



Strata


**Proposed Residential Development
Land to the South of the A1077,
Barton-upon-Humber
Transport Assessment**

July 2025

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Strata

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July 2025

Client Commission			
Client:	Strata	Date Commissioned:	April 2025

LTP Quality Control					
Job No:	LTP/25/5136	File Ref:	Land South of A1077 Barton TA Final Issue 2		
Issue	Revision	Description	Author	Checked	Date
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1	B	Minor amendments	MR	-	22/08/2023
1	A	Revised site plan	AC	MR	18/08/2023
1	-	Final issue for planning	AC	MR	10/02/2023
Authorised for Issue:				SW	

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 LAND TO THE SOUTH OF THE A1077, BARTON- UPON-HUMBER TRANSPORT ASSESSMENT

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EXECUTIVE SUMMARY

This Transport Assessment (TA) provides a detailed appraisal of the likely transport impacts associated with a proposed residential development on land to the south of the A1077 in Barton-upon-Humber, North Lincolnshire. The key findings of this TA are summarised below:

- The scope of this report has been produced in accordance with the relevant local and national guidance.
- A Travel Plan (TP) (LTP, 2025) has been produced in association with this TA to help promote and encourage sustainable travel to/from the proposed development.
- The proposals comprise a residential development of 196 dwellings to be served via a new four-arm priority-controlled roundabout connecting with the A1077 and Falkland Way on the northern boundary of the site which is to be implemented by North Lincolnshire Council (NLC) alongside a new link road running between the A1077 to the north and Caistor Road to the south. A full planning application (ref: PA/2023/1981) associated with the link road was approved in September 2024. The development site is split across two parcels either side of the link road. Footways flanking the internal roads are proposed, with a segregated foot/cycle facility expected to be provided on the western side of the new link road, and a footway on the eastern side, separated from the carriageway by a grassed verge. The facilities will connect with the pedestrian/cycle infrastructure provided on the A1077/Falkland Way.
- The site is in an accessible location with pedestrian routes to local amenities, bus stops accommodating services to various key destinations and a large number of areas/facilities within a reasonable cycle ride.
- Analysis of the 24 Personal Injury Collisions (PICs), which have occurred over a five-year study period (2019-2023), has not revealed any identifiable existing collision issues associated with the expected movements generated by the development, therefore it is considered that there are no pertinent road safety issues for the proposals.
- The traffic projections indicate that when the site is fully occupied, it is expected to generate up to 95 two-way vehicle trips during the AM peak hour (08:00-09:00) and 96 during the PM peak hour (17:00-18:00).
- The distribution of development traffic across the local highway network has been predicted using a gravity model derived from analysis of travel to work patterns for the local resident population.
- Capacity assessments of the key junctions have been undertaken using the industry-standard Junctions 9 and LinSig v3 modelling software. The results indicate that the proposed development will not have a severe impact on the operation of these key junctions once the schemes have been implemented.

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 full planning application for a proposed residential development on land to the south of the A1077 in Barton-upon-Humber, North Lincolnshire. 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 North Lincolnshire Council (NLC).
- 1.1.3 A Travel Plan (TP) (LTP, 2025) 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.

I.2 Scope

- 1.2.1 This report is written in accordance with the Government's 'National Planning Policy Framework' (MHCLG, 2024) and 'Planning Practice Guidance' (MHCLG, 2014), with the scope 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 any 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, utilising data from the industry-standard TRICS database;
 - Consideration of any relevant consented developments within the local area and any committed changes to the surrounding highway network;
 - Prediction of the distribution of the vehicle trips generated by the site onto the local highway network, utilising a gravity model;

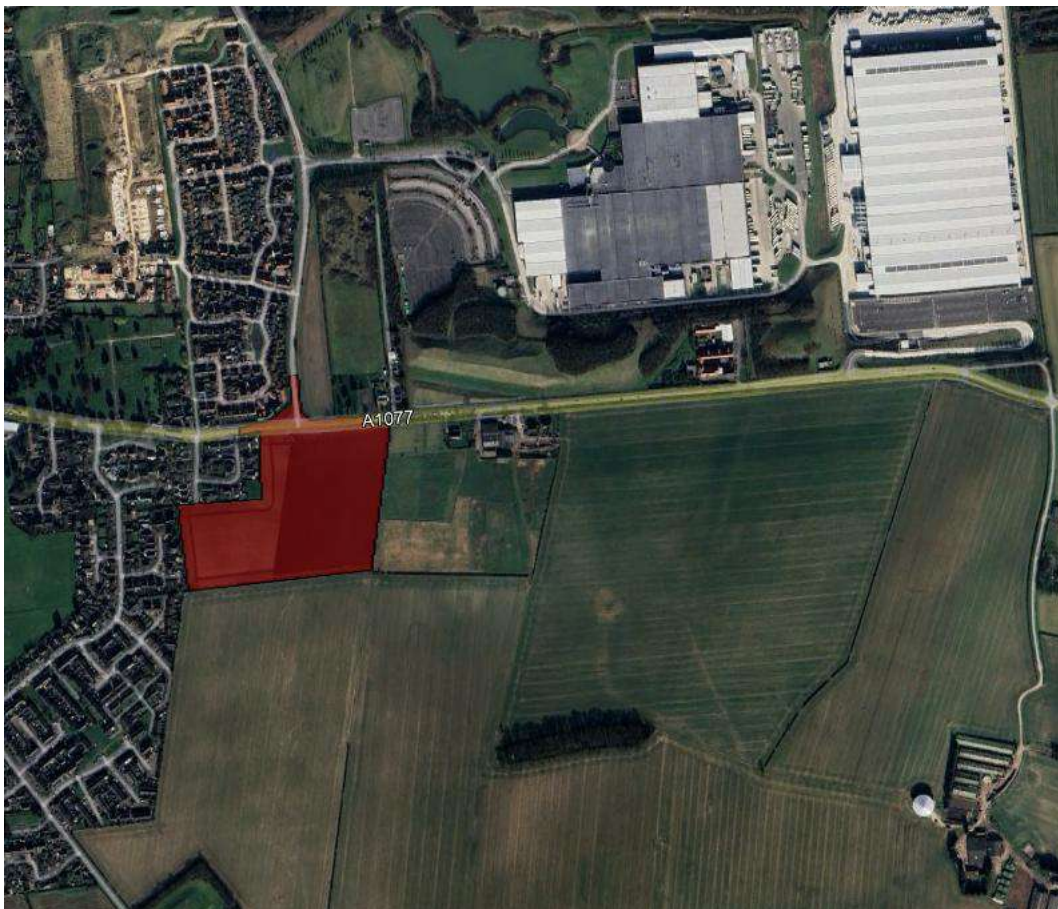
- Junction capacity assessment utilising the industry-standard modelling programmes (PICADY/ARCADY/LinSig) at the key local junctions:
 - A1077/Falkland Way/link road roundabout;
 - A1077/Hungate/Holydyke mini-roundabout (existing layout); and
 - A1077/Hungate/Holydyke improvement scheme (proposed layout).
 - Assessment of the likely traffic impact of the proposed development on the operation of the local highway network.
 - **Access, Parking & Internal Layout:** Consideration of the proposed access arrangements and internal layout of the site, including the servicing arrangements, parking provision (with reference to NLC parking standards) and suitability of the 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:
- National Planning Policy Framework (MHCLG, 2024);
 - North Lincolnshire Housing and Employment Land Allocations Development Plan (DPD) (NLC, 2016);
 - Planning Practice Guidance (MHCLG, 2014);
 - North Lincolnshire Local Development Framework: Core Strategy (NLC, 2011a);
 - North Lincolnshire Local Transport Plan 2011-2026 (NLC, 2011b);
 - Manual for Streets 2: Wider Application of the Principles (CIHT, 2010);
 - Parking Provision Guidelines for New & Change of Use Developments (NLC, 2009);
 - Guidance on Transport Assessment (DfT, 2007a);
 - Manual for Streets (DfT, 2007b); and
 - Saved Policies from The North Lincolnshire Local Plan 2003 (NLC, Updated 2007).

2. SITE BACKGROUND

2.1 Site Location & Existing Use

2.1.1 The site currently comprises agricultural land located to the south of the A1077 in the town of Barton-upon-Humber, North Lincolnshire. The site is bound by Falkland Way, and the A1077 to the north, agricultural land to the east and south, with existing dwellings served via Danson Close, Cornhill Drive, and Glebe Way forming the western boundary. The approximate location and boundary of the development site is highlighted in red in Figure 1 below.

Figure 1: Site Location



Map Data: Google, Airbus, Maxar technologies © 2025

2.2 Development Proposals & Access Arrangements

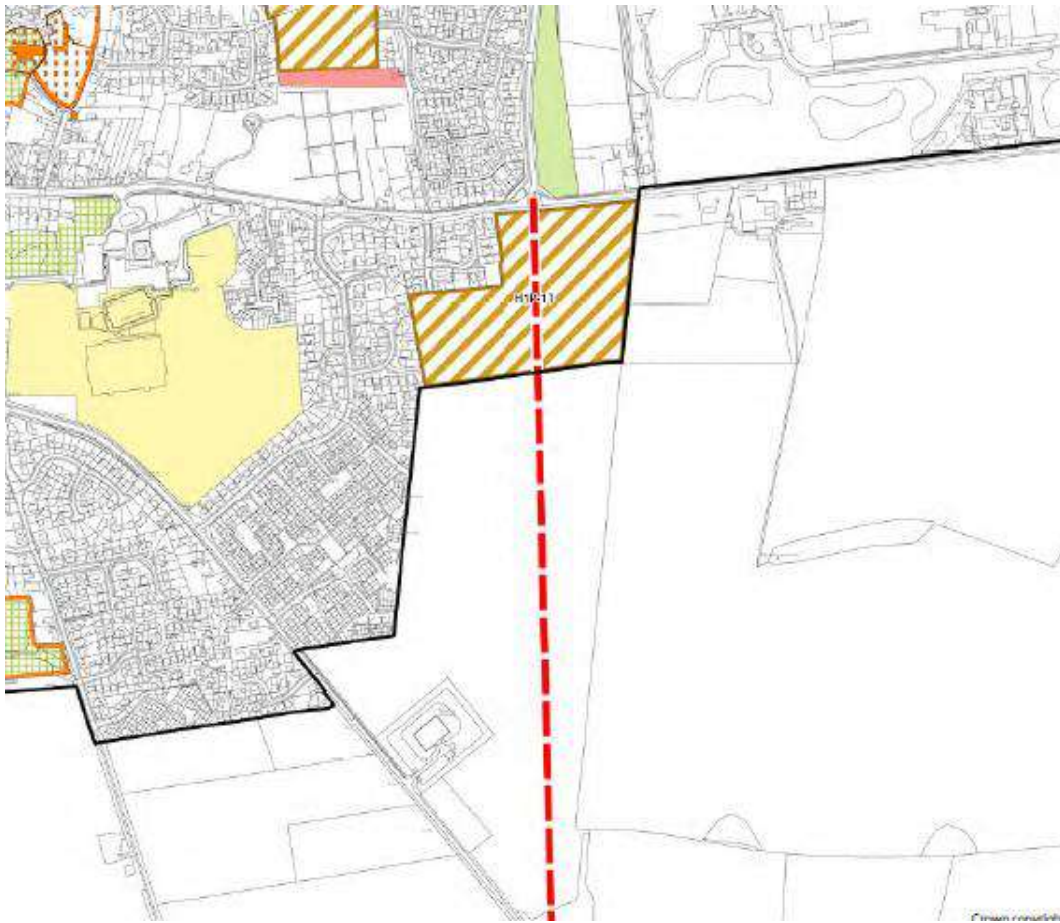
2.2.1 This report is based upon the proposals outlined on the site layout plan attached at Appendix 1. The proposals include the development of the site to accommodate 196 dwellings with a mixture of dwelling sizes and types. The original application (ref: PA/2023/1607) submitted by Strata in October 2023 has been revised in response to Officer feedback, with the most relevant amendment to the proposals in highways terms is the increase in dwellings, from 175 to 196 dwellings.

- 2.2.2 Vehicular access is to be provided via a new four-arm priority-controlled roundabout with the A1077 and Falkland Way on the northern boundary of the site which is to be implemented by North Lincolnshire Council (NLC) alongside a new link road running between the A1077 to the north and Caistor Road to the south, which is discussed further in Section 2.4. The development site is split across two parcels either side of the link road.
- 2.2.3 Footways flanking the internal roads are proposed, with a segregated foot/cycle facility expected to be provided on the western side of the new link road, and a footway on the eastern side, separated from the carriageway by a grassed verge. Pedestrian/cycle infrastructure improvements on the A1077 corridor and Falkland Way are to be implemented by NLC, as granted by the planning permission (ref: PA/2023/1981) associated with the link road.
- 2.2.4 As part of Strata's residential development proposals, a new footpath link is proposed to Cornhill Drive to the west of the site to enhance permeability and pedestrian connectivity.
- 2.2.5 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, as shown in Appendix 2. A large car has also been tested as part of this TA.
- 2.2.6 The visibility splays at junctions and the forward visibility on the internal access roads has been tested as part of this TA and a copy of the drawings are attached as Appendix 3.
- 2.2.7 Parking standards are outlined within NLC's *'Parking Provision Guidelines for New & Change of Use Developments'* (NLC, 2009). The document outlines that in 'rural' areas 'outside of urban centres' for 2-3 bed dwellings, 1 parking space and 0.5 communal parking space should be provided, with 4+ bed dwellings requiring 2 spaces and 0.5 communal space. The parking provision at the proposed development is to be provided in accordance with NLC parking requirements.
- 2.2.8 It is understood that each dwelling will be provided with private cycle storage in the form of a cycle shed located within the rear garden, with the exception of plots #80-#83 which will have a dedicated bin and cycle store.
- 2.2.9 The development will include links to existing pedestrian and cycle routes therefore according with saved policies T6 and T8 of The North Lincolnshire Local Plan 2003 (NLC 2007).

2.3 Planning Context

- 2.3.1 The site was proposed to be allocated for residential development (ref: H1P-13) within the draft North Lincolnshire Local Plan (NLC, 2022), although it is acknowledged that the draft Local Plan has since been withdrawn from examination. Figure 2 shows the boundary of the previous H1P-13 residential allocation (provisionally allocated for up to 225 dwellings).

Figure 2: Extract of Previous Draft Local Plan Policies Map



Source: NLC, 2022

2.3.2 The access and highway requirements for the H1P-13 site within the previous draft North Lincolnshire Local Plan (NLC, 2022) have been extracted below:

- *“Vehicular, pedestrian and cycle access point/s are to be taken from A1077 and will need to be agreed with the Local Highways Authority.*
- *Good footpath and cycle provision are to be delivered throughout the site, linking the development with the town centre, local services and employment areas.*
- *A Transport Assessment and Residential Travel Plan will be required to demonstrate that the development will have no adverse impacts on the highway network.*
- *A new link road is to be constructed between A1077 and Caistor Road including a new roundabout. Developers will be required to enter into a legal agreement to implement this proposal or make an appropriate financial contribution towards its completion.*
- *Financial contributions will be required for improvements to the Barrow Road/Falkland Way junction and other junctions on the A1077.”*

- 2.3.3 NLC Highways provided the following comments on the previous layout (ref: PA/2023/1607):

“Site Access

As we understand it, the council will be responsible for the construction of the roundabout at Barrow Road and the link road and an application has been submitted for this (PA/2023/1981). More detailed timescales and/or a phasing plan are required for the construction and occupation of the residential development. The submitted Production Plan suggests a number of dwellings will be built to the west of the link road first, before moving across to the east to construct all of that section. However, it is unclear how this will be achieved whilst the link road is under construction. There is a proposed temporary access shown from Barrow Road, to the east of Falkland Way, can the applicant clarify whether this will just be used for construction traffic or if there is any intention for it to be used by residents. Further details also need to be provided on how the construction of the roundabout and associated traffic management plan will affect the safe operation of the temporary junction.

Active Travel

A pedestrian/cycle access onto Cornhill Drive should be provided to improve connectivity throughout the site and a new footway/cycleway should be provided along the southern edge of Barrow Road to tie in with the existing provision to the west of Cornhill Drive.

Can the applicant clarify the cycle parking arrangements for the properties please and the proposed crossing facilities on the link road for pedestrians/cyclists

We would also be looking for a priority pedestrian/cycle crossing to be provided on the western site access from the link road.

S106 Agreement

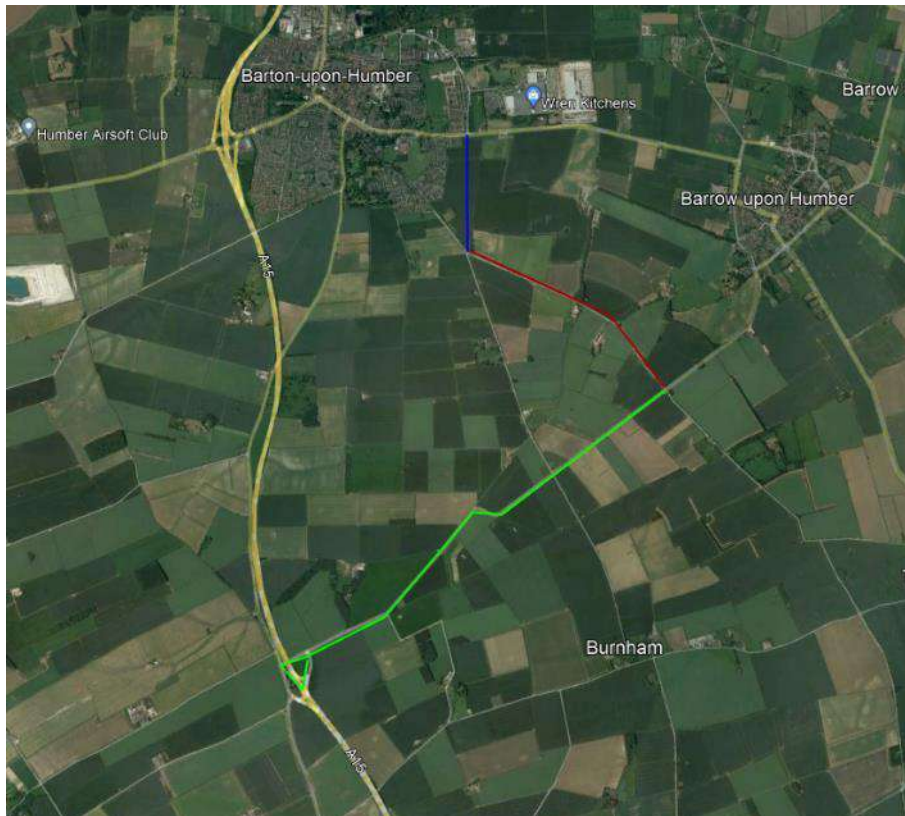
We’re uncertain whether any discussions have been held with the developer regarding any S106 contributions to off-site highway works (e.g. improvements to the A1077 corridor, or towards the roundabout and link road), similar to recent contributions for Keiger Homes (PA/2020/1628) and Wren Kitchens (PA/2019/1147), but this is something that we would be looking for.”

- 2.3.4 It should be noted that the proposed link road as set out within the draft North Lincolnshire Local Plan (NLC, 2022) has been granted planning permission (ref: PA/2023/1981) and will be delivered in line with the ‘General Arrangement Drawing’ (ref: NLC01-ARP-HGN-LR-DR-CH-030101). The link road has been designed to provide bellmouth connection points which will facilitate residential development on either side of the link road. The proposed development will utilise two of these connection points to serve the eastern and western parcels.
- 2.3.5 As previously mentioned, Strata submitted the planning application (ref: PA/2023/1607) for residential development in October 2023 and the development was positively received by NLC.

2.4 Link Road Overview

2.4.1 The proposed link road alignment is shown in Figure 3 below, with the section highlighted in blue forming new carriageway (including the section running through the proposed development site considered in this TA). The Caistor Road section highlighted in red is an existing road that is to be upgraded, and the green section along the B1206 would be retained, connecting to the A15 at the Bonby Lodge junction to the south-west.

Figure 3: Proposed Link Road Alignment



Source: LTP, 2022

- 2.4.2 It should be noted that a second round Levelling Up Fund (LUF) bid submitted by NLC for the *'Barton Principal Town Regeneration Project'* was successful with a total of £19.7 million being awarded to deliver the project, which includes a number of infrastructure improvements and active travel measures, including the delivery of the first phase of Barton link road, A1077 corridor improvements and cycle infrastructure upgrades.
- 2.4.3 The full planning application (ref: PA/2023/1981) associated with the link road between the A1077 and Caistor Road (highlighted in blue within Figure 3) was submitted in January 2024 and subsequently approved in September 2024 to *'construct a vehicular link road joining Barrow Road, A1077 and Caistor Road with cycle carriageway, footways and hard and soft landscaping treatment'*. The planning application was supported by a TA (Arup, 2024).

2.4.4 Further details regarding the approved link road alignment are outlined in the *'Barton Link Road Technical Note 2'* (LTP, 2022). Alongside the *'Barton Link Road Technical Note 2'* (LTP, 2022), the previous draft Local Plan evidence base also includes an assessment of the capacity for key local junctions, including the A1077/Holydyke/Hungate junction and the A1077/Falkland Way/Link Road roundabout, as presented in the *'A1077 Corridor Improvements Technical Note'* (LTP, 2021). To ensure consistency with the assessments undertaken on behalf of NLC for the approved link road, the baseline traffic flows, and junction models utilised within these documents have also been utilised as part of this TA, as agreed with NLC Highways.

3. SITE ASSESSMENT

3.1 Local Highway Network

- 3.1.1 As previously outlined, vehicular access to the site is to be provided via a new four-arm priority-controlled roundabout connecting with the A1077 and Falkland Way on the northern site boundary which is to be implemented by NLC as part of the link road between the A1077 and Caistor Road.
- 3.1.2 The A1077 is a two-way single carriageway that measures approximately 6.2m in width and is subject to a 30mph speed limit within the vicinity of the site, although 160m to the east of the Falkland Way junction the road is subject to a derestricted (60mph) speed limit. The road continues to the east of the site for approximately 2.5km before connecting with the B1402 via a three-arm priority-controlled roundabout. The A1077 continues south of the roundabout, providing access to several villages, including Barrow-upon-Humber, Ulceby, Thornton Curtis and Wootton before connecting with the A160, via Habrough Roundabout.

Photo 1: A1077 Along the Site Frontage



- 3.1.3 Approximately 1.4km to the west of the site, the A1077 connects with the B1218 and Hungate via a four-arm mini-roundabout. Hungate continues to the north, providing access to Barton-upon-Humber town centre, whilst the B1218 continues to the north-west, providing access to additional amenities within Barton-upon-Humber.
- 3.1.4 The A1077 continues to the south-west of the mini-roundabout for approximately 800m before connecting with the A15 via a Grade Separated Junction (GSJ). The A15 is a north-south route connecting the city of Hull and the East Riding of Yorkshire to the north and Peterborough to the south, via Lincoln and Sleaford. To the west of the A15 interchange, the A1077 continues to the town of Scunthorpe and provides access to the M181 which forms part of the Strategic Road Network (SRN).

- 3.1.5 Falkland Way is a two-way single carriageway which measures approximately 7.2m in width and is subject to a 40mph speed limit. The road provides access to several key employment sites including Wren Kitchens, Bakkavor and the Humber Bridge Industrial Estate. The road also provides access to a number of dwellings currently accessed via Canberra View, although further phases of residential development are currently under construction with an additional vehicular access to be provided. Falkland Way continues to the north-west, connecting with Pasture Road North and Pasture Road via a simple priority T-junction. There are no existing waiting/parking restrictions on Falkland Way apart from No Waiting At Any Time (NWAAT) restrictions in the vicinity of the Wren Kitchens site access.

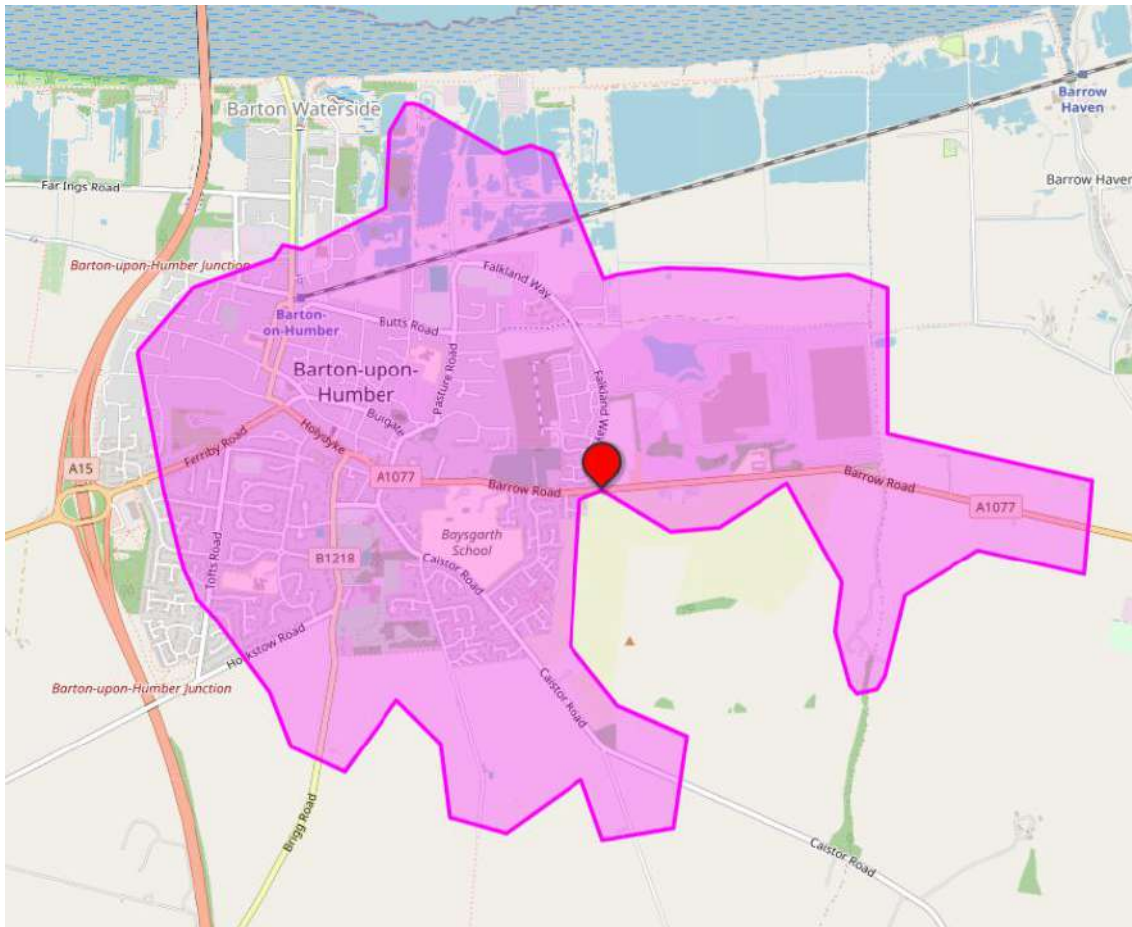
Photo 2: Falkland Way



3.2 Pedestrian Provision

- 3.2.1 Guidance from 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 the majority of the built-up area of Barton-upon-Humber as shown within Figure 4.

Figure 4: 2km Walking Isochrone



Source: ORS, 2025

- 3.2.2 Barton-upon-Humber town centre is accessible within a 2km walk of the site and includes various amenities, such as Co-op Food, Heron Foods, Boyes, restaurant/café, hot food takeaways and medical facilities. Furthermore, there are several schools accessible within a 2km walk of the site, including Baysgarth School, Barton St Peter's CofE Primary School and Bowmandale Primary School.
- 3.2.3 As part of the approved link road development (ref: PA/2023/1981), footways will be provided flanking the internal roads, with a segregated foot/cycle facility to be provided on the western side of the link road, and a footway on the eastern side, separated from the carriageway by a grassed verge. The facilities will connect with the pedestrian/cycle infrastructure on the A1077 corridor and Falkland Way, which is set to be improved as part of the active travel scheme which has received LUF funding.
- 3.2.4 There is currently no footway on the southern side of the A1077 within the extents of the site boundary, although the segregated foot/cycleway will tie-in to the existing shared-use facility to the west of the site and also provides access to a parallel crossing which connects to the proposed shared-use area on the northern side of the new roundabout.

- 3.2.5 To the east of the roundabout, a shared-use facility is provided which is circa 2.5m in width, although this reduces to circa 1.8m approximately 60m to the east of Falkland Way, providing access to Wren Kitchens and the village of Barrow-upon-Humber, and to the west becomes a shared-use facility providing access to Barton-upon-Humber town centre.

Photo 3: Footway on the Northern Side of the A1077



- 3.2.6 There are a number of Public Rights of Way (PRoW) near to the site, as shown within Figure 5. Public footpaths are shown in purple, public bridleways in green, with the site indicated by the blue star.

Figure 5: Public Rights of Way



Source: NLC, 2025

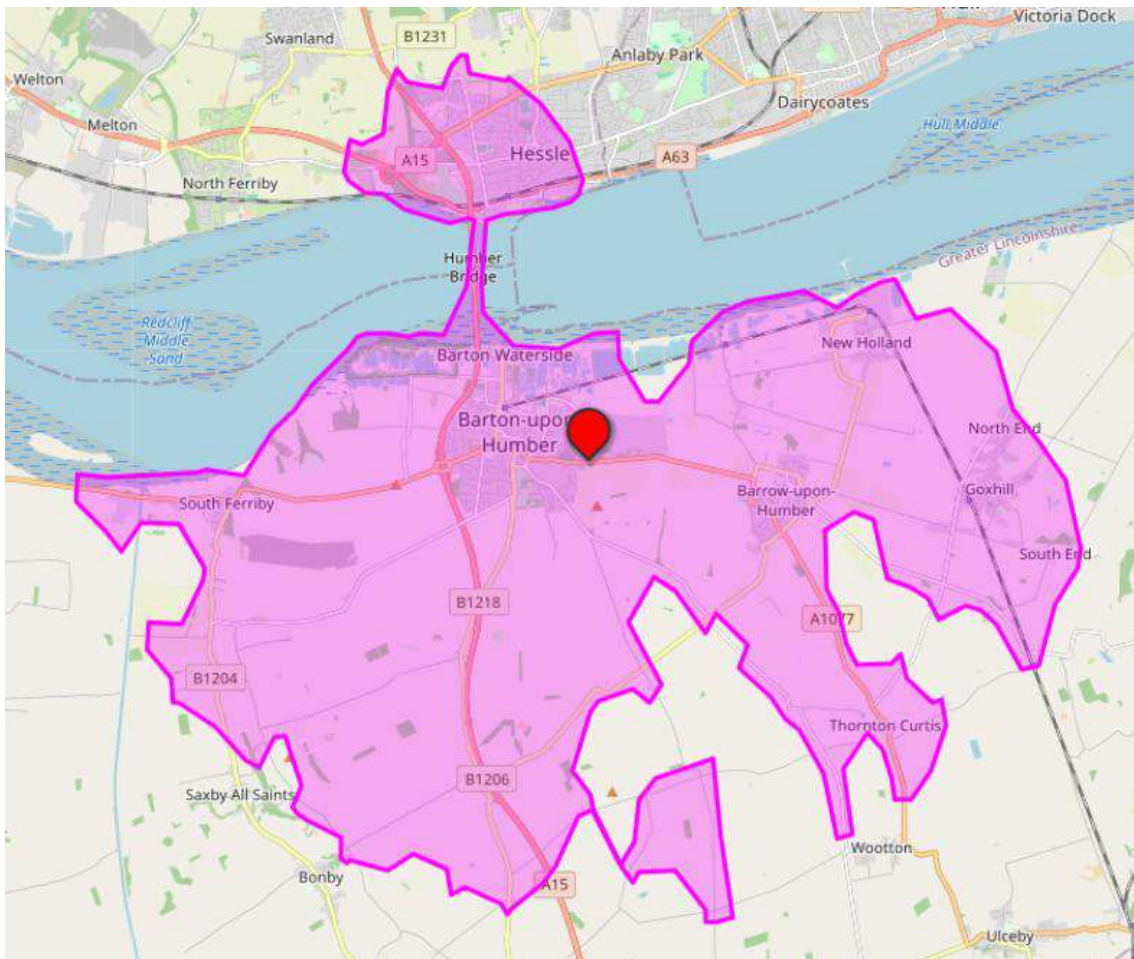
- 3.2.7 Figure 5 shows that Barton PRoW #38 is accessible from Green Lane approximately 700m to the west of the site, and Barton PRoW #37 is accessible from Eastfield Road approximately 1.6km to the south-west of the site providing access to Brigg Road.
- 3.2.8 The pedestrian infrastructure within the vicinity of the site is sufficient to facilitate the movements of mobility and visually impaired people, with the provision of dropped kerbs and tactile paving at most local junctions/crossing points. As outlined above, the pedestrian/cycle infrastructure on the A1077 corridor and Falkland Way is set to be improved as part of the new link road development (ref: PA/2023/1981). The footways in the local area are generally of sufficient width and surface quality to accommodate the passage of wheelchairs (DfT, 2021).
- 3.2.9 The internal pedestrian routes will be of adequate width, with step-free access between the site and the local footway network to allow the site to be suitably accessed on foot by all users, including those accompanied by young children and the mobility impaired.
- 3.2.10 Measures to promote walking trips to and from the site are included within the site TP (LTP, 2025).

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 Department for Transport (DfT) state that journeys up to five miles (circa 8km) are “an achievable distance to cycle for most people” (DfT, 2020).

3.3.2 The site is located within a reasonable cycle ride, up to 8km (approximately 25 minutes at the average cycling speed of 12mph), of the entire built-up areas of Barton-upon-Humber, Barrow-upon-Humber, Hessle within the East Riding of Yorkshire, and a number of further settlements, as illustrated within Figure 6.

Figure 6: 8km Cycle Isochrone



Source: ORS, 2025

3.3.3 As part of the link road development (ref: PA/2023/1981), a shared foot/cycleway measuring approximately 2m in width is to be provided along the eastern side of the link road and a fully segregated facility is provided on the western side, which will tie-in with the existing and proposed shared-use facilities on the A1077 and Falkland Way, respectively. The segregated facility on the western side of the link road will tie-in with the existing shared-use facility on the southern side of the A1077, providing an active travel route between the site and Barton town centre.

- 3.3.4 A shared-use foot/cycleway measuring approximately 2m in width is provided on the western side of Falkland Way providing access to key employment sites, such as Wren Kitchens, Bakkavor and the Humber Bridge Industrial Estate.
- 3.3.5 National Cycle Network (NCN) Route 1 is accessible from Whitecross Street within Barton town centre approximately 900m to the west of the site. NCN Route 1 is a long-distance cycle route connecting Dover and Scotland.

Photo 4: Shared Foot/Cycleway on Falkland Way



- 3.3.6 As part of the 'Barton Principal Town Regeneration Project' which has been awarded LUF funding, a number of cycle route improvement schemes are to be implemented to enhance cycling connectivity within Barton.
- 3.3.7 Given the availability of local cycle facilities and that the majority of the local roads are subject to a 30mph speed limit, it is considered that the local area is suitable to encourage cycling trips to/from the site.
- 3.3.8 Measures to promote cycling trips to and from the site are included within the site TP (LTP, 2025).

3.4 Public Transport Provision

- 3.4.1 Advice within 'Guidelines for Public Transport in Development' (IHT, 1999) states that the generally acceptable maximum 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. The nearest bus stops to the site are located on the A1077, approximately 145m to the west of the site, providing travel in both directions. An additional bus stop is provided on Falkland Way approximately 170m to the north of the site, providing access to northbound services.

3.4.2 Details of the bus services that operate from the local bus stops are outlined within Table 1.

Table 1: Local Bus Services

Service	Route	Weekday Frequency*
Services accessible from the A1077 (≈145m)		
255	North Bransholme – Hull Paragon Interchange – Anlaby – Hessle – Barton-upon-Humber – Wren Kitchens	6-7 services per day in each direction
256	North Bransholme – Hull Paragon Interchange – Anlaby – Hessle – Barton-upon-Humber – Wren Kitchens	1 service per day in each direction
260	Barton Tesco – Barton Interchange – Barton Barrow Road – Barrow – New Holland – Goxhill – East Halton – North Killingholme – South Killingholme - Immingham	4 services per day in each direction
350	Hull Paragon Interchange – Barton-upon-Humber – South Ferriby – Winterton – Scunthorpe Bus Station	2-3 services per day in each direction (<i>Every 30 mins to/from Barton town centre bus stops</i>)
560	Scunthorpe – Roxby – Winterton – South Ferriby – Barton-upon-Humber – East Halton	2 services per day in each direction
Additional Services from Falkland Way(≈170m)		
250	Hull Paragon Interchange – Anlaby – Hessle – Barton-upon-Humber - Grimsby	Hourly

*Refers to the general daytime service between 08:00 and 18:00.

3.4.3 Table 1 demonstrates that a number of frequent services are available from local stops, including services to Barton-upon-Humber town centre, Scunthorpe, Hull and Cleethorpes.

3.4.4 The nearest rail station to the site is Barton-on-Humber Rail Station, located approximately 1.9km to the north-west of the site. Barton-on-Humber Rail station is managed by East Midlands Railway and provides infrequent services to Cleethorpes. Amongst the facilities available at the station is a car park, cycle parking, and step-free access.

3.4.5 Measures to promote public transport trips to and from the site are included within the site TP (LTP, 2025).

3.5 Summary

3.5.1 The site is readily accessible by a range of sustainable transport modes in accordance with saved Policy T2 of The North Lincolnshire Local Plan 2003 (NLC, 2007).

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 five-year study period (01/01/2019 to 31/12/2023) was obtained via a search of the Department for Transport’s (DfT) road safety data (DfT, 2024).

4.1.2 A total of 24 collisions occurred within the study area, which includes an approximately 4km section of the A1077 between and including the A1077/B1402 roundabout to the east, and the A1077/Holydyke/Hungate mini-roundabout to the west. The study area extents and the locations of the collisions are indicated on the plan attached as Appendix 4. Table 2 below outlines the collision history of the study area.

Table 2: Collision History

Year	2019	2020	2021	2022	2023	Total
Fatal	-	-	-	-	1	1
Serious	1	-	1	3	1	6
Slight	4	4	2	5	2	17
Total	5	4	3	8	4	24

4.1.3 The collision records show that the number of collisions has remained relatively consistent across the study, albeit with a peak in 2022 whereby 8 collisions occurred. There were 7 KSI (Killed or Seriously Injured) collisions recorded during the study period, resulting in a severity ratio of 29.2%.

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	18	75.0%
Wet or damp	6	25.0%
Weather	Collisions	%
Fine	21	87.5%
Rain	2	8.3%
Unknown	1	4.2%
Lighting	Collisions	%
Daylight	16	66.7%
Dark	8	33.3%

4.2.2 As illustrated in Table 3, the majority of the collisions occurred without adverse road surface, weather or lighting 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)	7	29.2%
Spring (Mar-May)	4	16.7%
Summer (Jun-Aug)	8	33.3%
Autumn (Sep-Nov)	5	20.8%

4.3.2 Table 4 shows that the collisions were relatively spread out across the year, with a slight peak during the summer (33.3%) and winter months (29.2%).

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	-	2	1	-	4	16.7%
Tuesday	-	1	-	-	-	1	4.2%
Wednesday	2	-	3	1	-	6	25.0%
Thursday	-	2	2	1	-	5	20.8%
Friday	1	-	2	1	-	4	16.7%
Saturday	2	-	-	2	-	4	16.7%
Sunday	-	-	-	-	-	0	-
Total	6	3	9	6	0	24	
%	25.0%	12.5%	37.5%	25.0%	-		

4.3.4 Table 5 shows that there was a spread of collisions across the week, with a dip in collisions on Tuesdays (4.2%) and no collisions recorded on a Sunday. Over a third (37.5%) of the collisions were recorded during the afternoon period, with no collisions recorded during the nighttime period.

4.4 Collision Locations

4.4.1 The locations of the 24 study collisions (shown on the plot attached as Appendix 4) can be summarised as follows:

- 6 PICs occurred on the A1077 (not at a junction);
- 4 PICs occurred at the A1077/Whitecross Street priority junction;
- 3 PICs occurred at the A1077/Market Place junction;
- 2 PICs occurred on Falkland Way (not at a junction);
- 2 PICs occurred on Ferriby Road (not at a junction);

- 2 PICs occurred within the vicinity of the George Street/Priestgate/Chapel Lane priority junctions;
- 1 PIC occurred at the A1077/Hungate/Holydyke mini-roundabout;
- 1 PIC occurred at the A1077/B1218 Brigg Road priority junction;
- 1 PIC occurred at the Falkland Way/Canberra View junction;
- 1 PIC occurred at the A1077/Mere Farm access priority junction; and
- 1 PIC occurred at the A1077/Oak Drive priority junction.

4.4.2 It is noted that no collisions occurred at the existing A1077/Falkland Way priority junction where the proposed site access roundabout is due to be constructed.

4.5 Casualties

4.5.1 A total of 32 casualties occurred as a result of the 24 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	2	1	7	21.9%
Cyclist	1	-	-	2	-	-	3	9.4%
Powered Two-Wheeler	-	-	1	-	-	-	1	3.1%
Car Driver	-	-	2	7	2	2	13	40.6%
Car Passenger	1	1	-	2	3	-	7	21.9%
Other	-	-	-	1	-	-	1	3.1%
Total	4	1	3	14	7	3	32	
%	12.5%	3.1%	9.4%	43.8%	21.9%	9.4%		

4.5.2 Table 6 shows that just under two-thirds of the casualties (63.5%) were car occupants, and just over a third (34.4%) were vulnerable road users (pedestrians, cyclists and PTW riders). Almost half of the casualties (43.8%) were aged between 26 and 45 years, with the fewest casualties aged between 16 to 20 years (3.1%).

4.6 Road Safety Impact

4.6.1 A total of 24 collisions, resulting in 32 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.

- 4.6.2 As outlined within the TA (Arup, 2024) associated with the approved link road development (ref: PA/2023/1981), the *“accident records identify no common site-related causal factors and raises no safety concerns that is likely to be exacerbated as a result of the proposed scheme”*.
- 4.6.3 The proposed site access points and internal roads have been designed with due consideration to road safety, with appropriate highway design features incorporated into the detailed design, and therefore the proposals should not have a detrimental road safety impact on the local transport network and should not adversely affect the safety of other road users.

5. TRIP GENERATION

5.1 Proposed Traffic Generation

5.1.1 As agreed with NLC Highways, the approved vehicle trip rates within the Transport Assessment (BSP, 2020) produced for the Pasture Road South site (H1P-12) have been used to predict the likely vehicle trips expected to be generated by the proposed residential development. The vehicle trip rates and projected trip generation associated with the proposed development are shown in Table 7, with full details of the trip generation for the site attached as Appendix 5.

Table 7: Projected Vehicle Trip Generation

Houses Privately Owned (03-A)	AM Peak (08:00-09:00)		PM Peak (17:00-18:00)	
	Arrivals	Departures	Arrivals	Departures
Approved Vehicle Trip Rates (per dwelling)	0.122	0.360	0.333	0.158
Development Vehicle Trips (196 dwellings)	24	71	65	31

5.1.2 The trip generation projections shown in Table 7 indicate that the proposed development could be expected to generate up to 95 two-way vehicle trip movements during the AM peak hour and 96 during the PM peak hour.

5.1.3 A TP (LTP, 2025) 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

5.2.1 In order to predict the modal split of trips generated by the site, local travel patterns have been interrogated using 'Method of Travel to Work' data from the 2021 National Census (ONS, 2023). The modal split has been predicted based upon the travel patterns for those living within 'North Lincolnshire 001' within which the site is located. Table 8 provides a summary of the projected baseline modal split for the proposed development.

Table 8: Projected Modal Split (2021 Census)

Mode of Travel	Modal Split
Car/Van Drivers	66.2%
Taxi	0.4%
Powered Two-Wheeler	0.4%
Vehicle Trip Generating	67.0%
Car Passengers	13.7%
Pedestrians	11.5%
Cyclists	2.7%
Public Transport Users	4.2%
Other	0.9%
TOTAL	100%

* Total may not represent the sum of its parts due to rounding.

5.2.2 These modal split predictions indicate that just under a third of the person trips (33.0%) generated by the development would be expected to be made by sustainable modes (pedestrian, cycle, public transport and car passenger).

6. TRAFFIC IMPACT

6.1 Previous Assessment Work

6.1.1 The 'A1077 Corridor Improvements Technical Note' (LTP, 2021) produced to assess the link road impact tested a number of different development scenarios, based on potential residential development site allocations, with the most relevant scenario relating to the proposed development summarised below:

- **2031 With Residential Allocation Sites:** This scenario was based on 2019 traffic survey data growthed to 2031, with the addition of traffic associated with an approved extension to the Wren Kitchens site, as well as the development traffic associated with the following residential allocation sites (based on emerging Local Plan reference numbers that may have subsequently changed):
 - Land to the rear of 13-19 Pasture Road (H1C-29) = 19 dwellings.
 - Coach and Horses Inn 86 – 88 High Street (H1C-30) = 18 dwellings.
 - 7a, Marsh Lane (H1C-31) = 5 dwellings.
 - Bank House, 8 Holydyke (H1C-32) = 5 dwellings.
 - Pasture Road South (H1P-10) = 350 dwellings.
- The above sites total 394 dwellings but did not include the application site considered in this TA. Sites H1C-29/30/31/32 represent existing commitments with planning approval, whereas H1P-10 was the only site proposed for residential allocation at the time of producing the Technical Note (LTP, 2021).
- Since the Technical Note (LTP, 2021) was produced, there were some changes to the proposed allocations, as part of the most recent version of the (now withdrawn) draft Local Plan (NLC, 2022), as outlined below:
 - Land to the rear of 13-19 Pasture Road (now H1C-23) = 16 dwellings.
 - Coach and Horses Inn 86 – 88 High Street (now H1C-24) = 18 dwellings.
 - 7a, Marsh Lane = now removed (6 dwellings constructed and occupied).
 - Bank House, 8 Holydyke = removed (the planning permission [ref: PA/2017/1046] expired in 2021, with the development not constructed).
 - Land adjacent to White Swan, Butts Road (H1C-25) = added site with 5 dwellings (due to a recent planning consent).
 - Pasture Road South (now H1P-12) = 319 dwellings approved (ref: PA/2020/1628) which includes a £100,000 contribution associated with capacity improvements on the A1077 as requested by NLC Highways.
 - Land off Barrow Road (H1P-13) = 225 dwellings (this is the site assessed in this TA).
- The above sites now total 583 dwellings, an increase of 189 dwellings relative to the link road assessments. It should be noted that the application site (H1P-13) was not considered as part of this scenario within the Technical Note (LTP, 2021).

6.1.2 In order to reflect the latest development quantum associated with the previous draft Local Plan sites, the trip generation associated with these sites (excluding H1P-13) has been updated. A future assessment year of 2038 has also been considered rather than the future year of 2031 utilised within the Technical Note (LTP, 2021) in order to align with the previous draft Local Plan period, which ensures that the assessments presented in this TA are robust. The future year vehicle trip projections and assignment are illustrated in the network diagrams attached as Appendix 6.

6.2 Assessment Scenario

6.2.1 Strata's proposed residential development has been tested against the weekday network AM and PM peak hour traffic flow scenario summarised below, as agreed with NLC Highways:

- **2038 With Development:** '2019 Base' traffic flows (recorded during June 2019 traffic surveys), growthed to 2038, with the addition of traffic associated with the Wren Kitchens extension, the residential sites allocated in the previous draft North Lincolnshire Local Plan (NLC, 2022) and the proposed development (see Section 5.1). In order to consider a robust worst-case assessment, all development traffic flows have been assigned to the proposed roundabout and would be expected to travel through local junctions within Barton-upon-Humber rather than utilising the proposed link road.

6.2.2 The traffic flows at 2038 have been predicted using the DfT's 'National Traffic Model' (NTM) and 'Road Traffic Forecasts' (RTFs). The growth factor obtained from the NTM has been adjusted to reflect local circumstances from the local MSOA 'North Lincolnshire 001', using TEMPro (v7.2b) software (Ref: Yorkshire & Humber Dataset Version 7.2), see Appendix 7.

6.2.3 In accordance with the DfT's 'Transport Analysis Guidance' (TAG) (DfT, 2022b), the underlying NTEM growth includes for households and jobs have also been adjusted to reflect the local development traffic that has been explicitly incorporated into the traffic projections of this TA, in order to avoid double counting the associated traffic flows.

6.3 Trip Distribution & Assignment

6.3.1 The distribution of traffic associated with the site has been predicted utilising a gravity model based upon commuting patterns of existing residents within the 'North Lincolnshire 001' Middle-Layer Super Output Area (MSOA), in 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 existing residents travelling to each workplace destination (MSOAs and local authority districts) by mode of travel (it is noted that Origin-Destination by travel mode data from the 2021 census has not been released yet).

6.3.2 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, and known existing traffic conditions on the relevant routes. The defined zones utilised within the gravity model calculations are illustrated in Figure 7. It should be noted that this assumes that the first phase of the link road hasn't been fully implemented to Caistor Road and therefore all vehicle trips will utilise the proposed A1077/Falkland Way four-arm priority-controlled roundabout.

Figure 7: Gravity Model Zones



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6.3.3 The detailed calculations of the gravity model are attached as Appendix 8, with the results summarised in Table 9.

Table 9: Gravity Model Results

Zone	Route	Distribution Split	AM 2-Way	PM 2-Way
A	A1077 (E)	13.9%	13	13
B	A15 (N)	17.7%	17	17
C	A15 (S) via A1077	37.7%	36	36
D	A1077 (W)	11.9%	11	11
E	Falkland Way	6.3%	6	6
F	A1077 (W) (within Barton-upon-Humber town centre)	12.6%	12	12
TOTAL		100.0%	95	96

*Totals may not represent the sum of their parts due to rounding.

6.3.4 Network diagrams showing the distribution of proposed development trips at the site access roundabout are included as Appendix 6.

6.4 J1 A1077/Falkland Way/Link Road Roundabout

- 6.4.1 As mentioned previously, the proposed development site will be accessed via the new four-arm priority-controlled roundabout in the location of the existing A1077/Falkland Way priority junction which forms part of the approved link road development (ref: PA/2023/1981) to be implemented by NLC.
- 6.4.2 In order to assess the ability of the roundabout to accommodate the projected future traffic flows, a junction capacity assessment has been undertaken using Junctions 9 modelling software (ARCADY 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 (PICADY) and roundabouts (ARCADY). The input parameters used to create the Junctions 9 model have been extracted from the junction modelling utilised as part of the Technical Note (LTP, 2021).
- 6.4.3 The future peak hour traffic flows have been assessed against the proposed junction layout, the results of which are summarised in Table 10 and the complete modelling output in Appendix 9.

Table 10: J1 Capacity Assessment

Arm	2038 With Development		
	Max. RFC	Max End Q	Max. Delay (secs)
AM Peak (07:45-08:45)			
Falkland Way	18.8%	0.2	3.0
A1077 (E)	33.9%	0.5	3.5
Link Road	5.3%	0.1	2.6
A1077 (W)	44.6%	0.9	4.8
OVERALL	44.6%	0.9	4.8
PM Peak (17:00-18:00)			
Falkland Way	33.3%	0.5	3.6
A1077 (E)	35.2%	0.5	3.7
Link Road	2.5%	0.0	2.6
A1077 (W)	48.4%	1.0	4.9
OVERALL	48.4%	1.0	4.9

- 6.4.4 The capacity assessment results shown in Table 10 indicate that the proposed A1077/Falkland Way/Link Road priority-controlled roundabout is expected to operate well within capacity during both the AM and PM peak hours with the residential development fully occupied, with a maximum Ratio of Flow to Capacity (RFC) value of 48.4% (A1077 (W), PM peak), which is well below the typical target level of 85%.

6.5 J2 A1077/Holydyke/Hungate Mini-Roundabout

- 6.5.1 In order to assess the ability of the existing A1077/Holydyke/Hungate mini-roundabout to accommodate the projected future traffic flows, a junction capacity assessment has been undertaken using Junctions 9 modelling software (ARCADY module). An aerial image of the existing A1077/Holydyke/Hungate mini-roundabout can be seen in Figure 8.

Figure 8: J2 A1077/Holydyke/Hungate Mini-Roundabout



Source Imagery: Copyright Google Earth Pro (License Key-JCPMR5M58LXF2GE)

- 6.5.2 The input parameters used to create the Junctions 9 model have been extracted from the junction modelling utilised as part of the Technical Note (LTP, 2021).
- 6.5.3 The future peak hour traffic flows have been assessed against the existing junction layout, the results of which are summarised in Table 11 and the complete modelling output in Appendix 10.

Table 11: J2 Capacity Assessment (Existing Layout)

Arm	2038 With Development		
	Max. RFC	Max End Q	Max. Delay (secs)
AM Peak (07:45-08:45)			
Holydyke	46.3%	0.9	8.6
Hungate	44.6%	0.8	26.5
A1077 (Holydyke)	77.4%	3.4	17.4
A1077 (Ferriby Road)	82.2%	4.5	22.4
OVERALL	82.2%	4.5	26.5
PM Peak (17:00-18:00)			
Holydyke	52.2%	1.1	9.9
Hungate	67.7%	1.9	51.8
A1077 (Holydyke)	82.7%	4.5	22.4
A1077 (Ferriby Road)	116.1%	84.2	306.9
OVERALL	116.1%	84.2	306.9

- 6.5.4 The capacity assessment results shown in Table 11 indicate that the existing junction would be expected to operate over capacity with significant levels of queuing on the A1077 (Ferriby Road) arm during the PM peak with the development in place, however a junction improvement scheme is to be delivered as part of the *'Barton Principal Town Regeneration Project'* which has been considered in Section 6.6 of this TA.
- 6.5.5 It should be noted that the approved link road (ref: PA/2023/1981) is expected to provide an alternative route for vehicles passing through Barton, avoiding the town centre and may result in fewer vehicles utilising the junction.

6.6 J2 A1077/Holydyke/Hungate Improvement Scheme

- 6.6.1 As mentioned previously, a second round LUF bid for the *'Barton Principal Town Regeneration Project'* was successful with a total of £19.7 million being awarded to deliver the project, which includes a number of infrastructure improvements and active travel measures, including the delivery of the A1077/Holydyke/Hungate improvement scheme. NLC previously secured a £100,000 contribution towards capacity improvements on the A1077 corridor as part of the planning approval (ref: PA/2020/1628) for the Pasture Road South (H1P-12) development which was expected to partially fund the signalisation of the A1077/Holydyke/Hungate junction.
- 6.6.2 The Technical Note (LTP, 2021) considered an improvement scheme at the A1077/Holydyke/Hungate junction which would see the introduction of a signalised junction. As part of the scheme, Hungate would form a one-way egress and therefore for the purposes of this assessment, assumptions have been made in relation to the likely re-routing of vehicles with the following assumptions applied:
- 75% of right turn movements from Hungate added to the A1077 (W) arm and 25% added to the Holydyke arm.
 - 20% of left turn movements from Hungate added to the Holydyke arm within the remaining 80% movements expected to utilise other routes within Barton-upon-Humber town centre to travel east.
- 6.6.3 In order to assess the ability of the proposed signalised junction to accommodate the projected future traffic flows, a junction capacity assessment has been undertaken using the industry-standard LinSig v3, a design and assessment tool for traffic signal junctions. The input parameters used to create the LinSig v3 model have been extracted from the junction modelling utilised as part of the Technical Note (LTP, 2021).
- 6.6.4 The future peak hour traffic flows have been assessed against the proposed junction layout, the results of which are summarised in Table 12 and the complete modelling output is provided in Appendix 11.

Table 12: J2 Capacity Assessment (Improvement Scheme)

Movement From	2038 With Development	
	DoS (%)	MMQ (PCU)
AM Peak (07:45-08:45)		
A1077 (W)	68.8%	17.7
Holydyke	69.8%	11.8
A1077 (E)	63.9%	12.7
A1077 (W) Internal	48.8%	3.4
Practical Reserve Capacity (PRC)	+28.9%	
PM Peak (17:00-18:00)		
A1077 (W)	88.4%	30.8
Holydyke	89.1%	16.2
A1077 (E)	81.2%	13.5
A1077 (W) Internal	50.3%	3.4
PRC	+1.0%	

- 6.6.5 The Degree of Saturation (DoS) quoted within Table 12 is a ratio of the demand to capacity on each approach to the junction, with a value of 100% meaning that demand and capacity are equal. The Mean Max Queue (MMQ) is a measurement of the average maximum queue likely to occur across all cycles of the modelled scenario.
- 6.6.6 The results of the capacity assessment presented in Table 12 that the proposed improvement scheme operates with spare capacity during both peak hours with the proposed development fully occupied.
- 6.6.7 It should be noted that the maximum DoS recorded at the signal junction can be compared to the maximum RFC for the existing mini-roundabout junction layout, as they represent broadly the same measure of capacity. It is apparent that the proposed signal junction layout (worst case DoS 89.1% during the PM peak) would represent a considerable capacity improvement at the junction when compared to the existing junction layout (116.1% RFC PM peak) as shown in Table 11.

6.7 Traffic Impact Summary

- 6.7.1 Capacity assessments have been undertaken associated with the approved A1077/Falkland Way/link road roundabout, the existing A1077/Holydyke/Hungate mini-roundabout and the A1077/Holydyke/Hungate improvement scheme. The results indicate that the proposed development will not have a severe impact on the operation of these key junctions once the schemes have been implemented. The delivery of the full link road is also likely to result in fewer vehicles travelling through Barton town centre.

- 6.7.2 Therefore, the proposals are considered to be in accordance with the ‘*National Planning Policy Framework*’ (MHCLG, 2024), 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, following mitigation, would be severe, taking into account all reasonable future scenarios*”.

7. CONCLUSIONS

- 7.1.1 This TA provides a detailed appraisal of the expected transport impact associated with the proposed residential development on land to the south of the A1077 in Barton-upon-Humber, North Lincolnshire.
- 7.1.2 The scope of this report has been produced in accordance with the relevant local and national guidance.
- 7.1.3 A TP (LTP, 2025) that provides a strategy for encouraging sustainable travel at the site has been produced in conjunction with this TA as a separate document.
- 7.1.4 The proposals include the development of the site to accommodate 196 dwellings with a mixture of dwelling sizes and types. The original application (ref: PA/2023/1607) submitted by Strata in October 2023 has been revised in response to Officer feedback, with the most relevant amendment to the proposals in highways terms is the increase in dwellings, from 175 to 196 dwellings.
- 7.1.5 Vehicular access is to be provided via a new four-arm priority-controlled roundabout with the A1077 and Falkland Way on the northern boundary of the site which is to be implemented by NLC alongside a new link road running between the A1077 to the north and Caistor Road to the south, which is discussed further in Section 2.4. The development site is split across two parcels either side of the link road.
- 7.1.6 Footways flanking the internal roads are proposed, with a segregated foot/cycle facility expected to be provided on the western side of the new link road, and a footway on the eastern side, separated from the carriageway by a grassed verge. Pedestrian/cycle infrastructure improvements on the A1077 corridor and Falkland Way are to be implemented by NLC, as granted by the planning permission (ref: PA/2023/1981) associated with the link road.
- 7.1.7 As part of Strata's residential development proposals, a new footpath link is proposed to Cornhill Drive to the west of the site to enhance permeability and pedestrian connectivity.
- 7.1.8 The site is well placed to generate trips by sustainable modes of transport, with amenities in Barton-upon-Humber town centre within a 2km walk, and the built-up areas of Barton-upon-Humber, Barrow-upon-Humber and the western extents of Hesse within an 8km cycle ride of the site. The nearest bus stops to the site are on the A1077 within an approximately 145m walk to the west of the site. These stops accommodate services to Hull, Scunthorpe, Cleethorpes and areas of the East Riding of Yorkshire. The nearest rail station is Barton-upon-Humber Rail Station, located approximately 1.9km to the north-west of the site, providing regular services to Cleethorpes.

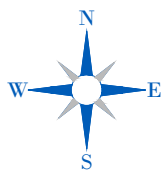
- 7.1.9 A road casualty study showed that 24 PICs occurred within the study area around the proposed development site during the most recent five-year study period. Analysis of the study collisions has not revealed any identifiable existing collision issues associated with the expected movements of the proposed development. Therefore, it is considered that there are not any existing road safety issues pertinent to the development of the site. The proposed site access points and internal roads have been designed with due consideration to road safety, with appropriate highway design features incorporated into the detailed design, and therefore the proposals should not have a detrimental road safety impact on the local transport network and should not adversely affect the safety of other road users.
- 7.1.10 The approved vehicle trip rates within the Transport Assessment (BSP, 2020) produced for the H1P-12 site have been used to predict the likely vehicle trips expected to be generated by the proposed development. The trip generation projections indicate that the proposed development is expected to generate 95 two-way vehicle trips during the AM peak hour (08:00-09:00) and 96 during the PM peak hour (17:00-18:00).
- 7.1.11 The distribution of development traffic across the local highway network has been predicted using a gravity model derived from analysis of travel to work patterns for the local resident population of the 'North Lincolnshire 001' MSOA. There is expected to be a split of approximately 6.3% of trips to/from the north, 13.9% to/from the east, and 79.8% to/from the west at the proposed site access roundabout.
- 7.1.12 Capacity assessments have been undertaken associated with the approved A1077/Falkland Way/link road roundabout, the existing A1077/Holydyke/Hungate mini-roundabout and the A1077/Holydyke/Hungate improvement scheme. The results indicate that the proposed development will not have a severe impact on the operation of these key junctions once the schemes have been implemented.
- 7.1.13 It is therefore considered that the proposals will not have a significant impact on the operation of the local highway network. The proposals are therefore considered to be in accordance with the 'National Planning Policy Framework' (NPPF) 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, following mitigation, would be severe, taking into account all reasonable future scenarios" (MHCLG, 2024).
- 7.1.14 It is concluded from the assessments within this TA that the proposed development would not be expected to have a significant impact in terms of sustainable travel, traffic impact and road safety.

8. REFERENCES

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Appendix I – Proposed Site Layout Plan

Appendix 2 – Swept Path Analysis

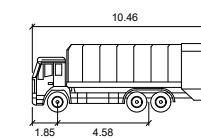


Key:-

	Outer Wheel Track
	Vehicle Swept Path
	Vehicle Centreline and Direction

Notes:-

1. Simulated speed - not more than 5 mph
2. Actual vehicle dimensions and track may vary.



MB Econic Refuse Vehicle (NLC)

	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 28.3

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B	07/05/25	OA	KN	Updated to new site layout BY00127 Site Layout 14.04.25.
A	03/04/25	JC	MR	Updated to latest site layout BY00127 Site Layout 02.04.25

Client
Strata

Project
Proposed Residential Development, Land to the South of A1077, Barton

Title
Refuse Vehicle Entering Site Swept Path Analysis

local transport projects
traffic engineering and transport planning

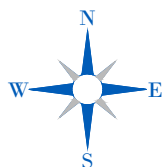
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Drawn	JWH	Date	26 03 25
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Status	Approved MR		

SITE TESTING

Project	Job	Drawing	Sheet	Revision
LTP/5136/T2/01	01	01		C

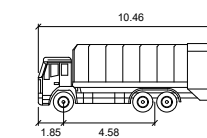


Key:-

	Outer Wheel Track
	Vehicle Swept Path
	Vehicle Centreline and Direction

Notes:-

1. Simulated speed - not more than 5 mph
2. Actual vehicle dimensions and track may vary.



MB Econic Refuse Vehicle (NLC)

meters	
Width	: 2.50
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Client
Strata

Project
Proposed Residential Development, Land to the South of A1077, Barton

Title
Refuse Vehicle Exiting Site Swept Path Analysis

local transport projects
traffic engineering and transport planning

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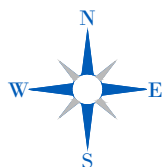
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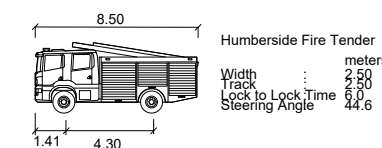


Key:-

	Outer Wheel Track
	Vehicle Swept Path
	Vehicle Centreline and Direction

Notes:-

1. Simulated speed - not more than 5 mph
2. Actual vehicle dimensions and track may vary.



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Client
Strata

Project
Proposed Residential Development, Land to the South of A1077, Barton

Title
Fire Tender Entering Site Swept Path Analysis

local transport projects
 traffic engineering and transport planning

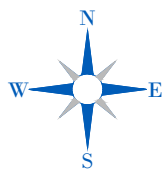
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Drawing number				
Project	Job	Drawing	Sheet	Revision
LTP/5136/	T2/	02	01	C

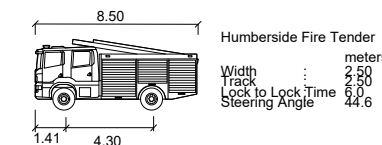


Key:-

	Outer Wheel Track
	Vehicle Swept Path
	Vehicle Centreline and Direction

Notes:-

1. Simulated speed - not more than 5 mph
2. Actual vehicle dimensions and track may vary.



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Client
Strata

Project
Proposed Residential Development, Land to the South of A1077, Barton

Title
Fire Tender Exiting Site Swept Path Analysis

local transport projects
traffic engineering and transport planning

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Drawing number				
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LTP/5136/	T2/	02	02	C

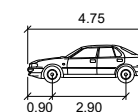


Key:-

	Outer Wheel Track
	Vehicle Swept Path
	Vehicle Centreline and Direction

Notes:-

1. Simulated speed - not more than 5 mph
2. Actual vehicle dimensions and track may vary.



Car

	meters
Width	: 1.80
Track	: 1.80
Lock to Lock Time	: 6.0
Steering Angle	: 30.5

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A	03/04/25	JC	MR	Updated to latest site layout BY00127 Site Layout 02.04.25

Client
Strata

Project
Proposed Residential Development, Land to the South of A1077, Barton

Title
Large Car Swept Path Analysis

local transport projects
traffic engineering and transport planning



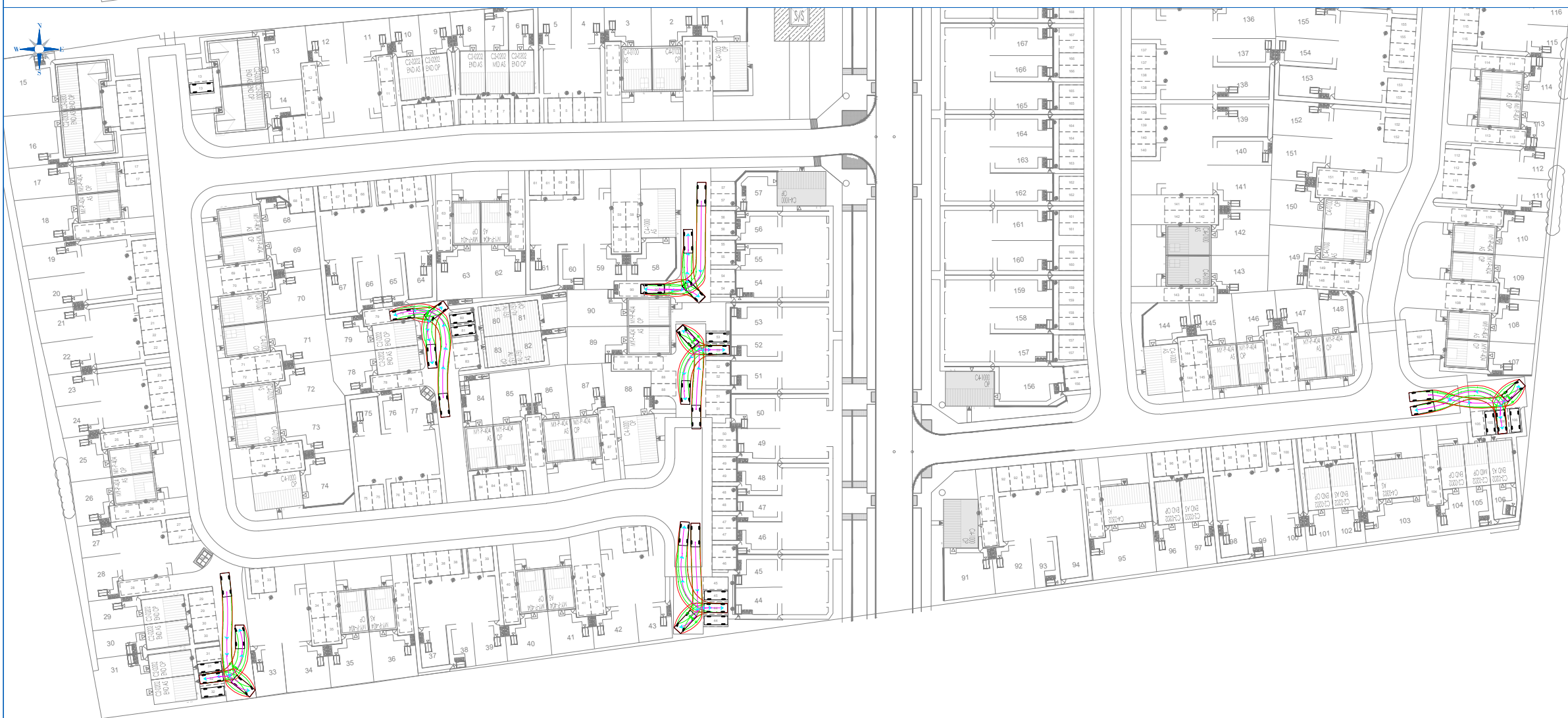
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Status		Approved	MR

SITE TESTING

Drawing number				
Project	Job	Drawing	Sheet	Revision
LTP/5136/T2/03	01			C



Appendix 3 – Visibility Splays



Key:-

- 2.4m x 70m visibility splay from priority junctions required by North Lincolnshire's Residential Road design guide for 30mph
- 2.4m x 33m visibility splay from residential access roads required by North Lincolnshire's Residential Road design guide for 20mph
- 2.4m x 43m visibility splay from priority junctions required by Manual For Streets for 30mph
- 2.4m x ##m achievable visibility splay (distance as annotated)
- 2.4m x 43m visibility splay from private drives
- - - Tangent visibility check to outside of bend

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- vi. Based on Planning Layout Rev D provided by Client, received 27 07 23.

Rev.	Date	By	Chk	Description
F	10 07 25	JC	MR	Updated following client comments.
E	07 05 25	OA	KN	Updated to new site layout BY00127 Site Layout 14.04.25.
D	16 08 23	JC	MR	Updated to new site layout XXXX-PL.PlanningLayout Barrow Road -REV I
C	08 08 23	JC	MR	Updated to new site layout XXXX-PL.PlanningLayout Barrow Road -REV H
B	10 02 23	OA	MR	Amended to match updated site layout provided by client 10 02 23.
A	09 02 23	OA	MR	Amended to match updated site layout provided by client 08 02 23.

Client
Strata

Project
Proposed Residential Development, Land to the South of A1077, Barton

Title
Junction Visibility Splays



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Drawn	OA	Date	19 01 23
Scale	1 : 1000	Checked	AC
		Approved	SW




Status
SITE TESTING

Drawing number				
Project	Job	Drawing	Sheet	Revision
LTP/5136/P1/	01	01	01	F





Key:-

-  25m forward visibility splay required for 20mph required by manual for streets measured at 2.0m intervals along line offset 1.375m from kerbline
-  21m achievable forward visibility splay measured at 2.0m intervals along line offset 1.375m from kerbline
-  16m achievable forward visibility splay measured at 2.0m intervals along line offset 1.375m from kerbline

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Rev.	Date	By	Chk	Description
F	10 07 25	JC	MR	Updated following client comments.
E	07 05 25	OA	KN	Updated to new site layout BY00127 Site Layout 14.04.25.
D	16 08 23	JC	MR	Updated to new site layout XXXX-PL.PlanningLayout Barrow Road -REV I
C	09 08 23	JC	MR	Updated to new site layout XXXX-PL.PlanningLayout Barrow Road -REV H
B	10 02 23	OA	MR	Amended to match updated site layout provided by client 10 02 23.
A	08 08 23	JC	MR	Updated to new site layout XXXX-PL.PlanningLayout Barrow Road -REV H

Client
Strata

Project
Proposed Residential Development, Land to the South of A1077, Barton

Title
Forward Visibility Splays



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Scale	1 : 1000	Checked	AC
		Approved	SW

Status
SITE TESTING

Drawing number				
Project	Job	Drawing	Sheet	Revision
LTP/5136/P1/	01	02	F	



Appendix 4 – Collision Plot

Appendix 5 – Trip Generation

Projected Vehicle Trip Generation - H1P-13

196 dwellings

Vehicle Trip Rates (per dwelling)

Time	IN	OUT	TOTAL
07:00-08:00			
08:00-09:00	0.122	0.360	0.482
09:00-10:00			
10:00-11:00			
11:00-12:00			
12:00-13:00			
13:00-14:00			
14:00-15:00			
15:00-16:00			
16:00-17:00			
17:00-18:00	0.333	0.158	0.491
18:00-19:00			

TOTAL	0.455	0.518	0.973
--------------	--------------	--------------	--------------

*Approved trip rates from TA (BSP, 2020)

Vehicle Trips

IN	OUT	TOTAL
24	71	95
65	31	96

89	102	191
-----------	------------	------------

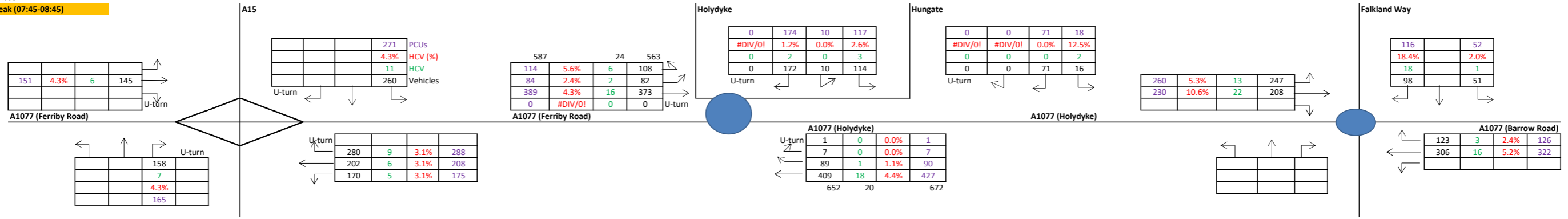
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AADT conversion

5.87895396

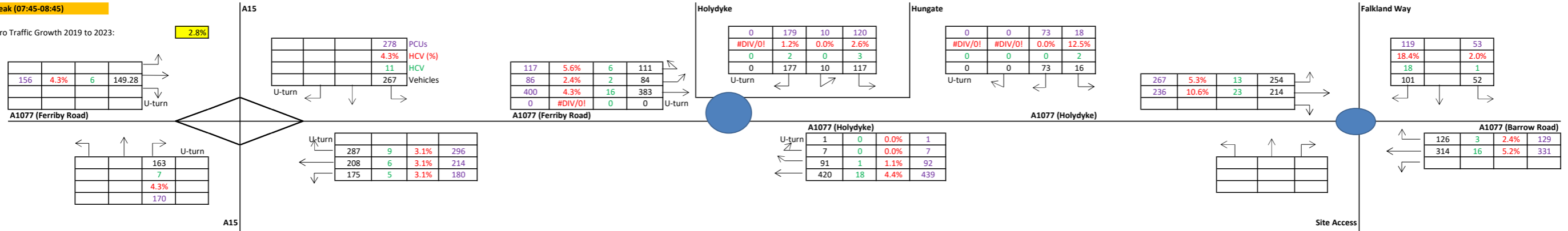
Appendix 6 – Network Diagrams

2019 Base
AM Peak (07:45-08:45)



2023 Base
AM Peak (07:45-08:45)

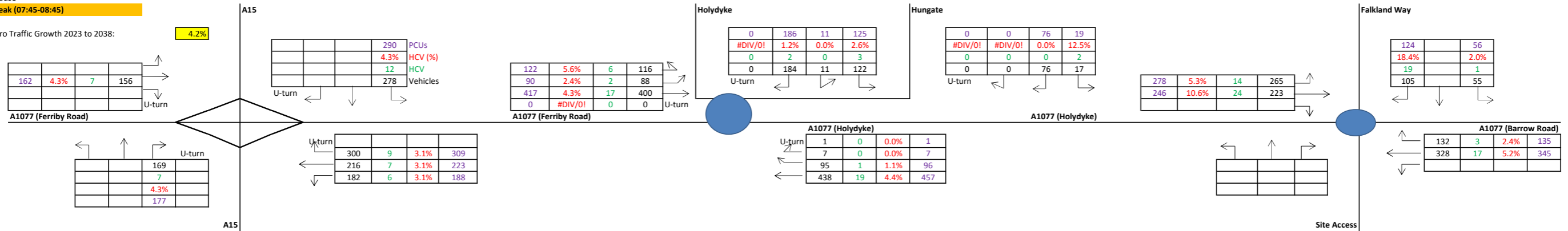
TEMPro Traffic Growth 2019 to 2023: **2.8%**



A1077/A15: 1294
 A1077/Holydyke/Hungate: 1544
 A1077/Falkland Way: 1137

2038 Base
AM Peak (07:45-08:45)

TEMPro Traffic Growth 2023 to 2038: **4.2%**



A1077/A15: 1348
 A1077/Holydyke/Hungate: 1609
 A1077/Falkland Way: 1185

Wren Kitchens Extension

AM Peak (07:45-08:45)

Arrivals	39	2
Departures	4	1

Based on assumptions in BGH TA

5	0.0%	0	5

A15

			12	PCUs
			9.1%	HCV (%)
			1	HCV
			11	Vehicles

20	5.1%	1	19

Holydyke

			6
			0.0%
			0
			6

Hungate

			1
			0.0%
			0
			1

27	5.1%	1	26

Falkland Way

			13%
			5
			0.0%
			0
			5

A1077 (Ferryby Road)

A1077 (Ferryby Road)

A1077 (Holydyke)

A1077 (Barrow Road)

40%
40%

			3
			0.0%
			3

1	0	0.0%	1
0	0	#DIV/0!	0
0	0	#DIV/0!	0

2	0	0.0%	2

2	0	0.0%	2
2	0	0.0%	2

A1077/A15	21
A1077/Holydyke/Hungate	29
A1077/Falkland Way	36

Local Housing Allocation (H1C-23)

AM Peak (07:45-08:45)

Worst-case all trips arrive/depart via A15/A1077

Arrivals	3
Departures	5

1	0.0%	0	1

A15

			2	PCUs
			0.0%	HCV (%)
			0	HCV
			2	Vehicles

2	0.0%	0	2
2	0.0%	0	2

Holydyke

			3
			0.0%
			0
			3

Hungate

Falkland Way

A1077 (Ferryby Road)

A1077 (Ferryby Road)

A1077 (Holydyke)

A1077 (Barrow Road)

			1
			0.0%
			1

3	0	0.0%	3
1	0	0.0%	1
1	0	0.0%	1

3	0	0.0%	3

A1077/A15	8
A1077/Holydyke/Hungate	8
A1077/Falkland Way	0

Local Housing Allocation (H1C-24)

AM Peak (07:45-08:45)

Worst-case all trips arrive/depart via A15/A1077

Arrivals	3
Departures	6

1	0.0%	0	1

A15

			2	PCUs
			0.0%	HCV (%)
			0	HCV
			2	Vehicles

2	0.0%	0	2
2	0.0%	0	2

Holydyke

			3
			0.0%
			0
			3

Hungate

			3
			0.0%
			0
			3

Falkland Way

A1077 (Ferryby Road)

A1077 (Ferryby Road)

A1077 (Holydyke)

A1077 (Barrow Road)

			1
			0.0%
			1

3	0	0.0%	3
2	0	0.0%	2
1	0	0.0%	1

A1077/A15	9
A1077/Holydyke/Hungate	9
A1077/Falkland Way	0

Local Housing Allocation (H1C-25)

AM Peak (07:45-08:45)

Worst-case all trips arrive/depart via A15/A1077

Arrivals

1

Departures

2

0	0.0%	0	0

A15

			1
			0.0%
			0
			1

PCUs
HCV (%)
HCV
Vehicles

1	0.0%	0	1

Holydyke

Hungate

		2	
		0.0%	
		0	
		2	

Falkland Way

A1077 (Ferryby Road)

A1077 (Ferryby Road)

A1077 (Holydyke)

A1077 (Barrow Road)

		0	
		0	
		0.0%	
		0	

1	0	0.0%	1
1	0	0.0%	1
0	0	0.0%	0

A15

Site Access

A1077/A15 3
A1077/Holydyke/Hungate 3
A1077/Falkland Way 0

Local Housing Allocation (H1P-12)*

AM Peak (07:45-08:45)

Arrivals

39

Departures

114

4	0.0%	0	4

A15

			9
			0.0%
			0
			9

PCUs
HCV (%)
HCV
Vehicles

16	0.0%	0	16

Holydyke

Hungate

16	0.0%	0	16

Falkland Way

46		46	
0.0%		0.0%	
0		0	
46		46	

A1077 (Ferryby Road)

A1077 (Ferryby Road)

A1077 (Holydyke)

A1077 (Barrow Road)

		3	
		0	
		0.0%	
		3	

26	0	0.0%	26
12	0	0.0%	12
8	0	0.0%	8

15	0	0.0%	15

A15

Site Access

A1077/A15 62
A1077/Holydyke/Hungate 62
A1077/Falkland Way 122

*Based on approved distribution & assignment presented within the TA (BSP, 2020) at the A1077/Falkland Way junction and the existing turning proportions at the A1077/A15 Interchange

2038 Do Nothing

AM Peak (07:45-08:45)

173	4.0%	7	167

A15

			315
			4.3%
			13
			302

PCUs
HCV (%)
HCV
Vehicles

125	5.4%	6	119
92	2.4%	2	90
455	4.2%	18	437
0	#DIV/0!	0	0

Holydyke

0	192	11	131
#DIV/0!	1.1%	0.0%	2.5%
0	2	0	3
0	190	11	128

Hungate

0	0	81	20
#DIV/0!	#DIV/0!	0.0%	11.9%
0	0	0	2
0	0	81	18

295	5.0%	14	281
274	10.0%	25	249
0	#DIV/0!	0	0

Falkland Way

170	0	106	
12.8%	#DIV/0!	1.0%	
19	0	1	
151	0	105	

A1077 (Ferryby Road)

A1077 (Ferryby Road)

A1077 (Holydyke)

A1077 (Barrow Road)

		177	
		7	
		4.1%	
		184	

333	9	2.8%	343
232	7	2.9%	238
193	6	2.9%	198

1	0	0.0%	1
7	0	0.0%	7
95	1	1.1%	96
488	19	4.0%	507

0	0	0	
0	0	0	
#DIV/0!	#DIV/0!	#DIV/0!	
0	0	0	

148	3	2.2%	151
329	17	5.2%	346
0	0	#DIV/0!	0

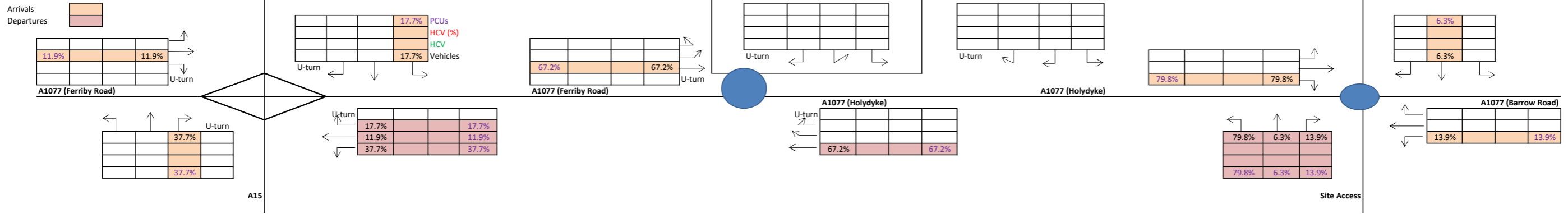
A15

Site Access

A1077/A15 1451
A1077/Holydyke/Hungate 1719
A1077/Falkland Way 1343

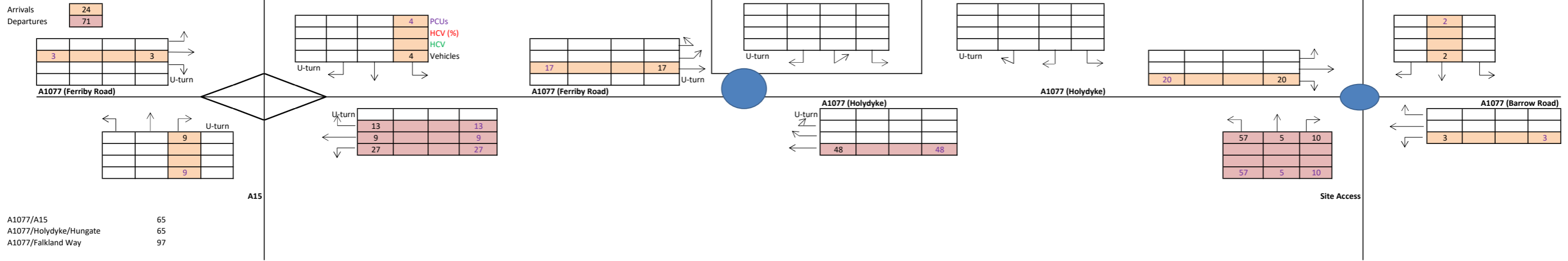
Proposed Development (HIP-13) Vehicle Trip Distribution

AM Peak (07:45-08:45)



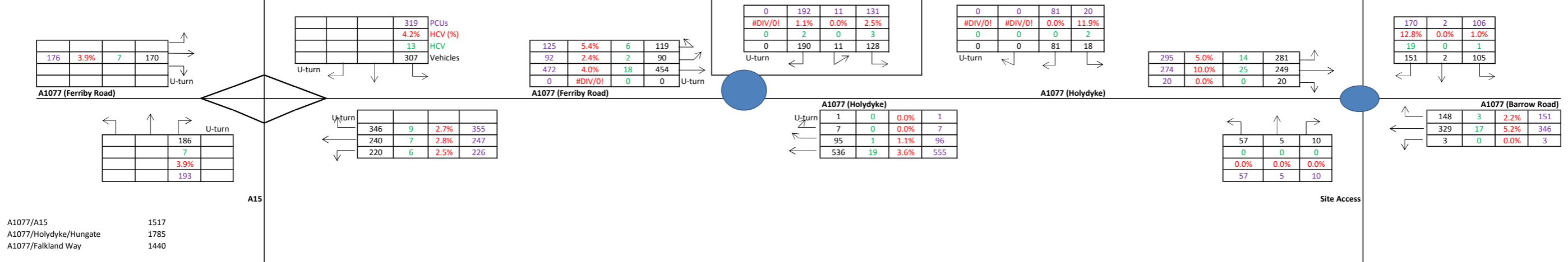
Proposed Development (HIP-13 - 196 dwellings) Vehicle Trip Generation

AM Peak (07:45-08:45)

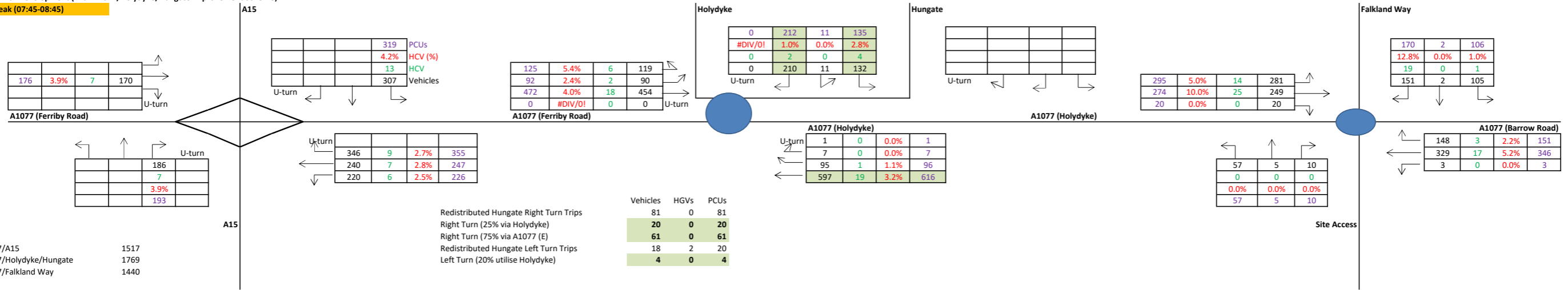


2038 With Development (without A1077/Holydyke/Hungate Improvement Scheme)

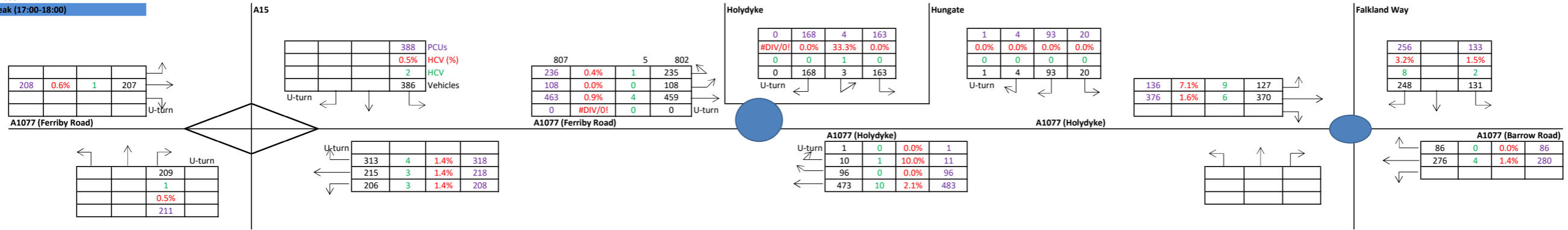
AM Peak (07:45-08:45)



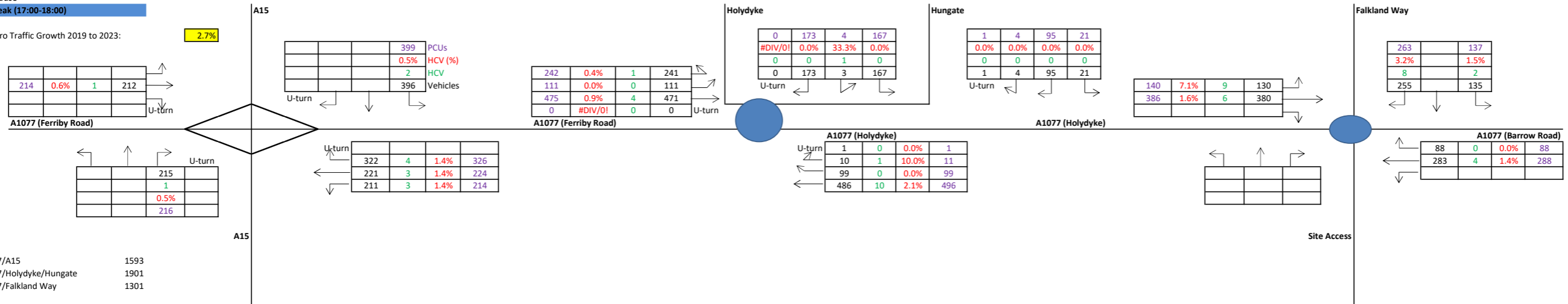
2038 With Development (with A1077/Holydyke/Hungate Improvement Scheme)
 AM Peak (07:45-08:45)



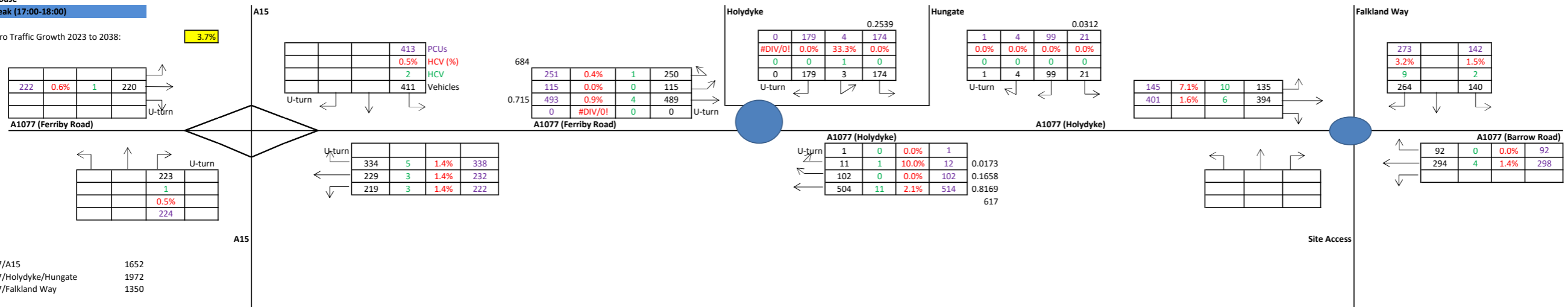
2019 Base
PM Peak (17:00-18:00)



2023 Base
PM Peak (17:00-18:00)
TEMPro Traffic Growth 2019 to 2023: 2.7%



2038 Base
PM Peak (17:00-18:00)
TEMPro Traffic Growth 2023 to 2038: 3.7%



A1077/A15 1593
A1077/Holydyke/Hungate 1901
A1077/Falkland Way 1301

A1077/A15 1652
A1077/Holydyke/Hungate 1972
A1077/Falkland Way 1350

Local Housing Allocation (H1C-25)

PM Peak (17:00-18:00)

Worst-case all trips arrive/depart via A15/A1077

Arrivals

2

Departures

1

1	0.0%	0	1

			1	PCUs
			0.0%	HCV (%)
			0	HCV
			1	Vehicles

2	0.0%	0	2

			1
			0.0%
			0
			1

			0
			0.0%
			0

1	0	0.0%	1
0	0	0.0%	0
0	0	0.0%	0

A15

A1077/A15 3
A1077/Holydyke/Hungate 3
A1077/Falkland Way 0

Local Housing Allocation (H1P-12)*

PM Peak (17:00-18:00)

Arrivals

106

Departures

50

9	0.0%	0	9

			20	PCUs
			0.0%	HCV (%)
			0	HCV
			20	Vehicles

36	0.0%	0	36

36	0.0%	0	36

46%			36%
23			18
0.0%			0.0%
0			0
23			18

			6
			0
			0.0%
			6

13	0	0.0%	13
6	0	0.0%	6
4	0	0.0%	4

49	0	0.0%	49

A15

A1077/A15 59
A1077/Holydyke/Hungate 59
A1077/Falkland Way 126

*Based on approved distribution & assignment presented within the TA (BSP, 2020) at the A1077/Falkland Way junction and the existing turning proportions at the A1077/A15 Interchange

2038 Do Nothing

PM Peak (17:00-18:00)

236	0.6%	1	235

			444	PCUs
			0.7%	HCV (%)
			3	HCV
			440	Vehicles

726				
258	0.4%	1	257	
121	0.0%	0	121	
535	1.0%	5	530	
0	#DIV/0!	0	0	

0	183	4	174	0.2402
#DIV/0!	0.0%	33.3%	0.0%	
0	0	1	0	
0	183	3	174	

1	4	102	21	0.0295
0.0%	0.0%	0.0%	0.1%	
0	0	0	0	
1	4	102	21	

181	5.6%	10	171
405	1.9%	7	397
0	#DIV/0!	0	0

296	0	161
3.0%	#DIV/0!	1.3%
9	0	2
287	0	159

			232
			1
			0.5%
			234

361	5	1.3%	365
242	3	1.3%	245
228	3	1.3%	231

1	0	0.0%	1
11	1	9.7%	12
105	0	0.0%	105
545	11	2.0%	555

0.0166
0.1592
0.8241
661

0	0	0
0	0	0
#DIV/0!	#DIV/0!	#DIV/0!
0	0	0

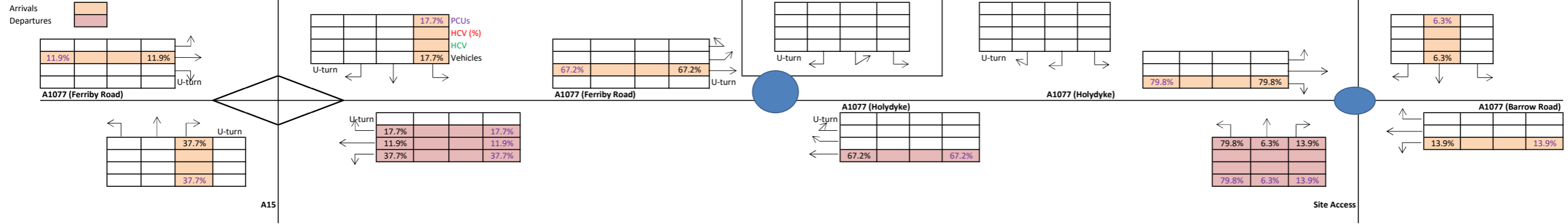
160	0	0.0%	160
314	4	1.4%	318
0	0	#DIV/0!	0

A15

A1077/A15 1754
A1077/Holydyke/Hungate 2078
A1077/Falkland Way 1520

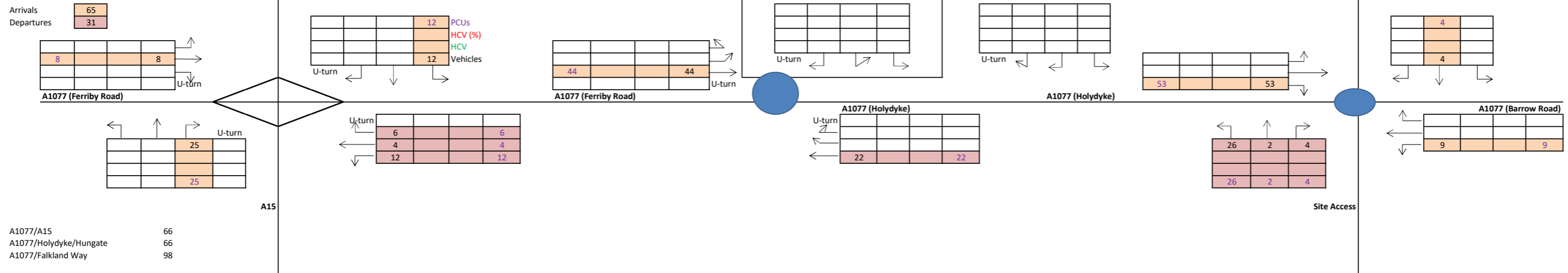
Proposed Development (HIP-13) Vehicle Trip Distribution

PM Peak (17:00-18:00)



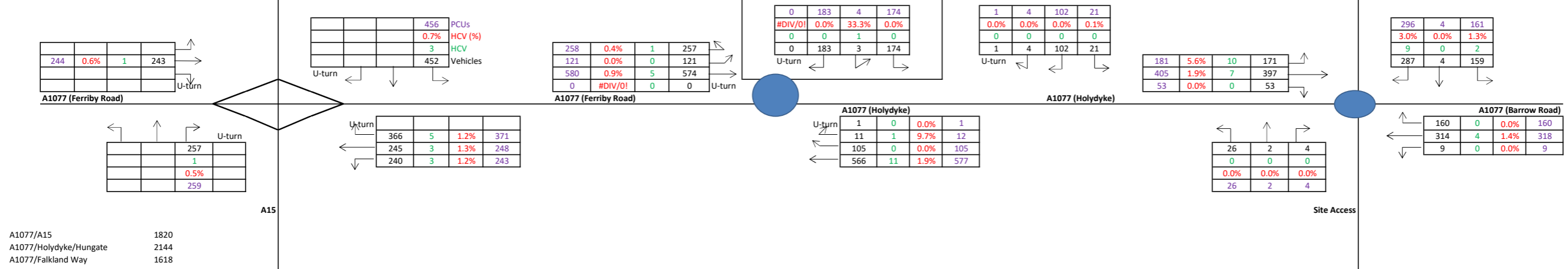
Proposed Development (HIP-13 - 196 dwellings) Vehicle Trip Generation

PM Peak (17:00-18:00)

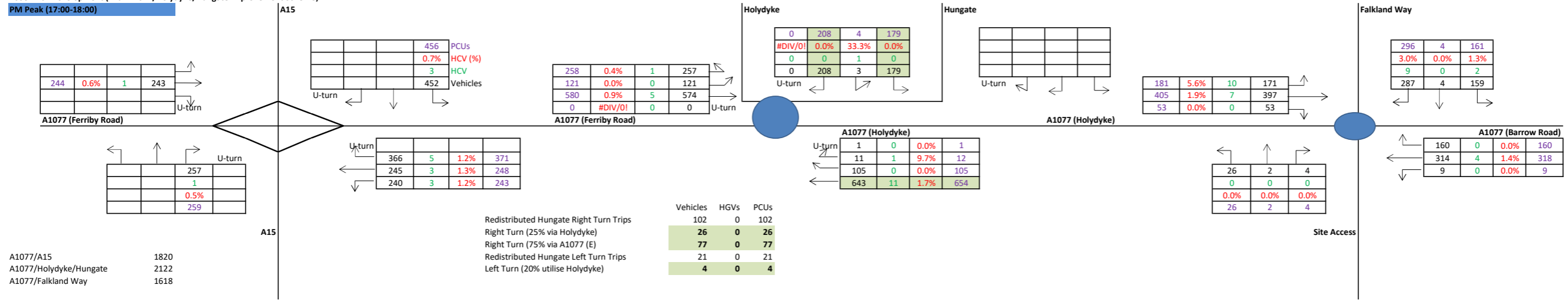


2038 With Development (without A1077/Holydyke/Hungate Improvement Scheme)

PM Peak (17:00-18:00)



2038 With Development (with A1077/Holydyke/Hungate Improvement Scheme)
 PM Peak (17:00-18:00)



Appendix 7 – TEMPro Traffic Growth

Base Year: 2019
Assessment Year: 2023
Period (years): 4
Area Type: N/A
Road Type: Principal
Area Served: Region
NTM Dataset: RTF 2018 Scenario 1 - Reference
Region Data Set Version: Yorkshire & Humber v7.2
Software Version: TEMPRO v7.2b
Area: North Lincolnshire 001

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	1.0277	1.0268
Unadjusted Growth Factor:	2.8%	2.7%

Base Year: 2023
Assessment Year: 2038
Period (years): 15
Area Type: N/A
Road Type: Principal
Area Served: Region
NTM Dataset: RTF 2018 Scenario 1 - Reference
Region Data Set Version: Yorkshire & Humber v7.2
Software Version: TEMPRO v7.2b
Area: North Lincolnshire 001

Factor	Households (HH)	Jobs
Base Year Unadjusted	5075	4423
Forecast Year Unadjusted	5855	4629
Growth Unadjusted	780	206
Committed Developments	358	300
Do Nothing Adjusted	5497	4423
Proposed Development	196	
Do Something Adjusted	5301	4423

Scenario	Weekday AM Peak Period (07:00-09:59)	Weekday PM Peak Period (16:00-18:59)
Unadjusted	1.1150	1.1124
Unadjusted Growth Factor:	11.5%	11.2%

Adjusted	1.0422	1.0374
Adjusted Growth Factor:	4.2%	3.7%

Appendix 8 – Gravity Model

Appendix 9 – JI Modelling Results

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.5.1.7462 © Copyright TRL Limited, 2019
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Filename: A1077 Falkland Way Roundabout.j9
Path: Y:\Projects\5136 Land South of A1077 Barton\Junction Capacity Modelling\May 2025 Update
Report generation date: 5/6/2025 10:08:03 AM

- »Proposed Layout - 2038 With Development, AM
- »Proposed Layout - 2038 With Development, PM

Summary of junction performance

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
Proposed Layout - 2038 With Development										
1 - Falkland Way	D1	0.3	2.95	0.19	A	D2	0.5	3.62	0.33	A
2 - A1077 (E)		0.5	3.49	0.34	A		0.5	3.66	0.35	A
3 - Link Road		0.1	2.57	0.05	A		0.0	2.61	0.02	A
4 - A1077 (W)		0.9	4.79	0.45	A		1.0	4.94	0.48	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	A1077/Falkland Way/Link Road Roundabout
Location	Barton upon Humber, North Lincolnshire
Site number	
Date	6/5/2025
Version	
Status	
Identifier	
Client	Strata
Jobnumber	5136
Enumerator	LTP/KN
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

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

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2038 With Development	AM	ONE HOUR	07:45	09:15	15	✓
D2	2038 With Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

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

Proposed Layout - 2038 With Development, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A1077/Falkland Way Roundabout	Standard Roundabout		1, 2, 3, 4	3.87	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description
1	Falkland Way	
2	A1077 (E)	
3	Link Road	
4	A1077 (W)	

Roundabout Geometry

Arm	V - Approach road half-width (m)	E - Entry width (m)	I' - Effective flare length (m)	R - Entry radius (m)	D - Inscribed circle diameter (m)	PHI - Conflict (entry) angle (deg)	Exit only
1 - Falkland Way	3.56	7.29	26.2	23.0	60.0	38.0	
2 - A1077 (E)	3.15	7.28	28.6	20.0	60.0	41.0	
3 - Link Road	3.87	7.35	27.9	30.4	60.0	36.0	
4 - A1077 (W)	3.40	6.42	16.1	20.7	60.0	40.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - Falkland Way	0.571	1815
2 - A1077 (E)	0.554	1741
3 - Link Road	0.594	1918
4 - A1077 (W)	0.522	1549

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2038 With Development	AM	ONE HOUR	07:45	09:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Falkland Way		ONE HOUR	✓	278	100.000
2 - A1077 (E)		ONE HOUR	✓	500	100.000
3 - Link Road		ONE HOUR	✓	72	100.000
4 - A1077 (W)		ONE HOUR	✓	589	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Falkland Way	2 - A1077 (E)	3 - Link Road	4 - A1077 (W)
From	1 - Falkland Way	0	106	2	170
	2 - A1077 (E)	151	0	3	346
	3 - Link Road	5	10	0	57
	4 - A1077 (W)	295	274	20	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - Falkland Way	2 - A1077 (E)	3 - Link Road	4 - A1077 (W)
From	1 - Falkland Way	0	1	0	13
	2 - A1077 (E)	2	0	0	5
	3 - Link Road	0	0	0	0
	4 - A1077 (W)	5	10	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Falkland Way	0.19	2.95	0.3	A	255	383
2 - A1077 (E)	0.34	3.49	0.5	A	459	688
3 - Link Road	0.05	2.57	0.1	A	66	99
4 - A1077 (W)	0.45	4.79	0.9	A	540	811

Main Results for each time segment

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	209	52	228	1685	0.124	209	338	0.0	0.2	2.631	A
2 - A1077 (E)	376	94	144	1661	0.227	375	293	0.0	0.3	2.910	A
3 - Link Road	54	14	501	1621	0.033	54	19	0.0	0.0	2.297	A
4 - A1077 (W)	443	111	125	1484	0.299	442	430	0.0	0.5	3.693	A

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	250	62	273	1659	0.151	250	405	0.2	0.2	2.757	A
2 - A1077 (E)	449	112	172	1645	0.273	449	350	0.3	0.4	3.131	A
3 - Link Road	65	16	599	1562	0.041	65	22	0.0	0.0	2.403	A
4 - A1077 (W)	529	132	149	1471	0.360	529	515	0.5	0.6	4.089	A

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	306	77	334	1624	0.188	306	496	0.2	0.2	2.948	A
2 - A1077 (E)	551	138	211	1624	0.339	550	429	0.4	0.5	3.486	A
3 - Link Road	79	20	734	1483	0.053	79	27	0.0	0.1	2.564	A
4 - A1077 (W)	649	162	183	1453	0.446	647	630	0.6	0.9	4.777	A

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	306	77	335	1624	0.188	306	497	0.2	0.3	2.949	A
2 - A1077 (E)	551	138	211	1624	0.339	551	429	0.5	0.5	3.489	A
3 - Link Road	79	20	734	1482	0.053	79	28	0.1	0.1	2.565	A
4 - A1077 (W)	649	162	183	1453	0.446	648	631	0.9	0.9	4.789	A

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	250	62	274	1659	0.151	250	406	0.3	0.2	2.761	A
2 - A1077 (E)	449	112	173	1645	0.273	450	351	0.5	0.4	3.137	A
3 - Link Road	65	16	600	1562	0.041	65	23	0.1	0.0	2.404	A
4 - A1077 (W)	529	132	149	1471	0.360	531	516	0.9	0.6	4.103	A

09:00 - 09:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	209	52	229	1685	0.124	209	340	0.2	0.2	2.635	A
2 - A1077 (E)	376	94	145	1661	0.227	377	294	0.4	0.3	2.919	A
3 - Link Road	54	14	503	1620	0.033	54	19	0.0	0.0	2.300	A
4 - A1077 (W)	443	111	125	1483	0.299	444	432	0.6	0.5	3.709	A

Proposed Layout - 2038 With Development, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A1077/Falkland Way Roundabout	Standard Roundabout		1, 2, 3, 4	4.13	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2038 With Development	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - Falkland Way		ONE HOUR	✓	461	100.000
2 - A1077 (E)		ONE HOUR	✓	487	100.000
3 - Link Road		ONE HOUR	✓	32	100.000
4 - A1077 (W)		ONE HOUR	✓	639	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - Falkland Way	2 - A1077 (E)	3 - Link Road	4 - A1077 (W)
From	1 - Falkland Way	0	161	4	296
	2 - A1077 (E)	160	0	9	318
	3 - Link Road	2	4	0	26
	4 - A1077 (W)	181	405	53	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - Falkland Way	2 - A1077 (E)	3 - Link Road	4 - A1077 (W)
From	1 - Falkland Way	0	1	0	3
	2 - A1077 (E)	0	0	0	1
	3 - Link Road	0	0	0	0
	4 - A1077 (W)	6	2	0	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - Falkland Way	0.33	3.62	0.5	A	423	635
2 - A1077 (E)	0.35	3.66	0.5	A	447	670
3 - Link Road	0.02	2.61	0.0	A	29	44
4 - A1077 (W)	0.48	4.94	1.0	A	586	880

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	347	87	346	1618	0.215	346	257	0.0	0.3	2.892	A
2 - A1077 (E)	367	92	265	1594	0.230	365	427	0.0	0.3	2.946	A
3 - Link Road	24	6	581	1573	0.015	24	49	0.0	0.0	2.323	A
4 - A1077 (W)	481	120	125	1484	0.324	479	480	0.0	0.5	3.683	A

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	414	104	415	1578	0.263	414	308	0.3	0.4	3.162	A
2 - A1077 (E)	438	109	317	1565	0.280	437	512	0.3	0.4	3.213	A
3 - Link Road	29	7	695	1505	0.019	29	59	0.0	0.0	2.437	A
4 - A1077 (W)	574	144	149	1471	0.391	574	575	0.5	0.7	4.128	A

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	508	127	508	1525	0.333	507	377	0.4	0.5	3.613	A
2 - A1077 (E)	536	134	388	1526	0.351	536	627	0.4	0.5	3.658	A
3 - Link Road	35	9	851	1413	0.025	35	73	0.0	0.0	2.612	A
4 - A1077 (W)	704	176	183	1453	0.484	702	704	0.7	1.0	4.925	A

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	508	127	509	1525	0.333	508	378	0.5	0.5	3.618	A
2 - A1077 (E)	536	134	389	1525	0.352	536	628	0.5	0.5	3.661	A
3 - Link Road	35	9	852	1412	0.025	35	73	0.0	0.0	2.613	A
4 - A1077 (W)	704	176	183	1453	0.484	704	705	1.0	1.0	4.941	A

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	414	104	416	1578	0.263	415	309	0.5	0.4	3.167	A
2 - A1077 (E)	438	109	318	1565	0.280	438	513	0.5	0.4	3.220	A
3 - Link Road	29	7	697	1505	0.019	29	59	0.0	0.0	2.440	A
4 - A1077 (W)	574	144	149	1471	0.391	576	576	1.0	0.7	4.146	A

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - Falkland Way	347	87	348	1616	0.215	347	259	0.4	0.3	2.903	A
2 - A1077 (E)	367	92	266	1593	0.230	367	430	0.4	0.3	2.957	A
3 - Link Road	24	6	583	1572	0.015	24	50	0.0	0.0	2.325	A
4 - A1077 (W)	481	120	125	1483	0.324	482	482	0.7	0.5	3.703	A

Appendix 10 – J2 Modelling Results (Existing Layout)

Junctions 9
ARCADY 9 - Roundabout Module
Version: 9.5.1.7462 © Copyright TRL Limited, 2019
For sales and distribution information, program advice and maintenance, contact TRL: +44 (0)1344 379777 software@trl.co.uk www.trlsoftware.co.uk
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Filename: A1077 Holydyke Hungate Mini-Roundabout Existing.j9
Path: Y:\Projects\5136 Land South of A1077 Barton\Junction Capacity Modelling\May 2025 Update
Report generation date: 5/6/2025 10:06:24 AM

- »Existing Layout - 2038 With Development, AM
- »Existing Layout - 2038 With Development, PM

Summary of junction performance

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
Existing Layout - 2038 With Development										
1 - B1218 (Holydyke)	D1	0.9	8.58	0.46	A	D2	1.1	9.91	0.52	A
2 - Hungate		0.8	26.51	0.45	D		1.9	51.84	0.68	F
3 - A1077 (Holydyke)		3.4	17.40	0.77	C		4.5	22.35	0.83	C
4 - A1077 (Ferriby Road)		4.5	22.35	0.82	C		84.2	306.97	1.16	F

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

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

File summary

File Description

Title	A1077 Holydyke Hungate Mini-Roundabout
Location	Barton, North Lincolnshire
Site number	
Date	6/5/2025
Version	
Status	
Identifier	
Client	North Lincolnshire Council
Jobnumber	5136
Enumerator	LTP\KN
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

Mini-roundabout model	Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
JUNCTIONS 9	5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2038 With Development	AM	ONE HOUR	07:30	09:00	15	✓
D2	2038 With Development	PM	ONE HOUR	16:45	18:15	15	✓

Analysis Set Details

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

Existing Layout - 2038 With Development, AM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 75% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout		1, 2, 3, 4	18.18	C

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	Normal/unknown	

Arms

Arms

Arm	Name	Description
1	B1218 (Holydyke)	
2	Hungate	
3	A1077 (Holydyke)	
4	A1077 (Ferriby Road)	

Mini Roundabout Geometry

Arm	Approach road half-width (m)	Minimum approach road half-width (m)	Entry width (m)	Effective flare length (m)	Distance to next arm (m)	Entry corner kerb line distance (m)	Gradient over 50m (%)	Kerbed central island
1 - B1218 (Holydyke)	4.20	3.90	6.50	4.1	13.20	8.70	0.0	
2 - Hungate	3.10	2.10	5.65	7.7	6.90	2.25	0.0	
3 - A1077 (Holydyke)	3.80	3.80	4.70	10.5	18.10	15.30	0.0	
4 - A1077 (Ferriby Road)	4.10	4.10	4.70	1.6	10.90	7.20	0.0	

Slope / Intercept / Capacity

Roundabout Slope and Intercept used in model

Arm	Final slope	Final intercept (PCU/hr)
1 - B1218 (Holydyke)	0.658	1208
2 - Hungate	0.610	784
3 - A1077 (Holydyke)	0.676	1141
4 - A1077 (Ferriby Road)	0.643	996

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

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2038 With Development	AM	ONE HOUR	07:30	09:00	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - B1218 (Holydyke)		ONE HOUR	✓	334	100.000
2 - Hungate		ONE HOUR	✓	101	100.000
3 - A1077 (Holydyke)		ONE HOUR	✓	659	100.000
4 - A1077 (Ferriby Road)		ONE HOUR	✓	689	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	11	131	192
	2 - Hungate	0	0	20	81
	3 - A1077 (Holydyke)	96	7	1	555
	4 - A1077 (Ferriby Road)	125	92	472	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferriby Road)
From	1 - B1218 (Holydyke)	0	0	3	1
	2 - Hungate	0	0	12	0
	3 - A1077 (Holydyke)	1	0	0	4
	4 - A1077 (Ferriby Road)	5	2	4	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - B1218 (Holydyke)	0.46	8.58	0.9	A	306	460
2 - Hungate	0.45	26.51	0.8	D	93	139
3 - A1077 (Holydyke)	0.77	17.40	3.4	C	605	907
4 - A1077 (Ferriby Road)	0.82	22.35	4.5	C	632	948

Main Results for each time segment

07:30 - 07:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	251	63	427	927	0.271	250	165	0.0	0.4	5.394	A
2 - Hungate	76	19	594	421	0.181	75	82	0.0	0.2	10.604	B
3 - A1077 (Holydyke)	496	124	204	1003	0.495	492	466	0.0	1.0	7.237	A
4 - A1077 (Ferriby Road)	519	130	78	946	0.548	514	618	0.0	1.2	8.557	A

07:45 - 08:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	300	75	512	871	0.345	300	198	0.4	0.5	6.400	A
2 - Hungate	91	23	713	349	0.260	90	98	0.2	0.4	14.199	B
3 - A1077 (Holydyke)	592	148	245	976	0.607	590	559	1.0	1.6	9.612	A
4 - A1077 (Ferryby Road)	619	155	93	936	0.662	616	742	1.2	2.0	11.590	B

08:00 - 08:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	368	92	622	799	0.460	366	241	0.5	0.9	8.448	A
2 - Hungate	111	28	869	254	0.438	110	120	0.4	0.8	25.240	D
3 - A1077 (Holydyke)	726	181	299	939	0.773	719	680	1.6	3.3	16.415	C
4 - A1077 (Ferryby Road)	759	190	113	923	0.822	749	904	2.0	4.3	20.484	C

08:15 - 08:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	368	92	629	794	0.463	368	243	0.9	0.9	8.584	A
2 - Hungate	111	28	876	249	0.446	111	121	0.8	0.8	26.511	D
3 - A1077 (Holydyke)	726	181	300	938	0.774	725	686	3.3	3.4	17.405	C
4 - A1077 (Ferryby Road)	759	190	114	923	0.822	758	911	4.3	4.5	22.353	C

08:30 - 08:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	300	75	522	865	0.347	302	201	0.9	0.5	6.520	A
2 - Hungate	91	23	723	342	0.265	92	100	0.8	0.4	14.809	B
3 - A1077 (Holydyke)	592	148	248	974	0.609	599	568	3.4	1.7	10.136	B
4 - A1077 (Ferryby Road)	619	155	95	935	0.662	629	752	4.5	2.1	12.568	B

08:45 - 09:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	251	63	433	923	0.272	252	167	0.5	0.4	5.467	A
2 - Hungate	76	19	602	416	0.183	77	83	0.4	0.2	10.840	B
3 - A1077 (Holydyke)	496	124	206	1001	0.495	499	472	1.7	1.0	7.446	A
4 - A1077 (Ferryby Road)	519	130	79	946	0.549	522	626	2.1	1.3	8.901	A

Existing Layout - 2038 With Development, PM

Data Errors and Warnings

Severity	Area	Item	Description
Warning	Mini-roundabout		Mini-roundabout appears to have unbalanced flows and may behave like a priority junction; treat results with caution. See User Guide for details.[Arms 3 and 4 have 77% of the total flow for the roundabout for one or more time segments]

Junction Network

Junctions

Junction	Name	Junction type	Use circulating lanes	Arm order	Junction Delay (s)	Junction LOS
1	A1077 Holydyke Hungate	Mini-roundabout		1, 2, 3, 4	149.39	F

Junction Network Options

Driving side	Lighting	Road surface	In London
Left	Normal/unknown	Normal/unknown	

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2038 With Development	PM	ONE HOUR	16:45	18:15	15	✓

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

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
1 - B1218 (Holydyke)		ONE HOUR	✓	361	100.000
2 - Hungate		ONE HOUR	✓	128	100.000
3 - A1077 (Holydyke)		ONE HOUR	✓	695	100.000
4 - A1077 (Ferryby Road)		ONE HOUR	✓	959	100.000

Origin-Destination Data

Demand (PCU/hr)

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferryby Road)
From	1 - B1218 (Holydyke)	0	4	174	183
	2 - Hungate	4	1	21	102
	3 - A1077 (Holydyke)	105	12	1	577
	4 - A1077 (Ferryby Road)	258	121	580	0

Vehicle Mix

Heavy Vehicle Percentages

		To			
		1 - B1218 (Holydyke)	2 - Hungate	3 - A1077 (Holydyke)	4 - A1077 (Ferryby Road)
From	1 - B1218 (Holydyke)	0	33	0	0
	2 - Hungate	0	0	0	0
	3 - A1077 (Holydyke)	0	10	0	2
	4 - A1077 (Ferryby Road)	0	0	1	0

Results

Results Summary for whole modelled period

Arm	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
1 - B1218 (Holydyke)	0.52	9.91	1.1	A	331	497
2 - Hungate	0.68	51.84	1.9	F	117	176
3 - A1077 (Holydyke)	0.83	22.35	4.5	C	638	957
4 - A1077 (Ferryby Road)	1.16	306.97	84.2	F	880	1320

Main Results for each time segment

16:45 - 17:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	272	68	529	860	0.316	270	272	0.0	0.5	6.100	A
2 - Hungate	96	24	697	359	0.269	95	102	0.0	0.4	13.577	B
3 - A1077 (Holydyke)	523	131	216	995	0.526	519	576	0.0	1.1	7.632	A
4 - A1077 (Ferryby Road)	722	180	92	937	0.770	709	643	0.0	3.1	15.174	C

17:00 - 17:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	325	81	626	796	0.408	324	323	0.5	0.7	7.629	A
2 - Hungate	115	29	829	278	0.414	114	121	0.4	0.7	21.739	C
3 - A1077 (Holydyke)	625	156	259	966	0.647	622	683	1.1	1.8	10.577	B
4 - A1077 (Ferryby Road)	862	216	110	925	0.932	840	771	3.1	8.7	35.277	E

17:15 - 17:30

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	397	99	675	764	0.520	396	361	0.7	1.1	9.761	A
2 - Hungate	141	35	938	211	0.667	137	132	0.7	1.7	45.866	E
3 - A1077 (Holydyke)	765	191	315	928	0.825	755	760	1.8	4.3	20.169	C
4 - A1077 (Ferryby Road)	1056	264	134	910	1.160	902	937	8.7	47.2	124.859	F

17:30 - 17:45

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	397	99	679	761	0.522	397	364	1.1	1.1	9.915	A
2 - Hungate	141	35	943	208	0.677	140	133	1.7	1.9	51.841	F
3 - A1077 (Holydyke)	765	191	319	925	0.827	764	765	4.3	4.5	22.353	C
4 - A1077 (Ferryby Road)	1056	264	135	909	1.161	908	948	47.2	84.2	269.051	F

17:45 - 18:00

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	325	81	680	761	0.427	326	345	1.1	0.8	8.329	A
2 - Hungate	115	29	875	250	0.461	119	131	1.9	0.9	28.316	D
3 - A1077 (Holydyke)	625	156	265	962	0.650	635	730	4.5	1.9	11.548	B
4 - A1077 (Ferryby Road)	862	216	112	924	0.933	913	787	84.2	71.5	306.972	F

18:00 - 18:15

Arm	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Circulating flow (PCU/hr)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Throughput (exit side) (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
1 - B1218 (Holydyke)	272	68	685	757	0.359	273	331	0.8	0.6	7.461	A
2 - Hungate	96	24	829	278	0.346	98	129	0.9	0.5	20.099	C
3 - A1077 (Holydyke)	523	131	220	992	0.527	526	707	1.9	1.2	7.922	A
4 - A1077 (Ferryby Road)	722	180	93	936	0.771	923	653	71.5	21.2	185.128	F

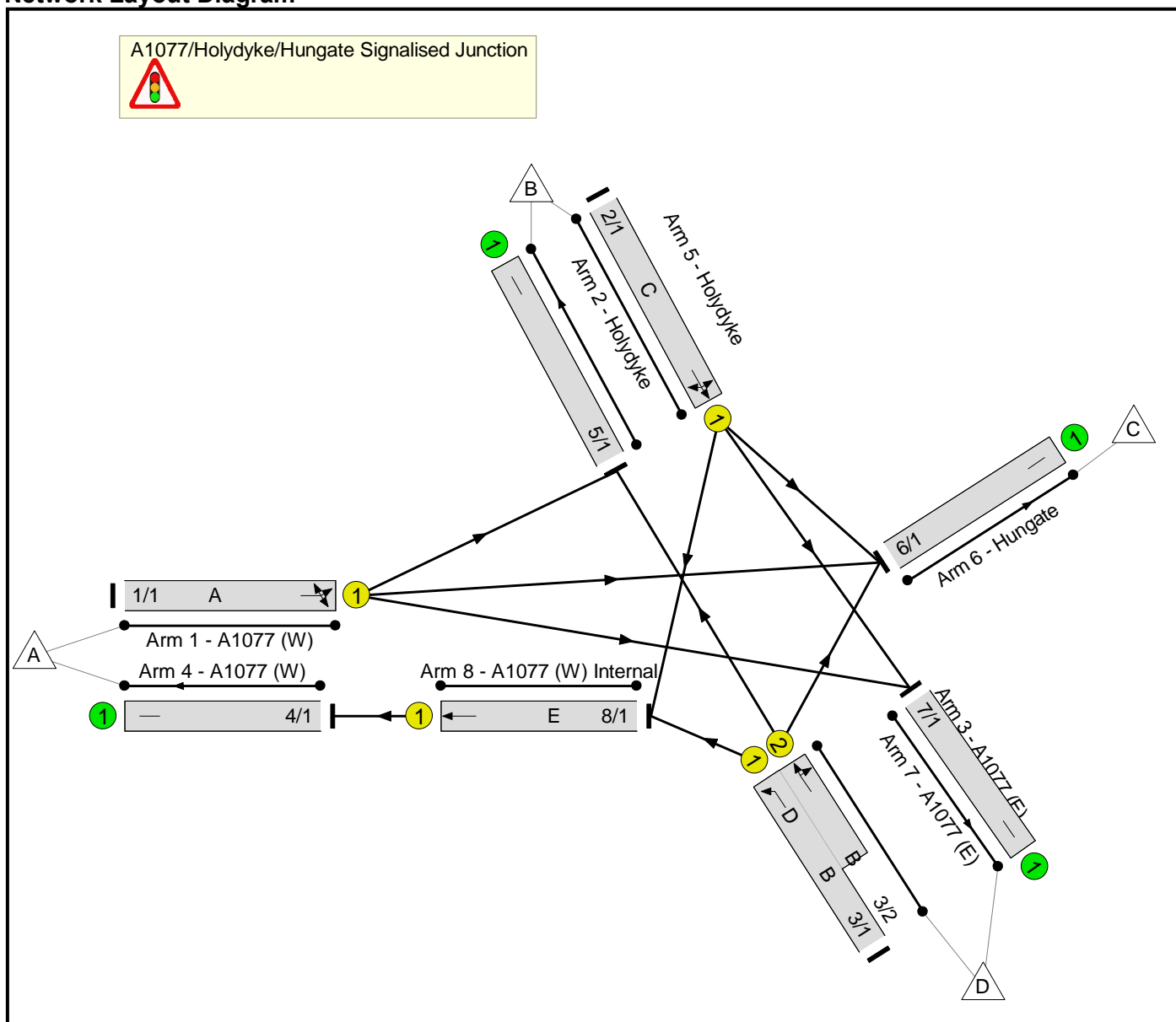
Appendix 11 – J2 Modelling Results (Improvement Scheme)

LTP LinSig Output

User and Project Details

Project:	Land South of A1077 (Barrow Road)
Title:	A1077/Holydyke/Hungate Signalled Junction Option
Location:	Barton upon Humber, North Lincolnshire
Client:	Strata
Additional detail:	
File name:	A1077 Holydyke Hungate Signalled Junction Improvement Scheme.lsg3x
Author:	
Company:	LTP
Address:	

Network Layout Diagram



Phase Input Data

Phase Name	Phase Type	Assoc. Phase	Street Min (s)	Cont Min (s)
A	Traffic		7	7
B	Traffic		7	7
C	Traffic		7	7
D	Filter	B	4	0
E	Traffic		7	7
F	Pedestrian		6	6
G	Pedestrian		6	6

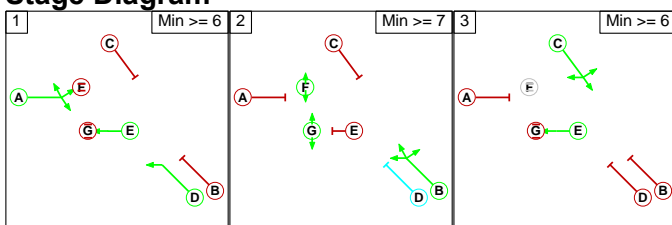
Phase Intergreens Matrix

	Starting Phase							
	A	B	C	D	E	F	G	
Terminating Phase	A	5	5	-	-	5	-	
	B	5	5	-	-	-	-	
	C	5	5	6	-	-	-	
	D	-	-	5	-	-	-	
	E	-	-	-	-	-	5	
	F	5	-	-	-	-	-	
	G	-	-	-	-	6	-	

Phases in Stage

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

Stage Diagram



Phase Delays

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

Prohibited Stage Change

		To Stage		
		1	2	3
From Stage	1	5	6	5
	2	6	5	6
	3	6	5	6

Give-Way Lane Input Data

Junction: A1077/Holydyke/Hungate Signalised Junction

There are no Opposed Lanes in this Junction

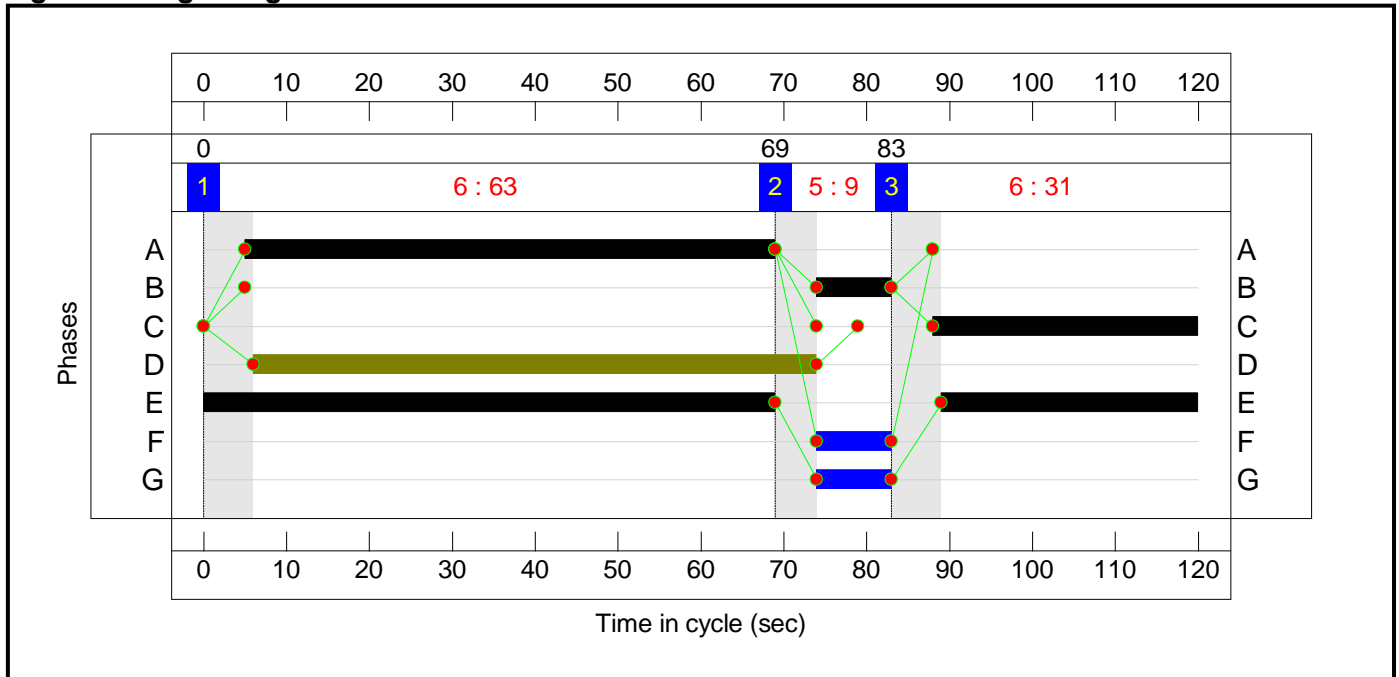
Lane Input Data

Junction: A1077/Holydyke/Hungate Signalised Junction												
Lane	Lane Type	Phases	Start Disp. (s)	End Disp. (s)	Physical Length (PCU)	Sat Flow Type	Def User Saturation Flow (PCU/Hr)	Lane Width (m)	Gradient (%)	Nearside Lane	Turns	Turning Radius (m)
1/1 (A1077 (W))	U	A	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 5 Left	10.41
											Arm 6 Ahead	Inf
											Arm 7 Right	28.00
2/1 (Holydyke)	U	C	2	3	60.0	Geom	-	3.85	0.00	Y	Arm 6 Left	12.00
											Arm 7 Ahead	Inf
											Arm 8 Right	12.90
3/1 (A1077 (E))	U	B D	2	3	60.0	Geom	-	3.50	0.00	Y	Arm 8 Left	27.15
3/2 (A1077 (E))	U	B	2	3	5.8	Geom	-	3.50	0.00	Y	Arm 5 Ahead	Inf
											Arm 6 Right	6.65
4/1 (A1077 (W))	U		2	3	60.0	Inf	-	-	-	-	-	-
5/1 (Holydyke)	U		2	3	60.0	Inf	-	-	-	-	-	-
6/1 (Hungate)	U		2	3	60.0	Inf	-	-	-	-	-	-
7/1 (A1077 (E))	U		2	3	60.0	Inf	-	-	-	-	-	-
8/1 (A1077 (W) Internal)	U	E	2	3	3.0	Geom	-	4.00	0.00	Y	Arm 4 Ahead	Inf

Traffic Flow Groups

Flow Group	Start Time	End Time	Duration	Formula
1: '2038 With Development AM'	07:45	08:45	01:00	
2: '2038 With Development PM'	17:00	18:00	01:00	

Scenario 1: '2038 With Development AM' (FG1: '2038 With Development AM', Plan 1: 'Network Control Plan 1')
Signal Timings Diagram



Traffic Flows, Desired

Desired Flow :

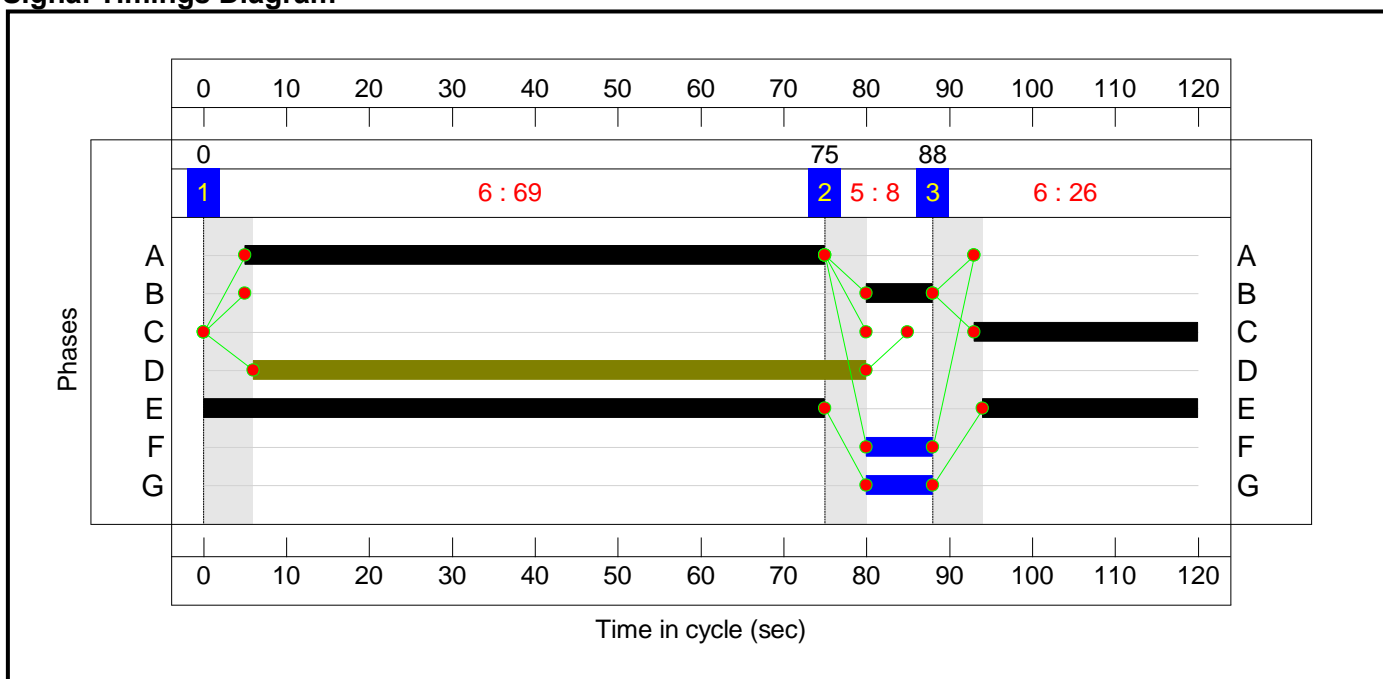
		Destination				Tot.
		A	B	C	D	
Origin	A	0	125	92	472	689
	B	212	0	11	135	358
	C	0	0	0	0	0
	D	616	96	7	0	719
	Tot.	828	221	110	607	1766

Lane Saturation Flows

Junction: A1077/Holydyke/Hungate Signalised Junction								
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 (A1077 (W))	3.50	0.00	Y	Arm 5 Left	10.41	18.1 %	1849	1849
				Arm 6 Ahead	Inf	13.4 %		
				Arm 7 Right	28.00	68.5 %		
2/1 (Holydyke)	3.85	0.00	Y	Arm 6 Left	12.00	3.1 %	1864	1864
				Arm 7 Ahead	Inf	37.7 %		
				Arm 8 Right	12.90	59.2 %		
3/1 (A1077 (E))	3.50	0.00	Y	Arm 8 Left	27.15	100.0 %	1862	1862
3/2 (A1077 (E))	3.50	0.00	Y	Arm 5 Ahead	Inf	93.2 %	1935	1935
				Arm 6 Right	6.65	6.8 %		
4/1 (A1077 (W) Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Holydyke Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Hungate Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (A1077 (E) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A1077 (W) Internal)	4.00	0.00	Y	Arm 4 Ahead	Inf	100.0 %	2015	2015

Scenario 2: '2038 With Development PM' (FG2: '2038 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	258	121	580	959
	B	208	0	4	179	391
	C	0	0	0	0	0
	D	654	105	12	0	771
	Tot.	862	363	137	759	2121

Lane Saturation Flows

Junction: A1077/Holydyke/Hungate Signalised Junction								
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 (A1077 (W))	3.50	0.00	Y	Arm 5 Left	10.41	26.9 %	1834	1834
				Arm 6 Ahead	Inf	12.6 %		
				Arm 7 Right	28.00	60.5 %		
2/1 (Holydyke)	3.85	0.00	Y	Arm 6 Left	12.00	1.0 %	1881	1881
				Arm 7 Ahead	Inf	45.8 %		
				Arm 8 Right	12.90	53.2 %		
3/1 (A1077 (E))	3.50	0.00	Y	Arm 8 Left	27.15	100.0 %	1862	1862
3/2 (A1077 (E))	3.50	0.00	Y	Arm 5 Ahead	Inf	89.7 %	1921	1921
				Arm 6 Right	6.65	10.3 %		
4/1 (A1077 (W) Lane 1)	Infinite Saturation Flow						Inf	Inf
5/1 (Holydyke Lane 1)	Infinite Saturation Flow						Inf	Inf
6/1 (Hungate Lane 1)	Infinite Saturation Flow						Inf	Inf
7/1 (A1077 (E) Lane 1)	Infinite Saturation Flow						Inf	Inf
8/1 (A1077 (W) Internal)	4.00	0.00	Y	Arm 4 Ahead	Inf	100.0 %	2015	2015

Scenario 2: '2038 With Development PM' (FG2: '2038 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: A1077/Holydyke/Hungate Signalised Junction Option	-	-	-		-	-	-	-	-	-	89.1 %	-	-	0	0	0	23.9	-	-
A1077/Holydyke/Hungate Signalised Junction	-	-	-		-	-	-	-	-	-	89.1 %	-	-	0	0	0	23.9	-	-
1/1	A1077 (W) Left Ahead Right	U	A		1	70	-	959	1834	1085	88.4 %	959	959	-	-	-	9.2	34.5	30.8
2/1	Holydyke Left Ahead Right	U	C		1	27	-	391	1881	439	89.1 %	391	391	-	-	-	8.4	77.2	16.2
3/1+3/2	A1077 (E) Ahead Right Left	U	B	D	1	82:8	74	771	1862:1921	805+144	81.2 : 81.2 %	771	771	-	-	-	5.5	25.7	13.5
8/1	A1077 (W) Internal Ahead	U	E		1	101	-	862	2015	1713	50.3 %	862	862	-	-	-	0.8	3.3	3.4
C1 PRC for Signalled Lanes (%): 1.0 Total Delay for Signalled Lanes (pcuHr): 23.87 Cycle Time (s): 120 PRC Over All Lanes (%): 1.0 Total Delay Over All Lanes(pcuHr): 23.87																			