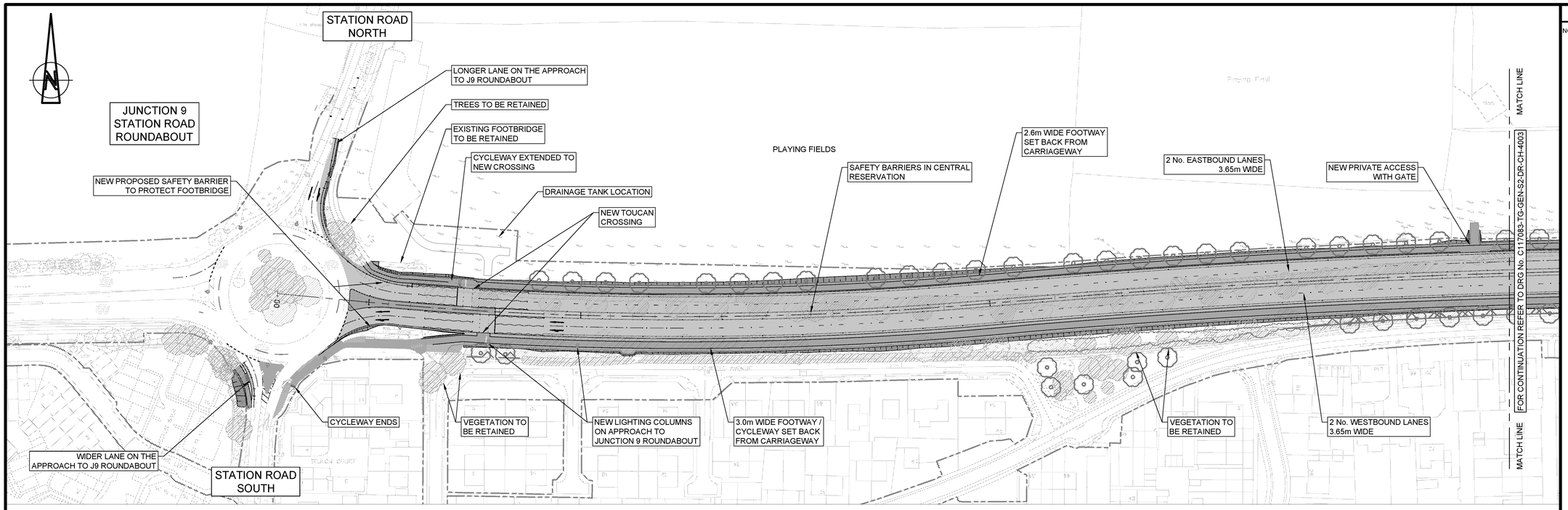

PHASE 1 DUALLING
JUNCTION 9 (STATION ROAD ROUNDABOUT) TO JUNCTION 10 (ROUNDSTONE LANE ROUNDABOUT)
SCALE 1:1000

OVERVIEW (JUNCTION 9-10)

- JUNCTION 9 (STATION ROAD) TO JUNCTION 11 (A280)
- WIDENING OF THE EXISTING SINGLE CARRIAGEWAY TO DUAL CARRIAGEWAY IN BOTH DIRECTIONS.
- ROUNDABOUTS TO BE UPGRADED TO ALLOW FOR DUAL CARRIAGEWAY ON THE APPROACHES AND TO IMPROVE TRAFFIC FLOW.
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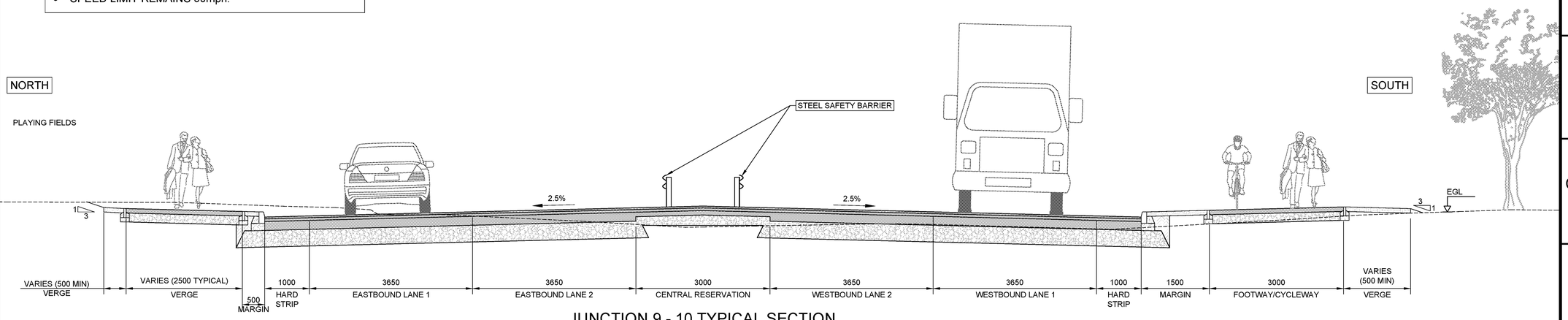
- LAYBYS REMOVED AND NO WORK PROPOSED TO THE FOOTBRIDGE AT STATION ROAD ROUNDABOUT. NEW TOUCAN CROSSING EAST OF FOOTBRIDGE.
- EXISTING SIGNALISED CROSSING UPGRADED TO A STAGGERED TOUCAN CROSSING.
- SPEED LIMIT REMAINS 50mph.



JUNCTION 9 - 10 TYPICAL SECTION
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SCALE 1:50

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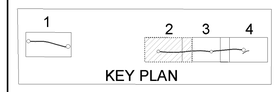
HIGHWAY BOUNDARY INCL CPO
ACOUSTIC FENCING
PROPOSED EXTENT OF VEGETATION CLEARANCE
VEGETATION TO BE RETAINED
NEW TREES/NATIVE SHRUBS



KEY PLAN

REV.	BY	CHK'D	APP'D	DATE	DESCRIPTION
P04	ARL	ARL	ARL	08/08/20	UPDATED BASED ON DETAILED DESIGN
P03	UKG	LD	ARL	27/09/18	UPDATED VEG. SITE CLEARANCE
P02	TCH	LD	ARL	10/04/18	SECOND ISSUE

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OVERALL CLIENT
west sussex county council

A259 LITTLEHAMPTON CORRIDOR IMPROVEMENTS (EAST ARUN)

HIGHWAYS DETAILED DESIGN JUNCTION 9-10 PLAN & TYPICAL SECTION

SHEET 2

DRAWING. No.
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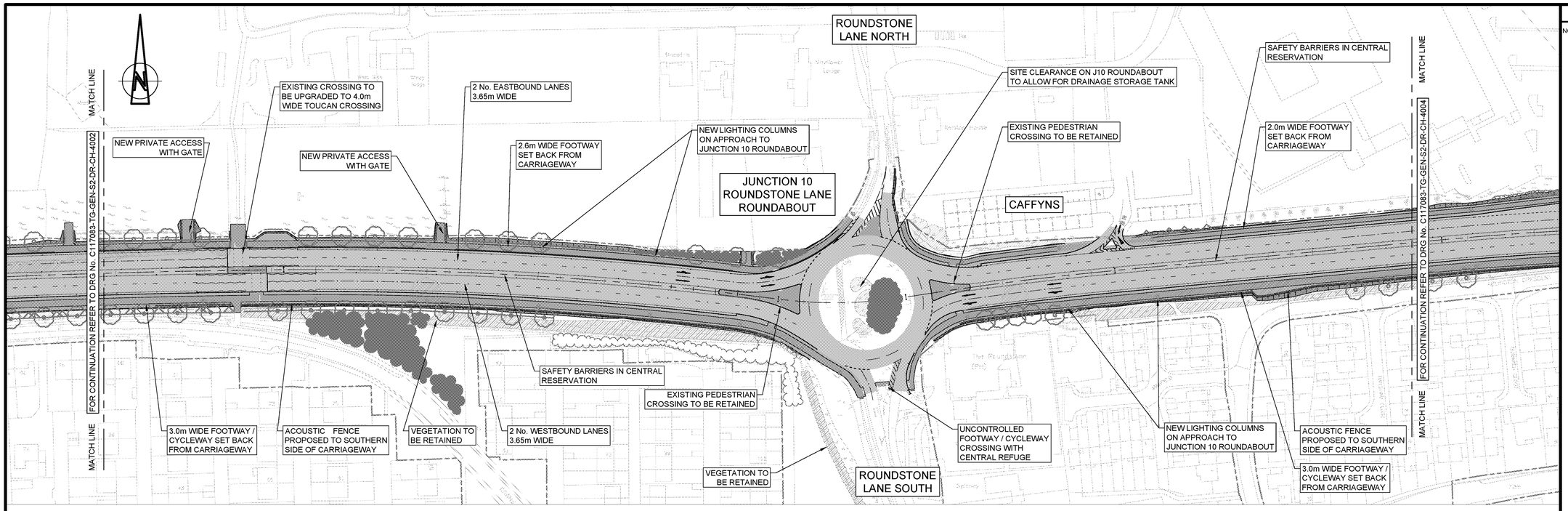

PHASE 1 DUALLING
JUNCTION 10 (ROUNDSTONE LANE ROUNDABOUT)

SCALE 1:1000

OVERVIEW (JUNCTION 10)

- JUNCTION 9 (STATION ROAD) TO JUNCTION 11 (A280)
- WIDENING OF THE EXISTING SINGLE CARRIAGEWAY TO DUAL CARRIAGEWAY IN BOTH DIRECTIONS.
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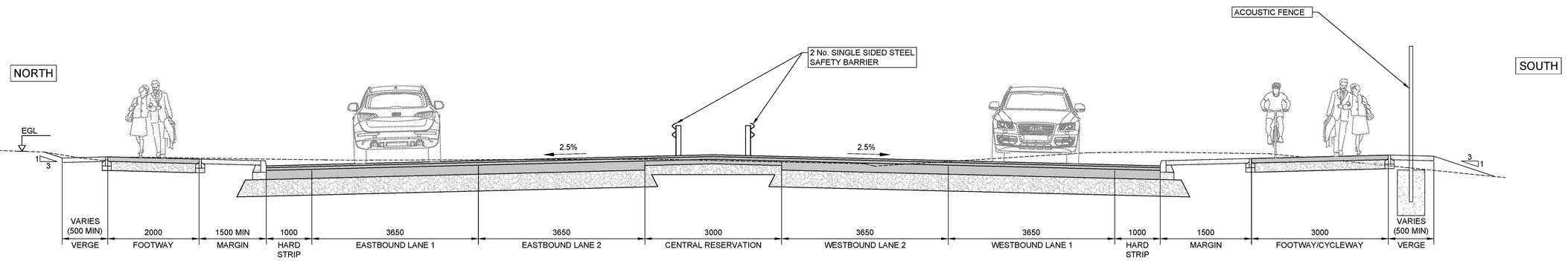

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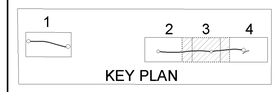

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A259 LITTLEHAMPTON CORRIDOR IMPROVEMENTS (EAST ARUN)

HIGHWAYS
DETAILED DESIGN
JUNCTION 10
PLAN & TYPICAL SECTION
SHEET 3

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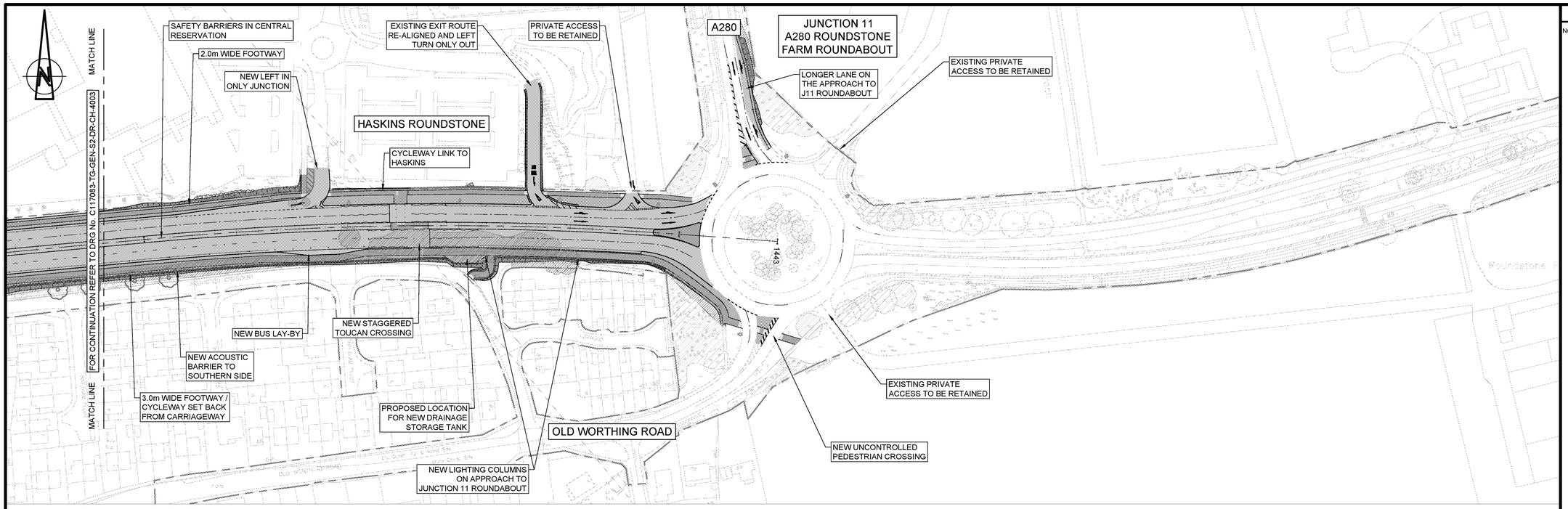

PHASE 1 DUALLING
JUNCTION 10 (ROUNDSTONE LANE ROUNDABOUT) TO JUNCTION 11(A280 ROUNDSTONE FARM ROUNDABOUT)

SCALE 1:1000

OVERVIEW (JUNCTION 11)

- JUNCTION 9 (STATION ROAD) TO JUNCTION 11 (A280)
- WIDENING OF THE EXISTING SINGLE CARRIAGEWAY TO DUAL CARRIAGEWAY IN BOTH DIRECTIONS.
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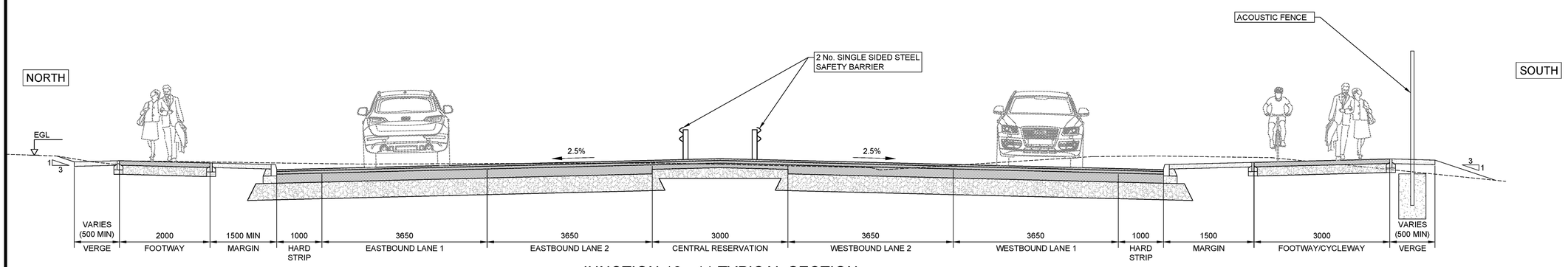
- SPEED LIMIT REMAINS 50mph.



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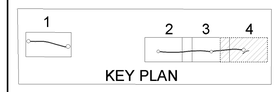

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ARUN DISTRICT COUNCIL A/45/22/PL

PARSONS BRINCKERHOFF

February 2013

A259 ROUTE IMPROVEMENT STUDY
Non-technical Summary

West Sussex County Council

ARUN DISTRICT COUNCIL A/45/22/PL

Non-technical Summary

285358N-PTG

Prepared for
West Sussex County Council
County Hall
Chichester
PO19 1RH

Prepared by
Parsons Brinckerhoff

ARUN DISTRICT COUNCIL A/45/22/PL

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Appendix A – Link Assessment Output Diagrams (2028 'with' development & 2028 'with' development + Preferred Option)

Appendix B – Junction Model Output Diagrams (2028 'with' development & 2028 'with' development + Preferred Option)

Appendix C – Preferred Option Drawings

1 EXECUTIVE SUMMARY

1.1.1 The study addresses how the impact of traffic growth and development related traffic on the section of A259 between Littlehampton and Goring can be mitigated in the period from now until 2028 (the planning horizon of the draft Arun Local Plan).

1.1.2 Parsons Brinckerhoff were commissioned to undertake the study and liaised with the JEAAC (H&T sub-group) in undertaking their work in order to more fully understand current traffic conditions, validate their survey findings, check the development growth assumptions, and check that the members of the committee understood the reasons for the options that have been put forward in the report.

1.1.3 The report recommends a series of junction improvements and the dualling of much of the current single carriageway sections of the route. Initial designs are put forward within the report for these together with their effectiveness in meeting forecast traffic demand. The package of improvements as a whole would meet the pressures of growth and development traffic in the study area and in some cases would result in some slight improvement compared to current conditions.

1.1.4 The complete set of improvements are estimated at this stage to cost in the region of £13.5 million. However, it is important to note that this is the first stage of a process of design and consideration and that designs and estimates would need to be refined with the benefit of more detailed investigation.

ARUN DISTRICT COUNCIL A/45/22/PL

2 INTRODUCTION

2.1 Background

2.1.1 Parsons Brinckerhoff (PB) has been commissioned by West Sussex County Council (WSCC) under the IESE framework contract to undertake an initial design study looking at improvements for the A259 within the Arun District. The Joint East Arun Area Committee (JEAAC) has identified concerns about the ability of the A259 to support anticipated future transport demand, including the implications of recent significant retail permissions and the emerging Arun Local Plan.

2.1.2 This study focuses on the section of the A259 which runs from the River Arun in the west and extends to and includes the Goring Crossways in the east. This equates to approximately 6 miles of the A259 and 14 key junctions.

2.1.3 The study reviews the need for improvements to the A259 within the study area and develops initial designs for highways improvements (where required).

2.2 PB's approach to the study

2.2.1 Using existing traffic flow information and newly acquired journey time data, an initial high-level first tranche assessment was undertaken with the aim of creating a short list of links and junctions that when future traffic growth (up to a forecast year of 2028) was taken into account were predicted to be operating with congestion pressures. A summary of this assessment is outlined in the 'Evidence for Improvements Note' which is included in **Appendix J** of the main report. A presentation and discussion session was also undertaken with the JEAAC H&T sub-group in order to confirm and validate our findings.

2.2.2 The note established that the road links and junctions listed below will potentially experience capacity limitations. The note therefore proposed that further more detailed analyses was required to a) confirm the need for improvement and b) identify and develop schemes to resolve the capacity issues where required. A map showing the locations of road links and junctions is provided in Figure 1.

Links:

- Between Wick Roundabout (J4) and Body Shop Roundabout (J6)
- Between Station Road Roundabout (J9) and Roundstone Lane Roundabout (J10)
- Between Roundstone Lane Roundabout (J10) and A280 Roundabout (J11)
- Between A280 Roundabout (J11) and Goring Crossways Roundabout (J14)

Junctions:

- Bridge Road Roundabout (J1)
- Wick Roundabout (J4)
- Body Shop Roundabout (J6)
- Station Road Roundabout (J9)
- Roundstone Lane Roundabout (J10)
- A280 Roundabout (J11)
- Goring Crossways Roundabout (J14)

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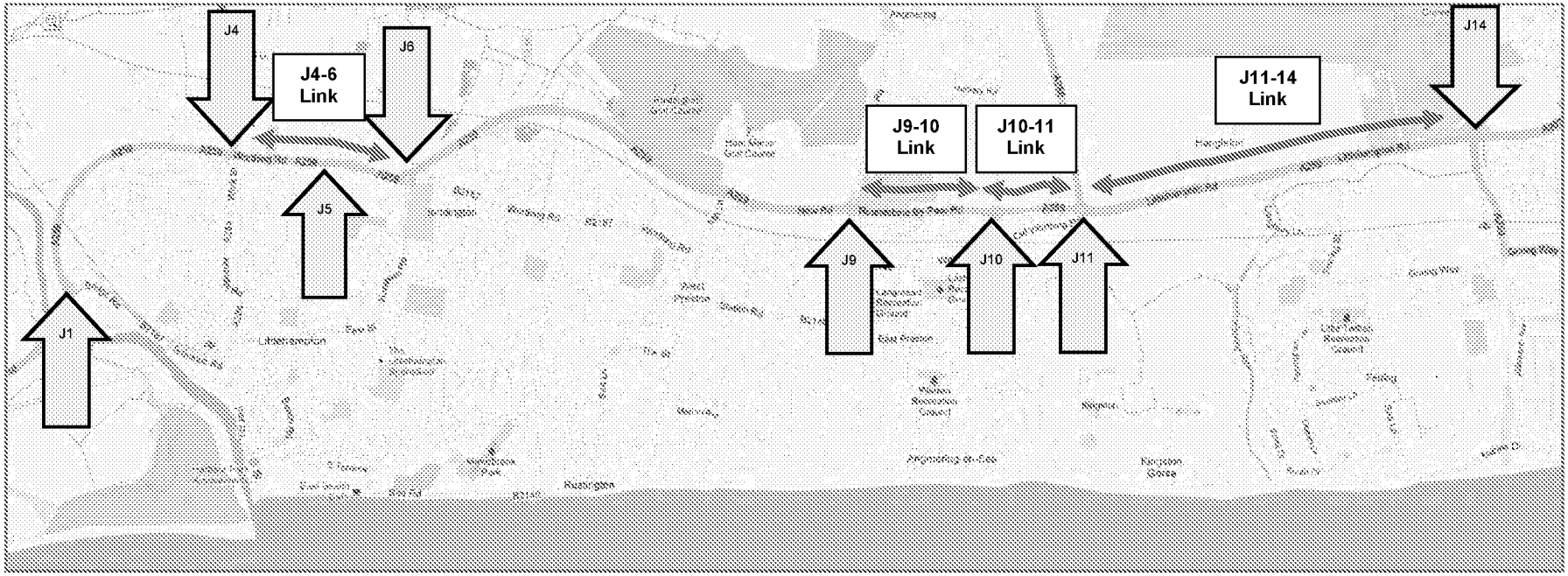
Figure 1 – Road Link & Junction Locations



Link / Junction	Reference
Bridge Road Roundabout	J1
Wick Roundabout	J4
Fitzalan Link Road Roundabout	J5
Body Shop Roundabout	J6
Station Road Roundabout	J9
Roundstone Lane Roundabout	J10
A280 Roundabout	J11
Goring Crossways Roundabout	J14

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3 TRAFFIC ANALYSIS - METHODOLOGY

3.1 How the traffic analysis was undertaken

3.1.1 The work undertaken within the Evidence for Improvements Note represented a high-level first tranche assessment of future link and junction performance in which 'blanket' TEMPRO[1] growth was applied to traffic flows in order to arrive at the 2028 forecast year.

3.1.2 To confirm the need for improvements and then test options (where required), a more detailed assessment was undertaken in which the traffic impacts of specific developments in the study area were considered. To do this the performance of the A259 links and junctions were assessed against the following scenarios:

- 2012 Base
- 2028 Base
- 2028 'with Development'
- 2028 'with Development' + 5% sensitivity allowance (links and junctions between J1 and J6 only)

3.1.3 The 2012 Base flows are intended to represent the existing traffic flows in the study area and provide a common base year for which predictions of future traffic conditions can be made. Traffic flows from surveys submitted with Transport Assessments (TAs) submitted with various planning applications within the study area were the primary source of data.

3.1.4 The 2028 Base flows represent a prediction of future traffic flows that take into account general background traffic growth using TEMPRO but not traffic generated from specific known developments.

3.1.5 The 2028 'with Development' flows represent a prediction of future traffic flows that take into account background traffic growth (2028 Base flows) but also factor in traffic generated from committed developments and strategic sites within the study area. A summary of the developments considered is provided in Table 3-1.

3.1.6 A sensitivity test was agreed with WSCC for the western side of the study area (the road links and junctions between Bridge Road Roundabout and the Body Shop Roundabout) as part of standard practice and to better understand the potential implications for variation in flows due to re-routing. Results for this area are based on outputs from a network model used within the North Littlehampton Strategic Development Area TA Addendum. The link and junction turning movements in the 2028 with Development scenario have been factored up by 5%.

3.1.7 Section 4 goes on to present the outcomes of testing these scenarios on the A259 links and junctions identified in the introduction.

[1] TEMPRO is a program that provides projections of growth over time for use in local and regional transport models. Part of the role of TEMPRO is to act as a nationally-consistent benchmark distribution of growth in planning data and trip ends. This benchmark allows consistency between different parts of the country when justifying transport proposals.

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Development	Dwellings	Employment Floorspace	Trigger Junction	Mitigation Junction	Start	Trigger Year	Scheme Comments
Courtwick Lane	600	4,000 sqm B1, B2 and B8	J1 J2 J3 J4	J1 J2 J3 J4	2008	2026	New access on to A259 proposed + mitigation at J1, J4 & J6. See Appendix F of Evidence for improvements Note for further details
Wick Site (Morrison's)	-	4,744 sqm Retail 3,368 sqm Office (extant)	J1 J3 J4 J6	J1 J3 J4 J6	2010	2016	No off-site highway schemes proposed
North Littlehampton SDA	1,460	13,000 sqm commercial 100 bed hotel 60 bed care home 3,500 sqm local shops 420 pupil school 1,500 sqm health club	J1 J4 J5 J6	- J4 J5 J6	2008	2016 & 2026	Various junction improvements (J4 & J6) + new link road proposed. See Appendix F of Evidence for improvements Note for further details
West Durrington	700	Community building School Doctor's surgery Sports and play areas	J14	J14	2010	2015 & 2020	700 and 1,000 dwelling tested in TA. 700 dwelling figures used in this study Junction improvement proposed at J14. See Appendix F of Evidence for improvements Note for further details
Northbrook College	117	Car showroom Care Home	J14	J14	2010	2015 & 2017	Junction improvement proposed at J14 in TA but works understood to be no longer going ahead
Roundstone Lane	150	-	J9 J10 J11	J9 J10 J11	2011	2013 & 2017	No off-site highway schemes proposed
West End Nursery	195	-	J9 J10 J11	J9 J10 J11	2012	2017	TA discusses potentially widening the A259 westbound approach from 7m to 8m to mitigate development impact
Angmering SDA	490	89,500 sqm (site as whole) 3,500 sqm B1c, B2 & B8	n/a				No information on development traffic impact available
Windroos Nursery	91	-	n/a				TA concludes a neutral traffic impact
ASDA	-	Food Superstore (575 parking spaces)	n/a				TA concludes a neutral traffic impact
Worthing College	265	-	n/a				No junctions assessed within the TA are in the A259 study area

J1	Bridge Rd Rbt
J4	Wick Rbt
J5	Fitzalan Link Rd Rbt
J6	Body Shop Rbt
J9	Station Rd Rbt
J10	Roundstone Ln Rbt
J11	A280 Rbt
J14	Goring Crossways

Table 3-1 – Committed Development Summary

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4 TRAFFIC ANALYSIS - RESULTS

4.1 A259 Link & Junction Summary

4.1.1 Table 4-1 and Table 4-2 provide a summary of the detailed A259 link and junction assessment work, confirming where measures are thought to be required, the options that were considered, and the recommended Preferred Option schemes.

4.1.2 The summary tables indicate the link and junction results using Ratio of Flow to Capacity (RFC) figures. An RFC is a widely used performance measure that provides an indication of whether a link or junction is likely to experience congestion/ delay.

4.1.3 The RFC figures provided in the results have been colour coded green, amber, or red. An RFC of less than 85% (green) represents a link/ junction approach predicted to be operating well within theoretical capacity with little congestion/ delay. Anywhere between 85% and 99% (amber) represents a link/ junction approach operating within theoretical capacity but may result in some congestion/ delay. Whilst a link/ junction approach with RFC figures of 100% or above (red) is operating above theoretical capacity and is likely to result in significant congestion/ delay.

4.1.4 It should be noted that, for simplicity, RFC results provided in the junction summary are those of the A259 eastbound and westbound approaches. For full details of the RFC results for all of the arms on all the junctions please refer Section 3.8 of the main report.

4.1.5 It can be seen from the tables that it was confirmed that measures are required at the following A259 links and junctions:

Links:

- Between Fitzalan Link Road/ A284 Lyminster Bypass Roundabout (Junction 5) and Body Shop Roundabout (Junction 6) (A259 Worthing Road)
- Link between Station Road Roundabout (Junction 9) and Roundstone Lane Roundabout (Junction 10) (A259 Roundstone Bypass Road western section)
- Link between Roundstone Lane Roundabout (Junction 10) and A280 Roundabout (Junction 11) (A259 Roundstone Bypass Road eastern section)

Junctions:

- Bridge Road Roundabout (Junction 1)
- Wick Roundabout (Junction 4)
- Body Shop Roundabout (Junction 6)
- Station Road Roundabout (Junction 9)
- Roundstone Lane Roundabout (Junction 10)
- A280 Roundabout (Junction 11)
- Goring Crossways Roundabout (Junction 14)

4.1.6 Link and junction diagrams showing the results of the detailed assessment work with and without the Preferred Option schemes in place can be found in **Appendix A** and

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Appendix B of this summary report. Full details of the assessment work undertaken can be found in Section 3 and Section 6 of the main study report.

4.1.7 CAD drawings of the Preferred Option schemes have been included in **Appendix C** of this summary report.

4.2 Environment & Safety Review

4.2.1 It should be noted that before options were considered to resolve the capacity issues at the links and junctions listed above, a high-level review was undertaken to identify potential environmental and safety constraints.

4.2.2 In summary, the environmental and safety review did not identify any insurmountable issues that would hinder any highway improvement proposals but did provide a number of recommendations to be assessed further during the next stages. Full details can be found in Section 4 and Section 5 of the main report.

4.3 Road Safety Audit

4.3.1 It should also be noted that the Preferred Option schemes in the following tables reflect those that have been modified following the outcome of a Stage 1 Road Safety Audit (RSA). Full details of the RSA can be found in Appendix D of the main report.

4.4 Key Risks & Issues

4.4.1 A Key Risks and Issues summary has been completed and identified 38 items, across the six broad areas listed below. The full Key Risks and Issues Summary table is included within the main study report.

- Strategic
- Statutory Process
- Environmental
- Construction
- Operation & Maintenance
- Decommissioning

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Road Link	Specific Development Considered	Associated Schemes (Link)	2026 + Development				Further Improvements Required?	Options Considered	Preferred Option	Drawing no.	Comments
			AM		PM						
			EB	WB	EB	WB					
J4 -J5	• Courtwick Lane • Morrison's • North L'hampton SDA	Fitzalan Link Road + associated A259 Rbt/ Lyminster Bypass					No	n/a	n/a	n/a	Predicted to operate within capacity due to Lyminster Bypass traffic reassignment therefore western section of WSCC scheme to improve Worthing Road not considered necessary. Existing Pelican crossing immediately east of Wick Roundabout (J4) proposed to be upgraded to a Puffin crossing. EB and WB PM RFC values 92% & 89% respectively
J5 - J6	• Courtwick Lane • Wick Site (Morrison's) • North L'hampton SDA	Fitzalan Link Road/ Lyminster Bypass/ Body Shop Rbt					Yes	• Upgrading link capacity by removing side road access/ bus stops/ at-grade Ped X-ing etc • Dualling in one direction • Dualling in both directions	Dualling in both directions	HW-SK-201 Sheet 2 & HW-SK-251 Sheet 2	As per approved WSCC scheme except existing Puffin crossing mid-way between J5-6 to include central refuge island. Existing Toucan crossing immediately west of J6 proposed to be re-located further west and include central refuge island due to proposed dualling and junction improvements
J9 - J10	• Courtwick Lane • Morrison's • North L'hampton SDA	n/a					Yes	• Dualling in one direction • Dualling in both directions	Dualling in both directions	HW-SK-201 Sheet 5 & HW-SK-251 Sheet 5	As per approved WSCC scheme but includes shared cycle and pedestrian path on southern side of carriageway. Existing Pelican crossing mid-way between J9 and J10 proposed to be upgraded to Toucan crossing. EB and WB PM RFC values 95% & 98% respectively
J10 - J11	• Roundstone Lane • West End Nursery	n/a					Yes	• Dualling in one direction • Dualling in both directions	Dualling in both directions	HW-SK-201 Sheet 5 & HW-SK-251 Sheet 5	As per approved WSCC scheme but includes shared cycle and pedestrian path on southern side of carriageway
J11 - J14 (W)	• Roundstone Lane • West End Nursery	n/a					No	n/a	n/a	n/a	Predicted to be operating well within capacity in both directions and both peak periods.
J11 - J14 (E)	• Roundstone Lane • West End Nursery	n/a					No	n/a	n/a	n/a	Predicted to be operating well within capacity in all but PM peak westbound in which RFC reaches 96%. Westbound dualling option worked up but not recommended to be taken forward (HW-SK-202 & HW-SK-252).

Ratio of Flow to Capacity (RFC)
0 - 85%
> 85%
> 95%

Table 4-1 – A259 Link Summary

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A259 Junction	Specific Development Considered	Associated Schemes/ Mitigation	2021 + Development				Further Improvements Required?	Options Considered	Preferred Option	Drawing No.	Comments
			AM		PM						
			EB	WB	EB	WB					
Bridge Rd Rbt (J1)	• Courtwick Lane • Wick Site (Morrison's) • North L'hampton SDA	• Minor alignment changes on A259 northbound approach • Cycle/ footway improvements					Yes	n/a	Localised entry widening (flare lanes) on the two A259 entry arms to the roundabout	HW-SK-301 & HW-SK-351	Preferred option entry capacity enhancements resolve capacity issues without the need for more substantial junction modifications therefore no further options were considered
Wick Rbt (J4)	• Courtwick Lane • Wick Site (Morrison's) • North L'hampton SDA	• Pedestrian crossing on Lyminster Rd • Road making amendments					Yes	n/a	• Localised entry widening (flare lane) on the A259 eastbound entry arm • Spiral markings on circulatory lanes	HW-SK-302 & HW-SK-352	Preferred option entry capacity enhancements resolve capacity issues without the need for more substantial junction modifications therefore no further options were considered
Body Shop Rbt (J6)	• Courtwick Lane • Wick Site (Morrison's) • North L'hampton SDA	• Revised spiral and destination markings • Entry lane adjustments					Yes	n/a	Dualling of A259 between Fitzalan Link Rd (J5) and Body Shop Rbt (J6)	HW-SK-303 & HW-SK-353	The dualling proposed as part of the link improvements resolve capacity issues on A259 eastbound approach therefore more substantial junction modifications not considered Existing Toucan crossing immediately west of J6 proposed to be re-located further west and include central refuge island due to proposed dualling and junction improvements Preferred option to be taken forward in conjunction with North L'hampton SDA (dwg. WYGLITTLEHAMPTON.1/37 rev A)
Station Rd Rbt (J9)	• Roundstone Lane • West End Nursery	n/a					Yes	n/a	• Localised entry widening (flare lane) on the Station Road Northbound approach (south arm) • Dualling of the A259 WB arm	HW-SK-304 & HW-SK-354	Preferred option entry capacity enhancements resolve capacity issues without the need for more substantial junction modifications therefore no further options considered
Roundstone Lane Rbt (J10)	• Roundstone Lane • West End Nursery	n/a					Yes	n/a	Dualling of A259 in both directions	HW-SK-201 & HW-SK-251	Preferred option entry capacity enhancements resolve capacity issues without the need for more substantial junction modifications therefore no further options considered
A280 Rbt (J11)	• Roundstone Lane • West End Nursery	n/a					Yes	• Approach arm capacity enhancements • Signalised cross-road	• Localised widening of eastbound A259 approach (in addition to dualling of link leading up to approach) • Increase in roundabout diameter	HW-SK-310 & HW-SK-361	Preferred option entry capacity enhancements resolve capacity issues without the need for more substantial junction modifications (signalised cross-road) and retains u-turn facility
Goring Crossways (J14)	• Northbrook College • West Durrington	Minor alignment changes on A259, A2032 & A2700 approaches					Yes	• Approach arm capacity enhancements • Signalised roundabout • Signalised cross-road	• Signalised roundabout (Titnore Lane entry to remain give-way) • Includes localised widening on the A259 L'hampton Road, A259 Goring Street and Titnore Lane entries	HW-SK-309 & HW-SK-359	Preferred option signalised roundabout resolves capacity issues without the need for more substantial junction modifications (signalised cross-road) and retains u-turn facility Existing at-grade crossing at J14 (southern arm) proposed to be re-located further south and upgraded to Puffin crossing

Ratio of Flow to Capacity (RFC)
0 - 85%
> 85%

Table 4-2 – A259 Junction Summary

ARUN DISTRICT COUNCIL A/45/22/PL

5 LAND TAKE ASSESSMENT

5.1 Objectives of the Land Take Assessment desktop review

5.1.1 To identify the highway boundaries and the land required to deliver the Preferred Option schemes proposed in Section 3 (if not wholly within the highway boundary).

5.2 How the Land Assessment was undertaken

5.2.1 Highway boundaries and public land ownership information was provided for the study area by WSCC and ADC and assessed in relation to the preferred options.

5.3 Findings and Recommendations

5.3.1 Land take has been determined at this initial design stage for each of the schemes by allowing for the following features to be accommodated (where possible):

- Road width, verges, earthworks and drainage ditches
- Structure and maintenance access
- Stream and river diversion works

5.3.2 No allowance has been made for the following detailed design features at this stage:

- Amenity and screening bunds
- Drainage storage and treatment areas
- Planting areas
- Off-site planting

5.3.3 Following the confirmation of the preferred options each one was assessed further against the existing highway boundary. It was found that only three schemes extended beyond the highway boundary.

5.3.4 Table 5-1 demonstrates the relatively small amount of land take assumed to be required outside of the highway boundary at Wick Roundabout (J4), Goring Crossways (J14) and between the future Fitzalan Link Road/ A284 Lyminster Bypass Roundabout (J5) and Body Shop Roundabout (J6).

Table 5-1 – Land Take Summary

Land Owner/ Type	Wick Roundabout (J4)	Goring Crossways (J14)	Dualling J5 - 6
Highways & Transport/ Freehold	100m^2	10m^2	350m^2

5.3.5 The land that this required is assumed to be owned by private owners and approximate consideration of this has been included within the cost estimates undertaken in the following section.

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6 COST ESTIMATES

6.1.1 Cost estimates (see Table 6-1) have been prepared using approximate quantities with rates derived from either the 2013 Spons price book with appropriate enhancement for overhead and profit or from analogous historic rates which have been indexed forward to current rates.

6.0.2 The base date for the estimates is Q1 2013 and no allowance has been included for inflation beyond that date. Allowance has been made for preliminaries and traffic management where appropriate, for works to statutory undertakers and service provider's apparatus that is affected by the works, land and compensation, and design and supervision. No allowance is included for VAT or clients costs.

Table 6-1 – Summary of Preferred Option Costs

Option	Estimate Cost (£)
Dualling Junctions 5 to 6	2,486,731
Dualling Junctions 9 to 10	4,405,756
Dualling Junctions 10 to 11	2,442,471
Junction 1 (Option 1)	263,340
Junction 4 (Option 1)	245,460
Junction 6 (Option 1)	263,554
Junction 9 (Option 1)	189,592
Junction 11 (Option 2)	1,336,244
Junction 14 (Option 3)	510,224
Dualling Junctions 11 to 14*	1,199,163
Total**	13,342,534

** Scheme is not a preferred option but has been 'costed' and included in total*

6.0.3 A sum has been included in respect of optimism bias/ risk; this has been calculated at 45% of the total cost and is based on advice contained in the Highways Agency Annex 1 estimate forms for schemes at this stage of development. All cost estimates, including the breakdown of options by series are detailed in **Appendix H** of the main report.

6.0.4 In terms of definition, the preliminaries are in respect of the main contractor's site set up including offices, messes, welfare facilities, site staff not employed in the actual construction of the works i.e. engineers, quantity surveyors etc. and any other items including transport, Local Authority charges etc. which are required to construct the scheme, but are not priced against individual works items. This item also included the supervisor's accommodation and site transport.

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7 CONCLUSIONS

7.1 General Overview

7.1.1 PB studied A259 link and junction capacity between the River Arun in the west and up to and including Goring Crossways in the east.

7.1.2 An initial first-tranche assessment was undertaken to create a shortlist of links and junctions that were likely to be experience capacity issues in the forecast year of 2028, the results of which are summarised in the Evidence for Improvements Note.

7.1.3 This was followed by a further more detailed assessment/ appraisal process to firstly confirm the result of the first tranche assessment and then test potential improvement options, before finally identifying a Preferred Options package for the whole study route.

7.1.4 The initial first-tranche assessment results were presented to the JEAAC H&T sub-group at a presentation meeting and the results of the detailed assessment work, along with preliminary draft Preferred Option scheme designs, were presented in a second meeting. It provided the group the opportunity to consider and shape the proposals and to provide their 'in principle' agreement to them.

7.2 Recommendations (Preferred Option Summary)

7.2.1 In conclusion, the A259 Route Improvement Study proposes the measures listed below as a Preferred Option package for the A259 corridor within Arun. These measures are considered suitable to accommodate background traffic growth and the ADC Local Plan development proposals forecast up to 2028.

Links:

- J5 – 6 (Worthing Road) – Future Fitzalan Link Road/ A284 Lyminster Bypass Roundabout to Body Shop Roundabout – Dualling of the current single carriageway section between J5–6 (similar to that proposed for the eastern section of the existing WSCC approved Worthing Road Improvement Scheme. The need for improvements between J4-5 (Worthing Road: Wick Roundabout to future Fitzalan Link Road/ A284 Lyminster Bypass Roundabout) is not proposed as part of this study.
- J9 – 11 (Roundstone Bypass Road) – Station Road Roundabout to A280 Roundabout – It is proposed that dualling of the current single carriageway section between J9-11. The proposal is similar to the approved WSCC Roundstone Bypass Improvement Scheme but with a shared pedestrian/ cycle path on southern side of the carriageway.
- An option for dualling the A259 Littlehampton Road westbound from Goring Crossways junction to just west of Ferring Lane has been produced but this is not recommended to be taken forward because the link assessment work indicates the need is marginal (PM peak only).

Continued on next page……

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Junctions:

- J1 – Bridge Road Roundabout – It is proposed that localised entry widening (flare lane) is provided on the two A259 entry arms to the roundabout.
- J4 – Wick Road Roundabout– It is proposed that localised entry widening (flare lane) is provided on the A259 eastbound entry arm and spiral road markings on circulatory lanes.
- J6 – Body Shop Roundabout – It is proposed that localised entry widening (flare lane) is provided on the A259 eastbound entry arm. It is also suggested that developer proposals as part of the NL SDA (dwg. WYGLITTLEHAMPTON.1/37 rev A) are also taken forward. These include revised spiral and destination markings and associated entry lane adjustments.
- J9 – Station Road Roundabout – It is proposed that localised entry widening (flare lane) is provided on both the Station Road approaches (north and south arm), along with the dualling of the A259 westbound arm.
- J10 - Roundstone Lane Roundabout – It is proposed that the A259 is dualled in both directions.
- J11 – A259/ A280 Roundabout – It is proposed that this roundabout is amended through localised widening of the A259 eastbound entry along with the dualling the link leading up to it from the Roundstone Lane Roundabout. As part of this proposal the roundabout diameter is also increased slightly.
- J14 – Goring Crossways – It is proposed that the current priority roundabout is upgraded to a signalised roundabout on all approaches except for Titnore Lane which is proposed to remain a give-way. Localised widening is proposed on the A2032 Littlehampton Road, A259 Goring Street and Titnore Lane entries.

7.2.2 Further to the above junction and link proposals it is also proposed that the pedestrian/ cycle crossings listed below are improved or adjusted as part of the Preferred Option scheme package outlined above.

- Existing Pelican crossing immediately east of Wick Roundabout (J4) is proposed to be upgraded to a Puffin crossing
- Existing Puffin crossing mid-way between the future Fitzalan Link Road/ A284 Lyminster Bypass Roundabout (J5) and Body Shop Roundabout (J6) to be amended due to proposed dualling
- Existing Toucan crossing immediately west of Body Shop Roundabout (J6) to be re-located further west due to proposed dualling and junction improvements
- Existing Pelican crossing mid-way between Station Road Roundabout (J9) and Roundstone Lane Roundabout (J10) to be upgraded to Toucan crossing. It is suggested that this proposal could form a standalone option or remain tied to the proposed dualling between J9–10.
- Existing at-grade crossing at Goring Crossways (J14), southern arm, to be re-located further south and upgraded to Puffin crossing as part of the proposed roundabout signalisation.

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7.2.3 The conversion of the existing Pelican crossings to Puffin (pedestrians) or toucan (pedestrian and cyclist) crossings will provide benefits to both Motorised and Non Motorised Users due to a reduction of lost green time and improved detection of crossing users.

7.3 Benefits of Preferred Option A259 Package

7.3.1 The proposed Preferred Option A259 package is expected to provide the following benefits:

- Journey time savings
- Improved journey time reliability
- Reduced queuing and delay
- Reduced pollution associated with vehicle congestion

7.4 Next Steps

7.4.1 This report provides the basis for a programme of improvements for the A259 within Arun. It is suggested that further more detailed assessment and refinement of each of the preferred options will be required along with any adjustments following the strategic modelling exercise currently being undertaken as part of the Arun Local Plan development.

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APPENDICES

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Appendix A – Link Assessment Output Diagrams (2028 'with' development & 2028 'with' development + Preferred Option)

ARUN DISTRICT COUNCIL A/45/22/PL

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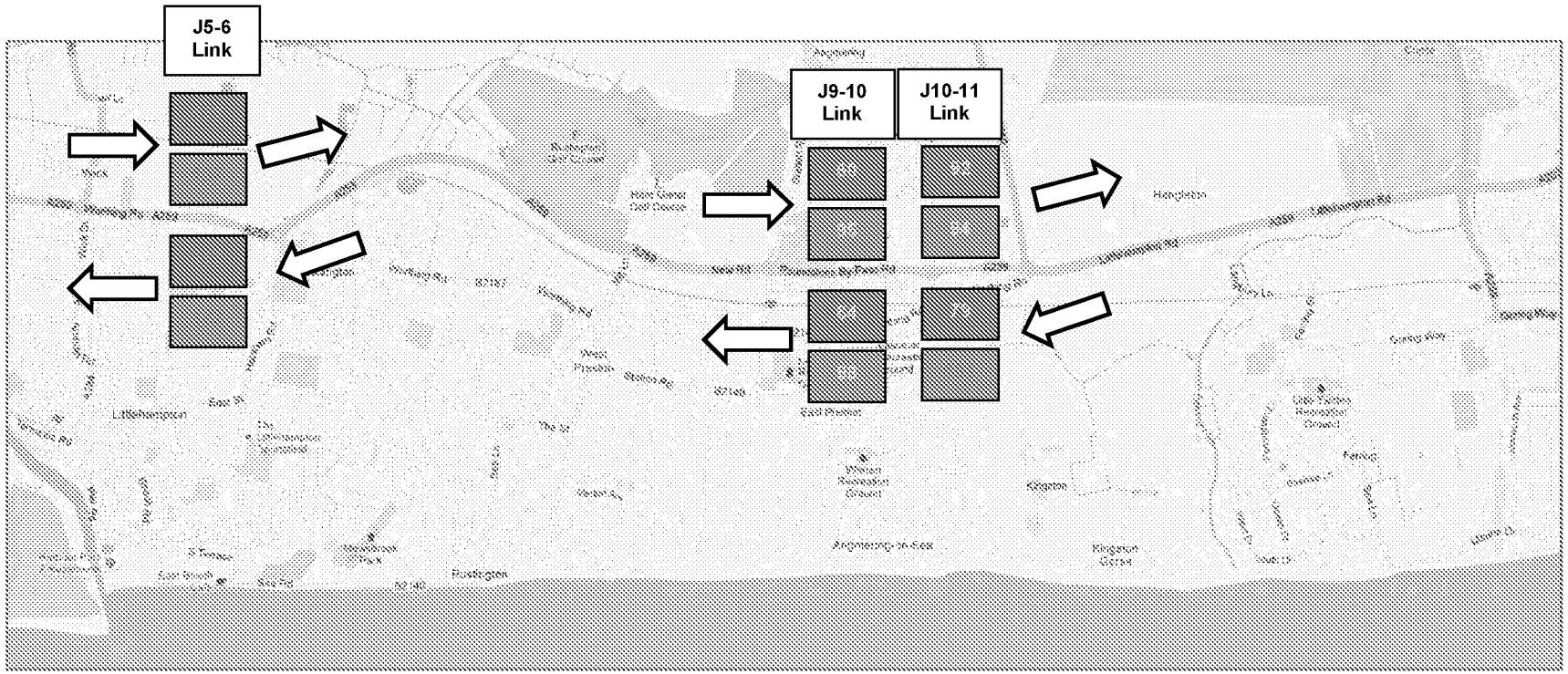
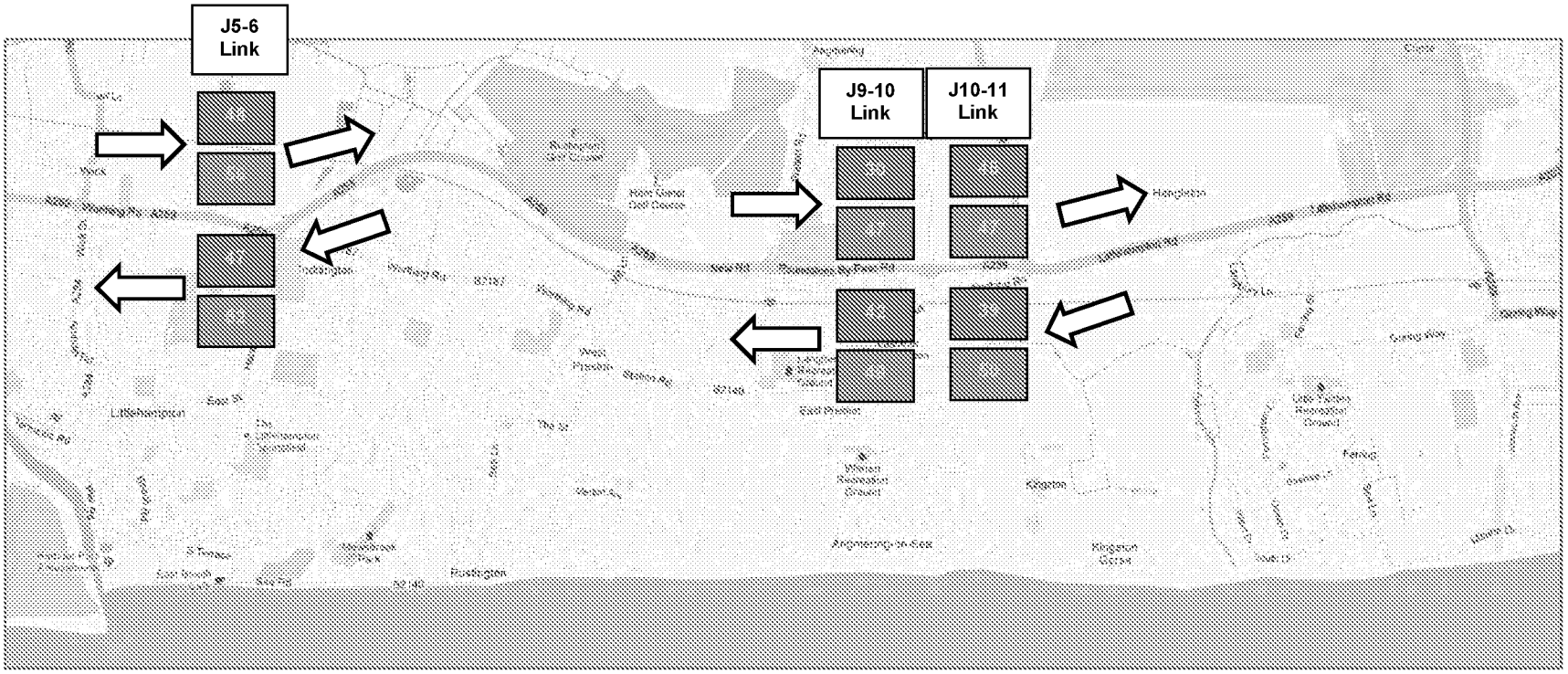
2028 'with' Development Link Results (RFCs)



ARUN DISTRICT COUNCIL A/45/22/PL

2028 'with' Development + Preferred Scheme Link Results (RFCs)



ARUN DISTRICT COUNCIL A/45/22/PL

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Appendix B – Junction Model Output Diagrams (2028 'with' development & 2028 'with' development + Preferred Option)

ARUN DISTRICT COUNCIL A/45/22/PL

Junction 1 (Bridge Road Roundabout) – 2028 + Development

A259

Broad Piece

	Queue	RFC
AM	2	0.72
PM	5	0.83

	Queue	RFC
AM	1	0.46
PM	4	0.79

B2187 Bridge Rd

	Queue	RFC
AM	2	0.65
PM	6	0.88

	Queue	RFC
AM	5	0.84
PM	39	1.02

A259 Bridge Rd

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Junction 1 (Bridge Road Roundabout) – 2028 + Dev + Preferred Scheme

A259

Broad Piece

	Queue	RFC
AM	2	0.62
PM	3	0.72

	Queue	RFC
AM	2	0.46
PM	3	0.81

B2187 Bridge Rd

	Queue	RFC
AM	2	0.65
PM	6	0.88

	Queue	RFC
AM	2	0.70
PM	5	0.85

A259 Bridge Rd

PARSONS BRINCKERHOFF

Junction 4 (Wick Roundabout) – 2028 + Development

	Queue	RFC
AM	1	0.26
PM	25	1.07

Hawthorn Rd

	Queue	RFC
AM	1	0.46
PM	1	0.59

A284
Lyminster Rd

A259

	Queue	RFC
AM	2	0.71
PM	8	0.90

	Queue	RFC
AM	4	0.79
PM	7	0.89

A259
Worthing Rd

	Queue	RFC
AM	1	0.45
PM	2	0.61

B2187
Wick St

PARSONS BRINCKERHOFF

ARUN DISTRICT COUNCIL A/45/22/PL

Junction 4 (Wick Roundabout) – 2028 + Development + Preferred Scheme

	Queue	RFC
AM	1	0.26
PM	25	1.07

Hawthorn Rd

	Queue	RFC
AM	1	0.46
PM	1	0.60

A284
Lyminster Rd

A259

	Queue	RFC
AM	2	0.65
PM	4	0.81

	Queue	RFC
AM	4	0.79
PM	7	0.89

A259
Worthing Rd

	Queue	RFC
AM	1	0.45
PM	2	0.61

B2187
Wick St

PARSONS BRINCKERHOFF

Junction 6 (Body Shop Roundabout) – 2028 + Development

Body Shop Access

	Queue	RFC
AM	1	0.15
PM	4	0.81

A259

	Queue	RFC
AM	2	0.61
PM	2	0.70

A259 Worthing Rd

	Queue	RFC
AM	31	1.01
PM	100	1.10

B2187 Worthing Rd

	Queue	RFC
AM	3	0.74
PM	4	0.80

B2187 Horsham Rd

	Queue	RFC
AM	3	0.78
PM	2	0.70

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Junction 6 (Body Shop Roundabout) – 2028 + Development + Preferred Scheme

Body Shop Access

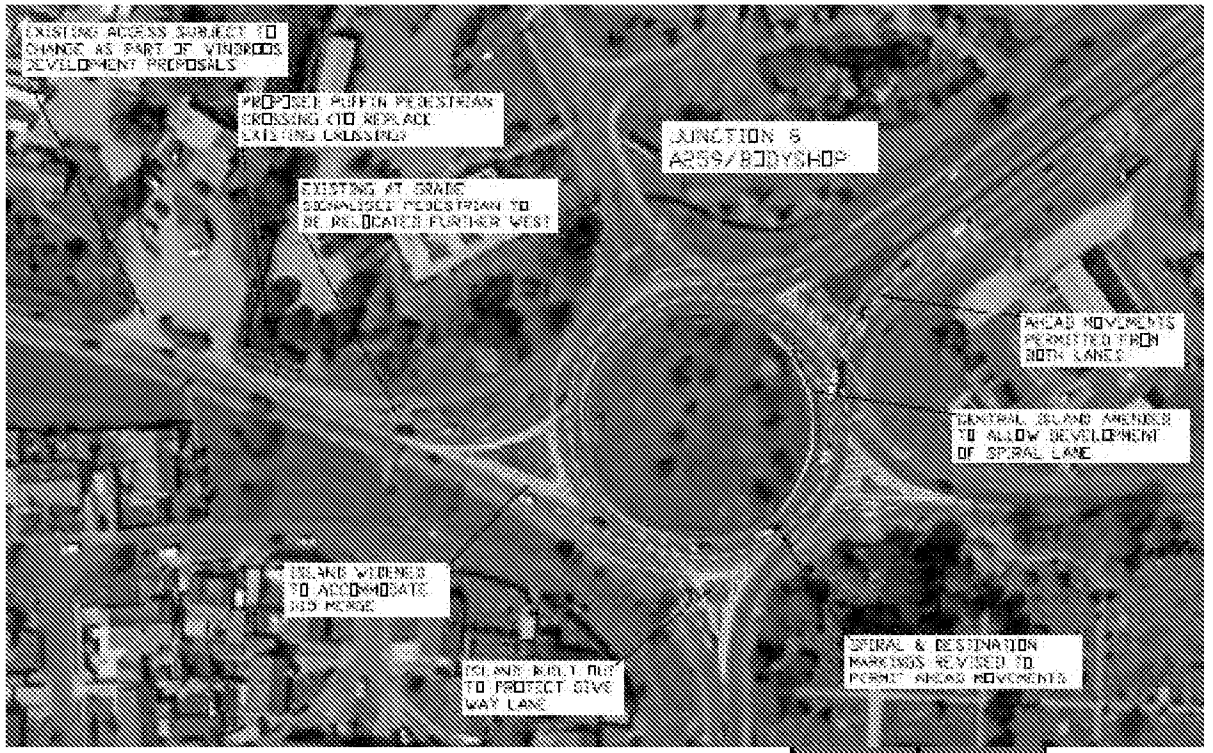
	Queue	RFC
AM	1	0.16
PM	12	1.01

A259

	Queue	RFC
AM	2	0.61
PM	2	0.71

A259 Worthing Rd

	Queue	RFC
AM	3	0.73
PM	4	0.80



B2187 Worthing Rd

	Queue	RFC
AM	3	0.75
PM	4	0.81

B2187 Horsham Rd

	Queue	RFC
AM	3	0.78
PM	2	0.70

PARSONS BRINCKERHOFF

Junction 9 (Station Road Roundabout) – 2028 + Development

Station Rd SB

	Queue	RFC
AM	5	0.83
PM	28	1.06

A259 EB

	Queue	RFC
AM	2	0.69
PM	3	0.74

A259 WB

	Queue	RFC
AM	13	0.94
PM	13	0.95

	Queue	RFC
AM	11	0.97
PM	6	0.90

Station Rd NB

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Junction 9 (Station Road Roundabout) – 2028 + Development + Preferred Scheme

Station Rd SB

	Queue	RFC
AM	2	0.70
PM	5	0.86

A259 EB

	Queue	RFC
AM	2	0.69
PM	3	0.74

A259 WB

	Queue	RFC
AM	9	0.91
PM	10	0.92

Station Rd NB

	Queue	RFC
AM	4	0.81
PM	3	0.75

PARSONS BRINCKERHOFF

Junction 10 (Roundstone Lane Roundabout) – 2028 + Development

R'stone Ln SB

	Queue	RFC
AM	3	0.78
PM	1	0.57

A259 EB

	Queue	RFC
AM	2	0.72
PM	7	0.89

A259 WB

	Queue	RFC
AM	3	0.74
PM	9	0.91

R'stone Ln NB

	Queue	RFC
AM	2	0.69
PM	1	0.31

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Junction 10 (Roundstone Lane Roundabout) – 2028 + Development + Preferred Scheme

R'stone Ln SB

	Queue	RFC
AM	3	0.78
PM	1	0.57

A259 EB

	Queue	RFC
AM	2	0.61
PM	3	0.76

A259 WB

	Queue	RFC
AM	2	0.65
PM	4	0.79

R'stone Ln NB

	Queue	RFC
AM	2	0.69
PM	1	0.31

PARSONS BRINCKERHOFF

Junction 11 (A280 Roundabout) – 2028 + Development

A280

	Queue	RFC
AM	2	0.66
PM	6	0.86

A259 EB

	Queue	RFC
AM	200	1.29
PM	136	1.17

A259 WB

	Queue	RFC
AM	1	0.58
PM	4	0.80

Old Worthing Rd

	Queue	RFC
AM	13	0.97
PM	1	0.41

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ARUN DISTRICT COUNCIL A/45/22/PL

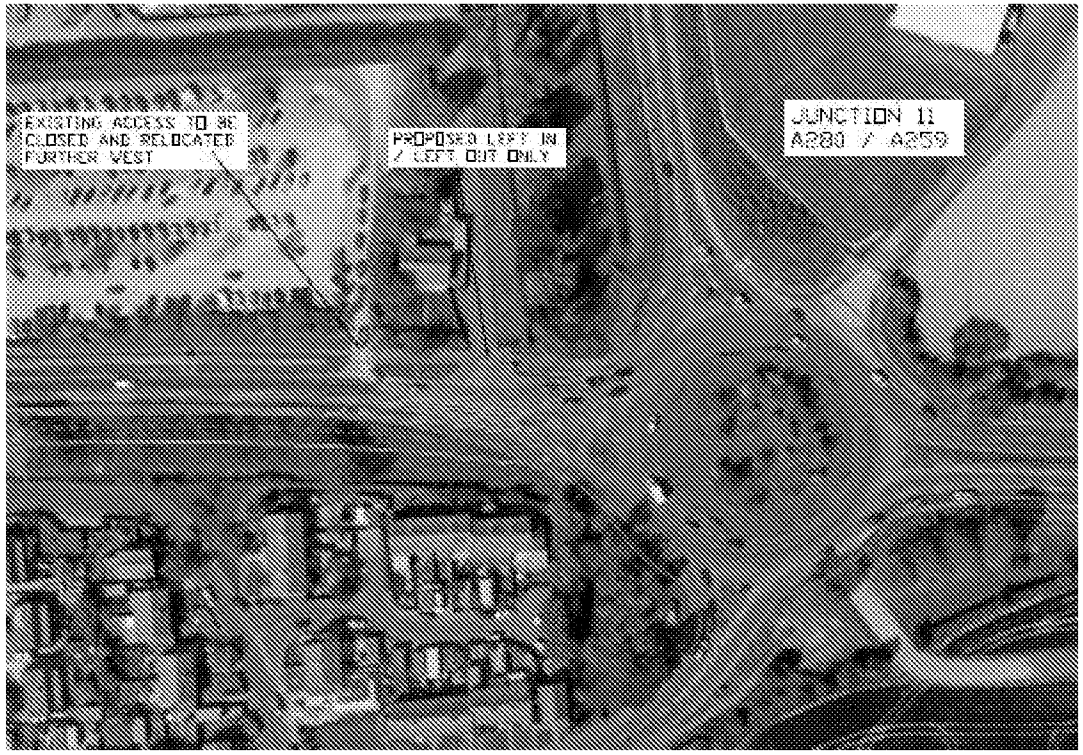
Junction 11 (A280 Roundabout) – 2028 + Development + Preferred Scheme

A280

	Queue	RFC
AM	4	0.79
PM	13	0.96

A259 EB

	Queue	RFC
AM	5	0.85
PM	4	0.79



A259 WB

	Queue	RFC
AM	1	0.58
PM	4	0.80

Old Worthing Rd

	Queue	RFC
AM	13	0.97
PM	1	0.41

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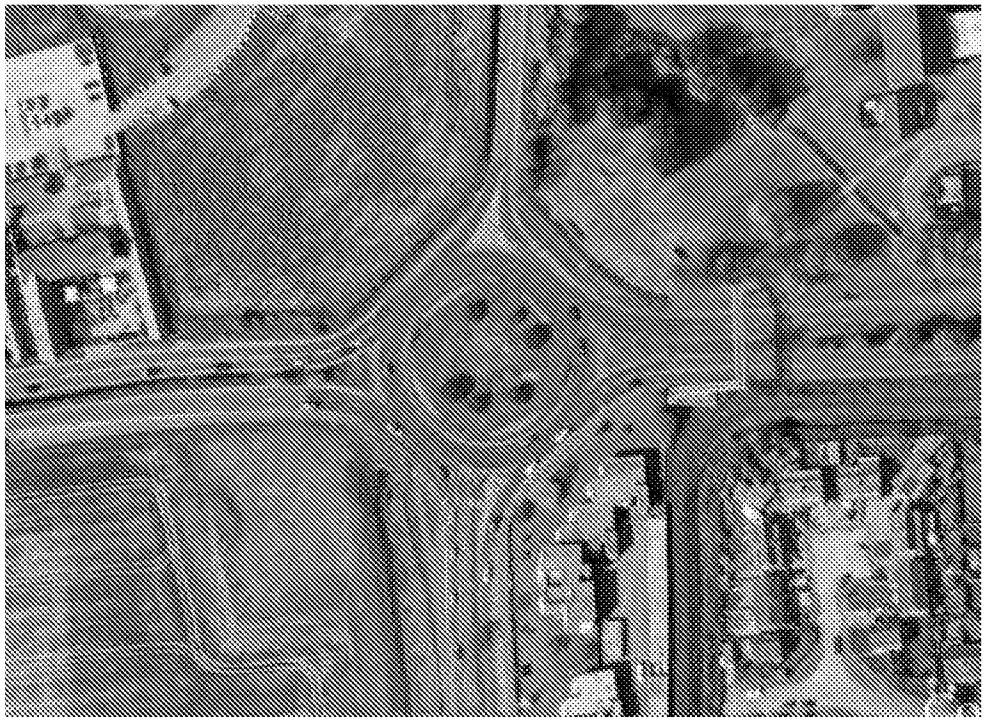
ARUN DISTRICT COUNCIL A/45/22/PL

Junction 14 (Goring) – 2028 + Development

A2700
Titnore Ln

	Queue	RFC
AM	22	1.05
PM	72	1.27



A259 EB

	Queue	RFC
AM	268	1.27
PM	43	1.02

A2032

	Queue	RFC
AM	6	0.87
PM	27	1.00

A259 Goring
St

	Queue	RFC
AM	54	1.06
PM	102	1.15

PARSONS
BRINCKERHOFF

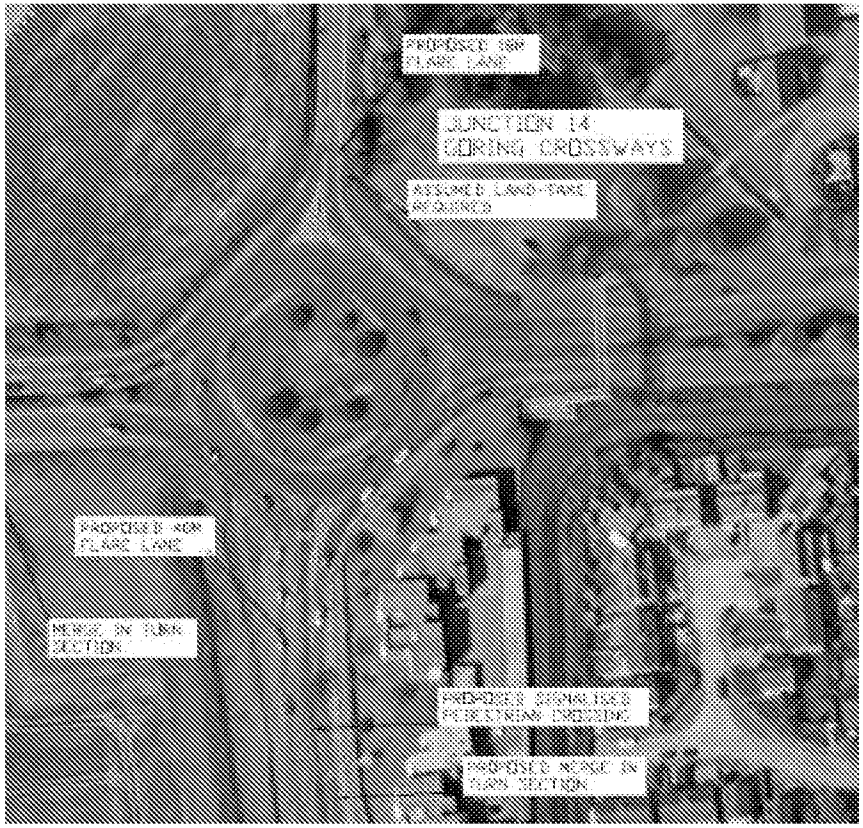
Junction 14 (Goring) – 2028 + Development + Preferred Scheme

A2700 Titnore Ln

	Queue	RFC
AM	3	0.61
PM	4	0.69

A259 EB

	Queue	RFC
AM	9	0.69
PM	7	0.58



A2032

	Queue	RFC
AM	6	0.61
PM	7	0.68

A259 Goring St

	Queue	RFC
AM	6	0.61
PM	7	0.73

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Appendix C – Preferred Option Drawings

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Appendix J – Junctions 10 Assessments

ARUN DISTRICT COUNCIL A/45/22/PL

Junctions 10

ARCADY 10 - Roundabout Module

Version: 10.0.1.1519
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[redacted]
The users of this computer prog[redacted]r the correctness of the solution

Filename: A351 - Mill Lane Roundabout - 167 Dwellings.j10
Path: P:\A351 Rustington Golf Course\Deliverables\Transport\Modelling\Junction\Capacity Assessment File
Report generation date: 14/01/2022 11:05:43

»2021, AM
»2021, PM
»2021 + Development, AM
»2021 + Development, PM
»2026, AM
»2026, PM
»2026 + Development, AM
»2026 + Development, PM

Summary of junction performance

	AM							PM						
	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Network Residual Capacity	Set ID	Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Network Residual Capacity
	2021													
Arm 1	D1	0.1	10.26	0.12	B	4.50	23 % [Arm 1]	D2	0.2	10.70	0.18	B	7.12	13 % [Arm 2]
Arm 2		1.7	3.71	0.62	A				5.6	9.34	0.85	A		
Arm 3		1.8	6.55	0.64	A				1.2	6.49	0.56	A		
Arm 4		1.2	3.66	0.54	A				1.5	3.78	0.59	A		
	2021 + Development													
Arm 1	D3	0.5	13.51	0.33	B	4.94	14 % [Arm 1]	D4	0.4	12.02	0.27	B	7.39	12 % [Arm 2]
Arm 2		1.7	3.89	0.64	A				5.8	9.74	0.86	A		
Arm 3		1.9	6.99	0.66	A				1.2	6.53	0.56	A		
Arm 4		1.2	3.75	0.55	A				1.5	3.78	0.59	A		
	2026													
Arm 1	D5	0.2	13.15	0.16	B	5.43	15 % [Arm 1]	D6	0.3	13.49	0.23	B	9.88	6 % [Arm 2]
Arm 2		2.0	4.27	0.67	A				9.2	14.72	0.91	B		
Arm 3		2.4	8.36	0.71	A				1.1	5.43	0.53	A		
Arm 4		1.5	4.33	0.60	A				1.8	4.36	0.64	A		
	2026 + Development													
Arm 1	D7	0.6	17.80	0.38	C	5.17	8 % [Arm 1]	D8	0.5	15.33	0.32	C	11.33	4 % [Arm 2]
Arm 2		2.2	4.51	0.69	A				10.9	17.28	0.93	C		
Arm 3		1.7	5.76	0.63	A				1.2	5.65	0.54	A		
Arm 4		1.5	4.36	0.60	A				2.0	4.67	0.66	A		

There are warnings associated with one or more model runs - see the 'Data Errors and Warnings' tables for each Analysis or Demand Set.

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	

Site number	
Date	19/04/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	ALPCE\transportuser
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75					✓	Delay	0.85	36.00	20.00		500

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	2021	AM	FLAT	08:00	09:00	60	15	✓
D2	2021	PM	FLAT	17:00	18:00	60	15	✓
D3	2021 + Development	AM	FLAT	08:00	09:00	60	15	✓
D4	2021 + Development	PM	FLAT	17:00	18:00	60	15	✓
D5	2026	AM	FLAT	08:00	09:00	60	15	✓
D6	2026	PM	FLAT	17:00	18:00	60	15	✓
D7	2026 + Development	AM	FLAT	08:00	09:00	60	15	✓
D8	2026 + Development	PM	FLAT	17:00	18:00	60	15	✓

Analysis Set Details

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

2021, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	4.50	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	23	Arm 1	4.50	A

Arms

Arms

Arm	Name	Description	No give-way line
1	Golfers Lane		
2	A259 Westbound		
3	B2187 Mill Lane		
4	A259 Westbound		

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	l' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Entry only	Exit only
1	2.80	7.00	15.5	8.0	62.0	25.0		
2	7.50	10.50	95.0	15.0	62.0	60.0		
3	3.50	10.60	38.1	13.0	62.0	50.0		
4	7.50	11.40	38.5	25.0	62.0	50.0		

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1	0.488	1444
2	0.689	2725
3	0.602	2178
4	0.747	2976

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 period length (min)	Time segment length (min)	Run automatically

D1	2021	AM	FLAT	08:00	09:00	60	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	Average Demand (Veh/hr)	Scaling Factor (%)
1		FLAT	✓	50	100.000
2		FLAT	✓	1608	100.000
3		FLAT	✓	976	100.000
4		FLAT	✓	1160	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	17	14	19
	2	26	85	579	918
	3	27	859	0	90
	4	32	1054	62	12

Proportions

		To			
		1	2	3	4
From	1	0.00	0.34	0.28	0.38
	2	0.02	0.05	0.36	0.57
	3	0.03	0.88	0.00	0.09
	4	0.03	0.91	0.05	0.01

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1	2	3	4
From	1	0	6	0	0
	2	0	4	4	2
	3	2	0	7	0
	4	3	4	5	0

Average PCU Per Veh

		To			
		1	2	3	4
From	1	1.000	1.060	1.000	1.000
	2	1.000	1.040	1.040	1.020
	3	1.020	1.000	1.070	1.000
	4	1.030	1.040	1.050	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (Veh/hr)	Demand in PCU (PCU/hr)
08:00-08:15	1	50	51
	2	1608	1653
	3	976	977
	4	1160	1206
08:15-08:30	1	50	51
	2	1608	1653
	3	976	977
	4	1160	1206
08:30-08:45	1	50	51
	2	1608	1653
	3	976	977
	4	1160	1206
08:45-09:00	1	50	51
	2	1608	1653
	3	976	977
	4	1160	1206

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)

1	0.12	10.26	0.1	B	50	50
2	0.62	3.71	1.7	A	1608	1608
3	0.64	6.55	1.8	A	976	976
4	0.54	3.66	1.2	A	1160	1160

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	50	13	2061	406	0.123	49	85	0.0	0.1	10.072	B
2	1608	402	106	2578	0.624	1601	2004	0.0	1.6	3.665	A
3	976	244	1056	1528	0.639	969	652	0.0	1.7	6.367	A
4	1160	290	990	2148	0.540	1155	1034	0.0	1.2	3.612	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	50	13	2072	401	0.125	50	85	0.1	0.1	10.254	B
2	1608	402	107	2577	0.624	1608	2015	1.6	1.6	3.713	A
3	976	244	1060	1525	0.640	976	655	1.7	1.8	6.552	A
4	1160	290	997	2143	0.541	1160	1039	1.2	1.2	3.661	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	50	13	2072	401	0.125	50	85	0.1	0.1	10.255	B
2	1608	402	107	2577	0.624	1608	2015	1.6	1.7	3.713	A
3	976	244	1060	1525	0.640	976	655	1.8	1.8	6.555	A
4	1160	290	997	2143	0.541	1160	1039	1.2	1.2	3.661	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	50	13	2072	401	0.125	50	85	0.1	0.1	10.255	B
2	1608	402	107	2577	0.624	1608	2015	1.7	1.7	3.713	A
3	976	244	1060	1525	0.640	976	655	1.8	1.8	6.555	A
4	1160	290	997	2143	0.541	1160	1039	1.2	1.2	3.661	A

2021, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	7.12	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	13	Arm 2	7.12	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D2	2021	PM	FLAT	17:00	18:00	60	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	Average Demand (Veh/hr)	Scaling Factor (%)
1		FLAT	✓	74	100.000
2		FLAT	✓	2183	100.000
3		FLAT	✓	692	100.000
4		FLAT	✓	1392	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	34	17	23
	2	40	178	818	1147
	3	22	565	0	105
	4	42	1184	58	108

Proportions

		To			
		1	2	3	4
From	1	0.00	0.46	0.23	0.31
	2	0.02	0.08	0.37	0.53
	3	0.03	0.82	0.00	0.15
	4	0.03	0.85	0.04	0.08

Vehicle Mix

Heavy Vehicle Percentages

Average PCU Per Veh

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	1	0	1
	3	0	2	0	1
	4	0	1	0	0

		To			
		1	2	3	4
From	1	1.000	1.000	1.000	1.000
	2	1.000	1.010	1.000	1.010
	3	1.000	1.020	1.000	1.010
	4	1.000	1.010	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (Veh/hr)	Demand in PCU (PCU/hr)
17:00-17:15	1	74	74
	2	2183	2196
	3	692	704
	4	1392	1404
17:15-17:30	1	74	74
	2	2183	2196
	3	692	704
	4	1392	1404
17:30-17:45	1	74	74
	2	2183	2196
	3	692	704
	4	1392	1404
17:45-18:00	1	74	74
	2	2183	2196
	3	692	704
	4	1392	1404

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.18	10.70	0.2	B	74	74
2	0.85	9.34	5.6	A	2183	2183
3	0.56	6.49	1.2	A	692	692
4	0.59	3.78	1.5	A	1392	1392

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	74	19	2082	416	0.178	73	103	0.0	0.2	10.471	B
2	2183	546	205	2568	0.850	2162	1950	0.0	5.3	8.459	A
3	692	173	1482	1255	0.552	687	885	0.0	1.2	6.293	A
4	1392	348	799	2350	0.592	1386	1370	0.0	1.4	3.714	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	74	19	2093	411	0.180	74	104	0.2	0.2	10.694	B
2	2183	546	206	2568	0.850	2182	1961	5.3	5.5	9.300	A
3	692	173	1496	1246	0.555	692	893	1.2	1.2	6.489	A
4	1392	348	805	2345	0.594	1392	1383	1.4	1.5	3.776	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	74	19	2093	411	0.180	74	104	0.2	0.2	10.696	B
2	2183	546	206	2568	0.850	2183	1961	5.5	5.5	9.330	A
3	692	173	1496	1246	0.555	692	893	1.2	1.2	6.494	A
4	1392	348	805	2345	0.594	1392	1383	1.5	1.5	3.776	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	74	19	2093	411	0.180	74	104	0.2	0.2	10.696	B
2	2183	546	206	2568	0.850	2183	1961	5.5	5.6	9.341	A
3	692	173	1496	1246	0.555	692	893	1.2	1.2	6.494	A
4	1392	348	805	2345	0.594	1392	1383	1.5	1.5	3.776	A

2021 + Development, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	4.94	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	14	Arm 1	4.94	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D3	2021 + Development	AM	FLAT	08:00	09:00	60	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	Average Demand (Veh/hr)	Scaling Factor (%)
1		FLAT	✓	134	100.000
2		FLAT	✓	1618	100.000
3		FLAT	✓	980	100.000
4		FLAT	✓	1173	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	49	26	59
	2	36	85	579	918
	3	31	859	0	90
	4	45	1054	62	12

Proportions

		To			
		1	2	3	4
From	1	0.00	0.37	0.19	0.44
	2	0.02	0.05	0.36	0.57
	3	0.03	0.88	0.00	0.09
	4	0.04	0.90	0.05	0.01

Vehicle Mix

Heavy Vehicle Percentages

Average PCU Per Veh

		To			
		1	2	3	4
From	1	0	6	0	0
	2	0	4	4	2
	3	2	0	7	0
	4	3	4	5	0

		To			
		1	2	3	4
From	1	1.000	1.060	1.000	1.000
	2	1.000	1.040	1.040	1.020
	3	1.020	1.000	1.070	1.000
	4	1.030	1.040	1.050	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (Veh/hr)	Demand in PCU (PCU/hr)
08:00-08:15	1	134	137
	2	1618	1663
	3	980	981
	4	1173	1220
08:15-08:30	1	134	137
	2	1618	1663
	3	980	981
	4	1173	1220
08:30-08:45	1	134	137
	2	1618	1663
	3	980	981
	4	1173	1220
08:45-09:00	1	134	137
	2	1618	1663
	3	980	981
	4	1173	1220

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.33	13.51	0.5	B	134	134
2	0.64	3.89	1.7	A	1618	1618
3	0.66	6.99	1.9	A	980	980
4	0.55	3.75	1.2	A	1173	1173

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	134	34	2061	406	0.330	132	111	0.0	0.5	13.054	B
2	1618	405	157	2544	0.636	1611	2035	0.0	1.7	3.832	A
3	980	245	1105	1498	0.654	973	664	0.0	1.9	6.759	A
4	1173	293	1004	2138	0.549	1168	1074	0.0	1.2	3.694	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	134	34	2072	400	0.335	134	112	0.5	0.5	13.501	B
2	1618	405	159	2543	0.636	1618	2047	1.7	1.7	3.892	A
3	980	245	1110	1495	0.656	980	667	1.9	1.9	6.983	A
4	1173	293	1011	2133	0.550	1173	1079	1.2	1.2	3.749	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	134	34	2072	400	0.335	134	112	0.5	0.5	13.509	B
2	1618	405	159	2543	0.636	1618	2047	1.7	1.7	3.892	A
3	980	245	1110	1495	0.656	980	667	1.9	1.9	6.991	A
4	1173	293	1011	2133	0.550	1173	1079	1.2	1.2	3.749	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	134	34	2072	400	0.335	134	112	0.5	0.5	13.512	B
2	1618	405	159	2543	0.636	1618	2047	1.7	1.7	3.892	A
3	980	245	1110	1495	0.656	980	667	1.9	1.9	6.991	A
4	1173	293	1011	2133	0.550	1173	1079	1.2	1.2	3.749	A

2021 + Development, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	7.39	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	12	Arm 2	7.39	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D4	2021 + Development	PM	FLAT	17:00	18:00	60	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	Average Demand (Veh/hr)	Scaling Factor (%)
1		FLAT	✓	111	100.000
2		FLAT	✓	2183	100.000
3		FLAT	✓	692	100.000
4		FLAT	✓	1392	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	48	35	28
	2	40	178	818	1147
	3	22	565	0	105
	4	42	1184	58	108

Proportions

		To			
		1	2	3	4
From	1	0.00	0.43	0.32	0.25
	2	0.02	0.08	0.37	0.53
	3	0.03	0.82	0.00	0.15
	4	0.03	0.85	0.04	0.08

Vehicle Mix

Heavy Vehicle Percentages

Average PCU Per Veh

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	1	0	1
	3	0	2	0	1
	4	0	1	0	0

		To			
		1	2	3	4
From	1	1.000	1.000	1.000	1.000
	2	1.000	1.010	1.000	1.010
	3	1.000	1.020	1.000	1.010
	4	1.000	1.010	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (Veh/hr)	Demand in PCU (PCU/hr)
17:00-17:15	1	111	111
	2	2183	2196
	3	692	704
	4	1392	1404
17:15-17:30	1	111	111
	2	2183	2196
	3	692	704
	4	1392	1404
17:30-17:45	1	111	111
	2	2183	2196
	3	692	704
	4	1392	1404
17:45-18:00	1	111	111
	2	2183	2196
	3	692	704
	4	1392	1404

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.27	12.02	0.4	B	111	111
2	0.55	9.74	5.8	A	2183	2183
3	0.56	6.53	1.2	A	692	692
4	0.59	3.78	1.5	A	1392	1392

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	111	28	2082	416	0.267	110	103	0.0	0.4	11.691	B
2	2183	546	228	2553	0.855	2161	1964	0.0	5.5	8.749	A
3	692	173	1486	1252	0.553	687	902	0.0	1.2	6.320	A
4	1392	348	799	2350	0.592	1386	1375	0.0	1.4	3.714	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	111	28	2093	411	0.270	111	104	0.4	0.4	12.012	B
2	2183	546	229	2552	0.855	2182	1975	5.5	5.7	9.688	A
3	692	173	1501	1243	0.556	692	911	1.2	1.2	6.524	A
4	1392	348	805	2345	0.594	1392	1388	1.4	1.5	3.776	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	111	28	2093	411	0.270	111	104	0.4	0.4	12.017	B
2	2183	546	229	2552	0.855	2183	1975	5.7	5.8	9.723	A
3	692	173	1501	1243	0.557	692	911	1.2	1.2	6.529	A
4	1392	348	805	2345	0.594	1392	1388	1.5	1.5	3.776	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	111	28	2093	411	0.270	111	104	0.4	0.4	12.018	B
2	2183	546	229	2552	0.855	2183	1975	5.8	5.8	9.736	A
3	692	173	1501	1243	0.557	692	911	1.2	1.2	6.529	A
4	1392	348	805	2345	0.594	1392	1388	1.5	1.5	3.776	A

2026, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	5.43	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	15	Arm 1	5.43	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D5	2026	AM	FLAT	08:00	09:00	60	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	Average Demand (Veh/hr)	Scaling Factor (%)
1		FLAT	✓	54	100.000
2		FLAT	✓	1726	100.000
3		FLAT	✓	1048	100.000
4		FLAT	✓	1246	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	18	15	21	0
	2	28	91	621	986
	3	29	922	0	97
	4	35	1131	67	13

Proportions

		To			
		1	2	3	4
From	1	0.33	0.28	0.39	0.00
	2	0.02	0.05	0.36	0.57
	3	0.03	0.88	0.00	0.09
	4	0.03	0.91	0.05	0.01

Vehicle Mix

Heavy Vehicle Percentages

Average PCU Per Veh

		To			
		1	2	3	4
From	1	0	6	0	0
	2	0	4	4	2
	3	2	0	7	0
	4	3	4	5	0

		To			
		1	2	3	4
From	1	1.000	1.060	1.000	1.000
	2	1.000	1.040	1.040	1.020
	3	1.020	1.000	1.070	1.000
	4	1.030	1.040	1.050	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (Veh/hr)	Demand in PCU (PCU/hr)
08:00-08:15	1	54	55
	2	1726	1774
	3	1048	1049
	4	1246	1296
08:15-08:30	1	54	55
	2	1726	1774
	3	1048	1049
	4	1246	1296
08:30-08:45	1	54	55
	2	1726	1774
	3	1048	1049
	4	1246	1296
08:45-09:00	1	54	55
	2	1726	1774
	3	1048	1049
	4	1246	1296

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.16	13.15	0.2	B	54	54
2	0.67	4.27	2.0	A	1726	1726
3	0.71	8.36	2.4	A	1048	1048
4	0.60	4.33	1.5	A	1246	1246

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	54	13	2210	335	0.161	53	109	0.0	0.2	12.754	B
2	1726	431	118	2570	0.672	1718	2145	0.0	2.0	4.188	A
3	1048	262	1131	1482	0.707	1039	705	0.0	2.3	7.965	A
4	1246	311	1079	2084	0.598	1240	1090	0.0	1.5	4.237	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	54	13	2224	328	0.165	54	110	0.2	0.2	13.140	B
2	1726	431	119	2569	0.672	1726	2159	2.0	2.0	4.269	A
3	1048	262	1136	1478	0.709	1048	709	2.3	2.4	8.350	A
4	1246	311	1088	2077	0.600	1246	1096	1.5	1.5	4.329	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	54	13	2224	328	0.165	54	110	0.2	0.2	13.146	B
2	1726	431	119	2569	0.672	1726	2159	2.0	2.0	4.270	A
3	1048	262	1136	1478	0.709	1048	709	2.4	2.4	8.359	A
4	1246	311	1088	2077	0.600	1246	1096	1.5	1.5	4.330	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	54	13	2224	328	0.165	54	110	0.2	0.2	13.147	B
2	1726	431	119	2569	0.672	1726	2159	2.0	2.0	4.270	A
3	1048	262	1136	1478	0.709	1048	709	2.4	2.4	8.361	A
4	1246	311	1088	2077	0.600	1246	1096	1.5	1.5	4.330	A

2026, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	9.88	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	6	Arm 2	9.88	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D6	2026	PM	FLAT	17:00	18:00	60	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	Average Demand (Veh/hr)	Scaling Factor (%)
1		FLAT	✓	78	100.000
2		FLAT	✓	2321	100.000
3		FLAT	✓	736	100.000
4		FLAT	✓	1481	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	36	18	24
	2	43	189	1219	870
	3	23	601	0	112
	4	45	1259	62	115

Proportions

		To			
		1	2	3	4
From	1	0.00	0.46	0.23	0.31
	2	0.02	0.08	0.53	0.37
	3	0.03	0.82	0.00	0.15
	4	0.03	0.85	0.04	0.08

Vehicle Mix

Heavy Vehicle Percentages

Average PCU Per Veh

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	1	0	1
	3	0	2	0	1
	4	0	1	0	0

		To			
		1	2	3	4
From	1	1.000	1.000	1.000	1.000
	2	1.000	1.010	1.000	1.010
	3	1.000	1.020	1.000	1.010
	4	1.000	1.010	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (Veh/hr)	Demand in PCU (PCU/hr)
17:00-17:15	1	78	78
	2	2321	2332
	3	736	749
	4	1481	1494
17:15-17:30	1	78	78
	2	2321	2332
	3	736	749
	4	1481	1494
17:30-17:45	1	78	78
	2	2321	2332
	3	736	749
	4	1481	1494
17:45-18:00	1	78	78
	2	2321	2332
	3	736	749
	4	1481	1494

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.23	13.49	0.3	B	78	78
2	0.91	14.72	9.2	B	2321	2321
3	0.53	5.43	1.1	A	736	736
4	0.64	4.36	1.8	A	1481	1481

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	78	20	2213	351	0.222	77	110	0.0	0.3	13.069	B
2	2321	580	218	2563	0.906	2288	2072	0.0	8.3	11.909	B
3	736	184	1224	1409	0.523	732	1281	0.0	1.1	5.284	A
4	1481	370	849	2312	0.641	1474	1107	0.0	1.8	4.261	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	78	20	2226	345	0.226	78	111	0.3	0.3	13.480	B
2	2321	580	219	2562	0.906	2319	2085	8.3	8.9	14.440	B
3	736	184	1240	1399	0.526	736	1298	1.1	1.1	5.426	A
4	1481	370	856	2307	0.642	1481	1120	1.8	1.8	4.359	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	78	20	2226	345	0.226	78	111	0.3	0.3	13.488	B
2	2321	580	219	2562	0.906	2320	2085	8.9	9.1	14.642	B
3	736	184	1241	1399	0.526	736	1299	1.1	1.1	5.430	A
4	1481	370	856	2307	0.642	1481	1121	1.8	1.8	4.360	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	78	20	2226	345	0.226	78	111	0.3	0.3	13.489	B
2	2321	580	219	2562	0.906	2321	2085	9.1	9.2	14.724	B
3	736	184	1241	1399	0.526	736	1299	1.1	1.1	5.431	A
4	1481	370	856	2307	0.642	1481	1121	1.8	1.8	4.360	A

2026 + Development, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	5.17	A

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	8	Arm 1	5.17	A

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D7	2026 + Development	AM	FLAT	08:00	09:00	60	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	Average Demand (Veh/hr)	Scaling Factor (%)
1		FLAT	✓	124	100.000
2		FLAT	✓	1735	100.000
3		FLAT	✓	1051	100.000
4		FLAT	✓	1257	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	45	25	54
	2	37	91	986	621
	3	32	922	0	97
	4	46	1131	67	13

Proportions

		To			
		1	2	3	4
From	1	0.00	0.36	0.20	0.44
	2	0.02	0.05	0.57	0.36
	3	0.03	0.88	0.00	0.09
	4	0.04	0.90	0.05	0.01

Vehicle Mix

Heavy Vehicle Percentages

Average PCU Per Veh

		To			
		1	2	3	4
From	1	0	6	0	0
	2	0	4	4	2
	3	2	0	7	0
	4	3	4	5	0

		To			
		1	2	3	4
From	1	1.000	1.060	1.000	1.000
	2	1.000	1.040	1.040	1.020
	3	1.020	1.000	1.070	1.000
	4	1.030	1.040	1.050	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (Veh/hr)	Demand in PCU (PCU/hr)
08:00-08:15	1	124	127
	2	1735	1791
	3	1051	1052
	4	1257	1307
08:15-08:30	1	124	127
	2	1735	1791
	3	1051	1052
	4	1257	1307
08:30-08:45	1	124	127
	2	1735	1791
	3	1051	1052
	4	1257	1307
08:45-09:00	1	124	127
	2	1735	1791
	3	1051	1052
	4	1257	1307

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.38	17.80	0.6	C	124	124
2	0.69	4.51	2.2	A	1735	1735
3	0.63	5.76	1.7	A	1051	1051
4	0.60	4.36	1.5	A	1257	1257

Main Results for each time segment

08:00 - 08:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	124	31	2212	332	0.374	122	114	0.0	0.6	16.942	C
2	1735	434	157	2533	0.685	1726	2177	0.0	2.1	4.416	A
3	1051	263	811	1678	0.626	1044	1072	0.0	1.6	5.624	A
4	1257	314	1075	2086	0.602	1251	780	0.0	1.5	4.278	A

08:15 - 08:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	124	31	2224	326	0.380	124	115	0.6	0.6	17.780	C
2	1735	434	159	2532	0.685	1735	2189	2.1	2.2	4.515	A
3	1051	263	816	1675	0.627	1051	1078	1.6	1.7	5.762	A
4	1257	314	1082	2082	0.604	1257	785	1.5	1.5	4.364	A

08:30 - 08:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	124	31	2224	326	0.380	124	115	0.6	0.6	17.800	C
2	1735	434	159	2532	0.685	1735	2189	2.2	2.2	4.515	A
3	1051	263	816	1675	0.627	1051	1078	1.7	1.7	5.765	A
4	1257	314	1082	2082	0.604	1257	785	1.5	1.5	4.364	A

08:45 - 09:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	124	31	2224	326	0.380	124	115	0.6	0.6	17.804	C
2	1735	434	159	2532	0.685	1735	2189	2.2	2.2	4.515	A
3	1051	263	816	1675	0.627	1051	1078	1.7	1.7	5.765	A
4	1257	314	1082	2082	0.604	1257	785	1.5	1.5	4.365	A

2026 + Development, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Geometry	Arm 2 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 3 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.
Warning	Geometry	Arm 4 - Roundabout Geometry	Effective flare length is over 30m, which is outside the normal range. Treat capacities with increasing caution.

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	untitled	Standard Roundabout		1, 2, 3, 4	11.33	B

Junction Network

Driving side	Lighting	Network residual capacity (%)	First arm reaching threshold	Network delay (s)	Network LOS
Left	Normal/unknown	4	Arm 2	11.33	B

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D8	2026 + Development	PM	FLAT	17:00	18:00	60	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	Average Demand (Veh/hr)	Scaling Factor (%)
1		FLAT	✓	110	100.000
2		FLAT	✓	2345	100.000
3		FLAT	✓	745	100.000
4		FLAT	✓	1511	100.000

Origin-Destination Data

Demand (Veh/hr)

		To			
		1	2	3	4
From	1	0	48	33	29
	2	67	189	1219	870
	3	32	601	0	112
	4	75	1259	62	115

Proportions

		To			
		1	2	3	4
From	1	0.00	0.44	0.30	0.26
	2	0.03	0.08	0.52	0.37
	3	0.04	0.81	0.00	0.15
	4	0.05	0.83	0.04	0.08

Vehicle Mix

Heavy Vehicle Percentages

Average PCU Per Veh

		To			
		1	2	3	4
From	1	0	0	0	0
	2	0	1	0	1
	3	0	2	0	1
	4	0	1	0	0

		To			
		1	2	3	4
From	1	1.000	1.000	1.000	1.000
	2	1.000	1.010	1.000	1.010
	3	1.000	1.020	1.000	1.010
	4	1.000	1.010	1.000	1.000

Detailed Demand Data

Demand for each time segment

Time Segment	Arm	Demand (Veh/hr)	Demand in PCU (PCU/hr)
17:00-17:15	1	110	110
	2	2345	2356
	3	745	758
	4	1511	1524
17:15-17:30	1	110	110
	2	2345	2356
	3	745	758
	4	1511	1524
17:30-17:45	1	110	110
	2	2345	2356
	3	745	758
	4	1511	1524
17:45-18:00	1	110	110
	2	2345	2356
	3	745	758
	4	1511	1524

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
1	0.32	15.33	0.5	C	110	110
2	0.92	17.28	10.9	C	2345	2345
3	0.54	5.65	1.2	A	745	745
4	0.66	4.67	2.0	A	1511	1511

Main Results for each time segment

17:00 - 17:15

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	110	28	2212	352	0.313	108	172	0.0	0.4	14.681	B
2	2345	586	237	2550	0.920	2307	2083	0.0	9.5	13.229	B
3	745	186	1251	1393	0.535	740	1293	0.0	1.1	5.478	A
4	1511	378	881	2288	0.660	1503	1110	0.0	1.9	4.543	A

17:15 - 17:30

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	110	28	2226	345	0.319	110	174	0.4	0.5	15.306	C
2	2345	586	239	2549	0.920	2342	2097	9.5	10.3	16.753	C
3	745	186	1268	1383	0.539	745	1312	1.1	1.2	5.641	A
4	1511	378	889	2283	0.662	1511	1125	1.9	1.9	4.662	A

17:30 - 17:45

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	110	28	2226	345	0.319	110	174	0.5	0.5	15.321	C
2	2345	586	239	2549	0.920	2344	2097	10.3	10.7	17.126	C
3	745	186	1269	1382	0.539	745	1313	1.2	1.2	5.649	A
4	1511	378	889	2283	0.662	1511	1125	1.9	1.9	4.665	A

17:45 - 18:00

Arm	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Circulating flow (Veh/hr)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Throughput (exit side) (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
1	110	28	2226	345	0.319	110	174	0.5	0.5	15.327	C
2	2345	586	239	2549	0.920	2344	2097	10.7	10.9	17.279	C
3	745	186	1270	1382	0.539	745	1314	1.2	1.2	5.650	A
4	1511	378	889	2283	0.662	1511	1126	1.9	2.0	4.665	A

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ARUN DISTRICT COUNCIL A48/22/RL