Government of **Western Australia**
Development Assessment Panels

Metro Central Joint Development Assessment Panel Agenda

Meeting Date and Time: Monday, 9 December 2013; 2:00 pm
Meeting Number: MCJDAP/48
Meeting Venue: Department of Planning; 140 William Street, Perth

Attendance

DAP Members

Mr Ian Hocking (Alternate Presiding Member)
Mr Rory O'Brien (Alternate Deputy Presiding Member)
Mr Luigi D'Alessandro (Specialist Member)
Cr Phil Marks (Local Government Member, City of Belmont)
Cr Margie Bass (Local Government Member, City of Belmont)
Cr Jennifer Carter (Local Government Member, Town of Bassendean)
Cr Gerry Pule (Local Government Member, Town of Bassendean)

Officers in attendance

Ms Karen Newman, Development Assessment Panels
Mr Wilmot Loh, City of Belmont
Mr Brian Reed, Town of Bassendean

Department of Planning Minute Secretary

Mr Luke Downes, Development Assessment Panels

Applicants and Submitters

Mr Ron Lee, Designinc Perth Pty Ltd
Great Eastern Group Pty Ltd
Mr Peter Fitzgerald, Rowe Group
Mr Adam Casotti, Statesman Homes Pty Ltd
Mr Malcolm Somers, Hames Sharley
Mr Richard Kilbane, Hawaiian Investments

Members of the Public

Nil

1. Declaration of Opening

The Presiding Member declares the meeting open and acknowledges the past and present traditional owners and custodians of the land on which the meeting is being held.

2. Apologies

Mr Charles Johnson, Presiding Member

3. Members on Leave of Absence

Nil

4. Noting of Minutes

Note the Minutes of the Metro Central JDAP meeting no.46 and no.47 held on the 19 November and 28 November 2013.

5. Disclosure of Interests

Nil

6. Declarations of Due Consideration

Any member who is not familiar with the substance of any report or other information provided for consideration at the DAP meeting must declare that fact before the meeting considers the matter.

7. Deputations and Presentations

7.1 Mr Peter Fitzgerald (Rowe Group) presenting for the application at Item 9.1. The presentation will provide an overview of the proposed development.

8. Form 1 - Responsible Authority Reports – DAP Application

8.1

Property Location:	• Lot 702 (215) Great Eastern Hwy • St Lots 1-5 (223 and 223A) Great Eastern Hwy and (22 and 24) Hargreaves St • Lot 4 (7) Belgravia St • Lot 180 (9) Belgravia St
Application Details:	Complex of four (4) buildings comprising: • Hotel (240 rooms) • 36 Serviced Apartments • 88 Multiple Dwellings • Restaurant • Office • Showrooms • Consulting Rooms • Lunch Bar • Fast Food / Takeaway
Applicant:	Design Inc Perth Pty Ltd
Owner:	Great Eastern Group Pty Ltd
Responsible authority:	City of Belmont
Report date:	3 December 2013
DoP File No:	DP/13/00715

9. Form 2 – Responsible Authority Reports - Amending or cancelling DAP development approval

9.1

Property Location:	10 Hawksburn Road, Rivervale
Application Details:	20 Multiple Dwellings (3 Storey)
Applicant:	Rowe Group
Owner:	Statesman Homes Pty Ltd
Responsible authority:	City of Belmont
Report date:	26 November 2013
DoP File No:	DP/12/00955

9.2

Property Location:	Lot 2 (2) West Road, Bassendean
Application Details:	Bassendean Village Shopping Centre
Applicant:	Hames Sharley
Owner:	Hawaiian Investments
Responsible authority:	Town of Bassendean
Report date:	22 November 2013
DoP File No:	DP/12/00535

10. Appeals to the State Administrative Tribunal

Nil

11. Meeting Closure

Government of **Western Australia**
Development Assessment Panels

Metro Central Joint Development Assessment Panel Minutes

Meeting Date and Time: Tuesday, 19 November 2013; 10:00am
Meeting Number: MCJDAP/46
Meeting Venue: City of South Perth; Civic Centre, Corner of Sandgate Street and South Terrace, South Perth

Attendance

DAP Members

Mr Charles Johnson (Presiding Member)
Mr Ian Hocking (Deputy Presiding Member)
Mr Luigi D'Alessandro (Specialist Member)
Cr Colin Cala (Local Government Member, City of South Perth)
Cr Glenn Cridland (Local Government Member, City of South Perth)
Mr Chris O'Neill (Local Government Member, City of Canning)

Officers in attendance

Ms Vicki Lummer, City of South Perth
Mr Rajiv Kapur, City of South Perth
Mr Siven Naidu, City of South Perth
Ms Kelly Vilkson, City of Canning
Mr Shakeel Maqbool, City of Canning
Ms Ivin Lim, Development Assessment Panel Secretariat

Local Government Minute Secretary

Ms Narelle Cecchi, City of South Perth

Applicant and Submitters

Mr Peter Simpson, TPG Town Planning, Urban Design and Heritage
Mr Tony Hatt, Devwest Group
Mr Chris Harman, TPG Town Planning, Urban Design and Heritage
Mr Kim Munro, Coles Group Property Development

Members of the Public

Nil

1. Declaration of Opening

The Presiding Member declared the meeting open, and acknowledged the past and present traditional owners and custodians of the land on which the meeting is being held.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

2. Apologies

Comm. Linton Reynolds, City of Canning

3. Members on Leave of Absence

Nil

4. Noting of Minutes

The Minutes of the Metro Central JDAP meeting No. 44 and No. 45 held on 24 October and 1 November 2013 were noted by DAP members.

5. Disclosure of Interests

Member / Officer	Report Item	Nature of Interest
Comm. Linton Reynolds	8.2	Indirect Pecuniary
Wife holds shares in Wesfarmers and Woolworths.		
Mr Charles Johnson	8.1	Indirect Pecuniary
Has a financial relationship with Devwest.		

6. Declarations of Due Consideration

All members declared that they had duly considered the documents.

Mr Charles Johnson left the Council Chambers at 10:05am as he had an interest in Item 8.1. The Deputy Presiding Member chaired the meeting in the Presiding Member's absence.

7. Deputations and Presentations

7.1 Mr Peter Simpson (TPG Town Planning, Urban Design and Heritage) and Mr Wes Barrett (McDonald Jones Architects) addressed the DAP for the application at Item 8.1, and spoke in favour of the recommendation and answered questions from DAP members.

8. Form 1 - Responsible Authority Reports – DAP Applications

8.1

Property Location:	Lot 209 (3) Richardson Street, South Perth
Application Details:	Mixed Development comprising 'Offices and Seventy (70) Multiple Dwellings' within a thirteen Storey building
Applicant:	TPG Town Planning, Urban Design and Heritage
Owner:	Richardson 1 Pty Ltd ATF Richardson Trust
Responsible authority:	City of South Perth
Report date:	7 November 2013
DoP File No:	DP/13/00712

REPORT RECOMMENDATION / PRIMARY MOTION

Moved by: Mr Luigi D'Alessandro **Seconded by:** Cr Colin Cala

Mr Charles Johnson
Presiding Member, Metro Central JDAP

That the Metro Central Joint Development Assessment Panel resolves to:

Approve DAP Application reference 11.2013.415.1 and accompanying plans P.00 –P.20 (received 23 October and 5 November 2013) in accordance with Clause 7.9 of the City of South Perth Town Planning Scheme No. 6, subject to the following conditions and important notes:

Conditions

(1) **Revised drawings** shall be submitted to the satisfaction of the City *as part of a Building Permit application*, and such drawings shall incorporate the following:

(i) The podium and communal facility shall be included in the south western elevation.
(ii) The developments shall, when relevant, incorporate illumination in accordance with the following Australian Standards:
(a) AS 1680 regarding safe movement;
(b) AS 1158 regarding lighting of roads and public spaces; and
(c) AS 4282 Control of obtrusive effects of outdoor lighting.

(2) The applicant shall manage the establishment of public art as per the Public Art: Letter of Agreement, dated 22 October 2013 capturing the objectives and aspirations of the City's Public Art Strategy. (Letter of agreement attached).

(3) Any dewatering at the site will require approval from the Department of Water through a water abstraction licence. (Refer to important note 3)

(4) The applicant to provide an engineer's certification in relation to water-proofing. (Refer to important note 3)

(5) At building permit stage the applicant is to provide a management plan to address noise limits referred to in State Planning Policy 5.4 that are likely to be exceeded, in accordance with Element 15 *'Road and Rail Transport Noise'* of Schedule 9.

(6) The comprehensive new development shall incorporate illumination in accordance with the following Australian Standards:

(a) AS 1680 regarding safe movement;
(b) AS 1158 regarding lighting of roads and public spaces; and
(c) AS 4282 Control of obtrusive effects of outdoor lighting.

(7) The landscaping proposed along the City's road verge and on the development site shall have a close resemblance to the landscaping concept plans submitted with the applicants support document date 23 October 2013. (Refer also to Important Note 5)

(8) Details of the proposed colours of the external materials shall be submitted for approval by the City, prior to the issuing of a building permit.

(9) The applicant shall construct a crossover between the road and the property boundary. The crossover shall be constructed in accordance with the approved drawings, associated conditions and the requirements contained within Management Practice M353, which is available at the City's website. The existing

Mr Charles Johnson
Presiding Member, Metro Central JDAP

verge levels at the front property boundary shall not be altered. (Refer also to Important Note 6)

(10) The surface of the boundary wall(s) not visible from the street on the north western and south western side of the lot, the applicant is to obtain the adjoining owner's agreement as to the surface finish of the wall. If the adjoining owner's agreement is not obtained, the surface finish is to be compatible with the external walls of the neighbour's dwelling. Details in this respect are to be included on the plans submitted with a building permit application. (Refer also to Important Note 7)

(11) The surface of the boundary wall(s) visible from the street on the north eastern and north western side of the lot shall be finished to match the external walls of the building on the development site. Details in this respect are to be included on the plans *submitted with a building permit* application.

(12) This planning approval does not permit the display of any signage on the building or on the site. A new application for planning approval will be required if signage is proposed to be displayed.

(13) All fencing, visual privacy screens and/or obscure glass panels to Major Openings and/or Active Habitable Spaces shown on the approved drawings, shall prevent overlooking in accordance with the visual privacy requirements of the *Residential Design Codes of WA*. The structure(s) shall be installed prior to occupation of the building and remain in place permanently, unless otherwise approved by the City.

(14) The designated visitor parking bays shall be clearly identified on site by means of a sign bearing the words **"Visitors' Parking Only**" in accordance with the requirements of clause 6.3 (11) of *Town Planning Scheme No. 6*.

(15) The car parking bays shall be marked on site as indicated on the approved site plan, in order to comply with the requirements of clause 6.3(10)(c) of Town Planning Scheme No. 6 and such marking shall be subsequently maintained so that the delineation of parking bays remains clearly visible at all times.

(16) Hard standing areas approved for the purpose of car parking or vehicle access shall be maintained in good condition at all times, free of potholes and dust and shall be adequately drained in accordance with the requirements of Clause 6.3 (10) of *Town Planning Scheme No. 6*.

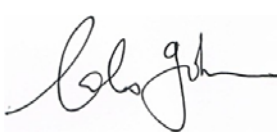
(17) Any required filling or excavation of the site shall be retained by embankments or walls, details of which are to be incorporated in the working drawings submitted in support of a building permit application.

(18) Any required retaining walls along lot boundaries shall be constructed immediately after excavation or filling has been carried out.

(19) External clothes drying facilities shall be screened from view from the street or any other public place.

(20) The height of any letterbox, electricity installation, bin enclosure, or other structure, fence, wall or hedge within 1.5 metres of any vehicle driveway where it meets a street alignment shall not exceed the 0.75 metre limit to demonstrate compliance with the intent of clause 6.2.6 (A6) of the Residential Design Codes.

Mr Charles Johnson
Presiding Member, Metro Central JDAP



(21) All plumbing fittings on external walls shall be concealed from external view as required by Clause 7.5(k) of Town Planning Scheme No. 6.

(22) In accordance with the provisions of Clause 6.8(2) of *Town Planning Scheme No. 6*, all subsoil water and stormwater from the property shall be discharged into soak wells or sumps located on the site unless special arrangements can be made to the satisfaction of the City Infrastructure Services for discharge into the street drainage system.

(23) The applicant/developer and the owners are to comply with the requirements set out in Council Policy P352 "Final Clearance Requirements for Completed Buildings**"**. Policy P352 requires the applicant to engage a licensed land surveyor, drawn from the City's panel, to undertake survey measurements on a floor-by-floor basis. The surveyor is to submit progressive reports to the City regarding compliance with the approved building permit documents. The City will not issue final clearance certificates until satisfied that the completed building is consistent with the building licence documents and the requirements of other relevant statutes.

(24) The property shall not be used for the approval hereby granted until an inspection has been carried out by a Council Officer and the City is satisfied that the conditions of planning approval have been complied with.

(25) The validity of this approval shall cease if construction is not substantially commenced within 24 months of the date of planning approval.

Important Notes

(1) It is necessary for revised drawings to be submitted prior to, or in conjunction with the building licence application as identified in Condition No. (1), prior to the assessment of the working drawings.

(2) Prior to the issuing of a building permit, the applicant is required to satisfactorily address the outstanding planning matters identified in Condition No's 3, 4, 5, 6, 8 & 10. Therefore, to avoid delay in obtaining a building permit, it is important for the Applicant to commence the related processes at the earliest.

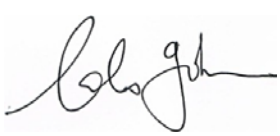
(3) The applicant is required to liaise closely with the City's Engineering Infrastructure Services in relation to the water discharge for the dewatering and waterproofing process.

(4) The applicant is advised of the need to comply with the relevant requirements of the City's Environmental Health Services and Engineering Infrastructure Services (list of requirements attached).

(5) The applicant is required to liaise closely with the City's Environment Services prior to installing the landscaping along the City's road verge.

(6) Planning Approval or the subsequent issuing of a Building Permit by the City is not consent for the construction of a crossing. As described in Management Practice M353 a 'Crossing Application' form must be formally submitted to Infrastructure Services for approval prior to any works being undertaken within the road reserve.

Mr Charles Johnson
Presiding Member, Metro Central JDAP



(7) As identified in Condition No. (10), prior to finishing the surface of the boundary wall, the applicant is required to obtain written agreement of the adjoining property owner with regards to the preferred *finish*. A copy of this agreement should be forwarded to the City prior to obtaining a building licence. If the adjoining property owner does not provide the applicant with a written response within 14 days, the applicant would provide sufficient evidence to the City that written correspondence from the applicant was not responded to. Therefore, to avoid delays in obtaining a building permit, it is important for the Applicant to commence the related processes at the earliest.

(8) If any boundary fencing is required, the applicant is advised, to liaise with the City of South Perth to determine if any further approvals are required.

(9) Where minor variations are sought at the building permit stage from an approved set of plans, a formal request for a variation to the planning approval is to be sought by the applicant, in accordance with Council policy P689.
If supported, the variations may be granted subject to all the previous terms and conditions, or possibly with new terms and conditions. If not supported, either the building plans must be amended for a building permit to be issued, or a new application for planning approval must be lodged for consideration by Council.

(10) If you are aggrieved by aspects of the decision **where discretion has been exercised,** you may investigate the ability to lodge an appeal with the State Administrative Tribunal within 28 days of the determination date recorded on this notice.

The report Recommendation / Primary motion was put and CARRIED (3/1).

For: Mr Ian Hocking, Mr Luigi D'Alessandro, Cr Colin Cala.
Against: Cr Glenn Cridland.

Mr Charles Johnson returned to the Council Chambers at 10:40am.

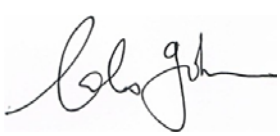
8.2	Property Location:	Lot 2 (353-361) High Road, Riverton
	Application Details:	Proposed Shop (Supermarket & Liquor Store) & Additions/Alterations to Existing Hotel
	Applicant:	TPG Town Planning, Urban Design and Heritage
	Owner:	Liquorland (Qld) Pty Ltd
	Responsible authority:	City of Canning
	Report date:	30 October 2013
	DoP File No:	DP/13/00662 and 15/15577

REPORT RECOMMENDATION / PRIMARY MOTION

Moved by: Mr Ian Hocking **Seconded by:** Mr Luigi D'Alessandro

That the Metro Central Joint Development Assessment Panel (JDAP) resolves to:

Approve DAP Application reference DP/13/00662 and accompanying plans Existing Site Plan ref: SD001 Rev A (dated 18/10/2013), Proposed Site Plan ref: SD002 Rev A (dated 18/10/2013), Coles Boundary Section ref: SD003 Rev A (dated 10/10/2013), Refurbished Hotel Plans ref: SD004 Rev A (dated 18/10/2013), Site Elevations ref: SD005 Rev B (dated 17/10/2013) and Proposed Landscape Site Plan ref: SDL01 Rev D (dated 23/10/2013) in accordance with Clause in accordance with Clause 2.3.9 of the City of Canning Town Planning Scheme No. 40, subject to the following conditions:



1. The proposed development is to comply in all respects with the approved plans.

2. This Development Approval is valid for a period of 24 months only. If the development the subject of this approval is not substantially commenced within this period, a new approval must be obtained before commencing or continuing with development.

3. Prior to the submission of an application for a Building Permit, a detailed stormwater drainage plan designed by a suitably qualified engineer is to be submitted and approved by the City's Manager Engineering Services. The drainage system is to be installed thereafter prior to the occupation of the development.

4. Prior to the submission of an application for a Building Permit, detailed plans of the upgraded intersection treatment associated with the north-western crossover are to be submitted and approved by the Manager Engineering Services. The intersection is to be constructed thereafter in accordance with the approved plans at the applicant's cost prior to the occupancy of the development.

5. Prior to the occupancy of the development, the existing right of carriageway is to be realigned to match the revised internal road network.

6. Prior to the occupancy of the development, the parking bays identified on the approved plans being constructed and line-marked to the satisfaction of the Manager Engineering Services.

7. Prior to the occupancy of the development landscaping is to be provided in accordance with the approved landscaping plan and maintained thereafter for the duration of the development.

8. The development being connected to the Water Corporation's sewerage system.

9. Access of service vehicles or operation of forklifts must be restricted to the hours of 7:00am to 7:00pm Monday to Saturday and 9:00am to 7:00pm Sunday and public holidays, for the duration of the development.

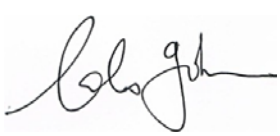
10. Prior to the submission of an application for a building permit, an Acoustic Report which demonstrates that all mechanical services associated with the proposed development and any other noise source will comply with the *Environmental Protection (Noise) Regulations 1997*, must be approved by the City's Manager Environmental Health and Compliance Services. All works must be carried out in accordance with the Acoustic Report, and implemented as such for the duration of the development.

11. The existing masonry wall separating this property from the adjacent residential development is to be retained unless a replacement masonry wall is proposed and thereafter constructed to the satisfaction of the City of Canning.

12. A Waste Management Plan (WMP) is required prior to the commencement of construction which shall be to the satisfaction of the City's Manager Waste Services.

13. The provision of a refuse storage enclosure being provided, of an adequate size to contain all bins and oil containers used by the food premises and be constructed with four walls, a graded and sealed floor, provided with a tap connected to an adequate supply of water and provided with a floor waste connected to the sewer.

Mr Charles Johnson
Presiding Member, Metro Central JDAP



Advice Notes:

A. The proposed development is to comply with the provisions of the Building Act 2011, the Building Code of Australia and any other requirements of the City's Building Department.

B. This development must comply with the access and facilities for people with disabilities provisions of the National Construction Code Series (NCC), the Disability (Access to Premises - Buildings) Standards 2010 and associated Australian Standards.

C. This approval does not authorise the demolition of the existing buildings on site. A demolition permit must be obtained from the City prior to the removal/demolition of the existing buildings.

D. In relation to the noise report required by the above Condition 10, all mechanical equipment, which includes compressors, air conditioning units and exhaust canopy exhaust systems must be assessed for compliance with the *Environmental Protection Noise Regulations 1997*. The assessment must be undertaken when the systems are operating, to verify that the noise emitted from the units, complies in all respects with the regulations. Ground truthing of this noise is required, and the results must be provided as part of the report, along with the details of any attenuation measures that have been installed.

E. The proponent is advised to consult with the Department of Fire and Emergency Services in relation to water pressure and firefighting requirements.

F. Should the applicant or owner be aggrieved by this decision, a right of review (appeal) may exist under the State Administrative Tribunal Act.

G. The proposed development is to comply with *Food Act 2008,* the *Food Regulations 2009,* the *Australia New Zealand Food Standards Code* and the *Australian Standard AS4674:2004 Design, construction and fit-out of food premises.* Detailed fit out plans, including elevations, are to be submitted with the building licence application showing all fixtures, fittings and finishes.

AMENDING MOTION

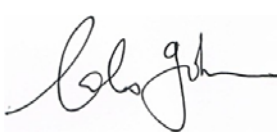
Moved by: Mr Chris O'Neill **Seconded by:** Mr Ian Hocking

That Condition 10 be amended to read as follows, and additional Advice Note (H) be inserted in relation to this condition:

10. "*Prior to the submission of an application for a building permit, an Acoustic Report which demonstrates that all mechanical services associated with the proposed development and any other noise source, including service vehicle movements, will comply with the Environmental Protection (Noise) Regulations 1997, must be approved by the City's Manager Environmental Health and Compliance Services. All works must be carried out in accordance with the Acoustic Report, and implemented as such for the duration of the development*"

H. "In respect to Condition 10, the noise sensitive premises that must be used in the final noise report, which confirms compliance with the regulations, are those residential premises in Golf Road, Parkwood."

Mr Charles Johnson
Presiding Member, Metro Central JDAP



Reason for amendment: To clarify the extent of the Acoustic Report.

The amending motion was put and CARRIED UNAMINOUSLY.

AMENDING MOTION

Moved by: Mr Chris O'Neill **Seconded by:** Mr Ian Hocking

That Advice Note (D) be amended to read as follows:

"In relation to the noise report required by the above Condition 10, all mechanical equipment, which includes compressors, air conditioning units and exhaust canopy exhaust systems, and all service vehicle manoeuvre activities, must be assessed for compliance with the Environmental Protection Noise Regulations 1997. The assessment must be undertaken when the systems are operating, to verify that the noise emitted from the units, complies in all respects with the regulations. Ground truthing of this noise is required, and the results must be provided as part of the report, along with the details of any attenuation measures that have been installed."

Reason for amendment: To clarify the extent of the Acoustic Report.

The amending motion was put and CARRIED UNAMINOUSLY.

AMENDING MOTION

Moved by: Mr Chris O'Neill **Seconded by:** Mr Ian Hocking

That Advice Note (F) be amended to read as follows:

"Should the applicant or owner be aggrieved by this decision, a right of review (appeal) may exist under the Planning and Development Act 2005."

Reason for amendment: In reference to the correct legislation.

The amending motion was put and CARRIED UNAMINOUSLY.

PRIMARY MOTION (AS AMENDED)

That the Metro Central Joint Development Assessment Panel (JDAP) resolves to:

Approve DAP Application reference DP/13/00662 and accompanying plans Existing Site Plan ref: SD001 Rev A (dated 18/10/2013), Proposed Site Plan ref: SD002 Rev A (dated 18/10/2013), Coles Boundary Section ref: SD003 Rev A (dated 10/10/2013), Refurbished Hotel Plans ref: SD004 Rev A (dated 18/10/2013), Site Elevations ref: SD005 Rev B (dated 17/10/2013) and Proposed Landscape Site Plan ref: SDL01 Rev D (dated 23/10/2013) in accordance with Clause in accordance with Clause 2.3.9 of the City of Canning Town Planning Scheme No. 40, subject to the following conditions:

1. The proposed development is to comply in all respects with the approved plans.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

2. This Development Approval is valid for a period of 24 months only. If the development the subject of this approval is not substantially commenced within this period, a new approval must be obtained before commencing or continuing with development.

3. Prior to the submission of an application for a Building Permit, a detailed stormwater drainage plan designed by a suitably qualified engineer is to be submitted and approved by the City's Manager Engineering Services. The drainage system is to be installed thereafter prior to the occupation of the development.

4. Prior to the submission of an application for a Building Permit, detailed plans of the upgraded intersection treatment associated with the north-western crossover are to be submitted and approved by the Manager Engineering Services. The intersection is to be constructed thereafter in accordance with the approved plans at the applicant's cost prior to the occupancy of the development.

5. Prior to the occupancy of the development, the existing right of carriageway is to be realigned to match the revised internal road network.

6. Prior to the occupancy of the development, the parking bays identified on the approved plans being constructed and line-marked to the satisfaction of the Manager Engineering Services.

7. Prior to the occupancy of the development landscaping is to be provided in accordance with the approved landscaping plan and maintained thereafter for the duration of the development.

8. The development being connected to the Water Corporation's sewerage system.

9. Access of service vehicles or operation of forklifts must be restricted to the hours of 7:00am to 7:00pm Monday to Saturday and 9:00am to 7:00pm Sunday and public holidays, for the duration of the development.

10. Prior to the submission of an application for a building permit, an Acoustic Report which demonstrates that all mechanical services associated with the proposed development and any other noise source, including service vehicle movements, will comply with the *Environmental Protection (Noise) Regulations 1997*, must be approved by the City's Manager Environmental Health and Compliance Services. All works must be carried out in accordance with the Acoustic Report, and implemented as such for the duration of the development.

11. The existing masonry wall separating this property from the adjacent residential development is to be retained unless a replacement masonry wall is proposed and thereafter constructed to the satisfaction of the City of Canning.

12. A Waste Management Plan (WMP) is required prior to the commencement of construction which shall be to the satisfaction of the City's Manager Waste Services.

13. The provision of a refuse storage enclosure being provided, of an adequate size to contain all bins and oil containers used by the food premises and be constructed with four walls, a graded and sealed floor, provided with a tap connected to an adequate supply of water and provided with a floor waste connected to the sewer.

Advice Notes:

Mr Charles Johnson
Presiding Member, Metro Central JDAP

A. The proposed development is to comply with the provisions of the Building Act 2011, the Building Code of Australia and any other requirements of the City's Building Department.

B. This development must comply with the access and facilities for people with disabilities provisions of the National Construction Code Series (NCC), the Disability (Access to Premises - Buildings) Standards 2010 and associated Australian Standards.

C. This approval does not authorise the demolition of the existing buildings on site. A demolition permit must be obtained from the City prior to the removal/demolition of the existing buildings.

D. In relation to the noise report required by the above Condition 10, all mechanical equipment, which includes compressors, air conditioning units and exhaust canopy exhaust systems, and all service vehicle manoeuvre activities, must be assessed for compliance with the *Environmental Protection Noise Regulations 1997*. The assessment must be undertaken when the systems are operating, to verify that the noise emitted from the units, complies in all respects with the regulations. Ground truthing of this noise is required, and the results must be provided as part of the report, along with the details of any attenuation measures that have been installed.

E. The proponent is advised to consult with the Department of Fire and Emergency Services in relation to water pressure and firefighting requirements.

F. Should the applicant or owner be aggrieved by this decision, a right of review (appeal) may exist under the *Planning and Development Act 2005*.

G. The proposed development is to comply with *Food Act 2008,* the *Food Regulations 2009,* the *Australia New Zealand Food Standards Code* and the *Australian Standard AS4674:2004 Design, construction and fit-out of food premises.* Detailed fit out plans, including elevations, are to be submitted with the building licence application showing all fixtures, fittings and finishes.

H. In respect to Condition 10, the noise sensitive premises that must be used in the final noise report, which confirms compliance with the regulations, are those residential premises in Golf Road, Parkwood.

The Primary Motion, as amended, was put and CARRIED UNANIMOUSLY.

9. Form 2 – Responsible Authority Reports - Amending or cancelling DAP development approval

Nil

10. Appeals to the State Administrative Tribunal

Nil

Mr Charles Johnson
Presiding Member, Metro Central JDAP

11. Meeting Closure

There being no further business, the Presiding Member declared the meeting closed at 11:09am.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

Government of **Western Australia**
Development Assessment Panels

Minutes of the Metro Central Joint Development Assessment Panel

Meeting Date and Time: Thursday, 28 November 2013; 10:30am;
Meeting Number: MCJDAP/47
Meeting Venue: Town of Victoria Park

Attendance

DAP Members

Mr Charles Johnson (Presiding Member)
Mr Ian Hocking (Deputy Presiding Member)
Mr Lou D'Alessandro (Specialist Member)
Cr Vicki Potter (Local Government Member, Town of Victoria Park)
Cr Mark Reynolds (Local Government Member, City of Melville)
Cr Nicolas Pazolli (Local Government Member, City of Melville)

Officers in attendance

Ms Karen Newman, Development Assessment Panels
Mr Julio Gonzalez, Town of Victoria Park
Mr Robert Cruickshank, Town of Victoria Park
Mr Simon Burnell, City of Melville
Mr Peter Prendergast, City of Melville

Local Government Minute Secretary

Ms Alison Podmore

Applicants and Submitters

Ms Mandy Leung, Hillam Architects
Mr David Hillam, Hillam Architects
Mr John Norup, Oracle Projects

Members of the Public

6

1. Declaration of Opening

The Presiding Member, Mr Charles Johnson declared the meeting open at 10:36am on 28 November 2013 and acknowledged the past and present traditional owners and custodians of the land on which the meeting was being held.

The Presiding Member announced the meeting would be run in accordance with the *Development* Assessment *Panel Standing Orders 2012* under the *Planning and Development (Development Assessment Panels) Regulations 2011*.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

2. Apologies

Nil

3. Members on Leave of absence

Nil

4. Noting of minutes

Minutes of the Metro Central JDAP meeting no.45 held on 1 November were noted by DAP members.

5. Disclosure of interests

Nil

6. Declaration of Due Consideration

All members declared that they had duly considered the documents.

7. Deputations and presentations

7.1 Mr David Hillam (Hillam Architects) addressed the DAP for the application at Item 8.1.

The presentation at Item 7.1 was heard prior to the application at Item No. 8.1

7.2 Mr Robert Cruickshank from the Town of Victoria Park addressed the DAP for the application at Item No. 8.1.

7.3 Mr Peter Prendergast and Mr Simon Burnell from The City of Melville addressed the DAP for the application at Item 8.2

7.4 Mr John Norup the Director of 893 Canning Highway Pty Ltd addressed the DAP for the application at Item No. 8.2.

8. Form 1 - Responsible Authority Reports – DAP Applications

8.1

Property Location:	No. 4-12 (Lots 148, 149, 150 & 151) Riversdale Road, Burswood
Application Details:	DA 5.2013.421.1 for Mixed Use Development (Two Offices and 89 Multiple Dwellings)
Applicant:	Hillam Architects
Owner:	Willis Light Engineering Pty Ltd & Ian Leigh Willis
Responsible authority:	Town of Victoria Park
Report date:	11 November 2013

DoP File No: DP/13/00743

REPORT RECOMMENDATION

Moved by: Cr Vicki Potter **Seconded by:** Mr Lou D'Alessandro

That the Metro Central Joint Development Assessment Panel resolves to:

Approve DAP Application reference DP/13/00743 and accompanying amended plans dated received 5 November 2013 in accordance with Clause 30, 36 and 38 of the Town of Victoria Park Town Planning Scheme No. 1, subject to the following conditions:

1. Prior to submission of an application for building permit, Lots 148, 149, 150 and 151 are to be amalgamated into a single lot on a Certificate of Title. (Refer related advice note).

2. Prior to the submission of an application for a building permit an internal and external lighting plan detailing all security and safety lighting for the development shall be submitted to and approved in writing by the Town's Manager Urban Planning and shall be in accordance with Australian Standards. The lighting shall be installed in full accordance with the approved details prior to the first occupation of the development hereby approved, and thereafter maintained.

3. Prior to the submission of an application for a building permit, full details of an external drying area for each residential unit shall be submitted to and approved in writing by the Town's Manager Urban Planning. The clothes drying facilities shall be fully installed and screened from view from surrounding streets in accordance with the approved details prior to the first occupation of the residential units hereby approved.

4. Prior to the submission of an application for a building permit, details of all proposed ventilation and exhaust systems, including the location of plant equipment, vents, and air conditioning units, shall be submitted to and approved in writing by the Town's Manager Urban Planning. All equipment must be adequately screened from view from surrounding streets and residents, and shall be installed in accordance with the approved details prior to the first occupation of the development hereby approved.

5. Prior to the submission of an application for a building permit, the applicant/owner is to contribute a sum of 1% of the value of the development towards public art, being either:

    a) payment directly to the Town which will be placed in the Town's Community Art Reserve with the funds being used for the Town to provide public art within the same Town Planning Scheme Precinct; or

    b) payment to the Town of a bond to the value of the contribution, on the basis that the owner/applicant is to provide public art on the development site in accordance with the procedures outlined in the Town's Public Art Masterplan, which includes the submission of details for approval by Council and review by the Town's Arts and Cultural Advisory Committee.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

The public art is to be completed and installed to the satisfaction of the Director Corporate Services prior to the occupation of the development, at which time the bond will be refunded by council. The public art is to be maintained thereafter by the owner/occupiers; or

c) the applicant/owner entering into a legal agreement with the Town prepared by the Town's solicitors at the cost of the owner/applicant, undertaking to provide public art on the development site in accordance with the procedures outlined in the Town's Public Art Masterplan, which includes the submission of details for approval by Council and review by the Town's Arts and Cultural Advisory Committee. The public art is to be completed and installed to the satisfaction of the Director Business Life Program prior to the occupation of the development. The public art is to be maintained thereafter by the owner/occupiers.

6. Prior to the submission of an application for a building permit, an updated 'Colour and Materials Schedule' shall be submitted to and approved in writing by the Town's Manager Urban Planning in consultation with the Town's Design Review Committee, with the building being finished in accordance with the approved schedule.

7. Prior to the submission of an application for a building permit a Construction Management Plan shall be submitted to and approved in writing by the Town's Manager Urban Planning which includes the route that construction vehicles will take to and from the site, the temporary realignment of pedestrian access ways (including crossing points and lighting), vehicular access to the site during construction, unloading and loading areas, waste disposal, the location on site of building materials to be stored, safety and security fencing, sanitary facilities, cranes and any other details as required by the Town's Manager Urban Planning. Construction works shall take place in accordance with the approved details at all times.

8. Prior to the first occupation of the development hereby approved, all approved car parking spaces together with their access aisles shall be clearly paved, sealed, marked, drained and arranged with the car park so that all vehicles may at all times leave or enter the street in a forward gear. All parking bays and access aisles shall thereafter be maintained to the satisfaction of the Town's Manager Urban Planning.

9. The dimensions of all car parking bays and access ways being to the satisfaction of the Town's Manager Urban Planning, with the following minimum dimensions: 5.4 metres in length and 2.4 metres in width, unless where abutting a wall, column or pier where they must be a minimum of 2.7 metres in width. Disabled persons parking bays shall comply with current Australian Standards. All parking facilities and access ways both internal and external to the development are to comply with AS1428.1 (2009), AS/NZS1428.4 (2009), AS/NZS2890.1 (2004), AS/NZS2890.1 (2004) / Admt 1:2005 and AS2890.5 (1993).

10. A minimum of 17 car parking bays (including the 4 unallocated bays) to be provided on site for the exclusive use of residential visitors. These bays shall be marked for the exclusive use of visitors prior to the first occupation or commencement of the development.

11. A minimum of 5 car parking bays to be provided on site for the exclusive use of the commercial use during normal business hours, and outside of business hours to be used for residential visitors. These bays shall be marked accordingly.

12. Bicycle spaces and end of trip facilities for cyclists to be provided in accordance with the approved plans prior to occupation of the development.

13. Provision being made for a 1.5 metre by 1.5 metre truncation at the intersection of Riversdale Road and the right of way.

14. Provision being made for a 3.0 metre by 3.0 metre truncation at the intersection of the right of ways.

15. All development is to be setback 0.5 metre from the right-of-way for the length of the common boundary with the right-of-way to allow for the future widening of the right-of-way.

16. The area of right-of-way adjacent to this property that is to be widened by 0.5 metres is to be constructed and drained to the Town of Victoria Park's specifications, by the applicant at their expense.

17. Lighting to illuminate that portion of the right-of-way adjacent the subject land is to be provided at vehicle and pedestrian entry points

18. External fixtures, including but not restricted to air-conditioning units, satellite dishes and non-standard television aerials, but excluding solar collectors, are to be located such that they are not visible from the primary street, secondary street or right-of-way.

19. Prior to the submission of an application for a building permit, details of car park signage shall be submitted to and approved in writing by the Manager Urban Planning which illustrates how visitors to the building will be clearly directed by foot and private vehicle to the relevant parts of the development.

20. The applicant is required to undertake a transport noise assessment in accordance with the guidelines of the WAPC State Planning Policy 5.4 *"Road and Rail Transport Noise and Freight Considerations in Land Use Planning"*. The noise report shall pay special consideration in addressing noise amelioration measures for multiple storey dwellings. The applicant shall be responsible for all costs in implementing all the recommendations of the approved report.

21. The right of way(s) to be widened and upgraded by applicant/owner to their expense, to the Town of Victoria Park specifications.

22. This approval is valid for a period of twenty four months only. If development is not commenced within this period, a fresh approval must be obtained before commencing or continuing the development.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

Advice to Applicant:

1. The applicant/owner should refer to the **Requirements of Other Council Business Units**, enclosed with this Planning Approval, which are relevant to the submission of a building permit and/or the carrying out of the development for which this approval is granted. This Planning Approval does not remove the need to obtain licences, permits or other forms of approval that may be required under other legislation or requirements of Council.

2. The Town will permit the Owner to defer compliance with condition No. 1, provided that the Owner enters into a deed of agreement with the Town prepared by the Town's solicitors at the Owner's cost agreeing to complete the amalgamation within 12 months of the issue of the building permit. The agreement shall require the registration of an absolute caveat on the title to the subject land, until such time as the amalgamation has been completed to the Town's satisfaction.

3. Prior to the submission of an application for a building permit, a Resource Efficiency Report including a Management Plan shall be submitted to and approved in writing by the Town's Manager Urban Planning in consultation with the Town's Design Review Committee. The report shall demonstrate that the development is compliant with the Building Code of Australia (BCA) and that it meets the energy standards of the BCA. The development shall be constructed in accordance with the approved details and thereafter maintained.

4. Prior to the submission of an application for a building permit, details of the security intercom system and any security gates to the car park, pedestrian and visitor entries to the development shall be submitted to and approved in writing by the Town's Manager Urban Planning. The development shall be constructed in accordance with the approved details and thereafter maintained.

5. This approval is for the use of the residential units as Multiple Dwellings only and does not include approval for use as Serviced Apartments. Any other use will require the submission of a new application for planning approval.

6. All building works to be carried out under this planning approval are required to be contained within the boundaries of the subject lot.

7. A Drainage Management plan including details of the on-site stormwater disposal including soakwell sizes and locations to be submitted prior to the submission of an application for a building permit.

8. During excavations, all necessary precautions to be taken to prevent damage or collapse of any adjacent streets, right-of-way or adjoining properties. It is the responsibility of the builder to liaise with adjoining owners and if necessary obtain consent prior to carrying out work.

9. Existing crossovers that are not used as part of the development or redevelopment shall be removed and the verge shall be reinstated to the satisfaction of the Director Renew Life Program.

10. This approval does not include the approval of any signage. Any signage for the development to be the subject of a separate sign licence application.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

11. Any modifications to the approved drawings, other than those authorised by the conditions of this approval, may require the submission of an application for Amendment to planning approval and reassessment of the proposal.

12. No earthworks are to encroach onto the Graham Farmer Freeway road reserve.

13. No stormwater drainage shall be discharged onto the Graham Farmer Freeway road reserve.

14. Any damage done to the existing verge and its vegetation within the Graham Farmer Freeway shall be made good at the expense of the applicant.

15. Should the applicant be aggrieved by this decision a right of appeal may exist under the provisions of the Town Planning Scheme or the Metropolitan Region Scheme and the applicant may apply for a review of the determination by the State Administrative Tribunal within 28 days of the date of this decision.

AMENDING MOTION

Moved by: Mr Ian Hocking **Seconded by:** Mr Lou D'Alessandro

That condition 21 be deleted and the remaining conditions be renumbered accordingly.

REASON: Condition 21 was covering the dame issue as Condition 16 and was therefore unnecessary.

The Amending Motion was put and CARRIED UNANIMOUSLY.

PRIMARY MOTION (AS AMENDED)

That the Metro Central Joint Development Assessment Panel resolves to:

Approve DAP Application reference DP/13/00743 and accompanying amended plans dated received 5 November 2013 in accordance with Clause 30, 36 and 38 of the Town of Victoria Park Town Planning Scheme No. 1, subject to the following conditions:

1. Prior to submission of an application for building permit, Lots 148, 149, 150 and 151 are to be amalgamated into a single lot on a Certificate of Title. (Refer related advice note).

2. Prior to the submission of an application for a building permit an internal and external lighting plan detailing all security and safety lighting for the development shall be submitted to and approved in writing by the Town's Manager Urban Planning and shall be in accordance with Australian Standards. The lighting shall be installed in full accordance with the approved details prior to the first occupation of the development hereby approved, and thereafter maintained.

3. Prior to the submission of an application for a building permit, full details of an external drying area for each residential unit shall be submitted to and approved in writing by the Town's Manager Urban Planning. The clothes drying facilities shall be fully installed and screened from view from surrounding streets in accordance with the approved details prior to the first occupation of the residential units hereby approved.

4. Prior to the submission of an application for a building permit, details of all proposed ventilation and exhaust systems, including the location of plant equipment, vents, and air conditioning units, shall be submitted to and approved in writing by the Town's Manager Urban Planning. All equipment must be adequately screened from view from surrounding streets and residents, and shall be installed in accordance with the approved details prior to the first occupation of the development hereby approved.

5. Prior to the submission of an application for a building permit, the applicant/owner is to contribute a sum of 1% of the value of the development towards public art, being either:

   a) payment directly to the Town which will be placed in the Town's Community Art Reserve with the funds being used for the Town to provide public art within the same Town Planning Scheme Precinct; or

   b) payment to the Town of a bond to the value of the contribution, on the basis that the owner/applicant is to provide public art on the development site in accordance with the procedures outlined in the Town's Public Art Masterplan, which includes the submission of details for approval by Council and review by the Town's Arts and Cultural Advisory Committee. The public art is to be completed and installed to the satisfaction of the Director Corporate Services prior to the occupation of the development, at which time the bond will be refunded by council. The public art is to be maintained thereafter by the owner/occupiers; or

   c) the applicant/owner entering into a legal agreement with the Town prepared by the Town's solicitors at the cost of the owner/applicant, undertaking to provide public art on the development site in accordance with the procedures outlined in the Town's Public Art Masterplan, which includes the submission of details for approval by Council and review by the Town's Arts and Cultural Advisory Committee. The public art is to be completed and installed to the satisfaction of the Director Business Life Program prior to the occupation of the development. The public art is to be maintained thereafter by the owner/occupiers.

6. Prior to the submission of an application for a building permit, an updated 'Colour and Materials Schedule' shall be submitted to and approved in writing by the Town's Manager Urban Planning in consultation with the Town's Design Review Committee, with the building being finished in accordance with the approved schedule.

7. Prior to the submission of an application for a building permit a Construction Management Plan shall be submitted to and approved in writing by the Town's Manager Urban Planning which includes the route that construction vehicles

will take to and from the site, the temporary realignment of pedestrian access ways (including crossing points and lighting), vehicular access to the site during construction, unloading and loading areas, waste disposal, the location on site of building materials to be stored, safety and security fencing, sanitary facilities, cranes and any other details as required by the Town's Manager Urban Planning. Construction works shall take place in accordance with the approved details at all times.

8. Prior to the first occupation of the development hereby approved, all approved car parking spaces together with their access aisles shall be clearly paved, sealed, marked, drained and arranged with the car park so that all vehicles may at all times leave or enter the street in a forward gear. All parking bays and access aisles shall thereafter be maintained to the satisfaction of the Town's Manager Urban Planning.

9. The dimensions of all car parking bays and access ways being to the satisfaction of the Town's Manager Urban Planning, with the following minimum dimensions: 5.4 metres in length and 2.4 metres in width, unless where abutting a wall, column or pier where they must be a minimum of 2.7 metres in width. Disabled persons parking bays shall comply with current Australian Standards. All parking facilities and access ways both internal and external to the development are to comply with AS1428.1 (2009), AS/NZS1428.4 (2009), AS/NZS2890.1 (2004), AS/NZS2890.1 (2004) / Admt 1:2005 and AS2890.5 (1993).

10. A minimum of 17 car parking bays (including the 4 unallocated bays) to be provided on site for the exclusive use of residential visitors. These bays shall be marked for the exclusive use of visitors prior to the first occupation or commencement of the development.

11. A minimum of 5 car parking bays to be provided on site for the exclusive use of the commercial use during normal business hours, and outside of business hours to be used for residential visitors. These bays shall be marked accordingly.

12. Bicycle spaces and end of trip facilities for cyclists to be provided in accordance with the approved plans prior to occupation of the development.

13. Provision being made for a 1.5 metre by 1.5 metre truncation at the intersection of Riversdale Road and the right of way.

14. Provision being made for a 3.0 metre by 3.0 metre truncation at the intersection of the right of ways.

15. All development is to be setback 0.5 metre from the right-of-way for the length of the common boundary with the right-of-way to allow for the future widening of the right-of-way.

16. The area of right-of-way adjacent to this property that is to be widened by 0.5 metres is to be constructed and drained to the Town of Victoria Park's specifications, by the applicant at their expense.

17. Lighting to illuminate that portion of the right-of-way adjacent the subject land is to be provided at vehicle and pedestrian entry points

18. External fixtures, including but not restricted to airconditioning units, satellite dishes and non-standard television aerials, but excluding solar collectors, are to be located such that they are not visible from the primary street, secondary street or right-of-way.

19. Prior to the submission of an application for a building permit, details of car park signage shall be submitted to and approved in writing by the Manager Urban Planning which illustrates how visitors to the building will be clearly directed by foot and private vehicle to the relevant parts of the development.

20. The applicant is required to undertake a transport noise assessment in accordance with the guidelines of the WAPC State Planning Policy 5.4 *"Road and Rail Transport Noise and Freight Considerations in Land Use Planning"*. The noise report shall pay special consideration in addressing noise amelioration measures for multiple storey dwellings. The applicant shall be responsible for all costs in implementing all the recommendations of the approved report.

21. This approval is valid for a period of twenty four months only. If development is not commenced within this period, a fresh approval must be obtained before commencing or continuing the development.

Advice to Applicant:

1. The applicant/owner should refer to the **Requirements of Other Council Business Units**, enclosed with this Planning Approval, which are relevant to the submission of a building permit and/or the carrying out of the development for which this approval is granted. This Planning Approval does not remove the need to obtain licences, permits or other forms of approval that may be required under other legislation or requirements of Council.

2. The Town will permit the Owner to defer compliance with condition No. 1, provided that the Owner enters into a deed of agreement with the Town prepared by the Town's solicitors at the Owner's cost agreeing to complete the amalgamation within 12 months of the issue of the building permit. The agreement shall require the registration of an absolute caveat on the title to the subject land, until such time as the amalgamation has been completed to the Town's satisfaction.

3. Prior to the submission of an application for a building permit, a Resource Efficiency Report including a Management Plan shall be submitted to and approved in writing by the Town's Manager Urban Planning in consultation with the Town's Design Review Committee. The report shall demonstrate that the development is compliant with the Building Code of Australia (BCA) and that it meets the energy standards of the BCA. The development shall be constructed in accordance with the approved details and thereafter maintained.

4. Prior to the submission of an application for a building permit, details of the security intercom system and any security gates to the car park, pedestrian and visitor entries to the development shall be submitted to and approved in writing

by the Town's Manager Urban Planning. The development shall be constructed in accordance with the approved details and thereafter maintained.

5. This approval is for the use of the residential units as Multiple Dwellings only and does not include approval for use as Serviced Apartments. Any other use will require the submission of a new application for planning approval.

6. All building works to be carried out under this planning approval are required to be contained within the boundaries of the subject lot.

7. A Drainage Management plan including details of the on-site stormwater disposal including soakwell sizes and locations to be submitted prior to the submission of an application for a building permit.

8. During excavations, all necessary precautions to be taken to prevent damage or collapse of any adjacent streets, right-of-way or adjoining properties. It is the responsibility of the builder to liaise with adjoining owners and if necessary obtain consent prior to carrying out work.

9. Existing crossovers that are not used as part of the development or redevelopment shall be removed and the verge shall be reinstated to the satisfaction of the Director Renew Life Program.

10. This approval does not include the approval of any signage. Any signage for the development to be the subject of a separate sign licence application.

11. Any modifications to the approved drawings, other than those authorised by the conditions of this approval, may require the submission of an application for Amendment to planning approval and reassessment of the proposal.

12. No earthworks are to encroach onto the Graham Farmer Freeway road reserve.

13. No stormwater drainage shall be discharged onto the Graham Farmer Freeway road reserve.

14. Any damage done to the existing verge and its vegetation within the Graham Farmer Freeway shall be made good at the expense of the applicant.

15. Should the applicant be aggrieved by this decision a right of appeal may exist under the provisions of the Town Planning Scheme or the Metropolitan Region Scheme and the applicant may apply for a review of the determination by the State Administrative Tribunal within 28 days of the date of this decision.

The Primary Motion (as amended) was put and CARRIED UNANIMOUSLY.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

8.2	Property Location:	Lot 136 (No.19) Ogilvie Road & Lot 8 (893-897) Canning Highway, Mount Pleasant
	Application Details:	Nine Storey Mixed-Use Development
	Applicant:	893 Canning Highway Pty Ltd
	Owner:	893 Canning Highway Pty Ltd
	Responsible authority:	City of Melville
	Report date:	21 November 2013
	DoP File No:	DP/13/00730

REPORT RECOMMENDATION / PRIMARY MOTION

Moved by: Cr Nicolas Pazolli **Seconded by:** Cr Mark Reynolds

That the Metro Central JDAP resolves to:

Approve DAP Application reference DP/13/00730 and accompanying plans (Site Shadow Diagram, Site Plan, Future Site Access Plan, Basement 02, Basement 01, Ground Floor, Level 01, Level 02, Level 03, Level 04, Level 05, Level 06, Level 07, Level 08, Roof Plan, South Elevation, East Elevation, North Elevation, West Elevation, Section AA, Section BB, Section CC Retaining Wall, Landscape Plan Ground Floor (all dated 21 October 2013) & Landscape Plan Level 01 & 02 and Plant Schedule (both dated 25 October 2013)), in accordance with the provisions of the City of Melville Community Planning Scheme No. 5, subject to the following conditions:

1. Prior to the commencement of the development, Lot 8 (No. 893-897) Canning Highway and Lot 136 (No.19) Ogilvie Road, Mount Pleasant are to be amalgamated and a copy of the updated Certificate of Title to confirm that the amalgamation has taken place shall be provided to the City, for the attention of the Manager Statutory Planning.

2. Prior to the initial occupation of the development, a public access easement over the vehicle access driveway along the southern boundary of the existing Lot 136 (No. 19 Ogilvie Road) is to be provided to the benefit of the City of Melville, pursuant to Section 195 and 196 of the Land Administration Act 1997 to the satisfaction of the Manager Statutory Planning.

3. Prior to the initial occupation of the development, one parallel on-street car parking bay is to be provided and marked within the road reserve to the satisfaction of the Manager Statutory Planning. The cost of all work undertaken is to be at the applicant's expense.

4. Prior to the initial occupation of the development a system shall be put in place to enable the vehicles of visitors to the site access to the parking area at Basement 1 level. Access to the Basement 1 parking area shall thereafter be retained in perpetuity to the satisfaction of the Manager Statutory Planning.

5. Prior to the commencement of the development, a scheme for the provision of Public Art shall be submitted to and approved in writing by the Manager Statutory Planning. The Public Art shall be provided in accordance with Council Policy CP – 085: Provision of Art in Development Proposals, and shall be to the

Mr Charles Johnson
Presiding Member, Metro Central JDAP

written satisfaction of the Manager Statutory Planning. Alternatively, the public art contribution may be satisfied by the provision of cash-in-lieu, also in accordance with Council policy.

6. Any roof mounted or freestanding plant or equipment, including air conditioning units on balconies shall be located and/or screened so as not to be visible from the surrounding street(s) prior to the initial occupation of the development to the satisfaction of the Manager Statutory Planning.

7. All stormwater generated on site is to be retained on site.

8. Prior to the initial occupation of the development, the surface finish of the boundary walls shall be to the satisfaction of the Manager Statutory Planning.

9. Prior to the initial occupation of the development, a signage strategy shall be submitted to and approved in writing by the Manager Statutory Planning. The strategy shall demonstrate how the future signage requirements for all uses are to be accommodated. Once approved, the signage strategy will inform the future assessment of applications for signage on the development.

10. Prior to the commencement of the development, the street tree/s within the verge are to be protected in accordance with Australian Standard AS4970-2009: Protection of trees on development sites.

11. The approved landscaping and reticulation plans shall be fully implemented within the first available planting season after the initial occupation of the development and maintained thereafter to the satisfaction of the Manager Statutory Planning. Any species which fail to establish within the first two planting seasons following implementation shall be replaced in accordance with the City's requirements.

12. Prior to the initial occupation of the development, the rubbish storage area as shown on the approved plans is to be constructed and maintained in perpetuity to the satisfaction of the Manager Statutory Planning.

13. The development shall be serviced by a concrete or brick paved vehicle crossovers with a maximum width of 7 metres (northern crossover) and 6 metres (southern crossover) constructed prior to the initial occupation of the development in accordance with the approved plans and Council's specification to the satisfaction of the Manager Statutory Planning.

14. Prior to the commencement of works, details of the exterior colours, materials and finishes are to be submitted and approved in writing to the satisfaction of the Manager Statutory Planning. Once approved, the development is to be constructed in accordance with those details.

15. No development (including fencing, letter boxes or any other structure) or landscaping over 0.75m in height is to be located within the 1.5m x 1.5m sightline truncation where the vehicle access points meet the road reserve.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

ADVICE NOTES

i. The City is concerned to ensure that its street tree assets are not compromised by development proposals, particularly during the construction phase. As such, you are advised that a zero tolerance approach will be adopted if it is brought to the attention of the City, that the health and/or integrity of any street tree is, or has been undermined.

ii. In order to satisfy Condition 10, the following measures (at a minimum) are required:

- A Tree Protection Zone (TPZ), in the form of a mesh fence (or similar material) is to be installed around each street tree prior to the commencement of works on site, and retained in place until the completion of the development.
- The TPZ is to have a radius of no less than 1.2m from the outside of the trunk of the street tree.
- Once established, no persons, vehicles or machinery are to enter the TPZ.
- No stockpiling of building materials, debris or soil is to occur within the TPZ.
- No fuel, oil dumps or chemicals are allowed or stored within the TPZ.
- No signage or other fixtures are to be attached to the tree.
- The natural ground level of the verge is not to be altered.
- All possible care is to be taken whilst works are occurring on site to ensure that no damage is caused to the tree/s including its trunk, roots and structural branches during construction.

iii. A separate planning application is required for any flood or security lighting.

iv. The Environmental Protection (Noise) Regulations 1997 must be complied with at all times. These regulations stipulate allowable noise levels which if breached constitute unreasonable noise for the purposes of the Environmental Protection Act 1986. These regulations can be obtained from www.slp.wa.gov.au.

v. The rubbish storage area as required by Condition (12) is to satisfy the following:
(a) is provided with a tap and connected to an adequate supply of water;
(b) is of sufficient size to accommodate all receptacles used on the premises;
(c) constructed of brick, concrete, corrugated compressed fibre cement sheet or other material of suitable thickness;
(d) having walls not less than 1.5 metres in height and having an access way of not less than 1 metre in width and fitted with a self closing gate;
(e) containing a smooth and impervious floor -
(i) of not less than 75 millimetres in thickness; and
(ii) provided with an adequate liquid refuse disposal system.

The Report Recommendation/Primary Motion was put and CARRIED UNANIMOUSLY.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

9. Form 2 – Responsible Authority Reports - Amending or cancelling DAP development approval

Nil

10. Appeals to the State Administrative Tribunal

Nil

11. Meeting Close

There being no further business, the presiding member declared the meeting closed at 11:30am.

Mr Charles Johnson
Presiding Member, Metro Central JDAP

Government of **Western Australia**
Development Assessment Panels

Form 1 - Responsible Authority Report

(Regulation 12)

Property Location:	• Lot 702 (215) Great Eastern Hwy • St Lots 1-5 (223 and 223A) Great Eastern Hwy and (22 and 24) Hargreaves St • Lot 4 (7) Belgravia St • Lot 180 (9) Belgravia St
Application Details:	Complex of four (4) buildings comprising: • Hotel (240 rooms) • 36 Serviced Apartments • 88 Multiple Dwellings • Restaurant • Office • Showrooms • Consulting Rooms • Lunch Bar • Fast Food / Takeaway
DAP Name:	Metro Central JDAP
Applicant:	Design Inc Perth Pty Ltd
Owner:	Great Eastern Group Pty Ltd
LG Reference:	10/2013/DAP
Responsible Authority:	City of Belmont
Authorising Officer:	Neville Deague – Director Community and Statutory Services
Department of Planning File No:	DP/13/00715
Report Date:	Submitted to DAP on 3 December 2013
Application Receipt Date:	23 August 2013
Application Process Days:	90 Days; extended by consent – Reg. 12(4) of *Planning and Development (Development Assessment Panels) Regulations 2011*
Attachment(s):	1 – Development Plans (7 November 2013) 2 – Applicant's Design Report (7 November 2013) 3 – Submissions Table 4 – Main Roads WA referral response (26 November 2013) 5 – Department of Planning (Infrastructure and Land Use Coordination) referral response (20 November 2013) 6 – Perth Airport referral response (21 November 2013) 7 – Transport Impact Assessment (Rev. I, November 2013)

Recommendation:

That the Metro Central JDAP resolves to:

Approve DAP Application reference DP/13/00715 and accompanying plans dated 7 November 2013 in accordance with the provisions of the City of Belmont's Local Planning Scheme No. 15, subject to the following conditions:

Conditions

1. The development plans, as dated marked and stamped "Development Assessment Panels Approved", together with any requirements and annotations detailed thereon, are the plans approved as part of this application and shall form part of the planning approval issued.

2. Lots 702, 4, 180 and Strata Lots 1-5 shall be amalgamated and a new Certificate of Title obtained for the amalgamated lot prior lodgement of an application for building permit.

3. A geotechnical report prepared for the City by an appropriately qualified consultant shall be lodged with the City, at the cost of the owner/applicant, prior to an application for a building permit, to the satisfaction of the City's Manager Projects and Development.

4. A detailed landscaping and irrigation plan for the subject development site and street verge is to be prepared by the owner/applicant and submitted to the City for approval within 60 days from the date of this planning approval.

5. Prior to occupation or use of the development, landscaping, plants and irrigation are to be installed and thereafter maintained in accordance with the approved landscaping and irrigation plan for the duration of the approved development at the cost of the owner/applicant, to the satisfaction of the City's Manager Parks and Environment.

6. No existing turf, irrigation or street trees located in the road verge abutting or adjacent to the subject land may be damaged or removed during the course of the development, unless separately approved in writing by the City.

7. Prior to occupation or use of the development, noise attenuation measures in accordance with SPP5.4 shall be implemented by the owner/applicant, to the satisfaction of the City's Director Community and Statutory Services, Manager Planning Services or Coordinator Planning Services.

8. No services, such as air conditioners or water heaters shall be visible from the street.

9. All clothes drying devices and clothes drying areas shall be located and positioned so as not to be visible from the street or a public place.

10. Storerooms with a minimum area of 4m² and a minimum dimension of 1.5m, accessible from outside the dwelling shall be provided for each dwelling.

11. The occupancy of the Conference/Meeting Room on the Podium Level of the development shall be limited to a maximum of 80 persons at any one time.

12. Prior to occupation or use of the development, vehicle parking, manoeuvring and circulation areas shall be designed, constructed, sealed, drained, line marked and kerbed in accordance with:

    (a) The approved plan (a total of 390 spaces that comply with AS 2890.1);
    (b) Schedule 11 of City of Belmont Local Planning Scheme No. 15; and
    (c) Council's engineering requirements and design guidelines.

    The areas must be sealed in concrete or brick paving in accordance with the City of Belmont specifications, unless otherwise approved by the City's Director Technical Services. All parking bays must be clearly line marked.

13. Prior to use or occupation of the development, an Access and Parking Management Plan shall be prepared at the applicant's cost to the satisfaction of the City, and thereafter implemented for the life of the development.

14. A minimum of 93 bicycle bays and the associated end of trip facilities are to be installed prior to use/occupation of the development, and maintained for the life of the development to the specifications contained within the City's Supplementary Planning Guidelines for End of Trip Facilities, to the satisfaction of the City's TravelSmart Officer.

15. All access ways, parking areas and hard stand areas shall be maintained in accordance with the City's engineering requirements and design guidelines.

16. Prior to occupation or use of the development, the redundant vehicle crossovers to the subject lot/s shall be removed and the verge/footpath made good at the cost of the owner/applicant, in accordance with the City of Belmont's engineering requirements and design guidelines.

17. Prior to occupation or use of the development, the owner/applicant shall submit an application for construction of a vehicle crossover/s to City's Technical Services. Upon receipt of approval from the City's Technical Services, construction of the crossover/s shall be undertaken in concrete, brick paving or hot mix in accordance with the City of Belmont crossover specifications.

18. A Stormwater Management Plan to satisfy the City of Belmont's engineering requirements and design guidelines shall be submitted for approval by the City prior to application for a building permit.

19. The applicant shall prepare and submit a Construction Management Plan to the satisfaction of the City's Manager Projects and Development prior to commencement of any site works or construction associated with the development.

20. No earthworks shall encroach onto the Great Eastern Highway road reserve.

21. No stormwater drainage shall be discharged onto the Great Eastern Highway road reserve.

22. Any damage caused by the development to the Great Eastern Highway verge shall be made good at the cost of the owner/applicant.

23. At least two weeks prior to the use of any cranes during the construction of the development, the applicant shall contact and refer the matter to Perth Airport's Senior Airports Operations Officer (phone 9478 8424, mobile 0419 195 790).

24. Within 60 days from the date of this planning approval, a public art concept/strategy for the subject development to the value of $650,000 shall be submitted to the City in accordance with the provisions of the City of Belmont Public Art Contribution Local Planning Policy, to the satisfaction of the City's Director Community and Statutory Services or Manager Planning Services.

25. The approved public art concept/strategy shall be thereafter implemented and the artwork constructed prior to use/occupation of the development, and maintained for the life of the development to the satisfaction of the City's Director Community and Statutory Services.

26. Prior to occupation of the development, a detailed Waste and Rubbish Collection Management Plan shall be submitted for the approval of the City's Manager Health and Rangers Services. The approved waste and rubbish collection management plan shall be thereafter implemented for the life of the development.

Footnotes

1. A planning approval is not an approval to commence any works associated with the development. A building permit must be obtained prior to commencement of any site and building works. An application for a building permit will not be accepted unless proof of payment of all bonds and guarantees accompanies the application documents.

2. Fire requirements to be in accordance with the Building Code of Australia.

3. As of the 1 July 2003, Energy Efficiency requirements were implemented via the Building Code of Australia (BCA) Volume 2 and all residential buildings need to comply with the 'deemed to satisfy' requirements, or alternatively a compliant Energy Audit Report can be submitted by an accredited person. Please be advised that the granting of planning approval from the City is no indication that the approved plans conform to the BCA Volume 2 as amended.

4. Where construction works of the development may encroach onto the road reserve (verge) the applicant shall obtain a Materials On Verge licence for the entire verge for the entire duration of construction works.

5. In regard to Condition 2 the applicant is advised that should the owners wish to have a Building Permit issued prior to amalgamating the lots, then the City may permit the owner to enter into a legal agreement with City to defer the

satisfaction of the condition. The legal agreement must be prepared by the City's solicitors (at the owner's full cost), finalised and signed, and then registered as an absolute caveat on the property's certificate of title prior to application for a building permit being submitted.

Please note that a legal agreement must be requested by the owner, in writing, and all costs associated with the preparation of a legal agreement and lodgement of a caveat must be borne by the owner. Generally legal agreements take three to four weeks to be prepared and therefore any such request should be lodged promptly with the City's Planning Department.

6. The required geotechnical report under Condition 3 must identify the geotechnical conditions of the site (including acid sulphate soils) and certify to the City that any earthworks proposed are structurally sound. The earthworks must be carried out in accordance with the geotechnical report as modified (if at all) by the City. Due to excavation to proposed basement levels, the suitability of soil conditions and water table for drainage purposes shall be confirmed with the results of geotechnical investigation.

7. The plan required by Condition 4 shall be a minimum size of A3, and is to contain a north point and a scale. The plan must show by numerical code, the botanical name of each plant species, proposed pot size, quantity and must also include the proposed treatments of:

   (a) all areas of the property visible from the street; and
   (b) the street verge.

8. In relation to Condition 5, the plants are to be nurtured until they reach their typical mature dimensions, and shall thereafter be maintained at those mature dimensions unless Council approves otherwise in writing.

9. This planning approval is not approval for the removal or alteration of any turf, irrigation or street tree. If during the course of the development any existing turf and/or irrigation is damaged or destroyed, the owner/applicant shall:

   (a) repair, reinstate or replace the item in accordance with any written direction of the City's Manager Parks and Environment; and
   (b) thereafter maintain the item for a period of 12 months, to the satisfaction of the City's Manager Parks and Environment.

   If during the course of the development any existing street tree is damaged or destroyed, the City shall repair or replace the street tree in accordance with any written direction of the City's Manager Parks and Environment. The owner/applicant shall:

   (a) be responsible for any costs associated with repair or replacement; and
   (b) thereafter maintain the street tree for a period of 12 months, to the satisfaction of the City's Manager Parks and Environment.

10. In relation to Condition 14, the City may at its discretion consider a reduced provision of bicycle parking spaces. The applicant is advised to liaise with the City's Planning Department in this regard.

11. In relation to Condition 15, in the event that access ways, parking areas and hard stand is not satisfactorily maintained, the City's Director Technical Services may require by notice, in writing, that the area be brought up to a satisfactory standard within a specified period of time and the notice shall be complied with within that period. Without limitation, the notice may require that lines marking car bays be re-painted, pot holes be repaired, damaged kerbs be replaced and degraded access or parking areas be resurfaced generally in accordance with Council's Engineering Requirements and Design Guidelines.

12. Council's Engineering Requirements and Design Guidelines contains detailed specifications which must be adhered to in the preparation of plans submitted for approval in respect of such matters as drainage, paving, parking, accessways, crossovers, land fill and retaining.

13. Neither a planning approval nor a building license constitutes an approval to construct a crossover to a property. Prior to occupation or use of the development, a separate application must be made to the City's Technical Services Department for approval to construct a crossover to the property (i.e. from the road to connect with the property's internal driveway). Failure to submit a separate application for crossover approval may result in delays in receiving a vehicle crossover subsidy.

14. Signage is not approved as part of this application. A separate application for planning approval and building permit is required prior to display of any advertisements/signage.

15. In relation to Condition 18, a combination of on-site and off-site stormwater drainage with implementation of interconnected soakwells and connection to the City's stormwater system at the existing connection points on Belgravia Street and Hargreaves Street is required. The applicant is advised to liaise with the City's Technical Services Department in this regard.

16. Conditions 20-22 have been applied by Main Roads WA, the applicant is advised to contact Main Roads on (08) 9323 4214 quoting reference number 13/7832 (D13#668222) with regard to any queries relating to these conditions.

17. A separate approval is required from the Commonwealth Department of Infrastructure and Regional Development as the proposed development exceeds the 61m AHD limit and penetrates the Inner Horizontal Surface of the Perth Airport Obstacle Limitation Surfaces. The applicant is advised to contact Perth Airport's Planning Officer on (08) 9478 8479 in regard to making this application.

18. In relation to Conditions 24 and 25, the City's Community Wellbeing Services will be required to give final consent for the proposed public art, including any cash-in-lieu arrangement. Full details and specifications should be submitted at the earliest opportunity to ensure that the finalisation of the public art does not delay the progression of the development.

19. In relation to Condition 26, please liaise with the City's Manager Health and Rangers Services for details regarding the finalisation of the Waste and Rubbish Collection management plan.

20. The applicant and owner are advised that the City's Rates Department will confirm under separate letter the street numbering applicable for this property.

This decision constitutes planning approval only and is valid for a period of two (2) years from the date of approval. If the subject development is not substantially commenced within the two (2) year period, the approval shall lapse and be of no further effect.

Background:

Property Address:		215, 223 and 223A Great Eastern Highway, 22 and 24 Hargreaves Street and 7 and 9 Belgravia Street, Belmont
Zoning	MRS:	Urban
	LPS:	Mixed Business
Use Class:		• Hotel – 'A' • Serviced Apartments – 'A' • Multiple Dwellings – 'A' • Restaurant – 'D' • Office – 'P' • Showroom – 'P' • Consulting Rooms – 'P' • Lunch Bar – 'P' • Fast Food / Takeaway – 'A'
Strategy Policy:		N/A
Development Scheme:		N/A
Lot Size:		7,876m² (Total Site Area)
Existing Land Use:		• Marine Sales and Repair (Non-conforming use) • Motor Vehicle Hire (Non-conforming use)
Value of Development:		$65,000,000

Subject Land

- The subject land as shown on Figure 1 is comprised of Lot 702 (215) Great Eastern Highway, Strata Lots 1-5 (223 and 223A) Great Eastern Highway and 22 and 24 Hargreaves Street, Lot 4 (7) Belgravia Street, and Lot 180 (9) Belgravia Street, Belmont.

- The land is currently being used for Marine Sales and Repair and Motor Vehicle Hire activities. Both of these land uses benefit from a non-conforming use right under Part 4.8 of Local Planning Scheme No. 15 (LPS15).

- The subject land has street frontages to Hargreaves Street to the northeast, Great Eastern Highway to the northwest and Belgravia Street to the southwest.

- The neighbouring properties on 28 Hargreaves Street and 13 Belgravia Street are occupied by Office/Warehouse land uses. Belmont Primary School is located on the opposite side of Belgravia Street from the subject land.

Figure 1 – Aerial Photography of Subject Land

Details:

The subject proposal is for development of a mixed use complex in the built form of a four-storey podium with four (4) towers ranging from eight (8) to sixteen (16) storeys in height. The complex comprises the following:

- Hotel Block (16 storeys):
  - 240 Hotel rooms
  - Restaurant
  - Meeting/Conference room
  - Lobby Café
  - Gym
  - Lounge/Bar
  - Lobby Shop

- Mixed Development Block 1 (14 storeys):
  - Office
  - 36 Multiple Dwellings (Single Bedroom)
  - 36 Serviced Apartments (Single Bedroom)
  - Showroom

- Mixed Development Block 2 (8 storeys):
  - Lunch Bar
  - Fast Food/Takeaway
  - 22 Multiple Dwellings (2 Bedroom)

- Mixed Development Block 3 (10 storeys):
  - Consulting rooms
  - Showroom
  - 30 Multiple Dwellings (3 Bedroom)

There are a total of 390 car parking spaces provided onsite for the complex. The majority of car parking spaces are accommodated within the podium levels of the development.

The development plans for the proposal are contained in Attachment 1. Attachment 2 contains a Design Report prepared by the applicant explaining the proposal.

Legislation & Policy:

Legislation

- Metropolitan Region Scheme (MRS)

  The subject site is zoned Urban under the MRS as shown in Figure 2. The site appropriately zoned under the MRS for the proposed development.

Figure 2 – Extract from MRS map

- Local Planning Scheme No. 15 (LPS15)

  The subject site is zoned 'Mixed Business' under City of Belmont LPS15. An extract of the LPS15 zoning map is shown in Figure 3.

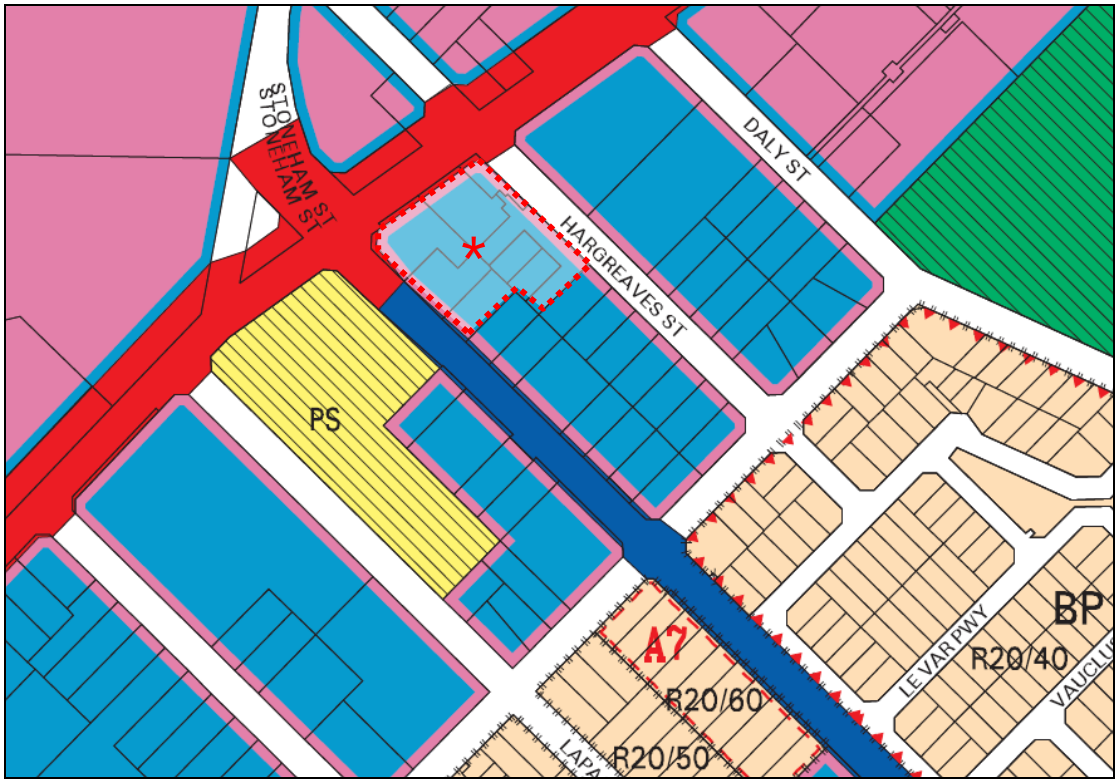


Figure 3 – Extract from LPS15 map

Clause 4.2 of LPS15 outlines the objectives of the Mixed Business zone as allowing a mix of varied but compatible business uses, eating establishments and appropriate industrial activities which do not generate nuisances detrimental to the amenity of the locality. Buildings should be of a high standard of architectural design set in pleasant garden surrounds with limited access from properties to primary roads.

Clause 4.3.2 of LPS15 requires advertising of applications in accordance with Clause 9.4 where proposed developments have an 'A' land use classification.

Part 5.5 of LPS15 provides discretion for the local government to approve variations to development standards or requirements prescribed under the Scheme.

Part 5.12 of LPS15 outlines the standards for development in the Mixed Business zone. The standards include maximum lot coverage limits, boundary setback requirements, vehicular access requirements and building design requirements.

Part 5.16 and Table 2 of the Scheme outlines standards for vehicle parking and loading. Part 5.17 and Table 3 of the Scheme specifies bicycle parking and end of trip facility requirements.

Part 5.19 provides matters to be considered in determining development applications for multi-storey building along Great Eastern Highway.

Clause 5.20 of LPS15 states that the height of structures within the Scheme Area shall be subject to, and not exceed, the WAC Structures Height Control Contours Map contained in Schedule 12.

Part 9.4 of LPS15 outlines the requirements for advertising of development proposal prior to determination of the application.

Part 10.1 of the Scheme provides that the local government may consult with any other statutory, public or planning authority it considers appropriate.

Part 10.2 of LPS15 outlines the matters to be considered by the local government in determining a planning application. The following matters are of particular relevance to this application:

- 10.2(i) – the compatibility of a use or development with its setting;
- 10.2(n) – the preservation of the amenity of the locality;
- 10.2(o) – the relationship of the proposal to development on adjoining land or on land in the locality including the height, bulk, scale, orientation and appearance of the proposed development;
- 10.2(p) – vehicle access, egress, loading, unloading, manoeuvring and parking arrangements;
- 10.2(q) – the generation of traffic and the impact on the capacity of the road system, including the effect on traffic flow and safety;
- 10.2(y) – any relevant submissions received on the application; and
- 10.2(z) – the comments or submissions received from any authority consulted.

<u>State Government Policies</u>

- State Planning Policy 5.4 (Road and Rail Transport Noise and Freight Considerations in Land Use Planning)

State Planning Policy 5.4 (SPP5.4) seeks to minimise the adverse impact of transport and freight noise on noise-sensitive developments. The policy does this primarily by:

- Identifying the situations in which it would be appropriate to assess proposals for transport noise impacts.

- Establishing noise criteria to be used in the assessment of these proposals.

- Identifying measures that can be adopted to reduce road and rail transport noise in these instances.

In summary, the Policy requires noise-sensitive development in the vicinity of a major road to comply with certain noise targets and limits. In doing so, additional noise mitigation measures may apply, as outlined in the Policy.

Local Policies

- Local Planning Policy No. 11 (Public Art Contribution Policy)

  Local Planning Policy No. 11 (LPP11) requires the provision of public art for developments with a value in excess of $4.5 million in certain zones. The subject land is within the Mixed Business Precinct as identified in LPP11 and is required to provide a public art contribution equivalent to 1% of the estimated cost of development.

Consultation:

Public Consultation

The proposal includes development of a Hotel, Serviced Apartments, Multiple Dwellings and a Fast Food/Takeaway establishment which have an 'A' land use classification in the Mixed Business zone. Part 9.4 of the Scheme requires a 14-day mandatory advertising period for any development incorporating land uses with an 'A' classification.

Notwithstanding the above, taking into account the significance of the proposed development, the City's Officers considered it appropriate to provide landowners and occupiers in the locality an opportunity to comment on the proposal in general. The proposal was advertised for a 14-day period from 6 November 2013 to 19 November 2013 inclusive. Figure 4 below shows the properties to which the proposal was advertised.

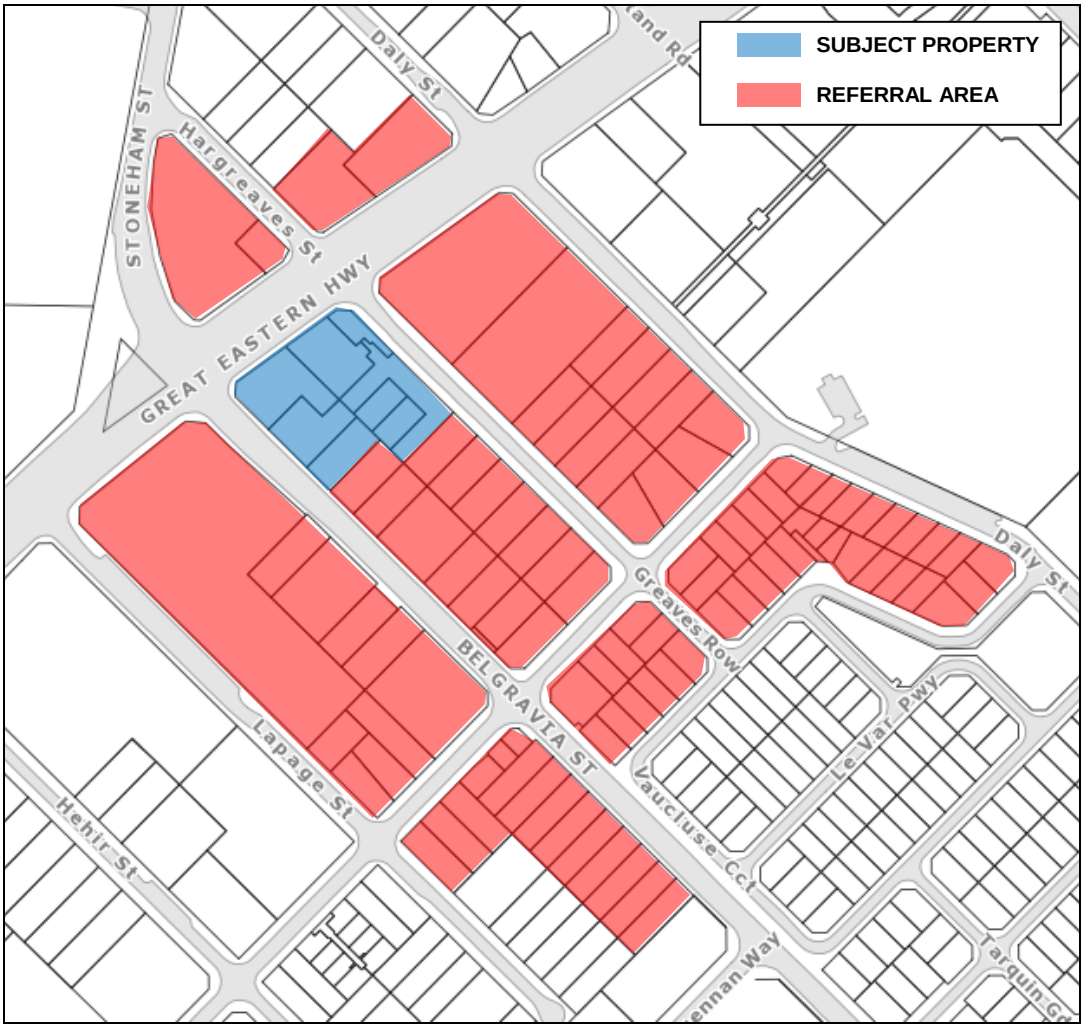


Figure 4 – Referral Area

Three submissions were received during the advertising period. All three submissions objected to the proposed development raising concerns over the impact of additional traffic generated from the development on the local roads (Barker Street), the impact of noise generated from the proposed development, the scale and the suitability of the development in its setting, overshadowing from the development, and concerns over the lack of parking in the area resulting in parking on local roads.

In addition to the three submissions, one late submission was received. This submission was in support of the proposal on the provision that the development does not impact on the local residents' quiet enjoyment of the area.

A summary of the submissions is provided in the Submissions Table (Attachment 3).

Main Roads WA

The subject land abuts the Great Eastern Highway Primary Regional Road (PRR) Reserve. The proposal was therefore referred to Main Roads WA for their comments and recommendations. Main Roads did not support the proposal initially as the Transport Impact Assessment (TIA) submitted by the applicant lacked information required by Main Roads to complete their assessment. The applicant subsequently submitted an updated TIA.

Main Roads provided a further response (26 November 2013) indicating that they do not object to the proposal subject to development conditions:

1. To relocate the crossover on Belgravia Street to avoid conflict with the school crossing.

2. Prohibiting encroachment of earthworks onto the PRR reserve.

3. Prohibiting discharge of stormwater onto the PRR reserve.

4. Requiring the removal of redundant crossovers and making good of the verge at the applicant's cost.

5. Requiring the applicant to make good any damage caused by the development to the Great Eastern Highway verge.

It is noted that revised development plans (7 November 2013) indicates a crossover location on Belgravia Street that does not conflict with the existing school crossing. This satisfies Condition 1 of Main Road's recommendation.

A copy of the referral response is contained in Attachment 4.

Department of Planning

The subject land abuts the Belgravia Street Other Regional Road (ORR) Reserve. The proposal was therefore referred to the Department of Planning's Infrastructure and Land Use Coordination branch for their comments and recommendations. The Department has no objection to the proposal subject to the following matters being taken into consideration:

- Given the proposed car parking reciprocity among the land uses within the development, an Access and Parking Management Plan will need to be developed and implemented by the proponent to the satisfaction of the City of Belmont.

- Land requirement and other matters that may be identified by Main Roads WA in relation to the Great Eastern Highway PRR reserve need to be addressed.

- Inconsistencies between the Traffic Impact Assessment and 'Access Planning 05' plan dated November 2013 are noted and need to be amended accordingly.

- The additional impact that taxi trips will have on the local road network.

- SIDRA analysis to be carried out on the Belgravia Street / Barker Street intersection to determine the impact on this intersection and to inform any modifications that may need to be made to the intersection.

A copy of the Department's referral response is contained in Attachment 5.

Perth Airport

The subject land is located between the Perth Airport's 50m and 60m maximum height contours as indicated on Schedule 12 of LPS15. As the height of the

proposed development exceeds 50m, the proposal was referred to Perth Airport for their comments and recommendations. Perth Airport do not object to the proposal but noted that the 64m height of the proposed development exceeds the prescribed 61m and penetrates the Protected Airspace. The proposal would therefore need to be further assessed by Airservices Australia (ASA) and the Civil Aviation Safety Authority (CASA); these assessments together with comment from the City of Belmont and Perth Airport must then be forwarded to the Commonwealth Department of Infrastructure and Regional Development (DoIRD) for approval.

Perth Airport further notes the proximity of the proposed development to one of the final approach paths into the airport, and recommend that non-reflective materials are used in the construction of the development to ensure that there is no reflection that may distract pilots and compromise the safety of operations into and out from the airport. Similarly, the velocity of any atmospheric emissions from the site must be below the Protected Airspace and must not exceed 4.3m/s. Where reflected light and emissions exceed the specified limits, further approval is required from DoIRD.

Perth Airport further advises that any cranes used during the construction of the development must be referred to them for approval.

A copy of Perth Airport's referral response is contained in Attachment 6.

Planning assessment:

The subject development has been assessed by the City of Belmont in accordance with LPS15 and the relevant local and state planning policies. The table below is a summary of the assessment against the development requirements:

Land Use	Any use with a use class of P, D or A may be considered.	• Hotel – 'A' • Serviced Apartments – 'A' • Multiple Dwellings – 'A' • Restaurant – 'D' • Office – 'P' • Showroom – 'P' • Consulting Rooms – 'P' • Lunch Bar – 'P' Fast Food / Takeaway – 'A'	• The Scheme permits 'P' uses. • The Scheme provides discretion for approval of 'D' uses. • The Scheme provides discretion for approval of 'A' uses subject to advertising.
Site Coverage	60%	49% (3850m²) approx.	Complies.
Plot Ratio	Not specified – to be determined at Council's discretion	**2.05 (approx.)**	**Residential component aligns with R-AC3 standard under R-Codes.** **Refer to discussion section of this report.**
Building Height	Not specified – to be determined at Council's discretion	**16 Storeys (max.) – 65m.**	**Proposed building height is considered to be appropriate, but further approval is required from the Commonwealth**

			Department of Infrastructure and Regional Development. **Refer to discussion section of this report.**
Setbacks (LPS15)	15m to Primary St, 7.5m to Secondary St	17m from Great Eastern Hwy, 14.5m from Belgravia St and Hargreaves St.	Complies.
Building Facades	Primary and secondary street facades to be predominantly constructed of brick, concrete, glass or steel or a combination of these materials acceptable to the City	Combination of concrete, cladding and glass construction.	Complies.
Street Fencing	Walls and fences within primary and secondary street frontages to be high quality, visually permeable and visually appealing	No fencing proposed.	Complies.
Landscaping	3m to Primary St, 1m to Secondary St	No landscaping details provided.	**Condition requiring applicant to comply with landscaping requirement under LPS15.**
Car Parking	Total of 551 car parking spaces required in accordance with Table 2 of LPS15.	Total of 390 car parking spaces proposed. Applicant has provided information on reciprocal use of car parking spaces.	**Significant shortfall of car parking if separate uses are individually assessed applying the respective standards. Reciprocity of car parking as proposed is considered appropriate.** **Refer to discussion section of this report.**
Bicycle Parking/End of Trip Facilities	Total of 93 bicycle parking spaces required as specified under Table 3 of LPS15 and 6.3.3(C3.2) of the R-Codes.	124 indicated on development plans.	Complies. **Condition to require installation of bicycle parking facilities.**
Residential Design Codes	As outlined under Part 6 of the R-Codes, standards for design elements such as the provision of storerooms, balconies, visual privacy and dwelling size/diversity apply for the residential component of the proposed development.	The residential component of the development is compliant with the 'deemed to comply' standards under the R-Codes in relation to: • Provision of a 4m² for each dwelling; • Provision of a	**The development proposes a variation to the 'deemed to comply' provision of the R-Codes in regard to dwelling diversity, however a variety of dwellings types/sizes is provided and is considered to be consistent with the intent of the R-Codes.** **Refer to discussion section of this report.**

		10m² balcony for each dwelling; and • Visual privacy. The development proposes: • 41% single-bedroom dwellings; • 25% two-bedroom dwellings; and • 34% three-bedroom dwellings.	**Notwithstanding the above, a planning condition has been recommended to guarantee the provision of a storeroom for each dwelling.**
Traffic / Vehicular Access	Minimise access to Great Eastern Hwy / Easement in Gross, traffic volume generated from proposed development etc.	Vehicle access via Hargreaves St and Belgravia St. Applicant has provided comprehensive Transport Impact Assessment (TIA).	**A number of discrepancies have been identified in the TIA, however, the overall findings are considered acceptable.** **Refer to discussion section of this report.**
Waste Management	Provision of bin storage, truck access for on-site collection	Preliminary plan indicates location of bin store and truck movement for bin collection.	**The Waste Management Concept Plan submitted by the applicant is considered to be appropriate, a condition of planning approval requiring a comprehensive Waste Management Plan has been recommended.** **Refer to discussion section of this report.**
Noise Attenuation	Comply with SPP5.4	The applicant has not provided information relating to compliance with SPP5.4.	**A condition requiring compliance with SPP5.4 has been recommended.** **Refer to discussion section of this report.**
Public Art	1% of estimated development cost ($65million)	**No information provided in relation to a public art proposal for the development, however, the applicant has acknowledged the requirement for a public art contribution.**	**A condition requiring a public art contribution has been recommended.** **Refer to discussion section of this report.**

Table 1 – Assessment of Proposal

Discussion:

Amalgamation of Land Parcels

The development straddles a number of land parcel boundaries. It is appropriate for the land parcels to be consolidated to be consistent with the parameters of the proposed development. A condition of planning approval for amalgamation of the land parcels has been recommended.

There are land requirements for future road upgrading purposes along Belgravia Street and Great Eastern Highway. It is noted that the development does not conflict with the land required for future road purposes. Given the requirement to amalgamate the lots, it is appropriate for the portions of land to be excised at the amalgamation stage.

Submissions

Submissions received from the advertising of this proposal raised concerns over a number of matters, primarily relating to the scale of the development, generation of additional traffic, generation of additional on-street parking, and overshadowing. It is noted that various other matters outlined in the submissions are not considered relevant and are inadmissible for the purpose of determining a planning application. A summary of the submissions and Officer Comments are contained in the Submissions Table (Attachment 3)

The matters considered relevant for the planning assessment of this application are discussed in further detail below.

Land Use Permissibility

Under Table 1 of LPS15, the Hotel, Serviced Apartment, Multiple Dwellings and Fast Food/Takeaway land use activities in the Mixed Business zone have an 'A' classification. This means that the use is not permitted unless the local government has exercised its discretion by granting planning approval after advertising the proposal in accordance with Clause 9.4 of the Scheme. Given this, it is essential to consider matters raised in the advertising process with regard to the land use. The submissions opposed to the proposal objected for a number of reasons, but did not object to the land use activities. The submission in support of the proposed development considered that the development improves the amenity of the area. Further, taking into account the significant number of properties included in the advertising area, it is considered that the land use activities do not cause concern for the property owners and occupiers in the locality.

Notwithstanding the above, the mix of land uses is considered consistent with the intent of the Mixed Business zone by incorporating compatible land uses such as hotel accommodation, housing, offices, showrooms and eating establishments.

Plot Ratio

LPS15 does not specify maximum permitted plot ratios for development in the Mixed Business zone. The acceptable plot ratio shall therefore be determined at the discretion of the Panel, having regard for the merits of the proposal.

It is noted that for residential elements of mixed used development within non R-Coded land, a maximum plot ratio 2.0 is specified under Table 4 of the R-Codes (R-AC3 code). The residential component of the development is compliant with the R-Code standard with a plot ratio of 0.84. The plot ratio for the whole development is 2.42.

In essence, plot ratio is a planning instrument intended to control the floor area and consequently the intensity of development. When coupled with maximum site coverage and building height controls, plot ratio also limits the building bulk of a development.

The proposal is compliant with the maximum 60% site cover specified under LPS15, and the building height is considered to be acceptable (as outlined in the 'Building Height' section below). Given this, the appropriateness of the floor area is to be considered. The critical constraint on floor area in this instance is the ability to accommodate all the car parking required by the various land uses onsite. As will be discussed in the Car Parking section below, it is considered that there is an appropriate number of car parking spaces provided for this development. On this basis, the plot ratio of the proposed development is considered acceptable.

Building Height

As with plot ratio, LPS15 does not specify maximum permitted building heights for development in the Mixed Business zone. The appropriate maximum building height shall therefore be determined at the discretion of the Panel.

The subject site is affected by the Perth Airport height control as indicated on Schedule 12 of LPS15. In providing a referral response to the City, Perth Airport have indicated that they have no objection to the proposed height of the development, but have indicated that given the 64m structure exceeds the 61m height control limit, a further approval is required from the Commonwealth Department of Infrastructure and Regional Development (DoIRD). The proposed building height is therefore acceptable in this regard.

Submissions from public advertising of the proposal have raised concern that the height of the proposed development is incompatible with the two to four storey height of existing development in the locality. However, it is noted that the majority of properties in the vicinity of the subject site are relatively old, and redevelopment of those properties is foreseeable. There is opportunity for the City to consider heights above two to four storeys when redevelopment occurs on the other properties in the Mixed Business and Mixed Use zones.

In addition to the above, the property encompasses the street block frontage to Great Eastern Highway between Belgravia Street and Hargreaves Street; this provides separation from the primary school building across Belgravia Street and from the building accommodating the business across Hargreaves Street. The separation mitigates the disparity of the building heights as viewed from Great Eastern Highway and the City considers this acceptable.

The development has a podium and tower type design which is acceptable to the City as a means to ameliorate the impact of building height. The tower component of the development is setback from the façade of the podium which enhances the legibility of the four storey podium while masking the height of the tower as viewed from the street level. The podium and tower type design is considered to provide an appropriate interface between the subject development and the existing buildings on the street block as viewed from Belgravia Street and Hargreaves Street.

Notwithstanding the above, the significant height of the proposed development is acknowledged. The City considers the subject site ideal for accommodating high-rise development given the site's relationship to Great Eastern Highway and Belgravia Street. It is considered important for development along Great Eastern Highway to respond to the significance of the highway being the primary road link between Perth Airport and Perth City.

Similarly, the Belgravia Street, Fairbrother Street and Abernethy Road forms the critical link between the northwest entry to the City of Belmont and the Kewdale Industrial area. In addition to the road links, the site forms an extension to the City's Golden Gateway Precinct. The Golden Gateway is a business precinct bounded by Stoneham Street, Resolution Drive and Great Eastern Highway as shown in Figure 5 below.

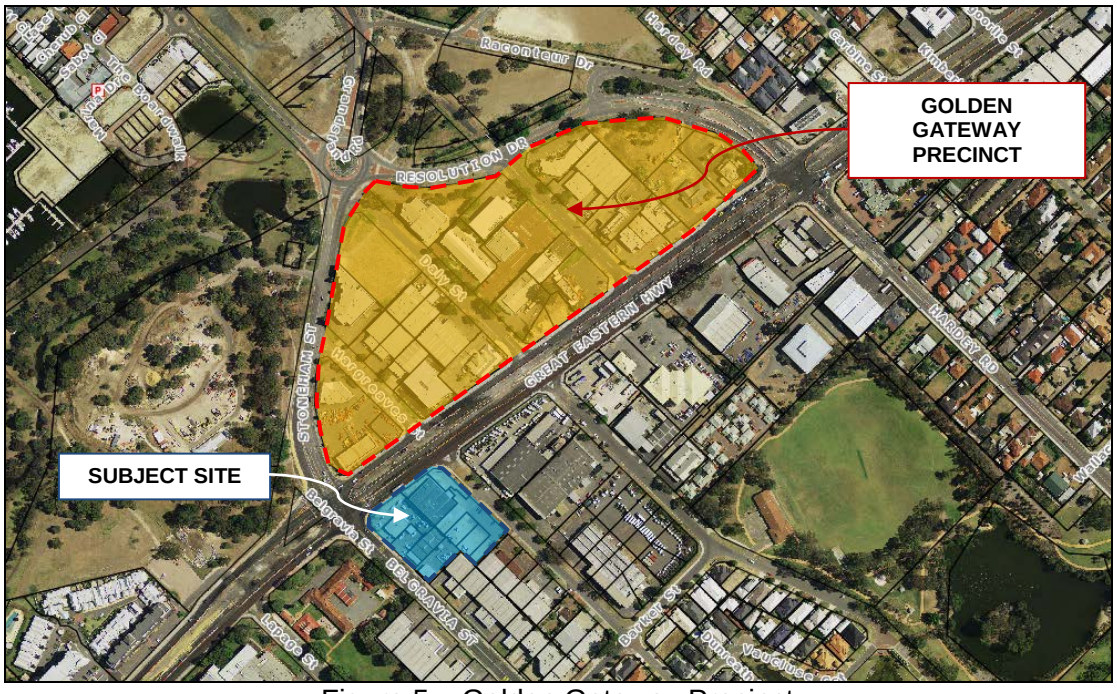


Figure 5 – Golden Gateway Precinct

Although strategic planning for the Golden Gateway Precinct is only at the preliminary stage, it is envisaged that this precinct will offer landmark development opportunities as a northwest 'gateway' to the City of Belmont. Buildings of a significant scale and a mix of activity generating land uses are considered desirable elements for landmark development. The City's Planning Department is in the process of developing a planning strategy to guide future development in the Golden Gateway Precinct.

Having regard for the above, the proposed height of the development is considered appropriate. A footnote has been recommended to advise the applicant that a separate approval is required from the Commonwealth Department of Infrastructure and Regional Development in regard to the height exceeding their height control limit by 3 metres.

R-Code Requirements

The 'deemed to comply' provisions under Part 6.4.3 of the R-Codes require a mix of dwelling types as follows:

- Minimum of 20 percent 1 bedroom dwellings; up to a maximum of 50 percent of the development; and

- Minimum of 40 percent 2 bedroom dwellings.

The development comprises a total of 88 multiple dwellings, of which:

- 41 percent (36 dwellings) are 1 bedroom dwellings;
- 25 percent (22 dwellings) are 2 bedroom dwellings; and
- 34 percent (30 dwellings) are 3 bedroom dwellings.

Although this represents a variation to the percentage of 2 bedroom dwellings required, it is important to consider the relatively large scale of the development. The percentages of dwelling types specified under the R-Codes apply to developments on a scale as small as 13 dwellings. The standard requires 40 percent (6 dwellings) of the 13 dwellings to be 2 bedroom dwellings. In comparison, the proposed 25 percent of 2 bedroom dwellings for this development yields 22 of the 2 bedroom dwelling type. On this basis, the development is considered to satisfy the 'design principles' of the R-Codes in that a reasonable range of dwellings types is provided.

The development plans indicate storerooms for each multiple dwellings as consistent with the requirement under the R-Codes. The City considers it essential for the storerooms to be maintained for the life of the multiple dwelling use. A condition of planning approval has been recommended to this effect.

Traffic

The applicant has submitted a comprehensive Transport Impact Assessment (TIA) (Attachment 7). The City's Engineer, the Department of Planning and Main Roads have reviewed the TIA and are satisfied that the road network is capable of accommodating the additional traffic generated from this development.

Assessment of traffic generated from this development has taken into account that vehicles leaving the development site to travel to the airport (east bound on Great Eastern Highway) will need to either:

1. Exit the site turning left onto Hargreaves Street, enter Great Eastern Highway westbound and traverse four lanes of traffic to access the u-turn facility at the signalised intersection of Great Eastern Highway and Belgravia Street; or

2. Exit the site turning right onto Hargreaves Street, turn right onto Barker Street, and turn right onto Belgravia Street to the signalised intersection Belgravia Street / Great Eastern Highway; or

3. Seek an alternative route through the local road network.

Scenarios 1 and 2 above are considered to be the most likely outcomes.

In the case of Scenario 1, exiting from Hargreaves Street and traversing multiple lanes of traffic to access the u-turn facility at the Great Eastern Highway / Belgravia Street is inherently hazardous and is likely to cause traffic safety issues if this movement is routinely used. Main Roads have advised that this may necessitate a review of the access arrangements from Hargreaves Street to Great Eastern Highway in the future. It is also noted that similar traffic concerns regarding the development of a McDonalds Fast Food outlet at 235 Great Eastern Highway were dismissed by the State Administrative Tribunal - [2012] WASAT 42 (S).

As evident from the public submissions received, Scenario 2 has raised concerns of increased traffic on Barker Street adversely impacting on residents of the Belgravia Residential Estate. This matter has been closely reviewed and the City's Officers are satisfied that the traffic generated from the proposed development will not significantly impact on the overall capacities of either Barker Street or Belgravia Street. The City is also satisfied that traffic during peak hours as identified in the TIA will not cause any significant delays or traffic issues at the intersection of Barker Street and Belgravia Street.

Given the above, the proposed development is not considered to adversely impact on the road system and traffic flow in the locality, and appropriately addresses the requirement under Clause 10.2(q) of LPS15.

Car Parking

A total of 390 car parking spaces are proposed for this development. This represents a significant shortfall from the 551 car parking spaces required under Table 2 of LPS15. The parking standard under the Scheme does not take into account reciprocity of car parking among land uses within the complex. It is practical to consider that some reciprocity of car parking is realistic given the mix of land uses that create a demand for car parking at different times of the day. It is therefore not appropriate to strictly apply the car parking requirements in accordance with the standards under the Scheme.

The applicant has included information in the TIA outlining the basis of the reciprocal car parking arrangement. In accordance with the reciprocal method adopted by the applicant, the development will generate a demand of 337 car parking spaces. It is noted that the applicant has adopted a car parking ratio of 1 space for every 3 rooms for the Hotel land use. This ratio is based on the NSW RTA standards which the applicant considers appropriate, drawing a comparison with the onsite car parking spaces provided for the Rendezvous Scarborough Hotel development. The City's Officers are of the view that it is not entirely acceptable to draw a comparison with Rendezvous Scarborough as the context of that development is markedly different from the subject site. The Rendezvous Scarborough site is supported by a large number of dedicated public car parks along the beach front, while there is little to no opportunity for on-street parking in

the locality of the subject site. The applicant further adopts what seem to be arbitrary percentages (ranging from 25% to 50%) for reciprocity of car parking between land uses – the adopted percentages for reciprocity are not substantiated. The method outlined in the TIA for reciprocal car parking is therefore questionable.

Notwithstanding the above, the City's Officers have considered a simpler method to determine if the proposed 390 car parking spaces for the development are appropriate. In the first instance, it is necessary to examine the car parking standard for the hotel land use under the Scheme which generates a requirement of 240 car parking spaces - this standard is considered excessive for larger scale hotels. The TIA draws 2011 data from Tourism Research Australia (Department of Resources, Energy and Tourism) indicating that 30 percent of all travellers to Australia use cars (private/company car, rental car, campervan etc.). On this basis, the City considers the appropriate standard to be 30% of the number of hotel rooms to be provided with 1 car parking bay each for hotel guest use; in addition it is necessary to provide for hotel staff car parking. The provision of 1 car parking bay for each staff member is considered practical. The applicant has indicated that there will be a total of 32 hotel staff. Given this 72 (30% of 240 hotel rooms) car parking spaces are required for hotel guests and 32 car parking spaces are required for hotel staff. The application of this modified standard for the hotel land use, together with the standards under LPS15 for the other land uses are tabled below without taking into account reciprocity of car parking spaces among the various land uses:

Land Use	Ratio	Required
Multiple Dwellings/Serviced Apartments	• (<75m²) 94 @ 0.75/dwelling = 71 • (75-110m²) 30 @ 1/dwelling = 30	101
Visitors (Multiple Dwellings)	124 @ 0.25/dwelling	31
Hotel	• 1/room for 30% of nos. = 72 • 32 staff @ 1/staff = 32	104
Conference Room* (Hotel)	80 seats @ 1/4 seats	20
Bar/Lounge (Hotel)	140 occupants @ 1/4 seats	35
Restaurant	132 occupants @ 1/4 seats	33
Office	1,371m² @ 1/30m²	46
Consulting Rooms	5 practitioners @ 4/practitioner	20
Showroom	484m² @ 1/40m²	13
Lunch Bar	85m² @ 6/100m²	6
Fast Food/Takeaway	118m² @ 6/100m²	8
	Total	417

Table 2 – Car Parking

*The development plans indicate a conference room capable of accommodating 80 persons. The space adjacent to the conference room is annotated 'Back of House' has a significant floor area – there is concern that this space may be used in de-facto as additional conference room space. As the capacity of the conference room will significantly affect the demand for car parking, a condition of planning approval to limit the conference room to 80 occupants at any one time has been recommended.

As mentioned above, it is realistic to consider reciprocity of car parking use to some extent. It is difficult to predict exactly how each of the land uses will operate and ascertain how reciprocity will function, however, it is reasonable in this instance to consider selected land use activities which traditionally generate a demand for parking at limited times of the day. For the purpose of this assessment, the parking demand times are simply classified as 'Business Hours' and 'Non Business Hours'. Table 3 below illustrates the potential for reciprocity between these two parking demand times:

Parking Demand	Land Uses	Reciprocal Spaces
Business Hours	• Office – 46 spaces • Showroom – 13 spaces • Lunch Bar – 6 spaces	65
Non Business Hours	• Visitors (Multiple Dwellings) – 31 • Bar/Lounge (Hotel) - 35	66
	Predicted Shortfall	1 space during non business hours.

Table 3 – Parking Reciprocity

Table 3 shows a predicted shortfall of 1 car parking space during non business hours, it is therefore appropriate to adopt the lesser figure of 65 spaces for reciprocity to negate the predicted shortfall.

Given the above, the City considers the acceptable car parking provision for the development to be 352 car parking spaces on the basis of the modified standard for the hotel land use (Table 2), and the opportunity for reciprocal use of at least 65 car parking spaces.

The 390 proposed car parking spaces therefore represents a surplus of 38 spaces and is considered appropriate for the development. Notwithstanding this, it is necessary for a comprehensive Parking Management Plan to be developed and implemented to ensure that reciprocal car parking arrangements on the property function effectively. A condition of planning approval has been recommended in this regard.

Bicycle Parking

In accordance with Table 3 of LPS15, a total of 93 bicycle parking spaces are required. The development plans indicate the provision of 124 bicycle parking facilities and end of trip facilities as required under Part 5.17 of LPS15.

It is noted that the requirement for provision of bicycle parking under LPS15 seems excessive for large scale developments. The applicant may consider reducing the provision of bicycle parking spaces to the satisfaction of the City. A condition of planning approval has been recommended to ensure the installation and maintenance of the bicycle parking facilities, the associated footnote advises the applicant that a reduced number may be negotiated with the City.

Noise Attenuation

SPP5.4 outlines noise targets and noise limits for development in the vicinity of major roads. The applicant has not submitted information to address the requirements under SPP5.4.

It is noted that noise mitigation measures to satisfy SPP5.4 are predominantly related to construction and material selection, and are more appropriately addressed at the building permit application stage. It is appropriate for this requirement to be dealt with through a condition of planning approval.

Waste Management

Due to the high density of the development and limited verge space suitable for bin presentation, it was considered necessary for the proponent to address the waste management arrangement at the earliest possible opportunity. This assists in minimising delays caused by the need to revise the development plans after planning approval has been granted. The applicant has provided a satisfactory waste management concept plan demonstrating adequate areas for bin storage and appropriate space for bin presentation and manoeuvring of the waste collection vehicles.

For this development, the City will provide a waste collection service for the residential component of the development; however, a private waste collection service will be required for the hotel, serviced apartments and other commercial uses within the complex.

For higher density multiple dwelling developments, the City applies a service equivalent to 70% of standard residential developments. This means rather than one general waste bin per dwelling (i.e. 88 general waste bins) for the proposed development with weekly collections for general waste can be reduced to 62 x 240 litre bins. With provision for the City's waste collection contractor to access and leave the site safely from Hargreaves Street, it is possible to incorporate the use of a 4.5m^3 bulk bin (equivalent of 18.75 x 240L) – this would be serviced by a front loading truck. Where collection of waste from the bulk bin occurs three (3) times a week, this equate to 56.25 x 240L bins. This arrangement leaves a shortfall of 8 x 240L (62 bins – 56 bins = 8 bins). To address this, 8 x 240L bins are required for presentation on the Hargreaves Street verge for weekly collection.

As with general waste bins, the bins for recyclables can also be reduced. A reduction of 70% is applied to high density multiple dwelling development (which equates to 62 x 240 litre bins). A reduced number of bins with an equivalent capacity can be provided with the use of 42 x 360L bins. With weekly rather than fortnightly recycle bin collections, the number of bins can be further reduced by 50% (i.e. 21 x 360L recycle bins).

With the 8 x 240L waste bins + 21 x 360L recyclable bins the required verge space would be approximately 22m. There is ample space on the Hargreaves Street verge to accommodate this 22m bin presentation area.

With regard to bulk waste removal, the City in conjunction with Cleanaway, is developing a system where high density developments (both current and proposed) will be provided with bulk bin/s for a few hours on predetermined days, twice a year. This arrangement would require management/residents to bring out the material and deposit it in the bulk bin/s provided (which would be between 15m^3 to 30m^3); as such, a set down area that can support the weight of large truck/bin is required. The applicant has identified an area at the eastern corner of the property to accommodate the bulk bin/s – the truck delivering/collecting the bulk bin/s will access the area via a crossover from Hargreaves Street.

To ensure that waste collection is managed in a satisfactory manner, a detailed Waste and Rubbish Collection Management Plan needs to be submitted for approval by the City and thereafter implemented for the life of the development. A condition of planning approval has been recommended to this effect.

Public Art

Given the estimated development cost of $65,000,000 the cost of the public artwork is to be no less than $650,000 to be consistent with the 1% requirement of LPP11. The provision of public art needs to be consistent with the City's Public Art Master Plan, and is subject to assessment by the City's Public Art Advisory Panel (PAAP).

Where a proposal for public art contribution in kind does not satisfy the assessment criteria under the City's Public Art Master Plan, the applicant may consider paying cash-in-lieu of the public art contribution. The cash-in-lieu arrangement is subject to approval by the City.

The applicant has not submitted information relating to a public art, but has indicated that public art will be incorporated within the development as required under LPP11.

The applicant will need to seek approval from the PAAP prior to installation of the public art work. The PAAP adopts the following principles in assessing artwork:

- Concept Innovation – The artwork is to be designed by a professional artist that shows strong vision, craftsmanship, choice of materials, uniqueness and public engagement.

- Context (sensitive to surroundings) – the artwork is to be designed for the specific site and considers the relevant themes, architectural, historical, geographical and/or socio-cultural context of the site and community identity.

- Public Domain – the artwork must be clearly seen and/or accessible from the public realm, and must positively impact on the visual amenity of the development.

- Public Safety – the artwork is designed, constructed and installed with best practice risk management and the artwork does not present a hazard to public safety.

- Longevity – the artwork design is structurally sound and resistant to theft, vandalism, weathering and excessive maintenance.

- Diversity – artworks should be diverse in style, scale and media, ranging from experimental to established art forms. This may also refer to artists from assorted backgrounds and ranges of experience.

Workshopping between the applicant and the City's PAAP is required in order to achieve a satisfactory outcome.

It has been recommended that a condition of planning approval outlines the requirement for satisfactory provision of public art.

Conclusion:

The subject proposal has been assessed in accordance with the relevant statutory planning documents and considered to be consistent with the intent and objectives of the Mixed Business zone under the City's Local Planning Scheme No. 15. It is considered that the proposed development will make a positive contribution to the locality and City of Belmont. On this basis, the application is recommended for approval subject to conditions.

ATTACHMENT 1 – DEVELOPMENT PLANS (7 NOVEMBER 2013)

Lot 702 (215) Great Eastern Highway, Strata Lots 1-5 (223 and 223A) Great Eastern Highway and (22 and 24) Hargreaves Street, Lot 4 (7) Belgravia Street and Lot 180 (9) Belgravia Street, Belmont

LG Reference: **10/2013/DAP**
DAP Reference: **DP/13/00715**

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

PERSPECTIVE 2 CORNER OF GREAT EASTERN HWY & BELGRAVIA STREET **SK21**

JOB No. 1302 NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

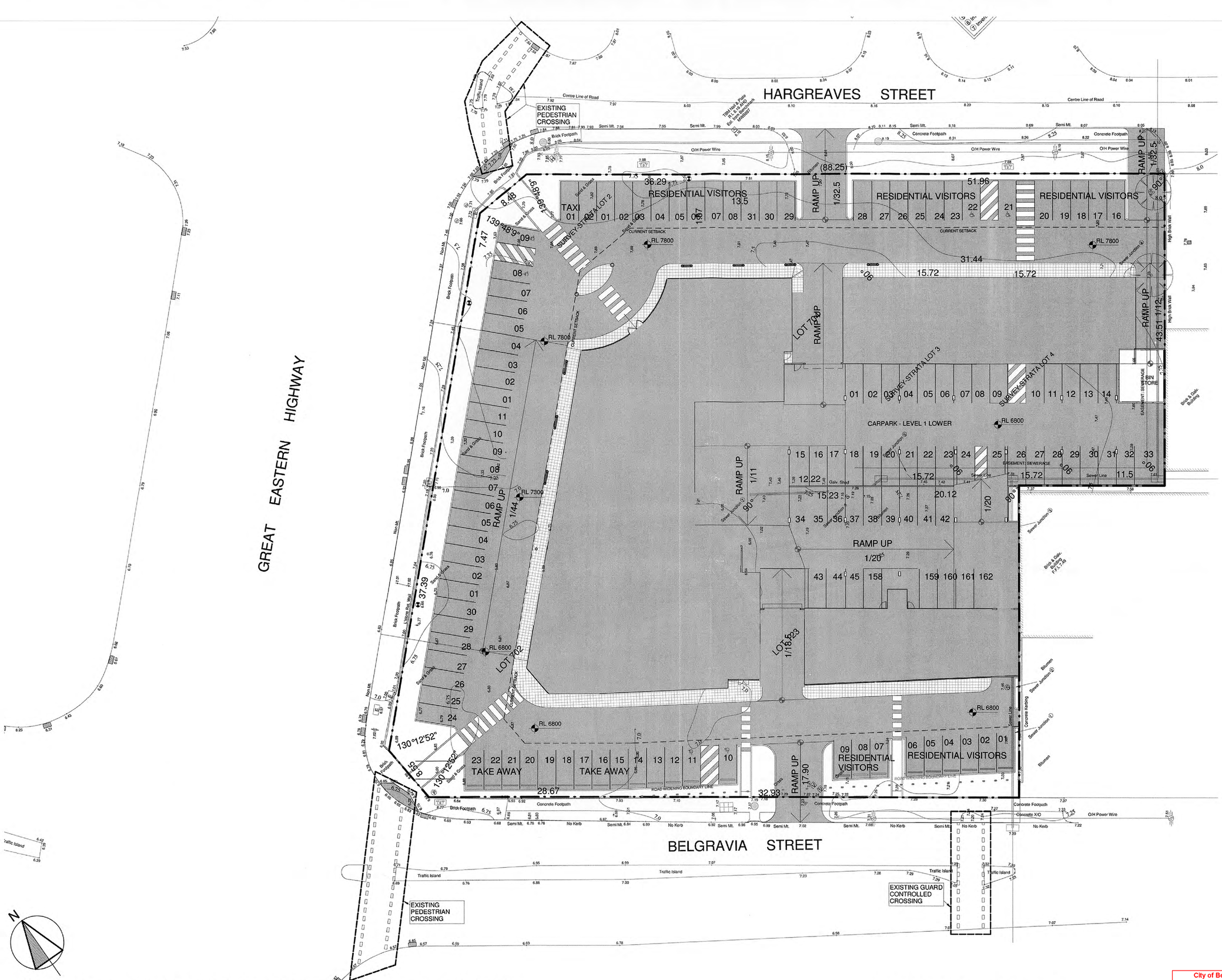
DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

PERSPECTIVE 1 CORNER OF GREAT EASTERN HWY & HARGREAVES STREET **SK22**

JOB No. 1302 NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au



GREAT EASTERN HIGHWAY DEVELOPMENT

EXISTING ASSETS

JOB No. 1302

NOVEMBER 2013

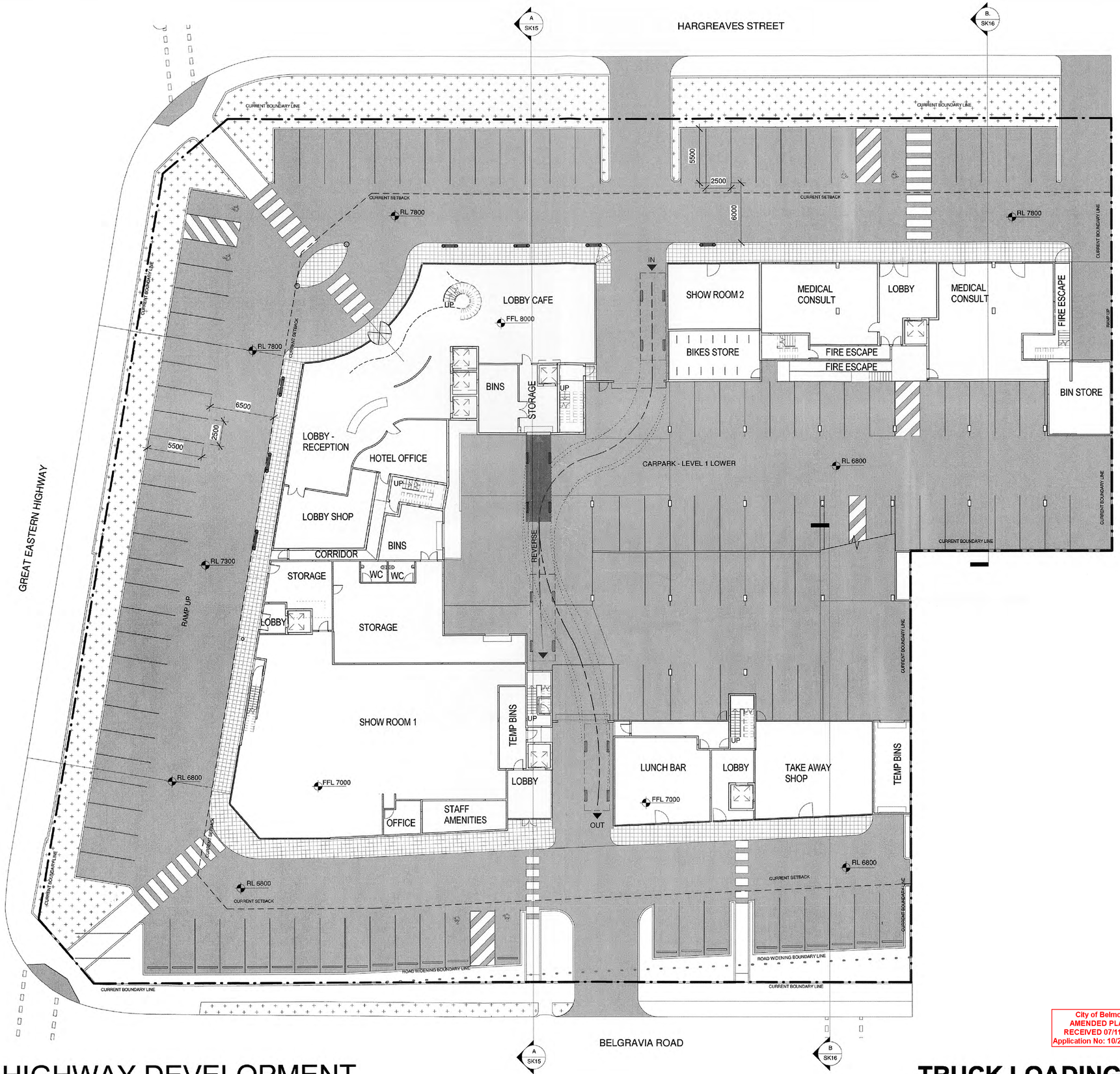
08

SCALE 1:250 @ A1

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au



City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

TRUCK LOADING 1

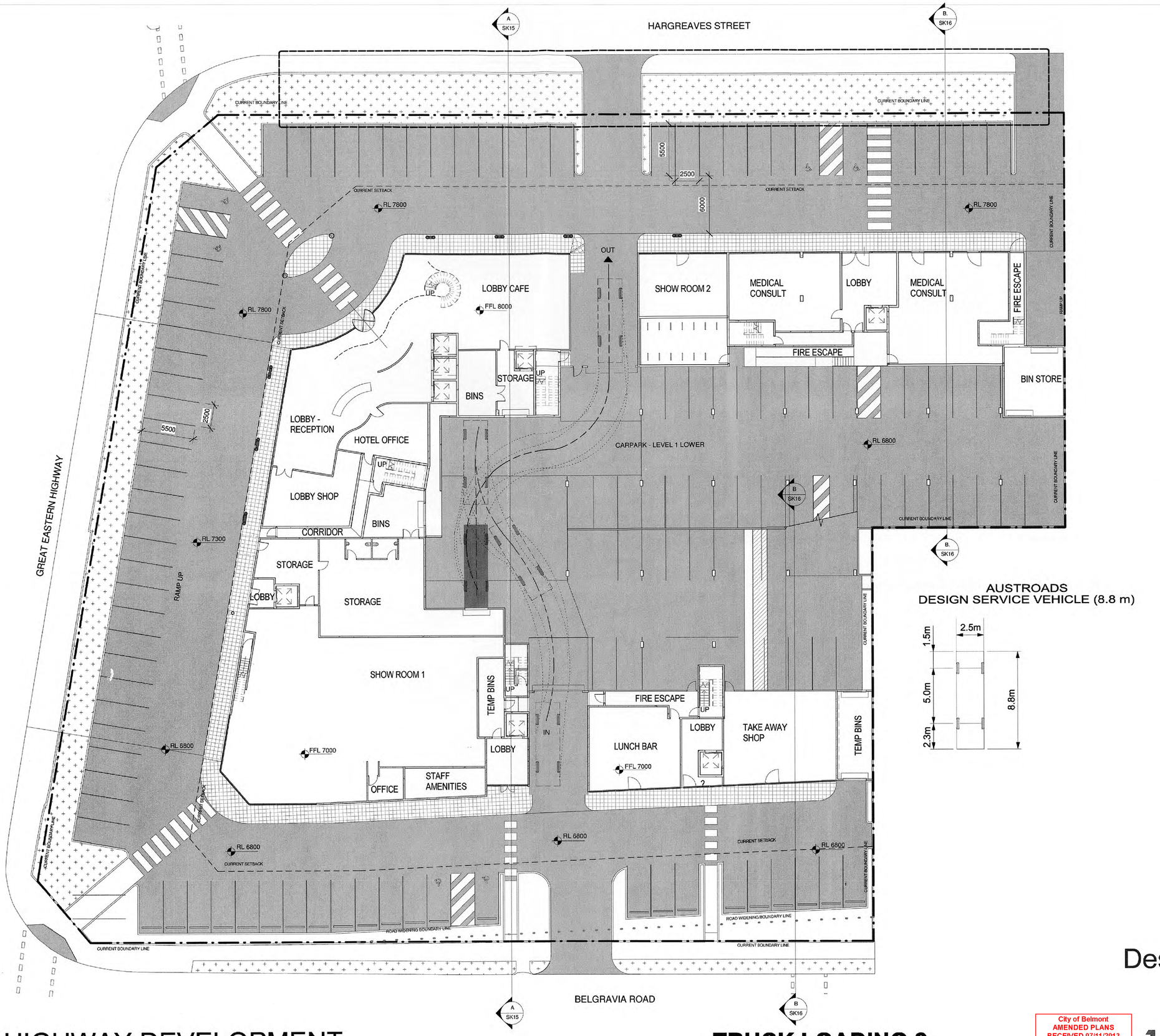
09

JOB No. 1302

NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

SCALE 1:200 @ A1



AUSTROADS
DESIGN SERVICE VEHICLE (8.8 m)

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

TRUCK LOADING 2

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

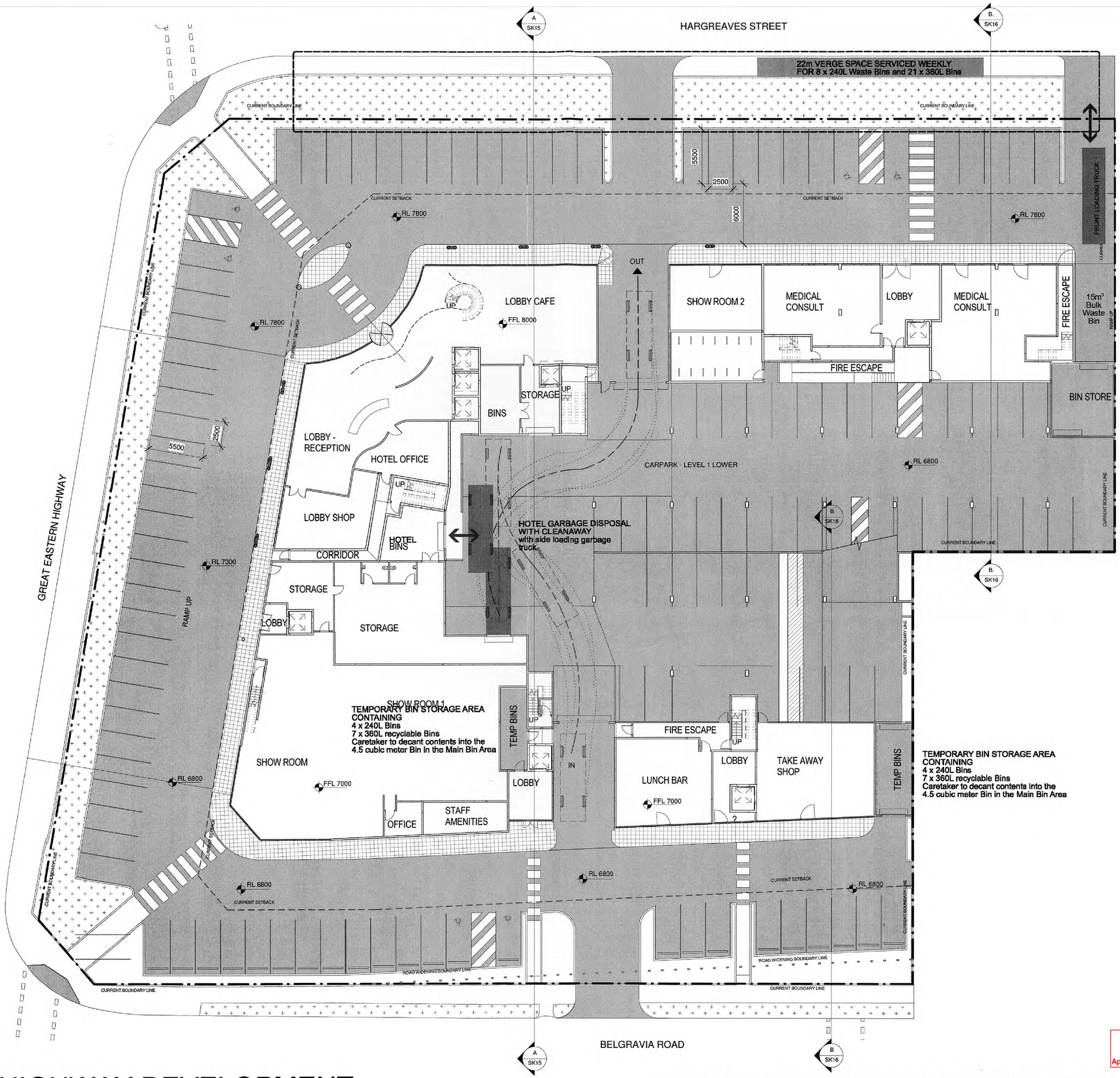
10

JOB No. 1302

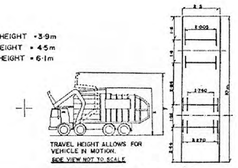
NOVEMBER 2013

SCALE 1:200 @ A1

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au



X— VEHICLE HEIGHT = 3.9m
TRAVEL HEIGHT = 4.5m
Y— WORKING HEIGHT = 6.1m



FRONT LOADING GARBAGE TRUCK
(can reverse into Hargreaves Street according to Cleanaway)

Bulk Waste will be provided twice/year on a Saturday morning for a few hours, the bin will be located on the ramp away from the street.

MAIN BIN AREA CONTAINING

1 x 4.5 cubic meter Bulk Bin (serviced 3 times/week)
7 x 360 L recyclables
1 x Bin Dumpmaster steelcage wheelie bin lifter

The Bin Store will be constructed of painted masonry walls with a concrete slab roof and a sealed concrete slab floor with falls to a 100mm industrial floor waste outlet connected to the sewer to comply with plumbing regulations.
A hose cock will also be included to facilitate washout of bins and washout of the area. Power will be provided via a wall mounted GPO.
The Caretaker will be responsible for washing and recycling bins.
Ventilation system to comply with AS 1668.

TEMPORARY BIN STORAGE AREA
CONTAINING
4 x 240L Bins
7 x 360L recyclable Bins
Caretaker to decant contents into the
4.5 cubic meter Bin in the Main Bin Area

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

WASTE MANAGEMENT CONCEPT PLAN

11

JOB No. 1302

NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

SCALE 1:200 @ A1

HARGREAVES STREET

GREAT EASTERN HIGHWAY

BELGRAVIA STREET

ORR ROAD WIDENING RESERVATION

SEE SP40967 AND DP67256 FOR ALL EASEMENT DETAILS & DIMENSIONS

Sewer Junction Details
① Invert: 4.62 Depth: 2.8
② Invert: 4.65 Depth: 2.8
③ Invert: 4.78 Depth: 2.8
④ Invert: 5.33 Depth: 2.8
⑤ Invert: 4.94 Depth: 2.5
⑥ Invert: 5.08 Depth: 2.1
⑦ Invert: 5.28 Depth: 1.8

VOL: FOLIO: XXX XXXX	Level Datum AHD(Approx.)		
	Scale 1:500 @ A2		
MAP REF: XXXXXXXX	Date 20/05/2013		
	Dwg Ref Great East Hwy 215-323 Belmont	PLAN / DIAG /SP	DP40967,DP67256 / P1884 D15272 / SP40967
TEL (08) 6144 0000 FAX (08) 6144 0099 59 SCARBOROUGH BEACH RD, SCARBOROUGH WA 6019 Email: info@visionsurveys.com.au	Surveyor	ELECTRICITY	O/H AND U/G
	Drafter Darryl Stone	WATER	CONNECTION
	Checked	GAS	YES
	Sheet 1 of 1 A3	TELSTRA	PIT
		SEWERAGE	YES
		DRAINAGE	GOOD
		VEG. / SOIL	AS DESCRIBED

VISION SURVEYS

Licensed & Engineering Surveyors
Land Development Consultants
Project Managers

IMPORTANT NOTES:
- THIS PLAN IS INTENDED FOR THE DEPT OF PLANNING & INFRASTRUCTURE ONLY.
- SEWER / DRAINAGE MAY VARY FROM SCHEMATIC PRESENTATION AND SHOULD BE APPROPRIATE AUTHORITY BEFORE ADOPTION OF POSITION.
- THIS SURVEY DOES NOT GUARANTEE THE LOCATION OF UNDERGROUND SERVICES.
- CHECK TITLE FOR EASEMENTS / COVENANTS ETC.

DesignInc

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

GREAT EASTERN HIGHWAY DEVELOPMENT

SITE SURVEY LOTS 1, 2, 3, 4, CP5, 702, 123, 180

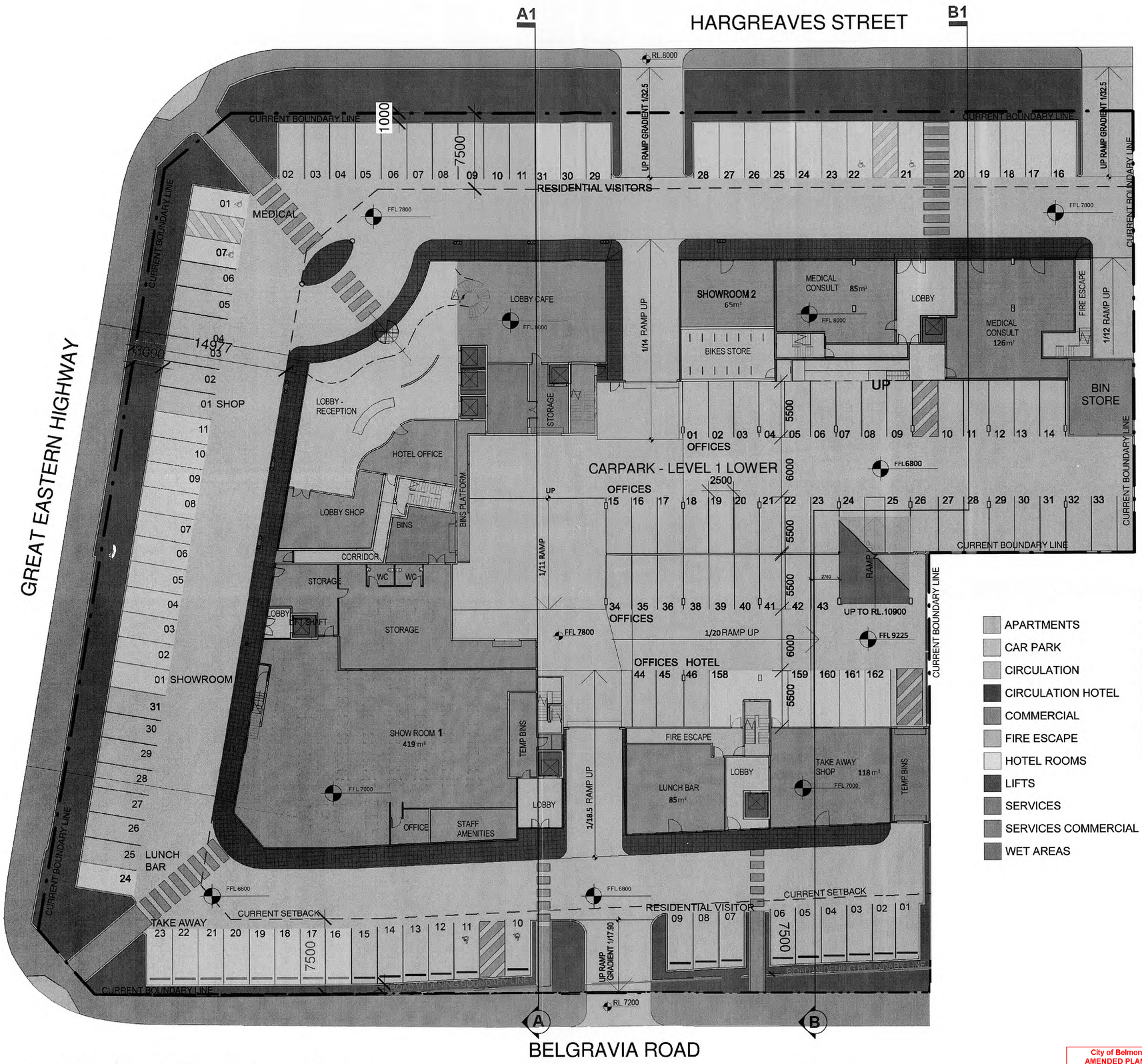
SK02

JOB No. 1302

NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

SCALE 1:250 @ A1



PARKING LEGEND

RESIDENTIAL VISITORS	- BAYS 01 to 15
TAKE AWAY	- BAYS 16 to 24
LUNCH BAR	- BAYS 25 to 31
SHOWROOM 1	- BAYS 01 to 11
SHOWROOM 2	- BAYS 01 to 07
MEDICAL	- BAYS 01 to 11
(REMAINING 9 BAYS TO BE RECIPROCAL WITH VISITORS BAYS)	
RESIDENTIAL VISITORS	- BAYS 16 to 31
OFFICES	- BAYS 01 to 46
HOTEL	- BAYS 158 to 162

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

GREAT EASTERN HIGHWAY DEVELOPMENT

LEVEL 1

JOB No. 1302

NOVEMBER 2013

SCALE 1:200 @ A1

SK03

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc
LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

PARKING LEGEND

HOTEL - BAYS 118 to 157

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

N

GREAT EASTERN HIGHWAY DEVELOPMENT

LEVEL 1A

SK03A

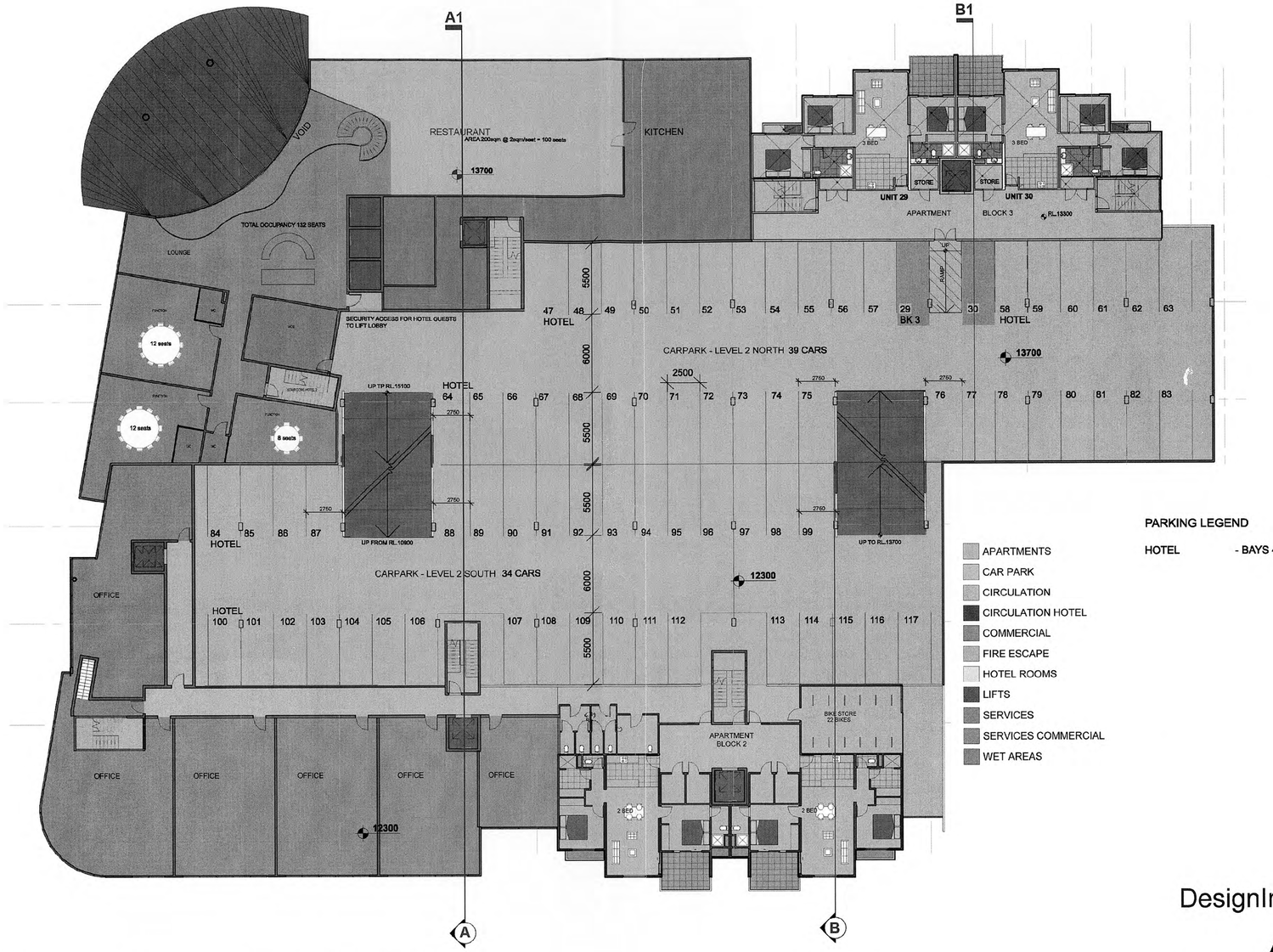
JOB No. 1302

NOVEMBER 2013

SCALE 1:200 @ A2

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T** +618 9328 3299 **F** +618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

DesignInc



PARKING LEGEND

HOTEL - BAYS 47 to 117

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

LEVEL 2

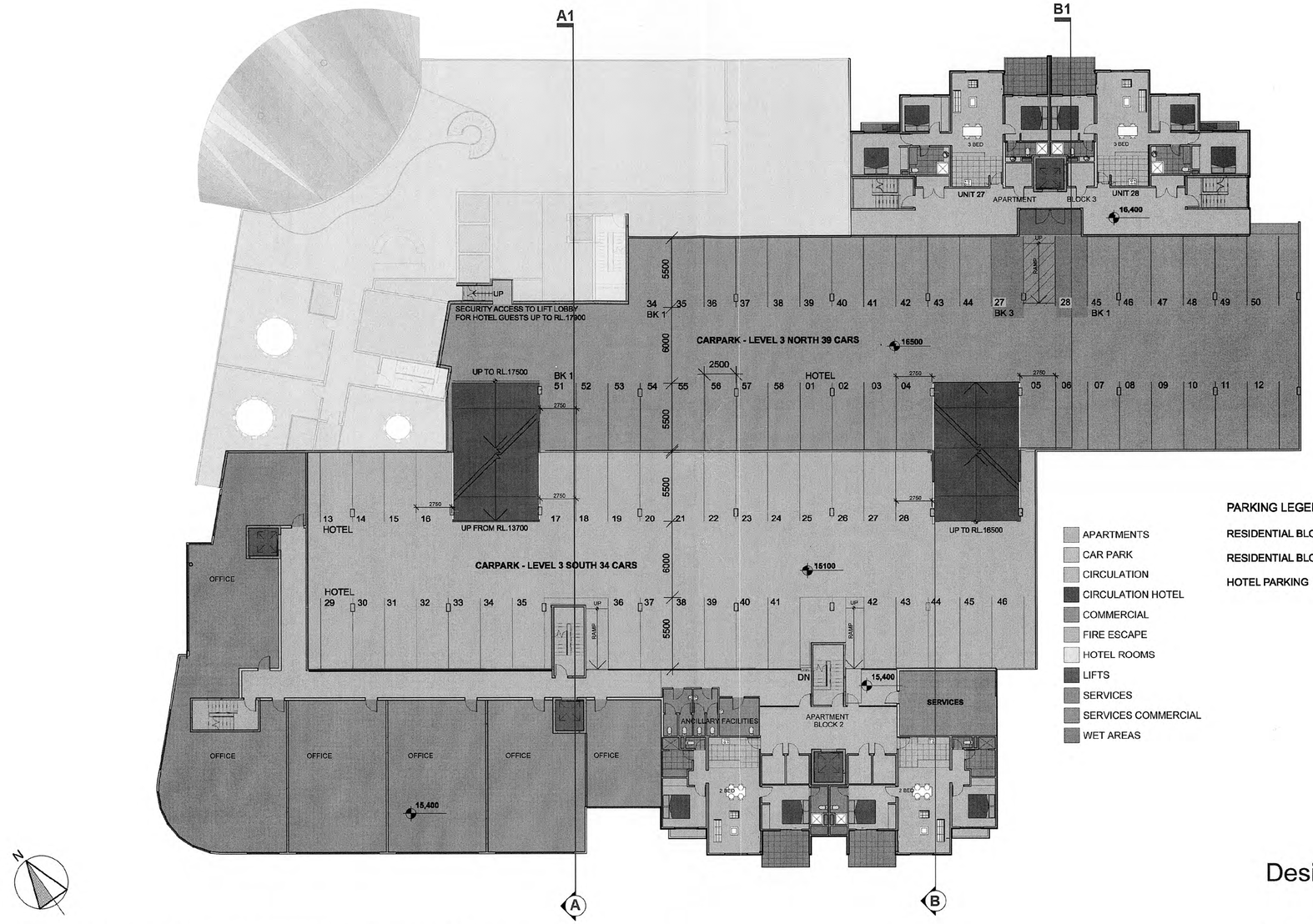
SK04

JOB No. 1302

NOVEMBER 2013

SCALE 1:200 @ A2

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au



PARKING LEGEND

RESIDENTIAL BLOCK 1 (BK 1)
- BAYS 34 to 58

RESIDENTIAL BLOCK 3 (BK 3)
- BAYS 27 to 28

HOTEL PARKING - BAYS 01 to 46

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

GREAT EASTERN HIGHWAY DEVELOPMENT

LEVEL 3

SK05

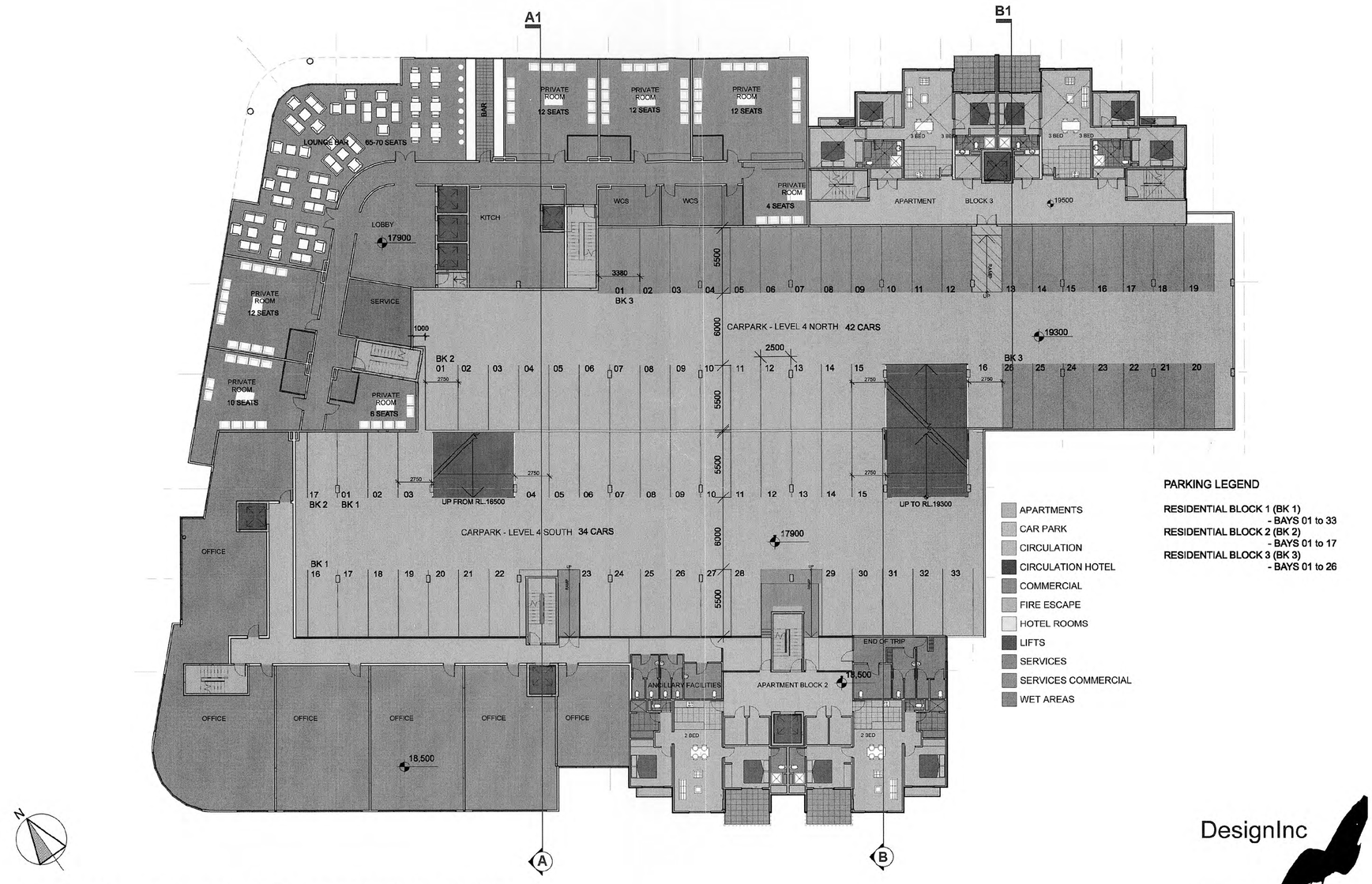
JOB No. 1302

NOVEMBER 2013

SCALE 1:200 @ A2

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T** +618 9328 3299 **F** +618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

DesignInc



APARTMENTS
CAR PARK
CIRCULATION
CIRCULATION HOTEL
COMMERCIAL
FIRE ESCAPE
HOTEL ROOMS
LIFTS
SERVICES
SERVICES COMMERCIAL
WET AREAS

PARKING LEGEND

RESIDENTIAL BLOCK 1 (BK 1)
- BAYS 01 to 33
RESIDENTIAL BLOCK 2 (BK 2)
- BAYS 01 to 17
RESIDENTIAL BLOCK 3 (BK 3)
- BAYS 01 to 26

GREAT EASTERN HIGHWAY DEVELOPMENT

LEVEL 4

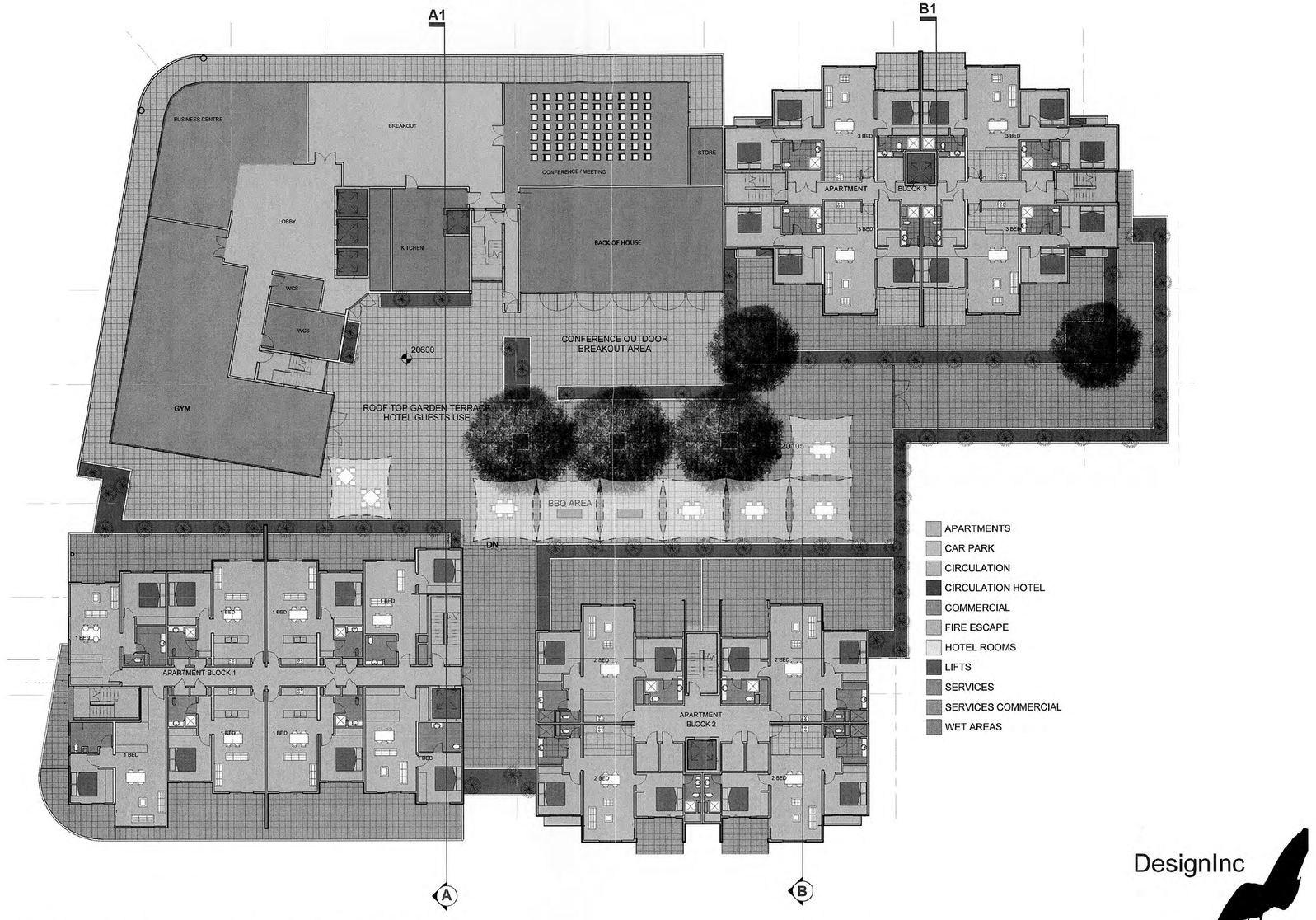
SK06

JOB No. 1302

NOVEMBER 2013

SCALE 1:200 @ A2

DesignInc
LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au



GREAT EASTERN HIGHWAY DEVELOPMENT

PODIUM LEVEL

SK07

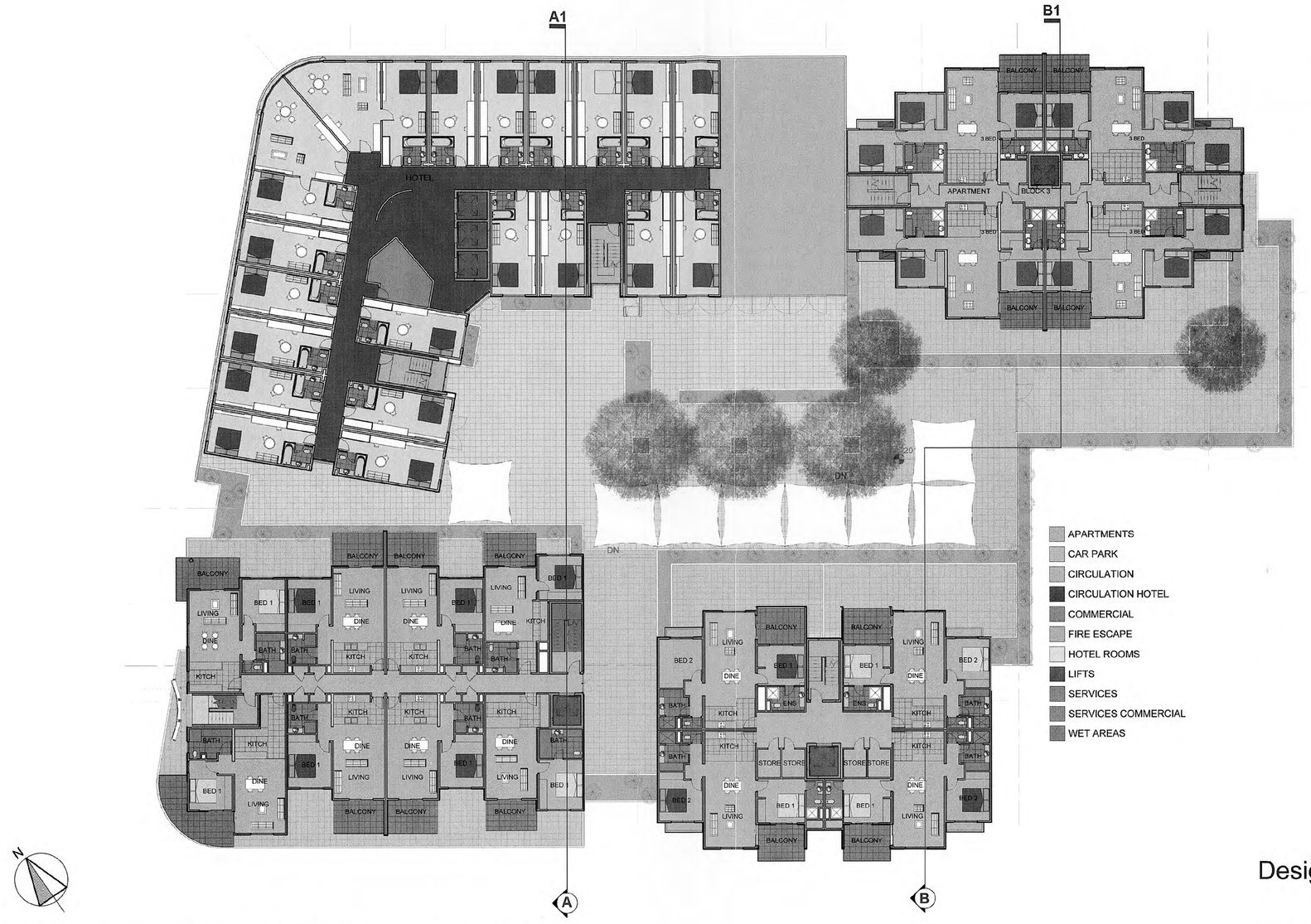
JOB No. 1302

NOVEMBER 2013

SCALE 1:200 @ A2

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T** +618 9328 3299 **F** +618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

DesignInc



GREAT EASTERN HIGHWAY DEVELOPMENT

TYPICAL LEVEL

SK08

JOB No. 1302

NOVEMBER 2013

SCALE 1:200 @ A2

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

DesignInc

HARGREAVES STREET

GREAT EASTERN HIGHWAY

HOTEL - LEVEL 1

GREAT EASTERN HIGHWAY DEVELOPMENT

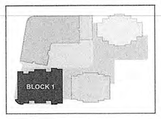
HOTEL TYPICAL FLOOR PLAN **SK09**

JOB No. 1302 NOVEMBER 2013

SCALE 1/200@A3

DesignInc

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au



GREAT EASTERN HIGHWAY

BALCONY
BEDROOM 1
LIVING
DINING
KITCHEN
BATH/LAUNDRY
FIRE ESCAPE STAIR
LIFT LOBBY
ENSUITE
1
2
3
4
5
6
7
8

BELGRAVIA STREET

GREAT EASTERN HIGHWAY DEVELOPMENT

50% SERVICED APARTMENTS LEVEL 5-9

BLOCK 1 - ONE BEDROOM APARTMENTS LEVEL 5-13 **SK10**

JOB No. 1302 NOVEMBER 2013

SCALE 1/125@A3

DesignInc

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

CARPARK
FIRE ESCAPE STAIR
BICYCLE STORE
BICYCLE STORE
LIFT LOBBY
ENTRANCE
ENTRANCE
1
2
BATH/LAUNDRY
KITCHEN
STORE 1
STORE 2
DINING
BEDROOM 1
ENSUITE
BEDROOM 2
LIVING
BALCONY 2
BALCONY 1

BELGRAVIA STREET

GREAT EASTERN HIGHWAY DEVELOPMENT

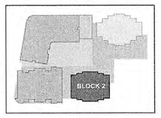
BLOCK 2 - TWO BEDROOM APARTMENTS LEVEL 2-4 **SK11**

JOB No. 1302 NOVEMBER 2013

SCALE 1/100@A3

DesignInc

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au



BALCONY 1
BALCONY 2
FIRE ESCAPE STAIR
BEDROOM 1
LIVING
BEDROOM 2
DINING
ENSUITE
KITCHEN
BATH/LAUNDRY
ENTRANCE
ENTRANCE
LIFT LOBBY
1
2
3
4
BATH/LAUNDRY
KITCHEN
STORE 3
STORE 1
STORE 2
STORE 4
DINING
BEDROOM 1
ENSUITE
BEDROOM 2
LIVING
BALCONY 2
BALCONY 1

BELGRAVIA STREET

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

GREAT EASTERN HIGHWAY DEVELOPMENT

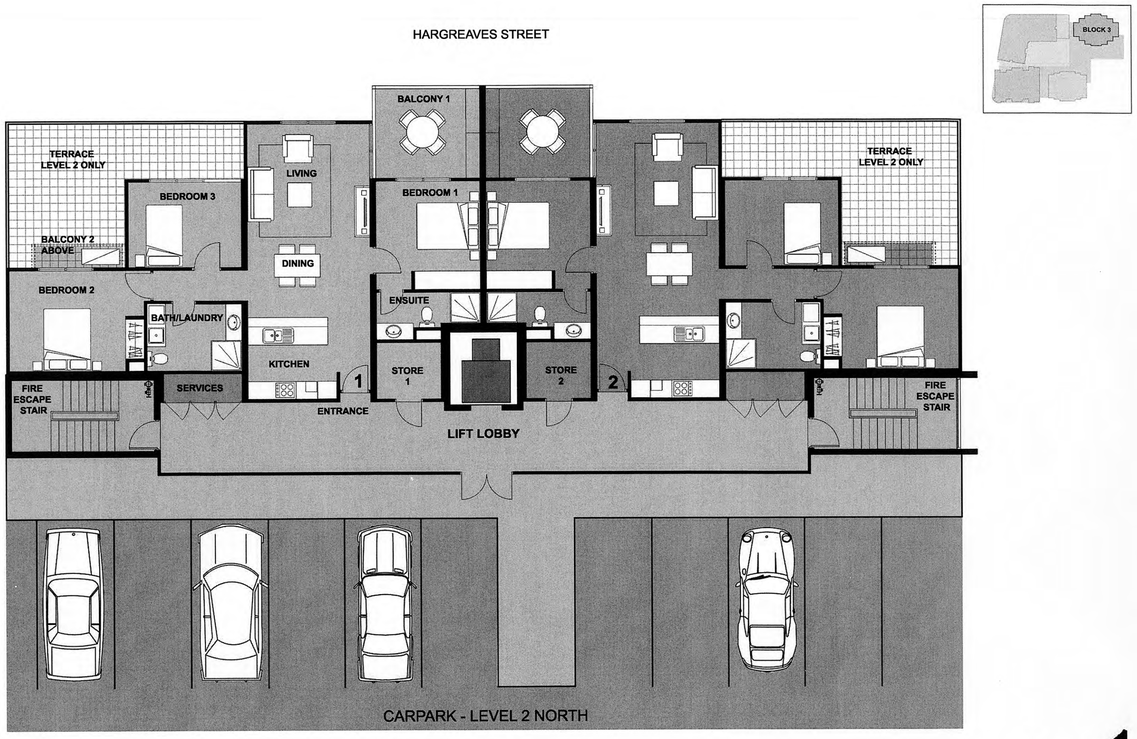
BLOCK 2 - TWO BEDROOM APARTMENTS LEVEL 5-8 **SK12**

JOB No. 1302 NOVEMBER 2013

SCALE 1/100@A3

DesignInc

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au



DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

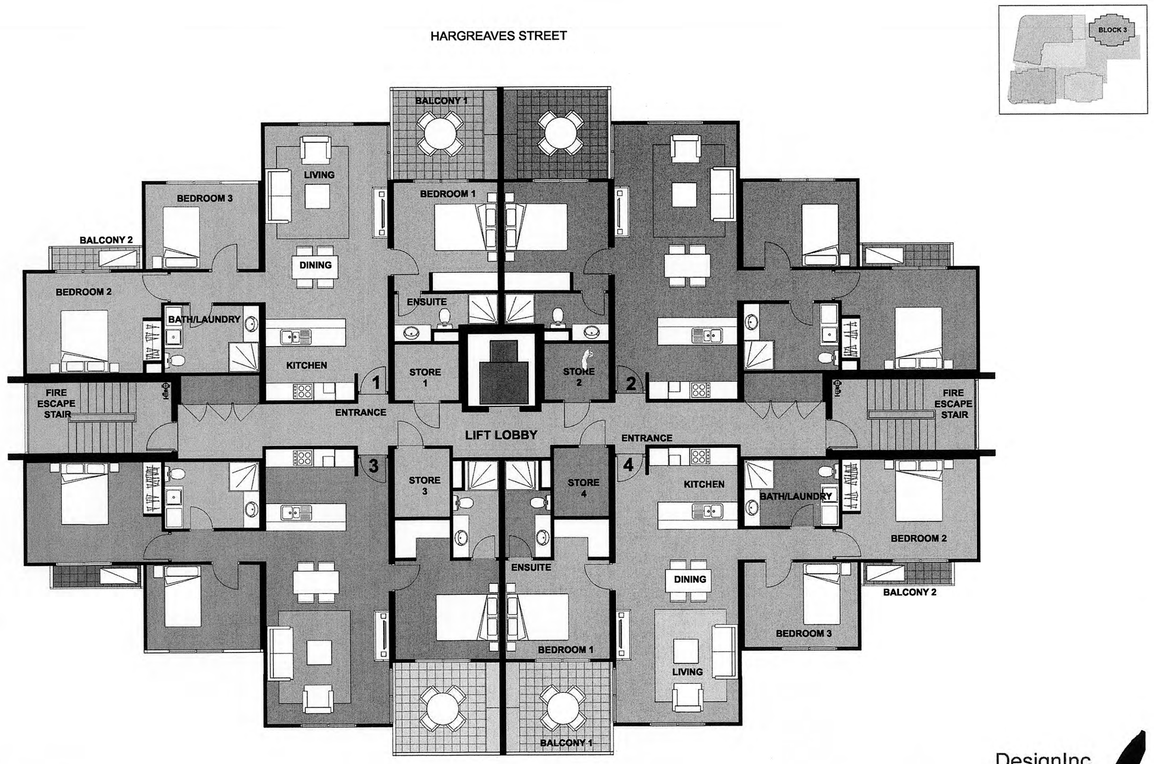
BLOCK 3 - THREE BEDROOM APARTMENTS LEVEL 2-4 **SK13**

JOB No. 1302

NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

SCALE 1/100@A3



DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

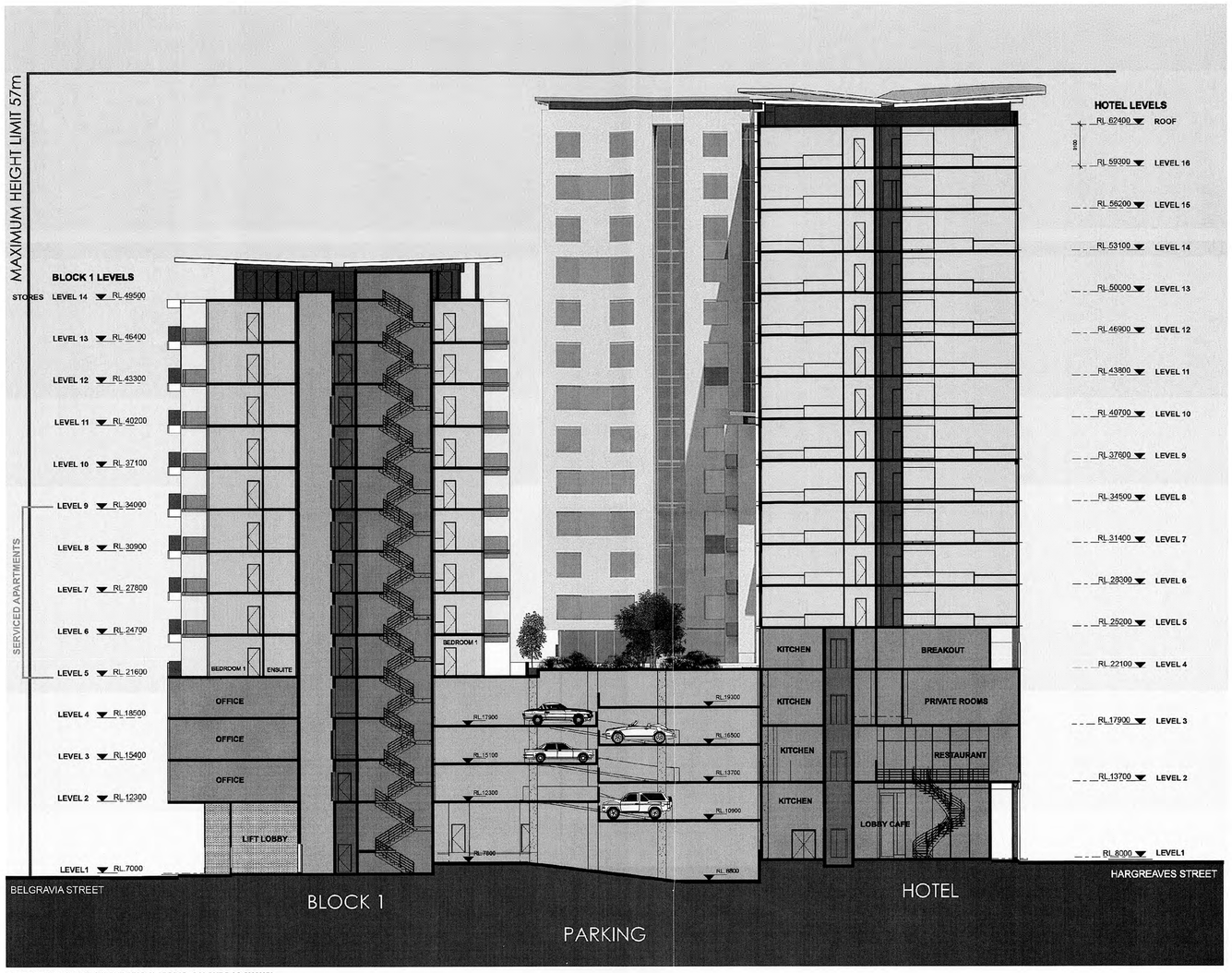
BLOCK 3 - THREE BEDROOM APARTMENTS LEVEL 5-10 **SK14**

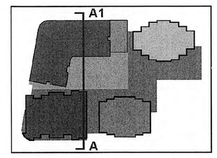
JOB No. 1302

NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

SCALE 1/100@A3





ALUCOBOND (OR SIMILAR) BUILDING CLADDING, COLOURS AS SHOWN
GLASS BALUSTRADES, COLOURS AS SHOWN

GREAT EASTERN HIGHWAY DEVELOPMENT

SECTION A - A1

SK15

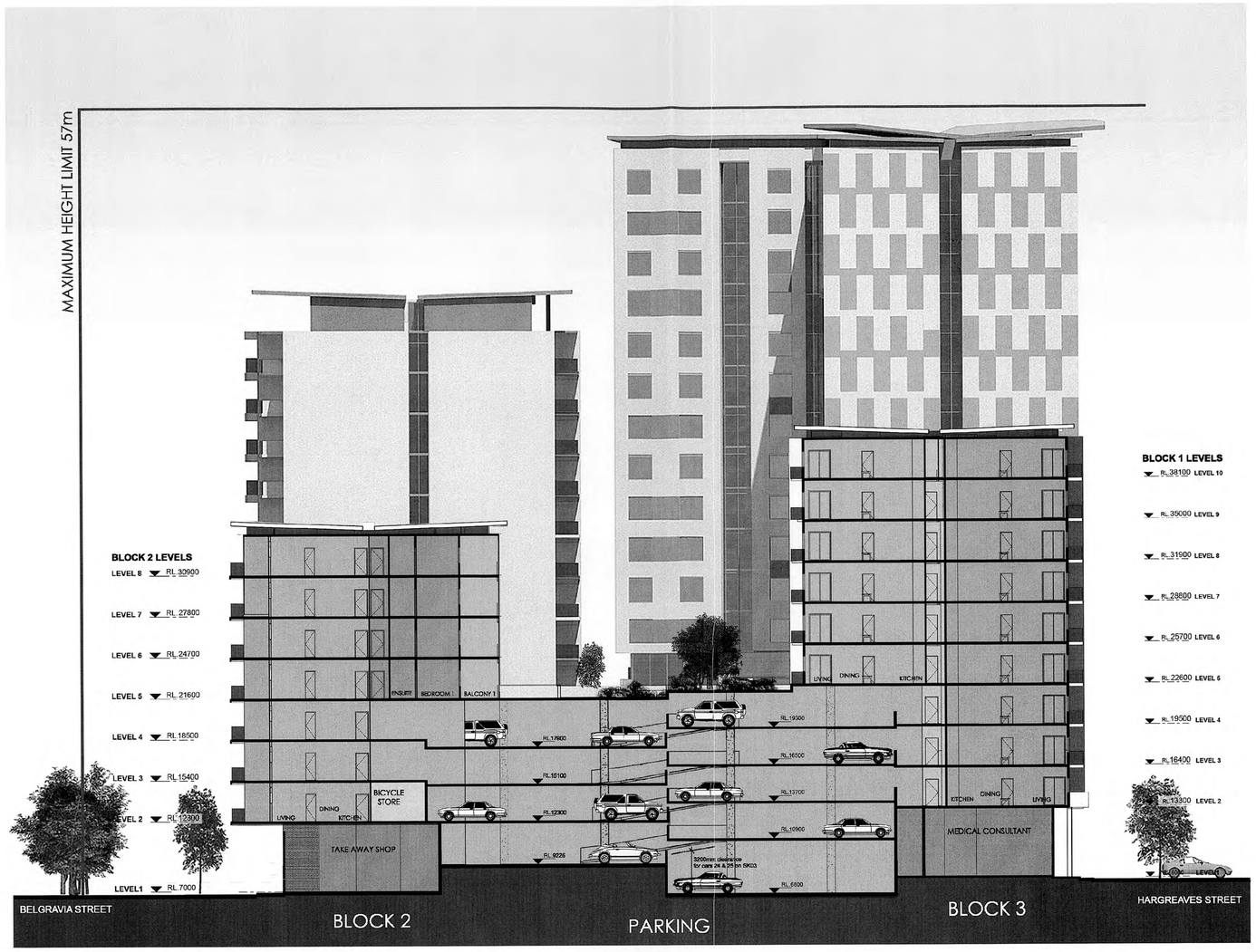
JOB No. 1302

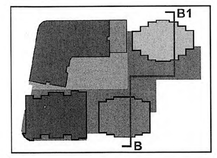
NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

SCALE 1:200 @ A2

DesignInc





ALUCOBOND (OR SIMILAR) BUILDING CLADDING, COLOURS AS SHOWN
GLASS BALUSTRADES, COLOURS AS SHOWN

GREAT EASTERN HIGHWAY DEVELOPMENT

SECTION B - B1

SK16

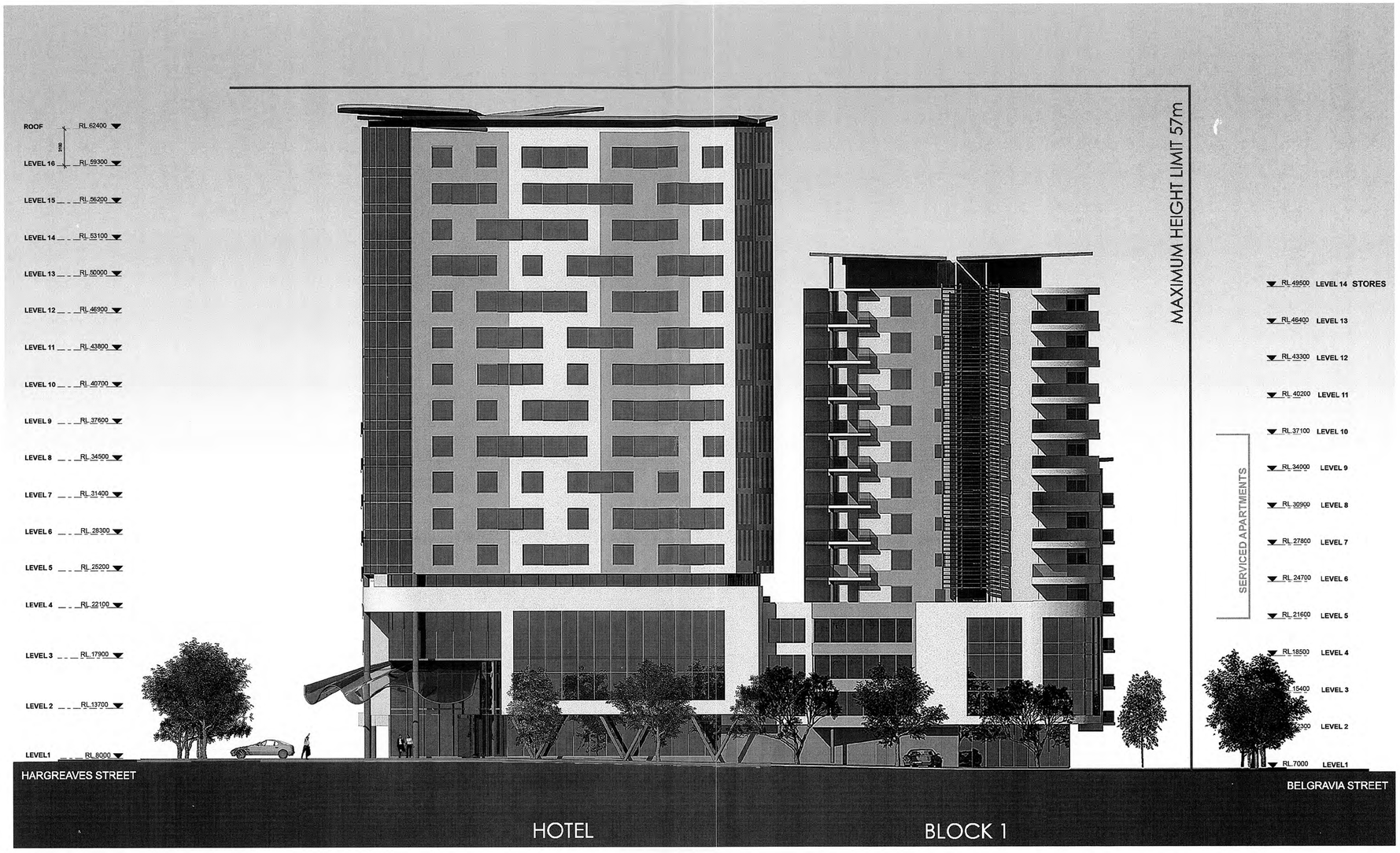
JOB No. 1302

NOVEMBER 2013

SCALE 1:200 @ A2

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

DesignInc



ALUCOBOND (OR SIMILAR) BUILDING CLADDING, COLOURS AS SHOWN
GLASS BALUSTRADES, COLOURS AS SHOWN

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

GREAT EASTERN HWY (NORTH - WEST) ELEVATIONS

SK17

JOB No. 1302

NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

SCALE 1:200 @ A1

ALUCOBOND (OR SIMILAR) BUILDING CLADDING, COLOURS AS SHOWN
GLASS BALUSTRADES, COLOURS AS SHOWN

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

HARGREAVES STREET (NORTH - EAST) ELEVATIONS

SK18

JOB No. 1302

NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

SCALE 1:200 @ A1

ALUCOBOND (OR SIMILAR) BUILDING CLADDING, COLOURS AS SHOWN
GLASS BALUSTRADES, COLOURS AS SHOWN

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

BELGRAVIA STREET (SOUTH - WEST) ELEVATIONS

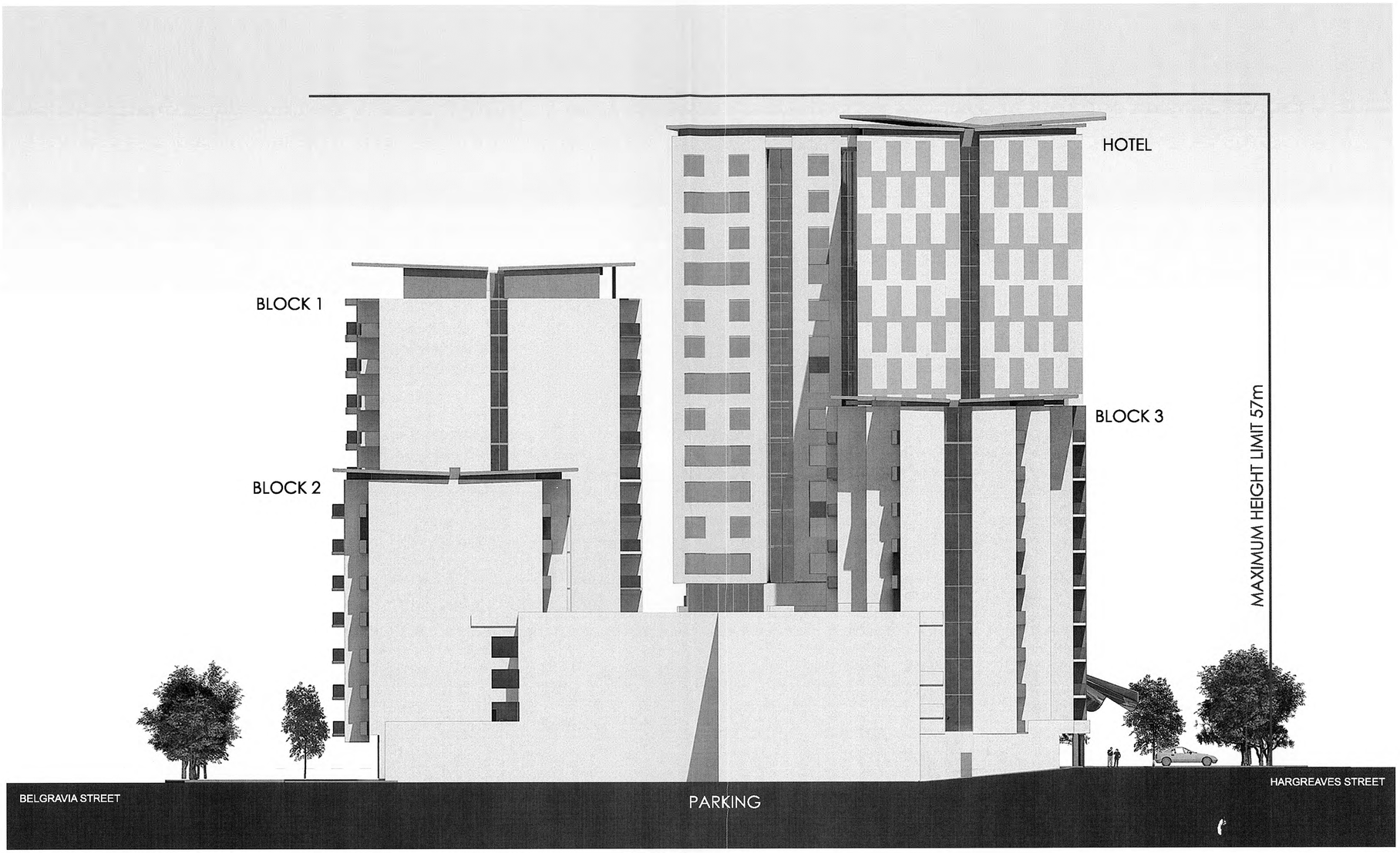
SK19

NOVEMBER 2013

JOB No. 1302

SCALE 1:200 @ A1

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au



ALUCOBOND (OR SIMILAR) BUILDING CLADDING, COLOURS AS SHOWN
GLASS BALUSTRADES, COLOURS AS SHOWN

City of Belmont
AMENDED PLANS
RECEIVED 07/11/2013
Application No: 10/2013/DAP

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

SOUTH - EAST ELEVATIONS SK20

JOB No. 1302

NOVEMBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 **T**+618 9328 3299 **F**+618 9325 5244 **E** admin@perth.designinc.com.au **W** designinc.com.au

SCALE 1:200 @ A1

ATTACHMENT 2 – APPLICANT'S DESIGN REPORT (7 NOVEMBER 2013)

Lot 702 (215) Great Eastern Highway, Strata Lots 1-5 (223 and 223A) Great Eastern Highway and (22 and 24) Hargreaves Street, Lot 4 (7) Belgravia Street and Lot 180 (9) Belgravia Street, Belmont

LG Reference: **10/2013/DAP**
DAP Reference: **DP/13/00715**

DesignInc

LEVEL 1, 3 PLAIN STREET
PERTH WA 6004 AUSTRALIA
T +618 9328 3299 F +618 9325 5244
E perth@designinc.com.au www.designinc.com.au

Adelaide
Brisbane
Dubai
Melbourne
Perth
Sydney

Architecture Urban Design Interiors

Ref: 1312_let02.DA.
Enquiries: Ron Jee

5th November, 2013

The Chief Executive
City of Belmont
GPO Box C120
PERTH, WA 6001

ATT: Mr Wilmot Loh
Senior Planning Officer

Dear Sir/Madam

RE: Mixed Use Development
215 – 223 Great Eastern Highway, Cnr Belgravia & Hargraves Streets, Belmont

We refer to your recent correspondences dated 28th October, 2013, and our meetings with you and your officers regarding additional information requested for the above application. We thank you for working with us as the applicant to achieve a favourable recommendation.

We hereby submit the additional information requested. This submission comprises the following:

a. Revised drawings including:

i. Existing Assets Plan - Scale 1:250@A1, sheet 08
ii. Truck Loading Plan - Scale 1:200@A1, sheet 09
iii. Truck Loading Plan - Scale 1:200@A1, sheet 10
iv. Waste Management Concept Plan - Scale 1:200@A1, sheet 11
v. Existing Site Survey Plan – Scale 1:250@A1, sheet SK02
vi. Level 1 – Scale 1:200@A1, sheet SK03
vii. Level 1A – Scale 1:200@A2, sheet SK03A
viii. Level 2 – Scale 1:200@A2, sheet SK04
ix. Level 3 – Scale 1:200@A2, sheet SK05
x. Level 3 – Scale 1:200@A2, sheet SK06
xi. Podium Level – Scale 1:200@A2, sheet SK07
xii. Typical Level – Scale1:200@A2, sheet SK08
xiii. Hotel typical floor plan – Scale 1:200@A3,SK09
Block 1 – One Bedroom Apartments Level 5-13 – Scale 1:125@A3,SK10
Block 2 – Two Bedroom Apartments Level 2-4 – Scale 1:100@A3, SK11
Block 2 – Two Bedroom Apartments Level 5-8 – Scale 1:100@A3, SK12
All on one A1 size sheet.
xiv. Block 3 – Three Bedroom Apartments Level 2-4 - Scale 1:100@A3, SK13
Block 3 – Three Bedroom Apartments Level 5-10 – Scale 1:100@A3, SK14
All on one A1 size sheet.
xv. Section A-A1 – Scale 1:200@A2,sheet SK15
xvi. Section B-B1 – Scale 1:200@A2, sheet SK16
xvii. Great Eastern Hwy (North-West) Elevations – Scale 1:200@A1, sheet SK17

xviii. Hargreaves Street (North-East) Elevations – Scale 1:200@A1, sheet SK18
xix. Belgravia Street (South-West) Elevations – Scale 1:200@A1, sheet SK19
xx. South-East Elevations – Scale 1:200@A1, sheet SK20

b. Revised Planning Report, including:

- One set (1) set of schematic design drawings as per above, plus
- Coloured perspectives

- Updated Traffic Impact Study prepared by Kleyweg Consulting, Traffic & Transport Engineers;

c. A CD containing the above drawings and report in pdf format;
d. Detailed written submission updated as appropriate, and including requested additional information as contained in this letter.

1.0 Land Information

The site for the development is located at 215 -223 Great Eastern Highway, Belmont, and comprises of the following lots:

No.	Lot No.	Plan	Vol/Folio
1.	1	40967	2510/767
2.	2	40967	2510/768
3.	3	40967	2510/769
4.	4	40967	2510/770
5.	123	13012	1538/026
6.	180	2634	1516/693
7.	702	67255	2763/432

This land has a total area of 7878sqm. Current improvements on the land include a boat showroom and sales display yard.

2.0 Development Concept

The major upgrade of Great Eastern Highway between Kooyong Road in Rivervale and Tonkin Highway in Redcliffe by Main Roads under their Strategic Access Policy Plan will provide motorists, pedestrians and cyclists with safe and efficient roadways and pathways for travelling along Great Eastern Highway both now and in the future.

The widening of the highway and the upgrade of major intersections has greatly improved the highway's efficiency and provide appropriate access to business and properties; the upgrade of the roadway and beautification of the road reserves, will make Great Eastern Highway an appealing and respectable approach route for international and domestic visitors to Perth.

The site the subject of this development application is located along Great Eastern Highway between the Perth Domestic Airport and the Perth CBD. With the chronic shortage and therefore strong demand for hotel accommodation in the CBD and fringe CBD areas, the developer consortium considered the site to be well suited and located for providing quality

short term accommodation for the travelling public (especially overseas tourists) as well as permanent and affordable residential accommodation.

The proposed development will be comprised of hotel & residential accommodation mixed with ancillary uses for offices, consulting rooms, showrooms, lunch shop and fast food outlet. The complex will be served by a multi-level car park.

The development will comprise of four (4) building blocks which surround and conceal the multi-storey car park.

The Hotel block is a 16-storey building located on the northwest corner of the site. This block houses the 240 room hotel and includes 4 levels of podium and 12 floors of hotel accommodation comprising 240 rooms. Within the podium are the facilities found in 3-4 star hotels and include Hotel Reception, Front Office, Lobby Restaurant, Restaurant, Lounge Bar, Meeting/Conference Rooms, and Gymnasium.

Block 1 is a 14-storey tower located on the southwest corner and houses Showrooms on the ground floor, 3 levels of offices, and 9 levels of one bedroom apartments plus 1 level of stores at the roof level. At this location, these apartments are designed for dual occupancies i.e. used as permanent dwellings as well as serviced apartments which are managed by the Hotel operator.

Each apartment will have balconies and store as are normally associated with apartments design. For Block 1, the stores have been located at the roof level and are accessed by the stairs.

Block 2 is an eight storey building comprising commercial tenancy spaces at the ground level, plus 7 levels of two bedroom apartments.

Block 3 is a 10 storey building with commercial tenancies on the ground floor with 9 levels of 3 bedrooms apartments. Each apartment will have a balcony and store as are normally associated with apartments design.

In providing the 1, 2 and 3 bedroom apartments, the development provide a mix of housing options and affordability choices. By grouping the same type of apartments in one block allows more compatibility in the type of residents who reside in any one building.

The multi-level car park is located behind and surrounded by the building towers with the result that except for the car bays at the ground level within the building setbacks, all other car bays are concealed from view. The roof over the car park is proposed to be landscaped and provide outdoor recreation areas for the residents and users of the hotel and the residents of the apartment buildings.

The buildings' design will be architecturally contemporary and elegant as the vision is to create a modern hotel, residential and commercial development at this location that offers high quality accommodation at reasonable and affordable prices.

3.0 Planning Information

The site falls within the Mixed Business Zone under the City of Belmont Local Planning Scheme No. 15.

The 'Mixed Business' zone is intended to allow for the development of a mix of varied but compatible business uses such as offices, showrooms, amusement centres, eating establishments and appropriate industrial activities which do not generate nuisances detrimental to the amenity of the district or to the health, welfare and safety of residents and workforce. Within this zone, buildings should be of a high standard of architectural design set in pleasant garden surrounds with limited vehicular access from properties to primary roads.

The design for the proposed development meets the requirements of the City of Belmont Local Planning Scheme No.15 and the design guidelines for Mixed Use Business Zone.

3.1 Proposed Land Uses

In terms of land use types, these can be summarised as follows:

- Commercial component including:
  - 240 Rooms Hotel (12 floors) – 'A' Use;
  - Restaurant, Nightclub, Meeting/Function Rooms, Health Centre – 'D' Use'
  - Offices – 'P' Use;
  - Medical & Consulting Rooms – 'P' Use;
  - Showrooms – 'P' Use;
  - Lunch Bar – 'P' Use;
  - Fast Food – 'A' Use.

- Residential component (total of 124 apartments) including:
  - Block 1 - 72 no. 1 bedroom apartments (including 50% used as serviced apartments) – 'A' Use;
  - Block 2 - 22 no. 2 bedrooms apartments – 'A' Use;
  - Block 3 - 30 no. 3 bedrooms apartments – 'A' Use

- Multi-storey car park
  - 390 car bays;
  - Bicycle stores & End-of-trip facilities.

With Great Eastern Highway as the major arterial road which connects the Perth Airport to the Perth CBD and surrounds, the proposed land use of Hotel ('A' use) contained in the proposed development is considered to be highly appropriate for such a major highway location. There is officially documented great shortage (by the likes of WA Tourism Commission) of hotel rooms and therefore great demand for good quality hotel and serviced apartments accommodation. Most of the existing hotels along Great Eastern Highway are of low grade standards; most of them are also very old and do not provide the level of quality and service standards now required by the travelling public. In this convenient location, the hotel will cater for the needs of the international and domestic tourism market as well as for FIFO workers looking for 3 to 4 star quality accommodation.

In this location which offers convenient access to public transportation available along the major routes, the proposed residential apartments ('A' Use) can help to meet the demand for affordable accommodation. The proposed apartments are therefore considered to be a highly appropriate use.

The Showrooms, Offices, Consulting Rooms, Lunch Bar ('P' Uses) and Fast Food/Take Away ('A' Uses) will cater for the needs of the businesses in the area which seek the highly visible and accessible locations such as this site can offer.

Variations from Scheme Requirements
On the above basis, we seek Council's support and approval for the proposed uses.

3.2 Building Setbacks From Main and Side Streets

The design has allowed for and will meet the requirement of the design guidelines for Mixed Use Business Zone with respect to setbacks of buildings from street boundaries.

The required and generous building setbacks have been provided and will be developed and maintained as garden space for pedestrian use. The development will also include the reticulating and landscaping the street verges. When completed, the buildings will sit well in a well landscaped garden, as most of the off-street car parking will be concealed within the building structure.

Setback to the side boundaries will be consistent and comply with the requirements and provisions of the Residential Design Codes.

3.3 Plot Ratio – Residential Component

The scheme requires that the residential elements of mixed use development within non R-coded land are to be assessed against the R-AC3 provisions.

In this regard, we can confirm that the residential elements of the development will comply with the provisions of the Residential Design Codes including the maximum allowable plot ratio, provision of private living areas, storage and parking facilities.

The plot ratio of the residential elements (excluding the serviced apartments) will represent only **0.84: 1** of plot ratio, therefore well under the maximum allowable plot ratio.

3.4 Heights

In the design and placement of the buildings, the taller buildings have been placed at the corners which address Great Eastern Highway and will serve as "Gateway" buildings. The other apartment buildings are lower buildings which step down to address and interface with the future buildings on the neighbouring lots.

The proposed maximum height of the tallest Hotel building of 16 storeys with an approximate overall height of 55.5M is below the height set by the Structures Height Control Contour Map provided by the Perth Airport.

The height of 14 storeys for Block 1 (being a mixed use building) will complement the taller Hotel building on the Great Eastern Highway frontage.

With commercial tenancies on the ground floor of Blocks 2 and 3, these are also mixed use buildings. However, the heights of these buildings are lower than the Hotel building and Block.

On the above basis, we seek Council's approval for the proposed building heights.

3.5 Building Facades, Thermal & Sound Insulation

The facades of the proposed buildings will consist of a combination of predominantly prefinished metal and painted compressed fibrocement sheet cladding and glass. These materials comply with the design guidelines for this zone.

Generally, the external walls will achieve the thermal insulation in excess of R = 3.3.
The windows will be double glazed, and will achieve the minimum of 6 stars rating.

3.6 Details on Number of Employees & Hours of Operation

The number of employees that will be employed and will be on site at any one time is estimated to be made up as follows:

• Hotel (Reception) & Admin	- 8
Restaurant	- 10
Lounge Bar	- 10
Hotel Meeting Rooms	- 4
• Office Area	- 80
• Showrooms	- 10
• Medical & Consulting Rooms	- 8
• Lunch Bar	- 4
• Fast Food	- 6
Total	**- 140**

The details on hours of operation are contained in the Traffic Impact Assessment and are summarised as follows:

• Hotel (Reception)	- Estimated 00:00 - 00:00 - 7 days
Restaurant	- Estimated 07:00 - 22:00 - 7 days
Lounge Bar	- Estimated 22:00 - 04:00 - Thurs - Sat Only
Hotel Meeting Rooms	- Estimated 09:00 - 17:00 - Mon - Fri
Gym	- Estimated 08:00 - 18:00 - 7 days
• Office Area	- Estimated 08:00 - 17:00 - Mon - Fri
• Showrooms	- Estimated 08:00 - 17:00 - Mon - Sat
• Medical & Consulting Rooms	- Estimated 08:00 - 18:00 - Mon - Fri
• Lunch Bar	- Estimated 06:00 - 18:00 - Mon - Fri
• Fast Food	- Estimated 07:30 - 22:00 - 7 days

For residential land uses, the hours of operation are not applicable. The peak trip generations from a residential development are likely to be between 7am and 8am daily for the morning and 5pm to 6pm in the evening peak for a development of this nature.

3.7 Parking & Loading Requirements, Traffic Impact Assessment (TIA)

Adequate off street parking for residents, customers and visitors have been provided for the entire development; including loading and unloading of service vehicles to the hotel and showrooms have been provided.

For this development, a total of 390 bays have been provided which included at grade car bays as well as in the multi-storey car park. Parking bays for the use of permanent residents of the apartment buildings will be separated and secured, and as indicated on the plans.

The design of the access and the layout of the car bays have been adjusted to meet with the City's Engineering Department's requirements.

The number of car bays provided has been assessed based on the City's Car Parking Requirements but with allowance for reciprocal parking usage for the peak and off-peak parking demand of the various complimentary uses.

The requirement has also been assessed by KC Consulting Traffic & Transport Consultants based on WAPC Transport Impact Assessment Guidelines – Part 4 (Developments).

The consultant has also provided a Comparative Analysis based on the minimum requirements for parking according to the NSW RTA Guide to Traffic Generating Developments and the City of Belmont Local Planning Scheme. On these bases, it was assessed that a total of 343 bays are required.

The consultant's investigation and assessment report clearly demonstrate that while car parking has not been provided in accordance with the City's car parking guidelines especially in relation to the requirement for the provision of 1 bay per hotel room, the development will provide more car bays than are actually required. Therefore there should be no car parking overflow to outside the development boundaries.

The Traffic Consultants have also modelled the impact of the additional traffic that would be generated by this development especially at peak hours. The investigation confirms that the Great Eastern Highway intersections will comfortably cater for the additional traffic generated and will not cause any traffic generated to adversely affect the local road network; the Belgravia Road intersection is expected to have satisfactory Level of Service operations.

On the above basis, we seek Council's approval for the amount of car parking provided.

4.0 Waste Management Concept

Separate refuse storage and collection areas have been provided for servicing the hotel and the apartment buildings.

For the Hotel and the commercial (Serviced Apartments) portion of Block 1, this is provided in the car park at the Ground Floor Level. The Site Plan shows the refuse truck turning and manoeuvring spaces required can be accommodated.

A bin area has been provided beside Block 3 to cater for the two apartments Block 2 & Block 3 and will accommodate bulk bins. The bin area is accessible to council's refuse trucks to suit the council's collection regime. The bin area can also accommodate the appropriate number of

recycling bins which will be wheeled to hard stand area along the Hargreaves Street frontage on collection days by the caretaker.

A bulk refuse collection hard stand area has also been provided as indicated on the Refuse Management Concept Plan provided.

5.0 Public Art

This application acknowledges the requirement for the provision of public Art at the rate of 1% of the estimated cost of development. In this respect, the applicant will allow for the installation of public art on the subject development site.

After the granting of the Development Approval and when the project proceeds to final design stage, the Project Architect will consult and work with the City's Public Art coordinator and the Public Art Committee to ensure that the public art meets with the City's requirements and guidelines contained in Local Planning Policy No.11.

6.0 Variation to Planning Scheme Requirements

The development has included uses such as Offices, Showrooms, Lunch Bar, Medical & Consulting Rooms which are 'P' Uses i.e. are permitted uses. However, it has also included 'A' and 'D' uses in the Hotel, Apartments, Fast Food uses.

Given the location of the site along Great Eastern Highway which is the main entry road from the Perth Airport to the Perth City, it is believed that the proposed uses are compatible and will cater for the demand for such services at this location and therefore are highly appropriate.

The design has recognised the many aspects of such a development and has considered and included appropriate provisions for safe access and sufficient parking that will ensure that the development will add value to the area. On the above basis, we seek the City's support and acceptance for the proposed 'A' and 'D' uses.

7.0 CONCLUSIONS

With the chronic shortage and therefore strong demand for hotel accommodation in the CBD and fringe CBD areas, the developer consortium considered the site to be well suited and located for providing quality short term accommodation for the corporate travellers as well as local, interstate and international tourists) as well as permanent and affordable residential accommodation. With this vision and the development experience, the consortium is determined to resource the project with the required finance to realise the project. The consortium also believes that the proposed development will be a very good outcome for Perth and but more specifically for the City of Belmont and the Great Eastern Highway Mixed Business Zone.

As project architects we believe that the proposed design meets the requirements and standards for such a development under the City's current Local Planning Scheme No. 15 and

that the design drawings and planning report provided have fully addressed all the requirements of the council. We therefore respectfully request that the City provide its support and grant approval for the project.

However, if you require any other information, please do not hesitate to contact the undersigned.

Yours faithfully
DesignInc PERTH PTY LTD

RON JEE
Director

C.c. Directors, Great Eastern Group Pty Ltd

ATTACHMENT 3 – SUBMISSIONS TABLE

Lot 702 (215) Great Eastern Highway, Strata Lots 1-5 (223 and 223A) Great Eastern Highway and (22 and 24) Hargreaves Street, Lot 4 (7) Belgravia Street and Lot 180 (9) Belgravia Street, Belmont

LG Reference: **10/2013/DAP**
DAP Reference: **DP/13/00715**

CITY OF BELMONT

SCHEDULE OF SUBMISSIONS

PLANNING APPLICATION 10/2013/DAP: MIXED USE DEVELOPMENT (HOTEL, SERVICED APARTMENTS, MULTIPLE DWELLINGS, RESTAURANT, OFFICE, SHOWROOMS, CONSULTING ROOMS, LUNCH BAR AND FAST FOOD/TAKEAWAY) LOT 702 (215) GREAT EASTERN HWY, ST LOTS 1-5 (223 & 223A) GREAT EASTERN HWY AND 22 & 24 HARGREAVES ST, LOT 4 (7) BELGRAVIA ST, LOT 180 (9) BELGRAVIA ST

No.	Name and Address	Resume of Submission	Officer Comment
1.	H Niklasson, 60 Barker Street Belmont WA 6104	Objection. a) Concerns over the volume of traffic generated from the proposed development impacting on Barker Street and the safety of residents. b) The on-street parking currently occurring on Barker Street is a big problem and will be made worse by the proposed development with taxis, hotel shuttles etc. generating more on-street parking. c) The use of Barker Street by patrons leaving the recently built McDonalds restaurant as well as by heavy vehicles presents a safety concern for those walking young children or pets. Vehicle access to Barker Street via Daly Street should be limited. d) A response from Council is sought in relation to how the following matters will be addressed: o Traffic management plans affecting the immediate area; o Guarantee additional safety and evacuation concerns if the development proceeds; o Noise from trucks using Barker Street and rubbish being discarded from patrons of the McDonalds restaurant.	a) The applicant has submitted a comprehensive Traffic Impact Assessment (TIA) satisfactorily demonstrating that the road network is capable of accommodating the additional traffic generated by the proposed development. b) The City's *Parking and Parking Facilities Local Law 2002* provides for on-street parking. As detailed in the DAP RAR, the 390 onsite car parking spaces are considered appropriate to cater for the car parking needs of the development. c) The traffic generated by other land uses in the vicinity travelling through Barker Street, and road modifications to Daly Street are not considered relevant for the purpose of determining this planning application. d) As outlined under point (a) above, a satisfactory TIA has been submitted. The concern over 'additional safety and evacuation' is unclear. Noise from trucks using Barker Street and rubbish being discarded by passing traffic on Barker Street are matters not relevant for the purpose of determining this planning application. Notwithstanding the above, it is impractical for the City to individual responses to submissions as part of the planning consultation process. Matters arising from the approval of the McDonalds Fast Food outlet were addressed in the State Administrative Tribunal approval of that development.
2.	L C Tan and M Gribble, 1 Greaves Row Belmont WA 6104	Objection. a) There is concern that the local roads will not be adequate to cope with the additional traffic generated from the development. b) There is a lack of parking in the area; local businesses are already using the streets for parking. c) The magnitude of the proposed development is out of character with the surrounding neighbourhood and will add to the level of noise pollution (from mechanical ventilation equipment and vehicles) being experienced in the area. d) The development will impact on the value of property and quality of life in the neighbourhood. e) There is no need for commercial towers and huge offices in this area; these should be located in the CBD. Belmont should not become a commercial hub, particularly when development impacts on the local residents. f) There was no mention of high density residential and mixed use development to be built when we decided to purchase and build within Belgravia Estate. g) The development will overshadow the neighbouring properties. h) This development is of a higher density than the development that was recently refused in The Springs Special Development Precinct.	a) The applicant has submitted a comprehensive Traffic Impact Assessment (TIA) satisfactorily demonstrating that the road network is capable of accommodating the additional traffic generated by the proposed development. b) The City's *Parking and Parking Facilities Local Law 2002* provides for on-street parking. As detailed in the DAP RAR, the 390 onsite car parking spaces are considered appropriate to cater for the car parking needs of the development. c) The scale of the proposed development is considered appropriate in its setting given the relationship to Great Eastern Highway, Belgravia Street and the City's 'Golden Gateway Precinct'. Any noise generating activities from the development must comply with the *Environmental Protection (Noise) Regulations 1997*. d) The effect on value of properties in the vicinity and the impact on 'quality of life' is not a matter relevant for the purpose of determining this planning application. e) The Local Planning Scheme provides for commercial type land uses and development in the Mixed Business zone. The development has been assessed in accordance with the relevant planning legislation and policies, the development is not considered to significantly impact on the residential precinct. f) The Mixed Business zone provides for a mix of development and land use types, the Mixed Business zone (previously zoned 'Industrial' under TPS11)

No.	Name and Address	Resume of Submission	Officer Comment
			was established prior to the development of the Belgravia Residential Estate Special Development Precinct. g) The development does not overshadow any residential property. h) The determination of a separate planning application, albeit in the City of Belmont is irrelevant for the purpose of determining this planning application. It is however noted that that refusal was based on the development far exceeding standards specified under the relevant Local Planning Policy for The Springs Special Development Precinct.
3.	S Koh and L Lim, 2 Greaves Row Belmont WA 6104	Objection. a) The increased traffic from the development will add to the noise pollution caused by trucks from one of the properties in the locality. b) The development will add to the increased traffic cause by customers visiting the recently built McDonalds restaurant in the locality. c) The development will add to the traffic and on-street parking along Barker Street which impedes on residents along Barker Street accessing their property. d) The scale of the development is incompatible with the existing 3-4 storey high development in the locality. e) The development will cause overshadowing. f) There is a possibility of anti-social behaviour stemming from patrons of the proposed lounge/bar. g) Vehicle access from Daly Street to Barker Street should be closed off.	a) Road traffic noise is not a matter relevant for the purpose of determining this planning application. b) The applicant has submitted a comprehensive Traffic Impact Assessment (TIA) satisfactorily demonstrating that the road network is capable of accommodating the additional traffic generated by the proposed development. c) The City's *Parking and Parking Facilities Local Law 2002* provides for on-street parking. As detailed in the DAP RAR, the 390 onsite car parking spaces are considered appropriate to cater for the car parking needs of the development. d) The proposed height of the development is considered acceptable given the relationship with Great Eastern Highway and the City's Golden Gateway Precinct. This is further discussed in the DAP RAR. e) The development does not overshadow any residential property. f) Although Cl. 10.2(j) of LPS15 requires the local government to consider social issues that have an effect on the amenity of the locality, it is unreasonable to assume that the lounge/bar within the development will cause anti-social behaviour. Notwithstanding this, anti-social behaviour is a matter to be handled by the police. g) Modifications to the Daly Street / Barker Street intersection is a matter not relevant for the purpose of determining this planning application. Should access prove to be an issue, that will become a matter for consideration by Council.
4.	L Li, 79 Vaucluse Circuit, Belmont WA 6104	Support. a) The development will improve the amenity of the area; however, Council should ensure that any development respects the quiet enjoyment of the area for local residents.	It is noted that this submission was received after closure of the advertising period. Nevertheless, the matter raised in this submission has been noted. a) It is noted that the development is consistent with the objectives of the Mixed Business zone as outlined under Cl. 4.2 of LPS15, and the development complies with the development standards contained in relevant planning legislation and policies.

ATTACHMENT 4 – MAIN ROADS WA REFERRAL RESPONSE (26 NOVEMBER 2013)

Lot 702 (215) Great Eastern Highway, Strata Lots 1-5 (223 and 223A) Great Eastern Highway and (22 and 24) Hargreaves Street, Lot 4 (7) Belgravia Street and Lot 180 (9) Belgravia Street, Belmont

LG Reference: **10/2013/DAP**
DAP Reference: **DP/13/00715**

mainroads
WESTERN AUSTRALIA
ABN: 50 860 676 021

Enquiries: James McCallum on (08) 9323 4214
Our Ref: 13/7832 (D13#668222)
Your Ref: 10/2013/DAP

26 November, 2013

The Chief Executive
City of Belmont
LMB 379
Cloverdale WA 6985

Attention: Wilmot Loh

Dear Wilmot

ADDITIONAL COMMENTS – MIXED USE DEVELOPMENT – HOTEL, RESTAURANT, DWELLINGS AND OFFICES- CITY OF BELMONT - DAP

I refer to Main Roads original response, dated 3rd of October, 2013 responding to the City of Belmont request for comment, dated 2nd of September, 2013. Reference is also made to the updated transport information that was submitted to Main Roads from the applicants consultant and correspondence with the City of Belmont's Planning Officer.

Following the submission of the updated SIDRA analysis Main Roads primary concern is the impact of the development on the intersection of GEH and Hargreaves Street. It is noted that the intersection of GEH / Belgravia / Stoneham will be under significant stress moving forward and that this situation is caused primarily by regional movements. However, due to the proposed access configuration of the development (Left In – Left Out on Belgravia St and Full Movement on Hargreaves) it would appear that vehicles wanting to travel eastbound on GEH would need to use the Hargreaves St connection to GEH, and then navigate across traffic to access the U-Turn facility. The alternative option would be to utilise Barker St to either access the GEH / Belgravia intersection or to access GEH from Daly St, either option would put additional strain on the local road network.

This movement, crossing multiple lanes of traffic to access a turning pocket, is considered to be hazardous and is likely to create traffic safety issues in the future if this movement becomes common place. It is noted that the Transport Impact Assessment states that some 919 vehicles are expected to use this access to GEH, suggesting that this location will experience a level of traffic that is not evident presently. In an effort to remove this hazard Main Roads would ideally remove the Hargreaves St access to GEH. This is because of the increased risk for conflict generated primarily by the applicants proposal, and will result in an increase in the amount of vehicles accessing GEH from Hargreaves St and raising this issue now is of some importance.

Removing the Hargreaves St access to GEH in the short term would be counter intuitive, especially considering the period of time since the completion of the GEH project. However, please be aware that should the Hargreaves St access cause a safety concern for Main Roads there is a high likelihood that this access to GEH would be removed. It is expected that such an eventuality would detrimentally impact on the proposed development and should be raised at this stage so that all stakeholders are aware of potential future issues.

As the applicant has addressed Main Roads previous requests to provide additional transport information, and agreed to resolve to not include any development within the area affected by the MRS reservation for Primary Regional Roads, Main Roads **no longer objects** to the proposed development. This is subject to the following conditions being imposed:

1. It is noted that a school crossing is located opposite the proposed southernmost Left-in Left –Out (LILO) onto Belgravia Street. This is likely to cause a hazard for pedestrians. The applicant shall either relocate the crossing further north to remove this obstruction, or change the crossover location to avoid this conflict.

2. No earthworks shall encroach onto the Great Eastern Highway road reserve.

3. No stormwater drainage shall be discharged onto the Great Eastern Highway road reserve.

4. Redundant driveways shall be removed and the verge and its vegetation made good at the applicants cost.

5. The applicant shall make good any damage done to the existing verge and its vegetation within the Great Eastern Highway road reserve.

If you require any further information please contact James McCallum on (08) 9323 4214. In reply please quote reference number 13/7832 (D13#668222).

Yours faithfully

Lang Fong

PLANNING INFORMATION MANAGER

ATTACHMENT 5 – DEPARTMENT OF PLANNING (INFRASTRUCTURE AND LAND USE COORDINATION) REFERRAL RESPONSE (20 NOVEMBER 2013)

Lot 702 (215) Great Eastern Highway, Strata Lots 1-5 (223 and 223A) Great Eastern Highway and (22 and 24) Hargreaves Street, Lot 4 (7) Belgravia Street and Lot 180 (9) Belgravia Street, Belmont

LG Reference: **10/2013/DAP**
DAP Reference: **DP/13/00715**

Government of **Western Australia**
Department of **Planning**

Your ref: 10/2013/DAP
Our ref: DP/10/00702
Enquiries: Alison Vangel (Ph: 6551 9526)

City of Belmont
LMB 379 Cloverdale
Western Australia 6985

20 November 2013

Attention: Wilmot Loh

Dear Sir/Madam

Re: Mixed Use Development – 250 Room Hotel, 124 Apartments, Convenience Store, Fastfood, Lunch Bar and Consulting Rooms

I refer to your letter dated 7 November 2013 regarding the above application. In accordance with the Western Australian Planning Commission's (WAPC) Notice of Delegation dated 23 December 2011, the following transport comments are provided with respect to this proposal.

Land Requirements

The subject site abuts Belgravia Street, which is reserved as an Other Regional Road (ORR) in the Metropolitan Region Scheme (MRS) and is reserved as a Category 2 Road per Plan Number SP 694/2. Lots 123 and 180 are affected by the ORR reservation for Belgravia Street, per the attached Western Australian Planning Commission (WAPC) Land Requirement Plan number 1.3504/1. The ORR road-widening reservation is 0-2.5 m wide and does not appear to have been acknowledged in the submitted plans. Should the proponent require the exact dimensions of the road widening affecting Lot 8, they would need to apply for a Clause 42 Certificate. The form can be downloaded from http://www.planning.wa.gov.au/5551.asp

The subject site also abuts Great Eastern Highway, which is reserved as a Primary Regional Road (PRR) in the MRS. Lot 702 is affected for the PRR reservation for Great Eastern Highway per the attached Western Australian Planning Commission (WAPC) Land Requirement Plan number 1.5080. The proposal should also be referred to Main Roads WA for comment, particularly on whether the road reservation requirements affecting Lot 702 are still required given the recent upgrades to Great Eastern Highway.

Transport Impact Assessment

The following comments are based on the Department's preliminary assessment of the Transport Impact Assessment (the Assessment) prepared by Kleyweg Consulting dated November 2013 (Revision H).

Access

It is noted that the property currently has several crossovers on Belgravia St and Hargreaves St and is proposing one left-in left-out access on Belgravia St, and two full movement access points on Hargreaves St, as stated on page 9 of the Assessment. This is in accordance with

the Commission's Regional Roads (Vehicular Access) Policy D.C. 5.1, which seeks to minimise the number of new crossovers onto regional roads.

It is also noted that the amended 'Access Planning 05' plan, dated November 2013, shows all exits from the site as left-out only and should be amended to be consistent with the Assessment.

Trip Generation & Distribution

The Assessment has estimated that the proposal will generate approximately 2100 daily vehicular trips and 245 peak hour vehicular trips. The Department is generally satisfied with the methods used to determine traffic generation, except for the Accommodation component.

It is noted that calculations on Page 29 claiming that 40% of all trips will be vehicular trips and that a large number of guests are expected to arrive to/depart from the site via taxi. Whilst taxis may decrease the parking provision required, it does not reduce the number of vehicles entering and exiting the site and the impact on the surrounding road network. Taxi services create a larger impact on the surrounding road network as they will both enter and leave the site for both a drop-off and a pick up. Given that direct public transport from the Perth Domestic and International Airports is not available to the site, it should be assumed that 100% of trips for the hotel/accommodation will be vehicular, whether private or by taxi/shuttlebus. At an 80% occupancy rate, this would generate at least approximately 160 peak hour trips, not 63 as stated in the Assessment. This will increase the impact of the proposal on the surrounding road network in the peak hour to at least 340 vehicular trips rather than 245.

On page 40, the Assessment discusses the demand for taxi use derived from the survey results at Observation City. Whilst a peak hour demand of 24 taxis in the peak hour seems reasonable although perhaps conservative given the proximity of the airport and availability of direct public transport, this is actually 48 trips generated, as both entry and exit for each pick up or drop off is single trip when determining the impact on the surrounding road network. It is also not clear whether taxi trips have been included in the total traffic generation calculations, but it appears they have not been, given the discussion on page 29 regarding vehicular trips.

Taxi trips will increase the impact of the proposal on the surrounding road network in the peak hour to 300-340 vehicular trips rather than 245. This may have an impact on the Level of Service of major intersections.

The Department has no objections to the trip distributions rates applied in the Assessment.

Intersection Analysis

SIDRA analysis has been provided for the following intersections:

- Great Eastern Hwy/Belgravia St/Stoneham St
- Great Eastern Hwy/Hargreaves

SIDRA analysis has not been provided for the intersection of Belgravia and Barker Street. It is noted that this intersection is currently treated to prevent through movements on Barker Street, and no median is provided to aid right-out movements. The increased traffic from the development may result in congestion at this intersection as traffic circulates from Hargreaves St to Belgravia St. Furthermore, vehicles exiting onto Belgravia St may attempt illegal manoeuvres to travel back towards Great Eastern Highway. This may require modification to this intersection to enable u-turns, however it is recognised that the City of Belmont wish to prevent 'rat-running' on Barker St. It is recommended that SIDRA analysis be carried out on this intersection to determine the likely impact and to inform any intersection modifications that may need to be made.

Parking

The proposal includes 390 off-site car parking bays, which is based on a relatively high degree of reciprocity between land uses. In order for this to be sufficient and not impact on the surrounding residential streets, an ongoing Access and Parking Management Plan will need to be developed and implemented by the proponent to the satisfaction of the City of Belmont.

Active ongoing management of all parking within the vicinity of the proposed development by landowner(s), their agents/property manager and tenants in conjunction with the City is essential to achieving the desired outcome of a mixed development site readily accessible to the general community by a range of modes across the day/week. Additionally, it will be necessary to ensure parking bays are not dominated by a particular group to the loss of other user groups. Accordingly, an Access and Parking Management Plan should be prepared for the site. This is considered appropriate as it will ensure issues relating to, but not limited to, prioritisation of parking, percentage allocation of short stay and longer visit parking bays, bicycle parking, as well as responsibility for management of parking allocation and compliance are appropriately managed.

Summary of Recommendations

The Department has no objection to the proposal provided above recommendations are taken into consideration:

- The proposal should also be referred to Main Roads WA for comment, particularly on whether the road reservation requirements affecting Lot 702 are still required given the recent upgrades to Great Eastern Highway.
- 'Access Planning 05' plan, dated November 2013, be amended to show that the access points on Hargreaves St are full-movement intersections.
- Consideration is given to the additional impact that taxi trips will have on the local road network, which has not been sufficiently addressed in the TIA.
- SIDRA analysis is carried out on the Belgravia St/Barker St intersection to determine the impact on this intersection and to inform any modifications that may need to be made to the intersection.

Yours sincerely

Mohsin Muttaqui
Planning Manager
Infrastructure & Land Use Coordination

140 William Street, Perth, Western Australia 6000
Tel: (08) 6551 9000 Fax: (08) 6551 9001 www.planning.wa.gov.au
ABN 79 051 750 680

ATTACHMENT 6 – PERTH AIRPORT REFERRAL RESPONSE (21 NOVEMBER 2013)

Lot 702 (215) Great Eastern Highway, Strata Lots 1-5 (223 and 223A) Great Eastern Highway and (22 and 24) Hargreaves Street, Lot 4 (7) Belgravia Street and Lot 180 (9) Belgravia Street, Belmont

LG Reference: **10/2013/DAP**
DAP Reference: **DP/13/00715**

PERTH AIRPORT

Our Ref: IP/0002
Your Ref: 10/2013/DAP

21 November 2013

The Chief Executive Officer
City of Belmont
LMB 379
CLOVERDALE
WA 6985

Attention: Wilmot Loh

Proposed Mixed Use Development – Corner of Belgravia Street and Great Eastern Highway

I refer to your correspondence dated 20th November 2013, in which you invite comment on the proposed Mixed Use Development located at 7 & 9 Belgravia Street, 215 – 219, 223 & 223A Great Eastern Highway, and 22 & 24 Hargreaves Street Belmont.

I have assessed this proposal under the *Airports (Protection of Airspace) Regulations.* The development is located within the area designated as the Inner Horizontal Surface of the Perth Airport Obstacle Limitation Surfaces (OLS) which form a part of the Protected Airspace for Perth Airport.

At the location shown in your correspondence the indicated height of the Hotel Building, at R.L. 64m (presumably with respect to the Australian Height Datum, AHD) exceeds the maximum allowable height for the buildings within the Inner Horizontal area of the OLS by 3m. The maximum allowable height should not exceed 61metres AHD. This allowable height must also include the provision of any structures, aerials, antenna, lightning arrestors, fixtures or fittings to be installed on the building or on the site either now or in the future, and is the limit for any cranes to be utilized on the site during construction.

As the Hotel Building will be a penetration of the Protected Airspace by a permanent structure, it will be termed a Controlled Activity and as such will need to be further assessed by Airservices Australia (ASA) and the Civil Aviation Safety Authority (CASA). These assessments together with comment from the local authority and Perth Airport must then be forwarded to the Commonwealth Department of Infrastructure and Regional Development (DoIRD) for a final decision as to whether the height of the building may or may not compromise the safety of operations into and out from the airport.

Due to the proximity of the construction to one of the final approach paths into Perth Airport, it is suggested that the builder utilize non reflective materials to ensure there is no reflection which may distract pilots and compromise the safety of operations into and out from the airport. Similarly, any emissions from the site need to be of a velocity less than 4.3m/s into the atmosphere below the Protected Airspace. Again reflected light and emissions may be termed controlled activities and require approval from DoIRD if exceeded.

Perth Airport Pty Ltd
ACN 077 153 130 | ABN 24 077 153 130
2 George Wiencke Drive (opposite Domestic Terminals)
Perth Airport WA 6105
PO Box 6 Cloverdale WA 6985 | Telephone: +61 8 9478 8888 | Fax: +61 8 9478 8889
E-Mail: perthairport@wac.com.au Web Site: www.perthairport.com

PERTH
AIRPORT

Any cranes used during the construction of the buildings must to be referred to the Perth Airport, Senior Airports Operations Officer (phone 9478 8424, mobile 0419 195 790) a minimum of 2 weeks prior to construction.

Please contact me on (08) 9478 8479 or email graeme.cooper@perthairport.com.au if you have any further questions with respect to the building assessment.

Yours sincerely

Graeme Cooper
PLANNING OFFICER

Perth Airport Pty Ltd
ACN 077 153 130 | ABN 24 077 153 130
2 George Wiencke Drive (opposite Domestic Terminals)
Perth Airport WA 6105
PO Box 6 Cloverdale WA 6985 | Telephone: +61 8 9478 8888 | Fax: +61 8 9478 8889
E-Mail: perthairport@wac.com.au Web Site: www.perthairport.com

ATTACHMENT 7 – TRANSPORT IMPACT ASSESSMENT (REV I, NOVEMBER 2013)

Lot 702 (215) Great Eastern Highway, Strata Lots 1-5 (223 and 223A) Great Eastern Highway and (22 and 24) Hargreaves Street, Lot 4 (7) Belgravia Street and Lot 180 (9) Belgravia Street, Belmont

LG Reference: **10/2013/DAP**
DAP Reference: **DP/13/00715**

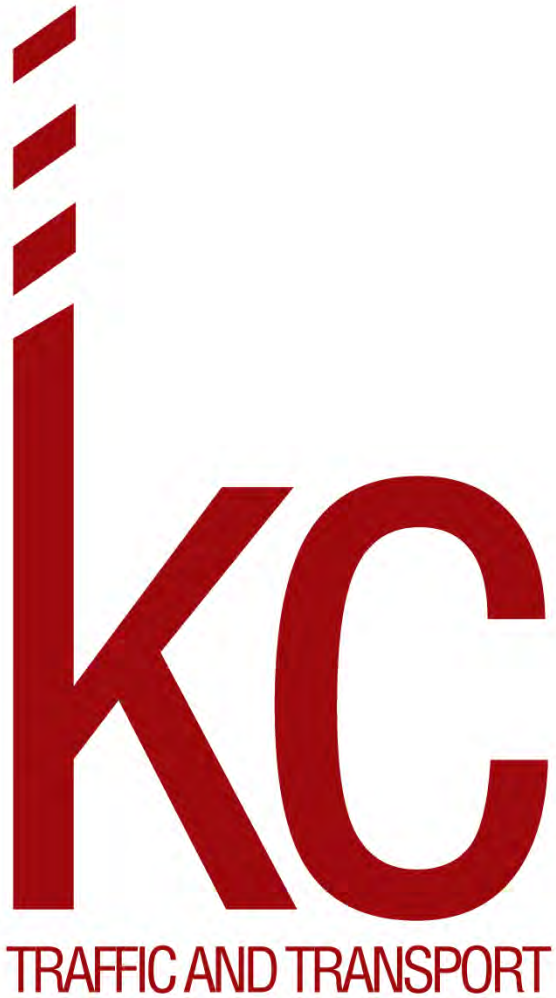
TRANSPORT IMPACT ASSESSMENT

Hotel, Apartments and Commercial

Mixed - Use Development

No. 215 - 223 Great Eastern Highway

Belmont



November 2013

Rev I

HISTORY AND STATUS OF THE DOCUMENT

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
Rev A	05.08.2013	C Kleyweg	C Kleyweg	05.08.2013	Issued for Review
Rev B	13.08.2013	C Kleyweg	C Kleyweg	13.08.2013	Issued for Approval
Rev C	18.08.2013	C Kleyweg	C Kleyweg	18.08.2013	DesignInc plans amended, car parking volumes amended
Rev D	20.08.2013	C Kleyweg	C Kleyweg	20.08.2013	DesignInc plans amended, car parking volumes amended
Rev E	15.10.2013	C Kleyweg	C Kleyweg	16.10.2013	SIDRA Analysis added. City of Belmont comments reviewed and responses provided.
Rev F	16.10.2013	C Kleyweg	C Kleyweg	17.10.2013	Convenience Store changed to Showrooms, according to DesignInc.
Rev G	01.11.2013	C Kleyweg	C Kleyweg	01.11.2013	City of Belmont comments reviewed and responses provided.
Rev H	07.11.2013	C Kleyweg	C Kleyweg	07.11.2013	Final comments from meeting held Friday 1st November 2013
Rev I	25.11.2013	C Kleyweg	C Kleyweg	25.11.2013	Revised Table 27

DISTRIBUTION OF COPIES

Revision	Date of issue	Quantity	Issued to
Rev A	05.08.2013	1 (PDF)	Ron Jee (Design Inc)
Rev B	13.08.2013	1 (PDF)	Ron Jee (Design Inc)
Rev C	18.08.2013	1 (PDF)	Ron Jee (Design Inc)
Rev D	20.08.2013	1 (PDF)	Ron Jee (Design Inc)
Rev E	16.10.2013	1 (PDF)	Ron Jee (Design Inc)
Rev F	17.10.2013	1 (PDF)	Ron Jee (Design Inc)
Rev G	01.11.2013	1 (PDF)	Ron Jee (Design Inc), Murray Ralph (City of Belmont), Wilmot Loh (City of Belmont)
Rev H	07.11.2013	1 (PDF)	Ron Jee (Design Inc), Murray Ralph (City of Belmont), Wilmot Loh (City of Belmont)
Rev I	25.11.2013	1 (PDF)	Ron Jee (Design Inc), Murray Ralph (city of Belmont), Wilmot Loh (City of Belmont)

Document Printed	25/11/2013 3:25 PM
File Name	C:\Users\colin\Desktop\KC 0179 No 215 to 223 Great Eastern Highway Belmont TIA Rev I.docx
Author	Marina Kleyweg / Katarina Pribakovic
Project Manager	Colin Kleyweg
Name of the Project	Hotel, Apartments and Commercial Mixed - Use Development No. 215 - 223 Great Eastern Highway, Belmont
Name of the Document	No. 215 - 223 Great Eastern Highway, Belmont Transport Impact Assessment Rev I
Document Version	KC00179.000_R01_Rev I

Contents

Tables

Appendices

Appendix 01 – Development Information Received From Others

Appendix 02 – Transport Planning and Traffic Plans

KCO0179.000 S01 No 215 to 223 GEH Belmont - Locality Plan - 800m Radius
KCO0179.000 S02 No 215 to 223 GEH Belmont - Bicycle Network Plan - 800m Radius
KCO0179.000 S03 No 215 to 223 GEH Belmont - Public Transport Plan - 800m Radius
KCO0179.000 S04 No 215 to 223 GEH Belmont - Pedestrian Paths Plan - 800m Radius
KCO0179.000 S05 No 215 to 223 GEH Belmont - Existing Traffic Counts - 800m Radius
KCO0179.000 S06 No 215 to 223 GEH Belmont - Traffic Flow Diagram

Appendix 03 – SIDRA Analysis

Great Eastern Highway / Belgravia Street / Stoneham Street
Great Eastern Highway / Hargreaves Street

1. Introduction

1.1 Transport Impact Assessment Layout

KC Traffic and Transport have been requested to provide a Transport Impact Assessment for the development of No. 215 - 223 Great Eastern Highway Belmont by the proponent, Great Eastern Group Pty Ltd. This Transport Impact Assessment has been completed in accordance with the guidelines as shown in the WAPC Transport Impact Assessment Guidelines – Part 4 (Developments).

The purpose of this document is to provide commentary and analysis on the potential traffic and transport impact that the proposed development of this site may have on the surrounding road and transportation networks. The impact of adjoining existing and proposed developments will also be taken into account. The scope of this report therefore is to provide a detailed assessment of the following: -

- Conduct an overview audit of the existing traffic infrastructure adjacent to and within the vicinity of the subject site and provide a concise summary of the existing network and its performance. This audit includes all transportation modes and is presented in graphical and written forms;
- Provide clear statements regarding the potential traffic impact of the proposed development option as presented in the Development. This will include a review of traffic attraction and generation, requirements for vehicle parking and requirements for alternative transportation mode linkages;
- Nominate any improvements to the local transport network which may be required due to the potential traffic impacts from the developments proposed in the Development;
- Produce a relevant document in accordance with "*Transport Assessment Guidelines for Developments – Volume 4*: *Individual Developments"* (August 2006) prepared by the Department of Planning and Infrastructure on behalf of Western Australian Planning Commission.

This Transport Impact Assessment is presented in the following logical sequence: -

- Section 1 – Introduction

  This section provides a brief description on the role of this report in the Development Application process, the general layout of the report and a list of the guideline and reference documents used in its composition.

- Section 2 – Transport Impact Assessment

  This section provides research and analysis of the key items required for submission of a Transport Impact Assessment for Developments in accordance with the Transport Assessment Guidelines nominated above. In this section, KC Traffic and Transport have examined the following subject areas: -

- Section 2.1 – Outline of the Development Proposal

  This section provides a brief description of the proposed land uses, as will be submitted to the City of Belmont for this Development Application.

- Section 2.2 – Vehicle Access and Parking Requirements

This section will generically describe vehicle access and parking requirements for the proposed development of the subject site.

- Section 2.3 – Provision for Delivery and Service Vehicles

  This section will generally describe the service vehicle requirements for the proposed development of the subject site.

- Section 2.4 – Hours of Operation

  This section will describe the general operating times for the proposed land usage as proposed under this Development Application. This information will assist in determining the likely timing of the AM and PM peaks, and therefore the peak impact on the existing and surrounding transportation network. The peak vehicle generation is the key for determining intersection capacities within a road network.

- Section 2.5 – Daily Vehicular Volumes and Vehicular Types

  This section will provide details on traffic generation rates used to determine daily traffic generation from the proposed development. It will also discuss the estimated peak hour traffic as well as the expected predominant type of vehicle which will be accessing the proposed development.

- Section 2.6 – Management of Traffic Generated by the Subject Site

  This section summarises the expected traffic generated by the land uses as proposed in the Development Application for the subject site and provides an assessment of the cumulative impact of the existing traffic volumes and the proposed traffic volumes as generated by the development.

- Section 2.7 – Public Transport Access

  This section provides a summary of the existing public transportation services available within an 800 metre radius of the subject site.

- Section 2.8 – Pedestrian and Cyclist Access

  This section provides a summary of the existing pedestrian and cyclist infrastructure available within an 800 metre radius of the subject sites boundaries.

- Section 3 – Transport Impact Assessment Checklist

  This section provides a concise, tabulated summary and review of the detailed information presented in Section 2 of this report. The intention of this checklist is to document the findings of this report, and / or any of the likely transportation / safety issues which should be considered as part of the Development Application submission. This checklist has been developed in accordance with the requirements of the Transport Assessment Guidelines for Developments.

1.2 Notes Pertaining To This Report

This report has been provided as one of the key inputs into the overall Development Application submission to the City of Belmont for the nominated landholding in Great Eastern Highway, Belmont on behalf of the proponent.

The following key points are relevant to the collection of data which has been undertaken for this project: -

- Collation of data from the City of Belmont's Local Planning Scheme No 15;
- Utilisation of Journey to Work data from the Australian Bureau of Statistics website;
- Research into room occupancy rates, bed occupancy rates and length of stay data for hotels in Western Australia from the Australian Bureau of Statistics website;
- Research into community profile data for Redcliffe and Belmont from both the Australian Bureau of Statistics and Community iD data from the City of Belmont's website;
- Compilation of traffic data from Main Roads WA website;
- Aerial imagery as available through commercial arrangements.

The above background information has provided a technical basis for the trip rates and parking requirements discussed in this report.

1.3 Available Information and Technical Literature

This section provides a brief description of the inputs used in the delivery of this report: -

- WAPC Transport Assessment Guidelines - Volume 4 (Individual Developments);
- WAPC Transport Assessment Guidelines for Developments Volume 5;
- Liveable Neighbourhoods – Element 2 – Movement Network. Any commentary on road widths has considered the Liveable Neighbourhoods Guidelines;
- RTA NSW Guide to Traffic Generating Developments. KC Traffic and Transport uses the NSW RTA Guide to Traffic Generating Developments as a base tool for calculating traffic generation from development sites. The NSW Guide to Traffic Generating Developments provides estimates for traffic generations for residential, recreational, commercial, retail and other land-uses;
- Guide to Traffic Management Part 3 Traffic Studies and Analysis (Austroads), 2008;
- Guide to Traffic Management – Part 11: Parking, Austroads, 2008 (referenced to discuss requirements for provision of car parking for various land use types, and how trip attraction / generation rates can be cross-checked in this report to provide a robust and consistent transportation model);
- Guide to Traffic Management – Part 12: Traffic Impacts of Developments, Austroads, 2008 (referenced to discuss requirements for provision of car parking for various land use types, and how trip attraction / generation rates can be cross-checked in this report to provide a robust and consistent transportation model);
- City of Belmont Local Planning Scheme 15 - Scheme Text - Gazetted 1 December 2011.
- International Visitors in Australia March 2011, Quarterly Results of the International Visitor Survey Tourism Research Australia, Department of Resources, Energy and Tourism www.ret.gov.au/tourism/Documents/tra/.../IVS_March_Qtr_2011.docx

2. Transport Impact Assessment

2.1 Outline of the Development Proposal

This Development Application considers the proposed development of No 215 to 223 Great Eastern Highway in Belmont. The subject site is currently utilised as a showroom for the boat and fishing company "Hayway Marine" and it belongs to the mixed business zone within the City of Belmont.

The proposed development is a mixed-use development comprising of: -

- Commercial component including: -
    - Hotel (12 floors) comprising 240 Rooms (Class 3), Restaurant (Class 6), Bar Lounge (Class 6), Hotel Conference / Meeting room (Class 5), Gym (Class 9b) and a Shop(Class 6);
    - Offices on levels 1 to 3 (Class 5);
    - Medical & Consulting Rooms (Class 9a);
    - Showrooms (Class 6);
    - Lunch Bar (Class 6);
    - Take Away Shop (Class 6).
- Residential component (total of 124 apartments) including:
    - 72 apartments with 1 bedroom in block 1 (Class 2);
    - 22 apartments with 2 bedrooms in block 2 (Class 2);
    - 30 apartments with 3 bedrooms in block 3 (Class 2).

The development is to be situated on a 7,878m^2 site area. Plans for the proposed development have been provided in Appendix 1 of this report.

2.2 Vehicular Access and Parking

2.2.1 Vehicular Access

The subject site is bounded by Belgravia Street to the southwest, Great Eastern Highway to the northwest and Hargreaves Street to the northeast. Direct vehicular access to the subject site is offered from Belgravia Street and Hargreaves Street. No vehicular access is allowed from Great Eastern Highway to the proposed development.

Proposed access arrangements include: -

- one access / egress point onto Hargreaves Street (full movement);
- one service vehicle access / egress point onto Hargreaves Street (full movement);
- one access / egress point onto Belgravia Street (LILO only).

Great Eastern Highway

In the vicinity of the subject site, Great Eastern Highway is a six-lane carriageway divided by a central median with a sign-posted speed limit of 60 km/h. Great Eastern Highway is classified as an Urban Highway – Primary Distributor by Main Roads WA. Bus services (including Route No's 36, 40, 295, 296 and 299) run on Great Eastern Highway in the vicinity of the Subject Site. Pedestrian paths are provided on both sides of the road reservation.

Belgravia Street

Belgravia Street is a two-way, four-lane (each lane is approximately 3.5 metres wide) carriageway divided by a central median close to the intersection with Great Eastern Highway. Belgravia Street is classified as a Significant Urban Local Road - Distributor A with a sign-posted speed limit of 60 km/h. The section of Belgravia Street between Barker Street and Great Eastern Highway has a 40kph speed limit during school entry and exit periods. Bus service (Route No 293) runs along this street. Pedestrian paths are provided on both sides of the road reservation, with a dedicated school crossing provided to the Belmont Primary School in front of the subject site. The design of future access and egress to the subject site considers the location of the existing crossing and the 40kph speed environment during school opening and closing periods. The location of driveways will be designed such that there is no conflict with the existing school crossing in Belgravia Road. On-street parking is not allowed.

Hargreaves Street

Hargreaves Street is a two-way, two-lane (each lane is approximately 3 metres wide) undivided road. Hargreaves Street is classified as an Urban Local Road - Access Road (Special Use - Industrial) with a sign-posted speed limit of 50 km/h. A pedestrian path is provided on the south western side of road reservation.

The table below shows the most recent available traffic data for the surrounding network. The following information has been obtained from Main Roads WA.

Table 1 - Traffic Volumes for Roads Adjacent to the Subject Site

Road Name	Road Hierarchy	Functional Classification	Location of Traffic Count	Vehicles Per Day (VPD)	Vehicles per Peak Hour (VPH)	Heavy Vehicle %	Year	Legal Speed Limit
Great Eastern Highway	Primary Distributor	Urban Highway	North of Abernethy Road	54,833	AM 0715 - 3,577 PM 1545 - 3,938	5.1	March 2010	60 kph
Great Eastern Highway	Primary Distributor	Urban Highway	East of Hardey Road	55,130	AM 0715 - 3,523 PM 1530 - 3,873	4.4	March 2010	60 kph
Great Eastern Highway	Primary Distributor	Urban Highway	West of Belgravia Street	68,237**	Not Provided	Not Provided	July 2013	60 kph
Great Eastern Highway	Primary Distributor	Urban Highway	East of Belgravia Street	51,618**	Not Provided	Not Provided	July 2013	60 kph
Belgravia Street	Local Distributor	Significant Urban Local Road	Between Barker Street and Wheeler Street	11,262	Not Provided	Not Provided	Jun 2013	60kph*
Belgravia Street	Local Distributor	Significant Urban Local Road	South of Great Eastern Highway	13,860**	Not Provided	Not Provided	July 2013	60kph*
Barker Street	Access Road	Urban Local Road	Between Greaves Row	539	Not Provided	Not Provided	Nov 2011	50kph

			and Daly Street					
Hargreaves Street	Access Road	Urban Local Road	Between Great Eastern Highway and Barker Street	389	Not Provided	Not Provided	Oct 2013	50kph
Abernethy Road	Local Distributor	Significant Urban Local Road	East of Great Eastern Highway	4,573	AM 0745 - 461 PM 1200 - 382	6.5	April 2013	60 kph
Abernethy Road	Distributor A	Significant Urban Local Road	East of Alexander Road	20,141	AM 0745 - 1,689 PM 1630 - 1,753	10.9	Sept 2012	60 kph
Hardey Road	Distributor B	Significant Urban Local Road	South of Great Eastern Highway	8,453	AM 0730 - 782 PM 1645 - 866	6.3	Sept 2012	60 kph
Stoneham Street	Distributor A	Significant Urban Local Road	North of Great Eastern Highway	23,851 **	AM 0730 – 1,364 ** PM 1700 – 1,155 **	n.a.	July 2013	60 kph
Resolution Drive	Distributor A	Significant Urban Local Road	North of Great Eastern Highway	9,890	n.a.	n.a.	2007	60kph

Notes * - Belgravia Street is 40kph during school periods between Barker Street and Great Eastern Highway. ** - Values have been derived from SCATS data used for SIDRA modelling at the intersection of Stoneham / Great Eastern Highway / Belgravia Street.

Main Roads WA does not provide information about formal peak hour data for Hargreaves Street. The formal peak hour data for the location on Great Eastern Highway approximately 400 metres northeast of the proposed mixed use development suggests the following:-

- Great Eastern Highway:-
  - AM peak occurs in period 06:15 - 07:15. Traffic volumes in AM peak are approximately 6.4% of total daily volumes;
  - PM peak occurs in period 14:30 - 15:30. Traffic volumes in PM peak are approximately 7.0% of total daily volumes.

2.2.2 Crash Data

The following table has collated the applicable crash data from the Main Roads WA database for crashes and incidents for roads adjacent to the subject site (Great Eastern Highway between Abernethy Road and Epsom Avenue) between the 1st January 2008 and 31st December 2012.

Table 2 – Crash Data (1st January 2008 to 31st December 2012)

Road Name	Road Hierarchy	Functional Classification	Speed Limit	Crash Statistics
Great Eastern Highway	Primary Distributor /	Urban Highway / Significant Urban	60kph / 60kph / 60kph	Total of 92 incidents: • 13 Medical

& Belgravia Street & Stoneham Street	Distributor A / Distributor A	Local Road / Significant Urban Local Road		• 41 PDO Major • 38 PDO Minor MR Type: • 5 Involving Overtaking • 87 Other / Unknown
Great Eastern Highway & Hargreaves Street	Primary Distributor / Access Road	Urban Highway / Urban Local Road	60kph / 50kph	Total of 4 incidents: • 2 PDO Major • 2 PDO Minor MR Type: • 1 Involving Pedestrian • 3 Other/Unknown
Great Eastern Highway & Daly Street	Primary Distributor / Access Road	Urban Highway / Urban Local Road	60kph / 50kph	Total of 4 incidents: • 3 PDO Major • 1 PDO Minor MR Type: • 4 Other / Unknown
Great Eastern Highway & Lapage Street	Primary Distributor / Access Road	Urban Highway / Urban Local Road	60kph / 50kph	Total of 2 incidents: • 1 PDO Major • 1 PDO Minor MR Type: • 2 Other / Unknown
Great Eastern Highway & Resolution Drive & Hardey Road	Primary Distributor / Distributor A / Distributor B	Urban Highway / Significant Urban Local Road / Significant Urban Local Road	60kph / 60kph / 60kph	Total of 120 incidents: • 6 Hospital • 22 Medical • 60 PDO Major • 32 PDO Minor MR Type: • 6 Involving Overtaking • 2 Involving Pedestrian • 112 Other / Unknown
Belgravia St & Barker St	Distributor A / Access Road	Significant Urban Local Road / Urban Local Road	60 kph / 50 kph	Total of 13 incidents: • 2 Medical • 9 PDO Major • 2 PDO Minor MR Type: • 1 Involving Overtaking • 12 Other/Unknown
Belgravia St & Brennan Way	Distributor A / Access Road	Significant Urban Local Road / Urban Local Road	60 kph / 50 kph	Total of 2 incidents: • 2 PDO Major MR Type: • 2 Other/Unknown
Belgravia St & Wheeler Street & Katoomba Place	Distributor A / Access Road / Access Road	Significant Urban Local Road / Urban Local Road/ Urban	60 kph / 50 kph / 50 kph	Total of 5 incidents: • 4 PDO Major • 1 PDO Minor MR Type:

		Local Road		• 5 Other/Unknown
Belgravia St & Fairbrother Street & Frederick Street	Distributor A / Distributor A / Local Distributor	Significant Urban Local Road / Significant Urban Local Road / Significant Urban Local Road	60 kph / 60 kph / 50 kph	Total of 8 incidents: • 4 PDO Major • 4 PDO Minor MR Type: • 8 Other/Unknown
Hargreaves Street & Greaves Row & Barker St	Access Road / Access Road / Access Road	Urban Local Road/ Urban Local Road / Urban Local Road	50 kph / 50 kph /50 kph	Total of 2 incidents: • 1 Medical • 1 PDO Major MR Type: • 2 Other/Unknown
Hargreaves Street & Stoneham St	Access Road / Distributor A	Urban Local Road / Significant Urban Local Road	50 kph / 60 kph	Total of 2 incidents: • 2 PDO Major MR Type: • 2 Other/Unknown
Great Eastern Highway 3.76 - 5.59	Primary Distributor	Urban Highway	60 kph	Total of 269 incidents: • 1 Fatal • 7 Hospital • 33 Medical • 147 PDO Major • 82 PDO Minor MR Type: • 29 Involving Overtaking • 2 Involving Parking • 2 Involving Animal • 5 Involving Pedestrian • 20 Entering / Leaving Driveway • 211 Other / Unknown
Belgravia Street (A) 0.00-0.95	Distributor A	Significant Urban Local Road	60kph	Total of 15 incidents: • 1 Medical • 9 PDO Major • 45 PDO Minor MR Type: • 4 Involving Overtaking • 5 Entering / Leaving Driveway • 6 Other / Unknown
Hargreaves Street	Access Road	Urban Local Road	50 kph	Total of 3 incidents: • 3 PDO Minor MR Type: • 3 Involving Parking

2.2.3 Vehicle Parking Requirements

To determine the relevant parking requirements for the development of No 215 to 223 Great Eastern Highway, Belmont, KC Traffic and Transport has undertaken an analysis based on the minimum requirements for parking in accordance with the City of Belmont Local Planning Scheme No 15 and the NSW RTA Guide to Traffic Generating Developments.

We believe that the NSW RTA Guide to Traffic Generating Developments provides appropriate parking requirements for consideration in this Development Application due to: -

- Development in Sydney, (in particular in the inner to middle ring suburbs) is generally of a higher density with greater mixing of land-uses within close proximity to that traditionally in the City of Belmont in particular and generally in the Perth Metropolitan Area;
- The NSW RTA Guide to Traffic Generating Developments gathered data from field surveys in the Sydney Metropolitan Area mainly in the 1990's when congestion levels in major arterial road networks would have been similar to that experienced in Perth in recent years;
- The parking rates applied in the City of Belmont LPS No 15 are generally based on more traditional, lower density development accompanied by very high rates of vehicle usage which in general are symptomatic of lower density residential design, separation of different land-use types, provision of high parking ratios per m^2 land area and a public transport system that has been radial in nature;
- The subject site is on high frequency public transportation routes, including the Perth Circle Route which provides additional opportunities for alternative mode share. This is the perfect site to test a TravelSmart program in the City of Belmont and to trial amended parking rates for large-scale developments such as this.

In summary, we believe it is appropriate to review the NSW RTA Guide to Traffic Generating Developments for parking due to the higher density proposal and greater similarities between this type of development, and development in the Sydney Metropolitan Area, than between this development and general development in the City of Belmont. In addition, we believe that the lessening of parking requirements in this location will provide an opportunity to reinforce that behaviour change is possible in Perth and that greater numbers of people can be attracted to alternative transportation mode forms, particularly for hotel guests.

The following sections highlight the parking requirements under the: -

- NSW RTA Guide,
- City of Belmont's LPS No 15 and
- a revised parking allowance based on reciprocity of uses utilising rates from the City of Belmont's LPS No 15

NSW RTA Guide to Traffic Generating Developments

The minimum parking requirements according to the NSW RTA Guide to Traffic Generating Developments are as follows: -

- Hotel - 1 space per 4 bedrooms in 3 and 4 star hotels;
- Restaurant - 15 spaces per every 100m² GLFA or 1 space for every 3 seats;
- Bar Lounge - *Comparisons should be drawn with similar use;*

- Hotel Conference / Meeting room - *Comparisons should be drawn with similar use*;
- Gym - 3 spaces per 100m² GFA;
- Shop - 6.1 spaces per 100m² GFA;
- Office Area - 1 space per 40m² GFA;
- *Medical & Consulting Rooms - The RTA has no data on the parking demand for professional consulting rooms. As a guide, three spaces per surgery has been found to be adequate in several local government areas. If it can be shown that not all surgeries will be in concurrent operation, it is acceptable to reduce the parking provision suggested above.*
- Showrooms – *The RTA has no data on the parking demand for showrooms. We believe that it would be most appropriate to consider this land use as general commercial purpose - 1 space per 40m² GFA;*
- Lunch Bar - 12 spaces per 100m² GFA;
- Take Away Shop - 6.1 spaces per 100m² GFA;
- A high density residential flat building:
    - 0.6 spaces per 1 bedroom unit;
    - 0.9 spaces per 2 bedroom unit;
    - 1.4 spaces per 3 bedroom unit; and
    - 1 space per 5 units (visitor parking).

The table below shows the minimum car parking requirements for the proposed development which has been calculated in accordance with the NSW RTA Guide to Traffic Generating Developments.

Table 3 - Minimum Car Parking Requirements (NSW RTA Guide to Traffic Generating Developments)

Criteria / Units		Requirement	Area (m²) NLA	Total
Commercial – Employee's & Visitor's Parking				
Hotel	Rooms	1 space for 4 rooms	240 Rooms	60
	Restaurant	1 space per 3 seats	132 Occupants	44
	Bar Lounge	1 space per 3 occupants	140 Occupants	47
	Hotel Conference / Meeting room	1 space per 3 occupants	80 seats	27
	Gym	3 spaces per 100m² GFA (Assumed to be used by guests in the hotel as opposed to being used for external purposes)	N/A	/
	Shop	6.1 spaces per 100m² GFA (Assumed to be used by guests in the hotel as opposed to being used for external purposes)	65m²	/
Office Area NLA (Level 1,2,3)		1 space per 40m² GFA	1,371m²	34
Medical & Consulting Rooms		3 spaces per practitioner	5 Practitioners	15
Showroom		1 space per 40m² GFA	419m²	11
Lunch Bar		12 spaces per 100m² GFA	85m²	10
Take Away Shop		6.1 spaces per 100m² GFA	118m²	7
Showroom		1 space per 40m² GFA	65m²	2

Total Commercial Component			**257**
Residential Component - Resident's Parking			
Residential Unit with GFA < 75m^2 (1 Bed)	0.6 spaces per 1 bedroom unit	72	43
Residential Unit with GFA < 75m^2 (2 Beds)	0.9 spaces per 1 bedroom unit	22	20
Residential Unit with GFA 75-110m^2 (3 Beds)	1.4 spaces per 1 bedroom unit	30	42
Residential Component - Visitor's Parking			
Residential Unit	1 space per 5 units	124 dwellings	25
Total Residential Component			**130**
Total - The proposed development			**387***

*the number represents cumulative rate – no reciprocal parking has been taken into account.

City of Belmont LPS No 15

The City of Belmont's Local Planning Scheme No. 15 stipulates that parking provisions for mixed use (hotel, commercial) developments should be made in accordance with the following ratio's and rates quoted from Section 5, Table 2 - Car Parking Requirements: -

- Hotel - 1 space for every 2m² of bar and lounge floor area. (1 space for every 4m² of seating only areas) plus 1 space for every bedroom. Where other facilities are provided parking is to be negotiated with the City.
    - Restaurant - 1 space for every 4 seats
    - Bar Lounge - 1 space for every 4 persons whom the building is designed to accommodate;
    - Hotel Conference / Meeting room - 1 space for every 4 seats
    - Gym – N/A;
    - Shop - 6 spaces per 100m² of NLA;
- Office Area - 1 space for every 30m² of NLA or 1 space for each employee, whichever is greater
- Medical & Consulting Rooms - 4 spaces for every practitioner;
- Showroom - 1 spaces per 40m² of NLA;
- Lunch Bar - 6 spaces for every 100m² of NLA.
- Take Away Shop - 6 spaces for every 100m² of NLA.

The City of Belmont's Local Planning Scheme No. 15 stipulates that parking provisions for residential developments should be made in accordance with the Residential Design Codes of Western Australia. Clause 7.3.3 On-site Parking Provision (section A3.1) of the Residential Design Codes provides guidance on the minimum requirements for parking provisions for developments of multiple dwellings with a coding of R30 or higher:-

- Parking for residents (dwelling area <75m^2) – 0.75 parking space per dwelling,
- Parking for residents (dwelling area 75-110m^2) – 1 parking space per dwelling,
- Parking for visitors – 0.25 parking spaces per dwelling.

Utilising the City of Belmont standard parking provisions, the parking volume required is as follows: -

Table 4 - Minimum Car Parking Requirements (City of Belmont LPS No 15)

Criteria / Units		Requirement	Area (m^2) NLA	Total
Commercial – Employee's & Visitor's Parking (City of Belmont's requirement)				
Hotel	Rooms	1 space for every bedroom	240 Rooms	240
	Restaurant	1 space for every 4 seats	132 Occupants	33
	Bar Lounge	1 space for every 4 persons whom the building is designed to accommodate	140 Occupants	35
	Hotel Conference / Meeting room	1 space for every 4 seats	80 seats	20
	Gym	Assumed to be used by guests in the hotel as opposed to being used for external purposes.	N/A	/
	Shop	6 spaces per 100m2 of NLA (Assumed to be used by guests in the hotel as opposed to being used for external purposes.)	$65m^2$	/
Office Area (Level 1,2,3)		As above	$1,371m^2$	46
Medical & Consulting Rooms		4 spaces for every practitioner	5 Practitioners	20
Showroom		1 space per $40m^2$ of NLA	$419m^2$	11
Lunch Bar		6 spaces for every $100m^2$ of NLA	$85m^2$	5
Take Away Shop		6 spaces for every $100m^2$ of NLA	$118m^2$	7
Total Commercial Component				**417**
Residential - Resident's Parking (R Codes Requirement) * high frequency public transport routes				
Residential Unit with GFA < $75m^2$ (1 Bed)		0.75 parking bay per dwelling	72	54
Residential Unit with GFA < $75m^2$ (2 Beds)		0.75 parking bay per dwelling	22	17
Residential Unit with GFA 75-$110m^2$ (3 Beds)		1.0 parking bay per dwelling	30	30
Residential - Visitor's Parking (R Codes Requirement)				
Residential Unit		0.25 parking bay per dwelling	124 dwellings	31
Total Residential Component				**132**
Total - The proposed development				**549***

**the number represents cumulative rate – no reciprocal parking has been taken into account.*

Therefore the City of Belmont LPS No 15 Parking Requirements show the proposed development would require a total of 549 parking spaces. This does not include an allowance for reciprocal parking for land uses which are generally not concurrent in their peak usage. The proposed parking bays will be 5.5m x 2.5 which is in accordance with the City of Belmont's LPS No. 15 page 111.

Calculation of Reciprocal Uses and Adjustment to Parking Volumes

The City of Belmont LPS NO 15 quotes on Page 92, (vii) *Car parking shall be calculated separately where there is a mixture of land uses (eg office and residential). The City may consider car parking dispensations where it is satisfied that on street car parking will be available for use outside normal business hours, or where it can be demonstrated that there is a certain amount of reciprocity between land uses.*

Table 5 below provides a detailed list of the parking requirements for the site allowing for reciprocity of uses. This reciprocity is based on the following principles: -

- **Hotel Rooms** – based on an occupation rate for rooms of approx. 90% based on the long-term averages in the Perth Metropolitan Region, coupled with high frequency public transportation routes available at the door and the proximity of the Perth Airport Domestic and International terminals and the provision of a high quality pick up / drop off for taxi's and other vehicles and approx. 30% vehicle hire usage for all travellers to Australia as researched in 2011 by Tourism Research Australia (Dept of Resources, Energy and Tourism) which calculates the number of tourists across Australia from overseas for the year to March 2011 and documents their usage of transportation when in Australia. www.ret.gov.au/tourism/Documents/tra/.../IVS_March_Qtr_2011.docx The findings are as follows: -
    - Private or company car – 601,000 persons or 16.0%
    - Rental car – 445,000 persons or 11.9%
    - Van / motor home / campervan – 91,000 persons or 2.4%
    - Taxi / Chauffeur etc – 63,000 persons or 1.7%
    - Aircraft – 1,583,000 persons or 42.2%
    - Rail – 168,000 persons or 4.5%
    - Bus – 240,000 persons or 6.4%
    - Ship / Boat / Ferry – 161,000 persons or 4.3%
    - Local Public Transport – 154,000 persons or 4.1%
    - Hotel or Motel Shuttle Bus / Courtesy Bus – 25,000 persons or 0.7%
    - Charter / Tour Bus – 175,000 persons or 4.7%
    - 4WD – 17,000 persons or 0.5%
    - Other – 31,000 persons or 0.8%
    - Total – 3,754,000 persons
- **Restaurant** – predominant times for restaurant are evening peaks and lunch-times, generally countercyclical to either visitors for residential purposes (lunch times) or office uses (day times). We have utilised a 25% reduction for reciprocal uses
- **Bar Lounge** – predominant usage times for lounge bar are evenings to late evenings when office uses will be minimal. We have utilised a 25% reduction for reciprocal uses.
- **Hotel Conference / Meeting Room** – all hotel conference / meeting room is expected to be during the day only. We have utilised a 25% reduction for reciprocal uses.
- **Gym** – the gym facilities are 100% for the use of residents and accommodation guests only and therefore will be for the use of persons already in the facility.
- **Office** – office parking is required for weekday 7am to 6pm usage and is reciprocal to visitors parking requirements for the residential land-use which are more likely to be higher in evenings and on weekends. We have utilised a 50% reduction for reciprocal uses.
- **Medical and Consulting Rooms** – required for daytime parking between 8am and 5pm. No reciprocal parking allowance given.

- **Showroom** – Largely used during weekdays and business hours. Reciprocal to 20% against visitor bay parking for residential and hotel guest parking.
- **Lunch Bar / Take Away Shop** – Used during morning peak and lunch peaks to around 3 to 4pm with incidental use at other times. High walk-up patronage expected and use by staff at Offices. Potential early morning and late afternoon use by residents and hotel guests. Allow 50% reciprocal use against other parking including Office, Residential, Hotel Guest etc.

The Importance of Pick Up / Drop Off (Taxi, Shuttle Bus etc)

According to the NSW RTA Guide to Traffic Generating Developments a large portion of traffic generation for hotels can be attributed to taxi traffic – on average 1 taxi vehicle per 10 rooms per hour. The provision of a small taxi rank or Porte-Cochere is important to the long term success of this development, and the ability for strong connectivity between key land-uses in the Perth Metropolitan Region using taxi's, shuttle buses etc should be considered in the overall parking strategy.

Car Parking Provision – Proposed Calculation

The table below shows the number of car parking bays provided by the proposal which has been calculated in accordance with the expected reciprocity between the land uses.

Table 5 - Car Parking Provision by the Proposal

Criteria / Units		Car Bays Provided	Area (m^2) NLA	Total (under scheme)	Total (after reciprocity)
Commercial – Employee's & Visitor's Parking					
Hotel	Rooms	1 space per 3 bedrooms	240 Rooms	80	80
	Restaurant	1 space per 4 persons (25% Reciprocal)	132 Occupants	33	25
	Bar Lounge	1 space per 4 persons (25% Reciprocal)	140 Occupants	35	26
	Hotel Conference / Meeting room	1 space per 4 persons (25% Reciprocal)	80 seats	20	16
	Gym	100% Hotel Guests	N/A	/	/
Office Area (Level 1,2,3)		6 spaces per 100m^2 (50% Reciprocal)	1,371m^2	46	23
Medical & Consulting Rooms		4 spaces for every Practitioner - Negligible Reciprocal	5 Practitioners	20	20
Showroom		1 space per 40m^2 (20% Reciprocal)	419m^2	11	8
Lunch Bar		6 spaces for every 100m^2 of NLA (50% Reciprocal)	85m^2	5	3
Take Away Shop		6 spaces for every 100m^2 of NLA (50% Reciprocal)	118m^2	7	4
Total Commercial Component				**257**	**205**
Residential - Resident's Parking					

Residential Unit with GFA < 75m^2 (1 Bed)	0.75 parking bay per dwelling	72	54	54
Residential Unit with GFA < 75m^2 (2 Beds)	0.75 parking bay per dwelling	22	17	17
Residential Unit with GFA 75-110m^2 (3 Beds)	1.0 parking bay per dwelling	30	30	30
Residential - Visitor's Parking				
Residential Unit	0.25 parking bay per dwelling	124 dwellings	31	31
Total Residential Component			**132**	**132**
Total - The Proposed Development			**389**	**337**

The development proposes 390 parking bays. As such, we believe the volume of parking offered is generous and offers additional parking for peak periods as well as ensuring that all residences have an opportunity for a dedicated bay per dwelling. The 390 bays provided equates to the numbers provided in the NSW RTA Guide to Traffic Generating Developments, effectively not allowing for any reciprocity of uses as shown in Table 3.

As part of this study, we reviewed the parking provided for a similar land-use in Scarborough, requested details on the available facilities and developed a retrospective table showing how parking could have been calculated.

2.2.4 Parking Survey – Observation City (Rendezvous Scarborough)

On Friday 4th October, members of the KC Traffic and Transport team conducted a parking survey at Rendezvous Scarborough, (formerly known as Observation City) to determine the usage of parking. We believed this site exhibits the greatest potential similarity in the Perth Metropolitan Area to the proposed development in Belmont.

The Rendezvous Scarborough is located approximately 11.2km north-northwest of the Perth CBD (compared to the subject site being located approximately 6.3km east-northeast of the Perth CBD). The Rendezvous Scarborough is a 4-star hotel with similar guest facilities to those offered for the subject site, inclusive of 336 guest rooms and suites, restaurant and lounge bars (including Straits Café for 100-150 people, Lobby bar for 50-60 people, Pool bar for 50-100 people), swimming and kiddies pool, resident gym (for 20 people), Day Spa Centre (for 8 people) and meeting rooms for the use of both guests an corporate hire.

Rendezvous Scarborough is set amongst a number of external restaurants, one of Perth's most popular beaches, low-intensity retail and higher density residential uses. We have contacted the Rendezvous and obtained further detailed information on their land-uses, to enable a comparison with the parking provision proposed in this report. This is shown in the table below: -

Table 6 - Analysis of Parking for Rendezvous Scarborough

Criteria / Units		Assumed Ratio of Parking	Area (m^2) NLA	Total
Commercial – Employee's & Visitor's Parking				
Hotel	Rooms	1 space per 3 bedrooms *(potentially may be as low as 1 space per 4 bedrooms)*	336 Rooms	112 / *84*
	Restaurant	1 space for every 4 persons	176 Occupants or	44 / *22*

	(Straits Café)	*(likely 50% reciprocal parking as guests likely to be from the hotel)*	270 if used for a function.	
	Lobby Bar	1 space for every 4 persons *(likely to be 90% reciprocal as guests likely to be from the hotel)*	40 to 50 Occupants	10 / *2*
	26 Meeting Rooms	1 space for every 4 persons *(likely to be based on an occupancy rate of up to 50%, with reciprocal parking allowance due to bookings being during weekdays and business hours).*	Up to 1,200 persons	300 / *75*
	Two Ballrooms	1 space for every 4 persons *(ballrooms to be used at night at opposite time to meeting rooms quoted above – fully reciprocal parking allowance)*	Up to 680 persons	170 / *0*
	Mentelle Room	1 space for every 4 persons *(allow parking calculation for this land use, and then reciprocal for Mezzanine Suite, Preston Rooms as all rooms not likely to be booked at same times coincidentally.)*	Up to 350 persons	90 / *90*
	Mezzanine Suite	1 space for every 4 persons *(refer above)*	Up to 100 persons	25 / *0*
	Preston Rooms	1 space for every 4 persons *(refer above)*	Up to 500 persons	125 / *0*
	Gym	Deemed to be for use of guests only		0
	Spa	Deemed to be for use of guests only		0
Total – Using City of Belmont LPS No 15				**876**
Total – Available Existing Parking (including additional parking allowed for service vehicles)				***277***

In summary, the Rendezvous is likely to use a parking availability of 1 bay per 3 rooms with reciprocal parking allocated for the various ballrooms, suites and the restaurant. It is highly unlikely that the Rendezvous would hire out all suites and ballrooms at the same time. We believe that this calculation supports the findings in the previous section, and that a lower parking rate for hotel guests should be considered for the development. In addition, this complies with the research completed by Tourism Research Australia as quoted on Page 18 of this report which showed approximately 30 to 35% of overseas tourists to Australia used motor vehicles during their stay in Australia in the year to the 31st March 2011.

Vehicle Parking Survey – Friday 4th October 2013

The following general information has been researched prior to the commencement of the survey: -

- Total available parking bays = 277
- Total bays unavailable due to construction issues = 28
- Total ACROD bays = 6

At the commencement of the survey, there were 75 bays occupied or 27% of the total supply.

Table 7 - Parking Survey Friday 4th October

Time	12:30-12:40	12:40-12:50	12:50-13:00	13:00-13:10	13:10-13:20	13:20-13:30	13:30-13:40	13:40-13:50	13:50-14:00	14:00-14:10	14:10-14:20	14:20-14:30	14:30-14:40	14:40-14:50	14:50-15:00	Total
No of Cars Entering	0	1	3	1	4	0	1	8	2	5	3	1	6	4	1	50
No of Cars Leaving	2	3	1	1	2	0	1	1	0	7	3	0	2	2	0	25

During the survey period there was a reasonable turnover of vehicles with over 1 vehicle per minute using the facility during one of the 10-minute survey periods. In general throughout the survey period 1 vehicle entered or left the parking area every 2 minutes when averaged across the 2.5 hour survey period.

In conclusion, we believe the collected data correlates strongly to the 1 parking bay per 3 rooms as proposed in our alternative strategy in Table 5 on Page 16, with commensurate allocation for calculation for reciprocal parking given the strong usage of facilities by on-site guests.

The provision of a formalised porte-cochere allowing for taxi's, other vehicle drop-off and pick-up and shuttle buses operating between the Perth CBD and the Perth Airport (both Domestic and International Terminals) will be important to creating the image that this is a location where having your own vehicle is less important.

2.2.5 Bicycle Parking

The City of Belmont has defined bicycle parking requirements in the Local Planning Scheme No 15. The table below sets out the minimum parking requirements for the proposed development.

Table 8 - Minimum Requirement for Bicycle Parking (City of Belmont LPS No 15)

Criteria / Units		Requirement	Area (m^2) NLA	Total
Commercial – Employee's Parking (City of Belmont's requirement)				
Hotel	Rooms	N/A	240 Rooms²	3
	Restaurant	1 per 25m² GFA bar floor area	132 Occupants	
	Lounge Bar	1 per 25m² GFA bar floor area	140 Occupants	

	Hotel Conference / Meeting room	N/A	80 seats	
	Gym	N/A	N/A	
	Shop	At discretion of City	65m²	
Office Area (Level 1,2,3)		1 per 200m² GFA; Less than 200m² GFA At discretion of City	1,371m²	7
Medical & Consulting Rooms		At discretion of City	5 Practitioners	/
Showroom		1 per 1,000m² sales floor	419m²	0.4
Lunch Bar		1 per 100m² GFA	85m²	0.8
Take Away Shop		1 per 100m² GFA	118m²	1.2
Showroom		1 per 1,000m² sales floor	65m²	0.07
Commercial – Visitors' Parking (City of Belmont's requirement)				
Hotel	Rooms	N/A	240 Rooms	4.2
	Restaurant	1 per 100m² GFA of lounge, dining and function areas	132 Occupants	
	Lounge Bar	1 per 100m² GFA of lounge, dining and function areas	140 Occupants	
	Hotel Conference / Meeting room	N/A	80 seats	
	Gym	1 per 200m² GFA	N/A	
	Shop	1 per 25m² GFA	65m²	
Office Area (Level 1,2,3)		1 per 750m² GFA; Less than 750m² GFA At discretion of City	1,371m²	2
Medical & Consulting Rooms		1 per 4 practitioners	5 Practitioners	1.25
Showroom		1 per 1,000m² sales floor	419m²	0.4
Lunch Bar		1 per 50m² GFA	85m²	1.4
Take Away Shop		1 per 50m² GFA	118m²	2.2
Showroom		1 per 1,000m² sales floor	65m²	0.07
Total Commercial Component				**17**
Residential – Residents' Parking (R Codes Requirement)				
Residential Unit		1 parking bay per 3 dwellings	124 Dwellings	42
Residential - Visitors' Parking (R Codes Requirement)				
Residential Unit		1 parking bay per 10 dwellings	124 Dwellings	12.4
Total Residential Component				**54**
Total - The proposed development				**71**

The City of Belmont's Local Planning Scheme No. 15 stipulates that bicycle parking provisions for hotels should be made in accordance with the following ratio's and rates quoted from Section 5, Table 3 - Bicycle Parking Requirements: -

- Employee's Parking - 1 per 25m² GFA bar floor area
- Visitors' Parking - 1 per 100m² GFA of lounge, dining and function areas

The City's LPS No. 15 further requires a ventilated lockable storage per bicycle parking spot and one male and one female shower in separate change rooms for the provision of between 1 and 10 bicycle parking spots.

According to the proposal, there will be dedicated bicycle parking in an enclosed space and end-of-trip facilities (a store for 82 bikes storage).

From a customer perspective, cycling to a hotel for the purpose of accommodation, showroom and restaurant is unlikely. It is expected that there would be a certain number of bicycle trips used by the hotel staff and the apartment's residents. With consideration for the reciprocity of land usages within the proposed mixed use development and its peak period of usage, we believe that 82 bicycle parking spaces should cater for the requirements of the proposed development.

2.2.5 ACROD Parking

1,464 people or 4.2% of the population in the City of Belmont report needing help in their day-to-day lives due to disability. The Building Code of Australia suggests the following method for determining the requirement for the provision of ACROD bays:-

Table 9 - Minimum Requirements for ACROD Parking

Criteria		Requirement	No of Standard Bays / Units	Total
Commercial– ACROD Parking (Building Code of Australia requirement)				
Hotel	Residential part - Class 3	201 to 500 sole-occupancy units (240 sole-occupancy units): 9 accessible sole-occupancy units plus 1 additional sole-occupancy unit for every 30 units or part thereof in excess of 200	11.0 accessible sole-occupancy units	16.4 (359 x 0.0458)
	Restaurant - Class 6	1 space for every 50 standard car parking spaces	51.5	1.03
	Lounge Bar - Class 9b	1 space for every 50 standard car parking spaces	69.3	1.4
	Hotel Conference / Meeting room - Class 9b	1 space for every 50 standard car parking spaces	18.8	0.4
	Gym - Class 9a	1 space for every 100 standard car parking spaces	/	/
Office Area - Class 5		1 space for every 100 standard car parking spaces	45.7	0.5
Medical & Consulting Rooms - Class 9a		1 space for every 100 standard car parking spaces	8.0	0.08
Showroom - Class 6		1 space for every 50 standard car parking spaces	25.1	2

Lunch Bar/Take Away - Class 6	1 space for every 50 standard car parking spaces	10	0.2
Total Commercial Component			**22**
Residential - ACROD Parking (Building Code of Australia requirement)			
Residential Unit - Class 2	101 to 200 sole-occupancy units (124 sole-occupancy units): 5 accessible sole-occupancy units plus 1 additional sole - occupancy unit for every 25 units or part thereof in excess of 100	No accessible units	/
Total Residential Component			/
Total - The proposed development			**22**

Car parking spaces for people with a disability is `to be calculated by multiplying the total number of carparking spaces by the percentage of: -

- Accessible sole-occupancy units to the total number of sole-occupancy units; or
- Accessible bedrooms to the total number of bedrooms.

In accordance with the BCA, 240 units in No 215 to 223 Great Eastern Highway development generate a requirement for 11 accessible units (which is approximately 4.58% of the total number of units).

The residential land use within the proposed development can be classified as Class 2. Given that there are no accessible units planned there is no specific requirement for provision of ACROD bays.

2.3 Provision for Delivery and Service Vehicles

Delivery and service vehicles can approach the site via Belgravia Street and Hargreaves Street. The main service access / egress is the eastern access / egress in Hargreaves Street.

The minimum parking requirements for the provision of delivery and service vehicles according to the NSW RTA Guide to Traffic Generating Developments are as follows: -

- Commercial premises < 20,000m^2 GFA - 1 space per 4,000m^2 GFA;
- Hotel > 200 bedrooms or bedroom suites - 4 + 1 per 100 bedrooms over 200;
- Residential flat buildings < 200 flats or home units - 1 space for every 50 residential units.

The following table provides a preliminary calculation for the delivery and service vehicle parking requirements for No 215 to 223 Great Eastern Highway on the basis of the development yields as depicted in Design Inc Draft DAP's.

Table 10 - Minimum Requirements for Delivery and Service Vehicle Parking

Land Use Type	Parking Requirements	Yield	Parking Bays
Hotel	4 + 1 per 100 bedrooms over 200	240 rooms	5
Commercial (Restaurant , Bar Lounge, Hotel Conference / Meeting room, Gym, Shop, Offices, Medical & Consulting Rooms, Showroom, Lunch Bar, Take Away Shop	1 space per 4,000m^2 GFA	Less than 4,000m^2 GFA	1
Residential	1 space for every 50 residential units	124 dwellings	3
Total Delivery and Service Vehicle Parking Requirement			**9**

We believe that 9 dedicated service bays is an overly conservative requirement given that the different facilities have requirements for parking of service vehicles at different times throughout the day and that this could be managed appropriately by Building Management. Therefore we believe that a total of 5 service vehicle parking spaces would be sufficient to cater for the requirements of this development, based on reciprocal usage.

The development of No 215 to 223 Great Eastern Highway, will require provision of a compound for rubbish bins within the subject site.

2.4 Hours of Operation

The expected hours of operation influence the likely timeframe for the generation of peak traffic flows into and out of the site:-

- Hotel (Reception) - Estimated 00:00 - 00:00
- Restaurant - Estimated 07:00 - 22:00
- Lounge Bar - Estimated 22:00 - 05:00 (likely Thursday to Saturday peak trading times)
- Hotel Conference / Meeting room - Estimated 09:00 - 17:00
- Gym - Estimated 08:00 - 20:00
- Shop - 08:00 - 18:00
- Office Area - Estimated 08:00 - 17:00
- Medical & Consulting Rooms - Estimated 08:00 - 18:00
- Showroom - Estimated 08:00 - 18:00
- Lunch Bar - Estimated 06:00 - 18:00
- Take Away Shop - Estimated 06:00 - 18:00

We expect the hotel facility to be operational 24 hours, 7 days a week. The majority of the activity is likely to be conducted in the period between 06.00AM and 22.00PM. It is expected that morning peak for the traffic generation will be from 07:00AM to 10:00 AM, for the morning check-out peak, while the afternoon peak is expected to be in the period between 14:00PM to 16:00PM, for the evening check-in peak.

The hours of operation for general commercial facilities are likely to be 9am to 5pm with occasional evening shopping options. The restaurant facility is expected to operate between 7am and 10pm daily if the facilities offer breakfast, lunch and dinner options.

For residential land uses, the hours of operation are not applicable. The peak trip generations from a residential development are likely to be between 7am and 8am daily for the morning and 5pm to 6pm in the evening peak for a development of this nature.

Given the above site uses, the peak trip generations for each of the land-uses are spread throughout different time zones, meaning the peak will be more evenly distributed than if the development was focused on residential land-uses only.

The analysis of traffic volumes data obtained through the Main Roads WA portal on the 25th March 2010 for Great Eastern Highway close to the intersection with Hardey Road / Resolution Drive shows that the morning peak is in the period between 06:15 and 07:15 and in the afternoon peak period in the period between 14:30 and 15:30. We do not expect this has changed in the last 3 years.

2.5 Daily Vehicular Volumes and Vehicular Types

This section provides a detailed explanation of how traffic volumes are calculated for the proposed development of No 215 to 223 Great Eastern Highway. Our traffic model uses a 3-step approach for the estimation of transportation demand into and out of the subject site: -

- Step 1 – Confirm the size and quantum of the proposed land uses.
- Step 2 – Confirm how these land uses impact travel patterns and the generation / attraction of transportation trips.
- Step 3 – Confirm where the likely origins of travel external to the development are located and confirm the likely destinations for travel from the subject landholdings and determine the impact of those transportation volumes on the local road network.

The purpose of the Transport Impact Assessment is to determine the likely impact of the proposed development upon the road network within an 800 metre radius of subject site, and the likely impact of the development on key intersections of proposed road networks and their intersections with existing road networks adjacent to the subject area.

Step 1 – Proposed Land Uses

Different land uses impact the transportation network in different ways. The purpose of this section is to discuss the land usages as proposed under the Development Application and to discuss their likely trip generations based on data from trusted guideline sources such as the ITE Trip Generation Tables (8th Edition), the NSW RTA Guide to Traffic Generating Developments and the City of Belmont's Local Planning Policy No 15.

Table 11 - Proposed Land Uses within the Development

Land Use Type			Yield
Commercial	Hotel	Rooms	240 Rooms
		Restaurant	132 Occupants
		Bar Lounge	140 Occupants
		Hotel Conference / Meeting room	80 seats
		Gym	N/A
		Shop	65m²

	Office Area	1,371 m²
	Medical & Consulting Rooms	5 Practitioners
	Showroom	419m²
	Lunch Bar	85m²
	Take Away Shop	118m²
	Showroom	65m²
Residential	1 Bedroom Apartment	72 dwellings
	2 Bedroom Apartment	22 dwellings
	3 Bedroom Apartment	30 dwellings

The NSW RTA Guide to Traffic Generating Developments offers the following vehicle trip generation rates for the land uses quoted above: -

- Restaurants - 60 vehicular trips per 100m^2 of GFA (PM Peak - 5 per 100m^2 of GFA)
- Bar Lounge - 60 vehicular trips per 100m^2 of GFA (PM Peak - 5 per 100m^2 of GFA)
- Hotel Conference / Meeting room - 60 vehicular trips per 100m^2 of GFA (PM Peak - 5 per 100m^2 of GFA)
- Gym - 20 vehicular trips per 100m^2 GFA (PM Peak - 3 per 100m^2 of GFA)
- Shop - 10 vehicular trips per 100m^2 of GFA (PM Peak - 2 per 100m^2 of GFA);
- Office and commercial - 10 vehicular trips per 100m^2 of GFA (PM Peak - 2 per 100m^2 of GFA);
- Medical & Consulting Rooms - *The NSW RTA Guide to Traffic Generating developments doesn't provide precise trip generation rates for medical uses.*
- Showroom - 10 vehicular trips per 100m^2 of GFA (PM Peak - 2 per 100m^2 of GFA);
- Lunch Bar - *The NSW RTA Guide to Traffic Generating developments doesn't provide precise trip generation rate for this use. Comparisons should be drawn with similar use.*
- Take Away Shop - *The NSW RTA Guide to Traffic Generating developments doesn't provide precise trip generation rate for this use. Comparisons should be drawn with similar use.*
- Medium Density Residential Apartments (1 to 2 bedrooms) - 5.0 vehicular trips per dwelling (Peak - 0.5 per dwelling);
- Medium Density Residential Apartments (3 bedrooms) - 6.5 vehicular trips per dwelling (Peak - 0.65 per dwelling).

The NSW RTA Guide to Traffic Generating Developments suggests analysis of the relevant precedents as opposed to prescribing a certain traffic generation rate for hotels, while it gives a rate of 3 vehicular trips per day per room for motels. The ITE Trip Generation Handbook 8th edition suggests a trip generation rate at a hotel of 8.17 vehicular trips per room on a weekday. We believe this is highly conservative and that a hotel room is likely to give similar trip generation to a 1 to 2 bedroom residential apartment. For the purposes of this calculation however, we will use 8.17 trips per day.

The restaurant and the hotel conference / meeting room are intended to be used by guests of the hotel and the general public (during lunch and dinner time). The gym and the lobby shop would be utilised by hotel guests only and hence is not included in the calculations. The office area and medical and consulting rooms would be mainly used by the general public. The lunch bar is intended for the predominant use of guests, apartment residents and both office workers and staff of the hotel, as well as walk-up customers from within 400 to 600 metres of the subject site.

Commercial Component

- Hotel / Accommodation

Based on the specific requirements of this development (the profile of clientele, the structure of employees and the proximity of the Domestic Terminal) we believe that approximately 40% of all trips will be vehicular trips. It is expected for the subject site development that less than 40% of guests will arrive in personal / rented vehicle. A large number of guests are expected to arrive to / depart from the subject site via taxi vehicles.

The rates provided by ITE reflect 100% occupancy which is rarely achieved. Analysis of available data from the Australian Bureau of Statistics shows that in the March Quarter 2013 an average room occupancy of 69.4% was achieved across Western Australia (Perth - 80.2%; Belmont – Ascot - Redcliffe - 87.3%) for hotels, motels and serviced apartments.

An analysis of historical data shows that there has been an average annual increase in room occupancy in WA over the last 5 years with the exception of the past year when a decrease was shown. Having in mind the greater average occupancy in Perth, and specifically in the City of Belmont, we believe that the assumption of an average 80% occupancy is a conservative approach.

Table 12 - Estimated Trip Generation for the Accommodation Component of the Development

Land Use Type	Units / Yield	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated (40%)	Vehicular Trips Per Hour (Peak Hour)
Accommodation	240 Units	8.17 trips per day per room	100%	1,961	784	78
Accommodation	240 Units	8.17 trips per day per room	80%	1,569	628	63
Accommodation	240 Units	8.17 trips per day per room	69.4%	1,361	544	54

- Restaurant (Public Patronage)

The public patronage for the proposed restaurant is expected up to 50% of its total capacity (103) for lunch and for dinner. We believe that it is reasonable to estimate the traffic impact of the public patronage in accordance with the NSW RTA Guide to Traffic Generating Developments where traffic generation rate of 0.6 trips per day per 1m² of GFA is suggested. The estimated peak hour generation is 0.05 trips per hour per 1m² of GFA.

According to the NSW RTA Guide to Traffic Generating Developments one seating space relates to approximately 2.1m² of GFA. The percentage of vehicular trips is estimated to be 85% of all trips with average car occupancy of 2.2 people. Since the maximum expected public patronage is 103 guests it is not reasonable to assume that this will be an average public patronage. The table below shows the estimated traffic impact for different occupancy rates for public patronage of the restaurant.

Table 13 - Estimated Trip Generation for the Restaurant (Public Patronage) Component of the Development

Land Use Type	Maximum Expected Patronage (public) during lunch	50% Reciprocal - Hotel Guests	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated (65%)	Vehicular Trips Per Hour (Peak Hour)
Restaurant	132	66	0.6 trips per day / 1m² GFA	100%	166	108	14
Restaurant	132	66	0.6 trips per day / 1m² GFA	80%	133	87	11
Restaurant	132	66	0.6 trips per day / 1m² GFA	69.4%	115	75	9

It is expected that peak times for the accommodation component and for the restaurant component will differ.

- Bar Lounge

Approximately 25% of the Lounge Bar users are not expected to be accommodated within the development and therefore would be coming from and going to the surrounding area. The estimated peak hour generation is 0.1 trips per hour per 1m² of GFA. We have based our calculations on the following ratio bar standing / floor area 1.25 m² per person. It is assumed that the operating hours for the Lounge Bar would be in the period between 22.00PM to 5.00AM.

Table 14- Estimated Trip Generation for the Lounge Bar (Public Patronage) Component of the Development

Land Use Type	Maximum Expected Patronage (public)	Less 75% Reciprocal - Hotel Guests	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated (80%)	Vehicular Trips Per Hour (Peak Hour)
Lounge Bar	140	35	0.9 trips per day / 1m² GFA	100%	158	127	13
Lounge Bar	140	35	0.9 trips per day / 1m² GFA	80%	127	102	10
Lounge Bar	140	35	0.9 trips per day / 1m² GFA	69.4%	110	88	9

It is expected that a large percentage of guests will arrive to / depart from the subject site via taxi vehicles, given the venue is a licensed premises.

- Hotel Conference / Meeting Room

Hotel Meeting Rooms are considered to be an accessory use within the hotel. It is expected that approximately 50% of the users would be hotel guests, while the other half of its capacity is expected to be used by the public. On the basis of the development yields as depicted in the DesignInc Draft DAP's, and the number of expected

occupants (approximately 2 m² per person) we have calculated the impact to the surrounding traffic that would be generated by this component.

Table 15 - Estimated Trip Generation for the Hotel Conference / Meeting Room (Public Patronage) Component of the Development

Land Use Type	Occupants	Less 50% Reciprocal - Hotel Guests	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated (40%)	Vehicular Trips Per Hour (Peak Hour)
Hotel Meeting Rooms	80	40	1.75 trips per day / 1 Occupant	100%	280	112	14
Hotel Meeting Rooms	80	40	1.75 trips per day / 1 Occupant	80%	224	90	11
Hotel Meeting Rooms	80	40	1.75 trips per day / 1 Occupant	69.4%	194	78	2

- Gym

The Heath Centre would be predominantly used by the hotel guests. We assume that its traffic impact would be negligible. The peak activity period for gymnasiums generally occurs between 5.30 and 6.30pm hours on week days. The peak parking accumulation is usually characterised by a short pronounced peak just prior to the commencement of the main evening class.

- Office Area

The office area is intended for the use of the apartments' visitors together with public users who would generate traffic as calculated in the table below. The estimated PM peak hour generation is 2 trips per hour per 100m² of GFA. It is assumed that alternate transportation modes would be used such as public transport.

Table 16 - Estimated Trip Generation for the Office Area (Public Patronage) Component of the Development

Land Use Type	Yield (m²)	Less 50% Reciprocal - Apartments' Visitors	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated (40%)	Vehicular Trips Per Hour (Peak Hour)
Office Area	1,371	686	10 trips per day / 100m² GFA	100%	137	55	11

- Medical & Consulting Rooms

Medical & Consulting Rooms would be used by the residents and people who live in the vicinity of the subject development. We have based our conclusions on the expected number of practitioners. The proposal shows that there can be a maximum of two practitioners. It is standard that consultations with general practitioner are booked in 10 minute slots. It is likely that each practitioner would be able to see a maximum of 48 clients during a standard working day. Based on this ratio, we believe the Monday peak traffic generation therefore generates up to 96 clients per day. Using a 100% vehicular attraction rate, this equates to 192 vehicle movements per day for clientele.

Table 17 - Estimated Trip Generation for the Medical and Consulting Rooms (Public Patronage) Component of the Development

Land Use Type	Yield (m^2)	Less 50% Reciprocal - Apartments' Visitors	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated (40%)	Vehicular Trips Per Hour (Peak Hour)
Medical & Consulting Rooms	5 Practitioners	2 Practitioner	96 trips per day / 1 Practitioner	100%	480	96	24

- Showrooms

It is expected that approximately 50% of the total showroom users would be accommodated within the proposed development. This retail component would attract traffic from the surrounding area for the purpose of shopping as well as delivery vehicles trips. According to the survey results as described in the NSW RTA Guide to Traffic Generating Developments, in the Thursday evening peak period the average generation rate surveyed was 2.5 veh / hr / 100m^2 GLFA, with a range extending from 0.1 to 6.4 veh / hr / 100m^2 GLFA. The average generation rate was higher on the weekend, with a mean peak rate of 6.6 veh / hr / 100m^2 GLFA.

Table 18 - Estimated Trip Generation for the Showroom (Public Patronage) Component of the Development

Land Use Type	Yield (m^2)	Less 50% Reciprocal - Hotel & Apartments	Peak Hour Trip Generation (15% of Total Daily Generated Traffic)	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated (20%)	Vehicular Trips Per Hour (Peak Hour)
Showroom	484 (419 + 65)	242	6.6 trips per hour / 100m^2 GLFA	100%	240	48	24
Showroom	484 (419 + 65)	242	6.6 trips per hour / 100m^2 GLFA	80%	192	38	19
Showroom	484 (419 + 65)	242	6.6 trips per hour / 100m^2 GLFA	69.4%	167	34	15

- Lunch Bar / Take Away

We have based our assumptions on surveys undertaken at a number of McDonald's Restaurants using a trip attraction ratio of 0.85m² of GFA / 1 person. People working in the surrounding mixed use and mixed business zone are expected to be visiting this facility during working hours, inclusive of some hotel guests and apartment residents. Having in mind the location of the subject area and its vicinity to its public users, we assume that vehicular trips are reduced in this land-use.

Table 19 - Estimated Trip Generation for the Lunch Bar / Take Away (Public Patronage) Component of the Development

Land Use Type	Yield (m²)	Less 50% Reciprocal - Hotel & Apartments	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated (60%)	Vehicular Trips Per Hour (Peak Hour)
Lunch Bar / Fast Food	203 (85 + 118)	102	3 VPH per internal seat	100%	714	428	36
Lunch Bar / Fast Food	203 (85 + 118)	102	3 VPH per internal seat	80%	571	342	29
Lunch Bar / Fast Food	203 (85 + 118)	102	3 VPH per internal seat	69.4%	495	297	25

Residential Component

According to the NSW RTA Guide to Traffic Generating Developments Medium Density Residential Apartments (1 to 2 bedrooms) generate 5.0 vehicular trips per dwelling (Peak - 0.5 per dwelling), while Medium Density Residential Apartments (3 bedrooms) generate 6.5 vehicular trips per dwelling (Peak - 0.65 per dwelling). The table below shows the estimated traffic impact for residential component.

Table 20 - Estimated Trip Generation for the Residential Component of the Development

Land Use Type	Units / Yield	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Vehicular Trips Per Hour (Peak Hour)
1 Bedroom Apartment	72 dwellings	5.0 vehicular trips per dwelling	100%	360	36
2 Bedroom Apartment	22 dwellings	5.0 vehicular trips per dwelling	100%	110	11
3 Bedroom Apartment	30 dwellings	6.5 vehicular trips per dwelling	100%	195	20
Total Residential Component				665	67

The expected cumulative values of the daily traffic impact are shown in the table below:-

Table 21 - Estimated Trip Generation for the Development (Cumulative Values)

Land Use Type	Units / Yield	Less Reciprocal - Hotel & Apartments	Daily Trip Generation	Assumed Occupancy Rate	Total Trips Per Day Generated	Total Vehicular Trips Per Day Generated	Vehicular Trips Per Hour (Peak Hour)
Accommodation	240 Accommodation Units	/	8.17 trips per day per room	80%	1,569	628	63
Restaurant	132 occupants	66 occupants	0.6 trips per day / 1m² GFA	80%	133	87	11
Lounge Bar	140 occupants	105 occupants	0.9 trips per day / 1m² GFA	80%	127	102	10
Hotel Conference / Meeting Room	80 occupants	141 occupants	5.23 trips per day / 100m² GLFA	80%	224	90	11
Gym	/	/	/	/	/	/	/
Office Area	1,371	686	10 trips per day / 100m² GFA	100%	137	55	11
Medical & Consulting Rooms	5 Practitioners	2 Practitioners	96 trips per day / 1 Practitioner	100%	480	96	24
Showrooms	484 m²	242 m²	6.6 trips per hour / 100m² GLFA	80%	192	38	19
Lunch Bar / Take Away	203 m²	102 m²	3 VPH per internal seat	80%	571	342	29
1 Bedroom Apartment	72 dwellings	/	5.0 vehicular trips per dwelling	100%	360	360	36
2 Bedroom Apartment	22 dwellings	/	5.0 vehicular trips per dwelling	100%	110	110	11
3 Bedroom Apartment	30 dwellings	/	6.5 vehicular trips per dwelling	100%	195	195	20
Total Proposed Development						**2,103**	**245**

Step 2 – Trip Purposes

To develop the trip matrix, we examined the reasons why people would travel in Belmont. This helped determine the trip destination, and therefore the route of travel, the entry and the exit points for that trip purpose to and from the Development area. The percentages used for determination of trip purpose were based on census data for the Perth metropolitan area and then further refined according to the specific requirements of accommodation.

Table 22 - Trip Purposes by Land Use

Land Use Type	Employment	Shopping	Education / Childcare Purposes	Social / Recreational / Other
Hotel / Accommodation	75%	10%	n.a.	15%
Restaurant	15%	n.a.	n.a.	85%
Bar Lounge	15%	n.a.	n.a.	85%
Hotel Conference / Meeting Room	100%	n.a.	n.a.	n.a.
Gym	15%	n.a.	n.a.	85%
Office Area	100%	n.a.	n.a.	n.a.
Showroom	15%	85%	n.a.	n.a.
Lunch Bar / Take Away	15%	85%	n.a.	n.a.
Residential	40%	25%	17.5%	17.5%
Health Centre / Medical and Consulting Rooms	Less than 5%			95%*

Note * - Health Centre / Medical & Consulting Rooms

Step 3 – Expected Origin / Destination

The expected origin / destination matrix is important to determine the likely route of vehicular and other travel.

Table 23 - Origin / Destination Matrix

Land Use Type	Trip Purpose	Likely Destinations
Hotel / Accommodation	• Employment	• The Belmont i.d. website on the City of Belmont's webpage suggests the differences between the jobs held by the population of the City of Belmont and Greater Perth - a larger percentage of persons employed in accommodation and food services (7.2% compared to 5.8%). The employment trips are deemed to be local (Belmont and Redcliffe).
	• Social / Recreational	• 60% of all trips are deemed to be toward the Perth CBD • 40% of all trips will be local for social / recreational purposes: - Grove Farm Reserve, Freshwater Lake, Ascot Racecourse and Centenary Park
	• Shopping	• Assume 45% of all trips for shopping purposes to Belmont Forum Shopping Centre • 55% of all trips are deemed to be toward the Perth CBD
Restaurant	• Employment	• The employment trips are assumed to be local (Belmont and Redcliffe)
	• Shopping / Social	• Having in mind the location of the subject area, it is assumed that the external trips would be from the direction of the surrounding local governments - Victoria Park, City of Swan, City of Bayswater.
Bar Lounge	• Employment	• The employment trips are assumed to be local (Belmont and

		Redcliffe)
	• Shopping / Social	• Assume the external trips from the direction of: Victoria Park, City of Swan, City of Bayswater, Bassendean, South Perth.
Hotel Conference / Meeting Room	• Employment	• The Hotel Meeting Rooms Land Use is not expected to be a large attractor for employment purposes
	• Conducting Business	• Local (City of Belmont), City of Perth, City of Canning, Victoria Park, City of Swan
Gym	• Employment	• The Gym Land Use is not expected to be a large attractor for employment purposes
	• Medical Treatment	• The trips are assumed to be local (Belmont and Redcliffe)
Office Area	• Employment	• The Office Land Use is not expected to be a large attractor for employment purposes
	• Shopping / Social	• Local (City of Belmont), City of Perth, City of Canning, Victoria Park, City of Swan
Medical & Consulting Rooms	• Employment	• The Medical & Consulting Rooms Land Use is not expected to be a large attractor for employment purposes
	• Medical Treatment	• The trips are assumed to be local (Belmont and Redcliffe)
Showroom	• Employment	• The employment trips are assumed to be local (Belmont and Redcliffe)
	• Shopping	• Assume the trips to be local (Belmont Business Area, Mixed Business Area and Belmont and Redcliffe residential area)
Lunch Bar / Take Away	• Employment	• The employment trips are assumed to be local (Belmont and Redcliffe)
	• Shopping / Social	• Assume the trips to be local (Belmont Business Area, Mixed Business Area)
Residential	• Employment	• Excluding work from home, the likely sources of employment is the proposed commercial component of the development (Hotel, Restaurant, Lounge Bar, Hotel Meeting Rooms, Health Centre, Office Area, Medical & Consulting Rooms, Showroom and Lunch Bar / Fast Food) • The majority of employment trips will be external to the proposed development. The Belmont i.d. website on the City of Belmont's webpage suggests that 65% of residents live in the area, but work outside. The breakdown for employment destinations for residents of the City of Belmont is shown below: a. Local (City of Belmont) – 22.6% b. West (City of Perth) – 15.2% (8.5% + 6.7%) c. South (City of Canning) – 8.1% d. West (Victoria Park) – 6.5% e. North (City of Swan) – 4.6% • Work locations unknown – 12.5%
	• Shopping	• Assume 90% of all trips for shopping purposes to Belmont Forum Shopping Centre and 10% to the Belvidere Shopping Centre
	• Education	• The Belmont Primary School is located adjacent to the development area • Belmont City College is located south of the subject area, in the

		vicinity of Belmont Forum Shopping Centre • Trips to major universities would likely be heading toward Perth CBD by Great Eastern Highway.
	• Social / Recreational	• 15% of all trips are deemed to be heading west ie Perth CBD • 85% of all trips will be local for social / recreational purposes. These types of trip purposes are expected to include sporting / local social trips etc. - Grove Farm Reserve (NW), Freshwater Lake (NW), Ascot Racecourse (N), Centenary Park (SE) and Belmont Forum Shopping Centre southeast of the subject area (local recreational facilities which are highly conducive to pedestrian and cyclist activity from the Development area and offer many recreational opportunities)

Accommodation facilities in the proposed development are expected to have a heavy focus on supporting business activities within the Local Government Area and the Perth CBD. Residential accommodation land uses, are likely to generate a greater spread of vehicular traffic on the surrounding road network.

Given the land uses proposed within the Development area, the volume of "internal trips" within the Development area is expected to be negligible. All trips within the Development area are expected to be completed as pedestrian trips only.

This section provides a summary of the likely trip generation by transportation mode to and from the Development Area, based on the land uses proposed: -

Table 24 - Standardised Trip Generation Rates by Land Use per Transportation Mode

Transport Mode	Land Use		
	Accommodation (1-2 beds)	**Residential (1-2 beds)**	**Residential (3 beds)**
Car	3.0	5	6.5
Bus / car – passenger	0.2	0.75	0.95
Foot	0.6	1.5	1.9
Cycle	0.2	0.38	0.48
Total	**4.0**	**7.63**	**9.83**

The trip rates nominated above are justified as follows: -

- Accommodation
  - The dominant mode of travel to the Hotel / Accommodation is expected to be vehicular travel.

- Residential Land Use
  - The Belmont iD. site shows that up to 67.2% of all work trips are undertaken using a vehicle (i.e. vehicle as driver plus vehicle as passenger). Therefore we have modelled traffic generation on the basis that 65% of all trips are by vehicle as mode.
  - Public transportation volumes are not expected to be large in Belmont (7.6%) because there are several bus services provided to service the development. The nearest railway station is not

currently in walking distance of the subject site. Public transport mode share is based on the Perth Metropolitan average of 5% for bus usage.

- The proximity of local schools and parks allows an expected combined trip generation of 25% of all trips undertaken from each house.

In order to determine the impact upon the surrounding network the next step in modelling is to determine the trip purpose distribution for each trip purpose (i.e. employment, shopping, recreation, education etc.) The purpose of this split is to establish a base origin-destination matrix from the development area. This will assist in determining the logical travel routes to and from the development area therefore allowing estimate of the potential traffic impact on the surrounding network.

Table 25 - Trip Purpose Distribution

Project and Land Use Descriptions	Trip Purpose Distribution				External	Internal
	Work	Education	Social / Sporting / Recreation	Shopping		
Hotel / Accommodation Units						
Trip Purpose Splits	75%	0%	15%	10%	100%	0%
Total	**471**	**n.a.**	**94**	**63**	**628**	**n.a.**
Restaurant						
Trip Purpose Splits	15%	0%	85%	0%	50%	50%
Total	**14**	**n.a.**	**74**	**n.a.**	**88**	**n.a.**
Lounge Bar						
Trip Purpose Splits	15%	0%	85%	0%	75%	25%
Total	**15**	**n.a.**	**87**	**n.a.**	**102**	**n.a.**
Hotel Meeting Rooms						
Trip Purpose Splits	100%	0%	0%	0%	50%	50%
Total	**90**	**n.a.**	**n.a.**	**n.a.**	**90**	**n.a.**
Offices						
Trip Purpose Splits	100%	0%	0%	0%	50%	50%
Total	**55**	**n.a.**	**n.a.**	**n.a.**	**55**	**n.a.**
Showroom						
Trip Purpose Splits	15%	0%	85%	0%	50%	50%
Total	**6**	**n.a.**	**35**	**n.a.**	**41**	**n.a.**
Lunch Bar / Fast Food						
Trip Purpose Splits	15%	0%	85%	0%	50%	50%
Total	**51**	**n.a.**	**285**	**n.a.**	**336**	**n.a.**
Residential						
Trip Purpose Splits	40%	25%	17.5%	17.5%	100%	0%
Residential Apartments – 1 bedroom	144	90	63	63	**360**	n.a.
Residential Apartments – 2bedrooms	44	27	20	20	**110**	n.a.
Residential Apartments – 3bedrooms	78	49	34	34	**195**	n.a.
Total	**266**	**166**	**117**	**117**	**665**	**n.a.**
Total (All Land Uses)	**968**	**166**	**692**	**180**	**2,005**	**n.a.**

The final step in the modelling of the traffic impact of the proposed development is to distribute the trip generations by mode into a trip generation by transportation mode. This final step allows the development of a preliminary origin- destination matrix which will show the impact of the proposed land uses in the Development Proposal on the external transportation network for each transportation mode.

Table 26 - Transport Modal Distribution and Total Trips per Transport Mode (Full Development Scenario)

Project and Land Use Descriptions	Modal Distribution				
	Vehicular Trips (incl. taxi)	Pedestrian Trips	Bus trips / Car Pass	Cycling Trips	Total
Hotel / Accommodation Units (Table 10)					
Estimated Transportation Mode Share	40%	n.a.	60%	n.a.	100%
Total	**628**	**0**	**941**	**0**	**1,569**
Restaurant (Table 11)					
Estimated Transportation Mode Share	85%	n.a.	14%	1%	100%
Total	**89**	**0**	**14**	**1**	**104**
Lounge Bar (Table 12)					
Estimated Transportation Mode Share	85%	5%	10%	n.a.	100%
Total	**108**	**6**	**13**	**0**	**127**
Hotel Meeting Rooms (Table 13)					
Estimated Transportation Mode Share	80%	n.a.	20%	n.a.	100%
Total	**90**	**0**	**22**	**0**	**112**
Offices (Table 14)					
Estimated Transportation Mode Share	80%	5%	12.5%	2.5%	100%
Total	**55**	**4**	**8**	**2**	**69**
Medical Consulting (Table 15)					
Estimated Transportation Mode Share	80%	5%	12.5%	2.5%	100%
Total	**77**	**5**	**12**	**2**	**96**
Showroom (Table 16)					
Estimated Transportation Mode Share	55%	25%	15%	5%	100%
Total	**40**	**18**	**11**	**3**	**72**
Lunch Bar / Fast Food (Table 17)					
Estimated Transportation Mode Share	20%	60%	15%	5%	100%
Total	**336**	**1,008**	**252**	**84**	**1,680**
Residential Units (Table 18)					
Estimated Transportation Mode Share	65%	20%	10%	5%	100%
Residential Apartments – 1bedroom	360	111	55	28	**554**
Residential Apartments – 2bedrooms	110	35	17	8	**170**

Residential Apartments – 3bedrooms	195	60	30	15	**300**
	665	**206**	**102**	**51**	**1,024**
Total Trips By Transportation Mode – Preliminary Development Area	**2,103**	**1,110**	**1,375**	**143**	**4,716**

The likely traffic generation from the Development area is therefore expected to be up to **2,103 vehicles per day**. The PM peak is expected to be the highest generator of hourly traffic into the Development area due to the convergence of PM employment trips for the residential land uses and short-stay accommodation uses as well as peak retail and restaurant usages.

The PM peak is expected to be around 12.5% of the total daily vehicle volumes, therefore the impact of the PM peak on the surrounding road networks is expected to be up to 262 vehicles in the PM peak.

Taxi facilities

A large proportion of hotel guests and conference patrons are expected to arrive by taxi. The survey findings indicated that the derived demand for taxi use to hotels is given by the relationship of 1 taxi trip per hour per 10 hotel rooms. The relationship provides an indication for the provision of taxi pick-up and drop off facilities. This equates to a peak requirement of 24 taxis per hour in this development.

2.6 Management of Traffic Generated by the Site

Table 23 - Origin / Destination Matrix provides a detailed assessment of how we believe the generated traffic from the subject area would be distributed onto the adjacent road network. Table 26 - Transport Modal Distribution and Total Trips per Transport Mode (Full Development Scenario) provides the expected trip generation by transportation mode.

Based on the analysis of employment opportunities, location of schools, shopping centers and preferred locations for social and recreational activities and the information provided in Tables 23 and 26, we believe the generated traffic from the development would be distributed onto the adjacent road network as follows: -

- 41% on Great Eastern Highway (west of the subject site - Perth CBD / Town of Victoria Park);
- 40% on Great Eastern Highway (east of the subject site - Perth Airport, City of Belmont / City of Swan Industrial Areas).
- 12% on Belgravia Street, via Hargreaves and Barker (south of the subject site - Belmont Shopping Centre).
- 3% on Belgravia Street, southeast-bound only from the site to Belmont Shopping Centre
- Less than 1% on Barker Street (south-east of the subject site - Perth Airport, City of Belmont / City of Swan Industrial Area);
- 3% on Stoneham Street (north of the subject site - City of Bayswater / City of Stirling).

In summary, the site is expected to generate 2,103 vehicular movements per day. The following table highlights the expected vehicular traffic flow from the subject site: -

Table 27 - Traffic Flow from Subject Site to Roads Adjacent to the Subject Site

Direction of Traffic Flow Distribution	Traffic Flow Distribution	Total Vehicular Distribution
Great Eastern Highway (west of the subject site) -> Perth CBD / Town of Victoria Park	41%	2,103 VPD * 41% = 862 VPD or 431 VPD in each direction
Great Eastern Highway (east of the subject site) -> Perth Airport, City of Belmont / City of Swan Industrial Area	40%	2,103 VPD * 40% = 841 VPD or 421 VPD in each direction
Belgravia Street, via Hargreaves and Barker (south of the subject site) -> Belmont Shopping Centre	12%	2,103 VPD * 12% = 252 VPD or 94 VPD exiting the site and 158 VPD entering the site
Belgravia Street -> Belmont Shopping Centre (southeast bound only)	3%	2,103 VPD * 3% = 63 VPD out of the site or southeast-bound only
Hargreaves Street (south-east of the subject site) -> Barker Street (Perth Airport, City of Belmont / City of Swan Industrial Areas)	Less than 1%	2,103 VPD * 1% = 20 VPD or 10 VPD in each direction
Stoneham Street (north of the subject site) -> City of Bayswater / City of Stirling	3%	2,103 VPD * 3% = 64 VPD or 32 VPD in each direction
Total	100%	2,103 VPD or 1,052 in each direction

The estimated traffic flow will not be equal for the in and out directions due to the left in / left out restriction on the access / egress to the development from Belgravia Street and on the Hargreaves Street / Great Eastern Highway intersection. A detailed plan with the estimated vehicular traffic flow and distribution is shown on KC00179.000 S06 Traffic Flow Diagram in Appendix 3.

The following points further describe the distribution of traffic where distribution is not equal: -

- Trips from the proposed development to the north are more likely to use the crossover in Hargreaves Street. We have assigned a trip distribution rate of 65% / 35% as follows: -
    - Turn left from the subject site into Hargreaves Street, then turn left into Great Eastern Highway and then turn right onto Stoneham Street (65% of 32 VPD = 22 VPD).
    - Turn right from the subject site into Hargreaves Street, the turn right into Barker Street, then turn right into Belgravia Street and then northbound on Stoneham Street (35% of 32 VPD = 10 VPD).
- Return trips from Stoneham Street will be distributed as follows: -
    - From Stoneham Street, then continues southbound into Belgravia Street, then turn left into the site at Belgravia – 100% of all return trips or 32 VPD.
- Trips from the proposed development, eastbound in Great Eastern Highway: -
    - Turn right from the subject site into Hargreaves Street, the turn right into Barker Street, then turn right into Belgravia Street and the turn right into Great Eastern Highway eastbound (35% of 421 VPD = 147 VPD).

- Turning left from Hargreaves Street, then turn left into Great Eastern Highway (westbound) and perform a U-turn at the Great Eastern Highway / Belgravia Street intersection then continue eastbound along Great Eastern Highway (65% of 421 VPD = 273 VPD).

- All returning trips from Great Eastern Highway east of the subject site are deemed to enter the site turning left into Hargreaves Street, then turning tight into the site (100% of 421 VPD = 421 VPD).

- All trips from the proposed development, using Great Eastern Highway (westbound) will exit the site turning left into Hargreaves Street then turn left onto Great Eastern Highway (100% = 431 VPD).

- All return trips from Great Eastern Highway west of the site will enter the site via the Belgravia Street access / egress. i.e. Great Eastern Highway, then turn right into Belgravia Street, then left turn into the site (100% = 431 VPD).

- Trips from the proposed development to the southeast (Belgravia Street) are expected to be split 66% from Hargreaves Street and 33% from Belgravia Street egress as follows: -

    - Turn right into Hargreaves Street, then turn right into Barker Street and left into Belgravia Street then southeast bound (100% of 94 VPD = 94 VPD)

    - Turn left into Belgravia Street and southeast bound (100% of 63 VPD = 63 VPD)

    - Therefore total VPD exiting the site to Belgravia Street south-east bound = 158 VPD.

- All return trips from Belgravia Street southeast must enter the site via Belgravia Street, turn right into Barker Street, then turn left into Hargreaves Street, then left into the subject site = 158 VPD

- We have allocated a minimal number of vehicles to travel northeast bound in Barker Street to local recreation facilities. All trips from the proposed development to Barker Street northeast bound will travel via the Hargreaves Street access / egress, then turn right into Hargreaves Street, then turn left into Barker Street = 10 VPD.

- Return trips from Barker Street (northeast of the site) will travel toward the site from Barker Street, turning right into Hargreaves Street, then turning left into the site at the Hargreaves Street entrance.

The distribution via each road therefore is as follows: -

- **Hargreaves Street (between the subject site and Great Eastern Highway) outbound**
    - 22 VPD – trips to Stoneham Street outbound.
    - 273 VPD – trips to GEH eastbound using u-turn at Belgravia / Stoneham / GEH.
    - 431 VPD – trips to GEH westbound
    - *Total – 726 VPD outbound.*
- **Hargreaves Street (between the subject site and Barker Street) outbound**
    - 10 VPD – trips to Stoneham Street outbound.
    - 147 VPD – trips to GEH eastbound.
    - 94 VPD – trips to Belgravia southeast bound.
    - 10 VPD – trips to Barker Street northeast.
    - *Total – 261 VPD outbound.*
- **Hargreaves Street (between the subject site and Great Eastern Highway) inbound**
    - 421 VPD – trips from GEH east of the site only.
    - *Total – 421 VPD inbound.*

- **Hargreaves Street (between the subject site and Barker Street) inbound**
    - 158 VPD – from Belgravia Street southeast.
    - 10 VPD – from Barker Street northeast.
    - *Total – 168 VPD inbound.*
- **Barker Street (between Hargreaves Street and Belgravia Street) outbound**
    - 10 VPD – trips to Stoneham Street outbound.
    - 94 VPD – trips to Belgravia Street outbound.
    - 147 VPD – trips to GEH eastbound.
    - *Total – 251 VPD outbound.*
- **Barker Street (between Hargreaves Street and Belgravia Street) inbound**
    - 158 VPD – from Belgravia Street southeast.
    - *Total – 158 VPD inbound.*
- **Barker Street (northeast of Hargreaves Street) outbound**
    - 10 VPD – trips to local recreation facilities.
    - *Total – 10 VPD outbound.*
- **Barker Street (northeast of Hargreaves Street) inbound**
    - 10 VPD – trips from local recreation facilities.
    - *Total – 10 VPD inbound.*
- **Belgravia Street (between Barker Street and Great Eastern Highway) outbound**
    - 10 VPD – trips to Stoneham Street outbound (northbound on Belgravia).
    - 147 VPD – trips to GEH eastbound (northbound on Belgravia).
    - 63 VPD – trips to Belgravia Street southeast bound (southbound on Belgravia).
    - *Total – 220 VPD outbound.*
- **Belgravia Street (southeast of Barker Street intersection) outbound**
    - 63 VPD – trips to Belgravia Street southbound.
    - 94 VPD – trips to Belgravia Street southbound.
    - *Total – 157 VPD outbound.*
- **Belgravia Street (between Great Eastern Highway and the subject site) inbound**
    - 32 VPD – inbound from Stoneham Street.
    - 431 VPD – inbound from GEH west.
    - *Total – 463 VPD inbound.*
- **Belgravia Street (south of Barker Street intersection) inbound**
    - 158 VPD – all trips turn right into Barker, then left into Hargreaves and enter site in Hargreaves.
    - *Total – 158 VPD inbound.*
- **Stoneham Street (north of Great Eastern Highway) outbound**
    - 22 VPD – trips from Hargreaves Street / GEH.
    - 10 VPD – trips from Hargreaves / Barker / Belgravia.
    - *Total – 32 VPD outbound.*
- **Stoneham Street (north of Great Eastern Highway) inbound**
    - 32 VPD – trips from north of the site.
    - *Total – 32 VPD inbound.*
- **Great Eastern Highway (east of Belgravia / Stoneham) outbound (eastbound only)**
    - 147 VPD – via Hargreaves / Barker / Belgravia then GEH eastbound.
    - 273 VPD – via Hargreaves / GEH then u-turn.
    - *Total – 420 VPD outbound.*

- *Note – 431 VPD on the westbound approach at this intersection.*

- **Great Eastern Highway (west of Belgravia / Stoneham) outbound (westbound only)**
  - 431 VPD – from Hargreaves westbound into GEH.
  - *Total – 431 VPD outbound.*
- **Great Eastern Highway (west of Belgravia / Stoneham) inbound (eastbound only)**
  - 431 VPD – into the site via Belgravia.
  - *Total – 431 VPD inbound.*

The peak PM traffic flows have been assessed as having the largest traffic generation from the land-uses nominated in the Development.

The PM Peak traffic is expected to be around 12.5% of the average daily traffic counts quoted in Table 12 above, with an in-bound to out-bound flow ratio of 67% to 33%, in accordance with statistics quoted in the Western Australian Planning Commission's Transport Assessment Guidelines for Developments – Volume 5 (Technical Appendix).

2.7 Public Transport Access

Bus route 293 (Esplanade Busport to Abernethy Rd / Casella Pl) runs along Belgravia Street with a bus stop approximately 50 metres south from the proposed development on the eastern side of the road reservation and approximately 30 metres south from the proposed development on the western side of the road reservation. Bus stops on both sides of Belgravia Street are easily accessible via footpaths.

A bus stop for Route No 36, 40, 295, 296 and 299 is directly opposite the subject site running along Great Eastern Highway. Bus stops on both sides of Great Eastern Highway are easily accessible via footpaths.

- 36 – Esplanade Busport to Midland Station;
- 40 – Esplanade Busport to Great Eastern Highway / Coolgardie Avenue;
- 295 – Esplanade Busport to Godfrey Street / Raymond Road;
- 296 – Esplanade Busport to Kalamunda Bus Station;
- 299 – Esplanade Busport to Godfrey Street / Raymond Road.

Within 400 metres (5 minutes walking distance) of the proposed development are bus stops for Routes 98 and 99.

- 98 – Fremantle Station to Fremantle Station (Circle Route - Clockwise);
- 99 – Fremantle Station to Fremantle Station (Circle Route - Anti Clockwise).

Routes 98 and 99 are ''Circle Routes'' which is one of the highest frequency bus services in the Transperth network and it provides services every 15 minutes on weekdays and every 30 minutes on weeknights and weekends. It is important to note that a high frequency route is one which has daytime trip frequencies of up to 15 minutes and peak frequencies of 5 minutes or less. In public transport planning terms, where frequencies are less than 5 minutes it is termed as "not being timetabled". The closest railway station is Burswood Train Station, located approximately 3.5 km to the south west of the subject site.
The subject site is considered to have strong access to high frequency public transportation. This should be a strong consideration in the reduction of parking from the standards set in the City of Belmont LPS No 15.

The local public transportation options are shown on the attached plan KC00179_S03 Public Transport Plan in Appendix 2 for clarity.

2.8 Pedestrian and Cyclist Access

The Perth Bicycle Network in the vicinity of the subject site is shown on the drawing KC00179_S02 PBN Plan. The following is a list of the major infrastructure within an 800 metre radius of the subject site: -

- Great Eastern Highway, Belgravia Street, Stoneham Street, Resolution Drive, Hardey Road and Grandstand Road are classified as PBN "Poor Road Riding Environment" route.
- Shared Path (Shared by Pedestrian & Cyclists) along Raconteur Drive, Stoneham Street and partly Great eastern Highway.
- Matheson Road, Epson Ave (north of Great Eastern Highway) and Daly Street are classified as PBN "Good Road Riding Environment" route.
- Epsom Avenue (south of Great Eastern Highway) Frederick Street and Abernethy Road are nominated as PBN "Medium Road Riding Environment" route.

All streets adjacent to the proposed development have pedestrian paths on one or both sides of the street providing good connectivity for pedestrian traffic. The analysis of ped-sheds confirms that bus stops are within walking distance (5 minutes) from the proposed development.

3. SIDRA Analysis

This section provides details on the SIDRA Analysis conducted to support the findings of this report. The intersections have been modelled in PM peak as it was deemed that PM peak is the critical timing for the intersections observed. Each of these intersections has been modelled in 3 scenarios listed below:-

- Model 1a – GEH – Belgravia Street, 2013;
- Model 1b – GEH – Belgravia Street, 2016 – no development;
- Model 1c – GEH – Belgravia Street, 2016 – with development;
- Model 2a – GEH – Hargreaves Street, 2013;
- Model 2b – GEH – Hargreaves St, 2016 – no development;
- Model 2c – GEH – Hagreaves St, 2016 – with development;

The corresponding intersections were connected into the network in order to estimate the mutual impact. Three networks were formed:-

- Network 1a-2a – 2013;
- Network 1b-2b – 2016 – no development;
- Network 1c-2c – 2016 – with development.

Dimensions of the intersection elements have been scaled from aerial imagery. Base traffic data utilised for the modelling were obtained from the SCATS system through MRWA. The data was collected in the period 29.07.2013 – 04.08.2013. Where OD data was insufficient, OD matrices presented in the report were utilised.

The timing of the phases in the traffic signals cycles was obtained through a field observation. Phasing diagrams were obtained through the SCATS system. Future modelling assumes utilisation of the same traffic signals cycles with no optimisation.

A traffic growth rate which was utilised (3.5% per annum) is highly conservative.

FINDINGS:

- The most affected lane is expected to be the right turn deceleration on Great Eastern Highway westbound. This can be further adjusted by refining traffic signals cycles.
- The intersection is expected to have satisfactory Level of Service operations. The conventional LOS marking might not be applicable to this particular intersection due to the limitations of the software utilised (approach lanes are modelled shorter in order to compose the network).
- Detailed SIDRA input and Lane Summaries are available in Appendix 3 of the report.

GEH - Belgravia St

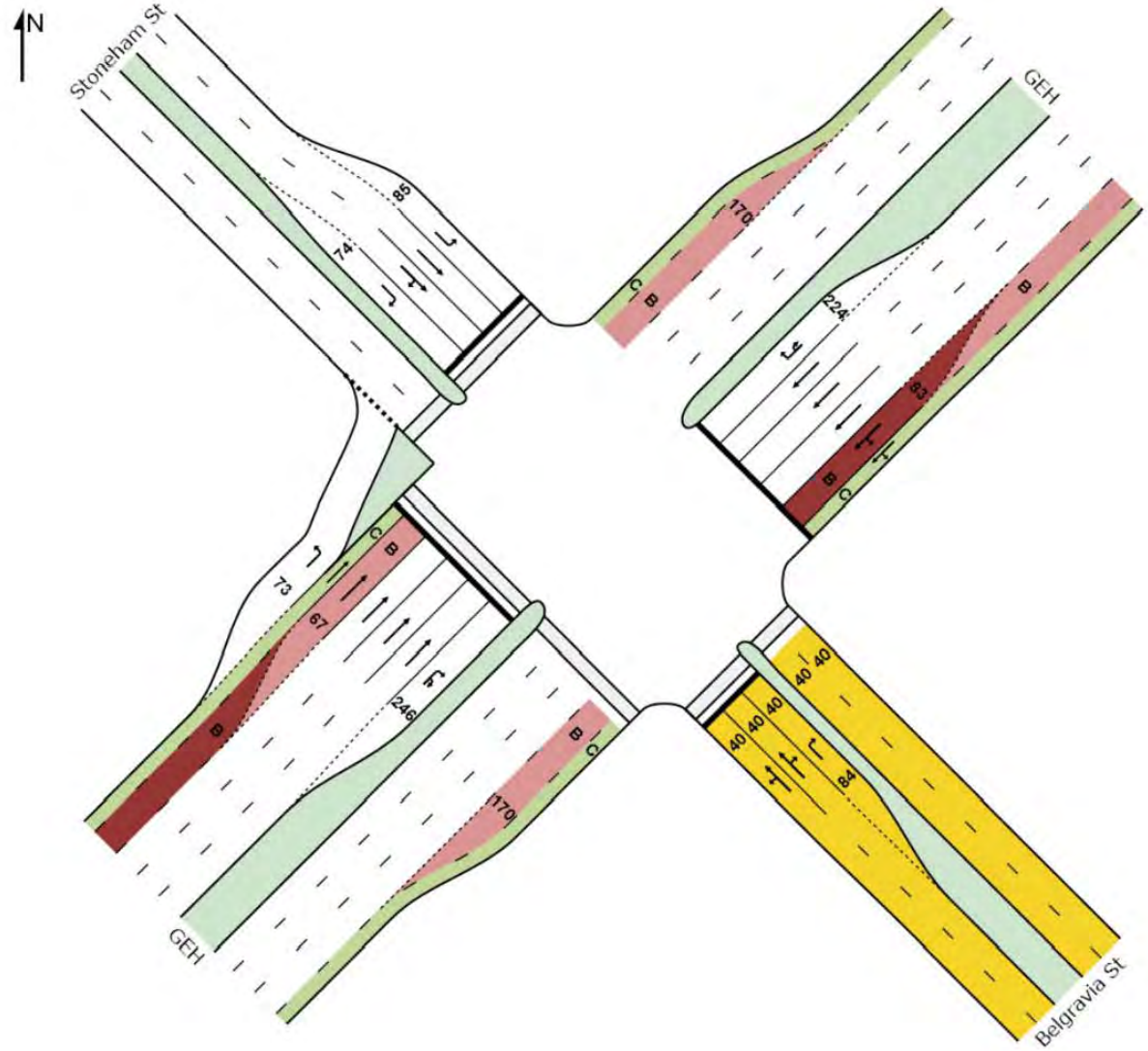


Figure 1 - Great Eastern Highway / Belgravia Street / Stoneham Street Intersection

GEH - Hagreaves St - 2013 pm

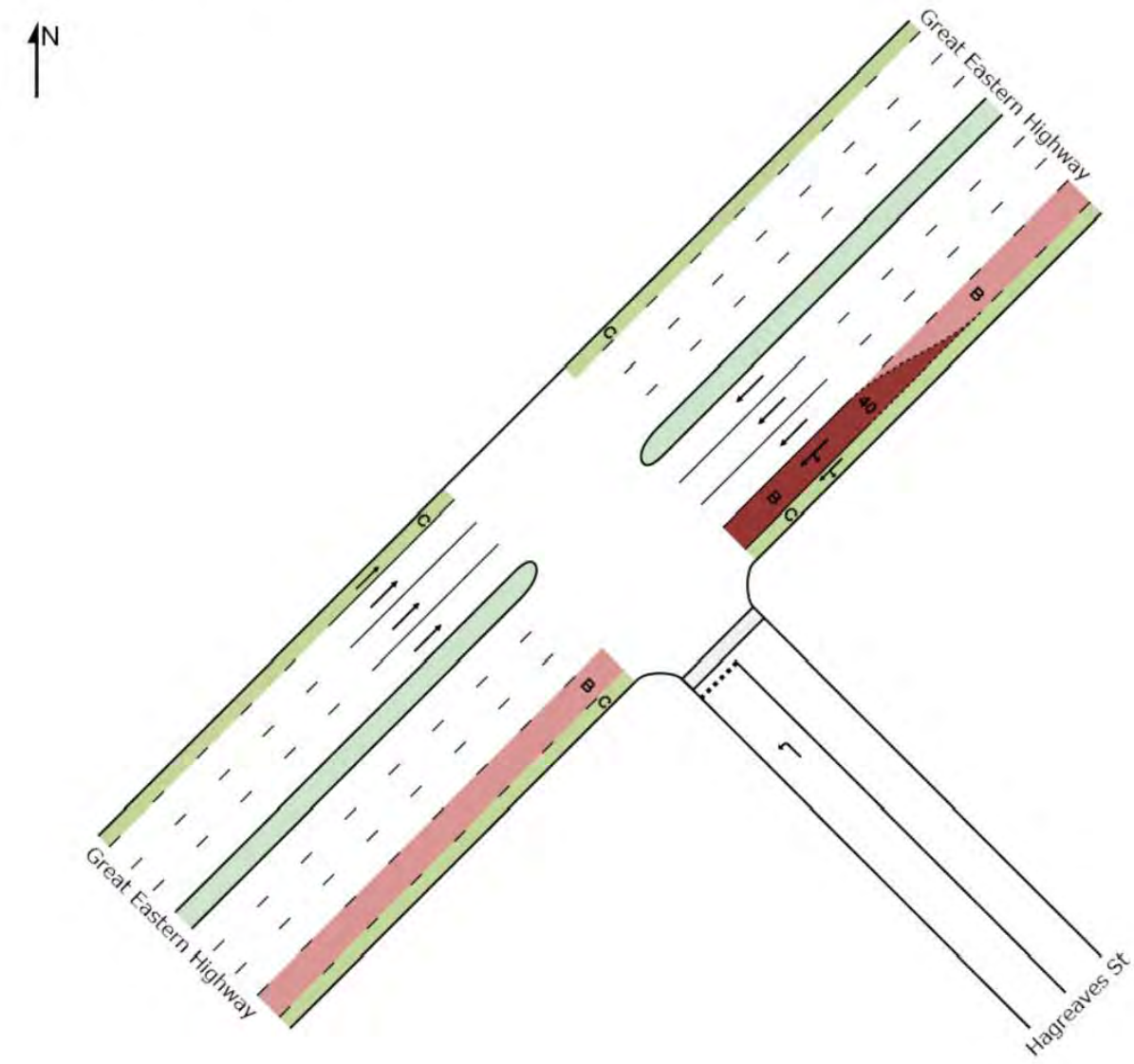


Figure 2 - Great Eastern Highway / Hargreaves Street Intersection

4. Transport Impact Assessment Checklist for a Development Site

The following is the summary / checklist for a Transport Impact Assessment as shown in the Department for Planning and Infrastructure's Transport Assessment Guidelines – Part 4.

Item	Status	Comments/Proposals
Proposed development		
Proposed land uses	Y	The proposed development is a mixed-use development comprising of: - • Commercial component including: - • Hotel (12 floors) comprising 240 Rooms (Class 3), Restaurant (Class 6), Lounge Bar (Class 6), Hotel meeting rooms (Class 5) and Health Centre (Class 9a); • Offices on levels 1 to 3 (Class 5); • Medical & Consulting Rooms (Class 9a); • Showroom (Class 6); • Lunch Bar / Fast Food (Class 6). • Residential component (total of 124 apartments) including: • 72 apartments with 1 bedroom in block 1 (Class 2); • 22 apartments with 2 bedrooms in block 2 (Class 2); • 30 apartments with 3 bedrooms in block 3 (Class 2). The development is to be situated on a 7,878m^2 site area. Plans for the proposed development have been provided in Appendix 1 of this report.
Existing land uses	Y	• Showroom (Commercial / Retail). • Belmont Primary School on opposite side of Belgravia Street. • Belgravia Park land development to the southeast of Barker Street.
Context with surrounds	Y	Complementary. Land-uses surrounding Great Eastern Highway between Belmont and Victoria Park are changing due to the Eastern Gateway project between the CBD and Perth Airport, with key development sites offering opportunities for: - • residential development and short-stay accommodation due to the proximity of the airport, the CBD and in the future the Burswood Stadium; • local centre retail; • office
Vehicular access and parking		
Access arrangements	Y	Vehicular access via Belgravia Street and Hargreaves Street. Proposed access arrangements include: - • two access / egress points onto Hargreaves Street (full movement) • one access / egress point onto Belgravia Street (LILO only). The proposed access onto Belgravia Street does not coincide with the existing controlled crossing for children for the Belmont Primary School.

		The location of driveways will be designed such that there is no conflict with the existing school crossing in Belgravia Road.
Public, private, disabled parking set down / pick up	Y	Parking Requirements for the Development: The Design Inc DAP Plan shows 390 car parking bays for the proposed development. • Table 5 shows 337 standard car parking bays based on reciprocity of uses as detailed on Pages 18 and 19P Plus: - • 5 delivery and service vehicle parking bays provided which complies with the requirements of the NSW RTA Guide to Traffic Generating Developments; and • 22 ACROD bays which complies with the Australian Building Code. This compares with Table 3 (NSW RTA Guide, no allowance for reciprocity = 387 standard car parking bays and Table 4 - City of Belmont Local Planning Scheme No 15 = 551 standard parking bays with no allowance for reciprocity. The provision of parking proposed correlates with the provision of parking determined for the Rendezvous Scarborough site as surveyed in Section 2.2.4 of this report. It has been found that the Rendezvous Scarborough site has a heavy percentage allocated for reciprocal parking based on the size of the various meeting rooms described to one of our team on the telephone.
Service vehicles (non-residential)		
Access arrangements	Y	Via Hargreaves Street – eastern crossover.
On / off-site loading facilities	Y	Via Hargreaves Street as above.
Service vehicles (residential)		
Rubbish collection and emergency vehicle access	Y	Via Belgravia Street.
Hours of operation (non-residential only)	Y	• Hotel (Reception) - Estimated 00:00 - 00:00 Restaurant - Estimated 07:00 - 22:00 Lounge Bar - Estimated 22:00 - 04:00 Hotel Meeting Rooms - Estimated 09:00 - 17:00 Health Centre - Estimated 08:00 - 18:00 • Office Area - Estimated 09:00 - 17:00 • Medical & Consulting Rooms - Estimated 08:00 - 18:00 • Showroom - Estimated 08:00 - 18:00 • Lunch Bar / Fast Food - Estimated 08:00 - 18:00

Traffic volumes		
Daily or peak traffic volumes	Y	The PM Peak traffic is expected to be around 12.5% of the average daily traffic counts quoted in Table 12, with an in-bound to out-bound flow ratio of 67% to 33%, in accordance with statistics quoted in the Western Australian Planning Commission's Transport Assessment Guidelines for Developments – Volume 5 (Technical Appendix). The development is expected to generate approximately 2,103 VPD with a PM peak hour generation of 245 private vehicles, plus an allocation for 24 taxi's per hr in peak periods. Refer Section 2.7 Management of Traffic Generated by the Development Area for details.
Type of vehicles (eg. cars, trucks)	Y	Light Vehicles – Predominantly Passenger Vehicles Access designed for council refuse vehicle where appropriate for loading purposes.
Traffic management on frontage streets		
Public transport access	Y	The site is encircled by existing public transportation routes and has excellent connectivity via Routes No 36, 40, 98, 99, 293, 295, 296 and 299. The subject site is deemed to have access to high frequency bus services.
Nearest bus/train routes	Y	• Bus route 293 (Esplanade Busport to Abernethy Road / Casella Place; • 36 – Esplanade Busport to Midland Station; • 40 – Esplanade Busport to Great Eastern Highway / Coolgardie Avenue; • 295 – Esplanade Busport to Godfrey Street / Raymond Road; • 296 – Esplanade Busport to Kalamunda Bus Station; • 299 – Esplanade Busport to Godfrey Street / Raymond Road; • 98 – Fremantle Station to Fremantle Station (Circle Route - Clockwise); • 99 – Fremantle Station to Fremantle Station (Circle Route - Anti Clockwise). The detailed overview of the available bus routes is provided in Appendix 3 of this report.
Nearest bus stops/train stations	Y	A bus stop for Route No 36, 40, 295, 296 and 299 is directly opposite of the subject site. A bus stop for Route No 293 is to the south of the development in Belgravia Street.
Pedestrian / cycle links to bus stops/train station	Y	Pedestrian path on Belgravia Street provide connectivity to the bus stop for Route No 293.
Pedestrian access / facilities		

Existing pedestrian facilities within the development (if any)	N /A	N /A
Proposed pedestrian facilities within development	Y	The development proposes acceptable pedestrian site linkages, as shown in the architectural drawings in Appendix 1. The key pedestrian linkages to maintain / enhance include: - • Belgravia Street – along the boundary of the subject site between Great Eastern Highway / controlled pedestrian crossing for the Belmont Primary School / Transperth Bus Station and to the intersection of Barker Street and Belgravia Street; • Great Eastern Highway – linking between Hargreaves and Belgravia Street • Hargreaves Street – linking between Great Eastern Highway and Barker Street. All of these facilities exist, therefore the goal of this project is to maintain and enhance the pedestrian amenity along the boundary of the project.
Existing pedestrian facilities on surrounding roads	Y	There are pedestrian facilities on both sides of Great Eastern Highway and Belgravia Street, and on the southern side of Hargreaves Street (streets surrounding the development). These are interlinked with pedestrian paths on surrounding / connecting streets. Refer Plan KC00179_S04 Pedestrian Paths Plan for details in Appendix 4.
Proposals to improve pedestrian access	N	The development does not propose any further modifications to the existing pedestrian network.
Cycle access/facilities		
Existing cycle facilities within the development (if any)	N	No cycle facilities within the existing development.
Proposed cycle facilities within development	Y	The development proposed dedicated bicycle parking in an enclosed space and end-of-trip facilities (a store for 82 bikes storage).
Existing cycle facilities on surrounding roads	Y	The roads in the immediate surroundings are marked as roads with poor road riding conditions. There are Shared paths (Shared by Pedestrians & Cyclists) in the vicinity of the proposed development along Great Eastern Highway and Stoneham Street.
Proposals to improve cycle access	Y	The development does not propose any further modifications to the existing cycling network. A detailed overview of the available cyclist routes is provided in Appendix 4 of this report.
Site specific issues		
Identify issues	Y	Confirm vehicular impacts on the intersection of Great Eastern Highway at the intersection of Hargreaves Street and Belgravia Street and confirm the impact of vehicles on the adjacent road network in Belgravia Park

		subdivision.
Remedial measures	Y	Model the intersections using SIDRA and confirm any impact on the local and wider road network.
Identify Issues	Y	Access routes for City of Belmont refuse vehicles
Remedial Measures	Y	Confirm the location of the bin enclosures and therefore the route for access / egress for the City of Belmont refuse vehicle
Identify Issues	Y	Location for taxi's and shuttle buses to pick-up and drop-off in close proximity to the entrance while maintaining a clean visual aspect.
Remedial Measures	Y	Provide porte-cochere for taxi's, pick-up / drop-off and shuttle buses.

This checklist and summary has been reviewed and is signed below as an accurate reflection of the transportation requirements for development of the subject site in accordance with the development yields and land uses which are nominated in this report.

Appendix 1

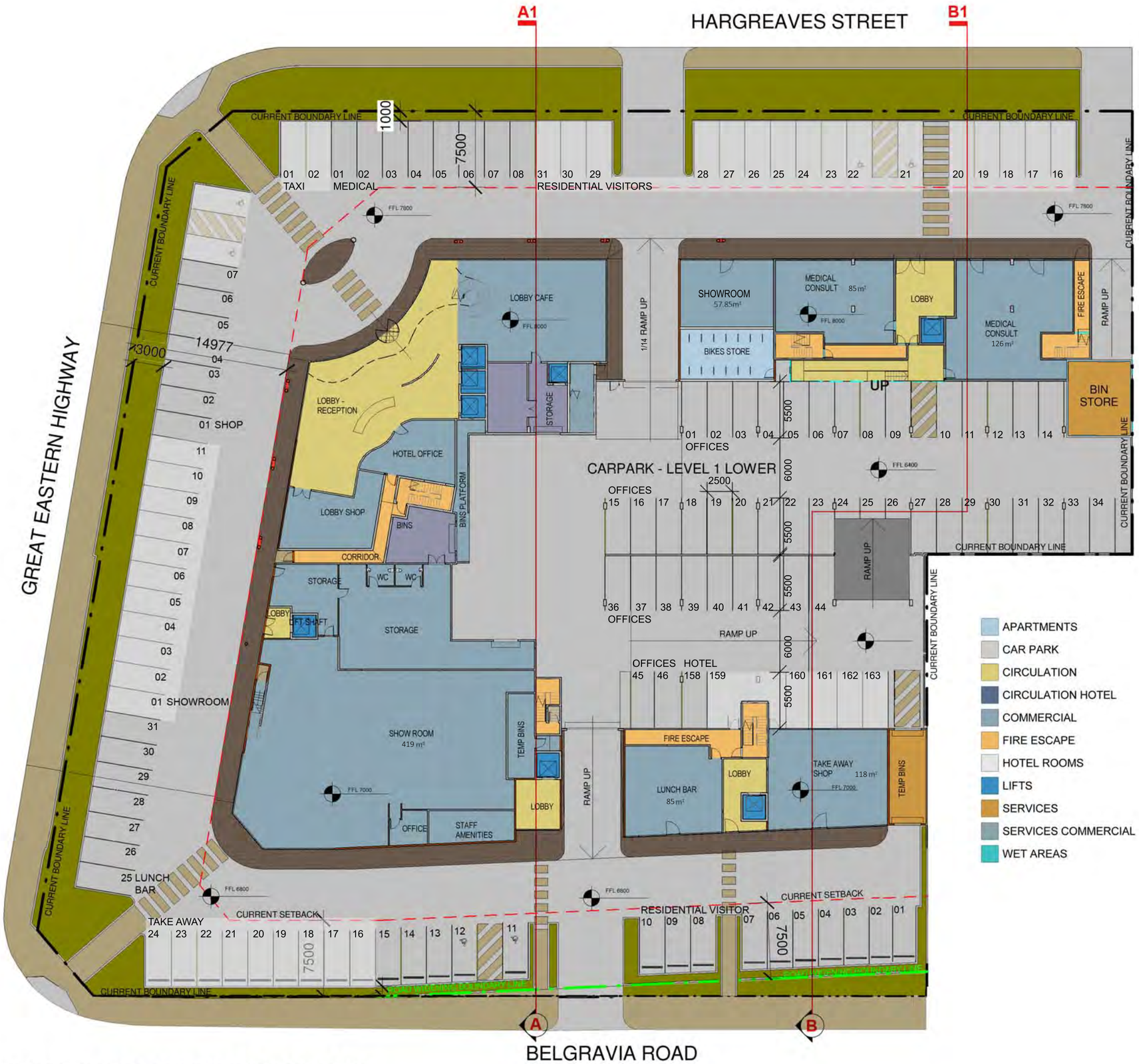
Development Information Received From the Client

A.	Land & Zoning Information				
a.	Site Area	7878	SQM		
b.	Zoning	Mixed Business			
c.	Max. Allowable Plot Ratio	N/A	SQM		
B.	**Plot Ratio & Car Parking Calculation**				
	Building Description	**Nett Area * (SQM)**	**Parking Provision**	**Car Bays Required (TPS)**	**Car Bays & Bicycles Provided**
a.	**Commercial**				
	Hotel 12 floors x 20 rooms per floor	240 Rooms	1 per bedroom	240.0	
	Restaurant (132) Occupants	132	1 per 4 seats	33.0	
	Bar Lounge (140 Occupants)	140	1 per 4 persons	35.0	
	Hotel Conference/Meeting room 80 seats	80	1 per 4 persons	20.0	
	Gym	N/A	Nil		
	Offices Level 1,2,3	1371	1 per 30 sqm	45.7	
	Medical & Consulting Rooms	(5 No.)	4 Per Practitioner	20.0	
	Showroom	419	1 per every 40sqm NLA	10.5	
	Lunch Bar	85	6 per 100sqm	5.0	
	Take Away	118	6 per 100sqm	7.0	
	Showroom	65	1 per every 40sqm NLA	1.6	
	Total Commercial Car Bays			**417.8**	
b.	**Residential Apartments**	**No. of**			
	Block 1 (1 Bed)	72	0.75 per dwelling	54.0	
	Block 2 (2 Beds)	22	0.75 per dwelling	16.5	
	Block 3 (3 Bed)	30	1.0 per dwelling	30.0	
	Total	**124**		**100.5**	
c.	**Residential Visitor Bays**	**0.25**	Per Dwelling	31.0	
	Total Residential Carparks			**131.5**	
	Residential + Commercial Parking		**TOTAL REQ. per TPS**	**549.3**	**390 cars**
	Bicycle Parking Requirements				
C.	**Residential** Residents	1 per 3 dwellings		42	42
	Visitors	1 per 10 dwellings		12.4	13
	Offices Employee	1 per 200sqm GFA		8	8
	End of trip Facilities	1 male & 1 female shower in separate change rooms per 10 cycles		(2)	(2)
	Visitors	1 per 750sqm GFA		2	2
	Hotel Employee	1 per 25sqm GFA Bar floor area		3	3
	Visitors	1 per 100sqm GFA of lounge, dining and function areas		4.2	4
	Showroom Employee	1 per 1000sqm sales floor		0.3	1
	Visitors	1 per 1000sqm sales floor		0.3	1
	Take Away/Lunch Bar Employee	1 per 100sqm GFA		2.5	3
	Visitors	1 per 50sqm GFA		5	5
			TOTAL BICYCLE PARKING Req. per TPS	**71.7**	**82 bicycles**

	LEGEND
*	Denotes Nett area for purpose of calculating car parking requirement.

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

DesignInc



PARKING LEGEND

RESIDENTIAL VISITORS	- BAYS 01 to 15
TAKE AWAY	- BAYS 16 to 24
LUNCH BAR	- BAYS 25 to 31
SHOWROOM	- BAYS 01 to 11
SHOP	- BAYS 01 to 07
ACROD & TAXI WAITING	- 4 BAYS
MEDICAL	- BAYS 01 to 08
RESIDENTIAL VISITORS	- BAYS 16 to 31
OFFICES	- BAYS 01 to 46
HOTEL	- BAYS 158 to 163

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

LEVEL 1

SK03

JOB No. 1302

OCTOBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

PARKING LEGEND

HOTEL - BAYS 1118 to 157

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

N

GREAT EASTERN HIGHWAY DEVELOPMENT

LEVEL 1A

SK03A

JOB No. 1302

OCTOBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

DesignInc

PARKING LEGEND

HOTEL - BAYS 47 to 117

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

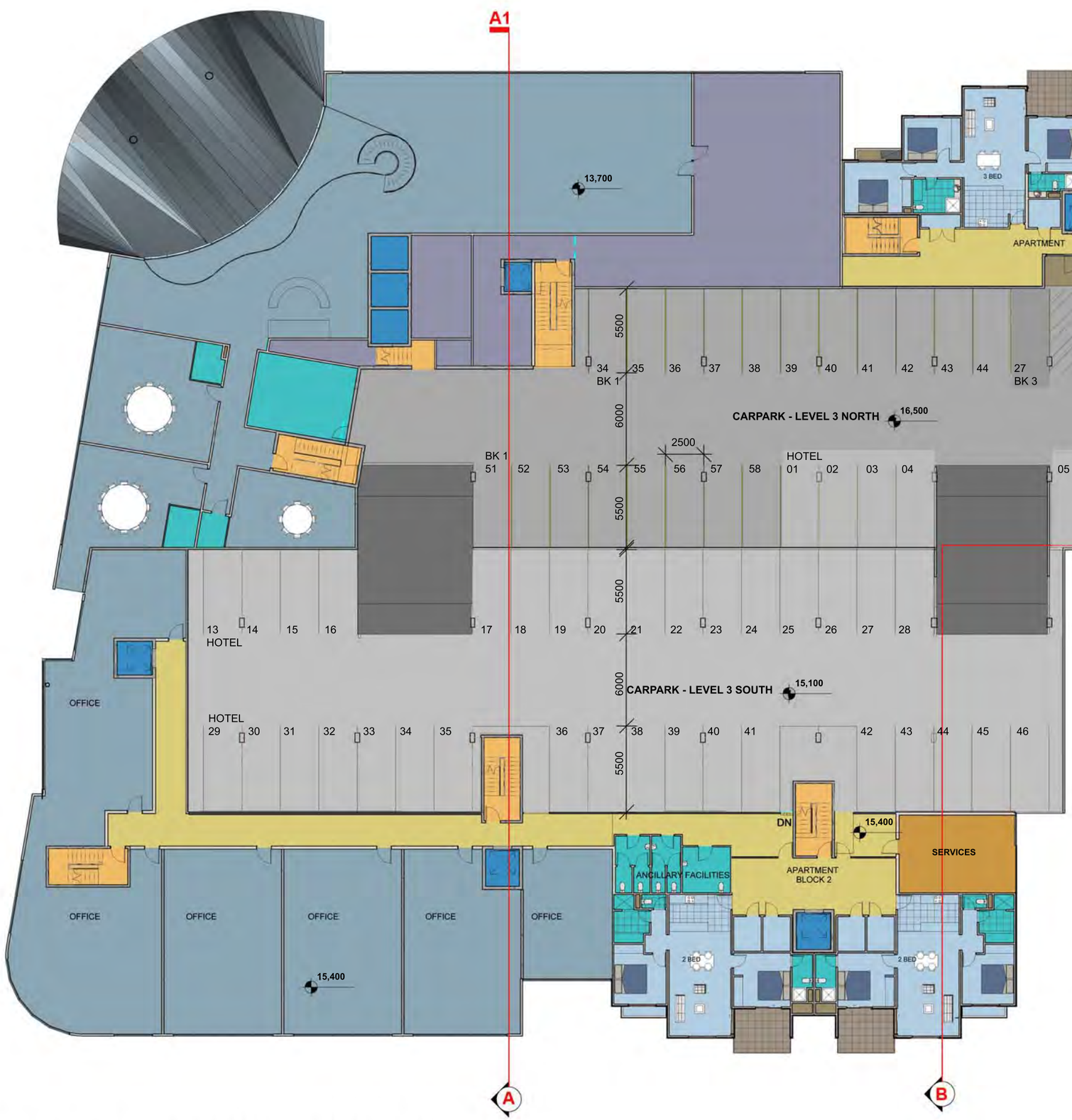
LEVEL 2

SK04

JOB No. 1302

OCTOBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au



PARKING LEGEND

RESIDENTIAL BLOCK 1 (BK 1)
- BAYS 34 to 58

RESIDENTIAL BLOCK 3 (BK 3)
- BAYS 27 to 28

HOTEL PARKING - BAYS 01 to 46

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

N

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

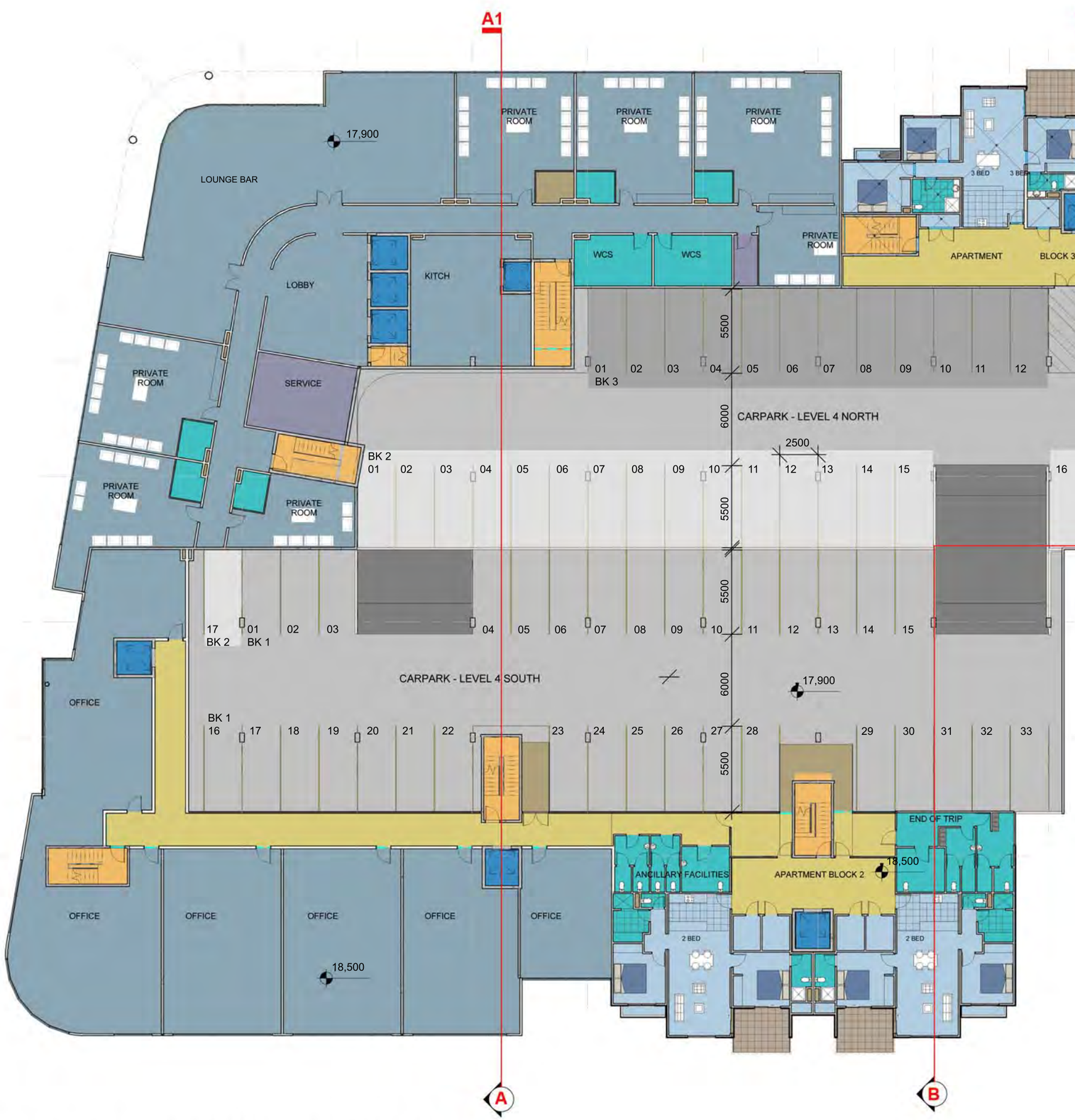
LEVEL 3

SK05

JOB No. 1302

OCTOBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au



PARKING LEGEND

RESIDENTIAL BLOCK 1 (BK 1)
- BAYS 01 to 33

RESIDENTIAL BLOCK 2 (BK 2)
- BAYS 01 to 17

RESIDENTIAL BLOCK 3 (BK 3)
- BAYS 01 to 26

- APARTMENTS
- CAR PARK
- CIRCULATION
- CIRCULATION HOTEL
- COMMERCIAL
- FIRE ESCAPE
- HOTEL ROOMS
- LIFTS
- SERVICES
- SERVICES COMMERCIAL
- WET AREAS

N

GREAT EASTERN HIGHWAY DEVELOPMENT

LEVEL 4

SK06

JOB No. 1302

OCTOBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

DesignInc

GREAT EASTERN HIGHWAY DEVELOPMENT

PODIUM LEVEL

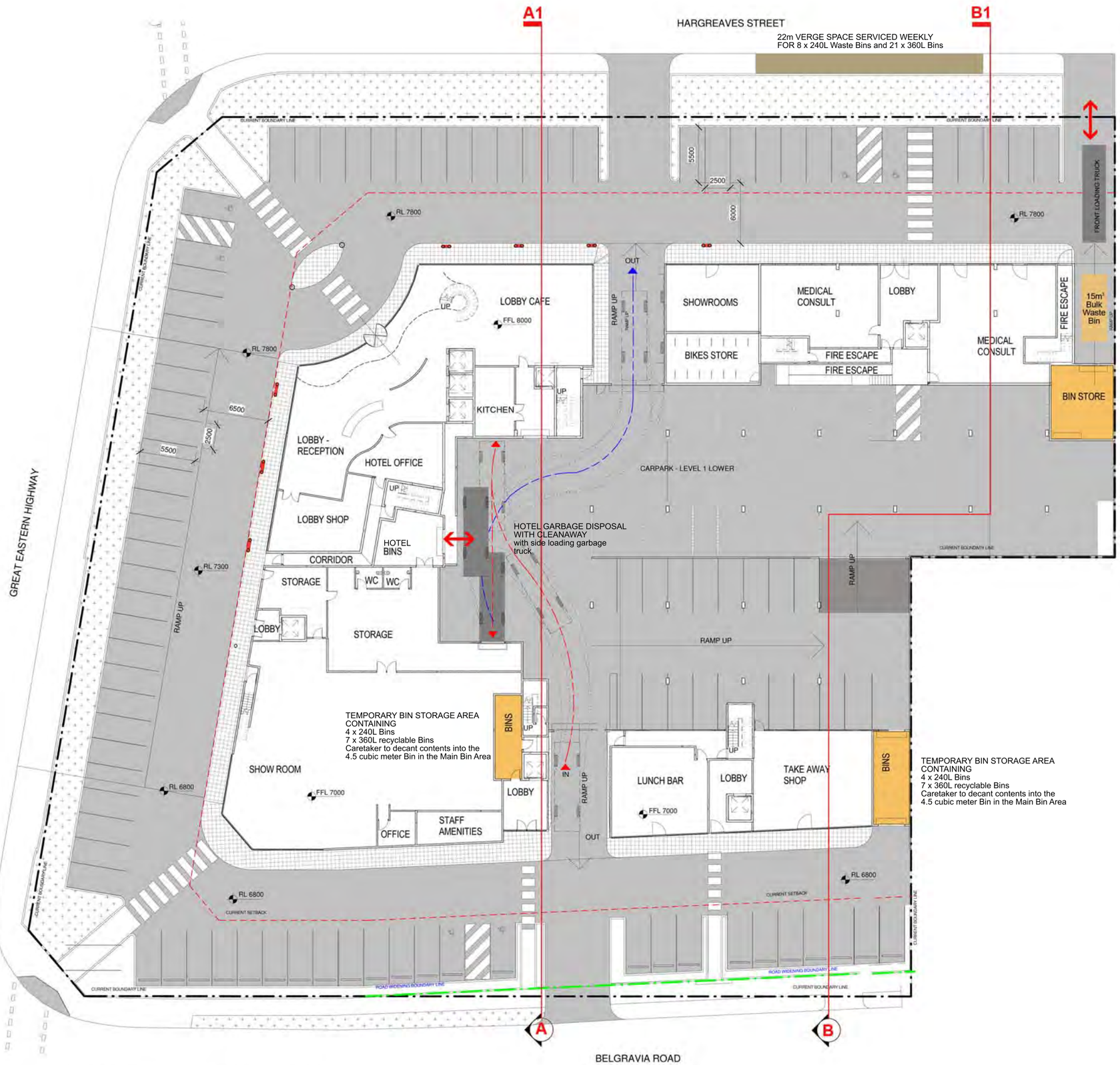
SK07

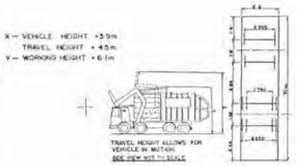
JOB No. 1302

OCTOBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

DesignInc





FRONT LOADING GARBAGE TRUCK
(can reverse into Hargreaves Street according to Cleanaway)

Bulk Waste will be provided twice/year on a Saturday morning for a few hours, the bin will be located on the ramp away from the street.

MAIN BIN AREA CONTAINING

1 x 4.5 cubic meter Bulk Bin (serviced 3 times/week)
7 x 360 L recyclables
1 x Bin Dumpmaster steelcage wheelie bin lifter

The Bin Store will be constructed of painted masonry walls with a concrete slab roof and a sealed concrete slab floor with falls to a 100mm industrial floor waste outlet connected to the sewer to comply with plumbing regulations. A hose cock will also be included to facilitate washout of bins and washout of the area. Power will be provided via a wall mounted GPO. The Caretaker will be responsible for washing and recycling bins. Ventilation system to comply with AS 1668.

TEMPORARY BIN STORAGE AREA
CONTAINING
4 x 240L Bins
7 x 360L recyclable Bins
Caretaker to decant contents into the
4.5 cubic meter Bin in the Main Bin Area

GREAT EASTERN HIGHWAY DEVELOPMENT

WASTE MANAGEMENT CONCEPT PLAN

11

JOB No. 1302

OCTOBER 2013

LEVEL 1, 3 PLAIN STREET, EAST PERTH WESTERN AUSTRALIA 6004 AUSTRALIA PO BOX 3130 EAST PERTH WA 6892 T+618 9328 3299 F+618 9325 5244 E admin@perth.designinc.com.au W designinc.com.au

DesignInc

Appendix 2

Transport Planning and Traffic Plans

KC00179.000 - Locality Plan - 800m Radius, Rev C

KC00179.000 - Bicycle Network Plan - 800m Radius, Rev C

KC00179.000 - Public Transport Plan - 800m Radius, Rev C

KC00179.000 - Pedestrian Paths Plan - 800m Radius, Rev C

KC00179.000 - Existing Traffic Counts - 800m Radius, Rev C

KC00179.000 - Traffic Flow Diagram, Rev D

KC00179.000 - Traffic Flow Diagram PM Peak, Rev A

KC00179.000 - Traffic Flow Diagram AM Peak, Rev A

Parks and Recreation

Public Facilities

Water

Location Boundary

BELMONT Local Government Name

Major Road

Minor Road

Distance from Location

Railway

Barker St Street Name

LEGEND

No	DATE	AMENDMENT
C	29-10-2013	PROPOSED LAYOUT AMENDED
B	15-10-2013	PROJECT CODE CHANGED, SCATS DATA ADDED
A	02-08-2013	ISSUED FOR REVIEW

PROJECT: No 215 to 223 Great Eastern Highway, Belmont

TITLE: Locality Plan - 800m Radius

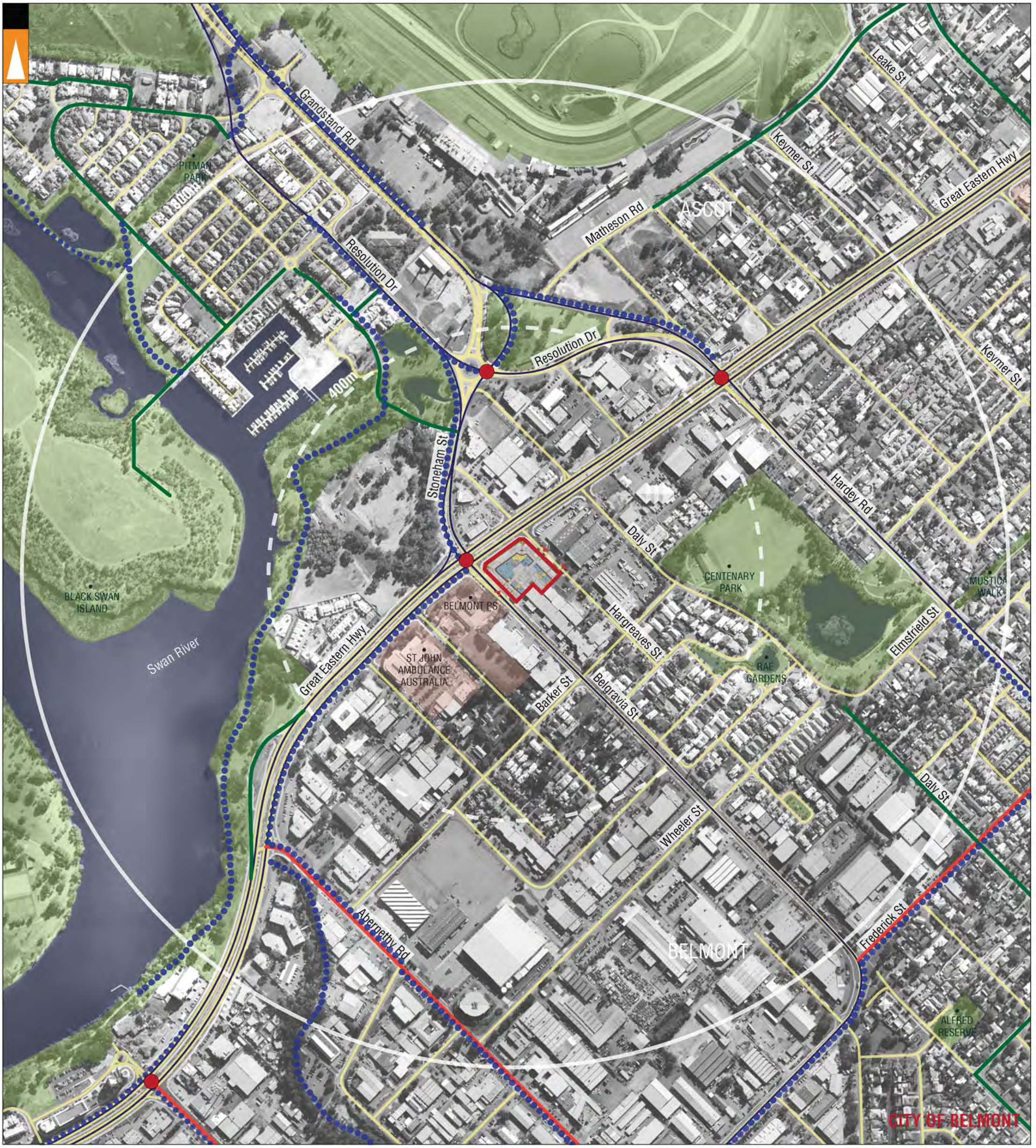
DRAWING NUMBER: KC00179.000 S01

DRAWN BY: K.P.

Traffic Engineering Consultants
PO Box 331 Guildford LPO WA 6935

PH: 08 9250 4550
WEB: www.kleywegconsulting.com.au
FTP: www.kleywegconsulting.wetransfer.com

kc TRAFFIC AND TRANSPORT



Parks and Recreation
Public Facilities
Water
Good Road Riding Environment
Medium Road Riding Environment
Location Boundary
BELMONT — Local Government Name
Major Road
Poor Road Riding Environment
Minor Road
Shared Path (Shared by Pedestrians & Cyclists)
Distance from Location
Railway
Barker St — Street Name
Road Traffic Light

LEGEND

No	DATE	AMENDMENT
C	29-10-2013	PROPOSED LAYOUT AMENDED
B	15-10-2013	PROJECT CODE CHANGED, SCATS DATA ADDED
A	02-08-2013	ISSUED FOR REVIEW

PROJECT: No 215 to 223 Great Eastern Highway, Belmont

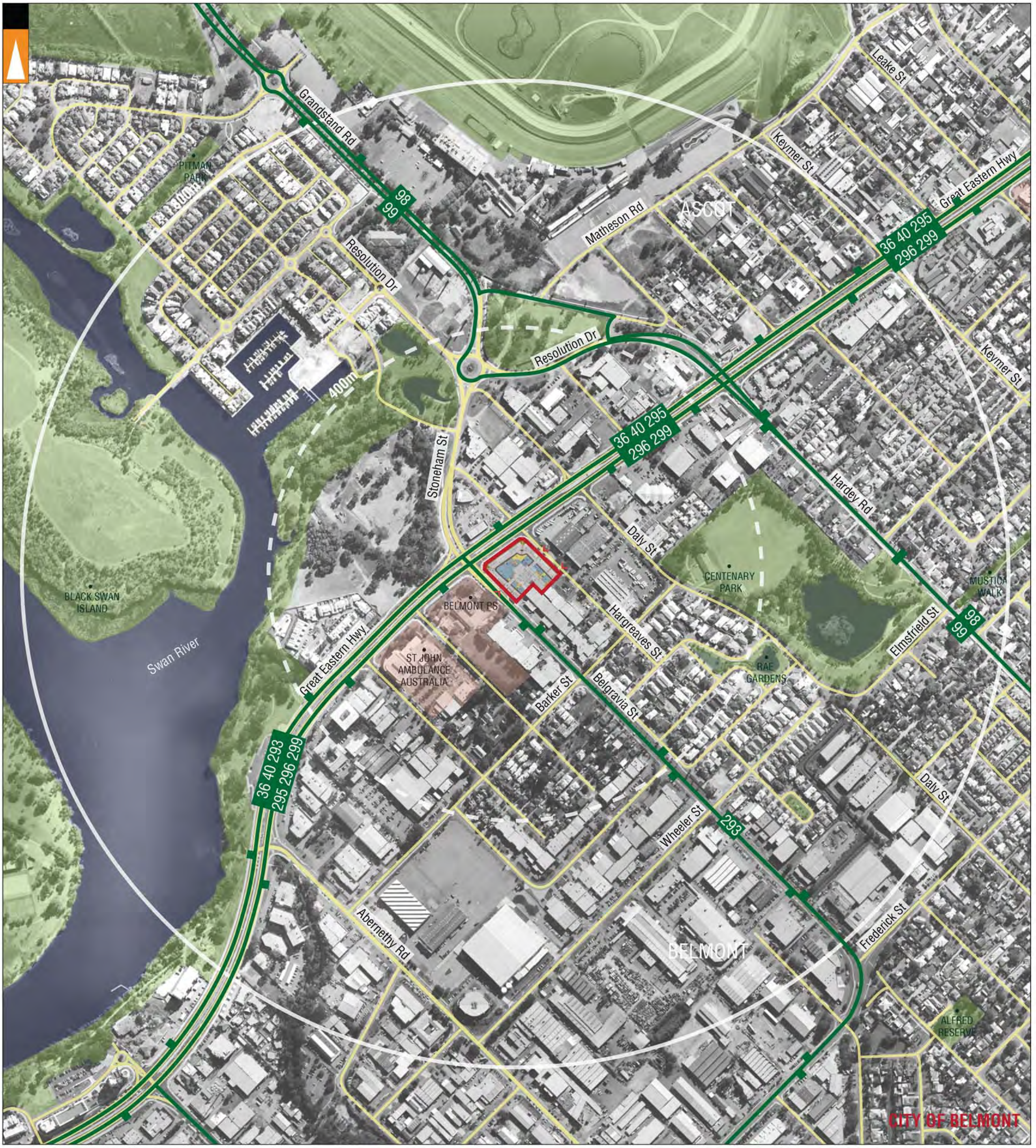
TITLE: PBN Plan - 800m Radius

DRAWING NUMBER: KC00179.000 S02

DRAWN BY: K.P.

Traffic Engineering Consultants
PO Box 331 Guildford LPO WA 6935
PH: 08 9250 4550
WEB: www.kleywegconsulting.com.au
FTP: www.kleywegconsulting.wetransfer.com

kc TRAFFIC AND TRANSPORT



Parks and Recreation

Public Facilities

Water

36 — Bus Route Number

Location Boundary

BELMONT — Local Government Name

Major Road

Bus Routes / Stops

Distance from Location

Railway

Barker St — Street Name

Minor Road

min* — Maximum Frequency of Bus Service / Peak Interval

36	20"	Esplanade Busport to Midland Station
40	10"	Esplanade Busport to Gt Eastern Hwy / Coolgardie Av
98	2"	Fremantle Station to Fremantle Station
99	2"	Fremantle Station to Fremantle Station
293	61"	Esplanade Busport to Abernethy Rd / Casella Pl
295	20"	Esplanade Busport to Godfrey St / Raymond Rd
296	20"	Esplanade Busport to Kalamunda Bus Station
299	20"	Esplanade Busport to Godfrey St / Raymond Rd

LEGEND

No	DATE	AMENDMENT
C	29-10-2013	PROPOSED LAYOUT AMENDED
B	15-10-2013	PROJECT CODE CHANGED, SCATS DATA ADDED
A	02-08-2013	ISSUED FOR REVIEW

PROJECT: No 215 to 223 Great Eastern Highway, Belmont

TITLE: Public Transport Plan - 800m Radius

DRAWING NUMBER: KC00179.000 S03

DRAWN BY: K.P.

Traffic Engineering Consultants
PO Box 331 Guildford LPO WA 6935

PH: 08 9250 4550
WEB: www.kleywegconsulting.com.au
FTP: www.kleywegconsulting.wetransfer.com

kc TRAFFIC AND TRANSPORT

Parks and Recreation
Public Facilities
Water
Pedestrian Paths
Location Boundary
BELMONT
Local Government Name
Major Road
400m
Ped Sheds
Minor Road
Shared Path (Shared by Pedestrians & Cyclists)
Distance from Location
Railway
Barker St
Street Name
Walk Trail

LEGEND

No	DATE	AMENDMENT
C	29-10-2013	PROPOSED LAYOUT AMENDED
B	15-10-2013	PROJECT CODE CHANGED, SCATS DATA ADDED
A	02-08-2013	ISSUED FOR REVIEW

PROJECT: No 215 to 223 Great Eastern Highway, Belmont

TITLE: Pedestrian Paths Plan - 800m Radius

DRAWING NUMBER: KC00179.000 S04

DRAWN BY: K.P.

Traffic Engineering Consultants
PO Box 331 Guildford LPO WA 6935
PH: 08 9250 4550
WEB: www.kleywegconsulting.com.au
FTP: www.kleywegconsulting.wetransfer.com

Parks and Recreation

Public Facilities

Water

7,418 Number of Vehicles per Day

Location Boundary

BELMONT Local Government Name

Major Road

Minor Road

Distance from Location

Railway

Barker St Street Name

LEGEND

No	DATE	AMENDMENT
C	29-10-2013	PROPOSED LAYOUT AMENDED
B	15-10-2013	PROJECT CODE CHANGED, SCATS DATA ADDED
A	02-08-2013	ISSUED FOR REVIEW

PROJECT: No 215 to 223 Great Eastern Highway, Belmont

TITLE: Existing Traffic Counts - 800m Radius

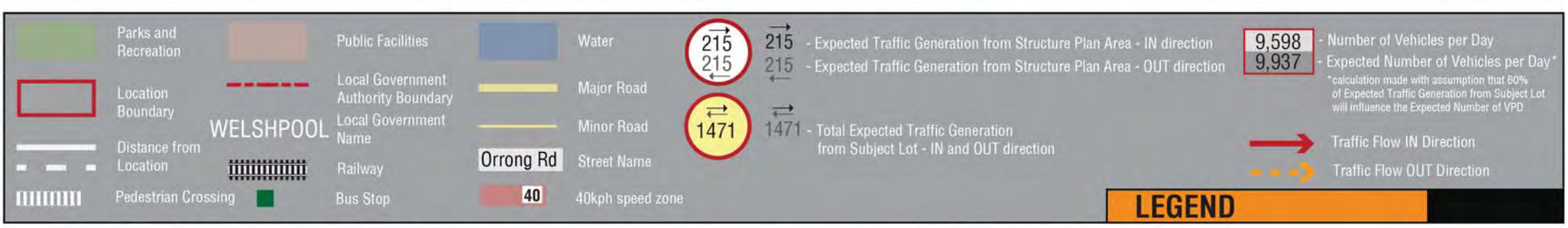
DRAWING NUMBER: KC00179.000 S05

DRAWN BY: K.P.

Traffic Engineering Consultants
PO Box 331 Guildford LPO WA 6935

PH: 08 9250 4550
WEB: www.kleywegconsulting.com.au
FTP: www.kleywegconsulting.wetransfer.com

kc TRAFFIC AND TRANSPORT



No	DATE	AMENDMENT
D	25-11-2013	Revised in accordance with changes of expected vehicular traffic distribution
C	06-11-2013	Revised in accordance with changes of expected vehicular traffic distribution
B	30-10-2013	Revised in accordance with changes of expected vehicular traffic distribution
A	15-10-2013	ISSUED FOR REVIEW

PROJECT:
No 215 to 223 Great Eastern Highway, Belmont

TITLE:
Traffic Flow Diagram

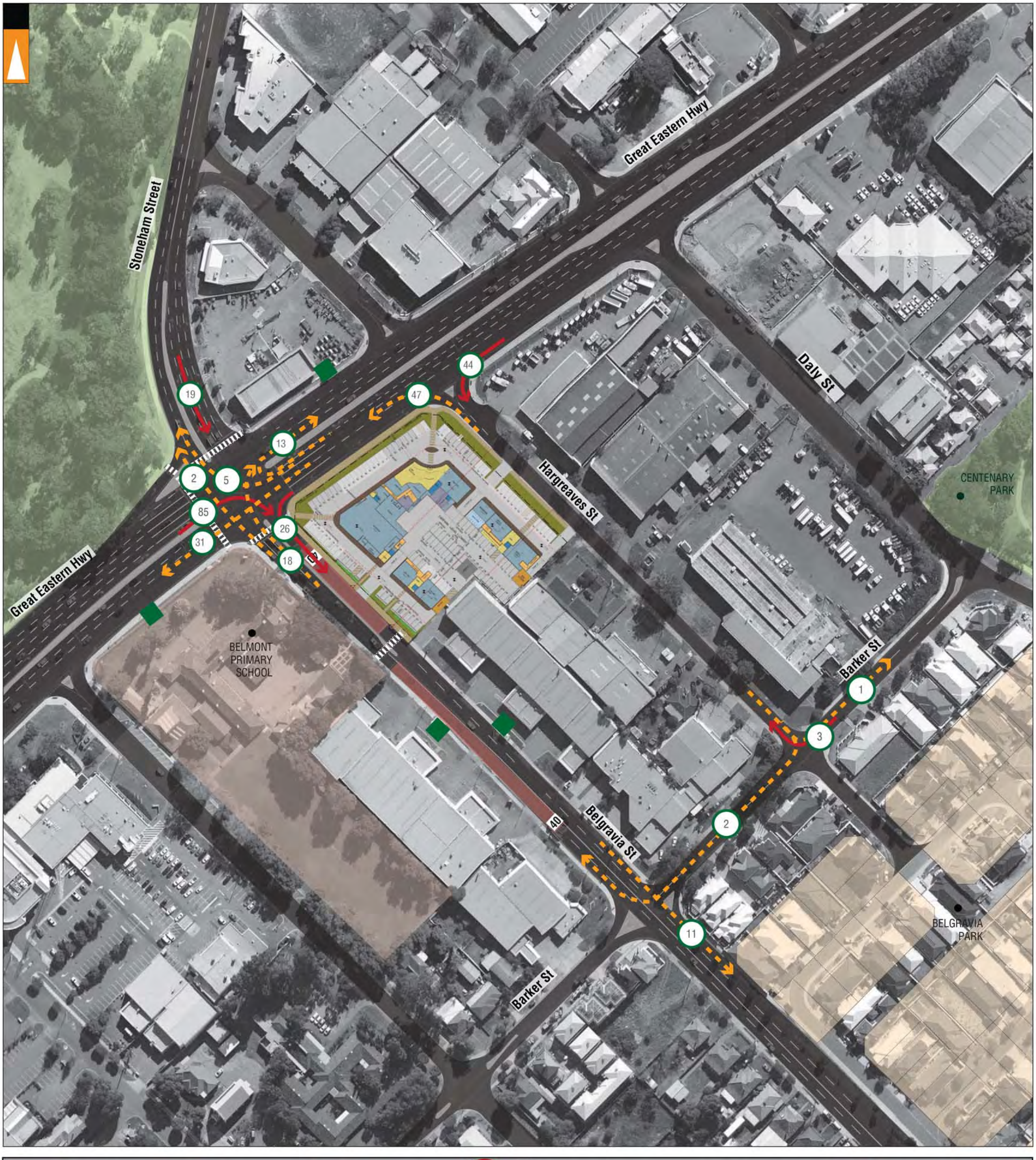
DRAWING NUMBER:
KC00179.000 S06

DRAWN BY:
M.D.
/
J.I.

Traffic Engineering Consultants
PO Box 331 Guildford LPO WA 6935

PH: 08 9250 4550
WEB: www.kleywegconsulting.com.au
FTP: www.kleywegconsulting.wetransfer.com

kc
TRAFFIC AND TRANSPORT



Parks and Recreation
Public Facilities
Water
Location Boundary
Local Government Authority Boundary
Major Road
WELSHPOOL Local Government Name
Minor Road
Distance from Location
Railway
Orrong Rd Street Name
Pedestrian Crossing
Bus Stop
40 40kph speed zone

215 / 215 - Expected Traffic Generation from Structure Plan Area - IN direction
215 - Expected Traffic Generation from Structure Plan Area - OUT direction
Traffic Flow IN Direction
Traffic Flow OUT Direction
1471 - Total Expected Traffic Generation from Subject Lot - IN and OUT direction
20 - Expected Vehicles per hour Generated from Subject Lot in Peak Hour

LEGEND

No	DATE	AMENDMENT
A	30-10-2013	ISSUED FOR REVIEW

PROJECT: No 215 to 223 Great Eastern Highway, Belmont

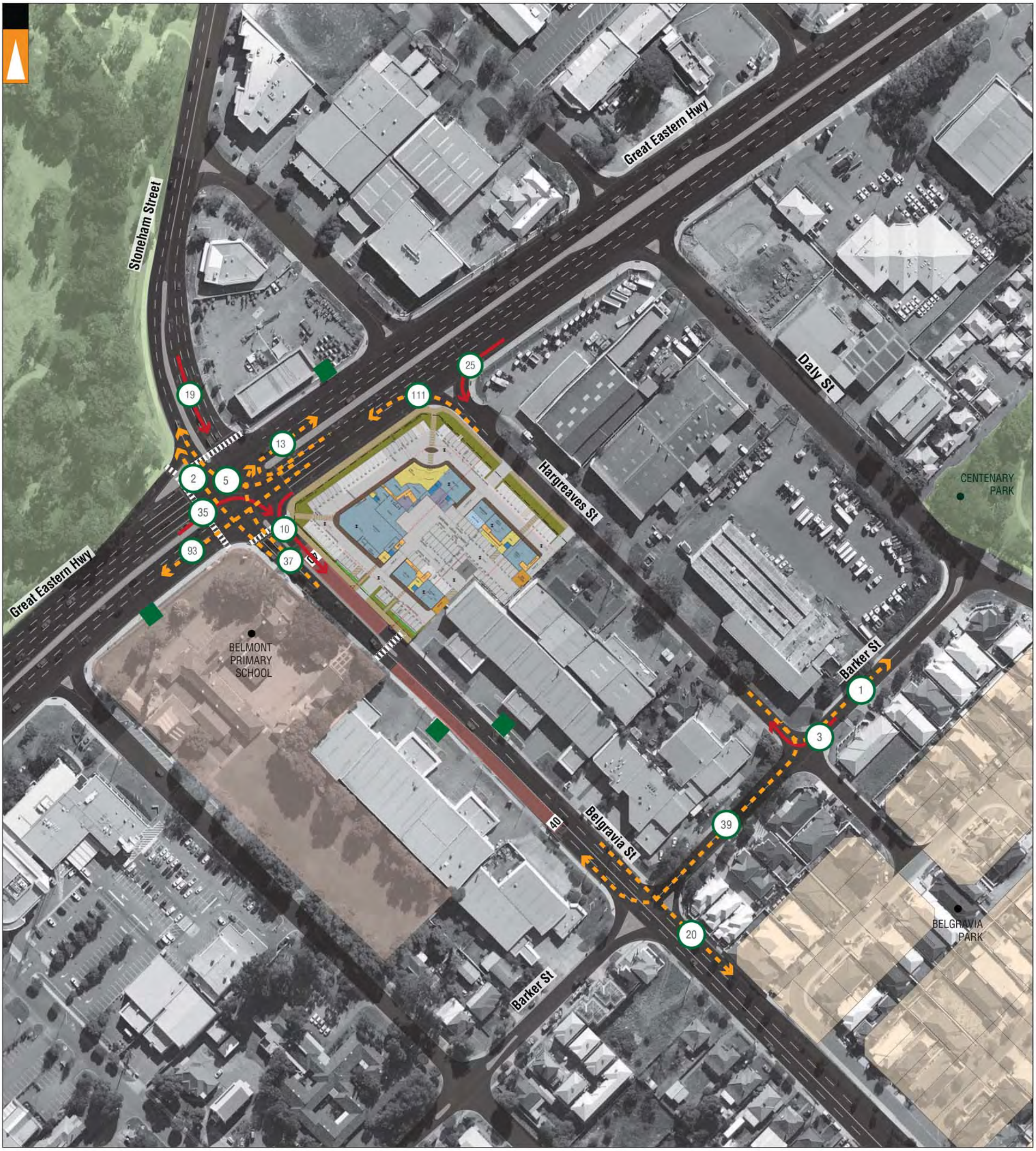
TITLE: Traffic Flow Diagram - PM Peak

DRAWING NUMBER: KC00179.000 S07

DRAWN BY: J.I.

Traffic Engineering Consultants
PO Box 331 Guildford LPO WA 6935
PH: 08 9250 4550
WEB: www.kleywegconsulting.com.au
FTP: www.kleywegconsulting.wetransfer.com

kc TRAFFIC AND TRANSPORT



Parks and Recreation
Public Facilities
Water
Location Boundary
Local Government Authority Boundary
Major Road
Distance from Location
WELSHPOOL Local Government Name
Minor Road
Railway
Orrong Rd Street Name
Pedestrian Crossing
Bus Stop
40 40kph speed zone
20 - Expected Vehicles per hour Generated from Subject Lot in Peak Hour
Traffic Flow IN Direction
Traffic Flow OUT Direction

LEGEND

No	DATE	AMENDMENT
A	30-10-2013	ISSUED FOR REVIEW

PROJECT: No 215 to 223 Great Eastern Highway, Belmont

TITLE: Traffic Flow Diagram - AM Peak

DRAWING NUMBER: KC00179.000 S08

DRAWN BY: J.I.

Traffic Engineering Consultants
PO Box 331 Guildford LPO WA 6935
PH: 08 9250 4550
WEB: www.kleywegconsulting.com.au
FTP: www.kleywegconsulting.wetransfer.com

kc TRAFFIC AND TRANSPORT

Appendix 3

SIDRA Intersection Analysis

215 to 223 Great Eastern Highway (GEH), Belmont – SIDRA Analysis

This short report provides details on the SIDRA Analysis conducted to support the findings of the report KC00179.000 R01 Rev H. The intersections have been modelled in the PM peak as it was deemed that the PM peak is the critical timing for the intersections observed given the convergence of peak operations for hotel / restaurant and evening residential trip attractions coinciding with the evening peaks in the local road network. Each of these intersections has been modelled in 7 scenarios listed below: -

- Model 1 – GEH – Belgravia Street, 2013;
- Model 1.1a – GEH – Belgravia Street, 2016 – no development;
- Model 1.1b – GEH – Belgravia Street, 2016 – with development;
- Model 1.2a – GEH – Belgravia Street, 2021 – no development;
- Model 1.2b – GEH – Belgravia Street, 2021 – with development;
- Model 1.3a – GEH – Belgravia Street, 2031 – no development;
- Model 1.3b – GEH – Belgravia Street, 2031 – with development;
- Model 2 – GEH – Hargreaves Street, 2013;
- Model 2.1a – GEH – Hargreaves Street, 2016 – no development;
- Model 2.1b – GEH – Hargreaves Street, 2016 – with development;
- Model 2.2a – GEH – Hargreaves Street, 2021 – no development;
- Model 2.2b – GEH – Hargreaves Street, 2021 – with development;
- Model 2.3a – GEH – Hargreaves Street, 2031 – no development;
- Model 2.3b – GEH – Hargreaves Street, 2031 – with development;

The corresponding intersections were connected into the network in order to estimate the mutual impact. Seven networks were formed: -

- Network 1-2 – 2013;
- Network N.1a – 1.1a – 2.1a – 2016 – no development;
- Network N.1b – 1.1b – 2.1b – 2016 – with development;
- Network N.2a – 1.2a – 2.2a – 2021 – no development;
- Network N.2b – 1.2b – 2.2b – 2021 – with development;
- Network N.3a – 1.3a – 2.3a – 2031 – no development;
- Network N.3b – 1.3b – 2.3b – 2031 – with development.

The dimensions of the intersection elements have been scaled from aerial imagery through our commercial arrangement with Nearmaps dated 30th June 2013. These images are suitable for use in concept drafting applications with a level of accuracy to within +/- 10 centimetres.

Base traffic data utilised for the modelling was obtained from the SCATS system through MRWA. The data was collected in the period 29.07.2013 – 04.08.2013. Where OD data was insufficient, OD matrices presented in the report were utilised. The timing of the phases in the traffic signals cycles was obtained through a field observation conducted in October 2013 after the morning peak at around 10:00am. Phasing diagrams were obtained through the SCATS system. Future modelling assumes utilisation of the same traffic signals cycles with no optimisation. Variable sequence analysis was applied.

A traffic growth rate of 2% per annum was agreed by MRWA and the City of Belmont as appropriate.

The lanes are numbered in accordance with the standard SIDRA convention – numbering starts from the kerb lane in approach towards centre of the carriageway.

SIDRA Intersection 6 Network offers opportunity to examine the performance of an intersection within a network. Lane Summaries for each scenario were provided in two variations:-

a) Intersection that is analysed independently;
b) Intersection that is analysed within the network (GEH – Belgravia Street / GEH – Hargreaves Street).

Comparison of these findings gives a good idea of mutual impact of these intersections.

FINDINGS

- The peak eastbound traffic in GEH prevents access to the right turn deceleration lane into Belgravia Street from 2021. The length of the deceleration lane is sufficient to accommodate the proposed right turning traffic, however queuing traffic in the eastbound lanes prevents access during the cycle in the PM peak.
- Using a Network Analysis approach, it is noted there will be impacts on the performance of the Hargreaves Street intersection due to traffic queuing through the intersection of GEH and Belgravia Street.
- It is noted that the likely delay caused by the proposed development can be "contained" within the same traffic cycle as the delay caused by the growth in base case traffic without the development.
    - In 2021 the anticipated intersection delay without the development is 67s while the anticipated average intersection delay with the proposed development is 90.9s – both of these values are less than the 150s (one traffic signals cycle)
    - In 2031 the anticipated intersection delay without the development is 198.7s while the anticipated intersection delay with the proposed development is 239.7s – both of these values are higher than 150s (one traffic signals cycle) and less than 300s (two traffic signals cycles);
- Detailed SIDRA Input Data, Lane Summaries and Phasing Summaries are attached.

CONCLUSION

The impacts noted should be expected for a development of this nature in the location. Given the increased delay is contained within the same cycle as that which occurs from the expected organic growth rate of 2% per annum along GEH, we believe the impact of the development of the subject site on the surrounding road network should be considered negligible, as the impact of the development is not changing the Level of Service, it is the compound growth in the regional network which impacts the intersections.

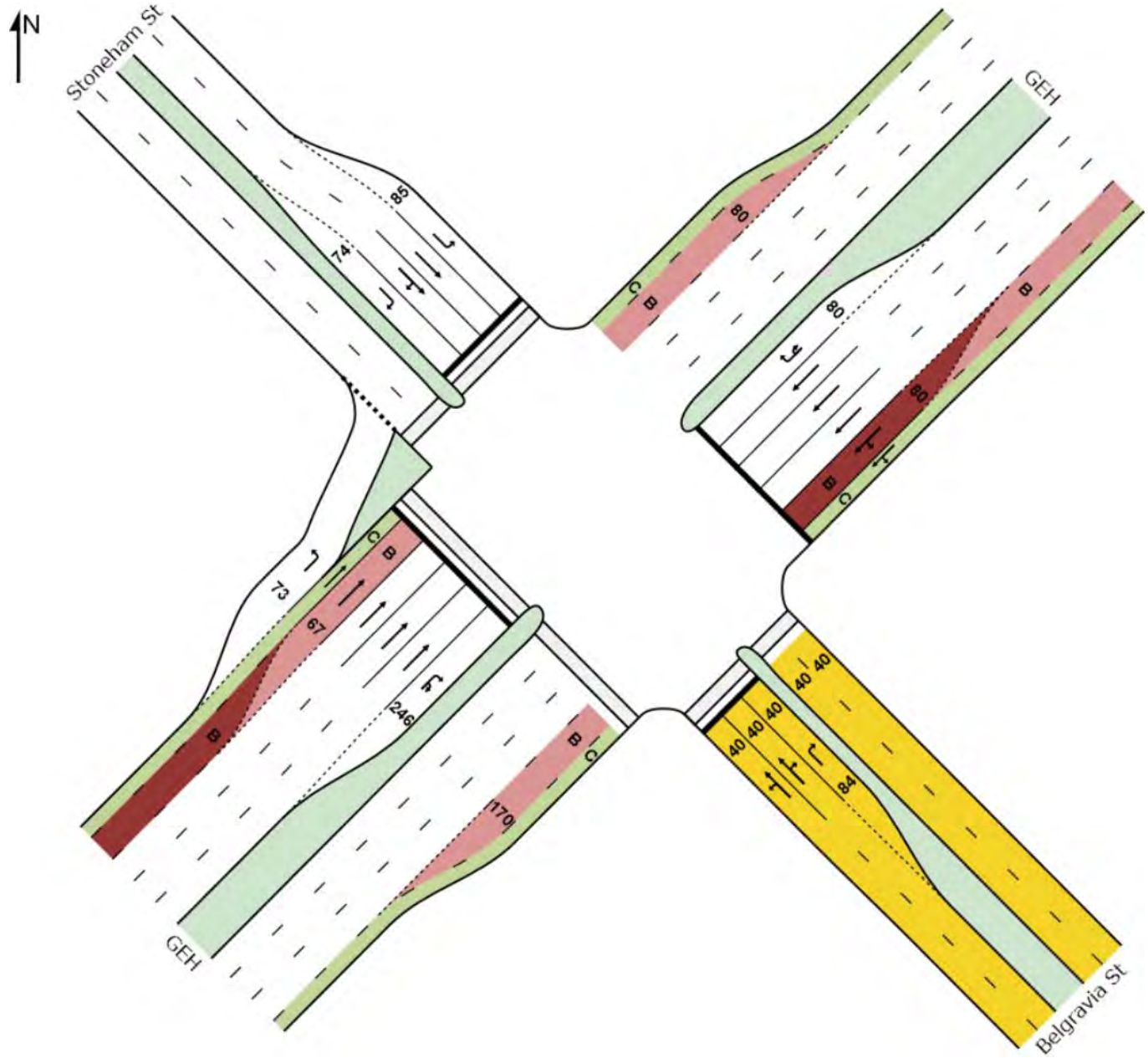
The addition of the development to the 2021 and 2031 models has a minor impact on the performance of the intersection due to increased percentage of right turn movements from GEH into Belgravia Street. This increased percentage of vehicle movements causes SCATS to optimise during peak periods to increase available time within the cycle for the right turn movement. This optimisation increases the phase by approximately 2 seconds to allow for additional right turn movements within the total 150 second cycle time. Therefore the increase in average delays at this intersection is caused by the increase in delay time for vehicles turning right being delayed in the through lanes through 1 full cycle of phases and not caused by the development itself.

Delays at the intersection of Hargreaves Street and GEH are inevitable given the proximity of the intersection to the signalised intersection of Belgravia Street and GEH. During peak times SIDRA does not allow for courteous behaviour from road users in GEH southwest bound allowing vehicles to enter from Hargreaves Street, therefore the delay at this intersection is conservative.

SITE LAYOUT

Site: GEH - Belgravia St - 2013 pm

GEH - Belgravia St



INPUT REPORT

Site: GEH - Belgravia St - 2013 pm

GEH - Belgravia St

Intersection - Site Data	
Site Name	GEH - Belgravia St - 2013 pm
Site ID	1
Site Title	GEH - Belgravia St

Intersection - Site Properties	
Site (Intersection) Type	Signals
Model Name	Standard Left
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	----------
Date	13/10/2013 11:05:18 AM
Created By	marina
Organisation	
Version	6.0.14.4193
Last Modified	----------
Date	19/11/2013 4:15:40 AM
Modified By	marina
Organisation	
Version	6.0.14.4193

Intersection - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Approach Distance m	Extra Bunching %	Approach Control	Area Type Factor
SouthEast	Belgravia St	Two-way	3	2	500.0	0	–	1
NorthEast	GEH	Two-way	6	5	83.0	10	–	1
NorthWest	Stoneham St	Two-way	4	2	320.0	0	–	1
SouthWest	GEH	Two-way	7	5	500.0	0	–	1

Movement Definitions - Included Movement Classes

Name	ID	Model Designation	Type
Light Vehicles	LV	Light Vehicle	Standard
Heavy Vehicles	HV	Heavy Vehicle	Standard
Buses	B	Heavy Vehicle	Standard
Bicycles	C	Light Vehicle	Standard

Movement Definitions - Origin-Destination Movements

To Approach	OD Movement	Turn Designation	OD Mov ID	LTR Mov ID
From: SouthEast	Belgravia St			
SouthWest	L2	L	4	4
NorthWest	T1	T	5	5
NorthEast	R2	R	6	6
From: NorthEast	GEH			
SouthEast	L2	L	7	7
SouthWest	T1	T	8	8
NorthWest	R2	R	9	9
NorthEast	U	R	9u	9
From: NorthWest	Stoneham St			
NorthEast	L2	L	10	10
SouthEast	T1	T	11	11
SouthWest	R2	R	12	12

From: SouthWest	GEH			
NorthWest	L2	L	1	1
NorthEast	T1	T	2	2
SouthEast	R2	R	3	3
SouthWest	U	R	3u	3

Lane Geometry - Lane Configuration

Leg	Item	Configuration	Type	Control	Slip/ Bypass Control	Length m	Width m	Grade %	Full Lane [ID	Colour]	[Front Width m	Island Back Width m	Fill Style	For Ped Staging]
SouthEast	Belgravia St													
	App. Lane 1	Full-Length	Normal	Signals	–	500	3.5	0	40		–	–	–	–
	App. Lane 2	Full-Length	Normal	Signals	–	500	3.5	0	40		–	–	–	–
	App. Lane 3	Short Lane	Normal	Signals	–	–	3.5	0	–	–	–	–	–	–
	Strip Island 1	–	–	–	–	–	–	–	–	–	2	5.3	Solid	Yes
	Exit Lane 2	Full-Length	–	–	–	500	3.6	0	40		–	–	–	–
	Exit Lane 1	Full-Length	–	–	–	500	3.6	0	40		–	–	–	–
NorthEast	GEH													
	App. Lane 1	Full-Length	Normal	Signals	–	83	2	0	C		–	–	–	–
	App. Lane 2	Two-Segment	Normal	Signals	–	–	3.8	0	–	–	–	–	–	–
	App. Lane 3	Full-Length	Normal	Signals	–	83	4.2	0			–	–	–	–
	App. Lane 4	Full-Length	Normal	Signals	–	83	4.2	0			–	–	–	–
	App. Lane 5	Full-Length	Normal	Signals	–	83	3.6	0			–	–	–	–
	App. Lane 6	Short Lane	Normal	Signals	–	–	4	0	–	–	–	–	–	–
	Strip Island 1	–	–	–	–	–	–	–	–	–	3	7.3	Solid	Yes
	Exit Lane 5	Full-Length	–	–	–	83	3.5	0			–	–	–	–
	Exit Lane 4	Full-Length	–	–	–	83	4.2	0			–	–	–	–
	Exit Lane 3	Full-Length	–	–	–	83	3.5	0			–	–	–	–
	Exit Lane 2	Short Lane	–	–	–	–	4	0	–	–	–	–	–	–
	Exit Lane 1	Full-Length	–	–	–	83	2	0	C		–	–	–	–
NorthWest	Stoneham St													
	App. Lane 1	Short Lane	Normal	Signals	–	–	3.7	0	–	–	–	–	–	–
	App. Lane 2	Full-Length	Normal	Signals	–	320	3.7	0			–	–	–	–
	App. Lane 3	Full-Length	Normal	Signals	–	320	3.7	0			–	–	–	–
	App. Lane 4	Short Lane	Normal	Signals	–	–	3.7	0	–	–	–	–	–	–
	Strip Island 1	–	–	–	–	–	–	–	–	–	2.3	3.2	Solid	Yes
	Exit Lane 2	Full-Length	–	–	–	320	3.7	0			–	–	–	–
	Exit Lane 1	Full-Length	–	–	–	320	3.7	0			–	–	–	–
SouthWest	GEH													
	App. Lane 1	Short Lane	Slip/ Bypass (High Angle)	Signals	Giveway/ Yield	–	5.5	0	–	–	–	–	–	–
	App. Lane 2	Full-Length	Normal	Signals	–	500	2	0	C		–	–	–	–
	App. Lane 3	Two-Segment	Normal	Signals	–	–	4.1	0	–	–	–	–	–	–
	App. Lane 4	Full-Length	Normal	Signals	–	500	4.1	0			–	–	–	–
	App. Lane 5	Full-Length	Normal	Signals	–	500	4.1	0			–	–	–	–
	App. Lane 6	Full-Length	Normal	Signals	–	500	4.1	0			–	–	–	–
	App. Lane 7	Short Lane	Normal	Signals	–	–	4.1	0	–	–	–	–	–	–
	Strip Island 1	–	–	–	–	–	–	–	–	–	3	6.5	Solid	Yes
	Exit Lane 5	Full-Length	–	–	–	500	3.6	0			–	–	–	–
	Exit Lane 4	Full-Length	–	–	–	500	4.1	0			–	–	–	–
	Exit Lane 3	Full-Length	–	–	–	500	4.1	0			–	–	–	–
	Exit Lane 2	Short Lane	–	–	–	–	4.1	0	–	–	–	–	–	–
	Exit Lane 1	Full-Length	–	–	–	500	2	0	C		–	–	–	–

Lanes are numbered from left to right in the direction of travel.

Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes

Leg	Item	Configuration	Short Lane / Segment 1 [Length m	Overflow/ Merge Dir	ID	Colour]	Segment 2 [Length m	ID	Colour]
SouthEast	Belgravia St								
	App. Lane 3	Short Lane	84	Left	40		–	–	–
NorthEast	GEH								
	App. Lane 2	Two-Segment	80	Right	B		3	B	
	App. Lane 6	Short Lane	80	Left			–	–	–
	Exit Lane 2	Short Lane	80	Right	B		–	–	–

NorthWest	Stoneham St								
App. Lane 1	Short Lane	85	Right			–	–	–	
App. Lane 4	Short Lane	74	Left			–	–	–	
SouthWest	GEH								
App. Lane 1	Short Lane	73	Right			–	–	–	
App. Lane 3	Two-Segment	67	Right	B		106	B		
App. Lane 7	Short Lane	246	Left			–	–	–	
Exit Lane 2	Short Lane	170	Right	B		–	–	–	

Lane Geometry - Lane Disciplines

To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: SouthEast	App. Lane 1		
SouthWest	L2	17	LV, HV, C
NorthWest	T1	16	LV, HV, C
From: SouthEast	App. Lane 2		
NorthWest	T1	16	LV, HV, C
NorthEast	R2	20	LV, HV
From: SouthEast	App. Lane 3		
NorthEast	R2	28	LV, HV, C
From: NorthEast	App. Lane 1		
SouthEast	L2	0	C
SouthWest	T1	0	C
From: NorthEast	App. Lane 2		
SouthEast	L2	17	LV, HV
SouthWest	T1	17	LV, HV, B
From: NorthEast	App. Lane 3		
SouthWest	T1	0	LV, HV
From: NorthEast	App. Lane 4		
SouthWest	T1	0	LV, HV
From: NorthEast	App. Lane 5		
SouthWest	T1	0	LV, HV
From: NorthEast	App. Lane 6		
NorthWest	R2	0	LV, HV
NorthEast	U	0	LV, HV
From: NorthWest	App. Lane 1		
NorthEast	L2	17	LV, HV, C
From: NorthWest	App. Lane 2		
SouthEast	T1	15	LV, HV, C
From: NorthWest	App. Lane 3		
SouthEast	T1	15	LV, HV, C
SouthWest	R2	15	LV, HV
From: NorthWest	App. Lane 4		
SouthWest	R2	18	LV, HV, C
From: SouthWest	App. Lane 1		
NorthWest	L2	69	LV, HV, C
From: SouthWest	App. Lane 2		
NorthEast	T1	0	C
From: SouthWest	App. Lane 3		
NorthEast	T1	17	B
From: SouthWest	App. Lane 4		
NorthEast	T1	17	LV, HV
From: SouthWest	App. Lane 5		
NorthEast	T1	17	LV, HV
From: SouthWest	App. Lane 6		
NorthEast	T1	17	LV, HV
From: SouthWest	App. Lane 7		
SouthEast	R2	34	LV, HV
SouthWest	U	10	LV, HV

Lane Geometry - Lane Disciplines - Lane Change Data

Movement Class	% Lane Change to Left %	% Lane Change to Right %
NorthEast Approach Lane 2 - Segment 2		
Light Vehicles (LV)	0	0
Heavy Vehicles (HV)	0	0
Buses (B)	0	0
Bicycles (C)	0	0
SouthWest Approach Lane 3 - Segment 2		
Light Vehicles (LV)	85	15
Heavy Vehicles (HV)	50	10
Buses (B)	0	0
Bicycles (C)	0	0

Lane Data - Lane Data

Approach Lane	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %	Use Given Cap Adj in Network Analysis	Buses Stopping veh/h	Parking Man. veh/h	Exclude SLip/ ByPass Lane from Signal Analysis
SouthEast Belgravia St								
App. Lane 1	1950	–	–	0.0	No	–	–	–
App. Lane 2	1950	–	–	0.0	No	–	–	–
App. Lane 3	1950	–	–	0.0	No	–	–	–
NorthEast GEH								
App. Lane 1	1950	–	–	0.0	No	–	–	–
App. Lane 2	1950	–	–	0.0	No	20	–	–
App. Lane 3	1950	–	–	0.0	No	–	–	–
App. Lane 4	1950	–	–	0.0	No	–	–	–
App. Lane 5	1950	–	–	0.0	No	–	–	–
App. Lane 6	1950	–	–	0.0	No	–	–	–
NorthWest Stoneham St								
App. Lane 1	1950	–	–	0.0	No	–	–	–
App. Lane 2	1950	–	–	0.0	No	–	–	–
App. Lane 3	1950	–	–	0.0	No	–	–	–
App. Lane 4	1950	–	–	0.0	No	–	–	–
SouthWest GEH								
App. Lane 1	1950	–	–	0.0	No	–	–	Yes
App. Lane 2	1950	–	–	0.0	No	–	–	–
App. Lane 3	1950	–	–	0.0	No	20	–	–
App. Lane 4	1950	–	–	0.0	No	–	–	–
App. Lane 5	1950	–	–	0.0	No	–	–	–
App. Lane 6	1950	–	–	0.0	No	–	–	–
App. Lane 7	1950	–	–	0.0	No	–	–	–

Lane Data - Flow Proportions

Exit Lane	To Exit Leg SouthEast %	NorthEast %	NorthWest %	SouthWest %
Light Vehicles (LV)				
From: SouthEast App. Lane 1				
Exit Lane 1	–	–	85	0
Exit Lane 2	–	–	15	0
Exit Lane 3	–	–	–	85
Exit Lane 4	–	–	–	15
Exit Lane 5	–	–	–	0
From: SouthEast App. Lane 2				
Exit Lane 1	–	0	20	–
Exit Lane 2	–	0	80	–
Exit Lane 3	–	10	–	–
Exit Lane 4	–	80	–	–
Exit Lane 5	–	10	–	–
From: SouthEast App. Lane 3				
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–

Exit Lane 3	–	0	–	–
Exit Lane 4	–	20	–	–
Exit Lane 5	–	80	–	–
From: NorthEast	App. Lane 2			
Exit Lane 1	25	–	–	0
Exit Lane 2	75	–	–	80
Exit Lane 3	–	–	–	20
Exit Lane 4	–	–	–	0
Exit Lane 5	–	–	–	0
From: NorthEast	App. Lane 3			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	20
Exit Lane 3	–	–	–	70
Exit Lane 4	–	–	–	10
Exit Lane 5	–	–	–	0
From: NorthEast	App. Lane 4			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	0
Exit Lane 3	–	–	–	10
Exit Lane 4	–	–	–	80
Exit Lane 5	–	–	–	10
From: NorthEast	App. Lane 5			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	0
Exit Lane 3	–	–	–	0
Exit Lane 4	–	–	–	20
Exit Lane 5	–	–	–	80
From: NorthEast	App. Lane 6			
Exit Lane 1	–	0	30	–
Exit Lane 2	–	0	70	–
Exit Lane 3	–	0	–	–
Exit Lane 4	–	20	–	–
Exit Lane 5	–	80	–	–
From: NorthWest	App. Lane 1			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	100	–	–
Exit Lane 4	–	0	–	–
Exit Lane 5	–	0	–	–
From: NorthWest	App. Lane 2			
Exit Lane 1	70	–	–	–
Exit Lane 2	30	–	–	–
From: NorthWest	App. Lane 3			
Exit Lane 1	30	–	–	0
Exit Lane 2	70	–	–	0
Exit Lane 3	–	–	–	10
Exit Lane 4	–	–	–	80
Exit Lane 5	–	–	–	10
From: NorthWest	App. Lane 4			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	0
Exit Lane 3	–	–	–	0
Exit Lane 4	–	–	–	30
Exit Lane 5	–	–	–	70
From: SouthWest	App. Lane 1			
Exit Lane 1	–	–	100	–
Exit Lane 2	–	–	0	–
From: SouthWest	App. Lane 4			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	5	–	–
Exit Lane 3	–	80	–	–
Exit Lane 4	–	15	–	–
Exit Lane 5	–	0	–	–
From: SouthWest	App. Lane 5			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	10	–	–
Exit Lane 4	–	80	–	–
Exit Lane 5	–	10	–	–
From: SouthWest	App. Lane 6			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–

Exit Lane 3	–	0	–	–
Exit Lane 4	–	10	–	–
Exit Lane 5	–	90	–	–
From: SouthWest	App. Lane 7			
Exit Lane 1	40	–	–	0
Exit Lane 2	60	–	–	0
Exit Lane 3	–	–	–	0
Exit Lane 4	–	–	–	20
Exit Lane 5	–	–	–	80
Heavy Vehicles (HV)				
From: SouthEast	App. Lane 1			
Exit Lane 1	–	–	85	0
Exit Lane 2	–	–	15	0
Exit Lane 3	–	–	–	85
Exit Lane 4	–	–	–	15
Exit Lane 5	–	–	–	0
From: SouthEast	App. Lane 2			
Exit Lane 1	–	0	20	–
Exit Lane 2	–	0	80	–
Exit Lane 3	–	10	–	–
Exit Lane 4	–	80	–	–
Exit Lane 5	–	10	–	–
From: SouthEast	App. Lane 3			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	0	–	–
Exit Lane 4	–	20	–	–
Exit Lane 5	–	80	–	–
From: NorthEast	App. Lane 2			
Exit Lane 1	25	–	–	0
Exit Lane 2	75	–	–	80
Exit Lane 3	–	–	–	20
Exit Lane 4	–	–	–	0
Exit Lane 5	–	–	–	0
From: NorthEast	App. Lane 3			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	20
Exit Lane 3	–	–	–	70
Exit Lane 4	–	–	–	10
Exit Lane 5	–	–	–	0
From: NorthEast	App. Lane 4			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	0
Exit Lane 3	–	–	–	10
Exit Lane 4	–	–	–	80
Exit Lane 5	–	–	–	10
From: NorthEast	App. Lane 5			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	0
Exit Lane 3	–	–	–	0
Exit Lane 4	–	–	–	20
Exit Lane 5	–	–	–	80
From: NorthEast	App. Lane 6			
Exit Lane 1	–	0	30	–
Exit Lane 2	–	0	70	–
Exit Lane 3	–	0	–	–
Exit Lane 4	–	20	–	–
Exit Lane 5	–	80	–	–
From: NorthWest	App. Lane 1			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	100	–	–
Exit Lane 4	–	0	–	–
Exit Lane 5	–	0	–	–
From: NorthWest	App. Lane 2			
Exit Lane 1	70	–	–	–
Exit Lane 2	30	–	–	–
From: NorthWest	App. Lane 3			
Exit Lane 1	30	–	–	0
Exit Lane 2	70	–	–	0
Exit Lane 3	–	–	–	10
Exit Lane 4	–	–	–	80

Exit Lane 5	–	–	–	10
From: NorthWest	App. Lane 4			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	0
Exit Lane 3	–	–	–	0
Exit Lane 4	–	–	–	30
Exit Lane 5	–	–	–	70
From: SouthWest	App. Lane 1			
Exit Lane 1	–	–	100	–
Exit Lane 2	–	–	0	–
From: SouthWest	App. Lane 4			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	5	–	–
Exit Lane 3	–	80	–	–
Exit Lane 4	–	15	–	–
Exit Lane 5	–	0	–	–
From: SouthWest	App. Lane 5			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	10	–	–
Exit Lane 4	–	80	–	–
Exit Lane 5	–	10	–	–
From: SouthWest	App. Lane 6			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	0	–	–
Exit Lane 4	–	10	–	–
Exit Lane 5	–	90	–	–
From: SouthWest	App. Lane 7			
Exit Lane 1	40	–	–	0
Exit Lane 2	60	–	–	0
Exit Lane 3	–	–	–	0
Exit Lane 4	–	–	–	20
Exit Lane 5	–	–	–	80
Buses (B)				
From: NorthEast	App. Lane 2			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	80
Exit Lane 3	–	–	–	20
Exit Lane 4	–	–	–	0
Exit Lane 5	–	–	–	0
From: SouthWest	App. Lane 3			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	80	–	–
Exit Lane 3	–	20	–	–
Exit Lane 4	–	0	–	–
Exit Lane 5	–	0	–	–
Bicycles (C)				
From: SouthEast	App. Lane 1			
Exit Lane 1	–	–	85	0
Exit Lane 2	–	–	15	0
Exit Lane 3	–	–	–	85
Exit Lane 4	–	–	–	15
Exit Lane 5	–	–	–	0
From: SouthEast	App. Lane 2			
Exit Lane 1	–	–	20	–
Exit Lane 2	–	–	80	–
From: SouthEast	App. Lane 3			
Exit Lane 1	–	0	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	0	–	–
Exit Lane 4	–	20	–	–
Exit Lane 5	–	80	–	–
From: NorthEast	App. Lane 1			
Exit Lane 1	100	–	–	100
Exit Lane 2	0	–	–	0
Exit Lane 3	–	–	–	0
Exit Lane 4	–	–	–	0
Exit Lane 5	–	–	–	0
From: NorthWest	App. Lane 1			

Exit Lane 1	–	100	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	0	–	–
Exit Lane 4	–	0	–	–
Exit Lane 5	–	0	–	–
From: NorthWest	App. Lane 2			
Exit Lane 1	70	–	–	–
Exit Lane 2	30	–	–	–
From: NorthWest	App. Lane 3			
Exit Lane 1	30	–	–	–
Exit Lane 2	70	–	–	–
From: NorthWest	App. Lane 4			
Exit Lane 1	–	–	–	0
Exit Lane 2	–	–	–	0
Exit Lane 3	–	–	–	0
Exit Lane 4	–	–	–	30
Exit Lane 5	–	–	–	70
From: SouthWest	App. Lane 1			
Exit Lane 1	–	–	100	–
Exit Lane 2	–	–	0	–
From: SouthWest	App. Lane 2			
Exit Lane 1	–	100	–	–
Exit Lane 2	–	0	–	–
Exit Lane 3	–	0	–	–
Exit Lane 4	–	0	–	–
Exit Lane 5	–	0	–	–

Lane Data - Lane Blockage

		To Exit Leg		
Exit Lane	SouthEast	NorthEast	NorthWest	SouthWest
From: SouthEast	App. Lane 1			
Exit Lane 1	–	–	Yes	Yes
Exit Lane 2	–	–	Yes	Yes
Exit Lane 3	–	–	–	Yes
Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes
From: SouthEast	App. Lane 2			
Exit Lane 1	–	Yes	Yes	–
Exit Lane 2	–	Yes	Yes	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: SouthEast	App. Lane 3			
Exit Lane 1	–	Yes	–	–
Exit Lane 2	–	Yes	–	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: NorthEast	App. Lane 1			
Exit Lane 1	Yes	–	–	Yes
Exit Lane 2	Yes	–	–	Yes
Exit Lane 3	–	–	–	Yes
Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes
From: NorthEast	App. Lane 2			
Exit Lane 1	Yes	–	–	Yes
Exit Lane 2	Yes	–	–	Yes
Exit Lane 3	–	–	–	Yes
Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes
From: NorthEast	App. Lane 3			
Exit Lane 1	–	–	–	Yes
Exit Lane 2	–	–	–	Yes
Exit Lane 3	–	–	–	Yes
Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes
From: NorthEast	App. Lane 4			
Exit Lane 1	–	–	–	Yes
Exit Lane 2	–	–	–	Yes
Exit Lane 3	–	–	–	Yes

Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes
From: NorthEast	App. Lane 5			
Exit Lane 1	–	–	–	Yes
Exit Lane 2	–	–	–	Yes
Exit Lane 3	–	–	–	Yes
Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes
From: NorthEast	App. Lane 6			
Exit Lane 1	–	Yes	Yes	–
Exit Lane 2	–	Yes	Yes	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: NorthWest	App. Lane 1			
Exit Lane 1	–	Yes	–	–
Exit Lane 2	–	Yes	–	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: NorthWest	App. Lane 2			
Exit Lane 1	Yes	–	–	–
Exit Lane 2	Yes	–	–	–
From: NorthWest	App. Lane 3			
Exit Lane 1	Yes	–	–	Yes
Exit Lane 2	Yes	–	–	Yes
Exit Lane 3	–	–	–	Yes
Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes
From: NorthWest	App. Lane 4			
Exit Lane 1	–	–	–	Yes
Exit Lane 2	–	–	–	Yes
Exit Lane 3	–	–	–	Yes
Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes
From: SouthWest	App. Lane 1			
Exit Lane 1	–	–	Yes	–
Exit Lane 2	–	–	Yes	–
From: SouthWest	App. Lane 2			
Exit Lane 1	–	Yes	–	–
Exit Lane 2	–	Yes	–	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: SouthWest	App. Lane 3			
Exit Lane 1	–	Yes	–	–
Exit Lane 2	–	Yes	–	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: SouthWest	App. Lane 4			
Exit Lane 1	–	Yes	–	–
Exit Lane 2	–	Yes	–	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: SouthWest	App. Lane 5			
Exit Lane 1	–	Yes	–	–
Exit Lane 2	–	Yes	–	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: SouthWest	App. Lane 6			
Exit Lane 1	–	Yes	–	–
Exit Lane 2	–	Yes	–	–
Exit Lane 3	–	Yes	–	–
Exit Lane 4	–	Yes	–	–
Exit Lane 5	–	Yes	–	–
From: SouthWest	App. Lane 7			
Exit Lane 1	Yes	–	–	Yes
Exit Lane 2	Yes	–	–	Yes
Exit Lane 3	–	–	–	Yes

Exit Lane 4	–	–	–	Yes
Exit Lane 5	–	–	–	Yes

Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

Main Crossing/ Slip/Bypass Lane Crossing	Volume	Peak Flow	Flow Scale	Growth Rate
	ped	%	%	%
Diagonal Crossing	–	–	–	–
SouthEast Belgravia St				
Stage 1 (Approach)	30.0	95.0	100.00	2.00
Stage 2 (Exit)	30.0	95.0	100.00	2.00
NorthWest Stoneham St				
Stage 1 (Approach)	30.0	95.0	100.00	2.00
Stage 2 (Exit)	30.0	95.0	100.00	2.00
SouthWest GEH				
Stage 1 (Approach)	50.0	95.0	100.00	2.00
Stage 2 (Exit)	50.0	95.0	100.00	2.00

Pedestrians - Pedestrian Movement Data

Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance	Oppng Ped.Fac.	P.Deg. Satn	Satn Flow	Walking Speed	App. Trav. Distance	Downst. Distance	Queue Space
		m			ped/h	m/sec	m	m	m
Diagonal Crossing	–	–	–	–	–	–	–	–	–
SouthEast Belgravia St									
Stage 1 (Approach)	P21	–	1	–	12000	1.30	10.0	10.0	1.00
Stage 2 (Exit)	P22	–	1	–	12000	1.30	10.0	10.0	1.00
NorthWest Stoneham St									
Stage 1 (Approach)	P41	–	1	–	12000	1.30	10.0	10.0	1.00
Stage 2 (Exit)	P42	–	1	–	12000	1.30	10.0	10.0	1.00
SouthWest GEH									
Stage 1 (Approach)	P11	–	1	–	12000	1.30	10.0	10.0	1.00
Stage 2 (Exit)	P12	–	1	–	12000	1.30	10.0	10.0	1.00

Pedestrians - Pedestrian Timing Data

Main Crossing/ Slip/Bypass Lane Crossing	Minimum Green	Maximum Green	Walk Time Extension	Crossing Speed	Min Walk Time	Min Clr Time	Clr Time Overlap	Start Loss	End Gain
	sec	sec		m/sec	sec	sec	sec	sec	sec
Diagonal Crossing	–	–	–	–	–	–	–	–	–
SouthEast Belgravia St									
Stage 1 (Approach)	–	–	Yes	1.20	5	5	2	2	3
Stage 2 (Exit)	–	–	Yes	1.20	5	5	2	2	3
NorthWest Stoneham St									
Stage 1 (Approach)	–	–	Yes	1.20	5	5	2	2	3
Stage 2 (Exit)	–	–	Yes	1.20	5	5	2	2	3
SouthWest GEH									
Stage 1	–	–	Yes	1.20	5	5	2	2	3

(Approach) Stage 2 (Exit)	–	–	Yes	1.20	5	5	2	2	3

Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Total and %

Movement Class	To Exit Leg SouthEast veh	NorthEast veh	NorthWest veh	SouthWest veh
From: SouthEast	Belgravia St			
Total (veh)	–	344	174	259
LV (%)	–	93.5	93.5	93.5
HV (%)	–	5.5	5.5	5.5
B (%)	–	–	–	–
C (%)	–	1.0	1.0	1.0
From: NorthEast	GEH			
Total (veh)	70	5	20	1415
LV (%)	94.0	95.0	95.0	91.0
HV (%)	5.0	5.0	5.0	5.0
B (%)	–	–	–	3.0
C (%)	1.0	–	–	1.0
From: NorthWest	Stoneham St			
Total (veh)	235	60	–	143
LV (%)	93.5	93.5	–	93.5
HV (%)	5.5	5.5	–	5.5
B (%)	–	–	–	–
C (%)	1.0	1.0	–	1.0
From: SouthWest	GEH			
Total (veh)	54	1940	525	9
LV (%)	95.0	91.0	94.0	95.0
HV (%)	5.0	5.0	5.0	5.0
B (%)	–	3.0	–	–
C (%)	–	1.0	1.0	–

Volumes - Volume Factors

To Approach	Peak Flow Factor %	Flow Scale %	Growth Rate %/year
Light Vehicles (LV)			
From: SouthEast	Belgravia St		
SouthWest	95.0	100.00	2.00
NorthWest	95.0	100.00	2.00
NorthEast	95.0	100.00	2.00
From: NorthEast	GEH		
SouthEast	95.0	100.00	2.00
SouthWest	95.0	100.00	2.00
NorthWest	95.0	100.00	2.00
NorthEast	95.0	100.00	2.00
From: NorthWest	Stoneham St		
NorthEast	95.0	100.00	2.00
SouthEast	95.0	100.00	2.00
SouthWest	95.0	100.00	2.00
From: SouthWest	GEH		
NorthWest	95.0	100.00	2.00
NorthEast	95.0	100.00	2.00
SouthEast	95.0	100.00	2.00
SouthWest	95.0	100.00	2.00
Heavy Vehicles (HV)			
From: SouthEast	Belgravia St		
SouthWest	95.0	100.00	2.00
NorthWest	95.0	100.00	2.00
NorthEast	95.0	100.00	2.00
From: NorthEast	GEH		
SouthEast	95.0	100.00	2.00
SouthWest	95.0	100.00	2.00

NorthWest		95.0	100.00	2.00
NorthEast		95.0	100.00	2.00
From: NorthWest	Stoneham St			
NorthEast		95.0	100.00	2.00
SouthEast		95.0	100.00	2.00
SouthWest		95.0	100.00	2.00
From: SouthWest	GEH			
NorthWest		95.0	100.00	2.00
NorthEast		95.0	100.00	2.00
SouthEast		95.0	100.00	2.00
SouthWest		95.0	100.00	2.00
Buses (B)				
From: NorthEast	GEH			
SouthWest		95.0	100.00	2.00
From: SouthWest	GEH			
NorthEast		95.0	100.00	2.00
Bicycles (C)				
From: SouthEast	Belgravia St			
SouthWest		95.0	100.00	2.00
NorthWest		95.0	100.00	2.00
NorthEast		95.0	100.00	2.00
From: NorthEast	GEH			
SouthEast		95.0	100.00	2.00
SouthWest		95.0	100.00	2.00
From: NorthWest	Stoneham St			
NorthEast		95.0	100.00	2.00
SouthEast		95.0	100.00	2.00
SouthWest		95.0	100.00	2.00
From: SouthWest	GEH			
NorthWest		95.0	100.00	2.00
NorthEast		95.0	100.00	2.00

Priorities

Opposed Movement		Opposing Movements NorthEast	NorthWest	SouthWest
SouthEast	Belgravia St			
L2	P21	–	–	P12
T1	–	–	–	–
R2	–	–	T1,L2	–
NorthEast	GEH			
L2	P22	–	–	–
T1	–	–	–	–
R2	–	–	P41	T1
U	–	–	–	T1
NorthWest	Stoneham St			
L2	–	–	–	–
T1	–	–	–	–
R2	L2,T1	–	–	P12
SouthWest	GEH			
L2	T1	R2	–	–
T1	–	–	–	–
R2	P22	T1,L2	–	–
U	–	T1	–	–

Gap Acceptance - Gap Acceptance Data

Opposed Movement		Critical Gap sec	Follow-up Headway sec	End Departures veh	Exiting Flow Effect %	% Opp. By Nearest Lane %	Opng Peds (Signals)
SouthEast	Belgravia St						
L2		4.000	2.400	2.50	0	0.00	St. Loss
R2		4.500	2.600	2.20	0	0.00	St. Loss
NorthEast	GEH						
L2		4.000	2.400	2.50	0	0.00	St. Loss
R2		4.500	2.600	2.20	0	0.00	St. Loss
U		4.500	2.600	2.20	0	0.00	St. Loss

NorthWest	Stoneham St					
R2	4.500	2.600	2.20	0	0.00	St. Loss
SouthWest	GEH					
L2	4.000	2.400	2.50	0	0.00	St. Loss
R2	4.500	2.600	2.20	0	0.00	St. Loss
U	4.500	2.600	2.20	0	0.00	St. Loss

Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

	Critical Gap sec	Follow-up Headway sec	End Departures veh	Exiting Flow Effect %	% Opp. By Nearest Lane %
Turn on Red	6.0	3.0	1	0	0.00

Vehicle Movement Data - Path Data

OD Movement	Approach Cruise Speed km/h	Exit Cruise Speed km/h	Negotiation Speed km/h	Negotiation Distance m	Downstream Distance m	Negotiation Radius m
Light Vehicles (LV)						
From: SouthEast	Belgravia St					
L2	40.0	60.0	–	–	–	–
T1	40.0	50.0	–	–	–	–
R2	40.0	60.0	–	–	–	–
From: NorthEast	GEH					
L2	60.0	40.0	–	–	–	–
T1	60.0	60.0	–	–	–	–
R2	60.0	50.0	–	–	–	–
U	60.0	60.0	–	–	–	–
From: NorthWest	Stoneham St					
L2	50.0	60.0	–	–	–	–
T1	50.0	40.0	–	–	–	–
R2	50.0	60.0	–	–	–	–
From: SouthWest	GEH					
L2	60.0	50.0	–	–	–	–
T1	60.0	60.0	–	–	–	–
R2	60.0	40.0	–	–	–	–
U	60.0	60.0	–	–	–	–
Heavy Vehicles (HV)						
From: SouthEast	Belgravia St					
L2	40.0	60.0	–	–	–	–
T1	40.0	50.0	–	–	–	–
R2	40.0	60.0	–	–	–	–
From: NorthEast	GEH					
L2	60.0	40.0	–	–	–	–
T1	60.0	60.0	–	–	–	–
R2	60.0	50.0	–	–	–	–
U	60.0	60.0	–	–	–	–
From: NorthWest	Stoneham St					
L2	50.0	60.0	–	–	–	–
T1	50.0	40.0	–	–	–	–
R2	50.0	60.0	–	–	–	–
From: SouthWest	GEH					
L2	60.0	50.0	–	–	–	–
T1	60.0	60.0	–	–	–	–
R2	60.0	40.0	–	–	–	–
U	60.0	60.0	–	–	–	–
Buses (B)						
From: NorthEast	GEH					
T1	60.0	60.0	–	–	–	–
From: SouthWest	GEH					
T1	60.0	60.0	–	–	–	–
Bicycles (C)						
From: SouthEast	Belgravia St					
L2	40.0	60.0	–	–	–	–

T1	40.0	50.0	–	–	–	–
R2	40.0	60.0	–	–	–	–
From: NorthEast	GEH					
L2	60.0	40.0	–	–	–	–
T1	60.0	60.0	–	–	–	–
From: NorthWest	Stoneham St					
L2	50.0	60.0	–	–	–	–
T1	50.0	40.0	–	–	–	–
R2	50.0	60.0	–	–	–	–
From: SouthWest	GEH					
L2	60.0	50.0	–	–	–	–
T1	60.0	60.0	–	–	–	–

Vehicle Movement Data - Calibration

OD Movement	Queue Space m	Vehicle Length m	Vehicle Occupancy pers/veh	Turn Veh Effect [Factor	Radius] m	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
Light Vehicles (LV)								
From: SouthEast	Belgravia St							
L2	7.20	5.20	1.20	1.05	–	1	1	–
T1	7.20	5.20	1.20	1	–	1	1	–
R2	7.20	5.20	1.20	1.05	–	1	1	–
From: NorthEast	GEH							
L2	7.20	5.20	1.20	1.05	–	1	1	–
T1	7.20	5.20	1.20	1	–	1	1	–
R2	7.20	5.20	1.20	1.05	–	1	1	–
U	7.20	5.20	1.20	1.4	–	1	1	–
From: NorthWest	Stoneham St							
L2	7.20	5.20	1.20	1.05	–	1	1	–
T1	7.20	5.20	1.20	1	–	1	1	–
R2	7.20	5.20	1.20	1.05	–	1	1	–
From: SouthWest	GEH							
L2	7.20	5.20	1.20	1.05	–	1	1	–
T1	7.20	5.20	1.20	1	–	1	1	–
R2	7.20	5.20	1.20	1.05	–	1	1	–
U	7.20	5.20	1.20	1.4	–	1	1	–
Heavy Vehicles (HV)								
From: SouthEast	Belgravia St							
L2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
T1	15.00	12.50	1.20	1	–	1.5	1.5	–
R2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
From: NorthEast	GEH							
L2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
T1	15.00	12.50	1.20	1	–	1.5	1.5	–
R2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
U	15.00	12.50	1.20	1.4	–	1.5	1.5	–
From: NorthWest	Stoneham St							
L2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
T1	15.00	12.50	1.20	1	–	1.5	1.5	–
R2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
From: SouthWest	GEH							
L2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
T1	15.00	12.50	1.20	1	–	1.5	1.5	–
R2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
U	15.00	12.50	1.20	1.4	–	1.5	1.5	–
Buses (B)								
From: NorthEast	GEH							
T1	13.00	10.00	30.00	1	–	1.5	1.5	–
From: SouthWest	GEH							
T1	13.00	10.00	30.00	1	–	1.5	1.5	–
Bicycles (C)								
From: SouthEast	Belgravia St							
L2	2.70	1.80	1.00	1.05	–	1	0.5	–
T1	2.70	1.80	1.00	1	–	1	0.5	–
R2	2.70	1.80	1.00	1.05	–	1	0.5	–
From: NorthEast	GEH							
L2	2.70	1.80	1.00	1.05	–	1	0.5	–

T1	2.70	1.80	1.00	1	–	1	0.5	–
From: NorthWest	Stoneham St							
L2	2.70	1.80	1.00	1.05	–	1	0.5	–
T1	2.70	1.80	1.00	1	–	1	0.5	–
R2	2.70	1.80	1.00	1.05	–	1	0.5	–
From: SouthWest	GEH							
L2	2.70	1.80	1.00	1.05	–	1	0.5	–
T1	2.70	1.80	1.00	1	–	1	0.5	–

Vehicle Movement Data - Signals

OD Movement	Signal Coordination [Arv. Type	% Green] %	Non-Actuated	Turn On Red	Vehicle Movement Timing Data [Start Loss sec	End Gain sec	Min Green sec	Max Green] sec
Light Vehicles (LV)								
From: SouthEast	Belgravia St							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
From: NorthEast	GEH							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
U	–	–	No	–	3	3	–	–
From: NorthWest	Stoneham St							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
From: SouthWest	GEH							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
U	–	–	No	–	3	3	–	–
Heavy Vehicles (HV)								
From: SouthEast	Belgravia St							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
From: NorthEast	GEH							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
U	–	–	No	–	3	3	–	–
From: NorthWest	Stoneham St							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
From: SouthWest	GEH							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
U	–	–	No	–	3	3	–	–
Buses (B)								
From: NorthEast	GEH							
T1	–	–	No	–	3	3	–	–
From: SouthWest	GEH							
T1	–	–	No	–	3	3	–	–
Bicycles (C)								
From: SouthEast	Belgravia St							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
R2	–	–	No	–	3	3	–	–
From: NorthEast	GEH							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–
From: NorthWest	Stoneham St							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–

R2	–	–	No	–	3	3	–	–
From: SouthWest	GEH							
L2	–	–	No	No	3	3	–	–
T1	–	–	No	–	3	3	–	–

Sequence Data

Signal Analysis Method	Actuated
Current Sequence	Variable Phasing - 2
Cycle Time Option	Practical Cycle Time
Max Cycle Time	150 sec
Cycle Rounding	1 sec
Green Split Option	
Green Split Priority	Yes
Actuated Signal Data	
Maximum Green Time	
Major Movement	50.00 sec
Minor Movement	20.00 sec
Gap Setting	
Major Movement	2.50 sec
Minor Movement	2.00 sec
Effective Detection Zone Length	
Major Movement	4.50 m
Minor Movement	4.50 m

Phasing Data

Current Sequence: Variable Phasing - 2

Name	Phase Time sec	Yellow Time sec	All-Red Time sec	Dummy Movement Parameters Specified	Min Green sec	Max Green sec
A	0	4	2	No	–	–
B1 (Variable)	0	4	2	No	–	–
B2 (Variable)	0	4	2	No	–	–
C	0	4	2	No	–	–
D	0	4	2	No	–	–
E1 (Variable)	0	4	2	No	–	–
E2 (Variable)	0	4	2	No	–	–
F	0	4	2	No	–	–

Phasing Data - Phase Movements

Current Sequence: Variable Phasing - 2

Movement Class	Movements Running in Phase S	SE	E	NE	N	NW	W	SW
Phase A								
Light Vehicles (LV)	–	–	–	T1	–	–	–	T1[1]
Heavy Vehicles (HV)	–	–	–	T1	–	–	–	T1[1]
Buses (B)	–	–	–	T1	–	–	–	T1[1]
Bicycles (C)	–	–	–	T1	–	–	–	T1[1]
Pedestrians	–	P21,P22	–	–	–	P41,P42	–	–
Phase B1 (Variable)								
Light Vehicles (LV)	–	–	–	–	–	–	–	T1R2U
Heavy Vehicles (HV)	–	–	–	–	–	–	–	T1R2U
Buses (B)	–	–	–	–	–	–	–	T1
Bicycles (C)	–	–	–	–	–	–	–	T1
Pedestrians	–	–	–	–	–	P41,P42	–	–
Phase B2 (Variable)								

Light Vehicles (LV)	–	–	–	T1R2U	–	–	–	–
Heavy Vehicles (HV)	–	–	–	T1R2U	–	–	–	–
Buses (B)	–	–	–	T1	–	–	–	–
Bicycles (C)	–	–	–	T1	–	–	–	–
Pedestrians	–	P21,P22	–	–	–	–	–	–
Phase C								
Light Vehicles (LV)	–	L2T1R2	–	L2	–	–	–	–
Heavy Vehicles (HV)	–	L2T1R2	–	L2	–	–	–	–
Buses (B)	–	–	–	–	–	–	–	–
Bicycles (C)	–	L2T1R2	–	L2	–	–	–	–
Pedestrians	–	–	–	–	–	–	–	P11,P12
Phase D								
Light Vehicles (LV)	–	–	–	–	–	L2T1R2	–	–
Heavy Vehicles (HV)	–	–	–	–	–	L2T1R2	–	–
Buses (B)	–	–	–	–	–	–	–	–
Bicycles (C)	–	–	–	–	–	L2T1R2	–	–
Pedestrians	–	–	–	–	–	–	–	–
Phase E1 (Variable)								
Light Vehicles (LV)	–	–	–	R2	–	–	–	R2
Heavy Vehicles (HV)	–	–	–	R2	–	–	–	R2
Buses (B)	–	–	–	–	–	–	–	–
Bicycles (C)	–	–	–	–	–	–	–	–
Pedestrians	–	–	–	–	–	–	–	–
Phase E2 (Variable)								
Light Vehicles (LV)	–	–	–	–	–	–	–	L2T1R2U
Heavy Vehicles (HV)	–	–	–	–	–	–	–	L2T1R2U
Buses (B)	–	–	–	–	–	–	–	T1
Bicycles (C)	–	–	–	–	–	–	–	L2T1
Pedestrians	–	–	–	–	–	P41,P42	–	–
Phase F								
Light Vehicles (LV)	–	–	–	L2T1[1]R2U	–	–	–	–
Heavy Vehicles (HV)	–	–	–	L2T1[1]R2U	–	–	–	–
Buses (B)	–	–	–	T1[1]	–	–	–	–
Bicycles (C)	–	–	–	L2T1[1]	–	–	–	–
Pedestrians	–	P21,P22	–	–	–	–	–	–

1 Phase Transition is applied.

Demand & Sensitivity

Analysis Method: None

Model Settings - Options

General Options	
Level of Service Method	Delay (HCM 2000)
Level of Service Target	LOS D
Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining	No

Queue Storage Ratio	

Model Settings - Model Parameters

Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Buses (B)	1.65 pcu/veh
Bicycles (C)	0.30 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	5
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost

Cost Options	
Cost Unit	$

Vehicle Cost Parameters

Movement Class	Veh Cost Method	Veh Operating Cost			Veh Time Cost	
		Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		$/L			$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Buses (B)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Bicycles (C)	–	–	–	–	38.00	0.600

Pedestrian Cost Parameters	
Pedestrian Average Income	38.00 $/h
Pedestrian Time Value Factor	0.600
Include Cost for Pedestrians	Yes

Model Settings - Vehicle Parameters

Movement Class	Mass kg	Max Power kW	CO2 to Fuel Rate
Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV)	15000.0	170	2.633
Buses (B)	8000.0	170	2.633
Bicycles (C)	90.0	0	–

Model Settings - Fuel Consumption

Movement Class	fi	A	B	Beta
Light Vehicles (LV)	1200	16	0.004	0.1
Heavy Vehicles (HV)	2300	200	0.009	0.075
Buses (B)	2100	180	0.0005	0.09
Bicycles (C)	–	–	–	–

Model Settings - CO Emission

Movement Class	fi	A	B	Beta
Light Vehicles (LV)	10000	176	0.115	0.92
Heavy Vehicles (HV)	25000	320	-0.06	0.04
Buses (B)	12000	240	0.01	0.6
Bicycles (C)	–	–	–	–

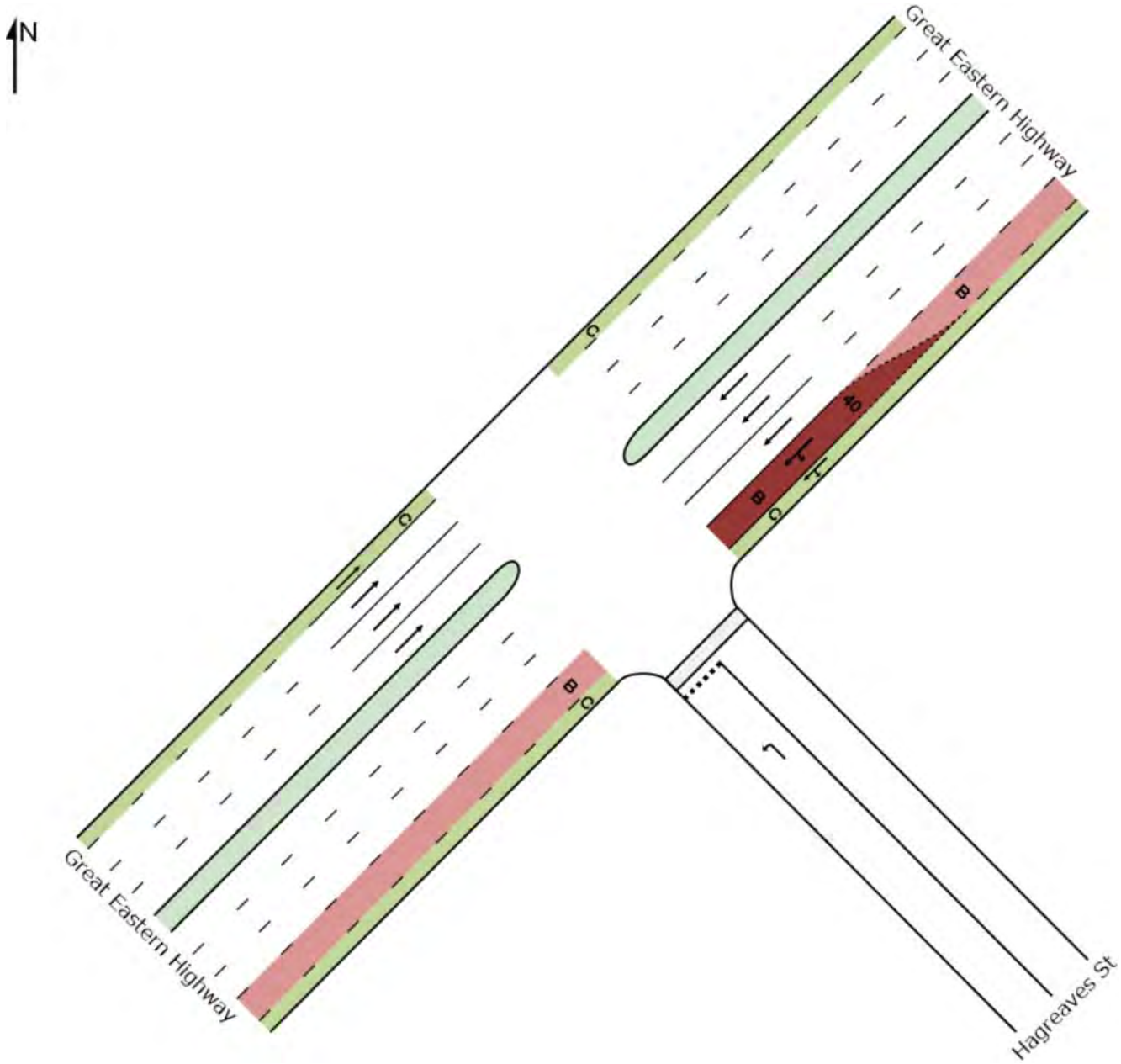
Model Settings - HC Emission				
Movement Class	fi	A	B	Beta
Light Vehicles (LV)	2400	-24	0.006	0.093
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013
Buses (B)	6800	-5	0.001	0.005
Bicycles (C)	–	–	–	–

Model Settings - NOx Emission				
Movement Class	fi	A	B	Beta
Light Vehicles (LV)	400	-22	0.0165	0.43
Heavy Vehicles (HV)	44000	2820	0.21	1.9
Buses (B)	49000	350	0.25	1.4
Bicycles (C)	–	–	–	–

SITE LAYOUT

Site: GEH - Hagreaves St - 2013 pm

GEH - Hagreaves St



INPUT REPORT

Site: GEH - Hagreaves St - 2013 pm

GEH - Hagreaves St

Intersection - Site Data	
Site Name	GEH - Hagreaves St - 2013 pm
Site ID	2
Site Title	GEH - Hagreaves St

Intersection - Site Properties	
Site (Intersection) Type	Giveway / Yield (Two-Way)
Model Name	Standard Left
Drive Rule	Left-hand side of the road
HCM Version	No
Units	Metric
First Created	----------
Date	16/10/2013 8:52:17 AM
Created By	marina
Organisation	
Version	6.0.14.4193
Last Modified	----------
Date	19/11/2013 5:38:13 PM
Modified By	marina
Organisation	
Version	6.0.14.4193

Intersection - Approach Data

Location	Name	Type	No. of App. Lanes	No. of Exit Lanes	Approach Distance m	Extra Bunching %	Approach Control	Area Type Factor
SouthEast	Hagreaves St	Two-way	1	1	500.0	0	Give-way Yield	–
NorthEast	Great Eastern Highway	Two-way	5	4	500.0	25	Major Road	–
SouthWest	Great Eastern Highway	Two-way	4	5	83.0	37.5	Major Road	–

Movement Definitions - Included Movement Classes

Name	ID	Model Designation	Type
Light Vehicles	LV	Light Vehicle	Standard
Heavy Vehicles	HV	Heavy Vehicle	Standard
Buses	B	Heavy Vehicle	Standard
Bicycles	C	Light Vehicle	Standard

Movement Definitions - Origin-Destination Movements

To Approach	OD Movement	Turn Designation	OD Mov ID	LTR Mov ID
From: SouthEast	Hagreaves St			
SouthWest	L2	L	1	1
From: NorthEast	Great Eastern Highway			
SouthEast	L2	L	4	4
SouthWest	T1	T	5	5
From: SouthWest	Great Eastern Highway			
NorthEast	T1	T	11	11

Lane Geometry - Lane Configuration

	Full Lane	Island

Leg	Item	Configuration	Type	Control	Slip/ Bypass Control	Length m	Width m	Grade %	[ID	Colour]	[Front Width m	Back Width m	Fill Style	For Ped Staging]
SouthEast		Hagreaves St												
	App. Lane 1	Full-Length	Normal	Giveway /Yield	–	250	6.5	0			–	–	–	–
	Exit Lane 1	Full-Length	–	–	–	500	6.5	0			–	–	–	–
NorthEast		Great Eastern Highway												
	App. Lane 1	Full-Length	Normal	Continuous	–	110	2	0	C		–	–	–	–
	App. Lane 2	Two-Segment	Normal	Continuous	–	–	4	0	–	–	–	–	–	–
	App. Lane 3	Full-Length	Normal	Continuous	–	500	4	0			–	–	–	–
	App. Lane 4	Full-Length	Normal	Continuous	–	500	4	0			–	–	–	–
	App. Lane 5	Full-Length	Normal	Continuous	–	500	4	0			–	–	–	–
	Strip Island 1	–	–	–	–	–	–	–	–	–	3	3	Solid	Yes
	Exit Lane 4	Full-Length	–	–	–	500	4	0			–	–	–	–
	Exit Lane 3	Full-Length	–	–	–	500	4	0			–	–	–	–
	Exit Lane 2	Full-Length	–	–	–	500	4	0			–	–	–	–
	Exit Lane 1	Full-Length	–	–	–	500	2	0	C		–	–	–	–
SouthWest		Great Eastern Highway												
	App. Lane 1	Full-Length	Normal	Continuous	–	83	2	0	C		–	–	–	–
	App. Lane 2	Full-Length	Normal	Continuous	–	83	4	0			–	–	–	–
	App. Lane 3	Full-Length	Normal	Continuous	–	83	4	0			–	–	–	–
	App. Lane 4	Full-Length	Normal	Continuous	–	83	4	0			–	–	–	–
	Strip Island 1	–	–	–	–	–	–	–	–	–	3	3	Solid	Yes
	Exit Lane 5	Full-Length	–	–	–	83	4	0			–	–	–	–
	Exit Lane 4	Full-Length	–	–	–	83	4	0			–	–	–	–
	Exit Lane 3	Full-Length	–	–	–	83	4	0			–	–	–	–
	Exit Lane 2	Full-Length	–	–	–	83	4	0	B		–	–	–	–
	Exit Lane 1	Full-Length	–	–	–	83	2	0	C		–	–	–	–

Lanes are numbered from left to right in the direction of travel.

Lane Geometry - Lane Configuration - Short Lanes and Two-Segment Lanes

Leg	Item	Configuration	Short Lane / Segment 1 [Length m	Overflow/ Merge Dir	ID	Colour]	Segment 2 [Length m	ID	Colour]
NorthEast		Great Eastern Highway							
	App. Lane 2	Two-Segment	40	Left	B		70	B	

Lane Geometry - Lane Disciplines

To Approach	OD Movement	Free Queue Distance m	Movement Class(es)
From: SouthEast	App. Lane 1		
SouthWest	L2	0	LV, HV, C
From: NorthEast	App. Lane 1		
SouthEast	L2	0	C
SouthWest	T1	0	C
From: NorthEast	App. Lane 2		
SouthEast	L2	0	LV, HV
SouthWest	T1	0	LV, HV, B
From: NorthEast	App. Lane 3		
SouthWest	T1	0	LV, HV
From: NorthEast	App. Lane 4		
SouthWest	T1	0	LV, HV
From: NorthEast	App. Lane 5		
SouthWest	T1	0	LV, HV

From: SouthWest	App. Lane 1		
NorthEast	T1	0	C
From: SouthWest	App. Lane 2		
NorthEast	T1	0	LV, HV, B
From: SouthWest	App. Lane 3		
NorthEast	T1	0	LV, HV
From: SouthWest	App. Lane 4		
NorthEast	T1	0	LV, HV

Lane Geometry - Lane Disciplines - Lane Change Data

Movement Class	% Lane Change to Left %	% Lane Change to Right %
NorthEast Approach Lane 2 - Segment 2		
Light Vehicles (LV)	0	20
Heavy Vehicles (HV)	0	20
Buses (B)	0	0
Bicycles (C)	0	0

Lane Data - Lane Data

Approach Lane	Basic Satn Flow tcu/h	Utilisation Ratio %	Saturation Speed km/h	Capacity Adjustment %	Use Given Cap Adj in Network Analysis
SouthEast Hagreaves St					
App. Lane 1	1950	–	–	0.0	No
NorthEast Great Eastern Highway					
App. Lane 1	1950	–	–	0.0	No
App. Lane 2	1950	–	–	0.0	No
App. Lane 3	1950	–	–	0.0	No
App. Lane 4	1950	–	–	0.0	No
App. Lane 5	1950	–	–	0.0	No
SouthWest Great Eastern Highway					
App. Lane 1	1950	–	–	0.0	No
App. Lane 2	1950	–	–	0.0	No
App. Lane 3	1950	–	–	0.0	No
App. Lane 4	1950	–	–	0.0	No

Lane Data - Flow Proportions

Exit Lane	To Exit Leg SouthEast %	NorthEast %	SouthWest %
Light Vehicles (LV)			
From: SouthEast App. Lane 1			
Exit Lane 1	–	–	0
Exit Lane 2	–	–	0
Exit Lane 3	–	–	80
Exit Lane 4	–	–	20
Exit Lane 5	–	–	0
From: NorthEast App. Lane 2			
Exit Lane 1	100	–	0
Exit Lane 2	–	–	85
Exit Lane 3	–	–	15
Exit Lane 4	–	–	0
Exit Lane 5	–	–	0
From: NorthEast App. Lane 3			
Exit Lane 1	–	–	0
Exit Lane 2	–	–	20
Exit Lane 3	–	–	75
Exit Lane 4	–	–	5
Exit Lane 5	–	–	0
From: NorthEast App. Lane 4			

Exit Lane 1	–	–	0
Exit Lane 2	–	–	0
Exit Lane 3	–	–	10
Exit Lane 4	–	–	80
Exit Lane 5	–	–	10
From: NorthEast	App. Lane 5		
Exit Lane 1	–	–	0
Exit Lane 2	–	–	0
Exit Lane 3	–	–	0
Exit Lane 4	–	–	10
Exit Lane 5	–	–	90
From: SouthWest	App. Lane 2		
Exit Lane 1	–	0	–
Exit Lane 2	–	100	–
Exit Lane 3	–	0	–
Exit Lane 4	–	0	–
From: SouthWest	App. Lane 3		
Exit Lane 1	–	0	–
Exit Lane 2	–	0	–
Exit Lane 3	–	100	–
Exit Lane 4	–	0	–
From: SouthWest	App. Lane 4		
Exit Lane 1	0	0	–
Exit Lane 2	–	0	–
Exit Lane 3	–	0	–
Exit Lane 4	–	100	–
Heavy Vehicles (HV)			
From: SouthEast	App. Lane 1		
Exit Lane 1	–	–	0
Exit Lane 2	–	–	0
Exit Lane 3	–	–	80
Exit Lane 4	–	–	20
Exit Lane 5	–	–	0
From: NorthEast	App. Lane 2		
Exit Lane 1	100	–	0
Exit Lane 2	–	–	85
Exit Lane 3	–	–	15
Exit Lane 4	–	–	0
Exit Lane 5	–	–	0
From: NorthEast	App. Lane 3		
Exit Lane 1	–	–	0
Exit Lane 2	–	–	20
Exit Lane 3	–	–	75
Exit Lane 4	–	–	5
Exit Lane 5	–	–	0
From: NorthEast	App. Lane 4		
Exit Lane 1	–	–	0
Exit Lane 2	–	–	0
Exit Lane 3	–	–	10
Exit Lane 4	–	–	80
Exit Lane 5	–	–	10
From: NorthEast	App. Lane 5		
Exit Lane 1	–	–	0
Exit Lane 2	–	–	0
Exit Lane 3	–	–	0
Exit Lane 4	–	–	10
Exit Lane 5	–	–	90
From: SouthWest	App. Lane 2		
Exit Lane 1	–	0	–
Exit Lane 2	–	100	–
Exit Lane 3	–	0	–
Exit Lane 4	–	0	–
From: SouthWest	App. Lane 3		
Exit Lane 1	–	0	–
Exit Lane 2	–	0	–
Exit Lane 3	–	100	–
Exit Lane 4	–	0	–
From: SouthWest	App. Lane 4		
Exit Lane 1	0	0	–
Exit Lane 2	–	0	–
Exit Lane 3	–	0	–
Exit Lane 4	–	100	–

Buses (B)			
From: NorthEast	App. Lane 2		
Exit Lane 1	–	–	0
Exit Lane 2	–	–	85
Exit Lane 3	–	–	15
Exit Lane 4	–	–	0
Exit Lane 5	–	–	0
From: SouthWest	App. Lane 2		
Exit Lane 1	–	0	–
Exit Lane 2	–	100	–
Exit Lane 3	–	0	–
Exit Lane 4	–	0	–
Bicycles (C)			
From: SouthEast	App. Lane 1		
Exit Lane 1	–	–	100
Exit Lane 2	–	–	0
Exit Lane 3	–	–	0
Exit Lane 4	–	–	0
Exit Lane 5	–	–	0
From: NorthEast	App. Lane 1		
Exit Lane 1	100	–	100
Exit Lane 2	–	–	0
Exit Lane 3	–	–	0
Exit Lane 4	–	–	0
Exit Lane 5	–	–	0
From: SouthWest	App. Lane 1		
Exit Lane 1	–	100	–
Exit Lane 2	–	0	–
Exit Lane 3	–	0	–
Exit Lane 4	–	0	–

Lane Data - Lane Blockage

Exit Lane	To Exit Leg SouthEast	NorthEast	SouthWest
From: SouthEast	App. Lane 1		
Exit Lane 1	–	–	Yes
Exit Lane 2	–	–	Yes
Exit Lane 3	–	–	Yes
Exit Lane 4	–	–	Yes
Exit Lane 5	–	–	Yes
From: NorthEast	App. Lane 1		
Exit Lane 1	Yes	–	Yes
Exit Lane 2	–	–	Yes
Exit Lane 3	–	–	Yes
Exit Lane 4	–	–	Yes
Exit Lane 5	–	–	Yes
From: NorthEast	App. Lane 2		
Exit Lane 1	Yes	–	Yes
Exit Lane 2	–	–	Yes
Exit Lane 3	–	–	Yes
Exit Lane 4	–	–	Yes
Exit Lane 5	–	–	Yes
From: NorthEast	App. Lane 3		
Exit Lane 1	–	–	Yes
Exit Lane 2	–	–	Yes
Exit Lane 3	–	–	Yes
Exit Lane 4	–	–	Yes
Exit Lane 5	–	–	Yes
From: NorthEast	App. Lane 4		
Exit Lane 1	–	–	Yes
Exit Lane 2	–	–	Yes
Exit Lane 3	–	–	Yes
Exit Lane 4	–	–	Yes
Exit Lane 5	–	–	Yes
From: NorthEast	App. Lane 5		
Exit Lane 1	–	–	Yes
Exit Lane 2	–	–	Yes
Exit Lane 3	–	–	Yes
Exit Lane 4	–	–	Yes
Exit Lane 5	–	–	Yes

From: SouthWest	App. Lane 1		
Exit Lane 1	–	Yes	–
Exit Lane 2	–	Yes	–
Exit Lane 3	–	Yes	–
Exit Lane 4	–	Yes	–
From: SouthWest	App. Lane 2		
Exit Lane 1	–	Yes	–
Exit Lane 2	–	Yes	–
Exit Lane 3	–	Yes	–
Exit Lane 4	–	Yes	–
From: SouthWest	App. Lane 3		
Exit Lane 1	–	Yes	–
Exit Lane 2	–	Yes	–
Exit Lane 3	–	Yes	–
Exit Lane 4	–	Yes	–
From: SouthWest	App. Lane 4		
Exit Lane 1	–	Yes	–
Exit Lane 2	–	Yes	–
Exit Lane 3	–	Yes	–
Exit Lane 4	–	Yes	–

Pedestrians - Pedestrian Movements

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes

Main Crossing/ Slip/Bypass Lane Crossing	Volume ped	Peak Flow %	Flow Scale %	Growth Rate %
SouthEast Hagreaves St				
Full Crossing	30.0	95.0	100.00	2.00

Pedestrians - Pedestrian Movement Data

Main Crossing/ Slip/Bypass Lane Crossing	Mov. ID	Crossing Distance m	Oppng Ped.Fac.	P.Deg. Satn	Walking Speed m/sec	App. Trav. Distance m	Downst. Distance m	Queue Space m
SouthEast Hagreaves St								
Full Crossing	P1	–	1	–	1.30	10.0	10.0	1.00

Volumes - Vehicle Volumes

Unit Time for Volumes: 60 minutes
Peak Flow Period: 30 minutes
Volume Data Method: Total and %

Movement Class	To Exit Leg SouthEast veh	NorthEast veh	SouthWest veh
From: SouthEast	Hagreaves St		
Total (veh)	–	–	56
LV (%)	–	–	79.5
HV (%)	–	–	20.0
B (%)	–	–	–
C (%)	–	–	0.5
From: NorthEast	Great Eastern Highway		
Total (veh)	28	–	1482
LV (%)	79.5	–	91.5
HV (%)	20.0	–	5.0
B (%)	–	–	3.0
C (%)	0.5	–	0.5
From: SouthWest	Great Eastern Highway		
Total (veh)	–	2344	–
LV (%)	–	91.5	–
HV (%)	–	5.0	–
B (%)	–	3.0	–
C (%)	–	0.5	–

Volumes - Volume Factors

To Approach	Peak Flow Factor %	Flow Scale %	Growth Rate %/year
Light Vehicles (LV)			
From: SouthEast	Hagreaves St		
SouthWest	95.0	100.00	2.00
From: NorthEast	Great Eastern Highway		
SouthEast	95.0	100.00	2.00
SouthWest	95.0	100.00	2.00
From: SouthWest	Great Eastern Highway		
NorthEast	95.0	100.00	2.00
Heavy Vehicles (HV)			
From: SouthEast	Hagreaves St		
SouthWest	95.0	100.00	2.00
From: NorthEast	Great Eastern Highway		
SouthEast	95.0	100.00	2.00
SouthWest	95.0	100.00	2.00
From: SouthWest	Great Eastern Highway		
NorthEast	95.0	100.00	2.00
Buses (B)			
From: NorthEast	Great Eastern Highway		
SouthWest	95.0	100.00	2.00
From: SouthWest	Great Eastern Highway		
NorthEast	95.0	100.00	2.00
Bicycles (C)			
From: SouthEast	Hagreaves St		
SouthWest	95.0	100.00	2.00
From: NorthEast	Great Eastern Highway		
SouthEast	95.0	100.00	2.00
SouthWest	95.0	100.00	2.00
From: SouthWest	Great Eastern Highway		
NorthEast	95.0	100.00	2.00

Priorities

Opposed Movement	Opposing Movements SouthEast	NorthEast	SouthWest
SouthEast	Hagreaves St		
L2	P1	T1	–
NorthEast	Great Eastern Highway		
L2	P1	–	–
T1	L2	–	–
SouthWest	Great Eastern Highway		
T1	–	–	–

Gap Acceptance - Gap Acceptance Data

Opposed Movement	Apply TWSC Calibration	Critical Gap sec	Follow-up Headway sec	Minimum Departures veh/min	Exiting Flow Effect %	% Opp. By Nearest Lane %	Opng. Peds (UnSig)	Staged Crossing
SouthEast	Hagreaves St							
L2	No	4.500	2.700	0.10	50	100.00	Pr (Flow)	None
NorthEast	Great Eastern Highway							
L2	Yes	5.000	3.000	0.10	0	0.00	Pr (Flow)	None
T1	Yes	6.500	3.500	0.10	0	0.00	Pr (Flow)	None

Gap Acceptance - Two-Way Sign Control Calibration

Level of Reduction with Opposing Flow Rate	Low
Major Road Turning Flow Factor	1

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Major Rd Number of Lanes

Major Road Number of Lanes:	Critical Gap Adjustment 2-lane sec	3-lane sec	5-lane sec	6-lane or more sec	Follow-up Headway Adjustment 2-lane sec	3-lane sec	5-lane sec	6-lane or more sec
Minor Road Left Turn	-0.5	-0.5	0.0	0.0	-0.5	-0.5	0.0	0.0
Minor Road Through	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Minor Road Right Turn	-1.5	-0.5	0.5	1.0	-0.5	-0.3	0.5	1.0
Major Road Turn (Right or Left)	-0.5	-0.5	0.0	1.0	-0.5	-0.5	0.0	1.0

Gap Acceptance - Two-Way Sign Control Parameter Adjs for Geometry and Control

	Critical Gap Adjustment sec	Follow-up Headway Adjustment sec
Give-Way / Yield Sign Control	-0.5	-0.3
One-Way Major Road	-0.5	-0.3
T Intersection (Minor Road Turn)	-0.7	-0.4
Entry Road Grade (for each per cent grade)	0.1	0.0
Staged Crossing - Stage 1	-1.0	-0.6
Staged Crossing - Stage 2	-1.0	-0.6
U Turn (Major Road)	1.5	0.9
User Adjustment	0.0	0.0

Gap Acceptance - Settings

Gap Acceptance Capacity : SIDRA Standard (Akçelik M3D)

Vehicle Movement Data - Path Data

OD Movement	Approach Cruise Speed km/h	Exit Cruise Speed km/h	Negotiation Speed km/h	Negotiation Distance m	Downstream Distance m	Negotiation Radius m
Light Vehicles (LV)						
From: SouthEast	Hagreaves St					
L2	50.0	60.0	–	–	–	–
From: NorthEast	Great Eastern Highway					
L2	60.0	50.0	–	–	–	–
T1	60.0	60.0	–	–	–	–
From: SouthWest	Great Eastern Highway					
T1	60.0	60.0	–	–	–	–
Heavy Vehicles (HV)						
From: SouthEast	Hagreaves St					
L2	50.0	60.0	–	–	–	–

From: NorthEast	Great Eastern Highway					
L2	60.0	50.0	–	–	–	–
T1	60.0	60.0	–	–	–	–
From: SouthWest	Great Eastern Highway					
T1	60.0	60.0	–	–	–	–
Buses (B)						
From: NorthEast	Great Eastern Highway					
T1	60.0	60.0	–	–	–	–
From: SouthWest	Great Eastern Highway					
T1	60.0	60.0	–	–	–	–
Bicycles (C)						
From: SouthEast	Hagreaves St					
L2	50.0	60.0	–	–	–	–
From: NorthEast	Great Eastern Highway					
L2	60.0	50.0	–	–	–	–
T1	60.0	60.0	–	–	–	–
From: SouthWest	Great Eastern Highway					
T1	60.0	60.0	–	–	–	–

Vehicle Movement Data - Calibration

OD Movement	Queue Space m	Vehicle Length m	Vehicle Occupancy pers/veh	Turn Veh Effect [Factor	Radius] m	Gap Accp Factor	Opng. Veh Factor	Prac. Deg. Of Satn.
Light Vehicles (LV)								
From: SouthEast	Hagreaves St							
L2	7.20	5.20	1.20	1.05	–	1	1	–
From: NorthEast	Great Eastern Highway							
L2	7.20	5.20	1.20	1.05	–	1	1	–
T1	7.20	5.20	1.20	1	–	1	1	–
From: SouthWest	Great Eastern Highway							
T1	7.20	5.20	1.20	1	–	1	1	–
Heavy Vehicles (HV)								
From: SouthEast	Hagreaves St							
L2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
From: NorthEast	Great Eastern Highway							
L2	15.00	12.50	1.20	1.09	–	1.5	1.5	–
T1	15.00	12.50	1.20	1	–	1.5	1.5	–
From: SouthWest	Great Eastern Highway							
T1	15.00	12.50	1.20	1	–	1.5	1.5	–
Buses (B)								
From: NorthEast	Great Eastern Highway							
T1	13.00	10.00	30.00	1	–	1.5	1.5	–
From: SouthWest	Great Eastern Highway							
T1	13.00	10.00	30.00	1	–	1.5	1.5	–
Bicycles (C)								
From: SouthEast	Hagreaves St							
L2	2.70	1.80	1.00	1.05	–	1	0.5	–
From: NorthEast	Great Eastern Highway							
L2	2.70	1.80	1.00	1.05	–	1	0.5	–
T1	2.70	1.80	1.00	1	–	1	0.5	–
From: SouthWest	Great Eastern Highway							
T1	2.70	1.80	1.00	1	–	1	0.5	–

Demand & Sensitivity

Analysis Method: None

Model Settings - Options

General Options	
Level of Service Method	Delay (HCM 2000)
Level of Service Target	LOS D

Performance Measure	Delay
Percentile Queue	95 %
Hours per Year	480 h
Include Short Lanes in determining Queue Storage Ratio	No

Model Settings - Model Parameters	
Passenger Car Equivalents	
Light Vehicles (LV)	1.00 pcu/veh
Heavy Vehicles (HV)	1.65 pcu/veh
Buses (B)	1.65 pcu/veh
Bicycles (C)	0.30 pcu/veh
Queue Blockage	
Minimum Probability of Blockage	5
Delay and Queue	
Exclude Geometry Delay	No
HCM Delay Formula	No
HCM Queue Formula	No
Downstream Short Lane	
Minimum Downstream Utilisation Ratio	20 %
Minimum Downstream Distance	30 m
Distance for Full Lane Utilisation	200 m
Calibration Parameter	1.2

Model Settings - Cost

Cost Options	
Cost Unit	$

Vehicle Cost Parameters

Movement Class	Veh Cost Method	Veh Operating Cost			Veh Time Cost	
		Pump Price of Fuel	Fuel Res. Cost Factor	Ratio of Running Cost to Fuel Cost	Avg. Income	Time Value Factor
		$/L			$/h	
Light Vehicles (LV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Heavy Vehicles (HV)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Buses (B)	Operating Cost	1.450	0.500	3.00	38.00	0.600
Bicycles (C)	–	–	–	–	38.00	0.600

Model Settings - Vehicle Parameters

Movement Class	Mass kg	Max Power kW	CO2 to Fuel Rate
Light Vehicles (LV)	1600.0	120	2.35
Heavy Vehicles (HV)	15000.0	170	2.633
Buses (B)	8000.0	170	2.633
Bicycles (C)	90.0	0	–

Model Settings - Fuel Consumption

Movement Class	fi	A	B	Beta
Light Vehicles (LV)	1200	16	0.004	0.1
Heavy Vehicles (HV)	2300	200	0.009	0.075
Buses (B)	2100	180	0.0005	0.09
Bicycles (C)	–	–	–	–

Model Settings - CO Emission

Movement Class	fi	A	B	Beta
Light Vehicles (LV)	10000	176	0.115	0.92
Heavy Vehicles (HV)	25000	320	-0.06	0.04
Buses (B)	12000	240	0.01	0.6
Bicycles (C)	–	–	–	–

Model Settings - HC Emission				
Movement Class	fi	A	B	Beta
Light Vehicles (LV)	2400	-24	0.006	0.093
Heavy Vehicles (HV)	3000	1	-0.0016	0.0013
Buses (B)	6800	-5	0.001	0.005
Bicycles (C)	–	–	–	–

Model Settings - NOx Emission				
Movement Class	fi	A	B	Beta
Light Vehicles (LV)	400	-22	0.0165	0.43
Heavy Vehicles (HV)	44000	2820	0.21	1.9
Buses (B)	49000	350	0.25	1.4
Bicycles (C)	–	–	–	–

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Belgravia St - 2013 pm

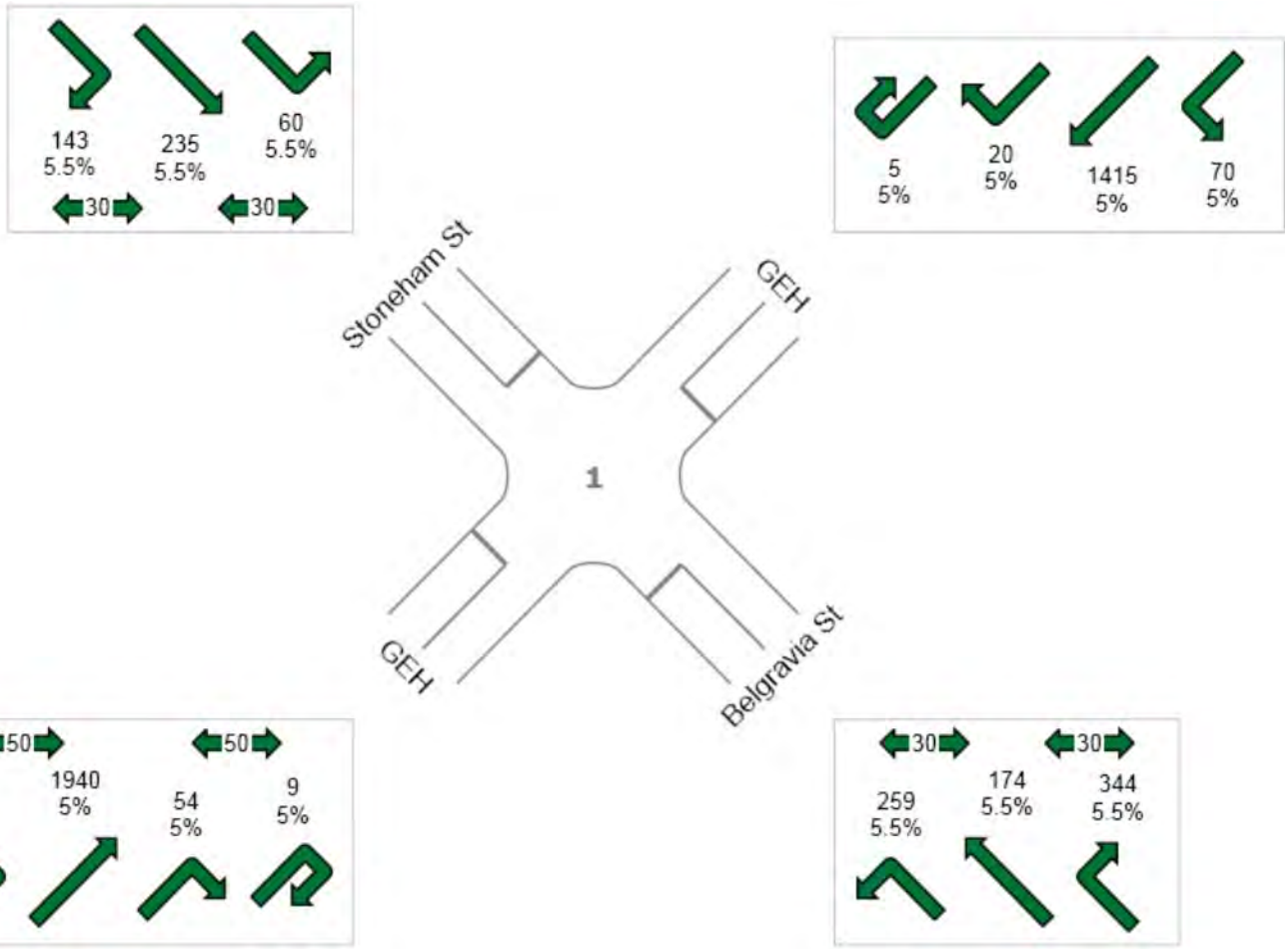
GEH - Belgravia St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 5253**
- **Light Vehicles (LV): 4832**
- **Heavy Vehicles (HV): 269**
- **Buses (B): 101**
- **Bicycles (C): 52**
- **Pedestrians: 220**



PHASING SUMMARY

Site: GEH - Belgravia St - 2013 pm

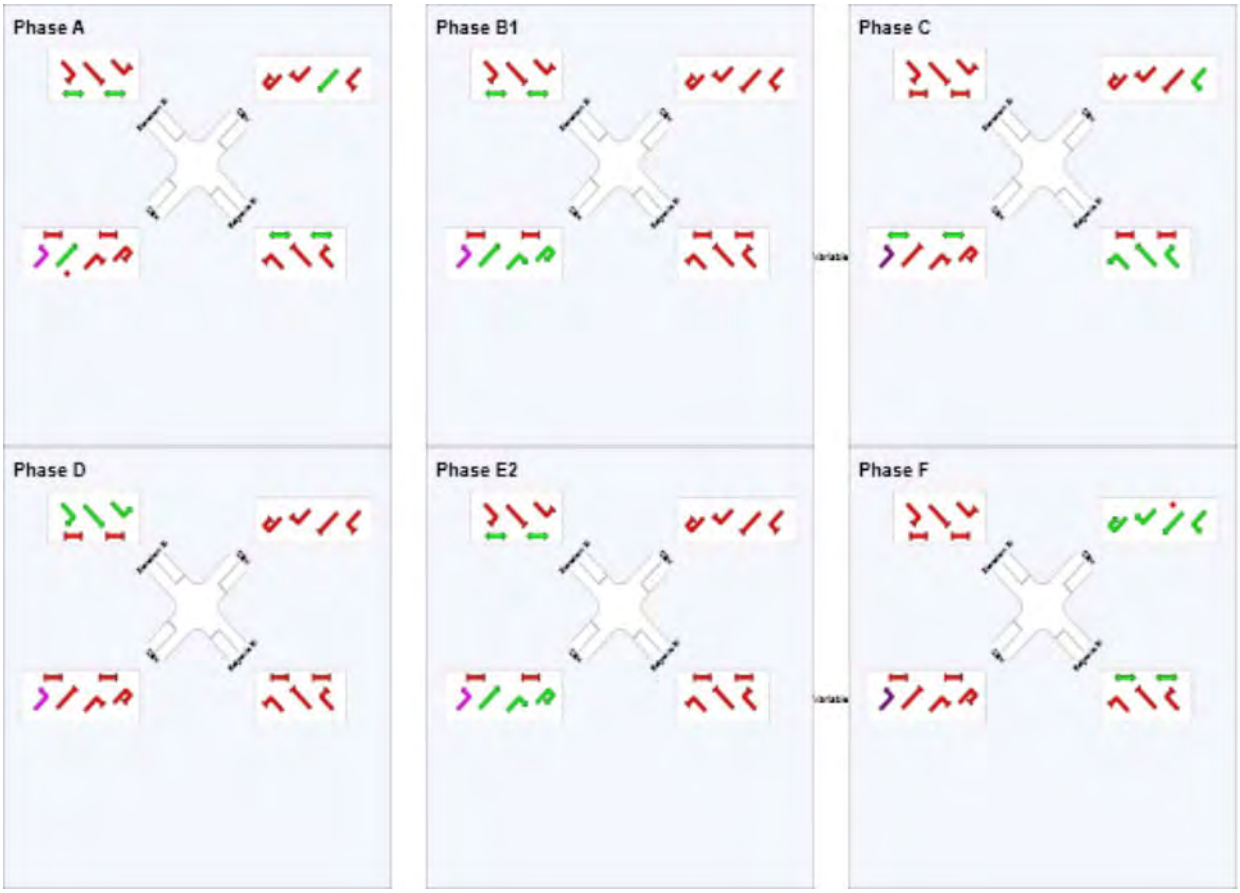
Network: N - 1-2 - 2013

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Phase times determined by the program
Sequence: Variable Phasing - 2
Movement Class: All Movement Classes
Input Sequence: A, B1, B2, C, D, E1, E2, F
Output Sequence: A, B1, C, D, E2, F

Phase Timing Results

Phase	A	B1	C	D	E2	F
Green Time (sec)	26	6	33	21	17	11
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	32	12	39	27	23	17
Phase Split	21 %	8 %	26 %	18 %	15 %	11 %



LANE SUMMARY

Site: GEH - Belgravia St - 2013 pm

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St													
Lane 1 (40)	273	5.5	376	0.726	100	68.3	LOS E	18.7	142.2	Full	500	0.0	0.0
Lane 2 (40)	277	5.5	413	0.670	92[5]	61.8	LOS E	18.6	141.2	Full	500	0.0	0.0
Lane 3 (40)	269	5.5	401	0.670	92[5]	65.2	LOS E	18.1	136.7	Short	84	0.0	49.7
Approach	818	5.5		0.726		65.1	LOS E	18.7	142.2				
NorthEast: GEH													
Lane 1 (C)	16	0.0	880	0.018	100	37.1	LOS D	0.7	1.9	Full	83	0.0	0.0
Lane 2 (B-B)	267	21.0	307	0.870	98[6]	48.8	LOS D	15.4	130.6	Two Seg	83	0.0	50.0
Lane 3	430	5.2	487	0.882	99[6]	63.5	LOS E	27.0	205.5	Full	83	0.0	90.2
Lane 4	432	5.2	487	0.887	100	63.9	LOS E	27.3	207.5	Full	83	0.0	91.2
Lane 5	419	5.2	473	0.887	100	64.0	LOS E	26.5	201.7	Full	83	0.0	88.4
Lane 6	26	5.0	128	0.206	100	82.4	LOS F	1.9	14.2	Short	80	0.0	0.0
Approach	1589	7.8		0.887		61.4	LOS E	27.3	207.5				
NorthWest: Stoneham St													
Lane 1	63	5.5	257	0.246	100	71.8	LOS E	4.2	31.5	Short	85	0.0	0.0
Lane 2	135	5.5	271	0.500	100	68.7	LOS E	9.3	70.4	Full	320	0.0	0.0
Lane 3	134	5.5	268	0.500	100	69.6	LOS E	9.2	69.8	Full	320	0.0	0.0
Lane 4	129	5.5	257	0.500	100	73.9	LOS E	8.8	67.0	Short	74	0.0	0.0
Approach	461	5.5		0.500		70.9	LOS E	9.3	70.4				
SouthWest: GEH													
Lane 1	553	5.0	1496	0.369	100	9.6	LOS A	8.1	61.0	Short	73	0.0	0.0
Lane 2 (C)	20	0.0	2272	0.009	100	20.4	LOS C	0.7	1.9	Full	500	0.0	0.0
Lane 3 (B-B)	61	100.0	415	0.148	60[6]	23.4	LOS C	2.4	31.0	Two Seg	173	0.0	0.0
Lane 4	643	5.2	720	0.892	98[6]	45.8	LOS D	31.3	238.4	Full	500	0.0	0.0
Lane 5	659	5.2	720	0.915	100	49.5	LOS D	33.8	257.0	Full	500	0.0	0.0
Lane 6	659	5.2	720	0.915	100	49.5	LOS D	33.8	257.0	Full	500	0.0	0.0
Lane 7	66	5.0	274	0.242	100	39.9	LOS D	2.5	18.8	Short	246	0.0	0.0
Approach	2661	7.3		0.915		39.3	LOS D	33.8	257.0				
Intersection	5529	7.0		0.915		52.1	LOS D	33.8	257.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: GEH - Belgravia St - 2013 pm

Network: 1-2 - 2013

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Belgravia St															
Lane 1 (40)	273	5.5	273	5.5	376	0.726	100	68.3	LOS E	18.7	142.2	Full	500	0.0	0.0
Lane 2 (40)	277	5.5	277	5.5	413	0.670	92[5]	61.8	LOS E	18.6	141.2	Full	500	0.0	0.0
Lane 3 (40)	269	5.5	269	5.5	401	0.670	92[5]	65.2	LOS E	18.1	136.7	Short	84	0.0	49.7
Approach	818	5.5	818	5.5		0.726		65.1	LOS E	18.7	142.2				
NorthEast: GEH															
Lane 1 (C)	16	0.0	16	0.0	880	0.018	100	37.1	LOS D	0.7	1.9	Full	83	0.0	0.0
Lane 2 (B-B)	267	21.0	267	21.0	307	0.870	98[6]	48.8	LOS D	15.4	130.6	Two Seg	83	0.0	50.0
Lane 3	430	5.2	430	5.2	487	0.882	99[6]	63.5	LOS E	27.0	205.5	Full	83	0.0	90.2
Lane 4	432	5.2	432	5.2	487	0.887	100	63.9	LOS E	27.3	207.5	Full	83	0.0	91.2
Lane 5	419	5.2	419	5.2	473	0.887	100	64.0	LOS E	26.5	201.7	Full	83	0.0	88.4
Lane 6	26	5.0	26	5.0	128	0.206	100	82.4	LOS F	1.9	14.2	Short	80	0.0	0.0
Approach	1589	7.8	1589	7.8		0.887		61.4	LOS E	27.3	207.5				
NorthWest: Stoneham St															
Lane 1	63	5.5	63	5.5	257	0.246	100	71.8	LOS E	4.2	31.5	Short	85	0.0	0.0
Lane 2	135	5.5	135	5.5	271	0.500	100	68.7	LOS E	9.3	70.4	Full	320	0.0	0.0
Lane 3	134	5.5	134	5.5	268	0.500	100	69.6	LOS E	9.2	69.8	Full	320	0.0	0.0
Lane 4	129	5.5	129	5.5	257	0.500	100	73.9	LOS E	8.8	67.0	Short	74	0.0	0.0
Approach	461	5.5	461	5.5		0.500		70.9	LOS E	9.3	70.4				
SouthWest: GEH															
Lane 1	553	5.0	553	5.0	1496	0.369	100	9.6	LOS A	8.1	61.0	Short	73	0.0	0.0
Lane 2 (C)	20	0.0	20	0.0	2272	0.009	100	20.4	LOS C	0.7	1.9	Full	500	0.0	0.0
Lane 3 (B-B)	61	100.0	61	100.0	415	0.148	60[6]	23.4	LOS C	2.4	31.0	Two Seg	173	0.0	0.0
Lane 4	643	5.2	643	5.2	720	0.892	98[6]	45.8	LOS D	31.3	238.4	Full	500	0.0	0.0
Lane 5	659	5.2	659	5.2	720	0.915	100	49.5	LOS D	33.8	257.0	Full	500	0.0	0.0
Lane 6	659	5.2	659	5.2	720	0.915	100	49.5	LOS D	33.8	257.0	Full	500	0.0	0.0
Lane 7	66	5.0	66	5.0	274	0.242	100	39.9	LOS D	2.5	18.8	Short	246	0.0	0.0
Approach	2661	7.3	2661	7.3		0.915		39.3	LOS D	33.8	257.0				
Intersection	5529	7.0	5529	7.0		0.915		52.1	LOS D	33.8	257.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Hagreaves St - 2013 pm

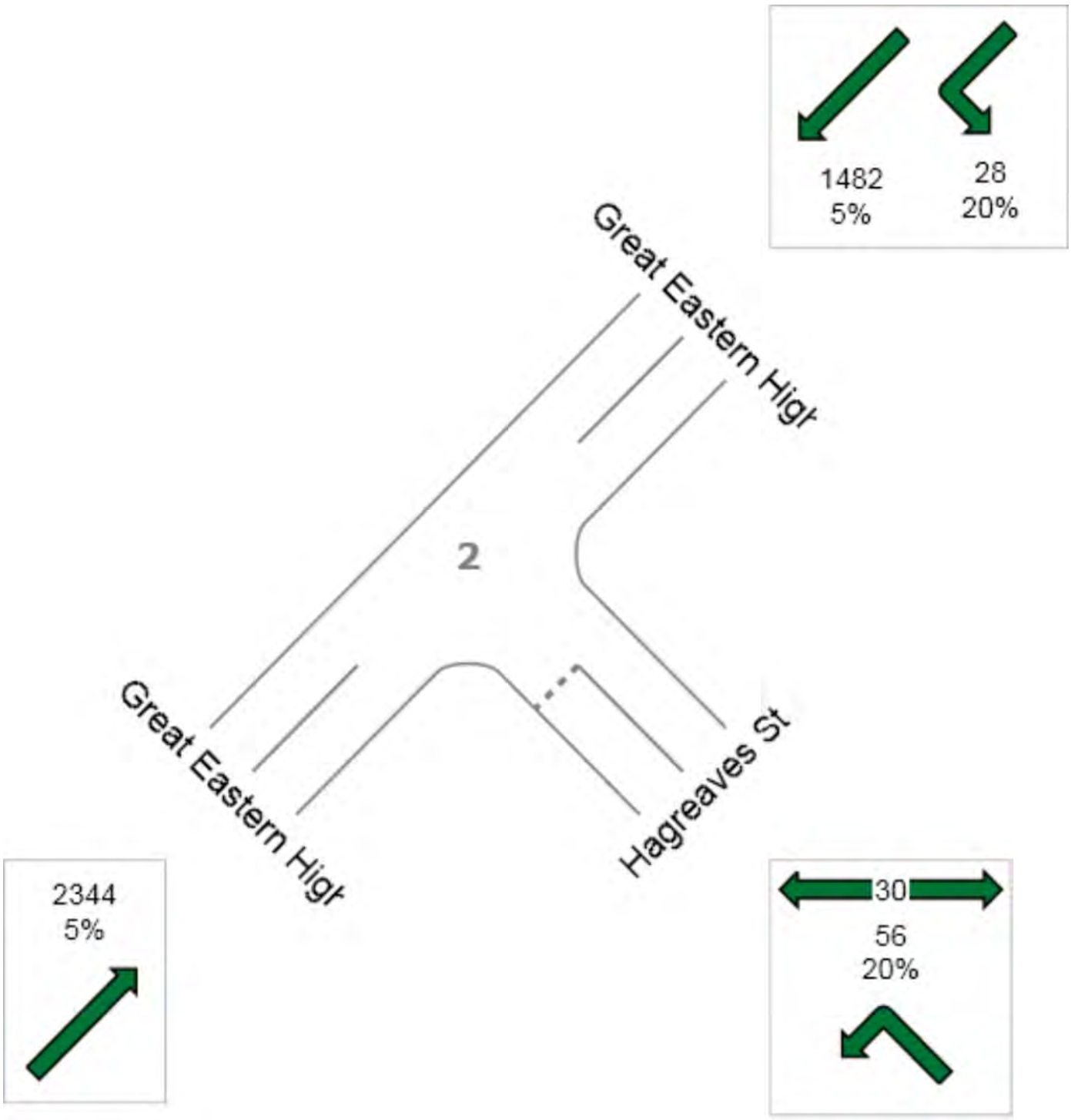
GEH - Hagreaves St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 3910**
- **Light Vehicles (LV): 3568**
- **Heavy Vehicles (HV): 208**
- **Buses (B): 115**
- **Bicycles (C): 20**
- **Pedestrians: 30**



LANE SUMMARY

Site: GEH - Hagreaves St - 2013 pm

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hagreaves St													
Lane 1	59	20.0	1178	0.050	100	7.3	LOS A	0.2	1.9	Full	250	0.0	0.0
Approach	59	20.0		0.050		7.3	LOS A	0.2	1.9				
NorthEast: Great Eastern Highway													
Lane 1 (C)	8	0.0	945	0.008	100	0.6	LOS A	0.0	0.1	Full	110	0.0	0.0
Lane 2 (B-B)	374	18.2	855	0.437	100	1.5	LOS A	2.4	19.9	Two Seg	110	0.0	0.0
Lane 3	403	5.2	920	0.437	100	0.9	LOS A	2.4	18.5	Full	500	0.0	0.0
Lane 4	403	5.2	920	0.437	100	0.9	LOS A	2.4	18.5	Full	500	0.0	0.0
Lane 5	403	5.2	920	0.437	100	0.9	LOS A	2.4	18.5	Full	500	0.0	0.0
Approach	1589	8.2		0.437		1.0	NA	2.4	19.9				
SouthWest: Great Eastern Highway													
Lane 1 (C)	12	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	789	14.1	1852	0.426	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	833	5.2	1955	0.426	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	833	5.2	1955	0.426	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2467	8.0		0.426		0.0	NA	0.0	0.0				
Intersection	4116	8.3		0.437		0.5	NA	2.4	19.9				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: GEH - Hagreaves St - 2013 pm

Network: 1-2 - 2013

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Hagreaves St															
Lane 1	59	20.0	59	20.0	698	0.085	100	125.0	LOS F	5.1	44.8	Full	250	-40.8 N3	0.0
Approach	59	20.0	59	20.0		0.085		125.0	LOS F	5.1	44.8				
NorthEast: Great Eastern Highway															
Lane 1 (C)	8	0.0	8	0.0	945	0.008	100	0.6	LOS A	0.0	0.1	Full	110	0.0	100.0 8
Lane 2 (B-B)	383	17.9	383	17.9	521	0.735	100	188.3	LOS F	97.6	815.0	Two Seg	110	-39.1 N3	100.0
Lane 3	399	5.2	399	5.2	544	0.735	100	182.5	LOS F	98.1	745.9	Full	500	-40.9 N3	18.4
Lane 4	399	5.2	399	5.2	544	0.735	100	182.5	LOS F	98.1	745.9	Full	500	-40.9 N3	18.4
Lane 5	399	5.2	399	5.2	544	0.735	100	182.5	LOS F	98.1	745.9	Full	500	-40.9 N3	18.4
Approach	1589	8.2	1589	8.2		0.735		183.0	NA	98.1	815.0				
SouthWest: Great Eastern Highway															
Lane 1 (C)	12	0.0	12	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	789	14.1	789	14.1	1852	0.426	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	833	5.2	833	5.2	1955	0.426	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	833	5.2	833	5.2	1955	0.426	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2467	8.0	2467	8.0		0.426		0.0	NA	0.0	0.0				
Intersection	4116	8.3	4116	8.3		0.735		72.5	NA	98.1	815.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Belgravia St - 2016 pm - no development

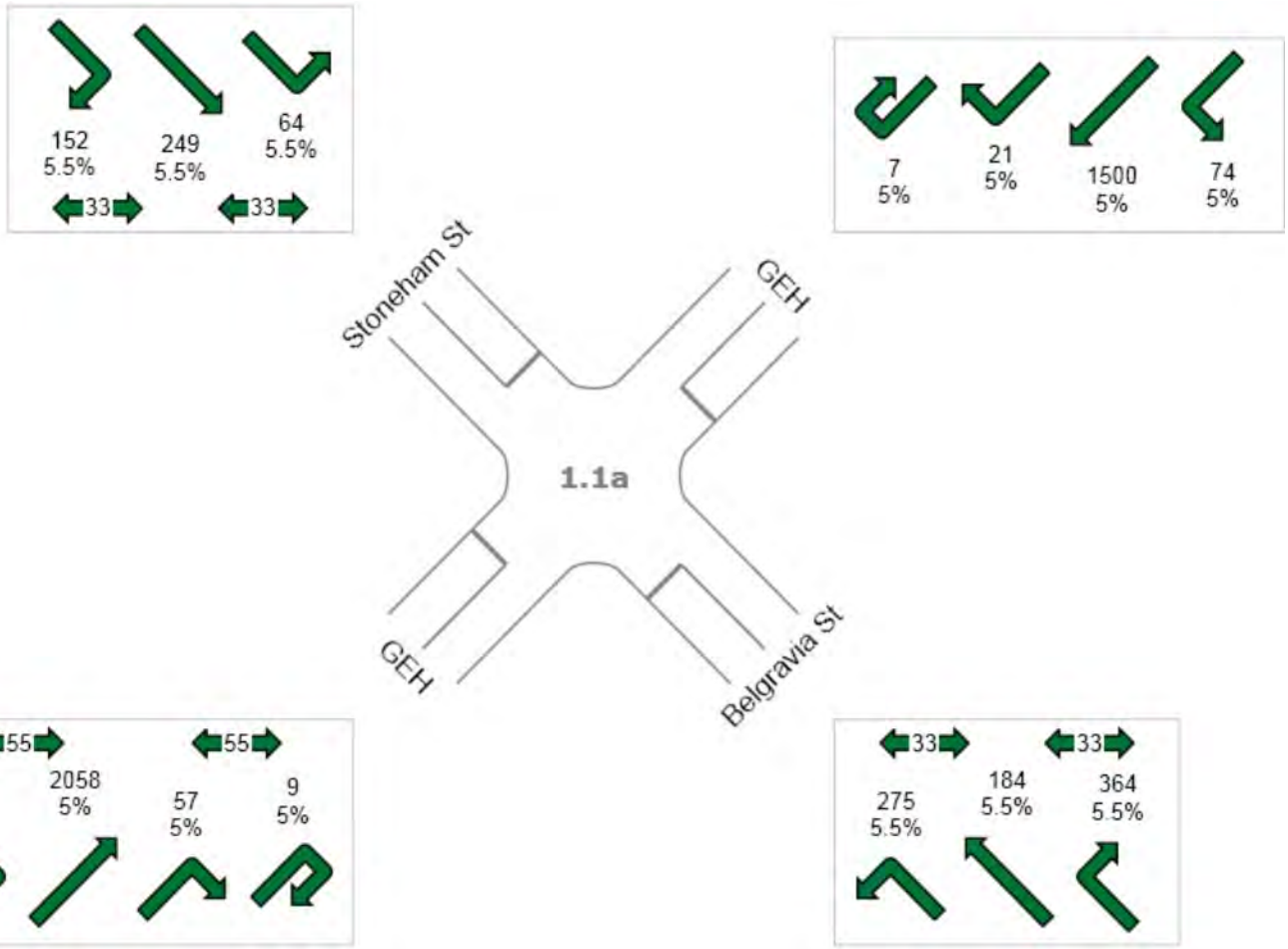
GEH - Belgravia St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 5571**
- **Light Vehicles (LV): 5125**
- **Heavy Vehicles (HV): 285**
- **Buses (B): 107**
- **Bicycles (C): 55**
- **Pedestrians: 242**



PHASING SUMMARY

Site: GEH - Belgravia St - 2016 pm - no development

Network: N.1a - 1.1a-2.1a- 2016 - no dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Phase times determined by the program
Sequence: Variable Phasing - 2
Movement Class: All Movement Classes
Input Sequence: A, B1, B2, C, D, E1, E2, F
Output Sequence: A, B1, C, D, E2, F

Phase Timing Results

Phase	A	B1	C	D	E2	F
Green Time (sec)	31	6	34	20	17	6
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	37	12	40	26	23	12
Phase Split	25 %	8 %	27 %	17 %	15 %	8 %

LANE SUMMARY

Site: GEH - Belgravia St - 2016 pm - no development

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St													
Lane 1 (40)	289	5.5	376	0.770	100	69.0	LOS E	20.1	152.7	Full	500	0.0	0.0
Lane 2 (40)	291	5.5	421[1]	0.692	90[5]	61.2	LOS E	19.5	148.6	Full	500	0.0	0.0
Lane 3 (40)	286	5.5	413	0.692	90[5]	64.8	LOS E	19.2	145.7	Short	84	0.0	55.7
Approach	866	5.5		0.770		65.0	LOS E	20.1	152.7				
NorthEast: GEH													
Lane 1 (C)	17	0.0	693	0.024	100	38.4	LOS D	0.8	2.1	Full	83	0.0	0.0
Lane 2 (B-B)	252	23.0	267	0.943	98[6]	57.3	LOS E	15.7	135.3	Two Seg	83	0.0	53.4
Lane 3	466	5.2	487	0.957	99[6]	78.0	LOS E	32.9	250.3	Full	83	0.0	100.0
Lane 4	468	5.2	487	0.961	100	79.4	LOS E	33.5	254.6	Full	83	0.0	100.0
Lane 5	454	5.2	473	0.961	100	79.6	LOS E	32.6	247.6	Full	83	0.0	100.0
Lane 6	29	5.0	69	0.429	100	90.9	LOS F	2.3	17.2	Short	80	0.0	0.0
Approach	1686	7.8		0.961		75.6	LOS E	33.5	254.6				
NorthWest: Stoneham St													
Lane 1	67	5.5	245	0.275	100	73.1	LOS E	4.5	34.1	Short	85	0.0	0.0
Lane 2	144	5.5	258	0.556	100	70.3	LOS E	10.0	75.8	Full	320	0.0	0.0
Lane 3	142	5.5	255	0.556	100	71.2	LOS E	9.9	75.2	Full	320	0.0	0.0
Lane 4	136	5.5	245	0.556	100	75.5	LOS E	9.5	72.1	Short	74	0.0	2.7
Approach	489	5.5		0.556		72.4	LOS E	10.0	75.8				
SouthWest: GEH													
Lane 1	586	5.0	1505	0.390	100	9.9	LOS A	9.2	69.4	Short	73	0.0	0.4
Lane 2 (C)	22	0.0	2478	0.009	100	19.7	LOS B	0.7	2.0	Full	500	0.0	0.0
Lane 3 (B-B)	65	100.0	453	0.143	50[6]	22.7	LOS C	2.5	33.1	Two Seg	173	0.0	0.0
Lane 4	682	5.2	786	0.867	98[6]	42.5	LOS D	32.0	243.5	Full	500	0.0	0.0
Lane 5	699	5.2	786	0.890	100	45.2	LOS D	34.2	259.9	Full	500	0.0	0.0
Lane 6	699	5.2	786	0.890	100	45.2	LOS D	34.2	259.9	Full	500	0.0	0.0
Lane 7	69	5.0	274	0.253	100	40.0	LOS D	2.6	19.7	Short	246	0.0	0.0
Approach	2822	7.3		0.890		36.4	LOS D	34.2	259.9				
Intersection	5864	7.0		0.961		54.9	LOS D	34.2	259.9				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: GEH - Belgravia St - 2016 pm - no development

Network: N.1a - 1.1a-2.1a- 2016 - no dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Belgravia St															
Lane 1 (40)	289	5.5	289	5.5	376	0.770	100	69.0	LOS E	20.1	152.7	Full	500	0.0	0.0
Lane 2 (40)	291	5.5	291	5.5	421[1]	0.692	90[5]	61.2	LOS E	19.5	148.6	Full	500	0.0	0.0
Lane 3 (40)	286	5.5	286	5.5	413	0.692	90[5]	64.8	LOS E	19.2	145.7	Short	84	0.0	55.7
Approach	866	5.5	866	5.5		0.770		65.0	LOS E	20.1	152.7				
NorthEast: GEH															
Lane 1 (C)	17	0.0	17	0.0	693	0.024	100	38.4	LOS D	0.8	2.1	Full	83	0.0	0.0
Lane 2 (B-B)	252	23.0	252	23.0	267	0.943	98[6]	57.3	LOS E	15.7	135.3	Two Seg	83	0.0	53.4
Lane 3	466	5.2	466	5.2	487	0.957	99[6]	78.0	LOS E	32.9	250.3	Full	83	0.0	100.0
Lane 4	468	5.2	468	5.2	487	0.961	100	79.4	LOS E	33.5	254.6	Full	83	0.0	100.0
Lane 5	454	5.2	454	5.2	473	0.961	100	79.6	LOS E	32.6	247.6	Full	83	0.0	100.0
Lane 6	29	5.0	29	5.0	69	0.429	100	90.9	LOS F	2.3	17.2	Short	80	0.0	0.0
Approach	1686	7.8	1686	7.8		0.961		75.6	LOS E	33.5	254.6				
NorthWest: Stoneham St															
Lane 1	67	5.5	67	5.5	245	0.275	100	73.1	LOS E	4.5	34.1	Short	85	0.0	0.0
Lane 2	144	5.5	144	5.5	258	0.556	100	70.3	LOS E	10.0	75.8	Full	320	0.0	0.0
Lane 3	142	5.5	142	5.5	255	0.556	100	71.2	LOS E	9.9	75.2	Full	320	0.0	0.0
Lane 4	136	5.5	136	5.5	245	0.556	100	75.5	LOS E	9.5	72.1	Short	74	0.0	2.7
Approach	489	5.5	489	5.5		0.556		72.4	LOS E	10.0	75.8				
SouthWest: GEH															
Lane 1	586	5.0	586	5.0	1505	0.390	100	9.9	LOS A	9.2	69.4	Short	73	0.0	0.4
Lane 2 (C)	22	0.0	22	0.0	2478	0.009	100	19.7	LOS B	0.7	2.0	Full	500	0.0	0.0
Lane 3 (B-B)	65	100.0	65	100.0	453	0.143	50[6]	22.7	LOS C	2.5	33.1	Two Seg	173	0.0	0.0
Lane 4	682	5.2	682	5.2	786	0.867	98[6]	42.5	LOS D	32.0	243.5	Full	500	0.0	0.0
Lane 5	699	5.2	699	5.2	786	0.890	100	45.2	LOS D	34.2	259.9	Full	500	0.0	0.0
Lane 6	699	5.2	699	5.2	786	0.890	100	45.2	LOS D	34.2	259.9	Full	500	0.0	0.0
Lane 7	69	5.0	69	5.0	274	0.253	100	40.0	LOS D	2.6	19.7	Short	246	0.0	0.0
Approach	2822	7.3	2822	7.3		0.890		36.4	LOS D	34.2	259.9				
Intersection	5864	7.0	5864	7.0		0.961		54.9	LOS D	34.2	259.9				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Hagreaves St - 2016 pm - no development

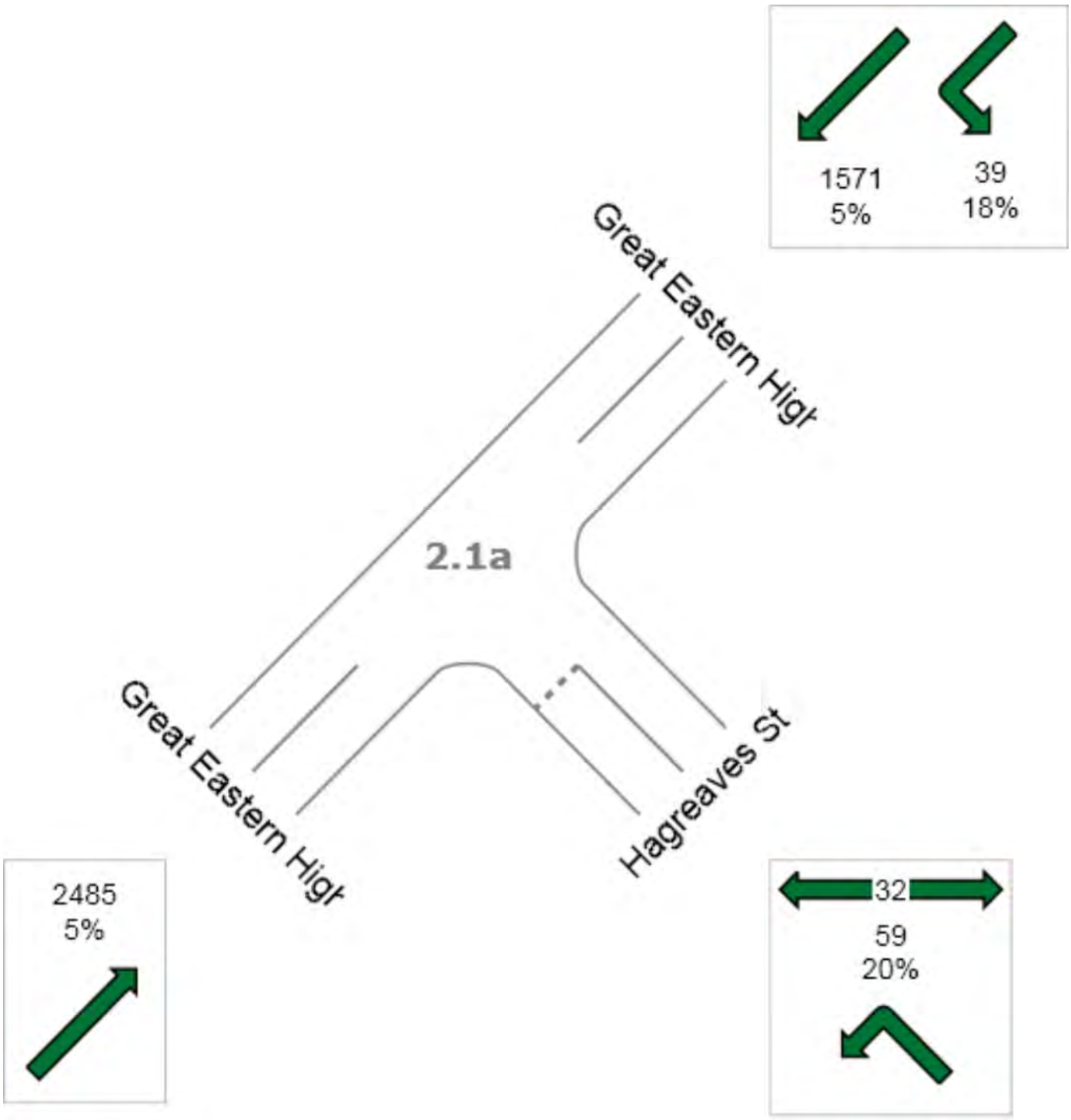
GEH - Hagreaves St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 4154**
- **Light Vehicles (LV): 3790**
- **Heavy Vehicles (HV): 222**
- **Buses (B): 122**
- **Bicycles (C): 21**
- **Pedestrians: 32**



LANE SUMMARY

Site: GEH - Hagreaves St - 2016 pm - no development

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hagreaves St													
Lane 1	62	20.0	1176	0.053	100	7.3	LOS A	0.2	2.0	Full	250	0.0	0.0
Approach	62	20.0		0.053		7.3	LOS A	0.2	2.0				
NorthEast: Great Eastern Highway													
Lane 1 (C)	8	0.0	940	0.009	100	0.6	LOS A	0.0	0.1	Full	110	0.0	0.0
Lane 2 (B-B)	398	18.3	849	0.469	100	1.8	LOS A	2.7	22.3	Two Seg	110	0.0	0.0
Lane 3	429	5.2	916	0.469	100	1.0	LOS A	2.7	20.8	Full	500	0.0	0.0
Lane 4	429	5.2	916	0.469	100	1.0	LOS A	2.7	20.8	Full	500	0.0	0.0
Lane 5	429	5.2	916	0.469	100	1.0	LOS A	2.7	20.8	Full	500	0.0	0.0
Approach	1695	8.2		0.469		1.2	NA	2.7	22.3				
SouthWest: Great Eastern Highway													
Lane 1 (C)	13	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	836	14.1	1852	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	883	5.2	1955	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	883	5.2	1955	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2616	8.0		0.452		0.0	NA	0.0	0.0				
Intersection	4373	8.3		0.469		0.6	NA	2.7	22.3				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: GEH - Hagreaves St - 2016 pm - no development

Network: N.1a - 1.1a-2.1a- 2016 - no dev

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Hagreaves St															
Lane 1	62	20.0	62	20.0	696	0.089	100	118.4	LOS F	5.1	44.6	Full	250	-40.8 N3	0.0
Approach	62	20.0	62	20.0		0.089		118.4	LOS F	5.1	44.6				
NorthEast: Great Eastern Highway															
Lane 1 (C)	8	0.0	8	0.0	940	0.009	100	0.6	LOS A	0.0	0.1	Full	110	0.0	100.0 8
Lane 2 (B-B)	411	17.9	411	17.9	523	0.786	100	229.1	LOS F	127.2	1062.6	Two Seg	110	-38.6 N3	100.0
Lane 3	425	5.2	425	5.2	541	0.786	100	226.3	LOS F	129.5	984.4	Full	500	-40.9 N3	31.4
Lane 4	425	5.2	425	5.2	541	0.786	100	226.3	LOS F	129.5	984.4	Full	500	-40.9 N3	31.4
Lane 5	425	5.2	425	5.2	541	0.786	100	226.3	LOS F	129.5	984.4	Full	500	-40.9 N3	31.4
Approach	1695	8.2	1695	8.2		0.786		225.9	NA	129.5	1062.6				
SouthWest: Great Eastern Highway															
Lane 1 (C)	13	0.0	13	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	836	14.1	836	14.1	1852	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	883	5.2	883	5.2	1955	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	883	5.2	883	5.2	1955	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2616	8.0	2616	8.0		0.452		0.0	NA	0.0	0.0				
Intersection	4373	8.3	4373	8.3		0.786		89.2	NA	129.5	1062.6				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Belgravia St - 2016 pm - with development

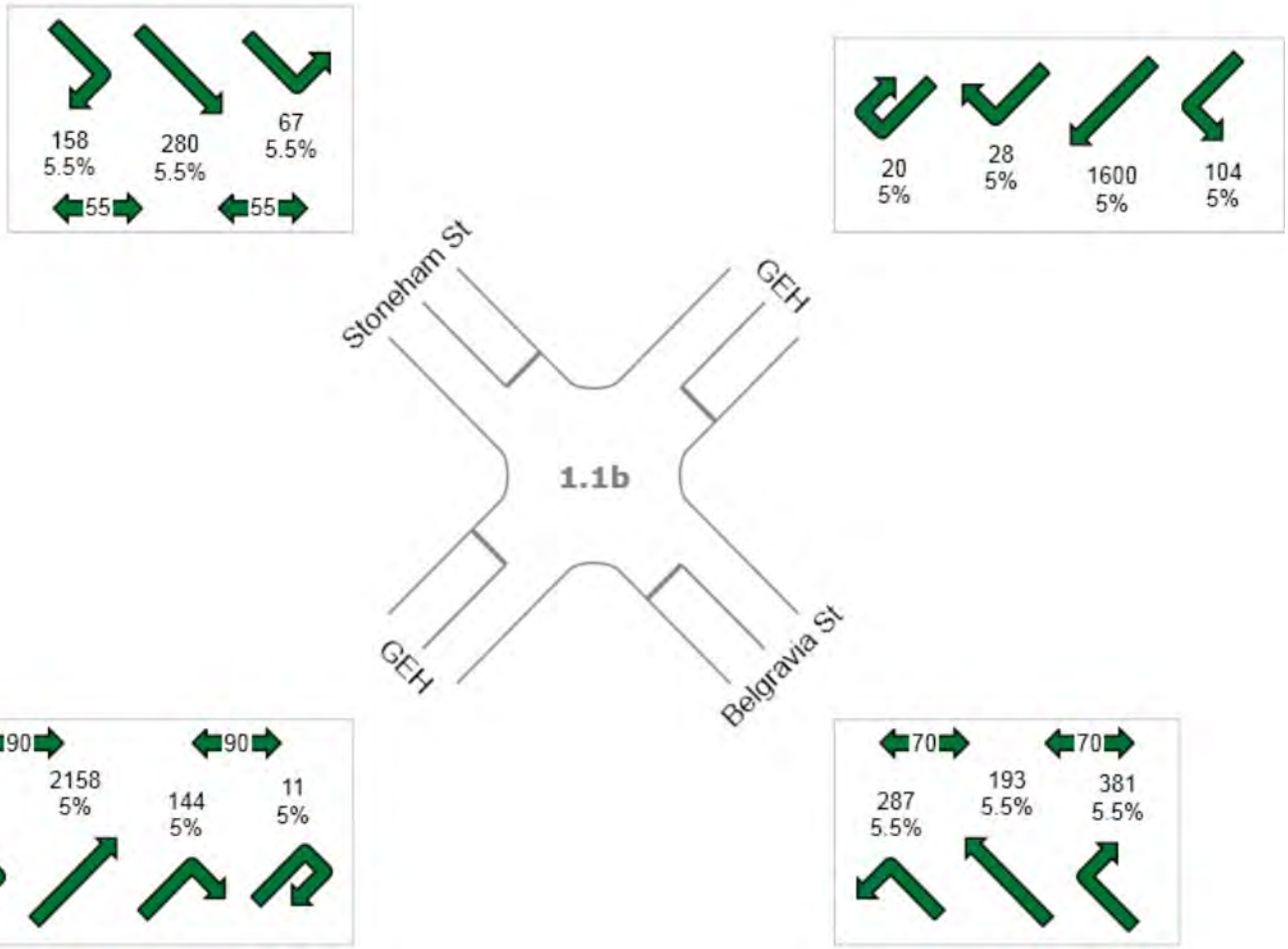
GEH - Belgravia St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 6013**
- **Light Vehicles (LV): 5535**
- **Heavy Vehicles (HV): 307**
- **Buses (B): 113**
- **Bicycles (C): 58**
- **Pedestrians: 430**



PHASING SUMMARY

Site: GEH - Belgravia St - 2016 pm - with development

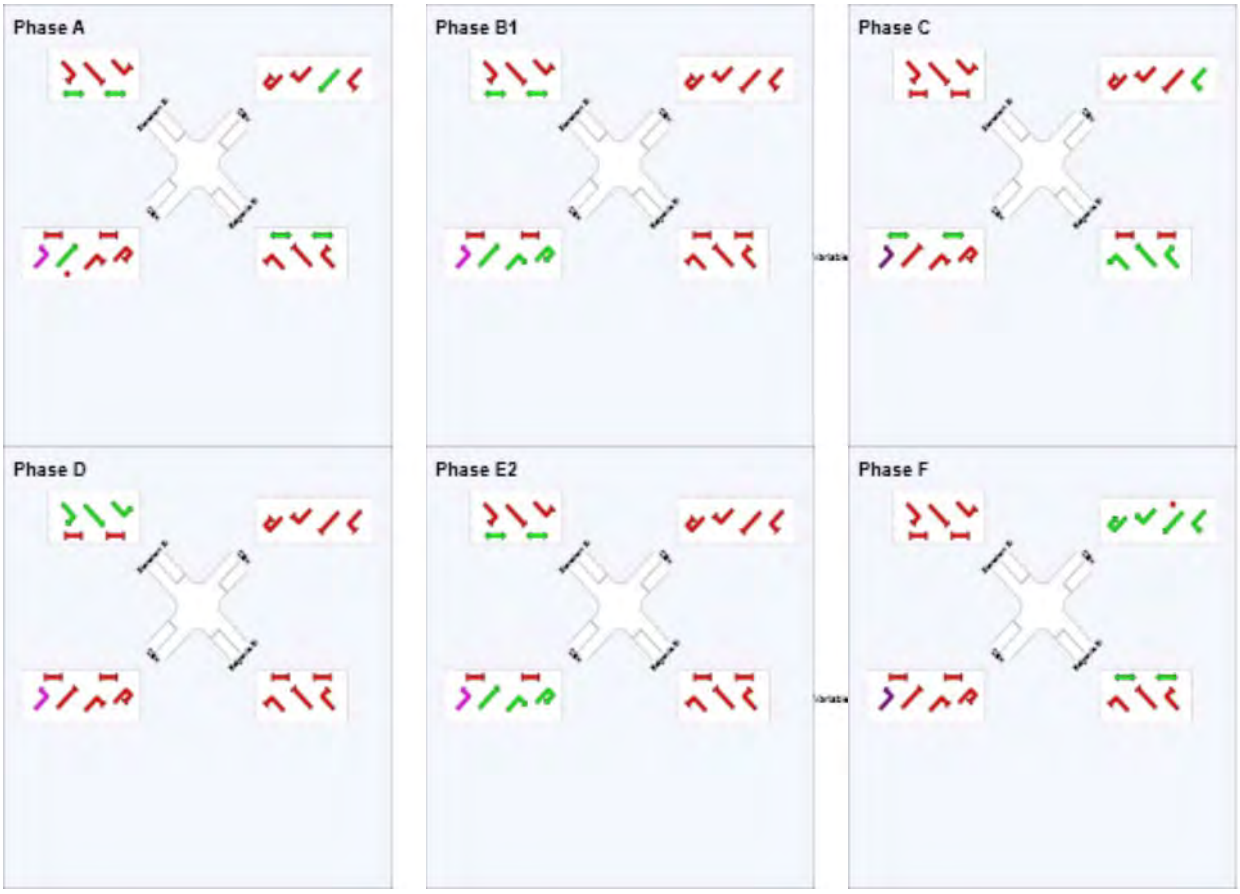
Network: N.1b - 1.1b-2.1b - 2016 - with dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Phase times determined by the program
Sequence: Variable Phasing - 2
Movement Class: All Movement Classes
Input Sequence: A, B1, B2, C, D, E1, E2, F
Output Sequence: A, B1, C, D, E2, F

Phase Timing Results

Phase	A	B1	C	D	E2	F
Green Time (sec)	29	8	32	19	17	9
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	35	14	38	25	23	15
Phase Split	23 %	9 %	25 %	17 %	15 %	10 %



LANE SUMMARY

Site: GEH - Belgravia St - 2016 pm - with development

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St													
Lane 1 (40)	302	5.5	339	0.890	100	75.1	LOS E	22.4	169.8	Full	500	0.0	0.0
Lane 2 (40)	304	5.5	368[1]	0.826	93[5]	64.0	LOS E	21.0	159.5	Full	500	0.0	0.0
Lane 3 (40)	300	5.5	364[1]	0.826	93[5]	67.7	LOS E	20.8	157.6	Short	84	0.0	63.2
Approach	906	5.5		0.890		68.9	LOS E	22.4	169.8				
NorthEast: GEH													
Lane 1 (C)	18	0.0	657	0.027	100	39.1	LOS D	0.8	2.3	Full	83	0.0	0.0
Lane 2 (B-B)	254	24.0	252	1.007	98[6]	67.4	LOS E	17.7	153.8	Two Seg	83	0.0	65.5
Lane 3	511	5.2	500	1.021	99[6]	60.5	LOS E	42.9	326.5	Full	83	0.0	100.0
Lane 4	513	5.2	500	1.026	100	64.1	LOS E	43.9	333.9	Full	83	0.0	100.0
Lane 5	498	5.2	485	1.026	100	64.3	LOS E	42.7	324.5	Full	83	0.0	100.0
Lane 6	51	5.0	98	0.515	100	88.3	LOS F	3.8	28.8	Short	80	0.0	0.0
Approach	1844	7.7		1.026		64.0	LOS E	43.9	333.9				
NorthWest: Stoneham St													
Lane 1	71	5.5	233	0.303	100	74.4	LOS E	4.8	36.1	Short	85	0.0	0.0
Lane 2	157	5.5	245	0.639	100	72.1	LOS E	11.1	84.2	Full	320	0.0	0.0
Lane 3	156	5.5	243	0.639	100	72.7	LOS E	11.0	83.8	Full	320	0.0	0.0
Lane 4	149	5.5	233	0.639	100	77.3	LOS E	10.6	80.2	Short	74	0.0	12.2
Approach	532	5.5		0.639		74.0	LOS E	11.1	84.2				
SouthWest: GEH													
Lane 1	613	5.0	1483	0.413	100	10.5	LOS B	10.7	80.9	Short	73	0.0	14.3
Lane 2 (C)	23	0.0	2478	0.009	100	18.6	LOS B	0.7	2.0	Full	500	0.0	0.0
Lane 3 (B-B)	68	100.0	453	0.150	50[6]	21.5	LOS C	2.6	33.3	Two Seg	173	0.0	0.0
Lane 4	715	5.2	786	0.910	98[6]	47.3	LOS D	37.3	283.4	Full	500	0.0	0.0
Lane 5	733	5.2	786	0.933	100	52.3	LOS D	41.8	318.1	Full	500	0.0	0.0
Lane 6	733	5.2	786	0.933	100	52.3	LOS D	41.8	318.1	Full	500	0.0	0.0
Lane 7	163	5.0	304	0.536	100	40.4	LOS D	6.2	47.1	Short	246	0.0	0.0
Approach	3047	7.2		0.933		41.1	LOS D	41.8	318.1				
Intersection	6329	7.0		1.026		54.6	LOS D	43.9	333.9				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: GEH - Belgravia St - 2016 pm - with development

Network: N.1b - 1.1b-2.1b - 2016 - with dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Belgravia St															
Lane 1 (40)	302	5.5	302	5.5	339	0.890	100	75.1	LOS E	22.4	169.8	Full	500	0.0	0.0
Lane 2 (40)	304	5.5	304	5.5	368[1]	0.826	93[5]	64.0	LOS E	21.0	159.5	Full	500	0.0	0.0
Lane 3 (40)	300	5.5	300	5.5	364[1]	0.826	93[5]	67.7	LOS E	20.8	157.6	Short	84	0.0	63.2
Approach	906	5.5	906	5.5		0.890		68.9	LOS E	22.4	169.8				
NorthEast: GEH															
Lane 1 (C)	18	0.0	18	0.0	657	0.027	100	39.1	LOS D	0.8	2.3	Full	83	0.0	0.0
Lane 2 (B-B)	254	24.0	254	24.0	252	1.007	98[6]	67.4	LOS E	17.7	153.8	Two Seg	83	0.0	65.5
Lane 3	511	5.2	511	5.2	500	1.021	99[6]	60.5	LOS E	42.9	326.5	Full	83	0.0	100.0
Lane 4	513	5.2	513	5.2	500	1.026	100	64.1	LOS E	43.9	333.9	Full	83	0.0	100.0
Lane 5	498	5.2	498	5.2	485	1.026	100	64.3	LOS E	42.7	324.5	Full	83	0.0	100.0
Lane 6	51	5.0	51	5.0	98	0.515	100	88.3	LOS F	3.8	28.8	Short	80	0.0	0.0
Approach	1844	7.7	1844	7.7		1.026		64.0	LOS E	43.9	333.9				
NorthWest: Stoneham St															
Lane 1	71	5.5	71	5.5	233	0.303	100	74.4	LOS E	4.8	36.1	Short	85	0.0	0.0
Lane 2	157	5.5	157	5.5	245	0.639	100	72.1	LOS E	11.1	84.2	Full	320	0.0	0.0
Lane 3	156	5.5	156	5.5	243	0.639	100	72.7	LOS E	11.0	83.8	Full	320	0.0	0.0
Lane 4	149	5.5	149	5.5	233	0.639	100	77.3	LOS E	10.6	80.2	Short	74	0.0	12.2
Approach	532	5.5	532	5.5		0.639		74.0	LOS E	11.1	84.2				
SouthWest: GEH															
Lane 1	613	5.0	613	5.0	1483	0.413	100	10.5	LOS B	10.7	80.9	Short	73	0.0	14.3
Lane 2 (C)	23	0.0	23	0.0	2478	0.009	100	18.6	LOS B	0.7	2.0	Full	500	0.0	0.0
Lane 3 (B-B)	68	100.0	68	100.0	453	0.150	50[6]	21.5	LOS C	2.6	33.3	Two Seg	173	0.0	0.0
Lane 4	715	5.2	715	5.2	786	0.910	98[6]	47.3	LOS D	37.3	283.4	Full	500	0.0	0.0
Lane 5	733	5.2	733	5.2	786	0.933	100	52.3	LOS D	41.8	318.1	Full	500	0.0	0.0
Lane 6	733	5.2	733	5.2	786	0.933	100	52.3	LOS D	41.8	318.1	Full	500	0.0	0.0
Lane 7	163	5.0	163	5.0	304	0.536	100	40.4	LOS D	6.2	47.1	Short	246	0.0	0.0
Approach	3047	7.2	3047	7.2		0.933		41.1	LOS D	41.8	318.1				
Intersection	6329	7.0	6329	7.0		1.026		54.6	LOS D	43.9	333.9				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
5 Lane underutilisation determined by program
6 Lane underutilisation due to downstream effects

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Hagreaves St - 2016 pm - with development

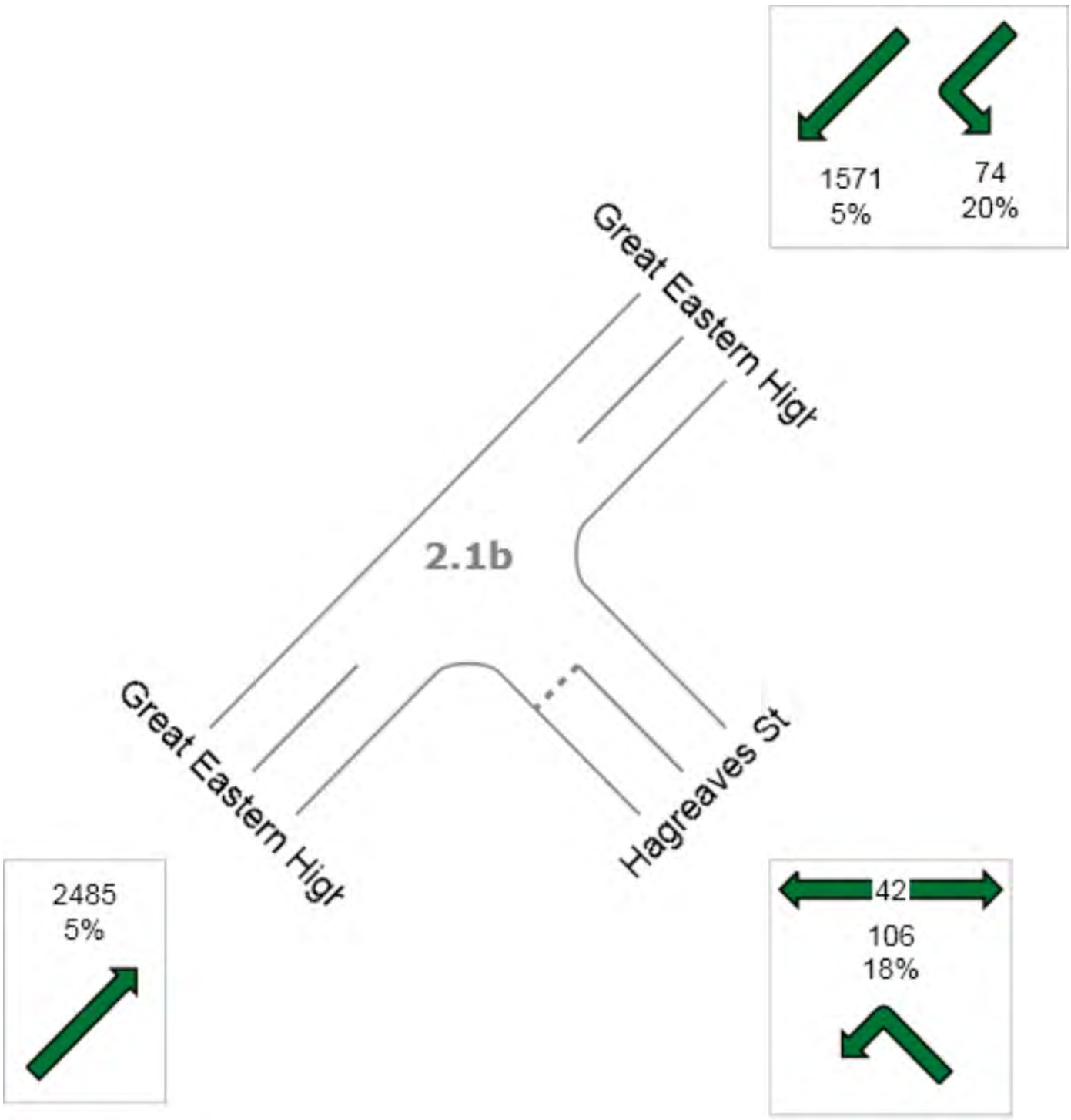
GEH - Hagreaves St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 4236**
- **Light Vehicles (LV): 3856**
- **Heavy Vehicles (HV): 237**
- **Buses (B): 122**
- **Bicycles (C): 21**
- **Pedestrians: 42**



LANE SUMMARY

Site: GEH - Hagreaves St - 2016 pm - with development

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hagreaves St													
Lane 1	112	18.0	1177	0.095	100	7.4	LOS A	0.4	3.6	Full	250	0.0	0.0
Approach	112	18.0		0.095		7.4	LOS A	0.4	3.6				
NorthEast: Great Eastern Highway													
Lane 1 (C)	9	0.0	875	0.010	100	1.2	LOS A	0.0	0.1	Full	110	0.0	0.0
Lane 2 (B-B)	405	19.7	784	0.517	100	3.6	LOS A	3.4	28.5	Two Seg	110	0.0	0.0
Lane 3	439	5.2	850	0.517	100	2.2	LOS A	3.6	27.2	Full	500	0.0	0.0
Lane 4	439	5.2	850	0.517	100	2.2	LOS A	3.6	27.2	Full	500	0.0	0.0
Lane 5	439	5.2	850	0.517	100	2.2	LOS A	3.6	27.2	Full	500	0.0	0.0
Approach	1732	8.5		0.517		2.5	NA	3.6	28.5				
SouthWest: Great Eastern Highway													
Lane 1 (C)	13	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	836	14.1	1852	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	883	5.2	1955	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	883	5.2	1955	0.452	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2616	8.0		0.452		0.0	NA	0.0	0.0				
Intersection	4459	8.5		0.517		1.2	NA	3.6	28.5				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: GEH - Hagreaves St - 2016 pm - with development

Network: N.1b - 1.1b-2.1b - 2016 - with dev

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Hagreaves St															
Lane 1	112	18.0	112	18.0	697	0.160	100	100.5	LOS F	7.6	65.3	Full	250	-40.8 N3	0.0
Approach	112	18.0	112	18.0		0.160		100.5	LOS F	7.6	65.3				
NorthEast: Great Eastern Highway															
Lane 1 (C)	9	0.0	9	0.0	875	0.010	100	1.2	LOS A	0.0	0.1	Full	110	0.0	100.0 8
Lane 2 (B-B)	429	18.8	429	18.8	500	0.858	100	192.7	LOS F	101.8	858.8	Two Seg	110	-36.4 N3	100.0
Lane 3	431	5.2	431	5.2	502	0.858	100	178.6	LOS F	93.0	707.3	Full	500	-40.9 N3	16.4
Lane 4	431	5.2	431	5.2	502	0.858	100	178.6	LOS F	93.0	707.3	Full	500	-40.9 N3	16.4
Lane 5	431	5.2	431	5.2	502	0.858	100	178.6	LOS F	93.0	707.3	Full	500	-40.9 N3	16.4
Approach	1732	8.5	1732	8.5		0.858		181.2	NA	101.8	858.8				
SouthWest: Great Eastern Highway															
Lane 1 (C)	13	0.0	13	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	836	14.1	818	14.3	1849	0.442	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	884	5.2	865	5.2	1955	0.442	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	884	5.2	865	5.2	1955	0.442	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2616	8.0	2560 N1	8.1		0.442		0.0	NA	0.0	0.0				
Intersection	4459	8.5	4404 N1	8.6		0.858		72.9	NA	101.8	858.8				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Belgravia St - 2021 pm - no development

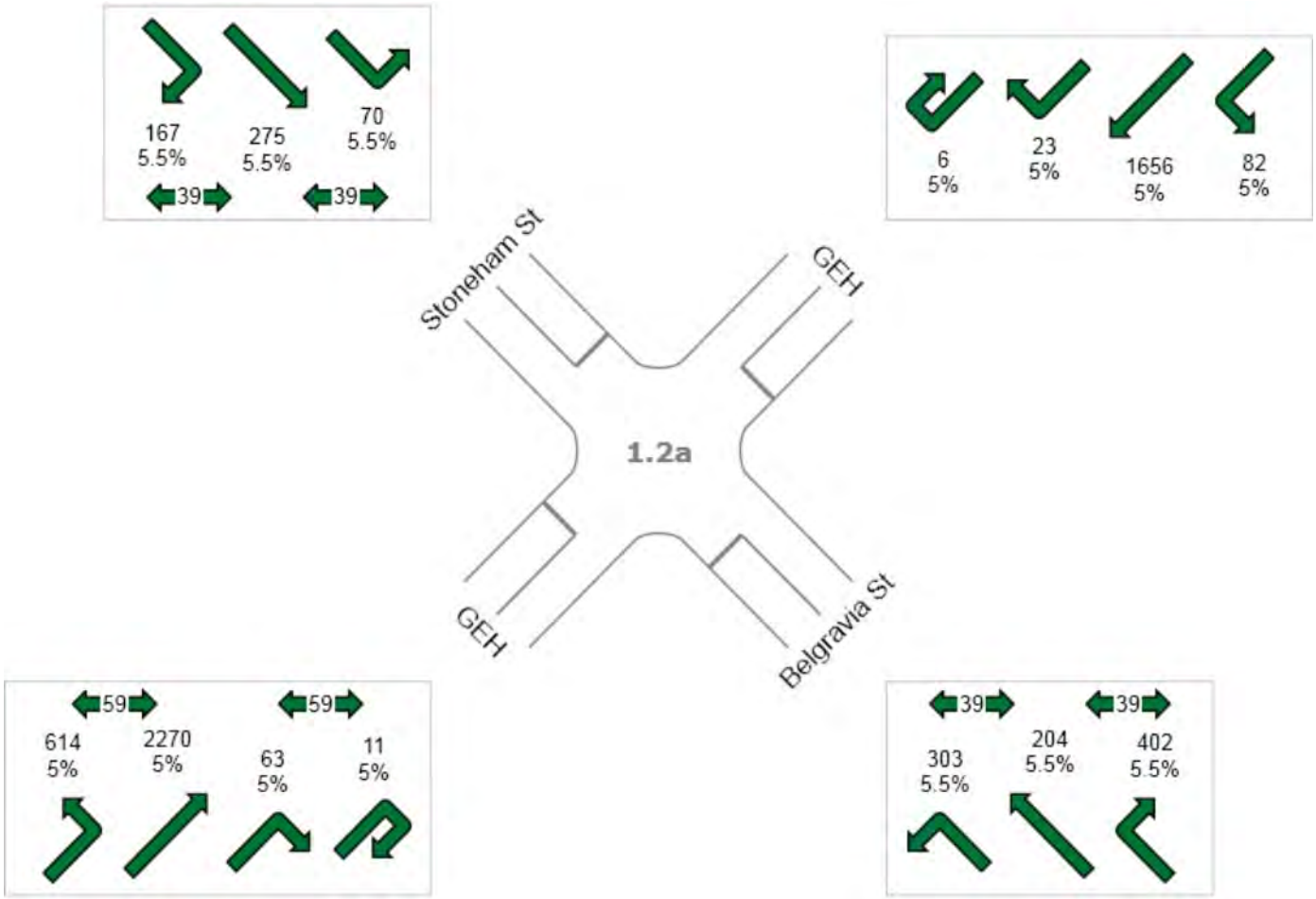
GEH - Belgravia St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 6146**
- **Light Vehicles (LV): 5653**
- **Heavy Vehicles (HV): 314**
- **Buses (B): 118**
- **Bicycles (C): 60**
- **Pedestrians: 274**



PHASING SUMMARY

Site: GEH - Belgravia St - 2021 pm - no development

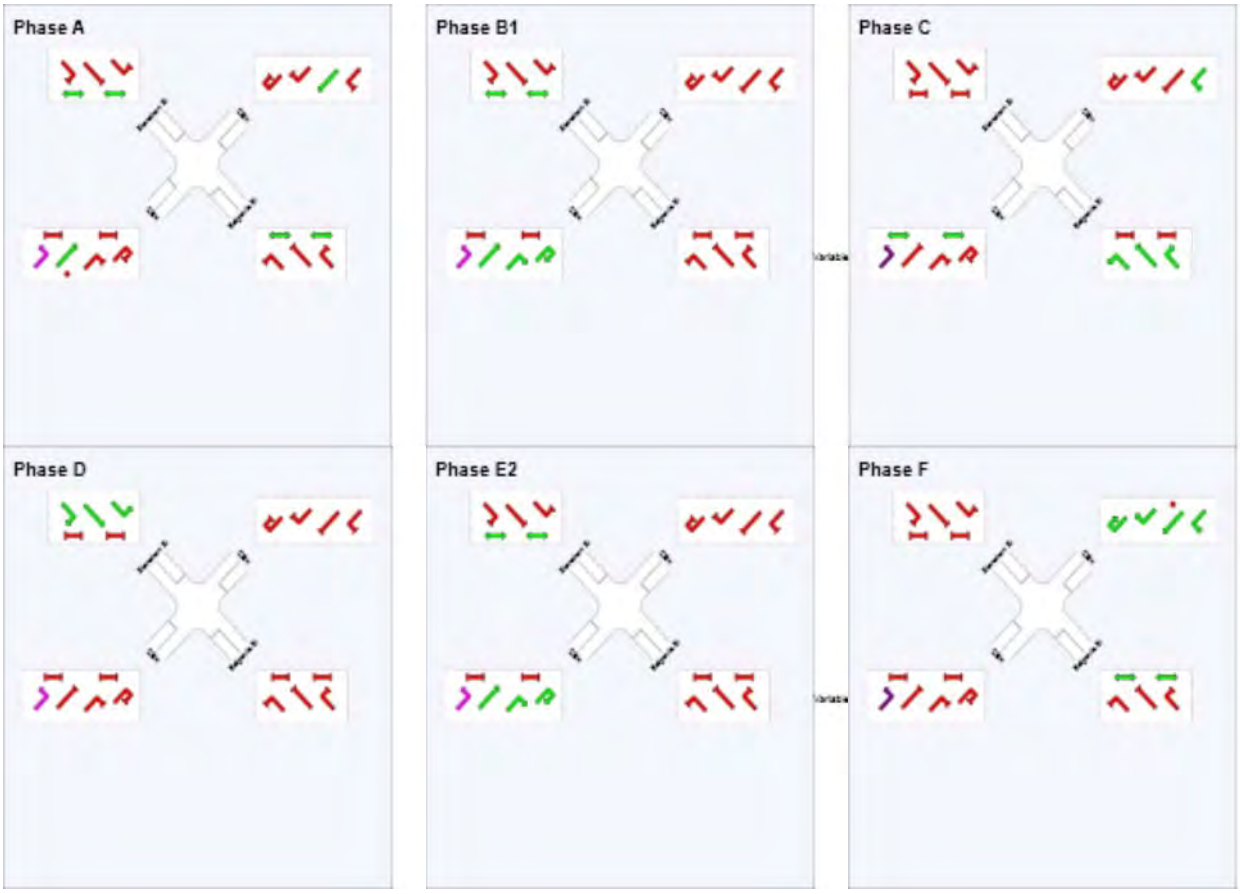
Network: N.2a - 1.2a-2.2a - 2021 - no dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Phase times determined by the program
Sequence: Variable Phasing - 2
Movement Class: All Movement Classes
Input Sequence: A, B1, B2, C, D, E1, E2, F
Output Sequence: A, B1, C, D, E2, F

Phase Timing Results

Phase	A	B1	C	D	E2	F
Green Time (sec)	31	6	34	20	17	6
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	37	12	40	26	23	12
Phase Split	25 %	8 %	27 %	17 %	15 %	8 %



LANE SUMMARY

Site: GEH - Belgravia St - 2021 pm - no development

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St													
Lane 1 (40)	322	5.5	377	0.854	100	70.3	LOS E	23.0	174.4	Full	500	0.0	0.0
Lane 2 (40)	320	5.5	374[1]	0.854	100	62.9	LOS E	22.0	167.6	Full	500	0.0	0.0
Lane 3 (40)	316	5.5	369[1]	0.854	100	66.6	LOS E	21.9	165.5	Short	84	0.0	67.9
Approach	957	5.5		0.854		66.6	LOS E	23.0	174.4				
NorthEast: GEH													
Lane 1 (C)	18	0.0	691	0.026	100	38.4	LOS D	0.8	2.3	Full	83	0.0	0.0
Lane 2 (B-B)	277	23.1	266	1.042	98[6]	98.2	LOS F	23.3	200.7	Two Seg	83	0.0	91.5
Lane 3	515	5.2	487	1.057	99[6]	82.7	LOS F	48.6	370.0	Full	83	0.0	100.0
Lane 4	517	5.2	487	1.062	100	87.0	LOS F	49.7	378.3	Full	83	0.0	100.0
Lane 5	502	5.2	473	1.062	100	87.2	LOS F	48.3	367.6	Full	83	0.0	100.0
Lane 6	31	5.0	70	0.439	100	90.7	LOS F	2.3	17.8	Short	80	0.0	0.0
Approach	1860	7.8		1.062		87.1	LOS F	49.7	378.3				
NorthWest: Stoneham St													
Lane 1	74	5.5	245	0.301	100	73.4	LOS E	4.9	37.4	Short	85	0.0	0.0
Lane 2	158	5.5	258	0.613	100	70.9	LOS E	11.1	84.3	Full	320	0.0	0.0
Lane 3	157	5.5	255	0.613	100	71.8	LOS E	11.0	83.6	Full	320	0.0	0.0
Lane 4	150	5.5	245	0.613	100	76.2	LOS E	10.6	80.2	Short	74	0.0	12.3
Approach	539	5.5		0.613		73.0	LOS E	11.1	84.3				
SouthWest: GEH													
Lane 1	646	5.0	1486	0.435	100	10.6	LOS B	11.6	87.7	Short	73	0.0	21.6
Lane 2 (C)	24	0.0	2478	0.010	100	19.7	LOS B	0.8	2.2	Full	500	0.0	0.0
Lane 3 (B-B)	72	100.0	453	0.158	50[6]	22.9	LOS C	2.8	36.7	Two Seg	173	0.0	0.0
Lane 4	752	5.2	786	0.957	98[6]	60.9	LOS E	47.5	360.9	Full	500	0.0	0.0
Lane 5	771	5.2	786	0.981	100	71.6	LOS E	54.2	412.4	Full	500	0.0	0.0
Lane 6	771	5.2	786	0.981	100	71.6	LOS E	54.2	412.4	Full	500	0.0	0.0
Lane 7	78	5.0	273	0.285	100	40.2	LOS D	2.9	22.2	Short	246	0.0	0.0
Approach	3114	7.3		0.981		54.0	LOS D	54.2	412.4				
Intersection	6469	7.0		1.062		67.0	LOS E	54.2	412.4				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: GEH - Belgravia St - 2021 pm - no development

Network: N.2a - 1.2a-2.2a - 2021 - no dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Belgravia St															
Lane 1 (40)	322	5.5	322	5.5	377	0.854	100	70.3	LOS E	23.0	174.4	Full	500	0.0	0.0
Lane 2 (40)	320	5.5	320	5.5	374[1]	0.854	100	62.9	LOS E	22.0	167.6	Full	500	0.0	0.0
Lane 3 (40)	316	5.5	316	5.5	369[1]	0.854	100	66.6	LOS E	21.9	165.5	Short	84	0.0	67.9
Approach	957	5.5	957	5.5		0.854		66.6	LOS E	23.0	174.4				
NorthEast: GEH															
Lane 1 (C)	18	0.0	18	0.0	691	0.026	100	38.4	LOS D	0.8	2.3	Full	83	0.0	0.0
Lane 2 (B-B)	277	23.1	277	23.1	266	1.042	98[6]	98.2	LOS F	23.3	200.7	Two Seg	83	0.0	91.5
Lane 3	515	5.2	515	5.2	487	1.057	99[6]	82.7	LOS F	48.6	370.0	Full	83	0.0	100.0
Lane 4	517	5.2	517	5.2	487	1.062	100	87.0	LOS F	49.7	378.3	Full	83	0.0	100.0
Lane 5	502	5.2	502	5.2	473	1.062	100	87.2	LOS F	48.3	367.6	Full	83	0.0	100.0
Lane 6	31	5.0	31	5.0	70	0.439	100	90.7	LOS F	2.3	17.8	Short	80	0.0	0.0
Approach	1860	7.8	1860	7.8		1.062		87.1	LOS F	49.7	378.3				
NorthWest: Stoneham St															
Lane 1	74	5.5	74	5.5	245	0.301	100	73.4	LOS E	4.9	37.4	Short	85	0.0	0.0
Lane 2	158	5.5	158	5.5	258	0.613	100	70.9	LOS E	11.1	84.3	Full	320	0.0	0.0
Lane 3	157	5.5	157	5.5	255	0.613	100	71.8	LOS E	11.0	83.6	Full	320	0.0	0.0
Lane 4	150	5.5	150	5.5	245	0.613	100	76.2	LOS E	10.6	80.2	Short	74	0.0	12.3
Approach	539	5.5	539	5.5		0.613		73.0	LOS E	11.1	84.3				
SouthWest: GEH															
Lane 1	646	5.0	646	5.0	1486	0.435	100	10.6	LOS B	11.6	87.7	Short	73	0.0	21.6
Lane 2 (C)	24	0.0	24	0.0	2478	0.010	100	19.7	LOS B	0.8	2.2	Full	500	0.0	0.0
Lane 3 (B-B)	72	100.0	72	100.0	453	0.158	50[6]	22.9	LOS C	2.8	36.7	Two Seg	173	0.0	0.0
Lane 4	752	5.2	752	5.2	786	0.957	98[6]	60.9	LOS E	47.5	360.9	Full	500	0.0	0.0
Lane 5	771	5.2	771	5.2	786	0.981	100	71.6	LOS E	54.2	412.4	Full	500	0.0	0.0
Lane 6	771	5.2	771	5.2	786	0.981	100	71.6	LOS E	54.2	412.4	Full	500	0.0	0.0
Lane 7	78	5.0	78	5.0	273	0.285	100	40.2	LOS D	2.9	22.2	Short	246	0.0	0.0
Approach	3114	7.3	3114	7.3		0.981		54.0	LOS D	54.2	412.4				
Intersection	6469	7.0	6469	7.0		1.062		67.0	LOS E	54.2	412.4				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Hagreaves St - 2021 pm - no development

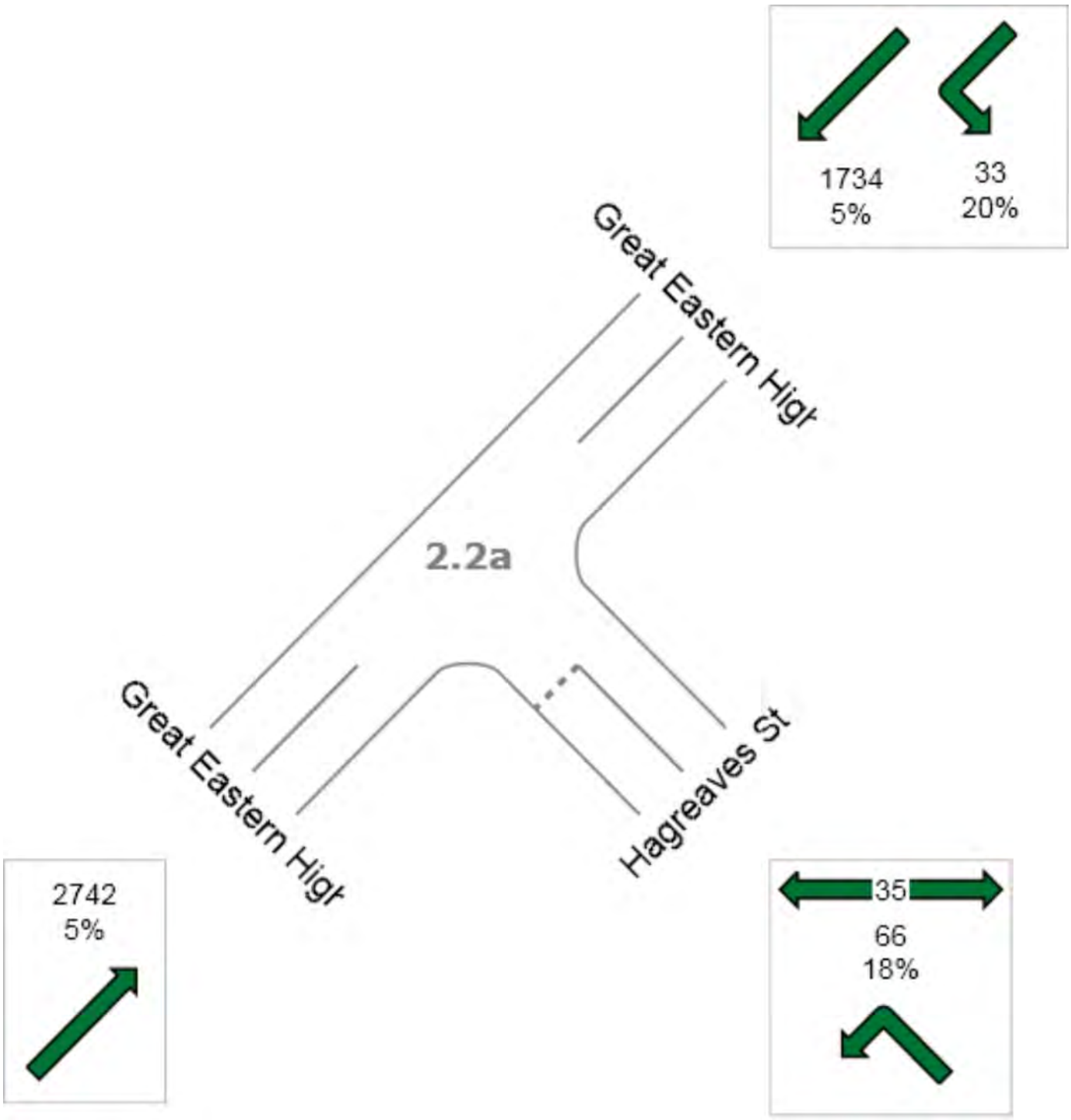
GEH - Hagreaves St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 4575**
- **Light Vehicles (LV): 4176**
- **Heavy Vehicles (HV): 242**
- **Buses (B): 134**
- **Bicycles (C): 23**
- **Pedestrians: 35**



LANE SUMMARY

Site: GEH - Hagreaves St - 2021 pm - no development

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hagreaves St													
Lane 1	69	18.0	1184	0.059	100	7.4	LOS A	0.3	2.2	Full	250	0.0	0.0
Approach	69	18.0		0.059		7.4	LOS A	0.3	2.2				
NorthEast: Great Eastern Highway													
Lane 1 (C)	9	0.0	931	0.010	100	0.7	LOS A	0.0	0.1	Full	110	0.0	0.0
Lane 2 (B-B)	438	18.2	842	0.520	100	1.9	LOS A	3.2	26.7	Two Seg	110	0.0	0.0
Lane 3	471	5.2	907	0.520	100	1.2	LOS A	3.3	24.8	Full	500	0.0	0.0
Lane 4	471	5.2	907	0.520	100	1.2	LOS A	3.3	24.8	Full	500	0.0	0.0
Lane 5	471	5.2	907	0.520	100	1.2	LOS A	3.3	24.8	Full	500	0.0	0.0
Approach	1860	8.2		0.520		1.3	NA	3.3	26.7				
SouthWest: Great Eastern Highway													
Lane 1 (C)	14	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	923	14.1	1852	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	975	5.2	1955	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	975	5.2	1955	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2886	8.0		0.498		0.0	NA	0.0	0.0				
Intersection	4816	8.2		0.520		0.6	NA	3.3	26.7				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: GEH - Hagreaves St - 2021 pm - no development

Network: N.2a - 1.2a-2.2a - 2021 - no dev

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Hagreaves St															
Lane 1	69	18.0	69	18.0	701	0.099	100	110.0	LOS F	5.3	45.3	Full	250	-40.8 N3	0.0
Approach	69	18.0	69	18.0		0.099		110.0	LOS F	5.3	45.3				
NorthEast: Great Eastern Highway															
Lane 1 (C)	9	0.0	9	0.0	931	0.010	100	0.7	LOS A	0.0	0.1	Full	110	0.0	100.0 8
Lane 2 (B-B)	448	17.9	448	17.9	514	0.873	100	282.5	LOS F	159.1	1329.1	Two Seg	110	-39.1 N3	100.0
Lane 3	467	5.2	467	5.2	536	0.873	100	280.3	LOS F	164.5	1250.8	Full	500	-40.9 N3	50.7
Lane 4	467	5.2	467	5.2	536	0.873	100	280.3	LOS F	164.5	1250.8	Full	500	-40.9 N3	50.7
Lane 5	467	5.2	467	5.2	536	0.873	100	280.3	LOS F	164.5	1250.8	Full	500	-40.9 N3	50.7
Approach	1860	8.2	1860	8.2		0.873		279.4	NA	164.5	1329.1				
SouthWest: Great Eastern Highway															
Lane 1 (C)	14	0.0	14	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	923	14.1	923	14.1	1852	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	975	5.2	975	5.2	1955	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	975	5.2	975	5.2	1955	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2886	8.0	2886	8.0		0.498		0.0	NA	0.0	0.0				
Intersection	4816	8.2	4816	8.2		0.873		109.5	NA	164.5	1329.1				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Belgravia St - 2021 pm - with development

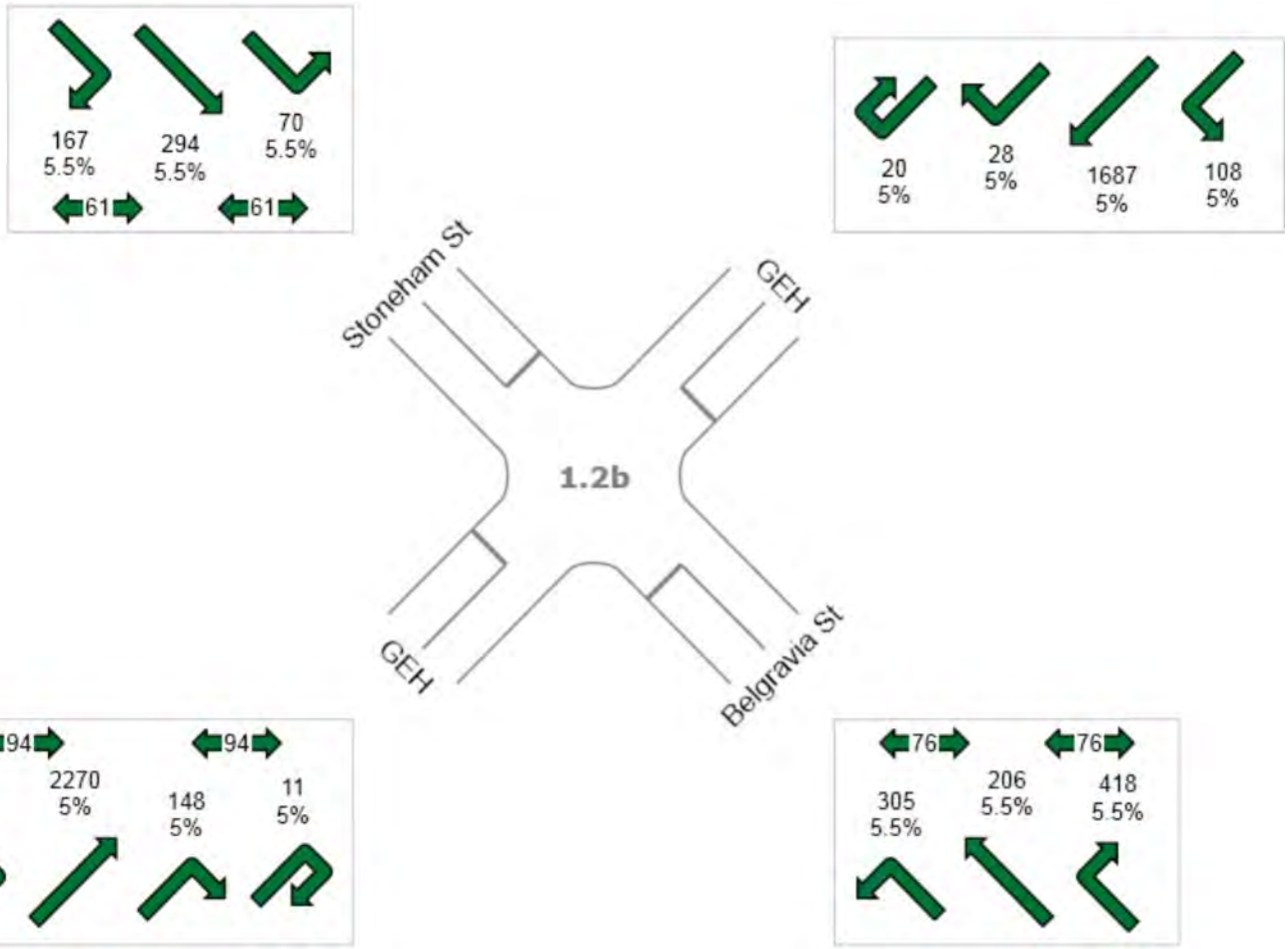
GEH - Belgravia St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 6346**
- **Light Vehicles (LV): 5841**
- **Heavy Vehicles (HV): 325**
- **Buses (B): 119**
- **Bicycles (C): 61**
- **Pedestrians: 462**



PHASING SUMMARY

Site: GEH - Belgravia St - 2021 pm - with development

Network: N.2b - 1.2b-2.2b - 2021 - with dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Phase times determined by the program
Sequence: Variable Phasing - 2
Movement Class: All Movement Classes
Input Sequence: A, B1, B2, C, D, E1, E2, F
Output Sequence: A, C, D, E2, F

Phase Timing Results

Phase	A	C	D	E2	F
Green Time (sec)	30	36	22	23	9
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	36	42	28	29	15
Phase Split	24 %	28 %	19 %	19 %	10 %

Normal Movement
Permitted/Opposed
Slip/Bypass-Lane Movement
Opposed Slip/Bypass-Lane
Stopped Movement
Turn On Red
Other Movement Class Running
Other Movement Class Stopped
Mixed Running & Stopped Movement Classes
Undetected Movement
Phase Transition Applied

LANE SUMMARY

Site: GEH - Belgravia St - 2021 pm - with development

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St													
Lane 1 (40)	327	5.5	390	0.838	100	68.7	LOS E	23.0	174.6	Full	500	0.0	0.0
Lane 2 (40)	327	5.5	390[1]	0.838	100	60.6	LOS E	22.0	167.6	Full	500	0.0	0.0
Lane 3 (40)	325	5.5	387[1]	0.838	100	64.2	LOS E	22.0	166.6	Short	84	0.0	68.5
Approach	978	5.5		0.838		64.5	LOS E	23.0	174.6				
NorthEast: GEH													
Lane 1 (C)	19	0.0	699	0.027	100	44.8	LOS D	1.0	2.7	Full	83	0.0	0.0
Lane 2 (B-B)	257	24.8	247	1.040	98[6]	88.3	LOS F	22.3	194.3	Two Seg	83	0.0	88.3
Lane 3	541	5.2	513	1.055	99[6]	85.1	LOS F	50.6	385.2	Full	83	0.0	100.0
Lane 4	544	5.2	513	1.060	100	89.3	LOS F	51.8	393.8	Full	83	0.0	100.0
Lane 5	528	5.2	498	1.060	100	89.5	LOS F	50.3	382.7	Full	83	0.0	100.0
Lane 6	51	5.0	98	0.515	100	88.3	LOS F	3.8	28.8	Short	80	0.0	0.0
Approach	1940	7.7		1.060		87.6	LOS F	51.8	393.8				
NorthWest: Stoneham St													
Lane 1	74	5.5	269	0.274	100	71.2	LOS E	4.8	36.7	Short	85	0.0	0.0
Lane 2	165	5.5	284	0.581	100	68.8	LOS E	11.4	86.5	Full	320	0.0	0.0
Lane 3	164	5.5	282	0.581	100	69.4	LOS E	11.3	86.0	Full	320	0.0	0.0
Lane 4	157	5.5	270	0.581	100	74.0	LOS E	10.9	82.3	Short	74	0.0	14.6
Approach	559	5.5		0.581		70.8	LOS E	11.4	86.5				
SouthWest: GEH													
Lane 1	646	5.0	1459	0.443	100	10.6	LOS B	11.7	87.9	Short	73	0.0	21.9
Lane 2 (C)	24	0.0	2189	0.011	100	22.1	LOS C	0.9	2.3	Full	500	0.0	0.0
Lane 3 (B-B)	72	100.0	400	0.179	50[6]	25.5	LOS C	2.9	38.1	Two Seg	173	0.0	0.0
Lane 4	752	5.2	694	1.083	98[6]	121.0	LOS F	72.0	547.8	Full	500	0.0	13.2
Lane 5	771	5.2	694	1.111	100	144.2	LOS F	80.2	610.0	Full	500	0.0	23.0
Lane 6	771	5.2	694	1.111	100	144.2	LOS F	80.2	610.0	Full	500	0.0	23.0
Lane 7	167	5.0	280	0.598	100	73.8	LOS E	11.6	87.9	Short	246	0.0	0.0
Approach	3203	7.2		1.111		104.6	LOS F	80.2	610.0				
Intersection	6680	7.0		1.111		90.9	LOS F	80.2	610.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: GEH - Belgravia St - 2021 pm - with development

Network: N.2b - 1.2b-2.2b - 2021 - with dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Belgravia St															
Lane 1 (40)	327	5.5	327	5.5	390	0.838	100	68.7	LOS E	23.0	174.6	Full	500	0.0	0.0
Lane 2 (40)	327	5.5	327	5.5	390[1]	0.838	100	60.6	LOS E	22.0	167.6	Full	500	0.0	0.0
Lane 3 (40)	325	5.5	325	5.5	387[1]	0.838	100	64.2	LOS E	22.0	166.6	Short	84	0.0	68.5
Approach	978	5.5	978	5.5		0.838		64.5	LOS E	23.0	174.6				
NorthEast: GEH															
Lane 1 (C)	19	0.0	19	0.0	699	0.027	100	44.8	LOS D	1.0	2.7	Full	83	0.0	0.0
Lane 2 (B-B)	257	24.8	257	24.8	247	1.040	98[6]	88.3	LOS F	22.3	194.3	Two Seg	83	0.0	88.3
Lane 3	541	5.2	541	5.2	513	1.055	99[6]	85.1	LOS F	50.6	385.2	Full	83	0.0	100.0
Lane 4	544	5.2	544	5.2	513	1.060	100	89.3	LOS F	51.8	393.8	Full	83	0.0	100.0
Lane 5	528	5.2	528	5.2	498	1.060	100	89.5	LOS F	50.3	382.7	Full	83	0.0	100.0
Lane 6	51	5.0	51	5.0	98	0.515	100	88.3	LOS F	3.8	28.8	Short	80	0.0	0.0
Approach	1940	7.7	1940	7.7		1.060		87.6	LOS F	51.8	393.8				
NorthWest: Stoneham St															
Lane 1	74	5.5	74	5.5	269	0.274	100	71.2	LOS E	4.8	36.7	Short	85	0.0	0.0
Lane 2	165	5.5	165	5.5	284	0.581	100	68.8	LOS E	11.4	86.5	Full	320	0.0	0.0
Lane 3	164	5.5	164	5.5	282	0.581	100	69.4	LOS E	11.3	86.0	Full	320	0.0	0.0
Lane 4	157	5.5	157	5.5	270	0.581	100	74.0	LOS E	10.9	82.3	Short	74	0.0	14.6
Approach	559	5.5	559	5.5		0.581		70.8	LOS E	11.4	86.5				
SouthWest: GEH															
Lane 1	646	5.0	646	5.0	1459	0.443	100	10.6	LOS B	11.7	87.9	Short	73	0.0	21.9
Lane 2 (C)	24	0.0	24	0.0	2189	0.011	100	22.1	LOS C	0.9	2.3	Full	500	0.0	0.0
Lane 3 (B-B)	72	100.0	72	100.0	400	0.179	50[6]	25.5	LOS C	2.9	38.1	Two Seg	173	0.0	0.0
Lane 4	752	5.2	752	5.2	694	1.083	98[6]	121.0	LOS F	72.0	547.8	Full	500	0.0	13.2
Lane 5	771	5.2	771	5.2	694	1.111	100	144.2	LOS F	80.2	610.0	Full	500	0.0	23.0
Lane 6	771	5.2	771	5.2	694	1.111	100	144.2	LOS F	80.2	610.0	Full	500	0.0	23.0
Lane 7	167	5.0	167	5.0	280	0.598	100	73.8	LOS E	11.6	87.9	Short	246	0.0	0.0
Approach	3203	7.2	3203	7.2		1.111		104.6	LOS F	80.2	610.0				
Intersection	6680	7.0	6680	7.0		1.111		90.9	LOS F	80.2	610.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Hagreaves St - 2021 pm - with development

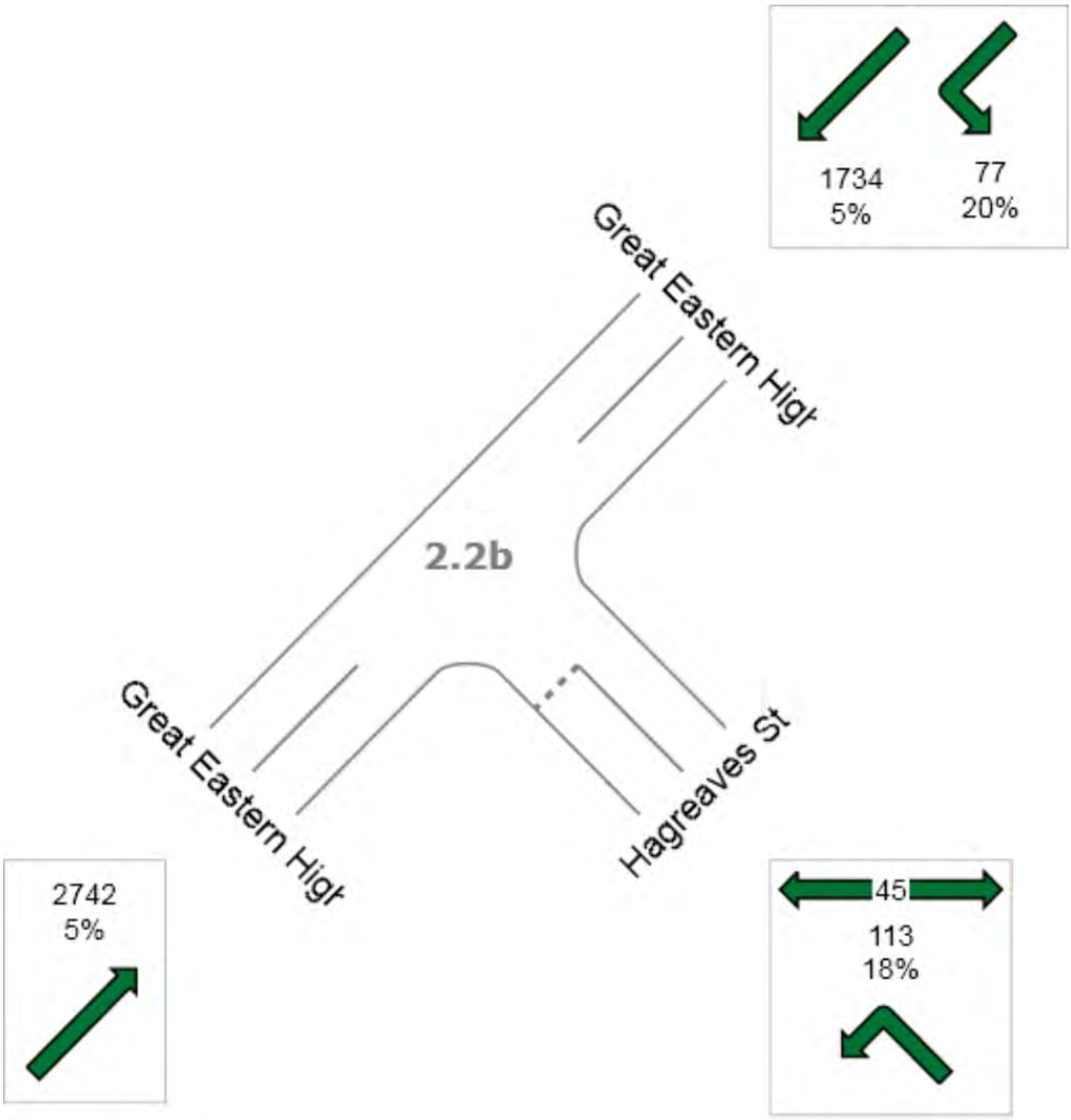
GEH - Hagreaves St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 4666**
- **Light Vehicles (LV): 4249**
- **Heavy Vehicles (HV): 260**
- **Buses (B): 134**
- **Bicycles (C): 23**
- **Pedestrians: 45**



LANE SUMMARY

Site: GEH - Hagreaves St - 2021 pm - with development

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hagreaves St													
Lane 1	119	18.0	1174	0.101	100	7.4	LOS A	0.5	3.9	Full	250	0.0	0.0
Approach	119	18.0		0.101		7.4	LOS A	0.5	3.9				
NorthEast: Great Eastern Highway													
Lane 1 (C)	10	0.0	866	0.011	100	1.2	LOS A	0.0	0.1	Full	110	0.0	0.0
Lane 2 (B-B)	446	19.5	776	0.575	100	4.4	LOS A	4.7	40.2	Two Seg	110	0.0	5.2
Lane 3	484	5.2	841	0.575	100	3.0	LOS A	5.0	37.6	Full	500	0.0	0.0
Lane 4	484	5.2	841	0.575	100	3.0	LOS A	5.0	37.6	Full	500	0.0	0.0
Lane 5	484	5.2	841	0.575	100	3.0	LOS A	5.0	37.6	Full	500	0.0	0.0
Approach	1906	8.5		0.575		3.3	NA	5.0	40.2				
SouthWest: Great Eastern Highway													
Lane 1 (C)	14	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	923	14.1	1852	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	975	5.2	1955	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	975	5.2	1955	0.498	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2886	8.0		0.498		0.0	NA	0.0	0.0				
Intersection	4912	8.4		0.575		1.5	NA	5.0	40.2				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: GEH - Hagreaves St - 2021 pm - with development

Network: N.2b - 1.2b-2.2b - 2021 - with dev

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Hagreaves St															
Lane 1	119	18.0	119	18.0	695	0.171	100	95.1	LOS F	7.6	65.6	Full	250	-40.8 N3	0.0
Approach	119	18.0	119	18.0		0.171		95.1	LOS F	7.6	65.6				
NorthEast: Great Eastern Highway															
Lane 1 (C)	10	0.0	10	0.0	866	0.011	100	1.2	LOS A	0.0	0.1	Full	110	0.0	100.0 8
Lane 2 (B-B)	472	18.7	472	18.7	493	0.957	100	235.6	LOS F	122.4	1032.0	Two Seg	110	-36.7 N3	100.0
Lane 3	475	5.2	475	5.2	497	0.957	100	220.3	LOS F	113.3	861.9	Full	500	-40.9 N3	24.6
Lane 4	475	5.2	475	5.2	497	0.957	100	220.3	LOS F	113.3	861.9	Full	500	-40.9 N3	24.6
Lane 5	475	5.2	475	5.2	497	0.957	100	220.3	LOS F	113.3	861.9	Full	500	-40.9 N3	24.6
Approach	1906	8.5	1906	8.5		0.957		223.0	NA	122.4	1032.0				
SouthWest: Great Eastern Highway															
Lane 1 (C)	14	0.0	14	0.0	6196	0.002	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	922	14.1	892	14.4	1848	0.483	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	975	5.2	944	5.2	1955	0.483	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	975	5.2	944	5.2	1955	0.483	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	2886	8.0	2795 N1	8.1		0.483		0.0	NA	0.0	0.0				
Intersection	4912	8.4	4820 N1	8.6		0.957		88.9	NA	122.4	1032.0				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Belgravia St - 2031 pm - no development

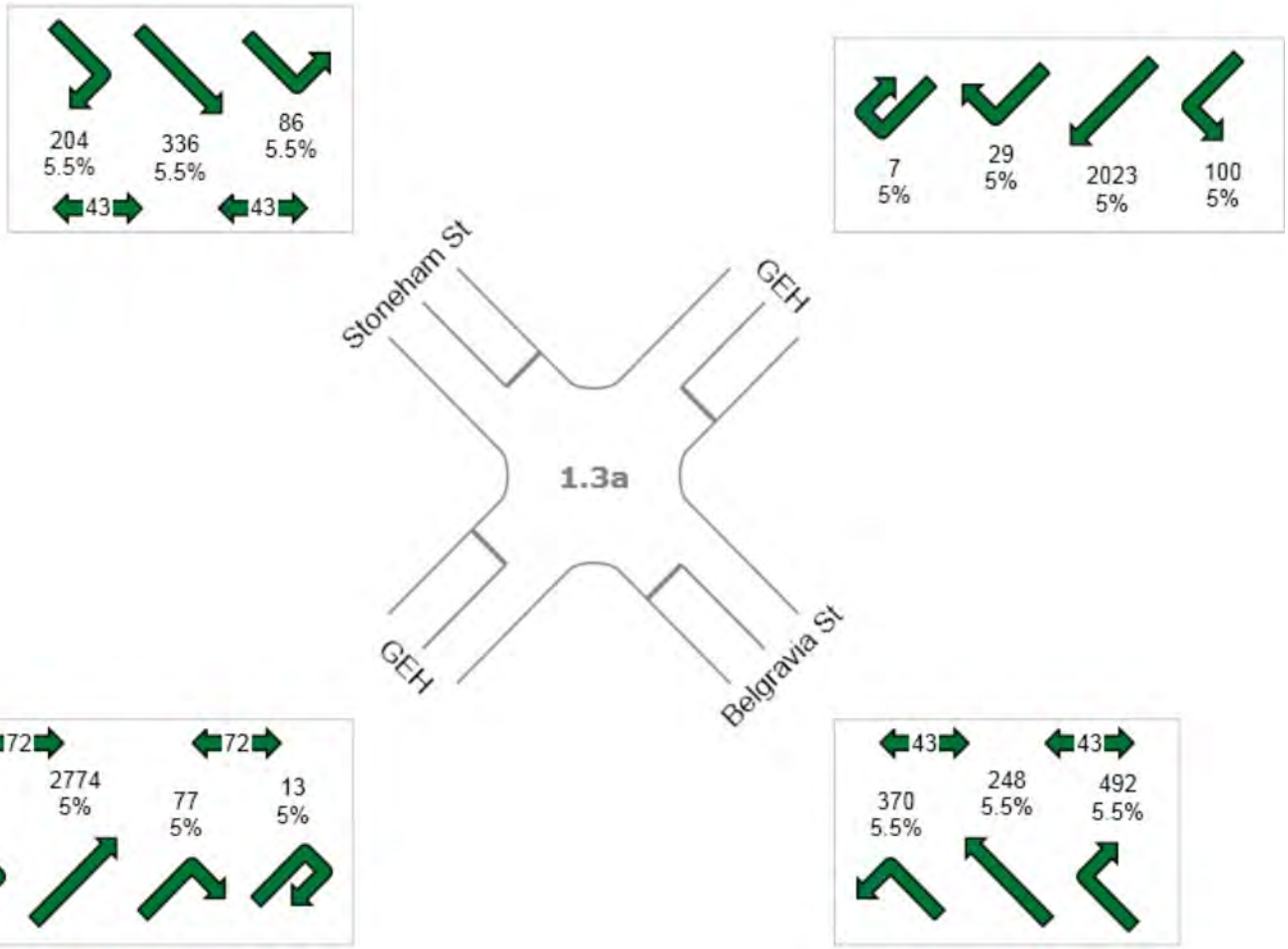
GEH - Belgravia St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 7509**
- **Light Vehicles (LV): 6907**
- **Heavy Vehicles (HV): 384**
- **Buses (B): 144**
- **Bicycles (C): 74**
- **Pedestrians: 316**



PHASING SUMMARY

Site: GEH - Belgravia St - 2031 pm - no development

Network: N.3a - 1.3a-2.3a - 2031 - no dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Phase times determined by the program
Sequence: Variable Phasing - 2
Movement Class: All Movement Classes
Input Sequence: A, B1, B2, C, D, E1, E2, F
Output Sequence: A, B1, C, D, E2, F

Phase Timing Results

Phase	A	B1	C	D	E2	F
Green Time (sec)	29	6	34	20	17	8
Yellow Time (sec)	4	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2	2
Phase Time (sec)	35	12	40	26	23	14
Phase Split	23 %	8 %	27 %	17 %	15 %	9 %

Normal Movement
Permitted/Opposed
Slip/Bypass-Lane Movement
Opposed Slip/Bypass-Lane
Stopped Movement
Turn On Red
Other Movement Class Running
Other Movement Class Stopped
Mixed Running & Stopped Movement Classes
Undetected Movement
Phase Transition Applied

LANE SUMMARY

Site: GEH - Belgravia St - 2031 pm - no development

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St													
Lane 1 (40)	420	5.5	385	1.093	100	169.8	LOS F	49.9	378.1	Full	500	0.0	0.0
Lane 2 (40)	376	5.5	344[1]	1.093	100	181.3	LOS F	44.7	339.8	Full	500	0.0	0.0
Lane 3 (40)	372	5.5	340[1]	1.093	100	183.3	LOS F	44.3	334.8	Short	84	0.0	100.0
Approach	1168	5.5		1.093		177.8	LOS F	49.9	378.1				
NorthEast: GEH													
Lane 1 (C)	22	0.0	768	0.029	100	37.9	LOS D	1.0	2.8	Full	83	0.0	0.0
Lane 2 (B-B)	371	21.5	297	1.250	98[6]	277.7	LOS F	53.9	459.6	Two Seg	83	0.0	100.0
Lane 3	618	5.2	487	1.269	99[6]	270.0	LOS F	95.2	723.8	Full	83	0.0	100.0
Lane 4	621	5.2	487	1.275	100	275.8	LOS F	96.6	735.0	Full	83	0.0	100.0
Lane 5	602	5.2	473	1.275	100	275.9	LOS F	93.8	713.7	Full	83	0.0	100.0
Lane 6	38	5.0	93	0.407	100	87.7	LOS F	2.8	21.5	Short	80	0.0	0.0
Approach	2273	7.8		1.275		269.1	LOS F	96.6	735.0				
NorthWest: Stoneham St													
Lane 1	91	5.5	245	0.370	100	74.2	LOS E	6.1	46.5	Short	85	0.0	0.0
Lane 2	193	5.5	258	0.749	100	72.5	LOS E	13.9	105.3	Full	320	0.0	0.0
Lane 3	191	5.5	255	0.749	100	73.4	LOS E	13.8	104.4	Full	320	0.0	0.0
Lane 4	184	5.5	245	0.749	100	77.7	LOS E	13.2	100.2	Short	74	0.0	32.6
Approach	659	5.5		0.749		74.5	LOS E	13.9	105.3				
SouthWest: GEH													
Lane 1	789	5.0	1430	0.552	100	12.4	LOS B	19.1	143.8	Short	73	0.0	67.8
Lane 2 (C)	29	0.0	2396	0.012	100	20.0	LOS C	1.0	2.7	Full	500	0.0	0.0
Lane 3 (B-B)	88	100.0	438	0.200	50[6]	23.6	LOS C	3.5	45.7	Two Seg	173	0.0	0.0
Lane 4	919	5.2	760	1.209	98[6]	226.3	LOS F	117.8	895.9	Full	500	0.0	58.8
Lane 5	942	5.2	760	1.240	100	253.8	LOS F	128.3	975.8	Full	500	0.0	67.0
Lane 6	942	5.2	760	1.240	100	253.8	LOS F	128.3	975.8	Full	500	0.0	67.0
Lane 7	95	5.0	273	0.347	100	40.6	LOS D	3.6	27.3	Short	246	0.0	0.0
Approach	3804	7.3		1.240		184.7	LOS F	128.3	975.8				
Intersection	7904	7.0		1.275		198.7	LOS F	128.3	975.8				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: GEH - Belgravia St - 2031 pm - no development

Network: N.3a - 1.3a-2.3a - 2031 - no dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Belgravia St															
Lane 1 (40)	420	5.5	420	5.5	385	1.093	100	169.8	LOS F	49.9	378.1	Full	500	0.0	0.0
Lane 2 (40)	376	5.5	376	5.5	344[1]	1.093	100	181.3	LOS F	44.7	339.8	Full	500	0.0	0.0
Lane 3 (40)	372	5.5	372	5.5	340[1]	1.093	100	183.3	LOS F	44.3	334.8	Short	84	0.0	100.0
Approach	1168	5.5	1168	5.5		1.093		177.8	LOS F	49.9	378.1				
NorthEast: GEH															
Lane 1 (C)	22	0.0	22	0.0	768	0.029	100	37.9	LOS D	1.0	2.8	Full	83	0.0	0.0
Lane 2 (B-B)	371	21.5	354	21.5	297	1.193	98[6]	226.2	LOS F	46.0	392.4	Two Seg	83	0.0	100.0
Lane 3	618	5.2	589	5.2	487	1.210	99[6]	217.7	LOS F	81.9	623.2	Full	83	0.0	100.0
Lane 4	621	5.2	592	5.2	487	1.216	100	223.2	LOS F	83.3	633.8	Full	83	0.0	100.0
Lane 5	602	5.2	575	5.2	472	1.216	100	223.3	LOS F	80.9	615.5	Full	83	0.0	100.0
Lane 6	38	5.0	36	5.0	93	0.388	100	87.6	LOS F	2.7	20.5	Short	80	0.0	0.0
Approach	2273	7.8	2168[N1]	7.8		1.216		218.0	LOS F	83.3	633.8				
NorthWest: Stoneham St															
Lane 1	91	5.5	91	5.5	245	0.370	100	74.2	LOS E	6.1	46.5	Short	85	0.0	0.0
Lane 2	193	5.5	193	5.5	258	0.749	100	72.5	LOS E	13.9	105.3	Full	320	0.0	0.0
Lane 3	191	5.5	191	5.5	255	0.749	100	73.4	LOS E	13.8	104.4	Full	320	0.0	0.0
Lane 4	184	5.5	184	5.5	245	0.749	100	77.7	LOS E	13.2	100.2	Short	74	0.0	32.6
Approach	659	5.5	659	5.5		0.749		74.5	LOS E	13.9	105.3				
SouthWest: GEH															
Lane 1	789	5.0	789	5.0	1431	0.552	100	12.4	LOS B	19.0	143.6	Short	73	0.0	67.7
Lane 2 (C)	29	0.0	29	0.0	2396	0.012	100	20.0	LOS C	1.0	2.7	Full	500	0.0	0.0
Lane 3 (B-B)	88	100.0	88	100.0	438	0.200	50[6]	23.6	LOS C	3.5	45.7	Two Seg	173	0.0	0.0
Lane 4	919	5.2	919	5.2	760	1.209	98[6]	226.3	LOS F	117.8	895.9	Full	500	0.0	58.8
Lane 5	942	5.2	942	5.2	760	1.240	100	253.8	LOS F	128.3	975.8	Full	500	0.0	67.0
Lane 6	942	5.2	942	5.2	760	1.240	100	253.8	LOS F	128.3	975.8	Full	500	0.0	67.0
Lane 7	95	5.0	95	5.0	273	0.347	100	40.6	LOS D	3.6	27.3	Short	246	0.0	0.0
Approach	3804	7.3	3804	7.3		1.240		184.7	LOS F	128.3	975.8				
Intersection	7904	7.0	7800[N1]	7.1		1.240		181.2	LOS F	128.3	975.8				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Hagreaves St - 2031 pm - no development

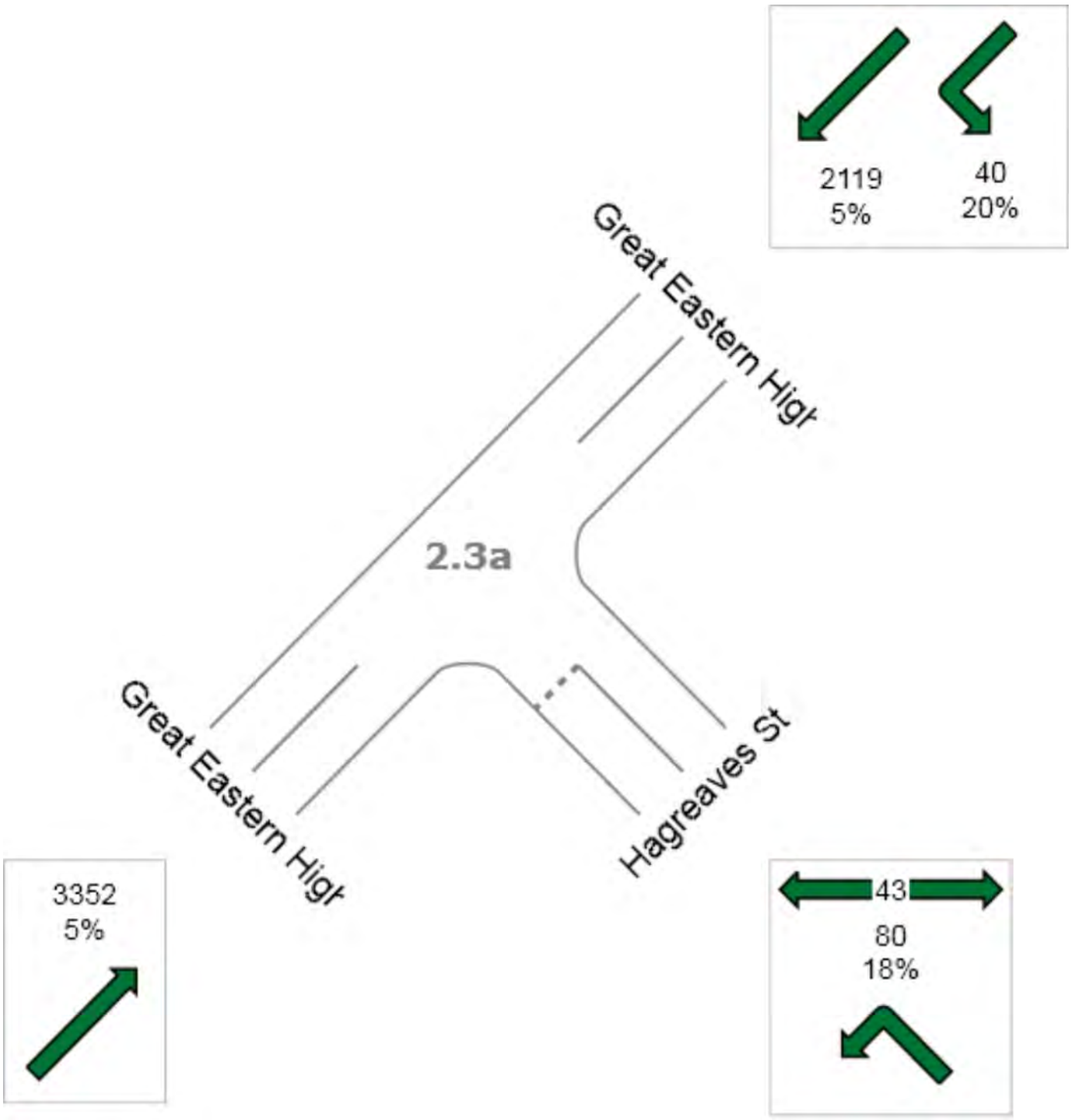
GEH - Hagreaves St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 5591**
- **Light Vehicles (LV): 5103**
- **Heavy Vehicles (HV): 296**
- **Buses (B): 164**
- **Bicycles (C): 28**
- **Pedestrians: 43**



LANE SUMMARY

Site: GEH - Hagreaves St - 2031 pm - no development

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hagreaves St													
Lane 1	84	18.0	1175	0.072	100	7.4	LOS A	0.3	2.7	Full	250	0.0	0.0
Approach	84	18.0		0.072		7.4	LOS A	0.3	2.7				
NorthEast: Great Eastern Highway													
Lane 1 (C)	11	0.0	912	0.012	100	0.8	LOS A	0.0	0.1	Full	110	0.0	0.0
Lane 2 (B-B)	534	18.2	823	0.649	100	3.5	LOS A	6.9	57.4	Two Seg	110	0.0	16.9
Lane 3	576	5.2	887	0.649	100	2.7	LOS A	6.9	52.6	Full	500	0.0	0.0
Lane 4	576	5.2	887	0.649	100	2.7	LOS A	6.9	52.6	Full	500	0.0	0.0
Lane 5	576	5.2	887	0.649	100	2.7	LOS A	6.9	52.6	Full	500	0.0	0.0
Approach	2273	8.2		0.649		2.9	NA	6.9	57.4				
SouthWest: Great Eastern Highway													
Lane 1 (C)	18	0.0	6196	0.003	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	1128	14.1	1852	0.609	100	0.1	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	1191	5.2	1955	0.609	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	1191	5.2	1955	0.609	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	3528	8.0		0.609		0.0	NA	0.0	0.0				
Intersection	5885	8.2		0.649		1.2	NA	6.9	57.4				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: GEH - Hagreaves St - 2031 pm - no development

Network: N.3a - 1.3a-2.3a - 2031 - no dev

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Hagreaves St															
Lane 1	84	18.0	84	18.0	695	0.121	100	93.2	LOS F	5.4	46.1	Full	250	-40.8[N3]	0.0
Approach	84	18.0	84	18.0		0.121		93.2	LOS F	5.4	46.1				
NorthEast: Great Eastern Highway															
Lane 1 (C)	11	0.0	11	0.0	912	0.012	100	0.8	LOS A	0.0	0.1	Full	110	0.0	100.0[8]
Lane 2 (B-B)	547	17.9	547	17.9	502	1.091	100	387.1	LOS F	212.4	1773.7	Two Seg	110	-39.1[N3]	100.0
Lane 3	571	5.2	571	5.2	524	1.091	100	388.1	LOS F	220.7	1678.0	Full	500	-40.9[N3]	100.0
Lane 4	571	5.2	571	5.2	524	1.091	100	388.1	LOS F	220.7	1678.0	Full	500	-40.9[N3]	100.0
Lane 5	571	5.2	571	5.2	524	1.091	100	388.1	LOS F	220.7	1678.0	Full	500	-40.9[N3]	100.0
Approach	2273	8.2	2273	8.2		1.091		385.9	NA	220.7	1773.7				
SouthWest: Great Eastern Highway															
Lane 1 (C)	18	0.0	17	0.0	6196	0.003	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	1120	14.1	939	15.9	1832	0.513	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	1195	5.2	1002	5.2	1955	0.513	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	1195	5.2	1002	5.2	1955	0.513	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	3528	8.0	2962[N1]	8.5		0.513		0.0	NA	0.0	0.0				
Intersection	5885	8.2	5319[N1]	9.1		1.091		150.4	NA	220.7	1773.7				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Belgravia St - 2031 pm - with development

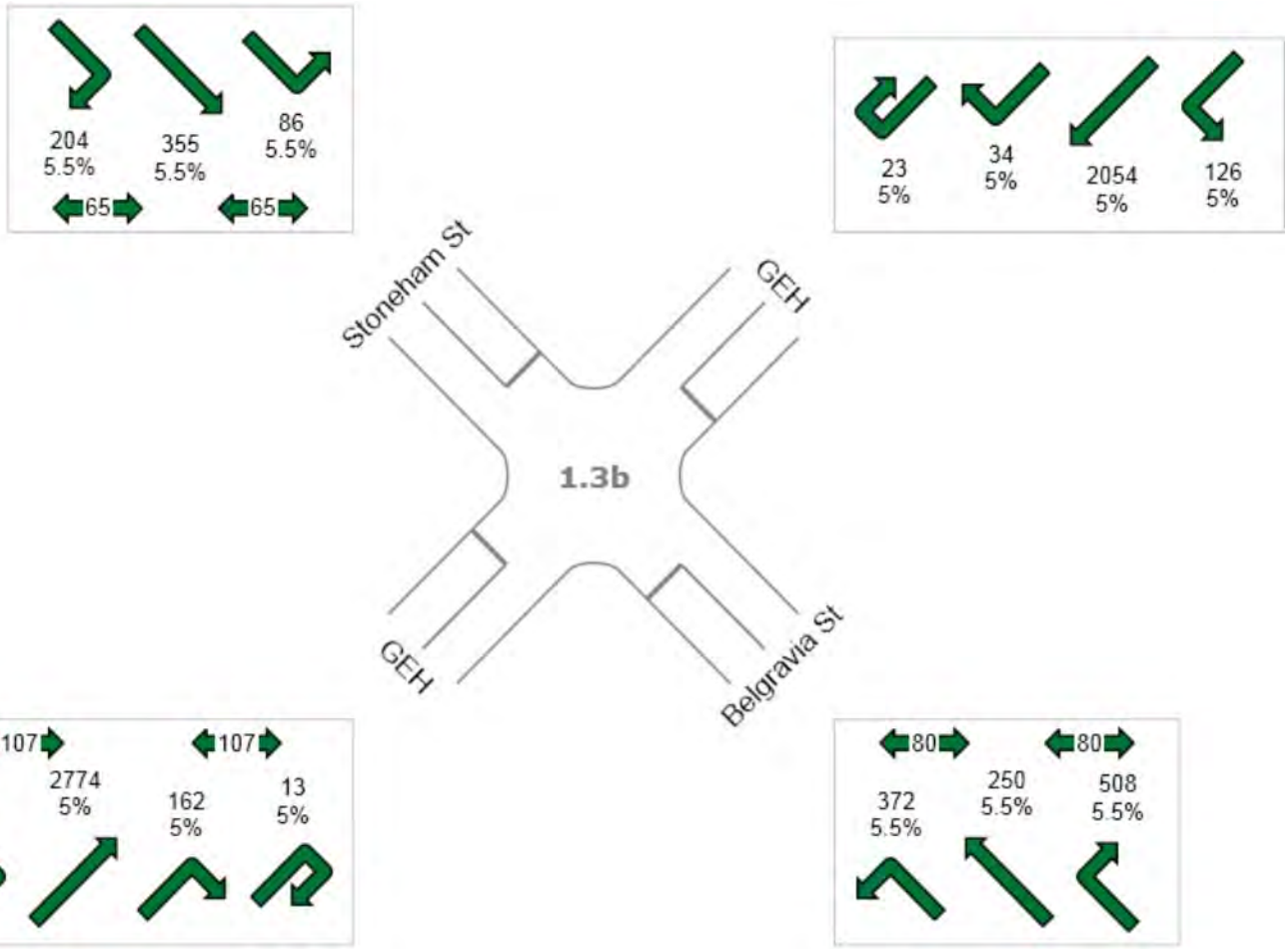
GEH - Belgravia St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 7711**
- **Light Vehicles (LV): 7097**
- **Heavy Vehicles (HV): 394**
- **Buses (B): 145**
- **Bicycles (C): 75**
- **Pedestrians: 504**



PHASING SUMMARY

Site: GEH - Belgravia St - 2031 pm - with development

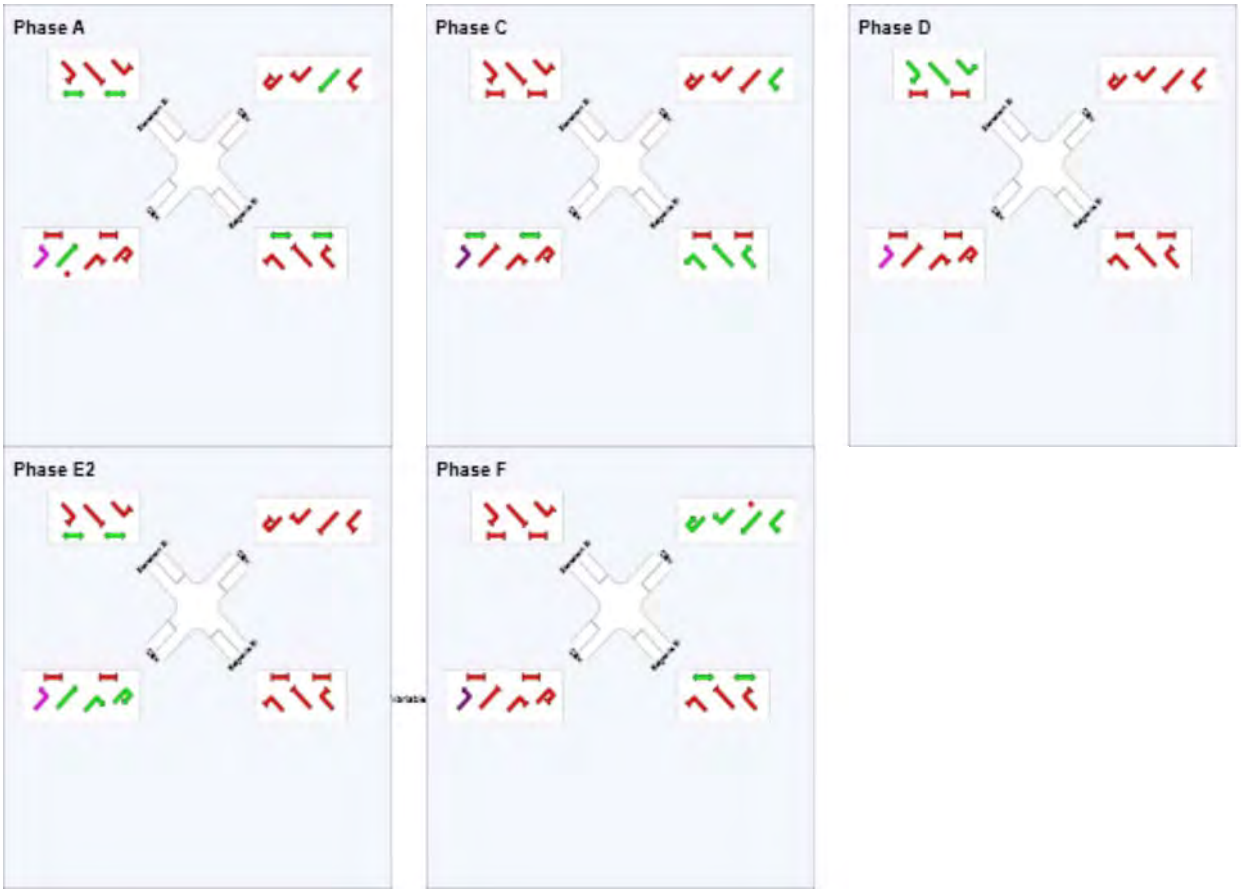
Network: N.3b - 1.3b-2.3b - 2031 - with dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Phase times determined by the program
Sequence: Variable Phasing - 2
Movement Class: All Movement Classes
Input Sequence: A, B1, B2, C, D, E1, E2, F
Output Sequence: A, C, D, E2, F

Phase Timing Results

Phase	A	C	D	E2	F
Green Time (sec)	28	36	21	25	10
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	34	42	27	31	16
Phase Split	23 %	28 %	18 %	21 %	11 %



Normal Movement
Permitted/Opposed
Slip/Bypass-Lane Movement
Opposed Slip/Bypass-Lane
Stopped Movement
Turn On Red
Other Movement Class Running
Other Movement Class Stopped
Mixed Running & Stopped Movement Classes
Undetected Movement
Phase Transition Applied

LANE SUMMARY

Site: GEH - Belgravia St - 2031 pm - with development

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds (Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Belgravia St													
Lane 1 (40)	417	5.5	382	1.090	100	167.6	LOS F	49.1	372.0	Full	500	0.0	0.0
Lane 2 (40)	389	5.5	356[1]	1.090	100	179.9	LOS F	46.0	349.9	Full	500	0.0	0.0
Lane 3 (40)	384	5.5	353[1]	1.090	100	181.9	LOS F	45.6	344.7	Short	84	0.0	100.0
Approach	1189	5.5		1.090		176.2	LOS F	49.1	372.0				
NorthEast: GEH													
Lane 1 (C)	23	0.0	751	0.031	100	45.3	LOS D	1.2	3.3	Full	83	0.0	0.0
Lane 2 (B-B)	357	22.4	282	1.267	98[6]	287.6	LOS F	54.9	471.2	Two Seg	83	0.0	100.0
Lane 3	643	5.2	500	1.285	99[6]	287.3	LOS F	101.6	772.5	Full	83	0.0	100.0
Lane 4	646	5.2	500	1.291	100	293.2	LOS F	103.1	784.1	Full	83	0.0	100.0
Lane 5	627	5.2	485	1.291	100	293.3	LOS F	100.1	761.3	Full	83	0.0	100.0
Lane 6	60	5.0	109	0.549	100	87.4	LOS F	4.5	34.0	Short	80	0.0	0.0
Approach	2355	7.8		1.291		283.1	LOS F	103.1	784.1				
NorthWest: Stoneham St													
Lane 1	91	5.5	257	0.352	100	73.1	LOS E	6.1	46.0	Short	85	0.0	0.0
Lane 2	200	5.5	271	0.738	100	71.6	LOS E	14.3	108.3	Full	320	0.0	0.0
Lane 3	198	5.5	269	0.738	100	72.2	LOS E	14.2	107.6	Full	320	0.0	0.0
Lane 4	190	5.5	257	0.738	100	76.8	LOS E	13.6	103.0	Short	74	0.0	35.2
Approach	679	5.5		0.738		73.4	LOS E	14.3	108.3				
SouthWest: GEH													
Lane 1	789	5.0	1394	0.566	100	13.2	LOS B	20.3	153.0	Short	73	0.0	73.9
Lane 2 (C)	29	0.0	2189	0.013	100	21.7	LOS C	1.0	2.8	Full	500	0.0	0.0
Lane 3 (B-B)	88	100.0	400	0.219	50[6]	25.4	LOS C	3.6	46.6	Two Seg	173	0.0	0.0
Lane 4	919	5.2	694	1.324	98[6]	333.8	LOS F	147.0	1117.7	Full	500	0.0	80.1
Lane 5	942	5.2	694	1.357	100	364.2	LOS F	157.7	1199.7	Full	500	0.0	87.1
Lane 6	942	5.2	694	1.357	100	364.2	LOS F	157.7	1199.7	Full	500	0.0	87.1
Lane 7	184	5.0	304	0.606	100	72.2	LOS E	12.6	96.0	Short	246	0.0	0.0
Approach	3894	7.2		1.357		261.8	LOS F	157.7	1199.7				
Intersection	8117	7.0		1.357		239.7	LOS F	157.7	1199.7				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects

LANE SUMMARY

Site: GEH - Belgravia St - 2031 pm - with development

Network: N.3b - 1.3b-2.3b - 2031 - with dev

GEH - Belgravia St
Signals - Actuated Cycle Time = 150 seconds

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Belgravia St															
Lane 1 (40)	417	5.5	417	5.5	382	1.090	100	167.6	LOS F	49.1	372.0	Full	500	0.0	0.0
Lane 2 (40)	389	5.5	389	5.5	356[1]	1.090	100	179.9	LOS F	46.0	349.9	Full	500	0.0	0.0
Lane 3 (40)	384	5.5	384	5.5	353[1]	1.090	100	181.9	LOS F	45.6	344.7	Short	84	0.0	100.0
Approach	1189	5.5	1189	5.5		1.090		176.2	LOS F	49.1	372.0				
NorthEast: GEH															
Lane 1 (C)	23	0.0	23	0.0	751	0.031	100	45.3	LOS D	1.2	3.3	Full	83	0.0	0.0
Lane 2 (B-B)	357	22.4	313	22.3	282	1.112	98[6]	150.4	LOS F	34.8	298.6	Two Seg	83	0.0	100.0
Lane 3	643	5.2	564	5.3	500	1.128	99[6]	147.8	LOS F	65.4	497.6	Full	83	0.0	100.0
Lane 4	646	5.2	567	5.3	500	1.133	100	152.8	LOS F	66.7	507.5	Full	83	0.0	100.0
Lane 5	627	5.2	550	5.3	485	1.133	100	152.9	LOS F	64.7	492.9	Full	83	0.0	100.0
Lane 6	60	5.0	53	5.1	109	0.482	100	86.8	LOS F	3.9	29.7	Short	80	0.0	0.0
Approach	2355	7.8	2068[N1]	7.8		1.133		148.3	LOS F	66.7	507.5				
NorthWest: Stoneham St															
Lane 1	91	5.5	91	5.5	257	0.352	100	73.1	LOS E	6.1	46.0	Short	85	0.0	0.0
Lane 2	200	5.5	200	5.5	271	0.738	100	71.6	LOS E	14.3	108.3	Full	320	0.0	0.0
Lane 3	198	5.5	198	5.5	269	0.738	100	72.2	LOS E	14.2	107.6	Full	320	0.0	0.0
Lane 4	190	5.5	190	5.5	257	0.738	100	76.8	LOS E	13.6	103.0	Short	74	0.0	35.2
Approach	679	5.5	679	5.5		0.738		73.4	LOS E	14.3	108.3				
SouthWest: GEH															
Lane 1	789	5.0	789	5.0	1397	0.565	100	13.2	LOS B	20.2	152.6	Short	73	0.0	73.6
Lane 2 (C)	29	0.0	29	0.0	2189	0.013	100	21.7	LOS C	1.0	2.8	Full	500	0.0	0.0
Lane 3 (B-B)	88	100.0	88	100.0	400	0.219	50[6]	25.4	LOS C	3.6	46.6	Two Seg	173	0.0	0.0
Lane 4	919	5.2	919	5.2	694	1.324	98[6]	333.8	LOS F	147.0	1117.7	Full	500	0.0	80.1
Lane 5	942	5.2	942	5.2	694	1.357	100	364.2	LOS F	157.7	1199.7	Full	500	0.0	87.1
Lane 6	942	5.2	942	5.2	694	1.357	100	364.2	LOS F	157.7	1199.7	Full	500	0.0	87.1
Lane 7	184	5.0	184	5.0	304	0.606	100	72.2	LOS E	12.6	96.0	Short	246	0.0	0.0
Approach	3894	7.2	3894	7.2		1.357		261.8	LOS F	157.7	1199.7				
Intersection	8117	7.0	7830[N1]	7.2		1.357		195.4	LOS F	157.7	1199.7				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect
6 Lane underutilisation due to downstream effects
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: GEH - Hagreaves St - 2031 pm - with development

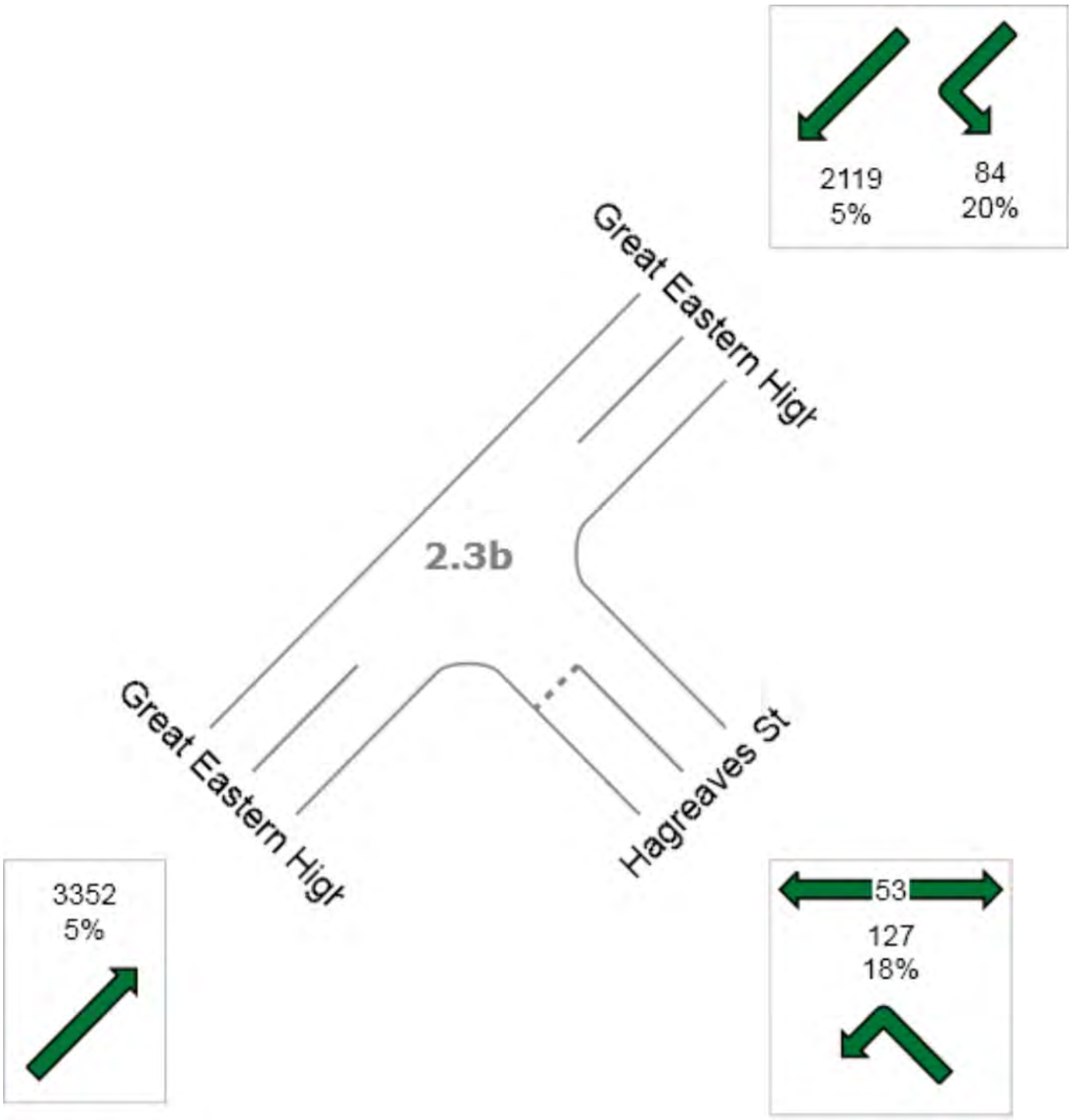
GEH - Hagreaves St

Volume Display Method: Total and %

Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

- **All Movement Classes: 5682**
- **Light Vehicles (LV): 5176**
- **Heavy Vehicles (HV): 313**
- **Buses (B): 164**
- **Bicycles (C): 28**
- **Pedestrians: 53**



LANE SUMMARY

Site: GEH - Hagreaves St - 2031 pm - with development

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
SouthEast: Hagreaves St													
Lane 1	134	18.0	1165	0.115	100	7.5	LOS A	0.5	4.4	Full	250	0.0	0.0
Approach	134	18.0		0.115		7.5	LOS A	0.5	4.4				
NorthEast: Great Eastern Highway													
Lane 1 (C)	12	0.0	847	0.014	100	1.3	LOS A	0.0	0.1	Full	110	0.0	0.0
Lane 2 (B-B)	544	19.3	760	0.716	100	6.9	LOS A	9.5	80.6	Two Seg	110	0.0	32.8
Lane 3	588	5.2	821	0.716	100	5.5	LOS A	9.7	73.8	Full	500	0.0	0.0
Lane 4	588	5.2	821	0.716	100	5.5	LOS A	9.7	73.8	Full	500	0.0	0.0
Lane 5	588	5.2	821	0.716	100	5.5	LOS A	9.7	73.8	Full	500	0.0	0.0
Approach	2319	8.5		0.716		5.8	NA	9.7	80.6				
SouthWest: Great Eastern Highway													
Lane 1 (C)	18	0.0	6196	0.003	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	1128	14.1	1852	0.609	100	0.1	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	1191	5.2	1955	0.609	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	1191	5.2	1955	0.609	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	3528	8.0		0.609		0.0	NA	0.0	0.0				
Intersection	5981	8.4		0.716		2.4	NA	9.7	80.6				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: GEH - Hagreaves St - 2031 pm - with development

Network: N.3b - 1.3b-2.3b - 2031 - with dev

GEH - Hagreaves St
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
SouthEast: Hagreaves St															
Lane 1	134	18.0	134	18.0	690	0.194	100	83.5	LOS F	7.5	64.4	Full	250	-40.8[N3]	0.0
Approach	134	18.0	134	18.0		0.194		83.5	LOS F	7.5	64.4				
NorthEast: Great Eastern Highway															
Lane 1 (C)	12	0.0	12	0.0	847	0.014	100	1.3	LOS A	0.0	0.1	Full	110	0.0	100.0[8]
Lane 2 (B-B)	571	18.6	571	18.6	479	1.193	100	354.7	LOS F	170.0	1430.4	Two Seg	110	-37.1[N3]	100.0
Lane 3	579	5.2	579	5.2	485	1.193	100	346.9	LOS F	162.9	1238.6	Full	500	-40.9[N3]	49.6
Lane 4	579	5.2	579	5.2	485	1.193	100	346.9	LOS F	162.9	1238.6	Full	500	-40.9[N3]	49.6
Lane 5	579	5.2	579	5.2	485	1.193	100	346.9	LOS F	162.9	1238.6	Full	500	-40.9[N3]	49.6
Approach	2319	8.5	2319	8.5		1.193		347.1	NA	170.0	1430.4				
SouthWest: Great Eastern Highway															
Lane 1 (C)	18	0.0	17	0.0	6196	0.003	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 2	1117	14.2	876	16.6	1824	0.480	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 3	1197	5.2	939	5.2	1955	0.480	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Lane 4	1197	5.2	939	5.2	1955	0.480	100	0.0	LOS A	0.0	0.0	Full	83	0.0	0.0
Approach	3528	8.0	2772[N1]	8.8		0.480		0.0	NA	0.0	0.0				
Intersection	5981	8.4	5225[N1]	9.6		1.193		136.4	NA	170.0	1430.4				

Level of Service (LOS) Method: Delay (HCM 2000).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Government of **Western Australia**
Development Assessment Panels

Form 2 - Responsible Authority Report

(Regulation 17)

Property Location:	10 Hawksburn Road, Rivervale
Application Details:	20 Multiple Dwellings (3 Storey)
DAP Name:	Metro Central JDAP
Applicant:	Rowe Group
Owner:	Statesman Homes Pty Ltd
LG Reference:	3/2012/DAP/A
Responsible Authority:	City of Belmont
Authorising Officer:	Neville Deague – Director Community & Statutory Services, City of Belmont
Department of Planning File No:	DP/12/00955
Report Date:	Submitted to DAP on 26 November 2013
Application Receipt Date:	17 October 2013
Application Process Days:	50 Days
Attachment(s):	1 – DAP Planning Approval (11 October 2012). 2 – Amended Development Plans (17 October 2013).

Recommendation:

That the Metro Central Joint Development Assessment Panel resolves to:

1. Accept that the DAP Application reference DP/12/00955 as detailed on the DAP Form 2 dated 17 October 2013 is appropriate for consideration in accordance with regulation 17 of the *Planning and Development (Development Assessment Panels) Regulations 2011*;

2. Approve an extension of the approval term to lapse two (2) years from the date of this Form 2 approval as per DAP Application reference DP/12/00955 (detailed on the DAP Form 2 received by the City of Belmont on 17 October 2013).

3. Approve the amendments to the approved plans of DAP Application reference DP/12/00955 as detailed on the DAP Form 2 dated 17 October 2013 and accompanying plans date stamped 17 October 2013 in accordance with the provisions of the City of Belmont's Local Planning Scheme No. 15, for the proposed amendment to the approved Multiple Dwellings at Lot 1009 (10) Hawksburn Road, Rivervale (formerly part lots 56, 57, 58, 59 and 60 (6, 8, 10, 12 & 14) Hawksburn Road, Rivervale) , subject to the following modifications:

   DELETION OF CONDITION:

   2. Lots 56, 57, 58, 59 and 60 shall be amalgamated and subdivided in accordance with the approved plan, and

   (a) new certificates of title obtained for the subdivided lots;

or

(b) the owner shall enter into a legal agreement with the City prepared by the City's solicitors by which the owner covenants to the required subdivision of the land within a specified period and agrees to the registration of an absolute caveat on the Certificate/s of Title to the land. The owner is to bear all costs associated with the preparation and stamping of the agreement and the registration of the caveat.

AND

AMENDED CONDITIONS:

12. Prior to occupation or use of the development, vehicle parking, manoeuvring and circulation areas shall be designed, constructed, sealed, drained, line marked and kerbed in accordance with:

(a) The approved plan (~~24~~ 29 spaces that comply with AS 2890.1);
(b) Schedule 11 of City of Belmont Local Planning Scheme No. 15; and
(c) Council's engineering requirements and design guidelines.

The areas must be sealed in concrete or brick paving in accordance with the City of Belmont specifications, unless otherwise approved by the City's Director Technical Services. All parking bays must be clearly line marked.

14. ~~4~~ 5 visitor bays are to be constructed, clearly marked on site as 'Visitor Bays', and maintained in accordance with the City's engineering requirements and design guidelines to the satisfaction of the City's Director Technical Services.

AND

ADDITIONAL CONDITIONS:

22. Parking bay Number 26 as reflected on the Ground Floor Plan shall be deleted and the space marked 'No Parking'.

23. The western facing balcony of Unit 14 on the First Floor Plan, shall be modified to comply with Clause 6.4.1 of the 2013 Residential Design Codes to the satisfaction of the City's Director Community & Statutory Services, Manager Planning Services or Coordinator Planning Services.

AND

RENUMBERING OF CONDITIONS

The Conditions of the Planning Approval to be renumbered accordingly, taking into account the deleted condition and additional conditions.

Advice Notes

i All other conditions and requirements detailed on the previous approval dated 11 October 2012 shall remain unless altered by this application.

ii In relation to deletion of parking bay no. 26, the space is required to facilitate vehicle manoeuvring/turn-around for users of parking bay nos. 27 and 28. The City may consider satisfactory alternatives to facilitate vehicle manoeuvring (e.g. vehicle turn-table).

Background:

Property Address:		10 Hawksburn Road, Rivervale
Zoning	MRS:	Urban
	LPS:	Special Development Precinct – The Springs
Use Class:		Multiple Dwellings
Strategy Policy:		The Springs Structure Plan (2009)
Development Scheme:		N/A
Lot Size:		2230m²
Insert Existing Land Use:		Vacant Land
Value of Development:		$7 Million

- The subject land is currently vacant.
- The subject land as shown on Figure 1 was formally comprised of part lots 56, 57, 58, 59 and 60 on Plan 1638. The lots have since been amalgamated; the property is now referred to as Lot 1009 on Deposited Plan 72644, No. 10 Hawksburn Road, Rivervale.
- The Metro Central JDAP granted conditional planning approval for development of 16 Multiple Dwellings over the land on 11 October 2012.
- The applicant proposes amendments to the approved development plans to incorporate an additional 4 dwellings.
- The applicant also seeks to extend the time period within which the approved development must be substantially commenced.

Figure 1 – Aerial Photograph of subject site

Details:

Further to the initial planning approval for the development of 16 multiple dwellings, the applicant seeks the approval to be amended to allow development of 20 multiple dwellings.

The built form of the amended development proposal remains largely unchanged from that of the approved development. As with the approved development, the amended proposal incorporates a mix of single-bedroom, two-bedroom and three-bedroom dwellings.

Notwithstanding that the building envelope of the amended development is in essence very similar to the approved development; the First and Second Floor plans of the approved development have been significantly modified. The approved development incorporated six two-storey apartments and (10) single-storey apartments. The amended development proposes single-storey apartments for all of the 20 dwellings. The elevation drawings of the amended development reflect very similar architectural articulation and interest to the facades of the building as the approved development, albeit the significant changes to the configuration of the floor plans.

The Ground Floor plan has been modified to relocate the swimming pool from the north-western corner of the site to the south-eastern corner of the site. The car park accommodates 25 onsite car parking bays for residents and five onsite car parking bays for visitors, which is an increase from the previously approved 20 bays for residents and four bays for visitors.

In view that the validity of the initial planning approval will lapse on 11 October 2014, the applicant also seeks an extension of the validity of the planning approval as part of this Form 2 application.

Legislation & policy:

Legislation

- ***Development Assessment Panel Regulations 2011***

  Regulation 17(1)(a) provides for applications to extend the term of a development approval.

  Regulation 17(1)(c) provides for amendments to aspects of an approved development which do not substantially change the approved development.

- **Metropolitan Region Scheme (MRS)**

  The subject site is zoned Urban under the MRS as shown in Figure 2. The proposed land use is appropriate in the Urban zone.

Figure 2 – Extract from MRS map

- **Local Planning Scheme No. 15 (LPS15)**

  The subject site is zoned 'Special Development Precinct – The Springs' under City of Belmont LPS15, and is also identified as 'Development Area 11'. An extract of the LPS15 zoning map is shown in Figure 3.

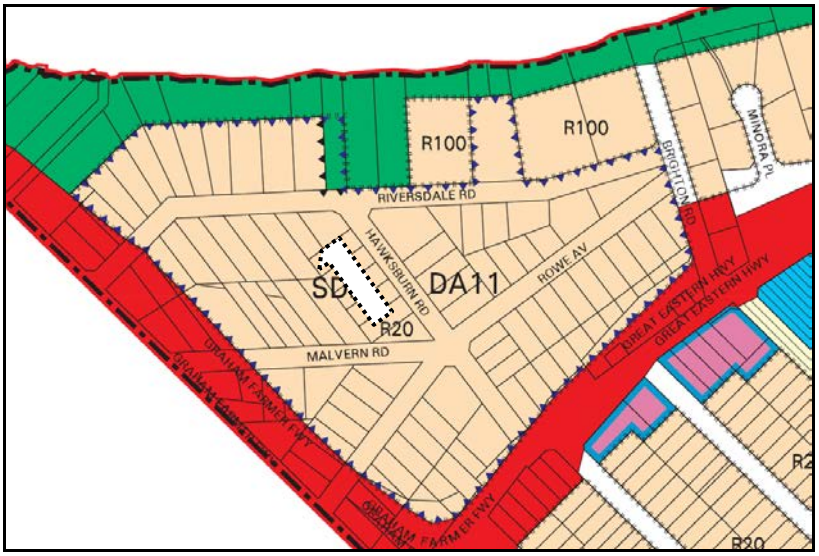


Figure 3 – Extract from LPS15 map

LPS15 requires a structure plan to be endorsed prior to supporting development and/or subdivision in a Development Area. The Springs Structure Plan was adopted by Council in November 2009 and endorsed by the Western Australian Planning Commission in December 2009.

Clause 5.3.4 of LPS15 provides Council the discretion to vary the provisions of the R-Codes having regard for the relevant Local Planning Policy adopted under LPS15.

Clause 5.20 of LPS15 states that the height of structures within the Scheme Area shall be subject to, and not exceed, the WAC Structures Height Control Contours Map contained in Schedule 12.

Structure Plans and Planning Policies

The Springs Structure Plan

The Springs Structure Plan identifies the subject site as being located within the 'Hawksburn Road' precinct, which is shown as 'Residential' with a density code of R60. An extract from The Springs Structure Plan is shown in Figure 4.

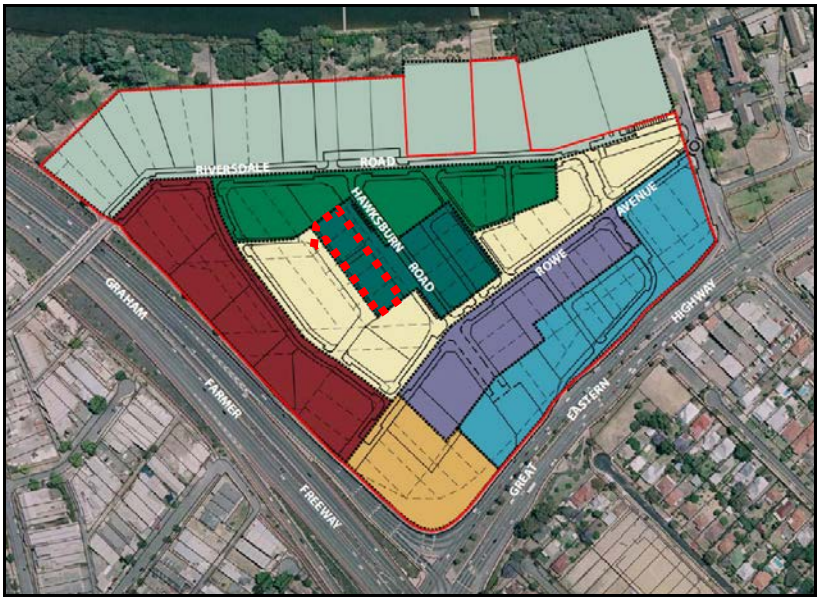


Figure 4 – Extract from The Springs Structure Plan map

The Structure Plan identifies the desired street character for this section of Hawksburn Road as an intimately scaled, tree-lined residential promenade characterised by a three to four storey streetscape of townhouse type units. The importance of the development interface with the adjoining recreation reserve is also recognised with the development to be designed to achieve a high standard of visual amenity, safety and surveillance. This may be achieved particularly through the use of visually permeable fencing and positioning of doorways, windows and balconies addressing the park.

The Springs Structure Plan identifies a number of key development standards for the Hawksburn Road precinct, which are further elaborated on in Local Planning Policy No. 7 (The Springs Design Guidelines).

State Planning Policy 3.1 (Residential Design Codes 2013)

The Residential Design Codes 2013 (R-Codes) provides standards for residential development throughout Western Australia. Part 6 of the R-Codes outlines standards for the development of multiple dwellings. The R-Codes are to be applied in conjunction with the development standards contained in the City's Local Planning Policy No. 7 (The Springs Design Guidelines).

Local Planning Policy No. 7 (The Springs Design Guidelines)

Local Planning Policy No. 7 (LPP7) was adopted in conjunction with LPS15 on 1 December 2011, and amended by Council on 24 July 2012. LPP7 contains specific development standards and design guidance for all development within The Springs. The Policy includes a series of detailed area plans (DAPs), which contain maximum building envelopes (MBEs) for individual sites. The relevant DAP in LPP7 is shown in Figure 5.

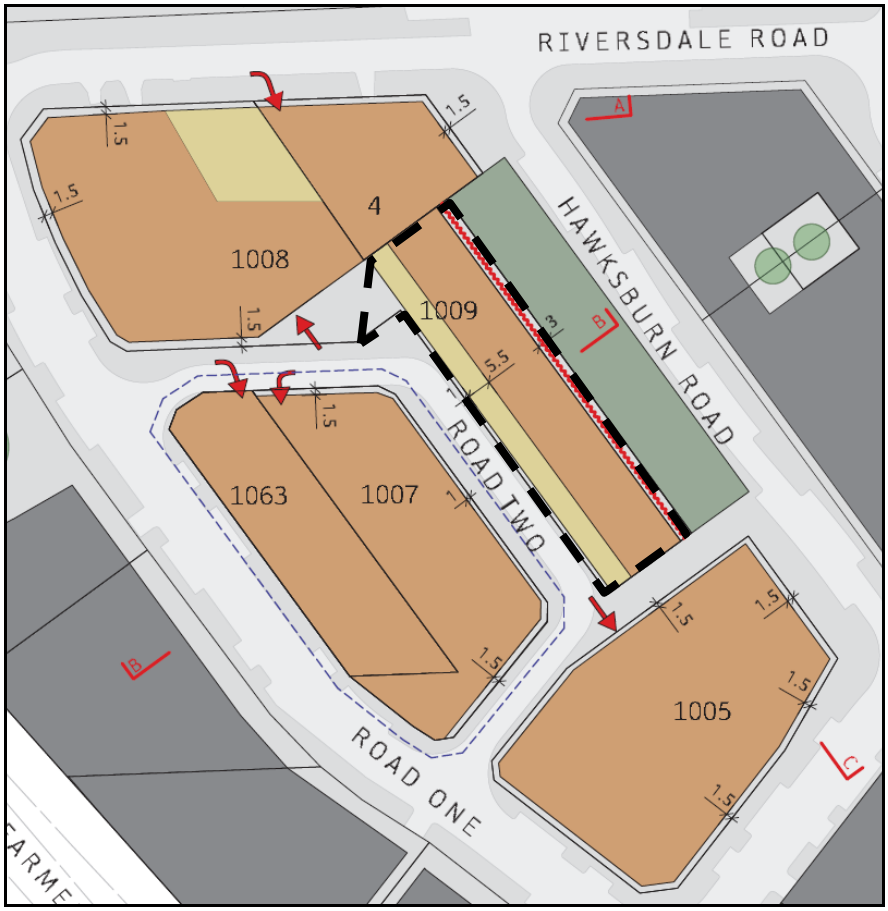


Figure 5: Extract from The Springs Design Guidelines Detailed Area Plan

Development is generally expected to comply with the relevant development standards and fit within the MBE, however variations can be supported where the design outcome is consistent with the objectives of The Springs Structure Plan. LPP7 is to be applied in conjunction with the standards contained in the R-Codes.

Consultation:

Public Consultation

No mandatory advertising of the proposed development is required under Clause 9.4 of LPS15. Notwithstanding this, no public consultation was considered necessary in assessing this amended development proposal as the nature of the amendments does not significantly alter the built form of the approved development. Also, the proposed amendments do not vary the development standards under the relevant planning legislation and policies.

Consultation with other Agencies or Consultants

The subject site does not abut the Swan River Trust Development Control Area / Metropolitan Region Scheme (MRS) Parks & Recreation Reserve or the MRS Primary Regional Road Reserve. The proposed development is outside the Westralia Airports Corporation mandatory referral area as outlined in Schedule 12 of LPS15, and the proposed height of the development falls significantly below the maximum allowable relative height of 50m. As such, no consultation with the Swan

River Trust, the Department of Transport, Main Roads WA, Westralia Airports Corporation, or any other agency was considered necessary.

Planning assessment:

The table below is a summary of the development elements that have been amended as part of this application. The amendments have been assessed in accordance with LPS15, The Springs Structure Plan and relevant local and state planning policies.

Development Component	**Approved**	**Proposed Amendment**	**Comment**
Plot Ratio	0.86	0.69	**Complies** - Notwithstanding an increase in the number of dwellings, the plot ratio area of the development has been reduced from 1,936m² to 1,547m².
Setback of Balconies	Balconies facing St Columbans Ln setback at 1m, consistent with building setback.	Balcony to Unit 14 on 1st Floor overlooks neighbouring No. 2 Rowe Av.	**Variation/Condition** – refer to comments in Discussion section of this report.
Waste Management	Waste Management plan – 6 general and 6 recycling bins.	No amended waste management plan has been submitted.	**Condition** – Development is capable of accommodating additional bins required for the amended proposal. Refer to comments in the Discussion section of this report.
Car Parking	24 bays (20 bays for residents + 4 bays for visitors)	30 bays (25 bays for residents + 5 bays for visitors)	**Complies/Condition** – Complies, however modifications required to facilitate vehicle manoeuvrability. Condition to be modified to reflect amended car parking requirement.

Table 1 – Assessment of proposal

Discussion:

Lot 1009

The Lots 56, 57, 58, 59 and 60 on Plan 1638 referred to in the initial planning approval have since been amalgamated. Condition 2 of the approval is therefore redundant and can be deleted.

The deletion of this condition has been reflected in the Recommendation section of this report.

Plot Ratio

Planning approval was granted for 16 dwellings with a plot ratio area of 1,936m² (plot ratio of 0.86). The amended plans propose an increased number of 20 dwellings, but with a reduced plot ratio area of 1,547m² (plot ratio of 0.69).

The significantly reduced plot ratio area is attributed largely to the reconfiguration of the Second Floor Plan as illustrated in Figures 6 & 7 below:

Figure 6 – Approved Second Floor Plan

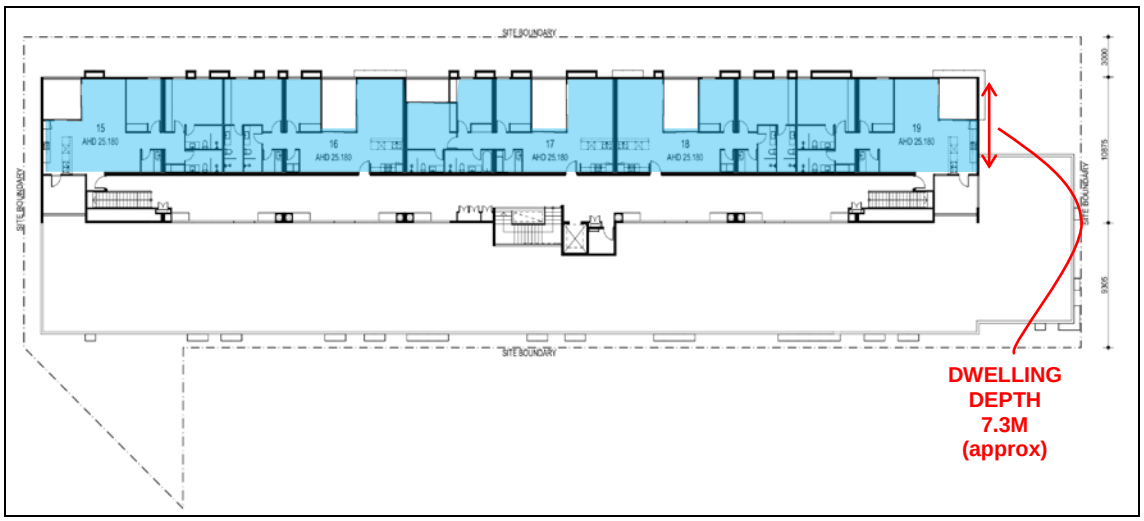


Figure 7 – Amended Second Floor Plan

The depth of the dwellings has been reduced from 11.56m (approximate) to 7.3m (approximate), this consequently reduces the plot ratio area.

The built form of the development - that is building height and boundary setbacks remain essentially unchanged from the approved plans. The reduced plot ratio is compliant with the permitted maximum of 0.7. The proposed change in plot ratio is therefore supported.

Waste Management

For higher density multiple dwelling developments, the City can apply a service equivalent to 70% of standard residential developments. This means rather than one general waste and one recycle bin per dwelling (i.e. 20 general waste, plus 20 recycle bins) for the proposed development, there will be 14 full services per week

(14 general and 14 recycling bins). This can be further reduced by 50% to seven services (seven general and seven recycling bins) where general waste collection occurs twice a week, and recyclables are collected weekly (as will be the case in The Springs).

There is in excess of 40 metres of road verge length along St Columbans Ln. This sufficiently provides for bin presentation/collection.

The applicant has not submitted an amended Waste Management Plan to address storage and management of the additional bins. Although the bin store reflected on the Ground Floor plan indicates that only 10 bins can be accommodated, there is sufficient space within the ground floor of the development to accommodate the four additional bins.

Notwithstanding the above, Condition 20 of the initial approval requires a Waste and Rubbish Collection Management Plan to be submitted for the approval of the City prior to occupation of the development. This condition of planning approval is appropriate to ensure the storage space required for the four additional bins is properly addressed.

Car Parking

For dwellings between 75m² and 110m², the R-Codes require the provision of one car parking space per dwelling. The amended plans propose a total of 30 car parking bays for the development (25 for residents and 5 for visitors); this equates to a surplus of five car parking spaces for residents.

The amended proposal does not provide adequate vehicle manoeuvrability to enable vehicles using bay numbers 27 & 28 to turn around. The proposed car parking configuration would require users of bay Numbers 27 & 28 to reverse their vehicles more than 30m to exit the car park. Given this, the City's Officers recommend the deletion of bay Number 26, and that the space be marked 'No Parking' (as reflected in Figure 8 below) to provide a turn-around space for users of the two end bays.

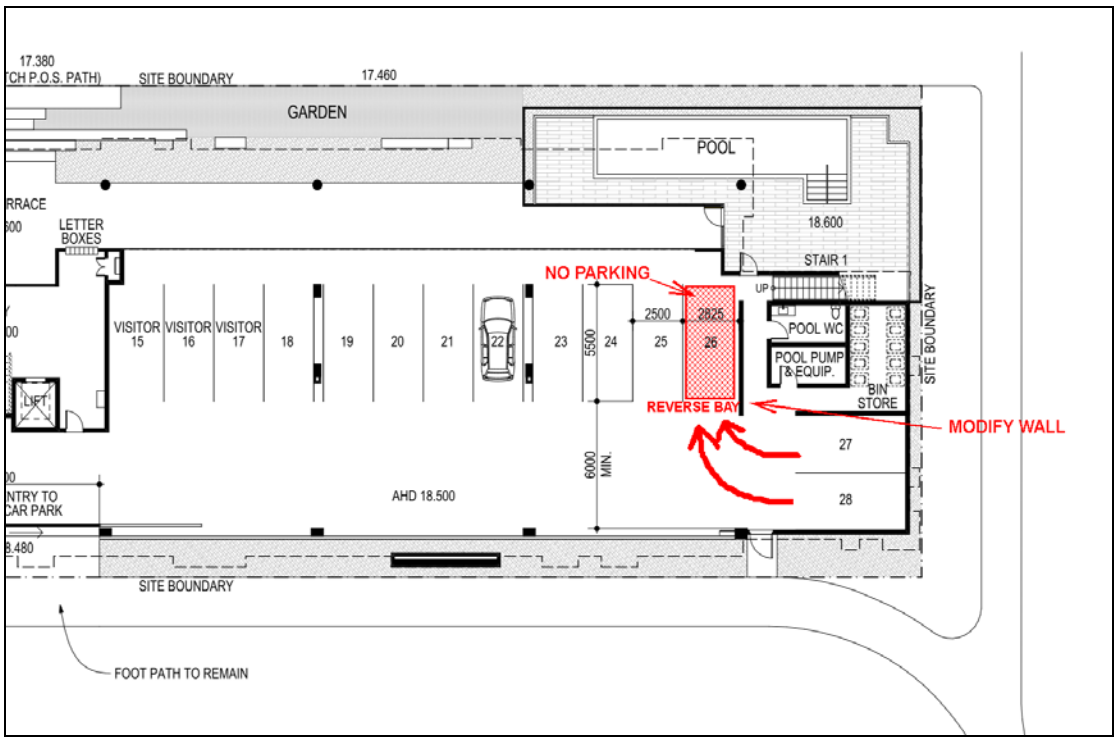


Figure 8 – Car Parking

The deletion of bay number 26 will result in a total of 29 car parking spaces for the development (24 for residents and 5 for visitors), which is still compliant with the car parking standards under the R-Codes.

It is recommended that Conditions 12 and 14 are amended to reflect the car parking requirements for this amended proposal, and an additional condition be included for the conversion of bay Number 26 into a turn-around space.

Setback of Balconies

The balcony of Unit 14 on the First Floor is setback 1.5m in lieu of the required 2m under LPP7, and the required 6m for visual privacy under Clause 6.4.1(C1.1) of the R-Codes.

LPP7 provides that the 2m minimum setback of balconies from the property boundary may be varied where the balcony is in-line with the building, as is the case with the proposed amended plans. The proposed setback variation is therefore considered to be consistent with the design objectives under LPP7. Notwithstanding this, the balcony must be screened to comply with the visual privacy requirements under the R-Codes.

An additional condition has been recommended requiring appropriate screening to be incorporated.

Extension of Time

Planning approval for 16 multiple dwellings on the subject land was granted on 11 October 2012. To date, the development has not been substantially commenced. If not substantially commenced before 11 October 2014, the planning approval will

lapse and will no longer be valid. The applicant seeks for the validity of the planning approval to be extended to allow additional time to act on the approval.

As consistent with the validity period of an approval for a fresh planning application, it is considered reasonable to extend the validity of the planning approval for two (2) years from the date of this amended planning approval.

Conclusion:

The proposed amendments to the approved plan dated 11 October 2012 can be considered under the provisions of regulation 17(1)(c) of the *Development Assessment Panel Regulations 2011*.

The proposed amendments are consistent with the relevant planning legislation and policy objectives. The extension to the term of the planning approval can also be supported.

Approval of the amended plans is recommended, subject to modifications to conditions of the planning approval, including the deletion and addition of conditions. For clarity and ease of reference, it is recommended that the conditions of the approval are re-numbered.

ATTACHMENT 1 – DAP Planning Approval (11 October 2012)

10 Hawksburn Road, Rivervale WA 6103

LG Reference: **3/2012/DAP/A**
DAP Reference: **DP/12/00955**

Government of **Western Australia**
Development Assessment Panels

LG Ref: 3/2012/DAP
DoP Ref: DP/12/00955, A2503961
Enquiries: Development Assessment Panels
Telephone: (08) 6551 9919

Mr Ross Catalano
JCP Construction PTY LTD
Level 5, 22 Mount Street
PERTH WA 6000

Dear Mr Catalano

Metro Central – City of Belmont – DAP Application 3/2012/DAP
6, 8, 10, 12 Hawksburn Road, Riverdale, WA 6103
16 Multiple Dwellings (3 Storey)

Thank you for your application and plans submitted to the City of Belmont on 13 August 2012 for the above development at the above mentioned site.

This application was considered by the Metro Central JDAP at its meeting held on 11 October 2012, where in accordance with the provisions of the City of Belmont Planning Scheme No.15, it was resolved to approve the application as per the attached notice of determination.

Should the applicant not be satisfied by this decision, a DAP Form 2 application may be made to amend or cancel this planning approval in accordance with Regulation 17 of the Development Assessment Panel Regulations 2011.

Also be advised that there is a right of review by the State Administrative Tribunal in accordance with Part 14 of the *Planning and Development Act 2005*. An application must be made within 28 days of the determination in accordance with the *State Administrative Tribunal Act 2004*.

Should you have any enquiries in respect to the conditions of approval please contact Mr Wilmot Loh at the City of Belmont on 9477 7274.

Yours sincerely

DAP Secretariat

19 / 10 /2012

Encl. DAP Determination Notice
Approved plans

Cc: Mr Wilmot Loh
City of Belmont
Locked Bag 379
CLOVERDALE WA 6985

RECEIVED
17 OCT 201
CITY OF BELMONT

Government of **Western Australia**
Development Assessment Panels

Planning and Development Act 2005

City of Belmont Planning Scheme No. 15

Metro Central Joint Development Assessment Panel

Determination on Development Assessment Panel Application for Planning Approval

Location: 6, 8, 10, 12 Hawksburn Road, Riverdale, WA 6103
Description of proposed Development: 16 Multiple Dwellings (3 Storey)

In accordance with Regulation 8 of the *Development Assessment Panels Regulations 2011*, the above application for planning approval was **granted** on 11 October 2012, subject to the following resolution and conditions:

Approve DAP Application reference DP 12/00955 and accompanying plans contained in Attachment 1 in accordance with the provisions of the City of Belmont Local Planning Scheme No. 15, subject to the following conditions:

1. The development plans, as dated marked and stamped "Planning Consent Granted Subject To The Conditions of Planning Approval", together with any requirements and annotations detailed thereon, are the plans approved as part of this application and shall form part of the planning approval issued.

2. Lots 56, 57, 58, 59 and 60 shall be amalgamated and subdivided in accordance with the approved plan, and

   (a) new certificates of title obtained for the subdivided lots; or

   (b) the owner shall enter into a legal agreement with the City prepared by the City's solicitors by which the owner covenants to the required subdivision of the land within a specified period and agrees to the registration of an absolute caveat on the Certificate/s of Title to the land. The owner is to bear all costs associated with the preparation and stamping of the agreement and the registration of the caveat.

3. A geotechnical report prepared for the City by an appropriately qualified consultant shall be lodged with the City, at the cost of the owner/applicant, prior to an application for a building permit, to the satisfaction of the City's Manager Projects & Development.

4. Prior to the commencement of any site works, the applicant/owner shall:

   (i) complete and submit an Acid Sulfate Soils Self-Assessment Form to the Department of Environment & Conservation and City of Belmont; and

   (ii) if required as a result of the self-assessment, subsequently prepare and submit an Acid Sulfate Soils Report and an Acid Sulfate Soils

Management Plan to the Department of Environment and Conservation and the City of Belmont for approval.

Where an Acid Sulfate Soils Management Plan is required to be submitted, all site works shall be carried out in accordance with the approved management plan.

5. A landscaping and irrigation plan for the subject development site and street verge is to be prepared and submitted to the City for approval prior to application for a building permit.

6. Prior to occupation or use of the development, landscaping, plants and irrigation are to be installed and thereafter maintained in accordance with the approved landscaping and irrigation plan for the duration of the approved development to the satisfaction of the City's Manager Parks and Environment.

7. No existing turf, irrigation or street trees located in the road verge abutting or adjacent to the subject land may be damaged or removed during the course of the development, unless separately approved in writing by the City.

8. Prior to occupation or use of the development, noise attenuation measures in accordance with AS 2107:2000 shall be implemented to the satisfaction of the City's Manager Health & Rangers Services.

9. A detailed schedule of external materials, finishes and colours to be used in the construction of the development shall be submitted to the City prior to application for a building permit to the satisfaction of the City's Director Community & Statutory Services, Manager Planning Services or Senior Planning Officer.

10. No services, such as air conditioners or water heaters shall be visible from the street.

11. All clothes drying devices and clothes drying areas shall be located and positioned so as not to be visible from the street or a public place.

12. Prior to occupation or use of the development, vehicle parking, manoeuvring and circulation areas shall be designed, constructed, sealed, drained, line marked and kerbed in accordance with:

    (a) The approved plan (24 spaces that comply with AS 2890.1);
    (b) Schedule 11 of City of Belmont Local Planning Scheme No. 15; and
    (c) Council's engineering requirements and design guidelines.

    The areas must be sealed in concrete or brick paving in accordance with the City of Belmont specifications, unless otherwise approved by the City's Director Technical Services. All parking bays must be clearly line marked.

13. Prior to occupation of the development, a minimum of 2 bicycle bays, are to be installed and maintained for the life of the development to the specifications contained within the City's Supplementary Planning Guidelines for End of Trip Facilities, to the satisfaction of the City's TravelSmart Officer.

14. Four visitor bays are to be constructed, clearly marked on site as 'Visitor Bays', *clearly visible from the front gate (Either side of the residents entry)* and maintained in accordance with the City's engineering requirements and design guidelines to the satisfaction of the City's Director Technical Services.

15. All access ways, parking areas and hard stand areas shall be maintained in accordance with the City's engineering requirements and design guidelines.

16. Prior to occupation or use of the development, the owner/applicant shall submit an application for construction of a vehicle crossover/s to City's Technical Services. Upon receipt of approval from the City's Technical Services, construction of the crossover/s shall be undertaken in concrete, brick paving or hot mix in accordance with the City of Belmont crossover specifications.

17. All stormwater from roofed and paved areas shall be collected and disposed of on-site in accordance with the City of Belmont's engineering requirements and design guidelines.

18. Prior to application for a building permit, a public art concept/strategy for the subject development to the value of $70,000 shall be submitted to the City in accordance with the provisions of the City of Belmont Public Art Contribution Local Planning Policy, to the satisfaction of the City's Director Community & Statutory Services or Manager Planning Services.

19. The approved public art concept/strategy shall be thereafter implemented and the artwork constructed and maintained for the life of the development to the satisfaction of the City's Director Community & Statutory Services.

20. Prior to occupation of the development, a Waste and Rubbish Collection Management Plan shall be submitted for the approval of the City's Manager Health & Rangers Services. The approved waste and rubbish collection management plan shall be thereafter implemented for the duration of the development.

21. Prior to use or occupation of the development, on-site renewable energy generation providing a minimum of 1kW per dwelling is to be implemented to the satisfaction of the City's Director Community & Statutory Services or Manager Planning Services.

Advice Notes

1. A planning approval is not an approval to commence any works associated with the development. A building permit must be obtained prior to commencement of any site and building works. An application for a building permit will not be accepted unless proof of payment of all bonds and guarantees accompanies the application documents.

2. Fire requirements to be in accordance with the Building Code of Australia.

3. As of the 1 July 2003, Energy Efficiency requirements were implemented via the Building Code of Australia (BCA) Volume 2 and all residential buildings need to comply with the 'deemed to satisfy' requirements, or alternatively a compliant Energy Audit Report can be submitted by an accredited person.

Please be advised that the granting of planning approval from the City is no indication that the approved plans conform to the BCA Volume 2 as amended.

4. Where construction works of the development may encroach onto the road reserve (verge) it is recommended the applicant obtain a Materials On Verge licence for the entire verge for the entire duration of construction works.

5. In regard to Condition 2, the applicant is advised that should the owners wish to have a building permit issued prior to amalgamating the lots, then the owner shall enter into a legal agreement with City to defer the satisfaction of the condition. The legal agreement must be finalised, signed and lodged as an absolute caveat on the property's certificate of title prior to the issue of a building permit.

   Please note that a legal agreement must be requested by the owner, in writing, and all costs associated with the preparation of a legal agreement and lodgement of a caveat must be borne by the owner. Generally legal agreements take 3 to 4 weeks to be prepared and therefore any such request should be lodged promptly. A form is attached for completion should you wish to proceed with the legal agreement.

6. The required geotechnical report under Condition 3 must identify the geotechnical conditions of the site (including acid sulphate soils) and certify to the City that any earthworks proposed are structurally sound. The earthworks must be carried out in accordance with the geotechnical report as modified (if at all) by the City. Due to excavation to proposed basement levels, the suitability of soil conditions and water table for drainage purposes shall be confirmed with the results of geotechnical investigation.

7. In relation to Condition 4, the required "Acid Sulfate Soils Self-Assessment Form" can be downloaded from the Western Australian Planning Commission's website at http://www.planning.wa.gov.au/dop_pub_pdf/ASS_(ver_4.0)_Aug09_interactive.pdf.

   Where required:

   - any Acid Sulfate Soils investigation shall follow the provisions of the DEC's *Identification and Investigation of Acid Sulphate Soils and Acidic Landscapes* (May 2009), which can be downloaded from the DEC website http://www.dec.wa.gov.au/content/view/2864/1698/; and

   - any Acid Sulfate Soils management plan shall follow the provisions of the DEC's *Treatment and Management of Soils and Water in Acid Sulfate Soil Landscapes* (July 2011), which can be downloaded from the DEC website http://www.dec.wa.gov.au/content/view/2864/1698/.

8. The plan required by Condition 5 shall be a minimum size of A3, and is to contain a north point and a scale. The plan must show by numerical code, the botanical name of each plant species, proposed pot size, quantity and must also include the proposed treatments of:

   (a) all areas of the property visible from the street; and
   (b) the street verge.

9. In relation to Condition 6, the plants are to be nurtured until they reach their typical mature dimensions, and shall thereafter be maintained at those mature dimensions unless Council approves otherwise in writing.

10. This planning approval is not approval for the removal or alteration of any turf, irrigation or street tree. If during the course of the development any existing turf and/or irrigation is damaged or destroyed, the owner/applicant shall:

    (a) repair, reinstate or replace the item in accordance with any written direction of the City's Manager Parks & Environment; and

    (b) thereafter maintain the item for a period of 12 months, to the satisfaction of the City's Manager Parks & Environment.

    If during the course of the development any existing street tree is damaged or destroyed, the City shall repair or replace the street tree in accordance with any written direction of the City's Manager Parks & Environment. The owner/applicant shall:

    (a) be responsible for any costs associated with repair or replacement; and

    (b) thereafter maintain the street tree for a period of 12 months, to the satisfaction of the City's Manager Parks & Environment.

11. In relation to Condition 15, in the event that access ways, parking areas and hard stand is not satisfactorily maintained, the City's Director Technical Services may require by notice, in writing, that the area be brought up to a satisfactory standard within a specified period of time and the notice shall be complied with within that period. Without limitation, the notice may require that lines marking car bays be re-painted, pot holes be repaired, damaged kerbs be replaced and degraded access or parking areas be resurfaced generally in accordance with Council's Engineering Requirements and Design Guidelines.

12. Council's Engineering Requirements and Design Guidelines contains detailed specifications which must be adhered to in the preparation of plans submitted for approval in respect of such matters as drainage, paving, parking, accessways, crossovers, land fill and retaining.

13. Neither a planning approval nor a building license constitutes an approval to construct a crossover to a property. Prior to occupation or use of the development, a separate application must be made to the City's Technical Services Department for approval to construct a crossover to the property (i.e. from the road to connect with the property's internal driveway). Failure to submit a separate application for crossover approval may result in delays in receiving a vehicle crossover subsidy.

14. Specification for construction of the crossover is outlined under item ST01D, contained within the Materials Schedule – Landscape Work Rev C2 (February 2010) for The Springs, the Applicant is advised to liaise with the City's Technical Services Department in regard to these specifications.

15. Signage is not approved as part of this application. A separate application for planning approval and building permit is required prior to display of any advertisements/signage.

16. In relation to Conditions 18 and 19, the City's Community Wellbeing Services will be required to give final consent for the proposed public art. Full details and specifications should be submitted at the earliest opportunity to ensure that the finalisation of the public art does not delay the progression of the development.

17. In relation to Condition 20, please liaise with the City's Manager Health & Rangers Services for details regarding the finalisation of the Waste and Rubbish Collection management plan.

18. The applicant and owner are advised that the City's Rates Department will confirm under separate letter the street numbering applicable for this property.

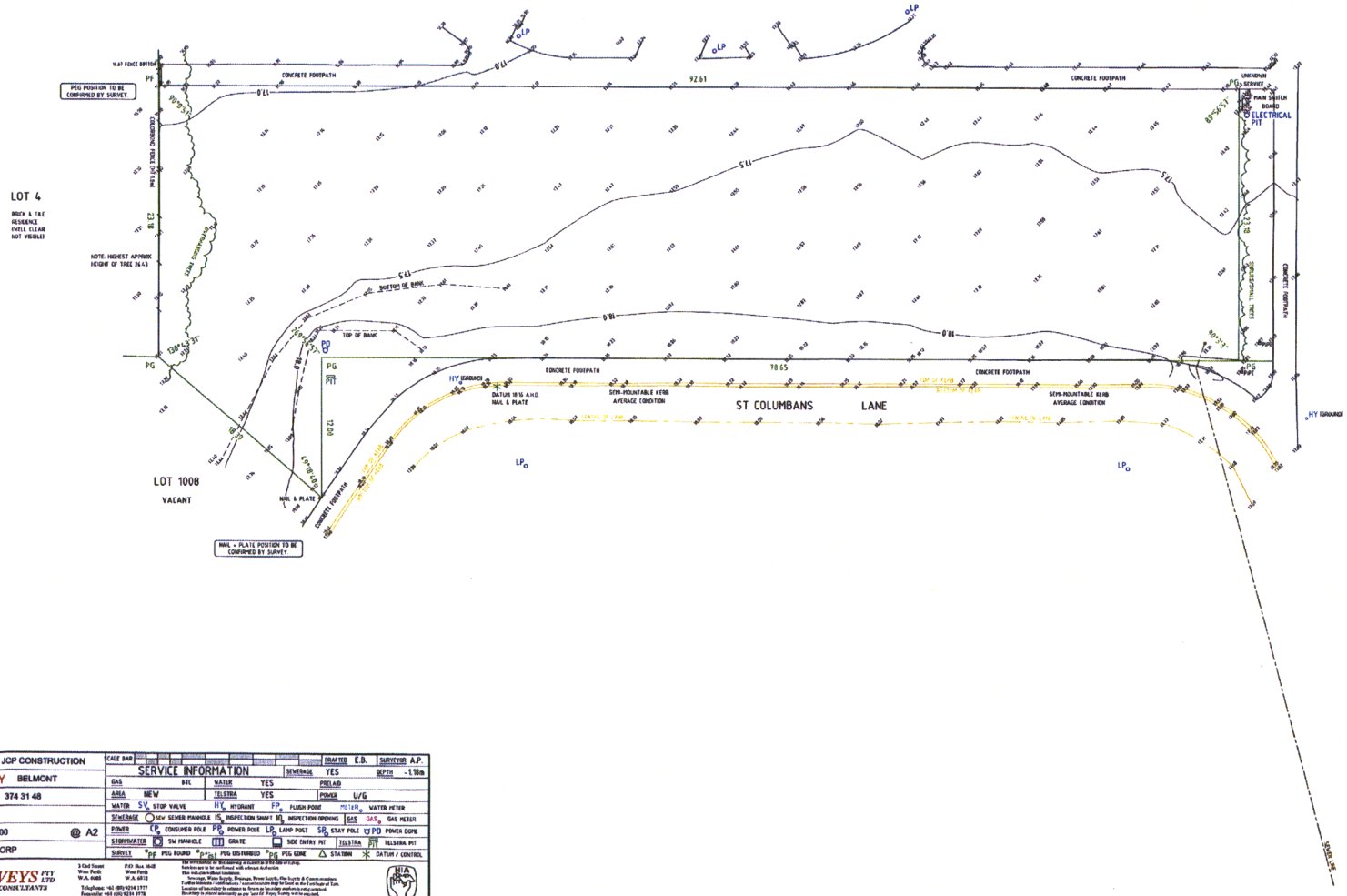
Where an approval has so lapsed, no development shall be carried out without further approval having first been sought and obtained, unless the applicant has applied and obtained Development Assessment Panel approval to extend the approval term under regulation 17(1)(a) of the *Development Assessment Panel Regulations 2011*.

WARNING!
BOUNDARY RE-PEG SURVEY
REQUIRED TO CONFIRM PEG POSITIONS

LANDGATE PLAN SUBJECT
TO MATERIAL CHANGE
AND WAPC APPROVAL

APPROVED 11 OCT 2012

LOT 9204
RESERVED FOR RECREATION

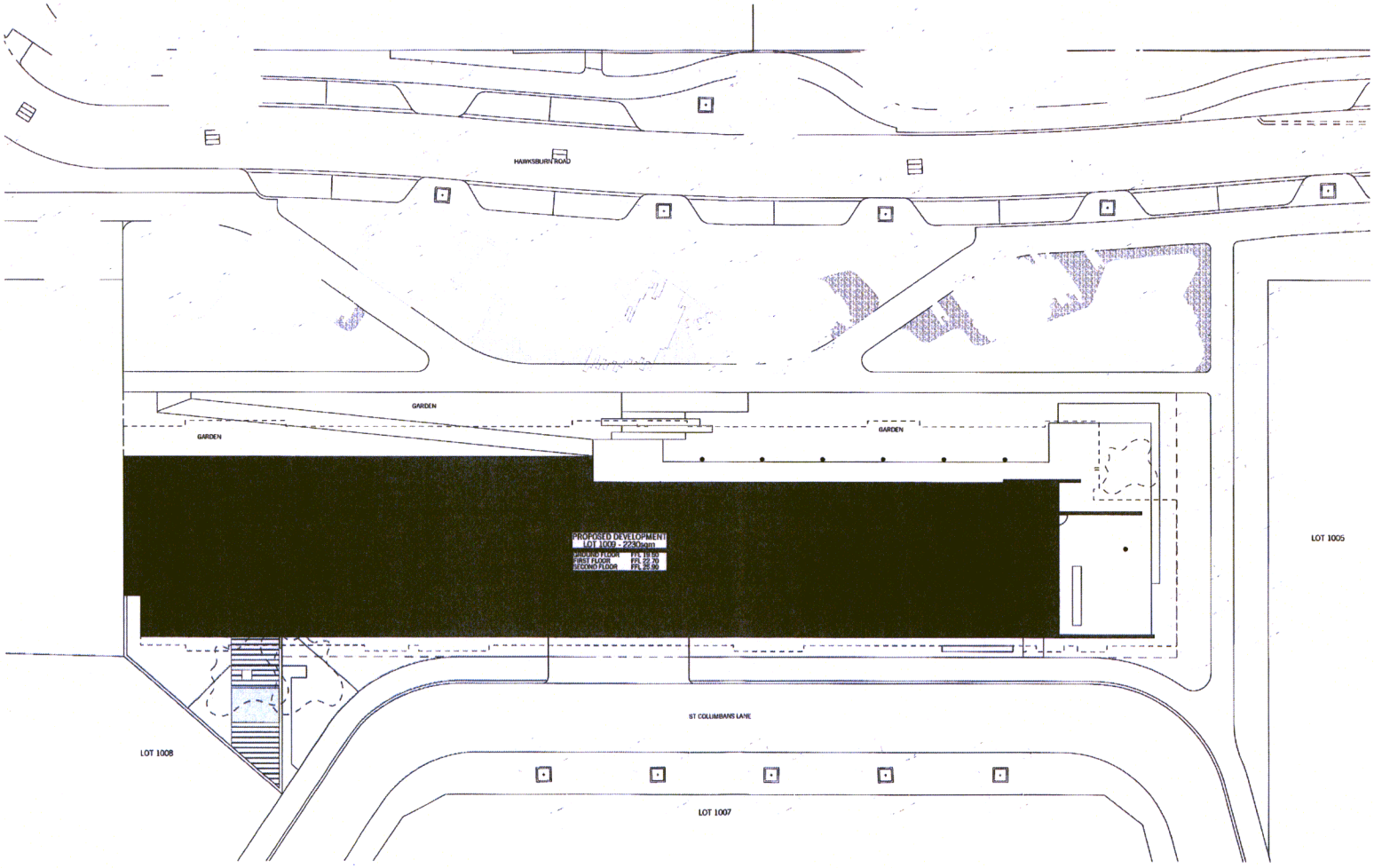


CONSTRUCTION	BUILDER	JCP CONSTRUCTION	SCALE BAR		DRAFTED	E.B.	SURVEYOR A.P.
ST COLUMBANS LANE	AUTHORITY	BELMONT	SERVICE INFORMATION		SEWERAGE	YES	DEPTH -1.18m
VALE	MAP REF.	374 31 48	GAS	BTC	WATER	YES	PRELAID
	C/T Vol.Fol.		AREA	NEW	TELSTRA	YES	POWER U/G
Y 31.07.12	SCALE	1:200 @ A2	WATER SV STOP VALVE		HYD HYDRANT		FP FLUSH POINT METER WATER METER
180648	YOURS:	JCORP	SEWERAGE		MH SEWER MANHOLE		IS INSPECTION SHAFT IO INSPECTION OPENING GAS GAS METER
			POWER		CP CONSUMER POLE		PP POWER POLE LP LAMP POST SP STAY POLE PD POWER DOME
			STORMWATER		SW MANHOLE		GRATE SOE ENTRY PIT TELSTRA PIT TELSTRA PIT
			SURVEY		PEG FOUND		PEG DISTURBED PEG GONE STATION DATUM / CONTROL

AUTOMATED SURVEYS PTY LTD
LAND SURVEYORS AND DEVELOPMENT CONSULTANTS

3 Old Street West Perth W.A. 6005
P.O. Box 1648 West Perth W.A. 6872
Telephone: +61 (08) 9214 1777
Facsimile: +61 (08) 9214 1778

APPROVED 11 OCT 2012



nals and existing
ssession of shop
installation.
es to SpA.

esign and drawing
spaceagency (SpA).
ny purpose without the
of SpA.
ppa to this design
ent of copyright.

Development Application

Revision	Notes	Date	By

spaceagency

SpA
PO Box 48
North Fremantle 6159
Western Australia
t: 08 94305450
f: 08 94305402

Client
BGC Residential

N

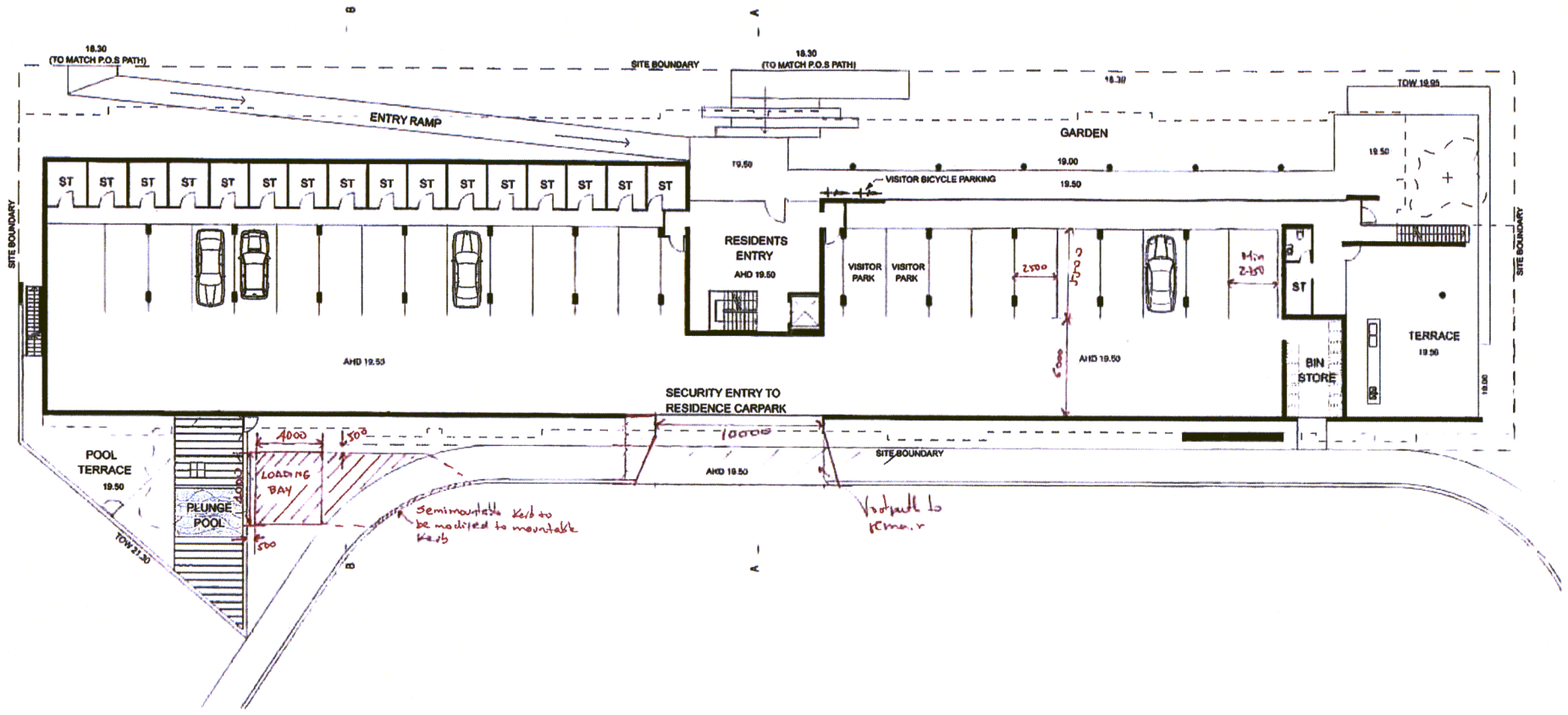
Scale
AS SHOWN @ A1
Drawn
CAE
Project No
1607
Date
Date of Issue
3/08/12

Project
Lot 1009
The Springs
Rivervale

Drawing
PROPOSED SITE PLAN

Drawing No
DA1.01
Revision

APPROVED 11 OCT 2012



Ground Floor Plan
1:250

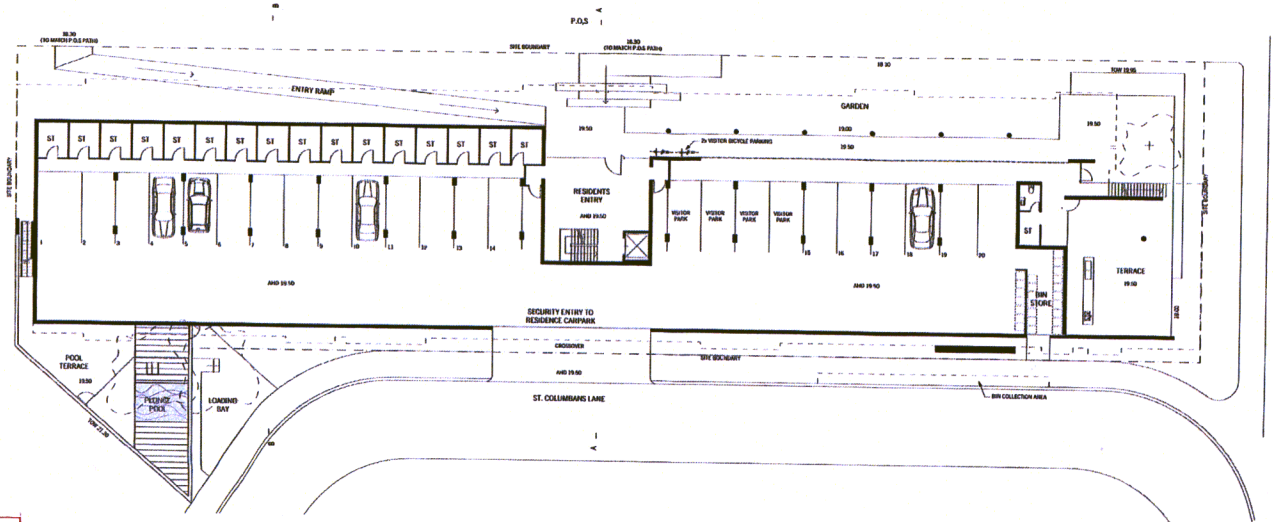
AMENDED PLAN
6 SEP 2012

NOTE: check all site levels and existing dimensions prior preparation of shop drawings, fabrication or installation
Report any discrepancies to the SpA

SpA
PO Box 48
North Fremantle 6159
Western Australia
t: 08 94305450
f: 08 94305402

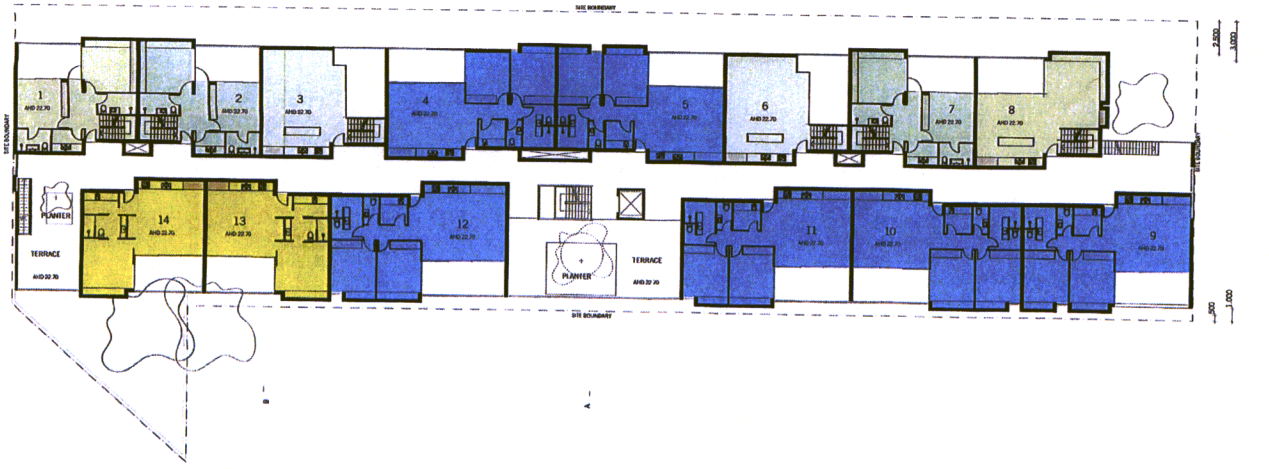
Scale: AS SHOWN	Date: 9/25/12	CLIENT: BGC	Drawing: GROUND FLOOR PLAN
Drawn: #CAD Technician	Issue: DA	Project: The Springs Lot 1009 Rivervale	Drawing No: DA2.01
Project No: 1107	Date of Issue: 9/25/12		Revision: A

APPROVED 11 OCT 2012



City of Belmont
SUPERSEDED
26 SEP 2012

Ground Floor Plan
1:200



First Floor Plan
1:200

spaceagency
SpA
PO Box 48
North Fremantle 6159
Western Australia
t: 08 94305450
f: 08 94305402

Development Application

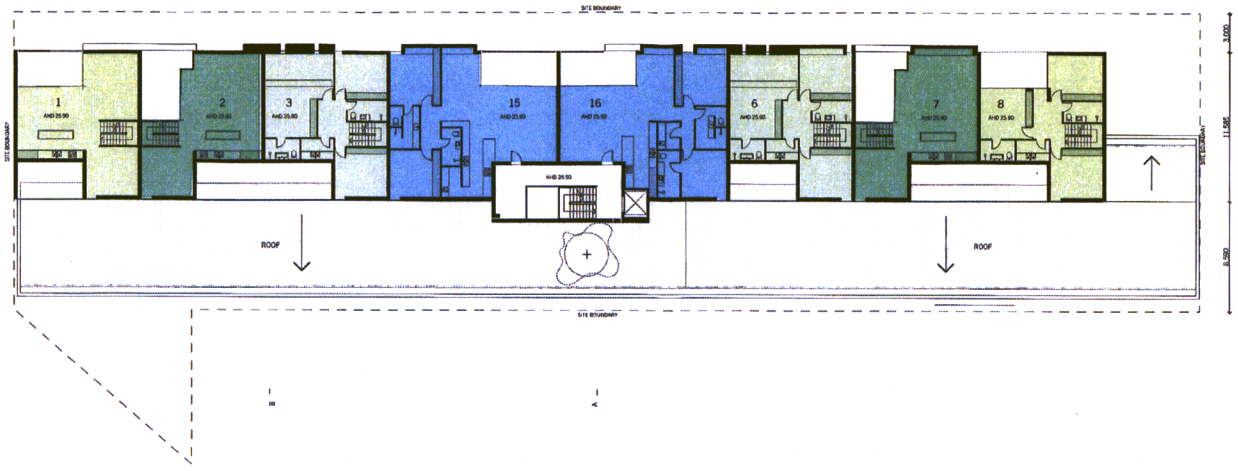
Client
BGC Residential

Project
Lot 1009
The Springs
Rivervale

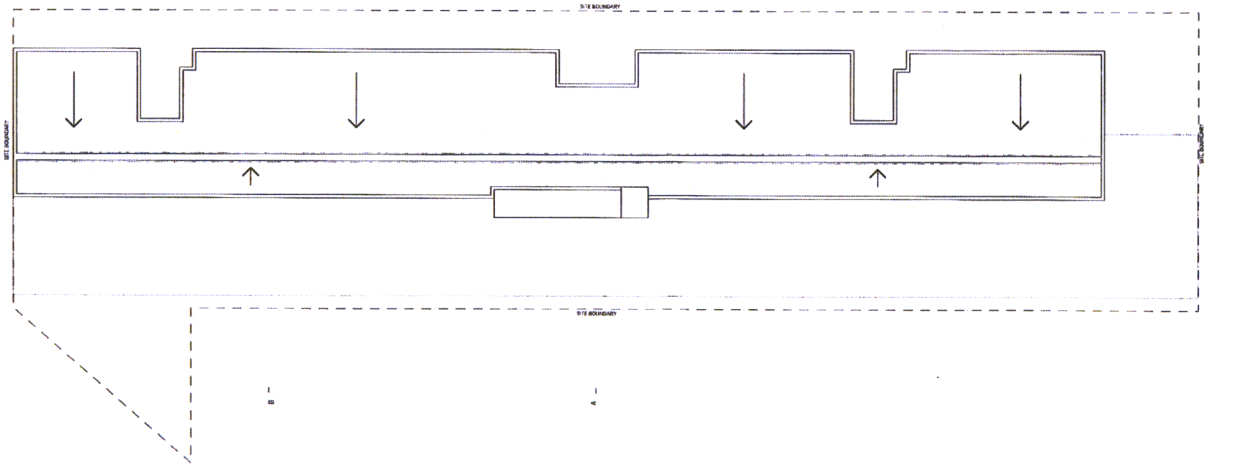
Drawing
GROUND & FIRST FLOOR PLAN

Drawing No
DA2.01

APPROVED 11 OCT 2012



Second Floor Plan
1:200



Roof Plan
1:200

Development Application

spaceagency
SpA
PO Box 49
North Fremantle 6159
Western Australia
t: 08 94305400
f: 08 94305402

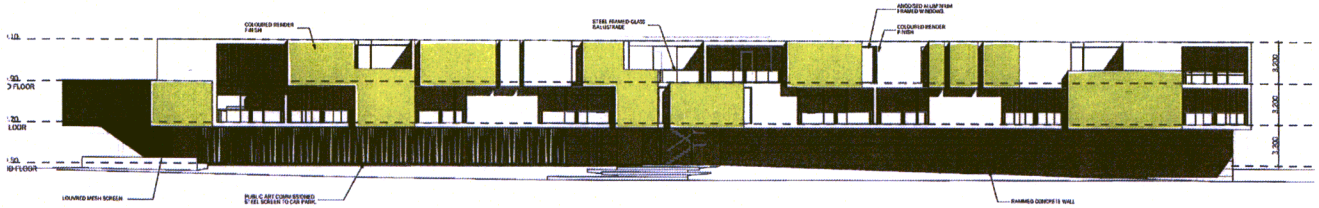
Client: BGC Residential

Project: Lot 1009 The Springs Brownlie

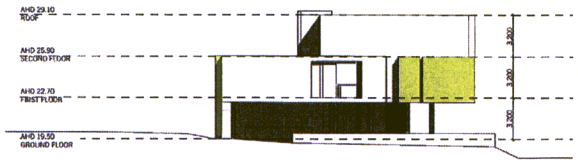
Drawing: SECOND FLOOR & ROOF PLAN

Drawing no: DA2.02

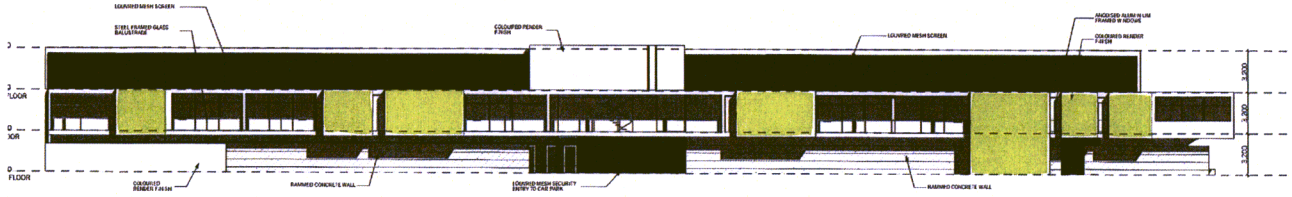
APPROVED 11 OCT 2012



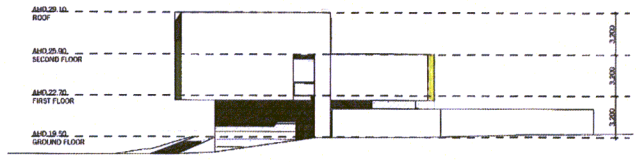
evation



East Elevation
1:200



levation



West Elevation
1:200

els and existing
ersion of shop
installation.
is to SpA.
esign and drawing
spaceagency (SpA).
ny purpose without the
of SpA.
ns to this design
ent of copyright.

Revision	Notes	Date	By

Development Application

spaceagency
SpA
PO Box 48
North Fremantle 6159
Western Australia
t: 08 94305450
f: 08 94305402

Client
BGC Residential

Scale
AS SHOWN @ A1
Drawn
CAE
Project No
1107
Date
Date of Issue
30/8/12

Project
Lot 1009
The Springs
Rivervale

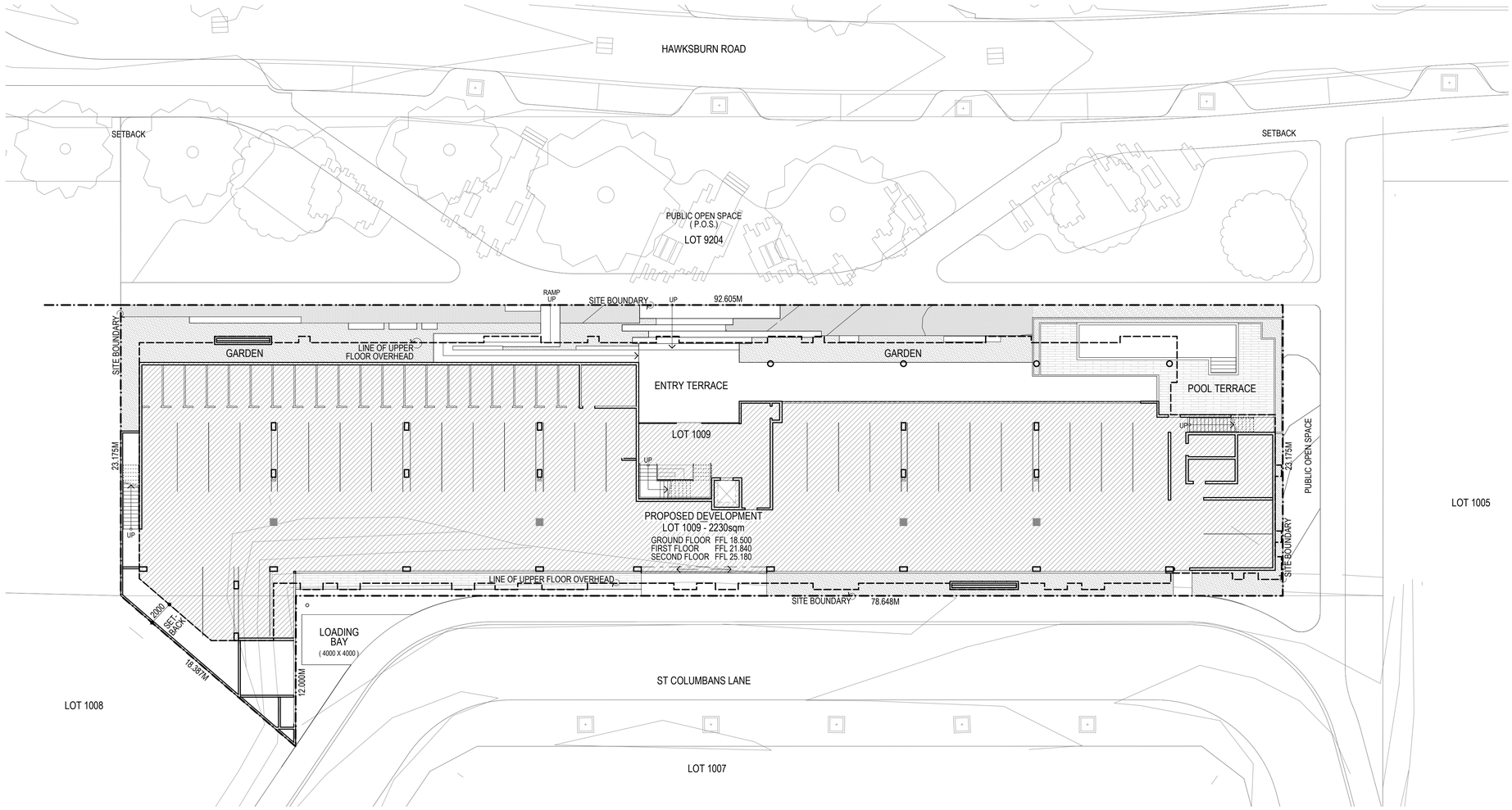
Drawing
ELEVATIONS

Drawing No
DA3.01
Revision

ATTACHMENT 2 – Amended Development Plans (17 October 2013)

10 Hawksburn Road, Rivervale WA 6103

LG Reference: **3/2012/DAP/A**
DAP Reference: **DP/12/00955**



SITE PLAN

SCALE 1:200

Revision	Notes	Date	By

Development Application

City of Belmont
RECEIVED 17/10/2013
Application No: 3/2012/DAP/A

CLIENT
BGC Construction

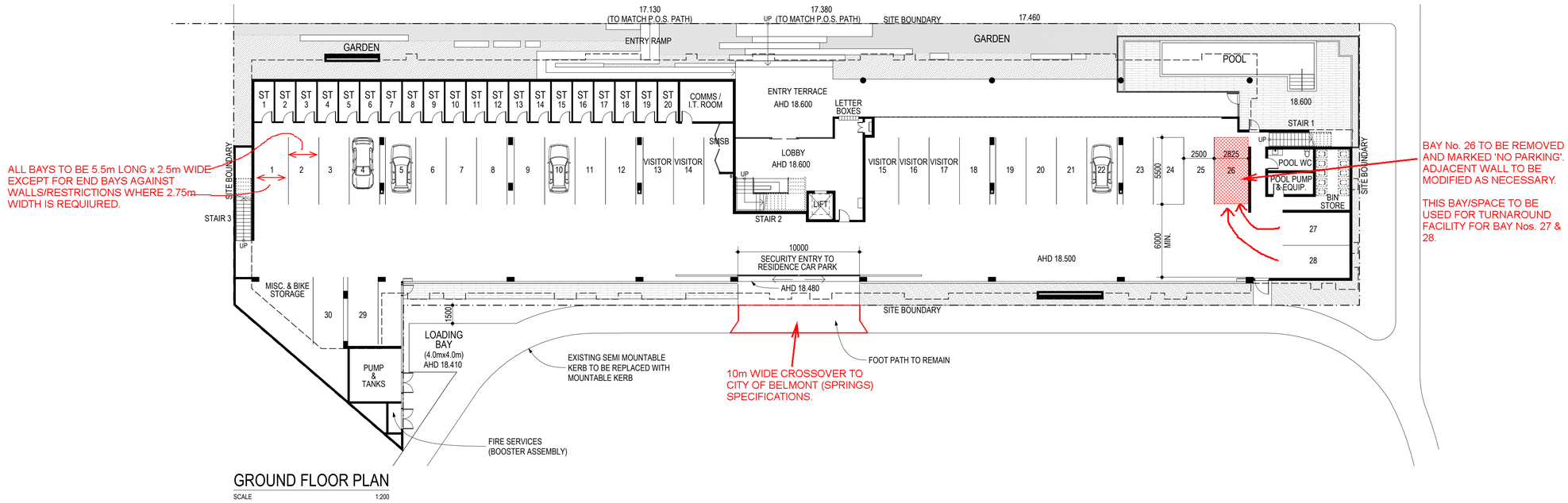
Scale
AS SHOWN @ A1
Drawn
BBF
Project No
70489
Date
10/16/2013
Date of Issue
10/16/2013

Project
Lot 1009
The Springs
Rivervale

Drawing
PROPOSED SITE PLAN

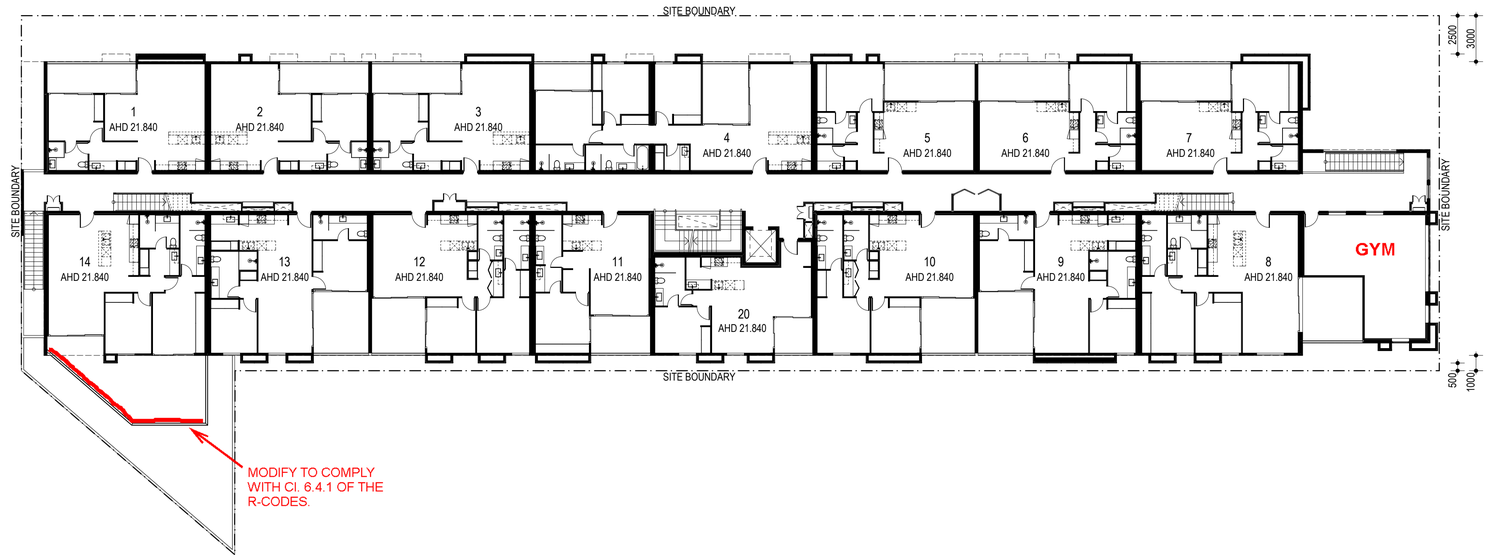
Drawing No.
DA1.01

Revision
A



GROUND FLOOR PLAN

SCALE 1:200



FIRST FLOOR PLAN

SCALE 1:200

Revision	Notes	Date	By

Development Application

City of Belmont
RECEIVED 17/10/2013
Application No: 3/2012/DAP/A

CLIENT
BGC Construction

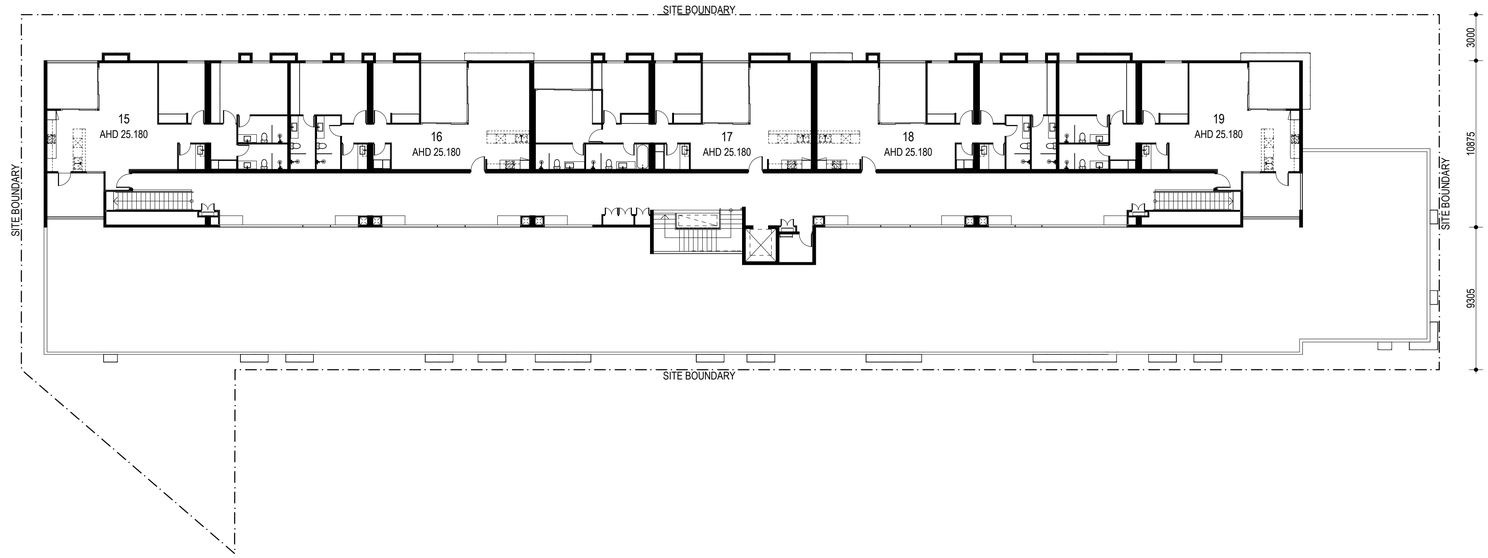
Scale
AS SHOWN @ A1
Drawn
BBF
Project No
70489
Date
10/16/2013
Date of Issue
10/16/2013

Project
Lot 1009
The Springs
Rivervale

Drawing
GROUND & FIRST FLOOR PLAN

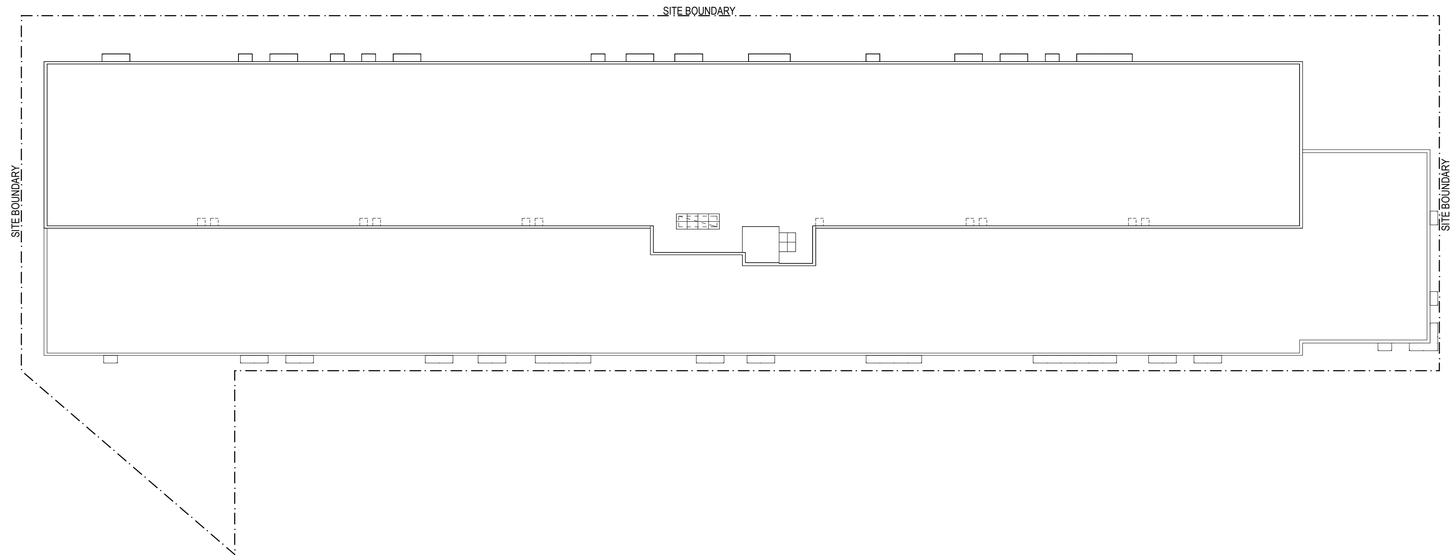
Drawing No.
DA2.01

Revision
A



SECOND FLOOR PLAN

SCALE 1:200



ROOF PLAN

SCALE 1:200

Revision	Notes	Date	By

Development Application

City of Belmont
RECEIVED 17/10/2013
Application No: 3/2012/DAP/A

CLIENT
BGC Construction

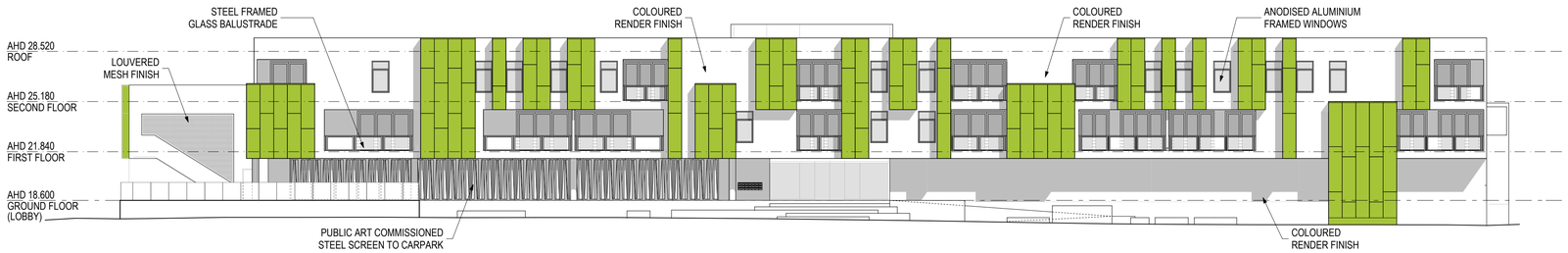
Scale
AS SHOWN @ A1
Drawn
BBF
Project No
70489
Date
10/16/2013
Date of Issue
10/16/2013

Project
Lot 1009
The Springs
Rivervale

Drawing
SECOND FLOOR & ROOF PLAN

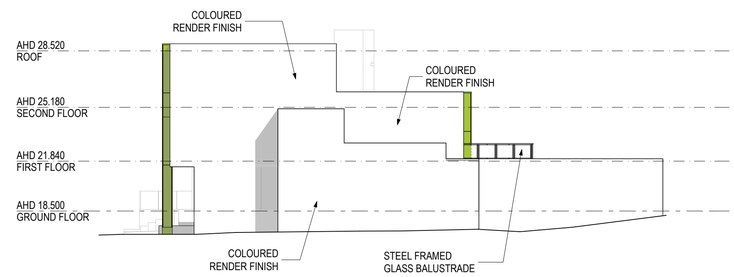
Drawing No.
DA2.02

Revision
A



NORTH EAST ELEVATION

SCALE 1:200

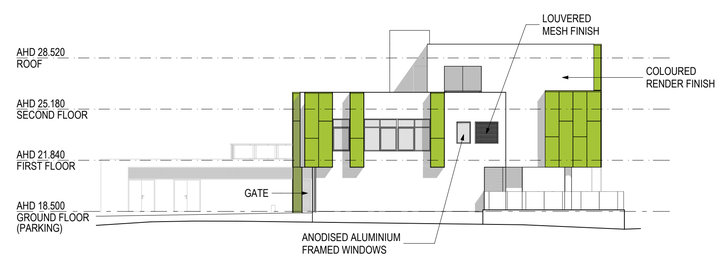


NORTH WEST ELEVATION

SCALE 1:200

SOUTH WEST ELEVATION

SCALE 1:200



SOUTH EAST ELEVATION

SCALE 1:200

Revision	Notes	Date	By

Development Application

City of Belmont
RECEIVED 17/10/2013
Application No: 3/2012/DAP/A

CLIENT
BGC Construction

Scale
AS SHOWN @ A1
Drawn
BBF
Project No
70489
Date
10/16/2013
Date of Issue
10/16/2013

Project
Lot 1009
The Springs
Rivervale

Drawing
ELEVATIONS

Drawing No.
DA3.01

Revision
A

Form 2 - Responsible Authority Report

(Regulation 17)

Property Location:	Lot 2 (2) West Road, Bassendean
Application Details:	Bassendean Village Shopping Centre
DAP Name:	Metro Central JDAP
Applicant:	Hames Sharley
Owner:	Hawaiian Investments
LG Reference:	DABC/BDVAPPS/2012-076
Responsible Authority:	Town of Bassendean
Authorising Officer:	Brian Reed – Manager Development Services
Department of Planning File No:	DP/12/00535
Report Date:	22 November 2013
Application Receipt Date:	8 October 2013
Application Process Days:	38 working days.
Attachment(s):	Copy of Drawing No A220 - Bassendean Shopping Centre Floor Plans – Overall

Recommendation:

That the Metro Central Joint Development Assessment Panel resolves to:

1. Accept that the DAP Application reference DP/12/00535 as detailed on the DAP Form 2 dated 10 October 2013 is appropriate for consideration in accordance with regulation 17 of the *Planning and Development (Development Assessment Panels) Regulations 2011*;

2. Approve the DAP Application reference DP/12/00535 as detailed on the DAP Form 2 date 10 October 2013 and accompanying plans Drawing No A220 - Bassendean Shopping Centre Floor Plans – Overall in accordance with the provisions of Clause 10.3 of the Town of Bassendean Local Planning Scheme for the proposed minor amendment to the approved Bassendean shopping Centre Redevelopment at Lot2 (2) West Road Bassendean.

Amended Conditions

Nil

Advice Notes

i All other conditions and requirements detailed on the previous approval dated 11 September 2012 and 7 May 2013 shall remain unless altered by this application.

Background:

Insert Property Address:	Lot 2 (2) West Road Bassendean
Insert Zoning MRS:	Urban
TPS:	Town Centre
Insert Use Class:	'P' 'D' 'A"
Insert Strategy Policy:	Local Planning Policy No 1 Town Centre Area Strategy and Guidelines
Insert Development Scheme:	N/A
Insert Lot Size:	24166m²
Insert Existing Land Use:	Shop, Office & Take Away Food
Value of Development:	$19 million

The subject site was developed in the 1976 as a 'big box' local shopping centre. Apart from the demolition of the former petrol station and the addition of detached fast food outlets, very little has changed since that time, with the exception of internal shop fit outs and routine maintenance.

On 30 August 2012, the Metro Joint Development Assessment Panel granted conditional approval for the redevelopment of the shopping centre. The approval involved an increase in the floor area of the Bassendean Village Shopping Centre from 7,688m2 to 9,845m2, which is comprised of the following increased floor areas and land-uses;

1 Extant Coles supermarket being increased in floor area from 2973m2 to 4035m2 (1062m2).

2 Additional retail floor area (761m2)

3 New Tavern with a floor area of 554m2. (net 224mm2 bar and seating area).

4 New Gymnasium of 400m2

5 New Kiosk of 125m2

On 29 April 2013, the Metro Joint Development Assessment Panel granted conditional approval for a minor amendment to the approved Bassendean Shopping Village Redevelopment. The minor amendment had the following features:

- It allowed a reduction of 9 car parking bays from the originally approved 448 bays to 439 bays in order to protect 6 trees that were considered to be worthy of retention;
- It required all trees other than those approved for removal to be protected during construction; and
- It allowed the approved Tavern to be either used as a Tavern or a Restaurant.

Details: outline of development application

The proposed minor amendment application relates to the following issues:

- Amend the area approved for the dual use of Tavern/Restaurant' to the use of 'Restaurant', with a reduced floor area from that previously approved;
- Amend the areas approved for 'Storerooms' to the use of 'Office'; and
- Note that an area approved for 'Retail' will be utilised as a 'Gymnasium (Yoga Studio)', however the proposal does not seek the associated reduction in car parking in the event that in the future, a future tenant wishes to seek an application to revert back to a retail use.

Legislation & policy:

Legislation

Local Planning Scheme No. 10
Clause 5.7.2 – Car Parking

State Government Policies

Directions 2031 and the Central Metropolitan Perth sub- regional strategy recognises the Bassendean Town Centre as a District Centre

Local Policies:

There are no local planning policies relating to the amendment.

Consultation:

Public Consultation

No consultation is required.

Consultation with other Agencies or Consultants

No consultation is required.

Planning assessment:

Amend the area approved for the dual use of Tavern/Restaurant' to the use of 'Restaurant', with a reduced floor area from that previously approved.

Land use

A Tavern is an “A” use within the Town Centre Zone where a Restaurant is a “P” use within the Zone.

From a planning perspective there is no objection to the approved Tavern/Restaurant being changed to a Restaurant: a restaurant is a permitted use in the Town Centre Zone, as opposed to the Tavern which is use that is not permitted in the zone unless the local government has exercised discretion by granting planning approval following public advertising of such a proposal.

In planning terms a restaurant is less likely to have the negative amenity impacts, sometimes associated with Taverns.

Car parking demand

The following table shows the approved floor areas and the proposed floor areas for the

Existing Land Use	**Approved Area**	**Proposed Land Use**	**Proposed Area**
Tavern (T24)	496 m²	Cafe (T24)	512 m²
Tavern Seating	58 m²	Cafe Alfresco / Deck	151 m²
Tavern Deck	155 m²		
Total	709m²	Total	663m²

In terms of the discussion of the car parking demand for the proposed change of use from Tavern to Restaurant it is considered to be more straight forward to quantify the car parking demand against Table 2 – Minimum Car Parking Spaces required by the Local Planning Scheme No 10. Although it should be recognised that the original approval was based on the reduction of car parking spaces based on a number of factors as outlined below.

The existing approval for the expansion of the shopping centre required the provision of 448 car bays to be provided. The modified approval issued on 29 April 2013 reduced the number of spaces required to 439 bays. The approved number of parking bays has been considerably reduced from the Scheme Requirement of 816 bays that would have been required for the individual components of the development.

The current approval based on 439 bays was endorsed by the Joint Central Metropolitan Development assessment Panel taking the following circumstances into account:

- *The existing shopping centre predated any Town Planning Scheme and the number of car bays would not comply with current requirements.*
- *The car parking demand under the Scheme took no account of the recently introduced extended trading hours and with the increase spread in trading hours, car parking demand is likely to be less.*
- *The applicant was able to demonstrate in a comprehensive traffic study that the car parking area at the Bassendean Village Shopping Centre is currently under-utilised during recognised peak shopping periods.*
- *The approved Tavern and Gymnasium are likely to have the greatest demand outside of peak retail trading hours.*
- *The parking requirements of the Activity Centres for Perth and Peel (SPP 4.2) recommend a lessor parking requirement for shopping centres based on 4-5 bays per 100m^2.*

The following table shows the full car parking demand for both the tavern use and the restaurant use.

Existing Land Use	**Approved Area**	**LPS No 10 parking requirement**	**Required parking spaces**
Tavern (T24)	496 m²	1 space for every 3m² of bar and public area.	236 bays
Tavern Seating	58 m²		
Tavern Deck	155 m²		
Proposed Land Use	Proposed Area	Based on 180 seats at a rate of 1 bay for every 4 seats	45 bays
Cafe (T24)	512 m²		
Cafe Alfresco / Deck	151 m²		

The above demonstrates that the overall car parking demand has reduced significantly over the Scheme requirements for the change of use from tavern to restaurant and the actual demand for the restaurant reduces the car parking requirement from the 92 bays notionally allocated to the Tavern to 45 bays.

Amend the areas approved for 'Storerooms' to the use of 'Office' Land use

It is considered that the storerooms would have been treated as falling under the broader definition of a ‘shop’ use which is a permitted use in the Town Centre Zone. The office incubators would fall under the definition of an office which again is a permitted use in the Zone.

From a land - use planning perspective there is no objection to the approved storerooms being used as offices.

Car parking demand

It is considered unlikely that the approved storerooms would have been subjected to a requirement to provide car parking spaces, as they would have likely been viewed as an incidental use to the retail element.

The area of the approved storerooms to be converted to Office use equates to around 111m² which would require the provision of 6 car parking bays.

The increase in car parking demand for this particular element is more than offset by the reduction in the car parking requirement caused by the reduction in floor area/and change of use form the Tavern to Restaurant.

The change of use of the area (T312 and T31) approved for 'Retail' to be used as a Gymnasium

Retail falls under the broader definition of shop which is a permitted use in the Town Centre Zone. A "gymnasium" would fall under the broader use class of "recreation-private" which is a discretionary use in the Town Centre zone.

It is considered that the change of use from an approved shop to a gymnasium is appropriate in land use planning terms. It should be noted that the original approval of the redevelopment of the shopping centre included a gymnasium with a floor area of 400m².

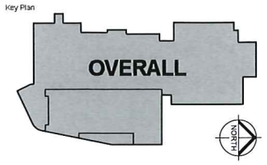
Car parking demand

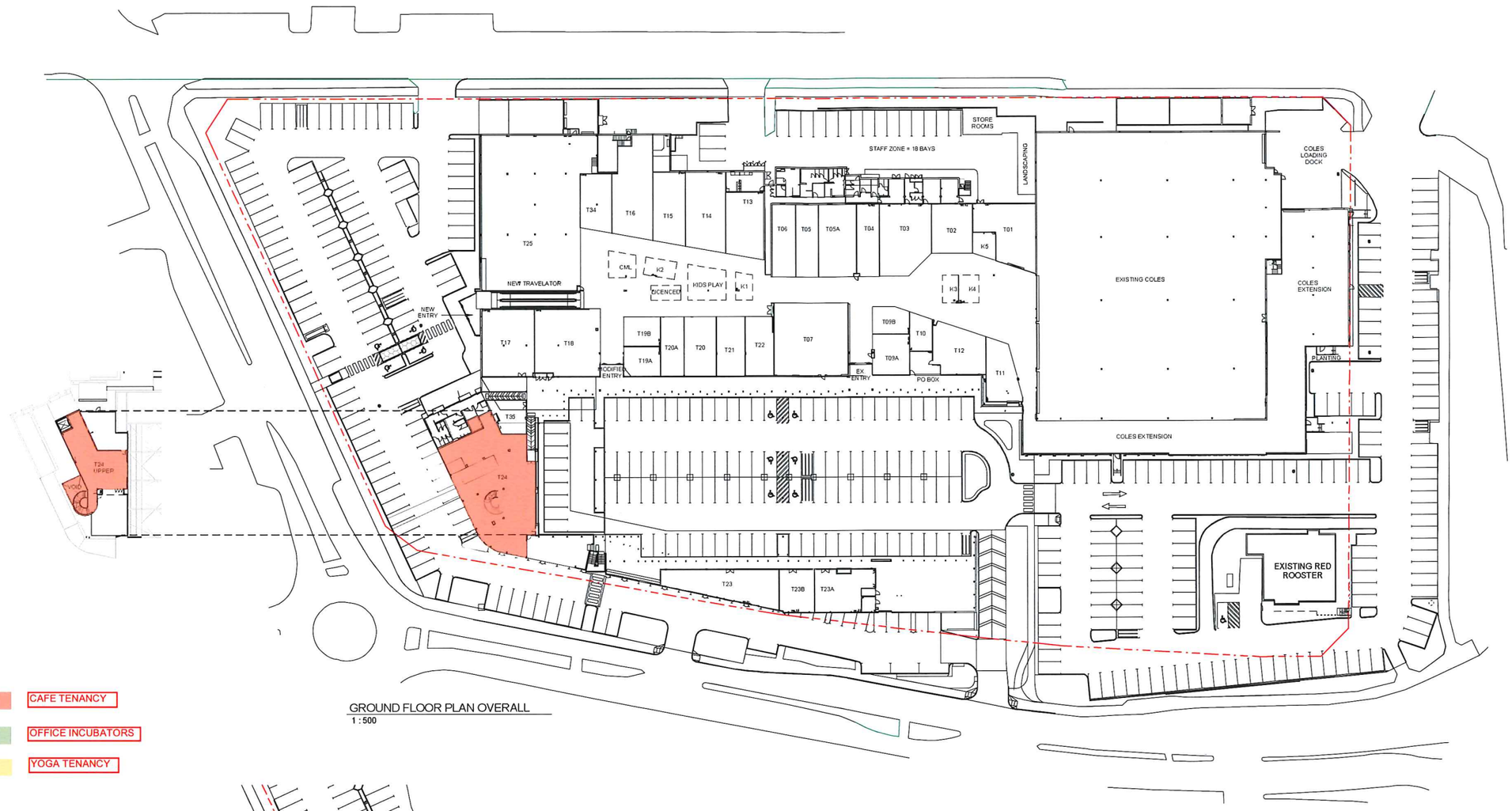
While the car parking demand for a gymnasium based on 1 bay per 20m² of gross floor area is less than that required for a shop at 1 bay per 12.5m² of gross floor area, the applicant does not seek a reduction in car parking provision to allow for future changes in use of the tenancy.

Conclusion:

The proposed land uses of Restaurant, Offices and Gymnasium as advocated in the proposed amendment are considered to be appropriate. The reduction in the area of the building footprint coupled with lesser car parking demand for the uses proposed will result in the reduction of the number of car parking spaces required to serve the development.

Key Plan





GROUND FLOOR PLAN OVERALL
1 : 500

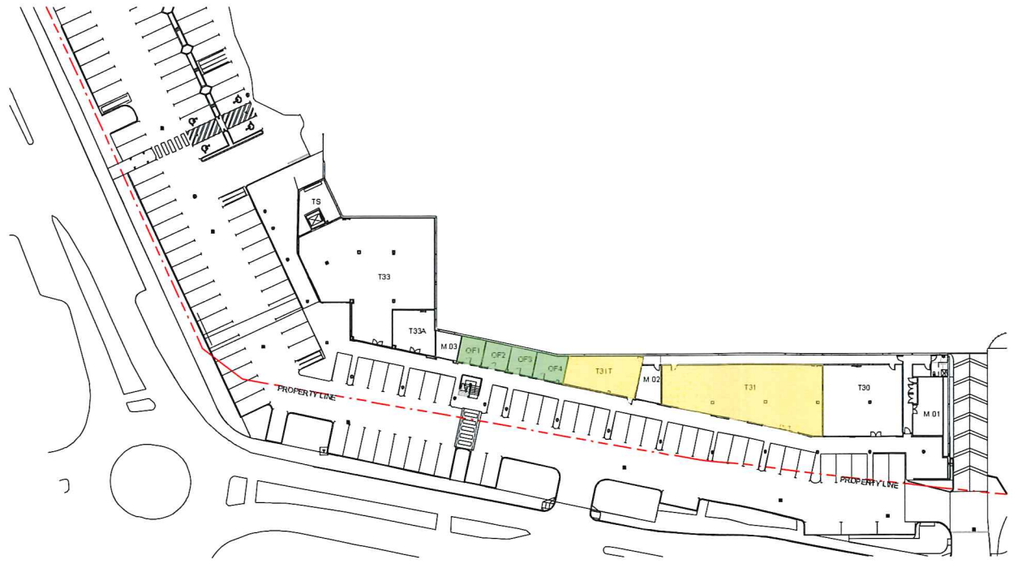
PARKING - GROUND FLOOR	
TYPE	TOTAL
EXISTING CARBAYS	64
NEW CARBAYS	212
NEW CARBAYS D.A.	6
	282

PARKING - LOWER GROUND FLOOR	
TYPE	TOTAL
EXISTING CARBAYS	56
NEW CARBAYS	97
NEW CARBAYS D.A.	4
	157

CAFE TENANCY

OFFICE INCUBATORS

YOGA TENANCY



LOWER GROUND FLOOR PLAN OVERALL
1 : 500

OVERALL AREA SCHEDULE	
Comments	Area
ALFRESCO SEATING	270.6 m²
EXISTING FAST FOOD	224.0 m²
EXISTING RETAIL	809.1 m²
NEW CAFE	512.2 m²
NEW GYM/YOGA	671.4 m²
NEW KIOSK	115.5 m²
NEW RETAIL	3255.3 m²
OFFICE	111.1 m²
SUPERMARKET	2973.5 m²
SUPERMARKET EXTENSION	1045.9 m²
Grand total: 58	9988.7 m²

Rev.	Date	Initial	Description
9	13/09/2013	SD	UPDATED TO CURRENT
8	26/08/2013	SD	LAYOUT AMENDMENTS TO REFLECT DOME TENANCY
7	06/08/2013	SD	RAMP SHIFTED 300mm NORTH
6	02/05/2013	NK	ISSUE FOR CONTRACT
5	23/04/2013	SD	AMENDMENTS
4	14/03/2013	HP	AREA SCHEDULE UPDATED
3	14/03/2013	HP	CARPARKING REDUCED TO RETAIN TREES
2	05/03/2013	SD	MODIFICATIONS TO GYM & TAVERN STORE DUE TO SEWER WORKS
1	18/02/2013	SD	ISSUE FOR TENDER
C	15/01/2013	SD	ISSUE FOR INFORMATION
B	03/12/2012	KM	FINAL PRICING SET
A	26/10/2012	KM	ISSUE TO RBB

Hames Sharley
www.hamessharley.com.au +61 8 9381 9877

Project
BASSENDEAN SHOPPING CENTRE

West Road, Corner of Guildford Road
Bassendean, WA
6054

Drawing Title
FLOOR PLANS - OVERALL

Drawn By	Checked By	Scale @ A1
SD	TL	1 : 500
Project No.	Drawing No.	Revision
42307	A220	9

Status
FOR CONTRACT