

1. Introduction

- 1.1. Richard Jackson Ltd have been commissioned by David Wilson Homes (Eastern) to provide engineering advice on Phase 3 of Land East of Holt Road, Horsford. This note considers the capacity of the recently constructed roundabout upgrade to the B1149 Holt Road/Green Lane junction proposed as part of the Phase 2 development to assess whether it can accommodate a future Phase 3. The future Phase 3 development would lie to the east of the existing/consented phases and when combined with Phase 2 is expected to comprise of 850 dwellings accessed from Green Lane (an increase of 591 dwellings above the existing planning permissions). A copy of the roundabout general arrangement M-EC drawing 22587_03_020_01.1 Rev L is attached to this note.
- 1.2. This note considers the B1149 Holt Road/Green Lane junction capacity only and any formal planning application would be required to be supported by Transport Assessment (TA). The scope of any future TA should be agreed with Norfolk County Council (the local Highway Authority) and should consider the accessibility of the site by sustainable modes of travel in addition to highway capacity. The development would also be of sufficient size to require a Travel Plan to minimise the developments impact on the local network.
- 1.3. This note also considers the public transport requirements for Phase 3 over and above those expected to be provided for Phase 2.

2. Public Transport

- 2.1. As part of the Phase 2 development a bus gate was proposed to connect to Phase 1 (Butterfly Mill) and route a bus service through the development. This is expected to be as an extensions of First route 36 which presently terminates using a loop of the Barrett-Lennard Road, Olive Crescent and B1149 Holt Road. The existing route and expected future bus route through the permitted Phase 2 development are shown attached.
- 2.2. There are two sets of bus stops proposed on the permitted Phase 2 development including those close to the bus gate to Phase 1 which are shown on the attached plan. From these, the furthest dwellings in Phase 3 are likely to be over 900m from these nearest bus stops. It is therefore likely that the bus route would need to be further extended into Phase 3 to bring all dwellings within an acceptable walking distance.
- 2.3. It would be possible to bring all dwellings to within 400m (potential maximum acceptable walking distance) of a bus stop by extending the route from Phase 2 into Phase 3 and back into Phase 2 again and such a route is shown indicatively on the attached plan. The final route alignment would be dependent on the layout of a future Phase 3, consultation with the bus provider and any supplementary guidance from Norfolk County Council on bus stop distances (such as relaxed walking distance in favour of a shorter bus route).

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6 December 2018

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- 2.4. Bus stops near to the Mill Lane/Memorial Road junction may provide some additional benefit should a pedestrian access be provided from Phase 3 to Mill Lane. A pedestrian/cycle access to Mill Lane would also reduce the distance for Phase 3 residents accessing local amenities including the primary school.
- 2.5. It may be possible, as an alternative, to take the bus route through Phases 2 and 3 only, bypassing Phase 1, however this would require upgrading of Mill Lane between Memorial Road and any (possibly bus / emergency vehicle only) access to Phase 3.

3. Traffic Data

- 3.1. A traffic survey of the existing junction was undertaken for the Phase 2 TA on Tuesday 7 June 2016 for the AM and PM peak periods. Movements to/from the minor access on the northeast corner of the junction were not specified in the survey. A diagrammatic summary of the peak hours in terms of Passenger Car Units (PCU's) is summarised on Traffic Flow Diagram 1 attached to this note.
- 3.2. Since undertaking the traffic surveys in 2016, the A1270 Norwich Northern Distributor Road has been completed. For consistency with the methodology of the Phase 2 TA, no adjustments have been made for the opening of this route, however, any future TA to support a Phase 3 planning application be expected to be supported by new post A1270 opening traffic surveys, to ensure any redistribution effects are considered.
- 3.3. Background traffic growth has been considered for five years, from potential planning application, providing a horizon year of 2025. The traffic growth factors have been obtained from the TEMPro computer programme using datasets NTEM 7.2 and NTM AF15. The calculation has been made for Broadland 004 with road type rural principal. The growth factors are summarised in Table 1 with TEMPro outputs attached for reference. The 2025 base traffic flows are shown on Traffic Flow Diagram 2 attached.

Table 1 – Traffic Growth Factors

	Weekday AM	Weekday PM
2016 – 2025	1.1744	1.1793

- 3.4. **The Phase 1 ('Butterfly Mill') development accessed off Mill Lane** (to the south) was not complete at the time of the 2016 traffic survey. As with the Phase 2 TA, 63 dwellings have been considered as committed development with no reductions made for any construction traffic included in the survey. In addition, the Phase 2 **development of 259 dwellings, as set out in the application's TA, are also** considered as committed. The committed development is summarised on Traffic Flow Diagram 3, as extracted from the Phase 2 TA.
- 3.5. **TRICS based trip rates used in both the Phase 1 'Butterfly Mill' and Phase 2** assessments have been applied to the potential Phase 3 development. The trip generation for an additional 591 dwellings to provide a total of 850 dwellings across Phases 2 and 3 is shown in Table 2.

Table 2 – Vehicular Trip Generation

Vehicular Trip Rates & Trips	AM Peak		PM Peak	
	Arrivals	Departures	Arrivals	Departures
Private Housing Trip Rate (1 Dwelling)	0.163	0.435	0.409	0.239
Private Housing Trips (591 dwellings)	96	257	242	141

3.6. Trip distribution for the additional Phase 3 dwellings would be expected to be the same as for Phase 2. The Phase 2 TA included 2011 Census workplace based distribution which is summarised as follows:

1. B1149 Holt Road (south) = 69%
2. B1149 Holt Road (north) = 20%
3. West (Haveringland Road) = 11%

3.7. The resulting traffic flows for Phase 3 are summarised on Traffic Flow Diagram 4. The 2025 with committed and proposed developments for the assessment of vehicular capacity is shown on Traffic Flow Diagram 5.

4. Junction Capacity

4.1. The capacity of the roundabout at the B1149 Holt Road/Green Lane junction has been assessed using industry standard modelling software Junctions 9. The roundabout also provides access to land on the northeast corner of the junction, however, movements to/from this access were not specified in the traffic survey and therefore the access is not part of the capacity model. A copy of the model output is attached to this note and the results are summarised in Table 3.

Table 3 – Junction Capacity Assessment Results

Arm/Movement	AM Peak		PM Peak	
	Queue PCUs	RFC	Queue PCUs	RFC
Holt Road (N)	1.2	0.55	1.8	0.64
Green Lane	0.8	0.46	0.3	0.26
Holt Road (S)	0.9	0.47	1.8	0.64

4.2. The results show that the junction is likely to remain within capacity in 2025 with the Phase 3 development traffic included **as all RFC's remain below 0.85**.

5. Summary/Conclusion

5.1. The impact of a future Phase 3 development on Land East of Holt Road, Horsford with access off Green Lane has been reviewed with respect to the proposed roundabout junction of the B1149 Holt Road/Green Lane. A total of 850 dwellings would be provided across Phases 2 and 3, of which 259 dwellings are already permitted as Phase 2. The public transport requirements have also been considered.

5.2. The assessment has considered the roundabout junction format associated with

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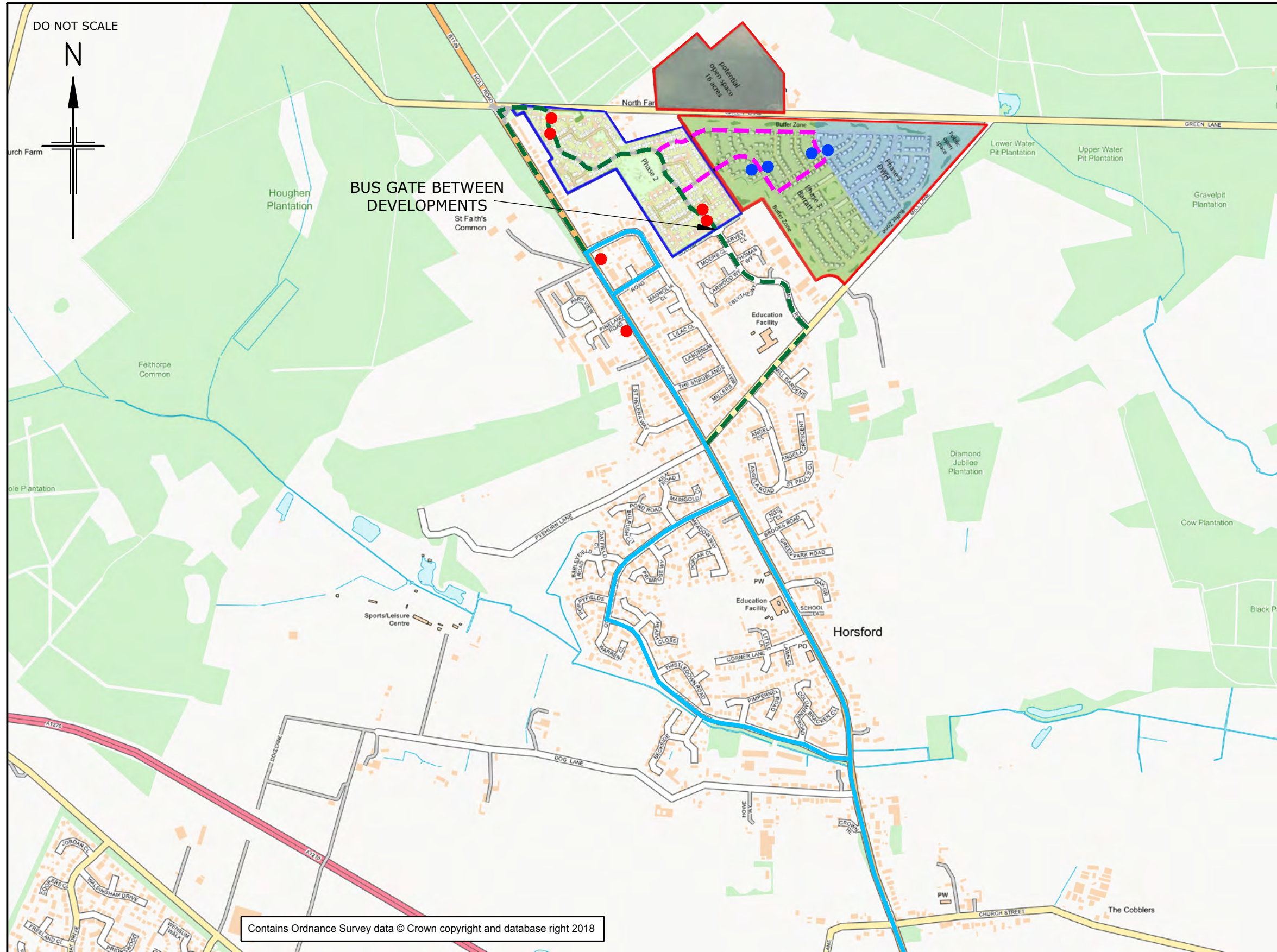
the Phase 2 development which has recently been completed and is based on traffic data from the Phase 2 TA. It has been noted that since the Phase 2 TA traffic surveys were undertaken, the A1270 Norwich Northern Distributor Road has opened and any TA supporting a future Phase 3 planning application would require new survey data to ensure any traffic redistribution effects are considered.

- 5.3. The traffic capacity assessment, which includes for traffic growth, outstanding and committed dwellings (for Phases 1 and 2) plus the additional Phase 3 development, has shown that the junction is likely to remain within capacity in 2025.
- 5.4. It is therefore concluded that whilst further assessment work would be required to support any future planning application, it is anticipated that no additional capacity would be required at the proposed improved B1149 Holt Road/Green Lane junction.

Note By: Duncan Palmer
BSc (Hons) MCIHT MTPS
On behalf of Richard Jackson Ltd

Reviewed By: Mark Geddes
IEng MICE
On behalf of Richard Jackson Ltd

Attachments:
Bus Consultation Plan
Drawing 22587_03_020_01.1 Rev L
Traffic Flow Diagrams
Traffic Growth Calculations
Traffic Model Output



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- KEY:**
- FIRST BUS ROUTE 36 (EXISTING)
 - FUTURE BUS ROUTE EXTENSION (PHASE 2)
 - POTENTIAL BUS ROUTE EXTENSION (PHASE 3)
 - SELECTED EXISTING & PHASE 2 BUS STOPS
 - POTENTIAL PHASE 3 BUS STOPS

REV	DATE	DESCRIPTION	DRAWN	CHKD
B	06/12/18	UPDATE TO CONSIDER PHASE 2B & 3	DDP	MJG
A	22/07/16	LAYOUT & BUS ROUTE OPTIONS	DDP	JDP

Project Title	LAND SOUTH OF GREEN LANE, HORSFORD		
Drawing Title	LOCAL BUS CONSULTATION		

Client Title	BDW EASTERN COUNTIES		
Scale	1:10,000 @A3	Drawn	D PALMER
Job Manager	M GEDDES	Checked	J PITCHER
Date	29/06/16	Approved	

This drawing is to be read in conjunction with all other Engineer's drawings and all other project information. Any discrepancy between the Engineer's drawings and other project information is to be reported to the Engineer immediately.



Richard Jackson Engineering Consultants

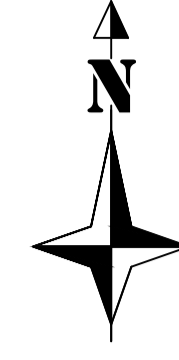
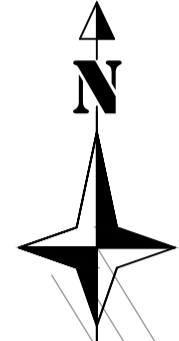
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Drawing No.	BUS CONSULTATION		Revision	B
Drawing Status	<input checked="" type="checkbox"/> INFORMATION <input type="checkbox"/> APPROVAL <input type="checkbox"/> COSTING <input type="checkbox"/> TENDER <input type="checkbox"/> CONSTRUCTION <input type="checkbox"/> AS CONSTRUCTED			

HORSFORD PHASE 2: S278
 PLAN VIEW
 GENERAL ARRANGEMENT
 VIEWPORT - A



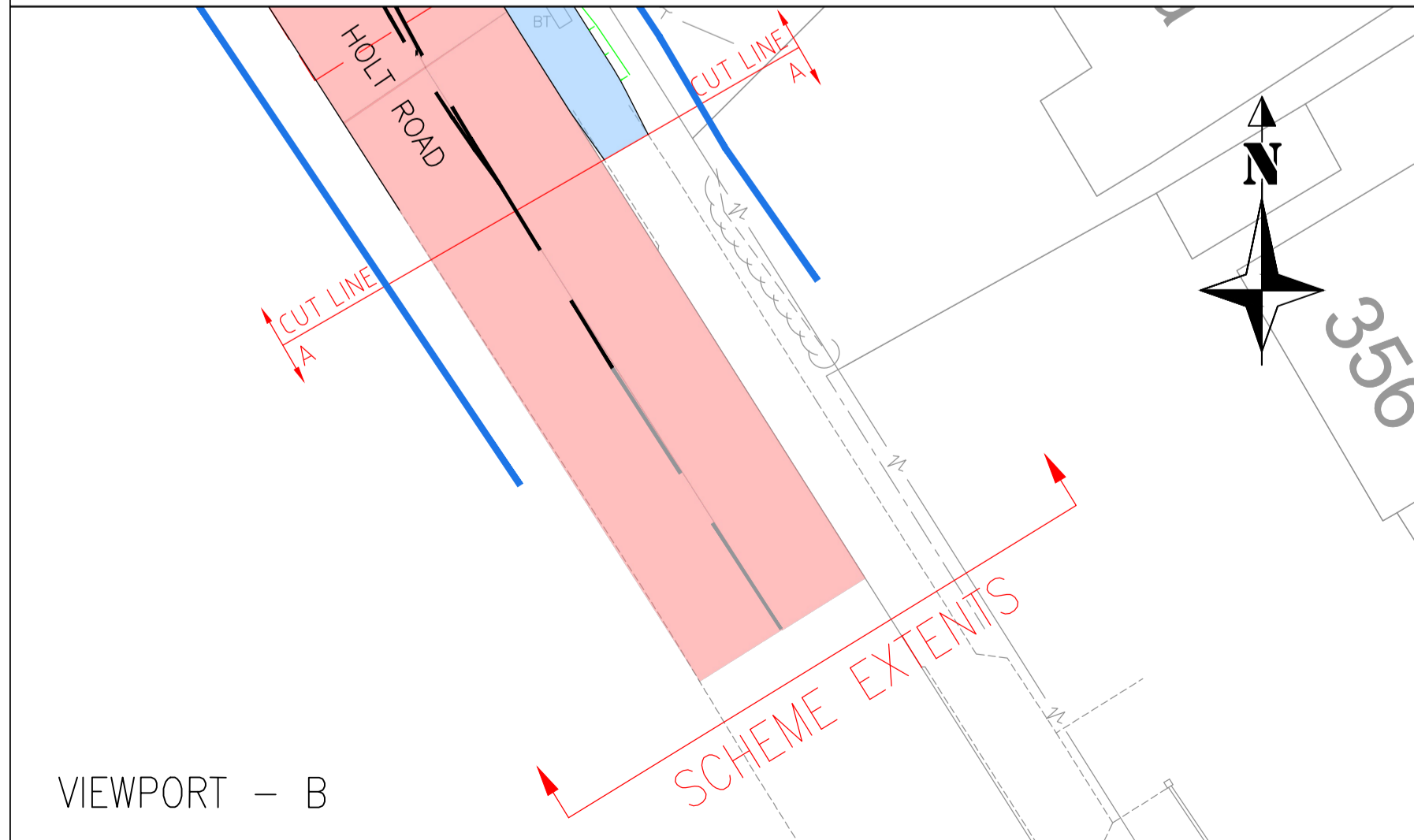
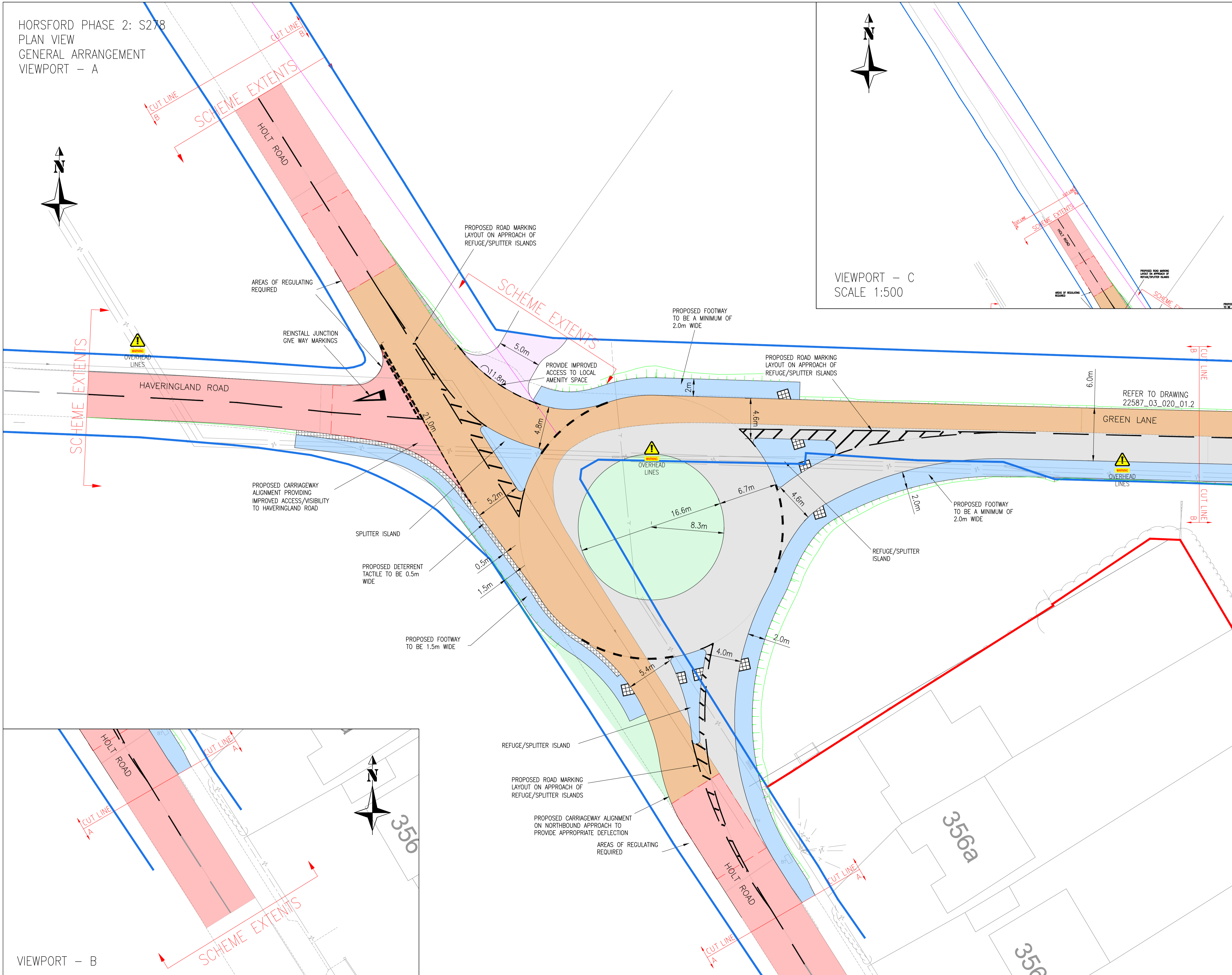
VIEWPORT - C
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NOTES:

1. VARIOUS DESIGN SERIES OMITTED FOR CLARITY.
2. DO NOT SCALE FROM THIS DRAWING.
3. THIS DRAWING SHOULD NOT BE USED FOR OTHER THAN ITS INTENDED PURPOSE.
4. DIMENSIONS SHOWN ARE IN METRES UNLESS OTHERWISE STATED.

KEY:

- PROPOSED NEW CARRIAGEWAY CONSTRUCTION
- EXISTING RURAL FOOTPATH AND NATURAL AMENITY RE-CONSTRUCTION
- EXISTING CARRIAGEWAY RE-SURFACING
- PROPOSED FOOTWAY, PHYSICAL ISLAND AND HARD STANDING AREA.
- PROPOSED LANDSCAPING
- EXISTING CARRIAGEWAY WITH OVERLAY
- PROPOSED DETERRENT TACTILES
- TACTILE PAVING
- 11KV OVERHEAD CABLE (GS6 OBTAINED)
- LAND OWNERSHIP BOUNDARY
- HIGHWAY BOUNDARY
- PROPOSED ROAD MARKINGS
- STOPPING SIGHT DISTANCE ON APPROACH (40mph - 120m DMRB)
- EXTENT OF EARTHWORKS



L	ISSUED FOR CONSTRUCTION	LD	ZA	06/06/18
K	AMENDMENTS AS PER NCC COMMENTS	LD	ZA	30/05/18
J	AMENDMENTS AS PER NCC COMMENTS	LD	ZA	29/05/18
I	AMENDMENTS AS PER NCC COMMENTS	LD	ZA	25/05/18
H	AMENDMENTS FOLLOWING NCC COMMENTS	ZA	MA	24/05/18
G	AMENDMENTS FOLLOWING NCC COMMENTS	ZA	MA	08/05/18
F	AMENDMENTS FOLLOWING NCC COMMENTS	ZA	MA	04/05/18
E	AMENDMENTS FOLLOWING NCC COMMENTS	ZA	MA	02/05/18
D	AMENDMENTS FOLLOWING NCC COMMENTS	ZA	MA	27/04/18
C	AMENDMENTS FOLLOWING CLIENT COMMENTS	ZA	WO	23/03/18
B	AMENDMENTS FOLLOWING CLIENT COMMENTS	HG	ZA	20/03/18
A	AMENDMENTS FOLLOWING DESIGN CHANGE	ZA	WO	09/02/18
REV:	AMENDMENTS	DRN	CHK	DATE:

PROJECT: **HORSFORD PHASE 2 NORFOLK**

DRAWING TITLE: **S278 GENERAL ARRANGEMENT SHEET 1 OF 2**

CLIENT: **BARRATT DAVID WILSON HOMES**

DRAWING NUMBER: **22587_03_020_01.1**

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DRAWN BY: LD	CHECKED BY: WO	DATE: 15/02/17

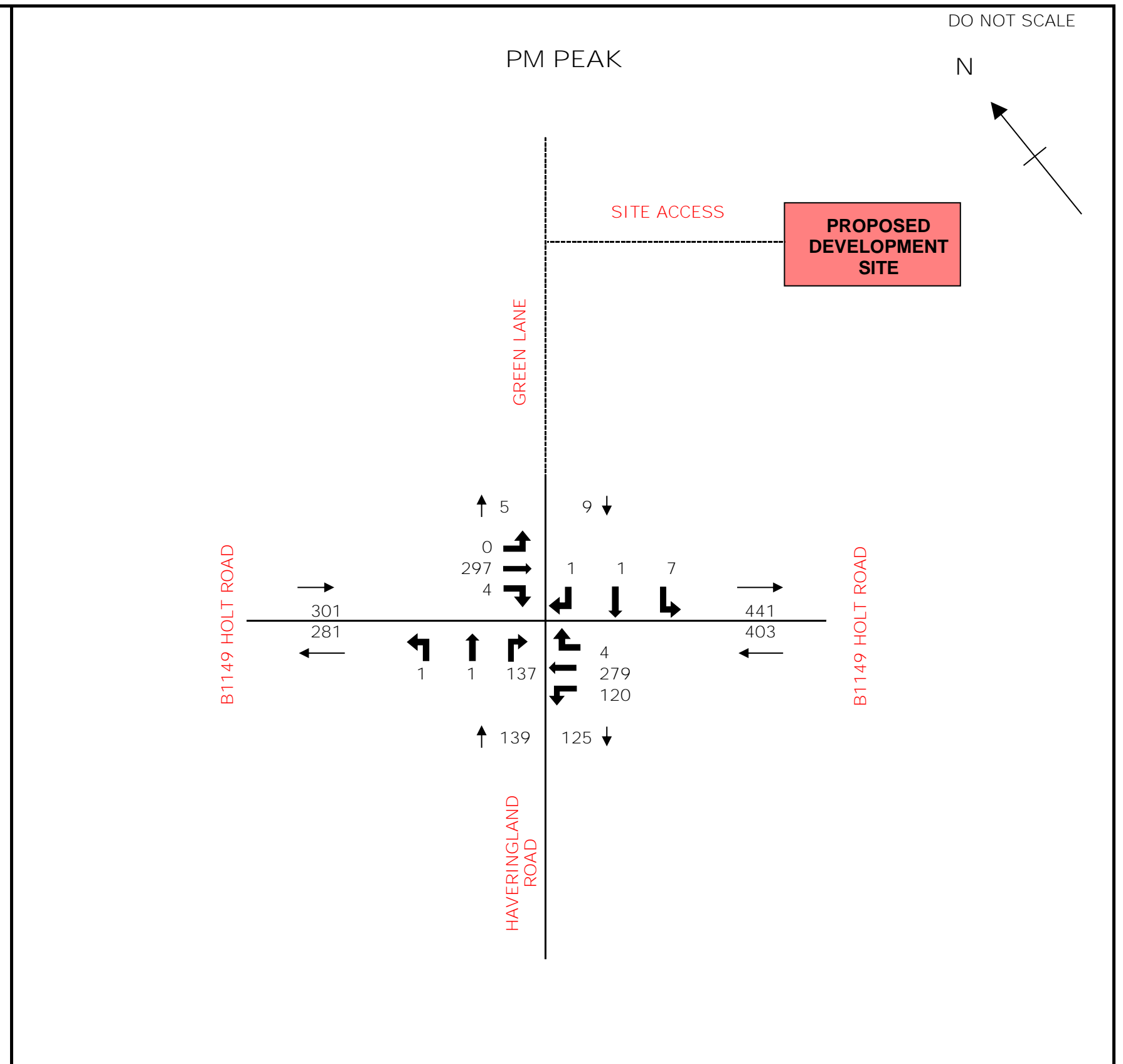
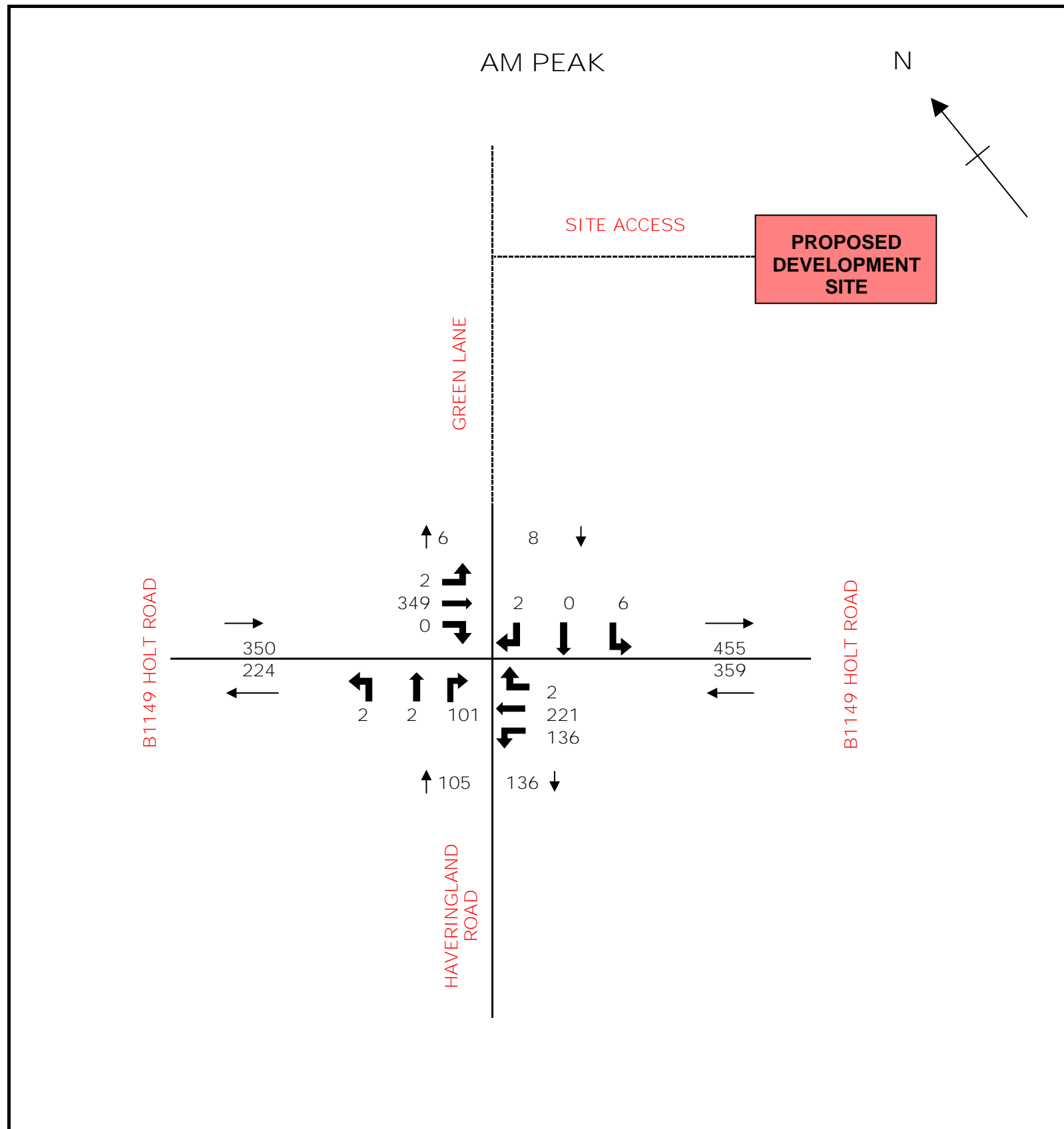
STATUS: **FOR CONSTRUCTION**

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Notes:

- Original survey date was Tuesday 7th June 2016.
- Peak 60min flows range between 07.00-10.00 and 16.00-19.00.
- Highest peak 60min interval for each period presented for robustness unless specific time period stated.
- Road network layout is representative only and not to scale.
- Junctions that are not being investigated are unlikely to show complete data in all scenarios.
- All flows are in PCUs

Key:

- Local Road Network Assessed
- Indicative Road Network

Traffic Growth Factors

	AM	PM
2016-2025	1.1744	1.1793

REV	DATE	DESCRIPTION	DRAWN	CHKD

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Project Title
Land East of Holt Road, Horsford

Client Title
David Wilson Homes
(Eastern)

Drawing No.
47172/P/TA/101

Revision

Drawing Title
TRAFFIC FLOW DIAGRAM - SCENARIO 1

Scale
NTS

Drawn
DDP

Date
15/02/18

Drawing Status

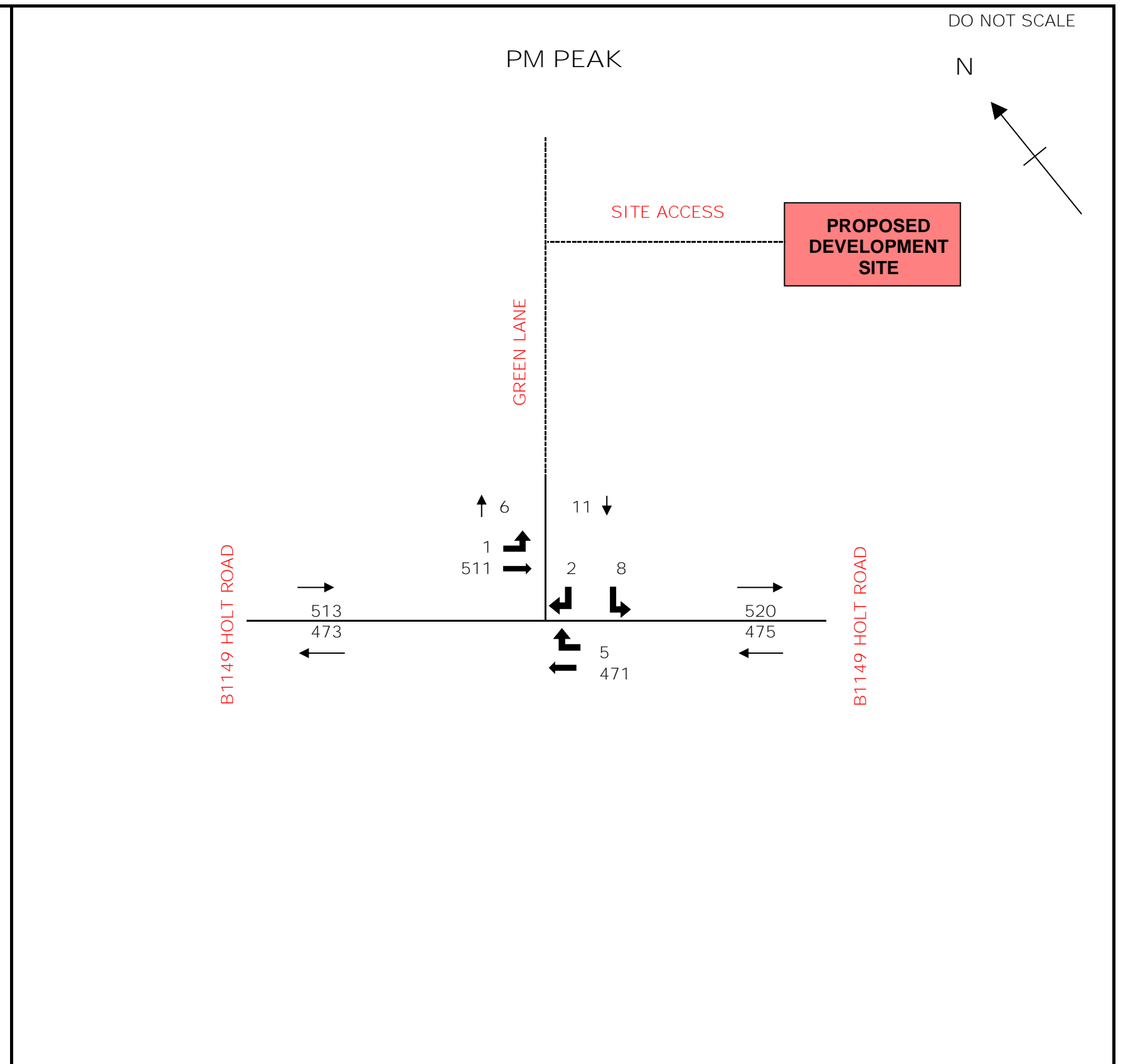
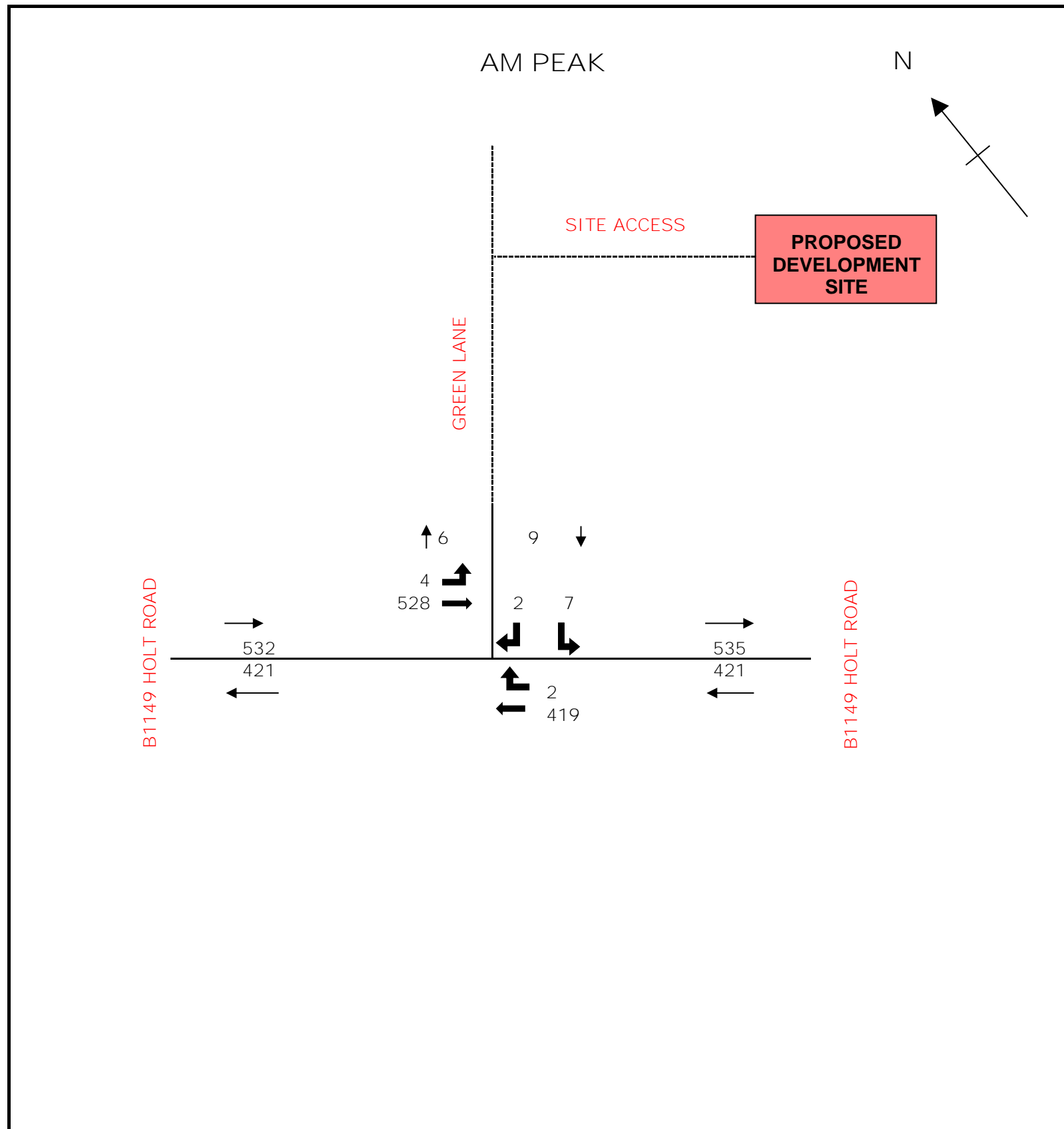
INFORMATION APPROVAL COSTING

TENDER CONSTRUCTION AS CONSTRUCTED

2016 Peak Hour (Maximum Junction Flows)

Job Manager
M Geddes

Quality Checked
R Long



Notes:

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Key:

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- Indicative Road Network

Traffic Growth Factors		
	AM	PM
2016-2025	1.1744	1.1793

REV	DATE	DESCRIPTION	DRAWN	CHKD
A	03/12/18	ROAD LAYOUT	DDP	MJG

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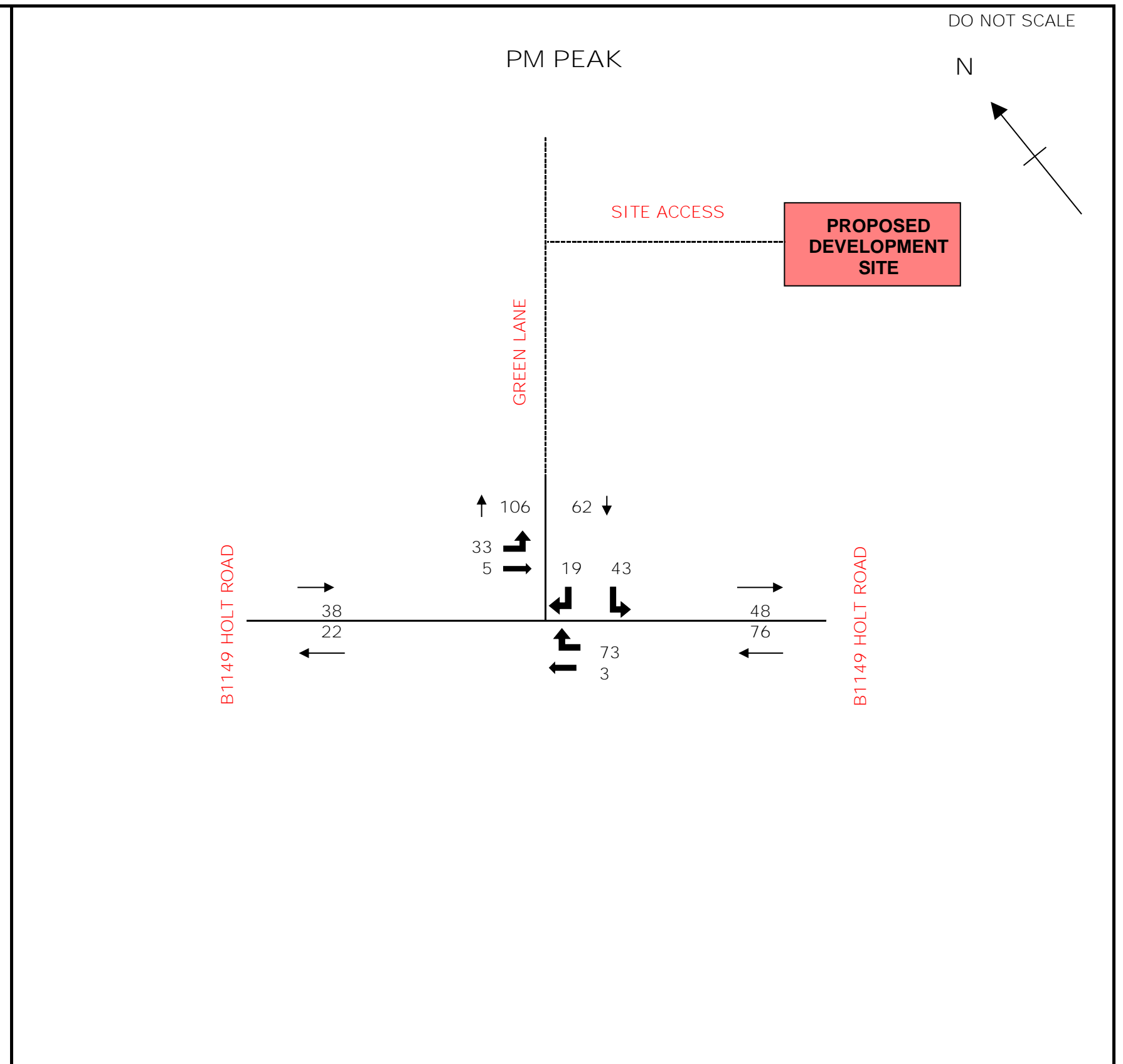
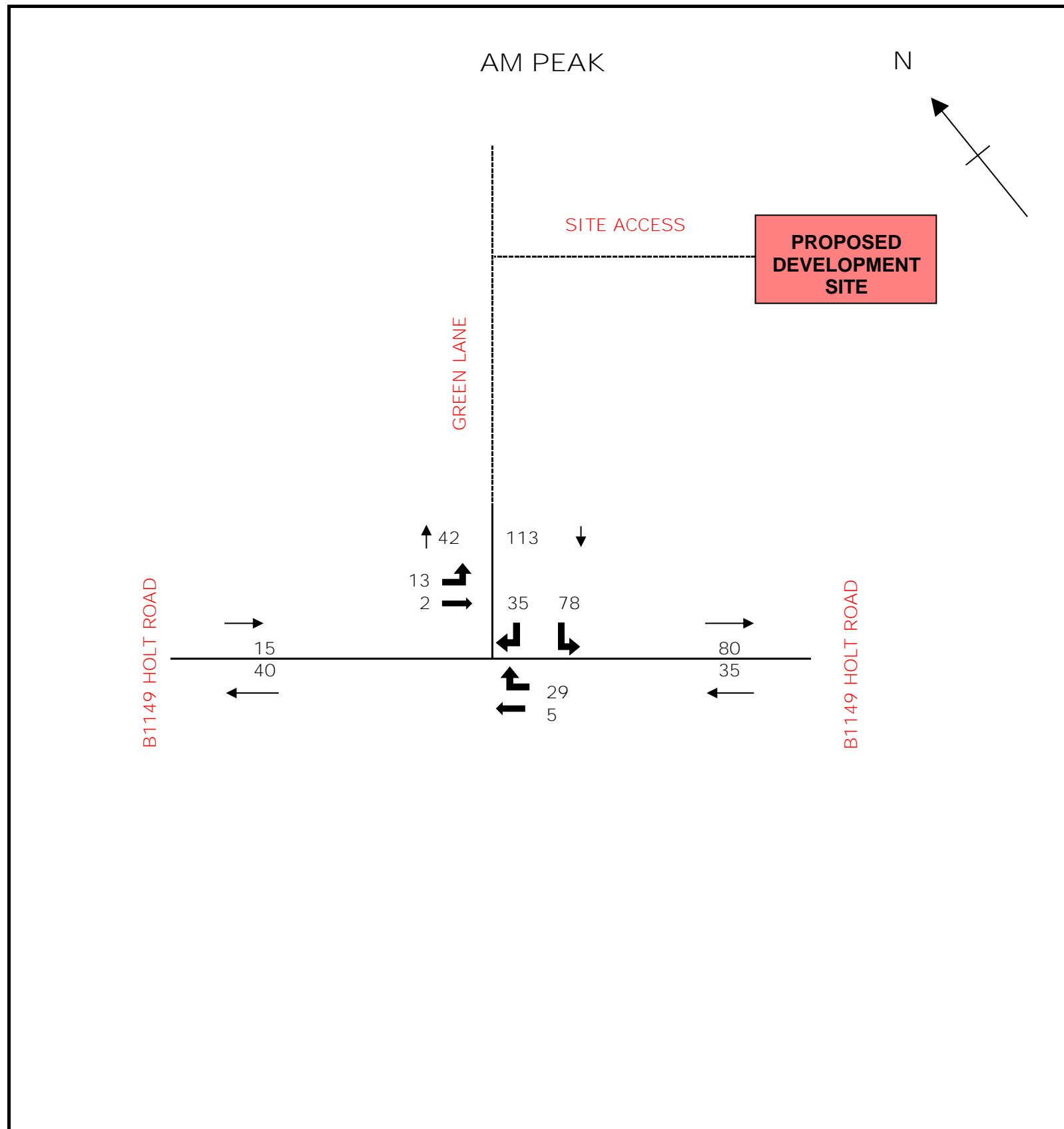
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<p>Project Title Land East of Holt Road, Horsford</p>	<p>Client Title David Wilson Homes (Eastern)</p>
<p>Drawing Title TRAFFIC FLOW DIAGRAM - SCENARIO 2</p>	<p>Scale NTS</p>
<p>2025 Peak Hour Flows</p>	<p>Drawn DDP</p>
	<p>Date 15/02/18</p>
	<p>Job Manager M Geddes</p>
	<p>Quality Checked R Long</p>

<p>Drawing No. 47172/P/TA/102</p>	<p>Revision A</p>
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Notes:

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- Highest peak 60min interval for each period presented for robustness unless specific time period stated.
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Key:

- Local Road Network Assessed
- Indicative Road Network

Traffic Growth Factors

	AM	PM
2016-2025	1.1744	1.1793

REV	DATE	DESCRIPTION	DRAWN	CHKD
A	03/12/18	ROAD LAYOUT	DDP	MJG

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Project Title
Land East of Holt Road, Horsford

Client Title
David Wilson Homes
(Eastern)

Drawing No.
47172/P/TA/103

Revision
A

Drawing Title
TRAFFIC FLOW DIAGRAM - SCENARIO 3

Scale
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Date
15/02/18

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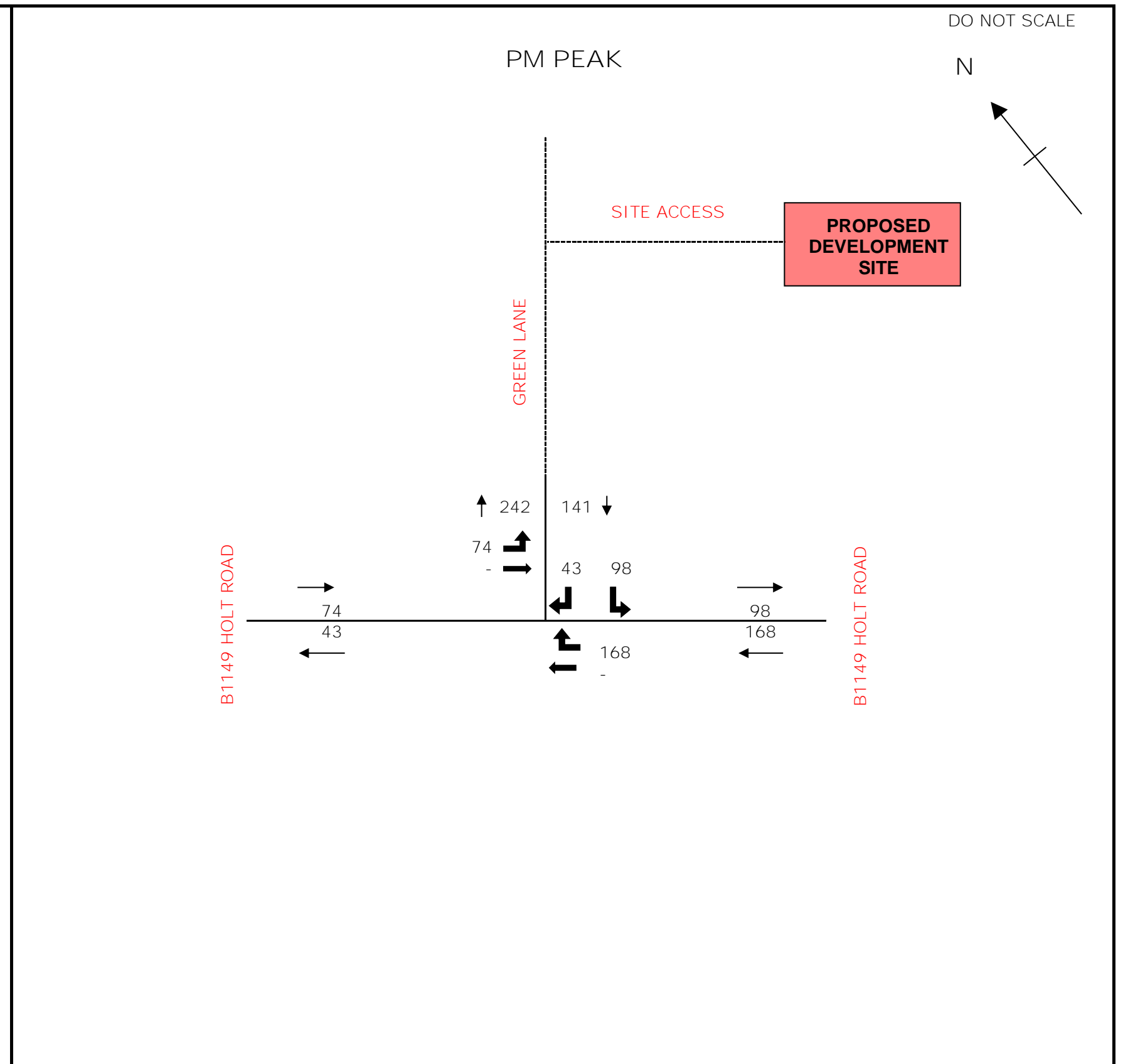
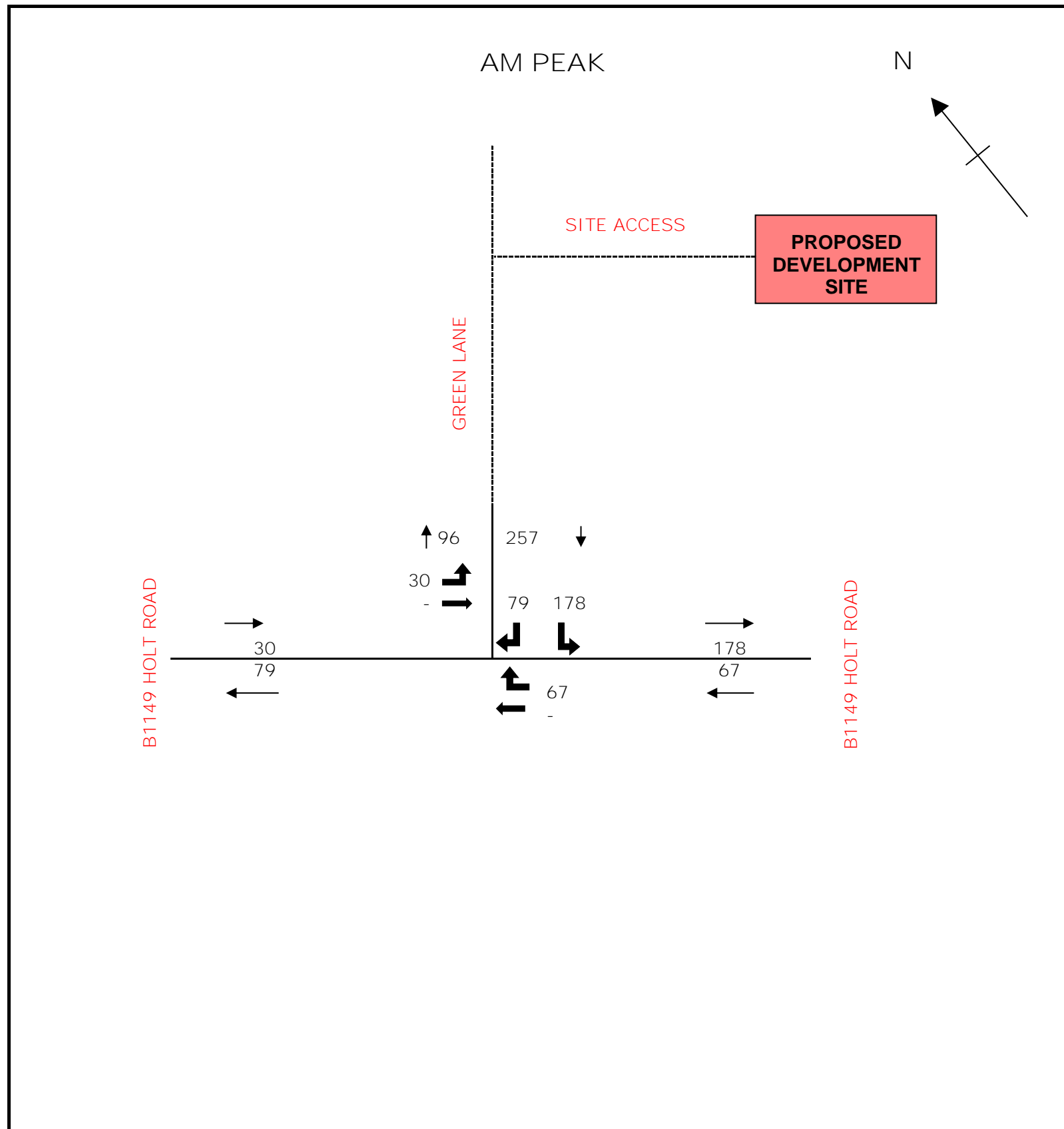
INFORMATION APPROVAL COSTING

TENDER CONSTRUCTION AS CONSTRUCTED

Committed Developments

Job Manager
M Geddes

Quality Checked
R Long



Notes:

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Key:

- Local Road Network Assessed
- Indicative Road Network

Traffic Growth Factors

	AM	PM
2016-2025	1.1744	1.1793

REV	DATE	DESCRIPTION	DRAWN	CHKD
C	03/12/18	ROAD LAYOUT & DEV SIZE	DDP	MJG
B	05/03/18	DEVELOPMENT SIZE	DDP	MJG
A	26/02/18	DEVELOPMENT SIZE	DDP	MJG

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Land East of Holt Road, Horsford

Client Title
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(Eastern)

Drawing No.
47172/P/TA/104

Revision
C

Drawing Title
TRAFFIC FLOW DIAGRAM - SCENARIO 4

Scale
NTS

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DDP

Date
15/02/18

Proposed Phase 3 Development

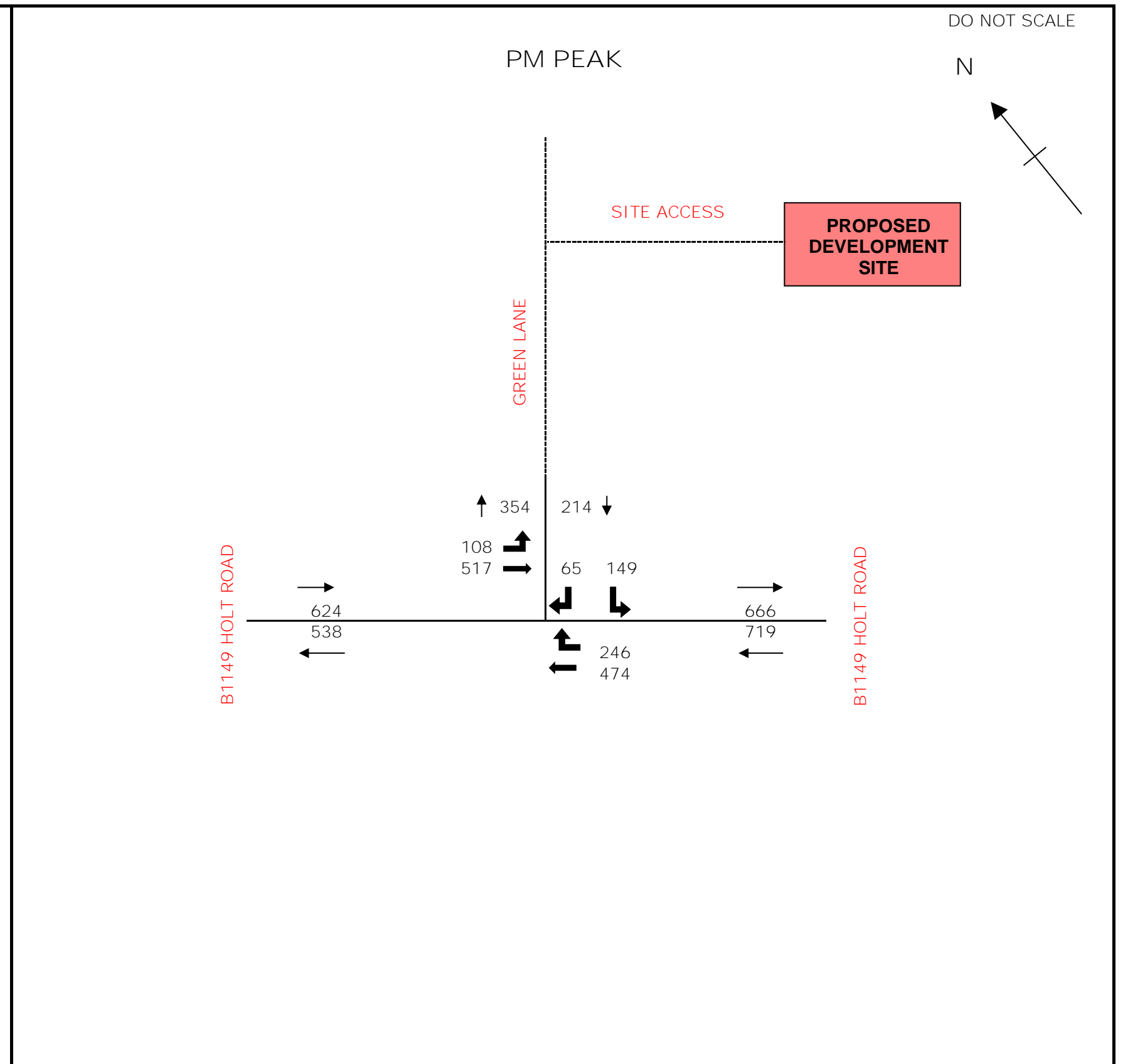
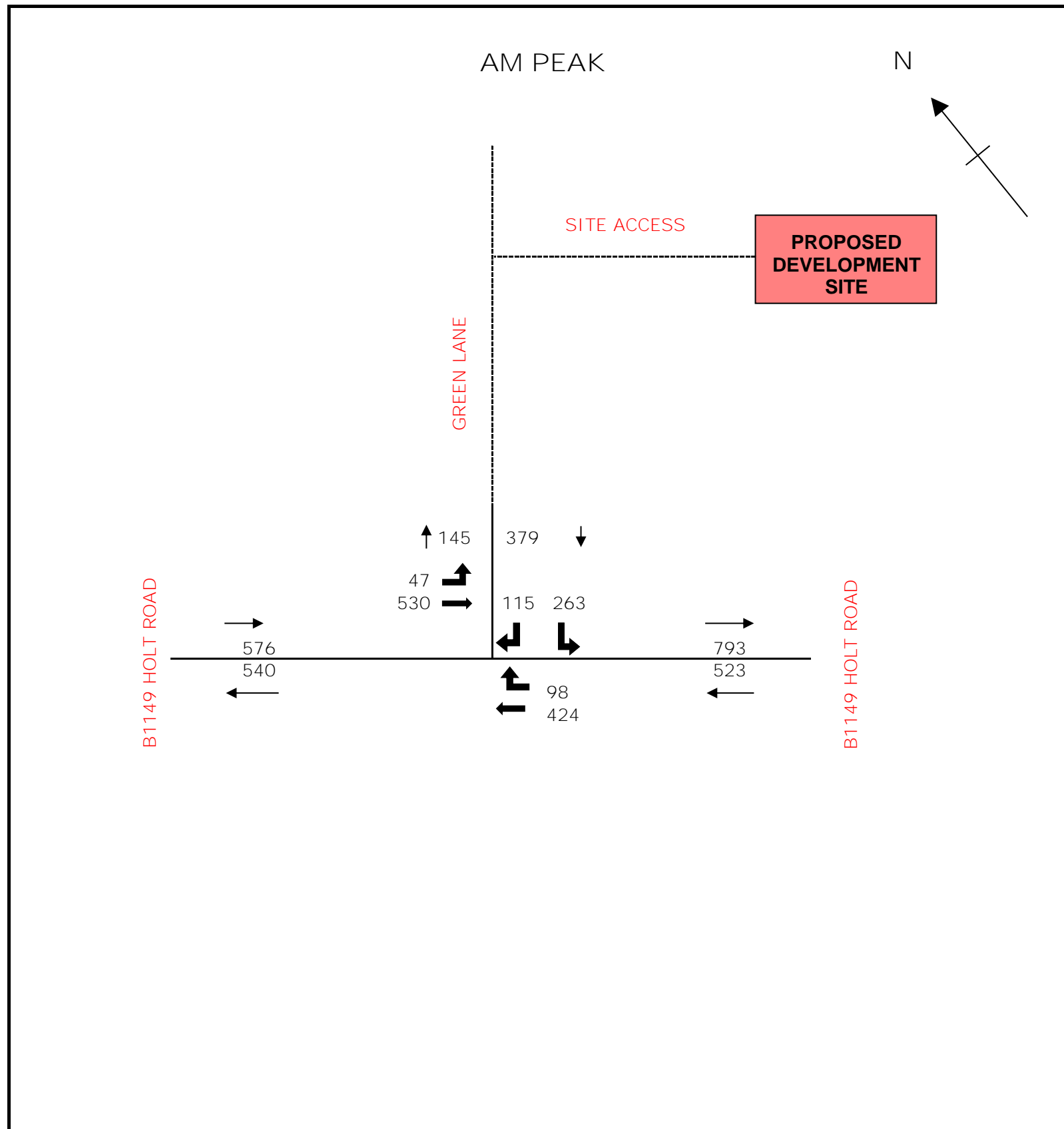
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M Geddes

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R Long

Drawing Status

INFORMATION APPROVAL COSTING

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Notes:

- Original survey date was Tuesday 7th June 2016.
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Key:

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- Indicative Road Network

Traffic Growth Factors

	AM	PM
2016-2025	1.1744	1.1793

REV	DATE	DESCRIPTION	DRAWN	CHKD
C	03/12/18	ROAD LAYOUT & DEV SIZE	DDP	MJG
B	05/03/18	DEVELOPMENT SIZE	DDP	MJG
A	26/02/18	DEVELOPMENT SIZE	DDP	MJG

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Land East of Holt Road, Horsford

Client Title
David Wilson Homes
(Eastern)

Drawing No.
47172/P/TA/105

Revision
C

Drawing Title
TRAFFIC FLOW DIAGRAM - SCENARIO 5
2025 Peak Hour with Development

Scale
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Drawn
DDP
Date
15/02/18
Job Manager
M Geddes
Quality Checked
R Long

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 CONSTRUCTION
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 AS CONSTRUCTED

TEMPro main form

Data selections

Select dataset version: 72

Result type

Trip ends by time period

Trip ends by car availability

Car ownership data

Planning data

Set area definition...

Enter base year: 2016

Enter future year: 2025

Trip end by time period selections

Select time period: Weekday AM peak period (0700 - 0959)

Trip end type

Production/Attraction

Origin/Destination

Select data type

Growth factors

Future year minus base year

Base year data

Future year data

*Italicised results indicate that there is a lower level of confidence in data presented at the zonal level than when aggregated to higher geographical levels

Car Driver Combined Modes

Area Description		All Purposes	
Level	Name	Origin	Destination
E02005523	Broadland 004	1.14	1.0985

NTM Traffic Growth Calculations

1: Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF15 Dataset	2010	2040
NTM AF09 Dataset	2003	2035
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

Broadland 004 (E02005523)

3. Select area type:

Urban

Rural

All

4. Select road type:

Motorway

Trunk

Principal

Minor

All

5. Select which area it serves:

Region

England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
E02005523	Broadland 004	1.1744

TEMPro main form

Data selections

Select dataset version: 72

Result type

Trip ends by time period

Trip ends by car availability

Car ownership data

Planning data

Set area definition...

Enter base year: 2016

Enter future year: 2025

Trip end by time period selections

Select time period: Weekday PM peak period (1600 - 1859)

Trip end type

Production/Attraction

Origin/Destination

Select data type

Growth factors

Future year minus base year

Base year data

Future year data

*Italicised results indicate that there is a lower level of confidence in data presented at the zonal level than when aggregated to higher geographical levels

Car Driver Combined Modes

Area Description		All Purposes	
Level	Name	Origin	Destination
E02005523	Broadland 004	1.1102	1.1376

NTM Traffic Growth Calculations

1: Select NTM Dataset:

NTM Dataset Description	From	To
NTM AF15 Dataset	2010	2040
NTM AF09 Dataset	2003	2035
NTM AF08 Dataset	2003	2025

2: Select Areas to make up the geographic region:

Broadland 004 (E02005523)

3. Select area type:

Urban

Rural

All

4. Select road type:

Motorway

Trunk

Principal

Minor

All

5. Select which area it serves:

Region

England

Calculate the adjusted local growth figure

Results

Level	Area	Local Growth Figure
E02005523	Broadland 004	1.1793

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.5.0.6896 © Copyright TRL Limited, 2018
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Filename: Green Lane Compact 3arm Rbt M-EC GenArr Rev L Phase 3.j9
Path: O:\47000 - Engineering\47100\47172 - Mill Lane, Horsford - Phase 2\Calculations\Transport\Models
Report generation date: 03/12/2018 12:55:20

- »Phase 3 - 2025 with Development, AM
- »Phase 3 - 2025 with Development, PM

Summary of junction performance

	AM		PM	
	Q (PCU)	RFC	Q (PCU)	RFC
Phase 3 - 2025 with Development				
Arm 1	1.2	0.55	1.8	0.64
Arm 2	0.8	0.46	0.3	0.26
Arm 3	0.9	0.47	1.8	0.64

Values shown are the highest values encountered over all time segments. Delay is the maximum value of Av. delay per arriving vehicle.

File summary

File Description

Title	Green Lane Horsford
Location	
Site number	
Date	03/12/2018
Version	
Status	Construction
Identifier	
Client	
Jobnumber	
Enumerator	RJPLC\duncanpalmer
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Av. delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Q Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Av. Delay threshold (s)	Q threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2025 with Development	AM	ONE HOUR	08:00	09:30	15	✓
D2	2025 with Development	PM	ONE HOUR	17:00	18:30	15	✓

Analysis Set Details

ID	Name	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	Phase 3	✓	100.000	100.000

Phase 3 - 2025 with Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3	6.73	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	B1149	
2	Green Lane	
3	B1149	

Roundabout Geometry

Arm	V (m)	E (m)	I' (m)	R (m)	D (m)	PHI (deg)	Exit only
1	3.11	4.83	11.5	10.0	30.0	31.6	
2	3.00	4.64	11.1	10.0	30.0	18.3	
3	3.13	5.44	6.9	20.0	30.0	30.3	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.544	1224
2	0.560	1236
3	0.573	1285

The slope and intercept shown above include any corrections and adjustments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2025 with Development	AM	ONE HOUR	08:00	09:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	577	100.000
2		ONE HOUR	✓	378	100.000
3		ONE HOUR	✓	522	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	47	530
	2	115	0	263
	3	424	98	0

Vehicle Mix

HV %s

		To		
		1	2	3
From	1	0	0	5
	2	0	0	0
	3	5	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.55	7.12	1.2	A	529	794
2	0.46	7.30	0.8	A	347	520
3	0.47	5.88	0.9	A	479	718

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	434	109	73	1184	0.367	432	404	0.0	0.6	5.005	A
2	285	71	397	1014	0.281	283	109	0.0	0.4	4.917	A
3	393	98	86	1236	0.318	391	594	0.0	0.5	4.431	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	519	130	88	1176	0.441	518	484	0.6	0.8	5.729	A
2	340	85	476	969	0.351	339	130	0.4	0.5	5.707	A
3	469	117	103	1226	0.383	469	712	0.5	0.6	4.948	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	635	159	108	1166	0.545	634	592	0.8	1.2	7.076	A
2	416	104	582	910	0.457	415	159	0.5	0.8	7.256	A
3	575	144	126	1213	0.474	574	871	0.6	0.9	5.857	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	635	159	108	1166	0.545	635	593	1.2	1.2	7.122	A
2	416	104	584	909	0.458	416	160	0.8	0.8	7.303	A
3	575	144	127	1212	0.474	575	873	0.9	0.9	5.880	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	519	130	88	1176	0.441	520	486	1.2	0.8	5.775	A
2	340	85	478	968	0.351	341	131	0.8	0.5	5.751	A
3	469	117	104	1226	0.383	470	715	0.9	0.7	4.973	A

09:15 - 09:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	434	109	74	1184	0.367	435	407	0.8	0.6	5.052	A
2	285	71	400	1012	0.281	285	109	0.5	0.4	4.958	A
3	393	98	87	1235	0.318	394	598	0.7	0.5	4.461	A

Phase 3 - 2025 with Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3	8.21	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2025 with Development	PM	ONE HOUR	17:00	18:30	15	✓

Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)
✓	✓	HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Av. Demand (PCU/hr)	Scaling Factor (%)
1		ONE HOUR	✓	625	100.000
2		ONE HOUR	✓	214	100.000
3		ONE HOUR	✓	720	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		1	2	3
From	1	0	108	517
	2	65	0	149
	3	474	246	0

Vehicle Mix

HV %s

		To		
		1	2	3
From	1	0	0	2
	2	0	0	0
	3	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Q (PCU)	Max LOS	Av. Demand (PCU/hr)	Total Junction Arrivals (PCU)
1	0.64	9.39	1.8	A	574	860
2	0.26	5.28	0.3	A	196	295
3	0.64	8.05	1.8	A	661	991

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	471	118	184	1124	0.419	468	404	0.0	0.7	5.545	A
2	161	40	387	1019	0.158	160	265	0.0	0.2	4.188	A
3	542	136	49	1257	0.431	539	498	0.0	0.8	5.042	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	562	140	221	1104	0.509	561	484	0.7	1.0	6.714	A
2	192	48	464	976	0.197	192	318	0.2	0.2	4.590	A
3	647	162	58	1252	0.517	646	598	0.8	1.1	5.991	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	688	172	270	1078	0.639	685	592	1.0	1.7	9.253	A
2	236	59	567	918	0.257	235	388	0.2	0.3	5.268	A
3	793	198	71	1244	0.637	790	731	1.1	1.7	7.960	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	688	172	271	1077	0.639	688	593	1.7	1.8	9.391	A
2	236	59	569	917	0.257	236	390	0.3	0.3	5.282	A
3	793	198	72	1244	0.637	793	733	1.7	1.8	8.051	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	562	140	222	1104	0.509	565	486	1.8	1.1	6.821	A
2	192	48	467	974	0.197	193	320	0.3	0.2	4.608	A
3	647	162	59	1251	0.517	650	601	1.8	1.1	6.071	A

18:15 - 18:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1	471	118	186	1123	0.419	472	407	1.1	0.7	5.625	A
2	161	40	390	1017	0.158	161	267	0.2	0.2	4.206	A
3	542	136	49	1257	0.431	543	503	1.1	0.8	5.103	A