management Code
- Transport, Access, Parking and Servicing Code
- Awning Lighting Code
- Bicycle and Cyclist On-Site Facilities Code
- Energy Efficiency Code
- Services Works and Infrastructure Code
- Waterway Code (site may be subject to flooding in 100 year ARI storm event)
- Industrial Areas – Adjacent Development

❑ Planning Scheme Policies

Further guidance to support the Codes is provided through Planning Scheme Policies. Planning Scheme Policies are applicable to the consideration of development for impact assessment in accordance with an IPA planning scheme. The policies include Council reports and other documents relevant to the Plan that have been agreed by Council and are effectively called up within the planning scheme. Relevant key Policies and associated Reports and other documents relevant to Lang Park include:

- Air Quality
- Centre Concepts Plans
- Community Impact Assessment
- Consultation
- Energy Efficiency
- Environmental Impact Assessment
- Hazard and Risk Assessment
- Heritage Register
- Impact Assessable Uses
- Management of Urban Stormwater Quality
- Noise Impact Assessment
- Transport, Access, Parking and Servicing
- Transport and Traffic Facilities
- Urban Design Advisory Panel
- Contaminated Land Management Guidebook
- Detailed Design Manual for City Signature Projects
- Environmental Best Management Practice for Parks
- Erosion and Sediment Control Standards
- Local Stormwater Management Plans for Castlemaine-Caxton Streets – Relief Drainage Investigation
- Technical Guidelines for assessing energy efficiency

Given the likelihood that consideration of the proposal under the City Plan would not require Impact Assessment the above policies remain largely irrelevant to the application.

4.4.3 Conclusions

This section has identified existing regional and local statutory planning strategies, plans, controls, codes and policies relating to the Lang Park area, and specifically the proposal for the redevelopment of the Lang Park Stadium.

As can be seen from the above discussion, there is a vast array of town planning intentions that may be considered relevant to the assessment of any subsequent development application for this proposal. Some of these intentions are extremely broad, and from a regional perspective focus on ensuring that local planning instruments are consistent with state and regional planning objectives. In this regard, the Modified Draft City Plan has clearly identified that the Lang Park site is suitable for a "major sporting stadium", consistent with the regional objectives of the RFGM, and without the need for impact assessment.

On the other hand, many of the controls are quite prescriptive, such as codes and planning scheme policies. Given that the proposed Lang Park stadium redevelopment is at the Concept Masterplan stage, it is considered too early to be able to apply detailed assessments of the

project's compliance or otherwise with these more prescriptive controls. It is clear however that the project will need to meet the intent of these prescriptive elements during the development assessment phase when detailed design in accordance with these codes and policies will be required. This will be subject to Cabinet's decision to proceed or not to proceed with the project.

Section 6.2.8 of this EIS considers the impact of the proposal on, and relation to, strategic planning intentions, and the relationship of the proposal to the broad intent of the existing planning objectives and controls.

5.EXISTING ENVIRONMENT

5. Description of Existing Environment

5.1 Location, Land Use & Urban Character

5.1.1 Regional & Local Context

❑ **Location**

Lang Park Stadium is centrally located to the regional population of metropolitan Brisbane and South East Queensland. **Figure 5.1.1** shows the broad regional setting of the Lang Park Stadium site. It is conveniently located to the major regional transport interchange at Roma Street, which includes regional and interstate bus lines and heavy rail services. Rail connections will also soon be available from Brisbane Airport which is one of the major domestic and international airports in Australia.

At the local level, Lang Park Stadium is situated in close proximity to the Brisbane Central Business District (CBD), to the proposed Roma Street Parklands, to the South Bank cultural and entertainment precinct, and to major elements of the transport network serving the northern and western metropolitan regions. There are significant entertainment, food and retail precincts within surrounding areas less than 1 kilometre from the site as shown on **Figure 5.1.2**. In this sense, the Lang Park Stadium enjoys the support of proximate services such as parking, transport, recreation and entertainment, and commercial accommodation.

Locally, the Lang Park Stadium is accessible from a wide range of public transport services, as well as pedestrian and bicycle links. With the completion of major transportation infrastructure projects, such as the Inner City By-Pass and the Inner Northern Busway, the accessibility of Lang Park Stadium to metropolitan and regional populations will be greatly enhanced.

Lang Park Stadium is situated on land bounded by Hale, Caxton, Castlemaine and Chippendall Streets in the suburb of Milton. Milton Road and the Western Railway are situated nearby to the south of the stadium site. These combine to provide the major transport corridor serving the Brisbane CBD from the western and inner north-western suburbs.

Other major sporting and entertainment venues capable of hosting major events and competitions in the metropolitan area and in South East Queensland include:

Metropolitan	Regional
ANZ Stadium at Upper Mt Gravatt	Carrara Sports Complex in Gold Coast City
Ballymore Park at Herston	
Brisbane Cricket Ground at Woolloongabba	
Brisbane Convention Centre at South Bank (indoor sports & entertainment only)	Seagulls Rugby League Club at Tweed Heads, NSW
Brisbane Entertainment Centre at Boondall (indoor sports & entertainment only)	
Chandler Aquatic Centre at Chandler	
Queensland Performing Arts Centre at South Bank (entertainment only)	

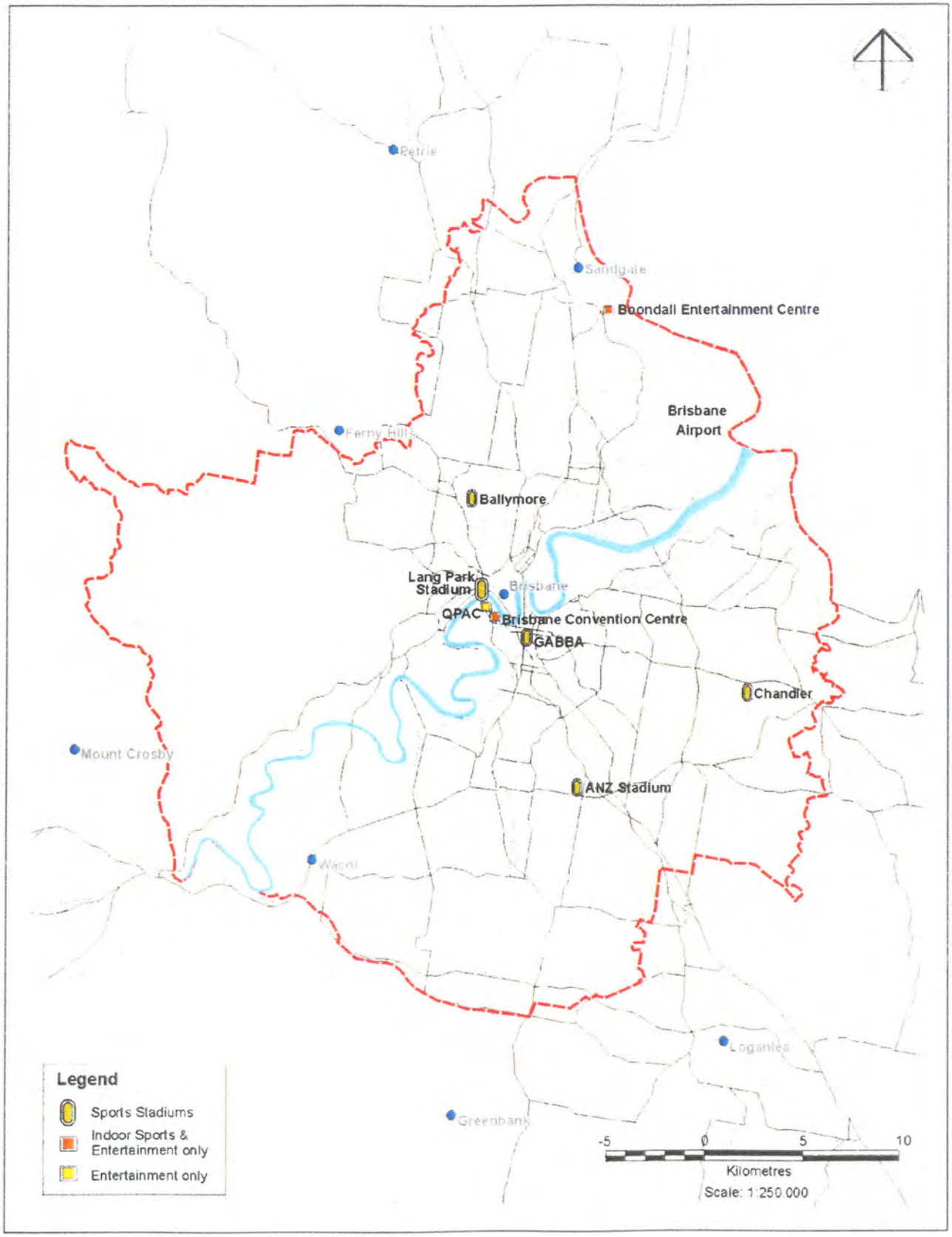


FIGURE 5.1.1
Regional Setting

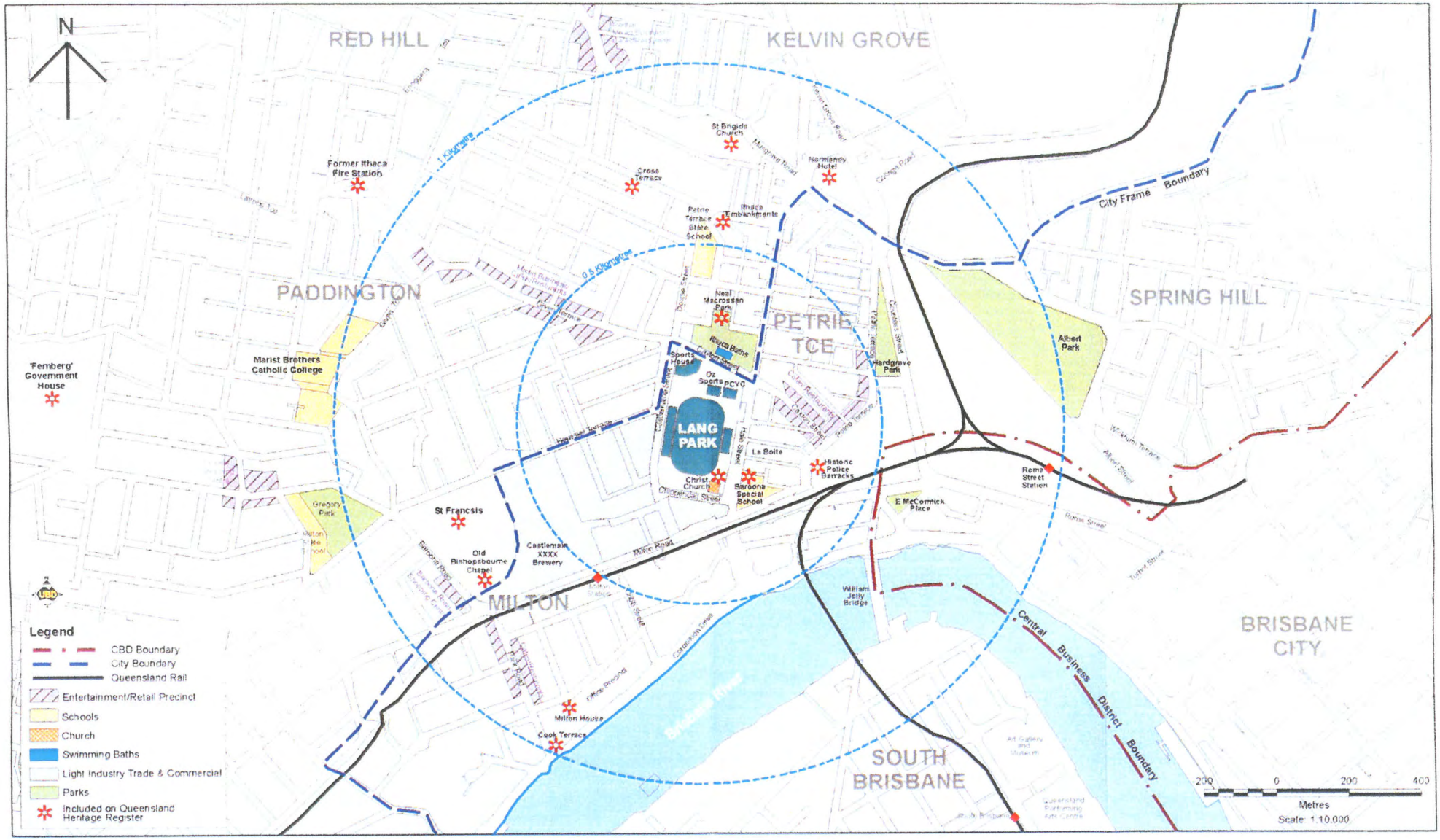


FIGURE 5.1.2
Existing Local Setting

5.1.2 Existing Stadium Uses & Facilities

The existing Lang Park Stadium has a current total spectator capacity of 42,000 patrons viewing events on a rectangular playing surface, or pitch. The facility consists of two grandstands on the eastern and western sides of the pitch, and terraces on the northern and southern sides. The eastern grandstand is known as the Ron McAuliffe Stand and was erected in the 1970s. The Ron McAuliffe Stand reaches a height of approximately 28 metres above ground level. Pedestrian access to this grandstand is from Hale Street. There is only limited service vehicle access from Hale Street.

The western grandstand is a relatively new structure, having been erected in 1994, to replace the Frank Burke Stand. The height of this grandstand is approximately 32 metres above ground level. Pedestrian access is via three points off Castlemaine Street. Service vehicle access is provided at the northern end again off Castlemaine Street.

The terraces at the northern and southern ends of the pitch are open, have no fixed seating, and are accessible from the entry points in Hale Street, Chippendall Street and Castlemaine Street. A notable feature of the northern terraces is that they do not extend to the full elevation of the enclosure. These terraces are capped by grassed banks with no seating. Toilet facilities for the terraces are provided in old structures adjacent to each.

A notable feature of the southern terrace is the statue of Wally Lewis, former Rugby League's Brisbane Broncos team captain and "football hero". The statue is a significant feature symbolising the strength of Brisbane within the National Rugby League, and the importance of Lang Park, "The Cauldron", as the home of rugby league in Queensland.

Liquor licenses apply to terraces on the northern side of the pitch, and in parts of both the Ron McAuliffe and Frank Burke Stands.

There is limited car parking within the stadium site at present. The existing car parking is not constructed and is not covered.

Lighting of the pitch is provided in free-standing towers and in banks along the top of the Ron McAuliffe Stand. For televised events, additional portable lighting is provided to supplement the fixed lighting. The stadium arena generally is open, or not enclosed, permitting the spill of lighting and noise to the surrounding environment.

Emergency services vehicles, such as ambulance vehicles, access the stadium via the Frank Burke Stand and the pitch via a vehicle accessway situated on the south-west corner. Police facilities are provided within the Frank Burke Stand with temporary arrangements in place in the Ron McAuliffe Stand for major events such as State of Origin or rugby internationals.

Present usage of Lang Park Stadium is limited to one or two State of Origin matches each year, possibly one rugby union test every other year, up to 10 National Soccer League matches each year and a small number of minor events, such as schools football carnivals. The State of Origin matches generally attract the largest crowds of up to 40,000 people. A rugby union test between Australia and a major rugby nation, such as New Zealand or South Africa, could attract a crowd in the order of 35,000. Such events are infrequent owing to the presence of high standard major stadia, with greater seating capacities, in Sydney and Melbourne.

5.1.3 Land Tenure

The existing Lang Park Stadium site and associated tenure is described as:

- Lot 354 on RP898660 – Freehold (Lang Park Trust)
- Part of Lot 355 on PR898660 - Freehold
- Lot 581 on RP227070 - Freehold
- Part of Lot 470 on SL4951 - Freehold

5.1.4 Surrounding Land Uses

Lang Park Stadium is situated in the inner suburban belt of Brisbane. This area is characterised by a transitional land use pattern from the high intensity of central business district activity to the closely settled residential areas of the older suburbs of Petrie Terrace Red Hill, Paddington and Milton.

The transitional land use pattern includes areas of residential, the enclosed commercial precincts of Caxton Street and Given Terrace, the commercial and industrial areas to the south of Heussler Terrace and to the west of Castlemaine Street, and the mixed uses and service trades immediately adjacent to the southern edge of the stadium. In addition, the stadium sits in close proximity to a large and still developing commercial office precinct to the south, along Coronation Drive.

The character of the commercial precincts differs in each case. The Caxton Street precinct is devoted mostly to dining and entertainment activities, with occasional commercial activities. There are a number of licensed premises in Caxton Street. This area is an important focus for patrons of the Lang Park Stadium, particularly before major events such as "State of Origin" rugby league matches. The entertainment venues in Caxton Street also attract patrons after matches. The physical form of Caxton Street is one of intimacy owing to the low rise, moderate intensity scale of development, supported by street plantings and furniture, and outdoor dining.

The Given Terrace commercial precinct also has a strong dining and entertainment character which is supplemented by a wider range of commercial activities such as retailing, offices and businesses. There is one major licensed premises in Given Terrace, with most restaurants operating under BYO licenses. The character of Given Terrace, in comparison with Caxton Street, is more typical of a local centre or "main street" owing to the built form, the intensity of development and the greater mix of activities.

The Castlemaine Street commercial precinct is comprised of light industry, commercial offices, service trades and a disparate range of mixed businesses. This precinct seems to have its roots in the more industrialised nature of the brewery and support activities that have established along Milton Road over many decades. Also, the Castlemaine Street precinct normally does not attract people outside business hours. The exception to this is the use of a local pool hall opposite the western stand of the stadium and the use of the area for coach set-down, pick-up and parking during major events.

There are a number of other land use spaces and activities that provide additional texture to the locality of Lang Park Stadium. These include:

- the Neal Macrossan Park, including the Ithaca Pool and Skate Park on the northern side of Caxton Street. This is a large area of publicly accessible open space, containing substantial trees and providing some green area relief to the surrounding built forms.

- the sports and recreation facilities on the southern side of Caxton Street and abutting the stadium (PCYC, Ozsports). These facilities are intensively used by the local population for a wide range of sport and recreation activities, including after school activities by local schoolchildren. Associated with the indoor activities of these centres are a number of outdoor volley ball courts which are in use both day and night. This area also provides for a substantial amount of on site parking for users.
- the Christ Church and grave yard immediately to the south-east of the stadium and fronting Chippendall Street.
- a number of heritage places and precincts, such as the Police Barracks area at the top of Caxton Street, the Baroona Special School complex on the corner of Milton Road and Hale Street, and also the Christ Church;
- the Brisbane River and associated office park precincts south of the railway line. The river is a major feature of the area which also provides pedestrian and cycle access from both the city and areas west of the stadium.
- the Castlemaine Brewery is a significant Brisbane landmark which dominates the skyline to the west of the stadium along Milton Road, and
- significant road and rail uses that also tend to dominate land use activities in the surrounding area.

Despite these uses the majority of the land surrounding Lang Park Stadium, particularly to the east, north and west is residential and associated community facilities, including local theatres.

The residential areas have particular characteristics which serve to define them into a number particular areas. The Petrie Terrace residential area is sharply defined by Petrie Terrace and Hale Street, both of which are major traffic arteries in the City. The Petrie Terrace area is characterised by old housing on small allotments fronting very narrow streets with the majority of homes dating from the Colonial period (1859-1901). There are also a number of early 1900s housing and inter-war houses. Apart from the commercial intrusions as part of the historic development along Petrie Terrace and Caxton Street, this area is relative intact as a residential area. It provides evidence of early housing styles in Brisbane and has been afforded the protection of detailed development control measures under the planning scheme to maintain this character.

The mix of Colonial and pre-World War II houses found to the west and north of Lang Park reflect development along arterial roads, transport routes and entrepreneurial subdivisions. The building boom of the 1880s and post World War I essentially created the urban character of the area with large areas of Petrie Terrace, Paddington, Red Hill and Milton remaining intact. The traditional Queensland timber and corrugated iron styles of domestic architecture predominate in the area.

The Paddington / Red Hill residential area extends northwards from Heussler Terrace to Musgrave Road and westwards from Hale Street (north of Caxton Road). Again the housing is mostly of old Queensland colonial styles, with quite recent and modern housing occurring near the Given Terrace commercial precinct. The very steep topography north of Given Terrace has had a modifying effect on housing, the street pattern and the arrangement of allotments.

The Hale Street residential area is a narrow corridor to the west of Hale Street and to the east of Dowse Street. It extends to Musgrave Road from Caxton Street. This area has been affected by the widening of Hale Street and the construction of roadways being part of the Inner Northern Ring Road. This area also includes several non-residential uses, such as the Neal Macrossan Park and the Petrie Terrace State School.

Lang Park has been used for sporting and recreational pursuits since shortly after 1911. Development of sporting facilities on the site has occurred since the 1950s, with intensification of those facilities occurring in the 1960s, 1970s and recently in 1994. In this context, Lang Park is an integral part of the fabric of the locality.

5.1.5 Surrounding Recreational & Educational Facilities

There is limited public open space surrounding Lang Park. Existing open space located within one kilometre of the site is shown in **Figure 5.1.2a** and comprises:

(i) Ithaca Swimming Pool and the surrounding Neal Macrossan Playground fronting Caxton Street. The Neal Macrossan Playground is a relatively large public park with significant recreation facilities including the Skate Park and various items of play equipment;
(ii) Gregory Park adjoining Milton Primary School, fronting Baroona Road;
(iii) McCormick Place at the intersection of Upper Roma Street, and the approach to the William Jolly Bridge;
(iv) Hardgrave Park bounded by Petrie Terrace, Countess Street and Secombe Street.

Of these, only the Neal Macrossan Playground and its surrounds, and Gregory Park provide any level of local amenity. Gregory Park is a large flat open parkland area on the corner of Baroona Road and Heussler Terrace. This park is relatively undeveloped apart from a well equipped playground area and a concrete cricket pitch. Due to its location and local topography, Gregory Park tends to service the areas of Rosalie and Auchenflower rather than Milton, Paddington or Petrie Terrace.

In terms of open space planning standards, most accessible 'local' parks would need to be within 500 metres walking distance of a residence. Current local open space provision, in the vicinity of the site, is highly limited.

There are extensive areas of parkland towards the City, principally Hardgrave Park, Albert Park, (and potentially the proposed Roma Street Parkland), however these areas are visually and physically isolated from the stadium area by topography and transport arteries. They appear to be a far greater distance from Lang Park than is apparent on the map (see **Figure 5.1.2**).

There are two State primary schools potentially affected by the proposed development. These are Milton Primary School and Petrie Terrace State School. Milton Primary is over a kilometre from the Stadium to the west, adjacent to Gregory Park. Petrie Terrace State School is north of Caxton Street, approximately 500 metres from the Stadium. These schools both run after school care programs and the Petrie Terrace School is also connected with activities at the Ithaca Swimming Pool and the PCYC.

The former Baroona Special School is directly opposite Lang Park Stadium on the corner of Milton Road and Hale Street. These premises are now used by Education Queensland for program support services.

5.1.6 Community Facilities & Services

There is a range of existing community services and facilities in the area surrounding Lang Park Stadium. These include government services, such as schools, libraries, recreation facilities, child

FIGURE 5.1.2a
Existing Open Space

care, and emergency services, and also non-government services supported by local associations, clubs and individual suppliers.

The area contains a number of child care services including Kindyworld, the Red Hill Kindergarten, Paddington Child Care Centre and the Paddington Kindergarten and Preschool. The Playground and Recreation Association of Queensland Inc provides after school care free of charge in the Neal Macrossan Park. The Lady Gowrie Family Day Care Scheme also operates in the area.

The Paddington and District Branch Meals on Wheels are based at the Police and Citizen's Youth Club and provide meals for people in the Petrie Terrace, Paddington, Rosalie and Red Hill area.

5.1.7 Local Business Activity

Lang Park is on the edge of the Central Business District of Brisbane and is surrounded by a mix of business and commercial services from the older and established trade and warehousing areas, to the newer cafes and restaurants of Given Terrace and Caxton Street.

The Castlemaine Perkins "XXXX" Brewery is a significant landmark and employment base to the west of Lang Park. For many years the brewery has identified with the "working class" and semi-industrial history of the surrounding trade areas between Heussler Terrace and Milton Road. This trading area contains a wide variety of commercial, trade and general business offices and warehousing facilities.

The area includes a number of major business and commercial training colleges, engineering and building trade and consulting establishments, electrical and computer works, automotive and repair and equipment, laboratory suppliers, trade and commercial offices, and many smaller business. The area would employ substantial numbers of people mainly during offices hours, although some commercial trades operate during weekends. There are few, if any food outlets, although a development application has been made to Brisbane City Council to establish a McDonalds restaurant adjacent to a fuel supplier off Milton Road, and accessible to the proposed stadium.

The trading area contains few building of any architectural note or character apart from the scale and prominence of the brewery. There is little integrated built form or character to the area which is dominated by a wide variety of building types, trading signs, and aerial cabling.

Mixed businesses, cafes and licensed premises areas occur along Given Terrace, Caxton Street and Petrie Terrace. Historically these roads provided the focus for trading along the major transport routes to and from the City. This ribbon trading has continued to develop, with associated impacts on access and transport as parking for trade consumes what are now major transport arteries to and from the suburbs.

Licensed premises, clubs, and restaurants predominate along Caxton Terrace near its junction with Petrie Terrace. This area has become a major City nightspot with weekend revellers often partying till well after midnight. This brings its own social impact upon the nearby residential areas of Petrie Terrace. Given Terrace also contains its share of licensed venues and cafes, but still retains a mix of small business and commercial retain outlets.

The area surrounding Lang Park to the east and north also contains a number of smaller and more isolated local business, art galleries, studios and theatre spaces which are an important part of the historical development and community character of the immediate neighbourhood.

5.1.8 Conservation, Cultural Heritage & Community Values

❑ Introduction

The areas surrounding Lang Park were some of the earliest parts of Brisbane to be settled by Europeans. The locality contains several places of cultural heritage significance such as the Petrie Terrace School and Christ Church, which are important when considering the pattern of suburban growth and people involved with Brisbane's early colonial development.

Originally the Lang Park area was a swampy, low-lying drainage area where creeks frequently overflowed. There is no record of the use of the Lang Park area as a camp or for traditional Aboriginal use and the area was not of significance according to recorded Aboriginal knowledge.

The Lang Park site has in the past been used for cemeteries as identified in **Figure 5.1.3**. The North Brisbane burial grounds or Paddington cemeteries as they were then known were surveyed in 1843. They were the principal burial place for the residents of Brisbane until 1875, when Toowong Cemetery opened. The illustration below is an 1861 survey plan of Petrie Terrace and the Lang Park site. The plan shows the distribution of separate burial grounds and other uses in the area such as the Petrie Terrace Gaol and Hale Street (running north south). At this time, Hale Street was the western boundary for urban development.

The site was not ideal for use as a cemetery. Topographically it was low-lying swampy land with creeks and ponds which often overflowed. However, it was beyond the town boundaries and natural drainage to the south emptied away from future inhabited areas, yet it was close enough to the town for corteges on foot.

Subdivision of Petrie Terrace, which was located on the edge of town, dates from 1861. Further subdivisions and the continued expansion with working to middle-class occupancy within the suburbs of Petrie Terrace, Red Hill and Paddington combined with community health concerns placed increasing pressure on Government officials to close the cemeteries. They were officially closed on 1 August 1875. The maintenance of the different denominational areas was the responsibility of the different religious trustees, some of whom had constructed mortuary chapels on their respective plots.

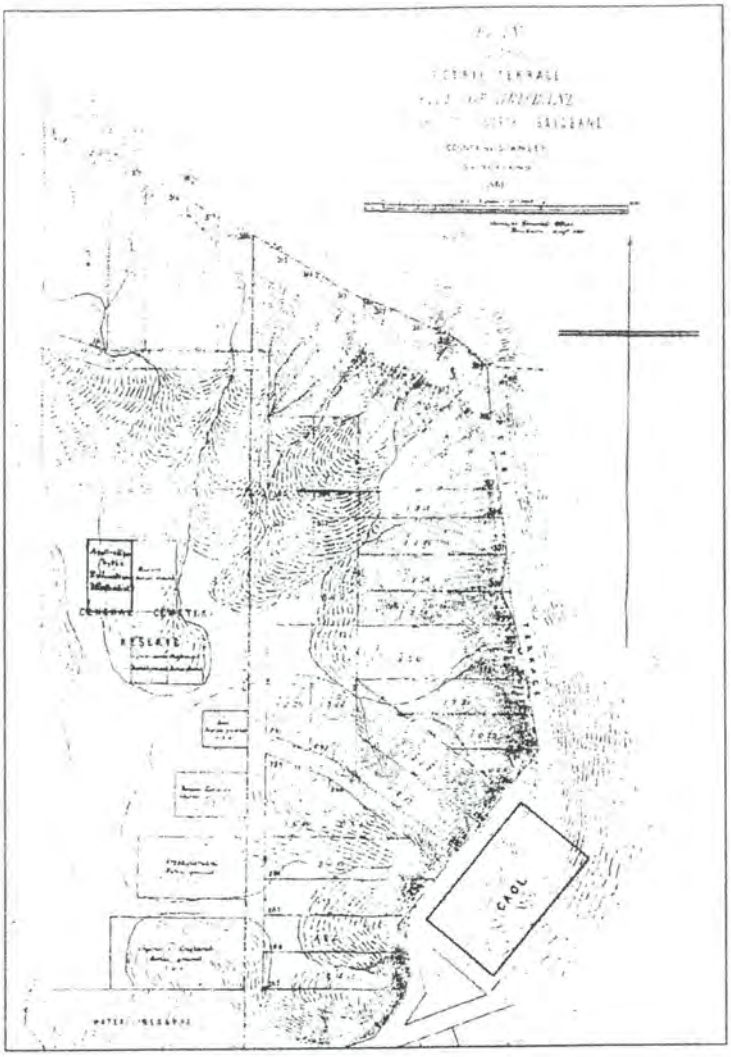


Figure 5.1.3 Plan Of The North Brisbane Burial Grounds Or Paddington Cemetery 1861 (Fisher, 1944 P.39 (Qsa)

In 1876, the Anglican community constructed a stone and shingle Gothic style church, designed by Richard George Suter architect of the Petrie State school (opposite), to replace the mortuary chapel. This building was severely damaged in an 1890 storm and was replaced in 1891 by the current Christ Church designed by diocesan architect John Hingeston Buckeridge. This building and the adjoining graveyard are the only visible evidence that the area was once used for burial purposes.

The 1880s were a period of rapid growth for Brisbane. Similarly, the expansion and upgrading of the city's road and transport networks were also undertaken to provide appropriate transport infrastructure.

Judge Street bisected the cemetery between the Presbyterian and Roman Catholic reserves to cross the open Milton drain and become Heussler Terrace. Caxton Street was built up over the Jewish burial ground. Due to the low-lying nature of the site, rubble derived from the Roma Street to Central Station railway excavations was used to help form Caxton Street.

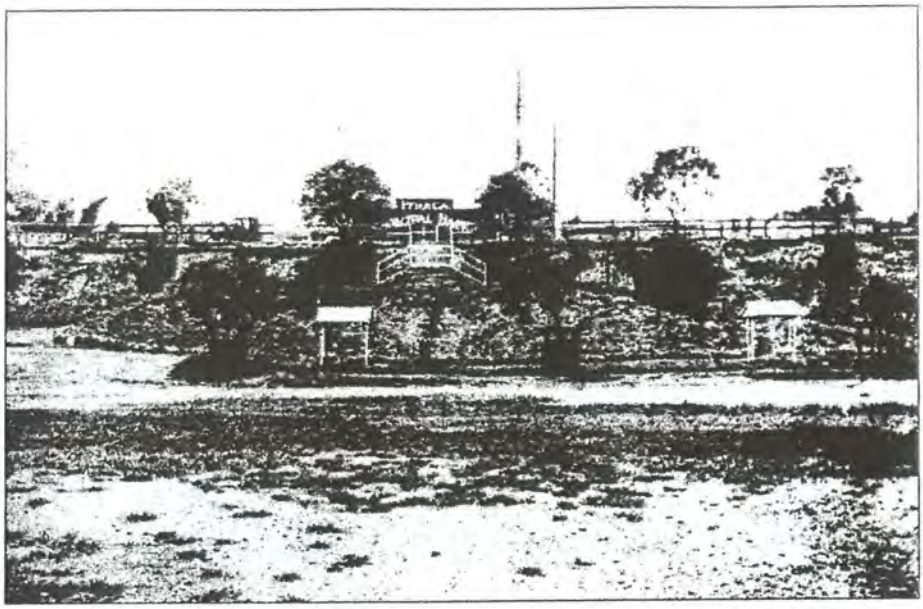


Figure 5.1.4 - View Looking North From Lang Park To Caxton Street, 1919. (Fisher, 1995 (JoI))

By the end of the nineteenth century, the suburbs of Petrie Terrace, Paddington, Red Hill and Milton were heavily populated with working class residents. The average size of allotments in these suburbs was 12 perches (300m²) or less and the provision of accessible areas of open space was non existent. In 1891 the Ithaca Council, as the local government authority, successfully lobbied the government for about 3 acres (1.4 ha) of the Cemetery Flats. This recreation reserve was soon fenced and used for football and cricket.

Increasing public pressure and support from the Ithaca Council convinced the State Government to reuse the seven closed and dilapidated cemeteries for public recreation purposes. In 1911, the Paddington Cemeteries Act was passed which enabled the redevelopment of the site for recreational purposes. The Presbyterian Church objected to the proposal stating that the use of the site for recreational purposes would be disrespectful to the existing use of the site as a burial ground. The Anglican Church also protested and were granted an area of land, located in the south eastern corner of the old Episcopalian burial ground enabling a definitive buffer area between Christ Church and the park.

Wide spread advertisements for the removal of graves and memorials resulted in the relocation of 99 remains and 148 memorials to Toowong and other cemeteries and the transferring of 505 unclaimed headstones to the memorial reserve beside Christ Church by mid-1914. Most were subsequently removed to Toowong Cemetery.

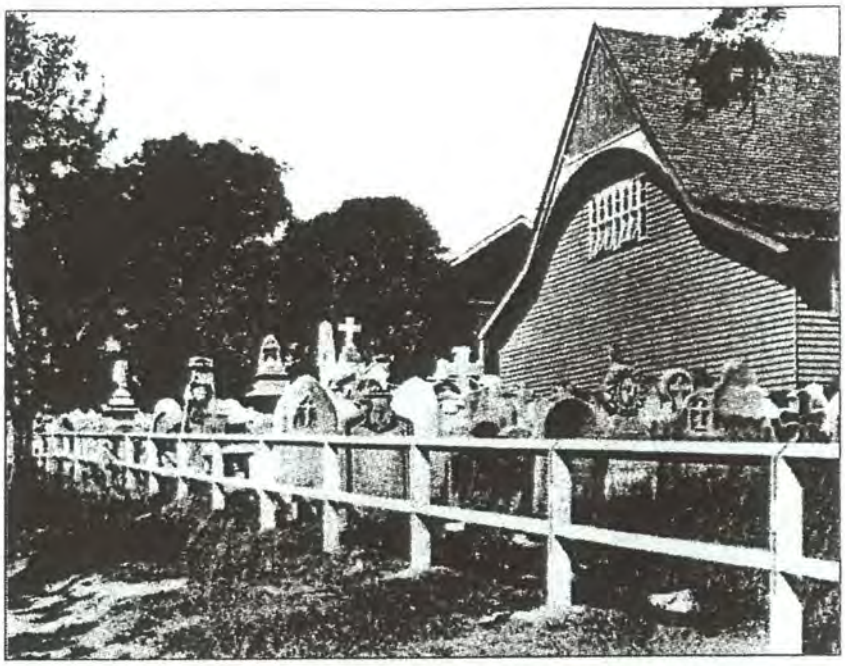


Figure 5.1.5 View Of Christ Church, Hall (Behind) And Relocated Headstones (1914). (Fisher, 1994 (Qpp 1914, P.407))

The neglected, disused cemeteries and reserve south of Caxton Street with its graves and trees were fenced, a shelter shed erected and declared a public recreation reserve with an area of 15 acres 1 rood 34 perches (6.2 ha). It was named Lang Park in memory of Dr John Dunmore Lang, an immigration organiser, politician and Presbyterian minister who had a profound effect on early Brisbane.

With drainage, filling and the closure of Judge Street to vehicular traffic this area was to evolve into a sporting area with tennis courts, and an oval for amateur athletics and football. This recreational usage caused much conflict between the local council and government bodies. It was not until 1954 that the situation was resolved when Cabinet approved, in principle, a lease of the site to the Queensland Rugby League and the Queensland Amateur Athletics Association (QAAA) as sub-lessors.

The lease of Lang Park by the Queensland Rugby League was proclaimed on 6 June 1959. In 1962, after the League had spent about £170,000 on improvements and with the grounds no longer open to the public, the Lang Park Trust Act was enacted. This allowed the formation of the Lang Park Trust, which currently administers the activities of Lang Park in accordance with the Lang Park Trust Act.

Construction of the Inner North Western Ring Road in the late 1980s, entailed resumption of land along the western side of Hale Street resulting in loss of open ground for parking outside the stadium and included demolition of the Christ Church hall.

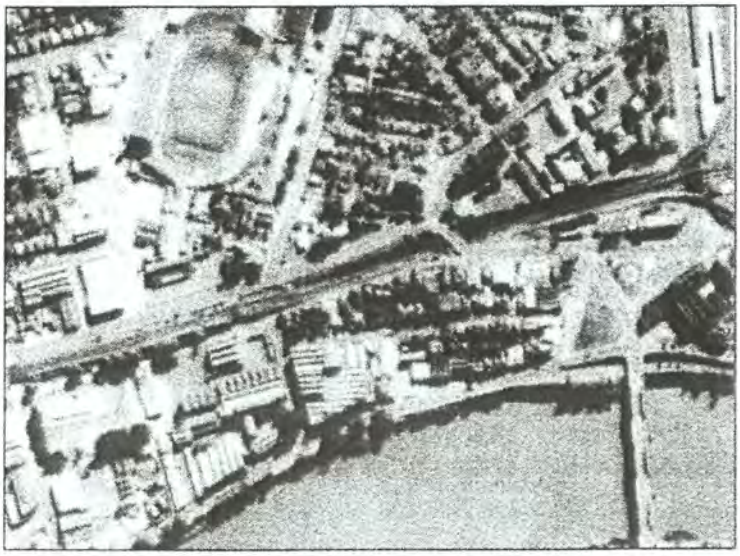
Lang Park is an icon in Brisbane because of its well-known connections to sport and in particular Rugby League. As the venue for numerous major rugby league contests, Lang Park is known in club, interstate and international sporting circles. It has long been the domain of rugby league supporters, many of whom have come from working-class or blue collar backgrounds, with

employment and social links to that other famous Milton landmark, the Castlemaine Perkins Brewery. Lang Park has additional connections with the blue collar work force as the venue for numerous trade union meetings.

Lang Park is an integral component of Brisbane sporting and social fabric, in much the same way "the Gabba" or Brisbane Cricket Ground is.

Aerial Photo 1:

The early sport and recreational oval during the 1940's and 1950's.



Aerial Photo 2:

The 1960's and 1970's. The early Lang Park rectangular field including western Frank Burke Stand.

Aerial Photo 3:

The 1980's with eastern Ron McAuliffe Stand.

Figure 5.1.6 Aerial photographic history capturing some of the physical changes of the ground and surrounding area.

❑ **Cultural Heritage & Character**

The Queensland Heritage Act 1992 defines "cultural heritage significance" of a place as 'it's aesthetic, architectural, historical, scientific or social significance, or other special value, to the present community and future generations'.

The following buildings, items or places listed on the Queensland Heritage Register are potentially affected by the proposal, or are located within a close proximity to the proposed works:

- **Milton**

  Christ Church (1876, 1891), Hale Street

  In accordance with the Queensland Heritage Register criteria, Christ Church is significant:

  (a) for its association with the development of Petrie Terrace and Milton;
  (b) as a creative example of ecclesiastical architecture in 19th century Queensland;
  (c) as a remnant of the cemetery; and
  (d) for the intactness of the adjoining rectory, a high quality 19th century house.

- **Paddington**

  Neal Macrossan Playground (1918), Caroline Street, Paddington

  In accordance with the Queensland Heritage Register criteria, the Neal Macrossan playground is significant:

  (a) as one of the first playgrounds planned by the Playground Association;
  (b) for demonstrating early 20th century philosophies of child care; and

(c) as a public open space area which contributes to the streetscape and Paddington townscape.

- **Petrie Terrace**

Baroona Special School (1868 and 1874), 1 Hale St, Petrie Terrace

In accordance with the Queensland Heritage Register criteria, Baroona Special School is significant:

(a) for its association with the development of education in Queensland from the 1860s;
(b) as it demonstrates the pattern of development of one of Brisbane's earliest suburbs;
(c) for its important associations with the development of Special Education in Queensland from the late 1960's;
(d) as an example of changes in the building form and function in education; and
(e) for the vegetation on the site which contributes towards the Petrie Terrace streetscape.

Baroona Labour Hall - Caxton St Hall (1884), 15 Caxton St, Petrie Terrace

In accordance with the Queensland Heritage Register criteria, Baroona Labour Hall is significant:

(a) in that it demonstrates the important role and services 'friendly societies' played in Brisbane during the late 18th century and early 19th century;
(b) because the design and workmanship have aesthetic significance and contribute to the streetscape; and
(c) due to its associations with members of the community, Australian Labor Party and prominent Brisbane architect Richard Gailey.

Victoria Barracks, Petrie Terrace, Petrie Terrace

In accordance with the Queensland Heritage Register criteria, the Victoria Barracks is significant:

(a) as an historic precinct which contains buildings dating from the early 1860s;
(b) because it reflects the "Russian scare" of the 1880s which resulted in the formation of the Queensland Defence Force, with this site named Victoria Barracks and occupied by 1885;
(c) as a military precinct containing many buildings, some of which date from the 1860s;
(d) as numerous buildings reflect the military history of a colony, and since Federation, the history of the Australian Army;
(e) for the considerable architectural significance of many of the buildings, especially the original officers quarters, superintendents home, Lunatic Reception House and Mounted Police stables; and
(f) for contribution to the Petrie Terrace streetscape.

Former Petrie Terrace Police Depot (1939), Petrie Tce, Petrie Terrace

In accordance with the Queensland Heritage Register criteria, the former Petrie Terrace Police Depot is significant:

(a) for its long association with law and order enforcement in Brisbane since the 1860s;

(b) as Brisbane's second gaol providing an understanding of the history of colonial punishment;
(c) as a rare example of residential accommodation for unmarried officers in early 20th century Brisbane;
(d) as a prominent landmark of Brisbane City; and
(e) for its architectural merit.

❑ Local Features of Community Value

The following organisations and places highlight local or regional features with community values in the locality surrounding Lang Park.

Queensland Police Citizens Youth Welfare Association (QPCYWA)

The Police Citizens Youth Club (PCYC) is located to the north-east of the Lang Park Stadium, on the south-west corner of Hale and Caxton Streets. It has been associated with the Lang Park area since the late 1940s when the QPCYWA opened its first Police Citizens Youth Club in a wartime RAAF store. The shed was replaced in 1984 with the existing facility which provides activities for the youth of the area and complements the Lang Park site as a centre for active use.

Neal Macrossan Playground

This playground was established in 1918 on part of what had been the Paddington Cemeteries. It was one of the first three playgrounds established by the Playground Association, and represents one of Queenslands first child care facilities which were deliberately located in areas of high density, low cost housing. The playground site contains several stands of significant vegetation which contribute to the local townscape.

Though the facilities have changed over time, this playground demonstrates the characteristics of the Playground Association of Queensland. The playground has aesthetic significance as an open public space and is important for its association with Justice Neal Macrossan who was a long time president of the Association. Moreover, as a public open space with a supervised children's playground, it has community value.

La Boite Theatre

Brisbane Repertory Theatre, one of Brisbane's earliest theatre groups, was founded in 1927 and established on the corner of Hale and Sexton Streets in 1967. Due to limited space, this site consists of the theatre and several adjacent houses. La Boite theatre complex has been an important part of community life in the Paddington area for many years.

Castlemaine Brewery

Located along Milton Road the Brewery has been a major employer and a prominent visual landmark in the area for many years. There is a community and cultural connection between the brewery and Lang Park Stadium deriving from their proximity to each other, the long-term commercial association with the stadium and that both are widely recognised icons of Milton, and of Brisbane.

Christ Church Environs

At the end of Chippendall Street, standing high above Hale Street, is a small precinct consisting of the 1890s timber and tiled gothic church, rectory built in 1876 and small graveyard for 20 Anglican pioneers of Brisbane. Both buildings have architectural interest and demonstrate the importance of religion to residents since the mid-1800s. The church with its slender spire and the small graveyard are visual reminders of the past and the use of the area for religious and burial purposes. Moreover, this place is listed in the Queensland Heritage Register in recognition of its cultural heritage significance to Brisbane.

Baroona Special School (former Petrie Terrace School)

Due to the rapid growth in the area Queensland's twentieth government school opened on the corner of Hale Street and Milton Road in 1868. Because of continued urban growth and educational needs, a second larger building was erected in 1875. Prominent architect Richard George Suter designed both in the gothic style. Until the opening of the Caxton Street Hall in 1884, the school was the venue for community meetings. This school was involved in the development of special education for the area from 1962. The site now accommodates the South East Queensland Facilities Service Centre and still functions as an educational facility serving the needs of the community.

This site has been used for educational purposes for over 130 years, and is associated with the development of primary school and special education in Queensland. The two earliest buildings, designed by well known architect RG Suter, reflect the residential growth of the area and are fine examples of Suter's work. Being in a prominent location, the buildings and surrounds contribute to the area's townscape.

- **Impact of Lang Park on Heritage Places**

The impact of the Lang Park Stadium on surrounding heritage places is minimal apart from the impact on the Christ Church. The rectory and church are excellent examples of earlier forms of architecture, and when combined with the third element of the precinct, the cemetery, they demonstrate the old custom of church, residence and place to intern parishioners.

The proximity and visual presence of the Ron McAuliffe Stand is certainly evident from Christ Church which adjoins the site on its south-eastern boundary. The height of this grandstand as well as the dilapidated state of existing structures to the south-east of the stadium have an impact on the visual context of the Church and environs.

Other existing impacts include the neighbouring fence treatments between Christ Church and Lang Park. Whilst security and privacy issues are mitigated with the use of concrete block walls, the effect these fences have on Christ Church is to greatly reduce the visual presentation of the site.

While the creation of the Hale Street ring road significantly reduced its streetscape value it is still highly visible from both Hale Street and Milton Road. Though this is the second church on the site it remains a historic reminder of the early use of this area.

Graves and monuments from the former cemeteries have been moved, destroyed or buried by fill since the cemeteries were closed and the area converted to public reserve in 1914. Any remnants from use as a cemetery have long since been destroyed. The last of the cemeteries' heritage, the

monuments and graves which were relocated to the reserve land in 1914, was resumed for the Hale Street ring road in 1989.

5.1.9 Visual & Landscape Context

Lang Park Stadium is situated in a natural bowl formed by the low but steeply sloping ridges of Red Hill, Petrie Terrace and Paddington. The eastern and northern rim of this bowl is formed by the ridgeline which corresponds with the alignment of Petrie Terrace and Musgrave Road. The western rim is formed by a ridgeline coming down from Red Hill to the Castlemaine Brewery, intersecting Heussler Terrace on the way.

Lang Park Stadium has commonly been referred to as the home ground of rugby league in Queensland *(Focus on Milton, City News 1992)*. As a result, Lang Park has become one of Brisbane's landmarks and contributes not only to the overall identity of the City of Brisbane, but also that of Queensland.

Figure 5.1.7 – Ron McAuliffe Stand

The two dominant visual features of Lang Park are:

- the eastern grandstand, namely the Ron McAuliffe Stand, adjoining Hale Street and;
- the western grandstand, on Castlemaine Street.

These features can be seen from a number of vantage points within the surrounding suburbs.

Overall, the site represents a stand-alone sporting facility within a highly developed urban environment. The existing Lang Park Stadium currently provides a landmark not only for its historical significance but also for its visual prominence, as an obvious physical element and an identifiable 'marker' in the urban landscape.

Situated on the floor of a valley surrounded by undulating hills, Lang Park Stadium provides a focal point for much of the surrounding development contained within the suburbs of Milton, Paddington, Red Hill and Petrie Terrace.

The western grandstand provides a substantial hard edge to the Castlemaine Street frontage. This building has a height of approximately 32 metres and an overall length of approximately 140 metres.

Figure 5.1.8 – Western Stand From Petrie Terrace

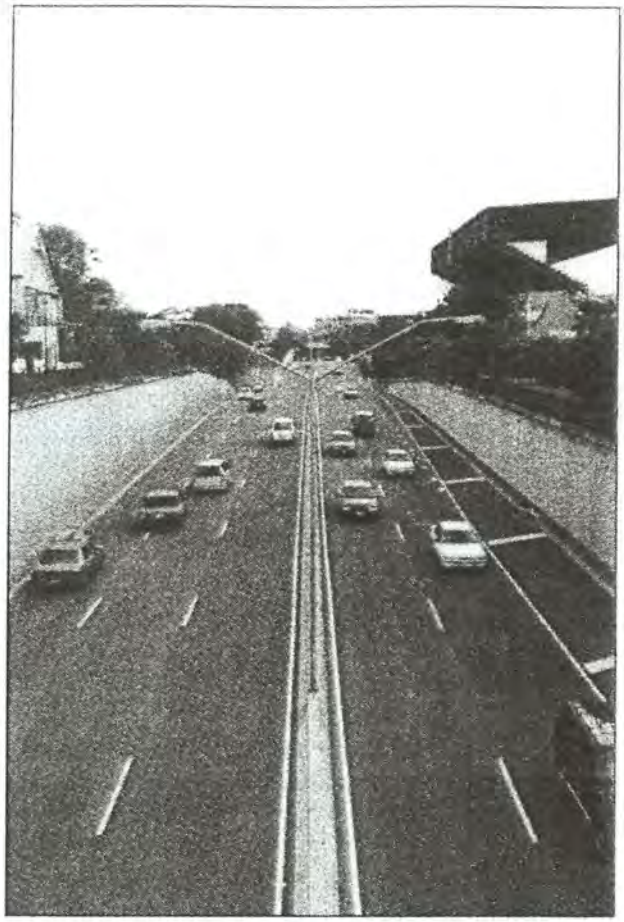


Figure 5.1.9 – Hale Street And Ron McAuliffe Stand

The Ron McAuliffe Stand is virtually an extension of the Hale Street retaining walls and has a separation distance of approximately 70 metres from the residential development on the eastern side of this arterial road. This structure dominates the skyline when viewed from the eastern side of Hale Street and represents a visual barrier for residents located within the Petrie Terrace/Hale Street precinct.

Due to the older age, style and height of this structure and its close proximity to the Hale Street road alignment, the rear of this building creates a monolithic and dominant interface between the low-rise residential development to the east and the non-residential land uses to the west.

The northern terraces of Lang Park Stadium visually interact with the recreational activities occurring on the land abutting Caxton Street, such as the PCYC, Ozsports and Sports House. Similarly, the southern terraces of the Lang Park Stadium have minimal visual impact upon the light industrial and commercial activities that exist on Chippendall Street.

The visual presence of Lang Park Stadium is certainly evident from Christ Church that adjoins the site on its south-eastern boundary to the extent that the cultural heritage values of the church are compromised.

Figure 5.1.10 – Christ Church, Ron McAuliffe Stand & Hale Street

❑ **Local Visibility**

The visibility of the existing Lang Park Stadium is primarily determined by the landform of immediate and outlying areas together with the most highly visible element; the western and eastern stands. Two levels of visibility and prominence have been identified and are shown in **Figure 5.1.11**. These are:

(i) sphere of broad visual influence
(ii) immediate visual catchment

▪ **Sphere of Broader Visual Influence**

The sphere of broad visual influence covers areas generally well over one kilometre away from Lang Park from which glimpses of parts or the entire stadium may be experienced. While elevated ridges in Paddington, such as along Enoggera Terrace and at the Ithaca Fire Station, may experience glimpses of the stadium, the majority of these views are experienced from the south and south-east extending across the Brisbane River to South Brisbane, Highgate Hill and West End. Views over this distance are typically composed of the stadium being part of a broader scenic or panoramic view rather than a dominating element. The prominence of Lang Park Stadium can be accentuated when fully lit and active of an evening. In this respect the stadium forms a 'landmark' element, including such views as from craft on the Brisbane River.

▪ **Immediate Visual Catchment**

The immediate visual catchment is far more defined than that previously described and is formed by the topography that encircles the stadium. It is within this area that the greatest potential exists for direct views of and into the existing Lang Park Stadium. The immediate visual catchment is generally bound by Milton Road to the south, Petrie Terrace to the east, Musgrave Road to the North and an arc extending from Cochrane Street to Baroona Road to the west.

FIGURE 5.1.11
Levels of Visibility and Prominence

Many areas immediately adjoining the existing Lang Park Stadium currently experience extended views to other city and regional features. These include:

(i) views and glimpses of the City (CBD) experienced predominantly from the residential areas west of the Stadium in Paddington and Milton.
(ii) long-distance southerly and westerly views of the Scenic Rim, the mountain ranges that encircles South East Queensland from the Border Ranges through Mt Barney to Toowoomba and the Liverpool Range. These are experienced from the elevated hillside slopes of Red Hill and Petrie Terrace.
(iii) mid-distance southerly and westerly views across the Brisbane inner city urban landscape. These are also experienced from the elevated hillside slopes of Red Hill and Petrie Terrace. These views, in particular, are also experienced between the eastern and western grandstands at lower elevations.
(iv) immediate views towards the Castlemaine Brewery and Mt Coot-tha from both Petrie Terrace and Red Hill.

❑ Prominent Viewing Points & Vistas

Analysis of the immediate visual catchment indicates that the only significant viewing point is the St Brigids Church located on a hilltop on Musgrave Road, Red Hill. From the base of this church, direct and unimpeded views of Lang Park Stadium can be experienced. No other public local viewing points of significance are known.

Outside the immediate visual catchment the following vistas currently exist:

(i) Musgrave Road – southerly glimpses of Land Park Stadium can be obtained through open areas such as the crossing over Hale Street, otherwise opportunities are very limited and most views are focussed along the road corridor;
(ii) Caxton Street – a westerly vista towards the stadium from the entertainment/retail areas, though somewhat visually severed by Hale Street;
(iii) Given Terrace - an easterly vista towards the stadium from the commercial strip;
(iv) Hale Street – western views of the stadium from a dedicated thoroughfare;
(v) Milton Road – northerly glimpses of the stadium, mostly obstructed by existing buildings;
(vi) Railway Line – locally elevated, northern, views of the stadium from the railway line parallel to Milton Road; and
(vii) Heussler Terrace – direct north-easterly views of the western stand's facade can be experienced on the descent of Heussler Terrace.

❑ Identification of Visual Precincts

Within the immediate visual catchment five residential precincts have been identified. Each of these has varying characteristics in terms of the nature of their view towards the existing stadium, degree of visibility and existing character. These precincts are also shown in **Figure 5.1.12** and comprise:

(a) Petrie Terrace South;
(b) Petrie Terrace North;
(c) Red Hill Elevated Slopes;
(d) Red Hill Lower Slopes; and
(e) Paddington and Milton Lower Slopes.

FIGURE 5.1.12
Identification of Visual Precincts

Table 5.1.1 summarises the viewing characteristics currently experienced from these precincts.

In considering **Table 5.1.1**, it should be noted that the existing Ron McAuliffe Stand is approximately 28 metres in height and the western stand is approximately 32 metres in height. The majority of residential dwellings would only contain living areas at a maximum of three storeys (approximately 6 metres floor height).

Table 5.1.1 Viewing Characteristics Currently Experienced

Precinct	Land Use & Character	Approximate Distance from Existing Stadium	Relative Height Relationship to Existing Lang Park Playing Surface	Description of Existing View(s)
Petrie Terrace South	Residential – Steep to Undulating, Dense Historical Inner-City Suburb	40-250 metres	Up to 30 metres above playing surface	Predominantly east-west views and glimpses along streets towards back of McAulliffe Stand
Petrie Terrace North	Residential – Steep, Dense, Historical Inner-City Suburb	200-700 metres	10 to 40 metres above playing surface	Direct views and glimpses, in elevated locations, into the stadium. No views from lower areas.
Red Hill Elevated Slopes	Residential – Steep, Historical Inner City Suburb	500-900 metres	20 to 60 metres above playing surface	Direct views and glimpses, from elevated locations, into the stadium.
Red Hill Lower Slopes	Residential – Undulating Historical Inner City Suburb	150- 500 metres	Up to 20 metres above playing surface	Limited glimpses mostly screened by existing buildings, other structures and vegetation.
Paddington and Milton Lower Slopes	Residential – Undulating Historical Inner City Suburb	50-700 metres	Up to 30 metres above playing surface	Direct views and glimpses, mostly of the back of the western stand.

❑ Landscape & Scenic Amenity

▪ Major Avenues & Streetscapes

Immediately adjoining the Lang Park Stadium are several streetscapes that essentially define its urban character. These are listed below. In general the urban design condition and fabric of these streetscapes is quite poor and suffers from an uneasy interface between the existing stadium and the adjoining land uses and urban fabric.

The major avenues and streetscapes are:

(i) Caxton Street – The section adjoining the Lang Park Stadium is fairly discordant and represents a 'gap' between the two entertainment precincts of Caxton Street and Given Terrace, Paddington. The northern side, between Hale and Castlemaine Streets, is a distinctly 'green' parkland zone;

(ii) Hale Street – As an inner city sub-arterial road, Hale Street comprises a streetscape that is sped through rather than experienced at a number of locations;

(iii) Castlemaine Street – This street mostly contains residential dwellings on the north western side and stadium related uses on the eastern. Its level of presentation and urban design integrity is generally low; and

(iv) Chippendall Street – This smaller street contains industrial land uses and one house on the southern side, and the stadium and the Christ Church and rectory to the north.

There are also other streetscapes, not immediately adjoining Lang Park, that contribute to the character of the broader setting. These also need to be considered in relationship to the Lang Park redevelopment. These are:

(i) Milton Road – The upper section of Milton Road, close to its intersection with Petrie Tce, features strong roadside plantings of a distinctive character that creates a memorable place for motorists to pass.

(ii) Roma Street and Upper Roma Street – The western end of Roma Street and its continuation into Upper Roma Street forms the western 'edge' of the CBD. This area currently provides a disjointed 'transitional' role between the inner city and the CBD characterised by a low level of pedestrian and general urban amenity.

❑ Visual Impact of Existing Stadium

The Ron McAuliffe Stand is constructed of steal beams, sheet metal cladding on the upper level and reinforced concrete and concrete blocks on the lower level. A vertically hung awning is situated on the internal edge of the stand's roof.

No attempt has been made to disguise the supporting structure or incorporate any design features that would visually enhance this exposed structure. The structure has not been painted, with the dull red/rust colour providing a true indication of its age and poor relationship to the streetscape, particularly the older style housing on the eastern side of Hale Street.

The Frank Burke Stand was originally opened in 1959 and later reconstructed in 1994. This grandstand consists of a mix of reinforced concrete, rendered masonry block, glazing and a sheet metal roof. The Castlemaine Street facade of this structure has been painted an off white and dark green colour and complements the existing commercial and light industrial activities along this frontage. A sign illustrating the Suncorp Metway logo is situated on the awning.

As this grandstand has been renovated within the last decade, it provides an improved edge to the adjoining road and land uses in comparison with the Ron McAuliffe Stand. However, the facade has little articulation. Further, pedestrian entrances to the development are not clearly defined and the streetscape relationship along Castlemaine Street is contrasting rather than integrated.

The overall appearance of Lang Park Stadium at the southern end is generally of poor visual quality due to the scattered array of structures, materials and finishes that have not been maintained to a high standard. Similarly, the stadium frontage in this location is not clearly defined and generally detracts from the overall streetscape, which is also poor.

There is little significant vegetation on the Lang Park site that softens the impact of the existing structures. A significant fig tree on the northern end of the Frank Burke Stand provides some visual enhancement at this end of the site.

❑ **Visual Description & Existing Impact of Adjoining Areas**

Areas adjoining the Lang Park Stadium also need to be considered in terms of existing visual impact. Two areas of particular significance are:

(i) the precinct of sports and community related land uses located immediately north of the stadium; and
(ii) the industrial land uses immediately south of the stadium between Chippendall Street and Milton Road.

The northern sporting and community uses precinct has developed in a mostly ad-hoc manner with a series of large warehouse-type structures and extensive surface car parking areas. Little effort has been made to achieve an integrated and attractive appearance to this area. The buildings do not generally address the Caxton Street frontage or each other. Apart from Sports House, this precinct detracts from visual amenity in urban design terms.

The southern industrial land use area features a series of smaller and older light-industrial premises generally of a low visual quality and urban amenity, together with the more recently constructed Konica Premises which features a more contemporary building style and a higher level of finish.

To the south-west of the site is the large Castlemaine Brewery. Due to the age and scale of this development, it provides a dominant industrialised edge to Milton. Surrounding the brewery are a number of light industries which provide a negative impact upon the visual amenity of the area.

5.1.10 Existing Image

As identified in Section 3, the 1987 Strategic Plan for Brisbane contains a specific objective or "desired outcome" for Brisbane as a "Well Designed and Culturally Dynamic City". The terms of reference for this EIS have included the need to identify built and natural elements within the project site and the surrounding area that positively contribute this image.

In relation to what is meant by a well designed and culturally dynamic city, the Strategic Plan defines the concept broadly as:

> *development maintaining and enhancing the unique character and culture of Brisbane, including traditional buildings and the landscape features of the City while catering for the diversity of residents and their cultural associations.*

A number of means to achieve this outcome are further identified, being:

- identifying, maintaining and enhancing the scenic and visual amenity of the City;
- requiring development to maintain and enhance the character, amenity and sense of place of urban areas, neighbourhoods and localities appropriate to the environmental and cultural contexts of those areas;
- enriching and fostering the cultural values and priorities between and within diverse local communities, and identifying, maintaining and enhancing distinct cultural places within the City;
- achieving safe, secure and comfortable urban areas and facilities;

- ensuring that people are able to choose their residential location with realistic expectations of the future amenity of the area; and
- providing opportunities for local communities and other relevant stakeholders to have input to forward planning and development processes which would result in significant change to the character, amenity, sense of place or accessibility in the local area, to help manage the impacts of that change.

The image is composed of:

- scenic and visual amenity;
- character, amenity and sense of place;
- cultural values and places;
- safe, secure and comfortable areas and facilities;
- future residential amenity; and
- community opportunities to help manage change.

The built and natural elements within the project site and surrounding area that could be said to contribute to this image could therefore include:

- the integrated character of hillside housing in timber and tin;
- the visual connectivity through sections of the current Lang Park Stadium;
- the "sense of place" provided by Lang Park as an identifiable landmark;
- the retention of local historic landmarks such as the Christ Church, Police Barracks Precinct and the protection of local character housing;
- the nightlife and atmosphere of Caxton Street, including sidewalk dining; and
- the accessible and well used public recreation zones, including outdoor volley ball associated with the PCYC and Ozsports.

There are also a range of built and natural elements within the project site and the surrounding area that may be seen as failing to support this strategic objective for Brisbane to achieve a well designed and culturally dynamic image. These could include:

- the visual obtrusiveness of the current Lang Park site and its lack of visual integration;
- the existing problems of surrounding residents with noise and public drunkenness associated with the Caxton Street and Given Terrace nightlife; and
- the poorly designed visual context and local amenity associated with surrounding transport corridors.

The potential impact of the proposed Lang Park Stadium Proposal on these strategic images for Brisbane are considered in the impact assessment section of this EIS.

5.2 Existing Traffic, Transportation & Pedestrian Environment

5.2.1 Current Situation for Major Events

❑ **Context**

Lang Park stadium currently serves a range of predominantly football events. Despite the capacity of 42 000 persons, capacity or near capacity patronage normally only occurs at a one or two events per year such as a Rugby Union or Rugby League international or a State of Origin match.

Event types held for the 1999 calendar year are described in Section 5.1.2. The day and time of particular events can vary. Typical timings for current events are described below:

- The majority of soccer matches occur on Saturday evenings with a 7:00 p.m. kick-off.
- State of Origin Rugby League matches occur midweek, usually on a Wednesday, with an 8:00 p.m. kick-off.
- Rugby Union and Rugby League international matches are typically held on Saturday evening with an 8:00 p.m. kick-off.

For capacity or near capacity events at the existing stadium, special traffic arrangements are made in the locality and additional public transport services are supplied. These are described further in the following sections.

Apart from additional transport services supplied for major events, there is no dedicated transport infrastructure to service Lang Park. Such infrastructure might include pedestrian walkways and integrated transport stations linking with the metropolitan networks.

❑ **Current Travel Characteristics**

Pedestrian surveys were undertaken by the Lang Park Trust (Ove Arup & Partners 1999) at two major events at the Stadium as follows:

- State of Origin Match: Wednesday evening 26th May 1999 (38 000 crowd); and
- Tri-Nations Rugby Match: Saturday evening 17th July 1999 (31 000 crowd).

A brief description of the survey methodology is detailed below:

- Pedestrian surveys were undertaken for these matches during a 3 hour period prior to the match and 1½-2 hour period following the match.
- Pedestrian flow volumes at 21 survey locations for the State of Origin Match, and 12 survey locations for the Tri-Nations Rugby Match, around the stadium were recorded at 15 minute intervals for most of the survey period. Recordings at 5 minute intervals were undertaken for one hour immediately before and after the game.
- Passenger numbers on coaches were also recorded prior to the State of Origin match. Interview surveys collecting data on the origin and transport mode of arrival spectators prior to the start of the event were undertaken.
- Arrival/departure information in the immediate area surrounding the stadium was ascertained, with the mode split to rail estimated from pedestrian volumes recorded at Roma Street station and Milton station.
- Digital video cameras were used to record the movements of pedestrians from the ground following the matches at 4 locations.

These surveys provide data on the mode of travel for patrons, pedestrian movements pre and post-event and documented observations on pedestrian and traffic operations. Survey data files were kindly supplied by Ove Arup & Partners for use in tabulations in this assessment.

Table 5.2.1 summarises the survey findings with respect to travel mode for the 1999 events, while **Table 5.2.2** provides a mode split estimate for major events in 1993. **Table 5.2.3** provides a breakdown of that catchment of patrons attending major events at Lang Park in 1999. Catchment sectors used in the tabulation are shown on **Figure 5.2.1**.

Table 5.2.1 1999 Major Events Travel Mode Summary

Primary Mode	1999 State of Origin Weeknight Match	1999 Tri-nations weekend evening Match
Car	52%	63%
Bus & Coach	16%	18%
Rail (Milton & Roma Street)	26%	11%
Taxi	2%	2%
Walk/Other	4%	6%
Total	100%	100%

Source : Derived from Ove Arup & Partners survey records .

Table 5.2.2 1993 Major Events Travel Mode Estimate

Mode	Proportion
Car	39%
Bus	4%
Coach	22%
Rail (Milton)	14%
Taxi	3%
Walk (including Roma Street Rail)	14%
Other	4%
Total	100%

Source : Roger Brameld Consulting Pty Ltd Traffic Report (August 1993) *Traffic Report for Proposed Redevelopment of Lang Park* prepared for Lang Park Trust.

Table 5.2.3 Patron Origin/Destination Data Summary

Sector (refer to Figure 5.2.1)	1999 State of Origin Weeknight Match	1999 Tri-nations weekend evening Match
North	15%	13%
North – West	8%	10%
West	11%	7%
South East	17%	18%
East	8%	9%
South	3%	5%
CBD	3%	9%
Regional South East Queensland	15%	15%
Other Intrastate	11%	5%
Interstate	9%	9%
	100%	100%

Source : Derived from Ove Arup & Partners survey records .

Key travel characteristics derived from these findings are:

- Currently private car is the dominant mode of travel to major events at the Stadium. Typically patrons park in the surrounding local areas, predominantly on-street with some use of private off-street and backyard parking areas.
- The proportion of private vehicle travel to the weeknight 1999 State of Origin match at 52% of patrons (representing 19 800 patrons) was lower than to the weekend Tri-Nations Match with 63% car travel (representing 19 500 patrons). However it is noted that the absolute number of parked cars in both cases calculated using this data and an average car-occupancy of 2.7 persons per vehicle (typical for recreational trips) would be similar at between 7 000 and 7 500 vehicles.
- A higher mode split to rail was evident for the mid-week major event. Mode splits for both bus/coach and walking is similar for both matches.
- A significant proportion of trips for both events were associated with areas outside the greater Brisbane region, these representing 35% and 29% of trips for the State of Origin match and Tri-Nations matches respectively. For both events travel from regional areas in South East Queensland such as the Gold Coast, Sunshine Coast and Toowoomba and western areas accounted for 15% of patrons. Interstate patrons comprised 9% of those surveyed.
- Comparison of recent 1999 mode share characteristics for major events with the earlier 1993 estimated mode share indicates that there has been an increased trend for private vehicle usage and rail and bus/coach has diminished over time.

Discussion on pedestrian movements surveyed at the existing stadium is provided later in the text.

❑ Road Network Operations

Details of current road closures enforced for a typical evening major event (eg State of Origin) at Lang Park stadium are shown on **Figure 5.2.2** and summarised below:

- Local streets immediately to the west of the stadium between Heussler Terrace and Milton Road and Castlemaine Street (Milton Road to Heussler Terrace) are closed to general traffic (local residents and businesses excepted) between 4:00 p.m. and 11:00 p.m. These areas are used for coach set-down and parking.
- Taxis operate from Castlemaine Street north of Heussler Terrace, with Blaxland Street used for taxi and limousine parking.
- The left turn from Milton Road into Hale Street is closed between 8:00 p.m. and 11:00 p.m.
- Hale Street (northbound) between Coronation Drive and Musgrave Road, and Boomerang Street, are closed between 8:45 p.m. and 11:00 p.m. to general traffic. This is primarily to allow safe pedestrian operation around BCC buses departing from Hale Street adjacent to the stadium. Safety issues with pedestrians crossing Hale Street, despite there being no design provisions to allow for this, has also lead to a need for this closure.

A number of intersections are controlled by Police on "point duty" to handle crowd and traffic movements after major events, and the locations of these are shown on **Figure 5.2.2**. Details of the manually controlled locations are:

- Heussler Terrace/Baroona Road – priority is given to traffic flow from restricted area and Heussler Terrace;
- Caxton Street/Castlemaine Street – priority is given to clearing Castlemaine Street;

- Hale Street/Caxton Street – priority is given to clearing Caxton Street access onto Hale Street and Petrie Terrace. Traffic control is performed for the large number of spectators traversing Caxton Street;
- Petrie Terrace/Milton Road – controlled until pedestrian traffic abates;
- Petrie Terrace/Caxton Street – controlled until pedestrian traffic abates;
- Countess Street/Roma Street – controlled if required to ensure free flow of traffic on Countess Street;
- Milton Road/Castlemaine Street – controlled until traffic abates; and
- Coronation Drive/Cribb Street – priority given to clearing traffic exiting from Cribb Street onto Coronation Drive.

The Queensland Police Service generally assists with the control of traffic operations at Lang Park for crowds in excess of 20 000. There is a stakeholder meeting prior to major Lang Park Events with all parties involved (Lang Park Trust, Police, bus operators, taxi operators, etc.). The operations used in previous years are reviewed and Police suggest required staffing levels for upcoming events.

Some Police for the event are engaged directly by the Lang Park Trust as special duty Police over and above normal Police levels. A total contingent of approximately 100 special duty Police officers are involved in current major Lang Park events. Typically 17 special duty Police officers are involved in traffic, pedestrian and crowd control activities outside the stadium post-event. For key intersections listed, either one or two officers per intersection are used to control operations. Permits are issued for road closures by the Queensland Police Service and the Brisbane City Council.

A number of existing key intersections currently experience congestion post-event, mainly attributable to high levels of pedestrian activity. Police officials have indicated that at police controlled intersections priority is always given to pedestrians for safety reasons, especially in a pedestrian overflow situation, and this subsequently affects vehicular traffic post-event including patrons exiting from parking areas. Local street congestion pre-match also occurs due to the high level of available on-street parking supply in the local area and, in particular, the effects of circulating traffic searching for parking as close to the stadium as possible.

❑ Heavy Rail Operations

For major events such as the State of Origin or Test matches, Queensland Rail experience is that there is no need to provide special or extra pre-match rail services because:

- Lang Park patron arrival demand for rail services is spread over several hours;
- many spectators are quite content to walk from the city to the venue; and
- there is spare capacity in scheduled services to satisfy demand.

After a major event, a different scenario prevails as the departure demand is more concentrated over a shorter period of time. Special trains operate from Milton Station and Roma Street for departures. Milton services serve the regular Caboolture and Ipswich lines. All rail lines are served from Roma Street. Train services are normally well patronised for major events.

For the State of Origin game held on 23rd June 1999 the Queensland Rail Citytrain group operated the following timetable services and special services.

- **Milton: A total of 12 trains**

  Specials (7) – Ferny Grove (1), Caboolture (1), Caboolture/Nambour (1), Shorncliffe (3), Ipswich (1). Timetable services (5) – Caboolture/Nambour (1), Caboolture (1) Ipswich (1), Ipswich/Rosewood (2).

- **Roma Street: A total of 11 trains**

  Specials (2) – Beenleigh/Gold Coast (1), Cleveland (1). Time table services (9) – as above for Milton plus Cleveland (1), Beenleigh (1), Beenleigh/Gold Coast (1). One Gold Coast and one Beenleigh service from Roma Street had connecting services from Milton.

  Queensland Rail estimate that typically about 5 000, and up to 7 000, Lang Park patrons depart from Milton Station and 3 000 to 5 000 patrons use Roma Street station post-event for major matches. Arrivals at Milton Station for a major event are of the order of 4 000 to 5 000 patrons.

  Once Queensland Rail is aware of major events being held at Lang Park, consideration is given to the likely patronage and the possible impact on normal services. Special trains are arranged accordingly. From time to time other minor events are held but rail patronage has not been significant enough to warrant special arrangements.

  Key issues with regard to existing rail patrons for existing capacity events at Lang Park are:

- **Pedestrian access to Milton station**

  Passengers exit the stadium from various points and walk to Milton Road and up to the station. Milton Road footpaths become very congested and for peak periods road traffic comes to a standstill as pedestrians spill onto the roadway and cross at various points.

- **Congestion on pedestrian overbridge and stairs**

  Both the overhead bridge and the stairs are very narrow, which restricts the numbers and flow of passengers. The steps to the platforms are narrow and steep which also slows people movements.

- **Ticketing issues**

  Difficulty is experienced in ensuring that all passengers have tickets prior to joining trains as this tends to slow the flow of passengers to the platforms and trains, and for some periods, ticket selling may cease in order to free up movements of trains.

- **Trains**

  Queensland Rail normally arranges for special trains to arrive at platforms as soon as the platforms become vacant. This allows passengers to board early and free up platform capacity.

❑ **Bus Services**

Brisbane Transport operate regular route services in the surrounding area and special bus services for events at Lang Park. Prior to major events at Lang Park in 1999, regular Cityxpress services from the city were supplemented to provide a five minute frequency from Queen Street. These

services set-down at Milton Road bus stops. Typically after the match, 10 free shuttle buses operate from kerbside areas in Hale Street to the Queen Street Bus Station in the CBD. At these times Hale Street between Milton Road and Musgrave Road is typically closed to northbound traffic from 8:45 p.m. to 11:00 p.m.

At the 1999 State of Origin match, there were three direct bus routes used (pre and post event):- from/to Chermside, Carindale and Garden City Shopping Centres, each of which is a major bus service hub and in corridors not well-served by rail. There were 3 buses from/to Chermside and Carindale and six buses from/to Garden City. These services all used Hale Street post-event. For arrivals, set-down occurs in Caxton Street for Chermside services and Milton road for the services from Carindale and Garden City.

The 1999 fare structure for direct bus routes to/from Chermside, Carindale and Garden City shopping centres was Adults $5.00 return and Concession $3.00 return. The current arrangement between the Lang Park Trust and Brisbane Transport is for the Lang Park Trust to be charged the difference between fare revenue raised from the direct services, and the operational cost of both direct services and the free shuttle service.

For the State of Origin Match on Wednesday 26th May 1999 approximately 2 200 passengers were carried to and from the Stadium on special direct services and the free shuttle service. This passenger volume increased to 2 900 for the State of Origin Match on Wednesday 23rd June 1999.

For some major Rugby events, Brisbane Transport operate special shuttle services post-event from Lang Park to Ballymore. These depart from the northern kerb along Heussler Terrace.

❑ Coach Operations

A coach strategy is implemented for current events for crowds in excess of 22 000. This strategy involves the closure of Castlemaine Street to general traffic to facilitate coach access and use of adjacent non-residential streets for coach parking (refer **Figure 5.2.1**). Loading and unloading of passengers occurs where the coaches are parked. This is convenient for patrons as they know where to return to board their coach post-event.

Specific operational details of the coach parking scheme are as follows:

- Local businesses fronting the roads where coach parking will occur are advised by letter drop two weeks prior to an event.
- Traffic is restricted in Castlemaine Street after 2:00 p.m. prior to an evening event.
- Castlemaine Street is barricaded off between Heussler and Milton Road at 5:00 p.m.
- Mini-buses park in Chippendall Street.
- Coaches commence parking in Parkview Street and then fill Mayneview Street, Cordova Street, Finchley Street and Black Street. Parking occurs both sides of the road in a one-way west and north-west direction.
- Coaches are instructed not to block any driveways and to keep a clear pathway for emergencies.
- Post-match all coaches and mini-buses depart into Heussler Terrace by turning left and proceeding to Park Road.

Coaches are a popular mode of transport to major events. Typically about 80 coaches and 50 mini buses would be required to service a capacity crowd of 42,000. For a deciding State of Origin match in the past, demand for 150 coaches and 50 mini-buses has occurred. Examination of

parking supply in the coach and mini-bus designated parking area indicates that the mini-bus area has an maximum capacity of 50 vehicles and the adjacent coach areas a maximum capacity of approximately 150 coaches. This indicates that for a capacity event available coach parking areas are fully utilised. Parking permits for coaches are issued by Queensland Transport prior to the event, and three representatives from Queensland Transport attend peak events to monitor and direct coaches to designated parking areas.

For small events with crowds less than 10 000 people, coach parking is confined to Castlemaine Street between Heussler Terrace and Chippendall Street. Special signage is deployed in these streets declaring both sides of each street to be a bus zone. For medium events (say 17 000 crowd) this signage extends into Chippendall Street where a larger number of coaches can be catered for.

The current coach parking arrangements are considered to operate satisfactorily from the venue, coach operator and Queensland Transport viewpoints. Local residents have expressed some concerns over coach parking in the street system with respect to noise and air pollution, caused mainly by coach engines idling for extended time periods prior to departure post-event. Some aspects of unacceptable behaviour have arisen from patrons accessing these coaches.

Local businesses generally find the coach parking arrangements acceptable. However they have indicated that the signage used when barricades are set up in Castlemaine Street should advise that traffic, (particularly delivery vehicles), with legitimate business in the local area, is permitted to access the coach parking region.

❑ Parking

Currently there is provision for 182 vehicles on-site with 67 spaces for VIPs, and the remaining 115 spaces comprising a mixture of corporate, media and team bus parking. For major events additional spaces are available on adjacent business premises via commercial agreements between the business owners and the Lang Park Trust. These additional spaces are located in the Sports House car park to the north (70 spaces) and the Konica car park to the south (45 spaces). These additional spaces are reserved primarily for corporate visitors. Disabled parking for 20 vehicles is provided in Cordova Street.

During major events, on-street parking is not permitted in Castlemaine Street and streets which are set aside for coach, taxi and limousine parking as defined in **Figure 5.2.2**. There are no general restrictions on patrons parking on-street elsewhere within the local area except where normal signed parking restrictions are in place. As discussed in Section 5.2.2, a high proportion of patrons currently drive to events at Lang Park and seek to park in non-restricted areas as close as possible.

There are also a number of off-street car parks within the local area primarily used for business and commercial use. The extent to which these car parks are used by Lang Park patrons is highly variable and is dependent on:

- utilisation by customers and employees at event times; and
- restrictions placed on these car parks for non-customers.

There is some evidence of local residents in close proximity to Lang Park allowing and/or charging for backyard parking.

❑ Pedestrians

Pedestrian access/egress for the existing stadium is achieved via the following gate arrangements:

- Ticketing gates are located on three sides of the stadium:
  - Gates 1 and 2 located on Castlemaine Street;
  - Gate 3 is located on Chippendall Street; and
  - Gates 4 and 5 located on the pedestrian concourse adjacent to Hale Street and the PCYC building.
- For major events additional temporary ticket turnstiles are installed at the southern gate on Chippendall Street and the northern gate on Hale Street to improve entry pedestrian flow. These turnstiles are removed prior to match end.

Overall arrival and departure pedestrian volumes from the two major events at Lang Park surveyed in 1999 are presented on **Figures 5.2.3-5.2.6**. The survey data reveals the following demand characteristics:

- **Arrival distribution:**
  - Many patrons approached the stadium from the east, approximately 41% for the State of Origin match and 31% for the Tri-Nations event;
  - Approaches from local streets to the west of the stadium accounted for 11% (State of Origin) to 17% (Tri-Nations) of patrons;
  - From Milton Road west of the stadium the crowd proportion was similar for both events (16-18%); and
  - From Given Terrace north-west of the stadium the proportion ranged between 11% (State of Origin) to 13% (Tri Nations).
- **Departure distribution:**
  - Departures to the east from the stadium are significant - 44% (State of Origin) and 38% (Tri Nations) with 10- 11% of patrons destined beyond Roma Street towards the CBD;
  - Local residential streets west of Lang Park attracted 11% of crowd movements post State of Origin and 14% after the Tri Nations match;
  - 14% to 15% of patrons are destined along Given Terrace; and
  - The crowd proportion dispersing to Milton Road west of the stadium post-event was similar in both cases at about 13-14%.

For both matches, Milton Road both east and west of the existing stadium, Given Terrace, Caxton Street, Petrie Terrace and Upper Roma/Roma Street are the most heavily used links by pedestrians. A high proportion of pedestrians associated with movements to and from the areas west of Lang Park stadium reflects the current high proportion of private vehicle mode share and use of the local street system for parking.

The temporal profiles of arrival and departure demand are shown in **Figures 5.2.7-5.2.10**. These graphs demonstrate:

- **State of Origin Match (Weeknight evening, 38 000 crowd).**

  Arrival:

  - A peak arrival flow was recorded from 7:00 p.m. to 7:15 p.m. at a rate equal to approximately 4 500 spectators per 15 minutes.
  - Approximately 50% of the spectators had arrived at least 75 minutes before the start of the game.
  - A further 35% of spectators arrived at least 30 minutes before the start of the game with the remaining 15% arriving in the last 30 minutes.

  Departure:

  - A peak departure flow was recorded from 10:00 p.m. to 10:05 p.m. at a rate equal to approximately 19 950 spectators per 15 minutes.
  - Approximately 50% of the spectators departed within 15 minutes following the end of the game.
  - A further 35% of the spectators had departed 30 minutes post-event.

- **Tri-Nations Match (Saturday evening, 31 000 crowd)**

  Arrival:

  - A peak arrival flow was recorded from 7:15 p.m. to 7:30 p.m. at a rate equal to approximately 4 600 spectators per 15 minutes.
  - Approximately 50% of the spectators had arrived 45 minutes before the start of the game.
  - A further 35% of spectators arrive at least 25 minutes before the start of the game with the remaining 15% arriving in the last 20 minutes.

  Departure:

  - A peak departure flow was recorded from 10:00 p.m. to 10:05 p.m. at a rate equal to approximately 14 750 spectators per 15 minutes.
  - Approximately 50% of the spectators departed within 15 to 20 minutes.
  - A further 35% of the spectators had departed within 30 minutes following the end of the game.

These comparisons demonstrate that for the smaller crowd, weekend event the arrival period is typically more concentrated with patrons arriving much closer to kick-off time. Comparison of departure proportions indicates similar patterns in the intensity of exit for both types of events.

Based on the arrival and departure time profiles for both events, **Table 5.2.4** below summarises the proportion of the crowd leaving the stadium for the peak 5, 10, 15 and 20 minute periods post-event.

Table 5.2.4 Proportion of Crowd Exiting in Peak Periods

State of Origin		Tri-Nations	
Peak Period (minutes)	Proportion of Crowd exiting stadium in peak period	Peak Period (minutes)	Proportion of Crowd exiting stadium in peak period
5	20%	5	21%
10	37%	10	42%
15	52%	15	57%
20	65%	20	67%

A summary of reported observations of pedestrian activity and behaviour for these matches (from Ove Arup & Partners 1999) is detailed below:

Arrival:

- For both evenings all pedestrian routes around the stadium experienced high pedestrian flow prior to the game, but no major queuing was observed with the exception of ticketing gates for the eastern stand.
- For both evenings increased pedestrian flow around the stadium was observed due to pedestrians being unsure of gate locations. Significant pedestrian activity on Caxton Street relating to Café/Restaurant/Hotels was observed from 4:30 p.m. onwards.
- A high level of pedestrian circulation on Caxton Street was observed prior to both matches. While the majority of flow was contained in the footpath, some pedestrians were observed to walk along gutters and over landscaped areas around driveways and street furniture.

Departure:

- For both evenings pedestrian flow was noticeably more congested during the departure period when compared with the arrival period. There was also a higher level of spectator overspill observed onto the road network and landscaped areas, particularly along Caxton Street. This resulted in a high level of vehicle conflict in this area.
- For the State of Origin Match there was a high level of congestion observed east of the stadium along Hale Street. This was caused by:
  - Pedestrian queuing for BCC buses reducing the capacity of the walkway along Hale Street.
  - Spectators gathering and waiting around exit points.
  - Northbound pedestrians from the southern gate of the eastern stand in conflict with southbound pedestrians from the northern gate of the eastern stand.
  - The flow capacity of the exits from the stadium exceeding the capacity of the footpath immediately to the north and south.
- Pedestrian congestion in the Hale Street area for the Tri-Nations match was not as noticeable. Although some conflict did occur between BCC buses and spectators, this was for a short period. There was also interference between spectators waiting to board buses and spectators wishing to continue through on the footpath causing congestion and delay for a short duration.
- For both evenings medium to high level of pedestrian conflict on the Caxton Street footpath was observed where pedestrian flows along Hale Street and the PCYC property merge. This conflict resulted in an overspill of pedestrians onto the road network in the proximity of the Hale Street overpass providing a high level of pedestrian/vehicle conflict for a short period.
- The pedestrian bridge over Hale Street at the end of Chippendall Street was heavily congested for approximately 20 minutes after the games. This was caused by limited bridge width and constraints of the signalised pedestrian crossing of the Hale Street off-ramp. Very slow

movement of pedestrians across the bridge resulted in queuing back along the two main access routes to the bridge.

- For both evenings footpaths on Milton Road between Hale Street and Petrie Terrace and Upper Roma Street between Petrie Terrace and the Transit Centre were insufficient to carry pedestrian load with pedestrian traffic spilling onto the road blocking use of a traffic lane. The intersection of Milton Road/Upper Roma Street and Petrie Terrace was police controlled. The large pedestrian volume along Roma Street restricted vehicles from exiting the Transit centre carpark onto Roma Street despite this vehicular exit being controlled by traffic signals.
- For the State of Origin match low pedestrian volumes were observed across the William Jolly Bridge both prior to and following the match.
- For the Tri-Nations match spectators were observed moving down Roma Street as late as 12:00 a.m.

❑ Cyclists

There are no cycle racks, lockers or end-of-trip facilities (showers) currently provided at Lang Park Stadium. Several cycle racks exist at adjoining Sports House facility located some distance to the north of the stadium, however no lockers or end-of-trip facilities are provided.

❑ Taxi & Limousines

A taxi rank for major events is located along the eastern kerb of Castlemaine Street north of Heussler Terrace. Approximately 25 taxis can queue at this location. Supplementary taxi/limousine storage occurs in Blaxland Street for about 50 vehicles.

Taxis approach the rank from the north along Castlemaine Street. Departure from the rank occurs via Heussler Terrace westwards or via U-Turn at the Castlemaine Street/Heussler Terrace roundabout and northbound of Castlemaine Street to Caxton Street or Given Terrace.

The Queensland Taxi Council has advised on several current operational aspects as follows:

Pre-event:

- Taxi signs are erected for designated taxi areas prior to an event.
- Taxis drop off passengers on the southern side of Heussler Terrace west of the Roundabout at Castlemaine Street.

Post-event:

- The first wave of taxis works well but drivers have difficulty in returning to the taxi rank for a second pick-up due to traffic congestion in the local road system post-event.
- The position of the rank and its good proximity to the Stadium is satisfactory from a taxi operator viewpoint.
- Passenger loading operations at the rank are assisted by Taxi Council personnel. Hired security guards also monitor the rank and perform crowd control if required.
- A second north facing rank on Castlemaine Street kerb has been trialed in the past but was not accepted by patrons as they were reluctant to cross the road to use it.
- Passenger queuing for taxis occurs for some considerable time post-event.

❑ Set-down & Pick-up

Set-down and pick-up of private vehicles and limousines currently occurs on the southern side of Heussler Terrace west of the Roundabout at Castlemaine Street. No set-down is allowed on Castlemaine Street within the restricted area south of Heussler Terrace, with the exception of extraordinary VIP's such as a State Premier in a vehicle under police escort.

❑ Service Vehicles

Service vehicles associated with a major Lang Park event can vary depending on timing and nature of the event. Service vehicle operations for a typical event are detailed below:

Regular Service Vehicle Operations:

- There are very few deliveries during non-event periods.
- A refuse vehicle performs a regular collection once per week (Monday).
- Other minor deliveries may occur during week on a non-regular basis, such as delivery of fertiliser to ground staff.

Major Event Service Vehicle Operations:

- For a major event deliveries typically start two days prior to the event.
- Catering deliveries commence two days before the event for catering equipment and non-perishable food items, whilst fresh food such as meat, bread, vegetables are delivered on the event day.
- Media staff (for TV coverage) arrive 5 hours prior to an event, however the majority of cabling is laid up to two days prior to the event with some additional cabling laid on match day. Outside Broadcast vehicles typically arrive the day before the event to set-up.
- Additional refuse collection is carried out for a major event.

An indicative summary of service vehicle activity associated with the World Rugby Sevens tournament held on the Friday 18th February and Saturday 19th February 2000 is provided in **Table 5.2.5**. This schedule indicates 31 deliveries pre-event over a three day period. Lang Park management advise that this represents a high activity scenario due to an extended time frame over which the event was held and a large number of teams and competitors involved.

Table 5.2.5 Indicative Delivery Schedule For Major Event

Delivery Type	Number of Deliveries by Item		
	Wednesday	Thursday	Friday (match day)
Catering Equipment	4		5
Catering Supplies	1	10	1
TV Broadcast Van	1		
Signage/Flags		1	1
Portable Toilets		1	
Power Generator and Lighting Towers		2	
Additional office equipment		1	
Video Screen		1	
Merchandise	1		1
Total	7	16	8

Source: Lang Park Trust data for World Rugby Sevens Tournament held in February 2000.

5.2.2 Existing and Proposed Relevant Transport Projects

Several transport projects are planned for Brisbane which will have an effect on the baseline traffic and transport environment for the Lang Park Stadium proposal. The location of each relevant project is shown on **Figure 5.2.11**, and details of these projects in the context of Lang Park are discussed in the following sub-section.

❑ **Inner City Bypass (ICB)**

The Inner City Bypass is a planned dual carriageway grade-separated road, approximately 4.5 km in length with no provision for cross median movement (other than emergency vehicles). It will connect Hale Street with Kingsford Smith Drive, and provide links to Bowen Bridge Road, Abbotsford Road and Kelvin Grove Road. The ICB will provide the Central Business District road system with some relief from through traffic. As part of the ICB project there will be a significant upgrade of the Normanby Five-ways intersection (Petrie Terrace/Countess Street/Kelvin Grove Road), which will involve grade separation of the intersection for inbound traffic on Kelvin Grove Road.

The project is managed by Brisbane City Council and is expected to be completed by December 2002. Work on the project has already commenced.

Of all the relevant major transport projects, the ICB will have the greatest effect on the baseline traffic environment around Lang Park, due mainly to changes in travel patterns on major roads in the immediate vicinity of the stadium associated with increased use for access to/from Hale Street. Based on comparison of PM peak period SATURN traffic models supplied by Brisbane City Council for both the existing road network and the future road network incorporating the ICB, indicative changes to traffic volumes are:

- PM peak traffic volumes on Milton Road may increase between 20-25%;
- traffic volumes in Hale Street adjacent to Lang Park stadium may increase by approximately 20% in the PM peak period;
- traffic volumes in Caxton Street east of Hale Street may increase by approximately 20-25%; and
- traffic volumes in Upper Roma Street and Petrie Terrace in the PM peak may increase by 15%.

❑ **Inner Northern Busway (INB)**

The INB is a dedicated transport corridor for buses and emergency service vehicles, which will link the Queen Street underground bus station and the Royal Brisbane Hospital. Eight busway stations have been proposed for the INB, with the nearest stops to Lang Park at Countess Street and Roma Street. The INB will connect to the South East Busway via the Queen Street bus station and Normanby Fiveways.

The project is to be funded by Queensland Transport and is expected to be completed by December 2002. It is planned to be delivered in 8 sections and different sections in various stages of planning and design.

The INB will affect bus operations in the area when implemented and will offer opportunities for use by proposed bus services for Lang Park Stadium. The project will have a number of distinct benefits for buses travelling to/from the city including improvement of the existing transport network (as buses using the INB will no longer be affected by traffic congestion) and improved travel times

and reliability for passengers. A detailed description of future bus operations related to the INB is provided in Section 5.2.3.

❑ **South-East Transit Lanes**

The South-East Busway and Transit Lane Project comprises a major upgrade of the South East Freeway with a focus on bus and transit lanes. The busway will run from the Brisbane CBD, via Southbank and Mater Hill and then to Eight Mile Plains via a two-lane roadway exclusively for buses, and emergency vehicles when necessary. The project also provides transit lanes between Griffith University and Loganholme with priority lane systems to service bus stations at Underwood and Springwood.

Funding for the project is provided by Queensland Transport and the project has been under construction for some time. Section 1 (Victoria Bridge, South Brisbane to Water Street, South Brisbane) and Section 2 (Water Street, South Brisbane to Fern Street, Woolloongabba) of the project is expected to be completed by August 2000. The entire project is expected to be completed by mid 2001.

The project will increase the speed, reliability and accessibility of bus services. Express routes and frequent all-day services stopping at all bus stations will improve travel times particularly in peak traffic periods. Local buses will also use the busway to improve service performance. The project will have minor direct effect on bus operations adjacent to the Lang Park redevelopment, with the exception of changes to bus operations in the South Brisbane area.

❑ **Brisbane Light Rail Project (BLRP)**

The BLRP provides for a high capacity light rail public transport system connecting major destinations in the City area, including the CBD retail core, the Riverside precinct, Southbank Parklands, QUT's Gardens Point campus, Fortitude Valley, the Royal Brisbane Hospital, and existing major bus, ferry and rail stations.

The BLRP is proposed to be built in two stages. Stage 1 is due to be completed by November 2001 and Stage 2 in December 2002. It is intended that the project delivery is to be facilitated by appointment of a preferred contracting/operating/construction consortium. Tenders are currently under review by the Queensland Government and a preferred operator is expected to be announced in May 2000.

The BLRP project provides the opportunity to offer an additional transport mode to the stadium via an extension from the planned light rail link between Roma Street and Countess Street to Lang Park. Under the existing proposal for the BLRP, the route will terminate near the stadium at Countess Street.

A major light rail and Inner Northern Busway station is planned for the vicinity of Roma Street rail station to provide for passenger interchanging between modes. Detailed planning of the location of these facilities is still in progress by Queensland Transport and Brisbane City Council.

❑ **Coronation Drive Bus Lane**

The Coronation Drive Bus Lane is a tidal flow bus lane along Coronation Drive. The lane will be controlled by electronic signage in and above the roadway. Coronation Drive will comprise two general traffic lanes in each direction with a single bus lane operating in the peak direction.

The project is funded by Brisbane City Council and Stage 1 of the project between High Street and Chasely Street is currently operational as an inbound bus lane. Stage 2 of the project between Chasely Street and Cribb Street is expected to be completed March 2001.

The project will have beneficial effects on bus services near the Lang Park redevelopment as the bus lane will improve the operations of buses using the Coronation Drive Bus corridor which is in close proximity to the stadium.

❑ **Waterworks Road Transit Lanes**

The Waterworks Road Transit Lane project will provide a transit lane in the peak direction along Waterworks Road between Settlement Road and Enoggera Terrace. The transit lane will be designated as a 'T2' and will only apply to inbound traffic in the morning peak period and outbound traffic in the afternoon peak period.

The project is funded by Brisbane City Council and construction has already commenced. The project is expected to be completed by December 2001.

The project will have limited affect on the Lang Park redevelopment as its focus is upon commuter peak period HOV and bus operations improvements in the corridor north-west of Lang Park.

❑ **Heavy Rail Projects**

Recent or planned rail projects which affect consideration of heavy rail services for the Lang Park Stadium proposal are:

- **Tunnel Improvements**

  The existing Queensland Rail network has ample capacity to service any proposed events to be conducted at Lang Park as the recently commissioned Central City additional tunnels have increased train movement capacity to well beyond the year 2025.

- **Crossover Upgrades**

  At the present time all Citytrain stopping passenger services on the Ipswich line travel on the Main Lines between Roma Street and a set of crossovers in the vicinity of Petrie Terrace road bridge and Lang Park. Queensland Rail propose in the future to replace these crossovers with new high speed crossovers to allow considerably faster train movements which will result in greater track capacity.

- **Additional tracks**

  Queensland Rail have given consideration to the provision of some additional track work in the vicinity of Countess Street for the movement of trains from Milton, South Brisbane and Normanby.

5.2.3 Transport Network Supply & Demand Characteristics

❑ Assessment of Representative Time Periods

Spectator arrivals at events at Lang Park are typically spread over two to three hours before the main event commencement. Departures from major events are concentrated; typically all spectators want to leave within one hour of the event ending.

For an event scheduled for a weekday evening, such as a State of Origin match typically starting at 8:00 p.m., arrival demands (commencing from about 5:15 p.m.) to the Stadium overlap with peak period commuter travel demands leaving the CBD. Current patterns result in 30% of arrivals occurring in the 5:30 to 6:30 p.m.

For this baseline assessment of transport network supply and demand characteristics, a set of representative arrival and departure scenarios associated with the spectrum of events envisaged for the redeveloped Stadium have been identified as listed **Table 5.2.6**. These encompass the critical times for transport infrastructure and service loadings.

Table 5.2.6 Representative Time Periods For Transport Assessment

Event Timing	Typical Arrival Period	Typical Departure Period
Weekday Evening	5:00pm-8:00pm	9:45pm-10:45pm
Weekend Evening	5:00pm-8:00pm	9:45pm-10:45pm
Weekend Afternoon	12:00noon-3:00pm	5:00pm-6:00pm

❑ Road Network Baseline Assessment

- **Supply Characteristics**

A description of key road links in the vicinity of the existing stadium is detailed below:

(a) Lang Park is located in a block bounded by Castlemaine Street, Chippendall Street, Hale Street and Caxton Street. The stadium does not have direct frontage onto Caxton Street.
(b) Hale Street is classed as an Arterial Route under the Brisbane City Council Road Hierarchy. It is of a high standard with grade separated intersections and typically consists of 2-3 lanes in both directions. It currently carries in the order of 50 000 vehicles per day in the vicinity of the site. Following the Inner City Bypass completion it is forecast to carry 70 000 vehicles per day.
(c) Caxton Street/Given Terrace is classed as a Suburban Route and forms a connection between Paddington and the city. The road typically consists of 1-2 traffic lanes in each direction, with kerbside parking restricting the road to 1 traffic lane at some locations. The road currently carries approximately 15 000 – 20 000 vehicles per day of which about 4% is heavy vehicle traffic.
(d) Milton Road is an Arterial Route and forms a major road corridor between western suburbs and the CBD. Connection is provided to Hale Street for travel to/from the north. Milton Road is typically a 4-lane road with sheltered turn lanes provided at most intersections. The road reserve width is constrained on this road by commercial/industrial properties on the northern edge and a heavy rail corridor on the southern edge. Milton Road currently carries approximately 45 000 vehicles per day west of Hale Street and 30 000 vehicles per day east of Hale Street. With the ICB, Milton Road volumes are expected to increase to 50 000. Heavy vehicle traffic typically comprises about 6% of the total traffic volume.
(e) Petrie Terrace forms an Arterial Route and provides a major link for outbound CBD traffic travelling north and inbound CBD traffic from Milton Road and Caxton Street to access

Countess Street. The road consists of 3 one-way traffic lanes, with one of these lanes reserved as a bus-lane in commuter peak periods. It currently caters for approximately 35 000 vehicles per day of which about 6% is heavy vehicle traffic.

(f) Castlemaine Street is a District Access Road and connects Milton Road with Caxton Street. It provides access to Heussler Terrace via a roundabout and to Black Street, Chippendall Street, Cordova Street, Blaxland Street and Hall Street via at-grade unsignalised intersections. All roads accessing Castlemaine Street are minor, with the exception of Heussler Terrace, and service adjacent commercial and industrial areas. Between Milton Road and Heussler Terrace, Castlemaine Street is a wide 2-lane undivided road, while north of Heussler Terrace it becomes divided. Close to the Caxton Street intersection there is provision for u-turns. Traffic circulation along Castlemaine Street is free flowing with good accessibility to all properties. Castlemaine Street currently carries about 8 000 vehicles per day. The proportion of heavy vehicles on this road varies with about 4% heavy vehicles at the northern end and up to 8% at the southern end of the road adjacent to commercial and industrial areas.

(g) Chippendall Street is a cul-de-sac providing access to the southern end of Lang Park stadium and properties on the southern side of the road.

The characteristics of key intersections near the Stadium are detailed below:

(a) Milton Road/Cribb Street is a 3-way signalised intersection with two lane approaches on each leg, and a protected right turn lane from Milton Road to Cribb Street. The intersection is tightly constrained geometrically due to commercial properties on the northern side and a heavy rail corridor on the southern side of Milton Road. The Cribb Street approach is also tightly constrained due to abutments for the overhead rail bridge.

(b) Milton Road/Castlemaine Street intersection comprises a 3-way signalised intersection with two lane approaches on each leg and a protected right turn lane from Milton Road to Castlemaine Street. The intersection is tightly constrained geometrically due to commercial properties on the northern side and a heavy rail corridor on the southern side of Milton Road.

(c) The intersection at Milton Road/Hale Street off-ramp is physically limited due to the Hale Street overbridge on the western leg, and the heavy rail corridor on the southern edge of the intersection. The intersection consists of a 3-way signalised layout with two lane approaches on each leg. The off-ramp from Hale Street is a one-way link.

(d) Milton Road/Upper Roma Street/Petrie Terrace is a 3-way signalised intersection with the northern and eastern approaches forming a one-way road link. The Milton Road western leg has 2 approach and departure lanes. The Upper Roma Street eastern leg has 4 approach lanes, with one of these lanes reserved for buses in commuter peak periods. A dominant feature of the intersection is the staged pedestrian crossing catering for east-west and north-south pedestrian movements. The pedestrian refuge located in the centre of the intersection for this crossing has limited pedestrian storage capacity. The intersection is extremely constrained geometrically due to properties on the north-west corner and eastern edge of the intersections in conjunction with the road-bridge over the heavy rail tunnels on the Upper Roma Street approach.

(e) Petrie Terrace/Caxton Street comprises a 4-way signalised intersection with a 2 lane approach on the eastern and western leg and a 4 lane one-way approach on the southern leg. One of the lanes on the southern approach is reserved for buses in commuter peak periods.

(f) Caxton Street/Hale Street off-ramp intersection is constrained geometrically due to the Hale Street overbridge on the western leg. The intersection is signalised with 3 approach legs, of which each leg has 2 traffic lanes. The off-ramp from Hale Street is a one-way link.

(g) Caxton Street/Castlemaine Street comprises a 4-way signalised intersection with 2 lane approaches on each leg. No protected turning lanes are provided on the east-west approaches and property boundaries constrain the intersection on the northern and southern

edges. The southern Castlemaine Street approach however is quite wide with a large central median.

(h) Castlemaine/Heussler Terrace is a 3-way roundabout intersection. The roundabout is typically single lane, however the Castlemaine Street approaches are quite wide and two lanes of queuing vehicles can form on these approaches.

A dangerous goods route is designated on some roads in the immediate vicinity of the existing stadium. The route travels along Milton Road from the west and turns onto Hale Street and travels north for vehicles travelling west to north. For vehicles travelling north to west, the reverse route is used. This dangerous goods route is predominantly used by fuel vehicles travelling to and from the western suburbs. No incidents involving dangerous goods vehicles have been recorded in this area. Whilst no defined routes in the Brisbane road network exist to carry over-dimensional vehicles, it is noted that dangerous goods routes are typically utilised by over-dimensional vehicles as these routes often represent a high standard of road suitable for this vehicle type.

- **Demand and Operating Characteristics**

(a) Commuter Peak Baseline Conditions

The commuter peak periods do not coincide directly with those of the stadium but do represent the time during which background operating conditions on the surrounding road network will be highest. Baseline conditions during commuter peak periods have been established to assess the indicative effect on the surrounding and wider road network of Lang Park activities which coincide with commuter peaks.

Brisbane City Council's CBD SATURN (Simulation and Assignment of Traffic to Urban Road Networks) model was obtained for use in this assessment. The CBD SATURN model has been calibrated for a 1999 base year and models the operation of road links and intersections in the Kelvin Grove, Spring Hill, Fortitude Valley, City, South Brisbane and West End areas. For this analysis additional coding to the west of Lang Park has been added to allow assignment of road traffic for commuter peak periods. The model includes network modifications for the Inner City Bypass although other planned major project network modifications (such as the Brisbane Light Rail Project) are not yet available in the model. As the Inner City Bypass is likely to have the greatest influence on baseline traffic on roads in the immediate Lang Park area, the model is considered to provide the best available tool for establishing baseline commuter peak conditions on the road network at the time of opening of the proposed redeveloped Stadium.

A baseline PM peak model was produced as this period coincides with the arrival period for a weekday evening Lang Park event. A baseline AM peak model was also produced. Model outputs for these periods are summarised graphically on **Figures 5.2.12 & 5.2.13** which show turning movement volumes at key intersections around the existing stadium.

To gain an appreciation of baseline road network operations a number of key intersections in the immediate road network surrounding Lang Park were identified as being most likely to have greatest impact as a result of Lang Park activities. These intersections may be affected for a variety of reasons such as pedestrian flows, bus traffic, and traffic management measures (eg police control, full or partial road closures).

SIDRA 5.20 analysis was performed on these intersections for AM and PM background commuter peak periods, operational statistics are detailed in **Table 5.2.7**. For the SIDRA assessment a growth factor of 1.5% per annum has been applied to factor the 1999 SATURN base model to

stadium opening year conditions in 2003. This growth factor is based on historical data for inner and outer CBD areas. An assessment has also been undertaken of intersections further afield from the site in order to gain an indication of regional effects. This is detailed in **Table 5.2.7**. Key findings from **Table 5.2.7** with respect to 2003 baseline conditions on the local road network in the commuter peak periods are:

AM Peak operating characteristics:

- Castlemaine Street/Caxton Street- congestion is forecast on the Dowse Street leg of the intersection although movements are relatively minor.
- Caxton Street/Petrie Terrace – congestion and delays are likely on both Caxton Street and Petrie Terrace.
- Milton Road/Castlemaine Street – inbound vehicles on Milton Road are likely to experience congestion and delays at this intersection.
- Milton Road/Cribb Street – Oversaturation is forecast for outbound traffic on Milton Road and the left turn from Cribb Street onto Milton Road. Queuing capacity may be exceeded for the right turn from Milton Road into Cribb Street.
- Milton Road/Petrie Terrace/Upper Roma Street – Both left turning inbound traffic on Milton Road and through traffic on Upper Roma Street/Petrie Terrace are likely to experience oversaturation in this period.

Intersections in the PM peak period are forecast to be generally less congested, with the following exceptions:

- Milton Road/Castlemaine Street – inbound traffic on Milton Road and left turning vehicles from Castlemaine Street (due to kerbside parking) are likely to become slightly oversaturated in this period. Queuing overflows for the right turn from Milton Road to Castlemaine Street are forecast.
- Milton Road/Cribb Street – similar operational difficulties as forecast for the AM peak period are forecast.

Key findings from **Table 5.2.8** with respect to 2003 baseline conditions on the regional road network intersections in the commuter peak periods are:

(i) Intersections considered in the AM peak period are forecast to operate satisfactorily, with the following exceptions:

- The intersection of Countess Street and Roma Street may experience congestion on minor movements during this period.
- The intersection of Cribb Street and Coronation Drive is likely to experience heavy congestion on both minor and major movements.

(ii) Most intersections considered in the PM peak period are also forecast to operate satisfactorily, with the following exceptions:

- The intersection of Roma Street and Ann Street is likely to experience some congestion on minor movements in this period.

- As with the AM peak period the intersection of Cribb Street and Coronation Drive may also experience heavy congestion on both minor and major movements.

(b) Baseline Conditions for Other Representative Time Periods

To assess the impact of peak demand for Lang Park events it was necessary to establish background road network conditions for time periods at which stadium travel demands are most concentrated. Analysis of temporal traffic flow for Milton Road adjacent to the Stadium yielded several traffic flow profiles for time of day and day of week (refer **Figures 5.2.14 – 5.2.16**). Inspection of these profiles yielded the following observations:

- The quantum of flows at post event departure times were similar for a weekday evening and a Saturday evening.
- The quantum of flows at Saturday afternoon event period times were similar for both arrival and departure times. The Saturday evening match arrival period was also similar in nature to the Saturday afternoon period.
- The flow at Sunday afternoon event period times was similar for both arrival and departure periods, and was comparable to flows on a Saturday afternoon at the same time.

Subsequently, two time periods were established which are representative of arrival/departure periods for future Lang Park events. The two representative time periods are as follows:

Saturday 5:00pm-6:00pm, representative of traffic conditions in a:

- Saturday afternoon event arrival or departure period
- Saturday evening event arrival period
- Sunday afternoon event departure period

Wednesday 9:45pm-10:45pm

- Weekday evening event departure period
- Saturday evening event departure period

On this basis, baseline traffic surveys were undertaken at a the following key intersections during these time periods on Wednesday 16th February 2000 and Saturday 26th February 2000 to establish background conditions:

- Milton Road/Cribb Street
- Milton Road/Castlemaine Street
- Milton Road/Hale Street off-ramp
- Milton Road/Clifton Street
- Milton Road/Upper Roma Street/Petrie Terrace
- Petrie Terrace/Sexton Street
- Petrie Terrace/Caxton Street
- Caxton Street/Judge Street/Weetman Street

- Caxton Street/Chapel Street
- Caxton Street/Hale Street off-ramp
- Hale Street Service Road/Judge Street/Sheriff Street/Clifton Street
- Caxton Street/Castlemaine Street
- Baroona Road/Heussler Terrace
- Park Road/Baroona Road/Milton Road

Existing observed traffic levels from these surveys require adjustment to represent likely traffic patterns at the redeveloped stadium opening time due to future addition of the Inner City Bypass to the road network. Adjusted traffic estimates were derived as follows:

- A PM peak SATURN model run was undertaken for a network without the ICB included (ie. current existing network).
- Comparative assessment was made between the ICB and non-ICB model runs.
- Significant changes to turning movement volumes were noted, and relevant proportions applied to the surveyed volumes for the Saturday PM and Weekday late night time periods.

Estimated baseline intersection traffic volumes are shown on **Figures 5.2.17** and **5.2.18**. Intersection operation assessments are shown in **Table 5.2.7**. Key findings from this table with respect to baseline conditions on the local road network in the late evening and weekday late afternoon representative time periods are:

Weekday & Saturday night departure period:

- For this period all intersections considered are forecast to operate well within capacity.

Saturday/Sunday afternoon arrival or departure period and Saturday evening arrival period:

- Heavier volumes on the road network are forecast with all intersections experiencing increase saturation level when compared to evening departure period. All intersections however, are likely to operate well within capacity with the exception of Milton Road/Cribb Street. This intersection (operating under its current 80 second cycle time) is likely to experience over-saturated movements for outbound Milton Road traffic and the right turn from Milton Road to Cribb Street with queuing capacity exceeded.

Table 5.2.7 Summary Of Local Intersection Baseline Operations

Location	Intersection Type	Degree of Saturation (1) for Representative Time Period based upon SIDRA analysis			
		AM Peak	PM Peak Weekday Arrival	Weekday (9:45-10:45pm) Weekday & Saturday Night Departure	Weekend (5:00-6:00pm) Saturday/Sunday Afternoon Departure & Saturday Evening Arrival
Castlemaine Street/Caxton Street	Signalised	0.93	0.86	0.28	0.42
Caxton Street/Hale Street off-ramp	Signalised	0.47	0.48	0.20	0.35
Caxton Street/Petrie Terrace	Signalised	1.05	0.83	0.44	0.52
Milton Road/ Castlemaine Street	Signalised	1.00	0.92	0.45	0.88
Milton Road/Cribb Street	Signalised	1.00	1.02	0.66	1.21
Milton Road/Hale Street off-ramp	Signalised	0.68	0.64	0.33	0.49
Milton Road/Petrie Terrace/Upper Roma Street	Signalised	0.96	0.91	0.36	0.45
Heussler Terrace /Baroona Road	Signalised	Not in model	Not in model	0.30	0.54
Park Road /Milton Road	Signalised	Not in model	Not in model	0.39	0.76

Notes :

1. Degree of Saturation or X Value tabulated is the ratio of demand to available capacity for the most critical movement at the intersection. An X of .90 represents a desirable maximum for acceptable operation of signalised intersections and roundabouts. For priority intersections an X above .80 indicates more formal control is warranted.
2. Saturation flow of 1850 pcu/hr used.
3. AM and PM Peak periods analysed for 120 second cycle time. Weekday evening and weekend periods analysed for 80 second cycle time (Source: BCC Bliss data sheets)

Table 5.2.8 Summary Of Regional Intersection Baseline Operations

Location	Intersection Type	Intersection Volume/Capacity Ratio (1) for Representative Time Period from SATURN model			
		AM Peak	PM Peak	Weekday (9:45-10:45pm)	Weekend (5:00-6:00pm)
			Weekday Arrival	Weekday & Saturday Night Departure	Saturday/Sunday Afternoon Arrival & Saturday Evening Arrival
Normanby five-ways	Signalised	45	46	Regional model not available for these time periods	
Gregory Terrace/Boundary Road	Signalised	20	11		
Gregory Terrace/College Road	Signalised	22	48		
Wickham Terrace/Upper Edward Street	Signalised	42	39		
Ann Street/Edward Street	Signalised	58	57		
Roma Street/Ann Street	Signalised	55	71		
Turbot Street/George Street	Signalised	60	44		
Countess Street/Roma Street	Signalised	66	55		
Upper Roma Street/Skew Street	Signalised	26	50		
Cribb Street/Coronation Drive	Signalised	99	92		

Notes :

1. Intersection Volume/Capacity Ratio (V/C) is equal to the sum of the volumes for all movements divided by the sum of the capacities for all movement
2. An intersection with a V/C ratio of greater than 60% may operate satisfactorily under current demands, however this generally implies that some movements may be severely overloaded and/or several movements have heavy demands compared to overall capacity at the intersection.

❑ **Heavy Rail Baseline Assessment**

(a) Supply Characteristics

Lang Park Stadium is located in close proximity to the Western Line operated by Queensland Rail. Milton Station and Roma Street Station are the closest rail stations. The rail network is shown on **Figure 5.2.19**.

(i) Milton Station

Milton station is located approximately 630 metres from the south-western corner of Lang Park.

It is situated on the Western Line. There are four tracks operating between Roma Street and Corinda. Normal suburban timetabled electric trains operate on the up and down Suburban lines. Express passenger services, long distance passenger trains, freight trains, livestock trains, light engines and other services operate on the up and down Main lines. The two Main lines are on the northern side of the two Suburban lines.

There are four platforms:

- Number 1 platform serves the up (or outbound) suburban line for stopping Citytrains travelling towards Ipswich.
- Number 2 platform of the island platform serves the down (or inbound) suburban line for stopping Citytrains travelling towards Roma Street.
- Number 3 platform (also part of the island platform) serves the up Main line towards Ipswich.
- Number 4 platform serves the down Main line towards Roma Street.

Characteristics of Milton Station are:

- Station Facilities

The existing station facilities at platform level are quite old and no significant upgrade works have been carried out in the past. QR has undertaken a progressive upgrade of suburban stations but Milton has not been included to date. Lifts are not provided for the elderly or persons with disabilities.

- Platforms and Access

Both number 1 and 4 platforms are narrow. One narrow overhead footbridge provides stair access to each platform. In addition there is one extra at-grade entry to number 4 platform on the western end and several exits from number 1 platform towards the river area of Milton. The stairs from the overhead bridge to each platform are narrow. As mentioned above, lifts are not provided for the elderly or persons with disabilities.

(ii) Roma Street

Roma Street rail station is located approximately 1.0 km from the eastern side of Lang Park. This station is the hub of train movements in the city area. It is the junction for trains arriving and departing over the Merivale Bridge, for all trains arriving and departing on the four tracks to Corinda, for all trains arriving and departing via the Normanby/Exhibition loop and of the four lines

which continue through the tunnels to Central station. Platforms 1, 2, 3, and 10 normally service the long distance passenger trains including the standard gauge trains to Sydney. Platforms 4 to 9 service all the various city destinations including Nambour and the Gold Coast trains.

The whole station complex has recently undergone renewal, which has seen the installation of escalators and lifts. All platforms have been widened extensively to cater for large numbers of passengers. The station complex now has the capacity to accommodate passenger increases well into the future. The Brisbane Transit Centre which caters for inter and intra-state coaches is located adjacent to Roma Street station.

(iii) Baseline Scheduled Services

Table 5.2.9 provides a summary of the number of existing rail services that operate during the representative time periods.

Table 5.2.9 Baseline Rail Services

Branch	Station	Number of Timetabled Services in Representative Time Periods					
		Weeknight Arrivals : 5.00 to 8.00pm	Weeknight Departures : 9.45 to 11.15 pm	Saturday Evening Arrivals : 5.00 to 8.00 pm	Saturday Evening Departures : 9.45 to 11.15 pm	Sunday Afternoon Arrivals : 12 noon to 3.00 pm	Sunday Afternoon Departures : 5pm to 6.30pm.
Shorncliffe	Milton	NA	NA	NA	NA	NA	NA
	Roma Street	6	3	6	3	6	3
Petrie/ Caboolture	Milton	6	3	6	3	6	3
	Roma Street	6	3	6	3	6	3
Ferny Grove	Milton	NA	NA	NA	NA	NA	NA
	Roma Street	6	3	6	3	6	3
Ipswich	Milton	6	3	6	3	6	3
	Roma Street	6	3	6	3	6	3
Beenleigh/ Gold Coast	Milton	NA	NA	NA	NA	NA	NA
	Roma Street	9	4	9	4	9	5
Cleveland	Milton	NA	NA	NA	NA	NA	NA
	Roma Street	6	3	6	3	6	3
	TOTAL	51	25	51	25	51	26

Notes:
1) NA: not applicable - this station does not serve this rail corridor with timetabled services.
2) Maximum passenger capacity of a 6 car set is approximately 750 persons, however crush capacity from Milton would increase to over 850 persons.
3) Seated capacity for a 6 car set is 496 persons.
4) Most services are worked by 6 car sets. When special events occur any three car sets are increased to 6 car sets.

(b) Baseline Demand Characteristics

Normal services outside weekday morning and peak hour services have spare capacity as follows:

- Weeknight post event departures (9:45 to 11:15 p.m.) the existing services would have considerable spare capacity as utilisation at this time is only in the range 30 to 40% ie 150/200 persons.
- On Saturdays pre event arrivals (5:00 to 8:00 p.m.) and post event departure services (9:45 to 11:15 p.m.) have utilisation in the range of 40 to 50% ie 200/250 persons.

- On Sundays pre event arrivals (12:00 to 3:00 p.m.) and post event departure services (5:00 to 6:30 p.m.) have utilisation in the range of 40 to 50 % ie 200/250 persons.

A recent survey undertaken at Milton Station during the 5:30 p.m.-7:15 p.m. weeknight time period indicated existing demand levels during this period for outbound trains as about 43% of capacity. The results are summarised in **Table 5.2.10**.

Table 5.2.10 Commuter Peak Passenger Train Utilisation At Milton Station

Train Time	Destination	Total Utilisation (Pax)	Spare Capacity (Pax)	% Utilisation
17:27	Ipswich	444	306	59%
17:37	Rosewood	368	382	49%
17:57	Ipswich	371	379	49%
18:07	Rosewood	358	392	48%
18:23	Ipswich	244	506	33%
18:40	Ipswich	246	504	33%
19:10	Rosewood	219	531	29%
	Total	2250	3000	43%

Source: SKM survey Thursday 9th December 1999

❑ Buses

(a) Supply Characteristics

Existing Background Situation

The current background bus service (Citybus and Cityxpress) routes around Lang Park Stadium are shown visually on **Figure 5.2.20** and summarised in **Table 5.2.11** below:

Table 5.2.11 Existing Local Bus Route Summary

Local Road Link	No of Bus Routes	Bus Route No.
Coronation Drive:	19	407,411,412,415,416,417,425,430,433,435,440,445,450,453,454, 457,459,471
Milton Road:	11	436,455,456,441,431,426,461,446,470,475
Caxton Street:	8	374,375,377,382,383,385,378,476
Petrie Tce/Countess St:	17	Various

There are several bus stops located closed to stadium:

(i) Milton Road

- Two stops located immediately east of Hale Street – Stop Number 4 on the northern road edge and Stop Number 3/4 on the southern road edge.
- A single stop located immediately east of Cribb Street on the northern road edge (Stop Number 5).
- Two stops (Stop Number 6) located west of Cribb Street on the northern and southern road edge.

(ii) Petrie Terrace

- Two stops (both Stop Number 3), one is located immediately south of Menzies Street and the other immediately south of Sexton Street.

(iii) Caxton Street

- Two stops (Stop Number 4) located immediately east of Hale Street on the northern and southern road edge.

(iv) Given Terrace

- Two stops (Stop Number 5) located immediately west of Castlemaine Street on the northern and southern road edge.

(v) Heussler Terrace

- Two stops (Stop Number 5) located immediately west of Castlemaine Street on the northern and southern road edge.

Service frequency has been obtained for applicable routes for the representative time periods as detailed in **Table 5.2.12**. Lang Park has a high frequency background bus service to a wide range of destinations during event arrival and departure times for weekday events, with reduced background frequency for weekend events.

Table 5.2.12 Local Bus Service Frequency

Route No:	Destination	BT Timetable Period Service Type	Service Frequency (minutes) for Representative Time Periods Weekday Arrival PM Peak Timetable (4:00-7:00pm)	Weekday Departure PM Off-Peak Timetable (after 7:00pm)	Saturday Afternoon Arrival/Departure Saturday Daytime Timetable	Saturday Evening Arrival/Departure Saturday Night Timetable	Sunday Afternoon Arrival Departure Sunday Daytime Timetable
Caxton Street Services							
374	Paddington–City	All stops	10	-	-	-	-
375	Bardon-City-Stafford	All stops	10	60	30	60	30
377	Ashgrove-City	All stops	30	-	120	-	-
378	Ashgrove-City	All stops	20	-	120	-	-
382	The Gap-City	Rocket	30	-	-	-	-
383	The Gap-City	Rocket	30	-	-	-	-
385	The Gap-City	Express	10	60	30	60	30
476	Rainworth St-City-PA Hospital	All stops	1 trip	-	-	-	-
Coronation Drive Services							
407	University of Qld - City	Rocket	15	60	-	-	-
411	University of Qld – City	All Stops	20	60	30	60	60
412	University of Qld – City	Express	15	60	30	30	30
415	Taringa-Indooroopilly-City	All Stops	20	-	75	-	120
416	Duke St-Toowong-City	All Stops	45	-	60	-	120
417	Long Pocket-City	All Stops	30	-	75	-	120
425	Kenmore/Chapel Hill-City	Express	30	60	60	60	60
430	Fig Tree Pocket-City	Express	-	60	60	60	60
433	Kenmore-City	All Stops	30	60	60	60	60
435	Brookfield-Indooroopilly-City	Express	30	-	60	-	60
440	Moggill-City	Express	30	60	60	60	60
445	Fig Tree Pocket-City	All Stops	30	-	60	-	-
450	Centenary/Riverhills-City	Express	-	-	30	60	30
453	Centenary-City	Express	30	60	-	-	-
454	Riverhills-City	Express	30	60	-	-	-
457	Centenary/Riverhills-City	City Precincts	4 trips	-	-	-	-
458	Centenary-City	City Precincts	1 trip	-	-	-	-
459	Riverhills-City	City Precincts	1 trip	-	-	-	-
471	Mt Coot-tha/Birdwood Tce-City	All stops	30	-	75	-	75
Milton Road Services							
426	Kenmore/Chapel Hill-City	Rocket	30	-	-	-	-
431	Kenmore South-City	Rocket	30	-	-	-	-
436	Brookfield-City	Rocket	1 trip	-	-	-	-
441	Moggill-City	Rocket	15	-	-	-	-
446	Fig Tree Pocket-City	Rocket	30	-	-	-	-
455	Riverhills-City	Rocket	10	-	-	-	-
456	Centenary/Sinnamon Pk-City	Rocket	2 trips	-	-	-	-
461	Forest Lake-Inala-City	Rocket	2 trips	-	-	-	-
470	Toowong-City-Newstead	All stops	20	60	30	60	60
475	Rainworth-City-PA Hospital	All stops	20	60	30	60	60

(b) Future Baseline Situation

There are three relevant studies under way to define the future pattern of scheduled bus services in the area. These are the *Inner Northern Busway Interim Connections to Western Services Study* by Queensland Transport, the *Inner City Transit Plan*, being developed by Brisbane City Council and the *South East Transit and Inner Northern Busway Operational Plans*, being prepared by Queensland Transport. None of these studies has been completed and the future situation has therefore been based on discussions with the agencies involved.

The *Inner Northern Busway (INB) Interim Connections to Western Services Study* is examining the connections and services during the period after the opening of the Inner Northern Busway but before the opening of a Western Busway. This is the primary design case for the Stadium, as the Western Busway is not expected to open for several years after the Stadium. Because the other studies are not complete, the study team has been instructed to assume that route arrangements on the western roads will remain as at present.

The *Inner City Transit Plan* is reviewing bus services within the CBD to accommodate the busways and Brisbane Light Rail. Three primary types of bus service are seen as relevant to the Stadium: Regional Centres Busway services (Tier 1); Cityxpress/Rocket services and City Bus services. The Tier 1 buses will be a new level of service with five minute frequencies for each of two or three routes along the busways. The envisaged routes are Carindale – Chermside, Garden City – University of Queensland and, possibly, Royal Brisbane Hospital – University of Queensland. Other services would use the busways where appropriate.

The *draft Inner Northern Busway Operational Plan* identifies five "tiers" of bus services:

(i) **Tier 1**: Through running services between major centres, running at 15 minute headways, 6 am to 11 pm. Two of the services (Eight Mile Plains to St Lucia and Carindale to Chermside) will operate at 5 minute headways, 24 hours a day. All Tier 1 buses will use busways.

(ii) **Tier 2**: CBD terminating services. Some of these will be diverted on to the busways, where their route is within the busway catchment. Services will generally be very similar to current operations.

(iii) **Tier 3**: Feeder bus services. These buses will specifically not use the busways. Some will feed to busway stations (or Tier 1 routes before the busway network is complete), others to rail stations.

(iv) **Tier 4**: Core cross-town services. These services will not generally use the busways but may interact with busway services as feeders.

(v) **Tier 5**: Other services with no interaction with the busway operations.

Since feeder services will be inappropriate in the inner city location of the stadium, only Tier 1 and Tier 2 services are relevant to this study. In the medium term, buses to/from the west (Coronation Drive, Milton Road and Caxton Street) will enter/exit the busway on Roma Street, as will those to the west north west (Musgrave Road) while those to the north west (Kelvin Grove Road) will enter/exit the busway at Normanby Fiveways. Buses to/from the north (Lutwyche Road and, possibly, Sandgate Road) will use the busway as a through route. These proposals would reduce the distance travelled by Coronation Drive and Milton Road services (30 routes), not affect Caxton Street services (8 routes) and increase the "stadium-to-stop" distances (especially to outbound services, currently using Petrie Terrace) for Musgrave Road and Kelvin Grove Road services (10 routes).

In summary, in the early years of operation of the stadium, it is likely that on-street services will be similar to the present situation, except possibly for some slight loss of services along Countess Street and Petrie Terrace. On the other hand, there will be a large number of Tier 1 buses running on the Busway, with access to the CBD and major Regional Centres. Note that this assessment has assumed that the Inner Northern Busway (INB) will be constructed by the time of the proposed Stadium opening in 2003.

(c) Demand Characteristics

Demand characteristic of buses varies and is dependant on the time of day:

(i) In commuter peak periods buses are typically heavily utilised in peak flow directions.
(ii) In the transitionary period between afternoon peak and late evening period, buses do display some spare capacity, due mainly to the service frequency being maintained post peak in conjunction with demand falling.
(iii) For late night week evenings whilst demand is typically much lower than at peak periods, service frequency drops, and subsequently buses are well utilised in these periods.
(iv) Similarly, for weekends service utilisation is typically high due to moderate demand and reduced service frequency.

❑ **Ferry Services**

(a) Supply Characteristics

Ferry services operated by Brisbane City Council are provided along the upper and lower reaches of the Brisbane River in conjunction with several cross river services in the CBD. Current ferry services travel adjacent to Coronation Drive in the general vicinity of Lang Park, however the nearest ferry terminals to Lang Park are located at North Quay on the north side of the river and at Southbank Parklands on the southern side of the river. Approximate walking distances from Lang Park Stadium to these locations are 1.9 km and 2.4 km respectively. Ferry routes in the area adjacent to the stadium are shown in **Figure 5.2.21**.

Two services operate from these nearest ferry terminals:

- CityCat service operating between the University of Queensland at St Lucia and Bretts Wharf at Hamilton
- Inner City Ferry service operating between North Quay in the CBD and Mowbray Park at East Brisbane.

CityCat vessels have an approximate capacity of 100 persons and cross river ferries slightly less.

KittyCat Service frequencies at event arrival and departure times for the services to the nearest ferry terminals to Lang Park are detailed in **Table 5.2.13**.

Table 5.2.13 Existing Ferry Services

Brisbane Transport Timetable Period Service:	Service Frequency (minutes) for Representative Time Periods				
	Weekday Arrival PM Peak Timetable (4:00-7:00pm)	Weekday Departure PM Off-Peak Timetable (after 7:00pm)	Saturday Afternoon Saturday Daytime Timetable	Saturday Evening Saturday Night Timetable	Sunday Afternoon Sunday Daytime Timetable
Citycat : UQ to Bretts Wharf	20	30	20	30	20
Inner City Ferry: North Quay to Mowbray Park	25	30	20	30	20

(b) Demand Characteristics

Recent Brisbane Transport patronage data indicate that current ferry services to and from the CBD facilitate an average of 10 800 person trips per day. Approximately 800 inbound trips occur during the morning commuter peak period with the majority of trips on these services being day trips and weekend recreational travel. Typically baseline demand during weekday commuter peak periods is high, with demand dropping for weekday evenings. On weekends however, baseline demand is actually higher than during commuter peak periods due to the high level of sight seeing and tourist activity.

❑ Parking

(a) Supply in Local Area

To gain an appreciation of on-street and off-street parking supply within the Lang Park Stadium local area, an extensive parking inventory was undertaken. The area investigated is shown on **Figure 5.2.22**, and it was defined as representative of the likely reasonable maximum walking distance that a patron attending an event at Lang Park would accept to utilise parking within this area. This distance was based on consideration of accessibility for walking, topography and natural barriers such as hills and ridges, and physical barriers such as major roads and the Brisbane River. This area corresponds to about a 1.5 kilometre radius west and north from the Stadium and excludes areas in the CBD.

It should also be noted that:

(i) A portion of the inventory area falls within the BCC Central Traffic Area which contains the following general restrictions:

- 2 hour parking limit (unless otherwise notified).
- restrictions apply from 7:00 a.m. to 7:00pm Monday to Friday and 7:00 a.m. to 12:00 noon on Saturday.

(ii) A portion of the surveyed area also falls within restrictions in force for current major Lang Park events.

Parking supply was categorised into several classes as specified below:

(i) On-street

- Marked kerb-side bays.
- Un-marked bays - defined as the number of complete 6 metre long kerb-side sections available for parking excluding driveways and non parking areas (ie. post boxes, street corners and no-standing areas, etc.).
- The above categories were split into sub-categories noting signed parking restrictions – ie. no restrictions, 2 hour limit 7:00 a.m.-7:00 p.m., ½ hour, 10 min loading zone, etc.

(ii) Off-Street

- Public – defined as parking in off-street areas with no restrictions as to who may use the area. This was split into sub-categories noting any time restrictions (ie unlimited, 2 hr, 4 hr etc).
- Private – defined as parking in non-residential off-street areas that is restricted generally as to who may use the area. Customer car parks, as well as employee spaces, are included in this category, but it does not generally include private residential parking. This was split into sub-categories which required a qualitative assessment of whether this parking is accessible in the context of a major event at Lang Park stadium. These sub-categories are as follows:
  Non-accessible. This is defined as a carpark being used exclusively by a business that operates at the same time of a major event, or that the carpark is restricted (physically or by other means) for general use at these times.
  Accessible. This is defined as a carpark for a business that is closed at event times, and that people can easily use it for other purposes.
- Pay Park – off-street parking for which a charge is made. Some details of the operation of the pay carpark were noted.

Surveyed on-street parking displayed a range of restricted and un-restricted parking categories. Restricted parking ranged from 2 min-11 hr limits with a large range of applicable times for these restrictions.

A total summary of parking type by class is shown in **Table 5.2.14** and **Table 5.2.15**, the spatial location and nature of this parking is shown in **Figures 5.2.23 – 5.2.28**. An allowance has also been made to identify the quantum of on-street parking within areas around Lang Park where parking is currently excluded due to coach/taxi/limousine parking, in order to establish an existing Lang Park major event base supply inventory. Similarly off-street parking areas currently used by the Lang Park Trust have been separately identified.

Table 5.2.14 On-Street Parking Supply In Local Area

Classification	Description	Parking Quantity (spaces)		
		Total Area Inventory	Existing Lang Park Major Event Exclusion Zone Inventory	Existing Lang Park Major Event Base Inventory
Unrestricted	No signed restrictions	4934	55	4879
No Standing/No Parking/Clearway	Generally restricted, however parking allowed outside restricted hours	225	-	225
Short Term	Time limited parking of up to 1 hour with varying times of restriction. Un-restricted parking outside restricted hours.	68	3	65
Medium Term	Time limited parking of 2-4 hours with varying times of restriction. Un-restricted parking outside restricted hours.	300	174	126
Long Term	Time limited parking of greater than 4 hours with varying times of restriction. Un-restricted parking outside restricted hours.	79	42	37
Loading/Passenger zone	Short term parking zones especially for loading/unloading goods and set-down/pick-up of passengers.	160	-	160
	Total	5766	274	5267

From **Table 5.2.14** it can be seen that:

- only a small proportion of on-street parking supply is currently under signed parking restrictions
- there is a significant number, approximately 4 900 unrestricted on-street parking spaces, in the local area within a reasonable walking catchment of the stadium

Table 5.2.15 Non-Residential Off-Street Parking Supply In Local Area

Category	Sub-Category	Parking Quantity (spaces)		
		Total Area Inventory	Existing Lang Park Major Event Exclusion Zone Inventory	Existing Lang Park Major Event Base Inventory
Public	Unrestricted	329	210	119
	Restricted	15	-	15
Private	Accessible	1445	491	954
	Non-Accessible	1018	229	789
Pay Park		639	-	639
	Total	3446	930	2516

From **Table 5.2.15** it is evident that there are reasonable supplies of non-residential off-street carparking within walking distance of the Stadium with about 68% (about 1 700 spaces) being potentially "accessible" to patrons attending a Lang Park event albeit via use of private parking areas that were accessible out-of-hours. The maps of parking distribution indicate that a significant proportion of this accessible parking is located at the fringe of the walking catchment area mainly concentrated in the industrial/commercial areas west of Park Road.

(b) Baseline Demand in the Local Area

The above data represents physical capacity in this area. Background utilisation of on-street parking within the area varies and is dependent on the nature of residential properties. Many of the residential properties within the area have narrow street frontages and limited off-street parking which results in moderate background utilisation levels of the on-street parking supply by residents. High background utilisation levels also exist at a number of locations in the area such as the café, restaurant and hotel precincts at Park Road, Caxton Street/Petrie Terrace, Given Terrace at Paddington and at Rosalie. Utilisation in these areas is typically highest on Friday nights and weekends.

(c) CBD Parking Supply and Baseline Demand

To gain an appreciation of available parking supply within the Brisbane CBD, existing parking inventory data was collated. A recent Brisbane city Council / Queensland Transport CBD parking inventory is shown graphically on **Figure 5.2.29**. The total parking supply available for public use is some 15 500 spaces. This value represents the total parking capacity and does not take into account car park operating hours (ie. some car parks do not operate on weekends) and also the background level of utilisation at certain times, particularly in the context of Lang Park events.

To supplement this data telephone interview surveys were undertaken with several major parking operators, in conjunction with collation of existing utilisation data, to ascertain available parking supply in the context of a Lang Park event.

General findings from this survey of parking operators were:

- Smaller car parks (less than 150 spaces) are typically shut on weekends due to low utilisation levels and higher relative operating expenses making them unviable. If sufficient demand existed for these car parks (say for a Lang Park event) then these car parks could be opened on a case by case basis.
- There is generally reasonable spare capacity in most CBD car parks on weekday evenings (excluding Friday evening) and weekends. On Friday evenings parking demand is typically higher due to CBD late night shopping. Demand levels at all times are also higher over the Christmas period.
- Most operators appear to be flexible in arrangements to provide sufficient parking for major events as well as providing parking for "park and ride" schemes.

From this process, indicative utilisation levels for a selection of major car parks showed that for a sample supply of 6 450 spaces, approximately 4 050 spaces would be available for use on weeknights (excluding Friday) and weekends. This equates to a 63% availability of parking supply over and above background utilisation levels at these times. This indicative baseline utilisation factor when applied to the overall CBD supply of 15 500 spaces yields an indicative total available capacity of 9 800 spaces for these representative periods.

Allowance should be made however for operating hours of smaller car parks and increased demand on Friday evenings, which would reduce this 9 800 space capacity. Assuming that a small car park that would not operate at event times would comprise 150 spaces or less, then would reduce the base parking supply by some 1 750 spaces. An estimate of the Friday evening CBD shopping effect would also reduce the availability of the remaining parking supply to approximately 40%. This equates to a spare capacity of some 5 500 spaces available on Friday evenings.

(d) Southbank Parking Supply and Baseline Demand

Interview surveys were also undertaken with parking operators at Southbank. Total parking supply for major car parks in the Southbank area is detailed below:

- Southbank Parklands – 800 undercover spaces and 300 on-grade spaces
- Art Gallery Carpark – 450 spaces
- Cultural Centre Carpark – 450 spaces
- Library Carpark – 70 spaces
- Convention Centre – 1 450 spaces

The total parking supply in the Southbank area is approximately 3 500 spaces. A future additional 500 spaces are also planned for Southbank Parklands, however the final usage details of these spaces is not known at this stage.

Estimates of background levels of utilisation are as follows:

- Typically some 400 of the 1 100 spaces at Southbank Parklands would be available on a typical weekday evening, however on weekends parking in this area is fully utilised due to activities at the Parklands.
- Available parking supply for the other areas at Southbank (2 400 spaces) is highly variable and is dependent on events that occur at the Cultural Centre, Art Gallery and Convention Centre and South Bank itself. Background utilisation ranges anywhere between minimal and full depending on the range of events being held at these venues at any one time, however weekend background utilisation is typically heaviest.

Any reliance on Southbank parking to serve demand associated with Lang Park events would require coordination with programmed events in the Southbank precinct.

❑ **Pedestrian & Cycling Networks**

(a) Existing Pedestrian Network

Pedestrian needs associated with a Stadium are diverse and encompass the following main aspects:

- Personal Security. This includes lighting, passive surveillance of the route, the presence of other pedestrians nearby and the presence of escape routes. Personal security is rarely an issue for spectators at major events. However, for small events and times before or after peak crowd movements personal security can be important.
- Flat grades. Uphill climbs can tire pedestrians quickly-particularly elderly pedestrians or pedestrians carrying loads.

- Even firm surfaces. The absence of obstructions and surface irregularities is important especially for frail pedestrians and those with disabilities.
- Legible networks and way finding. This is the understanding of where you are and where you're going. Prominent land marks and clear lines of sight are important.
- Safety from vehicular traffic. Walking on roads, crossing complex intersections, and high volumes of noisy vehicular traffic close by discourage walking.
- Absence of crush crowding. Pedestrians like to choose their own pace and value the ability to stop and pause if needed.
- Short Walking distances.
- Protection from the sun, wind and rain. Cars provide this protection automatically – pedestrians must rely on the infrastructure provided.

The following comments generally pertain to all pedestrian routes which currently access Lang Park:

- There is little passive surveillance on the routes – except around the existing stadium precinct itself and Caxton Street. Most land uses abutting the access routes are inactive at the time when crowds pass.
- Walking distances to some of the main public transport access points are significant.
- Most routes have even surfaces, or could be made so with relatively little investment.
- Most routes are reasonably legible – the presence of landmarks such as the CBD, the Brewery, the railway and the stadium itself provide a sense of orientation.
- Few pedestrian routes provide weather protection.

A detailed physical assessment of existing key pedestrian routes (refer **Figure 5.2.30**) and associated infrastructure is contained in **Table 5.2.17**.

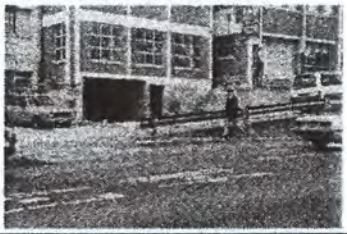
Table 5.2.16 provides a summary of walk distances between the Lang Park Stadium and key transport access points.

Table 5.2.16 Walking Distance Summary To Key Transport Access Points

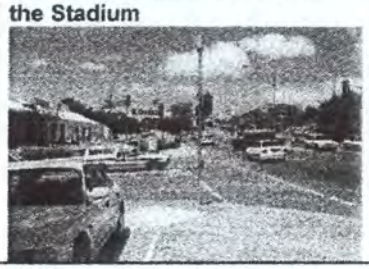
Route (refer Figure 5.2.29) for node numbers	Distance (metres)
South-western end of Stadium to Milton Station (12-19-20-21-22)	630
South-eastern end of Stadium to Milton Station (1-19-20-21-22)	650
South-eastern end of Stadium to Roma Street Station (1-2-3-4-5-6-7)	910
North-eastern end of Stadium to Roma Street Station (14-15-16-4-5-6-7)	1 060
North-eastern end of Stadium to Countess Street INB Station (14-15-16-INB Station)	670
South-eastern end of Stadium to Southbank (1-2-3-4-10-South Bank @ station)	1 580
North-eastern end of Stadium to Queen Street Bus Station (14-15-16-4-5-6-7-Queen St bus station)	2 020

Table 5.2.17 Existing Pedestrian Environment Appraisal

Link Number (refer Figure 5.2.30)	Link Name & Visualisation	Existing Pedestrian Environment Appraisal
Link 1 to 2;	**Crossing Milton Road and Off Ramp to Hale Street.** 	▪ A narrow pedestrian bridge links from the eastern end of Chippendall Street to Milton Road footpath on the bridge over Hale Street. This provides grade-separation over the vehicular on-ramp from Milton Road to Hale Street. ▪ The present footway is only 2.3m between handrails, so has very limited capacity. It is a major source of congestion following Lang Park events. ▪ The footbridge leads to a signalised pedestrian crossing of the vehicular off ramp from Hale Street off Ramp is problematic ▪ Pedestrian storage capacity on the footpath on both sides of this signalised pedestrian crossing is very limited and becomes problematic both before and after events.
Link 2 to 3	**Milton Road Northern footpath east of Hale Street** 	▪ This is a narrow footpath, only 2-3 metres wide, adjacent to a busy traffic lane on Milton Road, connecting to the intersection of Milton Road/Upper Roma Terrace/Petrie Terrace. ▪ Grades along this footpath are about 5%. ▪ There is existing pedestrian congestion before, and particularly after, major Lang Park events on this footpath. ▪ This currently causes a major safety concern because pedestrians walk on Milton Road, with their backs to traffic when leaving an event.
Link 8 to 9	**Southern Kerb of Milton Road east of Hale Street** 	▪ This narrow footpath (2.0 to 2.5 metres wide) is moderately trafficked on event days. ▪ It has a regular use function for local pedestrians on other days including access to Bus Stop 3 / 4 on the southern side of Milton Road.
Link 3 to 4	**Intersection of Milton Road, Upper Roma Street and Petrie Terrace** 	▪ The intersection layout and traffic signal phasing require the staged movement of pedestrians across the Petrie Terrace leg and the Milton Road leg. The refuge island is only sufficient to shelter about 5 people safety. ▪ This intersection is currently typically controlled by police after large events. ▪ There are limited holding areas for pedestrians waiting to cross. There are only narrow paths on either side of the Upper Roma Street bridge over the heavy rail corridor. ▪ Crossing Petrie Terrace at this point tends to be chaotic after events.

Link 4 to 25	**Northern Footpath along Upper Roma Street** 	▪ The existing footpath is approximately 4 metres wide however contains several obstructions. These cause difficulties during major pedestrian flows. ▪ At the Fire Station building driveway build-outs within the footpath are located to facilitate line of sight for exiting vehicles. This severely constrains the width available to pedestrians at this point. ▪ Pedestrians regularly spill onto the road both before and after matches along this path. ▪ The supply of pedestrians to this link after matches is presently choked because of restrictions closer to the stadium.
Link 9 to 10	**Southern Kerb Upper Roma Street West of Skew Street** 	▪ The southern footpath of Upper Roma Street is currently used as a local connection. ▪ Pedestrian conditions are extremely constrained as illustrated by the adjacent photo. ▪ This footpath also forms an access route for pedestrians to/from Southbank via the William Jolly Bridge. ▪ The current the signal phasing at the intersection of Skew Street and Upper Roma Street is impractical for pedestrians crossing between the southern and northern footpaths en-route to Southbank.
Link 5 to 6 to 7	**Roma Street east of Countess Street & Countess Street** 	▪ The footpaths on each side of Countess Street under the Railway Bridge over Countess Street are important links from the Petrie Terrace area to the CBD. ▪ Pedestrian crossing of Countess Street is available at grade via the signalised intersection, however there is a small refuge island for crossing the left-turn movement into Roma Street. This is insufficient to handle crowds. ▪ The current pedestrian footpath on the north side of Roma Street east of Countess Street is approximately 2.5 metres wide and has insufficient capacity for crowds after events. The signalised crossing of the driveway for coaches and carpark traffic at the Transit Centre along this route to the rail station entry represents a major conflict point with very limited pedestrian holding area. ▪ The planned Inner Northern Busway route to Countess Street will further add to the complexity of this intersection for at- grade pedestrian movements.
Link 15 to 16	**Caxton Street east of Stadium** 	▪ Caxton Street is an important meeting place for spectators before and after events at Lang Park. ▪ It is the venue for the informal, but time-honoured team bus parade before State of Origin Rugby League matches. ▪ Caxton Street is the only pedestrian route from the Stadium which has land uses compatible with a high quality pedestrian route, ie, active land uses abutting the route. ▪ The footpaths along either side of Caxton Street are typically 4 metres wide however contain many features such as street furniture, plantings and footpath dining areas which result in very narrow points along the route. These features contribute highly to the ambience for everyday functions, however, they represent obstructions to peak movements before and after events. ▪ Both before and after events heavy pedestrian flows spill out onto the roadway of Caxton Street.

Link 14 to 15	**Caxton Street Bridge over Hale Street** 	▪ The existing pedestrian route past the PCYC building, across the Hale Street overpass and then onto Caxton Street has extremely low pedestrian capacity. ▪ Conditions both before and after events can be quite chaotic with spectators walking along Caxton Street itself. ▪ There are anecdotal accounts of spectators, after a match, being so frustrated with delays beside the PCYC building that they jump down onto the Hale Street alignment below to take their chances crossing.
Link 14 to 13	**Caxton Street between Castlemaine Street and Hale Street** 	▪ This footpath on the south side of Caxton Street is narrow 2 to 3 metres with a great deal of wear of the concrete pavement. ▪ It is a popular spot for setting down passengers and also an access route to the stadium.
Link 12 to 13	**Castlemaine Street north of Chippendall Street** 	▪ This is a heavily used pedestrian area before and after main events. ▪ It is a meeting place, a route from the stadium north and south and caters for pedestrian movement to coach parking areas to the west. ▪ The taxi rank is located on the eastern footpath. ▪ Footpath width adjacent to the Stadium is very narrow (2 metres) although is more generous on the western side (5.5 metres).
Link 1 to 12	**Chippendall Street** 	▪ The southern entrance gate is not a major pedestrian thoroughfare because there are no major stands on this side of the stadium. ▪ Footpath widths are typically 3.5 metres.
Link 12 to 19	**Castlemaine Street south of Chippendall Street** 	▪ This is the main route for pedestrians walking to Milton Station. ▪ The footpaths are relatively wide but can be obstructed by parked cars. ▪ A signalised pedestrian crossing of Castlemaine Street is provided at the Milton Road signals and signalised crossing of Milton Road is allowed on the Milton Road west leg. ▪ Pedestrian movements at this intersection are police controlled post-event.

Link 1 to 20	**Crossing of Milton Road from the Stadium** 	▪ This connection is made via a footpath beside the left turn slip lane from Milton Road (west) to the Hale Street underpass (north). ▪ It is not heavily used at present after events partly because of pedestrian congestion at the northern end of the pedestrian footway connecting the western end of Chippendall Street to Milton Road.
Link 19 to 23	**Northern Footpath of Milton Road West of Castlemaine Street** 	▪ This link is mainly used by pedestrians destined for Milton Railway Station. ▪ It is reasonably wide except for a restriction at the bus stop outside the BP service station. ▪ It carries moderate everyday pedestrian traffic flows. ▪ Crossing of Milton Road to the Railway Station is problematic and ad-hoc.
Link 20 to 21	**Southern Side of Milton Road Castlemaine Street to Milton Station** 	▪ This footpath is used by pedestrians bound for the Milton Railway Station or spectators with cars parked in the Railway Terrace area that access their cars via the Cribb street underpass. ▪ The footpath is narrow at only 2 metres. There is very limited holding area at the signalised pedestrian crossing of Cribb Street along the route. ▪ After events pedestrians sometimes walk on the westbound kerb side lane on Milton Road with their backs to on coming traffic.
Link 21 to 22	**Southern Side of Milton Road near Milton Railway Station**  	▪ This footpath is very narrow (only 2 metres)in places and there are obstructions within the footpath area as can be seen in the adjacent photograph. ▪ The overhead pedestrian footway to Milton Station with stepped access to platforms is also quite narrow with limited capacity to cater for crowds.

West of Node 13	**Given Terrace west of Castlemaine Street** 	▪ This link is moderately used after events as it provides access to cafes/restaurants/hotels at Paddington and carparking in the local streets. ▪ The footpath width is reasonably wide at 3 to 4 metres, although the presence of some footpath furniture creates local pinch points.
Link 16 to 17	**Petrie Terrace north of Caxton Street** 	▪ This route is moderately used after events as it provides an alternative although longer access to Countess Street and to access Roma Street Station and the CBD ▪ This link will provide the key route to the future INB bus station on Countess Street ▪ The footpath width is moderately wide on the western side although narrower on the eastern side adjacent to the Victoria Barracks and on the Secombe Street connection to Countess Street. ▪ A signalised pedestrian crossing is provided across Countess Street and Secombe Street.
Link 1 to 15	**Hale Street Between Caxton Street and Petrie Terrace** 	▪ This pedestrian path (3-4 metres wide) forms a connection between the southern and northern ends of the stadium. ▪ Severe pedestrian congestion is experience here post event. ▪ Passengers waiting to depart on BCC buses from Hale Street constrict the flow of through pedestrians. ▪ Severe congestion is experienced where the eastern stand gates empty onto the pathway. ▪ Significant two-way pedestrian flow also add to congestion in this area.

(b) Cycle Network

Several key cycle routes operate in the vicinity of Lang Park as shown on **Figure 5.2.31**. Bicycle routes fall into two categories:

- Off-Carriage Bikeways which are separated from motor vehicle traffic. These paths are either shared footways, segregated footways or bicycle only pathways.
- On-Carriage Bikeways which are shared with motor vehicle traffic. These may be bicycle routes or bicycle lanes.

The closest bicycle route to Lang Park is immediately south of the stadium (approximately 500m) and is an off-carriageway bikeway located parallel to Coronation Drive. This route can access western and eastern cycle networks directly and the southern cycle network indirectly via Victoria Bridge and Southbank Parklands. A number of on/off access points exist along the section of bikeway adjacent to the stadium.

Located slightly further to the north-east of the stadium (approximately 800m) is a dedicated off-carriageway bikeway which accesses northern cycle networks. The starting point of this bikeway is located adjacent to the Kelvin Grove Road/Musgrave Road/Countess Street intersection.

At present there are no dedicated cycle links, whether on-carriageway or off-carriageway, directly linking Lang Park Stadium to the existing cycle network. Direct routes to access existing networks to and from the stadium would require cyclists to travel heavily trafficked roads or alternatively utilise existing pedestrian footpaths and signalised pedestrian crossings at intersections.

Brisbane City Council's 1998 Bicycle Plan identified the potential provision of a future on-carriageway bikeway along the Caxton Street/Given Terrace corridor, however no detailed planning for this has yet been undertaken by Council.

5.2.4 References

Reference material used in this assessment includes:

- *Suncorp Metway Stadium – Pedestrian Study I, Pedestrian Study II & Pedestrian Study Comparison.* Ove Arup and Partners, October 1999.
- Roger Brameld Consulting Pty Ltd Traffic Report (August 1993) *Traffic Report for Proposed Redevelopment of Lang Park* prepared for Lang Park Trust.
- Eppell Olsen for Queensland Transport *Inner Northern Busway Interim Connections to Western Services Study.*
- *Inner City Transit Plan.* Under preparation by Brisbane City Council, Brisbane Transport and PPK.
- *South East Transit and Inner Northern Busway Operational Plans.* Under preparation by Connell Wagner for Queensland Transport.
- Queensland Transport video surveys of 1999 Lang Park Major Event Pedestrian and Traffic Flows.

5.2.5 Summary of Existing Traffic Transport and Pedestrian Environment

Lang Park is located in close proximity to two major arterial road links, Hale Street and Milton Road. Both roads carry major traffic volumes, 45 000 and 50 000 vehicles per day respectively,

and will experience increases in traffic use upon the completion of Brisbane City Council's Inner City Bypass in late 2002. Milton Road experiences congested operations at several intersections during peak periods. The stadium is also accessible by the suburban route formed by Caxton Street and Given Terrace. Castlemaine Street, which serves the adjacent commercial/industrial precinct including the nearby brewery fronts the western stand.

There is no dedicated public transport infrastructure to directly service Lang Park. The Western Line operated by Queensland Rail runs adjacent to Milton Road. Milton and Roma Street stations are the closest to the stadium being about a 650 metres and 1 kilometre walk respectively. Roma Street is a major CBD rail hub and is designed to cater for large volumes of passengers and trains. Milton is a suburban station with four platforms available for use. There are a range of Brisbane Transport regular buses associated with local and western corridor services operating on roads around the Stadium. Busway stations are planned at Roma Street and Countess Street in conjunction with the Inner Northern Busway project due for completion by 2003 and a high frequency bus system is proposed to utilise these facilities. The Brisbane Light Rail Project system is planned to serve light rail stations at Roma Street and potentially Countess Street.

For major events currently at Lang Park special traffic arrangements are made in the locality, mainly to manage the traffic impacts and congestion caused by the large volume of private vehicles that park in the surrounding local area and walk to the stadium. The current mode split for major events is over 50% of travel occurs by private vehicles and data indicates that the private car use to Lang Park has probably increased over the last 6 years. Rail travel is the most important public transport mode, although currently the majority of use occurs from Milton Station. A small number of special trains are provided for major events.

Surveys of pedestrian movement and mode of travel at two major events at Lang Park, a State of Origin match and a Tri-Nations Rugby match, were undertaken by the Lang Park Trust in 1999. For major matches around 30% of travel occurs from outside the Brisbane area and coaches are an important form of travel for this market segment. These are catered for by coach parking in the adjacent streets fronting commercial/industrial premises. Some shuttle bus services are provided between Lang Park and the City, and some direct buses are provided to and from regional bus stations in suburban Brisbane. These buses set-down and pick-up at kerbside locations on the surrounding roads including Hale Street. Hale Street, a major road in Brisbane's regional network, is closed to all traffic in the northbound direction except buses serving Lang Park for about a 2 hour period encompassing a major event finish. This is to provide for pedestrian safety in the area due the constrained area available for bus patrons and pedestrian exiting the environs of the Stadium towards Milton Road and Caxton Street. Considerable conflicts and pedestrian congestion occurs due to the lack of footway width to accommodate people travelling in opposite directions generally along this eastern frontage.

Prior to a major event there are problems experienced with catering for pedestrian movement along Caxton Street due to the physical constraints that exist due to the streetscaped footpaths and activity from adjacent hotels and venues. Safety issues currently arise for pedestrian movement from the venue after a match, particularly along Milton Road and Upper Roma Street towards the City, and along Milton Road towards Milton Station where existing footpath widths are insufficient to cater for peak demands. Long delays are experienced by pedestrians on the Hale Street overbridge and pedestrian flows spill over into the traffic lanes on Milton Road and Upper Roma Street at times. This in turn contributes to traffic congestion and management problems. Special duty police officers are used post-event for traffic, pedestrian and crowd control activities.

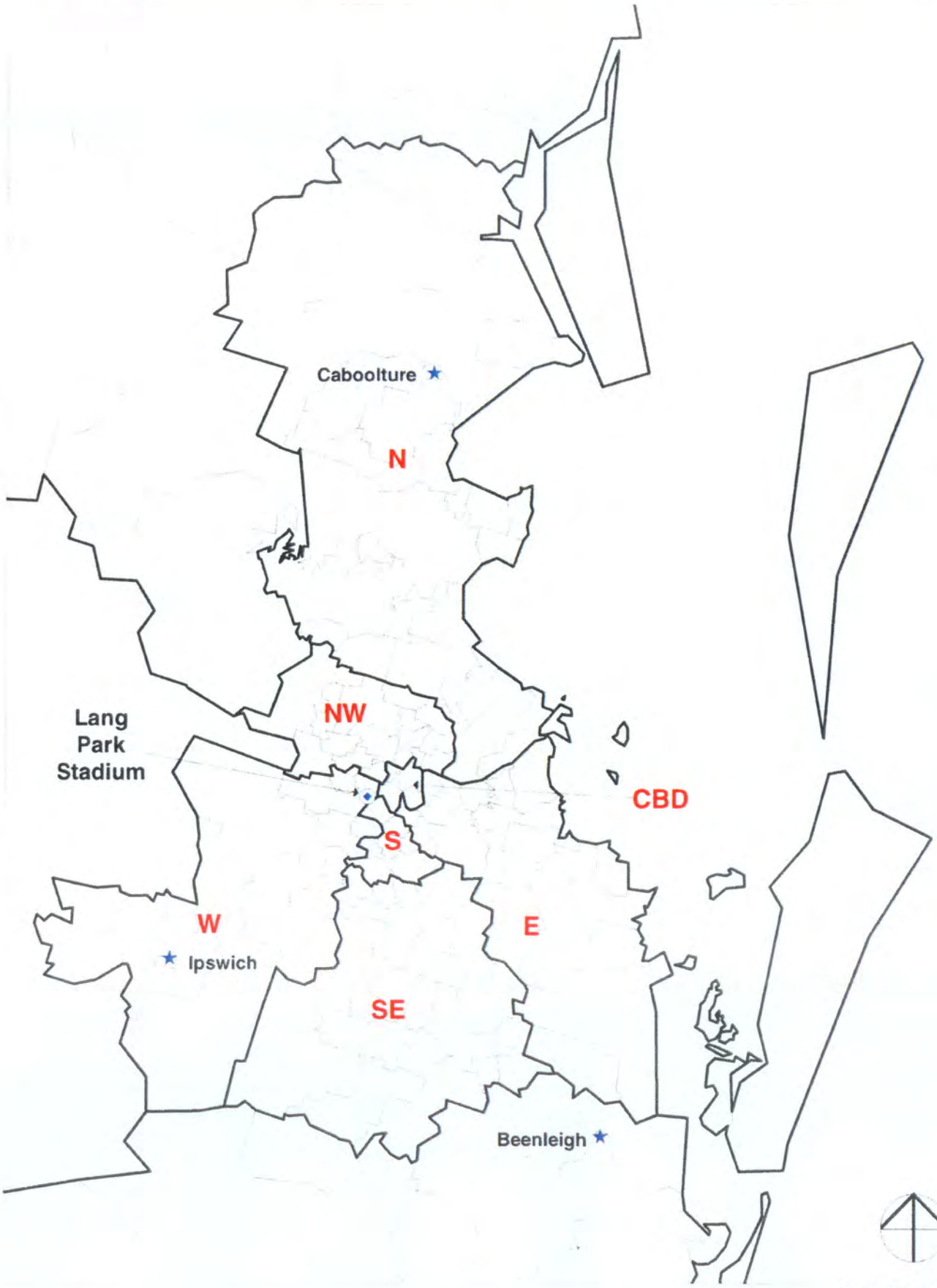


FIGURE 5.2.1
Stadium Catchment Sectors

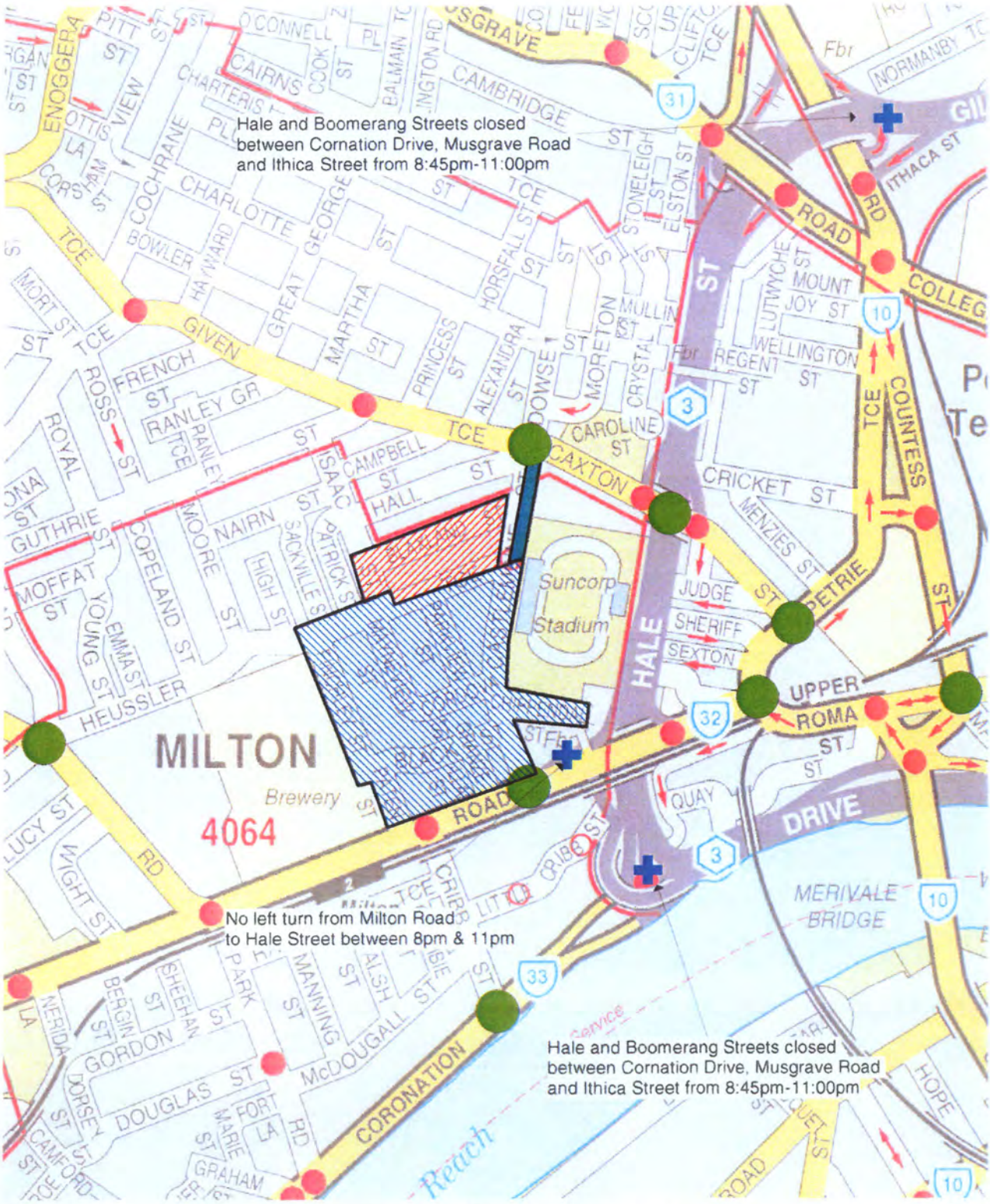


FIGURE 5.2.2
Existing Event Traffic Control & Restrictions

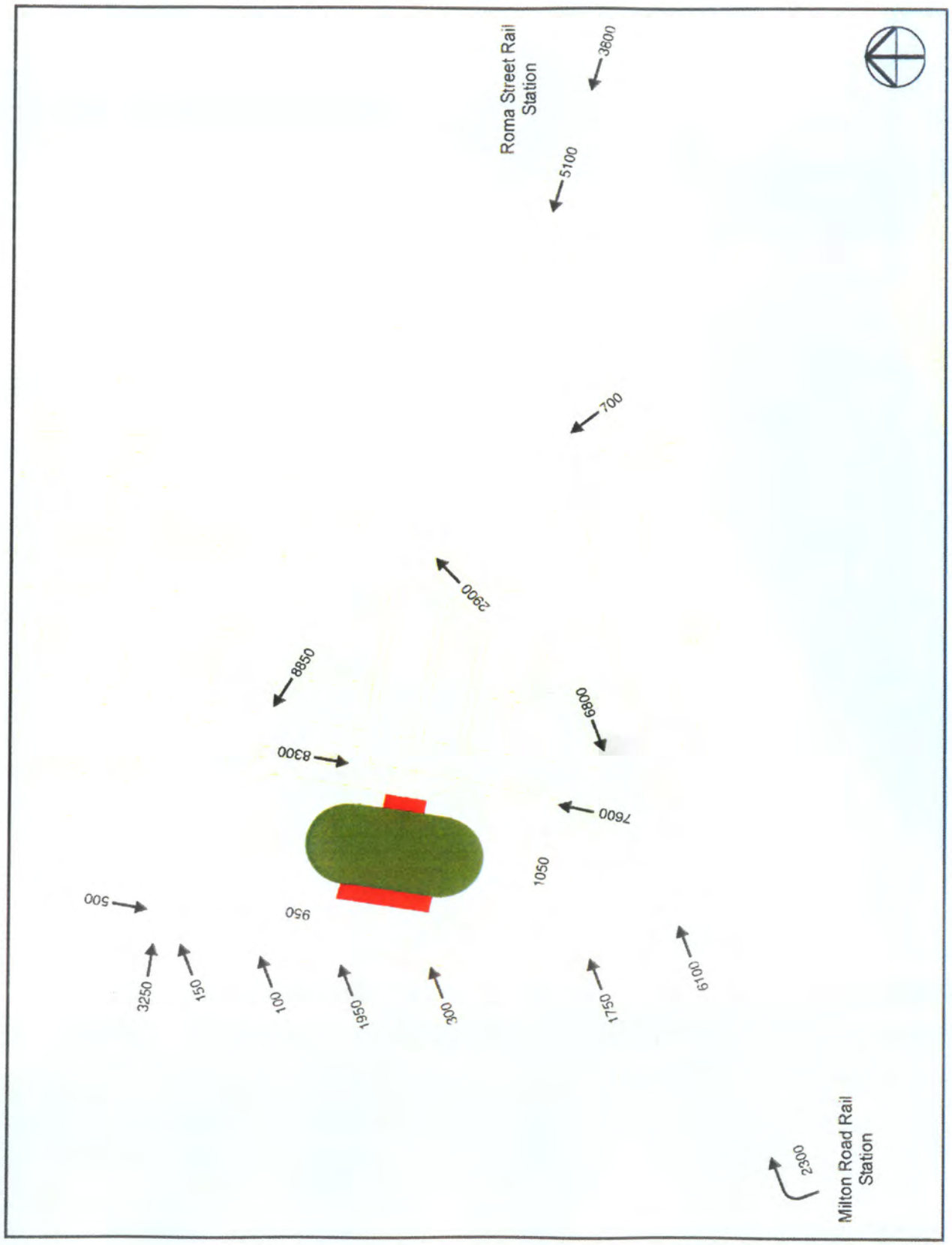


FIGURE 5.2.3

State of Origin Match (26/05/99) – Arrival Crowd – Flow in Key Locations (5pm to 8pm)

Source: (Arup Surveys – Reference 1)

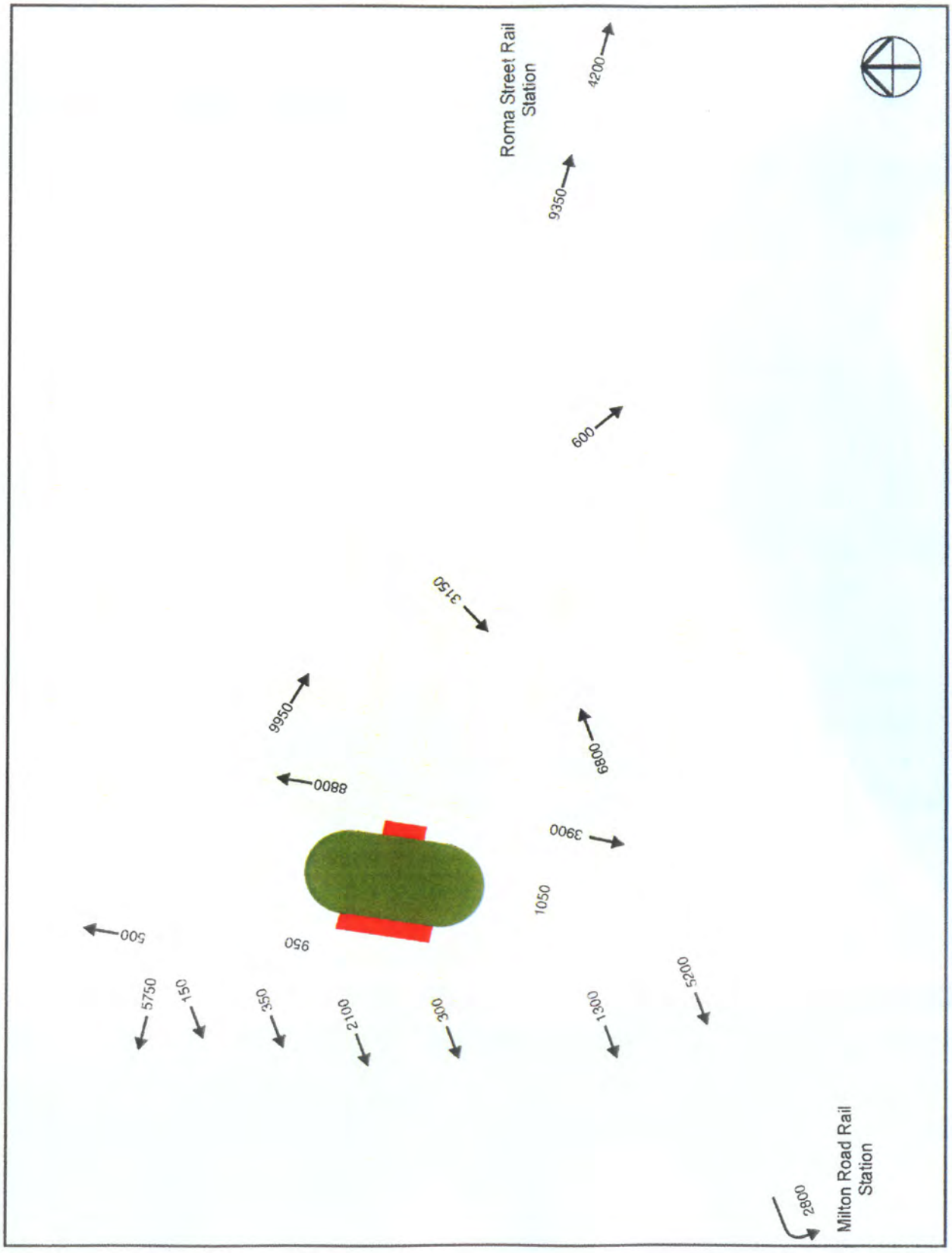


FIGURE 5.2.4

State of Origin Match (26/05/99) - Departure Crowd - Flow in Key Locations (9.30pm to 11.30pm)

Source: (Arup Surveys – Reference 1)

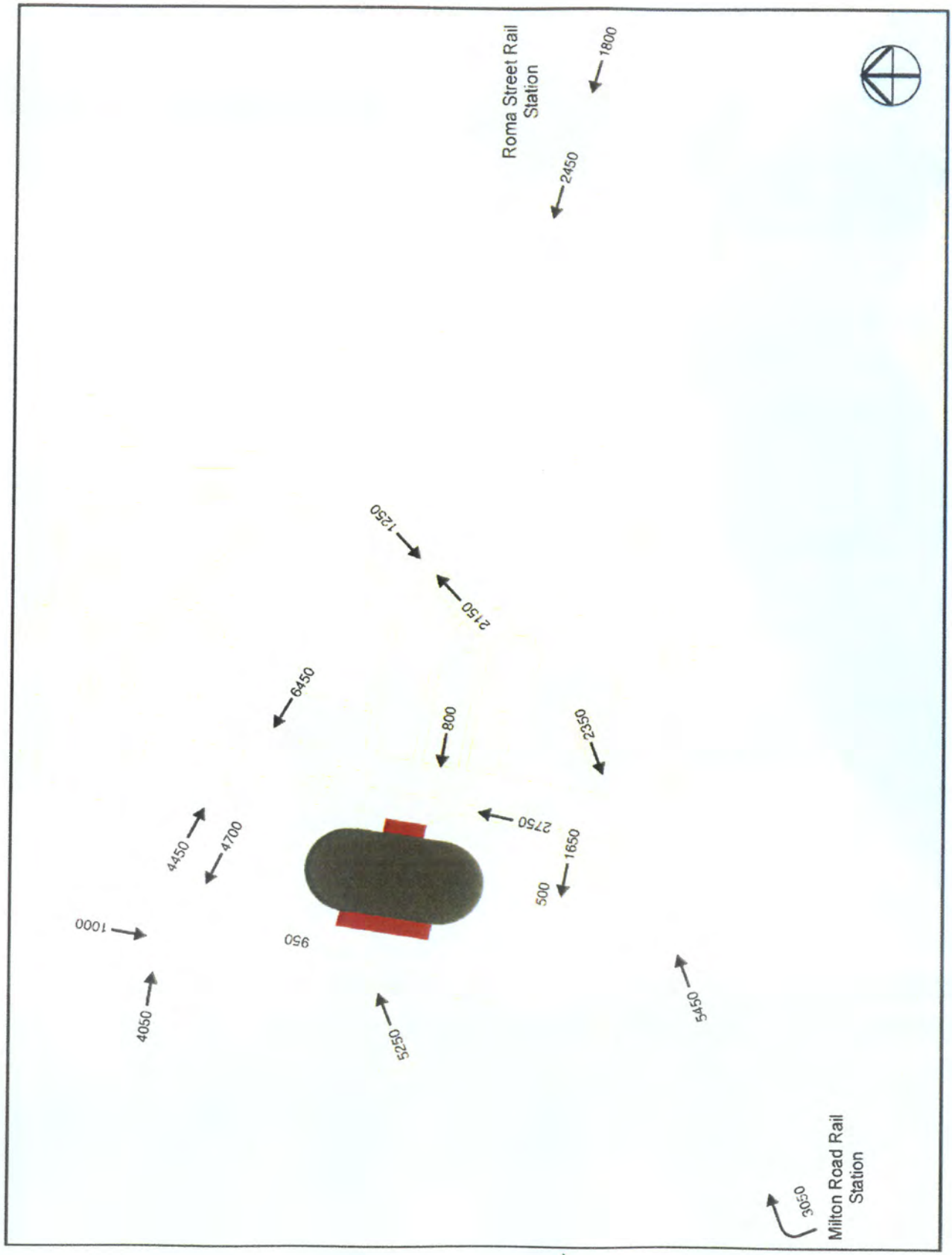


FIGURE 5.2.5

Tri-Nations Match (17/07/99) - Arrival Crowd - Flow in Key Locations (5pm to 8pm)

Source: (Arup Surveys – Reference 1)

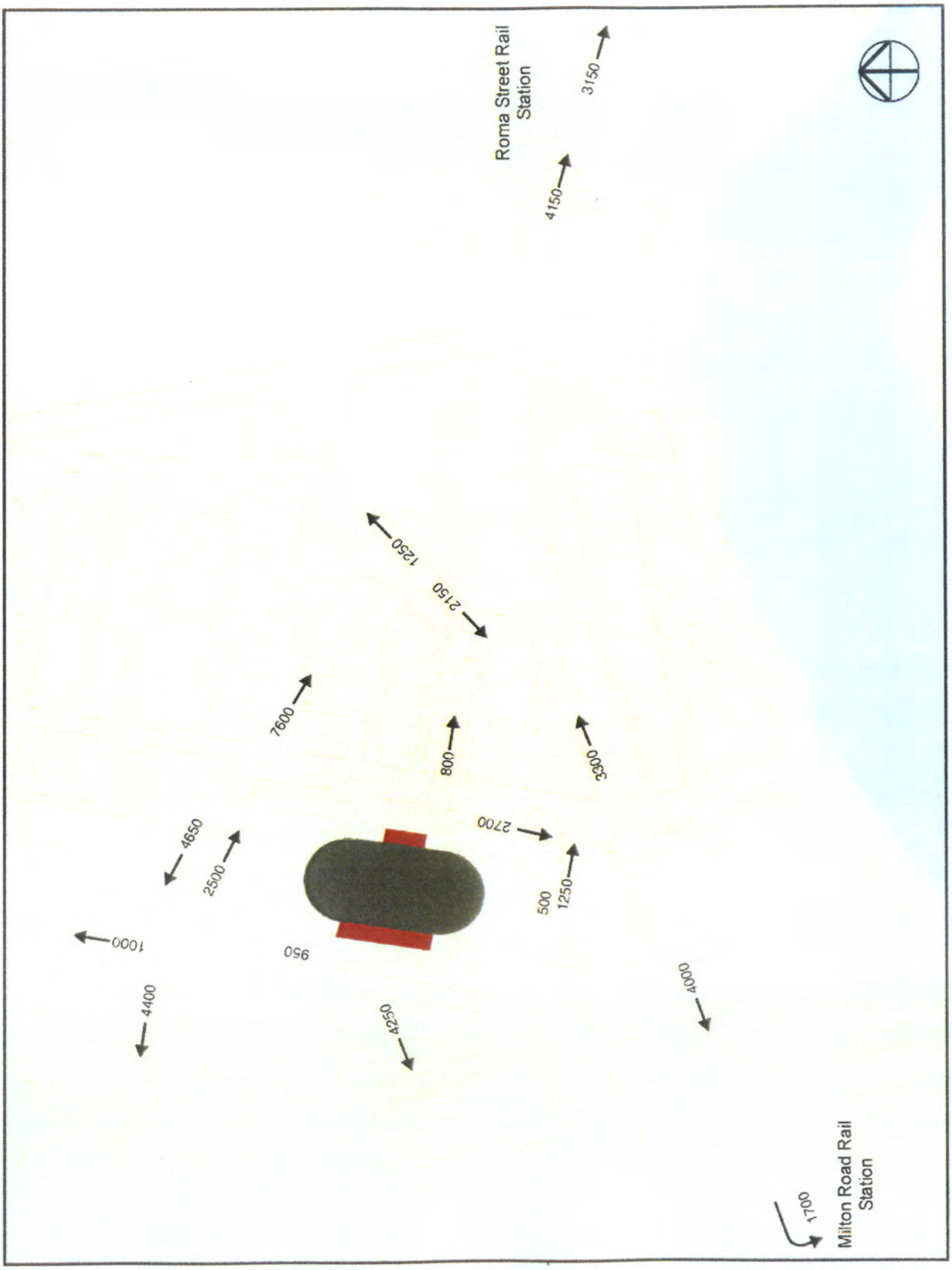
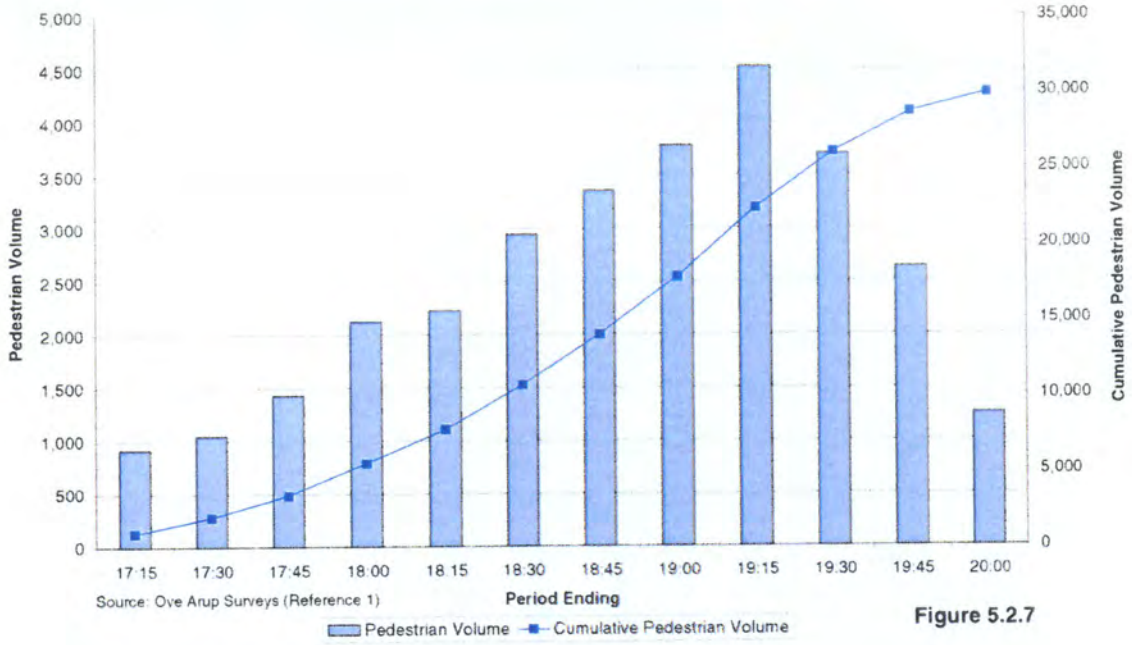


FIGURE 5.2.6

Tri-Nations Match (17/07/99) - Departure Crowd - Flow in Key Locations (9.30pm to 10.45pm)

Source: (Arup Surveys – Reference 1)

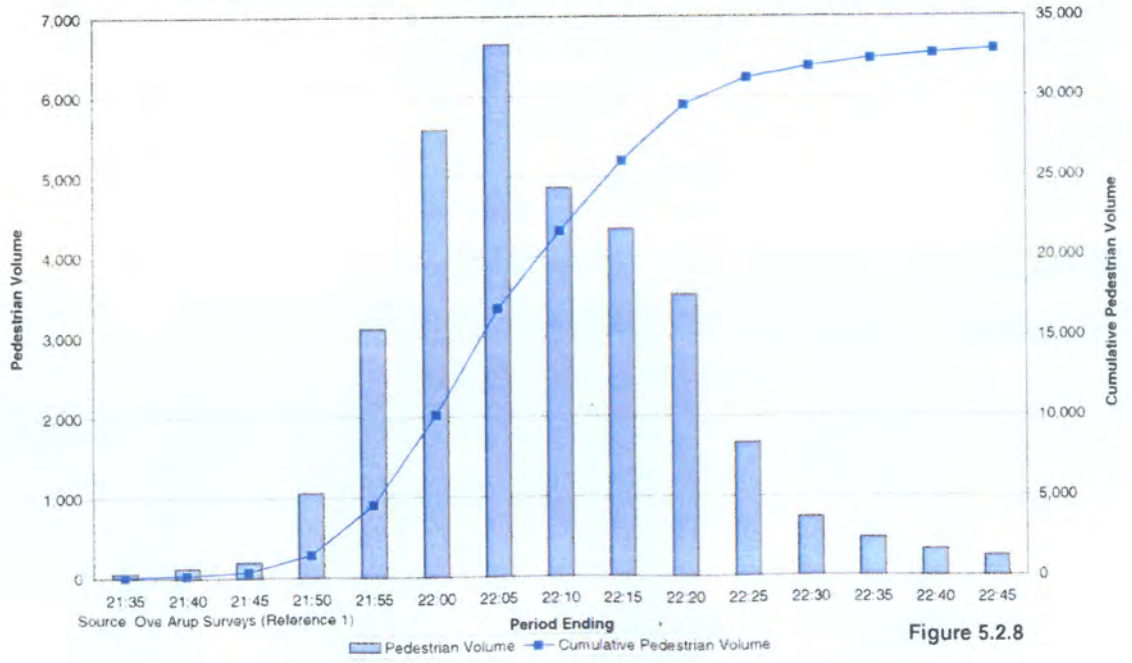
State of Origin Match (26/5/99) - 15 Minute Pedestrian Arrival Profile
(17:00 - 20:00 in 15 minute periods)



Source: Ove Arup Surveys (Reference 1)

Figure 5.2.7

State of Origin Match (26/5/99) - 5 Minute Pedestrian Departure Profile
(21:30 - 22:45 in 5 minute periods)



Source: Ove Arup Surveys (Reference 1)

Figure 5.2.8

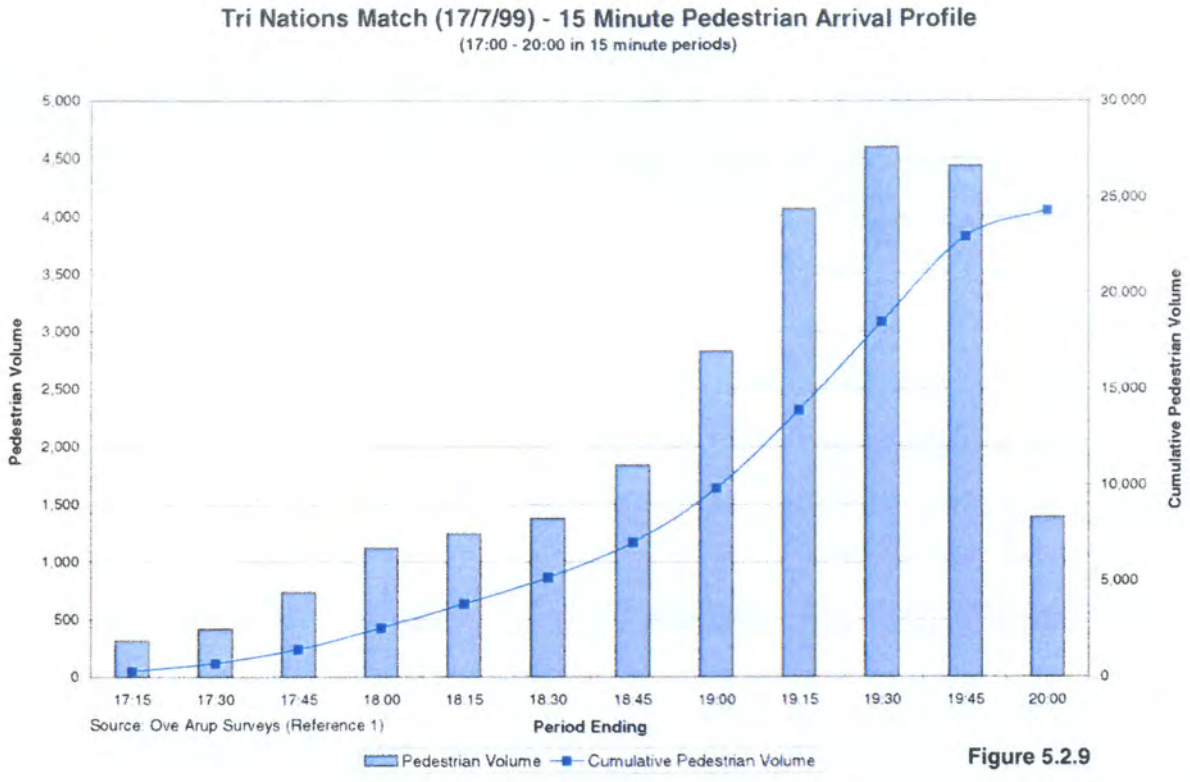


Figure 5.2.9

Figure 5.1 : 5 Minute Pedestrian Departure Profile
(21:30 - 22:30 in 5 minute periods)

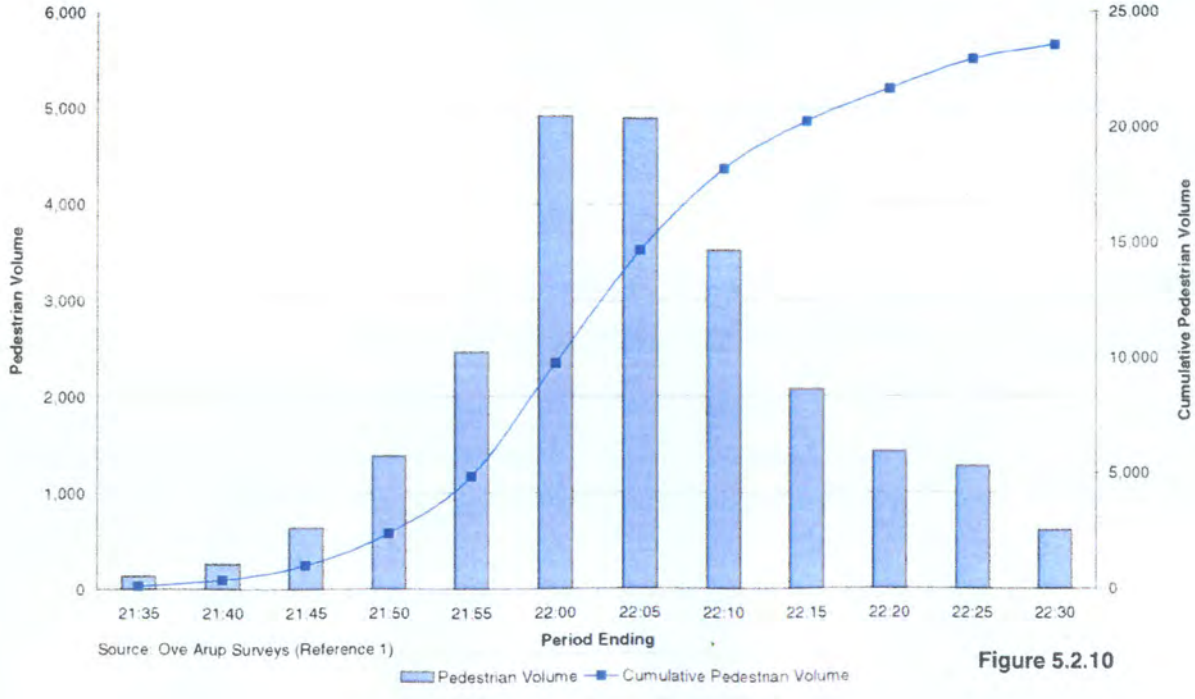


Figure 5.2.10

LEGEND

Public Transport

- P2 - Inner Northern Busway Sections
- P2 - Inner Northern Busway Sections B
- P5 - South East Transit Sections
- P5 - South East Transit Sections B
- P6 - Light Rail Preferred Network - Stage 1
- P6 - Opportunities for Extension of Light Rail Stage 2
- P8 - Coronation Drive Bus Lane
- P9 - Waterworks Road Transit Project

Roads

- P1 - Inner City Bypass Portions
- P1 - Inner City Bypass Portions B
- P4 - Grey Street

Other

- P10 - Bicentennial Bikeway Upgrade
- P11 - Proposed Pedestrain & Cycle Bridge
- P3 - S1 Sewer Main Stage 1
- P3 - S1 Sewer Main Stage 2

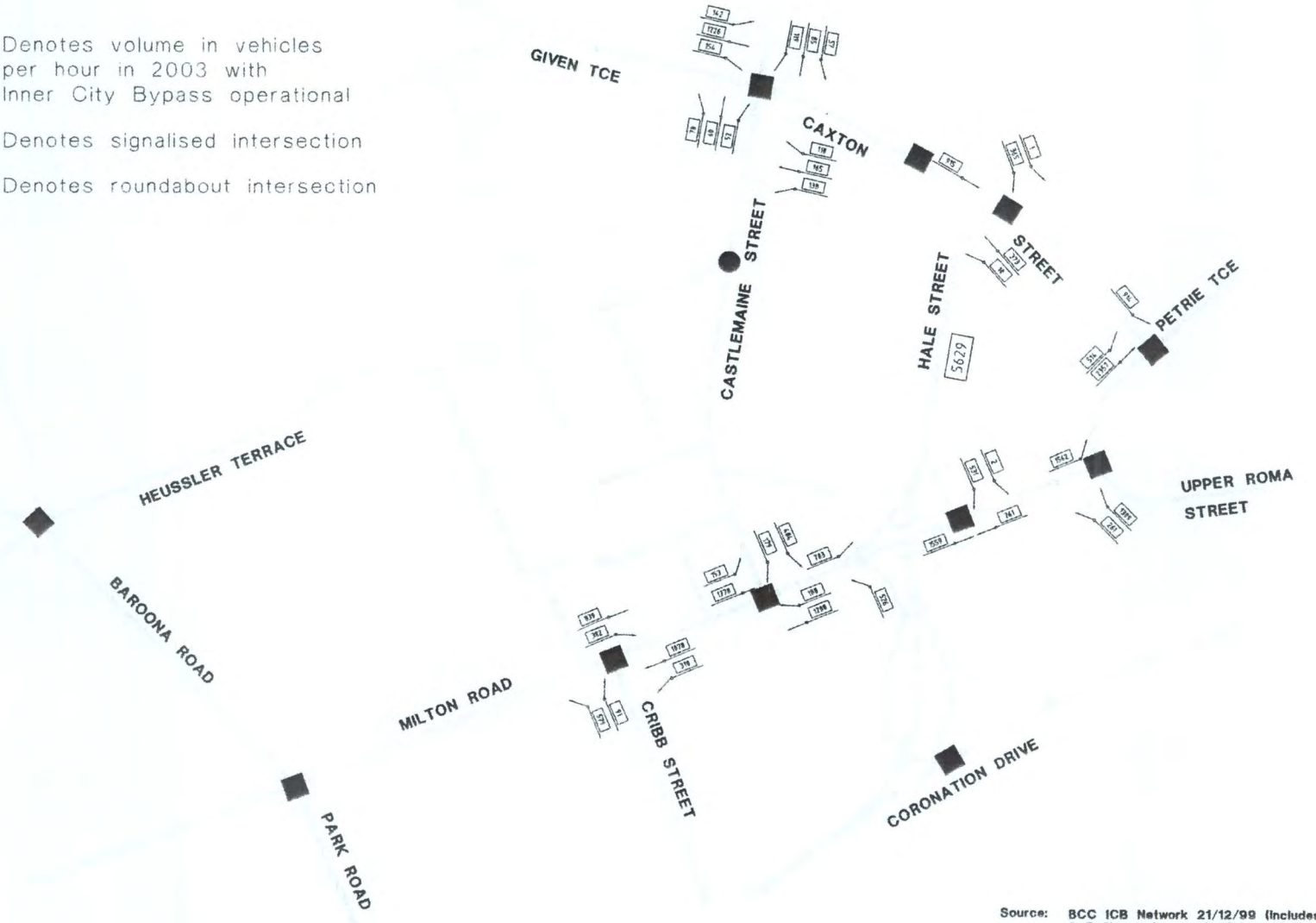
Figure 5.2.11
Major Inner City Projects

LEGEND

Denotes volume in vehicles per hour in 2003 with Inner City Bypass operational

Denotes signalised intersection

Denotes roundabout intersection

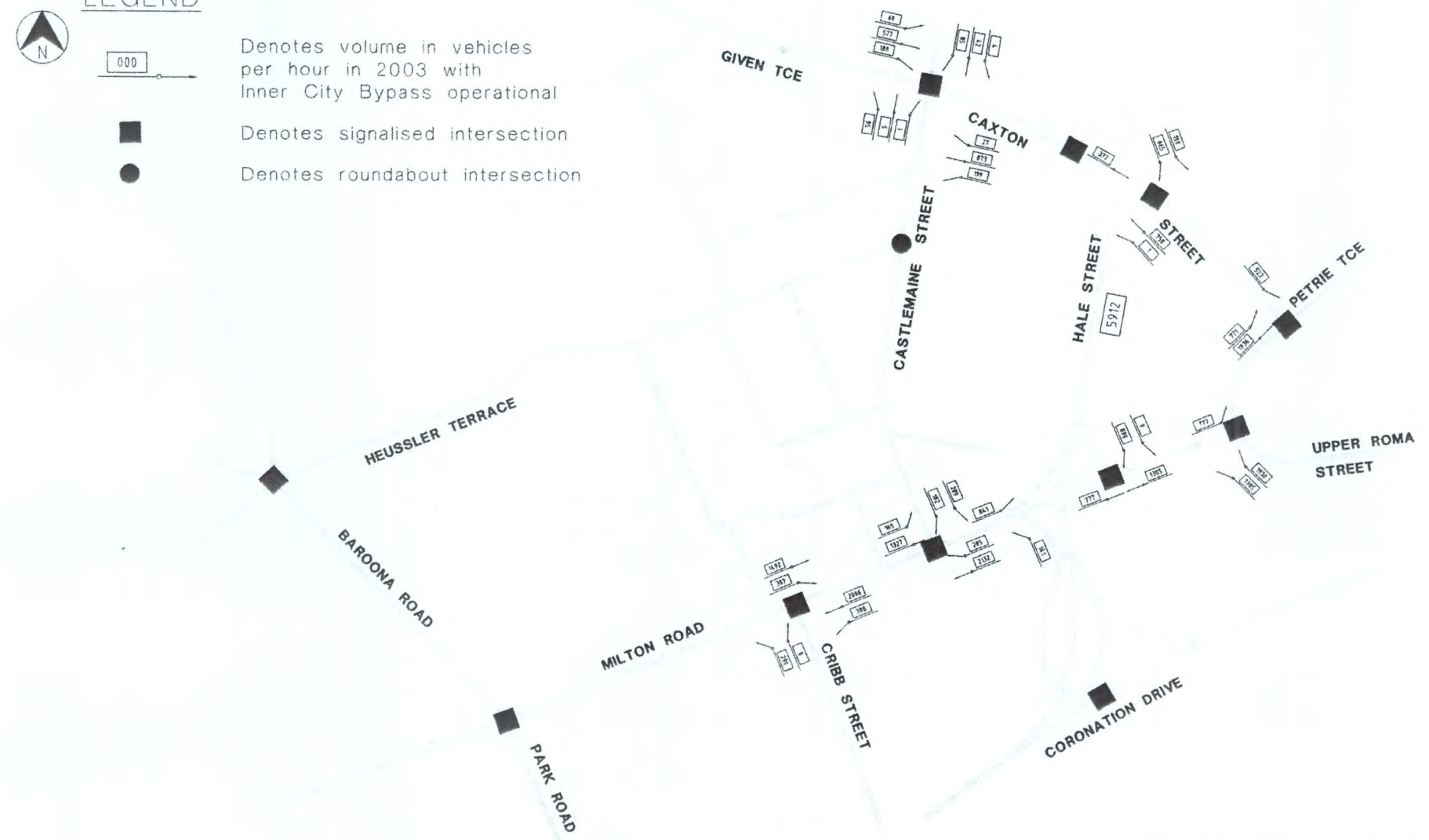


Source: BCC ICB Network 21/12/99 (Includes n1. inc file 3/2/00) & Buffer nodes west of Lang Park
BCC Matrix am99_3.ufm dated 20/12/99

ILENAME: 7055-T03.DWG
ATE: 12/05/00 - 11:53 am

LOCATION: J:\CISM\JOBS\DOT\RE07055\TRAFFIC\ACAD\
XREF: -

FIGURE 5.2.12
BASELINE WEEKDAY AM PEAK PERIOD



Source: BCC ICB Network 21/12/99 (include n1. inc file 3/2/00) & Buffer Nodes west of Lang Park
BCC Matrix pm99_4.utm dated 21/12/99

FILENAME: 7055-T04.DWG
DATE: 12/05/00 - 12:00 pm

LOCATION: J:\CISM\JOBS\DOT\RE07055\TRAFFIC\ACAD\
XREF: -

FIGURE 5.2.13
BASELINE WEEKDAY PM PEAK

Average Weekday Traffic Flow Profile
(Milton Road @ Hale Street)

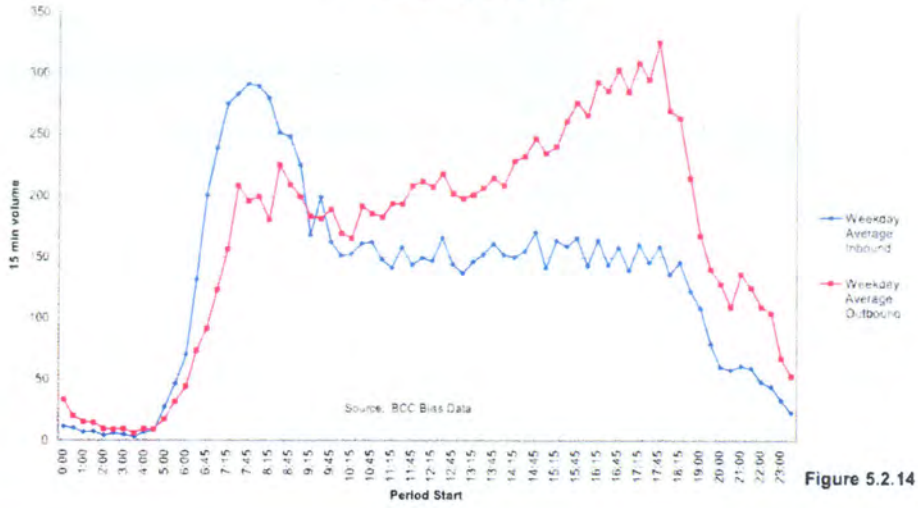


Figure 5.2.14

Saturday Weekday Traffic Flow Profile
(Milton Road @ Hale Street)

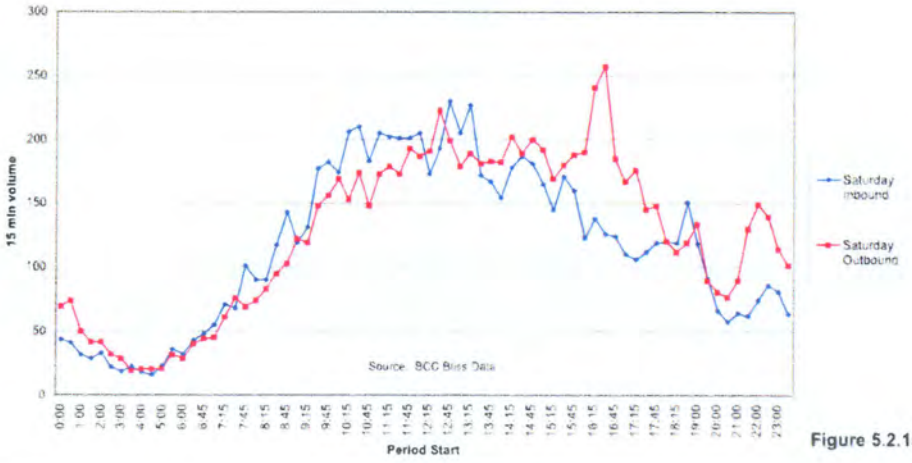
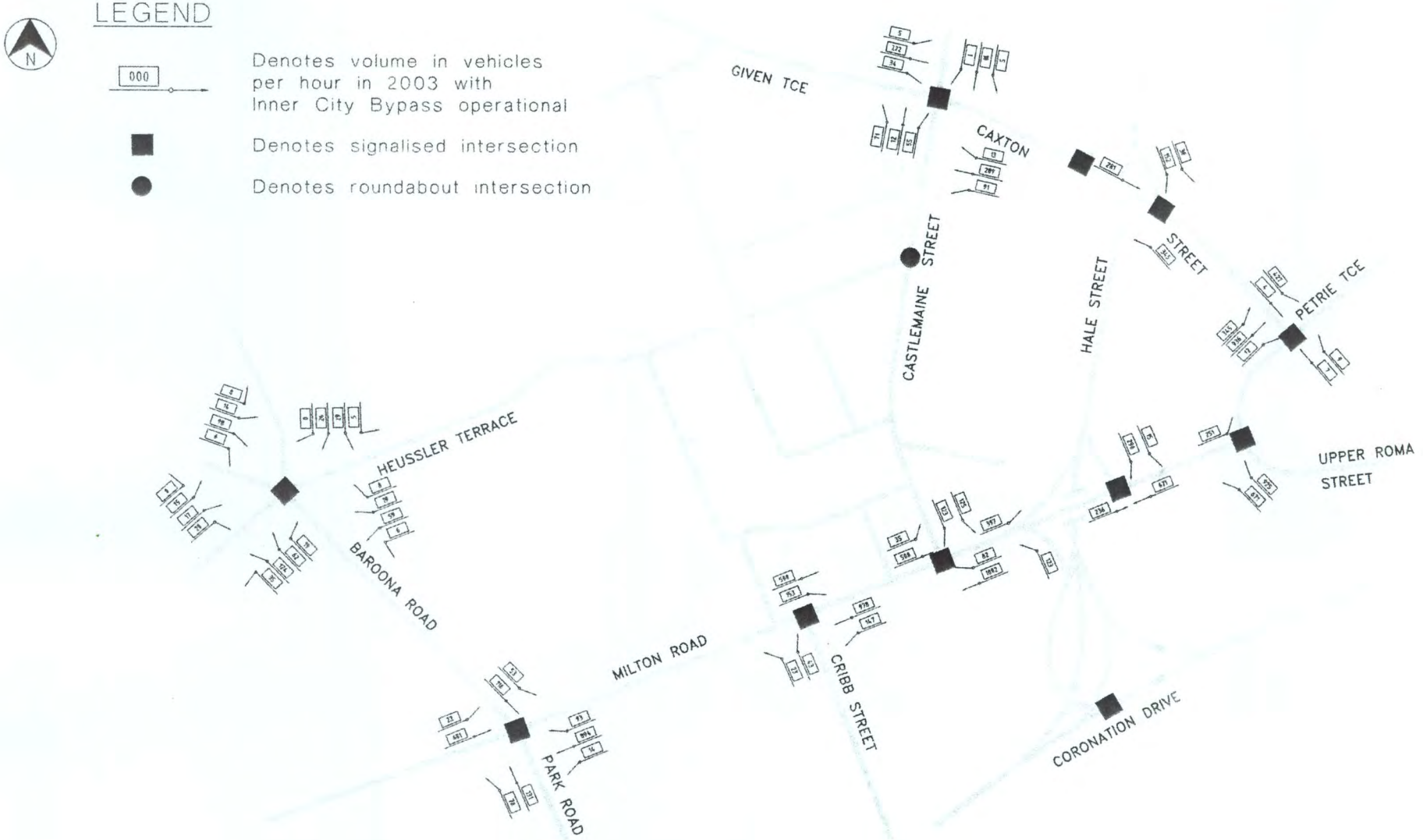


Figure 5.2.15

Sunday Traffic Flow Profile
(Milton Road @ Hale Street)

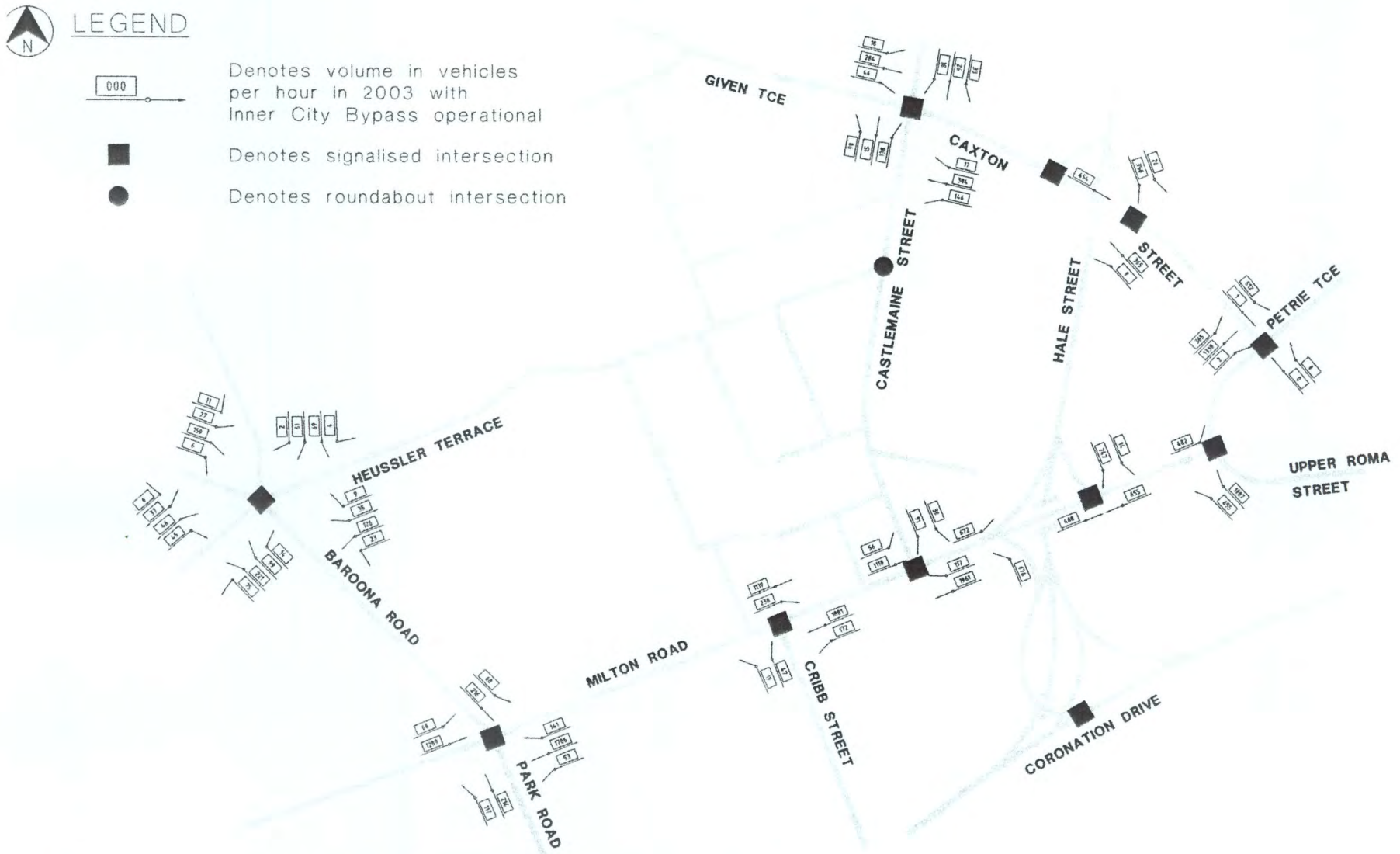
Figure 5.2.16



FILENAME: 7055-T01.DWG
DATE: 12/05/00 - 12:01 pm

LOCATION: J:\CISM\JOBS\DOT\RE07055\TRAFFIC\ACAD\
XREF: -

FIGURE 5.2.17
BASELINE EVENING POST EVENT REPRESENTATIVE HOUR



FILENAME: 7055-T02.DWG
DATE: 12/05/00 - 12.02 pm

LOCATION: J:\CISM\JOBS\DOT\RE07055\TRAFFIC\ACAD\
XREF: -

FIGURE 5.2.18
BASELINE WEEKEND AFTERNOON REPRESENTATIVE HOUR

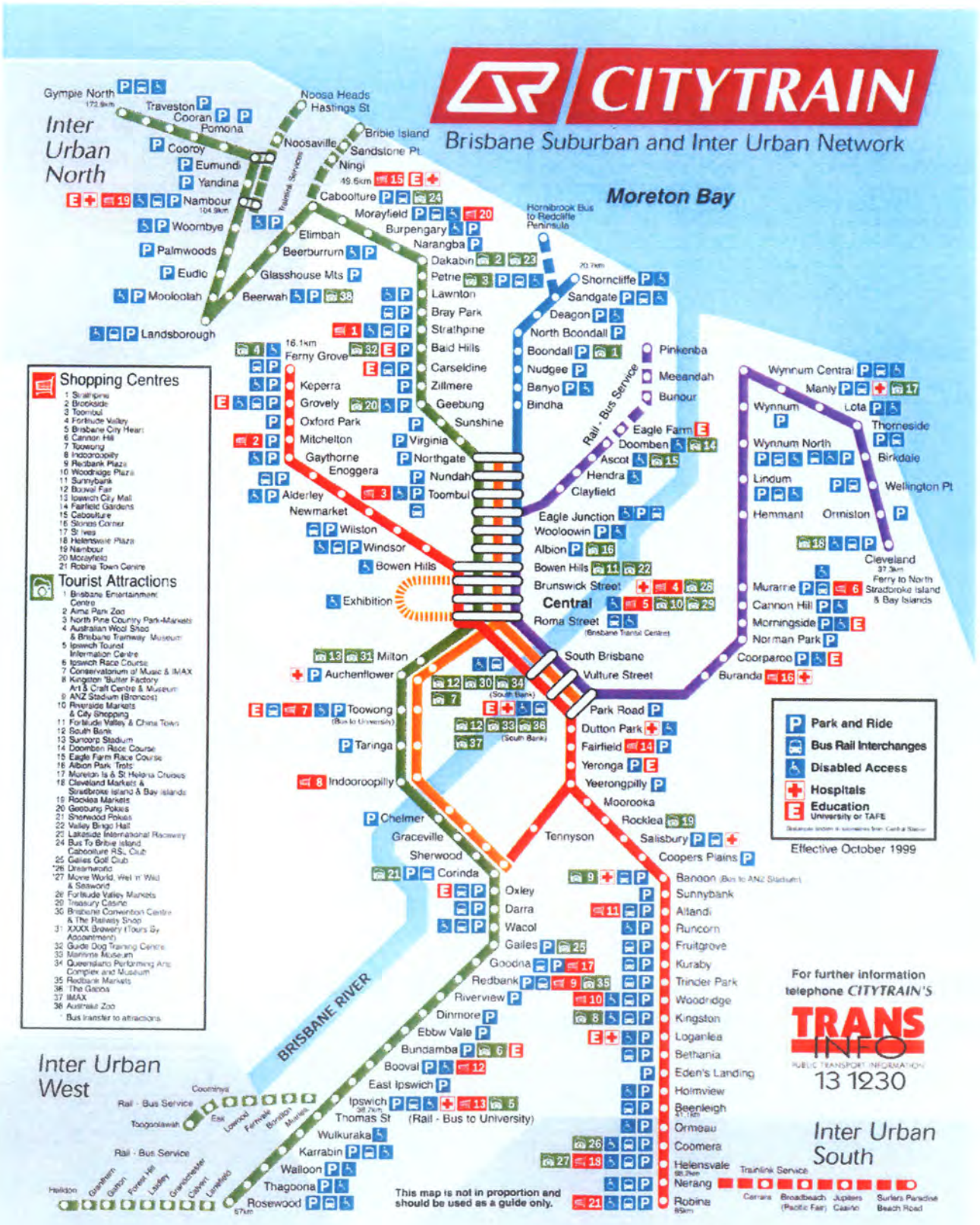
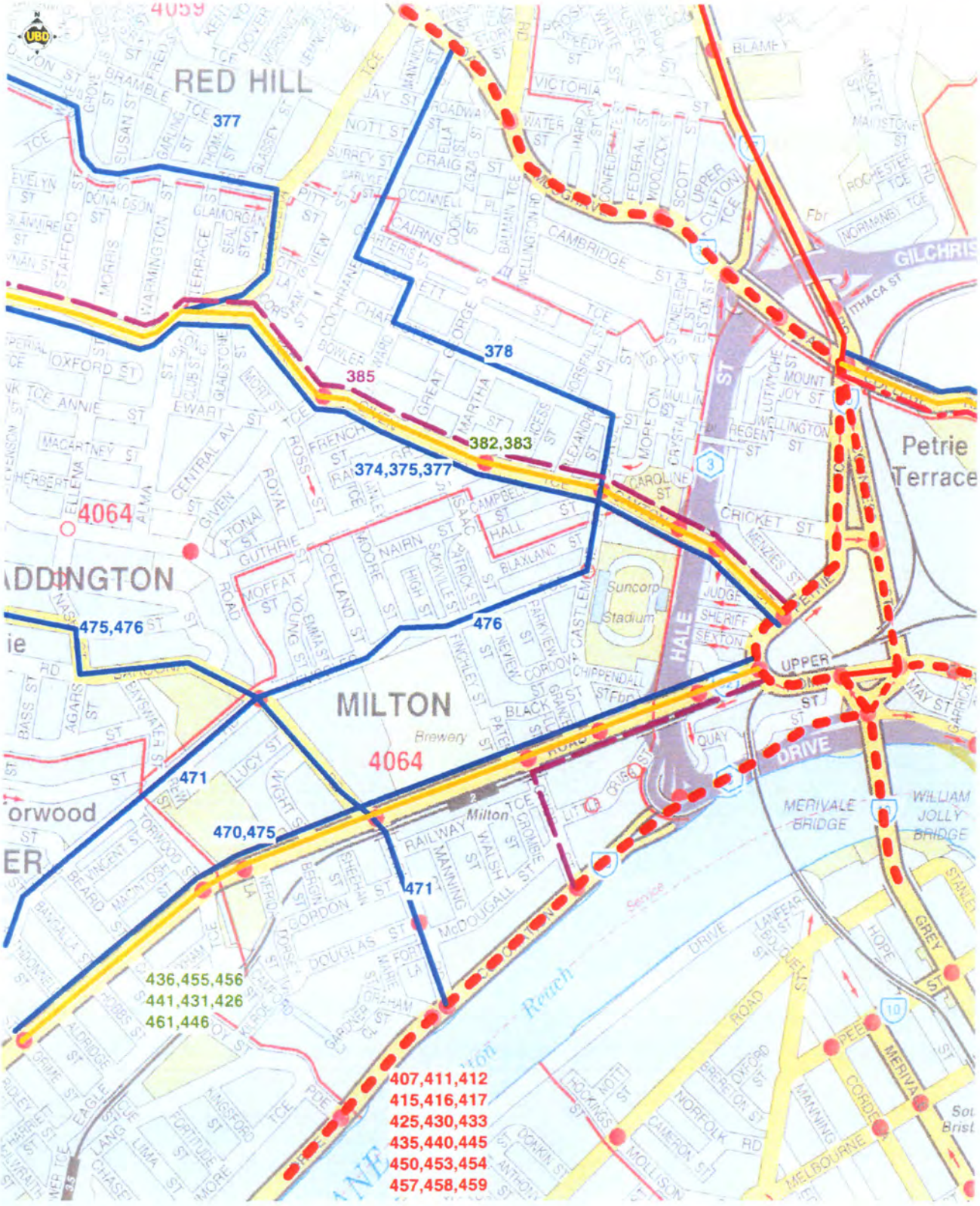


FIGURE 5.2.19
Brisbane Suburban & Inter Urban Rail Network
Source: Queensland Rail CityTrain



Multiple Bus Routes
Rocket
Express
All Stops
City Precincts
470,475 Bus Route Number

FIGURE 5.2.20
Existing Bus Routes

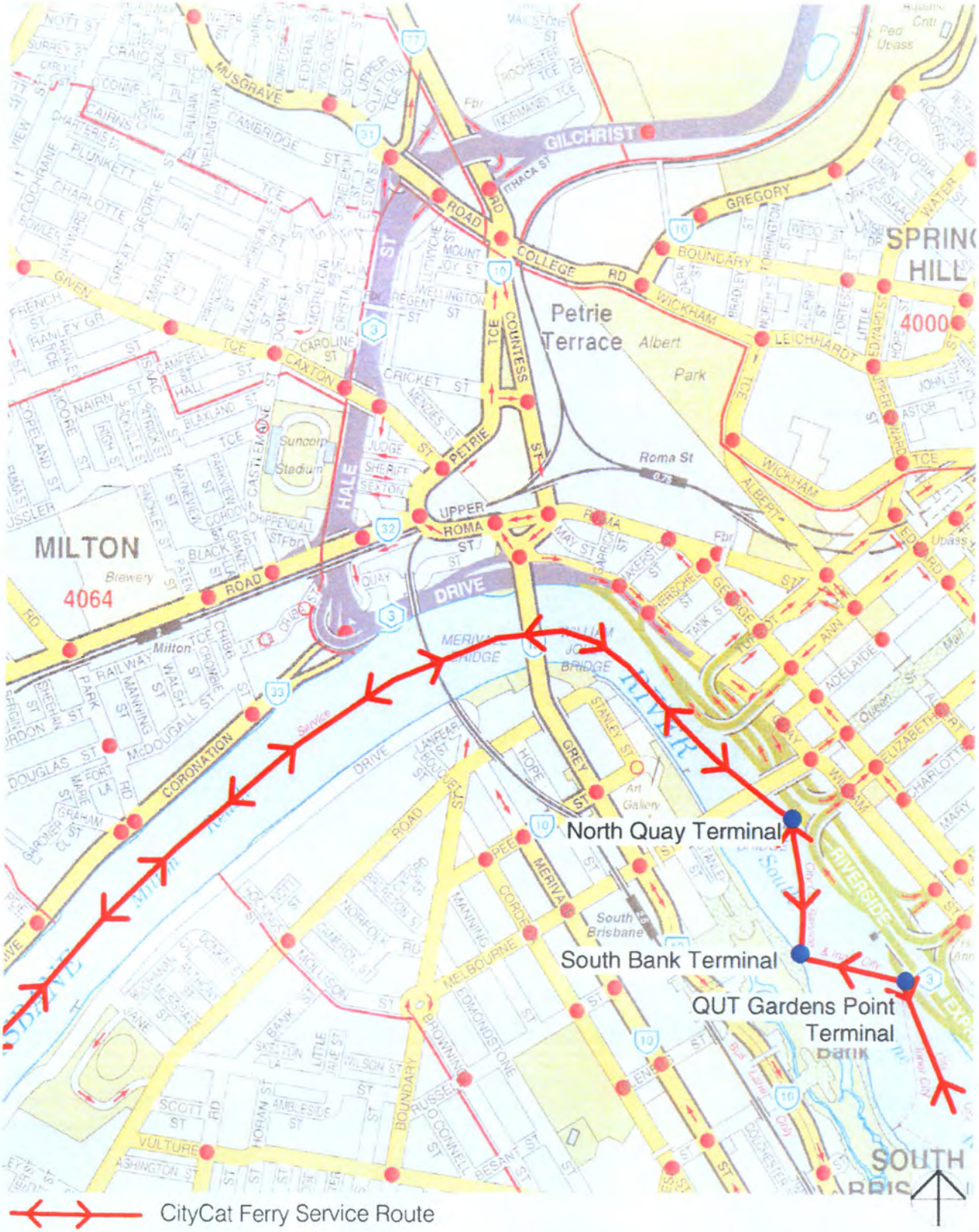
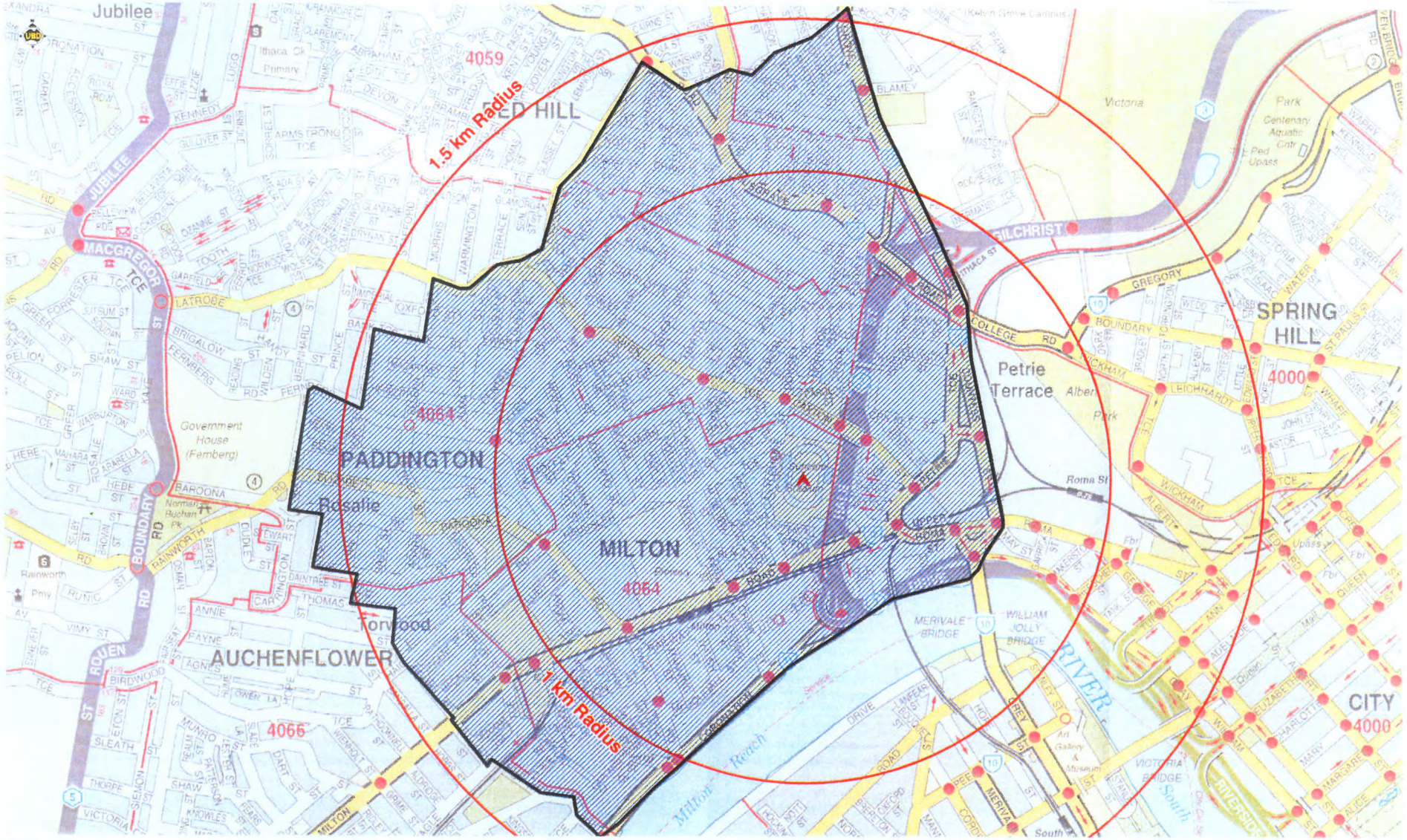


FIGURE 5.2.21
Existing Ferry Service Routes



Background Reproduced with Permission
Copyright Universal Press Pty Ltd

FIGURE 5.2.22
Local Area Parking Inventory Extent

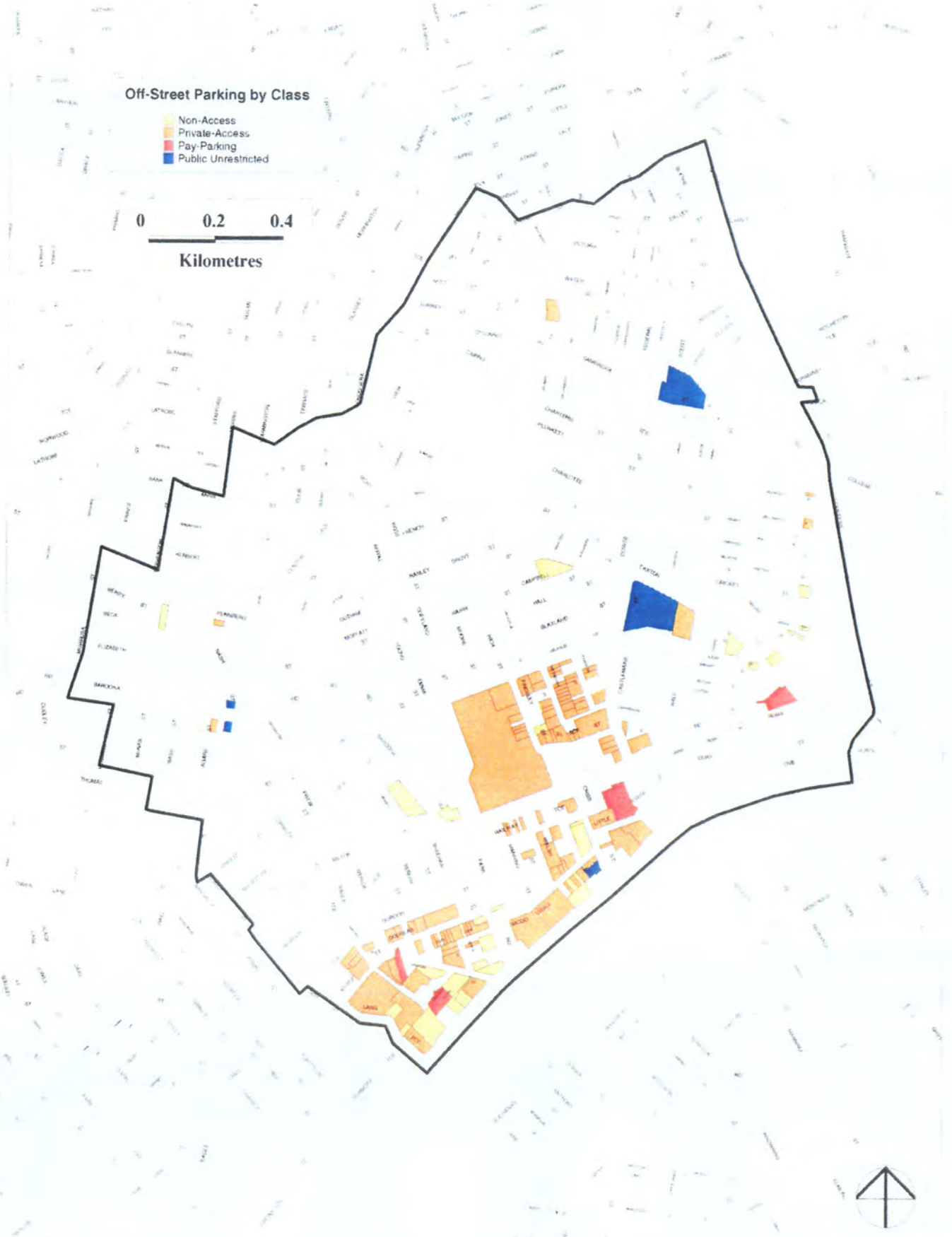


Figure 5.2.23
Parking Survey - Off Street Parking Classification

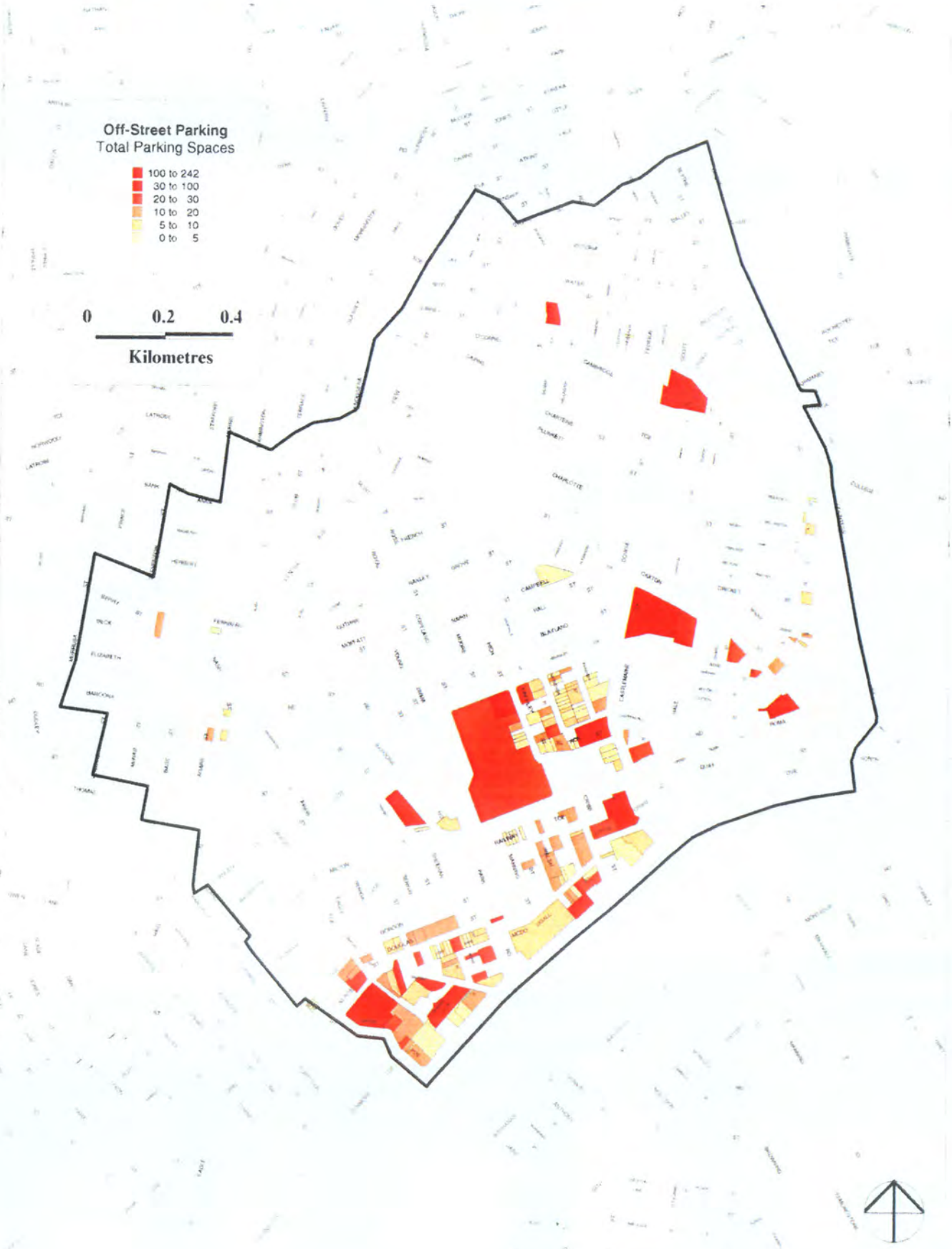


Figure 5.2.24
Parking Survey - Off Street Parking Quantity

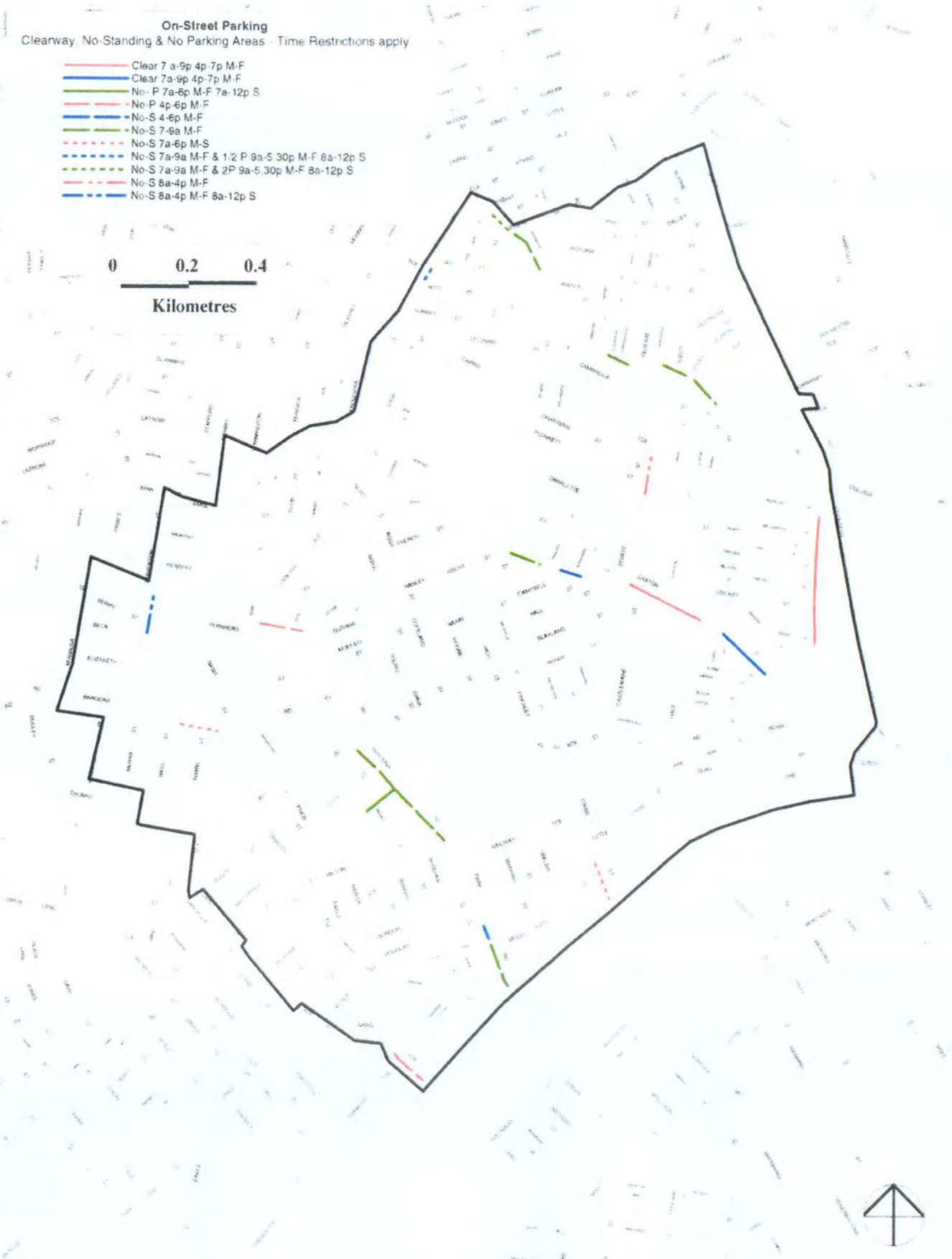


Figure 5.2.25
Parking Survey - On Street Parking Location and Type

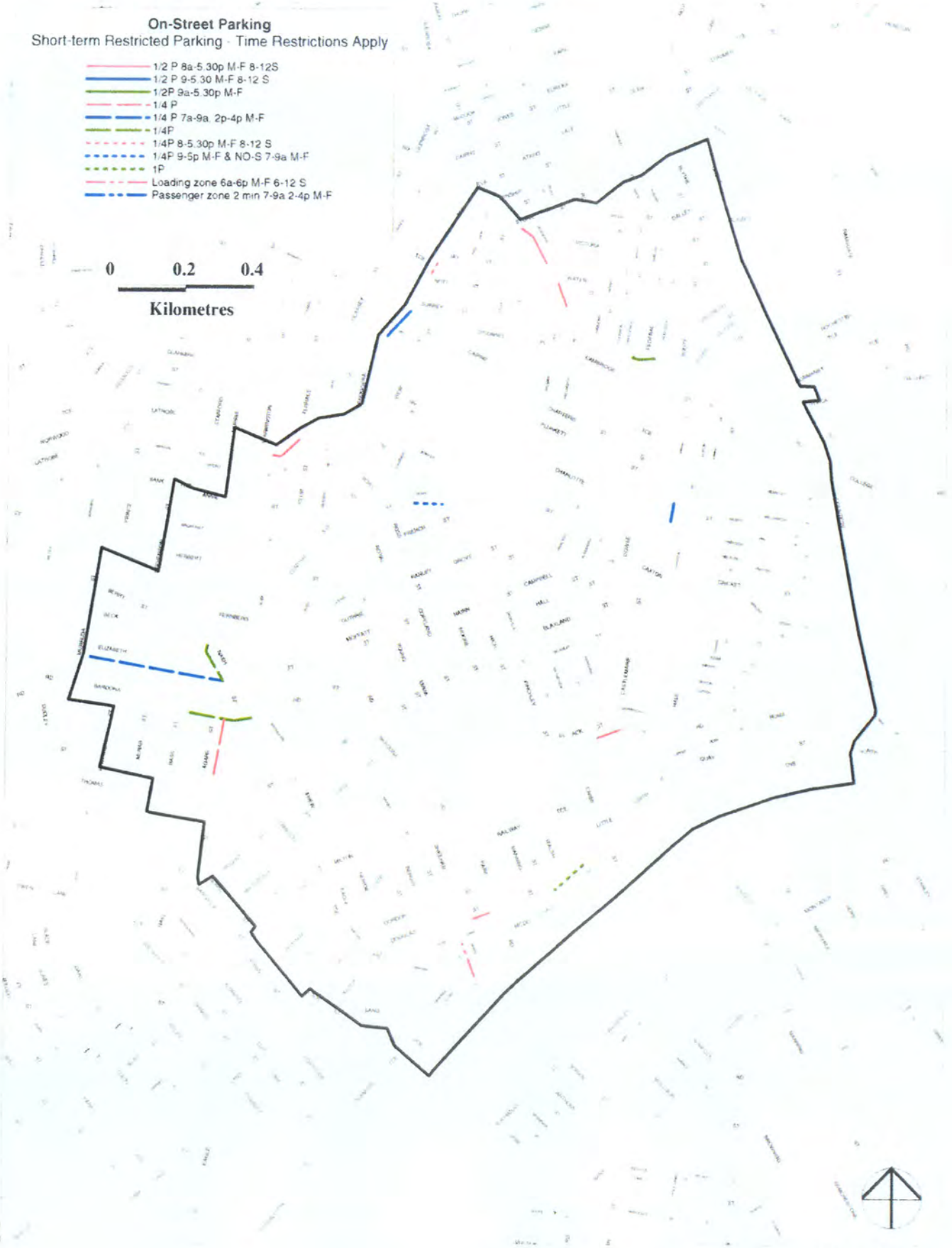


Figure 5.2.26
Parking Survey - On Street Parking Location & Type

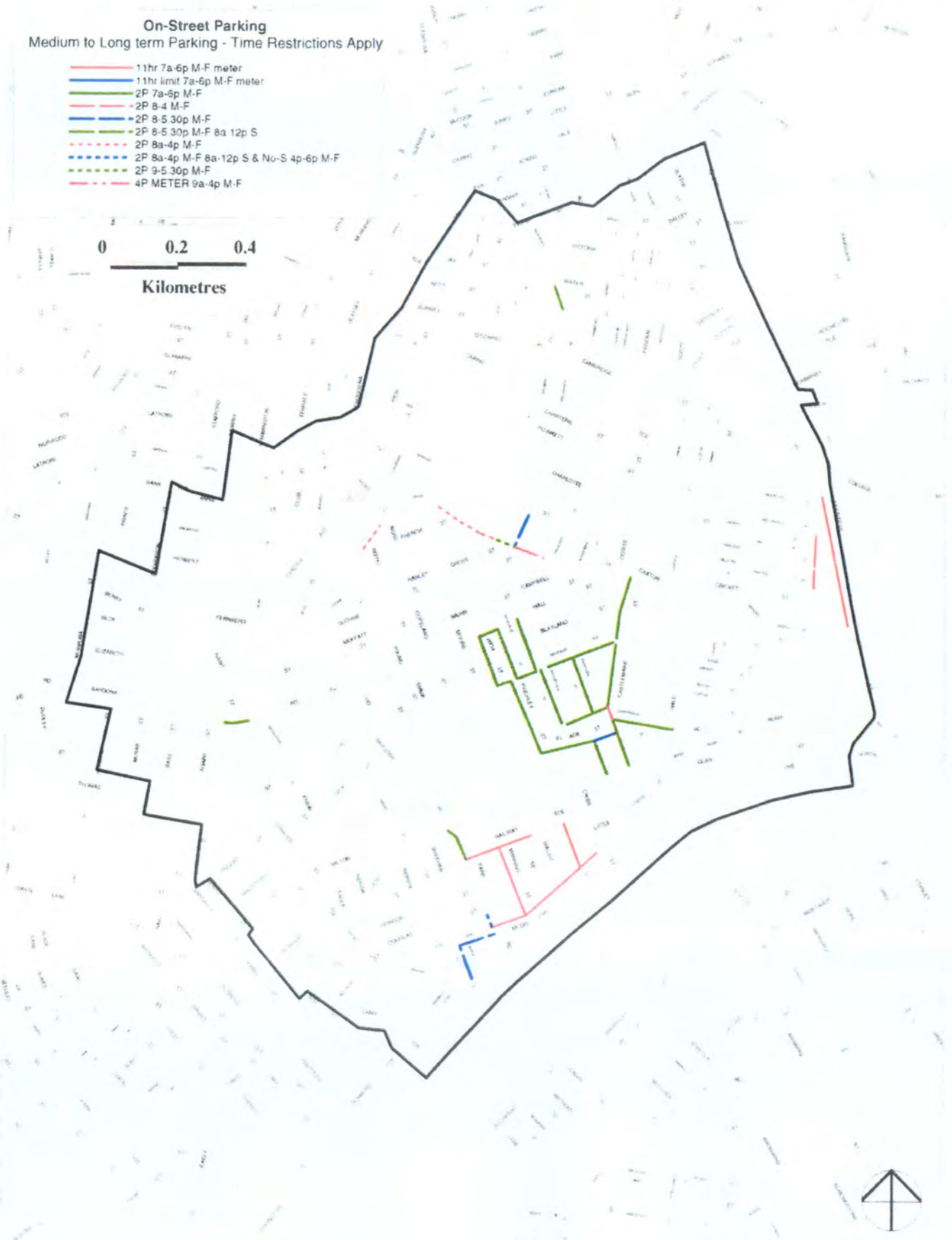


Figure 5.2.27
Parking Survey - On Street Parking Location & Type

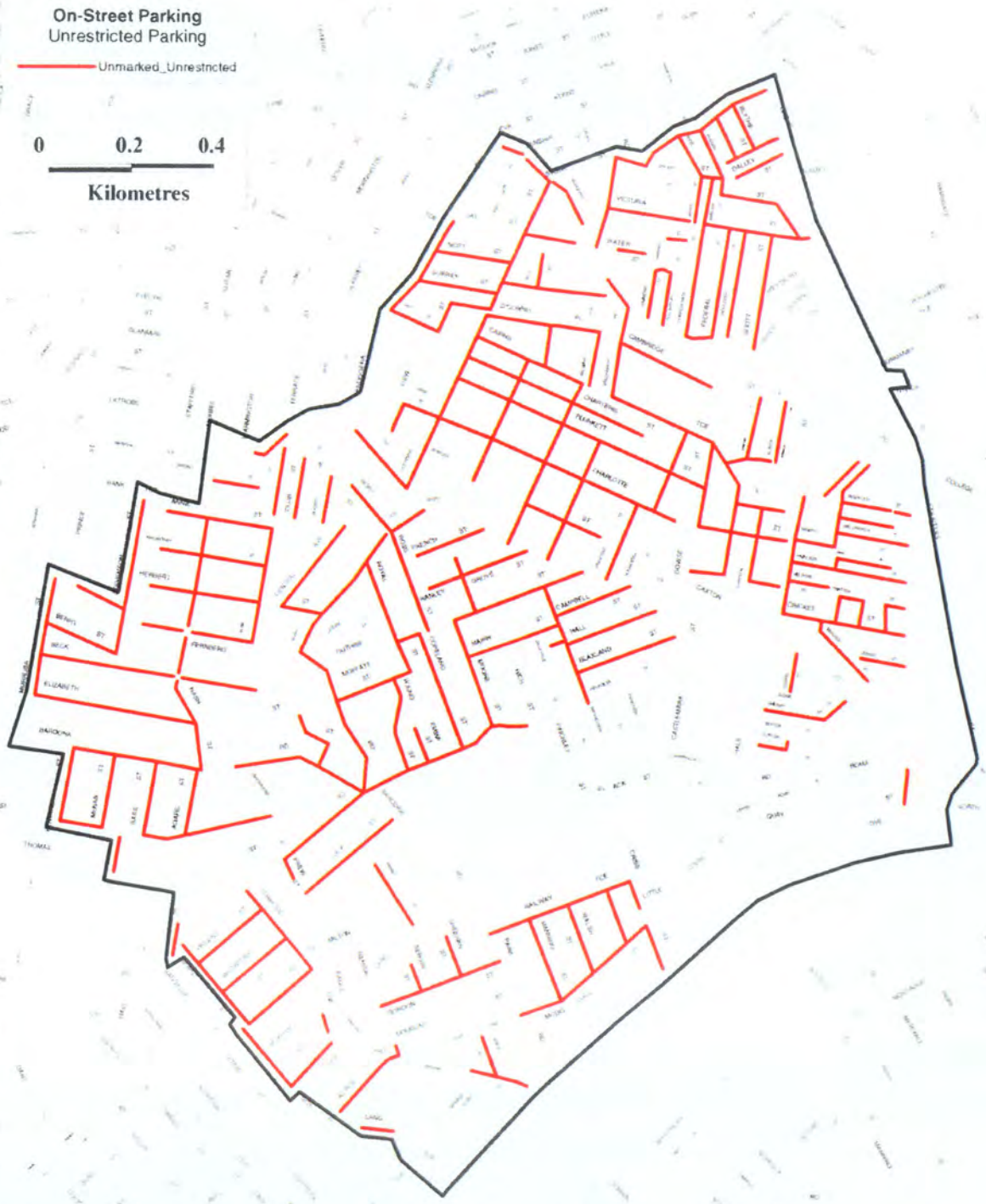


Figure 5.2.28
Parking Survey - On Street Parking Supply & Location

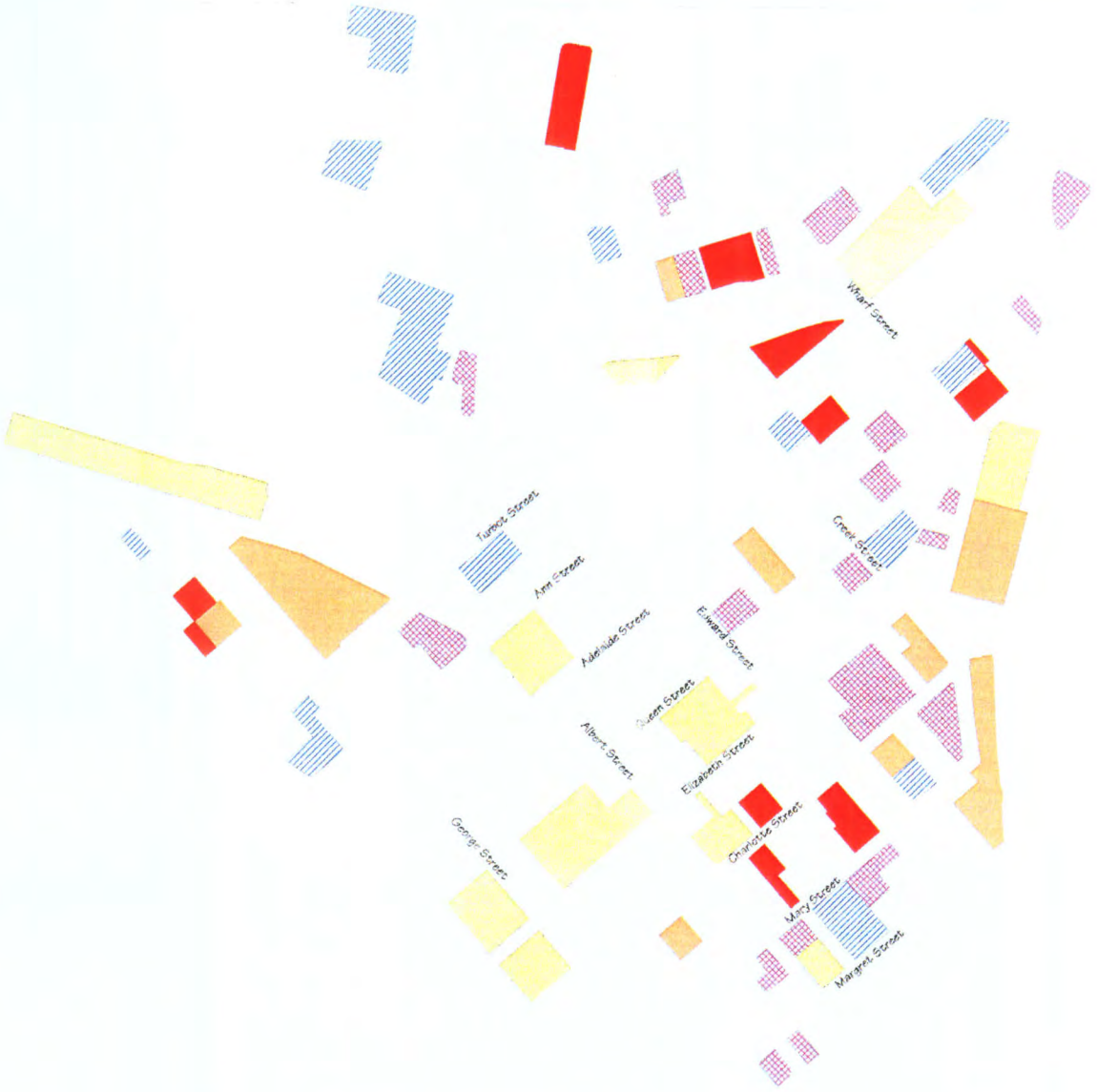


FIGURE 5.2.29
CBD Public Carpark Inventory - Parking Location & Quantity

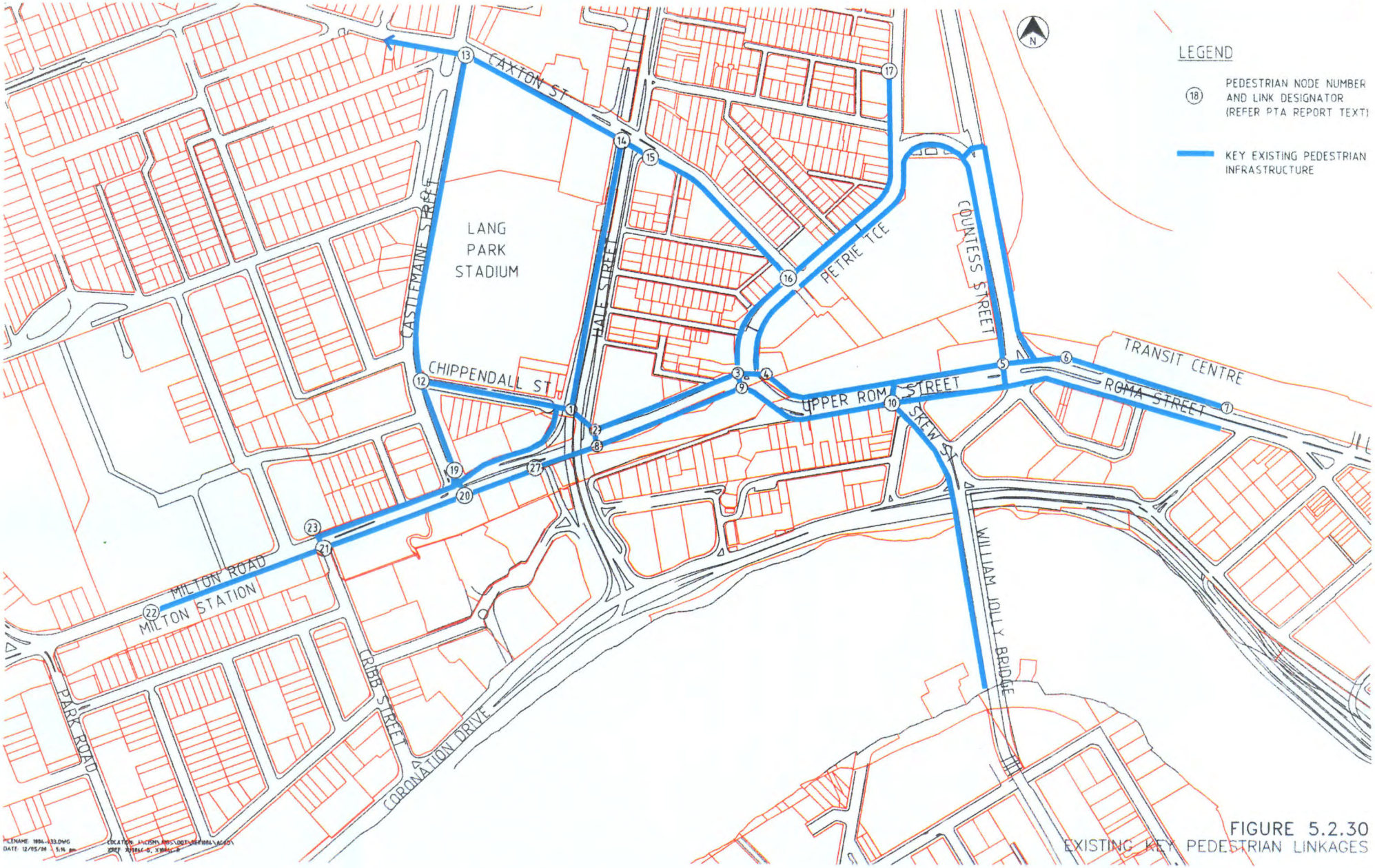


FIGURE 5.2.30
EXISTING KEY PEDESTRIAN LINKAGES

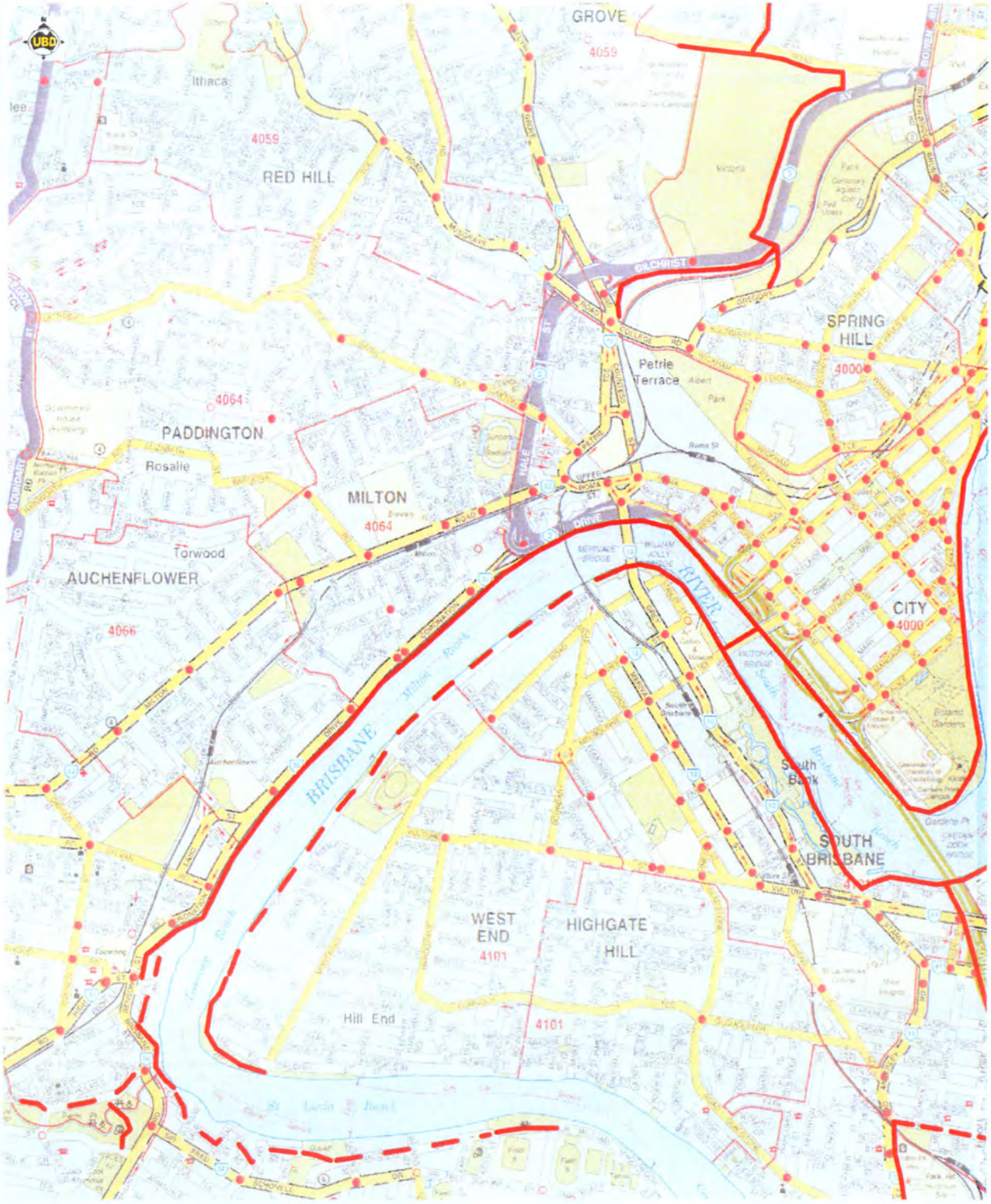


FIGURE 5.2.31
Existing Bicycle Routes

5.3 Lighting & Site Services

❑ General

The existing electrical installation has been installed at different construction stages of the Stadium.

The major works were:

- **1960 – 1962**

Frank Burke Stand

- **1969 – 1973**

Lang Park floodlighting – 2 floodlight towers located at north-east and south-east ends of the field.

- **1971**

The extension of the existing construction took form of the Ron McAuliffe Stand as it is known today.

- **1993 – 1995**

Construction of the new western grandstand replaced the Frank Burke Stand, which was demolished.

Therefore the age of the electricity supply varies from 30 years to 5 years.

❑ Electricity Supply

At present the site is supplied by two substations:

- Substation No. 1 – Located on the eastern side (Hale Street) of the McAuliffe Stand.
- Substation No. 2 – Located on the western side (Castlemaine Road entry) of the western grandstand.

❑ Substation No. 1

Substation No. 1 is located under the Stand at basement level and consists of:

- One transformer – 500 KVA – 11/.415 KV
- One RMU (Ring Main Unit)

The maximum demand for this substation is 466 KVA (649A).

This substation will require upgrading during the Stadium redevelopment.

❑ Substation No. 2

The Substation No. 2 has been designed for two transformers.

At present the western side of the Stadium is supplied by one only 1500 KVA transformer and one ring main unit (RMU).

The Energex maximum demand for this substation is 1900 KVA (2646A). This indicates that at special events the transformer has been overloaded by 27%. There is no spare capacity in this transformer, however there is spare space in the room for a second transformer installation if extra power is required for the new development.

❑ **Meters/Tariffs**

The site is metered by Energex at both substations under Tariff 20. The metering points are as follows:

McAuliffe Stand – Substation No. 1

Meter Point No. 1 – McAuliffe Stand

Western Grandstand – Substation No. 2

- Meter Point No. 1 – QRL Club facilities
- Meter Point No. 2 – Concessionaires
- Meter Point No. 3 – Community Section (House) Light & Power
- Meter Point No. 4 – QRL Office

❑ **Emergency Electricity Supply**

There is no permanent emergency supply to the site, however there is a 200 kVA mobile generator connection panel in the western grandstand main switchboard.

The mobile generator connection panel is located next to the substation entry door (Castlemaine Street).

A mobile generator could supply the Main Switch Board (MSB) fire section and general light and power section. There is no automatic load shedding within the light and power section. This section could load shed manually to meet the diesel generator capacity.

❑ **Electrical Reticulation**

❑ HV Supply

- Substation No. 1

This substation is supplied from the Hale Street Energex underground high voltage (HV) reticulation network.

- Substation No. 2

This substation is supplied from Energex underground reticulation from Castlemaine Street. The HV reticulation on Castlemaine Street is installed on the Western side of the street. There is an existing underground crossing on Castlemaine Street with five Energex conduits (3 conduits spare, 2 conduits with HV cables). The upgrade of this substation will not require major road works.

Energex drawings and on-site inspections have identified the presence of four direct buried 11 KV cables crossing the northern end of the Stadium. Energex has advised us orally that these cables are not in use at the moment. However, during the demolition or excavation works Energex representatives must be in attendance to check if the cables are alive.

❑ Main Switchboards (MSB)

- Ron McAuliffe Stand

The main switchboard and consumers mains were upgraded when the transformer was upgraded from 300 KVA to 500 KVA.

The main switchboard supplied from Substation No. 1 is located at ground level and supplies the Ron McAuliffe Stand, toilet blocks, ticketing booths, Maroons Bar & old broadcasting van DB's.

The main switchboard and associated distribution boards are of age and cannot be reused. Due to the status of the board and age of equipment the protection devices have been changed to circuit breakers in the MSB.

There is no spare capacity in the MSB at the moment.

The protection of the system is at risk due to the age of the installation.

- Western Grandstand

The MSB is located adjacent to the substation No. 2.

The MSB has been designed for two incomers, currently the bus tie is closed, linking the two busbar systems, so that the whole board is supplied from the one 1500 kVA transformer.

There is limited spare capacity in the board as built currently, however there is spare space in the MSB room for a board extension if required.

The MSB is built for:

- 2 x 2100A incomers. One only incomer is installed.
- The maximum demand recorded by the Energex peak demand ammeter at the transformer is approximately 2646A. This means that the MSB has been overloaded if no other Energex Low Voltage (LV) customers are supplied from this transformer.
- There is no spare capacity in the switchboard for additional electrical loads if required for the future development.

Site inspections have revealed pipes that cross above the MSB. This is not in accordance with the Statutory Authorities regulations. There is no tray or barrier below the pipe to protect the MSB against possible water damage. This matter requires urgent attention.

❑ Distribution Boards

- Ron McAuliffe Stand

The distribution boards in this area are aged and they cannot be reused in the future. There is no spare capacity in the Ron McAuliffe Stand electrical system.

There have been a number of sporting events where the electrical system in the Ron McAuliffe has failed. A Maintenance Electrician is on standby during all events in anticipation of another failure.

- Western Grandstand

The distribution boards in the Western Grandstand are in good condition.

The electrical distribution system for the Western Grandstand is supplied by the following boards:

- DB's for each concessionaires
- DB's for each light tower.
- House DB's for each level – Every level has three boards (e.g. DB-4A, 4B & 4C for level 4).
- Lift DB's.
- MSSB's
- Fire Services MSSB

The floodlight towers are supplied from the MSB (4 off – 200A circuit breakers) and can be reused for the future Stadium floodlighting.

The existing floodlighting and associated distribution boards require careful assessment in conjunction with the master planner design to determine if the floodlights mounted on the north-west and south-west towers can be reused in the new development.

The north-east and south-east towers are in a very poor condition and cannot be reused.

❑ Consumers Mains & Sub-mains

- Ron McAuliffe Stand

The consumers mains for this building have been upgraded to 3 x 240 mm^2 per phase Cu XLPE.

These mains could be reused for the new development.

- Western Grandstand

The consumers mains for this building are 4c x 400 mm^2/Cu Poly Vinyl Chlorine (PVC/PVC) per phase and 2c x 400 mm^2/Cu PVC/PVC for neutral.

AS 3008 rates the cable at 590A/core for a temperature rating of 75%. Therefore the consumers mains are rated at 2360A without applying any derating factor. Energex has advised that the maximum demand recorded at the Energex transformer is 1900 kVA (2646A). Therefore the consumers mains have been overloaded by approximately 286A. This value has to be confirmed by Energex.

❑ Recommendations

In conclusion we recommend the following actions be taken if the development is approved.

The Ron McAuliffe Stand electrical services are aged and should be removed during construction at the demolition stage.

The following materials and equipment could be removed and reused in the new development:

- Consumers mains cables
- Reuse the following equipment from the MSB

  – 1200A isolator
  – 800A circuit breaker
  – 400A circuit breaker (2 off)

The Western Grandstand electrical services facilities can be reused and integrated with the new development.

Regarding the maximum demand on the Western Stand substation, the main switchboard may be overloaded, if no other Energex LV customers are supplied from the transformer. The recorded 27% overloading of the transformer indicates a possible risk of transformer failure.

If a second transformer is required to be installed, the proponent will need to arrange for the installation of a second feeder to the MSB spare cubicle existing and associated consumers mains.

The existing electrical services are shown on **Figure 5.3.1.**

5.3.1 Existing Telecommunications Services

❑ General

The Lang Park site is supplied directly from the Telstra underground network as follows:

- Ron McAuliffe Stand
- Western Grandstand
- Broadcast/Press Room
- Broadcast Outside Van
- Police/Crowd Control Room

The Telstra copper and fibre optic lead in cable is installed underground and its capacity is as follows:

- Ron McAuliffe Stand – 100 pair cable
- Western Grandstand – 100 pair cable
- Broadcast Press Room – 50 pair cable
- Broadcast Outside Van – 50 pair cable
- Police/Crowd Control Room – 30 pair cable

There is an Optus fibre optic cable installed in the Western Grandstand MDF room. This is used for Optus mobile network antennae.

❑ Building and Floor Distribution Frames

The Lang Park Stadium has the Main Distribution Frame (MDF) installed in the Western Grandstand – Ground Floor.

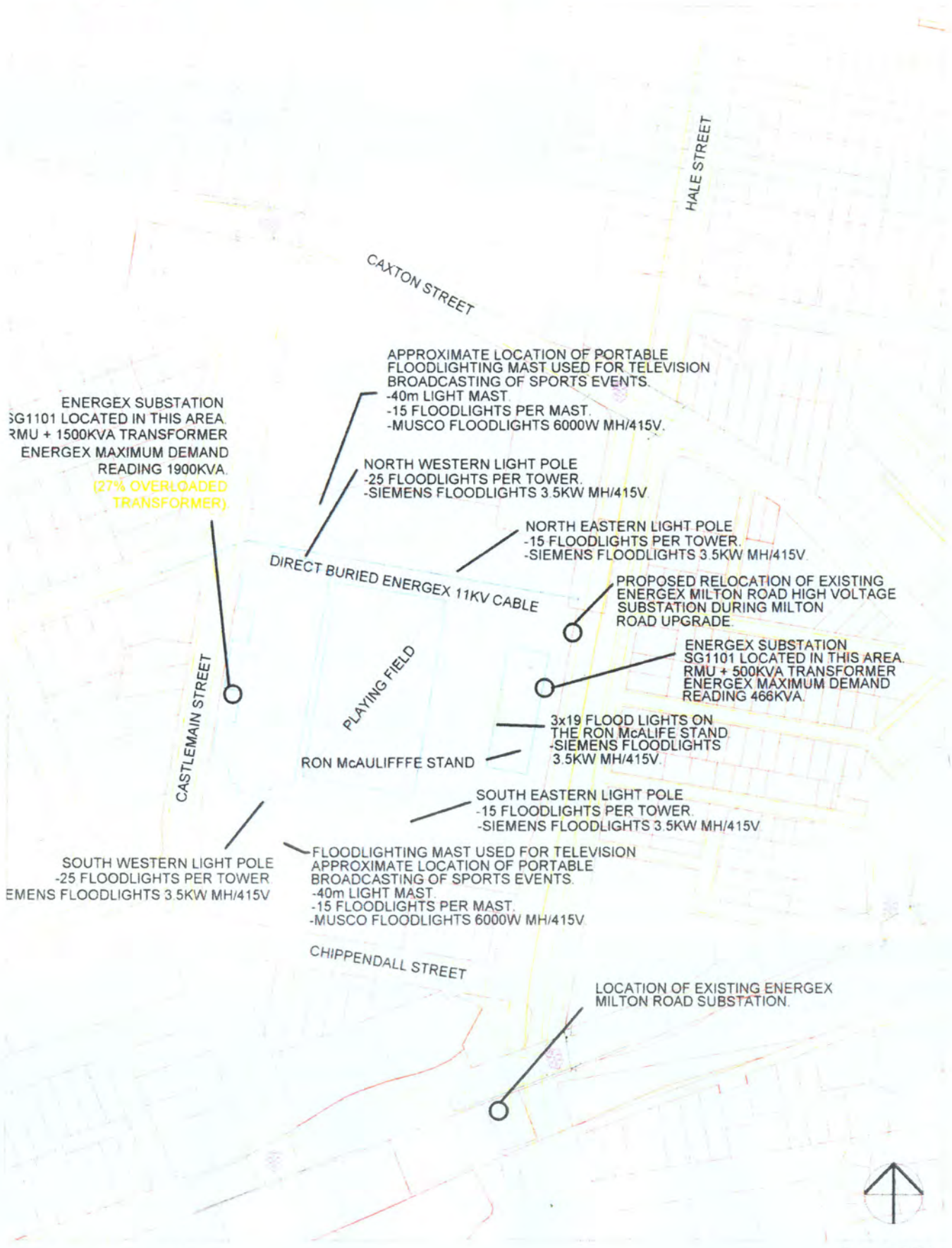


Figure 5.3.1
Existing Electrical Services Location

❑ **Western Stand**

The building distribution frame is a LSA Krone type (5 frame size) and has sufficient spare capacity for expansion if more exchange lines are required.

❑ **Ron McAuliffe Stand**

The building distribution frame is a LSA Krone type located on the third level at the northern end. The Telecommunications System for this stand should be removed during construction at the demolition stage.

❑ **PABX**

The existing PABX is a Commander System. This system is limited and cannot be expanded. A new PABX system will be required with the new development.

❑ **Paging System**

The paging system uses a two way radio system. Due to the position of Lang Park there is poor reception around the site, especially around the Ron McAuliffe Stand. A study of the cost effectiveness and reliability of the system is recommended. We propose this system to be replaced by a high tech cordless system for the redevelopment.

❑ **Conclusions**

- The Western Grandstand's facilities can be reused and integrated with the new development.
- The Ron McAuliffe Stand telecommunications facilities should be removed as part of the demolition work and a new system be installed as part of the Lang Park redevelopment.
- The telecommunication services for the Broadcast/Press Room, Broadcast Outside Van and Police/Crowd Control Room should be removed during the construction work and integrated into the Telecommunications System for the redevelopment.
- The existing paging system requires further investigation. A new cost effective high tech system should be installed as part of the new PABX for the redevelopment.

Figure 5.3.2 shows the existing telecommunication facilities.

5.3.2 Existing Lighting Installation

❑ **General**

This report specifically refers to the environmental impact associated with the Stadium floodlighting installation and the potential adverse effects of the Stadium floodlighting on nearby residential area (e.g. dwelling, adjacent roads, transport signalling systems etc).

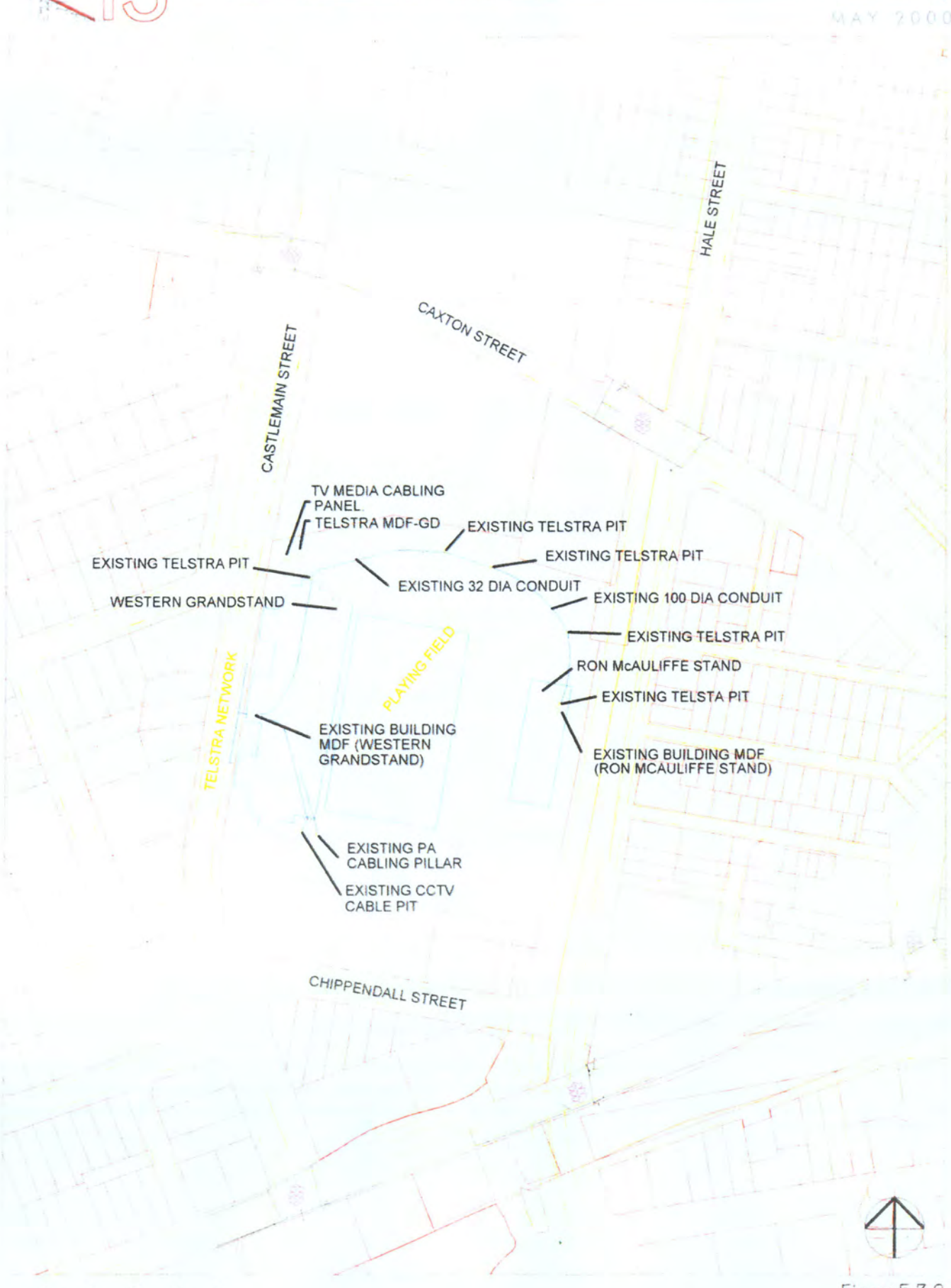


Figure 5.3.2
Existing Telecommunications Services Location

❑ Definitions

The definitions of terms used in this are defined as follows:

- Luminaire - apparatus which distributes, filters or transforms the light transmitted from one of more lamps;
- Spill Light - light emitted by a lighting installation which falls outside the boundaries of the property on which the installation is located;
- Obtrusive Light - spill light which gives rise to annoyance, discomfort, distraction or a reduction in the ability to see essential information;
- Outdoor Lighting - any form of permanently installed exterior lighting which emits light that impacts on outdoor environment;
- Principal Plane (Of the Luminaire Light Distribution) - the vertical plan through the luminaire that contains the reference direction;
- Reference Direction - the direction of the maximum luminous intensity from a floodlight;
- Relevant Boundary - any boundary of a residential property over which it is possible for spill light to directly impact upon a dwelling and its inhabitants;
- Luminous Flux ϕ - the light emitted by a light source or luminance, or received by a surface irrespective of the direction in which is distributed. The unit is lumen (lm);
- Illuminance (E) - the luminous flux incident on a surface per unit area. The unit the lux (lx);
- Illuminance Uniformity (VE) - the ratio of the maximum illuminance to the average illuminance within a specified area;
- Luminous Intensity (I) - the luminous flux emitted by the source in an infinitesimal core containing the given direction divided by the solid angle of the that core. The unit is Cordela(cd).

❑ Standards

This EIS refers to the following standards:

- AS 1158 Public Lighting Code
- AS 1158.0 Part 0 – Road Lighting - Introduction
- AS 1158.1 Part 1 – Performance and Installation Design Requirements
- AS 1158.1.1 Part 1.1 – Vehicular Traffic (Category V) Lighting – Performance and Installation Design Requirements
- AS 1158.1.3 Part 1.3 – Vehicular Traffic (Category V) Lighting – Guide to Design, Installation, Operation and Maintenance
- AS 1158.3.1 Part 3.1 – Pedestrian Area (Category P) Lighting – Performance and Installation Design Requirements
- AS 1680 Code of Practice for Interior Lighting and the Visual Environment
- AS 2560 Guide to Sports Lighting
- AS 2560.1 General Principles
- AS 2560.2.3 Part 2.3 – Lighting for Football (All Codes)
- AS 4282 Control of Obtrusive Effects of Outdoor Lighting

5.3.3 Impact of Existing Lighting Installation

❑ **General**

The aim of this section is to assess the lighting impact of the existing installation. The following procedure is adopted in the report for the assessment of light impacting upon the surrounding environment. The assessment is based on the BCC Town Plan Section 19.4 and AS 4282.

The original installation was not designed in accordance with AS 4282 because this standard did not exist at the time, however, if any existing installation is refurbished and reused in the future redevelopment, the entire installation must comply with AS 4282 recommendations.

❑ **Assessment Procedure**

- Determine the area affected by site readings:

  (a) Effects on residents
  (b) Effects on road users
  (c) Effects on transport signalling systems
  (d) Effects on pedestrians
  (e) Effects on spectators

- Determine the readings are compliant with:

  (a) Brisbane City Council Town Plan Section 19.4 requirements – "Maximum Vertical Illuminance (Ev) recommended at 1.5m outside the site boundary shall be less than 8 lux".
  (b) AS 4282 Table 2.1 – Recommended Maximum Values of Light Technical Parameters for the Control of Obtrusive Light.
  (c) Determine the operation times of the lighting installation (e.g. curfew and pre-curfew hours).

❑ **Description of Existing Field Lighting Installation**

The existing installation consists of:

(a) 3.5 kW MH/415V Siemens floodlight installed on the Ron McAuliffe Stand roof (3 banks of 19 floodlights).
(b) 3.5 kW MH/415V Siemens floodlight installed on four towers:

N-E Tower (installed 1973) – 8 off
S-E Tower (installed 1973) – 8 off
N-W (32m) Tower (installed 1993) – 15 off
S-W (32m) Tower (installed 1993) – 15 off

This installation is not suitable for broadcasted sporting events. Portable floodlights masts (2 off) are usually hired. The portable floodlights masts used at Lang Park Stadium are:

- MUSCO – Mast Height – 40m
- Fifteen (15) floodlights per mast are installed.

The floodlights are 6 kW MH/415V MUSCO floodlight. The mast is supplied from a stand alone generator. The temporary floodlights do not use the Stadium electrical system.

Adequate lighting is required:

- At ground level
- To a height of approximately 15m (ball trajectory)
- Soccer – back lighting for goal keeper

❑ **Site Readings Interpretation**

- **General**

The following lighting installation categories have been recorded on site:

- Existing background lighting (street lighting, residential area lighting, adjacent carpark).
- Standard field lighting for general sport events (field, spectator and residential areas.
- Field lighting for broadcast sport events (using portable floodlights).

The playing field vertical illuminance (Ev) of the existing lighting system was measured on 17 - 18 February, 2000 during the Seven's Rugby World Cup. Measurements were taken with and without the portable floodlights. A summary of the results for the standard lighting system is presented herewith:

Standard Lighting Installation	(Eh)	(Ev) Easterly	(Ev) Westerly
Centre Field	710 lux	900 lux	270 lux
North Field Goal Posts	760 lux	790 lux	560 lux
South Field Goal Posts	652 lux	905 lux	550 lux

Refer to **Appendix A** for more detailed information on the vertical illuminance values measured.

- **Background Lighting (Street Lighting)**

Generally, the illuminance levels of the surrounding street lighting is in accordance with AS 1158.

The illuminance levels of stairways, ramps, footpaths, pedestrian walkways and carparks have been measured and the measurements meet the requirements of AS 1158.3.1 with exception of:

(a) Ramp between Milton Road and Chippendall St where potential for a high risk of crime exists.
(b) Both entries to the Western Grandstand when no activities are taking place are well lit discouraging any vandal activities.
(c) All luminaires used in the area meet the BCC requirements in regards to glare control, limitation of waste light and limited spill light into the residential properties. We have also measured the street lighting background illuminance to compare with the lighting levels measured when the Stadium lights are on.

For detailed information of vertical illuminance values refer to **Appendix A**.

- **Field Illuminance for Broadcasted Sporting Events**

The levels of illuminance obtained from the in-situ Stadium floodlight installation cannot be used for broadcasting events where the minimum required level of illuminance is 1000 lux and 80% uniformity ratio. When events require broadcasting two portable floodlight towers are temporary

installed. Refer to **Figure 5.3.3a** and **Figure 5.3.3b**. The levels of illuminance on horizontal and vertical plans measured with the portable towers are as follows:

Temporary Lighting Installation	(Eh)	(Ev) Easterly	(Ev) Westerly
Centre Field	1020 lux	900 lux	760 lux
North Field Goal Posts	1000 lux	790 lux	900 lux
South Field Goal Posts	910 lux	905 lux	880 lux

Refer to **Appendix A** for more detailed information on the vertical illuminance values measured.

There is an increased impact from light spillage for some dwelling, road users and pedestrians when the Stadium is used with the portable broadcasting floodlights installed. **Figure 5.3.4** shows light spillage contours for the surrounding area when the broadcast lighting is used.

- **Dwellings**

The light spillage drawing shows graphically the affected areas. The following residences are mainly affected:

Reference No.	Residences/Locality	Light Spillage/ Lux	Clarification
200	1 Blaxland St	15.6	Bedroom wall
204 205	21 Castlemaine St (Refer to **Figure 5.3.5**).	17.9 21.9	Bedroom window Front door.
210	27 Castlemaine St	20.7	At 1.5m boundary as recommended by BCC
225	Cnr Castlemaine St & Hall St	12.8	At boundary
226	Cnr Castlemaine St & Heussler St	13.5	At boundary
230	Cnr Castlemaine St & Cordova St (Commercial)	32.3	At boundary
238	107 Caxton St/Northeast Side of Hale St Caxton off ramp.	430	Traffic
240 241	Cnr Caxton & Hale St (Southern Side) (Centre Island)	280 160	Traffic
255	105 Hale St (Refer to **Figure 5.3.5**).	42	Building wall
256	Property Cnr Hale St & Judge St	110	Bedroom window
277	39 Judge St	19.5	1.5m from boundary
279	Ramp/Walkway from Milton to Chippendall	32	Very glary for pedestrians when they walk towards Lang Park which makes it hard to adapt at the end of the ramp to see obstacles (e.g. kerb, change in levels etc).

Other measurements of vertical illuminance taken on site were within limits. However, a glare effect (obtrusive light) of the Stadium floodlights which gives a degree of discomfort has been noticed at Hale Street, Judge Street, Chapel Street, Caxton Street, Petrie Terrace, Musgrave Road, Milton Road, Heussler Street etc.

The obtrusive light effect perceived by the eye (despite the low level of vertical illuminance measured) is considered to be due to the luminous intensity of each luminaire in the principle plan. The tolerable brightness of a luminaire in a person's field of view has been limited by AS 4282 Table 2.2. where maximum luminous intensity per luminaire for pre-curfew operating times is at 7500 cd (level 1 control – residential area) and 100,000 cd (level 2 control).

Figure 5.3.3a
Light Spillage - Broadcast Levels

-25 0 25 50 75
Metres
Scale: 1:3,000

Legend
Background Levels
Existing Broadcast Levels
Proposed Broadcast Levels

Figure 5.3.3b
Lux Levels (Overlay)

Figure 5.3.4
Light Spillage - Background Levels

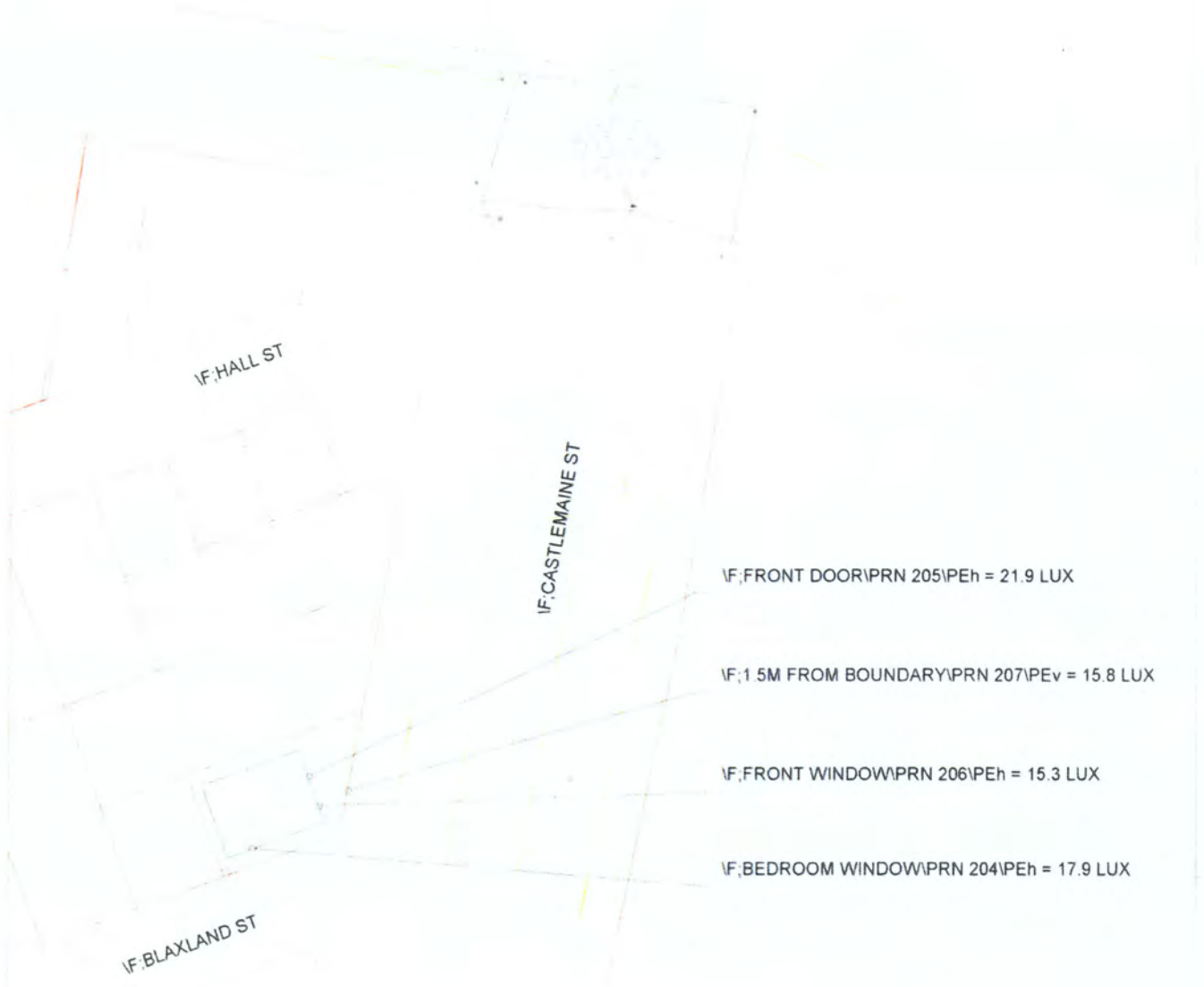


Figure 5.3.5
Lighting Spillage - 21 Castlemaine St

Due to the type of installation for the stadium (high level of illuminance required – 1000 lux, large area to be illuminated), it is mostly impossible for the existing facility to meet the above requirements.

The obtrusive lighting observed on the surrounding areas was likely due to the portable floodlights which are installed and aimed to get a uniform level of illuminance of 1000 lux for the broadcasting. Lighting for this purpose does not take into consideration the light spillage to the residential and traffic area.

The broadcasted sporting events occur on 2-3 occasions each year and are of concern to the local residents.

- **Effects on Road Users**

During site measurements, the Stadium floodlights were considered to be obtrusive to drivers at the following locations:

(a) Centre island of the Caxton Street intersection with Hale Street off ramp (residential access area). The vertical illuminance measured was 280 lux and the glare of floodlights created a discomfort and annoyance. (Refer to **Figure 5.3.6**).
(b) On Milton Road at the corner of Clifton Road the vertical illuminance measured was only 4 lux, but the glare presented a discomfort to motorists and a reduction in the ability to see pedestrians. This was most likely to be due to the temporary floodlights where the aiming angle did not take into consideration the traffic hazard.

- **Effects on Transport Signalling System**

Any light spill over the surrounding area up to Musgrave Road did not result in any discomfort or reduction in the ability to see the traffic lights or any vehicle approaching the abutting roads.

- **Effect on Pedestrians**

The level of illuminance on the pedestrian crossings was measured and found to be within acceptable limits. However, a discomfort glare was evident in the following areas

(a) Hale Street, northern side footpath
(b) Pedestrian ramp from Milton Road to Chippendall Street (Refer to **Figure 5.3.7**).
(c) Pedestrian crossing Caxton Street from north side to south side (close to Hale Street residential road access)
(d) Footpath along Caxton Street (Southside) from Hale Street to Castlemaine Road

The level of vertical illuminance in these areas where:

(a) north side – East Hale Street off ramp - 430 lux
(b) traffic island Caxton Street - 280 lux
(c) south side Caxton Street (footpath) - 160 lux
(d) Chippendall Street footpath - 50 lux
(e) Hale Street Cnr Judge Street - 110 lux
(f) Milton walkway (very glary) - 32 lux

These measurements again are high because of temporary floodlights which when are installed the aiming of luminaires does not take into consideration the surrounding areas.

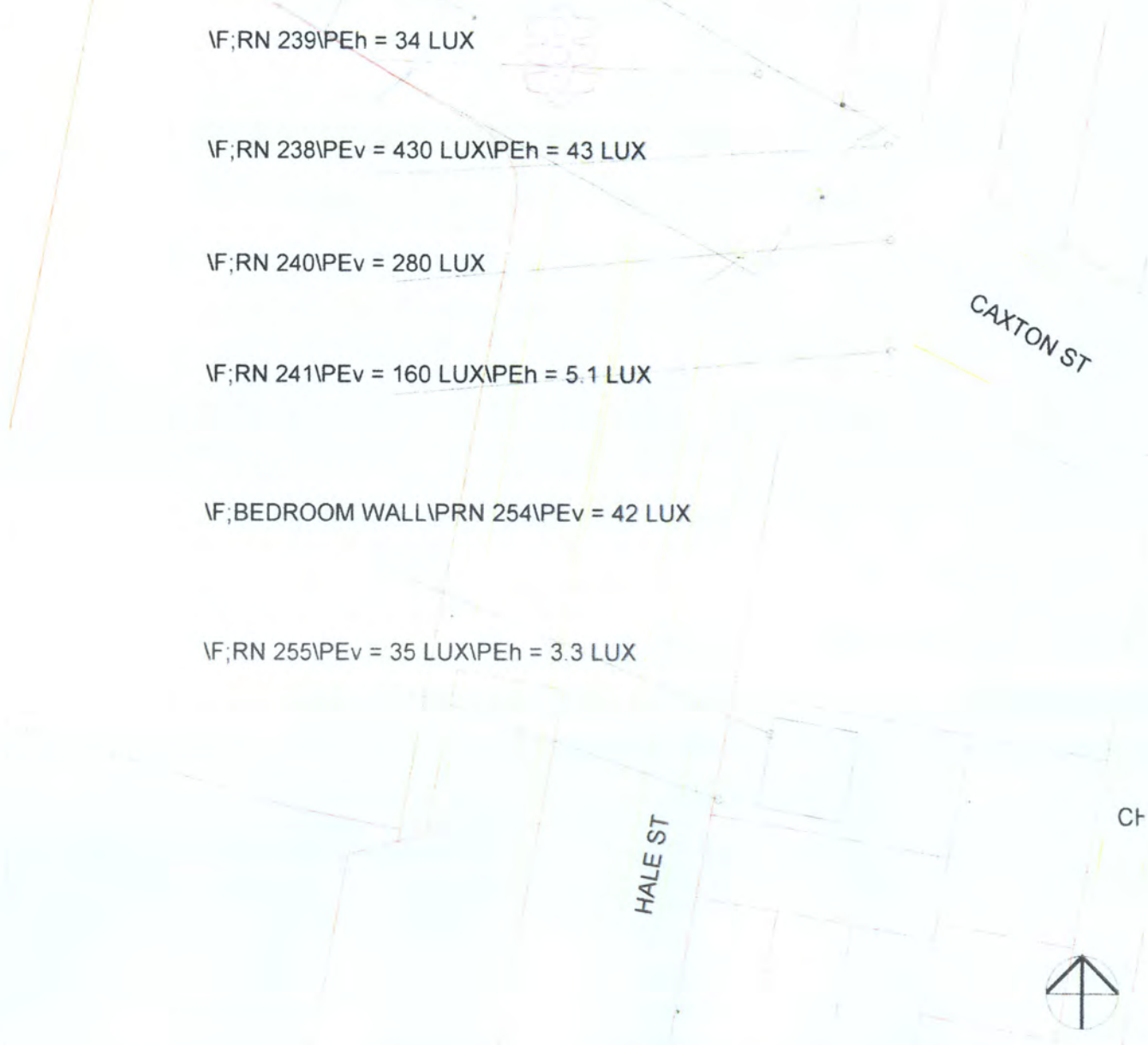


Figure 5.3.6
Lighting Spillage - Cnr Caxton St and 105 Hale St

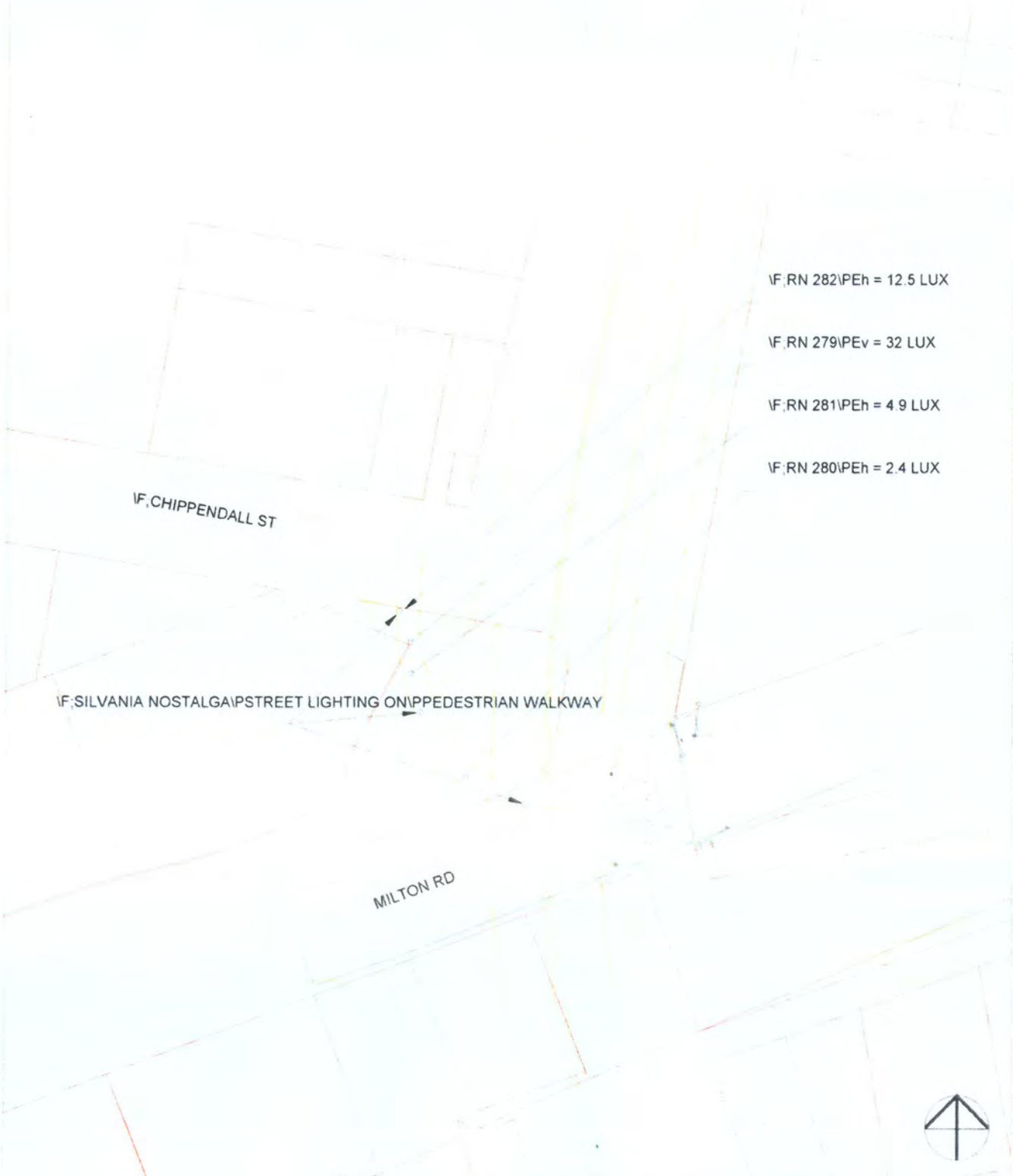


Figure 5.3.7
Lighting Spillage - Milton Rd to Chippendale Rd Pedestrian Ramp

- **Effects on Spectators**

The level of vertical illuminance measured around the Stadium at different heights as follows:

Level of vertical illuminance (Ev) measured (Broadcast Lighting):

Ron McAuliffe Stand

Lower Tier	-	North side	350 lux
		Centre	300 lux
		South side	490 lux
Upper Tier	-	North side	240 lux
		Centre	300 lux
		South side	320 lux

Western Grandstand

Lower Tier	-	North side	361 lux
		Centre	412 lux
		South side	338 lux
Middle Tier	-	North side	450 lux
		Centre	220 lux
		South side	550 lux
Upper Tier	-	North side	114 lux
		Centre	55 lux
		South side	92 lux

The middle tier and upper tier of the Western Grandstand are affected by the obtrusive lighting from the 57 floodlights installed on the Ron McAuliffe Stand roof. The floodlights do not have hoods installed at present to control the glare. Careful attention is required to the support system of these floodlights.

A site inspection with binoculars indicates that the supports are rusted. During a strong wind these supports could fail and the floodlights accidentally hit the spectators. The same situation can arise with the two 1973 constructed towers which are rusted. With strong wind gusts the tower could collapse onto the spectators. Given the infrequent use of the stadium, the probability of these falling on spectators is low.

- **Conclusions**

The floodlighting used for broadcasted events not in accordance with the Australian Standards or BCC requirements. This is mainly due to the incorrect aiming of the portable floodlights used. In the majority of cases the Statutory Regulation requirements for this type of installation cannot be met due to the high level of illuminance required (1000 – 2000 lux) and the vast field area which is required to be illuminated. In these cases a Local Council ordinance is issued which limits the time of use of the installation.

- **Background Lighting**

The background lighting meets the BCC requirements. There are some dark spots on some roads which would benefit an increase in lighting level to prevent crime and vandalism.

- **Temporary Floodlights**

The temporary floodlights are obtrusive and present annoyance and discomfort to spectators, dwellings, traffic users and pedestrians. This situation would be eliminated within the redevelopment if the floodlights were fixed and part of the Stadium new buildings (e.g. mounted on or under the roof).

5.4 Acoustic Environment

5.4.1 Introduction

In order to assess the likely impact of the proposed stadium it is first necessary to understand the existing acoustic environment. Background noise monitoring has been conducted in the area surrounding the proposed stadium to determine the current noise levels. Also noise from an event was measured (Rugby 7s) at the proposed stadium at several points.

The results of the background noise assessment and the nature of the surrounding area in relation to environmental noise will be analysed in the evaluation of the environmental impact of the proposed Stadium redevelopment.

5.4.2 Legislative Standards

❑ Queensland

The relevant legislation in Queensland is the *Environmental Protection Act 1994*. This Act refers to the *Environmental Protection (Noise) Policy 1997* (EPP (Noise)). The EPP (Noise) does not contain specific criteria for Stadium or other sporting events although it does specify criteria for outdoor concerts and for activities at certain indoor venues.

Section 10 of the EPP (Noise) specifies that the environmental values to be enhanced or protected are the qualities of the acoustic environment that are conducive to:

(a) the wellbeing of the community or a part of the community including its social and economic amenity: or
(b) the wellbeing of an individual, including the individual's opportunity to have sleep, relaxation and conversation without unreasonable interference from intrusive noise.

To protect environmental values the legislation requires that activities do not cause excessive noise and this is often assessed by comparing the background noise level (L_{A90}) to the maximum noise levels (L_{Amax}) where the L_{Amax} is the average of the maximum noise that occurs during a measurement period. L_{Amax} is often equated to the L_{A10}.

For many noise sources, particularly from industrial and commercial activities, the EPA has applied a standard that permits noise to exceed the background level by a small margin depending on the time of day and the premises receiving the noise. These frequently used standards are described in **Table 5.4.1**.

Table 5.4.1 Frequently Applied Standards

NOISE LIMITS AT AN EXISTING NOISE SENSITIVE PLACE *Period*	*Noise Level at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level $L_{A\ max\ adj,\ T}$*
6am – 6pm	Background noise level plus 5 dBA
6pm – 10pm	Background noise level plus 5 dBA
10pm – 7am	Background noise level plus 3 dBA
NOISE LIMITS AT AN EXISTING COMMERCIAL PLACE *Period*	*Noise Level at a Commercial Place measured as the Adjusted Maximum Sound Pressure Level $L_{A\ max\ adj,\ T}$*
6am – 6pm	Background noise level plus 10 dBA
6pm – 10pm	Background noise level plus 10 dBA
10pm – 7am	Background noise level plus 8 dBA

These criteria are generally not applied to "people" noise such as crowds at sporting stadia but may be applied to fixed plant and equipment associated with the proposed stadium, for example air conditioners, refrigeration equipment and possibly public address systems.

❑ **Other States**

Contact with the other State Government Environment Protection Authorities has confirmed that they also do not have criteria that are relevant to noise from Stadia.

For example, the Victorian State Environment Protection Policy N1 (Control of Noise from Commerce, Industry and Trade) specifically excludes noise from crowds. Also the NSW Environment Protection Act is used to control noise from music events at the stadium but is not used to control sporting events. However, in NSW, ancillary noise such as public address systems may be controlled under the general legislation applicable to premises although each would be considered on a case by case basis.

Officers from State EPAs noted that crowd noise was generally not able to be controlled. However, noise from the excessive use of public address systems can be controlled by the effective design of systems, regulating volumes and limiting their use. Public address systems may therefore be controlled in other states if they became a source of complaint.

5.4.3 Background Noise Levels

Measurements of the background noise were made at five sites located at various distances and directions from the proposed stadium. Measurements were conducted for a period of at least seven days. During the monitoring period there was a series of Rugby 7s matches and these are included in the monitoring results. These results are also discussed separately in Section 4.

❑ **Background Monitoring Sites**

The area around the proposed stadium to the east and north is primarily residential with some commercial to the east in the vicinity of Petrie Terrace and commercial / industrial to the south. There is also significant industrial development further to the west along Milton Road. The proposed stadium is also in at a low point in the land. The residential areas to the west, north and east rise significantly and allow some residences to overlook the proposed stadium.

To assess the existing noise levels in the area several sites were selected that would be representative of residences that could be exposed to noise from the proposed stadium. These

included residences that were relatively close, as well as residences to the north that were several hundred metres away, but overlooking the proposed stadium. The effect of traffic noise on background noise levels was taken into account when selecting sites. Some sites were selected as they may be less affected by traffic noise than others. However, it should be noted that in an inner city area, overall traffic noise levels would heavily influence the background noise at all sites.

The monitoring sites used were:

Site 1: 8½ Petrie Terrace

The microphone was positioned on a first floor verandah with a clear line of sight to the proposed stadium. The proposed stadium ground was partially screened by the eastern stand although the southern part of the ground was visible. Traffic on Petrie Terrace was clearly audible at this site although the road was significantly screened by the building.

Site 2: 15 Plunkett Street

This site was a significant distance to the north of the proposed stadium but was located well above it. The monitoring site also was located away from significant traffic and was selected as it would be likely to have a low background noise level (relative to other inner city dwellings) while still being potentially exposed to noise from the proposed stadium.

Site 3: 105 Hale Street

This site was located on Hale Street and was close to the proposed stadium. It would be likely to receive significant noise from activities in the proposed stadium although the proximity to Hale Street would be expected to lead to a higher background noise than other areas due to road traffic.

Site 4: 26 Princess Street

This site was located to the north east of the proposed stadium and was selected as it was at an exposed site with a relatively quiet background noise level, although the background noise may be partially influenced by the proximity to Petrie Terrace.

Site 5: 31 Isaac Street

This site was selected as it was relatively close to the proposed stadium with a direct line of site to the proposed stadium buildings. It is also in a relatively quiet location away from major roads although some traffic noise from Caxton Street would be expected to influence the background noise.

Each of the five sites were monitored for at least seven days and some were monitored for longer periods. A range of noise level values were recorded including L_{Aeq}, L_{A10} and L_{A90}.

❑ **Background Noise Monitoring Results**

The background monitoring results are presented in graphical form in **Figure 5.4.1** to **Figure 5.4.5**. Also in accordance with the EPP (Noise) the background noise levels have been averaged over the day evening and night periods for each of the sites and these are summarised in **Table 5.4.2**.

Table 5.4.2 Background Noise Levels (Day, Evening & Night)

Site	Day dB(A) 0600 – 1800			Evening dB(A) 1800 – 2200			Night dB(A) 2200 – 0600		
	L_{A10}	L_{Aeq}	L_{A90}	L_{A10}	L_{Aeq}	L_{A90}	L_{A10}	L_{Aeq}	L_{A90}
Site 1 Petrie Terrace	64.3	61.8	57.6	63.1	61.0	57.2	58.0	55.6	50.0
Site 2 Plunket Street	55.2	58.4	46.3	51.1	52.9	45.6	43.8	45.1	40.7
Site 3 Hale Street	70.2	67.9	64.5	69.2	67.0	63.0	64.4	60.6	48.1
Site 4 Princess Street	56.7	52.9	43.2	51.4	49.3	43.4	42.2	40.5	36.3
Site 5 Isaac Street	59.4	57.8	49.2	57.9	57.4	50.0	48.3	49.3	44.1

❑ Discussion of Background Noise Levels

The monitoring results show that the lowest average night background L_{90} noise level was 36.3 dB(A) at site 4 and the highest was 50.0 at Site 3. During the day and evening the noise levels at all sites were higher, reflecting the influence of traffic volumes within urban areas. The highest level was during the day at Site 3 (70.2) due to the high traffic volumes along Hale Street.

Site 1 and Site 3 were both located near to major roads and the measured results confirm the influence of road traffic noise. Sites 2, 4 and 5 were screened from traffic and this is reflected in the lower measured noise levels. Site 4 was located close to Petrie Terrace but was effectively screened from traffic noise resulting in a very low noise level at night.

These results show the range of noise levels typical in an inner city urban area where some residences are directly exposed to road traffic noise and others are screened. The levels also show that noise is highest during the day (as would be expected) but also continues at a moderate level in to the evening.

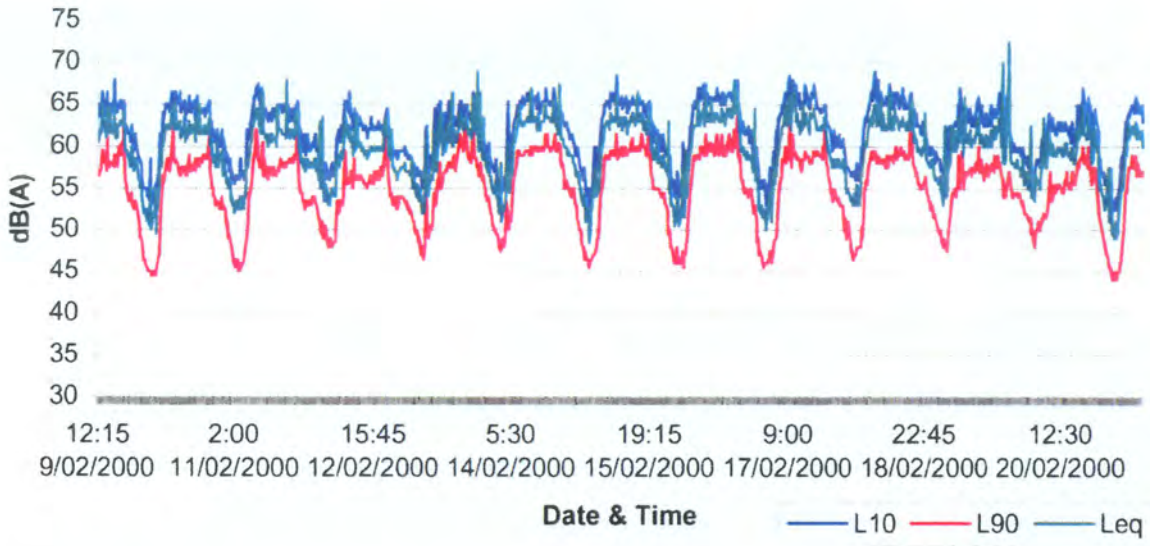


Figure 5.4.1 Background Noise - Site 1 - Petrie Terrace

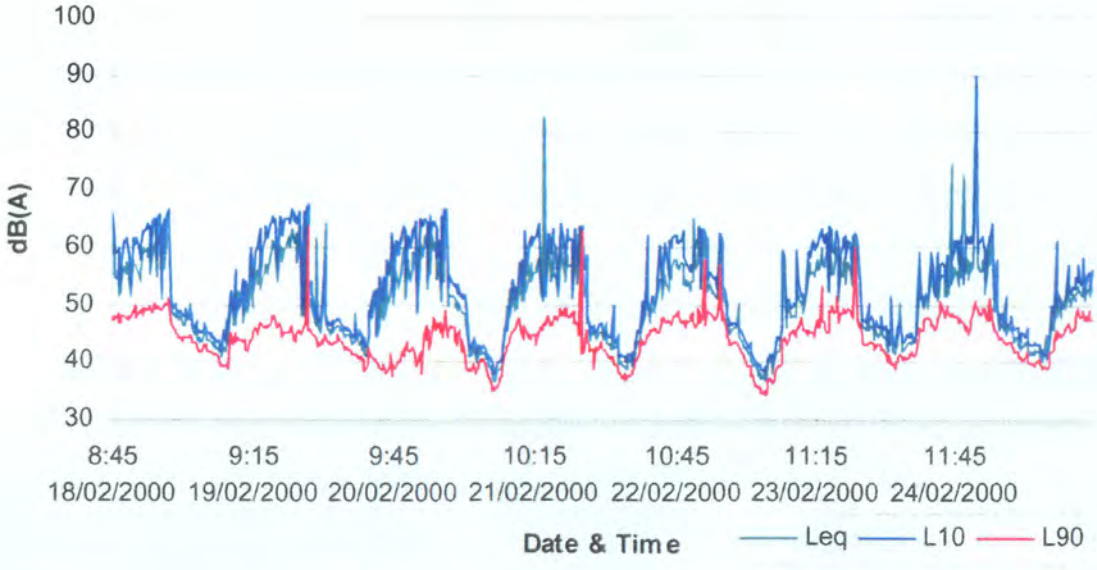


Figure 5.4.2 Background Noise - Site 2 – 15 Plunket Street

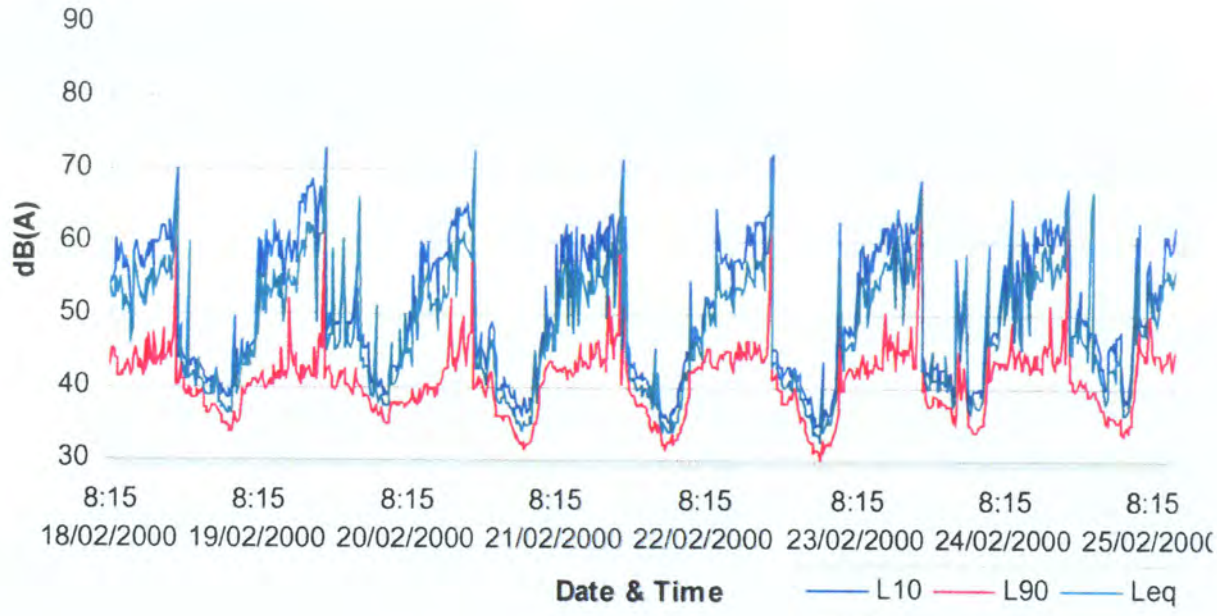


Figure 5.4.3 Background Noise - Site 3 – 105 Hale Street

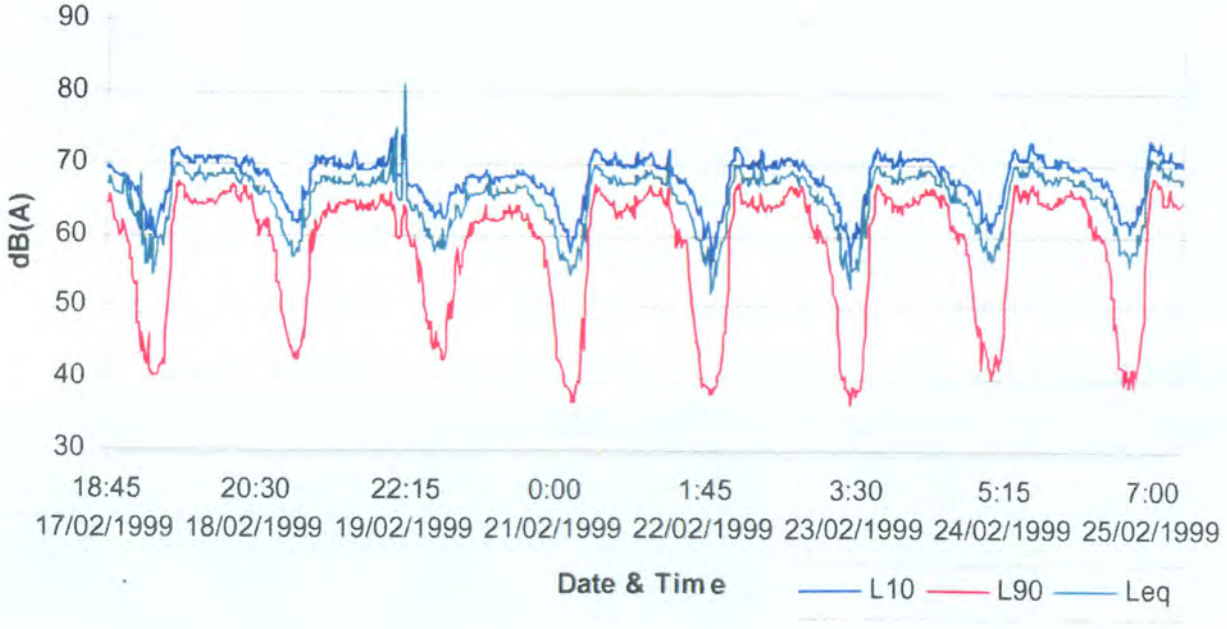


Figure 5.4.4 Background Noise - Site 4 – 26 Princess Street

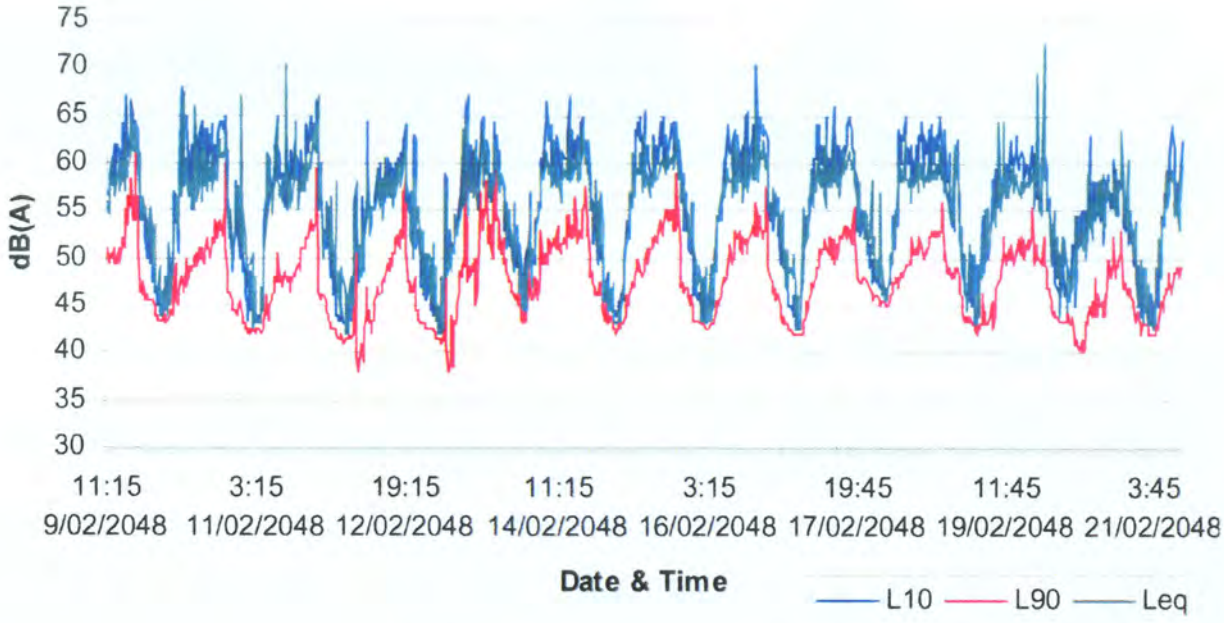


Figure 5.4.5 Background Noise - Site 5 – 31 Isaac Street

5.4.4 Rugby Sevens Match

On the weekend commencing on Friday 18 February, a series of Rugby Sevens matches were held at Lang Park. These matches were not as large as some of the more popular matches with attendance of between 5 000 and 10 000. However, the matches provided an indication of the type on noise that can arise from a large scale football match.

During the match, measurements were made of the principal noise sources. Measurements were short term (10 sec) and identified the L_{Amax} values. The L_{A10} values were also recorded although these may be of limited use as they are for only a very short time period.

During the matches, the major noise sources were identified as being public address system and the crowd noise and these were measured during periods when they were loudest. The results of the measurements are listed in **Table 5.4.3**.

Table 5.4.3 Short Term Noise Levels, 19 February 2000

Noise Source	Time	Location	Noise Level	
			L_{max} dB(A)	L_{10} dB(A)
Public Address	18:56	31 Isaac Street	62	59.1
Crowd Noise	18.57	31 Isaac Street	55	52.9
Crowd Noise	18.59	31 Isaac Street	56.7	55.8
Public Address	19:06	15 Plunkett Street	55	53.2
Public Address	19:07	15 Plunkett Street	55	52
Crowd Noise	19:09	15 Plunkett Street	56.3	54.9
PA & Crowd	19:20	105 Hale Street	78.4	77.8
Crowd Noise	19:21	105 Hale Street	65.2	65
Crowd Noise	19:21	105 Hale Street	81.3	80.4
Public Address	19:22	105 Hale Street	73.2	71.8
Public Address	19:32	26 Princess Street	52.3	48.7
Crowd Noise	19:33	26 Princess Street	49.4	48.9
Public Address	19:33	26 Princess Street	57.5	51.3
Crowd Noise	19.34	26 Princess Street	55.4	50.7
Public Address	20:00	8½ Petrie Terrace*	60.2	56.9
Public Address	20:01	8½ Petrie Terrace*	60	58.4
Crowd Noise	20:03	8½ Petrie Terrace*	58.5	57.6
Crowd Noise	20:05	8½ Petrie Terrace*	54.7	53.8

*Note: The measurements at 8 ½ Petrie Terrace were taken 3 metres below the monitoring site, at the edge of the carport

Discussion of Short Term Noise Levels

The short term measurements indicated that crowd noise is audible around the proposed stadium. They also showed that the public address system was audible and was frequently louder than the crowd noise. For example at Isaac Street the public address system was measured and found to be 7 dB louder than the crowd noise.

The level of noise at measured was dependent on the location of each measurement site with the highest noise levels being reached at Hale Street due to the proximity to the proposed stadium.

Although not well represented by the results, the noise levels varied considerably at each site with periods of quiet followed by periods of crowd noise and public address noise. The L_{Amax} crowd noise also varied according to the excitement of the stage of the game. This is particularly shown in the measurements at 105 Hale Street where crowd noise varied between 65.2 dB(A) to 81.3 dB(A).

The Rugby 7s match was attended by moderate crowds and it is likely that the maximum noise levels would not be as high as for a capacity crowd. For a crowd twice as large as the Rugby 7s, the peak noise levels may increase by up to 3 dB and for a crowd four times as large, by up to 6 dB.

5.5 Existing Social Environment

5.5.1 Study Area

For the purposes of the social impact assessment, a study area was defined, focussing on Milton, Paddington and Red Hill. These suburbs were included because of their proximity to Lang Park, and the natural associations and networks that bring people together as a community.

The Brisbane River forms a natural geographic boundary between South Brisbane and the study area while the busy and "pedestrian unfriendly' Countess Street forms a physical boundary between the city and the study area. For these reasons, South Brisbane and some parts of Petrie Terrace were not included in the study area for demographic analysis.

Some community agencies and public facilities that service the area and some interest groups are not geographically located in these suburbs. Where a relevant service with clients inside the study area has a base outside the boundary, the service is included as part of the description of the existing environment and included as a stakeholder for consultation purposes.

Where the wider community of South East Queensland and Queensland in general is relevant to specific social impact issues it is also included in the analysis.

❑ Nearest Neighbours

The sites' "nearest neighbours" are defined according to a 1.5 kilometre boundary around the Lang Park site, within the study area. (This boundary is equivalent to the proposed parking restriction areas). The preliminary consultation process indicated that traffic and pedestrian movements are major concerns for people living close to Lang Park. Anti-social behaviour from patrons leaving events at Lang Park, noise, light and vibration impacts are also of concern to local residents.

The preliminary consultation report and submissions on the Terms of Reference suggest that these effects are largely contained within the same boundaries as the proposed parking restrictions.

5.5.2 Population

The Brisbane City Council Central Ward Community Profile, based on 1996 census data has been used as a basis for some statistical analysis. As a number of other suburbs fall into the Central Ward, only data pertaining to Red Hill, parts of Milton, and parts of Paddington is included.

An aggregation of 1996 census data has been used to provide a demographic profile of the study area. The data relates to parts of Auchenflower and Petrie Terrace as well as Red Hill, Milton and Paddington. In most cases the census data sets correlate with data from the Cental Ward Community Profile. The ABS Census collectors' districts are identified in **Table 5.5.1**. Where appropriate a profile of the areas immediately adjacent to Lang Park has been used, and is referred to as the 'immediate area'.

Table 5.5.1 Census Collectors Districts

Immediate Study Area	3190603; 3191607.
Total Study Area	3190601; 3190602; 3190603; 3190604; 3190605; 3190606; 3190607; 3190608; 3190610; 3191104; 3191105; 3191110; 3191604; 3191605; 3191606; 3191607; 3191608; 3191609; 3192008; 3192009; 3192010; 3192011; 3192012; 3192013; 3231402.

The Brisbane City Council Central Ward Community Profile shows that the population of Red Hill has remained stable with a 1.2% average annual change during the 1991 - 1996 census period.

The population of the study area is highly mobile, with only 28.6% of residents living at the same address for the census in both 1991 and 1996. In comparison 43.9% of Brisbane City residents remained at the same address between 1991 and 1996.

Table 5.5.2 Persons Residing at Same Address in 1991 and 1996

	Paddington		Milton		Red Hill		Petrie		Immediate		Study Area		Brisbane
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	%
People at Same Address 5 Years Ago (aged 5+)	2,235	32.5	462	29.0	1,475	30.9	194	20.7	185	31.3	2,013	28.6	43.9
People at Different Address 5 Years Ago (aged 5+)	4,045	58.8	959	60.2	2,677	56.1	646	69.1	347	58.7	4,412	62.6	46.1
Other	529	7.8	146	9.3	573	12.1	68	7.5	56	9.5	520	7.5	10.0
Total Population	6809	100.0	1567	100.0	4725	100.0	908	100.0	588	100.0	6945	100.0	100.0

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics (B01)

In the 1996 Census 6945 people were counted within the study area (**Table 5.5.2**). Current population estimates for the area (DCILGP 1999) indicate that 5,009 people live in Red Hill, 7,288 in Paddington, and 1,667 people live in Milton.

The suburb of Red Hill has remained relatively stable in terms of overall population size with a 1.2% average change per year during the 1991 - 1996 census period. Milton has grown by an average 2.1% and Paddington by an average 0.7% during this same period (DCILGP, 1999). These rates are below the Brisbane average growth rate of 1.4% for Red Hill and Paddington, but slightly greater for Milton. The population in these areas may have increased as the area becomes gentrified, and residential areas are rezoned for higher density living.

Future population growth within the study area is likely to be relatively low, given the established nature of the inner city suburbs. Population growth will be limited to infill development, and the development of higher density housing options. Population growth for the City of Brisbane will occur at an average of approximately 1% per year (DCILGP 1998) (**Table 5.5.3**).

Table 5.5.3 Population Projections

Medium Series	1996	2001	% Change	2016	% Change
Part of Brisbane Statistical Division (including Ipswich Pt B)					
Brisbane City	819590	867850	1.2	996290	0.9
Ipswich City Pt A	117440	127490	1.7	163170	1.7
Ipswich City Pt B	12810	13960	1.7	16880	1.3
Logan City	162670	176610	1.7	212830	1.3
Pine Rivers	106280	119940	2.4	167020	2.2
Redcliffe	49610	50120	0.2	51430	0.2
Redland	103080	118640	2.9	159630	2.0
TOTAL	**1371480**	**1474610**	**1.5**	**1767250**	**1.2**
SEQ Region Statistical Divisions					
Gold Coast (Pt A: Pt B)	41480	51230	4.3	71520	2.2
	314960	360130	2.7	492100	2.1
Beaudesert (Pt A: Pt B)	23660	28580	3.9	47360	3.4
	23900	26940	2.4	36010	2.0
Caboolture (Pt A: Pt B)	96190	115870	3.8	190440	3.4
	4570	5130	2.3	6890	2.0
Caloundra (Pt A: Pt B)	44510	51230	2.9	81370	3.1
	21490	24370	2.5	36750	2.8
Maroochy (Pt A: Pt B)	87650	103480	3.4	168310	3.3
	20420	23630	3.0	36210	2.9
Noosa (Pt A: Pt B)	24250	29530	4.0	40740	2.2
	12150	13800	2.6	18920	2.1
Boonah	6930	7240	0.9	8170	0.8
Esk	13860	14630	1.1	16850	0.9
Gatton	15090	15770	0.9	17340	0.6
Laidley	12450	14470	3.1	21880	2.8
Toowoomba City	86570	88590	0.5	95280	0.5
Kilcoy	3200	3330	0.8	3730	0.8
TOTAL	**853330**	**977950**	**2.8**	**1389870**	**2.4**

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics

5.5.3 Socio-Demographic Characteristics

❑ Demography & Family Structure

The age structure of the area is presented in **Table 5.5.4**. There is a substantially higher proportion of young adults aged between 15 and 34 within the study area (55.7%) than that for Brisbane in general (33.7%). Within the Petrie Terrace area two thirds (65.9%) of residents are within this age group.

The proportion of people under 15 years of age is lower than that of Brisbane generally: 17.9% in Brisbane compared with 8.3% in Milton, 11.2% in Paddington, and 11.3% in Red Hill (Brisbane City Council Community Profiles, 1996 Census: 5). Only 2% of Petrie Terrace residents are under 15 years of age.

There is a lower proportion of people aged 65 and over in the study area (10.3%) than the Brisbane average (13.0%). Within the study area 10.7% of residents in Milton, 10.3% in Paddington and 7.8% in Red Hill are aged over 65 years. The median age of people in all three of these suburbs was 29 (Brisbane City Council Community Profiles, 1996 Census: 5).

Table 5.5.4 Age & Sex Profile (1996)

Age	Paddington		Milton		Red Hill		Petrie		Immediate		Study Area		Brisbane
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	%
0-4 years	276	4.1	52	3.3	223	4.7	9	1.0	33	5.6	207	3.0	6.1
5-9 years	242	3.6	36	2.3	157	3.3	6	0.7	21	3.6	148	2.1	5.7
10-14 years	236	3.5	42	2.7	154	3.3	3	0.3	12	2.0	180	2.6	6.2
15-19 years	386	5.7	118	7.5	295	6.2	69	7.6	32	5.4	486	7.0	7.7
20-24 years	1218	17.9	315	20.1	761	16.1	240	26.4	108	18.4	1423	20.5	9.7
25-29 years	1068	15.7	253	16.1	751	15.9	194	21.4	99	16.8	1205	17.4	8.6
30-34 years	683	10.0	152	9.7	524	11.1	95	10.5	75	12.8	749	10.8	7.7
35-39 years	498	7.3	95	6.1	358	7.6	59	6.5	48	8.2	482	6.9	7.4
40-44 years	421	6.2	94	6.0	277	5.9	39	4.3	20	3.4	365	5.3	7.1
45-49 years	412	6.1	96	6.1	277	5.9	52	5.7	25	4.3	365	5.3	7.1
50-54 years	300	4.4	52	3.3	210	4.4	37	4.1	13	2.2	236	3.4	5.7
55-59 years	194	2.8	43	2.7	147	3.1	18	2.0	9	1.5	193	2.8	4.5
60-64 years	173	2.5	53	3.4	128	2.7	18	2.0	21	3.6	186	2.7	3.6
65-69 years	180	2.6	48	3.1	134	2.8	9	1.0	16	2.7	203	2.9	3.7
70-74 years	184	2.7	37	2.4	127	2.7	21	2.3	15	2.6	167	2.4	3.5
75 and over	338	5.0	81	5.2	202	4.3	39	4.3	41	7.0	350	5.0	5.9
Total	6809	100.0	1567	100.0	4725	100.0	908	100.0	588	100.0	6945	100.0	100.0

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics (T02)

The community is within an early stage of the 'life cycle'. Couples without children comprise approximately 20%, lone person households 36%, and group households 19.5% of households (**Table 5.5.5**). This characteristic points to the possible future increase in population as these young couples become young families. The current demand patterns for social services in the area will alter as a consequence.

Brisbane City as a whole is notably different in its household structure. For example, group households comprise only 7% of the City, and lone person households comprise only 25%.

Table 5.5.5 Family & Household Structure (1996)

Family Structure	Study Area No.	%	Brisbane No.	%
One Family household				
Couple with children	365	*11.1*	90949	*30.0*
Couple without children	647	*19.7*	70276	*23.2*
One Parent Family	218	*6.7*	28994	*9.6*
Other Family	117	*3.6*	6303	*2.1*
Two Family Household	9	*0.3*	2634	*0.9*
Three Family Household	0	*0.0*	57	*0.0*
Non-Family Households:				
Lone Person Household	1194	*36.4*	75430	*24.9*
Group Household	651	*19.9*	20865	*6.9*
Not Classifiable	76	*2.3*	7606	*2.5*
Total	**3277**	**100.0**	**303114**	**100.0**

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics

In 1996, the proportion of single parent families in the study area was higher than the Brisbane average of 15.2%. For example in Milton, single parent families comprised 23.5% of families, with the proportion being slightly lower in Paddington (14.2%) and significantly lower in Red Hill (12.7%). Lone person households comprised 37% of households, which was substantially higher than Brisbane (25.5%).

Reflecting the nature of the rental housing market, group households made up 20% of the households of the study area. Within Brisbane only 7.1% of households are group households.

Approximately 74% of the population of the study area were born in Australia (**Table 5.5.6**). The proportions of people born outside Australia in Milton (10.6%), Paddington (9.9%) and Red Hill (9.5%) were all lower than for Brisbane (12.5%) (Brisbane City Council Community Profiles, 1996 Census: 6). Milton (8.4%), Paddington (9.4%) and Red Hill (9.7%) also contained lower proportions of people who speak languages other than English than Brisbane (12.5%) (Brisbane City Council Community Profiles, 1996 Census: 7). However the Petrie Terrace area differs significantly from the other parts of the study area. Only 43.3% of the Petrie Terrace population was born in Australia. The great majority of the migrants residing in the Petrie Terrace area were from non-English speaking countries, such as the Pacific Island nations and Italy.

Table 5.5.6 Country Of Birth (1996)

	Paddington		Milton		Red Hill		Petrie		Immediate		Study Area		Brisbane
	Total	%	Total	%	Total	%	Total	%	Total	%	Total	%	%
Australian by Birth	5221	76.7	1129	72.6	3416	72.3	674	43.3	427	74.0	5144	73.6	74.6
Main English	705	10.4	168	10.8	528	11.2	112	7.2	57	9.9	746	10.7	9.4
Other Countries	680	10.0	188	12.1	467	9.9	699	45.0	86	14.9	829	11.9	12.5
Not Stated	201	3.0	70	4.5	313	6.6	70	4.5	7	1.2	273	3.9	3.5
Total Population	6807	100.0	1555	100.0	4724	100.0	1555	100.0	577	100.0	6992	100.0	100.0

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics

In proportional terms, the 1996 census showed that Milton had a larger indigenous population of 2.1% than Brisbane with 1.2%. Paddington had a slightly lower indigenous population at 1.1%,

and Red Hill had a much smaller indigenous population at 0.5% (Brisbane City Council Community Profiles, 1996 Census: 7).

❑ Economy, Income & Employment

On average, households in the study area were more affluent than those in Queensland. Approximately 29% of households in the study area earned more than $1000 per week compared with 22% of Queensland households (**Table 5.5.7**). Levels of affluence differed within the study area, with Paddington (33.5%) and Red Hill (31.9%) having a larger proportion of households earning over $1000 per week. Median weekly household incomes in Paddington and Red Hill ranged between $700 and $999. The median weekly household income in Milton was less than this ($500 to $699 per week).

Table 5.5.7 Weekly Household Income (1996)

Income	Paddington		Milton		Red Hill		Petrie		Immediate		Study Area		Brisbane
	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%	
Neg/Nil Income	28	0.9	12	1.7	6	0.3	6	1.4	0	0.0	39	1.2	0.8
$1-$119(Under $6,188)	25	0.8	11	1.6	16	0.8	6	1.4	6	2.2	43	1.3	0.8
$120-$299 ($6,240 - $15,548 p.a.)	453	15.2	130	18.7	353	17.5	90	21.3	47	17.2	566	18.3	16.5
$300-$499 ($15,600 - $25,948 p.a.)	348	11.7	101	14.6	254	12.6	55	13.0	33	12.1	429	13.4	14.7
$500-$699 ($26,000 - $36,348 p.a.)	366	12.3	88	12.7	247	12.3	44	10.4	37	13.6	408	12.8	13.0
$700-$999 ($36,400 - $51,948 p.a.)	427	14.3	101	14.6	309	15.3	54	12.8	34	12.5	456	14.3	16.0
$1000-$1499 ($52,000 - $77,948 p.a.)	491	16.5	111	16.0	331	16.4	68	16.1	46	16.8	503	15.7	16.0
$1500-$1999 ($78,000-$103,948 p.a.)	232	7.8	39	5.6	139	6.9	27	6.4	20	7.3	198	6.2	6.3
$2000 or more (Over $104,000 p.a)	333	11.2	43	6.2	174	8.6	29	6.9	26	9.5	229	7.2	6.0
Partial income stated (a)/ All incomes not stated (b)	276	9.3	58	8.4	187	9.3	44	10.4	24	8.8	233	7.3	9.8
Total	**2979**	**100.0**	**694**	**100.0**	**2016**	**100.0**	**423**	**100.0**	**273**	**100.0**	**3194**	**97.8**	**100.0**

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics (B23)

The proportion of families in Brisbane with incomes below the $15,600 approximated poverty line was just under 11%. In comparison, Milton had a higher proportion at about 13%, with Paddington at around 11% and Red Hill at about 9%. This contrasts with the higher than average weekly household income and suggests some substantial differences in circumstances for households in the study area.

The unemployment rates in Milton (11.3%), Paddington (8.6%) and Red Hill (9.0%) were all higher than the Brisbane average unemployment rate (7.9%). Youth unemployment was higher again Paddington (20.2%) and Red Hill (18.6%) when compared to the Brisbane average (16.5%). Youth unemployment in Milton (12.7%) was lower than the Brisbane average.

In terms of employment, people engaged in professional occupations comprised 29.5% of the work force, compared with than Brisbane (22.3%) (**Table 5.5.8**). The 'professions' contributed the greatest proportion of the work force. The next largest group were those people engaged as 'intermediate clerical sales and service' workers (18.5%). The work force originating from Red Hill and Paddington had slightly larger proportion of professionals. A large number of people engaged in the work force were occupied in white collar activities such as the 'Property and Business Services' sector (18.8%). The 'accommodation cafes and restaurants' sector provided employment for approximately 10.2% of the work force (**Table 5.5.9**).

Table 5.5.8 Occupation Structure (1996)

Occupation	Paddington		Milton		Red Hill		Petrie		Immediate		Study Area		Brisbane
	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%	%
Managers and Administrative Staff	374	9.1	62	6.9	207	8.0	51	9.0	15	4.4	318	7.8	7.8
Professionals	1333	32.6	265	29.6	885	34.3	164	28.9	104	30.4	1208	29.5	22.3
Associate Professionals	535	13.1	135	15.1	332	12.9	84	14.8	43	12.6	561	14.2	12.2
Tradepersons and Related Workers	294	7.2	59	6.6	185	7.2	23	4.0	23	6.7	290	7.1	10.4
Advanced Clerical and Service Workers	183	4.5	35	3.9	116	4.5	27	4.8	20	5.8	184	4.5	4.6
Intermediate Clerical, Sales & Service Workers	702	17.2	168	18.8	460	17.8	90	15.8	66	19.3	756	18.5	18.0
Intermediate Production & Transport Workers	100	2.4	30	3.4	76	2.9	24	4.2	16	4.7	133	3.2	6.5
Elementary Clerical, Sales & Service Workers	344	8.4	81	9.1	162	6.3	56	9.9	28	8.2	363	8.9	9.2
Labourers & Related Workers	167	4.1	40	4.5	105	4.1	40	7.0	21	6.1	190	4.6	6.8
Inadequately Described/Not Stated	58	1.4	19	2.1	54	2.1	9	1.6	6	1.8	74	1.8	2.2
Total	**4090**	**100.0**	**894**	**100.0**	**2582**	100.0	**568**	**100.0**	**342**	**100.0**	**4097**	**100.0**	100.0

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics (B20)

Fewer residents work within the 'cultural and recreational services' and 'retail trade' sectors than in Brisbane.

Table 5.5.9 Industry Structure (1996)

Industry	Paddington		Milton		Red Hill		Petrie		Immediate		Study Area		Brisbane
	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%	Persons	%	%
Agriculture, Forestry and Fishing	12	0.3	3	0.3	9	0.3	3	0.5	0	0.0	21	0.5	0.6
Mining	26	0.6	10	1.1	24	0.9	0	0.0	6	1.9	36	0.9	0.4
Manufacturing	238	5.8	58	6.5	149	5.6	30	5.2	9	2.8	256	6.2	9.9
Electricity, Gas and Water Supply	15	0.4	6	0.7	5	0.2	0	0.0	6	1.9	12	0.3	0.5
Construction	155	3.8	34	3.8	94	3.6	21	3.6	15	4.7	159	3.9	5.5
Wholesale Trade	197	4.8	49	5.5	110	4.2	25	4.3	22	6.9	168	4.0	6.1
Retail Trade	415	10.1	96	10.7	232	9.0	59	10.2	37	11.7	430	10.5	12.6
Accommodation, Cafes, Restaurants	356	8.7	88	9.8	229	8.8	72	12.4	34	10.7	418	10.2	5.0
Transport and Storage	142	3.5	25	2.8	93	3.6	21	3.6	9	2.8	153	3.7	4.7
Communication Services	76	1.9	23	2.6	39	1.5	23	4.0	6	1.9	84	2.0	2.1
Finance and Insurance	163	4.0	40	4.5	120	4.6	24	4.1	15	4.7	177	4.3	4.4
Property and Business Services	750	18.3	184	20.5	466	18.0	110	19.0	77	24.3	775	18.8	13.3
Government Administration and Defence	256	6.3	46	5.1	166	6.4	40	6.9	15	4.7	243	5.9	5.7
Education	384	9.4	68	7.6	262	10.1	55	9.5	14	4.4	327	7.9	8.6
Health & Community Services	446	10.9	79	8.8	312	12.0	46	7.9	26	8.2	405	9.8	10.8
Cultural & Recreational Services	239	5.8	40	4.5	129	5.0	22	3.8	14	4.4	206	5.0	2.7
Personal and Other Services	144	3.5	30	3.3	85	3.3	16	2.8	9	2.8	143	3.5	3.9
Non-Classifiable Economic Units / Not Stated	76	1.9	18	2.0	67	2.6	12	2.1	3	0.9	81	2.0	2.9
Total	**4091**	**100.0**	**887**	**100.0**	**2591**	**100.0**	**579**	**100.0**	**317**	**100.0**	**4114**	**100.0**	**100.0**

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics (B19)

❑ Education

The level of education in the study area population reflects the occupational and industrial structure previously discussed. Approximately 40.2% of the population has Bachelor level qualifications in keeping with the professional occupational structure. (**Table 5.5.10**).

In the second semester of 1999, there were 230 pupils enrolled in Petrie Terrace State School, and 274 pupils enrolled in Milton State School.

Table 5.5.10 Educational Achievement (1996)

	Paddington		Milton		Red Hill		Petrie		Immediate		Study Area		Brisbane	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Higher Degree	222.0	7.0	29.0	4.3	131.0	5.7	15.0	3.2	9.0	3.9	130.0	4.0	4.9	
Graduate Diploma	156.0	4.9	26.0	3.8	122.0	5.3	25.0	5.4	18.0	7.8	148.0	4.6	3.7	
Post-Bachelor Degree	1299.0	40.7	283.0	41.7	874.0	38.3	186.0	39.8	94.0	40.5	1265.0	39.2	25.9	
Undergraduate Diploma	248.0	7.8	36.0	5.3	190.0	8.3	37.0	7.9	6.0	2.6	274.0	8.5	8.3	
Associate Diploma	165.0	5.8	48.0	7.1	135.0	5.9	26.0	5.6	15.0	6.5	220.0	6.8	6.4	
Skilled Vocational	394.0	12.3	93.0	13.7	296.0	13.0	58.0	12.4	40.0	17.2	424.0	13.2	20.4	
Basic Vocational	170.0	5.3	43.0	6.3	98.0	4.3	16.0	3.4	14.0	6.0	168.0	5.2	5.3	
Inadequate Description	48.0	1.5	4.0	0.6	35.0	13.5	9.0	1.9	3.0	1.3	57.0	1.8	2.0	
Not Stated	470.0	14.7	116.0	17.1	401.0	17.6	95.0	20.3	33.0	14.2	537.0	16.7	22.9	
Persons Total	3194.0	100.0	678.0	100.0	2282.0	100.0	467.0	100.0	232.0	100.0	3223.0	100.0	100.0	

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics

❑ Housing

The average household size of 2.2 persons in Paddington and Red Hill (2.3 persons) was below that of Brisbane as a whole (2.8) (Brisbane City Council Community Profiles, 1996 Census: 10).

The population is housed within a relatively high proportion of flats and apartments (30.7%). (**Table 5.5.11**). Separate houses comprise 62% of the total housing stock. The percentage of separate houses in Milton (74%) and Paddington (73%) were similar to the Brisbane average (75%). Red Hill had a lower proportion of separate houses (66%) than the Brisbane average and a correspondingly higher proportion of flats, units or apartments (Brisbane City Council Community Profiles, 1996 Census: 10).

Nearly 1% of the housing stock, or 34 dwellings, is attached to a shop or office.

Table 5.5.11 Dwelling Structure (1996)

Dwelling Structure	Study Area		Brisbane
	No.	%	%
Separate House	2278	62.0	75.1
Semi Detached Row or Terrace House, townhouse etc	157	4.3	4.6
Flat Unit or Apartment	1127	30.7	16.9
Other Dwelling:			
Caravan, cabin, houseboat	0	0.0	0.8
Improvised home, tent, sleepers out	0	0.0	0.1
house or flat attached to shop, office,	34	0.9	0.2
Not Stated	80	2.2	2.3
Total	**3676**	**100.0**	100.0

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics (B14)

Home ownership levels in Milton (45%), Paddington (50%) and Red Hill (50%) were lower than the Brisbane average (65%), corresponding with the high proportion of rental properties in the area (Brisbane City Council Community Profiles, 1996 Census: 10). Approximately half of the housing stock in the study areas is being rented. Occupancy levels of the total housing stock were high at approximately 90%. (**Table 5.5.12**).

Table 5.5.12 Dwelling Tenure (1996)

Tenure	Paddington			Milton			Red Hill			Petrie			Immediate			Study Area			Brisbane	
	No.	% of Occ	% of All	No.	% of Occ	% of All	No.	% of Occ	% of All	No.	% of Occ	% of All	No.	% of Occ	% of All	No.	% of Occ	% of All	% of Occ	% of All
Fully Owned	670	28.2	25.7	165	22.6	20.2	583	27.5	25.4	96	21.3	18.6	82	31.1	27.6	791	23.9	21.5	39.7	37.2
Being Purchased	590	19.1	17.4	102	14.0	12.5	413	19.5	18.0	70	15.2	13.3	46	17.4	15.5	505	15.2	13.7	22.8	21.4
Being Purchased under a rent/buy scheme	6	0.2	0.2	3	0.4	0.4	0	0.0	0.0	3	0.7	0.6	3	1.1	1.0	9	0.3	0.2	0.4	0.4
rented	1430	46.3	42.3	410	56.2	50.2	985	46.5	42.9	263	57.0	49.9	124	47.0	41.8	1798	54.2	48.9	31.8	29.7
being occupied rent free	35	1.1	1.0	11	1.5	1.3	27	1.3	1.2	6	1.3	1.1	3	1.1	1.0	38	1.1	1.0	1.0	1.0
being occupied under a life tenure scheme	7	0.2	0.2	0	0.0	0.0	6	0.3	0.3	0	0.0	0.0	0	0.0	0.0	3	0.1	0.1	0.4	0.4
Other	15	0.5	0.4	0	0.0	0.0	4	0.2	0.2	0	0.0	0.0	0	0.0	0.0	12	0.4	0.3	0.5	0.5
Not Stated	134	4.3	4.0	39	5.3	4.8	101	4.8	4.4	21	4.6	4.0	6	2.3	2.0	159	4.8	4.3	3.4	3.2
		100.0			*100.0*			*100.0*			*100.0*			*100.0*			*100.0*		*100.0*	
TOTAL OCCUPIED	3087	91.3	91.3	730	89.5	89.5	2119	92.2	92.2	461	87.5	87.5	264	88.9	88.9	3315	90.2	90.2	93.6	93.6
UNOCCUPIED PRIVATE DWELLING	296	8.7	8.7	86	10.5	10.5	179	7.8	7.8	66	12.5	12.5	33	11.1	11.1	361	9.8	9.8	6.4	6.4
TOTAL	**3383**	***100.0***	***100.0***	**816**	***100.0***	***100.0***	**2298**	***100.0***	***100.0***	**527**	***100.0***	***100.0***	**297**	***100.0***	***100.0***	**3676**	***100.0***	***100.0***	100.0	*100.0*

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics

The high incidence of rented, rather than owner/occupied accommodation is reflected in the lower proportion of people living at the same address in 1991, as in 1996 in the study area. This proportion is consistently lower at 28.6% in the total study area, than the Brisbane average of 43.9% (Brisbane City Council Community Profiles, 1996 Census: 4). In terms of mobility of population, Paddington was the most stable suburb (32.5%) with the Petrie Terrace area the least stable (20.7%). (**Table 5.5.1**)

A survey of six prominent real estate agents in the area indicated that the average rent for two and three bedroom houses in the area range between about $200 and $300 per week. The Residential Tenants Authority report on median weekly rents for three bedroom houses in the postcode areas coving the study area shows a median rental of $255 per week for Milton, Paddington and Rosalie in the December 1999 quarter. This is up $15 for the average median rental for the same housing stock in the December 1997 quarter. The median rental for two bedroom flats had remained the same over the same period in the same postcode areas.

For the Ithaca and Red Hill postcode areas, the median rental for a three-bedroom home was $240 per week for the December 1999 quarter. This was up $30 per week for the same housing stock in the December 1997 quarter. There was a $5 increase in the median weekly rental for two bedroom flats in the same area over the same period.

The increase in rental demand for three bedroom housing stock over the last two years, and the relative stability of rents for two bedroom flats reflects the comparatively youthful, high-earning characteristics of the population of the study area.

The survey of real estate agents also indicated that a large proportion of housing stock sold over the previous twelve months was for the purpose of renovation. Estimates varied from about 12% of housing sales to about 60% of housing sales for the study area being sold for the purpose of renovation.

❑ Accessibility

The study area is traversed by Coronation Drive, Milton Road and Waterworks Road. These are three of Brisbane's prominent transport corridors.

A railway line passes through, linking the study area to the City. The Milton station on the Ipswich line services the area. Bus services are also available, however there are plans to improve these services in terms of frequency and after hours and weekend services.

As an inner city community, households within the study area are less dependent on private motor vehicles for transport. Approximately 23% of households in the study area do not own a motor vehicle, and 40% own only one. This is substantially more than Queensland, where only 10% of households do not own a motor vehicle. (**Table 5.5.13**)

Table 5.5.13 Motor Vehicles Per Household (1996)

Number	Paddington		Milton		Red Hill		Petrie		Immediate		Study Area		Brisbane
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	%
None	523	17.3	156	21.8	393	18.8	127	28.5	49	18.1	753	23.0	13.9
One	1262	41.7	314	43.8	886	42.3	168	37.7	115	42.6	1340	40.9	40.5
Two	818	27.0	142	19.8	524	25.0	83	18.6	57	21.1	706	21.5	30.3
Three	194	6.4	31	4.3	128	6.1	18	4.0	22	8.1	182	5.6	7.7
Four or More	55	1.8	13	1.8	26	1.2	9	2.0	12	4.4	63	1.9	2.5
Not Stated	177	5.8	61	8.5	139	6.6	41	9.2	15	5.6	233	7.1	5.1
Total	3029	100.0	717	100.0	2096	100.0	446	100.0	270	100.0	3277	100.0	100.0

Source: 1996 Census of Population and Housing, Australian Bureau of Statistics (B29)

Residents are less likely to drive to work than the Brisbane population and are much more likely to walk or catch a bus to work (Brisbane City Council Community Profiles, 1996 Census: 15)

Traffic congestion is a significant issue for residents in the study area with parking overspill and general traffic intrusion into adjacent residential area from the shops and restaurants in Paddington (Brisbane City Council, 2000: 48).

There are no specially constructed bikeways in the study area. The Coronation Drive cycleway further to the south provides a link to the City, although access to this cycleway is neither direct nor convenient.

5.5.4 Community Structure & Profile

The study area is located in Brisbane's high-income and inner western suburbs. These suburbs are characterised by cafes, restaurants, nightspots and antique and curiosity shops. While there is a pocket of light industry, a high proportion of the study area is residential and the major businesses are professional services and specialty shops.

The area is well serviced by a range of community groups and organisations. Most Commonwealth, State and Local Government services are also offered in or close to the study area.

❑ History

The study area has a rich and varied history that is clearly valued by local residents and the wider community. The Paddington History Society has recently documented oral histories of local people in the area. This document provides tangible evidence that there are a number of local residents who have historic associations with the area and the importance of local history to residents.

A heritage trail researched by the Brisbane City Council Heritage Unit runs through the study area. A published booklet provides a guide to several areas of historic and cultural significance along Latrobe Terrace and Given Terrace.

❑ History of Surrounding Areas

The Ithaca area, in which the main part of the study area is located, contains some of Brisbane's oldest suburbs. For example, country lots in the Enoggera area were auctioned in 1859, and in 1863 an auction of allotments in Milton was advertised (Brisbane City Council, undated). In the 1860s the area was characterised by a sparse population, "timber and tin" cottages, a "scattering of tents" and "several elegant hilltop mansions" (Brisbane City Council, undated).

During the 1880s shops and community facilities clustered about the intersections of major roads. Grand homes were built on the highest aspects, the slopes and valleys were also developed and the town of Ithaca was formed. The surrounding areas became the basis of the suburbs that are now part of the study area (Brisbane City Council, undated). These older suburbs that were once on the outskirts of Brisbane are now seen as close to the city and are becoming gentrified as processes of urbane renewal take place. For example, the "timber and tin", Queenslanders and workers cottages are highly valued as character houses in the area (Brisbane City Council, 2000:35).

❑ Social Importance of Lang Park

The Lang Park site is well remembered in Paddington's oral history. *"The way to school was through some hilly overgrown land abutting the Cemetery in the Church of England Grounds [now the Lang Park Football Grounds]"* (Ella Ritchie in Buckberry D 1999: 63). Lang Park is named after Reverend John Dunmore Lang who established the area as a cemetery in 1840 (Rugby League News 1996:10). The cemetery was closed and the graves were transported to Toowong. Some of the headstones still remain on site near the Christ Church. *"There are still twenty headstones remaining in the memorial reserve next to the church, which is right beside Lang Park"* (Buckberry D, 1999: 79).

Lang Park itself is also remembered in local oral history. *"I don't think that there was a kid who hadn't snuck into Lang Park and watched a game on a Sunday afternoon or one of the Early State*

of Origins. But this was back in the days when you found someone had cut a hole in the fence, and the word got around. 'Oh, the hole's over the Hale Street fence or the Caxton St Fence'. Word spread around and God knows how many kids snuck in to the football". (Carleen Dent in Buckberry D, 1999: 73).

Lang Park also has importance as the home of Rugby League because it was the first major stadium in Australia controlled by Rugby League authorities. In 1957 the ground became headquarters of the code in Queensland (Rugby League News, 1996: 10).

Over 240 life memberships were sold in order to raise capital for improvements to Lang Park in 1955 (The Rugby League News, April 23-25 1955:15). At this time Lang Park was the only sport stadium in Australia specially designed for Rugby League football. The field was oval in shape with seats that "hug the touch line and give spectators full enjoyment of the play" (The Rugby League News, 1955:15).

The Lang Park Trust was established by an Act of Parliament in 1963 and the Queensland Rugby League gave complete control of the ground to the Trust in 1971, thus separating the Queensland Rugby League from administration of the ground. The Brisbane Broncos made Lang Park their home from 1988 to 1992, further enhancing the links between Ruby League and Lang Park. Lang Park has also been used for Rugby Union matches, World Youth Soccer tournaments, night baseball and occasionally for rock concerts, Jehovah's Witness Conventions, trade union meetings and athletic meets.

Lang Park is now used infrequently for State of Origin and other rugby union and league and soccer matches but still retains its reputation as the original home of Rugby League in Queensland.

❑ Community Networks

There are several community networks that operate within or influence the study area.

In particular, the Red Hill Paddington Community Centre provides information and support to local area networks regarding a range of issues from health and wellbeing, creative workshops, parents and children, the environment, as well as neighbourhood care and support.

Youth networks are encouraged in the local area through the Gap Youth Network, the Youth Action and Participation Network, the Inner City Youth Inter-Agency and the Police and Citizens Youth Club. The area is also a hub for less formal youth networks, congregating around the skate area, the Ozsports Centre and the various nightspots on Caxton Street. As the area's youth population is rising, there is a corresponding need for more activities for young people in the area (Brisbane City Council, 2000:83).

Several networks are available for disabled people including the Help and Awareness Northern Deanery which provides a social access program to help people with disabilities get together and participate in organised activities and outings in the community. The Recreation, Independence and Socialisation in the Community (RISC) group assists people with severe and multiple disabilities to gain access to and participate in community activities.

Neighbourhood networks exist for local women through the Red Hill Paddington Community Centre Family Support Worker.

The Milton Chamber of Commerce and the Caxton Street Traders provides a network for local business in the area.

Several churches in the study area support community networks such as social gatherings and activities for the frail aged and older people.

Several social groups for the gay community also provide networks in and around the study area.

Parents and Citizens organisations operate from several schools in the area.

The Paddington History Group also provides a network of activities relating to local history for the study area and its surrounds.

In addition, there are several residents groups including the longstanding Bardon Community Association. Others, some of which have formed more recently around local development issues and the increasing pace of change in the area include, the Petrie Terrace Action Group, the Petrie Terrace Resident Association, People for Paddington, Herston/Kelvin Grove Residents Association and the Caxton Street Association. These groups provided a range of networks for people to become involved in local issues.

❑ Factors Contributing to Existing Community Cohesion

The study area is characterised by its inner city suburban nature and proximity to the city centre. It is not only used by local residents but also frequented by people from surrounding areas. The support networks offered by a sense of community are valued by community members although some long-term residents have reported a gradual decline in the cohesiveness of the community (Brisbane City Council 2000:81).

The proliferation of local residents' groups in the area indicates that a number of local residents are seeking to establish a sense of identity and belonging. At the same time, long time residents are seeking to preserve their current sense of identity and belonging by actively trying to influence the future development of the area.

The Red Hill Paddington Community Centre provides a focal point for the local community, coordinating links between groups and facilitating activities. The Ithaca Hall and the community hall on Jubilee Terrace are used as meeting places by the local community. The Red Hill Paddington Community Centre administers these halls.

The La Boite Theatre is also located in the study area, along with Hands on Art and a local sculptors' society. These local community organisations provide focal meeting places and networks for many community activities.

Groups such as these have a long history of association with the study area and contribute to a cohesive, active community.

The diversity of beliefs and values in the study area are reflected in the demographics which show a community that is forming around local issues, seeking to maintain, and in some instances, define a sense of identity and belonging in the local area. Some members of the local community see this diversity as potentially under threat as the area becomes increasingly gentrified (Brisbane City Council 2000:81).

❑ Distinctively Vulnerable Groups

Demographic analysis shows that there are high proportions of young people and single parent families in the study area. These groups are generally considered vulnerable because they have higher support needs than others in society. These groups have been identified by the local community as being in need of further support in the area (Brisbane City Council 2000).

There were fewer indigenous people and people from non-English speaking backgrounds in the study area than Brisbane as a whole. These groups could also be considered as vulnerable due to their significantly lower proportionate representation in the study area.

Older people and people with disabilities are also identified by the local community as vulnerable groups with high support needs in the community. Some of the networks that operate around these groups have been discussed above in *Community Networks*.

❑ Existing Community Attributes, Lifestyle & Recreation

The community attributes and lifestyle of the study area residents are heavily influenced by its position in Brisbane's high income, inner western suburbs. In particular the suburbs of Milton, Red Hill and Auchenflower are popular with city dwellers and renovators.

In general the high income, professional population is relatively new to the area, moving in as homes are renovated. Pockets of older residents who have raised families and/or lived most of their lives in the area still remain.

The Caxton Street and Given Terrace precincts are regularly visited by people from surrounding Brisbane suburbs, seeking food and entertainment. These visitors also influence the culture, values and lifestyle of the study area, contributing to a cosmopolitan and urbane reputation for the area.

Existing facilities that provide an opportunity for informal sporting activities such as indoor cricket, beach volleyball, indoor netball, gym, boxing, basketball, pool and snooker, karaoke, and fitness are clustered around the area adjacent to and opposite Lang Park. As the inner city population increases, this area is an important hub for low cost, accessible, informal recreation.

This area has a history as an informal sporting and recreation precinct. "Any Paddington child would know about the Paddington playground and the community centre down there. The Ithaca pool was a popular spot, and of course we had Lang Park" (Carleen Dent in Buckberry 1999: 73).

Many sporting groups are located in Sports House on the corner of Castlemaine and Caxton Streets, immediately adjacent to Lang Park Stadium. These groups include Tennis Queensland, Queensland Volleyball Association Table Tennis Queensland, Brisbane North and Districts Soccer Association and Brisbane City Touch Association. Others in the area include the Metropolitan Tennis Association and the Ithaca Bowls Club. Queensland Master Swimming Incorporated is opposite the Sports House, on the other side of Caxton Street. A skate park is located opposite the Ithaca Swimming Pool.

The loss of the Milton Tennis Courts is seen to have constrained access to these facilities for local schools, and more facilities of this kind are seen as necessary (Brisbane City Council, 2000:75).

Several schools use, or have used, Lang Park Stadium for sporting events. These include the Petrie Terrace State Primary School for its athletics carnival once a year in August; the Primary

Schools Leagues Finals for the Metropolitan Primary Schools Rugby League for one day in September. The Secondary Schools Rugby League Finals were also held at Lang Park for one day in September. The last time was in 1998.

There are four parks in the study area offering informal public space and a range of facilities such as:

(a) playgrounds;
(b) shelter;
(c) half-court basketball;
(d) accessible toilets;
(e) water;
(f) barbeques; and
(g) wheelchair access.

In particular, the Neal Macrossan Park, opposite the Lang Park site offers opportunities for skating, BMX and rollerblading.

While the difficulty of providing open space this close to the city is acknowledged by residents, these spaces are clearly valued (Brisbane City Council, 2000:72).

❑ Activity Patterns

Activity in the study area is focussed on the strip shopping along Caxton Street and Given Terrace. A strip shopping area is also located in Park Road, Milton. Nearby Rosalie is also developing as a café and restaurant precinct.

The Caxton Street area has a history as an entertainment precinct. For example, local people remember the theatre opposite the Paddington hotel. "We used to go to the pictures on Saturday night. Nine times out of ten there would be a brawl somewhere from the park, strangers coming down from West End and the local lads would get stuck into it especially if there was a football match on." (Matt Horran in Buckberry D, (Ed) 1999. *Pad, Paddo, Paddington*: 98). This area is continuing to grow and expand as a popular entertainment and meeting place.

A variety of boutique clothing stores, coffee shops, special interest shops, home ware shops, delicatessens and book stores offer casual visitors and locals a range of shopping opportunities. On the weekends the area is frequented by non-residents visiting the specialty shops, restaurants and coffee houses. These are interspersed with real estate agents and hardware stores. The area also is a neighbourhood shopping precinct.

The nightclubs remain open until the early hours of the morning five or six days a week and there is a consistent steam of patrons moving between nightclubs in the area and into the city.

5.5.5 Experiences with Events at Lang Park

Minor events such as school carnivals are usually held on weekdays and depend on the absence of major games. The Brisbane Strikers Soccer team uses Lang Park for their home ground fixtures but they train and are based at Perry Park. Some home matches in the National Soccer League are held at Lang Park. These matches draw small crowds of between 3,000 and 6,000.

Occasionally the grounds are used by religious groups for meetings, however the cost of security for a large crowd and providing flooring etc are prohibitive for these occasional uses. There have been few anti-social behaviour problems for these, smaller events.

The ground is currently used for the Queensland Rugby League and the State of Origin matches. This means that current use for major events is limited to three to five times a year. The local area is letter dropped by ground staff before a major game and advised of the changes in parking restrictions. A contact telephone number is included in this letter drop.

Most complaints to Lang Park management after major events are about the lack of commercial food available. Other complaints include bad language within the venue, people upset with security officers doing their job, and ticketing issues. There are very few official complaints about parking problems or antisocial behaviour, even after major events. However, the consultation process has revealed that these problems do arise and that some residents are deeply concerned about them.

Of the complaints received about parking during major events, most are from residents in Cricket and Auburn Streets. Upon further investigation by the Lang Park Trust and the Brisbane City Council, Auburn St was found to be particularly narrow and appropriate parking restriction there has been recently tightened.

There have been few complaints to the Lang Park management from local businesses. Where problems with buses being parked near local businesses are raised, they were resolved out with the Lang Park Stadium Manger. In general some local businesses are concerned that customers are being deterred by the barricades on Castlemaine Street prior to and during large matches.

During major events the Police Special Response Team patrols the venue and surrounding areas, and Traffic Police also patrol the area. Stadium management has radio and mobile phone contact with the Police during major events in order to co-ordinate responses to identified problems.

Since the western grandstand was opened in 1994, only mid strength beer in plastic cups has been sold on the ground to prevent people throwing cans. A telephone hotline was installed in June 1994 to respond to local complaints about crowd behaviour and parking during the State of Origin Matches but only one complaint was recorded over four games so the hotline was abandoned. The consultation process has revealed that the hotline number was not widely known.

Despite the lack of formal complaints about major and minor events at Lang Park, anecdotal evidence from the preliminary consultation and submissions on the Terms of Reference for this proposal indicate that there is local concern about nuisance effects associated with crowd behaviour. For example, while few official complaints have been received about being frightened by loud, rowdy or drunken behaviour as patrons leave events, residents have indicated they still find this behaviour irritating and threatening.

❑ Law & Order

On Caxton Street and Petrie Terrace there are five nightclubs that operate until 5.00 a.m., between five and six days a week. City Police have noted an increasing incidence of antisocial behaviour on Friday and Saturday nights. The night life in this area has grown noticeably in the last five years.

The need to better manage public drunkenness in and around the entertainment district along Caxton Street and Given Terrace in Paddington has been identified as an area requiring further

action (Brisbane City Council, 2000:85). At present nearby residents experience nuisance effects such as unpleasant behaviour from drunken patrons, particularly around closing time. Empty bottles and rubbish litter their yards in the morning.

There is currently no neighbourhood watch in the study area. The Ithaca Neighbourhood Watch was set up in August of 1996 and ran for about 12 months but it has since closed down.

The nearest Police Station providing 24-hour services is the City Station on Adelaide Street. Parts of Red Hill and Auchenflower are provided with 24-hour policing services from the Indooroopilly Police Station. Some local residents have also highlighted the need for a greater Police presence in the district (Brisbane City Council, 2000:85).

The Police Special Duties Policy provides that for anyone wanting Police for special duties are able to access them on a user pays system. In addition to the special duty Police, there is a responsibility to provide a Police presence at public events. The Lang Park Trust arranges for Special Duties Police to be present at major events. Prior to a major event, the Lang Park Trust holds a meeting for Police and security staff to coordinate preparations.

Typically, a major event at Lang Park would involve about:

- 20 special duties Police;
- 8-10 traffic Police, most on motorbikes;
- 20-25 Public Safety Response Police to control the crowds;
- 25 general duties Police;
- 20 plain clothes Police;
- visits by the Dog Squad, Bomb Squad and the Mounted Police; and
- additional security guards.

Motorbike Police attend to calls about illegally parked cars.

5.6 Air Quality & Meteorological Conditions

5.6.1 Introduction

Lang Park is located in an inner suburban location where air quality is influenced by a variety of local and regional emissions sources. These sources are dominated by road traffic in the local area; other local contributions from industrial sources and a variety of commercial and domestic activities; and regional sources such as agricultural activities and biomass burning (e.g. prescribed burning and bushfires).

The current air quality effects of activities at Lang Park are sporadic and are mainly associated with traffic emissions. Locally, traffic increases at times of events at Lang Park, and periods of congested traffic can locally increase levels of air pollutants above the normal range. Short-term air quality effects can also arise from fireworks, especially when conditions are calm and smoke takes longer to disperse than in windy conditions. Traffic to Lang Park for major events originates in all parts of the metropolitan area and beyond, but the effects of this traffic on air quality are generally greatest in areas closer to the site, where convergence of the traffic into a relatively small area occurs.

Urban air contains a great variety of gases and particles that may be classed as pollutants. A relatively small number of pollutants are monitored and studied owing to their potential to affect health and well-being if their levels are too high. The main pollutants on which general monitoring information is available include carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter (PM), ozone (O_3) and sulphur dioxide (SO_2). Other less abundant pollutants for which much less information exists include benzene, 1,3-butadiene, formaldehyde, lead and a range of compounds associated with the trace metal content of fuels, and with incomplete combustion of fuels. Another indicator of air quality that is not measured in any systematic way is odour, which can arise from a variety of sources.

The nearest air quality monitoring sites to Lang Park are at Fortitude Valley and Brisbane CBD. Air quality at these sites is likely to be broadly representative of the area around Lang Park, although details will differ. Generally, air quality in inner Brisbane areas is within accepted guideline levels for the greater part of the time, and the most significant issues are associated with either:

- infrequent periods of weather conducive to the formation of regional smog or haze, or
- localised impacts of congested traffic.

To obtain some measures of current air quality near Lang Park, short-term measurements have been made for a 'baseline' situation with no activity at the existing stadium. Additional short-term measurements will be conducted in May 2000 during and after a major event, i.e., a State of Origin match.

5.6.2 Guidelines

The air quality goals for Queensland, as presented in the Environmental Protection (Air) Policy (1997) (amended 1998), are summarised in **Table 5.6.1**. These goals are often referred to as the "Air EPP" goals. The national air quality standards as listed in the National Environment Protection Measure for Ambient Air Quality (1998) (NEPM Air) are given in **Table 5.6.2**. These values are often referred to as "NEPM Air" standards. These standards are not mandatory in Queensland, but may be incorporated into the Environment Protection Legislation.

The National Environment Protection Goal of the Measure is to achieve the standards set out in Column 4 of **Table 5.6.2** as assessed in accordance with a specified monitoring protocol to the extent set out in Column 5 within ten years from commencement. Monitoring stations are to be located in such a manner that they contribute to obtaining a representative measure of the air quality likely to be experienced in a region or sub-region.

Table 5.6.1: Queensland EPP (Air) Goals For Criteria Pollutants

Air Quality Indicator		Air Quality Goal	
Pollutant	*Measure*	*Units*	*Averaging Time*
Carbon monoxide	8	ppm	8 hours
Lead	1.5	$\mu g/m^3$	3 months
Nitrogen dioxide	0.16	ppm	1 hour
	0.046	ppm	4 hours
	0.01	ppm	1 year
Ozone	0.1	ppm	1 hour
	0.08	ppm	4 hours
Particulates (as PM_{10})	150	$\mu g/m^3$	24 hours
	50	$\mu g/m^3$	1 year
Sulfur dioxide	0.25	ppm	10 minutes
	0.2	ppm	1 hour
	0.04	ppm	24 hours
	0.02	ppm	1 year

Table 5.6.2: National Environment Protection Measure Goals

Pollutant	Units	Averaging time	Maximum Concentration	Allowed exceedances (days per year)
Carbon monoxide	ppm	8 hours	9.0	1
Nitrogen dioxide	Ppm ($\mu g/m^3$)	1 hour	0.120 (225)	1
	Ppm ($\mu g/m^3$)	1 year	0.03 (56)	0
Photochemical Oxidants (as Ozone)	ppm	1 hour	0.10	1
		4 hours	0.08	1
Sulphur dioxide	Ppm ($\mu g/m^3$)	1 hour	0.20 (523)	1
	Ppm ($\mu g/m^3$)	24 hours	0.08 (209)	1
	Ppm ($\mu g/m^3$)	1 year	0.02 (52)	0
Lead (as TSP)	$\mu g/m^3$	3 months	0.5	0
Particles (as PM10)	$\mu g/m^3$	24 hours	50	5

Note: The mass values for gaseous pollutants are not given in the NEPM Air document but rather are inferred as follows. The molar mass of SO_2=64.065 g, NO_2=46.006 g and CO=28.010 g. The molar quantity of gas in 1 m^3 at STP (1 atmosphere and 25°C) is 40.8747. So for SO_2 1 ppm=2619 $\mu g/m^3$, NO_2 1 ppm=1880 $\mu g/m^3$ and CO 1 ppm=1145 $\mu g/m^3$.

5.6.3 Meteorological Influences on Air Quality

❑ General Description

Brisbane's humid subtropical climate is characterised by a summer with relatively wet conditions and prevailing onshore winds, and a winter period that is drier with more frequent offshore winds. A major controlling influence on the winds and general weather of the region is the position of subtropical high pressure systems which generally migrate from west to east. During summer, these systems are most commonly at latitudes between 35°S and 40°S. Consequently winds affecting the Brisbane region have an easterly component for most of the time. During winter, high pressure systems are generally centred much further north, commonly between 25°S and 30°S. This leads to periods of clear settled weather with light winds, often with a westerly component. Disturbances to the dominant weather patterns occur at irregular intervals throughout the year in the form of frontal systems, troughs and cyclonic disturbances.

Superimposed on the general synoptic influences are the effects of the daily cooling and heating of the land surface, as well as contrasts in temperature between land and sea surfaces. These thermal effects give rise to local and regional circulations that are superimposed on the general synoptic scale winds, especially when there are relatively clear skies that permit strong diurnal heating and cooling. The major features in the Brisbane region arising from this diurnal influence are cold air drainage flows and a regional land breeze at night and in the early morning, and sea breezes during the day and sometimes into the evening. The drainage flows and land breezes are strongest and most common in winter, and sea breezes are best developed and most common in the late spring and summer.

Distance from the coast is a significant factor controlling meteorological and climatic conditions in Brisbane. Locations nearer the coast have generally higher rainfall, more moderate temperatures and stronger winds than locations further from the coast. Coastal locations are also more regularly influenced by sea breezes. However, topography also plays a role, with higher sites (such as the ranges to the north of the City) generally receiving higher rainfall than lower areas the same distance inland.

In relation to air quality and plume dispersion, the key meteorological variables are winds, temperature, solar radiation, stability and mixing height. Rainfall is important from the point of view of hydrology and the deposition of atmospheric pollutants. These elements are considered in following sections.

The main meteorological monitoring site in Brisbane is now the Brisbane Airport site, and the EPA has developed a dispersion modelling data base for the Brisbane region based on data from Eagle Farm. Although Lang Park site is further inland, the general features of meteorology are similar.

❑ Winds

Wind roses for Brisbane Airport for different times of the day are shown in **Figure 5.6.1**. The wind roses show the frequency of occurrence of winds by direction and strength. The bars correspond to the 16 compass points – N, NNE, NE, etc. The bar at the top of each wind rose diagram represents winds blowing from the north (i.e., northerly winds), and so on. The length of the bar represents the frequency of occurrence of winds from that direction, and the widths of the bar sections correspond to wind speed categories, the narrowest representing the lightest winds. Thus it is possible to visualise how often winds of a certain direction and strength occur over a long period, either for all hours of the day, or for particular periods during the day.

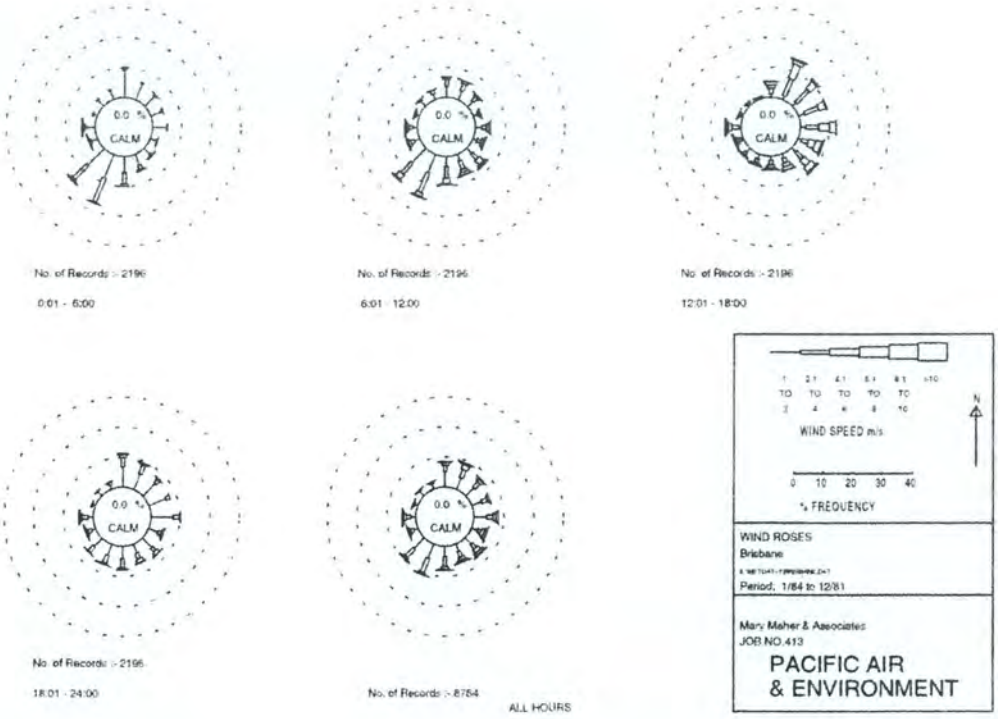


Figure 5.6.1 Annual Wind Roses For Brisbane Airport

The wind roses indicate a number of general features of the surface winds in the area, which can be applied over a wide area including Lang Park. These may be summarised as follows:

- There is a tendency for lighter winds at night and in the early morning than at other times. At these times conditions are also more stable in the lower atmosphere, with the result that emissions are dispersed less effectively than during unstable daytime conditions;

- At night and in the early morning winds most often blow from the south-west or south reflecting a tendency for a land breeze to develop, especially on cool clear nights. The land breeze pattern is most developed in winter. A secondary tendency is for light northerly and north-easterly winds at night, most often during the spring and early summer period. These breezes sometimes persist from stronger sea breeze flows in the afternoon and evening;

- By afternoon, winds are normally onshore (between south-easterly and northerly), reflecting both typical synoptic influences on Brisbane's meteorology, and sea breeze effects resulting from warming of the land surface. The most common sea breeze directions are from the north-northeast through to east, and sea breezes are most frequent in spring and summer. Afternoon south-easterlies are often associated with well-developed ridges extending along the coast from Tasman Sea high-pressure systems, and are more common during late summer through to early winter.

- Synoptic westerly and north-westerly winds are relatively uncommon, but occur more frequently in winter and early spring.

The wind regime indicated in **Figure 5.6.1** is based on a composite of 12 representative months taken from a 45 year period. In any given year, the wind regime will differ to some extent from that shown in **Figure 5.6.1**, as a result of the normal variations in weather from year to year.

❑ Temperature, Radiation & Stability

The average daily maximum and minimum temperatures at Brisbane Airport, as well as the highest recorded maxima and minima by month, are shown in Table 3. Temperatures at the Airport are somewhat milder than in many parts of Brisbane, especially the western suburbs where sea breezes arrive considerably later in the day. Extreme temperatures recorded at the Airport have varied between 0.6°C and 39.6°C. In the Lang Park area, maximum temperatures will average somewhat higher than the levels in Table 3, especially in summer, and minimum temperatures will be lower, especially in winter.

Also shown in **Table 5.6.3** are average 9am and 3pm relative humidity values. Average relative humidity reaches maximum values in late summer and autumn, reflecting the dominance of moist onshore winds at this time of the year. Lowest average humidity occurs during the late winter and early spring, when dry winds with a continental origin are more common than at other times of the year.

Table 5.6.3: Temperature & Relative Humidity At Brisbane Airport

Month	Average Daily Maximum Temperature (°C)	Extreme Maximum Temperature (°C)	Average Daily Minimum Temperature (°C)	Extreme Minimum Temperature (°C)	Average 9am Relative Humidity (%)	Average 3pm Relative Humidity (%)
January	29.2	38.3	21.0	16.1	66	59
February	28.9	35.8	20.8	15.5	69	60
March	28.1	38.3	19.5	12.6	71	59
April	26.4	34.3	17.0	7.6	71	56
May	23.5	30.1	13.8	4.7	71	54
June	21.2	28.3	11.0	0.6	70	50
July	20.6	29.6	9.4	0.9	67	47
August	21.8	28.7	10.0	0.6	63	44
September	23.9	33.8	12.5	2.6	59	46
October	25.7	39.1	15.6	7.3	59	52
November	27.4	39.4	18.1	9.1	60	56
December	28.7	39.6	19.8	12.1	62	58
Year	25.4	39.6	15.2	0.6	66	53

❑ Rainfall & Evaporation

Rainfall at Brisbane Airport reaches a seasonal maximum during the summer and early autumn, with just over half of the 1179 mm average annual rainfall occurring in the four months from December to March. The driest four months from June to September deliver on average less than 18% of the annual total. **Table 5.6.4** lists the average monthly and annual rainfall.

Evaporation for the year at Brisbane Airport normally exceeds rainfall by about 800 mm. Throughout the year, the difference between rainfall and evaporation provides an indication of the expected variation in soil moisture conditions, which affect plant growth and the potential for dust generation, as well as the partitioning of sensible and latent heat fluxes, which affect boundary layer development and structure. Also included in Table 5.7.3 is the average monthly evaporation,

and the deficit between rainfall and evaporation. The deficit reaches highest values in spring and early summer.

Table 5.6.4: Rainfall, Evaporation & Moisture Deficit[a] At Brisbane Airport[b]

Month	Average Rainfall (mm)	Average No. Raindays	Average Evaporation (mm)	Average Moisture Deficit (mm)
January	162	13	233	71
February	176	14	182	6
March	142	14	177	35
April	90	11	135	45
May	96	11	99	3
June	71	7	90	19
July	62	7	100	38
August	42	7	109	67
September	33	7	171	138
October	93	10	201	108
November	96	10	222	126
December	126	12	236	110
Year	1179	123	1975	796

a Average monthly evaporation minus average monthly rainfall
b Source: Bureau of Meteorology

The average data in **Table 5.6.4** mask the significant month-to-month and interannual variations that can occur in rainfall in particular. Extreme dry and wet periods can result in large departures from the average values.

5.6.4 Levels of Air Quality Indicators

❑ Introduction

No long-term measurements of air quality are available for the immediate vicinity of Lang Park. The nearest current or recent EPA air quality monitoring sites are in the CBD, Fortitude Valley, and Woolloongabba. Data from these monitoring sites are likely to provide a reasonable indication of air quality around Lang Park area under normal situations. However, in the specific cases of large events, local traffic conditions in the area may result in localised changes to air quality that are not represented in monitoring data from other sites. In addition, some local short-term effects from fireworks displays may occur.

The potentially highest local impacts of Stadium activities are associated with traffic congestion before and after events, especially at night when atmospheric conditions can restrict the dispersion of emissions from low-level sources such as vehicles. For example, the parking of charter coaches in streets near Lang Park leads to a period after events when coaches are idling waiting for specific passengers. This may lead to locally higher levels of CO, diesel particulates and odour than at other times if weather conditions are calm and poorly dispersive.

The measured values of carbon monoxide, nitrogen dioxide and PM_{10} in the inner city areas of Brisbane are generally well within the guideline levels set out in the Air EPP. These pollutants (or air quality indicators) are selected as the most relevant to Lang Park since they are closely related to the vehicle emissions.

❑ **Carbon monoxide**

Figure 5.6.2 shows the maximum 8-hour carbon monoxide concentrations for each month since January 1997 at the CBD, Woolloongabba and Fortitude Valley sites. (The Valley site was discontinued in early 1998 and the Woolloongabba site commenced in mid 1998).

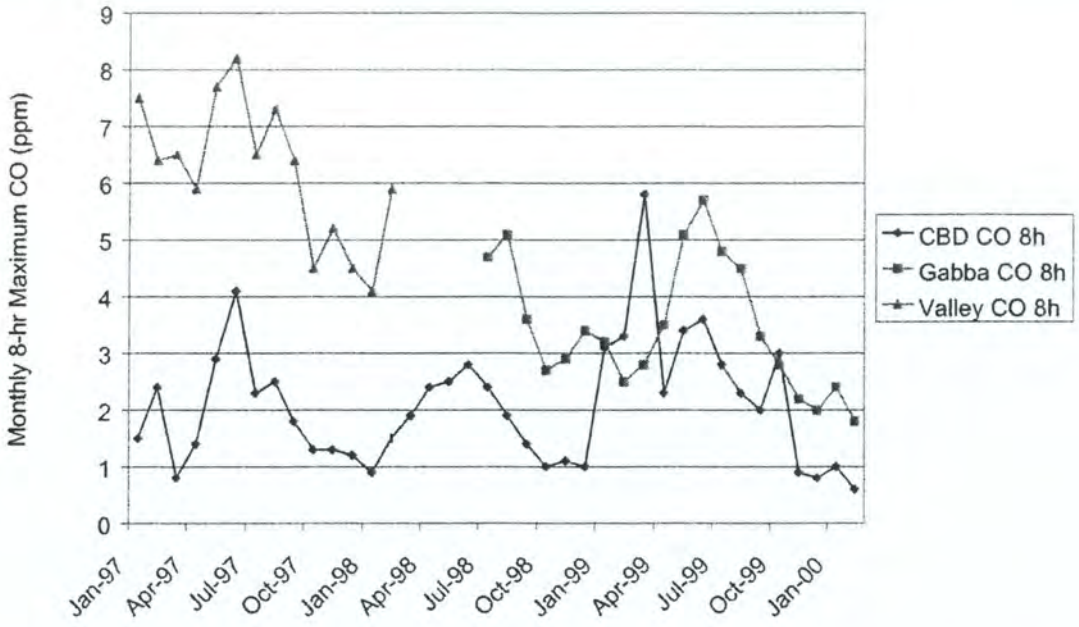


Figure 5.6.2: Monthly Maximum Values Of 8-Hr Carbon Monoxide

Figure 5.6.2 shows that the highest monthly values were relatively high at the Valley site prior to that site's closure in 1998, reflecting the location of the monitoring equipment near a busy road. Levels of CO in the Stadium area, in normal circumstances, should be better reflected by the data from the CBD and Woolloongabba sites. Note that because the levels plotted in **Figure 5.6.2** are the highest for each month, typical levels will be lower than indicated.

Short-term air sampling for carbon monoxide was conducted near the Lang Park roundabout on Sunday 16 April 2000. A continuous CO analyzer was used to record 5-minute average concentrations for a period during the afternoon and early evening. For each 5 minute averaging period, the number of cars that travelled through the roundabout was recorded.

The wind direction was from the north to north-east and conditions were mostly quite turbulent and gusty. **Figure 5.6.3** shows the measured CO concentrations and traffic counts. Although traffic was relatively steady (averaging 38 vehicles per 5 minutes, and varying between 24 and 60), the measured 5-minute CO levels varied from 0.5 to 3.4 ppm. Variations in CO were not closely correlated to the number of vehicles, since other factors such as variations in wind conditions and the influence of individual vehicle emission levels also were important.

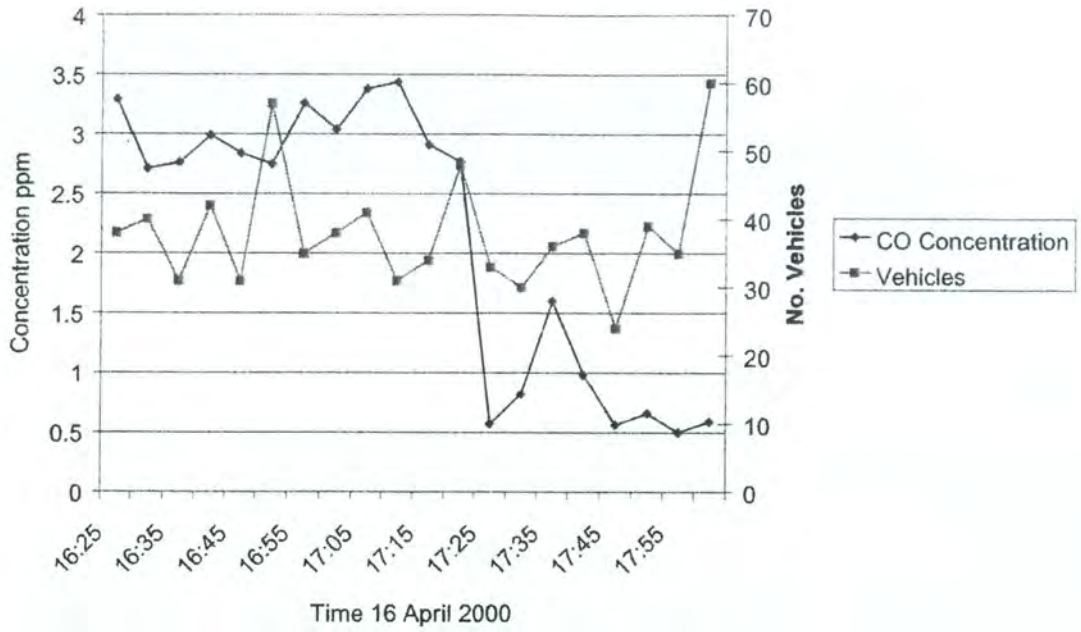


Figure 5.6.3 Measured Values Of Carbon Monoxide And Traffic At Lang Park Roundabout, 16 April 2000

The measured CO levels are well within the 8-hour average concentration goal contained in the Air EPP (8 ppm). Note also that the 8-hour average level is influenced by variations throughout the 8-hour period, and short-term levels within any 8-hour period may be well above the 8-hour average concentration. For example, based on the Turner method (1964) for comparing concentrations over different averaging periods, 5-minute values could be expected to be up to 2.5 times higher than the 8-hour average. While this method is not strictly applicable in areas of diffuse or widespread emissions (e.g. vehicle emissions), it is nevertheless a useful guide. However, over an 8-hour period, the change in emissions due to traffic variations also needs to be factored in. Hence, the 5-minute concentrations may be more than 5 times the 8-hour average, assuming a change of a factor of 2 in traffic levels during the period.

Further sampling of existing air quality near Lang Park is planned for the next State of Origin match in May 2000. A particular focus of this sampling will be the levels of CO associated with emissions from idling coaches and congested traffic after the match.

❑ Nitrogen dioxide

The monthly maximum 1-hr concentration of NO_2 since January 1997 is displayed in **Figure 5.6.4**. The measured values are all well within the Air EPP goal of 0.16 ppm, and it is likely that levels near the Stadium are similar.

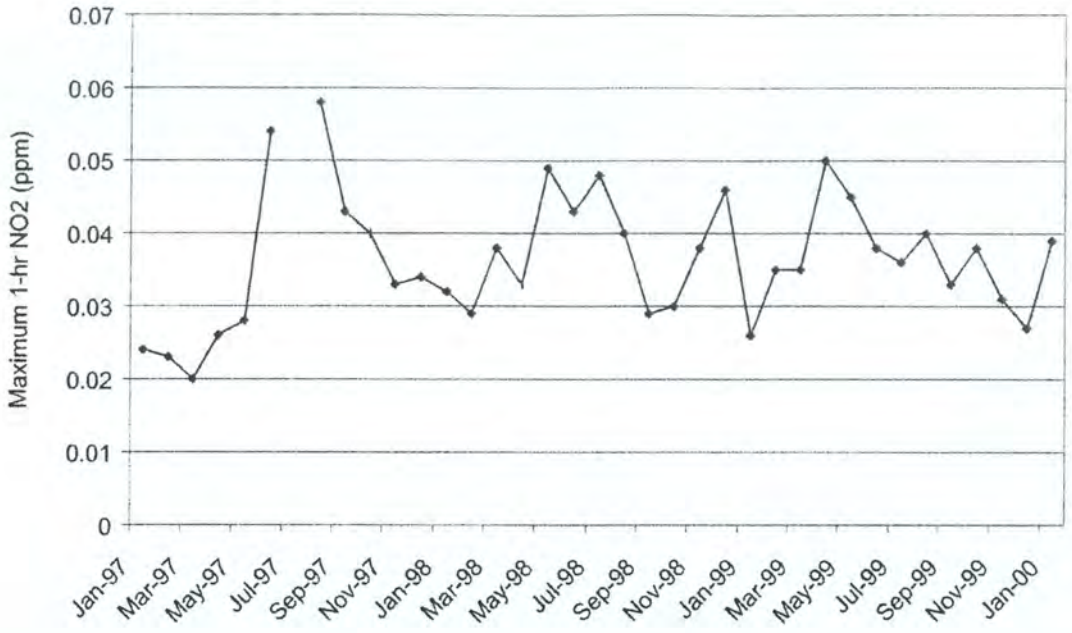


Figure 5.6.4: Monthly Maximum Values Of 1-Hr Nitrogen Dioxide

Nitrogen dioxide is emitted from motor vehicle exhausts and other combustion sources, usually as a small fraction of the total emissions of nitrogen oxides. The remainder is predominantly the relatively non-toxic nitric oxide (NO), but over time and dependent on atmospheric conditions, NO is converted to NO_2. The rate of conversion is generally slow when the air contains a low concentration of ozone and when the level of turbulent mixing in the air is low. These conditions will generally be satisfied at night, and so rapid formation of NO_2 from local traffic emissions is not likely during and around the times of the major night time events at the Stadium.

❑ PM10

Fine particles in the air are a significant concern of regulatory authorities, since relationships between particle concentrations and human morbidity have been identified. The fraction of particles less than 10 microns in aerodynamic diameter is known as PM_{10}, and incorporates the health-relevant finer fractions.

The highest measured levels of PM10 for each month at the CBD monitoring site, which should be broadly representative of the Stadium area, are displayed in **Figure 5.6.5**. It is evident that monthly maximum levels are well within the 150 $\mu g/m^3$ goal contained in the Air EPP.

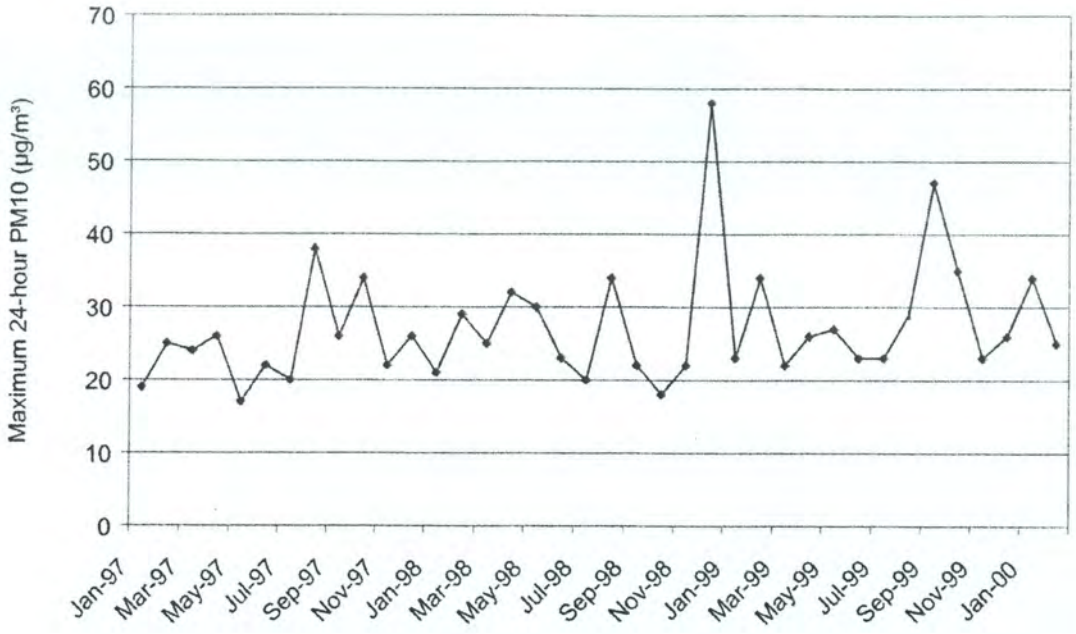


Figure 5.6.5: Maximum 24-Hour Pm_{10} By Month, Brisbane CBD

5.7 Existing Hydrological and Water Quality Factors

Existing hydrologic, ground water, hydraulic and water quality conditions within the study area have been determined by:

- reviewing existing flooding and drainage reports/plans applicable to the study area;
- identifying existing drainage paths, infrastructure and catchment areas;
- reviewing geological maps/reports and identifying potential ground water issues; and
- identifying the extent of regional flooding based on information provided by Brisbane City Council (BCC).

5.7.1 Existing Ground Water

❑ Regional Geological Setting

The site geology was sourced from the Brisbane 1:100 000 Geological Mapsheet (DME, 1986) and site inspection.

The structural belt of the D'Aguilar Block governs the regional geological setting of the Lang Park area. The D'Aguilar Block comprises pre-late Carboniferous deposits that have undergone folding, shearing and metamorphism. The Lang Park site is situated on the arenaceous rocks of the Carboniferous, Bunya Phyllite. This formation consists of phyllite, chert, and minor micaceous meta – arenite.

Arenaceous rocks are a group of detrital sedimentary rocks, typically sandstones, in which the particles range in size from 1/16 mm to 2 mm. Phyllite, the dominant rock type, is a cleaved metamorphic rock, having affinities with both slates and mica schists.

To the south, south-east boundary of the site, Quaternary alluvium exists, associated with the deposits of the Brisbane River. The alluvial coastal plain unit is mainly composed of silt, clay and sandy deposits.

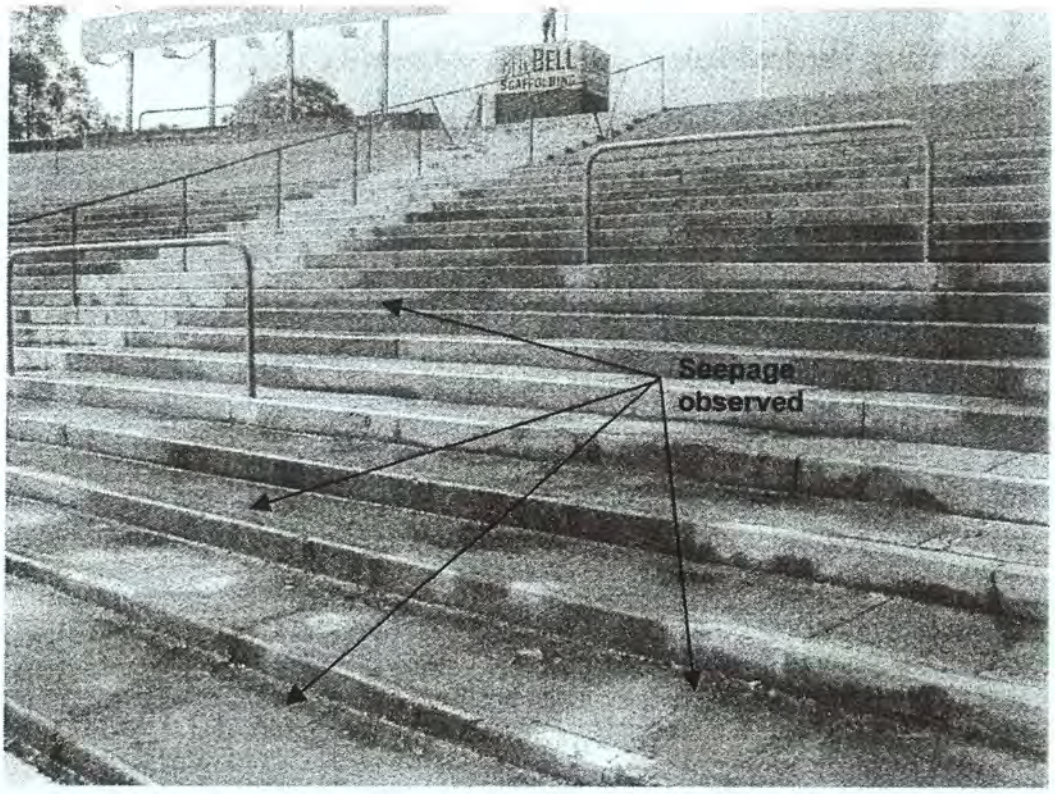


Figure 5.7.1 Ground Water Seepage At Southern Outer

❑ **Ground Water Seepage**

From a site inspection, ground water seepage through the outer seating was observed. From anecdotal evidence, the existing outer mounds are constructed on old disposal sites for glass and car bodies, in addition to a burial ground originating in the 19th century.

The porous nature of the subsurface material (car bodies etc.) in the outer areas facilitate lateral ground water movement, rather than downward infiltration. This would account for seepage on the hill stands following rainfall events (as shown on **Figure 5.7.1**).

For future development, sites where car bodies and glass are buried would need to be identified and removed, in order to reduce the shallow ground water seepage problem.

To-date no geo-technical reports have been made available for review. These are required to determine existing water table levels within the site.

5.7.2 Existing Drainage & Surface Run-off

❑ **Catchment**

The Castlemaine/Caxton Street Catchment has a total catchment area of 142 hectares and can be generally represented by the three following areas.

- Upper Catchment - north of Caxton Street
- Lang Park Catchment –between Caxton St and Milton Rd
- Lower Catchment – between Milton Rd and the Brisbane River.

The catchment generally drains in a southerly direction until it discharges into the Brisbane River.

Figure 5.7.2 presents the catchment boundaries and drainage layout for the entire catchment area.

This report is based on the Lang Park Catchment, which has a drainage area of 49 hectares. Most of the Lang Park Catchment lies to the west of Castlemaine Street, with a smaller area east of Hale Street. The boundaries and drainage paths are presented in **Figure 5.7.3.**

❑ Trunk Drainage & Overland Flow Paths

Flows from north of Caxton Street are currently conveyed adjacent to Castlemaine Street and under Lang Park within the site via a 2490mm diameter pipe. This pipe discharges to the Brisbane River. Flows from the eastern side of Hale Street (i.e. Hale Street Catchment) are conveyed via a 600mm diameter pipe across Lang Park and feed into the 2490 mm pipe along Castlemaine Street. All stormwater flows from Lang Park discharge into these two pipes. **Figure 5.7.3** presents the existing trunk drainage layout within the Lang Park Catchment.

The condition of the 2490 mm and the 600 mm diameter pipes is not known. Prior to construction of a new stadium, a pipe condition investigation should be carried out.

Other trunk drainage networks that connect to the 2490 mm diameter pipe along Castlemaine Street are Heussler Terrace and Black Street.

The majority of trunk drainage systems in the Lang Park Catchment currently have less than Q_2 flow capacity (Wade Lester Consultants 1996). The Queensland Urban Design Manual (Qudm 1992) recommends that trunk drainage capacity should be Q_2 for Low Density Urban Areas and Q_{10} for Commercial Areas.

Overland flow paths typically follow the trunk drainage lines, however Milton Road and Caxton Street provide major barriers to drainage of these flows. Overland flows are consequently ponded within the Castlemaine Street, Cordover Street and Black Street areas, until the trunk drainage network is able to discharge the runoff. Ponding currently occurs for storm events of less than Q2 frequency. Qudm recommends that overland flow path systems should be designed for the Q100 storm event.

Frequent ponding (less than Q_2 storm) also occurs at Hale Street and Heussler Terrace near the Parkview Street intersection due to insufficient pipe capacity.

A Relief Drainage Investigation (Wade Lester Consultants 1996) has been conducted and works have been scheduled to alleviate some of the drainage problems within the Castlemaine/Caxton Street Catchments. Note that the Relief Drainage Investigation has assumed that future development of Lang Park does not increase stormwater discharges. Any increase of flows due to the development of Lang Park must be reduced to existing condition flows prior to discharge into the trunk drainage network or alternatively the relief drainage scheme capacity could be increased.

Figure 5.7.2
Castlemaine / Caxton Street Catchment Layout

Figure 5.7.3
Castlemaine / Caxton Street Catchment Layout

❑ Local Flooding

This report assumes that the proposed relief drainage (Wade Lester Consultants 1996) has been constructed and that this infrastructure is the existing conditions case.

No relief drainage has been scheduled for the Hale Street area and thus local flooding along Hale Street may occur for less than Q_2 storms. While flooding in this location does not cause damage to the existing stadium, the flooding could cause significant public access problems in the vicinity of the sag outside the main entrance along Hale Street.

As shown in **Figure 5.7.2**, the ponded area in Q_{50} storms at the Castlemaine Street area is extensive and includes most of Black Street and Cordover Street. Minor ponding is expected in the more frequent Q_2 storms. The reported flood levels corresponding to the corner of Castlemaine Street and Chippendall Street are presented in **Table 5.7.1**.

Table 5.7.1 Existing Flood Levels: Castlemaine & Chippendall Streets – Relief Drainage In Place

Q_2 Flood Level (m AHD)	Q_{10} Flood Level (m AHD)	Q_{50} Flood Level (m AHD)
2.06	2.61	2.9

❑ Site Drainage

Playing field drainage and grandstand drainage currently discharge into the 600 mm diameter and 2490 mm diameter pipes which traverse Lang Park and along Castlemaine Street (see **Figure 5.7.3**). This is achieved via downpipes from the grandstands or field inlets and gully pits at various locations throughout the stadium.

Drainage of major walkways was found to be inadequate during a site visit where a small amount of rain had fallen. **Figure 5.7.4** Walkway drainage illustrates water ponding within major thoroughfares.

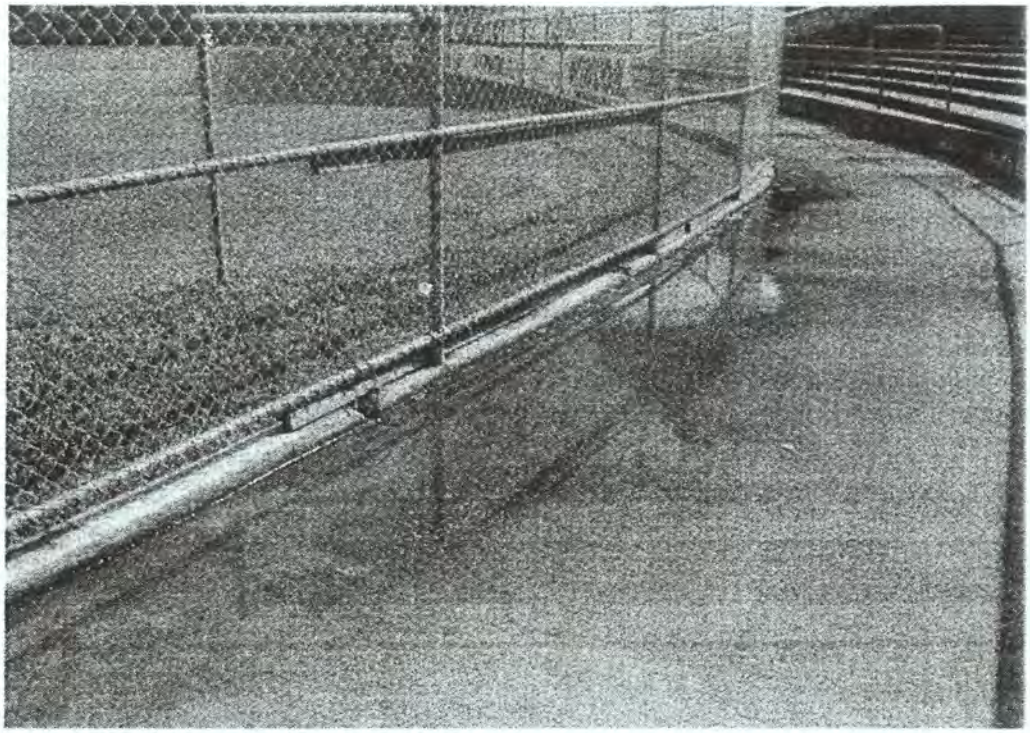


Figure 5.7.4 Walkway Drainage

❑ Regional Flooding

Lang Park is situated within 500 m of the Brisbane River and could be subject to Brisbane River flooding. While Coronation Drive, Milton Road and the railway act as a levee, river flooding may cause backwater inundation of Lang Park.

This flooding mechanism would occur due to water backing up via the Castlemaine Street trunk drainage network. Gully pits would then surcharge and flood levels around Lang Park would equalise to those in the Brisbane River.

Figure 5.7.5 Lang Park Flood Inundation – Regional Flooding presents Lang Park during the 1893 and 1974 floods. The recorded flood level for the 1974 flood event at the Hale Street/Coronation Drive intersection was measured at 7.3 mAHD.

Tidal effects from the Brisbane River may also have an impact on flooding within Lang Park. Anecdotal evidence from Ground staff at Lang Park suggests that during construction of the Western Stand, a king tide caused water to back up into areas in and surrounding Lang Park.

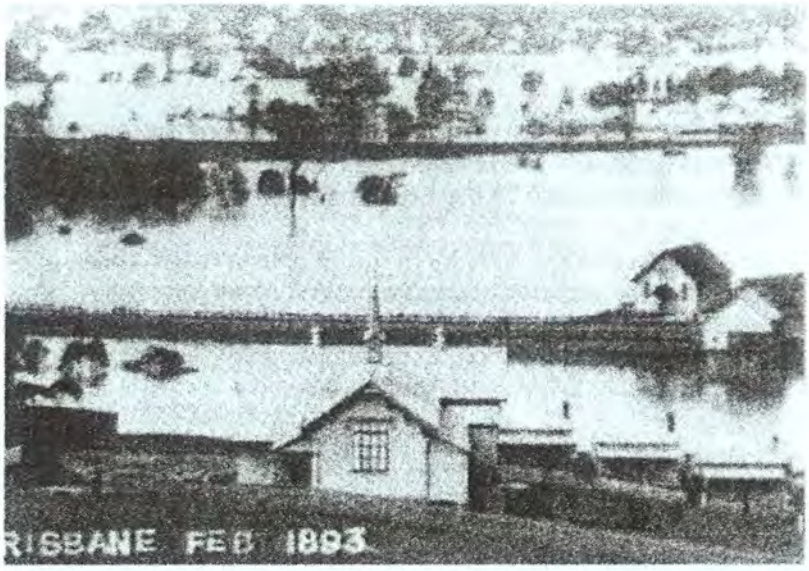


Photo 1: View towards Caxton Street, Lang Park and Milton Road during the 1893 flood.

Photo 2: Lang Park - 1974 flood.

Figure 5.7.5 Lang Park Flood Inundation – Regional Flooding

Source: *'Pad, Paddo Paddington'* - Courtesy Alan Miles Collection. Published by Red Hill Paddington Community Centre Inc. and the Paddington History Group.

The current designated Q_{100} and Q_{50} flood levels for the Brisbane River at Hale Street are 5.0 AHD and 4.0 m AHD respectively. Based on current topographical information, the lower levels of the Western Grounds Stand and some of the playing field could be inundated during these events. This is not considered to be a major concern with respect to public risk as it is likely sporting events would be cancelled during large floods. Damage may however occur to existing infrastructure located below these flood levels.

5.7.3 Existing Stormwater Pollution

❑ Receiving Waters

The Lang Park Stadium site occupies an area of 4.7 ha (or about 3%) of the Castlemaine/Caxton Street catchment that drains directly to the Brisbane River. As such, it contributes in part to stormwater quality of the Milton Reach of the Brisbane River estuary.

The Milton Reach is part of the middle estuary of the Brisbane River, which is generally turbid. Secchi depths, a measure of light penetration, are typically less than 0.5m. Sediment remains in suspension for extended periods, partly due to historical changes in tidal velocities and flushing flows. Nutrient concentrations are also high, but phytoplankton growth is restricted by the low light conditions in the turbid water (Dennison and Abal, 1999).

❑ Sources of Stormwater Pollution

Based on the existing site conditions and usage, the likely sources of stormwater contaminants are listed in **Table 5.7.2**. These pollutants are common in urban runoff.

Table 5.7.2 Potential Sources of Stormwater Pollution for Lang Park

Pollutant	Potential Source
Sediments	▪ Wash-off of sediments from the playing surface, especially following maintenance activities eg surface dressing. ▪ Wash-off of accumulated sediments from paved surfaces and stands.
Nutrients	▪ Organic matter eg food scraps ▪ Fertilisers applied to playing surface ▪ Sewer system overflows ▪ Detergents if used to clean surfaces exposed to weather ▪ Atmospheric deposition ▪ Spills and illegal discharges
Micro-organisms eg bacteria, viruses	▪ Sewer system overflows ▪ Decaying organic matter
Gross pollutants	▪ Discarded litter and debris ▪ Organic matter ▪ Overloaded litter collection points
Toxins	▪ Pesticides and herbicides applied to playing surface ▪ Spillage during maintenance activities eg repainting
Heavy Metals	▪ Atmospheric deposition ▪ Weathering of buildings and roof structures ▪ Vehicle wear deposits and emissions ▪ Spillage during maintenance activities
Oils and Grease	▪ Leaks from vehicles ▪ Spillage ▪ Organic matter

Note: Adapted from NSW Environment Protection Authority (1996).

The Lang Park site is expected to have high rates of gross pollutant and nutrient export (in terms of kg/ha/year) compared to that of nearby residential and commercial activities. This is due to the heavy public usage of the site during events and the extensive areas of maintained grassed surfaces.

Typical composition of gross pollutants in urban runoff includes 65% to 85% organic matter, in the form of leaf litter, twigs and garden refuse (Allison et al, 1998). By comparison, the gross pollutant load from the Lang Park site is expected to be dominated by paper and plastic material.

The Relief Drainage Investigation (Wade Lester Consultants, 1996) investigated possible sites for gross pollutant traps. Suitable locations for on-line traps were considered to be at the Caxton Street park and downstream of Milton Road.

❑ Stormwater Water Quality Objectives

Draft guidelines on identifying and applying water quality objectives (WQOs) in Brisbane have recently been released (Brisbane City Council, March 2000). These guidelines describe a process to determine long-term targets of water quality that account for the type of proposed development and the environmental values of the local waterway that could be impacted.

Using the draft process, the stormwater WQOs that are expected to apply to the Lang Park redevelopment are given in **Table 5.7.3**. While no long-term baseline water quality data is available for Lang Park discharges, it is likely that these WQOs are presently exceeded.

Table 5.7.3 Draft Water Quality Objectives For Lang Park Stadium

Indicator	Water Quality Objective
Suspended solids	15 mg/L for combined wet and dry periods 90%ile <100 mg/L for wet weather periods
Total phosphorus	0.07 mg/L
Total nitrogen	0.65 mg/L
Litter	No man-made material greater than 5 mm in any dimension
Faecal Coliforms	1000 organisms/100 mL (minimum of 5 samples taken at regular intervals not exceeding one month, with 4 of 5 not exceeding 4000 organisms/100 mL

Notes:
1. These WQOs are for Planning Unit BN/260 City (Freshwater Utility).
2. These WQOs relate to land-disturbing activities. If the redevelopment involves vehicle-related activities (eg carparks) then other indicators such as metals and hydrocarbons should be considered.
3. The WQOs are upper limits for median values, unless otherwise stated.

5.7.4 Existing Waste Management

❑ Waste Generation

The majority of wastes generated at the Stadium occurs during events. Wastes are also generated from the site office and the maintenance of the stadium.

Event Wastes

Wastes generated during stadium events are principally sourced from crowd consumption of foods and beverages. Event caterers, stadium kitchens and corporate facilities also generate wastes.

The types of wastes generated during stadium events principally include:

- paper and cardboard;
- plastics;
- glass;
- metals (aluminium and tin cans);
- putrescibles (food scraps and cooking oils); and
- kitchen detergents.

These wastes are presented in **Figure 5.7.6.**

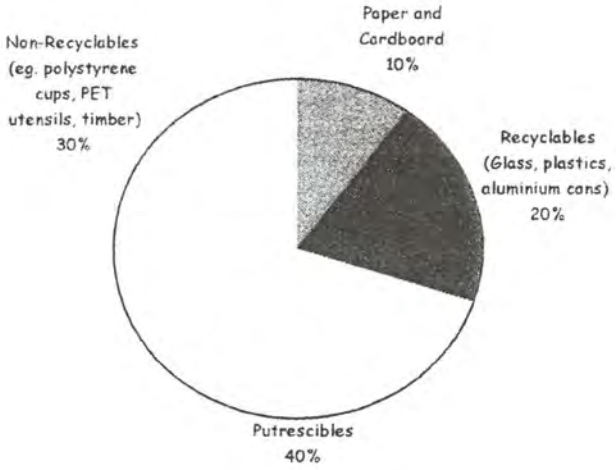


Figure 5.7.6 General Composition Of Stadium Event Wastes

Table 5.7.4 provides an estimate of the amount of waste generated during stadium events (Lang Park Trust, 2000).

Table 5.7.4 Estimated Stadium Event Waste Generation

Event	1998			1999		
	Waste (m^3)	Matches	Average crowd per game	Waste (m^3)	Matches	Average crowd per game
Brisbane Strikers	273	14	4 000	293	15	4 000
Australian Rugby Union Test	60	1	25 000	60	1	30 000
Australian Rugby League Test	48	1	16 000	48	1	11 000
State of Origin	90	1	40 000	180	2	40 000
TOTAL WASTE (m^3)	**471**	-	-	**581**	-	-
TOTAL WASTE (kg) [1]	**35 325**			**43 575**		

Note: [1] The average density of waste was assumed to be 75 kg per m^3 of waste (Cleanevent, 2000)

Office and Stadium Maintenance Wastes

Approximately 3 m^3 of waste is generated from the stadium's office and maintenance of the stadium each week. The types of office wastes generated mainly include:

- paper;
- cardboard;
- printer cartridges and ribbons; and
- kitchen wastes (packaging and food scraps).

The types of wastes generated from maintenance of the stadium mainly include:

- green wastes (grass clippings, leaves and tree clippings);
- oil, grease and lubricants;
- fertiliser packaging; and
- herbicide, fungicide and pesticide packaging.

5.7.4.1 Waste Collection Facilities

Stadium waste collection facilities include:

- 80 x 0.24 m3 (240 L) wheelie bins;
- 9 x 3 m3 bins (front lift bin);
- 2 x 1.5 m3 bins (front lift bin); and
- 1 x 30 m3 roll off bin (for large capacity events only).

5.7.4.2 Waste Collection and Disposal

Wastes other than cardboard are disposed to landfill. Cardboard is collected monthly for recycling.

For small events such as a Brisbane Strikers game, a single collection truck is required to collect the event wastes after the game.

For major events such as a State of Origin, up to four collection trucks may be required to collect the event wastes. Collection trucks include:

- 1 truck for the wheelie bins;
- 1 truck for the front lift bins; and
- 2 trucks for the roll off bins (one truck per bin).

For major events, wastes are collected in the morning of the event and again after the event.

5.7.5 Conclusions

From this investigation, the following conclusions can be drawn:

- Ground water seepage from the terraces was evident, however, geo-technical investigations should be conducted to determine underlying materials and ground water levels;
- Trunk drainage in the area of Lang Park currently has less than Q_2 capacity;
- Relief drainage works scheduled by BCC will increase capacity of damage network to approximately Q_{10};
- Flooding of Hale Street needs to be addressed prior to design of the stadium as it is currently inundated for less than Q_2 flood events;

- Overland flowpaths are blocked by Milton Road and Caxton Street and therefore all flood waters are conveyed via trunk drainage;
- Regional flooding and high tides cause flooding of the Lang Park site;
- A condition report of existing trunk drainage under the site is required prior to construction of the stadium;
- Flows from Lang Park are not to be increased through development of the site. If flows from within the Lang Park site are increased, receiving drainage will also have to be increased;
- Water quality devices are not currently in place at Lang Park Stadium and current levels of pollutants from Lang Park are therefore expected to be above current requirements;
- Water quality devices that meet Council guidelines are required for the upgraded stadium;
- Waste other than cardboard is disposed to land fill. Cardboard is collected and recycled on a monthly basis; and
- Contaminated sites have been identified on the Environmental Management Register and Contaminated Land Register and Site Management plans will have to be undertaken on the contaminated sites if land use is changed.

5.7.6 References

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5.8 Geomorphological Features

5.8.1 Topography

Lang Park sits in the floor of a bowl described by low ridgelines to the east, generally in the vicinity of Petrie Terrace, to the north generally in the vicinity of Musgrave Road, and to the west generally falling to the south from Musgrave Road to bisect Heussler Terrace before terminating in the vicinity of the Park Road / Milton Road intersection.

The eastern ridgeline attains elevations of 30 to 35 metres AHD, while the northern ridgeline attains elevations of up to 68 metres AHD. The western ridgeline fall from this elevation to approximately 20 metres AHD where it crosses Heussler Terrace and approximately 10 metres AHD at Milton Road.

Lang Park also is a bowl shape, with the playing surface at approximately 5 metres at the crown, with the surrounding terraces attaining elevations of up to 10 to 12 metres AHD.

The construction of Caxton Street has caused the natural drainage paths from the surrounding bowl to require piped underground drainage to the Brisbane River. As noted earlier in this EIS (Section 5), the site was formerly a series of swampy depressions and waterholes prior to its use as a cemetery and then a recreation reserve.

5.8.2 Soils & Geology

❑ Regional Geology

The site geology comprises Paleozoic rocks, overlain by undifferentiated Alluvial Plains. The 1:100,000 Geological series sheet for Brisbane describes the underlying rock formation as Bunya Phyllite, comprising phyllite, chert and minor micaceous meta-arenite. Bunya Phyllite is formed by low temperature metamorphism of the parent arenaceous (sandstone) rock.

The Quaternary alluvial plains on the site extend north from the Brisbane River, and consist of sand, silt, clay and gravel. It is likely that this deposit is associated with a tributary creek of the Brisbane River. The deposit appears to cover the south-eastern half of the site, and incorporates areas of anthropogenic deposits, described as land fill and mine tailings; mud, sand, and rubble. Filling of the original creek means that it is no longer visible from the ground surface.

❑ Site Orthography

The Lang Park playing surface field is at a level of RL 5.3. From the edge of the field, the ground remains relatively level towards the west. On the remaining sides, the stadium seating rises to ground level at around RL 10, where it continues to rise between RL 13m and RL 15m at each of the NE, NW and SE corners. Between the corners, and to the SW, the ground dips.

❑ Ground Conditions

▪ Fill

Fill material has been placed over a large part of the site surrounds, from procedures including:

(i) Filling of Brisbane River tributary
(ii) Development of Caxton Street
(iii) Construction of Hale Street Tunnel at Caxton Street intersection
(iv) Construction of Milton Road overpass

Fill materials varies from rubble, brick and ash, to soft gravelling clays and loose sands. The gravelly clays are likely to be reworked local soils, while the remaining fill has probably been imported. The degree of compaction of fill is highly variable.

The maximum depths of fill are anticipated in the north of the site (where records indicate up to 9m of fill has been placed on Caxton Road), and in the south of the site where the Brisbane River tributary has been filled.

It is recommended that footings are not founded in fill material.

▪ Alluvial Soils

Alluvial soils were encountered to the south of the site, generally as a soft to very soft silty marine clay. It is believed that a tributary creek off the Brisbane River deposited this stratum. For the purposes of construction, this material should be treated as fill and buildings should not found within this material.

▪ Residual Soil

The residual soils encountered during drilling consisted of soft to stiff gravelly and silty clays, becoming more gravelly with depth. It is considered that these soils have resulted from weathering of the phyllite rock mass. Infill of a similar material to the residual soils was noted in rock jointing in the phyllite mass.

The strength of the residual soils is generally related to the proportion of gravel within the sample or borehole. Test results indicated a range of unconfined compressive strengths up to 100kPa. Some high plasticity clays were encountered during drilling.

▪ Phyllite

The underlying rock mass, and anticipated founding stratum for the majority of structures consists of Bunya Phyllite. Throughout the area, this has been generally described as a fine grained rock with distinct foliation and occasional quartz veins of up to 25mm. Colouration varies between grey and dark grey, fresh rock towards grey brown or brown, weathered rock.

The rock strength was generally very low grading to high strength within the depth of drilling. However, anomalies such as inversion of the phyllite strength and irregular banding of variable weathered rock are present along fracture planes, and gravelly clay banding was encountered at up to 0.5m in thickness within the phyllite. Joints in the phyllite (other than parallel to cleavage) are generally of limited extent, usually terminating against intersecting joints of different orientation.

Due to the fractured nature of the phyllite, it would be expected to have an unconfined compressive strength of around 1Mpa over the rock mass.

Towards the SE, some variable strength sandstone (parent rock) was also encountered, with varying degrees of metamorphosis. The capacity of this rock would be expected to be similar to the phyllite.

It is expected that piles (and pad/strip footings where levels allow) would found satisfactorily in either the phyllite or sandstone, and would provide appropriate strengths and stiffness for supporting the proposed stadium structure. Lengths of piles can be expected to vary, as it evidenced by the records from the existing western stand, where pile founding levels varied between RL –8.0 and RL +1.0m.

It is possible, depending upon levels of proposed basements, that some bulk rock excavation will be required.

5.8.3 Land Contamination

A site history of the Environmental Protection Agency's Environmental Management Register (EMR) and the Contaminated Land Register (CLR) was undertaken to identify possible contaminated land. The following lots were found to be on the register:

- Lot: 355 Plan: RP898660
- Lot 354 Plan: RP898660
- Lot: 581 Plan: RP227070

These lots are presented in **Figure 5.8.1** EIS Contaminated Land Sites. Should this land be required for the redevelopment, site management plans (SMP's) will be required for each of the contaminated sites on the EMR/CLR.

A reliable way to determine the type and extent of contaminated wastes on the above sites would be to drill test holes around the site and record the types of materials found. Depth of contamination could also be determined which would allow estimates of the volume of contaminated waste on the site. Stadium management were approached however drilling was not permitted due to sporting event commitments. An estimate of the contaminated waste volumes were determined by assuming fill depths and areas. The assumptions of depths and areas were based on old photographs taken during filling from 1911 until the late 1940's.

A number of authorities were contacted to determine previous land uses of sites. Neither Brisbane City Council (BCC) or Environmental Protection Agency (EPA) were able to provide details in relation to previous land uses on the site. A historical search was conducted through the state library and a land use history of the site was determined. The land use history provided information to allow a preliminary contaminated waste volume to be estimated.

Between 1843 and 1975 the majority of the Lang Park site was used as the North Brisbane burial grounds. These burial grounds were located in a low lying drainage basin where creeks, ponds and swamps frequently overflowed (Brisbane History Group Papers No 14 1995). **Figure 5.8.2** Photograph of Lang Park Site - 1870 shows the residential dwellings and burial grounds looking in a westerly direction across Hale Street.

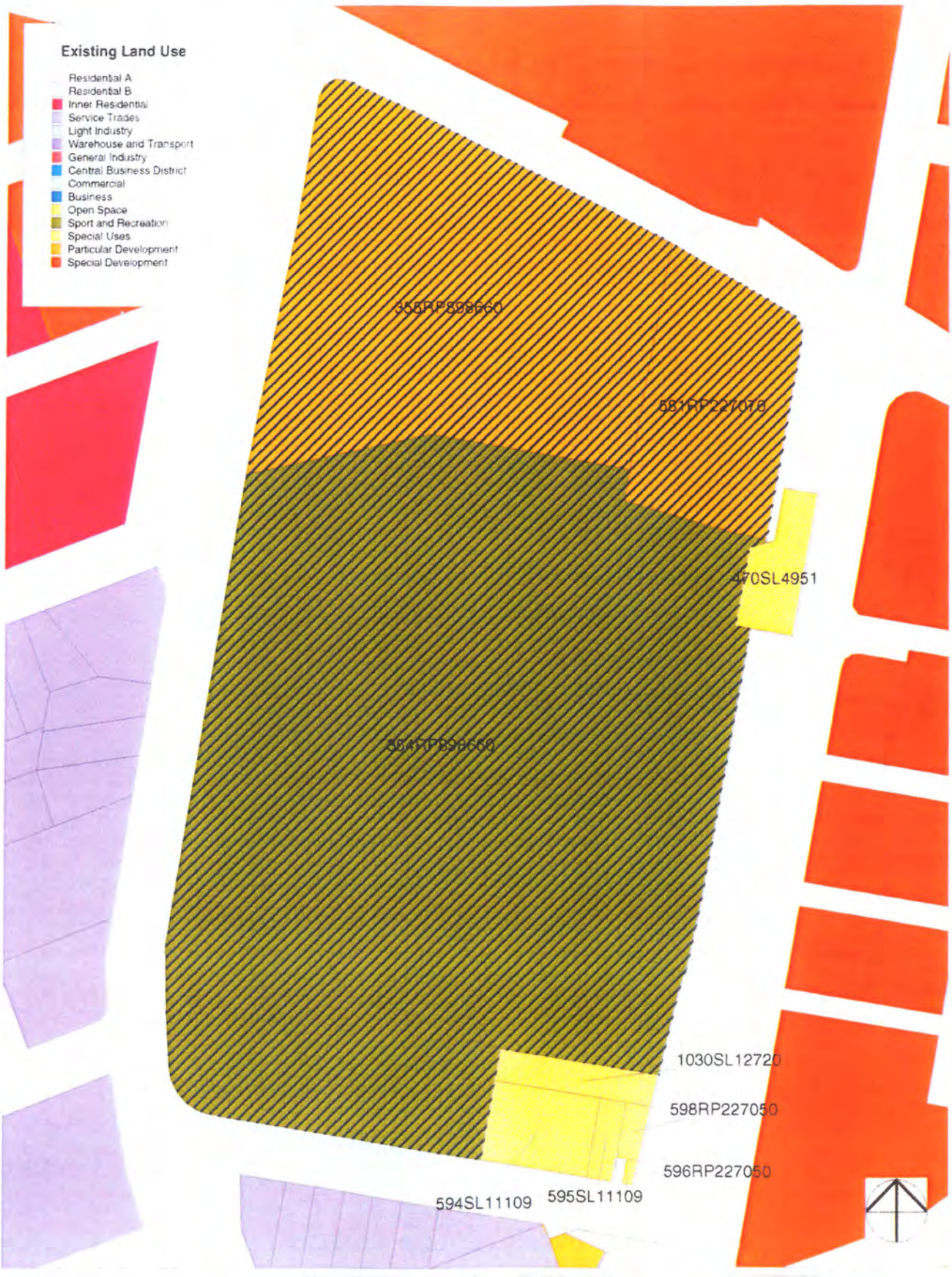


Figure 5.8.1
Lang Park EIS Contaminated Land Sites

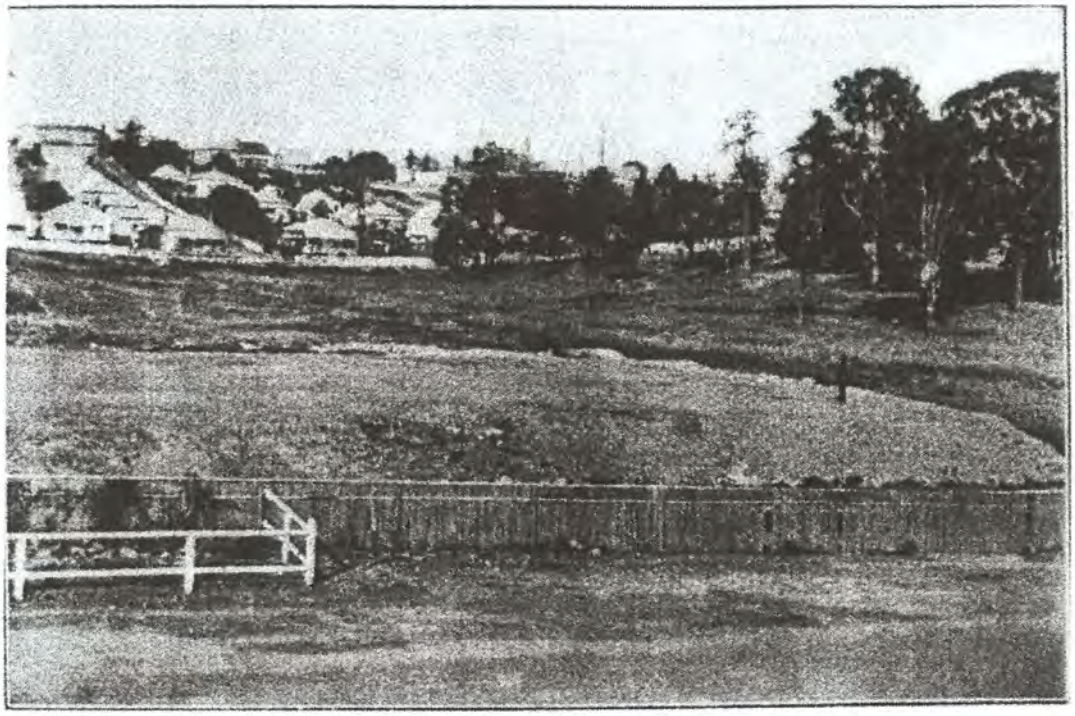
Figure 5.8.2 Photograph of Lang Park Site - 1870
Source: Unknown

During the late 1800's, habitation of the area was steadily increasing and in 1886 Milton Drain was completed. Milton Drain was constructed to alleviate serious stormwater and human waste problems in the area. By the middle of 1914 the cemetery had been relocated and the site was reserved for public use. **Figure 5.8.3** Lang Park 1914 shows the designated public parkland and Milton Drain running down the western edge of the site.

13.2 Lang Park view from Caxton Street across Milton drain towards Petrie-Terrace School (QPP 1914, 2:408)

Figure 5.8.3 Lang Park 1914
Source: QPP 1914, 2:408

From 1914 until the early 1940's the site was filled using warehouse waste, garbage and silt from Milton Drain. **Figure 5.8.4** Lang Park Land Fill shows the filling of the Lang Park Site over this period.



View showing site of abandoned cemetery; bodies previously removed; now being levelled up with warehouse refuse to form public park.

Figure 5.8.4 Lang Park Land Fill
Source: State Health Department Report, 1917

By the mid 1930's Lang Park Oval had been constructed and this is presented in **Figure 5.8.5** Lang Park Oval.

13.5 Lang Park oval with Hale Street school and church (left), c. mid - 1930s (QN)

Figure 5.8.5 Lang Park Oval
Source: QN

During the war a number of trenches were dug along Hale St within the Lang Park boundary and used as air raid shelters for Petrie-Terrace Girls and Infants School. In the late 1930's land between the oval and Caxton Street was still being filled with rubbish. Filling in this area continued until 1951. **Figure 5.8.6** Lang Park Rubbish Dump presents the northern portion of Lang Park towards Hale Street.

Figure 5.8.6 Lang Park Rubbish Dump
Source: Sunday Truth 20 May 1938

In 1939 the northern end of the site was fenced and buildings, garages and hangers were constructed and the area turned into a military base. It is unknown whether the site was used for an ammunitions dump.

In July 1954 a lease between the Brisbane City Council (BCC)and the Queensland Amateur Athletics Association allowing the Queensland Rugby League (QRL) to develop the site as Rugby League Headquarters was approved in principle. In 1956 the lease was signed and the QRL began development of the site. By the early 1960's a well drained levelled oval with western grandstand, enclosing mounds, terraces, crush barriers, perimeter fences and general facilities had been completed (Brisbane History Group Papers No 14 1995). Anecdotal evidence provided by ground staff at Lang Park suggests that these mounds were filled with various types of fill including a number of old car bodies.

The volume of contaminated land could be as much as 100,000 m^3 and could contain warehouse rubbish, other garbage, military waste and car bodies. This volume does not include the playing surface or the areas under the existing grandstands. This volume should be verified through site drilling prior to final design as the removal/remediation of contaminants are generally expensive.

5.9 Existing Environment Flora and Fauna

5.9.1 Introduction

The flora and fauna of Lang Park and surrounding area has been assessed by considering the presence and distribution of flora and fauna in the vicinity of the site and associated infrastructure such as public areas and open space, road upgrading and footpaths.

The flora and fauna values of the study area arise from the contribution of the vegetation to urban amenity and habitat for wildlife. The distribution of flora and fauna and their values are discussed below.

5.9.2 Background Data Collection & Review

There have not been any previous flora and fauna investigations undertaken for the study area, however several sources of information were used to help describe the flora and fauna of the area and determine the impact of the development.

Flora and fauna records from the Queensland Herbarium, Queensland Museum and the Environmental Protection Agency's Wildnet database were obtained for the study area. These records were used to supplement the observations made during the field assessment phase of the study. The results of the database and observations made during field searches are included in **Appendix G** and **H**.

Brisbane City Council Vegetation Protection Orders (VPO) were reviewed to determine the location of trees or stands of trees that are protected by VPOs, and which are considered to be of significance to the City. The Brisbane City Council (BCC) Conservation Atlas did not include any details for these areas.

5.9.3 Agency Consultation

Discussions were held with the BCC concerning the flora and fauna values of the study area. Discussions covered:

- the value of figs in urban Brisbane;
- the process of dealing with vegetation covered by a VPO where an impact cannot be avoided;
- the assessment process by BCC of the flora and fauna aspects of the study; and
- the information assessment officers of Council would expect to see included in the impact assessment study.

BCC officers indicated that the vegetation in the vicinity of Lang Park had value for its contribution to urban amenity values and the scenic quality of the area. The vegetation could also have cultural significance, if trees, in particular were associated with heritage buildings.

5.9.4 Aerial Photo Interpretation

Aerial photos of the study area were viewed to:

- develop an appreciation of the distribution of vegetation in the vicinity of Lang Park and along transport routes to be upgraded as part of the redevelopment;

- ascertain the proximity of vegetation to the site; and
- identify the presence of dominant vegetation communities.

5.9.5 Field Assessment

A survey of the study area was carried out on 25 February, 26 February and 29 February 2000. The study area comprised two areas:

- Lang Park and immediate vicinity, bounded by Castlemaine Street, Milton Road, Moreton Street, Charlotte Street and Crystal Street; and
- major transport links of Upper Roma Street from Petrie Terrace to Countess Street, Milton Road from Petrie Terrace to Milton Railway Station.

The field assessment in the vicinity of Lang Park concentrated on parkland areas, the existing stadium, street landscaping and road medians. Along the major transport links, the assessment of flora and fauna considered the vegetation adjacent to roads and paths that may be widened to accommodate increased traffic and pedestrian flow.

The study area was covered on foot, with notes made on species observed and photos taken of features of significance or interest and the location of features noted.

5.9.6 Existing Flora

The flora of the study area was dominated by planted vegetation in parks, roadsides and within the existing existing stadium. **Figure 5.9.1** shows the typical vegetation of the study area.

Figure 5.9.1 Typical Vegetation - Median Of Castlemaine Street Milton

The vegetation comprised a mixture of native and exotic species. The study area is a highly developed and modified urban environment, with major infrastructure dominating the area, including roads and rail routes, buildings, houses, commercial and industrial properties, public buildings and facilities and services.

The vegetation of the study area is described below. The study area has been divided into two areas for the description of flora. These are the:

- Lang Park Stadium and immediate vicinity; and
- major potential transport links/routes.

The Queensland *Nature Conservation Act 1992* covered none of the vegetation described in this report.

5.9.7 Lang Park & Vicinity

The vegetation of Lang Park and the immediate vicinity are mainly planted trees and shrubs. Much of the vegetation is typical of urban Brisbane and the species are commonly found in urban landscapes of the city. However, in the park surrounding the Ithaca pool, several large and significant trees are protected by Brisbane City Council Vegetation Protection Orders. The VPO covers these trees for their scenic and landscape values. These trees include several species of figs (**Figure 5.9.2**).

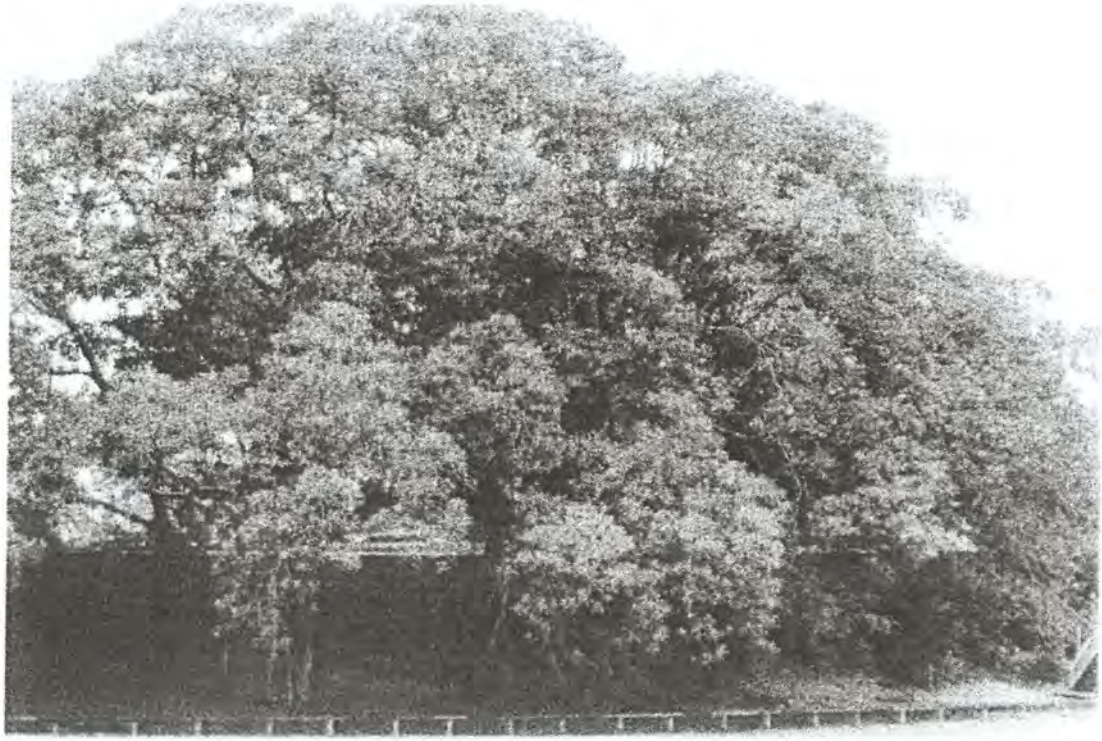


Figure 5.9.2 Protected Fig Trees in Neal Macrossan Park

These trees are considered significant due to their size and the contribution to amenity and landscape values of the area.

❑ Lang Park Stadium

Within the existing stadium, much of the vegetation is in small and isolated groups of trees or individual trees. All the vegetation has been planted and none is remnant vegetation.

The majority of the tree planting within Lang Park appears to be no more than 20 years old, apart from the two *Ficus benjamina* trees, to the north of the western stand, which are in the order of 40 years old. The Lang Park curator planted these trees at some time in the 1950s. The trees have a diameter at breast height of approximately 1.5 metres and a crown spread of 50 metres. The canopies of the two trees are growing together and present a single large crown.

The species within the existing stadium are listed in **Appendix G**. These include *Caesalpinia ferrea* (leopard wood), *Casuarina torulosa* (forest she oak), *Corymbia torelliana* (cadagi), *Eucalyptus tereticornis* (Queensland blue gum), *Ficus benjamina* (weeping fig), *Leptospermum petersonii* (lemon scented ti-tree), *Macaranga tanarius* (macaranga), *Melaleuca bracteata* (black paperbark) and *Syzygium luehmannii* (small leaved lilly-pilly).

Species such as *C. torulosa*, *C. torelliana* and *M. bracteata* were planted in single rows in groups of up to 15 plants, as shown in **Figure 5.9.3**.

Figure 5.9.3 Example of Vegetation Within Lang Park

These plantings provide some limited shade and shelter due to the size of the plants and their canopies. Individual large trees, especially in the south-eastern corner of the Stadium have an open grown habit

The vegetation within the Stadium appears to be of good health and vigour. All vegetation apart from one tree (*E. tereticornis*), adjacent to the northern stairs on the Ron McAuliffe Stand, have been well pruned and maintained. There is no obvious sign of disease or dieback in these trees.

❑ Vicinity of Lang Park

The area defined as the vicinity of Lang Park is bounded by Hale Street, Milton Road, Castlemaine Street and Moreton Street, Charlotte Street and Crystal Street, to the north. Within this area, the vegetation is a combination of street tree plantings, park plantings and landscape associated with public and commercial buildings.

Immediately north of Lang Park, the vegetation found associated with Sports House, Ozsports and the PCYC was dominated by individual plantings of mainly exotic species. The species found in this area included *Jacaranda mimosifolia* (jacaranda), *Cocus nucifera* (coconut palm), *Callistemon viminalis* (bottlebrush) and garden plants near Sports House. Coconut palms are commonly found throughout this part of the study area. **Figure 5.9.4** shows the vegetation found around the Indoor Sport Centre, to the north of the Stadium.

Figure 5.9.4 Vegetation Around Beach Volleyball Courts

A Brisbane City Council VPO covers vegetation in Neal Macrossan Park, the adjacent Ithaca Pool and skateboard area on the northern side of Caxton Street. A VPO has been placed over this vegetation, as it is a group of trees with "distinctive scenic and landscape value". A VPO also covers a group of trees at the intersection of Dowse Street and Moreton Street, and recognises the scenic and landscape values of these trees. The vegetation in this part of the study area was dominated by eight mature fig trees. The species include *F. obliqua* (small leaved fig), *E. tereticornis* (Queensland blue gum) and *Araucaria cunninghamii* (hoop pine). The crowns of the

figs that are growing on the bank adjacent to Caxton Street spread across Caxton Street. The diameter of the crown is approximately 25 metres. The figs adjacent to Moreton Street similarly have a crown that reaches across Moreton Street.

The figs adjacent to Caxton Street display aerial rooting, where roots have formed on branches and in some cases, have reached and become established in the ground. The development of aerial rooting is well advanced in these trees.

At the intersection of Dowse and Moreton Streets, a group of five trees are covered by a VPO, for their landscape and scenic value. They comprise figs and jacarandas. They are about 25 metres high, with a canopy that dominates the intersection. These trees are in good condition and do not show signs of ill health.

All the large trees in this part of the study area can be seen from nearby streets and homes. They dominate the local landscape and provide shade and shelter to Neal Macrossan Park and adjacent streets.

Vegetation along Hale Street, which is the eastern edge of the study area, is made up of street trees, planted following the road work associated with the Hale Street upgrade in the early 1990s, as shown in **Figure 5.9.5**.

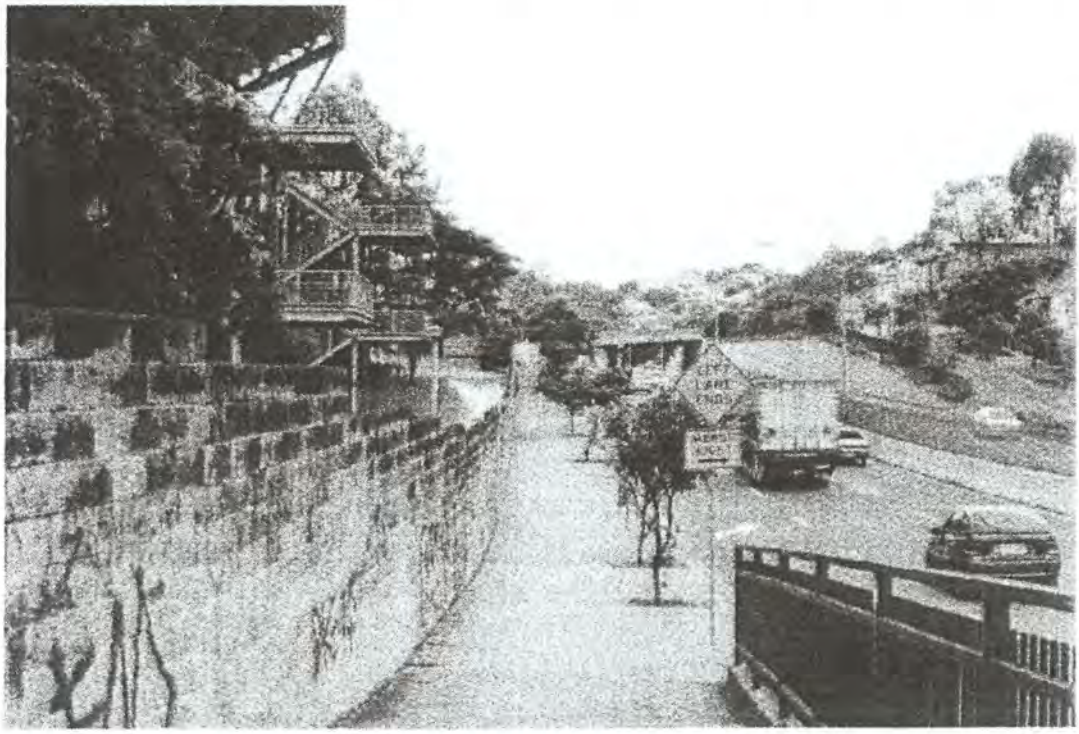


Figure 5.9.5 Streetscape of Hale Street

The trees are *Cupaniopsis anacardioides* (tuckeroo), and are up to three metres in height. They have been planted at a spacing of four to five metres. In general, these trees are healthy and have an even coverage of leaves.

The cemetery, adjacent to the Christ Church in Chippendall Street had a number of trees including *E. tereticornis* (Queensland blue gum), *Jacaranda mimosifolia* (jacaranda) and *Melia azedarach* (white cedar). These trees provide a backdrop to the cemetery and help screen neighbouring properties, especially to the west and north of the cemetery. The trees in the cemetery were 12 metres in height with narrow canopies, about five metres in diameter. The vegetation was healthy and in a sound condition.

Along Chippendall Street, most vegetation was found in the grounds of the Christ Church rectory on the northern side of Chippendall Street and in industrial blocks, on the southern side of the street. **Figure 5.9.6** shows vegetation along the northern side of Chippendall Street, with the Stadium in the background.

Figure 5.9.6 Vegetation associated Christ Church

Exotic species dominated the vegetation of the street. Species included *Cinnamomum camphora* (camphor laurel), *E. tereticornis* (Queensland blue gum), *Jacaranda mimosifolia* (jacaranda), *Mangifera indica* (mango), *Plumeria rubra* (frangipani), *Schinus terebinthifolia* (broad leaf pepper) and Syzygium species (lilly-pilly).

The vegetation on the industrial allotments was overgrown and had not been maintained in recent times.

5.9.8 Flora on Transportation Links

The Lang Park Stadium Proposal will potentially have an impact on the vegetation of the following transport links:

- Upper Roma Street from Petrie Terrace to Countess Street;

- Milton Road from Petrie Terrace to Milton Railway Station and
- Caxton Street.

The vegetation along these routes is described below.

❑ **Upper Roma Street from Petrie Terrace to Countess Street**

This part of the study area comprised street tree plantings along the footpath of Upper Roma Street. The street trees along this section of Upper Roma Street are *F. hillii* (weeping fig). These trees have a trunk diameter of about 300 mm and a height of up to six metres. The health of these trees is generally good, considering their location in a bitumen paved footpath, with extremely high traffic volumes passing within three metres of the trees. The street trees and vegetation of Roma Street is shown in **Figure 5.9.7**.

Figure 5.9.7 Streetscape Of Upper Roma Street

One large fig tree was present close to the Roma Street Fire Station. This was a *F. hillii*. It is a significantly larger tree than the other street trees of Upper Roma Street. It has a height of ten metres, a canopy spread of about 14 metres and trunk diameter of 700 mm. This tree is showing signs of disease, with epicormic shoots evident along branches and well established rot in some of the major branches.

The vegetation of two traffic islands across Roma Street from the Fire Station included a range of species commonly found is public landscapes in Brisbane. The plantings included include *Caesalpinia ferrea* (leopard wood), Callistemon species (bottlebrush) and *F. hillii* (weeping fig).

❑ **Milton Road from Petrie Terrace to Milton Railway Station**

Vegetation along Milton Road was generally confined to properties between Hale Street and Clifton Street. Along this section species included *Acacia aulacocarpa* (hickory wattle), *A. macradenia* (zig-zag wattle), Bauhinia species, *Callitris columellaris* (Bribie Island pine), *Cocus nucifera* (coconut palm), C. *torelliana* (cadagi), *F. obliqua* (small leaved fig), Grevillea cultivars, *Macaranga tanarius* (macaranga), *Plumeria rubra* (frangipani), *Schefflera actinophylla* (umbrella tree) and ground cover plants such as bromeliaeds and Singapore daisy. **Figure 5.9.8** illustrates the vegetation along properties that adjoin Milton Road, near the intersection with Hale Street.

Figure 5.9.8 Vegetation on Milton Road

Within this assemblage of vegetation, there are seven large and dominant fig trees, with crowns spreading across one lane of Milton Road. These trees provide valuable screening to the properties adjacent to Milton Road. The trees also contribute to the urban amenity of the area, because of their large canopies.

On the opposite side of Milton Road, there were no trees or shrubs. The area was covered with mown grass.

At the corner of Milton Road and Hale Street, and along Hale Street, the vegetation within the Department of Education property, along the boundary line was *Plumeria rubra* (frangipani) and associated ground cover garden plants.

❑ **Caxton Street**

The vegetation along Caxton Street comprises street tree plantings, of small size and young age. These trees are about three metres in height and have a trunk diameter of less than 300 mm.

The alignment of Caxton Street through Victoria Barracks is unmaintained land with a patchy coverage of trees and vegetation. Trees through this area include *Melaleuca quinquenervia* (paper bark) and *Ficus benjamina* (weeping fig).

5.9.9 Existing Fauna

As the study area is a highly modified urban environment, the fauna is also highly modified and adapted to coping in modified landscapes.

Observations of birds were made for the study, with Queensland Museum and Wildnet records being used for mammals and reptiles and to complement the bird observations. These observations and records do not reflect the seasonal variation of species that might be expected in south-east Queensland and urban Brisbane, in particular. However, these observations do provide an indication of the sort of fauna that will be found in the study area.

- **Amphibians**

All the species of amphibians (frogs and toads) listed by the Queensland Museum and the Wildnet database are all common species under *the Nature Conservation Act 1992*. These species as listed in **Appendix H** are all frequently found around urban Brisbane.

- **Birds**

The observation of birds was carried out between 5 am and 7 am on 26 February 2000, and was from a circuit of the adjoining streets, together with additional time in the Neal Macrossan Park in Caxton Street. The weather was fine and sunny with little or no breeze, and although there had been no rain overnight there have been a number of showers recently.

A total of 19 bird species were observed. These are listed in **Appendix H**. Many birds were observed foraging on figs and eucalypts, or amongst ground cover plants. Large numbers of scaly breasted lorikeets, figbirds and starlings were observed.

Other species that would be expected include Masked Lapwing, House Sparrow, Rainbow Lorikeet, Laughing Kookaburra, Koel, Boobook Owl, Barn Owl, Noisy Friarbird, Crested Pigeon, Mistletoebird and any of a number of possible raptors.

Based on the Queensland Museum and Wildnet data there are a number of species which are covered by the China Australian Migratory Bird Agreement (CAMBA) and the Japan Australia Migratory Bird Agreement (JAMBA). These species are listed below in **Table 5.9.1** which have been observed in the vicinity of Lang Park.

Table 5.9.1 Bird Species in Vicinity of Lang Park

Scientific Name	Common Name	CAMBA	JAMBA
Hirundapas caudacutus	white-throated needletail	*	
Ardea alba	great egret	*	*
Ardea ibis	cattle egret	*	*
Pluvialis squatarola	grey plover	*	*
Cuculus saturatus	oriental cuckoo	*	*
Chlidonias leucopterus	white-winged black tern	*	*
Sterna albifrons	little tern	*	*
Sterna anaethetus	bridled tern	*	*
Sterna bergii	crested tern		*
Sterna caspia	Caspian tern	*	
Puffinus pacificus	wedge-tailed shearwater		*
Puffinus tenuirostris	short-tailed shearwater		*
Rostratula benghalensis	painted snipe	*	
Actitis hypoleucos	common sandpiper		*
Arenaria interpres	turnstone		*
Calidris acuminata	sharp-tailed sandpiper		*
Calidris canutus	knot		*
Calidris ferruginea	curlew sandpiper	*	
Calidris tenuirostris	great knot	*	*
Gallinago hardwickii	Latham's snipe	*	
Heteroscelus brevipes	grey-tailed tattler	*	*
Limicola falcinellus	broad-billed sandpiper	*	*
Limosa lapponica	bar-tailed godwit		*
Numenius madagascariensis	eastern curlew	*	*
Numenius phaeopus	whimbrel	*	*
Tringa nebularia	greenshank		*
Tringa stagnatilis	marsh sandpiper	*	*
Xenus cinereus	terek sandpiper	*	*

The requirements of CAMBA and JAMBA commit signatories to protecting these species through the provision of sanctuaries and reserves. Within the study area there are no reserves covered by these agreements for the protection of these species.

❑ Mammals

The mammals that are listed in **Appendix H** are common to urban and developed areas of south-east Queensland. The mammals recorded in the vicinity of Lang Park include gliders, flying foxes, bats, possums, bandicoots and wallabies. There was one recording of a koala.

One species, the spotted-tailed quoll is listed as vulnerable under the Queensland *Nature Conservation Act 1992*. This species is found in a wide range of habitats from coastal areas to alpine regions of Australia. Its distribution is highly fragmented from clearing of habitat and the impact of foxes and cats. Based on the nature of vegetation in the study area, it is not expected that the spotted tail quoll will be found near Lang Park and is considered extinct in the Brisbane region.

❑ Reptiles

Two species of reptiles were reported in the Queensland Museum and Wildnet data as being observed in the vicinity of the study area. However, as the study area is highly modified and habitat is fragmented, the chance of these species being close to Lang Park is very low and unlikely they are in the area. These species were the common death adder and Stephen's banded snake. Both species are classified as rare under the Queensland *Nature Conservation Act 1992*. The common death adder prefers undisturbed eucalypt forests where it can find cover under leaf litter and overhanging foliage. The disturbed nature of vegetation in the vicinity of Lang Park suggests that this species is unlikely to be found near the proposed development.

Stephen's banded snake frequents wet eucalypt or rainforest areas (Cogger 2000). These habitat types are not found within the study area, so Stephen's banded snake is not expected to be found in the area proposed for development.

❑ Insects

The insects recorded in the study area are butterflies, with only one species, the Richmond birdwing butterfly being classified under the Queensland *Nature Conservation Act 1992*, as vulnerable.

The Richmond birdwing butterfly is found in rainforest areas, where its preferred food plant, *Aristolochia praevenosa* (pipe vine), is found. This plant was not observed during field investigations or recorded in the Queensland Herbarium records. Consequently, the Richmond birdwing is unlikely to be found near the site.

5.10 Other Information

5.10.1 Existing Emergency Services

Emergency Services are provided to the Lang Park Stadium and surrounding areas principally by the Queensland Fire and Rescue Authority (QFRA) and the Queensland Ambulance Service (QAS). These services are supported by the Chemical Hazards and Emergency Management (CHEM) Unit within the Counter Disaster and Rescue Services area of the Department of Emergency Services. These are also supported, where necessary, by the Queensland Police, as an essential element relating to crowd and traffic control, and the emergency services of Brisbane City Council and the State Emergency Services (SES).

Advice from the QFRA is that resources from the Roma Street Fire Station are despatched on an as needed basis depending upon the nature of the emergency. The standard response to a fire at Lang Park would be to send two "pumps" from Roma Street. The response to fire also may involve coordination with QAS, and with Police who would be involved in crowd control, traffic management, evacuation and any needed follow-up investigations. QAS have only one vehicle available from 7am to 9pm with an additional car and crew available between 11am and 5pm. On a Friday night the additional crew remains on duty from 5pm to 9pm.

There has been no dedicated ambulance in attendance at recent major events such as the State of Origin games at Lang Park. Past management during rugby league matches with the Broncos club have included an ambulance at all games. Any dedicated QAS vehicle at the ground is at the request of, and paid for by, the event organiser or responsible manager. Any dedicated QAS vehicle at the ground is in addition to the normal availability of vehicles.

Fire in the areas surrounding Lang Park has traditionally caused problems due to narrow streets and associated limited access. It can often take only one car parked in side streets to block access for the QFRA. QAS are not as affected due to the greater manoeuvrability of their vehicles and have rarely been blocked from local streets, even in Petrie Terrace. Due to the nature of the access available with areas surrounding Lang Park, response time to emergency situations is normally longer than would otherwise be expected.

The same is true in heavy traffic, generated either by normal peak hour movements or due to congestion associated with events at Lang Park. If Roma Street cannot access an emergency due to the traffic conditions then QFRA units will be called from other stations including Windsor, Taringa, Ashgrove and also Kemp Place. The past experience with either peak hour traffic or major sporting events at Lang Park is that response times to areas surrounding Lang Park are longer than would be considered normal. QAS have also advised that during a large event at Lang Park, while it is sometimes difficult to respond to surrounding emergency requirements, it is not impossible.

The situation with emergency access through pre or post-match crowds, such as along Caxton Street is generally managed under police control. Emergency vehicle sirens also have the effect of dispersing the crowd to enable careful but deliberate access through.

Access is also maintained for all emergency vehicles as a general condition of temporary road closures. Consultation is undertaken with QFRA in the issuing of a Police permit for the temporary closure of any road. Consultation is also undertaken with QFRA in the closure of any roads by Brisbane City Council or the Department of Main Roads.

The CHEM Unit of the Department of Emergency Services has a role to assist the QFRA in any chemical spills and to advise on handling, disposal, and the impact on rescue staff and the surrounding community. While both Hale Street and Milton Road are identified as "dangerous goods routes", no incidents involving dangerous goods can be recalled in the vicinity of Lang Park by either the CHEM Unit or the Department of Transport. No significant risk issues are perceived by the CHEM Unit in relation to the existing Lang Park Stadium complex and surrounding areas.

5.10.2 Existing Stadium Emergency Procedures

The Lang Park Trust has in place emergency procedures for the existing stadium.

Upon becoming aware of an emergency situation occurring all two-way radios are tuned to a nominated emergency channel. Communication via the two-way radios ceases unless it specifically relates to the emergency. In the event of an evacuation being ordered all Supervisors are advised under the Stadium Emergency Procedures to:

(i) direct staff to stand by exits;
(ii) stop escalators in the Ron McCauliffe stand;
(iii) not allow the use of lifts;
(iv) direct the public to the nearest safe exit;
(v) instruct bar staff and food outlet staff to secure money (Only if the situation permits and only if safe to do so);
(vi) ensure all areas are clear;
(vii) report status of area to Chief Warden; and
(viii) evacuate to the nominated external assembly point.

These emergency procedures include handling a bomb threat and general emergency alarm operations including fire doors operations and awaiting the arrival of emergency services and evacuation requirements where necessary.

Evacuation, if required, would be initiated by the police and would include the following procedures:

(i) McAuliffe Stand - Via the fire escape stairways at the northern and southern ends of each floor and proceeding out the metal gates onto Hale Street. In the case of such an emergency Hale Street would be closed by the police.
(ii) Southern Outer Stand - Via the metal gates at Gate 3 onto Chippendall Street. or via the metal gates on the Hale Street side of the ground.
(iii) Western Stand - All levels of the western stand would egress through the fire escapes at the northern and southern ends of the stand and onto Castlemaine Street. All fire doors have crash bars installed to enable a quick egress in case of emergency. Senior personnel would also be deployed to these sites on all levels to reduce panic on behalf of patrons unable to find their way.
(iv) Northern Outer Stand - Via the metal gates at Gate 5 and through the PCYC gate to Caxton Street and through Gate 7 behind the scoreboard through the carpark north to Castlemaine Street.

In case of emergencies, players and officials would be escorted from the playing area to the VIP car park and mustered there. In the case of the emergency being in the southern area of the ground, players and officials would be taken to the northern car park.

QAS and QFRA are not aware of these existing emergency procedures or any joint action plan or operational emergency plan for the existing stadium. The QAS has advised in reference to the above that there is no existing plan for the evacuation of one or more injured people from the stadium. The QFRA advise that it is their role to reset the Fire Indicator Panel (FIP), which does not appear to be the case in the current emergency procedures. It is also noted that the existing stadium emergency procedures plan relies upon external agencies such as QFRA and QAS to attend upon an emergency call.

5.10.3 Site Services

❑ Water Supply

Water supply is required for three main purposes:

- potable supply eg kitchens, toilets, drinking;
- irrigation of the field; and
- fire fighting demands.

The existing water supply system is supplied from a Brisbane City Council network located in Hale Street and Castlemaine Street. The mains in these streets are 100 mm.

Diameter:

A 150 mm diameter fire service for the existing western stand is connected to an 150 mm diameter main in Heussler Terrace. A 100 mm diameter fire service connection supplies the existing eastern stand from the 100 mm diameter main in Hale Street.

The mains adjacent to the existing facility are previously supplied by a 300 mm trunkmain located in Milton Road. A 600 mm trunkmain is located in Hale Street. This main is a major trunkmain between reservoirs and is not connected to local distribution networks.

❑ Sewerage

The existing facilities are serviced by two trunkmains. A 300 diameter PE sewer runs southwards from Caxton Street under the western stand connecting to a 375 mm diameter main near the western boundary approximately midway between Heussler Terrace and Chippendall Street. A 225 EW sewer joins at this point from the eastern stand crossing under the main oval from Hale Street. Both of these sewers serve extensive other areas as well as the existing Lang Park facility.

❑ Gas

Gas mains exist in the general area. The particular locations are indicated below:

- **Hale Street**: A low pressure gas main, with diameters varying from 50 mm to 100 mm, exists on the east side of Hale Street at offset of between 1.4 and 1.7m from the RP boundary.
- **Caxton Street**: A low pressure gas main, with diameter 150mm, exists on the north side of Caxton Street at offset of between 3.8 m and 3.9 m from the RP boundary of the swimming pool site.
- **Chippendall Street**: No gas main exists in Chippendall Street.

- **Castlemaine Street**: North of Heussler Terrace; A low pressure gas main, with diameter 80 mm, exists on the east side of Castelmaine Street at offset of between 5.3 m and 5.6 m from the RP boundary.

- **Heussler Terrace to Chippendall Street**: An abandoned gas main, with diameter 80 mm, exists on the east side of Castlemaine Street adjacent to the RP boundary in the northern part of this section of Castlemaine Street. A medium pressure gas main, with diameter 110 mm, exists on the east side of Castlemaine Street at offset of approximately 1.4m from the RP boundary, in the southern part of this section of the Castlemaine Street.

- **Chippendall Street to Milton Road**: A high pressure gas main, with diameter 150 mm, exists on the east side of Castlemaine Street at offset of between 6.0 m and 9.0 m from the RP boundary. A medium pressure gas main, with diameter 150 mm, exists on the west side of Castlemaine Street at offset of between 1.0 m and 1.6 m from the RP boundary.

Note: All offsets are with the road services.

Gas is currently provided from the medium pressure diameter 110 mm main located in Castlemaine Street between Heussler Terrace and Chippendall Street.

5.13 Existing Visual Setting and Urban Design Context

5.13.1 City Planning Controls & Guidelines

Lang Park Stadium and the land immediately surrounding the stadium which is bounded by Caxton Street, Castlemaine Street, Hale Street and Chippendall Street is mostly contained within the Sport and Recreation Zone under the Town Plan for the City of Brisbane. The exception is a small parcel of land to the south of the stadium that is contained within the Park Zone).

Land contained within the Sport and Recreation Zone is intended to accommodate organised sports with associated facilities, commercial recreational establishments as well as less formal recreational activities.

The Town Plan does not stipulate Development Standards within the Sport and Recreation Zone. However, the intent for the zone does state that in considering a development application Council will take into account, amongst other things, parking, servicing, landscaping, ingress and egress and the likely impact of the proposal on the existing and future amenity of adjoining sites and of the surrounding area. Further consideration will also be given to the likely impact of the proposal on public utilities, the surrounding road system and pedestrian movement and safety.

There are no specific requirements or guidelines with respect to height, bulk and scale, site coverage, landscaping or design.

Although Lang Park Stadium itself is not included within a Development Control Plan (DCP) under the Town Plan, there are three (3) DCP's in place which specifically regulate development within the surrounding suburbs;

- The Petrie Terrace and Spring Hill Development Plan (PTDCP);
- The Latrobe and Given Terraces Development Control Plan (LTDCP); and
- The Milton Development Plan (MDP).

The statutory controls which are contained within the above plans have a significant impact on the existing urban form of the areas immediately surrounding Lang Park.

❑ The Petrie Terrace and Spring Hill Development Plan

This plan encompasses the whole of the Petrie Terrace area west to Hale Street (see attachment). The PTDCP intent is to encourage the retention of the existing buildings in the area and to ensure that the intensity of development in the area is compatible with the existing character of the area. The intent for the land immediately to the east of the site is predominantly for detached housing. This form of development is also intended for those areas north east of the site.

❑ The Latrobe and Given Terraces Development Control Plan

This plan essentially regulates development along the spine of Latrobe and Given Terraces. The plan area extends east to Hale Street and includes the Neal Macrossan Playground site. The playground area is contained within an Open Space precinct. The intent of this precinct is to retain these areas for community purposes so that the facilities can be used by the local community.

❑ **Milton Development Plan**

This development plan bounded by Milton Road to the north, Hale Street to the east, the Brisbane River to the south and Roy Street to the west contains a dynamic mixture of land uses and heritage features.

The intent of the MDP is to allow for a wide range of uses consisting of showroom and retail uses towards the south-west corner of the plan area, a central area of residential and light industrial uses and commercial and office development located in the north eastern corner. Continued pressure from non-residential land uses has provided for a variety of land uses to predominate on the fringes of the plan area.

A large proportion of the MDP area has been developed or redeveloped, especially in the central and north-western areas. Large developments within close proximity to Lang Park have been established (e.g. Coronation Drive Office Park).

Lang Park Stadium and its immediate surrounds are not covered by development provisions that govern development. Furthermore, the DCP's offer no guidance for development taking place in the adjoining Sport and Recreation Zone, in which Lang Park is situated.

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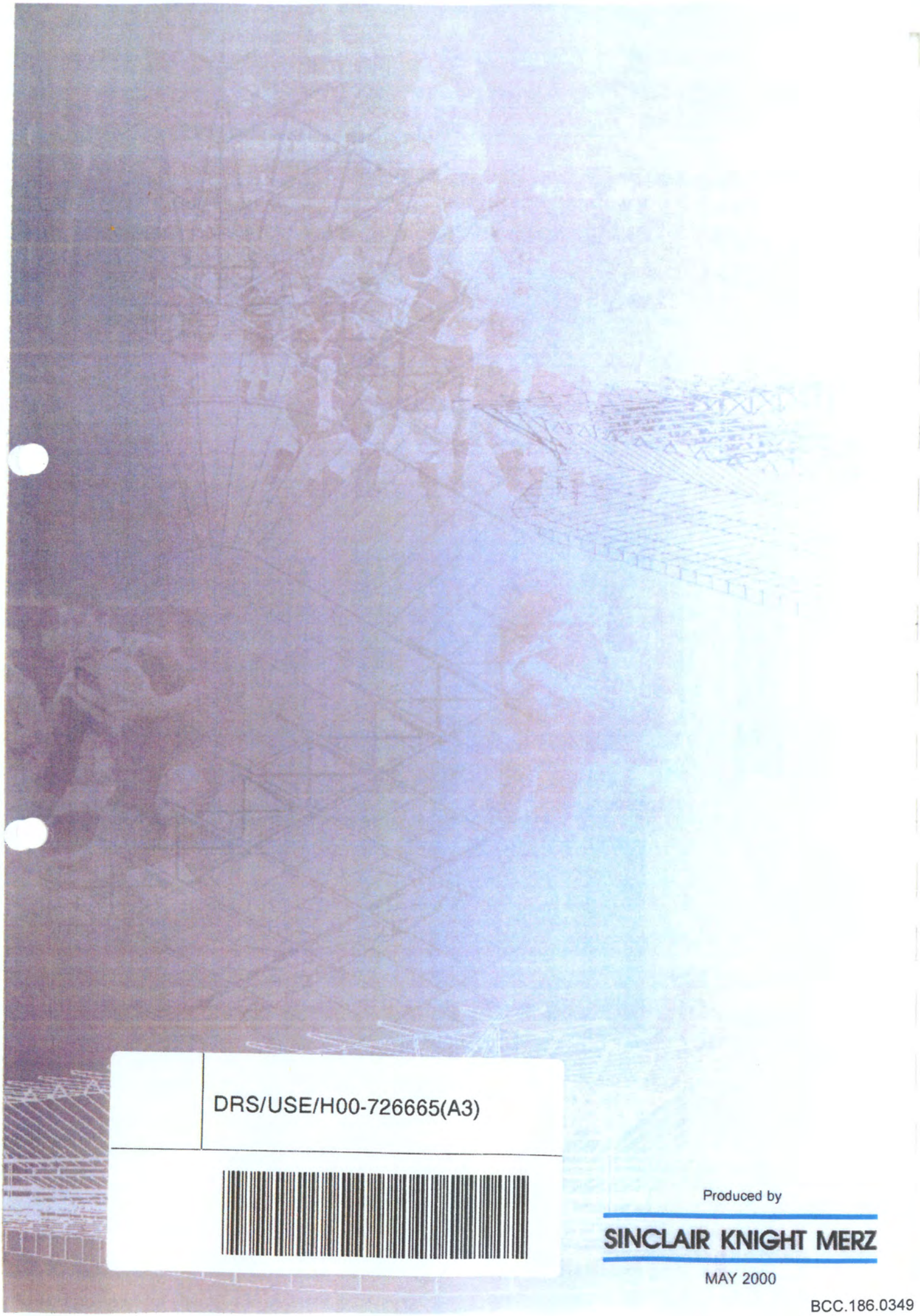

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LANG PARK STADIUM
PROPOSAL REVIEW

Queensland Government

Draft Environmental Impact Statement

VOLUME 4

Environmental Impacts
Transport Impacts

MAY 2000

SINCLAIR KNIGHT MERZ

BCC.187.0406

EIS OUTLINE

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6. ENVIRONMENTAL IMPACTS

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6. Environmental Impacts

6.1 Construction Impacts

6.1.1 Air Quality – Construction

Construction activities associated with development of the proposed stadium will have some potential to impact on air quality through:

(i) the disturbance of soil or potentially dusty materials,
(ii) and the generation of other pollutants such as combustion products from vehicles and machinery,
(iii) and possibly odours from various sources including vehicle exhausts and solvent-based products. Normally, however, dust is the main air quality issue associated with construction activities.

Given that the duration of construction will be limited, the potential for any significant air quality effects is temporary. However, in some circumstances uncontrolled emissions from construction activities have the potential to cause nuisance if adequate safeguards are not in place. The most effective way of avoiding nuisance from construction activities is to have in place a comprehensive system that encompasses the following:

(i) effective monitoring of impacts
(ii) effective communications with the local community on issues associated with the construction activities
(iii) a clearly identified point of contact should the community have comments or complaints
(iv) a well defined process to ensure that any issues are dealt with promptly and to a satisfactory level; and
(v) a well defined system of recording any incidents or complaints.

The construction phase for the proposed stadium must have this system in place. It will be the responsibility of the contractor undertaking the activity to activate and maintain the system, and will be an element of the contract performance evaluation.

Recommended components of the management system are as follows:

- **Monitoring**

Direct monitoring is normally confined to particulate matter (dust), which can be measured continuously with laser-based monitoring systems. Such systems can provide real-time dust data and can be set to trigger alarms when specific threshold levels (relevant to the Air EPP goals, for example) are exceeded over a suitable averaging period. This type of monitoring is recommended for the construction phase. At least one monitor is recommended for placement at the site boundary or at the nearest downwind sensitive location(s). This location will change according to variations in wind direction.

Such a system allows the impacts of the construction activities to be monitored continuously and in real-time. Similar systems have been very effective in reducing off-site impacts and complaints at construction and remediation sites.

Real-time and continuous monitoring of other air pollutants is normally not necessary or as feasible as it is for dust emissions.

❑ Communications

It is important that, when potentially intrusive activities such as construction are to be undertaken, the potentially affected community is kept well-informed about the types and duration of the activities. The community also must be informed of potential impacts and how they can respond if adversely affected. Typically, community response to intrusive activities is more tolerant when the community is advised of what can be expected. Complaints are often associated with uncertainty about how long or how often adverse impacts (e.g., especially dusty or odorous emissions) will occur. This uncertainty may generate anxiety and a degree of outrage at the unexplained and unannounced intrusion.

Forewarning of significant events in the construction phase and an explanation of their frequency and duration must be a significant part of the community liaison process for this project.

❑ Point of Contact

It is important that, when the community is advised of activities that may have some short-term impacts, there is a clearly identified point of contact for lodgement of complaints or comments. This can be achieved by a special 'hotline' phone number and/or a nominated person with whom the community has had some ongoing contact.

❑ Process

If a complaint is received, it is important that an adequate response ensues. The absence of an adequate response mechanism will almost inevitably lead to an increase in the potential for complaint. It will be important to ensure that the system works effectively.

The process to be followed will be as follows:

(i) the complainant will be contacted in person to enable details to be recorded and acted on. This will occur promptly on receipt of the complaint;
(ii) an initial investigation will be conducted to verify details of the incident, and these will be recorded;
(iii) if the investigation reveals that the construction activities were certainly not responsible (e.g., there is irrefutable evidence that the wind was blowing away from the complainant), then the complainant will be advised and the response will be recorded;
(iv) if the investigation indicates the likelihood or reasonable possibility that the construction activity was responsible, then a responsible person will identify the source of the complaint and will have the authority to ensure that the project manager acts upon it. This may mean temporary suspension of the activity leading to the impact, or modification of the activity (e.g., implementation of watering to control dust emissions); and
(v) the complainant will be informed of the result of the investigation, and of the remedial actions taken, and this will be recorded in the incident record.

6.1.2 Acoustic Impacts - Construction

❑ Overview of Demolition & Construction Noise

The development of the proposed stadium will require some demolition as well as the construction of the new grandstands. Demolition and construction can give rise to noise, particularly during stages when heavy machinery is used. Noise from these activities can be monitored and through appropriate management strategies, can be limited. The development therefore offers a number of opportunities to minimise this noise.

The demolition and construction of the proposed stadium will require the use of a range of machines. Some of these machines may cause significant noise although noise will usually continue only for a limited period of time.

Demolition will require the use of equipment such as rock breakers and heavy vehicles transporting material from the site.

The construction phase will require preparation of the site using earth moving equipment including excavators. During subsequent stages a number of machines include concrete pumps, air compressors, power tools and cranes will be used. A number of heavy vehicles will also be required to transport material on and off the site.

❑ Potential Noise Sources

The following machines may be associated with the demolition and construction of the proposed Stadium.

(i) Demolition
- Excavators
- Tracked Bulldozers
- Rock breakers
- Cranes
- Dump Trucks

(ii) Construction
- Excavators (during site preparation)
- Front end loaders
- Cranes (including tower cranes)
- Concrete pumps
- Heavy haulage vehicles (during site preparation)
- Delivery vehicles (small, medium and large)
- Portable air compressors and generators
- A range of hand held power tools

(iii) Vehicle Movements

– Delivery vehicles and vehicles removing materials will be required to move on and off site as well as within the site.

❑ Demolition Noise

Demolition is achieved by dismantling and removing material from existing buildings and structures. Many of these activities, such as dismantling the interior of buildings and removal of fittings, will not cause significant noise. However demolition also includes the use of pneumatic or hydraulic rock breakers and the movement of tracked and wheeled vehicles on site as they load waiting dump trucks. Fully laden dump trucks may also cause noise as they move off-site and towards major roads, where they become a part of the general traffic noise.

Rock breakers are usually only used for relatively short periods of time to break material into sizes that can be loaded onto trucks and removed. However, on occasions these machines may operate in exposed areas and this noise could be audible over a large area.

The noise level of equipment varies according to size, make and model. To enable an assessment of the noise from demolition, average values of noise from equipment have been obtained from the Australian Standard AS 2436 - 1981 *Noise Control on Construction Maintenance and Demolition Sites.* This Standard provides typical A-weighted sound power levels for site equipment (**Table 6.1.1**) although quieter versions of many items of equipment may also be available.

Table 6.1.1 Typical A- Weighted Sound Power Levels from Site Equipment associated with Demolition (AS 2436 – 1981)

Plant	Sound Power Level dB(A)
Excavators 100 to 200kW	108 to 112
Tracked Bulldozers (200 to 300 kW)	117 to 121
Rock Breakers (Hydraulic)	110 to 119
Cranes (Mobile)	118 to 120
Dump Trucks 25 t, 120 kW	< 114

To determine the worst case situation during the demolition phase of the development, the Environmental Noise Model (ENM) was run for a scenario involving two bulldozers and a hydraulic breaker operating in the open, at the base of the eastern grandstand with no screening from existing buildings.

Worst case demolition noise scenario model

Noise sources

Tracked bulldozer at the northern boundary of the exiting pitch – 120 dB(A) sound power
Tracked bulldozer at the southern boundary of the existing pitch – 120 dB(A) sound power
Hydraulic rock breaker in the middle of the front of the eastern grandstand – 115 dB(A) at a height of 3 metres

The model results are summarised in **Table 6.1.2** and show that noise will be approximately 60.5 dB(A) on the northern side of Caxton Street (200 metres from the closest edge of the pitch). At an additional 200 metres the noise level would be approximately 46 dB(A). These values assume that

there are no structures or barriers to attenuate noise and that all machines are operating simultaneously. The predicted values are therefore maximum noise levels.

Table 6.1.2 Worst Case Demolition Noise (2 Bulldozers and 1 hydraulic rock breaker)

Distance	200 metres	400 metres
Noise Level dB(A)	60.5	46

❑ Construction Noise

Like demolition noise, construction noise will vary significantly depending on the particular stage of the development, the machinery being used and the location of the machinery.

Typical values for construction equipment are obtained from the AS 2436 – 1981 and are shown in **Table 6.1.3.**

Table 6.1.3 Typical A- Weighted Sound Power Levels from Site Equipment associated with Construction (AS 2436 – 1981)

Plant	Sound Power Level dB(A)
Excavators 100 to 200kW	108 to 112
Front End Loaders (50 to 100 kW)	115 to 119
Tower Cranes	104 to 108
Concrete Pumps	102 to 107
Rock Breakers (Hydraulic)	110 to 119
Cranes (Mobile)	118 to 120
Dump Trucks 25 t, 120 kW	< 114
Portable air compressors (7 m^3/min – partially silenced)	98 to 100
Hand held power tools (eg Hammer drills, Grinders)	101 to 112

There are four principal activities associated with construction that may give rise to high levels of noise. They are site preperation, general construction, concrete deliveries and the use of tower cranes. General construction is associated with the assembling of the buildings and fittings. On occaions noise may arise from these activities such as when power tools are used or grinding occurs on welded beams. However, the major noise sources are associated with the use of heavy equipment such as excavators during site preparation and concrete pumps which may be loacted adjacent to building sites and near to residences. Tower cranes, as they operate above the surrounding buildings and may operate for long periods may also cause singifican noise levels. Therefore three construction noise scenarios are modelled. They are:

(i) excavation of the site involving the operation of two excavators
(ii) operation of a concrete pump
(iii) continuous noise of a tower crane.

Worst case construction noise scenario model (site preparation)

Noise sources
2 tracked excavators at the centre of the pitch, at the front of the western stadium - 110 dB(A) sound power

Worst case construction noise scenario model (concrete pump)

Noise sources
Concrete pump located in Castlemaine Street adjacent to northern end of existing western grandstand – 105 dB(A)

Worst case construction noise scenario model (tower crane)

Noise sources
Tower crane at 50 metres high – 106 dB(A) sound power.

The results of the modelling for site preparation are shown in **Table 6.1.4**; for a concrete pump in **Table 6.1.5** and for a tower crane in **Table 6.1.6**.

Table 6.1.4 Site Preparation Noise (2 operating bulldozers)

Distance	200 metres	400 metres
Noise Level dB(A)	44.3	33.9

Table 6.1.5 Concrete Pump Noise

Distance	100 metres	200 metres
Noise Level dB(A)	53.2	43.0

Table 6.1.6 Tower Crane Noise (at 50 metres high)

Distance	100	200	300
Noise Level dB(A)	55.3	48.0	43.7

❑ Vehicle Movements From the Construction Site

Vehicles associated with demolition and construction will travel through the streets around the stadium travelling on to Milton Road, Caxton Street and Hale Street. Once they have reached these roads they will become part of the general traffic noise associated with a major road network located close to a major city centre. However heavy vehicle traffic travelling along Castlemaine Street would be expected to have an impact on the existing level of noise.

The impact will depend on the number of heavy vehicles that will be directed onto this road. It will therefore be influenced by the layout and programming of the construction stage. Construction truck noise would be similar to existing heavy truck movements in the area. However, any increase in the volume of truck movements would be likely to have an impact on the amenity of the area, particularly if truck movements occurred ouside of normal working hours or at night.

❑ Discussion of Demolition & Construction Noise

Demolition and construction noise will vary during the phases of the project. The modelled scenarios show the worst case situations. However, with the exception of the tower crane, most

phases of construction and demolition noise levels will be significantly quieter than the predicted maximum noise levels and on many occasions will be inaudible.

Noise from demolition is unlikely to cause disturbance at nearby residences due to its infrequent nature although the demolition scenario modelled indicates that noise could reach 60 dB(A) at 200 metres. Premises on the east of the site, adjacent to Hale Street are already subjected to background noise level (L_{90}) of 64.5dB(A) and 63dB(A) during the day and evening. Residences along Castlemaine Street would be influenced by traffic along that street and therefore the background noise levels would be between the levels measured at Hale Street and those measured in Isaac Street. These residences may therefore be exposed to occasional demolition noise although the existing western stand would screen most demolition activities.

The closest residences to the site stadium therefore may be exposed to high levels on occasions such as when the three items of equipment modelled were operating and where those residences had a direct line of sight to the machinery. Noise levels at residences further from the demolition would be significantly less, particularly if the first residences restricted the direct line of sight to the machinery. All residences further than 400 metres from demolition work would be exposed to noise less than 46 dB(A) and this is below or near to the background noise levels measured at all residential sites during the day.

The construction noise modelling indicates that noise from site preparation works may be up to 44.3 dB(A) at 200 metres from the pitch. This level is below the background noise at the closest residences on the western side of the site and therefore is unlikely to cause disturbance, particularly as the western grandstand is to be retained. Residences on the eastern side of the site are closer than 200 metres but these residences are exposed to the higher background noise caused by traffic along Hale Street. Therefore noise levels would be unlikely to exceed the day and evening background noise which is in excess of 60 dB(A).

A concrete pump may cause noise of 53.2 dB(A) at 100 metres. Should a pump be positioned along Castlemaine Street, residences on the opposite side of the road would be exposed to noise that exceeds the background noise measured in Isaac Street (49.2 dB(A)) by 4 dB(A). Also reflection from the existing grandstand could increase that noise by an additional 3 dB(A). This noise may be intrusive but could be readily managed by positioning the concrete pump away from residences and away from reflective surfaces.

Tower cranes would be located above the surrounding construction and the modelled crane was assumed to be at 50 metres, that is 10 metres above the height of the grandstands. At this height the noise level at 100 metres will be 55.3 dB(A) reducing to 48 dB(A) at 200 metres. The location of tower crane is significant in determining the level of noise at nearby residences. Developments in the muffling of the diesel engine used on tower cranes may also enable quieter cranes to be used should they be located closer to the nearest residences.

❑ Management of Demolition & Construction Noise

Demolition and construction noise will vary considerably depending on the activities being performed, the proximity and direction of noise sensitive places and the location of buildings or other barriers that may attenuate noise. A plan could be developed which identifies noisy activities and develops appropriate noise management procedures. This would include strategies such as ensuring that quiet equipment and procedures are used where alternatives are available and nearby residents are advised of any unusually high noise (such as the need to commence a concrete pour in the early morning).

A contact telephone number could also be provided to nearby residences so that should any excessive noise occur, residents could contact the site managers and have that issue addressed immediately. The size manager should maintain a complaints register for review by the Environmental Protection Agency.

Additionally, any activities at night, for example during the construction of the light rail system should be conducted using appropriately silenced equipment and should be regularly monitored to ensure that it does not intrude significantly above the background noise at the closest residences. Should blasting be required, this should be done only during the middle of the day and nearby residents should be advised prior to the blast.

6.1.3 Power & Lighting During Construction

The temporary supply during construction to the site could be achieved in two options:

(i) Use the Western and Eastern Stand substation in different stages of construction as required.
(ii) Use Energex temporary construction site supply as required by the Builder.

Both options are feasible and neither of them will have an impact on the development.

The lighting installation required for the construction site can be organised to use the existing floodlighting in stages. If this is not possible due to the demolition program the construction site lighting must use floodlights with cut off characteristics to limit any obtrusive lighting to the residential area (the glare and light spillage).

The construction site temporary floodlights must meet the recommended maximum values of light technical parameters for the control of obtrusive lighting to the neighbourhood as identified in Section 5.3.2 AS4282 (Control of Obtrusive Effects of Outdoor Lighting). For example the vertical illuminance Ev = 10 lux for residential at pre-curfew hours and 2 – 1 lux curfewed hours. The vertical illuminance for commercial premises is 25 lux pre-curfew hours and 4 lux curfewed hours.

The limits apply at all times where users of transport systems are subject to a reduction in the ability to see essential information. In this case a threshold increment of 20% based on adaptation luminance of 10cd/m^2 (commercial area) and 0.1cd/m^2 (residential area).

Also the temporary construction floodlighting is required to meet the Brisbane City Council Town Plan – Section 19.4 requirements, which state that the maximum vertical illuminance (Ev) recommended at 1.5m outside the site boundary shall be less than 8 lux. The construction site also will be required to meet the AS1680.0 (Interior Lighting – Safe Movement) where the minimum recommended illuminance is 20 lux and 0.3 lux uniformity of illuminance on horizontal plane.

If these conditions are met by the Construction Site Management in regards to the obtrusive lighting (glare or spill) will be kept to a minimum.

6.1.4 Site Impacts

❑ Contaminated Land

The upper volume limit of contaminated land over the site is estimated to be 100000 m^3. The playing surface or the areas under the existing grandstands are not included in this volume. This

should be considered indicative and a Site Management Plan should be prepared following a comprehensive site investigation. The Site Management Plan should be prepared prior to final design to provide conclusive evidence of:

(i) the types of contaminants located on the site,
(ii) the volume of contaminants over the site,
(iii) groundwater water quality impacts over the site, and
(iv) removal and/or remediation of the site.

Should remediation of the site not be feasible, contaminated wastes will have to be removed from the site and deposited in an appropriate manner.

The preparation of the Site Management Plan, and any removal, or disposal or remediation of the contaminated material fill should be carried out in accordance with:

(a) Australian and New Zealand Guidelines for Assessment and Management of Contaminated Sites;
(b) The Environmental Protection Act (EPA) 1994 as amended; and
(c) Other related Acts, Policies and Statutory Regulations of Federal, State and Local Government.

❑ Soil Erosion and Sedimentation Control

A site investigation was undertaken to evaluate the potential for soil erosion and sedimentation during construction. In existing conditions, the site is not subject to soil erosion as the entire area is covered by either concrete or grass. Furthermore much of the site is level so that surface water flow velocities will be low, limiting effects of sheet and rill erosion.

▪ Construction

During construction of the stadium, a Soil Erosion and Sedimentation Control Plan must be implemented which conforms with:

(i) The Environmental Protection (Water) Policy (EPP) 1997 as amended;
(ii) Other related Acts, Policies and Statutory Regulations of Federal, State and Local Government origin.

The Soil Erosion and Sedimentation Control Plan should be formulated during final design based on the following guidelines:

(i) Soil Erosion and Sediment Control, Engineering Guideline for Queensland Construction Sites (IEAust, June 1996)
(ii) Managing Urban Stormwater, Soils and Construction (1998).

The Soil Erosion and Sedimentation Control Plan at the least, will require:

(i) perimeter silt fences that reduce wind blown dust;
(ii) surface flows to be all directed to a single sedimentation basin for water treatment prior to leaving the site, with water to be available for re-use in dust suppression and other applications;
(iii) a sedimentation basin for sedimentation transport rates and operating performance for up to a 10 year ARI flood event;

(iv) the control of dust by mist watering, seeding or covering of soil stockpiles; and regular watering of internal traffic routes and exposed soil;
(v) a truck wheel wash at all site exits; and
(vi) a maintenance plan for all erosion and sedimentation devices.

The sedimentation basin should be designed so that it can be used as a water quality measure to aid in the treatment of stormwater leaving the site during the operational phase of the stadium.

❑ **Site Drainage**

▪ **Design and Construction**

Site inspections of Lang Park indicate that runoff from the Ron McAuliffe Stand roof area and the area to the east of the grandstand, flows to the 600 mm diameter pipe that crosses Lang Park.

Inspection of the playing surface and discussions with ground staff indicate that the terraces and both grandstand seating areas drain via pipework to the south west corner of the site. Stormwater is then discharged to the 2490 mm diameter pipe along Castlemaine Street. Terraces and grandstand seating areas currently drain to the stormwater network and therefore food/beverage wastes are washed into the stormwater system.

It is unclear whether runoff from the western grandstand directly enters the 2490 mm diameter pipe that runs along Castlemaine Street, or whether it enters the 600 mm diameter pipe that runs across Lang Park.

Detailed drainage layouts for the proposed stadium, supporting facilities, paths or roadways will be required prior to the approval of building plans for the proposed stadium. Detailed design must take into account the need for any alterations to the points of discharge.

Discharges for the existing and proposed stadium were estimated to identify the potential increase in flows off the site. The area bounded by Caxton, Chippendall, Castlemaine and Hale Streets was assessed in a hydrological model to determine peak discharges from the site. The catchment outlet was assumed to be located at the corner of Castlemaine and Hale Streets and the 50, 10 and 2 year ARI flood events were assessed. The predicted peak discharges at this location are presented in **Table 6.1.7**.

Table 6.1.7 Peak Discharges for the Existing and Proposed Stadium

ARI (Years)	Existing Flow (m^3/s)	Proposed Flow (m^3/s)	Difference (%)
50	6.4	6.7	+5
10	5.1	5.1	0
2	3.4	3.6	+6

Discharges presented in the above table should be considered indicative only as trunk drainage travel times or capacities have not been assessed as no drainage design has been performed. Detailed hydrologic investigations should be undertaken once a final drainage layout has been adopted.

6.1.5 Waste Management Strategy

Pollution prevention and waste minimisation are important components of a waste management strategy for the stadium proposal. Implicit in continual improvement is the acceptance that

development will meet all regulatory requirements as a minimum, while implementing systems to achieve 'beyond compliance' where economically feasible.

❑ Regulatory Requirements

There are three elements of the *Environmental Protection Act 1994* (EP Act), which relate specifically to waste management. These are:

a) EP Act, Schedule 7 which lists substances considered to be Regulated Wastes;
b) Draft Environmental Protection (Waste Management) Policy (EPP (Waste); and
c) Environmental Protection (Waste Management) Regulation.

The Queensland Environmental Protection Agency is developing an Environmental Protection Policy for Waste and associated *Environmental Protection Regulation 1998*. The relevant draft documents have undergone a public consultation and internal review phase and these documents are being reviewed by the Environmental Protection Agency before finalisation. It is anticipated that the EPP (Waste) will be retained as will the key requirements of the original consultation documents. In particular, it is expected that requirements for waste management plans, cleaner production plans and regulated waste management will be retained.

▪ Environmental Protection Act

The *Environmental Protection Act 1994* defines waste as follows:

*"**Waste**" includes anything that is-*

(a) left over, or an unwanted byproduct, from an industrial, commercial, domestic or other activity, or
(b) surplus to the industrial, commercial, domestic or other activity generating the waste.

The *Environmental Protection Regulation 1998* is subordinate legislation to the *Environmental Protection Act 1994*. Schedule 7 of this regulation lists substances and materials regarded as regulated wastes. A regulated waste is defined in the *Environmental Protection Regulation 1998* (EPR) as "non-domestic waste mentioned in Schedule 7".

*"**Regulated waste**" means a waste which –*

(c) contains a significant quantity and concentration of a hazardous contaminant, or
(d) the hazardous contaminant exhibits hazardous characteristics because of its toxicity, carcinogenity, mutagenicity, teratogenicity, flammability, corrosivity, reactivity, ignitability or infectiousness, through its physical, chemical or biological characteristics, or

(e) the waste may cause environmental harm if improperly transported, treated, stored, disposed or otherwise managed.

The following substances are the regulated wastes likely to be generated during the operational phase of Lang Park stadium:

a) waste cooking oils - the collection and disposal of waste cooking oils will be the responsibility of stadium caterers. Contracts with caterers will include the preference for recycling of waste material including waste cooking oils.

b) organic solvents, acid and alkali solutions – Solvents, acid and/or alkali solutions may be used on-site in maintenance activities and will be collected and recycled or disposed of by methods acceptable to the (BCC) and the EPA.
c) contaminated soil - From time to time some small quantities of oil may be spilled. Contaminated soils will be remediated on-site or removed and disposed of off-site if required.
d) oil interceptor sludges - Sludges from the oil-water interceptors are to be collected and disposed off-site by acceptable methods. The recycling of waste oil is the preferred disposal method.

To comply with the Environmental Protectional Regulation the stadium proposal will be required to 'take all reasonable and practicable steps to segregate regulated wastes from other wastes.' Management strategies are proposed for compliance with the Regulation. These must be reviewed periodically.

- **Draft Environmental Protection Policy (Waste Management)**

It is anticipated that the EPP (Waste) is unlikely to change significantly from the public consultation document. In particular, those sections related to waste management plans and cleaner production plans are likely to remain. Determination of the requirement for a Waste Management Plan is based on relevant criteria including:

a) the amount and characteristics of waste generated;
b) the risk to the receiving environment and surrounding environmental values from the treatment and disposal of wastes.

A Waste Management Plan must be developed for both the construction and operation phases of the proposal. The Waste Management Plan must have regard for the principles which set the preferred order of waste management practices. These principles include avoidance, minimisation, reuse, recycling, treatment and disposal.

The Waste Management Plan must include:

a) the characterisation and quantification of wastes produced;
b) waste collection measures;
c) waste transportation and disposal measures;
d) the requirements for construction and operation contractors to adopt best practice waste minimisation procedures.

References

CRC for Catchment Hydrology " Removal of Suspended Solids and Associated Pollutants by A CDS Gross Pollutant Trap" Report 99/2 February 1999

CRC for Catchment Hydrology "Best Practice Environmental Management Guidelines for Urban Stormwater" Report 97/7 October 1997

Douglas & Partners "Proposed Inner Northern Ring Rod – Stage III Caxton Street Bridge Corner Caxton and Hale Streets, Petrie Terrace" July 1989

Soil Survey Engineering "Geotechnical Investigation – Lang Park Redevelopment" October 1993

HOK + LOBB & PDT Architects "Lang Park stadium Redevelopment Study Masterplan Report" 3 April 2000

6.1.6 Transport Impacts

The impacts of construction related traffic can be categorised into the following issues:

- site depot location and access;
- the impacts of vehicles associated with the construction workforce on the local street system in terms of capacity, safety and amenity and parking infiltration;
- the impacts of the construction vehicles transporting materials to/from the site on the road network in terms of haul routes, network and intersection capacity, safety, amenity and the movement of over dimensional vehicles to/from the site;
- the specific needs of the various construction activities in terms of road closures and impacts on the existing rail network including coordination of the major traffic management activities with those of the other major projects in the CBD area; and
- the impacts of construction traffic on the life of pavements on the major access routes to/from the site.

Each of the above issues has been examined.

Generally, the impacts of construction related traffic will be one of the key areas that the contractor undertaking the works will be responsible for monitoring and managing. The impacts of construction traffic and construction activities will be dependant upon the final detailed design requirements, project scope and construction program.

It is recommended that a condition of tendering is that detailed traffic management plans must be provided by the successful contractor for all major aspects of the construction activities. These traffic management plans should be cognisant of the existing arrangements for major projects in the central Brisbane area and ensure that all activities are coordinated with this. All permits and construction activities that will impact on traffic movements will need to adhere to the current arrangements of the *Inner City Major Projects Construction Management Traffic Permits and Assessment Process.* This is a process developed by QT and BCC to ensure coordination of all road network alterations undertaken for major projects. Permit applications for traffic re-arrangement are made by the contractor to BCC. The applications are reviewed by a joint taskforce which advises on the interaction of the proposal works with other proposals. The final recommendation is referred from BCC to the Police, who issue the permit in consultation with Emergency Services.

The traffic management of the construction phase should be the responsibility of the contractor and should include the following;

- Provision of a General Traffic Management Plan (TMP), that provides details of the following
  - vehicle types being used
  - the estimated numbers of vehicles (quantities should be available at the time of construction to allow these estimates to be made) gaining access to the site on a daily basis and any mitigation measures required to minimise the adverse impacts of this additional traffic on the road network.
  - routes to be used by construction vehicles including over dimensional and those carting hazardous goods and the proposed times these vehicles will be moved.

- management of on-site and staff parking arrangements to ensure vehicle infiltration into the local street system is addressed and avoided.
- identification of any special arrangements that may occur such as the likely timing for road closures to allow construction activities and impacts on the rail system including need for "isolations".

- Identification and provision for detailed TMP's for any full or partial road closures throughout the construction process. These would need to be developed in conjunction with the major transport agencies, police and other necessary bodies such as emergency services.

❑ Site Depot Location and Access

As part of the development it is proposed to provide a site depot for the construction stage within the site itself. This may need to be relocated internally for the various stages of the project, however, this will be located within the bounds of the site and will have specific access and control arrangements identified in the overall TMP. The general TMP will be kept updated to account for any changes in the location of the site depot.

❑ Construction Workforce – Traffic Impacts and Mitigation

As discussed in Section 2.4, it is estimated that the construction stage of the development will extend over a two (2) year period. While detailed workforce numbers are not available for this assessment it is estimated that the maximum number of workers on site would be in the order or 450 people. This represents a reasonably high number of workers requiring transport to their place of work, which could have implications for the local road network and amenity of neighbouring streets.

The potential impacts on the transport system of potentially 450 vehicles travelling to/from the site on a daily basis are as follows:

- Workers would be likely to travel to/from the site generally during or close to the commuter peak periods. Access would be gained to the local street system via Milton Road, Caxton Street or Heussler Terrace. This may lead to impacts on the operating efficiency of intersections along Milton Road (including Castlemaine Street and Cribb Street) and along Caxton Street (particularly at its intersection with Castlemaine Street which feeds off Heussler Terrace).
- Currently the Lang Park stadium is on the periphery of the Central Traffic Area. As such, to the west of the site parking restrictions do not apply other than those governed by local signage. This would potentially lead to an increase in vehicle infiltration and on street parking throughout the local area.

To minimise the potential impacts of the construction workforce traffic described above, a construction period parking management strategy will be required as part of the construction tendering and contracting process. The contractor will be required to provide up to 180 spaces for use by designated staff, delivery vehicles and permitted sub-contractors on site. The contractor will be required to provide the remaining parking requirements off site in a designated area of their choice. Provision will be required to transfer workers from this location to and from the Lang Park construction site, such as through the use of a shuttle bus.

❑ Construction Materials – Traffic Impacts and Mitigation

The construction traffic associated with the transport of material to and from the site will vary depending on the level of site activity and on the material quantities during the various construction stages. The majority of vehicles associated with the movement of construction materials will be heavy vehicles of fixed or articulated body type. The following matters are relevant to the assessment of the impacts of this traffic:

- Designated haulage routes for various vehicles types including over dimensional and hazardous goods transport.
- Material loading and unloading.
- Number of heavy vehicles to/from the site for the transport of materials.

Haulage Routes

The primary access to the site will be via Castlemaine Street. This street currently serves as a District Arterial road and provides access to several light industrial and commercial enterprises. It currently carries in excess of 8 000 vehicles per day with approximately 8% heavy vehicles adjacent to Milton Road. Castlemaine Street is also one of the major access roads for articulated vehicles accessing the adjacent Castlemaine Brewery site. With the exception of over size vehicles, the nature of vehicular traffic using Castlemaine Street during the construction stage will be within the existing environmental character of existing traffic. On this basis Castlemaine Street is considered acceptable for movements of heavy vehicle transport.

The higher order road network in the vicinity of the site consists of Milton Road which is an Arterial Road and carries in the order of 45 000 vehicles per day. This road serves as one of the major access roads linking the western suburbs with the Brisbane CBD and provides a direct access link to Hale Street and subsequently the Inner City Bypass (when complete). It is anticipated that this road will become the primary heavy vehicle access route for the site during the construction phase. The existing traffic includes 6% heavy vehicles. It is anticipated that the movement of over-dimensional/piloted vehicles would gain access to the site via Milton Road.

To mitigate against the impacts of construction vehicles on the surrounding areas it is proposed that Milton Road and Castlemaine Street form the primary access roads to the site during the construction activities. It is recommended that the construction vehicle movements be restricted to these roads and the other arterial roads in the vicinity, namely Hale Street, Coronation Drive/Riverside Expressway. Currently, Milton Road is designated as a "dangerous goods route" and it is noted that these routes typically serve as routes for over-dimensional vehicles.

It is expected that the construction stage will include some movement of piloted over-dimensional vehicles. Under these circumstances the standard approval process will need to be followed and any vehicle movement of this nature is likely to occur at night or early morning to minimise impacts on the road network.

Given the existing role the above major roads serve in the surrounding road network, the presence of construction related traffic is not likely to impact on these roads in terms of vehicle types using them.

It is recommended, however, that construction traffic be banned from using Heussler Terrace and other local road links to preserve the amenity of the surrounding residential area. It is also recommended that a restriction on construction traffic using Caxton Street be applied. These restrictions may form part of the contractual arrangements with the contractor undertaking the works, and should be included in the TMP.

Construction Material Unloading

The unloading of material at or in the vicinity of the site has the potential to impact upon the amenity of the area, other vehicular traffic and on vehicle and pedestrian safety. Unloading of construction vehicles related with the site could include the use of permanent or mobile cranes associated with other construction activities, fork lifts or other plant to unload vehicles. This would involve an element of manoeuvring around the vehicle that could impede other vehicular traffic.

As described in Section 2 of this report the majority of the construction activity will occur on the site. The on-site fabrication activities and other general construction activities are expected to take place on the arena. It is also expected that unloading of construction vehicles will occur close to these activities. This will ensure that the loading and unloading of vehicles will have minimal impacts on the surrounding road network. There will be occasions that the unloading of construction vehicles will occur on Castlemaine Street. This will need to be restricted, as far as possible, to outside business hours or commuter road peak to minimise impacts on the road network. This may also involve partial or full closure on occasions, which will be subject to the approval process mentioned above and would be subject to coordination with closures related to other major projects to minimise the impacts on other road users.

Construction Vehicle Numbers

At this stage of the development planning process it is not possible to provide accurate estimates of the number of construction vehicles to/from the site on a daily basis. It is anticipated that daily movements of construction vehicles to/from the site would occur at a reasonably uniform rate.

The level of traffic movements of construction vehicles will be dependant upon the following:

- Timing of construction activities
- Quantities of construction materials
- Level of coincidence of major construction activities
- Level of on-site versus remote fabrication

Some estimates of the quantum of vehicle movements are provided below for two of the more vehicle activity intense stages of the construction process:

- Demolition/Excavation. During the busiest times of this stage where materials are being transported into and out of the site it is anticipated that in the order of one vehicle would enter and leave the site every 10 minutes removing building material or spoil. This would be along with other ancillary heavy vehicle movements transporting material to the site. This would result in heavy vehicle movements in the order of *20 vehicle movements per hour.*
- Construction. The delivery of building materials to/from the site would occur in vehicles ranging from utility trucks to over-dimensional piloted vehicles. This would occur at reasonably uniform rates and would not result in significant "bursts" of activity. The anticipated peak vehicle number would occur typically during major concrete pours. This could result in up to *30 vehicle movements per hour* throughout the day.

While the numbers of construction vehicles are likely to be reasonably high, it is considered that the impacts of these on the operation of the road network would be relatively minor. The primary access roads to the site are arterial in nature and are intended to carry large traffic volumes. Movements during the road peak periods would be insignificant in terms of the background traffic movements and there is expected to be enough spare capacity during non road peak periods to accommodate the expected construction traffic.

The majority of construction vehicle access is expected to be via the intersection of Milton Road and Castlemaine Street and may travel through Milton Road/Cribb Street. Both of these intersections are currently approaching the practical capacity and during commuter peak periods the congestion along the length of Milton Road can lead to significant queuing and delays. It should be noted that this is not unexpected for peak period operations. The magnitude of the expected vehicle movements, discussed above, would not be expected to have significant detrimental impacts on the current level of operation. This should be examined in more detail as part of the general construction stage TMP when detailed estimates of material quantities and vehicle movements become available. Traffic modelling of these intersections should be undertaken to identify mitigation strategies such as possible delivery time restrictions.

❑ **Construction Activity – Traffic Impacts and Mitigation**

Throughout the life of the construction stage of the project it is likely that various construction activities may lead to impacts on the surrounding transport network. This could include the partial or full closure of road links, "isolations" of the rail network and potential traffic diversions. Some of the construction activities and the potential for impact on the transport network that these may have include:

- **Demolition/Excavation**

During this stage the demolition of the existing eastern stand may impact on Hale Street traffic movements. While it is expected that the majority of demolition and removal of structural elements could be undertaken from within the arena, there may be a need for the temporary location of mobile cranes on Hale Street to facilitate removal of elements attached to the rear of this stand. This would result in the need for partial closure of Hale Street.

- **Pedestrian Plaza across Milton Road**

The proposal includes the construction of grade separated crossing of Milton Road adjacent to Castlemaine Street. It is anticipated that the majority of construction of the deck support structure could be accommodated under normal traffic flow conditions, however, there may be some temporary lane closures or temporary diversions.

The construction of this pedestrian link will also involve the lifting of precast deck units for the overpass sub-structure. This will impact on traffic flows along Milton Road and temporary closure of all or part of Milton Road may be required. The methodology for construction will govern the need for closure of Milton Road and should therefore be addressed in a detailed TMP by the contractor when the details of construction methods are finalised.

- **Pedestrian Concourse and Pedestrian Footway over Hale Street**

The construction of this structure will involve similar issues to the pedestrian crossing of Milton Road discussed above. Throughout the construction of this pedestrian concourse, partial closure of Hale Street may be required. The construction of the pedestrian walkway and necessary widening of the Caxton Street overpass may also have impacts on Caxton Street requiring partial closure. Similar detailed TMP's will be required for these works and their approval.

- **Works over Queensland Rail operations**

Several infrastructure measures associated with the proposal require construction work to be carried out in areas where Queensland Rail operations occur. These include pedestrian access

facilities and platform improvements at Milton Station, the Light Rail alignment west of Upper Roma Street, the bus priority measures/intersection improvements at the Milton Road/Upper Roma Terrace/Petrie Terrace intersection and the pedestrian infrastructure links to Roma Street.

Advice from Queensland Rail has indicated that the construction of any facility above existing operational rail system must comply with strict safety procedures. This would require suitable solid work barriers and should work be required without solid barriers this can only be undertaken during "isolations". Construction of the pedestrian and light rail structures would require pre-cast structural elements to be lifted into place above the rail system and may require "isolations", which are only possible during the hours of 12:30am and 5:00am, to facilitate this work.

- **Pedestrian Links across Roma Street and Countess Street**

The construction of these grade separated facilities will result in similar impacts on Roma and Countess Street as for Hale and Milton Roads discussed above. Both of these construction elements are likely to require at least partial road closures for the positioning of overhead deck units.

As described above the impacts of the specific construction activities relate to the potential need for closure or partial closure of key road links and "isolation" of the rail system. With several major projects being undertaken in central Brisbane, Queensland Transport and BCC have established "Taskforce 3" as part of the *Inner City Major Projects Construction Management Traffic Permits and Assessment Process* to provide advice on the impacts of the combination of road closures. Throughout the construction process the closure or part closure of any road network elements should adhere to the existing procedure being applied to other major projects.

For each of the road network closures required, it is recommended that the contractor submit a detailed TMP that addresses the details of the proposed closure, time period proposed, impact on traffic flow and temporary mitigation measures such as diversion and signage etc. Should full closure of major network links such as Milton Road and Hale Street be required this should be restricted to periods of limited traffic movements and a suitable level of public consultation/notification be provided.

Queensland Rail have indicated that "isolations" of the rail system are restricted to between 12:30am and 5:00am. Overhead works in the vicinity of the rail system should therefore be restricted to these times or as otherwise agreed with Queensland Rail.

- **Construction Traffic - Pavement Impacts and Mitigation**

The construction traffic associated with the development will almost exclusively consist of commercial vehicles. With the magnitude of these over the proposed two year construction period, there may be impacts on the integrity and life of road pavements in the vicinity. The movement of construction vehicles may also have an impact on the existing kerb and channel and footpaths in the vicinity of the Stadium along Castlemaine Street.

Milton Road is an arterial road in Brisbane road network and as such is designed to carry significant traffic volumes including heavy vehicles. It is considered reasonable that the construction traffic associated with the Lang Park development be accommodated by this road without any adverse impacts on the pavement integrity.

6.1.7 Social Impacts

❑ **Changes to Population**

The population in the study area has increased as the area becomes gentrified, and residential areas are rezoned for higher density living. This population increase within the study area will continue to reflect the city's growth and to be limited to infill development, and the development of higher density housing options.

There is not expected to be a large incoming workforce associated with the proposed stadium. A total of about 15 permanent staff will be employed during the operational phase of the proposal, with up to 400 casual staff employed during an event. It is assumed that the construction workforce and casual operations staff would commute from their existing homes around the Brisbane area.

The population of the study area is already highly mobile, with only 28.6% of residents living at the same address for both the 1991 and 1996 Censuses. The near neighbour survey results (**Technical Appendices**) support these statistical data. For example, just under half of the respondents had lived in the area for 5 years or more. This high rate of mobility is expected to continue. As the proposed stadium is not expected to attract new people to the area, the demographic mix is expected to remain the same or change under the influence of regional and metropolitan factors.

A high number of near neighbours (**Technical Appendices**) have lived in the area for over twenty years. This group of residents has lived in the area for a long time and has formed a significant attachment to it. They are expected to continue to live in the area irrespective of whether the proposed stadium at Lang Park proceeds or otherwise).

Long-term residents are slowly being replaced by upwardly mobile professionals who are moving into the area and renovating old housing stock. This process is expected to continue as the area increases in value and attractiveness and will not be affected by the proposed stadium development.

The population mix and demographic trends for the study area are likely to remain unchanged if the Lang Stadium proposal proceeds.

❑ **Impacts of temporary workers**

If the proposed stadium proceeds, the construction workforce (see Project Description Chapter One SKM) will be in the area for at least two years. While the workers would commute daily from the suburbs surrounding Brisbane during the construction phase, the presence of between 300 and 450 people daily in the area will be significant in terms of parking and in terms of greater numbers of people using existing services and facilities.

Local food outlets and other commercial services may expect increased turnover as a result of the daily requirements of the construction workforce. It is possible that the increased number of workers in the area may cause congestion at commercial services at peak times. This is not expected to cause significant disruption, however, as many of the local food outlets already have the capacity to cater for large numbers of people.

Some of the other local businesses, have, expressed concern through the consultation process about the effects on parking in the area of between 300 and 450 additional people on a daily basis

(**Technical Appendices**). In response to these concerns, the stadium proposal includes arrangements for transporting construction workforces to the site by shuttle bus from commercial car parks elsewhere. In addition 180 carparks would be provided on site for tradespeople and other necessary on site parking.

There is a possibility that all construction workers will not use the shuttle bus arrangements.

Any use of the existing street parking areas by the construction workforce should be carefully managed by the Brisbane City Council, assisted by the Contractor, to ensure the local businesses and residents are not disrupted, especially for lengthy periods of time.

The need for public transport to be improved in terms of frequency and routes has been highlighted in the Ithaca District Local Area Plan Draft Issues Paper (2000). The potential for conflict between the public transport needs of the local community and those of the construction work force will therefore be alleviated by the use of shuttle busses and on site parking.

As the construction workforce will commute from their own homes, there is little opportunity for the local community and the construction workforce to mix.

The shuttle bus system will ensure that a majority of the construction workforce will return directly to their own vehicles after work. The opportunity for them to visit the local nightspots or public bars will be greatly reduced as a consequence.

❑ **Impacts on Residential & Business Amenity**

The construction phase could to produce nuisance effects such as noise, vibration and reduced air quality for those residents immediately opposite the site along Castlemaine Street, in the triangle between Heussler Terrace and Given Terrace and in the residential areas below Petrie Terrace. The light industrial area may also experience similar nuisance effects.

Residents of the area below Petrie Terrace may experience noise and vibration. There are some residents in this area with small children who have concerns about the length of the construction phase and the prolonged effects of nuisance effects on their family well being.

Any increase in local traffic surrounding stadium as a result of the construction workforce, combined with the daily movements of heavy vehicles, could affect the movement of local residents in and out of their suburbs. For example, the effect of delays due to traffic congestion on busy morning and afternoon routines or on travel to and from weekend sporting or entertainment activities is especially disruptive to modern busy lives. If these effects are to be experienced over a prolonged period of time, then people's satisfaction with their suburb and lifestyle may suffer.

In response to these concerns construction traffic activity will be channelled towards the southern end of the site through Milton Road and Chippendall Street with entry via Castlemaine Street. This relieves Caxton Street of most of the construction workforce traffic, and directs construction traffic away from most local residences. There are some residences near Castlemaine Street, however, that may be affected by construction traffic movements.

Road closures and part closures will have similar effects. It is possible that local streets will carry the burden of increased traffic as major roads such as Milton Road are partially closed. If it is required Milton Road will be closed partially and for short periods in the early hours of the morning.

There is likely to be noise impacts associated with demolition, such as blasting and the use of jackhammers. In addition there are expected to be effects from vibrations caused by pile drivers.

The nearest neighbours to the Lang Park Site have had previous adverse experiences with construction work at the site and during the recent construction of the western grandstand in particular. Residents' dissatisfaction with the 24 hour operation associated with the construction of the Western Stand was recorded in the near neighbour surveys. Several residents (**Technical Appendices**) rejected the possibility of 24-hour construction.

In addition, there are a number of other constructions scheduled to go ahead in the next two years. These include the Inner City Bypass, the construction of Roma Street Parklands and the Inner Northern Busway. The cumulative effects of a number of construction works occurring at similar times is likely to cause concern and frustration for some local residents.

The nearest neighbour surveys (**Technical Appendices**) also show that there are a number of shift workers in the area close to the stadium. These local residents are concerned about the effects on their sleeping patterns of construction during the day

The construction workforce hours of 6am to 6 pm six days a week is likely to result in stress and nuisance effects such as noise, vibrations, traffic congestion and air pollution for some near neighbours.

In response to these concerns it is recommended that construction hours be limited to the hours between 7am and 4pm, six days a week. It is recommended that after hours construction activity be kept to a minimum and that near neighbours are given prior warning of necessary after hours construction activity.

While the construction program is likely to result in some stress and nuisance effects for some near neighbours, the proposed working hours will offer periods of respite. Shift workers are likely to experience frustration due to construction effects.

It is recommended that if the proposal proceeds, a Stadium Management Community Advisory Committee be established to monitor the effects of construction and that a procedure for near neighbour liaison with the construction contractors and sub-contractors be developed as part of tender process for the construction.

❑ Activity by interest group

Activities of the interest groups using the areas around the Lang Park stadium will be affected to varying degrees. The use of extensive social impact and public consultation during the developmental stages of the proposal has resulted in many of the activity needs of these interest groups being accommodated in the proposed stadium design.

- **Ozsports & PCYC**

For example, the proposal includes facilities for the Ozsports and Police and Citizens Youth Club to remain close to their current locations and retain their existing functions.

- **Community Recreation**

The skate park and Ithaca Pool are on the opposite side of Caxton Street and are not expected to be affected by the proposed redevelopment.

- **Christ Church**

With respect to Christ Church, the passing crowds attending events and any noise spills from the Stadium may disturb Sunday services and song, and occasional weddings and funerals. At present the Church plans its activities around events at Lang Park. It is possible that during the peak football usage months of April to June, event free Sundays will become difficult to schedule.

Congregation members are most concerned about the effects the proposed stadium may have on their cohesion and ability to retain a presence at the site. Members of the congregation have attended most of the community consultation clinics. It is likely that the congregation of Christ Church on Chippendall Street will be significantly affected by the proposed redevelopment of Lang Park stadium.

- **La Boite Theatre**

The La Boite Theatre is also likely to be significantly affected by the proposed stadium at Lang Park. The Theatre reports an 80% downturn in attendance at events that coincide with major events at Lang Park. Currently the effects are experienced three to four times a year. The proposed event schedule is expected to increase this to more than 20 times a year. The proposed parking controls associated with events would prevent La Boite Theatre parking in the side streets during events. Even minor events at the proposed stadium would also affect the ability of theatre patrons to park in the area.

- **People from non-English Speaking Backgrounds**

The access of non-English speaking people to the stadium is not expected to change as a result of the proposed redevelopment.

- **Sporting Groups**

The Petrie Terrace State Primary School uses Lang Park once a year for their athletics day in August. The Primary and Secondary Schools Leagues Finals for the Metropolitan Primary Schools Rugby League matches are also held at Lang Park stadium. It is probable that these arrangements will not continue. The effects of this are discussed in more detail later.

- **Local Businesses**

The activity patterns of the local businesses with access to off-street parking are not expected to be substantially affected by the proposed stadium. There may be increased activity at night on Caxton Street and Petrie Terrace, but these venues are equipped to accommodate this (**Technical Appendices**). For example, some night spots already have plans for expansion and at least one new venue is due to open in the near future on Given Terrace.

Some restaurants and cafes along Given Terrace are concerned that their activity patterns may be affected by the proposed parking restrictions (**Technical Appendices**). Some of the major events to be held at Lang Park would coincide with busy Friday and Saturday night trade for the food outlets. Some restaurants fear that the proposed parking restrictions for the stadium could deter customers from visiting Given Terrace on match nights. The current experience is that Rugby League football crowds use the bars and nightspots, but not the restaurants and cafes. The increased number of people in the area as a result of Rugby League football events (say 15 –18 nights per year) is not seen as beneficial to these businesses (**Technical Appendices**).

6.1.8 Cultural Heritage Impacts

The construction of the proposed stadium could lead to:

- amenity, structural and property impacts on the Christ Church and its environ; and
- property and amenity impacts on the Baroona Special School.

Construction of the proposed stadium is not expected to have any impacts on the cultural heritage values of the former Police Barracks site, owing to its present use as a car park.

- **Christ Church & Environs**

The possible impacts on the cultural heritage value of Christ Church and its environs could arise from construction impacts such as excessive vibration causing structural damage to the building, and the spill of construction materials across the boundary onto the church and cemetery land. Other impacts could include the damage to the existing vegetation which, although not significant in itself, does provide a screen to the existing Lang Park stadium. These impacts would reduce the value of the setting and possibly the structural integrity of the building. The structural integrity of the building should be investigated prior to the commencement of construction.

Another construction impact requiring particular care is the potential discovery of human remains either within the cemetery site or nearby. In such instances, the appropriate authorities should be called immediately.

Construction impacts such as constrained access for parishioners during work hours, noise, dust and extended working hours also could diminish the amenity of the church for parishioners. This is more of a social impact than one pertaining to cultural heritage.

- **Baroona Special School**

The re-orientation of two classrooms in the Baroona Special School potentially could affect the cultural heritage value of the place, particularly if the architectural adaptations which make the school suitable for people with special needs, are damaged or not restored.

Also, the construction of the pedestrian walkway along Milton Road will entail some encroachment onto the school site. There could be adverse impacts on the existing vegetation if adequate protection of their root systems is not provided. The proposal is to create a broad walkway which surrounds and incorporates these trees in order to protect them.

6.1.9 Flora and Fauna Impacts

The development of the Lang Park stadium will impact on flora and fauna values through the removal of all vegetation from:

- within the existing stadium;
- around the existing Ozsports and PCYC development to the north of the stadium; and
- along the western side of Hale Street.

As described in **Section 5.9** vegetation comprises several mature trees of significant size and many sapling size trees. Birds and arboreal mammals, in particular, will be affected with the loss of this vegetation. There are other nesting and roosting sites available in close proximity to the

site. Fauna will need to relocate or make use of other trees and vegetation as a result of loss of vegetation.

❑ Impacts on Flora

All vegetation within the existing stadium and on the Ozsports and PCYC site will be removed to accommodate the proposed stadium. Street trees along the western side of Hale Street between Caxton Street and Chippendall Street will also be removed.

Upgrade of pedestrian links and roads in the vicinity of the site may lead to loss of vegetation growing in proximity to paths and roads.

At the Baroona Special School, trees on the Hale Street and Milton Road boundaries may be impacted through widening of footpaths. Footpath widening will need to be carefully designed to avoid impacting on frangipanis and fig trees. This vegetation is one of reasons for listing the school on the Queensland Heritage Register. A Site Landscape Plan should be prepared and agreed prior to construction.

The removal of vegetation due to the proposed development will effect the local amenity. In particular, the removal of the two large fig trees at the northern end of the western stand will result in a loss of streetscape and amenity in Castlemaine Street. These two trees have a large canopy that are approximately 40 metres in diameter and are visible from local streets near the stadium. They provide considerable shade and shelter to the north-western corner of the existing stadium and adjacent car park and help reduce the visual impact of the western stand.

Along Milton Road between Petrie Terrace and Hale Street, several established fig trees are growing adjacent to the footpath. Trees that are growing in the road reserve need to be accommodated in expanded footpaths. Otherwise, the loss of trees from this area will open views from the footpath to the rear of residences on Clifton Street. Tree loss also will substantially diminish the streetscape of this section of Milton Road, by reducing shade over the northern lanes of Milton Road and opening lines of site to buildings to properties in the vicinity of the corner of Petrie Terrace and Milton Road.

❑ Impact on Fauna

The impact on fauna of the proposed development will be the loss of nesting, nesting and roosting sites caused by removal of trees. While trees and vegetation will be lost from the site and along some pedestrian routes, there is remaining tree cover in adjoining parks, along roads, in private gardens and along the Brisbane River. Mobile species such as bird and arboreal mammals are expected to make use of trees in proximity to the site.

Less mobile species such as reptiles, smaller mammals and amphibians are unlikely to move to new areas. Some vegetation in the Christ Church property, graveyard and to the south of Chippendall Street will offer some value for habitat. However, the ability of these species to successfully relocate to new areas of habitat is likely to be limited.

None of the vegetation to be removed provides habitat for bird species covered by Japan Australia Migratory Bird Agreement or China Australia Migratory Bird Agreement. Consequently, those species listed in **Section 5.9** will not be affected by the proposed stadium.

❑ Mitigation Measures

To limit the impact of flora and fauna values arising from the proposed stadium, the following measures recognise the contribution of vegetation to the amenity of the Lang Park area. Recommended measures are:

(ii) Relocate the established F. benjamina to the public open space area between the proposed stadium and Caxton Street. Relocation of these trees will have the following benefits:

- retention of two large fig trees to provide shade and shelter in the new parkland area;
- provide a connection between vegetation in Neal Macrossan Park and the proposed stadium; and
- retain two large fig trees within the urban area of Brisbane.

(iii) Use local native species which are found within the Lang Park vicinity for landscaping in both parkland plantings and as street trees. Examples of species to use include:

- *Ficus obliqua* – white cedar
- *Macaranga tanarius* – macaranga
- *Melaleuca quinquenervia* – paper bark
- *Syzygium leuhmanni* – small leaved lilly-pilly

(iv) Install nesting boxes for birds and arboreal mammals in mature or advanced trees used in landscaping or in any trees retained in the vicinity of the site, such as the jacaranda in the gardens of Sports House.

(v) Included in the landscaping of public park land to the north of the proposed stadium to include shrubs and understorey species, in mulched garden beds, as well as large trees, to provide nesting sites for birds.

(vi) Where trees require pruning to accommodate the proposed stadium or pedestrian links, a qualified aboriculturalist should be engaged and AS 4373 used for pruning.

(vii) All excavation should occur outside the drip zone of any trees to be retained to avoid damage to tree trunks or roots close to the tree.

(viii) Trees which are to be relocated should be assessed by a qualified aboriculturalist for strength and overall health prior to a commitment being made for their relocations.

(ix) Garden beds and tree plantings are to be fenced with trees located beyond arm reach to avoid vandalism. Fences are to prevent entry to garden areas.

6.1.10 Public Safety & Risk

❑ Materials Handling and Storage

Materials handling, transport and storage will be in accordance with standard practices relevant statutory codes or licences. Special materials handling, transport and storage should be incorporated into relevant EMPs and Operational Plans including the construction and operational Traffic Management Plans.

❑ Emergency Services Access During Construction

This issue has been addressed in **Section 6.1.6**.

Finalisation of traffic planning for construction will be undertaken in consultation with emergency services, including Police, QFRA and QAS. A specific objective for the Construction Traffic Management Plan will be that emergency vehicle and private property/business access is maintained throughout the construction activities.

Access will be maintained for all emergency vehicles as a general condition of temporary road closures.

It is standard practice on all major project sites for QFRA to be included in all site work information sessions. They may be by way of faxed information being regularly sent to QFRA in order to identify changes to site access and associated infrastructure. It is imperative that QFRA have prior knowledge of site access arrangements considering that it is more probable that accidents requiring their services occur during construction than during operation of the stadium.

The construction of Lang Park stadium will also need to be co-ordinated with other major construction projects that are planned during the same period including:

(i) Inner City Bypass
(ii) Inner Northern Busway packages
(iii) Light Rail
(iv) S1 Sewer
(v) Hale Street and Castlemaine Street drainage upgrade
(vi) Roma Street Parklands
(vii) Milton Tennis Courts

The key areas which will require co-ordination are:

(i) Traffic Management Planning (particularly for emergency services)
(ii) Programme of Works
(iii) Community Consultation

Co-ordinated and integrated traffic sequencing studies will need to address the effects on the road users of construction works in parallel with other construction contracts being undertaken on affected roads. Staging of works will need to be planned so as to minimise the overall net effect on the road network. In this regard, minimisation of lane reduction and flows will be paramount in the obtaining this goal.

The BCC and QT maintain a Major Projects Construction Management Workgroup which includes monthly meeting arranged by the BCC. The Lang Park Construction contractor will need to attend and maintain a pro-active involvement in this Workgroup and integrate outcomes within their construction TMP in consultation with Police and emergency services.

❑ **Preventing Damage to Surrounding Facilities and Properties**

▪ **Emergency Action Plan**

Specific Terms of Reference for the Operational Plans for Construction and Traffic Management will include the need for consultation with Emergency Services and specifically the QFRA.

Contingency planning for emergency access during construction is considered appropriate for major site works. Emergency service planning should be incorporated into the detailed fire engineering modelling required for detailed building approval in accordance with the Australian Building Code and performance requirements agreed with relevant emergency service authorities.

As part of best practice it is considered that a construction Emergency Action Plan needs to be developed for the proposed stadium which address all relevant construction hazards (of natural or human origin), including:

(i) Fire
(ii) Flood
(iii) Structural damage/collapse
(iv) Dangerous Goods Accident/Chemical spill in Hale Street – potential for volatile/toxic gases to move into stadium gully pits from surrounding relief drainage

The Department of Emergency Services recommends an all hazard risk management analysis based on Risk Management Standard AS/NZS 4360:1999. These plans should be developed by the Lang Park Trust in consultation with emergency services. Where necessary these plans should be linked to the Local Counter Disaster Plans being developed by the SES in consultation with Brisbane City Council's crisis management programme.

6.1.11 Emergency Services

❑ **Access for Emergency Vehicles**

Emergency service access during construction will aim to ensure that emergency services continue to have the current level of access as that provided prior to the commencement of any construction works.

In this regard, finalisation of traffic planning for construction must be undertaken in consultation with emergency services, including Police, QFRA and QAS. A specific objective for the Construction Traffic Management Plan must be that emergency vehicle and private property/business access is maintained throughout the construction activities.

Access must be maintained for all emergency vehicles as a general condition of temporary road closures. As a matter of administrative procedure rather than statutory requirement, it is understood that the Police consult with QFRA in the issuing of a statutory permit for the temporary closure of any road. Consultation is also understood to be undertaken with QFRA in the closure of any roads by Brisbane City Council or the Department of Main Roads.

Advice from QFRA is that it is standard practice on all major project sites for QFRA to be included in all site work information sessions. This may be by way of faxed information being regularly sent to QFRA in order to identify changes to site access and associated infrastructure. It is imperative that QFRA have prior knowledge of site access arrangements considering that it is more probable that accidents requiring their services occur during construction than during operation of the stadium.

Specific Terms of Reference for the Operational Plans for Construction and Traffic Management will include the need for consultation with Emergency Services and specifically the QFRA.

- **Contingency Planning for Emergencies during Construction**

The potential for emergency service requirements due to high risks events such as fire, chemical spill, explosion or structural collapse is considered by QFRA to be higher during construction than operational phases of most major projects such as the proposed stadium. Emergency services have not advised that there is any apparent risk of catastrophic events from the construction of the proposed stadium however detailed proposals have not yet been reviewed.

Contingency planning for emergency access during construction is considered appropriate for major site works. Emergency service planning should be incorporated into the detailed fire engineering modelling required for detailed building approval in accordance with the relevant emergency service authorities.

The Construction Operational Plan will include results of detailed fire engineering modelling based on identified construction risks and consequences identified in consultation with QFRA. The incorporation of emergency planning into the Construction Operational Plan will take into account the perceived need for helicopter facilities on the basis of identified risks and consequences.

6.1.12 Site Services

- **Water**

The design and construction will need to avoid clashes with existing water services. The 600 mm trunkmain in Hale Street will be a constraint on the location of footings for the plaza construction.

- **Sewerage**

The trunk sewers are below the intended levels of carpark and service bays. However footings and support structures will need to avoid impacting on these services as the sewers service considerable upstream areas.

- **Gas**

The construction of the works should have limited impact on the existing gas mains. The footings associated with overhead walkways and plazas along and over Hale Street and along Castlemaine Street between Milton Road and Chippendall Street, could avoid the gas mains or the mains will require local relocation.

If required as an energy source, the installation of gas reticulation pipes will be part of the Works.

6.2 Operational Impacts

6.2.1 Air Quality Impacts

The potential for air emissions to affect local air quality is currently limited to short discrete periods, and this will remain the case in the future. In the future case, however, some mitigation of current impacts can be expected because planned transport arrangements will encourage less reliance on private transport to the Stadium. Currently, traffic congestion in the local area and nearby suburbs at times of major events can be significant. It is expected that the level of traffic after redevelopment will be reduced. This change would reduce the impact of traffic emissions on and near roads carrying the major traffic volumes, and also in those streets where congestion is greatest.

The brewery will cause odour on some occasions depending on the particular process and wind speed and direction. However, we do not believe that this will be an issue for the Lang Park Stadium Proposal.

Smoke from fireworks will continue to be emitted from the site, but except in poorly dispersive conditions (very light winds and temperature inversion), these emissions are not generally considered to be a significant factor in air quality.

Overall, the relatively infrequent and shot-lived nature of major stadium events means that impacts will be limited as now. It is expected that air quality will be dominated for all but a small proportion of the time by the same sources that currently affect the area, i.e. predominantly traffic and some industrial and other sources.

6.2.2 Acoustic Impacts

❑ Overview of Stadium Proposal

The proposed development is to construct grandstands on the four sides of the pitch and to develop infrastructure relating to pedestrian movement and public transport. The grandstands will be roofed and will form a continuous barrier around the pitch. Although the pitch will be open, the roofed grandstands will provide an effective barrier to noise.

❑ Acoustic Features

The proposed stadium will be designed to increase the maximum number of spectators by approximately 25 %. An increase of this magnitude is likely to result in an increase in crowd noise of no more than 1 dB(A), an increase which is marginal and is unlikely to be perceived by the human ear.

The existing stadium has open ends and allows for a direct line of sight to many residential properties. It therefore offers little attenuation to crowd noise or to the public address system. However, the 40 metre high structure to enclose the pitch will ensure that no residential property has a direct line of sight to the noise sources. The structure would be expected to attenuate noise by at least 10 dB(A), which is considered to be a subjective halving of the loudness. The construction of roofs over the grandstands will further increase the attenuation benefit.

The public address system at any major sporting facility is an important feature, both to make announcements and to provide additional atmosphere, particularly prior to a game. A recent trend is also to provide some limited commentary during an event, such as when a goal is scored. The development allows for the design of a new public address system using state of the art design and equipment. In particular the selection and location of speakers will allow for high clarity at all points within the ground without the need for high volumes. This is achieved by locating and orientating speakers so that they direct sound into the desired area and not in other directions. The majority of speakers are likely to be located under the roof sections and facing within the grandstand. This will ensure that the roof sections provide maximum attenuation to the sound leaving the stadium.

❑ Crowd Noise

Crowd noise will vary from being inaudible for small matches to clearly audible when the stadium is at capacity and during periods of loud cheering. To assess the impact of maximum/capacity crowd noise modelling has been undertaken by Bassett Pty Ltd. The modelling is based on a number of measurements performed by Bassett at venues around Australia and included crowd sizes of 15 500 (Ballymore, Brisbane) to 78 000 (MCG, Melbourne).

This modelling assessed the noise levels of a near capacity crowd and took into account the attenuation provided by the stadium walls. It also included the effets from breakout from the open roof space and the vomitories in the upper concourse areas. The results indicate the loudest noise ("roar") from a crowd such as would occur during a attempt by a team for a significantly score. The levels must be carefully interpreted as the noise level during the majoity of each game would be significantly less. Indeed, during the majority of time the background noise from the ground would be up to 15 dB(A) less than the maximum levels. The modelling results are shown in **Figure 6.2.1.**

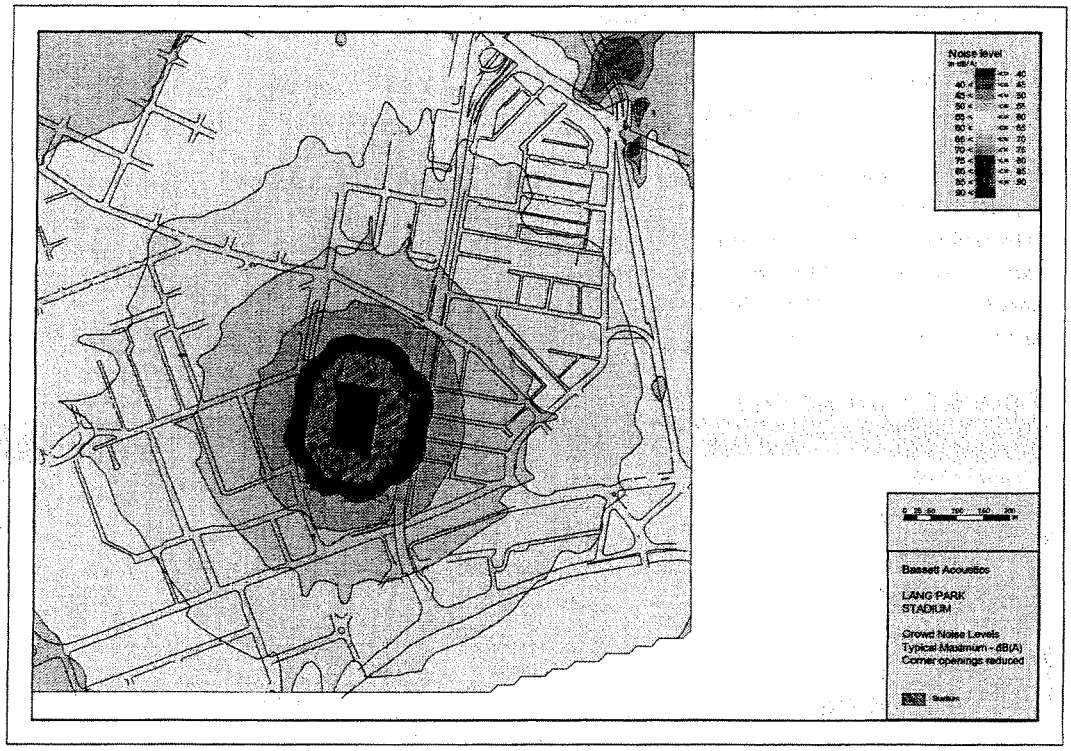

Figure 6.2.1 Maximum Crowd Noise from the Proposed Stadium (Bassett)

❑ Public Address System Noise

Noise from the public address system to be installed at the proposed stadium will vary according the particular needs at the time. For example, a match with only a small number of spectators, such as the Rugby 7's match, will not generate crowd noise as high as a State of Origin match. It is expected that the public address system would be operated at a lower volume. Conversely, during a State of Origin match with a capacity crowd, the noise levels inside the proposed stadium will be high and the public address system will need to be operated at a similar level to compete with that noise.

The existing noise from the Lang Park public address system was measured during the Rugby 7's matches and was found to be similar to the loudest crowd noise. Measurement done at the MCG in Melbourne also indicated that maximum crowd noise and the public address system operate at similar levels. This is to be expected as the public address system must compete with the crowd noise but should not be excessively loud and drown out that noise, which is an integral part of the game. The public address system may be expected to be at a similar internal level to the loudest crowd noise and the predicted maximum crowd noise shown in **Figure 6.2.1** is likely to also represent the maximum public address system noise.

However, the construction of a new stadium allows for an improvement in the design of the public address system. For example speakers will be located under the roof sections of the grandstands, facing the crowd resulting in lower noise in the centre of the pitch and lower noise levels outside the stadium. The noise levels shown in **Figure 6.2.1** for crowd noise may be 5 to 10 dB(A) higher than the peak public address system noise.

❑ Discussion of Stadium Crowd and Public Address System Noise

Crowd noise will vary according to the crowd size and the stage of each game. An estimate of the likely crowd noise can therefore be made from an assessment of the crowd size.

The crowd noise prediction shown in **Figure 6.2.1** assumes a capacity crowd or near capacity crowd. These would occur during the State of Origin, Rugby International and Rugby League International games between 3 and 4 times per year (**Table 6.2.1**). During these games it is likely that crowd and public address system noise levels of up to 75 dB(A) could occur at the closest residences along Hale Street and Castlemaine Street. Also residences at a radius of approximately 400 metres could receive noise levels up to 60 dB(A) during loud crowd noise.

Table 6.2.1 Crowd Size & Frequency of Major Events

Typical Event	Frequency / annum	Crowd Size	Timing
State of Origin	1 – 2	52 500	May – June
Rugby International	1	45 000	April – June
Rugby League International	1	45 000	June – Aug
NRL Club Matches	13	35 000	Feb – Sept
Super 12 Rugby	4 - 6	25 000	Feb – May
National Soccer	17	10 000	Oct – Mar
Major Event (eg religious)	1	35 000	anytime

A comparison of the predicted maximum crowd noise level to the measured background noise is contained in **Table 6.2.2**. This shows that the noise of a large crowd cheering will be audible at each of the sites at which background noise was monitored.

Table 6.2.2 Comparison of Maximum Crowd Noise to the Measured Background Noise

Site	Day dB(A) 0600 – 1800 L_{A90}	Evening 1800 – 2200 L_{A90}	Night 2200- 0600 L_{A90}	Predicted Maximum Crowd Noise levels dB(A)
Site 1 Petrie Terrace	57.6	57.2	50.0	67
Site 2 Plunket Street	46.3	45.6	40.7	58
Site 3 Hale Street	64.5	63.0	48.1	75
Site 4 Princess Street	43.2	43.4	36.3	58
Site 5 Isaac Street	49.2	50.0	44.1	65

To put these levels in perspective the noise from the Rugby 7 match held on Saturday 19th February 2000 is compared to the predicted maximum crowd noise (**Table 6.2.2**). **Table 6.2.3** also compares the existing noise levels to the estimated noise from a capacity crowd at the existing stadium. This estimation assumes that the crowd has increased eight times (from 5 000 to 40 000) and therefore that the level of noise would increase by 9 dB(A)[1]. However, this is a conservative estimate as it assumes that individuals within a the larger crowd would cheer at the same loudness as they would in a smaller crowd. Measurements at the MCG in Melbourne indicate that noise

[1] If two equal noises are added together the resulting noise level will be 3 dB higher. Therefore if the number of spectators doubles (from 5 000 to 10 000) the noise will increase by 3 dB(A). If it again double to 20 000 the noise will increase by another 3 dB(A). If doubles again to 40 000 the total increase will be 3 + 3 + 3 = 9 dB(A)

from large crowds increases more than would be predicted and this is likely to be due to the increased excitement that may arise in a large match and personal experience would support this.

Table 6.2.3 table shows that the peak noise predicted from a capacity crowd at the new stadium is expected to be similar to the noise from a small (5 000 to 10 000) crowd at a Rugby 7s match at Princess Street and Plunkett Street. These residences are not screened by the existing stadium. At Hale Street the noise from a small crowd is significantly louder than the predicted noise from a capacity crowd. The measurements at Isaac Street and Petrie Terrace do show that there is already some screening from noise but also show a reduction in overall noise when 40 000 spectators at the existing stadium are compared to a larger crowd (52 500) at the proposed stadium.

The proposed stadium is expected to result in noise from a capacity crowd being approximately equal to the current noise levels of a relatively small crowd at places that are currently not screened by the existing grandstands. It will also reduce the maximum noise levels from capacity crowds at all residences even though the maximum capacity is increased from 40 000 to 52 500.

Table 6.2.3 Comparisons Between Peak Short Term Noise Levels During a Rugby 7's Match (19 February 2000) at the Existing Stadium and the Predicted Noise Levels for a Capacity Crowd at the Proposed Stadium

Noise Source	Location	Existing Stadium Measured Noise Levels Rugby 7 Match L_{max} dB(A)	Predicted Noise Level Capacity Crowd dB(A)	Minimum Attenuation due to Proposed Stadium
Public Address	31 Isaac Street	62	65	6.0
Crowd Noise	31 Isaac Street	55		
Crowd Noise	31 Isaac Street	56.7		
Public Address	15 Plunkett Street	55	58	7.3
Public Address	15 Plunkett Street	55		
Crowd Noise	15 Plunkett Street	56.3		
PA & Crowd	105 Hale Street	78.4	75	15.3
Crowd Noise	105 Hale Street	65.2		
Crowd Noise	105 Hale Street	81.3		
Public Address	105 Hale Street	73.2		
Public Address	26 Princess Street	52.3	58	8.5
Crowd Noise	26 Princess Street	49.4		
Public Address	26 Princess Street	57.5		
Crowd Noise	26 Princess Street	55.4		
Public Address	8½ Petrie Terrace*	60.2	67	2.2
Public Address	8½ Petrie Terrace*	60		
Crowd Noise	8½ Petrie Terrace*	58.5		
Crowd Noise	8½ Petrie Terrace*	54.7		

The construction of the stadium will therefore significantly reduce the level of crowd noise. Public address systems would also be reduced by at least as much as crowd noise although the careful placement of speakers and the management of the public address system could achieve additional noise reductions.

❑ Noise Impacts Associated with Public Access to the Stadium

The proposed stadium is being developed with limited private parking facilities to ensure that the majority of patrons arrive and depart using public transport. Noise due to road traffic associated with the proposed stadium will not cause not nuisance to residents.

The majority of patrons will arrive and depart in either shuttle buses or by rail. Shuttle buses will generally travel along major roads at low speeds and will be compatible with exiting traffic noise levels. They will use Castlemaine Street to access the transport station to be located at the southern end of the site. This facility will be at the furthest location from residences, and will be semi-enclosed below the proposed pedestrian plaza to minimise any noise from this facility. The detailed design of the transport station takes into account the effect of vehicles entering and leaving the facility as well as the noise of vehicles and announcements.

Crowds entering and leaving the stadium will travel along Caxton Street and along pathways to be constructed adjacent to the existing railway line and Milton Road to Roma Street. Prior to a major event these patrons will generate some noise as they move towards the proposed stadium. This noise, which will occur during the day or early evening, may occur over several hours but is unlikely to be significantly high. However, after an event a large number of patrons will leave at the same time and this noise will be higher than during arrival, although it will occur for a significantly shorter length of time.

Noise is an integral part of a crowd of people. It is difficult to predict levels given the variation on the nature of crowds but it is reasonable to assume that at the edge of a congested pathway noise would be in the order of 50 to 65 dB(A) with occasions of higher noise where an exuberant person or group of people pass.

As the proposed stadium has few carparking spaces and as patrons will be actively discouraged from entering other streets, patrons will be confined to the major points pathways, towards their selected mode of public transport.

Patrons arriving or departing the proposed stadium will cause noise that will be above the background noise, particularly during the evening. However, the overall impact of a crowd of people is not just related to the level of noise. Instead it is generally a function of the behaviour of the crowd. Loss of privacy and unruly behaviour are factors that may influence nearby residences more than noise level.

Noise from patrons entering and leaving the Stadium will be audible, particularly at close residences. However, crowd behaviour will be managed as a single issue and not just in relation to the noise that it may cause. This will be achieved by monitoring crowds, particularly at the end of a match, to prevent unruly behaviour and to prevent patrons leaving the designated walkways and entering quiet residential areas.

❑ Other Noise from the Stadium

The proposed stadium will include a number of facilities that could generate noise. Principal amongst these are the cooling towers associated with the building services. These should be located and designed so that they minimise noise at all noise sensitive places.

The most appropriate location for this equipment would be on the south-western corner of the site, maximising the distance to any residences. Also acoustic treatments including maximising barrier shielding could be used to further minimise noise so that it did not intrude into the background noise in the surrounding residential area **Table 6.2.2** lists the background noise levels measured during the monitoring program and shows the quietest periods occur at night, when the traffic flows are light. Although most stadium activities would occur during the day or evening, cooling plant and other equipment may be operated at night. It is therefore appropriate that night time background noise levels are used to assess plant noise. The night time background noise at the

closest residential property measured (Hale Street) was 48.1dB(A). However, the background noise level at night in Isaac Street was 44.1 dB(A) and this level is likely to be representative of the lowest background night time noise close to the proposed stadium. Plant and equipment installed at the proposed stadium should be designed to ensure that it does not exceed 44 dB(A) at any residence.

Additional noise sources such as waste collection services and ground maintenance equipment also have the potential to cause noise. For example large waste collection vehicles use hydraulic lifters to raise large metal waste bins and drop waste into the body of the truck. Both the hydraulic noise and the noise of the waste falling into the vehicle can be loud, particularly at night. However, the service docks for waste collection and other loading and unloading activities are located internally, at the southern end of the site, such that noise from these operations will be inaudible at neighbouring residences.

Ground maintenance will be an on-going task that will involve the use of some mechanical equipment such as tractors. However, the height and construction of the grandstands around the pitch will attenuate noise to ensure that it is inaudible outside the grounds.

❑ Helicopter Noise

A feature of all major sporting events is television. For events such as a State of Origin Match, it is therefore likely that helicopters will be used to provide additional cameras and as a facility to transmit signals to the television station main facilities. This may require helicopters hovering over the proposed stadium for the duration of a match and this noise would be intrusive. Other issues such as loss of privacy and fear of crashing will also increase the degree of intrusion arising from helicopters.

❑ Concerts

The potential impacts of concerts was not evaluated given the Stadium Project Director's early statement that concerts would not be staged at the proposed stadium.

The stadium is being redeveloped to improve the access to sporting facilities. It is not intended to be a multi purpose facility for other events such as concerts. However, if at some time in the future there is an identified need for an outdoor concert, the number of these events would be unlikely to exceed one per year.

Noise from concerts can be loud depending on the type of music. The character of music can also make it audible over large distances. However a number of strategies can be implemented to minimise that noise. For example:

- limiting the duration and the finishing time of concerts;
- orienting the loud speakers away from noise sensitive places;
- using several speakers throughout a crowd (with appropriate time delays) to reduce the overall loudness.

Should any concerns be held at the proposed stadium appropriate measures will be implemented to minimise impacts in the surrounding residential.

❑ Conclusions & Recommendations

Despite the increase in the maximum number of spectators from 40 000 to 52 500, the construction of continuous grandstands around the pitch will reduce the maximum noise from crowds and public address systems a value in the order of 10 dB(A). This will result in a capacity match causing peak noise levels approximately equivalent to a small-scale match at the current stadium. Also careful design and management of the public address system could achieve additional reductions in noise.

Construction and demolition noise may on occasions be audible in neighbouring residential areas. However, the management of construction activities can minimise noise. For example, using quiet equipment wherever practical, restricting noisy activities to daytime hours and locating noisy equipment such as concrete pumps away from residential areas. The use of tower cranes is a potential source of noise and the location and selection of these will take noise into account.

The cooling towers may be operated at all times of day and night. These units, and all other fixed or mobile items of plant and equipment, must be designed to not exceed 44 dB(A) at any residence.

The use of helicopters should be avoided in favour of alternative means of television transmission. Should this not be possible, helicopters should be encouraged to hover at the highest possible altitude at the southern end of the stadium only.

The location and design of the transport station will be such that bus and patron noise is minimised in the direction of residences. Also a management strategy will be developed to ensure that shuttle buses follow specific routes and are operated in a manner that minimises noise.

Private motor vehicles will be discouraged from entering and parking in the areas around the proposed stadium. Also there will be no public access parking at the stadium. Therefore private vehicle noise will not be an issue with the controlled parking scheme area.

Patrons arriving and departing the Stadium will be directed along defined pedestrian corridors which avoid residential areas. This will minimise any disturbance from noise or other behavioural problems in the residential areas around the proposed stadium. The movement of patrons along the pedestrian corridors will also be monitored to ensure that behavioural problems are minimised and patrons will be encouraged to leave the area as quickly as possible after a match.

6.2.3 Lighting, Electrical & Telecommunication Services

The proposed stadium requires the retention of the existing substation in the western stand and retention or removal of the existing substation in the McAuliffe Stand. The development will require the construction of four new substations on site, located in positions that minimise the distance between plant and Low Voltage distribution switchboards. This would minimise energy losses and voltage drop in distribution circuits thus reducing the cost of the installation since cable sizes can be reduced. Ideally there should be a substation for each of the northern, southern, eastern and western stands that supplies the distribution network for the respective buildings.

❑ Electricity Supply

The proposal refers to four substations:

- Substation No. 1 – Located at the corner of the Western and Northern stands (north end of Castlemaine Street).
- Substation No. 2 – Located at the corner of the Eastern and Northern stands (north end of Hale Street).
- Substation No. 3 – Located at the corner of the Eastern and Southern stands (corner of Hale and Chippendall Streets).
- Substation No. 4 – Located at the corner of the Western and Southern stands (corner of Castlemaine and Chippendall Streets).
  – Refer to **Figure 6.2.2** – Proposed Electrical Services Location.

- **Existing Western Grandstand Substation**

This substation will be upgraded as per the proposal.

This Substation has one 1,500KVA 11/.415KV transformer and any spare capacity can be re-used as required. The other Energex Low Voltage consumers supplied from the substation must be disconnected.

There is room in the existing substation for the installation of another transformer. The existing transformer does not have the capacity to supply any extra loads for the proposed stadium. A 1,500 KVA transformer could be installed into the existing substation room, each transformer would supply half of the load requirements for the Western Stand Main Switchboard (Main Switch Board) by removing the bus tie in the existing Main Switch Board and providing separate consumer mains from each transformer.

Substation No. 1 will be located at ground level in the northern corner of the proposed stadium with the Western Stand as per the proposal. It would be preferable to locate this substation at a position centrally located to the areas it shall be supplying. If this substation is to supply the Northern stand only it would be better located centre stand at ground level to minimise the cable route length.

Substation No. 2 will be located at ground level in the corner of the Northern Stand with the Eastern Stand as per the proposal. If this substation is to supply the Eastern stand only it would be better located centre stand at ground level.

Substation No. 3 will be newly constructed and be located at ground level in the corner of the Southern Stand with the Eastern Stand as per the proposal. If this substation will supply the Eastern or the Northern Stand only it would be better located in the centre of the stand at ground level.

This substation is proposed to be the main HV distribution point for the dual open loop 11KV rings that supply the other substations.

Substation No. 4 will be located at ground level in the corner of the Southern Stand with the Western Stand as per the proposal. If this substation is to supply the Southern Stand only it would be better located centre stand at ground level.

- **Alternative Electricity Supply Scenario**

Alternatively, the site could be supplied by upgrading the existing substation in the western stand and constructing three new substations located centrally in the northern, eastern and southern stands. Each substation would supply only the grandstand in which it is located. This scenario

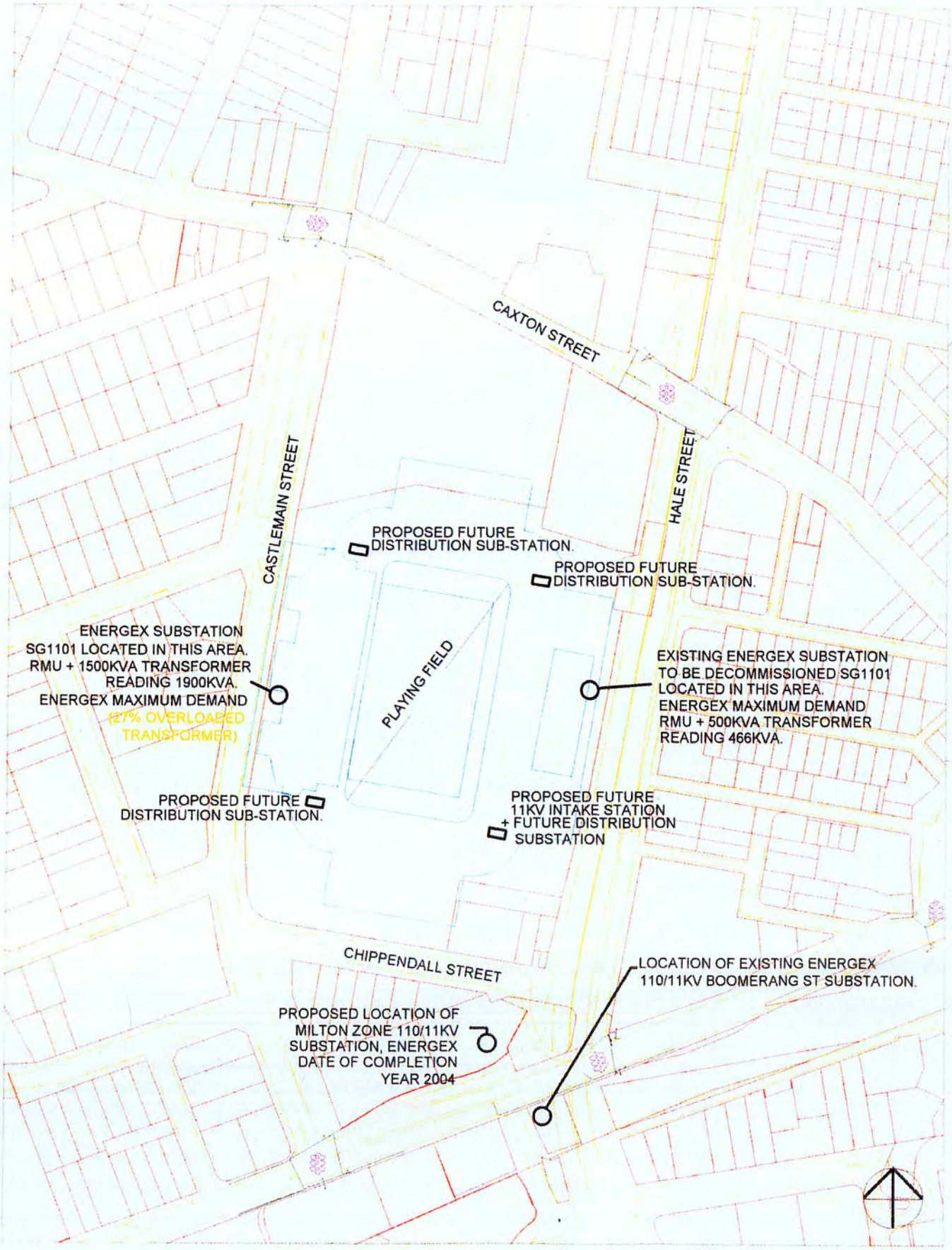

Figure 6.2.2
Proposed Electrical Services Location

would reduce the cost of the installation because one less substation needs to be constructed and the Low Voltage distribution network can be designed with smaller cables over a shorter distance. The installation would also be more efficient in terms of I^2R losses (heat losses due to the resistance of cable runs) since the length of cable is minimised.

- **Emergency Electricity Supply**

(i) The proposal includes the installation of two 1.5Mega Volt Ampers HV diesel standby power generators that automatically supply essential services upon the loss of power from the Energex grid. The generators must be capable of supplying power continuously for a minimum period of three hours. Essential services are divided into three groups of decreasing priority: Safety Services; Security and Communication Services; and Event Critical Services. Automatic load shedding will be controlled by the SCADA/PCMS system and can be manually overridden at the generator control panel.

Safety services shall be connected to the essential supply generators and will also be connected to battery back-up power in case of generator failure. Safety services include:

(i) emergency and escape lighting
(ii) fire alarm system
(iii) emergency telephones

Security and communication services shall be connected to the essential supply and have priority over event critical services, these include:

(i) pitch lighting;
(ii) security and control systems;
(iii) telephone system;
(iv) public address system;
(v) CCTV system;
(vi) one lift per group for Firemen and disabled use for evacuation;
(vii) percentage of maintained normal lighting internally and externally;
(viii) turnstile monitoring system; and
(ix) smoke ventilation system.

Event critical services will be connected to the essential supply enabling events to proceed during supply power failure. The existing 200KVA mobile generator connection panel located next to the western stand substation entry door can be retained for temporary diesel generator connection if the need arises. If the existing substation is decommissioned the existing generator panel will also be decommissioned.

- **Electrical Reticulation (HV Supply)**

The western grandstand sub-station is currently supplied from the Energex underground reticulation from the western side of Castlemaine Street. The underground crossing on Castlemaine Street has three spare conduits to supply a possible second transformer installed in this substation.

The HV reticulation for the proposed stadium will be provided by dual open loop 11KV rings to each of the four new substations. The main feeder will be at Substation No.3 and looped to the other substations.

Discussions with Energex indicate that the electricity supply for the Lang Park area is supplied from the Boomerang Street distribution substation, which is supplied from the Makerston Street zone substation. The existing network from Boomerang Street is heavily loaded and will have sufficient capacity to supply a proposed demand of 7Mega Volt Ampers for the proposed stadium.

Energex plan to build a new 110/11KV zone substation on land at the corner of Milton Road, Hale Street, and Chippendall Street by 2004. Owing to other circumstances, the location of this substation is yet to be finally agreed. Also, the completion date is beyond the required completion date of 2003 for hosting of Rugby World Cup. Energex have advised that there is a lead time of two and a half years for completion of a new zone substation on this site and therefore it may be necessary to begin planning the substation immediately to meet the expected Lang Park completion date in 2003.

❑ Impact On Communications Services

The proposed stadium will be connected directly to the existing Telstra trunk underground network in Caxton Street via a new fibre optic lead-in cable and the existing copper cabling from the Paddington Exchange. The cables will run down Castlemaine Street through existing underground conduits and enter the proposed stadium at a new main communications room to be constructed at ground level in the existing western stand.

There is also provision for 400 pairs of copper cable and a fibre optic lead-in cable to be connected to the secondary communications room located in the new eastern stand, fed from either the Roma Street or Spring Hill Exchanges to provide geographical diversity. There is an existing single conduit in Hale Street to accommodate these cables; no major road works are envisaged for this option.

Discussions with Telstra regarding the communications requirements for the redevelopment have indicated that there is enough capacity within the existing street network. At present no major impacts have been identified because existing conduits shall be utilised and there is sufficient capacity available at the local exchanges.

❑ Telecommunications Network

The new telecommunications network will have a single connection point providing a fully integrated communications system for voice, data, and video information. The communication network will be utilised by the following groups:

(i) administration;
(ii) media;
(iii) event and venue management;
(iv) spectators (public telephones, score board and cctv system);
(v) caterers;
(vi) officials and participants;
(vii) security staff; and
(viii) emergency services.

Separate telecommunications services will be provided in different locations for the broadcasting channels.

❑ Campus, Building and Floor Distribution Frames

The main communications room located at ground level in the existing western stand will contain the Campus Distribution Frame for the Lang Park site. A secondary communications room will be located at ground level in the centre of the eastern stand and can be connected to the Telstra network for redundancy provisions.

Building distribution frames and floor distribution frames will be positioned to reflect current standards in office cabling. Connection to each building distribution frame from the campus distributor shall be via single-mode and multi-mode fibre optic cables for high-speed voice (PABX) and data transmission. Standard voice and low speed data cabling shall be via unshielded twisted pair (UTP) cabling.

❑ PABX

The existing PABX system will be decommissioned. A new multi-tenanted PABX system will be installed in the redevelopment and the main equipment will be located near the campus distribution frame in the main communications room. A secondary PABX may be installed at a later date in the secondary communications room if required. This will provide flexibility for future expansion and service stability.

❑ Paging System

The existing two-way radio system will be replaced with a new high tech two-channel radio system for use of venue management and maintenance staff. It will be connected to the PABX system for telephone paging.

❑ Optus Mobile Network Antennae

The existing Optus mobile network antennae located at the moment on N – W light tower will be located on the new structure as directed by Optus.

❑ Playing/Field Area Floodlighting

There is no final concept design for this category of lighting. The conditions which the design must meet to satisfy statutory requirements are:

(i) CIE TC 5.12 Guide on the limitation of the effects of obtrusive light from outdoor lighting installations;
(ii) CIE TC 5.11 Practical Design Guidelines for the Lighting of Sports Events;
(iii) AS2560.2.3 – 1982 Guide to Sports Lighting – Lighting for football (all codes);
(iv) FIFA Guide to the Artificial Lighting of Football Pitches;
(v) Draft EBU recommendations for Sports Lighting; and
(vi) TV Coverage Plan for NRL Matches – Nine Network Outside Broadcast.

The floodlighting proposed for the playing field at Lang Park stadium must provide an efficient, effective and environmental friendly floodlighting system to suit three separate categories of the use:

(i) broadcasting events – 2,000 lux
(ii) competition events (non broadcasted) – 1,000 lux
(iii) practice/training session – 500 lux

The types of floodlights used are not conventional type floodlights and they should have a small luminous area visible to the observer/spectators. Each type of floodlight will have a precise optical reflector system designed to reduce unwanted spill/glare light so outside of the Lang Park stadium very little so no physical glare or spill light can occur to Castlemaine Street, Hale Street, Chippendall Street and Caxton Street. Refer to **Figure 6.2.3** – Proposed Lighting – Sky Dome Effect

- **Lighting Design Requirement**

There are three levels of illumination required, each of which are scheduled below. The illumination levels are based upon the initial 100 hour lamp output, the average throughout the life of the lamp is approximately 80% of the quoted values.

(a) Practice Level - Average Horizontal Illuminance

(i) Horizontal Average Illuminance shall be greater than 120 lux at ground level.
(ii) Uniformity E h min/E h max greater than 0.4 over any 100m^2 area.

(b) Competition Level for Spectators - Average Horizontal Illuminance

(iii) Horizontal Average Illuminance shall be greater than 1,000 lux at ground level.
(iv) Uniformity E h min/E h max greater than 0.66 over any 100m2 area as recommended by AS 2560.2.3 Table 1.

(c) Colour Television Night Broadcasts (CTV) - Average Horizontal Illuminance

(v) Horizontal Average Illuminance/Vertical Average Illuminance 0.5 to 2 ratio
(vi) E hmin/Horizontal Average Illuminance greater than 0.75
(vii) E hmin/E Hmax greater than 0.5
Average Vertical Illuminance to the Camera Axis with 60% Bias
(viii) Average Vertical Illuminance greater than 1,600 lux
(ix) E vmin/ Average Vertical Illuminance greater than 0.75
(x) E vmin/E vmax greater than 0.5

(d) Lamp Characteristics

(xi) Lamp Rating – 1.8 kW or 2.0 kW Metal Halide
(xii) Ra – greater than 85.
(xiii) Colour temperature – greater than 5000 °K.

- **Floodlight Design**

In order to eliminate as much spill light as possible, we propose to use luminaires which have a high quality optical control. There are four such fixtures presently available, they are –

(i) Phillips "Arena Vision" MVF403
(ii) Sill/Versalux
(iii) Siemens
(iv) Thorn – PRT 2000-04-17

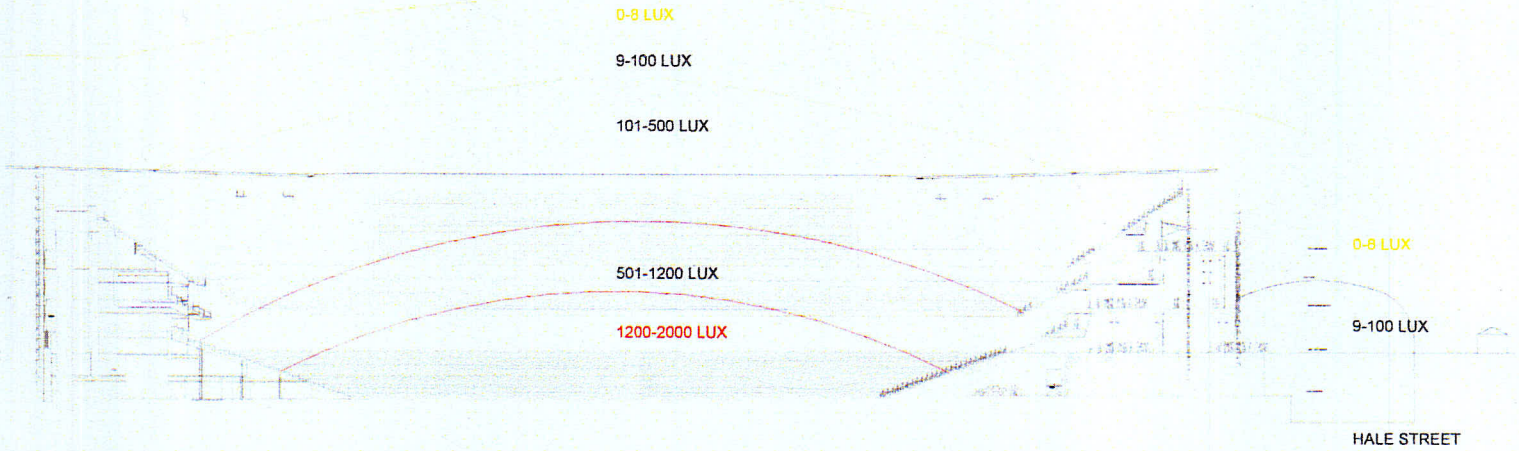

Figure 6.2.3
Proposed Lighting - Sky Glow Dome Effect

- **Spill Light**

Preliminary design calculations using any of the above luminaires result in horizontal illumination levels at practically nil or at least less than the street lights in Hale Street, Castlemaine Street, Hall Street, Judge Street, Chalk Street and Chippendall Street. Spill light to the road would be equivalent to the Australian Standard for Category A street lighting at a major intersection. The major intersection at Milton Road and Caxton / Hale St will not be affected. Refer to **Figure 6.2.4** – Proposed Spill Lighting Levels.

- **Veiling Illuminance**

The calculation of veiling luminance is necessary in order to obtain accurate information necessary for determination of glare ratings in accordance with CIE TC 5-04. A glare rating of 50 is said to indicate that glare is just perceptible. The greater the value above 50, the worse the glare.

The proposed stadium will be a closed bowl, therefore veiling illuminance to motorists on neighbouring streets. Perceived glare to motorists may vary due to the street level, observer position, background luminance, on-coming headlights and road reflection. It is not possible to quantify and gauge to a high degree of accuracy all drivers perception of glare. However, due to the type of floodlights proposed and the closed bowl stadium the obtrusive lighting is minimal.

- **Conclusion**

It is essential that when the tender documentation is prepared, the field floodlighting should specify precise levels of spill light and veiling illuminances to comply with this proposal. In doing so, the proposed stadium would be an outstanding installation without any adverse environmental trespass, light spillage and annoyance to the surrounding neighbourhood.

- **Lighting Outside Stadium**

The following areas require a careful lighting design to avoid any light spillage or glare to the residential neighbourhood:

(i) open north, south and east side concourse;
(ii) forecourt and undercroft areas;
(iii) illuminated sign facades; and
(iv) car park.

The luminaire types proposed in the concept design are:

(i) cut off (glare and light spillage controlled) downlights;
(ii) uplighters; and
(iii) floodlights.

Requirements for the installation of uplighters proposed for the project include:

(i) louvre or other means of glare control; and
(ii) be installed out of public access routes or be temperature controlled (heat dissipation) uplighter (cool face type).

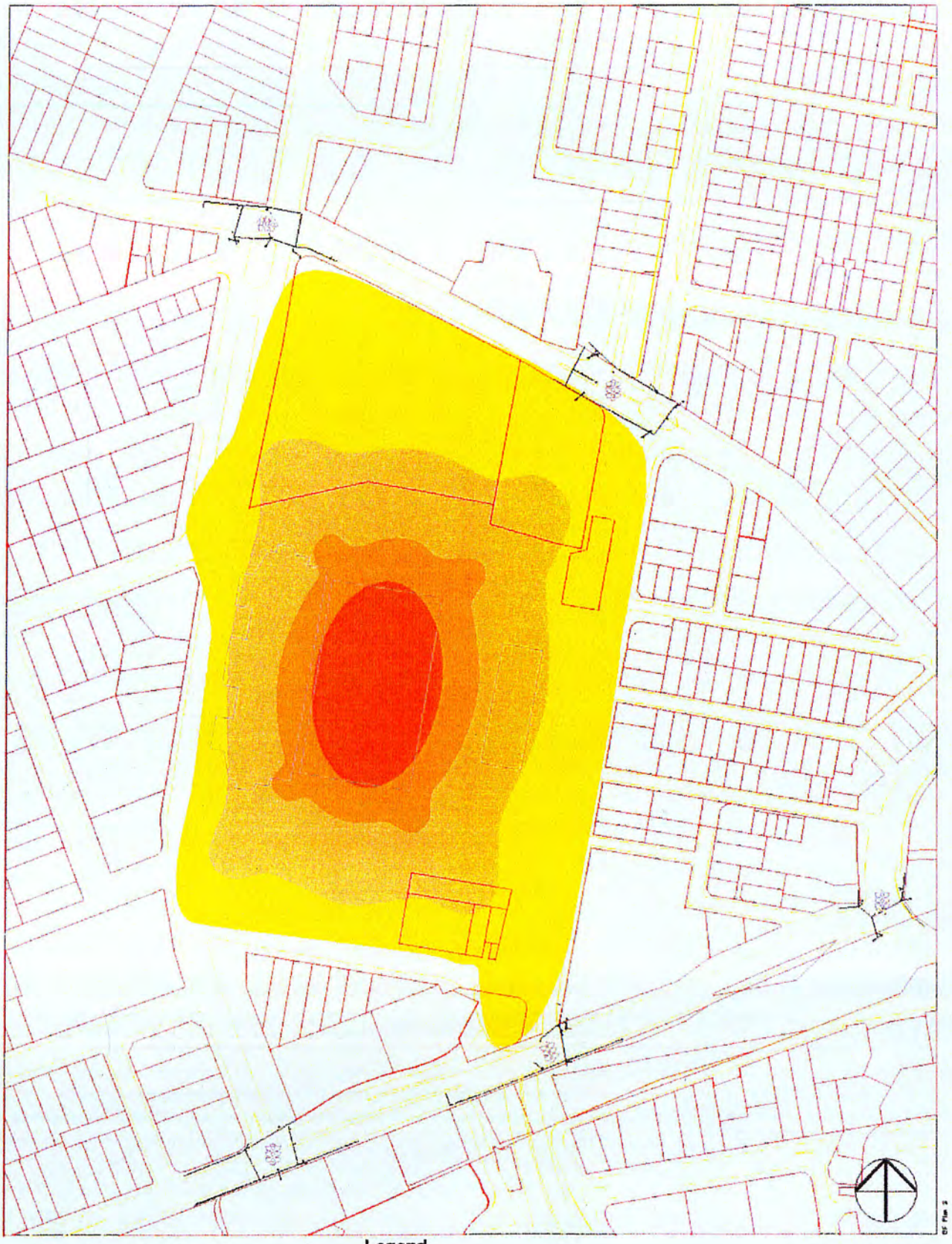

FIGURE 6.2.4
Proposed Spill Lighting Levels

The floodlights must:

(i) be positioned during design away from public path of travel;
(ii) have a cut off as required by Standards;
(iii) the luminous intensity be limited to 7,500 cd (Refer to AS 4282 Table 2.2 – Maximum luminous intensity per luminaire for pre-curfew operating times); and
(iv) the aiming of the floodlights should not coincide with the main directions of view.

The light source colour for each luminaire type shall be selected based on the following criteria:

(i) highlighting areas prone to crime and vandalism;
(ii) different colours of light source can be used to differentiate features in the building façade and entries to the building;
(iii) also different colours can be used to markup a path of travel or to indicate a "no go area";
(iv) the light source colour should not differ greatly from the surface colour;
(v) the psychological effect of colours should be taken into consideration; and
(vi) coloured glass filters can be used to create different colour schemes.

The lighting design for a sign will depend on the following:

(i) BCC requirements and conditions of approval for a sign direction;
(ii) size of the sign;
(iii) distance from where the sign is required;
(iv) contrast of various parts of the sign with each other;
(v) ambient lighting conditions; and
(vi) position of the sign in relation to the residential neighbourhood.

- **Pedestrian Access Lighting**

The luminaires proposed in the concept design must meet the standards and Local Authority requirements. The luminaires used for pedestrian access overpasses must be carefully selected and with special cut off characteristics to avoid any glare to the approaching drivers.

Overpasses for pedestrian access will be installed with category A luminaires to avoid:

(i) glare discomfort for drivers;
(ii) obtrusive lighting for pedestrians; and
(iii) residential spillage lighting.

- **Pedestrian Crossing Lighting**

The lighting installation shall meet the AS 1158.4 Supplementary Lighting at pedestrian crossings.

(i) The floodlights shall meet the technical characteristics as specified in AS 1158.4 Table 4.1 – Manufacturers' Compliance Table.
(ii) The floodlights required shall be equipped with external/internal shields or louvres to restrict the vertical and/or horizontal spread of light. These shields shall be an integral part of floodlights.
(iii) The lighting design shall provide advanced warning to motorists of the presence of the pedestrian crossing.
(iv) Enhance pedestrian visibility by direct illuminance.

(v) To achieve the above, a minimum of 45 lux on the vertical plane of illuminance is required within the crossing zone.
(vi) The illumination provided by floodlights shall be 3m back from the kerb to adequately illuminate the pedestrians approaching the crossing.

- **Amenities Security Lighting**

The level of illuminance must meet the AS1158 & AS1680 requirements and a high level of illuminance is required so:

(i) Intruders will be detected directly by human eye and indirectly via the CCTV system.
(ii) The security lighting shall be carefully designed so that when the site is unattended the security system can effectively detect intruders.

The security lighting must be designed with:

(i) Long life lamps
(ii) High efficiency luminaire
(iii) Easy maintenance

The security lighting control could be switched off during low sport events season and be activated automatically when an intruder alarm or a CCTV system depicts.

- **Vehicle Headlights on Entry and Exit From Stadium**

Buses

The Bus Station shall be located at the Chippendall Street end of the stadium. It is assumed that access to the Bus Station entry shall be from Milton Road turning into Castlemaine Street then into the bus station from an entry on Castlemaine Street. The exit to the bus station is located on Chippendall Street.

The bus station entry and exit paths are away from residential areas and would therefore pose little impact on the surrounding neighbourhood.

Taxis

The taxi set-down and pick-up areas shall be located in the industrial area on Castlemaine Street. Entry shall be via one of the many connecting roads depending upon the place of origin of the passenger/s.

Entry and exit from the taxi stand would pose little impact to the surrounding neighbourhood, although an increased presence of traffic on the local roads around the stadium could provide some annoyance to local residents. It may be desirable to specify allowable routes for taxis arriving and departing from the stadium on night events to limit the annoyance to residents.

Private Vehicles

The private vehicle carpark is located at the northern end of the stadium at ground level, with the entry/exit on Castlemaine Street opposite the residential premises at 23 Castlemaine Street. The capacity of the carpark is approximately 200 vehicles.

Depending upon the gradient of the ramp, vehicles exiting the carpark may aim headlights directly into the front windows of the residence opposite. Potentially, at the end of an event, 200 vehicles could exit the carpark between 9:30pm and 10:30pm. This would create great annoyance to the residents opposite.

It may be necessary to install a barrier in the centre island on Castlemaine Street to block the light from headlights exiting the carpark. This barrier could be constructed or could be implemented by planting more trees and landscaping in this area.

- **PWD Special Lighting**

The concept design must treat with care the PWD access and the level of illumination shall be determined for:

(i) PWD access signs.
(ii) Detection of an obstruction.
(iii) Special sign direction.

- **Building (Façade) Lighting**

The building/façade lighting should be designed to:

(i) avoid too much light resulting in an uncomfortable effect.
(ii) an average illuminance level shall be selected for building floodlighting.
(iii) depending on the ambient lighting conditions and the reflectance of the building materials the lighting will be designed to produce an acceptable level of overall building brightness.
(iv) avoid light spillage to the residential area.
(v) the purpose of façade lighting is to provide an enhanced appearance.

6.2.4 Site Impacts

❑ **Operational Impacts – Soil Erosion and Sedimentation**

The proposed stadium is not expected to have any adverse impacts in relation to soil erosion or sedimentation in the operational plan. The introduction of the concourse around the stadium will be beneficial as the amount of soil protective coverings (i.e. paved areas) will be increased.

❑ Suitability of Soil for the Proposal and Associated Infrastructure

As both the western and Ron McAuliffe grandstands have been constructed for some time, it could be deduced that the soil is suitable however geo-technical investigations should be carried out prior to final design.

The Lang Park Redevelopment Study Masterplan Report, Second Draft Issue (HOK + LOBB & PDT Architects 3 April 2000) recommends that footings should not be founded on fill material as the compaction of the fill is highly variable.

❑ Operational Impacts – Site Drainage

Discussions with the Brisbane City Council should be held if the points of discharge are to be altered for the proposed stadium. Changing the points of discharge from the site is not expected to be of major concern providing that peak flows leaving the site are not increased. The proposed stadium is not expected to affect local overland flow paths.

The maximum increase in discharge for the proposed stadium was estimated to be 6%. This increase is most likely due to the significant increase in impervious areas (ie. roof and concourse areas).

This increase in discharge from the site will have adverse flooding effects on surrounding properties. Detention storage will be required to mitigate against the increase in discharge off site. The storage volume required to reduce discharge to existing conditions is estimated to be 2000 m^3. This storage volume should only be considered indicative as the final storage volume will be dependent on the drainage layout. Area restrictions on site may require that the detention storage be constructed underground.

This underground storage could be used to store rainwater after an event, and later be re-used for watering the pitch or as wash down water.

Flooding in Hale Street is caused by runoff from the area between Hale Street and Petrie Terrace and is considered to be a municipal problem rather than an impact resulting from the proposed stadium. The existing trunk drainage system has less than Q2 capacity and no overland flow path has been provided to reduce flooding. This flooding may have impacts in regard to access and should be addressed.

To minimise flooding in this location a number of alternatives are available.

The first alternative entails additional drainage being provided to alleviate flooding problems at the sag point along Hale Street. While the additional drainage would reduce flooding in Hale Street, additional stormwater flows would be directed to the Castlemaine St drainage system via the trunk drainage system. This would increase flooding in Castlemaine St.

Detention basins would be required to limit flows entering the Castlemaine Street stormwater drainage system to existing conditions to mitigate against these potential increases in flows. These detention basins may have to be constructed underground due to site area constraints. The size of the basins will be dependent on the increase in flows entering the Castlemaine Street drainage system. The magnitude of the increase in flows and sizing of detention basins would be determined as part of final design.

The second alternative is to provide additional drainage from Hale Street to Castlemaine Street and to increase the capacity of the Castlemaine Street stormwater drainage system to facilitate the additional flows.

The third alternative would be to provide stormwater drainage along Hale Street that discharges directly into the Brisbane River. From a flooding perspective this would provide the most desirable solution as runoff from Petrie Terrace to Hale Street could be re-directed into the new trunk drainage system. Similarly flows from the eastern side of the proposed stadium could be directed into the new trunk drainage system. The re-directed flows would reduce the flows entering the Castlemaine Street stormwater drainage and this would have a positive impact on reducing flooding in both Hale and Castlemaine Streets.

Each of these alternatives should be investigated during final design, however none of the solutions arise as a consequence of the proposed stadium.

During large regional flood events (i.e. Jan 1974) Lang Park was inundated with flood waters. The proposed stadium playing surface level is not to be raised and there will be no loss of flood storage due to the proposed stadium.

❑ Surface & Groundwater

▪ Groundwater

A geo-technical investigation was conducted by Soil Surveys Engineering over the construction site prior to the construction of the Western Stand (Frank Burke Stand). During this investigation, groundwater was encountered at between 2.1 and 2.5 m below natural ground surface (Soil Surveys Engineering 1993). Natural ground surface levels in this area are between RL 4 to 5 m AHD. The water table for the site adopted at between RL 1.5 m AHD and RL 2.9 m AHD.

A site investigation was conducted as part of the construction of the Proposed Inner Northern Ring Road – Stage 3 (Douglas & Partners 1989). Bore holes were drilled along Hale Street between Caxton and Sheriff Streets to a depth of almost 10 m (approximately RL 4.0 m AHD). No free groundwater was encountered during this investigation.

Site investigations over the remainder of the site should be conducted prior to final design.

▪ Impacts - Groundwater

The water table level will be important for structures such as underground carparks, storage detention basins and foundations below RL 3.0 m AHD. Excavations may have to be de-watered and sealed to stop groundwater entering the excavations during construction. Construction of structures below the water table will have to tanked (water proofed) to stop groundwater leakage into the structures.

Although groundwater samples in the area could not be obtained, redevelopment of the stadium is expected to have a positive impact in groundwater quality in the area if removal or remediation of the contaminated land is conducted. This will need to be determined by geo-technical investigations prior to final design.

❑ Water Quality

Runoff from Lang Park during rainfall events and from irrigation of the playing field drains to a series of sumps at the southern end of the field. Water from these sumps drain to an external north-south stormwater drain, which discharges in to the Brisbane River. Roof runoff from the grandstands drains to external stormwater drains, which eventually flow to the Brisbane River.

A water sample of baseflow was taken from playing field irrigation in the southern drain on 30th March, 2000. The baseflow was very low and short in duration due to the prolonged period of dry weather. The volume of runoff water was small. Sampling was undertaken to determine the level of contaminates likely to be present based upon the previous land uses of the site (eg rubbish dump). The analysis of the samples taken is presented in **Table 6.2.4.**

Water quality laboratory results are presented in Water Quality Results.

Table 6.2.4 Drainage from Lang Park Water Quality

Parameter (All measurements in mg/L except where noted).	Stormwater Drain Runoff	Guidelines for Identifying Water Quality Objectives in Brisbane City Council Water – Land Disturbing Activities	Mean concentrations of stormwater runoff from high urban land use (Note 1)
Dissolved Oxygen	7.3	-	-
pH	7.2	-	-
Conductivity (uS/cm)	70	-	-
Temperature (degrees C)	25.6	-	-
Oil and Grease	5	-	6
Arsenic	0.006	-	-
Cadmium	<0.005	-	0.0045
Copper	0.020	-	0.050
Lead	0.010	-	0.105
Mercury	0.0005	-	-
Zinc	0.070	-	0.115
Total phosphorus	0.760	0.070	0.025
Reactive phosphorus	0.590	-	-
Ammonia	0.080	-	-
Total Kjeldahl Nitrogen	2.200	0.650 (Total nitrogen)	2.8
Nitrate-Nitrite Nitrogen	28.1	-	-
Total Suspended Solids	12	15	105
Total Coliforms (orgs/100ml)	>1600	-	-
Faecal Coliforms (orgs/100ml)	>1600	1000	-
E.coli (orgs/100ml)	900	-	-

Note 1. Source: CRC Catchment Hydrology (1997)
2. "-" denotes concentration is not specified.

The physical properties of the drainage runoff is good. The dissolved oxygen concentration of the runoff is high whereas conductivity is low and pH is near neutral.

The nutrient content is relatively high, particularly the nitrogen component. Nitrogen is relatively soluble in fertilisers and this reflected in the baseflow. Runoff from care and maintenance of the playing field is expected to be similar to other major sporting venues in Brisbane (eg. Brisbane Cricket Ground, Ballymore and ANZ Stadium). The runoff concentrations exceed the Guidelines for Identifying Water Quality Objectives in Brisbane City Council Water – Land Disturbing Activities

for nutrients and bacterial levels. However, the measured concentrations are typical of (CRC, Catchment Hydrology 1997) stormwater drainage from high urban land use areas.

Bacterial levels are high and reflect the organic contaminants generally found in stormwater. The metal concentrations are generally less than the mean concentrations found in stormwater from high urban areas.

In conclusion, the stormwater from Lang Park is likely to be typical of waters draining from a high urban area with a maintained sporting oval.

❑ Water Quality Impacts

The proposed stadium will have a roof, which encompasses the pitch. Rainfall will fall on this roof, the pedestrian plazas and the pitch. Runoff from the proposed stadium roofs will contain dissolved deposition material similar in quality to that draining roofs throughout urban Brisbane.

The water runoff from the roof will drain to external drains. The plazas and pitch runoff will be collected in internal drains before draining to a series of external drains connecting with the Brisbane River. The water quality is expected to be marginally improved because of the extended roof coverage and removal of the terrace areas. On this basis, the water quality impacts of the existing facility within Brisbane River are expected to be marginally reduced.

❑ Stormwater Treatment

Requirements for treatment of stormwater discharges take into account Brisbane City Council guidelines on water quality objectives (Brisbane City Council, March 2000 DRAFT). The stormwater water quality objectives that apply to Lang Park would be subject to discussions and agreement with the Council Development Assessment team. Draft water quality objectives have been provided in **Table 4.7.3.**

The use of best practice may be applied to Lang Park, depending on the feasibility of meeting stormwater water quality objectives (to be finalised) and subject to Council approval. The range of stormwater treatment practices that are considered to be appropriate to the operational phase of the proposed Lang Park stadium are given below:

(i) gross pollutant traps to intercept sediments and litter from the pitch and pedestrian plazas. Proprietary systems are available that have a high capture rate for gross pollutants (greater than 5mm size) and up to 70 percent removal of Total Suspended Solids (CRC Catchment Hydrology 1999);
(ii) effective litter source controls such as collection after major events;
(iii) controlled fertiliser application to the pitch;
(iv) controlled irrigation of the pitch to restrict contaminated flows during dry weather; and
(v) onsite capture and reuse of stormwater

Constraints on available space would restrict the application of above ground and large scale practices such as major sediment ponds and constructed wetlands however sedimentation basins may be integrated with stormwater detention basins if required.

6.2.5 Waste Management

Operational wastes will be principally generated during stadium events and from the stadium office and maintenance of the stadium.

(a) Event Wastes

Wastes produced during events at the proposed Stadium will be of comparable type to those produced during events at the existing stadium. These wastes are described in Section 5.8.

The additional capacity of the proposed stadium will result in larger quantities of wastes produced during stadium events. **Table 6.2.5** provides an estimate of waste generated from a full capacity event at the proposed stadium.

Table 6.2.5 Project Stadium Event Waste Generation Potential

Capacity (Patrons)	Waste (m^3)/per Patron	Total Waste (m^3)	Total Waste (kg)
40 000	0.00225[1]	90	6 750
52 500 (proposed capacity)	0.00225[1]	118	8 860

Note: 1 The average quantity of waste per patron was estimated from the 1998 and 1999 State of Origin events. The average density of waste was assumed to be 75 kg per m^3 of waste (Cleanevent, 2000)

(b) Office & Maintenance Wastes

Wastes will be generated from the office and maintenance of the stadium. The type and quantity of wastes generated by the Project would be comparable with the existing stadium. These wastes are described in Section 5.8.

(c) Stormwater

The stormwater system will be designed to treat water on-site to an acceptable standard prior to discharge to the stormwater.

(d) Waste Collection and Disposal

Waste collection and disposal methods must be described in the Waste Management Plan.

Waste management practices which may be incorporated include:

(i) Organic Materials – Food scraps will be generated from office facilities, stadium patrons and caterers. Food scraps will be disposed by a licensed contractor to an approved facility;
(ii) Oily Wastes – Waste oils will be collected for reuse or recycling where possible, or disposed of off-site in an approved manner.
(iii) Sewage – Domestic sewage will be generated mainly during stadium events and discharged to the Council's sewer system.
(iv) Waste Waters – Such as waters used to wash down stadium waste collection areas, will be treated to an acceptable level prior to discharge into the sewer system. Any wastes removed on-site from waste waters will be segregated for reuse or recycling where possible, or disposed of off-site in an approved manner.

6.2.6 Visual & Landscape Impacts

❑ Overview

Potential sources of visual impacts of the Lang Park Stadium Proposal on the surrounding area are likely to include:

- stadium design and aesthetics;
- change in the visual character of the area;
- interruptions to existing views and vistas;
- light spillage during night events;
- urban design impacts;
- open space impacts; and
- impacts of associated transport infrastructure.

❑ Stadium Design & Aesthetics

- Scale

The redeveloped Lang Park stadium will appear markedly different to the existing Lang Park stadium in that it will be a fully enclosed structure. The scale of the proposed stadium will contrast significantly with the scale of existing residential and commercial development in the surrounding locality. The scale of the built form of the surrounding locality is comprised of two significant forms:

(i) the one and two level traditional detached housing forms of Petrie Terrace, Red Hill, Paddington and Milton; and
(ii) the predominantly one and two level commercial building forms of the Finchley, Black, Castlemaine Streets and Heussler Terrace precinct.

There will be a significant contrast in the scale of the proposed stadium building to the existing. This built environment is further demonstrated by the contrast in the scale of the two immediately adjoining buildings:

(i) Christ Church; and
(ii) Sports House.

Efforts have been made to address this significant contrast in the scale of the proposed stadium and the surrounding environment. The focus of these efforts is on the elevational treatment to the facades of the proposed structure. Elevation and façade treatments will be discussed in later in the this section. Other measures employed to address the significant contrast in scale include:

(i) The creation of the pedestrian concourse, on a plinth above the level of the surrounding environment. This assists in lowering the perceived height of the proposed structure when viewed from a distance.
(ii) The inclusion of open spaces and entrances at the public concourse level. This assists in creating opportunities to view through the building to the playing surface beyond, and in creating some opportunities to view through the building (vista connection), across the playing surface, and through the building on the opposite side to the street beyond.
(iii) Setting the structure back from the Caxton Street frontage to further reduce the visual bulk and scale.

(iv) Façade screening stops above the public concourse level, reducing the entry scale and providing a fully accessible ground level perimeter.

The issue of scale has not been treated appropriately at the points of direct interaction with surrounding urban fabric, especially in relation to the juxtaposition with Christ Church. The proposed stadium building physically isolates Christ Church from the greater suburban context, and physically overbears the Church. Efforts should be made to reduce the scale of the proposed stadium at the corner adjacent the Church.

If the base of the proposed stadium is to be opened up for public use, the perimeter spaces should appear safe, and non-alienating to the intended user. So often the perimeter of stadia are windswept alienating spaces not appropriate to out of hours use. It is not obvious how this will be achieved in the proposed design solution.

- Local Cultural Context

The proposed built form will contrast significantly with the built form context one and two level predominantly timber and tin detached houses, and one and two level predominantly sheet metal and glass commercial and light industrial premises. This "fine grained" built form contrasts with the more landmark cultural qualities of the existing stadium – "Queensland's home of rugby league". The proposed stadium will continue the evolution of improving sporting facilities at Lang Park since it's creation.

- Effect of Materials & Colours

With the exception of concrete, the materials proposed draw heavily on the symbolism of the original timber and tin houses of the surrounding residential suburbs. The composition of these elements provides for a distinctively characteristic Queensland house form – the vernacular house. The colours proposed and resulting textures should provide a degree of neutrality in the urban context, but withstand the pressures of an aggressive, corrosive environment as exists adjacent to Hale Street.

- Signage Control

It is apparent that the location and integration of necessary signage has not been given due thought to date in the Master Plan and should be addressed. This issue is important to address as signage will need to be incorporated as so not to clash with the design integrity of the proposed stadium. Signage by its very nature is bold in its use of colour and graphic content, and may contrast significantly with the otherwise neutral colour and toning of the proposed stadium.

❑ **Change in the Visual Character of the Area**

- Regional Context

The proposed Lang Park stadium will be a more prominent visual element in the regional landscape. However, it will not significantly alter the visual or landscape character of the region, as it is still essentially a large sports stadium set in a valley surrounded by a mix of residential, commercial and industrial development. The increased prominence of the stadium will also increase its value as a visual landmark in the region.

- Local Context

The following local impacts are anticipated;

(i) The redeveloped Lang Park stadium will be a more prominent visual element in the local landscape due primarily to the enclosures on the northern and southern ends. This will increase the physical and visual mass of the stadium.

(ii) The increased physical and visual mass will create a significant visual barrier for properties within close proximity, and possibly even a sense of enclosure.

(iii) The proposed building will be a more dominant visual element along Hale Street, creating a higher sense of enclosure along the western side of Hale Street than the existing stand. However, through sympathetic design and detailing, the proposed could be significantly more visually appealing than the existing stand, and will crystalise the landmark values of the site at close range.

(iv) The new park to be developed at the northern end of the stadium will considerably improve the Caxton Street frontage to the stadium. At present this area is dominated by a large expanse of car park and shed structures housing a variety of sports. The park will off-set the existing greenery surrounding Neal Macrossan Park on the northern side of the street, and soften or humanise the scale of the proposed buildings from Caxton Street.

- **Compatibility with Local Area**

Whilst the scale of the proposed stadium will be dominant in the local area, there are numerous attributes of the proposed structure that are compatible with the local area context.

The "contemporary minimalist" form of the proposed structure would be in contrast to the local area, except for the contextual references made in the choice of proposed building material. The "timber and tin" materials provide reference to the "Queenslander" or "colonial" house history of the surrounding suburbs.

The visual prominence of the proposed stadium is further addressed with respect to: the siting of the stadium on the floor of the valley created by Petrie Terrace, Musgrave Road, and Given Terrace / Heussler Terrace; and, the layering of the façade to reduce the perceived scale of the perimeter vertical wall.

The perceived visual in-compatibility between the proposed stadium and the Christ Church precinct is of concern. The Christ Church precinct is comprised of the Memorial Cemetery, the Christ Church, and the Rectory, all of which are of significantly smaller scale than the proposed stadium. This precinct will be substantially overshadowed in June and may not retain the visual presence in the landscape or local area.

However, sensitive facade treatments to the southern wall of the stadium buildings combined with the creation of a large pedestrian plaza over Hale Street could accentuate and draw attention to the Christ Church precinct.

- **Improvements to Local Area Qualities**

The design intent for the public concourse level, with public access to the plazas to the north and south, is a significant improvement to the visual quality of the local area. The re-introduction of the public access through the site from north to south and west to east provides a visual permeability to the local environment. This public access is further enhanced through the introduction of the Caxton Street and Chippendall Street pedestrian plazas and urban parks.

The Caxton Street plaza in combination with the fig trees on the southern edge of Neal Macrossan Park form a green entry to the suburb of Paddington when approached from the east, and to the Caxton Street precinct when approached from the west.

The proposed stadium obscures from view the visual clutter of the commercial activities and non-residential activities along Chippendall Street and the southern part of Castlemaine Street. This is especially evident when viewing the proposed stadium and beyond from Wellington Street, and surrounding streets in Petrie Terrace. However views to geographic markers and landmarks, such as the Brisbane River, West End, Highgate Hill, and Mt Coot-tha and beyond.

- **Integration & Contribution to Street Activities**

A duality exists with regard to the contribution of the proposed stadium to the street activities and the integration of the proposed structure with the surrounding environment. The surrounding unit environment is very characteristic of the early residential development of Brisbane, yet the "landmark" qualities of the proposed stadium must also be recognised as being relevant. The scale and design of the proposed stadium will achieve landmark qualities. This is relevant for a cultural icon of the national status of Lang Park.

The degree of compatibility of the proposed stadium with the surrounding environment can be evidenced at another level. The proposed stadium provides for active street facades to all frontages. This assists greatly in achieving a positive relationship between existing street activities, and the proposed stadium. While there is an appreciable distinction in the scale of the proposed stadium with the surrounding streets, the detail of façade elements will assist with the overall integration of the proposal into the street environment.

It is the previously mentioned "finer grain detail" of the active facades, coupled with the visual permeability of these facades, that contributes to the life of the Castlemaine, Hale and Caxton Street facades.

The scale and proximity of the proposed stadium to the Christ Church precinct has the potential to overwhelm and overshadow the precinct. However, the Christ Church precinct has been isolated by Hale Street and associated infrastructure. The visual impact of the proposed stadium upon the Christ Church precinct will be off-set by the positive contribution of the proposed pedestrian plaza over Hale Street. This will open up the precinct to users from Milton Road and reconnect the precinct with Petrie Terrace and heritage sites there.

The Chippendall Street façade is the least visually sympathetic to the existing development, especially the contextual relationship with Christ Church. This lack of visual harmony between the old and new is detrimental to the integration of the proposed stadium with the existing environment. The proposed pedestrian plaza situated over the top of the Hale Street / Milton Road intersection has a very positive effect upon the proposed integration of the new structure with the existing streetscape, although the visual bulk and siting of the proposed stadium still overshadows and dwarfs this important near neighbour. Further consideration needs to be given to the visual

curtilage of the Christ Church, and the incorporation of this curtilage into the design intent of the proposed stadium.

❑ **Interruptions to Existing Views & Vistas**

A number of visual impacts are anticipated in the residential precincts adjoining Lang Park. To assist in understanding these impacts a series of visual simulations have been prepared. **Figure 6.2.4 – Figure 6.2.8** indicates the location and view direction of these simulations. These have been computer generated and are based upon elevations taken from the stadium masterplan.

Precinct 1 – Petrie Terrace South (Refer to Photograph 1 and Simulation 1)

Existing views are predominantly east-west views and glimpses along the streets between Hale Street and Petrie Terrace, towards the back of the eastern stand. The only views from residences are from western facing windows in two-storey and other particularly elevated houses. As with the existing Lang Park stadium, the proposed stadium will dominate all westerly views, particularly those from the lower slopes.

The new eastern stand will further emphasise the visual barrier between this small residential pocket below Petrie Terrace and other precincts in the locality. It will increase the visual containment between Hale Street and Petrie Terrace.

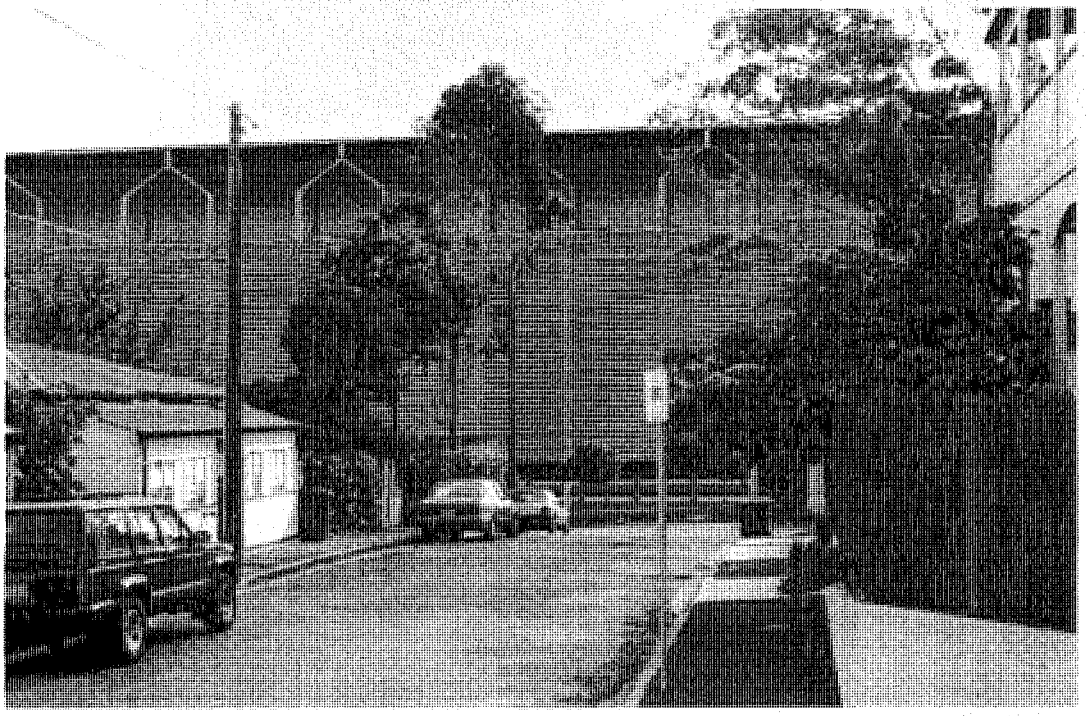

Figure 6.2.4 Petrie Terrace South

*Precinct 2 – Petrie Terrace North (Refer to **Figure 6.2.4**)*

Existing views are direct south-easterly views and glimpses from elevated locations into the stadium. Views from lower locations are screened by houses and vegetation.

The proposed Lang Park stadium will alter, but not dominate existing views to the south-east from elevated areas in Precinct 2. Although existing views through the two existing stands to commercial and industrial development along the Brisbane River will be lost, the entire stadium will still sit below the horizon and will not screen any long distance views from these elevated areas.

The proposed stadium essentially will blend in with the surrounding development and not break the existing skyline.

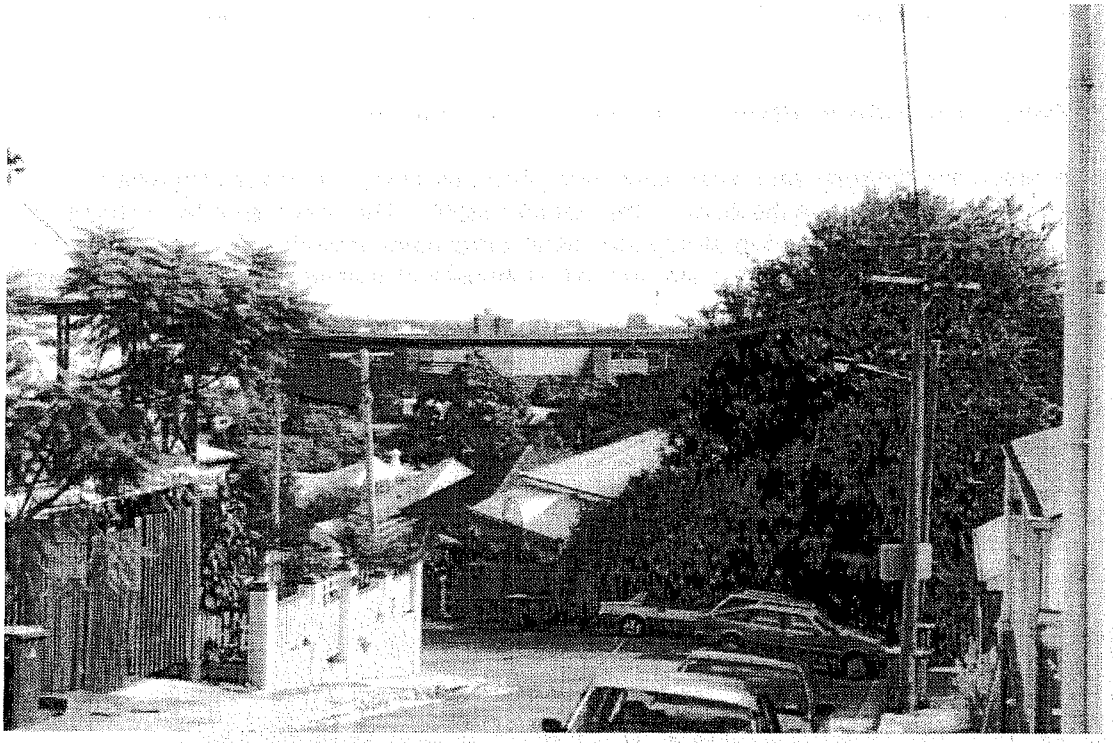

Figure 6.2.5 Petrie Terrace North

Precinct 3 – Red Hill Elevated Slopes (Refer to ***Figure 6.2.6****)*

Existing views are predominantly direct southerly views from elevated locations into the stadium. The ridge top in this area offers the most direct and unhindered views to the site.

The proposed stadium will significantly alter existing views to the south from elevated areas in Precinct 3. Like Precinct 3, views through the two existing stands to commercial and industrial development along the Brisbane River will be screened by the new northern stand. The loss of these views is not in itself significant, however, the introduction of a large building mass in the middle distance will substantially alter the views from this precinct. Although the entire stadium will still sit below the horizon and not block any long distance views, it will dominate the middle ground from elevated positions.

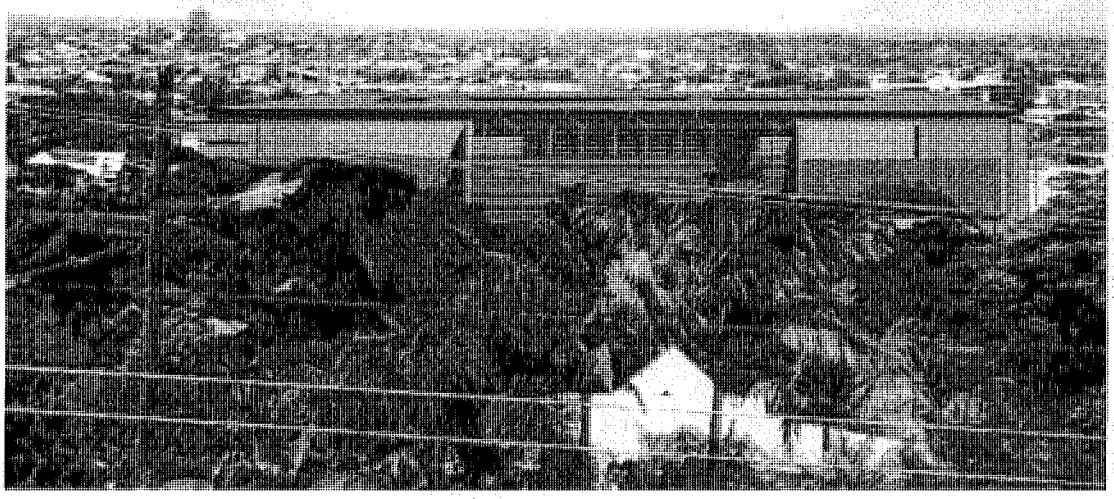

Figure 6.2.6 Red Hill Elevated Slopes

Precinct 4 – Red Hill Lower Slopes (Refer to ***Figure 6.2.7****)*

Existing views are limited southerly glimpses to the top of the stands, which are mostly screened by existing buildings and vegetation.

The proposed stadium, in particular the northern facade, will be more visible from current viewing points in this precinct, due to its expanded mass. However, it will not appear as any more than a visual reference to a structure beyond the existing tree line.

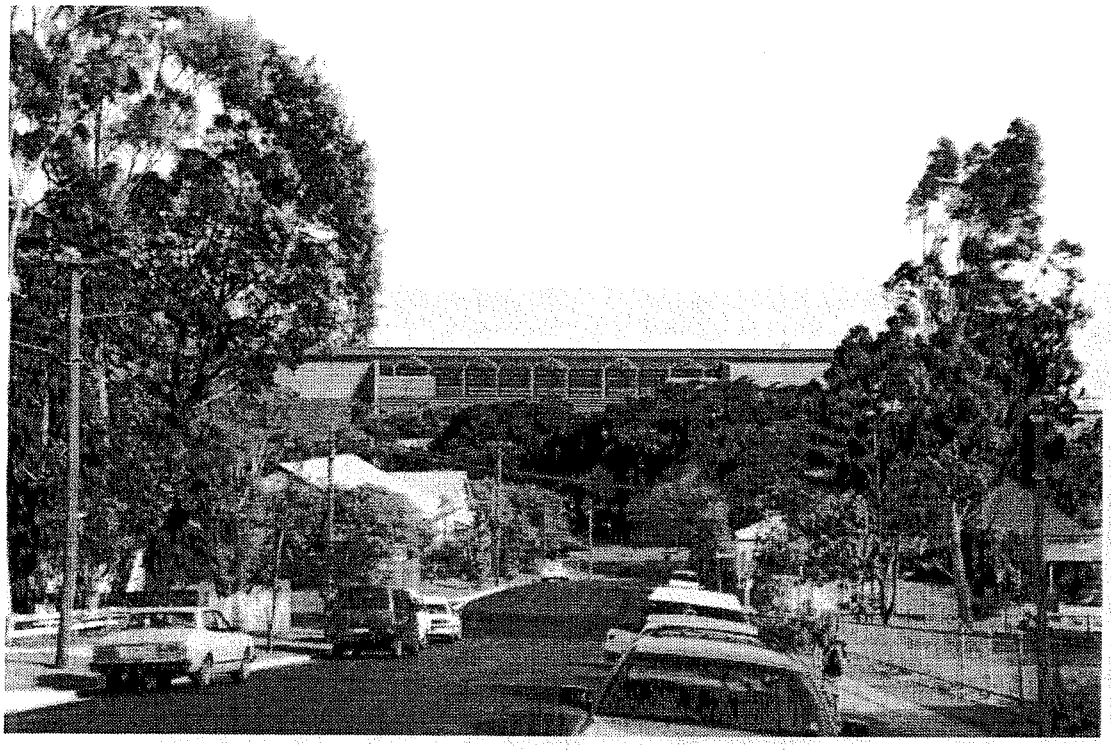

Figure 6.2.7 Red Hill Lower Slopes

*Precinct 5 – Paddington & Milton Lower Slopes (Refer to **Figure 6.2.8**)*

Existing views are direct easterly views and glimpses along the streets, towards the back of the western stand.

As with the existing stadium, the proposed stadium will dominate all easterly views.

The new northern end of the proposed stadium will further block views to the city and Spring Hill from this precinct.

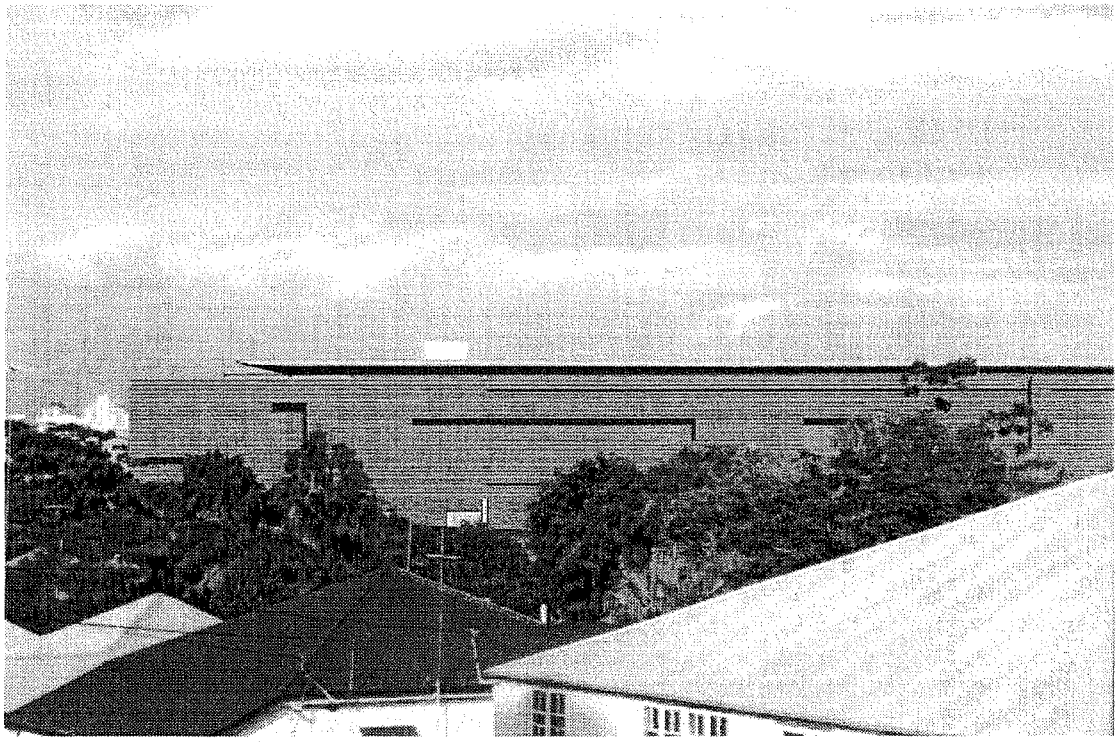

Figure 6.2.8 Paddington & Milton Lower Slopes

- **Summary of Visual Impacts**

The visual impacts can be summarised as follows:

(i) The likely visual impacts of the proposed Lang Park stadium on the regional landscape will be minimal;

(ii) The likely visual impacts of the proposed Lang Park stadium on the local landscape will vary according to distance from the site and elevation above the site;

(iii) Generally, the enclosed building ends and general increased mass of the proposed stadium will create or emphasise existing feelings of visual enclosure for areas below Petrie Terrace within close proximity of the site;

(iv) Generally, the proposed stadium will dominate views from midway up a slope, where the stadium forms part of the skyline and blocks views to landmarks beyond. Views to the stadium from the base of a slope are mostly screened by surrounding houses or vegetation, while above the midway point of a slope, the stadium generally will blur into the middle distance and form part of the typical inner city landscape.

❑ **Urban Design Impacts**

- **Solar / Shading / Overshadowing Impacts**

Solar access, or access to sunlight, is considered to be part of the overall amenity of any land. Solar access is more important during the cooler winter months.

In order to correctly assess the issue of solar access it is necessary to study the shadows cast by the proposed stadium. Shadow diagrams have been produced for 7.00 am, 10.00 am, 12.00 pm,

2.30 pm, and 4.30 pm for the following days of the year to assist in this analysis (HOK + Lobb, PDT):

- Winter solstice – 21 June;
- Vernal equinox – 21 March;
- Summer solstice – 21 December.

Proposed Stadium

The Caxton Street pedestrian plaza which faces to the north will enjoy good solar access at all times of the year. The southern pedestrian plaza (Chippendall Street) will have poor overall solar access, being shaded in all but the highest summer months. This poor solar access will affect the enjoyment, or amenity, of the southern pedestrian plaza.

All parts of the pitch are exposed to sunlight, at some stage during each day analysed.

Adjoining Sites

The Christ Church precinct, will be impacted adversely by the proposed stadium in terms of overshadowing. Due to the proximity of the proposed stadium, the cemetery will be in shadow for all of the identified instances, except for the Summer solstice. The Christ Church building will be in shadow during the winter months from 12.00 pm onward through the afternoon hours.

Generally, the remainder of the surrounding environment is not impacted to any significant level by shadows cast by the proposed stadium. Properties on the eastern side of Hale Street shadow in the late afternoon, 4.30 pm, as will be properties on the western side of Castlemaine Street in the early winter morning, 7.00 am. The early morning shadowing is likely to be experienced at present. Due to the increased building site on the eastern side of the proposed stadium, the late afternoon shadowing at present is less than that expected with the proposed stadium.

- **Reflectivity, Glare & Heat Transfer**

The use of reflective materials such as glass, metal and even some paint colours can have detrimental impact on neighbouring properties, pedestrians, and vehicle users.

The problems which may arise from the inappropriate use of these materials include:

(i) heat and glare on adjacent buildings and properties which can cause physical and micro-climatic problems in buildings and discomfort for occupants. Heat and glare impact can also affect pedestrians and vehicle users causing discomfort and potential risk of accident or injury;
(ii) buildings which lack visual interest or texture for observers or occupants of adjacent buildings. Buildings which provide visual stimulation will contribute to a higher standard of visual amenity; and
(iii) building materials which are out of character with surrounding development, particularly where that surrounding development is of historical significance.

The proposed stadium is to be constructed of concrete, steel sheet metal, glass, and timber. These materials should be neutral in colour and toning, although specific colours have not been supplied at this time. Similarly, the materials are believed to be as non-reflective as possible, with

the concrete being off-form and thus not polished, the timber being recycled timber with a natural finish.

In accordance with Brisbane City Council Local Planning Policy 9.02, metal and glass surfaces should demonstrate a level of light reflectivity no greater than 20%, and a level of heat transmission no less than 20%.

Meeting these specifications will ensure that the heat and glare impact on adjoining properties, street and pedestrian areas is kept to an acceptable level.

Other measures that have been used to reduce the reflectivity of metal or glass facades to acceptable levels include:

(i) The selection of colours and points with relatively low light reflectivity characteristics; and
(ii) The treatment of smooth surfaces with a texture material, or with a screening material, which reduces reflectivity.

❑ Open Space Impacts

▪ City-Wide Open Space

The Lang Park Stadium Proposal will retain its City-wide significance as a major area of active open space close to the City. The proposed improvements to capacity and transport infrastructure will effectively improve the useability of the stadium for major outdoor sporting and other events, and therefore, improve its significance as a primary venue in Brisbane, Queensland and Australia generally.

Existing local and district sport opportunities housed along the Caxton Street frontage (e.g. PCYC and Ozsports) will be retained in new spaces within the proposal stadium. The outdoor beach volleyball courts will become a feature of the new park land on the northern side of the proposed stadium. Therefore, no existing sporting opportunities will be lost as a result of the redevelopment of Lang Park. It is more likely that they will be expanded, and possibly even upgraded to provide more regional opportunities.

▪ Local Open Space

The proposed stadium will improve local open space provision in the local area due to the development of a small park fronting Caxton Street. This park could serve multiple purposes:

(i) a gathering space for patrons of the stadium before and after events;
(ii) a gathering space for the local community for festivals and other community events;
(iii) a physical and visual link between the Caxton Street and Given Terrace entertainment precincts;
(iv) a recreation hub with links to the PCYC and Ozsports facilities and Neal Macrossan Park and the other recreation facilities across Caxton Street; and
(v) a green space in an otherwise hard urban environment.

The new park could serve to localise the facility by offering *real* recreation and open space opportunities for the local community, along with its other functions, in an area that is otherwise lacking in such facilities.

❑ **Impacts of Associated Transport Infrastructure**

▪ **Visual & Urban Design Impacts of Light Rail Connection**

The proposed light rail connection, including the station will form a visually very dominant element for users of Milton Road. Considerable attention to architectural design and treatment will be required to integrate this element. The impact is exacerbated by its elevated nature along the rail corridor in Milton Road.

Considering the location of the light rail station and gantry structures in relation to Milton Road and situated at a principal position to the City, the visual impact of this infrastructure is likely to be significant. There will be limited opportunities to mitigate this adverse visual impact.

▪ **Visual & Urban Design Impacts of Transport Station**

Apart from the increased number of buses using Milton Road and Castlemaine Streets the visual impact of the busway station is likely to be minimal as it is located out of view from residential and public areas. The structure of the transport station will be situation below the southern pedestrian plaza. This plaza will be treated with landscaping and design elements to reduce it's physical presence and to blend with the Castlemaine Street Café.

▪ **Visual and Urban Design Impacts of Proposed Pedestrian Accessways & Overpasses**

The following impacts are envisaged:

(i) The widening of the Caxton Street bridge would not create any detrimental visual effect and, well designed, would provide urban design benefits in this location.
(ii) The southern pedestrian bridge over Hale Street would be of minimal visual impact. This pedestrian plaza is expected to improve greatly on visual access to Christ Church precinct and to provide a physical and visual connection between the stadium, Christ Church, the Baroona Special School and Petrie Terrace. A similar pedestrian bridge exists north of Caxton Street and creates minimal impact and improved local amenity.
(iii) The widening of the north-western side of Milton Road could potentially result in the removal of existing fig trees that are a highly significant local character feature.
(iv) The pedestrian plazas through the Police Barracks site are largely out of public view and would note create visual impacts. Considerable attention would need to be placed on the prevention of crime through urban design in this area.

Overall, the pedestrian improvements should increase, out of event times, improved pedestrian accessibility and permeability for the local area.

6.2.7 Cultural Heritage Impacts

The following section discusses the cultural heritage impact of the proposed development in relation to the:

- Lang Park site;
- immediate neighbours which are impacted either due to their proximity or by an aspect of the proposal;
- broader context, which discusses places and of areas of significance which are impacted.

The format of the following section provides a brief summary of the place and a description of the proposal in relation to how that aspect of the proposal effects the identified place.

❑ Impacts within Lang Park

The cultural heritage significance and Lang Park can be summarised as follows:

- Major burial grounds for Brisbane from 1843 to 1875.
- In 1890s a small section between Caxton and Judge Streets became a recreation area.
- The Paddington Cemeteries Act of 1911 resulted in disposal of some graves and monuments and creation of a public reserve.
- Lang Park was named in memory of Dr John Dunmore Lang, an immigration organiser, politician and Presbyterian minister who had a profound affect on early Brisbane.
- With drainage, filling, and opening of Caxton Street across the Jewish cemetery and closure of Judge Street crossing the site this area was to evolve into a sporting area with tennis courts, and an oval for amateur athletics and football.
- This recreational usage caused much conflict between local council and government bodies. It was not until 1954 that the situation was resolved when Cabinet approved, in principle, a lease of the site to the Queensland Rugby League and the Queensland Amateur Athletics Association (QAAA) as sub lessors.
- The lease of Lang Park by the Queensland Rugby League was proclaimed on 6 June 1959. In 1962, after the League had spent about £170,000 on improvements and with the grounds no longer open to the public, the Lang Park Trust Act was enacted. This allowed the formation of the Lang Park Trust, which continues to administer the activities of Lang Park to this day.

Lang Park has sporting cultural heritage significance due to the long affiliation with Rugby League in Queensland. Media coverage of sporting events over past decades has resulted in the site now enjoying a national profile as the Queensland home of Rugby League. Lang Park could be construed to be a site of cultural heritage significance to Queensland, and Australia.

The most noticeable impact of the proposed stadium is the change in building form and increased site area. The proposed enclosed stadium utilises a much larger area including the properties directly to the north of the current site. The incorporation of these properties provides a frontage to Caxton Street which clearly defines a pedestrian entry point to the site which previously, due to site constraints, had not been clearly defined. This northern area is proposed to be redeveloped as a large pedestrian plaza and landscaped park land. The impact of this area and increased public access through the stadium is reflective of the original intent of Lang Park as a public recreation reserve.

Traditionally Lang Park has been a simple horseshoe shaped arena, open in nature with limited amenity and crowd capacity.

The incremental upgrading of Lang Park with the erection of the Frank Burke grandstand in 1959 and the Ron McAuliffe grandstand in 1977 increased the capacity of the facility. The site, however, retained many cultural 'elements' which have long been part of the Lang Park ethos. Features such as:

- the 'open' nature of the facility;
- earth mounding for the provision of seating and the shape of seating (horseshoe in format);
- views from inside the stadium to other features outside the stadium such as St Brigids, the Castlemaine Brewery, and character housing;

- Christ Church precinct of a church, rectory and graveyard within the visual curtilage of Lang Park.

The proposed redevelopment will impact on the cultural experience in the following ways:

- The open nature of the stadium will be curtailed;
- The proposed roof; will limit visual penetration beyond the site for nearby properties;
- Christ Church environs will in the main be screened from those inside the stadium.

The proposed excavation for stadium footings, and additional vehicular and pedestrian accessways within the northern, eastern and southern areas of the Lang Park site, may uncover remnants of its past use as a cemetery. If remnants are uncovered relevant government officials must be contacted. However, before commencing any excavation on any part of the site is commenced, a permit to excavate must be obtained from the Queensland Environmental Protection Agency.

❑ Milton Drain[2]

Development and excavation works for footings and other structures will need to be undertaken in the south-western and north-western areas of Lang Park, under the Frank Burke stand, and within close proximity to the Milton Drain.

The proposed extension and refurbishment of the grandstand along Castlemaine Street combined with the proposed elevated pedestrian traffic path along the eastern side of this street may impact on the drain. On-site earthworks should ensure that disruption to this structure is minimised.

❑ Local Impacts

▪ Christ Church precinct

Christ Church has architectural, historic, social and spiritual significance and is regarded as a heritage feature of inner city Brisbane. While the creation of the Hale Street ring road significantly reduced its streetscape presence, and its visual setting, it is still highly visible from both Hale Street and Milton Road. Though this is the second church on the site it remains a historic reminder of the early use of this area.

The visual presence of the Ron McAuliffe grandstand is certainly evident from Christ Church which adjoins the site on its south-eastern boundary. The height of this grandstand as well as the dilapidated state of existing structures to the south-east of Lang Park has a impact on the visual context of this State Heritage listed Church and environs.

The rectory and church are excellent examples of earlier forms of architecture, when combined with the third element of the precinct, the cemetery, demonstrate the old custom of church, residence and place to intern parishioners on one site.

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[2] Information on this and other historical sites was prepared on the basis of evidence available at this time. The significance criteria are merely a summary of the most important aspects of the property based on this available knowledge, and will be subject to re-assessment should fresh information either support or contest this evaluation.

Elements of the proposal which will impact upon the Christ Church include:

(i) The proposed development in the south-eastern corner will abut the Christ Church site.

(ii) Architectural plans indicate that the height of the proposed stadium where it abuts the Christ Church site will be approximately 34 metres above ground level. The stadium wall adjacent to memorial graves, at this point in time, is proposed to be constructed entirely of glass. One design option which has been suggested is to etch the names of the people buried in the cemetery on this wall to remind persons visiting the site of its cultural connection to the former cemetery.

(iii) A pedestrian plaza area is proposed to be located from the eastern end of Chippendall Street across the top of Hale Street connecting, at grade to the western side of the service road which runs adjacent to the Baroona Special School.

(iv) An elevated pedestrian accessway is also proposed to be located along the eastern side of Castlemaine Street between Lang Park and the railway line. A light rail station is also proposed. The elevated pathway provides access to Chipendall Street.

Impacts of the redevelopment proposal upon the Christ Church are as follows:

(a) Bulk and Scale

The proposed development is not sympathetic to the existing bulk, form and scale of Christ Church. The proposed height of the stadium wall along the northern boundary of the memorial graves is approximately 34 metres. This exterior wall extends for the majority of this boundary and visually dominates and, in winter will overshadow this area. Similarly, the wall of the proposed southern grandstand is also unsympathetic to the existing bulk, form and scale of the rectory building which is within close proximity to this elevation. The height of this wall is also approximately 34 metres. The cumulative effect of these two walls along the northern and western boundary of the Christ Church precinct will act as a visual barrier greatly reducing the remaining Christ Church visual curtilage.

(b) Solar Access

The proposed development will have a great impact on the Christ Church precinct's access to natural light. Shadow diagrams prepared for the proposed development indicate that the site will be greatly effected during both summer and winter months. This could impact on the precinct's current composition of vegetation, and subsequently detract from the visual presentation and landscape qualities of the church.

(c) Streetscape

The bulk of the proposed stadium will severely diminish the streetscape values of Christ Church from Milton Road, and Castlemaine Street. Historically, the ability to view the Christ Church precinct from Milton Road has existed for over 110 years. This has in the past gradually been obscured by light industrial developments along the southern side of Chippendall Street. However, due to the elevated nature of the Christ Church site some view lines have been retained.

The proposal to cap Hale Street to provide a pedestrian plaza adjacent to the Church will add a new and exciting element to the Milton Road streetscape. This plaza will also provide a better linkage between Christ Church, the Barrona Special School which is also heritage listed, and the Petrie Terrace residential area.

The elevated walkway adjacent from Castlemaine Street, to the future light rail station may obscure the view of the church from Castlemaine Street.

(d) Cultural Reference

Due to the open nature of the existing stadium and the existing grandstands' north– south orientation, views to Christ Church from the residential areas to the north and north-west of Lang Park have been partially retained. The proposed enclosure and height of the proposed grandstands abutting the Christ Church site will result in a total loss of these views. This will remove the Church and Rectory buildings as elements of the cultural landscape for residents and parishioners of areas of Red Hill and Paddington.

The suggested design idea of etching the names of the persons buried in the cemetery on the glass wall adjacent to the memorial graves has merit as it will bring attention to the past use of the site. While it gives an indication of the earliest use of the site, many of the names of the nearly 10,000 people buried in the former cemeteries are not known.

Another design solution is to provide a stained glass wall in the proposed stadium as a backdrop to the church and cemetery.

(e) Privacy

The proposed development will introduce privacy issues for users of the Christ Church site. Persons attending Lang Park will have the ability to overlook the whole of the Christ Church precinct. The frequency of concurrent events at each place however is not expected to be great. The church parishioners have received notification of events at the proposed stadium in avance to avoid concurrent activity.

(f) Setting

The proposed pedestrian plaza over Hale Street will assist in providing a visual curtilage for the Church. Visitors to Christ Church will have the ability to view the church in an improved visual setting. In addition, the plaza area will assist in connecting Christ Church and Baroona Special School as a historical node with the Petrie Terrace historical precinct.

- **Baroona Special School**

The element of the proposed stadium which will impact upon the Baroona Special School is the 10 metre wide pedestrian pathway to be located along the Milton Road frontage of the Baroona Special School site providing direct pedestrian and disabled access between Lang Park, Milton Road and the Central Business District. The proposal is to re-orient the building on its present site to accommodate the width of the walkway. With a wider walkway, the existing trees can be retained.

The Queensland Heritage Register states that the two classroom buildings located on the western side of the site are specifically registered as cultural heritage places. These RG Suter designed buildings have been identified as being architecturally significant, and therefore removal or relocation of the buildings to another site are considered inappropriate. The intact relocation of the affected building on site could be appropriate, although the building is of masonry construction and thus would prove very difficult to relocate in an intact way. Loss of original architectural details affixed to the affected building would be inappropriate and would constitute significant diminution of the cultural heritage value of the listing.

- **Neal Macrossan Playground**

Elements of the proposed stadium which impact upon the Neal Macrossan Playground:

- proposed open pedestrian plaza. This area includes:
- Street tree planting along Caxton Street;
- Active recreation areas in the forms of a basketball court and oval amphitheatre area.

The impact of the proposed development on the Neal Macrossan Playground is considered to be minimal. Indeed the proposed development is generally considered to be an improvement to the streetscape and ambience of this location. The development of a line of street trees along the Caxton Street frontage as well as within the pedestrian plaza aids in visually connecting the Playground to the Lang Park site. In time, when the proposed trees in the pedestrian plaza mature, the existing trees located on the northern side of Caxton Street will combine with this vegetation providing an appropriate interface between the two sites.

The openness of this portion of Lang Park and the availability for use of this area by members of the general public reflects on the original intent of Lang Park as a recreational reserve.

❑ **Broader context**

- **Public Spaces and Pedestrial Walkways**

The pedestrian plaza and walkways will play an important role in assisting with the flow of pedestrians to and from Lang Park.

The only pedestrian plaza and walkways with implications for cultural heritage is in the area of the former Police Barracks on Petrie Terrace, adjacent to Caxton Street. The former Police Barracks site is included on Queensland Heritage Register. The proposed walkway will not affect the heritage significance of the Police Barracks building, although it will affect the building immediately to the south of this, currently tenanted by Hog's Breath Café. The proposed walkway will require the removal or demolition of this building. Whilst this building is not included on the Queensland Heritage Register, it in contributes aesthetically to the former Police Barracks precinct, and provides an important streetscape element to Petrie Terrace. For these reasons, it is considered to be worthy of retention if possible for re-use as an element of infrastructure within the overall pedestrian mobility strategy.

- **Former Police Barracks**

The proposed pedestrian infrastructure includes a walkway through the former Police Barracks site as an extension of Caxton Street. This walkway will connect with another coming through the Hogsbreath Café site before crossing the rail lines to connect with the City.

The land required for the pedestrian walkway has in the past served as a vehicle accessway. This accessway is proposed to be used for a similar function under a development approval for residential apartments granted by the Brisbane City Council.

Due to the fact that the proposed walkway will not have a direct or permanent impact on the former Police Depot building or significantly detract from its setting, the impact on its cultural heritage significance is considered to be minimal.

- **The Existing Character of the Area**

Land uses surrounding the site are essentially comprised of a mix of light industrial, sport and recreation, residential, office and entertainment. Within close proximity to Lang Park are elevated residential areas located along the ridges of the bowl shaped topography, including those houses along and near Petrie Terrace, Musgrave Road, Cairns Terrace and Moreton Street to the east and north of the site. These include many early tin and timber character houses. The topography of these areas is such that residential areas vary from being highly elevated above Lang Park to lower than it. With the former they are orientated such that Lang Park is included within their overall 'field of vision'.

Noticeable features which are included in this view include:

(i) Lang Park;
(ii) Castlemaine Brewery and light industrial areas to the west of Castlemaine Street;
(iii) St Brigids Church;
(iv) residential areas of Petrie Terrace, Paddington and Red Hill;
(v) Christ Church;
(vi) Coronation Drive office park development; and
(vii) elevated parts of Milton.

Located in the backdrop, noticeable features include:

(i) Mt Coot-tha foothills to the west; and
(ii) St Lucia, parts of West End and Highgate to the south-west.

These elements are considered valuable for reasons of providing residents with a strong sense of intra-city reference and identity. The proposed stadium does not generally detract from these elements.

❑ **Local Features of Community Value**

- **The Queensland Police Citizens Youth Welfare Association (QPCYWA)**

The Police Citizens Youth Club (PCYC) is currently located to the north-east of the Lang Park stadium, on the south-west corner of Hale and Caxton Streets. It has been associated with the Lang Park area since the late 1940s when the QPCYWA opened its first Police Citizens Youth Club in a wartime RAAF store. The shed was replaced in 1984 with the existing facility which provides activities for the youth of the area and complements the Lang Park site as a centre for active use.

The proposed stadium will replace the existing PCYC with an open pedestrian plaza. The suggested design intent is to incorporate the PCYC within the new facility. The existing PCYC buildings do not have any heritage value. From a community use perspective the suggested design intent to incorporate the use of the organisation near to its original location is considered a positive impact in this instance.

❑ Mitigation Measures

▪ Lang Park Stadium

The chequered history of the Lang Park site is unique in Brisbane. Many who currently visit the site are unaware of this uniqueness, and the history and cultural heritage significance of this place.

The introduction of the pedestrian plaza to the north of the stadium building reflects the long-standing intention of public usage of this land. This public accessibility is a positive aspect of the proposal.

The proposed stadium will provide a strong base for a range of measures which can enhance the readability of the site's historical and cultural significance. These may include the following suggestions that recognise and reinforce the sporting heritage of Lang Park:

(i) the provision of formal pedestrian areas to the north and south of the stadium allows for the development of interactive interpretation areas with walks/sculptures of past sporting greats and local identities relating to the site;
(ii) to highlight the original intent for the site as a recreational reserve, the pedestrian areas may include delineated paving patterns which could be used for handball/basketball activities etc;
(iii) This has been suggested in the northern area of the site but could also be included in other parts of the site; and
(iv) a formal planting pattern could be incorporated somewhere within the curtilage to reflect a graveyard pattern highlighting the previous use of the site as one of Brisbane's first cemeteries.

There is some potential to uncover human remains, from the original use of the Lang Park site during site preparation and earthworks. Should human remains be uncovered, the construction contractor should contact the appropriate authorities including the Queensland Police and the Environment Protection Authority (Cultural Heritage Unit).

❑ Local Impacts

(a) Christ Church

The Christ church precinct is an historic place with cultural heritage significance.

The proposed stadium will have measures to mitigate this impact including a significant and generally detrimental impact on the cultural heritage of the site:

(i) to provide visual integration of the Christ Church site, the proposed design could include the incorporation of curtilage setbacks from the Christ Church environs. Other treatments could include the use of glass in the walls and roof of the proposed stadium. Glass works, such as stains or engraving should be considered to provide a sensitive recognition of the precinct.
(ii) to provide some visual presentation of Christ Church and environs to the south-western view some setbacks of the proposed southern grandstand adjacent to Chippendall Street should be incorporated.
(iii) A mitigation measure for the overshadowing on Christ Church may include reviewing the height of the development adjacent to Christ Church or the use of glass or similar materials in the stadium roof. The benefit of this would be twofold, firstly solar access to Christ

Church would be greatly improved and secondly the contrast of scale on the Christ Church would also be lessened.

(iv) The proposed 'Church plaza' area over Hale Street to the Baroona Special School assists in visually connecting these sites and highlights this area as a historical node.

(v) The possibility either creating a stained glass wall or of etching the names of the persons who were buried at the Lang Park site into a portion of the glass wall adjacent to the memorial grave area has merit and should be further developed. This would assist in communicating to persons visiting the site the cultural heritage significance of Christ Church and environs.

(vi) In addition, the renaming of Chippendall Street (back to the original) to Church Street may increase the public's awareness of the immediate area as a former spiritual and religious precinct.

- **Baroona Special School**

Baroona Special School comprises a complex of buildings. The earliest buildings were erected in 1867 and 1874. The most relevant significance of this site attaches to the architectural worth of the buildings, and the demonstration of development of buildings over time of the school. Consequently, the actual position of these buildings on site is not quite of the same importance.

The mitigation measure is to re-orientate the R.G Suter buildings to accommodate the Milton Road pedestrian walkway while retaining the architectural features and details of interest. Prior to such works commencing, a Heritage Conservation Plan should be prepared, dealing with the following issues:

(i) retention of architectural features on the buildings;
(ii) retention and safety of the existing trees within the proposed walkway,
(iii) maintenance of views to, and the setting of the classrooms in relation to the proposed walkways and pedestrian plaza.

The proposal to "deck" Hale Street with a pedestrian platform from the intersection of Milton Road to Lang Park would provide for a visual link from the Christ Church precinct to the Baroona Special School, thus strengthening the prominence of these "townscape" elements within the streetscape and townscape of the locality. This strengthening of the visual prominence of the school, would prove to be an effective mitigating strategy to the consequent loss of visual prominence suffered by the school as a result of the scale and bulk of the proposed stadium.

6.2.8 Land Use & Urban Character

Land Use impacts are discussed in terms of the proposal's relationship to and consistency with the strategic land use planning intentions for the area as discussed in Section 4 of this EIS. These intentions include regional visions and strategies as well as local intentions expressed through current and proposed planning strategies, development control plans and local area planning.

❑ Impact on Regional Planning Intentions

The RFGM is a framework to guide local planning in order to help achieve sustainable and socially justified regional outcomes. The Lang Park Stadium Proposal has been recognised as being of state significance by the State Government. Development proposals of this size and scale, particularly in terms of associated public investment in both capital expenditure and direct infrastructure commitments have the ability to affect, or influence regional planning outcomes.

The vision for regional planning expressing future planning intensions for Brisbane and SE Queensland is broad. The proposed development can be seen to be consistent with this vision. The proposal is also consistent with the relevant key regional planning principles:

- supporting the CBD as the dominant centre for recreational facilities; and
- supporting the commitment to reduce dependence on private motor vehicles.

At the level of specific regional planning objectives there is extensive scope to argue the specific effects of the proposal on land use and community impact acceptability. Generally the regional planning objectives apply to the preparation of planning schemes and associated instruments, rather than consistency with a particular development proposal. In this regard it would be expected that the regional planning implications of a major stadium redevelopment at Lang Park have been already considered and accounted for in the designation of the Lang Park site as a Major Sporting Stadium in the Modified Draft City Plan.

The key regional planning objective that has been a consistent community focus of this development proposal is its fit within its surrounding land use context. In other words the issue of integrating land use and infrastructure with surrounding social, cultural and human resource impacts. "*To develop communities, planning should be comprehensive, integrating land use and infrastructure with social, cultural and human resource issues*" (RFGM – Regional Outline Plan Objective 10.3)

From a regional planning perspective achieving this objective is a task for local statutory land use planning – in fact it is probably the fundamental core of town planning and the concept of "orderly development". This is not an objective that can be achieved easily through control of individual developments at the development approval and subsequent building stage. If there are fundamental problems with the ability to integrate a particular land use within its surrounding community context then the planning controls should limit the use of the land to a level acceptable for integration with the surrounding social, cultural and human resources.

In this regard the Modified Draft City Plan has identified the Lang Park site as being suitable for a Major Sporting Stadium of undefined capacity with only Code Assessment. The Modified Draft City Plan if approved will therefore imply, that the use of the Lang Park site for a major sporting stadium is consistent with the objectives and principles of the RFGM and integrates with the surrounding social and cultural setting.

Other regional planning objectives relevant to the Lang Park Stadium Proposal include improving transport networks and facilities and concentrating development near transport nodes. The Lang Park Stadium Proposal includes an integrated transport strategy. The basis of this strategy include an 80% public transport patronage by stadium users. In this context, the proposal incorporates extensive investment in public transport and linkages with the existing transport modes in the City and Milton.

❑ City West Vision

The City West "Vision" brings together a number of significant development projects within the western precinct of the City including the proposal to redevelop Lang Park. The core of the vision is an integrated transport system based on maximising the use of public transport, walking and cycling.

One of the stated objectives for the Lang Park Stadium Proposal is:

- To provide an icon building within the overall City West vision and master plan.

The City West Vision identifies State development project areas which require better public transport and integration with City infrastructure. The public transport and pedestrian infrastructure proposed for Lang Park will go towards the provision of an integrated system for City West. However, the proposed stadium should not be seen as the primary element in bringing City West together.

❑ Local Strategic Planning

The key intentions of local strategic planning expressed in both the 1987 Town Plan and the Modified Draft City Plan are about "liveability" and "ecological sustainability". These concepts are very broad.

In regard to Lang Park, the issue of ecological sustainability is not considered to be a factor of significant concern given the demise of natural local ecosystems generally within the City Frame Area. While the principles of ecologically sustainable development (ESD) go well beyond the protection of natural ecosystems (precautionary principles, intergenerational equity), the issue of ecological sustainability has not been specifically raised in the Terms of Reference for this EIS.

The question of "liveability" is however directly related to the concept and principles of ESD, and is seen to be at the core of potential conflict between the Lang Park Stadium Proposal and elements of the surrounding and wider community.

In the context of the City of Brisbane, the Lang Park Stadium Proposal can be seen to support the idea of liveability through the development of a vibrant social venue for community entertainment that reinforces a cultural landmark, and which therefore contributes significantly to identity and sense of place. Lang Park undeniably has a unique sense of place as a rugby league venue of State and National significance. The redevelopment of the Lang Park stadium will enhance the existing landmark as a place which contributes substantially to the cultural identity of Brisbane.

The question of liveability at the local or neighbourhood level is a different issue. From a land use planning and development control perspective, liveability is supported by a vast array of planning directions, implementation criteria and general statements of intent. The core of these statements (generally identified in Section 4 of this EIS) is for development to respect, and be compatible with, the "character" of the neighbourhood in which it is located.

The compatibility of character at the level of local land use is expressed principally through such considerations as:

- level of intrusion and/or means of physical separation between incompatible land uses (particularly visual incompatibility or compatibility between noise and/or light generators and sensitivity uses); and

- complementing, maintaining and even enhancing the character and style of the surrounding area, including amenity, sense of place, and neighbourhood, appropriate to the environmental and cultural contexts of those areas.

The issue of compatibility between land uses is further discussed in the 1987 Town Plan in the context of the Strategic Plan's statement of intent for identified Major Institutions and Public Venues. This statement refers to ensuring integration, both internally within the venue, and externally within the immediate surrounds. This integration is required to be expressed in a "Concept Master Plan" for the venue prepared in consultation with the community and illustrating how integration is to be achieved.

The compatibility of character between proposed developments and existing neighbourhoods has been carried over from the 1987 Strategic Plan into the Modified Draft City Plan through similar "visions", statements of desired environmental objectives, and "Centre Concept Plans" for identified major public venues, including Lang Park.

The strategic plan's statement of intent requires the concept master plan before any approval of significant development or redevelopment will be contemplated by Brisbane City Council. Due to the position of the redevelopment also being within the "City Frame" area of Brisbane Strategic Plan, the following statement is also relevant – "*Council will not support applications for centre development which do not achieve appropriate integration and co-ordination of centre components both within the centre and with the surrounding area*".

❑ Character of the Proposed Stadium

According to the Concept Master Plan for the Lang Park stadium (HOK+LOBB & PDT Architects 2000) the aim has been to develop a scheme that takes into account the surroundings of the building and the impact the concept has on the surrounding community.

Integration of the proposed stadium within the surrounding neighbourhood is, according to the masterplan report, to be achieved in a number of ways, including:

(i) Reduced noise and light spillage to residential areas.
(ii) Establishing the stadium as a pavilion set within a redeveloped park setting which redefines the building edge and opens up the site. "In this way the building's mass and language addresses an urban setting through the transition zones of the redeveloped landscaped Lang Park".
(iii) The concentration of the "key impact areas" (transport nodes) of the stadium to the south.
(iv) The lowering of the effective mass of the building through the use of plazas and parklands to the south and north.
(v) The location of service entries to the stadium to the south away from local residences.
(vi) The use of materials on the elevations that respect the local vernacular. This includes the incorporation of 'Queensland' and sub-tropical design elements such as sun decks, verandahs, sun screens, and transition zones between the internal and external spaces of the building.
(vii) The mass of the building in relation to the surrounding residential area has been reduced by countersinking the stadium into the rising ground towards Caxton Street. This combined with the recessive nature of the building form provides a reduction of scale compared to the current western stand.
(viii) The absence of full height facades and features, combined with the horizontal articulation of the elevations, reinforce the subordinate scale of the building.

(ix) The use of a plinth base or podium for the stadium further reduces the apparent scale of the building. The podium, with its associated plant cover and use of brick cladding to the lowest level of accommodation, anchors the building to the ground, effectively reducing the scale of the building.

(x) The thin linear appearance of the roof, within the height envelope of the existing stand, emphasises the horizontal, reducing the perceived scale of the building.

(xi) The omission of lighting towers and the maximisation of roof coverage to the drip line will help to minimise the impact of light and noise spillage from the stadium.

(xii) The development of adequate pedestrian routes to and from various transport nodes and the CBD that provides benefits and increased amenity to the local residents and stadium patrons.

❑ Level of Intrusion

The concept plan has tried seriously to minimise the level of physical intrusion of the proposed new structure, and its associated increased use, will have on its surrounding community. There is no overcoming the fact however, that the level of physical intrusion from the site into surrounding land uses will increase in proportion to the scale of the proposed infrastructure and the increase frequency of events.

The physical separation between the proposed stadium and the most sensitive land uses, being the Christ Church and the residential and associated mixed uses such as the La Boite theatre to the east, is minimal.

The Christ Church is immediately adjacent to the south. Means of physical separation are basically total sound and light enclosure. There is no buffer distance and the physical presence of the proposed stadium will completely overshadow the Church in winter and also will expose the Church and its congregation to visual intrusion from the planned pedestrian access ways and public plazas. The Church is also seriously exposed to the concentration of transport infrastructure for the proposed stadium to the south and off Chippendall Street.

On the other hand, the proposed pedestrian plaza over Hale Street beside the Church will provide it with a much needed address and connectivity back into its Petrie Terrace community.

The physical separation between the residential areas of Petrie Terrace and the eastern edge of the proposed stadium is only some 25-50 meters across Hale Street. The greatest level of intrusion occurs where the proposed pedestrian plaza overhangs Hale Street adjacent to the Christ Church. While the proposed stadium will help to contain internal noise and light spill there will be the potential for significant intrusion into residential uses, with minimal physical separation, from the public plaza levels and access ways.

Land uses adjacent to the proposed pedestrian paths along Milton Road will also have minimal physical separation. Proposed barrier areas with extensive landscape treatments, including planting will help to lessen the level of intrusion.

The proposed northern plaza area of the proposed stadium will potentially have a positive impact on the surrounding northern land uses. These uses are generally open space related, being the Neal Macrossan Park, Ithaca Baths and Skate Park. The integration of PCYC and Ozsports into the proposed stadium and the continuation of existing outdoor volley ball will provide greater opportunity for public recreation activities, within a more attractive landscape setting. The existing

level of light and noise intrusion from the volleyball courts into the wider residential community will either remain or be minimised through tighter enclosure and extensive landscaping.

The level of intrusion into surrounding land uses to the south and west of the proposed stadium will not be as significant due to the general commercial, office, and semi-industrial trading carried on in these areas. These activities are not as sensitive to noise and light intrusion as the residential uses to the east, being generators in their own right, or being closed at night.

There is an area of residential land use immediately to the west of the proposed stadium off Heussler Terrace and Castlemaine Street. The level of intrusion from the physical presence of the proposed stadium will be significant in this area. There is the opportunity to provide extensive planting to the traffic island in Castlemaine Street which may relieve some of the visual impact of the stadium structure and the taxi set-down area. The proposed public entries to the proposed stadium will also facilitate public entry from the north and south rather than from Castlemaine Street and Hale Street thereby mitigating the impact from crowd assembly on this residential area.

A potentially significant issue, as far as liveability with the proposed stadium and its potential intrusion into the use of land surrounding the site, will be associated with traffic management. Parking restrictions are required to mitigate the impact of events on transport and access to local parking. However, these restrictions will constrain the livability of the land within the parking scheme area on event days.

The parking control scheme also must balance the needs of local businesses for customer parking. While the present situation is unacceptable, it is expected that in the initial "shake down" of the parking control scheme, there is the potential for impacts on local businesses from parking and from parking restrictions.

- **Character of the Surrounding Area**

The issue of compatibility of the proposed stadium as an architectural statement with the character of the surrounding area is an extremely complex question. There is no doubt that the scale of proposed stadium will contrast significantly with the scale of surrounding development, except perhaps the Castlemaine Perkins Brewery.

Significant attempts are being made in the design to mitigate character impacts through use of vernacular design features.

The compatibility of character between a proposed development and its surrounding, as defined in the Strategic Plan, is something that is appropriate to the environmental and cultural context of the area. While historic housing areas have their defined character, this should not become a required imposition on the character of a proposed stadium at Lang Park. The proposed stadium should express itself clearly as a major sporting stadium consistent with its cultural recognition as one of the major sporting grounds in Australia, and consistent with the expectations of the Modified Draft City Plan.

Potentially, the biggest impact that the proposed stadium would have on the architectural character of the surrounding area, would be from the indirect effects of associated crowd behaviour and security. The proposed stadium may lead to a consequential change in the character of the surrounding historic areas through the need for better security, such as high fences, enclosed verandas, security grills etc. Such changes would become necessary if crowd management is not effective. These impacts are potentially significant in terms of evolutionary changes to the style, amenity and character of the surrounding area.

These impacts equally can be generated by other forces of social change and development, such as the growth of commercial development and night life along Caxton Street, they should not be solely attributed to the redevelopment of Lang Park.

❑ Local Area Planning

As discussed in Section 4, the area to the east and north of Lang Park is identified, as an area with a unique heritage reflected in the style of the existing residential buildings. For this reason, development principles in recognition of this special character are contained within Special Development Areas to the east and north/north west of Lang Park.

❑ Petrie Terrace & Given Terrace Development Plans

There is a direct relationship between Lang Park and the local planning intentions for the development areas of Petrie Terrace and Given Terrace. This is due to the direct proximity of the relationship. Also the historical context behind the origins of Lang Park as a local recreation area and graveyard used by the surrounding neighbourhood is important.

▪ Commercial Planning Intentions

One of the principle aims of both the Petrie Terrace and Spring Hill Development Plan and the Latrobe and Given Terraces Development Plan, includes aiming to improve the residential amenity of these areas which suffer from the pressure for commercial expansion beyond the CBD. Commercial development is therefore limited, or at least tightly controlled.

There is an argument that the proposed stadium raises the potential for a significant commercial expansion of the area beyond the CBD. This would be in total contrast to the planning objectives for the surrounding Special Development Areas (while acknowledging that Lang Park is not contained within these areas). It would also be in contrast to the experience of other locations where stadia have been established.

It is understood that any commercial development associated with the proposed stadium is limited to event schedules and is therefore available only to stadium patrons and not the general public. There should be no significant impact on the commercial development restrictions applied through the Special Development Areas surrounding Lang Park.

▪ Historic Character Intentions

Another primary objective of the Special Development Areas is to help retain their historical and architectural character and associated amenity. In this regard all development and redevelopment is to be consistent with the traditional character of the area. Demolition or removal of buildings requires Council approval. Design codes are in place to ensure that new development retains the scale and character of the original buildings from the 1850 to 1920 period.

Potentially one of the more significant physical impacts of the proposed stadium is the possible requirement to remove or reposition a registered historic element of the Baroona Special School. The impact also includes encroachment into the identified curtilage of the Special School in order to widen the footpath on the northern side of Milton Road. Removal of the building would result in an unacceptable loss in heritage values and the sites however, the repositioning of one of the buildings could be acceptable provided the existing architectural features are conserved. The extension of a pedestrian walkway into the site would need to protect the existing trees and the character of the Baroona Special School.

An analysis of the potential urban design impacts of the proposed redevelopment is addressed in Section 5.2.5 of the EIS. It is identified that the scale of the proposed stadium will contrast significantly with the scale of the existing development in the surrounding locality. A significant attempt is however being made in the design to recognise the issue of surrounding heritage character and to respond in a positive sense through the deliberate use of appropriate materials and vernacular features.

During the preparation of the EIS, Council planners have advised that the proposed City Plan will include an extended Petrie Terrace Local Plan to include the Police Barracks Precinct. The intention is for development within this precinct to integrate with existing significant buildings without prejudicing the retention and appearance of these buildings.

The planning intentions for the Police Barracks are similar to statutory measures under the existing Particular Development Zones for this precinct. These measures include the retention of the existing buildings, including the Officers Mess currently operating as the Hogs Breath Café. Plans to demolish this structure in order to facilitate pedestrian movements through the precinct will result in the loss of a building of historic interest, unless all or some part of the building can be retained while achieving the objectives of pedestrian movement. It should be noted however, that the Officers Mess is not included in the Queensland Heritage Register.

- **Traffic & Parking Intentions**

A particular aspect of the Latrobe and Given Terrace Development Area is also to ensure that non-residential land uses fronting the Terraces do not lead to the increased use of residential streets for parking and the need generally to minimise the intrusion of traffic into these streets. The proposed stadium and the associated increase in event activities has a direct relationship with these areas with the potential to impact on this local planning intention. The issue is dealt with in specific detail in the parking control scheme and the public transport strategy (Section 5.2.4 EIS). Mitigation measures are proposed to minimise the potential for impacts.

- **Retention of Public Land**

The Latrobe and Given Terraces Development Plan within the Modified Draft City Plan also identifies the "Recreation and Community Use Precinct" of the Neal Macrossan Park, and the need to make it more accessible and attractive for use by the community. The scarceness of publicly owned land and the desirability to retain such land for public recreation are important planning intentions for the area.

The redevelopment of Lang Park has the potential to make important contributions to improving the accessibility and attractiveness of this Precinct, and to increase the area of publicly owned land available for community use. The retention of the well used outside volleyball area would contribute significantly to retaining the recreational use of the general area by the public.

❑ **Ithaca District Local Area Plan**

As addressed in Section 4 of the EIS, a Local Area Planning process is currently underway for the Ithaca district which covers the suburbs of Herston, Kelvin Grove, Paddington, Red Hill, Auchenflower, Milton and part of Bardon. Lang Park is contained within the eastern edge of the proposed Local Area Plan area.

The issues raised in the Draft Issues Paper (February 2000) are all addressed within this EIS consistent with the Terms of Reference.

Should the development application for the proposed stadium be made under the proposed City Plan, then the planning intentions of the proposed Ithaca District Local Area Plan could be of importance to the assessment, depending on the timing of the Local Area Plan and the formal adoption of City Plan.

The Modified Draft City Plan has identified Lang Park as being suitable for a "Major Sporting Stadium" subject to Code Assessment. There are presently no planning codes created that are specifically directed towards the consideration of major sporting stadium and its impact on surrounding communities. The proposed Ithaca District Local Area Plan and its associated community based involvement has the potential to directly influence both the level of assessment for the proposed stadium and the standards for development control consistent with the planning scheme.

❑ **Zoning or Area Designation**

From a land use planning perspective the most fundamental intentions for the use of land are obtained from its particular zoning or what has will become called, area designation. Despite the intentions of the surrounding area, the implication of the zoning or designation of Lang Park as either Sport and Recreation under the 1987 Town Plan, and as Major Sporting Stadium under the Modified Draft City Plan, is fundamental to the intended use of the land.

The proposed expansion of the existing stadium is consistent with the current use of the land and its designated statutory use for Sport and Recreation. It is even more consistent with the proposed future use of the land for "Major Sporting Stadium" under City Plan, without any process for public notification under code assessment.

There are elements of the proposed stadium, associated with the transport and access infrastructure, that have the potential to be inconsistent with the current designation of land use rights attached to the land required for the infrastructure works. While zoning or area designation used to provide some degree of planning certainty for the use of land, the concept of flexibility is promoted by the Integrated Planning Act 1997. Flexibility means that despite the classification of land use, any use is possible depending of the level of assessment required. The impact assessment process used within this EIS will be sufficient to accompany any applications for a material change of use for transport infrastructure associated with the proposed stadium redevelopment.

6.2.9 Social Impacts

❑ **Overview**

There is a range of attitudes to the proposal displayed by the local and broader community. There are a significant number of local people for whom nothing can make the proposal acceptable, and who do not want to see the proposal approved because they feel the wrong site has been chosen. There are also a number of local community members who are supportive of the proposal, would like to see the site better used and see advantages for their lifestyle in the proposal (**Technical Appendix**).

▪ **Opposition to Proposal**

The perceived inappropriateness of the site selection process by some sections of the local community and the tight timeframes for the production of the approval documents for the proposal

have galvanised some sections of the community against the proposal. New relationships and networks have been formed as a result of some sections of the community coming together in opposition to the proposal. This was observed during the course of the consultation clinics where nearest neighbours and residents' association representatives were able to share information and exchange views.

- **Community Survey**

Within the broader community, there is a range of attitudes to the proposal. Some of these attitudes were explored by a telephone survey, the details of which are in the **Technical Appendices**. Relevant points from the survey are highlighted below.

In general there was a high level of awareness of the proposal to redevelop Lang Park stadium. There was a low level of understanding of all of the elements of the proposal, however, with only 24 % of respondents being aware of the integrated transport strategy.

Nearly a third of respondents did not follow a sport that could be played at Lang Park. This figure is similar to the proportion of respondents who were indifferent to the proposal.

Support or lack of support for the proposal was fairly evenly spread, with 18 % strongly positive and 15.25% strongly negative. About two thirds of respondents were indifferent or only mildly positive or mildly negative about the proposal, indicating a high degree of disinterest among respondents.

These proportions change, however, with proximity to Lang Park. Opposition to the proposal increases with proximity to Lang Park, with more respondents in the study area (39.4%) holding a negative view of the proposal than a positive one (31.7%).

This trend towards a less positive opinion of the proposal in the study area continues through the attitudinal questions. For example, nearly half of the study area respondents felt that the appearance of the surrounding suburbs would be adversely affected by the proposal, compared with 36.5% in the Greater Brisbane area.

While a high proportion of respondents in both the Greater Brisbane and the study area agreed that the proposal would have direct community benefit, a noticeably higher proportion in the study area disagreed, or strongly disagreed with the statement (20.8% in the Greater Brisbane area compared to 36.5% in the study area).

There was a strongly positive response to the statement that local business would benefit from the Proposal in both the Greater Brisbane and the Study Area, although more study Area respondents (10.6%) disagreed with this statement than in the Greater Brisbane Area (2.4%). The experience of communities in other parts of the world does not support the community expectation that local businesses benefit from such development (Federation of Stadium Communities 1999: 57).

About a third of respondents to the survey felt that on-street parking would be improved, or greatly improved during an event if the proposal goes ahead. 43% of respondents felt that on-street car parking would be worse, or much worse if the proposal goes ahead. This proportion increased in the study area, where 54.8% of respondents felt that street car parking would be worse or much worse, if the Proposal goes ahead.

These proportions were similar regarding traffic congestion, where (53.75%) of respondents felt that traffic congestion would increase or greatly increase, even with an integrated public transport

strategy in place. A slightly higher proportion of respondents in the study area (58%) felt that traffic congestion would increase or greatly increase.

A majority of respondents to the community survey (in both the Greater Brisbane area (54.25%) and the Study Area (60.6)) held the view that pedestrian links and would be improved if the proposal, and integrated public transport goes ahead. A noticeable proportion of respondents in the Study Area disagreed that pedestrian links would be improved. (9.75% in the Greater Brisbane area compared with 17.3% in the study area).

Most respondents to the survey were of the view that existing problems such as noise, light and crowd behaviour would increase, or greatly increase (54.5%) if the proposed stadium goes ahead. This proportion was higher in the study area (63.5%).

A high proportion of respondents to the survey felt that the lifestyle of the local community would be reduced (32.75%), or greatly reduced (11.5%) if the proposed goes ahead. These proportions are also high in the study Area where 31% of respondents felt that their lifestyle would be reduced and 21% felt that it would be greatly reduced.

It is possible that the formation of negative attitudes towards the proposed by some sections of the community will lead to other community members being reluctant to participate in further community consultation activities regarding the implementation and management of the proposal should it go ahead.

It is probable, however, that many other interested and capable individuals in the community would participate effectively in further community consultation structures should they be established, whether or not they support the proposed redevelopment.

❑ **Change in Community Focus**

- **Population Growth**

It has already been established that the proposed stadium will not affect the projections for population growth in the area. The inner city nature of the residential areas is already under pressure from different sources to higher density living. The introduction of new people into the area is not expected to change this trend, as the operational workforce will not be large.

- **Transport & Pedestrians**

The integrated transport strategy for the proposed stadium will enhance the pedestrian links between Paddington/Milton and the city centre. The strategy will facilitate the efficient movement of large numbers of people into and out of the area, before and after events. This will not change the community focus, as there will be large numbers of people in and out of the area in a short amount of time.

The proposed stadium is expected to accelerate the increase in the number of nights that existing public bars and nightspots in the area are at capacity. (**Technical Appendices**).

- **Leisure & Recreation**

At present focal points for leisure, include the Ithaca Pool, the PCYC, Volleyball courts, Ozsports and the skate park at one end of the shopping strip. New leisure opportunities will be available to the local community, in the proposed northern pedestrian plaza parkland. This is not expected to

attract a significant number of new people into the area but rather improve amenity for residents in the local area. The proposed pedestrian plaza and parkland is consistent with the current leisure and sporting focus in this area.

- **Shopping and Entertainment**

No new retail opportunities in the proposed stadium are proposed redevelopment. Therefore there is not expected to be competition with the local business community and the existing retail focal points are expected to remain.

The proposal encompasses two restaurants within the complex. The clientele for these restaurants is to be drawn from the patrons at events so that they will not affect the current focus of retail activity in the local area. There is not expected to be any competition with local business in the area for other retail opportunities. The late night focus of nightspots on Caxton Street and Petrie Terrace and mixed business on Given Terrace would remain unchanged by the limited commercial opportunities associated with the proposed stadium.

❑ **Changes to Local Behavioural Patterns**

The increased frequency of events at Lang Park will create a necessity for local residents to plan around the event schedule more closely than they do at present. This might mean those plans involving travel in or out of surrounding suburbs on event nights would need more time to accommodate any delays due to the closure of Caxton Street, or the pedestrian flows across Hale Street and Petrie Terrace.

Also local residents will need to obtain parking permits for their own vehicles, and those of visitors should they plan to hold private functions in their homes on event nights.

The large number of people coming to the area to attend events is not expected to change daily behavioural patterns for most businesses.

The proposed parking scheme may mean that local cafes and restaurants that rely on curb-side parking have less people visiting the area on event nights, as the parking restrictions prevent them from staying longer than a few hours. Staff working at these premises may also experience difficulty in parking on event nights.

Disruptions to traffic flow due to the closure of Caxton Street will occur shortly before and after major events, and therefore are not expected to affect the behavioural patterns of these businesses outside event times.

Most of the resident associations have been formed around a number of development issues in the area. These groups would continue to function should the proposed redevelopment go ahead. There are a small number of near neighbours who may decide to leave the area if the proposed redevelopment is approved. Many of the residents' associations have broader goals than influencing the outcome of the Lang Park redevelopment, and these groups are expected to continue.

A number of residents have experienced distress and anxiety as a result of the proposal to redevelop Lang Park stadium, and the cumulative effects of a number of other development proposals in the area such as the Inner Northern Busway, the Inner City Bypass and the Roma Street Parklands.

Many residents' concerns have been addressed through the community consultation process and mitigation measures in the Environmental Impact Statement for the Lang Park Stadium Proposal.

There are some community members however, who will continue to experience stress and anxiety about the effects of the proposal should it go ahead.

❑ **Implications for Public Health, Safety and Amenity**

- **Crowd Movement**

The proposed stadium and related integrated transport strategy are designed to maximise people's safety before, during and after events. Safety features include security cameras to Roma Street, monitored for 24 hours a day. Well-lit, wide pedestrian flows have been designed to overcome some of the existing problems with crowd management in particular as patrons are leaving the venue. Attention should also be paid to the possible need for police or security staff at peak times.

- **Crowd Behaviour**

At present, on the nights of major football events at Lang Park there are a number of impacts arising from rowdy behaviour, including obscene language, urinating in streets and damage to private properties and cars. (**Technical Appendices**). The consultation process suggests that many of these problems occur well after events at Lang Park.

The introduction of parking controls is one mitigation strategy, which will decrease the likelihood of these behaviours in local streets after events, as people will not be returning to cars parked in side streets.

In addition, it is proposed that an alcohol management strategy including local licensed premises, the Lang Park Management, Police, Liquor Licensing and local community members be established, should the proposed stadium proceed. This would include preventing anyone that was already intoxicated from entering the Stadium on event nights, and adopting a code of behaviour to manage the behaviour of crowds.

Crowd behaviour during events is expected to improve if the proposed redevelopment of Lang Park goes ahead. This is because individual seating arrangements as are proposed for the Stadium redevelopment are expected to have a marked effect on crowd behaviour (Consultation Clinic on Safety and Crowd Behaviour, **Technical Appendices**). Crowd behaviour is improved because it is easier to find Police when everyone else is seated and there are less incidences of nuisance behaviour such as people spilling drinks on others when the crowd is seated. In addition patrons have a defined zone and do not have to compete for space, reducing the incidence of conflict.

Additional measures to improve crowd behaviour include the sale of mid strength beers; active and effective techniques to be used by Stadium Management, and the enforcement of a code of behaviour.

Often measures, beyond the scope and control of stadium management, should include stricter control over the sale of liquor in licensed premises in Caxton Street and Given Terrace and integration between the stadium and Caxton Street/Petrie Terrace licensed venues management practices.

- **Emergency Services**

The ability of emergency services to access the narrow residential streets in the area is, already a problem for local people in the area. The consultation process has revealed circumstances where local residents have been caught in football-related traffic jams while rushing small children to nearby hospitals (**Technical Appendices**). The integrated transport strategy which aims to prevent most people attending events from using private vehicles, if successful, will mitigate existing traffic flow problems associated with major events at Lang Park.

The primary concern of Police is to get people away from the proposed stadium after an event as quickly, efficiently and safely as possible (Consultation notes, Safety Clinic). The proposed stadium design channels the crowds towards exits at either end, and the transport strategy provides for the efficient movement of large numbers of people away from these points. These modern pedestrian and transport flow strategies are expected to achieve the Police goals regarding crowd movement.

Concern was expressed through the consultation process, and in the near neighbour surveys, that Police will not respond to emergencies on event nights because they are busy with crowd control.

Interviews with Police (**Technical Appendices**) confirm that they are responsible for normal Police duties during major events at the Stadium. Additional Police are currently employed on "Special Duties" for major events at Lang Park. This means that while normal Police patrols continue in the area on event nights and Police respond to calls as usual, at least 40 additional Police will be located inside the Stadium and 10 additional Police located outside the stadium, at the expense of the event organiser. This additional Police presence will cease one hour after an event, however security cameras will continue to monitor the walkways.

It is recommended that a code of behaviour be adopted by the Lang Park Management, similar to those used successfully elsewhere and that the enforcement of the code of behaviour be monitored by the proposed Stadium Management Advisory Committee.

- **Impacts due to Seasonal Changes**

The proposed event schedule for the redeveloped stadium anticipates capacity events once or twice a year in May or June with State of Origin matches. It is expected that there would be two matches with large crowds of 45000 for Rugby Union International and Rugby League International games between June and August. Thirteen National Rugby League matches attracting crowds of up to 35000 between February and September are also anticipated. One additional major event such as a religious event attracting a crowd of up to 35000 is also expected at any time of the year. The crowd size then reduces significantly to between two and four Super 12 Rugby matches attracting up to 25000 people between February and May.

Assuming other events are not found to fill the gap, this leaves the proposed stadium virtually unused for four months between October and January each year thus requiring particular attention in maximising community safety during this period. The greater frequency of events will occur between April and June when State of Origin, Rugby Union International and Rugby League International matches are held. There will be National Rugby League (NRL) matches also occurring during these months. It is possible that events would be held on consecutive weeks during these months, noting however, that the most frequent NRL fixtures are usually held on a "home and away" basis.

During February, March and July, August and September, the National Rugby League matches could occur on a fortnightly basis. The frequency of events during this time is likely to cause increased stress and decreased amenity during these months.

❑ Implications on Access and Movements

▪ Access

The integrated transport strategy and proposed parking controls are based on the principle that large numbers of patrons will attend events by using public transport. These proposals aim to alleviate many of the adverse effects relating to property access, and local pedestrian and vehicle movement associated with current operations at Lang Park (**Technical Appendices**). The transport and parking control strategies will address the considerable difficulties currently associated with local residents being parked into their homes by illegal parking and being parked out so that residents cannot find a car park if they leave their homes for short periods during a major event. In addition, the transport strategy will address residents' difficulties finding a car park when returning from work on the nights of major events (**Technical Appendices**).

▪ Parking

The proposed parking controls and integrated transport strategy is expected, in balance, to have a positive effect on the current situation by reducing existing problems. There remains a concern in the local community, however, that the parking proposals will not work (**Technical Appendices**). These concerns are based on beliefs that:

(i) Brisbane residents are culturally oriented towards the use of private vehicles (**Technical Appendices**);
(ii) many patrons will simply park illegally and risk a fine to attend events at Lang Park; and
(iii) the large catchment area to be subject to parking controls around the stadium will be difficult and costly to police. (Consultation Clinic 6, **Technical Appendices**).

Local restaurants in the Paddington area are concerned that they may be adversely affected by the proposed parking controls, as they currently depend on the availability of roadside parking. Many cafe and restaurant patrons usually stay longer than the proposed two-hour limit. Proprietors are also concerned that they will have to actively prevent football crowds from parking in their off-street parking spaces. In addition, it is probable that many events at the proposed stadium will coincide with the Friday and Saturday night peaks in trade for these businesses.

▪ Road Closures

The proposed road closures before and after major events at the Lang Park are seen as having the potential to affect local property access and vehicle movements for residents who depend on roadside parking for their private vehicles. For example, of the 36 respondents to the near neighbour surveys who were concerned about, or identified disadvantages with, the proposed redevelopment of Lang Park, 21 were concerned about increased traffic congestion and parking in the area, during major events (**Technical Appendices**). Some of these respondents were concerned that it would be more difficult to get to and from their homes during events held at the proposed stadium because of road closures and diversions, and because of illegally parked cars in narrow streets.

Respondents to the business surveys were also concerned about access to their premises due to road closures before, during and after events. In particular, some businesses in the light industrial

area are concerned that the closure of Castlemaine Street during events would prevent customers from entering the area and therefore decrease trading opportunities. In addition, staff who work on weekends will be prevented from using roadside parking during major events (Consultation Clinic 6). It should be noted that road closures generally would occur outside the normal business hours of 8.30am – 5.00pm on weekdays. Closures may occur earlier for weekend events.

The proposed road closures and pedestrian flows are described in Section 4 of the EIS. It is probable the closure of these roads will mean residents, business owners and their staff will need to use alternative routes for accessing major roads before and after events.

If Castlemaine Street is closed off to public access on a regular basis it is possible that retail businesses in the light industrial area may lose potential customers. The extent to which this affects business viability, and the extent to which liaison between traffic controllers and local business can ameliorate these effects, should be monitored by the proposed Stadium Management Advisory Committee.

❑ Implications for Local & State Government Services

Some additional Local and State Government services will be required to manage crowds and carparking during events at the proposed stadium. Additional Police will be required to patrol the proposed stadium, the surrounding areas and the traffic and pedestrian flows. An ambulance is required on site for the duration of major events. Additional parking inspectors from the Brisbane City Council will be required to enforce the proposed parking controls. At present, these additional services are drawn from staff prepared to work additional shifts or overtime. The cost of these additional staff is borne by the event organiser and is built into the cost of staging the event. This practice will continue for the proposed stadium.

Additional public transport such as shuttle buses from City car parks, trains and light rail required for an event would also be self-funding. A more detailed discussion of the effects of the proposal on public transport can be found in the Integrated Transport Strategy.

The additional services required to manage events at the proposed redevelopment of Lang Park will be funded by the stadium operator, and will not affect the current resourcing of State and Local Government services.

❑ Impacts on Commercial & Retail sectors

The proposed stadium is not expected to diversify the commercial and retail sectors in the study area. While existing retail outlets might be able to attract more trade as a result of the increased number and frequency of people in the area, this is not expected to create new business opportunities.

❑ Changes in Employment & Occupational Opportunities

The community survey of Greater Brisbane and the study area shows that most people believe there will be employment benefits arising from the proposed stadium. Most respondents (69%) agreed that more jobs would be created although this proportion was slightly reduced for the study area (60.6%).

The proposed stadium is not expected to significantly change employment and occupational opportunities in the study area. It is possible that additional staff will be required for any sports retail outlets and the restaurants that will be located in the proposed stadium. These businesses

are not expected to operate outside event times and so will not require many additional full time staff.

There will be more casual staff employed on a more frequent basis during events at Lang Park, however these staff are likely to be drawn from the existing Brisbane workforce and be able to commute from their residences outside the study area.

❑ Impacts on Community Infrastructure & Services

The proposed design of the stadium will incorporate existing community infrastructure and is not expected to create any long-term changes. The cost of using existing facilities is expected to remain the same. There may be conflicts between the needs of Ozsports and PCYC patrons and those attending events on event nights. This may decrease the accessibility of informal sport and leisure opportunities to nearby residents and young people on these nights.

The integrated transport strategy will enhance community infrastructure for pedestrians by creating improved pedestrian links between the local area and the City.

The possible extension of light rail to Milton and the proposed transport station at the southern end will increase the public transport options to the area. There is a concern in the community that more community benefit should be created by these new transport links and that the light rail and bus way are too "stadium focussed" and provide no benefit for the local community outside events at the proposed redevelopment of Lang Park stadium.

Alternative locations and alignments for public transport modes were evaluated and found to be unfeasible for technical reasons (gradients and interruptions to traffic flows). The proposal does contribute towards the fitout of an additional station on the Inner Northern Busway at Countess Street. While of limited benefit to stadium patrons, this station will enhance the convenience of the busway for Petrie Terrace residents there are also potential benefits pertaining to the proposed upgrade of Milton Station.

More public open space will be provided at the Caxton Street entrance to the proposed stadium in response to a need for more public open space identified by the local community in the Ithaca Local Area Draft Plan and EIS consultation process.

❑ Implications for Property & Rental Values

Information from the face-to-face interviews suggests that some people believe that property values will go up while others believe property values will go down if the site is redeveloped (**Technical Appendices**). The economic impact assessment shows that the proposed stadium is not expected to have a significant influence on the long-term trend of increasing inner city residential property values.

The proposal does not involve a large permanent incoming workforce and is not expected to affect the rate of population growth in the area. No new demand for rental accommodation will be created and therefore the high proportion of renters in the area will not be affected by the proposed redevelopment.

❑ Impact on Amenity

The proposed stadium would be completely enclosed and therefore the current nuisance effects of noise and light are expected to be significantly reduced. Although noise and light spill will be

reduced, the reduced effects will be experienced much more frequently. It is still expected, however, that the impacts of noise and light spill will be significantly better than at present.

Another possible nuisance effect that has potential to affect the amenity of the area is the possible increased frequency of noise from fire works and helicopters. Near neighbours report that fireworks disturb their dogs. The noise from helicopters with film crews filming major events can also cause disturbances for near neighbours. The proposed waterways to Milton Station could have negative impacts on the privacy of adjoining residents.

The proposed stadium will be situated between Mt Coot-tha and properties near Caxton Street, behind the Stadium. There is concern that a large structure will affect television reception.

❑ Implications for Minority Groups

▪ Gay Community

Some safety concerns for groups such as gay men were identified in the preliminary consultations, the Environmental Impact Statement consultation process and in near neighbour interviews. The Police Liaison Officers to the Lesbian, Bisexual, Gay and Transvestite (LGBT) community and the AIDs Council were invited to identify concerned representatives of this community for a focus group. However, these organisations were unable to confirm that these concerns were widely shared and no participants could be nominated.

▪ Indigenous Community

The Consultants wrote to the Foundation for Aboriginal and Islander Research and Action (FAIRA) to establish whether or not there were traditional owners in the area who would like the opportunity of discussing the proposed redevelopment. FAIRA has not responded to date, however further inquiries will be made.

▪ Women

A focus group was held with local women in the area, selected with the assistance of Paddington Red Hill Community Centre. Concerns identified by these women were:

(i) the possibility of increased crime against women from drunken men after games;
(ii) more car accidents in the area;
(iii) possible impacts on traffic, noise, light and family safety; and
(iv) behaviour of State of Origin patrons causing concerns for safety.

▪ Senior Citizens

A focus group was also held with senior citizens in the study area. The primary concerns were

(i) patrons parking in narrow streets;
(ii) restricted mobility due to traffic congestion;
(iii) feeling "trapped" at home on Origin nights due to the antisocial behaviour of large football crowds;
(iv) concern about the Christ Church on Chippendall Street (no congregation means less money for upkeep);
(v) air movement in an enclosed stadium; and
(vi) light, noise, parking and access.

These concerns will be addressed by the reduction of patrons wandering around residential areas as a result of the integrated transport strategy and the introduction of parking controls. The code of behaviour proposed will also improve these crime and safety effects.

- **People with Disabilities**

People with a disability were also invited to participate in a focus group. Major concerns for disabled people were

(i) parking and access to the stadium;
(ii) getting through turnstiles at the entrance to the stadium;
(iii) access to seating; and
(iv) safety issue of wheel chairs in large crowds.

These concerns have been addressed through the proposed stadium design, which provides for disabled parking, access and seating.

- **Change in Leisure and Recreational Opportunities**

The proposed stadium will retain existing leisure and recreational opportunities within the study area. It is possible that community access to these leisure activities will be reduced, especially during construction where there are likely to be significant effects. These facilities are also expected to be less accessible during April to September as their operations might conflict with stadium operations during an event.

The current use of Lang Park by local primary and high schools is not expected to continue. This will affect the capacity of these schools to provide acceptable sporting venues close to their neighbourhoods. Children will need to be transported to alternative locations. This could result in less community feelings of "ownership" of the proposed stadium.

The local area is already seen to be losing venues for informal leisure and recreation activity with the closure of the Milton tennis courts. The loss of the use of Lang Park for local schools could contribute to the decline in access to informal sporting and leisure opportunities for the local community.

It is recommended that every effort is made to reduce potential conflict between users of Ozsports and the PCYC and users of the proposed stadium. It is also recommended that the low cost and affordability of these facilities be retained.

There is likely to be considerable disruption caused by construction effects on La Boite Theatre, Ozsports, PCYC and the Christ Church on Chippendall Street. These venues are likely to be affected by the movement of heavy vehicles and the noise and vibration effects from the demolition of the existing stand.

❑ Impacts on the Social & Cultural Value of Lang Park

Lang Park is well remembered in Paddington's oral history. The existing stadium itself is also remembered in local oral history. Lang Park also has a place in Queensland and Australian history as the home of Rugby League in Queensland.

A focus group was held with patrons of Lang Park football events (**Technical Appendices**). The social and cultural values of Lang Park that were most important to these patrons were:

(i) the need to preserve good viewing quality, atmosphere and interactions which generate atmosphere;
(ii) the need for a "buffer" of grassed areas and a children's grassed play area;
(iii) the importance of the ground's history to patrons; and
(iv) the view that working class supporters who can't afford expensive seats should be catered for.

The first point has been addressed in the Master Plan for the proposed redevelopment of Lang Park stadium. Good viewing quality has been preserved by the design of the grounds ensuring that some patrons can still sit in close proximity to the pitch.

Some of the patrons who attended the focus group also felt the existing stadium was "ugly". Some patrons believe that the site itself is of historical importance to the users of Lang Park as it is associated with Rugby League. While other events such as Rugby Union and Rugby Sevens may be held if the proposal to redevelop Lang Park proceeds, Rugby League is expected to be a significant focus of events. In this way the historical value of Lang Park to patrons will be preserved.

❑ Other Social Effects

One issue raise several times throughout the consultations and interviews was the need to extend the clean up area after an event. The integrated transport strategy and proposed parking controls will mitigate the incidence of litter to some extent, because far fewer people will be walking back to cars after an event. In addition it is proposed that rubbish bins be placed along the walkways and in strategic places before events and then removed after events at the cost of the event organisers.

Recommendations

The recommendations contained in this report are summarised below:

- Any use of the existing street parking areas by the construction workforce should be carefully managed to ensure the local businesses and residents are not disrupted, especially for lengthy periods of time.
- The Stadium Management Advisory Committee should monitor the effects of construction and a procedure for near neighbour liaison with the construction contractors and sub contractors be developed as part of the tender process for the construction.
- A code of behaviour should be adopted by the Lang Park Management, similar to those used in New Zealand, and that the enforcement of the code of behaviour be monitored by the Proposed Stadium Management Advisory Committee.
- The extent to which the closure, or partial closure of Castlemaine Street affects business viability, and the extent to which liaison between traffic controllers and local business can ameliorate these effects, should be monitored by the proposed Stadium Management Advisory Committee.

- If properties are resumed then the attachment of some long time residents to the local area should be sensitively managed.
- Every effort should be made to reduce potential conflict between users of Ozsports and the Police and Citizens Youth Club and users of the Stadium. It is also recommended that the low cost and affordability of these facilities be retained.

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6.2.10 Economic & Business

❑ Introduction

The terms of reference for the economic assessment as set out in the EIS are to assess:

- the beneficial and adverse impacts on existing businesses and commercial activities both within the immediate study area and the wider community;
- potential impacts on property values (real and probable); and
- an assessment of likely levels of employment and income (both direct and indirect) during construction and operation.

Based on these terms of reference, the economic assessment is provided in three parts:

- a quantified assessment of direct employment and income during both construction and operational phases of the new Stadium;
- an unquantified assessment of the impacts on business turnover and property values in surrounding areas; and
- an estimate of the flow-on or indirect effects on employment in both the construction and operational phases of the new Stadium, or induced by expenditure of the additional incomes created.

No attempt has been made to estimate the effects of spin-off expenditure on businesses in areas surrounding the proposed stadium. The economic benefits of stadium developments are often over-estimated because of the failure to take account of substitution and displacement effects. Substitution and displacement effects occur where spin-off expenditure is confused with spending that is diverted from other activities or localities.

❑ Other Issues

A number of specific issues were raised during the community consultation which could impact on the economic assessment. The key issues are indicated below and are addressed later in this section.

Key issues include concerns:

- with parking related to matches and events at the proposed stadium. There are concerns about the parking impacts on residential and business access on match days and that additional matches with larger attendances will make the situation worse. The concerns are that the proposed parking restrictions will not solve the potential problems;
- that businesses' off-street parking may be used by stadium patrons;
- about the potential impacts during construction including impacts on:
  - residential house values;
  - businesses due to reduced access on match days;

- restaurant and hospitality businesses if large crowds discourage their normal patronage; and
- on the impact of temporary street closures on:
- customers;
- delivery vehicles.

In addition to these concerns expressed by the local community, there were views that the redevelopment could have a beneficial impact and increase turnover for some businesses including food and beverage and retail outlets.

The consultation also identified a range of mitigation strategies that could reduce or eliminate the perceived adverse impacts of the development. These are discussed in this report in relation to their potential economic implications.

❑ Methodology

The economic assessment includes an employment impact assessment based on the Queensland Government's Employment Impact Statement Guidelines. These guidelines were effective from September 1999 and set out the General Procedures for employment assessment as part of an EIS together with specific issues for consideration.

The guidelines put emphasis on the direct employment impact of projects. They also stress the importance of determining any substitution or displacement effects of the proposed project so that the estimated direct employment is the incremental employment attributable to the project.

The guidelines recognise the indirect and flow-on impacts of projects in the region where the activity is located (multiplier effect) but note that multipliers provide an estimate of gross flow-on employment effects and do not take into account displacement and substitution effects and may not make appropriate allowances for leakages from the region, State or national economies. They also note that the source of funds for a project will affect the benefits. Projects in Queensland that are funded by State or local government funds will not provide an increased benefit to the State as the funds would have been used on other projects within the State. State funding may provide a regional benefit. On this basis, the Guidelines note that EIS's should only include discussion of indirect effects where formal quantitative modelling has been undertaken. Such modelling has not been undertaken and is not required under the terms of reference for this EIS.

The purpose of the employment impact statement in the EIS is to provide a potential incremental employment estimate for the Lang Park proposal compared with the employment potential from other projects competing for State government funding.

There are two concerns in ignoring the potential flow-on employment impacts in relation to the Lang Park project. The first is general, the second is project specific, as follows:

- the employment potential from a project is, to some extent, industry and region specific (that is, the employment multipliers vary between industries and across regions). On this basis, ignoring the flow-on impacts should lead to funding for projects and regions that offer the highest direct employment but which may not offer the highest overall employment potential;
- the benefits of the Lang Park Redevelopment project are based on its ability to attract larger matches and events that can attract additional interstate and international visitors. Attraction of the larger events may include an element of competition with interstate venues. Presentation

of the full incremental potential employment impacts may be necessary in determining whether State or local government support is warranted to attract the event.

On this basis, we provide an indicative estimate of the potential flow-on benefits of the proposal. The limitations of these estimates is discussed.

The assessment also discusses qualitatively the potential:

- impacts of increased frequency of major events on local businesses; and
- impacts on property values.

❑ Economic Impact of a Major Sporting or Other Event for Queensland

The impact at the State level of a major event such as hosting the Bledisloe Cup relates to the new income brought into the State. This will usually relate to the expenditure in Queensland of visitors who have come specifically for the match or event from interstate or overseas. Care needs to be taken to ensure that these visitors would not have come anyway. For example, expenditure would need to be discounted for;

- interstate and overseas visitors who are already in the State and attend the event to reflect the expenditure they would have made without the event. However, this group may extend their stay or spend more which would provide a net additional benefit; and
- visitors who would normally have visited Queensland but who arranged the date of the visit to coincide with the match or event. Again, the net benefit of the match or event is only the incremental expenditure related to the event/match and not their full trip expenditure.

The actual benefit of any big match/event will depend on the incremental expenditure of interstate and international visitors as a result of attending the match.

As noted in Section 5.1 of the report, hosting the Bledisloe Cup in Victoria in 1997 was estimated to generate some $61 million in additional income. This was the incremental expenditure of some 16,520 (18.3% of total visitors to the match) new interstate visitors and 8,350 (9.3%) new overseas visitors. The average expenditure of this group in Victoria was some $1,150 per head or $19 million for interstate visitors and some $1,800 per head or $15 million for overseas visitors.

Hosting the Bledisloe Cup in Queensland is likely to attract less interstate and international visitors, because of the large audience already in Queensland. In particular, many of the interstate visitors to Melbourne would have come from Queensland. These would be unlikely to be replaced by say Victorians visiting Brisbane.

If we use the total visitors discussed in Table 3.2 for the Bledisloe Cup of 52,500, the proportion of new interstate and overseas visitors is reduced to say 20% (rather than 27% in Victoria) to reflect the reduced new interstate and international visitors to Queensland, the proportion of interstate (66.7%) to overseas (33.3%) and the expenditure per head is assumed to be the same as in Victoria as above, hosting a Bledisloe Cup at Lang Park would generate some $14 million in new direct income to Queensland. Using the same multiplier as Victoria, the total income could be some $25 million.

❑ Construction Benefits

▪ Cost of Construction

The proposed stadium entails a total project cost of $279.7 million.

❑ Direct Employment & Income Impact Estimates During Construction

These costs have been split into construction and equipment expenditure to reflect differences in adjustment for trade margins and net taxes on products and salary and wage differences between the relevant sectors. The allocation includes on-site and off-site works in **Table 6.2.6** for the proposal. The table indicates the income and employment implications of the proposed development under each option.

Table 6.2.6 Calculation of Direct Employment & Income Impacts Construction Phase – Stadium Proposal

	Note	Unit	Change in Final Demand Construction	Machinery & Equipment
Output	1	$mill	249.90	23.60
less Direct imports	1	$mill		7.57
			249.90	16.03
Basic prices adjustment factor	2		1.00	0.65
Output at basic prices	3	$mill	249.90	10.42
Direct labour req'ts coefficient	4	%	22.80	27.50
Employees' compensation	5	$mill	56.98	2.86
Average annual compensation	6	$	45907.65	45519.73
Direct jobs created	7	no.	1241	63
Period of employment	8	years	2.50	
Average direct jobs per year	9	no.	496.45	

Notes:

1) From Davis and Langdon master planning costings(28 April 2000). Includes Project Contingency at 7.5%. Excludes Escalation. 'Machinery & Equipment' items classified as final demand are scoreboard, public address & communication systems, pitch works and stadium lighting (fixtures, fittings & equipment classified as intermediate usage). These items are based on HOK + LOBB/FDT Estimates 1999 adjusted. Scoreboard & pitch works assumed imported.
2) Adjustment for trade margins and net taxes on products. From ABS, Input-Output Tables 1994-95, Catalogue No. 5209.0, Table 3 for Product Group 4102 & 2806,2807,2808,2810.
3) x (2)
4) As for (2), Table 5 for Industry Code 21 & 18 (the latter recalculated for zero import usage as imports were subtracted in (1) above).
5) x (4)
6) From ABS, Average Weekly Earnings November 1999, Catalogue No. 6302.0, Table 10 for Construction & Manufacturing. 'Full-time adult total eamings' adjusted for increases between February and November (using Table 1) and for employers' social contributions (from ABS, Australian System of National Accounts 1998-99, Catalogue No. 5204.0, Table 3.4).
7) (5) / (6)
8) From Section 10 of PDT/HOK + Lobb report quoted in (1).

The impact that construction of the proposed stadium will have on employment is estimated in terms of the new jobs that are directly created by the capital investment expenditure. This is achieved by using the direct requirements coefficient for labour that is available from the Australian National Accounts input-output tables produced by the Australian Bureau of Statistics (ABS). This coefficient calculates the input from labour as a percentage of the output of an industry and can be used for estimating the direct labour requirement for any given output of that industry.

The national input-output tables for 1994-95 have been used as the source. These tables are the latest available and provide a reliable description of the broad structure of an industry sector in terms of its input requirements and output destinations. As the published tables provided are at the 35- industry sector level, the results can be regarded only as indicative of any individual industry within an aggregated industry classification. The most recent input-output tables for Queensland are for 1992-93 and for the Brisbane-Moreton Region 1989-90. The regional tables are currently being updated and are expected to be available in the next few months. The indicative estimates above could be reviewed for the region when the information is available.

Based on the estimated investment expenditure, the stadium proposal will lead to a total of 1,241 new jobs in the construction industry and 63 in the other machinery and equipment industry. This represents 496 new construction jobs per year over the 2.5 year construction period. Total additional income of just under $60 million will be created.

For the modified project investment, there is the potential to create some 1,316 new jobs in the construction sector and 63 in the machinery and equipment sector. This represents a potential 526 new construction jobs over the 2.5 year construction period. Total new income for the modified project would equal some $63 million.

However, these estimates should be regarded as upper limits of the direct employment and income impacts of the project. The estimates assume that:

- the new activity does not displace jobs elsewhere – for example, as a result of increased taxation or reduced expenditure to fund other new projects; and
- there is no under-utilisation of labour currently employed in the two industries – such labour would be absorbed before any new positions were created.

Brisbane's unemployment rates at 7.1%[3] were slightly higher than the national average (6.7%) but were continuing to fall. This could indicate some under-utilisation of labour in the economy. However, it is unlikely that there is significant under-utilisation in the construction sector at present.

In addition, the redevelopment costings used in this section include significant public works including transport works. Some of these may not go ahead, reducing the potential new construction employment. For example, if the proposed light rail extension does not go ahead, the total number of new jobs for the stadium proposal would reduce to 1,117 or 447 jobs over the 2.5 year construction period and 22 new jobs in the machinery and equipment sector. If the light rail extension is approved but the vehicles are manufactured outside the State (imported), this would also lead to the reduced employment from equipment of 22 with the additional 41 jobs assumed from manufacture of light rail vehicles wholly in Queensland, moved interstate or overseas.

[3] December 1999. DEWRSB Small Area Labour Markets

❑ Operational Benefits

The impacts on employment and income of the operation of the proposed stadium are difficult to quantify. The proper measure for assessing the direct employment impact is the net incremental employment due to the proposed stadium, rather than the total employment projected for the new facility.

- On the supply side, this means netting out the current employment at Lang Park and at other facilities that will be displaced by the operation of the proposed stadium.
- On the demand side, this means netting out employment generated by the expenditure that otherwise would have been spent at the existing facilities or, given limited household leisure budgets, on substitute leisure activities.

The approach to netting out these substitution/displacement effects is to estimate a percentage of patronage at the proposed stadium that represents new economic activity, rather than a transfer of expenditure from one location or activity to another. The new patronage is generated by the holding of events which otherwise would not have taken place in Brisbane or by the attractiveness of the new facility creating additional patronage (that is, patronage that would not have occurred at other facilities if the proposed stadium did not exist). This percentage is then applied to projections of total employment for the proposed stadium to provide estimates of incremental employment and income generated by its operation.

❑ Current Activities & Patronage

The current number of events at Lang Park stadium and the approximate patronage is shown in **Table 6.2.7** by month and type of activity.

Table 6.2.7 Current Events & Estimated Patronage

		1999			2000		
Month	Activity	Number of Events	Patrons/ Match	Total Patronage	Number of Events	Patrons/ Match	Total Patronage
Jan	Soccer Matches	2	3,000	6,000	3	2,500	7,500
Feb	Soccer Matches	2	3,000	6,000	1	2,500	2,500
Feb	World Rugby Sevens				1	16,252	16,252
Feb	NRL Matches(Trial)	1	3,978	3,978	0		
Mar	Soccer Matches	2	3,000	6,000	2	2,500	5,000
Mar	NRL Matches	1	3,068	3,068	0		
April	Soccer Matches	2	3,000	6,000	3	2,500	7,500
May	Soccer Matches	0	3,000	0	1	2,500	2,500
May	State of Origin	1	40,000	40,000	1	40,000	40,000
May	Brisbane River Marathon	1	5,500	5,500	1	5,500	5,500
June	State of Origin	1	40,000	40,000			
July	ARU Test Match	1	30,000	30,000			0
Aug		0		0			0
Sept	Queensland Cup Final	1	3,829	3,829			0
Oct	Soccer Matches	3	3,000	9,000			0

Month	Activity	1999 Number of Events	1999 Patrons/ Match	1999 Total Patronage	2000 Number of Events	2000 Patrons/ Match	2000 Total Patronage
Oct	ARL Test Match	1	11,511	11,511			0
Nov	Soccer Matches	2	3,000	6,000			0
Dec	Soccer Matches	2	3,000	6,000			0
Total		23		182,886	14		86,752

Source: Suncorp Metway Stadium

Table 6.2.7 suggests that current patronage of Lang Park stadium is around 200,000 per annum with some 4 more significant patronage events mainly from May to October. However, on average there are two matches in most months of the year.

Lang Park is known as the home of Rugby League in Queensland and until recently was the home ground of a major Brisbane ARL Club. At that stage it would have hosted some 12 – 13 home rugby league club games each year rather than the two hosted over the past 18 months.

Potential Activities and Patronage

Table 6.2.8 sets out potential new patronage for the proposed stadium. The patronage without the project are based on existing patronage estimates. The new figures are based on the estimated patronage numbers provided in the EIS project description Chapter 2.

Table 6.2.8 Potential New Patronage

Event (1)	No of Games	Frequency (3)	% of Patrons from Outside QLD	% of Patrons from Within QLD	Substitution/ Displacement Effect (2)	Crowd Size (1) without Project	Crowd Size (1) with Project	Crowd Size (1) New	Net (Incr'tl) Patrons	% of Total Crowd
Bledisloe Cup	1	1	20%	80%	0.50	0	52,500	52,500	31,500	60%
State of Origin	2	1	15%	85%	0.50	40,000	52,500	12,000	7,188	14%
Other ARU Test	1	1	10%	90%	0.40	30,000	40,000	10,000	4,600	12%
NRL Test	1	1	5%	95%	0.35	11,500	45,000	33,500	12,814	28%
NRL Broncos	13	1	5%	95%	0.30	20,000	25,000	5,000	1,675	7%
AAMI Super 12	6	1	85%	90%	0.40	15,000	25,000	10,000	4,900	20%
Major Cultural	1	2	15%	85%	0.50	0	20,000	20,000	11,500	58%
Other Cultural	3	1	5%	95%	0.30	5,500	10,000	4,500	1,508	15%
Total	18					488,000	757,500	269,500	124,736	16%

(1) Source: EIS Report Chapter 2 Description of the project, Table 6 and the QRU.
(2) Proportion of Queensland resident patrons that represent net or incremental demand. All patrons from outside Queensland are assumed to represent incremental demand.
(3) 1 equals an annual event, 2 equals a biannual event

The table assumes that the proposed stadium will attract:

- one Bledisloe Cup Game each year and one other Rugby Union Test, either a second Tri-Nations Game or with a Northern Hemisphere touring side, Brisbane currently hosts Rugby

Union tests but has not hosted a Bledisloe Cup game because of limitations in the size of existing venues. On this basis the Bledisloe Cup game each year would be a new event.
- a return of the two State of Origin games it hosted earlier;
- one NRL Test;
- the Broncos to return and make the home of Rugby League their home;
- the Queensland Super 12 team; and
- a number of minor and major cultural events. One major cultural event is assumed to be new to Queensland.

The split of patronages in attendees from outside Queensland and from Queensland reflects our understanding of the potential patronage mix for different types of games or events. The proportions used are considered to be conservative with a low estimate of overseas and interstate proportions. For example at the Bledisloe Cup in Melbourne just over 30% of attendees were from outside Victoria (20.4% interstate and 10.2% overseas) and some 69.4% Victorian.

The figure for displacement and substitution is again designed to be a conservative estimate with the aim of ensuring that the substitution and displacement effect is not understated. Sensitivity analysis can be undertaken to test the impact of changes in these assumptions.

The percentage of patronage that can be regarded as new or incremental economic activity attributable to the new Stadium is derived in **Table 6.2.9**. About 16% of the total "target" patronage for the new Stadium can be regarded as new or incremental economic activity, based on the assumptions set out in the table. This compares with an estimated 55% increase in the total number of patrons attending these events at the new Stadium compared with the 'without project' situation.

The key assumptions are that all the increase in the number of patrons from outside Queensland represents new or incremental demand, but only a portion of the increase in the number of Queensland residents. This is because the expenditures of Queensland residents in most situations would represent transfers from another location or activity and do not generate a net economic impact.

❑ Direct Employment & Income Operational Impacts

It is understood that there will be 15 permanent staff and up to 400 part time and casual staff. The part time and casual staff are estimated to be split approximately 50% catering staff and 50% security and other operating staff.

The average annual compensation for the relevant industry sectors (ABS Average Weekly Earnings November 1999) is as follows:

- Accommodation, Restaurants and Cafes - Full Time $31,954 and total including part time and casual $ 19,089; and
- Cultural and Recreational Services -Full time $40,461 per annum and $ 23,416 for all employees.

Extending the estimated staffing above by these earnings figures implies an direct income benefit of some $8-$9.1 million per annum based on either half the full time earnings or the average for all employees. These estimates are likely to understate the actual income.

It should be noted that these estimates are gross employment and do not take account of substitution or displacement.

As an attempt to determine the net employment we have estimated the potential direct expenditure by the incremental visitors to the proposed stadium (**Table 6.2.9**).

Table 6.2.9: Potential Direct Expenditure

Event(1)	Net (Incremental) Patrons	Direct Expenditure		
		Entry	Food & Bev	Total
Bledisloe Cup	31,500	44	7.5	$1,622,250
State of Origin	7,188	32	7.5	$283,906
Other ARU Test	4,600	44	7.5	$236,900
NRL Test	12,814	16.5	7.5	$307,530
NRL Broncos	1,675	12	7.5	$32,663
AAMI Super 12	4,900	15	7.5	$110,250
Major Cultural	11,500	44	7.5	$592,250
Other Cultural	1,508	12	7.5	$29,396
Total	**124,736**			**$3,215,145**

The table calculates the direct expenditure of the incremental patronage to the proposed stadium on entry and food and drinks. Ticket prices are based on tickets to comparable events in 1999 and take account of a mix of adult and concessions including 10% of complimentary tickets. The food and beverage estimates are arbitrary but are considered to be conservative. Based on these figures the estimated expenditure from the new attendees is of the order of $3.1 million. Based on approximately 50% entry staff and 50% other recreation and personal services the average earnings of the total workforce for both sectors would be some $21,250 per annum. This implies a potential direct workforce of some 145 net employees full-time, part time and casual staff compared with some 415 gross employment.

It is difficult to determine what the full-time equivalent (FTE) workforce would equate to for 145 mixed employees. An alternative approach is to use the initial employment based on the input-output tables. The Brisbane-Moreton 1989-90 multipliers provided an initial employment effect of just under 16 jobs per $1 million of output. Adjusting this figure for inflation suggests a 1999 equivalent of some 13 jobs per $1 million. This would suggest the expenditure of the incremental visitors would provide just over 40 FTE new jobs.

Given the event-related work at the proposed stadium, for most of the non-permanent staff, an estimate of 40 FTE new jobs is reasonably consistent with the 145 full time, part time and casual employee figures estimated above. On this basis, and based on the projected events schedule, an estimate of some 40 FTE new direct on-going jobs is reasonable.

❑ Unquantified Impacts

This section discusses the potential impacts on businesses and residents in the locality.

▪ Surrounding Businesses

There are three shopping precincts within a 300-metre radius - Caxton Street, Given Terrace and Petrie Terrace. In addition to the normal types of retail outlets found in suburban shopping strips, these precincts contain cafes, restaurants, bars, hotels and specialty shops that could receive some spin-off expenditure from patrons on their way to and from events at the new Stadium. There are another two shopping precincts within a one-kilometre radius that contain cafes and restaurants which also could receive some spin-off expenditure from Stadium patrons.

A summary of the number of businesses involved is given below. These numbers are approximate only.

	Total number of businesses	Number of Stadium-related businesses
Within 300-metre radius		
Caxton Street	13	10
Given Terrace	36	12
Petrie Terrace	27	6
Within one-kilometre radius		
Park Road	n.a.	18
Rosalie	n.a.	6

n.a. - not available

Although stadium patrons usually account for only a small proportion of trade in areas surrounding stadiums, they will be of some additional benefit to surrounding retail and entertainment facilities.

Cafes/restaurants, bars/hotels and specialty shops surveyed as part of the community consultation process expect to experience increases in trade before and after events. This is likely to be the case particularly for the Caxton Street shopping strip, as it will be on one of the main pedestrian thoroughfares. These types of businesses on Petrie Terrace and Given Terrace could also benefit to a lesser extent, while those on Park Road and at Rosalie may receive some spill-over trade. However, other types of businesses in all centres expect to experience some adverse effects on trading on event days, as a result of parking restrictions on main roads and residential streets.

It is not possible to quantify the net effects on employment and income of such expenditure without detailed surveys of businesses and stadium patrons' expenditure patterns. Relevant factors are the types and timing of events; crowd size; the types and opening times of concession outlets within the proposed stadium; the types and capacities of surrounding businesses, the proportion of their total sales turnover contributed by stadium patrons and their promotional efforts to attract stadium patrons.

Care would need to be taken in interpreting the results of such surveys, as some spin-off expenditure could substitute for dining, entertainment and leisure expenditure by patrons in other localities. The net economic impact of this type of expenditure is reduced to the extent that it represents substitute expenditure.

- **Property Values**

Land and property rental values have been steadily increasing in the study area, and a large proportion of the housing stock sold over the last 12 months has been for renovation purposes. The area is regarded as becoming increasingly "gentrified" as higher income professionals move in. (Refer Section 5.11.2). The average residential land valuation in the Milton LGA was increased by 12.5% from October 1998 to October 1999 (this compares to the Brisbane average of 6.4%); the corresponding figures for Red Hill and Paddington were 9.0% and 11.9% respectively.

The proposed stadium is not expected to have a significant influence on the long-term trend of increasing inner city residential property values, as architecturally the structure and immediate surrounds will be better designed and visually more appealing than the existing facility. There may be some slowing of the rate of increase in the values of properties and possibly small short term decreases for owners who have to sell properties in close proximity to the facility during the pre-

construction and construction phases (in the former period because of uncertainty of whether the project is to proceed, in the latter because of disruption caused by construction activities).

The Lang Park Stadium Proposal has the potential to enhance non-residential property values by encouraging higher value land uses that can exploit the inherent advantages of the area in terms of location, accessibility and existing profile as a specialty shopping/dining/entertainment precinct. Lower valued land uses such as workshops and warehouses could be replaced by stadium-related activities and complementary uses. Examples of such market opportunities are:

- entertainment - sports bars, clubs, taverns;
- leisure or lifestyle shopping - sports equipment, leisure/sports apparel, sports gifts/souvenirs, books, music stores;
- sports medicine/physiotherapy services; and
- gymnasiums, fitness centres, indoor sports centres.

- **Traffic Management & Parking Issues**

The proposed parking restrictions are designed to minimise the adverse impacts on traders in the area from patron parking during an event at the proposed stadium. These severely restrict access to parking for Stadium patrons for an area of up to 30 minutes walking and covers all the key commercial areas noted above. Current and prospective patrons to the commercial areas would continue to have access and parking facilities under this scheme.

The aim is to encourage at least 80% of patrons to access the Stadium by public transport and new public transport facilities are proposed including on-site bus and taxi facilities and new and attractive pedestrian routes to both existing and proposed rail and light rail facilities.

Community concerns that the parking restrictions may not be effective will need to be addressed.

The community consultation suggested a number of mitigation measures related to information and education, integration of public transport including linked ticketing schemes with the Stadium, priority access for residents and business customers, time to understand the system together with appropriate policing and sanctions.

These measures have been or can be included in the scheme as required to ensure that the adverse impacts to residents and local businesses are minimised.

A key mitigation strategy proposed during construction is to provide a shuttle bus service from nominated car parks elsewhere to the site to minimise the impact on local residents and businesses of construction activity. There are a number of concerns about the impact of the construction period and implementation of schemes that indicate early recognition of avoiding adverse impacts should reduce uncertainty and assist in meeting community concerns.

Commercial property owners in close proximity to the site are concerned about the impact of road closures and parking. The parking issue is discussed above. Road closures will be minimised and in some cases will not coincide with business hours. In most cases alternative access is available which can be advertised and appropriate temporary signage provided.

Consultation with the business owners and appropriate advertising of road closures associated with each event should minimise any adverse impacts of temporary road closures. Uncertainty is a major factor in a range of concerns which can be mitigated through adequate consultation.

- **On-Site Businesses**

There are two businesses on site, Ozsports and PCYC. It is proposed that these two businesses are relocated to the proposed stadium on completion. However, there are concerns about their location during construction. Under the stadium proposal, there appears to be no ability to relocate them temporarily on-site prior to their eventual move. However, the mitigating project modifications provide the opportunity to relocate the two businesses on-site during construction. Lack of a suitable on-site option to relocate to would mean that the two businesses would need to find an alternative location. Depending on the lease arrangements and the advantages of co-location with the Stadium, this could lead to them being lost as eventual tenants. There would be a cost of temporary relocation related to the double move which would need to be considered in terms of retaining the two as tenants.

❑ **Indirect Benefits**

An assessment of the indirect income and employment impacts during construction and operations is required in the terms of reference. As discussed earlier, the current EIS guidelines for economic assessment do not require the indirect impacts to be quantified unless formal quantitative modelling has been undertaken which was not required under the terms of reference for this project.

However, access to a major new stadium facility designed specifically with an oblong pitch, for Rugby, soccer and other sports requiring an oblong pitch offers considerable flow-on benefits if major new events can be attracted.

Staging a major international sporting event will attract a portion of visitors from interstate and overseas, many of whom will stay longer and visit other places as part of the trip.

An analysis of staging the Bledisloe Cup in Melbourne in 1997[4] indicated that, of the total attendance at the game of 90,119, 62,460 (69.3%) were Victorian residents, 18,360 (20.4%) interstate and 9,180 (10.2%) overseas visitors. Further analysis indicated that 16,520 (18.3%) interstate and 8,350 (9.27%) came specifically to see the game and would not have come otherwise.

These numbers exclude people who came to Victoria primarily for reasons other than the event, rearranged the timing of a trip to coincide with the event or who were already in Victoria and attended the event.

The numbers also do not include additional travel party members who came to Victoria but did not attend the event such as partners of the attender.

The study showed that all interstate visitors to the Cup spent an average of $766 in Victoria and international visitors $1,561. The average length of stay was 3.25 nights and 5.75 nights respectively.

The total economic impact including flow-on effects was estimated at $61 million or approximately 1.8 times the total visitor expenditure.

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[4] Economic Impact Assessment 1997 Bledisloe Cup in Melbourne. Ernst and Young, Bledisloe Cup 1997 Attendance Survey, AC Nielsen McNair

Hosting rounds of the Rugby World Cup in 2003 is likely to produce a higher proportion of international visitors as players, officials and spectators.

The flow-on from other events is likely to be significantly less than a major rugby union international as there is likely to be less international interest. However, there could be more interest at a new and specifically designed facility than at another venue in Brisbane.

In considering the flow-on from all the proposed schedule of events, extent to which the patronage and expenditure is incremental needs to be considered.

This is the issue that is raised in the Employment Impact Guidelines and part of the reason for only considering the direct economic impacts.

Taking account of these considerations, the following sections provide an estimate of employment inputs based on the production in demand flow-on effects to meet the requirements of the Terms of Reference. The consumption induced effects are not included. However, these are likely to be at least comparable with the production induced impacts for the industry sectors involved in this project.

❑ Construction

The estimated direct employment in the construction of the proposed stadium and infrastructure works is some 496 new jobs per annum over a 2.5 year period and for the mitigating project modifications, some 526 new jobs on the same basis.

The Brisbane-Moreton 1989-90 Regional input-output tables indicate a type 1 employment multiplier of some 1.68 for the other building and construction sector. This multiplier represents the initial direct employment on projects together with the production induced effect, this is the initial wages and salaries paid to workers on the project, the supplies and direct services purchased for the project and the second and subsequent round effects of suppliers to the project purchasing goods and services to restock and continue supplying the project.

Based on the above direct employment estimates, the employment multiplier implies the production induced flow-on effects would generate an addition of some 340 jobs for the stadium proposal and 360 should the project modifications be pursued.

In addition to the production induced effects there would be consumption induced effects related to the flow-on from household expenditure generated by the household income provided by the project. These impacts are ignored in this analysis but are likely to provide at least a similar flow-on impact for the construction sector based on national multipliers.

❑ Operations

The direct employment calculated in **Potential Activities & Patronage** considered that an incremental employment estimate of 40 on-going FTE operational jobs was reasonable. The Brisbane-Moreton 1989-90 Region data provided a type 1 multiplier of some 1.48. Based on this multiplier, the production induced flow-on impact would provide a further 19-20 incremental jobs or around 60 new on-going jobs in the region.

This figure is potentially very conservative as it is likely that international and interstate visitors will include attendance at the match as part of a longer trip. For example, interstate visitors for the Bledisloe Cup in Victoria stayed an average 3.25 nights and international visitors 5.75 nights. If

this was repeated in Queensland for all events at the proposed stadium by the incremental interstate and international visitors, and if they spent the average per night of interstate ($89.65 after adjustment for expenditure outside the destination state)[5] and international ($85.00 net of package tours and pre-paid international airfares)[6] visitors to in Australia, the events could generate a further 100 FTE new on-going jobs.

❑ Summary of Impacts

Table 6.2.10 summarises the quantified impacts discussed in this report.

Table 6.2.10 Summary of Impacts

	Impact
Direct Employment – Construction Phase	496
Direct Income – Construction Phase	$60 million
Direct Employment – Operational Phase	15 full-time 400 part time and casual
Direct Income – Operational Phase	$8 – 9 million
Incremental Employment (FTE) – Operational Phase	40
Flow on Employment Production induced – Construction	340
Total Direct and Product Induced Employment – Construction	836
Flow-on employment Production Induced – Operations (1)	20
Total Direct and Production Induced Employment – Operations	60

1. Consumption induced effects could be expected to provide at least a similar flow-on employment to production effects, based on national multipliers.

❑ Other Impacts

In addition to the quantified impacts the report notes the need to consider:

- The impacts to traffic and road closures on surrounding business and residential areas;
- The possibility of a short-term hiatus or even small downturn in property prices during the construction period and the need to mitigate the impact of construction on neighbouring areas;
- The likelihood of a positive benefit to local businesses, particularly hospitality and retail outlets from the proposed stadium; and
- Relocation options for the two on-site businesses Ozsports and PCYC.

6.2.11 Public Safety & Risk

❑ Dangerous Goods

Dangerous Goods are defined in the Australian Dangerous Goods Code and include a range of listed classes of goods or other goods that meet accepted criteria. Dangerous goods include explosives, gases, flammables, oxidising agents, fuels and combustibles, toxic and bio-hazards, radioactives, corrosives and various miscellaneous articles such as aerosols.

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5 Bureau of Tourism Research 1998 National Visitor Survey

6 BTR International Visitors Survey 1998

A cooperative approach to the designation and enforcement of dangerous goods routes for the movement of these goods through urban areas is undertaken by Queensland Transport. The dangerous goods industry is discouraged from carrying hazardous materials through Fortitude Valley, the city area and four major inner city bridges, (Grey Street Bridge, Storey Bridge, Victoria Bridge and Captain Cook Bridge), between 6am and midnight. The preferred route around the city is the Gateway arterial road and Ipswich Road or Logan Motorway to access the west.

Despite this cooperative approach, and in large caused by the continued existence of tolls, (particularly on the Gateway), dangerous goods vehicles continue to use the east-west distributor route through Hale Street and Milton Road. This route is officially designated as a service route to be used only for local deliveries to the western suburbs. There is potential for this route to become even more attractive to the dangerous goods movement industry following the construction of the Inner City Bypass. This route surrounds two sides of the proposed stadium and brings the proposal into potential conflict with events involving dangerous goods.

The primary use of the route is for fuel tankers (80%), however the route is also used for a range of other dangerous goods including LPG and corrosives such as sulphuric acid. The risk of such an incident occurring is considered low based on previous experience.

Advice from QT Dangerous Goods Branch is that tunnels are not favoured for the passage of dangerous goods for obvious reasons relating to access and evacuation. It is understood that the use of the future Inner City Bypass for dangerous goods is being reviewed due to the tunnels involved.

There are also a number of overpasses associated with the proposed stadium over both Hale Street and Milton Road that bring into question the acceptability of a dangerous goods route through this area, particularly during events. The question of what is a tunnel remains open at this stage, however where the breadth of a bridge or covering above a roadway exceeds it length, then this could be described as a tunnel. As such the crossing of Hale Street could be considered as a tunnel and provisions may be required by the CHEM Unit of Emergency Services for the approval of these features in relation to the movement of dangerous goods.

❑ Emergency Services Access During Operation

Emergency access to the site during operation of the Stadium will be ensured by following best practices as required during detailed design and operational consultation with emergency services.

QFRA will require a detailed fire and engineering study for their certification of the building plans. This study will involve fire modelling of the detailed design of the stadium (including construction as previously discussed). Emergency risks and consequences must be identified between the design team, Brisbane City Council and QFRA. These event situations must be modelled and the design amended where necessary to ensure that emergency vehicle access to the proposed stadium is acceptable to the responsible emergency service authorities.

QAS have advised the need for dedicated ambulance vehicles to be provided at the stadium for all major events.

❑ Emergency Services Access to Surrounding Areas

Due to the nature of the access available within areas surrounding Lang Park, response time to emergency situations is normally longer than would otherwise be expected. This situation will potentially be exacerbated by the proposed stadium to the extent that stadium related events will

happen more frequently than is currently experienced. Response times to emergency situations in surrounding areas during events is likely to be increased.

Emergency service access requirements need to be incorporated into the Traffic Management Plan. Consultation with emergency services will need to be an integral part of final Traffic Management Plan approval and ongoing adjustment.

Finalisation of the Traffic Management Plan for event management will be undertaken in consultation with emergency services, including Police, QFRA and QAS. A specific objective for the Traffic Management Plan will be that emergency vehicle and private property/business access is maintained throughout the stadium event activities.

The situation with emergency access through pre- or post match crowds, such as along Caxton Street is generally managed under police control. Emergency vehicle sirens also have the effect of dispersing the crowd to enable careful but deliberate access through. Access will be maintained for all emergency vehicles as a general condition of temporary road closures.

❑ **Emergency Access to Local Streets During Events**

As discussed in above, emergency service access requirements need to be incorporated into the Traffic Management Plan. Consultation with emergency services will need to be an integral part of final Traffic Management Plan approval and ongoing adjustment.

Standard access width of 4 metres minimum needs to be ensured for all local streets to enable QFRA vehicle access. The policing of traffic management arrangements within the proposed Land Park Traffic Management Area will need to ensure minimum emergency service requirements are maintained, with the power to take appropriate action should access be blocked, such as vehicle removal.

Finalisation of the Traffic Management Plan for event management will be undertaken in consultation with emergency services, including Police, QFRA and QAS. A specific objective for the Traffic Management Plan will be that emergency vehicle and private property/business access is maintained throughout the stadium event activities.

6.2.12 Emergency Services

❑ **Access for Emergency Vehicles**

The operational impacts of the proposed stadium on emergency services include impacts on stadium access and emergency procedures and also impact on emergency services access to surrounding areas.

▪ **Stadium Operations**

Emergency access to the site during operation of the proposed stadium will be ensured by following best practices as required during detailed design and operational consultation with emergency services.

Advice from QFRA is that a detailed fire and engineering study will be required for their certification of the building plans. This study will involve fire modelling of the detailed design of the stadium (including construction as previously discussed). Emergency risks and consequences will be identified between the design team, Brisbane City Council, and QFRA. These event situations

must be modelled and the design amended where necessary to ensure that emergency vehicle access to the proposed stadium is acceptable to the responsible emergency service authorities.

QAS have advised the need for dedicated ambulance vehicles to be provided at the stadium for all major events.

- **Emergency Services Access to Surrounding Areas**

As previously discussed, fire or other emergencies in the areas surrounding Lang Park have traditionally caused problems due to narrow streets and associated limited access.

This situation will potentially be exacerbated by the proposed stadium because events will happen more frequently than is currently experienced. Response times to emergency situations in surrounding areas during events is likely to be increased. The cause of the impact is potentially three fold;

(i) Increased traffic congestion in the surrounding area if the transport strategy is less successful than anticipated;
(ii) potential for narrow streets to be blocked to emergency service vehicles by inappropriate parking if the controlled parking scheme is not enforced; and
(iii) crowd behaviour being a potential source of emergency event, and therefore increasing risk of emergency service requirements.

Traffic congestion is a normal and anticipated occurrence for emergency services. As previously discussed, should access not be available from Roma Street QFRA units would be called from other surrounding stations. Dedicated QAS services should be available at the stadium site for all major events.

- Emergency service access requirements need to be incorporated into the Traffic Management Plan. Consultation with emergency services will need to be an integral part of the final Traffic Management Plan approval and ongoing adjustment. Standard access width of 4 metres minimum needs to be ensured for all local streets to enable QFRA vehicle access. The policing of traffic management arrangements within the proposed Lang Park Traffic Management Area will need to ensure minimum emergency service requirements are maintained, with the power to take appropriate action should access be blocked, such as vehicle removal.
- Finalisation of the Traffic Management Plan for event management must be undertaken in consultation with emergency services, including Police, QFRA and QAS. A specific objective for the Traffic Management Plan will be that emergency vehicle, and private property access is maintained throughout the scheduled event activities.
- The situation with emergency access through pre or post-match crowds, such as along Caxton Street is generally managed under police control. Emergency vehicle sirens also have the effect of dispersing the crowd to enable careful but deliberate access through. Access will be maintained for all emergency vehicles as a general condition of temporary road closures.
- Pre and post-match crowd behaviour will need to be adequately policed to ensure that surrounding areas are not exposed to adverse risks. Operational Management Policies for the control of crowd behaviour are an integral part of the stadium assessment.

❑ Contingency Planning for Emergencies during Stadium Operation

Stadia inherently contain large numbers of people and the potential for catastrophic events even with modern design codes, cannot be entirely removed. The need for contingency planning for catastrophic events is recognised, and is seen as a shared responsibility between relevant authorities and the Stadium management.

The impact of potential catastrophic events at the proposed stadium could be significant. Potential emergency events linked to the proposed stadium may include:

(i) Fire;
(ii) Flood – rain/hail storm event preventing exit from stadium – potential for flooded exists and requirements for cover;
(iii) Structural damage/collapse;
(iv) Public transport strike or interruption due to storm event generating private vehicle gridlock;
(v) Power failure – loss of lights/ crowd panic; and
(vi) Dangerous goods accident/chemical spill in Hale Street – potential for volatile/toxic gases to move into stadium gully pits from surrounding relief drainage.

Consultation with emergency service authorities during the preparation of the EIS indicates that the risk of potential catastrophes was extremely low. None of these authorities, including the Department of Emergency Services, QFRA the SES and the CHEM Unit, identified particular concerns regarding potential catastrophes in relation to the use of the Lang Park site for a major stadium redevelopment.

The project goals for the proposed stadium include ensuring that current world's best practices are included in the design of the facility to create a state of the art facility.

The general emergency planning standard applied by QFRA is described as "no deaths" QFRA advice is that if the design of the facility can handle the criteria required for fire and rescue related events then other hazardous contingencies should be covered.

Construction approval for the proposed stadium will only be certified by the QFRA on the basis that it meets the emergency planning criteria and standard of the Building Code of Australia. Where the prescriptive criteria of the Building Code do not adequately apply to stadia structures then performance-based solutions to emergency planning and design criteria must be developed during the Fire and Engineering Modelling Stage of the approval process. QFRA advise that fire models for the design will be carried out identifying relevant risks and analysing consequences to ensure that the design can meet the "no death" criterion.

As part of best practice it is considered that Emergency Action Plans need to be developed for the proposed stadium which address all relevant hazards (of natural or human origin), including those described above. In this regard Dept of Emergency Services recommend an all hazard risk management analysis based on Risk Management Standard AS/NZS 4360:1999. These Plans should be developed by the Lang Park Trust in consultation with emergency services. Where necessary these plans should be linked to the Local Counter Disaster Plans being developed by the SES in consultation with Brisbane City Council's crisis management program.

6.2.13 Site Services

❑ Water

The new facility will have increased provisions for potable supply to cater for the increased capacity from 42 000 to 52 500 persons. The demand for water during events is typically of the order of 5 to 10 litres per person. The demand during an event is increased from 420 000 litres to 525 000 litres. The demand occurs over a short period.

With new stands provided at northern and southern ends, there will be a requirement for increased fire service provisions.

The irrigation demand is essentially unaltered from the existing case.

The increased peak demand could overload the existing 100 mm diameter mains causing a drop in pressure to the stadium and to the adjacent areas.

Average demand increases are due to total patronage because of the new facility. The estimated annual increased patronage is 269 000 (**Table 6.2.8**). At a consumption of 10 litres per person this equates to 2.7 ML. For comparison this is equivalent to approximately 6 new households. This is not a significant increase in average demand.

❑ Sewerage

The future demands on the sewerage system will increase in line with the increase in demand for potable water ie approximately 100 000 litres in a peak period.

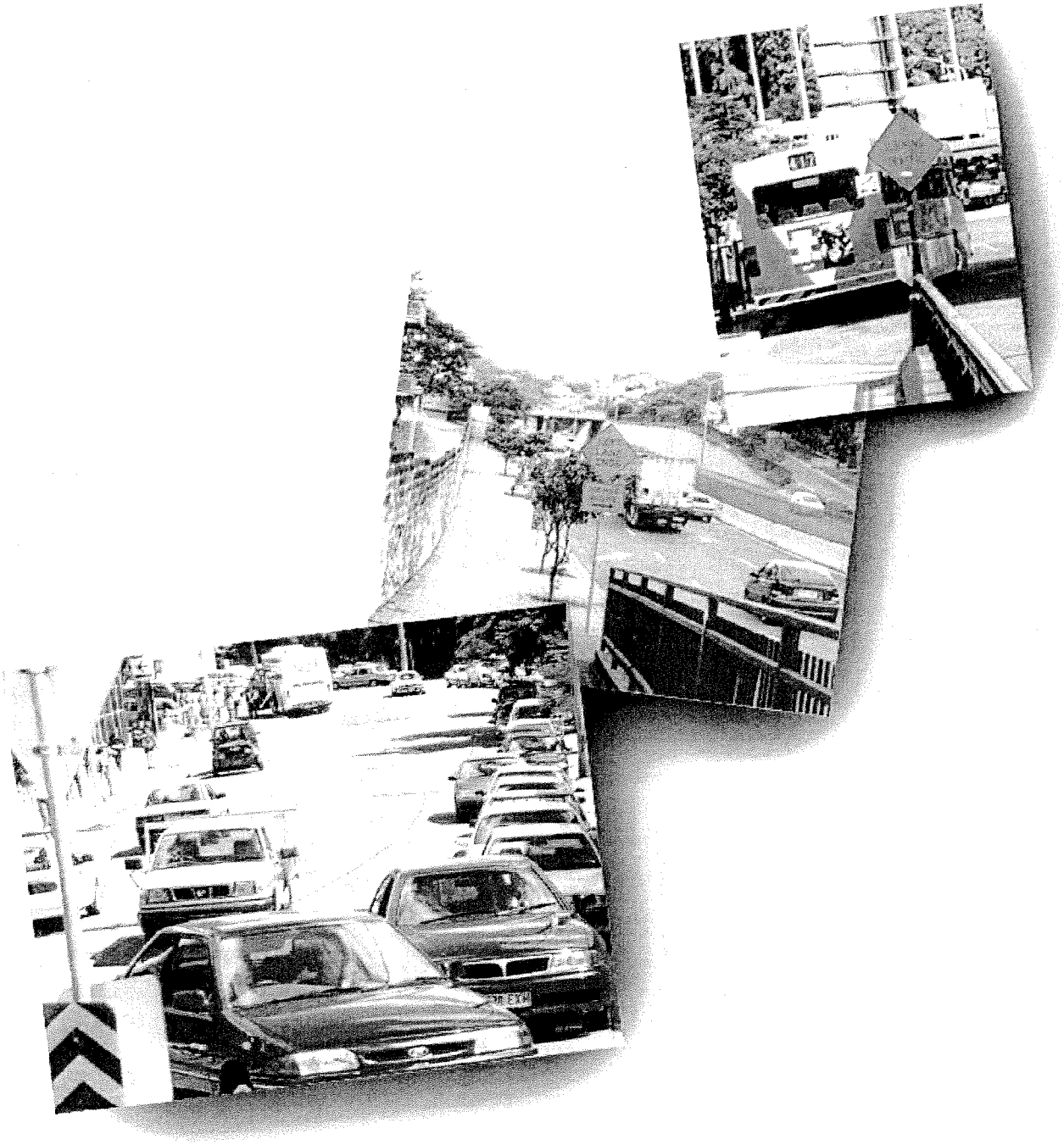
The increase in average annual demand is not significant in terms of sewers which serve the facility being of order of 10 equivalent households.

Most of this increased demand will be generated from the increased facilities at the northern and southern ends of the oval. These increased demands can be serviced by new mains, at the northern end connecting to the 300 mm diameter sewer and at the southern end; the 375 mm diameter sewer.

❑ Gas

The demand for gas will primarily be heating in the kitchen. This is not significant demand and consequently no significant external augmentation would be required.

7. TRANSPORT IMPACTS



7. Transport Impacts

7.1 Transport Strategy Overview

7.1.1 Strategic and Policy Context

The objectives and principles outlined in the Queensland State Government's Integrated Regional Transport Plan (IRTP) provide the strategic context for the Lang Park Stadium Proposal transport planning.

As a result, the transport strategy for the proposed stadium is one which is public transport focussed and seeks to actively discourage reliance on private car travel.

The transport infrastructure and associated services operating and promotions strategies for the proposed stadium are thus designed to cater for a high target level of public transport use, with demand management measures proposed, to seek to achieve a target private car usage of no greater than 20%.

The draft 2007 Vision is a more detailed assessment of the transport strategy to the year 2007, compared to the 2021 horizon of the IRTP. It identifies specific proposals for a light rail network, including a potential light rail connection from the CBD to Indooroopilly and for busways as well as identifying target mode shares for 2007.

The transport planning approach for the proposed stadium is highly consistent with Brisbane City Council's Integrated Transport Strategy and Travelsmart Policy which seek to reduce car travel, encourage more walking and increase use of public transport and bicycles. Strategies include better land use planning, parking policies that support public transport and ride sharing.

7.1.2 Transport Objectives

The transport planning goals for the Lang Park Stadium Proposal are to;

1. Cater for the travel demands generated by the stadium in a cost-effective manner.

2. Ensure that the public transport, pedestrian and vehicular travel demands can be accommodated in a flexible, efficient and safe manner.

3. Minimise adverse impacts of the increased travel demand on the existing transport systems and the surrounding community.

In order to achieve these goals the Master Plan development for the proposed stadium has therefore incorporated the following:

- inclusion of integrated transport infrastructure within the stadium such as a major bus station, taxi rank and light rail station to maximise public transport patronage;
- provision of high quality pedestrian linkages to existing heavy rail stations and planned public transport systems such as the busway system; and
- minimisation of parking supply at, and in the vicinity of, the proposed stadium.

7.1.3 Components of the Stadium Transport Strategy

The Transport Strategy for the Lang Park Stadium Proposal involves four key elements:

- A Travel Demand Management (TDM) Strategy
- A Services Operating Strategy
- A Transport Infrastructure Plan
- A Services Promotion Strategy

Table 7.1 lists examples of the types of measures that could form part of each strategy component and that have been considered in this impact assessment and mitigation strategy study.

Table 7.1: Possible Components of a Stadium Transport Strategy

Strategy Element	Types of Measures Considered for Lang Park Stadium Proposal
Travel Demand Management Strategy	▪ Parking quarantine in local areas surrounding the stadium. ▪ An awareness program regarding parking non-availability. ▪ Use of travel management, e.g. variable message signing.
Service Operating Strategy	▪ Rail – Timetabled and special services at Milton Station & Roma Street Stations ▪ Bus – Shuttle services on various routes (eg Roma Street, CBD, Southbank),direct services, suburban services, INB services. ▪ Light Rail - direct to Stadium ▪ Coach ▪ Taxi ▪ Ferry ▪ Walk ▪ Private Car Parking ▪ Private Car Set-Down/Pick-up
Transport Infrastructure	▪ Rail Station improvements ▪ Bus Station(s) & Bus Priority measures ▪ Light Rail route & station ▪ Pedestrian route improvements ▪ Coach Parking areas ▪ Taxi rank ▪ Passenger set-down/pick up area ▪ Traffic management measures
Services Promotions Strategy	▪ Integrated public transport fares with event tickets. ▪ CBD allocated carparking/ticketing arrangements. ▪ Public transport information systems eg Specific marketing regarding PT options, PT map/information distributed with tickets

7.2 Types of Events & Impact Assessment Context

Table 7.2 summarises the event schedule for the Lang Park Stadium Proposal and associated consideration of the various design cases for transport impact assessment and mitigation strategy development. This assessment involved consideration of the typical transport demand characteristics of a stadium and the likely interaction with the surrounding transport system.

Table 7.2: Indicative Event Schedule & Consideration of Transport Impact Assessment Cases

Event Type	Frequency per Annum	Typical Crowd Size	Occurrence within Year	Typical Event Timing	Impact Analysis Considerations
State of Origin	**1 – 2**	Capacity ie 52 500	May – June	Mid-week evening with 8.00pm kick-off & finish just prior to 10.00pm.	▪ Capacity Event thus generally critical for infrastructure and service provision sizing. ▪ Arrivals overlap with commuter peak period. ▪ High modal capacity needed at departure due to crowd size. ▪ Arrival and Departure assessment therefore essential
Rugby International	**1**	45 000	April – June	Saturday evening with 7.30 to 8.00 pm kick-off & finish between 9.30 and 10.00pm.	▪ High modal capacity needed with lower baseline service availability ▪ Moderate traffic flows during arrival period. ▪ Limited parking availability at Southbank ▪ Arrival and Departure assessment required.
Rugby League International	**1**	45 000	June – August	Saturday evening with 7.30 to 8.00 pm kick-off & finish between 9.30 and 10.00pm.	as above for Rugby International
NRL Club Matches	**13**	35 000	February – September	▪ Friday or Monday evening with 7.30 pm kick-off ▪ Saturday evening with 7.30 pm kick-off ▪ Sunday afternoon with 3.00 pm kick-off Event finish approximately 1 ¾ to 2 hours later.	▪ Weekday evening events not specially assessed as they represent a lesser impact case than State of Origin ▪ Saturday evening event not specially assessed as it represents a lesser impact case than Saturday evening Internationals ▪ Sunday afternoon case assessment is required due to lower weekend baseline services, moderate baseline traffic flows and lower parking availability at Southbank.
Super 12 Rugby	**2 –4**	25 000	February – May	Saturday evening with 7.30 to 8.00 pm kick-off & finish between 9.30 and 10.00pm.	Specific assessment not required as represents a lesser impact case than Saturday evening internationals.
Other Event eg Religious Meeting	**1**	35 000	Anytime	Not defined	Specific assessment not required – strategy could be tailored to the event as a combination of others. Possible longer duration puts greater emphasis on parking strategy.
TOTAL	**19 – 22**	-	-	-	-

Key factors of relevance when identifying a set of representative scenarios for impact assessment purposes that encompass the critical times for transport infrastructure and service loadings include:

- The proposed stadium will be available for a range of sporting uses at different times of day and during the week. As with the existing stadium however, it would be anticipated that peak capacity events would occur relatively infrequently. An example of such a capacity event would be a State of Origin rugby league match. For the transport strategy to be effective it must be able to respond to such a capacity event, hence this represents an important case for design and assessment.

- For football events spectator arrivals for events at Lang Park will be typically spread over two to three hours before the main event commencement. This trend can be reinforced via use of pre-match curtain raiser events or entertainment.
- Departures from a major event will be concentrated, typically all spectators will want to leave within one hour of the event ending.
- For an event scheduled for a weekday evening, such as a State of Origin match typically starting at 8.00pm, arrival demands (commencing from about 5.15pm) to the proposed stadium will overlap with peak period commuter travel demands leaving the CBD. Current patterns reveal about 30% of arrivals occur in the 5.30 to 6.30pm period.
- Although baseline travel demands in the system at the completion of a State of Origin match at just prior to 10pm are low, due to the concentrated nature of departure demands, transport infrastructure needs will be significant as a high capacity is required to move people efficiently and safely away from the proposed stadium.

Detailed modelling and assessment has therefore been carried out for the following representative cases:

- Capacity (52 500 persons) Event eg State of Origin:
  - Full departure demand (52 500 persons) in the one hour period around 10pm to 11pm weeknight; and
  - 30% of arrival demand (15 750 persons) in the 5.30pm to 6.30pm period coincident with the weeknight commuter peak demand.
- Major Event (45 000 persons) on Saturday Night eg Rugby or Rugby League International.
- Weekend Afternoon Event with Typical Crowd (35 000 persons) eg NRL Club Match.

7.3 Transport Demand Forecasting and Impact Assessment Tools

A series of tools have been developed for the sensitivity testing of various transport and event scenarios with respect to transport demand, pedestrian volumes and traffic impacts. These are discussed below.

7.3.1 Transport Model

❑ General Methodology Discussion

Patrons of the Lang Park Stadium Proposal represent a market different to any current set of transport users. The increase in stadium size and the changes to the transport choice set for future patrons (due to factors such as restricted carparking capacity near the stadium, introduction of light rail services and busway services) represent significant deviation from current Lang Park conditions governing event travel characteristics.

The likely travel behaviour of the Lang Park Stadium Proposal patrons could also be affected by factors such as:

- Atypical perception of public transport fares. This could occur if the fare was potentially "removed" via incorporation in the event ticket.
- Different tolerance to waiting for services due to the general acceptance of crowd conditions.
- Time constraints on trips. Patrons arrive over a long time period (particularly if a pre-main event programme is offered) however the demand for travel occurs immediately at the event finish with few patrons choosing to depart early or substantially later.

Due to these factors the modelling of transport demand for the proposed stadium events using regular transport models designed for forecasting commuter peak and daily travel demand for a range of trip purposes was not deemed suitable.

A comparative empirical modelling approach was therefore adopted for this study. This involved utilising knowledge of other markets and adjusting these in the informed expectation of how Lang Park patrons would differ in their characteristics from the known market segments.

The conduct of stated preference (SP) surveys to assist in model development was deemed unsuitable for the following reasons:

- Stated preference surveys are typically used to predict likely changes from an existing well understood base situation. The travel characteristics for Lang Park (and indeed most large sporting stadia) are vastly different from that of normal travel behaviour. The conduct of stated preference surveys for Lang Park would therefore not be comparable to an existing set of travel parameters.
- Precise parameters collected with a large SP survey may still not be very accurate as SP notoriously tends to overestimate demand for new facilities (eg. by under counting the ability of existing modes to improve themselves, or over counting the attractiveness of new facilities).
- A set of revealed preference surveys were available for two major events at the existing stadium in 1999 as a guide to existing travel characteristics and behaviour. These have been described previously in Section 5.2.1.

The transport demand forecasting model has been developed capable of testing the various mode share and transport service options for the representative scenarios reflective of the range of type and scale of events. **Figure 7.1** shows the general model structure. A spreadsheet approach has been used to progressively segment the person travel demand for the capacity crowd into both primary and auxiliary transport mode demands. Descriptions of the primary elements of the spreadsheet process are given in the following sub-sections. While separate models have been developed for the arrival and departure scenarios, their structures are identical.

❑ Model Calibration/Validation

As there will be a vast range of behavioural parameters influencing mode choice for the proposed stadium patrons, there is no analytical procedure which could "calibrate" the model from a relevant data set (if it existed). The "comparative empirical" approach described above means that the behaviour of sports event patrons can be inferred from other markets by increasing or de-emphasising (possibly to vanishing point) the weights conventionally used on elements considered to influence travel choice. Of relevance in this exercise was the findings on a world-wide survey of generalised cost modelling practices undertaken by SKM on behalf of Queensland Transport in 1995.

Testing of various parameters was carried out until a logical and consistent model behaviour was obtained. The ability of the model to replicate existing behaviour is a good validation test. The model's ability to reproduce the approximate behaviour of an existing 30,000 crowd was assessed, even though the options (including parking arrangements and the absence of light rail) are different from those envisaged for the proposed stadium.

Calibration is usually an analytical exercise in deriving statistical relationships, while validation is usually a matter of addressing input data deficiencies if the initial results are less than convincing. In this case, however, the approach adopted has led to a joint calibration/validation exercise,

where the behavioural parameters – which are not formally calibrated – were varied to assess the effect on the modal split. This was therefore more in the nature of a sensitivity test.

The model developed represents an appropriate blend of the theoretical and the practical to address a unique situation. It is sensitive to those issues that are likely to particularly to influence modal choice behaviour (eg. waiting time in queues).

Using such a comparative empirical modelling approach, the forecasts produced are indicative rather than definitive. However they are highly appropriate for the assessment of the relative impact of the various representative events on the surrounding transport system and in identifying the order of magnitude of infrastructure and public transport fleet requirements to cater for the respective modal tasks.

Clearly the precise travel demands will vary from event to event. In practice, managing a large sporting crowd requires flexibility, tact and patience on the part of the operational controllers on the day and the proposed stadium transport strategy must provide a robust framework within which these can be exercised.

❑ Stadium Catchment Distribution

The catchment for the proposed stadium patrons has been divided into geographic sectors as shown on **Figure 5.2.1.** For future forecasting purposes the distribution characteristics have been developed from consideration of sector population distribution in combination with consideration of the existing catchment findings of the major events surveys at Lang Park described previously in Section 5.2.1. Particular distribution characteristics adopted include:

- Weekday Arrival : Distribution proportions based on sector population following adjustment by adding CBD workers. This approach was used to account for a large number of arrivals direct from CBD locations following work.
- Weekday Departure : Distribution proportions based on a similar approach to weekday arrivals however it has been assumed that a lower number of trips for departure compared to arrival will return to the CBD to take advantage of either a parked car or normal commuter public transport.
- Weekend Arrival and Departure : Distribution proportions on only population distribution (ie no adjustment for CBD workers).
- Based on the findings of the 1999 Lang Park major event surveys, it is estimated that transport planning for major events should be based on approximately 30% of the proposed stadium patronage likely to be drawn from locations outside the Brisbane Statistical Division (BSD).
- For a smaller scale events, transport demands based on a lesser external catchment influence would be likely and modelling has assumed for such events a 15% catchment outside the BSD.

Table 7.3 summarises the indicative proposed stadium patronage catchment distribution for a capacity event.

Table 7.3: Indicative Proposed Stadium Catchment Distribution for Capacity Event

Sector	Proportion of Arrival Crowd from each Sector	Proportion of Departure Crowd to each Sector
North	16%	17%
North West	7%	7%
West	7%	7%
South East	19%	20%
East	10%	10%
South	4%	4%
CBD	8%	5%
External	30%	30%

❑ Primary Mode Share and Transfer Locations

The primary mode referred to within the model is that transport mode used for the majority of the trip to/from the stadium. Each of the sectors is treated separately by initially applying global proportion factors for each mode available within the sector. These were derived from consideration of the relativities in the 1999 Lang Park events survey data. The available future primary modes included in the spreadsheet model are car, bus, train, light rail, taxi and walk.

Further factors are then applied to divide the modal patronage into stop locations either at or in the near vicinity of the proposed stadium (eg Milton Rail Station, Stadium Bus Station, etc) or at a local transfer point (eg Roma Street, Southbank, or CBD). The allocation of the transfer location factors by sector has been carried out given restrictions and opportunities of the transport system and include:

- Direct connectivity of services to proposed stadium stops
- Availability and timing of connecting services
- Availability of local parking

Combination of these factors and the sector distribution yields both direct and transfer stop person trip demands by sector. The direct trips are deemed to alight from their respective modes at the local stadium stop and walk the final leg to the proposed stadium (as there are no competing mode choices). The transfer trips are aggregated at the transfer points (ie. Roma Street, Southbank, or CBD) and further analysed with respect to their auxiliary mode choice for the remaining portion of their trip to the proposed stadium.

❑ Auxiliary Mode Choice

While the primary transport modes remote from the proposed stadium are likely to have capacity to handle the demands imposed by a capacity event via a combination of scheduled (and if required supplementary) services, the local transfer task is heavily dependant on capacity of the auxiliary transport modes.

Characteristics for transfer trips have been collated and compared within the spreadsheet using a simple multinomial logit mode choice formula for each of the three standard transfer trips (ie. stadium to/from: Roma Street, CBD - Queen Street, and Southbank). Testing a nested binomial model structure showed that the walk/motorised split was not sensitive to variation in the quality of motorised options. This is almost certainly because of the dominant share of walking and the probable relatively flat shape of the logit curve in this area.

Key modes that have been considered as potential auxiliary modes for transfer trips include:

- Walk;
- Shuttle Bus;
- Light Rail; and
- Taxi.

Characteristics collated for each trip/mode include:

- Walk distances (both direct and access distances);
- Mode travel speed, load and unload times;
- Effects of competing "direct" (ie non-shuttle) service patrons;
- Mode choice time (access/egress, wait and in-vehicle) weights;
- Service frequency;
- Available loading platforms; and
- Vehicle capacity (varied to take into account normal baseline loads as appropriate to the scenario).

In the model the effect of direct fares on auxiliary modes has not been incorporated as it has been assumed that collection delays would severely compromise the performance of the transfer services for a major event. It is likely (or at least highly recommended) that subsidised services would be provided in conjunction with ticketing arrangements in this situation. The only exception to this is taxi trips, for which an adjustment to the in-vehicle time weight has been made to take account the personal fare component.

For each mode to/from the transfer locations, the model calculates a weighted time taking into account of the perceived attractiveness (or lack thereof) of access walk time, wait time and in-vehicle time. A simple logit formula is applied to give comparative attractiveness of the alternative modes such that a probability of use of individual modes calculated.

A key factor in the selection of a mode for potential transfer trips is the availability of loading platforms. In normal public transport mode choice models, the time spent waiting for a service is related only to the service frequency. Due to the very large loadings for the auxiliary transfer services, wait time in the model includes the time spent waiting in queues on and approaching the stations. This component of the auxiliary mode trip appears to be the single most significant issue in the selection of a mode and is naturally related to the combination of demand (both auxiliary and direct patrons), service frequency, vehicle capacity and platform availability.

The output of the auxiliary mode choice component of the model is loadings for the various modes available for a particular transfer trip. This therefore gives total loadings on the mode/station and ultimately the number of patrons boarding/alighting at the stops.

The patronage associated with a potential ferry service has not been modelled as this would only comprise a very minor part of the total transport task and has been discounted as a mode as discussed in Section 7.10.3.

❑ **Total Stadium Loadings**

Combination of the person trips directly to the proposed stadium (ie "direct" trips) and person trips using transfer modes to the proposed stadium (ie "auxiliary" trips) yields total person demand at the various stops (and local streets) immediately surrounding the stadium. The following outputs are produced by the model:

- Primary mode loadings (or vehicle numbers) by sector;
- Auxiliary mode loadings for transfer trips;
- Walk OD matrices to/from the area surrounding the proposed stadium and transfer locations; and
- Vehicle origin-destination matrices suitable for transfer to the SATURN traffic model.

7.3.2 Pedestrian Demand Model

A pedestrian model was developed in Emme/2 modelling software to allow aggregation of walk trips on the network surrounding the proposed stadium. The spreadsheet mode choice model was developed to directly export Emme/2 OD matrices for peak five minute walk periods for assignment in the Emme/2 model. Resulting assigned flows on walk "links" reflect the design loadings for the pedestrian network assessment.

7.3.3 Traffic System Model and Traffic Impact Assessment

Brisbane City Council's base year (1999) CBD SATURN model for the AM and PM commuter peaks was obtained for use in the study. This incorporated network coding to reflect the planned Inner City Bypass (ICB) project as well as a base case without the ICB.

To enable modelling of the local road network to the west of Lang Park some additional network coding to reflect the road connections to the west of the stadium was incorporated in the model.

Vehicle origin-destination (OD) matrices from the transport demand spreadsheet model were used to develop additional vehicle loadings associated with car, coach, bus and taxi movements to add to the existing PM traffic demand.

For the purposes of the EIS, the CBD commuter peak models available were used to assess Lang Park traffic impact for a capacity event coinciding with the weekday PM commuter peak period. As SATURN models for late evening and weekend time periods were not available, the traffic impact in these other representative design cases (eg evening departure and weekend events) have been assessed using a combination of manual traffic impact assessment analyses and SATURN model networks assigned only with additional Lang Park vehicle loadings.

The SATURN model was also used to undertake testing of the temporary closure/ capacity reduction of various roads in the area around the stadium associated with proposed pedestrian management measures (refer Section 7.11).

7.4 Transport Strategy Analysis

7.4.1 Target Design

The existing mode share for Lang Park is detailed in Section 5.2.1. This indicates that for major events over half of all patrons travel by private vehicle.

As described in Section 7.1, the Government's approach in planning for the Lang Park Stadium Proposal has been on the basis of aiming for a 20% private car use target, and ensuring that the public transport infrastructure, pedestrian facilities and parking management systems are in place to support the potential realisation of such a target. Transport modelling has therefore focussed on identifying the scale of public transport and pedestrian infrastructure needs commensurate with this target, whilst at the same time quantifying the associated road network impacts.

To check the reasonableness of this low car use target, a comparison was undertaken with measured data on stadium modal travel demand at Stadium Australia at Homebush, Sydney as shown in **Table 7.4.** Stadium Australia is a purpose built facility for the Sydney 2000 Olympic Games on a greenfield site where a deliberate strategy to discourage car use and encourage public transport as the major primary travel mode has been employed. Public transport infrastructure includes a new heavy rail link from the Western line, rail station at Stadium Australia and direct bus services via dedicated bus lanes to the stadium from areas not well covered by rail services.

This data indicates a car use of in the range 15 to 30% and averaging about 25%. It provides a guide to what might be expected as a level of car use to a major event at a stadium in Australia where a strongly public transport focussed strategy is implemented.

Table 7.4: Mode of Access to Major Events at Stadium Australia 1998 - 1999

Event	Rail	Bus	Charter Coach	Car and Walk
Rugby League (combined State of Origin, NRL double-header and NRL Grand Final)	45-50%	17-19%	10-14%	15-20%
Bee Gees Concert	50%	14%	5%	31%
Soccer (Manchester United)	50%	18%	3%	29%
Soccer (stadium opening)	47%	19%	6%	20%
Rugby Union (Centenary Test)	40%	20%	17%	23%
Rugby Union (Bledisloe Cup)	37%	20%	17%	26%

Notes:
- Data Source : Olympic Roads and Transport Authority (ORTA)
- Due to remote location of Stadium, the primary component of car and walk would be car usage
- Some pre-booked on-site carparking during events available.
- A Special Event parking Scheme was implemented in local areas surrounding the Homebush Bay site.

7.4.2 Transport Strategy Tests

An assessment of the travel on all modes including the nature, timing and scale of that travel for a range of possible critical events has been undertaken using the transport modelling tools described in Section 7.3.

Based on the event schedule and associated consideration of the various design cases for transport impact assessment and mitigation strategy development as discussed in Section 7.2 the types of events tested using the model were :

1. A capacity event held on a weeknight.
2. A major event held on a weekend evening.
3. A typical event held on a weekend afternoon.

Modelling has been based on adopting the target car mode share of 20% of primary trips as the reference case for the design of public transport infrastructure and servicing strategies and resultant impact assessment.

For each mode a range of operational issues and constraints were initially considered. Based on this heavy rail, light rail, bus, taxi, coach and pedestrian operations were progressively tested in combinations for each event type. In each situation the impacts of a parking quarantine around the proposed stadium were incorporated.

For the capacity event departure, the implications of two different rail operating strategies were initially tested to assist in the development of the most appropriate and cost-effective rail strategy for the proposed stadium. These options (denoted as A and B) reflected fundamentally distinct alternatives for rail task allocation between Milton and Roma Street stations. Scenario A focused the rail task on Roma Street Station with Milton Station serving the normal northern and western lines whereas Scenario B focused all corridor rail services on Milton Station. The fleet and infrastructure implications of these two options and the resultant recommended rail strategy are discussed in Section 7.5.

For Light Rail, the effects of two scenarios were incorporated in the modelling;

- With Light Rail operational at the time of the proposed stadium opening; and
- With Light Rail delayed (ie not available at the time of the proposed stadium opening) – this has the effect of placing greater demands on the shuttle bus and pedestrian access systems to Roma Street and the CBD.

The fleet and infrastructure requirements associated with the Light Rail inclusion scenarios are discussed further in Section 7.7.

The strategy elements incorporated in the modelling are summarised in **Table 7.5 a)** for departures and **Table 7.5 b)** for arrivals.

Results of model runs are summarised in **Tables 7.6 a) to c)** for departures for each event type and **Tables 7.7 a) to c)** for arrivals for each event type. The specific operational implications of the forecast demand for each mode (rail, bus, pedestrians, taxi, private cars, etc) are discussed in subsequent sub-sections of this report.

Broad comments on the results of the transport modelling for a capacity event (52 500 persons) are as follows:

- Rail would be the dominant mode for travel to the proposed stadium under a target 20% private car use transport strategy. For a capacity event, approximately 44% of patrons would use a train as their primary mode of travel to and from the proposed stadium.
- Bus travel would also be important catering for about 12% of primary trips, and coach travel would be utilised by 15% of patrons.

- About half of all patrons would make their primary or main trip directly to or from the proposed stadium, or the very near surrounding environs accessible only via a short walking distance. The remaining 50% of patrons would have the choice of using an auxiliary mode (other than just walking), such as shuttle bus or light rail, to or from the public transport node or carpark where their main means of travel to the proposed stadium arrived at or departed from.
- Walking via upgraded pedestrian routes to Roma Street and the CBD is forecast to represent the main mode used to access these slightly more distant public transport nodes and carparks.
- Shuttle bus and light rail are forecast to be used by about 9% of patrons each. In the scenario where light rail is not operational at the time of the proposed stadium opening, shuttle bus use would increase to 12% with the remainder walking.
- About 7% of patrons would be associated with private car travel to the immediate local area under a scenario with a local on-street parking control scheme operational. Private car travel would be associated with limited on-site parking, passenger set-down/pick-up, local parking in off-street public and private areas, and a small level of on-street infringements.

Table 7.5 a): Strategy Elements incorporated in Departure Model Testing

Mode	Potential Demand Management Strategy for Car Use & Service Operating Strategy for Other Modes	Options Tested for each Representative Scenario			
		Weeknight Capacity Event (State of Origin)		Saturday Night Major Event (Rugby Test)	Sunday Afternoon NRL Match
		Option A : Roma Street Rail Focus	Option B : Milton Station Rail Focus		
Car	Instigate major local parking restrictions around stadium	✓	✓	✓	✓
	Allow for CBD parking by stadium patrons	✓	✓	✓	✓
	Allow for limited Southbank parking by stadium patrons	✓	✓	✓	✓
Heavy Rail	Use scheduled services & provide special supplementary services to all rail lines from Roma Street Station	✓	✓	✓	✓
	Use scheduled & provide special supplementary services from Milton Station to Ipswich, Caboolture & Shorncliffe lines	✓	✓	✓	✓
	Provide special services from Milton Station to Ferny Grove, Cleveland and Beenleigh lines.	X	✓	X	X
Bus	Provide shuttle service from stadium to CBD	✓	✓	✓	✓
	Provide shuttle service from stadium to Roma Street	✓	✓	✓	✓
	Provide shuttle service from stadium to South Bank	✓	✓	✓	✓
	Provide direct services from stadium to Chermside, Garden City & Carindale	✓	✓	✓	✓
	Use scheduled INB/SET Countess Street services	✓	✓	✓	✓
	Use scheduled local Milton Road/Caxton Street services	✓	✓	✓	✓
Light Rail	Scenario 1 : Assume stadium – Roma Street – CBD – Southbank services	✓	✓	✓	✓
	Scenario 2 : Assume Light Rail not available at stadium Opening Year	✓	✓	✓	✓
Coach	Provide facility close to stadium	✓	✓	✓	✓
	Provide remote coach parking at Southbank	✓	✓	✓	X
Taxi	Provide facility Close to stadium	✓	✓	✓	✓
Walk	Provide upgraded pedestrian routes to Roma Street and CBD	✓	✓	✓	✓
	Provide upgraded pedestrian routes to Milton Station	✓	✓	✓	✓

Table 7:5 b): Strategy Elements Incorporated in Arrival Model Testing

Mode	Potential Demand Management Strategy for Car Use & Service Operating Strategy for Other Modes	Options Tested for each Potential Car use Scenario		
		Weeknight Capacity Event (State of Origin)	Saturday Night Major Event (Rugby Test)	Sunday Afternoon NRL Match
Car	Instigate major local parking restrictions	✓	✓	✓
	Allow for CBD parking by stadium patrons	✓	✓	✓
	Allow for limited Southbank parking by stadium patrons as appropriate	✓	✓	✓
Heavy Rail	Use scheduled services from all rail lines to Roma Street Station	✓	✓	✓
	Use scheduled services to Milton Station on Ipswich line	✓	✓	✓
	Provide special services to Milton Station from CBD	X	X	X
Bus	Provide shuttle service from CBD to stadium	✓	✓	✓
	Provide shuttle service from Roma Street to stadium	✓	✓	✓
	Provide shuttle service from South Bank to stadium	✓	✓	✓
	Provide direct services to stadium from Chermside, Garden City & Carindale	✓	✓	✓
	Use scheduled INB/SET Countess Street services	✓	✓	✓
	Use scheduled local Milton Road/Caxton Street services	✓	✓	✓
Light Rail	Scenario 1 : Assume stadium – Roma Street – CBD – Southbank services	✓	✓	✓
	Scenario 2 : Assume Light Rail not available at stadium Opening Year	✓	✓	✓
Coach	Provide facility close to stadium	✓	✓	✓
	Provide remote coach parking at Southbank	✓	✓	X
Taxi	Provide facility Close to stadium	✓	✓	✓
Walk	Provide upgraded pedestrian routes from Roma Street and CBD	✓	✓	✓
	Provide upgraded pedestrian routes from Milton Station	✓	✓	✓

Table 7.6 a): Summary of Modal Strategy Testing for Departure from a Capacity Event 52 500 persons With LRT & (Without LRT)

Mode Type	Comment on Mode Features	Persons by Various Trip Types (1)				
		The Main Trip or Primary Trip from the Stadium	Primary Trips that occur directly from Stadium or very near environs accessible only via walking	Primary Trips with a choice of an Auxiliary Mode other than walking to access their primary mode	Trips made on Auxiliary Modes including Walking to access a primary trip mode	Summary of Trips Exiting from Stadium Local Environs
Private Vehicle - Parked Car	a) a local on-street parking control scheme operational (3) b) a limited amount of on-site parking (max 400 spaces). c) Some local parking in off-street areas d) Balance of private vehicle parking occurring in CBD or Southbank region	9 700 *19%*	3 000	6 700	N/A	3 000 *6%*
Private Vehicle – Passenger Pick-up	From facility close to stadium	900 *1%*	900	0	N/A	900 *1%*
Heavy Rail	Scheduled and special services provided from Milton Station and Roma Street	22 800 (23 000) *44%*	7 800 (8 000)	15 200	N/A	7 800 (8 000) *15% (15%)*
Bus	Shuttle service provided from the stadium to CBD and Southbank	700 (900) *1%*	700 (900)	0	4 100 (5 600)	4 800 (6 500) *9% (12%)*
	Direct services provided from the stadium to Chermside, Garden City and Carindale .	1 100 *2%*	1 100	0	N/A	1 100 *2%*
	Regular scheduled services from Countess Street, Roma Street & CBD including those available on INB & regular scheduled services available on Milton Road	4 800 *9%*	2 200	2 600	N/A	2 200 *4%*
Coach	Charter coach and mini-bus services	8 100 *15%*	5 800	2 300	N/A	5 800 *11%*
Light Rail	Assume services provided from stadium – Roma Street – CBD – Southbank.	900 *2%*	900	0	3 600	4 500 *9%*
	(Assume no LRT services available)	(0)	(0)	(0)	(0)	(0) *(0%)*
Taxi	From facility close to stadium	1 500 *3%*	1 500	0	0	1 500 *3%*
Walk	Primarily using upgraded pedestrian routes to Roma Street and CBD	2 000 (2 300) *4%*	2 000 (2 300)	0	18 900 (21 200)	20 900 (23 500) *40% (46%)*
TOTAL		52 500 *100%*	25 900 (25 700)	26 600 (26 800)	26 600 (26 800)	52 500 *100%*

Notes
(1) The numbers in brackets detail the varied forecast in number of trips on each mode in a scenario where no LRT service is available from the stadium. Note not all modal forecasts vary in this latter scenario as they do not represent a competing mode to LRT.
(2) N/A : Not applicable or likely to be strongly used as an auxiliary travel mode to a primary mode.
(3) Modelling has allowed for some local on-street infringements.

Table 7:6 b): Summary of Modal Strategy Testing for Departure from a Major Weekend Evening Event 45 000 persons With LRT & (Without LRT)

Mode Type	Comment on Mode Features	Persons by Various Trip Types (1)				
		The Main Trip or Primary Trip from the Stadium	Primary Trips that occur directly from Stadium or very near environs accessible only via walking	Primary Trips with a choice of an Auxiliary Mode other than walking to access their primary mode	Trips made on Auxiliary Modes including Walking to access a primary trip mode	Summary of Trips Exiting from the Local Environs of the Stadium
Private Vehicle - Parked Car	a) a local on-street parking control scheme operational (3) b) a limited amount of on-site parking (max 400 spaces). c) Some local parking in off-street areas. d) Balance of private vehicle parking occurring in CBD & Southbank	8 100 *18%*	3 000	5 100	N/A	3 000 *7%*
Private Vehicle – Passenger Pick-up	From facility close to stadium	800 *2%*	800	0	N/A	800 *2%*
Heavy Rail	Scheduled and special services provided from Milton Station and Roma Street	20 700 *46%*	7 000	13 700	N/A	7 000 *16%*
Bus	Shuttle service provided from the stadium to CBD and Southbank	200 *1%*	200	0	2 500 (3 300)	2 700 (3 500) *6% (8%)*
	Direct services provided from the stadium to Chermside, Garden City and Carindale .	1 000 *2%*	1 000	0	N/A	1 000 *2%*
	Regular scheduled services from Countess Street, Roma Street & CBD including those available on INB & regular scheduled services available on Milton Road	4 300 *9%*	2 000	2 300	N/A	2 000 *4%*
Coach	Charter coach and mini-bus services	7 000 *15%*	5 800	1 200	N/A	5 800 *13%*
Light Rail	Assume services provided from stadium – Roma Street – CBD – Southbank.	500 *1%*	500	0	4 000	4 500 *10%*
	(Assume no LRT services available)	(0)	(0)	(0)	(0)	(0) *(0%)*
Taxi	From facility close to stadium	1 300 *3%*	1 300	0	0	1 300 *3%*
Walk	Primarily using upgraded pedestrian routes to Roma Street and CBD	1 100 (1 200) *2%*	1 100 (1 200)	0	15 700 (19 100)	16 800 (20 300) *37% (45%)*
TOTAL		45 000 *100%*	22 700 (22 600)	22 200 (22 500)	22 200 (22 500)	45 000 *100%*

Notes
(1) The numbers in brackets detail the varied forecast in number of trips on each mode in a scenario where no LRT service is available from the stadium. Note not all modal forecasts vary in this latter scenario as they do not represent a competing mode to LRT.
(2) N/A : Not applicable or likely to be strongly used as an auxiliary travel mode to a primary mode.
(3) Modelling has allowed for some local on-street infringements.

Table 7:6 c): Summary of Modal Strategy Testing for Departure from a Typical Weekend Afternoon Event 35 000 persons With LRT & (Without LRT)

Mode Type	Comment on Mode Features	Persons by Various Trip Types (1)				
		The Main Trip or Primary Trip from the Stadium	Primary Trips that occur directly from Stadium or very near environs accessible only via walking	Primary Trips with a choice of an Auxiliary Mode other than walking to access their primary mode	Trips made on Auxiliary Modes including Walking to access a primary trip mode	Summary of Trips Exiting from the Local Environs of the Stadium
Private Vehicle - Parked Car	a) a local on-street parking control scheme operational (3) b) a limited amount of on-site parking (max 400 spaces). c) Some local parking in off-street areas. d) Balance of private vehicle parking occurring in CBD	6 500 *18%*	2 600	3 900	N/A	2 600 *7%*
Private Vehicle – Passenger Pick-up	From facility close to stadium	600 *2%*	600	0	N/A	600 *2%*
Heavy Rail	Scheduled and special services provided from Milton Station and Roma Street	17 700 *49%*	6 200	11 500	N/A	6 200 *18%*
Bus	Shuttle service provided from the stadium to CBD and Southbank	200 *1%*	200	0	400 (2 200)	600 (2 200) *2% (6%)*
	Direct services provided from the stadium to Chermside, Garden City and Carindale.	900 *3%*	900	0	N/A	900 *3%*
	Regular scheduled services from Countess Street, Roma Street & CBD including those available on INB & regular scheduled services available on Milton Road	4 300 *12%*	2 000	2 300	N/A	2 000 *5%*
Coach	Charter coach and mini-bus services	3 000 *8%*	3 000	0	N/A	3 000 *8%*
Light Rail	Assume services provided from stadium – Roma Street – CBD – Southbank.	400 *1%*	400	0	2 700	3 100 *9%*
	(Assume no LRT services available)	(0)	(0)	(0)	(0)	(0) *(0%)*
Taxi	From facility close to stadium	1 200 *3%*	1 200	0	0	1 200 *3%*
Walk	Primarily using upgraded pedestrian routes to Roma Street and CBD	1 100 (1 200) *3%*	1 100 (1 200)	0	14 200 (14 900)	15 300 (16 100) *43% (46%)*
TOTAL		35 000 *100%*	17 700 (17 900)	17 300 (17 100)	17 300 (17 100)	35 000 *100%*

Notes
(1) The numbers in brackets detail the varied forecast in number of trips on each mode in a scenario where no LRT service is available from the stadium. Note not all modal forecasts vary in this latter scenario as they do not represent a competing mode to LRT.
(2) N/A : Not applicable or likely to be strongly used as an auxiliary travel mode to a primary mode.
(3) Modelling has allowed for some local on-street infringements.

Table 7.7 a): Summary of Modal Strategy Testing for Arrival to a Capacity Event 52 500 persons With LRT & (Without LRT) in Commuter Peak Hour

Mode Type	Comment on Mode Features	Persons by Various Trip Types (1)				
		The Main Trip or Primary Trip to the Stadium	Primary Trips that occur directly to the Stadium or very near environs within walking access	Primary Trips with a choice of an Auxiliary Mode other than walking to access the Stadium from their primary mode	Trips made on Auxiliary Modes including Walking to access from a primary trip mode	Summary of Trips Arriving to the Local Environs of the Stadium
Private Vehicle - Parked Car	a) a local on-street parking control scheme operational (3) b) a limited amount of on-site parking (max 400 spaces). c) Some local parking in off-street areas. d) Balance of private vehicle parking occurring in CBD or Southbank region.	2 800 *18%*	900	1 700	N/A	900 *5%*
Private Vehicle – Passenger Set-down	At facility close to stadium	300 *2%*	300	0	N/A	300 *2%*
Heavy Rail	Scheduled services provided to Milton Station and Roma Street	6 600 (6900) *42% (44%)*	2 300 (2 500)	4 400	N/A	2 300 (2 500) *14% (15%)*
Bus	Shuttle service provided to the stadium from CBD and Southbank	100 *1%*	100	0	900 (1 700)	1 000 (1 800) *6% (11%)*
	Direct services provided to the stadium from Chermside, Garden City and Carindale.	300 *2%*	300	0	N/A	300 *2%*
	Regular scheduled services to Countess Street, Roma Street & CBD including those available on INB & regular scheduled services available on Milton Road	1 400 *9%*	700	700	N/A	1 400 *9%*
Coach	Charter coach and mini-bus services	2 400 *15%*	1 700	700	N/A	1 700 *10%*
Light Rail	Assume services provided to stadium from Roma Street – CBD – Southbank.	900 *5%*	900	0	1 800	2 700 *16%*
	(Assume no LRT services available)	(0)	(0)	(0)	(0)	(0) *(0%)*
Taxi	To facility close to stadium	500 *3%*	500	0	200 (200)	700 *4%*
Walk	Primarily using upgraded pedestrian routes to Roma Street and CBD	500 (1 000) *3%*	500 (1 000)	0	4 900 (5 900)	5 400 (6 900) *33% (43%)*
TOTAL ARRIVALS IN COMMUTER PEAK HOUR = 30% of crowd		15 750 *100%*	8 000 (8 000)	7 700 (7 700)	7 700 (7 800)	15 750 *100%*

Notes
(1) The numbers in brackets detail the varied forecast in number of trips on each mode in a scenario where no LRT service is available from the stadium. Note not all modal forecasts vary in this latter scenario as they do not represent a competing mode to LRT.
(2) N/A : Not applicable or likely to be strongly used as an auxiliary travel mode from a primary mode.
(3) Modelling has allowed for some local on-street infringements.

Table 7:7 b): Summary of Model Strategy Testing for Arrival to a Major Event Weekend Evening 45 000 persons With LRT & (Without LRT) in the Road Peak Hour Prior to Event Start

Mode Type	Comment on Mode Features	Persons by Various Trip Types (1)				
		The Main Trip or Primary Trip to the Stadium	Primary Trips that occur directly to the Stadium or very near environs within walking access	Primary Trips with a choice of an Auxiliary Mode other than walking to access the Stadium from their primary mode	Trips made on Auxiliary Modes including Walking to access from a primary trip mode	Summary of Trips Arriving to the Local Environs of the Stadium
Private Vehicle - Parked Car	a) a local on-street parking control scheme operational (3) b) a limited amount of on-site parking (max 400 spaces). c) Some local parking in off-street areas. d) Balance of private vehicle parking occurring in CBD or Southbank region.	2 400 *18%*	900	1 500	N/A	900 *7%*
Private Vehicle – Passenger Set-down	At facility close to stadium	250 *2%*	250	0	N/A	250 *2%*
Heavy Rail	Scheduled services provided to Milton Station and Roma Street	6 200 *45%*	2 100	4 100	N/A	2 100 *16%*
Bus	Shuttle service provided to the stadium from CBD and Southbank	0	0	0	700 (1 400)	700 (1 400) *5% (10%)*
	Direct services provided to the stadium from Chermside, Garden City and Carindale.	300 *2%*	300	0	N/A	300 *2%*
	Regular scheduled services to Countess Street, Roma Street & CBD including those available on INB & regular scheduled services available on Milton Road	1 300 *10%*	600	700	N/A	600 *4%*
Coach	Charter coach and mini-bus services	2 100 *15%*	1 700	400	N/A	1 700 *13%*
Light Rail	Assume services provided to stadium from Roma Street – CBD – Southbank.	300 *2%*	300	0	1 800	2 100 *15%*
	(Assume no LRT services available)	(0)	(0)	(0)	(0)	(0) *(0%)*
Taxi	To facility close to stadium	400 *3%*	400	0	200 (200)	600 *4%*
Walk	Primarily using upgraded pedestrian routes to Roma Street and CBD	300 (400) *3%*	300 (400)	0	3 900 (5 100)	4 200 (5 500) *31% (41%)*
TOTAL ARRIVALS IN ROAD PEAK HOUR PRIOR TO EVENT = 30% of crowd		13 500 *100%*	6 900 (6 800)	6 700 (6 700)	6 600 (6 700)	15 750 *100%*

Notes
(1) The numbers in brackets detail the varied forecast in number of trips on each mode in a scenario where no LRT service is available from the stadium. Note not all modal forecasts vary in this latter scenario as they do not represent a competing mode to LRT.
(2) N/A : Not applicable or likely to be strongly used as an auxiliary travel mode from a primary mode.
(3) Modelling has allowed for some local on-street infringements.

Table 7:7 c): Summary of Modal Strategy Testing for Arrival to a Typical Weekend Event 35 000 persons With LRT & (Without LRT) in Road Peak Hour Prior to Event Start

Mode Type	Comment on Mode Features	Persons by Various Trip Types (1)				
		The Main Trip or Primary Trip to the Stadium	Primary Trips that occur directly to the Stadium or very near environs within walking access	Primary Trips with a choice of an Auxiliary Mode other than walking to access the Stadium from their primary mode	Trips made on Auxiliary Modes including Walking to access from a primary trip mode	Summary of Trips Arriving to the Local Environs of the Stadium
Private Vehicle - Parked Car	a) a local on-street parking control scheme operational (3) b) a limited amount of on-site parking (max 400 spaces). c) Some local parking in off-street areas. d) Balance of private vehicle parking occurring in CBD or Southbank region.	1 900 *19%*	800	1 100	N/A	800 *7%*
Private Vehicle – Passenger Set-down	At facility close to stadium	200 *2%*	200	0	N/A	200 *2%*
Heavy Rail	Scheduled services provided to Milton Station and Roma Street	5 300 *49%*	1 900	3 400	N/A	1 900 *18%*
Bus	Shuttle service provided to the stadium from CBD and Southbank	0	0	0	200 (900)	200 (900) *2% (9%)*
	Direct services provided to the stadium from Chermside, Garden City and Carindale.	200 *2%*	200	0	N/A	200 *2%*
	Regular scheduled services to Countess Street, Roma Street & CBD including those available on INB & regular scheduled services available on Milton Road	1 300 *12%*	600	700	N/A	600 *6%*
Coach	Charter coach and mini-bus services	900 *8%*	900	0	N/A	900 *8%*
Light Rail	Assume services provided to stadium from Roma Street – CBD – Southbank.	300 *3%*	200	0	1 200	1 400 *13%*
	(Assume no LRT services available)	(0)	(0)	(0)	(0)	(0) *(0%)*
Taxi	To facility close to stadium	400 *4%*	400	0	200	600 *4%*
Walk	Primarily using upgraded pedestrian routes to Roma Street and CBD	300 *3%*	300	0	3 600 (4 100)	3 900 (4 400) *36% (42%)*
TOTAL ARRIVALS IN ROAD PEAK HOUR PRIOR TO EVENT = 30% of crowd		10 800 *100%*	5 300(5 300)	5 200 (5200)	5 200 (5 200)	10 600 *100%*

Notes
(1) The numbers in brackets detail the varied forecast in number of trips on each mode in a scenario where no LRT service is available from the stadium. Note not all modal forecasts vary in this latter scenario as they do not represent a competing mode to LRT.
(2) N/A : Not applicable or likely to be strongly used as an auxiliary travel mode from a primary mode.
(3) Modelling has allowed for some local on-street infringements.

7.5 Heavy Rail Issues

7.5.1 Constraints and Opportunities Appraisal

There are three basic options to cater for the heavy rail task associated with the Lang Park Stadium Proposal. These have been considered as follows :

1. Construct a new rail station adjacent to Lang Park

An option exists to construct a new island platform station between the up and down Suburban Lines adjacent to Lang Park. In this situation the new station could service the normal corridors of Ipswich and Caboolture with the remaining passengers walking to Roma Street. Extending other rail corridor services to these platforms may be possible, however the capacity of the island platform would be constrained by the lack of queuing area in this location.

The advantages of this option are:

- The station would be approximately 300 metres closer than the existing Milton station and thus more convenient for some rail patrons.

New station disadvantages are:

- Significant costs would be involved to realign existing tracks and overhead power, and provide new platforms and a station building.
- The new platform would extend over Cribb Street Bridge, which would require reconstruction.
- The station would only service two tracks.
- Considerable walkways and overhead footbridges would be required to provide pedestrian access to the proposed stadium.
- Close proximity to the major crossovers from Main lines to Suburban lines would impose restrictions on other services.
- This major transport infrastructure investment would not be used on a frequent basis or benefit the wider community.

2. Use Milton Station as the Focus for Rail Travel to/from the Stadium and service all rail corridors

An indicative calculation of special services to platforms was carried out to match the "theoretical" maximum post-match clearance capacity at Milton Station. This indicated a possibility of operating say 18 special destination trains with 750-person capacity and 4 regular timetable trains with 500-person capacity within one hour, yielding a total capacity of potentially 15,500 persons. Special trains could be queued between Corinda and Milton, on the Exhibition Branch and at Roma Street, Central and Brunswick stations.

The advantages of this operational strategy are:

- The availability of a rail service to all rail corridors from Milton would offer a convenient option for patrons from most areas.
- For southside rail patrons, there would be no need to consider use of an auxiliary mode to access Roma Street station and the walk distance involved is some 400 metres less.
- In terms of train paths, all destination trains can be adequately handled through the four existing platforms (although passenger queuing problems would exist unless the platforms were expanded).

- Capacity would be available to hold special empty trains.
- Even though upgrading would be required, it is likely to be a significantly less expensive option than building an additional new station. Minimal track or signalling changes are likely to be required.
- Milton rail station is due for major rejuvenation and upgrading would benefit the general local community.

The disadvantages of the strategy are:

- Potential variability in choice by patrons with both Roma Street and Milton station options could lead to demand fluctuations at individual stations and services not adequately matching demand.
- Major costs would be associated with upgrading to provide for adequate platform queuing areas to enable passenger throughput to be achieved.
- The strategy will place increased pressure on pedestrian walkways between Lang Park and Milton station and result in potentially substantial infrastructure needs to create safe paths.
- Increased travel times would result for some services (Cleveland, Beenleigh, Gold Coast) due to re-routing via Corinda.
- Increased travel times would result for stations between Yerongpilly and Park Road due to Cleveland trains re-routing via Corinda.
- There would be difficulty servicing some southside stations eg South Brisbane, Vulture Street.
- For arrivals to major weeknight events, it would not be feasible to divert services from all rail corridors via Milton Station without adverse impact on commuter peak operations. In this scenario Roma Street would have to provide the focus for arriving patrons to the proposed stadium to avoid conflicts with normal weekday commuter operations.

3. Use Roma Street for the bulk of the Rail Task with Milton Station serving the regular Northern – Western Corridor

This scenario represents a continuation of the existing operating practice. Most passengers would need to walk to Roma Street and join their destination train. Roma Street is adequately appointed and has many train services. There is a capacity to queue additional special trains if required.

Advantages are:

- Lesser costs would be associated with more modest upgrades at the existing Milton station.
- Roma Street is able to accommodate expected passenger numbers.
- There is capacity to queue additional special trains if required.
- Assessment of modelled passenger demands under this operating strategy indicates that it would be likely to require marginally less services than Option 2 because it maximises the efficiency of use of spare capacity on scheduled services.

Disadvantages are:

- Additional distance to walk to Roma Street (compared to Milton Station) may be less supportive of public transport focussed strategy although this impact could be reduced via improved walkways to Roma Street.
- Considerable upgrading of walkways from the proposed Stadium to Roma Street would be required to cater for increased spectator numbers although it is noted that improved walkways to the CBD are needed to cater for other modes in any case. These improved walkways also provided a wider benefit to the community for everyday use.

Based on the above considerations Option 3, which involves using both Milton and Roma Street stations in an integrated manner represents the preferred strategy. Under this strategy, Milton Station would be utilised to its maximum capability serving the Ipswich, Caboolture-Petrie and Shorncliffe lines, with the bulk of the rail passenger task handled through Roma Station as it serves all rail corridors. This strategy is recommended as it represents :

- A cost-effective strategy which utilises existing major public transport infrastructure at Roma Street at non-commuter peak times.
- Provides for upgraded facilities and access improvements at Milton Station of a nature and scale which have everyday use benefit as well as being appropriate for supplementary Lang Park patronage.
- Provides pedestrian infrastructure improvements to Roma Street/CBD which are complementary to the needs of other modes (eg CBD bus access, CBD carparking access, CBD worker access pre-event, and CBD venue access post-event). The multi-user role of these pedestrian improvements also will allow flexibility in the attainment of individual mode share targets.

For the target (low car use) modal scenario, this rail strategy implies a need to cater for 15 00 rail patrons post capacity event at Roma Street and 8 000 persons at Milton Station over about a one hour period. The following sections examine the operational issues and impacts associated with this strategy.

7.5.2 Heavy Rail Operations

❑ **Indicative Train Servicing Requirements - Departure**

Table 7.8 a) identifies the indicative passenger demand upon departure by sector to be catered for over about a one hour period for each of the modelled event types. Using this data, a calculation of indicative train servicing requirements to match forecast demand is presented for the preferred rail operational/infrastructure strategy which involves Roma Street Station as the focus, with Milton Station serving a supplementary role. These are presented in **Table 7.8 b) to d).** This assessment takes into account the need to ensure that normal baseline passenger demands on timetabled services are also catered for at the proposed stadium event times.

Tables 7.9 a) to c) provides indicative timetables for services to match the calculated train requirements in each event case. These have been prepared in order to check passenger queuing requirements on the platforms at Milton Station.

The assessment indicates that to meet potential rail patronage demands associated with event departure for the target low car use transport strategy :

- Up to 24 special train services could be required in the late evening post-capacity event (11 from Milton, 13 from Roma Street) to supplement the 11 normal timetable services available.
- About 18 special train services (6 from Milton, 12 from Roma Street) would cater for post-major event (45 000 person) demands.
- For a weekend afternoon event with a typical crowd size of 35 000 persons, it is likely that 16 (6 from Milton, 10 from Roma Street) special train services would be required post-event.

As discussed in Section 5.2.1, for a major event at the existing stadium currently (say 40 000 persons) Queensland Rail typically operate 9 special train services post-event. The train servicing, described above, associated with the target low car use transport strategy represents a significant increase in rail service provision compared to the current situation. However as the post-event periods occur at times well outside commuter peak times it is envisaged that this level of servicing could be achieved via use of available rollingstock in the QR fleet without adverse impact on normal services.

❑ **Indicative Train Servicing Requirements - Arrival**

Tables 7.10 a) to c) tabulate the indicative passenger demand for inbound rail services in the typical three hour arrival period for events, particularly where pre-main event entertainment is incorporated.

For the weeknight capacity event arrival scenario, the ability to use special trains services in the commuter peak hour will be influenced by the need to designate available heavy rail rollingstock to the commuter peak task. It is understood however that it is likely that because Queensland Railways are taking delivery of an additional thirty 3-car trains this year, there would be greater scope in the future for rollingstock availability for special events during the weekday afternoon/evening pre-match time period.

A comparison of the forecast peak hour demand for travel to Milton Station as modelled (2 500 passengers) compares favourably with the typical available spare capacity on outbound trains via Milton during the period modelled, 5.30 to 6.30pm, based on a recent survey (refer **Table 5.2.10**). This showed between 5.27pm and 6.40pm on a typical weeknight an available spare capacity of about 2 500 passengers on existing outbound Ipswich line trains which indicates the pre-match demand in the commuter peak hour (for the capacity event assessed) under the low car use scenario could be accommodated.

The capacity to accommodate the level of forecast inbound travel from other rail corridors to the CBD has also been checked. Summary findings are provided in **Tables 7.10 a) to c)**. This appraisal indicates during the 3 hour period pre-capacity event supplementary inbound services on the Beenleigh and Cleveland rail lines would be required to cater for target scenario demands. Similarly it would be desirable to supplement the Petrie/Caboolture line inbound services with two special services to Milton Station although these services could be timed to occur outside the commuter peak hour to match rollingstock availability.

For the weekend evening and weekend afternoon events, to meet target demands then special inbound train services would also be needed on the Beenleigh, Cleveland and Petrie/Caboolture line. There would be no difficulties in provision of rollingstock to cater for such services due to the lower frequency baseline services offered at these times.

Table 7:8a Summary of Indicative Rail Demands for Event Departure

Branch	Station	Weeknight Capacity Event (52 500 persons)	Weekend Evening Major Event (45 000 persons)	Weekend Afternoon Typical Event (35 000 persons)
Shorncliffe	Milton	1 500	1 400	1 200
	Roma Street	600	500	500
Petrie/Caboolture	Milton	3 300	2 900	2 600
	Roma Street	1 200	1 100	1 000
Ferny Grove	Milton	400	400	300
	Roma Street	1 000	900	800
Ipswich	Milton	2 500	2 300	2 000
	Roma Street	-	-	-
Beenleigh/Gold Coast	Milton	-	-	-
	Roma Street	8 300	7 200	5 600
Cleveland	Milton	-	-	-
	Roma Street	4 200	4 000	3 700
	TOTAL	**23,000**	**20,700**	**17,700**

Table 7.8b Weeknight Capacity Event (52 500 p) Departure: Indicative Train Servicing Requirements

Branch	Station	Trains		Number of Trains Required	Milton Platform Number
		Timetable	Special		
Shorncliffe	Milton	–	2	2	4
	Roma Street	1	1	2	–
Petrie/Caboolture	Milton	3	2	5	2
	Roma Street	–	1	1	–
Ferny Grove	Milton	–	1	-	4
	Roma Street	1	1	2	–
Ipswich	Milton	2	2	4	1
	Roma Street	–	–	–	–
Beenleigh/Gold Coast	Milton	–	-	-	-
	Roma Street	3	9	12	–
Cleveland	Milton	–	–	–	–
	Roma Street	1	5	6	–
	TOTAL	11	**24**	**35**	

Table 7.8c: Weekend Evening Major Event (45 000p) Departure — Indicative Train Servicing Requirements

Branch	Station	Trains		Number of Trains Required	Milton Platform Number
		Timetable	Special		
Shorncliffe	Milton	-	1	1	4
	Roma Street	2	-	2	
Petrie/Caboolture	Milton	3	3	6	2
	Roma Street	-	1	1	
Ferny Grove	Milton	-	1	1	4
	Roma Street	2	-	2	
Ipswich	Milton	3	1	4	1
	Roma Street	-	-	-	
Beenleigh/Gold Coast	Milton	-	-	-	
	Roma Street	4	7	11	
Cleveland	Milton	-	-	-	
	Roma Street	2	4	6	
	TOTAL	**16**	**18**	**34**	

Table 7.8d: Weekend Afternoon Typical Event (35 000p) Departure — Indicative Train Servicing Requirements

Branch	Station	Trains		Number of Trains Required	Milton Platform Number
		Timetable	Special		
Shorncliffe	Milton	-	1	1	4
	Roma Street	2	-	2	
Petrie/Caboolture	Milton	2	3	5	2
	Roma Street	-	1	1	
Ferny Grove	Milton	-	1	1	4
	Roma Street	2	-	2	
Ipswich	Milton	3	1	4	1
	Roma Street	-	-	-	
Beenleigh/Gold Coast	Milton	-	-	-	
	Roma Street	4	5	9	
Cleveland	Milton	-	-	-	
	Roma Street	2	4	6	
	TOTAL	**15**	**16**	**31**	

Table 7.9a: Weeknight Capacity Event (52 500p) Departure –Indicative Train Scheduling at Milton Station

Indicative Departure Time					
Platform 1	**Timetable**	**Special**	**Special**	**Timetable**	
Ipswich	10:10	10:15	10:25	11:10	
Platform 2	**Timetable**	**Special**	**Timetable**	**Special**	**Timetable**
Petrie/ Caboolture	9:58	10:15	10:28	10:40	10:58
Platform 3					
Nil					
Platform 4	**Special**	**Special**			
Ferny Grove	10:30				
Shorncliffe	10:15	10:30			

Table 7.9b: Weekend Evening Major Event (45 000p)Departure –Indicative Train Schedule at Milton Station

Indicative Departure Time						
Platform 1	**Timetable**	**Special**	**Timetable**	**Timetable**	**Timetable**	
Ipswich/ Rosewood	10:00	10:30	10:40	11:10	11:10	
Platform 2	**Timetable**	**Special**	**Special**	**Timetable**	**Special**	**Timetable**
Petrie/ Caboolture	10:00	10:10	10:20	10:40	10:45	11:00
Platform 3						
Nil						
Platform 4	**Special**					
Ferny Grove	10:30					
Shorncliffe	10:20					

Table 7.9c: Weekend Afternoon Typical Event (35 000p) Departure –Indicative Train Schedule at Milton Station

Indicative Departure Time					
Platform 1	**Timetable**	**Special**	**Timetable**	**Timetable**	
Ipswich/ Rosewood	5:10	5:30	5:40	6:10	
Platform 2	**Special**	**Timetable**	**Special**	**Special**	**Timetable**
Petrie/ Caboolture	5:20	5:30	5:40	5:50	6:00
Platform 3					
Nil					
Platform 4	**Special**				
Ferny Grove	5:25				
Shorncliffe	5:30				

Table 7.10a: Weeknight Capacity Event (52 500 persons) Arrival (5.00 pm to 8.00pm) : Indicative Passenger Demands & Train Servicing Requirements

Originating Branch	Station	Scheduled Trains & Indicative Available Spare Capacity		Forecast Lang Park Additional Demand (pax)	Comment re Impact & Need for Additional Services from Originating Station
		No of Trains In Arrival Period	Spare Capacity (pax)		
Shorncliffe	Milton	–	–	–	N/A
	Roma Street	6	3 000	2 000	Adequate capacity available on existing services
Petrie/Caboolture & CBD	Milton	6	3 000	4 400	2 Special Train Services Needed
	Roma Street			1 000	1 Special Train Service Needed
Ferny Grove	Milton	–	–	–	N/A
	Roma Street	6	3 000	1 300	Adequate capacity available on existing services
Ipswich	Milton	6	3 000	2 400	Adequate capacity available on existing services
	Roma Street	–	–	–	N/A
Beenleigh/Gold Coast	Milton	–	–	–	N/A
	Roma Street	9	4 500	7 300	4 Special Train Services Needed
Cleveland	Milton	–	–	–	N/A
	Roma Street	6	3 000	4 500	2 Special Train Services Needed
	TOTAL	**39**	**19 500**	**22 900**	

Table 7.10b: Weekend Evening Major Event (45 000 persons) Arrival (5.00 pm to 8.00pm) : Indicative Passenger Demands & Train Servicing Requirements

Branch	Station	Scheduled Trains & Indicative Available Spare Capacity		Forecast Lang Park Additional Demand (pax)	Comment re Impact & Need for Additional Services
		No of Trains In Arrival Period	Spare Capacity (pax)		
Shorncliffe	Milton	–	–	–	N/A
	Roma Street	6	3 000	2 000	Adequate capacity available on existing services
Petrie/Caboolture & CBD	Milton	6	3 000	3 000	Adequate capacity available on existing services
	Roma Street			1 100	1 Special Train Service Needed
Ferny Grove	Milton	–	–	–	N/A
	Roma Street	6	3000	1 300	Adequate capacity available on existing services
Ipswich	Milton	6	3000	2 300	Adequate capacity available on existing services
	Roma Street	–	–	–	N/A
Beenleigh/Gold Coast	Milton	–	–	–	N/A
	Roma Street	9	4 500	6 700	3 Special Train Services Needed
Cleveland	Milton	–	–	–	N/A
	Roma Street	6	3 000	4 500	2 Special Train Services Needed
	TOTAL	**39**	**14 500**	**20 900**	

Table 7.10c: Weekend Afternoon Typical Event (35 000 persons) Arrival (12.00 noon to 3.00pm) : Indicative Passenger Demands & Train Servicing Requirements

Originating Branch	Arrival Station	Scheduled Trains & Indicative Available Spare Capacity		Forecast Lang Park Additional Demand (pax)	Comment re Impact & Need for Additional Services from Originating Station
		No of Trains In Arrival Period	Spare Capacity (pax)		
Shorncliffe	Milton	–	–	–	N/A
	Roma Street	6	3 000	1 700	Adequate capacity available on existing services
Petrie/Caboolture	Milton	6	3 000	3 000	Adequate capacity available on existing services
	Roma Street			1 000	1 Special Train Service Needed
Ferny Grove	Milton	–	–	–	N/A
	Roma Street	6	3 000	1 200	Adequate capacity available on existing services
Ipswich	Milton	6	3000	2 000	Adequate capacity available on existing services
	Roma Street	-	-	-	N/A
Beenleigh/Gold Coast	Milton	–	–	–	N/A
	Roma Street	9	4 500	5 400	2 Special Train Services Needed
Cleveland	Milton	–	–	–	N/A
	Roma Street	6	3 000	3 700	1 Special Train Service Needed
	TOTAL	**39**	**19 500**	**18 000**	

7.5.3 Rail Station Platform Assessment

Milton Station

A platform queuing assessment has been undertaken based on the indicative timetables and an anticipated pedestrian flow profile to Milton Station.

This assessment has found:

- The estimated effective area available of the 4 platforms at Milton for passenger waiting is about 1 900 m^2.
- For the capacity event, queuing analysis indicates a deficiency in the available queuing area and would be evident for short periods in the hour post-event unless improvements were undertaken.

A satisfactory situation (level of service D-E) could be achieved by physical widening on Platform 4 (the platform immediately adjacent to Milton Road) and pedestrian access improvements to all platforms to allow a better distribution of passengers along the platforms. This would be supplemented by operational fine-tuning of the arrival of special services based on patterns that result with the proposed stadium operational.

Upgrading of Milton Station is proposed as part of the Lang Park Stadium Proposal and concept arrangements are shown in **Figure 7.2.** The widening on Platform 4 achieves an increase of about 500 m^2 in passenger waiting area.

Integrated event/ public transport travel ticketing would also have the benefit of removing ticket vendors from the station approaches and platform areas and improve the efficiency of passenger movement at the rail stations.

With these improvements the arrival and departures associated with the other types of events could also be catered for adequately in terms of platform access and passenger waiting areas.

Roma Street Station

Roma Street station is a major rail hub designed to cater for large volumes of rail commuters. As described in Section 5.2.3 the physical infrastructure available at Roma Street station to cater for passenger access/egress and platform queuing to cater for these everyday needs would be more than adequate to handle the Lang Park stadium patronage under the target modal scenario.

However, improvements in the pedestrian access systems between the proposed stadium and Roma Street are essential to cater for the demands in a suitable and safe manner.

7.5.4 Other Operational Issues

The recently commissioned central city additional tunnels (as described in Section 5.2.2) have provided ample future increased train movement capacity in the rail network and the additional train movements associated with the stadium proposal would have no adverse impact on the operation of the tunnel system.

Whilst there will be some use of the Main Lines (which normally cater for freight services and express passenger services) at Milton Station (accessing platforms 3 and 4) for Special Train services post-event, this would not be expected to have any significant adverse impact on freight

operations. This would be due to the relatively short time period involved (ie one hour post-event) and the low number of days in the year that major Lang Park events will be held.

7.5.5 Rail Infrastructure Upgrades

Infrastructure improvements are recommended to cater for this rail operational strategy. These are shown conceptually in **Figure 7.2** and form part of the Lang Park Stadium Proposal. They are described as follows:

❑ **Milton Station Platforms**

Platform No 4 could be widened to the extreme northern reserve boundary to provide maximum surface area to accommodate increased passenger numbers on special services to Northern Lines.

❑ **Milton Station Pedestrian Walkway Improvements**

For safety and capacity it will be essential to improve pedestrian systems between the proposed stadium and Milton Station. An elevated or segregated accessway would only be used for events and not represent a pedestrian enhancement that would have broader benefits to the local community. An at-grade treatment is preferred and appropriate concepts have been incorporated in the Lang Park Stadium Proposal as assessed further in Section 7.8.

❑ **Improvement to Footbridges at Milton Station**

Recommended improvements are:

- Widening of the existing overhead pedestrian walkway and stair access system to Platforms 1 and 2/3. This would benefit all station users.
- Provision of a supplementary overhead pedestrian walkway at the eastern (ie Lang Park) end of the station to provide access to Platforms 1 and 2/3 with an associated direct at-grade ramp access to the eastern end of Platform 4. It would be envisaged that this system would only be opened for use during Lang Park events.

❑ **Lifts at Milton Station**

Upgrading at Milton Station would need to include the provision of lifts for persons with disabilities. The direct access to No 4 platform as provided above would limit the lifts needed to one each to No 1 and No 2/3 platforms.

It is understood that Queensland Rail intend to provide lifts from the existing footbridge to the rail platforms as part of their Easy Access – Action Plan. It is recommended that the programming of these works by QR is undertaken in conjunction with the proposed improvements to the Milton Station to cater for Stadium patrons described above to ensure that these lifts are provided prior to the opening of the proposed stadium.

❑ **Improvements to Pedestrian Access between the Stadium and Roma Street Station**

Such improvements are essential to support the preferred rail strategy and are described in Section 7.8.

7.5.6 Summary of Rail Issues

Key findings from the assessment of rail issues are:

- A rail operating strategy with Roma Street as the focus is recommended as a key component of a public-transport focussed strategy for the proposed stadium. For the target (low car use) transport strategy after a capacity crowd event, this implies a need to cater for 15 000 rail patrons at Roma Street and 8 000 persons at Milton Station over about a one hour period post-event. This represents 44% of capacity event patrons at the proposed stadium.
- Catering for this level of rail patronage at Roma Street generates a substantial need for upgraded pedestrian systems to Roma Street from the proposed stadium and such measures have been incorporated in the Stadium proposal.
- Even with the rail task focus at Roma Street, improvements will also be required at Milton Station and the following measures are incorporated in the Lang Park Stadium Proposal:
  - Widening of Platform 4 (adjacent to Milton Road);
  - Enhancement to the available passenger waiting areas on the island Platform 2/3 & associated widening of the existing overhead pedestrian walkway and stair access system to Platforms 1 and 2/3;
  - Provision of a supplementary overhead pedestrian walkway/queuing concourse at the eastern (or Lang Park) end of the station to provide access to Platforms 1 and 2/3 with an associated direct at-grade ramp access to the eastern end of Platform 4; and
  - Provision of upgraded pedestrian walkways between Milton Station and Lang Park.

7.6 Buses and Coaches

7.6.1 Overview of Operational Issues

A number of operational issues for buses serving the Lang Park Stadium Proposal have been considered in this assessment. These include:

- The types of specific services to be offered (normal buses, shuttle buses, direct buses and charter coaches/mini-buses).
- The locations to be served by shuttle buses and direct buses for the proposed stadium.
- The routes to be followed by such bus services.
- The location of a bus station at/near the stadium and associated design needs, bus layover and bus queuing areas.
- The potential for bus priority measures and other traffic management initiatives to assist bus movements.
- The operation of local bus stops and the Countess Street busway station.

7.6.2 Service Types

❑ Normal Bus Services

The opportunity exists to cater for some of the bus travel demand associated with the proposed stadium via normal route services, both existing and planned. Therefore an appraisal of the constraints and opportunities for such normal route services to meet demands has been undertaken.

For the weeknight capacity event arrival demand pattern, some spare bus fleet capacity is available although it is limited until about 6.30 pm due to peak demands and bus location logistics. After 6.30 pm, there is more spare capacity per bus but fewer scheduled buses. For the evening departure demand pattern, the number of scheduled services is relatively low.

However, by the time the proposed stadium opens, there will be a high capacity service on the relatively nearby Inner Northern Busway for both arrival and departure scenarios for the range of representative events.

Inspection of the busway plans suggests that it could be viable to divert outbound (from the city) busway buses via Petrie Terrace for major events in order to provide better access to/from events. This could either be by leaving the busway at Roma Street and rejoining it at Normanby Fiveways or by completing a loop to rejoin the busway at the Countess Street/Roma Street intersection. The former concept would result in two busway stations being missed while the latter would add more time and distance to journeys.

Alternatively, the planned Countess Street and Roma Street busway stations represent viable locations for patrons to access busway services, particularly if pedestrian route improvements are incorporated to improve accessibility to these locations.

❑ **Shuttle Bus Services**

Four possible destinations for shuttle buses from the proposed stadium were identified as follows :

1. Roma Street
2. Queen Street
3. South Bank
4. Countess Street busway station

The merits of each potential shuttle bus service have been assessed as follows :

1. Roma Street (900 – 1 000 m walk distance from the proposed stadium) is seen as a major transport hub, offering full access to all train lines, the busway system, light rail and inter city buses. The Roma Street shuttle service will be an important service to supplement the upgraded pedestrian linkages to Roma Street.

2. Queen Street (about 2.0 km walk distance) provides access to the CBD (a major post event destination), the full range of bus services, including busway services and major parking stations. A Queen Street shuttle bus service will be essential.

3. South Bank (1.6 km walk distance from the stadium to South Brisbane Station) offers access to car parking and potential remote coach parking for a capacity event and post-event venues. A shuttle bus to this location will be important.

4. The Countess Street busway/Light Rail Station is only about 700 – 800 m from the proposed stadium, well within a reasonable walking distance. About two thirds of bus users are estimated to have destinations to the south and east of the stadium and these passengers could be served by shuttle buses to Roma Street or Queen Street. Passengers to the north and west would be better served by some or all busway buses diverting on to Petrie Terrace. A Countess Street shuttle bus is thus not seen as appropriate.

❑ Special Direct Suburban Regional Centre Bus Services

As previously noted, there are currently direct services from/to Carindale, Chermside and Garden City. These locations plus the University of Queensland will also be served by the high frequency Tier 1 Busway buses.

Under a public transport focussed strategy, and with the provision of an on-site bus station at the proposed stadium, it is considered that continued provision of special direct bus services from these locations will be important to demonstrate a commitment to offering the highest level of convenient bus services for patrons from corridors that are not as strongly served by rail. These supplementary direct services utilising the busway would represent an efficient means of serving these and associated areas.

❑ Charter Coaches/Mini-buses

Charter coaches/mini-buses will continue to represent an integral part of the transport strategy for events at the Lang Park Stadium Proposal. Three broad types of arrangements have been considered:

1. A coach set down/pick up facility coupled with remote parking. Post–event passenger groups would need to assemble in substantial pedestrian marshalling areas and then their specific coach being called to the pick up area.
2. Coach parking in a nearby location with passengers walking from and to their coaches directly.
3. Coach parking in a remote location with shuttle bus services used to convey passengers from and to their coaches.

The coach set down/pick up arrangement (Option 1) is considered to be too operationally complex in the Lang Park road network and access setting. It could contribute adversely to the road network operations for other forms of public transport (such as buses) and result in coach traffic circulating within the local road network and causing traffic congestion.

The preferred arrangement for coach parking is therefore a combination of Options 2 and 3 tailored to the event size and demand for coach services. Suitable locations for on-street coach parking in non-residential areas near the proposed stadium are available as shown on **Figure 7.3.** These include use of the streets currently used for coach parking immediately west of the proposed stadium and an overflow area in non-residential area accessed via Cribb Street. The capacity in these areas has been assessed as follows :

- Parkview Street, Mayneview Street, Cordova Street, Finchley Street, Black Street and Chippendall Street: approximately 95 coaches and mini-buses. Note this coach parking estimate makes allowance for use of Black Street (northern kerb) as a marshalling region for shuttle buses as discussed later in the text.
- Cribb Street, Railway Terrace and McDougall Street (east of Walsh Street), and Crombie Street : approximately 40 coaches and mini-buses.

There will also be some parking bays for mini-buses associated with use by persons with disabilities in the on-site carpark in the proposed stadium.

The combined capacity of these coach/mini-bus parking areas would be about 5 850 persons and the modelling for the target low car use strategy indicates that this would be adequate to meet the demands of typical (35 000 person) events. Major (45 000 person) and capacity (52 500 person) events would also require some remote coach parking to be used with a shuttle bus service

operating between the proposed stadium bus station and the remote coach parking location. The location for remote coach parking areas would ideally be in locations that would be served by the regular shuttle bus services and could include use of coach and on-street parking areas at Southbank and/or planned coach parking areas at Roma Street parklands. Selection of the best location for a particular event will be dependent upon the event timing and any planned major use of other locations at the same time. As coach parking is controlled by the pre-issuing of parking permits by Queensland Transport it is considered that this could be adequately planned for in an operational sense.

7.6.3 Bus Station Options

Eight locations for a bus station at, or near, the proposed stadium were considered within the master plan development and reviewed within the impact assessment process. Some of the bus station options considered were on land external to Lang Park. Options assessed were as follows (refer also **Figure 7.4**):

1. Off-street adjacent to Hale Street (eg under the Eastern Stand)
2. Southern Plaza region off Castlemaine Street and Chippendall Street
3. Off-street on property adjacent to Little Cribb Street
4. On top of a potential Hale Street Broadwalk
5. Off-street on property adjacent to Quay Street/Exford Street
6. Kerbside on Petrie Terrace (north of Caxton Street)
7. Northern Plaza region off Caxton Street
8. Off-street on property bounded by Chippendall Street, Castlemaine Street and Milton Road

Issues to be considered in the bus station location assessment include space requirements, bus route efficiency, pedestrian conflict and impact of the bus station on the surrounding transport system and local community. Initially separate facilities were considered for different shuttle bus services in order to potentially minimise patron confusion and congestion and to assist in routeing efficiency. However operational considerations with respect to pedestrian flows within the stadium and crowd management objectives favoured a single shuttle bus facility. For a smaller event, use of one bus station only with combined routes (eg combined Roma Street/Queen Street shuttle) provides an operationally more efficient and flexible situation.

The assessment of issues associated with each potential bus station location is summarised as follows :

1. Hale Street Bus Station

Hale Street (northbound) is currently closed to general traffic for a period post-event during major events and is used as a kerbside bus facility. However given the importance of Hale Street within the regional road hierarchy (which will be increased when the Inner City Bypass is operational), this situation would be clearly unacceptable with redevelopment. Any bus facility associated with Hale Street would thus have to be entirely within the Stadium site (for example under the eastern stand). Detailed studies by the Lang Park Stadium Proposal architects revealed that available space for buses and passenger concourses was severely limited. For such a facility to provide for sufficiently efficient bus routeing upon exit the provision of a right turn facility from a proposed stadium bus facility to Hale Street (southbound) would be needed however would result in some adverse impact on Hale Street traffic operations. Potential conflict between bus exits via the off-ramp to Milton Road and pedestrian flows between the proposed stadium and Roma Street would need resolution with grade-separation.

2. Southern Plaza Region off Castlemaine Street/Chippendall Street

In terms of routeing, bus facilities off Castlemaine Street and/or Chippendall Street under the Southern Plaza region would be equivalent to each other. Arrival and departure routes would be feasible from/to all directions, except Hale Street (southbound). This location for bus operations is remote from residential areas and provides a highly convenient location with respect to patron accessibility. Separation of pedestrian movements associated with Milton Station and the proposed light rail station would be required for a bus station at this location.

3. Little Cribb Street

A site adjacent to Little Cribb Street was considered as a possible bus facility. Access to this site is principally from Boomerang Street off the overpass from Coronation Drive to Milton Road. Egress from the site is to Milton Road (westbound) or via Cribb Street to Milton Road or Coronation Drive. This bus station site is more remote from the immediate proposed stadium environs which detracts from its viability for shuttle services compared to the other station options. It would require a major pedestrian route from the proposed stadium including an underpass of Milton Road and the rail corridor.

4. Hale Street Plaza

Consideration was given to the siting of a bus facility on a plaza level over Hale Street linked to Milton Road and/or Caxton Street. However, problems with this concept included:

- Caxton Street is envisaged as one of two major pedestrian routes and having buses turning on and off Caxton Street so close to the proposed stadium would have significant impacts on pedestrian movements.
- Similar difficulties with providing suitable bus connections to/from Milton Road that did not conflict with pedestrian flows in this corridor.

5. Quay Street/Exford Street

The site bounded by Boomerang Street, Quay Street, Exford Street and Coronation Drive was considered not able to offer suitable accessibility opportunities for a bus station for the proposed stadium.

6. Petrie Terrace

A kerbside bus facility in Petrie Terrace north of Caxton Street, coupled with diversion of outbound busway buses, was considered as offering an efficient means of optimising the use of the substantial resource available in the busway. Outbound buses could leave the Inner Northern Busway at Roma Street, use the Upper Roma Street bus facility to access Petrie Terrace and then rejoin the busway at Normanby Fiveways or the Countess Street/Roma Street intersection. However it was considered that this facility would not be appropriate for other services.

7. Northern Plaza Bus Station

Bus routeing via Caxton Street would result in potential conflict with use of roadspace to assist in the catering for pedestrian demands in this corridor, particularly post-event. The generation of bus movements on the road network at the northern end of the site would generally result in a potentially greater adverse impact on local residential amenity.

From the above assessment, it was concluded that the most appropriate siting for a bus station for the proposed stadium would be either:

- Within the site at the southern end and under the southern pedestrian plaza; or
- On external land within the Chippendall Street/Castlemaine Street/Milton Road precinct. In this latter option there would be ability to accommodate a larger number of bus bays (refer also Section 7.6.4), greater potential for integration with the light rail station for everyday use (refer also Section 7.7.4) and a more effective separation of pedestrian and vehicle movements.

8. Chippendall/Castlemaine Street/Milton Road Precinct

This precinct currently incorporates the Konica building property. The ability to provide direct bus access to or from Milton Road at-grade is restricted due to the presence of the entry ramp from Milton Road to Hale Street northbound along the frontage. However arrival and departure routes would be feasible from/to all directions via the Milton Road/Castlemaine Street signalised intersection, except Hale Street (southbound). Bus movements and major pedestrian flows around the proposed stadium and to Milton Station would require grade-separation in this area.

7.6.4 Shuttle Bus Service Routeing

Potential shuttle bus routes for a bus station at the proposed stadium located at the southern end of the site are shown on **Figures 7.5 a) to c)**. Features of the routes identified are as follows:

❑ Queen Street Shuttle

There are two possible efficient routes from the stadium to Queen Street. These are via:

- Milton Road, Upper Roma Street, Roma Street, Herschel Street and North Quay. In order to avoid conflict with Roma Street shuttle buses unloading at Roma Street, this service would not use the busway. However it would use the associated contra-flow bus lane in Upper Roma Street. The preferred return route would be via the busway to Countess Street, then the Upper Roma Street bus lane and Milton Road. An alternative return route would be via Adelaide Street, George Street, Ann Street, Coronation Drive and Boomerang Street.
- Coronation Drive and North Quay although this route is not preferred because access to Coronation Drive from the preferred bus station location would be inefficient.

❑ Roma Street Shuttle

Shuttle buses to Roma Street would be most efficiently routed via Milton Road, Upper Roma Street and the Inner Northern Busway. Return trips could either be via Albert Street, Ann Street, George Street back to the busway or via Makerston Street, the emergency access to Riverside Expressway and Boomerang Street.

❑ South Bank Shuttle

Getting from the proposed stadium to South Bank would be relatively straightforward from most of the possible bus facility locations. The most efficient route is likely to be via Milton Road, Upper Roma Street, Saul Street and Grey Street. Returning would be either via Grey Street, Upper Roma Street and Milton Road or Melbourne St, George St, Roma Street, Upper Roma Street and

Milton Road. Given the likely range of potential Southbank destinations, a loop of Russell Street, Cordelia Street and Melbourne Street is likely to be desirable.

- Combination Shuttle Runs

It would be possible to combine shuttle runs in a number of ways, such as Roma Street + Queen Street, a loop service covering all three destinations or a two way loop covering all three destinations but with preference to either Roma Street or South Bank. For a major event a combined Roma Street and Queen Street shuttle would result in lower efficiencies due to partial load factors between Roma Street and Queen Street and all buses having to return empty from Queen Street. Nonetheless, this option may be appropriate for smaller crowd events.

Specific bus priority measures related to the Lang Park Stadium Proposal and associated with the proposed routes are discussed later in the text. A summary of the characteristics of the recommended routes is provided in **Table 7.11**.

Table 7.11: Shuttle Bus Route Statistics

	Roma St	Queen St	South Bank
Walk distance (m)	900	1 800	1 600 – 2 000
Round trip bus journey distance (m)	3 100	4 200	5 000
Length on busway (m)	350	1 000	0
Length on other bus priority (m)	350	700	750
Journey time (s) @ 30 km/h	372	504	600
Bus stop time (dwell + clearance) (s) (1)	176	176	192
Round trip time (s)	548	680	792

Note:

(1) The total time for a bus to load and leave a bus bay comprises the loading time, door opening and closing time (jointly known as the dwell time) and the clearance time (the time for a bus to start up and travel its own length to exit the bus stop). An average boarding time of 1.2 s/passenger would be very conservative. For an average load of 60 passengers, the boarding time would thus be 72 s. The door opening and closing time is normally in the range 2 to 5 seconds. A figure of 4 s has been adopted for this analysis. Bus start up times range from 2 to 5 seconds while the bus length travel time from stationary is about 5 to 10 seconds. A total clearance time of 12 s has been adopted, resulting in a total stop occupancy time of 88 s/bus. Two separate bus stop locations have been assumed for Southbank, incurring an additional 16 seconds door and clearance time.

7.6.5 Bus Operations Assessment

Based on the modelling of the transport demand for the target low car use scenario for various event timing/crowd size scenarios, the number of person trips by bus, categorised by mode function, is as shown in **Table 7.12.** The type of bus service in the vicinity of the proposed stadium for each scenario as modelled is shown in **Table 7.13.** Of the shuttle bus users, the numbers and percentages by forecast destination are shown in **Table 7.14**.

Table 7.12: Indicative Bus Person - Trips by Function

Event Type/Crowd Size		Bus Function		Total Bus Person Trips
		Primary Mode for Stadium Travel	Auxiliary Mode to or from a Primary Mode	
Capacity Weeknight Event (52 500 p)	Arrival	5 600 (5 600)	3 000 (5 600)	8 600 (10 200)
	Departure	6 600 (6 800)	3 700 (5 200)	10 300 (12 000)
Major Weekend Evening Event (45 000 p)	Arrival	5 300 (5 300)	2 300 (4 600)	7 600 (9 900)
	Departure	5 500 (5 500)	2 500 (3 300)	8 000 (8 800)
Typical Weekend Event (35 000 p)	Arrival	5 000 (5 000)	700 (3 000)	5 700 (8 000)
	Departure	5 400 (5 400)	400 (2 200)	5 800 (7 600)

Notes
(1) The numbers in brackets detail the varied forecast in number of trips on each mode in a scenario where no LRT service is available from the proposed stadium.

Table 7.13: Indicative Bus Person -Trips by Service Type

Event Type/Crowd Size		Bus Service Type				
		Shuttle	Busway & CBD Bus Services	Local Area Bus Services	Special Direct Stadium	Total
Capacity Weeknight Event (52 500 p)	Arrival	3 500 (6 700)	3 700	400	1 000	8 600 (10 200)
	Departure	4 800 (6 500)	4 000	400	1 100	10 300 (12 000)
Major Weekend Evening Event (45 000 p)	Arrival	2 300 (5 000)	3 500	400	1 000	7 600 (9 900)
	Departure	2 700 (3 500)	3 900	400	1 000	8 000 (8 800)
Typical Weekend Event (35 000 p)	Arrival	700 (3 000)	3 600	400	1 000	5 700 (8 000)
	Departure	600 (2 400)	3 900	400	900	5 800 (7 600)

Notes
(1) The numbers in brackets detail the varied forecast in number of trips on each mode in a scenario where no LRT service is available from the proposed stadium. Note not all modal forecasts vary in this latter scenario as they do not represent a competing mode to LRT.

Table 7.14: Indicative Shuttle Bus Patronage Distribution without Light Rail Transit (LRT)

Scenario		Destination		
		Roma St	CBD (Queen St)	South Bank
Capacity Weeknight Event (52 500 p)	Arrival	2 300 (34%)	2 700 (40%)	1 700 (26%)
	Departure	2 400 (37%)	2 900 (45%)	1 200 (18%)
Major Weekend Evening Event (45 000 p)	Arrival	2 100 (42%)	2 100 (42%)	800 (16%)
	Departure	1 400 (40%)	1 800 (51%)	300 (9%)
Typical Weekend Event (35 000 p)	Arrival	1 600 (53%)	1 400 (47%)	n/a [1]
	Departure	1 350 (56%)	1 050 (44%)	n/a [1]

Notes :
(1) Shuttle service from Southbank not envisaged for weekend afternoon events as typically there would be limited surplus Southbank carparking available at these times for Stadium patron use.

Operational and impact issues associated with the required bus operations to meet these patronage targets are as follows:

Shuttle Buses

Assuming standard full sized buses are used as shuttle buses, a design capacity of 66 passengers/bus is considered appropriate, compared to the crush capacity of about 70 passengers. Meeting transport demand for after a major event is a matter of balancing very high peak demand with practicalities of service provision.

Based on assessment of the modelled demand for a capacity event departure, a headway of 70 seconds is considered appropriate for the peak half hour and 2½ minutes for the remainder of the peak hour for shuttle services to Roma Street. The equivalent peak half hour headways for Queen Street and South Bank would be about 60 seconds and 2 minutes respectively, with shoulder frequencies of 2 and 6 minutes.

The implications of the shuttle bus service on fleet requirements post peak-event without light rail transit (LRT) have been assessed as follows:

- The peak hour number of bus runs to Roma Street is forecast as 37 (refer **Table 7.15**). With an indicative round trip time for the Roma Street shuttle of about 9 minutes and a contingency of 2 minutes, the resultant requirement would be for 10 buses to service this route.
- The number of bus runs required to serve the total forecast Queen Street shuttle demand is 45. The round trip time is forecast to be about 11 ½ minutes and a contingency of 2 ½ minutes is recommended, resulting in a peak requirement for 13 buses.
- The peak number of departure bus runs required to serve the total forecast South Bank shuttle demand is 19, including demand due to potential use of this area for supplementary remote coach parking for a capacity weeknight event. The round trip time is forecast to be just over 13 minutes and a contingency of 3 minutes is recommended, resulting in a peak requirement for 7 buses.
- In summary there would be an overall requirement for 30 buses to provide the post-event shuttle services to Roma Street, Queen Street and South Bank. These buses could be sourced from the existing BCC fleet without any impact on normal service provision.

For a capacity event arrival for the target modal scenario without light rail transit (LRT), a similar assessment indicates:

- The required number of shuttle bus runs from Roma Street in the hour co-incident with commuter peak operations (ie 5.30 to 6.30pm) would be 12. This would require 3 buses to operate.
- Queen Street shuttle bus runs in the commuter peak hour would be 12. This would require 4 buses to operate.
- Shuttle bus runs from Southbank in the hour co-incident with commuter peak operations would be 9, requiring 3 buses to operate.
- In summary, there would be an overall requirement for 10 buses to provide the pre-event shuttle services to Roma Street, Queen Street and South Bank during the commuter peak. These buses could be sourced from reserve buses held to replace broken down vehicles. Maximum general bus demand in the PM peak is not as high as for the AM peak as the peak is longer. This results in a higher number of reserve buses being available. Use of these reserve buses would reduce operating margins and this may be acceptable for the one or two occasions each year that capacity event crowds are anticipated at the Stadium on a weeknight.

For other events, the arrival demand would not coincide with peak general demand and buses would be readily available.

Table 7.15: Indicative Shuttle Bus Servicing Requirements without LRT

Scenario		Indicative Shuttle Bus Services by Route in Peak Hour			TOTAL BUSES IN PEAK HOUR
		Roma St	CBD (Queen St)	South Bank	
Capacity Weeknight Event	Arrival in Commuter Peak Hour	12	12	9	33
(52 500 p)	Departure	37	45	19	101
Major Weekend Evening Event (45 000 p)	Departure	23	29	4	56
Typical Weekend Event (35 000 p)	Departure	21	16	0	37

Notes :
(1) Shuttle service from Southbank not envisaged for weekend afternoon events as typically there would be limited surplus Southbank carparking available at these times for Stadium patron use.

Busway Buses

For a capacity event departure, based on the information provided by the Busway Operational Plan team, there will be at least 50 buses per hour stopping at the Countess Street busway station during the hour 10 pm to 11 pm plus about half this number of Tier 1 buses to/from St Lucia. The forecast busway demand from the stadium is about 2 000 people, which indicates an additional demand of about 26 people per bus, which is likely to be within the spare capacity on these buses. For northbound busway buses, it would be possible to divert buses off the busway to use Petrie Terrace in order to reduce walking distances. However, only about one third of the forecast busway users would be travelling north. Given that the Countess Street busway station is within a reasonable walking distance of the proposed stadium, it is considered that such a diversion is not appropriate.

During arrival for a capacity event, demand levels will be more dispersed and the base busway frequency would be added to by peak hour services. Busway frequencies at weekends will be similar to after a weekday evening event. While general demand will be higher, Lang Park demand would be lower (1 600 – 1 700 persons). It is anticipated that busway buses will have sufficient capacity to accommodate these 20 persons per bus.

CBD Buses

The number of Lang Park patrons forecast to catch buses form the CBD ranges from 1 100 to 1 300 dependent on scenario. For a weekday evening capacity event, this would result in an average of an 26 extra passengers on each of approximately 50 services/hour operating at that time, if all passengers catch buses within one hour. However, it is likely that many of the patrons on CBD buses may visit entertainment venues before catching the bus resulting in lower demands per hour. The estimated demands could be accommodated without adverse impact on existing timetabled services.

On-Street Buses

After a weeknight capacity event there are forecast to be about 40 other buses operating on the roads around the stadium between 10 pm and 11 pm. The forecast demand is about 400 people or about 10/bus, which will be within the spare capacity on these buses.

The lesser arrival and weekend departure demands would be adequately catered for by normal services. In particular, arrivals on a weekday during peak periods would only be 3 – 4 per bus. This may involve some boarding delays due to some buses being at capacity, but there would be adequate capacity in normal services on average.

Suburban Regional Centre Direct Buses

Direct services are forecast to accommodate 1 000 persons in arrival and departure scenarios for the range of events. An appropriate distribution based on demand for services would be Garden City (8 services), Chermside and Carindale (4 services each). For capacity event crowd departure, the Garden City service would have a 5 minute headway and the other services 10 minute headways. For arrival, the headways would be 20 minutes and 45 minutes respectively.

Prior to a weekday event this would require dedicated use of 6 buses to perform this task over the 5.00 pm to 8.00 pm period. This could have some implications for fleet as resources during the early part of this period are required to meet commuter service demands. These buses could be sourced from reserves as described previously in the discussion on shuttle buses.

The availability of bus fleet to operate these direct services post-event or for arrival and departure to weekend events would be well within the capacity of available resources.

7.6.6 Bus Station Appraisal

The adequacy of the proposed stadium bus station sizing has been assessed based on the ability of the facility to accommodate the servicing needs post peak capacity event in a scenario where light rail is delayed as this represents the critical demand case. The needs of each service type likely to use the facility have firstly been considered as follows:

1. Shuttle Bus Services

As described previously the combined number of buses for the three types of shuttle services during the peak post-capacity event demand period (without LRT) would be about 101 buses/hour, with peak frequencies of the three shuttle services are proposed as 70 seconds, 1 minute and 2 minutes.

Separate designated bays and platform regions for each shuttle bus service to assist with loading efficiency, signage and user comprehension of the different services available would be desirable. Two to three bays each would be recommended to provide a comfortable situation for each of the two busier services (Roma Street and Queen Street) and two bays should also be provided for the South Bank route, resulting in a total minimum requirement of six to eight bays. Higher numbers of bays, particularly in the scenario where light rail is delayed, would reduce passenger queuing pressures.

2. Direct Suburban Regional Centre Bus Services

Direct services to suburban regional locations such as Garden City, Chermside and Carindale would be of the order of 16 buses in the post-event hour. These could operate from two dedicated bays at the proposed stadium bus station.

3. Other Special Shuttle Services

For particular events, special bus shuttle services may operate to post-event venues associated with a particular football code. For example, shuttle services currently operate between Lang Park and Ballymore after a major Rugby Union match leaving from kerbside in Heussler Terrace which has resulted in some adverse impacts on residential amenity. Provision should be made in the proposed stadium bus station to accommodate such event-specific special shuttle services. An allowance of one or two bays is recommended.

Queuing analysis based on the expected arrival flow of patrons to the bus station and the indicative bus frequencies described above indicates that the overall bus station platform queuing areas would need to accommodate a peak of about 1 100 persons would be required. This would require an indicative minimum area allowance of 600 m^2 at Level of Service E with a 90% effective area allowance assumed (refer to **Table 7.16** for Level of Service definitions). The concept plan (Ground Level) in Volume 2 showing the proposed stadium bus station indicates an effective platform queuing area of approximately 1 200 m^2 which implies that the bus station can handle the forecast capacity event passenger demands at Level of Service D.

The concept plan (Ground Level) in Volume 2 indicates provision for 11 bus bays which could be allocated as say 7 - 8 bays for regular shuttle services, 2 bays for regional direct services, and 1 - 2

bays for special event-related shuttle services. This is considered workable, although extra bays would provide for greater flexibility.

The proposed layout as shown on the plans allows for buses from each sawtooth bay to enter/exit via a circulation lane independently of each other which supports the operation of the facility for high-throughput post-event.

Passenger access to the bus concourse area is suitability catered for via the provision of stairs and lifts from the southern plaza above, via an intermediate or ground mezzanine level.

7.6.7 Bus Queuing and Marshalling

In order to accommodate the intense demand after a major event, it is necessary for buses to arrive at the shuttle bus platforms regularly and reliably. Achieving a peak combined frequency of 101 regular shuttle buses/hour, 16 suburban services and extra event-specific special shuttle services from 11 bays will require buses to be marshalled near the stadium. This can be achieved in two main ways:

- Marshal all buses at a nearby location; and
- Maintain a pool of buses at a nearby marshalling location and feed the marshalling area from the relevant bus depot.

The former has the advantage that it is more reliable and less complex but the disadvantage that it requires more area near the proposed stadium. The latter alternative requires an adequate capacity at the marshalling point to accommodate unexpected occurrences such as match overtime being required. Buses should not need to be dispatched from the depot until loaded buses are leaving the stadium.

The proposed bus station would have a capacity of 11 buses at platforms, plus five buses in temporary bays in the circulation aisle, prior to the end of events. It is estimated that a total of 30 buses would be needed to operate the route shuttle services and say 15 to 20 buses for regional services and/or special event shuttles thus requiring 30 - 35 buses to be marshalled elsewhere. A supply of 25 buses at a nearby marshalling area would provide a workable buffer.

A nearby location identified as suitable and practical for this quantum of bus marshalling prior to event finish is shown on **Figure 7.3.** This involves use of some of the western kerb of Castlemaine Street south of the bus station entry, northern kerbside areas on Black Street and western kerbside areas in Granzella Street. Queuing buses in these locations will have little impact on residential amenity as these streets serve commercial and industrial premises.

7.6.8 Bus Priority and Traffic Arrangements for Buses and Coaches

Figures 7.6 a) & b) demonstrates a recommended concept to improve the operating conditions for buses travelling to and from the proposed stadium from the key locations to be served by shuttle buses. This mitigative strategy is compatible with, and complementary in operations and infrastructure provision to, the alignment and intersection arrangements associated with the proposed Roma Street to Lang Park light rail route provision which is also shown on **Figure 7.6 a)**. It also links with proposed planning concepts supplied by Queensland Transport for improved everyday inbound bus access from Coronation Drive via Eagle Terrace to the planned Roma Street Inner Northern Busway system. These planned arrangements are also shown on **Figure 7.6 a).**

Features of the concept include:

- At the Milton Road/Upper Roma Street/Petrie Terrace intersection a dedicated 100 metre long right turn lane on Milton Road is provided to gain access to a proposed contra-flow bus lane in Upper Roma Street. This has major benefits for inbound bus movements from the Stadium (and also regular Milton Road bus services) as it avoids the need for buses to travel via the longer and more "indirect" Petrie Terrace- Seccombe Street-Countess Street route to Roma Street.
- The contra-flow (inbound) bus lane in Upper Roma Street would be located along the northern kerb of Upper Roma Street adjacent to a relocated outbound bus lane in Upper Roma Street.
- The outbound bus lane in Upper Roma Street to Milton Road is maintained (but relocated) with traffic signal modifications in conjunction with the upgraded intersection allowing the provision of improved bus priority phasing.
- Improved arrangements for the at-grade signal crossing by pedestrians of the Petrie Terrace leg of the Milton Road/Upper Roma Terrace/Petrie Terrace intersection are incorporated in the intersection design. These are discussed further in Section 7.8.

Buses entering and exiting the proposed stadium bus station will use the signalised Castlemaine Street/Milton Road intersection. At event times proposed general traffic and pedestrian management arrangements in the vicinity of the proposed stadium (described further in Section 7.11.1) are such that Castlemaine Street between Cordova Street and Heussler Terrace would be closed to through traffic movement. In addition streets to the immediate west (such as Cordova Street, Mayneview Street, Parkview Street, Finchley Street and Black Street) are planned to incorporate kerbside coach parking and/or shuttle bus queuing allocations.

These general traffic management and coach parking arrangements in the vicinity of the proposed stadium will be such that whilst local land-use traffic access will still be allowed, dominant use of the Castlemaine Street/Milton Road intersection during event times (particularly post-event) will be by stadium related traffic comprising:

- Buses to and from the proposed stadium Bus Station pre- and post-event.
- Coaches to coach parking areas pre-event. Note post-event coaches are intended to continue the current practice of exiting via Heussler Terrace.
- Entry and exit traffic associated with the Stadium carpark accessed off Chippendall Street.

As discussed further in Section 7.11.1, to assist in affording priority to the movement of buses in the hour post-event, police control of the Castlemaine Street/Milton Road intersection is proposed. This would include a simplified operation of the intersection under police control whereby right turn movements from Castlemaine Street to Milton Road (which are not needed for buses) are not allowed. The ability to provide for ease of bus movements to/from Milton Road will be also assisted by the removal of at-grade pedestrian movements of Milton Road from this location due to the provision of the pedestrian overbridge from the proposed stadium over Milton Road.

7.6.9 Operation of Local Bus Stops and Countess Street Bus Station

Local bus stops (described in Section 5.2.3) are affected by the proposal and the associated proposed event traffic management arrangements in the following manner:

❑ Milton Road Bus Stops

Modifications would be undertaken to the two existing bus stops located immediately east of Hale Street in conjunction with the proposed Milton Road works to accommodate a widened pedestrian path on the northern side of Milton Road, bus priority measures as previously described and the proposed light rail route and station.

The inbound stop (No 4) on the northern side of Milton Road outside the school site would be maintained as a facility for everyday use via allocation of a suitably paved area within the 10 metre wide expanded footway zone. It would not be possible to operate this bus stop however in the hour post-event due to the need to accommodate major pedestrian movements in this area.

The outbound stop (No 3 / 4) would be permanently relocated to a point closer to the stadium in an indented facility off the Milton Road carriageway located under the proposed light rail station. This facility would operate at all times and would be well positioned with respect to access to the Milton Road pedestrian overbridge linking to the proposed stadium and adjacent business precinct.

❑ Caxton Street

The bus stops on either side of Caxton Street located immediately east of Hale Street would be affected by the implementation of the Stage 2 Caxton Street temporary traffic/pedestrian management measures (refer Section 7.11.2 for details) which would effectively close Caxton Street between Hale Street and Petrie Terrace to vehicular traffic in the hour post-major event to accommodated major pedestrian flows in safety. In this scenario it is proposed to temporarily re-route Caxton Street buses via Petrie Terrace, Musgrave Road and Hale Street during the one-hour post event period. Whilst this represents a longer route for travellers, it is considered that the proposed deviation would not represent an unacceptable impact given the infrequent nature or occurrence likely.

❑ Given Terrace, Heussler Terrace and Petrie Terrace

Existing bus stops are unaffected by the proposal.

❑ **Countess Street Bus Station**

The Countess Street Bus Station on the planned Inner Northern Busway would be used by proposed stadium patrons and model forecasts for the target low car use scenario indicate that post capacity event approximately 3½% of the patrons (1 850 people) would use such a facility. For typical events, peak patronage of the order of 1 600 people per hour at the station would be envisaged. Based on discussions with Queensland Transport it is understood that the fitout of the Countess Street bus station is not planned for completion by 2003 but at a later, as yet undefined, time. It would be desirable for the proposed stadium to have this conveniently located facility available at opening time (rather than insist patrons access the Roma Street or CBD bus station facilities). Therefore as a mitigative strategy it would be appropriate for the Lang Park Stadium Proposal to contribute to the early construction of this bus station. Provision of this facility will have wider benefits as it will allow the local community the opportunity of everyday use of a busway station at an earlier time than under normal funding.

7.6.10 Summary of Bus Issues

Key findings from the assessment of bus issues are:

- There are five recommended forms of bus services for events at the proposed stadium:
  - On-street local buses;
  - Busway buses;
  - Special direct stadium buses;
  - Shuttle buses; and
  - Charter coaches & mini-buses.

- Shuttle buses will play a valuable role in serving the proposed stadium and three destinations are recommended; Roma Street, Queen Street and South Bank. For a capacity scenario a post-event demand of 6 450 person-trips (12% of patrons) on shuttle bus is forecast for the target low car use scenario with no light rail. To cater for forecast demand, the Roma Street and Queen Street services would need peak headways of about 1 minute, while South Bank would require a 2 minute headway. An overall shuttle bus task of about 100 buses per hour post peak event has been calculated based on the modelling for the target low car use scenario. With light rail, the number of shuttle bus users is lower and forecast to be about 4 800 persons (9% of patrons).
- The preferred location for a bus station at the proposed stadium is at the southern end of the site based on consideration of space requirements, route efficiency and bus access, pedestrian conflict and impact on surrounding transport and local area.

7.7 Light Rail

7.7.1 Light Rail to Lang Park Route and Station Options

A series of route options for light rail to the proposed stadium were identified in the Master Plan development process. **Figure 7.6 d)** shows the options considered. **Table 7.16** summarises a comparative assessment of options.

The preferred light rail option which forms part of the Lang Park Stadium Proposal is shown in **Figure 7.6 a) to c).** It also accommodates shared bus lane and bus priority measures. This light

rail route links to a light rail station partially elevated over Milton Road and this would be connected directly to the concourse level at southern end of the proposed stadium via grade-separated pedestrian connections over Milton Road. A lift and stairs between the southern footpath on Milton Road and the light rail station would also be provided.

The route features are described as follows:

- Commencing at the planned light rail/busway route in Roma Street a combined dual-track light rail/ two-way bus lane route is proposed to proceed at-grade across Countess Street at the reconfigured Countess Street/Upper Roma Street/Saul Street intersection into the northern side on Upper Roma Street past the Fire Station. The route would then proceed along Upper Roma Street via a reconfigured signalised intersection at Upper Roma Street/Skew Street. The proposed alignment over this route segment matches draft planning layouts prepared by Queensland Transport for bus lane treatments in the road segment between Skew Street and Countess Street to provide access for western bus routes between Coronation Drive and the planned Inner Northern Busway.
- From the Skew Street intersection the proposed dual-track light rail/two-way bus lane route continues to proceed along Upper Roma Street to the road bridge over the rail tracks at the intersection of Upper Roma Street/Petrie Terrace/ Milton Road.
- The light rail route then crosses at-grade through an upgraded signalised intersection (which also incorporates pedestrian improvements and bus priority access to and from Milton Road) into the rail corridor adjacent to Milton Road. Widening of the existing road over rail structures would be incorporated in the intersection upgrading which also involves a widening of Milton Road (to accommodate a widened footpath on the northern side and a bus priority right-turn lane).
- The light rail route proceeds in an elevated structure above the existing heavy rail corridor (which also incorporates a pedestrian path on the southern side of Milton Road) crossing Hale Street on a new bridge.
- The light rail continues on elevated structure to an elevated station which would span over the westbound traffic lanes on Milton Road between Castlemaine Street and Hale Street.
- Buses to/from Milton Road would cross into the bus lane /light rail route at the signals at Milton Road/Upper Roma Street/Petrie Terrace which would have a modified signal phasing that permitted the safe movement on buses, light rail vehicles, general road traffic and pedestrians across Petrie Terrace. The signalised pedestrian crossing of Milton Road at this location however would not be permitted and such crossing movements would need to be made at the nearby Milton Road/Hale Street off-ramp intersection to the west or via use of the new pedestrian routes towards Roma Street to the east.
- The existing outbound bus stop on Milton Road just east of Hale Street would be relocated to the west underneath the proposed Light Rail Station. Localised modifications to Milton Road including median works would be required in the vicinity of the light rail station to accommodate the structure above, the relocated bus stop and the outbound traffic lanes including the right turn lane into Castlemaine Street.

The concept alignment described above and shown in **Figure 7.6 a) to c)** is considered feasible in terms of light rail functionality, impact on Queensland Rail operations and road traffic impact. The concept also provides for associated improvements in bus priority and pedestrian movements at the Milton Road/ Upper Roma Terrace/ Petrie Terrace intersection, as discussed in Section 7.6.8. The widened footpath along the northern side of Milton Road associated with access to the proposed stadium has been incorporated in the concept planning for road traffic, bus and light rail movement in this corridor at sufficient width to cater for likely pedestrian movements in a safe manner under a range of potential travel outcomes. The detailed design of the elevated section of

light rail structure over the heavy rail corridor could adequately incorporate required Queensland Rail clearances and minimise the extent to which gantry structures over the rail corridor are required. During construction, procedures that ensured minimal impact on Queensland Rail operations, as identified in Section 6.1.6 would need to be adopted.

7.7.2 Operational Concepts

Two potential operation concepts for additional or special light rail to the proposed Lang Park stadium were identified as follows :

1. Provide a shuttle service between the proposed stadium and the suburban line haul public transport modes at the Roma Street heavy rail station, busway and light rail station.
2. Provide a shuttle/distribution service between the proposed stadium and the CBD more generally, serving Roma Street as in Option 1 but also wider CBD carparking locations and post-event entertainment venues.

Normal light rail operations would also be available with the western terminus at the new Milton Station when peak events are held at the proposed stadium rather than at the planned Countess Street terminus.

Option 1 would enable a higher frequency of service for a given fleet size compared with Option 2 and would have the potential to relieve walk demand to Roma Street station. However, this method of operation would introduce the requirement to design track facilities at Roma Street to allow the light rail vehicle return trip/shuttle operation to take place. This would be likely to be extremely difficult to achieve in view of the severe constraints with available space in the Roma Street area.

Option 2 has the potential for light rail to be regarded as more than just a feeder to the suburban line haul public transport modes. In this scenario it would also represent a viable primary mode to the Stadium for residents/workers within the light rail catchment area as well as providing a convenient mode of travel to carparking locations in the wider CBD and Fortitude Valley area. This latter operational role could be reinforced via the use of combined city carpark and light rail ticketing arrangements associated with peak events at the stadium.

Taking into account these factors, Option 2 has thus been identified as the preferred operational concept for light rail to the stadium.

Based on discussions with Queensland Transport and the Brisbane Light Rail project team, for the peak event departure scenarios it has been assumed that up to eight light rail vehicles from the standard level of rollingstock envisaged within the system would be available to assist with the servicing of a potential Lang Park link post-event and during the commuter peak (pre-event) period a total of three vehicles would be available from the basic fleet. This allows for the scenario whereby the Lang Park light rail station effectively becomes the western terminus for normal light rail services (rather than the Countess Street station) when major events are on at the stadium.

The Lang Park Stadium Proposal also incorporates provision for the purchase of three additional light rail vehicles. Therefore for analysis purposes it has been assumed that about 11 light rail vehicles are available for post-event operation with six light rail vehicles allocated to the arrival scenario. Indicative service frequency has been calculated based on a routing scenario between Roma Street and the CBD via the Brisbane Light Rail Project (BLRP)team planned route to QUT via George Street, although routing variations to Southbank or via other BLRP routes may also be

worthy of consideration in detailed operational planning. This yields a potential overall 2 minute service frequency for light rail operation from the stadium post-event with an overall 3 minute service frequency pre-event to the Stadium.

7.7.3 Patronage and Station Assessment

The preferred role of light rail for the proposed stadium is a shuttle/distribution service to Roma Street and other locations in the CBD linking with normal BLRP operations. Light rail could serve CBD workers travelling to the proposed stadium, carparking locations and post-event entertainment venues. It would also provide an alternative mode to walking to Roma Street for rail patrons.

Transport modelling described in indicates a forecast post-weeknight capacity event patronage of 4 500 persons (representing 9% of Stadium patrons) for the target strategy given likely rollingstock levels. Pre-event light rail use (spread over several hours) by about 16% of patrons is forecast.

The indicative light rail station layout shown on **Figure 7.8** provides for two light rail vehicles along the platform. The southern track and platform at the station could accommodate an additional two waiting vehicles post-event.

An assessment of the light rail platform queuing requirements has been undertaken which indicates a peak end of period requirement for up to 1 000 waiting passengers over the peak 10 minutes post-match. The proposed light rail station concept shown in the Master Plan and in **Figure 7.8** could accommodate these peak needs for a capacity event departure at an acceptable level of service of D (refer **Table 7.17** for descriptions) over this short period with higher levels of service attained at other less congested times.

The proposed light rail station will be easily accessible for patrons via the proposed elevated walkway connections to the southern pedestrian plaza.

7.7.4 Future Extension Potential and Integration with Other Modes

Whilst the planning for the alignment for future western extensions to the Stadium light rail link to provide for wider community use has not been undertaken as such extensions do not form part of the Lang Park Stadium Proposal, it is noted that the station arrangement allows functionally for this possibility. Future extension could be in the form of light rail system extension in this corridor further west towards Indooroopilly, consistent with planning intentions for light rail as described in Queensland Transport's draft 2007 Vision document, or alternatively the system could be extended into the Given Terrace corridor via a grade separated link over Milton Road to Castlemaine Street.

The proposed stadium bus station in the location proposed under the southern stand is considered too remote to provide the opportunity for potential use of the bus station and proposed light rail station in an integrated manner as an everyday public transport interchange. Under such a scenario regular bus services serving the western routes could offer passengers the opportunity of connecting to a potential regular light rail service connecting the proposed stadium station to the planned BLRP network to the CBD and Southbank. However the light rail station and bus station would need to be located in close proximity to each other for this potential public transport integration opportunity to be available for wider community use throughout the year.

Table 7.16: Comparison of Light Rail Route Options

Route Designations (refer Figure 7.6d)	Route Description	Comparative Feature: Compatibility with Bus Priority in Upper Roma Street	Suitability of Station Location with regard to Stadium access	Compatibility with road traffic operations	Compatibility with stadium pedestrian routes & management	Potential for everyday use for Light Rail services	Potential for western extension towards Indooroopilly	Potential for western extension towards Paddington	Engineering Feasibility	Cost Ranking (higher cost = lower ranking)
A	From Roma Street at-grade to Milton Road/Upper Roma Street intersection. Then at grade through signalised intersection. Continuing on elevated structure over heavy rail corridor to elevated station partially over Milton Road.	High	High	Medium	Medium	Medium (1)	High	Medium	High	Medium
B	From Roma Street at-grade to Skew Street /Upper Roma Street intersection. Then in tunnel under heavy rail tracks to south side of Milton Road. Continuing adjacent to Milton Road rising to elevated structure over heavy rail corridor to elevated station partially over Milton Road.	Medium	High	High	High	Medium (1)	High	Medium	High	Low
C	From Roma Street at-grade to Milton Road/Upper Roma Street intersection. Then at grade through signalised intersection. Continuing on elevated structure over heavy rail corridor. Then via elevated crossing of Milton Road to elevated station partially over Hale Street.	High	Medium	Medium	Low	Low	Medium	Low	High	Medium
D	From Roma Street at-grade to Milton Road/Upper Roma Street intersection. Then at grade through signalised intersection to southern side on rail corridor. Continuing on elevated structure adjacent to heavy rail. Then elevated crossing of rail and Milton Road to elevated station in Castlemaine Street.	Medium	Low	Medium	Medium	Low	Medium	Medium	High	Low - Medium
E	From Roma Street then across heavy rail (tunnel or elevated options considered). Along Caxton Street (tunnel or at-grade options considered) rising to at-grade station near proposed stadium	Low	High	Low	Low	High	Low	High	Low (2)	Low
F	From Roma Street at-grade to Milton Road/Upper Roma Street intersection. Then at grade through signalised intersection and continue along Petrie Terrace. Turn south into Caxton Street at signalised intersection and process at-grade on Caxton Street to station rear proposed stadium.	High	High	Low	Low	High	Low	High	High	Medium – High

Note :

(1) This would increase to high if the stadium bus station were to be used on an everday basis to provide integrated bus/light rail services.
(2) Unacceptable grades for the heavy rail crossing & connection under Hale Street

7.8 Pedestrians

7.8.1 Pedestrian Access to Stadium & Gate Locations

The Lang Park Stadium Proposal concept plans in Volume 2 depict proposed pedestrian access arrangements in the immediate vicinity of the proposed stadium and gate locations. The main gates into the proposed stadium will occur at Level 1 (RL13.0) providing direct access from the northern and southern plazas. The new walkway linking these plazas between the proposed stadium and Hale Street is also at this level.

The main public entry turnstiles are located in two banks on the north and south sides of the building at Level 1 offering direct access to the proposed stadium from the connected northern and southern plazas. Dedicated corporate and members entry turnstiles are provided on the eastern and western sides of the proposed stadium.

Supplementary turnstiles will be provided at Ground Level at the south-western corner of the building to provide for access for coach patrons from the closed-off section of Castlemaine Street between Cordova Street and Heussler Terrace.

The southern pedestrian plaza provides direct linkages to various external transport nodes as follows:

- Milton Station and the proposed Light Rail Station via an elevated pedestrian link along Castlemaine Street and across Milton Road.
- The Milton Road pedestrian route to Roma Street, the CBD and Southbank via an elevated plaza over Hale Street.
- The proposed stadium bus station via vertical movement systems (stairs and lifts).

The northern pedestrian plaza provides direct linkages to various transport nodes as follows:

- The Caxton Street pedestrian route to Roma Street, the CBD and Southbank via a widened bridge link over Hale Street to Caxton Street.
- The taxi rank on Castlemaine Street.
- Coach parking areas in the local streets immediately west of the proposed stadium.
- The passenger set-down/pick-up area in the northern plaza off Caxton Street.

7.8.2 Design Parameters for Assessment of Pedestrian Routes

Pedestrian Surge Curve

A pedestrian surge curve is a graph that presents the pedestrian demand volume by time before or after an event. It can also be represented as a cumulative frequency curve where the horizontal axis is the time in minutes and the vertical axis is the percentage of the crowd that moves past that point in that time. The intensity of pedestrian flow after an event is invariably higher than before the event.

Sinclair Knight Merz has drawn together a number of pedestrian surge curves based on video surveys conducted at sporting events in Australia. These are shown in **Figure 7.7.** The findings of the 1999 major event surveys at Lang Park have also been shown on this graph. Comparison of the existing Lang Park findings with those at other stadia indicate that the pedestrian surge peak away from the existing stadium after the particular 1999 State of Origin and Tri Nation events were

somewhat suppressed due to the high level of congestion and constraints around the concourse areas and walkways adjacent to the existing stadium.

The intensity of the pedestrian surge post-event could also influenced by other factors including:

- The evenness of scores during the final stages of a football match. Often some of the supporters of the losing team leave as soon as it is clear they will not win.
- Size of crowd. The greater the crowd the more likely they are to spread their departure over a longer time. Often this is influenced by congestion in egress from the stands and/or after large events, supporters of the winning team are prone to stay in the stadium to soak up the atmosphere and view award presentations etc.
- Post-event activities. Scheduled post-event entertainment can provide a "control mechanism" for crowd dispersion.

The Lang Park Stadium Proposal incorporates well-designed concourse areas and egress routes to the pedestrian routes leading away from the proposed stadium. Therefore it would be expected that the post-event pedestrian surge curve for the redeveloped proposed stadium will be less constrained than the current situation at Lang Park. A recommended pedestrian surge curve (design curve 1) for planning and assessment purposes of the pedestrian routes in the near proximity to the proposed stadium leading to transport nodes and the CBD is shown in **Figure 7.7.**

Time Slice for Design

For the pedestrian routes a period of 5 minutes is recommended as the most appropriate design and assessment case for the following reasons:

- Previous surveys of pedestrians leaving major events show that the maximum 5 minute flow is about (15%) greater than the maximum 15 minutes flow.
- These surveys also show that the maximum 1 minute flow is very similar to the average of the peak 5 minutes.

The nature of pedestrian crowd behaviour is that if the maximum flow is not catered for then movement slows, flow reduces and pedestrian congestion increases rapidly as new arrivals join the queue. The aim should be to avoid this unstable flow condition.

Diminution of Peak Surge with walking distance from the Stadium

The intensity of the pedestrian surge curve at a distance from the proposed stadium (eg approaching Roma Street) could be expected to be much less than just outside the stadium due to the variability in walking speeds and dispersal effects particularly if pedestrian plazas or waiting areas are provided en-route. Walking distances to some key destinations for public transport access or parking (eg Queen Street bus station within the CBD – approximately 2 km, and Southbank – approximately 1.6 km) are reasonably significant (refer **Table 5.2.16**). It is noted that the two surveys of events at the MCG (as shown on **Figure 7.7**) which were measured at Richmond Station, which is 550m from the stadium, had less intense peaks than other events measured at the stadium itself.

Surveyed pedestrian surge curves for Lang Park shown on **Figure 7.7** represent a summary of survey sites forming a cordon around the stadium. To investigate the effect of distance from the stadium on surge curves, individual survey site data was examined, in particular sites at Roma Street Station and Milton Station. The proportion of crowd exiting the stadium was established for peak 5, 10, 15 & 20 minute periods at these sites and then compared to relevant sites adjacent to

the stadium. This analysis indicated that a diminution of the design pedestrian surge curve as walking distance from the stadium increases would be valid. Comparison of the peak 5 minute design period at a distance from the stadium with the peak 5 minute period outside the stadium indicates a reduction to pedestrian volume of approximately 15% to 25%. Therefore a second pedestrian surge curve (design curve 2) was developed representing this diminution of peak surge effect and is shown on **Figure 7.7**. This curve is considered appropriate for the assessment of pedestrian infrastructure at a distance from the proposed stadium where the effects of dispersal would have been realised.

Acceptable Levels of Pedestrian Congestion

Pedestrian levels of service are given in **Table 7.17**.

Table 7.17: Pedestrian Levels of Service

Level of Service	Approx sq m per pedestrian	Approx Pedestrians/metre/ minute	Freedom to Select Walking Speed
A	>3.2	23	Pedestrians freely select their own walking speed
B	2.3 to 3.2	23 to 33	Reverse direction movements would imply minor conflicts will occur
C	1.4 to 2.3	33 to 49	Freedom to select walking speed is restricted
D	0.9 to 1.4	49 to 66	Most pedestrians are restricted in walking speed
E	0.5 to 0.9	66 to 82	Virtually all pedestrians would have their normal walking speeds restricted very difficult to over take slower moving pedestrians
F	<0.5	<82	Forward progress only by shuffling unstable flow.

Note : Based on Fruin,J (1971) *Pedestrian Planning and Design*

The level of service characteristics above represent a range of pedestrian flow conditions. Fruin (1971) and Austroads (1995) *Guide to Traffic Engineering Practice Part 13 – Pedestrians* indicates that Level of Service E (ie where the pedestrian design volume approaches the maximum capacity of a walkway) represents a design range that is appropriate for application over short peaks in the most crowded areas. Typical examples where this design range is appropriate are sports stadia and railway platforms. A need also exists in this circumstance to provide for holding areas for pedestrians to seek refuge from the flow. On this basis, attainment of Level of Service E or better for forecast demands associated with a capacity event has been adopted as the benchmark for assessment of the suitability of the indicative pedestrian infrastructure and public transport platform sizing proposed for the Lang Park Stadium Proposal.

7.8.3 Pedestrian Infrastructure Improvements

Pedestrian improvement concepts associated with the proposed stadium are described in Section 2 and illustrated in the accompanying concept plans in Volume 2.

In summary the pedestrian infrastructure proposals that are included in the Lang Park Stadium Proposal are:

1. A major elevated pedestrian crossing of Milton Road. This would provide access to a proposed light rail station adjacent to the proposed stadium and would also provide for grade-separated movement over Milton Road to the Milton Road footpath link to Milton Station.

2. Upgraded at-grade pedestrian access to Milton Station compatible with the proposed Milton Station upgrading (refer Section 7.5.5). Note this treatment would not preclude a potential future extension (at an elevated level) of the light rail route westwards from the proposed stadium as discussed in Section 7.7.4.

3. Pedestrian route extension from the eastern end of Caxton Street through the Police Barracks site and elevated above the rail corridor linking to pedestrian improvements in the Upper Roma Street corridor.

4. Improved pedestrian capacity along the Upper Roma Street corridor via an elevated walkway behind the Fire Station, an elevated connection across Upper Roma Street to the southern footpath near Skew Street and a connection along the northern side of the rail corridor from the Petrie Terrace intersection.

5. Elevated pedestrian crossing of Countess Street – this eliminates a range of existing and future pedestrian conflicts with cars, buses and potentially light rail at the Countess Street/Roma Street intersection. It is intended that this route links via an elevated walkway along Roma street to the Rail Interchange, Inner Northern Busway and light rail station. As the planning detail for this integrated node by Queensland Transport and Brisbane City Council is still in progress, the specific treatment for this elevated link cannot be fully defined at this stage.

6. Pedestrian improvements at the intersection of Milton Road, Upper Roma Street and Petrie Terrace. This concept would be achieved in conjunction with an at-grade light rail/bus-priority alignment through the intersection as shown in **Figure 7.6 a).** A key improvement for pedestrians at this location in addition to widened footpaths will be the replacement of the existing "two stage" signalised pedestrian crossing of Petrie Terrace to the Milton Road footpath with allowance for pedestrians to cross at the signals in a single phase movement. Signal phasing is such that pedestrian movements can occur at the same time that bus lane movements between Upper Roma Street and Milton Road, and outbound light rail movements occur.

7. Widened crossing of the southern end of Hale Street for movements to/from Milton Road.

8. Widening of the Milton Road northern footpath east of Hale Street to Petrie Terrace.

9. Widened crossing of the northern end of Hale Street for movements to/from Caxton Street.

7.8.4 Pedestrian Access to Transport Nodes

Pedestrian access to transport nodes associated with the Lang Park Stadium Proposal have been designed to:

- Avoid crush crowding and the need for pedestrians to encroach onto the road. As described in Section 5.2.1 the existing routes perform poorly in this regard after major events.
- Provide a suitable footway slope and directness of route to the destination.
- Avoid the potential for infiltration of pedestrian traffic into residential areas.
- Be distanced from residential precincts in order to protect amenity.
- Achieve a suitable pedestrian environment for personal safety.
- Where possible meet every day needs in addition to catering for the needs on event days.

Level of Service Assessment

It is important to ensure that pedestrian facilities are sufficiently wide to accommodate expected peak demands in safety. Using the pedestrian surge curves developed as described previously, the pedestrian demands towards transport nodes in the peak 5 minute post-event design period have been estimated based on the following:

1. links in very close proximity to the Stadium - 30% of pedestrian demand could occur in the peak 5 minutes.

2. links further away from the Stadium where dispersal occurs due to variability in walking speeds and the effects of intervening pedestrian plaza areas – 22% of the pedestrian demand could occur in the peak 5 minutes.

For arrival, the pedestrian flow on links from transport nodes will be dispersed over a longer time period due to the generally longer profile of crowd arrival to the region. Based on consideration of the arrival characteristics to the 1999 major events at Lang Park and the expected arrival characteristics with the proposed public transport focussed strategy, it is estimated that the peak 5 minute flow for arrival on routes from transport nodes would equate to about 10% of the total crowd.

Modelling of these expected pedestrian demands on the various pedestrian routes to transport nodes has been undertaken using the Emme/2 model described in Section 7.3.2. **Figure 7.9** illustrates the distribution of pedestrian flows from the proposed stadium along major routes to transport nodes post capacity event.

Tables 7.18 a) to c) identify the indicative level of service on key pedestrian links (denoted in **Figure 7.8**) for the various event type/crowd sizes assessed. The table also lists the indicative pedestrian infrastructure sizing incorporated in the pedestrian infrastructure measures that form part of the Lang Park Stadium Proposal.

These tabulations demonstrate that the proposed infrastructure provisions on the key routes are suitable to meet demands for a capacity event at the stadium. The concept plans in Volume 2 indicate that, at key holding points on the various routes (eg at intersections where stoppages may occur due to police control of movements post-event and where traffic signal phasing will result in pedestrians queuing whilst waiting to cross pre-event), suitable areas are generally available.

At the upgraded intersection of Milton Road/Petrie Terrace/Upper Roma Street the pedestrian footpath and holding area on the eastern (or City) side of Petrie Terrace is somewhat constrained due to the proximity of the Hogs Breath Café building to the kerb. In an operational sense, post-event this restriction, whilst not desirable, can be overcome. When the intersection is operated under police control then pedestrians can be directed in a skew manner across Petrie Terrace from the Milton Road footpath holding area towards the proposed pedestrian plaza link elevated over the rail line adjacent to the Hogs Breath Café. Pre-event when pedestrians cross under the normal signal phasing, pedestrian queuing on the eastern side of Petrie Terrace, whilst not problematic in terms of safety, may be less efficient due to the geometric constraints.

7.8.5 Appraisal of Various Issues

Personal Safety

The proposed pedestrian infrastructure avoids the use of subway links which can present safety and social issues. In order to maximise personal safety on the pedestrian routes (particularly when used outside event times), the pedestrian infrastructure proposed incorporates suitable lighting and surveillance using CCTV and this is described separately in Section 2. It would be recommended that, with these provisions in place, pedestrian structures associated with the proposed stadium should be left open with free access at all times.

Suitable barrier treatments are proposed on elevated pedestrian structures that cross over road and rail corridors.

Signage Requirements

It is recommended that well-designed guidance signage on the external pedestrian routes to assist patrons in way-finding the most appropriate and direct route to transport nodes is provided. This should be fully integrated and themed with signage within the proposed stadium and around the concourse.

Impact of Traffic and Parking on Pedestrian Movements and Safety

With the proposed parking restrictions around the proposed stadium as described in Section 7.9.2, there will also be less pedestrian movement associated with private car parking access throughout the entire local street system and this will also provide an improvement in local traffic operations and pedestrian safety compared to the current situation at major events.

Similarly with the proposed public transport focussed strategy, in combination with the proposed parking restrictions, there will be less stadium related traffic in the area compared to the current situation, despite the increase in stadium size.

The pedestrian infrastructure proposed for the Lang Park Stadium proposal has, where practicable, provided for grade separation of road traffic and pedestrian movement streams. The elevated pedestrian bridge crossings of Milton Road near the Stadium, Countess Street and Upper Roma Street are key initiatives in this regard. The latter two measures in particular will provide for safer pedestrian links for everyday use across a very busy arterial roads which would otherwise become more complex for a pedestrian to negotiate in the future with the busway links operational.

Impact of Pedestrian Movement on Traffic

As described in Section 7.8.4 the widths of upgraded pedestrian facilities are sufficient to accommodate expected peak pedestrian flows at a suitable level of service thereby reducing the potential for pedestrians to spill out onto the road at locations where the footpath is adjacent to traffic lanes. For a major event currently, as discussed in Section 5.2.1, this issue is a particular concern due to insufficient footpath widths along Milton Road (both towards the City and Milton Station) and along the current pedestrian route to Roma Street and the city via Upper Roma Street. Safety problems with pedestrian movements adjacent to Hale Street at the existing stadium, in conjunction with the use of Hale Street as a de-facto bus station, imply there is a need to close the northbound lanes on Hale Street for post-match demands and this contributes to traffic congestion in the locality and wider network. The proposed stadium and the associated upgraded pedestrian

facilities will therefore represent a vastly improved situation for traffic operations to the one that currently prevails for a current major event at the existing stadium.

The impacts of accommodating pedestrian movement in Caxton Street are described separately in Section 7.11.2.

Pedestrian Facilities at Public Transport Facilities

- Rail: Existing facilities at Roma Street that are designed to cater for peak commuter loads would be suitable for catering for the needs of Stadium patrons. Pedestrian access improvements to achieve suitable standards at Milton Station are proposed as described in Section 7.5.5.
- Bus: the concept plans illustrate pedestrian access concepts for the proposed bus station at the southern end of the site. Physical constraints on the site and its boundaries at the southern end have influenced the means of facilitating the safe movement of people on the southern pedestrian concourse and enabling the range of cross movements to occur to the various transport nodes (eg bus station, light rail station, Milton Station, Roma Street/CBD). As a result, the pedestrian access system for the bus station has been split into two stages with patrons using a stair system or lift from the general southern concourse/plaza level to a mezzanine level below before linking by stair systems/lift to the bus platform level. This is considered to provide a workable pedestrian access arrangement.
- Coach: As described in Section 7.6.2, coaches are to be parked in the nearby commercial streets immediately west of the Stadium or in the vicinity of Cribb Street. No specific pedestrian facilities are proposed associated with coaches and patrons would use the footpath system on these streets for access. Coaches will be parked at these locations for passengers to enable passenger to disembark and walk to the proposed stadium and then return post-event to the waiting coach. The main pedestrian access route to the streets where coach parking is proposed will be via Cordova Street although some use of the southern side of Heussler Terrace between Finchley Street and Castlemaine Street will also occur. With the section of Castlemaine Street between Cordova Street and Heussler Terrace closed to though traffic during events these pedestrian movements should be accommodated in safety with little potential vehicular conflict. However there may also be a need to accommodate some service vehicle traffic movements to the proposed stadium (via the service vehicle driveway in the closed section of Castlemaine Street) at these times. Also due to the proximity of the entry and exit driveways to the bus station there will be a need to carefully channel pedestrian flow (with the assistance of special duty Police) across to the western side of Castlemaine Street or to the elevated pedestrian walkway across Milton Road to ensure that no conflict between pedestrian and bus traffic occurs in this region.

Access to the Stadium for People with Disabilities and Other Special Needs & Disabled Access to the Stadium.

This issue is addressed in Section 2.13.

7.8.6 Proposed Pedestrian Management Arrangements

❑ Caxton Street Pedestrian and Traffic Management

Caxton Street is a major pedestrian thoroughfare for both pre and post major event periods at the existing stadium. There is also a considerable amount of pedestrian activity in this area associated with hotels, restaurants and nightclubs which have active frontage directly on to Caxton Street. As

identified in **Table 7.18**, the minimum required pedestrian walkway width in Caxton Street to cater for pedestrian flows in a safe and acceptable manner in the peak 5 minute period after a capacity event is departure crowd would be 10 metres. Arrival crowd volumes are less intense, however reasonable pedestrian width (calculated as 3.7 metres based on forecast arrival flows) is still required pre-event to allow safe pedestrian operations in this area. As a result, the management of traffic on Caxton Street is recommended as a mitigation measure to allow increased pedestrian space in association with Lang Park events, whilst still retaining the current streetscape and urban design features along Caxton Street, which as described in Section 5.2.3, are desirable for seven day a week use however are not compatible with major pedestrian flows.

The following mitigation measures are proposed:

- Stage 1 Caxton Street temporary traffic/pedestrian management. This will allow two-way vehicular movements, however vehicles will be confined to a reduced roadway space on the northern side of Caxton Street. The existing traffic lane on the southern side of Caxton Street would be made available for pedestrian use.
- Stage 2 Caxton Street temporary traffic/pedestrian management. This will involve the temporary restriction of vehicle use of Caxton Street. This will allow the entire roadspace to be utilised by pedestrians, catering in safety for the intense pedestrian flow peak immediately after the finish of an event.

Stage 1 & 2 management can be implemented at different times, and usage will be dependent on event size and timing. For a typical midweek evening capacity event, it is envisaged that a Stage 1 closure will be implemented between several hours prior to the event and the event end. At the event end, a Stage 2 closure will become operational to cater for peak pedestrian flows. A Stage 1 closure may then be used to form a transition between a Stage 2 closure and fully opening the road after peak pedestrian flows have dispersed, and will be maintained until pedestrian activity can be contained within normal footpath space post event.

7.8.7 Summary of Pedestrian Issues

Key findings with regard to pedestrian issues are:

- Forecast pedestrian flows post-peak weeknight event indicates the following major pedestrian desire lines away from the proposed stadium for the target transport strategy:
  - 15% towards Milton Station
  - 26% to Roma Street Station
  - 7% to other CBD locations
  - 3% to the Countess Street busway station
  - 6% to Southbank

The balance of the patrons (43%) are destined for more localised locations such as the stadium bus station (11%), the light rail station (9%), local coaches (11%), taxis (3%), passenger pick-up (1%), the stadium carpark (2%) and local venues or parking (4%).

- Pedestrian infrastructure measures are required to cater for these pedestrian demands and form part of the Lang Park Stadium Proposal. These include:
  - provision of grade-separated crossing of Milton Road;

- upgraded at-grade pedestrian access to Milton Station along the south side of Milton Road;
- provision of a pedestrian corridor as a direct extension from Caxton Street towards the CBD and crossing over the railway corridor;
- widening of Milton Road northern footpath east of Hale Street;
- improved pedestrian capacity from Milton Road along the rail corridor adjacent to Upper Roma Street linking to an elevated crossing of Countess Street;
- linkage of the elevated crossing of Countess Street to elevated pedestrian access systems to the Roma Street Rail Station and Transit Centre, and planned busway and light rail stations, the final locations of which are still subject to further Queensland Transport and Brisbane City Council planning;
- provision of a grade separated crossing of Upper Roma Street for travel to the CBD and Southbank;
- pedestrian improvements at the intersection of Milton Road, Upper Roma Street and Petrie Terrace; and
- widened elevated crossings of Hale Street at southern and northern ends.

- Management of traffic on Caxton Street allowing for pedestrian use of some, or all, of the vehicular roadspace, would provide for the safe and effective movement of pedestrians in this corridor.

Table 7.18 a) : Pedestrian Infrastructure Assessment - Capacity Event (52 500 p)

ARRIVAL

Pedestrian Link No. (refer Figure 7.8)	Description	Provided Infrastructure Width (metres)	With Light Rail		Without Light Rail	
			Forecast 5 min pedestrian volume	Forecast LOS (5)	Forecast 5 min pedestrian volume	Forecast LOS (5)
1-3	Southern Plaza to Milton Road	10	1100	B	1200	B
3-4	Milton Road northern footpath east of Hale Street	10	1100	B	1200	B
4-5	At-grade crossing of Petrie Terrace	10	1050	B	1150	B
5-6	Police Barracks site east-west link	10	1000	A	1100	B
6-7	Bridge over Rail Line	17	2000	B	2250	B
7-8	Elevated link to Roma Street Station over Countess Street (1)	11	1700	C	1900	C
7-13	Bridge over Upper Roma Street (1)	4	300	A	300	A
3-15	At-grade crossing of Milton Road	3	0	A	0	A
15-13	Milton Road southern footpath : Hale Street to Skew Street	3	0	A	0	A
13-14	Upper Roma Street to Southbank (1)	3	300	B	300	B
13-11	Upper Roma Street & Roma Street southern footpath (1)	3	0	A	0	A
8-9	Link west of Roma Street Station to Queensland Place & CBD (1)(4)	n/a	450	n/a	550	n/a
11-10	Southern footpath on Roma Street to CBD (1)	3	0	A	0	A
2-18	Link from Northern Plaza over Hale Street	10	1100	B	1200	B
18-16	Caxton Street (2)	7	1100	C	1200	C
16-17	Petrie Terrace & Secombe Street to INB Station	3	150	A	200	A
1-28	Elevated link from Southern Plaza across Milton Road to LRT station & southern footpath	12	1550	B	1000	A
1-30	Castlemaine Street western footpath & northern Milton Road footpath	3.5	0	A	0	A
28-29	Milton Road southern footpath Castlemaine Street to Cribb Street	8	900	B	650	A
29-32	Milton Road southern footpath Cribb Street to Rail Station	8	750	A	850	B

DEPARTURE

Pedestrian Link No. (refer Figure 7.8)	Description	Provided Infrastructure Width (metres)	With Light Rail		Without Light Rail	
			Forecast 5 min pedestrian volume	Forecast LOS (5)	Forecast 5 min pedestrian volume	Forecast LOS (5)
1-3	Southern Plaza to Milton Road	10	3300	E	3750	E
3-4	Milton Road northern footpath east of Hale Street	10	3000	E	3200	E
4-5	At-grade crossing of Petrie Terrace	10	2900	D	3200	E
5-6	Police Barracks site east-west link	10	2750	D	2950	D
6-7	Bridge over Rail Line	17	5850	E	6400	E
7-8	Elevated link to Roma Street Station over Countess Street (1)	11	3700	E	3750	E
7-13	Bridge over Upper Roma Street (1)	4	800	D	1200	E
3-15	At-grade crossing of Milton Road	3	300	B	550	D
15-13	Milton Road southern footpath : Hale Street to Skew Street	3	300	B	550	D
13-14	Upper Roma Street to Southbank (1)	3	700	E	600	D
13-11	Upper Roma Street & Roma Street southern footpath (1)	3	100	A	550	D
8-9	Link west of Roma Street Station to Queensland Place & CBD (1)(4)	n/a	750	n/a	700	n/a
11-10	Southern footpath on Roma Street to CBD (1)	3	100	A	550	D
2-18	Link from Northern Plaza over Hale Street	10	3350	E	3750	E
18-16	Caxton Street (3)	10	3350	E	3750	E
16-17	Petrie Terrace & Secombe Street to INB Station	3	550	D	550	D
1-28	Elevated link from Southern Plaza across Milton Road to LRT station & southern footpath	12	3850	E	2550	C
1-30	Castlemaine Street western footpath & northern Milton Road footpath	3.5	900	E	850	E
28-29	Milton Road southern footpath Castlemaine Street to Cribb Street	8	2350	E	2450	E
29-32	Milton Road southern footpath Cribb Street to Rail Station	8	2350	E	2350	E

Notes : (1) Links at sufficient distance from the Stadium that diminuation of surge would be expected.
(2) With Stage 1 implementation of Caxton Street Temporary Traffic / Pedestrian Management Plan (pre-event).
(3) With Stage 2 implementation of Caxton Street Temporary Traffic / Pedestrian Management Plan (post-event).
(4) Link width not defined, as required width will be dependant on commuter use needs for connection from Roma Street to Queensland Place. Minimum width required for Lang Park = 3.3 metres.
(5) Level of Service definitions are provided in Table 7.17.

Table 7.18 b) : Pedestrian Infrastructure Assessment - Major Event (45 000 p)

ARRIVAL						
Pedestrian Link No. (refer Figure 7.8)	Description	Provided Infrastructure Width (metres)	With Light Rail		Without Light Rail	
			Forecast 5 min pedestrian volume	Forecast LOS (5)	Forecast 5 min pedestrian volume	Forecast LOS (5)
1-3	Southern Plaza to Milton Road	10	650	A	950	A
3-4	Milton Road northern footpath east of Hale Street	10	650	A	950	A
4-5	At-grade crossing of Petrie Terrace	10	600	A	950	A
5-6	Police Barracks site east-west link	10	600	A	900	A
6-7	Bridge over Rail Line	17	1150	A	1800	A
7-8	Elevated link to Roma Street Station over Countess Street (1)	11	1150	A	1750	C
7-13	Bridge over Upper Roma Street (1)	4	50	A	50	A
3-15	At-grade crossing of Milton Road	3	0	A	0	A
15-13	Milton Road southern footpath : Hale Street to Skew Street	3	0	A	0	A
13-14	Upper Roma Street to Southbank (1)	3	50	A	50	A
13-11	Upper Roma Street & Roma Street southern footpath (1)	3	0	A	0	A
8-9	Link west of Roma Street Station to Queensland Place & CBD (1)(4)	n/a	450	n/a	750	n/a
11-10	Southern footpath on Roma Street to CBD (1)	3	0	A	0	A
2-18	Link from Northern Plaza over Hale Street	10	650	A	950	A
18-16	Caxton Street (2)	7	650	A	950	B
16-17	Petrie Terrace & Secombe Street to INB Station	3	100	A	150	A
1-28	Elevated link from Southern Plaza across Milton Road to LRT station & southern footpath	12	1400	B	750	A
1-30	Castlemaine Street western footpath & northern Milton Road footpath	3.5	0	A	0	A
28-29	Milton Road southern footpath Castlemaine Street to Cribb Street	8	650	A	750	A
29-32	Milton Road southern footpath Cribb Street to Rail Station	8	550	A	600	A

DEPARTURE						
Pedestrian Link No. (refer Figure 7.8)	Description	Provided Infrastructure Width (metres)	With Light Rail		Without Light Rail	
			Forecast 5 min pedestrian volume	Forecast LOS (5)	Forecast 5 min pedestrian volume	Forecast LOS (5)
1-3	Southern Plaza to Milton Road	10	2700	D	3150	E
3-4	Milton Road northern footpath east of Hale Street	10	2700	D	3050	E
4-5	At-grade crossing of Petrie Terrace	10	2550	D	2900	D
5-6	Police Barracks site east-west link	10	2450	D	2800	D
6-7	Bridge over Rail Line	17	4850	D	2750	C
7-8	Elevated link to Roma Street Station over Countess Street (1)	11	3200	D	3750	E
7-13	Bridge over Upper Roma Street (1)	4	350	B	550	C
3-15	At-grade crossing of Milton Road	3	0	A	150	A
15-13	Milton Road southern footpath : Hale Street to Skew Street	3	0	A	150	A
13-14	Upper Roma Street to Southbank (1)	3	350	C	400	C
13-11	Upper Roma Street & Roma Street southern footpath (1)	3	0	A	150	A
8-9	Link west of Roma Street Station to Queensland Place & CBD (1)(4)	n/a	950	n/a	800	n/a
11-10	Southern footpath on Roma Street to CBD (1)	3	0	A	150	A
2-18	Link from Northern Plaza over Hale Street	10	2700	D	3250	E
18-16	Caxton Street (3)	10	2700	D	3250	E
16-17	Petrie Terrace & Secombe Street to INB Station	3	500	D	500	D
1-28	Elevated link from Southern Plaza across Milton Road to LRT station & southern footpath	12	3700	E	2450	C
1-30	Castlemaine Street western footpath & northern Milton Road footpath	3.5	800	D	700	D
28-29	Milton Road southern footpath Castlemaine Street to Cribb Street	8	2250	D	2350	E
29-32	Milton Road southern footpath Cribb Street to Rail Station	8	2100	D	2100	D

Notes : (1) Links at sufficient distance from the Stadium that diminuation of surge would be expected.
(2) With Stage 1 implementation of Caxton Street Temporary Traffic / Pedestrian Management Plan (pre-event).
(3) With Stage 2 implementation of Caxton Street Temporary Traffic / Pedestrian Management Plan (post-event).
(4) Link width not defined, as required width will be dependant on commuter use needs for connection from Roma Street to Queensland Place. Minimum width required for Lang Park = 3.3 metres.
(5) Level of Service definitions are provided in Table 7.17.

Table 7.18 C) : Pedestrian Infrastructure Assessment - Typical Event (35 000 p)

ARRIVAL

Pedestrian Link No. (refer Figure 7.8)	Description	Provided Infrastructure Width (metres)	With Light Rail		Without Light Rail	
			Forecast 5 min pedestrian volume	Forecast LOS (5)	Forecast 5 min pedestrian volume	Forecast LOS (5)
1-3	Southern Plaza to Milton Road	10	700	A	800	A
3-4	Milton Road northern footpath east of Hale Street	10	700	A	800	A
4-5	At-grade crossing of Petrie Terrace	10	650	A	750	A
5-6	Police Barracks site east-west link	10	600	A	700	A
6-7	Bridge over Rail Line	17	1200	A	1450	A
7-8	Elevated link to Roma Street Station over Countess Street (1)	11	1150	A	1350	B
7-13	Bridge over Upper Roma Street (1)	4	100	A	100	A
3-15	At-grade crossing of Milton Road	3	0	A	0	A
15-13	Milton Road southern footpath : Hale Street to Skew Street	3	0	A	0	A
13-14	Upper Roma Street to Southbank (1)	3	100	A	100	A
13-11	Upper Roma Street & Roma Street southern tootpath (1)	3	0	A	0	A
8-9	Link west of Roma Street Station to Queensland Place & CBD (1)(4)	n/a	200	n/a	300	n/a
11-10	Southern footpath on Roma Street to CBD (1)	3	0	A	0	A
2-18	Link from Northern Plaza over Hale Street	10	700	A	800	A
18-16	Caxton Street (2)	3	700	E	800	E
16-17	Petrie Terrace & Secombe Street to INB Station	3	150	A	150	A
1-28	Elevated link from Southern Plaza across Milton Road to LRT station & southern footpath	12	1250	A	800	A
1-30	Castlemaine Street western footpath & northern Milton Road footpath	3.5	0	A	0	A
28-29	Milton Road southern footpath Castlemaine Street to Cribb Street	8	750	A	750	A
29-32	Milton Road southern footpath Cribb Street to Rail Station	8	600	A	650	A

DEPARTURE

Pedestrian Link No. (refer Figure 7.8)	Description	Provided Infrastructure Width (metres)	With Light Rail		Without Light Rail	
			Forecast 5 min pedestrian volume	Forecast LOS (5)	Forecast 5 min pedestrian volume	Forecast LOS (5)
1-3	Southern Plaza to Milton Road	10	2450	D	2450	D
3-4	Milton Road northern footpath east of Hale Street	10	2450	D	2450	D
4-5	At-grade crossing of Petrie Terrace	10	2350	D	2350	D
5-6	Police Barracks site east-west link	10	2200	C	2200	C
6-7	Bridge over Rail Line	17	4400	D	4400	D
7-8	Elevated link to Roma Street Station over Countess Street (1)	11	4100	E	4100	E
7-13	Bridge over Upper Roma Street (1)	4	300	A	300	A
3-15	At-grade crossing of Milton Road	3	0	A	0	A
15-13	Milton Road southern footpath : Hale Street to Skew Street	3	0	A	0	A
13-14	Upper Roma Street to Southbank (1)	3	300	B	300	B
13-11	Upper Roma Street & Roma Street southern footpath (1)	3	0	A	0	A
8-9	Link west of Roma Street Station to Queensland Place & CBD (1)(4)	n/a	900	n/a	900	n/a
11-10	Southern footpath on Roma Street to CBD (1)	3	0	A	0	A
2-18	Link from Northern Plaza over Hale Street	10	2450	D	2450	D
18-16	Caxton Street (3)	7	2450	E	2450	E
16-17	Petrie Terrace & Secombe Street to INB Station	3	450	C	450	C
1-28	Elevated link from Southern Plaza across Milton Road to LRT station & southern footpath	12	3200	D	3200	D
1-30	Castlemaine Street western footpath & northern Milton Road footpath	3.5	0	A	0	A
28-29	Milton Road southern footpath Castlemaine Street to Cribb Street	8	2200	D	2200	D
29-32	Milton Road southern footpath Cribb Street to Rail Station	8	1850	D	1850	D

Notes : (1) Links at sufficient distance from the Stadium that diminuation of surge would be expected.
(2) With no implementation of Caxton Street Temporary Traffic / Pedestrian Management Plan (pre-event).
(3) With Stage 1 implementation of Caxton Street Temporary Traffic / Pedestrian Management Plan (post-event).
(4) Link width not defined, as required width will be dependant on commuter use needs for connection from Roma Street to Queensland Place.
Minimum width required for Lang Park = 3.3 metres.
(5) Level of Service definitions are provided in Table 7.17.

7.9 Parking

7.9.1 On-site Parking

The concept plans incorporate 280 parking spaces on the proposed stadium site accessed from an internal on-site two way circulation road around and below the entire stadium. Subject to detailed planning, carparking supply may be increased to 400 spaces. For traffic impact assessment purposes, it has been assumed that 400 spaces could result.

The indicative breakdown of the parking space allocation shown would be:

- 40 parking spaces for vehicle occupants with disabilities
- 40 Staff/Management Spaces
- 195 to 315 VIP/Corporate Patron parking spaces
- 5 spaces for police vehicles

The community facilities, PCYC and Ozsports currently have approximately 150 spaces available. It is intended that the parking needs of these uses would be provided for by allocation of a segregated parking region within the overall proposed stadium carpark that could be made available for everyday use. However it is not likely that it would be practical for these spaces to be available for use by patrons of those facilities during event times due to the security arrangements that need to be applied to access to the carpark during this period.

Under *Table 5.1 Carparking* in the *Transport Access Parking and Servicing Code* of Brisbane City Council's draft City Plan, the land use "Outdoor Sport and Recreation – football" requires provision of 50 spaces (minimum).

Access to the proposed stadium carpark for patrons during events, would be by an access driveway on Chippendall Street, a minor road in function. Given the low turnover characteristics of the patron carpark, provision of a driveway type B2 as per the BCC code, minimum 6.0 metres in width, would be appropriate.

A secondary left-in left-out carpark entry/exit point is proposed on Castlemaine Street north of the Heussler Terrace roundabout. This would not be utilised on event days as it would be in conflict with the proposed taxi rank location. This driveway would be used to provide access to the segregated area of the proposed stadium carpark that would be available for use by the Ozsports and PCYC patrons at non-event times.

The proposed carparking provision, indicative carparking layout and access arrangements as shown on the concept plans are generally in accordance with the requirements of the *Transport Access Parking and Servicing Code* of Brisbane City Council's draft City Plan.

Operational staff who do not have an allocated parking space on-site will need to use public transport to access the site, be dropped off/picked up by private vehicle or alternatively utilise public parking within the CBD.

7.9.2 Off-site Parking

❑ The Need for Parking Quarantine

As described in Section 7.1, the transport strategy proposed for the Stadium is one which is public transport focussed and designed to target a maximum private car mode share of 20% of patrons. Public transport infrastructure, service provision needs, and service promotion strategies to meet the challenges of the high public transport target have been identified and assessed in previous sections of this chapter, and these measures will provide an appropriate incentive framework for public transport travel to the proposed stadium.

However, as identified in Section 5.2.3, currently there is a large supply of on-street parking available to patrons at evening or weekend events, with a supply of some 4 500 to 5 000 on-street spaces likely to be found within a reasonable walking catchment (about 1.5 kilometres) of the Stadium excluding CBD parking. In addition about 2 000 spaces are supplied in off-street parking areas, 300 for allocated Stadium needs and the remaining 1 700 associated with public and private carparking areas potentially accessible to the public (albeit via unlawful use of private parking areas unattended after hours).

With this available supply of predominantly free parking, it is not surprising that parking demand in the local area around the existing stadium for a major event is significant. It is estimated that for a major event it is likely to be of the order of 5 000 spaces, representing about 13 500 patrons. The majority of this parking use occurs in the local street system and this contributes to significant traffic congestion before and after events, as well as a range of social issues which are described in other sections of this report.

It is clear, therefore, that if the low car use transport strategy for the Lang Park Stadium Proposal is to have a reasonable prospect of success, then management of the demand for travel by private car directly to the proposed stadium environs will be essential. The mechanisms available to achieve this aim include :

1. Implementation of a controlled parking area around the proposed stadium such that parking in the streets during events is regulated by time limits.

2. Use of travel management signage, for example variable message signs on key access roads to the proposed stadium, advising of the parking limitations in the local area. These message signs could be implemented in conjunction with the "official traffic signs" required for the parking scheme implementation.

3. Use of extensive pre-event publicity including an awareness program regarding the non-availability of parking in the local area.

❑ Development of a Lang Park Controlled Parking Area

Research

Research has been undertaken to identify the features of parking restriction schemes operational at other stadia in Australia and New Zealand. The findings are presented in detail **Table 7.19** and a summary of key points for consideration in the development of a suitable scheme are as follows:

- Short time limits are considered to be the most effective.
- Fines for infringements need to be substantial for the scheme to work.

- Publicity regarding the scheme is important to the likely success.
- On-going monitoring is vital – there may be a need to treat fringe effects (ie parking demand just outside the boundary).
- Some Local Authorities charge for resident parking permits.
- Several Local Authorities find that enforcement is generally self funding.
- Enforcement staffing ranges from 3 to 25 persons.

Nature of the Proposed Scheme

The general nature of a proposed controlled parking scheme for the proposed Stadium is :

- It would define an area around Lang Park where parking in the streets would be regulated by a time limit during events. The time limit for parking could be 15 minutes only.

- It would allow residents and their visitors to park on-street if required at these times with exemption from this time limit.

- It would allow specific parking zones near businesses and restaurants where longer stay time limit parking could be allowed. The time limit for parking in these zones could be 2 hours.

Scheme Extent

The indicative physical extent of the scheme has been identified based on consideration of several factors including:

1. The extent of parking intrusion that currently occurs for a major event. No actual field surveys of the extent of parking for a major event were available (or able to be measured) during the study period. However inventories (described in Section 5.2.3) of the existing parking supply within a 1.5 kilometre radius of the Stadium indicate that the estimated demand for local parking currently experienced for a major event could be contained within this area.

2. A survey of walking times around the existing stadium. Field surveys were undertaken to establish the distance typical patrons could walk in various time intervals to access parking locations in the local area surrounding the existing stadium. These surveys take account of the delays that pedestrians would typically encounter crossing roads on their journey and the physical characteristics of the routes, particularly local topography. Results are presented in the form of walking time contours in 5 minute intervals around Lang Park and are shown in **Figure 7.10.** This indicates that the 1.5 kilometre radius corresponds to about a 25 to 30 minute walking time which is generally regarded as the maximum that the majority of patrons would be prepared to walk from a parked vehicle rather than seek other alternatives.

3. Natural barriers (eg the river), major roads (eg Countess Street), topography, accessibility of particular local streets require consideration.

4. Experience at other stadia with parking restrictions in place. The findings of surveys shown in **Table 7.19** indicated most schemes found that a 1 kilometre to 1.5 kilometre scheme extent is successful.

5. Inputs received at a public consultation clinic on a potential controlled parking area carried out during the preparation of the draft EIS.

Based on the above considerations, an indicative parking scheme area boundary has been identified as shown in **Figure 7.11.**

Implementation Mechanism and Infrastructure

The proposed Lang Park controlled parking scheme could be implemented as a Brisbane City Council Local Law. The object of the local law would be to provide for Council's regulation of parking by time in a particular part of the City (a "traffic area"). The traffic area could be termed "The Lang Park Traffic Area".

If approved as a Local Law, official traffic signs would be installed on all roads entering into The Lang Park Traffic Area as per the requirements of the *Transport Operations (Road Use Management) Act 1995*. **Figure 7.12** shows the indicative locations and types of signs that could be used.

The signs on major entry roads could have an electronic "variable message" component that shows the day/date and times during which the event parking time limits are to apply. **Figure 7.13** presents an example of this type of sign. As well as the "official traffic sign" component, a variable message advisory sign could be used to convey a travel management message in the week preceding a Lang Park event. At other times, Council could use this part of the sign for other travel messages/advice.

Signs that are installed on less major roads on the boundary could simply have a plate or sticker appended to show the event restriction details. Special folding out signs (which would be permanently fixed in place on poles) could be installed to define the special parking zones near businesses.

The eastern region of the proposed Lang Park Traffic Area overlaps with the existing Central Traffic Area which has the function of regulating parking in the Central City and fringe areas during "working hours". This protects generally against commuter parking use of streets where individual parking signs or meters are not in place. This overlap issue could be catered for by instigating an amendment to the Central Traffic Area boundary such that it does not overlap with the Lang Park Traffic Area boundary. In conjunction with this amendment, appropriate street by street parking signage to replace the function of the Central Traffic Area would need to be installed in existing streets where "everyday" time restrictions are not specifically signed at present. **Figure 7.14 b)** indicates streets where this replacement signage would need to be installed.

Operation Times

It is recommended that the regulation of parking in the proposed Lang Park Traffic Area is only carried out in conjunction with events at the proposed stadium. The signs designating the regulation of parking for an event would need to be displayed 24 hours prior to the start time for the time limits.

For example, for a State of Origin Match on Wednesday 26th May commencing at around 8pm the following time regulation could apply:

- ¼ hour parking 7 PM to 11 PM

This would apply:

- except as signed eg outside restaurants
- except if you are a Resident or Visitor with a Permit

The signs advising that this regulation was to apply would need to be displayed by 7 PM on Tuesday 25th May.

For example, for an afternoon match on Sunday 25th June commencing at around 3pm the following time regulation could apply:

- ¼ hour parking 2 PM to 6 PM

The signs advising that this regulation was to apply need to be displayed by 2 PM on Saturday 24th June.

Provision for Residents and Visitors

Within the proposed Lang Park Traffic Area residents requiring access to an on-street parking space could apply to Brisbane City Council for a resident parking permit. This would show the name of their street and would need to be fixed to the windscreen.

Residents could also have a visitor permit. This would show the street name. A visitor would display this on the dashboard of their vehicle while visiting the resident's premises during the time at which the Lang Park parking regulations were operational. If a resident wanted to allow for several visitors to park on-street during a time at which the Lang Park parking regulations were operational then they could apply to Council for extra permits for that particular day.

To allow residents to plan ahead, a schedule of events could be distributed to residents well in advance to allow their planning for such occurrences.

Provision for Businesses

Within the area to be covered by the proposed 15 minute time limit for parking during events there are a number of restaurants and shops that would be open for trade during Lang Park event times and need to rely on on-street parking use by customers. This need is generally as a result of the older-style nature of many retailing premises in the area which have limited or no off-street parking provision. The provision of special 2 hour parking zones around these premises could allow for such customer parking up to a 2 hour time duration during Lang Park events. **Figure 7.14 a)** shows indicative street locations where such special parking zones (to apply at event times only) would be appropriate. These locations would need to be refined during the detailed implementation phase of a proposed scheme. Examples of the practical implications of this measure would be as follows:

- a restaurant customer arriving and parking at 7.15 PM on a Lang Park event evening would need to depart by 9.15 PM to avoid a parking infringement.
- a customer arriving at 9 PM could stay as long as desired without incurring a parking infringement.
- staff parking on-street would be in breach of the scheme if parked for longer than 15 minutes.

Enforcement

Physical barriers on the streets to prevent non-local traffic entering the area would not be proposed in conjunction with the proposed area-wide parking scheme. This would not be practical in the context of Lang Park due to the need to preserve traffic accessibility for residents and businesses and maintain through traffic routes.

In addition, the findings of the research documented in **Table 7.19,** indicate that several other stadia have implemented successful parking restriction schemes without the use of physical barriers.

A strong commitment to enforcement would be essential for the success of the parking scheme. Council parking officers would be used to issue infringement notices to those vehicles over-staying the time limits. Use of at least 25 officers would be needed.

Based on experience with similar schemes in operation at other stadia, a hefty infringement fee would be recommended eg $250. A hotline number for residents to advise of scheme abuse could be established.

Strong use of advance publicity describing the parking restrictions would be an important factor.

Monitoring

On-going monitoring of infringement levels to guide enforcement levels would be important. Close monitoring of edge effects (parking just outside the boundary) would be required with adjustments if necessary to overcome problem streets. The need for extensions to the scheme area at the fringe could be monitored on an on-going basis.

❑ Impact on CBD and Southbank Parking

Table 7.20 summarises the carparking demands associated with the various event types with the target transport strategy. Based on estimates presented in Section 5.2.3 regarding available spare capacity of parking in the CBD it is clear that the indicative demands in the CBD of 1 850 (capacity event) to 1 250 spaces (typical event) could be readily accommodated at the time periods when these events would be held, including Friday evening. The demand associated with a capacity weeknight event at Southbank could be reasonably accommodated given available supplies/likely spare capacity on a weekday evening at these locations, albeit the co-incidence of a key event at Lang Park with major events at the Cultural Centre and Convention Centre would be problematic. In this scenario such parking could be accommodated in the CBD.

Table 7.20: External Parking Demands Summary under Target Low Car Use Transport Strategy

Scenario	Forecast Car Parking Demand (spaces)			
	CBD	Southbank	Local including Stadium Carpark	Total
Capacity Weeknight Event (52 000 persons)	1 850	700	1 200	3 750
Major Weekend Evening Event (45 000 persons)	1 650	250	1 150	3 050
Typical Weekend Event (35 000 persons)	1 250	200	950	2 400

Table 7.19: Features of Parking Restriction Schemes at Stadiums in Australia and New Zealand

Scheme & Authority	Reasons For Scheme Introduction	Scheme Context			Scheme Description					Scheme Cost and Management	Scheme Acceptance and Compliance
		Stadium/Events	Land Use	Transport Systems	Extent	Restrictions	Signage	Fines	Permits		
Waverly Oval, Melbourne City of Monash Council	▪ Recently defunct due to football teams relocating to other stadiums ▪ Has been operating for 8-9 years ▪ Scheme was introduced because residents could not park in streets close to ground during matches. ▪ Also problems with access to some streets being blocked during matches	▪ Formerly the home ground for two AFL teams equating to 22 matches per year ▪ Occasional concert also held at the ground ▪ Baseball matches were held in the summer season about 3 years ago ▪ Stadium capacity is 75,000, however 30,000 – 40,000 is a normal attendance	▪ Land use in the scheme area is mainly residential (approximately 90% of scheme area) ▪ Major Shopping Centre exists within scheme area (Waverly Gardens) ▪ Along the edge of scheme area is a very large Safeway office & distribution centre ▪ Retirement village in the area ▪ Some schools in the area also ▪ No clubs, hotels or pubs in the scheme area, however there is an exclusive country club close the ground	▪ No Light Rail or Heavy rail servicing the ground ▪ Ground is serviced by buses only. Some park and ride schemes exist ▪ Major freeway (SE Freeway) runs along scheme boundary and has an off-ramp near the site ▪ 14,000 off-street charge parking spaces around ground are available, however normally only ½ filled for most events.	1km approx	▪ Scheme operates Saturdays & Sundays between 10am and 6pm for the entire football season only ▪ Total prohibition (no standing, residents excepted) within scheme area ▪ With the advent of night matches at the stadium, time restrictions were not changed	▪ No individual signs – signed at perimeter on all major access roads (cordon signage). ▪ Some minor streets are not signed ▪ Signage includes map defining the area ▪ Signage is fold over type, and is folded over at the start of football season, and folded back at the end	▪ $100 – no standing ▪ $47 – exceeding time limit	▪ Residents are issued with a permit card – up to 4 in total which includes a visitor's card (i.e. 2 residential + 2 visitor) ▪ Some permit issued for business, however business parking generally falls under localised time limit signing adjacent to the business. ▪ No charge to residents for permits	▪ Scheme operates under local government act ▪ Day to day administration of the scheme as part of normal Council workload ▪ On match days 2-3 Council officers required policing ▪ Police do some work, mainly for dangerously parked vehicles (ie. across driveways and close to corners) ▪ Policing is generally self funding due to the level of infringements	▪ Some inconvenience to residents, however benefits outweigh this. Typically residents are happy, and the level of residents complaints is very low provided the scheme is policed. If the scheme is not policed effectively then complaint levels rise. ▪ Level of compliance is generally good and has improved every year since inception. ▪ No incidents of residents charging for parking has been noted. ▪ Waverley Gardens Shopping Centre carpark does not cause significant problems as a time limit of 2 hours applies to this parking area ▪ No real problems at the edge of the scheme, but the scheme/cordon would be extended if there was a problem.
Subiaco Oval, Perth City of Subiaco Council	▪ Scheme has been in place 3-4 years ▪ The scheme was introduced because the residences close to ground are high density and as such rely on on-street parking. ▪ This was being adversely effected by football goers parking close to stadium.	▪ Hosts AFL football games for two football teams giving a frequency of 22 events per year during the football season ▪ Typical event times are on Saturday and Sundays ▪ Ground capacity is a maximum of 45 000. ▪ Typical crowd sizes range from 25 000-45 000	▪ Land use immediately adjacent the ground is all residential ▪ Within the scheme area approximately 80% of land use in the area is residential. ▪ There is a business, commercial and restaurant centre within the scheme area, approximately 600m from the ground. This is strip style development on both sides of two streets ▪ There are 2 hotels and 3 nightclubs located in the business, commercial, restaurant centre and are located at a sufficient distance for spectators not to walk there after a match. The tendency for the majority of the crowd is to head home straight after the matches ▪ There is a major shopping centre in the area	▪ The ground is serviced by Heavy Rail (dual track) with two stations located near the ground. One station is approximately 500m from the ground and the other at 600-700 from the ground. ▪ The Ground is also serviced by buses. Regular services operate as well as combined park and ride schemes from train stations and bus depots outside the area ▪ There is a Council controlled off-street carpark adjacent to ground (1,200 spaces) and is used for matches at the ground	1 km radius approx	▪ A number of parking zones already exist in the area (ie. ½ hour, 1 hour, 2 hour) ▪ 75% of on-street parking is reserved for residents. ▪ There are special signs for resident parking areas, where date of football matches is marked on the sign. This is achieved by attaching a new sticker to the sign at the beginning of eech football season noting match time and dates ▪ Restriction in designated resident parking areas is total prohibition and signage reads 'Authorised Vehicles Only' ▪ Scheme operates on the date on the sticker , however enforcement only occurs from a couple of hours prior to match through to the end of the match ▪ There is a major S/C in the Scheme area, however, a 2 hour limit applies	▪ Signage is in a street-by-street basis – blanket signage was not preferred by business ▪ Council can enforce restrictions to off-street carparks if asked to do so by the carpark owner (businesses, etc.). Carpark needs to be registered with Council and adequate warning signage installed.	▪ Fines are $60 and are quite effective in stopping people	▪ Residents receive a sticker for their vehicle and residents visitors use a card ▪ No passes are given to commercial/business as they fall under normal parking restrictions already	▪ Scheme is under a local law registered and published under a act of parliament ▪ On match day requires 5 Council officers + 20 casual staff to police ▪ Day to day management costs is part of normal Council workload ▪ Residents are not charged for permits – however businesses are charged for any signage required. ▪ Stickers must be renewed yearly (similar to vehicle registration stickers) to keep current, i.e. ex-residents cannot use an old sticker. ▪ There are 120-300 infringements per match which makes the enforcement exercise cost effective ▪ Council conduct a lot of publicity advising on the restrictions and the location of restricted areas. Council officers are out beforehand to answer queries and adopt a pro-active approach to enforcement	▪ Residents approve of the scheme. The scheme is into its 4th year of operation and very few residents complaints are received. ▪ There have been no complaints from businesses due to the scheme not effecting them. Areas set aside for residential parking are away from business areas and as such does not effect them. ▪ People generally comply to the scheme and infringements have been steadily dropping since scheme inception ▪ One or two incidents of residents charging for parking has occurred, but it is not a noticeable problem ▪ Council monitor operation at the scheme's edge (through counts, complaints, etc.) and change the scheme boundary as necessary

Table 7.19: Features of Parking Restriction Schemes at Stadiums in Australia and New Zealand (Continued)

Scheme & Authority	Reasons For Scheme Introduction	Scheme Context		Scheme Description						Scheme Cost and Management	Scheme Acceptance and Compliance
		Stadium/Events	Land Use	Transport Systems	Extent	Restrictions	Signage	Fines	Permits		
Melbourne Cricket Ground Melbourne City Council	▪ The scheme was introduced in 1972 ▪ Main reason for introduction of the scheme was residents complaints – residents were unable to find spaces during events	▪ Approximately 50 AFL games held at the ground per year with an average crowd of at least 40,000 ▪ 3 x one day cricket matches held per year with an average crowd of at least 50,000. Also a cricket test match and rock concert is held once per year ▪ Events are typically held on Friday night, Saturday afternoon and evening, and Sunday afternoon. ▪ There are also events held at the Tennis Centre near the ground which come under the scheme area, however these do not coincide with the football season	▪ 30% of the scheme area is classed as parkland and recreational areas ▪ 5% of the area is in the Melbourne CBD ▪ 15% is mixed use which comprises retail and restaurants in the Richmond area ▪ There are also 4 major hospitals in the scheme area, with a further 2 located at the fringe of the scheme area ▪ There are a couple of Pubs/Hotels within 400m of the ground, only one is a major destination pre/post event and the road outside the pub is barricadad off for safety reasons ▪ Within the scheme area there are several more local pubs	▪ A major heavy rail corridor exists to the south of the ground with two stations serving the ground. The main station is Richmond station, and Jollymont station is also used. ▪ An extensive Light Rail system is located on major roads around the ground (Wellington Pde, Bridge Rd, Swann St). A new light rail link also exists on the southern side of the rail corridor and services the ground. ▪ Parking around comprises 1000 – 2000 private spaces and 6000 public spaces within 300m of the ground available (charge is approx 5$). ▪ The Botanic Gardens is located nearby which has significant on-street parking supply on several parkways ▪ No major off-street carparks other than at MCG	1.5 km approx	▪ Parking limit restrictions are a mixture of 1hr and 2hr limits, residents excepted between 7:30am – 11:00pm Saturdays and Sundays ▪ Two hours is not effective as 1 hour ▪ Normal time restrictions apply near businesses, however the restriction may be changed immediately adjacent to the business. If this is done it is kept consistent with the scheme	▪ Signage is on a street to street basis	▪ Fines are a maximum of $65 and are not always totally effective. Council would prefer them to be higher	▪ Residents are charged for permits but they are not expensive: — 1st permit is free — 2nd permit is $10 ▪ Visitor passes are allowed (multi-use) ▪ A mixture of passes is also allowed, ie. 1 resident + 1 multi-use up to a maximum of 2 passes in total ▪ Resident stickers and visitor passes need to be of good quality. Have had problems with permit forgeries in the past. A good quality permit with laser/holographic logos is needed	▪ Scheme is under a Local Government Act ▪ Scheme is continuously reviewed ▪ Looking to install parking meters (ie. 2 hour paid parking, residents excepted_ as this makes enforcement easier ▪ On match days up to 12 enforcement officers policing ▪ When games are not on, restrictions are generally not policed	▪ Effectiveness of fines and level of compliance is dependant on the type of event: — Football/cricket matches are good — Concerts are not so good ▪ Problems occur when local carparks are full, people are running late and park close to the ground and are happy to accept the fine ▪ There is reasonably good adherence to the scheme ▪ Residents like the scheme as most can usually get a parking space at event times. Residents recognise the benefits of the scheme and it is generally well accepted. Most complaints arise from problems around the hospitals in East Melbourne and not MCG events ▪ Council do review the scheme from time to time ▪ No problems exist with residents charging for parking due to high density residential dwellings (ie. most residences do not have off-street parking) ▪ No problems at the edge of the scheme – 1.5km walking distance is a sufficient deterrent ▪ Park and Ride scheme is in place with Yarra Trams for the Tennis Centre only – no scheme is implemented for the football/cricket as yet
Melbourne Cricket Ground City of Yarra Council (Richmond)	▪ The scheme covers two major areas – MCG and Optus Oval ▪ The scheme has been in existence at least 10 years ▪ The scheme was introduced initially because of problems with residential parking. Residents were 'parked out' on game days. There were also issues with bad crowd behaviour in residential streets and the scheme was intended to address this. ▪ The scheme has also been reviewed recently to address business concerns with parking problems from match patrons	▪ Approximately 50 AFL games held at the ground per year with an average crowd of at least 40,000 ▪ 3 x one day cricket matches held per year with an average crowd of at least 50,000. Also a cricket test match and rock concert is held once per year ▪ Events are typically held on Friday night, Saturday afternoon and evening, and Sunday afternoon. ▪ There are also events held at the Tennis Centre near the ground which come under the scheme area, however these do not coincide with the football season	▪ Land use in the area is mainly residential (approximately 95% of scheme area) with a heavy reliance on on-street parking ▪ Some small pockets of Business in the scheme area ▪ The area also contains the Bridge Road retail Strip and the Hoddle Road commercial strip ▪ Just outside the southern boundary of scheme area (Swann Street) there is a large business area, however normal 2hr parking restrictions already apply here ▪ Within the scheme area there are several local pubs.	▪ A major heavy rail corridor exists to the south of the ground with two stations serving the ground. The main station is Richmond station, and Jollymont station is also used. ▪ An extensive Light Rail system is located on major roads around the ground (Wellington Pde, Bridge Rd, Swann St). A new light rail link also exists on the southern side of the rail corridor and services the ground. ▪ Parking around comprises 1000 – 2000 private spaces and 6000 public spaces within 300m of the ground available (charge is approx 5$). ▪ The Botanic Gardens is located nearby which has significant on-street parking supply on several parkways ▪ No major off-street carparks other than at MCG	800 m approx (from MCG)	▪ Range of parking restrictions is dependent on proximity to ground, time restrictions vary: — 1 hour restriction closer to ground — 2 hour restrictions further from ground ▪ Resident are exempt from restrictions ▪ Period of operation also varies: — close to ground 7 a.m. to 11 p.m. Saturday and Sunday — Further from ground 7 – 9 p.m. Saturday and Sunday ▪ Restrictions were changed around some businesses, in particular restaurants, to address business concerns. Time restrictions were reduced to operate until 9pm only (usually 11pm). This allows patrons of the restaurant to park after 7pm and not be booked.	▪ Signage is on a street to street basis	▪ Fines are a maximum of $65 and are not always totally effective. Council would prefer them to be higher	▪ Residents allowed up to maximum of 3 permits per household whether resident or visitor, i.e. 2 residents + 1 visitor ▪ Some permits are given to businesses but it is very restricted and is typically issued to business owners only, employees/customers utilise existing time restricted parking ▪ Residents are charged permits as follows — First permit is free — second permit $30 — third permit $40	▪ Local act allows Council to establish parking restriction – action taken under broad guidelines of the Act	▪ Residents are reasonably happy with the scheme. Some complaints are made by residents but there are no major issues with the scheme. Can never make residents 100% happy with the scheme. ▪ The scheme developed is not too restrictive (ie. road closure were not considered appropriate) and provides a balance between residential amenity and residential access ▪ Scheme was reviewed 3 years ago and resident feedback was adopted. ▪ Compliance to scheme is reasonable ▪ Nature of properties (limited off-street parking) means that residents charging for parking does not occur ▪ Parking across driveways can be a big problem at times ▪ There are some minor problems at the edge of the scheme, however, they are not sufficient to warrant action at this stage.

Table 7.19: Features of Parking Restriction Schemes at Stadiums in Australia and New Zealand (Continued)

Scheme & Authority	Reasons For Scheme Introduction	Scheme Context	Scheme Description							Scheme Cost and Management	Scheme Acceptance and Compliance
		Stadium/Events	Land Use	Transport Systems	Extent	Restrictions	Signage	Fines	Permits		
Sydney Football Stadium/Sydney Cricket Ground, South Sydney City Council	▪ Scheme has been operating since 1979. ▪ Scheme was introduced to address residents complaints primarily with problems associated with commuter parking and visitors to retail areas, however scheme also addresses major events at the SCG/SFS. ▪ Council has policy to use public transport instead of cars ▪ Council has policy against car usage and as such there is not many off-street carparks in area. ▪ A large portion of the Council area is resident parking (many kilometres from ground) problems occur up to 2 km from grounds, with major problems occurring 1 km from ground.	▪ The Sydney Cricket Ground hosts several one-day international cricket matches, a cricket test match and numerous state level cricket matches per year during the summer season ▪ The SCG also hosts 11 AFL football matches per year during the winter season ▪ The Sydney football stadium hosts NRL Rugby league matches for a number of home based Sydney clubs and between 1 and 2 matches can be played there per weekend during the football season. ▪ The ground can also host between 1-2 rugby league State of Origin matches per year, a rugby league test match and several state and international level rugby union matches	▪ Land use is mainly Residential (terrace) housing around stadium Some strip retail at Oxford and Flinders Streets.	▪ When crowds are greater than 20,000, Centennial Park adjacent to ground allows parking on grounds – $15 each for 1,000 spaces. This parking will not continue past 2003 ▪ Fox Studio carpark is in area (2,000 spaces) but it is well controlled. ▪ For big events there is Kiss and ride facilities at Randwick Racecourse, NSW University and Goulburn – all are some distance from grounds (i.e. satellite parking)	▪ No defined extent ▪ 24 resident parking precincts in total which cover 90% of Council area.	▪ Restrictions are generally 8:00 a.m. – 10:00 p.m. 1 hour parking, Residents Vehicles Excepted ▪ Tried 2 hour restrictions – did not work due to the tyre marking ('chalking') by enforcement officers not being effective	▪ Individual street by street signage ▪ Trialed an area wide scheme for a precinct (ie. signage at major entry points) – was totally ignored and was not effective.	▪ Fines are $60 – not enough.	▪ Residents apply for stickers. Up to 3 per Residence allowed under RTA, however Council have reduced this to two. ▪ Visitors were not eligible for passes up to 1 year ago, but are trialing a visitor scheme snow ▪ Businesses are covered by normal parking restrictions ▪ Three permits total per residence: — 1st $26 visitor or resident — 2nd $50 visitor or resident — $75 for 3rd visitor – will be reviewed soon	▪ RTA has powers to delegate authority to approve parking restriction schemes to Councils in accordance with guidelines ▪ Fees from permits partly fund day to day administration of scheme ▪ 1 stop Council shop is devoted 50% of time to permit administration ▪ 3 staff required for permit paperwork – fraud is common and careful checking is required. ▪ For events at the stadium Council parking wardens concentrate there enforcement of resident parking next to stadiums – 8 staff used ▪ Police (14 staff) enforce restriction on a more general area wide basis, not specifically for events (prefer no standing infringements) ▪ $60 fines are not effective – desire is for increased finds	▪ Residents react favourably to scheme and if anything want more, such as ½ hour restrictions, residents only restrictions or exclusive rights. This however is not possible to achieve ▪ Level of compliance is poor. Sydney drivers attitude is to park wherever they want regardless of restrictions. ▪ No real problems of residents charging for parking – dense / terrace housing means not much off-street parking – also, if a house an off-street park, it has no permit sticker and therefore cannot park on street. ▪ Some problems at edge of precincts but mainly due to residents from other precincts within Council Boundaries with permits trying to park close to an event (each precinct has a different permit number)
Brisbane Cricket Ground (proposed) Brisbane City Council	▪ Scheme has been developed but has not been implemented yet ▪ Proposed Gabba Local Traffic Area is to be implemented to control on-street parking at event times. ▪ The Traffic Area is planned to be in-force for the Olympic Soccer Events in September however will also remain in place – post Olympics ▪ May meet resistance from Gabba Trust & Lions after Olympics ▪ 8 AFL games will be used as a trial	▪ Redeveloped ground has a capacity of almost 38 000 ▪ The ground hosts 12 AFL games per year with a 20 000 average crowd (based on ground capacity of 22 000 prior to redevelopment) ▪ 2 one-day cricket matches were held at the redeveloped stadium with between 20 000 and 35 000 attending. A Cricket Test Match was also held with an average crowd of 10 000 to 20 000 attending per day ▪ Minor State level cricket matches are also held at the ground with very small crowd attendance	▪ Main land use in area is residential ▪ Other land uses in the area includes some retail and numerous retail/commercial/industrial premises ▪ There are also a number of restaurants in the area ▪ There are numerous pubs and hotels in close proximity the ground, and are popular drinking locations both before and after events at the ground.	▪ Heavy Rail does exist in the area, however the nearest station is located at considerable distance from the ground. ▪ The ground is serviced by some 200 Council buses which park in an area south-west of the ground. A major bus station exists opposite the ground ▪ 60-70 coaches are also used for major events ▪ For Olympic soccer events a shuttle bus service to remote parking areas is proposed	1.2km approx Railways and freeway act as natural barriers defining the scheme area	▪ Generally 2 hour limit on non-residents ▪ Special consideration for business strip at Gabba, longer limits 4, 8, 11 hr for businesses ▪ Due to a Variable Message Signage system proposed, parking restrictions can be varied ie. 1hr/2hr, etc ▪ Time of restrictions can be varied, ie. 6 – 9 p.m., 2 – 4 p.m, etc. ▪ Can also vary day of restriction, ie. Tuesday, Wednesday, etc	▪ Area wide scheme which will need fewer signs and can control whole area. Strategy is to advise people at major approach roads to the Gabba and make people divert to satellite parking. ▪ Signage will comprise Variable Message Signs (VMS) – 7 major signs (11 total) ▪ VMS will comprise character message board and can display other texts ▪ 7 Major signs at main entrance roads ▪ 3-4 Minor signs at other locations	▪ Fines will be $25, although this is under review.	▪ Residents apply for permits: ▪ 1 resident + 1 visitor ▪ Will allow additional resident permit for extra resident vehicles at the household. ▪ Residents can apply for visitor day passes. ▪ No charge for permits	▪ Not implemented yet ▪ Proposed Local Law advertised in late March for consultation	▪ Not implemented yet ▪ Backyard parking is a current problem – parking restrictions may not address this. Council could control backyard parking if this remains a problem on the basis that it is illegal to run a business without a license. ▪ Consultation on scheme is still in progress.

Table 7.19: Features of Parking Restriction Schemes at Stadiums in Australia and New Zealand (Continued)

Scheme & Authority	Reasons For Scheme Introduction	Scheme Context		Scheme Description						Scheme Cost and Management	Scheme Acceptance and Compliance
		Stadium/Events	Land Use	Transport Systems	Extent	Restrictions	Signage	Fines	Permits		
Eden Park, Aukland Aukland City Council	▪ Scheme was implemented as a requirement of a Development Court decision for approval of the ground redevelopment and installation of lights for night events	▪ Ground can hold up to 16 games per year at present comprising mainly rugby matches and a cricket match. ▪ Ground capacity is a maximum of 50 000 ▪ Average cricket match attendance is 5 000 ▪ Average Rugby attendance is 25 000-35 000	▪ Area is essentially residential with a high reliance on on-street parking. ▪ The only other land uses in the area are a couple of businesses, petrol station and day care centre ▪ Nearest pub to the ground is 2km away. A suburban shopping centre is located approximately 1km away from the ground and contains some restaurant/bars. Patrons do not go to these venues after the game.	▪ Ground is serviced by a heavy rail system, however operations are limited due to a single rail line and no regular night services. Additional services are in place for events and a station is located close to ground (300-400m approx) ▪ Charter buses/coaches operate for large events, with parking for 45 vehicles provided within the ground. ▪ Normal background bus services operate in conjunction with extra services for matches ▪ Park and ride scheme exists with four locations around the area (bus depots and nearby showground). The scheme is not well used at present however it is gaining popularity ▪ Taxi use has increased since parking scheme was introduced, and at present taxis are not well controlled. Council is currently looking at providing a formalised setdown/pickup area	Up to 1km approx	▪ Only in force for crowds in excess of 5 000 ▪ Restrictions are in force only on game days as is generally for the entire game day. ▪ Restrictions are signed as Residents Parking Only. ▪ Signage is installed at least 24 hours prior to the event, and enforcement of infringements can not start until 24 hours after the signs are installed. This gives non-resident vehicles parked in the area opportunity to leave. ▪ Typically enforcement occurs immediately prior to and during the match ▪ Council has the power to tow offending vehicles, however this is not done unless the residents are is full	▪ Signage is on a street-by street basis ▪ Contractor installs signage (fold down) 24hrs prior to event as this is a legal requirement ▪ Special signage is in place for child care centre ▪ Disabled parking is also in place and is exempt from parking restrictions	▪ Fines are $40 (NZD)	▪ Permits last for 1 year and residents have to apply for them ▪ No cost is associated with obtaining a permit ▪ Generally only 1 permit is issued per household, however extra permits can be issued on a case-by-case basis ▪ No permanent visitor passes are issued, however visitor day passes are	▪ Court decision specified that the Stadium Trust Board fund scheme administration ▪ Community liason group exists (also part of court decision) ▪ Council pay for enforcement which requires a minimum of 6 officers (10 preferred). Enforcement of the scheme is not completely self-funding ▪ A residents hot-line exists (funded by Trust Board) where residents can ring and report a non-resident or illegally parked vehicle. Enforcement officers are then directed to this vehicle on a priority basis.	▪ Initially there was some problems with the scheme due to lack of notification/publicity of the scheme ▪ Implementation problems have settled down and 1st yearly review of the scheme went smoothly ▪ Initially there was a lack of compliance due to a lack of publicity, however enforcement was lenient for the first few matches. For current matches enforcement has toughened and conformance is generally good ▪ Residents generally want the scheme extended. ▪ For capacity games there is some level of parking at the scheme edges.

Data Source: SKM personnel or telephone interview survey with relevant Local Authority Officers

7.10 Other Modes

7.10.1 Taxis and Limousines

The location of taxi facilities at the proposed stadium was assessed based on discussions with the Queensland Taxi Council and considering the impacts of taxi operations associated with events on the surrounding road network and local area.

A taxi rank at the southern end of the site would offer the benefits of residential amenity protection and enable taxis to utilise the proposed bus lanes in Upper Roma Street. However space constraints on the site in this southern region, the need to incorporate the proposed stadium bus station as a priority, and the need to locate carpark access/egress at the south of the site to minimise impacts, has implied that this design concept was unable to be realised in the master plan.

The proposed location of the taxi rank for the proposed stadium is therefore a continuation of the current practice, whereby a taxi rank accommodating 25 vehicles is located kerbside on Castlemaine Street north of Heussler Terrace. Prior to the end of a major event, additional taxi storage could be located in Blaxland Street (as per the current situation for major events). It is proposed that limousine parking also occur in this region.

This arrangement implies that there will continue to be some adverse impact on residents on Heussler Terrace opposite the taxi rank associated with the presence of the taxi rank opposite, mainly because the demand for taxis and activity in this region typically will extend for several hours after the event finish.

A taxi rank on Heussler Terrace will be readily accessible for patrons from the Northern Plaza area. The ability for taxis to return to the proposed stadium for a second trip post-event should be improved markedly compared to the current situation for taxis as the parking restriction scheme in the local area will reduce potential traffic congestion around the proposed stadium.

7.10.2 Private Vehicle Set-Down

The concept plans show an indicative private vehicle set-down/pick up area located off the Caxton Street road reserve and in the Northern Plaza area. This would provide a convenient and quite workable facility for patrons pre-event. Post-event police control would be recommended to ensure that waiting vehicles do not park in this facility and lead to queuing and traffic congestion.

Staff would also be able to benefit from this provision and it would be convenient users of the community facilities in this region of the proposed stadium out of event times.

As well as this nearby facility, it is also recommended that use of vehicle set down and pick up remote from the site at locations readily accessible by the upgraded pedestrian infrastructure is encouraged as an alternative to driving close to the site. The facilities planned within the Roma Street parklands present an ideal opportunity for this function and this should be highlighted in pre-event marketing material on transport options.

7.10.3 Ferries

In terms of meeting the critical people-moving task for the proposed stadium, City Cats each with a capacity of 140 persons and with only 8 vessels in total (including those committed to regular services) could not offer a high capacity mode to or from the CBD or Southbank. The potential role of ferry services for the proposed stadium would therefore not be as a shuttle service, but as a potential primary mode for travel to and from locations as part of a potential regular ferry service to this reach of the River.

Discussions with Brisbane Transport however reveal that there is community interest in the provision of an every-day use ferry terminal at the end of Park Road . Therefore if a regular use facility were to be considered for the local area, a location closer to Park Road would be preferred rather than at the end of Hale Street which would be the closest location on the River to serve the proposed stadium. It would not be practical to operate regular services to both facilities because of their close proximity to each other.

Given the above factors, the use of ferry as a key travel mode for the Lang Park Stadium Proposal has been discounted.

7.10.4 Helicopters

The potential need for helicopter use associated with the proposed stadium falls into three categories;

1. Emergency need use (eg medical)

2. Live Broadcast transmission use

3. Entertainment-related activity use

Except for the need to use a helicopter to and from the pitch as the best means of transport to best meet the needs of a particular emergency situation, the other reasons to cater for helicopter use at the Stadium should be avoided and/or mitigated wherever possible as described in Sections 6 & 9.

7.11 Traffic Impacts and Mitigation Measures

7.11.1 Local Traffic Management near Stadium for Pedestrian Management, Coach Parking and Bus Station Accessibility

Several temporary traffic management, traffic control and kerbside allocation management measures will need to be implemented in the immediate environs on the proposed stadium in conjunction with an event to ensure the safe movement of pedestrians and vehicles at intersections, and use of on-street areas near the proposed stadium by various forms of public transport. These are shown schematically on **Figure 7.3.**

Temporary traffic and kerbside allocation management measures recommended include:

1. Temporary closure of Castlemaine Street between Cordova Street and Heussler Terrace to general traffic (local residents and businesses excepted) – This will facilitate safe pedestrian movement to and from coach parking areas and allow safe pedestrian circulation along Castlemaine Street during peak flow periods post-event. This measure will also provide for

access/egress to the proposed stadium bus station and access to coach parking areas with minimal interaction with other traffic use of the southern end of Castlemaine Street.

2. Creation of temporary coach parking zones in the following streets:
   - Parkview Street, Cordova Street, Mayneview Street, Finchley Street and Black Street immediately west of the Stadium (for all events);
   - Cribb Street, Railway Terrace, Crombie Street and McDougall Street south of Milton Road (for major events);
   - Temporary closure of the local streets associated with coach parking immediately to the west of the proposed stadium to general traffic (local residents and businesses excepted);
   - Creation of temporary bus parking zones for buses waiting to enter the bus station post-event in Castlemaine Street (south of Cordova Street), Black Street and Granzella Street;
   - Establishment of a temporary kerbside taxi holding zone in Blaxland Street for taxis waiting to feed the taxi rank on the eastern side of Castlemaine Street post-event; and
   - Implementation of temporary No Standing restrictions as appropriate on Castlemaine Street, Chippendall Street and the eastern end of Heussler Terrace to deter use of kerbside areas for passenger set-down/pick-up.

3. Implementation of temporary traffic and pedestrian management measures in Caxton Street. These are discussed in further detail in Section 7.12.2.

Manual traffic control by police on "point duty" is recommended at several signalised intersections after events, principally to ensure that major pedestrian movement streams that encounter at-grade crossings can be afforded "priority" where appropriate. Police control can also be used to assist with the clearing movement streams of buses through key intersections.

The recommended police controlled intersections post-event are:

- Milton Road/Castlemaine Street – control will be needed to provide priority to bus movements in and out of Castlemaine Street & control pedestrian movements across Castlemaine Street. Note that due to the presence of the pedestrian overbridge on Milton Road, at-grade pedestrian movements across Milton Road will be prevented and enforced via barrier at this location.
- Milton Road/Hale Street-off ramp – control will be needed to safely manage the movement of pedestrians from the Stadium Plaza area across the Hale Street off-ramp to the widened Milton Road footpath.
- Milton Road/Upper Roma Street/Petrie Terrace – control will be required to safely manage the movement of pedestrians across the Petrie Terrace leg from the widened Milton Road footpath to the pedestrian route to the Police Barracks plaza. In conjunction priority can be given to bus and light rail movements between Milton Road and Upper Roma Street from the bus-lane and light rail corridor, as these can occur without conflict with pedestrian movements across Petrie Terrace.
- Caxton Street/Petrie Terrace – control of pedestrian movements from the Caxton Street corridor to the Police Barracks corridor across Petrie Terrace will be important to ensure safety.
- Caxton Street/Castlemaine Street – police control is recommended to assist with the clearance of taxis from Castlemaine Street and manage pedestrian movements towards Given Terrace venues.
- Milton Road/Cribb Street – police control is recommended to manage pedestrian movements along the widened footpath on the southern side of Milton Road across Cribb Street towards Milton Station. Police management of pedestrian flows across Milton Road at this location may also be necessary.

It is not envisaged that there will be a need to continue the current practice of police control at Heussler Terrace/Baroona Road and Coronation Drive/Cribb Street post-event as the local parking restrictions will imply there will not be a high volume of local parking traffic attempting to exit the area post-event. This should be monitored.

7.11.2 Proposed Caxton Street Temporary Traffic and Pedestrian Management

❑ Context

As described in Section 7.8.6, the temporary management of traffic movement on Caxton Street between Petrie Terrace and Hale Street is proposed to facilitate the safe movement of pedestrians in this corridor towards the CBD post-event and also prior to major events. In addition to Caxton Street itself, several narrow streets adjacent to Caxton Street will undergo temporary traffic management changes. Residences on Sexton Street and south of this street will be unaffected by the measures and will be able to gain normal access to properties from Sexton Street via Petrie Terrace.

❑ Local Street Description

A description of the characteristics of the streets that will be affected is as follows:

- Caxton Street. This forms a major road link though the area and comprises 3 traffic lanes (1 hour westbound and 2 eastbound). The westbound single lane is signed as no standing, while the kerbside eastbound lane allows parking, but is a clearway at morning peak times. At the eastern end of Caxton Street there is no direct frontage access to business properties. At the western end of Caxton Street a number of residential properties (6) have direct frontage access from Caxton Street. There is also a separate in and out driveway access to the Caxton Hotel carpark, and a driveway also provides access to a local Church carpark.
- Cathie Street and Weetman Street (north of Caxton Street). These streets form an extremely narrow dead end laneway at approximately 4m width. This road services business properties on Caxton Street from the rear which have no direct frontage access. It also services a number of residential properties that have frontages on both Cathie Street and Menzies Street, although only one property has a vehicular access point.
- Chapel Street. This street is an extremely narrow one-way street of about 5m width between Caxton Street and Judge Street. A small amount of kerb-side parking is allowed on the western side of the street, with the rest of the street signed as no standing. The street serves a very small number of residential properties (3 driveway accesses).
- Judge Street. This is a narrow one-way street of approximately 6m width between Caxton Street and Hale Street Service Road. It services a number of residential properties (18) of which the majority have driveway access. It also services a number of businesses from the rear at the eastern end of the street, due to these businesses having no direct access onto Caxton Street. Parking is typically confined to the southern side of the street as the northern side is signed as no standing.
- Sheriff Street. This is a narrow one-way street of approximately 7m width between Weetman Street and Hale Street Service Road. It services a number of residential properties (26) of which the majority have driveway access. Parking is typically allowed on both sides of the street.
- Weetman Street is an extremely narrow one-way street of about 4.5m width between Caxton Street and Sheriff Street. A small amount of kerb-side parking is allowed on the western side of the street, with the rest of the street signed as no-standing. The street serves a small

number of businesses (4) with access driveways, an off-street carpark and a single residential property.

- Hale Street Service Road (between Caxton Street and Sheriff Street). This road link provides access to east-bound one-way streets in the precinct from Caxton Street (left-in only), and also allows access to a limited number of residential properties (3) on the service road. Both sides of the street are signed as no-standing with the exception of a portion of the eastern side of the road between Caxton Street and Judge Street.

There are a range of regulatory traffic signs on streets in the affected area and these consist primarily of no standing signs, intersection control signs and signs used to reinforce the one-way circulation system which operates currently.

❑ Precinct Traffic

Traffic surveys were undertaken on Wednesday 16th February 2000 and on Saturday 26th February to ascertain the quantum of traffic generation of the precinct at representative event time periods. These surveys are presented graphically on **Figures 7.15 a) and b).** The findings of this survey indicate that the traffic to/from the area at these times is extremely low, with a total of 67 trips to/from the precinct during the weekday evening post event representative hour and 85 trips to/from the precinct during the weekend afternoon representative hour.

❑ Proposed Stage 1 Traffic and Pedestrian Management

The proposed Stage 1 traffic and pedestrian management of Caxton Street is shown on **Figure 7.16 a)** and involves the use of the lane on the southern side of Caxton Street between Petrie Terrace and Hale Street for pedestrian rather than traffic movement. Two-way vehicular movements would still be provided for on Caxton Street under this arrangement, but these movements would operate in two minimum lane widths on the northern side of the road and would be defined by the use of barricades. This will allow an increased pedestrian area on the southern side of the road to cater for increased pedestrian flow and activity.

A number of closure points are required to restrict access to local streets on the southern side of Caxton Street in association with this scheme to reduce the potential for vehicle/pedestrian conflicts as follows:

- Chapel Street at Caxton Street
- Judge Street at Caxton Street
- Weetman Street (south) at Caxton Street

Access Issues

Access to/from some streets adjoining Caxton Street and properties with direct frontage access onto Caxton Street would still be allowed during the Stage 1 traffic and pedestrian management, however movements to/from these streets would be restricted to left in or left out only (ie no right turn movements allowed across the opposing traffic stream). These restricted movements would simplify vehicle interactions, and are necessary to allow efficient vehicle operation of vehicles with the reduced lane configuration on the northern side of Caxton Street.

As entry/exit from Caxton Street to Chapel Street, Judge Street and Weetman Street (south) will be restricted, access to local streets on the southern side of Caxton Street would be via the Hale Street service road. Under this arrangement vehicles accessing the service road would interact

with pedestrians on the southern side of Caxton Street. It is envisaged that this crossing point would need to be police monitored to ensure safe pedestrian operations in this area.

A secondary access route to the local streets with entry restrictions from Caxton Street would also be provided from Sexton Street. This would involve allowing vehicles to right turn at the intersection of Sexton Street and the Hale Street service road, and then travelling northbound on the Hale Street Service Road to access Judge and Sheriff Street.

Local Street Traffic Circulation

Both of the above access arrangements under the Stage 1 Caxton Street traffic/pedestrian management proposal would require changes to the existing circulation characteristics.

The following traffic circulation changes in some streets south of Caxton Street would be implemented on a temporary basis to maintain satisfactory access to properties:

- Sheriff Street/Weetman Street currently operates one-way from west to east. To allow the Stage 1 traffic/pedestrian Management of Caxton Street, Weetman Street would be barricaded at the intersection of Caxton Street to stop access onto Caxton Street. This would require the current one-way system to temporarily operate as two-way. Sheriff Street is quite narrow with on-street parking on both sides of the road, however the street allows access to only a small number of properties, and occurrence of opposing vehicles passing each under two-way operation would be quite low. Vehicles will access and egress the street via the Hale Street service road. A small T-shaped road stub exists at the eastern end of Sheriff Street which would allow vehicles to u-turn at this location.
- Judge Street currently operates as a one-way street from east to west. To allow Stage 1 traffic/pedestrian management of Caxton Street, Judge Street would be required to be barricaded at the intersection with Caxton Street. This would require the current one-way system to operate as two-way. Judge Street is quite narrow and allows access to a small number of residential properties and some businesses, some of which have off-street carparks. However, parking on-street is typically confined to one side of the street and occurrence of opposing vehicles passing each other under two-way operation would be low. A widened area of road exists at the intersection of Judge Street with Caxton Street, which will allow vehicles to U-turn, however some marked kerbside parking bays will need to be temporarily removed to allow sufficient manoeuvring space. A secondary turning area exists at the eastern end of the street, utilising a large paved service area at the rear of a business.
- Chapel Street is currently one-way southbound and, to allow Stage 1 traffic/pedestrian management of Caxton Street, it would be barricaded at the intersection with Caxton Street. Only a small portion of kerbside parking is allowed on the western side of the street and the street allows access to only three properties. The street would operate temporarily as a two-way street only for the small number of properties which have access onto this street.
- The Hale Street service road currently operates as one-way in a southbound direction. To allow the use of Sexton Street as a secondary access to local streets, a portion of the service road between Sexton Street and Judge Street would operate temporarily as a two-way street.

Signage

To accommodate the revised circulation as detailed above, a number of existing regulatory traffic signs (in particular existing one-way signage) would require to be temporarily covered. Signs which require this treatment are shown on **Figure 7.15 a).**

Some additional temporary signage would also be required to reinforce the revised circulation system and is shown on **Figure 7.15 a).** In particular, some temporary signage would be required on the approaches to Caxton Street to warn of changed traffic conditions, and divert approaching traffic onto the new road/lane alignment. Some additional temporary signage would also be required on the Hale Street Service Road to enforce changes to circulation.

❑ **Proposed Stage 2 Caxton Street Traffic/Pedestrian Management**

The proposed Stage 2 Caxton Street traffic/pedestrian management is designed to provide maximum pedestrian widths to cater for peak pedestrian flows in safety for a 30 to 45 minute period immediately after a major event. It is shown on **Figure 7.15 b)** and involves the full closure to normal vehicular traffic of Caxton Street between Petrie Terrace and Hale Street for this short time period as follows :

- Proposed closure point at the western end of Caxton Street immediately east of the Hale Street off-ramp. No access allowed through barriers with the exception of emergency vehicles.
- Proposed closure point at the eastern end of Caxton Street at the intersection with Petrie Terrace. No access allowed through barriers with the exception of emergency vehicles.

Access Issues

There are a number of properties at the western end of Caxton Street which rely on driveway access off Caxton Street. Two options exist to address this issue. The first would be to allow people wishing to access these properties access through the barricades. This would be acceptable if the number of vehicles wishing to do this is small, however one of the properties affected is the Caxton Hotel. Allowing access to and from this property during peak pedestrian flow times would create a high incidence of pedestrian/vehicle conflict. The preferred option therefore would be to restrict access to such off-street carparks during major events or, at a minimum, restrict exits during the immediate post-match period.

Properties at the eastern end of Caxton Street do not rely on direct frontage access off Caxton Street, however a number of properties on the northern side of Caxton Street rely on the Cathie Street Lane-way running off Caxton Street for property access. Similarly, two options exist to address this issue. The first would be to allow vehicles access to these properties through the barricade. The number of vehicles doing this would be small and pedestrian/vehicle conflicts would not be as high as on the southern side of Caxton Street. The other preferred option would be to prevent access to this lane-way during the immediate post-match period.

The extent to which restricting access to Caxton Street properties would cause an impact dependent on the duration that the Stage 2 closure would be in place. If this closure is maintained from immediately after event end until peak pedestrian flow abates, and then transitions to the Stage 1 traffic/pedestrian management, then the duration of this closure would be short (30 to 45 minutes) and hence have reduced impact. It is thus recommended that reverting to a Stage 1 traffic/pedestrian management immediately after the peak pedestrian surge has dissipated provides a reasonable compromise between pedestrian capacity/amenity needs and meeting property access needs.

Local Street Traffic Circulation

It is envisaged that the Stage 2 closure will transition from a Stage 1 traffic/pedestrian management prior to event peak departure pedestrian flows. This will require placement of barricades at the western and eastern ends of Caxton Street in addition to Stage 1 barricades already in place. Changes to traffic circulation under a Stage 2 closure will be identical to required changes for the Stage 1 traffic/pedestrian management, with the exception of the Hale Street Service Road. Under the Stage 2 closure no access would be permitted from the Caxton Street onto the service road, with the only access to local streets via Sexton Street.

Signage

Temporary changes to existing signage and additional temporary signage would be identical to that required for a Stage 1 traffic/pedestrian management and are shown on **Figure 7.15 b).** Supplementary temporary signage would be required on the approaches to Caxton Street to advise of the road closure and divert traffic appropriately.

❑ **Summary of Caxton Street Temporary Traffic/Pedestrian Management Impact**

The proposed Caxton Street temporary traffic/pedestrian management scheme would be effective in providing for the safe movement of pedestrians from the northern end of the proposed stadium post-event to designated routes of travel to public transport nodes, entertainment venues and carparking in the CBD. This could be achieved without compromising on a permanent basis the features of the streetscape of Caxton Street (such as outdoor dining areas, landscaping and street furniture) that provide the street with an active and appealing pedestrian environment for everyday community use. The scheme would place some restrictions on local parking accessibility for businesses whose access was directly affected by the restriction of use of roadspace in Caxton Street, although the for typical events this would only occur for one or two hours (including set-up time) to manage post-event pedestrian flows.

7.11.3 Traffic Impacts and Mitigation Measures

A comprehensive traffic impact assessment has been undertaken to assess the indicative effect on the surrounding and wider road network of the target low car use transport strategy. As described in Section 7.3, Brisbane City Council's CBD SATURN model has been used as an analysis tool to assist in this appraisal. The assessment has been undertaken for several scenarios involving combined background and Lang Park event traffic.

❑ **Lang Park Event - Traffic Generation**

In this assessment the following types of Lang Park Stadium proposed generated vehicular traffic have been incorporated:

- Private Vehicle – on-site car parking traffic
- Bus movements
- Coach traffic
- Taxi movements
- Private Vehicle - set-down/pick-up traffic
- Private Vehicle - movements associated with other off-street carparking areas and allowance for 200 infringements of the on-street parking restriction scheme

Table 7.21 summarises the quantum and type of traffic generation for various event types in both with and without light rail provision scenarios for the proposed stadium.

Table 7.21: Estimated Traffic Generation for Lang Park Events under Target Transport Strategy – With Light Rail (& Without Light Rail)

Vehicle Type		Analysis Scenario Traffic Generation (vehicles per hour)			
		Capacity Weeknight Event (52 500 p)		Major Weekend Evening Event (45 000 p)	Typical Weekend Afternoon Event (35 000 p)
		Arrival in Traffic Peak Hour	Departure	Arrival in Traffic Peak Hour	Departure
Private Vehicle Stadium Parking	Enter	110	0	120	0
	Exit	0	390	0	320
	Total	*110*	*390*	*120*	*320*
Private Vehicle Set Down Traffic	Enter	130	440	130	360
	Exit	130	440	130	360
	Total	*260*	*880*	*260*	*720*
Private Vehicle Local Parking	Enter	230	0	230	0
	Exit	0	780	0	640
	Total	*230*	*780*	*230*	*640*
Private Vehicle Remote Parking	Enter	730	0	570	0
	Exit	0	2 500	0	1 420
	Total	*730*	*2 500*	*570*	*1 420*
Taxis	Enter	255 (265)	560 (580)	230 (250)	470 (480)
	Exit	255 (265)	560 (580)	230 (250)	470 (480)
	Total	*510 (530)*	*1 120 (1 160hrs)*	*460 (500)*	*940 (960)*
Buses	Enter	23 (41)	102 (129)	17 (28)	26 (54)
	Exit	23 (41)	102 (129)	17 (28)	26 (54)
	Total	*46 (82)*	*204 (258)*	*34*	*52 (108)*
Coaches & Mini-buses	Enter	70	0	60	0
	Exit	0	250	0	90
	Total	*70*	*250*	*60*	*90*
Total Stadium Vehicular Traffic Generation	Enter	1 550 (1 580)	1 100 (1150)	1 360 (1 390)	860 (890)
	Exit	410 (440)	5 020 (5070hrs)	380 (410)	3 330 (3 360)
	Total	*1 960 (2 020hrs)*	*6 120 (6 220hrs)*	*1 740 (1 800)*	*4 190 (4 250)*

Note : The numbers in brackets detail the varied forecast in the number of vehicular trips in a scenario where no LRT service is provided to the Stadium.

❑ Traffic Impact Assessment Scenarios

The traffic impact assessment has been undertaken for four representative cases as follows;

1. Weeknight capacity event arrival in commuter peak hour 5.30pm to 6.30pm.
2. Weeknight capacity event departure in the period 10.00pm to 11.00pm.
3. Major weekend event (45 000 person) arrival during the Saturday 5.00pm to 6.00pm period.
4. Typical weekend event (35 000 person) departure during the Sunday afternoon 5.00pm to 6.00pm period.

Both opening year (2003) and ten years beyond (2013) scenarios have been considered in the traffic impact assessment in accordance with the requirements of the *Transport, Access, Parking and Servicing Code* in Brisbane City Council's draft City Plan. For each of the above representative events, the analysis has considered traffic flow scenarios assuming the following two cases;

1. Light rail to the stadium is provided.
2. Light rail access to the stadium is not available.

The above event scenarios have been selected for detailed analysis as these represent the critical periods for the combined background traffic and Lang Park event generated traffic.

In formulating forecast traffic volumes a long term growth rate of 1% per annum has been adopted to project growth in baseline traffic flows in the period 2003 to 2013. The traffic generation associated with the relevant event type was added to the background traffic for the appropriate time period (shown in **Figures 5.2.13, 5.2.17** and **5.2.18**) to represent the design scenarios discussed above. The traffic flows presented are in the form of passenger car units (pcu's). The traffic volumes developed for this assessment have used a factor of two to convert heavy vehicle/bus traffic to pcu's.

The forecast traffic flows in the surrounding road network with the Stadium redevelopment are shown on **Figures 7.17** to **7.20.**

The traffic impact assessment has included a detailed investigation of the impacts of the events discussed above on the key intersections in the immediate vicinity of the site. The analysis of the local intersections was undertaken using the SIDRA intersection analysis package. The impact of the various events on the wider regional network, including intersections and links, was also assessed, in this instance using the SATURN traffic model provided by Brisbane City Council. This latter assessment has been undertaken for the relevant PM commuter peak design scenarios (the capacity event arrival).

The above analysis was also undertaken for the baseline traffic volumes (without a Lang Park event) to allow comparison of the network and intersection operations with and without the proposal. The results of the baseline assessment are discussed in detail in Section 5.2.2 and are also included for comparison in the impact assessment tables.

A series of additional measures have also been incorporated in the traffic impact assessment, where relevant, to account for the transport infrastructure traffic management strategies and mitigation measures associated with the proposal. These include:

- The effects of the closure of Castlemaine Street in association with all Lang Park events.
- Upgrading of the Upper Roma Street/Petrie Terrace/Milton Road intersection associated with the proposed Light Rail alignment/bus-priority initiatives.
- The effects on intersection operations of grade separation of pedestrian movements where applicable (ie. some intersections on Milton Road).
- The management of Caxton Street traffic use for all post event scenarios to facilitate pedestrian movement and safety.
- The management of traffic use of Caxton Street is some pre event scenarios to facilitate pedestrian movement and safety.
- The effects of police control at intersections post-event.

❑ Traffic Impact Analysis Results

The impacts of the Lang Park Stadium Proposal on the road network have been assessed in this section by reviewing the analysis results on two separate levels, those being:

- the impacts of the traffic generated by various events on the wider Brisbane network serving the proposed stadium; and
- the impacts of the traffic generated by various events on the local road network and intersections in close proximity to the proposed stadium.

Table 7.22 summarises the results of the SATURN modelling for the weekday PM commuter peak with a capacity event at the proposed stadium, providing overall network statistics. **Table 7.23** and **Table 7.24** present modelled on-link traffic volumes and intersection performance at selected key road links and intersections within the wider regional road network under a PM peak scenario where arrival traffic to a Lang Park capacity event has been added.

Table 7.22: Overall Network Performance Statistics

Road Link/Segment	Network Scenario Tested		
	Base Network	Lang Park Capacity Event Arrival in PM Peak Hour (With Light Rail to Stadium)	Lang Park Capacity Event Arrival in PM Peak Hour (Without Light Rail to Stadium)
Travel Time Totals (PCU hrs)			
Delayed	1 843	1 873	1 862
Queued	435	392	413
Free Run	3 105	3 131	3 129
Total	5 383	5 395	5404
Other Network Totals			
Total Travel Distance (PCU kms/hr)	166 294	168 437	168 437
Average Speed (km/hr)	30.9	31.2	31.2
Total Fuel Consumption (litres/hr)	18 900	18 980	18 976

Source : SATURN model runs for weekday PM peak

Table 7.23: Regional Network Road Link Statistics

Road Link/Segment	Two-way Link Volume (veh/hr)		
	Base Network	Lang Park Capacity Event Arrival in PM Peak Hour (With Light Rail to Stadium)	Lang Park Capacity Event Arrival in PM Peak Hour (Without Light Rail to Stadium)
Hale Street (north of Caxton Street)	6 662	7 061	7 136
Hale Street (south of Caxton Street)	5 594	5 657	5 703
Coronation Drive (east of Cribb Street)	7 291	7 210	7 196
William Jolly Bridge	3 768	3 864	3 873
Roma Street (at Roma Street Station)	3 019	2 913	2 938
George Street (between Herschel Street and Tank Street)	865	860	862
Ann Street (between Roma Street and George Street)	2 972	2 827	2 798
Petrie Terrace (north of Secombe Street)	1 362	1 204	1 194
College Road (between Countess Street and Gregory Terrace)	2 583	2 518	2 510

Source: SATURN model runs for weekday PM peak period

Table 7.24: Regional Network Intersection Statistics

Intersection	Maximum Volume/Capacity Ratio (%)		
	Base Network	Lang Park Capacity Event Arrival in PM Peak Hour (With Light Rail to Stadium)	Lang Park Capacity Event Arrival in PM Peak Hour (Without Light Rail to Stadium)
Normanby five-ways	45.8	45.7	45.3
Gregory Terrace/Boundary Road	11.0	11.0	10.6
Gregory Terrace/College Road	47.5	48.5	48.6
Wickham Terrace/Upper Edward Street	38.2	39.9	40.3
Ann Street/Edward Street	56.9	58.1	57.4
Roma Street/Ann Street	69.5	70.2	69.2
Ann Street/George Street	66.9	68.1	68.0
Countess Street/Roma Street	53.9	57.6	58.1
Upper Roma Street/Skew Street	49.9	54.6	54.6
Cribb Street/Coronation Drive	94.0	95.3	95.4
Turbot Street/George Street	44.1	49.8	50.7

Source: SATURN model runs for weekday PM peak

Notes :

1. Intersection Volume/Capacity Ratio (V/C) is equal to the sum of the volumes for all movements divided by the sum of the capacities for all movements
2. An intersection with a V/C ratio of greater than 60% may operate satisfactorily under current demands, however this generally implies that some movements may be severely overloaded and/or several movements have heavy demands compared to overall capacity at the intersection.

Key points to emerge from the regional traffic impact investigation with the target low car use transport strategy for the redeveloped Stadium are:

- With the target modal use scenario for the proposed stadium only a small overall increase (1-2%) in commuter peak hour travel parameters is forecast, indicating minimal overall impact on the road network with a capacity event.
- The presence of traffic generated by a 52 500 spectator event arrival will not have a significant impact upon the total travel times in the network, despite the closure of Castlemaine Street to through traffic and the reduction in vehicular capacity on Caxton Street due to implementation of the Stage 1 temporary traffic/pedestrian management measures.
- The total vehicle time spent in queues reduces for the Lang Park event scenarios, indicating the redistribution of traffic as a result of some of the Lang Park traffic management arrangements has a positive impact on over congestion in the road network.
- The implications of Lang Park event traffic are relatively minor at the regional level. The increases in the degree of saturation at key intersections are not significant and the increases in link traffic are also minor.

The results of the detailed assessment using SIDRA of the operation of local intersections based on forecast traffic volumes shown in **Figures 7.17** to **7.20** are shown in **Table 7.25**.

Table 7.25: Local Intersection Operations

Year	Background Traffic	Lang Park Event Scenario	Light Rail	Degree of Saturation (1) for Scenarios based upon SIDRA						
				Caxton/ Castlemaine	Caxton/ Hale	Caxton/ Petrie	Milton/ Upper Roma	Milton/ Hale	Milton/ Castlemaine	Milton/ Cribb
2003	PM Peak [2]	N/a	N/a	0.86	0.48	0.83	0.91	0.64	0.92	1.02
2003	PM Peak [4]	Capacity Arrival	With	0.88	0.65	1.07[8]	0.88	0.65	0.75	1.00[8]
2003	PM Peak [4]	Capacity Arrival	Delayed	0.88	0.65	1.05[8]	0.87	0.69	0.75	1.00[8]
2013	PM Peak [2]	N/a	N/a	1.03	0.48	0.84	0.92	0.70	0.85	1.00
2013	PM Peak [5]	Capacity Arrival	With	0.87	0.66	1.13	0.89	0.66	0.74	1.00[8]
2013	PM Peak [5]	Capacity Arrival	Delayed	0.88	0.66	1.06	0.89	0.71	0.77	1.00[8]
2003	Evening – Post Event [3]	N/a	N/a	0.28	0.20	0.44	0.36	0.33	0.45	0.66
2003	Evening – Post Event [4]	Capacity Departure	With	0.63	N/a	0.41*	0.64*	0.46*	0.46*	1.00*[8]
2003	Evening – Post Event [4]	Capacity Departure	Delayed	0.62	N/a	0.43*	0.64*	0.47*	0.51*	1.00*[8]
2013	Evening – Post Event [3]	N/a	N/a	0.30	0.21	0.46	0.38	0.35	0.48	0.71
2013	Evening – Post Event [4]	Capacity Departure	With	0.60	N/a	0.42*	0.64*	0.47*	0.46*	1.00*[8]
2013	Evening – Post Event [4]	Capacity Departure	Delayed	0.60	N/a	0.43*	0.64*	0.49*	0.51*	1.00*[8]
2003	Weekend Afternoon [3]	N/a	N/a	0.42	0.35	0.52	0.45	0.49	0.88	1.21
2003	Weekend Afternoon [6]	Major Arrival	With	0.71	0.45	0.89[7]	0.68	0.56	0.82[7]	1.00[8]
2003	Weekend Afternoon [6]	Major Arrival	Delayed	0.72	0.47	1.03[7]	0.69	0.56	0.82[7]	1.00[8]
2013	Weekend Afternoon [3]	N/a	N/a	0.46	0.39	0.56	0.48	0.52	0.94	1.30
2013	Weekend Afternoon [6]	Major Arrival	With	0.72	0.49	1.02[7]	0.68	0.58	0.86[7]	1.00[8]
2013	Weekend Afternoon [6]	Major Arrival	Delayed	0.73	0.50	1.01[8]	0.69	0.58	0.86[7]	1.00[8]
2003	Weekend Afternoon [3]	N/a	N/a	0.42	0.35	0.52	0.45	0.49	0.88	1.21
2003	Weekend Afternoon [6]	Typical Departure	With	0.72	N/a	0.50*	0.81*	0.58*	0.77*	1.21*[8]
2003	Weekend Afternoon [6]	Typical Departure	Delayed	0.72	N/a	0.45*	0.64*	0.59*	0.77*	1.21*[8]
2013	Weekend Afternoon [3]	N/a	N/a	0.46	0.39	0.56*	0.48	0.52	0.94	1.30
2013	Weekend Afternoon [6]	Typical Departure	With	0.69	N/a	0.52*	0.78*	0.61*	0.80*	1.24*[8]
2013	Weekend Afternoon [6]	Typical Departure	Delayed	0.73	N/a	0.49*	0.65*	0.62*	0.80*	1.24*[8]

* = Indicates those intersections assumed to be under Police Control during the appropriate departure scenario

Notes:

1. Degree of saturation or X value tabulated represents the ratio of demand to available capacity for the most critical movement at the intersection. An X value of 0.90 represents a desirable maximum far acceptable operation of a signalised intersection or roundabout.
2. For all PM Peak scenarios (2003 & 2013) with no Lang Park development a cycle time of 120 seconds adopted.
3. For Weekend Afternoon and Evening scenarios (2003 & 2013) with no Lang Park a cycle time of 80 seconds adopted.
4. All intersection assessed with a cycle time of 120 seconds unless specifically noted.
5. All intersection assessed with a cycle time of 140 seconds unless specifically noted.
6. All intersection assessed with a cycle time of 80 seconds unless specifically noted.
7. Cycle time of 120 seconds adopted.
8. Cycle time of 140 seconds adopted.
9. Saturation Flow of 1850 pcu/hr used for opening year and 1950 pcu/hr used for 10 year planning horizon.

From **Table 7.25** and the comparison of traffic volumes the following assessment of road network performance has been prepared by examining the operation of specific intersections as these represent the most important influences on road capacity and safety considerations:

Caxton Street/Castlemaine Street

This intersection was analysed for all scenarios assuming the existing layout remains unchanged and the traffic signal phasing currently used remains appropriate. This intersection provides access to the stadium primarily for taxis and it is also provides for through traffic movement to Heussler Terrace and the adjacent local land-uses. With the stadium proposal during event times there will be a marked increase in the turning traffic into and out of Castlemaine Street.

The analysis results indicate that for each of the event scenarios, the operation of this intersection would be acceptable in 2003 and 2013. This intersection would not require any mitigation measures other than to ensure parking on the Castlemaine Street approach is prevented during event arrival and departure times to ensure two approach lanes are achieved on this approach. With the left turn into Castlemaine Street being relatively high for event scenarios the provision of a left turn slip lane for this movement was investigated. It is considered preferable, for pedestrian safety, that the left turn remain signalised.

Although not essential from a traffic capacity viewpoint, police control post-event would be recommended to assist with the clearing of taxi movements and to ensure safe movement of pedestrians.

Caxton Street/Hale Street Off-ramp

The analysis of this intersection was also based on the existing layout and phasing but, for major event departure scenarios, with the implementation of the Stage 2 Caxton Street temporary traffic/pedestrian management scheme to assist in pedestrian safety (refer Section 7.11.2), Caxton Street will be effectively closed to traffic between this intersection and Petrie Terrace. Thus only right turn traffic from the Hale Street off-ramp into Caxton Street will be the only movement post-event and this would run unopposed with no specific capacity issues resulting.

The analysis of the arrival scenarios indicates, that under each of the Lang Park event scenarios assessed that the intersection would operate at an acceptable degree of saturation.

Caxton Street/Petrie Terrace

This intersection has been analysed with varying management initiatives as appropriate for each scenario. The assumptions made in the analysis are as follows:

- In all cases it has been assumed that there would be restriction of traffic movement from the Police Barracks precinct on the eastern side of Petrie Terrace during event times due to the presence of the proposed pedestrian corridor to the CBD at this location. Traffic from future development on this precinct would need to access via left-in/left-out arrangements further south on Petrie Terrace during pre and post-event periods.
- For the each of the pre event arrival scenarios, a reduction in capacity of Caxton Street to one travel lane in each direction has been adopted as per the arrangements described for the proposed Stage 1 Caxton Street temporary traffic/pedestrian scheme to facilitate the safe and efficient movement of pedestrians along Caxton Street.

- For the each of the post event departure scenarios, the effective closure of Caxton Street to traffic has been assessed as per the arrangements described for the proposed Stage 2 Caxton Street temporary traffic/pedestrian scheme.
- During the post event departure scenarios it has been assumed that the intersection would be under the control of Police.

The above management measures would result in some localised redistribution of the background traffic to alternative routes and this has been taken into account in the development of design hour turning movement volumes in the local road network. The analysis results in **Table 7.25** indicate that the intersection would operate within practical capacity for all scenarios excepting some arrival scenarios. For the capacity event and the 2013 major event (45 000 spectator) arrival scenarios analysis indicates that traffic demands at this intersection would exceed the practical capacity due to the partial use of Caxton Street for pedestrian flow management. Under each of these scenarios the reduction in the capacity of Caxton Street would result in the movements into and out of Caxton Street exceeding the practical capacity of these movements, that is delays would be experienced for such traffic.

It is considered imperative, however, that a reduction in traffic capacity along Caxton Street be provided to ensure the safety of pedestrians along this route to the Stadium prior to these major events that will occur a few times in the year. Given these likely impacts which may effect local residents and businesses, some regular users of this road link may choose to divert more widely to more indirect, yet uncongested, alternative routes to their destination. To enable this to opportunity, the likelihood of delays on Caxton Street due to pedestrian management should be advised to the public and local community in pre-event publicity and marketing material for these major events. Note that for smaller events the need to restrict the traffic capacity of Caxton Street to cater for arriving pedestrian flows is not evident (refer Section 7.8.6).

Milton Road/Upper Roma Street/Petrie Terrace

Various geometric changes have been incorporated as relevant to each light rail analysis scenario at this location.

Under the "with light rail" option, the intersection geometry includes allowance for the additional light rail corridor approach on Milton Road and a shared bus lane/light rail approach on Upper Roma Street. For the "delayed light rail" options only the bus lane on Upper Roma Street are included. For each of these options a right turn from Milton Road to Upper Roma Street for bus movements has been included in the design volumes and analysis geometry.

It has also been assumed that the intersection would be under Police control during the departure scenarios. The intersection phasing has been altered to ensure a simplified sequence that would be representative of police control.

The analysis results clearly indicate that this intersection would operate acceptably for each of the analysis scenarios. It is concluded that the intersection would adequately cater for the efficient and safe movement of pedestrians, private vehicles, buses and light rail vehicles in the configuration proposed in **Figure 7.6.**

Milton Road/Hale Street Southbound Off-ramp

This intersection is proposed to essentially remain in its existing configuration. As such, for each of the analysis scenarios undertaken, the existing intersection geometry and phase arrangements have been adopted. As for the other Milton Road intersection, to facilitate pedestrian safety and

efficiency, it is proposed that this intersection be Police controlled for each of the post event departure scenarios. Due to the relatively simple existing two phase arrangement of this intersection this has also been adopted for the Police control scenarios, as this is likely to represent the operation used.

The analysis indicates that this intersection would also operate at a satisfactory level for each of the analysis scenarios. This intersection would have significant spare capacity, with no adverse impacts on Hale Street operations due to potential queuing being forecast. This arrangement would cater adequately for the anticipated level of pedestrian traffic and the pedestrian plaza across Hale Street provides a generous holding area for pedestrians waiting to cross the off-ramp roadway under Police direction.

Milton Road/Castlemaine Street

This is one of the primary access locations for the proposed stadium generated traffic. It is proposed that access to the proposed stadium and surrounds for buses, coaches and VIP/on-site parking would be provided via this intersection. The analysis of this intersection has also included geometric and demand changes based on the scenario being assessed. These assumptions are as follows:

- For all scenarios with the proposed stadium the effects of the closure of Castlemaine Street to through traffic between Cordova Street and Heussler Terrace have been incorporated.
- For all pre event arrival scenarios the existing intersection configuration has been adopted.
- For all post event scenarios it is assumed that the right turn out of Castlemaine Street has been banned (via police control).
- The intersection is police controlled for all post event departure scenarios.
- No at-grade pedestrian crossings of Milton Road are permitted at this location in the post event departure scenarios due to the presence of the pedestrian overbridge from the proposed stadium.

The results of the analysis, shown in **Table 7.25**, for each of the Lang Park event scenarios indicates that the intersection would have satisfactory operational characteristics. The analysis of the existing intersection operation indicates that this intersection is approaching practical capacity. In many of the analysis scenarios the operational efficiency of the intersection would be improved. This is largely due to the traffic/pedestrian management initiatives proposed. The intersection would require no mitigation strategies other than the alterations to the geometry proposed as part of these traffic management strategies, discussed in Section 7.12.1 and above.

Milton Road/Cribb Street

This intersection is currently constrained by the limitations on available width along Milton Road and under the rail overpass in Cribb Street. The current operation of this intersection in the commuter peak periods is congested due to the high traffic volumes on Milton Road which are forecast to increase with the completion of the Inner City Bypass.

Generally, the existing intersection geometry and phasing has been adopted for the analysis of each of the assessment scenarios. It has been assumed that this intersection would also be under police control for post event departure periods to ensure safety of pedestrian traffic approaching Milton Station.

The detailed analysis of this intersection has indicated that the intersection operation would be above the practical capacity for each scenario including those without the Stadium redevelopment.

The primary movements that would exhibit these characteristics are the outbound through movements and left turns on Milton Road and the right turn from Milton Road west into Cribb Street. While the intersection would be expected to operate above practical capacity, the operation would not be exacerbated significantly as a result of traffic generated by Lang Park events. With the public transport focussed/local car use transport strategy planned for the Stadium, the overall increase in traffic through this intersection as a result of the stadium is relatively small (1%).

The potential to improve the intersection configuration to yield improved operations was explored via consideration of:

- Grade separation of pedestrian crossing of Cribb Street.
- The extension of the right turn pocket on Milton Road.
- Provision of a left turn slip lane from Milton Road into Cribb Street. This would only be applicable if pedestrian movements were grade separated.
- Provision of a dedicated left turn slip lane for movements from Cribb Street into Milton Road. This would also have implications for pedestrian safety.

Each of the above measures were tested in isolation and in various combinations for the critical PM peak time period, however, these measures were found to offer little improvement in overall intersection performance which is dominated by through traffic capacity needs on Milton Road.

It would not however be feasible to practically widen Milton Road to provide more through capacity at an isolated intersection as this would have other implications as this widening would be required over a more significant section of road to avoid the development of "constriction points" along Milton Road which could compromise user safety. The presence of significant local land uses (such as the Castlemaine brewery) limits the ability to consider major continuous road widening in this corridor. Also road capacity increases that favour CBD commuter travel do not represent a sound transport planning approach.

A number of recently implemented or planned measures such as the Coronation Drive bus priority improvements and the potential Light Rail link to Indooroopilly (as discussed in the 2007 Vision), may provide future relief to Milton Road traffic demands and thus intersection performance. The proposed stadium related bus priority measures at the Milton Road/Petrie Terrace/Upper Roma Street intersection and the light rail route to the proposed stadium represent responsible contributions to the longer term mitigation of excess private vehicle travel demand in the Milton Road corridor.

❑ Summary of Traffic Impact

Key findings of the traffic impact assessment are:

- With the target modal use scenario for the Stadium redevelopment only a small overall increase (1-2%) in overall travel parameters is forecast, indicating minimal overall impact on the regional road network.
- The management of traffic use of Caxton Street between Petrie Terrace and Hale Street both prior to and after major events, and after typical size events, to provide pedestrian access improvements is feasible from an overall network impact perspective. However delays will occur for traffic intending to use this section of Caxton Street during periods when these restrictions are in place.
- The proposed Caxton Street temporary traffic/pedestrian traffic management will impose constraints on accessibility to frontage properties, particularly on the southside of Caxton Street, for a period of several hours encompassing the period prior to major events and the

hour post-event due to the use of Stage 1 management pre-event and Stage 2 management post-event. For a typical event, some constraints would also exist due to the proposed use of the Stage 1 management for both arrival and departure management. Properties on the northern side of Caxton Street would be affected for a period of less than one hour post major event during the period of Stage 2 management, however would not be significantly affected during a typical event when Stage 1 management was in place albeit increased traffic congestion would be present on Caxton Street.

- Accessibility for streets in the precinct south of Caxton Street such as between Petrie Terrace and the Hale Street service road including Chapel Street, Judge Street and Weetman Street during all events would be need fully maintained through provision of alternative managed access routes via Sexton Street and the Hale Street service road. These are demonstrated in the proposed Stage 1 and Stage 2 temporary traffic/pedestrian management concepts.
- The traffic management associated with the proposed stadium and proposed bus priority measures will provide for ease of movement for non-private car traffic in the vicinity of the proposed stadium eg buses, taxis, coaches, cyclists whilst at the same time accommodating pedestrian movements in safety.
- Operating conditions at the Milton Road/Cribb Street intersection would continue to be highly congested with the proposed stadium due to general through traffic demand on Milton Road and opportunities to increase traffic capacity are not evident. The public transport strategy focus for the proposed stadium and associated infrastructure provisions represent a appropriate mitigative response for the Milton Road corridor where demand management of excess through travel demand is desirable.
- Improvements at the intersection of Upper Roma Street/Milton Road/Petrie Terrace associated with light rail/bus-priority/pedestrian upgrading yield travel benefits for public transport vehicles.
- If the target modal scenario is not immediately realised and higher levels of private car travel initially occur, provided that the proposed controlled parking scheme is operational then the local environs of the proposed stadium would be protected from excessive traffic demand. Intersection operations in the adjacent network would be similar to those assessed for the target modal case. In such a situation, higher levels of car parking use within the CBD (where capacity is available) would be the most likely outcome and the traffic impacts associated with access/egress to these locations would be more disperse due to the range of potential parking locations available. For a capacity event weeknight, inbound flows towards such parking areas would occur during the period of commuter outbound flows from the CBD and as such overall impacts on the wider road network links and intersections would not be likely to be significant. The pedestrian improvements between the proposed stadium and the CBD would be sufficient to cater for demands associated with such varied carparking demands in the CBD in the event that the full target public transport use is not initially attained. This would be because these pedestrian links have a multi-user access function (eg patrons associated with Roma Street rail, CBD bus, CBD carparking, CBD entertainment venues).

7.12 Miscellaneous Transport Issues

7.12.1 Access for Emergency Vehicles

This issue has been addressed in Section 6.

7.12.2 Contingency Planning for Emergencies during Stadium Operations

This issue has been addressed in Section 6.

7.12.3 Service Vehicles

Servicing will occur via use of the internal road system under the proposed stadium at Ground Level. This internal ring road will provide access to the kitchen, ground stores and event storage areas as well as team facilities. Loading bays for services vehicles will be located adjacent to key storage areas and service elevators. Direct access to the pitch will be available from this level. The access driveway for service vehicles will be located off Castlemaine Street north of Cordova Street.

An emergency vehicle access point is provided directly off the Heussler Terrace roundabout. It is not intended that this is used for routine servicing of the proposed stadium. It likely that this access however would be used by team buses to enter the proposed stadium following a traditional pre-event journey down Caxton Street. This access point could also cater for specialised equipment deliveries to the pitch area associated with a concert event (if required).

The quantum of service vehicles for each event (based on information for existing events as described in Section 5.2.1) is estimated as 30 to 40 service vehicles over a 2 to 3 day period. As all service vehicle loading and unloading will occur on-site, with access for service vehicles off Castlemaine Street using the major road network, there will be minimal impact on the surrounding road network and nearby residential areas.

These proposed service vehicle loading bay provisions and access arrangements are appropriate from a traffic engineering viewpoint and in accordance with the requirements of the *Transport Access Parking and Servicing Code* of Brisbane City Council's draft City Plan.

7.12.4 Co-ordinated Ticketing

Queensland Transport called tenders in December 1999 for the planning, design, implementation, operation and maintenance of an Integrated Ticketing System for South East Queensland. The system is intended to become fully operational by January 2003 and will encompass all public transport including Queensland Rail services, Brisbane Transport bus and ferry services, private bus services and the proposed Brisbane Light Rail system. The system may also accommodate parking applications.

The proposed system is based on use of a multi-application, dual interface smart card as the primary medium used to pay for public transport fares. It is intended that the card also is able to accommodate special event ticketing such as combined travel and event entry.

The use of co-ordinated event and public transport ticketing for the redeveloped Stadium would be supportive of the proposed transport strategy and beneficial for several reasons including:

- It would represent a strong service promotion initiative that would encourage patrons to consider public transport use.
- It is beneficial to rail platform operations as it obviates the need to have ticket sellers on platforms at Milton which has been found to be problematic in the past at peak event times.
- It provides an effective mechanism to eliminate fare collection for shuttle bus and direct bus patrons at the Stadium bus station which is considered vital for the efficiency of operation of such services post-event.
- It could potentially be used in conjunction with CBD (or Southbank) allocated parking and light rail or shuttle bus promotions strategies.