SECTION 100, CITY

CONCEPT DESIGN REPORT
DATE SEPTEMBER 2018

PREPARED FOR MORRIS PROPERTY GROUP

This report has been prepared by the office of Spiire
Suite 5, Level 1, 243 Northbourne Ave, Lyneham **Canberra** ACT 2602

Acknowledgements and Recognition

Issue Date	Rev No	Authors	Checked	Approved
24/09/2018	1	M Bomben	B Cargill	M Bomben

Spiire Job Number: enter job number

Citation: Spiire 2018, SECTION 100, CITY Report for MORRIS PROPERTY GROUP.
Authors: M Bomben - Spiire Australia Pty Ltd.

File Name: T:\30\305632\Civil\Reports\Concept Design Report

TABLE OF CONTENTS

TABLES

FIGURES

1. INTRODUCTION

1.1 BACKGROUND

In December 2007 City West Property Holdings, a subsidiary of Leighton Properties and Mirvac, purchased Block 19, Section 63, from the ACT Government.

Mott McDonald, formerly known as Hughes Trueman, were the former consulting engineers undertaking preliminary design for the development of Section 63, Block 19 and the extension of Edinburgh Avenue. The proposed development, at the time, included a basement carpark under the proposed extension of Edinburgh Avenue connecting part Blocks 19 and 20. The National Capital Authority (NCA) Works Approval for the extension of Edinburgh Avenue was obtained in October 2009. A copy of the Works Approval drawings is found at Appendix D.

In 2012 AECOM were engaged by the ACT Government to design and document the off-site works required for the extension of Edinburgh Avenue. These works were mainly associated with intersection improvements at London Circuit including provisions for services (i.e. water, stormwater and sewerage) for the development of Block 21, Section 63. A part copy of these drawings is found at Appendix D. It's understood that the NCA were consulted during the design development works that AECOM undertook in 2012.

In January 2014 Block 19 Section 63 was subdivided into Blocks 7-11, Section 100, City.

In 2014 Mott MacDonald produced another set of preliminary design drawings for the extension of Edinburgh Avenue. A copy (part-thereof) of these drawings are also found at Appendix D. The status of these drawings is unknown in context of the proposed development for Blocks 7 – 11 Section 100.

Morris Property Group (MPG) represented by BJM Canberra Pty Limited purchased Blocks 7-11, Section 100 21, Section 63, from the City West Property Holdings in June 2018. MPG entered into a Deed of Assignment with the ACT Government for the development of Section 100.

In addition MPG entered into a Licence Agreement with The Territory over Block 20, Section 63. This land does not form part of the holding leases.

Morris Property Group (MPG) engaged Spiire in 2018 to undertake the detail design and documentation for the off-site works associated with the development of Section 100, Canberra City, including the extension Edinburgh Avenue from London Circuit and Vernon Circle.

It is proposed that Section 100 will be subdivided into four blocks as shown on Drawing 305632CF215 at Appendix A. Section 100 will also include the creation of a 40m wide road reserve for the extension of Edinburgh Avenue.

1.2 DEVELOPMENT SITE

1.2.1 EXISTING

The site, Blocks 7 – 11, Section 100, formerly Block 19, Section 63, is surrounded by Vernon Circle to the east, the existing Law Courts and the City Police Station to the north, London Circuit to the west and Block 20, Section 63, to the south.

Section 100 is approximately 2.5 hectares in size and is zoned as a Designated Area under the National Capital Plan. The site is in the City Hill Precinct and is currently used as a surface carpark, which has access of London Circuit via a signalised intersection.

The locality plan for Section 100 shown in Figure 1, below.

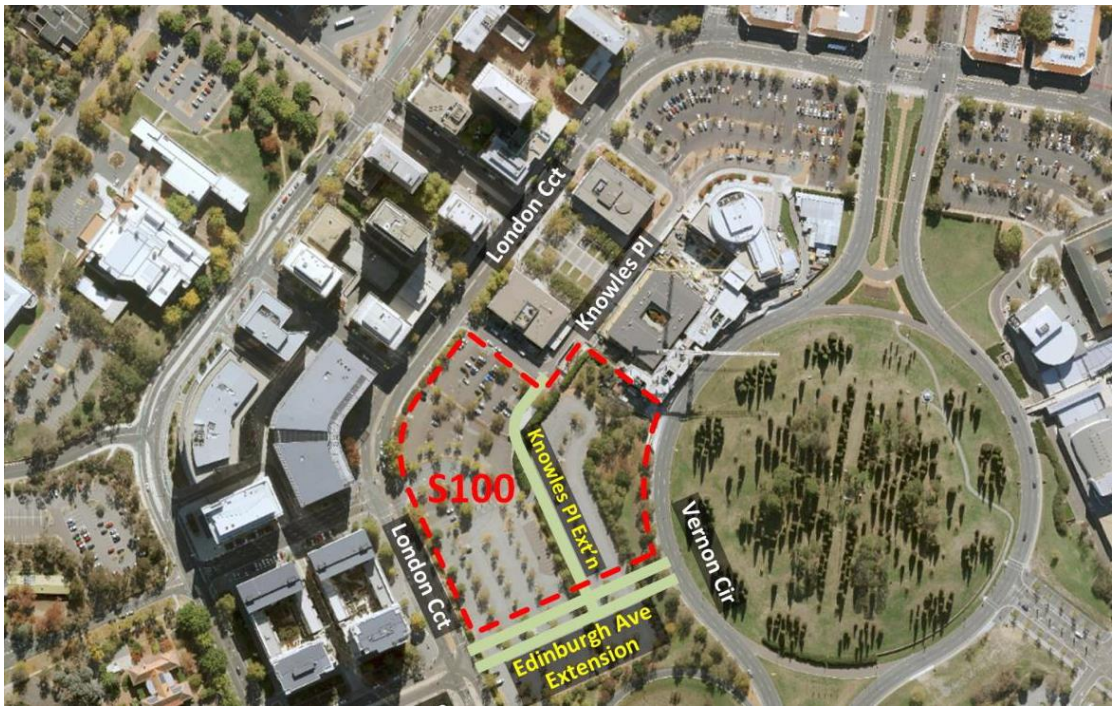


Figure 1: Locality plan for Section 100

1.2.2 PROPOSED

The proposed development consists of four development sites, known for the purposed of this report, as Site 1, Site 2, Site 3 and Site 4.

Site 1 is located on the eastern side Section 100 and Sites 2, 3 and 4 are located on the western side of Section 100.

The Section 100 development will be accessible via Knowles Place, London Circuit (left-in only) and the Edinburgh Avenue extension. The existing access point from the London Circuit – Gordon Street intersection will be removed once Site 1 is developed and operating as a public carpark. The provided ground level public parking and basement three residential car parking will be accessed from the corner of Knowles Place, south of the Canberra City Police Station.

Knowles Place will extend from the southern corner of Knowles Pace to the Edinburgh Avenue extension. This part of Knowles Place will be a “private road” as it crosses Site 4 and Site 1. Midblock driveway access to basement parking for public parking, residents and tenants of Section 100 will be provided from Knowles Place extension.

Vehicle access to the proposed development from London Circuit and Vernon Circle will not be permitted.

The layout of the development is shown in Figure 2, below.

Figure 2: Layout development for Section 100

1.2.2.1 Scope of Works

The off-site scope of works for the development for Section 100 is summarised as follows:

- Extend Edinburgh Avenue from London Circuit to Vernon Circle *(off-site works for the purpose of this report)*
- Modify existing signalised T intersection at London Circuit/Edinburgh Avenue into a four-way intersection including intersection improvements to permit greater traffic capacity at the intersection
- Construct a “stub” connection to Knowles Place (extension) from Edinburgh Avenue (extension)
- Construct a “stub” connection to Block 19, Section 63, from Edinburgh Avenue (extension). For these works to be undertaken by MPG a variation to the Deed scope of works for the development of Section 100 will be required. These works have been shown as works “by-others” in the interim
- Construct a three-way signalised intersection at Vernon Circle
- Convert the “four-way” signalised intersection at Gordon Street and London Circuit to a “three-way” signalised intersection

- Convert Knowles Place (south) from a “one-way” street to a “two-way” street. Left-in and Left-out turns only will be permitted at the intersection of Knowles Place (south) and London Circuit, emergency vehicles excepted
- Upgrade London Circuit verge fronting the Site, including new street lights and street trees
- Upgrade Vernon Circle verge fronting Site 1 including new street trees, street lights and footpath
- Provide hydraulic and shared services to service Sites 1, 2, 3 and 4
- Relocate and/or adjust existing services to permit the above works

The extension of Knowles Place from Knowles Place (south) to Edinburgh Avenue (extension) does not form part of the off-site works for Section 100. This section of road will be privately owned and constructed as part of the building works for Sites 1 and 4.

The Designated Land/Non Designated Land boundary is shown on Drawing 305632CF200. All works within the Designated Land requires NCA Works Approval. All works outside this (i.e. Non Designated Land) is subject to the ACT Government Development Application (DA) Approval process.

The proposed works are shown on the drawings included at Appendix A.

2. GEOMETRIC LAYOUT

2.1 EXISTING CONDITIONS

2.1.1 EDINBURGH AVENUE

Edinburgh Avenue is a major road that connects Parks Way to the Australian National University and the City from the west. Edinburgh Avenue currently terminates at a signalised T- intersection at London Circuit.

Edinburgh Avenue has two 3.5m wide lanes in each direction and is separated by a median which is approximately 3.0m wide. On street parking bays exists along the eastbound carriageway between London Circuit and Marcus Clarke.

There are no on road cycling facilities along Edinburgh Avenue between Marcus Clarke Street and London Circuit.

2.1.2 LONDON CIRCUIT

London Circuit is major collector road which runs in a north-south direction as it intersects Edinburgh Avenue (existing). London Circuit has two 3.6m wide through lanes, in each direction, and is separated by a 3.8m wide median to the north of the intersection and a 3.9m median to the south of the intersection.

There are no on-road cycling facilities along London Avenue.

2.1.3 VERNON CIRCLE

Vernon Circle is major road that connects the City to the south and vice versa via Northbourne Avenue and Commonwealth Avenue, respectively. Vernon Circle has three 3.5m (approx.) wide lanes that circulate is a clockwise direction.

A 1.3m wide on-road cycle path is provided along Vernon Circle.

2.1.4 KNOWLES PLACE (SOUTH)

Knowles Place is a “one-way” street that provides access to the Law Courts and collects traffic from the adjoining Law Courts carpark, from the north. Knowles Place (south) connects into London Circuit via an un-signalized intersection. Right and left hand turns into London Circuit from Knowles Place are currently permitted at this location.

Knowles Place (south) also provides access to the City Police Station via a basement carpark driveway located on the northern verge, just east of London Circuit.

The Road Reserve width of Knowles Place is 13.2m and its northern and southern verge widths are 1.7m and 2.3m, respectively.

On street parking exists on both sides of Knowles Place (south).

2.2 PROPOSED LAYOUT

The proposed “off-site” works for the Section 100 development are shown on Drawing 305632CF200 - “General Arrangement Plan”.

2.2.1 EDINBURGH AVENUE/LONDON CIRCUIT INTERSECTION

The following works are recommended at the intersection Edinburgh Avenue and London Circuit:

- Provide a dedicated 3.0m wide right turn lane from Edinburgh Avenue (existing) into London Circuit
- Provide a dedicated 3.0m wide right turn lane from London Circuit into Edinburgh Avenue (existing)
- Provide a dedicated 3.0m wide right turn lane from London Circuit into Edinburgh Avenue (extension)
- Modify existing medians along London Circuit and Edinburgh Avenue (existing) to accommodate the new traffic arrangements noted above

Refer to Drawing 305632CR201 for typical cross-sections of London Circuit and Edinburgh Avenue (existing)

2.2.2 EDINBURGH AVENUE (EXTENSION)

Edinburgh Avenue is a dual carriageway asymmetrically located within a 40m wide road reserve. The alignment of the central median of Edinburgh Avenue is governed by the alignment of existing travel lanes along Edinburgh Avenue (existing). The northern and southern verges of Edinburgh Avenue vary in width because of this.

The typical cross-sections for Edinburgh Avenue are shown on Drawing 305632CR200 and it includes the following elements:

- 3.0m wide median
- 6.5m wide carriageway consisting of a 3.0m wide inside lane and a 3.5m wide outside lane
- 2.8m wide on-road parking
- 3.5m wide dedicated left turn lane into London Circuit from Edinburgh Avenue
- 2.5% road cross fall and 3.0% on-road parking cross fall
- Concrete Open Channel is provided between the proposed parking bays and the through travel lane
- Concrete Open Channel is provided through the intersection at Knowles Place and at the proposed road stub servicing Block 20, Section 63
- 2.0% verge cross fall
- Shared path arrangements along both the northern and southern verges. This is consistent with the recently constructed section of Constitution Avenue from Knowles Place to Vernon Circle
- Street trees in the verges and central median. Refer to Landscape Plans
- Underground hydraulic services. Refer to Service Master Plans

(It is noted that a previous design for the extension of Edinburgh Avenue (by AECOM in 2012) required major regrading works along the southbound lane of London Circuit. The 3% longitudinal grade "ease" at the intersection with Knowles Place (extension) combined with limiting the longitudinal grade of Edinburgh Avenue to less than 8% is understood to be the principal drivers for extending the regrading works into London Circuit. Adjustments to the existing stormwater system along London Circuit was also necessary as the southbound lane had to transition from a "two-way" cross fall road (just south of Gordon Street) to a "one-way" cross fall road, at Edinburgh Avenue, and back again to a "two-way" cross fall road (just past the intersection). The proposed regrading works required the "lifting" of the eastern side of London Circuit by 600mm (approx.). Refer to Appendix D for Edinburgh Avenue longitudinal section by AECOM).

The longitudinal section of Edinburgh Avenue (extension), which minimises the amount of new works and abortive works along London Circuit is presented in this Design Submission Report. The key geometric features are summarised as follows:

- The proposed longitudinal section of Edinburgh Avenue is shown on Drawing 305632CR300. The longitudinal grade is limited 7.6% which is within the maximum permissible grade of 8.0% for a bus route should Edinburgh Avenue become a designated bus route
- A vertical sag curve of 34m with a K value of 3.9 has been is provided at London Circuit. This K value is compliant for a design speed of 50km/hr

2.2.3 EDINBURGH AVENUE/VERNON CIRCLE

A signalised T intersection is proposed at the intersection of Edinburgh Avenue and Vernon Circle.

A vertical crest curve of 20m with a K value of 2.6m has been provided at the intersection of Edinburgh Avenue and Vernon Circle. Sight Distance is provided by the continuous median, signage and proposed traffic lights at this intersection.

2.2.4 KNOWLES PLACE (SOUTH)

Knowles Place (south), from London Circuit to the first 90-degree bend along Knowles Place, will be converted from a "one-way" street to a "two-way" street as shown on Drawing 305632CF200. The intersection of Knowles Place and London Circuit will operate as a "left-in" and "left-out" only intersection but allows emergency vehicles to turn right into London Circuit when required.

The new lane configuration for Knowles Place (south) will consist of two 3.2m wide lanes in each direction with 2.8m wide on-street parking along northern verge.

Stop and No Entry signs are proposed at the southern end of the Knowles Place where the street changes from a "one-way" street to a "two-way" street.

2.2.5 KNOWLES PLACE (EXTENSION)

Knowles Place (extension) is a 7m wide private road and it is located within Site 1 and Site 4. The longitudinal section of Knowles Place (extension) is shown on Drawing 305632CR302.

A low point is provided along Knowles Place and it is located approximately 35m south of the Knowles Place (south). Further grading details will be provided at detail design stage. The drainage area for this low point is limited to road surface drainage only.

Typical cross section for Knowles Place (extension) are shown on Drawing 305632CR202 and Drawing 305632CR203.

3. TRAFFIC ANALYSIS

A traffic study for the proposed development was undertake by SMEC in September 2018. A copy of the report is attached at Appendix C.

The traffic study includes traffic generations based on trip rates agreed with TCCS, traffic distribution using the Canberra Strategic Transport Model (CSTM) and networked intersection analysis using SIDRA intersection.

The objectives of the traffic study were to:

- Review existing Traffic volumes
- Assess future traffic operations with and without the proposed development
- Provide recommendations about the appropriate intersection arrangement at the proposed development access points and the Edinburgh Avenue extension intersections with London Circuit and Vernon Circle

The proposed development Land Use for Section 100 is summarised in Table 1, below.

Table 1: Section 100 Land Use

Land Use	Quantity
Residential Units	700 dwellings
Commercial Floorspace	38,500m^2
Retail Floorspace	5,322m^2

(It is noted that the existing public parking on Section 100, formerly known as Blocks 21 and 20, Section 63, will be incorporated into the basement parking in the development and will be publicly accessible via Knowles Place).

The following modelling scenarios were investigated:

***2018 Base Case** – Current land use and transport network assumptions for 2016, supplemented by SCAT traffic data supplied by TCCS.*

***2031 Do Minimum** – All land use and network assumptions already in the CSTM for 2031 but with Edinburgh Avenue extension included.*

***2031 Section 100** – All land use and network assumptions already in the CSTM for 2031 but with Edinburgh Avenue extension and proposed Section 100 land use and carpark access locations included.*

The following intersections were analysed for the various scenarios noted above:

Table 2: Intersections Assessed

No.	Intersection
1	London Circuit – Edinburgh Avenue
2	Edinburgh Avenue (extension) – Knowles Place (extension)
3	Vernon Circle – Edinburgh Avenue (extension)
4	London Circuit – Gordon Street
5	London Circuit – Farrell Place
6	London Circuit – Knowles Place (south)
7	London Circuit – University Avenue
8	London Circuit – Knowles Place (north)
9	Knowles Place – Knowles Place (extension)

Each of the above intersections were tested for both the AM and PM periods. A summary of the results is found in the SMEC Report at Appendix C.

The SIDRA intersection analysis for Section 100, City, indicates the following:

- The local road network operates well in 2018 but degrades in 2031 Do Minimum and then degrades further with the proposed development at Section 100.
- In the 2031 Do Minimum scenario, the following intersection already operates at Level of Service (LoS) F in at least one of the peak periods:
  - London Circuit – Farrell Place (PM peak right turn out of Farrell Place only)
  - London Circuit – Edinburgh Avenue (close to capacity with some movements operating at LoS F)

  (It is noted that the surrounding future developments will further contribute to the worsening of the above intersection)
- The proposed Section 100 development in 2031 is expected to further worsen the performance of these intersections and would also cause three more intersections to operate poorly in 2031. These are:
  - London Circuit – Edinburgh Avenue (AM Peak, overall LoS E)
  - Edinburgh Avenue extension – Knowles Place extension (AM and PM peaks)
  - London Circuit – University Avenue (AM peak right turn out of University Avenue only)

  (It is noted that the intersections of London Circuit with Farrell Place and University Avenue will be different in the future if the Light Rail Stage 2 proceeds, but the

expected layout of these intersections is not yet known. They may operate at an acceptable LoS in the Light Rail Stage 2 design. The signalisation of these intersections, if required, should form part of the ACT Government overall strategy associated with the Light Rail Stage 2 design)

- Substantial queueing associated with the right turn out of Knowles Place onto Edinburgh Avenue extension will extend back into Section 100 and may interfere with the operation of other intersections and basement parking access driveways.

SMEC has made the following recommendations based on the outcomes of the transport modelling and analysis they undertook.

Recommendation No.1 *- Allow two-way access on Knowles Place (north) so that vehicles leaving the existing Law Courts car park do not have to travel south on Knowles Place to access London Circuit.*

Recommendation No.2 *- Include a continuous median on Edinburgh Avenue extension so that the intersection with Knowles Place extension operates as left-in, left-out only, noting that this will likely increase traffic volumes on London Circuit and the northern end of Knowles Place.*

In regard to Recommendation No.1 it's further recommended that these works be undertaken as part of the off-site works for the future development of the existing Law Courts car park and not part of this development.

Whilst Recommendation No.2 is justified from a traffic modelling perspective it may not address the "urban design/planning" outcome to provide a "four-way" intersection at this location - *It is noted that the recently constructed intersection of Constitution Avenue and Knowles Place is a "four-way" intersection.* To address the anticipated traffic delays along Knowles Place (extension), without compromising the planning intent, it's recommended that "right" turns, from Knowles Place, be banned at this intersection via signage. This traffic control measure is also recommended at the intersection of the "stub" road to Block 20, Section 63 and Edinburgh Avenue (extension). It is noted that the "stub" road to Block 20 is not included in the Deed scope of work for the development of Section 100 and if required a variation from the Deed Manager will be required.

4. PUBLIC UTILITIES

4.1 STORMWATER

4.1.1 EXISTING CONDITIONS

The existing stormwater network is shown on Drawing 305632CD100 – "Stormwater Master Plan". The majority of the existing services have been located via detail survey and site inspections of the site. Works-as-Executed information and drawings as produced by others, namely AECOM's DR Design Report for the Extension of Edinburgh Avenue Stage 1, were also used as a basis to develop the existing stormwater network.

4.1.1.1 London Circuit

Two major stormwater pipes are located within the road pavement of London Circuit and both are 750mm dia. in size. The invert levels of the existing 750mm dia. main along the southbound carriageway of London Circuit has been surveyed, however the survey of the exiting 750mm dia. main along the northbound carriageway of London was not possible as the lids to the existing manholes were not accessible at the time of preparing this report. Further investigation works are required. Refer to Section 8.

The stormwater drainage network along London Circuit grades in a southward direction from Knowles Place towards an existing trapped low point near the Australian Capital Territory Bar Association.

There are several existing sumps along the eastern verge of London Circuit which collect stormwater from the adjoining existing open space carparks (Block 21, Section 63) via a series of stormwater pipes that cross the verge. These stormwater pipes will be either removed or modified as the redevelopment of the existing carparks occur.

Previous studies, namely AECOM's DR Design Report for the Extension of Edinburgh Avenue Stage 1, have indicated that the existing network along London Circuit has spare pipe capacity.

4.1.1.2 Vernon Circle

There is an existing "trapped" low point located along Vernon Circle which is currently drained via a stormwater system that runs in a southerly direction. This system runs through the existing open space carpark and towards an existing 525mm dia. stormwater main located within the eastern verge of London Circuit. The existing 525mm dia. main also forms part of the existing carpark drainage system located in Block 20, Section 63. This main eventually discharges into a series of high capacity sumps located at the low point at London Circuit.

4.1.1.3 Knowles Place (South)

There is no stormwater pipe network along Knowles Place (south).

4.1.1.4 Edinburgh Avenue (Existing)

There is a "trapped" low point just to the west of the existing intersection of London Circuit and Edinburgh Avenue. The low point is drained by two sumps - a grated sump along an open concrete invert on the northern side of the road and by a QS sump on the southern side.

Based on previous reports these sumps do not have sufficient inlet capacity to drain the low point in a 100 year ARI stormwater event. The overland flow path associated with this trapped low point is understood to be via the existing footpath located along the southern verge of Edinburgh Avenue once the flow depth exceeds the height of the existing kerb.

4.1.2 DEVELOPMENT CONDITIONS

The proposed development will have an impact on the existing stormwater network but only to the extent that some of the existing stormwater pipes and sumps will require relocation and/or modification due to the proposed works. The proposed development does not increase the stormwater flows to the existing stormwater network, hence no networks upgrades are proposed.

The Stormwater Master Plan for the proposed development is shown at Appendix A. The stormwater flows at key locations are summaries in Table 3, below.

Table 3: Stormwater Data Flow

Node	Location	Stormwater Data
A	Vernon Circle - Trapped low point	Catchment Area = 1.33 Ha 20-year ARI= 0.20m3/sec 100-year ARI = 0.27m3/sec
B	Knowles Place (extension – southern end)	Catchment Area = 1.0 Ha 20-year ARI= 0.35m3/sec 100-year ARI = 0.49m3/sec
C	London Circuit	Catchment Area = 13.1 Ha 20-year ARI= 0.53m3/sec 100-year ARI = 0.73m3/sec

Table 4, below, summaries the key element of works associated with the proposed development.

Table 4: Proposed Works

Location	Description
Vernon Circle	Modify existing pipe network in Vernon Circle to accommodate the proposed Edinburgh Avenue Extension. Trapped low point removed.
Edinburgh Avenue (extension)	Construct new stormwater pipe system to accommodate stormwater flows from Vernon Circle and Knowles Place (extension). Provide stormwater tie to Site 1.

Location	Description
London Circuit	Modify existing sumps due to the proposed construction of Edinburgh Avenue – extension. Connect new stormwater network from Edinburgh Avenue extension to existing pipe network. Connection to be via a series of 375mm dia. pipes due to clearance limitation. It's noted that the existing 675mm dia. Water Supply main along the eastern verge of London Circuit is a significant constraint for "cross-connections" to the existing 750mm dia. main in London Circuit. Provide stormwater ties to Sites 2, 3 and 4.

No remedial works are proposed along Edinburgh Avenue (existing) as the proposed development and the proposed intersection upgrade do not impact existing the stormwater system at this location.

4.2 SEWERAGE

4.2.1 EXISTING CONDITIONS

The existing sewer network is shown on Drawing 305632CS200 - Sewer Master Plan. The majority of these services have been located via detail survey and site inspections of the site. Works-as-Executed information and drawings as produced by others, namely AECOM's DR Design Report for the Extension of Edinburgh Avenue Stage 1, were also used as a basis to develop the existing sewer network.

4.2.1.1 London Circuit

There is a 450mm dia. sewer main located along the western verge of London Circuit. According to Icon Water records this sewer main it is approximately 12m deep and connection to this main is not permitted.

There is a 150mm dia. sewer main which runs diagonally across London Circuit from the southern verge of Gordon Street to the eastern verge of London Circuit. This main currently services Block 19, Section 63 via a sewer tie from an existing sewer manhole located in the verge.

4.2.1.2 Marcus Clarke Street

A 225mm dia. sewer main is located along Marcus Clarke Street. This sewer main is approximately 3.6m deep as it crosses the intersection of Edinburgh Avenue (existing) and Marcus Clarke Street.

4.2.1.3 Knowles Place (South)

A 150mm dia. sewer main is located at the northern corner of Block 21, Section 63. The exact location and status of this main has yet to be determined. Further discussions are required with Icon Water noting that the main will be either removed or relocated depending on the advice provided. This main runs along the southern side of Knowles Place and crosses London Circuit where it connects into an existing manhole located in the western verge of London Circuit.

4.2.1.4 Vernon Circle

There are no sewer mains located in Vernon Circle which fronts the proposed development.

4.2.2 DEVELOPMENT CONDITIONS

The proposed development requires new sewer infrastructure works to service the proposed sites.

Previous studies indicated that a 225mm dia. main was required along the London Circuit median south from Edinburgh Avenue. This alignment had approval in principal from ActewAGL, now Icon Water, in 2008.

Discussions with Icon Water has indicated that a sewer connection is now possible from an existing sewer main located in Marcus Clarke Avenue. Icon Water has indicated that this main has sufficient capacity to accommodate the proposed developments. Refer to Appendix B for Icon Water correspondence.

The sewer flows associated with the proposed development, based on ICON Water's design guidelines, is summarised in Table 5, below.

Table 5: Sewer Data Flows

Node	Location	Design Flow (Peak Wet Weather Flow)
S1	Intersection of Edinburgh Avenue (extension) and Knowles Place (extension)	5.56 l/s
S2	Intersection of Edinburgh Avenue (extension) and London Circuit	4.60 l/s
S3	London Circuit (eastern verge)	4.52 l/s
S4	Edinburgh Avenue (existing) and Marcus Clarke Street	3.71 l/s
S5	London Circuit (eastern verge) and at connection point at Marcus Clarke Street	14.68 l/s

Table 6, below, summaries the key element of works associated with the proposed development.

Table 6: Proposed Works

Location	Description
Edinburgh Avenue (existing)	Connection point for proposed upstream development. Construct 225mm dia. main along the southern verge of Edinburgh Avenue. Longitudinal section for the proposed sewer main is shown on Drawing 305632CS20. *All major services, excluding the existing 750mm dia. stormwater main along the northbound lane of London Circuit, have been located. Refer to Section 8 for additional investigative works.*
London Circuit	Construct 225mm/150mm dia. mains along the eastern verge of London Circuit. Offset typically is 1.2m from boundary. Provide sewer tie to Site 2, 3 and 4.
Edinburgh Avenue (extension)	Construct 150mm dia. sewer main along northern verge Edinburgh Avenue. Offset typically 2.1m from boundary. Provide sewer tie to Site 1.

4.3 WATER SUPPLY

4.3.1 EXISTING CONDITIONS

The existing water supply network is shown on Drawing 305632CW200 - Water Supply Master Plan.

The majority of these services have been located via detail survey and site inspections. Works-as-Executed information and drawings as produced by others, namely AECOM's DR Design Report for the Extension of Edinburgh Avenue Stage 1, were also used as a basis to develop the existing water supply network.

4.3.1.1 London Circuit

A 675mm dia. steel water main is located along the eastern verge of London Circuit. This main forms part of Icon Water's main distribution network for the City. No direct connections are permitted to this main. The location of this main has been located and potholed at several locations along London Circuit.

Typically, the water main is located 1.2m from the back of the kerb, although this offset varies at the bend in London Circuit, between Gordon Street and Farrell Place. The water main at this location varies from 1.2m to 2.0m from back of kerb. It is noted that there are several high value trees (Refer to Appendix E) within proximity of the existing water main.

The existing 675mm dia. water main was previously potholed at several locations along the eastern verge of London Circuit. Two of these locations fall within the proposed intersection of London Circuit and Edinburgh Avenue (extension). The potholing works were carried out by AECOM in 2012 and a summary of their findings are noted in Table 7 below.

Table 7: 675mm dia. Water main Potholing Information

Location	Top of existing main – level	Cover to existing surface (concrete path)
WPH – 01 (Edinburgh Avenue - eastern carriageway)	561.520	0.77m
WPH – 02 (Edinburgh Avenue – western carriageway)	561.400	0.71m

Additional potholes of the existing 675mm dia. main were carried out by AECOM, but they are located south of the proposed intersection. These potholes (WPH-03, WPH-04 and WPH-05) indicate that the depth of the existing water varies from 0.70m to 0.85m.

A 225mm dia. water main is located along the western verge of London Circuit.

4.3.1.2 Vernon Circle

A 150mm dia. water main is located along the western verge of Vernon Circle. This water main terminates at north-eastern corner of Block 21 Section 63 via a fire hydrant

4.3.1.3 Edinburgh Avenue (Existing)

A 150mm dia. water main is located along the northern verge Edinburgh Avenue. This water main connects to the existing 225mm dia. in London Circuit.

4.3.1.4 Knowles Place (Existing)

A 150mm dia. water main is located along the southern verge of Knowles Place. This water main terminates at northern end of Block 21 Section 63 via a fire hydrant.

4.3.2 DEVELOPMENT CONDITIONS

The proposed development requires new water supply infrastructure works, to service the proposed sites, and the protection of existing assets, namely the 675mm dia. water supply main.

The Water Supply Master Plan for the proposed development is shown at Appendix A. The Fire Risk Category is F4. Fire hydrants are required at 60m spacing.

Table 8, below, summaries the key element of works associated with the proposed development.

Table 8: Proposed Works

Location	Description
Vernon Circle	Extend the existing water main along Vernon Circle to the Edinburgh Avenue extension.
Edinburgh Avenue (extension)	Construct 150mm dia. water main along the northern verge. Connect to exiting 225mm dia. main along London Circuit.
Knowles Place – extension	Construct 150mm dia. water main along the western/eastern verge and connect to exiting 150mm dia. main at the southern end of existing Knowles Place. It is noted that Icon Water has indicated that a 4m wide easement will be required over this water main it will be located in private property. Refer to Appendix B for Icon Water correspondence. Provide water ties to Sites 1, 2, 3 and 4.
London Circuit (eastern verge)	Provide slab protection over existing 675mm dia. main. Refer to Drawing 305632CR300 for typical slab protection detail.
London Circuit (western verge)	Provide Fire Hydrants at to existing 225mm dia. main.

4.4 GAS/ELECTRICAL/TELECOMMUNICATION

4.4.1 EXISTING CONDITIONS

The existing gas, electrical and communication networks are shown on Drawing 305632CF300 Gas/Electrical/Telecommunication Master Plan.

Dial Before You Dig information was used to locate most of the existing services surrounding the site. The depth of some of the more critical services have yet to be determined. Potholing works for the existing High Voltage electrical cables along the northern boundary of Block 21 Section 63, along existing Knowles Place (South) and along Vernon Circle have yet to be carried out. Once this information is available the existing base plans will be updated and clashes, if any, with the proposed works will be identified and addressed during the detail design phase of the works.

4.4.1.1 Vernon Circle

High Voltage electrical and street light cables are located along the western verge of Vernon Circle.

There is no gas and telecommunication infrastructure located along Vernon Circle which fronts Blocks 10 and 11, Section 100.

4.4.1.2 Knowles Place (South)

High Voltage electrical cables are located within the Knowles Place. It's unknown whether these electrical cables are located within the narrow verge of Knowles Place or whether they located under the existing road pavement. Potholing works will determine their exact location and cover from existing surface.

Gas is located along the southern side of Knowles Place. This main is a 100mm dia. steel supply main.

4.4.1.3 London Circuit

High Voltage electrical and street light cables are located along the eastern verge of London Circuit.

The High Voltage cables are located approximately 3.8m behind of kerb. The depth of these existing cable at the proposed intersection of London Circuit and Edinburgh Avenue Extension have been noted as follows:

Table 9: High voltage electrical location

Location	Top of existing cable – level	Cover to existing surface (concrete footpath)
HVPH – 01 (Edinburgh Avenue - eastern carriageway)	561.92	0.54m
HVPH – 02 (Edinburgh Avenue – western carriageway)	561.85	0.45m

(The potholing works were carried out by AECOM in 2012)

There is no gas and telecommunication infrastructure located along eastern verge of London Circuit from Farrell Street to Edinburgh Avenue.

4.4.1.4 Edinburgh Avenue (Existing)

Telecommunications infrastructure is located along both sides of Edinburgh Avenue. There are several telecommunication cables which cross Edinburgh Avenue, from verge to verge, just west of London Circuit. These cables will be potholed to determine their vertical position in relation to the proposed sewer main which will be located along the southern verge of Edinburgh Avenue.

No gas mains exist along the northern and southern verge of Edinburgh Avenue.

Electrical reticulation infrastructure exists along both sides of Edinburgh Avenue.

4.4.2 DEVELOPMENT CONDITIONS

The proposed development requires new electrical, telecommunication and gas infrastructure work to service the proposed sites. Some of the existing infrastructure will also require adjustments due to the proposed works.

Table 10, below, summaries the key element of works associated with the proposed development.

Table 10: Proposed Works

Location	Description of Works
Vernon Circle	Provision for protective concrete slab to existing High Voltage conduits at the intersection of Vernon Circle - *potholing of existing services will determine if this is required.*
Edinburgh Avenue (extension)	Construct shared services trench along the northern and southern verge.
Edinburgh Avenue (existing)	Connect to existing gas main at Marcus Clarke Street. Construct new gas main along the southern verge to service the proposed development. A “district regulator” required at take-off point.
Knowles Place – (extension)	Construct shared services trench along the western verge. A Service Easement will be required over the proposed services as they are in private property - Service Easement width to be determined at detail design stage.
London Circuit (eastern verge)	Lower existing high voltage electrical cables due to grading of Edinburgh Avenue (extension).
Along the northern boundary of Blocks 10 and 11, Section 100 (on-site works)	Provision for relocating existing High Voltage electrical cables/conduits - *potholing of existing services will determine if this is required.*

5. STREET LIGHTING

5.1 EXISTING CONDITIONS

5.1.1 LONDON CIRCUIT (EASTERN VERGE)

The existing street lighting along London Circuit consists of a combination of the following:

- Concrete pole mounted high pressure discharge luminaires
- Galvanized steel mounted high pressure discharge luminaires
- Pole top luminaires for on-street parking areas and pedestrian footpaths

The luminaires are in a staggered arrangement.

5.1.2 VERNON CIRCLE (EASTERN VERGE)

The existing street lighting along Vernon Circle consists of the following:

- Galvanized steel mounted high pressure discharge luminaires

The luminaires are in a single sided arrangement.

There are no street lights along the western verge of Vernon Circle.

5.2 DEVELOPMENT CONDITIONS

The lighting classification for London Circuit, Vernon Circle and Edinburgh Avenue are summarised in Table 11.

Table 11: Lighting Categories

Road Location	Vehicular and Pedestrian area*	Vehicular Traffic*
London Circuit	Category V2	Category P2
Vernon Circle	Category V1	Category P2
Edinburgh Avenue (extension)	Category V2	Category P2

(as specified in the Canberra Central Design Manual – DS26).*

The proposed street lighting amendments along London Circuit and Vernon Circle will utilize LED luminaires selected from the AEMO list of luminaires which have been used previously within the City precinct to maintain uniformity.

The street lighting arrangements along Edinburgh Avenue (extension) will also consist of LED luminaires selected from the AEMO list of luminaires.

The luminaires will be mounted on Multipole poles as per Canberra Central Design Manual Part B-B5 and C-C5. Poles on Category V2 roads will be 9m high with 3m outreach arms and 6m high for Category P areas.

Cabling and conduits to the luminaires will be as per TCCS design standards.

6. PAVEMENT DESIGN

The following design parameters were used to determine the pavement designs for the extension of Edinburgh Avenue and at the intersections of London Circuit/Edinburgh Avenue and Vernon Circle/Edinburgh Avenue:

Design subgrade CBR value =	5% (previous investigations)
Traffic Loading at mid-block =	$1x10^6$ ESA (Collector – Bus route)
Traffic loading at intersections =	$4x10^6$ ESA (Collector – Bus route)

The preliminary pavement design for Edinburgh Avenue (extension) is shown on Drawing 305632CR400. The road pavements are summarised in Table 12.

Table 12: Pavement Design – Edinburgh Avenue (extension)

Pavement Type	Location	Pavement profile
Pavement Type 1	Mid-block	45mm Heavy Duty AC 150mm DGB 20 250mm DGS 20
Pavement Type 2	At London Circuit intersection and at Vernon Circle Intersection.	45mm Heavy Duty AC 190mm Heavy Duty AC 150mm DGB 20

7. LANDSCAPE

7.1 EXISTING CONDITIONS

7.1.1 EDINBURGH AVENUE

The existing landscape features of Edinburgh Avenue, west of London Circuit, include a wide verge on the northern and southern sides of the street with paved connecting pathways, grassing, understorey planting and tree planting.

The northern verge includes pathway access provided along the back of kerb (adjacent the parking bays), a secondary pathway adjacent consolidated garden bed planting and main pathway along the building line / property boundary.

Soft landscape features on the northern verge consists of a double row of *Eucalyptus mannifera* under planted with *Poa* species. A row of *Platanus* species in grass exists to the south of the main pathway.

The southern verge includes mature *Eucalptus mannifera* species and grassing.

It is noted that the verges on Edinburgh Avenue, west of London Circuit, are wider than the verges in the Edinburgh Avenue extension, and as such there is capacity for double rows of trees in the existing streetscape.

7.1.2 LONDON CIRCUIT

London Circuit landscape features consist of mature *Platanus* species on both sides of the street. The Section 100 interface includes *Platanus* species at semi-regular intervals, under planted with low shrubs. A pine log barrier runs along the eastern edge of the footpath.

Five existing *Platanus* species located at the bend and along the northern part of the straight in London Circuit have been identified as having high value.

Refer to Drawing 305632 TMP 01 Tree Management Plan.

7.1.3 VERNON CIRCLE

The western edge of Vernon Circle includes an avenue of *Ulmus procera* at generally regular spacing. The trees sit on the title boundary within a grassed mound.

Refer to Drawing 305632 TMP 01 Tree Management Plan.

7.2 DEVELOPMENT CONDITIONS

The proposed landscape design for the verge works associated with the offsite works for Section 100 feature integrated hard and soft landscape features which respond to the site and surrounding landscape character, while presenting a contemporary and unique sense of place. Further design rationale for each street is described below.

7.2.1 LONDON CIRCUIT

The London Circuit landscape design responds to the existing conditions and proposed contemporary character of the development.

A key feature of the landscape are three *Platanus acerifolia* species located on the bend of London Circuit at the northern portion of the site. These *Platanus* species sit over an existing water main. Given the high value assessment of these trees, their location within the streetscape and the existing water main, these trees are to be retained.

A consolidated avenue of *Platanus orientalis* 'Digitata' (as specified by the Canberra Design Manual) are proposed to be planted within the straight section of London Circuit north of Edinburgh Avenue. Given the constraints of the existing water main and proposed sewer (along the building line) and the required offsets, the tree avenue will sit centrally to the pavement. Given the limited space available for tree planting and the need for pedestrian flows along the street, a trafficable surface of terrabond paving is proposed beneath the trees to allow passage of pedestrians while allowing permeable surface for passive irrigation to the trees.

The paving is proposed to be predominantly Austral black granite (as specified by the Canberra Design Manual), with feature paving bands around tree planting pits, along back of kerb and along the title boundary.

7.2.2 EDINBURGH AVENUE (EXTENSION)

The Edinburgh Avenue extension is an opportunity to create a new public realm. The landscape design provides paved areas, seating walls, garden bed planting and avenue of trees. A central median is provided that includes paving, garden bed planting and tree avenue.

The northern verge of Edinburgh Avenue will be the key interface with the proposed on block development. The verge will provide a contemporary public realm that caters for pedestrian flows along the streetscape, as well as access from the parking bays in Edinburgh Avenue.

Paved access is provided along the back of kerb adjacent parking bays to allow pedestrian access and connections through to the broader pavement area. The paving design responds to the hexagonal design theme of the Burley Griffin Plan. The hexagons define the shapes of the garden bed areas and seating walls, with offset hexagon shapes to highlight areas along the streetscape. Radiating bands extrude from the centres of the hexagon shapes at 90 degrees as feature bands and to highlight approaches to the intersections with London Circuit, Knowles Place and Vernon Circle.

A tree avenue of *Platanus orientalis* 'Digitata' sitting in large garden bed areas will soften the streetscape and provide a vegetated buffer between the pedestrian pavement and road. The *Platanus* will be under planted with *Juniperus sabina* to the edges of the garden bed and *Abelia schumannii* species centrally within the garden beds. The combination of these species will provide evergreen foliage with complementary textures and seasonal floral display.

Concrete seating walls with timber battens to tops are located at the ends of each block. The shape of the walls respond to the hexagonal shapes of the design. The seating walls are proposed for the northern verge only given the limited width of the southern verge.

The central median is defined by an avenue of *Cupressus sempervirens* 'Stricta' at regular spacing with under planting of *Lomandra longifolia* 'Katrinus'. The *Cupressus* species respond to the existing City Hill design and also the recently completed Constitution Avenue extension. The under planting of *Lomandra* will provide an evergreen foundation to the *Cupressus*, while the contrasting foliage will provide movement. Bands of granite paving between the garden beds will allow pedestrian passage across the street and also allow for maintenance.

The southern verge of Edinburgh Avenue aligns with the hexagonal design of the northern verge. Paving is provided along the back of kerb adjacent the parking bays with connections through to the main pavement area adjacent the southern boundary.

A tree avenue of *Platanus orientalis* 'Digitata' is proposed and align with the *Platanus* on the northern verge.

Garden beds are provided beneath the trees and will be planted with *Juniperus sabina.*

7.2.3 VERNON CIRCLE

The Vernon Circle landscape design responds to the proposed development and establishes a new character for Vernon Circle.

An avenue of *Zelkova serrata* 'Green Vase' offset into the road reserve 0.5m from the boundary will soften the interface and provide shade along the pedestrian path. The trees are located at regular spacing which responds to the access requirements to courtyards in the proposed development.

A concrete footpath is provided along the back of kerb.

Access to the courtyards of the future development which front Vernon Circle will be via gravel pathways which connect to the footpath. Garden bed planting of *Trachelospermum asiaticum* will cover the verge between the footpath and boundary.

8. UNRESOLVED MATTERS

The following Table 13 summarises the issues that need to be resolved prior to proceeding to detail design phase

Table 13: Unresolved matters

Item No.	Description of Works	Action
1	Determine location of existing High Voltage Electrical Cables conduits at numerous locations as noted in Section 4.4.	Undertake potholing works.
2	Determine location of existing 675mm dia. water main north of the proposed intersection of London Circuit and Edinburgh Avenue (extension).	Undertake potholing works.
3	The alignment of the proposed 225mm dia. sewer main along the southern verge of Edinburgh Avenue.	Undertake potholing works of existing services and possible tree assessment if alignment coincides with existing trees.
4	The alignment of the proposed gas main along the southern verge of Edinburgh Avenue.	Undertake potholing works of existing services and possible tree assessment if alignment coincides with existing trees.
5	Determine service locations and easement width for Share Trench along Knowles Place (extension).	Liaise with Service authorities.
6	“As-Constructed” information on the existing 750mm dia. stormwater main along the northbound carriageway along London Circuit.	ACT Government to provide access to manholes as existing lids are not assessable by Surveyor. One lid is covered by asphalt and the other lid is “sealed”.

9. OPTION OF PROBABLE COST

Two Opinions of Probable Costs have been provided. Contingencies and GST have been specifically excluded from the Option of Probable Cost.

Option of Probable Cost 1 is for the construction of ALL "off-site" works and the construction of the Edinburgh Avenue (extension) as shown on the drawings at Appendix A, but excludes the construction of Knowles Place (extension) within Site 1 and Site 4.

Option of Probable Cost 2 is for the construction of the "off-site" works within NCA Designated Land associated with the development of Section 100, including the construction Edinburgh Avenue (extension), which requires NCA Works Approval.

The Opinion of Probable Cost 1 is **$4,160,000**. This sum is exclusive of contingencies and GST.

The Opinion of Probable Cost 2 is **$3,545,000**. This sum is exclusive of contingencies and GST.

A breakdown of the Option of Probable Costs is summarised in the tables below.

Table 14: Option of Probable Cost 1 – All "Off-site" Works

Item No	Description	Amount (Ex. GST)
1	General (preliminaries)	$495,000
2	Provision of Traffic	$150,000
3	Earthworks and Demolition	$235,000
4	Underground Services	
	Identification of Existing Services	$10,000
	Backfill under Roads & Paths	$65,000
	Sewerage	$125,000
	Stormwater	$150,000
	Subsoil drains	$45,000
	Shared Trench & Conduits	$95,000
	Water Supply	$115,000
5	Flexible Pavement	$420,000
6	Concrete Kerbs, Footpaths & Minor Concrete Works	$235,000
7	Segmental Paving	$1,100,000
8	Traffic Signals, Road Furniture and Signs	$330,000

Item No	Description	Amount (Ex. GST)
9	Landscaping Works	$310,000
10	Pavement Markings	$100,000
11	Street Lighting	$180,000
12	**Total (excluding Contingencies and GST)**	**$4,160,000**

Table 15: Option of Probable Cost 2 – "Off-site" Works within NCA Designated Land

Item No	Description	Amount (Ex. GST)
1	General (preliminaries)	$300,000
2	Provision of Traffic	$125,000
3	Earthworks and Demolition	$220,000
4	Underground Services	
	Identification of Existing Services	$5,000
	Backfill under Roads & Paths	$50,000
	Sewerage	$115,000
	Stormwater	$150,000
	Subsoil drains	$40,000
	Shared Trench & Conduits	$95,000
	Water Supply	$115,000
5	Flexible Pavement	$400,000
6	Concrete Kerbs, Footpaths & Minor Concrete Works	$225,000
7	Segmental Paving	$950,000
8	Traffic Signals, Road Furniture and Signs	$280,000
9	Landscaping Works	$280,000
10	Pavement Marking	$85,000
11	Street Lighting	$110,000
12	**Total (excluding Contingencies and GST)**	**$3,545,000**

10. APPENDICES

Appendix A – Drawings

Appendix B – Authority Correspondence

Appendix C – SMEC – Traffic Report

Appendix D – Drawings by others (Hughes Trueman, Mott MacDonald & AECOM)

Appendix E – Tree Assessment Report

APPENDIX A – DRAWINGS

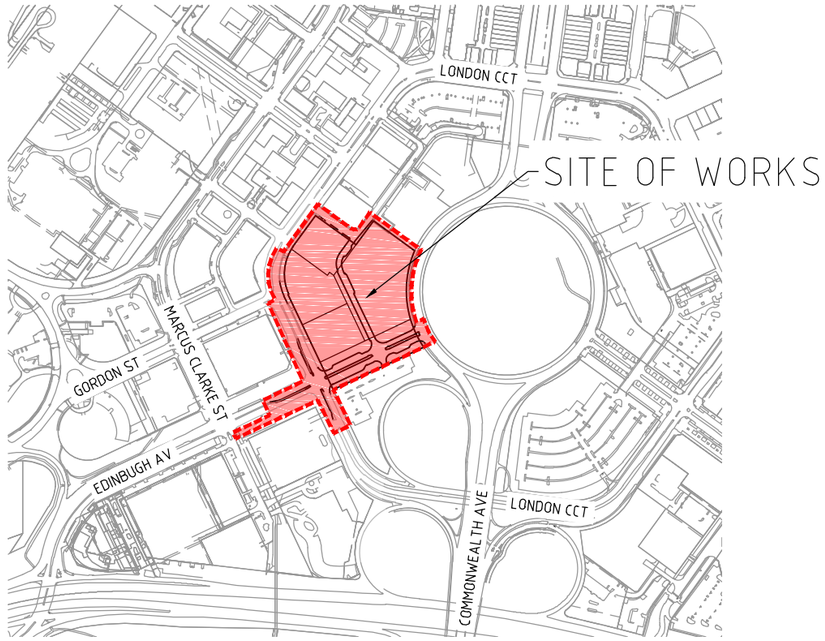
DRAWING SCHEDULE

REFERENCE	DESCRIPTION	REVISION
305632CR100	COVER SHEET	A
305632CF200	GENERAL ARRANGEMENT PLAN	A
305632CF215	STAGING PLAN	A
305632CD100	STORMWATER MASTER PLAN	A
305632CS200	SEWER MASTER PLAN	A
305632CS201	SEWER LONG SECTION	A
305632CW200	WATER MASTER PLAN	A
305632CF300	SHARED TRENCH PLAN	A
305632CR200	TYPICAL CROSS SECTIONS EDINBURGH AVENUE SHEET 1	A
305632CR201	TYPICAL CROSS SECTIONS EDINBURGH AVENUE SHEET 2	A
305632CR202	TYPICAL CROSS SECTIONS KNOWLES PLACE SHEET 1	A
305632CR203	TYPICAL CROSS SECTIONS KNOWLES PLACE SHEET 2	A
305632CR300	LONGITUDINAL SECTIONS EDINBURGH AVENUE	A
305632CR301	CROSS SECTIONS EDINBURGH AVENUE	A
305632CR302	LONGITUDINAL SECTION AND CROSS SECTIONS KNOWLES PLACE	A
305632CR400	PAVEMENT PLAN	A
305632CE200	ENVIRONMENTAL MANAGEMENT CONCEPT PLAN	A
305632CF250	DEMOLITION PLAN	A
305632CE220	FENCING PLAN	A
305632CR500	TURNING MOVEMENTS DETAILS SHEET 1	A
305632CR501	TURNING MOVEMENTS DETAILS SHEET 2	A
305632CR502	TURNING MOVEMENTS DETAILS SHEET 3	A
305632LD400	SURFACES AND FINISHES PLAN SHEET 1	A
305632LD401	SURFACES AND FINISHES PLAN SHEET 2	A
305632LD800	CROSS SECTIONS	A
305632LD900	MATERIALS PALETTE	A
305632TMP01	TREE MANAGEMENT PLAN	A

SECTION 100 CANBERRA CITY
MPG CONSTRUCTIONS

DRAWING SCHEDULE

REFERENCE	DESCRIPTION	REVISION
305632CR100	COVER SHEET	A
305632CF200	GENERAL ARRANGEMENT PLAN	A
305632CF215	STAGING PLAN	A
305632CD100	STORMWATER MASTER PLAN	A
305632CS200	SEWER MASTER PLAN	A
305632CS201	SEWER LONG SECTION	A
305632CW200	WATER MASTER PLAN	A
305632CF300	SHARED TRENCH PLAN	A
305632CR200	TYPICAL CROSS SECTIONS EDINBURGH AVENUE SHEET 1	A
305632CR201	TYPICAL CROSS SECTIONS EDINBURGH AVENUE SHEET 2	A
305632CR202	TYPICAL CROSS SECTIONS KNOWLES PLACE SHEET 1	A
305632CR203	TYPICAL CROSS SECTIONS KNOWLES PLACE SHEET 2	A
305632CR300	LONGITUDINAL SECTIONS EDINBURGH AVENUE	A
305632CR301	CROSS SECTIONS EDINBURGH AVENUE	A
305632CR302	LONGITUDINAL SECTION AND CROSS SECTIONS KNOWLES PLACE	A
305632CR400	PAVEMENT PLAN	A
305632CE200	ENVIRONMENTAL MANAGEMENT CONCEPT PLAN	A
305632CF250	DEMOLITION PLAN	A
305632CE220	FENCING PLAN	A
305632CR500	TURNING MOVEMENTS DETAILS SHEET 1	A
305632CR501	TURNING MOVEMENTS DETAILS SHEET 2	A
305632CR502	TURNING MOVEMENTS DETAILS SHEET 3	A
305632LD400	SURFACES AND FINISHES PLAN SHEET 1	A
305632LD401	SURFACES AND FINISHES PLAN SHEET 2	A
305632LD800	CROSS SECTIONS	A
305632LD900	MATERIALS PALETTE	A
305632TMP01	TREE MANAGEMENT PLAN	A



LOCALITY PLAN

LEGEND

DESCRIPTION	EXISTING	PROPOSED
EXTENT OF WORKS		
WATER MAIN, VALVE AND HYDRANT	eW	W
WATER RECYCLED	W(R)	W(R)
UNDERGROUND ELECTRICITY	E	E
OVERHEAD ELECTRICITY AND POLE	OE	OE
TELSTRA AND SERVICE PIT	T	T
OVERHEAD TELSTRA	OT	
OPTIC FIBRE	OF	OF
GAS MAIN	eG	G
BRANCH SEWER AND MANHOLE		S
SEWER AND MANHOLE	eS	S
SEWER RISING MAIN	SRM	SRM
CENTRAL INVERT		
STORMWATER MAIN	eSW	SW
STORMWATER PITS		
HOUSE DRAIN	H	H
SUBSOIL DRAIN AND FLUSHING POINT		
CONCRETE VEHICLE CROSSING		
DRIVEWAYS		
SURFACE CONTOUR MINOR	- 168.90 -	- 168.90 -
SURFACE CONTOUR MAJOR	- 169.00 -	- 169.00 -
SURFACE LEVEL	E123.45	E123.45
SIGN AND POST		
BOLLARD		
ROAD CHAINAGES	CH116.57 (L/R)TP CH116.57	CH116.57 (L/R)TP CH116.57
BATTER		
PARKING BAY/PAVED AREA		
TREE (& SURVEYED CANOPY) TO BE RETAINED		
TREE TO BE REMOVED		
VEGETATION LINE		
NCA WORKS APPROVAL AREA		

DIAL BEFORE YOU DIG www.1100.com.au

WARNING

BEWARE OF UNDERGROUND/OVERHEAD SERVICES

THE LOCATION OF SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. SPECIAL CONSIDERATION SHOULD BE GIVEN TO CONSTRUCTION PROCEDURES UNDER OVERHEAD ELECTRICITY TRANSMISSION LINES.

WORKS APPROVAL SUBMISSION

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

spiire
Suite 5 | Level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed	Checked
PIB	BSC
Authorised	Date
M B	24-09-18

SECTION 100 CANBERRA CITY
WORKS APPROVAL
COVER SHEET

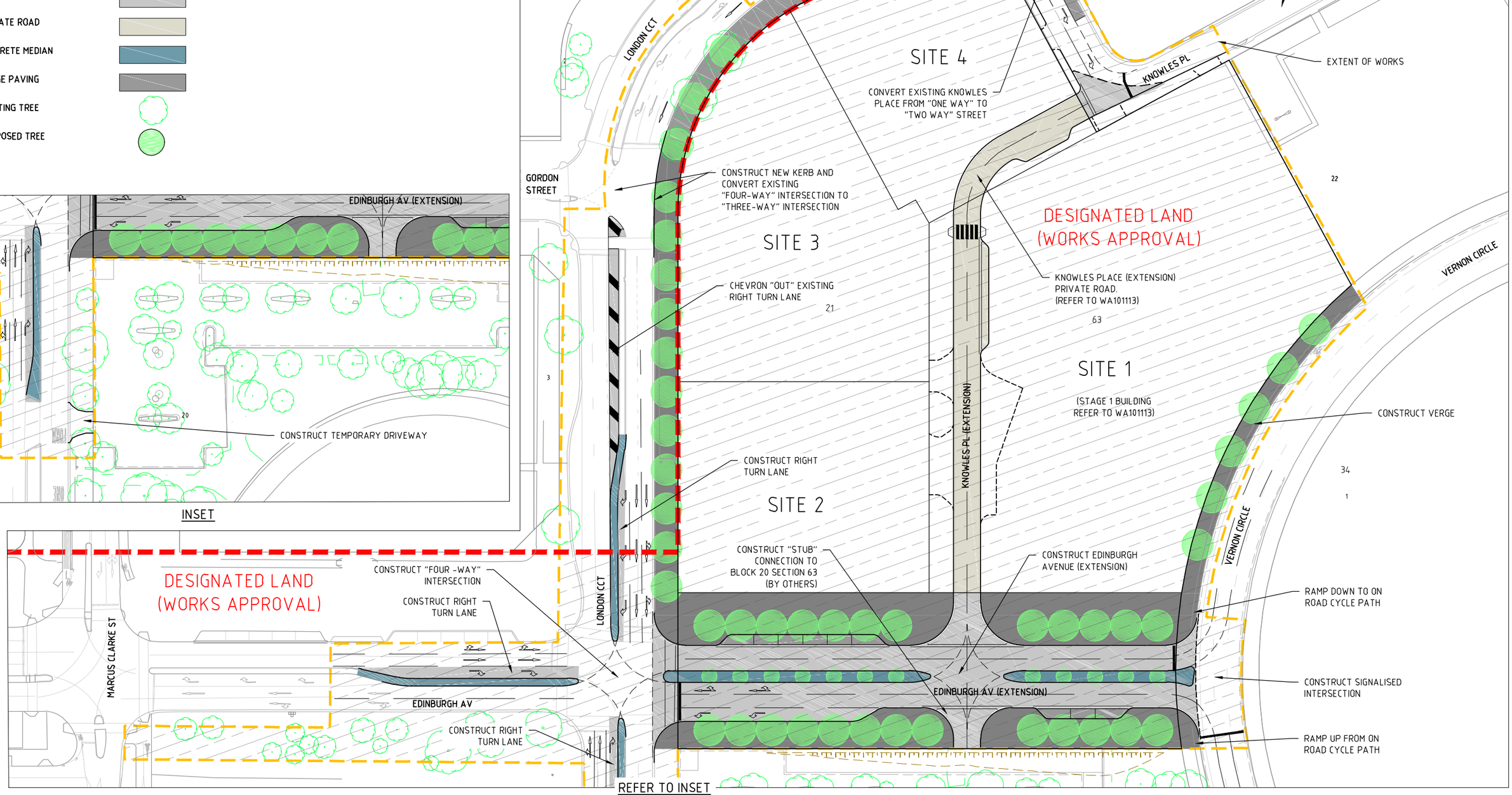
MPG CONSTRUCTIONS

PRELIMINARY Drg No **305632CR100** Rev **A**

file name 305632CR100 COV.dwg layout name CR100 plotted by Suzie Gilbert
file location G:\301\305632\Civil\ACAD plot date 24/09/2018 11:40 AM Sheet 1 of 22 Sheets

LEGEND:

- EXTENT OF WORKS
- DESIGNATED LAND/NON DESIGNATED LAND BOUNDARY
- NCA WORKS APPROVAL AREA
- ROAD WORKS (PUBLIC)
- PRIVATE ROAD
- CONCRETE MEDIAN
- VERGE PAVING
- EXISTING TREE
- PROPOSED TREE



Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1
SCALE
1:500@A3
0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC
Authorised M B | Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL
GENERAL ARRANGEMENT PLAN

MPG CONSTRUCTIONS

PRELIMINARY | Drg No 305632CF200 | Rev A

file name 305632CF200 EDP.dwg layout name CF200 plotted by Suzie Gilbert
file location G:\30\305632\Civil\ACAD plot date 24/09/2018 11:40 AM Sheet 2 of 22 Sheets

STAGING SEQUENCE

STAGE 1 (OFFSITE WORKS)

- CONSTRUCT TEMPORARY DRIVEWAY OFF LONDON CIRCUIT TO EXISTING CAR PARK ON BLOCK 20 SECTION 63 PRIOR TO CONSTRUCTION OF EDINBURGH AVENUE EXTENSION.
- CONSTRUCT EDINBURGH AVENUE EXTENSION AND ASSOCIATED HYDRAULIC WORKS
- MODIFY LONDON CIRCUIT/EDINBURGH AVENUE INTERSECTION. CONSTRUCT NEW "FOUR-WAY" SIGNALISED INTERSECTION.
- SIGNALISE INTERSECTION OF EDINBURGH AVENUE EXTENSION AND VERNON CIRCUIT.
- CONVERT EXISTING GORDON STREET/ LONDON CIRCUIT INTERSECTION TO A "THREE-WAY" INTERSECTION ONCE STAGE 1 ONSITE WORKS ARE COMPLETED.
- CONVERT EXISTING KNOWLES PLACE TO A "TWO-WAY" STREET ONCE STAGE 1 ONSITE WORKS ARE COMPLETED.
- CONSTRUCT NEW VERGE WORKS.

STAGE 2 (OFF SITE WORKS)

- CONSTRUCT VERGE WORKS

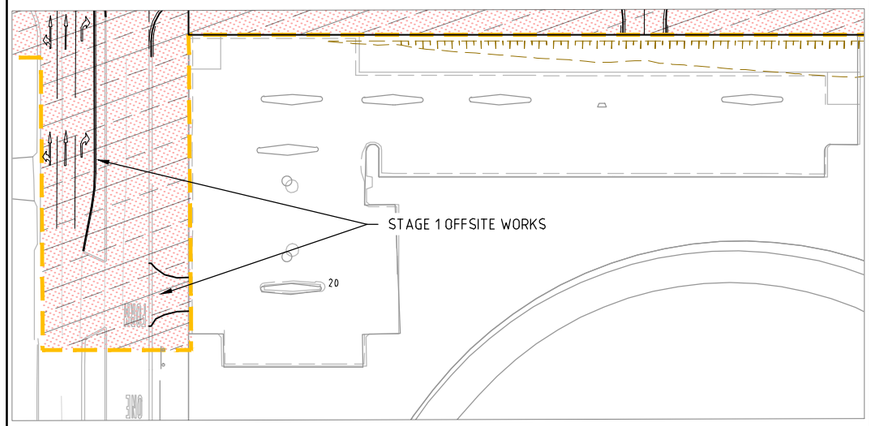
STAGE 3 (OFF SITE WORKS)

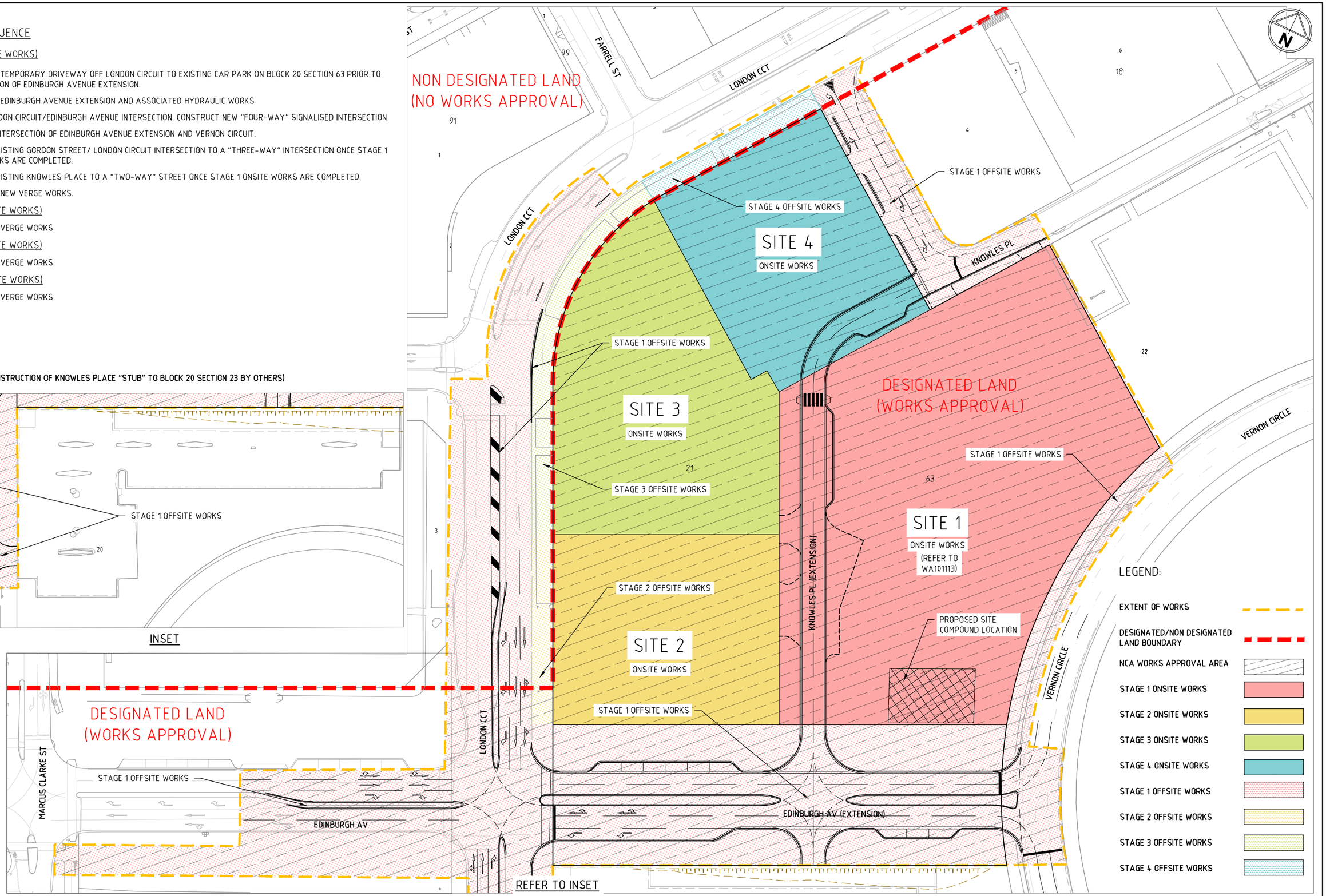
- CONSTRUCT VERGE WORKS

STAGE 4 (OFF SITE WORKS)

- CONSTRUCT VERGE WORKS

(NOTE: CONSTRUCTION OF KNOWLES PLACE "STUB" TO BLOCK 20 SECTION 23 BY OTHERS)





Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1
SCALE
1:500@A3
0 2.5 5 7.5 10 12.5
0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC
Authorised M B | Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

STAGING PLAN

MPG CONSTRUCTIONS

PRELIMINARY Drg No **305632CF215** Rev **A**

file name 305632CF215 STAGE.dwg layout name CF215 plotted by Suzie Gilbert
file location G:\30\305632\Civil\CAD plot date 24/09/2018 11:40 AM Sheet 3 of 22 Sheets

NOTES:

1. PIPE MATERIAL TO BE CLASS 2 UNLESS OTHERWISE NOTED.
2. ALL STORMWATER PIPELINES UP TO AND INCLUDING 675Ø LOCATED UNDER ROADWAYS SHALL HAVE RUBBER RING JOINTS.
3. HEAVY DUTY STORMWATER MANHOLE COVERS SHALL BE GATIC CLASS D.

(A) STORMWATER DATA

CATCHMENT AREA	1.33 Ha
20 YEAR ARI	0.20m³ s/m
100 YEAR ARI	0.27m³ s/m
GAP FLOW	0.17m³ s/m

(B) STORMWATER DATA

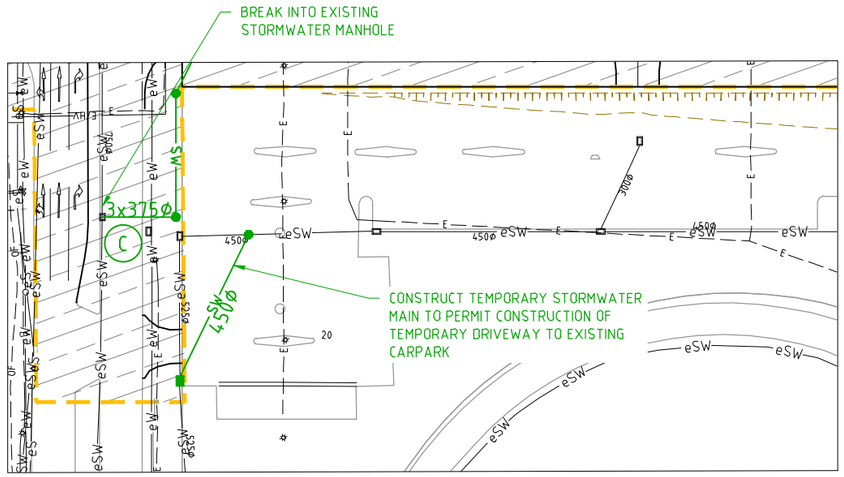
CATCHMENT AREA	1.0 Ha
20 YEAR ARI	0.35m³ s/m
100 YEAR ARI	0.49m³ s/m
GAP FLOW	0.32m³ s/m

(C) STORMWATER DATA

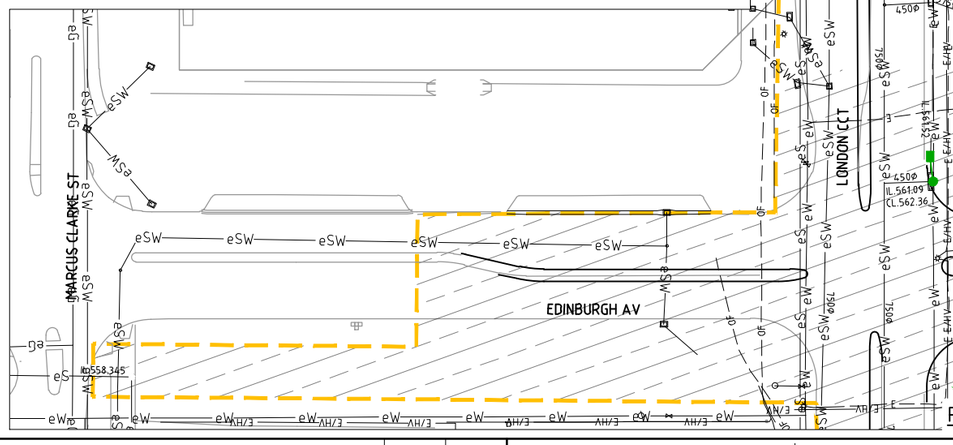
CATCHMENT AREA	13.1 Ha
20 YEAR ARI	0.53m³ s/m
100 YEAR ARI	0.73m³ s/m
GAP FLOW	0.46m³ s/m

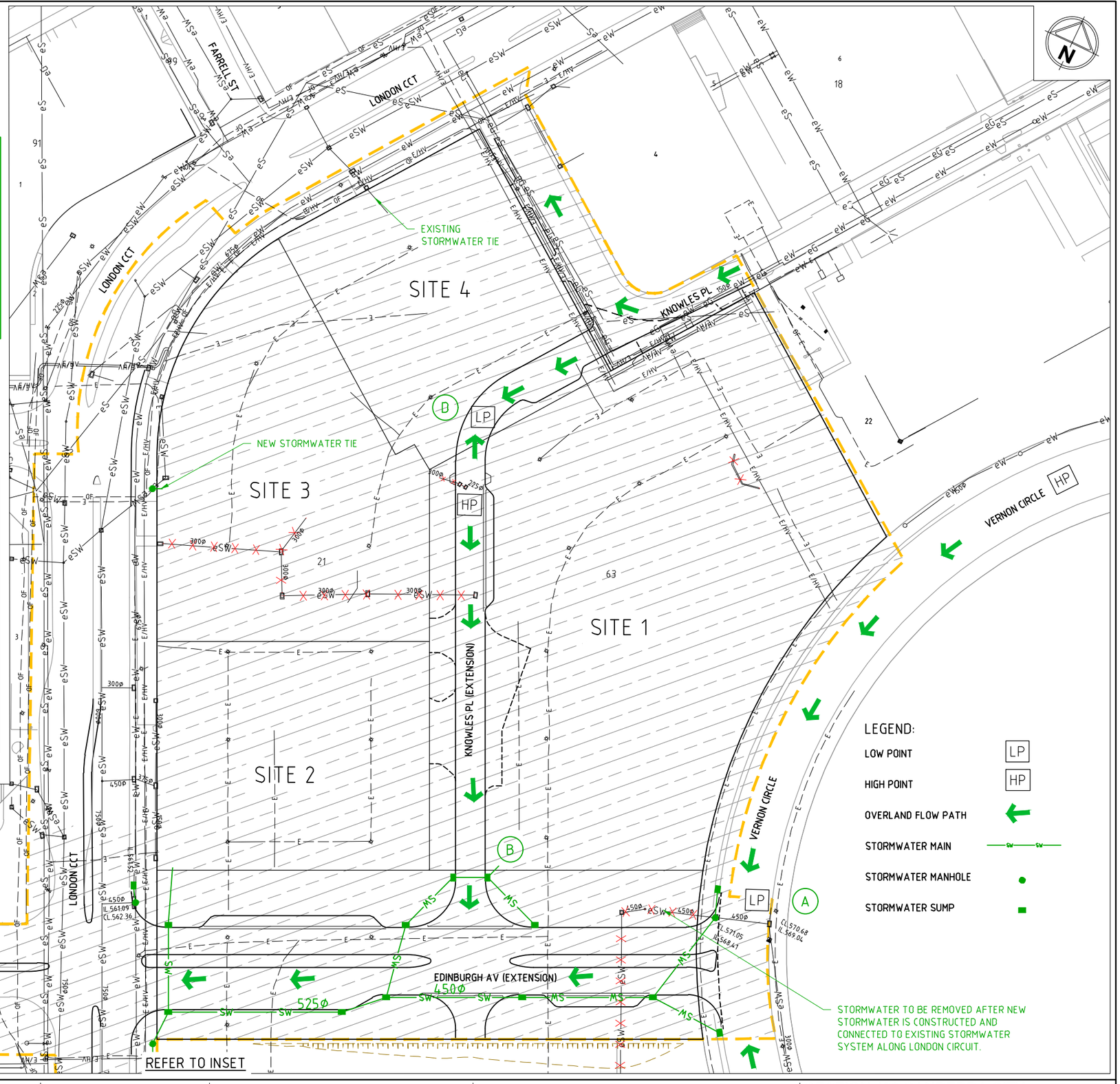
(D) STORMWATER DATA

CATCHMENT AREA	0.11 Ha
20 YEAR ARI	0.02m³ s/m
100 YEAR ARI	0.03m³ s/m
GAP FLOW	0.02m³ s/m



INSET





LEGEND:

- LOW POINT (LP)
- HIGH POINT (HP)
- OVERLAND FLOW PATH
- STORMWATER MAIN
- STORMWATER MANHOLE
- STORMWATER SUMP

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

H 1:500 SCALE @ A1 0 5 10 15 20 25

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC
Authorised M B | Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL
STORMWATER MASTER PLAN

MPG CONSTRUCTIONS

PRELIMINARY Drg No **305632CD100** Rev **A**

file name 305632CD100 SW MAST.dwg layout name CD100 plotted by Suzie Gilbert
file location G:\30\305632\Civil\ACAD plot date 24/09/2018 11:41 AM Sheet 4 of 22 Sheets

Stages	TEP	PCC	ADWF	PDWF	Portion Wet	Net Sewered Area (hectares)	GWI (L/s)	C	I1,2	Factorsize	Factorcontainment	I	RDI	Design Flow
Stage 1	642.95	180	1.34	4.09	0.75	0.95	0.01	1.2	19.4	1.57	1.5	45.57	1.46	5.56
Stage 2	629.65	180	1.31	4.01	0.75	0.33	0.00	1.2	19.4	1.78	1.5	51.66	0.58	4.60
Stage 3	587.45	180	1.22	3.77	0.75	0.45	0.01	1.2	19.4	1.72	1.5	49.93	0.75	4.52
Stage 4	476.95	180	0.99	3.13	0.75	0.33	0.00	1.2	19.4	1.78	1.5	51.68	0.58	3.71

NOTES:

1. ALL CONNECTIONS TO LIVE SEWER MAINS SHALL BE MADE BY ICON WATER AT THE CONTRACTORS EXPENSE. REFER TO SPECIFICATION.
2. SEWER TIES SHALL BE CLASS SN8, SOLID WALLED OR APPROVED STRUCTURED WALL PVC WITH SOLVENT WELDED JOINTS CONSTRUCTED IN ACCORDANCE WITH SD-2005-D, SD-2006-D. REFER TO AS 1260. 2% MINIMUM GRADE.
3. SEWER PIPES SHALL BE CLASS SN8, SOLID WALLED PVC WITH RUBBER RING JOINTS. REFER TO AS 1260. CURVED PVC SEWERS UP TO 225mm TO HAVE SOLVENT WELDED JOINTS, FOR RADIUS LESS THAN 250mm.
4. SEWER MAIN AND SERVICES SHALL BE CONSTRUCTED IN ACCORDANCE WITH ICON WATER SUPPLY AND SEWERAGE STANDARDS. REFER TO ICON WATER APPROVED PRODUCT LIST.
5. ALL MANHOLE COVERS SHALL BE CLASS B UNLESS NOTED AS 'HD'. HD DESIGNATED COVERS SHALL BE CLASS D. REFER TO ICON WATER SUPPLY AND SEWERAGE STANDARDS. DRAWING SD-2204-C

S1 - STAGE 1 = 5.56 L/S
S2 - STAGE 2 = 4.60 L/S
S3 - STAGE 3 = 4.52 L/S
S4 - STAGE 4 = 3.71 L/S
S5 - STAGES 1,2,3 = 14.68 L/S

CONNECT TO EXISTING SEWER RL 558.345

REFER TO DRAWING 305632CS201 FOR SEWER LONG SECTION

CONNECT TO EXISTING SEWER

EXISTING SEWER LOCATION AND STATUS DRY/WET TO BE CONFIRMED. RELOCATE OUTSIDE OF BLOCK OR REMOVE FROM BLOCK AND CAP IF NO LONGER REQUIRED.

SITE 1
SITE 2
SITE 3
SITE 4

MARCUS CLARKE ST
FARRELL ST
LONDON CCT
KNOWLES PL
KNOWLES PL (EXTENSION)
VERNON CIRCLE
EDINBURGH AV
EDINBURGH AV (EXTENSION)

LEGEND:
SEWER MAIN
SEWER MANHOLE

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1
1:500@A3
SCALE
0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

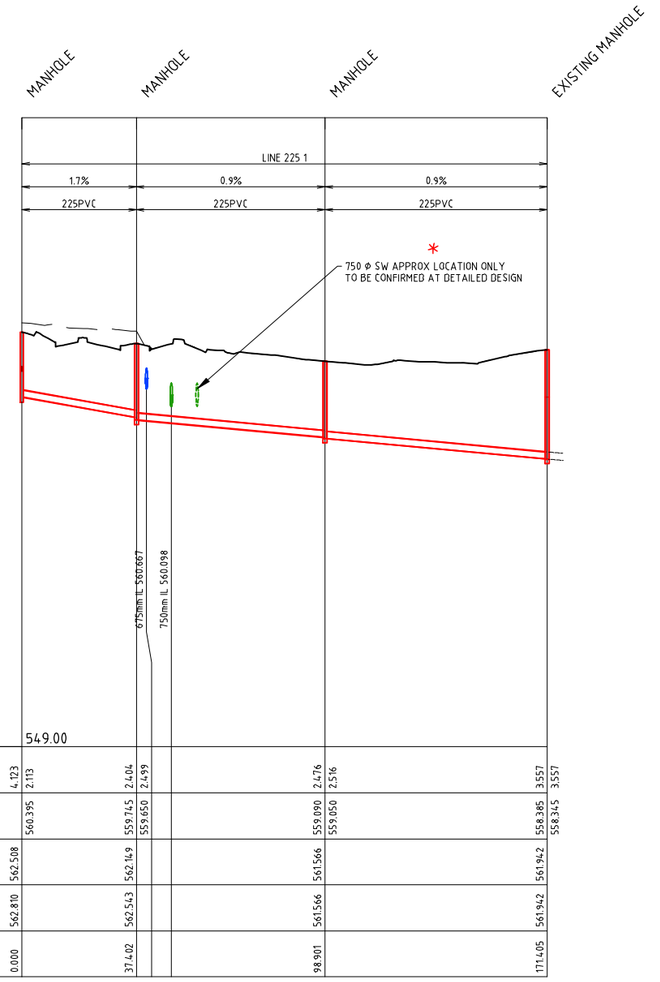
SECTION 100 CANBERRA CITY WORKS APPROVAL
SEWER MASTER PLAN

MPG CONSTRUCTIONS

PRELIMINARY

Drg No 305632CS200
Rev A

file name 305632CS200 S MAST.dwg layout name CS200 plotted by Suzie Gilbert
file location G:\301\305632\Civil\CAD plot date 24/09/2018 11:41 AM Sheet 5 of 22 Sheets



N

DATUM RL (m) 549.00

DEPTH TO INVERT	4.123 2.113	2.404 2.499	2.476 2.516	3.557 3.557
INVERT LEVEL	560.395	559.745 559.650	559.090 559.050	558.385 558.345
FINISHED SURFACE	562.508	562.149	561.566	561.942
EXISTING SURFACE	562.810	562.543	561.566	561.942
CHAINAGE	0.000	37.402	98.901	171.405

* DOWNSTREAM AND UPSTREAM STORMWATER MANHOLES TO EXISTING 750⌀. MAIN ALONG THE NORTHBOUND CARRRIAGEWAY OF LONDON CIRCUIT ARE CURRENTLY NOT ACCESSABLE. ACT GOVERNMENT TO PROVIDE ACCESS TO THESE STRUCTURES TO DETERMINE "AS CONSTRUCTED" WORKS INFORMATION.

file name 305632CS200 S MAST.dwg layout name CS201 plotted by Suzie Gilbert
file location G:\30\305632\Civil\ACAD plot date 24/09/2018 11:41 AM Sheet 6 of 22 Sheets

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

H 1 : 1000 @ A3
H 1 : 500 @ A1
SCALE
V 1 : 41.45701392 @ A3
V 1 : 20.72850696 @ A1

0 5 10 15 20 25
0 0.20728 0.41457 0.62185 0.82914 1.03642535

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY
WORKS APPROVAL
SEWER MASTER PLAN
LONG SECTION

MPG CONSTRUCTIONS

PRELIMINARY

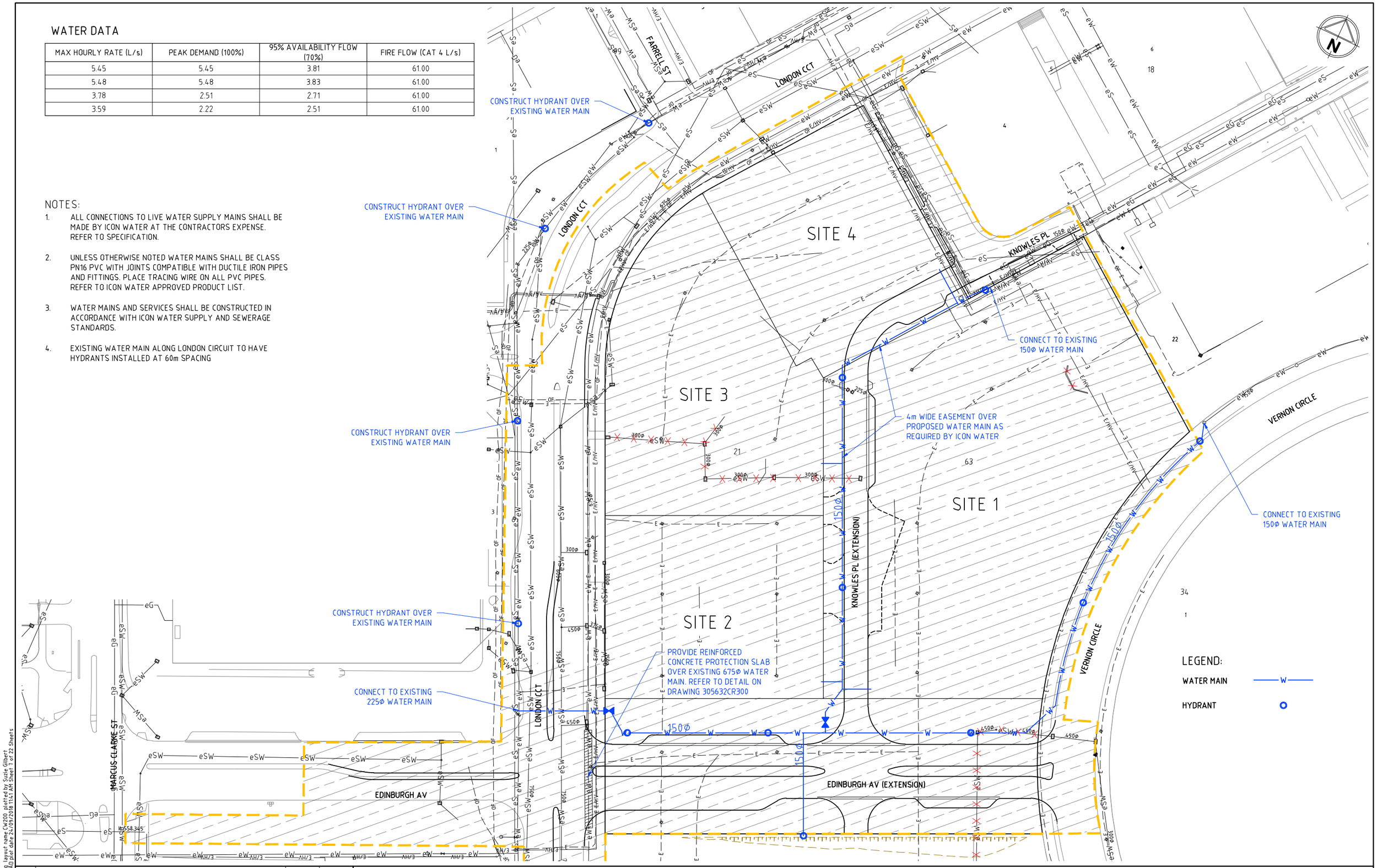
Drg No 305632CS201
Rev A

WATER DATA

MAX HOURLY RATE (L/s)	PEAK DEMAND (100%)	95% AVAILABILITY FLOW (70%)	FIRE FLOW (CAT 4 L/s)
5.45	5.45	3.81	61.00
5.48	5.48	3.83	61.00
3.78	2.51	2.71	61.00
3.59	2.22	2.51	61.00

NOTES:

1. ALL CONNECTIONS TO LIVE WATER SUPPLY MAINS SHALL BE MADE BY ICON WATER AT THE CONTRACTORS EXPENSE. REFER TO SPECIFICATION.
2. UNLESS OTHERWISE NOTED WATER MAINS SHALL BE CLASS PN16 PVC WITH JOINTS COMPATIBLE WITH DUCTILE IRON PIPES AND FITTINGS. PLACE TRACING WIRE ON ALL PVC PIPES. REFER TO ICON WATER APPROVED PRODUCT LIST.
3. WATER MAINS AND SERVICES SHALL BE CONSTRUCTED IN ACCORDANCE WITH ICON WATER SUPPLY AND SEWERAGE STANDARDS.
4. EXISTING WATER MAIN ALONG LONDON CIRCUIT TO HAVE HYDRANTS INSTALLED AT 60m SPACING



Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1 SCALE 1:500@A3 — 0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC
Authorised M B | Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

WATER MASTER PLAN

MPG CONSTRUCTIONS

PRELIMINARY Drg No 305632CW200 Rev A

file name 305632CW200 W MAST.dwg layout name CW200 plotted by Suzie Gilbert
file location G:\30\305632\Civil\ACAD plot date 24/09/2018 11:41 AM Sheet 1 of 22 Sheets

LEGEND:

NCA WORKS APPROVAL AREA

EXTENT OF WORKS

3 WAY ELECTRICITY, GAS AND TELECOMMUNICATION

1 WAY TELECOMMUNICATION

1 WAY GAS

SITE 1

SITE 2

SITE 3

SITE 4

FARRELL ST

LONDON CCT

KNOWLES PL

KNOWLES PL (EXTENSION)

VERNON CIRCLE

EDINBURGH AV

EDINBURGH AV (EXTENSION)

MARCUS CLARKE ST

ELECTRICITY, GAS AND TELECOMMUNICATION CONDUITS

TELECOMMUNICATION CONDUITS

GAS MAIN DISTRICT REGULATOR (ALIGNMENT TO BE DETERMINED AT DETAIL DESIGN STAGE)

INSET

REFER TO INSET

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1 SCALE 1:500@A3 0 2.5 5 7.5 10 12.5

Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC | Authorised M B | Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

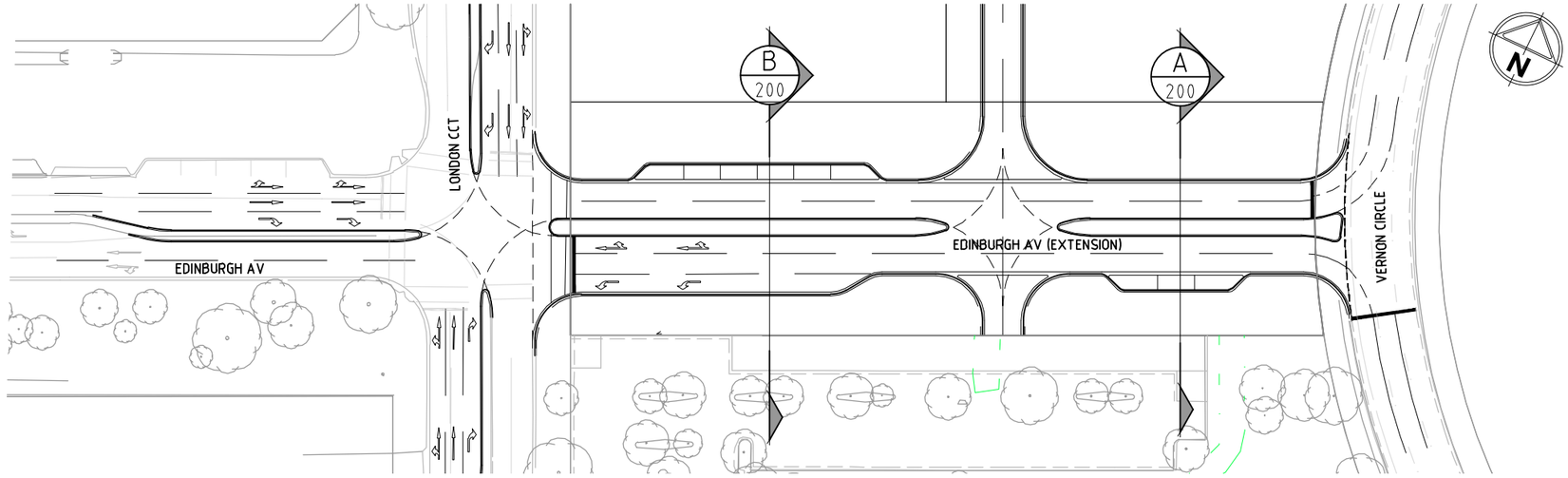
SHARED TRENCH

MPG CONSTRUCTIONS

PRELIMINARY

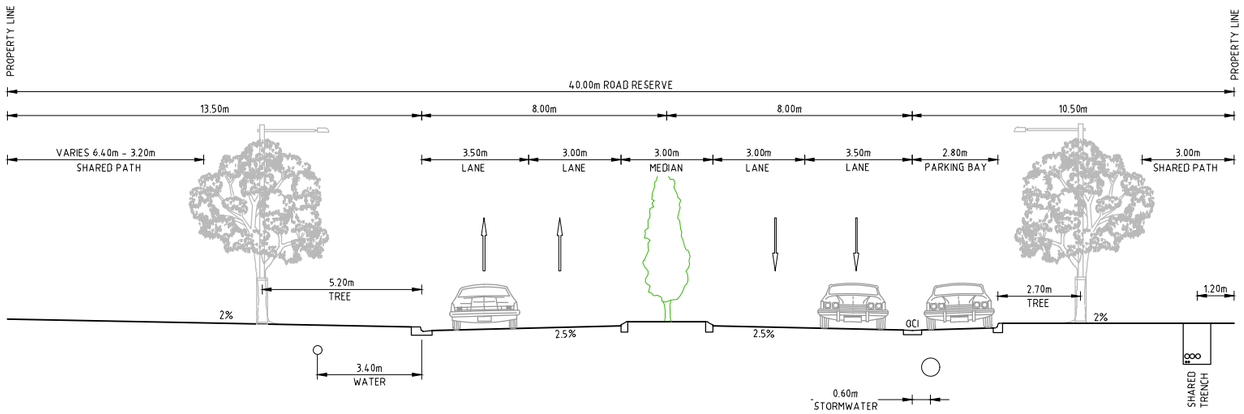
Drg No 305632CF300 | Rev A

file name 305632CF300 SHARED TRENCH.dwg layout name CF300 plotted by Suzie Gilbert
file location G:\305\305632\Civil\ACAD plot date 24/09/2018 11:41 AM Sheet 8 of 22 Sheets



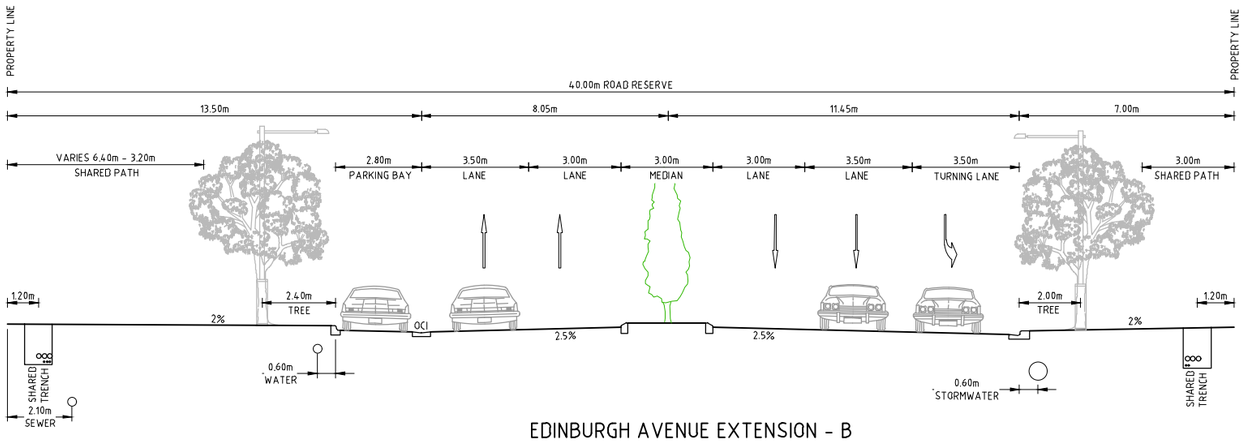
H 1:500 SCALE @ A1 0 5 10 15 20 25

PLAN VIEW



EDINBURGH AVENUE EXTENSION-A

(DUAL 6.5m CARRIAGEWAY)



EDINBURGH AVENUE EXTENSION - B

(DUAL 6.5m CARRIAGEWAY WITH PARKING AND TURNING LANE)

NOTE:

KERB & GUTTER AND K4A KERB ALONG EDINBURGH AVENUE (EXTENSION) TO HAVE A TOP WIDTH OF 300mm IN ACCORDANCE WITH DETAIL 1.4.6 IN PART C1 OF CANBERRA CENTRAL DESIGN MANUAL.

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:50@A1 SCALE 1:100@A3 0 0.5 1 1.5 2 2.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC
Authorised M B | Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

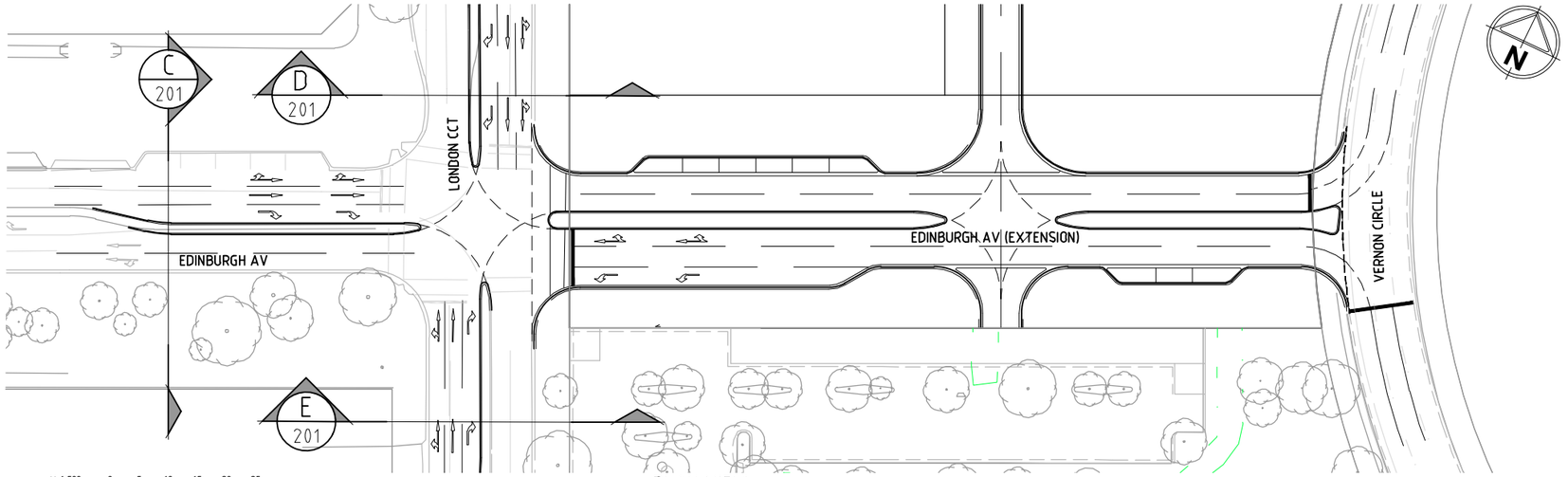
TYPICAL CROSS SECTIONS EDINBURGH AVENUE SHEET 1

MPG CONSTRUCTIONS

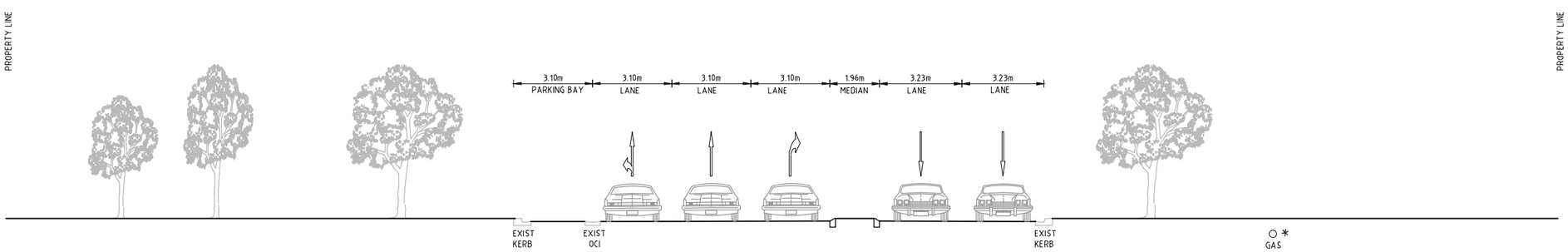
PRELIMINARY

Drg No 305632CR200 Rev A

file name 305632CR200_TYP.dwg layout name CR200 plotted by Suzie Gilbert
file location G:\301\305632\Civil\ACAD plot date 24/09/2018 11:41 AM Sheet 9 of 22 Sheets



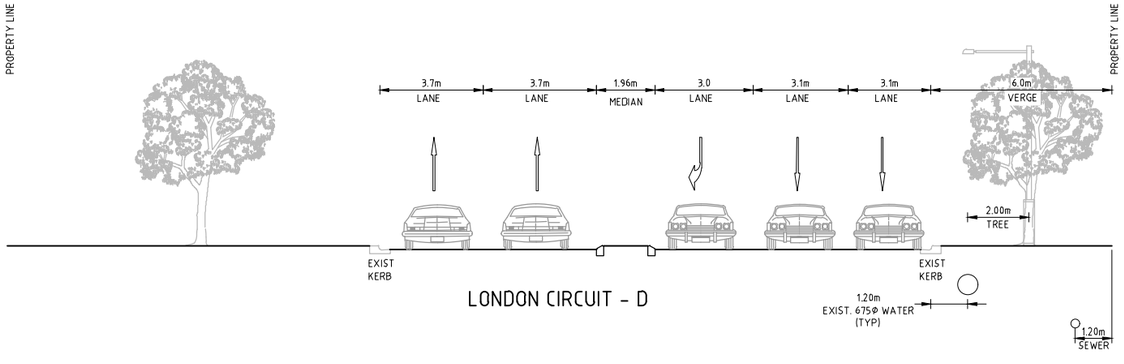
PLAN VIEW



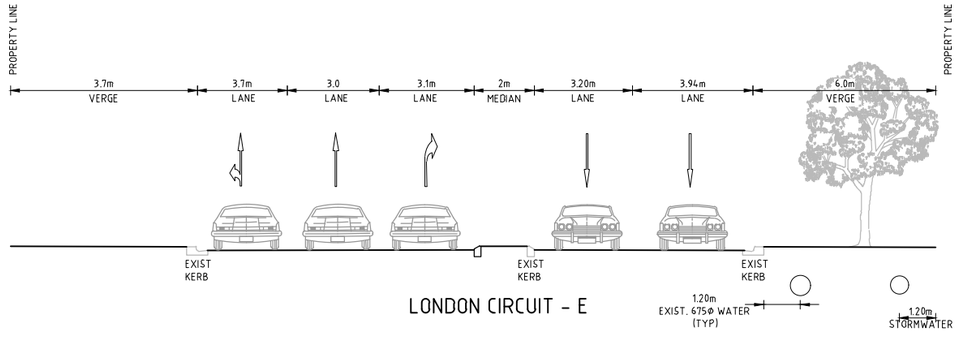
EDINBURGH AVENUE - C

225ø SEWER

* EXACT ALIGNMENT TO BE DETERMINED AT DETAILED DESIGN STAGE



LONDON CIRCUIT - D



LONDON CIRCUIT - E

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:50@A1 SCALE 1:100@A3 0 0.5 1 1.5 2 2.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

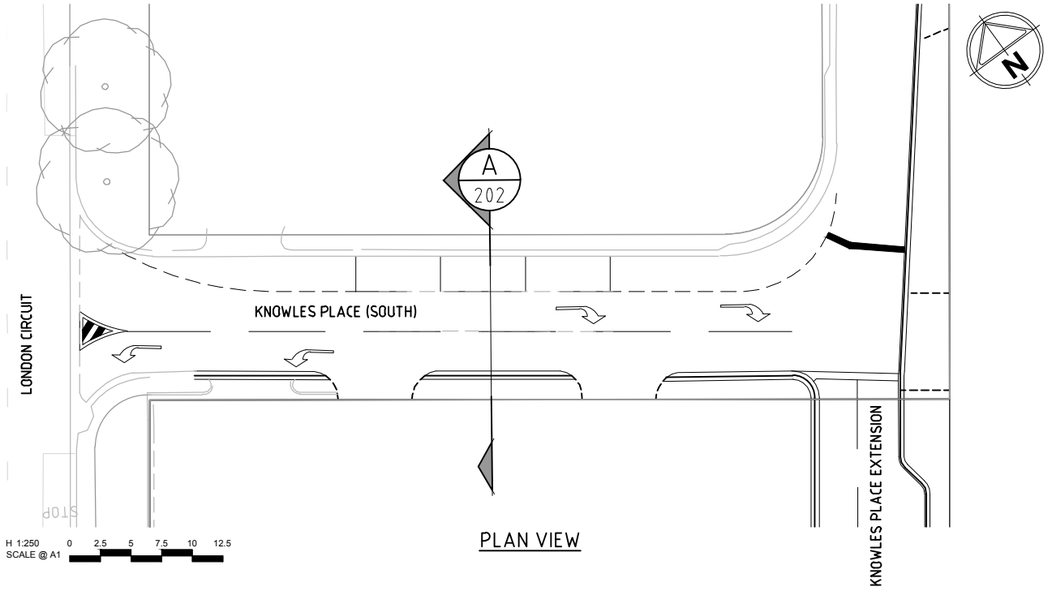
SECTION 100 CANBERRA CITY WORKS APPROVAL

TYPICAL CROSS SECTIONS EDINBURGH AVENUE SHEET 2

MPG CONSTRUCTIONS

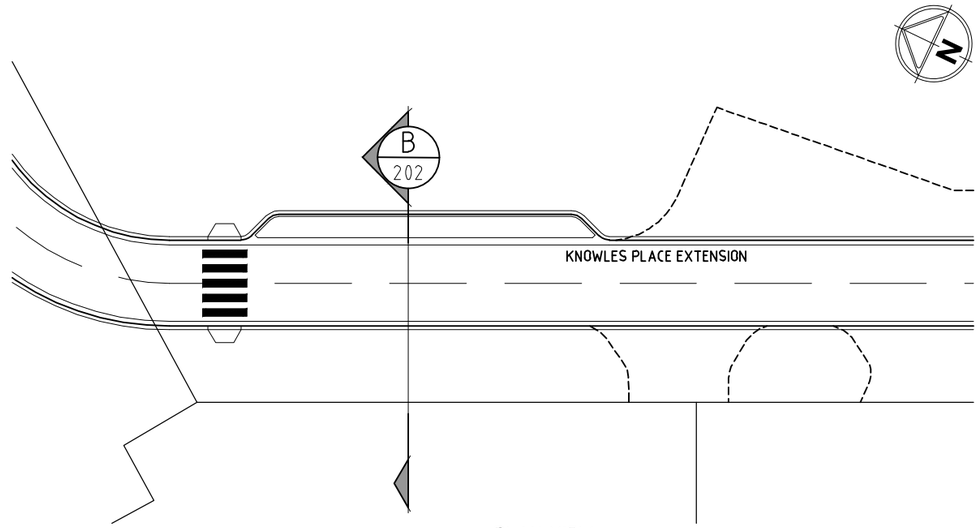
PRELIMINARY Drg No **305632CR201** Rev **A**

file name 305632CR200_TYP.dwg layout name CR201 plotted by Suzie Gilbert
file location G:\30\305632\Civil\ACAD plot date 24/09/2018 11:41 AM Sheet 10 of 22 Sheets



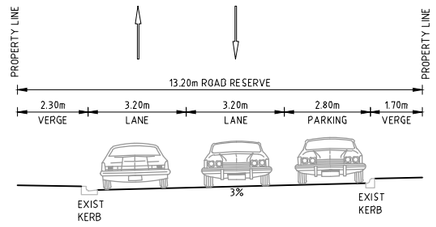
H 1:250 SCALE @ A1 0 2.5 5 7.5 10 12.5

PLAN VIEW



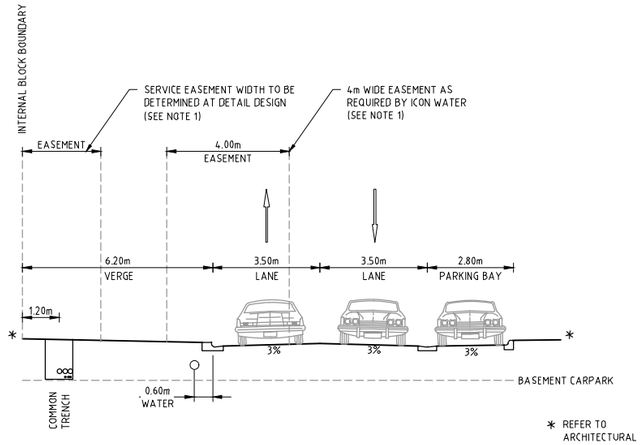
H 1:250 SCALE @ A1 0 2.5 5 7.5 10 12.5

PLAN VIEW



EXISTING KNOWLES PLACE (EXISTING) TWO WAY - A

(6.4m CARRIAGEWAY WITH 2.8m PARKING)



KNOWLES PLACE EXTENSION (PRIVATE ROAD) - B

(7.0m CARRIAGEWAY)

(NOTE 1: HORIZONTAL AND VERTICAL LOCATION TO BE DETERMINED AT DETAIL DESIGN.)

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:50@A1 SCALE 1:100@A3 0 0.5 1 1.5 2 2.5

Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC | Authorised M B | Date 24-09-18

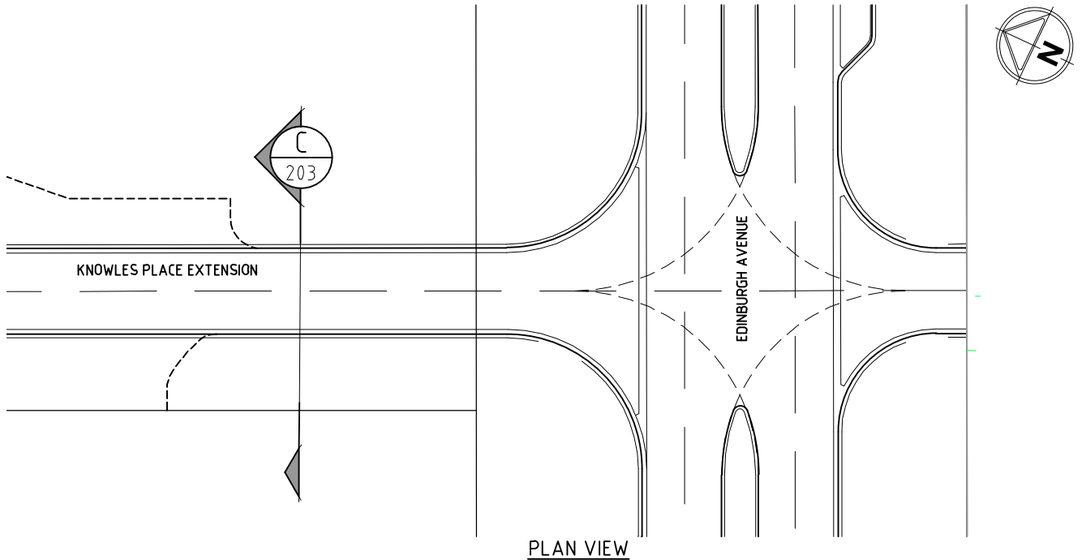
SECTION 100 CANBERRA CITY WORKS APPROVAL

TYPICAL CROSS SECTIONS KNOWLES PLACE SHEET 1

MPG CONSTRUCTIONS

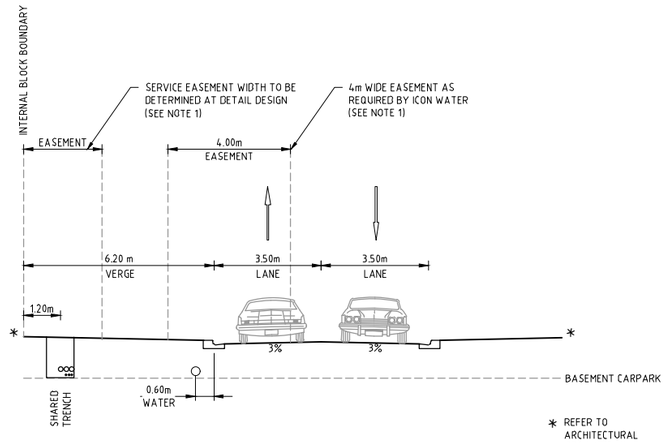
PRELIMINARY Drg No 305632CR202 Rev A

file name 305632CR200_TYP.dwg layout name CR202 plotted by Suzie Gilbert
file location G:\305\305632\Civil\ACAD plot date 24/09/2018 11:42 AM Sheet 11 of 22 Sheets



PLAN VIEW

H 1:250 0 2.5 5 7.5 10 12.5
SCALE @ A1



KNOWLES PLACE EXTENSION (PRIVATE ROAD) - C

(7.0m CARRIAGEWAY)

(NOTE 1: HORIZONTAL AND VERTICAL LOCATION TO BE DETERMINED AT DETAIL DESIGN.)

Rev			
A	WORKS APPROVAL	MFB	24-09-18
Rev	Amendments	Approved	Date

1:50@A1 0 0.5 1 1.5 2 2.5
SCALE
1:100@A3 0 0.5 1 1.5 2 2.5

Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

TYPICAL CROSS SECTIONS KNOWLES PLACE SHEET 2

MPG CONSTRUCTIONS

PRELIMINARY

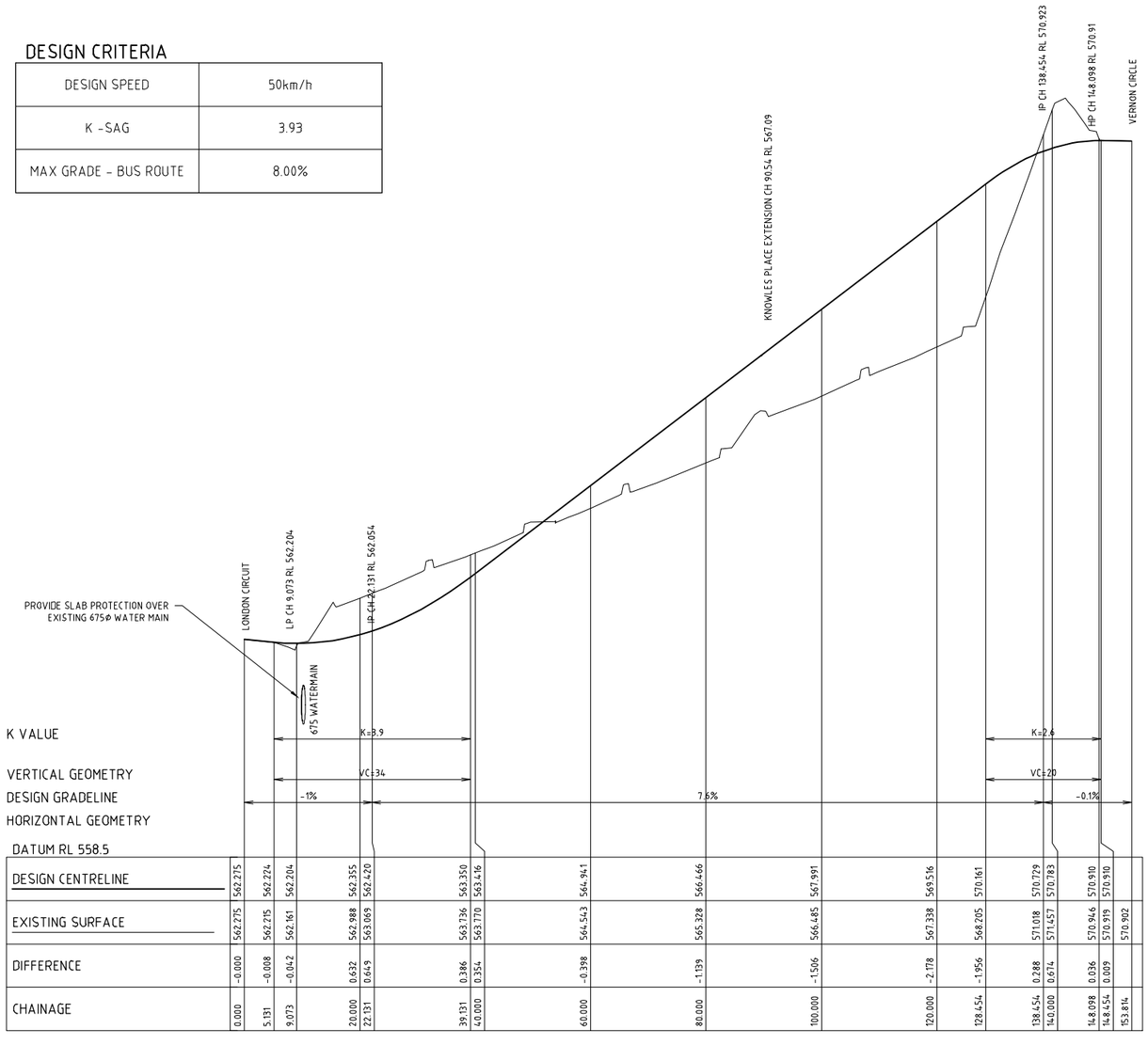
Drg No 305632CR203

Rev A

file name 305632CR200_TYP.dwg layout name CR203 plotted by Suzie Gilbert
file location G:\30\305632\Civil\ACAD plot date 24/09/2018 11:42 AM Sheet 12 of 22 Sheets

DESIGN CRITERIA

DESIGN SPEED	50km/h
K -SAG	3.93
MAX GRADE - BUS ROUTE	8.00%



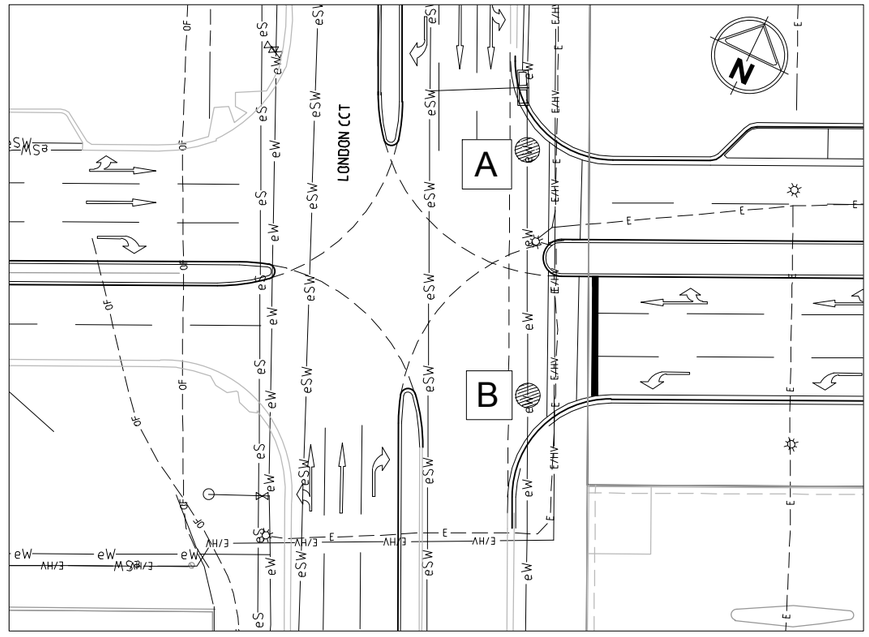
CHAINAGE	0.000	5.131	9.073	20.000	22.131	39.131	40.000	60.000	80.000	100.000	120.000	128.454	138.454	140.000	148.098	148.454	153.814
DESIGN CENTRELINE	562.275	562.224	562.204	562.355	562.420	563.350	563.416	564.941	566.466	567.991	569.516	570.161	570.729	570.783	570.910	570.910	
EXISTING SURFACE	562.275	562.215	562.161	562.988	563.069	563.736	563.770	564.543	565.328	566.485	567.338	568.205	571.018	571.457	570.946	570.919	570.902
DIFFERENCE	-0.000	-0.008	-0.042	0.632	0.649	0.386	0.354	-0.398	-1.139	-1.506	-2.178	-1.956	0.288	0.674	0.036	0.009	
CHAINAGE	0.000	5.131	9.073	20.000	22.131	39.131	40.000	60.000	80.000	100.000	120.000	128.454	138.454	140.000	148.098	148.454	153.814

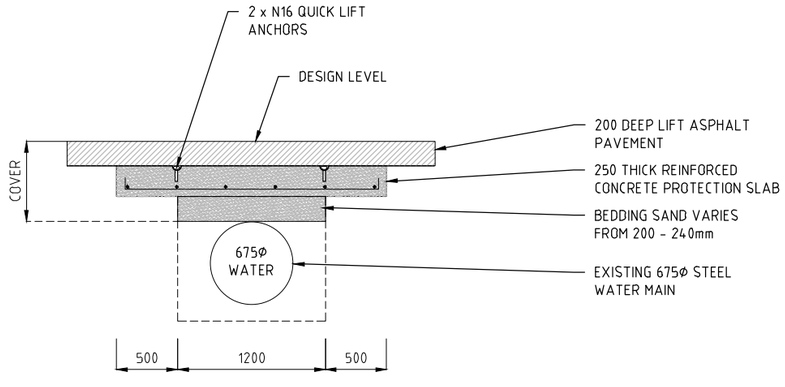
EDINBURGH AVE

POTHOLING DATA

LOCATION	OBVERT LEVEL	DESIGN LEVEL	COVER
A	561.520 *	562.210	0.690
B	561.400 *	562.050	0.650

(* LEVELS BY OTHERS)





SLAB PROTECTION DETAIL
(REINFORCEMENT DETAILS TO BE PROVIDED AT DETAIL DESIGN STAGE)

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

H 1:1000 @ A3
H 1:500 @ A1
SCALE
V 1:100 @ A3
V 1:50 @ A1
0 5 10 15 20 25
0 0.5 1.0 1.5 2.0 2.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

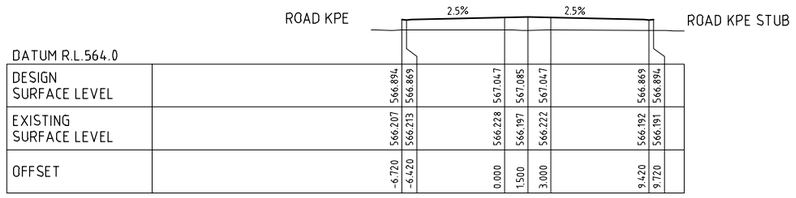
LONGITUDINAL AND CROSS SECTIONS EDINBURGH AVENUE LONG SECTIONS

MPG CONSTRUCTIONS

PRELIMINARY

Drg No 305632CR300

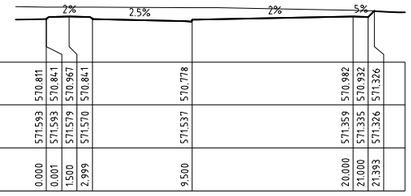
Rev A



DATUM R.L.564.0								
DESIGN SURFACE LEVEL		566.894	566.869	567.047	567.085	567.047	566.869	566.894
EXISTING SURFACE LEVEL		566.207	566.213	566.228	566.197	566.222	566.192	566.191
OFFSET		-6.720	-6.420	0.000	1.500	3.000	9.420	9.720

CH 90.00

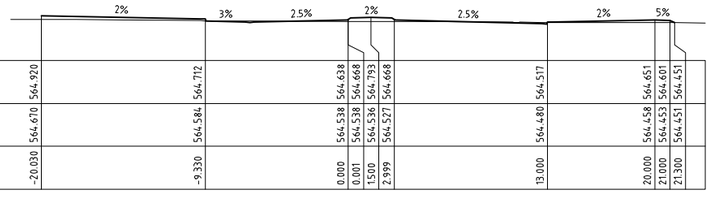
EDINBURGH AVENUE



DATUM R.L.568.0								
DESIGN SURFACE LEVEL		570.811	570.841	570.967	570.841	570.778	570.982	570.932	571.326
EXISTING SURFACE LEVEL		571.593	571.593	571.579	571.570	571.537	571.359	571.335	571.326
OFFSET		0.000	0.001	1.500	2.999	9.500	20.000	21.000	21.393

CH 141.16

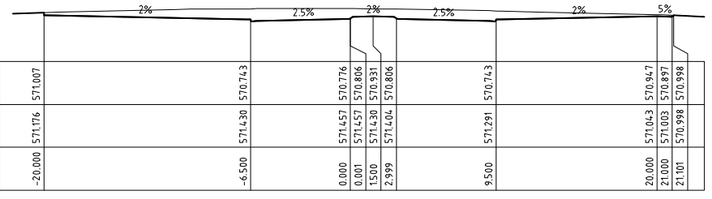
EDINBURGH AVENUE



DATUM R.L.562.0									
DESIGN SURFACE LEVEL	564.920	564.712	564.638	564.668	564.793	564.668	564.517	564.651	564.601	564.451
EXISTING SURFACE LEVEL	564.670	564.584	564.538	564.538	564.536	564.527	564.480	564.458	564.453	564.451
OFFSET	-20.030	-9.330	0.000	0.001	1.500	2.999	13.000	20.000	21.000	21.300

CH 59.88

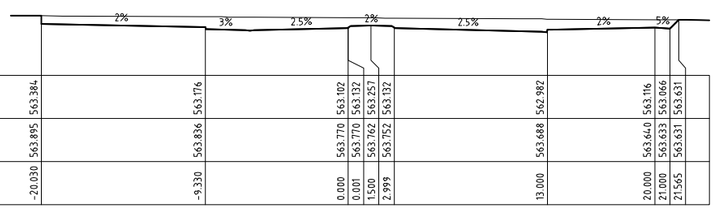
EDINBURGH AVENUE



DATUM R.L.568.0								
DESIGN SURFACE LEVEL	571.007	570.743	570.776	570.806	570.931	570.806	570.743	570.947	570.897	570.998
EXISTING SURFACE LEVEL	571.176	571.430	571.457	571.457	571.430	571.404	571.291	571.043	571.003	570.998
OFFSET	-20.000	-6.500	0.000	0.001	1.500	2.999	9.500	20.000	21.000	21.101

CH 140.00

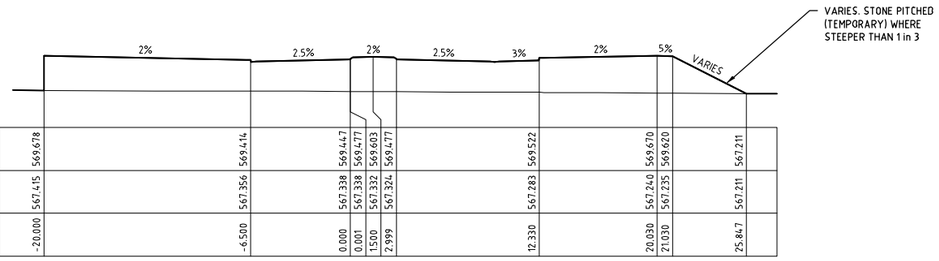
EDINBURGH AVENUE



DATUM R.L.560.0									
DESIGN SURFACE LEVEL	563.384	563.176	563.102	563.132	563.257	563.132	562.982	563.116	563.066	563.631
EXISTING SURFACE LEVEL	563.895	563.836	563.770	563.770	563.762	563.752	563.688	563.640	563.633	563.631
OFFSET	-20.030	-9.330	0.000	0.001	1.500	2.999	13.000	20.000	21.000	21.565

CH 40.00

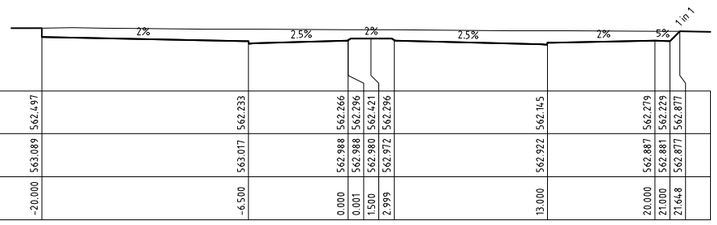
EDINBURGH AVENUE



DATUM R.L.565.0									
DESIGN SURFACE LEVEL	569.678	569.414	569.447	569.477	569.603	569.477	569.522	569.670	569.620	567.211
EXISTING SURFACE LEVEL	567.415	567.356	567.338	567.338	567.332	567.324	567.283	567.240	567.235	567.211
OFFSET	-20.000	-6.500	0.000	0.001	1.500	2.999	12.330	20.030	21.030	25.847

CH 120.00

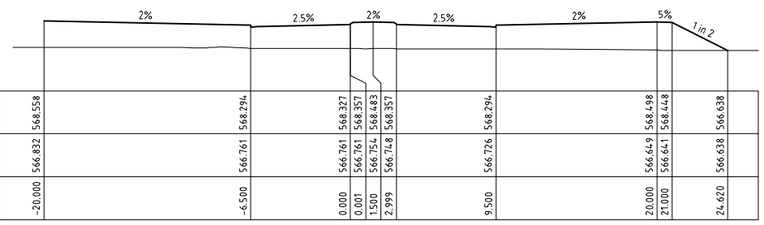
EDINBURGH AVENUE



DATUM R.L.559.0									
DESIGN SURFACE LEVEL	562.497	562.233	562.266	562.296	562.421	562.296	562.145	562.279	562.229	562.877
EXISTING SURFACE LEVEL	563.089	563.017	562.988	562.988	562.980	562.972	562.922	562.887	562.881	562.877
OFFSET	-20.000	-6.500	0.000	0.001	1.500	2.999	13.000	20.000	21.000	21.648

CH 20.00

EDINBURGH AVENUE



DATUM R.L.564.0									
DESIGN SURFACE LEVEL	568.558	568.294	568.327	568.357	568.483	568.357	568.294	568.498	568.448	566.638
EXISTING SURFACE LEVEL	566.832	566.761	566.761	566.761	566.754	566.748	566.726	566.649	566.641	566.638
OFFSET	-20.000	-6.500	0.000	0.001	1.500	2.999	9.500	20.000	21.000	24.620

CH 106.00

EDINBURGH AVENUE

file name 305632CR300 LS.dwg layout name CR301 plotted by Suzie Gilbert
file location G:\301\305632\Civil\ACAD plot date 24/09/2018 11:42 AM Sheet 14 of 22 Sheets

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

H 1:1000 @ A3
H 1:500 @ A1
SCALE
V 1:100 @ A3
V 1:50 @ A1

0 5 10 15 20 25
0 0.5 1.0 1.5 2.0 2.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

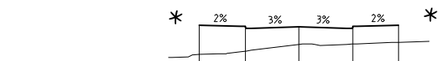
LONGITUDINAL AND CROSS SECTIONS EDINBURGH AVENUE CROSS SECTIONS

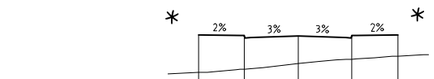
MPG CONSTRUCTIONS

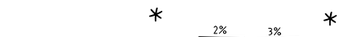
PRELIMINARY

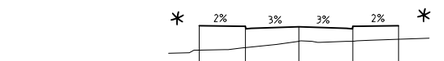
Drg No 305632CR301

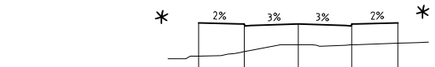
Rev A

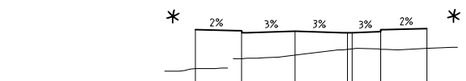


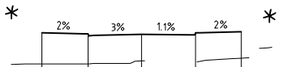


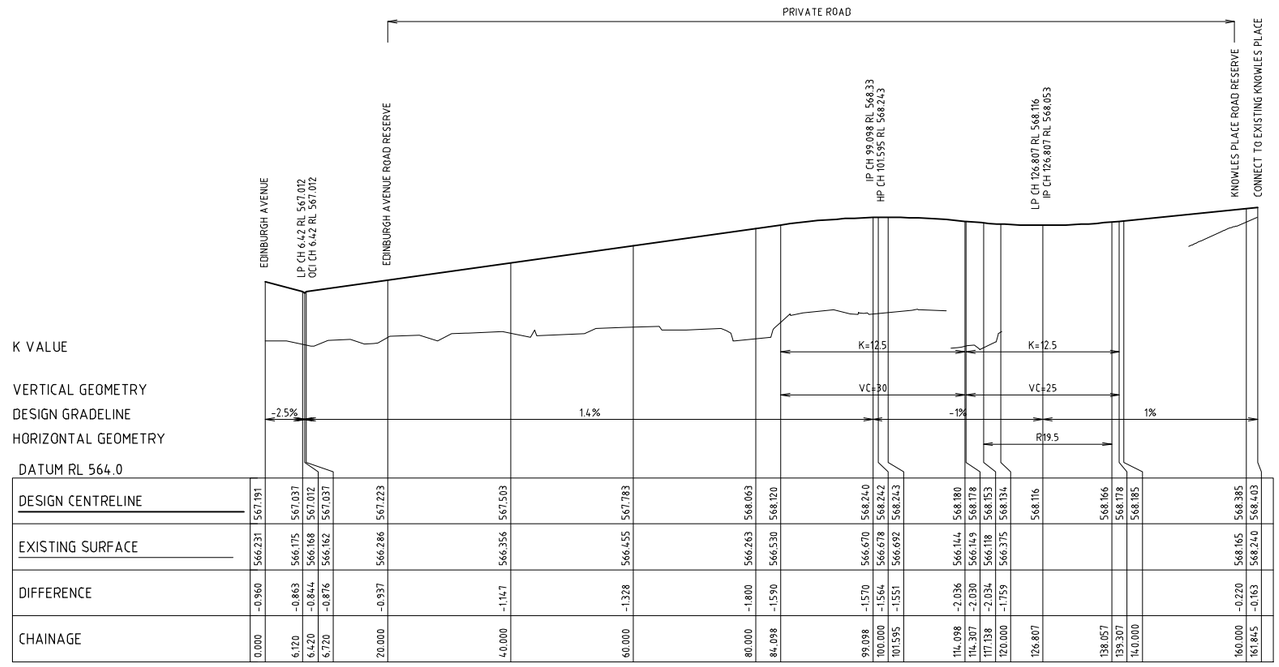












DATUM R.L.563.0

DESIGN SURFACE LEVEL	567.583	567.529	567.503	567.529	567.583
EXISTING SURFACE LEVEL	565.690	565.909	566.356	566.366	566.486
OFFSET	-6.500	-3.500	0.000	3.500	6.500

CH 40.00

DATUM R.L.563.0

DESIGN SURFACE LEVEL	568.143	568.089	568.063	568.089	568.143
EXISTING SURFACE LEVEL	565.686	565.913	566.263	566.563	566.760
OFFSET	-6.500	-3.500	0.000	3.500	6.500

CH 80.00

DATUM R.L.564.0

DESIGN SURFACE LEVEL	568.233	568.179	568.153	568.219	568.273
EXISTING SURFACE LEVEL	566.039	566.073	566.118	566.349	567.150
OFFSET	-6.500	-3.500	0.000	3.500	6.500

CH 117.14

DATUM R.L.566.0

DESIGN SURFACE LEVEL	568.247	568.193	568.166
EXISTING SURFACE LEVEL			
OFFSET	-6.500	-3.500	0.000

CH 138.06

DATUM R.L.566.0

DESIGN SURFACE LEVEL	568.498	568.444	568.385	568.600	568.653
EXISTING SURFACE LEVEL	568.330	568.160	568.165	568.120	568.214
OFFSET	-6.500	-3.500	0.000	3.500	6.450

CH 160.00

DATUM R.L.563.0

DESIGN SURFACE LEVEL	567.304	567.250	567.223	567.250	567.304
EXISTING SURFACE LEVEL	565.693	565.861	566.286	566.278	566.404
OFFSET	-6.500	-3.500	0.000	3.500	6.500

CH 20.00

DATUM R.L.563.0

DESIGN SURFACE LEVEL	567.863	567.809	567.783	567.809	567.863
EXISTING SURFACE LEVEL	565.693	566.006	566.455	566.433	566.543
OFFSET	-6.500	-3.500	0.000	3.500	6.500

CH 60.00

DATUM R.L.563.0

DESIGN SURFACE LEVEL	568.322	568.268	568.242	568.123	568.148	568.350	568.404
EXISTING SURFACE LEVEL	565.782	566.449	566.678	567.054	567.079	567.063	567.114
OFFSET	-6.500	-3.500	0.000	3.420	3.720	5.600	8.600

CH 100.00

DATUM R.L.564.0

DESIGN SURFACE LEVEL	568.214	568.160	568.134	568.220	568.274
EXISTING SURFACE LEVEL	566.188	566.204	566.375		566.563
OFFSET	-6.500	-3.500	0.000	3.500	6.500

CH 120.00

DATUM R.L.566.0

DESIGN SURFACE LEVEL	568.265	568.211	568.185
EXISTING SURFACE LEVEL			
OFFSET	-6.500	-3.500	0.000

CH 140.00

* REFER TO ARCHITECTURAL DRAWINGS

DATUM RL 564.0

DESIGN CENTRELINE	567.191	567.037	567.012	567.037	567.223	567.503	567.783	568.063	568.120	568.240	568.242	568.243	568.180	568.178	568.153	568.134	568.116	568.166	568.178	568.185	568.385	568.403
EXISTING SURFACE	566.231	566.175	566.168	566.162	566.286	566.356	566.455	566.263	566.530	566.670	566.678	566.692	566.144	566.149	566.118	566.375					568.165	568.240
DIFFERENCE	-0.960	-0.863	-0.844	-0.876	-0.937	-1.147	-1.328	-1.800	-1.590	-1.570	-1.564	-1.551	-2.036	-2.030	-2.034	-1.759					-0.220	-0.163
CHAINAGE	0.000	6.120	6.420	6.720	20.000	40.000	60.000	80.000	84.098	99.098	100.000	101.595	114.098	114.307	117.138	120.000	126.807	138.057	139.307	140.000	160.000	161.845

KNOWLES PLACE EXTENSION

DATUM RL 563.5

DESIGN CENTRELINE	567.191	567.011	566.986	567.011	567.194	567.245	567.294	567.285
EXISTING SURFACE	566.163	566.186	566.162	566.139	566.138	566.119	565.984	565.827
DIFFERENCE	-1.028	-0.825	-0.823	-0.872	-1.056	-1.126	-1.311	-1.458
CHAINAGE	0.000	7.220	7.520	7.820	17.000	20.000	27.000	30.000

KNOWLES PL EXT STUB (BY OTHERS)

file name 305632CR300 LS.dwg layout name CR302 plotted by Suzie Gilbert
file location G:\30\305632\Civil\ACAD plot date 24/09/2018 11:42 AM Sheet 15 of 22 Sheets

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

H 1:1000 @ A3
H 1:500 @ A1
SCALE
V 1:100 @ A3
V 1:50 @ A1

0 5 10 15 20 25
0 0.5 1.0 1.5 2.0 2.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY
WORKS APPROVAL
LONGITUDINAL AND CROSS SECTIONS
LONGITUDINAL AND CROSS SECTIONS KNOWLES PLACE

MPG CONSTRUCTIONS

PRELIMINARY

Drg No 305632CR302
Rev A

LEGEND:

NCA WORKS APPROVAL AREA

VERGE PAVING

ROAD PAVEMENT TYPE 1

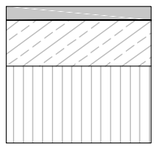
ROAD PAVEMENT TYPE 2

PRIVATE ROAD

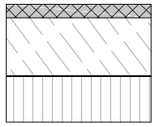
MEDIAN CONCRETE

MEDIAN PAVING

CARPARK PAVING



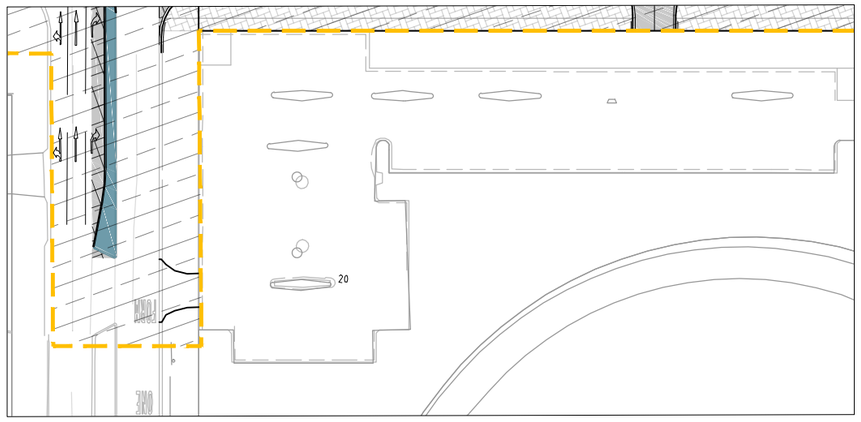
(CBR>5%)
ROAD PAVEMENT TYPE 1



(CBR>5%)
ROAD PAVEMENT TYPE 2

NOTES

1. VERGE PAVING : REFER TO DRAWING 305632LD400 AND 305632LD401
2. ROAD PAVEMENT 1 : THIN FLEXIBLE ASPHALTIC CONCRETE PAVEMENT
3. ROAD PAVEMENT TYPE 2 : DEEP LIFT ASHALTIC CONCRETE PAVEMENT
4. PRIVATE ROAD : THIN FLEXIBLE ASPHALTIC CONCRETE PAVEMENT
5. MEDIAN CONCRETE : CONCRETE
6. MEDIAN PAVEMENT : REFER TO DRAWING 305632LD400
7. CARPARK PAVING : INTERLOCKING PAVERS



INSET

NON DESIGNATED LAND
(NO WORKS APPROVAL)

DESIGNATED LAND
(WORKS APPROVAL)

DESIGNATED LAND
(WORKS APPROVAL)

SITE 1

SITE 2

SITE 3

SITE 4

FARRELL ST

LONDON CCT

LONDON CCT

LONDON CCT

KNOWLES PL

KNOWLES PL (EXTENSION)

VERNON CIRCLE

VERNON CIRCLE

MARCUS CLARKE ST

EDINBURGH AV

EDINBURGH AV (EXTENSION)

ASHALTIC CONCRETE OVERLAY
(EXACT EXTENT TO BE
DETERMINED AT FINAL DESIGN)

ASHALTIC CONCRETE OVERLAY AT
INTERSECTION. (EXACT EXTENT TO
BE DETERMINED AT FINAL DESIGN)

5.00m

5.00m

REFER TO INSET

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1
SCALE
1:500@A3

0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY
WORKS APPROVAL
PAVEMENT PLAN

MPG CONSTRUCTIONS

PRELIMINARY

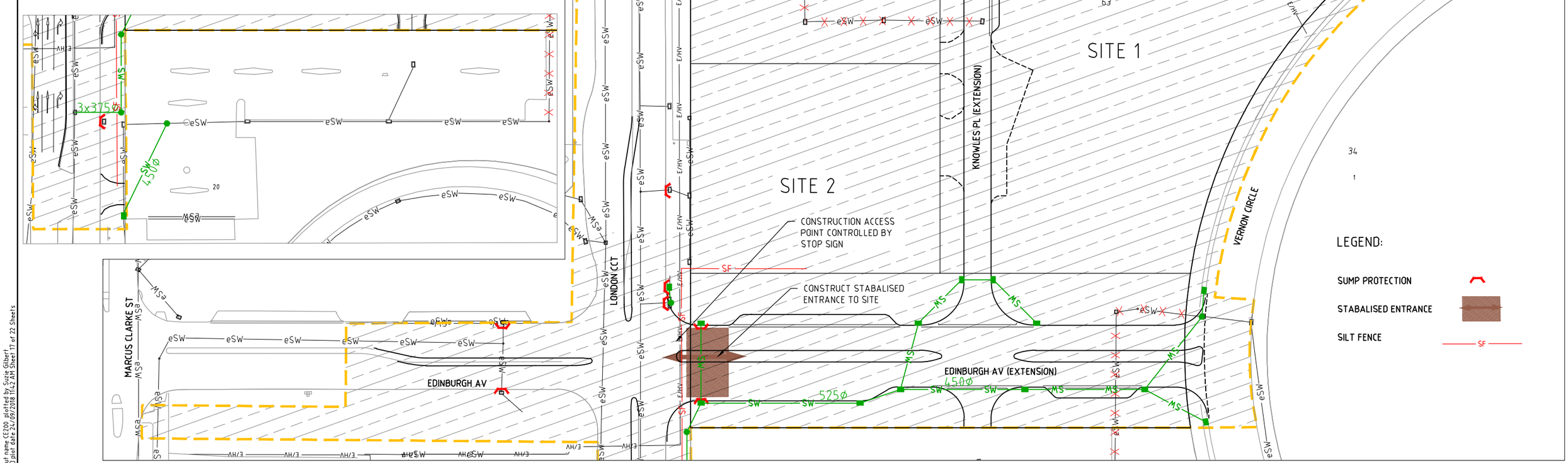
Drg No **305632CR400**
Rev **A**

file name 305632CR400 PAVE.dwg layout name CR400 plotted by Suzie Gilbert
file location G:\130\305632\Civil\LCAD plot date 24/09/2018 11:42 AM Sheet 16 of 22 Sheets

GENERAL NOTES

1. REFER TO CLAUSES 2.03 OF THE STANDARD SPECIFICATION FOR URBAN INFRASTRUCTURE WORKS.
2. THIS DRAWING TYPIFIES ONLY THE SEDIMENT AND EROSION CONTROL PRINCIPALS REQUIRED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DESIGN, CONSTRUCT AND MAINTAIN TEMPORARY EROSION CONTROL MEASURES TO COMPLY WITH THE REQUIREMENTS OF THE ENVIRONMENT PROTECTION AUTHORITY ACT 1997 AND THER "ENVIRONMENT PROTECTION GUIDELINES FOR CONSTRUCTION AND LAND DEVELOPMENT IN THE ACT". EPA 2011.
3. VARIATIONS TO BE APPROVED CONCEPTS AND PROPOSALS ARE TO BE ENDORSED BY ENVIRONEMTAL PROTECTION AUTHORITY PRIOR TO IMPLEMENTATION.
4. THE CONTRACTOR MUST ENTER INTO AN ENVIROMENTAL PROTECTION AGREEMENT WITH THE ENVIRONMENT PROTECTION AUTHORITY BY CONTACTING ENVIRONMENT ACT ON 132281 PRIOR TO COMMENCEMENT OF WORK.
5. UPON THE COMPLETION OF ROAD SEALING SUBJECT TO THE APPROVAL OF THE SUPERINTENDENT, THE ASSOCIATED GENERAL INLET PROTECTION SHALL BE REMOVED.
6. STOCKPILES TO BE LOCATED AWAY FROM DRAINAGE LINES AND SURFACE FLOW PATHS. CONTOURED STRIATIONS OR FURROWS TO BE PROVIDED TO STOCKPILES TO MINIMISE EROSION.
7. STABALISED CONSTRUCTION ENTRANCE TO BE CONSTRUCTED PRIOR TO ACCESS TO SITE BY CONSTRUCTION VEHICLES, AGGREGATE TO BE TURNED WHEN SEDIMENT BUILDS UP.
8. WHERE STORMWATER DRAINAGE IS INSTALLED TO INTERNAL ROADWORKS, PROVIDE KERBSIDE FILTER ROLL TO SUMP INLET.
9. CONTRACTOR IS TO ESTABLISH A MAINTENANCE PROGRAM FOR SEDIMENT AND EROSION CONTROL DEVICES TO ENSURE INSPECTION AFTER SIGNIFICANT RAINFALL AND THAT ANY REPAIRS NECESSARY ARE QUICKLY ATTENDED TO. ALL NEW CONSTRUCTION WORK MUST BE CONTAINED WITHIN THE SITE EXEPT FOR APPROVED SERVICE CONNECTIONS AND ROADWORKS.
10. REGULARY REMOVE ANY SOIL FROM ROADS ADJACENT TO THE SITE.
11. NO STORAGE OF CONSTRUCTION MATERIALS, PARKING OF VEHICLES NOR EQUIPTMENT PERMITTED OUTSIDE OF BLOCKS WITHOUT TCCS APPROVAL.
12. NO SITE SHEDS, STORAGE SHEDS, SITE AMENITIES TO BE ERECTED OUTSIDE OF BLOCKS WITHOUT TCCS APPROVAL.
13. PROVIDE KERBSIDE FILTER ROLL TO EXISTING SUMPS. KERBSIDE FILTER ROLLS TO BE REMOVED, CLEANED AND REINSTATED ON WEEKLY BASIS AT MINIMUM TRAPPED SEDIMENT AROUND SUMPS ALSO TO BE REMOVED. CLEANING TO BE BE TAKEN OUT IMMEDIATLY AFTER PERIODS OF RAINFALL DURING CONSTRUCTION.
14. ALL BUILDING MATERIAL AND WASTE STOCKPILES SHALL BE LOCATED WITHIN A WASTE ENCLOSURE OR WASTE CONTAINMENT AREA ON THE SITE.
15. A WATER CART OR SUFFICIENT WATER SPRAYS SHALL BE MADE AVALIABLE IN DRY AND WINDY CONDITIONS TO MAINTAIN DUST SUPPRESION.
16. WATER SHALL BE APPLIED TO SURPRESS DUST FROM OPEN EARTHWORKS AS WELL AS UNPROTECTED STOCKPILES.
17. ALL BUILDING MATERIAL AND WASTE STOCKPILES MUST BE LOCATED ON THE SITE.
18. THE WASTE ENCLOSURE IS TO BE USED AND IS TO BE CAPABLE OF HOLDING ALL WASTES ON THE SITE UNTIL THEY CAN BE DISPOSED OF IN AN APPROPRIATE MANNER.
19. ANY NOISE ACTIVITITES, WHICJ INCLUD MATERIAL DELIVERIES AND WORK SITE PREPERATION IS ONLY PERMITTED BETWEEN THE FOLLOWING HOURS:

    7.00AM AND 6.00 PM MONDAY TO SATURDAY (EXCLUDING PUBLIC HOLIDAYS), AT ALL OTHER TIMES NOISE EMISSION MUST NOT EXCEED THE ZONE NOISE STANDARD.
20. IF SOIL IS TO BE REMOVED OR IMPORTED ON SITE, THE DETAILS OF THE ORIGIN OF THE SOIL IMPORTED OR THE LOCATION WHERE THE SOIL IS TO BE EXPORTED ARE TO BE PROVIDED TO EPA A MINIMUM OF 2 WEEKS IN ADVANCE OF THE WORK.



Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1 SCALE 1:500@A3 — 0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC | Authorised M B | Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

ENVIRONMENTAL MANAGEMENT CONCEPT PLAN

MPG CONSTRUCTIONS

PRELIMINARY | Drg No 305632CE200 | Rev A

file name 305632CE200 ENV dwg layout name CE200 plotted by Suzie Gilbert
file location G:\301\305632\Civil\ACAD plot date 24/09/2018 11:42 AM Sheet 17 of 22 Sheets

LEGEND:

NCA WORKS APPROVAL AREA

REMOVE EXISTING PATH AND VEGITATION

REMOVE EXISTING KERB

REMOVE EXISTING STREETLIGHT

REMOVE EXISTING BARRIERS

(REFER TO DRAWING 305632LD100 FOR TREE REMOVAL)

NON DESIGNATED LAND
(NO WORKS APPROVAL)

DESIGNATED LAND
(WORKS APPROVAL)

DESIGNATED LAND
(WORKS APPROVAL)

SITE 1

SITE 2

SITE 3

SITE 4

FARRELL ST

LONDON CCT

KNOWLES PL

VERNON CIRCLE

MARCUS CLARKE ST

EDINBURGH AV

INSET

REFER TO INSET

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1
SCALE
1:500@A3

0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

DEMOLITION PLAN

MPG CONSTRUCTIONS

PRELIMINARY

Drg No 305632CF250

Rev A

file name 305632CF250 DEMO.dwg layout name CF250 plotted by Suzie Gilbert
file location G:\301\305632\Civil\CAD plot date 24/09/2018 11:42 AM Sheet 18 of 22 Sheets

CONSTRUCT 1.8m HIGH TEMPORARY SECURITY FENCE (FENCE TO BE RELOCATED TO TOE OF BATTER ONCE EDINBURGH AVENUE EARTHWORKS ARE COMPLETED)

INSET

SITE 4

SITE 3

RELOCATE EXISTING FENCE (HOARDING) WITHIN VERGE TO BOUNDARY LINE TO PERMIT CONSTRUCTION OF LONDON CIRCUIT VERGE

TO

FROM

SITE 1

RELOCATE EXISTING FENCE (HOARDING) WITHIN VERGE TO BOUNDARY LINE TO PERMIT CONSTRUCTION OF VERNON CIRCLE VERGE

CONSTRUCT 1.8m HIGH TEMPORARY SECURITY FENCE

SITE 2

REMOVE EXISTING FENCE (HOARDING) AND REPLACE WITH 1.8m HIGH SECURITY FENCE AND GATES FOR ACCESS TO SITE

REMOVE EXISTING FENCE (HOARDING) AND REPLACE WITH 1.8m HIGH SECURITY FENCE AND GATES FOR ACCESS TO SITE

REFER TO INSET

FARRELL ST

LONDON CCT

KNOWLES PL

KNOWLES PL (EXTENSION)

VERNON CIRCLE

MARCUS CLARKE ST

EDINBURGH AV

EDINBURGH AV (EXTENSION)

LEGEND:

TEMPORARY SECURITY FENCE

EXISTING FENCE

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1
SCALE
1:500@A3

0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

FENCING PLAN

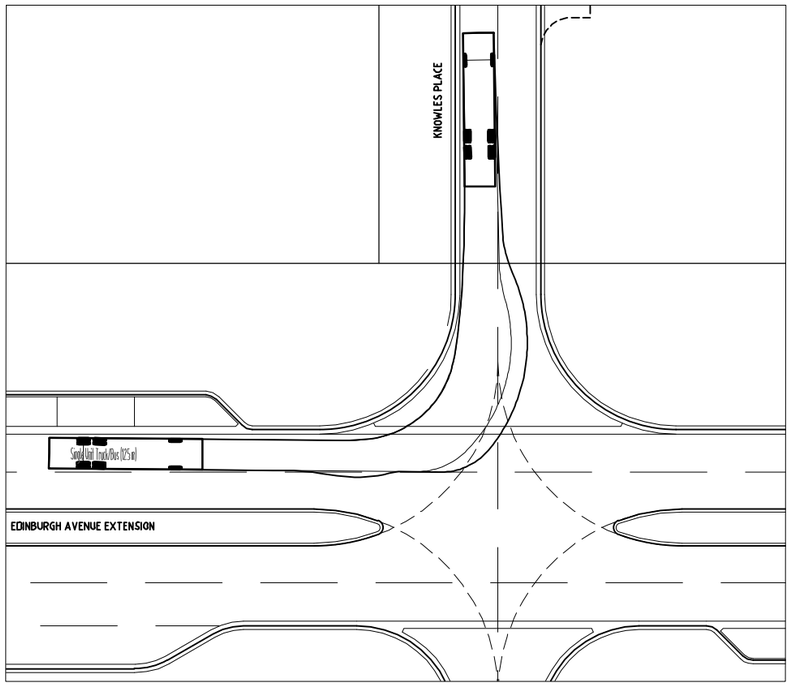
MPG CONSTRUCTIONS

PRELIMINARY

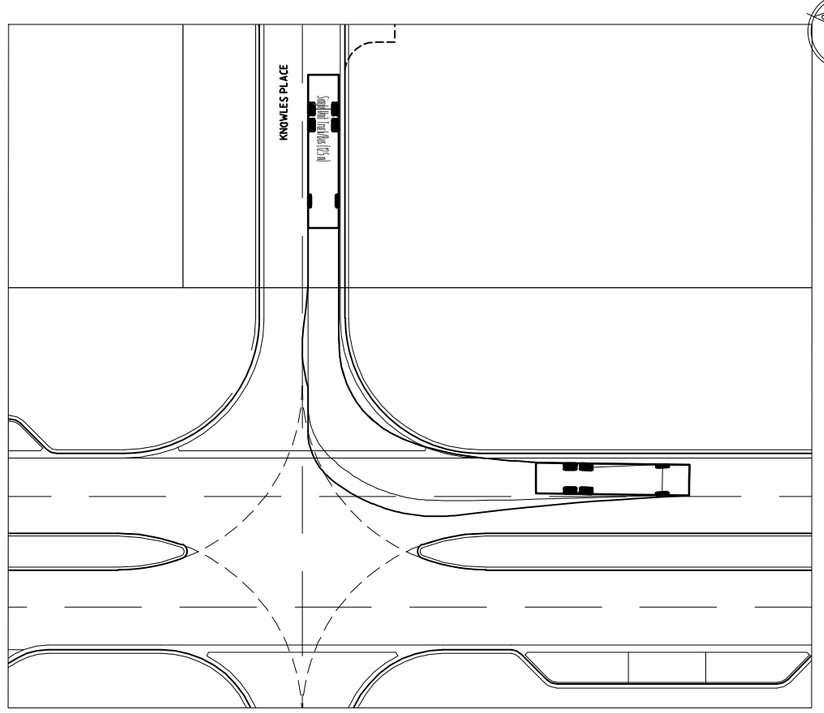
Drg No 305632CE220

Rev A

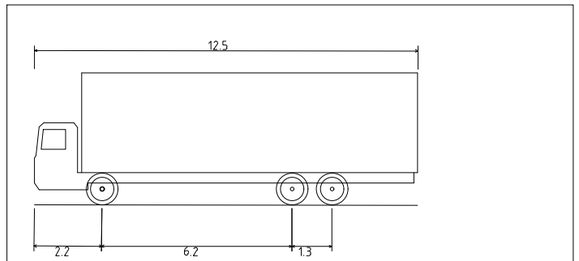
file name 305632CE220 FENCE.dwg layout name CE220 plotted by Suzie Gilbert
file location G:\30\305632\Civil\CAD plot date 24/09/2018 11:42 AM Sheet 19 of 22 Sheets



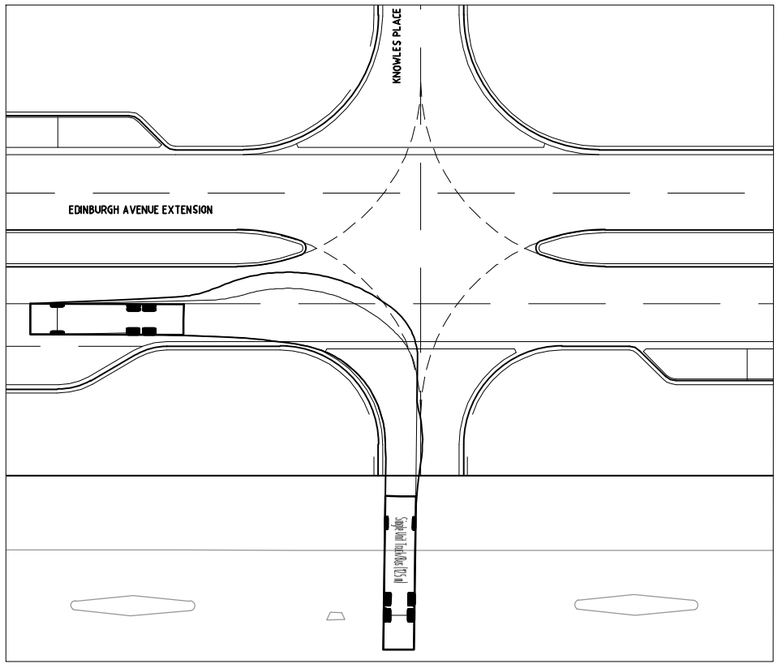
LEFT TURN FROM EDINBURGH AVENUE EXTENSION TO KNOWLES PLACE



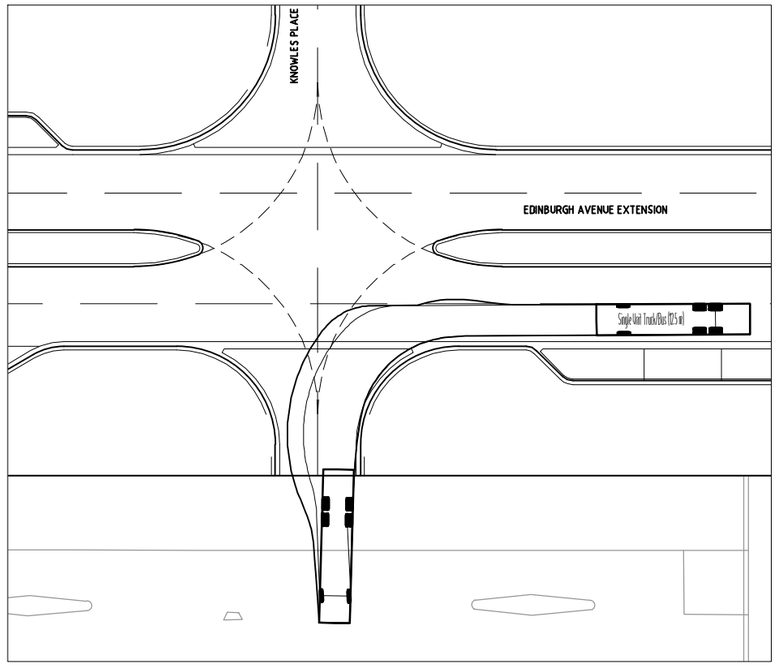
LEFT TURN FROM KNOWLES PLACE TO EDINBURGH AVENUE EXTENSION



Single Unit Truck/Bus (12.5 m)	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.490m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



LEFT TURN FROM BLOCK 20 TO EDINBURGH AVENUE EXTENSION



LEFT TURN FROM EDINBURGH AVENUE EXTENSION TO BLOCK 20

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1
1:500@A3
SCALE
0 2.5 5 7.5 10 12.5

Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

TURNING MOVEMENTS SHEET 1

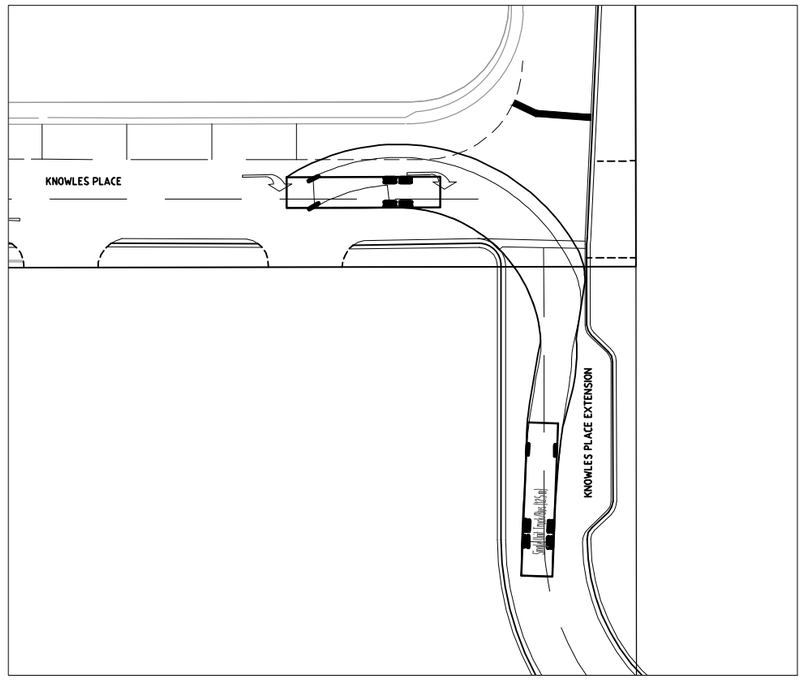
MPG CONSTRUCTIONS

PRELIMINARY

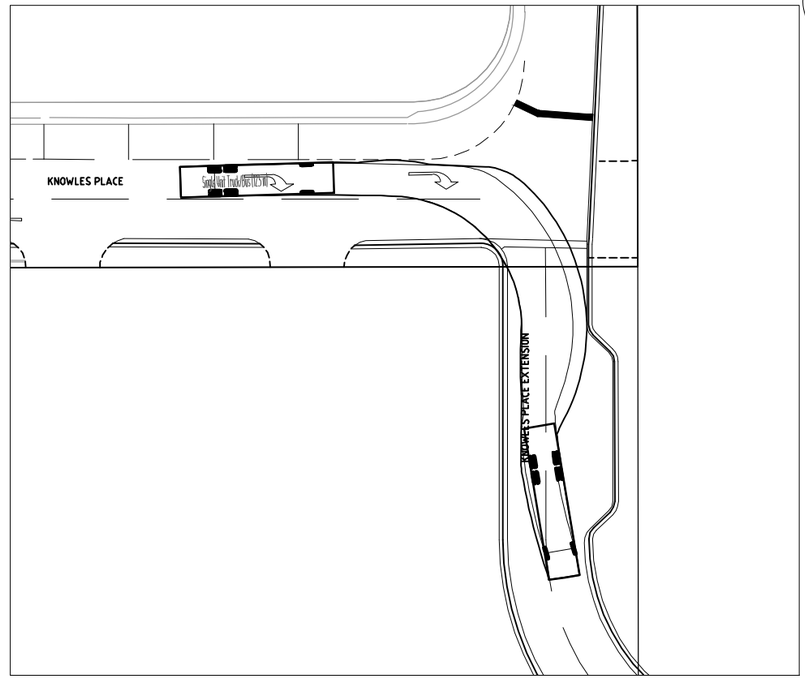
Drg No 305632CR500

Rev A

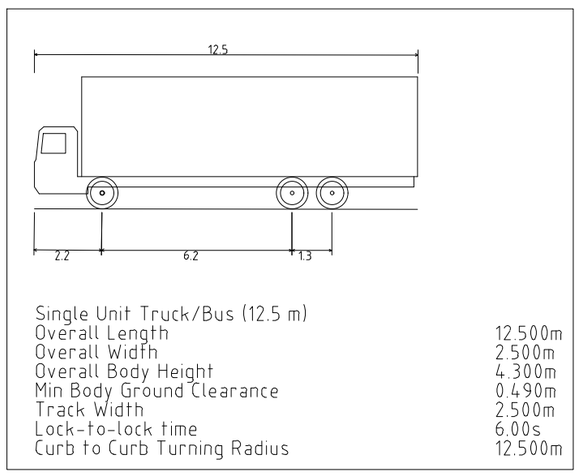
file name: 305632CR500_TURN.dwg layout name: CR500 plotted by: Suzie Gilbert
file location: G:\30\305632\Civil\CAD\ plot date: 24/09/2018 11:43 AM Sheet 20 of 22 Sheets



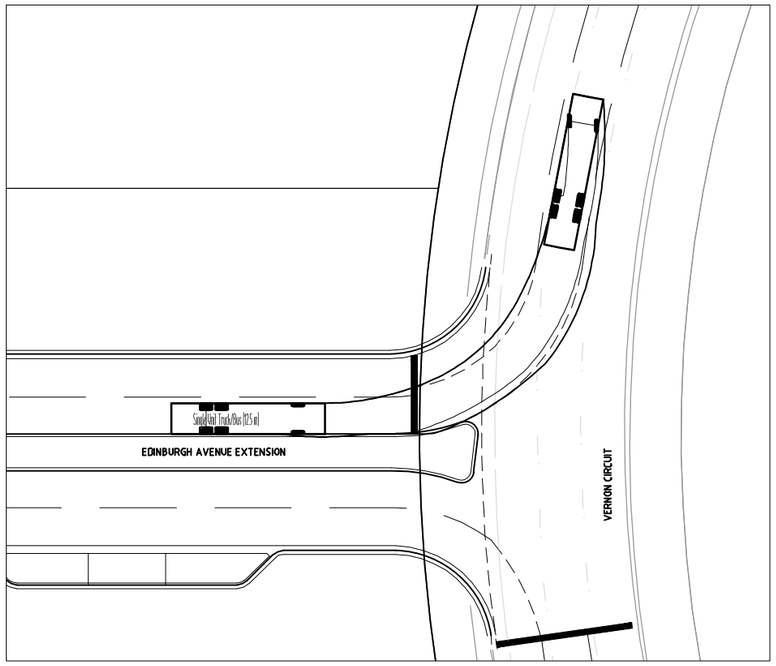
LEFT TURN FROM KNOWLES PLACE EXTENSION TO KNOWLES PLACE



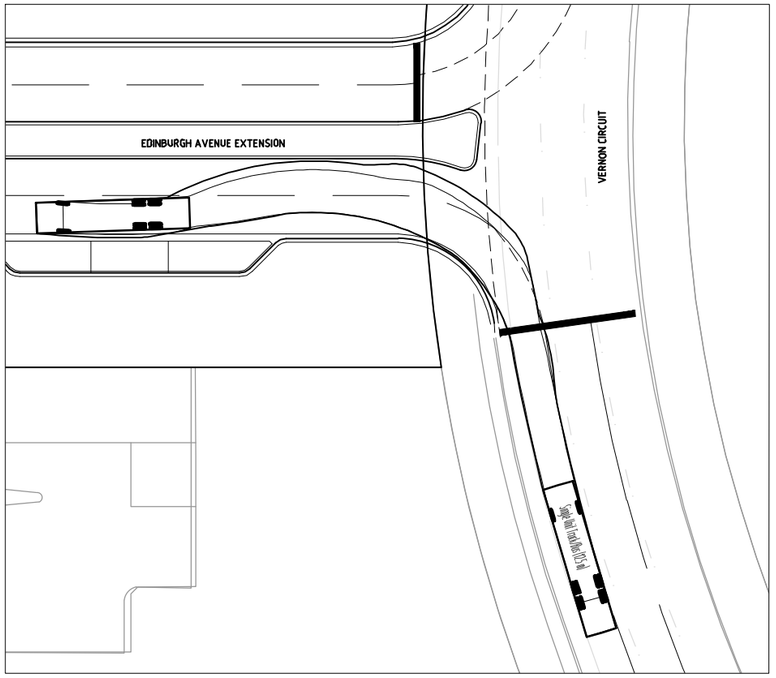
RIGHT TURN FROM KNOWLES PLACE TO KNOWLES PLACE EXTENSION



Single Unit Truck/Bus (12.5 m)	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.490m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



LEFT TURN FROM EDINBURGH AVENUE EXTENSION TO VERNON CIRCUIT



LEFT TURN FROM VERNON CIRCUIT TO EDINBURGH AVENUE EXTENSION

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1
SCALE
1:500@A3

0 2.5 5 7.5 10 12.5
0 2.5 5 7.5 10 12.5

Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB
Checked BSC
Authorised M B
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

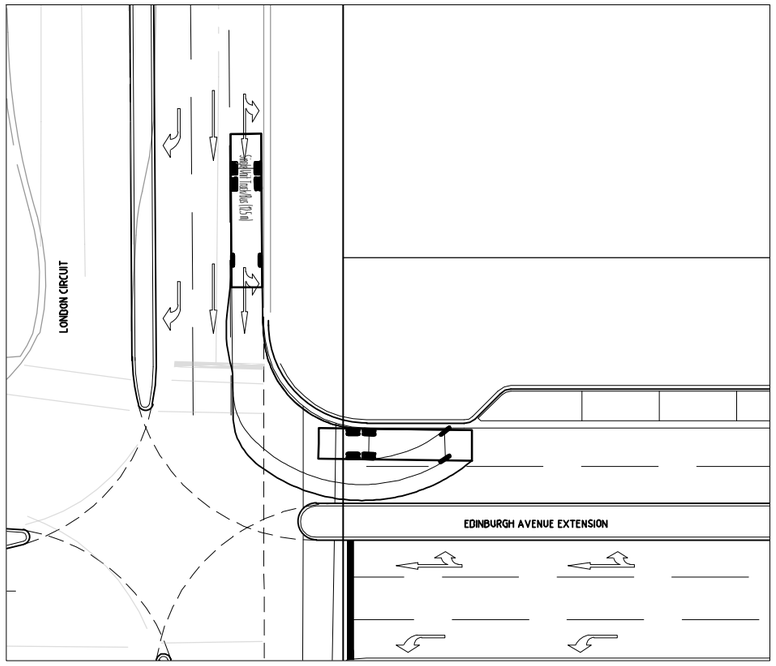
TURNING MOVEMENTS
SHEET 2

MPG CONSTRUCTIONS

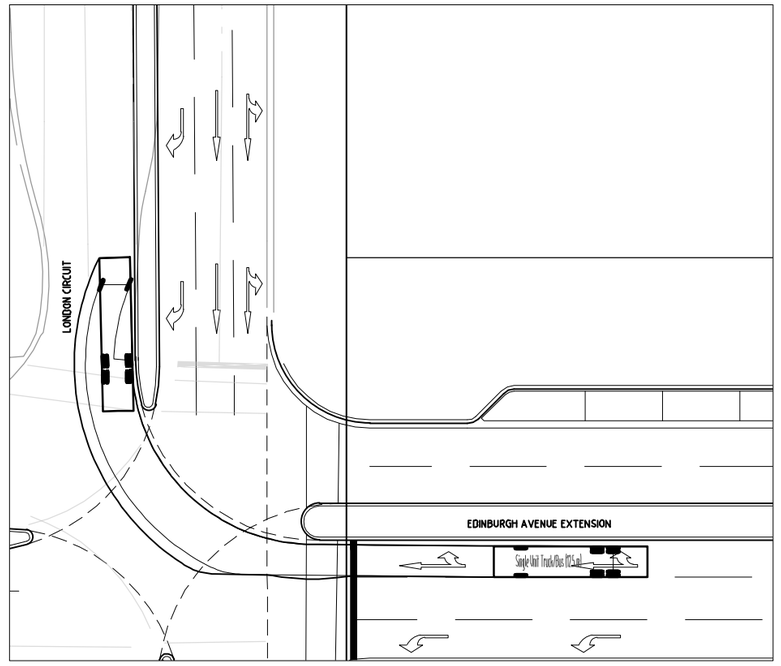
PRELIMINARY

Drg No 305632CR501
Rev A

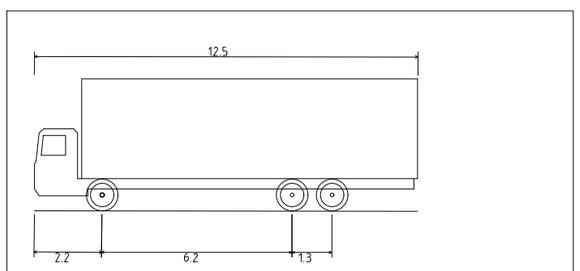
file name 305632CR500_TURN.dwg layout name CR501 plotted by Suzie Gilbert
file location G:\30\305632\Civil\ACAD plot date 24/09/2018 11:43 AM Sheet 21 of 22 Sheets



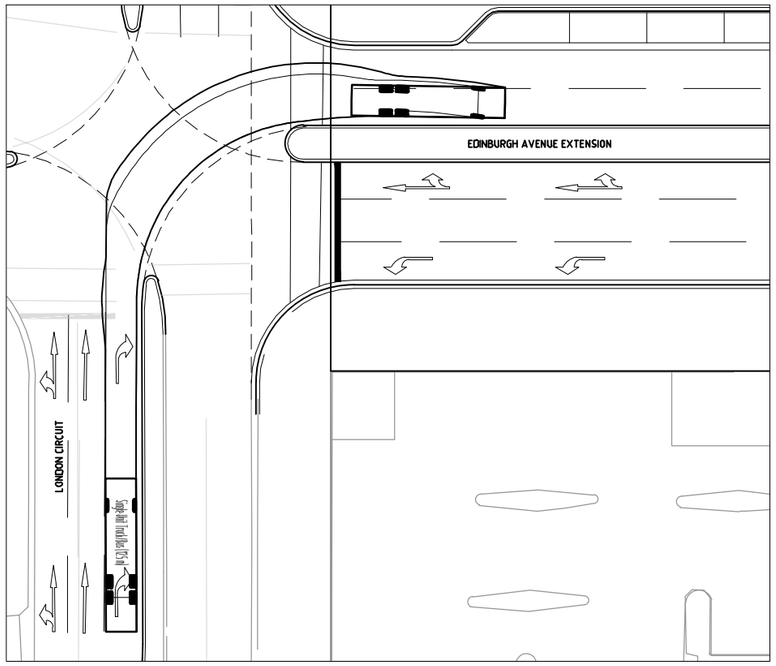
LEFT TURN FROM LONDON CIRCUIT TO EDINBURGH AVENUE EXTENSION



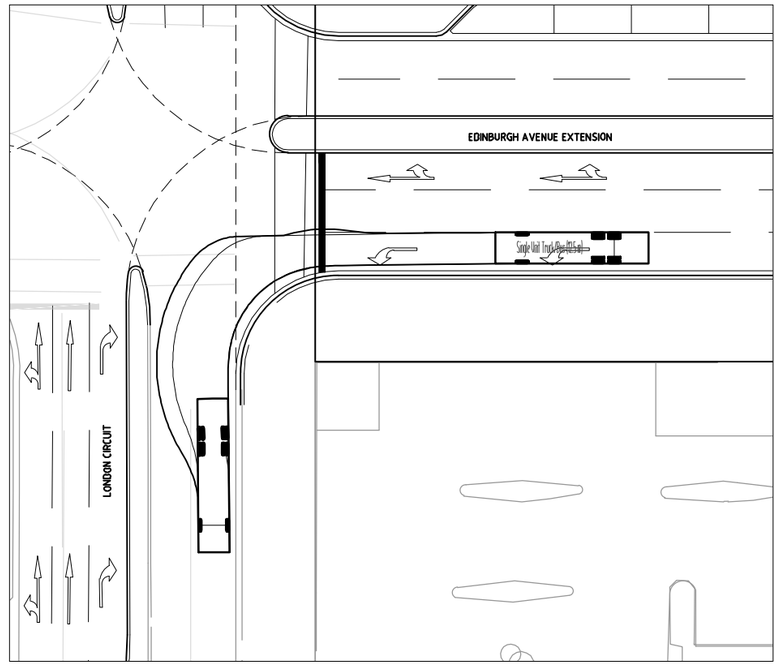
RIGHT TURN FROM EDINBURGH AVENUE EXTENSION TO LONDON CIRCUIT



Single Unit Truck/Bus (12.5 m)	
Overall Length	12.500m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.490m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m



RIGHT TURN FROM LONDON CIRCUIT TO EDINBURGH AVENUE EXTENSION



LEFT TURN FROM EDINBURGH AVENUE EXTENSION TO LONDON CIRCUIT

Rev	Amendments	Approved	Date
A	WORKS APPROVAL	MFB	24-09-18

1:250@A1 SCALE 1:500@A3 — 0 2.5 5 7.5 10 12.5

spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

Designed PIB | Checked BSC
Authorised M B | Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

TURNING MOVEMENTS
SHEET 3

MPG CONSTRUCTIONS

PRELIMINARY Drg No **305632CR502** Rev **A**

file name: 305632CR500 TURN.dwg layout name: CR502 plotted by: Suzie Gilbert
file location: G:\30\305632\Civil\AutoCAD plot date: 24/09/2018 11:44 AM Sheet 22 of 22 Sheets

JOINS LD401

PLANT SCHEDULE - LD400				
CODE	**BOTANICAL NAME**	**COMMON NAME**	**MATURE SIZE**	**ARRANGEMENT**
TREES				
Central median	*Cupressus sempervirens* 'Stricta	Pencil Pine	15 x 1.5m	As shown
Verge	*Platanus orientalis* 'Digitata'	Oriental Plane	15-20 x 10m	As shown
Verge	*Zelkova serrata* 'Green Vase'	Japanese Elm	14 x 10m	As shown
GARDEN BED PLANTING				
Verge (North only)	*Abelia schumannii*	Schumann Abelia	1.5 x 1m	Staggered
Verge	*Juniperus sabina*	Savin juniper	1 x 3m	Staggered
Central median	*Lomandra longifolia* 'Katrinus'	Mat rush	0.6 x 0.8m	Staggered
Verge- Vernon Circle	*Trachelospermum asiaticum*	Asiatic jasmine	0.4 x 3m	Staggered

Granite paving Type 1 (stretcher bond)

Terrabond infill to tree planting bay

Refer to drawing 305632CF200 for Designated Land / Non Designated Land Boundary

Granite paving Type 1

Granite paving Type 3

Single band granite paving Type 2 to edge of garden bed

Granite sets to ends of median

Concrete seating wall with timber battens to top

Granite paving Type 1

Single band of granite paving Type 1 along lot boundary

Granite paving Type 2

Granite paving Type 1

Feature band of Granite paving Type 3

CIRCUIT

LONDON

PLACE

KNOWLES

EDINBURGH

AVENUE

VERNON CIRCLE

VERNON CIRCLE

LEGEND

- PROPOSED TREES *Platanus orientalis* 'Digitata'
- PROPOSED TREES *Cupressus sempervirens* 'Stricta'
- PROPOSED TREES *Zelkova serrata* 'Green Vase'
- GARDEN BED Refer Plant Schedule and Plans
- PAVING TYPE 1 Austral Black granite paving 400 x 600mm
- PAVING TYPE 2 Grandee Lio granite paving 400 x 600mm
- PAVING TYPE 3 Kimberley Storm granite paving 400 x 600mm
- PAVING TYPE 4 Granite sets 100 x 100mm
- PAVING TYPE 5 Charcoal Terrabond
- PAVING TYPE 6 Saw cut charcoal concrete
- GRANITIC GRAVEL
- SEATING WALLS Concrete with timber battens

Rev	Amendments	Approved	Date
	WORKS APPROVAL	SE	24-09-18

H 1:250 SCALE @ A1 0 2.5 5 7.5 10 12.5

spiire
Suite 5, Level 1, 243 Northbourne Avenue
Canberra ACT 2601 Australia 612 6102 1000
spiire.com.au ABN 55 050 029 635

Designed S.EAKIN/S.MURRAY
Checked S.EAKIN
Authorised M.SANGALLI
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL
SURFACES & FINISHES PLANS

MPG CONSTRUCTIONS

PRELIMINARY Drg No **305632LD400** Rev

file name 305632LD001 Section 100.dwg Layout name LD400 plotted by Sheridan Murray
file location G:\30\305632\Landscape\ACAD plot date 24/09/2018 10:40 AM Sheet of Sheets

PLANT SCHEDULE - LD401				
CODE	**BOTANICAL NAME**	**COMMON NAME**	**MATURE SIZE**	**ARRANGEMENT**
TREES				
Verge- London	*Platanus orientalis* 'Digitata'	Oriental Plane	15-20 x 10m	As shown
Verge- Vernon Circle	*Zelkova serrata* 'Green Vase'	Japanese Elm	14 x 10m	As shown
GARDEN BED PLANTING				
Verge- Vernon Circle	*Trachelospermum asiaticum*	Asiatic jasmine	0.4 x 3m	Staggered

LEGEND

- EXISTING TREES
  To be retained
- PROPOSED TREES
  Platanus orientalis 'Digitata'
- PROPOSED TREES
  Zelkova serrata 'Green Vase'
- GARDEN BED
  Refer Plant Schedule and Plans
- PAVING TYPE 1
  Austral Black granite paving
  400 x 600mm
- PAVING TYPE 3
  Kimberley Storm granite paving
  400 x 600mm
- PAVING TYPE 5
  Charcoal Terrabond
- PAVING TYPE 6
  Saw cut charcoal concrete
- GRANITIC GRAVEL

Refer to drawing 305632CF200 for Designated Land / Non Designated Land Boundary

Granite paving Type 3

Terrabond infill to tree planting bay

Granite paving Type 1
(stretcher bond)

Single band of granite paving
Type 1 along back of kerb

CIRCUIT

LONDON

KNOWLES

PLACE

JOINS LD400

21

22

63

Rev	Amendments	Approved	Date
	WORKS APPROVAL	SE	24-09-18

H 1:250 SCALE @ A1 0 2.5 5 7.5 10 12.5

spiire
Suite 5, Level 1, 243 Northbourne Avenue
Canberra ACT 2601 Australia 612 6102 1000
spiire.com.au ABN 55 050 029 635

Designed S.EAKIN/S.MURRAY
Checked S.EAKIN
Authorised M.SANGALLI
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL

SURFACES & FINISHES PLANS

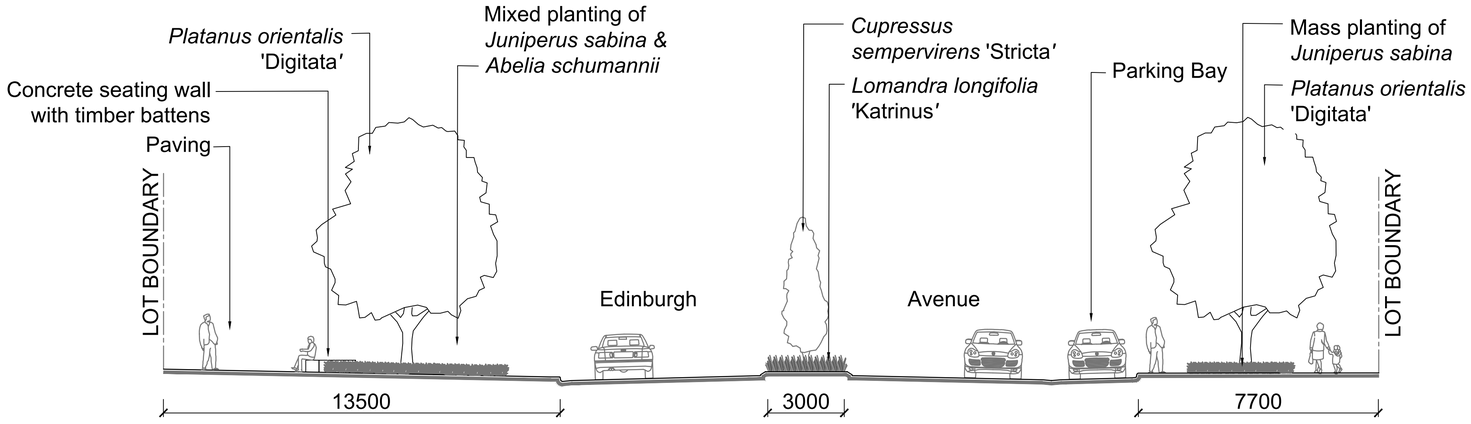
MPG CONSTRUCTIONS

PRELIMINARY

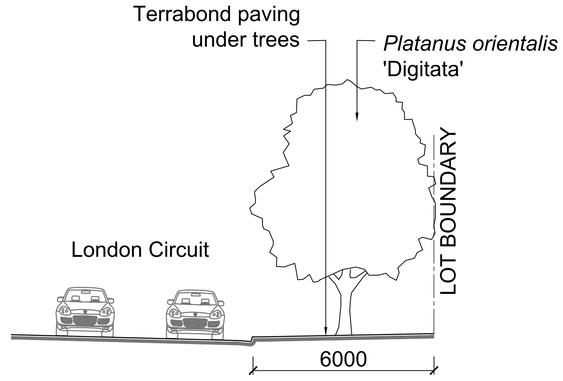
Drg No 305632LD401

Rev

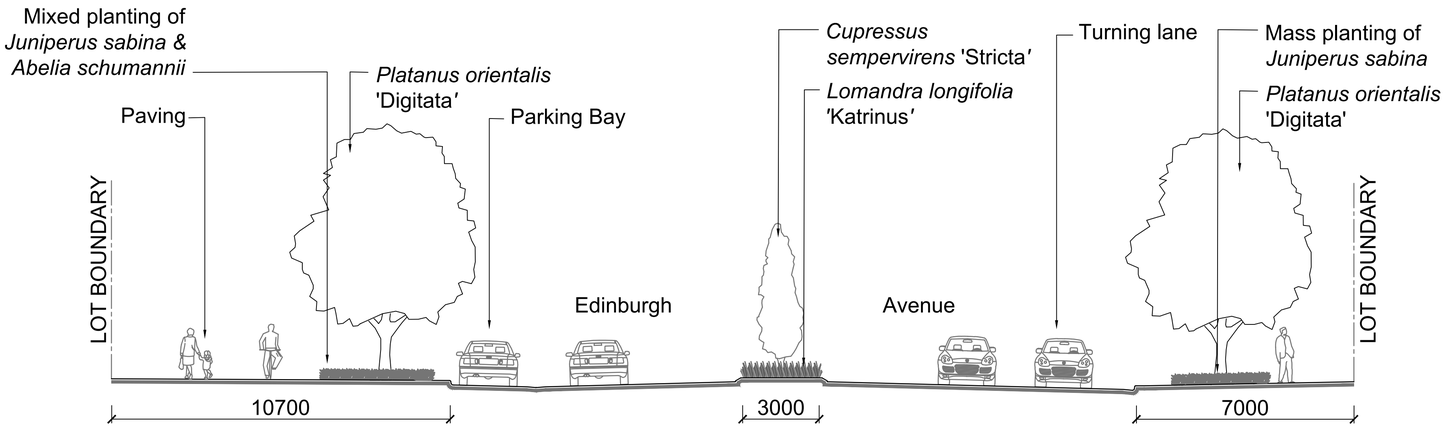
file name 305632LD001 Section 100.dwg layout name LDL01 plotted by Sheridan Murray
file location G:\301\305632\Landscape\ACAD plot date 24/09/2018 10:39 AM Sheet 1 of Sheets



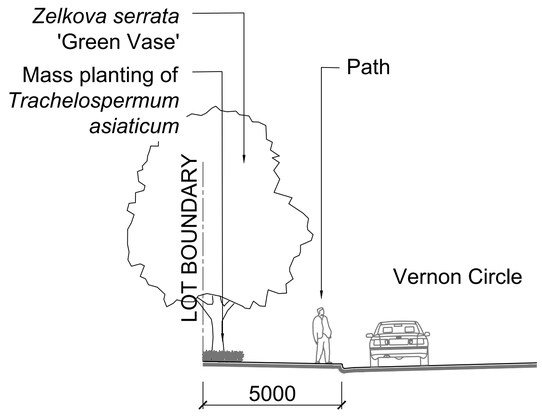
1 LD800 **Edinburgh Avenue (Dual 6.5m Carriageway)**
Section A-A' Scale 1:100 @ A1



3 LD800 **London Circuit north-west bound**
Section C-C' Scale 1:100 @ A1



2 LD800 **Edinburgh Avenue (Dual 6.5m carriageway with turning lane)**
Section B-B' Scale 1:100 @ A1



4 LD800 **Vernon Circle north bound**
Section D-D' Scale 1:100 @ A1

Rev	Amendments	Approved	Date
	WORKS APPROVAL	SE	24-09-18

H 1:100 SCALE @ A1 0 1 2 3 4 5

spiire
Suite 5, Level 1, 243 Northbourne Avenue
Canberra ACT 2601 Australia 612 6102 1000
spiire.com.au ABN 55 050 029 635

Designed S.EAKIN/S.MURRAY
Checked S.EAKIN
Authorised M.SANGALLI
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL
SECTIONS

MPG CONSTRUCTIONS

PRELIMINARY
Drg No **305632LD800**
Rev

TREE SPECIES

- Road verge trees
- Median strip trees

Verge: Oriental Plane
Platanus orientalis
'Digitata'

Centre median: Pencil Pine
Cupressus sempervirens
'Stricta'

Verge: Japanese Elm
Zelkova serrata 'Green Vase'

PLANTING SPECIES

- Garden beds on verges
- Garden beds on median strips

Verge: Savin Juniper
Juniperus sabina

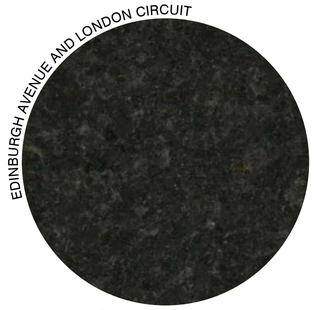
Centre median: Lomandra
Lomandra longifolia
'Katrinus'

Verge: Schumann Abelia
Abelia schumannii'

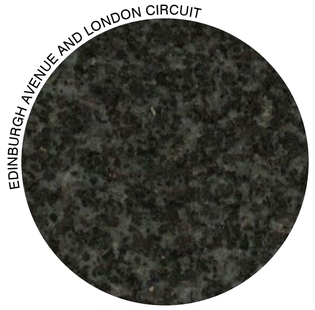
Verge: Asiatic jasmine
'Trachelospermum asiaticum'

PAVING TYPES

- Austral Black granite paving
- Grandee Lio granite paving
- Kimberley Storm granite paving
- Granite sets
- Charcoal Terrabond



Paving Type 1
Austral Black granite paving
400 x 600mm



Paving Type 2
Grandee Lio granite paving
400 x 600mm

Paving Type 3
Kimberley Storm granite
paving 400 x 600mm

Paving Type 4
Granite sets 100 x 100mm

Paving Type 5
Charcoal Terrabond

FURNITURE

- Concrete walls with timber batten tops

Seating walls

Seating walls

Timber batten tops

Rev	Amendments	Approved	Date
	WORKS APPROVAL	SE	24-09-18

spiire
Suite 5, Level 1, 243 Northbourne Avenue
Canberra ACT 2601 Australia 612 6102 1000
spiire.com.au ABN 55 050 029 635

Designed S.EAKIN/S.MURRAY
Checked S.EAKIN
Authorised M.SANGALLI
Date 21-09-18

SECTION 100 CANBERRA CITY
WORKS APPROVAL
MATERIALS PALETTE

MPG CONSTRUCTIONS

PRELIMINARY
Drg No **305632LD900**
Rev

file name:305632LD001 Section 100.dwg layout name:LD900 plotted by:Sheridan Murray
file location:G:\30\305632\Landscape\ACAD plot date:24/09/2018 9:57 AM Sheet of Sheets

LEGEND

ASSESSED EXISTING TREE
Refer to Tree Assessment Schedule
Existing Tree To Be Retained

HIGH VALUE ASSESSED TREE
Refer to Tree Assessment Schedule

E,H,M,P,D

VALUE RANKING
Refer to Tree Assessment Report
E = Exceptional Value
H = High Value
M = Medium Value
P = Poor Value
L = Low Value

EXISTING TREE
To be removed

EXISTING TREE
To be removed

This Tree Management Plan has been prepared by Spiire based on the Tree Assessment Report prepared by envirolinks design dated 16/07/2018

General Data

Species
» Botanical Name
Height, Canopy and Trunk Circumference (Physical Dimensions)
» Height in metres
» Canopy diameter in metres shown as the maximum crown width of the tree or group of trees
» For Single Trunks circumference in metres, measured 1 metre above ground level
» For multiple trunks the cumulative total of each trunk in metres at 1 metre above ground level
Number of Trunks
» Number of trunks at 1 metre above ground level

Quality Ranking

The delineation within the value classification is based on the works being on leased land and therefore under the jurisdiction of the TCCS Urban Tree Unit (UTU). All trees on Government Land are regarded as protected trees and cannot be removed or damaged or works undertaken near them without the approval of the UTU. (The Tree Act and Regulated Tree definitions are therefore applicable to both public and leased sites, unless otherwise advised).

E - Exceptional Value
Trees that are outstanding examples of their species and have significant visual impact. They have most of the following: mature specimens with grand appearance and stature; may have unusual character; may be a rare species; well balanced; cultural heritage importance; significant scientific value; presents a low hazard/safety risk. Significant value within the landscape context of the site and should be preserved.

H - High Value
Trees that are good examples of their species and have significant visual impact. They have most of the following: high arboricultural value or potential; good form; healthy specimens with good size and little or no epicormic shoots or other arboricultural problems. Good value within the landscape context of the site and should be preserved if at all possible.

M - Medium Value
Trees generally complying with most of the following: reasonable form or reasonable current size with good health / growth potential; healthy specimen with significant growth (or with moderate tree surgery a large tree can be modified from fair to good health, ie can carry some deadwood); has value within the landscape context of the site; presents a medium to low hazard/safety risk. Does not justify special attention of construction expenditure but justifies a minor design adjustment to save or could be removed if necessary by approval. Retain if appropriate to land use and future management cost and risks.

P - Poor Value
Trees generally complying with most of the following: specimen with low growth or poor form and possible health problems; trees of little value; presents a high or very high hazard/safety risk. Expendable, remove if necessary - retain if appropriate to land use and future management costs and risks.

L - Low Value
Non-regulated tree under the 2005 Tree Protection Act for trees on leased blocks only. Trees therefore can range from well-established quality trees to poor health small trees of no significance. Some possibly with important landscape impact (e.g. regeneration) or future growth potential to contribute to the landscape in future years. Expendable, remove if necessary - retain if appropriate to land use and future management costs and risks.

D - Dead Tree

Tree Act Status / Protection Status

Tree 'Regulated' Status by Virtue of Size (On - Lease)
Under the Tree Protection Act 2005 a tree is termed a Regulated Tree and is to be protected if it is growing on Urban Leased land and has at least one of:
* A height of 12m or more; or
* A trunk circumference of 1.5m (approx 0.5m in diameter) or more at 1m above ground level; or
* Two or more trunks and the total circumference of all the trunks, 1m above ground level, is 1.5m or more, or
* A minimum crown width of 12m or more, and
* Must be alive - all dead trees have been ranked as Non Protected tree.
* Is not a weed species under the Pest Plant & Animals Declaration 2005

Tree Protected Status
YES - The tree has a dimension that any activity must be assessed under the Tree Protection Act on Leased land; or is on Government land eg. road verge, park, etc as all trees on Government land are protected.
NO - The tree if on Leased land is sufficiently small or declared a Weed Species that it does not require assessment under the Tree Protection Act.
Yes TCCS - Off Lease but often protected as these trees are generally on Government (Unleased) land.

Survey No.	Botanical Name	Height (m)	No. Trunks	Trunk circ. (m)	Canopy dia. (m)	Health and Vigour	Structural defects and decay	Past Damage or root disturbance	Disease or infestation	Stage	Quality Rating	Protected Status
						(0-good, F-fair, P-poor, DW-deadwood, EPI-epicormic growth)	(OC- occluded fork, AGL - Above Ground Level)	(AGL - Above Ground Level)	(AGL - Above Ground Level)	Juvenile (J), Semi-mature (SM), Mature (M), Over mature (OM)	Low (L), Poor (P), Medium (M), High (H), Exceptional (NOTE: Quality Rating also noted with (E) specify an exceptional rating due to heritage listed status)	Unleased Land (Yes - TCCS) Tree Act. (Yes - Y, No - N) - Note: 'N' denotes a tree not regulated due to ACT Declared Weed Species status
1	Platanus acerifolia	7	1	0.56	4	**Fair**	-	-	-	Semi - Mature	Low	No
2	Platanus acerifolia	8	1	0.64	6	**Fair**	-	-	-	Semi - Mature	Low	No
3	Platanus acerifolia	8	1	0.69	6	**Fair**	-	-	-	Semi - Mature	Low	No
4	Platanus acerifolia	6	1	0.54	4.5	**Fair**	Stunted growth	-	-	Semi - Mature	Low	No
32	Platanus orientalis	7	1	0.7	7	**Good**	-	-	-	Mature	Poor	Yes TCCS
33	Platanus acerifolia	10	1	0.9	9	**Good**	-	-	-	Mature	Poor	Yes TCCS
63	Platanus orientalis	10	1	0.89	5	**Fair -** Major EPI	-	-	-	Semi - Mature	Low	No
64	Platanus orientalis	8	1	0.87	5	**Fair -** Major EPI	-	-	-	Semi - Mature	Low	No
65	Platanus orientalis	9	1	1.07	8	**Good to Fair -** Major EPI	Lopsided canopy	Past limb removal. Major roots exposed at base of tree	-	Mature	Low	No
66	Platanus acerifolia	8	1	0.7	5	**Fair -** Major EPI and minor DW	-	-	-	Semi - Mature	Low	No
67	Platanus acerifolia	7	1	0.49	3	**Fair -** Major DW	Stunted growth	-	-	Semi - Mature	Low	No
68	Platanus acerifolia	8	1	0.83	5	**Fair**	Good Form	-	-	Semi - Mature	Low	No
149	Platanus acerifolia	10.5	1	0.7	6	**Good**	Good form	Past limb removal	-	Mature	Medium -	Yes TCCS
150	Platanus orientalis	13	1	0.9	10	**Good**	-	-	-	Mature	Medium -	Yes TCCS
151	Platanus acerifolia	10.5	1	0.7	6.5	**Good**	Poor form	-	-	Mature	Poor	Yes TCCS
152	Platanus orientalis	9	1	0.5	4	**Good**	-	-	-	Mature	Poor	Yes TCCS
153	Platanus orientalis	11	1	0.7	6	**Fair -** DW and EPI	Lopsided canopy	-	-	Mature	Poor	Yes TCCS
154	Platanus orientalis	9	1	0.6	7	**Good**	-	-	-	Mature	Medium -	Yes TCCS
155	Platanus orientalis	8	1	0.5	6	**Fair -** EPI	-	-	-	Mature	Poor	Yes TCCS
156	Platanus orientalis	7	1	0.5	2	**Fair -** Major EPI	Stunted growth	-	-	Mature	Poor	Yes TCCS
159	Platanus orientalis	10	1	0.6	5	**Fair -** Major EPI	-	-	-	Mature	Poor	Yes TCCS
164	Platanus acerifolia	13	1	1.7	12	**Good**	-	-	-	Mature	High	Yes TCCS
165	Platanus acerifolia	13	1	2.1	13	**Good**	-	-	-	Mature	High	Yes TCCS
166	Platanus acerifolia	13	1	1.8	12	**Good -** Some minor EPI	-	-	-	Mature	High	Yes TCCS
239	Ulmus procera	11	1	0.7	5	**Fair**	-	-	-	Mature	Low	No
240	Ulmus procera	10	1	1.4	10	**Fair -** Major EPI and DW	-	Exposed roots	-	Mature	Low	No
254	Ulmus procera	11.5	1	1.3	8	**Fair -** Major EPI and DW	-	-	-	Mature	Low	No
255	Ulmus procera	11.5	1	1.3	12	**Fair -** Major EPI and DW	Past limb failures decay	Exposed Roots	-	Mature	Poor	Yes
256	Ulmus procera	12.5	1	1.4	13	**Fair**	Decay in lower trunk and OC	-	Past insect attack	Mature	Poor	Yes
257	Ulmus procera	11	1	1.47	12	**Good -** EPI	OC	-	-	Mature	Medium	Yes
258	Ulmus procera	12	1	1.37	9	**Fair -** Major EPI	-	-	-	Mature	Poor	Yes
259	Ulmus procera	11	1	1.28	10	**Good -** EPI	OC	-	-	Mature	Low	Yes
263	Gleditsia sp.	8	1	0.64	8	**Good**	Leaning	-	-	Mature	Low	No
264	Gleditsia sp.	7	1	0.7	6	**Good to Fair -** EPI and DW	-	-	-	Mature	Low	No
265	Gleditsia sp.	6	1	0.74	8	**Good to Fair -** EPI and DW	-	-	-	Mature	Low	No
300	Platanus orientalis	10	1	0.6	6	**Fair -** Major EPI	-	Past limb failure	-	Mature	Poor	Yes TCCS
301	Platanus orientalis	13	1	1.23	10	**Good**	-	-	-	Mature	High	Yes TCCS
302	Platanus acerifolia	12	1	1.9	13	**Good**	-	-	-	Mature	High	Yes TCCS
303	Ulmus procera	11	1	1.4	9	**Fair -** Major EPI and DW	-	-	-	Mature	Low	No

Rev	Amendments	Approved	Date
-	WORKS APPROVAL	SE	24-09-18

NOT TO SCALE

N

spiire
Suite 5, Level 1, 243 Northbourne Avenue
Canberra ACT 2601 Australia 612 6102 1000
spiire.com.au ABN 55 050 029 635

Designed S.EAKIN/S.MURRAY
Checked S.EAKIN
Authorised M.SANGALLI
Date 24-09-18

SECTION 100 CANBERRA CITY WORKS APPROVAL
TREE MANAGEMENT PLAN

MPG CONSTRUCTIONS

PRELIMINARY

Drg No **305632 TMP 01**
Rev

file name 305632\D002 Section 100.dwg layout name LDTMP plotted by Sheridan Murray
file location G:\30\305632\Landscape\CAD plot date 24/09/2018 9:57 AM Sheet of Sheets

APPENDIX B – AUTHORITY CORRESPONDENCE

Max Bomben

From: Max Bomben
Sent: Friday, August 3, 2018 2:49 PM
To: Joseph, Gabriel
Cc: 'Benjamin Cargill'
Subject: Section 100 - Edinburgh Ave Extension - Long section
Attachments: EDINBURGH AVE LONG SECTION.PDF; 60187159-drg-20-rd1201 A[1].pdf; MMD-325342-C-DR-FSP-LS-0001 Rev P2.pdf

Good afternoon Gabriel,

Attached is a copy of our proposed long section for the extension of Edinburgh Avenue for TCCS' consideration and approval. We are of the view that this design adequately addresses the clearance/bottoming out issues associated with the extension of Edinburgh Avenue as a proposed Bus Route. You will note that this long section requires minimal regrading works (90 mm lift outer kerb edge) at the intersection of London Circuit and Edinburgh Ave when compared to the proposed designs by AECOM/Mott MacDonald (drawings attached for comparison).

The proposed AECOM/Mott MacDonald design requires a significant amount of regrading works (700 mm lift – outer kerb edge) at the intersection of London Circuit due to the proposed long section associated with the extension of Edinburgh Ave. It would appear that design profile (3.13%) across the south bound lane of London Circuit is driven by the proposed long section for the extension of Edinburgh Ave, which incorporates the "flattening-out" of the longitudinal grade from 8% to 3% between Chainage 510 and Chainage 570.

At our previous meeting with TCCS there was mention that the regrading works along London was necessary due to stormwater issues along London Circuit and that the Territory had already upgraded its stormwater system to reflect the proposed regrading works. We are not sure that this would be the case. We are of the view the regrading works along London Circuit is directly related to the longitudinal section as proposed by AECOM/Mott MacDonald.

We seek an urgent meeting with TCCS to clarify the above.

We are of the view that our design meets the design intent for Section 100 and therefore it should be approved in principal.

Should you have any further quires regarding the above please do not hesitate to contact me.

Max

Max Bomben
General Manager ACT
Civil Engineering

spiire

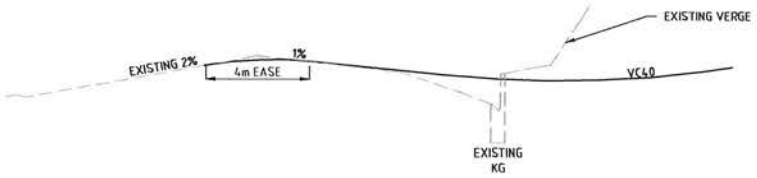
Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'Connor ACT 2602

t +61 2 6102 1007 +61 412 627 428
spiire.com.au

Inspiiring people and places

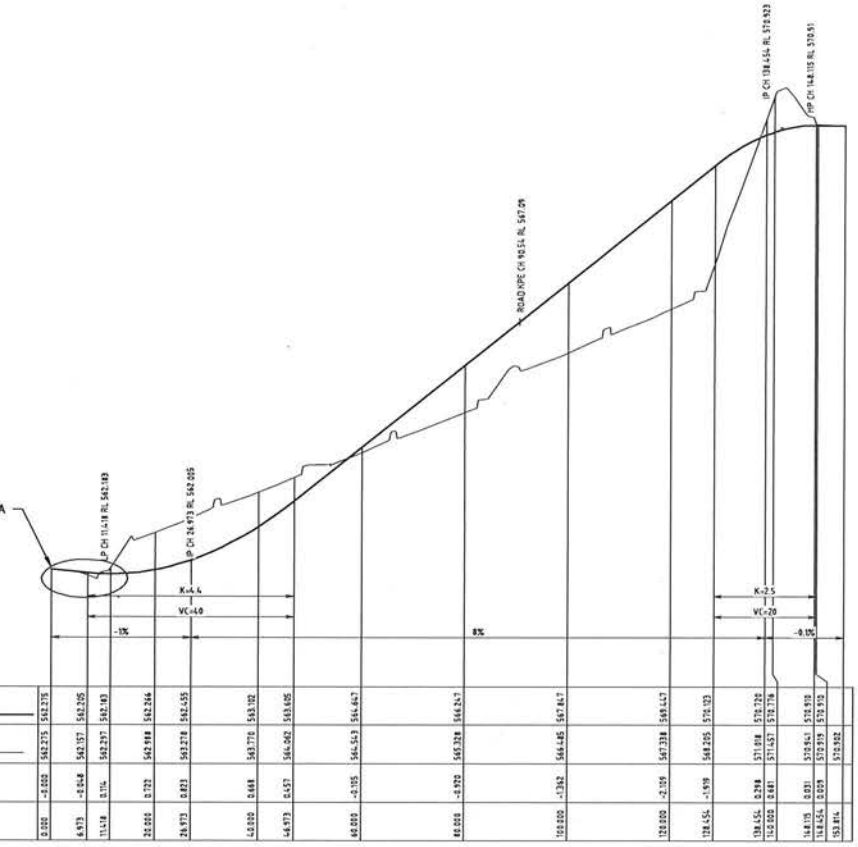
VIC | NSW | & NOW ACT

Please consider the environment before printing.



DETAIL A

H 1:100 SCALE @ A1
V 1:10



EDINBURGH AVENUE

FOR DISCUSSION PURPOSES ONLY

DESIGN CRITERIA

DESIGN SPEED	50km/h
K -SAG	3.93
MAX GRADE -BUS	8.00%

Rev	Amendments	Approved	Date
A	PRELIMINARY ISSUE - FOR DISCUSSION PURPOSES ONLY	N/A	31-07-18

H 1:500 SCALE @ A1
V 1:50

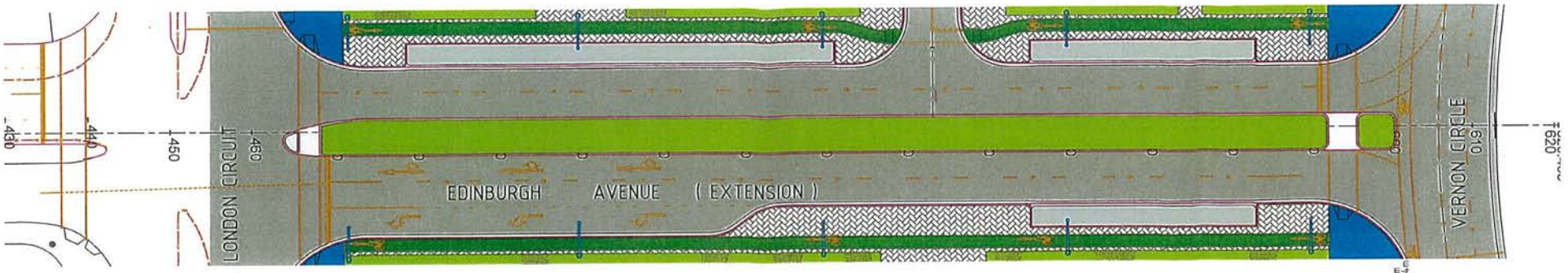
spiire
Suite 5 level 1, 243 Northbourne Avenue
Lyneham ACT 2602 T 02 61025 1007
spiire.com.au ABN 55 050 029 635

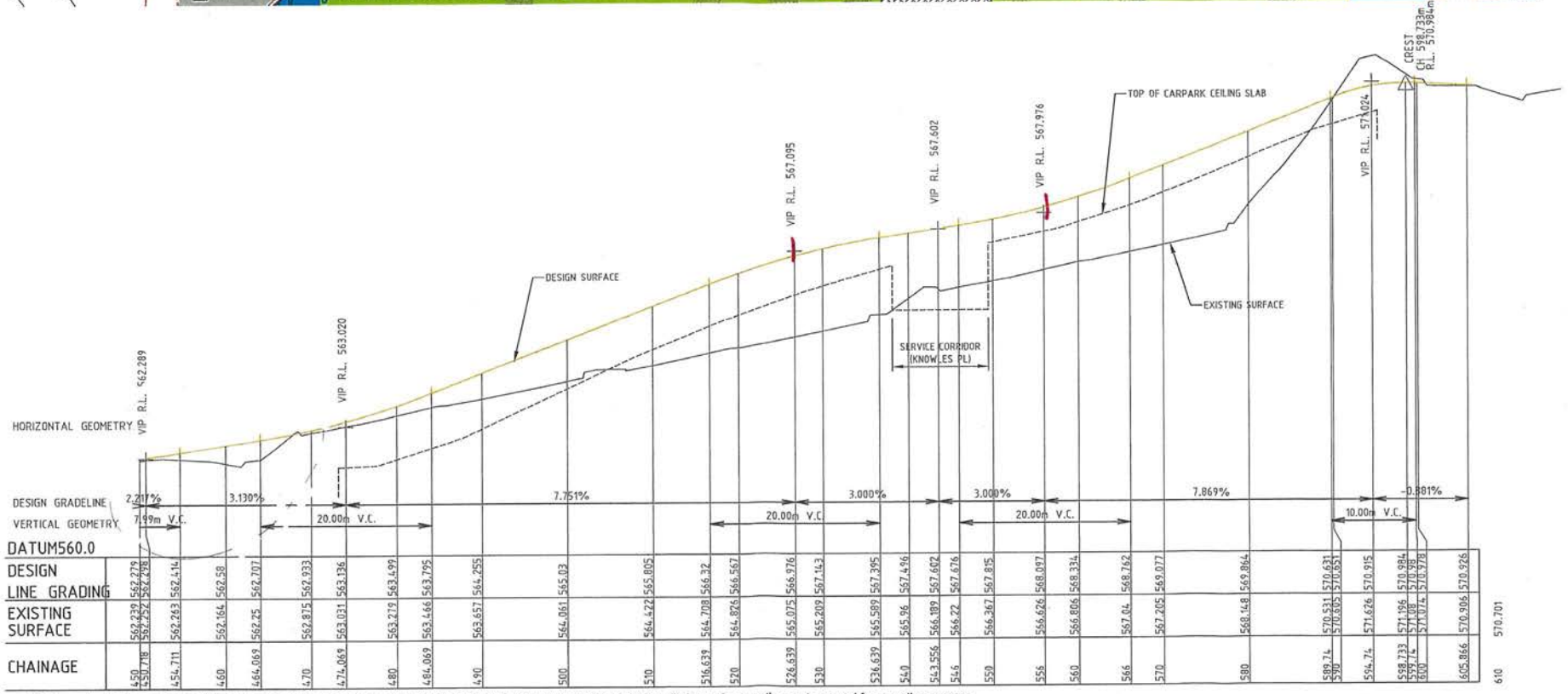
Designed PIB
Checked
Authorised
Date

SECTION 100 CANBERRA CITY
CIVIL DESIGN & SUPERINTENDENCE
DEVELOPMENT APPLICATION
LONGDITUDINAL SECTIONS SHEET 1 OF 2

MORRIS PROPERTY GROUP

PRELIMINARY Drg No 305632CR300 Rev A





Mott MacDonald
Level 6, SAP House, 224 Bunda St
Canberra City ACT 2601
PO Box 224 Civic Square ACT 2608
Australia
T +61 (0)2 6253 1555
F
W www.mottmac.com.au

Client
ACT Government Economic Development
ON BEHALF OF
City West Property Holdings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	28/04/14	TTN	TAMS SUBMISSION		
P1	08/11/13		INITIAL DRAWING		

Title
EDINBURGH AVENUE EXTENSION
LONGITUDINAL SECTION
EDINBURGH AVENUE

Drawn		T.NELL
Checked		T.NELL
Approved		M.BREEN

Scale at A3
[H] 1:500 [V] 1:100

Drawing Number
MMD-325342-C-DR-FSP-LS-0001

Security	Status	Rev
	PRE	P2

Max Bomben

From: Max Bomben
Sent: Tuesday, August 14, 2018 6:31 AM
To: Joseph, Gabriel
Cc: Bell, Jeff; Benjamin Cargill
Subject: RE: Edinburgh Avenue Extension - Stormwater Investigation [SEC=UNCLASSIFIED]
Attachments: scan_gabriel joseph_2018-08-08-14-01-15.pdf; Extension of Edinburgh Ave_DR Design Report_Stage 1_With Correspondence.pdf; Extension of Edinburgh Ave_Revised PSP Design Report.pdf

Hi Gabriel,

I've read the attached reports and its clear that the reason why AECOM is proposing stormwater works along London Circuit is because of the proposed regrading works at the intersection Edinburgh Ave (Extension) and London Circuit.

As noted previously it's AECOM's longsection for the extension of Edinburgh Ave which is driving the regraded works along London Circuit. The existing cross-fall of the south bound lane of London Circuit varies from -1% to -3%. AECOM's design proposes a 3% cross-fall transition at the intersection, hence the extensive regrading works along London Circuit.

Spiire's design for the extension Edinburgh Ave retains the existing cross-fall along the sound bound lane of London Circuit therefore avoiding any significant and unnecessary regarding works along London Circuit.

More than happy to discuss further at Friday's Meeting.

Max

Max Bomben
General Manager ACT
Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 412 627 428
spiire.com.au

Inspiiring people and places
VIC | NSW | & NOW ACT

From: Joseph, Gabriel <Gabriel.Joseph@act.gov.au>
Sent: Thursday, 9 August 2018 1:01 PM
To: Max Bomben <Max.Bomben@spiire.com.au>
Cc: Bell, Jeff <Jeff.Bell@act.gov.au>
Subject: Edinburgh Avenue Extension - Stormwater Investigation [SEC=UNCLASSIFIED]

Max

I was able to find these reports. Please read the report and let me know whether your proposal will not compromise any of the assumptions in the previous design. If it does, then what are the impacts and how do we rectify these.

Thanks

Regards

GABRIEL JOSEPH | FIEAust CPEng NER
SENIOR MANAGER | DEVELOPMENT REVIEW & COORDINATION
CAPITAL WORKS & DEVELOPMENT SUPPORT | City Planning and Infrastructure|
City Services | Transport Canberra and City Services Directorate | ACT Government
Phone 02 6207 6581 | Email: gabriel.joseph@act.gov.au
Level 1, 490 Northbourne Ave – WOTSO Building, Dickson| Locked bag 200, Civic Square, ACT 2608 | www.act.gov.au

Connected services for the people of Canberra

From: Joseph, Gabriel [mailto:gabriel.joseph@act.gov.au]
Sent: Wednesday, 8 August 2018 2:02 PM
To: Joseph, Gabriel <Gabriel.Joseph@act.gov.au>
Subject: Your scan (Scan to My Email)

Max Bomben

From: Allen, Craig <Craig.Allen@iconwater.com.au>
Sent: Tuesday, August 28, 2018 8:48 AM
To: Benjamin Cargill
Subject: RE: Section 100 Servicing Meeting

Thanks Ben,

Our preference is not having any watermain within a leased block, but if it is absolutely necessary and the only option we will have to consider it. It may be worthwhile touching base with our building approvals team directly to confirm if they will be ok with the easement and surrounding assets/access if you have an indicative typical section and plan of the proposed alignment. Email: BAsubmission_watersewer@iconwater.com.au.

The building approval guides provide information on access requirements and pipe protection envelope (4m wide for DN150 watermain). http://www.iconwater.com.au/Developers-and-Renovators/Building-approval-guides.aspx

You likely already have this information but I like to be proactive on encouraging the design down a path Icon Water can be happy with from the beginning.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Tuesday, 28 August 2018 8:33 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hey Craig,

Just an update after a meeting with Emergency Services regarding Section 100.

We will now run the main through the middle of the site and create the necessary easements as ESA will require this service. We will then take Stages 2, 3 & 4 from this side to avoid being anywhere near the old 675mm steel main.

Will keep you updated as to revised water calculations once I get the GFA's from the architects.

Regards,
Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'Connor ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au


Please consider the environment before printing.

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Monday, 27 August 2018 2:25 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Have you provided updated water network calculations yet for the City S100 site as per below email request?

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Allen, Craig
Sent: Friday, 17 August 2018 3:33 PM
To: 'Benjamin Cargill' <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Thank you for double checking the high rise for comparison, I think 3 storeys is borderline high rise/low rise and the more conservative option should be used.

During our verification of the sewer calculations attached we note the latest standards haven't been used to determine the flow rates.
I suggest a review of the calculations is undertaken, specifically related to the PCC (L/EP/Day) and PWWF. These are the major differences.

I've undertaken recalculation based on the latest formulae and PWWF for Stages 1,2 & 3 ~ 12.8L/s and for Stage 4 ~ 3.6L/s. Can you please verify the calculations and provide updated figures. In the meantime we are checking these numbers against the dynamic modelling for the area.

Unfortunately I don't think a final capacity response will be achieved on Monday to facilitate potholing on Tuesday. Will keep you updated on Monday.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 17 August 2018 8:35 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Morning Craig,

Apologies I was interstate yesterday.

I was trying to find an definition of high rise in the spec, the building is only going to be 3 stories of apartments hence why I used the low rise block area. However, I have requested the GFA numbers from the architects to do it both ways for you.

With regards to the block area for each stage please see below. In round figures the site is 21,000m2.

m^2	Stage
9,528.25	1
3,347.85	4
4,450.80	3
3,339.99	2
20,666.89	Total

Let me know if you need anything further. I will be in and out of the office all day but feel free to call my mobile if needed.

Many thanks for the prompt responses to date.

Regards,
Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'Connor ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Thursday, 16 August 2018 10:42 AM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

I'm having a look at the calculation basis below and I believe you should calculate the residential based on floor area instead of block area if these are high rise flats.

Can you please provide the block area for each stage? I'm trying to verify the calculations undertaken by THCS and Spiire to assist the modelling team in providing a prompt answer.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Wednesday, 15 August 2018 12:49 PM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hey Craig,

Apologies I missed it last week. Refer attached based on Table 1W.1 & the attached development Matrix.

For the commercial areas I used the 1.8, 60% & 70% based on the floor area. For the residential I have used 1.5, 100% & 70% based on the block area. For the retail areas I used the future development details unknown and the 1.5, 100% & 70% as the table didn't really have a retail type section but let me know if you want to use something else.

Let me know if you required anything further.

Regards,
Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'Connor ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Wednesday, 15 August 2018 11:40 AM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Have you responded to the below email? I think the modelling team are partly awaiting this information to provide a consolidated answer. I am following up if they can provide the specific sewer capacity response now.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

icon WATER

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Allen, Craig
Sent: Monday, 6 August 2018 11:09 AM
To: 'Benjamin Cargill' <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

The hydraulic modelling team in Icon Water are working on this, the attached layout and connection points is very helpful to the team.

Can you also provide the water peak demand flow rate calculation based on Icon Water standards or GFA broken down into each type of development (residential/commercial/etc) with the number of storeys for each stage. The attached loading calcs does not quite contain all of this information.

Comments on the layout proposed and some preliminary guidance on addressing temporary/early connections for sewer and water can be provided tomorrow.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 3 August 2018 10:10 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Craig,

How is the below going?

We are doing all of the offsite works and really need to know our connection points, particularly for sewer given the two options are challenging either way so that we can keep this project moving.

Regards,
Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Monday, 23 July 2018 9:25 AM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Thanks Ben,

I've passed this onto the modelling team for incorporation into the assessment.

Will let you know tomorrow when we will have the results.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

icon WATER

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 20 July 2018 4:33 PM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hey Craig,

As discussed refer attached for the indicative connection locations for sewer and water.

Stage 1 will definitely go first but the order of Stage 2, 3 & 4 is still being determined. The Stage 2, 3 & 4 water connections will come off London Circuit, but stage 1 will come off Knowles Place. The Stage 1 & 2 sewer connections will come off the Edinburgh Ave extension and Stages 3 & 4 will come of London Cct.

If you have any questions let me know.

Regards,
Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Friday, 20 July 2018 12:54 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: FW: Section 100 Servicing Meeting

Hi Ben,

Any updates on the below requested information?

Kind Regards,
Craig Allen

From: Allen, Craig
Sent: Tuesday, 17 July 2018 11:55 AM
To: 'Benjamin Cargill' <Benjamin.Cargill@spiire.com.au>; David Tennant <david.tennant@thcs.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Thank you Ben,

Can you please also provide any further indicative proposed connection locations/layout of the later stages (if applicable) and construction timing of the stages.

Our strategic modelling team is now over capacity for the next week and unable to respond by Monday, instead we are looking at the earliest response timing being late next week.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Tuesday, 17 July 2018 10:55 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>; David Tennant <david.tennant@thcs.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Craig,

Refer attached for the overall development details. Nabin previously indicated a week to undertaking the review of the Eps/demands hence the proposed date of next Monday.

Let me know if this is not achievable.

Regards,
Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au


Please consider the environment before printing.

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Tuesday, 17 July 2018 10:52 AM
To: David Tennant <david.tennant@thcs.com.au>; Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Thank you for the development yield for Stage 1, can you please provide the overall development EP/demands and breakdown of staging with an indicative timeline for development.

We're happy to meet and discuss the temporary sewer/water connections for site compounds/display suites next week although we will not be able to discuss limitations of the network until we have the above requested information and sufficient time to undertake the modelling.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: David Tennant <david.tennant@thcs.com.au>
Sent: Monday, 16 July 2018 4:26 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Dahal, Nabin <Nabin.Dahal@iconwater.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

All,

Please see attached updated diagram following discussions in today's meeting, together with calculation details below.

Sewer Loading Calculations		Stage 1
Residential	**No Apartments**	**319**
	EP Rate (EP/unit)	2.0
	EP (residential)	**638**
Commercial	Commercial Area (m^2 NLA)	392
	Population Density (m^2 per person)	10
	# of Employees	**39**
	EP Rate	0.3
	Resturant Area (m^2)	409
	Population Density (m^2 per seat)	3
	Resturant Seats (No)	**136**
	EP Rate (EP/seat)	0.1
	EP (commercial)	**25.4**
Sewer Loading	**Total EP (TEP)**	**655.0**
	ADWF (l/s)	2.27
	PDWF (l/s)	6.93
AS3500.2 Loading	Total Number of Fixtures	1022
	Fixture Loading Units	6010
	Required tie size	225 @ 2.0%

Regards
David Tennant

From: Benjamin Cargill [mailto:Benjamin.Cargill@spiire.com.au]
Sent: Monday, 16 July 2018 3:28 PM
To: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Allen, Craig <Craig.Allen@iconwater.com.au>; David Tennant <david.tennant@thcs.com.au>
Subject: RE: Section 100 Servicing Meeting

Nabin,

Refer attached for the S100 Sewer/Water numbers for Stage 1 of Section 100 from the on-block hydraulic consultant.

Could we please reschedule our meeting to Monday 23rd July 2018 at 10:00am? We will also bring along Dave Tennant (copied into this email) who is undertaking the on block building hydraulics.

We also wish to discuss temporary sewer/water connections for site compounds/display suites during this meeting.

Let me know if you have any questions.

Regards,
Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au


Please consider the environment before printing.

From: Dahal, Nabin [mailto:Nabin.Dahal@iconwater.com.au]
Sent: Friday, 13 July 2018 1:42 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi All,

Just to clarify that Icon Water hasn't receive the EP to review. The cancelation is due to the consultant not provide the EP on agreed time and not due to Icon Water taking longer time to review it.

Please give me a call if you want to clarify this.

Regards,

Nabin Dahal
Senior Technical Officer, Developer Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6011
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

-----Original Appointment-----
From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 13 July 2018 9:59 AM
To: Dahal, Nabin; Mark Wallis; Max Bomben
Cc: Allen, Craig
Subject: Canceled: Section 100 Servicing Meeting
When: Monday, 16 July 2018 10:00 AM-11:00 AM (UTC+10:00) Canberra, Melbourne, Sydney.
Where: ICON Water Offices - Mitchell
Importance: High

All,
Meeting cancelled as per ICONs request due to not have sufficient time to review EPs prior to the meeting time.

Regards,
Ben

the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****

Max Bomben

From: Allen, Craig <Craig.Allen@iconwater.com.au>
Sent: Friday, August 24, 2018 9:38 AM
To: Benjamin Cargill
Subject: RE: Section 100 Servicing Meeting
Attachments: ICON Water Sewer Calcs.pdf; 03082018100912-0001.pdf

Hi Ben,

Icon Water can confirm there is sufficient capacity in the sewer network for connection of the proposed development stages 1, 2 and 3 to the DN225 sewer main on Edinburgh Avenue / Marcus Clarke Street Intersection.

This will need to be reconfirmed with Icon Water if the flow increases.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Tuesday, 21 August 2018 12:22 PM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Thanks Craig,

I've attached my calculations and used a $I_{1,2}$ of 19.9 using a latitude and longitude of 35.28218, 149.12616

This results in the following PDWF

Stage 1: 5.61L/s
Stage 2: 4.63L/s
Stage 3: 4.64L/s
Stage 4: 3.77L/s

More than happy to send through the spreadsheet used to calculate it if you wish.

Regards,
Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'Connor ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au


Please consider the environment before printing.

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Tuesday, 21 August 2018 11:10 AM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

I used the employee data given on the attached calculations from THCS. 300 EP per Ha is typically used internally by Icon Water as a conservative figure unless detailed assessment is required.

Internally Icon Water have a new template calculation spreadsheet. When checking the formula related to this item I noticed an error in the EP calculation for commercial so your flows will be a little bit lower than mine (about 0.3L/s less on Stages 1, 2 and 3 combined.

Kind Regards,
Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Tuesday, 21 August 2018 10:45 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hey Craig,

What EP did you adopt for the Shops and Offices to get the numbers below? Given there is no employee number it says it is determine by ICON water.

Regards,
Benjamin Cargill
Associate

Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'Connor ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Friday, 17 August 2018 3:33 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Thank you for double checking the high rise for comparison, I think 3 storeys is borderline high rise/low rise and the more conservative option should be used.

During our verification of the sewer calculations attached we note the latest standards haven't been used to determine the flow rates.
I suggest a review of the calculations is undertaken, specifically related to the PCC (L/EP/Day) and PWWF. These are the major differences.

I've undertaken recalculation based on the latest formulae and PWWF for Stages 1,2 & 3 ~ 12.8L/s and for Stage 4 ~ 3.6L/s. Can you please verify the calculations and provide updated figures. In the meantime we are checking these numbers against the dynamic modelling for the area.

Unfortunately I don't think a final capacity response will be achieved on Monday to facilitate potholing on Tuesday. Will keep you updated on Monday.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

icon WATER

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 17 August 2018 8:35 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Morning Craig,

Apologies I was interstate yesterday.

I was trying to find an definition of high rise in the spec, the building is only going to be 3 stories of apartments hence why I used the low rise block area. However, I have requested the GFA numbers from the architects to do it both ways for you.

With regards to the block area for each stage please see below. In round figures the site is 21,000m2.

m^2	Stage
9,528.25	1
3,347.85	4
4,450.80	3
3,339.99	2
20,666.89	Total

Let me know if you need anything further. I will be in and out of the office all day but feel free to call my mobile if needed.

Many thanks for the prompt responses to date.

Regards,
Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'Connor ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Thursday, 16 August 2018 10:42 AM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

I'm having a look at the calculation basis below and I believe you should calculate the residential based on floor area instead of block area if these are high rise flats.

Can you please provide the block area for each stage? I'm trying to verify the calculations undertaken by THCS and Spiire to assist the modelling team in providing a prompt answer.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Wednesday, 15 August 2018 12:49 PM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hey Craig,

Apologies I missed it last week. Refer attached based on Table 1W.1 & the attached development Matrix.

For the commercial areas I used the 1.8, 60% & 70% based on the floor area. For the residential I have used 1.5, 100% & 70% based on the block area. For the retail areas I used the future development details unknown and the 1.5, 100% & 70% as the table didn't really have a retail type section but let me know if you want to use something else.

Let me know if you required anything further.

Regards,

Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'Connor ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Wednesday, 15 August 2018 11:40 AM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Have you responded to the below email? I think the modelling team are partly awaiting this information to provide a consolidated answer. I am following up if they can provide the specific sewer capacity response now.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

icon WATER

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Allen, Craig
Sent: Monday, 6 August 2018 11:09 AM
To: 'Benjamin Cargill' <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

The hydraulic modelling team in Icon Water are working on this, the attached layout and connection points is very helpful to the team.

Can you also provide the water peak demand flow rate calculation based on Icon Water standards or GFA broken down into each type of development (residential/commercial/etc) with the number of storeys for each stage. The attached loading calcs does not quite contain all of this information.

Comments on the layout proposed and some preliminary guidance on addressing temporary/early connections for sewer and water can be provided tomorrow.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 3 August 2018 10:10 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Craig,

How is the below going?

We are doing all of the offsite works and really need to know our connection points, particularly for sewer given the two options are challenging either way so that we can keep this project moving.

Regards,
Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Monday, 23 July 2018 9:25 AM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Thanks Ben,

I've passed this onto the modelling team for incorporation into the assessment.

Will let you know tomorrow when we will have the results.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 20 July 2018 4:33 PM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hey Craig,

As discussed refer attached for the indicative connection locations for sewer and water.

Stage 1 will definitely go first but the order of Stage 2, 3 & 4 is still being determined. The Stage 2, 3 & 4 water connections will come off London Circuit, but stage 1 will come off Knowles Place. The Stage 1 & 2 sewer connections will come off the Edinburgh Ave extension and Stages 3 & 4 will come of London Cct.

If you have any questions let me know.

Regards,
Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Friday, 20 July 2018 12:54 PM

To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: FW: Section 100 Servicing Meeting

Hi Ben,

Any updates on the below requested information?

Kind Regards,
Craig Allen

From: Allen, Craig
Sent: Tuesday, 17 July 2018 11:55 AM
To: 'Benjamin Cargill' <Benjamin.Cargill@spiire.com.au>; David Tennant <david.tennant@thcs.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Thank you Ben,

Can you please also provide any further indicative proposed connection locations/layout of the later stages (if applicable) and construction timing of the stages.

Our strategic modelling team is now over capacity for the next week and unable to respond by Monday, instead we are looking at the earliest response timing being late next week.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Tuesday, 17 July 2018 10:55 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>; David Tennant <david.tennant@thcs.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Craig,

Refer attached for the overall development details. Nabin previously indicated a week to undertaking the review of the Eps/demands hence the proposed date of next Monday.

Let me know if this is not achievable.

Regards,
Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

Inspiiring people and places
VIC | NSW | & NOW ACT

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Tuesday, 17 July 2018 10:52 AM
To: David Tennant <david.tennant@thcs.com.au>; Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Thank you for the development yield for Stage 1, can you please provide the overall development EP/demands and breakdown of staging with an indicative timeline for development.

We're happy to meet and discuss the temporary sewer/water connections for site compounds/display suites next week although we will not be able to discuss limitations of the network until we have the above requested information and sufficient time to undertake the modelling.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: David Tennant <david.tennant@thcs.com.au>
Sent: Monday, 16 July 2018 4:26 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Dahal, Nabin <Nabin.Dahal@iconwater.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>

Cc: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

All,

Please see attached updated diagram following discussions in today's meeting, together with calculation details below.

Sewer Loading Calculations		Stage 1
Residential	**No Apartments**	**319**
	EP Rate (EP/unit)	2.0
	EP (residential)	**638**
Commercial	Commercial Area (m^2 NLA)	392
	Population Density (m^2 per person)	10
	# of Employees	**39**
	EP Rate	0.3
	Resturant Area (m^2)	409
	Population Density (m^2 per seat)	3
	Resturant Seats (No)	**136**
	EP Rate (EP/seat)	0.1
	EP (commercial)	**25.4**
Sewer Loading	**Total EP (TEP)**	**655.0**
	ADWF (l/s)	2.27
	PDWF (l/s)	6.93
AS3500.2 Loading	Total Number of Fixtures	1022
	Fixture Loading Units	6010
	Required tie size	225 @ 2.0%

Regards
David Tennant

From: Benjamin Cargill [mailto:Benjamin.Cargill@spiire.com.au]
Sent: Monday, 16 July 2018 3:28 PM
To: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Allen, Craig <Craig.Allen@iconwater.com.au>; David Tennant <david.tennant@thcs.com.au>
Subject: RE: Section 100 Servicing Meeting

Nabin,

Refer attached for the S100 Sewer/Water numbers for Stage 1 of Section 100 from the on-block hydraulic consultant.

Could we please reschedule our meeting to Monday 23rd July 2018 at 10:00am? We will also bring along Dave Tennant (copied into this email) who is undertaking the on block building hydraulics.

We also wish to discuss temporary sewer/water connections for site compounds/display suites during this meeting.

Let me know if you have any questions.

Regards,
Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Dahal, Nabin [mailto:Nabin.Dahal@iconwater.com.au]
Sent: Friday, 13 July 2018 1:42 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi All,

Just to clarify that Icon Water hasn't receive the EP to review. The cancelation is due to the consultant not provide the EP on agreed time and not due to Icon Water taking longer time to review it.

Please give me a call if you want to clarify this.

Regards,

Nabin Dahal
Senior Technical Officer, Developer Services
Urban Development Services

icon WATER

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6011
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

-----Original Appointment-----
From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 13 July 2018 9:59 AM
To: Dahal, Nabin; Mark Wallis; Max Bomben
Cc: Allen, Craig
Subject: Canceled: Section 100 Servicing Meeting
When: Monday, 16 July 2018 10:00 AM-11:00 AM (UTC+10:00) Canberra, Melbourne, Sydney.
Where: ICON Water Offices - Mitchell
Importance: High

All,
Meeting cancelled as per ICONs request due to not have sufficient time to review EPs prior to the meeting time.

Regards,
Ben

** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****

*** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
*** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
*** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
*** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****

Max Bomben

From: Allen, Craig <Craig.Allen@iconwater.com.au>
Sent: Wednesday, August 8, 2018 1:36 PM
To: Benjamin Cargill
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Further to the email below, please be advised the horizontal clearance required by Icon Water from the DN675 watermain to the parallel sewer main is 1.5m.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Allen, Craig
Sent: Wednesday, 8 August 2018 9:23 AM
To: 'Benjamin Cargill' <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Some preliminary comments I have on the works sketched in the attached plans thus far are as follows.

1. The proposed sewer main along London Circuit may conflict with the light rail alignment and will need to be verified.
2. The proposed sewer main south of London Circuit may impact on the Central Precinct development by the CRA and these designs should be coordinated if this alignment is proposed.
3. The proposed sewer main along Edinburgh avenue may offer a better solution if there is sufficient capacity in this part of the network (capacity is being verified).
4. The cover to the DN675 water main needs to be verified by the consultant for the proposed Edinburgh Avenue extension to Vernon Circle and adequate protection measures incorporated into your design works.
5. Is extension of the watermain along the Knowles Place extension proposed to the Edinburgh Avenue extension? This may be required by ACT fire and rescue.
6. The clearance to the 1950s DN675 Mild Steel Cement Lined water main to the proposed parallel sewer main is being determined by our engineering team and I will provide advice on this at the earliest available opportunity. In the meantime please advise on the horizontal clearance achievable.
7. A sewer and water masterplan needs to be submitted for this project. Have you already undertaken or received previous enquiries for information sufficient to undertake masterplanning?
8. Temporary sewer connections for construction works to the Stage 4 point appears to be ok, please provide an indicative demand for the construction works. Trade waste cannot be discharged into the sewer system without a trade waste agreement being completed with Icon Water.
9. We are preparing a standard connection detail for early watermain connections which will be advised within the next week or so. It involves the early construction of the connection point and a flanged stop valve with thrust restraint to achieve quick connections later in the project. Please advise if further information will assist.

Capacity modelling of the network is still outstanding, however due to the extensive future works in this area, detailed modelling is very complicated and taking some time. I have undertaken some preliminary assessments to keep things moving until we achieve final modelling results. Connection to the DN225 sewer main on Edinburgh Avenue appears to have sufficient capacity.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 3 August 2018 10:10 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Craig,

How is the below going?

We are doing all of the offsite works and really need to know our connection points, particularly for sewer given the two options are challenging either way so that we can keep this project moving.

Regards,
Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Monday, 23 July 2018 9:25 AM

To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: RE: Section 100 Servicing Meeting

Thanks Ben,

I've passed this onto the modelling team for incorporation into the assessment.

Will let you know tomorrow when we will have the results.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 20 July 2018 4:33 PM
To: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hey Craig,

As discussed refer attached for the indicative connection locations for sewer and water.

Stage 1 will definitely go first but the order of Stage 2, 3 & 4 is still being determined. The Stage 2, 3 & 4 water connections will come off London Circuit, but stage 1 will come off Knowles Place. The Stage 1 & 2 sewer connections will come off the Edinburgh Ave extension and Stages 3 & 4 will come of London Cct.

If you have any questions let me know.

Regards,
Benjamin Cargill
Associate
Civil Engineering

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au

Inspiiring people and places
VIC | NSW | & NOW ACT

Please consider the environment before printing.

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Friday, 20 July 2018 12:54 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Subject: FW: Section 100 Servicing Meeting

Hi Ben,

Any updates on the below requested information?

Kind Regards,
Craig Allen

From: Allen, Craig
Sent: Tuesday, 17 July 2018 11:55 AM
To: 'Benjamin Cargill' <Benjamin.Cargill@spiire.com.au>; David Tennant <david.tennant@thcs.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Thank you Ben,

Can you please also provide any further indicative proposed connection locations/layout of the later stages (if applicable) and construction timing of the stages.

Our strategic modelling team is now over capacity for the next week and unable to respond by Monday, instead we are looking at the earliest response timing being late next week.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

icon WATER

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Tuesday, 17 July 2018 10:55 AM
To: Allen, Craig <Craig.Allen@iconwater.com.au>; David Tennant <david.tennant@thcs.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Craig,

Refer attached for the overall development details. Nabin previously indicated a week to undertaking the review of the Eps/demands hence the proposed date of next Monday.

Let me know if this is not achievable.

Regards,
Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au


Please consider the environment before printing.

From: Allen, Craig [mailto:Craig.Allen@iconwater.com.au]
Sent: Tuesday, 17 July 2018 10:52 AM
To: David Tennant <david.tennant@thcs.com.au>; Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi Ben,

Thank you for the development yield for Stage 1, can you please provide the overall development EP/demands and breakdown of staging with an indicative timeline for development.

We're happy to meet and discuss the temporary sewer/water connections for site compounds/display suites next week although we will not be able to discuss limitations of the network until we have the above requested information and sufficient time to undertake the modelling.

Kind Regards,

Craig Allen
Senior Technical Officer
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6902
iconwater.com.au | Twitter | YouTube | LinkedIn

From: David Tennant <david.tennant@thcs.com.au>
Sent: Monday, 16 July 2018 4:26 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Dahal, Nabin <Nabin.Dahal@iconwater.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

All,

Please see attached updated diagram following discussions in today's meeting, together with calculation details below.

Sewer Loading Calculations		Stage 1
Residential	**No Apartments**	**319**
	EP Rate (EP/unit)	2.0
	EP (residential)	**638**
Commercial	Commercial Area (m^2 NLA)	392
	Population Density (m^2 per person)	10
	# of Employees	**39**
	EP Rate	0.3
	Resturant Area (m^2)	409
	Population Density (m^2 per seat)	3
	Resturant Seats (No)	**136**
	EP Rate (EP/seat)	0.1
	EP (commercial)	**25.4**
Sewer Loading	**Total EP (TEP)**	**655.0**
	ADWF (l/s)	2.27
	PDWF (l/s)	6.93
AS3500.2 Loading	Total Number of Fixtures	1022
	Fixture Loading Units	6010
	Required tie size	225 @ 2.0%

Regards
David Tennant

From: Benjamin Cargill [mailto:Benjamin.Cargill@spiire.com.au]
Sent: Monday, 16 July 2018 3:28 PM
To: Dahal, Nabin <Nabin.Dahal@iconwater.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>

Cc: Allen, Craig <Craig.Allen@iconwater.com.au>; David Tennant <david.tennant@thcs.com.au>
Subject: RE: Section 100 Servicing Meeting

Nabin,

Refer attached for the S100 Sewer/Water numbers for Stage 1 of Section 100 from the on-block hydraulic consultant.

Could we please reschedule our meeting to Monday 23rd July 2018 at 10:00am? We will also bring along Dave Tennant (copied into this email) who is undertaking the on block building hydraulics.

We also wish to discuss temporary sewer/water connections for site compounds/display suites during this meeting.

Let me know if you have any questions.

Regards,

Benjamin Cargill
Associate
Civil Engineering

spiire

Suite 5 | Level 1, 243 Northbourne Avenue Lyneham ACT 2602
PO Box 6042 O'CONNOR ACT 2602

t +61 2 6102 1003 +61 488 075 179
spiire.com.au


Please consider the environment before printing.

From: Dahal, Nabin [mailto:Nabin.Dahal@iconwater.com.au]
Sent: Friday, 13 July 2018 1:42 PM
To: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>; Mark Wallis <mwallis@morrispropertygroup.com.au>; Max Bomben <Max.Bomben@spiire.com.au>
Cc: Allen, Craig <Craig.Allen@iconwater.com.au>
Subject: RE: Section 100 Servicing Meeting

Hi All,

Just to clarify that Icon Water hasn't receive the EP to review. The cancelation is due to the consultant not provide the EP on agreed time and not due to Icon Water taking longer time to review it.

Please give me a call if you want to clarify this.

Regards,

Nabin Dahal
Senior Technical Officer, Developer Services
Urban Development Services

Icon Water
GPO Box 366 Canberra ACT 2601
T 02 6180 6011
iconwater.com.au | Twitter | YouTube | LinkedIn

SAFETY ◆ EXCELLENCE ◆ OPENNESS

-----Original Appointment-----
From: Benjamin Cargill <Benjamin.Cargill@spiire.com.au>
Sent: Friday, 13 July 2018 9:59 AM
To: Dahal, Nabin; Mark Wallis; Max Bomben
Cc: Allen, Craig
Subject: Canceled: Section 100 Servicing Meeting
When: Monday, 16 July 2018 10:00 AM-11:00 AM (UTC+10:00) Canberra, Melbourne, Sydney.
Where: ICON Water Offices - Mitchell
Importance: High

All,
Meeting cancelled as per ICONs request due to not have sufficient time to review EPs prior to the meeting time.

Regards,
Ben

authority, states them to be the views of the organisation.
****
********** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****
********** *PLEASE NOTE* This email and any attachments may be confidential. If received in error, please delete all copies and advise the sender. The reproduction or dissemination of this email or its attachments is prohibited without the consent of the sender. WARNING RE VIRUSES: Our computer systems sweep outgoing email to guard against viruses, but no warranty is given that this email or its attachments are virus free. Before opening or using attachments, please check for viruses. Our liability is limited to the re-supply of any affected attachments. Any views expressed in this message are those of the individual sender, except where the sender expressly, and with authority, states them to be the views of the organisation.
****

APPENDIX C – TRAFFIC REPORT (SMEC)

SMEC
Member of the Surbana Jurong Group

local people
global experience

Traffic Report

City Section 100 Traffic Study

Prepared for Spiire
13 September 2018

SMEC INTERNAL REF. 3002653.102

Document Control

Document:	Traffic Report
File Location:	X:\Projects\3002653 Traffic Minor Projects 2018\102 City Section 100 Traffic Study\037 Reports - Outgoing\3002653.102 Section 100 Traffic Study Report Rev2 - 3.4vpd.docx
Project Name:	City Section 100 Traffic Study
Project Number:	3002653.102
Revision Number:	2a

Revision History

REVISION NO.	DATE	PREPARED BY	REVIEWED BY	APPROVED FOR ISSUE BY
0	15/8/2018	Josh Everett Lindsay Jacobsen	Jerome Catbagan	Jerome Catbagan
1	22/8/2018	Josh Everett	Jerome Catbagan	Jerome Catbagan
2	3/9/2018	Josh Everett	Josh Everett	Josh Everett
2a	13/9/2018	Josh Everett	Lindsay Jacobsen	Josh Everett

Issue Register

DISTRIBUTION LIST	DATE ISSUED	NUMBER OF COPIES
Spiire	13/9/2018	Electronic
SMEC Canberra	13/9/2018	Electronic

SMEC Company Details

Approved by:	Josh Everett		
Address:	Level 1, 243 Northbourne Avenue, Lyneham ACT 2602		
Signature:			
Tel:	(02) 6234 1960	Fax:	(02) 6234 1966
Email:	Josh.Everett@smec.com	Website:	www.smec.com

Important Notice

This report is provided pursuant to a Consultancy Agreement between SMEC Australia Pty Limited ("SMEC") and Spiire, under which SMEC undertook to perform a specific and limited task for Spiire. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

This report must be read as a whole. The executive summary is not a substitute for this. Any subsequent report must be read in conjunction with this report.

The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents or which come to light after the date of the report. SMEC is not obliged to inform you of any such event, transaction or matter nor to update the report for anything that occurs, or of which SMEC becomes aware, after the date of this report.

Unless expressly agreed otherwise in writing, SMEC does not accept a duty of care or any other legal responsibility whatsoever in relation to this report, or any related enquiries, advice or other work, nor does SMEC make any representation in connection with this report, to any person other than Spiire. Any other person who receives a draft or a copy of this report (or any part of it) or discusses it (or any part of it) or any related matter with SMEC, does so on the basis that he or she acknowledges and accepts that he or she may not rely on this report nor on any related information or advice given by SMEC for any purpose whatsoever.

Contents

Appendices

Tables

Figures

1 Introduction

SMEC was commissioned by Spiire Australia Pty Ltd (Spiire) to conduct a traffic study for a proposed development in Section 100, Canberra City. The proposed development includes residential units, commercial space and retail space.

The Section 100 development is a redevelopment of the land currently occupied by a surface car park, which is accessed by the intersection at London Circuit and Gordon Street. The proposed development will provide publicly accessible parking to replace the existing surface parking available at the site.

This study includes traffic generation based on trip generation rates agreed with TCCS, traffic distribution using the Canberra Strategic Transport Model (CSTM) and networked intersection analysis using SIDRA Intersection.

1.1 Project Location

The context and study areas covered by this study are shown in Figure 1.

Figure 1: Context and Study Area

1.2 Objectives

The objectives of this study are to:

- Review existing traffic volumes
- Assess future traffic operations with and without the proposed development
- Provide recommendations about the appropriate intersection arrangements at the proposed development access points and the Edinburgh Avenue extension intersections with London Circuit and Vernon Circle

2 Existing Conditions and Proposed Development

2.1 Site Description and Existing Land Use

City Section 100 has a total area of approximately 25,000 m² and is zoned as a designated area under the National Capital Plan. The site is located in the City Hill precinct and is currently used as a car park, with 730 parking spaces (shown in Figure 1). Under the City Hill precinct controls, the site allows a range of land uses, including residential, retail and commercial.

2.2 Existing Road Network

Section 100 is currently bounded by the following roads:

- London Circuit
- Vernon Circle
- Knowles Place

Current access to Section 100 is via Gordon Street, into the large public car park, and Knowles Place, into the private AFP parking area. The Gordon Street access point is a four-way signalised intersection. Knowles Place operates one-way southbound so vehicles accessing the police car park, at the southern side of the police station, enter at the northern end of Knowles Place and then travel past the ACT Supreme Court to the car park.

Other key roads in the area include:

- Edinburgh Avenue
- Gordon Street
- Farrell Place
- University Avenue

The hierarchy of the roads around the study area is shown in Figure 2. The arterial roads, which allow high capacity travel between districts are Northbourne Avenue, Commonwealth Avenue, Constitution Avenue, Edinburgh Avenue and Parkes Way. Marcus Clarke Street and London Circuit are classified as major collectors, which are intended to connect the arterial network to local districts and should only carry traffic originating or terminating in the local area. University Avenue, McCoy Circuit and Ellery Crescent are classified as minor collectors, which link access streets to the major collector network. All other roads in the area are access streets, which should only carry traffic originating or terminating at land uses on those streets and should not carry any through traffic.

Figure 2: Road Hierarchy

2.3 Proposed Development Land Use

The proposed City Section 100 development includes the land use shown in Table 1.

Table 1: Proposed Section 100 Land Use

LAND USE	QUANTITY
Residential Units	700 dwellings
Commercial Floorspace	38,500 m²
Retail Floorspace	5,322 m²

An additional land use option containing no commercial space and 1,200 residential units was also provided. However, the option shown in Table 1 generates more traffic and has been analysed here to provide a more conservative assessment of the development's traffic impacts.

As noted previously, the existing public parking supply on Section 100 will be incorporated into the basement parking in the development and will remain publicly accessible.

2.4 Proposed Site Access and Internal Road Network

The Section 100 development will be accessible via both Knowles Place and the Edinburgh Avenue extension. The existing access point from the London Circuit – Gordon Street intersection will be removed. The provided public parking will be accessed from the corner of Knowles Place south of the Canberra City Police Station. Knowles Place will be

extended south of this point, connecting to the Edinburgh Avenue extension. This new road will provide midblock driveway access to basement parking for residents and tenants of Section 100.

There will not be any driveway access to the development from London Circuit, Edinburgh Avenue extension or Vernon Circle.

The layout of the development is shown in Figure 3.

Figure 3: City Section 100 Layout (Source: Spiire)

3 Traffic Generation

Traffic generated by the City Section 100 development has been calculated using traffic generation rates from Review of ACT Traffic Generation Rates for High Density Residential Developments in the Vicinity of Town Centres and Northbourne Avenue Corridor (SMEC, 2018) and the RMS Guide to Traffic Generating Developments. AM and PM peak proportions have been sourced from the RMS Guide to Traffic Generating Developments and the ITE Trip Generation Manual. Directional ratios for vehicles entering and exiting the development in each peak period have been sourced from the ITE Trip Generation Manual. The vehicle trip rates, directional splits and traffic generated by the development are shown in Table 2.

Table 2: Traffic Generated by Section 100

Land Use	Yield	Peak Period	Trip Rate	Peak Direction	Peak Split	Trips	Notes
Residential	700 units	AM	0.337 /dwelling	In	0.29	68	Rate: Review of ACT Traffic Generation Rates for High Density Residential Developments in the Vicinity of Town Centres and Northbourne Avenue Corridor, 10% in AM, ITE 223 Mid-rise Apartment for PM proportion Direction: ITE 223 Mid-rise Apartment
				Out	0.71	167	
		PM	0.425 /dwelling	In	0.59	175	
				Out	0.41	122	
Commercial	38,500 m²	AM	1.45 /100 m²	In	0.88	490	Rate: RMS Office and Commercial (daily rate), ITE 710 General Office Building (peak proportions) Direction: ITE 710 General Office Building
				Out	0.12	67	
		PM	1.39 /100 m²	In	0.17	91	
				Out	0.83	443	
Retail	5,322 m²	AM	6.26 /100 m²	In	0.48	160	Rate: RMS Shopping Centre (specialty shop component) Direction: ITE 826 Specialty Retail Centre
				Out	0.52	173	
		PM	4.60 /100 m²	In	0.56	137	
				Out	0.44	108	
Total		**AM**		**In**		**718**	
				Out		**408**	
				Total		**1,126**	
		PM		**In**		**403**	
				Out		**672**	
				Total		**1,075**	

Note: All trips generated in the table refer to vehicle trips

4 Strategic Transport Modelling

The trip distribution has been conducted using the Canberra Strategic Transport Model (CSTM), which was most recently updated in 2017 using the 2011 Census. This model contains a complete representation of the ACT's road network.

The model is an equilibrium model, in which travel decisions (origin/destination, mode choice, travel route etc.) are related to cost, where the cost of travel is minimised for every road user. As such, any changes to the model inputs and assumptions can have impacts far from where the change was made, with the severity of the change decreasing with distance, as the traffic adjusts and redistributes to minimise the average user cost.

The modelling was conducted for the AM and PM peak periods in the 2016 and 2031 model years. The strategic modelling outputs have been used to calculate growth and distribution of traffic volumes for the intersections surrounding the development.

4.1.1 Model Scenarios

Modelling was conducted for the following scenarios:

- **2018 Base Case**: Current land use and transport network assumptions for 2016, supplemented by SCATS traffic data supplied by TCCS
- **2031 Do Minimum**: All land use and network assumptions already in the CSTM for 2031 but with the Edinburgh Avenue extension included.
- **2031 Section 100**: All land use and network assumptions already in the CSTM for 2031 with the Edinburgh Avenue extension and proposed Section 100 land use and car park access locations included.

Each of these scenarios was tested for both the AM and PM peak periods.

4.2 Model Assumptions

4.2.1 Zone Structure

The City Section 100 development area falls within the existing CSTM Zone 16, as shown on the 2018 Base Case road network in Figure 4. The exact location of the development area is also shown. Zones 15 and 16 currently connect directly to the London Circuit – Gordon Street intersection.

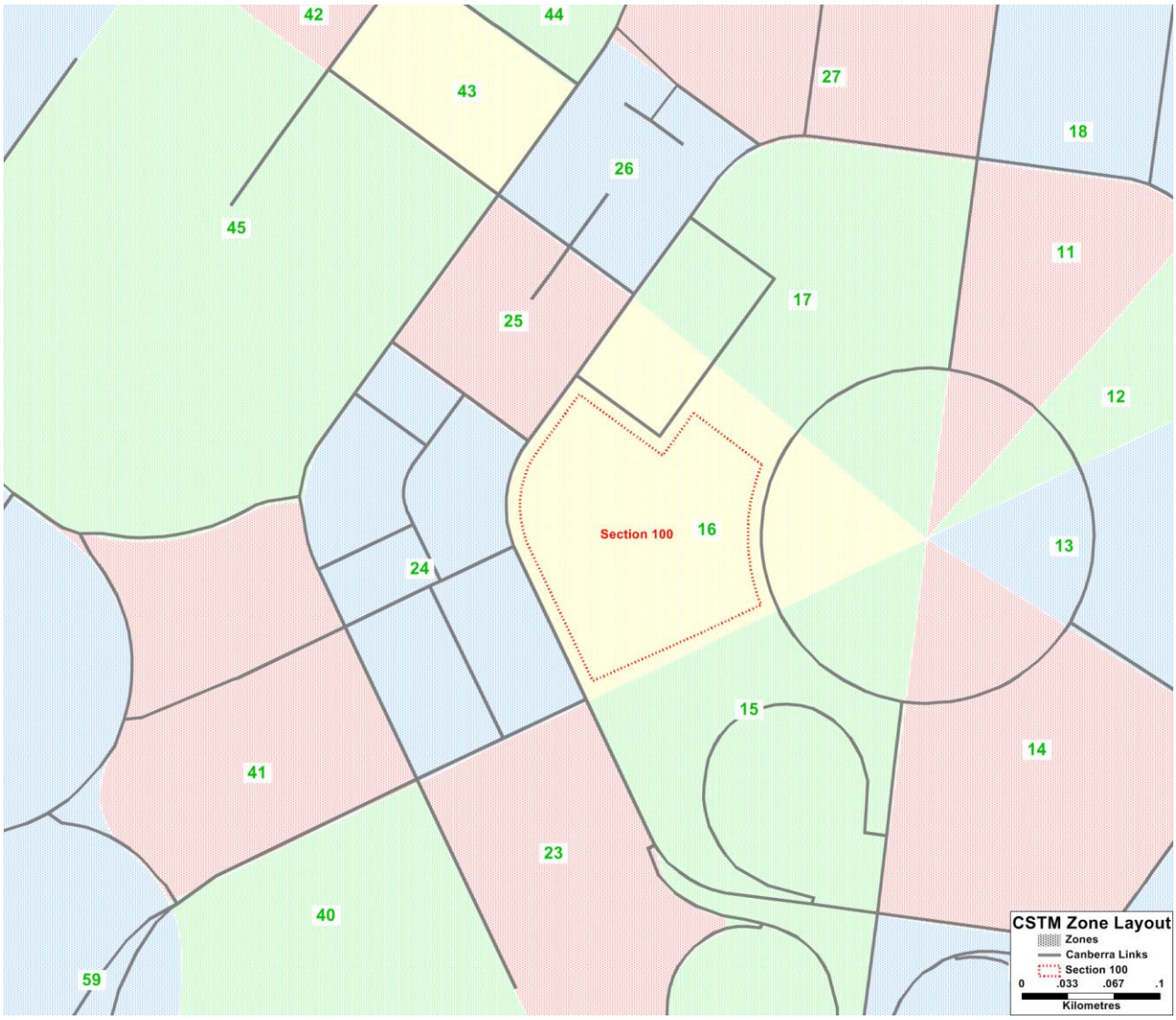


Figure 4: CSTM Zones in Development Area

In *2018 Base Case*, Zones 15 and 16 both access the road network by the intersection of London Circuit and Gordon Street.

In *2031 Do Minimum*, Zone 15 accesses the road network via a connection to Edinburgh Avenue extension, while Zone 16 remains connected to London Circuit – Gordon Street.

For the *2031 With Section 100* scenario, the proposed developments within Section 100 required the addition of a new zone (Zone 900) to the CSTM. The existing Zones 15 and 16 are shown in Figure 5 with the new connection for Zone 900 on Knowles Place extension. Zone 15 is now separated from Zone 16 by Edinburgh Avenue extension and connects to it directly. Zone 16 now represents the existing public parking capacity that is incorporated into the Section 100 development, so its connector has been moved to the corner of Knowles Place, south of the Canberra City Police Station, where the access driveway is expected to be located.

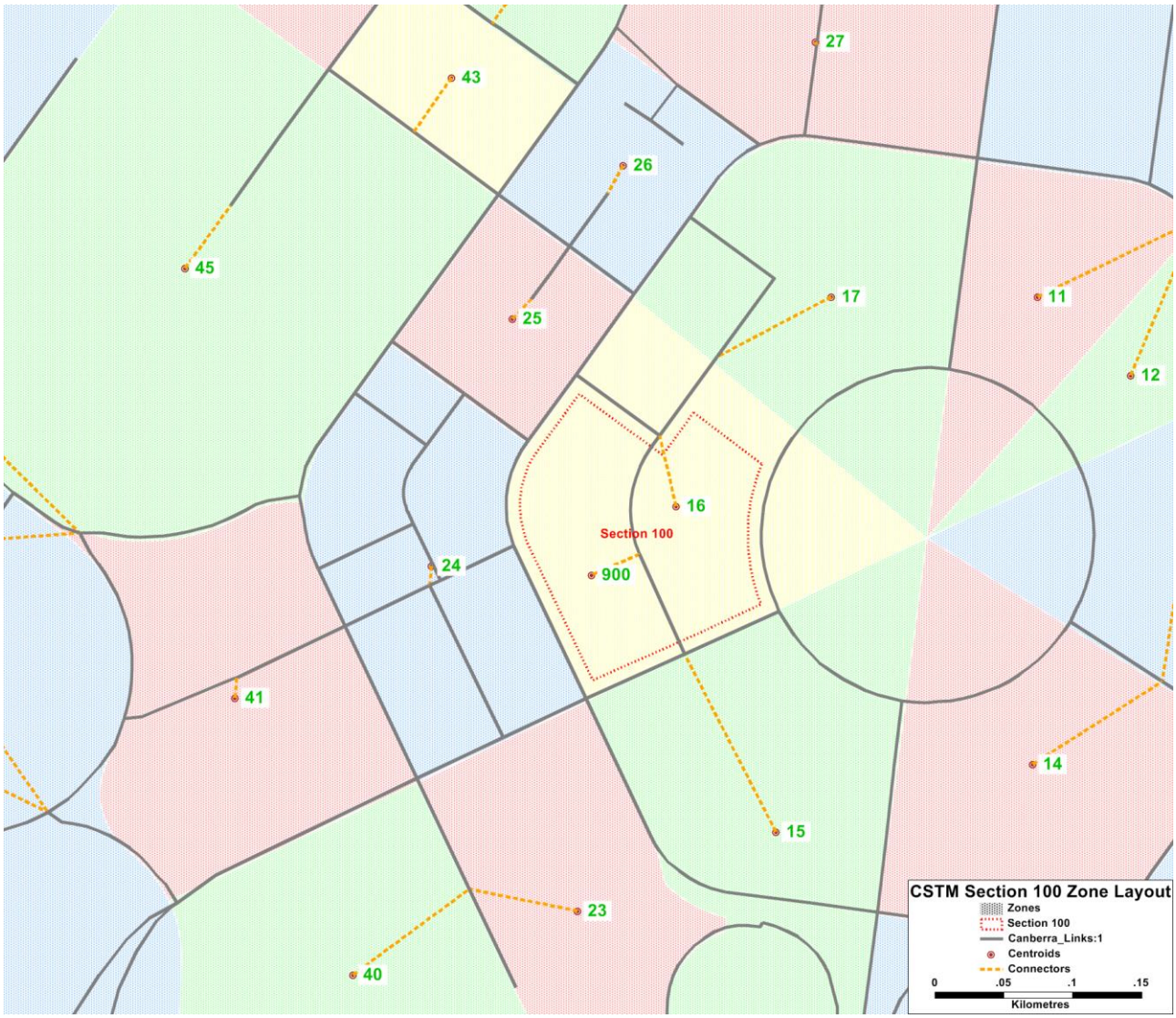


Figure 5: Updated Zone Connectors

4.2.2 Road Network

The road network infrastructure improvements assumed to be present in each year from 2016 to 2031 were confirmed with TCCS in 2017, when the current version of the CSTM was completed. Diagrams showing the upgrades in 2021 and 2031 are included in Appendix A.

Intersections are represented in the CSTM at a high level, with those that require vehicles to stop or give way being modelled through a reduction in capacity on the approaching roads. No discrimination is made by intersection control method.

4.2.3 Public Transport

The public transport network in 2021 onwards is based on ACTION's proposed Network 2018 provided to SMEC in March 2017, with the addition of Light Rail Stage 1 (LRS1) and the removal of bus routes operating along the LRS1 corridor. Stage 2 (LRS2) is added in 2031. Light Rail Stage 2 (LRS2) is included in the CSTM using broad assumptions made in 2017 about route, stop location and service frequency.

4.2.4 Parking Capacity

The CSTM contains parking capacity for each of the zones within the City, so that car trips to and from the City are distributed only to locations where parking is available. The existing parking capacity has been retained in zones 15 and 16. A new zone (Zone 900) was created for Section 100, which is not part of this parking distribution. As such, the traffic generated by Section 100 remains in Zone 900, while no other City traffic is moved into it.

4.2.5 Land Use

The base land use data was provided by TCCS and is dated 13 April 2017. The land use assumption for the *2031 Do Minimum* scenario is shown in Table 3. For this scenario, Zone 16 is assumed to be still operating as a surface car park with no development on the site.

Table 3: CSTM 2031 Do Minimum Land Use

Zone	Description	Population	Employment	Retail Space	School Enrolments	Tertiary Enrolments
15	City	350	500	0	0	0
16	City	0	0	0	0	0

For the *2031 Section 100* scenario, the base land use in Zones 15 and 16 is the same as in *2031 Do Minimum*. A new zone (Zone 900) was created to contain the Section 100 land use and to explicitly generate the number of car trips calculated in Table 2. Due to the way the CSTM operates, this modelled land use is not identical to the proposed land use in Table 2, but does generate the required number of car trips after the CSTM's specific trip generation and mode split calculations have been completed.

4.3 Strategic Transport Modelling Results

Diagrams extracted from the CSTM for each scenario are shown in the following sections. These show the hourly peak volumes and volume/capacity ratios, as well as peak volume differences between scenarios. The peak traffic difference (compared to the Base Case) are included for the 2031 With Section 100 scenario.

4.3.1 2016 Base Case

The *2016 Base Case* hourly flow diagrams for AM and PM are shown in Figure 6 and Figure 7, respectively.

In the 2016 AM peak period, most of the road network around the Section 100 site operates well, with a few roads operating near capacity. Edinburgh Avenue, west of McCoy Circuit, is over capacity. Marcus Clarke Street between Edinburgh Avenue and Gordon Street, the ramps between London Circuit and Commonwealth Avenue, Northbourne Avenue north of London Circuit and most of Vernon Circle operate very close to their capacity. London Circuit between Edinburgh Avenue and Northbourne Avenue operates below 70% of its capacity.

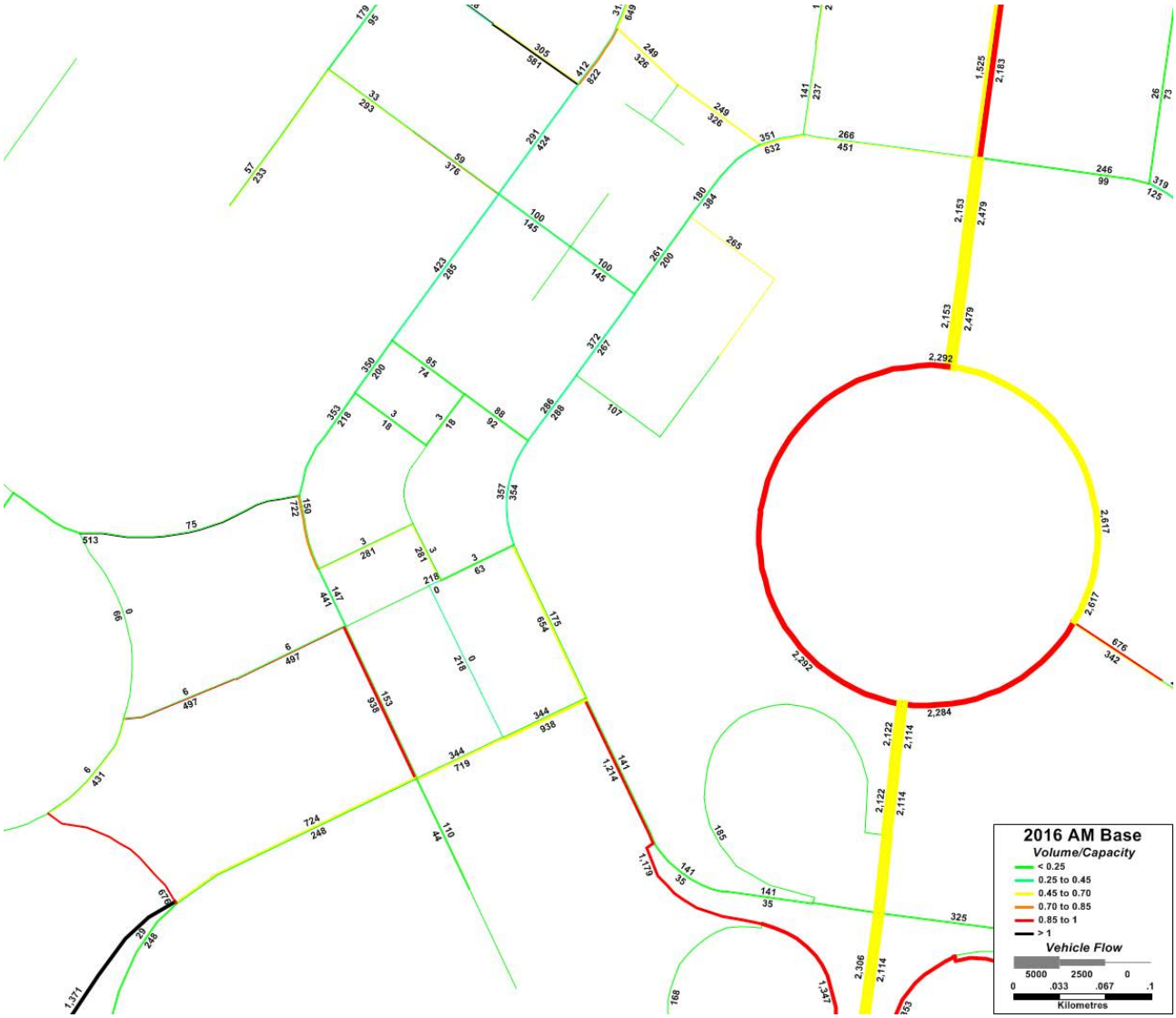


Figure 6: 2016 Base Case AM Hourly Flow and V/C

In the 2016 PM peak period, all of the local network operates well, except for Vernon Circle, which operates just over its modelled capacity, which is 2,300 vehicles per hour. The volume on Vernon Circle only increases by 15 vehicles per hour compared to the AM peak but crosses the capacity threshold.

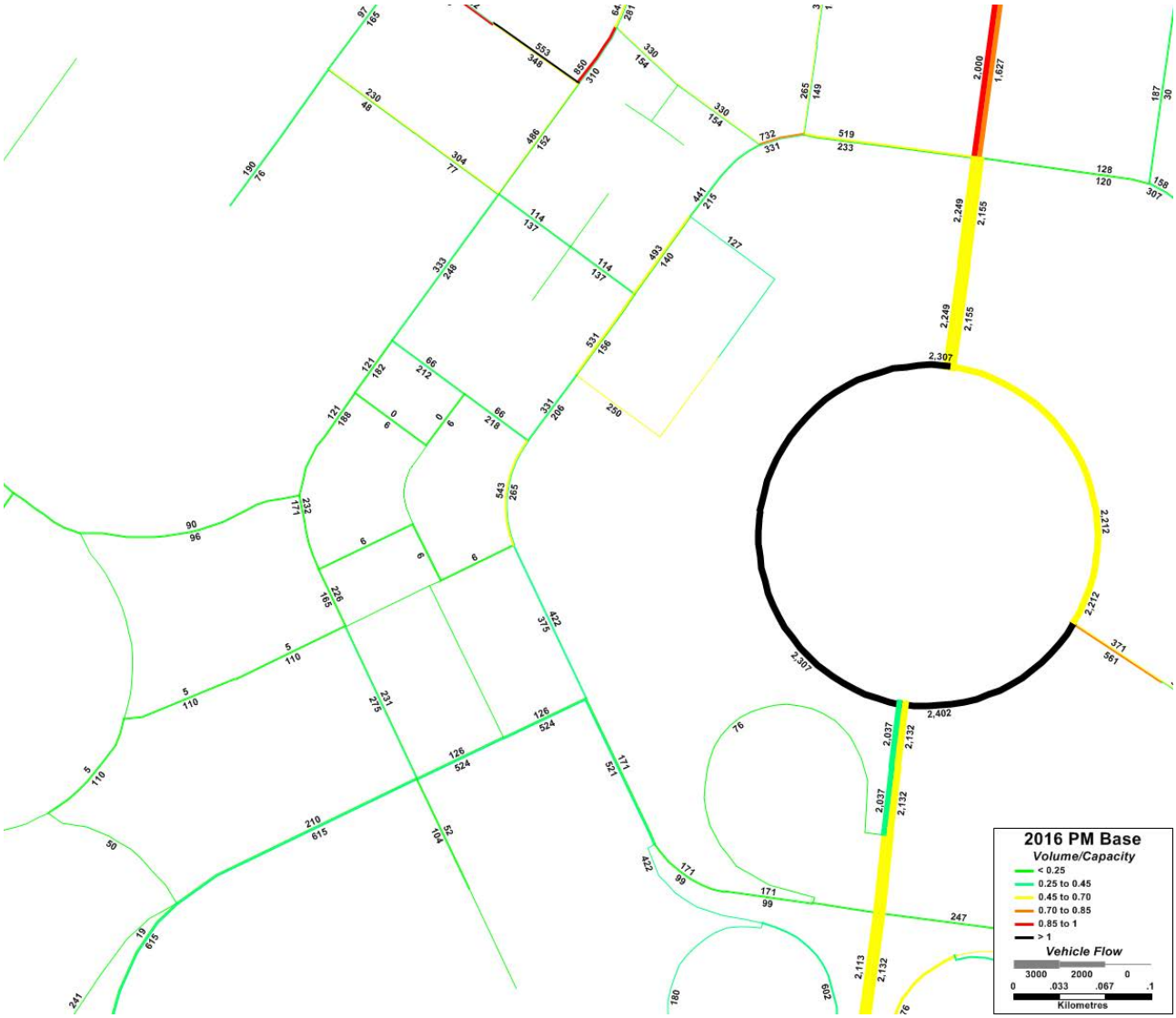


Figure 7: 2016 Base Case PM Hourly Flow and V/C

4.3.2 2031 Do Minimum

The *2031 Do Minimum* scenario includes the extension of Edinburgh Avenue from London Circuit to Vernon Circle, which leads to significant traffic redistribution around the study area.

There appears to be some travel from east to west from Constitution Avenue to Edinburgh Avenue via Vernon Circle. This movement requires many lane changes across a short distance and is likely to be unsafe.

Traffic volumes northbound on Commonwealth Avenue are lower than in 2016 due to the reduced capacity caused by intersections associated with West Basin and the conversion of the London Circuit grade separation to an at-grade intersection. Edinburgh Avenue, west of McCoy Circuit, McCoy Circuit, Gordon Street and Ellery Crescent are all over capacity. London Circuit is generally below 70% of capacity, with some sections near Northbourne Avenue operating below 85% of capacity.

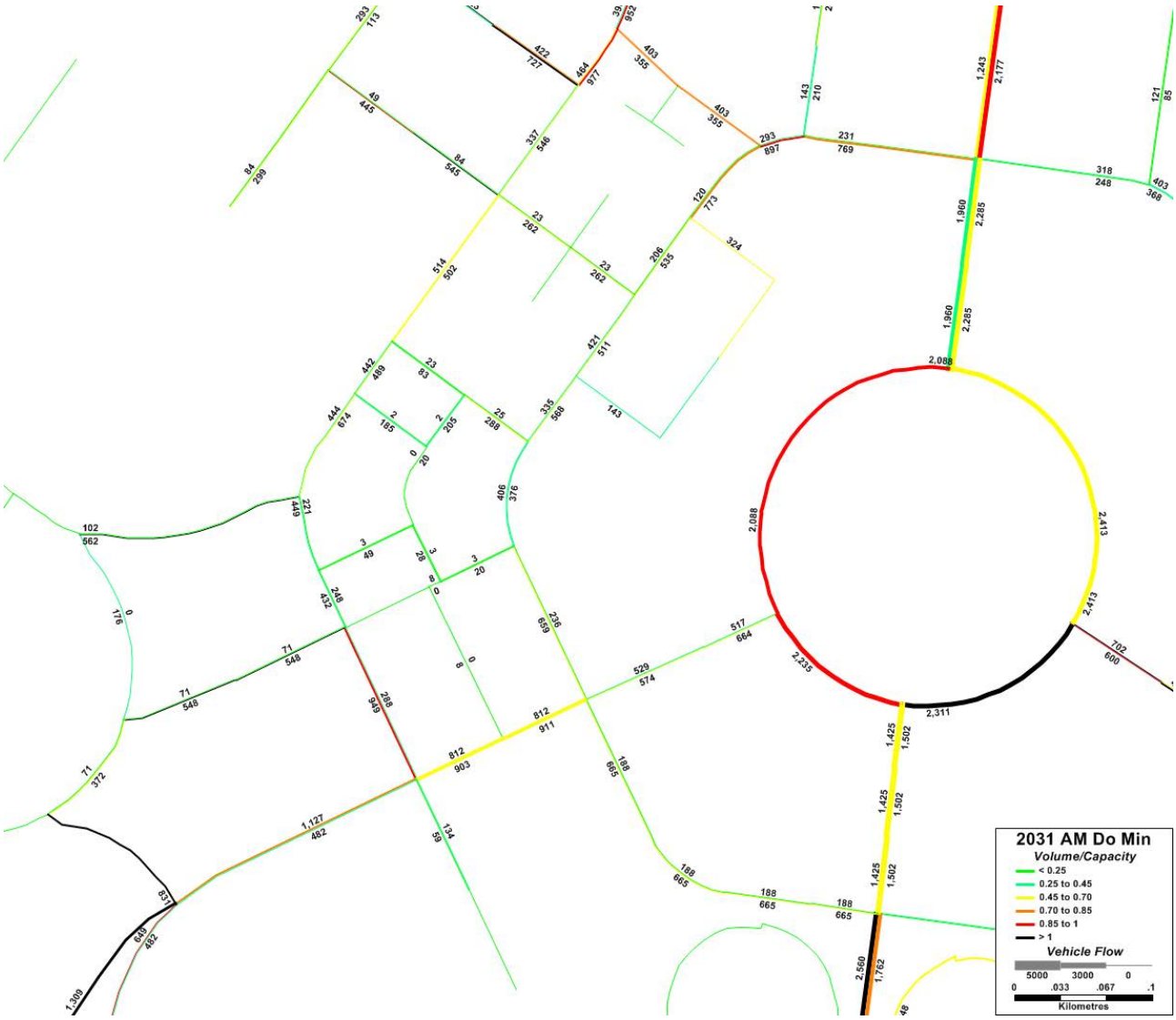


Figure 8: 2031 Do Minimum AM Hourly Flow and V/C

In the 2031 Do Minimum PM peak, Edinburgh Avenue, west of London Circuit operates between 45-85% of capacity, as does London Circuit, between Commonwealth Avenue and Knowles Place. The Edinburgh Avenue extension operates very well northbound and below 70% of capacity southbound. Vernon Circle, between Constitution Avenue and Edinburgh Avenue operates over capacity, while the section between Edinburgh Avenue and Northbourne Avenue operates above 85% of capacity.

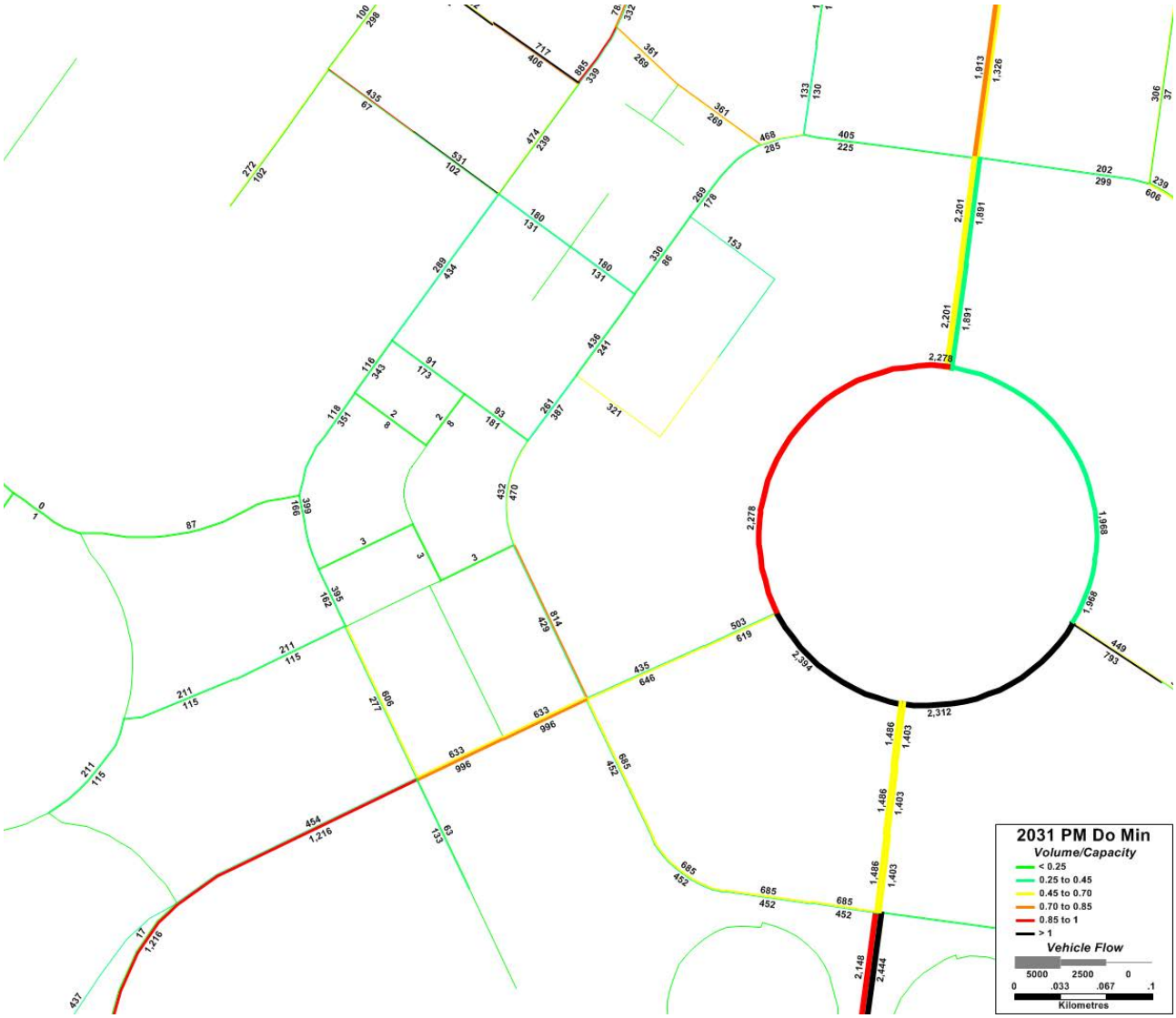


Figure 9: 2031 Do Minimum PM Hourly Flow and V/C

4.3.3 2031 Section 100

The *2031 Section 100* scenario includes the extension of Knowles Place to intersect the Edinburgh Avenue extension and converts the existing southern part of Knowles Place to two-way operation. Along with the Section 100 land use, there are substantial changes to the traffic volume and distribution in the area. The traffic volume differences between the 2031 Do Minimum and 2031 With Section 100 scenarios have also been included.

In the 2031 With Section 100 AM peak period, shown in Figure 10, there is an increase in congestion around the study area. Knowles Place and Knowles Place extension both operate over capacity. Congestion on the eastern side of Vernon Circle (southbound) has decreased but the northbound section between Commonwealth Avenue and Edinburgh Avenue extension operates over capacity. Edinburgh Avenue extension, between Vernon Circle and Knowles Place extension operates between 70-85% of capacity.

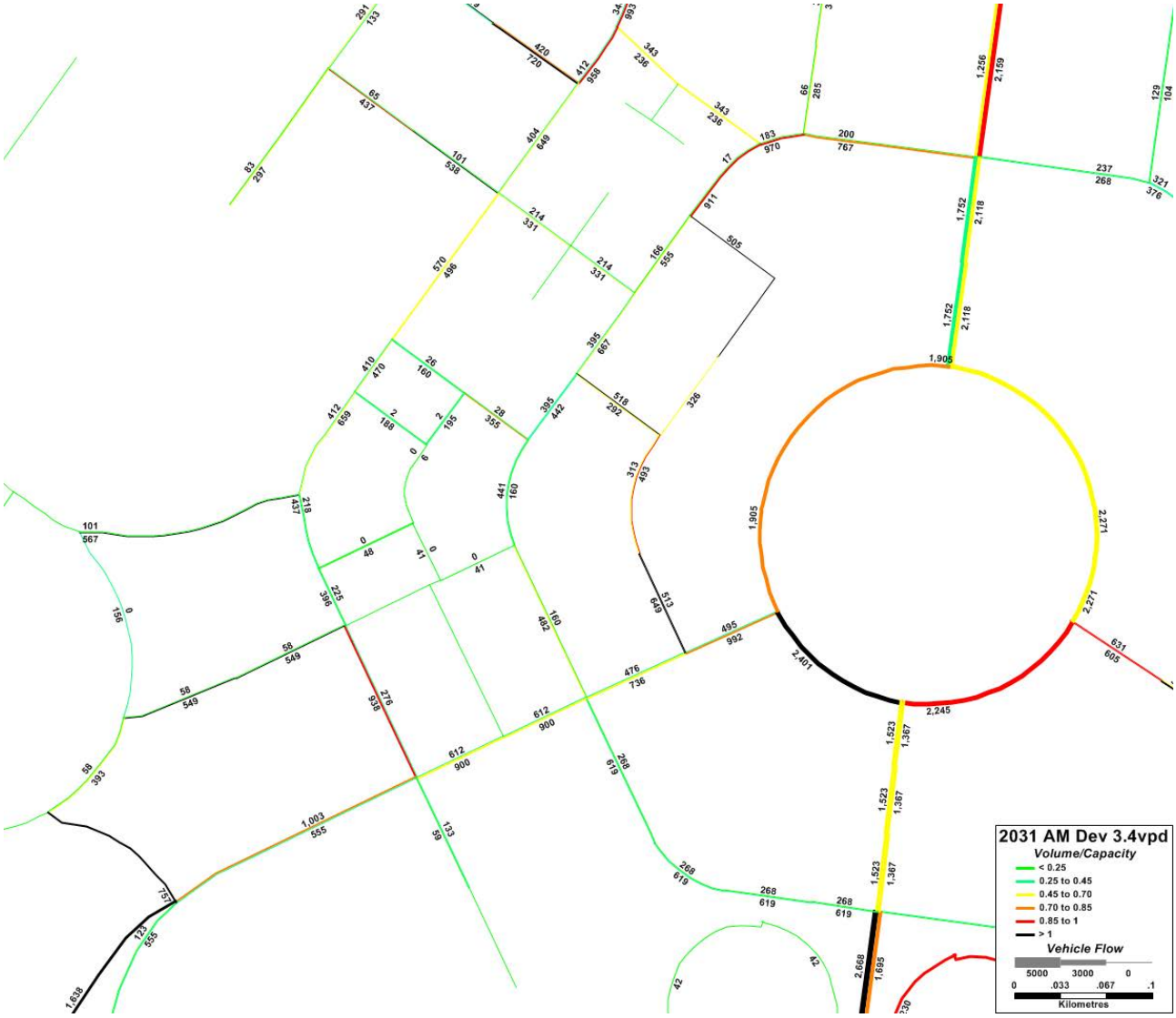


Figure 10: 2031 With Section 100 AM Hourly Flow and V/C

Figure 11 shows the flow differences between 2031 Do Minimum and 2031 With Section 100 in the AM peak period. There is a decrease in traffic on most of Vernon Circle and Northbourne Avenue, which is likely caused by the additional traffic on Commonwealth Avenue and Vernon Circle, south of Edinburgh Avenue, which is travelling to Section 100. There are increases to traffic volumes on Commonwealth Avenue northbound, part of Vernon Circle, Edinburgh Avenue extension, Knowles Place, Knowles Place extension, Farrell Place, University Avenue and parts of Marcus Clarke Street and London Circuit, likely from traffic travelling between Section 100 and Belconnen. Outside of the immediate area shown in Figure 11, volume changes on roads is less than 50 vehicles per hour.

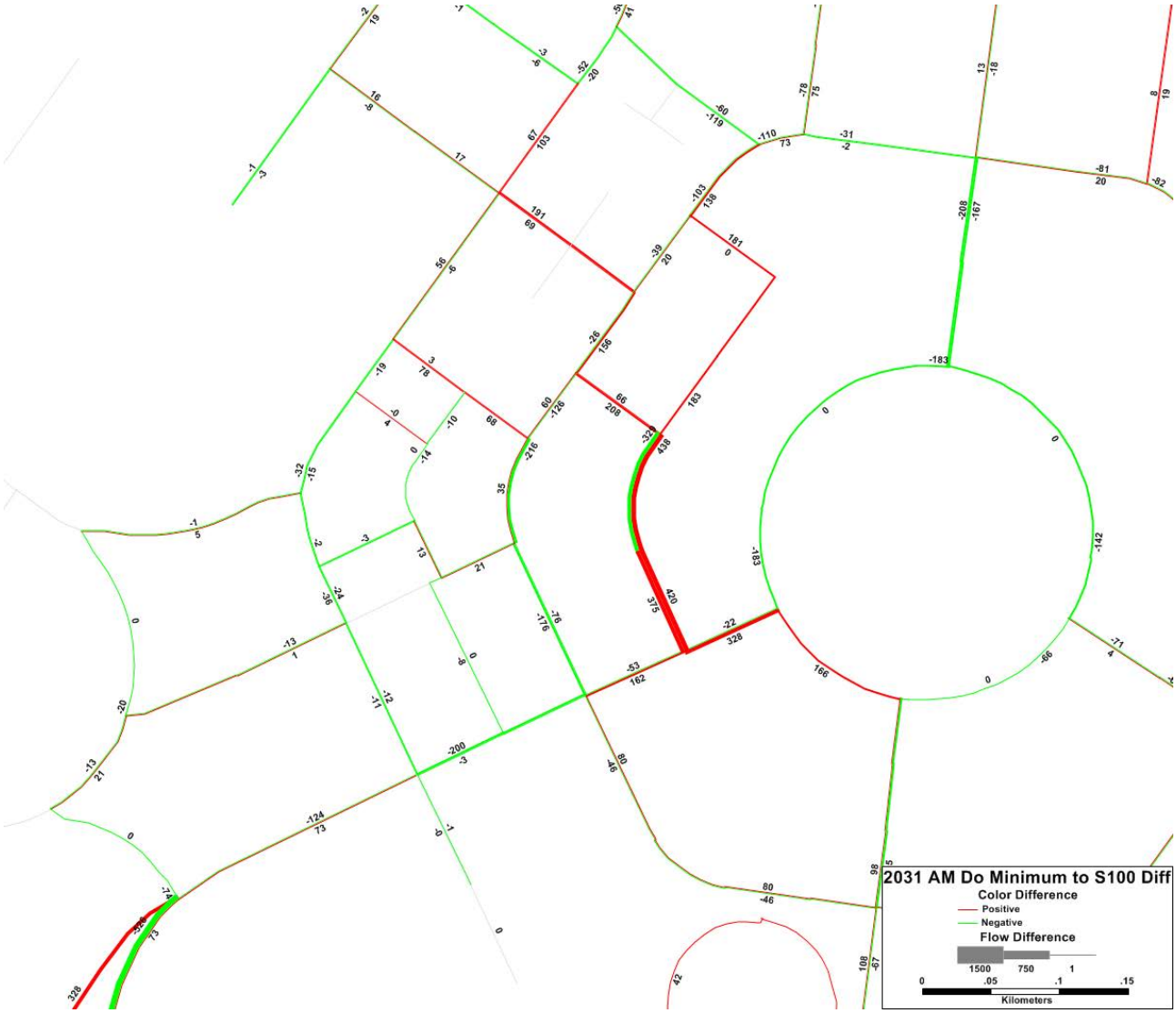


Figure 11: 2031 With Section 100 Compared to Do Minimum 2031 AM Hourly Flow Difference

In the 2031 With Section 100 PM peak period, shown in Figure 12, the western (northbound) section of Vernon Circle operates over capacity, as do parts of Knowles Place and Knowles Place extension. Edinburgh Avenue and London Circuit generally operate below 70% of capacity.

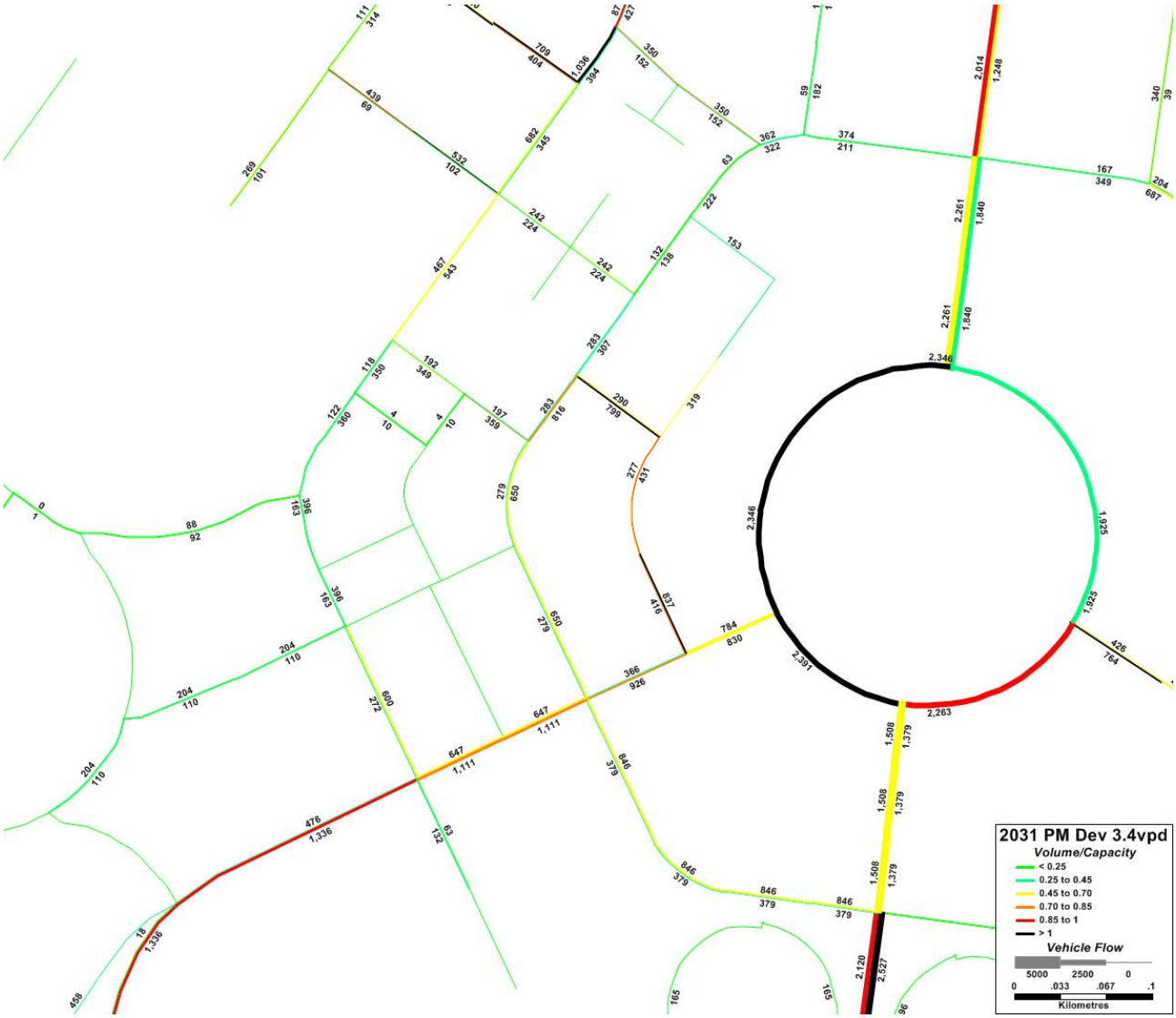


Figure 12: 2031 With Section 100 PM Hourly Flow and V/C

Figure 13 shows the traffic volume differences in the 2031 PM peak period with the Section 100 compared to the Do Minimum scenario. Volume differences are typically small, with growth on Knowles Place, Knowles Place extension, Edinburgh Avenue, Edinburgh Avenue extension, London Circuit, Farrell Place, University Avenue and Marcus Clarke Street. There is a reduction in southbound traffic on Northbourne Avenue and Vernon Circle, likely because of additional southbound traffic from Section 100 joining Commonwealth Avenue at London Circuit. The traffic volume changes suggest that the major origin/destination of traffic travelling to and from Section 100 is Belconnen. Outside of the immediate area shown in Figure 13, differences are less than 100 vehicles per hour.

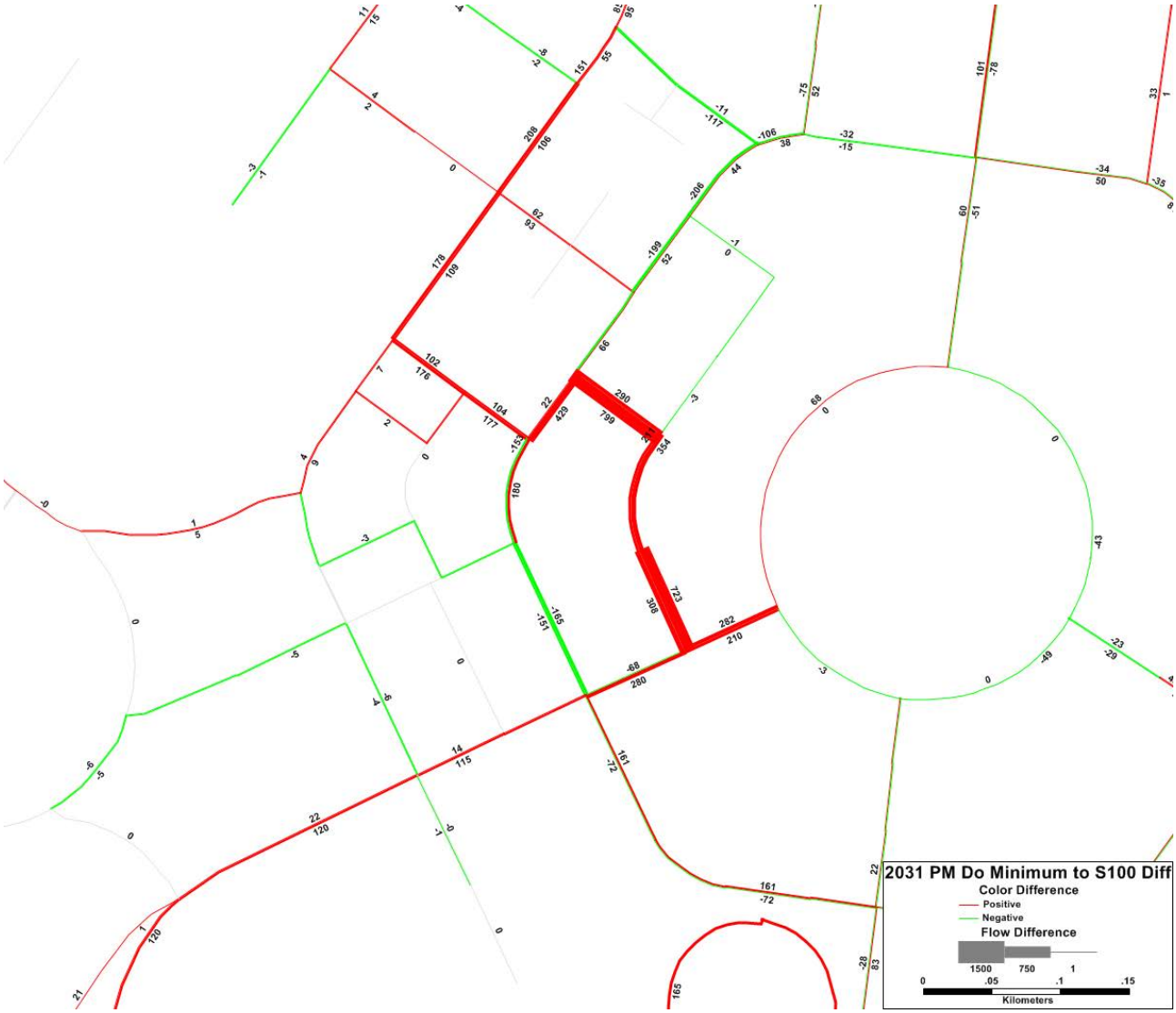


Figure 13: 2031 With Section 100 Compared to Do Minimum 2031 PM Hourly Flow Difference

4.3.4 Strategic Transport Modelling Summary

The strategic transport modelling carried out has shown the expected growth from 2016 to 2031 and the likely impact of the traffic generated by Section 100 on the local road network. Increased traffic volumes and delays on some roads, including Edinburgh Avenue, London Circuit and Marcus Clarke Street, has led to reductions in traffic on other roads connected to those roads, including Northbourne Avenue, Commonwealth Avenue and Constitution Avenue.

For most of the roads that are expected to have an increase in traffic, the additional traffic does not cause the roads to operate over capacity. However, the section of Vernon Circle between Commonwealth Avenue and Edinburgh Avenue and most of Knowles Place goes over capacity because of the Section 100 development in the AM peak in 2031. In the 2031 PM peak, the development of Section 100 causes the Knowles Place extension and the section of Vernon Circle between Edinburgh Avenue and Northbourne Avenue to operate over capacity. All other roads are expected to be able to cater for the additional Section 100 traffic without going over capacity.

5 Intersection Assessment

Turning movement counts from SCATS were obtained from TCCS for the following intersections:

1. London Circuit – Edinburgh Avenue
2. London Circuit – Gordon Street

These volumes were counted by the SCATS traffic signal control system for the seven days starting 25 July 2018. These volumes were combined with the CSTM turning volumes to synthesise demand for the following intersections:

1. London Circuit – Edinburgh Avenue
2. Edinburgh Avenue extension – Knowles Place extension (2031 only)
3. Vernon Circle – Edinburgh Avenue extension (2031 only)
4. London Circuit – Gordon Street
5. London Circuit – Farrell Place
6. London Circuit – Knowles Place (south)
7. London Circuit – University Avenue
8. London Circuit – Knowles Place (north)
9. Knowles Place – Knowles Place extension (2031 Section 100 only)

Details of the modelled turning movement volumes are included in Appendix B.

The intersection analysis has been conducted using the network functionality of SIDRA Intersection 8. This considers the impact of queuing, platooning, signal coordination and other interactions between intersections on the performance of each intersection in the network. The performance is measured by average delay in seconds, Level of Service (determined from average delay) and worst approach 95th percentile queue (measured in metres) with the approach on which that queue occurs. The analysis is discussed in the following sections and detailed outputs are included in Appendix C.

Table 4 shows the Level of Service (LoS) delay thresholds and colour code used in output figures presented later in this chapter.

Table 4: SIDRA Intersection Level of Service Criteria (Delay and HCM 2010 Method)

LEVEL OF SERVICE	GIVE-WAY / ROUNDABOUT	SIGNAL CONTROL	COLOUR CODE
A	D ≤ 10s	D ≤ 10s	
B	10s < D ≤ 15s	10s < D ≤ 20s	
C	15s < D ≤ 25s	20s < D ≤ 35s	
D	25s < D ≤ 35s	35s < D ≤ 50s	
E	35s < D ≤ 50s	55s < D ≤ 80s	
F	D ≥ 50s	D ≥ 80s or V/C ≥ 1	

5.1 2018 Base Case

The summary of SIDRA Intersection network results for the *2018 Base Case* scenario is shown in Table 5. The 2018 models indicate a good level of performance under current conditions.

Table 5: 2018 Base Case Intersection Performance Summary

INTERSECTION		AM PEAK			PM PEAK		
		DELAY	LOS	QUEUE	DELAY	LOS	QUEUE
1	London Circuit – Edinburgh Avenue	25.2	C	58 (S)	22.4	C	50 (S)
4	London Circuit – Gordon Street	20.3	C	48 (S)	15.7	B	29 (S)
5	London Circuit – Farrell Place	1.6 (16.0)	C*	2 (W)	2.1 (17.2)	C*	2 (W)
6	London Circuit – Knowles Place (S)	1.4 (13.4)	B*	3 (E)	3.3 (13.7)	B*	7 (E)
7	London Circuit – University Avenue	2.1 (15.9)	C*	1 (W)	1.8 (16.6)	C*	1 (W)
8	London Circuit – Knowles Place (N)	1.6 (4.1)	A*	2 (S)	0.7 (4.1)	A*	2 (S)

* SIDRA Intersection does not report Level of Service for sign-controlled intersections. The worst movement LoS is shown instead and the worst movement delay is also shown in parenthesis.

The SIDRA Intersection network layout and lane Level of Service diagrams for 2018 AM and 2018 PM are shown in Figures 14 and 15 respectively.

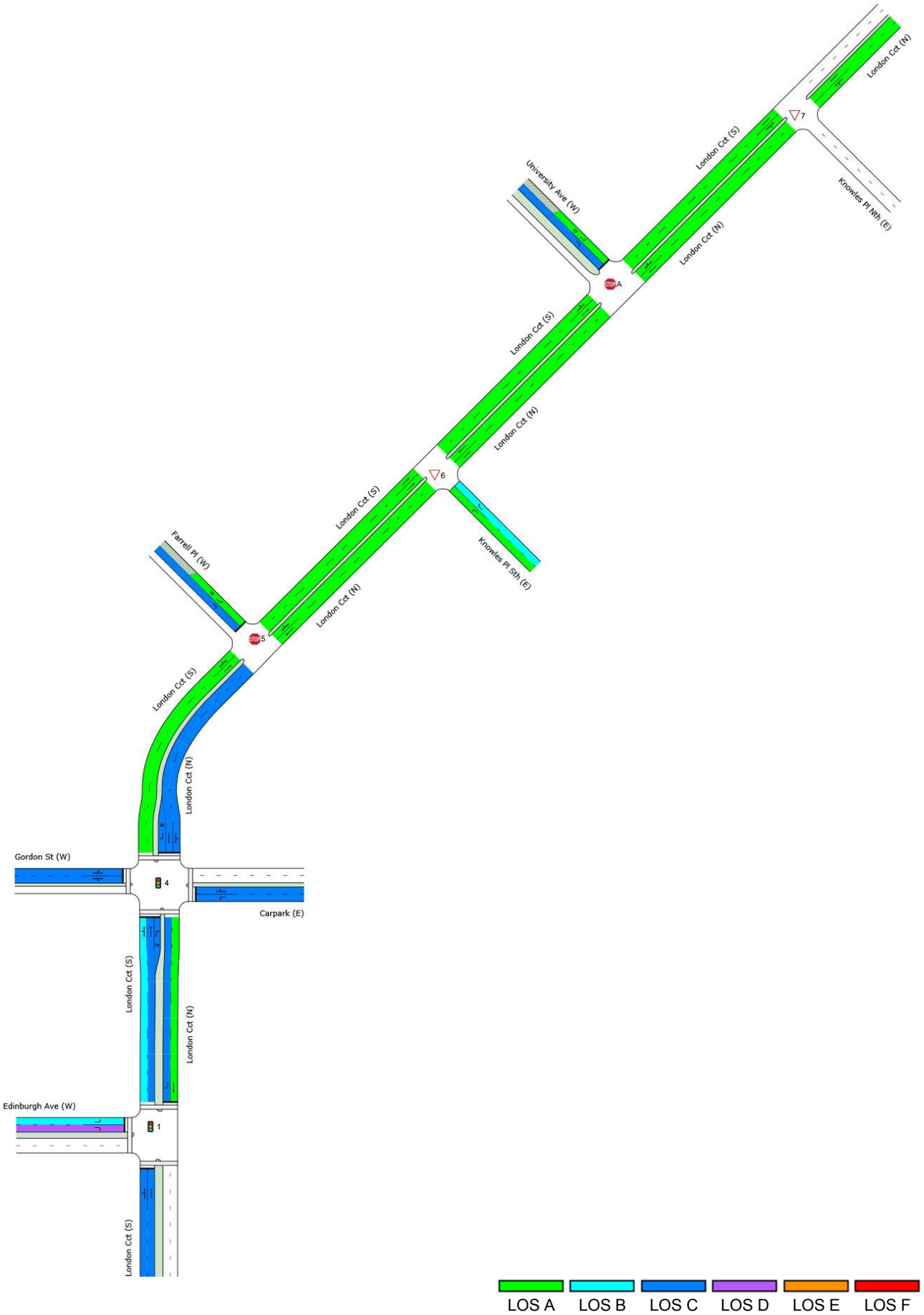


Figure 14: 2018 AM Base Case Network Level of Service

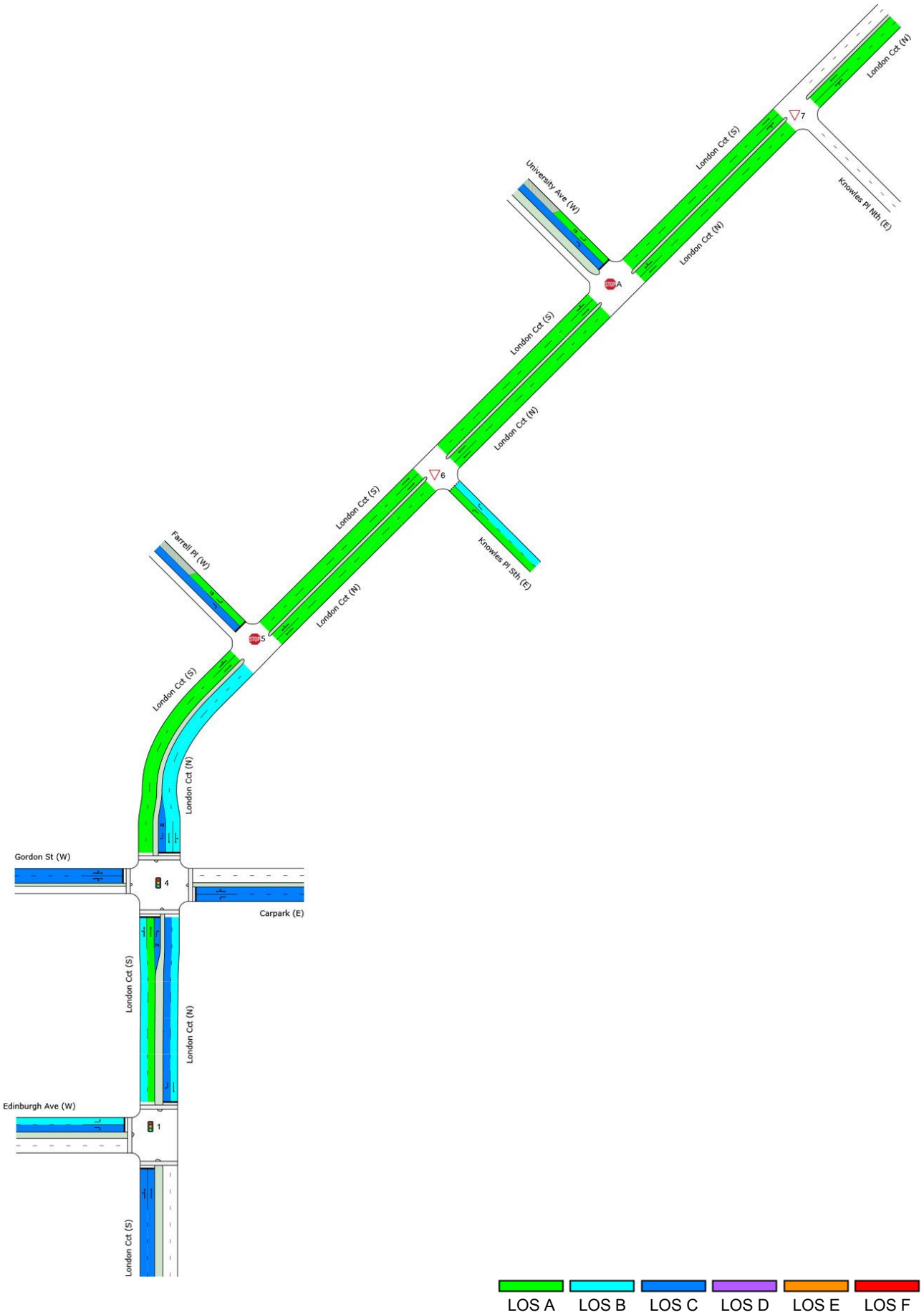


Figure 15: 2018 PM Base Case Network Level of Service

5.2 2031 Do Minimum

The SIDRA Network layout for 2031 Do Minimum scenario is shown in Figure 16. For this scenario, the Edinburgh Avenue extension has been included, with access to assumed developments on the southern side. Edinburgh Avenue has been modelled with a similar layout to the Constitution Avenue extension, with two lanes each way between London Circuit and Vernon Circle. There is an additional left turn lane from Edinburgh Avenue extension westbound to London Circuit southbound. To maximise pedestrian safety and accessibility, no left-turn slip lanes have been included and all left turns are signal controlled.

All other intersections remain as they were in 2018. The potential installation of light rail lines on London Circuit has not been considered.

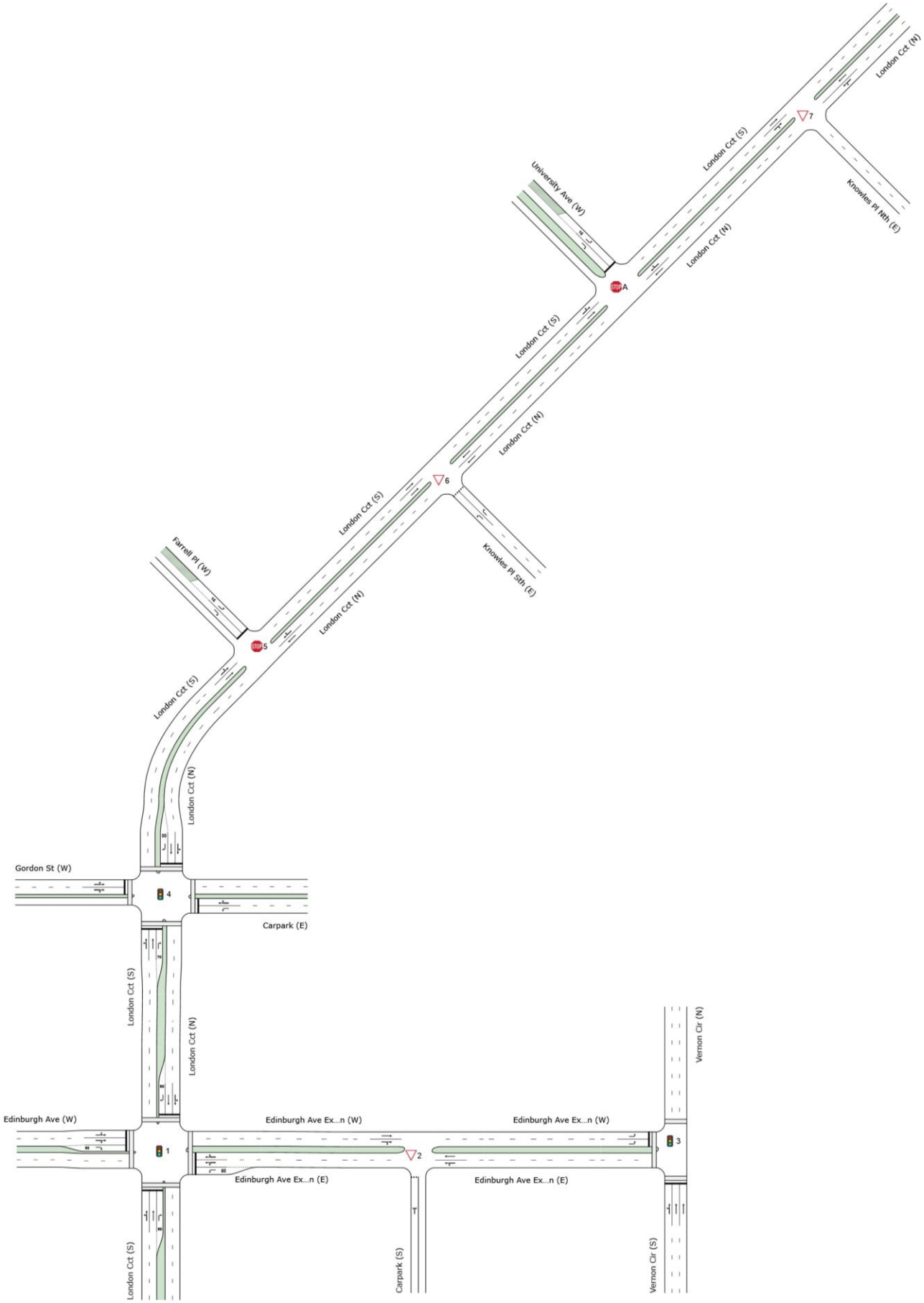


Figure 16: 2031 Do Minimum SIDRA Network Layout

The summary of SIDRA Intersection network results for the *2031 Do Minimum* scenario is shown in Table 6, which indicate that the network generally operates at an acceptable level with all intersections operating at LoS E or better. The intersection of London Circuit with Edinburgh Avenue operates very close to capacity with some individual movements operating at LoS F.

Gordon Street operates with longer average delays than in 2018, but remains at LoS C.

Many of the give-way intersections still have good average delay, however at Farrell Place the right turn out of the side street has performance issues, particularly in the PM peak, where it operates at LoS F.

Table 6: 2031 Do Minimum Intersection Performance Summary

INTERSECTION		AM PEAK			PM PEAK		
		DELAY	LOS	QUEUE	DELAY	LOS	QUEUE
1	London Circuit – Edinburgh Avenue	61.0	E	153.7 (W)	73.8	E	164.3 (S)
2	Edinburgh Avenue ext'n – Knowles Place ext'n	1.9 (20.6)	C*	34.9 (W)	3.7 (27.1)	D*	40.0 (E)
3	Vernon Circle – Edinburgh Avenue ext'n	24.7	C	134.8 (S)	21.6	C	137.0 (S)
4	London Circuit – Gordon Street	24.9	C	60.7 (S)	23.0	C	64.4 (E)
5	London Circuit – Farrell Place	2.3 (26.2)	D*	4.9 (N)	7.2 (82.0)	F*	14.9 (W)
6	London Circuit – Knowles Place (S)	1.9 (22.9)	C*	4.4 (E)	3.7 (20.7)	C*	8.8 (E)
7	London Circuit – University Avenue	1.8 (21.4)	C*	1.9 (N)	5.9 (26.1)	D*	11.3 (W)
8	London Circuit – Knowles Place (N)	1.6 (5.7)	A*	1.8 (S)	1.0 (4.0)	A*	1.9 (S)

* SIDRA Intersection does not report Level of Service for sign-controlled intersections. The worst movement LoS is shown instead and the worst movement delay is also shown in parenthesis.

The SIDRA Intersection network layout and lane Level of Service diagrams for 2018 AM and 2018 PM are shown in Figures 17 and 18 respectively.

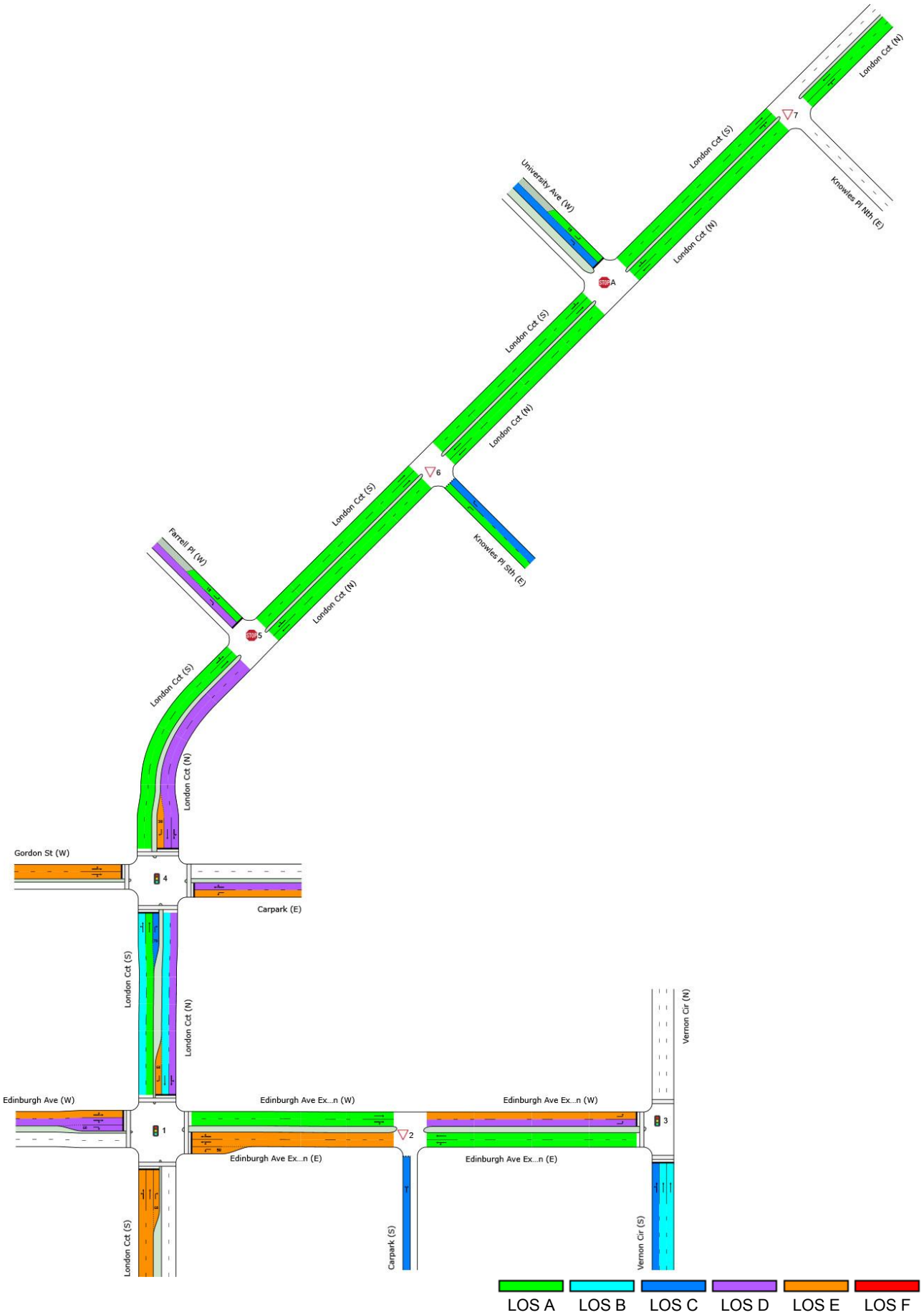


Figure 17: 2031 Do Minimum AM Network Level of Service

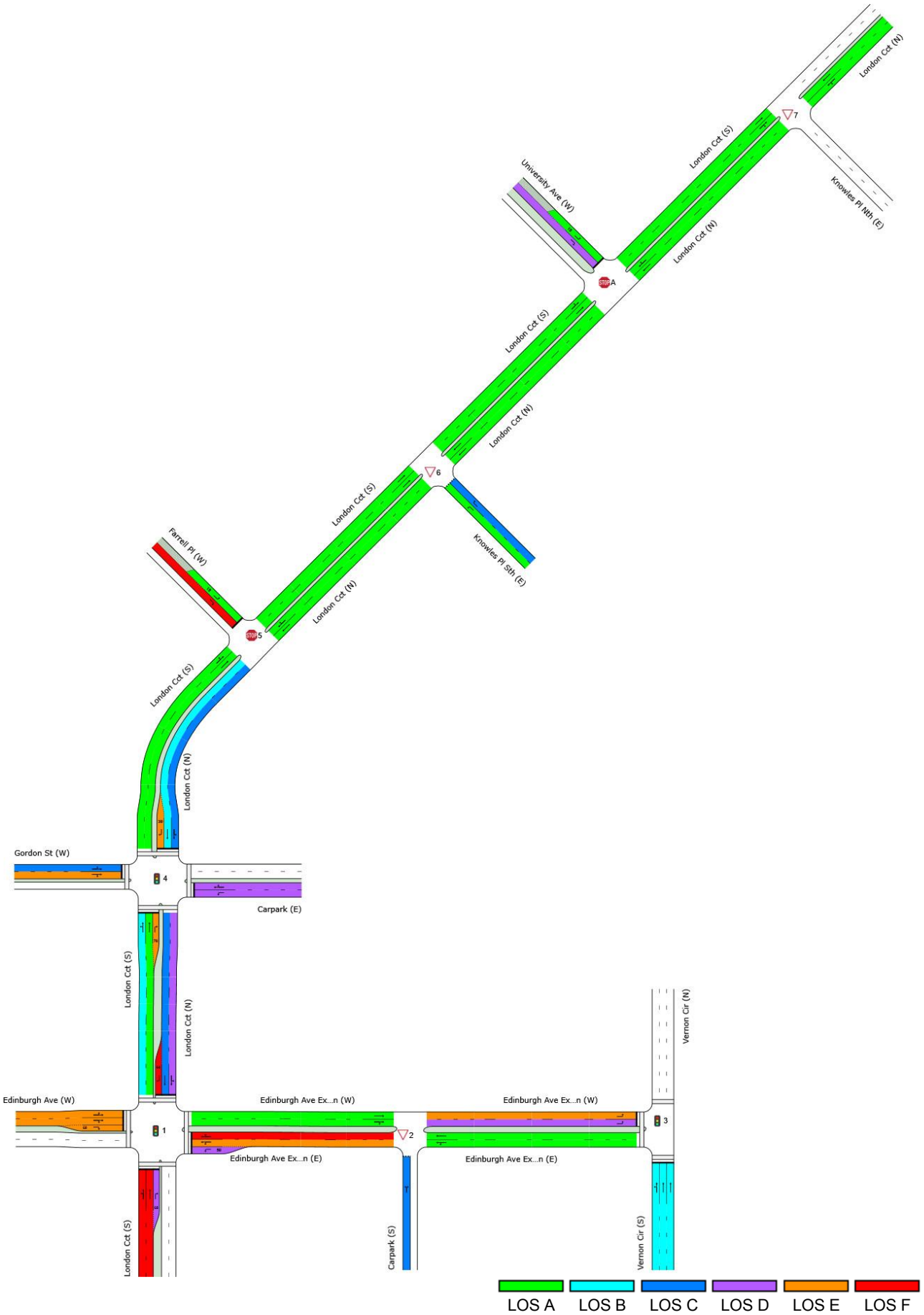


Figure 18: 2031 Do Minimum PM Network Level of Service

5.3 2031 Section 100

The SIDRA Network layout for 2031 Do Minimum scenario is shown in Figure 19. For this scenario, the Knowles Place extension to Edinburgh Avenue extension has been included, with full access to Edinburgh Avenue. Edinburgh Avenue has again been modelled with a similar layout to the Constitution Avenue extension, with two lanes each way for the entire length. There is an additional left turn lane from Edinburgh Avenue extension to London Circuit southbound. To maximise pedestrian safety and accessibility, no left-turn slip lanes have been included and all left turns are signal controlled. At the intersection of Knowles Place and Knowles Place extension (including Section 100 public carpark access,) priority is given to the major traffic movements, which are east-west, to and from the carpark. Knowles Place between London Circuit and Knowles Place extension operates two-way but has Left-In/Left-Out access only at London Circuit.

All other intersections remain as they were in 2018. The potential installation of light rail lines on London Circuit has not been considered.

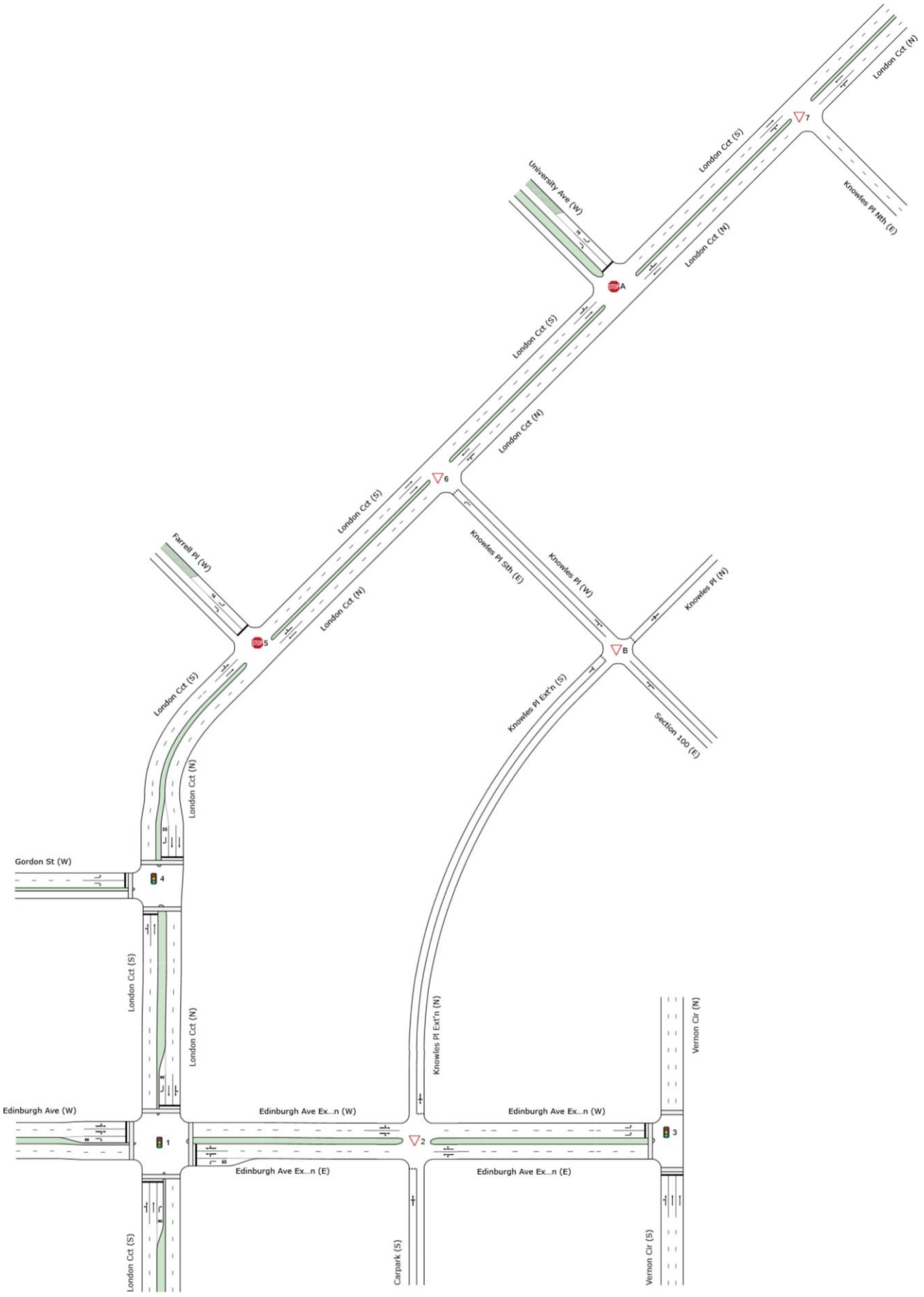


Figure 19: 2031 Section 100 SIDRA Network Layout

The summary of SIDRA Intersection network results for the *2031 Section 100* scenario is shown in Table 7. Two intersections along Edinburgh Avenue have performance issues. The poor performance at Edinburgh Avenue extension – Knowles Place extension is largely confined to the right turns out of Knowles Place extension. The queue generated along Knowles Place extension southbound then has knock-on effects further upstream. The average delay at London Circuit – Edinburgh Avenue has increased only slightly from *2031 Do Minimum*, however the queue that develops on Edinburgh Avenue extension westbound overflows and blocks the Knowles Place extension intersection.

These issues suggest some changes to the road network assumptions to improve performance:

- Provision of only Left-In/Left-Out (LILO) access between Knowles Place extension and Edinburgh Avenue. This would eliminate the right turn delays and the reduction in traffic entering Edinburgh Avenue extension would also reduce the effect of the queue on Vernon Circle. However, it should be noted that this would shift traffic and increase the demand on Knowles Place.
- Provision of two-way access at Knowles Place (north), to allow vehicles leaving the City Block 13 Section 63 car park (adjacent the law courts) direct access to London Circuit. Knowles Place along the front of the law courts can remain one-way. This will reduce traffic at the Knowles Place – Knowles Place extension intersection.

With the removal of the car park access from the London Circuit – Gordon Street intersection, it is now a three-way intersection and its performance has improved as a result.

The poor performance at University Avenue in the AM peak and Farrell Place in the PM peak is dominated by the right turn out of each side street, being unable to find sufficient gaps in the flow on both directions of London Circuit. Management of or improvement to these intersections might need to be considered, for example coordinated signal control at University Avenue.

Table 7: 2031 With Section 100 Intersection Performance Summary

INTERSECTION		AM PEAK			PM PEAK		
		DELAY	LOS	QUEUE	DELAY	LOS	QUEUE
1	London Circuit – Edinburgh Avenue	76.0	E	203.8 (S)	60.9	E	152.0 (S)
2	Edinburgh Avenue ext'n – Knowles Place ext'n	>1,000 (>1,000)	F*	139.9 (N)	>1,000 (>1,000)	F*	189.7 (S)
3	Vernon Circle – Edinburgh Avenue ext'n	18.2	B	196.9 (S)	17.0	B	126.3 (S)
4	London Circuit – Gordon Street	8.9	A	41.1 (S)	9.1	A	36.4 (N)
5	London Circuit – Farrell Place	4.6 (48.7)	E*	10.3 (N)	280.2 (>1,000)	F*	323.0 (W)
6	London Circuit – Knowles Place (S)	1.8 (4.3)	A*	60.0 (N)	2.3 (4.3)	A*	60.0 (N)
7	London Circuit – University Avenue	58.1 (431.2)	F*	132.3 (W)	5.0 (15.1)	C*	60.0 (N)
8	London Circuit – Knowles Place (N)	2.9 (3.4)	A*	>1,000 (N)	1.7 (4.1)	A*	>1,000 (N)
9	Knowles Place – Knowles Place ext'n	201.1 (492.0)	F*	>1,000 (E)	168.7 (800.0)	F*	544.4 (E)

* SIDRA Intersection does not report Level of Service for sign-controlled intersections. The worst movement LoS is shown instead and the worst movement delay is also shown in parenthesis.

The SIDRA Intersection network layout and lane Level of Service diagrams for 2018 AM and 2018 PM are shown in Figures 20 and 21 respectively.

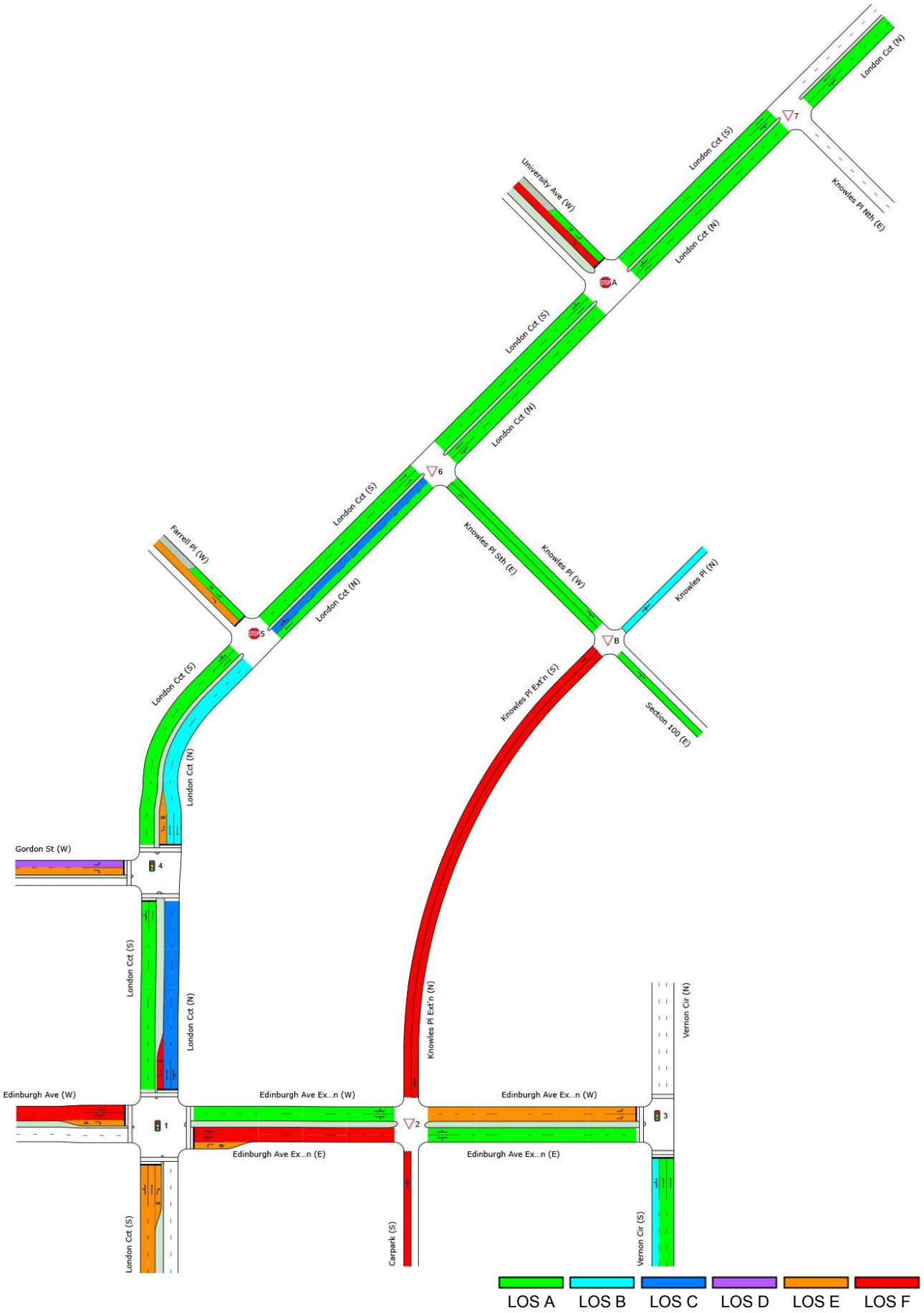


Figure 20: 2031 With Section 100 AM Network Level of Service

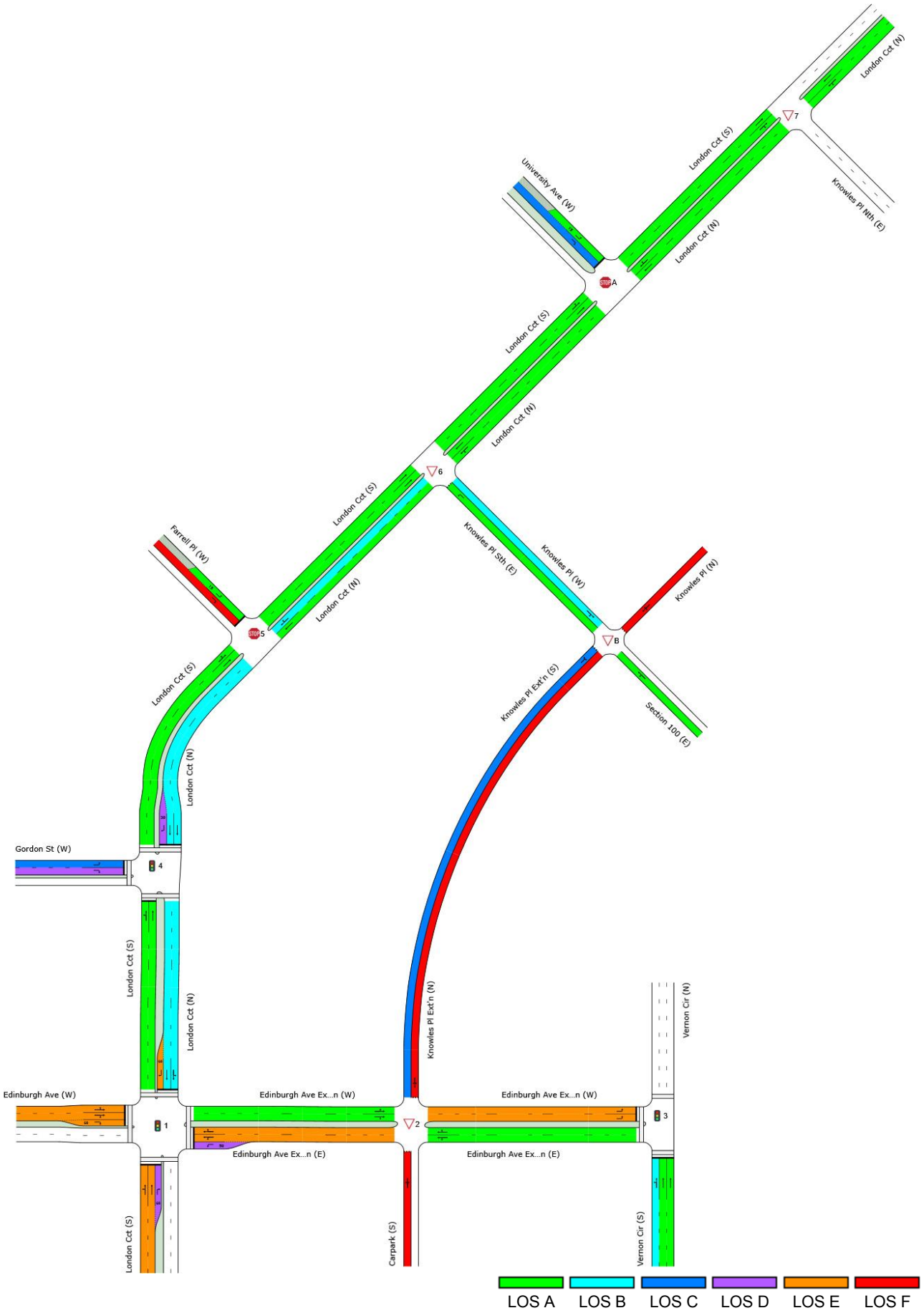


Figure 21: 2031 With Section 100 PM Network Level of Service

5.4 Intersection Modelling Summary

Table 8 shows a comparison of the 2031 Do Minimum and Section 100 intersection analysis results. In the 2031 Do Minimum scenario, the following intersections operate below an acceptable LoS:

- London Circuit – Farrell Place (PM peak right turn out of Farrell Place only)
- London Circuit – Edinburgh Avenue (operates close to capacity with some movements at LoS F)

The development of Section 100, using the trip generation rates and road network assumptions discussed earlier, would cause the following intersections to fall below an acceptable LoS:

- Edinburgh Avenue extension – Knowles Place extension (AM and PM peaks)
- London Circuit – University Avenue (AM peak right turn out of University Avenue)

The intersections of London Circuit with Farrell Place and University Avenue have been modelled as priority controlled, as per their current layout. It is possible that the construction of LRS2 will lead to changes to these intersections as it is unlikely that priority controlled vehicle movements will be permitted across the light rail route.

In addition, the new intersection between Knowles Place and Knowles Place extension is expected to operate at LoS F in 2031.

The new intersection of Edinburgh Avenue extension with London Circuit is expected to operate at LoS E in all future scenarios.

Table 8: 2031 Intersection Performance Summary Comparison

INTERSECTION		AM PEAK				PM PEAK			
		DO MINIMUM		SECTION 100		DO MINIMUM		SECTION 100	
		DELAY	LOS	DELAY	LOS	DELAY	LOS	DELAY	LOS
1	London Circuit – Edinburgh Avenue	61.0	E	76.0	E	73.8	E	60.9	E
2	Edinburgh Avenue ext'n – Knowles Place ext'n	1.9 (20.6)	C*	>1,000 (>1,000)	F*	3.7 (27.1)	D*	>1,000 (>1,000)	F*
3	Vernon Circle – Edinburgh Avenue ext'n	24.7	C	18.2	B	21.6	C	17.0	B
4	London Circuit – Gordon Street	24.9	C	8.9	A	23.0	C	9.1	A
5	London Circuit – Farrell Place	2.3 (26.2)	D*	4.6 (48.7)	E*	7.2 (82.0)	F*	280.2 (>1,000)	F*
6	London Circuit – Knowles Place (S)	1.9 (22.9)	C*	1.8 (4.3)	A*	3.7 (20.7)	C*	2.3 (4.3)	A*
7	London Circuit – University Avenue	1.8 (21.4)	C*	58.1 (431.2)	F*	5.9 (26.1)	D*	5.0 (15.1)	C*
8	London Circuit – Knowles Place (N)	1.6 (5.7)	A*	2.9 (3.4)	A*	1.0 (4.0)	A*	1.7 (4.1)	A*
9	Knowles Place – Knowles Place ext'n	-	-	201.1 (492.0)	F*	-	-	168.7 (800.0)	F*

* SIDRA Intersection does not report Level of Service for sign-controlled intersections. The worst movement LoS is shown instead.

The SIDRA Intersection analysis of City Section 100 indicates the following:

- Performance in the area is quite good in 2018.
- There is a significant increase in delay at some intersections between 2018 and 2031, before considering any additional development in Section 100. Most intersections continue to operate reasonably well overall, however turning right out of some side streets would be difficult. In particular, the right turn out of Farrell Place in the PM peak operates at LoS F. The intersection of London Circuit with Edinburgh Avenue operates very close to capacity and some movements operate at LoS F.
- The addition of land use and Knowles Place extension in the *2031 Section 100* scenario will require careful thought regarding the network connectivity and the routes vehicles will be allowed to use to enter and exit the precinct. The London Circuit – Edinburgh Avenue intersection experiences an impact in the AM peak, although it still operates at LoS E, while the additional traffic on Edinburgh Avenue extension means that the right turns out of both sides of Knowles Place extension operate very poorly. The queue from the right turn out of Knowles Place extension causes substantial queueing inside the Section 100 development area and may cause issues with driveway access to the basement parking areas.
- The traffic generated by Section 100 causes additional delays for traffic turning right out of University Avenue onto London Circuit, particularly in the AM peak, and the access arrangements at this intersection will need to be reviewed.
- Some possible improvements to the proposed *2031 Section 100* road network have been identified:
  - Allow only Left-In/Left-Out access to Knowles Place extension where it meets Edinburgh Avenue extension.
  - Allow two-way access on Knowles Place north so that vehicles leaving the existing law courts car park do not have to travel south on Knowles Place to access London Circuit.
  - Signal control at London Circuit – University Avenue to better control traffic and the intersection's performance.

6 Conclusion

6.1 Summary

SMEC was engaged by Spiire to undertake an assessment of the impact on the road network of traffic generated by a proposed development on Section 100, City. The proposed development includes residential, commercial and retail land uses. The development would be accessed via a new extension of Knowles Place, connecting the existing Knowles Place to the proposed Edinburgh Avenue extension to Vernon Circle. The existing car parking on the site, currently accessed via Gordon Street, would be accessed via Knowles Place.

SMEC generated traffic volumes in accordance with ACT and RMS published generation rates. The traffic was distributed using ITE published proportions. The generated traffic was assigned to the Canberra road network using the CSTM, which distributes trips across the whole urban area. This process allows the redistribution of trips caused by increased congestion or displaced trip ends to be accurately modelled.

The CSTM results showed that the increased traffic is confined to a relatively small area on the western side of Civic and Acton. The increased traffic causes the western part of Vernon Circle and the Knowles Place extension to operate over capacity. All other roads in the area do not operate over capacity after the proposed development.

The CSTM outputs were used in conjunction with SCATS traffic counts supplied by TCCS to conduct intersection modelling using SIDRA Network. SIDRA Network allows closely spaced intersections to be modelled by quantifying the effects of platoons and queues on adjacent intersections in the network.

Intersection layouts for the future scenarios were developed using the assumptions made at Constitution Avenue extension as a basis and emphasising pedestrian amenity by omitting left-turn slip lanes.

The SIDRA Network analysis showed that the local road network operates well in 2018 but degrades in 2031 Do Minimum and then degrades further with the proposed development at Section 100. In the 2031 Do Minimum scenario, the following intersection already operates at LoS F in at least one of the peak periods:

- London Circuit – Farrell Place (PM peak right turn out of Farrell Place only)
- London Circuit – Edinburgh Avenue (close to capacity with some movements operating at LoS F))

The proposed Section 100 development is expected to further worsen the performance of these intersections and would also cause three more intersections to operate poorly in 2031. These are:

- London Circuit – Edinburgh Avenue (AM Peak, overall LoS E)
- Edinburgh Avenue extension – Knowles Place extension (AM and PM peaks)
- London Circuit – University Avenue (AM peak right turn out of University Avenue only)

Substantial queueing associated with the right turn out of Knowles Place onto Edinburgh Avenue extension will extend back into Section 100 and may interfere with the operation of other intersections and basement parking access driveways.

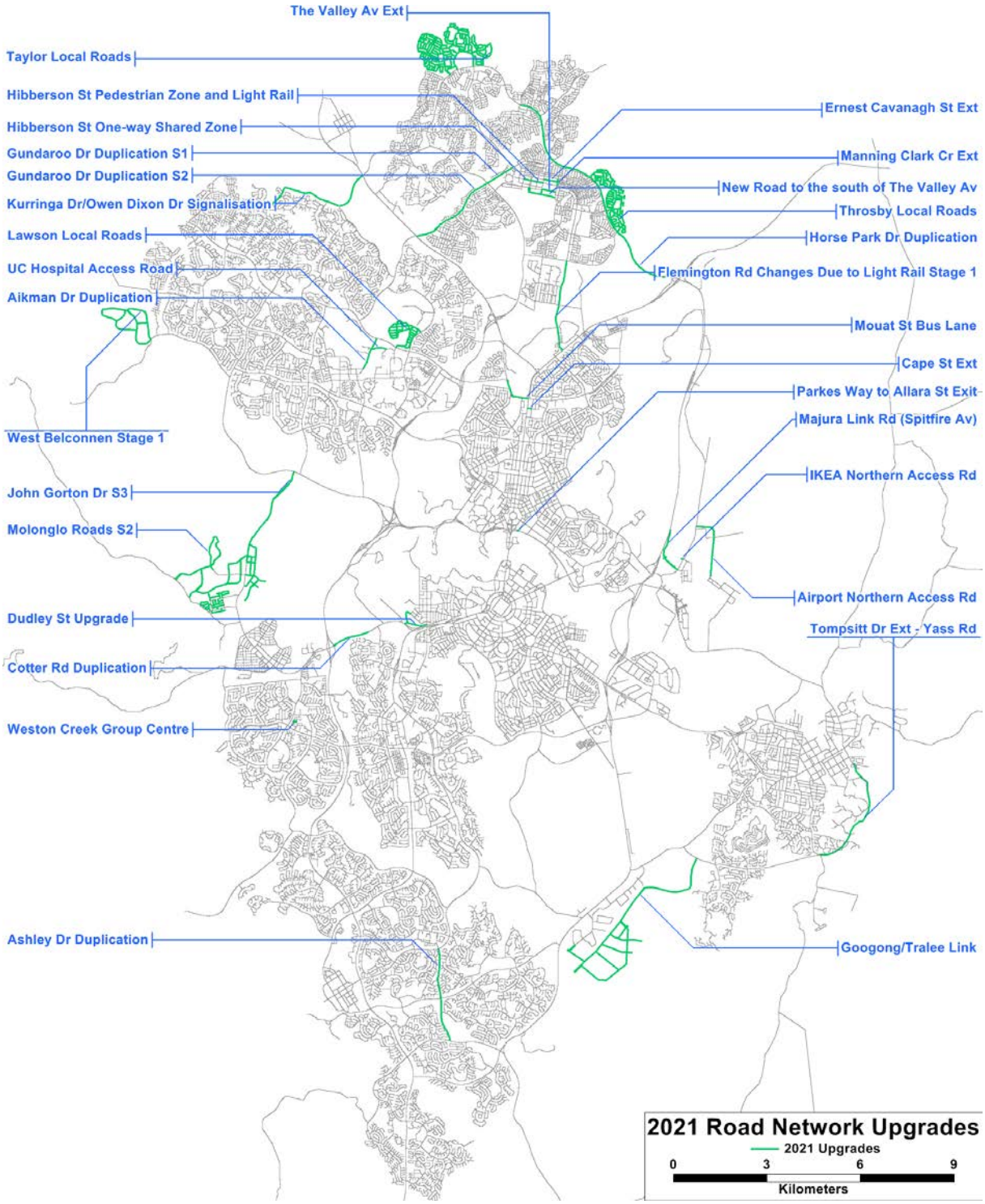
It is expected that the intersections of London Circuit with Farrell Place and University Avenue will be different in the future if LRS2 proceeds but the expected layout of these intersections is not yet known. They may operate at an acceptable LoS in in the LRS2 design.

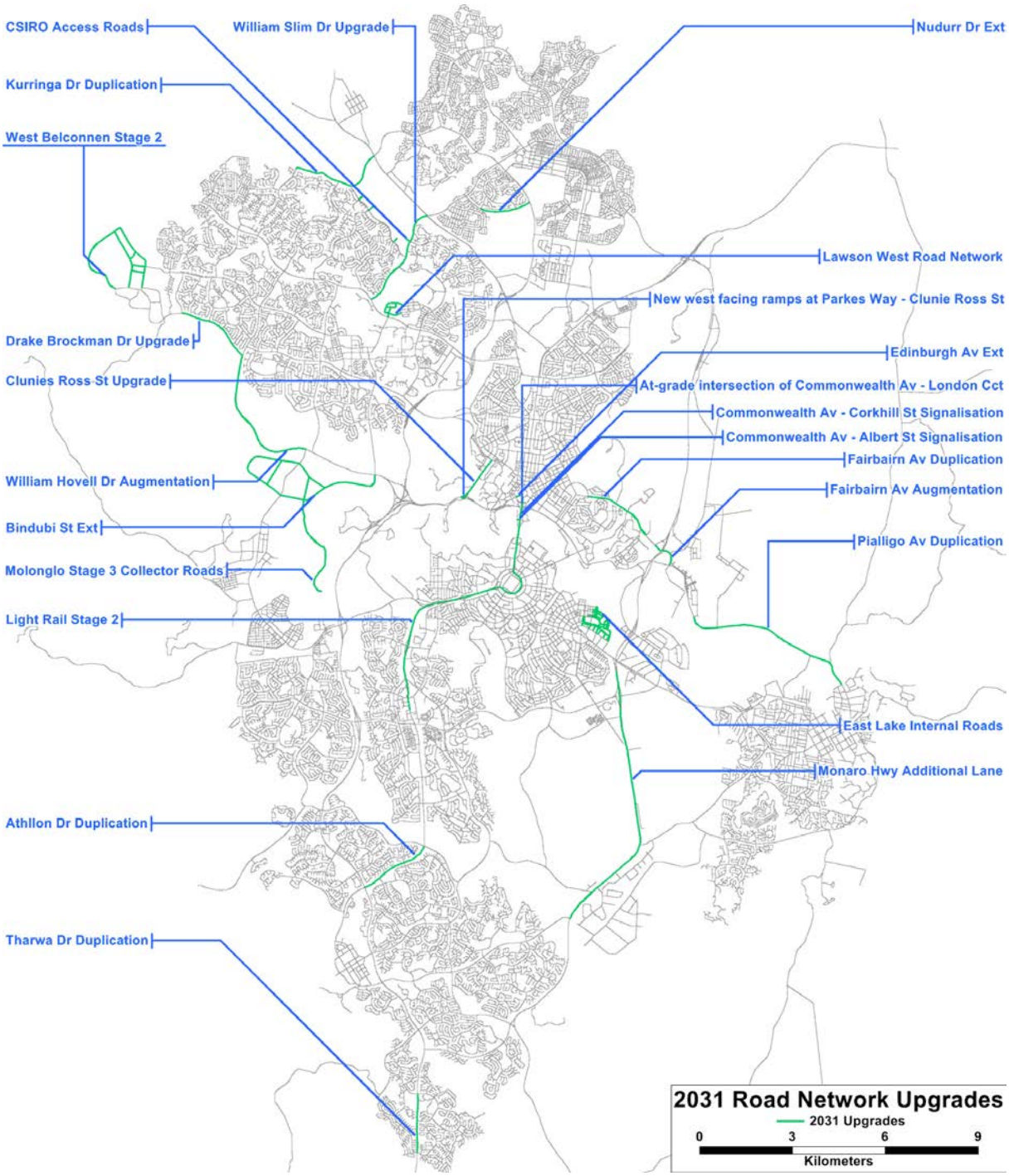
6.2 Recommendations

Based on the outcomes of the transport modelling and analysis, SMEC recommends the following:

- Allow two-way access on Knowles Place north so that vehicles leaving the existing law courts car park do not have to travel south on Knowles Place to access London Circuit.
- Include a continuous median on Edinburgh Avenue extension so that the intersection with Knowles Place extension operates as left-in, left-out only, noting that this will likely increase traffic volumes on London Circuit and the northern end of Knowles Place.

Appendix A Future Road Network Assumptions




CSIRO Access Roads
William Slim Dr Upgrade
Nudurr Dr Ext
Kurringa Dr Duplication
West Belconnen Stage 2
Lawson West Road Network
New west facing ramps at Parkes Way - Clunie Ross St
Drake Brockman Dr Upgrade
Edinburgh Av Ext
Clunies Ross St Upgrade
At-grade intersection of Commonwealth Av - London Cct
Commonwealth Av - Corkhill St Signalisation
Commonwealth Av - Albert St Signalisation
Fairbairn Av Duplication
William Hovell Dr Augmentation
Fairbairn Av Augmentation
Bindubi St Ext
Pialligo Av Duplication
Molonglo Stage 3 Collector Roads
Light Rail Stage 2
East Lake Internal Roads
Monaro Hwy Additional Lane
Athllon Dr Duplication
Tharwa Dr Duplication
2031 Road Network Upgrades
2031 Upgrades
0
3
6
9
Kilometers

Appendix B Intersection Turning Movement Volumes

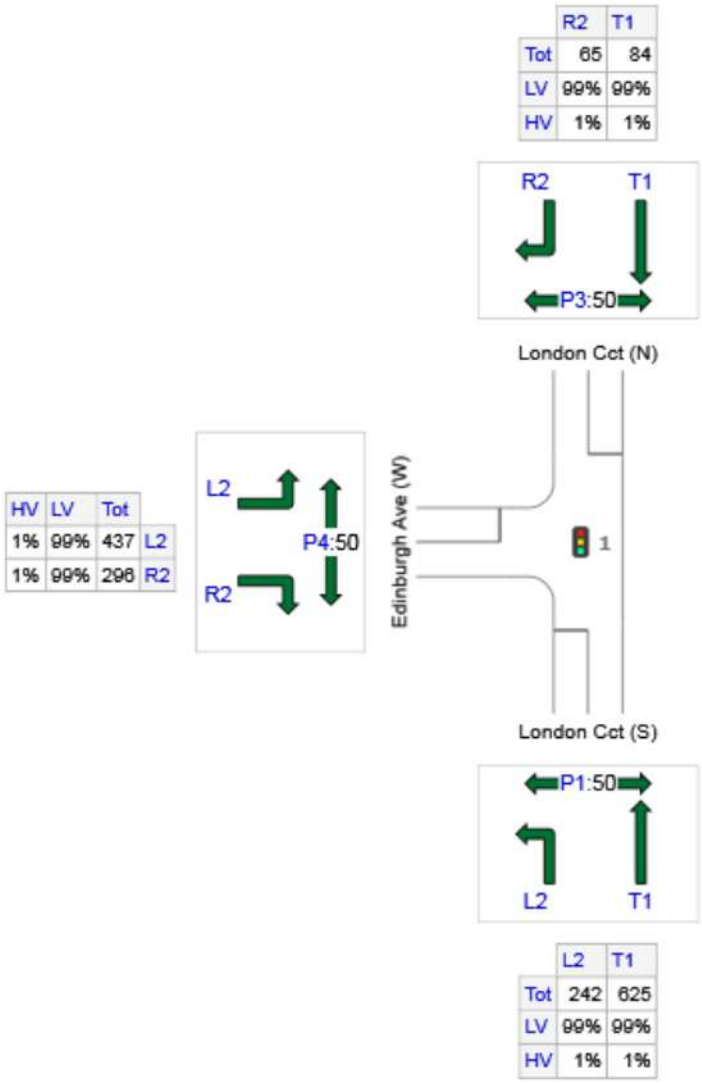
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [1: London - Edinburgh EXISTING]

London Circuit - Edinburgh Avenue
Existing
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	867	858	9
N: London Cct (N)	149	148	1
W: Edinburgh Ave (W)	733	726	7
Total	1749	1732	17

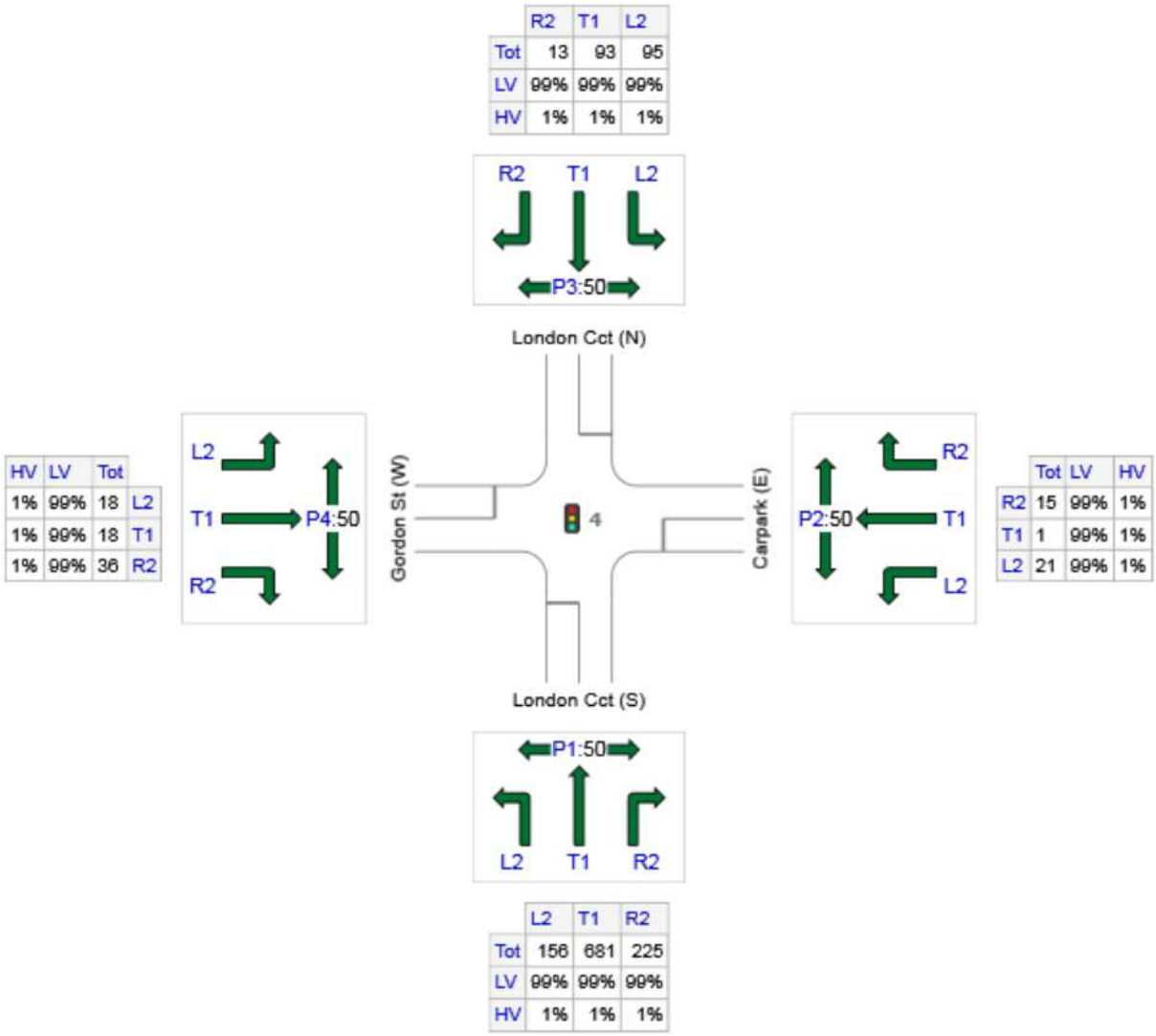
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 4 [4: London - Gordon EXISTING]

London Circuit - Gordon Street/Carpark Entrance
Existing
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	1062	1051	11
E: Carpark (E)	37	37	0
N: London Cct (N)	201	199	2
W: Gordon St (W)	72	71	1
Total	1372	1358	14

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

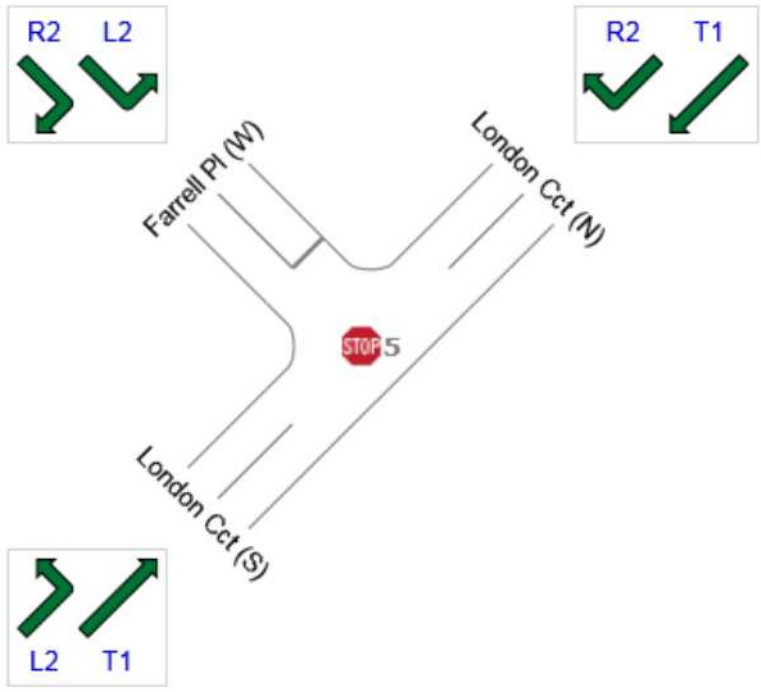
Site: 5 [5: London - Farrell EXISTING]

London Circuit - Farrell Place
Existing
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	48	3
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	18	152
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	152	585
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	170	168	2
NW: Farrell Pl (W)	51	50	1
SW: London Cct (S)	737	730	7
Total	958	948	10

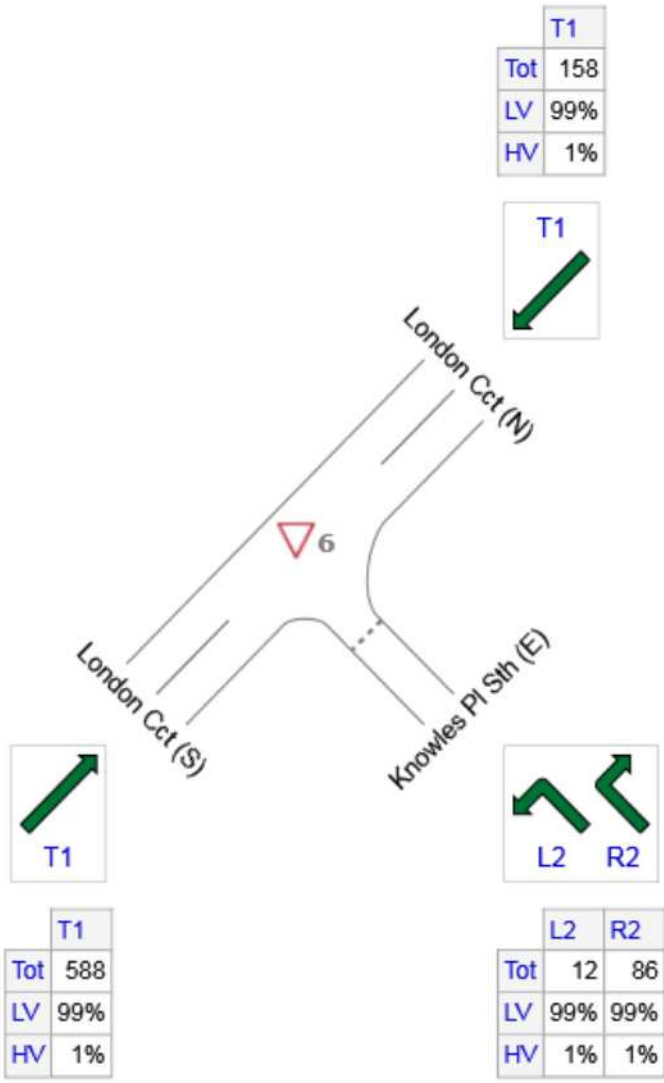
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 6 [6: London - Knowles Sth EXISTING]

London Circuit - Knowles Place South
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Knowles Pl Sth (E)	98	97	1
NE: London Cct (N)	158	156	2
SW: London Cct (S)	588	582	6
Total	844	836	8

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

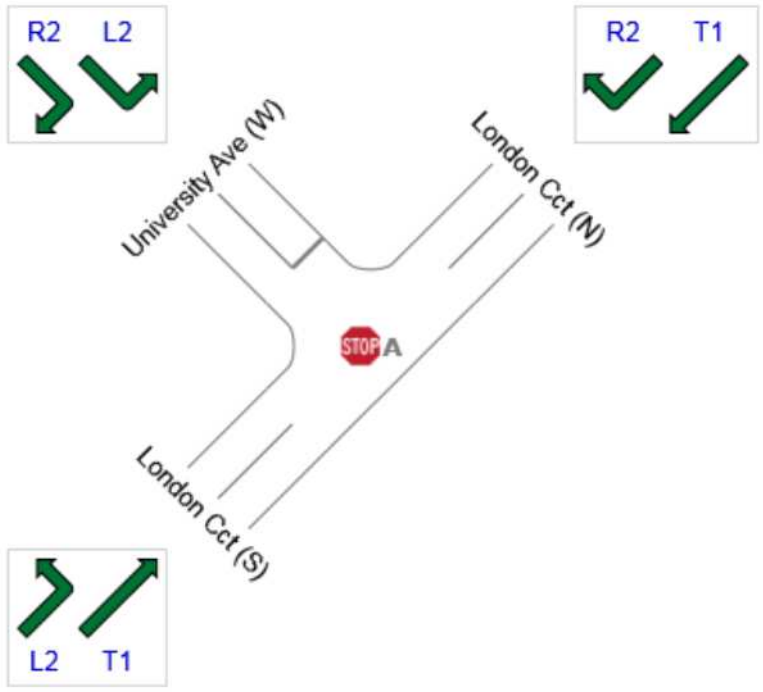
Site: A [A: London - University EXISTING]

London Circuit - University Avenue
Existing
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	43	28
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	6	116
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	252	422
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	122	121	1
NW: University Ave (W)	71	70	1
SW: London Cct (S)	674	667	7
Total	867	858	9

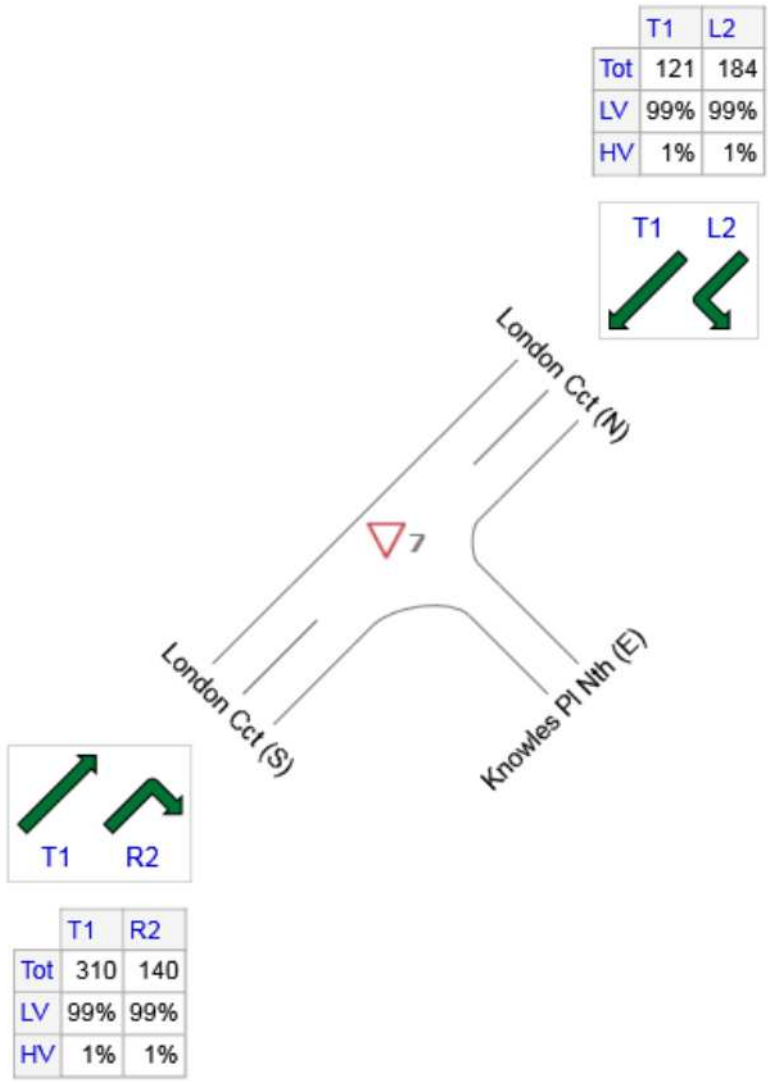
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 7 [7: London - Knowles Nth EXISTING]

London Circuit - Knowles Place North
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	305	302	3
SW: London Cct (S)	450	446	5
Total	755	747	8

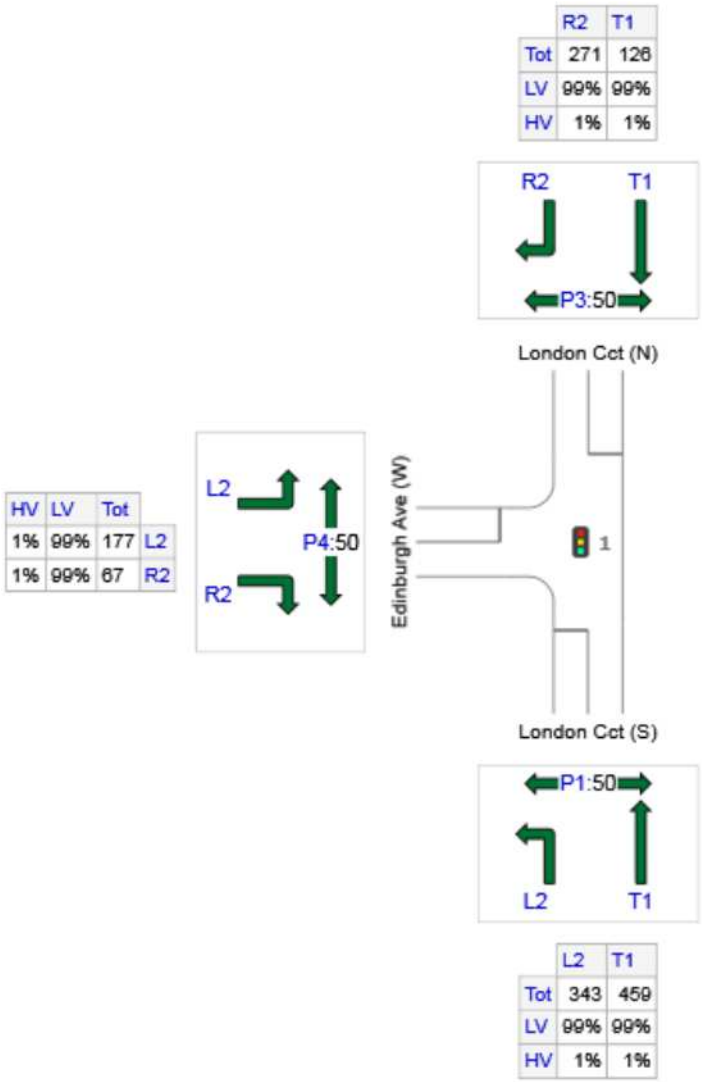
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [1: London - Edinburgh EXISTING]

London Circuit - Edinburgh Avenue
Existing
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	802	794	8
N: London Cct (N)	397	393	4
W: Edinburgh Ave (W)	244	242	2
Total	1443	1429	14

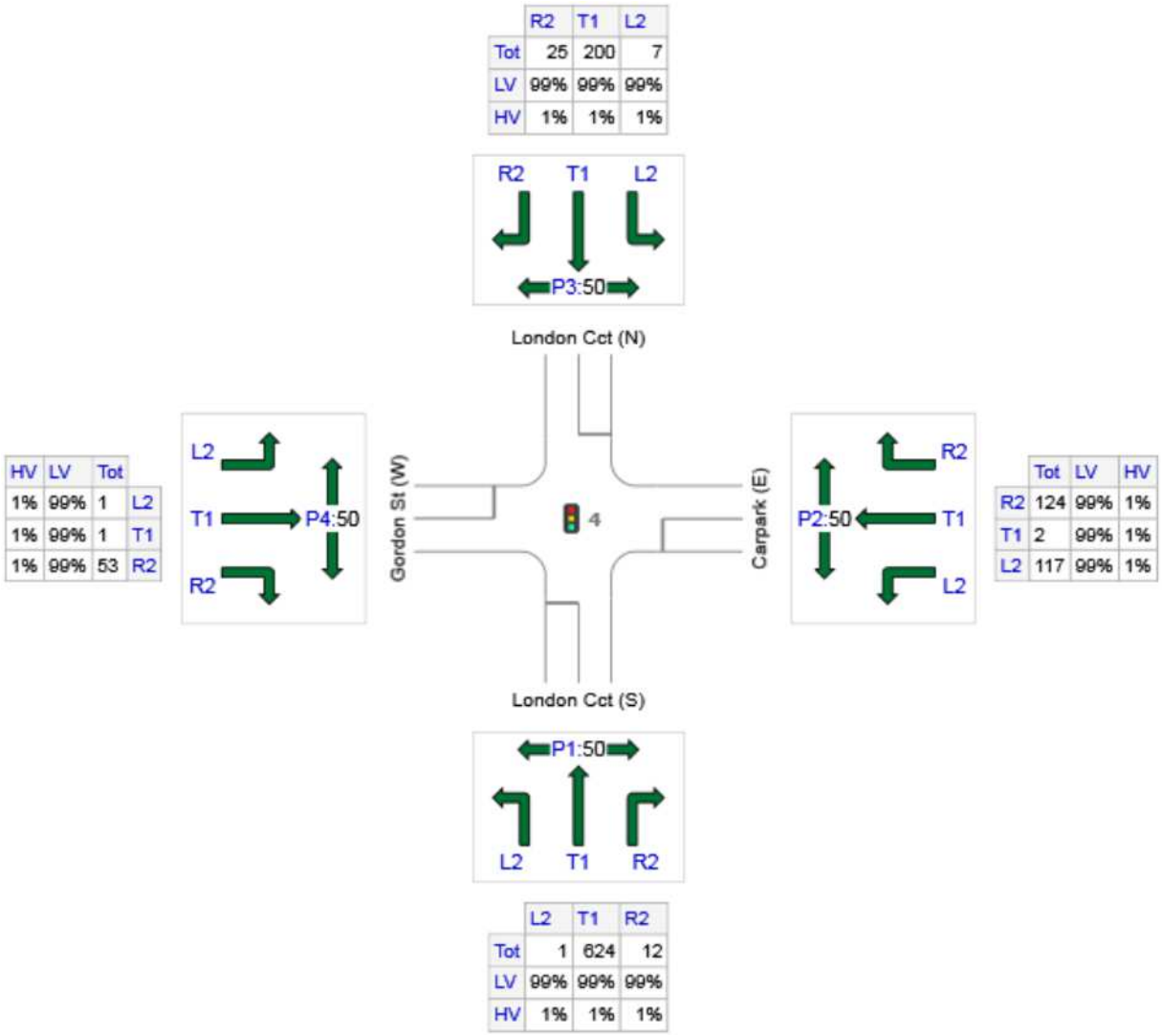
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 4 [4: London - Gordon EXISTING]

London Circuit - Gordon Street/Carpark Entrance
Existing
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	637	631	6
E: Carpark (E)	243	241	2
N: London Cct (N)	232	230	2
W: Gordon St (W)	55	54	1
Total	1167	1155	12

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

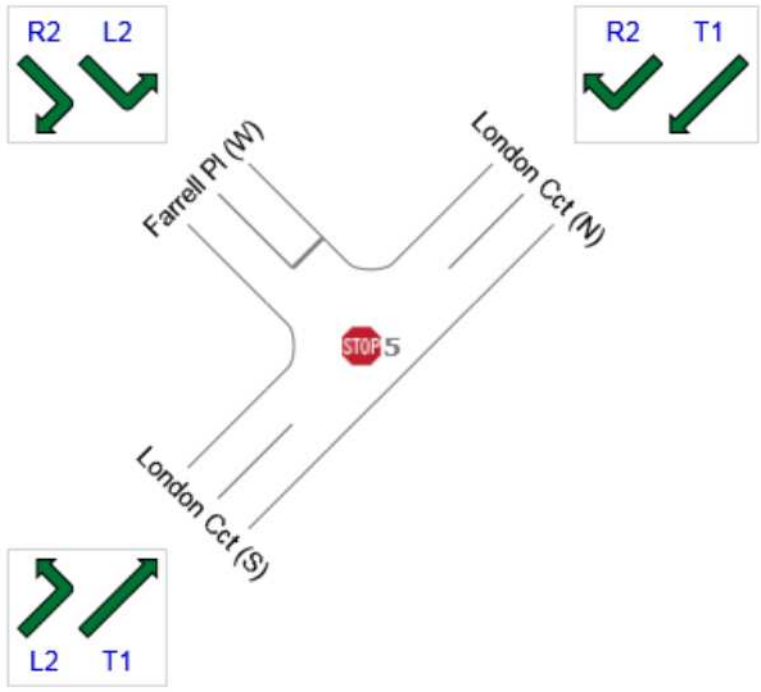
Site: 5 [5: London - Farrell EXISTING]

London Circuit - Farrell Place
Existing
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	58	1
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	6	175
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	310	485
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	181	179	2
NW: Farrell Pl (W)	59	58	1
SW: London Cct (S)	795	787	8
Total	1035	1025	10

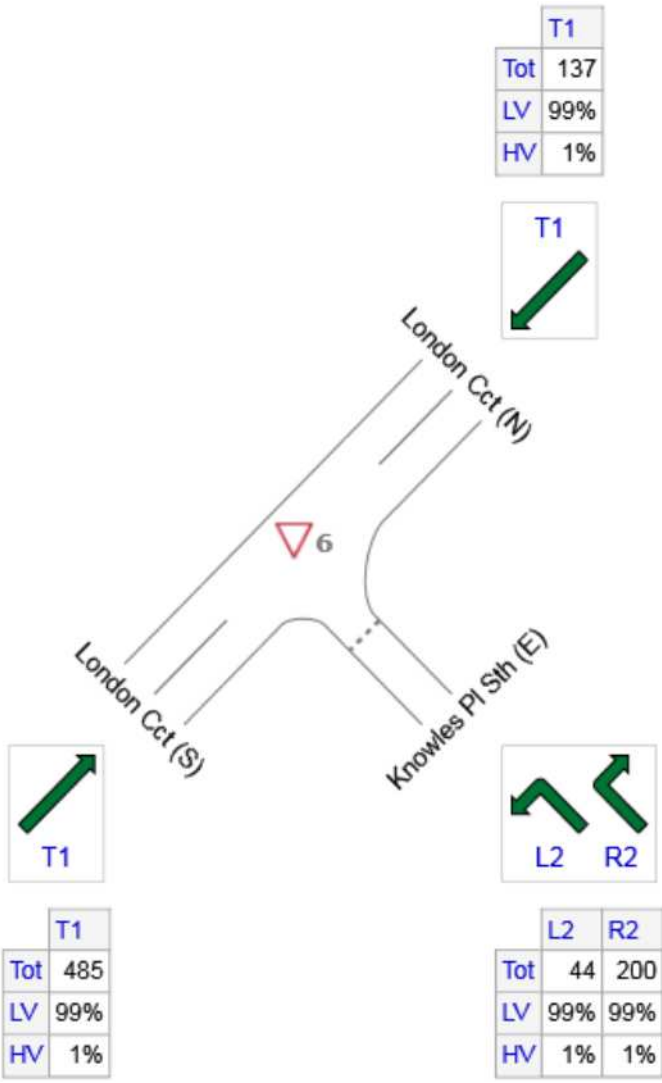
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 6 [6: London - Knowles Sth EXISTING]

London Circuit - Knowles Place South
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Knowles Pl Sth (E)	244	242	2
NE: London Cct (N)	137	136	1
SW: London Cct (S)	485	480	5
Total	866	857	9

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

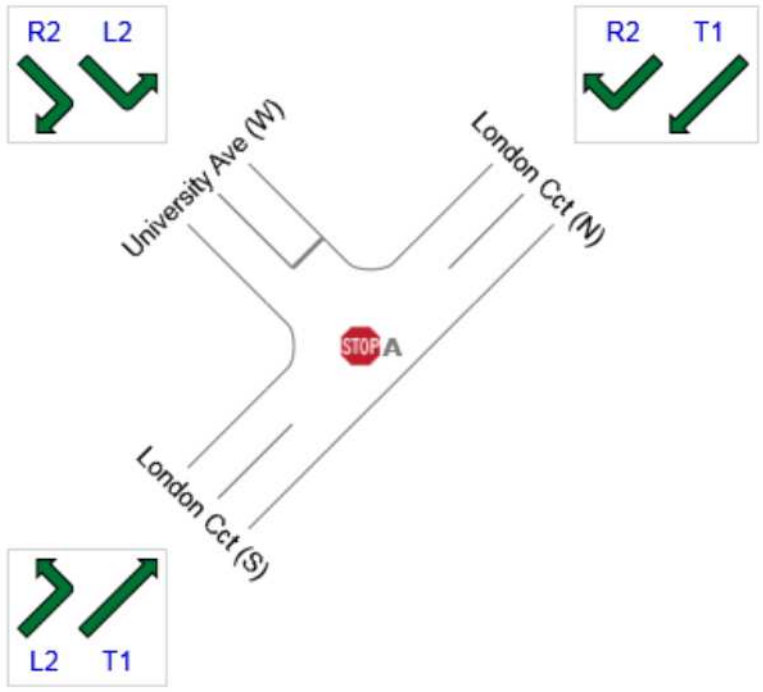
Site: A [A: London - University EXISTING]

London Circuit - University Avenue
Existing
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	17	94
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	4	120
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	171	513
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	124	123	1
NW: University Ave (W)	111	110	1
SW: London Cct (S)	684	677	7
Total	919	910	9

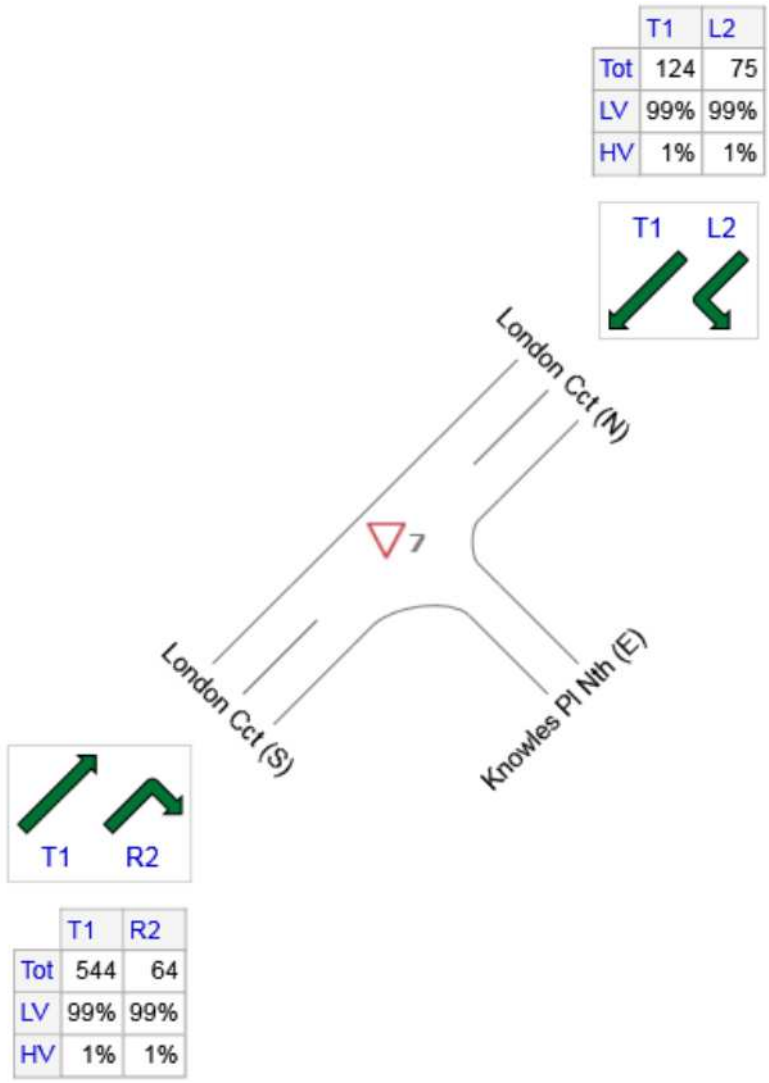
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 7 [7: London - Knowles Nth EXISTING]

London Circuit - Knowles Place North
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	199	197	2
SW: London Cct (S)	608	602	6
Total	807	799	8

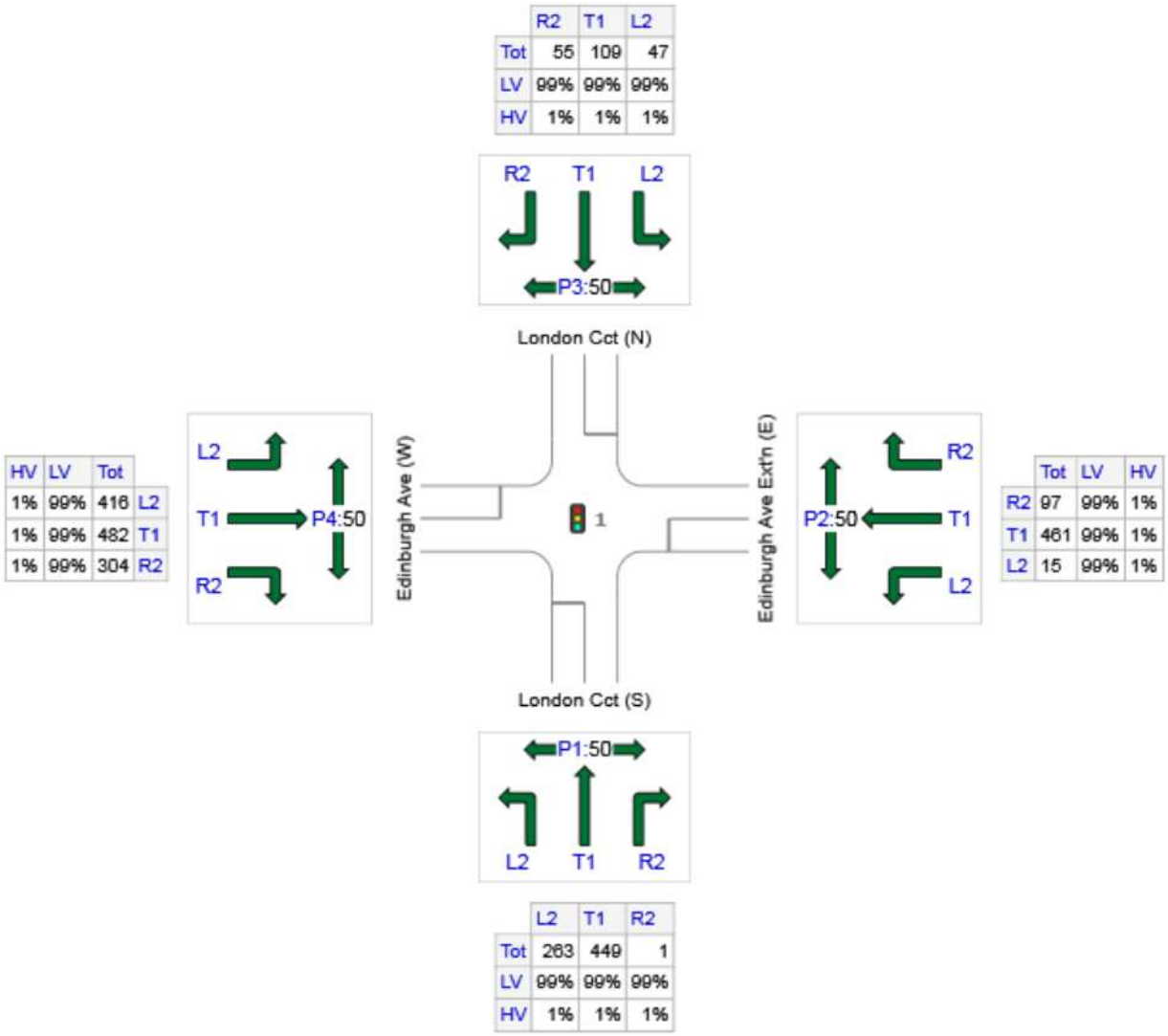
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [1: London - Edinburgh DO MIN]

London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	713	706	7
E: Edinburgh Ave Ext'n (E)	573	567	6
N: London Cct (N)	211	209	2
W: Edinburgh Ave (W)	1202	1190	12
Total	2699	2672	27

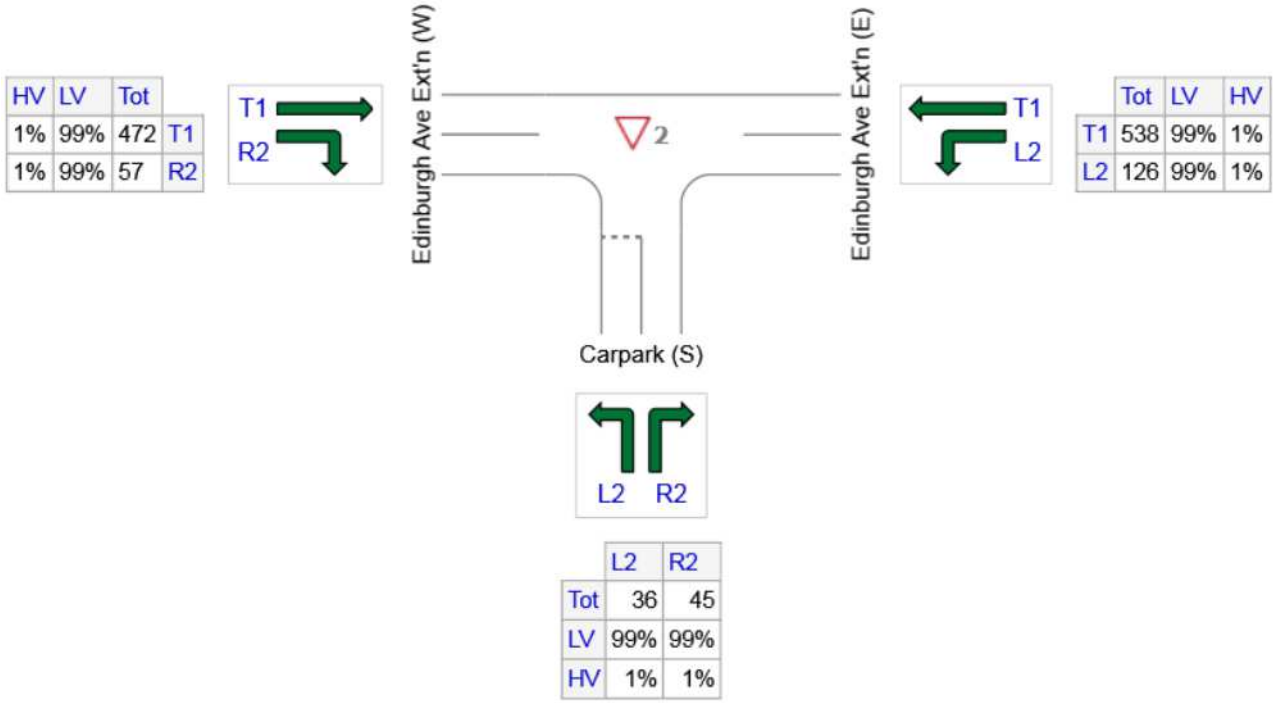
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 2 [2: Edinburgh - Knowles DO MIN]

Edinburgh Avenue Extension - Knowles Place Extension
Edinburgh Avenue Extension Do Minimum
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Carpark (S)	81	80	1
E: Edinburgh Ave Ext'n (E)	664	657	7
W: Edinburgh Ave Ext'n (W)	529	524	5
Total	1274	1261	13

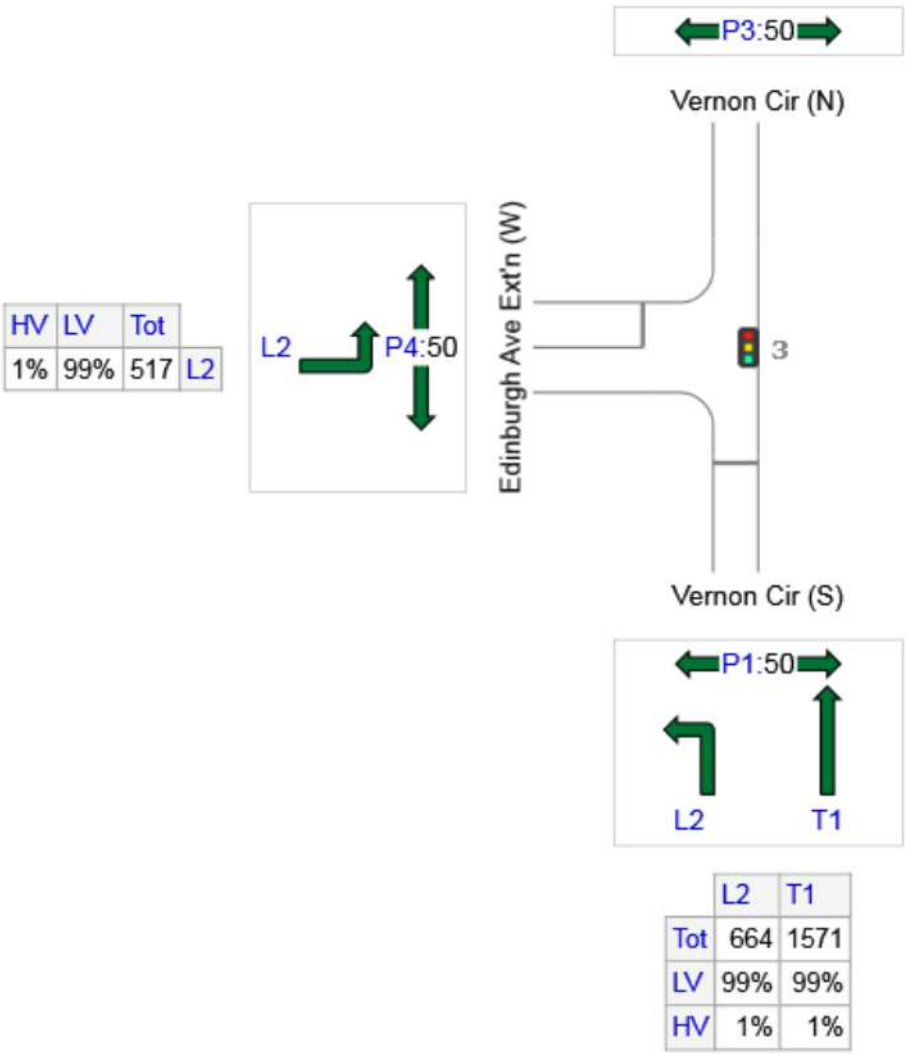
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 3 [3: Vernon - Edinburgh DO MIN]

Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Vernon Cir (S)	2235	2213	22
W: Edinburgh Ave Ext'n (W)	517	512	5
Total	2752	2724	28

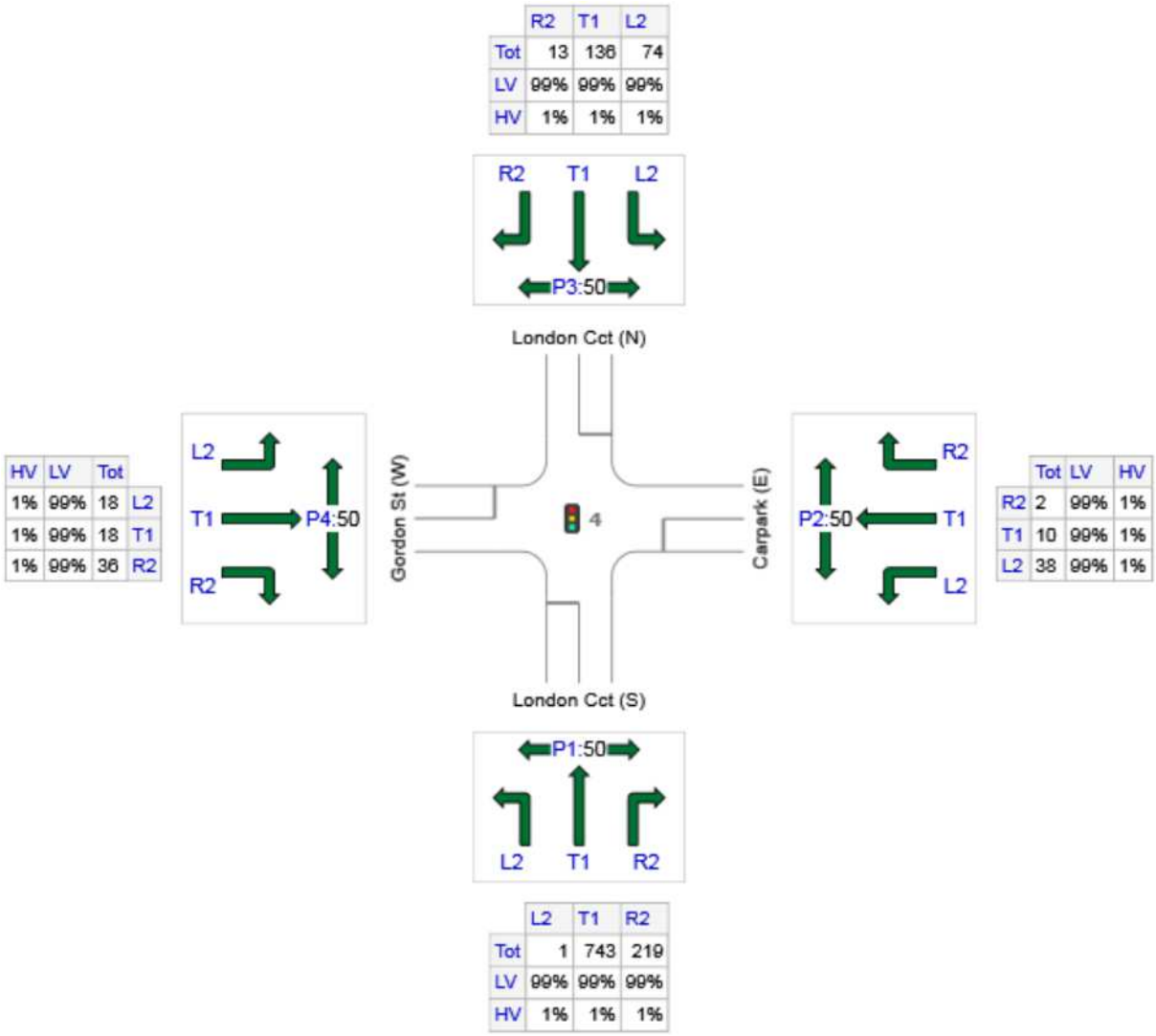
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 4 [4: London - Gordon DO MIN]

London Circuit - Gordon Street/Carpark Entrance
Do Minimum
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	963	953	10
E: Carpark (E)	50	50	1
N: London Cct (N)	223	221	2
W: Gordon St (W)	72	71	1
Total	1308	1295	13

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

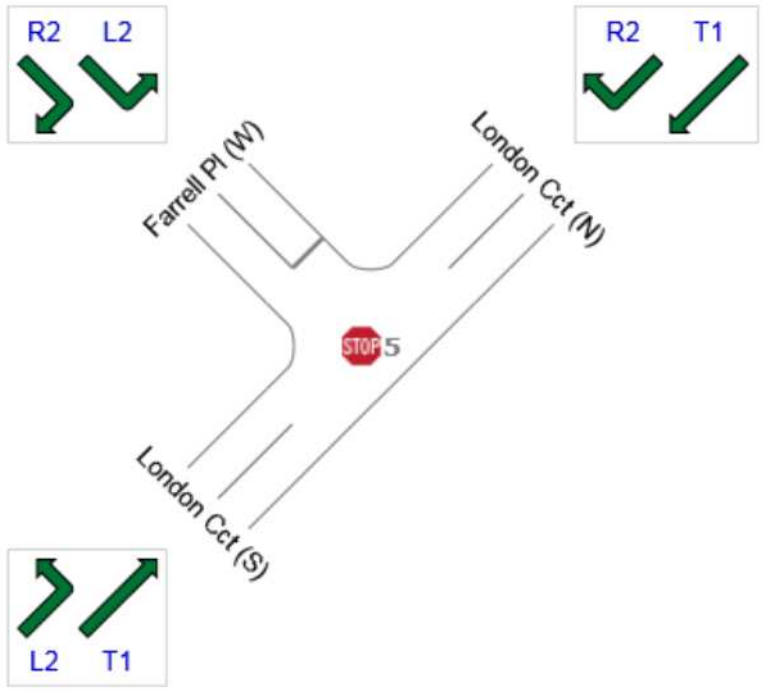
Site: 5 [5: London - Farrell DO MIN]

London Circuit - Farrell Place
Existing
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	14	2
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	215	209
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	147	616
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	424	420	4
NW: Farrell Pl (W)	16	16	0
SW: London Cct (S)	763	755	8
Total	1203	1191	12

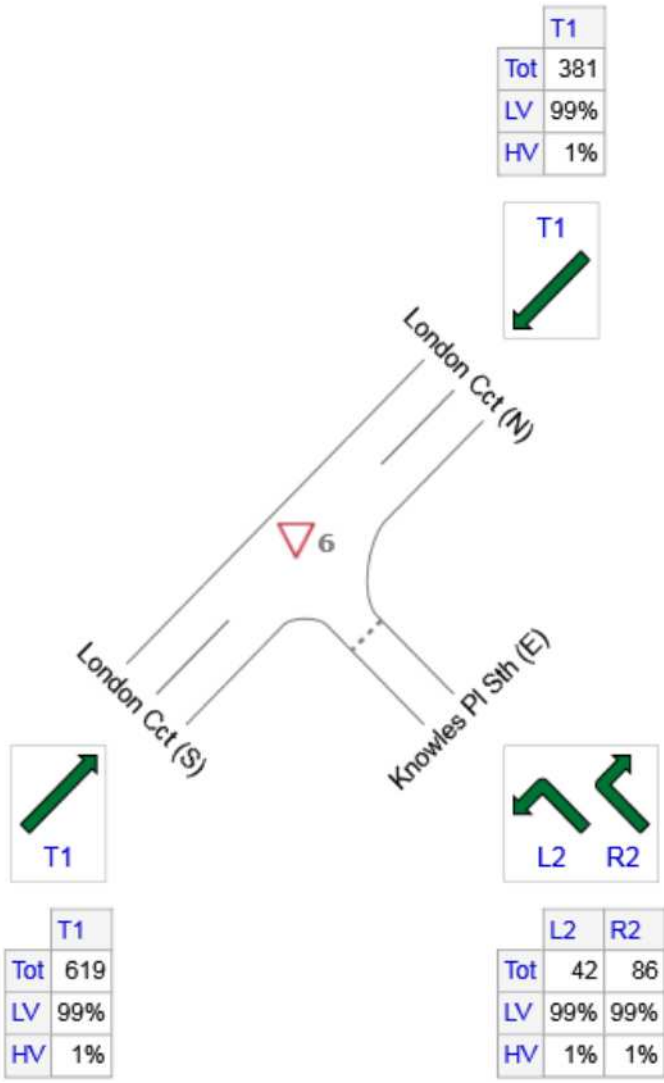
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 6 [6: London - Knowles Sth DO MIN]

London Circuit - Knowles Place South
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Knowles Pl Sth (E)	128	127	1
NE: London Cct (N)	381	377	4
SW: London Cct (S)	619	613	6
Total	1128	1117	11

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

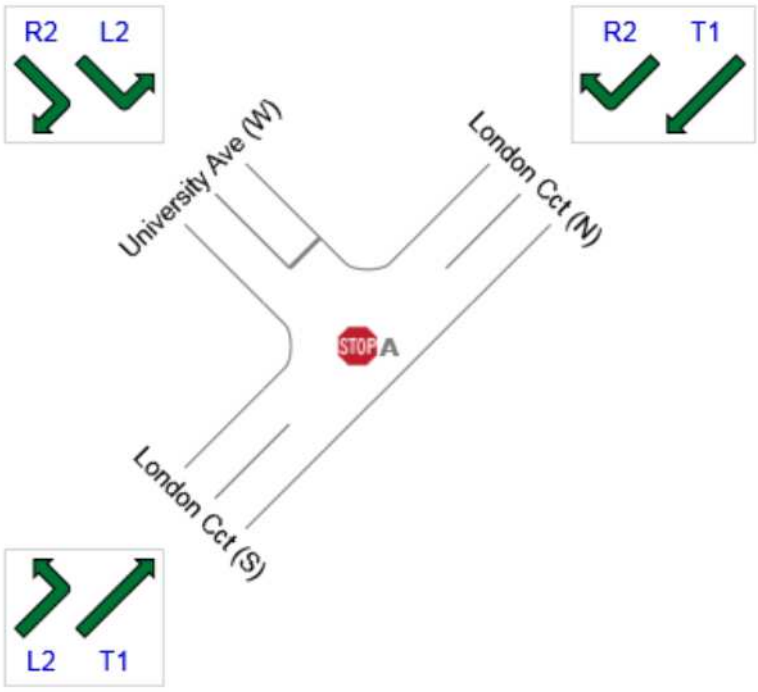
Site: A [A: London - University DO MIN]

London Circuit - University Avenue
Existing
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	5	17
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	30	376
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	389	316
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	406	402	4
NW: University Ave (W)	22	22	0
SW: London Cct (S)	705	698	7
Total	1133	1122	11

INPUT VOLUMES

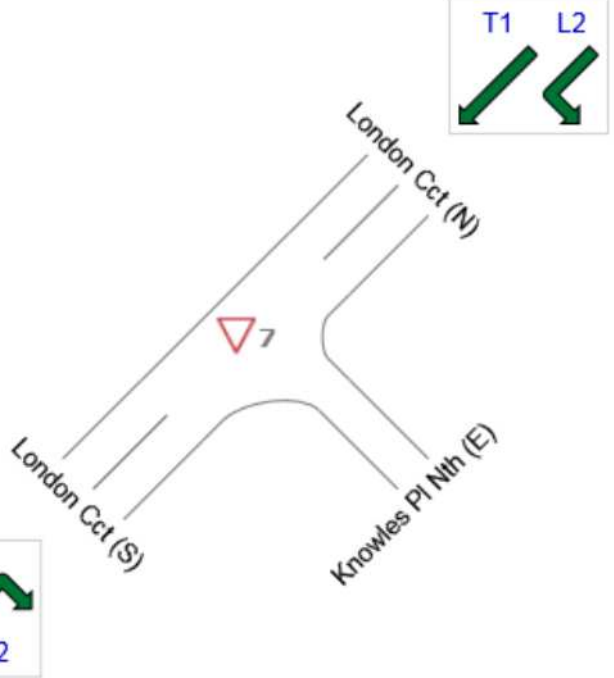
Vehicles and pedestrians per 60 minutes

Site: 7 [7: London - Knowles Nth DO MIN]

London Circuit - Knowles Place North
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %

	T1	L2
Tot	406	238
LV	99%	99%
HV	1%	1%



	T1	R2
Tot	194	139
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	644	638	6
SW: London Cct (S)	333	330	3
Total	977	967	10

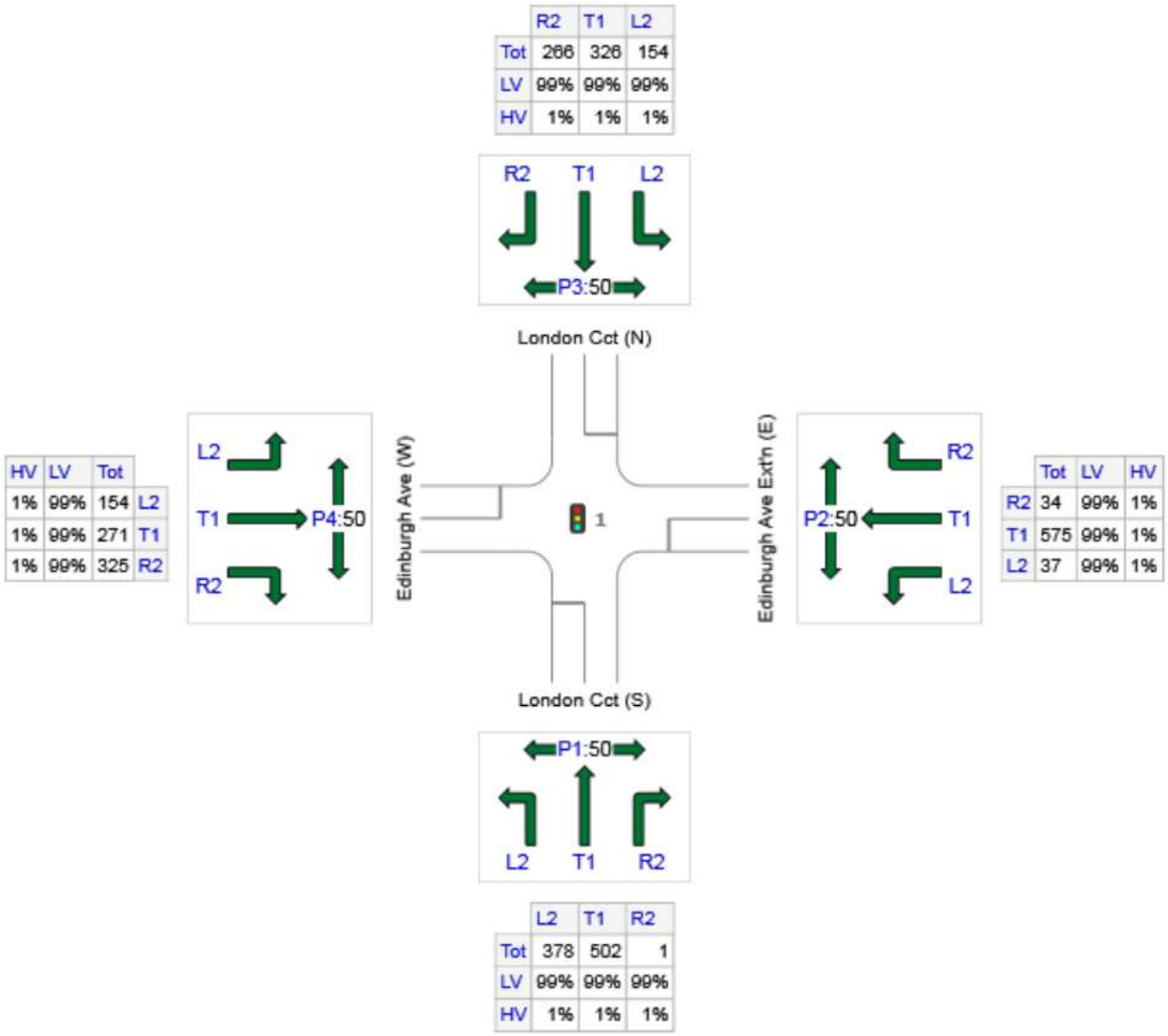
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [1: London - Edinburgh DO MIN]

London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	881	872	9
E: Edinburgh Ave Ext'n (E)	646	640	6
N: London Cct (N)	746	739	7
W: Edinburgh Ave (W)	750	743	8
Total	3023	2993	30

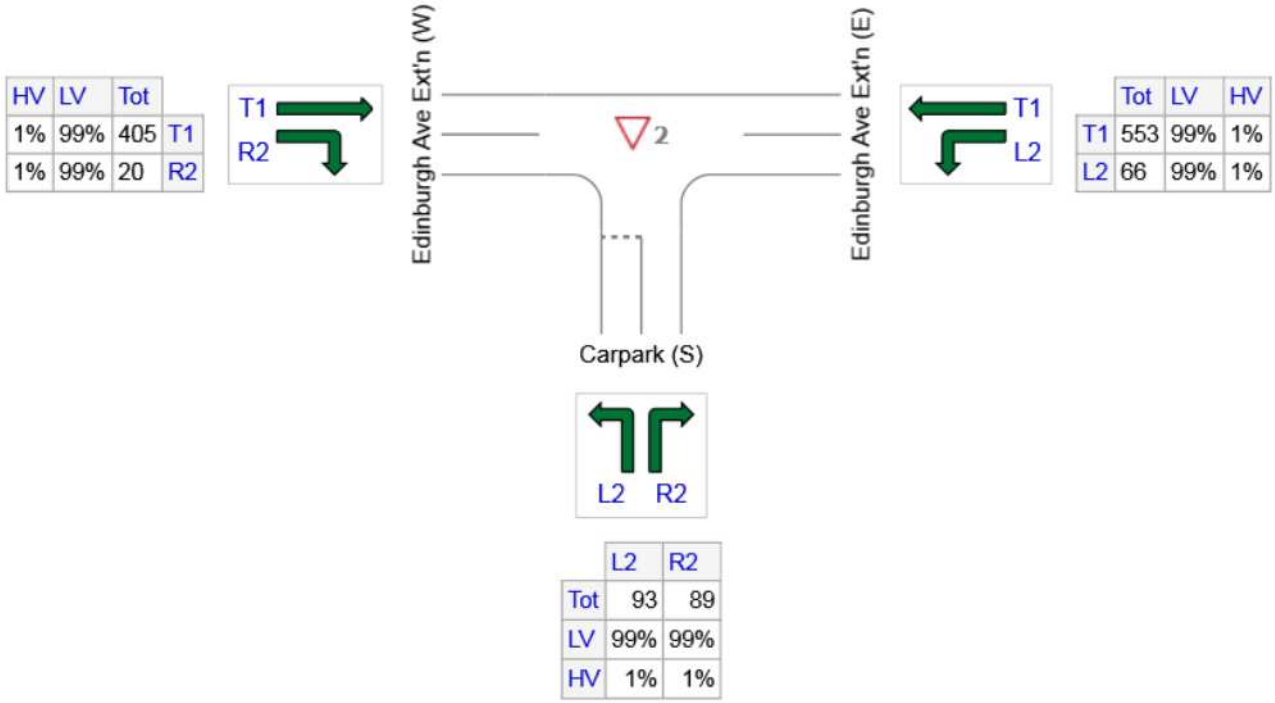
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 2 [2: Edinburgh - Knowles DO MIN]

Edinburgh Avenue Extension - Knowles Place Extension
Edinburgh Avenue Extension Do Minimum
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Carpark (S)	182	180	2
E: Edinburgh Ave Ext'n (E)	619	613	6
W: Edinburgh Ave Ext'n (W)	425	421	4
Total	1226	1214	12

Organisation: SMEC AUSTRALIA PTY LTD (ACT) | Created: Friday, 10 August 2018 2:54:44 PM
Project: X:\Projects\3002653 Traffic Minor Projects 2018\102 City Section 100 Traffic Study\015 Traffic - Intersection Flow Modelling\Section 100 PM Peak.sip8

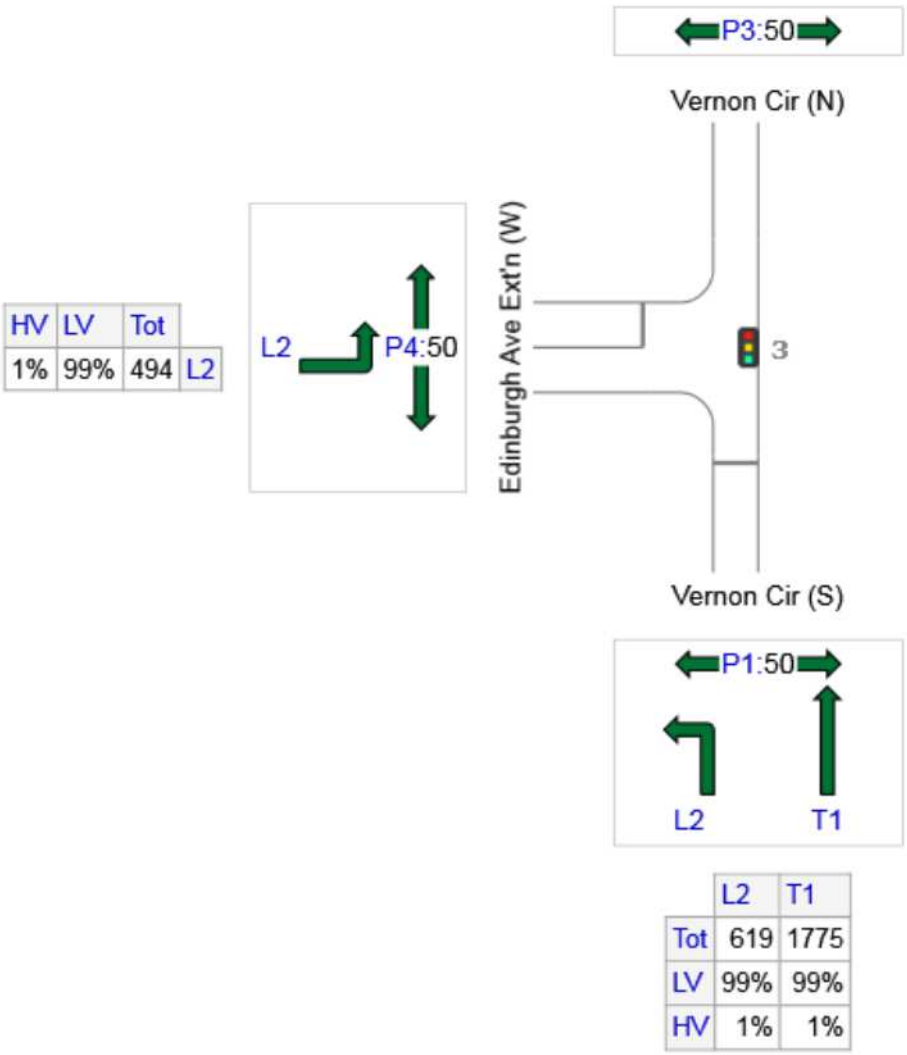
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 3 [3: Vernon - Edinburgh DO MIN]

Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Vernon Cir (S)	2394	2370	24
W: Edinburgh Ave Ext'n (W)	494	489	5
Total	2888	2859	29

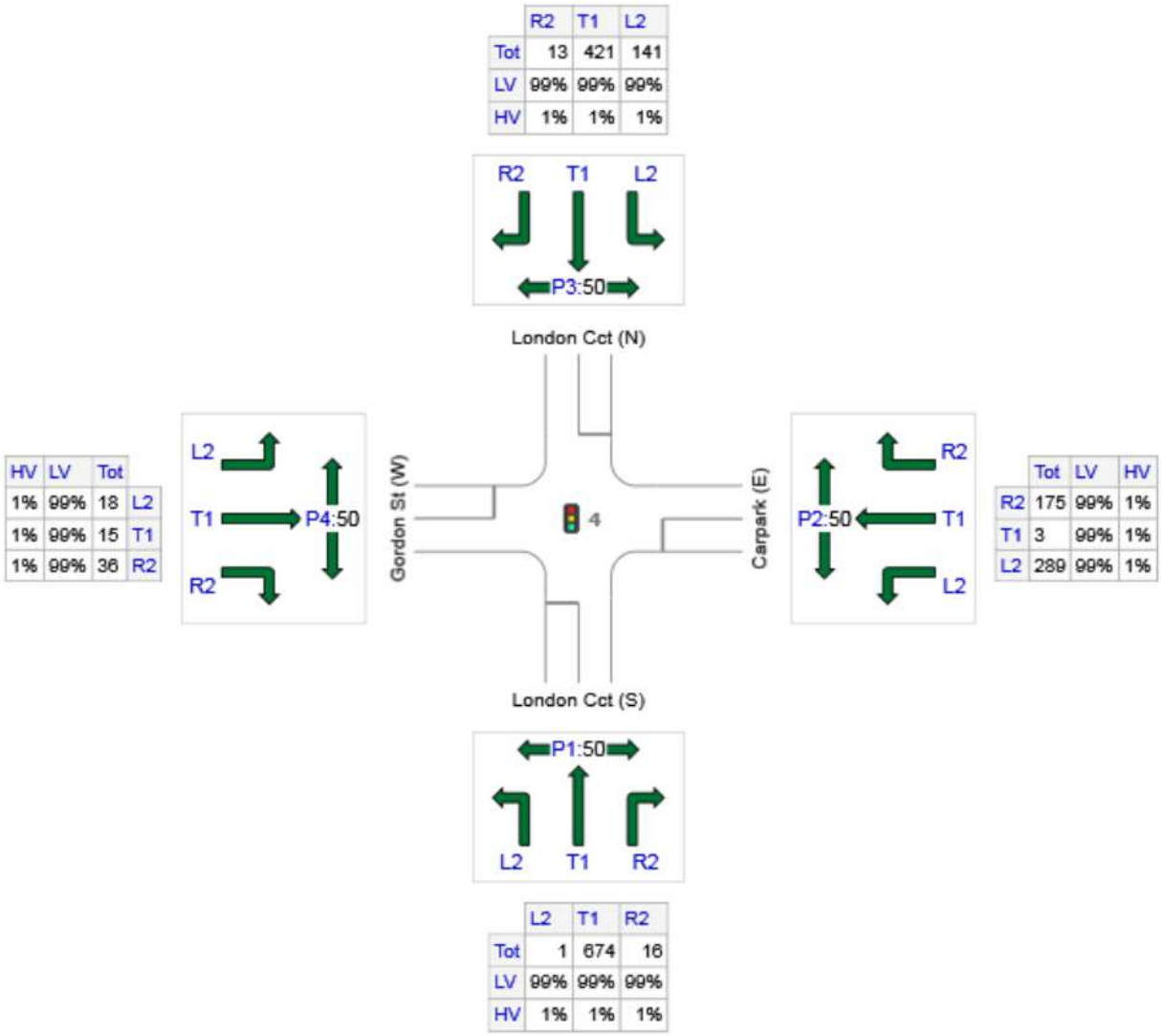
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 4 [4: London - Gordon DO MIN]

London Circuit - Gordon Street/Carpark Entrance
Do Minimum
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	691	684	7
E: Carpark (E)	467	462	5
N: London Cct (N)	575	569	6
W: Gordon St (W)	69	68	1
Total	1802	1784	18

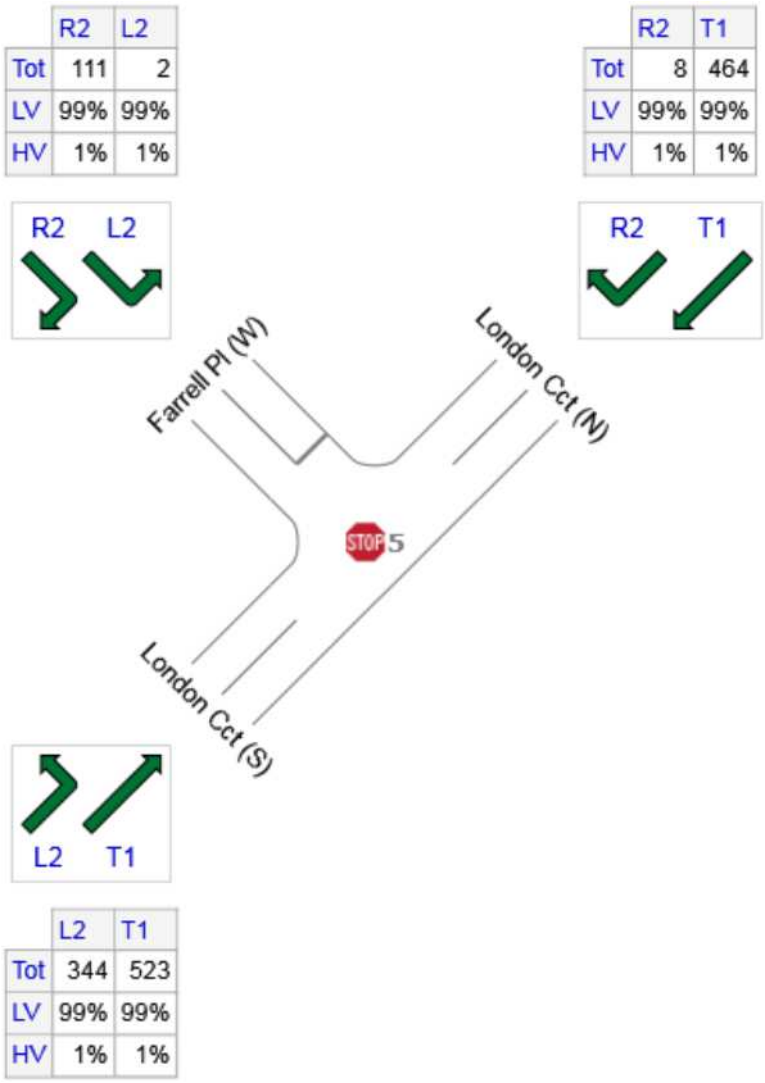
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 5 [5: London - Farrell DO MIN]

London Circuit - Farrell Place
Existing
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	472	467	5
NW: Farrell Pl (W)	113	112	1
SW: London Cct (S)	867	858	9
Total	1452	1437	15

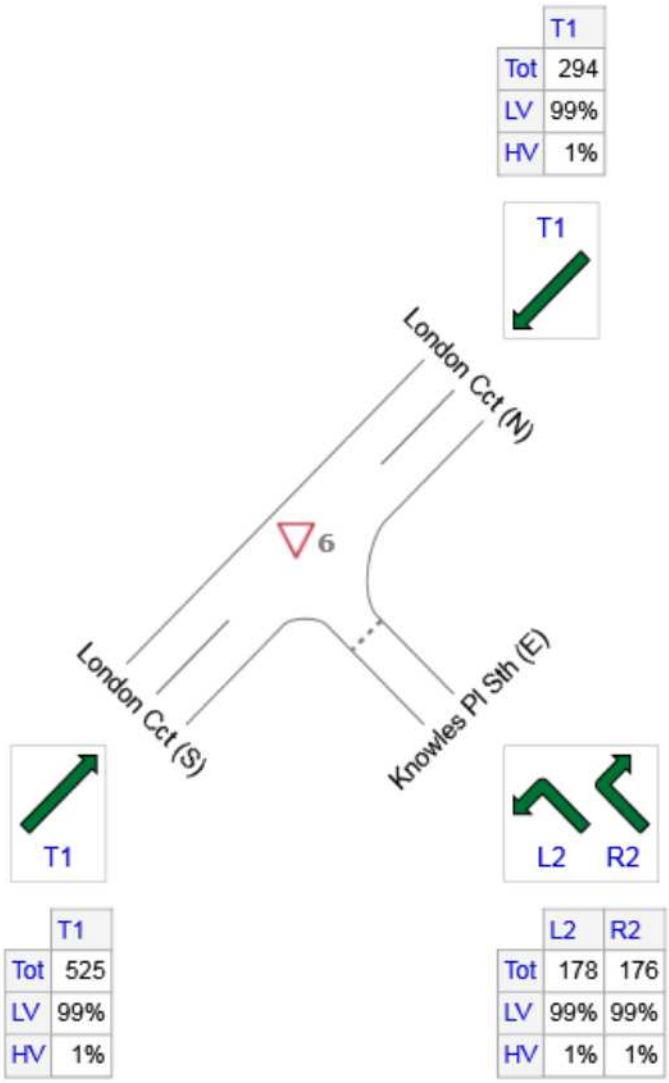
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 6 [6: London - Knowles Sth DO MIN]

London Circuit - Knowles Place South
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Knowles Pl Sth (E)	354	350	4
NE: London Cct (N)	294	291	3
SW: London Cct (S)	525	520	5
Total	1173	1161	12

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

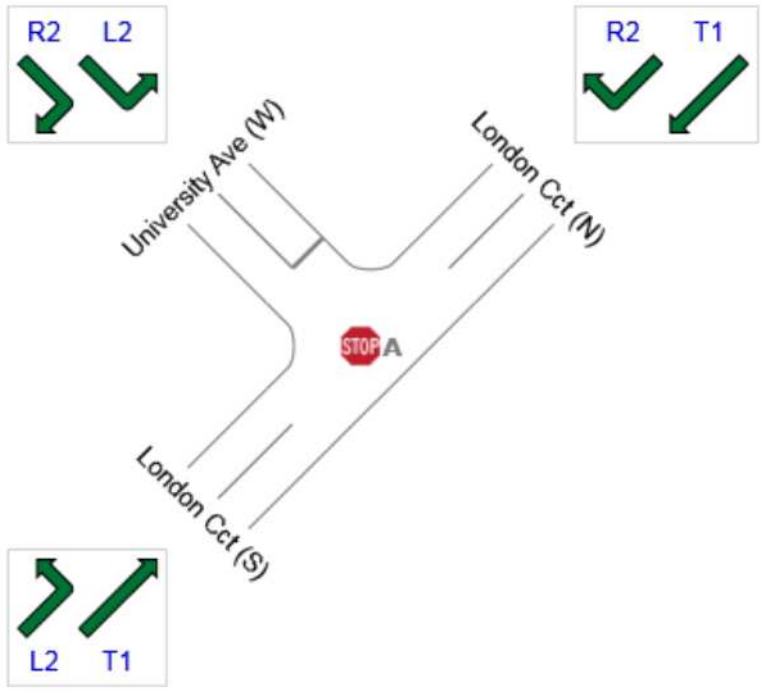
Site: A [A: London - University DO MIN]

London Circuit - University Avenue
Existing
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	195	20
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	5	99
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	203	498
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	104	103	1
NW: University Ave (W)	215	213	2
SW: London Cct (S)	701	694	7
Total	1020	1010	10

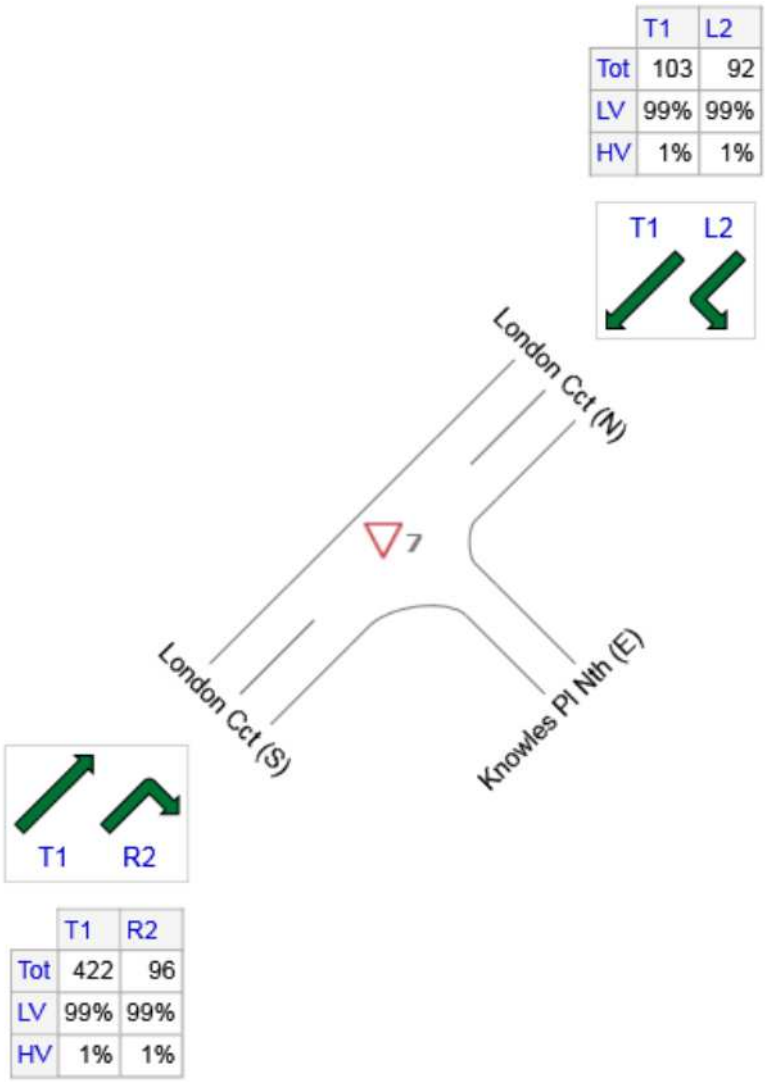
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 7 [7: London - Knowles Nth DO MIN]

London Circuit - Knowles Place North
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	195	193	2
SW: London Cct (S)	518	513	5
Total	713	706	7

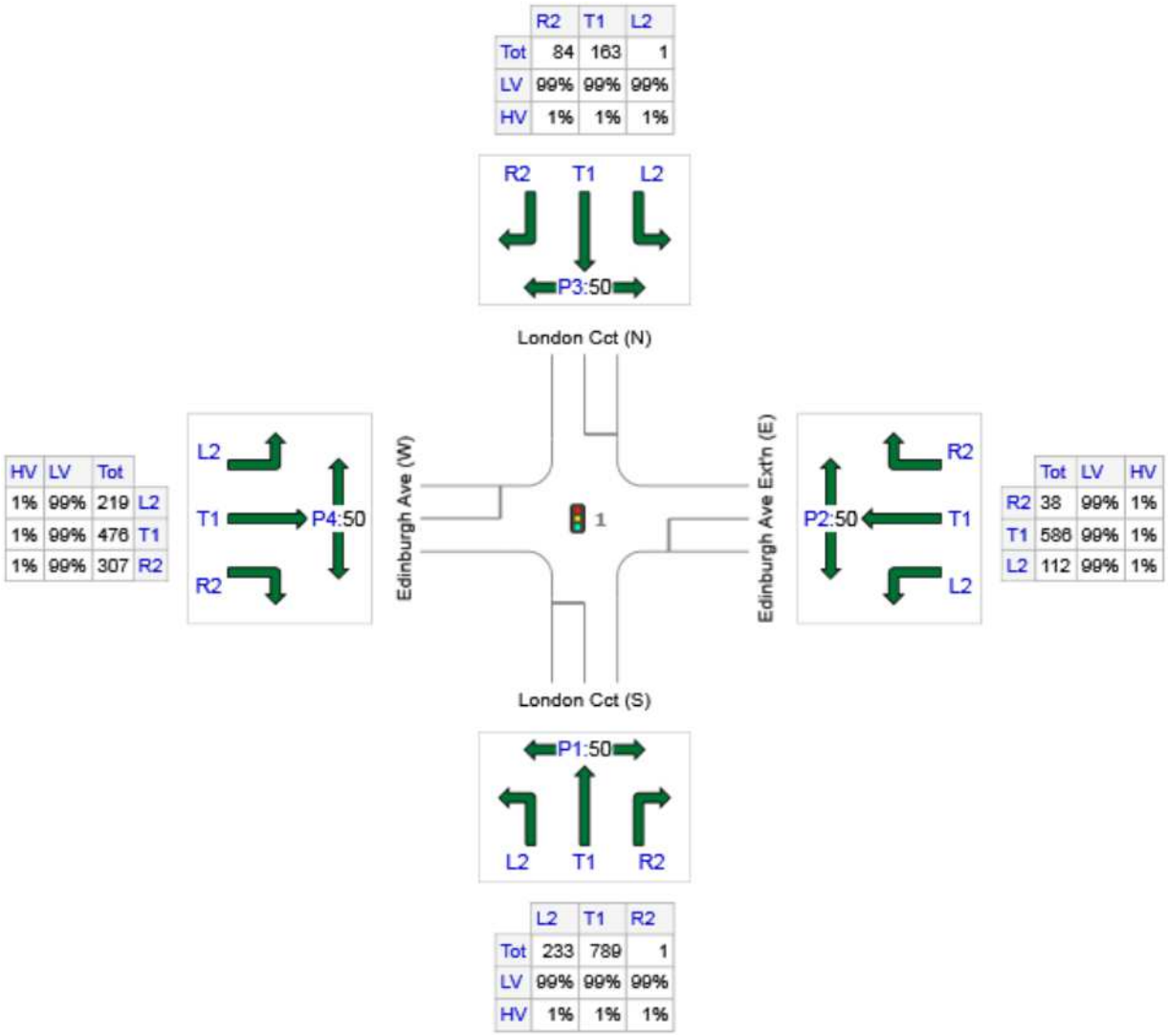
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [1: London - Edinburgh S100 3.4 vpd]

London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	1023	1013	10
E: Edinburgh Ave Ext'n (E)	736	729	7
N: London Cct (N)	248	246	2
W: Edinburgh Ave (W)	1002	992	10
Total	3009	2979	30

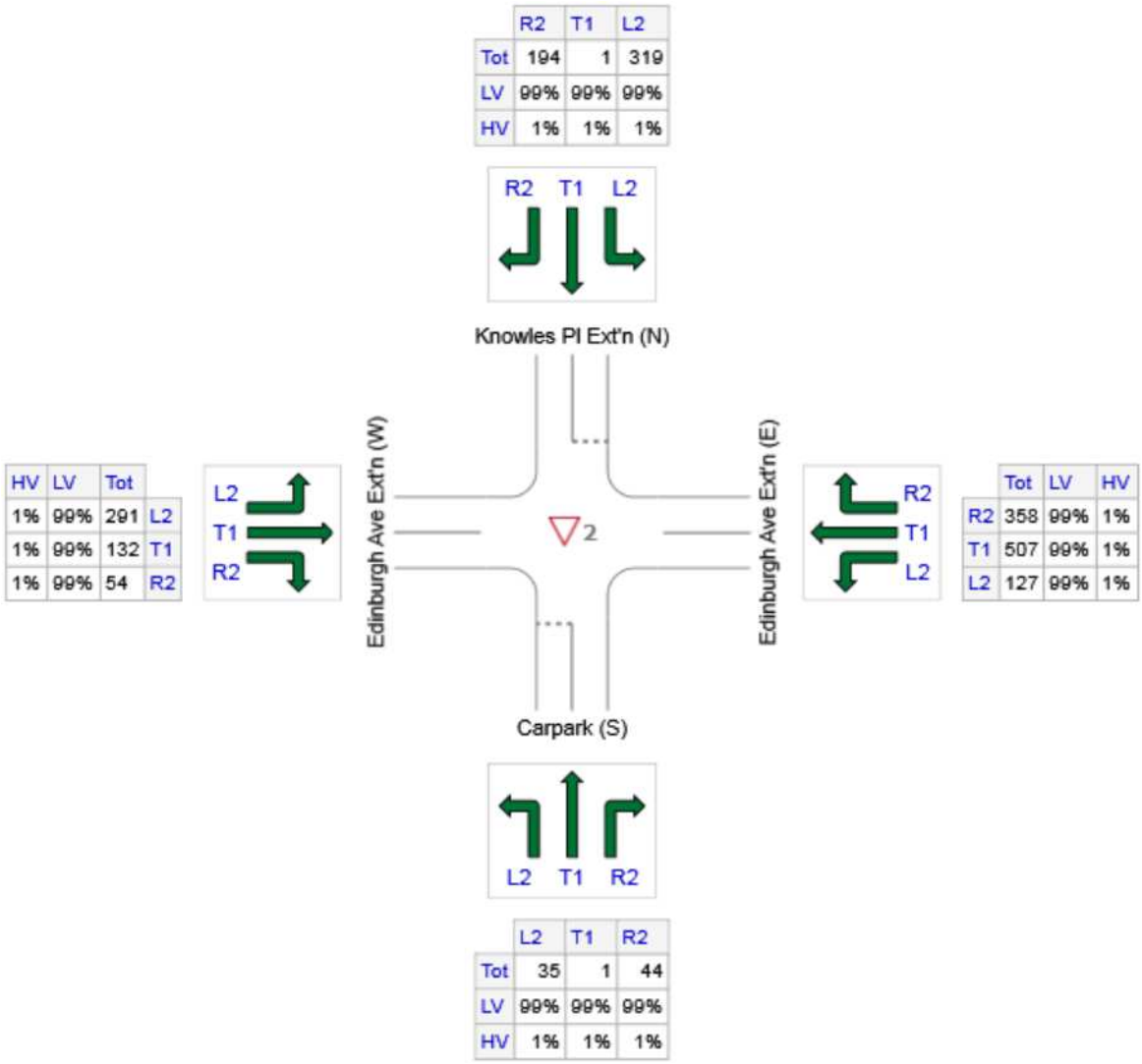
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 2 [2: Edinburgh - Knowles S100 3.4 vpd]

Edinburgh Avenue Extension - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Carpark (S)	80	79	1
E: Edinburgh Ave Ext'n (E)	992	982	10
N: Knowles Pl Ext'n (N)	514	509	5
W: Edinburgh Ave Ext'n (W)	477	472	5
Total	2063	2042	21

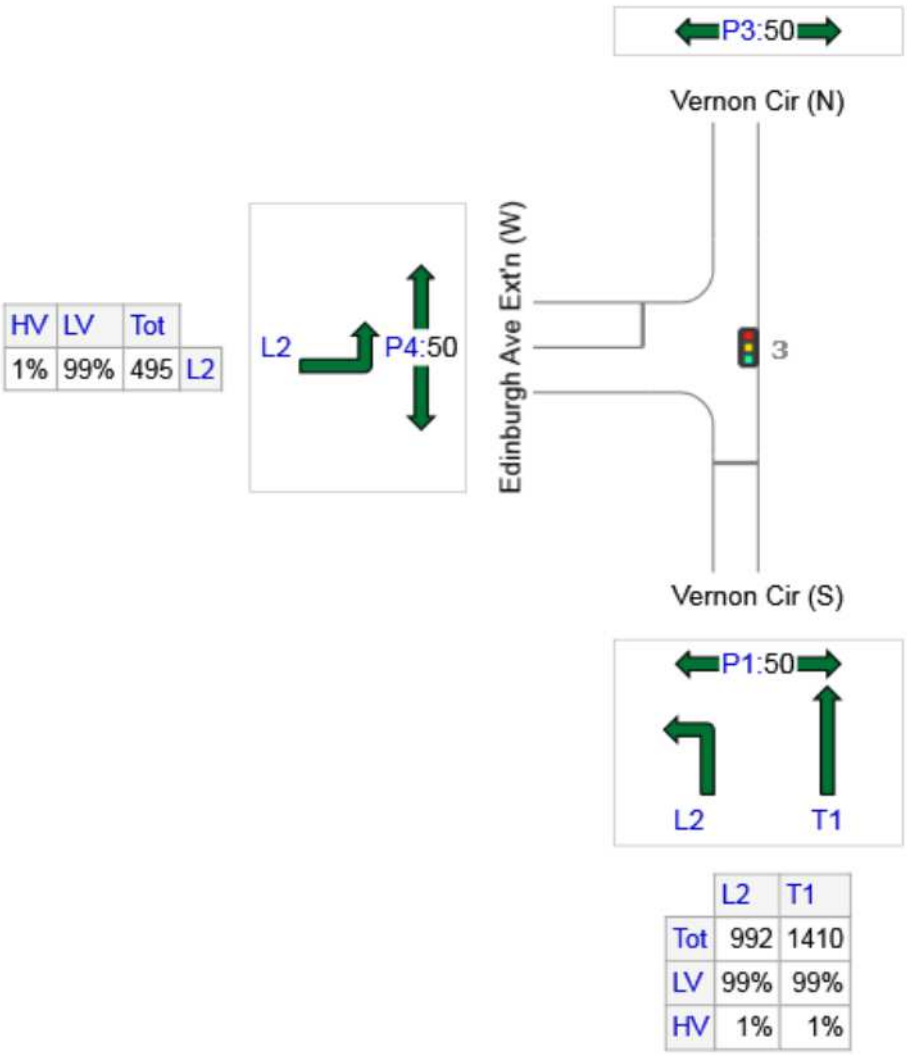
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 3 [3: Vernon - Edinburgh S100 3.4 vpd]

Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	L2	T1
Tot	992	1410
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Vernon Cir (S)	2402	2378	24
W: Edinburgh Ave Ext'n (W)	495	490	5
Total	2897	2868	29

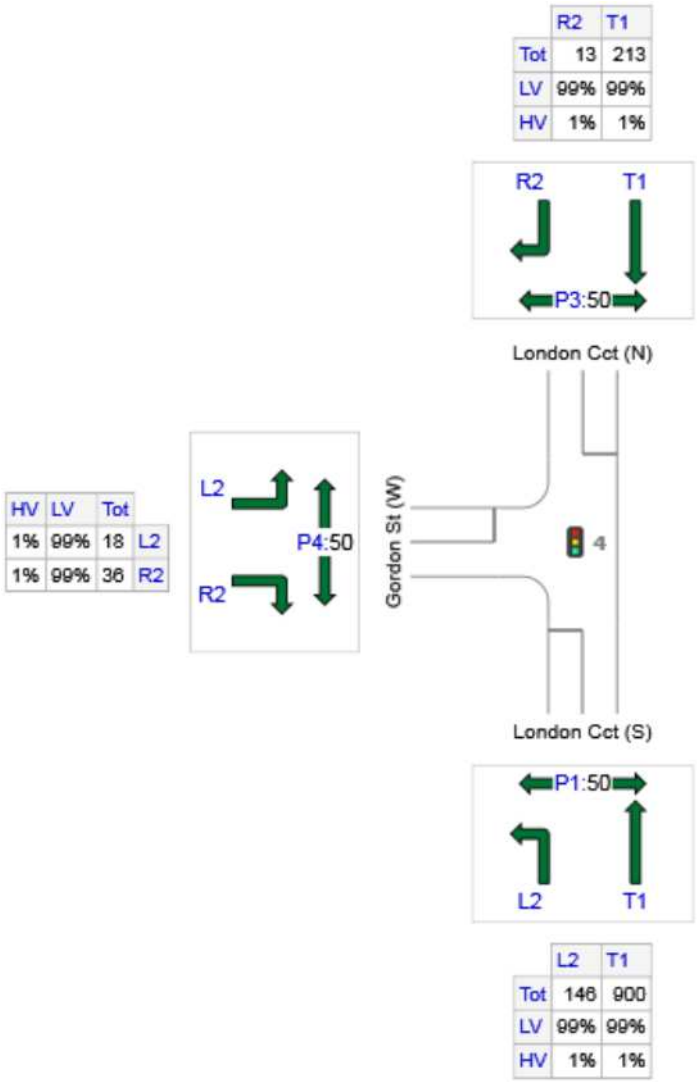
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 4 [4: London - Gordon S100 3.4 vpd]

London Circuit - Gordon Street/Carpark Entrance
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	1046	1036	10
N: London Cct (N)	226	224	2
W: Gordon St (W)	54	53	1
Total	1326	1313	13

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

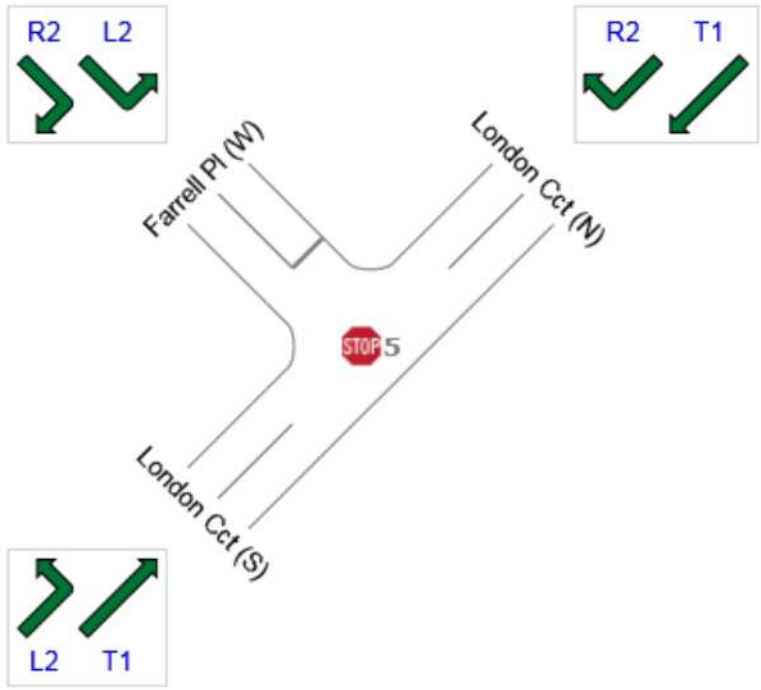
Site: 5 [5: London - Farrell S100 3.4 vpd]

London Circuit - Farrell Place
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	36	2
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	307	190
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	141	776
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	497	492	5
NW: Farrell Pl (W)	38	38	0
SW: London Cct (S)	917	908	9
Total	1452	1437	15

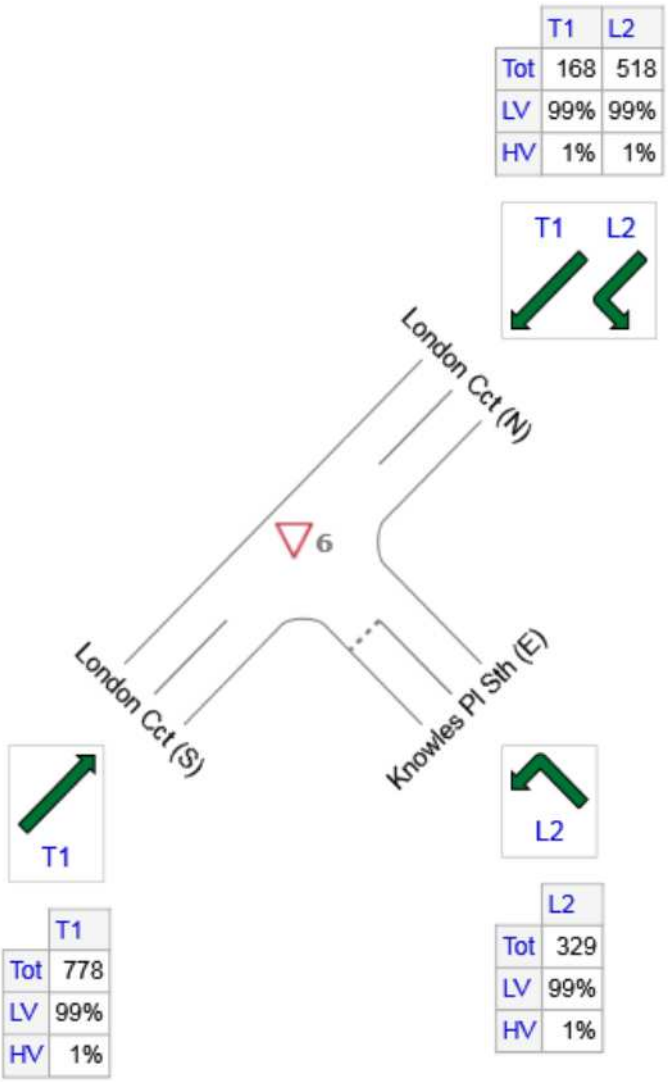
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 6 [6: London - Knowles Sth S100 3.4 vpd]

London Circuit - Knowles Place South
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Knowles Pl Sth (E)	329	326	3
NE: London Cct (N)	686	679	7
SW: London Cct (S)	778	770	8
Total	1793	1775	18

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

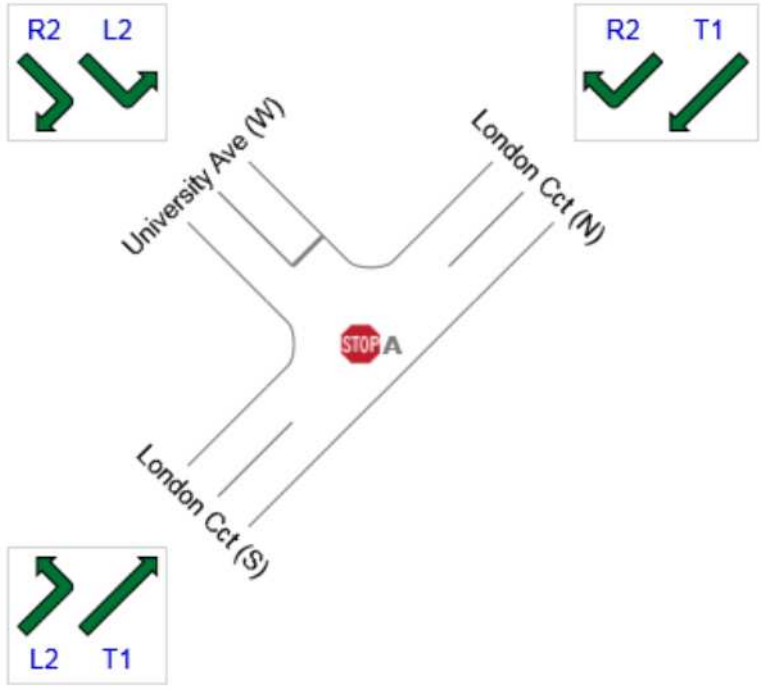
Site: A [A: London - University S100 3.4 vpd]

London Circuit - University Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	203	17
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	85	483
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	484	294
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	568	562	6
NW: University Ave (W)	220	218	2
SW: London Cct (S)	778	770	8
Total	1566	1550	16

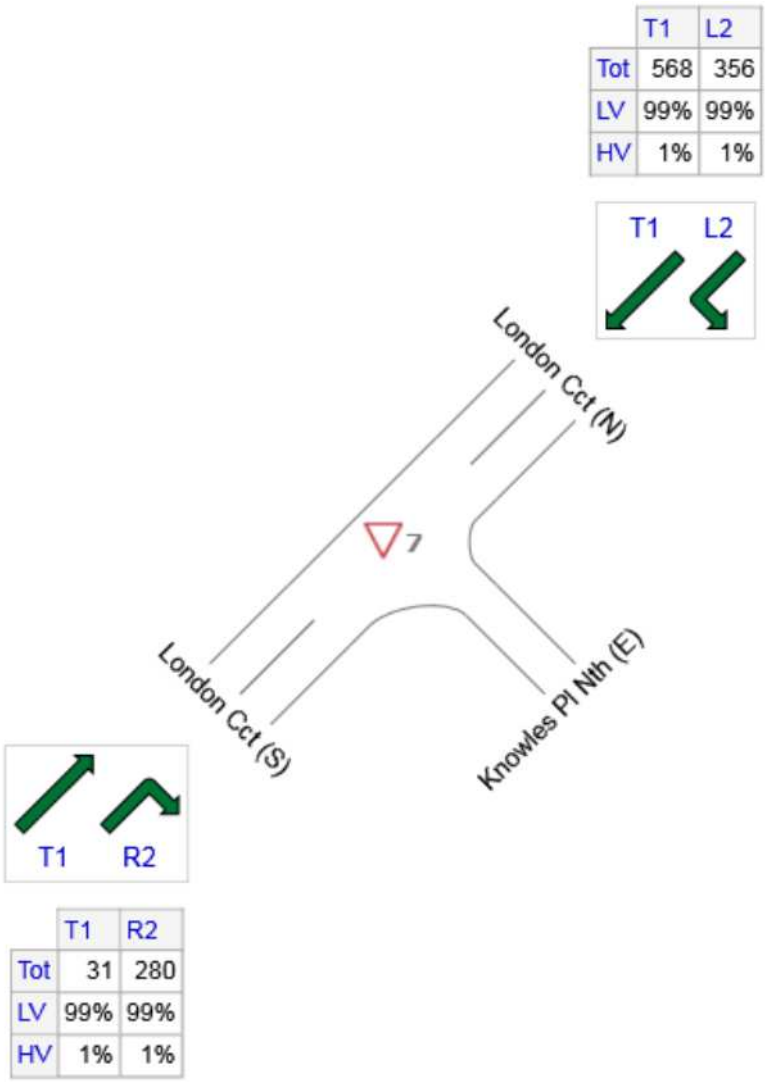
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 7 [7: London - Knowles Nth S100 3.4 vpd]

London Circuit - Knowles Place North
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	924	915	9
SW: London Cct (S)	311	308	3
Total	1235	1223	12

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

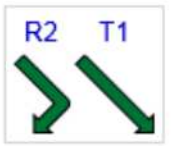
Site: B [B: Knowles - Knowles Ext'n S100 3.4 vpd]

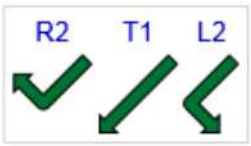
Knowles Place - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

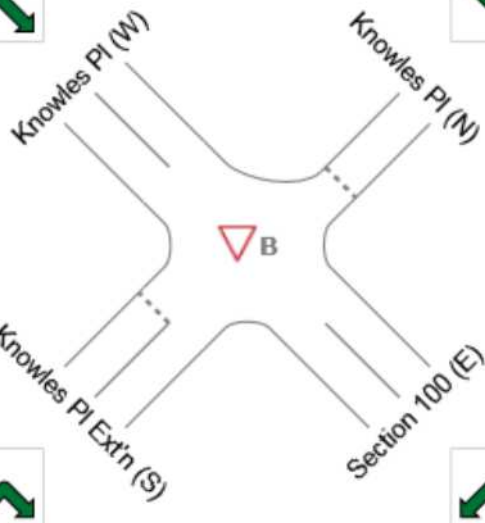
Volume Display Method: Total and %

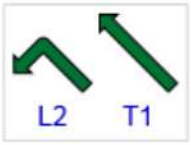
	R2	T1
Tot	311	207
LV	99%	99%
HV	1%	1%

	R2	T1	L2
Tot	82	118	52
LV	99%	99%	99%
HV	1%	1%	1%









	L2	R2
Tot	104	546
LV	99%	99%
HV	1%	1%

	L2	T1
Tot	84	143
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Section 100 (E)	227	225	2
NE: Knowles Pl (N)	252	249	3
NW: Knowles Pl (W)	518	513	5
SW: Knowles Pl Ext'n (S)	650	644	7
Total	1647	1631	16

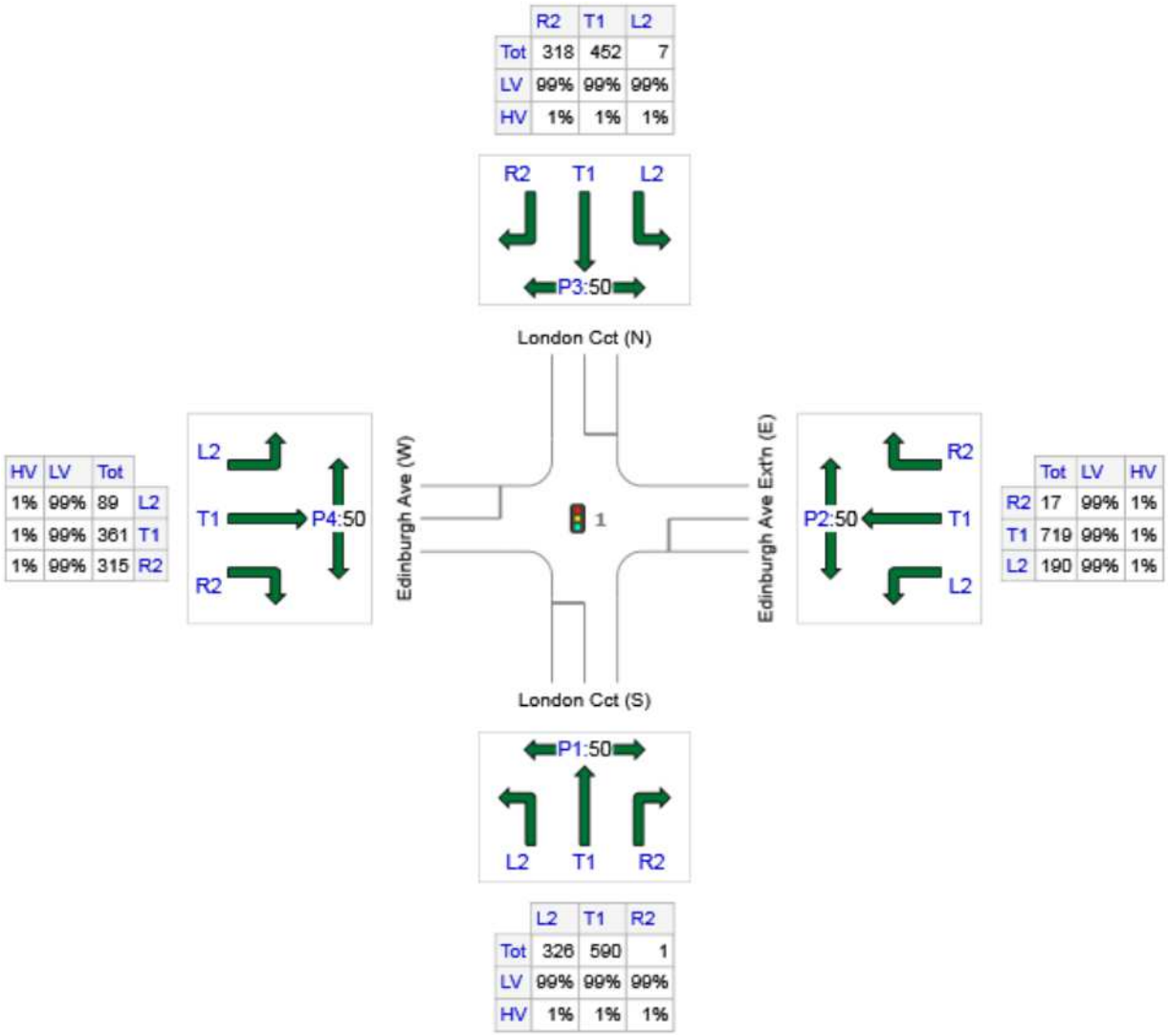
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 1 [1: London - Edinburgh S100 3.4 vpd]

London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	917	908	9
E: Edinburgh Ave Ext'n (E)	926	917	9
N: London Cct (N)	777	769	8
W: Edinburgh Ave (W)	765	757	8
Total	3385	3351	34

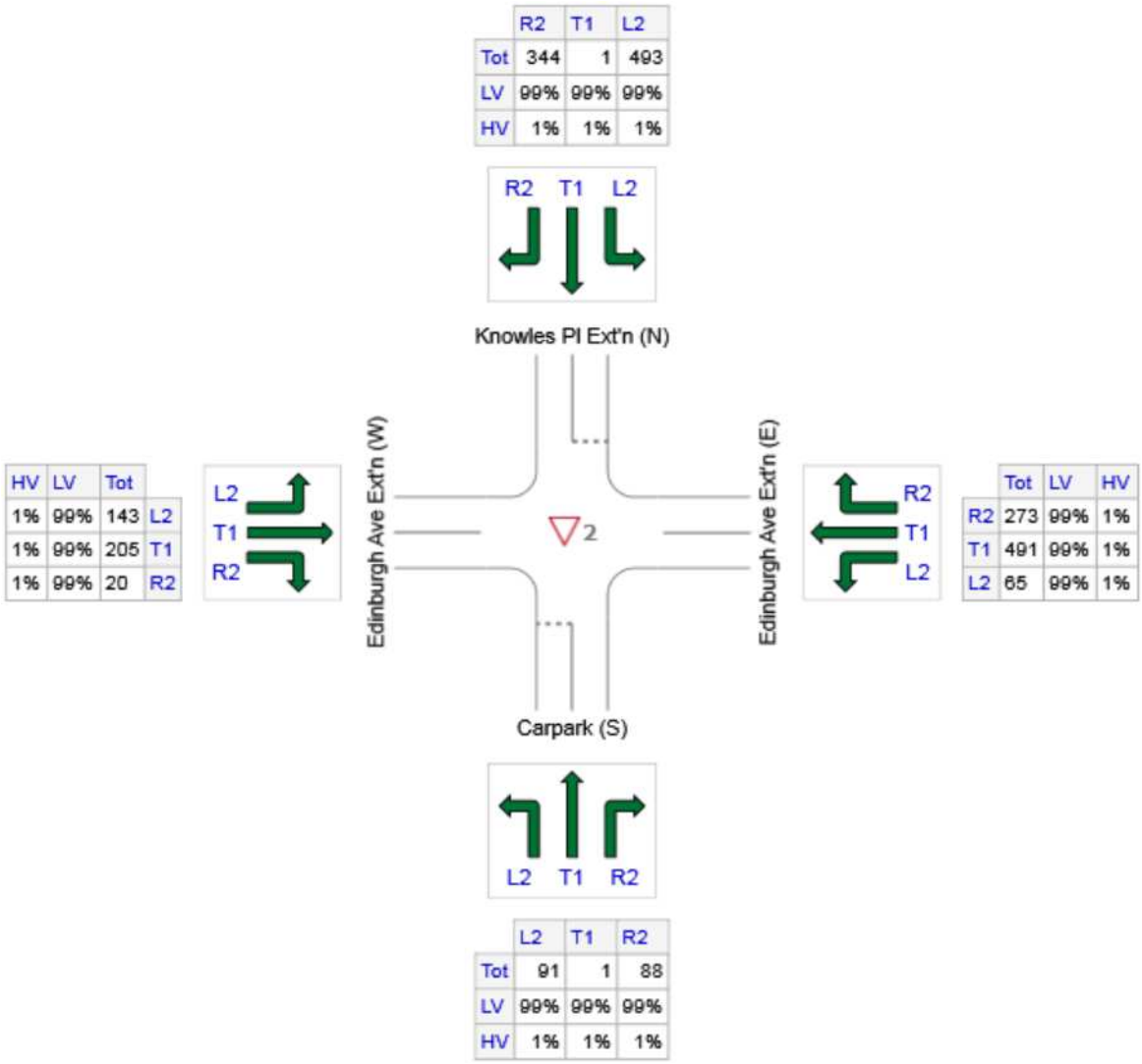
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 2 [2: Edinburgh - Knowles S100 3.4 vpd]

Edinburgh Avenue Extension - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Carpark (S)	180	178	2
E: Edinburgh Ave Ext'n (E)	829	821	8
N: Knowles Pl Ext'n (N)	838	830	8
W: Edinburgh Ave Ext'n (W)	368	364	4
Total	2215	2193	22

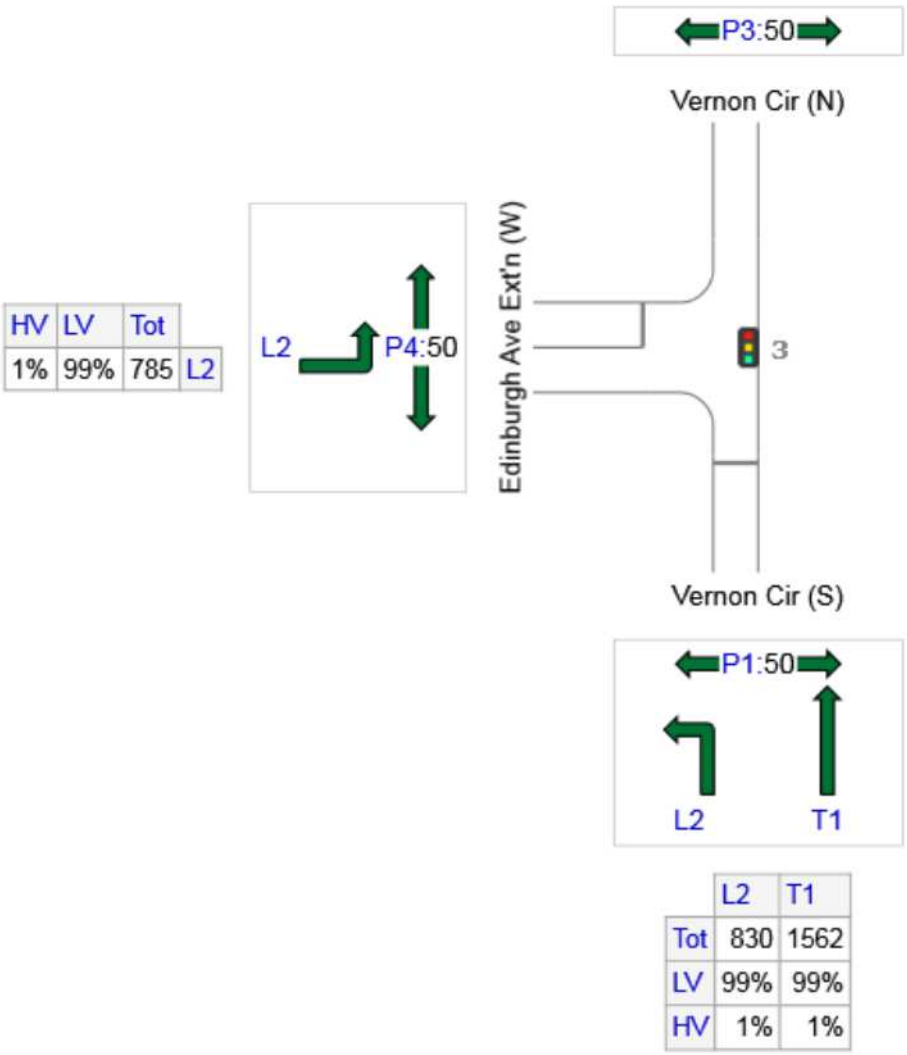
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 3 [3: Vernon - Edinburgh S100 3.4 vpd]

Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Vernon Cir (S)	2392	2368	24
W: Edinburgh Ave Ext'n (W)	785	777	8
Total	3177	3145	32

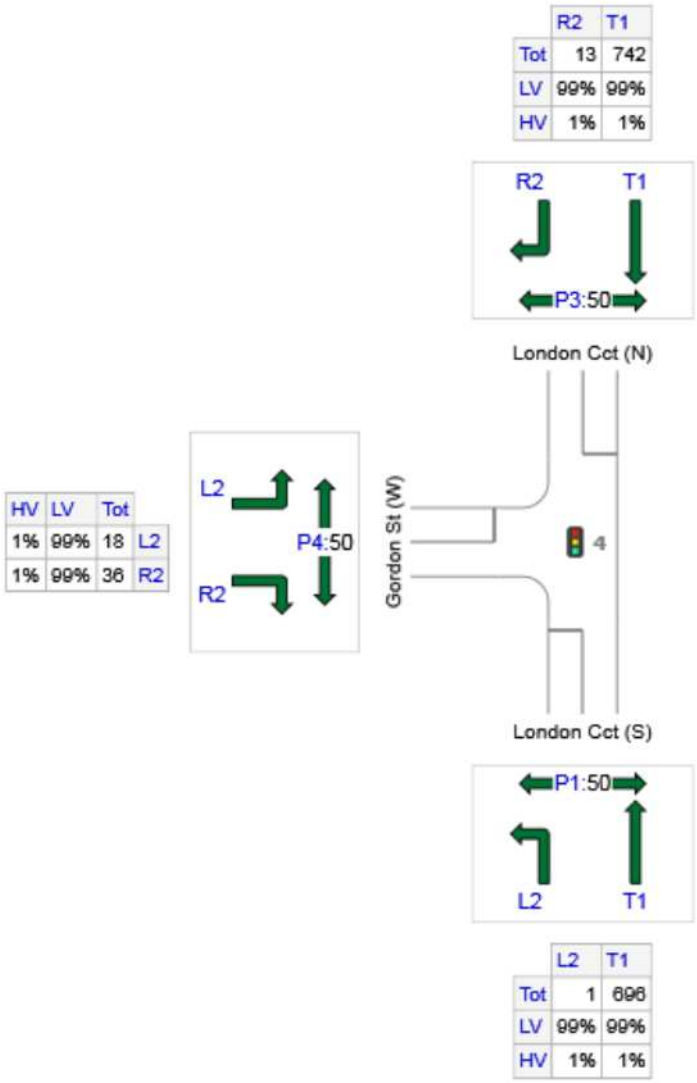
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 4 [4: London - Gordon S100 3.4 vpd]

London Circuit - Gordon Street/Carpark Entrance
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: London Cct (S)	697	690	7
N: London Cct (N)	755	747	8
W: Gordon St (W)	54	53	1
Total	1506	1491	15

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

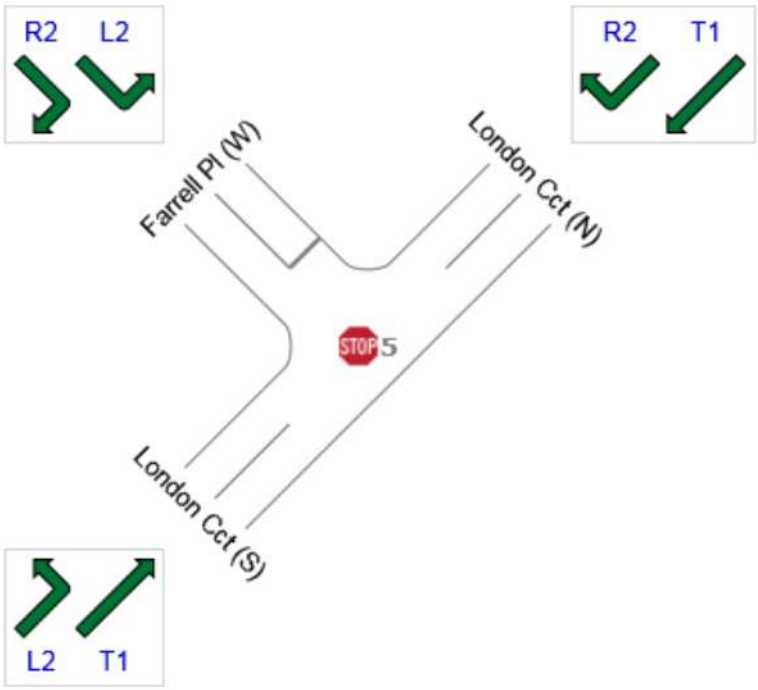
Site: 5 [5: London - Farrell S100 3.4 vpd]

London Circuit - Farrell Place
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	224	4
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	359	531
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	132	582
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	890	881	9
NW: Farrell Pl (W)	228	226	2
SW: London Cct (S)	714	707	7
Total	1832	1814	18

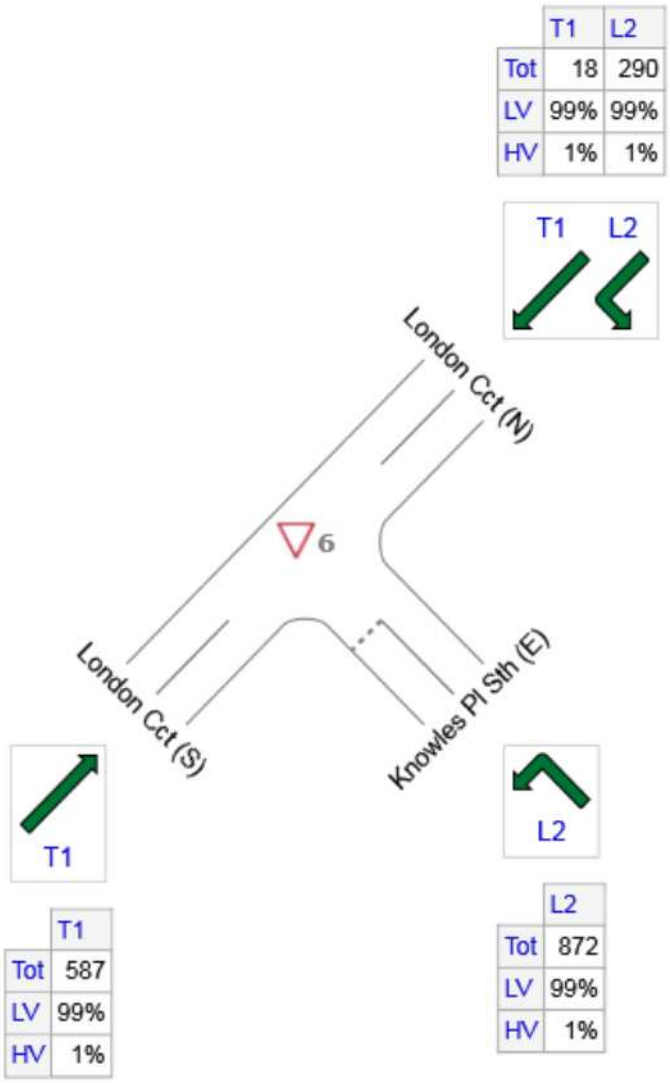
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 6 [6: London - Knowles Sth S100 3.4 vpd]

London Circuit - Knowles Place South
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Knowles Pl Sth (E)	872	863	9
NE: London Cct (N)	308	305	3
SW: London Cct (S)	587	581	6
Total	1767	1749	18

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

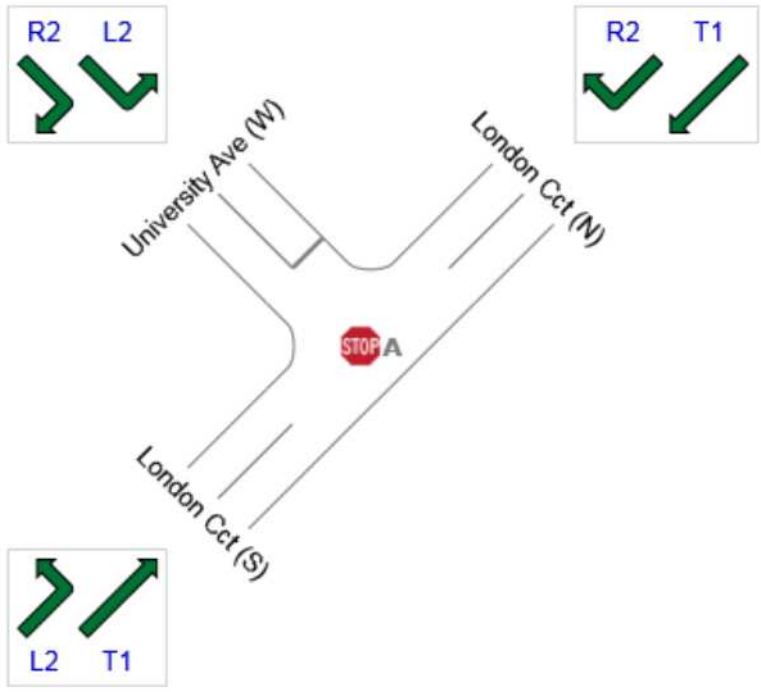
Site: A [A: London - University S100 3.4 vpd]

London Circuit - University Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)

Volume Display Method: Total and %

	R2	L2
Tot	181	62
LV	99%	99%
HV	1%	1%

	R2	T1
Tot	11	127
LV	99%	99%
HV	1%	1%



	L2	T1
Tot	442	145
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	138	137	1
NW: University Ave (W)	243	241	2
SW: London Cct (S)	587	581	6
Total	968	958	10

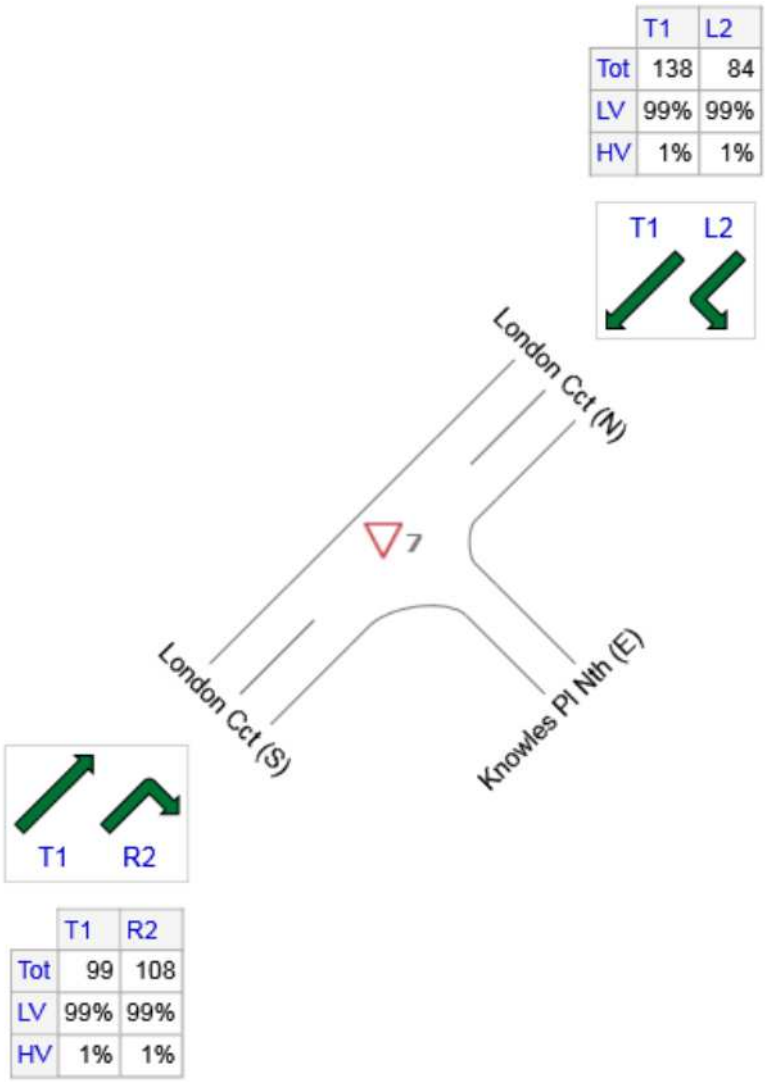
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 7 [7: London - Knowles Nth S100 3.4 vpd]

London Circuit - Knowles Place North
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
NE: London Cct (N)	222	220	2
SW: London Cct (S)	207	205	2
Total	429	425	4

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

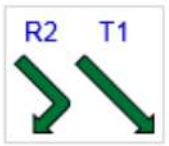
Site: B [B: Knowles - Knowles Ext'n S100 3.4 vpd]

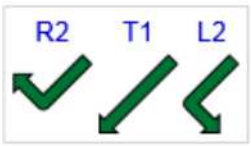
Knowles Place - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

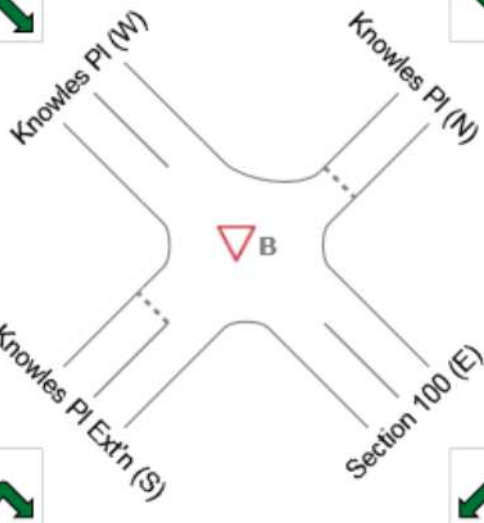
Volume Display Method: Total and %

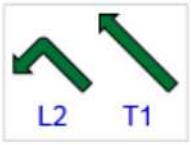
	R2	T1
Tot	262	28
LV	99%	99%
HV	1%	1%

	R2	T1	L2
Tot	187	187	1
LV	99%	99%	99%
HV	1%	1%	1%









	L2	R2
Tot	299	118
LV	99%	99%
HV	1%	1%

	L2	T1
Tot	387	386
LV	99%	99%
HV	1%	1%

	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
SE: Section 100 (E)	773	765	8
NE: Knowles Pl (N)	375	371	4
NW: Knowles Pl (W)	290	287	3
SW: Knowles Pl Ext'n (S)	417	413	4
Total	1855	1836	19

Appendix C SIDRA Outputs

MOVEMENT SUMMARY

Site: 1 [1: London - Edinburgh S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: London Cct (S)														
1	L2	245	1.0	245	1.0	0.932	80.6	LOS F	27.5	194.0	1.00	1.04	1.24	18.0
2	T1	831	1.0	831	1.0	0.932	74.1	LOS E	28.9	203.8	1.00	1.06	1.23	17.6
3	R2	1	1.0	1	1.0	0.011	79.4	LOS E	0.0	0.3	0.96	0.59	0.96	16.9
Approach		1077	1.0	1077	1.0	0.932	75.6	LOS E	28.9	203.8	1.00	1.06	1.24	17.7
East: Edinburgh Ave Ext'n (E)														
4	L2	118	1.0	97	1.0	0.359	66.3	LOS E	3.8	27.1	0.91	0.77	0.91	20.2
5	T1	617	1.0	509	1.0	0.933	83.3	LOS F	8.5	60.0	1.00	1.04	1.30	6.9
6	R2	40	1.0	33	1.0	0.933	87.8	LOS F	8.5	60.0	1.00	1.04	1.29	3.3
Approach		775	1.0	639 N1	1.0	0.933	80.9	LOS F	8.5	60.0	0.99	1.00	1.24	8.9
North: London Cct (N)														
7	L2	1	1.0	1	1.0	0.135	26.6	LOS C	1.4	10.1	0.43	0.35	0.43	15.3
8	T1	172	1.0	159	1.0	0.135	27.6	LOS C	2.0	14.0	0.51	0.41	0.51	34.4
9	R2	88	1.0	82	1.0	0.891	94.2	LOS F	4.1	28.6	1.00	0.88	1.27	7.2
Approach		261	1.0	242 N1	1.0	0.891	50.1	LOS D	4.1	28.6	0.68	0.57	0.77	21.7
West: Edinburgh Ave (W)														
10	L2	231	1.0	231	1.0	0.945	93.8	LOS F	20.3	143.5	1.00	1.08	1.36	4.3
11	T1	501	1.0	501	1.0	0.945	82.8	LOS F	20.3	143.5	0.95	1.08	1.31	4.7
12	R2	323	1.0	323	1.0	0.845	63.5	LOS E	13.9	98.3	0.92	0.90	1.07	21.8
Approach		1055	1.0	1055	1.0	0.945	79.3	LOS E	20.3	143.5	0.95	1.02	1.25	10.2
All Vehicles		3167	1.0	3013 N1	1.1	0.945	76.0	LOS E	28.9	203.8	0.95	0.99	1.20	13.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		211	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 2 [2: Edinburgh - Knowles S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

Edinburgh Avenue Extension - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Carpark (S)														
1	L2	37	1.0	37	1.0	0.815	48.5	LOS E	1.1	7.7	0.80	1.26	1.93	5.8
2	T1	1	1.0	1	1.0	0.815	65.1	LOS F	1.1	7.7	0.80	1.26	1.93	5.8
3	R2	46	1.0	46	1.0	0.815	77.0	LOS F	1.1	7.7	0.80	1.26	1.93	5.8
Approach		84	1.0	84	1.0	0.815	64.4	LOS F	1.1	7.7	0.80	1.26	1.93	5.8
East: Edinburgh Ave Ext'n (E)														
4	L2	134	1.0	134	1.0	0.363	3.5	LOS A	4.1	28.6	0.00	0.11	0.00	43.8
5	T1	534	1.0	534	1.0	0.363	0.0	LOS A	4.1	28.6	0.00	0.11	0.00	48.8
6	R2	377	1.0	377	1.0	0.375	6.0	LOS A	5.7	40.0	0.41	0.66	0.44	21.0
Approach		1044	1.0	1044	1.0	0.375	2.6	NA	5.7	40.0	0.15	0.31	0.16	34.2
North: Knowles Pl Ext'n (N)														
7	L2	336	1.0	318	1.0	2.412	1287.2	LOS F	19.8	139.9	1.00	0.41	1.02	0.0
8	T1	1	1.0	1	1.0	2.412	32941.7	LOS F	19.8	139.9	1.00	0.41	1.02	0.0
9	R2	204	1.0	193	1.0	2.412	34094.0	LOS F	19.8	139.9	1.00	0.41	1.02	0.0
Approach		541	1.0	512[N1]	1.0	2.412	13731.1	LOS F	19.8	139.9	1.00	0.41	1.02	0.0
West: Edinburgh Ave Ext'n (W)														
10	L2	306	1.0	306	1.0	0.173	4.3	LOS A	8.5	60.0	0.00	0.56	0.00	30.7
11	T1	139	1.0	139	1.0	0.152	2.6	LOS A	1.9	13.5	0.39	0.20	0.39	29.9
12	R2	57	1.0	57	1.0	0.152	8.6	LOS A	1.9	13.5	0.39	0.20	0.39	35.5
Approach		502	1.0	502	1.0	0.173	4.3	NA	8.5	60.0	0.15	0.42	0.15	31.5
All Vehicles		2172	1.0	2143[N1]	1.0	2.412	3287.3	NA	19.8	139.9	0.38	0.40	0.43	0.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3 [3: Vernon - Edinburgh S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Vernon Cir (S)														
1	L2	1044	1.0	1044	1.0	0.805	16.8	LOS B	27.9	196.9	0.67	0.82	0.67	38.9
2	T1	1484	1.0	1484	1.0	0.508	6.0	LOS A	11.5	81.2	0.39	0.36	0.39	53.9
Approach		2528	1.0	2528	1.0	0.805	10.4	LOS B	27.9	196.9	0.50	0.55	0.50	48.4
West: Edinburgh Ave Ext'n (W)														
10	L2	521	1.0	321	1.0	0.801	79.5	LOS E	5.7	40.0	1.00	0.88	1.17	14.1
Approach		521	1.0	321[N1]	1.0	0.801	79.5	LOS E	5.7	40.0	1.00	0.88	1.17	14.1
All Vehicles		3049	1.0	2849[N1]	1.1	0.805	18.2	LOS B	27.9	196.9	0.56	0.59	0.58	41.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4 [4: London - Gordon S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

London Circuit - Gordon Street/Carpark Entrance
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: London Cct (S)														
1	L2	154	1.0	153	1.0	0.466	10.4	LOS B	5.8	41.1	0.27	0.34	0.27	28.6
2	T1	947	1.0	941	1.0	0.466	4.4	LOS A	5.8	41.1	0.17	0.20	0.17	27.3
Approach		1101	1.0	1093 N1	1.0	0.466	5.2	LOS A	5.8	41.1	0.19	0.22	0.19	27.6
North: London Cct (N)														
8	T1	224	1.0	205	1.0	0.086	10.7	LOS B	1.7	12.0	0.40	0.33	0.40	15.3
9	R2	14	1.0	12	1.0	0.062	67.8	LOS E	0.5	3.6	0.92	0.68	0.92	7.6
Approach		238	1.0	217 N1	1.0	0.086	14.0	LOS B	1.7	12.0	0.43	0.35	0.43	13.6
West: Gordon St (W)														
10	L2	19	1.0	19	1.0	0.041	47.3	LOS D	0.6	4.4	0.78	0.67	0.78	7.2
12	R2	38	1.0	38	1.0	0.169	67.1	LOS E	1.5	10.8	0.93	0.73	0.93	5.3
Approach		57	1.0	57	1.0	0.169	60.5	LOS E	1.5	10.8	0.88	0.71	0.88	5.8
All Vehicles		1396	1.0	1367 N1	1.0	0.466	8.9	LOS A	5.8	41.1	0.25	0.26	0.25	21.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		158	69.3	LOS F			0.96	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 5 [5: London - Farrell S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

London Circuit - Farrell Place
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
NorthEast: London Cct (N)														
8	T1	200	1.0	179	1.0	0.097	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9	R2	323	1.0	290	1.0	0.596	15.1	LOS C	1.5	10.3	0.83	1.15	1.44	19.6
Approach		523	1.0	469[N1]	1.0	0.596	9.3	NA	1.5	10.3	0.51	0.71	0.89	21.5
NorthWest: Farrell Pl (W)														
10	L2	2	1.0	2	1.0	0.003	8.4	LOS A	0.0	0.0	0.39	0.82	0.39	23.2
12	R2	38	1.0	38	1.0	0.357	48.7	LOS E	0.5	3.4	0.93	1.06	1.10	7.2
Approach		40	1.0	40	1.0	0.357	46.6	LOS E	0.5	3.4	0.90	1.04	1.06	7.5
SouthWest: London Cct (S)														
1	L2	148	1.0	147	1.0	0.260	3.4	LOS A	0.0	0.0	0.00	0.14	0.00	38.2
2	T1	817	1.0	811	1.0	0.260	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	37.6
Approach		965	1.0	959[N1]	1.0	0.260	0.5	NA	0.0	0.0	0.00	0.07	0.00	37.8
All Vehicles		1528	1.0	1467[N1]	1.0	0.596	4.6	NA	1.5	10.3	0.19	0.30	0.31	26.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 6 [6: London - Knowles Sth S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

London Circuit - Knowles Place South
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Knowles Pl Sth (E)														
4	L2	346	1.0	308	1.0	0.232	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	26.7
Approach		346	1.0	308[N1]	1.0	0.232	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	26.7
NorthEast: London Cct (N)														
7	L2	545	1.0	497	1.0	0.281	4.3	LOS A	8.5	60.0	0.00	0.56	0.00	30.7
8	T1	177	1.0	161	1.0	0.087	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		722	1.0	658[N1]	1.0	0.281	3.3	NA	8.5	60.0	0.00	0.42	0.00	32.5
SouthWest: London Cct (S)														
2	T1	819	1.0	813	1.0	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		819	1.0	813[N1]	1.0	0.219	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
All Vehicles		1887	1.0	1779[N1]	1.1	0.281	1.8	NA	8.5	60.0	0.00	0.23	0.00	33.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.

LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).

Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).

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 movements.

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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 7 [7: London - Knowles Nth S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

London Circuit - Knowles Place North
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
NorthEast: London Cct (N)														
7	L2	375	1.0	375	1.0	0.267	3.4	LOS A	12879.6	90930.1	0.00	0.36	0.00	36.4
8	T1	598	1.0	598	1.0	0.267	0.0	LOS A	12879.6	90930.1	0.00	0.06	0.00	39.0
Approach		973	1.0	973	1.0	0.267	1.3	NA	12879.6	90930.1	0.00	0.18	0.00	37.8
SouthWest: London Cct (S)														
2	T1	33	1.0	32	1.0	0.017	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
3	R2	295	1.0	293	1.0	0.400	8.6	LOS A	0.9	6.2	0.64	0.91	0.85	23.1
Approach		327	1.0	326[N1]	1.0	0.400	7.7	NA	0.9	6.2	0.58	0.82	0.76	25.0
All Vehicles		1300	1.0	1298[N1]	1.0	0.400	2.9	NA	12879.6	90930.1	0.14	0.34	0.19	34.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: A [A: London - University S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

London Circuit - University Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
NorthEast: London Cct (N)														
8	T1	508	1.0	508	1.0	0.215	1.1	LOS A	8.5	60.0	0.14	0.08	0.14	32.6
9	R2	89	1.0	89	1.0	0.215	9.5	LOS A	0.5	3.7	0.63	0.37	0.66	28.2
Approach		598	1.0	598	1.0	0.215	2.3	NA	8.5	60.0	0.21	0.12	0.22	31.2
NorthWest: University Ave (W)														
10	L2	18	1.0	18	1.0	0.015	6.7	LOS A	0.0	0.0	0.00	1.00	0.00	24.4
12	R2	214	1.0	214	1.0	1.423	431.2	LOS F	18.7	132.3	1.00	4.43	10.95	0.9
Approach		232	1.0	232	1.0	1.423	398.4	LOS F	18.7	132.3	0.92	4.16	10.11	1.0
SouthWest: London Cct (S)														
1	L2	509	1.0	506	1.0	0.286	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	33.5
2	T1	309	1.0	308	1.0	0.166	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		819	1.0	814[N1]	1.0	0.286	2.1	NA	0.0	0.0	0.00	0.28	0.00	34.6
All Vehicles		1648	1.0	1643[N1]	1.0	1.423	58.1	NA	18.7	132.3	0.21	0.77	1.50	6.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: B [B: Knowles - Knowles Ext'n S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

Knowles Place - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Section 100 (E)														
21	L2	88	1.0	88	1.0	0.126	5.5	LOS A	960.3	6779.9	0.00	0.22	0.00	46.0
22	T1	151	1.0	151	1.0	0.126	0.0	LOS A	960.3	6779.9	0.00	0.22	0.00	46.0
Approach		239	1.0	239	1.0	0.126	2.1	NA	960.3	6779.9	0.00	0.22	0.00	46.0
NorthEast: Knowles Pl (N)														
24	L2	55	1.0	55	1.0	0.651	8.7	LOS A	1.1	8.1	0.57	0.95	1.08	26.4
8	T1	124	1.0	124	1.0	0.651	12.3	LOS B	1.1	8.1	0.57	0.95	1.08	21.0
9	R2	86	1.0	86	1.0	0.651	15.7	LOS C	1.1	8.1	0.57	0.95	1.08	21.0
Approach		265	1.0	265	1.0	0.651	12.7	LOS B	1.1	8.1	0.57	0.95	1.08	22.4
NorthWest: Knowles Pl (W)														
28	T1	218	1.0	199	1.0	0.318	3.2	LOS A	8.5	60.0	0.40	0.50	0.40	38.7
12	R2	327	1.0	299	1.0	0.318	5.4	LOS A	8.5	60.0	0.40	0.50	0.40	25.7
Approach		545	1.0	497 N1	1.0	0.318	4.5	NA	8.5	60.0	0.40	0.50	0.40	32.4
SouthWest: Knowles Pl Ext'n (S)														
1	L2	109	1.0	108	1.0	1.524	482.9	LOS F	19.8	139.9	1.00	6.91	20.47	1.1
32	R2	575	1.0	567	1.0	1.524	492.0	LOS F	19.8	139.9	1.00	6.91	20.47	1.8
Approach		684	1.0	675 N1	1.0	1.524	490.6	LOS F	19.8	139.9	1.00	6.91	20.47	1.7
All Vehicles		1734	1.0	1676 N1	1.0	1.524	201.1	NA	960.3	6779.9	0.61	3.11	8.53	2.8

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 1 [1: London - Edinburgh S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: London Cct (S)														
1	L2	343	1.0	343	1.0	0.945	73.2	LOS E	19.3	136.4	1.00	1.09	1.42	18.9
2	T1	621	1.0	621	1.0	0.945	66.2	LOS E	21.5	152.0	1.00	1.16	1.39	19.1
3	R2	1	1.0	1	1.0	0.004	47.6	LOS D	0.0	0.2	0.86	0.60	0.86	23.8
Approach		965	1.0	965	1.0	0.945	68.7	LOS E	21.5	152.0	1.00	1.13	1.40	19.0
East: Edinburgh Ave Ext'n (E)														
4	L2	200	1.0	132	1.0	0.548	53.7	LOS D	4.2	29.6	0.98	0.80	0.98	23.0
5	T1	757	1.0	500	1.0	0.908	64.3	LOS E	8.5	60.0	1.00	1.07	1.41	8.6
6	R2	18	1.0	12	1.0	0.908	68.7	LOS E	8.5	60.0	1.00	1.07	1.40	4.2
Approach		975	1.0	644 N1	1.0	0.908	62.2	LOS E	8.5	60.0	1.00	1.01	1.32	12.0
North: London Cct (N)														
7	L2	7	1.0	5	1.0	0.332	21.2	LOS C	2.5	17.7	0.46	0.39	0.46	18.8
8	T1	476	1.0	350	1.0	0.332	17.1	LOS B	2.9	20.6	0.49	0.41	0.49	41.1
9	R2	335	1.0	246	1.0	0.926	74.5	LOS E	9.3	65.8	1.00	0.96	1.28	8.7
Approach		818	1.0	602 N1	1.0	0.926	40.6	LOS D	9.3	65.8	0.70	0.63	0.81	23.7
West: Edinburgh Ave (W)														
10	L2	94	1.0	94	1.0	0.901	70.0	LOS E	9.1	64.3	1.00	1.07	1.41	5.8
11	T1	380	1.0	380	1.0	0.901	62.6	LOS E	11.2	78.8	1.00	1.06	1.38	6.0
12	R2	332	1.0	332	1.0	0.901	67.8	LOS E	11.2	78.8	1.00	1.01	1.37	21.1
Approach		805	1.0	805	1.0	0.901	65.6	LOS E	11.2	78.8	1.00	1.04	1.38	13.7
All Vehicles		3563	1.0	3016 N1	1.2	0.945	60.9	LOS E	21.5	152.0	0.94	0.98	1.26	17.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95

MOVEMENT SUMMARY

Site: 2 [2: Edinburgh - Knowles S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

Edinburgh Avenue Extension - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Carpark (S)														
1	L2	96	1.0	96	1.0	2.093	1011.6	LOS F	26.9	189.7	1.00	6.52	18.17	0.4
2	T1	1	1.0	1	1.0	2.093	1018.7	LOS F	26.9	189.7	1.00	6.52	18.17	0.4
3	R2	93	1.0	93	1.0	2.093	1034.5	LOS F	26.9	189.7	1.00	6.52	18.17	0.4
Approach		189	1.0	189	1.0	2.093	1022.8	LOS F	26.9	189.7	1.00	6.52	18.17	0.4
East: Edinburgh Ave Ext'n (E)														
4	L2	68	1.0	68	1.0	0.289	3.5	LOS A	1.1	8.0	0.00	0.07	0.00	44.7
5	T1	517	1.0	517	1.0	0.289	0.2	LOS A	1.1	8.0	0.04	0.12	0.04	46.8
6	R2	287	1.0	287	1.0	0.289	5.1	LOS A	0.6	4.5	0.35	0.52	0.35	24.7
Approach		873	1.0	873	1.0	0.289	2.1	NA	1.1	8.0	0.14	0.25	0.14	36.7
North: Knowles Pl Ext'n (N)														
7	L2	519	1.0	466	1.0	4.108	2808.7	LOS F	19.8	139.9	1.00	4.52	10.37	0.2
8	T1	1	1.0	1	1.0	4.108	2830.8	LOS F	19.8	139.9	1.00	4.52	10.37	0.3
9	R2	362	1.0	325	1.0	4.108	2839.5	LOS F	19.8	139.9	1.00	4.52	10.37	0.2
Approach		882	1.0	791 N1	1.0	4.108	2821.4	LOS F	19.8	139.9	1.00	4.52	10.37	0.2
West: Edinburgh Ave Ext'n (W)														
10	L2	151	1.0	150	1.0	0.113	4.3	LOS A	0.2	1.5	0.00	0.42	0.00	34.9
11	T1	216	1.0	215	1.0	0.113	0.5	LOS A	0.5	3.3	0.12	0.16	0.12	41.5
12	R2	21	1.0	21	1.0	0.113	7.4	LOS A	0.5	3.3	0.15	0.07	0.15	42.4
Approach		387	1.0	385 N1	1.0	0.113	2.4	NA	0.5	3.3	0.07	0.26	0.07	38.9
All Vehicles		2332	1.0	2239 N1	1.0	4.108	1085.0	NA	26.9	189.7	0.50	2.29	5.27	0.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3 [3: Vernon - Edinburgh S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Vernon Cir (S)														
1	L2	874	1.0	874	1.0	0.738	16.9	LOS B	17.9	126.3	0.69	0.82	0.69	38.8
2	T1	1644	1.0	1644	1.0	0.616	8.3	LOS A	13.4	94.9	0.55	0.51	0.55	51.8
Approach		2518	1.0	2518	1.0	0.738	11.3	LOS B	17.9	126.3	0.60	0.61	0.60	48.0
West: Edinburgh Ave Ext'n (W)														
10	L2	826	1.0	374	1.0	0.728	55.3	LOS E	5.7	40.0	1.00	0.86	1.10	18.3
Approach		826	1.0	374[N1]	1.0	0.728	55.3	LOS E	5.7	40.0	1.00	0.86	1.10	18.3
All Vehicles		3344	1.0	2892[N1]	1.2	0.738	17.0	LOS B	17.9	126.3	0.65	0.65	0.66	42.7

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	49.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 4 [4: London - Gordon S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

London Circuit - Gordon Street/Carpark Entrance
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: London Cct (S)														
1	L2	1	1.0	1	1.0	0.353	7.3	LOS A	2.1	14.5	0.19	0.16	0.19	33.7
2	T1	733	1.0	727	1.0	0.353	2.3	LOS A	2.1	14.5	0.11	0.10	0.11	32.6
Approach		734	1.0	728 N1	1.0	0.353	2.3	LOS A	2.1	14.5	0.11	0.10	0.11	32.6
North: London Cct (N)														
8	T1	781	1.0	565	1.0	0.291	13.8	LOS B	5.2	36.4	0.57	0.49	0.57	13.0
9	R2	14	1.0	10	1.0	0.041	48.3	LOS D	0.3	2.0	0.89	0.66	0.89	10.0
Approach		795	1.0	575 N1	1.0	0.291	14.4	LOS B	5.2	36.4	0.57	0.49	0.57	12.8
West: Gordon St (W)														
10	L2	19	1.0	19	1.0	0.035	31.6	LOS C	0.4	3.0	0.72	0.65	0.72	9.9
12	R2	38	1.0	38	1.0	0.166	48.9	LOS D	1.1	7.9	0.91	0.72	0.91	6.9
Approach		57	1.0	57	1.0	0.166	43.1	LOS D	1.1	7.9	0.85	0.70	0.85	7.7
All Vehicles		1585	1.0	1359 N1	1.2	0.353	9.1	LOS A	5.2	36.4	0.34	0.29	0.34	19.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	49.3	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

Project: X:\Projects\3002653 Traffic Minor Projects 2018\102 City Section 100 Traffic Study\015 Traffic - Intersection Flow Modelling\Section 100 PM Peak Rev2.sip8

MOVEMENT SUMMARY

Site: 5 [5: London - Farrell S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

London Circuit - Farrell Place
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: London Cct (N)														
8	T1	559	1.0	504	1.0	0.285	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
9	R2	378	1.0	341	1.0	0.528	10.9	LOS B	1.4	9.6	0.73	1.04	1.16	23.0
Approach		937	1.0	845 N1	1.0	0.528	4.4	NA	1.4	9.6	0.29	0.42	0.47	26.8
NorthWest: Farrell Pl (W)														
10	L2	4	1.0	4	1.0	0.005	7.8	LOS A	0.0	0.0	0.32	0.84	0.32	23.8
12	R2	236	1.0	236	1.0	3.351	2157.8	LOS F	45.7	323.0	1.00	4.89	13.18	0.2
Approach		240	1.0	240	1.0	3.351	2120.1	LOS F	45.7	323.0	0.99	4.82	12.95	0.2
SouthWest: London Cct (S)														
1	L2	139	1.0	138	1.0	0.203	3.4	LOS A	0.0	0.0	0.00	0.17	0.00	37.7
2	T1	613	1.0	608	1.0	0.203	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	37.3
Approach		752	1.0	746 N1	1.0	0.203	0.6	NA	0.0	0.0	0.00	0.09	0.00	37.4
All Vehicles		1928	1.0	1831 N1	1.1	3.351	280.2	NA	45.7	323.0	0.26	0.86	1.92	1.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 6 [6: London - Knowles Sth S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

London Circuit - Knowles Place South
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Knowles Pl Sth (E)														
4	L2	918	1.0	826	1.0	0.623	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	26.7
Approach		918	1.0	826[N1]	1.0	0.623	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	26.7
NorthEast: London Cct (N)														
7	L2	305	1.0	305	1.0	0.173	4.3	LOS A	8.5	60.0	0.00	0.56	0.00	30.7
8	T1	19	1.0	19	1.0	0.010	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		324	1.0	324	1.0	0.173	4.1	NA	8.5	60.0	0.00	0.53	0.00	31.1
SouthWest: London Cct (S)														
2	T1	618	1.0	613	1.0	0.165	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		618	1.0	613[N1]	1.0	0.165	0.0	NA	0.0	0.0	0.00	0.00	0.00	40.0
All Vehicles		1860	1.0	1763[N1]	1.1	0.623	2.3	NA	8.5	60.0	0.00	0.31	0.00	30.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 7 [7: London - Knowles Nth S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

London Circuit - Knowles Place North
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: London Cct (N)														
7	L2	88	1.0	88	1.0	0.064	3.4	LOS A	148.6	1049.1	0.00	0.35	0.00	36.4
8	T1	145	1.0	145	1.0	0.064	0.0	LOS A	148.6	1049.1	0.00	0.06	0.00	39.0
Approach		234	1.0	234	1.0	0.064	1.3	NA	148.6	1049.1	0.00	0.17	0.00	37.8
SouthWest: London Cct (S)														
2	T1	104	1.0	104	1.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
3	R2	114	1.0	113	1.0	0.091	4.1	LOS A	0.1	1.1	0.26	0.49	0.26	28.7
Approach		218	1.0	217[N1]	1.0	0.091	2.1	NA	0.1	1.1	0.14	0.26	0.14	35.1
All Vehicles		452	1.0	450[N1]	1.0	0.091	1.7	NA	148.6	1049.1	0.07	0.21	0.07	36.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: A [A: London - University S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

London Circuit - University Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
NorthEast: London Cct (N)														
8	T1	134	1.0	134	1.0	0.044	0.5	LOS A	8.5	60.0	0.10	0.04	0.10	35.4
9	R2	12	1.0	12	1.0	0.044	6.8	LOS A	0.1	0.4	0.26	0.10	0.26	35.9
Approach		145	1.0	145	1.0	0.044	1.0	NA	8.5	60.0	0.12	0.04	0.12	35.4
NorthWest: University Ave (W)														
10	L2	65	1.0	65	1.0	0.055	6.7	LOS A	0.0	0.0	0.00	1.00	0.00	24.4
12	R2	191	1.0	191	1.0	0.410	15.1	LOS C	0.9	6.2	0.67	1.11	0.91	17.1
Approach		256	1.0	256	1.0	0.410	12.9	LOS B	0.9	6.2	0.50	1.08	0.68	18.6
SouthWest: London Cct (S)														
1	L2	465	1.0	462	1.0	0.261	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	33.5
2	T1	153	1.0	151	1.0	0.082	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		618	1.0	613[N1]	1.0	0.261	2.6	NA	0.0	0.0	0.00	0.34	0.00	34.2
All Vehicles		1019	1.0	1014[N1]	1.0	0.410	5.0	NA	8.5	60.0	0.14	0.49	0.19	28.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: B [B: Knowles - Knowles Ext'n S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

Knowles Place - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
SouthEast: Section 100 (E)														
21	L2	407	1.0	407	1.0	0.431	5.5	LOS A	77.1	544.4	0.00	0.30	0.00	42.5
22	T1	406	1.0	406	1.0	0.431	0.0	LOS A	77.1	544.4	0.00	0.30	0.00	42.5
Approach		814	1.0	814	1.0	0.431	2.8	NA	77.1	544.4	0.00	0.30	0.00	42.5
NorthEast: Knowles Pl (N)														
24	L2	1	1.0	1	1.0	1.870	793.3	LOS F	48.4	341.9	1.00	10.67	27.53	1.0
8	T1	197	1.0	197	1.0	1.870	800.0	LOS F	48.4	341.9	1.00	10.67	27.53	0.6
9	R2	197	1.0	197	1.0	1.870	800.6	LOS F	48.4	341.9	1.00	10.67	27.53	0.6
Approach		395	1.0	395	1.0	1.870	800.3	LOS F	48.4	341.9	1.00	10.67	27.53	0.6
NorthWest: Knowles Pl (W)														
28	T1	29	1.0	29	1.0	0.428	10.3	LOS B	8.5	60.0	0.75	0.93	1.06	27.4
12	R2	276	1.0	276	1.0	0.428	10.6	LOS B	8.5	60.0	0.75	0.93	1.06	15.5
Approach		305	1.0	305	1.0	0.428	10.6	NA	8.5	60.0	0.75	0.93	1.06	17.1
SouthWest: Knowles Pl Ext'n (S)														
1	L2	315	1.0	314	1.0	0.748	13.2	LOS B	2.8	19.9	0.70	1.30	1.79	18.7
32	R2	124	1.0	124	1.0	0.748	28.8	LOS D	2.8	19.9	0.70	1.30	1.79	23.6
Approach		439	1.0	438 N1	1.0	0.748	17.6	LOS C	2.8	19.9	0.70	1.30	1.79	20.3
All Vehicles		1953	1.0	1951 N1	1.0	1.870	168.7	NA	77.1	544.4	0.48	2.72	6.14	2.6

Site Level of Service (LOS) Method: Delay & v/c (HCM 2010). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Minor Road Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
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 movements.
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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

PHASING SUMMARY

Site: 1 [1: London - Edinburgh S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Optimum Cycle Time - Minimum Delay)

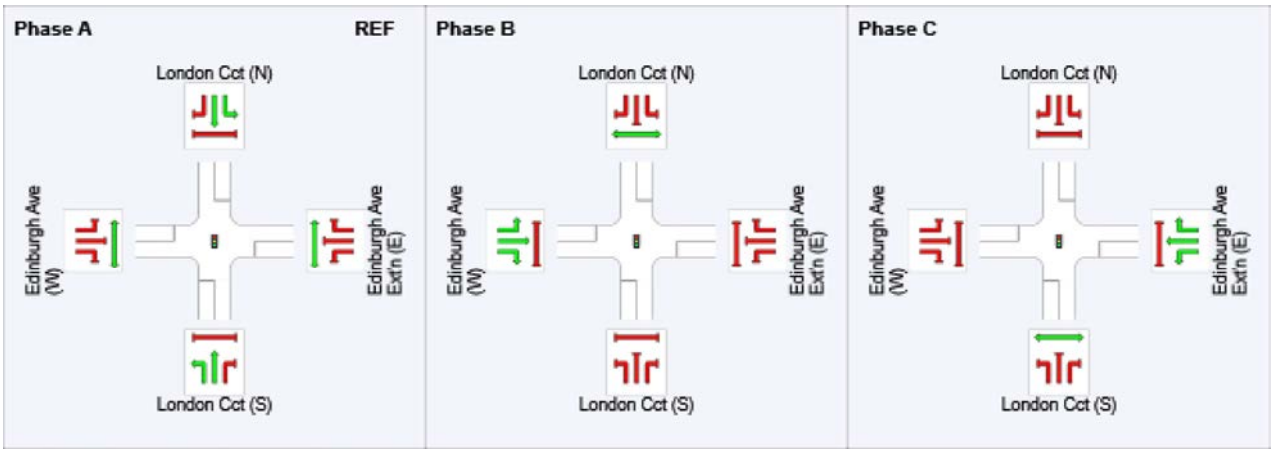
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Four Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

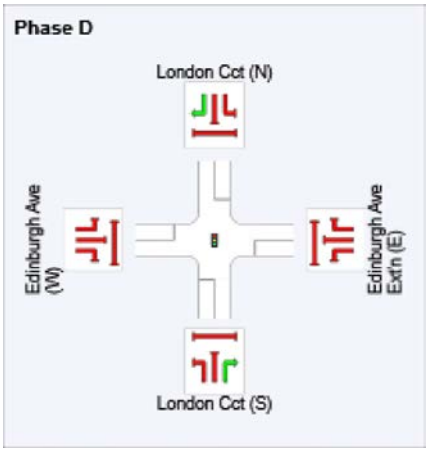
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	54	105	136
Green Time (sec)	48	45	25	8
Phase Time (sec)	54	51	31	14
Phase Split	36%	34%	21%	9%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence





REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

PHASING SUMMARY

Site: 3 [3: Vernon - Edinburgh S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Optimum Cycle Time - Minimum Delay)

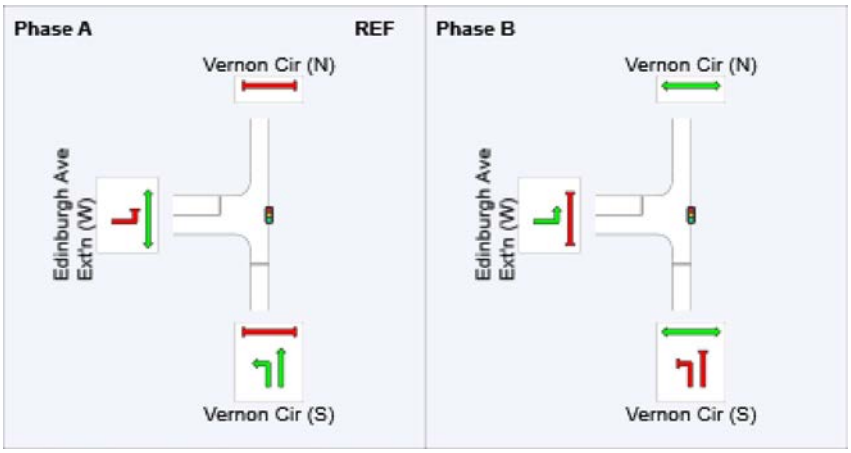
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Two Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	124
Green Time (sec)	118	20
Phase Time (sec)	124	26
Phase Split	83%	17%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

PHASING SUMMARY

Site: 4 [4: London - Gordon S100 3.4 vpd]

Network: 3 [2031 AM Section 100 3.4 vpd]

London Circuit - Gordon Street/Carpark Entrance
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 150 seconds (Network Optimum Cycle Time - Minimum Delay)

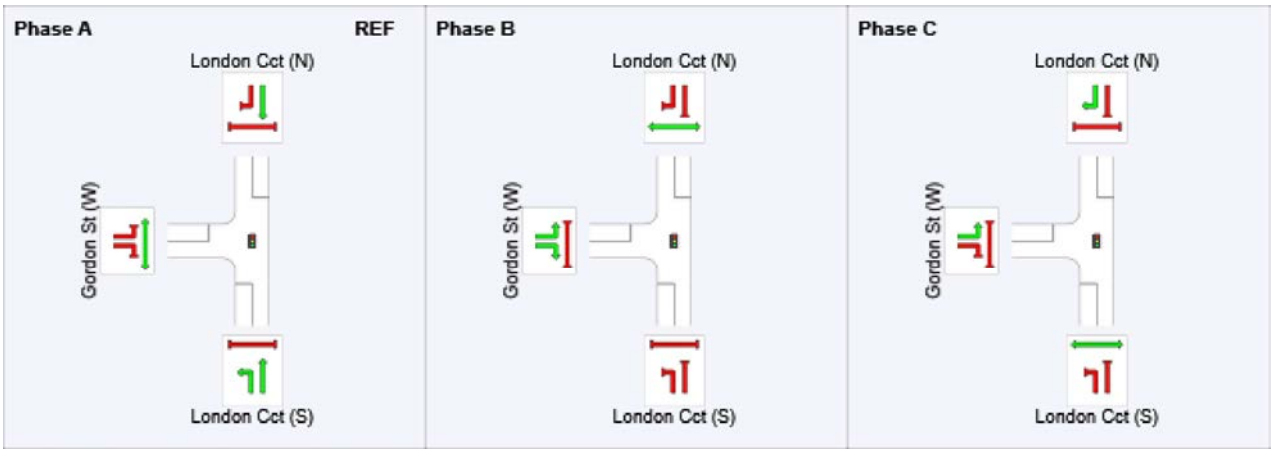
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Three Phase (phase reduction applied)
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	102	127
Green Time (sec)	96	19	17
Phase Time (sec)	102	25	23
Phase Split	68%	17%	15%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

PHASING SUMMARY

Site: 1 [1: London - Edinburgh S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

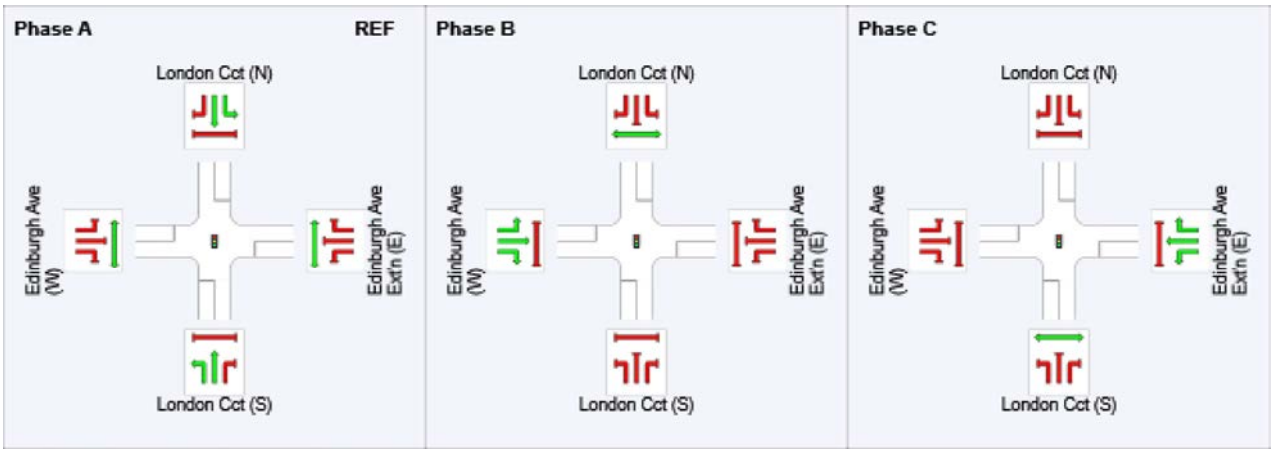
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Four Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

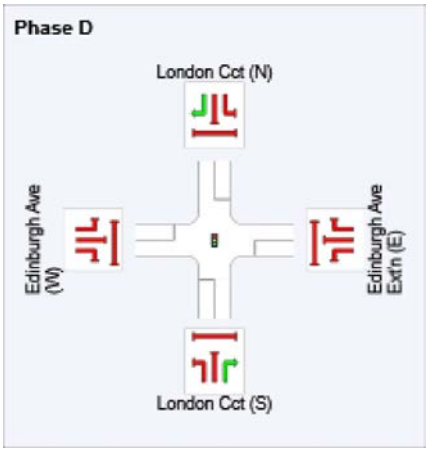
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	38	64	87
Green Time (sec)	32	20	17	17
Phase Time (sec)	38	26	23	23
Phase Split	35%	24%	21%	21%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence





REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

PHASING SUMMARY

Site: 3 [3: Vernon - Edinburgh S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

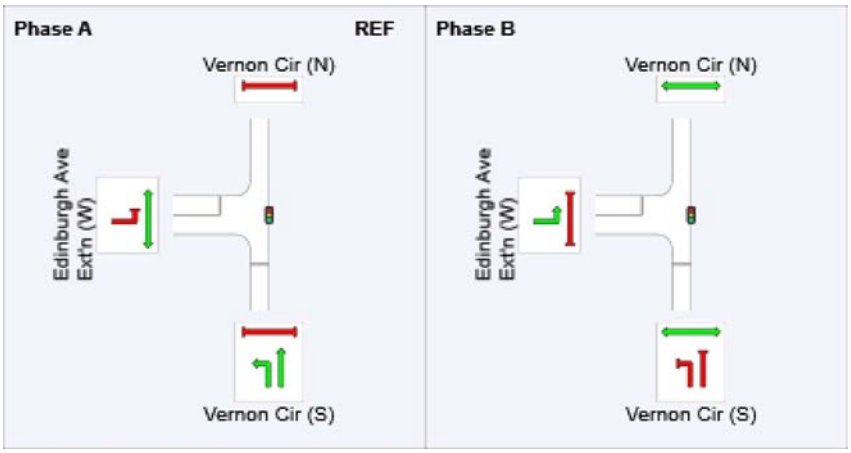
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Two Phase
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	85
Green Time (sec)	79	19
Phase Time (sec)	85	25
Phase Split	77%	23%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

PHASING SUMMARY

Site: 4 [4: London - Gordon S100 3.4 vpd]

Network: 3 [2031 PM Section 100 3.4 vpd]

London Circuit - Gordon Street/Carpark Entrance
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Optimum Cycle Time - Minimum Delay)

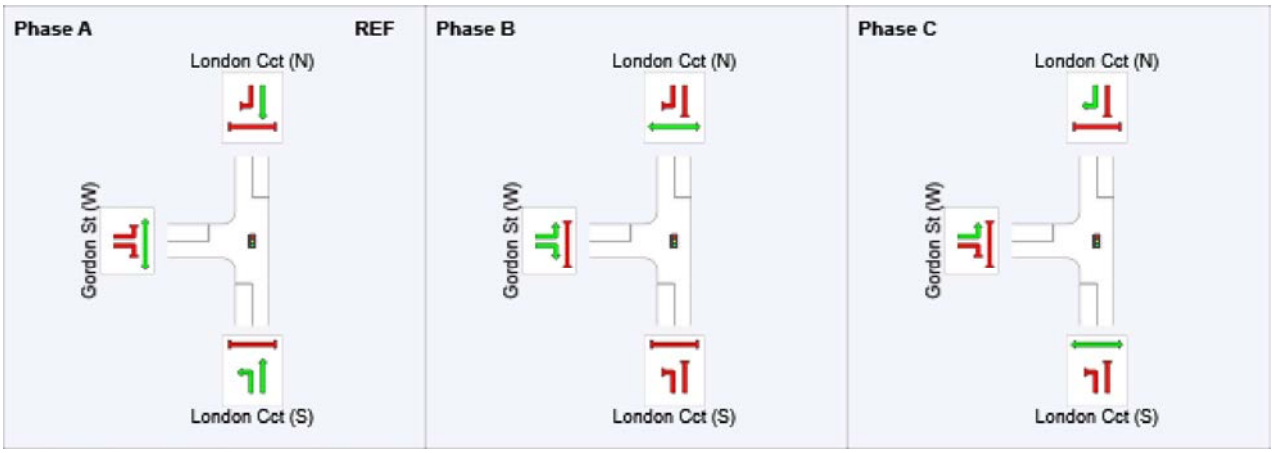
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Three Phase (phase reduction applied)
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	67	89
Green Time (sec)	61	16	15
Phase Time (sec)	67	22	21
Phase Split	61%	20%	19%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



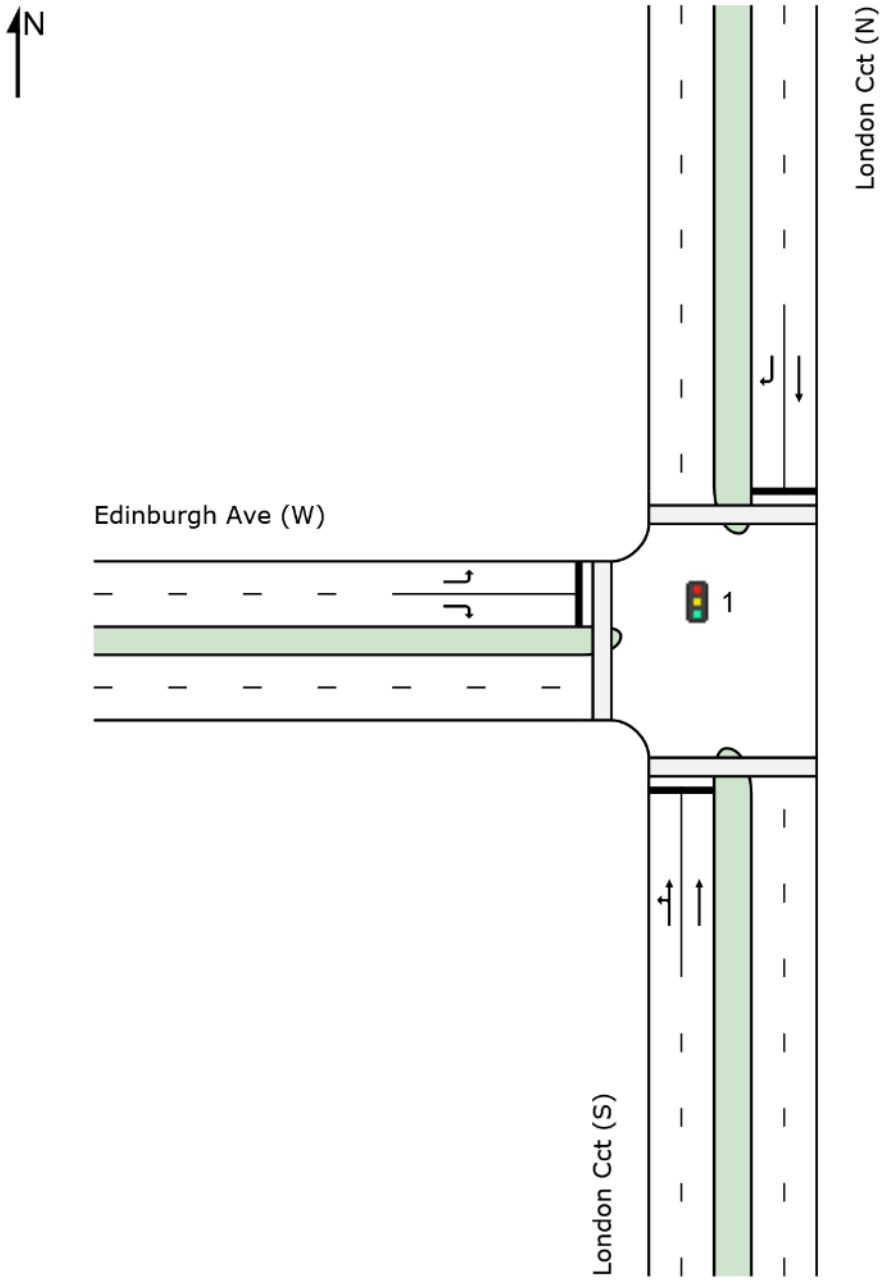
REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

SITE LAYOUT

Site: 1 [1: London - Edinburgh EXISTING]

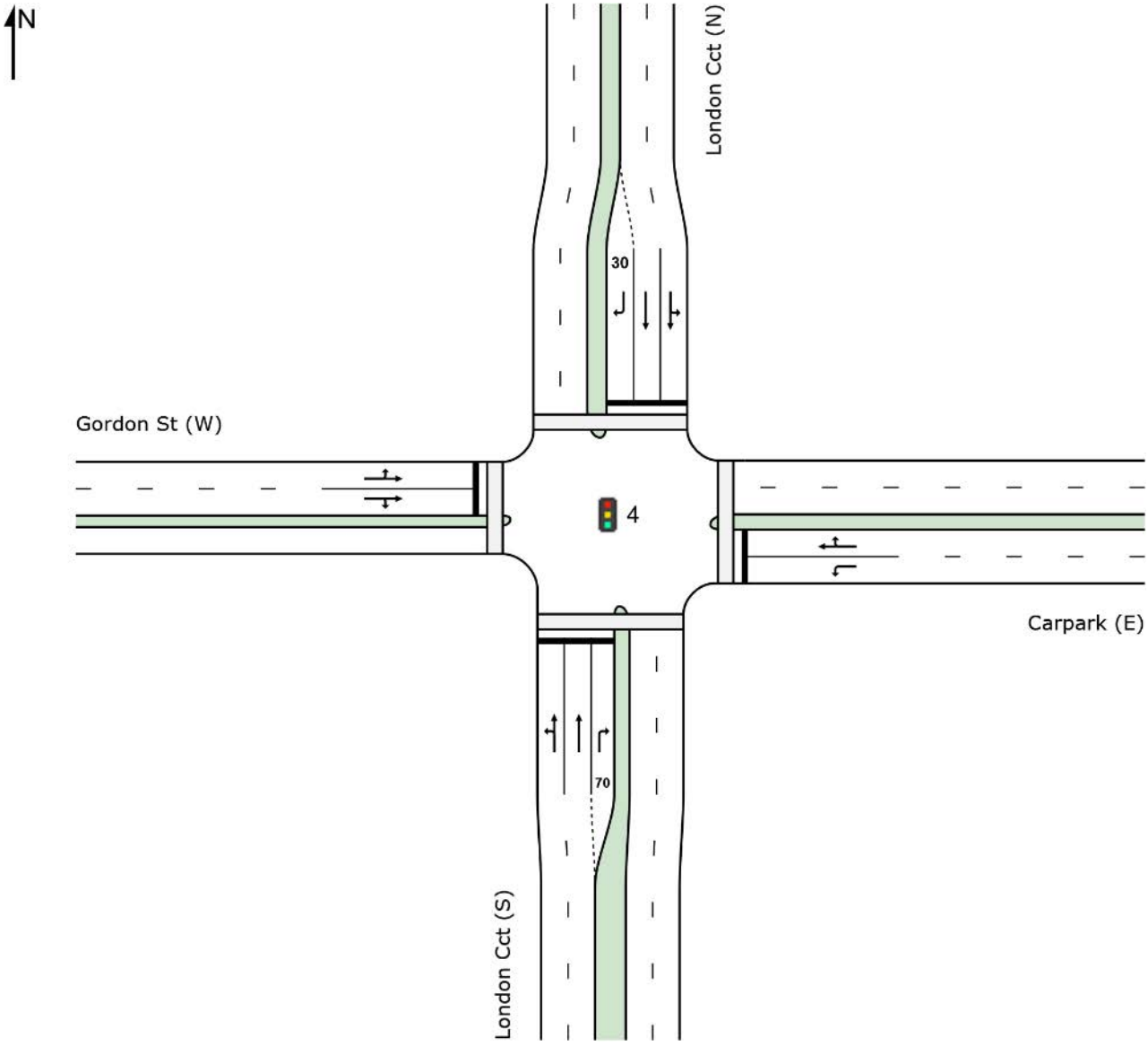
London Circuit - Edinburgh Avenue
Existing
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 4 [4: London - Gordon EXISTING]

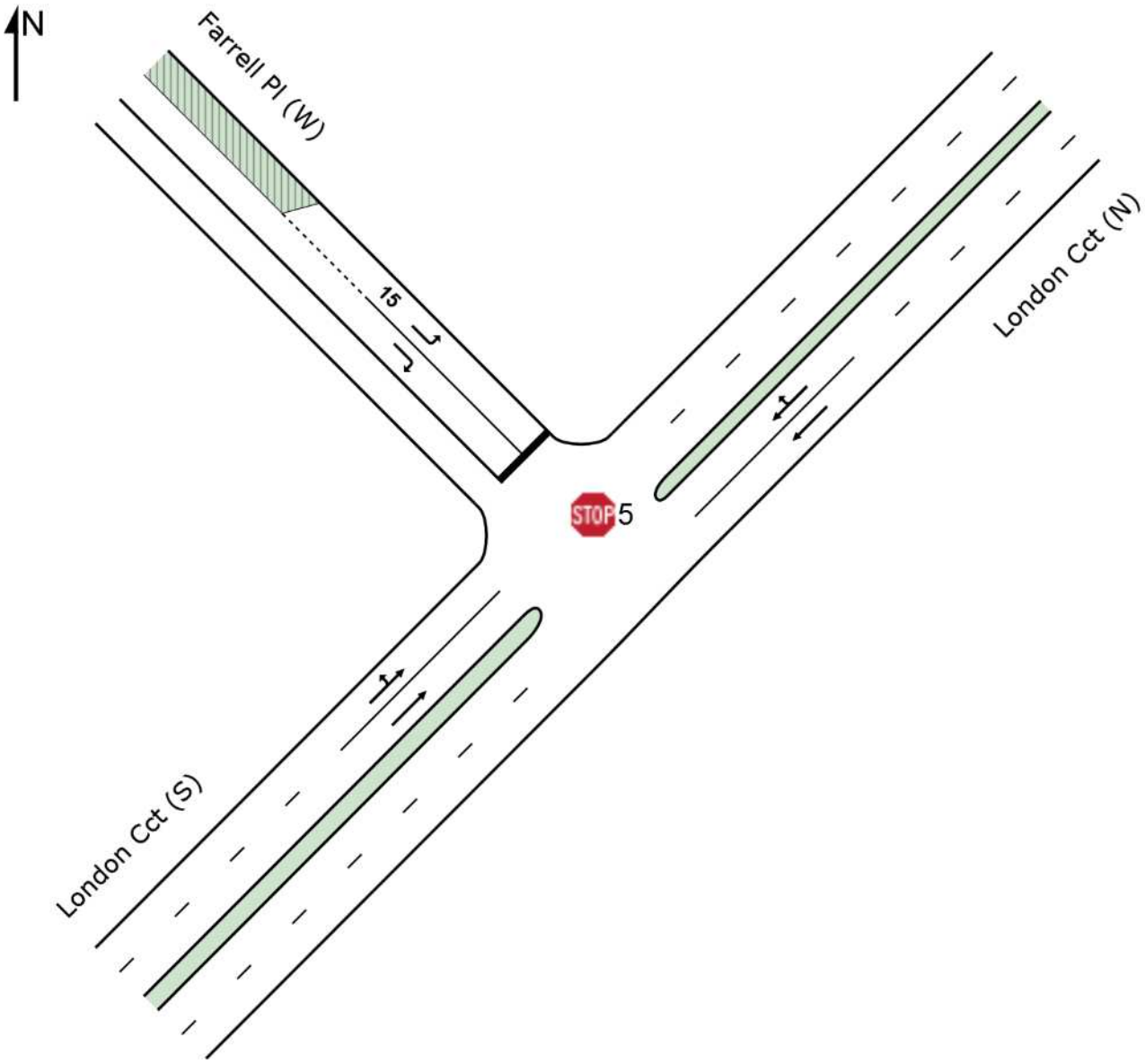
London Circuit - Gordon Street/Carpark Entrance
Existing
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 5 [5: London - Farrell EXISTING]

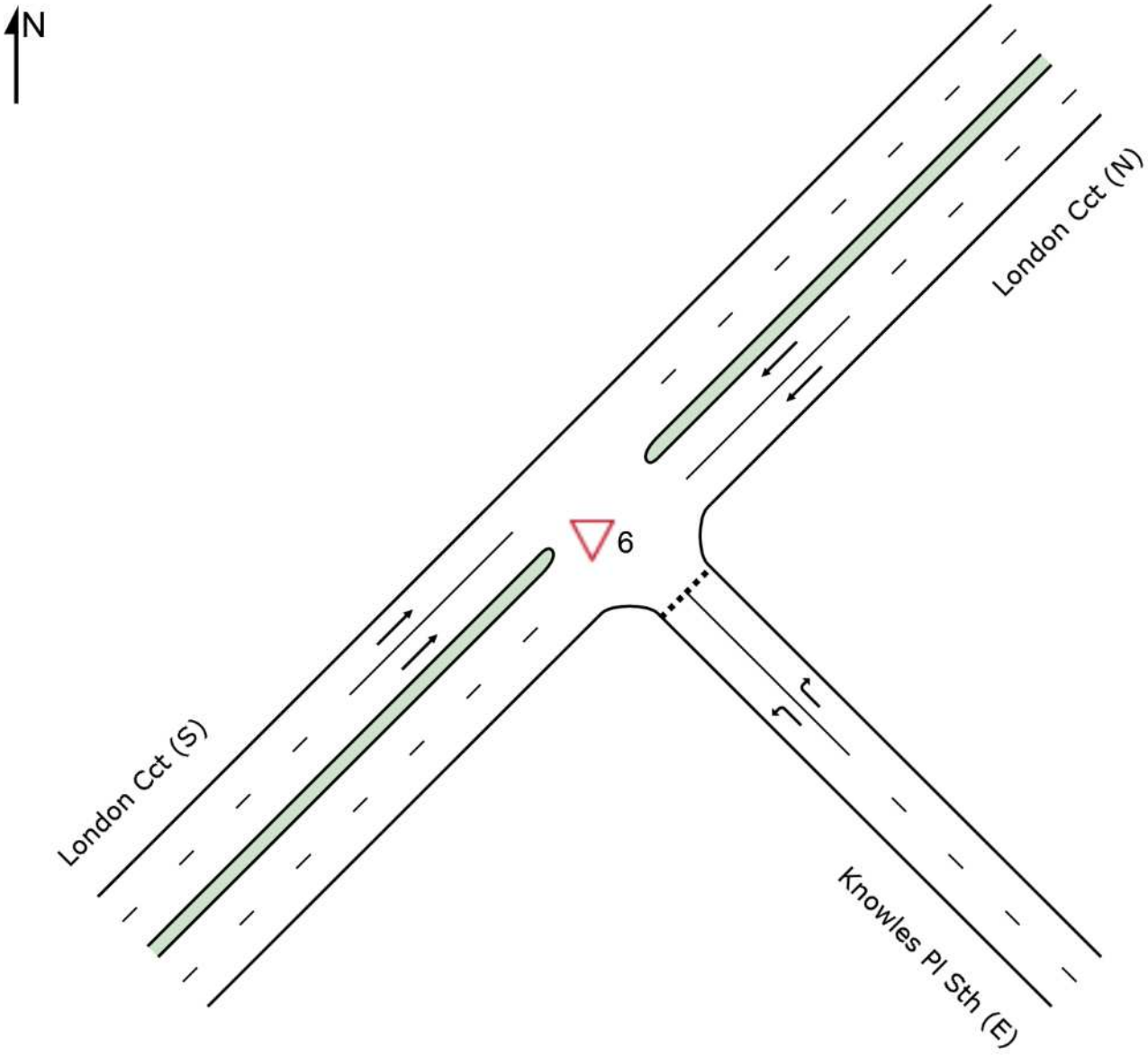
London Circuit - Farrell Place
Existing
Site Category: (None)
Stop (Two-Way)



SITE LAYOUT

Site: 6 [6: London - Knowles Sth EXISTING]

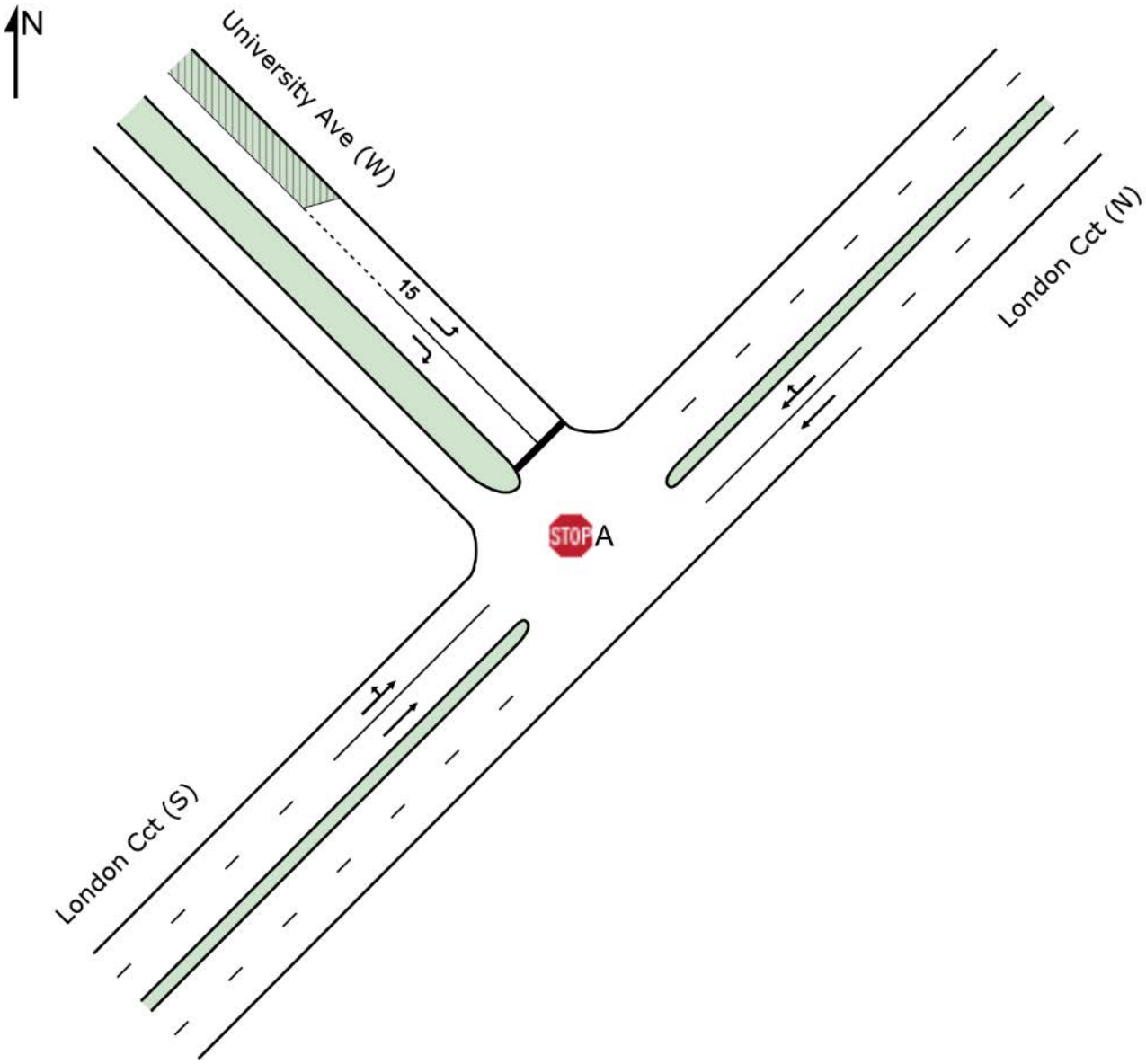
London Circuit - Knowles Place South
Existing
Site Category: (None)
Giveway / Yield (Two-Way)



SITE LAYOUT

Site: A [A: London - University EXISTING]

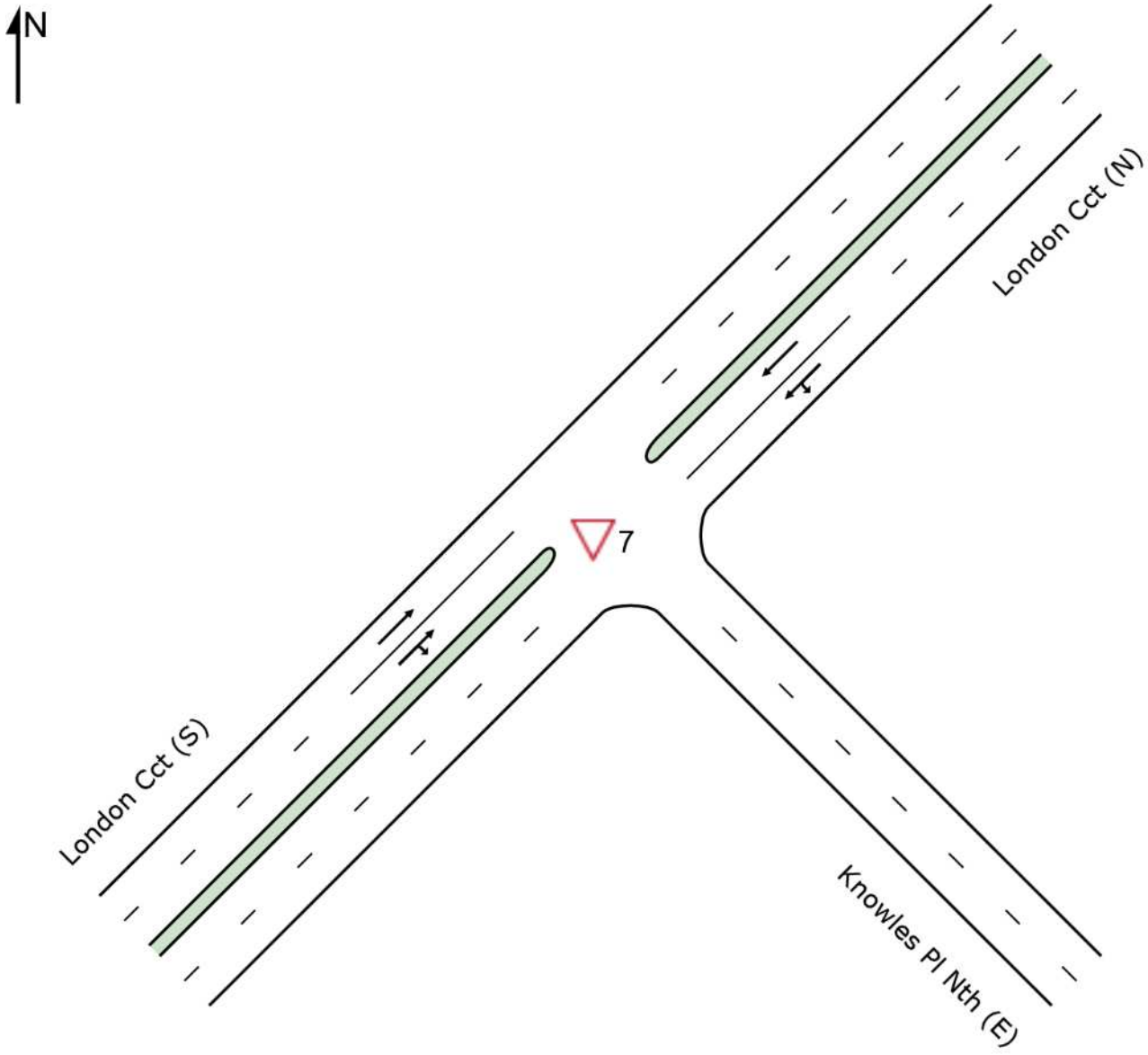
London Circuit - University Avenue
Existing
Site Category: (None)
Stop (Two-Way)



SITE LAYOUT

Site: 7 [7: London - Knowles Nth EXISTING]

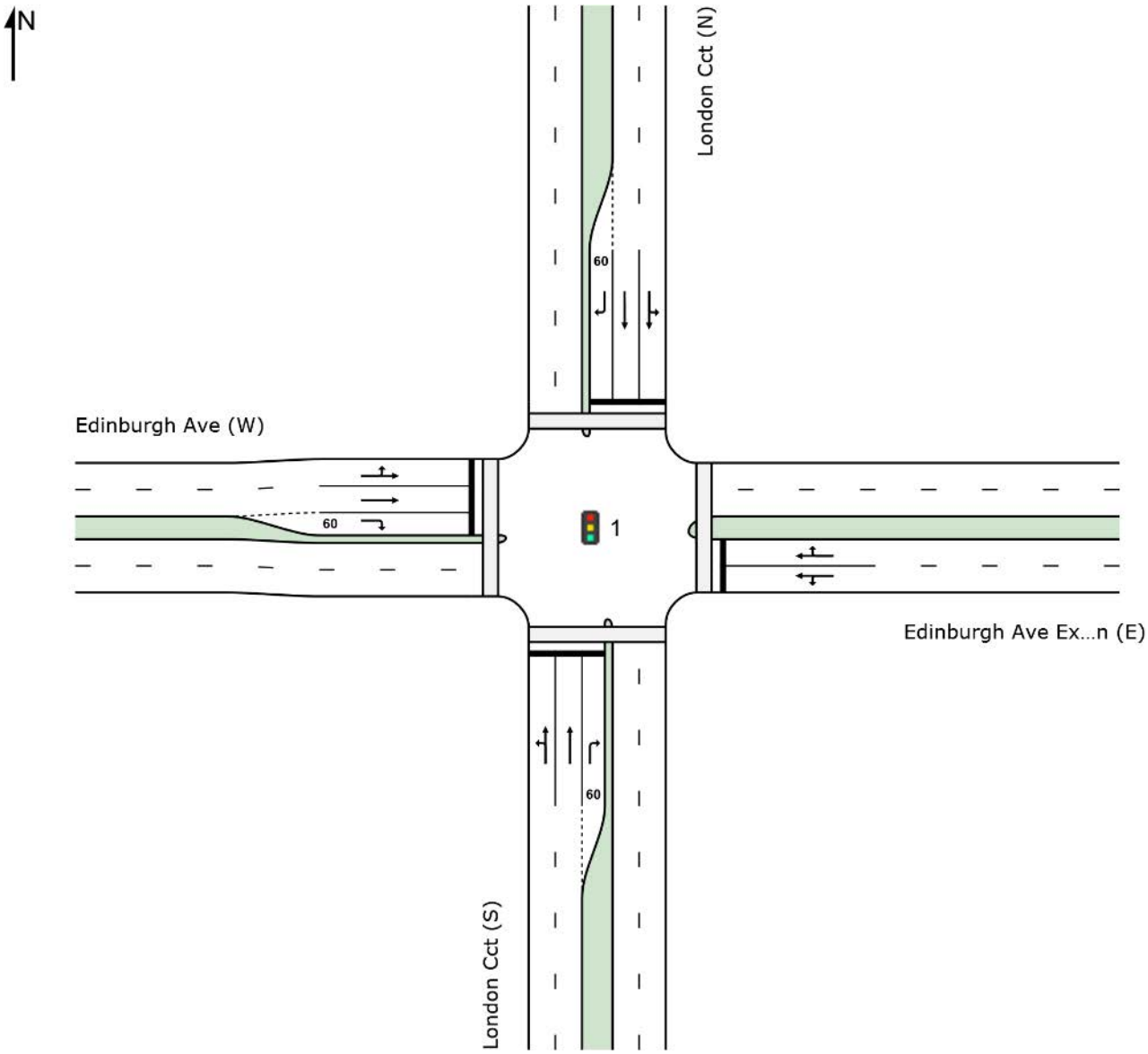
London Circuit - Knowles Place North
Existing
Site Category: (None)
Giveway / Yield (Two-Way)



SITE LAYOUT

Site: 1 [1: London - Edinburgh DO MIN]

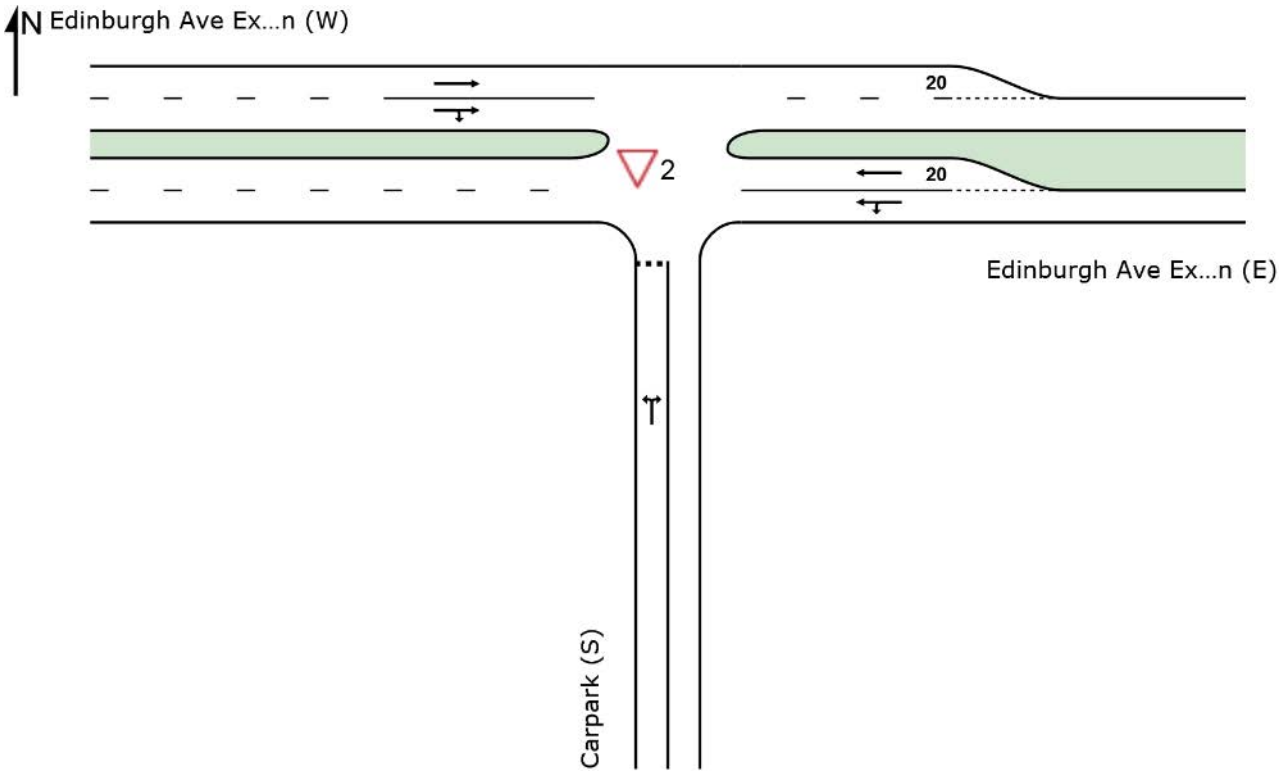
London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 2 [2: Edinburgh - Knowles DO MIN]

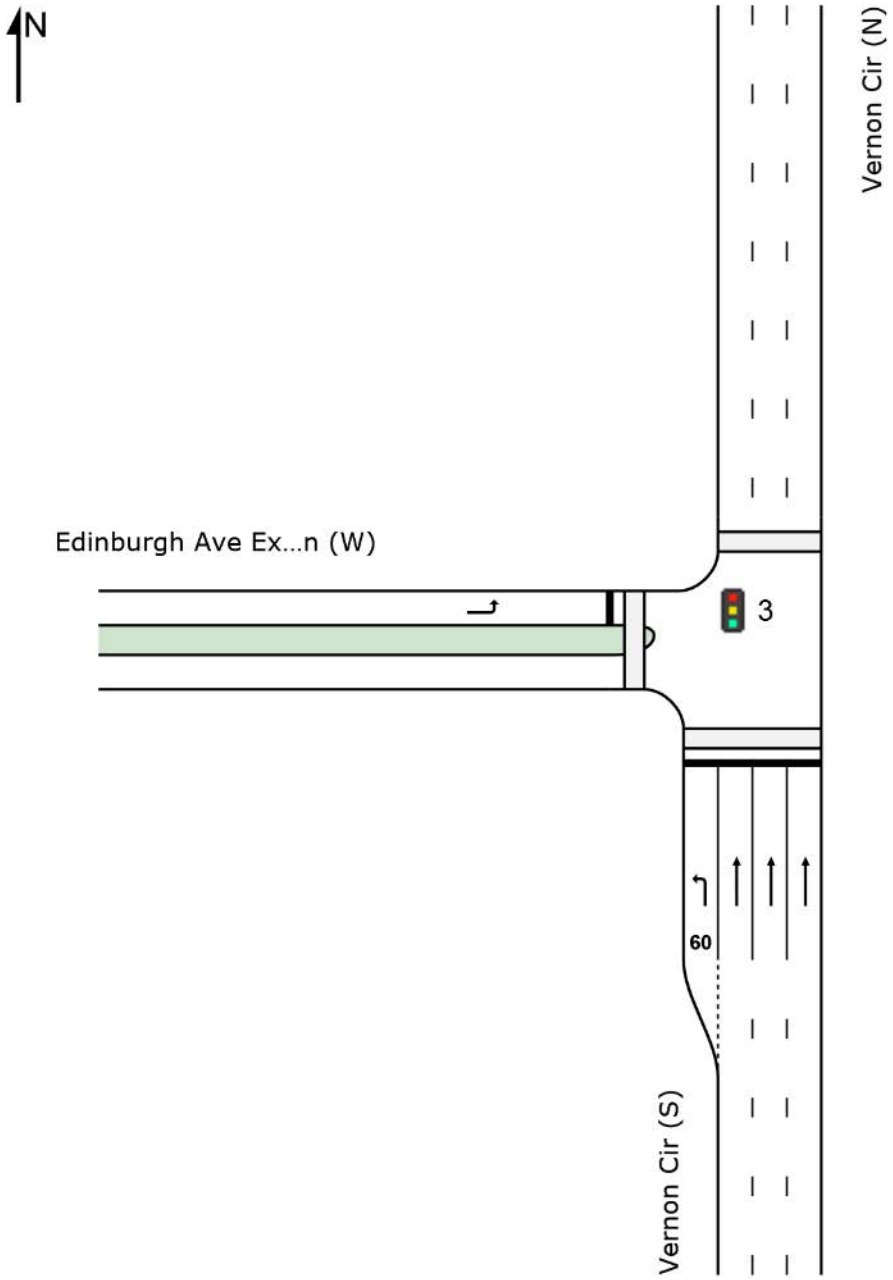
Edinburgh Avenue Extension - Knowles Place Extension
Edinburgh Avenue Extension Do Minimum
Site Category: (None)
Giveway / Yield (Two-Way)



SITE LAYOUT

Site: 3 [3: Vernon - Edinburgh DO MIN]

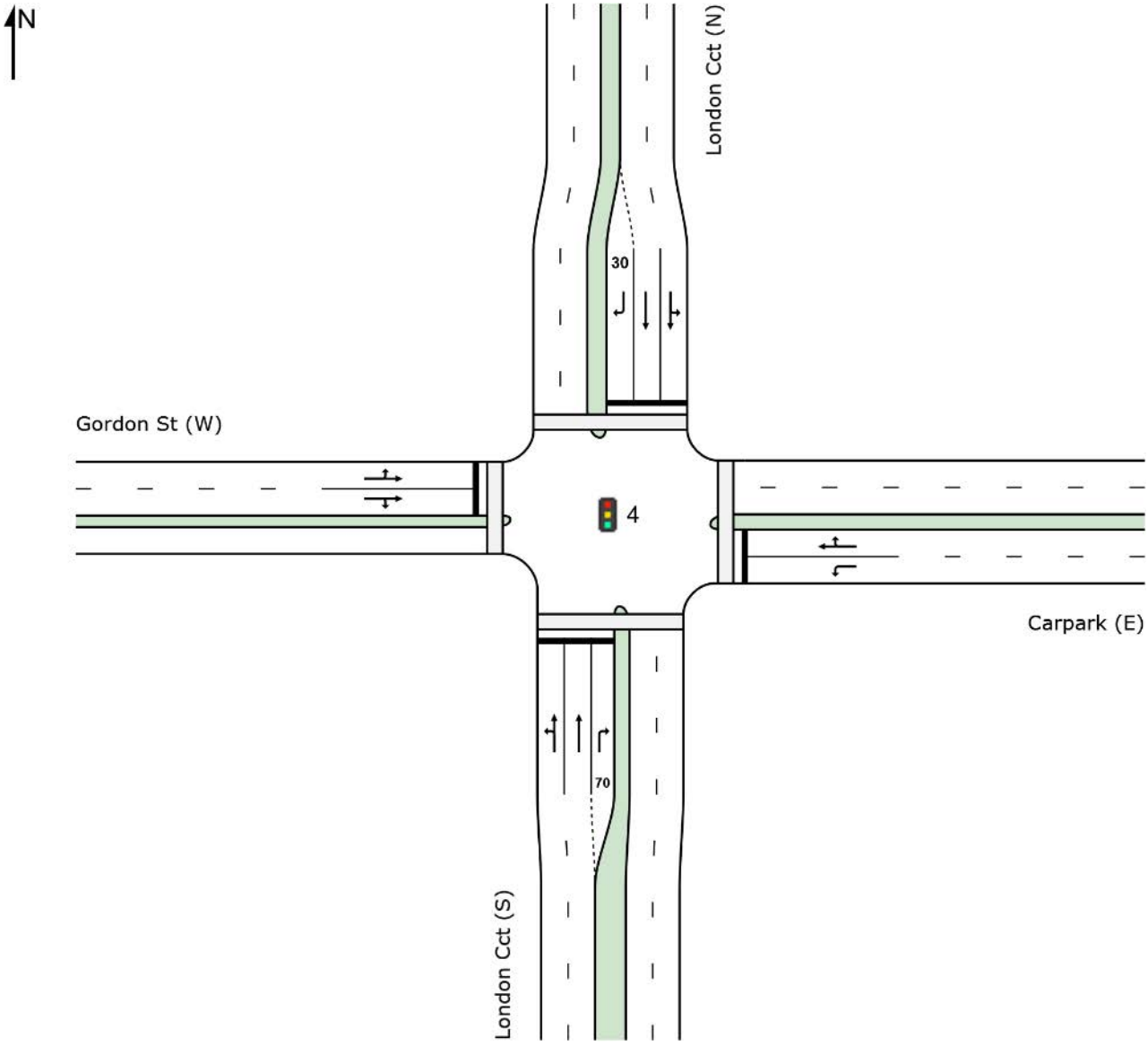
Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 4 [4: London - Gordon DO MIN]

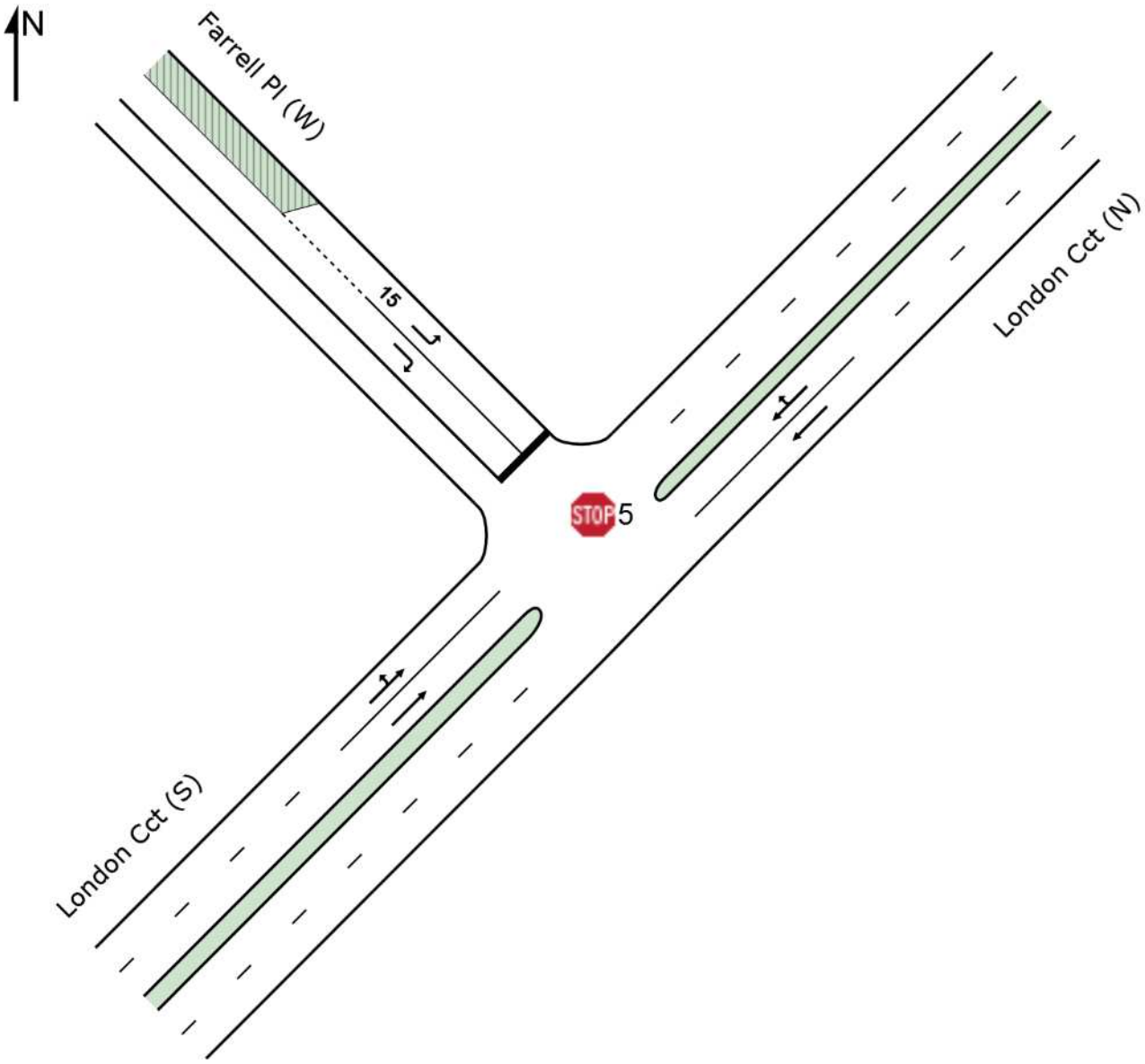
London Circuit - Gordon Street/Carpark Entrance
Do Minimum
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 5 [5: London - Farrell DO MIN]

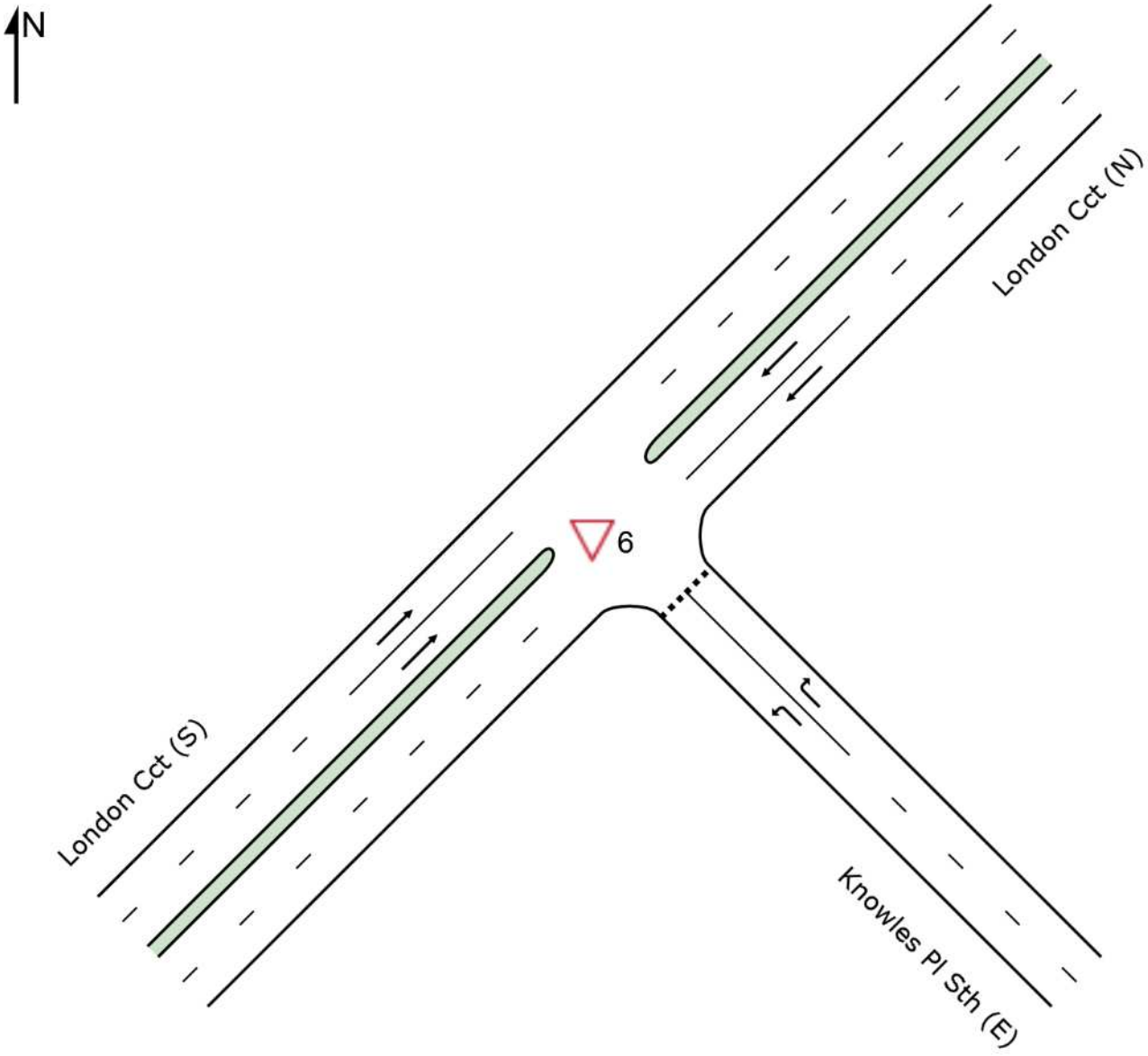
London Circuit - Farrell Place
Existing
Site Category: (None)
Stop (Two-Way)



SITE LAYOUT

Site: 6 [6: London - Knowles Sth DO MIN]

London Circuit - Knowles Place South
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

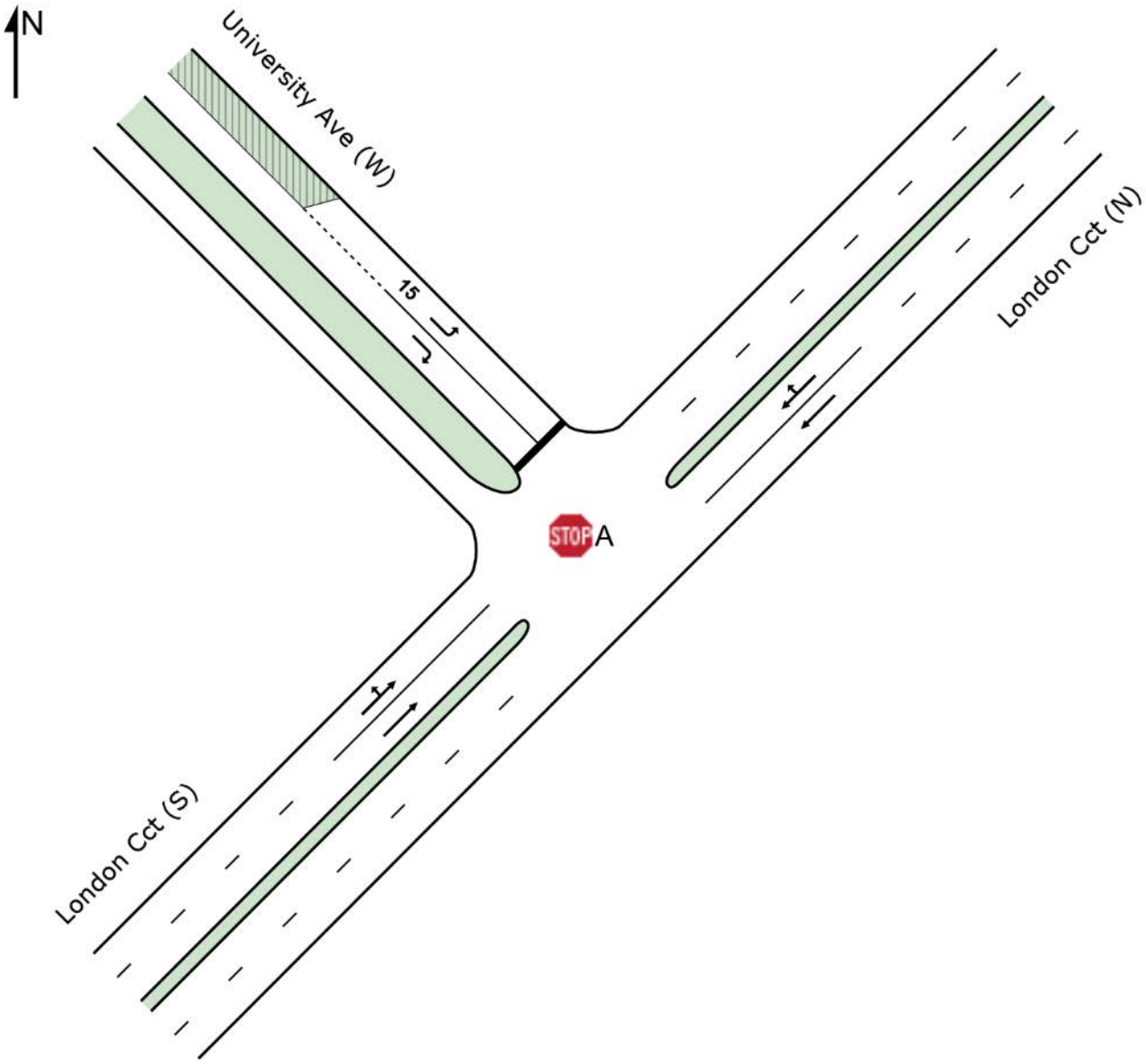


Organisation: SMEC AUSTRALIA PTY LTD (ACT) | Created: Friday, 10 August 2018 3:17:12 PM
Project: X:\Projects\3002653 Traffic Minor Projects 2018\102 City Section 100 Traffic Study\015 Traffic - Intersection Flow Modelling\Section 100 AM Peak.sip8

SITE LAYOUT

Site: A [A: London - University DO MIN]

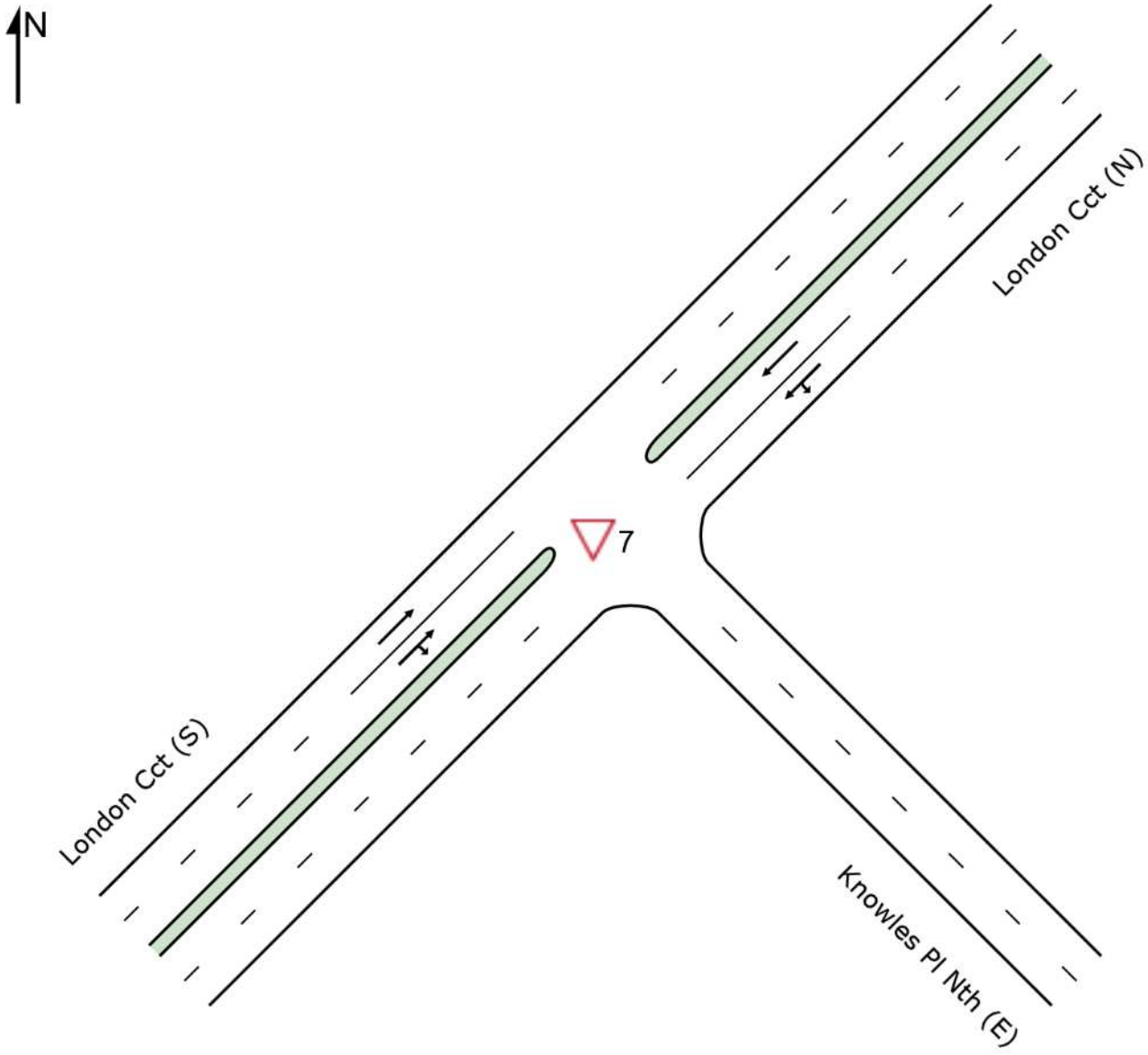
London Circuit - University Avenue
Existing
Site Category: (None)
Stop (Two-Way)



SITE LAYOUT

Site: 7 [7: London - Knowles Nth DO MIN]

London Circuit - Knowles Place North
Existing
Site Category: (None)
Giveway / Yield (Two-Way)

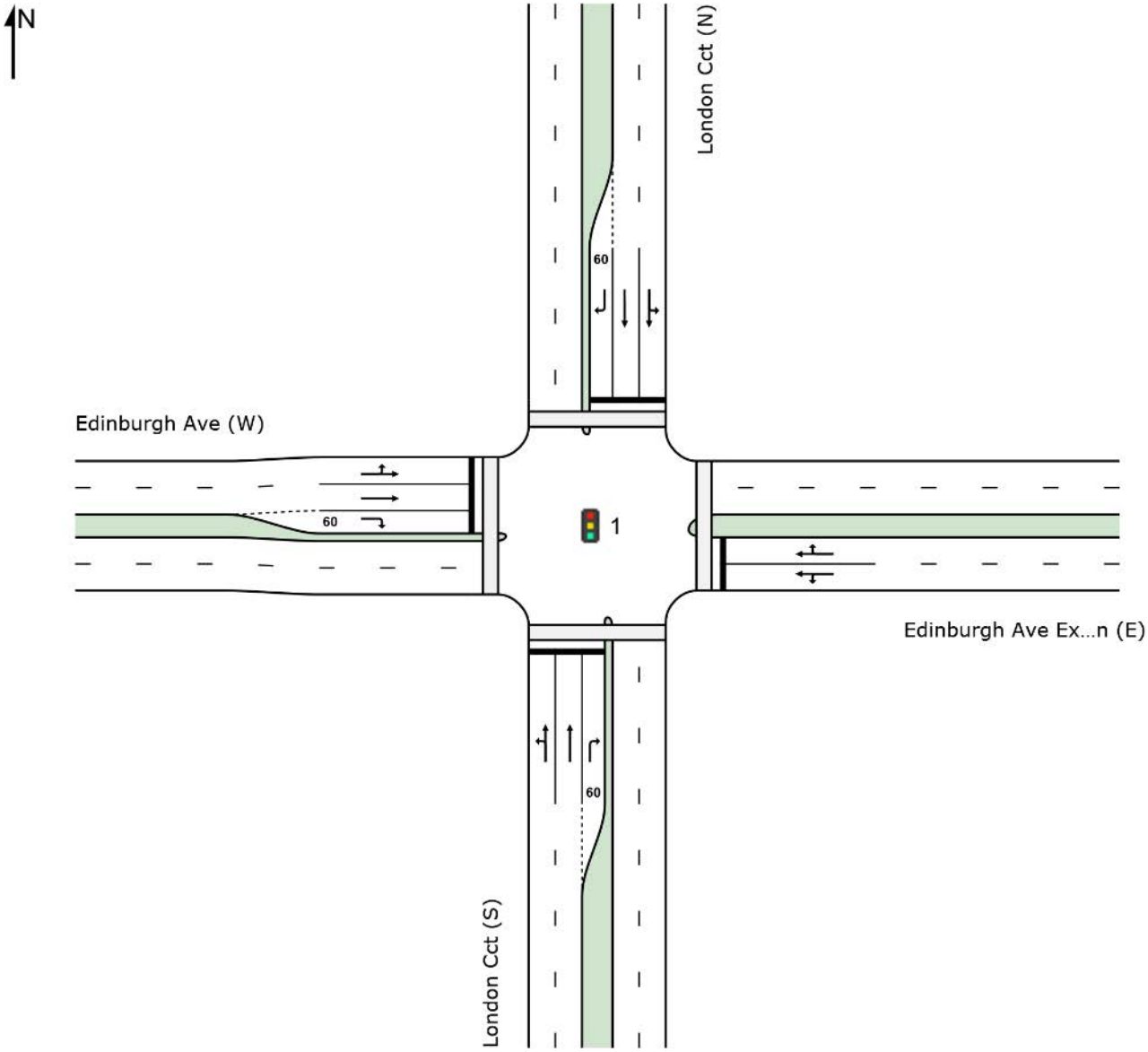


Organisation: SMEC AUSTRALIA PTY LTD (ACT) | Created: Friday, 10 August 2018 3:17:13 PM
Project: X:\Projects\3002653 Traffic Minor Projects 2018\102 City Section 100 Traffic Study\015 Traffic - Intersection Flow Modelling\Section 100 AM Peak.sip8

SITE LAYOUT

Site: 1 [1: London - Edinburgh S100 3.4 vpd]

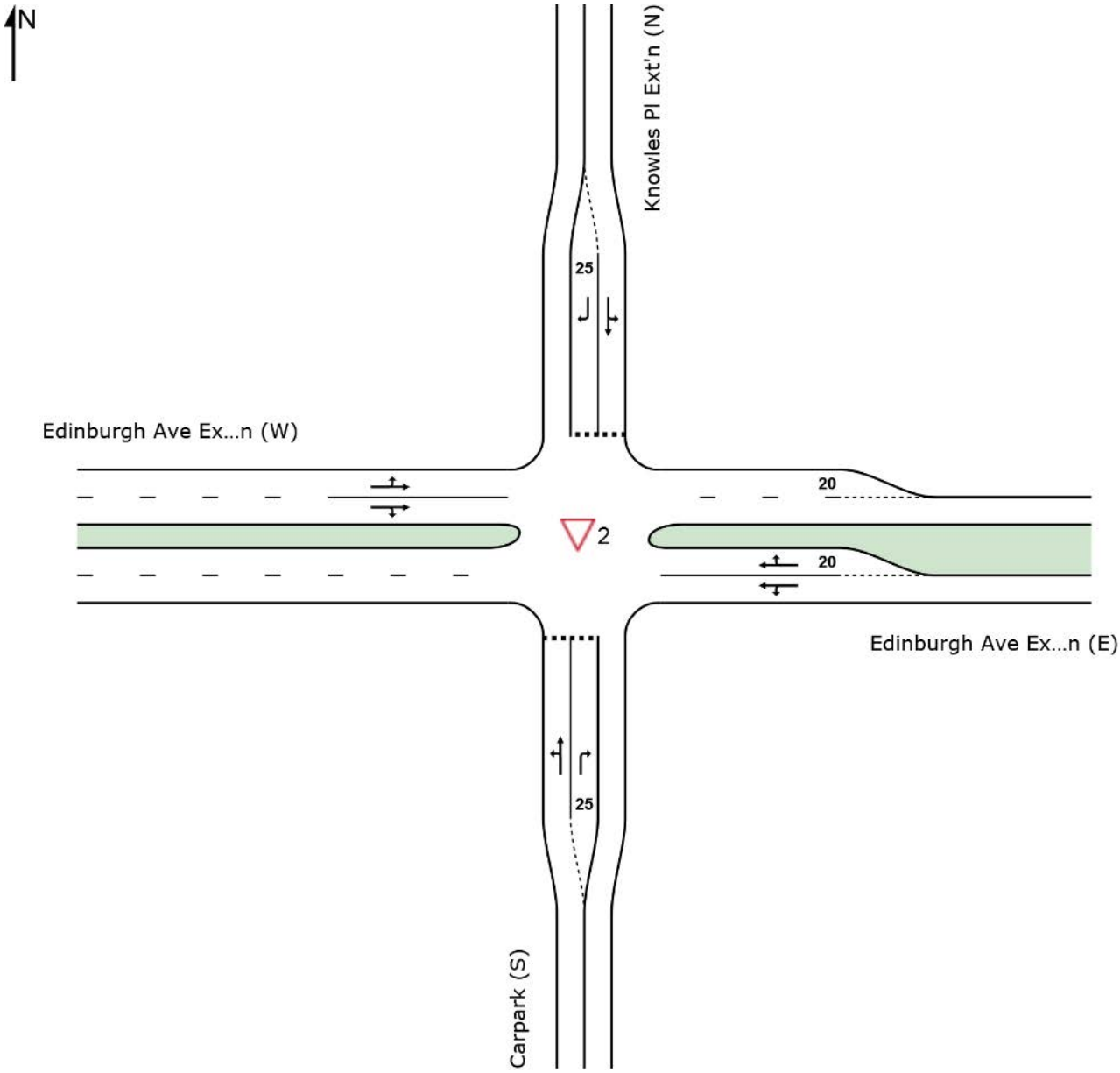
London Circuit - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 2 [2: Edinburgh - Knowles S100 3.4 vpd]

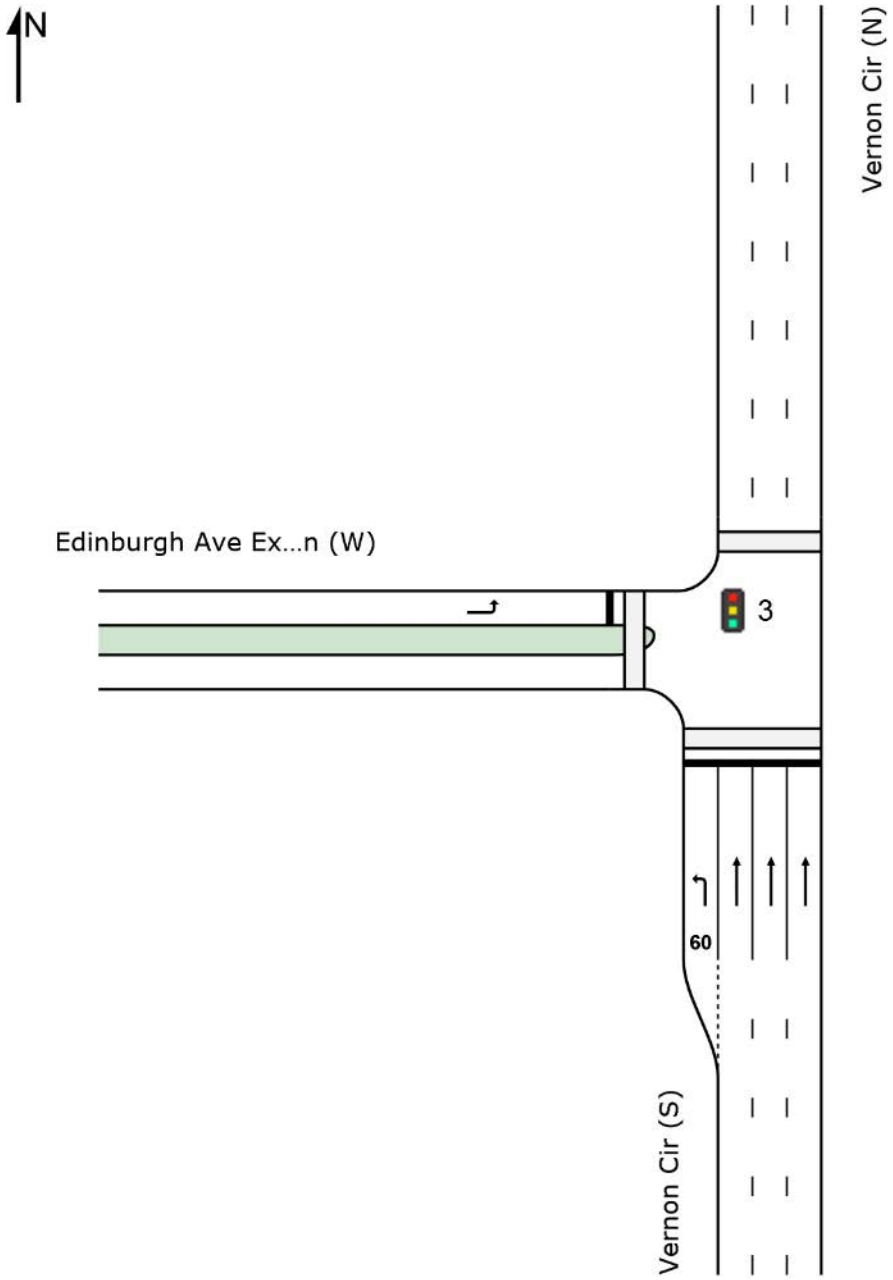
Edinburgh Avenue Extension - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)



SITE LAYOUT

Site: 3 [3: Vernon - Edinburgh S100 3.4 vpd]

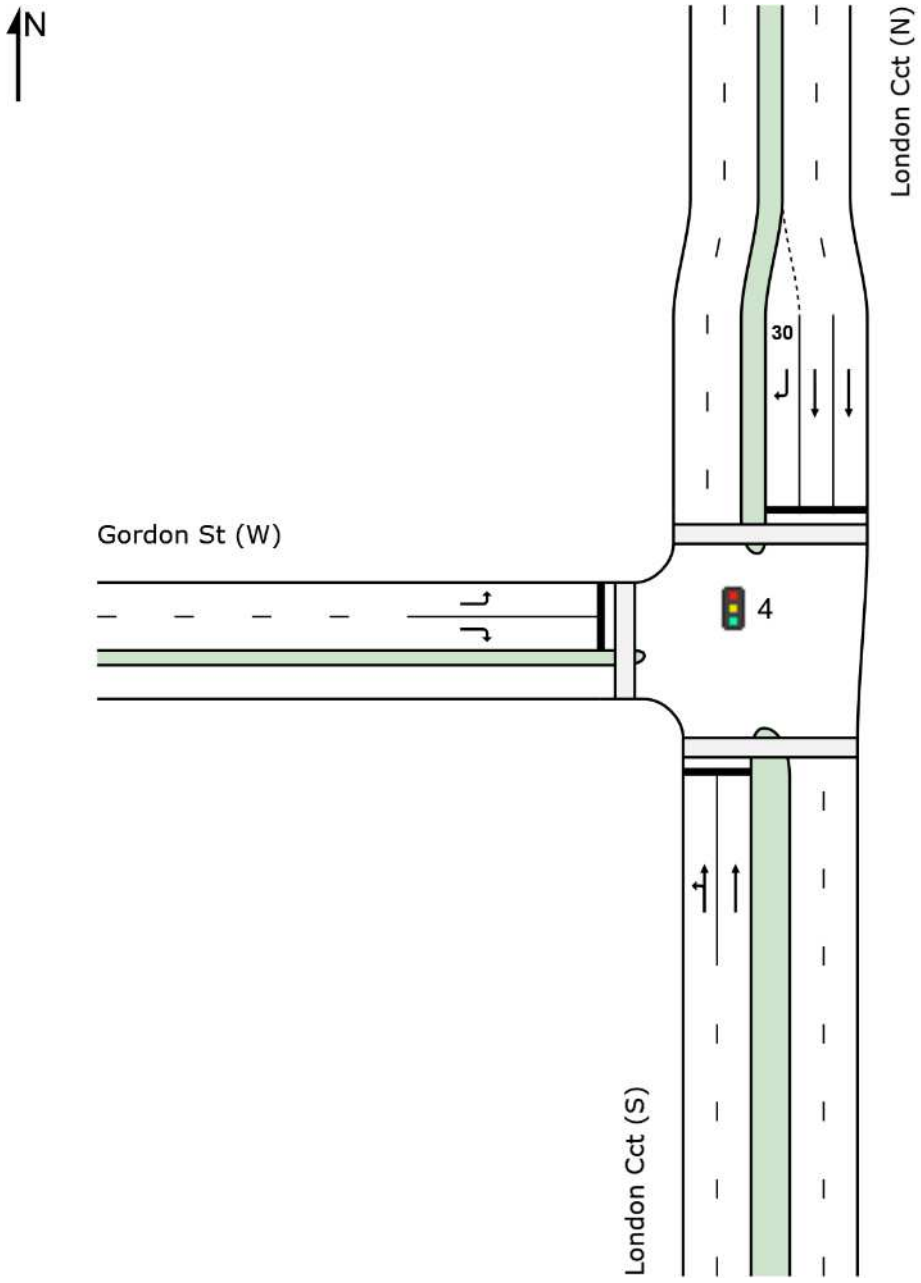
Vernon Circle - Edinburgh Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 4 [4: London - Gordon S100 3.4 vpd]

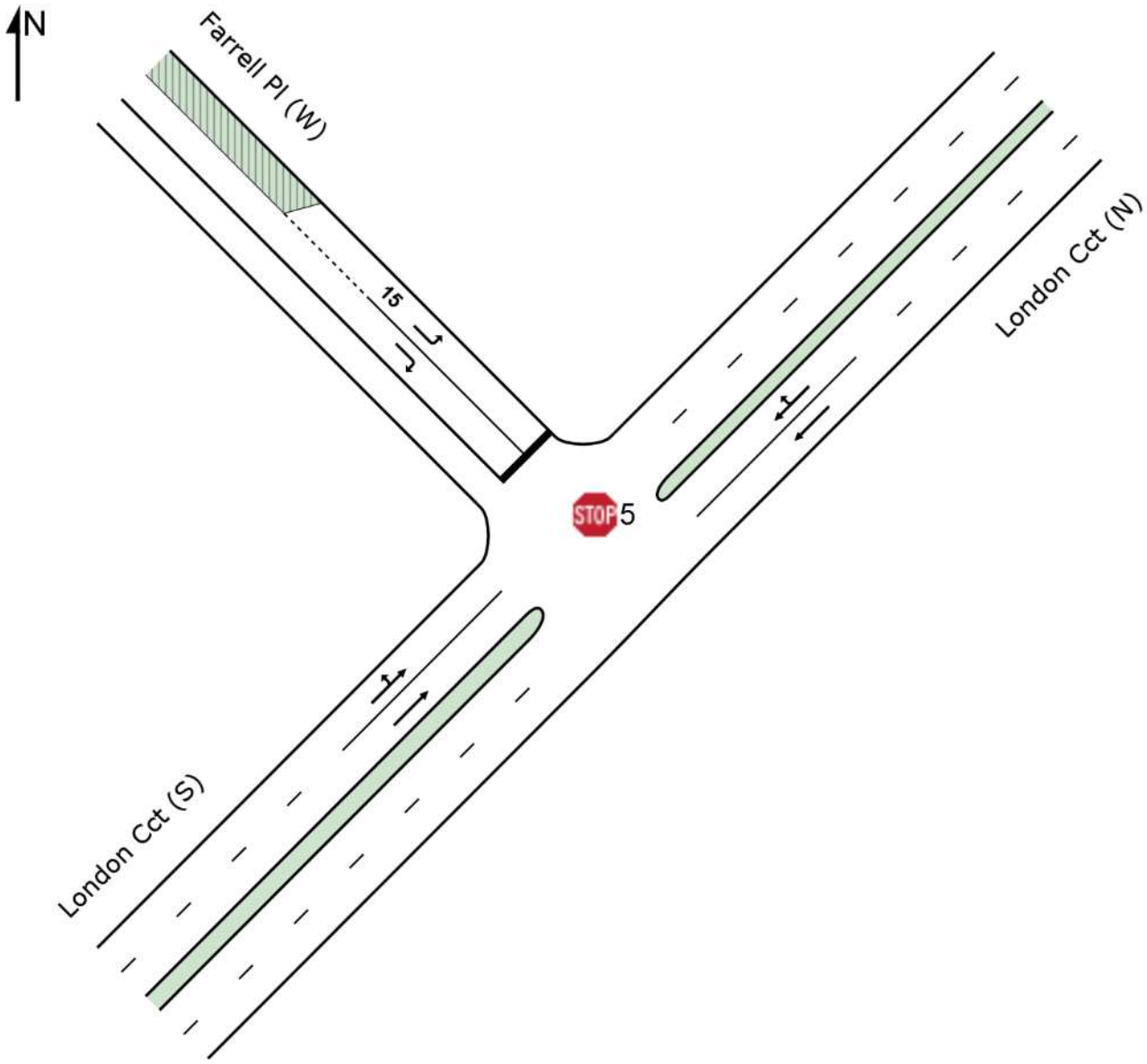
London Circuit - Gordon Street/Carpark Entrance
Edinburgh Avenue Extension Base
Site Category: (None)
Signals - Fixed Time Isolated



SITE LAYOUT

Site: 5 [5: London - Farrell S100 3.4 vpd]

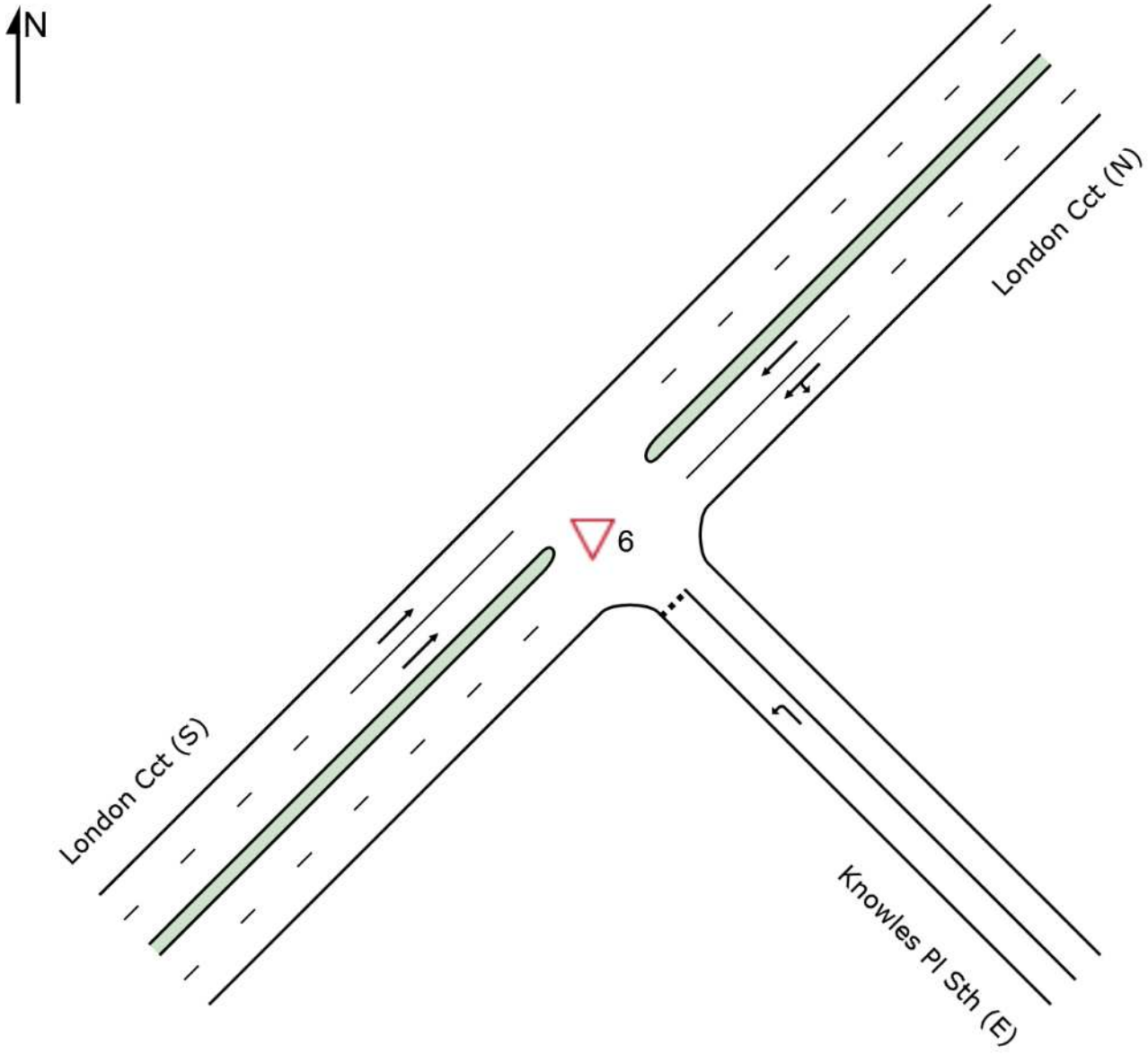
London Circuit - Farrell Place
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)



SITE LAYOUT

Site: 6 [6: London - Knowles Sth S100 3.4 vpd]

London Circuit - Knowles Place South
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)

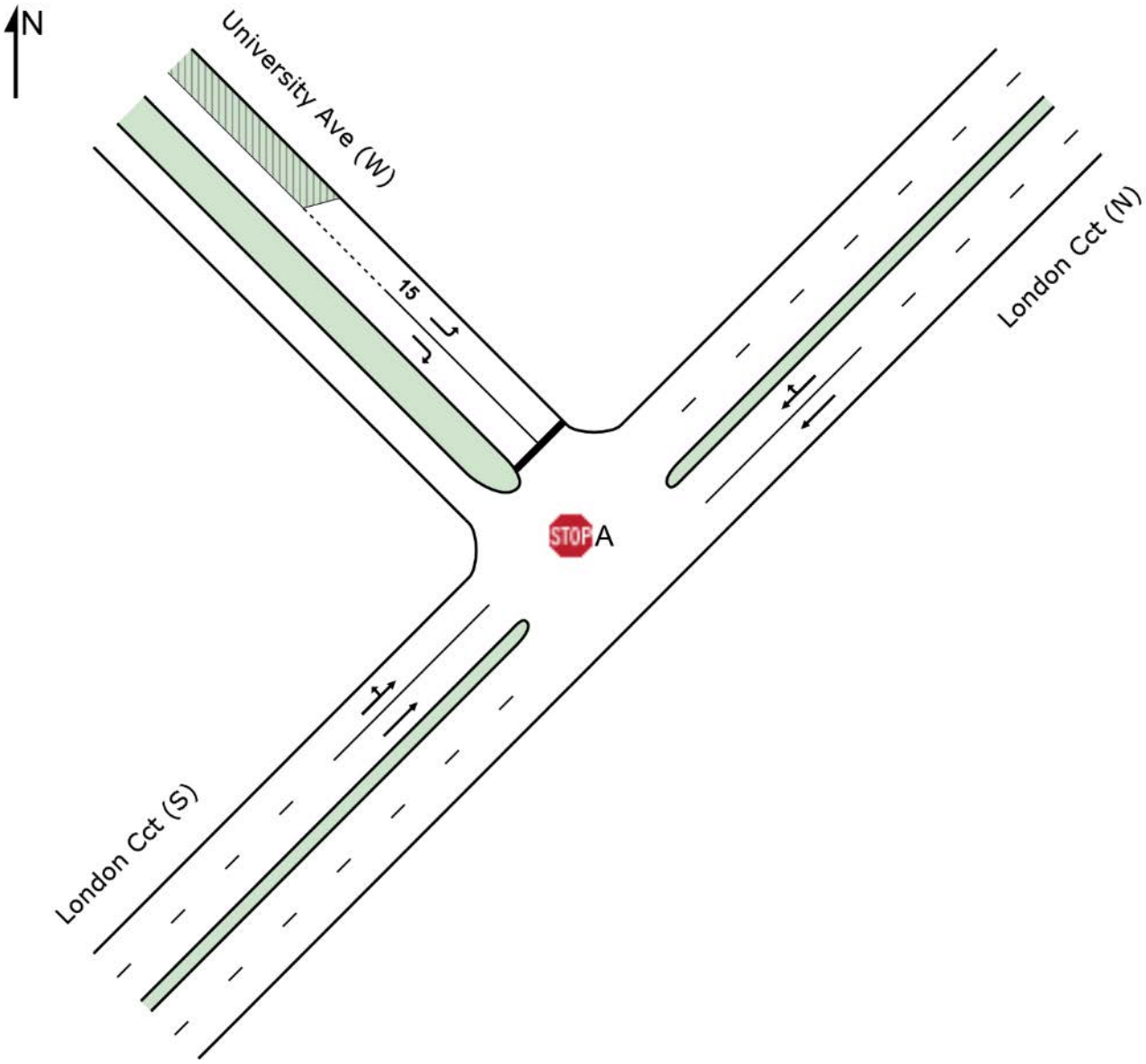


Organisation: SMEC AUSTRALIA PTY LTD (ACT) | Created: Friday, 10 August 2018 3:17:59 PM
Project: X:\Projects\3002653 Traffic Minor Projects 2018\102 City Section 100 Traffic Study\015 Traffic - Intersection Flow Modelling\Section 100 AM Peak.sip8

SITE LAYOUT

Site: A [A: London - University S100 3.4 vpd]

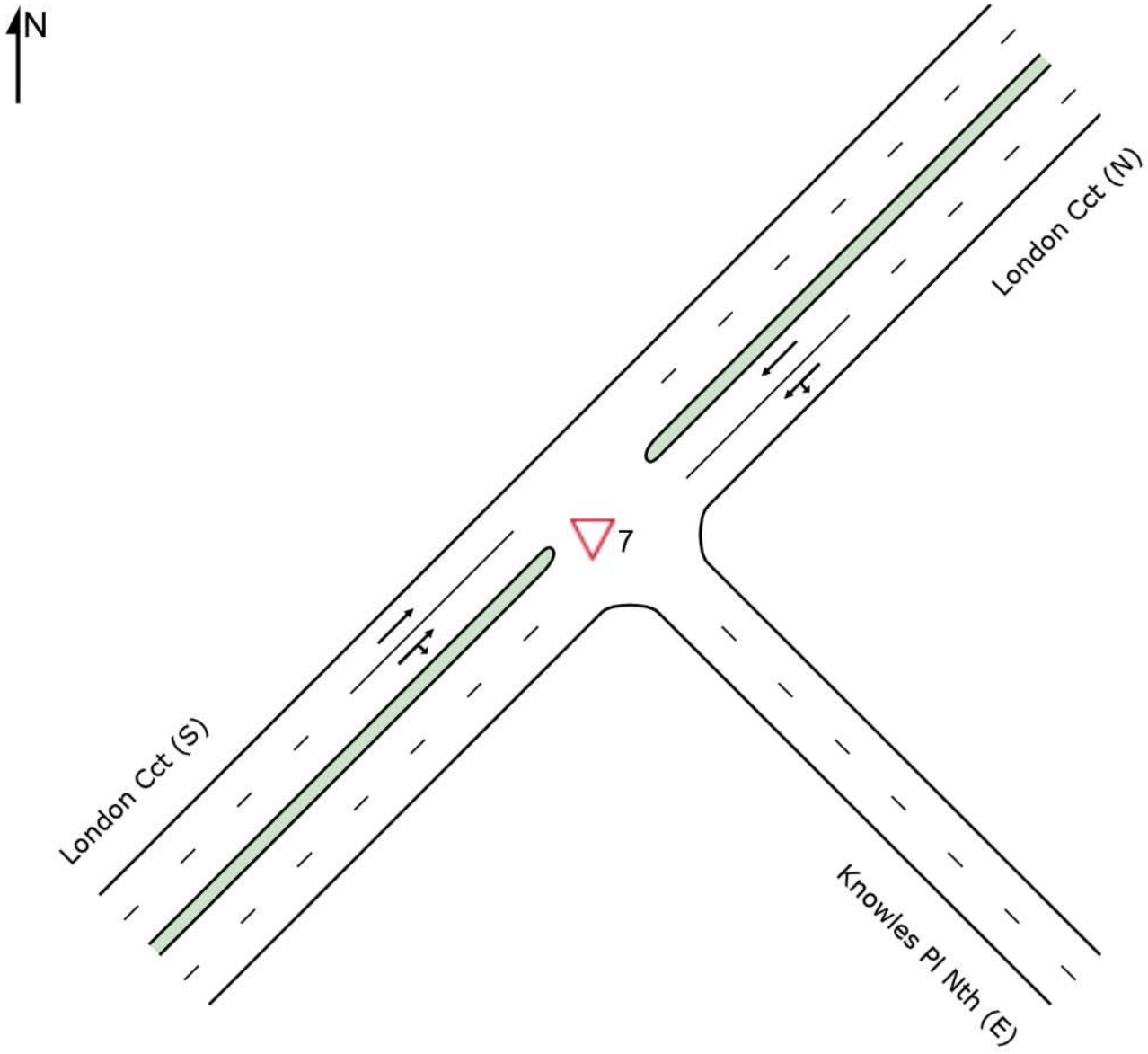
London Circuit - University Avenue
Edinburgh Avenue Extension Base
Site Category: (None)
Stop (Two-Way)



SITE LAYOUT

Site: 7 [7: London - Knowles Nth S100 3.4 vpd]

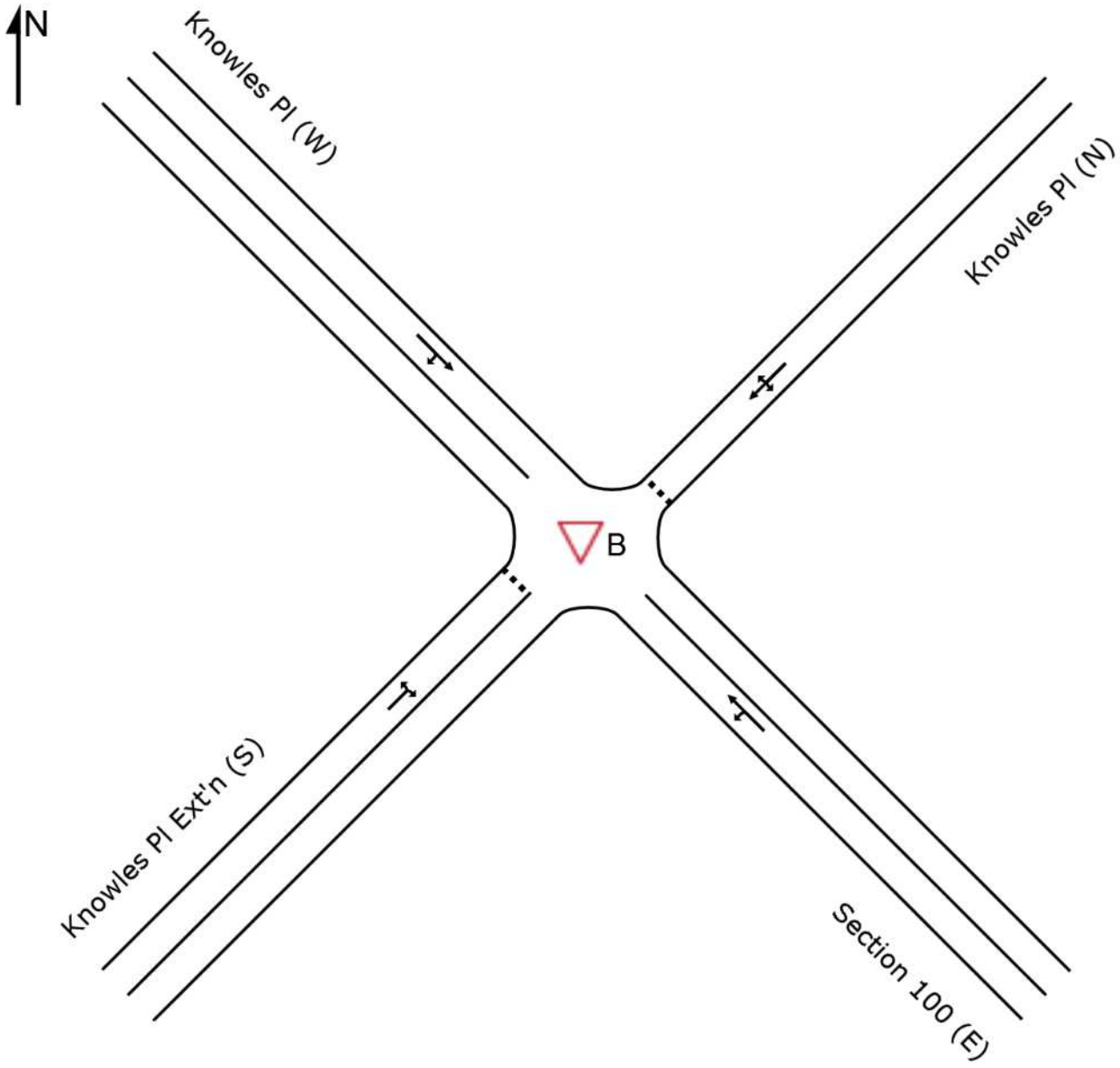
London Circuit - Knowles Place North
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)



SITE LAYOUT

Site: B [B: Knowles - Knowles Ext'n S100 3.4 vpd]

Knowles Place - Knowles Place Extension
Edinburgh Avenue Extension Base
Site Category: (None)
Giveway / Yield (Two-Way)



local people
global experience

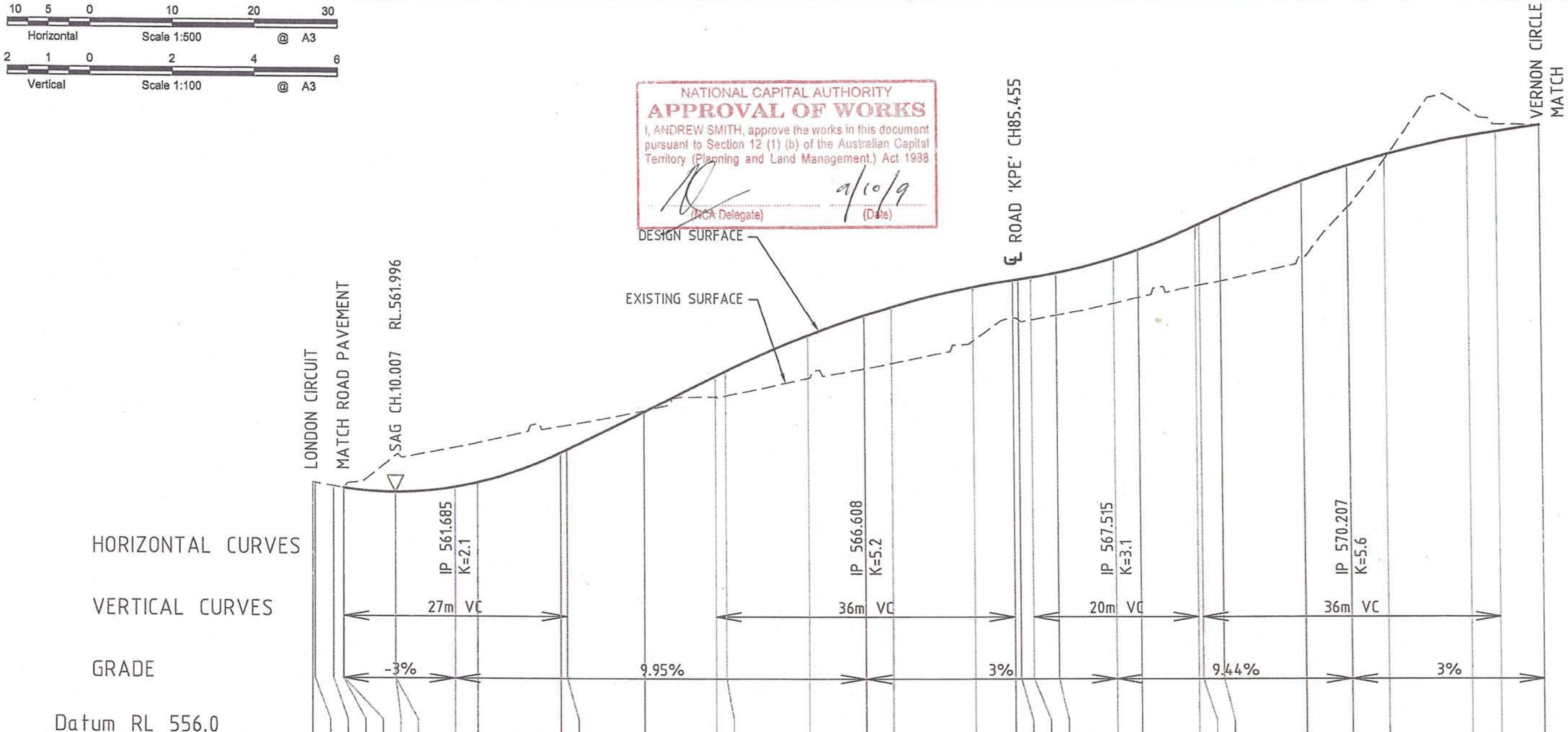
SMEC is recognised for providing technical excellence and consultancy expertise in urban, infrastructure and management advisory. From concept to completion, our core service offering covers the life-cycle of a project and maximises value to our clients and communities. We align global expertise with local knowledge and state-of-the-art processes and systems to deliver innovative solutions to a range of industry sectors.

www.smec.com

APPENDIX D – DRAWINGS BY OTHERS

(HUGHES TRUEMAN – 2009,
AECOM – 2012, MOTT MACDONALD – 2014)

A3 SHEET



PROPOSED LEVEL	562.216	562.213	562.137	562.092	562.090	561.996	561.996	562.121	562.235	562.954	563.027
EXISTING LEVEL	562.216	562.213	562.137	562.092	562.108	562.872	562.873	563.077	563.193	563.591	563.617
CHAINAGE	0.000	0.262	2.478	3.683	3.750	10.000	10.007	17.250	20.000	30.000	30.750

PROPOSED LEVEL	563.947	564.818	564.940	565.814	566.295	566.495	566.984	567.148	567.169	567.215	567.320
EXISTING LEVEL	563.978	564.315	564.343	564.776	565.000	565.129	565.680	566.229	566.188	566.184	566.294
CHAINAGE	40.000	48.750	50.000	60.000	66.750	70.000	80.000	84.750	85.455	87.000	87.006

PROPOSED LEVEL	567.676	567.878	568.460	568.507	568.737	569.547	569.917	570.179	570.631	570.747	570.902
EXISTING LEVEL	566.581	566.719	567.001	567.021	567.120	567.688	568.900	570.069	571.287	570.918	570.902
CHAINAGE	97.000	100.000	107.000	107.500	110.000	120.000	125.500	130.000	140.000	143.500	148.689

SCALE 1:500 HORIZ 1:100 VERT

CENTRELINE LONGITUDINAL SECTION - Edinburgh Extension (50 kPH)

Rev	Amendment / Reason For Issue	Date	Drawing Completed by	Designed & Checked by	Verified by X = Not verified	Issue Authorised (*)
C	SUBMISSION REISSUE/KPE AMENDED	13.02.09	T.A.C.	M.B		
B	SUBMISSION REISSUE/KPE AMENDED	06.09.08	T.A.C.	M.B	M.B	M.B
A	INITIAL SUBMISSION	23.05.08	T.A.C.	M.B	M.B	M.B

HughesTrueman
Consulting Engineers Planners & Managers
Branches: St. Leonards, Parramatta, Canberra, Wagga Wagga
ABN 53 831 529 091
First Floor, Block C, Trevor Pearcey House, 28-30 Traeger, Bruce ACT 2617
T +61 2 6253 1555 F +61 2 6253 1666 canberra@hughestrueman.com.au

Project: CITY SECTION 63

Client: CITY WEST PROP. HOLD. PTY LTD

Architect/Project Manager: WOODS BAGOT

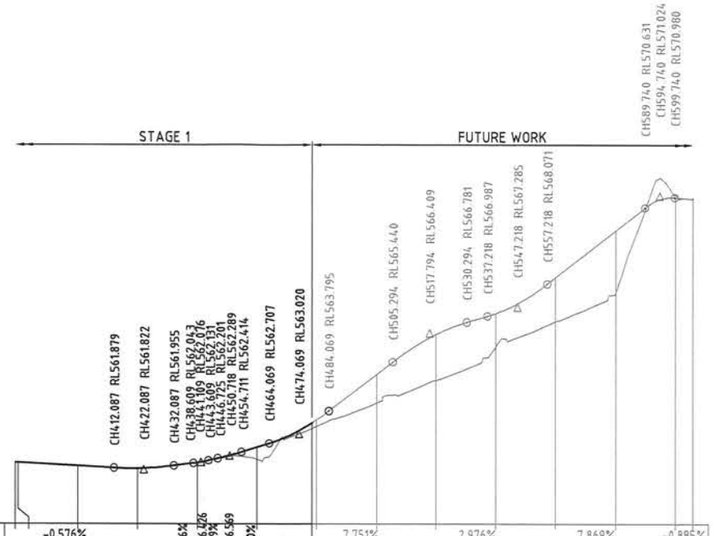
Drawing Title: LONGITUDINAL SECTION EDINBURGH AVE. EXTENSION OPTION 'B'

Drawing No.: 07C014-LS03

Sheet 1 of 1

Rev C

Cad ref: P:\CBR\60187159_Extension_of_Edinburgh_Avenue\5. CADD\5.3 Working\Drg\20_DR\60187159-drg-20-rd1201.dwg   Last modified: 04 Jun 12 - 10:42



DESIGN LEVELS	562.070 562.064	561.949	561.864	562.063	562.580	563.499	565.030	566.373	567.079	568.290	569.864	570.977 570.926
EXISTING LEVELS	562.069 562.061	561.947	561.868	562.072	562.164	563.279	564.061	564.826	565.960	566.806	567.785	571.050 570.926
LEVEL DIFFERENCE	-0.001 -0.003	-0.002	0.004	0.009	-0.415	-0.220	-0.968	-1.547	-1.119	-1.485	-2.079	0.072 0.000
CHAINAGES	379.000 380.000	400.000	420.000	440.000	460.000	480.000	500.000	520.000	540.000	560.000	580.000	600.000 605.866

CONTROL LINE MCA01(EDINBURGH AVENUE)

HORIZONTAL - 1 : 1000

VERTICAL - 1 : 100

THE INFORMATION SHOWN ON THIS DRAWING IS FOR THE PURPOSES OF THE PROJECT NAMED IN THE TITLE BLOCK ONLY, NO WARRANTY IS GIVEN OR IMPLIED AS TO ITS SUITABILITY FOR ANY OTHER PURPOSE. AECOM ACCEPTS NO LIABILITY ARISING FROM USE OF THE INFORMATION SHOWN HEREON FOR ANY PURPOSE OTHER THAN THE PROJECT NAMED IN THE TITLE BLOCK

This drawing is confidential and shall only be used for the purposes of this project.

REVISIONS

No.	BY	DATE	DESCRIPTION	WVR	APPD
A	RI	01.06.2012	DOCUMENT READINESS	01	JP

SCALES:
10 0 10 20 30 40m
1 : 1000 FULL SIZE A1
1 0 1 2 3 4m
1 : 100 FULL SIZE A1

THE SIGNING OF THIS TITLE BLOCK CONFIRMS THE DESIGN AND DRAFTING OF THIS PROJECT HAVE BEEN PREPARED AND CHECKED IN ACCORDANCE WITH THE AECOM QUALITY ASSURANCE SYSTEM TO ISO 9001-2000

DESIGNED	AJ	CHECKED	RW
DRAWN	DA	CHECKED	RW
APPROVED	JP	DATE	01.06.2012

CLIENT:
PROCUREMENT SOLUTIONS

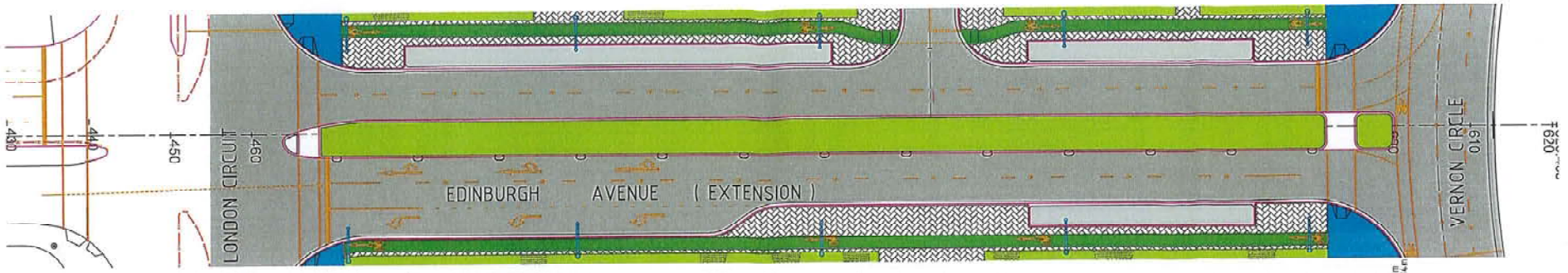
DESIGNER:
AECOM
AECOM Australia Pty Ltd A.B.N. 20 093 846 925

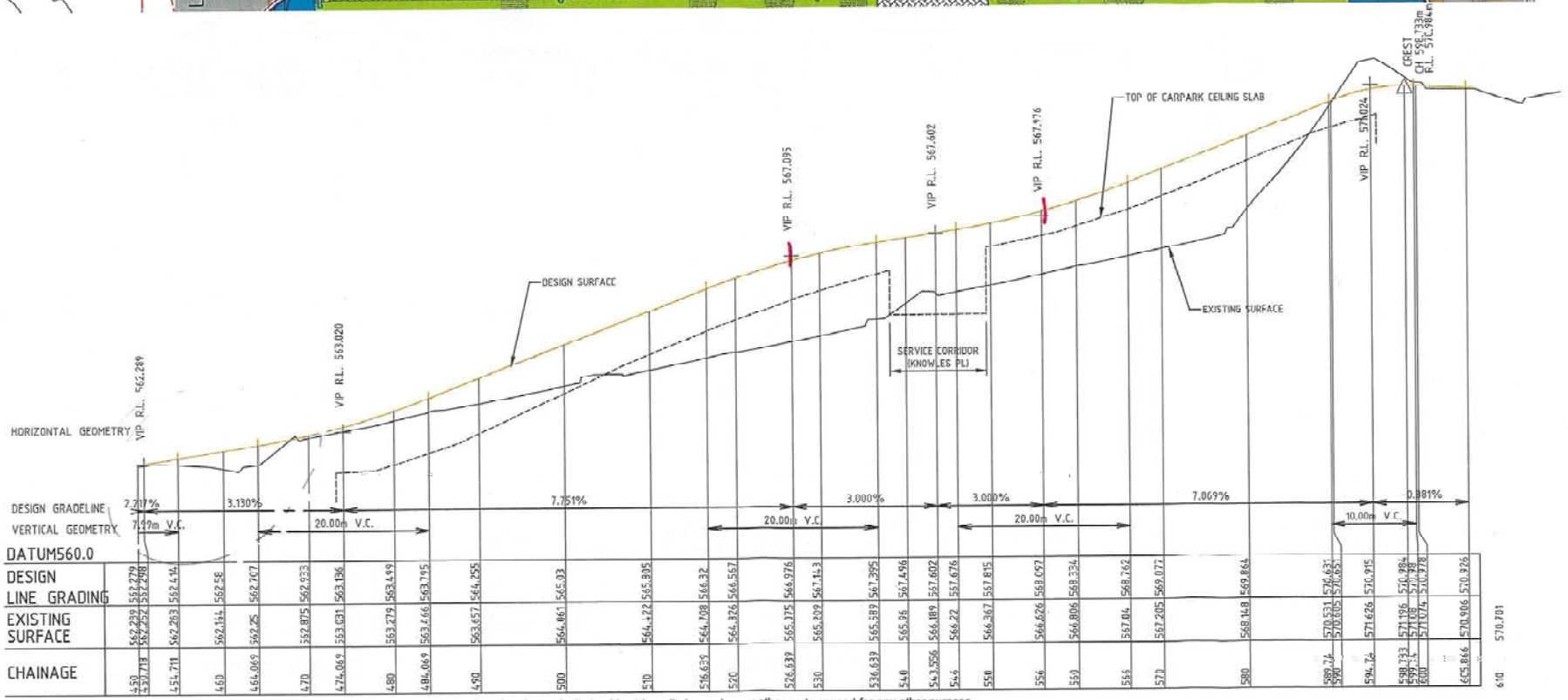
CLIENT:
Department of
Land & Property
Services

EDINBURGH AVENUE EXTENSION AND ASSOCIATED WORKS

LONGITUDINAL SECTION
CONTROL MCA01

STATUS: DR
DRAWING NO: 60187159-DRG-20-RD1201
REV: A





Mott MacDonald
Level 6, SAP House, 224 Bunda St
Canberra City ACT 2601
PO Box 224 Civic Square ACT 2608
Australia
T +61 (0)2 6253 1555
F
W www.mottmac.com.au

Client: ACT Government Economic Development ON BEHALF OF City West Property Holdings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	28/04/14	TTN	TAMS SUBMISSION		
P1	08/11/13		INITIAL DRAWING		

Title: EDINBURGH AVENUE EXTENSION
LONGITUDINAL SECTION
EDINBURGH AVENUE

Drawn		T.NELL
Checked		T.NELL
Approved		M.BREEN
Scale at A3		[H] 1:500 [V] 1:100

Drawing Number: MMD-325342-C-DR-FSP-LS-0001

Security	Status	Rev
	PRE	P2

APPENDIX E – TREE ASSESSMENT REPORT

Tree Assessment Report

Section 100, City

ISSUE 1_ 16 July 2018

Unit 5, 61 Dundas Court
PHILLIP ACT 2606
POBox 88 Waramanga ACT 2611
P 02 6281 6066
eld@envirolinks.com.au
www.envirolinks.com.au
ABN 64 078 436 478

Prepared by
Enviro Links Design Pty Ltd (2018)

For
Spiire

Contents

1 Introduction

Enviro Links Design Pty Ltd was engaged by Spiire to undertake the tree assessment for the extent of works to the outer perimeter of Section 100, City. An assessment of existing trees was undertaken to determine the quality and health of trees within the extent of works. The report highlights the value of individual trees to assist with the future design works.

Figure 1: Extent of Tree Assessment along London Circuit verge, along Vernon Circle (trunks within 1m inside of the boundary) and possible 'Edinburgh Ave' extension verge.

2 Methodology

The following describes in general terms the processes and criteria that trees and tree groups were assess upon on behalf of the ACT Government.

Tree Number/Group: A unique reference number is assigned to each tree or group of trees. Each tree/group of trees is numbered and referenced in the Plan and Report as applicable.

2.1 General Data

Species

- Botanical Name

Height, Canopy and Trunk Circumference (Physical Dimensions)

- Height in metres
- Canopy diameter in metres shown as the maximum crown width of the tree or group of trees
- For Single Trunks circumference in metres, measured 1 metre above ground level
- For multiple trunks the cumulative total of each trunk in metres at 1 metre above ground level

Number of Trunks

- Number of trunks at 1 metre above ground level

2.2 Arboricultural Criteria

Health

- The general health and vigour Tree

Defects / Decay

- Structural defects or evidence of internal decay

Damage / Disturbance

- Evidence of past damage to the tree or disturbance within the root zone

Disease

- Evidence of past or present disease or insect infestation

Stage

- Current growth stage (e.g. juvenile, semi-mature, mature or over mature)

Quality Ranking

- Tree quality classification trees are to be classified as being of:
  Exceptional (E), High (H), Medium (M), Poor (P), or Low (L) quality. Refer to notes below

Tree Act Status

- Refer notes below

2.3 Quality Ranking

The delineation within the value classification is based on the works being on leased land and therefore under the jurisdiction of the TCCS Urban Tree Unit (UTU). All trees on Government Land are regarded as protected trees and cannot be removed or damaged or works undertaken near them without the approval of the UTU. (The Tree Act and Regulated Tree definitions are therefore applicable to both public and leased sites, unless otherwise advised).

E - Exceptional Value
Trees that are outstanding examples of their species and have significant visual impact. They have most of the following: mature specimens with grand appearance and stature; may have unusual character; may be a rare species; well balanced; cultural heritage importance; significant scientific value; presents a low hazard/safety risk. Significant value within the landscape context of the site and should be preserved.

H - High Value
Trees that are good examples of their species and have significant visual impact. They have most of the following: high arboricultural value or potential; good form; healthy specimens with good size and little or no epicormic shoots or other arboricultural problems. Good value within the landscape context of the site and should be preserved if at all possible.

M - Medium Value
Trees generally complying with most of the following: reasonable form or reasonable current size with good health / growth potential; healthy specimen with significant growth (or with moderate tree surgery a large tree can be modified from fair to good health, ie can carry some deadwood); has value within the landscape context of the site; presents a medium to low hazard/safety risk. Does not justify special attention of construction expenditure but justifies a minor design adjustment to save or could be removed if necessary by approval. Retain if appropriate to land use and future management cost and risks.

P - Poor Value
Trees generally complying with most of the following: specimen with low growth or poor form and possible health problems; trees of little value; presents a high or very high hazard/safety risk. Expendable, remove if necessary - retain if appropriate to land use and future management costs and risks.

L - Low Value
Non-regulated tree under the 2005 Tree Protection Act for trees on leased blocks only. Trees therefore can range from well-established quality trees to poor health small trees of no significance. Some possibly with important landscape impact (e.g. regeneration) or future growth potential to contribute to the landscape in future years. Expendable, remove if necessary - retain if appropriate to land use and future management costs and risks.

D - Dead Tree

2.4 Tree Act Status / Protection Status

Tree 'Regulated' Status by Virtue of Size (On - Lease)
Under the Tree Protection Act 2005 a tree is termed a Regulated Tree and is to be protected if it is growing on Urban Leased land and has at least one of:
* A height of 12m or more; or
* A trunk circumference of 1.5m (approx 0.5m in diameter) or more at 1m above ground level; or
* Two or more trunks and the total circumference of all the trunks, 1m above ground level, is 1.5m or more, or
* A minimum crown width of 12m or more, and
* Must be alive - all dead trees have been ranked as Non Protected tree.
* Is not a weed species under the Pest Plant & Animals Declaration 2005

Tree Protected Status
YES - The tree has a dimension that any activity must be assessed under the Tree Protection Act on Leased land; or is on Government land eg. road verge, park, etc as all trees on Government land are protected.
NO - The tree if on Leased land is sufficiently small or declared a Weed Species that it does not require assessment under the Tree Protection Act.
Yes TCCS - Off Lease but often protected as these trees are generally on Government (Unleased) land.

Trees nominated as Protected can only be removed / pruned if approval in writing gained from all applicable Government agencies.

Future Tree Approvals
On-Leased land: if a tree has protected status then approval must be gained from TCCS Urban Tree Unit prior to removal, lopping or ground damaging activity.

Off-Leased (Territory) land: Please note all trees located external to the leased block boundary i.e. the verge or open space, cannot be removed, pruned or damaged without the approval of the Urban Tree Unit, City Services (13 22 81) as on Government land.

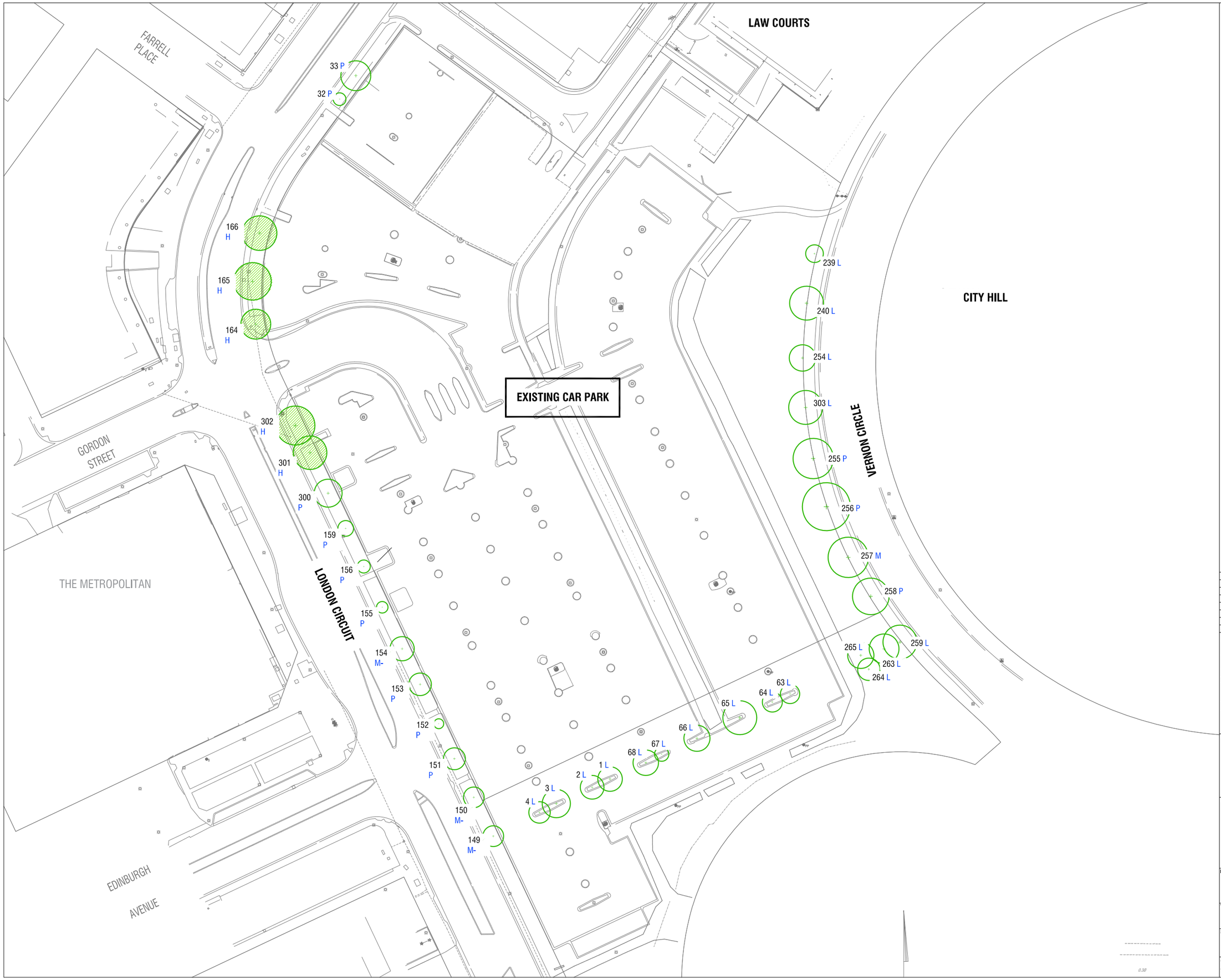
Tree Management:
Trees within lease require a Tree Management Plan (TMP) and on unleased land a Landscape Management Protection Plan (LMPP) outlining removals, pruning, tree protection measures, site access and restorative works issues as part of the design process.

3 Tree Assessment
The following provides the individual tree assessment data (Refer to Appendix 1 for locations on site).

3.1 Assessment Schedule

Survey No.	Botanical Name	Height (m)	No. Trunks	Trunk circ. (m)	Canopy dia. (m)	Health and Vigour	Structural defects and decay	Past Damage or root disturbance	Disease or infestation	Stage	Quality Rating	Protected Status
						(G-good, F-fair, P-poor, DW-deadwood, EPI-epicormic growth)	(OC- occluded fork, AGL - Above Ground Level)	(AGL - Above Ground Level)	(AGL - Above Ground Level)	Juvenile (J), Semi-mature (SM), Mature (M), Over mature (OM)	Low (L), Poor (P), Medium (M), High (H), Exceptional *(NOTE: Quality Rating also noted with (E) specify an exceptional rating due to heritage listed status)*	**Unleased Land** (Yes - TCCS) ***Tree Act*** (Yes - Y, No - N) - Note: N* denotes a tree **not** regulated due to ACT Declared Weed Species status
1	Platanus acerifolia	7	1	0.56	4	**Fair**	-	-	-	Semi - Mature	Low	No
2	Platanus acerifolia	8	1	0.64	6	**Fair**	-	-	-	Semi - Mature	Low	No
3	Platanus acerifolia	8	1	0.69	6	**Fair**	-	-	-	Semi - Mature	Low	No
4	Platanus acerifolia	6	1	0.54	4.5	**Fair**	Stunted growth	-	-	Semi - Mature	Low	No
32	Platanus orientalis	7	1	0.7	7	**Good**	-	-	-	Mature	Poor	Yes TCCS
33	Platanus acerifolia	10	1	0.9	9	**Good**	-	-	-	Mature	Poor	Yes TCCS
63	Platanus orientalis	10	1	0.89	5	**Fair -** Major EPI	-	-	-	Semi - Mature	Low	No
64	Platanus orientalis	8	1	0.87	5	**Fair -** Major EPI	-	-	-	Semi - Mature	Low	No
65	Platanus orientalis	9	1	1.07	8	**Good to Fair-** Major EPI	Lopsided canopy	Past limb removal. Major roots exposed at base of tree	-	Mature	Low	No
66	Platanus acerifolia	8	1	0.7	5	**Fair** - Major EPI and minor DW	-	-	-	Semi - Mature	Low	No
67	Platanus acerifolia	7	1	0.49	3	**Fair** - Major DW	Stunted growth	-	-	Semi - Mature	Low	No
68	Platanus acerifolia	8	1	0.83	5	**Fair**	Good Form	-	-	Semi - Mature	Low	No
149	Platanus acerifolia	10.5	1	0.7	6	**Good**	Good form	Past limb removal	-	Mature	Medium -	Yes TCCS
150	Platanus orientalis	13	1	0.9	10	**Good**	-	-	-	Mature	Medium -	Yes TCCS
151	Platanus acerifolia	10.5	1	0.7	6.5	**Good**	Poor form	-	-	Mature	Poor	Yes TCCS
152	Platanus orientalis	9	1	0.5	4	**Good**	-	-	-	Mature	Poor	Yes TCCS
153	Platanus orientalis	11	1	0.7	6	**Fair -** DW and EPI	Lopsided canopy	-	-	Mature	Poor	Yes TCCS
154	Platanus orientalis	9	1	0.6	7	**Good**	-	-	-	Mature	Medium -	Yes TCCS
155	Platanus orientalis	8	1	0.5	6	**Fair -** EPI	-	-	-	Mature	Poor	Yes TCCS
156	Platanus orientalis	7	1	0.5	2	**Fair -** Major EPI	Stunted growth	-	-	Mature	Poor	Yes TCCS
159	Platanus orientalis	10	1	0.6	5	**Fair -** Major EPI	-	-	-	Mature	Poor	Yes TCCS
164	Platanus acerifolia	13	1	1.7	12	**Good**	-	-	-	Mature	High	Yes TCCS
165	Platanus acerifolia	13	1	2.1	13	**Good**	-	-	-	Mature	High	Yes TCCS
166	Platanus acerifolia	13	1	1.8	12	**Good -** Some minor EPI	-	-	-	Mature	High	Yes TCCS
239	Ulmus procera	11	1	0.7	5	**Fair**	-	-	-	Mature	Low	No
240	Ulmus procera	10	1	1.4	10	**Fair -** Major EPI and DW	-	Exposed roots	-	Mature	Low	No
254	Ulmus procera	11.5	1	1.3	8	**Fair -** Major EPI and DW	-	-	-	Mature	Low	No
255	Ulmus procera	11.5	1	1.3	12	**Fair -** Major EPI and DW	Past limb failures decay	Exposed Roots	-	Mature	Poor	Yes
256	Ulmus procera	12.5	1	1.4	13	**Fair**	Decay in lower trunk and OC	-	Past insect attack	Mature	Poor	Yes
257	Ulmus procera	11	1	1.47	12	**Good -** EPI	OC	-	-	Mature	Medium	Yes
258	Ulmus procera	12	1	1.37	9	**Fair -** Major EPI	-	-	-	Mature	Poor	Yes
259	Ulmus procera	11	1	1.28	10	**Good -** EPI	OC	-	-	Mature	Low	Yes
263	Gleditsia sp.	8	1	0.64	8	**Good**	Leaning	-	-	Mature	Low	No
264	Gleditsia sp.	7	1	0.7	6	**Good to Fair** - EPI and DW	-	-	-	Mature	Low	No
265	Gleditsia sp.	6	1	0.74	8	**Good to Fair** - EPI and DW	-	-	-	Mature	Low	No
300	Platanus orientalis	10	1	0.6	6	**Fair -** Major EPI	-	Past limb failure	-	Mature	Poor	Yes TCCS
301	Platanus orientalis	13	1	1.23	10	**Good**	-	-	-	Mature	High	Yes TCCS
302	Platanus acerifolia	12	1	1.9	13	**Good**	-	-	-	Mature	High	Yes TCCS
303	Ulmus procera	11	1	1.4	9	**Fair -** Major EPI and DW	-	-	-	Mature	Low	No

4 Appendix 1 – Tree Location Plan



LEGEND

ASSESSED EXISTING TREE
Refer to Tree Assessment Schedule

HIGH VALUE ASSESSED TREE
Refer to Tree Assessment Schedule

E,H,M,P,D

VALUE RANKING
Refer to Tree Assessment Report
E = Exceptional Value
H = High Value
M = Medium Value
P = Poor Value
L = Low Value

EXISTING TREE
Not assessed as part of this tree assessment

NO.	DESCRIPTION	DWN	APP'D	DATE
A	FOR APPROVAL	JK	JRD	16.7.18

NOTES
- COPYRIGHT AND PROPERTY OF ENVIRO LINKS DESIGN PTY LTD. MAY BE USED ONLY FOR THE STATED PROJECT AND ISSUE STATUS, AND IN ACCORDANCE WITH TERMS OF ENGAGEMENT FOR WHICH IT WAS COMMISSIONED.
- TO BE READ IN CONJUNCTION WITH ALL RELEVANT CONTRACTS, SPECIFICATIONS, REPORTS, DRAWINGS AND DEVELOPMENT APPROVAL CONDITIONS. OBTAIN ANY OUTSTANDING STATUTORY APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
- FIGURED DIMENSIONS TO BE TAKEN IN PREFERENCE TO SCALED MEASUREMENTS. DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.

WHERE ISSUED FOR CONSTRUCTION:
- CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL SERVICES AND OBTAINING NECESSARY CLEARANCES AND APPROVALS. CONTRACTOR TO VERIFY DIMENSIONS, LEVELS & DETAILS TO SITE CONDITIONS AND PRIOR WORKS, AND REPORT ALL DISCREPANCIES TO THE SUPERINTENDENT FOR RESOLUTION BEFORE COMMENCING WORK.
- PRESENT SAMPLES AND GAIN APPROVAL FROM SUPERINTENDENT FOR ANY NOMINATED MATERIALS OR FINISHES.
- ADOPT AND IMPLEMENT APPROVED TREE MANAGEMENT PLAN, LANDSCAPE MANAGEMENT & PROTECTION PLAN & ENVIRONMENTAL AUTHORISATIONS. ALL WORKS TO BE IN ACCORDANCE WITH CURRENT TCCS (DUS) STANDARD SPECIFICATION FOR URBAN INFRASTRUCTURE WORKS UNLESS OTHERWISE PRESCRIBED. ALL DISTURBANCE BY WORKS MUST BE REINSTATED TO EXISTING CONDITION.

CLIENT
SPIIRE

LANDSCAPE ARCHITECT
enviro links design
5 / 61 Dundas Court PHILLIP ACT 2606 Ph:(02) 6281 6066 www.envirolinks.com.au

PROJECT
CITY SECTION 100

TITLE
TREE ASSESSMENT PLAN

SCALE
0 5 10 15 20m
1:1000@A3

NORTH

JOB NO. 1821
DWG NO. TA-01
ISSUE A