



Camden Council

Attachments

Ordinary Council Meeting
8 July 2014

Camden Civic Centre
Oxley Street
Camden



ORDINARY COUNCIL

ATTACHMENTS - ORDINARY COUNCIL

ORD01	Subdivision To Create 28 Residential Lots, 1 Residue Lot And Associated Site Works At 47C And 65 Hilder Street, Elderslie	
	Attachment 1: Proposed Plan of Subdivision	5
	Attachment 2: Elderslie Master Plan	6
ORD02	Subdivision To Create 66 Residential Lots, 5 Super Lots, 1 Residue Lot And Associated Civil Works And Landscaping At A The Hermitage Way, 29 Tarrawarra Drive & 810c Camden Valley Way, Gledswood Hills	
	Attachment 1: Proposed Plan of Subdivision A3	9
	Attachment 2: Proposed Layout Plan - A3	10
ORD03	IPART - Local Government Compliance And Enforcement Regulation Review - Submission On Draft Report	
	Attachment 1: IPART Submission on draft report - version 1 June 2014	11
ORD04	Macquarie Grove Road, Kirkham, Submission To JRPP On Pre Gateway Review	
	Attachment 1: Attachment 1 – Kirkham Timeline of Key Events	20
	Attachment 2: Attachment 2 Record of Decision JRPP	22
	Attachment 3: Attachment 3 - Macquarie Grove Rd, Kirkham – Pre Gateway Review - Submission Doc 3July 2014	37
ORD05	Incoming Corporate Sponsorship	
	Attachment 1: Final Incoming Sponsorship Policy	48



ORD06 Camden Town Centre Improvements

Attachment 1:	Camden Town Centre - Traffic and Transport Study 2013	55
Attachment 2:	Camden Town Centre Decked Car Park Study.....	269
Attachment 3:	Argyle Street - Paving Material Selection Assessment.....	319
Attachment 4:	Argyle Street - Street Furniture Selection Assessment.....	321
Attachment 5:	Argyle Street Plan	325

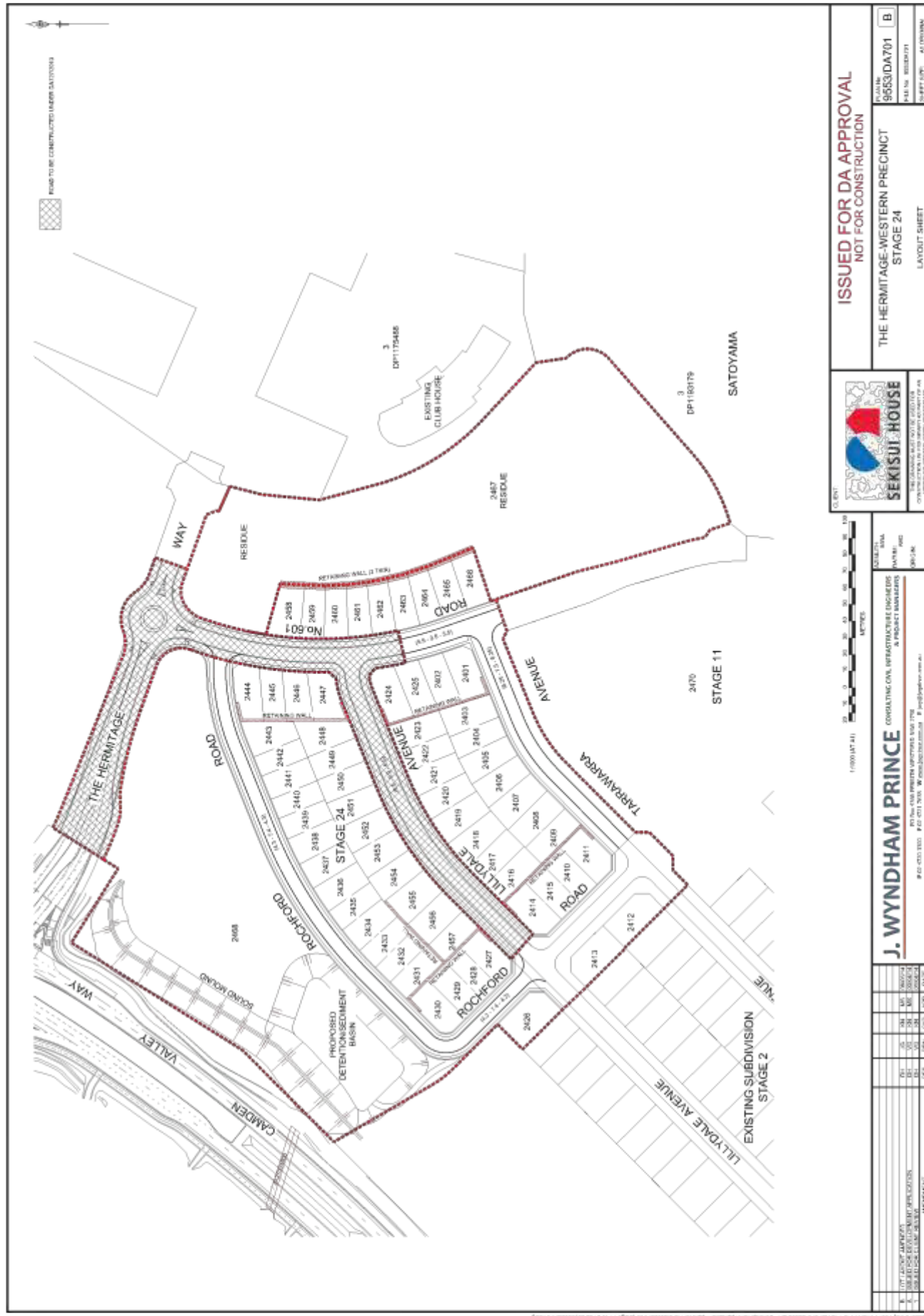


Attachment 1

ORD02

Attachment 2

ORD02



<p>ISSUED FOR DA APPROVAL NOT FOR CONSTRUCTION</p>	
<p>THE HERMITAGE-WESTERN PRECINCT STAGE 24 LAYOUT SHEET</p>	
<p>PLAN NO. 9553(DA)701 DATE: 18/08/2014 BY: [Signature]</p>	
<p>SEKISUI HOUSE 1000 WILSON ROAD, WILSON PROMENADE, WILSON PROMENADE, WILSON PROMENADE SYDNEY NSW 2030</p>	
<p>J. WYNNDHAM PRINCE CONSULTING CIVIL/INFRASTRUCTURE ENGINEERS 24 FORD STREET, WILSON PROMENADE, WILSON PROMENADE, WILSON PROMENADE SYDNEY NSW 2030</p>	
<p>DATE: 18/08/2014</p>	<p>SCALE: 1:1000</p>

DATE

Regulation Review – Local Government
Independent Pricing and Regulatory Tribunal
PO Box Q290
QVB Post Office NSW 1230

By email: lil_cullen@ipart.nsw.gov.au

Dear Sir/Madam,

**RE: SUBMISSION – LOCAL GOVERNMENT COMPLIANCE AND ENFORCEMENT
REGULATION REVIEW DRAFT REPORT**

In reference to the exhibition of the draft report - *Local government compliance and enforcement regulation review*, please find attached Council's submission.

Council is generally supportive of the review and encouraged by the improvements that could be made if the recommendations are implemented.

Where Council disagrees or requests further consideration or clarification, specific comment is provided in the attachment. Where Council agrees with a recommendation, no comment is provided.

Some sections of the report refer to the planning whitepaper and the improvements contained within it. Council was generally supportive of the whitepaper and previously provided a submission.

Council requests this submission be considered by IPART when finalising the report.

Should you require any clarification or additional information with any aspect of this submission please contact Ms Nicole Magurren, Director Development & Health during business hours on 4654 7777.

Yours sincerely,

Ms Nicole Magurren
DIRECTOR DEVELOPMENT & HEALTH

Attachment 1 – Comments on Recommendations

A new partnership between State Government and local government

1 Subject to cost benefit analysis, the NSW Department of Planning and Infrastructure (DoPI) should engage in a Partnership Model with local government, similar to the Food Regulation Partnership, to enhance the capacity and capability of councils to undertake their regulatory functions. This should include:

- enshrining the partnership model in legislation
- clear delineation of regulatory roles and responsibilities
- a risk-based approach to regulation supported by a compliance and enforcement policy
- use and publication of reported data to assess and assist council performance
- a dedicated consultation forum for strategic consultation with councils
- ability for councils to recover their efficient regulatory costs
- a system of periodic review and assessment of the partnership agreement
- a dedicated local government unit to provide:
 - a council hotline to provide support and assistance
 - a password-protected local government online portal
 - guidelines, advice and protocols
 - standardised compliance tools (eg, forms and templates)
 - coordinated meetings, workshops and training with councils and other stakeholders.

Comment: Agree.

Implementation of the Food Regulation Partnership (FRP) has resulted in a better understanding of the roles and responsibilities of the state government and local government and has increased the capability and capacity of Council environmental health staff. However, partnerships, networks or forums must be accompanied by an ongoing commitment to adequately fund and resource the initiatives.

There is also a need to ensure that any partnership continues to operate as a partnership. The success of the FRP was extensive consultation with local government, along with a high level of collaboration. The views and opinions that were expressed by Councils were taken into account during the formulation of the FRP. The Food Authority got “buy-in” from local government.

As there is with the FRP, any partnership arrangement should allow Councils to determine what sort of regulatory role they will undertake. Under the FRP each Council nominated and signed up as either a Category A, B or C Council. The responsibilities of each category vary so that where Councils have more capacity and/or experience they can elect to provide a higher level of regulatory oversight (Category C) or if they do not have the required capacity or experience they sign up for a basic emergency response role (Category A).

2 Subject to cost benefit analysis, the NSW Environment Protection Authority should engage in a Partnership Model with local government, similar to the Food Regulation Partnership (as per Draft Recommendation 1).

Comment: Agree.

We also refer to our comments made regarding Recommendation 1.

Improving the regulatory framework at the State level

3 The Department of Premier and Cabinet should revise the *NSW Guide to Better Regulation* (November 2009) to include requirements for developing regulations involving regulatory or other responsibilities for local government, in particular:

- consideration of whether a regulatory proposal involves responsibilities for local government
- clear identification and delineation of State and local government responsibilities
- consideration of the costs and benefits of regulatory options on local government
- assessment of the capacity and capability of local government to administer and implement the proposed responsibilities, including consideration of adequate cost recovery mechanisms for local government
- consultation with local government to inform development of the regulatory proposal
- if establishing a jointly provided service or function, agreement with local government as to the objectives, design, standards and shared funding arrangements, and
- development of an implementation and compliance plan.

Comment: Agree.

The use of compliance plans should be mandatory so that it is clear what a state government agency must do when new legislation is proposed.

- 6** The Department of Premier and Cabinet should:
- Develop a Regulators' Compliance Code for local government, similar to the one currently in operation in the UK, to guide local government in undertaking enforcement activities. This should be undertaken in consultation with the NSW Ombudsman and State and local government regulators.
 - Include local government regulators in the former Better Regulation Office's Regulators' Group or network.
 - Develop simplified cost benefit analysis guidance material for local government to undertake proportional assessments of the costs and benefits of regulatory actions or policies, including consideration of alternatives.
 - Develop simplified guidance for the development of local government policies and statutory instruments.

Comment: Agree.

However in relation to the proposed Compliance Code, further detail is required to consider the benefits of such a Code.

9 The NSW Government should publish and distribute guidance material for:

- Councils in setting their regulatory fees and charges (to apply to fees and charges, where councils have discretion), and
- State agencies in setting councils' regulatory fees and charges.

This guidance material should include principles and methodologies for estimating efficient costs, setting fees and charges, and reviewing and updating these fees and charges over time.

Comment: Agree

However, fees should not be pegged, or if they are, a reasonable increase needs to be prescribed in any Regulation drafted to accompany the necessary changes.

In addition, consideration is required for services where Councils compete with private industry. There should be flexibility built into these fees.

Enhancing regulatory collaboration amongst councils

10 The *Local Government Act 1993* (NSW) should be amended to remove any impediments to, or facilitate the easier use of, shared regulatory services. In particular, consideration should be given to:

- removing or amending section 379 – which currently restricts the delegation of a council's regulatory functions under Chapter 7 of the *Local Government Act*, including to shared services bodies
- amending section 377, which prohibits any delegation by a council of the acceptance of tenders.

If Regional Organisations of Councils (ROCs) continue as the preferred form of council collaboration, consideration should also be given to whether the Act should specify how and in what form ROCs should be established (including whether management frameworks should be prescribed).

Comment: Agree

However, the implementation of partnerships as part of Recommendations 1 and 2 should lead to better collaboration between Councils and could reduce the need for other forms of shared regulatory services.

11 The NSW Government should encourage and develop incentives to form collaborative arrangements in relation to regulatory functions. This should include training, guidance and promotion of leading practice collaborative arrangements, and the establishment of a small repayable fund to assist in setting up shared regulatory services. Councils could obtain a loan with a concessional rate of interest that is repayable within a specified period. This should tend to be cost neutral over time, as cost savings to councils would be achieved from the collaborative arrangements.

Comment: Agree.

Also see the comments made at Recommendation 10.

Improving the regulatory framework at the local level

- 12 The *Local Government Act 1993* (NSW) should be amended to:
- remove duplication between approvals under the *Local Government Act 1993* (NSW) and other Acts, including the *Environmental Planning & Assessment Act 1979* (NSW) and *Roads Act 1993* (NSW) in terms of: footpath restaurants; mobile vendors; installation of amusement devices; installation and operation of manufactured homes; stormwater drainage approvals
 - remove low-risk activities from the list of activities currently requiring approval under section 68 of the *Local Government Act*, including: busking; set up, operation or use of a loudspeaker or sound amplifying device; and deliver a public address or hold a religious service or public meeting
 - allow for longer duration and automatic renewal of approvals
 - provide more standard exemptions or minimum requirements from section 68 approvals, where possible, initially in the areas of: footpath restaurants; A-frames or sandwich boards; skip bins; domestic oil or solid fuel heaters
 - abolish Local Approvals Policies (LAPs) or, alternatively: reduce the consultation period to 28 days in line with Development Control Plans; remove sunset clauses; require Ministerial approval only for amendments of substance; centralise LAPs in alphabetical order in one location on DLG's website; consolidate activities within 1 LAP per council; and DLG to provide a model LAP in consultation with councils
 - enable councils to recognise section 68 approvals issued by another council (ie, mutual recognition of section 68 approvals), for example with mobile vendors and skip bins.

Comment: Agree

However, in relation to the use of standard exemptions and minimum standards as proposed for s.68 approval, Council would encourage the use of higher standards in some instances, with the need for an application under s68 if a person wants to undertake something to a lower standard.

For example, the installation of a domestic solid fuel heater (ie wood heater) with an emissions rate of 1g/kg and an efficiency standard of 65% could be undertaken under an exemption. However if a homeowner wants to install a more polluting wood heater with an emissions rate of 4g/kg (the minimum standard under the *Protection of the Environment Operations Act 1997*), they would need to make application to Council under s68 and pay the required fees.

Secondly, in relation to mutual recognition of s68 Approvals, further information is required. For example, clarification is required on how a Council could enforce compliance with conditions or recover costs from a mobile food vendor that has obtained a s.68 approval from another Council.

In addition, when mobile food vendors are at home, there is often no food handling being undertaken. Inspections undertaken under these circumstances will only assess the standard of cleanliness and vehicle construction. The risks associated

with the sale of food often relate to food handling operations, not the standard of construction or cleanliness. It is noted that councils within the South West Sydney Region Food Group (one of the regional FRP forums) have voted to not accept the home jurisdiction rule.

Improving regulatory outcomes

15 As part of the State's Quality Regulatory Services initiative, the NSW Government should require all State agencies that devolve regulatory responsibilities to local government to:

- consider councils' responsibilities in developing their risk-based approach to compliance and enforcement
- consider councils' responsibilities in defining the regulatory outcomes and setting monitoring mechanisms to measure the outcomes, and
- identify what information needs to be obtained from councils in relation to their regulatory activities to measure regulatory outcomes and how this data will be used or published to assess and assist council performance.

These requirements should be developed in consultation with local government regulators and commence by the end of 2014.

Comment: Agree

However, there needs to be consideration of the type of data that will be collected and the frequency at which it will be collected. The burden associated with the collection and reporting of this data should not be unreasonable.

In addition, funding should be provided to councils for upgrades if required to existing software to facilitate the capture and reporting of required data.

Planning

16 DoPI, in consultation with key stakeholders and on consideration of existing approaches, should:

- identify which development consent conditions may be applied across council areas, including regional groupings of councils, and which conditions will vary across council areas
- then develop (where appropriate) a standardised and consolidated set of development consent conditions for councils to utilise for different forms of development.

Comment Agree:

Council supports the development of a standardised and consolidated set of conditions provided there is a degree of flexibility to allow for local conditions, as one size doesn't always fit all.

17 The NSW Government (eg, DoPI) should enable building owners to submit Annual Fire Safety Statements online to councils and the Commissioner of the Fire and Rescue Service.

Comment: Agree

Council agrees with the development of an online system provided Council is given the ability to collect fees so that Council can check the submitted Fire Safety Statements. In Council's experience, fire safety certificates are often lodged without all the required information and therefore a checking system is required. The costs associated with this checking process should be allowed for in the system.

Building and Construction

18 The NSW Government should:

- **subject to a cost benefit analysis, create a stronger, single State regulator, the Building Authority, containing, at a minimum, the roles of the Building Professionals Board and the building trades regulation aspects of NSW Fair Trading, and**
- **create a more robust, coordinated framework for interacting with councils through instituting a 'Partnership Model' (as discussed in Chapter 2).**

Comment: Agree

Council supports the initiative of developing a partnership model for interacting with Councils and the idea of creating a stronger single State regulator that can be more effective in regulating building certifiers.

We also refer to our comments made in relation to Recommendation 1.

20 Councils seeking to impose conditions of consent above that of the Building Code of Australia (BCA) (now part of the National Construction Code (NCC)) must conduct a cost benefit analysis (CBA) justifying the benefits of these additional requirements and seek approval from an independent body, such as IPART, under a 'gateway' model.

Comment: Agree

However, this recommendation should apply only to those works associated with buildings and should not apply to subdivision or public infrastructure works.

21 Certifiers should be required to inform council of builders' breaches if they are not addressed to the certifier's satisfaction by the builder within a fixed time period. Where councils have been notified, they should be required to respond to the certifier in writing within a set period of time. If council does not respond within the specified period, then the certifier can issue an occupation certificate.

Comment: Agree

However, the information supplied to Council by certifiers should be clear, timely and in a consistent format.

The system could have standard templates and be lodged through a central register so that Councils are aware and understand the nature of the issue. ie. if the information is not complete when lodged then the 'clock' should not start. It would be the responsibility of the certifier to ensure the information is complete and clear and not that of Council to check the information at lodgement. Example templates and a clear process should be developed so that certifiers and Council are aware of the required information and format.

Furthermore, an exception should be considered where a matter relates to a potential fire or life safety issue. An occupation certificate should not be issued in any circumstances where fire or life safety concerns exist.

Public health, safety and the environment

23 All councils should adopt the NSW Food Authority's guidelines on Mobile Food Vendors. This will allow for food safety inspections to be conducted in a mobile food vendor's 'home jurisdiction', which will be recognised by other councils.

Comment: Disagree

Refer to our comments at Recommendation 12 regarding mutual recognition and the home jurisdiction rule.

Companion animal management

32 DLG should allow for an optional 1-step registration process, whereby:

- the owner could microchip and register their pet at the same time
- the person completing the microchipping would act as a registration agent for councils either by providing access to online facilities (per recommendation below) or passing the registration onto councils (on an opt-in, fee-for-service basis).

Comment: Agree

However, allowing other organisations to act as registration agents could affect the veracity of the information put into the Companion Animals Register. Council currently verifies all information received and validates the required paperwork to ensure that the legislative requirements are adhered to.

33 DLG should allow for online companion animals registration (including provision to change details of registration online).

Comment: Agree

However the management of how pet owner's identification is authenticated to ensure that persons are unable to change ownership/details without it being verified is needed.

Other areas

38 DLG should collect data on the time taken for Section 68 approvals to be processed by councils. This data should be collated and reported as an indicator of performance in this area to reduce delays.

Comment: Agree

Refer to comments for Recommendation 15 regarding data collection and reporting.

Other comments from Council:**Appendix D – Best Practice Approaches to On-site Sewage Management**

Council provides comment in relation to the example of best practice from Port Macquarie-Hastings Council in which the Approval to Install (ATI) and Approval to Operate (ATO) for on-site Sewage Management (OSSM) facilities are issued concurrently.

Currently, the ATI sets out what system will be installed and what standards will be complied with. Inspections of the installation will be carried out to ensure that the OSSM is installed in accordance with the approval. When the system is installed satisfactorily, Council issues the ATO.

In the absence of this approach, or a similar one, Council has concerns that the system that is installed is the same as the one that was approved. The improper installation of OSSMs can have health and environmental impacts.

ORD04

Attachment 1

Attachment 1 – Timeline of Key Events

Date of Council Meeting or event	Resolution of Council
24 March 2009	Resolved to prepare a draft LES and LEP and report this back to Council to seek a resolution as to Councils support to proceed.
22 September 2009	Resolved that Council reaffirmed its previous decision, note community concerns, and resolve to report back to council the outcomes of the Draft LES and LEP prior to public exhibition.
23 November 2010	<p>Following the second report in September 2009 it was determined that in light of residents concerns regarding drainage and to reduce undue cost too the proponent that the process should be undertaken in two (2) stages.</p> <p>Stage 1 consisted of the drainage assessment if outstanding concerns were addressed then the applicant should proceed to full Draft LES and LEP (Stage 2).</p> <p>The report of November 23 considered the Drainage Study undertaken by Storm Consulting, which identified that flows from the development could be managed by on site detention within the development which would be allocated to individual lots.</p> <p>Council subsequently resolved not to proceed with the rezoning of the subject site due to community objection and ongoing drainage concerns.</p>
27 March 2012	<p>Following the resolution not to proceed (made at the meeting of 23 November 2010) the proponent resubmitted the proposal to Council.</p> <p>The report to the 27 March 2012 meeting reiterated the planning proposal, and identified what preliminary studies had been undertaken.</p> <p>Council resolved that I reaffirm its decision of November 23, 2010.</p>
23 July, 2013	Proponent makes application to the Department of Planning and Infrastructure for a Pre Gateway Review of the Planning Proposal
13 August 2013	<p>Report to Council notifying of the pre gateway application by the proponent to the Department of Planning and Infrastructure (DPI).</p> <p>Council resolved to reaffirm its previous decision and to forward information to the DPI.</p>
4 th April, 2014	Pre Gateway review considered by the Joint Regional Planning Panel (JRPP).

	<p>"The Panel, by a majority of 3 to 2 refused to recommend the planning proposal for Macquarie Grove Road at the present time, because the majority determined that certain issues remained unresolved. Additional material was requested from the applicants, it was noted that this will need to be reviewed by the Council's assessment officers, namely":</p> <ul style="list-style-type: none">• Landscaping Proposal;• Drainage Proposal; and• Traffic Analysis.
24 June	Council Workshop to discuss outstanding concerns with regards to the planning proposal.

ORD04

RECORD OF DECISION
SYDNEY WEST JOINT REGIONAL PLANNING PANEL
3 April 2014

Members:

Mary-Lynne Taylor	Chair
Bruce McDonald	Panel Member
Paul Mitchell	Panel Member
Mayor Lara Symkowiak	Panel Member
Councillor Peter Sidgreaves	Panel Member

Addressed the panel on behalf of the proponent:

Michael Brown – Director, Michael Brown Planning Strategies
Michael Gordon – Director, John M Daly & Associates
Dean Boone – Director, Distinctive Landscape

Apology: None

The Panel, as the Relevant Planning Authority as appointed by the Minister to consider the following planning proposal and this is a record of the process and decision.

Business Item

ITEM 1 - Macquarie Grove Road, Kirkham – the proposal seeks to rezone the subject land from RU1 Primary Production (40ha minimum lot size) to R5 Large Lot Residential (4,000sq.m. minimum lot size) in order to subdivide the land into 15 lots. It is proposed to amend the Lot Size Map to enable a minimum 4,000sq.m. lot size on the subject land. The site area is 8ha and is currently vacant other than one detached dwelling.

On 3 April 2014, the panel members met to be briefed on the planning proposal and to review material relevant to the proposal.

The Panel, by a majority of 3 to 2 (Taylor, McDonald, Mitchell – for) (Symkowiak, Sidgreaves – against) refused to recommend the planning proposal for Macquarie Grove Road at the present time, because the majority determined that certain issues remained unresolved. Additional material was requested from the applicants, it was noted that this will need to be reviewed by the Council's assessment officers, namely:

- An access proposal and accompanying traffic analysis by a suitably qualified engineer that demonstrates an acceptable level of traffic safety and traffic impact on Macquarie Grove Road and Kirkham Lane.
- A drainage proposal that restricts flows from the site to current levels or less. This proposal is to be based on consolidated on-site detention facilities not facilities individually located on each of the proposed allotments. This is to be prepared by a suitably qualified engineer.

Attachment 2

- A landscape proposal addressing the section of the site that is adjacent to Macquarie Grove Road. This should present the site to motorists in a manner that is consistent with the rural character of the immediate locality and the more general approach to Camden Township via this route. This proposal should also address the retention of the landscape elements over time.

The majority of the Panel were prepared to allow this additional material to be provided as the majority noted:

1. The site was surrounded on three sides by land similarly zoned;
2. The Panel could find no legal basis in Council's planning instruments or DCPs that limited the height of development to RL90;
3. There had not been an agricultural use of the site for many years (previously used as a golf course), and following the recent subdivision of adjoining land the site is not now viable for agricultural usage;
4. With the provision of the additional information, the site may be found to be suitable for the proposed use;
5. Particularly if a suitable landscaping proposal can be prepared that will present a rural background to the surrounding streets;
6. The Panel did not find that preserving the existing view of the ridgeline from Camden Valley Way was a compelling argument for refusing this type of development because suitable landscaping may provide the appropriate outcome with the new houses on the proposed subdivided lots.

Councillor Lara Symkowiak and Councillor Peter Sidgreaves do not support the proposal to rezone the subject land from RU1 Primary Production (40ha minimum lot size) to R5 Large Lot Residential (4,000sq.m. minimum lot size) in order to subdivide the land into 15 lots for the following reasons: 1-6. For fuller explanation of the reasons see **Appendix A** for Councillor Symkowiak and **Appendix B** for Councillor Sidgreaves.

Councillors Symkowiak and Sidgreaves do not support the proposal for the following reasons –

- 1) This proposal goes against almost every key direction outlined by the community in Camden 2040.
- 2) This proposal has been knocked back three times by two different elected councils.
- 3) The residents were assured by Council that the land behind them would never be built on because of RL90 and they had the current zoning protection of RU1 Primary Production (40ha minimum lot size).
- 4) Camden already has a significant supply of large Lot Residential. Currently there are over 1,200 properties zoned R5 Large Lot Residential and there are over 750 residential properties in excess of 4,000sqm.
- 5) Once the land is re-zoned, there is no certainty around what actual plans and development applications will be lodged as the Rural Housing Code would apply with single houses, two-storey houses and dual occupancies being permissible.
- 6) This proposal is inconsistent with NSW Government strategic documents.

Appendix A –

1. <i>Camden 2040</i> – the community's strategic plan for our LGA	This proposal goes against almost every key direction outlined by our community in this document. Our community supports growth in appropriate areas but continually state their wish to protect Camden Town's "rural hinterland" and the need to "retain natural heritage" and "rural setting".
2. Previous decisions of Camden Council	This proposal has been knocked back three times by two different elected councils.
3. RL90	Residents of Kirkham Meadows had to go to significant cost to build under RL90 as the community placed high importance on the visual amenity along the ridgeline of Macquarie Grove Road. These residents were assured by Council that the land behind them would never be built on because of RL90 and they had the current zoning protection of RU1 Primary Production (40ha minimum lot size).
4. Supply of R5 Large Lot Residential in Camden	Camden already has a significant supply of Large Lot Residential. Currently there are over 1,200 properties zoned R5 Large Lot Residential and there are over 750 residential properties in excess of 4,000sqm. Additionally, Council is continuing to approve new lots in excess of 4,000sqm across our LGA in appropriate locations.
5. Re-zoning would provide uncertainty for the community	Once the land is re-zoned, there is no certainty around what actual plans and development applications will be lodged. The Rural Housing Code would apply with single houses, two-storey houses and dual occupancies being permissible. Under the Rural Housing Code, a complying development certificate could be issued by a private certifier and Council would never even see the development applications to impose important conditions of consent (such as access, landscaping, one storey etc).
6. Inconsistent with NSW Government strategic documents	<i>NSW 2021</i> outlines goals such as returning planning powers to local communities and restoring trust and accountability. The aims of the new planning legislation review also echo these goals. The draft <i>Metropolitan Strategy for Sydney to 2031</i> describes the need to improve community participation and give people more certainty about changes to their area.

1. CAMDEN 2040

This is Camden Council's community strategic plan. Almost 1,300 residents (out of a total 60,000 residents) were consulted about their vision for Camden. This document was adopted on 14 May 2013. The next few pages show the community's vision and expectations for their area – protection of our rural backdrop, rural hinterland, retaining natural heritage, significance of trees and open space, ensuring Camden retains its country town feel and all levels of government listening to their views and letting them have a real say in the decisions that affect their area.

Excerpt from page 20:

Vision for Camden's Future

In year 2040, the Camden Local Government Area is a dynamic, modern, urban place which is defined by its unique history and rural backdrop, and has realised the many opportunities presented by urban development and population growth.

This has been achieved through effectively managing urban and population growth to:

1. protect Camden Town, the floodplain and associated rural hinterland, and promote and celebrate the area's unique country history, heritage and community
2. maximise the many opportunities presented by large scale modern urban development in terms of improved access to high quality services, facilities and infrastructure
3. support and maintain opportunities for rural living through urban growth and carefully manage the transition to an increasingly urban environment

Camden 2040 Key Direction 1 – Actively Managing Camden’s Growth

Excerpt from page 23:

Growing the Camden Area – Key Opportunities and Challenges

The growth of the Camden area will bring a range of opportunities that would not otherwise be available to this area in terms of access to infrastructure, services, employment and economic opportunities, and a range of facilities.

The most significant challenge related to Camden's future growth is the sheer rate of this growth. If the State Government's Metropolitan Strategy is implemented according to its timeframes, the population of the Camden area will increase five-fold by 2040, at an annual growth rate of 5%.

Key opportunities and challenges that this growth, and rate of growth, will present include:

- Retaining within Camden the valued heritage and characteristics – its history, open spaces and scenic vistas, natural setting, country town feel and lifestyle.
- Improving the environment, including maximising opportunities for environmental restoration through the development process, and managing impacts from loss of native vegetation and rural land, retaining natural heritage, minimising the effects of climate change, and ensuring sustainable access to and use of natural resources.

Excerpt from page 24:

What Our Community Says

The aspects or features of Camden that are most valued by the community are its country town feel, rural setting and lifestyle, its history, trees and open space. The community's vision for the future, within the context of Camden's growth, is that these important aspects of the place and life of this area are still here in 2040.

Understanding that Camden's huge population growth is inevitable under the State Government's Metropolitan Strategy, the community of Camden is concerned to see this growth managed well and essential infrastructure delivered as part of the growth process, particularly transport infrastructure.

Excerpt from page 26:

Strategies

The outcomes for effectively managing the growth of Camden will be achieved through a focus on:

1.1 Growth Objective: Camden has the best of both worlds

Strategies	Responsibility	State Plan Goals
1.1.1 A commitment to strong leadership and partnerships in the urban planning and development process that carefully balances environmental, social and economic outcomes.	CC, SG, OI	29, 20, 22
1.1.2 Conserving and enhancing the heritage, character and lifestyle of the area where possible, with a particular focus on Camden town, associated flood plain and rural hinterland for the enjoyment of existing and future populations.	CC, SG, OI, Ch, BI	22, 27

Excerpt from page 29:

ORD04

Attachment 2

<i>Council Local Services – Actively Managing Camden’s Growth</i>	
Local Services	Partners⁴
LS1.1 Development Control The building process is managed well, Camden’s valued characteristics are retained, and the outcomes intended through the urban planning process are achieved.	SG, DI
LS1.2 Heritage Protection The built, environmental, cultural and Indigenous heritage of the Camden Local Government Area are protected, enhanced and enjoyed.	SG, DI, CG
LS1.3 Urban and Rural Planning Camden’s valued characteristics are balanced and retained with new growth, and good outcomes are secured for the people and place of the Camden Local Government Area.	SG, DI

Camden 2040 Key Direction 2 – Healthy Urban & Natural Environments

Excerpt from page 32:

What Our Community Says

Camden’s rural setting, and trees, parks and natural open spaces hold significant value to current residents of the area, as does its country town feel.

The community is concerned to see that the growth and urban development of the Camden area is managed well, and desire to see Camden retain its rural setting and country town feel.

Trees, parks and natural open space are important to the community now and are a key part of the vision for the area in the future.

Camden 2040 Key Direction 3 – A Prosperous Economy

Excerpt from page 42:

What Our Community Says

Camden’s country town feel and lifestyle, and its rural setting, are greatly valued by both residents and visitors to the area. This is an important part of the place, and therefore the economy, of Camden. Keeping these characteristics and lifestyle are a key part of the community’s vision for the future.

Excerpt from page 45: Strategy 3.1.7

3.1.7	Developing and increasing tourism and visitors to the Camden area through regional partnerships and promotion, strengthening the capacity of the local tourism industry, supporting the ongoing improvement of local items of interest, and ensuring that Camden retains its country town feel and heritage as its central tourism driver.	CC, M
--------------	--	-------

Camden 2040 Key Direction 6 – Strong Local Leadership

Excerpt from page 68:

What is Strong Local Leadership and Why is it Important?

Strong local leadership will be the key vehicle for achieving the outcomes expressed by the Camden community in this plan. Strong local leadership means that the Camden area has strong organisations and individuals representing its interests, who are responsive to this community, and who are working together to achieve the community’s vision for the future.

Strong local leadership will be needed from all levels of government, as well as the private sector, non-government organisations, business and industry groups, and community organisations. Developing leaders within our community will place the Camden area in good stead for the years to come.

Excerpt from page 68:

Growing the Camden Area - Key Opportunities and Challenges

Strong local leadership and effective partnerships and cooperation will be the most important factor in the effective management of the growth of the Camden area over the coming decades. Some of the key opportunities and challenges in terms of leadership and partnerships include:

- The ability to establish early in the planning process the kind of characteristics, outcomes and opportunities the community want to see delivered through growth, which is not usually available through the longer term natural evolution and change of a local area
- Achieving the balanced outcomes that the community have expressed, including maximising the opportunities from growth and retaining the valued aspects of Camden's rural and country heritage and landscape.

Excerpt from page 69:

What Our Community Says

The effective management of the population growth planned for the Camden area is a priority for the local community, particularly to ensure that this growth occurs in a balanced way. This means that valued characteristics of the Camden area – its country town feel and lifestyle and aspects of its rural setting – are retained, and that the opportunities from growth are secured and maximised.

Excerpt from page 72:

6.2.6	A commitment to effective partnerships and open communication between Government, non-government agencies, local business and industry, community groups and organisations, and local residents to deliver coordinated and effective outcomes for the Camden area.	FG, SG, CC, Rt, NGO, CG, Ch
-------	--	-----------------------------

2. Previous decisions of Camden Council

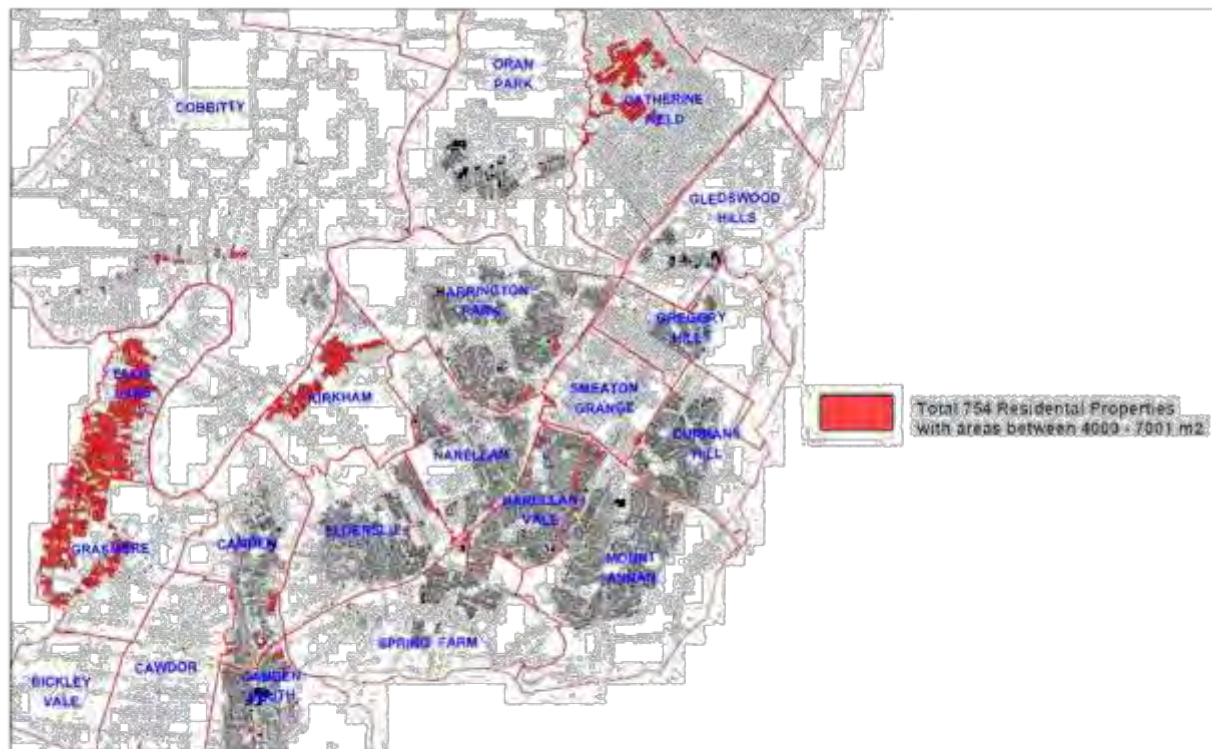
This planning proposal has already been knocked back three times across two different elected councils. Councillors are elected to represent the views of their community. If the JRPP were to approve this planning proposal, it would be completely inconsistent with the long held views of the local community and those elected to represent them. Numerous submissions and petitions have been received from the community over the years opposing this proposal.

Camden 2040 clearly expresses the desires of Camden residents who want growth in the appropriate areas and rural hinterland around Camden protected. The corner of Macquarie Grove Road and Kirkham Lane is a very significant location to the local community with its "gateway location" and prominent ridgeline views.

3. RL90

Residents of Kirkham Meadows were made to go to significant cost to build below RL90 due to the significance of the location and the important ridgeline along Macquarie Grove Road. Residents of Kirkham Meadows had to cut into the hillside to conceal their houses and ensure that they did not exceed a certain height and get in the way of the view of the ridgeline or been seen from Macquarie Grove Road or Kirkham Lane.

Residents of Kirkham Meadows were assured by Camden Council that they would never be built above because of the significance of the scenic views and this land was above RL90. Additionally, Council could assure the residents that this land would never be built on because it was protected by its zoning of RU1 Primary Production and that it could not be subdivided. This zoning was Council's tool to protect the land from development as up until November 2012, Council had the final say on zonings.



Council's records indicate that there is a regular turnover of ownership on large lot residential land. In the last twelve month period there were over 100 transfers/sales on residential lots with a site area in excess of 4,000sqm.

Council is very supportive of providing diversity of housing choices, including new large lot residential blocks, but in the appropriate areas. Some recent examples of development application approvals for lots in excess of 4,000sqm within the Camden LGA are:

- 121 Raby Road, Leppington – Council resolved to support the planning proposal proceeding to Gateway on 10 September 2013. This involves rezoning RU2 land to R5 Large Lot Residential and will create 32 R5 residential lots at 4,000sqm minimums.
- 120 The Old Oaks Road and 3 Wirryna Place, Grasmere – 35 residential lots of minimum 4,000sqm was approved by Council on 26 March 2013. This land was already zoned R5 Large Lot Residential.
- 181 Camden Valley Way, Narellan – 5 residential lots minimum 4,00sqm was approved in 2012. This land was already zoned R5 Large Lot Residential.
- 17 Yewens Circuit, Grasmere – Council is currently assessing this development application for 4 residential large lots. This land is already zoned R5 Large Lot Residential.

It is important to note that Council is providing executive style rural living options within our LGA, as seen by the figures and examples above. The community and Council support residential development in planned and appropriate locations. Camden Council is already meeting required population targets, density yields and diversity of housing choices.

5. Re-zoning would provide uncertainty for the community

If the land were to be re-zoned, there would be a large degree of uncertainty to the community. Under R5 Large Lot Residential, dual occupancies would be permissible. The 15 proposed dwellings could turn into 30 dwellings if all blocks were developed with a dual occupancy.

Under the *State Environmental Planning Policy (Exempt & Complying Codes) 2008*, the Rural Housing Code (Part 3A of the Exempt and Complying SEPP) applies to land zoned R5. Under this Rural Housing Code, a new single or two storey dwelling could be constructed on each of the new lots as complying development. The Rural Housing Code contains development standards that if met, will allow a complying development certificate to be issued by Council or a private certifier for various types of development including single or two storey dwellings.

It is important to note that if the land is re-zoned, Council will have no control to enforce the designs that are currently being put forward by the proponent with this planning proposal (i.e. certain lots only being single storey, detailed and appropriate landscaping etc). Council may never even get to see the development applications that get lodged if this land gets re-zoned. Ultimately, there is no mechanism to stop the proponent from building 15 two storey homes all with dual occupancy attached and without the necessary landscaping etc.

The community, and Council, would have no idea about what development will occur on the land until development applications are actually lodged AFTER the re-zoning. The proponent is under no obligation to lodge development applications in accordance with the plans they are showing as part of this planning proposal.

Council's tool to protect this land from being sub-divided has been the actual zoning itself. As Council had the final say on re-zonings, up until November 2012, this was sufficient to protect this land from the type of development being proposed now.

6. NSW Government strategic documents

NSW 2021

This is the NSW Government's current adopted strategic document and business plan.

An excerpt at the beginning of this document from the Premier (attached below) states:

NSW 2021 will drive our agenda for change in NSW to:

- *Strengthen our local environments, devolve decision making and return planning powers to the community*
- *Restore accountability and transparency to government, and give the community a say in decisions affecting their lives.*

<p>The NSW Government is determined to deliver the change the people of NSW have called for to rebuild our State and make NSW number one.</p> <p>Work is well underway to rebuild the economy, return quality services, renovate infrastructure, strengthen our local environment and communities, and restore accountability to government.</p> <p>Responsible economic management requires sound strategic planning coupled with rigorous fiscal discipline.</p> <p>NSW 2021 is our 10-year plan to guide our policy and budget decision making and, in conjunction with the</p>	<p>NSW 2021 will drive our agenda for change in NSW to:</p> <ul style="list-style-type: none"> • Restore economic growth • Return quality health, transport, education, police, justice and community services, putting customer service at the heart of service design • Build infrastructure that drives our economy and improves people's lives • Strengthen our local environments, devolve decision making and return planning powers to the community • Restore accountability and transparency to government, and give the community a say in decisions affecting their lives.
--	--

An excerpt from the Introduction of this document (attached below) states two of the five strategies of NSW 2021 are to:

Strengthen our Local Environment and Communities

- *Improve people's lives by protecting natural environments and building a strong sense of community.*

Restore Accountability to Government

- *Talk honestly with the community, return planning powers to the community and give people a say on decisions that affect them.*

INTRODUCTION

NSW 2021 is a plan to make NSW number one. It is a 10 year plan to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability, and strengthen our local environment and communities. It replaces the State Plan as the NSW Government's strategic business plan, setting priorities for action and guiding resource allocation.

NSW 2021 is a plan for change with ambitious goals and challenging targets. These targets will be hard to meet and there will be many factors outside the control of the NSW Government. However, we will work to bring together government, community and business to respond to the challenges and opportunities we face and achieve the goals we have set.

FIVE STRATEGIES
NSW 2021 is based around five strategies:

- REBUILD THE ECONOMY**
—restore economic growth and establish NSW as the 'first place in Australia to do business'
- RETURN QUALITY SERVICES**
—provide the best transport, health, education, policing, justice and family services, with a focus on the customer
- RENOVATE INFRASTRUCTURE**
—build the infrastructure that makes a difference to both our economy and people's lives
- STRENGTHEN OUR LOCAL ENVIRONMENT AND COMMUNITIES**
—improve people's lives by protecting natural environments and building a strong sense of community
- RESTORE ACCOUNTABILITY TO GOVERNMENT**
—talk honestly with the community, return planning powers to the community and give people a say on decisions that affect them.

ORD04

If the JRPP were to approve this planning proposal, it would be completely inconsistent with two of the five NSW Government's 2021 strategies. The community and the local Council have said no to this proposal three times already. If the JRPP approved this, how is this in line with the NSW Government's vision of returning planning powers to the community and giving people a say on decisions that affect them? It is also inconsistent with protecting the natural environment.

In NSW 2021, the key strategy *Strengthen our Local Environment and Communities* is described in more detail on page 42 (excerpt attached below).

Individuals, families, businesses and communities know best what works for them – wherever they are. The NSW Government will trust and encourage this local energy, innovation and ownership and work to strengthen community relationships.

We will give local communities more control on issues such as tackling graffiti, planning issues and the quality of the built and natural environment, conservation, safety and emergency preparation, volunteering and recreational and cultural activities.

We will return as much decision making as possible to local communities and to those affected by the decisions. In addition, new opportunities for local decision making by councils, community, business organisations, individuals and neighbourhood groups will be pursued across all government agencies. We want to encourage expressions of interest from people on functions they would like to see decentralised, devolved and localised – along with management of resources and related accountability.

In this excerpt, the NSW Government acknowledges local communities are best placed to make decisions that affect them. The words used are "trust", "strengthen community relationships", "we will give local communities more control", "return as much decision making as possible to local communities and to those affected by the decisions", "decentralised" and "localised". So many reasons have been provided by the local community as to why this proposal should not go ahead. How can the JRPP vote in favour of this proposal when it directly flies in the face of one of the NSW Government's key strategies?

I have been elected to represent the views of my local community and I have done so by voting against this planning proposal three times now. Prior to November 2012, this would have been the end of the issue as Council and the local community had the last say on re-zonings up to this point.

In NSW 2021, the key strategy *Restore Accountability to Government* is described in more detail on page 59 (excerpt attached below).

Attachment 2

INVOLVE THE COMMUNITY IN DECISION MAKING ON GOVERNMENT POLICY, SERVICES AND PROJECTS	
<p>We will increase opportunities for people to participate in the way government makes decisions, including ways for people to have a real say and be involved in localised decision making, including through local government. By devolving decision making as close as possible to the people and places affected by decisions, people are able to take more control over their choices and opportunities and shape their own futures.</p>	
<p>KEY OBJECTIVE</p> <p>INCREASED PROPORTION OF PEOPLE WHO FEEL ABLE TO HAVE A SAY ON ISSUES THAT ARE IMPORTANT TO THEM</p>	<p>KEY STRATEGIES</p> <p>Governments that listen to their citizens are more responsive to their needs. Giving people a real say on issues that are important to them gives greater motivation to take responsibility and improves community outcomes. Actions to achieve this include:</p> <ul style="list-style-type: none"> • Reform the NSW planning system • Establish Service NSW to provide: <ul style="list-style-type: none"> – a single 24/7 NSW Government phone number – a customer-friendly government web portal – one-stop shops where multiple transactions can be carried out efficiently for customers • A central government website where communities can have their say on NSW Government plans to improve services and quality of life
<p>KEY OBJECTIVE</p> <p>INCREASE OPPORTUNITIES FOR PEOPLE TO PARTICIPATE IN LOCAL GOVERNMENT DECISION MAKING</p>	<p>Increasing local decision making and participation in decision making means people can influence decisions that affect them. The NSW Government will increase opportunities for people to participate in localised decision making and through local government encourage them to have a real say on local planning decisions. Actions to achieve this include:</p> <ul style="list-style-type: none"> • Invite local government representatives and individuals to help identify more ways to devolve decision making to local levels, and actively consider ideas • Work with local councils, shires and communities around NSW to identify opportunities to return local decision making, for example, the creation of district health boards, local partnerships to tackle graffiti, and a trial of a regional 'Sobering-Up Centre' to address alcohol-fueled violence.

The Premier's office and NSW Government is directly accountable for this key strategy. The people of Camden will not feel the NSW Government has listened to them if this planning proposal is approved. One of the key aims of the NSW Government, as stated above, is "devolving decision making as close as possible to the people and places affected by decisions". The community is clearly very opposed to this proposal and has been for many years. By approving this proposal, the JRPP would be ignoring the views of the local community who will have to live with the development.

The draft Metropolitan Strategy for Sydney to 2031

This is still in draft form and is a high level plan to guide the future growth of Sydney. An excerpt from the draft *Metropolitan Strategy for Sydney to 2031* is attached below. Page 22 states:

These plans will also be supported by the new planning system for NSW, which is currently being developed. The new system will help to make NSW the best place to live and do business in Australia by streamlining planning processes, improving community participation and giving people more certainty about changes to their area.

ORD04

Attachment 2

Delivery

This draft strategy has a far stronger focus on delivering the right jobs, homes, transport and infrastructure when they are needed.

Building a better Sydney will involve partnerships with residents, community groups, councils, businesses, industry and other government agencies.

These plans will also be supported by the new planning system for NSW, which is currently being developed.

The new system will help to make NSW the best place to live and do business in Australia by streamlining planning processes, improving community participation and giving people more certainty about changes to their area.

A range of new delivery tools have been included in the draft strategy. These include:

- **Subregional Delivery Plans.** These will be drawn up in partnership with communities and groups of councils. The Subregional Delivery Plans will decide where jobs and homes will go, and the improvements to infrastructure that need to be delivered at the same time.

The Camden community has a very strong view against this proposal and has already expressed this view through many submissions and petitions over a period of time. The residents of Kirkham Meadows would have zero certainty about the proposed development as all of it could come under the Rural Housing Code and be complying development. Council would have no opportunity to impose conditions of consent as the development applications for each of the lots may not even come to Council or the community for consultation. This proposal clearly goes against giving people more certainty about changes to their direct amenity.

Councillor Peter Sidgreaves considers that the planning proposal does not have strategic merit because it clearly goes against the vision of the Camden community's strategic plan - *Camden 2040* - which was last adopted by Council on Tuesday 14th May 2013. Fuller explanation of his reasons for proposal is found in Appendix B.

Appendix B

The vision statement in *Camden 2040* is:

In year 2040, the Camden Local Government Area is a dynamic, modern, urban place which is defined by its unique history and rural backdrop, and has realised the many opportunities presented by urban development and population growth.

This proposal defies Camden's vision for maintaining its rural backdrop. The Pre-gateway review Information Assessment and Recommendation Report declares that the proposal may be "inconsistent with the protection of rural hinterland" - part of Camden's vision.

While it could be argued that this proposal enables Camden to realise the many opportunities presented by urban development and population growth, Camden Council is already doing this by delivering in excess of 1,200 properties zoned R5 Large Lot Residential with over 750 of those lots greater than 4,000 sq.m. in suburbs including Grasmere, Ellis Lane, Cobbitty, Kirkham, Harrington Park, Harrington Grove, Gledswood Hills and Catherine Field (see Appendix C).

Further, Camden Council is already exceeding its housing density objectives and targets of the NSW State Government's Sydney South West Growth Centre and also meeting the NSW State Government's housing diversity and affordability objectives. These targets and objectives are being achieved through cooperation with the NSW State Government. As a snapshot, the Camden Local Government Area is increasing from 18,500 dwellings to 84,500 dwellings and 60,000 to 260,000 residents over the next 25 years.

Another reason why this proposal does not have strategic merit is because it goes against the priorities of *Camden 2040*. Two of the four priorities of *Camden 2040* are "retention of the places, landscapes and characteristics of Camden's rural and country heritage and backdrop" and "open spaces". In formulating *Camden 2040* Camden Council engaged with their community who provided a very clear and consistent message that Camden needs to retain its country and rural feel, its heritage, vistas and open space as the area grows.

A further reason why this proposal does not have strategic merit because it defies the vision and goals articulated in the NSW State Government's strategic plan *NSW 2021* and the *South Western Sydney Regional Action Plan (2021)*. This is evidenced by goal 23 which is to increase opportunities for people to look after their own neighbourhoods and environments. It is also evidenced by goal 32 which is to involve the community in decision making on government policy, services and projects. It is further evidenced by the quotes by the Premier of NSW, Barry O'Farrell, from *NSW 2021* including: "**strengthen our local environments, devolve decision making and return planning powers to the community**"; and "**restore accountability and transparency to government, and give the community a say in decisions affecting their lives**". And the quote from the *South Western Sydney Regional Action Plan (2021)* of: "**the unwavering focus on delivery of these plans will ensure we respond to the priorities of local people**".

Is it correct that the Pre-gateway review Information Assessment and Recommendation Report should compare the strategic merit with the **draft** Metropolitan strategy 2031 and not NSW 2021 and with the **draft** South West sub-regional strategy (2031) and not the South Western Sydney Regional Action Plan (2021) considering both of these documents are only in draft?

Technical Merit

This proposal does not have technical merit by the virtue of the fact that the land in the proposal is currently zoned RU1. The zoning of this land has been Camden Council's control instrument to ensure that the land in this proposal was not developed as per the intentions of the proposal. It should also be noted that up until to November 2012 there was no course of appeal for zonings decisions.

Once the land is rezoned from RU1 Primary Production to R5 Large Lot Residential there is nothing that Camden Council can do to stop the developer from submitting complying applications to subdivide the land into up to 20 lots, building two storey dwellings, dual occupancy dwellings or anything else that is permissible in R5 Large Lot Residential zoned land.

Another reason why this proposal does not have technical merit is because it exceeds RL90. Whilst this is not a control, it is a tool that Camden Council has used to protect the rural vistas and ridgelines. For example, significant effort was made by Camden Council to ensure that RL90 was not exceeded by the neighbouring development to this proposal, Kirkham Meadows, which does not exceed RL90. This was achieved at significant expense to the residents of Kirkham Meadows and it is reasonable that they could expect they would not have dwellings built above them - which this proposal proposes.

A further reason why this proposal does not have technical merit is because even if it is accepted that engineering solutions can be provided for drainage and landscaping, it is extremely difficult for Camden Council to ensure these solutions are maintained by future residents.

Social Merit

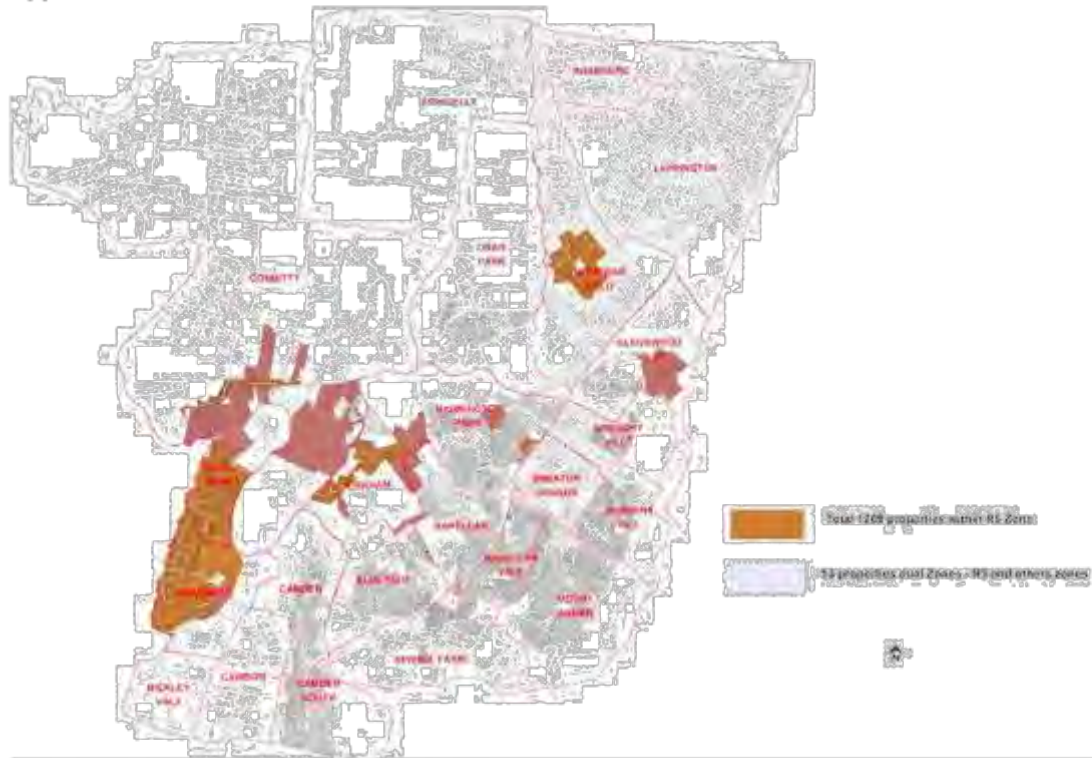
This proposal does not have social merit because this matter has come before Camden Council five times and has been rejected by Council three times, by two separate Councils. Not only was this matter rejected

ORD04

by two different Councils, the ridgeline has been protected by five consecutive Councils since the neighbouring development to this proposal, Kirkham Meadows, was established below RL90.

Further to Camden Council's rejection of this proposal, there have been numerous submissions made by the community objecting to the proposal each time it has come before Camden Council. Given the community and Council's objection to this proposal, at what point will the Camden community be given a voice in this proposal and their wishes for it not to proceed be granted?

Appendix C



R5 Large Lot Residential Zoning in Camden LGA.

Endorsed by

Mary-Lynne Taylor
Chair
Sydney West Joint Regional Planning Panel
Date: 9 May 2014

Attachment 2

Macquarie Grove Rd, Kirkham – Pre Gateway Review

Introduction

This submission is in response to the additional information forwarded by the proponent for the above planning proposal pre gateway review. The additional information was requested by the JRPP following a hearing on the pre gateway application.

In addition the submission provides a summary of outstanding concerns in relation to this planning proposal, and a review of the amended planning proposal.

1. Additional Information Review

Drainage Proposal

Outstanding Issue

JRPP requested a proposal that restricts flows from the site to current levels or less. The proposal must be based on consolidated onsite detention facilities not facilities located on each of the proposed allotments.

Council Officer Comments

The revised design proposes two (2) consolidated on-site detention (OSD) basins that collect storm water for the southern and central catchments of the site, these are proposed to be dedicated to Council as drainage reserves. The northern catchment can be collected and stored via the drainage infrastructure within the proposed road.

The revised proposal does not demonstrate the ability to comply with Councils engineering standards. Councils specifications require a formed "escape path" downstream of basins for overland flows, this enables safe conveyance of stormwater should the OSD basin fail.

The current proposal would see water directed across private property on no formed path should the OSD basins fail. To enable compliance the proposed development would require the permission of owners in the adjacent lots (The Meadows) to form these channels.

In its current form, Council does not support the proposed stormwater design, as it has not been demonstrated that the proposal can comply with Councils engineering specifications.

At present it has not been demonstrated to Council that this site has sufficient drainage capacity to support residential development. Future development applications on the site will need to

1

demonstrate compliance with Councils engineering standards which has yet to be demonstrated as possible.

Traffic

Outstanding Issue:

The JRPP requested an access proposal and accompanying traffic analysis that demonstrates an acceptable level of traffic safety and traffic impact on Macquarie Grove Road and Kirkham Lane.

Council Officer Comments

The proponent has not undertaken any additional traffic analysis. The additional information submitted reiterates the status of the previous Traffic Safety Audit Report undertaken by the proponent in 2008.

Given the limited information provided it is not possible for Council officers to provide definitive advice with regards to the safety of the intersection from Macquarie Grove Road.

There are however outstanding concerns regarding the impact of the proposed intersection on Macquarie Grove Road, in particular with regards to the removal of vegetation to provide sight lines, and the impact on the rural nature of the existing road as a result of potential widening.

Council officers have previously requested the proponent to undertake assessment of the potential access from the existing Meadows Estate, as this could potentially have less impact and provide safer access to the site. This has not been undertaken and remains an outstanding issue.

Landscape

Outstanding Issue

The JRPP requested a Landscaping proposal that addresses the section of the site visible to motorists in a manner that is consistent with the rural character of the immediate locality and the more general approach to Camden Town.

Council Officer Comments

The revised design provides for a 10m landscaped buffer for those lots backing onto Macquarie Grove Road. The proponent proposes to manage the maintenance of the buffer by imposing a s.88B (restriction to title) on these lots until such time as trees within the buffer meet the requirements for protection under Councils Tree Preservation Order (TPO).

Council's officers have assessed the proposed landscape design, and agree that the proposed design could help preserve the rural feel of Macquarie Grove Road. However it is noted that the additional

2

information does not include information on fencing design or restriction on the location of outbuildings within the buffer.

Officers have also raised concerns over the ability to enforce and monitor the s.88B instrument to ensure maintenance of trees and restrict inappropriate development within the 10m buffer.

ORD04

Attachment 3

2. Outstanding Concerns

In addition to the additional information requested by the JRPP, Council officers have also identified a number of outstanding concerns with regard to the planning proposal.

a. Community Objections and Concerns

There remains community objection to the proposed development of this site. Since the lodging of this planning proposal Council has received 14 letters in objection from existing residents in the Meadows and the Outlook.

Issues identified by objectors include:

- Privacy impacts – Subject site is higher than surrounding development and will create overlooking concerns for existing residents
- Concern over inequity where previous rules were applied to applications in the Meadows which are now proposed to be superseded i.e. RL90 development restrictions.

These objections remain outstanding and have not been addressed by the additional information provided. In addition it is noted that this planning proposal has never been formally exhibited, formal exhibition is likely to expose wider community concerns.

b. Visual Impacts

The subject site has high visual significance to the Camden LGA and can be clearly seen from Camden Valley Way. The Macquarie Grove Road corridor also has high visual and cultural significance.

The proposed development will impact on the rural significance of Macquarie Grove Road, due to tree removal and possible road widening to enable safe access. The proposed landscaping will not fully mitigate this impact and it remains an outstanding concern for Council.

There is also concern about the ability to impose and monitor mitigation measures such as landscaping requirements and building colour and material control. If rezoned to R5 Large Lot Residential future development within the site will be subject to the Exempt and Complying SEPP, which will not require full consideration of Council's DCP controls.

c. Exempt and Complying SEPP

Once rezoned the subject lands will meet the criteria for assessment under the Exempt and Complying SEPP – Rural Housing Code. Therefore where Council has site specific DCP controls to mitigate impacts i.e. setbacks, dwelling design requirements, vegetation requirements, these will be overridden by the SEPP requirements.

In addition approval under the Exempt and Complying SEPP could be undertaken by a private certifier, providing less certainty for the community over the outcomes of the proposed development.

d. Housing Diversity

The planning proposal lodged by the applicant contends that this development will contribute to Councils diversity of housing product (R5 Large Lot Residential)

Council has significant existing stock of R5 lands (approximately 1200 lots) with additional large lots proposed as part of a number of new developments in areas, such as Emerald Hills. Council is also committed to ensuring new development within the South West Growth centres deliver a range of housing options and lot sizes to ensure housing diversity.

It is therefore not supported that the proposed 15 lots are necessary for the provision of housing diversity.

e. State and Local Government Strategic Planning Objectives

The subject site is not identified within any state or local strategic planning documentation for future development. Council is already exceeding targets with regard to population requirements, and does not need to provide additional development.

The proposal is also contrary to the directions provided within Camden 2040 it does not contribute to the community's aspiration to maintain the country town feel, rural setting and lifestyle, and enhance its history, trees and open space.

One of the key requirements of a planning proposal progressing beyond the gateway process is meeting the strategic state and local planning objectives, of which this proposal does not.

3. The Amended Planning Proposal

The amended planning proposal forwarded to Council for additional comment has a number of errors and inaccuracies.

Amended Planning Proposal	Council Comment
<p><u>1.2 Scope of Report (pg 7)</u> <i>"This report confirms that the development will provide a number of benefits, including providing housing choice (lifestyle lots) within close proximity to all services and facilities offered in Camden and Narellan"</i></p>	<p>Housing choice and diversity of housing product has been sufficiently planned for in other development areas that better address state and local strategic planning objectives. The 15 lots proposed as part of this development will not greatly impact on the provision of housing choice.</p>
<p><u>1.2 Scope of Report (pg 7)</u> <i>"The justification for the Planning Proposal can also be understood in the context of the recent trends towards population growth in Camden, the demographics of the area. The need for increased housing provision is reflected in housing targets by the state government for supply of housing"</i></p>	<p>As part of the South West Growth Centre the Camden LGA will provide in excess of 61,000 dwellings. This is in addition to identified development areas in Harrington Grove, Emerald Hills Spring Farm and Elderslie. Provision of an additional 15 lots outside of these areas is insignificant and will not impact on Councils ability to address its housing targets.</p>
<p><u>2.2 Context - page 8</u> <i>...the Mater Dei lands. These lands were recently rezoned from E2 Environmental Conservation to R2 Low Density residential to permit seniors housing"</i></p>	<p>Reference to the Mater Dei development rezoning has been mis-represented by the proponent. The lands at Mater Dei were in fact E4 Environmental Living and were always intended for Seniors development.</p> <p>The Mater Dei precinct was rezoned to R2 Low Density Residential from E4 Environmental Living to better facilitate the Seniors development.</p> <p>The amended planning proposal is incorrect in this reference.</p>
<p><u>2.2 Context - page 8</u></p>	<p>Macquarie Grove Road is also a rural road which</p>

Amended Planning Proposal	Council Comment
“Macquarie Grove Rd is a local collector road within the Council Rd hierarchy”...	Council has identified as significant in terms of maintaining the rural feel to the entry into Camden Town. Whilst it may be a Collector Rd its capacity and ability to be augmented is limited.
<p>2.3.2 Objectives - page 10</p> <p>Objectives of the RU1 zone</p> <p>To maintain rural landscape character of the land</p>	As demonstrated by the objectives of the zone RU1 land has an objective to maintain the rural landscape character of the land. This justifies the use of this zoning on this site in line with Councils objective to keep development below the RL90.
<p><u>Part 1 Statement of objectives or intended outcomes of the Planning Proposal</u></p> <p>Outcomes</p> <p>1. “Elements of the natural landscape will be conserved by the proposed subdivision size and commensurate adjoining lands”</p> <p>2. “Conservation and enhancement of the Cumberland Plain Woodland Species”</p>	<p>Outcome 1 is not supported by Council – the proposal will negatively impact on the natural landscape and impact on the existing ridgeline. The proposal also requires the removal of vegetation.</p> <p>Outcome 2 is not supported by Council the proposed development does not support the conservation of the CPW species.</p>
<p><u>4.1 Draft LEP Provisions for Subject Lands</u></p> <p>“to provide residential housing in a rural setting while preserving, and minimizing impacts on, environmentally sensitive locations and scenic quality”</p>	Council does not agree that the proposed rezoning to R5 large lot adequately addresses this objective. The proposal will have an impact on the sensitive ridgeline and scenic quality.
<p><u>Section 5.2.1 Is the planning proposal as a result of any strategic study or report</u></p> <p>Reference to the letter from the Department of Planning and Infrastructure dated 7 September 2009</p>	<p>The letter referred to within the amended planning proposal precedes the Camden LEP 2010. This is when Camden Council transferred to the standard LEP template.</p> <p>During the development of the CLEP Council officers considered protection of rural lands. It was considered that maintaining the existing rural zoning and minimum lot size that prohibited</p>

7

ORD04

Attachment 3

Amended Planning Proposal	Council Comment
	<p>further subdivision and development was the best method to protect such lands from development.</p> <p>It was considered that a stand alone strategy provided less weight then the zoning which has clear objectives regarding the protection of rural landscape character of the land.</p>
<p>Is there a Net Community benefit Will the LEP be compatible with agreed State and Regional Strategic direction for development...</p>	<p>The amended planning proposal suggests this evaluation criteria is not applicable. Council would suggest compliance with State government policy directions is paramount to the progression of this planning proposal.</p>
<p>Is the LEP likely to create a precedent or create or change the expectations of the landowners</p>	<p>Council suggests that by proceeding with this planning proposal it would create a precedent and open the opportunity for all RU1 landowners to rezone land that is not identified within the strategic planning framework. Council supports growth within approved areas that are identified within approved strategies e.g. Growth Centers.</p>
<p>Have the cumulative effects of other spot rezoning proposals in the locality been considered? What was the outcome of these considerations</p>	<p>The response within the amended planning proposal does not address these evaluation criteria these must be addressed.</p>
<p>What are the public interest reasons for preparing the draft plan?</p>	<p>Improvement of drainage system in the Meadows is in no way dependent on this rezoning.</p>
<p>Will the public domain improve?</p>	<p>Council does not support the amended planning proposals assertion that this proposal will improve the public domain, as there are no lands proposed to be transferred to Council. The only public lands affected are the road reserve on Macquarie Grove Rd, which will be negatively impacted by the proposed access point.</p>
<p>5.3.2 Metropolitan Strategy – reference to meeting population targets under the South West sub regional plan</p>	<p>Camden Council will meet all its future population requirements under the sub-regional strategy within lands identified as urban release areas. The subject site is not within an urban release area,</p>

8

Amended Planning Proposal	Council Comment
	and is not required to meet population projection targets.
Table 2 pg. 22 C4 Improve Housing Affordability	The amended planning proposal identifies that this proposal will help address Housing Affordability within the Camden LGA. Council does not support this suggestion. The subject lots are large lot residential lots and they will not be affordable in the sense of the definition of affordable housing " affordable housing means housing for very low income households, low income households or moderate income households, being such households as are prescribed by the regulations or as are provided for in an environmental planning instrument."
Table 2 Pg. 24 – E2 Protect Sydney's natural environment"	The amended planning proposal identifies this action as 'not applicable' Council believes it is applicable and that the planning proposal is not consistent with the action. The PP will impact negatively on Sydney's natural environment and remove more RU1 land from Camden's Scenic Ridgeline.
E6 Conserve Sydney's Cultural Heritage	<p>The planning proposal incorrectly identifies that the planning proposal is consistent with this action.</p> <p>The planning proposal will in no way contribute towards the preservation of Sydney's Cultural Heritage. The scenic hills and Camden's rural feel is considered part of its cultural heritage. Development on these important scenic points is detrimental to that cultural heritage.</p> <p>The impacts on rural road corridors such as Macquarie Grove Road which form a significant cultural landscape driving towards Camden Town.</p> <p>Council suggests the planning proposal is inconsistent with this action.</p>
F4 Enhance cultural life and tourism	The planning proposal does not adequately

ORD04

Attachment 3

Amended Planning Proposal	Council Comment
precincts	address this action. Camden's scenic views and maintaining the rural feel is a key aspect of its cultural and tourism appeal. This action needs to be addressed.
G6 Ensure Stakeholder Involvement	<p>The planning proposal incorrectly states that the Planning Proposal along with relevant documents was placed on public exhibition. This is incorrect the Planning Proposal has never been formally exhibited.</p> <p>Some affected owners have objected to the proposal, but not through a formal public exhibition process.</p>
<p>Camden 2040</p> <p>Actively Managing Camden's Growth</p>	<p>One of the key directions of the Camden 2040 strategy looks at balancing our community's aspirations with the growth mandate in the Camden LGA. Protecting important scenic corridors such as Macquarie Grove Rd and ridgelines was a clear aspiration of the Community in terms of maintaining the balance.</p> <p>Council does not believe that the planning proposal currently meets this direction.</p>
<p>An enriched and connected community</p>	<p>The planning proposal identifies that the development would be subject to the payment of State Infrastructure Fund/Levies. The subject site is not within the identified release areas and will not require any upgrade to State Infrastructure. It is therefore not likely to trigger State Infrastructure Payments.</p>

Conclusion

The additional information provided following the JRPP determination does not satisfy outstanding technical concerns with regard to drainage, traffic and landscaping. The proponent has not demonstrated that the subject site can meet Councils engineering specifications with regards to stormwater.

10

Any potential solutions appear predicated on the landowners ability to get approval for overland flow paths through adjoining private properties.

Without evidence of the ability to meet engineering specifications Council cannot support this planning proposal.

Whilst the proponent has submitted further landscaping plans detailing potential planting along Macquarie Grove Road, Council officers remain concern about the strength of the proposed 88B mechanism to enable the proposed outcomes to be achieved.

The additional traffic information does not address other access options to the subject site, and council remain concerned that all options have not been sufficiently investigated.

In addition to drainage, traffic and landscaping concerns Council has also reiterated ongoing concerns with regards to community objections, visual significance, the Exempt and Complying SEPP, Housing Diversity and compliance with State and Local Government strategic planning objectives.

The premise of the planning proposal process is to demonstrate that the subject lands have planning merit and have demonstrated capacity for the proposed landuse. Council is of the belief that the proponent has not demonstrated that the land has residential capacity therefore the land should not be rezoned from RU1 Primary Production.

ORD05

Attachment 1



INCOMING CORPORATE SPONSORSHIP POLICY

0.00

INCOMING CORPORATE SPONSORSHIP

DIVISION: GOVERNANCE

BRANCH: COMMUNICATIONS

PART 1 - INTRODUCTION

1. BACKGROUND

Council adopted and endorsed the Community Sponsorship Program to address how Council will administer sponsorship requests (outgoing). The Corporate Sponsorship Policy addresses how Council will seek sponsorship and provide guidelines, procedures and principles to assist Council Officers in pursuing sponsorship for Council run events and activities.

2. OBJECTIVE

The purpose of this policy is to document the general principles and outline mechanisms that apply to the negotiation and implementation of agreements concerning the sponsorship of Council's events and activities.

This policy aims:

- To provide procedures and principles for the pursuit and assessment of sponsorship to enhance the resources available to Council in providing for the needs of the community.
- To ensure that sponsorship from business, community groups and organisations to Council is dealt with in a fair, transparent and equitable manner.

3. SCOPE

This policy applies to:

- all employees of Camden Council (whether full-time, part-time or casual) and all persons performing work at the direction of, or on behalf of Camden Council including volunteers, contractors, subcontractors, agents, consultants and temporary staff collectively referred to as "workers".

4. DEFINITIONS

Sponsorship received by Council:

Council defines sponsorship as a commercial arrangement in which an organisation provides a contribution in monetary terms or in-kind to support a Council activity or event in return for certain specified benefits.

Sponsorship can be provided by the corporate sector or private individuals to support Council's activities.

POLICY NAME

Adopted by Council: (DATE); Amended

Page 2 of 7

Note: Joint ventures are business relationships between Council and private or public sector individuals or organisations to conduct a joint project. Consultancies are business relationships with external individuals or organisations that provide expert advice or services to Council. These are not classed as sponsorship.

PART 2 - POLICY STATEMENT

5. Council is interested in developing sponsorship arrangements that will provide additional resources to the community. Seeking sponsorship can be advantageous to all parties, however Council must ensure that sponsorship does not compromise or question the integrity of Council operations or its corporate reputation.

Sponsorship is a commercial arrangement in which an organisation provides a contribution in monetary terms or in-kind to support an activity or event for a certain specified benefit. Such relationships potentially have risks and Council must ensure that proper processes are followed and that its reputation is maintained and enhanced from such relationships.

This Policy outlines Camden Council's approach and guides Council Officers in seeking sponsorship for Council run events and activities.

6. PRINCIPLES

Sponsorship is a commercial arrangement in which an organisation or individual provides a contribution in monetary terms or in-kind support to a Council run activity or event in return for certain benefits.

Sponsorship does not include, and this Policy does not apply to:

- Selling advertising space
- Joint ventures
- Consultancies
- Grants, gifts or donations.

In addition to those points outlined in Conflicts of Interest, Council reserves the right not to agree to a sponsorship proposal where the potential sponsor, their activities or their proposals, as the case may be, and in Council's sole opinion:

- Do not support or are in conflict with Council's Core values;
- Could have a negative impact on the Camden community;
- Are primarily in the political field, eg. political parties;
- Involve the manufacture, distribution and sale of tobacco and tobacco related products.

Council will approach groups, businesses or individuals that are seen as appropriate/relevant to the nature of the event based on ICAC principles (*ICAC Sponsorship in the Public Sector 2006*), Council policies and social constraints.

INCOMING CORPORATE SPONSORSHIP GUIDELINES AND OPERATING PROCEDURES

PROCEDURE:

- The Council Officer responsible for the event/activity will prepare a Sponsorship Plan relevant to each event or activity for which sponsorship is sought.
- The Sponsorship Plan will describe:
 - The nature of the event or opportunity
 - Define the level of sponsorship to be sought
 - Benefits offered to sponsors in recognition of the sponsorship provided.
- The Council Officer responsible for the activity/event will prepare a sponsorship package outlining:
 - The nature of the event or opportunity
 - Level/s of sponsorship
 - Define the level of sponsorship to be sought – monetary/in-kind
 - Define the benefits offered to sponsors in recognition of the sponsorship provided.
- In most cases, the public interest is best served by making sponsorship opportunities widely known. To this end, sponsorship should be sought using mechanisms not limited solely to invited sponsors.
- When, and in what form, a broadly-based process should be used depends on the nature of the market. If there is vigorous interest in sponsorship, the process should be competitive.
- Alternatively, if interest is restricted to potential sponsors with highly specialised characteristics, then more direct methods would be unlikely to offend.
- Council will approach groups, businesses or individuals that are seen as appropriate / relevant to the nature of the event based on ICAC principles (*ICAC Sponsorship in the Public Sector 2006*), Council policies and social constraints.
- Sponsorship is taxable for purposes of GST. It is essential that before finalising any Sponsorship Agreement that compliance with the Goods and Services Tax Act is discussed with Council's Taxation Officer.

SPONSORSHIP AGREEMENTS:

- All of Council's sponsorship arrangements will be documented in the form of a written Sponsorship Agreement and signed by the relevant Director and the Council Officer responsible for the sponsorship.

POLICY NAME

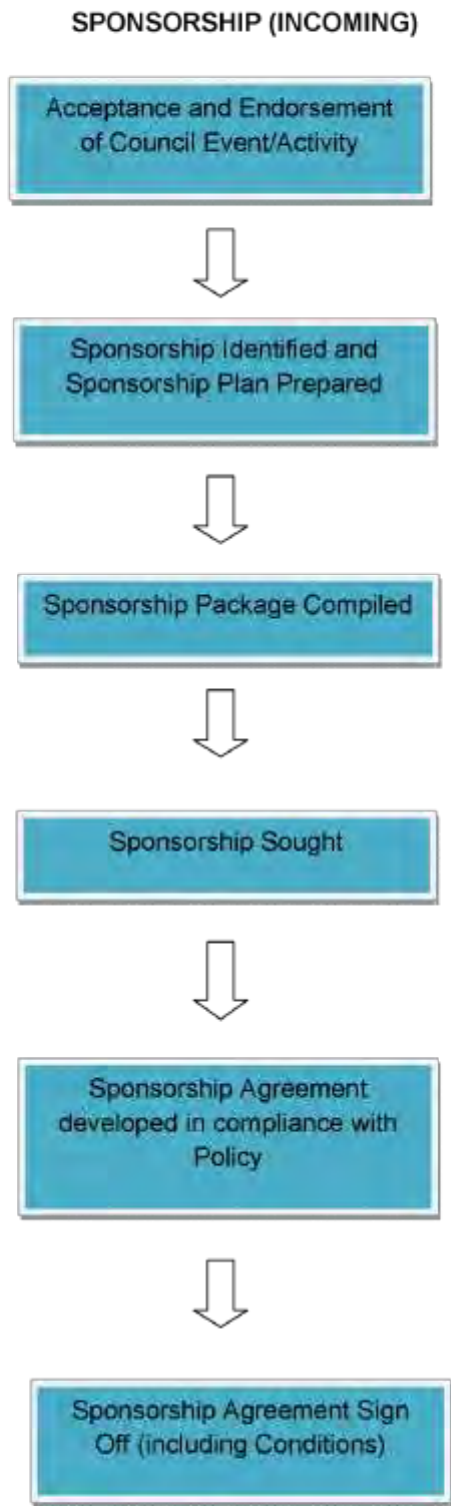
Adopted by Council: (DATE); Amended

Page 4 of 7

- The Sponsorship Agreement should be prepared by the responsible officer, in conjunction with the relevant Manager and Council's legal adviser if necessary.
- The Sponsorship Agreement should outline the following:
 - Details of event being sponsored
 - Level of sponsorship including financial and/or in-kind contribution
 - Period of sponsorship
 - Exclusivity or non-exclusivity of the sponsorship
 - Payment arrangements
 - Benefits to the business/organisation
 - Benefits to Council
 - Commitment by Camden Council
 - Insurance
 - Indemnity
 - Wet weather/cancellation clause
 - Obligations of sponsor
 - Termination of agreement
 - Disputes
 - Placement of material/logo/branding symbols
- The Sponsorship Agreement must also define timeframes, payment schedules and the rights and obligations of each party. If the sponsorship is regarded as a general endorsement of the sponsor, it must be clearly stated.

CONFLICT OF INTEREST:

- Council has the discretion to decline offers of sponsorship where the sponsor's involvement could compromise, or be seen to compromise, Council's role and/or public image and public confidence.
- Council Officers are discouraged from accepting sponsorship from businesses or organisations with which Council has a contractual relationship. If Council Officers are to accept sponsorship from a business or organisation in which it has a contractual relationship, permission must be sought from the General Manager and Council's legal advisors and the reasons for acceptance recorded.
- All Council Officers must, if necessary, declare any conflict of interest, pecuniary or otherwise posed by a potential sponsor to the General Manager.
- Council will not enter into any sponsorship agreement where the business or organisation's mission or objectives are in conflict with Council.



ORD05

Attachment 1

* * *

RELEVANT LEGISLATION: NSW Local Government Act 1993
ICAC Sponsorship in the Public Sector 2006

RELATED POLICIES AND PROCEDURES: Community Financial Assistance Policy

RELEVANT CAMDEN 2040 KEY DIRECTION AND OBJECTIVE: Strong Local Leadership; It is well governed.

RESPONSIBLE DIRECTOR: Governance

APPROVALS Council

NEXT REVIEW DATE: Month and Year

RECORD KEEPING NOTES:

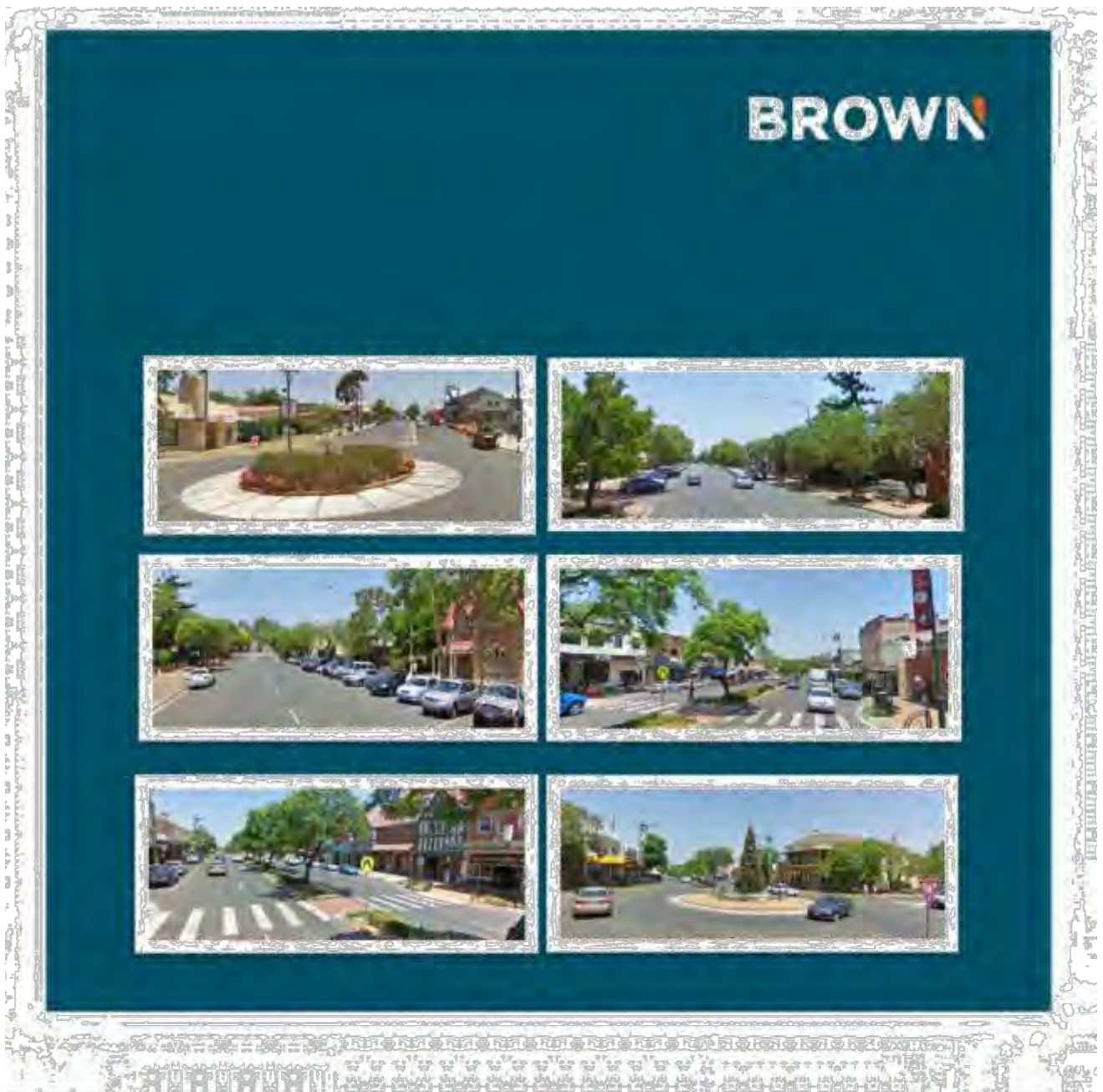
CONFIDENTIALITY/PRIVACY REQUIREMENTS: Available to the public.

HISTORY:

PREVIOUS POLICY Incoming and Outgoing Sponsorship Policy

ADOPTED: 11 December 2007

MINUTE: ORD 342/06



Camden Town Centre Traffic & Transport Study

September 2013

Reference Number

Prepared for Camden Council

Smart Consulting



COMMERCIAL IN CONFIDENCE

All intellectual property rights, including copyright, in designs developed and documents created Brown Consulting NSW Pty Ltd remain the property of this company. Any use made of such design or document without the prior written approval of Brown Consulting NSW Pty Ltd will constitute an infringement of the rights of the company which reserves all legal rights and remedies in respect of any such infringement.

The information, including any intellectual property, contained in this proposal is confidential and proprietary to the Company. It may only be used by the person to whom it is provided for the stated purpose for which it is provided and must not be imparted to any third person without the prior written approval of the Company. The Company reserves all legal rights and remedies in relation to any infringement of its rights in respect of its confidential information.

©

Brown Consulting (NSW) Pty Ltd
PO Box 8300
Baulkham Hills
NSW 2153

Ph: (02) 8808 5000

2013

DOCUMENT CONTROL

X13060 Traffic and Transport Study

Issue	Date	Issue Details	Author	Checked	Approved
A	June 2013	Draft Report	DB	DB	SM
B	July 2013	Final Draft Report	DB	TL	DB
C	September 2013	Final Report	EK	PL	PL

Traffic and Transport Study
Camden Town Centre
Prepared for Camden Council



Smart Consulting

Table of Contents

1. Introduction	1
2. Background Report Review	3
2.1 Camden Town Centre Strategy – June 2008	3
2.2 Key Findings	5
2.2 Camden Contributions Plan	7
2.3 Proposed Deck Car Park at Lot 26 DP 624557 and Lot 15 DP 235365 John Street & Murray Street, Camden	8
2.4 Camden 2040	9
2.5 Camden Major Events	9
2.5.1 Australia Day Parade	10
2.5.2 The Camden Show	10
2.5.3 Light Up Camden	10
2.5.4 Anzac Day	10
3. Existing Conditions	11
3.1 Intersection Counts	12
3.1.1 Existing Intersection Operating Conditions	13
3.2 Mid Block Flows	18
3.2.1 Commentary on Mid-Block Flows	23
3.2 Public Parking Inventory	24
3.2.1 Commentary on Public Parking Provision	30
3.4 Public Parking Demand Analysis	30
3.4.1 Weekday Parking Supply	31
3.4.2 Weekday Parking Demand	34
3.4.3 Weekday Evening Parking Demand	42
3.4.4 Saturday Parking Supply	43
3.4.5 Saturday Parking Demand	45
3.4.6 Saturday Evening Parking Demand	50
3.5 Origin/ Destination Assessment	51
3.6 Pedestrian Counts	62
3.6.1 Pedestrian Facility Warrant Assessment	64
3.7 Public Transport Operations	65
3.7.1 Bus Networks	66
3.8 Journey to Work Patterns	69
3.9 Accident Assessment	71
3.10 Traffic Modelling	72
4. Future Development Potential	75
4.1 Introduction	75
4.2 Last Five Years of Development	75
4.3 Strategic Overview	76
4.3.1 Employment	81

Traffic and Transport Study

Camden Town Centre

Prepared for Camden Council



Smart Consulting

5.	Identified Key Areas for Improvement	85
5.1	Road Network.....	85
5.2	Discussion of future traffic conditions	85
5.3	Pedestrian Network/ Access	88
5.3.1	Argyle Street Footpath Widening Opportunities	89
5.3	Car Parking	90
5.4	Wayfinding Signage	90
6.	Future Traffic Conditions Assessment	91
6.1	Town Centre Projections	91
6.1.1	Introduction.....	91
6.1.2	Background Projections.....	91
1.1.2	Likely employment outcomes	92
6.2	Strategic Option Assessment.....	93
6.3	Future Year Traffic Analysis.....	93
7.	Options for Improvement Assessment	94
7.1	Town Centre Core Improvement Strategy	94
7.2	Options Testing.....	95
7.2.1	Signalisation of Argyle Street/ Oxley Street & Removal of Marked Footcrossing.....	95
7.2.2	Signalisation of Marked Footcrossing in Argyle Street between John Street and Hill Street ...	96
7.2.3	Signalisation of Argyle Street/ John Street Roundabout.....	97
7.3	Further Potential Improvement Options.....	98
7.3.1	Additional Multi Storey Car Park – Oxley Street	98
7.3.2	Creation of a Civic Precinct.....	98
7.3.3	Elizabeth Street/Mitchell Street.....	100
7.3.4	Seven Day Parking Restrictions	102
7.3.5	Murray Street/ Broughton Street.....	103
7.3.6	Wayfinding Signage	103
8.	Short, Medium, Long Term Recommendations	105
8.1	Road Network.....	105
8.1.1	Narrowing of Argyle Street to one lane.....	105
8.2	Pedestrian Network.....	107
8.2.1	Narrowing Lanes in Argyle Street	108
8.3	Bicycle Networks	108
8.4	Public Parking	109
8.4.1	Future Additional Parking Provision	109
8.4.2	Next Steps.....	111
8.5	Town Square.....	112
8.6	Public Transport Operations	112
8.6.1	Future Bus Services	112
8.7	Potential Bus Terminus Locations	113
8.8	Road Geometry	114

Traffic and Transport Study

Camden Town Centre

Prepared for Camden Council



8.9	Speed Limits	114
8.10	Street Lighting	115
8.11	Streetscape	115
8.12	Cost Estimates of Potential Options.....	115
9.	Responses to Brief Objectives.....	116
10.	Appendices	118
Appendix A	Public Parking by Location and Restriction	
Appendix B	Accident Statistics Review	
Appendix C	Traffic Modelling Summary Paper	
Appendix D	Option Assessment Matrix	
Appendix E	SIDRA Assessment of Future Conditions	

1. Introduction

This report has been prepared for Camden Council to provide a complete summary of traffic and transport reports undertaken to date for the Camden Town Centre. Further, to establish an understanding of existing capacity of road networks and transit operations in and around the Camden Town Centre and what improvements are available to ameliorate identified issues.

A significant volume of data collection and analysis has been undertaken to prepare this report. The data collection was tailored to provide Council with a clear understanding of current traffic, transport and parking conditions and to allow assessment of future conditions to inform policy.

The original objectives of the study as specified in the brief are provided below:

The study will be focus on transport infrastructure necessary to achieve greater accessibility for all road users whilst also seeking to retain the unique aspects that the Town Centre currently provides in terms of its heritage and 'country town' environment. These are but not limited to:

1. identify and resolve crash Blackspot sites;
2. manage the current and future level of traffic and transport;
3. identify and resolve pedestrian accident clustering;
4. facilitate improvements in the level of pedestrian access and priority, particularly in areas of pedestrian concentrations;
5. promote pedestrian access connectivity and enhance safe crossing points;
6. facilitate improvement in the level of personal mobility and safety for people with disabilities and senior through the provision of enhanced infrastructure and facilities;
7. facilitate safe bicycle access and parking;
8. identify parking patterns to maximise parking opportunities;
9. Investigate different parking restrictions:
 - Timed parking;
 - Pay Parking;
 - Residential permits parking; and
 - Multi-deck parking.
10. accommodate special event needs for all road users, including public transport (buses and taxi), vehicular access, pedestrians and parking facilities, etc.

The study area subject to the investigations in this report is shown in **Figure 1**.

Camden Town Centre
Prepared for Camden Council



Smart Consulting



Figure 1: Study Area

2. Background Report Review

A number of background reports were provided by Camden Council for review as part of this study. A summary of the key elements of each report is provided below.

2.1 Camden Town Centre Strategy – June 2008

This strategy was prepared to establish a framework for guiding future development within the Camden Town Centre. In combination with developing partnerships to deliver particular outcomes, the strategy sought to deliver public realm improvements at a cost in the order of \$12.5 million.

The strategy included short, medium and long term costed improvement projects.

Overall, the strategy noted the importance of maintaining the character of the Camden Town Centre and devised schemes to balance the accommodation of future development whilst maintaining the town centres character.

The study devised 9 key precincts in and around the Camden Town Centre and defined strategies for improvement for all facets of each area. The locations of each precinct from the study are provided below:



Figure 2: Camden Town Centre Adopted Precincts

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Of key interest were the proposals for Main Street which included both Argyle Street and John Street. Three options with increasing changes for each included:

Option 1 Public domain upgrade included two additional street crossings. Including:

- Removal of informal crossings in median
- Two additional formal crossings

Option 2 Public domain upgrade with 1-3 intersections signalised. Including:

- One to three signalised intersections
- Retention of the median
- Two additional formal crossings

Option 3 Public domain upgrade, three signalised intersections with lane reductions. Including:

- Three signalised intersections
- Removal of central median
- Removal of informal crossings
- Reduction to two lanes in each direction (two travel and no parking or one travel and one parking)
- Reduced parking in Argyle Street
- Widened footpaths by 3.0m

The traffic impacts of the proposals were assessed by Transport and Urban Planning Pty Ltd which concluded the following:

An assessment of the three options proposed indicates that Option 1, whilst affording short term benefits at the detriment of existing and future traffic options, is unlikely to be a longer term viable option when traffic delay and pedestrian safety factors are considered and costed.

Option 3 offers improved pedestrian amenity on the footpaths at the expense of kerbside parking. Removal of the central median is not supported with retention of marked foot crossings (MFCs) in Argyle Street for reasons of safety. Widening of the footway and removal of the kerbside parking (39 spaces) is only supported if parking is readily available elsewhere.

Therefore Option 2 is favoured, particularly signals at John Street over the longer term with improved safety and service levels for pedestrians and minimal impacts on traffic operations / on street car parking.

A combination of Option 2 and 3 indicated in table 1 as a proposed alternate option, would also be supported, subject to a road safety audit of the proposal. Option 2 (or part thereof) is in the longer term likely to offer safer pedestrian controls and improved traffic management while not compromising existing parking provisions in Argyle Street

Thus a hybrid of Option 2 and 3 was recommended by the traffic assessment report.

Camden Town Centre
Prepared for Camden Council



The key findings of the traffic report is also summarised below:

2.2 Key Findings

The assessment of the three main street options highlighted the following:

- Current mid-block crossings are potentially hazardous and will become more dangerous as traffic volumes increase;
- The retention of the central median is recommended for pedestrian safety reasons;
- Signalisation of the John and Argyle Street intersection was recommended.
- Signalisation of other intersections at Murray and Elizabeth may be warranted in the long term;
- At least 2 travel lanes in each direction are required on Argyle Street. One travel lane and 1 parking lane would not be feasible;
- If the footpaths were widened to include all of the existing parking lanes it could only be justified if the 39 car spaces that would be lost could be found elsewhere in the town centre.
- Removal of existing mid-block crossings are recommended in conjunction with signalisation and the provision of 2 additional relocated pedestrian crossings.
- Pedestrian crossing demand west of John Street may warrant a higher order of traffic controls – signals or mid-block pedestrian signals in the long term.

A copy of the traffic report prepared by Transport and Urban Planning Pty Ltd was not provided as part of this study.

Of interest the study did not consider public parking either in what form it should take or what provision would be appropriate for the Town Centre. However, it is noted that parking demands have been assessed in a separate report which is summarised further below.

The recommended hybrid version of Option 2 and 3 as a comparison of all options from the traffic report is provided in **Table 1**.

Table 1: Transport & Urban Traffic Report Recommended Option

Element	Option 1 1 parking lane 2 travel lanes	Option 2 1 parking lane 2 travel lanes	Option 3 2 travel and no parking or 1 travel and parking in each direction	Proposed Alternative Option 1 parking lane 2 travel lanes
Streetscape	Yes	Yes	Yes	Yes
Median	Yes	Yes	No	Yes
Bicycle racks	Yes	Yes	Yes	Yes
Existing Pedestrian Crossings	Yes	No	No	No
New Pedestrian Crossings	No	Yes (2)	No	Yes (2) relocated mid block
Traffic lights	No	Yes (1/2)	Yes (3)	Yes (1)
Pedestrian traffic	Not improved	Improved	Improved	Improved
Footpath widening	No	Yes (20mm)	Yes (lane 2.2m)	Yes (600mm)
Reduction in lanes	No	No	Yes	No
Reduction in parking	No	No	Yes	No

Camden Town Centre

Prepared for Camden Council



Street Consulting

The components of improvement of the preferred scheme are shown diagrammatically below:



Figure 3: Preferred Scheme

It is noted that the location of the signalised crossings to replace the existing crossings in Argyle Street were proposed to be located between Hill Street/Elizabeth Street in the east and Murray Street/Oxley Street in the west.

The preferred locations of improved pedestrian facilities in Argyle Street in this report differ from the above and further information is presented in Section 7.2.2.

Overall after a review of the 2008 strategy it is our view that retaining the central median is supported because of the safety benefits it provides. However, removal of the roundabout at John Street / Argyle Street and replacing with traffic signals is not considered warranted. This is discussed further in Section 7.2.3.

2.1.2 Commentary on Safety Aspects of Central Median

The central median improves pedestrian safety over the situations without the median by:

- a) channelising traffic so that pedestrians do not have to deal with vehicles undertaking unpredictable manoeuvres such as travelling on the wrong side of the road or executing mid-block u-turns
- b) it provides the opportunity for pedestrians to stage their crossing of Argyle Street so that they have to deal with only one direction of traffic at a time
- c) it provides a visual cue to drivers that the road environment is narrow (than it otherwise would appear if the central median was not there), assisting to reduce traffic speeds

Camden Town Centre
Prepared for Camden Council



Smart Consulting

2.2 Camden Contributions Plan

Camden Council has adopted a Contributions Plan 2011 under the Environmental Planning and Assessment Act, Section 94, for the provision of public car parking facilities. The Contribution Plan sets out the need for the provision of public car parking facilities related to expected developments for both Camden and Narellan Town Centres.

Where the entire required car parking provision under the Council's Development Contract Plan may not be able to be provided due to the site constraints, Council will consider whether it is appropriate for the development to contribute toward providing the additional spaces that are required in a central public parking area. The contributions will be used to purchase land, construct car parking at ground level and to augment existing car parks by erecting deck structures.

The Contributions Plan for Camden Town Centre has adopted the provision of a decked car park. The possible sites for the decked car park are identified as in the following figure as Larkin Place and John/ Murray streets car parks.

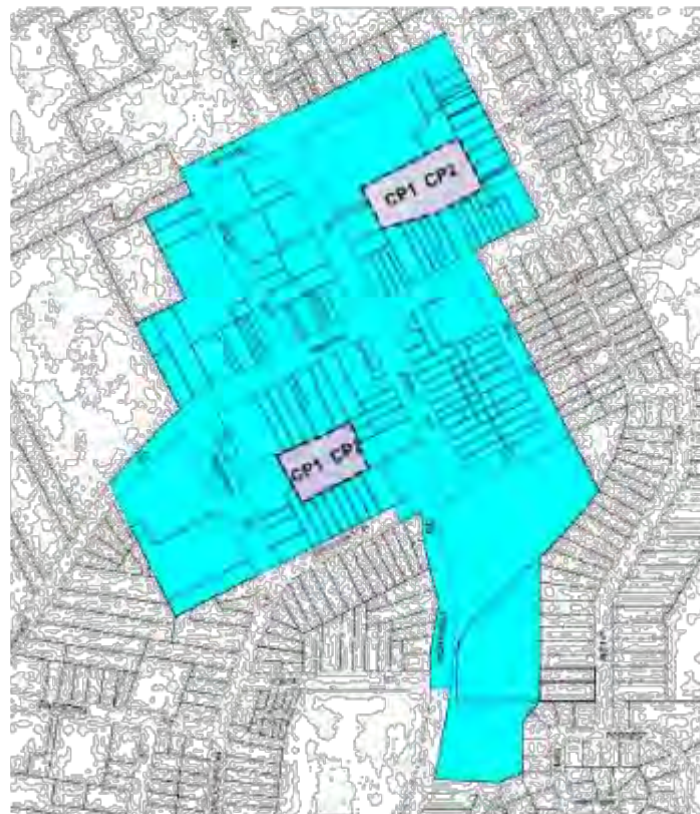


Figure 4: Decked Car Park locations from Contributions Plan

Council in 2006 resolved to adapt the John/Murray car park as the preferred site for the decked car park structure. The car park site is owned by Council and the Contribution Plan has been prepared on the basis of construction estimates for the deck car park structure.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

The analysis for the required car parking spaces in the deck car park was based on a study by Haliburton (2002). That study identified the need for approx. 108 additional spaces based on an estimate of an additional 3,000m² of retail and 1,500m² of commercial floor space for new development in Camden Town Centre to 2021.

The estimated cost of the deck car park structure at John/Murray sites in the Contribution Plan is \$3.64m. The Council's current section 94 contribution rate for car parking spaces for Camden Town Centre is \$49,260 per space (June 2012).

Since the inception of the Contribution Plan and based on the funds collected towards car parking provision Council has only collected an equivalent amount to 14 spaces. With the relatively low rate of contributions for the deck car parking structure there must be serious doubt as to whether the full cost of the car parking facility in the plan will be collected via contributions.

The contribution rate at \$49,260 per space may be considered a disincentive to development to warrant such a high dollar amount to the car parking facility. Council may wish to reconsider its position in respect to the section 94 Contribution rate for public car parking deck structure.

Some examples of other Council contribution rates both regional and Sydney metropolitan are presented below.

Table 2: Camden versus other Council Parking Space Contribution Rates

Council	Area	Rate per Space
Camden	All locations	\$49,260
Campbelltown	Campbelltown	\$17,452.80
	Ingleburn	\$32,605.52
Ashfield	All locations	\$30,000
Lane Cove	Lane Cove	\$19,157-\$20,986
Wollondilly Shire	All locations	Under VPA's
Gosford	All locations	\$6,500-\$15,600

From **Table 2** it can be seen that the parking contribution rate in Camden is well above other Councils.

As an alternative to Section 94 contribution rate for car parking based on the provision of monetary contribution in lieu of car parking, it is suggested that a Section 94A contribution levy approach be determined as a more feasible arrangement. The Section 94A contribution levy of, say, 1% levy across all new development in Camden Town Centre may be utilised for all proposed civic improvements such as traffic facilities, town centre works including town square as well as parking facilities. From the Section 94A levy Council could determine a priority of civic improvements based on short, medium and long term with the decked parking structure long term facility.

2.3 Proposed Deck Car Park at Lot 26 DP 624557 and Lot 15 DP 235365 John Street & Murray Street, Camden

This report submitted to the Ordinary Council meeting held on 10 July 2006 was to allow Council to consider the merits of the application to construct a decked car park at the location of Council's existing car park off John Street

Camden Town Centre
Prepared for Camden Council



Smart Consulting

and Murray Street. As stated in Section 2.1, two locations are detailed in Council's contribution plan for additional public parking.

The car park in question currently includes some 139 public car spaces. The proposal would have created a two storey split level car park with provision for a total of 214 cars and 4 motorcycles.

Of interest, whilst the location is detailed in the contributions plan, the proposal was rejected by Council on a number of grounds including inconsistencies with the objective of the Town Centre zone and heritage grounds.

It is understood that no further consideration by Council to a deck car park for John & Murray Streets car park had occurred in accordance with the section 94 contribution plan.

2.4 Camden 2040

Camden Council has adopted the community's vision for the future of Camden Local Government Area being a document entitled Camden 2040 (adopted Dec 2010). Camden 2040 seeks to set out the vision and principles for the future development for Camden.

In the year 2040, Camden is set to be a dynamic, modern, urban place which is defined by its unique history and rural backdrop and has realised the many opportunities presented by urban development and population growth. Camden Council will experience considerable pressure from urban growth associated with the significant urban release areas identified in Sydney's South West Growth Centre Release Area.

Particularly relevant for this Camden Town Centre Traffic and Transport Study is the identified vision to protect Camden town as a unique country heritage town. The community of Camden does not want to lose the character of the town and the country town feel and lifestyle.

Camden's country town feel is greatly valued by both residents and visitors and is an important part of the place and the economy of the town. Also of importance to many in the community is Camden's main street.

An important strategy in Camden 2040 is developing a well-connected, well designed and free flowing road network supported by infrastructure for a growing community that provides effective movement of people and goods within the local area and broader region.

2.5 Camden Major Events

Council has provided event management plans for inclusion in the assessment / planning of this study. The event management plans cover the following events:

1. Australia Day Parade;
2. The Camden Show;
3. Light Up Camden; and
4. Anzac Day

Camden Town Centre

Prepared for Camden Council



Smart Consulting

A summary of the road network arrangements for each event is presented below.

2.5.1 Australia Day Parade

The traffic control arrangements are generally set around the closure of John Street between Argyle Street and Mitchell Street. Bus operations are moved to Elizabeth Street to accommodate the closure. During the middle of the day the road closures expand to Argyle Street just east of Murray Street to Elizabeth Street for the eastbound direction. In the westbound direction, closures commence from Hill Street (allowing entry into Hill Street) to just west of Murray Street.

The Larkin Place car park is closed to vehicles. However, existing remaining public car parks are available for access via the side street network.

Of interest during the peak period of the parade (11:15am – 11:45am), traffic travelling to Camden from the east (via Camden Valley Way) and who park in car parks on the southern side of Argyle Street have no alternative to get back to Camden Valley Way other than make their way to the Old Hume Highway and the Camden bypass.

2.5.2 The Camden Show

The arrangement includes the closure of John Street between Mitchell Street and Exeter Street to marshal persons involved in the parade. The parade then travels to / from the intersection of John Street / Mitchell Street and Argyle Street / Murray Street via the intersection of Argyle Street / John Street.

During the parade itself, Argyle Street is closed temporarily by police at the intersections of Argyle Street / John Street and Argyle Street / Murray Street which is then reopened once the parade has been completed.

2.5.3 Light Up Camden

Initially the closures include only John Street between Mitchell Street / Argyle Street and Argyle Street to the entry / exit driveway of the John Street public car park. During the main festivities arrangements which generally mirror the Australia Day arrangements are put in place between the hours of 2:00pm – 10:30pm.

As is the case for the Australia Day parade, traffic travelling to Camden from the east must use Old Hume Highway / Camden bypass to return.

2.5.4 Anzac Day

This is considered the largest event to manage from a traffic / access management perspective.

The arrangements include the closure of Argyle Street between Elizabeth Street and Barsden Street for both directions of traffic between the hours of 5:00am-7:00am and 10:00 – 11:00am. The closures also include John Street between the Larkin Place car park across Argyle Street to the John Street car park entry /exit. In addition, Elizabeth Street between Mitchell Street and Argyle Street is closed to traffic.

Camden Town Centre
Prepared for Camden Council



Smart Consulting

The resulting arrangements do not allow any vehicles travelling to Camden from the east to access any of the public car parking areas on the southern side of Argyle Street.

The main areas of occupation for each event are shown in **Figure 5**.



Figure 5: Major events use of roads

3. Existing Conditions

The data collected for this study has captured existing conditions for all nodes. Some of the information gathered included but not limited to:

1. Origin / Destination surveys
2. Intersection counts
3. Pedestrian counts
4. Parking demand counts
5. Parking restriction audit
6. Accident Analysis
7. Site observations
8. Background report reviews
9. Consultation meetings with Council officers.

The following presents the data collection approach of the study and an assessment of existing conditions by mode.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

3.1 Intersection Counts

Intersection counts were undertaken during the morning and afternoon road network peak periods on both a Thursday and Saturday. These days were identified in the brief and captured a mix of road network and retail peaks combined. The locations of the intersection counts are provided below:

1. Argyle Street/Edward Street
2. Argyle Street/Elizabeth Street/View Street
3. Argyle Street (south side)/ Hill Street
4. Argyle Street/John Street
5. Argyle Street (north side)/Oxley Street
6. Argyle Street/Murray Street
7. Mitchell Street/Elizabeth Street
8. Mitchell Street/John Street
9. Broughton Street/John Street
10. Broughton Street/Murray Street
11. Broughton Street/Old Hume Highway/Menangle Road
12. Macquarie Grove/Exeter Street
13. Cawdor Road/Sheathers Lane
14. Camden Valley Way/Macarthur Road

The locations of the intersection counts are also shown in Figure 6.



Figure 6: Intersection Count Locations

3.1.1 Existing Intersection Operating Conditions

The intersections within the study area have been analysed using the SIDRA Intersection analysis program. Sidra Intersection determines the average delay that vehicles encounter, the degree of saturation of the intersection, and the level of service. The degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. Sidra Intersection provides analysis of the operating conditions which can be compared to the performance criteria set out in **Table 3**.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 3: Level of Service Criteria

Level of Service	Average delay per vehicle (secs/veh)	Signals & Roundabouts	Give Way & Stop signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & Spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays	At capacity, requires other control mode
F	> 70	Roundabouts require other control mode	Extreme delay, traffic signals or other major treatment required

Adapted from RTA 'Guide to Traffic Generating Developments' 2002

For roundabouts and priority intersections, the reported average delay is for the individual movement with the highest average delay per vehicle. At signalised intersections, the reported average delay is over all movements.

The results of this operational assessment are provided in **Table 4**.

ORD06

Attachment 1

Traffic and Transport Study
Camden Town Centre



Table 4: Thursday & Saturday AM/PM Existing Intersection Operating Conditions

Street 1	Street 2	Existing Thursday AM		Existing Thursday PM		Existing Saturday AM		Existing Saturday PM	
		LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)	LOS	Delay (secs)
Macquarie Grove Road	Exeter Street	A	10.5	A	10.3	B	18.2	A	9.2
John Street	Mitchell Street	B	15.4	B	14.6	A	11.2	A	10.7
Elizabeth Street	Mitchell Street	A	11.3	A	10.8	A	9.5	A	9.4
Argyle Street	Murray Street	B	20.4	B	14.7	B	15.3	A	13.1
Argyle Street	Oxley Street	B	18.2	B	15.3	A	13.9	A	12.3
Argyle Street	John Street	B	18.3	B	20.5	B	14.8	A	14.0
Argyle Street	Hill Street	B	14.7	B	18.4	A	12.8	A	12.0
Argyle Street	Elizabeth St	B	14.8	B	15.7	A	13.9	A	13.7
Argyle Street	Edward Street	B	15.3	B	16.7	B	14.7	A	13.1
Murray Street	Broughton Street	B	25.6	D	43.3	B	19.1	B	20.1
John Street	Broughton Street	A	12.0	B	14.4	A	10.5	A	10.0
Cawdor Road	Sheathers Lane	B	14.5	B	15.1	A	14.3	B	14.3
Old Hume Highway	Menangle Road	B	27.3	C	36.2	B	20.5	B	22.0

Camden Town Centre

Prepared for Camden Council



Smart Consulting

From **Table 4** the following observations have been made:

1. The vast majority of intersections within the study area operate well with minimal delays during all four peak periods assessed.
2. Intersection operating conditions during each AM peak period were similar at each location as which was the case for the PM peak periods compared
3. Only the intersection of Murray Street / Broughton Street during the Thursday afternoon peak period was found to operate poorly with right turning traffic out of Broughton Street delayed by through traffic in Menangle Road.
4. The intersection of Old Hume Highway / Menangle Road was nearing capacity during the Thursday afternoon peak. However, this was only for the right turn movement out of Menangle which included an only a small number of 10 vehicles.

For ease of reference, existing intersection operating conditions by day and peak period are shown in **Figure 7** to **Figure 10** below.

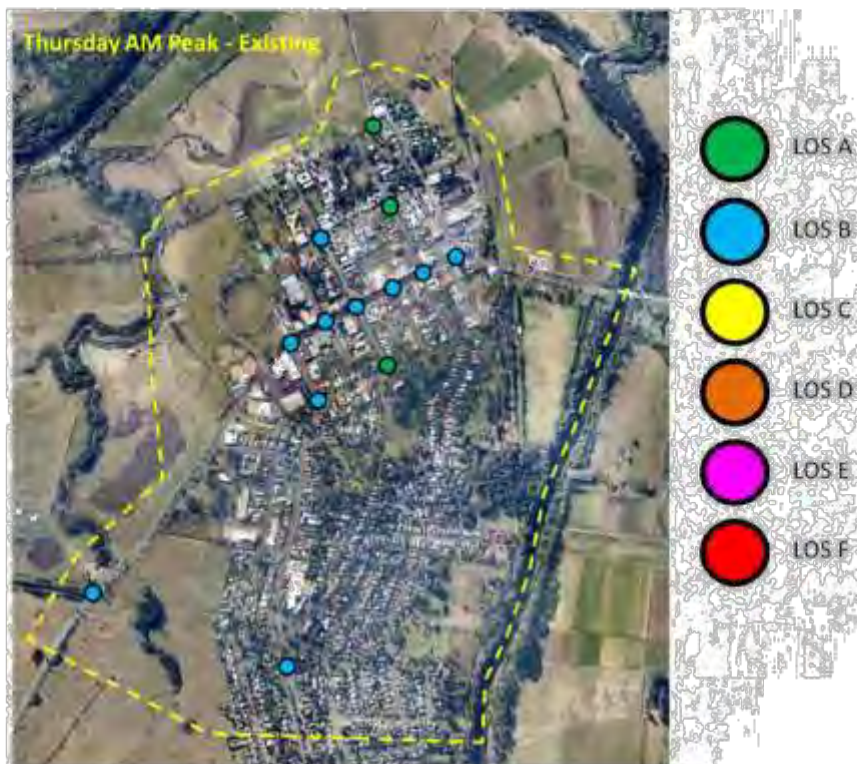


Figure 7: Thursday AM Peak Existing Intersection Operating Conditions

ORD06

Attachment 1

Camden Town Centre
Prepared for Camden Council



Smart Consulting

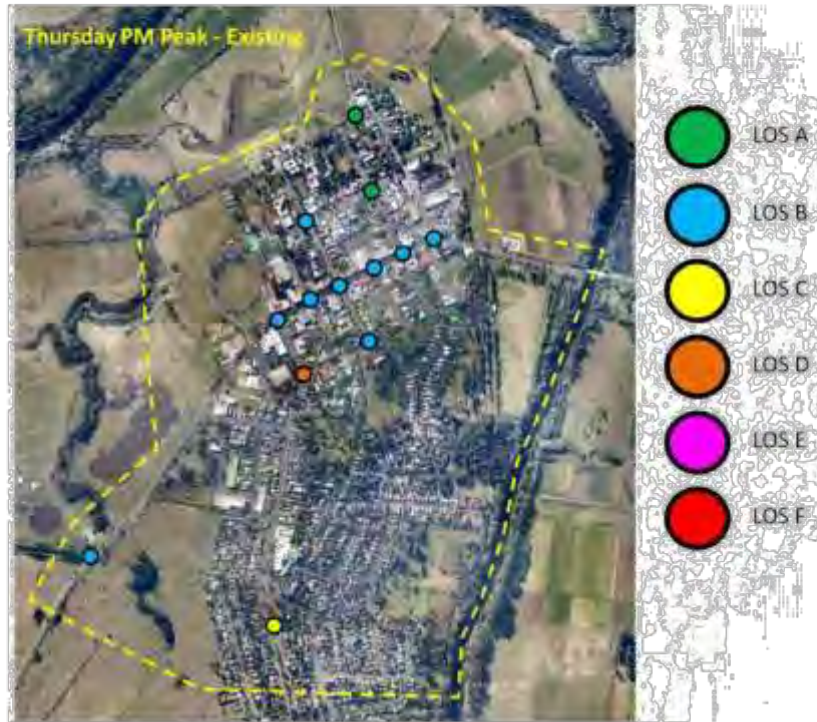


Figure 8: Thursday PM Peak Existing Intersection Operating Conditions



Figure 9: Saturday AM Peak Existing Intersection Operating Conditions

Camden Town Centre

Prepared for Camden Council



Smart Consulting

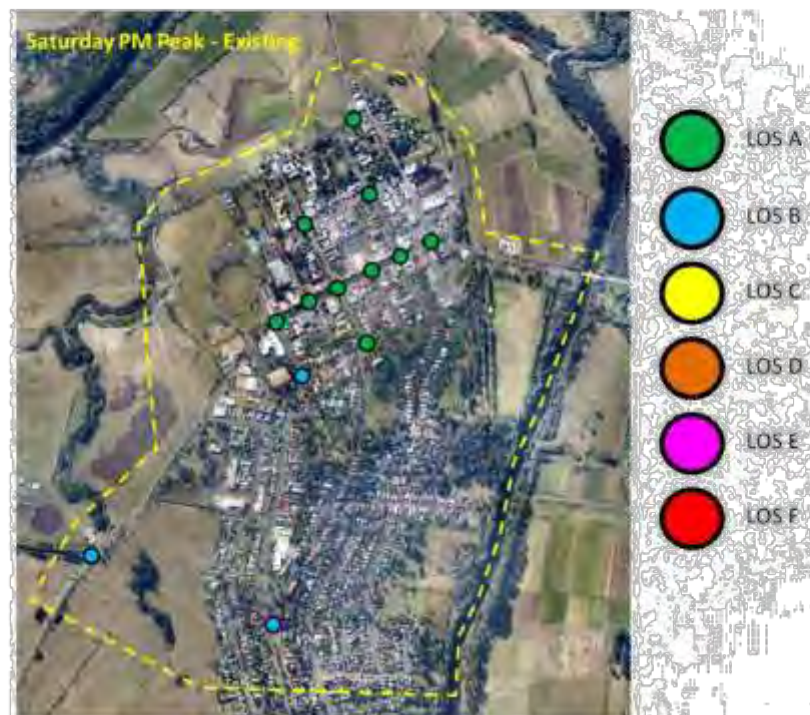


Figure 10: Saturday OM Peak Existing Intersection Operating Conditions

3.2 Mid Block Flows

Mid-block flows provide a further indication of existing traffic conditions. Mid-block demands versus available capacity is heavily dependent on side friction whether in the form of intersections or parking.

The following locations have been identified of interest:

1. Cawdor Road – between Sheathers Lane and Murray Street
2. Old Hume Highway – north of Menangle Road
3. Argyle Street – between Murray Street and Oxley Street
4. Argyle Street – between Oxley Street and John Street
5. Argyle Street – between John Street and Hill Street
6. Argyle Street – between Hills Street and Elizabeth Street
7. Argyle Street – between Elizabeth Street and Edward Street
8. Argyle Street – east of Edward Street

Existing mid-block AM and PM peak hour flows by direction are presented in Figure 11 to Figure 14:

ORD06

Attachment 1

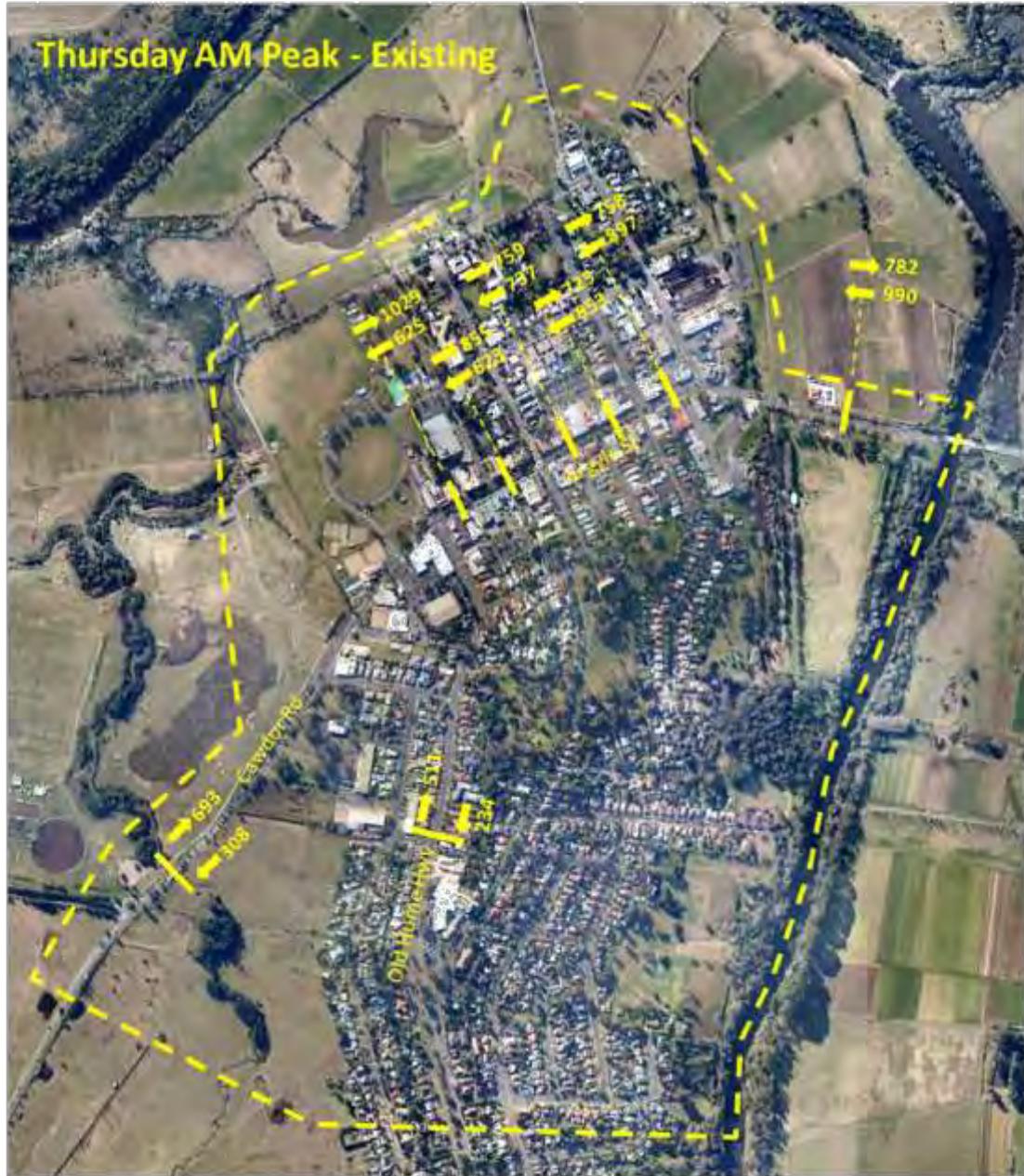


Figure 11: Thursday AM Peak Existing Mid-Block Flows

Camden Town Centre
Prepared for Camden Council



Smart Consulting

ORD06

Attachment 1

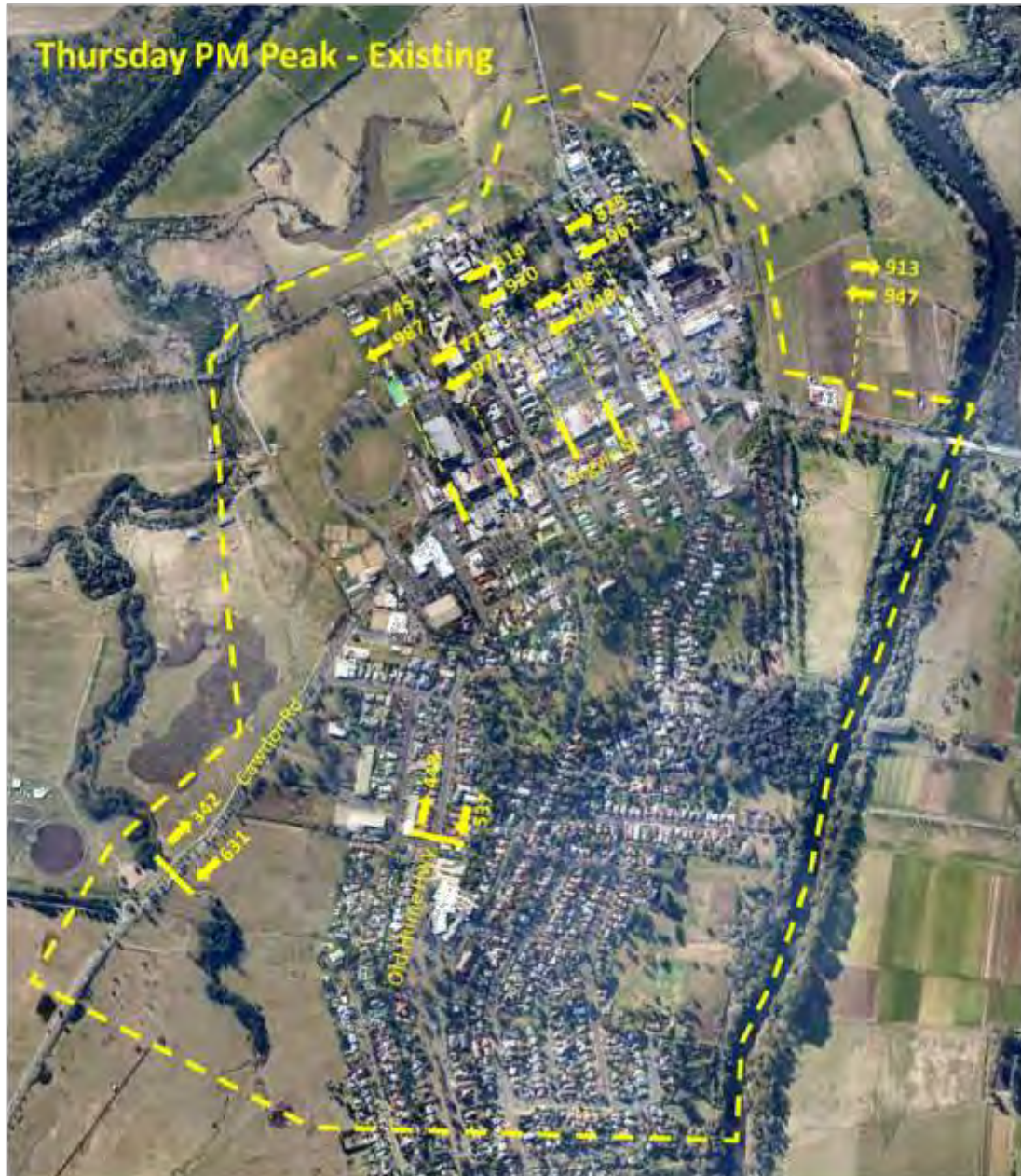


Figure 12: Thursday PM Peak Existing Mid-Block Flows

ORD06

Attachment 1

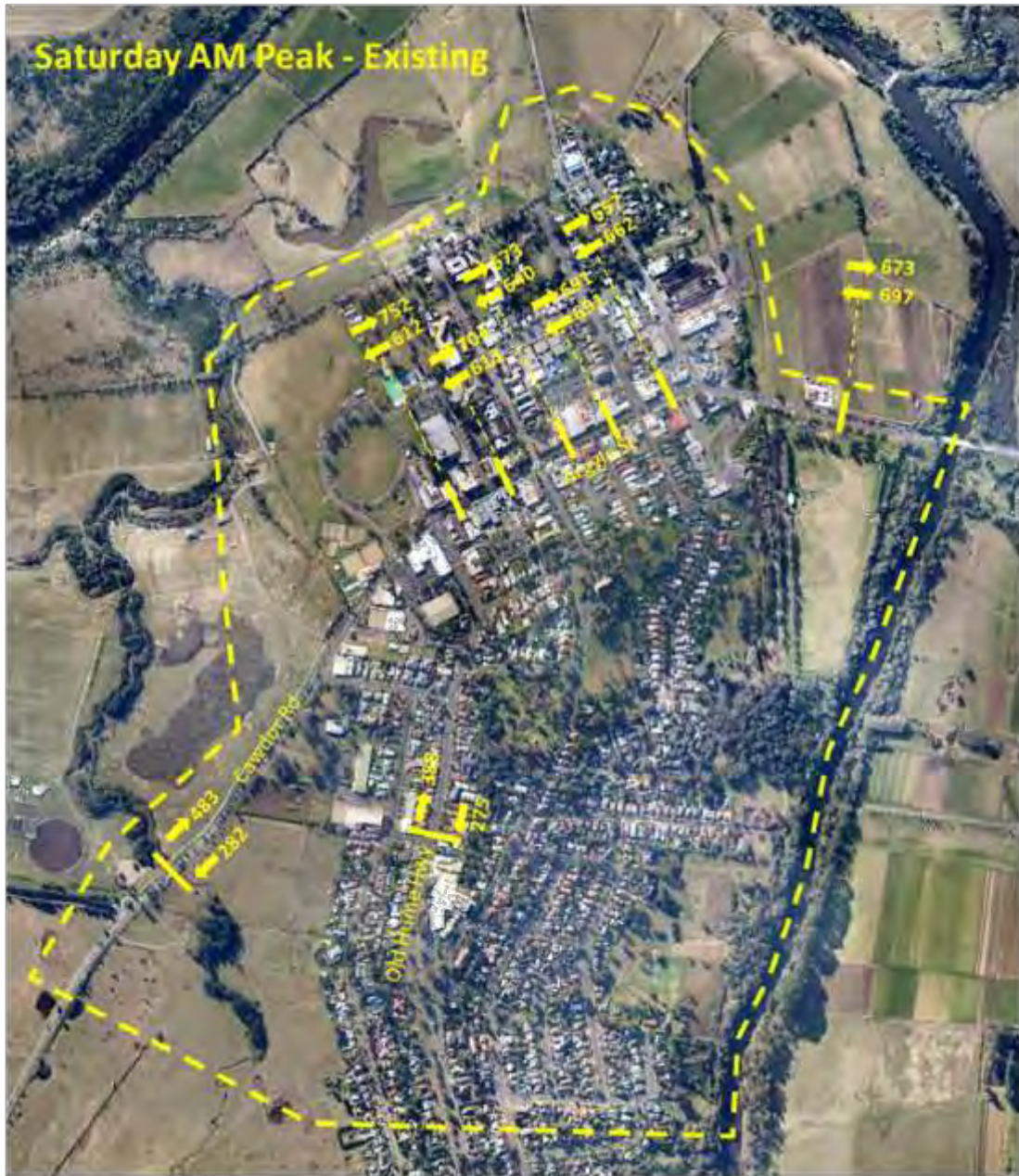


Figure 13: Saturday AM Peak Existing Mid-Block Flows

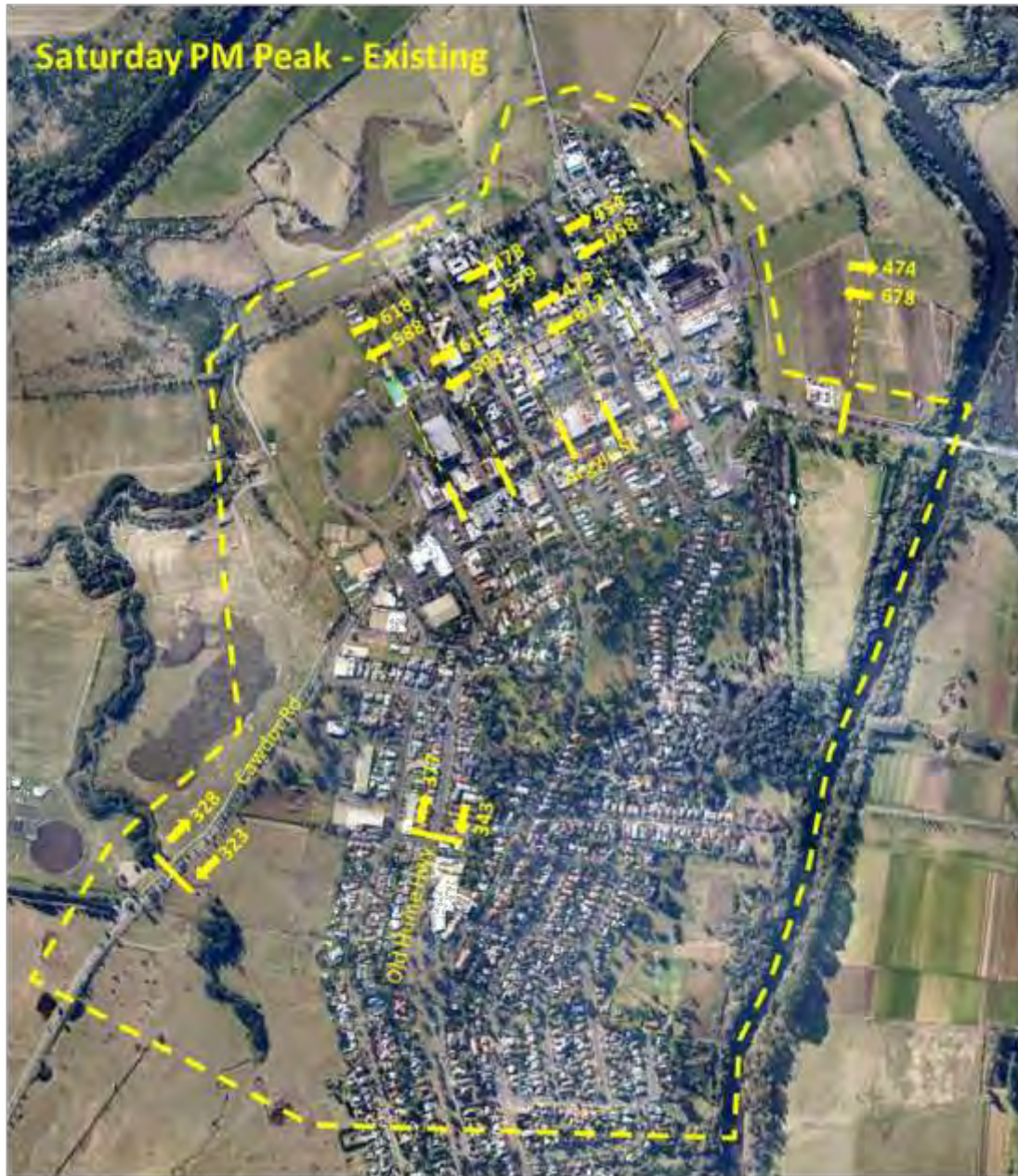


Figure 14: Saturday PM Peak Existing Mid-Block Flows

Camden Town Centre
Prepared for Camden Council



Smart Consulting

3.2.1 Commentary on Mid-Block Flows

During the AM peak on a weekday, the draw towards Camden Town Centre from the west is fairly evenly split between Cawdor Road and Old Hume Highway (Murray Street). The mirror image occurs during the afternoon weekday peak period.

Flows along Argyle Street were generally consistent for its entire length. There was a reasonable draw of eastbound traffic in Argyle Street turning left into Oxley Street which explains the drop in eastbound flow east of the intersection.

Based on the recorded mid-block flows by direction in Argyle Street, reduction of the street to a single lane in each direction to allow footpath widening is not considered a viable option.

On a Saturday, similar distributions of traffic to / from the centre occur but at lower demand levels. Eastbound and westbound flows in Argyle Street are very similar. Traffic to / from the south and south west are fairly evenly split between Cawdor Road and Old Hume Highway.

As stated in the 2008 Town Centre Strategy report, the reduction of Argyle Street to a single lane in each direction was not considered feasible based on existing traffic demands. Further, rerouting of this traffic would provide more dis-benefits than benefits.

Having regard to the existing two – way mid block flows, it is the opinion of this assessment that reducing Argyle Street to a single lane of travel in each direction with a parallel parking lane is not feasible. This is discussed further in Section 6.2 of this report.

3.2 Public Parking Inventory



Figure 15: Public Parking Audit Study Area

The total estimated public parking provision within the area defined in Figure 15 equates to the following:

Table 5 – Total Public Parking Spaces by Type

Total Unrestricted	879	
Total 15 Minutes	6	
Total 1 hour	259	
Total 2 hours	30	
Total 3 hours	394	
Total accessible	10	
Total	879	1578

ORD06

Camden Town Centre
Prepared for Camden Council



The logo for Smart Consulting, featuring the words "Smart Consulting" in a white, italicized, sans-serif font. The logo is set against a dark blue background with a white border.

Each public space was captured by the following elements:

1. Current imposed parking restriction
2. Whether on street or within a car park
3. Section and side of street

A plan showing all public parking spaces is provided in **Appendix A** of this report and is summarised in **Table 6**.

Attachment 1



Table 6: Parking Spaces by Restriction by Location

Street	From	To	Side	Capacity	Restrictions	Times Monday to Friday	Times Sat	Times Sun
Exeter Street	Oval	John Street	Northern	10	Unrestricted	---	---	---
Exeter Street	Oval	John Street	Southern	20	Unrestricted	---	---	---
Exeter Street	John Street	Elizabeth Street	Northern	30	Unrestricted	---	---	---
Exeter Street	John Street	Elizabeth Street	Southern	30	Unrestricted	---	---	---
Exeter Street	Elizabeth Street	Edward Street	Northern	9	Unrestricted	---	---	---
Exeter Street	Elizabeth Street	Edward Street	Southern	15	Unrestricted	---	---	---
John Street	Exeter Street	Mitchell Street	Eastern	57	Unrestricted	---	---	---
John Street	Exeter Street	Mitchell Street	Western	50	Unrestricted	---	---	---
John Street	Mitchell Street	Argyle Street	Eastern	13	Bus Zone	8:00am - 9:30am, 2:30pm - 4:00pm	---	---
John Street	Mitchell Street	Argyle Street	Eastern	13	Unrestricted	9:30am - 2:30pm, 4:00pm - 6:00pm	---	---
John Street	Mitchell Street	Argyle Street	Eastern	1	15 Minutes	8:30am - 6:00pm	8:30am - 12:30pm	---
John Street	Mitchell Street	Argyle Street	Eastern	6	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
John Street	Mitchell Street	Argyle Street	Western	18	Unrestricted	---	---	---
John Street	Mitchell Street	Argyle Street	Western	8	2 hours	8:30am - 6:00pm	8:30am - 12:30pm	---
John Street	Mitchell Street	Argyle Street	Western	20	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Elizabeth Street	Exeter Street	Mitchell Street	Eastern	46	Unrestricted	---	---	---
Elizabeth Street	Exeter Street	Mitchell Street	Western	49	Unrestricted	---	---	---
Elizabeth Street	Mitchell Street	Argyle Street	Eastern	10	Unrestricted	---	---	---

ORD06

Attachment 1

Traffic and Transport Study
Camden Town Centre



Street	From	To	Side	Capacity	Restrictions	Times Monday to Friday	Times Sat	Times Sun
Elizabeth Street	Mitchell Street	Argyle Street	Eastern	17	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Elizabeth Street	Mitchell Street	Argyle Street	Western	19	Unrestricted	---	---	---
Edward Street	Exeter Street	Mitchell Street	Eastern	60	Unrestricted	---	---	---
Edward Street	Exeter Street	Mitchell Street	Western	60	Unrestricted	---	---	---
Edward Street	Mitchell Street	Argyle Street	Eastern	25	Unrestricted	---	---	---
Edward Street	Mitchell Street	Argyle Street	Western	14	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Mitchell Street	Oval	John Street	Northern	24	Bus Zone	8:00am - 9:30am, 2:30pm - 4:00pm	---	---
Mitchell Street	Oval	John Street	Northern	24	Unrestricted	9:30am - 2:30pm, 4:00pm - 6:00pm	---	---
Mitchell Street	Oval	John Street	Southern	6	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Mitchell Street	Oval	John Street	Southern	9	Unrestricted	---	---	---
Mitchell Street	John Street	Elizabeth Street	Northern	39	Unrestricted	---	---	---
Mitchell Street	John Street	Elizabeth Street	Southern	43	Unrestricted	---	---	---
Mitchell Street	Elizabeth Street	Edward Street	Northern	39	Unrestricted	---	---	---
Mitchell Street	Elizabeth Street	Edward Street	Southern	43	Unrestricted	---	---	---
Oxley Street	Mitchell Street	Argyle Street	Eastern	16	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Oxley Street Public Car Park North	Mitchell Street	Argyle Street	Eastern	46	3 hours	8:30am - 6:00pm	8:30am - 12:30pm	---
Oxley Street Council Car Park (Central)	Mitchell Street	Argyle Street	Eastern	26	Restricted	8:30am - 6:00pm	---	---

Traffic and Transport Study
Camden Town Centre



Street	From	To	Side	Capacity	Restrictions	Times Monday to Friday	Times Sat	Times Sun
Oxley Street Public Car Park South	Mitchell Street	Argyle Street	Eastern	Unknown	Unknown	Unknown	Unknown	Unknown
Oxley Street	Mitchell Street	Argyle Street	Western	18	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Larkin Place Public Car Park	John Street	Elizabeth Street	---	26	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Larkin Place Public Car Park	John Street	Elizabeth Street	---	2	Accessible			
Larkin Place Public Car Park	John Street	Elizabeth Street	---	151	3 hours	8:30am - 6:00pm	8:30am - 12:30pm	---
Cawdor Road	Oval	Murray Street	Northern	9	Unrestricted	---	---	---
Cawdor Road	Oval	Murray Street	Southern	4	Unrestricted	---	---	---
Argyle Street	Murray Street	John Street	Northern	12	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Argyle Street	Murray Street	John Street	Northern	5	15 Minutes	8:30am - 6:00pm	8:30am - 12:30pm	---
Argyle Street	Murray Street	John Street	Southern	21	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Argyle Street	John Street	Elizabeth Street	Northern	21	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Argyle Street	John Street	Elizabeth Street	Southern	19	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Argyle Street	Elizabeth Street	Edward Street	Northern	6	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Argyle Street	Elizabeth Street	Edward Street	Southern	3	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---

ORD06

Attachment 1

Traffic and Transport Study
Camden Town Centre



Street	From	To	Side	Capacity	Restrictions	Times Monday to Friday	Times Sat	Times Sun
Murray Street	John Street	Broughton Street	Eastern	6	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Murray Street	John Street	Broughton Street	Western	10	2 hours	All Day	All Day	All Day
Murray Street Public Car Park	Murray Street	John Street	---	29	Unrestricted	---	---	---
Murray Street Public Car Park	Murray Street	John Street	---	2	Accessible	---	---	---
Murray Street Public Car Park	Murray Street	John Street	---	104	3 hours	8:30am - 6:00pm	8:30am - 12:30pm	---
John Street	Argyle Street	Broughton Street	Eastern	23	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
John Street	Argyle Street	Broughton Street	Western	6	Accessible	All Day	All Day	All Day
John Street	Argyle Street	Broughton Street	Western	23	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
John Street Public Car Park	John Street	Hill Street	---	93	3 hours	8:30am - 6:00pm	8:30am - 12:30pm	---
Hill Street	Argyle Street	Broughton Street	Eastern	13	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Hill Street	Argyle Street	Broughton Street	Eastern	10	2 hours	8:30am - 6:00pm	8:30am - 12:30pm	---
Hill Street	Argyle Street	Broughton Street	Western	10	1 hour	8:30am - 6:00pm	8:30am - 12:30pm	---
Hill Street	Argyle Street	Broughton Street	Western	10	2 hours	8:30am - 6:00pm	8:30am - 12:30pm	---
View Street	Argyle Street	Alpha Road	Eastern	22	Unrestricted	---	---	---
View Street	Argyle Street	Alpha Road	Western	0	No Parking	---	---	---

Traffic and Transport Study
Camden Town Centre



Street	From	To	Side	Capacity	Restrictions	Times Monday to Friday	Times Sat	Times Sun
Broughton Street	Murray Street	Menangle Road	Northern	15	Unrestricted	---	---	---
Broughton Street	Murray Street	Menangle Road	Southern	15	Unrestricted	---	---	---
Broughton Street	John Street	Hill Street	Northern	15	Unrestricted	---	---	---
Broughton Street	John Street	Hill Street	Southern	15	Unrestricted	---	---	---
		Total		1578				

3.2.1 Commentary on Public Parking Provision

A glaring omission of the existing restrictions in place in and around the Camden Town Centre is seven day restrictions are basically non-existent. Therefore after 12:30pm on a Saturday, whilst main retailers continue to trade in the town centre core, no time restrictions apply to any of the available public parking.

The Camden Town Centre benefits from four large public car parks which can be accessed in most instances without the need to travel the full length of Argyle Street from either direction. Allowing vehicles to come to and from a town centre and access public parking without the need to travel through the core is considered best practice.

The overall supply of accessible parking spaces within the centre as a whole equates to approximately 1% of the total parking available as recorded in **Table 5**. In previous versions of the Australian Standard for Off Street Car Parking Facilities – AS2890.1, a rate of 1-3% of total spaces set aside as accessible spaces was considered appropriate for retail uses.

Overall the existing accessible space provision in the centre is considered low and inadequate for the aging population which exists in and around the Camden area. It is recommended that Council adopt a 3% provision rate for accessible parking spaces. The provision of designated accessible spaces should be in the public car park adjacent to medical facilities.

Whilst accessible parking permits allow users to park double the designated time of the parking restriction, this does not give any consideration to the location and the accessible routes of travel to from that particular general parking space.

3.4 Public Parking Demand Analysis

Parking surveys were undertaken within the town centre on:

- Thursday 8:00am to 5:00pm with selected off-street car parks (P2 & P3) surveyed until 9:00pm
- Friday 6:00pm to 9:00pm at selected off-street car parks (P2 & P3)
- Saturday 8:00am to 5:00pm with selected off-street car parks (P2 & P3) surveyed until 9:00pm

A one hour beat survey method was used in which the number of vehicles present was recorded by street block and side of the street at hourly intervals. In addition to demand, parking regulations applying to each of these blocks was recorded along with their estimated capacity. The study area for the parking demand counts is shown below.



Figure 16: Public Parking Audit Study Area

3.4.1 Weekday Parking Supply

A detailed set of drawings was prepared indicating the prevailing parking regulations within the town centre. These are shown in Appendix A of this report and summarised above in **Table 6**.

In addition, an analysis of spaces by type was undertaken and is reported below. Of note is that some spaces have several different applicable regulations by time of day and day of week, and these are reflected in this analysis.

As part of the analysis spaces were classified into two broad groups:

- General – these are spaces that are generally available to all vehicles (including loading zones) and have a range of time limits applied
- Special – these are spaces designated for particular restricted user groups, such as disabled, set down pick up, police, council, etc;

The following table summarises the allocation of general car parking spaces within the town centre on weekdays.

Table 7: Parking space allocation by type and on street/off street, weekday, by hour

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Time	General			Special			Total
	On-street	Off-street	Total	On-street	Off-street	Total	
8:00	1,058	813	1,871	20	41	61	1,932
9:00	1,058	813	1,871	20	41	61	1,932
10:00	1,094	823	1,917	20	41	61	1,978
11:00	1,094	823	1,917	20	41	61	1,978
12:00	1,094	823	1,917	20	41	61	1,978
13:00	1,094	823	1,917	20	41	61	1,978
14:00	1,094	823	1,917	20	41	61	1,978
15:00	1,058	813	1,871	20	41	61	1,932
16:00	1,094	823	1,917	20	41	61	1,978
17:00	1,094	823	1,917	20	41	61	1,978

This analysis demonstrates that general parking is by far the largest parking type surveyed, with special parking accounting for less than 5% of spaces. On-street spaces account for between 55% and 60% of general parking spaces; this reinforces the importance of the on-street parking resource for the town centre.

The next table summarises the time restrictions of general parking spaces.

Table 8: Parking space allocation by type and on street/off street, weekday, by hour

Time	P15	2P	2P	3P	No Restriction	Loading Zone	Total
8:00	5	253	110	445	1,050	8	1,871
9:00	5	253	110	445	1,050	8	1,871
10:00	5	253	110	455	1,086	8	1,917
11:00	5	261	110	455	1,086	0	1,917
12:00	5	261	110	455	1,086	0	1,917
13:00	5	261	110	455	1,086	0	1,917
14:00	5	261	110	455	1,086	0	1,917
15:00	5	261	110	445	1,050	0	1,871
16:00	5	261	110	455	1,086	0	1,917
17:00	5	261	110	455	1,086	0	1,917

Of the spaces in the town centre, those during the week with no restriction account for roughly half the supply. Spaces designated as 3P are about a quarter of spaces. There are few designated on-street loading zones and these convert to other parking types from 11:00am.

Table 9 provides a breakdown of special spaces among their designated users.

Traffic and Transport Study

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 9: Parking space allocation for special spaces, weekday, by hour and by time regulation

Time	Disable parking	Motor Bikes Only	Pick up & Setdown only	Pedestrian vehicles (Exempt)	Service Vehicles only	Low Zone	No Parking - Allv. (no access)	Total
8:00	22	4	1	2	1	5	26	61
9:00	22	4	1	2	1	5	26	61
10:00	22	4	1	2	1	5	26	61
11:00	22	4	1	2	1	5	26	61
12:00	22	4	1	2	1	5	26	61
13:00	22	4	1	2	1	5	26	61
14:00	22	4	1	2	1	5	26	61
15:00	22	4	1	2	1	5	26	61
16:00	22	4	1	2	1	5	26	61
17:00	22	4	1	2	1	5	26	61

The 26 'no parking authorised vehicles only' are spaces reserved for Council vehicles off Oxley Street. The supply of disabled parking spaces is between 1 and 2% of town centre spaces.

As part of the analysis, a notional walk distance between groups of car parking spaces and Argyle Street (between Murray Street and Elizabeth Street/View Street) was measured¹ to provide an indication of the convenience of spaces for town centre users. The following table identifies the number of general user parking spaces within these distances bands of Argyle Street.

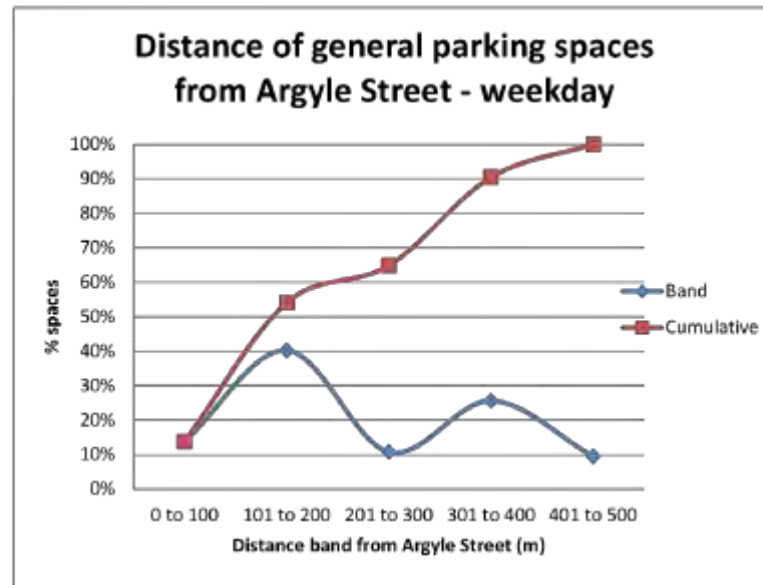
Table 10: Parking space walk distance bands by time restriction by hour, for general spaces – Thursday

Restriction	P15				P1				No Restriction				Loading Zone
	0 to 100	101 to 200	201 to 300	301 to 400	0 to 100	101 to 200	101 to 200	0 to 100	101 to 200	201 to 300	301 to 400	401 plus	
Time													
8:00	5	168	73	12	74	36	445	18	187	171	491	183	8
9:00	5	168	73	12	74	36	445	18	187	171	491	183	8
10:00	5	168	73	12	74	36	455	18	200	194	491	183	8
11:00	5	168	81	12	74	36	455	18	200	194	491	183	0
12:00	5	168	81	12	74	36	455	18	200	194	491	183	0
13:00	5	168	81	12	74	36	455	18	200	194	491	183	0
14:00	5	168	81	12	74	36	455	18	200	194	491	183	0
15:00	5	168	81	12	74	36	445	18	187	171	491	183	0
16:00	5	168	81	12	74	36	455	18	200	194	491	183	0
17:00	5	168	81	12	74	36	455	18	200	194	491	183	0

¹ This was generally from the centroid of the parking zone to Argyle Street via the most direct walk path available, including via private arcade-style links. Argyle Street was chosen as it is a focus for the town centre; however, some people/vehicles do not necessarily want to use Argyle Street, and this is likely to account for some of the more distant parking activity, even when spaces closer to Argyle Street are available.

Much of the general parking supply, both on- and off-street, is located in reasonably close proximity to Argyle Street. The following chart shows the proportional distribution of spaces by distance band, as well as a cumulative series. These are for a notional hour commencing 10:00am.

Chart 1: Proportional Distribution of Spaces by Distance Band



The above chart indicates that some two-thirds of the town centre's supply of general parking is located closer than the '301 to 400m' walk distance band and 90% is closer to Argyle Street than 400m.

3.4.2 Weekday Parking Demand

The beat surveys identified the number of vehicles actually parked in each set of parking spaces within the town centre. The following table provides a summary of vehicles present and the next table shows this as a percentage utilisation of spaces.

Table 11: Vehicles parked by type of space – Thursday

Time	On-street			Off-street			Total
	On-street	Off-street	Total	On-street	Off-street	Total	
8:00	429	146	575	12	27	39	614
9:00	523	419	942	10	36	46	988
10:00	577	529	1,106	9	34	43	1,149
11:00	567	575	1,142	8	30	38	1,180
12:00	588	632	1,220	9	32	41	1,261
13:00	634	747	1,381	12	40	52	1,433
14:00	625	737	1,362	11	37	48	1,410
15:00	637	691	1,328	11	36	47	1,375
16:00	498	547	1,045	8	23	31	1,076
17:00	393	344	737	4	9	13	750

The following table reports the utilisation of these spaces as a percentage of the total number of spaces by type.

Table 12: Utilisation of parking spaces by type of space, by hour – Thursday

Time	General			Special			Total
	On-street	Off-street	Total	On-street	Off-street	Total	
8:00	41%	18%	31%	60%	66%	64%	32%
9:00	49%	52%	50%	50%	88%	75%	51%
10:00	53%	64%	58%	45%	83%	70%	58%
11:00	52%	70%	60%	40%	73%	62%	60%
12:00	54%	77%	64%	45%	78%	67%	64%
13:00	58%	91%	72%	60%	98%	85%	72%
14:00	57%	90%	71%	55%	90%	79%	71%
15:00	60%	85%	71%	55%	88%	77%	71%
16:00	46%	66%	55%	40%	56%	51%	54%
17:00	36%	42%	38%	20%	22%	21%	38%

General parking spaces in off-street car parks experience higher overall utilisation than on-street spaces. This is likely due to the proximity of off-street car parks to town centre destinations when compared with on-street parking which is available over a greater range. Overall general parking spaces have a peak utilisation of just under three-quarters at around 1:00pm.

The following table disaggregates general parking demand by time restriction.

Table 13: Vehicles parked in general parking by time restriction, by hour – Thursday

Time	all	1P	2P	3P	No Restriction	Loading/Unloading	Total
8:00	5	155	70	78	262	5	575
9:00	5	189	97	252	392	7	942
10:00	5	217	101	328	447	8	1,106
11:00	5	232	100	370	435	0	1,142
12:00	4	234	100	420	462	0	1,220
13:00	5	233	91	452	600	0	1,381
14:00	5	221	92	448	596	0	1,362
15:00	4	202	105	425	592	0	1,328
16:00	3	202	93	343	404	0	1,045
17:00	4	173	76	213	271	0	737

Numerically the 'no restriction' parking has the highest demand, peaking at around 600 vehicles at 1:00pm. The 3P parking is the next most important source of supply – it also peaks around 1:00pm, at just over 450 vehicles.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

The relative utilisation of these spaces is summarised by hour in the following table.

Table 14: Utilisation of general parking spaces by time restriction by hour – Thursday

Time	15P	1P	2P	3P	No Restriction	Loading Zone	Total
8:00	100%	61%	64%	18%	25%	63%	31%
9:00	100%	75%	88%	57%	37%	88%	50%
10:00	100%	86%	92%	72%	41%	100%	58%
11:00	100%	89%	91%	81%	40%	n.a.	60%
12:00	80%	90%	91%	92%	43%	n.a.	64%
13:00	100%	89%	83%	99%	55%	n.a.	72%
14:00	100%	85%	84%	98%	55%	n.a.	71%
15:00	80%	77%	95%	96%	56%	n.a.	71%
16:00	60%	77%	85%	75%	37%	n.a.	55%
17:00	80%	66%	69%	47%	25%	n.a.	38%

The 15P parking is busy all day, but it is a very small proportion of supply. Peak utilisation of the other time restricted parking, i.e., 1P, 2P and 3P, are high at between 90 and 99% occurring around midday to 1:00pm. Parking with no restriction has peak utilisation of 56% around 3:00pm.

The use of special parking spaces is tabulated below.

Table 15: Vehicles parked in special parking spaces by restriction by hour – Thursday

Time	Unstable Parking	Motor Bikes Only	Pick up & Setdown only	Police vehicles - Exempt	Service Vehicles only	Taxi Zone	No Parking - Auth veh accepted	Total
8:00	6	4	0	1	0	2	26	39
9:00	17	0	0	0	1	2	26	46
10:00	14	0	0	0	0	3	26	43
11:00	11	0	0	0	0	3	24	38
12:00	14	1	0	0	0	3	23	41
13:00	20	1	0	0	1	4	26	52
14:00	19	0	0	0	0	3	26	48
15:00	15	0	0	2	1	3	26	47
16:00	8	0	0	2	0	3	18	31
17:00	2	0	0	1	0	2	8	13

Camden Town Centre

Prepared for Camden Council



Smart Consulting

The survey information suggests that most of these spaces turnover through the day, with considerable fluctuations in demand. The exception to this are the 'No Parking – authorised vehicles excepted' which are a yard of Council vehicles in the off-street car park on Oxley Street.

The utilisation of these spaces is shown in the next table.

Table 16: Utilisation of special parking spaces by restrictions by hour – Thursday

Time	Disabled Parking	Visitor Only	Police Suburban only	Police Vehicles Registered	Service Vehicles only	Two wheels	No Parking – authorised vehicles excepted	Total
8:00	27%	100%	0%	50%	0%	40%	100%	64%
9:00	77%	0%	0%	0%	100%	40%	100%	75%
10:00	64%	0%	0%	0%	0%	60%	100%	70%
11:00	50%	0%	0%	0%	0%	60%	92%	62%
12:00	64%	25%	0%	0%	0%	60%	88%	67%
13:00	91%	25%	0%	0%	100%	80%	100%	85%
14:00	86%	0%	0%	0%	0%	60%	100%	79%
15:00	68%	0%	0%	100%	100%	60%	100%	77%
16:00	36%	0%	0%	100%	0%	60%	69%	51%
17:00	9%	0%	0%	50%	0%	40%	31%	21%

The disabled parking spaces are well-used in the middle of the day, when they are utilised 85% or more for two hours.

Time distance bands (for the notional walk from the car parking spaces to Argyle Street) were attached to the data and these demands are summarised in Error! Reference source not found., below.

Table 17: Cars parked in general parking spaces by time restriction, by walk distance to Argyle Street, by hour – Thursday

Restriction	0-15'		15'		20'		30'		No Restriction					Loading Zone
	0 to 100	101 to 200	201 to 300	301 to 400	401 plus	101 to 200	201 to 300	301 to 400	401 plus	101 to 200	201 to 300	301 to 400	401 plus	
Time														
8:00	5	103	51	1	59	11	78	10	72	50	122	8	5	
9:00	5	136	52	1	63	34	252	10	140	83	148	11	7	
10:00	5	151	66	0	66	35	328	12	172	109	152	2	8	
11:00	5	157	75	0	65	35	370	14	174	108	138	1	0	
12:00	4	154	75	5	65	35	420	14	173	127	136	12	0	
13:00	5	158	72	3	55	36	452	11	168	143	267	11	0	
14:00	5	145	74	2	57	35	448	8	179	135	265	9	0	
15:00	4	127	74	1	69	36	425	7	169	122	281	13	0	

ORD06

Camden Town Centre
Prepared for Camden Council



Smart Consulting

Restriction	All	1P		2P		3P		No Restriction					Loading Zone
16:00	3	127	72	3	64	29	343	6	149	96	143	10	0
17:00	4	122	50	1	57	19	213	5	102	45	108	11	0

This demand information is used in the following table to provide an indication of utilisation.

Table 18: Utilisation of general parking spaces by time restrictions, by walk distance to Argyle Street, by hour- Thursday

Restriction	All	1P		2P		3P		No Restriction					Loading Zone
Walk distance band (m)	0 to 100	0 to 100	101 to 200	201 to 300	0 to 100	101 to 200	101 to 200	0 to 100	101 to 200	201 to 300	301 to 400	401 plus	101 to 200
Time													
8:00	100%	61%	70%	8%	80%	31%	18%	56%	39%	29%	25%	4%	63%
9:00	100%	81%	71%	8%	85%	94%	57%	56%	75%	49%	30%	6%	88%
10:00	100%	90%	90%	0%	89%	97%	72%	67%	86%	56%	31%	1%	100%
11:00	100%	93%	93%	0%	88%	97%	81%	78%	87%	56%	28%	1%	n.a.
12:00	80%	92%	93%	42%	88%	97%	92%	78%	87%	65%	28%	7%	n.a.
13:00	100%	94%	89%	25%	74%	100%	99%	61%	84%	74%	54%	6%	n.a.
14:00	100%	86%	91%	17%	77%	97%	98%	44%	90%	70%	54%	5%	n.a.
15:00	80%	76%	91%	8%	93%	100%	96%	39%	90%	71%	57%	7%	n.a.
16:00	60%	76%	89%	25%	86%	81%	75%	33%	75%	49%	29%	5%	n.a.
17:00	80%	73%	62%	8%	77%	53%	47%	28%	51%	23%	22%	6%	n.a.

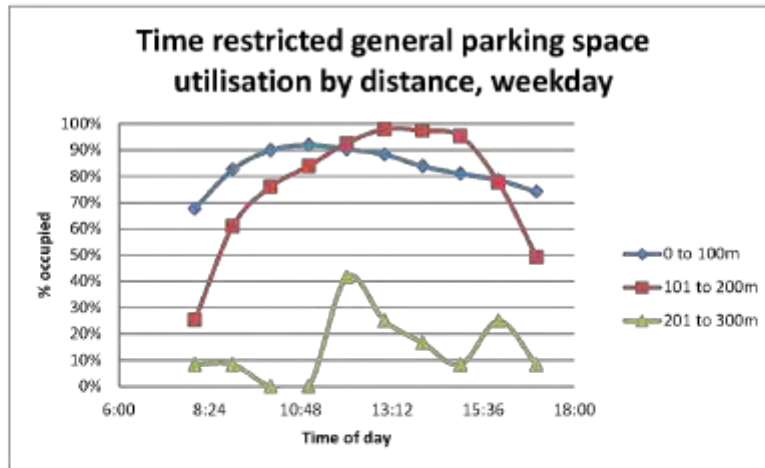
The above analysis indicates that unrestricted spaces closer to Argyle Street (within 200m) are well used, holding around 85% utilisation from about 10:00am through to between 3:00 and 4:00pm. More than 200m from Argyle Street there is a good supply of un-used parking spaces.

Attachment 1



The following chart presents the utilisation of all time restricted spaces by walk distance from Argyle Street.

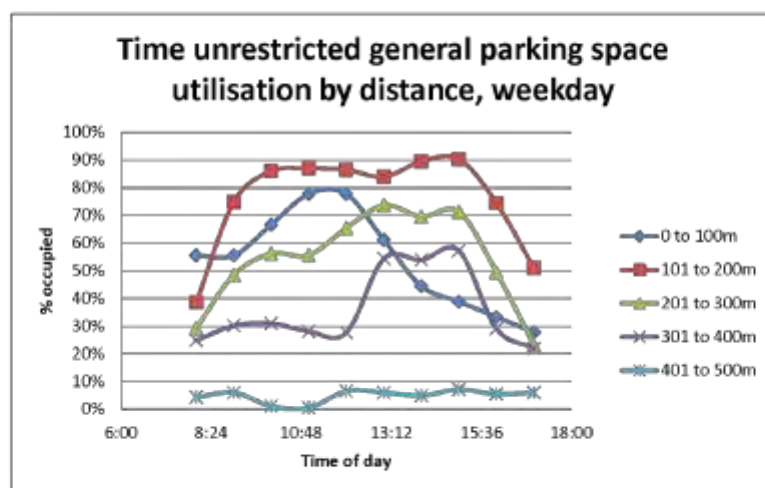
Chart 2: Parking Utilisation by Walk distance from Argyle Street – Time Restricted Spaces



The closer spaces tend to fill earlier than the more remote spaces, which is an expected finding. Of interest is that a large proportion of the time restricted spaces are occupied early in the day, prior to the commencement of a large proportion of retail and personal business customer activity (typically later, around 10:00am onward, and, at 8:00am, prior to the commencement of school. The more distant time restricted spaces are not heavily used, although there are few of them.

The next chart shows the same information for the unrestricted spaces.

Chart 3: Parking Utilisation by Walk distance from Argyle Street - Unrestricted Spaces





Again these tend to fill from the spaces that are closer to Argyle Street first, and then more distant spaces become utilised. Note that the number of unrestricted spaces up to 100m of Argyle Street is small. Our expectation was that a greater proportion of unrestricted spaces would be taken earlier in the day when compared with time restricted spaces. This was based on long-stay parkers (town centre workers) would arrive between 7:00am and 9:30am to prepare for the day, whilst their customers (generally short stay parkers) would arrive in substantial numbers from about 9:30am/10:00am. Whereas comparison of the above two charts indicates similar profiles of demand for spaces within 200m of Argyle Street, whether time restricted or not.

A partial explanation might be that there are private on-site parking spaces used by employees at a number of businesses and that these spaces were not included in the surveys undertaken for this study.

The following charts show the percentage utilisation of spaces for each of the main time restrictions.

Chart 4: Percentage Utilisation by 1 Hour Time Restrictions

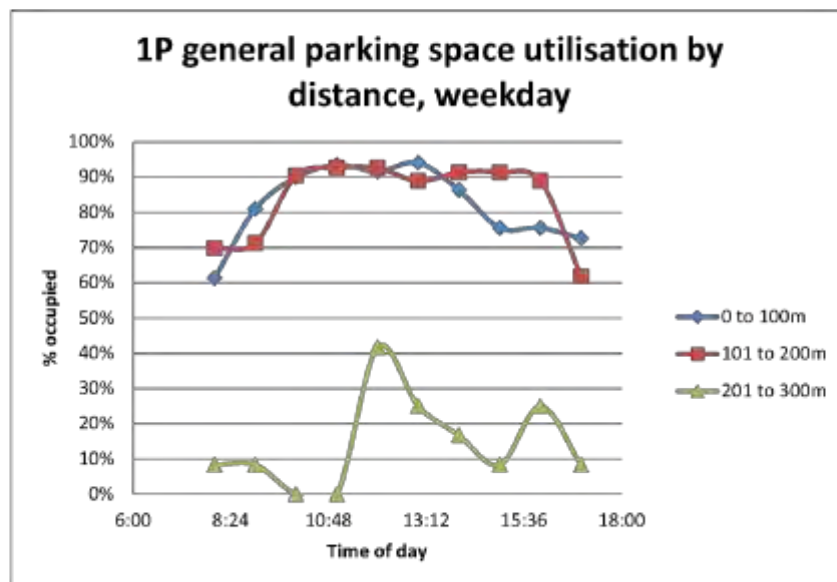




Chart 5: Percentage Utilisation by 2 Hour Time Restrictions

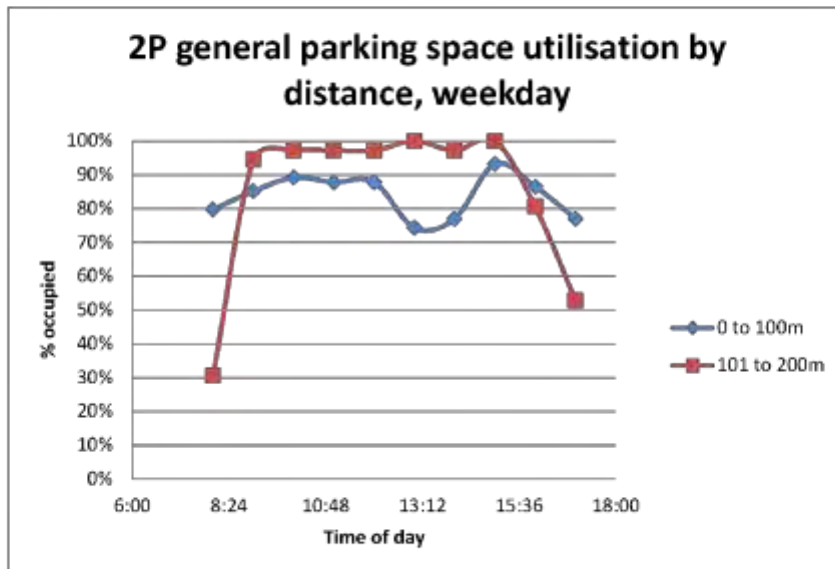
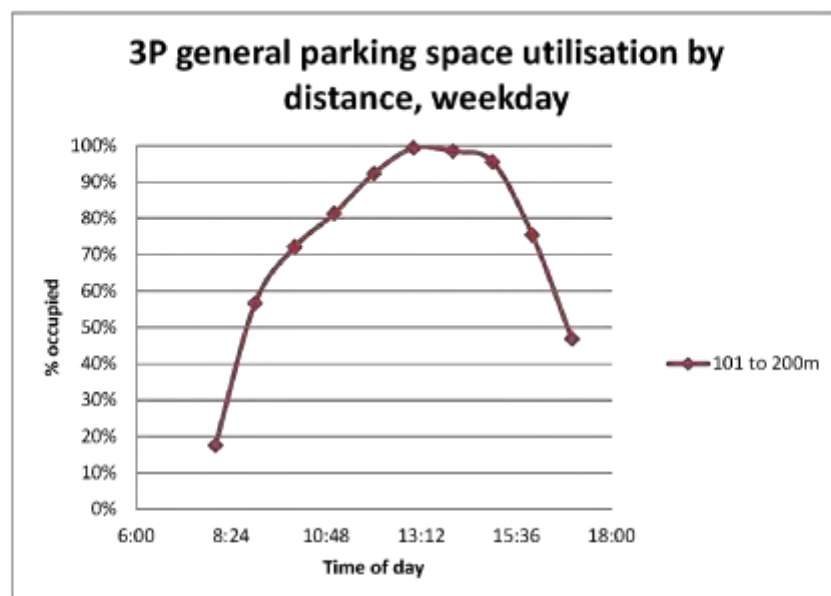


Chart 6: Percentage Utilisation by 3 Hour Time Restrictions



Camden Town Centre

Prepared for Camden Council



Smart Consulting

3.4.3 Weekday Evening Parking Demand

Surveys were taken in off-street car parks P2 and P3 on Thursday and Friday evenings from 6:00pm to 9:00pm. The following table reports the utilisation of these car parks on Thursday all day, including the evening, to provide context for the evening usage.

Table 19: Occupancy, capacity and utilisation of car parks P2 and P3 on Thursday (9.00am to 9.00pm), by hour

Time	Occupancy			Capacity			Utilisation		
	P2	P3	Total	P2	P3	Total	P2	P3	Total
8:00	34	28	62	134	142	276	25%	20%	22%
9:00	126	80	206	134	142	276	94%	56%	75%
10:00	134	134	268	134	152	286	100%	88%	94%
11:00	134	137	271	134	152	286	100%	90%	95%
12:00	134	141	275	134	152	286	100%	93%	96%
13:00	134	152	286	134	152	286	100%	100%	100%
14:00	132	148	280	134	152	286	99%	97%	98%
15:00	129	133	262	134	142	276	96%	94%	95%
16:00	130	80	210	134	152	286	97%	53%	73%
17:00	55	70	125	134	152	286	41%	46%	44%
18:00	40	59	99	134	152	286	30%	39%	35%
19:00	46	64	110	134	152	286	34%	42%	38%
20:00	42	63	105	134	152	286	31%	41%	37%
21:00	39	60	99	134	152	286	29%	39%	35%

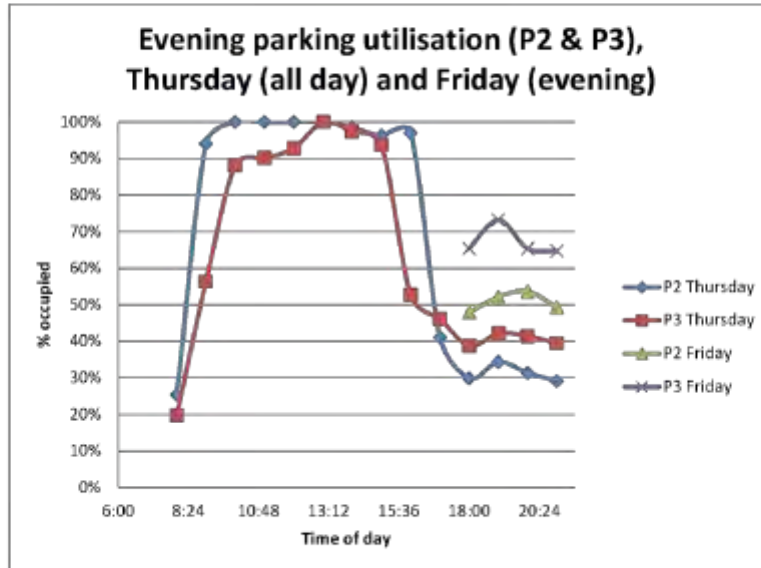
The following table summarises the use of these car parks on the Friday evening.

Time	Occupancy			Capacity			Utilisation		
	P2	P3	Total	P2	P3	Total	P2	P3	Total
18:00	66	100	166	138	153	291	48%	65%	57%
19:00	72	112	184	138	153	291	52%	73%	63%
20:00	74	100	174	138	153	291	54%	65%	60%
21:00	68	99	167	138	153	291	49%	65%	57%

The following chart shows the utilisation of these spaces as a percentage of supply for all day Thursday (from 9:00am to 9:00pm) and for Friday evening.



Chart 7: 9.00am to 9.00pm Thursday – Percentage Utilisation by Supply



The utilisation on Thursday evening is relatively low for both car parks – below 50% and well below the daytime peaks of around 100%. On Friday evening the use of both car parks is higher, with P2 peaking around 50% utilised and P3 peaking around 75% utilised.

3.4.4 Saturday Parking Supply

This section presents a similar analysis of car park supply as in the above section for weekdays.

The following table summarises the allocation of general car parking spaces within the town centre on weekdays.

Table 21: Parking space allocation by type and on-street/off-street, Saturday, by hour

Time	General			Special			Total
	On-street	Off-street	Total	On-street	Off-street	Total	
8:00	1,066	823	1,889	20	41	61	1,950
9:00	1,066	823	1,889	20	41	61	1,950
10:00	1,066	823	1,889	20	41	61	1,950
11:00	1,066	823	1,889	20	41	61	1,950
12:00	1,066	823	1,889	20	41	61	1,950
13:00	1,066	823	1,889	20	41	61	1,950
14:00	1,066	823	1,889	20	41	61	1,950
15:00	1,066	823	1,889	20	41	61	1,950
16:00	1,066	823	1,889	20	41	61	1,950
17:00	1,066	823	1,889	20	41	61	1,950

Camden Town Centre

Prepared for Camden Council



Smart Consulting

ORD06

Attachment 1

Table 22: Parking space allocation for general spaces, Saturday, by hour and by time regulation

Time	15'	30'	2H	3H	No. Restriction	Loading Zone	Total
8:00	5	261	110	445	1,068	n.a.	1,889
9:00	5	261	110	445	1,068	n.a.	1,889
10:00	5	261	110	445	1,068	n.a.	1,889
11:00	5	261	110	445	1,068	n.a.	1,889
12:00	5	261	110	445	1,068	n.a.	1,889
13:00			10	141	1,738	n.a.	1,889
14:00			10	141	1,738	n.a.	1,889
15:00			10	141	1,738	n.a.	1,889
16:00			10	141	1,738	n.a.	1,889
17:00			10	141	1,738	n.a.	1,889

Of note from the above analysis is that most of the time restrictions applicable to spaces in the town centre cease from 12:30pm on Saturday, hence the drop in the number of timed spaces and increase in number of unrestricted spaces that occurs around the middle of the day.

Table 23: Parking space allocation for special spaces, Saturday, by hour and by time regulation

Time	Disable Parking	Motor Bikes-Only	Pick up & Setdown only	Police vehicles-Exempted	Service Vehicles only	Taxi Zone	No Parking - Auth. veh accepted	Total
8:00	22	4	1	2	1	5	26	61
9:00	22	4	1	2	1	5	26	61
10:00	22	4	1	2	1	5	26	61
11:00	22	4	1	2	1	5	26	61
12:00	22	4	1	2	1	5	26	61
13:00	22	4	1	2	1	5	26	61
14:00	22	4	1	2	1	5	26	61
15:00	22	4	1	2	1	5	26	61
16:00	22	4	1	2	1	5	26	61
17:00	22	4	1	2	1	5	26	61

The same notional walk distances from car parking spaces to Argyle Street are used in the Saturday analysis. The following table identifies the number of spaces by their walk distance from Argyle Street.



3.4.5 Saturday Parking Demand

As with the Thursday surveys, on Saturday beat surveys identified the number of vehicles actually parked in each set of parking spaces within the town centre. The following table provides a summary of vehicles present and the next table shows this as a percentage utilisation of spaces.

Table 25: Vehicles parked by type of space, Saturday

Time	General			Special			Total
	On-street	Off-street	Total	On-street	Off-street	Total	
8:00	300	193	493	10	2	12	505
9:00	315	233	548	9	4	13	561
10:00	337	245	582	9	7	16	598
11:00	361	270	631	9	7	16	647
12:00	387	281	668	11	9	20	688
13:00	393	289	682	7	8	15	697
14:00	385	307	692	8	7	15	707
15:00	356	287	643	7	3	10	653
16:00	339	262	601	5	5	10	611
17:00	337	250	587	4	4	8	595

Table 26: Utilisation of parking spaces by type of space, by hour, Saturday

Time	General			Special			Total
	On-street	Off-street	Total	On-street	Off-street	Total	
8:00	28%	23%	26%	50%	5%	20%	26%
9:00	30%	28%	29%	45%	10%	21%	29%
10:00	32%	30%	31%	45%	17%	26%	31%
11:00	34%	33%	33%	45%	17%	26%	33%
12:00	36%	34%	35%	55%	22%	33%	35%
13:00	37%	35%	36%	35%	20%	25%	36%
14:00	36%	37%	37%	40%	17%	25%	36%
15:00	33%	35%	34%	35%	7%	16%	33%
16:00	32%	32%	32%	25%	12%	16%	31%
17:00	32%	30%	31%	20%	10%	13%	31%

The above table indicates that utilisation of spaces overall on Saturday is low when compared with Thursday. The number of vehicles parked by restriction type is summarised in **Table 27**.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

ORD06

Attachment 1

Table 27: Vehicles parked in general parking by time restriction, by hour, Saturday

Time	µ15	1P	2P	3P	No Restriction	Loading Zone	Total
8:00	5	160	63	139	126		493
9:00	5	172	65	171	135		548
10:00	5	188	63	179	147		582
11:00	5	195	71	208	152		631
12:00	5	200	79	215	169		668
13:00			9	63	610		682
14:00			9	62	621		692
15:00			9	58	576		643
16:00			9	47	545		601
17:00			9	43	535		587

The utilisation of these spaces is shown in the next table.

Table 28: Utilisation of general parking spaces by time restriction by hour, Saturday

Time	µ15	1P	2P	3P	No Restriction	Loading Zone	Total
8:00	100%	61%	57%	31%	12%		26%
9:00	100%	66%	59%	38%	13%		29%
10:00	100%	72%	57%	40%	14%		31%
11:00	100%	75%	65%	47%	14%		33%
12:00	100%	77%	72%	48%	16%		35%
13:00			90%	45%	35%		36%
14:00			90%	44%	36%		37%
15:00			90%	41%	33%		34%
16:00			90%	33%	31%		32%
17:00			90%	30%	31%		31%

The relatively high utilisation of 2P spaces from 1:00pm through to the end of the survey period is partly due to the small number of these spaces (10 in the town centre after 12:30pm on a Saturday). Note that loading zone restrictions do not apply on Saturday.

The use of special parking spaces is shown in the next table.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 29: Vehicles parked in special parking spaces by restriction by hour, Saturday

Time	Disable Parking	Motor Bikes Only	Pick up & Setdown only	Police vehicles Excepted	Service Vehicle only	Taxi Zone	No Parking authorised yet accepted	Total
8:00	5	4	0	1	0	0	2	12
9:00	7	4	0	0	0	0	2	13
10:00	8	4	0	0	0	0	4	16
11:00	7	4	0	0	0	0	5	16
12:00	11	4	0	0	0	1	4	20
13:00	7	1	0	0	0	1	6	15
14:00	9	0	0	1	0	1	4	15
15:00	6	0	0	0	0	1	3	10
16:00	5	0	0	0	0	1	4	10
17:00	3	0	0	0	0	1	4	8

This shows lower overall use when compared with Thursday's survey, apart from motorcycle parking spaces.

Table 30: Utilisation of special parking spaces by restriction by hour, Saturday

Time	Disable Parking	Motor Bikes Only	Pick up & Setdown only	Police vehicles Excepted	Service Vehicle only	Taxi Zone	No Parking authorised yet accepted	Total
8:00	23%	100%	0%	50%	0%	0%	8%	20%
9:00	32%	100%	0%	0%	0%	0%	8%	21%
10:00	36%	100%	0%	0%	0%	0%	15%	26%
11:00	32%	100%	0%	0%	0%	0%	19%	26%
12:00	50%	100%	0%	0%	0%	20%	15%	33%
13:00	32%	25%	0%	0%	0%	20%	23%	25%
14:00	41%	0%	0%	50%	0%	20%	15%	25%
15:00	27%	0%	0%	0%	0%	20%	12%	16%
16:00	23%	0%	0%	0%	0%	20%	15%	16%
17:00	14%	0%	0%	0%	0%	20%	15%	13%

Use of general car parking spaces by walk distance from Argyle Street is shown in the following table.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 31: Cars parked in general parking spaces by time restriction, by walk distance to Argyle Street, by hour – Saturday

Restriction	All	1P		2P		3P		No Restriction				
Walk distance band (m)	0 to 100	0 to 100	101 to 200	201 to 300	0 to 100	101 to 200	101 to 200	0 to 100	101 to 200	201 to 300	301 to 400	401 plus
Time												
8:00	5	112	48	0	45	18	139	7	48	21	45	5
9:00	5	122	50	0	49	16	171	9	52	26	41	7
10:00	5	129	59	0	44	19	179	9	56	27	49	6
11:00	5	132	62	1	46	25	208	9	69	22	47	5
12:00	5	137	58	5	52	27	215	11	67	42	40	9
13:00					9		63	196	320	47	38	9
14:00					9		62	190	329	55	38	9
15:00					9		58	176	297	50	43	10
16:00					9		47	170	287	44	37	7
17:00					9		43	174	283	38	33	7

The switching off of most time restrictions in the middle of the day on Saturday is the reason for the sudden drop in time-restricted spaces and increase in unrestricted spaces. The percentage utilisation of the spaces is shown in Table 32.

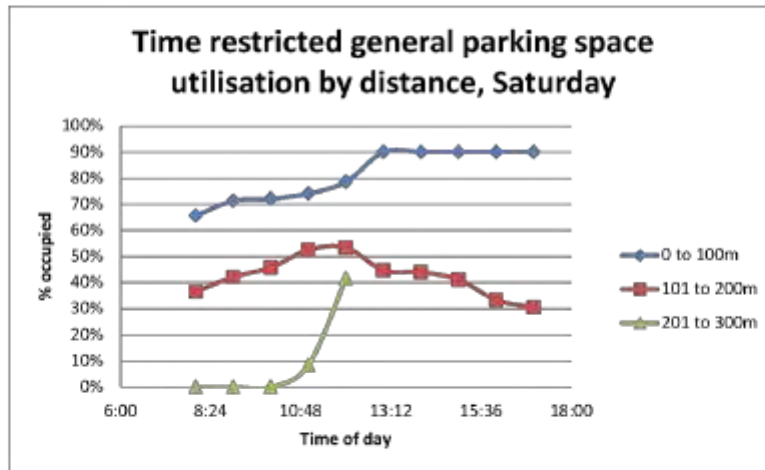
Table 32: Utilisation of general parking spaces by time restriction, by walk distance to Argyle Street, by hour - Saturday

Restriction	All	1P		2P		3P		No Restriction				
Walk distance band (m)	0 to 100	0 to 100	101 to 200	201 to 300	0 to 100	101 to 200	101 to 200	0 to 100	101 to 200	201 to 300	301 to 400	401 plus
Time												
8:00	100%	67%	59%	0%	61%	50%	31%	39%	23%	12%	9%	3%
9:00	100%	73%	62%	0%	66%	44%	38%	50%	25%	15%	8%	4%
10:00	100%	77%	73%	0%	59%	53%	40%	50%	27%	16%	10%	3%
11:00	100%	79%	77%	8%	62%	69%	47%	50%	34%	13%	10%	3%
12:00	100%	82%	72%	42%	70%	75%	48%	61%	33%	25%	8%	5%
13:00					90%		45%	77%	51%	26%	8%	5%
14:00					90%		44%	75%	53%	30%	8%	5%
15:00					90%		41%	69%	47%	27%	9%	5%
16:00					90%		33%	67%	46%	24%	8%	4%
17:00					90%		30%	68%	45%	21%	7%	4%

The above analysis suggests that there were no capacity issues on the Saturday of survey. The following chart shows utilisation of time restricted spaces in the town centre by distance from Argyle Street.



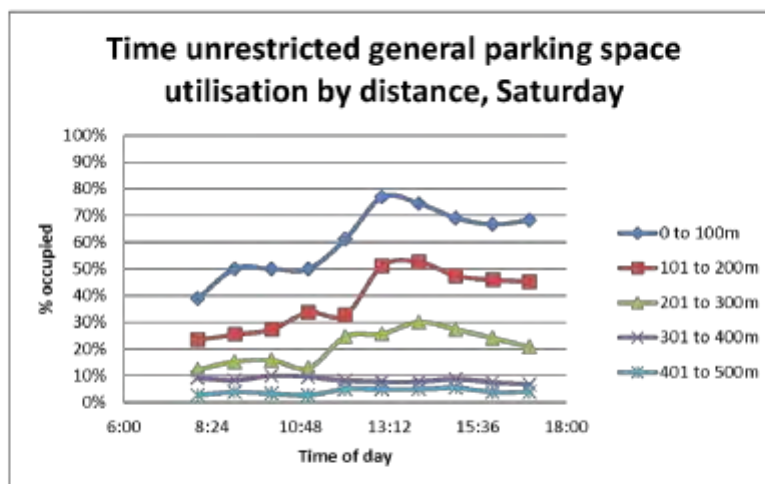
Chart 8: Utilisation by Distance – Saturday 9.00am to 9.00pm Thursday – Percentage Utilisation by Supply – Restricted Spaces



As previously noted, the high utilisation of spaces between 0 and 100m from Argyle Street after midday on Saturday is due to the small supply of these spaces after 12:30pm, when most become unrestricted.

The chart below shows the utilisation of time unrestricted spaces.

Chart 9: Utilisation by Distance – Saturday 9.00am to 9.00pm – Percentage Utilisation by Supply – Un-Restricted Spaces



Camden Town Centre
Prepared for Camden Council



Smart Consulting

3.4.6 Saturday Evening Parking Demand

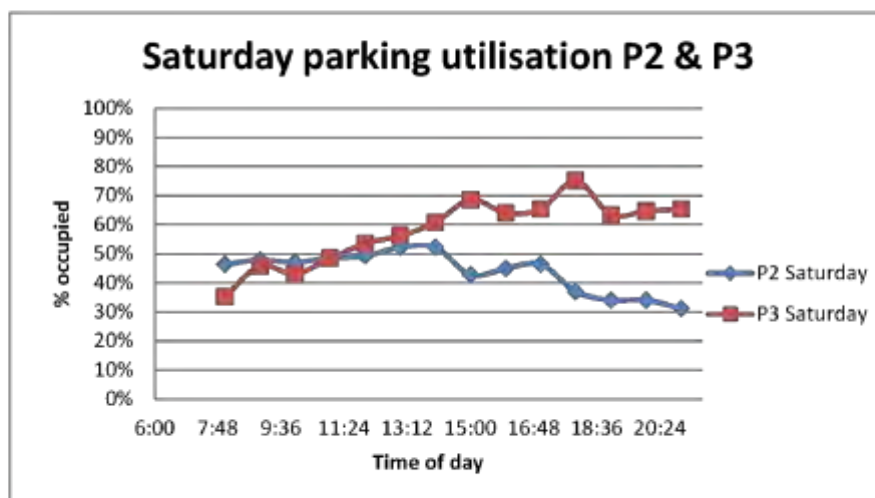
Car parks P2 and P3 were surveyed all day Saturday from 9:00am to 9:00pm. The following table presents the results of the survey.

Table 33: Utilisation of car parks P2 and P3, by hour, Saturday (9.00am to 9.00pm)

Time	Capacity			Capacity			Utilisation		
	P2	P3	Total	P2	P3	Total	P2	P3	Total
8:00	64	54	118	138	153	291	46%	35%	41%
9:00	66	70	136	138	153	291	48%	46%	47%
10:00	65	66	131	138	153	291	47%	43%	45%
11:00	67	74	141	138	153	291	49%	48%	48%
12:00	68	82	150	138	153	291	49%	54%	52%
13:00	72	86	158	138	153	291	52%	56%	54%
14:00	72	93	165	138	153	291	52%	61%	57%
15:00	59	105	164	138	153	291	43%	69%	56%
16:00	62	98	160	138	153	291	45%	64%	55%
17:00	64	100	164	138	153	291	46%	65%	56%
18:00	51	115	166	138	153	291	37%	75%	57%
19:00	47	97	144	138	153	291	34%	63%	49%
20:00	47	99	146	138	153	291	34%	65%	50%
21:00	43	100	143	138	153	291	31%	65%	49%

The following chart shows the utilisation series for both car parks.

Chart 10: P2 & P3 Public Car Parks – Utilisation – Saturday 9.00am to 9.00pm



3.5 Origin/ Destination Assessment

In accordance with the brief, an origin / destination count strategy was developed to gauge routes of choice through the town centre from all available road access points. The locations of the origin / destination data collectors are shown below.



Figure 17: Origin/Destination Count Locations

The number of vehicles recorded from each O/D station to each remaining O/D station is presented below.

ORD06

Attachment 1



Figure 18: Cawdor Road Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 19: Old Hume Highway Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 20: Menangle Road Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 21: Camden Valley Way Origin to All Stations

ORD06

Attachment 1



Figure 22: Macquarie Grove Road Origin to All Stations



Figure 23: Cawdor Road Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 24: Menangle Road Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 25: Menangle Road Station Origin to Macquarie Grove Road & Camden Valley Way

ORD06

Attachment 1



Figure 26: Camden Valley Way Origin to All Stations



Figure 27: Macquarie Grove Road Origin to All Stations



Figure 28: Cawdor Road Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 29: Old Hume Highway Station Origin to Macquarie Grove Road & Camden Valley Way

ORD06

Attachment 1



Figure 30: Menangle Road Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 31: Camden Valley Way Origin to All Stations



Figure 32: Macquarie Grove Road Origin to All Stations



Figure 33: Cawdor Road Station Origin to Macquarie Grove Road & Camden Valley Way

ORD06

Attachment 1



Figure 34: Old Hume Highway Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 35: Menangle Road Station Origin to Macquarie Grove Road & Camden Valley Way



Figure 36: Camden Valley Way Origin to All Stations



Figure 37: Macquarie Grove Road Origin to All Stations

Whilst the proportions of through traffic vary by time of day and day of week, it is clear that a large portion of traffic observed at the survey cordon is destined for Camden town centre. No station had more than 50% of its traffic travelling through the town centre during any of the four survey periods. This reinforces the role that Camden has of a local service centre, offering retail, education and employment for the district.

3.6 Pedestrian Counts

In addition to the minimum requirements of the brief, pedestrian counts at the two existing pedestrian crossings in Argyle Street were undertaken between the hours of 2:30pm -6:30pm on Thursday 11 April 2013.

The locations of the existing crossings are shown below.



Figure 38: Pedestrian Count Locations

The hourly flows at each location are presented below:

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 34: Thursday PM Pedestrian Flows by Type

Approach	Pedestrian Crossing located on Argyle St											
	(Site1) between John St and Oxley St						(Site2) between John St and Hill St					
Time Period	Children	Adults	Prams	Wheelchairs	Cyclists	Total	Children	Adults	Prams	Wheelchairs	Cyclists	Total
14:30 to 15:30	27	252	8	0	1	288	29	87	5	0	1	122
14:45 to 15:45	49	275	13	0	1	338	35	96	3	0	1	135
15:00 to 16:00	60	289	16	0	1	366	38	102	3	0	1	144
15:15 to 16:15	74	289	13	0	1	377	41	106	4	0	0	151
15:30 to 16:30	69	269	12	0	0	350	34	116	3	0	0	153
15:45 to 16:45	54	243	7	0	0	304	32	102	3	0	0	137
16:00 to 17:00	48	200	4	0	0	252	30	88	2	0	0	120
16:15 to 17:15	37	180	3	1	0	221	17	76	1	0	0	94
16:30 to 17:30	26	166	2	1	0	195	21	54	0	0	0	75
16:45 to 17:45	21	148	0	2	0	171	17	51	0	0	1	69
17:00 to 18:00	20	134	0	2	0	156	13	43	0	0	1	57
17:15 to 18:15	14	103	0	1	0	118	9	37	0	0	1	47
17:30 to 18:30	11	74	0	1	0	86	3	36	0	0	1	40
Totals	133	761	22	2	1	919	87	293	8	0	2	390

From **Table 34** it can be seen that there is a constant stream of pedestrians using each crossing hourly. It should be noted that the above counts did not capture those pedestrians who cross Argyle Street using the gaps in the existing median like faux pedestrian refuges.

3.6.1 Pedestrian Facility Warrant Assessment

Having regard to the pedestrian flows shown in **Table 34** and the traffic flows in Argyle Street presented in Section 3.2, the following presents the warrants for signalisations of pedestrian crossings:

A signalised mid-block pedestrian crossing requires the following warrants to be met:

Warrant 1

- a) For each of four one-hour periods of an average day:
 - i. The pedestrian flow crossing the road exceeds 250 persons per hour; and
 - ii. The vehicular flow exceeds 600 vehicles per hour in both directions or, where there is a central pedestrian refuge, 1000 vehicles per hour in both directions.

OR

Warrant 2

- b) For each of eight one-hour periods of an average day:
 - i. The pedestrian flow exceeds 175 persons per hour; and
 - ii. The vehicular flow exceeds 600 vehicles per hour in both directions or, where this is a central pedestrian refuge, 1000 vehicles per hour in both directions; and
 - iii. There is no other pedestrian crossing within a reasonable distance

A signalised mid-block pedestrian crossing may also be considered in certain special situations if one of the following warrants is met:

- a) The flow warrant for a marked foot crossing is realised but its provision could cause a hazard to pedestrians because of the width of the carriageway, insufficient sight distance to the crossing or the speed or number of vehicles.

OR

- b) There is a large seasonal variation in the traffic flow (such as at a holiday resort) and it can be shown to meet the general criterion during the busy season, even if during the rest of the year the general criterion is not met.

OR

- c) The location has been the site of two or more pedestrian casualties over a three year period that could have been prevented by traffic signals.

The recorded volumes of vehicles and pedestrians per hour for a Thursday afternoon are presented below.

Table 35: Argyle Street marked foot crossing between Oxley Street and John Street – Pedestrian Signal Warrant Assessment

Hour	EB	WB	Total	Total Pedestrians	Warrant No.1 Met?	Warrant No.2 Met?
6:30	464	286	750			
7:30	753	458	1,211			
8:30	816	624	1,440			
14:30	800	754	1,554	288	Yes*	Yes
15:30	795	906	1,701	350	Yes	Yes
16:30	794	988	1,782	195	No	Yes**
17:30	690	862	1,552	86	No	Yes**

*Assuming median is not considered a central pedestrian refuge where pedestrians can wait

** No other pedestrian crossing facility within reasonable walking distance

Table 36: Argyle Street marked foot crossing between Hill Street and John Street – Pedestrian Signal Warrant Assessment

Hour	EB	WB	Total	Total Pedestrians	Warrant No.1 Met?	Warrant No.2 Met?
6:30	265	413	678			
7:30	503	645	1,148			
8:30	738	716	1,454			
14:30	741	691	1,432	122	No*	No*
15:30	819	706	1,525	153	No*	No*
16:30	920	739	1,659	75	No*	No*
17:30	769	651	1,420	40	No*	No*

From **Table 35** it is noted that warrants for signalisation of the existing pedestrian crossing in Argyle Street between Oxley Street and John Street are being met with current pedestrian and vehicle volumes.

However, pedestrian flows on the existing pedestrian crossing between John Street and Hill Street are below that which is required whilst traffic volumes exceed the minimum requirements of either warrant.

Further analysis of the two existing pedestrian crossings is discussed in Section 8 of this report.

3.7 Public Transport Operations

Camden is served by Busways as part of Metropolitan bus service contract region 15. The bus network provides connections to Camden Town Centre, as well as to local travel generators and onto surrounding centres such as Narellan and Campbelltown/Macarthur.

Camden Town Centre
Prepared for Camden Council



Smart Consulting

The closest access to the CityRail network is at Campbelltown and Macarthur. Trains from here run into the City via East Hills and Airport Line, as well as via Liverpool and Bankstown. There are also services to Schofields via the Cumberland Line, providing direct connections to Parramatta.

Trains on the Southern Highlands Line also serve Campbelltown and Macarthur. Most of these services terminate/commence at Campbelltown, although there are a limited number of services through to Central. The forthcoming modified timetable is expected to make some changes to these arrangements, although it is not clear what will change at this stage.

3.7.1 Bus Networks

Camden Country Networks

The following routes form the country bus service network that hubs off Camden town centre:

- Rt 31 – Camden – Coates Park Rd, Cobbitty
- Rt 32 – Camden – Cobbitty, Theresa Park, Orangeville, Werombi and Warragamba
- Rt 38 – Camden – Spring Creek
- Rt 39 – Camden – Rockbarton and Mowbray Park
- Rt 40 – Camden – The Oaks, Oakdale, and Belimbla Park
- Rt 47 – Camden – Menangle via Remembrance Drive
- Rt 49 – Camden – Razorback via Cawdor

These offer connections between smaller rural villages spread out around Camden town centre and the town centre. They are characterised by limited service levels, generally with several trips a day, although some offer almost an hourly service (e.g., rt 32), that run out and then back. Some of these are tied to school services, with trips only running on public school days (e.g., rts 38 and 39). Several of the routes offer Saturday trips, but most are weekday only.

The alignment of some of the services is fairly circuitous; as well some have route diversions. These characteristics indicate that the level of patronage is low and that bus resources are being optimised to afford the opportunity for bus-based mobility, whilst keeping operating costs low. Given the population in some of the route catchments is low, the patronage potential would be very low. Nonetheless, these services provide an essential level of mobility for residents of the outlying areas.

Contact Region 15 Metropolitan Bus Network

Camden falls within metropolitan bus service contract region 15, run by Busways, as shown in the figure below.



Figure 39: Metropolitan bus service contract regions

The following metropolitan routes connect Camden:

- Rt 890 – Campbelltown – Harrington Park or Camden
- Rt 893 – Camden – Spring Farm and Narellan
- Rt 894 – Campbelltown – Bridgewater Estate via Narellan
- Rt 894X – Campbelltown – Bridgewater Estate via Camden Bypass
- Rt 895 – Campbelltown – Camden and Camden South
- Rt 899 – Camden – Catherine Field
- Rt 900 – Picton - Narellan²

The following figure shows routing within the town centre for metropolitan bus services that commence and terminate within the town centre. The terminus is on John Street, north of Argyle Street.

² Some trips terminate at Camden; this service is operated by Picton Buses



Figure 40: Metropolitan bus routes terminating & commencing in the town centre

Figure 41 shows circulation pattern of metropolitan bus services that through route the town centre.



Figure 41: Metropolitan bus routes running through the town centre



This indicates the importance of the bus stop on John Street north of Argyle Street, as well as quite clearly showing the additional coverage of Camden afforded by these through routes.

Approximate service frequencies are:

- Rt 890 – ten trips each way per weekday
- Rt 893 – three trips each way per weekday
- Rt 894 – ten trips to Campbelltown Station per weekday and twelve going to South Camden
- Rt 894X –two trips each way per weekday
- Rt 895 – 102 trips per weekday
- Rt 899 – offers two trips each way per weekday
- Rt 900 - offers four services each way per weekday

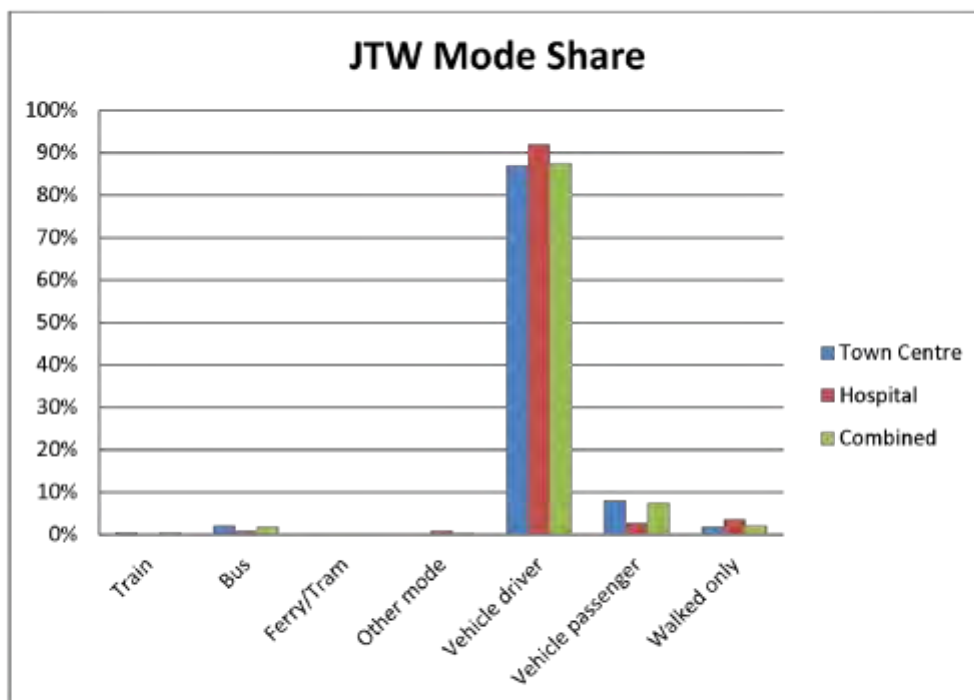
School Services

In addition to the regular passenger services, a network of school bus services supports Camden town centre, calling at bus stops outside the public school in Mitchell Street near Oxley Street and in John Street near St Paul’s Primary School.

3.8 Journey to Work Patterns

The census provides information about how workers travel to work. The most common method of characterising this is to identify an area’s mode share (the proportion of commute travel by different travel modes). The following chart indicates mode share of those who work in Camden town centre as well as the zone immediately to the south around Camden hospital.

Figure 42: Existing JTW by Mode



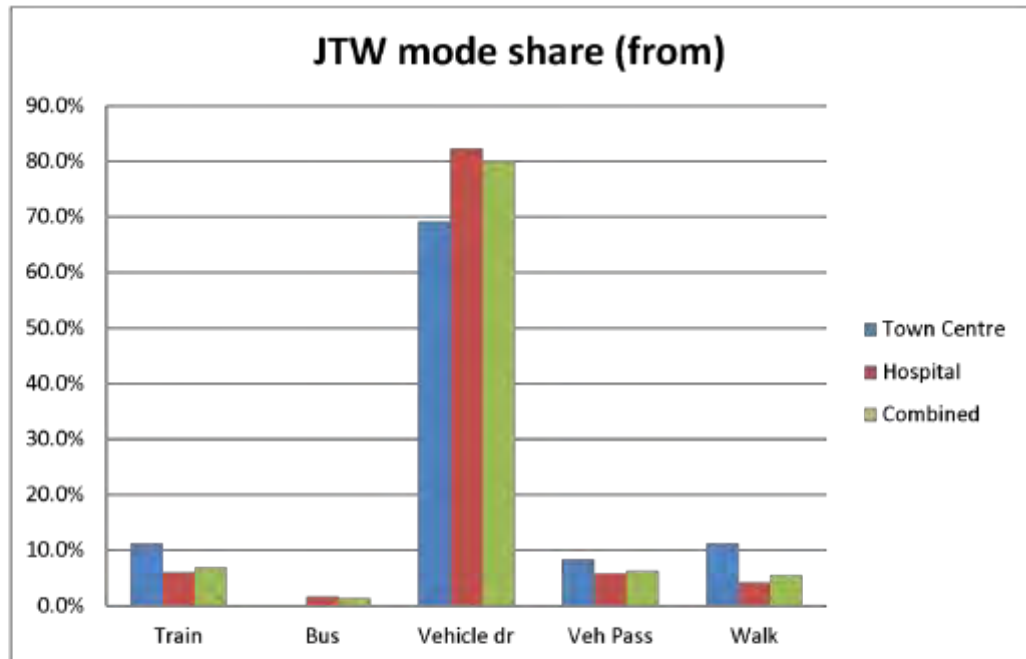
Camden Town Centre
Prepared for Camden Council



The above indicates that overwhelmingly commuters use vehicles to get to work in the town centre and the area around Camden Hospital.

For those who live in Camden town centre and the zone around the hospital, the mode shares are shown below.

Figure 43: JTW Mode Share (from)



These shares indicate greater use of train and walk, especially for residents of the town centre. The method of coding the census data used in the above analysis uses a priority mode system to reflect the modes that the census form provides the respondent to complete (some 235 mode combinations). At the top of the hierarchy of priority modes is rail, which means that a commuter is counted as a rail user, even if they took a car or bus or possibly and car and bus to the train station.

For commuter travel to work out of Camden town centre and the hospital zone almost all train users drive to the station. For commuters who work in the town centre, the coding of modes to the hierarchy does not overly skew the picture of modal usage, as car is so dominant. Nonetheless, of the few train users, most nominated car and or bus in conjunction with train; unfortunately it is not known from the census whether they took the bus to the local station and then got a lift to Camden, perhaps with a colleague.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

3.9 Accident Assessment

As part of the provision of background information, Camden Council provided the most recent accident statistics for the study area since 2005 up to June 2012 (7.5 years). For this period, a total of 272 accidents had occurred.

The RMS Crashlink Data manual provides three classifications of Degree of Severity of Accidents. Namely "Fatal, Injury and Non-Casualty (tow away)". A summary of the number of accidents by type is shown below.

Table 37: No. accidents by severity classification

	Grand Total
Total Accidents	150
Total Degree 1	2
Total Degree 2	57
Total Degree 3	92

A summary of the number of accidents by degree by street within the study area is shown below.

Table 38: No. accidents by severity by location

	Total Degree 1	Total Degree 2	Total Degree 3	Total Accidents	Accidents Per Year	No Ped Accidents
Alpha	0	0	2	2	0.27	0
Argyle	1	22	18	41	5.47	10
Barsden	0	0	1	1	0.13	0
Broughton	0	5	9	14	1.87	1
Cawdor	1	3	10	14	1.87	0
Edward	0	0	1	1	0.13	0
Elizabeth	0	6	7	13	1.73	9
Exeter	0	0	0	0	0.00	0
Hill	0	1	0	0	0.00	1
John	0	1	5	6	0.80	3
Little	0	1	1	2	0.27	1
Macarthur	0	7	22	29	3.87	1
Menangle	0	4	9	13	1.73	1
Murray	0	3	7	10	1.33	1
Oxley	0	1	0	1	0.13	1
Park	0	0	0	0	0.00	0
Pindari	0	2	1	3	0.40	1
View	0	0	0	0	0.00	0
Total	2	56	93	150		30

From **Table 38** it is noted that a total of 150 accidents were recorded and of these 30 accidents involved pedestrians. Of the two accidents which included fatalities, the two recorded occurred at the following locations:

- 2011 – Argyle Street - Pedestrian fatality at pedestrian crossing in Argyle Street between John Street and Hill Street
- 2009 – Cawdor Road 60m south of Sheathers Lane – Single vehicle off carriageway crash on right bend in to object

In the town centre core, Argyle Street included a total of 41 accidents. Of these, a total of 10 accidents occurred which involved pedestrians. Of these 10 accidents, 8 accidents occurred on the existing pedestrians crossings. Four accidents occurred on the existing pedestrian crossing in Argyle Street between John Street and Hill Street. Also, four accidents occurred on the existing pedestrian crossing between John Street and Oxley Street. The remaining two accidents occurred at the intersection of Argyle Street with Oxley Street and Argyle Street / Murray Street respectively.

ALL pedestrian accidents in Argyle Street were classified as either Degree 1 – Fatal (1) or Degree 2 – Injury (9).

Of interest, four accidents which occurred out of the 41 recorded involved single vehicles crashing out of control in Argyle Street.

Elizabeth Street also included a high proportion of pedestrian accidents. That is, 70% of all accidents which occurred in Mitchell Street involved pedestrians. Further, every one of these accidents occurred at the intersection of Elizabeth Street and Mitchell Street.

Copies of all accident statistics are provided in **Appendix B** of this report and are analysed further in Section 8.

3.10 Traffic Modelling

A traffic model was prepared for this study to assist in the traffic analysis for Camden Town Centre. The model selected was an application called Commuter produced by Azalient (refer to www.azalient.com). This is a nanosimulation model and provides agent based analysis of the movements and interactions between the road network and vehicles and pedestrians.

To analyse traffic in town centres it is important to endeavour to reflect the many things that influence traffic system performance. These include:

- Interactions between through vehicles with vehicles parking at kerbside.
- Queuing on approach to intersections.
- The impact of pedestrians on traffic movements where pedestrians have right of way.
- The effect of different vehicle types, with different kinematic performance, as well as the effect of different driver behaviours.
- The effect of buses stopping along routes through the town centre.
- A model was established for the peak hour within each of the survey periods:
- Thursday morning, with peak between 8:15am and 9:15am

- Thursday evening, with peak between 4:30pm and 5:30pm
- Saturday morning, with peak between 9:00am and 10:00am
- Saturday afternoon, with peak between 5:15pm and 6:15pm.

The key features of the models are:

- Network extent from Sheathers Lane in the west through to Macarthur Road in the east and Macquarie Grove in the north to Old Hume Highway and Menangle Road in the south (refer to **Figure 44** below).



Figure 44: Network Modelling Extents

- The network reflects traffic conditions, such as lane widths, intersection mode of control and priority arrangements, key access points, sign posted speed limits, with School zone active during Thursday morning model.
- On-street parking is included where this has an impact on traffic flow and where it is important for traffic distribution control.
- A relatively fine grained zonal system to provide reasonable control over movements.
- Inclusion of scheduled route buses within the modelling system.
- Marked foot crossings included where activity on these has an impact on traffic flow.
- Demands were built from traffic information collected during the surveys, plus land use information and census information. These are segmented into light vehicles, heavy vehicles, buses and pedestrians based on counts. Further disaggregation of agent types for light vehicles and heavy vehicles was based on information in the RTA microsimulation modelling standards.

ORD06

Camden Town Centre

Prepared for Camden Council



- A graphical interface.

The modelling process involved the establishment of base models, with demand calibration to fit traffic counts within a margin. Future year demands were forecast by applying growth factors to different traffic segments, based on their characteristics. The growth factors were based on land use projections and are discussed elsewhere in this report. The future demands were then assigned to the model, and the model's performance was reviewed. Adjustments to the model parameters were made where required to ensure traffic operations were appropriate. Further details of the traffic modelling are in **Appendix C - Traffic Modelling Working Paper**.

Attachment 1

4. Future Development Potential

4.1 Introduction

This section summarises the land use of the study area, including the environs of the broader Camden area. This provides information regarding employment, population, dwellings and vehicle ownership. It also provides information about projected future land use, which is an important input to traffic analysis.

4.2 Last Five Years of Development

In respect to development in Camden Town Centre the following figure shows the location of the development approvals issue by Council in the last 5 years.

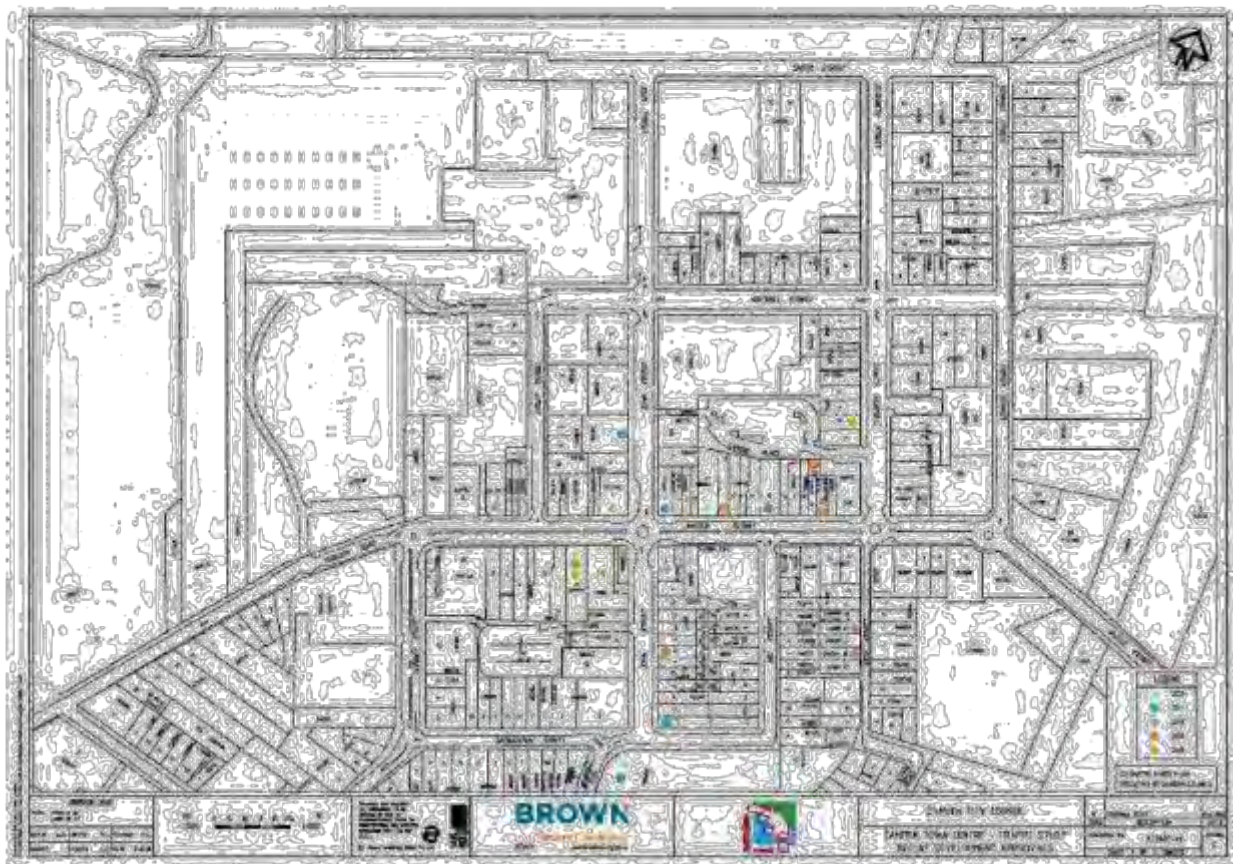


Figure 45: Development Approval Locations in the last 5 years

There is no distinct factor to the approvals, with no real pattern appearing to major re-developments.

Camden Town Centre
Prepared for Camden Council



As part of identifying future development potential the identification of properties that has an area of greater than 1,000m² have been plotted on the following plan. Properties that have been strata subdivided have been excluded due to separate ownership making the property unlikely to be redeveloped.

The larger development sites are those currently developed by major supermarkets, the hotels and the school sites as well as the Council owned properties. These are shown in **Figure 46**.

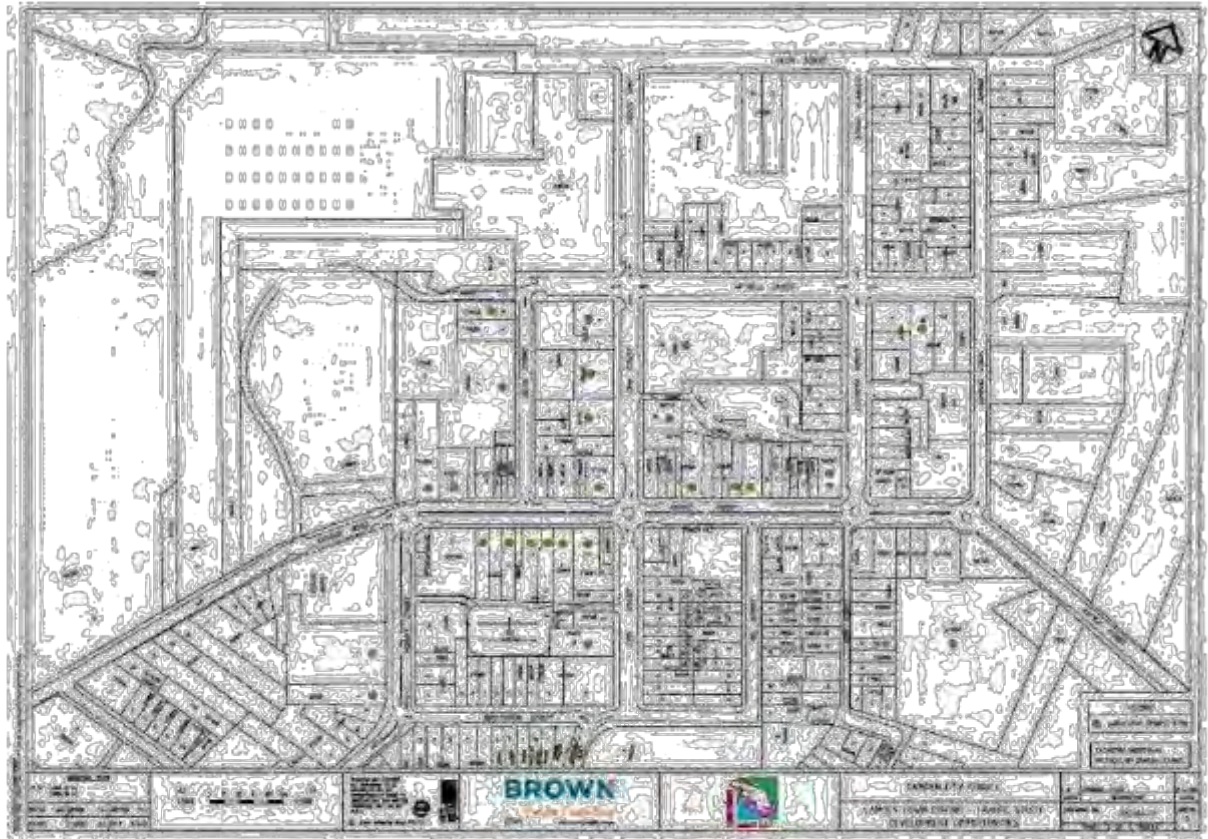


Figure 46: Development Site Opportunities

4.3 Strategic Overview

Camden town sits within the local government of Camden, which is in Sydney's southwest sub-region, which has been redefined in the latest draft metropolitan strategy to add Bankstown and Fairfield to the previously included local government areas of Camden, Campbelltown, Liverpool and Wollondilly. The most recent metropolitan strategy projects the following population and employment targets for this redefined southwest sub region³.

³ South west sub region: Bankstown, Camden, Campbelltown, Fairfield, Liverpool and Wollondilly.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 39: Land use projections from latest Metropolitan Strategy

Parameter	Current	Target to 2021 (2011 to 2021)	Target to 2031 (2011 to 2031)
Population	829,000	1,048,000 (218,000)	1,298,000 (469,000)
Housing	286,000	346,000 (60,000)	427,000 (141,000)
Employment	298,000	362,000 (64,000)	432,000 (134,000)

Source: pg 95 Draft Metropolitan Strategy for Sydney

These are not comparable with the previous sub regional strategies, which were developed under the umbrella of the 2005 Metropolitan Strategy, making it difficult to discern a meaningful population growth trajectory for Camden, at least under state strategic plans. The Draft Metropolitan Strategy does confirm the previously announced large population growth in the South West Growth Centre of 64,000 dwellings over the next 20 years (pg 96), which includes the northern portion of Camden LGA.

The following table compares the latest small area population forecasts produced by the Bureau of Transport Statistics for each of the local government areas in the Southwest Sub region.

Table 1: Small area population projections for LGAs in Southwest Sub region, persons

LGA	2006	2011	2016	2021	2026	2031	2036	2041	2046
Bankstown	176,857	190,723	199,510	210,443	220,288	231,036	242,550	254,868	268,212
Camden	50,940	63,158	99,299	129,111	178,910	229,323	261,886	288,791	302,158
Campbelltown	147,440	157,887	172,647	191,286	209,770	228,161	245,699	262,816	279,535
Fairfield	187,263	196,962	204,184	212,749	223,515	235,194	247,659	260,937	275,276
Liverpool	170,915	194,099	215,168	249,250	281,029	309,951	355,040	398,425	443,861
Wollondilly	41,221	45,992	49,766	54,839	59,665	64,766	70,125	75,729	81,697
Total	774,636	848,821	940,575	1,047,678	1,173,177	1,298,430	1,422,959	1,541,566	1,650,738

Source: BTS Small area population projections, August 2012

The above table indicates very strong growth for Camden, with its population surpassing that of Bankstown and Campbelltown by 2031 and exceeding Fairfield's population by 2036. Within ten years Camden's population is projected to be larger than Campbelltown's current (2011) population. The next table indicates the projected population increase from 2006 through to 2046.

Table 2: Small area population projections for LGAs in Southwest Sub region, change in persons from 2006 to 2046

LGA	2006 to 2011	2011 to 2016	2016 to 2021	2021 to 2026	2026 to 2031	2031 to 2036	2036 to 2041	2041 to 2046
Bankstown		13,866	22,653	33,586	43,431	54,179	65,693	78,011
Camden		12,218	48,359	78,171	127,970	178,383	210,946	237,851
Campbelltown		10,447	25,207	43,846	62,330	80,721	98,259	115,376
Fairfield		9,699	16,921	25,486	36,252	47,931	60,396	73,674
Liverpool		23,184	44,253	78,335	110,114	139,036	184,125	227,510
Wollondilly		4,771	8,545	13,618	18,444	23,545	28,904	34,508
Total		74,185	165,939	273,042	398,541	523,794	648,323	766,930

Source: Based on data in BTS Small area population projections, August 2012

Camden Town Centre

Prepared for Camden Council



Smart Consulting

In terms of numeric increase in population the above table indicates the large scale population growth projected for Camden and Liverpool over the horizon of the projections. In Camden's case the increase in population over the next twenty years (to 2031) is expected to see an *increase* that is greater than the current population of Campbelltown. Note that Wollondilly shows more subdued growth, with its population projected to double from 2006 to 2046.

The next table shows the growth factors for population for each of the LGAs based off 2006.

Table 3: Small area population projections for LGAs in Southwest Sub region, growth factors from 2006 to 2046

	2006 to	2011	2016	2021	2026	2031	2036	2041	2046
Bankstown		1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.5
Camden		1.2	1.9	2.5	3.5	4.5	5.1	5.7	5.9
Campbelltown		1.1	1.2	1.3	1.4	1.5	1.7	1.8	1.9
Fairfield		1.1	1.1	1.1	1.2	1.3	1.3	1.4	1.5
Liverpool		1.1	1.3	1.5	1.6	1.8	2.1	2.3	2.6
Wollondilly		1.1	1.2	1.3	1.4	1.6	1.7	1.8	2.0
Total		1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1

Source: Based on data in BTS Small area population projections, August 2012

Camden is clearly expected to see the largest rate of growth, with a growth factor of 5.9 over the long term which is more than twice as fast as the next fastest growing LGA of Liverpool with a growth factor of 2.6.

Alternative population forecasts are available through a link on Camden Council's website to [profile.id](#) and [forecast.id](#). These project a population for Camden of 213,376 by 2036, about 50,000 persons lower than the BTS projections.

Camden has seen rapid growth in the Narellan Spring Farm and Elderslie Area over the past ten to fifteen years, with rapid development commencing further north, around Oran Park Town Centre, as part of the South West Growth Centre, as well as later stages of Harrington Park.

Expectations further south, around Camden town centre, are more subdued, with modest population and employment growth.

To illustrate the differential distribution of growth, BTS's population projections for Camden LGA were disaggregated into the following eight precincts that were defined to assist in understanding how land use changes might affect Camden Town Centre:

- Camden Town Centre which is the focus of the study
- South Camden the urban area to the south of the town centre
- South west rural Camden, west of the town centre and south of the river, abutting Wollondilly Shire

Camden Town Centre

Prepared for Camden Council



Smart Consulting

- Elderslie and Spring Farm areas to the east of the town centre, over the river, which are experiencing rapid urban development
- Narellan, Mount Annan, Harrington Park, Smeaton Grange and Currans Hill, an area which includes a mix of established urban areas around Narellan as well as growth areas, such as Currans Hill and the later stages of Harrington Park
- Southern portion of South West Growth Centre from north of Harrington Park and Oran Park through to south and west of Catherine Field
- North east portion of South West Growth Centre covering a triangle from Leppington to Bringelly to Catherine Fields
- Western rural part of Camden LGA

The next table summarises the projected population level by future five-year period by precinct.

Table 4: Small area population projections for precincts around Camden town, from 2006 to 2046

	2006	2011	2016	2021	2026	2031	2036	2041	2046
West of Nepean									
Town Centre	412	441	978	991	996	1,052	1,100	1,155	1,194
South Camden	7,289	7,440	7,648	7,888	8,119	8,387	8,613	8,848	9,025
South west rural	2,416	2,765	2,994	3,144	3,431	3,748	4,020	4,632	4,935
Elderslie & Spring Farm	2,944	7,359	17,310	21,736	23,254	23,873	24,611	25,027	25,290
Narellan	31,718	38,227	45,430	48,552	49,253	50,063	51,086	54,667	56,335
Sth SWGC	355	926	16,925	32,491	48,935	57,650	64,917	68,839	71,783
NE SWGC	4,941	5,071	6,718	12,999	43,587	83,190	106,151	124,191	132,134
Western rural	864	928	1,295	1,310	1,334	1,362	1,387	1,433	1,462
Total	50,940	63,158	99,299	129,111	178,910	229,323	261,886	288,791	302,158

Source: Based on data in BTS Small area population projections, August 2012

The following table summarises the numerical projected growth from 2006 for each of these precincts, as well as indicating the share of Camden LGA's total growth from 2006.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 5: Small area population projections for precincts around Camden town, numerical increase from 2006 to 2046

	2006	2011	2015	2021	2026	2031	2036	2041	2046
West of Nepean									
Town Centre		29	566	579	584	640	688	742	781
South Camden		151	359	599	831	1,098	1,325	1,559	1,737
South west rural		349	579	729	1,015	1,332	1,605	2,216	2,519
Elderslie & Spring Farm		4,415	14,366	18,792	20,310	20,928	21,667	22,083	22,346
Narellan		6,508	13,711	16,834	17,535	18,344	19,367	22,949	24,617
Sth SWGC		571	16,570	32,136	48,580	57,295	64,562	68,484	71,428
NE SWGC		130	1,777	8,057	38,646	78,249	101,210	119,250	127,193
Western rural		64	431	445	469	497	523	569	597
Total growth		12,218	48,359	78,171	127,970	178,383	210,946	237,851	251,218
West of Nepean		4%	3%	2%	2%	2%	2%	2%	2%
Elderslie & Spring Farm		36%	30%	24%	16%	12%	10%	9%	9%
Narellan		53%	28%	22%	14%	10%	9%	10%	10%
Sth SWGC		5%	34%	41%	38%	32%	31%	29%	28%
NE SWGC		1%	4%	10%	30%	44%	48%	50%	51%
Western rural		1%	1%	1%	0%	0%	0%	0%	0%

Source: Based on data in BTS Small area population projections, August 2012

This analysis indicates that:

- Camden Town Centre, South Camden and south west rural area of the LGA are expecting modest population growth in comparison with the rest of the LGA. By 2036 growth in the town centre plus south Camden would have contributed less than 2% of the LGA's growth.
- Elderslie and Spring Farm and Narellan are expected to contribute most of the near term growth to 2016 and possibly 2021. After that their growth is more subdued.
- After 2021 the two precincts identified as part of the SWGC (South SWGC and NE SWGC) are expected to contribute the vast majority of growth, with the north eastern portion of the growth centre, some 17 km from Camden Town Centre, containing some 120,000 additional residents by 2041.

Scattered around this are several areas where urban development is expected:

Northern part of Wollondilly Shire – this connects to the north and east via either Burragarang Road, the Old Oaks Road and Sheathers Lane into Camden Town Centre or via Burragarang Road, the Coal Road and Camden Bypass.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

The projected population increase for the land supported by this alignment is:

Table 6: Small area population projections for part of Wollondilly Shire adjoining study area, from 2006 to 2046

Year	2006	2011	2016	2021	2026	2031	2036	2041	2046
1437	5,410	5,578	5,628	5,704	6,020	6,362	6,695	7,052	7,414

Source: Based on data in BTS Small area population projections, August 2012

This level of additional population is modest, representing an increase of about three-quarters of a percent per annum.

1.1.1 Employment

This section provides a set of analyses similar to the above but this time for projected employment contained in the latest set of BTS's small area projections. Employment projections for the southwest sub region LGAs are tabulated below.

Table 7: Small area employment projections for LGAs in Southwest Sub region, 2006 to 2046 (jobs)

Area Labelled	2006	2011	2016	2021	2026	2031	2036	2041	2046
Bankstown	71,007	76,482	79,310	81,163	83,449	85,895	88,886	91,993	95,537
Camden	17,318	19,811	24,273	30,598	39,236	48,962	56,115	62,185	64,592
Campbelltown	45,926	53,422	59,529	65,438	71,019	76,784	82,945	89,587	93,131
Fairfield	56,203	63,158	69,418	74,930	80,868	87,031	92,711	98,920	102,723
Liverpool	59,156	71,309	81,499	90,983	98,943	109,330	120,304	130,932	136,137
Wollondilly	10,920	13,495	14,980	15,910	16,884	17,845	18,864	19,958	20,751
Total	260,531	297,678	329,010	359,021	390,398	425,848	459,825	493,574	512,871

Source: Based on data in BTS Small area population projections, August 2012

The above table indicates a substantial increase in jobs in the sub-region of approximately a quarter of a million additional jobs by 2046. However, as indicated in further analysis, even this large increase in employment is insufficient to provide employment for the increased sub-regional resident workforce. Consequently, large-scale outward commuting is likely to remain a feature of the sub-region for another generation or two.

The following table shows the large numerical increase in jobs for the sub-region.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 8: Small area employment projections for LGAs in Southwest Sub region, numerical change from 2006

Row Labels	2006	2011	2016	2021	2026	2031	2036	2041	2046
Bankstown		5,475	8,303	10,156	12,442	14,888	17,879	20,986	24,530
Camden		2,492	6,955	13,279	21,917	31,644	38,797	44,867	47,273
Campbelltown		7,496	13,603	19,512	25,093	30,858	37,019	43,661	47,205
Fairfield		6,955	13,215	18,727	24,664	30,828	36,508	42,716	46,520
Liverpool		12,153	22,343	31,827	39,787	50,174	61,148	71,776	76,981
Wollondilly		2,575	4,060	4,990	5,964	6,925	7,944	9,037	9,831
Total		37,147	68,479	98,490	129,867	165,317	199,294	233,044	252,341

Source: Based on data in BTS Small area population projections, August 2012

Table 9 below summarises the growth factors from 2006 that describe the extent of growth.

Table 9: Small area employment projections for LGAs in Southwest Sub region, growth factors from 2006 to 2046

LGA	2006	2011	2016	2021	2026	2031	2036	2041	2046
Bankstown		1.1	1.1	1.1	1.2	1.2	1.3	1.3	1.3
Camden		1.1	1.4	1.8	2.3	2.8	3.2	3.6	3.7
Campbelltown		1.2	1.3	1.4	1.5	1.7	1.8	2.0	2.0
Fairfield		1.1	1.2	1.3	1.4	1.5	1.6	1.8	1.8
Liverpool		1.2	1.4	1.5	1.7	1.8	2.0	2.2	2.3
Wollondilly		1.2	1.4	1.5	1.5	1.6	1.7	1.8	1.9
Total		1.1	1.3	1.4	1.5	1.6	1.8	1.9	2.0

Source: Based on data in BTS Small area population projections, August 2012

The next table shows the ratio of projected population to jobs by LGA. While not a perfect measure of net jobs surplus or deficit in an area, due to differing factors such as age profiles, unemployment rates and workforce participation rates, declines in this ratio suggest that there would be a relative decrease in available employment, and hence an increase in the size of an area's existing jobs deficit. The consequence of this would be increasing levels of out-commuting.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

Table 10: Small area employment projections for LGAs in Southwest Sub region, ratio of jobs to population ratio, from 2006 to 2046

LGA	2006	2011	2016	2021	2026	2031	2036	2041	2046
Bankstown	0.40	0.40	0.40	0.39	0.38	0.37	0.37	0.36	0.36
Camden	0.34	0.31	0.24	0.24	0.22	0.21	0.21	0.22	0.21
Campbelltown	0.31	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.33
Fairfield	0.30	0.32	0.34	0.35	0.36	0.37	0.37	0.38	0.37
Liverpool	0.35	0.37	0.38	0.37	0.35	0.35	0.34	0.33	0.31
Wollondilly	0.26	0.29	0.30	0.29	0.28	0.28	0.27	0.26	0.25
Total	0.34	0.35	0.35	0.34	0.33	0.33	0.32	0.32	0.31

Source: Based on data in BTS Small area population projections, August 2012

The jobs ratio in Bankstown in 2006 was roughly sufficient to provide employment self-containment for the area (of course people out-commute and some in-commute). All the other area's ratios in 2006 are well below that of Bankstown, indicating a higher level of out-commute as a proportion of the resident workforce.

From the above table it is clear that the Bankstown, Camden, Liverpool and Wollondilly will all see their ratio decline; whilst others are expected to experience an increase in the ratio, although none would have a ratio approaching 0.40 by 2046.

Employment projections for precincts around Camden town are shown in the following table.

Table 11: Small area employment projections for precincts around Camden town, from 2006 to 2046

Precinct	2006	2011	2016	2021	2026	2031	2036	2041	2046
West of Nepean									
Town Centre	2,827	3,279	3,669	3,991	4,326	4,651	4,990	5,356	5,571
South Camden	1,242	1,535	1,768	1,996	2,221	2,446	2,681	2,935	3,057
South west rural	559	686	793	905	1,012	1,119	1,231	1,350	1,407
East of Nepean									
Elderslie & Spring Farm	512	593	652	723	788	850	913	977	1,018
Narellan	10,264	11,589	12,628	13,590	14,544	15,569	16,665	17,847	18,547
Sth SWGC	285	332	659	2,583	5,407	7,655	9,166	10,659	11,063
NE SWGC	1,276	1,402	3,688	6,353	10,441	16,138	19,899	22,452	23,295
Western rural	354	394	416	456	496	533	571	609	634
Total	17,318	19,811	24,273	30,598	39,236	48,962	56,115	62,185	64,592

Source: Based on data in BTS Small area population projections, August 2012

Camden Town Centre

Prepared for Camden Council



Smart Consulting

The projected increase in jobs is focused to the east of the Nepean, with the overwhelming bulk of new jobs (about 70% of new jobs by 2046) to be located within the South West Growth Centre. The area west of the Nepean would have a share of new jobs of about 11%, with about 2,000 extra jobs in the Camden town zone, by 2046.

Table 12: Small area population projections for precincts around Camden town, numerical growth from 2006 to 2046

Precinct	2006	2011	2016	2021	2026	2031	2036	2041	2046
West of Nepean									
Town Centre		452	842	1,164	1,499	1,824	2,163	2,529	2,744
South Camden		293	526	753	979	1,203	1,439	1,693	1,815
South west rural		127	234	346	453	560	672	791	848
Elderslie & Spring Farm		82	140	212	276	338	401	466	506
Narellan		1,325	2,364	3,325	4,280	5,305	6,400	7,583	8,282
Sth SWGC		47	374	2,298	5,122	7,370	8,881	10,374	10,778
NE SWGC		126	2,413	5,077	9,166	14,863	18,623	21,176	22,020
Western rural		40	62	103	143	180	217	255	280
Total growth		2,492	6,955	13,279	21,917	31,644	38,797	44,867	47,273
Share of growth									
West of Nepean		35%	23%	17%	13%	11%	11%	11%	11%
Elderslie & Spring Farm		3%	2%	2%	1%	1%	1%	1%	1%
Narellan		53%	34%	25%	20%	17%	16%	17%	18%
Sth SWGC		2%	5%	17%	23%	23%	23%	23%	23%
NE SWGC		5%	35%	38%	42%	47%	48%	47%	47%
Western rural		2%	1%	1%	1%	1%	1%	1%	1%

Source: Based on data in BTS Small area population projections, August 2012

Camden Town Centre

Prepared for Camden Council



Smart Consulting

5. Identified Key Areas for Improvement

5.1 Road Network

From the investigations presented in Section 3 of this report, it has been determined that in general intersections throughout the Camden Town Centre operate at a satisfactory level of service during both weekday and weekend peak periods.

Further, there is spare capacity in the road network to accommodate the demands of future development in the area. This is discussed further in Section 6 of this report.

The nature of Argyle Street through the Camden Town Centre provides a relatively safe environment with separated opposing traffic via a landscaped median in a distinctive mainstreet environs.

It is the view of this study that observed traffic congestion along the Argyle Street corridor is more related to the poor operation of the existing marked pedestrian crossings than traffic loadings along the corridor.

5.2 Discussion of future traffic conditions

The critical time period for the town centre is Thursday PM peak, followed by Thursday AM peak, and the Saturday peaks are not as critical, in terms of traffic performance.

The section of Argyle Street between Murray Street and John Street is the critical section of the town centre in terms of traffic operations. Traffic density, queuing and transient delays in this area are most marked in this area in the existing year and future year models. Eastbound operations appear more constrained than westbound operations, primarily due to the interaction of operation of the marked foot crossing of Argyle Street west of John Street with the roundabout at the intersection of Argyle Street and John Street.

In effect, eastbound vehicles are delayed at the marked foot crossing, to the point where the approach queue at the roundabout dissipates, so that few or no vehicles are at the roundabout approach to take advantage of gaps at the roundabout to proceed through the intersection. This interaction tends to reduce overall sub-system capacity. In future years, with the increase in pedestrians using the crossing, more traffic on Argyle Street and more side-street traffic, this situation. Of note is that this behaviour is sensitive to our projections of volumes of pedestrian crossing at the marked foot crossing – a substantial increase over our projection would see traffic operations of this sub-system under more pressure.

Future Model – Thursday AM

In the future Thursday AM model, transient eastbound queues extend back to and past Oxley Street. This results in small (less than 5 vehicles) southbound queues in Oxley Street, waiting to turn left onto Argyle Street. The rest of the network functions well with only transient queues at the various intersections. The section of Argyle Street east of John Street functions well – primarily due to lower volumes of pedestrians crossing the marked foot crossing than the crossing to the west, but also because the marked foot crossing is approximately 20 metres further from the roundabout, permitting more vehicles to store between the two facilities, thereby reducing the interaction between the two facilities.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

- Future Model – Thursday PM

In the future Thursday PM model, the transient eastbound queues along Argyle Street from John Street, are longer, frequently extending past Oxley Street, and, as a result, causing longer queues of southbound traffic waiting to turn left from Oxley Street to Argyle Street. The length of this southbound queue varies, but at one point extends up to 20 vehicles in length in the model, with a queue length of 5 to 10 vehicles more usual. The rest of the network functions well during this time period.

- Future Model – Saturday AM

In the Saturday AM Future Year model the network operates well with few queues. Again, the critical part of the network is the section of Argyle Street between Murray and John Street, but this generally operates satisfactorily over the model's analysis hour.

- Future Model – Saturday PM

In the Saturday PM Future Year model the network operates well with few queues, in a similar fashion to the Saturday AM Future Year model.

Discussion of future traffic conditions with signals at Argyle Street and Oxley Street and removal of marked foot crossing west of John Street

- Future Model – Thursday AM with Signals at Oxley Street

With the closure of the marked foot crossing west of John Street and the introduction of signals at the intersection of Argyle Street and Oxley Street the southbound queues in Oxley Street almost completely disappear. Eastbound queuing on Argyle Street remains but is more evenly balanced between the new stop line at Argyle and Oxley Streets signals and the western approach to the roundabout at John Street and Argyle Street. This is partly due to the increased distance between the John Street roundabout and the proposed signals at Oxley Street compared with the marked footcrossing. This increased distance permits the storage of another 8 to 12 eastbound vehicles on Argyle Street between Oxley Street and John Street. If these signals are implemented in the real world, with direct SCATS control, it is likely that the situation on Argyle Street would have even shorter queues and lower delays, as signal would timings adapt to traffic conditions.

- Future Model – Thursday PM with Signals at Oxley Street

With the introduction of signals at Argyle and Oxley Streets, the southbound queuing in Oxley Street is substantially reduced, with six or seven vehicles as the maximum. This is even though right turn vehicles are now also using Oxley Street. This is a result of changing the mode of control to signals and the additional short left turn lane provided in Oxley Street at its approach to Argyle Street. There is still eastbound queuing on Argyle Street, but in a similar manner to the Thursday AM Model, the queuing between intersections is better balanced than in the Thursday PM model without signals. Of note is that friction from on-street parking in Argyle Street is included in the model. Overall, whilst the signals at Argyle and Oxley Streets tend to introduce more stops and some minor additional delay



to Argyle Street traffic⁴, they provide better overall town centre capacity and improved egress of town centre traffic to the west, as well as providing a high quality pedestrian crossing facility of both Argyle Street and Oxley Street.

- Future Model – Saturday AM with Signals at Oxley Street

This model runs well with limited queuing and good traffic flow along Argyle Street. The rest of the network operates satisfactorily.

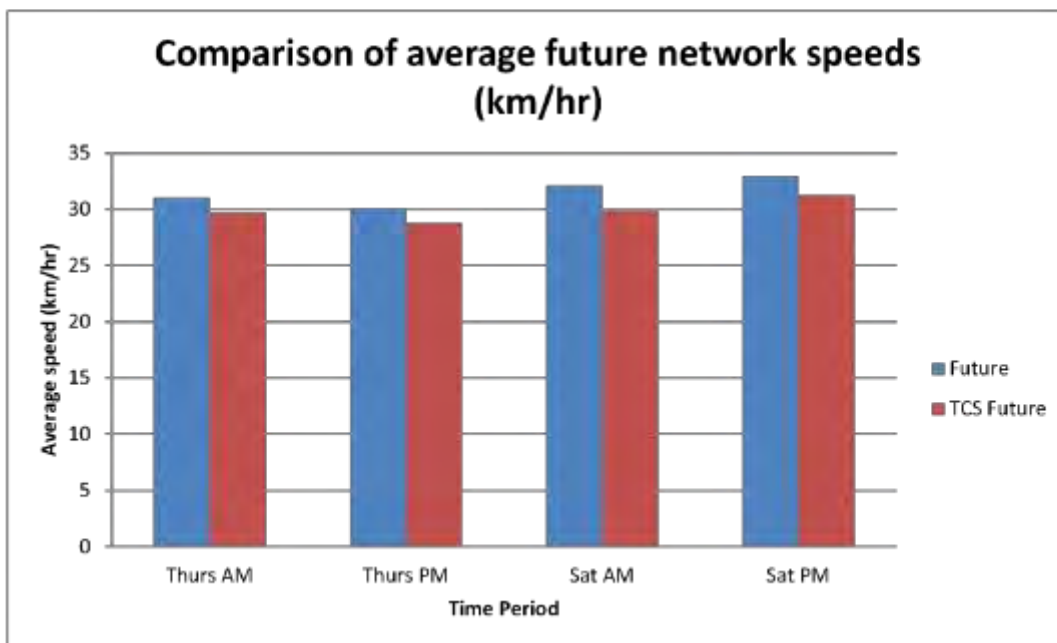
- Future Model – Saturday PM with Signals at Oxley Street

As with the Saturday AM model with signals at Oxley Street, this model operates satisfactorily.

Comparison of future network performance

As an indication of overall network performance the following chart compares future average network speeds with and without the implementation of traffic signals (TCS) at the intersection of Argyle Street and Oxley Street.

Figure 47: Comparison of average future network speeds



The chart indicates small reductions in average network speeds with the implementation of traffic signals. This is to be expected, as signals tend to introduce stops along the main road where previously vehicles had priority. The purpose of the chart is to indicate that, despite the introduction of these signals, there is only a small impact on

⁴ As noted elsewhere the signals have been tested using an arrangement of cycle times and phase settings to provide a robust assessment of performance which provides a high proportion of green time to pedestrians. This has been done on the basis that if the signals work satisfactorily under these conditions then they are most likely to work well in the real world. Consequently, it provides a more negative view of the impact on vehicular traffic.

overall network performance. In terms of considering alternatives, as indicated elsewhere, the current marked foot crossing of Argyle Street is unlikely to remain for the medium to long term. From an economic appraisal perspective the future case in the above chart (i.e., the existing road network with future traffic growth) would not be the base case against which to compare the effects of signals at Argyle Street and Oxley Street.

5.3 Pedestrian Network/ Access

As stated above, an observed and real issue for the Argyle Street corridor is the existing marked footcrossings to the north and south of John Street.

Under current Roads and Maritime Services guidelines, new marked footcrossings on four lane roads are not permitted. Granted the existing crossings have been in place for many years. However, they are noted to be one of the major influences on traffic conditions along Argyle Street.

Further, it is noted that over some years now the RMS has been actively removing existing marked footcrossings on four lane roads. For example in Canterbury Road at Summer Hill. Thus it is expected that the existing crossings would be removed / replaced at some time in the future.

A key concern of marked footcrossings on four lane roads is the limited sight distance for approaching traffic to crossing pedestrians. The problems with view corridors to crossing pedestrians are further amplified by the fact that Argyle Street includes a landscaped median.

When a pedestrian crosses from a kerbline, a vehicle in the median lane has limited viewing distance to the crossing pedestrians if a vehicle in the kerbside lane is adjacent. Once a pedestrian crossing across the path of the two waiting vehicles, it was observed the median lane vehicle would not move forward unless the kerbside waiting vehicle moved forward. The current arrangement is very inefficient and impacts markedly on traffic flows during peak pedestrian periods.

Linkages between public car parks are generally confined to through privately owned properties. Further, access ways to / from Argyle Street and the car parks are poorly delineated and on the southern side of Argyle Street require pedestrians to walk through back of house areas of properties fronting Argyle Street.

The access from the Larkin Place car park is of a higher standard with active frontages internally.

Argyle Street itself includes an active and vibrant retail strip shopping experience with seating areas catering for outdoor dining. However, the conditions of the footpaths were noted to be generally of a poor standard with many areas of maintenance taken place historically which have resulted in a patchwork of materials, condition and look.

In other locations, the crossfall grade of the footpaths was too steep for outside dining. Overall the town centre would benefit from an urban design study which determined the look of pedestrian infrastructure in keeping with the character of the centre. This study could include identification of suitable and non-suitable locations of coherent treatments including outdoor dining. This could also reference to the findings of Council's drainage study currently being undertaken as advised by Council officers.

Throughout peripheral areas of the town centre pedestrian facilities are limited. The wide roads of John Street, Elizabeth Street and Edward Street are not user friendly and require pedestrians to cross long lengths in the path of traffic.

There are generally poor pedestrian connections between the public car parking areas in Oxley Street and Larkin Place.

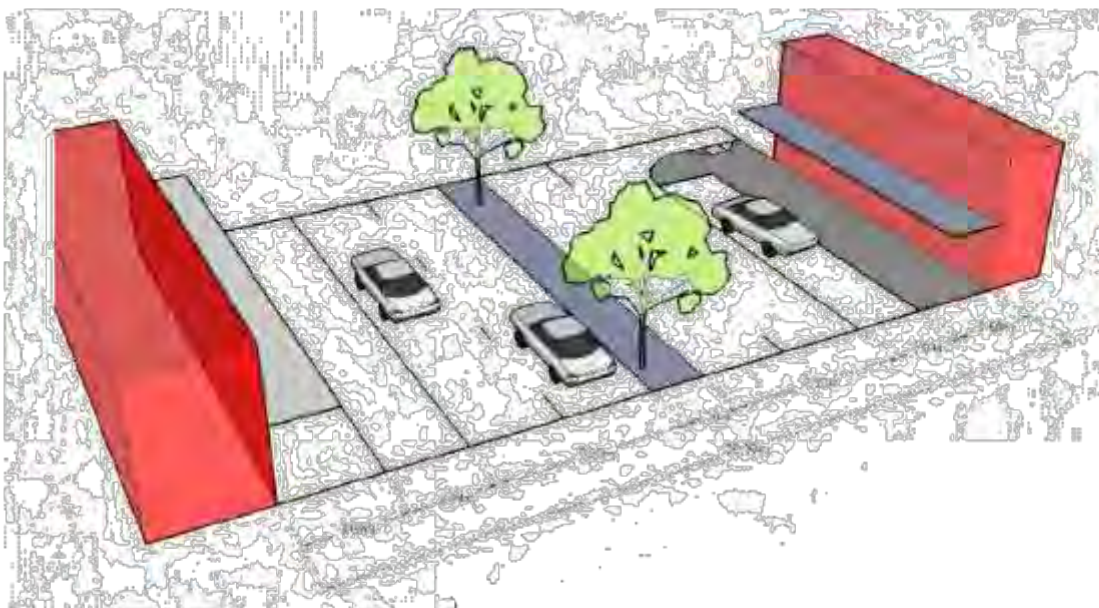
Topography plays a role of a barrier towards the southern ends of John Street, Hill Street, and View Street towards the Hospital.

As is the case of Argyle Street, the existing crossing in Murray is located on a four lane section of road. However, the viability of reducing this section of Murray Street to a single lane approach in each direction is discussed further in Section 6.2.

5.3.1 Argyle Street Footpath Widening Opportunities

Of particular interest are the suggestions for Argyle Street in the 2008 Town Centre Strategy report. The report noted the following existing general arrangements of Argyle Street:

Figure 48: Existing Parking and Lane Widths in Argyle Street



© 2008 Town Centre Strategy Report

The existing configuration includes a wide parallel parking lane of 3.04m (the Australian Standard would suggest 2.5m would be sufficient) and a total width of 7.2m for two travel lanes (3.6m per lane). The potential changes to the existing configuration to achieve improvement to the pedestrian environment in Argyle Street are discussed further in Section Error! Reference source not found. of this report. This assessment has regard to the

existing and future capacity needs of Argyle Street which in turn require a minimum of two travel lanes in each direction.

5.3 Car Parking

The following is noted in summary from the analysis conducted in Section 3.4 of this report:

- General parking spaces in off-street car parks experience higher overall utilisation than on-street spaces.
- Overall general parking spaces have a peak utilisation of just fewer than three-quarters at around 1:00pm.
- Numerically the 'no restriction' parking has the highest demand, peaking at around 600 vehicles at 1:00pm.
- The 3P parking is the next most important source of supply – it also peaks around 1:00pm, at just over 450 vehicles.
- Of note from the above analysis is that most of the time restrictions applicable to spaces in the town centre cease from 12:30pm on Saturday.

In general, there appears to be minimal need for an increase in overall parking provision within the Camden Town Centre as capacity can be increased with both increased enforcement of existing restrictions and conversion of parking restrictions to 'Seven Day' restrictions.

However, information on existing parking areas, their capacity and directions to their locations is considered a key element of an efficiently function town centre. That is, both locals and visitors have a clear understanding of where to travel to via their vehicle and what pathways are provided to / from the town centre core.

5.4 Wayfinding Signage

Whilst the Camden Town Centre would include a large proportion of 'locals' who know where parking areas are located and how best to travel to / from there, given the attractiveness of the centre to visitors there is overall a minimal volume of wayfinding signage for visitors. This includes advice on parking areas, routes of travel, key pedestrian pathways and public transport locations.

The Town Centre would benefit greatly from a wayfinding strategy for all modes and this is discussed further in the recommendations of this report.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

6. Future Traffic Conditions Assessment

6.1 Town Centre Projections

6.1.1 Introduction

The prime driver of town centre traffic growth is town centre activity and employment. This note provides background information on the Bureau of Transport Statistics projections and then provides an analysis of local and aggregate factors that are likely to act to reduce employment in the town centre.

6.1.2 Background Projections

Bureau of Transport Statistics latest small area employment projections (August 2012) indicate, as shown in Table 52, the growth in employment for Camden Town Centre.

Table 52: Employment projections for the town centre

Practise	2006	2011	2016	2021	2026	2031	2036	2041	2046
Town Centre	2,827	3,279	3,669	3,991	4,326	4,651	4,990	5,356	5,571

Note – These projections use travel zone 1371 (2006 travel zones – TZ06), which approximates TZ11 3101

Recent information about town centre employment from 2011 Census journey to work information indicates there were 2563 jobs. This information is not consistent with Table 1 of projections due to Census undercount. The comparable figure for 2006 Census was 2365 jobs. Using the same factor from 2006 Census to correct for undercount applied to the 2011 Census estimate was $2563 * (2827/2365) = 3,064$ jobs. This suggests that recent town centre jobs numbers have fallen short of expectations – i.e., a growth factor of 8% compared with the projection of 15%.

The following table shows implied growth factors for the latest BTS small area employment projections and for a modified series which maintains employment projections for the out-years, but rebases to the modified 2011 estimate of 3064.

Table 13 – Employment projection growth factors – BTS and re-based to lower 2011 employment

Practise	2006	2011	2016	2021	2026	2031	2036	2041	2046
BTS projections									
Town Centre	2,827	3,279	3,669	3,991	4,326	4,651	4,990	5,356	5,571
Growth factors			1.12	1.22	1.32	1.42	1.52	1.63	1.70
Re-based to latest employment estimate									
Town Centre		3,064							
Growth factors			1.20	1.30	1.41	1.52	1.63	1.75	1.82

Camden Town Centre
Prepared for Camden Council



Smart Consulting

The growth factor for the period from 2011 to 2041 is between 1.63 and 1.75. Numerically this is an increase of between 2,086 and 2,301 jobs in the town centre. The implication is that for retail jobs at approximately 1 per 30sqm, this translates into a requirement for around some 60,000 to 70,000 sqm of floorspace, and if they were commercial jobs at 1 per 25 sqm, this would require some 50,000 to 60,000 sqm of floorspace.

1.1.2 Likely employment outcomes

Development and employment growth in the town centre faces a number of hurdles that are likely to reduce this level of growth below the projections. Please note that this is not a criticism of BTS's employment projections – it is simply focusing on the local factors that will challenge growth as well as touching on some issues at the aggregate level. These factors include:

1. Physical constraints – primarily flooding issues
2. Land ownership and planning constraints:
 - a. limited number of large sites or aggregated sites within single ownership
 - b. heritage constraints on development that are likely to reduce yields and increase costs of development
3. Competition from surrounding centres, especially Narellan, but also Oran Park Town Centre for trade and for investment
4. Limited projected population growth in the immediate catchment of the town centre, of about 33% over the 30-year period

Table 14 - Population projections for the immediate town centre catchment

Travel zone in catchment	2011	2015	2021	2028	2031	2036	2041
Ellis Lane (1366)	1,809	1,914	2,024	2,226	2,449	2,638	2,834
Camden TC (1371)	441	978	991	996	1,052	1,100	1,155
Elderslie (1375)	2,804	2,964	3,168	3,201	3,216	3,231	3,247
southern Camden (1376)	2,931	3,048	3,209	3,430	3,677	3,887	4,104
Bickley Vale (1381)	956	1,081	1,120	1,205	1,299	1,382	1,798
South Camden (1376)	4,509	4,599	4,679	4,689	4,710	4,726	4,744
Combined	13,450	14,584	15,191	15,747	16,403	16,965	17,882
Catchment growth factors from 2011		1.08	1.13	1.17	1.22	1.26	1.33

5. Scheduled move of Council Chambers from the town centre has the potential to reduce town centre activity, until a comparable occupier of the space can be found. This potential reduction in activity will be somewhat of a demand side shock to existing activity.
6. Recent growth of jobs has not matched projections.
7. Similarly, there have been only sporadic development consents granted in recent years, suggesting that competition for investment with surrounding centres may have already commenced in earnest.



8. It is unlikely that the number of jobs in the future in Sydney per head of population will be as high as projected due to a reduction in the workforce participation rate for the working age population, as the recent levels of the participation rate have been historically high, driven by the recent resource investment boom. It is considered unlikely, based on historical cycles that such a large boom will be seen again within the next two generations (i.e., prior to 2070).

Thus for the purpose of assessing future traffic conditions, a development growth factor of 1.3 was applied to determine future traffic flows for the testing of specific options for improvement.

Future intersection analysis can be found in **Appendix E** of this report.

6.2 Strategic Option Assessment

As part of the preparation of this report, a number of potential options were considered for improvement in and around the Camden Town Centre. During the initial phases of the assessment, some options were not progressed to final assessment based on a strategic analysis of their feasibility, benefits and impacts. A summary of all options considered and the pros and cons of each is provided in **Appendix D**.

6.3 Future Year Traffic Analysis

As discussed in Section **Error! Reference source not found.**, land use projections for the study area and its environs were used to forecast future traffic demands. These demands were then analysed using the traffic model to identify future traffic flows, and overall network performance. This information formed the basis of estimates of future year traffic flows for analysis in the detailed intersection analysis application, SIDRA, as discussed above in the section on existing intersection performance. This tiered approach to traffic analysis provides a robust assessment of future year traffic conditions.

Further details about the analysis are in **Appendix C - Traffic Modelling Working Paper**.

7. Options for Improvement Assessment

This component of the study includes an assessment for improvements to existing conditions from both an overall holistic perspective for Camden Town Centre core and site specific improvements to ameliorate identified issues such as accident trends.

7.1 Town Centre Core Improvement Strategy

After consideration of the existing conditions for all modes, the key areas of improvement have been identified as follows:

1. Replacement / upgrade of existing marked footcrossings in Argyle Street north and south of John Street.
2. Future use of parking areas in Oxley Street which currently service Council offices.
3. Better access from existing parking areas in Oxley Street north of Argyle Street
4. Grid pattern of pedestrian pathways linking existing main public car parks
5. Future use of Council offices site and creation of civic precinct in John Street

The 'grid within a grid' recommended overall outcome for the town centre is shown in **Figure 49** below



Figure 49: Recommended overall town centre core improvements



The following provides an assessment of the possible changes which may be considered in the short, medium and long term. The SIDRA assessments of future operating conditions at intersections where improvements are proposed are provided in **Appendix E** of this report.

7.2 Options Testing

7.2.1 Signalisation of Argyle Street/ Oxley Street & Removal of Marked Footcrossing

As shown in Table 36, the warrants for signalisation of the existing marked footcrossing are being currently met. Therefore signalisation of this non-compliant crossing would appear a reasonable improvement to consider.

Of further interest is the main pedestrian link to / from Argyle Street and the main car park between Murray Street and John Street is located in close proximity to the Argyle Street /Oxley Street intersection.

Oxley Street includes the major Woolworths supermarket and future potential additional public parking areas with the relocation of the Council offices to Oran Park. Thus, allow vehicles to exit Oxley Street and travel south along Argyle Street would alleviate pressure on the Argyle Street / John Street roundabout.

Therefore signalisation of the intersection of Argyle Street / Oxley Street and include pedestrian phasing's across both Argyle Street and Oxley Street would allow removal of the existing marked footcrossing and provision of a higher grade safer facility. Right turn movements into Oxley Street are not supported as this traffic travelling from the east to Oxley Street have the option to either travel via Mitchell Street (out of the town centre core) or U-turn at Murray Street.

The suggested improvements are shown below:



Figure 50: Signalisation of Oxley Street/ Removal of Marked Footcrossing

The proposal would result in the loss of a small number of on street spaces. However, the improvements to pedestrian safety and connectivity to public carparks would be markedly improved.

A further significant benefit of the proposal is traffic travelling from the west via Cawdor Road and south west via Murray Street could travel to the Oxley Street car parks within the need of passing through the Argyle Street / John Street intersection.

SIDRA assessment of future conditions with the signals in place found the intersection would operate at a satisfactory level of service during peak periods on both a weekday and weekend day.

7.2.2 Signalisation of Marked Footcrossing in Argyle Street between John Street and Hill Street

As stated in Section 3.6.1 of this report, the warrants based on traffic flows / pedestrian flows were just below those required for traffic signals at the existing marked footcrossing.

However, application of the 'special warrant' *"The location has been the site of two or more pedestrian casualties over a three year period that could have been prevented by traffic signals"*, signalisation of the intersection is justified.

It is recommended that if signalisation is considered, the existing openings in the central median which allow pedestrians to cross in various locations should be closed so crossing is concentrated to the signalised pedestrian crossing.

To maintain traffic efficiency along Argyle Street, it is recommended that these signals are 'actuated' pedestrian signals. The potential arrangements are shown below:



Figure 51: Signalisation of Marked Footcrossing – Argyle Street between John Street & Hill Street



7.2.3 Signalisation of Argyle Street/ John Street Roundabout

In the event that support from the Roads and Maritime Services for the signalisation of the marked footcrossing as shown in **Figure 51**, the an alternative would be to replace the roundabout at Argyle Street / John Street with traffic signals.

It is noted that the existing roundabout does not meet current design standards to allow two vehicles (a semi-trailer / car) at the same time and signalisation of the intersection would resolve this issue. However, signalisation should only be considered if it included the closure of the existing marked footcrossing east of John Street.

Having regard to the overall desired 'grid within a grid' strategy, closure of the crossing would require pedestrians to walk longer distances to cross Argyle Street east of John Street which is less desirable compared with the option in Figure 48.

The arrangements for signalisation of Argyle Street / John Street intersection are shown below.



Figure 52: Traffic Signals at Argyle Street/ John Street Intersection

The arrangement would also require the provision of right turn bays eastbound and westbound in place of a proportion of the existing landscaped central median.

In the future, the intersection would operate at a poor level of service during the Thursday PM peak. However, it would operate satisfactorily at all other peak times assessed.

Whilst the above option is feasible, maintaining the roundabout and signalisation of the existing pedestrian crossing in Argyle Street east of John Street is considered a holistically better outcome.

7.3 Further Potential Improvement Options

7.3.1 Additional Multi Storey Car Park – Oxley Street

Whilst not currently considered in the existing contribution plan, the relocation of the Council offices to Oran Park and creation of a civic precinct (discussed further below in Section 7.3.2) would allow provision of a multi storey car park on the existing public car park on Oxley Street.

The proposal to signalise the Argyle Street / Oxley Street intersection as described above would reinforce this public car park option. A multi storey car park in this location would not impact upon any major heritage items.

Council could consider allowing redevelopment of the site to a private developer on the basis that a minimal number of public car spaces were provided as part of the private development. In addition, monies collected from the contributions plan to date to assist in paying for further public spaces in this location.

A further benefit of providing a multi-deck car park in this location is that it has the potential of allowing for a significant redevelopment of the Council building to say provide a regional community asset. This may include a multipurpose centre, a theatre or the like.

7.3.2 Creation of a Civic Precinct

The area north of Argyle Street along John Street is well utilised during major events. Further, the relocation of the Council offices to Oran Park would provide the opportunity to create a civic / marketplace precinct in and around this location.

With the proposals listed above in place, John Street between Argyle Street and the entrance to the existing public car park could be closed for events and weekend markets with minimal disruption to traffic. The signalisation of Oxley Street would allow traffic travelling to / from the west and south west to use Oxley Street public car parking. Traffic from the east and north could still gain access to the Larkin Place car park.

To reinforce the precinct, alternative paving could be considered in John Street which includes delineation of the existing bus stop areas in a holistic approach to improving the area and reinforcing the character of the Camden Town Centre.

A missing link to achieving the above and the 'grid within a grid' system is a safe crossing facility across John Street linking the two public car parks. It is recommended that either a marked footcrossing with kerb extensions (if

warrants are met in the future) or an elongated pedestrian refuge be considered. It should be located directly opposite the pedestrian pathway to the Larkin Place car park.

The overall potential scheme is shown below.



Figure 53: John Street Gateway Precinct Scheme

Other areas which were considered for a 'town square' environment included John Street south of Argyle Street and Oxley Street north of Argyle Street.

John Street south of Argyle Street has topographical issues with steep grades away from Argyle Street. Further, the crossfall of footpaths were adverse. In the event this section of John Street was closed there would still be opportunities to travel to the existing off street car parks either side of John Street. However, traffic wishing to travel back to the east would have a long distance to travel via the Camden bypass or via Murray Street to travel eastbound along Argyle Street.

Whilst Oxley Street provides an off street car parking facility, the street in its current form (which includes a relatively new supermarket development) does not include active frontages.

7.3.3 Elizabeth Street/Mitchell Street

As stated in Section 3.9, the intersection of Elizabeth Street / Mitchell Street has had a large number of accidents which have involved pedestrians. The existing arrangements are shown below.



Figure 54: Elizabeth Street/Mitchell Street Existing Intersection Arrangements



Figure 55: Mitchell Street – looking north to Elizabeth Street



The existing intersection includes pedestrian refuges on all legs of the intersection. However, the wide nature of both Elizabeth Street and Mitchell Street combined with vehicles parked at 60 degree angles exposes crossing pedestrians to poor sight distance and long walking distances in the path of oncoming traffic.

Closer examination of the times of accidents revealed accidents has occurred at all times of the day and therefore there is no clear common time period for which pedestrian accidents are occurring. Thus, it is not an issue of say poor lighting or say intoxicated persons being hit by oncoming vehicles. Further, the ages of the pedestrians involved ranged from 17 years old to 70 years old with an average of 45 years old.

Overall improvements to the delineation of the intersection and narrowing where possible would assist in reducing the number of pedestrian accidents.

These improvements could include:

- Painting all existing pedestrian refuge islands in Glassbead paint to improve reflectivity
- Incorporate splayed approach chevron linemarking for each refuge
- Installing standard pedestrian refuge island signage and hoop as per the RTA Technical Direction 2011 / 01A (shown below)

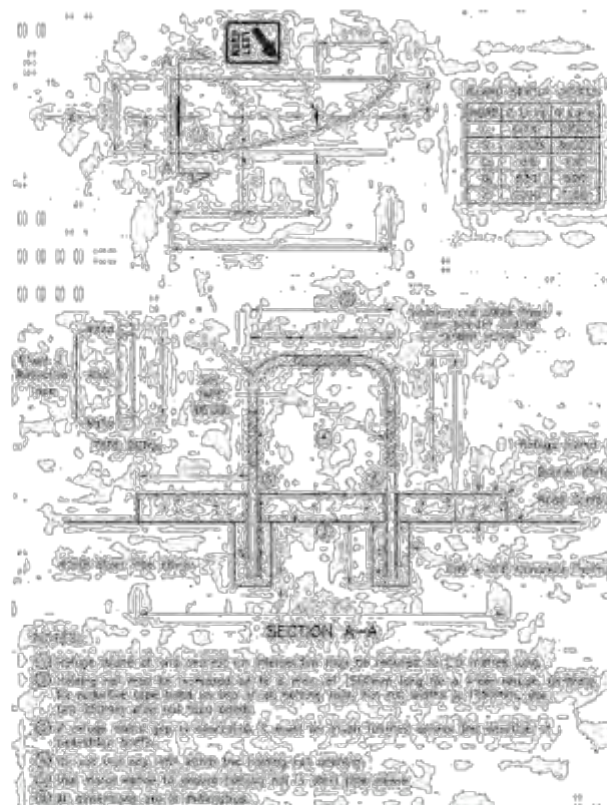


Figure S6: RTA Direction 2011/01A

Camden Town Centre
Prepared for Camden Council



Smart Consulting

An alternative arrangement to the above would be the provision of a roundabout at the intersection, closure of the centre islands to prevent pedestrians from using them and creation of a midblock pedestrian facility between John Street and Elizabeth Street.

However, such an arrangement would not follow the desire lines of existing pedestrian flows along Elizabeth Street and Edward Street. The frontage of Mitchell Street between Elizabeth Street and Edward Street consists of a very long impermeable block as is the case for most blocks in the town centre.

7.3.4 Seven Day Parking Restrictions

As stated in Section, 3.3, all current restrictions except for a few spaces in Murray Street end at 12:30pm on a Saturday. However, much of the premises in Argyle Street operate with seven (7) day trading.

Centres like the Camden Town Centre which include thriving street retail must include convenient street parking with good turnover to maintain their attractiveness. The further benefit of extending restrictions to seven (7) day restrictions is that additional parking capacity (through increased turnover and opportunities) can be created.

It is recommended that the area encompassed by seven (7) restrictions be slowly expanded over time beyond the initial precinct which includes Argyle Street.

The suggested precinct to include seven (7) day restrictions is shown below.

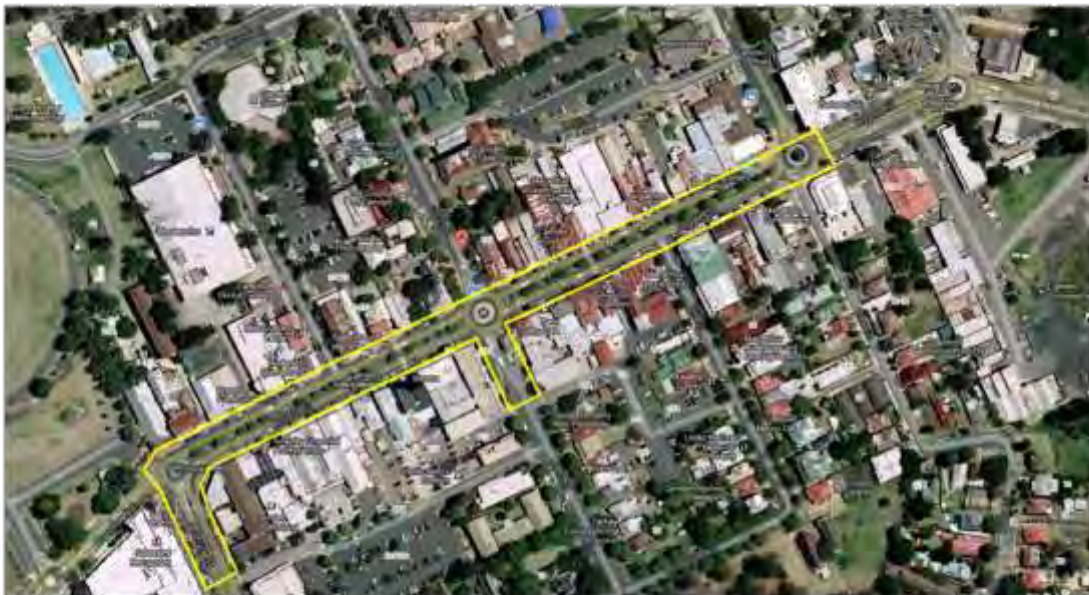


Figure 56: Recommended Precinct for Seven (7) Day parking restrictions

7.3.5 Murray Street/ Broughton Street

As stated in Section 3.1 of this report, the intersection of Menangle Road and Broughton Street currently operates at a LOS D in the afternoon peak. This LOS is generated by the difficulty vehicles have exiting Broughton Street. The provision of a single lane roundabout at the location would both slow vehicle speeds through the intersection and provide additional opportunities for vehicles exiting Broughton Street to join the traffic in Murray Street.

A single lane roundabout has been assessed for future operating conditions (30% increase in development scenario) and was found to operate with a good level of service in all weekday and weekend day peaks. This analysis is provided in **Appendix E** of this report.



Figure 57: Recommended Single Lane Roundabout at Murray Street/ Broughton Street

7.3.6 Wayfinding Signage

The existing signposting of Council's existing parking areas and in particular directional signage to these car parks is generally non-existent. Council should consider the installation of direction signage to each car park from each direction in Argyle Street to direct traffic to car parks and so to avoid where possible the intersection of Argyle Street / John Street.

This signage should also include the number of spaces available in each car park (as a total number) as this type of signage generally attracts more visitors in knowing that they are travelling towards a large capacity carpark. The locations of the signage are shown below:

ORD06

Attachment 1



Figure 58: Suggested Public Car Park Wayfinding Signage Locations

8. Short, Medium, Long Term Recommendations

8.1 Road Network

Section 7 of this report provides a number of improvements recommended for the road network.

Whilst the existing dual lane roundabout at the intersection of Argyle Street / John Street does not comply with current standards, it is not recommended that this intersection be converted to traffic signals.

In the short term, Council should explore the feasibility of signalising the intersection of Argyle Street / Oxley Street to allow vehicles to exit Oxley Street and travel west / south. Right turn movements into Oxley Street from Argyle Street should not be permitted.

The signalisation of Argyle Street / Oxley Street would allow the closure of John Street between Argyle Street / Larkin Place car park access road for weekend markets and other events. Consideration should be given to providing a gateway scheme to this section of John Street with alternative pavement materials and improved bus layover facilities.

In the medium term provision of a single lane roundabout at the intersection of Menangle Road / Broughton Street would improve intersection operating conditions in the weekday PM peak.

8.1.1 Narrowing of Argyle Street to one lane

As noted elsewhere in this report, Argyle Street between Edward Street and Murray Street is a divided road with two travel lanes in each direction and kerbside parking. At face value, there are opportunities to consider the re-configuration of the cross section to re-allocate road space away from vehicles, possibly to other road users, such as pedestrians and bicycles, and maybe toward outdoor dining.

The current capacity of Argyle Street is:

- Lane next to on-street parking – approximately 600 vehicles per hour
- Lane next to median – approximately 900 vehicles per hour
- Combined one-way capacity – approximately 1,500 vehicles per hour

To achieve service flows of traffic comparable with these capacities requires efficient intersections. Current traffic flows are between 700 and 1,100 vehicles per hour one-way depending on the section of Argyle Street, with future demand of between 850 and 1,400 vehicles per hour.

The implications of a potential scheme, such as removing a lane in each direction from Argyle Street to permit the widening of the footpath, needs to consider the capacity of Argyle Street after the change and the traffic loading on alternative routes. Removal of one travel lane would reduce Argyle Street's capacity from 1,500 vehicles per hour to around 600 vehicles per hour. This is largely the result of side friction between moving traffic and kerbside activity such as parking.

Camden Town Centre
Prepared for Camden Council



Smart Consulting

If the travel lane on Argyle Street were wide, say 3.6m, then some of the friction from kerbside activity might be reduced and a slightly higher service flow achieved of say 650 vehicles per hour one-way. However, to achieve these service flows efficient intersections will be required, which would include, among other things, two-lane approaches on the new one-lane section of Argyle Street.

The following table provides a comparison of the future four-lane situation and a reconfigured arrangement for westbound traffic, across a screenline between Elizabeth Street and John Street, in terms of traffic capacity and predicted service flows. An advantage of using a screenline is that it abstracts away from the difficulties of how this deviation of traffic would connect at Argyle Street and how intersections could be configured to manage these large deviation flows.

Table 55: Existing & Reduced cross section

Scenario		Argyle Street	Mitchell Street	Combined Screenline
<i>Existing cross section</i>	<i>Configuration</i>	Two-lanes each way	One-lane each way	
	<i>Traffic capacity</i>	1,500 vph	600 vph*	2,100 vph
	<i>Service flows future</i>	1,280 vph	100 vph	1,380 vph
<i>Reduced cross-section</i>	<i>Configuration</i>	One-lane each way	One-lane each way	
	<i>Traffic capacity</i>	650 vph	600 vph*	1,350 vph
	<i>Service flows future</i>	650 vph	730 vph	1,380 vph

* The traffic capacity is based on traffic flow, whereas Mitchell Street has residential lots and sensitive land use along it (school), environmental capacity considerations would apply.

The above table indicates that, on traffic capacity grounds, some 630 vehicles per hour from Argyle Street would need to use an alternative route, such as Mitchell Street, for the remaining flows on Argyle Street to stay below traffic capacity. This would combine with the 100 vehicles per hour on Mitchell Street to give a one-way volume of 730 vehicles per hour westbound on Mitchell Street. This would exceed the traffic capacity of Mitchell Street.

However, Mitchell Street provides a collector type of traffic function and has sensitive land uses along it, including residential and a school. As such, environmental capacity must be considered. For a collector road a maximum two-way flow of 500 vehicles per hour is the environmental capacity. Mitchell Street, as per the above table, would have around 730 vehicles per hour westbound. In addition it would have around 550 vehicles per hour eastbound – a total of about 1,300 vehicles per hour, more than two and a half times the environmental capacity.

In order for the traffic flow on Mitchell Street to remain within environmental capacity for a collector road, no more than 200 to 250 vehicles per hour (combined directions) could transfer from Argyle Street in the future.

Why is Argyle Street two lanes in each direction?

When examining Camden Town centre's road network, the question arises as to why, if the approach roads to the town centre are all one-lane each way, does Argyle Street need to be two-lanes each way?

The response is that there is convergence of traffic from several roads onto Argyle Street; the roads feeding in from rural areas (and indeed Camden Valley Way) do not experience the interruptions to traffic flow associated with a town centre and so have higher effective capacities per lane than Argyle Street, and that there is circulating traffic within town centres some of which, in Camden's case, uses Argyle Street. In addition, the intersections in town centres tend to be the regulator of road network capacity; the two-lanes on Argyle Street provide higher capacity approaches and departures to intersections along the route.

Several roads converge on the town centre – for example, Murray Street and Cawdor Street are effectively a single lane in each direction, but then converge onto the western end of Argyle Street in the afternoon. In the morning peak:

- Cawdor Street eastbound – 621 vph of which 564 vph proceed to Argyle Street
- Murray Street northbound – 471 vph of which 395 vph proceed to Argyle Street
- Argyle Street has 70 vph u-turning from westbound to eastbound
- Combined flow on Argyle Street of 1,029 vph which exceeds capacity of a single lane

The effective capacity of some of the roads feeding the town centre is in excess of traffic capacity that can be achieved within a town centre. For example, Camden Valley Way, whilst only a single lane each way, has features that enhance its capacity. These include:

- Almost no kerbside activity such as parking, a shoulder is provided
- Limited property access points
- Open environment with few, if any, pedestrians around and good sight distances
- Flaring to two-lanes on eastern approach and departure to the intersection with Edward Street
- Seagull treatment at Macarthur Road with priority to the through movements on Camden Valley Way

8.2 Pedestrian Network

Of more importance to improve pedestrian connectivity in the Town Centre is the adoption of a 'grid within a grid' system linking the main street and the main public car parks.

To facilitate this in the short term the following should be considered:

1. Signalisation of the intersection of Argyle Street / Oxley Street and the removal of the existing pedestrian crossing west of John Street
2. Signalisation of the existing marked footcrossing in Argyle Street between John Street and Hill Street
3. Marked footcrossing (or pedestrian refuge if marked footcrossing warrants are not met) in John Street opposite existing pathway to Larkin Place car park

In the medium to long term, having public accessways to car parks over private property should be avoided. Council may consider in future planning policies to promote transfer of the existing accessways linking car parks to Argyle Street to public ownership with incentives for developers to do so. That may come in the form of reduction in parking contributions, higher yields or a number of other alternatives.

8.2.1 Narrowing Lanes in Argyle Street

As stated in Section 5.2.1, there is an opportunity to widen the footpaths of Argyle Street through the narrowing of the existing travel and parking lanes.

The Australian Standard for On Street Parking Facilities suggests a width of 2.5m could be considered for a parking lane. However, in the environment in Argyle Street, a wider lane of 3.0m as is currently in place provides some additional separation between a parallel parked vehicle and the adjacent two lanes of travel.

Overall the parallel parking lanes could be provided at a width of 2.75m which is still considered generous and would allow an additional 250mm of footpath widening on either side of Argyle Street.

As shown in **Figure 48: Existing Parking and Lane Widths in Argyle Street**

8 Argyle Street includes 7.2m of road to provide two travel lanes in each direction, or 3.6m wide lanes.

There would be the opportunity to consider narrowing the lanes to a width of 3.25m per lane which would provide an additional 500mm of footpath width. A lanewidth of 3.25m would still be considered acceptable to accommodate large articulated vehicles.

However, any changes to the lane widths need to consider design investigations at each intersection in Argyle Street to confirm what impacts they may have on turning manoeuvres.

8.3 Bicycle Networks

As stated above, there is an opportunity to widen the footpaths in Argyle Street through the narrowing of the parking and travel lanes. However, in turn this would limit the opportunity to allow bicycles to travel along Argyle Street in wide lanes. There is no opportunity to allow off street cycleways along Argyle Street.

It is noted that a cycleway is currently installed along Camden Valley Way in the east to the Town Centre. However, ends at Edward Street.

Consideration could be given to identifying an on road cycle road around the town centre using Edward Street / Mitchell Street / Oxley Street. Exit vehicle Oxley Street could be facilitated at the recommended signals for the intersection.

There is generally a lack of existing bicycle parking facilities in the town centre. These should be located in high pedestrian flow areas to maximise passive surveillance of parked bikes. In the short term, consideration should be given to increasing the number of bicycle racks with the possible provision of higher order parking facilities

Camden Town Centre

Prepared for Camden Council



Smart Consulting

such as lockers. The bicycle provision rate should a minimum of 1 space/ 50 car spaces and should be located in areas of high surveillance i.e. John/ Argyle Street.

In the medium to long term, Camden Council should consider updating the Camden Bicycle Plan which was undertaken a significant number of years ago.

8.4 Public Parking

After a detailed review of the availability of parking in the town centre and its use, it is the view of this report that at this stage additional multi deck car parking is not required to accommodate current demands.

Of a more pressing nature is the enforcement of existing restrictions which Council advised only forms some 5% of the duties of the two existing Council rangers who patrol the entire LGA. The volume of parking available in the Camden and Narellan Town Centres justifies a further range who's main role is to police existing restrictions to in turn maximise turnover and parking availability.

Also in the short term consideration should be given to converting existing parking restrictions in Argyle Street between Murray Street and Elizabeth Street to seven (7) day restrictions maintaining the current one hour limits. A short section of Murray Street between Argyle Street and the entrance to the Murray Street car park should also be converted to seven (7) day restrictions.

In the medium to long term it is suggested that Council investigate through survey length of stay of vehicles parking in the four main public car parks. Whilst this information was not gathered as part of this report, observations during many site inspections revealed that a large proportion of vehicles were using the car parks as all day parking.

Also in the medium to long term, consideration should also be given to including the existing Oxley Street public carpark in the contributions plan to provide a multi deck car park in the future. This location is considered the most feasible in terms of limiting impact on surrounding areas. Again, signalisation of the intersection of Argyle Street / Oxley Street would be required to maximise the success of a larger car park.

8.4.1 Future Additional Parking Provision

Does Camden need a multi-story car park?

Analysis of the surveys for this study indicate that current off-street car parking and much of the on-street car parking close to Argyle Street is heavily used during the middle of the surveyed weekday. Further away from Argyle Street there are substantial amounts of unused on-street car parking.

The data and on-site observations suggest that there is a fair proportion of long-stay parking occurring in short-stay spaces. Town centre workers (the predominant group of long-stay parkers in a town centre such as Camden) would be expected to park in unrestricted spaces, at some distance from the core of Argyle Street. This situation was expected to be evidenced by many of these unrestricted spaces filling early in the day (prior to 9am) and remaining occupied for a large proportion of the day. This would appear like a doughnut –filling at the periphery early; the centre filling later in the morning, as shoppers and other town centre visitors arrive.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

On a Saturday, the off-street car parking areas, which on a weekday were substantially full by 9:00am and 10:00am, do not reach more than 60% utilisation all day, except for the Larkin Street car park, which exceeds 60% only after 2:00pm, when the main retail activity has wound down. As there is less commercial activity on a Saturday, with various government offices and most banks closed, the Saturday parking demands probably provide a better indicator of retail parking demand.

The following discussion outlines a series of activities to improve the utilisation of the existing parking assets which currently support Camden. Below this is a set of next steps.

Achieve better utilisation of existing parking assets, by conversion of all long-stay parking spaces close to Argyle Street (between Broughton Street and Mitchell Street, exclusive) to short-stay. This includes the public off-street car parks. It would also require increased enforcement of time restrictions – additional activity by rangers would be appropriate. Further, this would need to be supported by ensuring that there is no doubt that Council has the ability to enforce infringement notices.

This approach would push a proportion of long-stay parking demand away from the town centre core, where it could be readily accommodated in on-street parking. To support this, consideration should be given to way finding signage, ensuring that signs and lines for these parking places are in good order and that pedestrian pathways are maintained in good condition.

The amount of parking capacity that would be freed-up as a result of the above actions cannot be directly quantified now without knowing the current duration of stay of parkers. Whilst the indirect evidence discussed above indicates there is a non-trivial problem of over-stay parking, it does not quantify it. Surveys of duration of stay in a good sample of on-street and off-street parking areas on a weekday would provide direct evidence and a good estimate of the size of the problem.

Once long-stay parkers are using existing peripheral on-street parking spaces, the prime retail parking spaces will be available for town centre visitors.

As activity in the town centre grows, it is expected that demand for car parking would also increase. As new developments are approved, there is a requirement for those developments to meet their parking demands through provision of on-site parking or a contribution toward common-user off-street parking, to be arranged by Council. If all the parking demand that would be generated by future development were accommodated on-site, then, theoretically, no additional public car parking would be required.

However, as our review of land holdings and lot sizes indicated, many of the sites which might be considered for redevelopment are physically constrained and would reasonably be expected not to be able to accommodate all their parking on-site. The few recent development approvals, which were also reviewed, indicated most occurred on small sites, with little on-site parking and few contributions have been collected toward a common parking facility.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

In the future some site consolidation might be achieved, possibly through some form of incentive introduced in the planning regulations, and this might lead to the ability to accommodate much of the additional parking demand on-site; this would result in only a small requirement for additional Council-provided off-street parking and this would be many years in the future.

However, with the site constraints outlined above, there will be a requirement for additional off-street car parking at some future point. The timing of this will depend on:

- The proportion of existing parking that is freed-up by the more active enforcement
- Development uptake rate
- Proportion of additional car parking demand generated by the development uptake accommodated on the relevant sites

Given current conditions and a reasonable shift of existing long-stay parkers to more peripheral locations, through enhanced enforcement, additional off-street car parking capacity is not likely to be required in the short to medium term.

8.4.2 Next Steps

- Council to have surveys of parking taken to establish the duration of stay profiles for a good sample of existing on-street and off-street car parking facilities
- Investigate improvements to enforcement including budget implications, changes required to ensure that infringement notices can be enforced
- Convert long-stay/unrestricted spaces that are close to Argyle Street to short-stay
- Identify improvements to pedestrian facilities, signage and lines required to 'formalise' existing on-street car parking in peripheral areas
- Implement enhanced enforcement with a period of grace/awareness to endeavour to maintain public support
- Twelve months after implementation retake car park surveys to identify use of the various parking areas and the duration of stay; identify available parking capacity (unused) close to Argyle Street
- Monitor growth in the town centre and number of car parking spaces provided by new developments on-site and how many are required off-site – update this progressively as developments are approved and then constructed
- Retake parking surveys, say, every five-years, unless something should occur that suggests they should be re-taken more frequently
- Based on the parking surveys and the monitoring, especially after Camden Council's offices have relocated out of town, a better appreciation of the likely timing of new parking capacity would be available.

8.5 Town Square

As stated in Sections 7.3.2 and 8.1, a gateway scheme should be considered for John Street between Argyle Street and the entrance to the Larkin Place car park. This section of John Street could be closed on weekends for markets and / or other events with minimal impact on traffic conditions in the town centre. However, as also stated above consideration should be given to undertaking these works in parallel with the signalisation of the intersection of Argyle Street / Oxley Street.

The relocation of Council offices to Oran Park also provides the opportunity to create a civic precinct which links John Street to the Oxley Street public car park.

8.6 Public Transport Operations

8.6.1 Future Bus Services

South West Sector Bus Servicing Plan – Technical Paper (prepared by Maunsell|Aecom for Ministry of Transport, February 2013) provides an indication of future bus servicing arrangements in the south west of Sydney. The scope of the investigation does not directly include Camden town centre, as it is located outside the growth centre's area (refer to Figure 2.1 in AECOM's report). The technical paper does, however, give some consideration to how bus services between Camden town centre and the growth centre might emerge.

The bus network plans put forward by AECOM's technical paper cover:

- Long-term
- Short-term
- Staging strategy.

The long-term network indicates a peak hour route – P1 – between Leppington and Camden. This would use Camden Valley Way from Camden to Narellan, then The Northern Road up to Oran Park Town Centre.

The short-term network shows rt 890 between Camden and Campbelltown/Macarthur via Narellan and Mount Annan. This looks like a combination of the existing rts 894 and 892.

The two major difficulties facing Camden in terms of gaining improved bus services for a range of travel opportunities, including better access to rail, are:

- Its location, which is off to the west and south of the South West Growth Centre. The implication is that services that anchor on Campbelltown/Macarthur and link areas to the west to this sub-regional centre, travel along the Narellan Road alignment. At Narellan they face a choice – turn south west to Camden or turn north/ north west to various centres and their catchments, including Harrington Park, Oran Park, and precincts, such as Catherine Field.
- Its size, which is small in comparison with the rapidly expanding areas in the South West Growth Centres.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

It is not practical for a route to serve Campbelltown/Macarthur, Narellan and both Camden and the South West Growth Centre, they must diverge at Narellan.

An alternative approach to improving bus connectivity that would link Camden via Narellan and Oran Park Town Centre to Leppington, as indicated by P1 in AECOM's report, is too long for attractive end-to-end travel from Camden to Leppington. It will certainly provide a useful connection to Oran Park Town Centre from Camden, but it is unlikely that many Camden boarders would stay on as far as Leppington.

As such it is unlikely that bus will be able to attract a substantial increase in patronage from the Camden travel market. Whilst existing bus links may only serve a limited existing market, it is recommended that:

- Any proposed changes to town centre traffic facilities bear in mind the potential impact on buses and work to improve the conditions that can make bus use more attractive. These include improved pedestrian connectivity, accessibility and general conditions; a high standard of urban design around bus stops (e.g., John Street bus stop reflects this high quality); positioning of bus stops close to major potential generators.
- Council liaise with the bus operator and TfNSW through local traffic committee as well as engaging with service planning processes to ensure that current bus resources are retained and improved, where possible. For example, the through routing of bus services to the South Camden area is advantageous as they serve a larger catchment, including the hospital; provide a useful local link; and they do this without requiring layover within the town centre – this arrangement should be encouraged.
- Opportunities for linking country routes onto metropolitan routes, to provide longer direct connections for patrons should be explored. This would entail hooking the country route onto the metropolitan route, so the metropolitan bus would continue through Camden town centre and run the country route. Due to differences in frequency, this might see the first metropolitan trip run a country route, then the next trip run a different country trip. Whilst there are institutional barriers to this, as well as practical issues of hooking very low frequency country services onto low frequency metropolitan services, and having a complex service pattern, the potential benefits to passengers, and possibly to operational costs, may warrant further investigation. It also has the potential to reduce the number of town centre terminators.

8.7 Potential Bus Terminus Locations

The bus stop, located on the east side of John Street north of Argyle Street, is the main focus for buses serving Camden Town centre. It is the terminus for all the Country services, and some of the Metropolitan services.

It is fairly centrally located, providing reasonably broad accessibility to attractors within the town centre. It is supported by bus stops on Oxley Street (for buses coming into town from the south and the west), on Elizabeth Street for buses approaching from the east, and a bus stop on Argyle Street (west of Elizabeth Street) for buses heading east.

Moving this bus stop to Oxley Street or to an off-street facility behind the Council Offices would reduce the coverage of the town centre for most routes, and would be undesirable. The main considerations are discussed below:

Camden Town Centre

Prepared for Camden Council



Smart Consulting

- Being an off-street facility it would lack the high degree of passive surveillance that the current stop on John Street enjoys.
- Whilst the Country services and the 890 use the John Street bus stop as their terminus (i.e., they terminate and commence trips at the stop), the other Metropolitan services, rts 894 and 895, call at John Street on their way through (they run between Camden South and Campbelltown). It would be desirable in the future to encourage TfNSW's bus planning group and the contract region's operator, to look for opportunities to convert some of the John Street terminators so that they run through the town centre. This provides benefits for patrons as well as reducing the need for a terminus within the town centre.
- An off-street terminus is generally not as efficient in terms of operating costs as a facility such as the John Street bus stop where there is little or no extraneous movement of the bus.
- The John Street stop is closely located to existing amenities, such as the adjacent public toilets, which the drivers can use.

Given the relative advantages of the current arrangement for bus patrons and bus operations, it is unlikely that the operator would be keen to use it. Unless something dramatic changes in the future, it is likely that John Street would remain as the main bus stop/focal point in Camden.

8.8 Road Geometry

This report has assessed a number of opportunities to modify the road geometry of both individual streets and intersections. This information can be found in Sections 7.2, 7.3, 8.1 and 8.2.1.

8.9 Speed Limits

The data collection requirements of the brief to develop this report did not include any traffic speed surveys and thus it is beyond the scope of this report to comment on areas where speeding is an issue.

The Town Centre includes as with the surrounding residential streets a 50km/hr speed limit. From Camden Valley Way, a 60km/hr speed zone ends immediately south of the Hot Spot fuel station. The same is the case in Cawdor Road with a 60km/hr approach speed limit and a 50km/hr limit imposed just west of Barsden Street.

The streets around the town centre to the north include 40km/hr speed zones for the existing schools. This includes John Street and Mitchell Street.

The nature of the town centre and the low observed travel speeds may provide the opportunity to consider a 40km/hr High Pedestrian Activity speed zone along Argyle Street subject to RMS review and approval.

It is recommended that investigations into a 40km/hr High Pedestrian Activity Area be considered for Argyle Street in consultation with the RMS.

Camden Town Centre

Prepared for Camden Council



Smart Consulting

8.10 Street Lighting

The provision of adequate street lighting is under the care and control of the relevant power supply authority. In general, street lighting was noted to be in place in most areas of the Camden Town Centre.

The provision of adequate street lighting is also related to the 'look' of the town centre infrastructure and as recommended in this report below consideration should be given to developing a design manual for the Town Centre for the provision of all future infrastructure including street furniture and lighting.

8.11 Streetscape

From a traffic management and safety point of view, the existing median island in Argyle Street should remain as it provides a number of measurable benefits. Suggested changes to the streetscape including provision for a 'Civic Precinct' are addressed in Section 8.5 of this report.

Further, potential opportunities to provide greater footpath widths in Argyle Street are addressed in Section 8.2.1. of this report.

8.12 Cost Estimates of Potential Options

Formal engineering cost estimates of proposals detailed in this report are beyond the scope of the study. However, preliminary cost estimates of list of potential improvement options as detailed in Section Error! Reference source not found. are presented below:

Option	Comment	Estimated Cost
Argyle Street / Oxley Street		
Traffic Signals	Signalisation of intersection	\$350,000
Asphalt Works	Resheeting of intersection	\$62,500
Central Median	Remove Median / Ped Xing	\$15,000
Argyle St Crossing Signalisation		
Existing Crossing	Removal	\$10,000
Traffic Signals	Pedestrian Actuated Signals	\$175,000
Central Median	Close existing breaks in median	\$15,000
Argyle Street / John Street		
Existing Roundabout	Removal	\$35,000
Central Median	Create right turn bays	\$40,000
Traffic Signals	Signalisation of intersection	\$350,000
Asphalt Works	Resheeting intersection	\$75,000
Central Median	Close existing breaks in median	\$15,000

Camden Town Centre
Prepared for Camden Council



Smart Consulting

Option	Comment	Estimated Cost
Elizabeth St / Mitchell St		
Pedestrian Refuges Improvements	Signage / Linemarking	\$25,000
Civic Precinct		
John Street	Alternative paving works	\$200,000
Pedestrians	Pedestrian crossing + islands	\$20,000
Buses	Bus shelters	\$20,000 - \$45,000
Parking Restrictions	Replacement signage	\$400 per sign installed
Seven (7) day parking restrictions Murray St/Broughton St		
Intersection improvements	Roundabout	\$60,000
Asphalt Works	Resheeting	\$30,000

9. Responses to Brief Objectives

For ease of reference, the following provides the locations in this report which respond to each objective of the original brief. In some instances, additional information has also been provided on each matter.

Objective 1: Identify and resolve crash Blackspot sites

Comment: Accident analysis can be found in Section 3.9 of this report.

Objective 2: Manage the current and future level of traffic and transport

Comment: Existing conditions road network assessment can be found in Section 3.1 and 3.2 of this report. Future year assessment can be found in Section 4 and **Appendix E**.

Objective 3: Identify and resolve pedestrian accident clustering

Comment: Accident analysis can be found in Section 3.9 of this report. Recommendations for improvements to pedestrian accident cluster locations can be found in Section 8.2.

Objective 4: Facilitate improvements in the level of pedestrian access and priority, particularly in areas of pedestrian concentrations;

Comment: Recommended short, medium and long term improvements for pedestrians can be found in Section 8.2.

Objective 5: Promote pedestrian access connectivity and enhance safe crossing points.

Comment: Recommended short, medium and long term improvements for pedestrians can be found in Section 8.2.

Camden Town Centre

Prepared for Camden Council



The logo for SMART Consulting, with the word "SMART" in a blue, sans-serif font and "Consulting" in a smaller, lighter blue font below it. The logo is set against a dark blue background with a white border.

Objective 6: Facilitate improvement in the level of personal mobility and safety for people with disabilities and senior through the provision of enhanced infrastructure and facilities

Comment: Identification of existing parking for persons for disabilities is provided in Section 3.3. Recommended short, medium and long term improvements for pedestrians can be found in Section 8.2.

Objective 7: Facilitate safe bicycle access and parking;

Comment: Recommended improvements to bicycle parking and planning are provided in Section 8.3.

Objective 8: Identify parking patterns to maximise parking opportunities

Comment: Assessment of parking utilisation is provided in Section 3.4. Recommendations for improvements to parking are provided in Section 8.4.

Objective 9:

- Investigate different parking restrictions:
- Timed parking;
- Pay Parking;
- Residential permits parking; and
- Multi-deck parking.

Comment: Assessment of parking utilisation is provided in Section 3.4. Recommendations for improvements to parking both in terms of provision and changes to restrictions are provided in Section 8.4.

On the matter of introducing paid parking in the Camden Town Centre, in the short to medium term it is the view of this report that it is not required. Focus by Council should be on introducing seven day restrictions along Argyle Street and enforcing existing restrictions on both on and off street car parking locations.

On the matter of residential parking permits, it was noted that the majority of residencies in the Town Centre have their own off street parking provision. Further, parking availability in the residential areas to the north and south of Argyle Street is substantial. Resident parking schemes are not considered warranted for the study area.

Objective 10: Accommodate special event needs for all road users, including public transport (buses and taxi), vehicular access, pedestrians and parking facilities, etc.

Comment: A review of existing special event operations is provided in Section 2.5. Recommendations for an introduction of a Civic Precinct and changes to allow the closure of John Street north of Argyle Street to enhance existing events and facilitate new events are provided in Section 8.5.



10. Appendices

- Appendix A – Public Parking by Location and Restriction
- Appendix B – Accident Statistics Review
- Appendix C – Traffic Modelling Summary Paper
- Appendix D – Option Assessment Matrix
- Appendix E – SIDRA Assessment of Future Conditions



Appendices

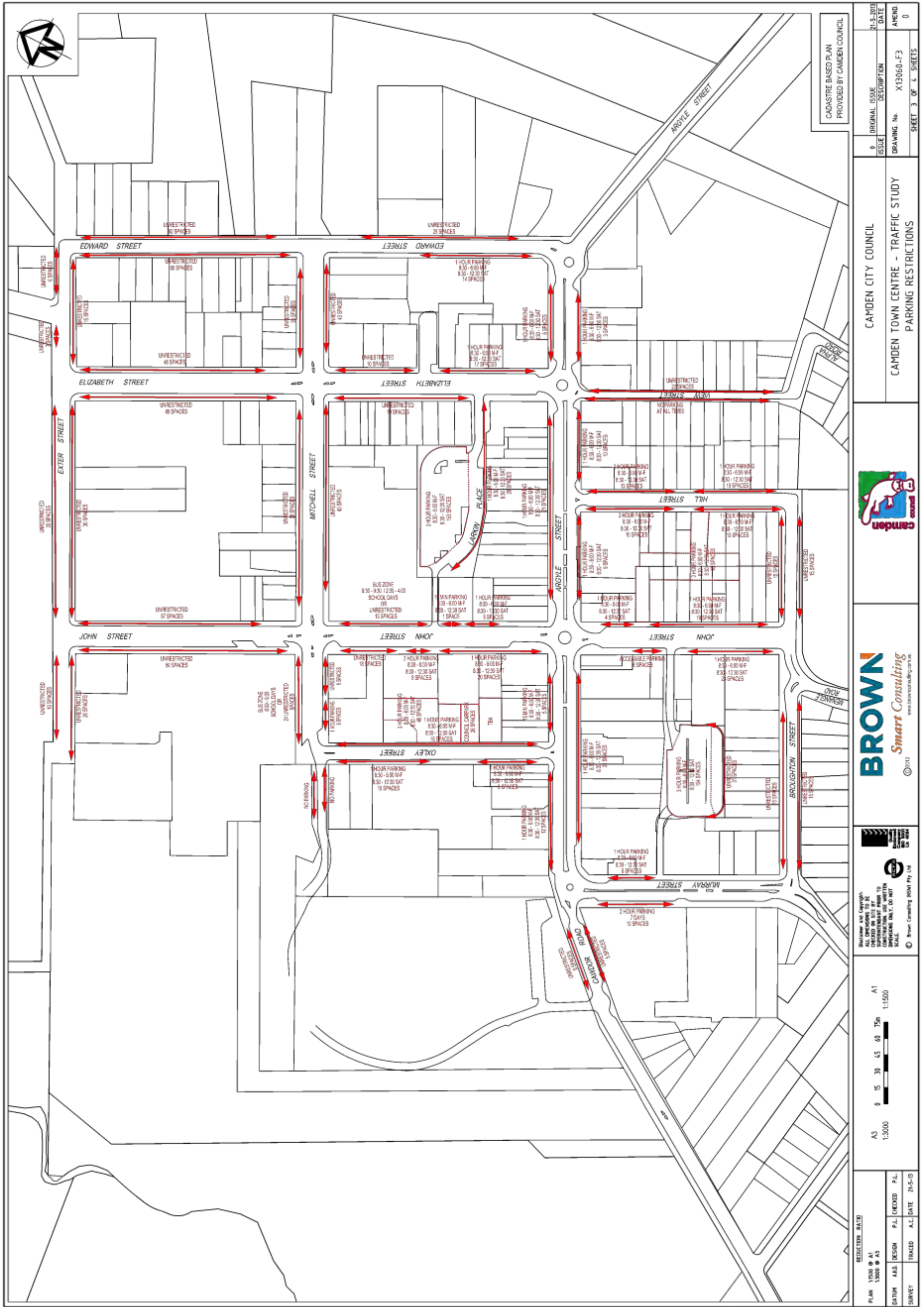


ORD06



Appendix A Public Parking by Location and Restriction

Attachment 1

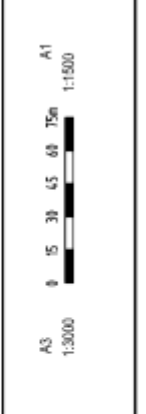


ISSUE	6	ORIGINAL ISSUE	21-5-2013
DATE		DESCRIPTION	
DRAWING No.	X13060-F3	APPEND.	0
SHEET 3 OF 6 SHEETS			

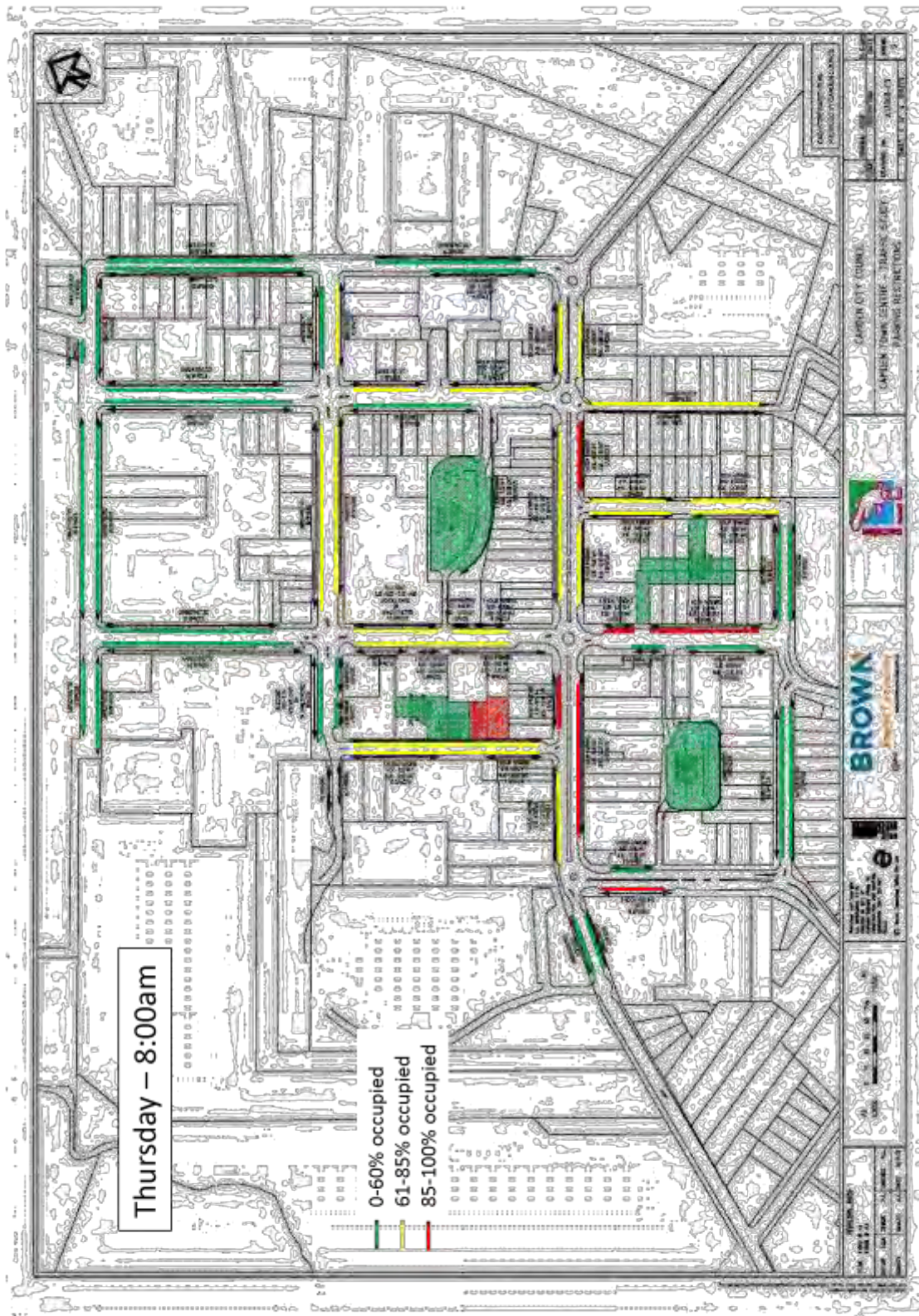
CAMDEN CITY COUNCIL
 CAMDEN TOWN CENTRE - TRAFFIC STUDY
 PARKING RESTRICTIONS



Author and Copyright:
 CHECKED ON SITE BY:
 DRAWING SCALE:
 IMPROVING ONLY, NOT
 SCALE.
 © Brown Consulting 2014 Pty Ltd

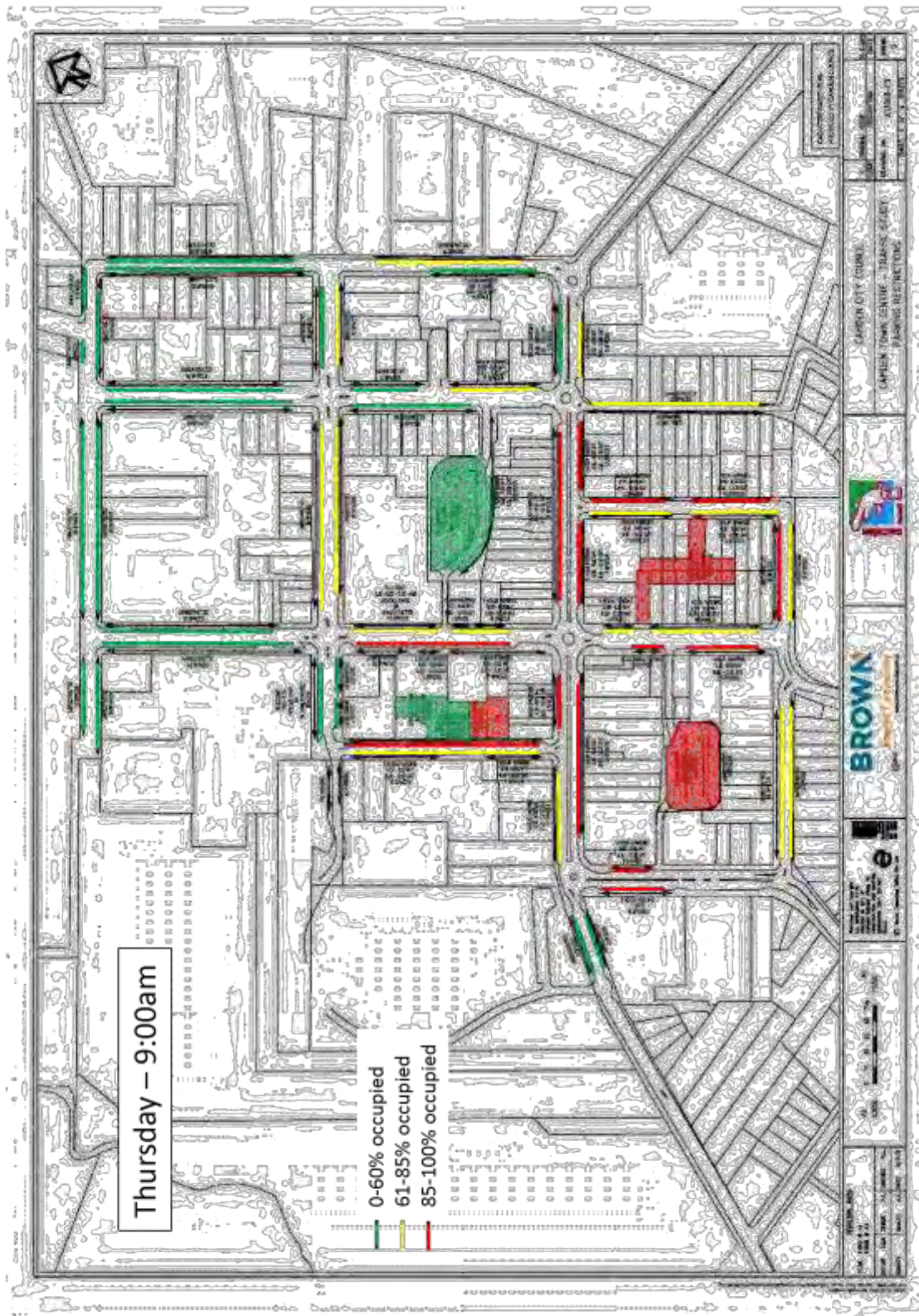


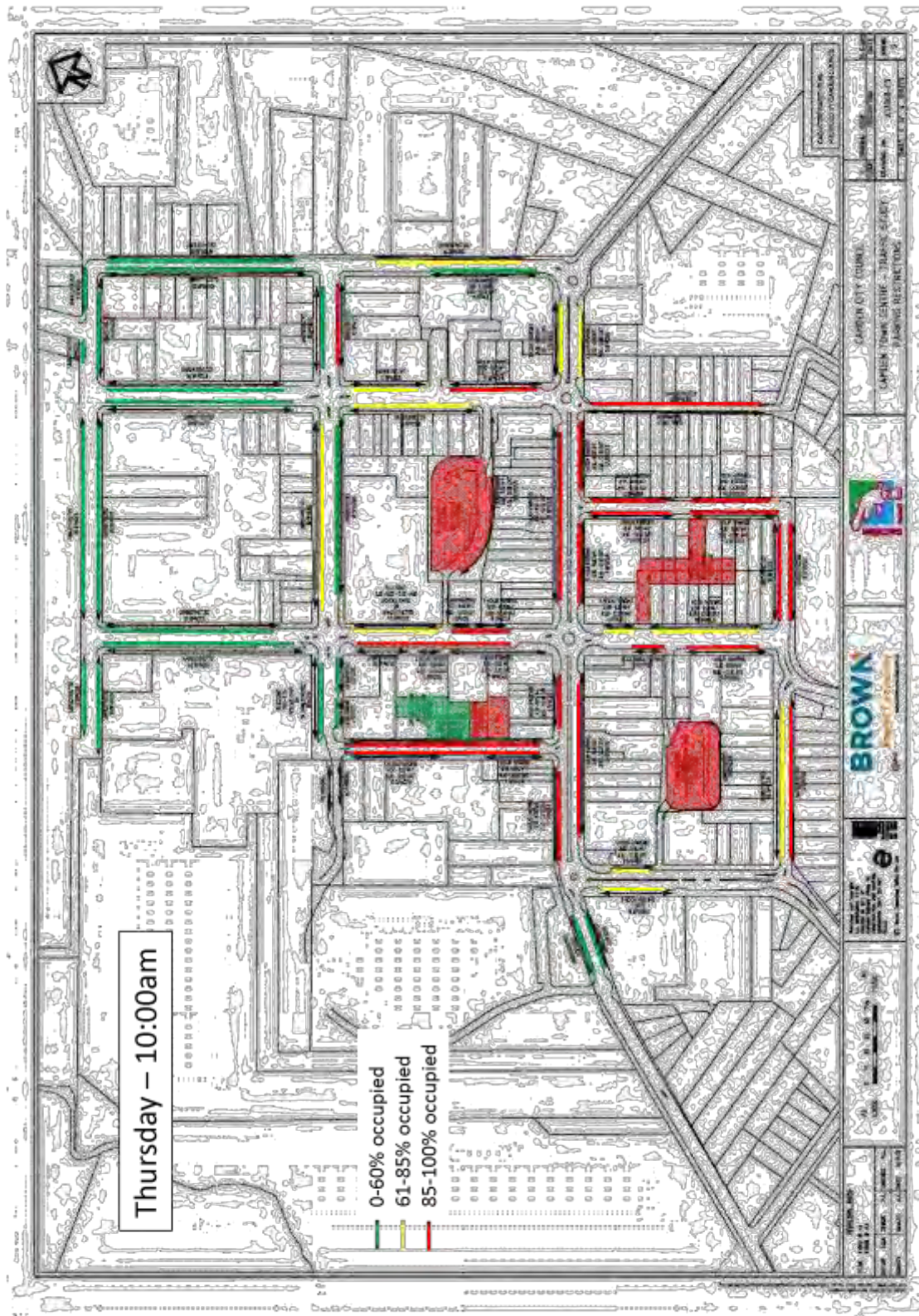
REVISION	DATE	BY	CHECKED	DATE
PLAN 1:1500 @ A1				
DATUM	ALL DESIGN	P.L.	CHECKED	P.L.
SURVEY	1942	A.L.	DATE	21-5-10



ORD06

Attachment 1



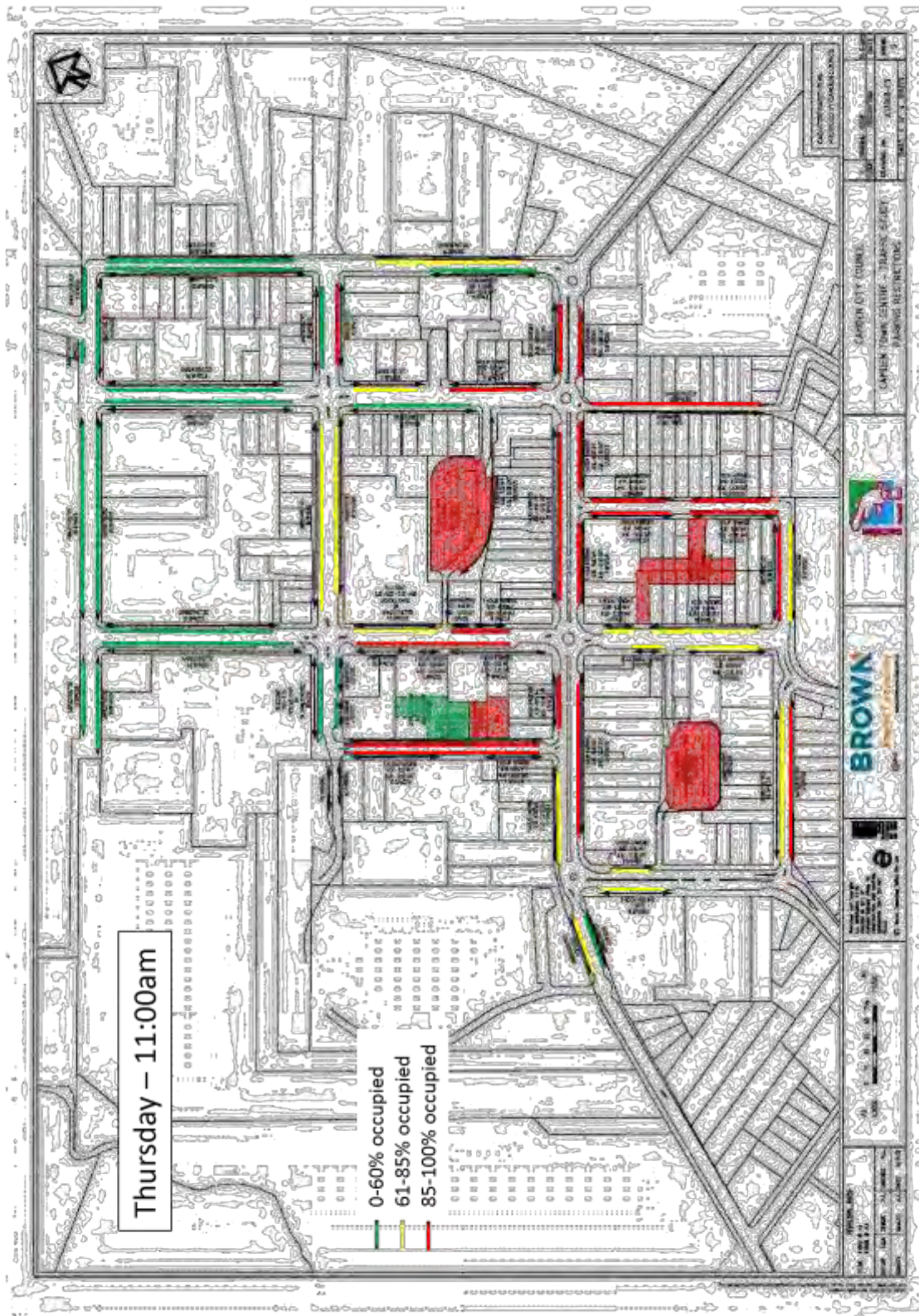


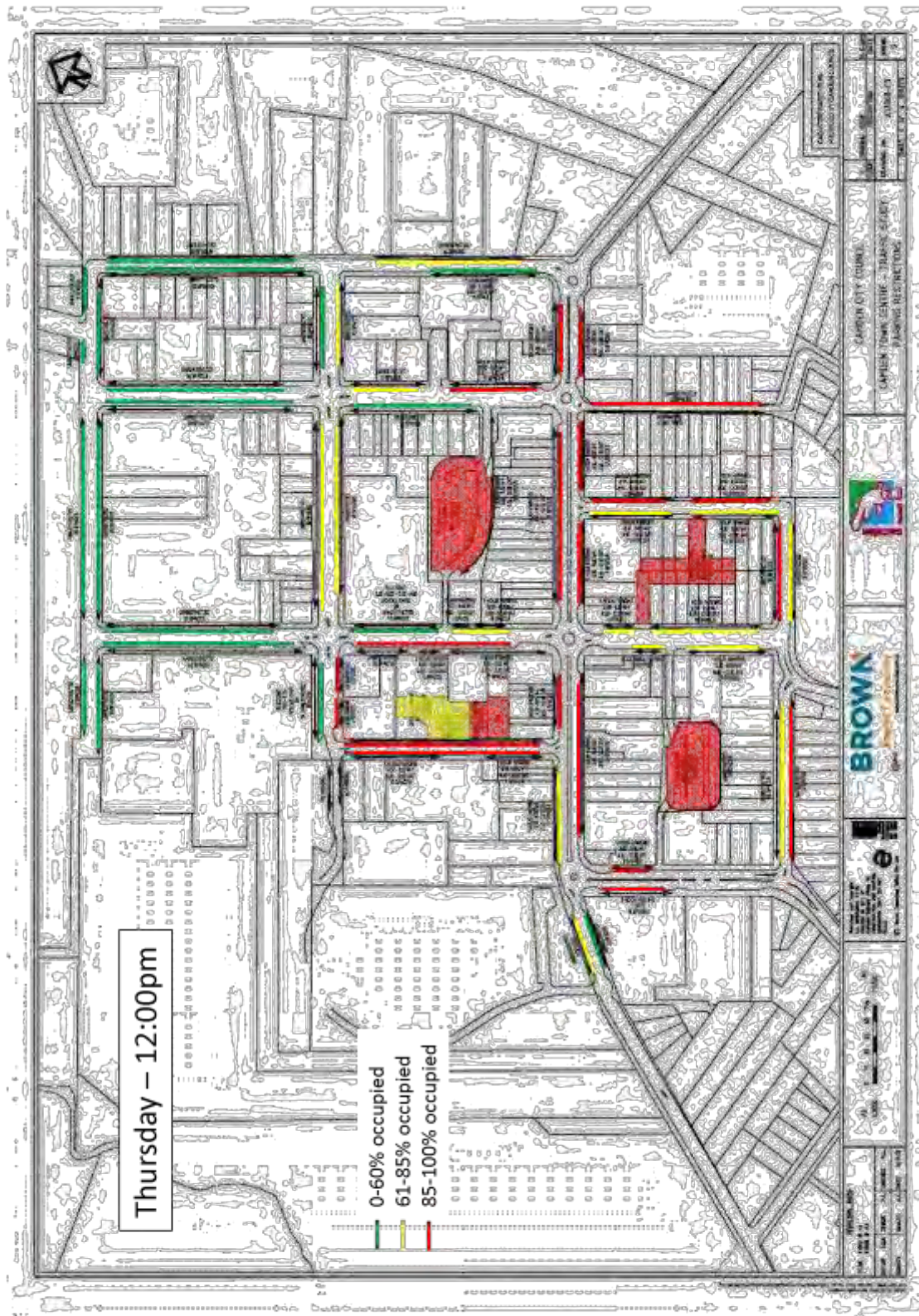
ORD06

Attachment 1

ORD06

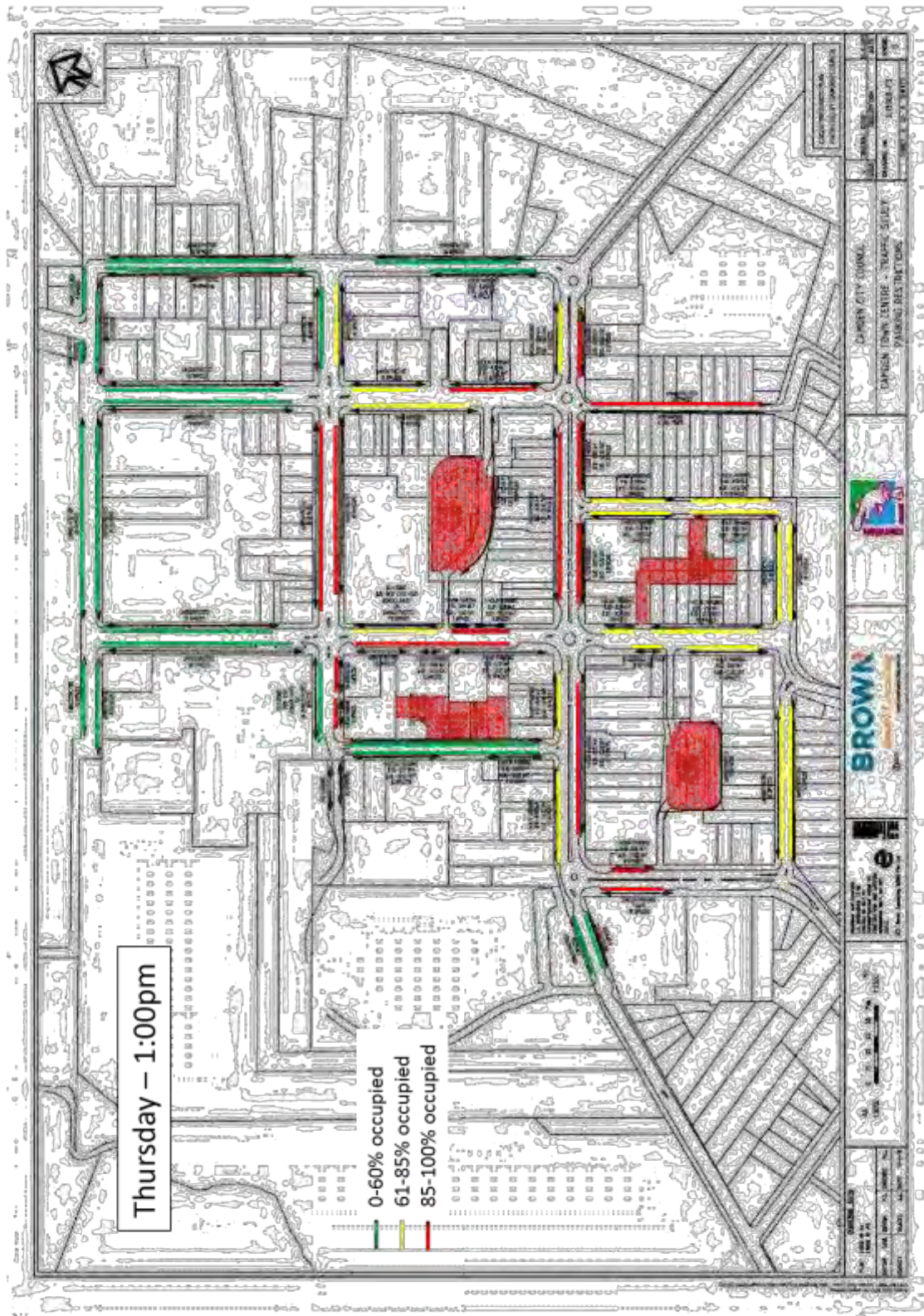
Attachment 1

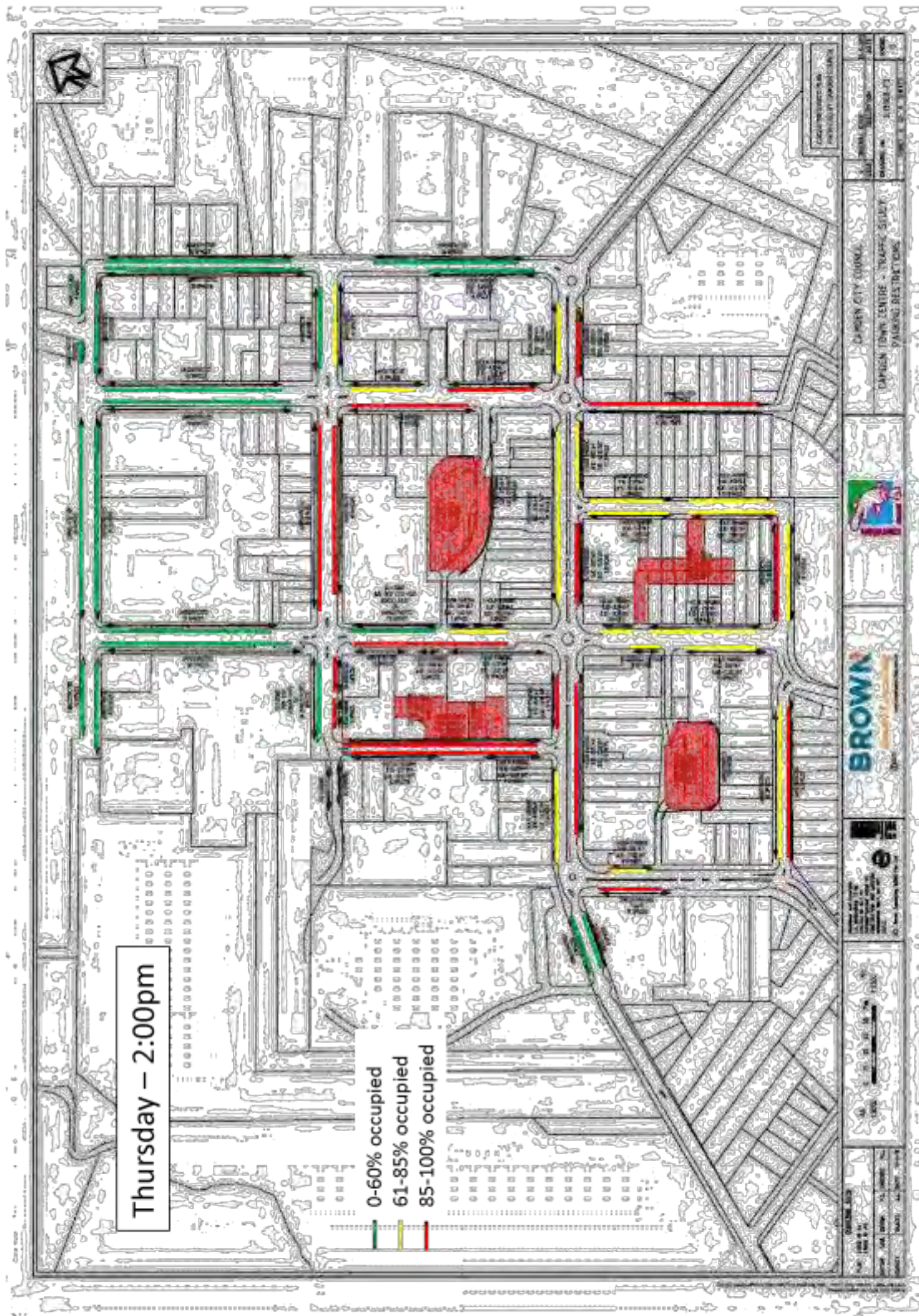




ORD06

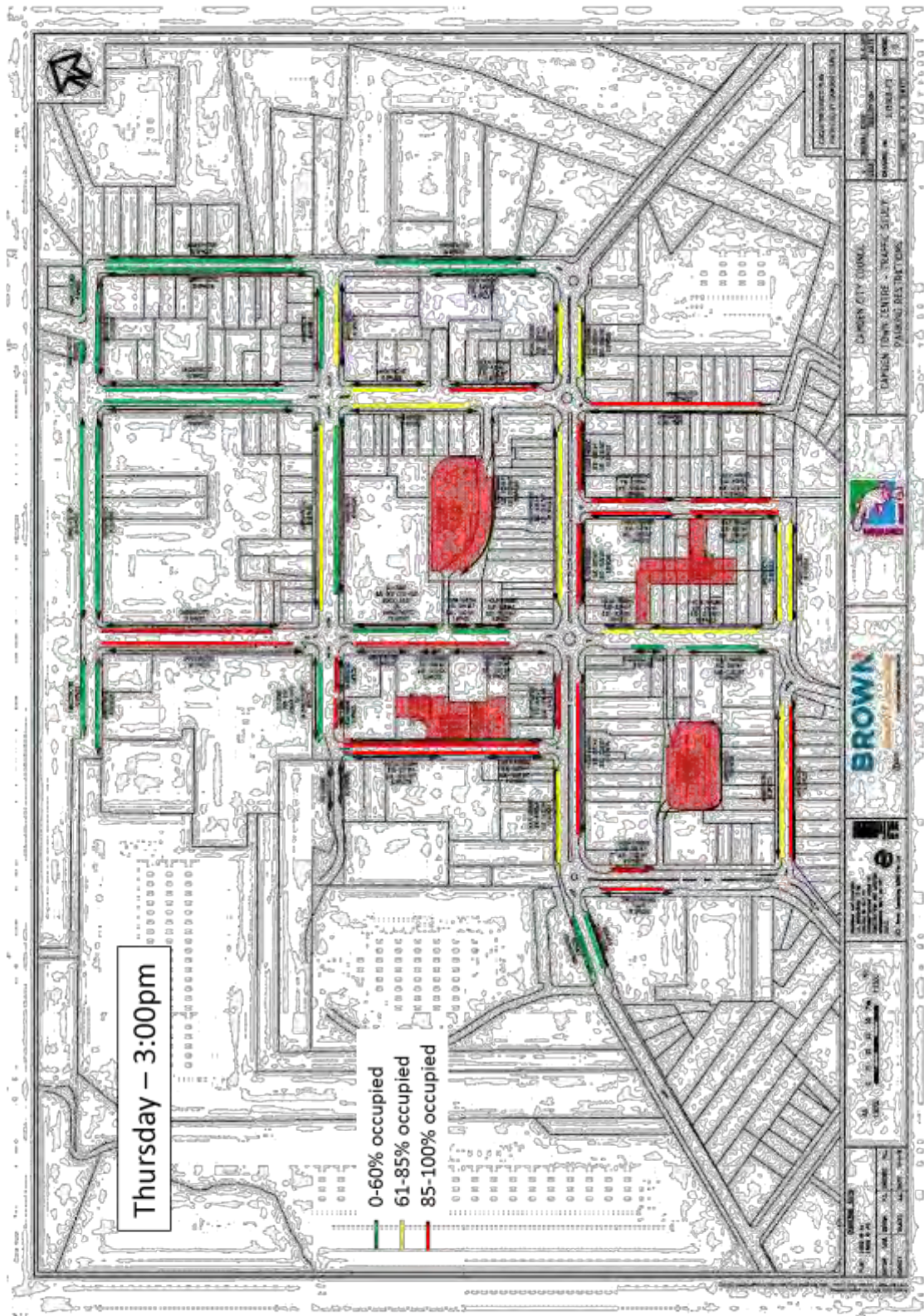
Attachment 1

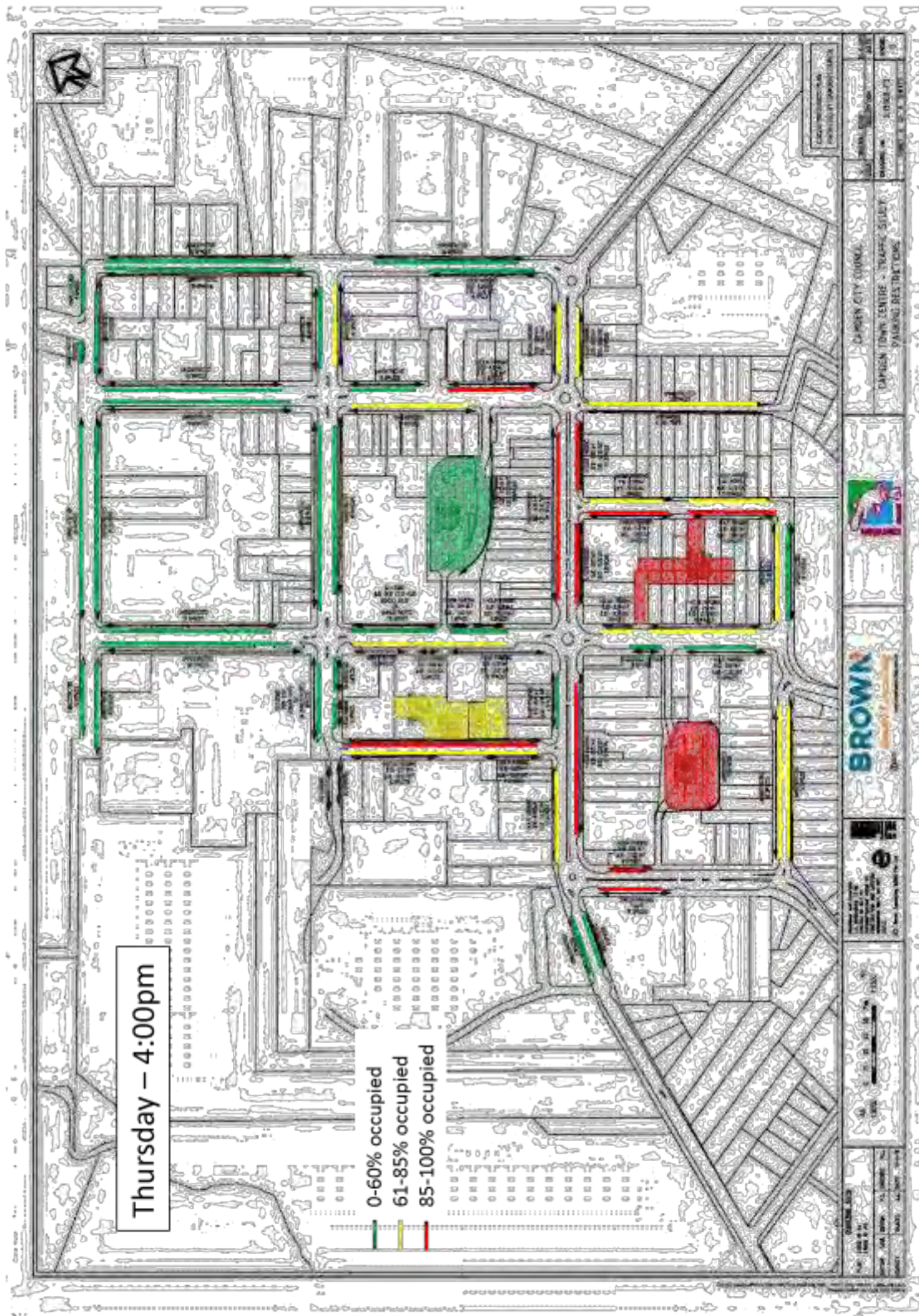




ORD06

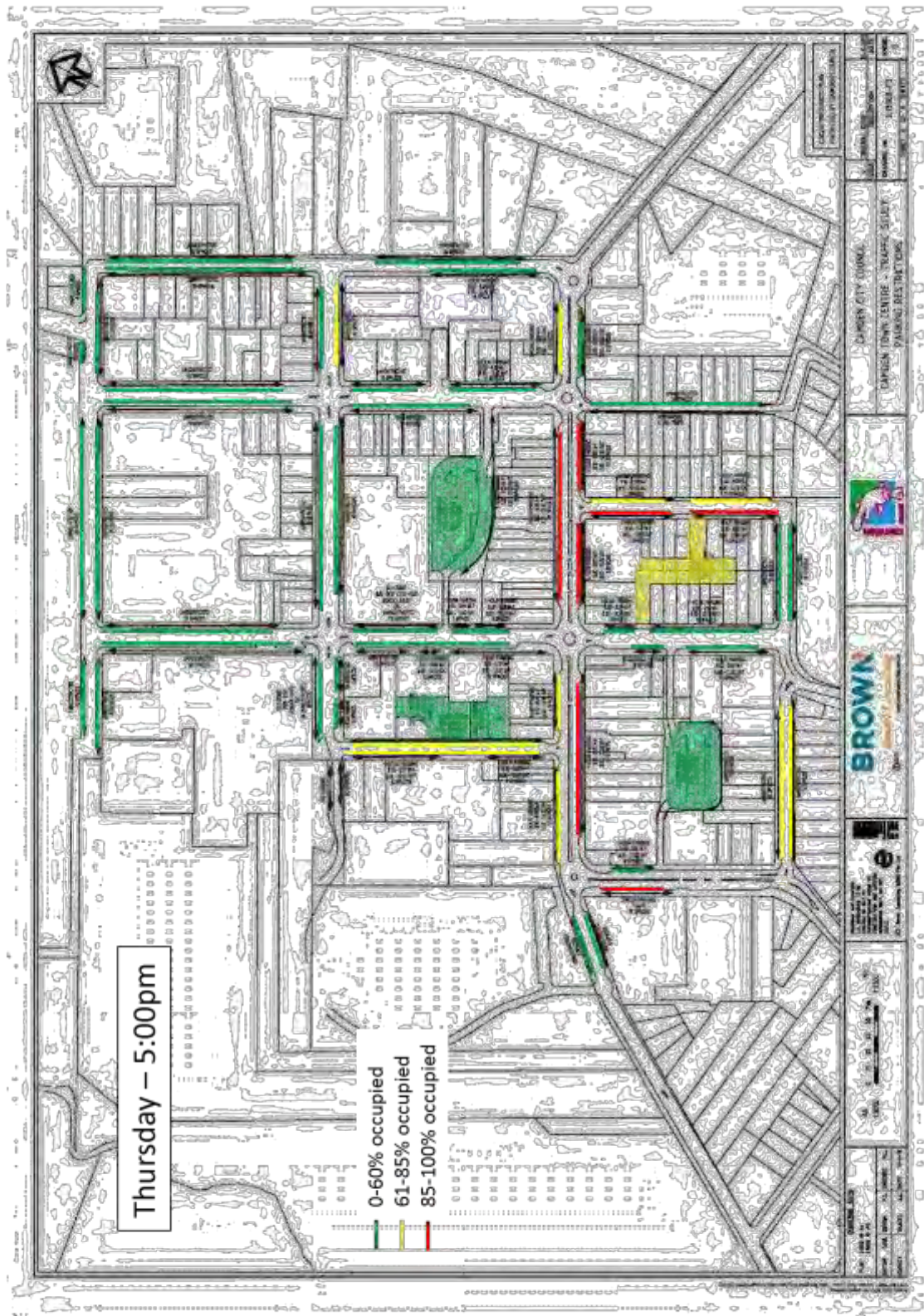
Attachment 1

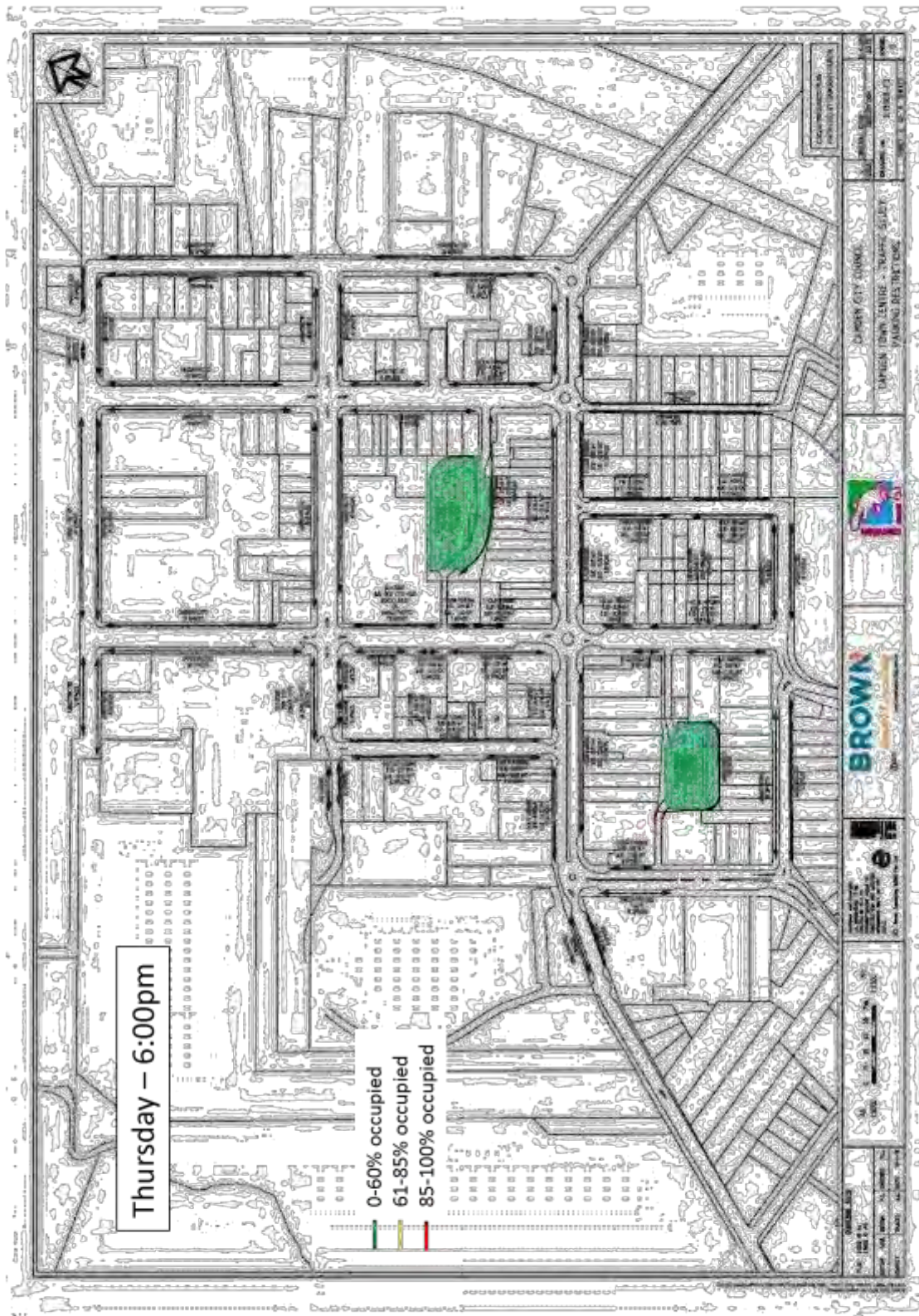




ORD06

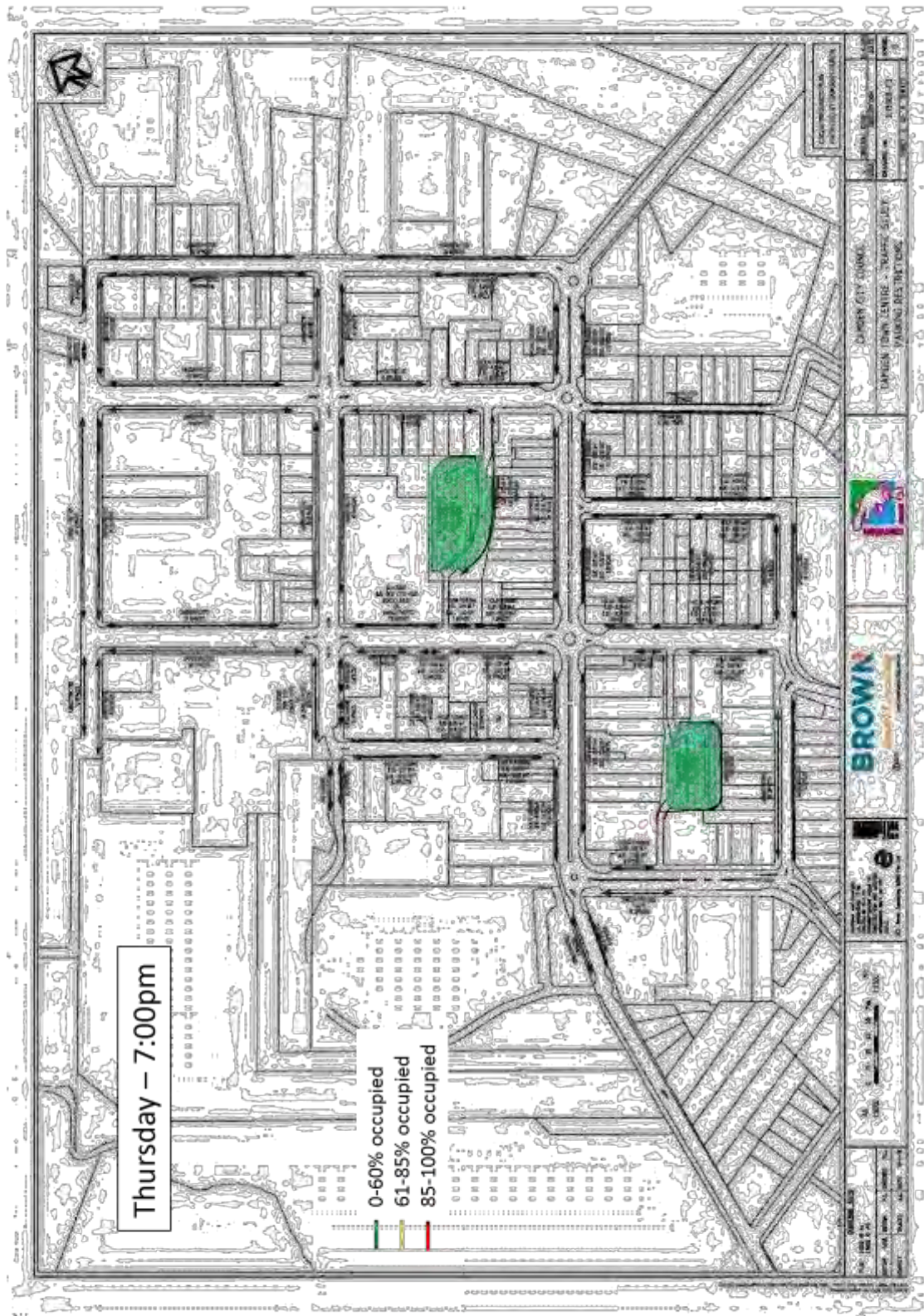
Attachment 1

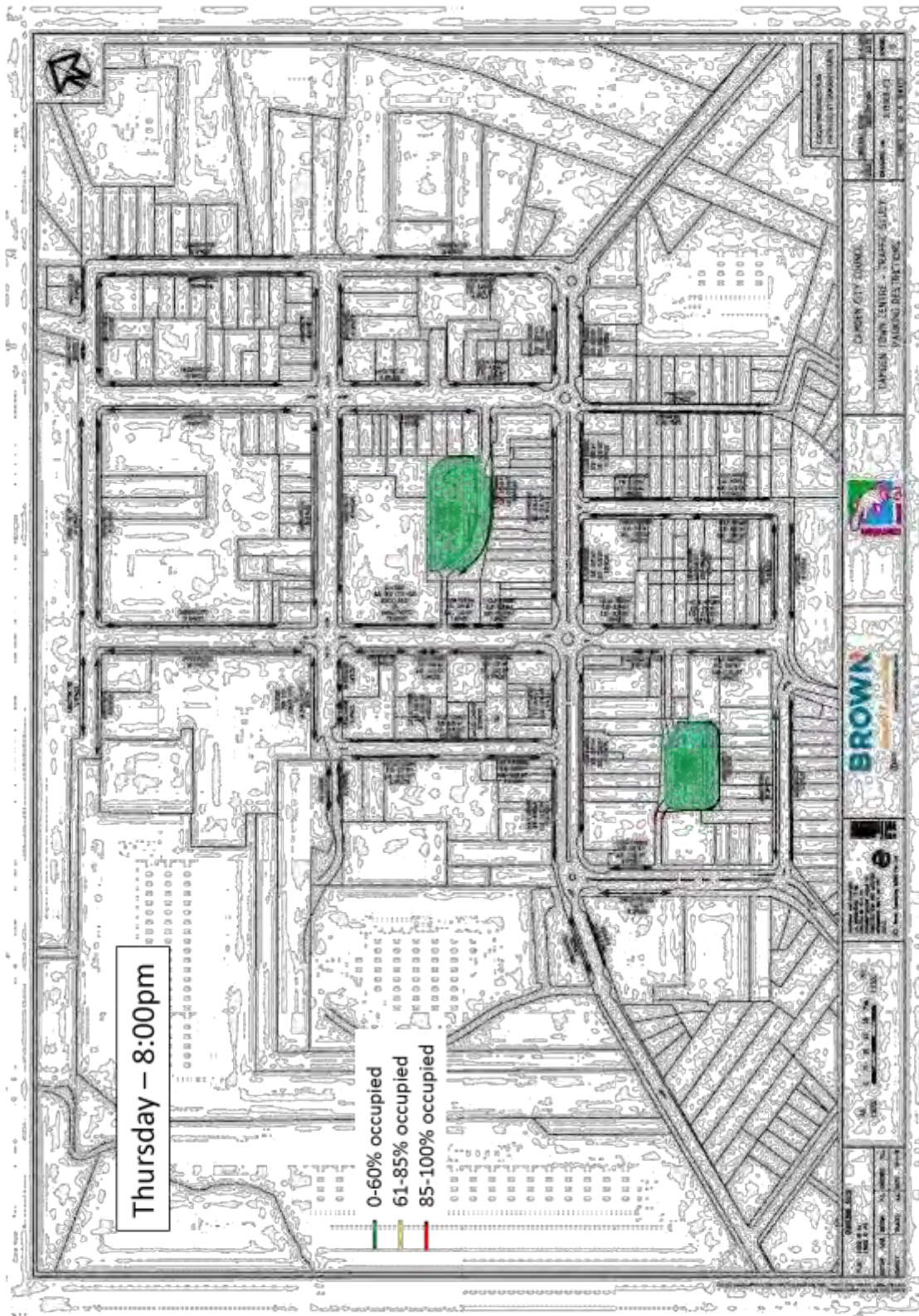




ORD06

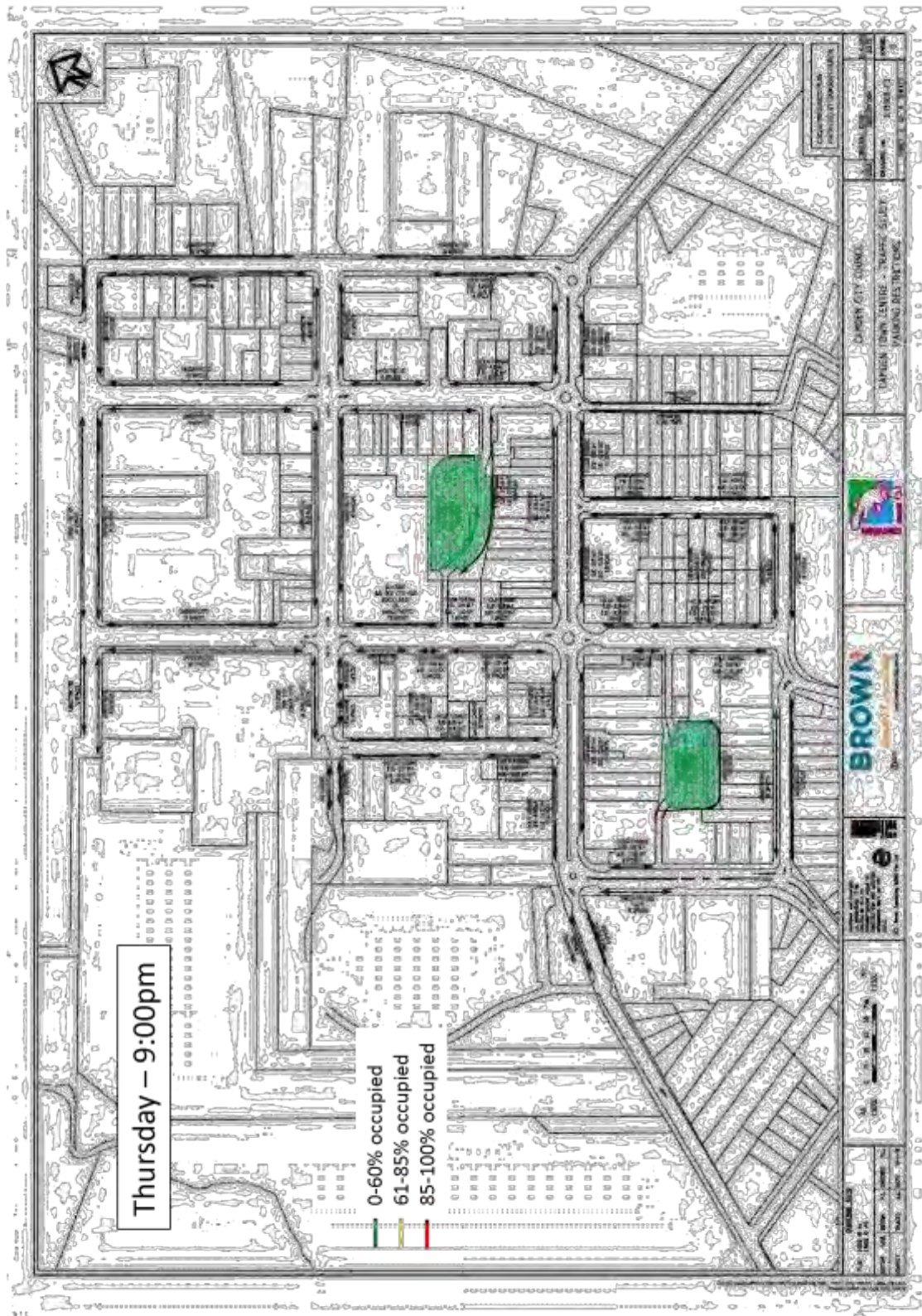
Attachment 1

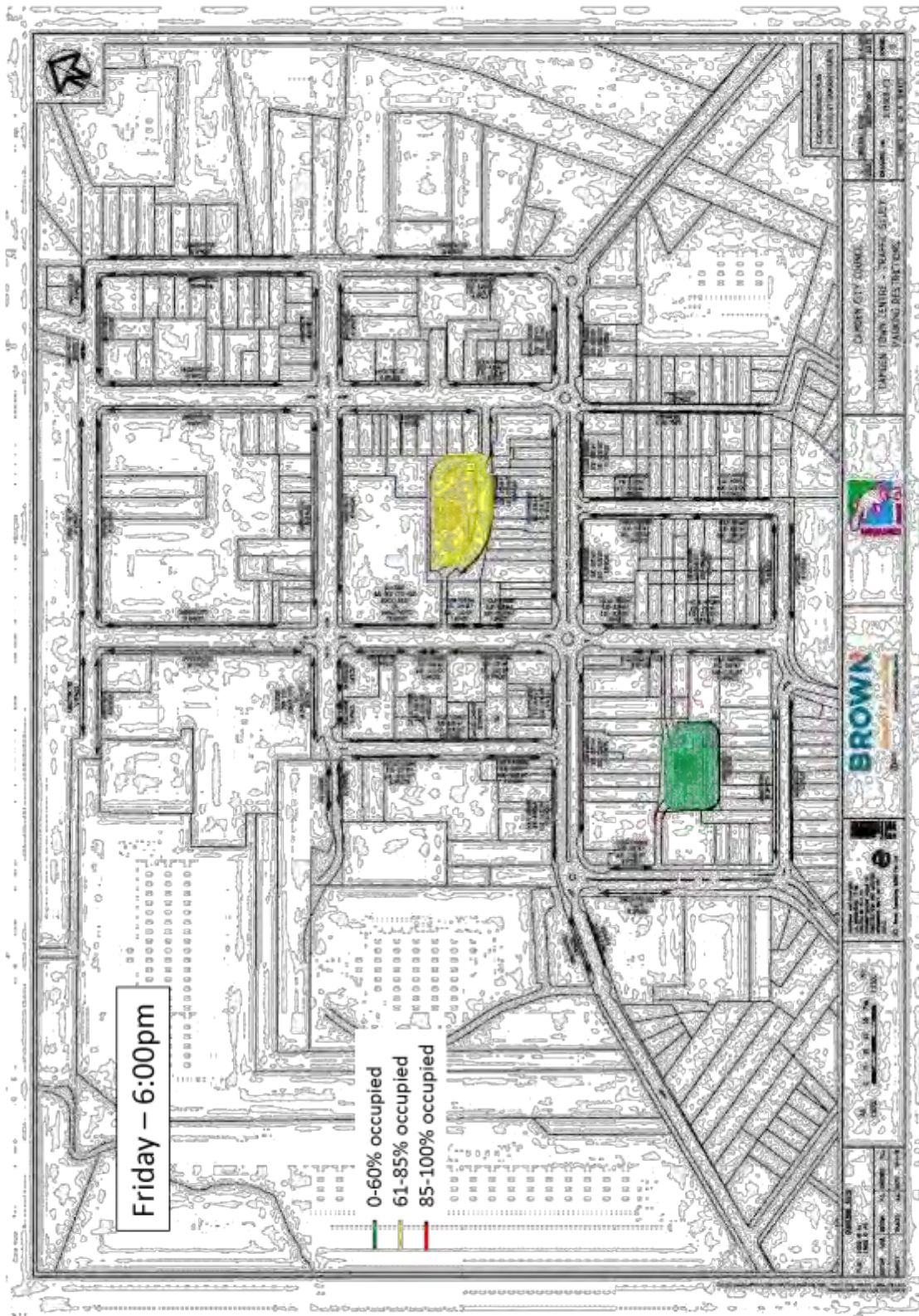




ORD06

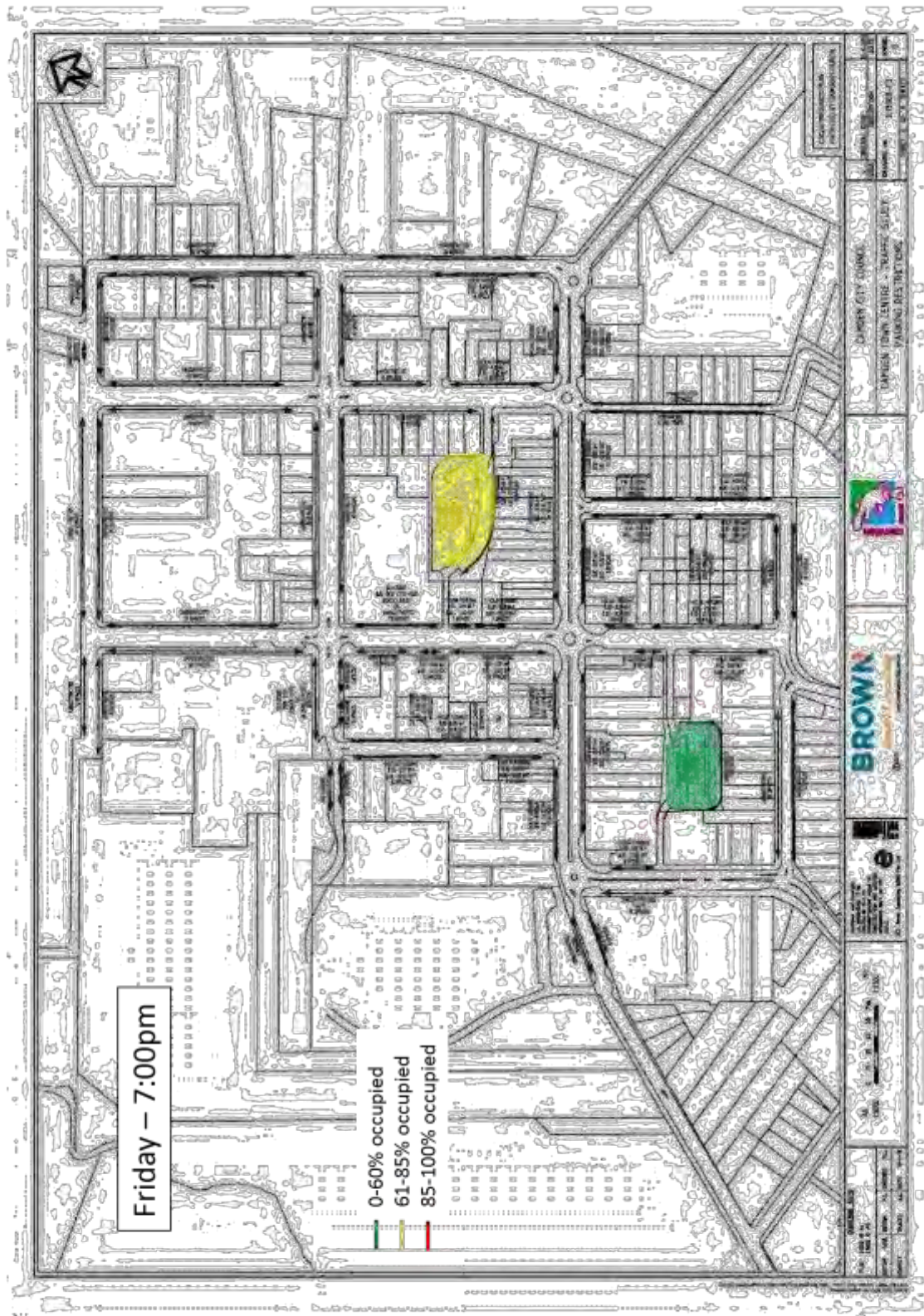
Attachment 1





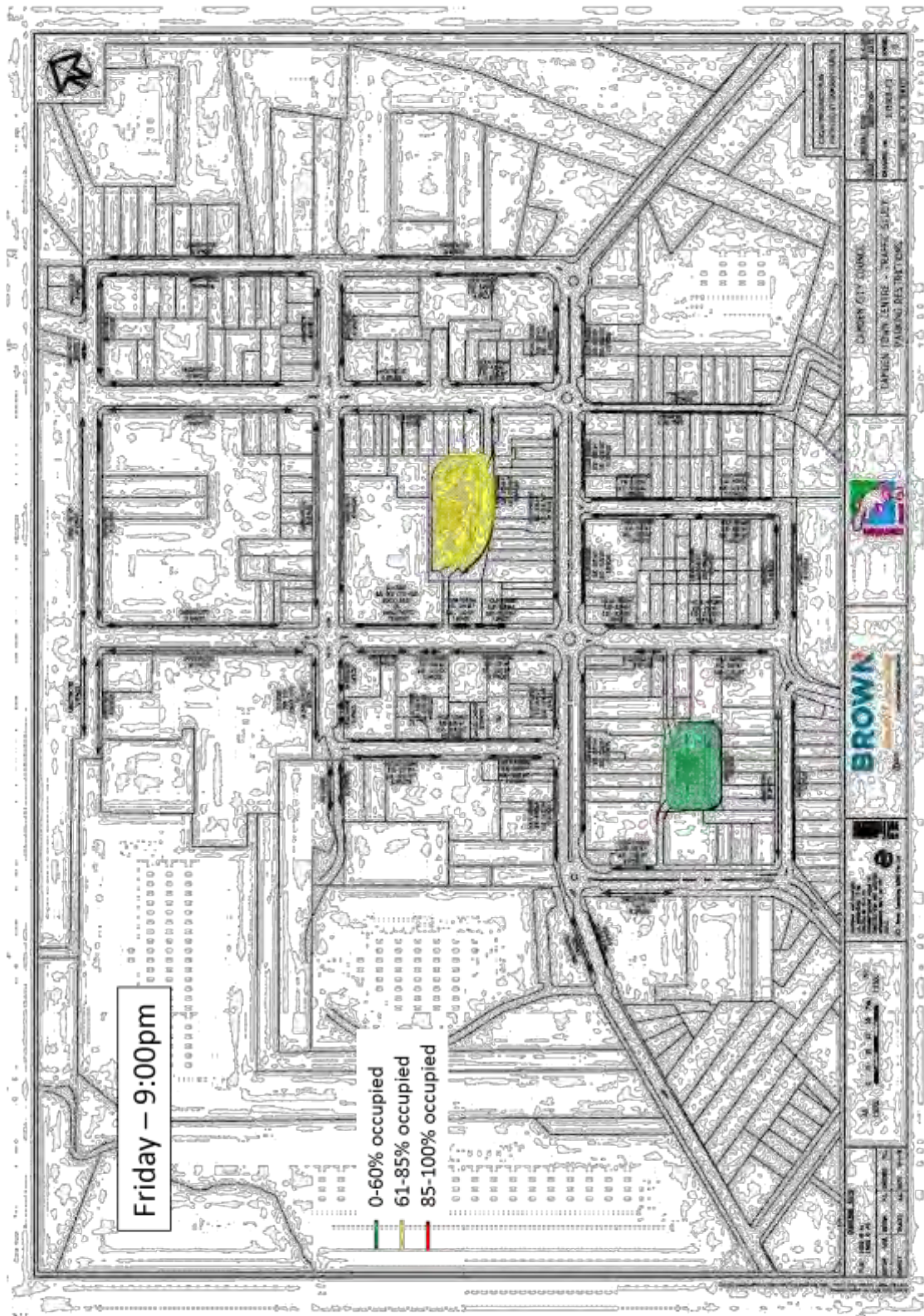
ORD06

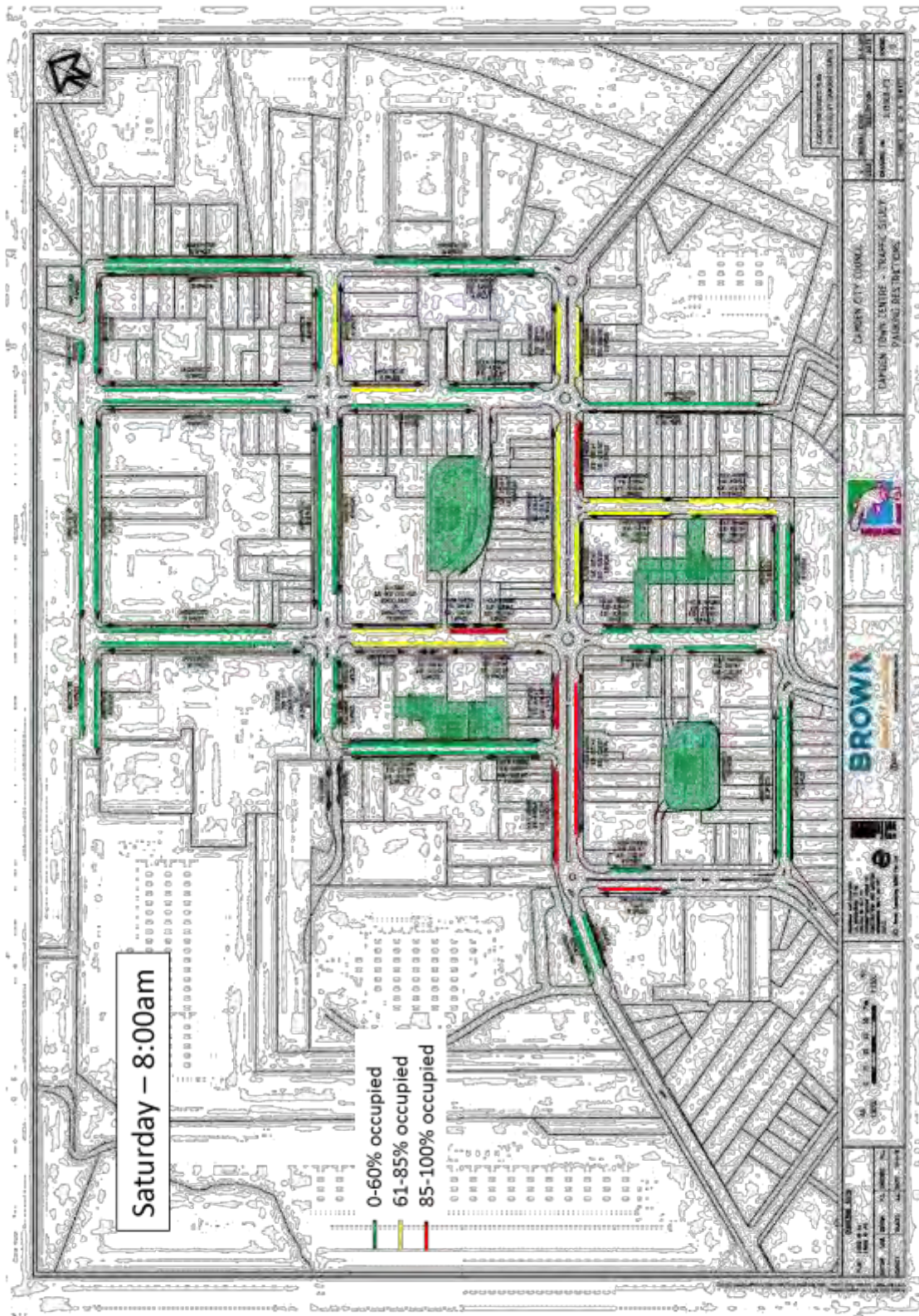
Attachment 1



ORD06

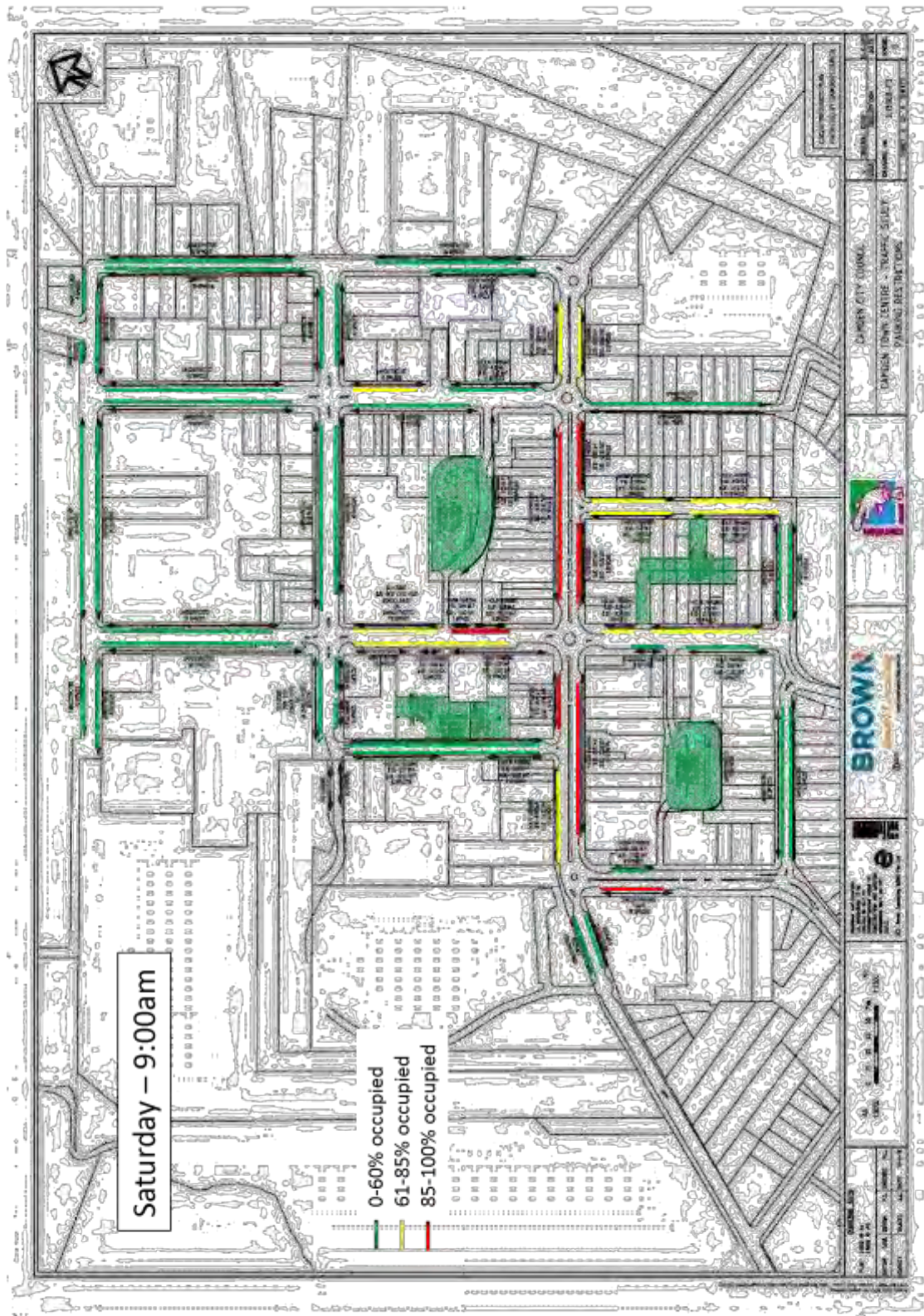
Attachment 1

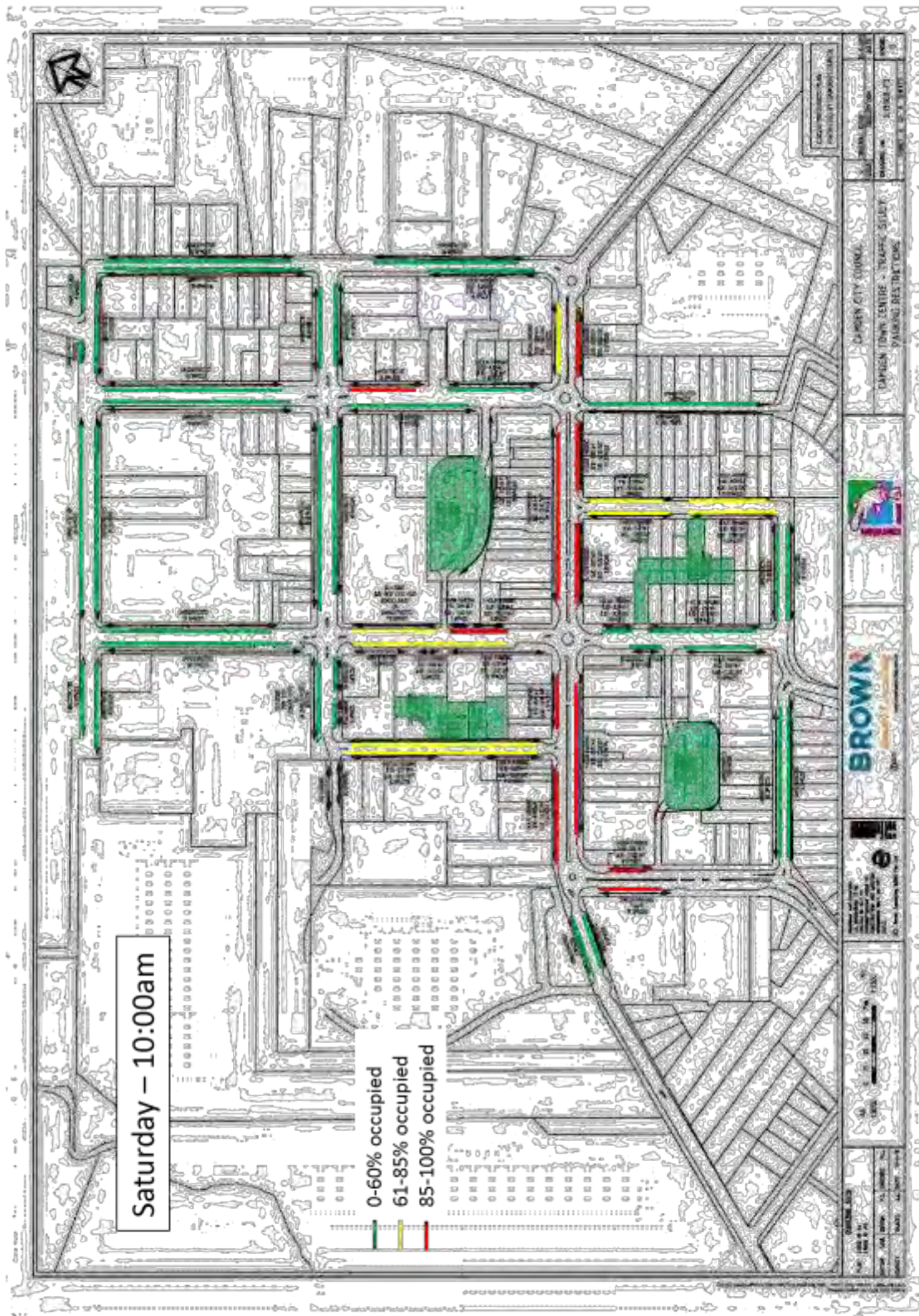




ORD06

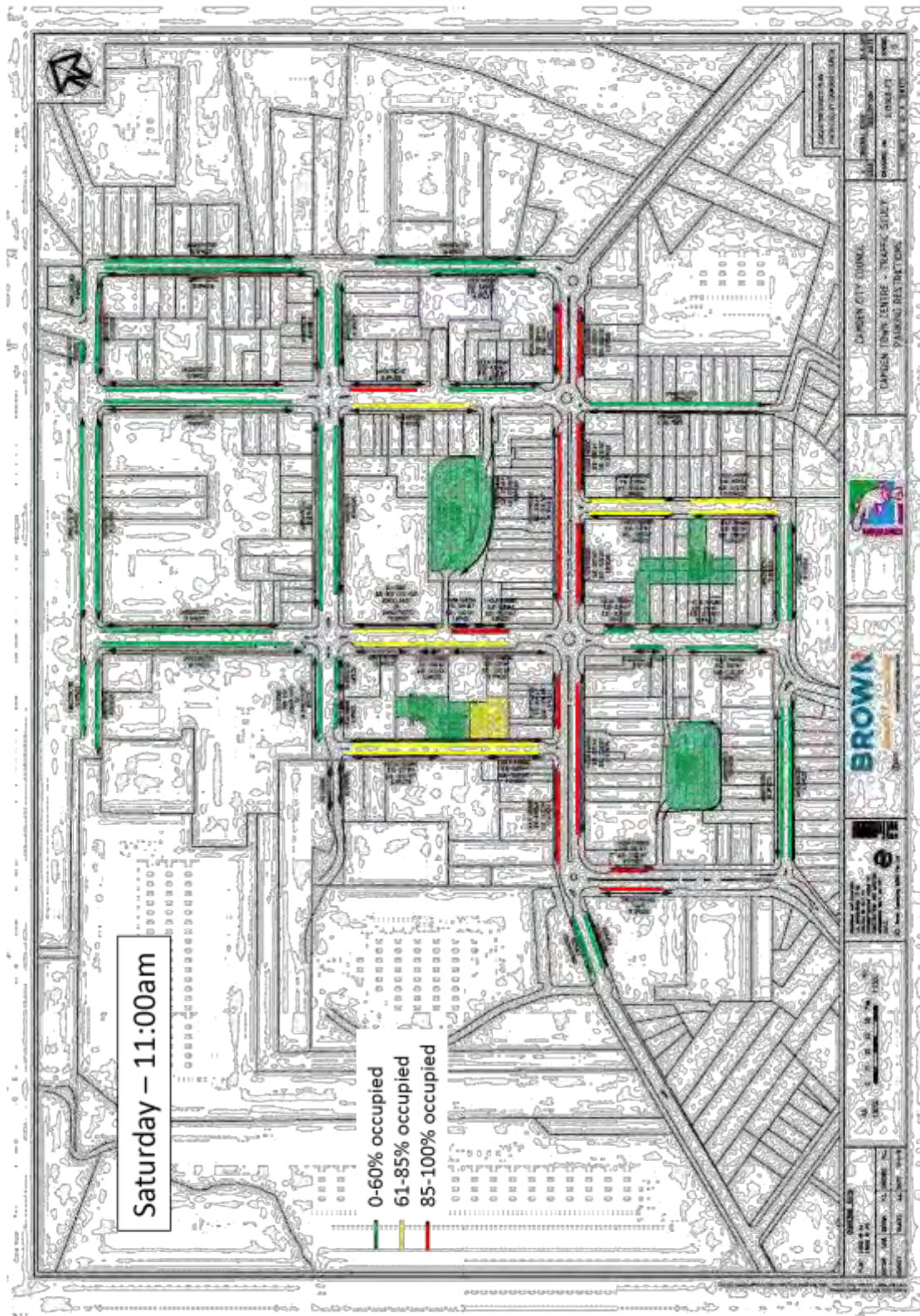
Attachment 1

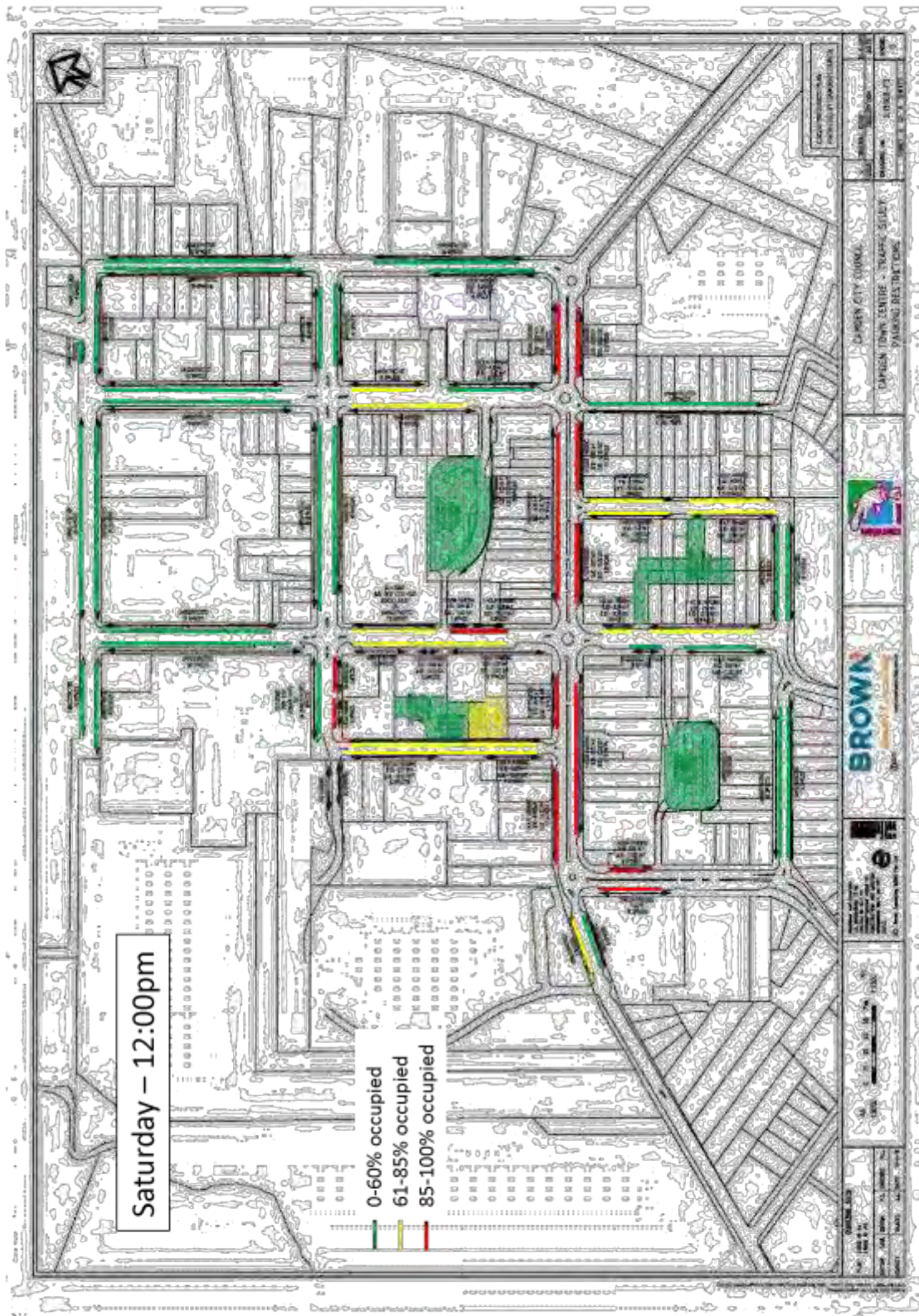




ORD06

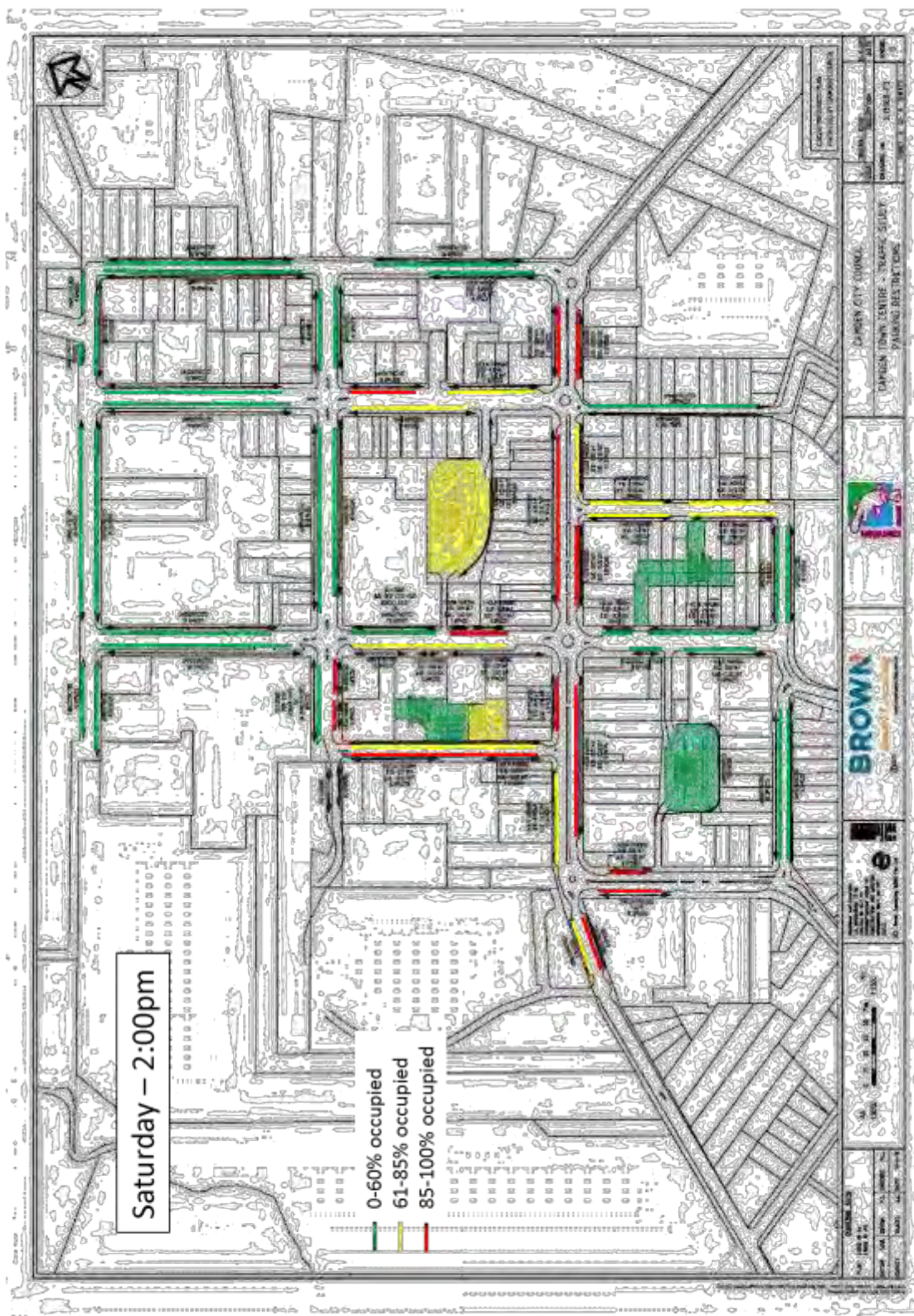
Attachment 1





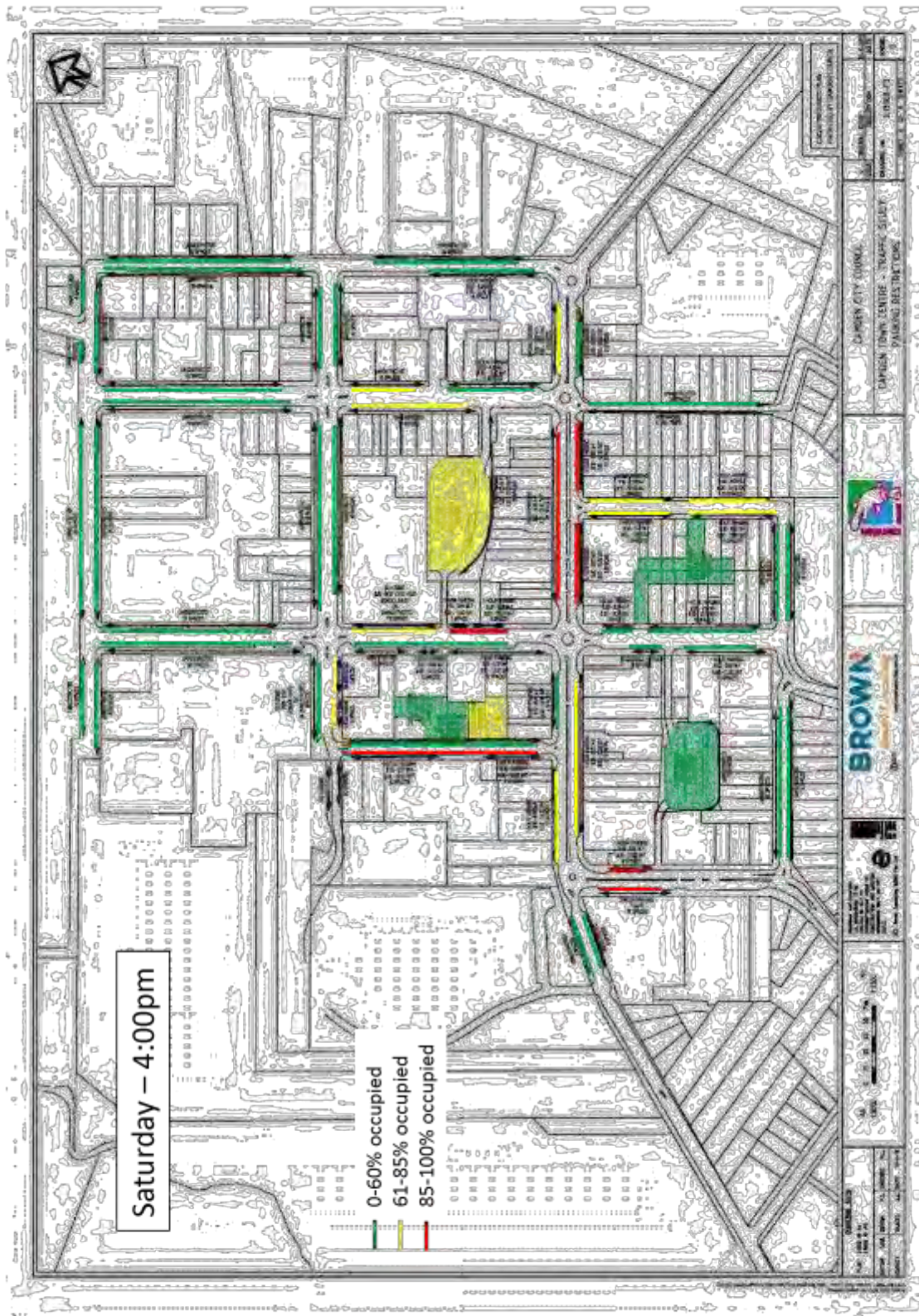
ORD06

Attachment 1



ORD06

Attachment 1

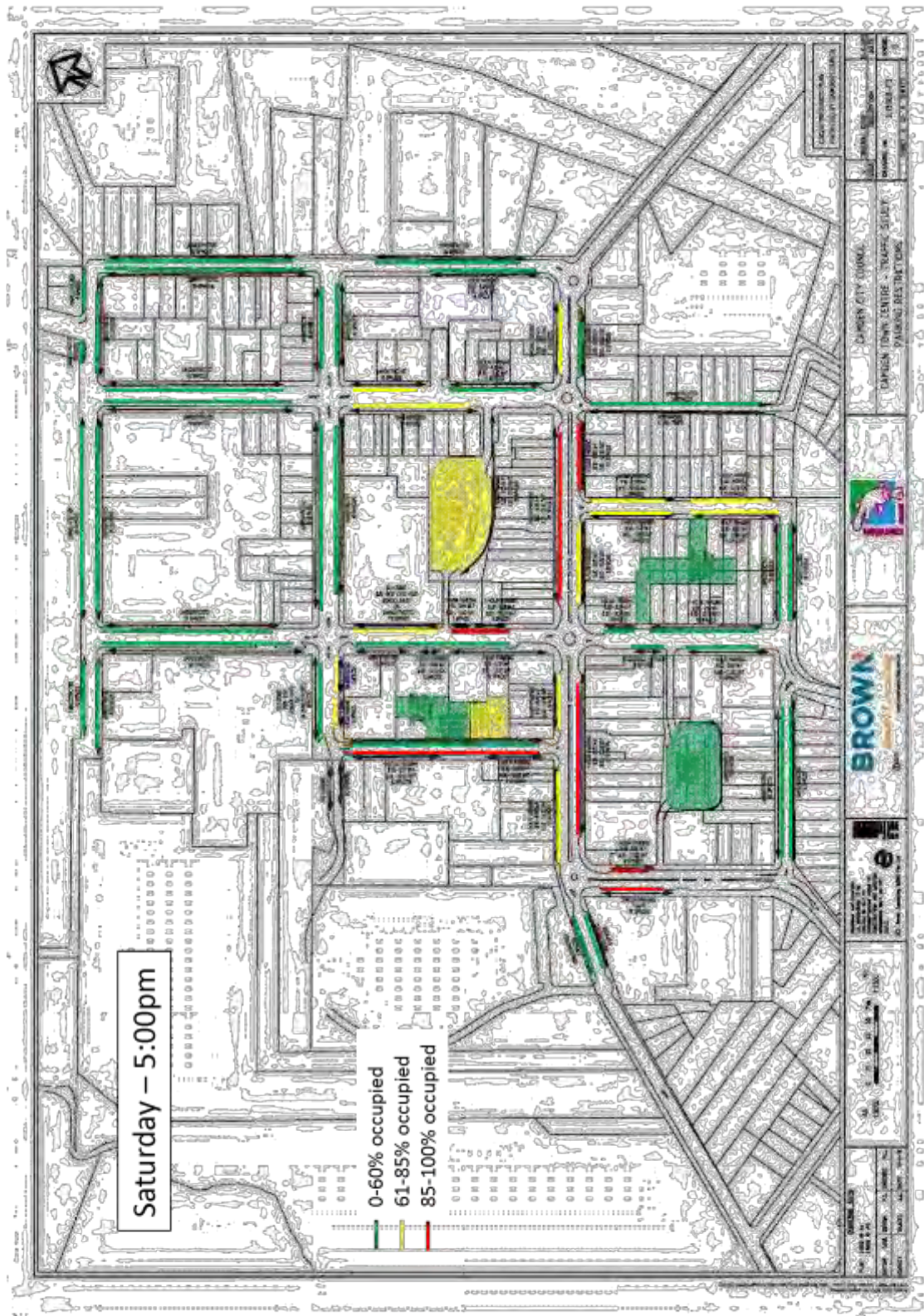


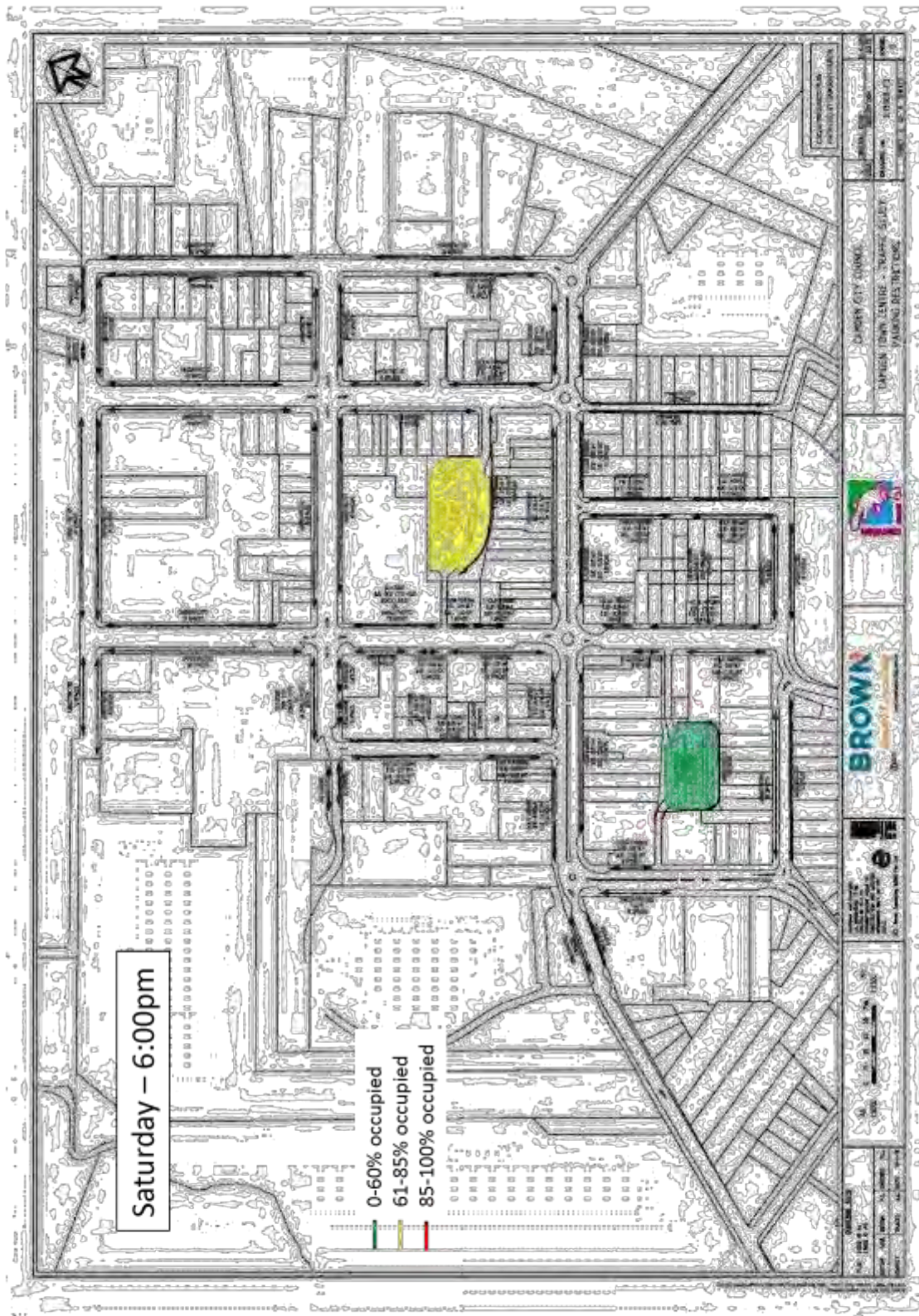
ORD06

Attachment 1

ORD06

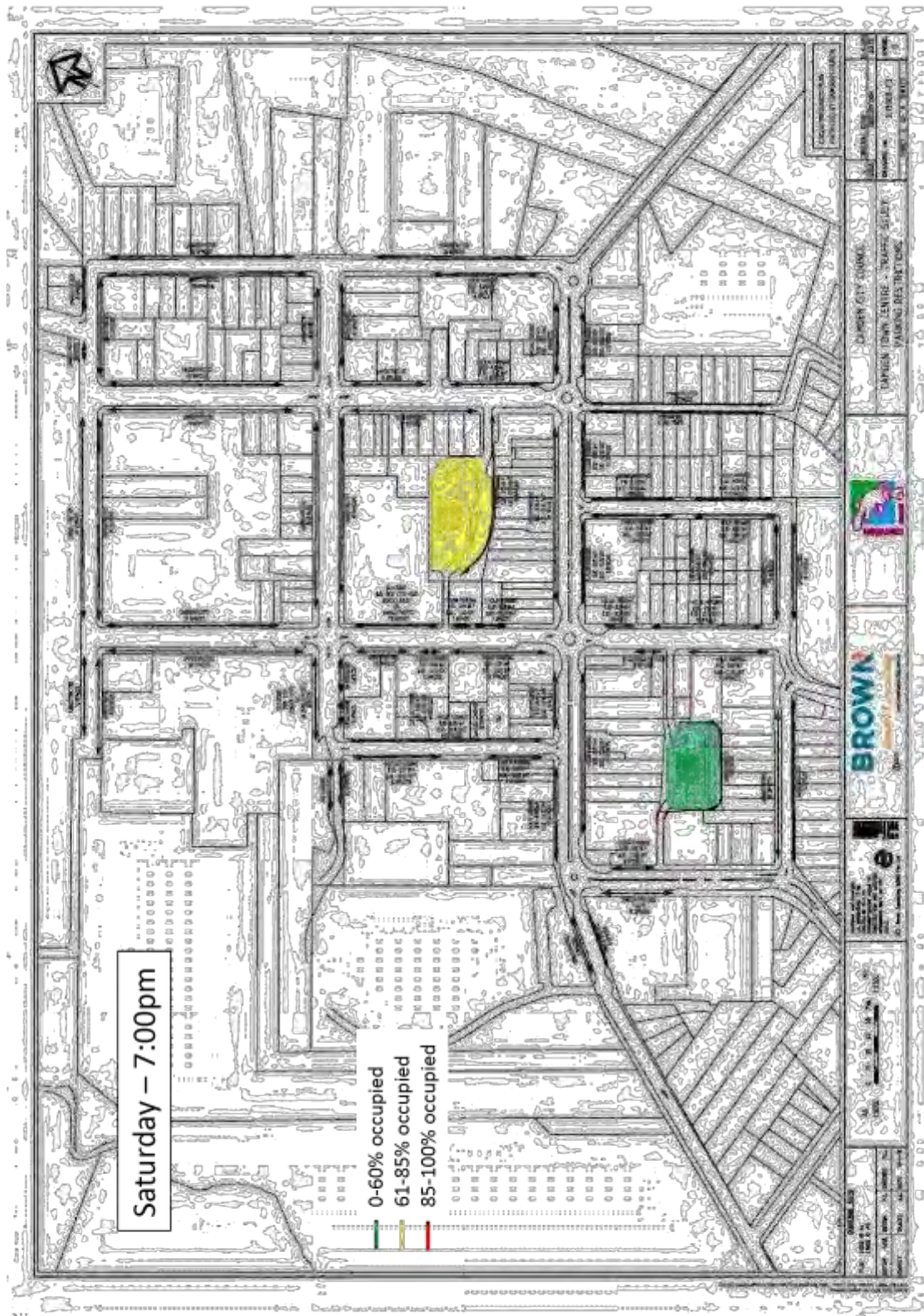
Attachment 1

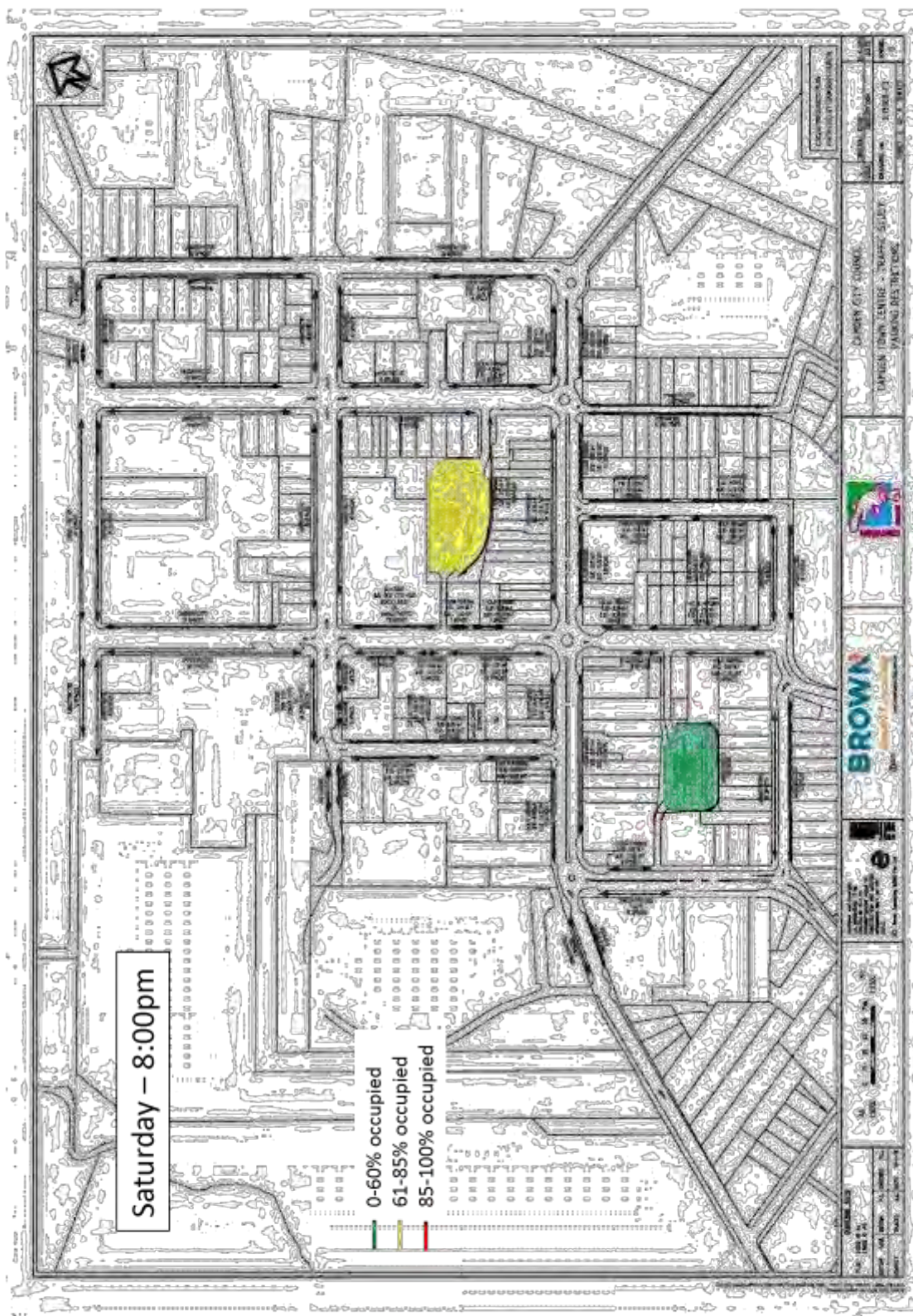




ORD06

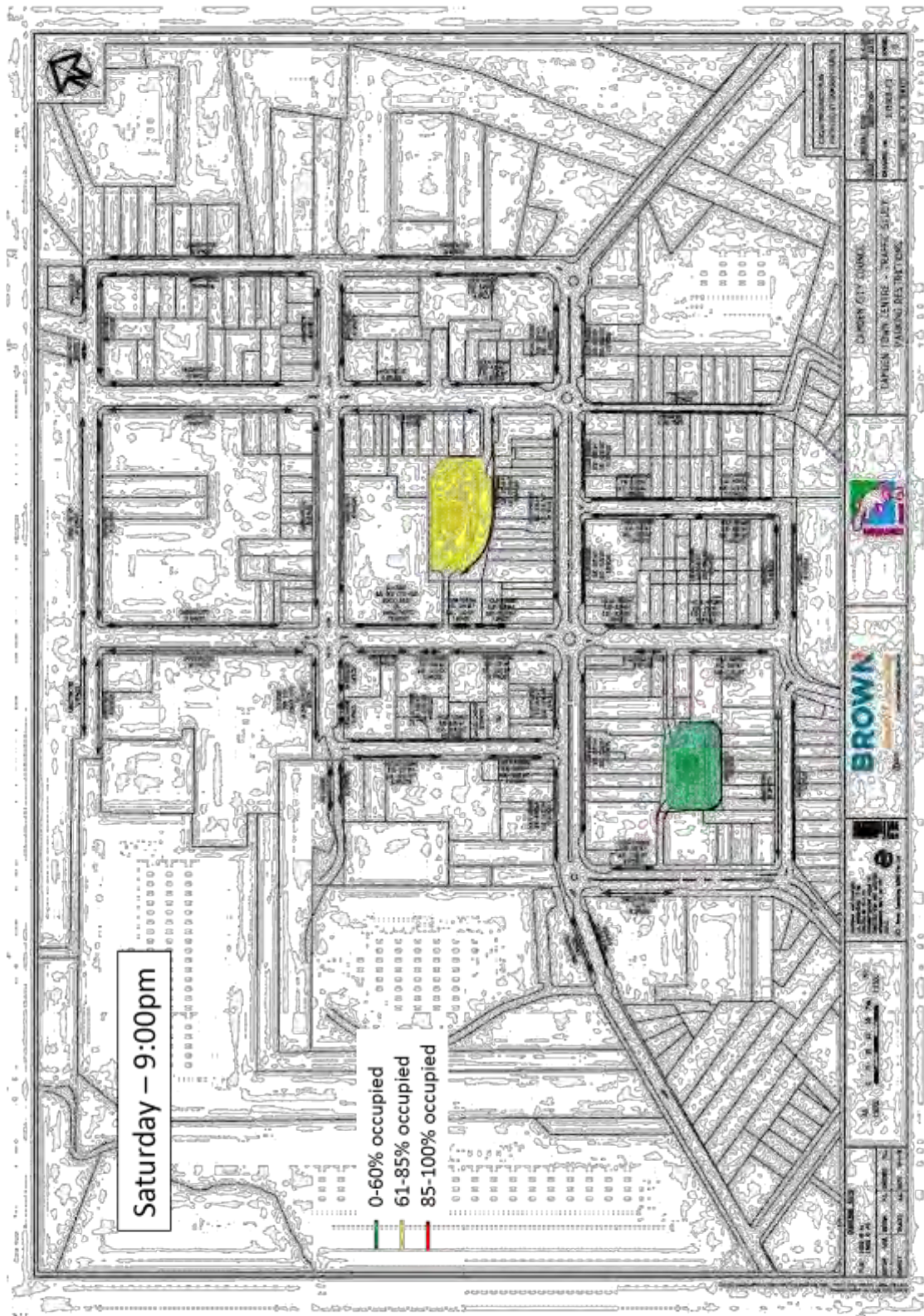
Attachment 1





ORD06

Attachment 1





ORD06

Appendix B Accident Statistics Review

Attachment 1



Appendix B: Accident Statistics Review

	Jan-June			Grand Total		
Total Accidents	148	6	154			
Total Degree 1	2	0	2			
Total Degree 2	56	3	59			
Total Degree 3	91	3	94			
	Total Degree 1	Total Degree 2	Total Degree 3	Total Accidents	Accident Per Year	No Ped Accidents
Alpha	0	0	2	2	0.27	0
Argyle	1	22	18	41	5.47	10
Barsden	0	0	1	1	0.13	0
Broughton	0	5	9	14	1.87	1
Cawdor	1	3	10	14	1.87	0
Edward	0	0	1	1	0.13	0
Elizabeth	0	6	7	13	1.73	9
Exeter	0	0	0	0	0.00	0
Hill	0	1	0	0	0.00	1
John	0	1	5	6	0.80	3
Little	0	1	1	2	0.27	1
Macarthur	0	7	22	29	3.87	1
Menangle	0	4	9	13	1.73	1
Murray	0	3	7	10	1.33	1
Oxley	0	1	0	1	0.13	1
Park	0	0	0	0	0.00	0
Pindari	0	2	1	3	0.40	1
View	0	0	0	0	0.00	0
Total	2	56	93	150		30

ORD06

Attachment 1



Appendix C Traffic Modelling Summary Paper

ORD06

Attachment 1

Traffic Modelling Working Paper

1.0 Introduction

A traffic model was prepared for this study to assist in the analysis of traffic in Camden Town Centre. The model selected was an application called Commuter produced by Azalient (refer to www.azalient.com). This is a nanosimulation model and provides agent based analysis of the movements and interactions between the road network and vehicles and pedestrians.

This working paper describes the process used to establish the base models and how they were subsequently modified to provide an indication of future traffic conditions.

2.0 Software selection

To analyse traffic in town centres it is important to endeavour to reflect the many things that influence traffic system performance. These include:

- Interactions between through vehicles with vehicles parking at kerbside.
- Queuing on approach to intersections.
- The impact of pedestrians on traffic movements where pedestrians have right of way.
- The effect of different vehicle types, with different kinematic performance, as well as the effect of different driver behaviours.
- The effect of buses stopping along routes through the town centre.
- Circulating traffic and the relatively high number of u-turns.

Commuter provides these functions, as well as more sophisticated facilities to manage traffic signals and large public transport networks. This application has been in use for a number of years in NSW and has been applied on a number of projects by various agencies, including:

- SCATS and the Environment – Spit Road Corridor for RTA/RMS, where it was used to test the impact of SCATS control and different signal controls on the environmental performance of the Spit Road Corridor from Sydney Road through to the Warringah Freeway.
- Wynyard Precinct model – for TfNSW, where was used to test the operational performance of vehicles, buses, pedestrians in a congested part of the CBD's road network.

The version of Commuter used on this project is 5.2 (64 bit implementation).

3.0 Base model development

3.1 Process

The base models are established to reflect existing traffic and road conditions. These are then modified to reflect expected future traffic demands and provide an insight into how traffic might operate in the future, including the assigned volumes.

The process followed was:

- Collate and analyse survey information and prepare for incorporation in the models
- Select model hour within the survey periods
- Build the model networks, using the base information and information from site visits
- Develop the demand specification for the models, to produce a pattern matrix
- Calibrate the demands through a process of demand adjustments and network modifications
- Review base models against calibration and validation criteria

The following sources of base information were drawn upon:

- Town centre cadastral boundaries
- Aerial photographs of the town centre
- Traffic counts
- Traffic surveys
- Census information
- Bus timetables, network maps and bus stop locations

3.2 Collate and Analyse survey information

The field data was received from the survey firm and reviewed prior to its preparation for inclusion in the traffic models. This review process entailed the production of detailed stickfigures of the town centre in excel to represent the key traffic facilities such as roads, intersections and car park access points.

The turning movement counts were read into the spreadsheets, which permitted ready identification of mis-closures in the counts. These are where the departure flows from an intersection do not correspond with the arrival flows at downstream intersections. This can be caused by intervening land use and intersections, it can also be due to timing differences in the surveys.

The turning movement counts were also compared within the stickfigures (and for equivalent hours) with turning movement counts taken in 2010. This comparison showed that some counts were down and some were up, which is expected when looking at single day counts several years apart. The earlier counts did not include u-turn movements at the large roundabouts, which may also explain some of the apparent differences between the years.

Based on this review, no adjustments were made to the raw counts, and minor misclosures remaining in the data used to calibrated the demand matrices. The implication of this is that some of the differences between modelled flows and observed counts from the fieldwork will be due to minor inconsistencies in the data, rather than a problem with the models.

The origin destination was reviewed to identify travel time distributions and average travel times in each survey period between selected road sections that corresponded with survey stations.

3.3 Selection of model hour within the survey periods

The attached note (ATTCHMENT A) describes the process used to select hours within survey periods for traffic modelling. A model was established for the peak hour within each of the survey periods:

- Thursday morning, with peak between 8:15am and 9:15am
- Thursday evening, with peak between 4:30pm and 5:30pm
- Saturday morning, with peak between 9:00am and 10:00am
- Saturday afternoon, with peak between 5:15pm and 6:15pm.

To achieve realistic network loads at the commencement of the analysis hour a fifteen-minute warm-up period was run in the lead up to the analysis hour.

3.4 Model network development

The model network was developed using a cadastral layer and aerial photographs. This provided dimensional control and assisted in the initial selection of road network elements to position within the model. Subsequent site visits and network testing refined the network further.

The key features of the model networks are:

- Network extent from Sheathers Lane in the west through to Macarthur Road in the east and Macquarie Grove in the north to Old Hume Highway and Menangle Road in the south (refer to Figure 1 below).
- The network reflects traffic conditions, such as lane widths, intersection mode of control and priority arrangements, key access points, sign posted speed limits, with School zone active during Thursday morning model.
- On-street parking is included where this has an impact on traffic flow and where it is important for traffic distribution control.
- A relatively fine grained zonal system was developed to reflect the dispersed pattern of traffic loading to the network and to provide control over movements.
- Inclusion of scheduled route buses within the modelling system.
- Marked foot crossings included where activity on these has an impact on traffic flow.

The following series of figures show the traffic model's network in progressively more detail.

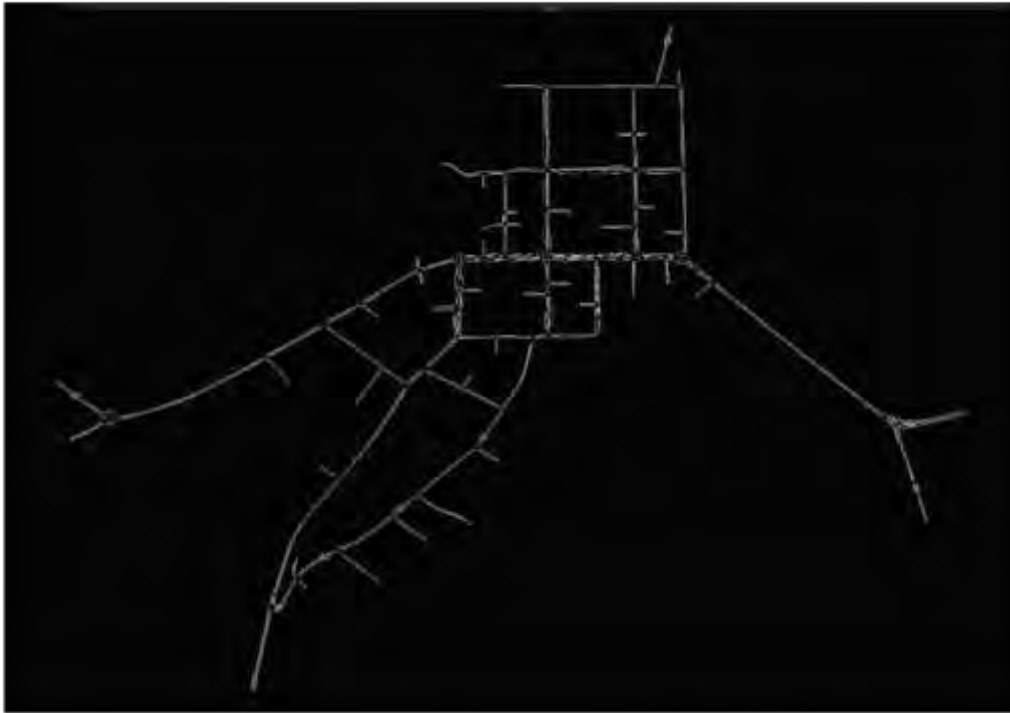


Figure 1 – Model extents



Figure 2 – Model network of town centre

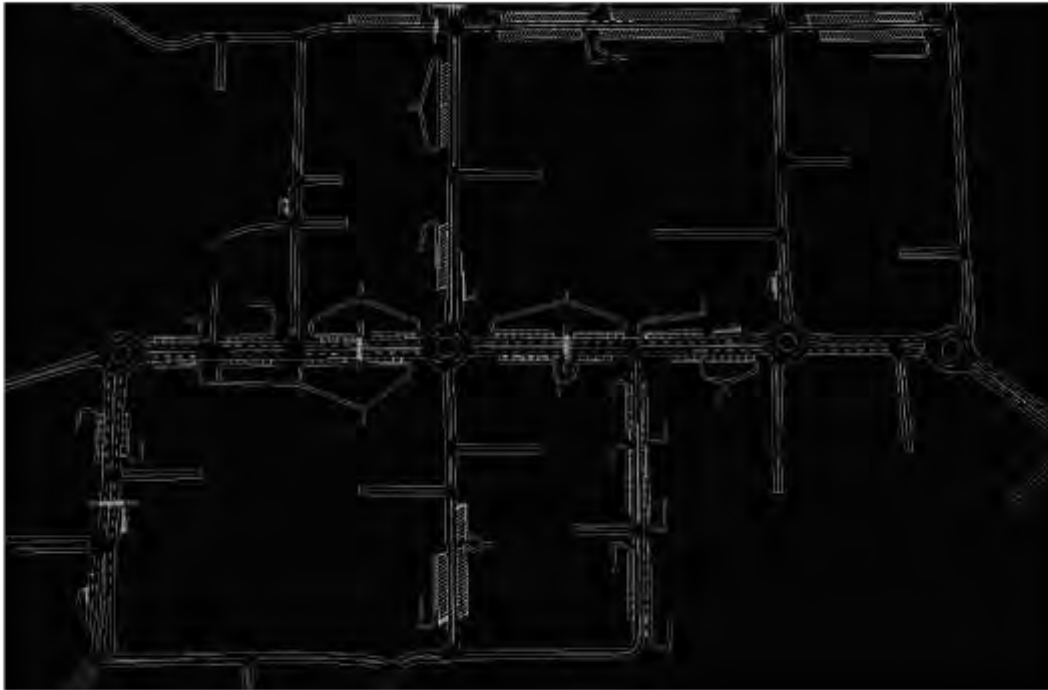


Figure 3 – Model network of central town centre, showing on-street car parking and pedestrian crossings

3.5 Network spatial information

A cadastral layer provided by the client in DWG format was imported into the modelling application and this was supplemented with aerial photographs, to provide spatial control.

3.6 Road elements

Links were coded into the model using default links with:

- Signposted speed limits as evidenced on the ground – the only time of day change to speed limits was the school speed zone, which is marked along John Street north of Argyle Street, Mitchell Street from west of Elizabeth Street to west of Oxley Street and the north end of Oxley Street
- Default lane widths of 3.0m which were subsequently adjusted where required

Default cost factors of 1.0 were subsequently adjusted to provide differentiation of routes such that:

- Argyle Street had an adjusted cost factor of 1.0
- North of Argyle Street had an adjusted cost factor of 1.3
- South of Argyle Street had an adjusted cost factor of 1.5

During the network calibration process of the Thursday PM peak model the relativities of cost factors along different routes was tested and the above scheme was modified to:

- Argyle Street cost factor of 1.0
- North of Argyle Street cost factor of 1.7
- South of Argyle Street cost factor of:
 - View Street cost factor of 1.3
 - John Street south cost factor of 1.3
 - Broughton Street from View Street to John Street cost factor 1.5
 - Broughton Street from John Street to Menangle Road cost factor 1.3
 - Broughton Street west of Menangle Road cost factor 1.7
 - Murray Street cost factor 1.0.

This scheme was applied in the other three time period networks without modification as it produced reasonable routing of demands.

3.7 Intersection coding

Intersections were generally coded to reflect conditions on the ground in terms of mode of control, approach number of lanes and configuration, and priority arrangements.

The exception to this was the four arm mini-roundabout on Cawdor Road south west of Murray Street, which was coded as a four way priority intersection, with the main road (Cawdor Road) having priority. This approach was used to avoid issues with mini-roundabout operations and is considered satisfactory in terms of traffic operations.

Priority coded in the model was checked at all intersections to ensure that traffic with right of way was not yielding to other vehicles. Commuter provides four levels of priority:

- Stop
- Give way
- Yield
- Free flow

The approach used was to select the particular priority based on a driver's expectation – i.e., a stop sign on the ground was generally coded so that vehicles facing the stop sign were assigned to priority level 'Stop'. Some adjustments to this were made during the network calibration process with changes between 'Give way' and 'Yield' selected depending on the traffic operations within the model. Due to the relatively low traffic volumes away from Argyle Street, the actual priority adopted in those areas was not critical over all operations, as long as the relative hierarchy of priority was maintained between movements.

Camden town centre does not currently have traffic signals for intersection control or for pedestrian crossings.

3.8 On-street parking coding

On-street parking was included in the model primarily because:

- It is a source of friction within the town centre, influencing network costs and assignment of traffic.
- On-street parking areas are a key, fine-grained element of the traffic demand specification for most town centres, and Camden is no different.

To reflect these attributes of on-street parking, not all on-street parking in the town centre has been included. It is evident from the models' network the locations of modelled on-street parking.

The parking was coded by creating:

- the parking lane, either parallel or angle parking, as appropriate;
- a parking zone over the parking lane;
- walkways beside the parking zones; and
- an area which generates/attracts people to walk to/from parked vehicles.

The walkways are simply to connect areas to parking zones – they do not endeavour to reflect footpath conditions or the direction of demand of town centre pedestrians – far more field work would be required to achieve this and for the purposes of this model, such refinement is not required.

We have not populated parking zones with parked vehicles at the commencement of the analysis period, so some of the parking zones look sparse at the commencement of some of the analysis period.

Due to the stochastic the nature of the model's demand generation process it is not possible to perfectly match parking area ins and outs so that the accumulation of traffic will fit within the number of spaces within the parking zone. Consequently, some parking zone choice rules were introduced to direct vehicles to an alternative one or two on-street parking zones, should their initially allocated destination one be full.

No other model facilities, such as incidents, were used to reflect friction in the road network.

3.9 Off-street parking coding

The major off-street car parking areas within the model extent are included in the model as transition zones, attached to person generating areas. These are coded as short side roads off the town centre roads, such as Elizabeth Street, with a priority intersection. The short access road into the car park terminates at a traffic zone (a transition zone) which is the place where the vehicles appears to vanish from the model, and their drivers walk to or from the person generating areas.

3.10 Bus stops and routes

The trails facility within Commuter was used to code in the major route bus services operated within the town centre. This used information about networks and routes from operator publications (from Busways' website), as well as information about bus stops available on www.131500.info.

The bus stops were coded along the trails in the appropriate location. At the edge of the model, additional bus stops were coded to permit buses to be loaded onto and off the road network at these places. The dwell time at these stops was set to a minimum value of 1 second.

Subsequently, the operative bus stops were associated in the definition of particular routes and their trails through the network.

Buses were released onto the model's road network in accordance with the timetables and then they proceed along the trails as fixed-route demands. The dwell time of buses at each stop was coded separately and reflects expectations given the potential boardings and alightings of the bus stop's surrounds and the function of the stop, based on the modeller's experience. For example, the main town centre bus stop, at John Street, has a longer dwell time than other bus stops. The model's operation is not particularly sensitive to the adopted dwell times as most stops, where the buses dwell, are located out of the travel lanes, and there are relatively few bus trips.

3.11 Pedestrian crossing facilities

The following marked foot crossing facilities (zebra crossings) were coded into the model:

- Argyle Street between John Street and Hill Street
- Argyle Street between John Street and Oxley Street
- Murray Street between Argyle Street and Broughton Street
- Mitchell Street's western approach to John Street
- John Street's northern approach to Mitchell Street

When a pedestrian steps onto a marked foot crossing in the model, the software stops vehicles from passing over the crossing. To prevent unrealistic delays at the first three crossings (listed above) in the model, they were coded as staged crossings, so that if a pedestrian steps on to the crossing on the southern carriageway, vehicles are not prevent from passing over the crossing on the northern carriageway (unless of course, there are also separate pedestrians on this crossing). These operate so that there is a 'separate' crossing of each carriageway.

The crossings are connected via footways to person generating areas located approximately where pedestrians would 'appear' from prior to using the crossing. These are included to provide realistic loading of the pedestrian crossing facilities and do not reflect the broader movements of pedestrians within the town centre.

3.12 Approach to traffic assignment

Traffic assignment in the model is governed by the approach to assignment specified in the model. For this project the following approach was used:

- Cost spreading 5%
- Standard model behaviour for drivers.

Pedestrian assignment is not a concern as pedestrians in the model had not route choice available to them.

3.13 Demand specification

3.13.1 Sources of demand

The following sources of demand are represented in the model:

- Light vehicle demand, based on person movements between person-generating areas and transition zones
- Heavy vehicle demand, based on vehicle movements between zones
- Bus demand, as discussed above, it is modelled as fixed route demands
- Pedestrian movements at marked foot crossings, with people moving between person-generating areas.

3.13.2 Demand distribution

Light and heavy vehicles spatial dimension of demand is specified with matrices:

- Light vehicles – demand is specified between person-generating areas through transition or on-street parking zones, where people are loaded into vehicles; the vehicles then enter the road network, travel to their destination transition or on-street parking zone, where they leave their vehicle and walk to the person-generating areas.
- Heavy vehicles – demand is specified between an origin traffic zone (a transition zone for light vehicles) to a destination traffic zone via the road network.
- Buses are specified so that each individual trip follows the bus route, with commencement reflecting the timetabled location of the bus at the edge of the model, or at the commencement bus stop.
- Person demand for pedestrian crossings is specified as movements between the person-generating areas connected at either end of the crossing and is also contained in a matrix.

These demand elements were developed in a staged process which is described in the following paragraphs.

An all-vehicle (light vehicles and heavy vehicles) pattern matrix was developed to represent movements between person-generating areas that were connected to transition zones for each model time period. This drew upon the origin destination survey information, land use information and traffic generation estimates. This provided an estimate of trip ends by direction at each zone, an estimate of traffic volumes across the model cordon, as well as an estimate of through traffic volumes. A balancing process was applied so that the estimated trip ends within the modelled area approximately reflected the non-through traffic volumes across the cordon. Then the cordon flows into the model were distributed proportionally among the internal trip ends. A similar process was applied to 'match' the out bound traffic across the cordon to origin trip ends within the modelled area.

This all-vehicle pattern matrix was assigned on the model network, and adjusted so that screenline flows within the model generally matched counts (within a tolerance). This adjustment process then adjusted the cordon flows so they generally matched the counts, again within a tolerance. The next step was a review of turning movements within the network, and where these were wayward, our approach was to follow key routes – Cawdor Road, Old Hume Highway, and Argyle Street – to gain an appreciation of the pattern of differences between assigned flows and observed counts from survey. In some cases an improvement could be achieved through a minor network adjustment, in other places the demand was adjusted. At this stage some trialling of different cost factor schemes were tried till a reasonable balance of routes was achieved. Further adjustments to demand were made to improve the 'fit' of the model.

Once the all-vehicle matrix was producing satisfactory assignment of traffic within the model, a heavy vehicle sub-matrix was developed, based on counts and origin-destination surveys, as well as identifying traffic zones with a high propensity to generate truck movements. This matrix was developed manually.

The heavy vehicle matrix was subsequently deducted from the all-vehicle matrix, resulting in separate light vehicle and heavy vehicle matrices.

The assignment of both matrices was tested within the model to ensure that the vehicle movements retained a reasonable fit to the counts.

At this stage the bus demands were coded to timetable, as previously described, and the bus trips were generated in the model.

Pedestrian demands at foot crossings were developed in the following manner:

- Argyle Street between John Street and Hill Street – based on counts taken on a Thursday afternoon. For the Thursday afternoon model, the counts were used directly, assuming an approximately 50/50 directional split of movements. The Thursday morning volumes were assumed to be the same as the Thursday afternoon counts. Volumes used in the Saturday model were scaled off the Thursday counts using the relationship between pedestrian movements at the intersection of Argyle Street and John Street in both periods (collected during the intersection count surveys).
- Argyle Street between John Street and Oxley Street – as for the above crossing.

- Murray Street between Argyle Street and Broughton Street – this was based on the use of the Argyle Street crossings, although with a scaled down volume.
- Mitchell Street’s western approach to John Street – these were counted directly by surveys, as part of the intersection counts.
- John Street’s northern approach to Mitchell Street – as for the above crossing.

The following table identifies the role of each of the matrices in the models.

Table 1 – Demand matrix descriptions

Matrix	Description
Matrix 1	Analysis hour movement of people between areas via transition zones and the road network in light vehicles.
Matrix 2	Warm-up period equivalent of Matrix 1.
Matrix 3	Person movements across pedestrian crossings of Argyle Street.
Matrix 4	Warm-up period equivalent of Matrix 3.
Matrix 5	Person movements across pedestrian crossing of Murray Street.
Matrix 6	Warm-up period equivalent of Matrix 5.
Matrix 7	Analysis hour movement of heavy vehicles between zones and the road network.
Matrix 8	Warm-up period equivalent of Matrix 7.

3.13.3 Demand temporal profiles

These provide an indication of the relative proportion of an hour’s flow occurring in each of the four 15-minute periods in the analysis hour. Profiles were developed from counts for each of the cordon zones for each of the analysis hours. The other zones all had flat profiles through the hour.

These profiles are tabulated below.

Table 2 - Traffic profiles – Thursday AM

Zone	Quarter hour commencing...			
	8:30	8:45	9:00	9:15
Cawdor Road (Z1)	34%	30%	20%	16%
SHheather’s Lane (Z2)	24%	30%	23%	22%
Macquarie Grove Road (Z4)	27%	31%	24%	18%
Camden Valley Way (Z5)	23%	31%	25%	21%
Macarthur Street (Z6)	26%	33%	24%	17%
Hill Street (Z7)	38%	19%	19%	24%
Old Hume Highway (Z8)	23%	28%	25%	23%
Other	25%	25%	25%	25%

Table 3 - Traffic profiles - Thursday PM

	Quarter hour commencing...
--	----------------------------

Zone	16:30	16:45	17:00	17:15
Cawdor Road (Z1)	22%	26%	27%	25%
SHheather's Lane (Z2)	23%	28%	25%	25%
Macquarie Grove Road (Z4)	23%	26%	25%	25%
Camden Valley Way (Z5)	23%	27%	24%	26%
Macarthur Street (Z6)	27%	25%	22%	25%
Hill Street (Z7)	23%	8%	35%	33%
Old Hume Highway (Z8)	25%	28%	23%	24%
Other	25%	25%	25%	25%

Table 4 - Traffic profiles - Saturday AM

Zone	Quarter hour commencing...			
	9:00	9:15	9:30	9:45
Cawdor Road (Z1)	34%	28%	15%	23%
SHheather's Lane (Z2)	31%	33%	16%	20%
Macquarie Grove Road (Z4)	39%	31%	14%	16%
Camden Valley Way (Z5)	33%	32%	17%	18%
Macarthur Street (Z6)	38%	33%	14%	15%
Hill Street (Z7)	29%	36%	22%	13%
Old Hume Highway (Z8)	37%	34%	13%	16%
Other	25%	25%	25%	25%

Table 5 - Traffic profiles - Saturday PM

Zone	Quarter hour commencing...			
	17:00	17:15	17:30	17:45
Cawdor Road (Z1)	27%	24%	24%	24%
SHheather's Lane (Z2)	22%	25%	27%	26%
Macquarie Grove Road (Z4)	25%	25%	24%	27%
Camden Valley Way (Z5)	23%	25%	23%	28%
Macarthur Street (Z6)	24%	26%	25%	25%
Hill Street (Z7)	29%	29%	19%	23%
Old Hume Highway (Z8)	22%	25%	24%	29%
Other	25%	25%	25%	25%

3.13.4 Vehicle Types

Vehicle types within the light vehicle fleet were based on three different sizes of light vehicles (4.1m, 4.4m and 4.8m). These sizes were drawn and their proportion of the light vehicle fleet (33%, 4% and 25% respectively) was sourced from RTA-commissioned analysis of vehicle registrations in NSW.

Heavy vehicle types were drawn from previous fleet information published by the RTA. The following heavy vehicle types and their proportions of the heavy vehicle fleet were coded into the models:

- Light goods vehicle (LGV) (14%)
- Light rigid heavy vehicle (23%)

- Medium rigid heavy vehicle (22%)
- Heavy rigid heavy vehicles (21%)
- Light semi-trailer (10%)
- Heavy semi-trailer (10%).

Buses were coded using Commuter's Standard Bus 202.

People within the model were coded using Commuters default standard person type, without adjustment to their physical attributes (such as size, weight, walk speed, etc;). This included a 0.10 size variation parameter, which in effect sets the standard distribution of the dimensions to be within 10% of the mean.

No adjustment to driver behaviour attributes was made.

3.13.5 Calibration of the network and demands

This process involves adjustments to demand and the network. The following approach was generally applied:

- Improved demand matrices (see description above) were assigned to the road network, with all elements of the demand specification in place, including route buses, heavy vehicles, profiles, pedestrians and selected vehicle types and fleet compositions.
- The network's traffic operations are observed to ensure that vehicles are using appropriate lane discipline at intersections, that they are obeying priority arrangements, and that they are not causing undue delay as a result of aberrant behaviour.
- The assigned traffic flows are compared with observed counts, and where counts are out of tolerance, an assessment is made, with reference to comparisons along corridors and at adjoining intersections, as to whether it is a routing problem or a demand problem. Adjustments are made accordingly.

The main network adjustments undertaken were:

- Lane choice rules were applied to get most vehicles in the appropriate lanes at intersections. In particular, along Argyle Street lane choice rules were coded into the network to force most vehicles into the appropriate approach lane based on their departure leg from the intersection. The two left-in-left-out intersections with Argyle Street (Oxley Street and Hill Street) both had vehicles turning left into the side road from the median lane, waiting for a gap in the traffic in the adjacent lane prior to turning. This was causing unrealistic queuing on Argyle Street. Lane choice rules were introduced to force most left turning vehicles across to the correct lane (i.e., not the median lane). Of note is that during the stability testing of the model, in some time periods for some seed values, an episode or two of this behaviour was observed for a short period – it is considered that one or two episodes of this behaviour in an hour is a fair reflection of on-the-ground behaviour.
- Route choice rules were applied where vehicles were using unnecessarily circuitous routes, when more direct routes were obviously available.

- Parking choice rules were applied to selected on-street parking zones so that vehicles arriving to park at the zone move to an alternative zone, should their initial choice of zone be full and unable to accommodate them.
- Adjustment to the position of intersection streams to try to maintain the expected vehicle path of travel as they move through the intersection.
- Adjustments to the end handle of links at intersections to better reflect approach angle and position of stop or yield line (even if notional).
- Lane attributes were adjusted in selected locations to better represent driver behaviour:
 - Along Argyle Street – the avoidance attribute was selected to ensure drivers were looking ahead for pedestrians at the crossings and for vehicles drawing in or pulling out from the kerbside to park.

4.0 Model calibration and validation summary reporting

4.1 General

Model calibration compares modelled and observed volumes to establish the level of fit of the model to real-world traffic movements. The comparison is for traffic volumes at:

- Link Flows
- Turning movements
- Screenlines

Model validation uses travel time information collected by the origin destination survey to check if times of vehicles through the model provide a reasonable fit to real-world conditions. This required a review of the matched travel times to ensure that long duration 'trips' were excluded from the group of observations that were used to calculate average travel times.

Model stability was tested using five seeds with which to initialise the modelling application's random number generator. The following seed values were used:

- 12345
- 349508
- 836912
- 1198894
- 1694994

These were selected following advice that the seed values should be at least 100,000 apart by selecting the increment from the first to the second, the second to the third, etc, using the random number generator in excel to select a number between 105,000 and 513,000. The same seed values were used in each of the time period models. While each of the models were run with different seed values, the network was observed to check if there were stuck vehicles or behaviours leading to network operation instability or lock-ups. Through this process all models ran smoothly and the volumes in each model showed a good fit to the observed counts. This indicates that the models are stable and that there were no readily identifiable aspects of the model operation leading to unrealistic behaviours that cause model instability.

This section reports a summary of the calibration and validation comparisons for each of the four models in turn.

4.2 Thursday morning model

4.2.1 Demand calibration

Table 6 – Summary statistics for comparison of modelled and observed mid-block flows (freq), Thursday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	30	29	29	29	30
5<GEH<=10	0	1	1	1	0
10<=GEH	0	0	0	0	0
Total	30	30	30	30	30

Table 7 – Summary statistics for comparison of modelled and observed mid-block flows (%), Thursday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	100%	97%	97%	97%	100%
5<GEH<=10	0%	3%	3%	3%	0%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Table 8 – Summary statistics for comparison of modelled and observed turning movement flows (freq), Thursday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	103	100	103	97	103
5<GEH<=10	11	14	11	17	11
10<=GEH	0	0	0	0	0
Total	114	114	114	114	114

Table 9 – Summary statistics for comparison of modelled and observed turning movement flows (%), Thursday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	90%	88%	90%	85%	90%
5<GEH<=10	10%	12%	10%	15%	10%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Table 10 – Summary statistics for comparison of modelled and observed screenline flows (freq), Thursday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	12	12	12	12	12
5<GEH<=10	0	0	0	0	0
10<=GEH	0	0	0	0	0
Total	12	12	12	12	12

Table 11 – Summary statistics for comparison of modelled and observed screenline flows (%), Thursday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	100%	100%	100%	100%	100%
5<GEH<=10	0%	0%	0%	0%	0%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

4.2.2 Model validation

Table 12 – Comparison of modelled and observed screenline flows (%), Thursday AM Peak, seed value 12345

Travel time movement	Observed Avg (s)	Modelled count	Modelled Avg (s)	Difference (s)	%	GEH
Cawdor Road to Camden Valley Way	169	135	164	-5	-3.1	0.4
Camden Valley Way to Cawdor Road	173	176	152	-21	-11.9	1.6
Camden Valley Way to Macquarie Grove Road	112	16	105	-7	-6.6	0.7
Macquarie Grove Road to Camden Valley Way	105	27	100	-5	-4.8	0.5
Camden Valley Way to Murray Street	177	41	179	2	1.0	0.1
Murray Street to Camden Valley Way	212	72	180	-32	-15.1	2.3
Camden Valley Way to Menangle Road	155	34	149	-6	-4.0	0.5
Menangle Road to Camden Valley Way	179	88	147	-32	-17.7	2.5
Murray Street to Macquarie Grove Road	177	11	205	28	16.1	2.1
Macquarie Grove Road to Murray Street	196	3	185	-11	-5.7	0.8
Menangle Street to Macquarie Grove Road	208	12	180	-28	-13.3	2.0
Macquarie Grove Road to Menangle Street	149	6	170	21	14.4	1.7

4.2.3 Model stability

All models using five seed values ran to completion without lock-ups.

4.3 Thursday afternoon model

4.3.1 Demand calibration

Table 13 – Summary statistics for comparison of modelled and observed mid-block flows (freq), Thursday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	30	30	30	30	30
5<GEH<=10	0	0	0	0	0
10<=GEH	0	0	0	0	0
Total	30	30	30	30	30

Table 14 – Summary statistics for comparison of modelled and observed mid-block flows (%), Thursday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	100%	100%	100%	100%	100%
5<GEH<=10	0%	0%	0%	0%	0%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Table 15 – Summary statistics for comparison of modelled and observed turning movement flows (freq), Thursday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	111	110	111	110	109
5<GEH<=10	6	7	6	7	8
10<=GEH	0	0	0	0	0
Total	117	117	117	117	117

Table 16 – Summary statistics for comparison of modelled and observed turning movement flows (%), Thursday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	95%	94%	95%	94%	93%
5<GEH<=10	5%	6%	5%	6%	7%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Table 17 – Summary statistics for comparison of modelled and observed screenline flows (freq) , Thursday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	12	12	12	12	12
5<GEH<=10	0	0	0	0	0
10<=GEH	0	0	0	0	0
Total	12	12	12	12	12

Table 18 – Summary statistics for comparison of modelled and observed screenline flows (%), Thursday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	100%	100%	100%	100%	100%
5<GEH<=10	0%	0%	0%	0%	0%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

4.3.2 Model validation

Table 19 – Comparison of modelled and observed screenline flows (%), Thursday PM Peak, seed value 12345

Travel time movement	Observed Avg (s)	Modelled count	Modelled Avg (s)	Difference (s)	%	GEH
Cawdor Road to Camden Valley Way	140	186	163	23	16.3	1.9
Camden Valley Way to Cawdor Road	168	260	160	-8	-5.0	0.7
Camden Valley Way to Macquarie Grove Road	98	15	109	11	11.0	1.1
Macquarie Grove Road to Camden Valley Way	125	28	102	-23	-18.4	2.2
Camden Valley Way to Murray Street	200	70	183	-17	-8.6	1.2
Murray Street to Camden Valley Way	185	99	181	-4	-2.2	0.3
Camden Valley Way to Menangle Road	147	49	153	6	4.3	0.5
Menangle Road to Camden Valley Way	155	51	148	-7	-4.6	0.6
Murray Street to Macquarie Grove Road	163	20	184	21	12.9	1.6
Macquarie Grove Road to Murray Street	214	16	180	-34	-16.0	2.4
Menangle Street to Macquarie Grove Road	182	3	169	-13	-7.0	1.0
Macquarie Grove Road to Menangle Street	156	10	152	-4	-2.8	0.4

4.3.3 Model stability

All models using five seed values ran to completion without lock-ups.

4.4 Saturday morning model

4.4.1 Demand calibration

Table 20 – Summary statistics for comparison of modelled and observed mid-block flows (freq), Saturday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	30	30	30	30	30
5<GEH<=10	0	0	0	0	0
10<=GEH	0	0	0	0	0
Total	30	30	30	30	30

Table 21 – Summary statistics for comparison of modelled and observed mid-block flows (%), Saturday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	100%	100%	100%	100%	100%
5<GEH<=10	0%	0%	0%	0%	0%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Table 22 – Summary statistics for comparison of modelled and observed turning movement flows (freq), Saturday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	108	112	113	111	111
5<GEH<=10	9	5	4	6	6
10<=GEH	0	0	0	0	0
Total	117	117	117	117	117

Table 23 – Summary statistics for comparison of modelled and observed turning movement flows (%), Saturday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	92%	96%	97%	95%	95%
5<GEH<=10	8%	4%	3%	5%	5%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Table 24 – Summary statistics for comparison of modelled and observed screenline flows (freq), Saturday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	12	12	12	12	12
5<GEH<=10	0	0	0	0	0
10<=GEH	0	0	0	0	0
Total	12	12	12	12	12

Table 25 – Summary statistics for comparison of modelled and observed screenline flows (%), Saturday AM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	100%	100%	100%	100%	100%
5<GEH<=10	0%	0%	0%	0%	0%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

4.4.2 Model validation

Table 26 – Comparison of modelled and observed screenline flows (%), Saturday AM Peak, seed value 12345

Travel time movement	Observed Avg (s)	Modelled count	Modelled Avg (s)	Difference (s)	%	GEH
Cawdor Road to Camden Valley Way	136	456	159	23	17.1	1.9
Camden Valley Way to Cawdor Road	141	450	152	11	7.7	0.9
Camden Valley Way to Macquarie Grove Road	97	52	103	6	6.3	0.6
Macquarie Grove Road to Camden Valley Way	101	50	97	-4	-3.9	0.4
Camden Valley Way to Murray Street	152	62	178	26	17.3	2.0
Murray Street to Camden Valley Way	183	148	175	-8	-4.3	0.6
Camden Valley Way to Menangle Road	NS	0	NA	NA	NA	NA
Menangle Road to Camden Valley Way	144	22	145	1	1	0.1
Murray Street to Macquarie Grove Road	131	68	179	48	37	3.9
Macquarie Grove Road to Murray Street	154	28	162	8	5	0.6
Menangle Street to Macquarie Grove Road	127	0	NA	NA	NA	NA

4.4.3 Model stability

All models using five seed values ran to completion without lock-ups.

4.5 Saturday afternoon model

4.5.1 Demand calibration

Table 27 – Summary statistics for comparison of modelled and observed mid-block flows (freq), Saturday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	30	30	30	30	30
5<GEH<=10	0	0	0	0	0
10<=GEH	0	0	0	0	0
Total	30	30	30	30	30

Table 28 – Summary statistics for comparison of modelled and observed mid-block flows (%), Saturday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	100%	100%	100%	100%	100%
5<GEH<=10	0%	0%	0%	0%	0%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Table 29 – Summary statistics for comparison of modelled and observed turning movement flows (freq), Saturday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	108	109	104	108	109
5<GEH<=10	5	4	9	5	4
10<=GEH	0	0	0	0	0
Total	113	113	113	113	113

Table 30 – Summary statistics for comparison of modelled and observed turning movement flows (%), Saturday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	96%	96%	92%	96%	96%
5<GEH<=10	4%	4%	8%	4%	4%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

Table 31 – Summary statistics for comparison of modelled and observed screenline flows (freq), Saturday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	Freq	Freq	Freq	Freq	Freq
GEH<=5	12	12	12	12	12
5<GEH<=10	0	0	0	0	0
10<=GEH	0	0	0	0	0
Total	12	12	12	12	12

Table 32 – Summary statistics for comparison of modelled and observed screenline flows (%), Saturday PM Peak

Seed	12345	349508	836912	1198894	1694994
GEH Band	%	%	%	%	%
GEH<=5	100%	100%	100%	100%	100%
5<GEH<=10	0%	0%	0%	0%	0%
10<=GEH	0%	0%	0%	0%	0%
Total	100%	100%	100%	100%	100%

4.5.2 Model validation

Table 33 – Comparison of modelled and observed screenline flows (%), Saturday PM Peak, seed value 12345

Travel time movement	Observed Avg (s)	Modelled count	Modelled Avg (s)	Difference (s)	%	GEH
Cawdor Road to Camden Valley Way	126	166	150	24	18.8	2.0
Camden Valley Way to Cawdor Road	127	236	146	19	15.2	1.7
Camden Valley Way to Macquarie Grove Road	189	8	102	-87	-46.0	7.2
Macquarie Grove Road to Camden Valley Way	100	12	100	0	-0.1	0.0
Camden Valley Way to Murray Street	150	29	173	23	15.6	1.8
Murray Street to Camden Valley Way	145	20	172	27	18.7	2.1
Camden Valley Way to Menangle Road	148	20	142	-6	-4.3	0.5
Menangle Road to Camden Valley Way	136	6	147	11	7.7	0.9
Murray Street to Macquarie Grove Road	144	16	173	29	19.9	2.3
Macquarie Grove Road to Murray Street	144	6	161	17	11.7	1.4
Menangle Street to Macquarie Grove Road	114	0	114	-114	-100.0	15.1

4.5.3 Model stability

All models using five seed values ran to completion without lock-ups.

4.6 Apparent Issues

At the access to the area south of Woolworths (directly off Oxley Street) there is a one-way access coded into the model to connect to transition zone 18 (connected to and person-generating area #49). The software flags this as an unconnected link. This has been investigated and the arrangement appears to be operating as intended – so the unconnected link message has been ignored.

The inbound bus stop coded on Macquarie Grove (coded as a dummy stop to permit buses to load onto the road network at the cordon) flags an issue in models that load no buses at this location. We have explored the issue and the area is operating as expected.

5.0 Future conditions models

The purpose of this study is to project future traffic conditions within the town centre. To meet this requirement the following process was followed:

- Review land use projections for the town centre
- Review the surrounding strategic situation in terms of future land use and transport network developments
- Consider the applicability of the land use projections for the town centre, in terms of physical constraints, recent market activity, expected future development
- Based on the strategic assessment of the above factors, develop growth factors to apply to base year traffic demands
- Produce future year traffic and pedestrian demand matrices, and consider likely changes to bus route networks and frequencies
- Develop future year road networks incorporating known works – in this case the starting point for future year networks was the existing road network
- Assign these in the model and examine network operations and make minor adjustments to the allocation of demand
- Review assigned volumes

Zones in the model were categorised as either:

- Internal town centre zones
- Internal non town centre zones
- External zones

Based on a review of factors identified above, future year peak demands were produced by using the following growth factors:

- Internal town centre zones to internal town centre zones: 1.3
- External zones to external zones: 1.2
- Internal town centre zones to external zones: 1.3
- External zones to internal town centre zones: 1.3
- Internal non town centre zones to/from all types of zones: 1.1

The resulting demands were assigned to the base year road networks in each of the time periods. The models were run and the traffic operations were examined. The models generally ran satisfactorily, although some changes were made. These were:

- As noted previously, a small number of vehicles turning left from Argyle Street to Oxley Street and from Argyle Street to View Street endeavour to do so from the median lane. As such they must await a gap in the kerbside lane's traffic to safely turn. With additional traffic on the network this problem was exacerbated. Consequently, additional lane choice rules were introduced to deal with the issue at Argyle Street and Oxley Street; these included lane choice rules applied within the circulating lanes of the Argyle Street and Murray Street roundabout. This appeared to improve the situation, although several times in the analysis hour, the problem emerges and has a negative effect on eastbound traffic flow along Argyle Street.
- No changes were introduced to deal with this problem at Argyle Street and View Street as it does not have the same impact and occasional aberrant behaviour is probably worth retaining in the model from a realism perspective.

These future year models show good traffic operations within the town centre. The Thursday models have noticeably higher traffic density, with transient eastbound queues. The higher pedestrian volumes using the pedestrian crossing of Argyle Street between Oxley Street and John Street, interacting with the roundabout at John Street appear to have a detrimental impact on traffic.

5.1 Discussion of future traffic conditions

The critical time period for the town centre is Thursday PM peak, followed by Thursday AM peak, and the Saturday peaks are not as critical, in terms of traffic performance.

The section of Argyle Street between Murray Street and John Street is the critical section of the town centre in terms of traffic operations. Traffic density, queuing and transient delays in this area are most marked in this area in the existing year and future year models. Eastbound operations appear more constrained than westbound operations, primarily due to the interaction of operation of the marked foot crossing of Argyle Street west of John Street with the roundabout at the intersection of Argyle Street and John Street.

In effect, eastbound vehicles are delayed at the marked foot crossing, to the point where the approach queue at the roundabout dissipates, so that few or no vehicles are at the roundabout approach to take advantage of gaps at the roundabout to proceed through the intersection. This interaction tends to reduce overall sub-system capacity. In future years, with the increase in pedestrians using the crossing, more traffic on Argyle Street and more side-street traffic, this situation. Of note is that this behaviour is sensitive to our projections of volumes of pedestrian crossing at the marked foot crossing – a substantial increase over our projection would see traffic operations of this sub-system under more pressure.

Future Model – Thursday AM

In the future Thursday AM model, transient eastbound queues extend back to and past Oxley Street. This results in small (less than 5 vehicles) southbound queues in Oxley Street, waiting to turn left onto Argyle Street. The rest of the network functions well with only transient queues at the various intersections. The section of Argyle Street east of John Street functions well – primarily due to lower volumes of pedestrians crossing the marked foot crossing than the crossing to the west, but also because the marked foot crossing is approximately 20 metres further from the roundabout, permitting more vehicles to store between the two facilities, thereby reducing the interaction between the two facilities.

Future Model – Thursday PM

In the future Thursday PM model, the transient eastbound queues along Argyle Street from John Street, are longer, frequently extending past Oxley Street, and, as a result, causing longer queues of southbound traffic waiting to turn left from Oxley Street to Argyle Street. The length of this southbound queue varies, but at one point extends up to 20 vehicles in length in the model, with a queue length of 5 to 10 vehicles more usual. The rest of the network functions well during this time period.

Future Model – Saturday AM

In the Saturday AM Future Year model the network operates well with few queues. Again, the critical part of the network is the section of Argyle Street between Murray and John Street, but this generally operates satisfactorily over the model's analysis hour.

Future Model – Saturday PM

In the Saturday PM Future Year model the network operates well with few queues, in a similar fashion to the Saturday AM Future Year model.

The following tables compare travel times between the base models and the future models

Table 34 – Comparison of Observed, Base Modelled and Future Modelled Travel Times, Thursday AM

Travel time movement	Observed avg (s)	Modelled count	Base Modelled Avg (s)	Future Modelled Avg (s)	Modelled Diff (s) Base - Future	Diff (%)
Cawdor Road to Camden Valley Way	169	135	164	185	21.7	13.3%
Camden Valley Way to Cawdor Road	173	176	152	163	10.9	7.2%
Camden Valley Way to Macquarie Grove Road	112	16	105	109	4.1	3.9%
Macquarie Grove Road to Camden Valley Way	105	27	100	101	1.4	1.4%
Camden Valley Way to Murray Street	177	41	179	185	5.7	3.2%
Murray Street to Camden Valley Way	212	72	180	199	19.0	10.5%
Camden Valley Way to Menangle Road	155	34	149	155	5.8	3.9%
Menangle Road to Camden Valley Way	179	88	147	151	3.8	2.6%
Murray Street to Macquarie Grove Road	177	11	205	222	16.3	8.0%
Macquarie Grove Road to Murray Street	196	3	185	197	12.3	6.6%
Menangle Street to Macquarie Grove Road	208	12	180	190	9.3	5.2%
Macquarie Grove Road to Menangle Street	149	6	170	158	-12.4	-7.3%

Table 35 – Comparison of Observed, Base Modelled and Future Modelled Travel Times, Thursday PM

Travel time movement	Observed avg (s)	Modelled count	Base Modelled Avg (s)	Future Modelled Avg (s)	Modelled Diff (s) Base - Future	Diff (%)
Cawdor Road to Camden Valley Way	140	186	163	195	32.4	19.9%
Camden Valley Way to Cawdor Road	168	260	160	177	17.6	11.0%
Camden Valley Way to Macquarie Grove Road	98	15	109	105	-4.3	-4.0%
Macquarie Grove Road to Camden Valley Way	125	28	102	103	0.9	0.9%
Camden Valley Way to Murray Street	200	70	183	201	18.3	10.0%
Murray Street to Camden Valley Way	185	99	181	218	36.8	20.3%
Camden Valley Way to Menangle Road	147	49	153	167	14.0	9.2%
Menangle Road to Camden Valley Way	155	51	148	165	17.7	11.9%
Murray Street to Macquarie Grove Road	163	20	184	208	23.9	13.0%
Macquarie Grove Road to Murray Street	214	16	180	198	17.9	10.0%
Menangle Street to Macquarie Grove Road	182	3	169	188	18.3	10.8%
Macquarie Grove Road to Menangle Street	156	10	152	158	6.2	4.1%

Table 36 – Comparison of Observed, Base Modelled and Future Modelled Travel Times, Saturday AM

Travel time movement	Observed Avg (s)	Modelled count	Modelled Avg (s) Base	Modelled Avg (s) Future	Modelled Diff (s)	Diff (%)
Cawdor Road to Camden Valley Way	136	456	159	168	8.4	5.3%
Camden Valley Way to Cawdor Road	141	450	152	156	4.5	2.9%
Camden Valley Way to Macquarie Grove Road	97	52	103	103	-0.1	-0.1%
Macquarie Grove Road to Camden Valley Way	101	50	97	101	3.9	4.1%
Camden Valley Way to Murray Street	152	62	178	178	-0.1	0.0%
Murray Street to Camden Valley Way	183	148	175	184	9.1	5.2%
Camden Valley Way to Menangle Road	NS	0	NA	154	NA	NA
Menangle Road to Camden Valley Way	144	22	145	190	45.2	31.1%
Murray Street to Macquarie Grove Road	131	68	179	180	0.4	0.2%
Macquarie Grove Road to Murray Street	154	28	162	127	-34.7	-21.4%
Menangle Street to Macquarie Grove Road	127	0	NA	144	NA	NA
Macquarie Grove Road to Menangle Street	NS	6	148	NA	NA	NA

Table 37 – Comparison of Observed, Base Modelled and Future Modelled Travel Times, Saturday PM

Travel time movement	Observed avg (s)	Modelled count	Base Modelled Avg (s)	Future Modelled Avg (s)	Modelled Diff (s)	Diff (%)
Cawdor Road to Camden Valley Way	126	166	150	156	6.1	4.1%
Camden Valley Way to Cawdor Road	127	236	146	152	5.4	3.7%
Camden Valley Way to Macquarie Grove Road	189	8	102	106	3.7	3.6%
Macquarie Grove Road to Camden Valley Way	100	12	100	105	5.0	5.0%
Camden Valley Way to Murray Street	150	29	173	172	-1.0	-0.6%
Murray Street to Camden Valley Way	145	20	172	173	1.4	0.8%
Camden Valley Way to Menangle Road	148	20	142	144	2.2	1.5%
Menangle Road to Camden Valley Way	136	6	147	151	4.9	3.3%
Murray Street to Macquarie Grove Road	144	16	173	174	1.8	1.0%
Macquarie Grove Road to Murray Street	144	6	161	170	9.0	5.6%
Menangle Street to Macquarie Grove Road	114	0	114	114	0.0	0.0%
Macquarie Grove Road to Menangle Street	147	0	147	138	-9.3	-6.3%

The above comparison of travel times from existing conditions to future year conditions show generally small changes in terms of seconds of travel time as well as proportions of base travel times in all time periods except for Thursday PM when several of the routes show increases of the order of half a minute and about 20% of the base value. These are still relatively modest increases in travel time.

6.0 Future Option Model – signals at Argyle Street and Oxley Street

Based on a review of the structure of the town centre and key traffic generators, an option was developed which sought to support the pedestrian crossing movements, whilst also facilitating traffic access and departure from the town centre. This entailed:

- Introduction of signal controls at the intersection of Argyle Street and Oxley Street
- Opening access at this intersection to permit right turns out of Oxley Street – which is currently left-in-left-out – but not permit the right turn in from Argyle Street
- Remove the marked foot crossing of Argyle Street between John Street and Oxley Street
- Include pedestrian crossing facilities at in the proposed signals.

To model this, the following modifications were made to the models:

- Removal of foot crossing of Argyle Street between John Street and Oxley Street
- Removal of limited on-street parking on Argyle Street
- Permitting right turn out of Oxley Street to Argyle Street
- Introduction of foot crossing on eastern approach to signals
- Coding of a second lane on the approach of Oxley Street to Argyle Street
- A blocking reduction treatment was introduced on John Street south to reduce the likelihood of vehicles turning into the car park on the east side and west side of John Street inter-locking and blocking access

- No changes were made to the assignment parameters or cost factors within the model. It is possible that, due to the signals at Oxley Street, drivers would perceive Oxley Street to be higher in the hierarchy of streets and a proportion of them may switch from current routes to Oxley Street.

Signal Arrangements

Four phases were used:

- A – Argyle Street runs
- B – all traffic stops and crossing of Argyle Street operates
- C – Oxley Street left and right turn operates and Argyle Street left turn to Oxley Street operates
- D – Argyle Street operates but left turn from Argyle Street to Oxley Street is red

In effect Phase D operates as a late start phase for Phase A, permitting pedestrians to cross Oxley Street. Phase B is in effect also a late start for Phase C, letting pedestrians cross Argyle Street – note, in the model if there are pedestrians still on the crossing at the completion of Phase B, vehicles in Phase C give way to the pedestrians.

The plans used in each of the modelled time periods were:

- Thursday AM CT 102 sec, phase order: A,B,C,D green splits: 56,19,13,12%
- Thursday PM CT 102 sec, phase order: A,B,C,D green splits: 50,23,18,9%
- Saturday AM CT 96 sec, phase order: A,B,C,D green splits: 47,21,17,15%
- Saturday PM CT 90 sec, phase order: A,B,C,D green splits: 53,20,17,10%

Each phase ran in each cycle.

This signal arrangement was used for testing purposes and would require optimisation. On the ground, with SCATS's adaptive logic controlling the signals, it is expected that traffic operations would be more efficient than indicated by the modelling. In particular, the adaptive nature of SCATS means that some phases may not be called in every cycle (depending on demand), and the ability to tailor phase splits (again in response to demand) over time, means that delays would be expected to be lower than indicated by the modelling.

In general the Oxley Street approach cleared every cycle, which largely reflects the volume of pedestrians wishing to cross Argyle Street, requiring phase B/C to be run each cycle.

Due to the length of phase B a second pedestrian crossing of Argyle Street on the western approach to Oxley Street would be accommodated (although not shown in the modelling¹). Similarly, phase D may not be needed if the pedestrians crossing Oxley Street can do so within Phase B; although retaining it would reduce delays to pedestrians.

Any future optimisation of the signal arrangements ought to endeavour to reduce cycle times so that delays to pedestrians are minimised.

¹ For testing purposes we have used one crossing (on the eastern approach) and placed all pedestrian demand on it to see how pedestrians interact and how they manage to cross the road.

Future Model – Thursday AM with Signals at Oxley Street

With the closure of the marked foot crossing west of John Street and the introduction of signals at the intersection of Argyle Street and Oxley Street the southbound queues in Oxley Street almost completely disappear. Eastbound queuing on Argyle Street remains but is more evenly balanced between the new stop line at Argyle and Oxley Streets signals and the western approach to the roundabout at John Street and Argyle Street. This is partly due to the increased distance between the John Street roundabout and the proposed signals at Oxley Street compared with the marked footcrossing. This increased distance permits the storage of another 8 to 12 eastbound vehicles on Argyle Street between Oxley Street and John Street. If these signals are implemented in the real world, with direct SCATS control, it is likely that the situation on Argyle Street would have even shorter queues and lower delays, as signal would timings adapt to traffic conditions.

Future Model – Thursday PM with Signals at Oxley Street

With the introduction of signals at Argyle and Oxley Streets, the southbound queuing in Oxley Street is substantially reduced, with six or seven vehicles as the maximum. This is even though right turn vehicles are now also using Oxley Street. This is a result of changing the mode of control to signals and the additional short left turn lane provided in Oxley Street at its approach to Argyle Street. There is still eastbound queuing on Argyle Street, but in a similar manner to the Thursday AM Model, the queuing between intersections is better balanced than in the Thursday PM model without signals. Of note is that friction from on-street parking in Argyle Street is included in the model. Overall, whilst the signals at Argyle and Oxley Streets tend to introduce more stops and some minor additional delay to Argyle Street traffic², they provide better overall town centre capacity and improved egress of town centre traffic to the west, as well as providing a high quality pedestrian crossing facility of both Argyle Street and Oxley Street.

Future Model – Saturday AM with Signals at Oxley Street

This model runs well with limited queuing and good traffic flow along Argyle Street. The rest of the network operates satisfactorily.

Future Model – Saturday PM with Signals at Oxley Street

As with the Saturday AM model with signals at Oxley Street, this model operates satisfactorily.

The following tables compare travel times through the model with the observed, base model, future model and future model with signals. These are for a single seed value (12345).

² As noted elsewhere the signals have been tested using an arrangement of cycle times and phase settings to provide a robust assessment of performance which provides a high proportion of green time to pedestrians. This has been done on the basis that if the signals work satisfactorily under these conditions then they are most likely to work well in the real world. Consequently, it provides a more negative view of the impact on vehicular traffic.

Table 38 – Comparison of travel times for observed, base model, future model and future model with signals, Thursday AM (seconds)

Travel time movement	Observed avg (s)	Base Modelled Avg (s)	Future Modelled Avg (s)	Future Modelled with Signals Avg (s)
Cawdor Road to Camden Valley Way	169	164	185	194
Camden Valley Way to Cawdor Road	173	152	163	171
Camden Valley Way to Macquarie Grove Road	112	105	109	110
Macquarie Grove Road to Camden Valley Way	105	100	101	103
Camden Valley Way to Murray Street	177	179	185	189
Murray Street to Camden Valley Way	212	180	199	210
Camden Valley Way to Menangle Road	155	149	155	156
Menangle Road to Camden Valley Way	179	147	151	157
Murray Street to Macquarie Grove Road	177	205	222	232
Macquarie Grove Road to Murray Street	196	185	197	195
Menangle Street to Macquarie Grove Road	208	180	190	188
Macquarie Grove Road to Menangle Street	149	170	158	188

Table 39 – Comparison of travel times for observed, base model, future model and future model with signals, Thursday PM (seconds)

Travel time movement	Observed avg (s)	Base Modelled Avg (s)	Future Modelled Avg (s)	Future Modelled with Signals Avg (s)
Cawdor Road to Camden Valley Way	140	163	195	204
Camden Valley Way to Cawdor Road	168	160	177	195
Camden Valley Way to Macquarie Grove Road	98	109	105	107
Macquarie Grove Road to Camden Valley Way	125	102	103	105
Camden Valley Way to Murray Street	200	183	201	215
Murray Street to Camden Valley Way	185	181	218	217
Camden Valley Way to Menangle Road	147	153	167	164
Menangle Road to Camden Valley Way	155	148	165	166
Murray Street to Macquarie Grove Road	163	184	208	225
Macquarie Grove Road to Murray Street	214	180	198	194
Menangle Street to Macquarie Grove Road	182	169	188	184
Macquarie Grove Road to Menangle Street	156	152	158	151

Table 40 – Comparison of travel times for observed, base model, future model and future model with signals, Saturday AM (seconds)

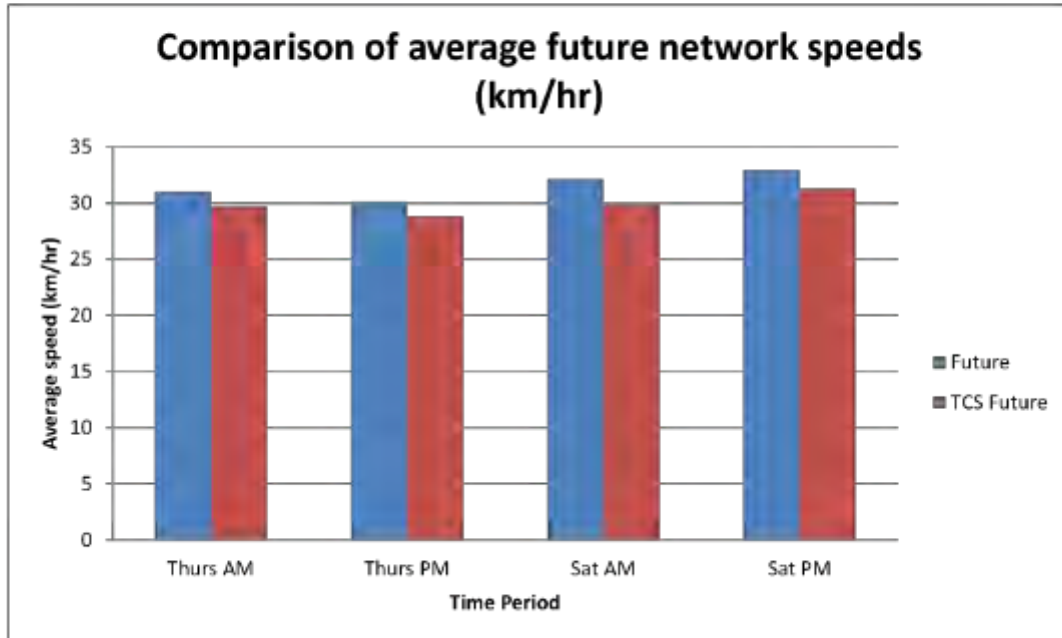
Travel time movement	Observed avg (s)	Base Modelled Avg (s)	Future Modelled Avg (s)	Future Modelled with Signals Avg (s)
Cawdor Road to Camden Valley Way	136	159	168	182
Camden Valley Way to Cawdor Road	141	152	156	167
Camden Valley Way to Macquarie Grove Road	97	103	103	103
Macquarie Grove Road to Camden Valley Way	101	97	101	101
Camden Valley Way to Murray Street	152	178	178	193
Murray Street to Camden Valley Way	183	175	184	201
Camden Valley Way to Menangle Road	NS	NA	154	152
Menangle Road to Camden Valley Way	144	145	190	209
Murray Street to Macquarie Grove Road	131	179	180	185
Macquarie Grove Road to Murray Street	154	162	127	155
Menangle Street to Macquarie Grove Road	127	NA	144	145
Macquarie Grove Road to Menangle Street	NS	148	NA	NA

Table 41 – Comparison of travel times for observed, base model, future model and future model with signals, Saturday PM (seconds)

Travel time movement	Observed avg (s)	Base Modelled Avg (s)	Future Modelled Avg (s)	Future Modelled with Signals Avg (s)
Cawdor Road to Camden Valley Way	126	150	156	173
Camden Valley Way to Cawdor Road	127	146	152	164
Camden Valley Way to Macquarie Grove Road	189	102	106	107
Macquarie Grove Road to Camden Valley Way	100	100	105	98
Camden Valley Way to Murray Street	150	173	172	189
Murray Street to Camden Valley Way	145	172	173	193
Camden Valley Way to Menangle Road	148	142	144	145
Menangle Road to Camden Valley Way	136	147	151	144
Murray Street to Macquarie Grove Road	144	173	174	190
Macquarie Grove Road to Murray Street	144	161	170	176
Menangle Street to Macquarie Grove Road	114	114	114	136
Macquarie Grove Road to Menangle Street	147	147	138	145

In general the above four tables indicate that the signals would introduce small additional delays into the traffic network. With signal optimisation using SCATS on the ground, it is likely that these increases in travel times would be lower than indicated above. Given the advantages of the proposed signals at Argyle Street and Oxley Street, these minor delays would be more than offset by the high quality pedestrian crossing, the better egress to the west for town centre traffic and the greater stability of eastbound traffic along Argyle Street between Murray Street and John Street.

As an indication of overall network performance the following chart compares future average network speeds with and without the implementation of traffic signals (TCS) at the intersection of Argyle Street and Oxley Street.



The chart indicates small reductions in average network speeds with the implementation of traffic signals. This is to be expected, as signals tend to introduce stops along the main road where previously vehicles had priority. The purpose of the chart is to indicate that, despite the introduction of these signals, there is only a small impact on overall network performance. In terms of considering alternatives, as indicated elsewhere, the current marked foot crossing of Argyle Street is unlikely to remain for the medium to long term. From an economic appraisal perspective the future case in the above chart (i.e., the existing road network with future traffic growth) would not be the base case against which to compare the effects of signals at Argyle Street and Oxley Street.

ORD06



Attachment 1

Appendix D Option Assessment Matrix

Strategic assessment of options

Camden Town Centre

This appendix considers potential options for re-configuration of Camden's road network. These are considered in terms of their objectives, advantages and disadvantages using a strategic approach which focusses on the concepts involved.

The main features of the town centre are:

- Grid pattern network, with a fairly large grid size. The central block bounded by Argyle Street, Elizabeth Street, Mitchell Street and John Street is approximately 240 m east west and 230 m north south.
- The roads are relatively large – Argyle Street is two-lanes in each direction, reflecting its long past function as the main Sydney-Melbourne Road, which largely ceased in the 1970s with the opening of the Camden Bypass, and was further reduced with the subsequent opening of the Hume Freeway.
- Argyle Street and to the north, the land is gently graded, whereas south of Argyle Street approximately east of Oxley Street rises to the south.

The traffic surveys indicated that:

- Mid-block volumes on Argyle Street (existing and future) would be accommodated within the current configuration and that they were generally too high during peak periods to permit Argyle Street to be reduced to a single travel lane in each direction.
- That the Argyle Street roundabouts had relatively high u-turn volumes for u-turns for travel along Argyle Street. The size and location of the u-turns varied by peak period, but were evident in all four traffic survey periods. Side roads (John Street, Murray Street, Elizabeth Street and Edward Street) generally had much lower u-turn volumes. Clearly the roundabouts are providing a traffic circulation function which, given limited movements permitted at Argyle Street and Oxley Street and at Argyle Street and Hill Street (both are left in left out), is not surprising.
- The origin destination surveys indicated that through traffic is not the dominant traffic segment into the town centre, although it is a non-trivial proportion of traffic.
- The two marked foot crossings of Argyle Street are heavily used. The western one (between Oxley Street and John Street) has about two-and-a-half times the usage of the eastern one (between John Street and Hill Street) during the surveyed period. Both these crossings are much more heavily used than crossings at the roundabout controlled intersection of Argyle Street (during the Thursday afternoon, only one pedestrian was counted crossing Argyle Street at the John Street roundabout).

There are a range of modifications to the town centre road network that could be considered.

Options include the creation of an inner bypass.

Objectives of this could be to:

- A. Provide traffic relief for Argyle Street in the event that traffic volumes grew beyond the current capacity.
- B. Divert traffic from Argyle Street so that Argyle Street's cross-section could be reconfigured to remove a travel lane in each direction. The freed up road space might be used to widen the footways and possibly to allow for more extensive urban streetscape treatments.

Traffic relief for Argyle Street is unlikely to be required in the medium to long term (Objective A).

Diversion of traffic from Argyle Street could take the following forms:

- A northern bypass using Mitchell Street – notionally this could use Elizabeth Street and John Street (or possibly Oxley Street) as the connecting roads.
- A southern bypass using Hill Street and possibly Broughton Street to the Old Hume Highway; Hill Street and Menangle Road; and, possibly Broughton Street and Barsden Street to Cawdor Road. Using John Street as the diversion road, as opposed to Hill Street, is unlikely to be as effective as it is further west, providing no relief to Argyle Street between John Street and Elizabeth Street.
- A hybrid, which puts eastbound traffic on the Mitchell Street alignment and westbound traffic on the Hill Street/Broughton Street/Barsden Street alignment

The following sketch illustrates the concept of the northern bypass and the southern bypass. The lines are notional sketches, and would be largely confined to existing road reservations with two-way traffic movement along each alignment.



The hybrid alignment is shown in the following sketch.

ORD06

Attachment 1



Using roads further from Argyle Street than the above, such as Exeter Street, which is approximately half a kilometre north of Argyle Street, is considered impractical. Similarly, the use of View Street alignment is too circuitous and unattractive to be used as a bypass (in addition the alignment and adjoining residential land use would not support a bypass function).

Northern Inner bypass

Encouraging/pushing a substantial segment of Argyle Street's traffic onto this alignment:

- From a physical perspective in terms of road widths and roadspace available at key intersections is likely to be accommodated, subject to more detailed investigation;
- Would result in traffic volumes on Mitchell Street exceeding environment capacity thresholds;
- Would result in placing additional traffic past sensitive land uses, such as the two schools on Mitchell Street (currently the sections of Mitchell Street, John Street and Oxley Street that might form part of this alignment are all school speed zones (subject to 40 km/hr restrictions during school arrival and departure times)
- If further development were to take place to the north of Mitchell Street, this traffic diverted to Mitchell Street would increase severance effects and discourage integration of

activity with the core of the town centre – it would increase severance between Camden Public School and the core of the town centre, including access to the library; and between St Paul's Primary School and Camden Pool and Onslow Park

- Would require a substantial increase in delays along Argyle Street in order for drivers to use Mitchell Street.

Southern inner bypass

Encouraging substantial additional traffic volumes to use Hill Street:

- is in conflict with the current use of Hill Street as an access road to local retail and commercial services;
- Hill Street and Broughton Street east of John Street is relatively narrow and subject to grades;
- On-street parking in Hill Street would need to be reviewed, adjusted, and some would be lost;
- The additional traffic on Hill Street would make access to/from the existing off-street car park less attractive, as delays would increase;
- As traffic volumes increase on this alignment, travel times and delays would increase relatively quickly due to the lower standard of road and relatively simple intersection arrangements, such as at John Street and Broughton Street – the increase in delays at this intersection for vehicles trying to turn right from John Street to Broughton Street may be sufficient to encourage that traffic segment to use Argyle Street as an alternative;
- To support traffic to and from Cawdor Road
- To achieve sufficient traffic relief for Argyle Street would:
 - Most likely result in environmental capacity thresholds being exceeded along part or all of the alignment;
 - Would require a substantial increase in costs (additional travel times and delays) to be imposed on drivers using Argyle Street.

Hybrid inner bypass

The hybrid option would tend to reduce the impacts of the additional traffic through diffusion across two alignments. However, environmental thresholds would still be exceeded, and the severance effects, etc; would now impact almost the entire town centre core's edge.

All three of the above would require significant increases in costs (higher travel times and delays) to be incurred by vehicles using Argyle Street in order for drivers to consider diverting. This is a major issue and would face a number of hurdles. Over time, as traffic volumes increase on Argyle Street, some traffic will divert to use alternatives. However the amount that diverts is expected to be modest – primarily because alternative routes would, in their current form, experience a relatively rapid increase in costs as the volumes they try to process increase. An additional 150 to 200 vehicles per hour each way along the current Mitchell Street alignment, would see substantial increases in queues and delays (as well as likely breaching environmental capacity thresholds). This broad order of traffic diversion would not be sufficient to remove a travel lane in each direction on Argyle Street.

Consequently, the diversion of substantial traffic volumes from Argyle Street (i.e., sufficient to leave a single travel lane in each direction on Argyle Street) to alternative routes is unlikely to be achieved without actively increasing delays on Argyle Street. This could take a number of forms, including narrowings, partial closures, etc; The introduction of a 40km/hr high pedestrian activity scheme along Argyle Street could reduce the use of Argyle Street marginally, as it would reduce traffic speeds and increase travel times by a small amount (due to the roundabouts and parking activity on Argyle Street it is unlikely that this reduction in sign posted speed limit would substantially alter the overall travel time along Argyle Street – although it would be expected to reduce peak speeds)¹.

From a practical perspective, the associated increase in road user costs associated with this sort treatment would most likely result in a road user cost benefit analysis of the scheme indicating a negative net present value and a benefit cost ratio of something less than unity. Obtaining funds for the works may, therefore, prove difficult. As the diversion route (Mitchell Street) would increase the distance of travel by 400m, and would increase delays at intersections and car park access points along the way (and on Argyle Street), it is most unlikely that the higher road user costs could be offset by the value of the improved amenity along the core of Argyle Street².

Opportunities for improvement

An approach that encourages vehicles to use alternative routes and minimises circulating traffic would provide benefits for Camden. Argyle Street would remain the key traffic route through town, with better sign-posting of car parking facilities and greater turnover of car parking spaces, drivers would turn from Argyle Street earlier and access the car parks, rather than trawling along the length of the main street, u-turning and coming back along the other side. There is also an opportunity to reduce travel along Argyle Street as a result of improving egress from Oxley Street to Argyle Street, better serving the Oxley Street precinct

¹ It is understood that Council has commissioned an investigation of a High Pedestrian Activity Study, which would provide further advice about the degree of speed reduction that could be achieved by such a scheme.

² If Argyle Street were heavily congested and if the alternative route was not as circuitous, then it may be more likely that increases in road user costs would be modest and that the relatively smaller disbenefit to road users could be offset by arguments about improved main street amenity.



ORD06

Appendix E SIDRA Assessment of Future Conditions

Attachment 1



ORD06

Appendix E: SIDRA Assessment of Future Conditions

The following presents the assessment of future conditions based on a 30% increase growth scenario as described in Section 4 of this report.

Intersection Operating Conditions

The existing intersection operating conditions are presented again below.

Attachment 1



Table 1 - Thursday & Saturday AM / PM Existing Intersection Operating Conditions

Street 1	Street 2	Existing Thursday AM			Existing Thursday PM			Existing Saturday AM			Existing Saturday PM		
		LO	Delay (secs)	S	LO	Delay (secs)	S	LO	Delay (secs)	S	LO	Delay (secs)	S
Macquarie Grove Road	Exeter Street	A	10.5	A	10.3	B	18.2	A	9.2				
John Street	Mitchell Street	B	15.4	B	14.6	A	11.2	A	10.7				
Elizabeth Street	Mitchell Street	A	11.3	A	10.8	A	9.5	A	9.4				
Argyle Street	Murray Street	B	20.4	B	14.7	B	15.3	A	13.1				
Argyle Street	Oxley Street	B	18.2	B	15.3	A	13.9	A	12.3				
Argyle Street	John Street	B	18.3	B	20.5	B	14.8	A	14.0				
Argyle Street	Hill Street	B	14.7	B	18.4	A	12.8	A	12.0				
Argyle Street	Elizabeth St	B	14.8	B	15.7	A	13.9	A	13.7				
Argyle Street	Edward Street	B	15.3	B	16.7	B	14.7	A	13.1				
Murray Street	Broughton Street	B	25.6	D	43.3	B	19.1	B	20.1				
John Street	Broughton Street	A	12.0	B	14.4	A	10.5	A	10.0				
Cawdor Road	Sheathers Lane	B	14.5	B	15.1	A	14.3	B	14.3				
Old Hume Highway	Menangle Road	B	27.3	C	36.2	B	20.5	B	22.0				

ORD06



As can be seen from Table 1, all intersections currently operate satisfactorily in all peaks assessed except for the intersection of Murray Street / Broughton Street which operated near capacity in the Thursday PM peak. However, this is directly attributed to the small number of right turn movements (some 10 vehicles) being delayed exiting Broughton Street.

The additional traffic generated by a 30% yield and taking into account future traffic conditions has been assessed. The following presents the future intersection operating conditions in both tabulated and diagrammatic form.

Attachment 1



Table 2 - Thursday & Saturday AM / PM - Future Intersection Operating Conditions

Street 1	Street 2	Future Thursday AM			Future Thursday PM			Future Saturday AM			Future Saturday PM		
		LO	Delay (secs)	S	LO	Delay (secs)	S	LO	Delay (secs)	S	LO	Delay (secs)	S
Macquarie Grove Road	Exeter Street	A	11.1	A	10.7	A	10.8	A	10.8	A	9.4	A	9.4
John Street	Mitchell Street	B	18.7	B	22.2	A	11.5	A	11.5	A	11.4	A	11.4
Elizabeth Street	Mitchell Street	A	11.9	A	11.4	A	9.8	A	9.8	A	9.6	A	9.6
Argyle Street	Murray Street	F	>120	B	18.9	B	18.6	B	18.6	B	14.7	B	14.7
Argyle Street	Oxley Street	C	29.1	B	22.7	B	17.3	B	17.3	B	14.4	B	14.4
Argyle Street	John Street	B	27.2	F	>120	B	16.4	B	16.4	B	14.9	B	14.9
Argyle Street	Hill Street	B	18.2	B	28.7	B	14.1	A	14.1	A	13.0	A	13.0
Argyle Street	Elizabeth St	B	16.3	B	18.0	B	14.2	A	14.2	A	14.0	A	14.0
Argyle Street	Edward Street	B	17.3	B	19.8	B	15.4	A	15.4	A	13.5	A	13.5
Murray Street	Broughton Street	C	38.5	F	110.0	B	23.8	B	23.8	B	26.4	B	26.4
John Street	Broughton Street	A	13.6	B	20.6	A	11.2	A	11.2	A	10.5	A	10.5
Cawdor Road	Sheathers Lane	B	15.8	B	15.7	B	14.6	B	14.6	B	14.6	B	14.6
Old Hume Highway	Menangle Road	D	44.4	C	29.6	B	27.0	C	27.0	C	30.2	C	30.2

*Modified intersection



Smart Consulting

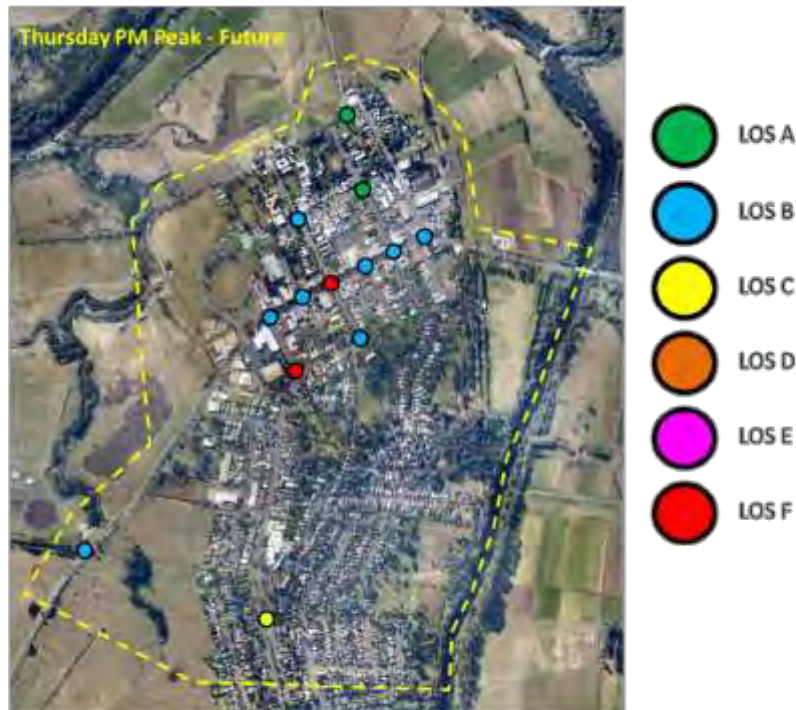
ORD06

Attachment 1

Figure 56 - Thursday AM Peak Future Intersection Operating Conditions



Figure 57 - Thursday PM Peak Future Intersection Operating Conditions





Smart Consulting

Figure 58– Saturday AM Peak Future Intersection Operating Conditions

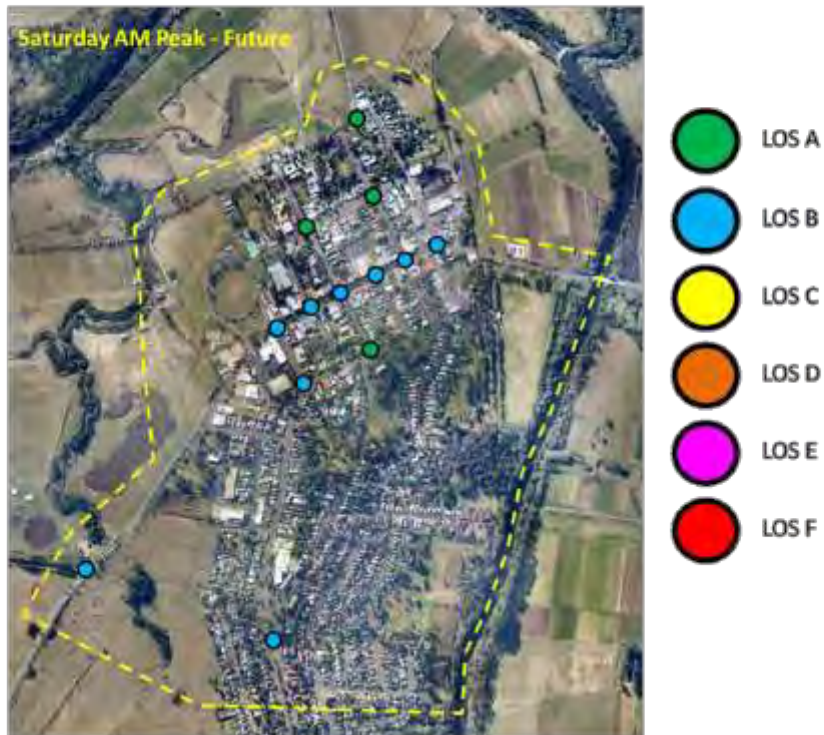
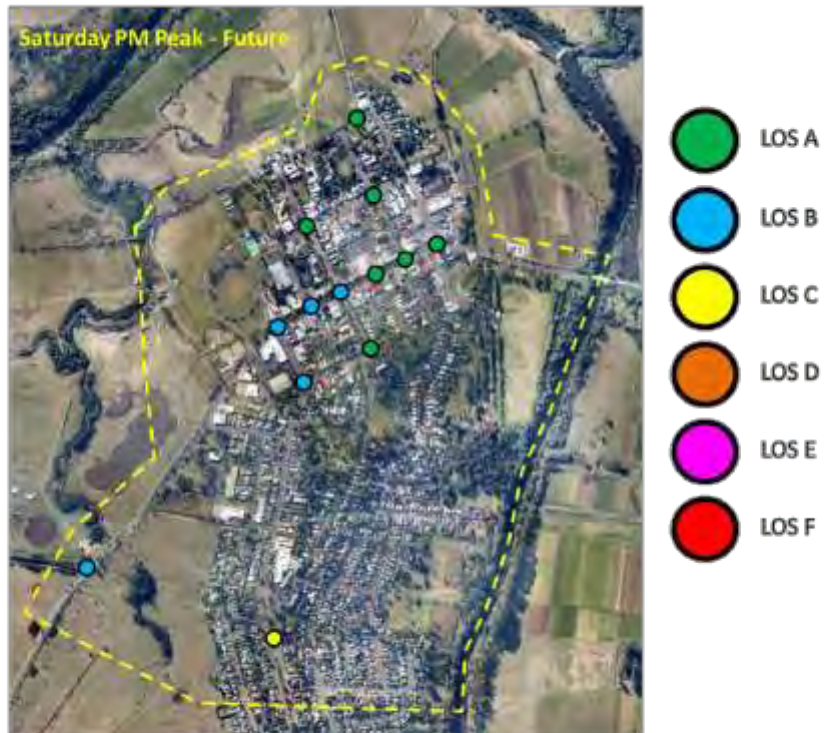


Figure 59 – Saturday PM Peak Future Intersection Operating Conditions





Smart Consulting

ORD06

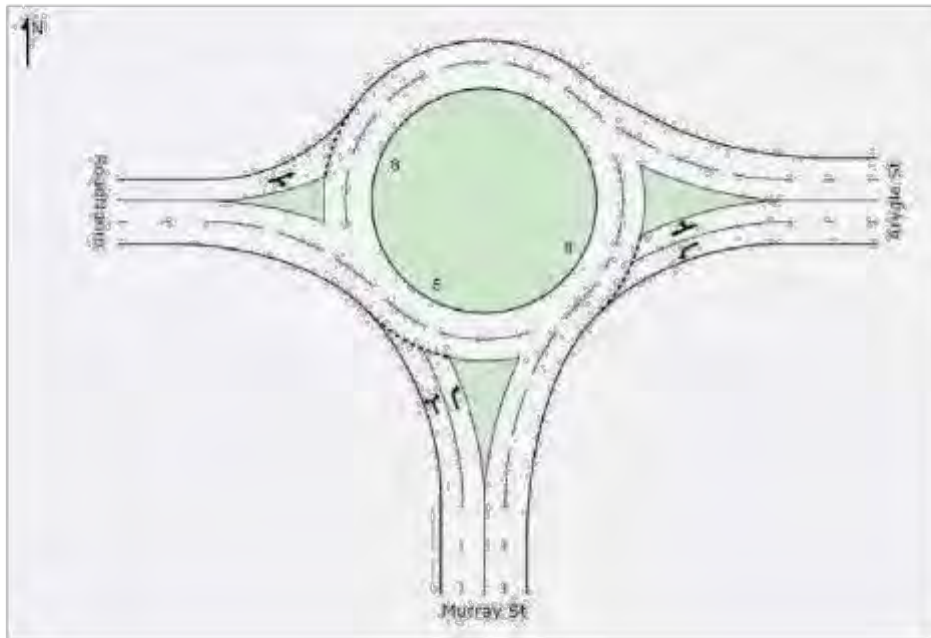
Having regard to the future conditions presented above, the following locations were identified for additional assessment:

- Argyle St / Murray Street – Thursday AM Future LOS F
- Argyle St / John Street – Thursday PM Future LOS F
- Murray Street / Broughton Street – Thursday PM Future LOS F

Argyle Street / Murray Street

The existing layout and resultant LOS for each movement at the intersection during the Thursday PM peak period in the future is shown below.

Figure 60 – Argyle Street / Murray Street Modelled Configuration

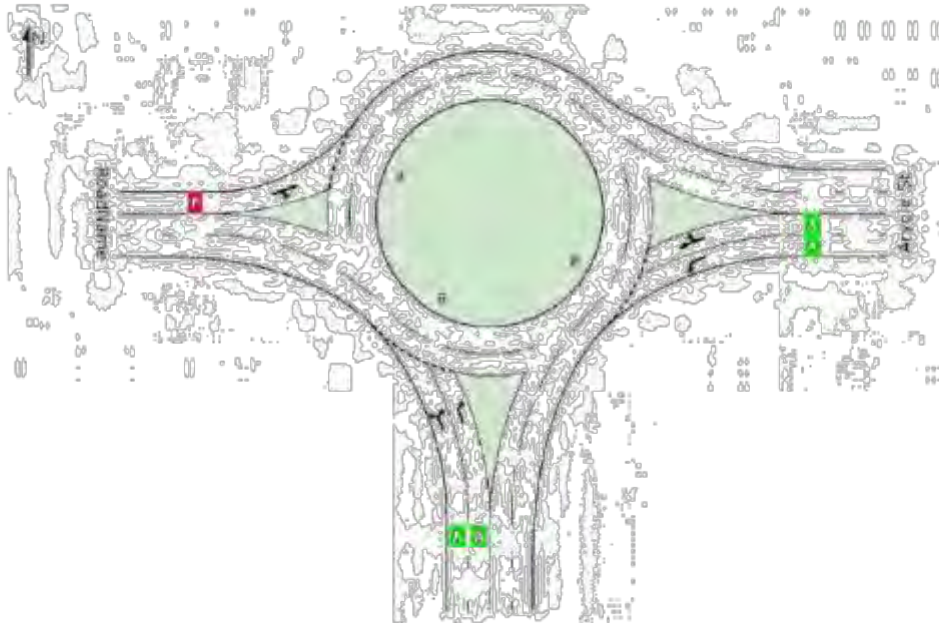


Attachment 1



Smart Consulting

Figure 10 – Argyle Street / Murray Street Thursday AM Future LOS by Movement



From Figure 61 it can be seen that the LOS of F is attributed to the eastbound through / right turn lane whereas all other movements operate very well.

The existing arrangements are shown below:

Figure 62 – Argyle Street / Murray Street Existing Arrangements

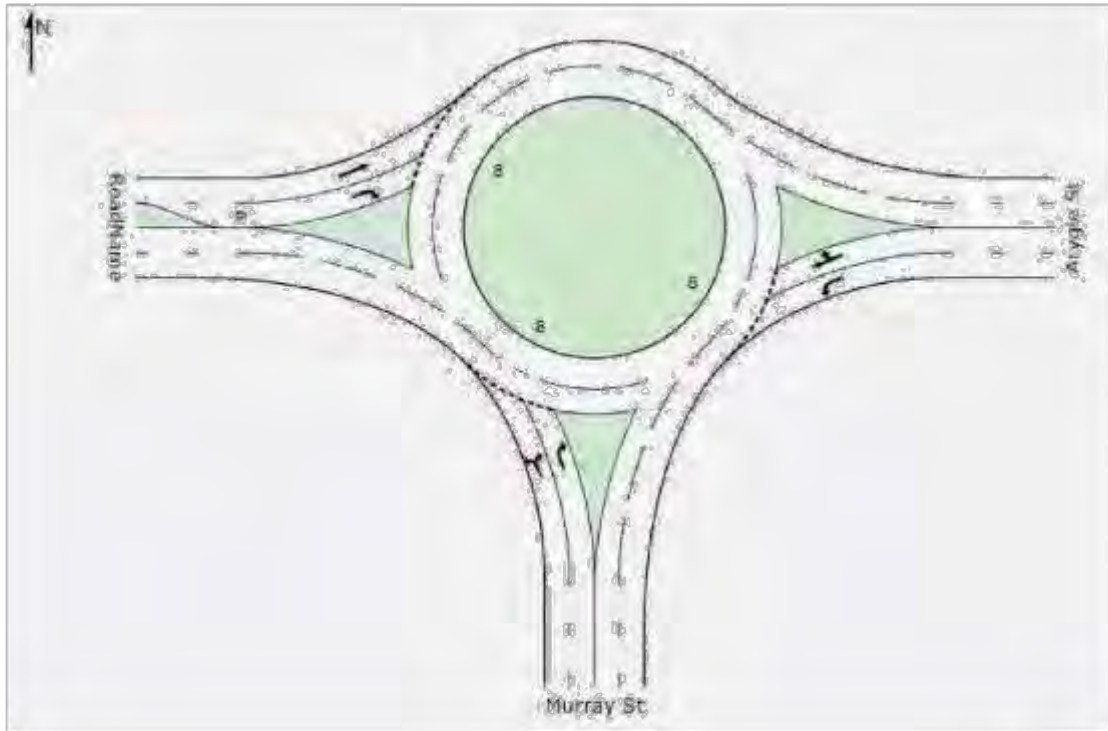


ORD06

Attachment 1

The existing arrangement allows an eastbound through movement to pass through the roundabout immediately following a right turn movement into Murray Street commencing their turn. SIDRA is highly sensitive to these situations and a minor change can change the LOS estimates. To account for the actual existing arrangements, the following modified layout was adopted:

Figure 63 – Argyle Street / Murray Street Modified Modelling Arrangement

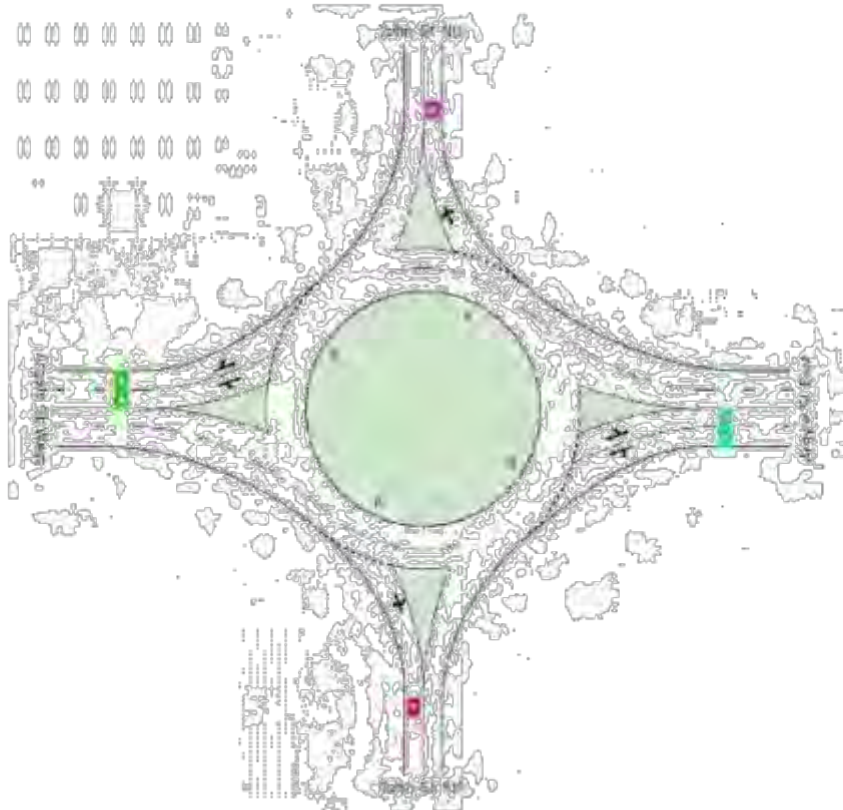


The above arrangement shown in Figure 63 results in a LOS 'B' with delay of the worst movement being 18.7m seconds. Thus no upgrades are considered necessary to accommodate future traffic flows in the Thursday PM peak or at any other peak period assessed.

Argyle Street / John Street

The modelling of the existing roundabout for the future Thursday PM peak indicated the intersection would operate at a LOS "F". The following shows the LOS by movement during this peak.

Figure 64 – Argyle Street / John Street Thursday PM Peak Future LOS by Movement



From **Figure 64** it is noted that the exit flows from John Street south are resulting in the intersection being classified as LOS "F". This would occur if the 30% development yield increases were achieved well into the future.

As stated in Section 7.2.3 there are many benefits to retain the existing roundabout. Therefore as issues only occur during one peak period well into the future and are generated by side street traffic, it is suggested that signalisation of the roundabout could occur at times when it is required. The traffic signals would operate on as needs basis and would be triggered by queuing in John Street south.

It is also suggested that the LOS at the intersection be assessed into the future to gauge whether the potential flows and delays for John Street south traffic do eventuate or whether travel patterns change over time.

Murray Street / Broughton Street

Modelling indicates that the intersection would operate at a LOS "F" in the future Thursday PM peak. The LOS by movement is presented below.

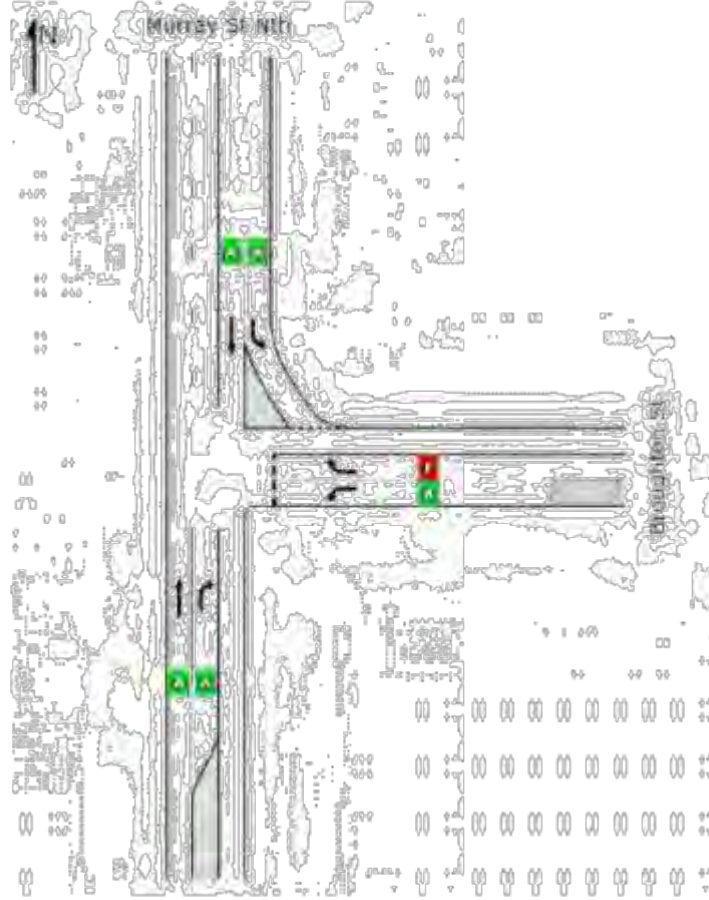


Smart Consulting

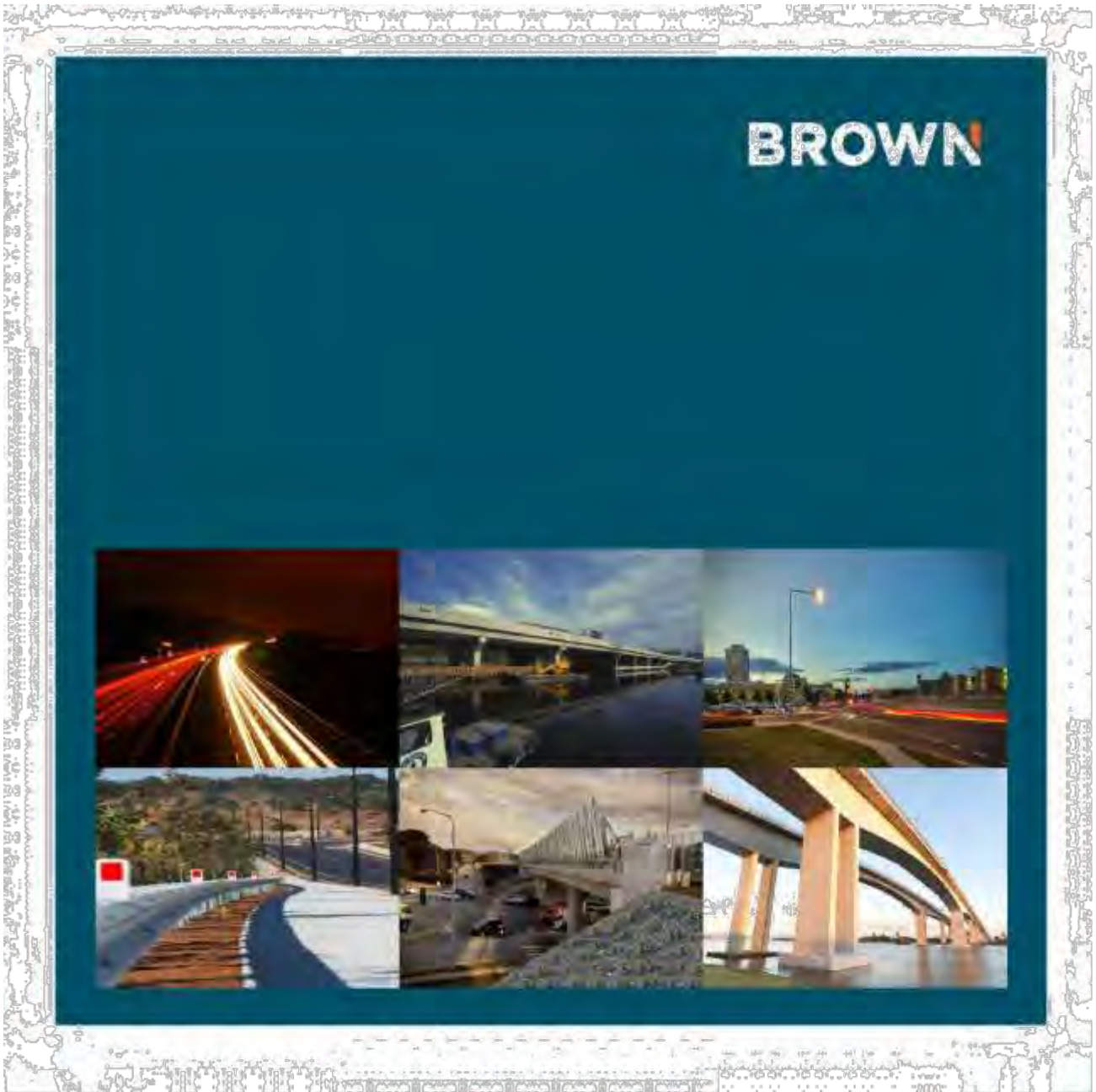
ORD06

Attachment 1

Figure 65 – Murray Street / Broughton Street Thursday PM Peak Future LOS by Movement



As stated in Section 7.3.5 a single lane roundabout at the location would assist right turn movements from exiting Broughton Street. The provision of a single lane roundabout at the location would result in an intersection operating conditions of LOS "B" with delay of the worst movement of 16.6 seconds.



Camden Town Centre

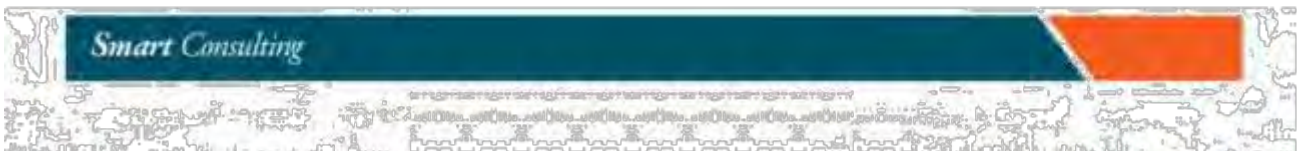
Multi-Storey Car Park Study



April 2014

Reference Number: X13060.01

Prepared for Camden Council





ORD06

COMMERCIAL IN CONFIDENCE

All intellectual property rights, including copyright, in designs developed and documents created Brown Consulting NSW Pty Ltd remain the property of this company. Any use made of such design or document without the prior written approval of Brown Consulting NSW Pty Ltd will constitute an infringement of the rights of the company which reserves all legal rights and remedies in respect of any such infringement.

The information, including any intellectual property, contained in this proposal is confidential and proprietary to the Company. It may only be used by the person to whom it is provided for the stated purpose for which it is provided and must not be imparted to any third person without the prior written approval of the Company. The Company reserves all legal rights and remedies in relation to any infringement of its rights in respect of its confidential information.

©

Brown Consulting (NSW) Pty Ltd
 Level 2, 2 Burbank Place
 Norwest Business Park
 PO Box 8300
 BAULKHAM HILLS BC NSW 2153

Ph: (02) 8808 5000

Attachment 2

DOCUMENT CONTROL

X13060.01

Issue	Date	Issue Details	Author	Checked	Approved
A	27/03/14	Draft Report	FR	JA	PL
B	09/04/14	Final Report	FR	JA	PL
C	11/04/14	Final Report	FR	JA	PL
D	09/05/14	Comments from meeting 06/05/14	FR	JA	PL



Smart Consulting

Table of Contents

Multi-Storey Car Park Study.....	0
Table of Contents	2
List of Tables	3
1 Introduction	4
1.1 Objectives of the Study	5
1.2 Camden Town Centre Multi-story Car Park Feasibility Study	5
1.3 Car Park Design Options Report.....	5
1.4 Traffic & Transport Study – Brown Consulting	8
2. Previous Studies.....	9
2.1 Camden Town Centre Strategy – June 2008.....	9
2.2 Camden Contributions Plan	9
2.3 Proposed Deck Car Park at Lot 26 DP 624557 and Lot 15 DP 235365 John Street & Murray Street, Camden	11
2.4 Traffic & Transport Study Prepared By Brown Consulting.....	11
3. Car Park Location - Options Analysis.....	14
3.1 Option 1 – John Street Car Park.....	14
3.2 Option 2a – Oxley Street Car Park	19
3.3 Option 2a – Oxley Street/ Mitchell Street Car Park	23
3.4 Car Park 3 – Larkin Place Car Park.....	26
3.5 Car Park 4 – Hill Street Car Park.....	32
4. Multi-Storey Car Park Assessment.....	38
4.1 Preliminary Yield & Cost Estimate	38
4.2 Assessment Matrix Criteria	41
5. Summary	42
6. Recommendation.....	44
Appendix A: Heritage Items.....	45
Appendix B: Option Analysis Matrix.....	46

List of Tables

Table 1:	Estimated Yield & Cost.....	38
Table 2:	Potential Cost per Additional Space	39

List of Figures

Figure A-1:	Study Area	4
Figure A-2:	Decked Car Park Locations	10
Figure A-3:	John Street Gateway Precinct Scheme	12
Figure A-4:	Location Map of the John Street Car Park	14
Figure A-5:	John Street Car Park Photos	15
Figure A-6:	Pedestrian Link to Argyle Street	16
Figure A-7:	Access to John Street (Footpath on one side only)	16
Figure A-8:	Driveway to Residential Units	17
Figure A-9:	John Street car park - benefits and constraints	18
Figure A-10:	Oxley Street Car Park	19
Figure A-11:	Oxley Street Car Park Photos	20
Figure A-12:	Pedestrian Link to John Street	21
Figure A-13:	Oxley Street Car Park – Benefits & Constraints	22
Figure A-14:	Oxley Street / Mitchell Street Car Park	23
Figure A-15:	Oxley Street / Mitchell Street Car Park Photos	24
Figure A-16:	Oxley Street / Mitchel Street Car Park – Benefits & Constraints	25
Figure A-17:	Larkin Street Car Park	26
Figure A-18:	Larkin Street Car Park Photos	27
Figure A-19:	Pedestrian Access to Argyle Street	28
Figure A-20:	Access to John Street (No Footpath)	28
Figure A-21:	Access to Elizabeth Street (Inadequate Footpath)	29
Figure A-22:	Pedestrian Access to School	30
Figure A-23:	Larkin Place Car Park – Benefits & Constraints	31
Figure A-24:	Hill Street Car Park	32
Figure A-25:	Hill Street Car Park Photos	33
Figure A-26:	Access to John Street (Inadequate Pedestrian Path)	34
Figure A-27:	Access to Commercial Lots	35
Figure A-28:	Pedestrian Access to Argyle Street	36
Figure A-29:	Proximity to Adjoining Properties	37
Figure A-30:	Option 2a – Car Park Footprint	39



Smart Consulting

1 Introduction

Camden Council has engaged Brown Consulting to undertake an in-depth assessment of the possibility of constructing a multi deck car park as an extension of the Camden Town Centre - Traffic and Transport Study. The report details previous documentation regarding the proposed deck car park, assessment of possible site locations and a recommendation for the future location in view of the studies. Currently within Camden there are five public car park within the central town centre that gain access to Argyle Street via both public and private walkways and roads. This report through analysis of previous reports, fieldwork and existing planning controls reviews the location for a multi deck car park, within the town centre.

The assessment will form the basis in which a new multi-story car park, proposed to be constructed by Council, will be located, through a multi-criteria comparison of a number of locations for the multi-storey car park.

The study area subject to the investigations in this report is shown in Figure 1.

Figure A-1: Study Area



Source: Camden Town Centre Traffic & Transport Study



1.1 Objectives of the Study

The objective of this study is to examine all potential locations for a multi deck car park by carrying out a range works. These works include:

- Reviewing past reports and meeting notes to understand previous issues with the multi deck car park which need to be addressed in future decisions.
- Assess possible sites locations for the multi deck car park including the existing public car parking areas at Murrays / John Streets, Oxley Street, Oxley Street (Woolworths), Larkin Place and John/Hill Streets.
- Provide a justified recommendation for the most suitable site for the construction of a multi decked car park.

1.2 Camden Town Centre Multi-story Car Park Feasibility Study

In March of 2002 Halliburton KBR Pty Ltd prepared a Car Park Feasibility Study for a Multi-Storey Car Park for Camden Council. The study was prepared on behalf of Camden Council to provide an assessment of the car parking situation in the Camden Town Centre and in particular to assess if Council should construct a multi-level car park to service the growing needs of the Camden Town Centre. The report was to provide a recommendation for the location of a new car park and recommendations for funding mechanisms for the construction of this car park.

The report considered two locations within the Camden Town Centre for the multi-levelled decked car park, with these being the John/Murray Street and the Larkin Place site. The John/Murray Street option would provide approximately 110 spaces whereas the Larkin Place site would provide approximately 130 spaces. The Larkin Place site had the potential for a larger net revenue and included larger building footprint as compared to the John/Murray Street site. The Halliburton KBR Report identified the Larkin Place site as the preferred location for the future decked car park, however Council lodged a development application for the John/Murray Street site.

1.3 Car Park Design Options Report

In 2005, Camden Council considered a report that presented design options and costing, prepared by Kann Finch Pty Ltd, for the development of a decked car park at John Street Car Park, Camden. It was resolved that:

1. Further consideration of this matter be deferred pending further investigations;
2. Tenders be called for concept design services for a decked car park in Larkin Place with the architectural design brief to incorporate those elements included in the previous brief for the John/Murray Street car park; and
3. The tender process be undertaken as a matter of urgency and that Council Officers report back on the outcome as soon as possible.

Following Council's resolution, the report was subsequently presented to Council with the findings of an investigation into the possible development of a decked car park at Larkin Place, Camden. The information contained in the report provides a direct comparison with previously presented options for the



Smart Consulting

development of a decked car park at the alternate John/ Murray Street site. The report further seeks Council's direction on the preferred site for the future development of the proposed decked car park.

In February 2006, Council resolved that:

1. Council adopt John Street as the preferred site for the development of the Camden decked car park;
2. Council initiate all measures necessary to pursue the detailed design and documentation for an unroofed proposal of the John Street decked car park in preparation for the construction of the facility;
3. Construction of the John Street decked car park be rescheduled for 2007;
4. Council notify all stakeholders of the decision; and
5. Necessary additional funding of \$1.1m be sourced from a combination of Council's Capital Works Reserve and external loan borrowings.

Following the Council's resolution, a Development Application for the construction of multi-decked car park at John Street site was submitted to Council. At its meeting on 10 July 2006, Council resolved that Development Application No 421/2006 at Lot 26 DP624557 and Lot 15 DP235365 John Street and Murray Street, Camden, for a proposed decked car park be refused for the following reasons:

1. The proposed development is inconsistent with the objectives, strategies and aims of Camden 2025 for managing urban growth as they relate to preservation and enhancement of the heritage character of Camden Town;
2. The proposed development is inconsistent with the following aims of Camden LEP 45:
 - a. To encourage the conservation of historic buildings and precincts; and
 - b. To protect significant vistas towards St. Johns church;
3. The proposed development is inconsistent with objective (b) of the applicable 3(e) Town Centre Zone under Camden LEP 45 to maintain and enhance the historic character of Argyle, Hill and John Streets in the town centre;
4. The proposed development is unsatisfactory when having regard to the following design considerations of clause 13 of Camden LEP 45:
 - a. Whether the development will detract from significant existing views and vistas.
 - b. Whether the development is of a type, scale, design and character that complements the established character of the centre, having regard to the particular character of the particular part of the town centre in which the development is proposed to be carried out;
5. The proposed development does not comply with clause 14(1) of Camden LEP 45 by reason that it exceeds a height of 7metres and will unnecessarily and unreasonably intrude upon:
 - a. An item of the environmental heritage;
 - b. The existing character of buildings in the locality; and
 - c. Significant streetscapes or vistas;
6. Having regard to clause 20 of Camden LEP 45, the proposed development would have an unsatisfactory effect on the heritage significance of the St. John's Hill Heritage Conservation Area;
7. The design of the proposed development presents an unsatisfactory crime and safety risk when having regard to safer by design principles; and
8. In light of the above reasons for refusal, the proposed development is not considered to be in the public interest.



Clive Lucas, Stapleton & Partners Pty Limited ('Lucas Stapleton'), Architects and Heritage Consultants were commissioned by Camden Council to prepare a Statement of Heritage Impact (SOHI). This statement provided an analysis for the proposed car park at the John/Murray Car Park site. Any proposed car park deck within the Camden Town Centre needs to be in accordance with the guidelines proposed by Lucas Stapleton Architects and Heritage Consultants. The assessment of the guidelines and SOHI comments in relation to the John/Murray Car park are summarised in the points below:

- Building – “the proposed car park design does not include a roof and there is no evidence to demonstrate that it cannot be seen from the outskirts of the town. The general plan of the car park has a good concept, however the height and elevation of the building is of high concern. From the information provided the decked car park is presumably highly visible from the countryside around Camden town. The proposed decked car park, as is, would have a major impact on the historic town.”
- Typology and Form – “The proposed design for the car park is not consistent with the suggested building form. The building floats above the ground and looks unfinished. This is without precedent in Camden’s historic town. The external walls must go to the ground. The concept of breaking the proposed car park design into bays, similar to the grain of the town, is however a commendable design.”
- Form – “The proposal includes large light standards with no covering for unwanted spilling light. There is no evidence to demonstrate that light will not be seen from the neighbouring properties or from the outskirts of Camden town.”

The findings of the SOHI considered that the proposal would detract from the significant existing views and vistas and is of a type, scale, design and character that does not satisfactorily complement the established character of the centre. In addition to this the report noted that the John/Murray Car park adjoins the St John’s Hill Heritage Conservation Area and would have had an unsatisfactory effect on the conservation area due to its proximity and its presence in view lines to the area. In summary the SOHI concluded that the John/Murray car park proposal was not acceptable in its form and design as it would have a major impact on the significance of the Camden locality and should not be approved.

In summary the heritage impact on the Camden town centre area for any proposed car park deck needs to be in accordance with these guidelines proposed by Lucas Stapleton Architects and Heritage Consultants. These guidelines include the building design, typology and form. Specific design controls include having a roofed car park so that car park is not highly visible from the main street. The issue of visibility and the built form being designed as an integral part of any future car park to complement the established heritage character of the Camden Town Centre.



Smart Consulting

1.4 Traffic & Transport Study – Brown Consulting

In 2012, Council engaged Brown Consulting to undertake a Traffic and Transport Study for Camden Town Centre. The study was to examine how traffic and transport improvements, can be enhanced within Camden Town Centre to accommodate the current and future needs of Camden. A number of recommendations were made and presented to Council at Councilor's workshop in November 2013. At that workshop, it was resolved that planning for additional town centre car park spaces, including location, timing and costing for a decked car park be carried out.

Council has now requested that Brown Consulting undertake further assessment of a decked car park to supplement the Traffic and Transport Study. The scope of work required includes the following:

- Review previous documentation relating to decked car park:
 - Camden Town Centre Multi-Story Car Park, March 2002 Rev 3, prepared by Halliburton KBR Pty Ltd;
- Review past Council's resolution relating to decked car park and provide solutions to addressing issues raised;
- Assess possible suitable sites within Camden Town Centre for decked car park:
 - John Street;
 - Oxley Street;
 - Oxley Street/ Mitchell Street;
 - Larkin Place; and
 - Hill Street.
- Provide pros and cons for each suitable site;
- Provide a justified recommendation for the most suitable site to construct a decked car park; and
- Strategic Cost Estimate of a decked car park.

The five proposed locations are detailed in Section 4.



2. Previous Studies

A number of studies have previously been undertaken for the Camden Town Centre. The relevant findings of each have been summarised below.

2.1 Camden Town Centre Strategy – June 2008

This strategy was prepared to establish a framework for guiding future development within the Camden Town Centre. In combination with developing partnerships to deliver particular outcomes, the strategy sought to deliver public realm improvements at a cost in the order of \$12.5 million.

The strategy included short, medium and long term costed improvement projects. Overall, the strategy noted the importance of maintaining the character of the Camden Town Centre and devised schemes to balance the accommodation of future development whilst maintaining the town centres character. Of key interest were the proposals for Main Street which included both Argyle Street and John Street. One of the options considered involved improved pedestrian amenity on the footpaths at the expense of kerbside parking. Removal of the central median is not supported with retention of marked foot crossings (MFCs) in Argyle Street for reasons of safety. Widening of the footway and removal of the kerbside parking (39 spaces) is only supported if parking is readily available elsewhere. Of interest the study did not consider public parking either in what form it should take or what provision would be appropriate for the Town Centre

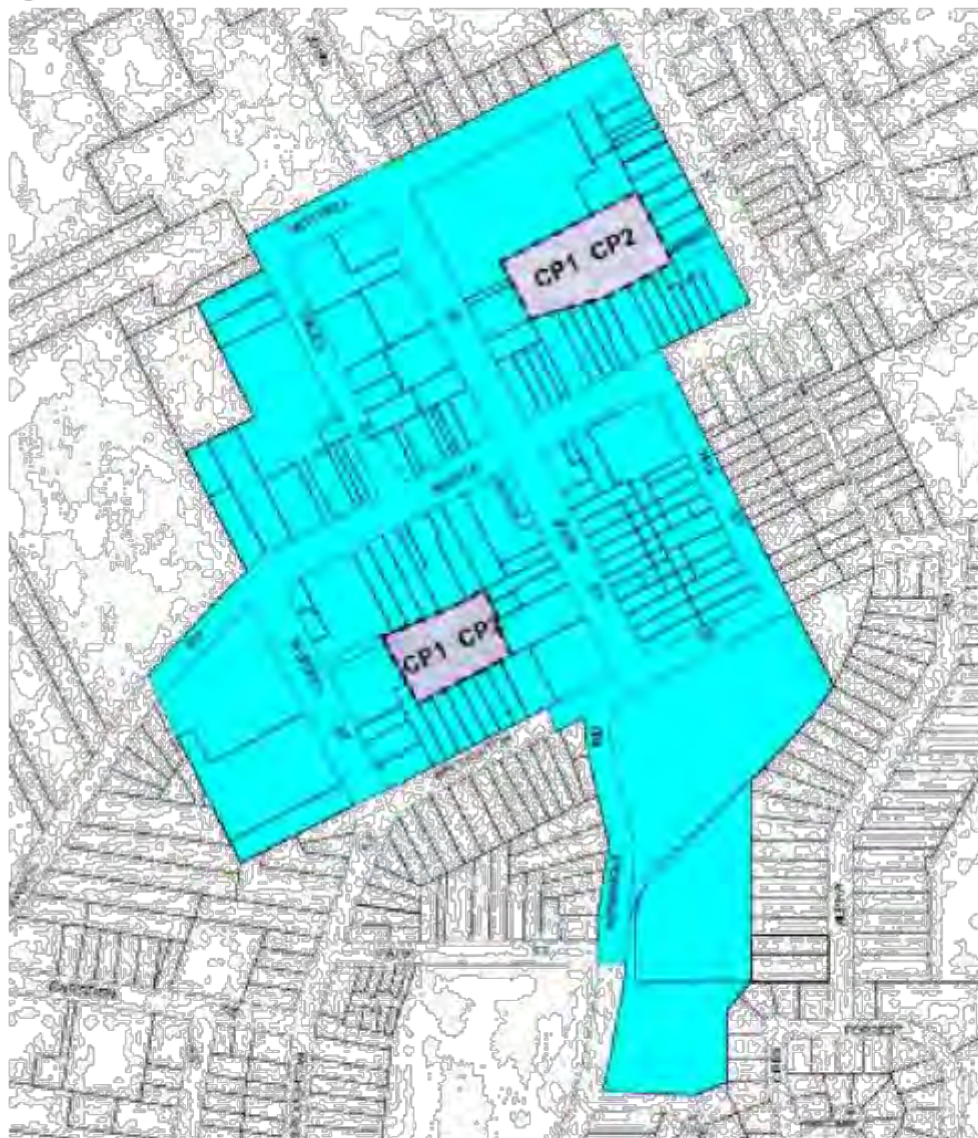
2.2 Camden Contributions Plan

Camden Council adopted a Contributions Plan in 2011 under the Environmental Planning and Assessment Act, Section 94, for the provision of public car parking facilities. The Contribution Plan sets out the need for the provision of public car parking facilities related to expected developments for both Camden and Narellan Town Centres.

Where the entire required car parking provision under the Council's Development Contract Plan may not be able to be provided due to the site constraints, Council will consider whether it is appropriate for the development to contribute toward providing the additional spaces that are required in a central public parking area. The contributions will be used to purchase land, construct car parking at ground level and to augment existing car parks by erecting deck structures.

The Contributions Plan for Camden Town Centre has adopted the provision of a decked car park. The possible sites for the decked car park are identified as in the following figure as Larkin Place and John/Murray streets car parks.

Figure A-2: Decked Car Park Locations



Source: Camden Council Contribution Plan

Council in 2006 resolved to adopt the John/Murray car park as the preferred site for the decked car park structure. The car park site is owned by Council and the Contribution Plan has been prepared on the basis of construction estimates for the deck car park structure.

The analysis for the required car parking spaces in the deck car park was based on a study by Haliburton (2002). That study identified the need for approx. 108 additional spaces based on an estimate of an additional 3,000m² of retail and 1,500m² of commercial floor space for new development in Camden Town Centre to 2021.



2.3 Proposed Deck Car Park at Lot 26 DP 624557 and Lot 15 DP 235365 John Street & Murray Street, Camden

This report submitted to the Ordinary Council meeting held on 10 July 2006 was to allow Council to consider the merits of the application to construct a decked car park at the location of Council's existing car park off John Street and Murray Street. As stated in Section 2.1, two locations are detailed in Council's contribution plan for additional public parking.

The car park in question currently includes some 139 public car spaces. The proposal would have created a two-storey split level car park with provision for a total of 214 cars and 4 motorcycles. Of interest, whilst the location is detailed in the contributions plan, the proposal was rejected by Council (see Section 2) on a number of grounds including inconsistencies with the objective of the Town Centre zone and heritage grounds. It is understood that no further consideration by Council to a deck car park for John & Murray Streets car park had occurred in accordance with the section 94 contribution plan.

2.4 Traffic & Transport Study Prepared By Brown Consulting

The main findings and recommendations in the report are summarised as follows:

Pedestrian Network/ Access

1. Linkages between public car parks are generally confined to through privately owned properties. Further, access ways to/ from Argyle Street and the car parks are poorly delineated and on the southern side of Argyle Street require pedestrians to walk through back of house areas of properties fronting Argyle Street. The access from the Larkin Place car park is of a higher standard with active frontages internally;
2. Throughout peripheral areas of the town centre pedestrian facilities are limited. The wide roads of John Street and Elizabeth Street are not user friendly and require pedestrians to cross long lengths in the path of traffic; and
3. There are generally poor pedestrian connections between the public car parking areas in Oxley Street and Larkin Place.

Additional Multi Storey Car Park – Oxley Street

Whilst not currently considered in the existing contribution plan, the relocation of the Council offices to Oran Park and creation of a civic precinct would allow provision of a multi-storey car park on the existing public car park on Oxley Street.

The proposal to signalise the Argyle Street/ Oxley Street intersection would reinforce this public car park option. A multi-storey car park in this location would not impact upon any major heritage items.



Smart Consulting

Creation of a Civic Precinct

The area north of Argyle Street along John Street is well utilised during major events. Further, the relocation of the Council offices to Oran Park would provide the opportunity to create a civic/marketplace precinct in and around this location. The signalisation of Oxley Street would allow traffic travelling to/ from the west and south west to use Oxley Street public car parking. Traffic from the east and north could still gain access to the Larkin Place car park.

To reinforce the precinct, alternative paving could be considered in John Street which includes delineation of the existing bus stop areas in a holistic approach to improving the area and reinforcing the character of the Camden Town Centre.

A missing link to achieving the above would be a safe crossing facility across John Street linking the two public car parks. It was recommended that either a marked foot crossing with kerb extensions (if warrants are met in the future) or an elongated pedestrian refuge be considered. It should be located directly opposite the pedestrian pathway to the Larkin Place car park. The overall potential scheme is shown as follows:

Figure A-3: John Street Gateway Precinct Scheme



Source: Camden Town Centre Traffic & Transport Study



ORD06

Short, Medium, Long Term Recommendations (Public Parking)

At this stage additional multi-deck car parking is not required to accommodate current demands. However, the report recommends that in the medium to long term, consideration should be given to include the existing Oxley Street public car park in the contributions plan to provide a multi-deck car park in the future. This location was considered the most feasible in terms of limiting impact on surrounding areas. Signalisation of the intersection of Argyle Street/ Oxley Street would be required to maximise the success of a larger car park.

Additional Comments

Brown's report notes that the pedestrian crossings on Argyle Street stretch across two lanes travelling in the same direction. This is generally considered to be unsafe and requires an ameliorative treatment. It is also noted that the warrants for introducing a signalised crossing were met. It is therefore recommended that this treatment be implemented. This recommendation should be implemented whatever the location of the proposed multi-deck car park is proposed.

Attachment 2

3. Car Park Location - Options Analysis

The present study will assess five locations for a proposed multi-storey car park, as follows:

Option 1 - John Street Car Park – South of Argyle Street, between Murray Street and John Street;

Option 2a - Oxley Street Car Park – North of Argyle Street, on the eastern side of Oxley Street;

Option 2b - Oxley Street/ Mitchell Street Car Park – At the south-western corner of the intersection of these two street, north of Woolworths;

Option 3 - Larkin Place Car Park – North of Argyle Street, between Murray Street and John Street;

Option 4 - Hill Street Car Park – located south of Argyle Street, between John Street and Hill Street.

A site visit was undertaken on Thursday 13th March 2014. The observations for each individual car park are described in the following subsections. An important aspect of any proposal for a decked car park is the relationship with any item of environmental heritage that is the context of Camden Town Centre. Appendix A is a composite plan showing the relationship of the properties and environmental heritage to the car park areas.

3.1 Option 1 – John Street Car Park

This car park is bounded by residential properties to the west, south and east and commercial properties to the north. It currently provides 129 car spaces. Vehicular access is provided from John Street to the east and Murray Street to the west. The dominant pedestrian movement is between the car park and Argyle Street through two commercial arcades. There are two heritage items in the vicinity of the car park with these being St John's Hill Conservation Area and an historic cottage. The location of the car park is shown Figure 4 below.

Figure A-4: Location Map of the John Street Car Park



General Layout

The site is bounded by the following land uses:

- The access laneway and rear of shops facing Argyle Street to the north.
- Residential dwellings to the south that face Broughton Street, which also contains a heritage cottage.
- A 3 storey residential flat building to the east, with vehicle access through the public car park.
- Single story office building to the east also with vehicle access through the public car park.

The access road for the car park running from John Street to Murray Street also provides access to several privately owned commercial car parks. Figure 5 below presents photos taken from within the car park.

Figure A-5: John Street Car Park Photos



Pedestrian Access & Safety

The dominant pedestrian movement would continue to be between the car park and Argyle Street. The car park would increase pedestrian movements and require further attention in terms of pedestrian safety. The need for a pedestrian crossing between the decked car park and the commercial car parks should be considered.

It should be noted that the pedestrian link to Argyle Street is via privately owned car parks and commercial arcades. While it is envisaged that maintaining the pedestrian access is in the best interest of the retail stores, the desirability of locating the decked car park at this location is primarily based on the access being maintained. Furthermore, providing the decked car park at this location would intensify the number of pedestrians travelling through the privately owned car parks.

Figure A-6: Pedestrian Link to Argyle Street



A pedestrian footpath between the car park and John Street is only provided along the northern side of the access road. This requires pedestrians to cross the access way in order to travel between John Street and the car park. It is noted that there is insufficient space to provide a footpath along the southern side of the access road. Similarly, only one footpath is provided along the southern side of the access road between the car park and Murray Street.

Figure A-7: Access to John Street (Footpath on one side only)



Access to Residential Units

There is a driveway located within the car park leading to a privately owned residential car park. Access to this driveway needs to be maintained and therefore needs to be included in the design. This is likely to impact on the size of the car park.

Figure A-8: Driveway to Residential Units



Proximity to Residential Properties

This site is within relatively close proximity to residential properties. There are concerns that introducing a decked car park at this location will adversely affect residents in terms of privacy and noise. This concern is anticipated to extend beyond the construction phase. Figure 9 identifies the benefits and constraints associated with a car park located at this site:



Figure A-9: John Street car park - benefits and constraints



ORD06

Attachment 2



3.2 Option 2a – Oxley Street Car Park

The site is bounded by the following land uses:

- The Camden Civic Centre on the corner of Oxley & Mitchell St, with the entrance facing the existing car park.
- Rear of shops facing Argyle Street to the south. Two of these buildings are heritage items however they face the main street rather than the existing car park.
- Civil buildings and heritage items including the Camden Court House, Camden Police Station and Camden Council are to the east of the car park facing John Street.
- Retail buildings including the Woolworths Shopping Centre are to the west.

The car park currently provides 98 car spaces. Vehicular access is via two driveways along Oxley Street and the dominant pedestrian movement is to and from Argyle Street along Oxley Street. It should be noted that while the dominant pedestrian movement is between the car park and Argyle Street, pedestrian movements appear to be more evenly dispersed than other car parks in all directions. This is predominantly due to more commercial lots surrounding the car park including the Civic Centre and the Council building, as well as Woolworths on the western side of Oxley Street. It should also be noted that there are a number of heritage items along John Street and Argyle Street including Camden Court House, Camden Police Station, Camden Council and some retail shops. (See Appendix A for Heritage Items Map)

Figure A-10: Oxley Street Car Park



Figure A-11: Oxley Street Car Park Photos



There are no obvious pedestrian safety concerns surrounding the car park other than the likely intensification of pedestrian movements across Oxley Street. Consideration into providing a pedestrian crossing may be required post-development (i.e. should RMS warrants be met in terms of pedestrian and vehicular volumes).

All pedestrian links associated with this location are Council owned and therefore likely to be maintained. Unlike all other locations, the car park is clearly visible from Oxley Street and will therefore require minimal sign-posting to advise motorists of its location. It should be noted that all other car parks are relatively hidden from the main road, which constitutes an advantage regarding maintaining the aesthetic appeal of the town centre, but makes it difficult to find for motorists unfamiliar with the area.

ORD06

Figure A-12: Pedestrian Link to John Street



It is understood that the Council office will be relocated to Oran Park. As such, the nature of the next tenant, particularly the parking demand, is uncertain. Nevertheless, it is assumed that the parking demand will be in line with general office parking such that the peak parking demand will occur between 9am and 5pm Monday to Friday. It is therefore anticipated that the parking demand will remain relatively unchanged once a new tenant is in place.

The site is relatively surrounded by traffic / parking generating sites within close proximity including the Woolworths on the western side of Oxley street, Council office, several commercial / retail buildings, the sports field and public pools, the Camden Civic Centre as well as Argyle Street. The variety of land uses surrounding the site will generate peak parking demands at different times of the day and week. This will ensure that the car park will rarely be underutilised.

In addition to the above, the potential / likely introduction of a signalisation of the Oxley Street / Argyle Street intersection is likely to increase the parking demand at this location given the introduction of a right turn movement in and out of Oxley Street. Figure 13 identifies the benefits and constraints associated with a car park located at this site:

Attachment 2



Figure A-13: Oxley Street Car Park – Benefits & Constraints



ORD06

Attachment 2

3.3 Option 2b – Oxley Street/ Mitchell Street Car Park

This car park is situated between Mitchell Street to the north, and Oxley Street to the east. Its capacity is 70 car spaces. Access to the car park is gained via Mitchell Street. This car park immediately adjoins the Woolworths car par and provides a connection to this car park. The impact on heritage is very limited except for obstructing views from the historic Onslow Park and War Memorial Pool.

The site is bounded by the following land uses:

- The Camden War Memorial Pool is to the north
- The Woolworths Shopping Centre is situated on the southern boundary of the car park. This is two storey building and does not overlook the car park.
- The Camden Civic Centre to the east.
- Onslow Park is to the west of the subject site.

Figure A-14: Oxley Street / Mitchell Street Car Park





Figure A-15: Oxley Street / Mitchell Street Car Park Photos



Vehicular access is provided through Oxley Street and Mitchell Street, with good access to and from the Town Centre. The car park currently provides 78 spaces. Due to its proximity to Woolworths and its multi-deck car park, there is much ambiguity regarding way finding. The benefits regarding Option 2a are also applicable to Option 2b, although the projected size of a car park in this location would be smaller. In addition, the distance from Argyle Street, which is anticipated the most common origin of motorists, is greater. As such, this car park is anticipated to be the second option where Car Park 2a is observed to be full. Figure 16 identifies the benefits and constraints associated with a car park located at this site:

ORD06

Attachment 2

Figure A-16: Oxley Street / Mitchel Street Car Park – Benefits & Constraints



3.4 Car Park 3 – Larkin Place Car Park

The Larkin Place Car Park is bounded to the north by St Pauls Primary School, commercial lots along the eastern boundary and Larkin Place along the south and western boundaries. The car park's capacity is approximately 151 spaces, not including the 29 spaces along the southern side of Larkin Place. Vehicular access is provided via Larkin Place which links to John Street and Elizabeth Street. The vehicular link provided by Larkin Place is also used by pedestrians. The dominant pedestrian movement is via a commercial arcade that links Larkin Place to Argyle Street. It should also be noted that there are a number of heritage items on this block including St Paul's Church, St Andrews Church, Camden Library (former fire station), and an inter-war flat building (refer to Appendix A).

The site is bounded by the following land uses:

- A Catholic Primary School to the north
- Larken Place Roadway and rear of shops facing Argyle Street to the South
- A two story Bulky Goods Shop and Interwar Flat Building to the east
- Camden Library and Camden Museum and a Church to the west

Figure A-17: Larkin Street Car Park



Figure A-18: Larkin Street Car Park Photos



General Layout

The layout of the car park including pavement type and line marking is similar in appearance to parking along Larkin Place. A proposed car park in this location would not incorporate the parking along Larkin Lane, as it is a public road and should be kept open to public. In addition, Larkin Place consists of 90 degree parking. As such, there is no clear definition of where the car park boundary is located. This will need further consideration should the decked car park be placed in this location. The Larkin Place car park is the largest car park in terms of its area and provides an opportunity to introduce a relatively large car park. It should be noted however, that there are several other constraints that will affect the total yield, design and cost associated with introducing a decked car park.

Pedestrian Access & Safety

If a multi-storey car park is built on this site, the dominant pedestrian movement will continue to be between the car park and Argyle Street. The car park would increase pedestrian movements and require further attention regarding pedestrian safety, particularly across Larkin Place. The need for a pedestrian crossing on Larkin Place will need to be considered.

It should be noted that the pedestrian link to Argyle Street is via a privately owned commercial arcade. While it is envisaged that maintaining the pedestrian access is in the best interest of the retail stores, the desirability of locating the decked car park at this location is primarily based on the access being maintained.

Figure A-19: Pedestrian Access to Argyle Street



Site observations revealed that pedestrians travelling between the car park and John Street currently walk along the roadway of Larkin Place given that there is no footpath provided. This small section of Larkin Place is relatively narrow and bounded on either side by heritage listed buildings and therefore do not provide any opportunities to widen the carriageway. The current situation is considered to be unsatisfactory in terms of pedestrian safety which is likely to be intensified with the introduction of a decked car park. Figure 20 illustrates the current conditions.

Figure A-20: Access to John Street (No Footpath)



Therefore, the introduction of a decked car park will warrant the investigation on potential ameliorative treatment(s) along this section of Larkin Place such as:

- The introduction of a shared zone; or
- Converting this section of road into a one-way road, such that the carriageway can be narrowed and a pedestrian footpath is introduced.

Similarly, there is inadequate pedestrian paths linking the car park to Elizabeth Street (Figure 21). This will need to be addressed during the design stage.

Figure A-21: Access to Elizabeth Street (Inadequate Footpath)



School Access

A pedestrian access is provided to the school directly from the car park. As such, the car park is used as a pick-up/ drop-off area during morning and evening peak periods. This is anticipated to be intensified with the addition of a decked car park and may result in the introduction of pedestrian safety concerns. This can also be viewed as an opportunity to provide a dedicated pick-up/ drop-off for the school thereby enhancing pedestrian safety. The effectiveness of safety measures will be determined during the detail design which must incorporate a pick-up/ drop-off area in order to avoid safety concerns. Figure 22 shows the interface between the existing car park and the school access on Larkin Street.

Figure A-22: Pedestrian Access to School



Figure 23 identifies the benefits and constraints associated with a car park located at this site.

ORD06

Attachment 2

Figure A-23: Larkin Place Car Park – Benefits & Constraints



3.5 Car Park 4 – Hill Street Car Park

The John & Hill Street car park is surrounded by four perimeter roads. Argyle Street to the north, Hill Street to the east, Broughton Street to the south and John Street to the West. Its capacity is 87 car spaces. Access to the car park is gained via a laneway between John and Hill Street and also through a privately owned walkway through Whiteman's Arcade. There are a number of heritage items in the vicinity of the car park including the St John's Hill Conservation Area, a number of heritage houses and the Whiteman's Commercial Building (see Appendix A for Heritage Items Map). Vehicular access is provided to John Street towards the west and to Hill Street towards the east. The dominant pedestrian movement is between the car park and Argyle Street through a commercial arcade.

The site is bounded by the following land uses:

- A Laneway access road and the rear of shops facing Argyle Street.
- Residential properties to the south and the St John's Hill Conservation Area on the other side of Broughton Street.
- To the east are Heritage listed houses facing Hill Street. Some of these historic buildings are being used for businesses. In addition to this there is a laneway access road.
- To the west are Heritage listed houses facing John Street. Similar to Hill Street some of these buildings are being used for businesses.

Figure A-24: Hill Street Car Park



ORD06

Attachment 2

Figure A-25: Hill Street Car Park Photos



General Layout

Both vehicular accesses to the car park do not provide a pedestrian footpath. This results in pedestrians walking along the carriageway. It is noted that both vehicular accesses are sufficiently wide to be modified such that footpaths can be introduced; however, this is likely to result in a substantial loss of parking spaces.

Figure A-26: Access to John Street (Inadequate Pedestrian Path)



The site is of an irregular shape and is relatively narrow. This will raise difficulties during the design stage given that a large proportion of the site will be required for parking aisle(s) and ramp(s), thereby adversely affecting the yield in terms of the parking supply.

During the site visit it was noted that cars were parked informally along the central chevron in the car park.

Access to Commercial Lots

There are driveways located within the car park leading to a privately owned commercial car park. Accesses will need to be maintained and therefore should be included in the design. This is likely to impact on the size of the car park and potential yield.

Figure A-27: Access to Commercial Lots



Pedestrian Access & Safety

The dominant pedestrian movement will continue to be between the car park and Argyle Street. It should be noted that the pedestrian link to Argyle Street is via a privately owned commercial arcade. While it is envisaged that maintaining the pedestrian access is in the best interest of the retail stores, the desirability of locating the decked car park at this location is primarily based on the access being maintained. Furthermore, providing the decked car park at this location would intensify the number of pedestrians travelling through the privately owned car parks. Nevertheless, it should be noted that upgrades to the pedestrian link will be required in order to accommodate disabled users, as illustrated in Figure 28.

Figure A-28: Pedestrian Access to Argyle Street



Proximity to Residential Properties

While the site is currently bounded by commercial land uses, there is a potential for the adjoining lots to be used for residential purposes. There are concerns that introducing a decked car park at this location will adversely affect residents in terms of privacy and noise. This concern is anticipated to extend beyond the construction phase.

ORD06

Attachment 2

Figure A-29: Proximity to Adjoining Properties





4. Multi-Storey Car Park Assessment

In order to compare each car park location on a merit basis, a multi-criteria assessment matrix was created which incorporates key considerations and provides a weighted score based on preferred characteristics. An additional criteria to all the previously listed items is a financial assessment as discussed below.

4.1 Preliminary Yield & Cost Estimate

The final yield will need to be determined during the conceptual and final design. Nevertheless, basic assumptions have been made in order to provide a basic estimate. It is assumed that the maximum yield of each car park is equal to the existing number of spaces, minus 12 spaces (required for ramps), multiplied by two.

The car park at Larkin Place was calculated without the incorporation of the existing parking spaces along Larkin Place.

In addition to the above, it is anticipated that other site specific factors may reduce the potential parking yield. As such, the minimum yield is taken to be the maximum yield (as calculated above), minus 15%.

The Rawlinsons Australian Construction Handbook 2013 Section 10.3.1.1 provides an average cost estimate of up to \$14,100 per parking spaces located above ground (Ground floor plus 1 level car parks). This cost estimate has been used to provide a strategic estimate for each car park. The potential parking yield and cost estimate for each location are summarised in Table 1 below.

Table 1: Estimated Yield & Cost

Car Park	Existing Spaces (Based on google image)	Estimated Yield (Spaces)	Estimated Cost (\$)
Car Park 1 - John Street	129	195 - 235	\$ 2,749,500.00 - \$ 3,313,500.00
Car Park 2a - Oxley Street	98	158 - 186	\$ 2,227,800.00 - \$ 2,622,600.00
Car Park 2b - Oxley St / Mitchel St	70	100 - 115	\$ 1,410,000.00 - \$ 1,621,500.00
Car Park 3 - Larkin Place	151	235 - 280	\$ 3,313,500.00 - \$ 3,948,000.00
Car Park 4 - Hill Street	87	125 - 150	\$ 1,762,500.00 - \$ 2,115,000.00

Using this information, the cost per increase in parking space has been estimated and summarised in the table below.

Table 2: Potential Cost per Additional Space

Car Park		Potential Increase (spaces)		Cost per Additional Space	
Car Park 1	- John Street	66	- 106	\$41,659	- \$31,259
Car Park 2a	- Oxley Street	58	- 86	\$38,410	- \$30,167
Car Park 2b	- Oxley St / Mitchel St	30	- 45	\$47,000	- \$36,033
Car Park 3	- Larkin Place	84	- 129	\$39,446	- \$30,605
Car Park 4	- Hill Street	38	- 63	\$46,382	- \$33,571

The table above indicates that providing the car park in Larkin Place or Oxley Street are the most cost-effective options from a financial perspective. It should be noted however, that additional considerations need to be placed on this option in order to adequately address the pick-up/ drop-off facilities associated with the adjacent school as well as the lack of pedestrian facilities along Larkin Place that would need to be incorporated in the final design. Once these factors are taken into account, it is anticipated that the cost per additional space will increase significantly.

Option 2a will not require any additional works associated with pedestrian facilities within close proximity to the site. As such, it is envisaged that Option 2a will provide the most cost effective option.

Option 2a – Further Investigation

Given that option 2a is considered to be the best option, further investigation has been undertaken to determine the maximum number of additional spaces that can be introduced. The estimated additional 86 spaces assumes that part of the garden area including trees to the north of the northernmost driveway would need to be removed. The number of spaces takes into consideration the size of the building that can be introduced as well as considering walls, aisle widths, column widths, ramps, lifts stairs and accessible parking spaces. The area required to accommodate up to 184 spaces over two levels is shown in the figure below.

Figure A-30: Option 2a – Car Park Footprint





Smart Consulting

In addition to the above, incorporating more than 184 spaces can only be achieved by increasing the car park footprint given the current height restrictions on the site. As such, the only option meriting further investigation involves the removal of a greater extent of the garden between the car park and the civic centre. This would also require assessing the feasibility of reconfiguring the main access to the civic centre in terms of what can physically be incorporated in the design as well as the financial costs. These further modifications may allow up to 205 spaces to be incorporated in the car park (i.e. an increase of 107 spaces).

Option 3 – Further Investigation

The assessment of Option 3 took into account the fact that Larkin Place is a public road, linking John Street and Elizabeth Street. The car park’s existing total capacity is approximately 180 space, including the 29 spaces along the southern side of Larkin Place. If a car park would be built at this location, the public access along Larkin Place would be maintained, reducing the potentiality of the site. Our assessment of the site therefore was based on the area limited by Larkin Place (existing 151 spaces) as illustrated in the figure below.

Figure A-31: Option 3 – Car Park Footprint



4.2 Assessment Matrix Criteria

The criteria utilised in the building of the matrix are described as follows:

1. Cost per space: the cost per space, taking into account potential associated works (strategic);
2. Location: proximity to main streets;
3. Accessibility by pedestrians: the network providing access to and from the proposed car park;
4. Number of spaces: a strategic projected total number of spaces;
5. Space taken by lifts and/ or ramps: a strategic consideration of the use of lifts and/ or ramps;
6. Existing demand: the existing demand for parking in the area;
7. Impacts upon road network: potential impacts upon the existing road network;
8. Impacts on public transportation: potential impacts upon public transportation in the surrounds of the proposed car park, such as bus tops;
9. Impact upon heritage items: potential impacts upon listed heritage items and constraints due to the existence of heritage items;
10. Impacts upon environment – noise: potential acoustic and noise impacts upon the neighbouring area due to the operation of the car park;
11. Impacts during construction: potential impacts during construction, in particular noise, property access, congestion;
12. Visual impact: aesthetic impact upon the area, including vistas from neighbours;
13. Installation of ancillary measures: if the proposed car park would require the installation of ancillary measures, such as traffic signals etc.;
14. Provision for growth and flexibility: the potentiality for widening the car park and flexibility of use;
15. Neighbouring future developments: the potential impacts and constraints of future developments around the car park;
16. Integration with other land uses: how the proposed car park integrates organically with other existing land uses;
17. Queuing issues: potential congestion and queuing at the access and egress of the proposed car park;
18. Manoeuvrability: considerations regarding access and egress;
19. Land purchase: the need for land purchase;
20. Allows ITS: provision for ITS facilities, such as on-street variable message signs informing location and number of parking spaces; and
21. Safety of site - future car park: degree of safety of the car park.

Each criterion was given a certain weight, which was then multiplied by the score given by our study team. This does not mean that the preferred location is the best option for all of the criteria, but actually takes into account a significant number of factors. The results of the matrix assess indicate that the preferred location is for a proposed multi-storey car park is Option 2a. Appendix B illustrates the assessment undertaken by the study team, including weights and scorings given to each criterion and results for each and final scoring.



5. Summary

An extensive comparison of each potential site has been undertaken. The findings for each site are summarised below.

Option 1 – John Street Car Park

- There are two heritage items in the vicinity of the car park with these being St John's Hill Conservation Area and an historic cottage;
- A pedestrian crossing between the decked car park and the commercial car parks is recommended;
- The pedestrian link to Argyle Street is via privately owned car parks and commercial arcade;
- There is insufficient space to provide a footpath along the southern side of the access road;
- Only one footpath is provided along the southern side of the access road between the car park and Murray Street;
- There is a driveway located within the car park leading to a privately owned residential car park that will need to be maintained and therefore impact on the size of the car park; and
- Introducing a decked car park at this location will adversely affect residents in terms of privacy and noise.

Option 2a – Oxley Street Car Park

- There are no obvious pedestrian safety concerns surrounding the car park other than the likely intensification of pedestrian movements across Oxley Street;
- All pedestrian links associated with this location are Council owned and therefore likely to be maintained;
- The car park is clearly visible from Oxley Street and will therefore require minimal sign-posting to advise motorists of its location. Conversely, the will have a negative aesthetic impact; and
- The site is relatively surrounded by traffic / parking generating sites within close proximity such that the site will generate peak parking demands at different times of the day and week and ensure that the car park will rarely be underutilised.

Option 2b – Oxley Street/ Mitchell Street Car Park

- Due to its proximity to Woolworths and its multi-deck car park, there is much ambiguity regarding way finding; and
- The benefits regarding Option 2a are also applicable to Option 2b, although the projected size of a car park in this location would be smaller. In addition, the distance from Argyle Street, which is anticipated the most common origin of motorists, is greater.

Car Park 3 – Larkin Place Car Park

- The car spaces along Larkin Place would not be incorporated into a future car park, as Larkin Place is a public road would be kept open to public;
- The pedestrian link to Argyle Street is via a privately owned commercial arcade;



ORD06

Attachment 2

- Pedestrian safety across Larkin Place will need to be reviewed due to the intensification of pedestrian traffic;
- No footpath provided on Larkin Place near John Street. This small section of Larkin Place is relatively narrow and bounded on either side by heritage listed buildings and therefore do not provide any opportunities to widen the carriageway;
- Consideration may be required to:
 - The introduction of a shared zone; or
 - Converting this section of road into a one-way road, such that the carriageway can be narrowed and a pedestrian footpath is introduced.
- There is inadequate pedestrian paths linking the car park to Elizabeth Street;
- A pedestrian access is provided to the school directly from the car park. A dedicated pick-up/drop-off may be required within the car park; and
- Based on the cost per additional parking space provided this location is the best option. However, it does not take into account the ancillary costs associated with pedestrian facilities surrounding the car park.

Car Park 4 – Hill Street Car Park

- Both vehicular accesses to the car park do not provide a pedestrian footpath;
- It is noted that both vehicular accesses are sufficiently wide to be modified such that footpaths can be introduced, however, substantial parking space will be lost;
- The site is of an irregular shape and is relatively narrow resulting in a large proportion of the site being required for parking aisle(s) and ramp(s), thereby adversely affecting the yield in terms of the parking supply;
- There are driveways located within the car park leading to a privately owned commercial car park. This is likely to impact on the size of the car park and potential yield;
- The pedestrian link to Argyle Street is via a privately owned commercial arcade;
- Upgrades to the pedestrian link will be required in order to accommodate disabled users; and
- Introducing a decked car park at this location will adversely affect residents in terms of privacy and noise.

All of the above items have been taken into account and assessed using weighted scores, subjectively based on the importance of the item. The final scoring reveals that providing a car park in Oxley Street (Option 2a) is the preferred option.



Smart Consulting

6. Recommendation

Based on the assessment undertaken it is recommended that Option 2a be adopted as the preferred car park location. It should be noted that the car park usage will increase once the Oxley Street/ Argyle Street intersection is signalised thereby permitting the right turn into Oxley Street.

It is recommended that the Oxley St car park be designed to accommodate 184 spaces over two levels (i.e. an additional 86 spaces). This will require the car park footprint to encroach onto the garden area between the civic centre and the car park, such that some trees would need to be removed.

The provision of additional spaces can only be achieved by increasing the car park footprint given the current height restrictions on the site. The only option meriting further investigation involves the removal of a greater extent of the garden between the car park and the civic centre. This would also require assessing the feasibility of reconfiguring the main access to the civic centre in terms of what can physically be incorporated in the design as well as the financial costs. These further modifications may allow up to 205 spaces to be incorporated in the car park (i.e. an increase of 107 spaces).

The heritage impact on the Camden town centre area for any proposed car park deck needs to be in accordance with the guidelines proposed by Lucas Stapleton Architects and Heritage Consultants. These guidelines include the building design, typology and form. Specific design controls include having a roofed car park so that car park is not highly visible from the main street. The issue of visibility and the built form being designed as an integral part of any future car park to complement the established heritage character of the Camden Town Centre.

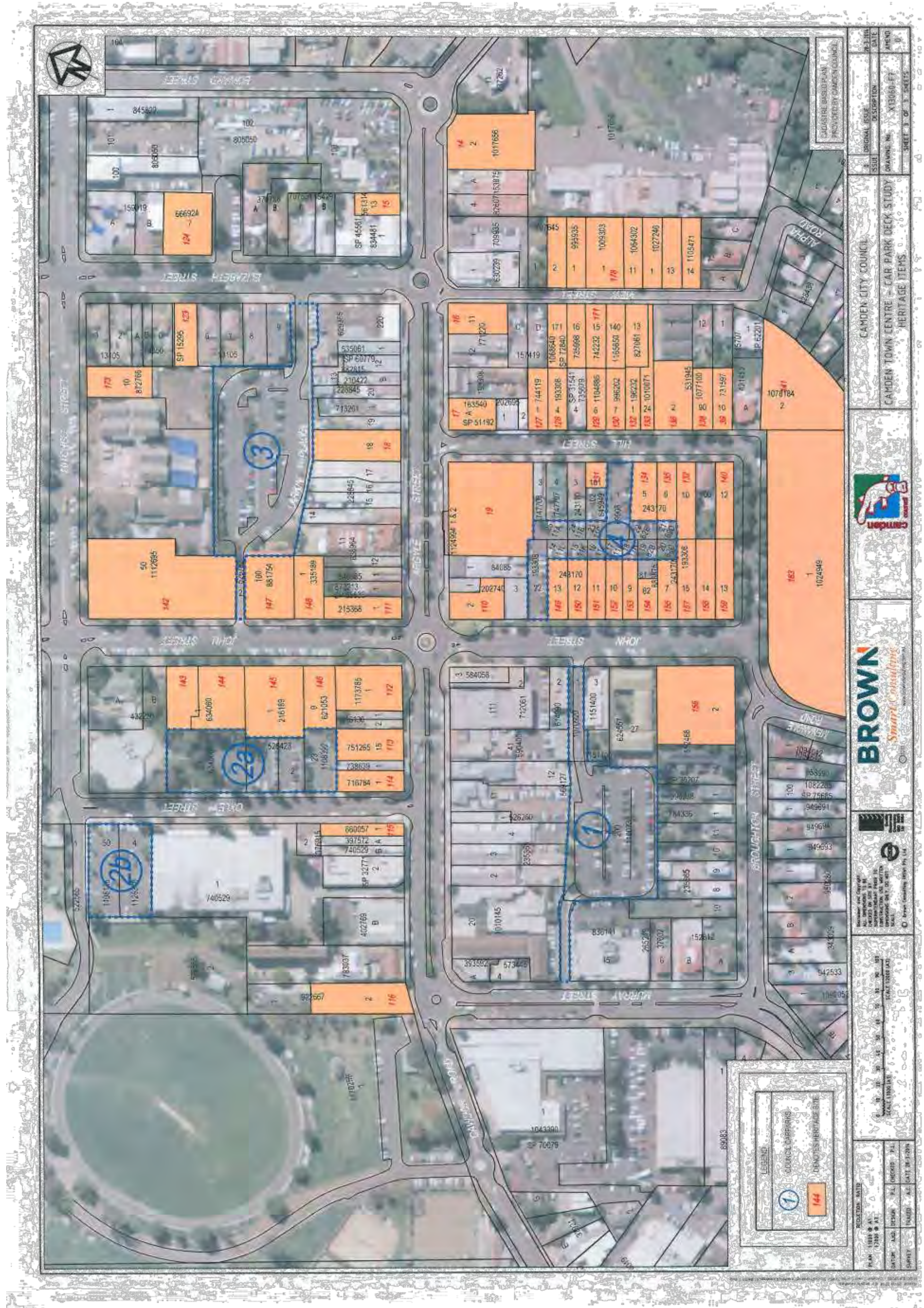
In summary, to definitely provide an answer regarding the suitability of the Oxley St car park investigation into the suitability of the site needs to be undertaken a design by an architectural firm with heritage experience which will appropriately address the heritage design guidelines for Camden Town Centre. If the architectural design meets the discussed design criteria and can facilitate the appropriate amount of car parking spaces it is recommended that the Oxley St car park be adopted as the preferred car park location.



ORD06

Attachment 2

Appendix A: Heritage Items



Attachment 2

ORD06



Appendix B: Option Analysis Matrix

Attachment 2

ORD06


Camden Town Centre - Decked Car Park Assessment

Assessment Matrix

Score	
Excellent	5
Good	4
Satisfactory	3
Bad	2
Very bad	1




No. Criteria	Weight	CP.1 - John Street	CP.2a - Oxley Street	CP.2b - Mitchell Street	CP.3 - Larkin Place	CP.4 - Hill Street
		Score	Score	Score	Score	Score
		Total	Total	Total	Total	Total
1	12	3	2	2	4	1
2	8	5	5	5	5	5
3	8	3	5	5	2	3
4	12	4	3	2	5	2
5	1	3	3	2	3	1
6	4	5	5	4	5	5
7	4	2	4	4	3	4
8	4	5	4	4	5	5
9	8	3	4	5	3	2
10	3	2	4	2	1	2
11	1	1	3	2	1	1
12	5	1	3	2	3	1
13	3	2	3	3	3	3
14	5	1	3	2	2	1
15	4	1	3	2	2	2
16	3	1	3	2	2	2
17	3	3	4	3	2	2
18	3	2	4	3	3	2
19	3	2	4	4	2	1
20	1	3	3	3	3	3
21	5	2	4	3	3	3
Total scoring	100	287	361	317	334	246

Paving material selection assessment

Material	Benefits	Other Considerations
<p>Grey granite paving</p>  <p>Granite Paver</p>	<ul style="list-style-type: none"> <li>• Very Durable <li>• Lifespan is essentially indefinite <li>• Minimal ongoing maintenance requirements. Little to no impact on product from maintenance practices. <li>• Non-porous (almost impossible to penetrate the surface of the material to a degree that would cause permanent staining) <li>• Simplicity of colour, pattern and street embellishment <li>• Grey granite comes from one quarry that is very consistent in both colour and hardness, and has very large volumes of material. <li>• Investment in this specification of material would reinforce Camden's importance in a changing LGA <li>• If constructed correctly on a concrete slab it is very unlikely to move over time. <li>• Meets slip resistance standards 	<p>Higher base rate cost per m2</p>

ORD06

Attachment 3

<p>Grey concrete composite pavers</p> 	<ul style="list-style-type: none"> • Cheaper than Granite • Very similar in appearance to Austral Black granite • Durable • Easily replaced as can be ready made to the specified mix • Simplicity of colour, pattern and street embellishment • If constructed correctly on a concrete slab it is very unlikely to move over time. • Meets slip resistance standards 	<ul style="list-style-type: none"> • Less durable and more absorbent than granite meaning that over time, staining and discolouration through intensity of use would result in a reduced lifespan; and • Needs sealing every so often in order to maintain the integrity of the surface colour that would significantly disrupt activity on the main street and incur ongoing costs.
<p>Clay brick pavers</p> 	<ul style="list-style-type: none"> • Cheaper than Granite and Concrete Composite paving • Resonates with the existing material character of the town • Meets slip resistance standards 	<ul style="list-style-type: none"> • More unstable surface over the medium/long term • Less durable and flexible material • Potentially make the pavement too fussy and draw too much of the material character of the town into the pavement; and • There is a very negative public perception about the existing pavers in Camden
<p>Concrete</p> 	<ul style="list-style-type: none"> • Cheapest of the four material selections which means that the greatest amount of work could be completed with the current budget • Meets slip resistance standards 	<ul style="list-style-type: none"> • More susceptible to discoloration over time • Harder to maintain in good condition • Harder to undertake retrospective service works over time; and • Will underplay Camden's role in a growing LGA where many other centres are getting a higher specification of material.

Street Furniture Selection Assessment

Furniture selection	Benefits	Other Considerations
Existing	<ul style="list-style-type: none"> • Cheap option as would only replace furniture as and when replacements were needed • Maintenance of some community expectations about the heritage look of Camden 	<ul style="list-style-type: none"> • Heritage theme of existing furniture has no genuine historical merit. • Off the shelf heritage theme items detract from the items of genuine heritage importance in Camden. • The existing suite of furniture elements do not read as a consistent/coordinated suite • Intricacy of some of the elements results in increased maintenance requirements.
Customised	<ul style="list-style-type: none"> • Potential to draw on particular events, moments, people, times in Camden's history as inspiration for the customisation of some/all of the selection of furniture for Argyle Street. • Opportunity to draw out/compliment items of genuine heritage importance in the town. • Help Camden reinforce its unique history and identity 	<ul style="list-style-type: none"> • Potentially harder to replace over the long term • Potentially more expensive • Potentially increased maintenance requirements depending on the final design.
Historically Sensitive	<ul style="list-style-type: none"> • Simplistically styled furniture suite of consistent colour to recede in the street and not be features themselves • Simplicity of design would likely lead to increased durability and ability to replace items. • Best opportunity for the items of true heritage importance to be presented in the best possible way. 	<ul style="list-style-type: none"> • Despite design and technical appropriateness the deviation from the existing heritage themed furniture may not meet community expectation

ORD06

Attachment 4

	<ul style="list-style-type: none"> • Most appropriate heritage option, using generally accepted national and international standards of best practice. 	
Modern	<ul style="list-style-type: none"> • Easiest option to maintain as selection would be primarily stainless steel. • Potential to draw on particular events, moments, people, times in Camden's history as inspiration for the customisation of some/all of the selection of furniture for Argyle Street. Design would be a modern presentation of past events. 	<ul style="list-style-type: none"> • Probably would not meet community expectation.

The following images show existing and recommended furniture selections for Argyle Street.



Figure 1 - Existing Furniture

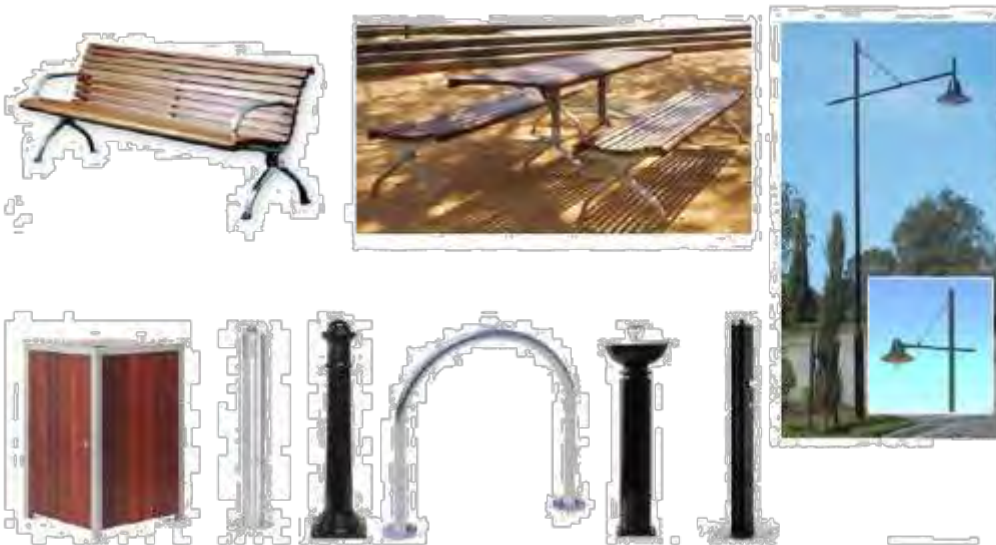


Figure 2 - Historically sensitive furniture selection



DRAFT NOT FOR CONSTRUCTION

PROPOSED SIGNALIZED PEDESTRIAN CROSSING AND REMOVAL OF EXISTING ZEBRA CROSSING

PROPOSED WIDENED FOOTPATH AND PAVING

PROPOSED REMOVAL OF EXISTING ZEBRA CROSSING

PROPOSED SIGNALIZED INTERSECTION CORNER ARGYLE ST & OXLEY ST

PROPOSED WIDENED FOOTPATH AND PAVING

LEGEND:

- PROPOSED NEW PAVED FOOTPATH
- PROPOSED NEW KERB AND GUTTER
- Proposed stage 1 works - Subject to detailed investigation