

local transport projects 

traffic engineering and transport planning

Keepmoat Homes Ltd

**Proposed Residential Development
St Helen's Boulevard, Barnsley
Transport Assessment**

July 2019

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Client Commission

Client: Keepmoat Homes Ltd Date Commissioned: June 2017

LTP Quality Control

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Authorised for Issue:				TK	

LTP PROJECT TEAM

As part of our commitment to quality the following team of transport professionals was assembled specifically for the delivery of this project. Relevant qualifications are shown and CVs are available upon request to demonstrate our experience and credentials.

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PROPOSED RESIDENTIAL DEVELOPMENT ST HELEN'S BOULEVARD, BARNSELEY TRANSPORT ASSESSMENT

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EXECUTIVE SUMMARY

This Transport Assessment (TA) provides a detailed appraisal of the likely transport impacts of the proposed residential development on land off St Helen's Boulevard in Barnsley, South Yorkshire. The key findings of this TA are summarised below:

- The proposals involve a residential development of 93 dwellings, accessed via the existing access south of St Helen's Boulevard. It is understood that the development would involve a mix of housing types, including an element of affordable housing. A footway is expected to be provided on the western side of the main access road to tie-in with the existing footways on St Helen's Boulevard.
- The scope of this report has been agreed with the local highway authority (Barnsley Metropolitan Borough Council - BMBC) and produced in accordance with the relevant local and national guidance.
- A Travel Plan that provides a strategy for encouraging sustainable travel at the proposed development site has been produced in conjunction with this TA as a separate document.
- The site is in an accessible location with pedestrian routes to local amenities, bus stops accommodating frequent services to Barnsley interchange and Athersley South, and a large number of areas accessible within a reasonable cycle ride.
- Analysis of the 17 local Personal Injury Collisions (PICs) has not revealed any identifiable existing collision issues associated with the expected movements of the development, therefore it is considered that there are no pertinent road safety issues for the proposals.
- Trip generation and modal split for the development has been projected using the industry-standard TRICS database. The traffic projections indicate that when fully-built, the proposed residential development is expected to generate 46 two-way vehicle trip movements during the AM (08:00-09:00) peak hour and 47 during the PM (17:00-18:00) peak hour.
- The distribution and assignment of traffic associated with the proposed development has been predicted utilising a gravity model based upon commuting patterns of existing residents in the local Barnsley Middle-Layer Super Output Areas (MSOAs).
- The proposals are expected to generate a maximum of 47 two-way vehicle trips at the St Helen's Boulevard/Carlton Road crossroads during the PM peak hour and 46 during the AM peak hour.
- Capacity assessments at key local junctions have been undertaken using the industry-standard Junctions 9 and LinSig v3 software. The results show that the local junctions are expected to operate within capacity with the development in place.

This TA demonstrates that the proposed development would not be expected to have a significant impact in terms of sustainable travel, traffic impact and road safety. As the impact of the proposals is not expected to be severe, the proposals are therefore considered to be in accordance with the National Planning Policy Framework (NPPF).

I. INTRODUCTION

I.1 Background

- 1.1.1 Local Transport Projects Ltd (LTP) has been commissioned to produce a Transport Assessment (TA) in support of a planning application for a proposed residential development on land off St Helen's Boulevard in Barnsley, South Yorkshire. This TA provides a detailed appraisal of the expected transport impacts of the proposals. A plan of the proposed site layout is attached as Appendix 1.
- 1.1.2 The local planning and highway authority for the site is Barnsley Metropolitan Borough Council (BMBC).
- 1.1.3 LTP has also been commissioned to prepare a Travel Plan (LTP, 2019) for the proposed development, which outlines the approach to encouraging travel by sustainable modes at the site. Although the TP has been prepared as a standalone document, both the TA and TP are linked and should be read in conjunction with each other.

I.2 Scope

- 1.2.1 The scope of this report has been agreed with BMBC Highway Development Management (ref: Barbara Wilson). The report is written in accordance with the Government's 'National Planning Policy Framework' (MHCLG, 2019) and 'Planning Practice Guidance' (DCLG, 2014), as summarised below:
 - **Executive Summary:** A non-technical summary of the report outlining the key outcomes of the assessment.
 - **Introduction & Description of Proposals:**
 - Description of the development site, including location and existing access arrangements;
 - Summary of relevant planning and allocation history for the site;
 - Description of the proposed development including site layout, pedestrian/cycle facilities and proposed access arrangements.
 - **Site Assessment:**
 - Site assessments to determine existing traffic conditions, such as posted speed limits, road restrictions, highway geometry, on-street parking restrictions and any other relevant features of the local area;
 - Assessment of the sustainable transport infrastructure (pedestrian, cycle and public transport) local to the site.
 - **Road Casualty Appraisal:** Examination of road collision records (5 year study period) and assessment of the road safety impact of the proposed development on the local highway network.
 - **Traffic Impact:**
 - Calculation of the projected trip generation for the proposed development;

- Consideration of any relevant consented developments within the local area and any committed changes to the surrounding highway network;
 - Predict the distribution of the vehicle trips generated by the site onto the local highway network;
 - Calculation of suitable future traffic growing factor(s) utilising nationally approved models and software;
 - Junction capacity modelling utilising the relevant Junctions 9/LinSig v3 software at the following locations:
 - Carlton Road/St Helen's Boulevard crossroads; and
 - Rotherham Road/Carlton Road signalised junction.
 - Assessment of the likely traffic impact of the proposed development on the operation of the local highway network.
 - **Access, Parking & Internal Layout:** Description of the proposed access arrangements and internal layout of the site, including consideration of the proposed parking provision, access/servicing arrangements and suitability of proposed access arrangements.
 - **Conclusions:** Conclusions summarising the outcomes of the TA, including a commentary on the suitability of the proposals in terms of sustainable travel, traffic impact and road safety.
- 1.2.2 This TA report has been prepared in accordance with the above scope and reference has been made to the following documents where appropriate:
- Barnsley Local Plan - Adopted January 2019 (BMBC, 2019a);
 - National Planning Policy Framework (MHCLG, 2019);
 - Barnsley Transport Strategy 2013-2033 (BMBC, 2016);
 - South Yorkshire Local Transport Plan 2011-2026 (SYLTP, 2015);
 - Planning Practice Guidance (DCLG, 2014);
 - Barnsley Supplementary Planning Document: Parking (BMBC, 2012);
 - Guidance on Transport Assessment (DfT, 2007a);
 - Manual for Streets (DfT, 2007b); and
 - The Unitary Development Plan Volume 2: Community Areas (BMBC, 2000).

2. SITE BACKGROUND

2.1 Site Location & Previous Use

- 2.1.1 The application site is located in the town of Barnsley, approximately 3.5km to the north-east of the town centre within South Yorkshire. The site was previously home to Springwell Community Special School which closed in 2014 and is bound by a combination of woodland/fields to the east and south. Existing residential dwellings served via St Helen's Avenue form the western boundary of the site and St Helen's Boulevard forms the northern boundary, which also serves Springwell Alternative Academy. The approximate extents of the site are shown within Figure 1.

Figure 1: Site Location



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2.2 Development Proposals & Access Arrangements

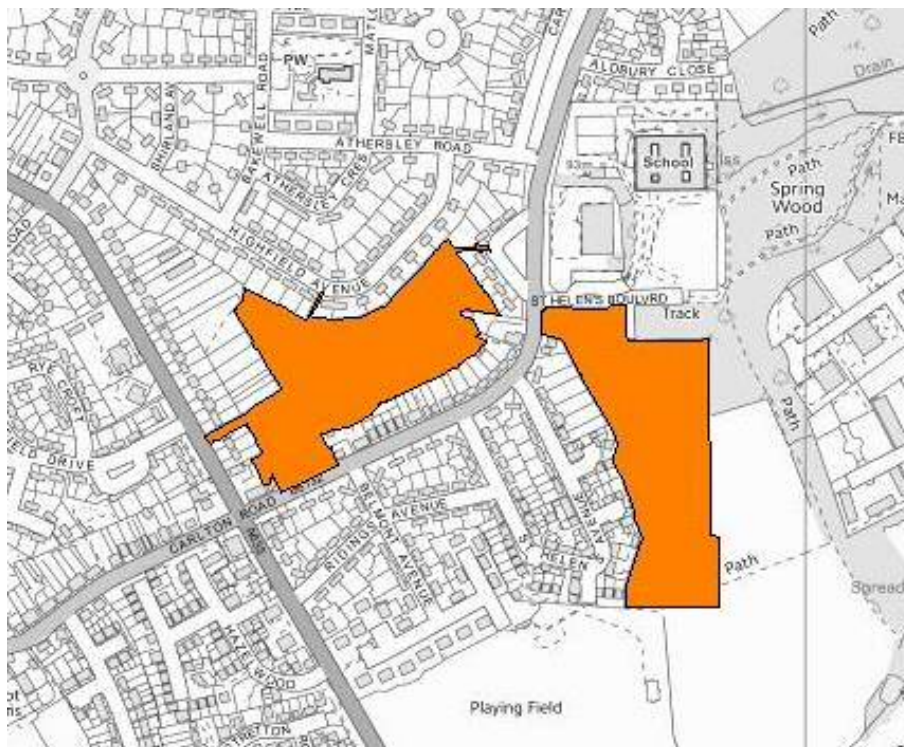
- 2.2.1 This TA is based upon the proposals shown on the site layout plan attached as Appendix 1. The proposals will be seeking consent for a development of 93 dwellings. It is understood that the development would involve a mix of housing types, including an element of affordable housing.
- 2.2.2 The development is to be served by the existing access junction from St Helen's Boulevard. The main access road through the development site will serve a number of dwellings directly, with additional connecting culs-de-sac providing access to other properties, and potential future links to adjacent land. Footways will also be provided alongside the main internal road.

- 2.2.3 It is understood that the internal highway network of the site has been designed to ensure that refuse vehicles can utilise the highway alignment to enter and exit the site in a forward gear, with appropriate turning heads provided in culs-de-sac.
- 2.2.4 The proposed parking for the residential development is expected to be provided in accordance with the requirements of Barnsley's Supplementary Planning Document: Parking (BMBC, 2012), with sufficient provision to accommodate the demand generated by the development.

2.3 Local Plan Allocation & Planning History

- 2.3.1 The application site forms land allocated for residential development (ref: HS16) within the adopted Barnsley Local Plan (BMBC, 2019a), for an indicative 96 dwellings. The extents of the HS16 site, and HS12 site to the west, are shown within Figure 2.

Figure 2: Housing Sites H12 and HS16



Source: BMBC, 2019b

- 2.3.2 It is understood that there have been no relevant planning applications relating to the development site.

3. SITE ASSESSMENT

3.1 Local Highway Network

- 3.1.1 The application site would be accessed by all modes via the existing priority junction with St Helen's Boulevard situated to the north of the site. St Helen's Boulevard is a private road that is approximately 7.3m in width that forms a cul-de-sac and intersects with Carlton Road (B1632) to the west, via priority crossroads. St Helen's Boulevard forms a two-way single carriageway that provides access to Springwell Alternative Academy and is subject to a 30mph speed limit with a traffic calming feature in the form of a priority build-out. There are not any existing waiting/parking restrictions in the vicinity of the site with an existing layby on the southern side for approximately five vehicles.

Photo 1: St Helen's Boulevard



- 3.1.2 Carlton Road (B6132) is a two-way single carriageway that connects Church Street to the north-east and the A61 to the south-west and measures approximately 6.7m in width. The road is subject to a 20mph speed limit north of the priority junction with St Helen's Boulevard. To the south, the road is subject to a 30mph speed limit and there are a number of traffic calming measures present, including speed humps, priority build-outs and speed cameras. There are not any existing waiting/parking restrictions on Carlton Road within the vicinity of the site.

Photo 2: Carlton Road

- 3.1.3 St Helen's Avenue is a two-way single carriageway that intersects with Carlton Road via a simple priority T-junction. The road measures approximately 4.8m in width and is subject to a 30mph speed limit. There are not any existing waiting/parking restrictions along the entire length of St Helen's Avenue.

Photo 3: St Helen's Avenue

- 3.1.4 The A633 connects Barnsley and Rotherham and in the vicinity of the site, the road forms Rotherham Road at the signalised crossroads with Carlton Road. The A633 is a two-way single carriageway that is subject to a 30mph speed limit with No Waiting At Any Time (NWAAT) restrictions in the vicinity of the signalised junction with Carlton Road.

Photo 4: A633 (Rotherham Road)



3.2 Pedestrian Provision

- 3.2.1 Guidance from the Chartered Institution of Highways & Transportation (CIHT) suggests a preferred maximum walking distance of 2km for a number of trips, including commuting and school trips (IHT, 2000). The site is located within a 2km walking distance of a large number of local trip attractors, as shown within Table 1.

Table 1: Key Trip Attractors by Foot

Trip Attractor	Walking Route	Walking Distance*
Education		
Springwell Alternative Academy	St Helen's Boulevard	30m
Holy Trinity School	St Helen's Boulevard - Carlton Road (B6132)	700m
Athersley South Primary School	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633) - Wakefield Road (A61)	1.3km
Laithes Primary School	St Helen's Boulevard - Carlton Road (B6132) - Athersley Road - Bakewell Road - Wingfield Road	1.7km
Burton Road Primary School	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633) - Wakefield Road (A61) - Burton Road	1.8km
Retail		
Tesco Express	St Helen's Boulevard - Carlton Road (B6132)	500m
Farmfoods	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633)	700m
Factory Foods	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633) - Wakefield Road (A61)	1.3km
Health		
Rotherham Road Medical Centre	St Helen's Boulevard - Carlton Road (B6132) - Athersley Road - Highfield Avenue - Rotherham Road (A633)	650m
R D Hill Chemist	St Helen's Boulevard - Carlton Road (B6132) - Athersley Road - Bakewell Road - Highfield Avenue	800m
The Co-operative Pharmacy	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633) - Wakefield Road (A61)	1.7km

Trip Attractor	Walking Route	Walking Distance*
St Georges Medical Practice	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633) - Wakefield Road (A61)	1.7km
Roundhouse Medical Centre	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633) - Wakefield Road (A61)	1.8km
Akram Z A Pharmacy	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633) - Westgate - Cross Street - High Street - Judy Row	1.8km
Leisure		
Barnsley Bowl	St Helen's Boulevard - Carlton Road (B6132)	160m
Worship/Community Use		
Blessed Sacrament Catholic Church	St Helen's Boulevard - Carlton Road (B6132) - Athersley Road - Matlock Road	500m
St Helen's Church	St Helen's Boulevard - Carlton Road (B6132) - Athersley Road - Bakewell Road - Wingfield Road - Laithes Lane	1.8km
Monk Bretton Methodist Church	St Helen's Boulevard - Carlton Road (B6132) - Rotherham Road (A633) - Westgate - Cross Road - High Street - Well Lane	2.0km

*Walking distances are approximate (measured along footways, rather than as the crow flies) and have been measured from the existing access from St Helen's Boulevard.

- 3.2.2 Table 1 shows that the proposed development site is located within a reasonable walking distance (up to 2km) of a large number of local amenities, including a number of nearby educational facilities. The proposals are set to provide footway provision to tie-in with the existing provision on St Helen's Boulevard. Pedestrian links are also to be provided to connect with the existing Public Right of Way (PRoW) to the south.
- 3.2.3 The proposed development site is located close to good pedestrian routes, with pedestrian infrastructure serving a large residential area to the west of the site.
- 3.2.4 To the west of the existing access junction, footways are provided on both sides of St Helen's Boulevard. The footways appear to be in good condition and vary in width between 1.9m and 3.0m. The footways provide access to the pedestrian infrastructure available on Carlton Road.

Photo 5: Pedestrian Infrastructure on St Helen's Boulevard (West of Access)



- 3.2.5 To the east of the existing access junction, there is a footway on the southern side of St Helen's Boulevard that is approximately 1.5m in width and in reasonable condition. It provides access to the PRow situated to the east of the site.

Photo 6: Pedestrian Infrastructure on St Helen's Boulevard (East of Access)



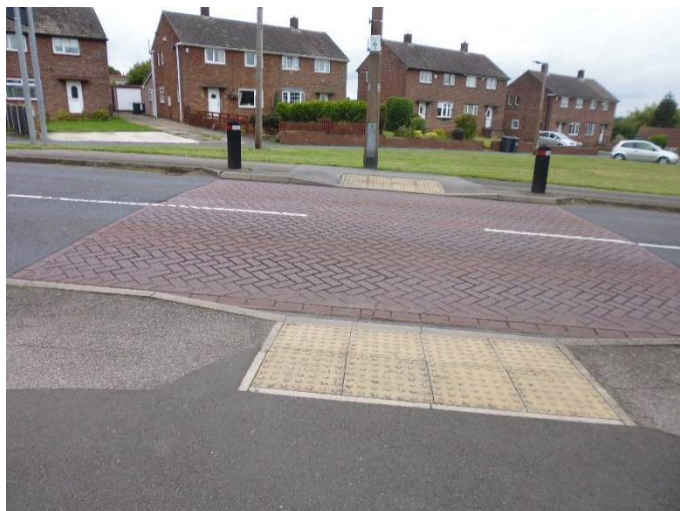
- 3.2.6 There are footways on both sides of Carlton Road that are between 1.5m and 1.7m in width and in reasonable condition. They provide access to the large residential area of Athersley South to the west of the site and the pedestrian infrastructure on Rotherham Road to the south-west.

Photo 7: Pedestrian Infrastructure on Carlton Road



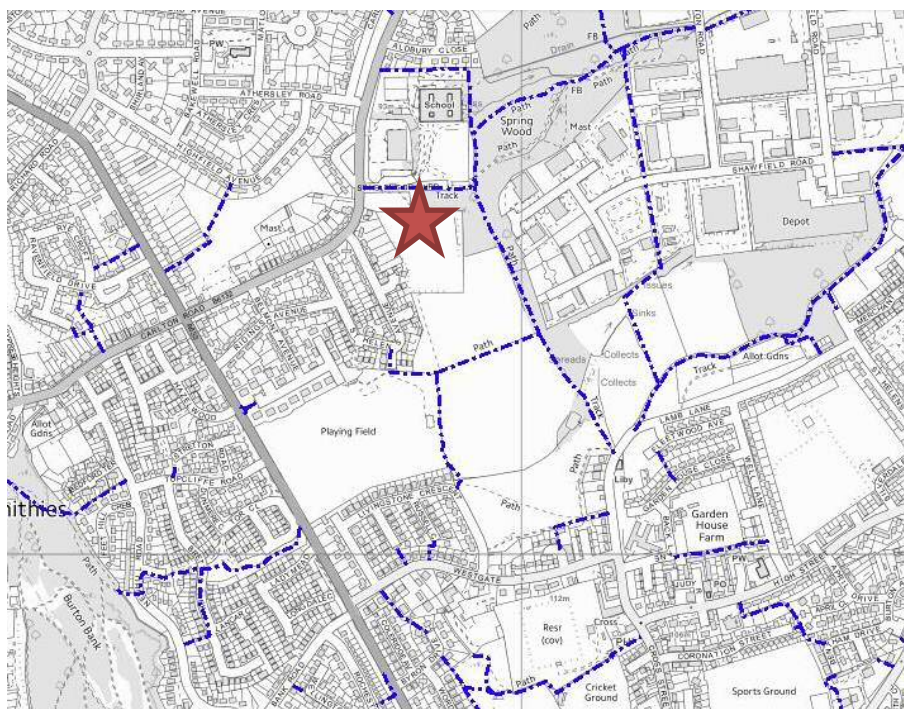
- 3.2.7 The local footways are complemented by existing crossing facilities, including pedestrian refuge points and priority build-outs which feature tactile paving and dropped kerbs.

Photo 8: Pedestrian Build Out on Carlton Road



- 3.2.8 Figure 3 shows the existing PRow within the vicinity of the site (site indicated by red star). There are a number of public footpaths within close proximity of the site which are highlighted in blue, with one running along the southern parcel of the site although the alignment will not be altered as part of the proposals.

Figure 3: Local Public Rights of Way

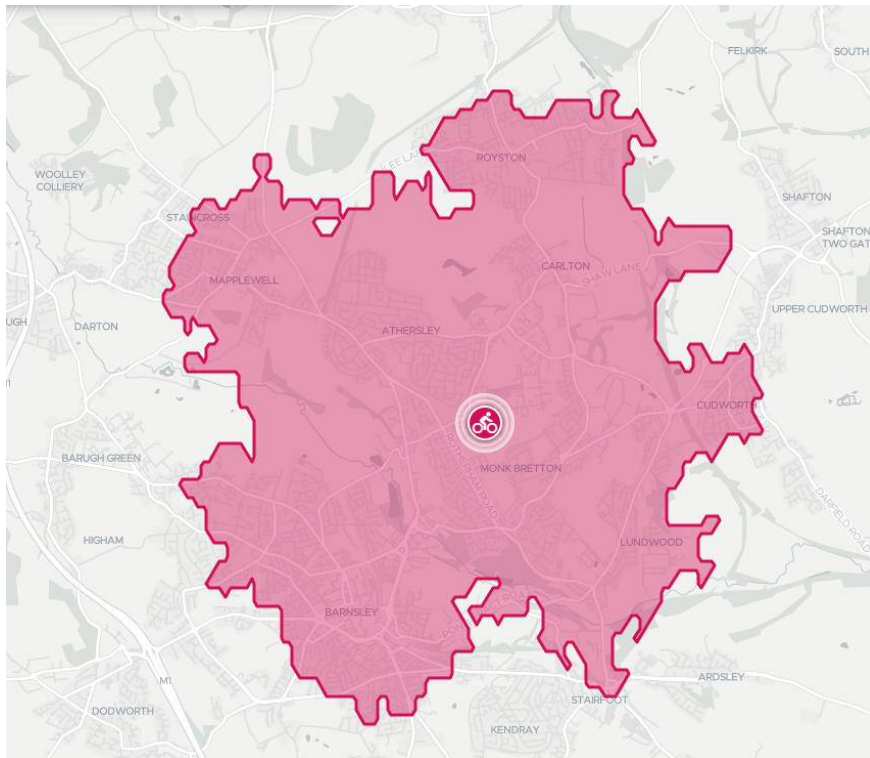


Source: BMBC, 2017a

- 3.2.9 The pedestrian infrastructure within the vicinity of the site appears to generally be sufficient to facilitate the movements of mobility and visually impaired people, with the provision of dropped kerbs and tactile paving at most local junctions and crossing points within the local area. The footways are generally of sufficient width and surface quality to accommodate the passage of wheelchairs (DfT, 2002).
- 3.2.10 The proposed internal pedestrian routes appear to be of adequate width, with step-free access between the site and the local footway network; it is considered that the site can be suitably accessed on foot by all users, including those accompanied by young children and the mobility impaired.
- 3.2.11 A number of measures to promote walking trips to and from the site are outlined within the site Travel Plan (LTP, 2019).

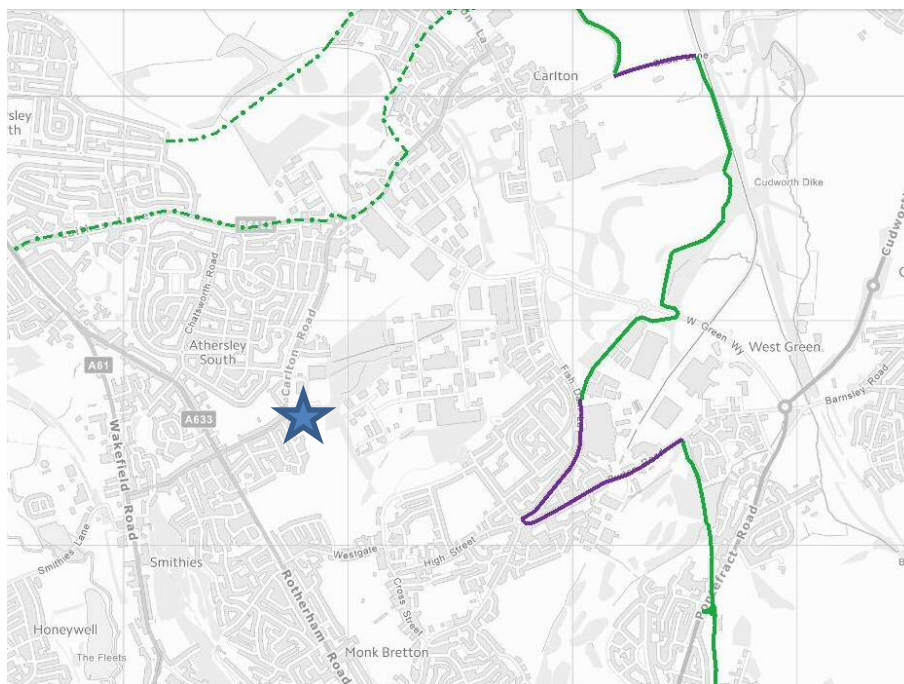
3.3 Cycling Provision

- 3.3.1 Cycling is a low cost and healthy alternative to car use, which can substitute for short car trips, or can form part of a longer journey by public transport. The DfT state that *"in common with other modes, many utility cycle journeys are under three miles (5km), although, for commuter journeys, a trip distance of over five miles (8km) is not uncommon"* (DfT, 2008).
- 3.3.2 The site is located within a reasonable cycle ride, up to 5km (approximately 15 minutes at the average cycling speed of 12mph), of the majority of the built-up area of Barnsley as well as the villages of Cudworth, Mapplewell and Royston.

Figure 4: Cycling Isochrone Map

Source: TTM, 2019

- 3.3.3 An extract of the online '*BMBC National and Regional Cycle Routes Map*' (BMBC, 2017b) is provided in Figure 5 and shows the cycle facilities in the local area (site highlighted by blue star). Off-road routes are highlighted in green and on-road routes highlighted in purple.

Figure 5: Extract of BMBC National and Regional Cycle Network Map

Source: BMBC, 2017b

- 3.3.4 There is a segregated foot/cycleway approximately 1.0km to the north of the site at the Laithes Lane/Longfields Road/Carlton Road roundabout which forms part of the National Cycle Network (NCN) Route 67 and the TransPennine Trail. NCN Route 67 runs between Loughborough and Northallerton where it joins NCN Route 71.
- 3.3.5 Given the proximity of the site to signed NCN routes, and that most local roads are subject to 20mph or 30mph speed limits, it is considered that the local environment within the vicinity of the site is generally conducive to encouraging cycling trips.
- 3.3.6 A number of measures to promote cycling trips to and from the site are outlined within the site Travel Plan (LTP, 2019).

3.4 Public Transport Provision

- 3.4.1 Guidance outlined within 'Guidelines for Public Transport in Development' (IHT, 1999) states that the generally acceptable maximum walking distance that a bus stop should be located from a development site is 400m, although it is acknowledged that actual walking distances can be notably longer.
- 3.4.2 The nearest bus stops are located on Carlton Road, providing travel in both directions, situated an approximately 140m (northbound) and 270m (southbound) walk from the site. There are additional stops located on Carlton Road and Athersley Road situated to the north-west of the site within a 400m walk of the site.

Photo 9: Northbound Bus Stop on Carlton Road



- 3.4.3 The #12 bus service provides four services every hour between Barnsley Interchange and Athersley South which can be accessed from the local bus stops.
- 3.4.4 The nearest rail station to the site is Barnsley Rail Station which is located approximately 2.8km south-west of the site and accessible via the #12 bus service. The station accommodates Northern services, providing access to local, regional and national rail services to destinations, including Leeds, Sheffield, Huddersfield and Nottingham. It is also noted that a Northern Connect service between Lincoln and Sheffield is also planned for winter 2019.
- 3.4.5 A number of measures to encourage public transport use to and from the site are outlined within the site Travel Plan (LTP, 2019).

4. ROAD CASUALTY APPRAISAL

4.1 Collision Record

- 4.1.1 Personal Injury Collision (PIC) data for the highway network local to the site for the most recent available extended five-year study period (01/01/2013 to 31/12/2017) was obtained via a search of the Department for Transport's (DfT) road safety data (DfT, 2019).
- 4.1.2 A total of 17 collisions occurred within the study area, which includes St Helen's Boulevard and sections of Carlton Road, St Helen's Avenue and a number of junctions within the vicinity of the site. The study area and the locations of the collisions are shown on the plan attached as Appendix 2. Table 2 below outlines the collision history of the study area.

Table 2: Collision History

Year	2013	2014	2015	2016	2017	Total
Fatal	0	0	0	0	0	0
Serious	3	1	0	0	1	5
Slight	1	4	1	2	4	12
Total	4	5	1	2	5	17

- 4.1.3 The collision records show that the number of collisions has fluctuated across the study period. There were five Killed or Seriously Injured (KSI) collisions during the study period, resulting in a severity ratio of 29.4%.

4.2 Collision Conditions

- 4.2.1 Table 3 below summarises the collisions by road surface, weather and lighting conditions:

Table 3: Collision Conditions

Road Surface	Collisions	%
Dry	10	58.8%
Wet	5	29.4%
Ice	1	5.9%
Unknown	1	5.9%
Weather	Collisions	%
Fine	12	70.6%
Rain	3	17.6%
Snow	1	5.9%
Unknown	1	5.9%
Lighting	Collisions	%
Daylight	8	47.1%
Dark	9	52.9%

- 4.2.2 As illustrated in Table 3, the majority of collisions did not occur with adverse road surface or weather conditions.

4.3 Collision Times

4.3.1 Table 4 summarises the collisions by time of year:

Table 4: Collisions by Time of Year

Time of Year	Collisions	%
Winter (Dec-Feb)	5	29.4%
Spring (Mar-May)	4	23.5%
Summer (Jun-Aug)	3	17.6%
Autumn (Sep-Nov)	5	29.4%

4.3.2 Table 4 shows that over a quarter of collisions occurred in the winter (29.4%) and autumn (29.4%) months respectively.

4.3.3 Table 5 below summarises the collisions by day of week and also the time of day:

Table 5: Collisions by Day & Time

Day	Morning (06:00- 11:00)	Lunch (11:00- 14:00)	Afternoon (14:00- 19:00)	Evening (19:00- 01:00)	Night (01:00- 06:00)	Total	%
Monday	1	0	1	0	0	2	11.8%
Tuesday	1	1	0	4	0	6	35.3%
Wednesday	1	0	1	1	0	3	17.6%
Thursday	0	0	0	0	0	0	-
Friday	0	0	3	0	0	3	17.6%
Saturday	0	0	0	1	0	1	5.9%
Sunday	0	0	1	1	0	2	11.8%
Total	3	1	6	7	0	17	
%	17.6%	5.9%	35.3%	41.2%	-		

4.3.4 Table 5 highlights that over a third of collisions occurred on a Tuesday (35.3%) with no collisions on a Thursday. Under half of collisions occurred during the evening period (41.2%) with no collisions occurring during the night time period.

4.4 Collision Locations

4.4.1 The locations of the 17 study collisions (shown on the plot attached as Appendix 2) can be summarised as follows:

- 12 PICs occurred at the Carlton Road/Rotherham Road junction;
- 2 PICs occurred at the St Helen's Road/Carlton Road Avenue junction;
- 2 PICs occurred at the Carlton Road/Staithes Lane/Longfields Road roundabout; and
- 1 PIC occurred on Carlton Road (not a junction).

4.4.2 No collisions were recorded within the vicinity of the site access junction or St Helen's Boulevard/Carlton Road junction during the study period.

4.5 Casualties

- 4.5.1 A total of 27 casualties occurred as a result of the 17 recorded injury collisions during the study period. Table 6 below provides a breakdown of the casualties according to the mode of travel and age group:

Table 6: Casualty Road User Groups

Road User Group	Age (years)						Total	%
	0 to 15	16 to 20	21 to 25	26 to 45	46 to 65	66+		
Pedestrian	2	2	0	0	0	0	4	14.8%
Cyclist	0	0	0	1	0	0	1	3.7%
Powered Two-Wheeler Rider	0	2	0	0	2	0	4	14.8%
Car Driver	0	0	2	7	1	0	10	37.0%
Car Passenger	0	2	0	0	0	0	2	7.4%
Minibus/Bus Passenger	0	0	0	0	1	0	1	3.7%
Goods Vehicle Occupant	0	0	0	1	2	0	3	11.1%
Taxi Occupant	0	0	0	1	0	0	1	3.7%
Horse Rider	0	0	0	1	0	0	1	3.7%
Total	2	6	2	11	6	0	27	
%	7.4%	22.2%	7.4%	40.7%	22.2%	-		

- 4.5.2 Table 6 shows that over a third of casualties were car drivers (37%), with over a third of casualties aged 26 to 45 years old (40.7%).

4.6 2018 Update

- 4.6.1 The DfT have released provisional part-year 2018 collision data covering the period 01/01/2018 to 30/06/2018. Given that the data is provisional, it does not contain all the information to allow a full analysis to be undertaken, however only one additional collision occurred within the study area in the first six months of 2018. The collision occurred at the Carlton Road/Rotherham Road junction and is shown on the plot attached as Appendix 2.
- 4.6.2 Given that only a single additional collision has occurred, it is considered that the findings of the above appraisal are still pertinent.

4.7 Road Safety Impact

- 4.7.1 A total of 17 collisions, resulting in 27 casualties, have occurred within the study area during the five-year study period. Analysis of the study collisions has not revealed any identifiable existing collision issues associated with the expected movements of the proposed development, therefore it is considered that there are no existing road safety issues pertinent to the development of the site.
- 4.7.2 If the proposed site access junction and internal roads are designed with due consideration to road safety, with appropriate highway design features incorporated into the detailed design, then the proposals should not have a detrimental road safety impact on the local highway network and should not adversely affect the safety of pedestrians and cyclists.

5. TRIP GENERATION PROJECTIONS

5.1 Proposed Traffic Generation

5.1.1 The TRICS database is an industry-standard collection of traffic counts and trip generation statistics for calculating trip rates at development sites. The TRICS database has been interrogated to find suitable data to assist in projecting the trip generation of the proposed residential development.

5.1.2 In order to derive reflective trip rates, vehicle trip generation statistics within the 'Houses Privately Owned' category (03-A) of the TRICS database have been interrogated. To ensure that only trip generation statistics for comparable sites were used in calculations, the TRICS sites were filtered to the following criteria:

- Database version: v7.4.2;
- Survey type: Multi-modal sites;
- Size: 50 to 150 dwellings;
- TRICS location type: 'Suburban Area' and 'Edge of Town';
- Regions: England only, excluding Greater London sites;
- Weekday survey data only (exclusion of Saturday and Sunday surveys); and
- Recent survey data only (exclusion of surveys undertaken prior to 01/01/2009).

5.1.3 As there were less than 20 comparable sites in the database after filtering (13 survey sites), mean trip rates (as weighted and calculated by the TRICS software) have been used to project the vehicle trip generation of the proposed development, in accordance with good practice guidelines (TCL, 2016). Details of the site selection and trip rates taken from the TRICS database are attached in full within Appendix 3, with the projected vehicle trip rates and generation shown in Table 7.

Table 7: Projected Vehicle Trip Generation

	AM Peak (08:00-09:00)		PM Peak (17:00-18:00)		Daily (07:00 -19:00) Two-Way Trips
	Arrivals	Departures	Arrivals	Departures	
Houses Privately Owned (03-A)					
Vehicle Trip Rates (per dwelling)	0.135	0.360	0.341	0.161	4.342
Vehicle Trips (93 dwellings)	13	33	32	15	404

5.1.4 The trip generation projections shown in Table 7 indicate that the development could generate up to 46 two-way vehicle trips during the AM peak hour (08:00-09:00), with 47 during the PM peak hour (17:00-18:00) and 404 two-way daily movements (07:00-19:00).

- 5.1.5 A Travel Plan (LTP, 2019) has been produced in association with this TA to help promote and encourage sustainable travel to/from the proposed development. In order to ensure that this assessment robustly analyses a 'worst-case scenario', the potential vehicle trip reducing benefits of the site Travel Plan have not been considered within the trip generation projections. However, it is worth noting that the Travel Plan would be expected to increase the number of trips generated by sustainable modes, and reduce the number of car trips.

5.2 Modal Split & Person Trip Generation

- 5.2.1 The TRICS sites utilised to predict the traffic generation of the development (see Section 5.1) contain multi-modal information, therefore the person trip generation has been predicted based on the person trip rates derived from the comparable TRICS sites, summarised in Table 8 and shown in full as Appendix 3.

Table 8: Projected Person Trip Generation

	AM Peak (08:00-09:00)		PM Peak (17:00-18:00)		12 Hour (07:00 -19:00)
Houses Privately Owned (03-A)	Arrivals	Departures	Arrivals	Departures	Two-Way Trips
Person Trip Rates (per dwelling)	0.208	0.715	0.586	0.246	7.458
Person Trips (93 dwellings)	19	66	54	23	693

- 5.2.2 The modal split of the development has been predicted based on travel pattern information from the comparable residential development sites in the TRICS database, with the number of trips generated by each mode projected utilising the total person trip generation for the site, as summarised in Table 9.

Table 9: Projected Modal Trip Generation

Person Trips	Modal Split	12 Hour (07:00-19:00) Two-Way Trips
Vehicle Drivers	58.2%	404
Vehicle Passengers	18.1%	125
Vehicle Occupants	76.3%	529
Pedestrians	19.5%	135
Cyclists	2.3%	16
Public Transport Users	2.0%	14
TOTAL	100%	693

* The total may not represent the sum of its parts due to rounding

- 5.2.3 These modal split predictions indicate that under half of person trips (41.8%) generated by the development would be expected to be made by sustainable modes (pedestrian, cycle, public transport and car passenger).

- 5.2.4 It is noted that journey to work data from the 2011 National Census could be utilised to predict the modal split of trips generated by the site, however this dataset only represents commuting trips and does not account for journey purposes associated with other trips generated by residential sites, with varying modal splits across different journey purposes and time periods. It is therefore considered to be more representative to base the modal split projections for the proposed residential development on recorded trip generation data from comparable sites within the TRICS database.
- 5.2.5 The previous educational use (primary school) associated with the site would have been expected to generate a number of AM and PM peak hour vehicle trips, possibly more than the peak hour traffic generation for the proposed residential use particularly during the AM peak, as such it is considered that the traffic impact of the proposals should be considered in the context of the impact associated with the previous use.

6. TRAFFIC IMPACT

6.1 Existing Network Traffic Flows

6.1.1 In order to establish the baseline traffic situation across the key local junctions, fully classified turning count surveys were undertaken by a specialist traffic survey company on a neutral weekday during school term-time (Tuesday 17th October 2017) at the following junctions, as requested by BMBC Highways:

- Carlton Road/St Helen's Boulevard priority crossroads; and
- Rotherham Road/Carlton Road signalised junction.

6.1.2 The obtained traffic flows across the aforementioned junctions are illustrated in the network diagrams attached as Appendix 4.

6.2 Peak Hours

6.2.1 The baseline traffic surveys indicate that the network peak hours for the local highway network are weekday AM (07:45-08:45) and PM (16:15-17:15), based on the total number of traffic movements (in terms of Passenger Car Units (PCUs)) recorded across the two junctions. The weekday peak hours for the local highway network reflect the 'worst-case' scenario in terms of network traffic flows, therefore this TA considers the operation of the junctions against these peak periods.

6.3 Committed Development

6.3.1 From a search of the BMBC planning portal, it is considered that there are no notable developments within the vicinity of the proposed development site which this TA should consider.

6.4 Assessment Scenarios

6.4.1 The proposals have been tested against the following weekday AM and PM peak hour traffic flow scenarios:

- **2017 Base** - Traffic flows recorded and observed during the October 2017 traffic surveys;
- **2024 Do Nothing** - '2017 Base' network traffic flows growthed to 2024;
- **2024 With Development** - '2024 Do Nothing' flows with the addition of traffic associated with the proposed development.

6.4.2 The traffic impact of the proposals is typically assessed against the predicted traffic flows 5 years after registration of the planning application, in accordance with guidance from the DfT with respect to the local highway network (DfT, 2007a). At the time of producing this TA, it was assumed that the planning application would be submitted in 2019, therefore the proposals for the application site have been assessed against a horizon year of 2024.

- 6.4.3 The network traffic flows at 2024 have been predicted using the DfT's '*National Traffic Model*' (NTM) and '*National Trip End Model*' (NTEM). The regional growth factor obtained from the NTM has been adjusted to reflect local circumstances from the NTEM, using TEMPro software (Ref: Yorkshire and Humber Dataset Version 7.2), see Appendix 6.

6.5 Trip Distribution & Assignment

- 6.5.1 The distribution of traffic associated with the application site has been predicted utilising a gravity model based upon commuting patterns of existing residents within the '*Barnsley 007*' and '*Barnsley 010*' MSOAs (Middle Layer Super Output Areas), within which the site is situated. '*Location of usual residence and place of work by method of travel to work*' data from the 2011 National Census (ONS, 2014) shows the proportion of local residents travelling to each workplace destination (MSOAs and local authority districts) by mode of travel.
- 6.5.2 This trip distribution data has been combined with an assessment of route choice (traffic assignment) to determine the likely distribution of development traffic across the highway network. The predicted traffic assignment has been undertaken utilising journey planning tools to help determine the relative attractiveness of alternative routes, with consideration of influences such as the location and size of settlements and employment areas within each workplace destination, required junction movements (including consideration of one-way streets etc.), existing directional traffic signing strategy at local junctions and known existing traffic conditions on the relevant routes. The defined zones utilised within the gravity model are illustrated in Figure 6.

Figure 6: Gravity Model Zones



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6.5.3 The detailed calculations of the gravity model are attached as Appendix 6, with the results summarised in Table 10:

Table 10: Gravity Model Results

Zone	Route	Distribution Split (%)
A	Longfields Road	1.0%
B	Carlton Road (NE)	18.1%
C	Laithes Lane	1.8%
D	A633 (N)	21.5%
E	Carlton Road (SW)	32.6%
F	A633 (S)	23.6%
G	Carlton Road Employment (Barnsley 007)	1.3%
TOTAL		100.0%

* The total may not represent the sum of its parts due to rounding

6.6 Impact on Local Junctions

6.6.1 The predicted increase in traffic across the local highway network as a result of the development is summarised in Table 11.

Table 11: Predicted Traffic Impact at Key Local Junctions

Junction	Zones Included	Development Impact (Two-Way Vehicle Trips)
AM PEAK		
St Helen's Boulevard/Carlton Road Junction	All	+46
Carlton Road/Staithes Lane/Longfields Road Roundabout	A,B,C	+10
Carlton Road/Rotherham Road Junction	D,E,F	+36
PM PEAK		
St Helen's Boulevard/Carlton Road Junction	All	+47
Carlton Road/Staithes Lane/Longfields Road Roundabout	A,B,C	+10
Carlton Road/Rotherham Road Junction	D,E,F	+37

6.6.2 The traffic projections summarised in Table 11 indicate that the proposals are expected to generate a maximum of 47 two-way vehicle trips at the St Helen's Boulevard/Carlton Road crossroads during the PM peak hour and 36 two-way vehicle trips during the AM peak hour. The development is expected to generate less than 30 two-way vehicle trips at the Carlton Road/Staithes Lane/Longfields Road roundabout. The following section of the report considers the impact of residential development at the St Helen's Boulevard/Carlton Road crossroads and the Carlton Road/Rotherham Road signalised junction.

6.7 St Helen's Boulevard/Carlton Road Junction Capacity Assessment

6.7.1 In order to assess the ability of the existing St Helen's Boulevard/Carlton Road priority crossroads to accommodate the traffic associated with residential development at the site, a junction capacity assessment has been undertaken using Junctions 9 modelling software (PICADY module), which is a software package produced by Transport Research Laboratory (TRL) that provides an industry-standard method for assessing capacity, queuing and delay at priority junctions and roundabouts.

6.7.2 The geometric input parameters used to create the Junctions 9 model have been measured from relevant scaled Ordnance Survey plans and scaled aerial imagery. The model has been validated against peak hour observations. The baseline and projected future peak hour traffic flows have been assessed against the existing junction layout, the results of which are summarised in Table 12 and the full modelling output attached as Appendix 7.

Table 12: St Helen's Boulevard/Carlton Road Junction Capacity Assessment

Peak	Traffic Stream	2017 Base		2024 Do Nothing		2024 With Development		Development Impact	
		Max. RFC	Max. End Q	Max. RFC	Max. End Q	Max. RFC	Max. End Q	Max. RFC	Max. End Q
AM	St Helens Boulevard (B-CD)	2.3%	0.0	2.8%	0.0	7.8%	0.1	+5.0%	+0.1
	St Helen's Boulevard (B-AD)	1.9%	0.0	2.4%	0.0	4.9%	0.1	+2.5%	+0.1
	Carlton Road (N) (A-BCD)	0.3%	0.0	0.3%	0.0	0.3%	0.0	-	-
	Untitled Road (D-ABC)	-	0.0	-	0.0	-	0.0	-	-
	Carlton Road (S) (C-ABD)	12.8%	0.3	15.4%	0.4	18.2%	0.4	+2.8%	-
	Overall	12.8%	0.3	15.4%	0.4	18.2%	0.4	+5.0%	+0.1
PM	St Helens Boulevard (B-CD)	3.5%	0.0	4.0%	0.0	6.2%	0.1	+2.2%	+0.1
	St Helen's Boulevard (B-AD)	0.9%	0.0	0.9%	0.0	1.9%	0.0	+1.0%	-
	Carlton Road (N) (A-BCD)	-	0.0	-	0.0	-	0.0	-	-
	Untitled Road (D-ABC)	-	0.0	-	0.0	-	0.0	-	-
	Carlton Road (S) (C-ABD)	2.2%	0.0	2.5%	0.0	8.8%	0.2	+6.3%	+0.2
	Overall	3.5%	0.0	4.0%	0.0	8.8%	0.2	+6.3%	+0.2

6.7.3 The capacity assessment results shown in Table 12 indicate that the St Helen's Boulevard/Carlton Road (B6132) priority crossroads would be expected to operate well within capacity across all scenarios in both peak periods. The modelling results indicate that the maximum Ratio of Flow to Capacity (RFC) during the peak hours is likely to be 18.2% (AM peak), which is well below the typical target level of 85%, and comfortably below the 100% RFC level of full capacity. The impact of the proposed development is expected to be minimal with a maximum RFC increase of 6.3%.

6.8 Carlton Road/Rotherham Road Junction Capacity Assessment

6.8.1 In order to assess the ability of the existing Carlton Road/Rotherham Road signalised junction to accommodate the projected future traffic flows, a junction capacity assessment has been undertaken using LinSig v3 software, an industry-standard design and assessment tool for traffic signalised junctions.

- 6.8.2 Signalised controller data for the junction model was requested, however none has been provided by BMBC, therefore suitable assumptions have been made regarding cycle times, intergreens and phasing based on the video footage captured as part of the surveys. The geometric input parameters have been obtained from scaled Ordnance Survey plans and scaled aerial imagery.
- 6.8.3 The baseline and projected future peak hour traffic flows have been assessed against the existing junction layout and operation, the results of which are summarised in Table 13 and the complete modelling output in Appendix 7.

Table 13: Carlton Road/Rotherham Road Signalised Junction Capacity Assessment

Movement From	2017 Base		2024 Do Nothing		2024 With Development		Development Impact	
	DoS (%)	MMQ (PCU)	DoS (%)	MMQ (PCU)	DoS (%)	MMQ (PCU)	DoS (%)	MMQ (PCU)
AM Peak (07:45-08:45)								
Rotherham Road (N)	44.9%	4.6	48.7%	5.4	50.1%	5.4	+1.4%	-
Carlton Road (E)	77.2%	9.1	88.5%	12.8	90.8%	15.1	+2.3%	+2.3
Rotherham Road (S)	79.0%	10.8	86.9%	14.0	89.3%	14.5	+2.4%	+0.5
Carlton Road (W)	51.2%	5.0	58.8%	6.2	57.8%	6.8	-1.0%	+0.6
Practical Reserve Capacity (PRC)	+13.9%		+1.6%		-0.9%		-0.7%	
PM Peak (16:15-17:15)								
Rotherham Road (N)	55.4%	6.1	60.9%	6.9	61.8%	7.2	+0.9%	+0.3
Carlton Road (E)	67.8%	6.7	75.7%	8.8	77.8%	9.5	+2.1%	+0.7
Rotherham Road (S)	67.4%	8.2	75.1%	9.8	76.3%	10.0	+1.2%	+0.2
Carlton Road (W)	61.3%	5.8	68.5%	7.5	70.1%	8.0	+1.6%	+0.5
Practical Reserve Capacity (PRC)	+32.7%		+18.9%		+15.6%		-3.3%	

- 6.8.4 The results of the capacity assessments present in Table 13 indicate that the existing Carlton Road/Rotherham Road signalised junction is predicted to operate within 100% capacity during all modelled scenarios with the proposed development in place. All arms are expected to operate with positive levels of Practical Reserve Capacity (PRC) during the PM peak hour, with a maximum Degree of Saturation (DoS) of 77.8%. The maximum DoS during the AM peak hour is expected to be 90.8% in the 2024 With Development scenario (Carlton Road (E) arm), which represents a PRC change of -2.5% associated with the development. It is therefore considered that the impact of the development at this junction is not significant.
- 6.8.5 The junction currently forms part of an Urban Traffic Control (UTC) system, with tools currently in operation at the junction that maximise operational efficiency, such as MOVA (Microprocessor Optimised Vehicle Actuation). The capacity-enhancing benefits of such additional tools cannot be represented accurately within the LinSig modelling programme, therefore it would be reasonable to assume that the modelling results outlined above represent an underestimation of the capacity of the junction operation.

6.9 Traffic Impact Summary

- 6.9.1 The DfT has previously issued guidance that transport assessment of development impacts could be based on a threshold of *“30 two-way peak hour vehicle trips”* (DfT, 2007a). This guidance acknowledged that this threshold was not to be applied rigidly, but rather that it provided *“a useful point of reference from which to commence discussions”*.
- 6.9.2 This national DfT guidance has now been superseded and replaced with the *‘National Planning Policy Framework’* (NPPF) (MHCLG, 2019) and its accompanying *‘Planning Practice Guidance’* (PPG) (DCLG, 2014). NPPF and PPG require that transport assessment is undertaken for *“developments that generate significant amounts of movement”*, although this is not defined. It is therefore acknowledged that there is no set threshold for assessment within the current national planning policy.
- 6.9.3 As detailed in Section 5.1, the development proposals are expected to generate a maximum of 46 two-way vehicle movements at the site during the AM peak hour and 47 during the PM peak hour.
- 6.9.4 Based on the results of the junction capacity assessments, the local junctions are expected to operate within capacity with the residential development fully constructed. The impact of the development at the assessed junction is not expected to be significant.
- 6.9.5 Therefore, as the impact of the development is not expected to be significant, the proposals are considered to be in accordance with the *‘National Planning Policy Framework’* (MHCLG, 2019), which states that *“development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe”* (MHCLG, 2019).

7. CONCLUSIONS

- 7.1.1 This TA provides a detailed appraisal of the expected transport impacts associated with proposals for a residential development on land south of St Helen's Boulevard, Barnsley.
- 7.1.2 The proposals involve the development of the site to accommodate 93 dwellings, with vehicular access to the site via the existing access junction from St Helen's Boulevard. Pedestrian and cycle access to the site would also be provided via this access.
- 7.1.3 The scope of this report has been agreed with BMBC Highways as part of pre-application scoping and has been produced in accordance with the relevant local and national guidance.
- 7.1.4 A Travel Plan (LTP, 2019) that provides a strategy for encouraging sustainable travel at the proposed development site has been produced in conjunction with this TA as a separate document.
- 7.1.5 The site is located approximately 3.5km north-east of Barnsley town centre, with access to pedestrian, cycle and public transport facilities. The proposed development site is located close to good pedestrian routes, with good quality footways within close proximity of the site, providing good access to local amenities. The site is located within a reasonable cycle ride of the majority of the built-up area of Barnsley. The nearest bus stops to the proposed development are located on Carlton Road, providing travel in both directions, situated an approximately 140m (northbound) and 270m (southbound) walk from the proposed development site providing access to the #12 service. The nearest rail station to the site is Barnsley Rail Station which is located approximately 2.8km south-west of the site providing access to local, regional and national destinations including Leeds, Sheffield, Huddersfield and Nottingham.
- 7.1.6 A road casualty study showed that 17 PICs occurred within the study area around the proposed development site during the 5-year study period. Analysis of the study collisions has not revealed any identifiable existing collision issues associated with the expected movements generated by the proposed development, therefore it is considered that there are no existing road safety issues pertinent to the development of the site. If the proposed access junction and internal roads of the proposed development are designed with due consideration to road safety, then the proposals should not have a detrimental road safety impact on the local transport network and should not adversely affect the safety of pedestrians and cyclists.
- 7.1.7 The vehicle and person trip generation of the proposed development has been projected using the industry-standard TRICS database, with the impact of up to 93 dwellings assessed. The traffic projections indicate that when fully-built, the proposed residential development is expected to generate up to 46 two-way vehicle trips during the AM peak hour (08:00-09:00), with 47 during the PM peak hour (17:00-18:00) and 404 daily movements (07:00-19:00).

- 7.1.8 The modal split of the proposed development has been predicted based on travel pattern information from the comparable residential development sites in the TRICS database. The modal split predictions indicate that under half of person trips (41.8%) generated by the development would be expected to be made by sustainable modes (pedestrian, cycle, public transport and car passenger).
- 7.1.9 The distribution and assignment of traffic associated with the proposed development has been predicted utilising a gravity model based upon commuting patterns of existing residents in the local area.
- 7.1.10 In order to assess the ability of local junctions to accommodate the traffic associated with the proposed development, junction capacity assessments have been undertaken at two local junctions, using the industry-standard Junctions 9 and LinSig v3 modelling software. The results show that the local junctions are expected to operate within capacity in 2024 with the development in place. Furthermore, the previous educational use (primary school) associated with the site would have been expected to generate a number of AM and PM peak hour vehicle trips, possibly more than the peak hour traffic generation for the proposed residential use particularly during the AM peak.
- 7.1.11 The proposed development is expected to generate less than 30 two-way trips at the Carlton Road/Staithes Lane/Longfields Road and as such it is considered that the proposed development would not be expected to have a significant impact on the operation of this junction.
- 7.1.12 Based on the traffic flow forecasts and capacity assessments of this TA, it is considered that the proposed residential development would not be expected to have a significant impact on the operation of the local highway network. The relevant test is that development *“should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe”* (MHCLG, 2019). The projections of this TA indicate that the proposed development will not have a severe transport impact, therefore the proposed development is in accordance with the *‘National Planning Policy Framework’* (MHCLG, 2019).
- 7.1.13 It is concluded from the assessments within this TA that the proposed development would not be expected to have a severe impact in terms of sustainable travel, road safety and traffic impact.

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Appendix I – Site Layout Plan

Notes:

This drawing design and concepts are copyright of STEN Architecture.

All Dimensions are to be verified on site before any work commences. If any discrepancies, errors are emissions are noted, these are to be report to STEN architecture immediately.

If any other drawings are reference within this layout, please refer to the specific detailed drawing for design, materials and specific working practices.

PLANNING LAYOUT KEY:

- Boundary treatments
- 1800mm high screen wall
 - 1800mm high timber fence
 - 1000mm high metal railings
 - Low trip fence
 - Private, non-adopted, block paving
 - Adopted Block paving
 - Bin collection point (bin collection day only)
 - Tree/vegetation to be retained.
 - Root protection Zone.
 - Tree/vegetation to be removed.
 - Indicative planting

Accommodation schedule							
Private							
Type	GIA (sqft)	GIA (sqm)	Arrangement	Requested	Total Units	GIA Total (sqft)	GIA Total (sqm)
Halstead End	651	60.52	End/Semi		9	5859	545
Halstead Mid	651	60.52	Mid		3	1953	182
Danbury End	832	77.31	End/Semi		12	9984	928
Caddington End	850	78.98	End/Semi		20	17000	1580
Caddington Mid	850	78.98	Mid		2	1700	158
Windsor End	869	80.71	End/Semi		5	4345	404
Windsor Det	869	80.71	Detached		4	3476	323
Warwick	869	80.71	Detached		1	869	81
Barnburgh End	1051	97.68	End/Semi		26	27326	2540
Rothway	1028	95.47	End/Semi		6	6168	573
Eaton	1279	118.81	Detached		4	5116	475
Cambridge	1251	116.25	Detached		1	1251	116
Grand total					93	85047	7903

D	Rumble strip removed and adoptable footpath adjacent plot ?? introduced.	TS	15.07.19
C	Raised tables/squares updated to clients comments.	TS	15.07.19
B	Paving to fronts of plots 23-32 & 71-86 amended to clients comments	TS	11.07.19
A	Layout updated to clients comments.	TS	09.07.19
REV:	DESCRIPTION:	BY:	DATE:

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Homes

SITE:

Carlton Road
Carlton, Barnsley

TITLE:

Planning layout

SCALE AT A1:

DATE:

DRAWN:

CHECKED:

1:500

03.07.19

TS

--

PROJECT NO:

DRAWING NO:

REVISION:

1931

1931.01

D

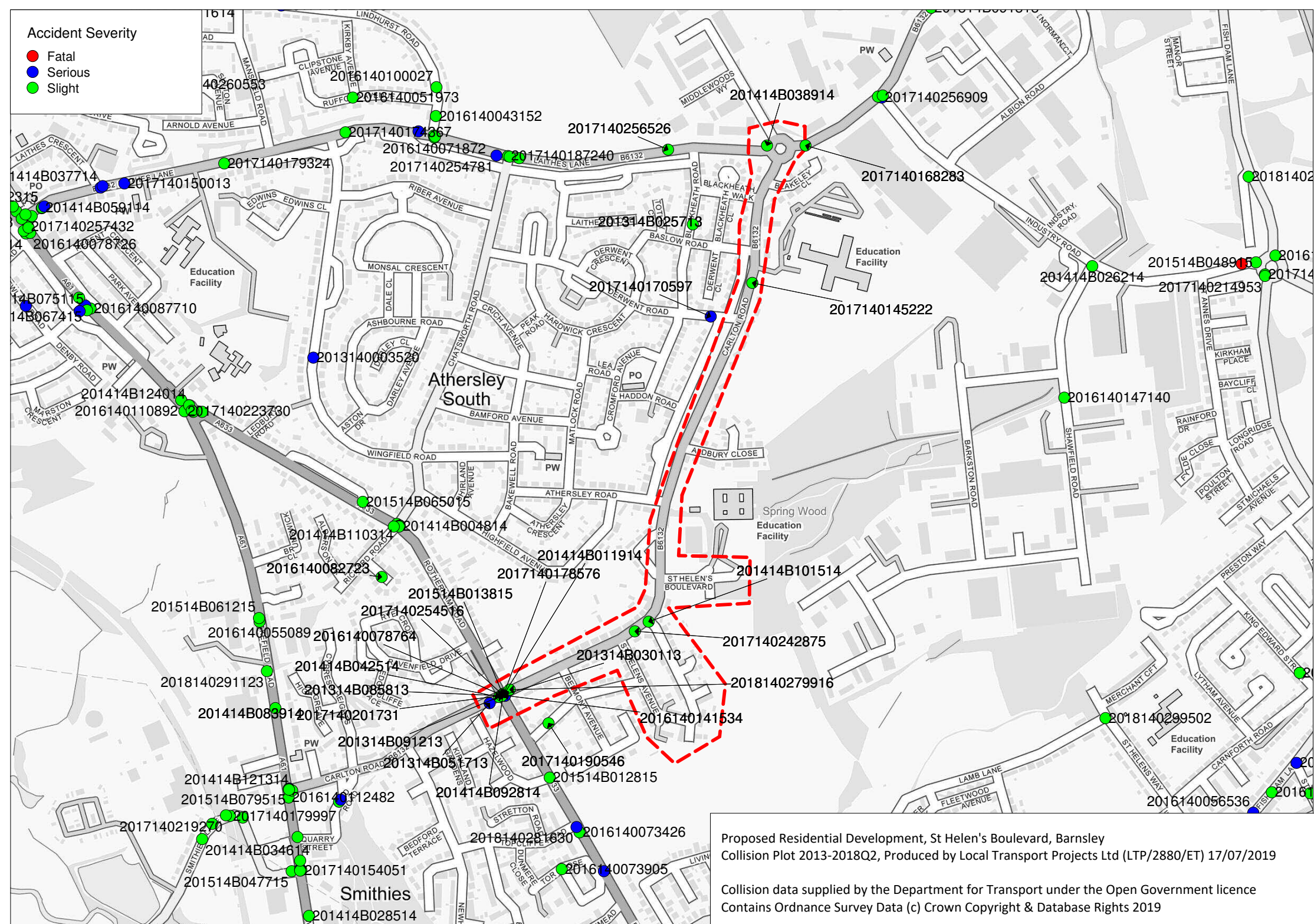
Scaled @ 1:500

0 10m 20m 50m

Appendix 2 – PIC Study Plot

Accident Severity

- Fatal
- Serious
- Slight



Appendix 3 – TRICS Output

Projected Vehicle Trip Generation

93 dwellings

Vehicle Trip Rates (per dwelling)

Time	IN	OUT	TOTAL
07:00-08:00	0.069	0.274	0.343
08:00-09:00	0.135	0.36	0.495
09:00-10:00	0.15	0.162	0.312
10:00-11:00	0.14	0.178	0.318
11:00-12:00	0.147	0.156	0.303
12:00-13:00	0.164	0.155	0.319
13:00-14:00	0.161	0.15	0.311
14:00-15:00	0.148	0.164	0.312
15:00-16:00	0.219	0.14	0.359
16:00-17:00	0.243	0.158	0.401
17:00-18:00	0.341	0.161	0.502
18:00-19:00	0.221	0.146	0.367

TOTAL	2.138	2.204	4.342
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TRICS v7.4.2 MM, Mean 03-A, 50-150 dwells, England only (exc. GL), 'Edge of Town' and 'Suburban Area', exc. Sat/Sun, 04+ (13)

Vehicle Trips

IN	OUT	TOTAL
6	25	31
13	33	46
14	15	29
13	17	30
14	15	29
15	14	29
15	14	29
14	15	29
20	13	33
23	15	38
32	15	47
21	14	35

199	205	404
-----	-----	-----

Projected Person Trip Generation

Person Trip Rates (per dwelling)

Time	IN	OUT	TOTAL
07:00-08:00	0.103	0.439	0.542
08:00-09:00	0.208	0.715	0.923
09:00-10:00	0.231	0.291	0.522
10:00-11:00	0.233	0.297	0.530
11:00-12:00	0.233	0.246	0.479
12:00-13:00	0.264	0.241	0.505
13:00-14:00	0.259	0.263	0.522
14:00-15:00	0.233	0.267	0.500
15:00-16:00	0.479	0.265	0.744
16:00-17:00	0.466	0.281	0.747
17:00-18:00	0.586	0.246	0.832
18:00-19:00	0.365	0.247	0.612

TOTAL	3.660	3.798	7.458
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Projected Person Trip Generation

Person Trip Rates (per dwelling)

Time	IN	OUT	TOTAL
07:00-08:00	10	41	51
08:00-09:00	19	66	85
09:00-10:00	21	27	48
10:00-11:00	22	28	50
11:00-12:00	22	23	45
12:00-13:00	25	22	47
13:00-14:00	24	24	48
14:00-15:00	22	25	47
15:00-16:00	45	25	70
16:00-17:00	43	26	69
17:00-18:00	54	23	77
18:00-19:00	34	23	57

TOTAL	340	353	693
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Projected Modal Split

Proportion of Vehicle Trips

Time	IN	OUT	TOTAL
07:00-08:00	67.0%	62.4%	63.3%
08:00-09:00	64.9%	50.3%	53.6%
09:00-10:00	64.9%	55.7%	59.8%
10:00-11:00	60.1%	59.9%	60.0%
11:00-12:00	63.1%	63.4%	63.3%
12:00-13:00	62.1%	64.3%	63.2%
13:00-14:00	62.2%	57.0%	59.6%
14:00-15:00	63.5%	61.4%	62.4%
15:00-16:00	45.7%	52.8%	48.3%
16:00-17:00	52.1%	56.2%	53.7%
17:00-18:00	58.2%	65.4%	60.3%
18:00-19:00	60.5%	59.1%	60.0%

TOTAL	58.4%	58.0%	58.2%
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Projected Modal Trip Generation - (100 dwellings)

Mode	Split	12-Hour (07:00-19:00)		
		IN	OUT	TOTAL
Vehicle Drivers	58.2%	198	206	404
Vehicle Passengers	18.1%	61	64	125
Vehicle Occupants Sub-Total	76.3%	259	270	529

Pedestrian	19.5%	66	69	135
Pedal-cycle	2.3%	8	8	16
Public Transport	2.0%	7	7	14
	23.8%	81	84	165

Total Person Trips	100%	340	353	693
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Calculation Reference: AUDIT-342901-170911-0935

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
 Category : A - HOUSES PRIVATELY OWNED

MULTI-MODAL VEHICLESSelected regions and areas:

02	SOUTH EAST	
	HC HAMPSHIRE	1 days
	SC SURREY	1 days
03	SOUTH WEST	
	DV DEVON	2 days
04	EAST ANGLIA	
	NF NORFOLK	1 days
06	WEST MIDLANDS	
	SH SHROPSHIRE	2 days
07	YORKSHIRE & NORTH LINCOLNSHIRE	
	NY NORTH YORKSHIRE	3 days
	SY SOUTH YORKSHIRE	1 days
09	NORTH	
	CB CUMBRIA	1 days
	DH DURHAM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Number of dwellings
 Actual Range: 50 to 116 (units:)
 Range Selected by User: 50 to 150 (units:)

Public Transport Provision:

Selection by: Include all surveys

Date Range: 01/01/09 to 28/03/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	3 days
Tuesday	3 days
Wednesday	1 days
Thursday	3 days
Friday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	13 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaken using machines.

Selected Locations:

Suburban Area (PPS6 Out of Centre)	9
Edge of Town	4

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	10
No Sub Category	3

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3

13 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	2 days
5,001 to 10,000	6 days
10,001 to 15,000	3 days
15,001 to 20,000	1 days
20,001 to 25,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	3 days
25,001 to 50,000	3 days
75,001 to 100,000	4 days
100,001 to 125,000	1 days
125,001 to 250,000	1 days
250,001 to 500,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	11 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	12 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	13 days
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This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1	CB-03-A-04	SEMI DETACHED		CUMBRIA
	MOORCLOSE ROAD			
	SALTERBACK			
	WORKINGTON			
	Edge of Town			
	No Sub Category			
	Total Number of dwellings:	82		
	Survey date: FRIDAY	24/04/09		Survey Type: MANUAL
2	DH-03-A-01	SEMI DETACHED		DURHAM
	GREENFIELDS ROAD			
	BISHOP AUCKLAND			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of dwellings:	50		
	Survey date: TUESDAY	28/03/17		Survey Type: MANUAL
3	DV-03-A-02	HOUSES & BUNGALOWS		DEVON
	MILLHEAD ROAD			
	HONITON			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of dwellings:	116		
	Survey date: FRIDAY	25/09/15		Survey Type: MANUAL
4	DV-03-A-03	TERRACED & SEMI DETACHED		DEVON
	LOWER BRAND LANE			
	HONITON			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of dwellings:	70		
	Survey date: MONDAY	28/09/15		Survey Type: MANUAL
5	HC-03-A-18	HOUSES & FLATS		HAMPSHIRE
	CANADA WAY			
	LIPHOOK			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of dwellings:	62		
	Survey date: TUESDAY	29/11/16		Survey Type: MANUAL
6	NF-03-A-02	HOUSES & FLATS		NORFOLK
	DEREHAM ROAD			
	NORWICH			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of dwellings:	98		
	Survey date: MONDAY	22/10/12		Survey Type: MANUAL
7	NY-03-A-06	BUNGALOWS & SEMI DET.		NORTH YORKSHIRE
	HORSEFAIR			
	BOROUGHBRIDGE			
	Suburban Area (PPS6 Out of Centre)			
	Residential Zone			
	Total Number of dwellings:	115		
	Survey date: FRIDAY	14/10/11		Survey Type: MANUAL

LIST OF SITES relevant to selection parameters (Cont.)

8	NY-03-A-09	MIXED HOUSING	NORTH YORKSHIRE
	GRAMMAR SCHOOL LANE		
	NORTHALLERTON		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total Number of dwellings:	52	
	Survey date: MONDAY	16/09/13	Survey Type: MANUAL
9	NY-03-A-10	HOUSES AND FLATS	NORTH YORKSHIRE
	BOROUGHBRIDGE ROAD		
	RIPON		
	Edge of Town		
	No Sub Category		
	Total Number of dwellings:	71	
	Survey date: TUESDAY	17/09/13	Survey Type: MANUAL
10	SC-03-A-04	DETACHED & TERRACED	SURREY
	HIGH ROAD		
	BYFLEET		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	71	
	Survey date: THURSDAY	23/01/14	Survey Type: MANUAL
11	SH-03-A-04	TERRACED	SHROPSHIRE
	ST MICHAEL'S STREET		
	SHREWSBURY		
	Suburban Area (PPS6 Out of Centre)		
	No Sub Category		
	Total Number of dwellings:	108	
	Survey date: THURSDAY	11/06/09	Survey Type: MANUAL
12	SH-03-A-05	SEMI-DETACHED/TERRACED	SHROPSHIRE
	SANDCROFT		
	SUTTON HILL		
	TELFORD		
	Edge of Town		
	Residential Zone		
	Total Number of dwellings:	54	
	Survey date: THURSDAY	24/10/13	Survey Type: MANUAL
13	SY-03-A-01	SEMI DETACHED HOUSES	SOUTH YORKSHIRE
	A19 BENTLEY ROAD		
	BENTLEY RISE		
	DONCASTER		
	Suburban Area (PPS6 Out of Centre)		
	Residential Zone		
	Total Number of dwellings:	54	
	Survey date: WEDNESDAY	18/09/13	Survey Type: MANUAL

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

MULTI-MODAL VEHICLES**Calculation factor: 1 DWELLS****BOLD print indicates peak (busiest) period**

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	13	77	0.069	13	77	0.274	13	77	0.343
08:00 - 09:00	13	77	0.135	13	77	0.360	13	77	0.495
09:00 - 10:00	13	77	0.150	13	77	0.162	13	77	0.312
10:00 - 11:00	13	77	0.140	13	77	0.178	13	77	0.318
11:00 - 12:00	13	77	0.147	13	77	0.156	13	77	0.303
12:00 - 13:00	13	77	0.164	13	77	0.155	13	77	0.319
13:00 - 14:00	13	77	0.161	13	77	0.150	13	77	0.311
14:00 - 15:00	13	77	0.148	13	77	0.164	13	77	0.312
15:00 - 16:00	13	77	0.219	13	77	0.140	13	77	0.359
16:00 - 17:00	13	77	0.243	13	77	0.158	13	77	0.401
17:00 - 18:00	13	77	0.341	13	77	0.161	13	77	0.502
18:00 - 19:00	13	77	0.221	13	77	0.146	13	77	0.367
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.138			2.204			4.342

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: $COUNT/TRP*FACT$. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	50 - 116 (units:)
Survey date date range:	01/01/09 - 28/03/17
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

MULTI-MODAL TOTAL PEOPLE**Calculation factor: 1 DWELLS****BOLD print indicates peak (busiest) period**

Time Range	ARRIVALS			DEPARTURES			TOTALS		
	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	13	77	0.103	13	77	0.439	13	77	0.542
08:00 - 09:00	13	77	0.208	13	77	0.715	13	77	0.923
09:00 - 10:00	13	77	0.231	13	77	0.291	13	77	0.522
10:00 - 11:00	13	77	0.233	13	77	0.297	13	77	0.530
11:00 - 12:00	13	77	0.233	13	77	0.246	13	77	0.479
12:00 - 13:00	13	77	0.264	13	77	0.241	13	77	0.505
13:00 - 14:00	13	77	0.259	13	77	0.263	13	77	0.522
14:00 - 15:00	13	77	0.233	13	77	0.267	13	77	0.500
15:00 - 16:00	13	77	0.479	13	77	0.265	13	77	0.744
16:00 - 17:00	13	77	0.466	13	77	0.281	13	77	0.747
17:00 - 18:00	13	77	0.586	13	77	0.246	13	77	0.832
18:00 - 19:00	13	77	0.365	13	77	0.247	13	77	0.612
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			3.660			3.798			7.458

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

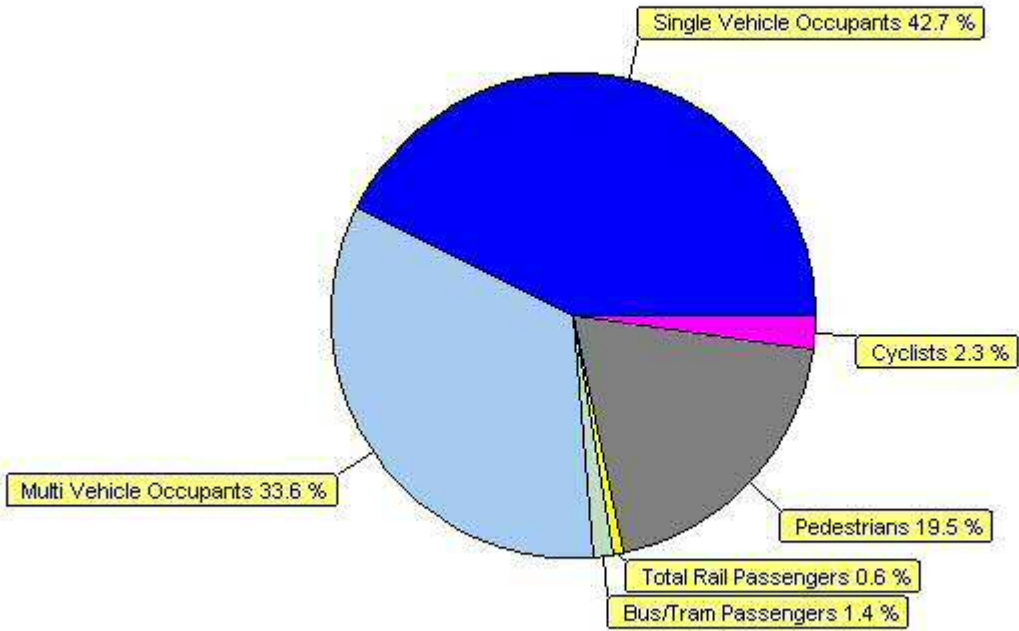
To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: $COUNT/TRP*FACT$. Trip rates are then rounded to 3 decimal places.

Parameter summary

Trip rate parameter range selected:	50 - 116 (units:)
Survey date range:	01/01/09 - 28/03/17
Number of weekdays (Monday-Friday):	13
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	0
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are shown. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

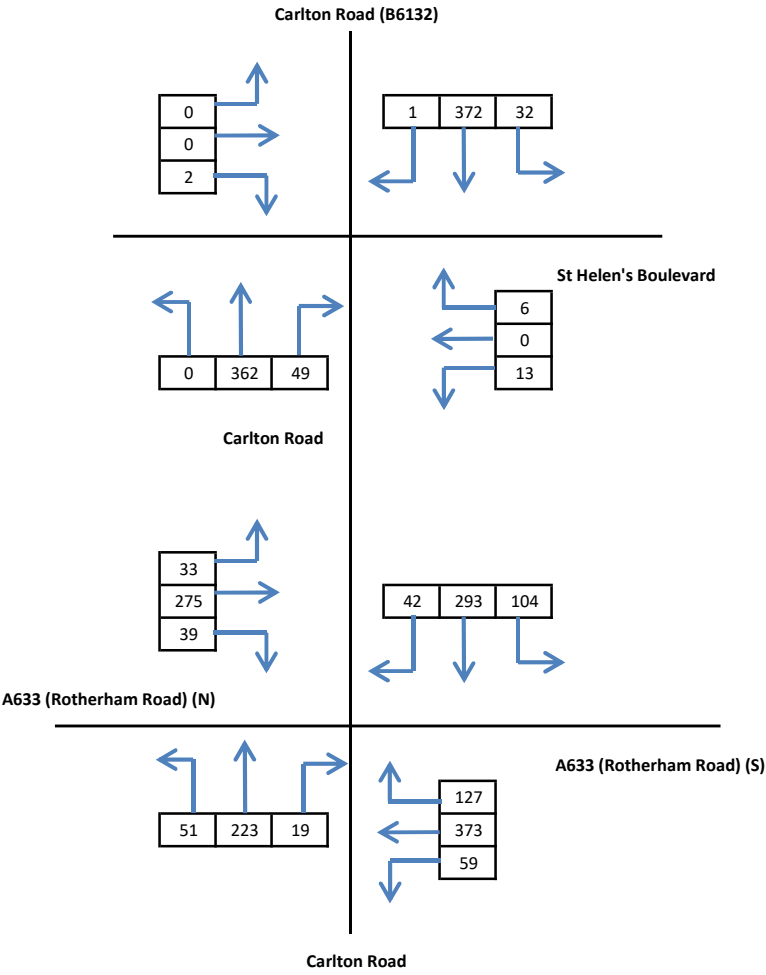
Modal Split Percentages



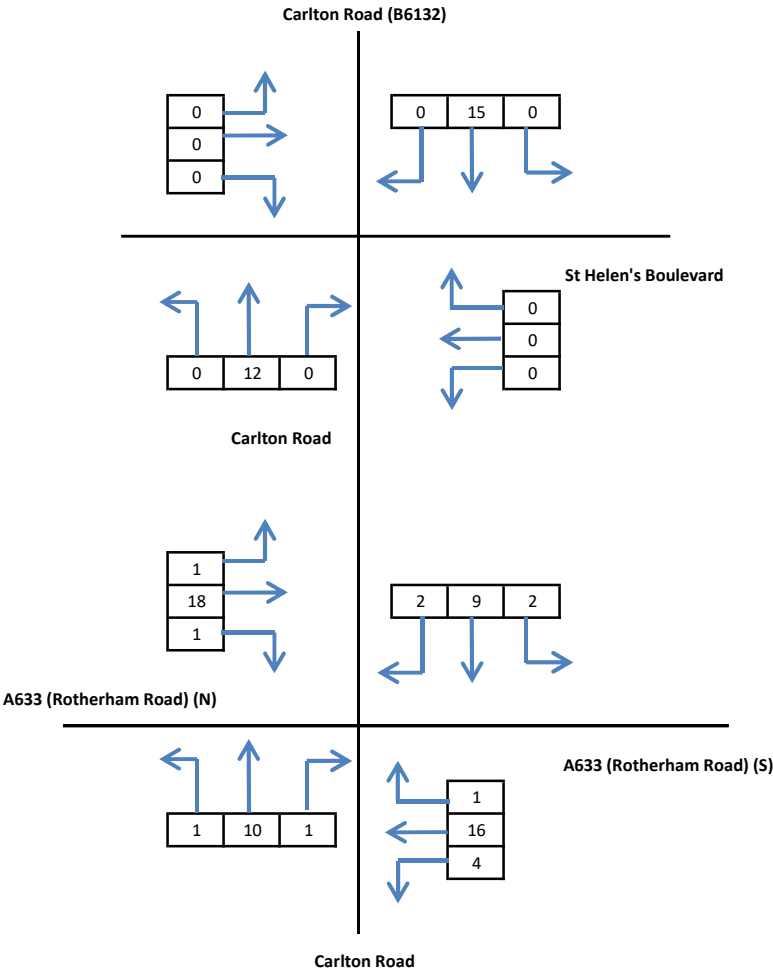
Time Range/Peak Period Selection
Direction: Totals / Use All Times

Appendix 4 – Network Diagrams

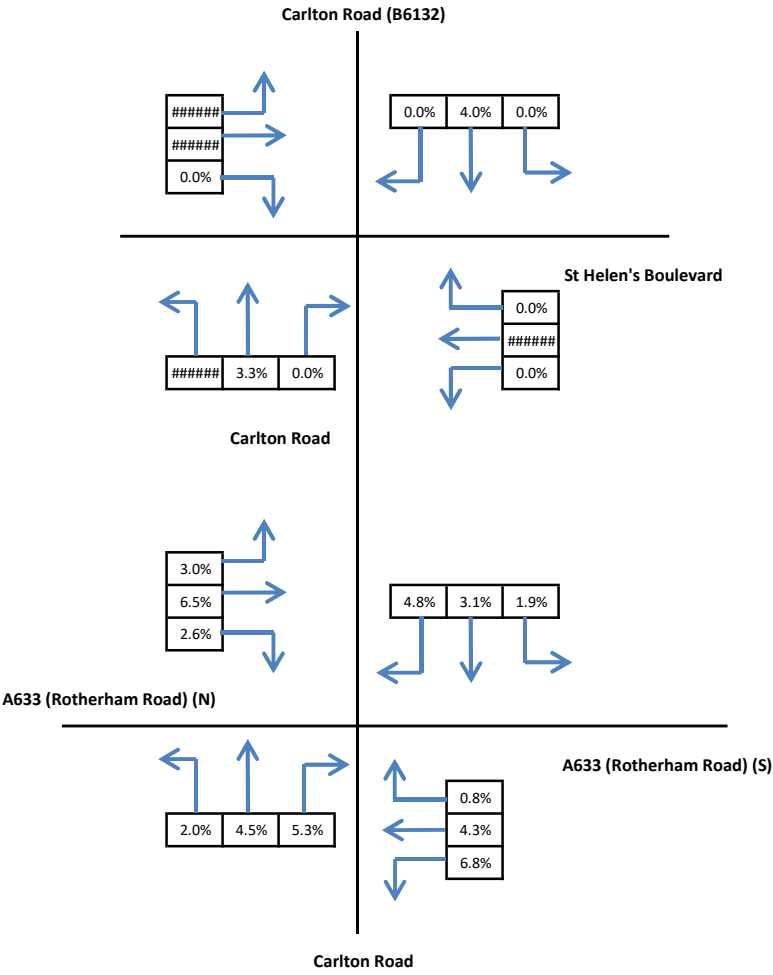
2017 Base
AM Peak (07:45-08:45)
Vehicles



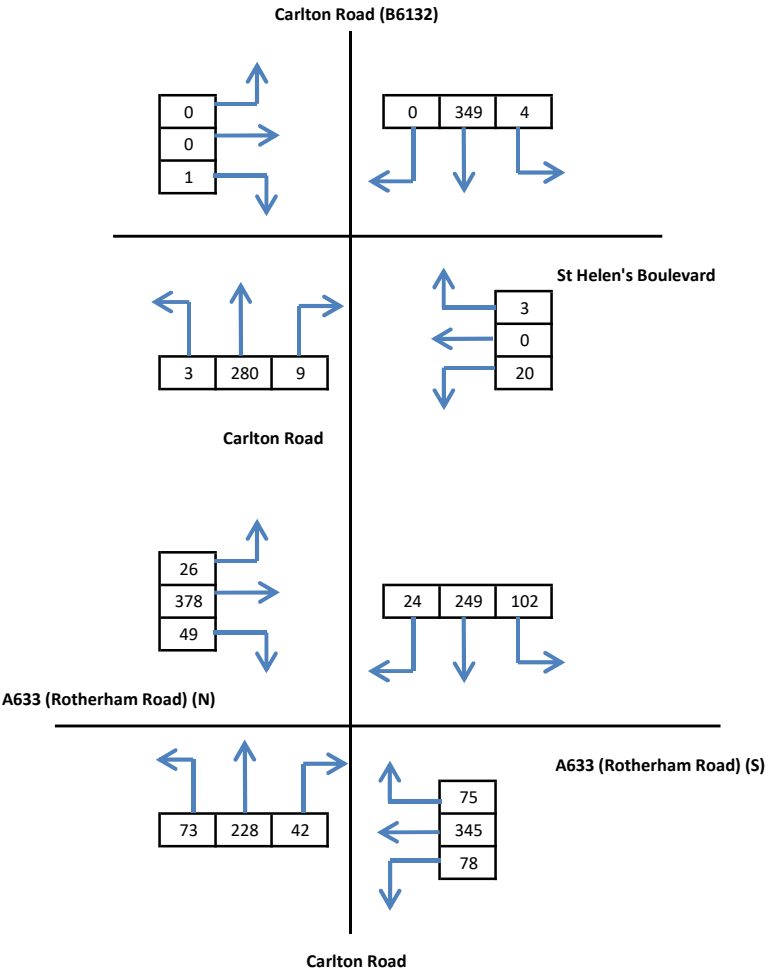
2017 Base
AM Peak (07:45-08:45)
HCVs



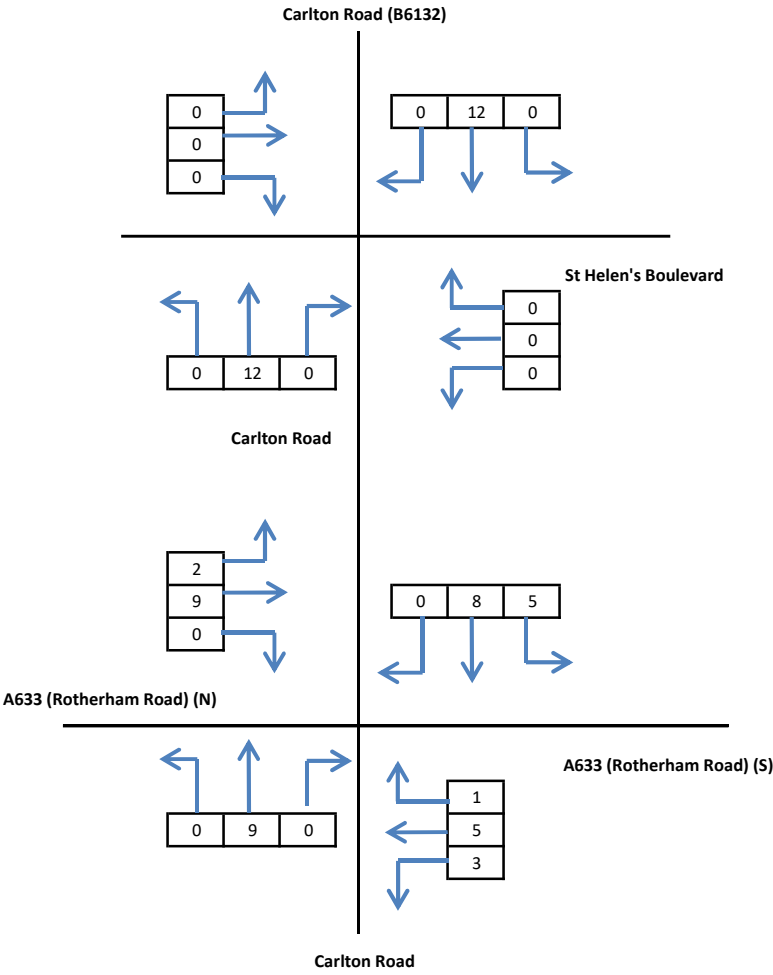
2017 Base
AM Peak (07:45-08:45)
HCVs (%)



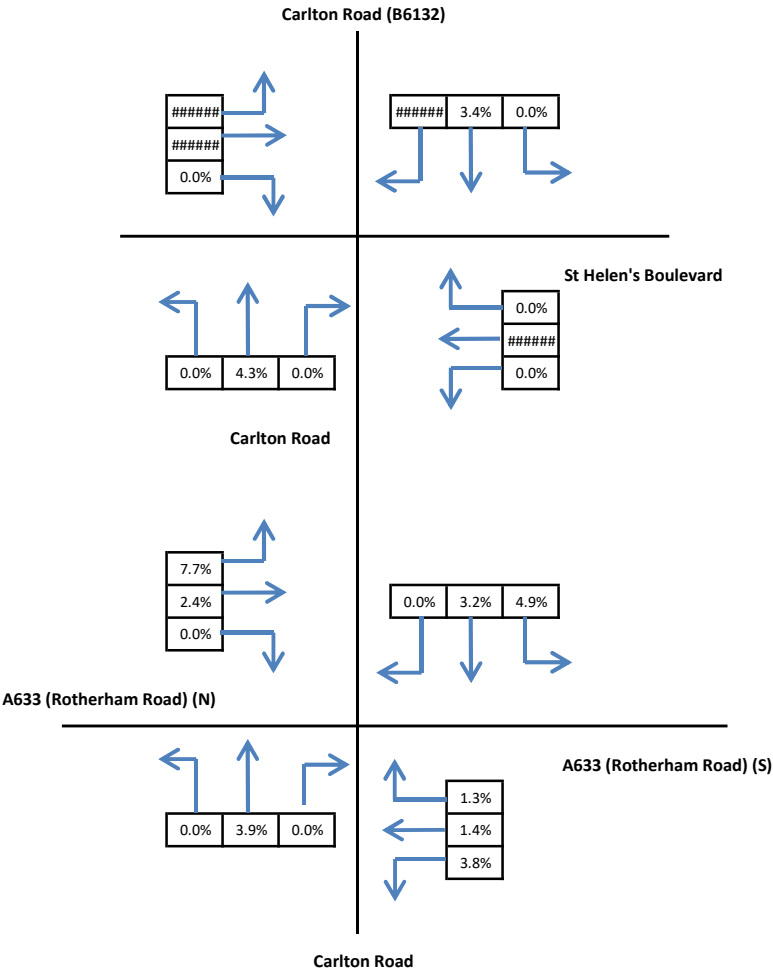
2017 Base
PM Peak (16:15-17:15)
Vehicles

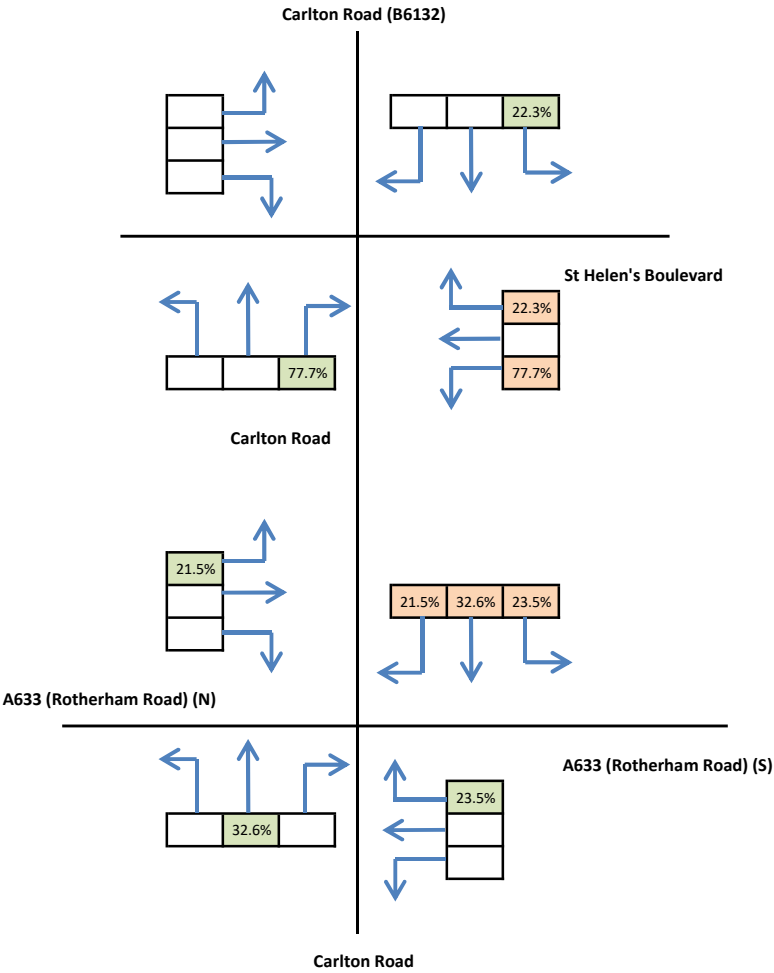
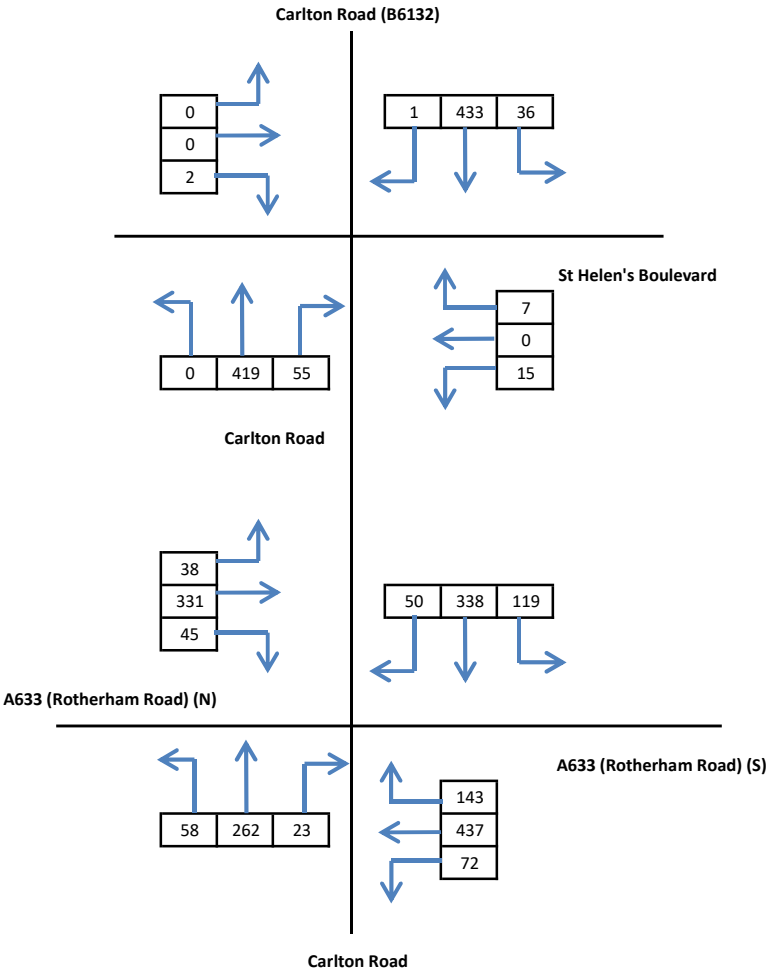
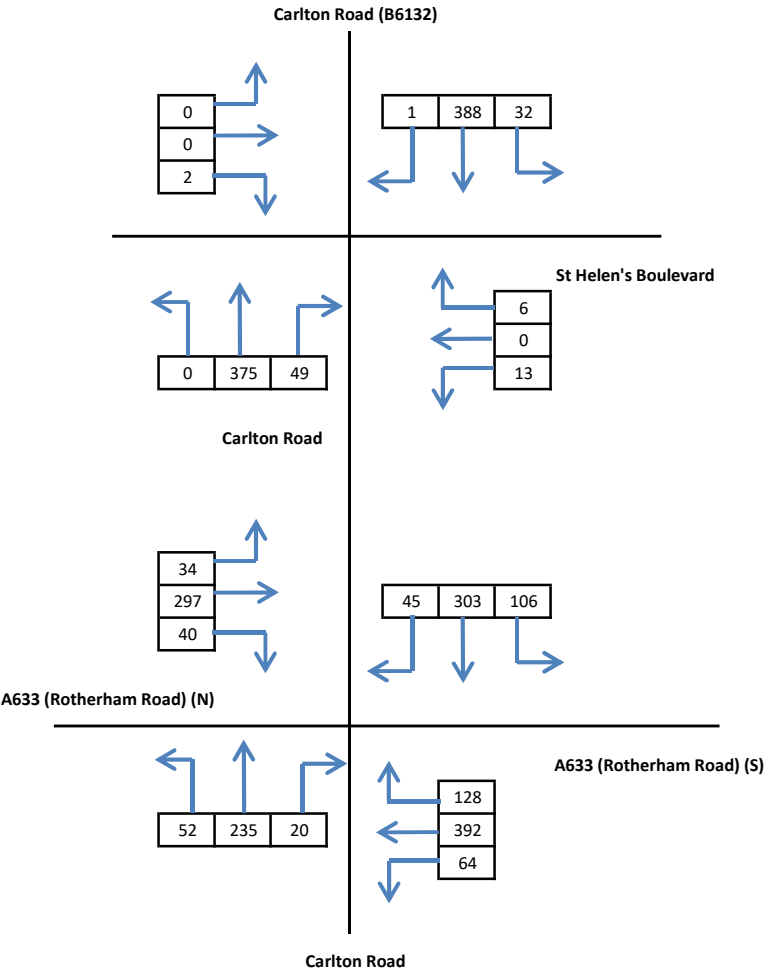


2017 Base
PM Peak (16:15-17:15)
HCVs

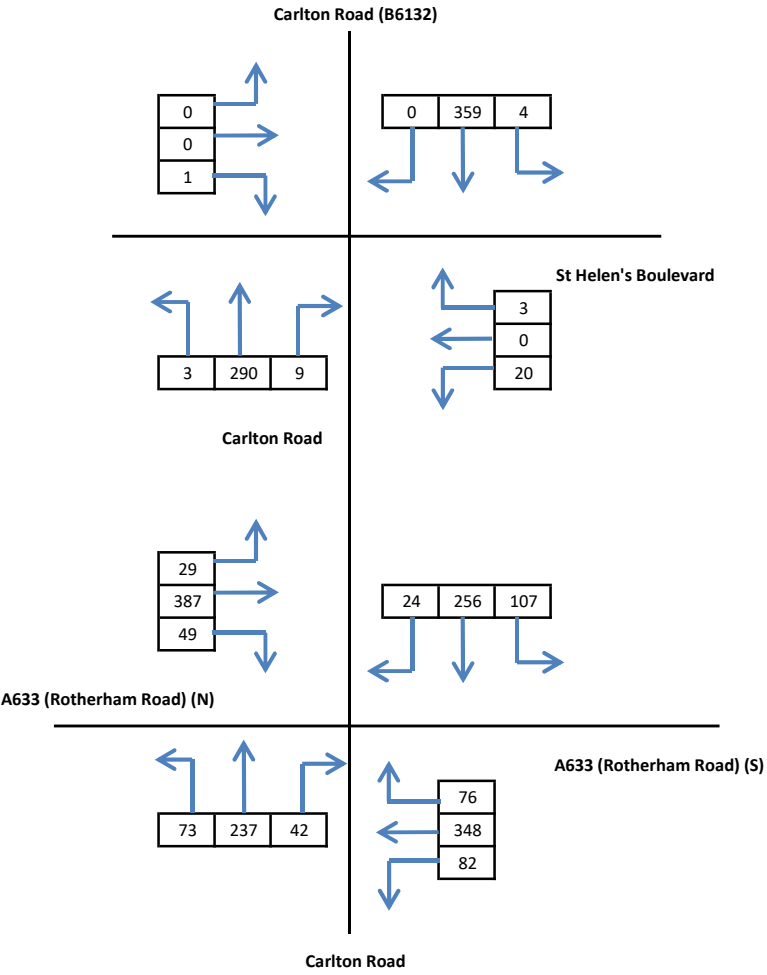


2017 Base
PM Peak (16:15-17:15)
HCVs (%)





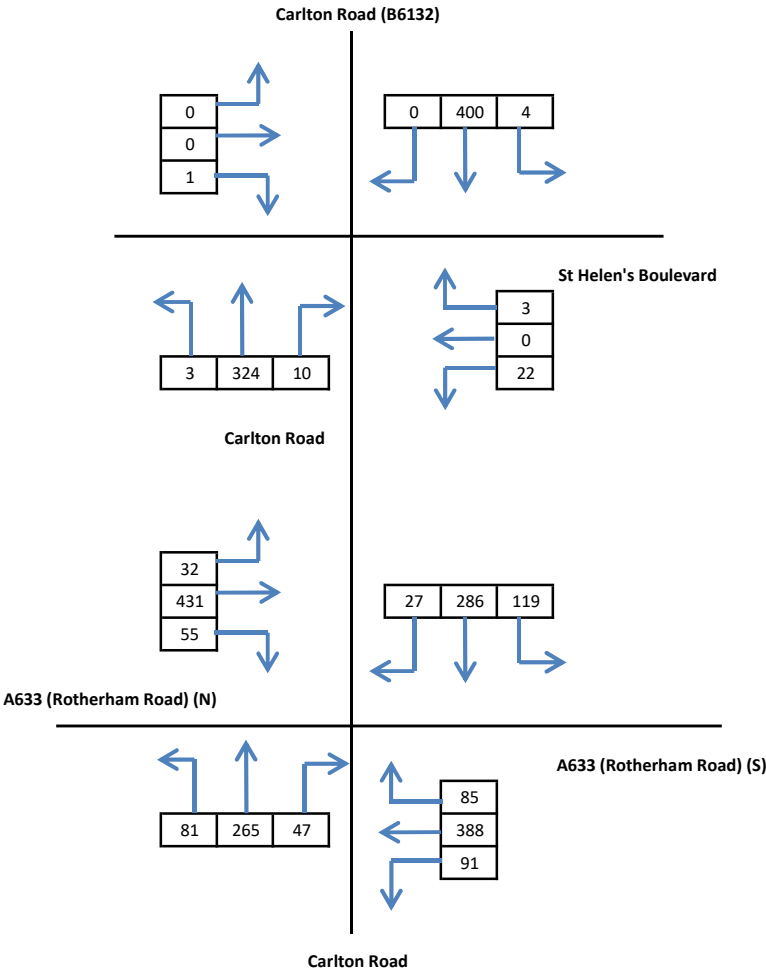
2017 Base
PM Peak (16:15-17:15)
PCUs



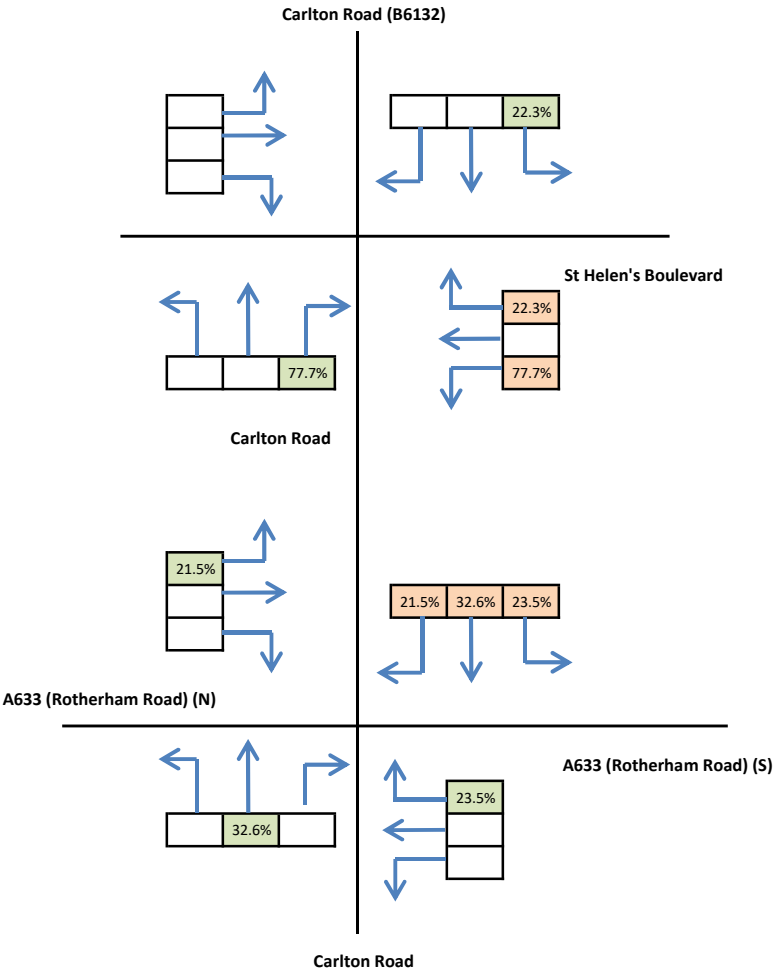
2024 Do Nothing
PM Peak (16:15-17:15)
PCUs

Tempro Traffic Growth 2017 to 2022

11.5%



Residential Trip Distribution
PM Peak (16:15-17:15)



Residential Development Trips

AM Peak (07:45-08:45)

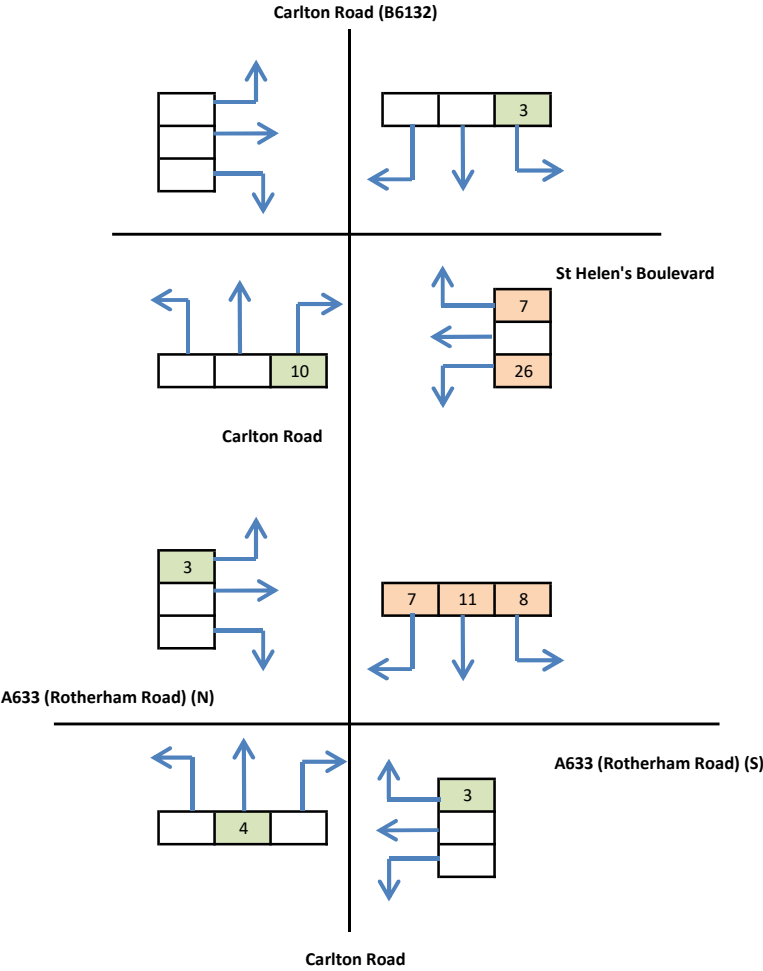
PCUs

Arrivals

13

Departures

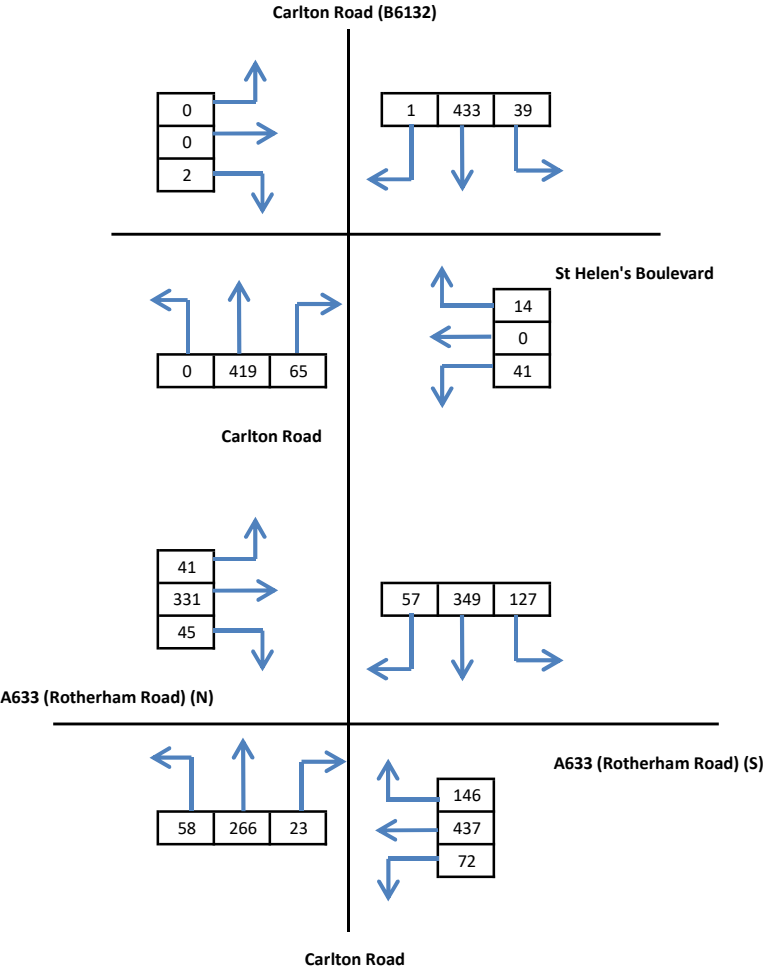
33



2024 With Development

AM Peak (07:45-08:45)

PCUs



Residential Development Trips

PM Peak (16:15-17:15)

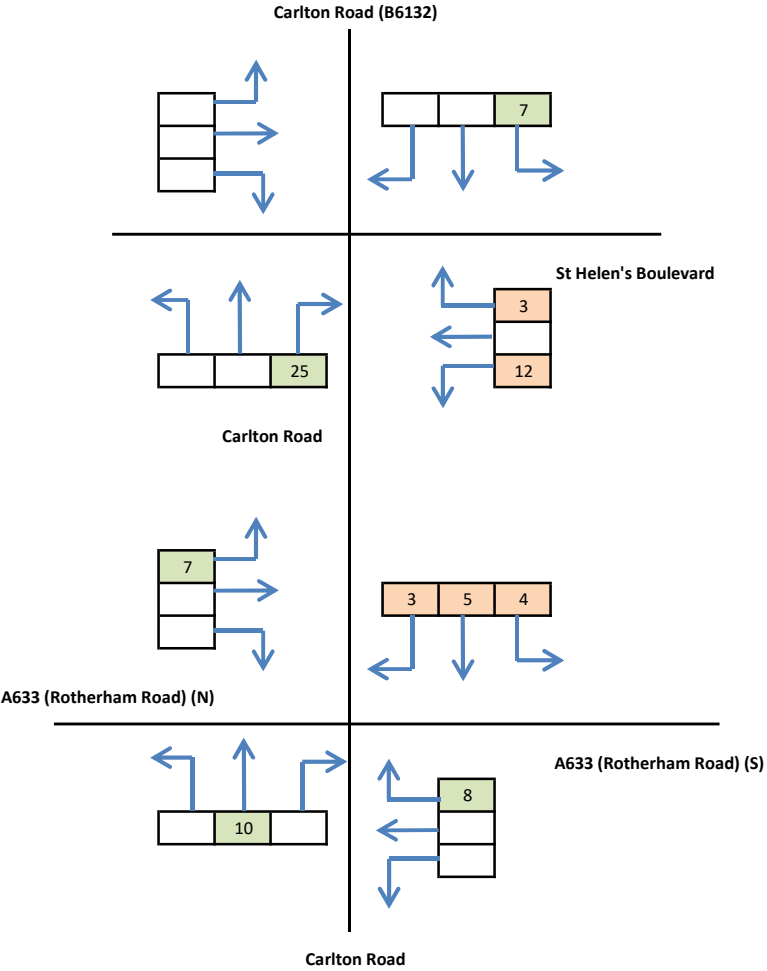
PCUs

Arrivals

32

Departures

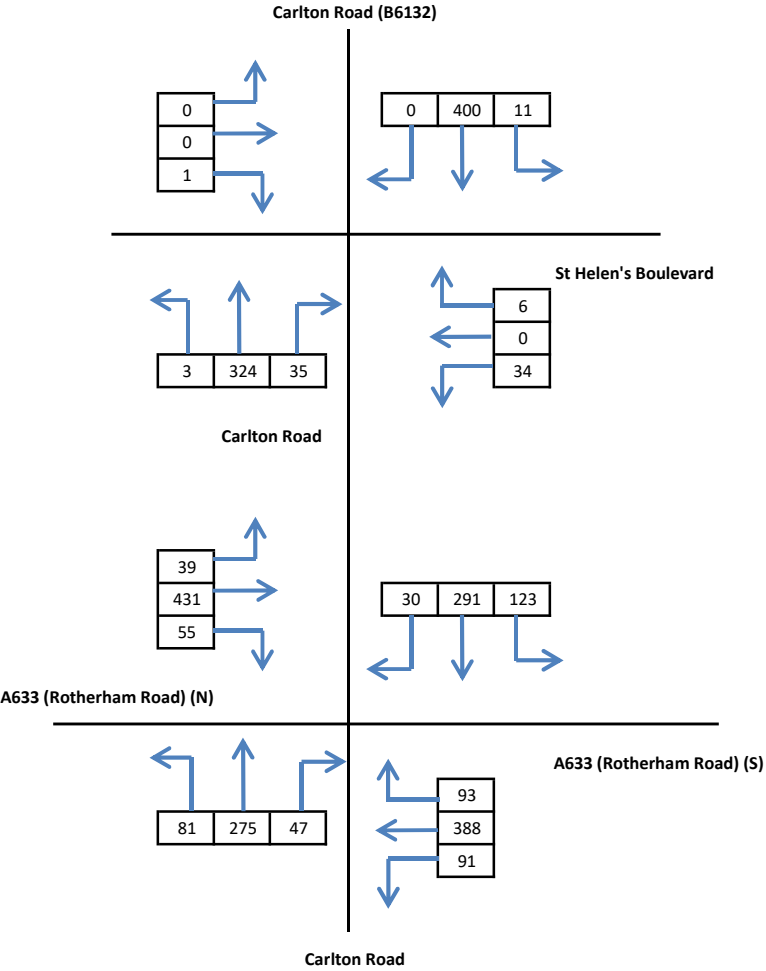
15



2024 With Development

PM Peak (16:15-17:15)

PCUs



Appendix 5 – TEMPro Traffic Growth

Traffic Growth Forecasts

Base Year: 2017
Assessment Year: 2024
Period (years): 7
Area Type: Urban
Road Type: Principal
Area Served: N/A
Region Data Set Version: Yorkshire & Humber YH v7.2
Software Version: TEMPRO v7.2
NTM Version: AF15
NTEM Version: v7.2
Area: Barnsley 007

Factor	Households (HH)	Jobs
Base Year Unadjusted	4130	3209
Forecast Year Unadjusted	4348	3258
Growth Unadjusted	218	49
Committed Developments		
Do Nothing Adjusted	4348	3258
Proposed Development	93	
Do Something Adjusted	4255	3258

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	1.1206	1.1205

Average	1.1164	1.1149
Adjusted Growth Factor:	11.6%	11.5%

Traffic Growth Forecasts

Base Year: 2017
Assessment Year: 2024
Period (years): 7
Area Type: Urban
Road Type: Principal
Area Served: N/A
Region Data Set Version: Yorkshire & Humber YH v7.2
Software Version: TEMPRO v7.2
NTM Version: AF15
NTEM Version: v7.2
Area: Barnsley 010

Factor	Households (HH)	Jobs
Base Year Unadjusted	4614	3969
Forecast Year Unadjusted	4857	4019
Growth Unadjusted	243	50
Committed Developments		
Do Nothing Adjusted	4857	4019
Proposed Development	93	
Do Something Adjusted	4764	4019

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	1.1121	1.1093

Appendix 6 – Gravity Model

Proposed Trip Distribution & Assignment - Gravity Model

Origin MSOA: Barnsley 007 and Barnsley 010
Stage 1: Trip Distribution

Area of Workplace	Type	All people	Works mainly at or from home	Underground, metro, light rail or tram	Train	Bus, minibus or coach	Taxi or minicab	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other	Vehicle Trip Generating Mode	%
Wakefield	Y&H Local Authority	609	0	0	4	24	3	6	516	48	0	7	1	525	12.66%
Barnsley 013	MSOA Level	1,158	0	0	3	218	11	7	503	87	6	323	0	521	12.56%
Barnsley 012	MSOA Level	588	0	0	2	38	4	4	276	59	3	202	0	284	6.85%
Sheffield	Y&H Local Authority	361	0	2	57	2	1	5	257	23	0	7	0	263	6.34%
Barnsley 010	MSOA Level	508	0	2	4	48	5	6	215	45	8	173	2	226	5.45%
Leeds	Y&H Local Authority	277	0	0	23	9	0	1	221	15	1	5	2	222	5.35%
Barnsley 002	MSOA Level	380	0	0	1	26	2	7	207	49	21	66	1	216	5.21%
Rotherham	Y&H Local Authority	287	0	0	6	43	0	3	212	17	2	2	2	215	5.18%
Barnsley 007	MSOA Level	451	0	0	1	25	1	8	203	29	6	176	2	212	5.11%
Barnsley 015	MSOA Level	302	0	0	2	45	7	1	191	14	5	35	2	199	4.80%
Kirklees	Y&H Local Authority	141	0	0	4	1	1	1	121	8	0	5	0	123	2.97%
Doncaster	Y&H Local Authority	136	0	0	1	11	1	1	110	10	0	1	1	112	2.70%
Barnsley 004	MSOA Level	153	0	0	0	24	2	1	91	17	2	16	0	94	2.27%
Barnsley 005	MSOA Level	124	0	0	0	9	0	3	85	20	3	4	0	88	2.13%
Barnsley 011	MSOA Level	100	0	0	0	12	2	0	70	11	2	2	1	72	1.74%
Barnsley 017	MSOA Level	103	0	0	0	17	1	1	63	6	0	15	0	65	1.57%
Barnsley 023	MSOA Level	76	0	0	0	10	1	2	58	4	1	0	0	61	1.47%
Barnsley 009	MSOA Level	103	0	0	0	13	1	0	56	12	4	17	0	57	1.37%
Barnsley 028	MSOA Level	76	0	0	0	6	1	2	52	6	1	8	0	55	1.33%
Barnsley 006	MSOA Level	65	0	0	0	5	0	3	49	6	0	2	0	52	1.25%
Barnsley 019	MSOA Level	76	0	0	0	8	2	0	50	7	2	7	0	52	1.25%
Barnsley 021	MSOA Level	67	0	0	0	8	1	0	46	7	0	5	0	47	1.13%
Barnsley 026	MSOA Level	62	0	0	0	13	0	1	38	6	2	2	0	39	0.94%
Bradford	Y&H Local Authority	42	0	0	3	1	0	0	35	2	0	1	0	35	0.84%
Barnsley 022	MSOA Level	41	0	0	0	1	0	1	32	5	0	2	0	33	0.80%
Barnsley 018	MSOA Level	46	0	0	0	8	1	0	33	1	0	5	0	32	0.77%
Barnsley 016	MSOA Level	49	0	0	0	7	1	0	29	10	0	2	0	30	0.72%
Barnsley 001	MSOA Level	49	0	0	0	7	2	0	27	10	0	3	0	29	0.70%
Barnsley 020	MSOA Level	30	0	0	0	2	0	0	26	1	0	0	1	26	0.63%
Barnsley 030	MSOA Level	40	0	0	0	6	0	1	25	3	0	4	1	26	0.63%
Barnsley 008	MSOA Level	49	0	0	0	6	0	0	24	13	2	3	0	25	0.60%
Barnsley 003	MSOA Level	28	0	0	0	3	0	0	23	1	0	1	0	23	0.55%
Barnsley 027	MSOA Level	26	0	0	1	1	0	0	22	1	0	1	0	22	0.53%
Selby	Y&H Local Authority	22	0	0	0	0	0	1	20	1	0	0	0	21	0.51%
Barnsley 014	MSOA Level	20	0	0	0	0	0	0	18	2	0	0	0	18	0.43%
Barnsley 024	MSOA Level	19	0	0	1	1	0	0	15	1	0	1	0	15	0.36%
Calderdale	Y&H Local Authority	14	0	0	1	1	0	0	13	0	0	0	0	13	0.31%
TOTAL:		4,148												100.00%	

Stage 2: Traffic assignment for each O-D pair

Area of Workplace	Type	Route Assignment							TOTAL
		A	B	C	D	E	F	G	
Wakefield	Y&H Local Authority	45.00%			55.00%				100%
Barnsley 013	MSOA Level					95.00%	5.00%		100%
Barnsley 012	MSOA Level					50.00%			100%
Sheffield	Y&H Local Authority						100.00%		100%
Barnsley 010	MSOA Level					95.00%	5.00%		100%
Leeds	Y&H Local Authority				100.00%				100%
Barnsley 002	MSOA Level	20.00%	80.00%						100%
Rotherham	Y&H Local Authority					10.00%	90.00%		100%
Barnsley 007	MSOA Level		50.00%	25.00%				25.00%	100%
Barnsley 015	MSOA Level					45.00%	55.00%		100%
Kirklees	Y&H Local Authority				25.00%	75.00%			100%
Doncaster	Y&H Local Authority		30.00%				70.00%		100%
Barnsley 004	MSOA Level			25.00%	75.00%				100%
Barnsley 005	MSOA Level				100.00%				100%
Barnsley 011	MSOA Level		10.00%				90.00%		100%
Barnsley 017	MSOA Level					90.00%	10.00%		100%
Barnsley 023	MSOA Level						100.00%		100%
Barnsley 009	MSOA Level		75.00%			25.00%			100%
Barnsley 028	MSOA Level					85.00%	15.00%		100%
Barnsley 006	MSOA Level		90.00%				10.00%		100%
Barnsley 019	MSOA Level					90.00%	10.00%		100%
Barnsley 021	MSOA Level					50.00%	50.00%		100%
Barnsley 026	MSOA Level						100.00%		100%
Bradford	Y&H Local Authority				100.00%				100%
Barnsley 022	MSOA Level						100.00%		100%
Barnsley 018	MSOA Level					70.00%	30.00%		100%
Barnsley 016	MSOA Level				10.00%	90.00%			100%
Barnsley 001	MSOA Level		100.00%						100%
Barnsley 020	MSOA Level						100.00%		100%
Barnsley 030	MSOA Level					85.00%	15.00%		100%
Barnsley 008	MSOA Level		100.00%						100%
Barnsley 003	MSOA Level		100.00%						100%
Barnsley 027	MSOA Level		100.00%			100.00%			100%
Selby	Y&H Local Authority		100.00%						100%
Barnsley 014	MSOA Level		50.00%				50.00%		100%
Barnsley 024	MSOA Level					100.00%			100%
Calderdale	Y&H Local Authority				100.00%				100%

Stage 3: Total zonal distribution of traffic

Area of Workplace	Type	Route Assignment							TOTAL
		A	B	C	D	E	F	G	
Wakefield	Y&H Local Authority	0.00%	5.70%	0.00%	6.96%	0.00%	0.00%	0.00%	12.66%
Barnsley 013	MSOA Level	0.00%	0.00%	0.00%	0.00%	11.93%	0.63%	0.00%	12.56%
Barnsley 012	MSOA Level	0.00%	0.00%	0.00%	3.42%	3.42%	0.00%	0.00%	6.85%
Sheffield	Y&H Local Authority	0.00%	0.00%	0.00%	0.00%	0.00%	6.34%	0.00%	6.34%
Barnsley 010	MSOA Level	0.00%	0.00%	0.00%	0.00%	5.18%	0.27%	0.00%	5.45%
Leeds	Y&H Local Authority	0.00%	0.00%	0.00%	5.35%	0.00%	0.00%	0.00%	5.35%
Barnsley 002	MSOA Level	1.04%	4.17%	0.00%	0.00%	0.00%	0.00%	0.00%	5.21%
Rotherham	Y&H Local Authority	0.00%	0.00%	0.00%	0.00%	0.52%	4.66%	0.00%	5.18%
Barnsley 007	MSOA Level	0.00%	2.56%	1.28%	0.00%	0.00%	0.00%	1.28%	5.11%
Barnsley 015	MSOA Level	0.00%	0.00%	0.00%	0.00%	2.16%	2.64%	0.00%	4.80%
Kirklees	Y&H Local Authority	0.00%	0.00%	0.00%	0.74%	2.22%	0.00%	0.00%	2.97%
Doncaster	Y&H Local Authority	0.00%	0.81%	0.00%	0.00%	0.00%	1.89%	0.00%	2.70%
Barnsley 004	MSOA Level	0.00%	0.00%	0.57%	1.70%	0.00%	0.00%	0.00%	2.27%
Barnsley 005	MSOA Level	0.00%	0.00%	0.00%	2.12%	0.00%	0.00%	0.00%	2.12%
Barnsley 011	MSOA Level	0.00%	0.17%	0.00%	0.00%	0.00%	1.56%	0.00%	1.74%
Barnsley 017	MSOA Level	0.00%	0.00%	0.00%	0.00%	1.41%	0.16%	0.00%	1.57%
Barnsley 023	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.00%	1.47%	0.00%	1.47%
Barnsley 009	MSOA Level	0.00%	1.03%	0.00%	0.00%	0.34%	0.00%	0.00%	1.37%
Barnsley 028	MSOA Level	0.00%	0.00%	0.00%	0.00%	1.13%	0.20%	0.00%	1.33%
Barnsley 006	MSOA Level	0.00%	1.13%	0.00%	0.00%	0.00%	0.13%	0.00%	1.25%
Barnsley 019	MSOA Level	0.00%	0.00%	0.00%	0.00%	1.13%	0.13%	0.00%	1.25%
Barnsley 021	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.57%	0.57%	0.00%	1.13%
Barnsley 026	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.00%	0.94%	0.00%	0.94%
Bradford	Y&H Local Authority	0.00%	0.00%	0.00%	0.84%	0.00%	0.00%	0.00%	0.84%
Barnsley 022	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.00%	0.80%	0.00%	0.80%
Barnsley 018	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.54%	0.23%	0.00%	0.77%
Barnsley 016	MSOA Level	0.00%	0.00%	0.00%	0.07%	0.65%	0.00%	0.00%	0.72%
Barnsley 001	MSOA Level	0.00%	0.70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.70%
Barnsley 020	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.00%	0.63%	0.00%	0.63%
Barnsley 030	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.53%	0.00%	0.00%	0.63%
Barnsley 008	MSOA Level	0.00%	0.60%	0.00%	0.00%	0.00%	0.00%	0.00%	0.60%
Barnsley 003	MSOA Level	0.00%	0.55%	0.00%	0.00%	0.00%	0.00%	0.00%	0.55%
Barnsley 027	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.53%	0.00%	0.00%	0.53%
Selby	Y&H Local Authority	0.00%	0.51%	0.00%	0.00%	0.00%	0.00%	0.00%	0.51%
Barnsley 014	MSOA Level	0.00%	0.22%	0.00%	0.00%	0.00%	0.22%	0.00%	0.43%
Barnsley 024	MSOA Level	0.00%	0.00%	0.00%	0.00%	0.36%	0.00%	0.00%	0.36%
Calderdale	Y&H Local Authority	0.00%	0.00%	0.00%	0.31%	0.00%	0.00%	0.00%	0.31%
Sub-total		1.04%	18.14%	1.84%	21.53%	32.62%	23.55%	1.28%	100.00%

Notes

Source: 2011 National Census - Travel to work flows
Table WU06EW - Location of usual residence and place of work by method of travel to work (MSOA level)
Based on 2011 Middle-Layer Super Output Areas (MSOA)
Local authorities in Yorkshire & Humber region only
MSOA/LA with fewer than 10 people travelling by a vehicle trip generating modes have been excluded

Area of Workplace	Type	All people	Works mainly at or from home	Underground, metro, light rail or tram	Train	Bus, minibus or coach	Taxi or minicab	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other	<10 excluded
Barnsley 029	MSOA Level	20	0	0	1	4	0	0	9	2	0	4	0	9
York	Y&H Local Authority	10	0	0	1	0	0	0	9	0	0	0	0	9
North Lincolnshire	Y&H Local Authority	6	0	0	0	0	0	0	6	0	0	0	0	6
East Riding of Yorkshire	Y&H Local Authority	5	0	0	0	0	0	0	5	0	0	0	0	5
Barnsley 025	MSOA Level	4	0	0	0	0	0	0	4	0	0	0	0	4
Harrogate	Y&H Local Authority	6	0	0	2	0	0	0	3	0	0	1	0	3
Craven	Y&H Local Authority	1	0	0	0	0	0	0	1	0	0	0	0	1
Kinoston upon Hull, City of	Y&H Local Authority	1	0	0	0	0	0	0	1	0	0	0	0	1
Hambleton	Y&H Local Authority	0	0	0	0	0	0	0	0	0	0	0	0	0
North East Lincolnshire	Y&H Local Authority	0	0	0	0	0	0	0	0	0	0	0	0	0
Richmondshire	Y&H Local Authority	0	0	0	0	0	0	0	0	0	0	0	0	0
Hydals	Y&H Local Authority	0	0	0	0	0	0	0	0	0	0	0	0	0
Scaphorrough	Y&H Local Authority	0	0	0	0	0	0	0	0	0	0	0	0	0

Appendix 7 – Junction Modelling Results

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.0.6896
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Filename: St Helens Boulevard Carlton Road Junction (2019 Update).j9
Path: Z:\Projects\2880 Carlton Road Barnsley\Data\Junction Capacity Modelling
Report generation date: 17/07/2019 13:10:25

- »Existing Layout - 2017 Base, AM
- »Existing Layout - 2017 Base, PM
- »Existing Layout - 2024 Do Nothing, AM
- »Existing Layout - 2024 Do Nothing, PM
- »Existing Layout - 2024 With Development, AM
- »Existing Layout - 2024 With Development, PM

Summary of junction performance

	AM				PM			
	Queue (PCU)	Delay (s)	RFC	LOS	Queue (PCU)	Delay (s)	RFC	LOS
Existing Layout - 2017 Base								
Stream B-CD	0.0	5.94	0.02	A	0.0	6.00	0.04	A
Stream B-AD	0.0	10.55	0.02	B	0.0	9.96	0.01	A
Stream A-BCD	0.0	4.91	0.00	A	0.0	0.00	0.00	A
Stream D-ABC	0.0	0.00	0.00	A	0.0	0.00	0.00	A
Stream C-ABD	0.3	5.09	0.13	A	0.0	4.99	0.02	A
Existing Layout - 2024 Do Nothing								
Stream B-CD	0.0	6.18	0.03	A	0.0	6.14	0.04	A
Stream B-AD	0.0	11.49	0.02	B	0.0	10.45	0.01	B
Stream A-BCD	0.0	4.73	0.00	A	0.0	0.00	0.00	A
Stream D-ABC	0.0	0.00	0.00	A	0.0	0.00	0.00	A
Stream C-ABD	0.4	5.09	0.15	A	0.0	4.93	0.03	A
Existing Layout - 2024 With Development								
Stream B-CD	0.1	6.70	0.08	A	0.1	6.33	0.06	A
Stream B-AD	0.1	12.15	0.05	B	0.0	10.77	0.02	B
Stream A-BCD	0.0	4.74	0.00	A	0.0	0.00	0.00	A
Stream D-ABC	0.0	0.00	0.00	A	0.0	0.00	0.00	A
Stream C-ABD	0.4	5.25	0.18	A	0.2	5.14	0.09	A

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

File summary

File Description

Title	St Helens Boulevard/Carlton Road (B6132) Junction
Location	Barnsley, South Yorkshire
Site number	
Date	01/11/2017
Version	
Status	
Identifier	
Client	Keepmoat
Jobnumber	2880
Enumerator	LTP\MR
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	PCU	PCU	perHour	s	-Min	perMin

Analysis Options

Calculate Queue Percentiles	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
		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)
D1	2017 Base	AM	ONE HOUR	07:30	09:00	15
D2	2017 Base	PM	ONE HOUR	16:00	17:30	15
D3	2024 Do Nothing	AM	ONE HOUR	07:30	09:00	15
D4	2024 Do Nothing	PM	ONE HOUR	16:00	17:30	15
D5	2024 With Development	AM	ONE HOUR	07:30	09:00	15
D6	2024 With Development	PM	ONE HOUR	16:00	17:30	15

Analysis Set Details

ID	Name	Network flow scaling factor (%)
A1	Existing Layout	100.000

Existing Layout - 2017 Base, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	St Helen's Boulevard/Carlton Road (B6132) Junction	Crossroads	Two-way		0.71	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	Carlton Road (B6132) (N)		Major
B	St Helens Boulevard		Minor
C	Carlton Road (B6132) (S)		Major
D	untitled		Minor

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
A - Carlton Road (B6132) (N)	6.50			67.0	✓	0.00
C - Carlton Road (B6132) (S)	6.50			150.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
B - St Helens Boulevard	One lane plus flare		10.00	5.10	3.75	3.75	3.75	✓	1.00	22	56
D - untitled	One lane	2.20								220	38

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for A-D	Slope for B-A	Slope for B-C	Slope for B-D	Slope for C-A	Slope for C-B	Slope for C-D	Slope for D-A	Slope for D-B	Slope for D-C
1	A-D	613	-	-	-	-	-	-	0.232	0.332	0.232	-	-	-
1	B-A	528	0.094	0.238	0.238	-	-	-	0.150	0.340	-	0.238	0.238	0.119
1	B-C	741	0.111	0.281	-	-	-	-	-	-	-	-	-	-
1	B-D, nearside lane	576	0.103	0.259	0.259	-	-	-	0.163	0.371	0.163	-	-	-
1	B-D, offside lane	528	0.094	0.238	0.238	-	-	-	0.150	0.340	0.150	-	-	-
1	C-B	661	0.250	0.250	0.358	-	-	-	-	-	-	-	-	-
1	D-A	596	-	-	-	-	-	-	0.226	-	0.089	-	-	-
1	D-B, nearside lane	523	0.148	0.148	0.336	-	-	-	0.235	0.235	0.093	-	-	-
1	D-B, offside lane	523	0.148	0.148	0.336	-	-	-	0.235	0.235	0.093	-	-	-
1	D-C	523	-	0.148	0.336	0.118	0.235	0.235	0.235	0.235	0.093	-	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

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)
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D1	2017 Base	AM	ONE HOUR	07:30	09:00	15
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Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A - Carlton Road (B6132) (N)		✓	401	100.000
B - St Helens Boulevard		✓	19	100.000
C - Carlton Road (B6132) (S)		✓	424	100.000
D - untitled		✓	2	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
From	A - Carlton Road (B6132) (N)	0	32	368	1
	B - St Helens Boulevard	6	0	13	0
	C - Carlton Road (B6132) (S)	375	49	0	0
	D - untitled	0	0	2	0

Vehicle Mix

Heavy Vehicle Percentages

	To				
		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
From	A - Carlton Road (B6132) (N)	0	0	4	0
	B - St Helens Boulevard	0	0	0	0
	C - Carlton Road (B6132) (S)	3	0	0	0
	D - untitled	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-CD	0.02	5.94	0.0	A
B-AD	0.02	10.55	0.0	B
A-BCD	0.00	4.91	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.13	5.09	0.3	A
C-D				
C-A				

Main Results for each time segment

07:30 - 07:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	10	659	0.015	10	0.0	5.544	A
B-AD	5	405	0.011	4	0.0	8.992	A
A-BCD	1	747	0.002	1	0.0	4.899	A
A-B	24			24			
A-C	277			277			
D-ABC	0	429	0.000	0	0.0	0.000	A
C-ABD	58	776	0.075	57	0.1	5.070	A
C-D	0			0			
C-A	261			261			

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	12	643	0.018	12	0.0	5.703	A
B-AD	5	381	0.014	5	0.0	9.588	A
A-BCD	2	775	0.002	2	0.0	4.725	A
A-B	29			29			
A-C	330			330			
D-ABC	0	407	0.000	0	0.0	0.000	A
C-ABD	76	801	0.095	76	0.2	5.033	A
C-D	0			0			
C-A	305			305			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	14	620	0.023	14	0.0	5.938	A
B-AD	7	348	0.019	7	0.0	10.552	B
A-BCD	2	817	0.003	2	0.0	4.499	A
A-B	35			35			
A-C	404			404			
D-ABC	0	376	0.000	0	0.0	0.000	A
C-ABD	107	837	0.128	107	0.3	5.008	A
C-D	0			0			
C-A	360			360			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	14	620	0.023	14	0.0	5.938	A
B-AD	7	348	0.019	7	0.0	10.554	B
A-BCD	2	817	0.003	2	0.0	4.504	A
A-B	35			35			
A-C	404			404			
D-ABC	0	376	0.000	0	0.0	0.000	A

C-ABD	107	837	0.128	107	0.3	5.016	A
C-D	0			0			
C-A	360			360			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	12	643	0.018	12	0.0	5.705	A
B-AD	5	381	0.014	5	0.0	9.591	A
A-BCD	2	775	0.002	2	0.0	4.738	A
A-B	29			29			
A-C	330			330			
D-ABC	0	407	0.000	0	0.0	0.000	A
C-ABD	77	801	0.096	77	0.2	5.053	A
C-D	0			0			
C-A	305			305			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	10	659	0.015	10	0.0	5.548	A
B-AD	5	405	0.011	5	0.0	8.998	A
A-BCD	1	746	0.002	1	0.0	4.907	A
A-B	24			24			
A-C	277			277			
D-ABC	0	429	0.000	0	0.0	0.000	A
C-ABD	58	776	0.075	58	0.1	5.087	A
C-D	0			0			
C-A	261			261			

Existing Layout - 2017 Base, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	St Helen's Boulevard/Carlton Road (B6132) Junction	Crossroads	Two-way		0.32	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)
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D2	2017 Base	PM	ONE HOUR	16:00	17:30	15
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Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A - Carlton Road (B6132) (N)		✓	363	100.000
B - St Helens Boulevard		✓	23	100.000
C - Carlton Road (B6132) (S)		✓	302	100.000
D - untitled		✓	1	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	4	359	0
	B - St Helens Boulevard	3	0	20	0
	C - Carlton Road (B6132) (S)	290	9	0	3
	D - untitled	0	0	1	0

Vehicle Mix

Heavy Vehicle Percentages

	To				
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	0	3	0
	B - St Helens Boulevard	0	0	0	0
	C - Carlton Road (B6132) (S)	4	0	0	0
	D - untitled	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-CD	0.04	6.00	0.0	A
B-AD	0.01	9.96	0.0	A
A-BCD	0.00	0.00	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.02	4.99	0.0	A
C-D				
C-A				

Main Results for each time segment

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	15	658	0.023	15	0.0	5.600	A
B-AD	2	409	0.006	2	0.0	8.857	A
A-BCD	0	559	0.000	0	0.0	0.000	A
A-B	3			3			
A-C	270			270			
D-ABC	0	452	0.000	0	0.0	0.000	A
C-ABD	10	740	0.013	10	0.0	4.982	A
C-D	2			2			
C-A	215			215			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	18	643	0.028	18	0.0	5.760	A
B-AD	3	390	0.007	3	0.0	9.288	A
A-BCD	0	549	0.000	0	0.0	0.000	A
A-B	4			4			
A-C	323			323			
D-ABC	0	435	0.000	0	0.0	0.000	A
C-ABD	12	758	0.016	12	0.0	4.890	A
C-D	3			3			
C-A	256			256			

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	22	622	0.035	22	0.0	5.996	A
B-AD	3	365	0.009	3	0.0	9.958	A
A-BCD	0	535	0.000	0	0.0	0.000	A
A-B	4			4			
A-C	395			395			
D-ABC	0	411	0.000	0	0.0	0.000	A
C-ABD	17	783	0.022	17	0.0	4.769	A
C-D	3			3			
C-A	312			312			

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	22	622	0.035	22	0.0	5.996	A
B-AD	3	365	0.009	3	0.0	9.958	A
A-BCD	0	535	0.000	0	0.0	0.000	A
A-B	4			4			
A-C	395			395			
D-ABC	0	411	0.000	0	0.0	0.000	A

C-ABD	17	783	0.022	17	0.0	4.774	A
C-D	3			3			
C-A	312			312			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	18	643	0.028	18	0.0	5.763	A
B-AD	3	390	0.007	3	0.0	9.290	A
A-BCD	0	549	0.000	0	0.0	0.000	A
A-B	4			4			
A-C	323			323			
D-ABC	0	435	0.000	0	0.0	0.000	A
C-ABD	12	758	0.016	12	0.0	4.904	A
C-D	3			3			
C-A	256			256			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	15	658	0.023	15	0.0	5.601	A
B-AD	2	409	0.006	2	0.0	8.858	A
A-BCD	0	559	0.000	0	0.0	0.000	A
A-B	3			3			
A-C	270			270			
D-ABC	0	452	0.000	0	0.0	0.000	A
C-ABD	10	740	0.013	10	0.0	4.988	A
C-D	2			2			
C-A	215			215			

Existing Layout - 2024 Do Nothing, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	St Helen's Boulevard/Carlton Road (B6132) Junction	Crossroads	Two-way		0.75	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)
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D3	2024 Do Nothing	AM	ONE HOUR	07:30	09:00	15
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Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A - Carlton Road (B6132) (N)		✓	470	100.000
B - St Helens Boulevard		✓	22	100.000
C - Carlton Road (B6132) (S)		✓	474	100.000
D - untitled		✓	2	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	36	433	1
	B - St Helens Boulevard	7	0	15	0
	C - Carlton Road (B6132) (S)	419	55	0	0
	D - untitled	0	0	2	0

Vehicle Mix

Heavy Vehicle Percentages

	To				
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	0	4	0
	B - St Helens Boulevard	0	0	0	0
	C - Carlton Road (B6132) (S)	3	0	0	0
	D - untitled	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-CD	0.03	6.18	0.0	A
B-AD	0.02	11.49	0.0	B
A-BCD	0.00	4.73	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.15	5.09	0.4	A
C-D				
C-A				

Main Results for each time segment

07:30 - 07:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	11	644	0.018	11	0.0	5.687	A
B-AD	5	387	0.014	5	0.0	9.438	A
A-BCD	1	776	0.002	1	0.0	4.725	A
A-B	27			27			
A-C	325			325			
D-ABC	0	414	0.000	0	0.0	0.000	A
C-ABD	69	787	0.088	68	0.2	5.072	A
C-D	0			0			
C-A	288			288			

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	13	625	0.022	13	0.0	5.885	A
B-AD	6	359	0.018	6	0.0	10.205	B
A-BCD	2	811	0.002	2	0.0	4.527	A
A-B	32			32			
A-C	388			388			
D-ABC	0	388	0.000	0	0.0	0.000	A
C-ABD	92	816	0.113	92	0.2	5.048	A
C-D	0			0			
C-A	334			334			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	17	599	0.028	16	0.0	6.181	A
B-AD	8	321	0.024	8	0.0	11.491	B
A-BCD	3	862	0.003	3	0.0	4.273	A
A-B	40			40			
A-C	475			475			
D-ABC	0	353	0.000	0	0.0	0.000	A
C-ABD	132	857	0.154	131	0.4	5.051	A
C-D	0			0			
C-A	390			390			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	17	599	0.028	17	0.0	6.181	A
B-AD	8	321	0.024	8	0.0	11.494	B
A-BCD	3	862	0.003	3	0.0	4.278	A
A-B	40			40			
A-C	475			475			
D-ABC	0	353	0.000	0	0.0	0.000	A

C-ABD	132	857	0.154	132	0.4	5.065	A
C-D	0			0			
C-A	390			390			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	13	625	0.022	14	0.0	5.889	A
B-AD	6	359	0.018	6	0.0	10.210	B
A-BCD	2	811	0.002	2	0.0	4.542	A
A-B	32			32			
A-C	388			388			
D-ABC	0	388	0.000	0	0.0	0.000	A
C-ABD	92	816	0.113	93	0.2	5.071	A
C-D	0			0			
C-A	334			334			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	11	644	0.018	11	0.0	5.689	A
B-AD	5	386	0.014	5	0.0	9.446	A
A-BCD	1	775	0.002	1	0.0	4.735	A
A-B	27			27			
A-C	325			325			
D-ABC	0	413	0.000	0	0.0	0.000	A
C-ABD	69	788	0.088	70	0.2	5.092	A
C-D	0			0			
C-A	287			287			

Existing Layout - 2024 Do Nothing, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	St Helen's Boulevard/Carlton Road (B6132) Junction	Crossroads	Two-way		0.32	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)
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D4	2024 Do Nothing	PM	ONE HOUR	16:00	17:30	15
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Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A - Carlton Road (B6132) (N)		✓	404	100.000
B - St Helens Boulevard		✓	25	100.000
C - Carlton Road (B6132) (S)		✓	337	100.000
D - untitled		✓	1	100.000

Origin-Destination Data

Demand (PCU/hr)

	To				
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	4	400	0
	B - St Helens Boulevard	3	0	22	0
	C - Carlton Road (B6132) (S)	324	10	0	3
	D - untitled	0	0	1	0

Vehicle Mix

Heavy Vehicle Percentages

	To				
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	0	3	0
	B - St Helens Boulevard	0	0	0	0
	C - Carlton Road (B6132) (S)	4	0	0	0
	D - untitled	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-CD	0.04	6.14	0.0	A
B-AD	0.01	10.45	0.0	B
A-BCD	0.00	0.00	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.03	4.93	0.0	A
C-D				
C-A				

Main Results for each time segment

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	17	650	0.025	16	0.0	5.684	A
B-AD	2	397	0.006	2	0.0	9.126	A
A-BCD	0	553	0.000	0	0.0	0.000	A
A-B	3			3			
A-C	301			301			
D-ABC	0	442	0.000	0	0.0	0.000	A
C-ABD	11	751	0.015	11	0.0	4.928	A
C-D	2			2			
C-A	240			240			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	20	633	0.031	20	0.0	5.868	A
B-AD	3	376	0.007	3	0.0	9.637	A
A-BCD	0	541	0.000	0	0.0	0.000	A
A-B	4			4			
A-C	360			360			
D-ABC	0	423	0.000	0	0.0	0.000	A
C-ABD	15	771	0.019	15	0.0	4.826	A
C-D	3			3			
C-A	286			286			

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	24	610	0.040	24	0.0	6.142	A
B-AD	3	348	0.009	3	0.0	10.446	B
A-BCD	0	525	0.000	0	0.0	0.000	A
A-B	4			4			
A-C	440			440			
D-ABC	0	396	0.000	0	0.0	0.000	A
C-ABD	20	800	0.025	20	0.0	4.693	A
C-D	3			3			
C-A	348			348			

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	24	610	0.040	24	0.0	6.142	A
B-AD	3	348	0.009	3	0.0	10.446	B
A-BCD	0	525	0.000	0	0.0	0.000	A
A-B	4			4			
A-C	440			440			
D-ABC	0	396	0.000	0	0.0	0.000	A

C-ABD	20	800	0.025	20	0.0	4.699	A
C-D	3			3			
C-A	348			348			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	20	633	0.031	20	0.0	5.868	A
B-AD	3	376	0.007	3	0.0	9.637	A
A-BCD	0	541	0.000	0	0.0	0.000	A
A-B	4			4			
A-C	360			360			
D-ABC	0	423	0.000	0	0.0	0.000	A
C-ABD	15	771	0.019	15	0.0	4.838	A
C-D	3			3			
C-A	286			286			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	17	650	0.025	17	0.0	5.687	A
B-AD	2	397	0.006	2	0.0	9.127	A
A-BCD	0	553	0.000	0	0.0	0.000	A
A-B	3			3			
A-C	301			301			
D-ABC	0	442	0.000	0	0.0	0.000	A
C-ABD	11	751	0.015	11	0.0	4.934	A
C-D	2			2			
C-A	240			240			

Existing Layout - 2024 With Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	St Helen's Boulevard/Carlton Road (B6132) Junction	Crossroads	Two-way		1.10	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)
D5	2024 With Development	AM	ONE HOUR	07:30	09:00	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A - Carlton Road (B6132) (N)		✓	473	100.000
B - St Helens Boulevard		✓	55	100.000
C - Carlton Road (B6132) (S)		✓	484	100.000
D - untitled		✓	2	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	39	433	1
	B - St Helens Boulevard	14	0	41	0
	C - Carlton Road (B6132) (S)	419	65	0	0
	D - untitled	0	0	2	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	0	4	0
	B - St Helens Boulevard	0	0	0	0
	C - Carlton Road (B6132) (S)	3	0	0	0
	D - untitled	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-CD	0.08	6.70	0.1	A
B-AD	0.05	12.15	0.1	B
A-BCD	0.00	4.74	0.0	A
A-B				
A-C				
D-ABC	0.00	0.00	0.0	A
C-ABD	0.18	5.25	0.4	A

C-D				
C-A				

Main Results for each time segment

07:30 - 07:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	31	629	0.049	31	0.1	6.020	A
B-AD	11	378	0.028	10	0.0	9.797	A
A-BCD	1	775	0.002	1	0.0	4.727	A
A-B	29			29			
A-C	325			325			
D-ABC	0	410	0.000	0	0.0	0.000	A
C-ABD	82	787	0.104	81	0.2	5.164	A
C-D	0			0			
C-A	283			283			

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	37	609	0.060	37	0.1	6.288	A
B-AD	13	350	0.036	13	0.0	10.666	B
A-BCD	2	811	0.002	2	0.0	4.529	A
A-B	35			35			
A-C	388			388			
D-ABC	0	384	0.000	0	0.0	0.000	A
C-ABD	109	815	0.134	109	0.3	5.174	A
C-D	0			0			
C-A	326			326			

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	45	583	0.077	45	0.1	6.698	A
B-AD	15	312	0.049	15	0.1	12.142	B
A-BCD	3	862	0.003	3	0.0	4.274	A
A-B	43			43			
A-C	475			475			
D-ABC	0	348	0.000	0	0.0	0.000	A
C-ABD	156	856	0.182	155	0.4	5.228	A
C-D	0			0			
C-A	377			377			

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	45	582	0.078	45	0.1	6.698	A
B-AD	15	312	0.049	15	0.1	12.152	B
A-BCD	3	862	0.003	3	0.0	4.281	A
A-B	43			43			

A-C	475			475			
D-ABC	0	348	0.000	0	0.0	0.000	A
C-ABD	156	856	0.182	156	0.4	5.246	A
C-D	0			0			
C-A	377			377			

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	37	609	0.061	37	0.1	6.293	A
B-AD	13	350	0.036	13	0.0	10.676	B
A-BCD	2	811	0.002	2	0.0	4.542	A
A-B	35			35			
A-C	388			388			
D-ABC	0	384	0.000	0	0.0	0.000	A
C-ABD	109	816	0.134	110	0.3	5.198	A
C-D	0			0			
C-A	326			326			

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	31	628	0.049	31	0.1	6.024	A
B-AD	11	378	0.028	11	0.0	9.810	A
A-BCD	1	775	0.002	1	0.0	4.737	A
A-B	29			29			
A-C	325			325			
D-ABC	0	410	0.000	0	0.0	0.000	A
C-ABD	82	787	0.104	82	0.2	5.188	A
C-D	0			0			
C-A	282			282			

Existing Layout - 2024 With Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	St Helen's Boulevard/Carlton Road (B6132) Junction	Crossroads	Two-way		0.71	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)
D6	2024 With Development	PM	ONE HOUR	16:00	17:30	15

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.00

Demand overview (Traffic)

Arm	Linked arm	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A - Carlton Road (B6132) (N)		✓	411	100.000
B - St Helens Boulevard		✓	40	100.000
C - Carlton Road (B6132) (S)		✓	362	100.000
D - untitled		✓	1	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	11	400	0
	B - St Helens Boulevard	6	0	34	0
	C - Carlton Road (B6132) (S)	324	35	0	3
	D - untitled	0	0	1	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
From		A - Carlton Road (B6132) (N)	B - St Helens Boulevard	C - Carlton Road (B6132) (S)	D - untitled
	A - Carlton Road (B6132) (N)	0	0	3	0
	B - St Helens Boulevard	0	0	0	0
	C - Carlton Road (B6132) (S)	4	0	0	0
	D - untitled	0	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS
B-CD	0.06	6.33	0.1	A
B-AD	0.02	10.77	0.0	B
A-BCD	0.00	0.00	0.0	A
A-B				
A-C				

D-ABC	0.00	0.00	0.0	A
C-ABD	0.09	5.14	0.2	A
C-D				
C-A				

Main Results for each time segment

16:00 - 16:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	26	646	0.040	25	0.0	5.795	A
B-AD	5	393	0.011	4	0.0	9.260	A
A-BCD	0	547	0.000	0	0.0	0.000	A
A-B	8			8			
A-C	301			301			
D-ABC	0	437	0.000	0	0.0	0.000	A
C-ABD	39	750	0.052	39	0.1	5.128	A
C-D	2			2			
C-A	231			231			

16:15 - 16:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	31	630	0.049	31	0.1	6.009	A
B-AD	5	371	0.015	5	0.0	9.841	A
A-BCD	0	534	0.000	0	0.0	0.000	A
A-B	10			10			
A-C	360			360			
D-ABC	0	417	0.000	0	0.0	0.000	A
C-ABD	51	770	0.066	51	0.1	5.082	A
C-D	3			3			
C-A	272			272			

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	37	606	0.062	37	0.1	6.328	A
B-AD	7	341	0.019	7	0.0	10.771	B
A-BCD	0	516	0.000	0	0.0	0.000	A
A-B	12			12			
A-C	440			440			
D-ABC	0	389	0.000	0	0.0	0.000	A
C-ABD	70	798	0.088	70	0.2	5.028	A
C-D	3			3			
C-A	325			325			

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	37	606	0.062	37	0.1	6.328	A
B-AD	7	341	0.019	7	0.0	10.772	B

A-BCD	0	516	0.000	0	0.0	0.000	A
A-B	12			12			
A-C	440			440			
D-ABC	0	389	0.000	0	0.0	0.000	A
C-ABD	71	798	0.088	71	0.2	5.037	A
C-D	3			3			
C-A	325			325			

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	31	630	0.049	31	0.1	6.012	A
B-AD	5	371	0.015	5	0.0	9.845	A
A-BCD	0	534	0.000	0	0.0	0.000	A
A-B	10			10			
A-C	360			360			
D-ABC	0	417	0.000	0	0.0	0.000	A
C-ABD	51	770	0.066	51	0.1	5.100	A
C-D	3			3			
C-A	272			272			

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-CD	26	646	0.040	26	0.0	5.798	A
B-AD	5	393	0.011	5	0.0	9.265	A
A-BCD	0	547	0.000	0	0.0	0.000	A
A-B	8			8			
A-C	301			301			
D-ABC	0	437	0.000	0	0.0	0.000	A
C-ABD	39	750	0.053	40	0.1	5.141	A
C-D	2			2			
C-A	231			231			

LTP LinSig Output

User and Project Details

Project:	A633/B6132 Signal Junction
Title:	Proposed Residential Development, Land South of St Helen's Boulevard
Location:	Barnsley, South Yorkshire
Client:	Keepmoat Homes
Site Ref(s):	2880
Additional detail:	
File name:	Rotherham Road Carlton Road Signal Junction (2019 Update).lsg3x
Author:	MR
Company:	LTP
Address:	

Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min	Cont Min
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Traffic		7	7
E	Pedestrian		6	6
F	Pedestrian		6	6

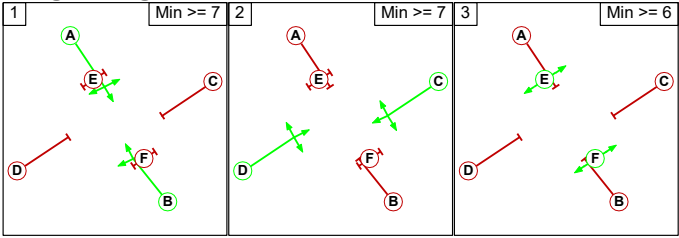
Phase Intergreens Matrix

Terminating Phase	Starting Phase						
		A	B	C	D	E	F
	A		-	5	5	5	7
	B	-		5	5	7	5
	C	5	5		-	6	6
	D	5	5	-		6	7
	E	10	10	10	10		-
	F	8	8	8	8	-	

Phases in Stage

Stage No.	Phases in Stage
1	A B
2	C D
3	E F

Stage Diagram



Phase Delays

Term.	Stage	Start Stage	Phase	Type	Value	Cont value
There are no Phase Delays defined						

Prohibited Stage Change

		To Stage			
From Stage		1	2	3	
	1		5	7	
	2	5		7	
	3	10	10		

Give-Way Lane Input Data

Junction: A633/B6132											
Lane	Movement	Max Flow when Giving Way (PCU/Hr)	Min Flow when Giving Way (PCU/Hr)	Opposing Lane	Opp. Lane Coeff.	Opp. Mvmnts.	Right Turn Storage (PCU)	Non-Blocking Storage (PCU)	RTF	Right Turn Move up (s)	Max Turns in Intergreen (PCU)
1/2 (A633 (Rotherham Road) North)	8/1 (Right)	1439	0	3/1	1.09	To 5/1 (Ahead) To 8/1 (Left)	2.00	-	0.50	2	2.00
2/1 (B6132 (Carlton Road) East)	5/1 (Right)	1439	0	4/1	1.09	To 5/1 (Left) To 6/1 (Ahead)	2.00	2.00	0.50	2	2.00
3/1 (A633 (Rotherham Road) South)	6/1 (Right)	1439	0	1/1	1.09	All	2.00	2.00	0.50	2	2.00
4/1 (B6132 (Carlton Road) West)	7/1 (Right)	1439	0	2/1	1.09	To 7/1 (Left) To 8/1 (Ahead)	2.00	2.00	0.50	2	2.00

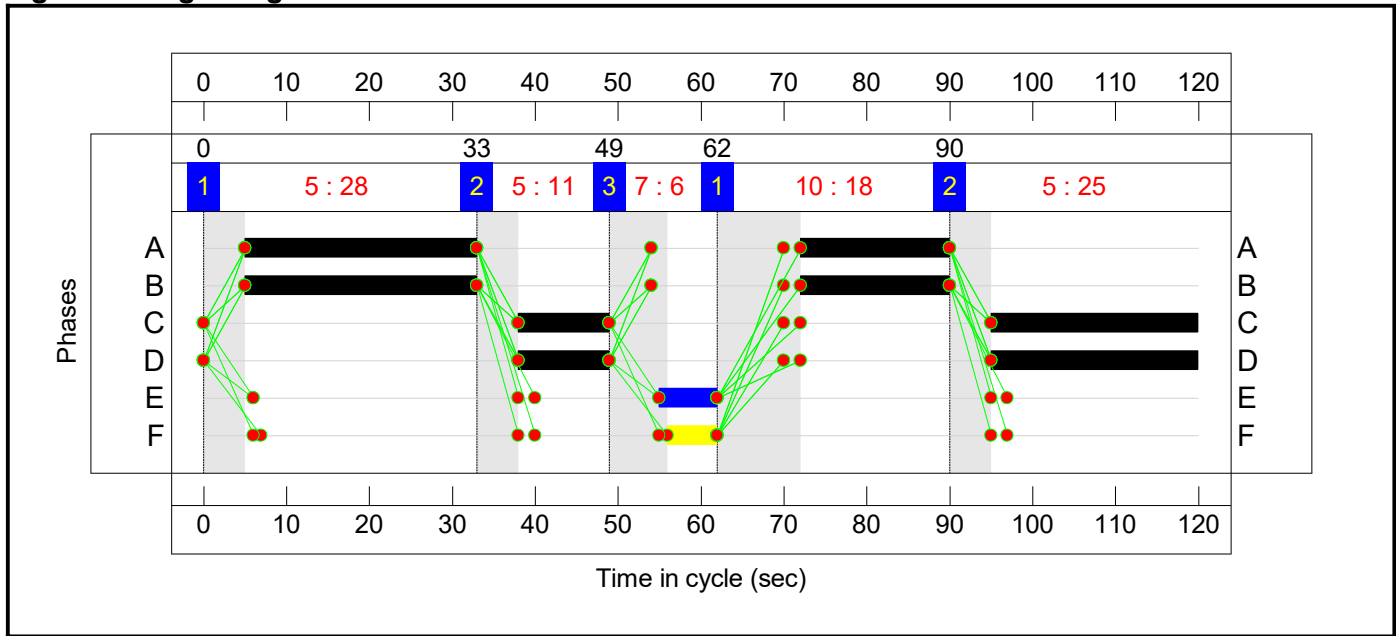
Lane Input Data

Junction: A633/B6132												
Lane	Lane Type	Phases	Start Disp.	End Disp.	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient	Nearside Lane	Turns	Turning Radius (m)
1/1 (A633 (Rotherham Road) North)	U	A	2	3	60.0	Geom	-	3.25	0.00	Y	Arm 6 Left	4.00
											Arm 7 Ahead	Inf
1/2 (A633 (Rotherham Road) North)	O	A	2	3	12.0	Geom	-	3.00	0.00	Y	Arm 8 Right	8.30
2/1 (B6132 (Carlton Road) East)	O	C	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 5 Right	12.10
											Arm 7 Left	7.70
											Arm 8 Ahead	Inf
3/1 (A633 (Rotherham Road) South)	O	B	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	10.56
											Arm 8 Left	5.10
4/1 (B6132 (Carlton Road) West)	O	D	2	3	60.0	Geom	-	4.00	0.00	Y	Arm 5 Left	4.50
											Arm 6 Ahead	Inf
											Arm 7 Right	12.87
5/1 (A633 (Rotherham Road) North)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (B6132 (Carlton Road) East)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (A633 (Rotherham Road) South)	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (B6132 (Carlton Road) West)	U		2	3	60.0	Inf	-	-	-	-	-	-

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2017 Base AM'	07:45	08:45	01:00	
2: '2017 Base PM'	16:15	17:15	01:00	
3: '2024 Do Nothing AM'	07:45	08:45	01:00	
4: '2024 Do Nothing PM'	16:15	17:15	01:00	
5: '2024 With Development AM'	07:45	08:45	01:00	
6: '2024 With Development PM'	16:15	17:15	01:00	

Scenario 1: '2017 Base AM' (FG1: '2017 Base AM', Plan 1: 'Network Control Plan 1')
Signal Timings Diagram



Traffic Flows, Desired
Desired Flow :

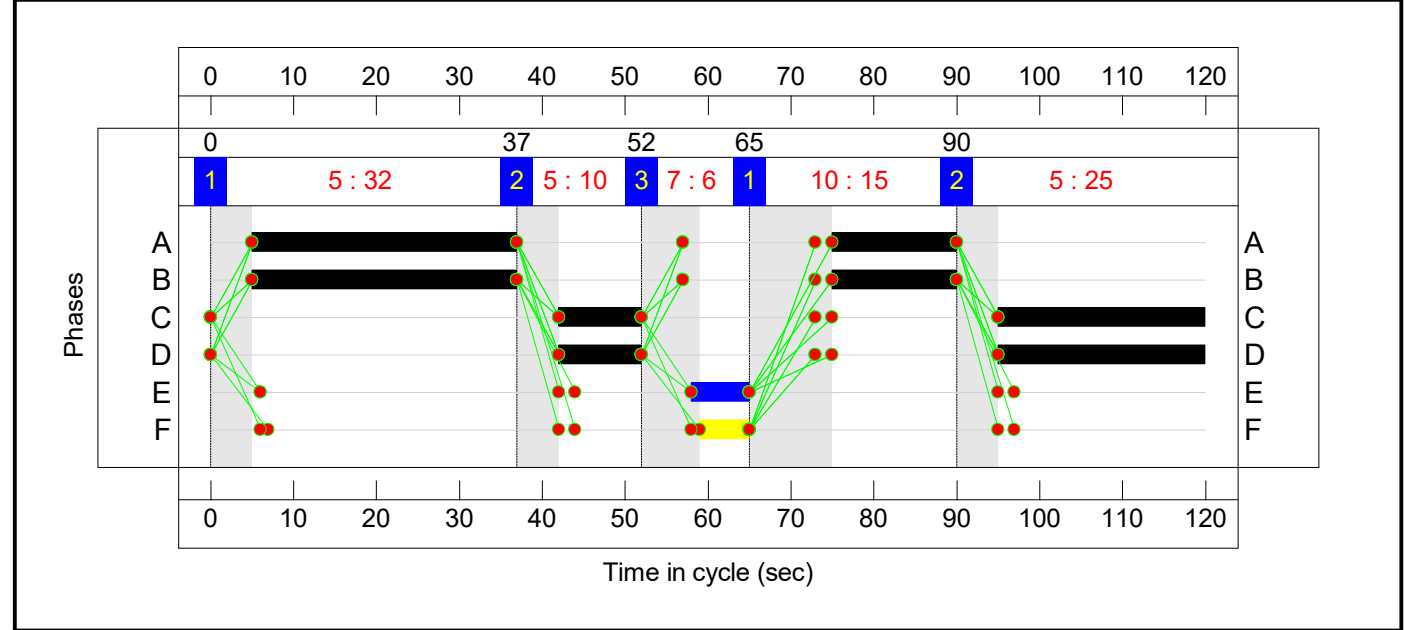
	Destination					
	A	B	C	D	Tot.	
Origin	A	0	34	297	40	371
	B	45	0	106	303	454
	C	392	128	0	64	584
	D	52	235	20	0	307
	Tot.	489	397	423	407	1716

Lane Saturation Flows

Junction: A633/B6132								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A633 (Rotherham Road) North)	3.25	0.00	Y	Arm 6 Left	4.00	10.3 %	1868	1868
				Arm 7 Ahead	Inf	89.7 %		
1/2 (A633 (Rotherham Road) North)	3.00	0.00	Y	Arm 8 Right	8.30	100.0 %	1622	1622
2/1 (B6132 (Carlton Road) East)	3.50	0.00	Y	Arm 5 Right	12.10	9.9 %	1858	1858
				Arm 7 Left	7.70	23.3 %		
				Arm 8 Ahead	Inf	66.7 %		
3/1 (A633 (Rotherham Road) South)	3.50	0.00	Y	Arm 5 Ahead	Inf	67.1 %	1848	1848
				Arm 6 Right	10.56	21.9 %		
				Arm 8 Left	5.10	11.0 %		
4/1 (B6132 (Carlton Road) West)	4.00	0.00	Y	Arm 5 Left	4.50	16.9 %	1894	1894
				Arm 6 Ahead	Inf	76.5 %		
				Arm 7 Right	12.87	6.5 %		
5/1 (A633 (Rotherham Road) North Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B6132 (Carlton Road) East Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (A633 (Rotherham Road) South Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B6132 (Carlton Road) West Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 2: '2017 Base PM' (FG2: '2017 Base PM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Traffic Flows, Desired

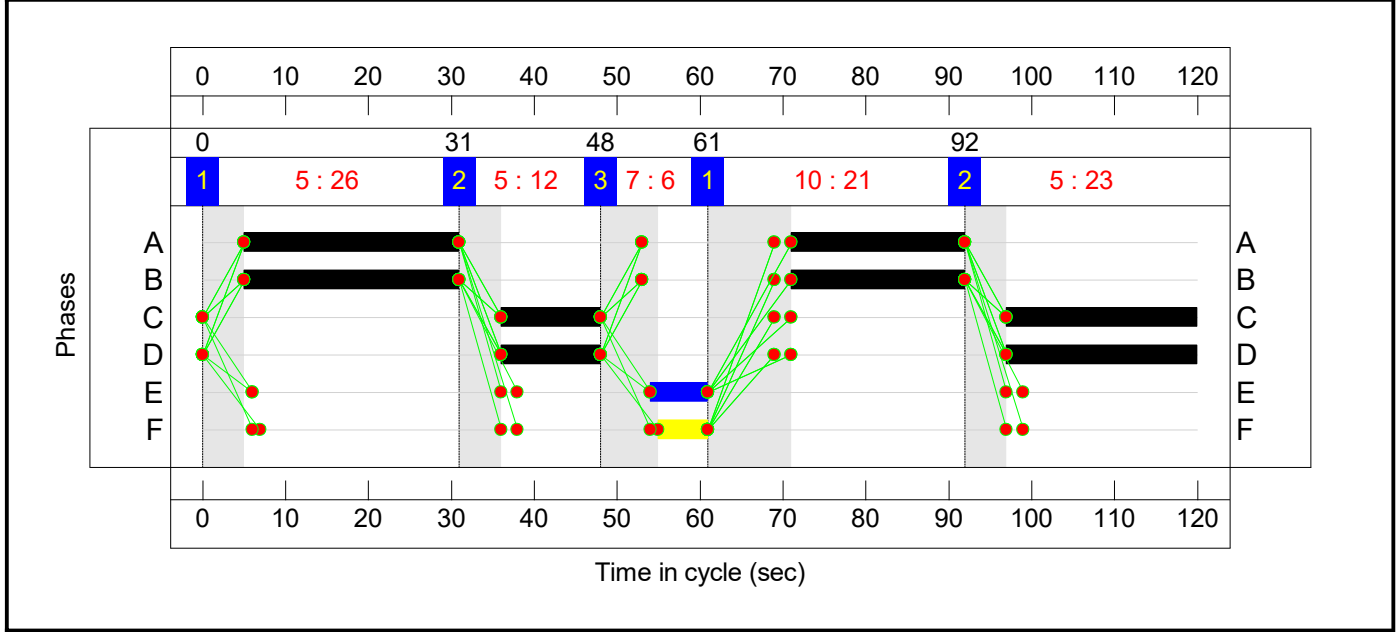
Desired Flow :

	Destination					
	A	B	C	D	Tot.	
Origin	A	0	29	387	49	465
	B	24	0	107	256	387
	C	348	76	0	82	506
	D	73	237	42	0	352
	Tot.	445	342	536	387	1710

Junction: A633/B6132								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A633 (Rotherham Road) North)	3.25	0.00	Y	Arm 6 Left	4.00	7.0 %	1891	1891
				Arm 7 Ahead	Inf	93.0 %		
1/2 (A633 (Rotherham Road) North)	3.00	0.00	Y	Arm 8 Right	8.30	100.0 %	1622	1622
2/1 (B6132 (Carlton Road) East)	3.50	0.00	Y	Arm 5 Right	12.10	6.2 %	1851	1851
				Arm 7 Left	7.70	27.6 %		
				Arm 8 Ahead	Inf	66.1 %		
3/1 (A633 (Rotherham Road) South)	3.50	0.00	Y	Arm 5 Ahead	Inf	68.8 %	1838	1838
				Arm 6 Right	10.56	15.0 %		
				Arm 8 Left	5.10	16.2 %		
4/1 (B6132 (Carlton Road) West)	4.00	0.00	Y	Arm 5 Left	4.50	20.7 %	1861	1861
				Arm 6 Ahead	Inf	67.3 %		
				Arm 7 Right	12.87	11.9 %		
5/1 (A633 (Rotherham Road) North Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B6132 (Carlton Road) East Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (A633 (Rotherham Road) South Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B6132 (Carlton Road) West Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 3: '2024 Do Nothing AM' (FG3: '2024 Do Nothing AM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Traffic Flows, Desired

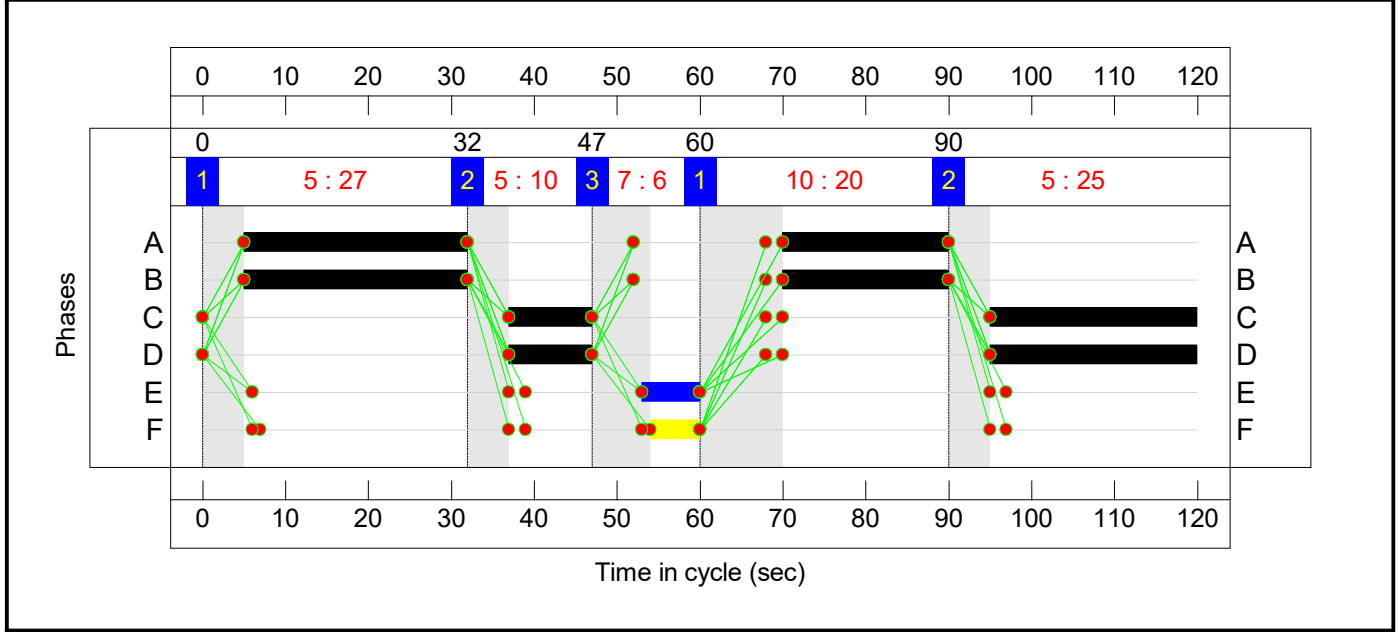
Desired Flow :

	Destination					
	A	B	C	D	Tot.	
Origin	A	0	38	331	45	414
	B	50	0	119	338	507
	C	437	143	0	72	652
	D	58	262	23	0	343
	Tot.	545	443	473	455	1916

Junction: A633/B6132								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A633 (Rotherham Road) North)	3.25	0.00	Y	Arm 6 Left	4.00	10.3 %	1868	1868
				Arm 7 Ahead	Inf	89.7 %		
1/2 (A633 (Rotherham Road) North)	3.00	0.00	Y	Arm 8 Right	8.30	100.0 %	1622	1622
2/1 (B6132 (Carlton Road) East)	3.50	0.00	Y	Arm 5 Right	12.10	9.9 %	1857	1857
				Arm 7 Left	7.70	23.5 %		
				Arm 8 Ahead	Inf	66.7 %		
3/1 (A633 (Rotherham Road) South)	3.50	0.00	Y	Arm 5 Ahead	Inf	67.0 %	1847	1847
				Arm 6 Right	10.56	21.9 %		
				Arm 8 Left	5.10	11.0 %		
4/1 (B6132 (Carlton Road) West)	4.00	0.00	Y	Arm 5 Left	4.50	16.9 %	1893	1893
				Arm 6 Ahead	Inf	76.4 %		
				Arm 7 Right	12.87	6.7 %		
5/1 (A633 (Rotherham Road) North Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B6132 (Carlton Road) East Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (A633 (Rotherham Road) South Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B6132 (Carlton Road) West Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 4: '2024 Do Nothing PM' (FG4: '2024 Do Nothing PM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Traffic Flows, Desired

Desired Flow :

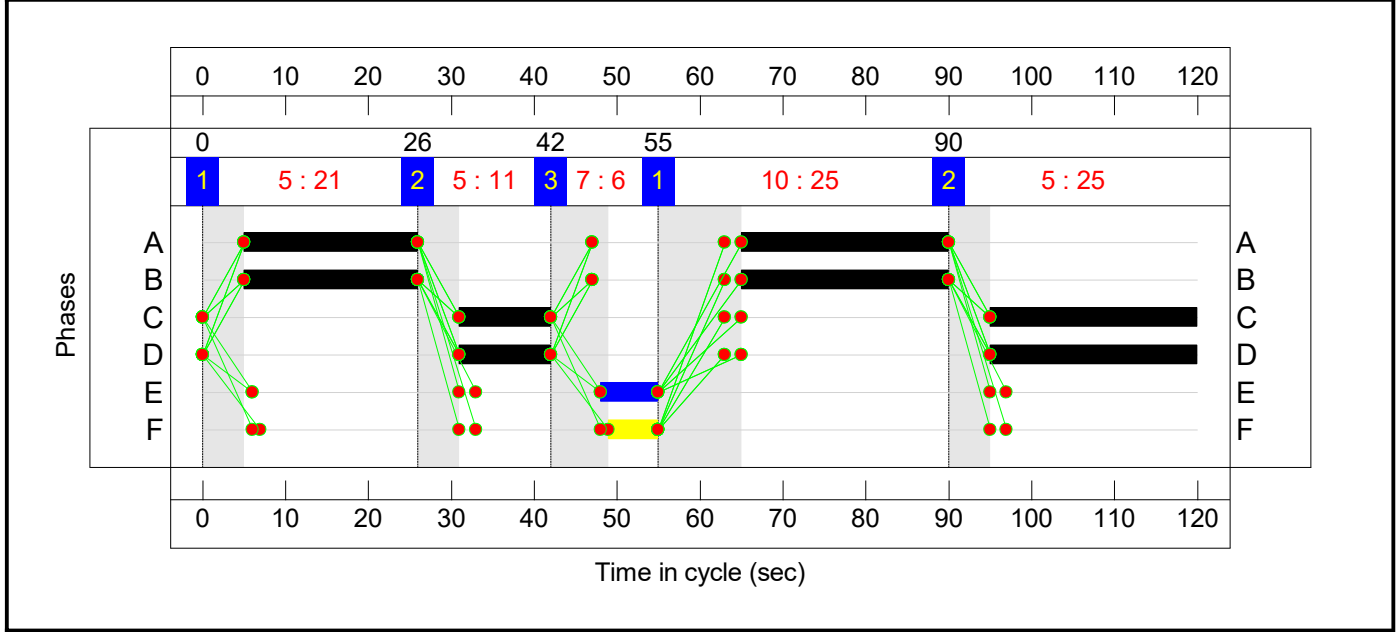
	Destination					
	A	B	C	D	Tot.	
Origin	A	0	32	431	55	518
	B	27	0	119	286	432
	C	388	85	0	91	564
	D	81	265	47	0	393
	Tot.	496	382	597	432	1907

Lane Saturation Flows

Junction: A633/B6132								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A633 (Rotherham Road) North)	3.25	0.00	Y	Arm 6 Left	4.00	6.9 %	1891	1891
				Arm 7 Ahead	Inf	93.1 %		
1/2 (A633 (Rotherham Road) North)	3.00	0.00	Y	Arm 8 Right	8.30	100.0 %	1622	1622
2/1 (B6132 (Carlton Road) East)	3.50	0.00	Y	Arm 5 Right	12.10	6.3 %	1851	1851
				Arm 7 Left	7.70	27.5 %		
				Arm 8 Ahead	Inf	66.2 %		
3/1 (A633 (Rotherham Road) South)	3.50	0.00	Y	Arm 5 Ahead	Inf	68.8 %	1838	1838
				Arm 6 Right	10.56	15.1 %		
				Arm 8 Left	5.10	16.1 %		
4/1 (B6132 (Carlton Road) West)	4.00	0.00	Y	Arm 5 Left	4.50	20.6 %	1861	1861
				Arm 6 Ahead	Inf	67.4 %		
				Arm 7 Right	12.87	12.0 %		
5/1 (A633 (Rotherham Road) North Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B6132 (Carlton Road) East Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (A633 (Rotherham Road) South Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B6132 (Carlton Road) West Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 5: '2024 With Development AM' (FG5: '2024 With Development AM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Traffic Flows, Desired

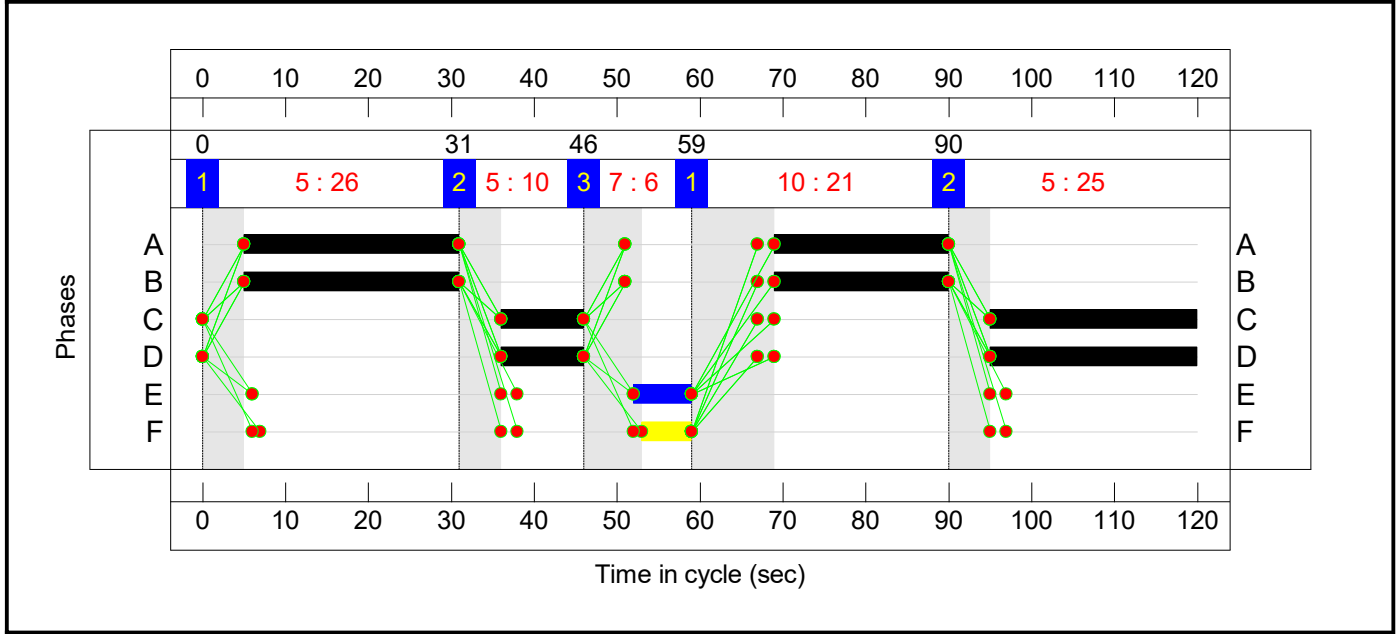
Desired Flow :

	Destination					
	A	B	C	D	Tot.	
Origin	A	0	41	331	45	417
	B	57	0	127	349	533
	C	437	146	0	72	655
	D	58	266	23	0	347
	Tot.	552	453	481	466	1952

Junction: A633/B6132								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A633 (Rotherham Road) North)	3.25	0.00	Y	Arm 6 Left	4.00	11.0 %	1863	1863
				Arm 7 Ahead	Inf	89.0 %		
1/2 (A633 (Rotherham Road) North)	3.00	0.00	Y	Arm 8 Right	8.30	100.0 %	1622	1622
2/1 (B6132 (Carlton Road) East)	3.50	0.00	Y	Arm 5 Right	12.10	10.7 %	1854	1854
				Arm 7 Left	7.70	23.8 %		
				Arm 8 Ahead	Inf	65.5 %		
3/1 (A633 (Rotherham Road) South)	3.50	0.00	Y	Arm 5 Ahead	Inf	66.7 %	1847	1847
				Arm 6 Right	10.56	22.3 %		
				Arm 8 Left	5.10	11.0 %		
4/1 (B6132 (Carlton Road) West)	4.00	0.00	Y	Arm 5 Left	4.50	16.7 %	1895	1895
				Arm 6 Ahead	Inf	76.7 %		
				Arm 7 Right	12.87	6.6 %		
5/1 (A633 (Rotherham Road) North Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B6132 (Carlton Road) East Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (A633 (Rotherham Road) South Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B6132 (Carlton Road) West Lane 1)	Infinite Saturation Flow						Inf	Inf

Scenario 6: '2024 With Development PM' (FG6: '2024 With Development PM', Plan 1: 'Network Control Plan 1')

Signal Timings Diagram



Traffic Flows, Desired

Desired Flow :

	Destination					
	A	B	C	D	Tot.	
Origin	A	0	39	431	55	525
	B	30	0	123	291	444
	C	388	93	0	91	572
	D	81	275	47	0	403
	Tot.	499	407	601	437	1944

Lane Saturation Flows

Junction: A633/B6132								
Lane	Lane Width (m)	Gradient	Nearside Lane	Allowed Turns	Turning Radius (m)	Turning Prop.	Sat Flow (PCU/Hr)	Flared Sat Flow (PCU/Hr)
1/1 (A633 (Rotherham Road) North)	3.25	0.00	Y	Arm 6 Left	4.00	8.3 %	1881	1881
				Arm 7 Ahead	Inf	91.7 %		
1/2 (A633 (Rotherham Road) North)	3.00	0.00	Y	Arm 8 Right	8.30	100.0 %	1622	1622
2/1 (B6132 (Carlton Road) East)	3.50	0.00	Y	Arm 5 Right	12.10	6.8 %	1850	1850
				Arm 7 Left	7.70	27.7 %		
				Arm 8 Ahead	Inf	65.5 %		
3/1 (A633 (Rotherham Road) South)	3.50	0.00	Y	Arm 5 Ahead	Inf	67.8 %	1837	1837
				Arm 6 Right	10.56	16.3 %		
				Arm 8 Left	5.10	15.9 %		
4/1 (B6132 (Carlton Road) West)	4.00	0.00	Y	Arm 5 Left	4.50	20.1 %	1865	1865
				Arm 6 Ahead	Inf	68.2 %		
				Arm 7 Right	12.87	11.7 %		
5/1 (A633 (Rotherham Road) North Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (B6132 (Carlton Road) East Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (A633 (Rotherham Road) South Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (B6132 (Carlton Road) West Lane 1)	Infinite Saturation Flow						Inf	Inf

Network Results

Scenario 1: '2017 Base AM' (FG1: '2017 Base AM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Proposed Residential Development, Land South of St Helen's Boulevard	-	-	-		-	-	-	-	-	-	79.0%	-	-	217	0	16	12.4	-	-
A633/B6132	-	-	-		-	-	-	-	-	-	79.0%	-	-	217	0	16	12.4	-	-
1/1+1/2	A633 (Rotherham Road) North Left Ahead Right	U+O	A		2	46	-	371	1868:1622	738+89	44.9 : 44.9%	371	371	32	0	8	1.9	18.3	4.6
2/1	B6132 (Carlton Road) East Right Left Ahead	O	C		2	36	-	454	1858	588	77.2%	454	454	45	0	0	4.0	32.1	9.1
3/1	A633 (Rotherham Road) South Ahead Right Left	O	B		2	46	-	584	1848	739	79.0%	584	584	128	0	0	4.5	27.7	10.8
4/1	B6132 (Carlton Road) West Left Ahead Right	O	D		2	36	-	307	1894	600	51.2%	307	307	12	0	8	2.0	23.6	5.0
C1 PRC for Signalled Lanes (%): 13.9 Total Delay for Signalled Lanes (pcuHr): 12.44 Cycle Time (s): 120 PRC Over All Lanes (%): 13.9 Total Delay Over All Lanes(pcuHr): 12.44																			

Scenario 2: '2017 Base PM' (FG2: '2017 Base PM', Plan 1: 'Network Control Plan 1')

[illegible]

Scenario 3: '2024 Do Nothing AM' (FG3: '2024 Do Nothing AM', Plan 1: 'Network Control Plan 1')

[illegible]

Scenario 4: '2024 Do Nothing PM' (FG4: '2024 Do Nothing PM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)		
Network: Proposed Residential Development, Land South of St Helen's Boulevard	-	-	-		-	-	-	-	-	-	75.7%	-	-	195	0	19	14.0	-	-		
	A633/B6132	-	-		-	-	-	-	-	-	75.7%	-	-	195	0	19	14.0	-	-		
1/1+1/2	A633 (Rotherham Road) North Left Ahead Right	U+O	A		2	47	-	518	1891:1622	760+90	60.9 : 60.9%	518	518	55	0	0	2.9	20.3	6.9		
2/1	B6132 (Carlton Road) East Right Left Ahead	O	C		2	35	-	432	1851	571	75.7%	432	432	27	0	0	3.8	32.1	8.8		
3/1	A633 (Rotherham Road) South Ahead Right Left	O	B		2	47	-	564	1838	751	75.1%	564	564	85	0	0	4.0	25.5	9.8		
4/1	B6132 (Carlton Road) West Left Ahead Right	O	D		2	35	-	393	1861	574	68.5%	393	393	29	0	18	3.2	29.3	7.5		
C1																					
PRC for Signalled Lanes (%):								18.9		Total Delay for Signalled Lanes (pcuHr):				13.95		Cycle Time (s): 120					
PRC Over All Lanes (%):								18.9		Total Delay Over All Lanes(pcuHr):				13.95							

Scenario 5: '2024 With Development AM' (FG5: '2024 With Development AM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)	
Network: Proposed Residential Development, Land South of St Helen's Boulevard	-	-	-		-	-	-	-	-	-	90.8%	-	-	263	0	8	19.2	-	-	
A633/B6132	-	-	-		-	-	-	-	-	-	90.8%	-	-	263	0	8	19.2	-	-	
1/1+1/2	A633 (Rotherham Road) North Left Ahead Right	U+O	A		2	46	-	417	1863:1622	742+90	50.1 : 50.1%	417	417	45	0	0	2.2	19.4	5.4	
2/1	B6132 (Carlton Road) East Right Left Ahead	O	C		2	36	-	533	1854	587	90.8%	533	533	57	0	0	7.5	50.3	15.1	
3/1	A633 (Rotherham Road) South Ahead Right Left	O	B		2	46	-	655	1847	734	89.3%	655	655	146	0	0	7.0	38.4	14.5	
4/1	B6132 (Carlton Road) West Left Ahead Right	O	D		2	36	-	347	1895	600	57.8%	347	347	15	0	8	2.5	26.3	6.8	
C1																				
PRC for Signalled Lanes (%):					-0.9			Total Delay for Signalled Lanes (pcuHr):					19.21		Cycle Time (s): 120					
PRC Over All Lanes (%):					-0.9			Total Delay Over All Lanes(pcuHr):					19.21							

Scenario 6: '2024 With Development PM' (FG6: '2024 With Development PM', Plan 1: 'Network Control Plan 1')

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Arriving (pcu)	Leaving (pcu)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)		
Network: Proposed Residential Development, Land South of St Helen's Boulevard	-	-	-		-	-	-	-	-	-	77.8%	-	-	205	0	20	14.7	-	-		
	A633/B6132	-	-		-	-	-	-	-	-	77.8%	-	-	205	0	20	14.7	-	-		
1/1+1/2	A633 (Rotherham Road) North Left Ahead Right	U+O	A		2	47	-	525	1881:1622	760+89	61.8 : 61.8%	525	525	55	0	0	3.0	20.6	7.2		
2/1	B6132 (Carlton Road) East Right Left Ahead	O	C		2	35	-	444	1850	570	77.8%	444	444	28	0	2	4.2	33.7	9.5		
3/1	A633 (Rotherham Road) South Ahead Right Left	O	B		2	47	-	572	1837	750	76.3%	572	572	93	0	0	4.2	26.2	10.0		
4/1	B6132 (Carlton Road) West Left Ahead Right	O	D		2	35	-	403	1865	575	70.1%	403	403	29	0	18	3.4	30.0	8.0		
C1																					
PRC for Signalled Lanes (%):								15.6		Total Delay for Signalled Lanes (pcuHr):				14.67		Cycle Time (s): 120					
PRC Over All Lanes (%):								15.6		Total Delay Over All Lanes(pcuHr):				14.67							