Transport Assessment

Promotion to the Flintshire
Local Development Plan

HWN005, Mancot

Flintshire

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1 Introduction

This report has been prepared to support the promotion of the HW005 Mancot site into the upcoming Flintshire Local Development Plan (LDP).

The site is located in Mancot, Flintshire. The site is currently agricultural land and is fronted to the west by the A550 Gladstone Way and to the east by Ash Lane. A site location plan is included as **Appendix A**.

It is proposed that the site could accommodate up to 250 units with access provided via two simple priority junctions located on Gladstone Way and Ash Lane, respectively.

The scope of the assessment has been agreed with Flintshire County Council (FCC), as the local highway authority, and Welsh Government (WG), as the strategic highway authority for the trunk road network. The scoping note is included as **Appendix B**.

Based on our initial discussions it is understood that the proposed land allocation will need to be supported by a Transport Assessment (TA) prepared in line with TAN18 guidance.

Following this introduction, the report is structured as follows:

- Chapter 2 reviews the proposals against prevailing transport policy
- Chapter 3 outlines the existing highway network
- Chapter 4 details the proposed development
- Chapter 5 sets out the forecast traffic flows
- Chapter 6 presents the assessment of the highway network
- Chapter 7 outlines the strategy for a Travel Plan
- Chapter 8 summarises the report.

2 Policy

2.1 Overview

This section of the TA provides an examination of current transport and land use policies at the national and local level where they relate to the proposed development. In particular, this section reviews the following documents, and notes where appropriate, the strategies that may be needed to ensure the proposed development is consistent with these policies:

- Planning Policy Wales – Chapter 8 Transport;
- Planning Policy Wales – TAN18;
- Welsh Transport Strategy 2008;
- North Wales Joint Local Transport Plan (2015-2020);
- UDP (2000-2015);
- LDP; and
- LDP Topic Paper - Transport

2.2 National policy

2.2.1 Planning Policy Wales – Chapter 8 Transport

Planning Policy Wales (PPW) Edition 9 (November 2016) sets out the land use policies of the Welsh Assembly Government.

Chapter 8 discusses how the government plan to reach their aim of encouraging "a more effective and efficient transport system, with greater use of the more sustainable and healthy forms of travel, and minimising the need to travel."

Section 8.7 '*Development management and transport'* provides guidance for local planning authorities when determining planning applications that have transport implications, this includes;

- "the impacts of the proposed development on travel demand;
- the level and nature of public transport provision;
- accessibility by a range of different transport modes;
- the opportunities to promote active travel journeys, and secure new and improved active travel routes and related facilities, in accordance with the provisions of the Active Travel (Wales) Act 2013;
- the willingness of a developer to promote travel by walking, cycling or public transport, or to provide infrastructure or measures to manage traffic, to overcome transport objections to the proposed development (payment for such measures will not, however, justify granting planning permission to a development for which it would not otherwise be granted);
- the environmental impact of both transport infrastructure and the traffic generated (with a particular emphasis on minimising the causes of climate change associated with transport); and
- the effects on the safety and convenience of other users of the transport network."

The assessment presented in this TA identifies that opportunities for walking, cycling and use of public transport are good, given the location if the site in respect to local amenities, employment and leisure facilities.

The provision of a Travel Plan will help to maximise sustainable travel choices for residents and focus the efforts of the developer and local authority, as well as residents, on improvement of areas which will result in the greatest results.

2.2.2 Planning Policy Wales - TAN18

Further to PPW Chapter 8 providing guidance for Local Planning Authorities, the PPW – TAN18 (March 2007) provides the aims of undertaking a TA, this includes:

- "understand the transport impacts of the development;
- clearly communicate the impacts to assist the decision making process;
- demonstrate the development is sited in a location that will produce a desired and predicted output (for example in terms of target modal split);
- mitigate negative transport impacts through the design process and secured through planning conditions or obligations;
- maximise the accessibility of the development by non-car modes;
- contribute to relevant development plan and RTP objectives relating to accessibility of services and modal share."

This TA has been prepared in liaison with the local and strategic highway authorities to ensure that the document appropriately addresses their requirements. Primarily, this has included the inclusion of the Northern Gateway site within the traffic impact assessment which represents a significant development for the area. Also, the TA sets out the opportunities for sustainable and active travel options for residents, which fulfils a key strategy target, both nationally and locally.

2.2.3 The Wales Transport Strategy 2008

The Wales Transport Strategy (April 2008) details how transport plays a key role in shaping our daily lives. The goal of the strategy is to "promote sustainable transport networks that safeguard the environment while strengthening our country's economic and social life."

It sets out five key areas where substantial progress is needed:

- reducing greenhouse gas emissions and other environmental impacts;
- improving public transport and better integration between the different types;
- improving links and access between key settlements and sites;
- enhancing international connectivity; and
- increasing safety and security

The assessment has identified that the site has good opportunities for walking, cycling and use of public transport and is ideally located for residents to utilise a range of local amenities, employment and leisure facilities, using sustainable and active travel modes.

The provision of a Travel Plan will encourage future residents to utilise sustainable travel choices.

2.2.4 North Wales Joint Local Transport Plan (2015-2020)

The North Wales Joint Local Transport Plan (January 2015). The six local authorities working together have created a detailed programme from 2015 to 2020, as well as a framework of scheme up to 2030. The aim of the plan is to "improve connections to key destinations and markets, enhance access to employment and services, increase levels of walking and cycling, bring improved safety and security and at the same time bring benefits and minimised impacts on the environment."

The plan sets out a number of infrastructure improvements identified by FCC to enable greater use of walking and cycling by connecting existing routes and providing quality routes to key destinations. The development is ideally located to take advantage of the active travel network.

2.3 Local policy

2.3.1 UDP (2000-2015)

Although the adopted UDP became time expired at the end of 2015 it remains the adopted development plan for the County. The aim of the UDP is to "provide a framework for making rational and consistent decisions on planning applications and to guide development to appropriate locations."

STR2 relates to Transport and Communications and states;

"In order to facilitate a safe, efficient and integrated transport and communications system and improve accessibility throughout the County, new development will be expected to incorporate, wherever practicable, the following requirements:

- minimising the number and length of journeys especially by private car;
- making the best use of existing roads and addressing congestion and safety issues through traffic management and calming measures;
- enabling the efficient use of and improvements to public transport;
- enabling alternative means of travel including cycling and walking;
- facilitating the transfer of freight from road to rail or water; and
- facilitating the provision and use of telecommunications."

2.3.2 LDP (Deposit Plan)

Following the adoption of the UDP, FCC is now embarking on the preparation of a Local Development Plan (LDP) for the County. The LDP will provide a framework for delivering sustainable development for a 15 year period 2015 to 2030 and will include:

- policies which will guide decisions on planning applications;
- proposals for the development of housing, retail, employment and other land uses;
- policies which seek the protection and enhancement of the natural and built environment

This TA has been prepared to input into the LDP consultation process in order to promote the site HWN005. The report seeks to outline the key elements of the site which relate to transport and ensure that its development for residential land uses would not result in any negative impacts on the highway network.

The TA also identifies how the site accords with current planning policy, and particularly, is ideally located to facilitate sustainable and active travel options.

2.3.3 LDP Topic Paper – Transport

The Topic Paper states that some of the key aspects of modern, integrated and efficient transport systems include:

- Accessibility to services jobs and facilities;
- People engaging in healthier alternatives to the private car;
- Reduction in carbon emissions;

The key objective is "to assist in delivering a sustainable integrated transport system whereby different mode of travel i.e. walking, cycling, bus, rail and car work together in an efficient and accessible manner." This will be achieved through a number of initiatives including;

- Locating developments which generate significant travel demand in sustainable locations;
- Designing new developments to facilitate walking and cycling.

An accessibility study included within this TA identifies that the site is ideally located to take advantage of local amenities, employment and leisure facilities without the reliance on private car trips. The Travel Plan will further promote trips by sustainable and active travel modes.

3 Existing Conditions

3.1 Site Location

The site is located in Mancot, Flintshire. The site is currently agricultural land and is fronted to the west by the A550 Gladstone Way and to the East by Ash Lane. A site location plan is included as **Appendix A**.

It has been agreed that the highway network of interest should comprise the following junctions:

- the A494/A550
- the A55/A550
- the A550/B5125 (westernmost)
- the A550/B5125 (easternmost)
- Ash Lane/site access (east)
- Gladstone Way/site access (west)

3.2 Local Highway Network

The A550 Gladstone Way runs north to south from its junction with the A494 to the village of Hawarden. The A550 then continues southbound to Junction 35 of the A55 North Wales Expressway. Within Hawarden Village, the A550 forms the minor arms of two junctions with the B5125/A550, separated by approximately 100m.

The westernmost junction is a priority controlled crossroads with Mossley Court forming the opposite minor arm. The junction is located immediately adjacent to Church Lane which, itself forms a simple priority junction with the B5125/A550 and is separated from the A550 Give Way line by an area of carriageway hatching. The easternmost junction is also a priority controlled crossroads with Rectory Lane forming the opposite minor arm. Mossley Court, Church Lane and Rectory Lane are all cul-de-sac.

In the vicinity of the site, the A550 is a single carriageway road which is street lit and subject to a 30mph speed limit. A speed camera is located for southbound traffic close to the junction with Cottage Lane.

The road comprises residential development on both frontages to the north of the site although, in the vicinity of the site the frontage is largely agricultural with a footway provided on the eastern frontage only. As the road approaches the village of Hawarden to the south, residential development increases although the footway provision varies with a narrow footway provided on the eastern frontage and only a short section of footway provided on the western frontage, between Bennett's Lane and the Masonic Hall.

To the north of its junction with Cottage Lane, the A550 speed limit changes to National Speed Limit, although footways are provided on both frontages and a system of street lighting is maintained as far as its junction with the A494. The A550 is a bus route and bus shelters are provided at regular locations.

Ash Lane is a single carriageway road which is street lit and subject to a 30mph speed limit. At its southern end, the road forms the minor arm of a simple priority junction with Cross Tree Lane. At the junction, the road is fronted by the cemetery on both sides and then by agricultural land as far as the residential boundary, with a footway provided on the eastern frontage only. Within Mancot village the road is typically residential in nature and with footways, side roads and direct private accesses on both frontages. Along with Hawarden Way and Leaches Lane, the route forms a key local distributor through Mancot to the B5129 Chester Road to the north.

Cross Tree Lane is a single carriageway road which is street lit and subject to a 30mph speed limit. The road provides a link from Gladstone Way, Ash Lane and the B5125 to the east of Hawarden Village.

The A494, located to the north of the site, is a two lane dual carriageway and forms part of the trunk road network. The road forms a grade separated roundabout with the A550 and the B5129 at the Queensferry Interchange. Following recent upgrades, each of the A494 off-slips is signalised, which have also been widened to provide three lanes at the stop lines. The junction incorporates dedicated pedestrian routes via a network of overbridges and footpaths to ensure that pedestrians have a traffic free route spanning the A494.

The A55 North Wales Expressway, located to the south of Hawarden, is a two lane, dual carriageway. The road forms part of the trunk road network and is also designated as E22 as part of the Trans-European network as far as the port of Holyhead. The road forms a grade separated roundabout with the A550 and Drury Lane at the Dobshill Interchange.

3.3 Sustainable Access Audit

Walking

In terms of acknowledged criteria for walking distances, the Chartered Institution of Highways and Transportation (CIHT) document, '*Providing for Journeys on Foot*' (2000), suggests that the preferred maximum walking distance to common facilities is 1.2km and up to 2km for commuting or walking to school.

Within these parameters, the available facilities are shown on **Figure 1**, as listed below:

1 Hawarden Infant School;
2 Sandycroft Primary School;
3 Hawarden Masonic Hall;
4 Hawarden Institute community centre;
5 the Hawarden Health Centre
6 Vittoria Health Centre;
7 Hawarden Library
8 Gladstone's Library
9 Mancot Library;
10 Gladstone Playing Fields;
11 Daleside Garden Centre;

12 Greenacres Animal Park;
13 Mancot Post Office; and
14 Hawarden High School.

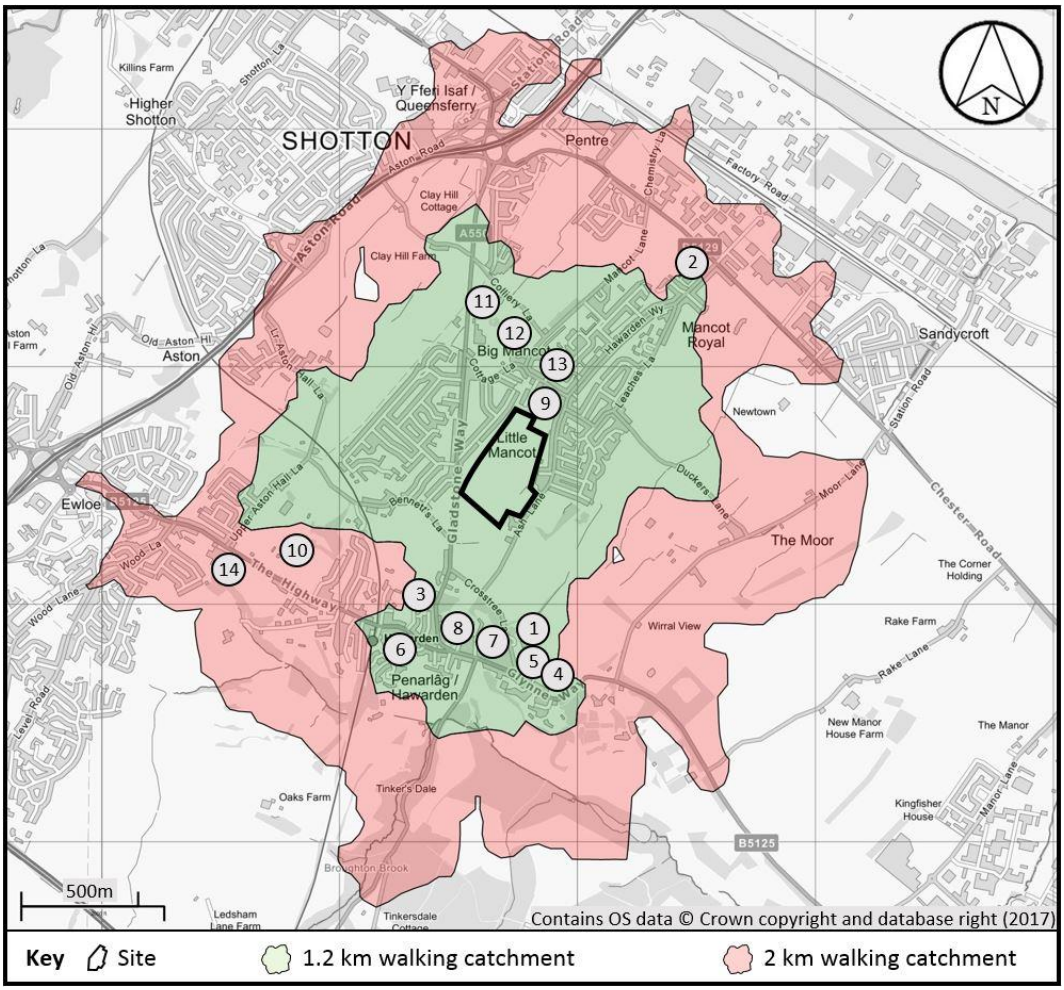


Figure 1 – Walking Catchment

The site is located 800m walking distance from Hawarden Village centre, measured from the site access on Gladstone Way and is therefore ideally located to access local retail and leisure services.

The 'Rural Walks in Flintshire' (2010) booklet prepared by FCC promotes Walk No 4 which provides a leisure walk along an 8km 'easy' loop from Hawarden Village. An extract is included as **Appendix C**.

Based on the above, it is considered that the site is well placed to encourage walking.

Cycling

Cycling provides a good alternative to the private car for journeys of up to 8km and can form part of a longer journey by public transport; it is cheap, offers reliable journey times, is environmentally friendly and promotes improved health through regular exercise.

An 8km catchment takes in Northop, Connah's Quay, Deeside industrial Estate, Bretton, Buckley and parts of Mold. The Flintshire Cycle Network Plan for Deeside Industrial Estate shows various local cycle routes in the vicinity of the site and is included as **Appendix D**. Primarily these comprise routes on the B5129 and B5125 to the north and the south of the site, respectively.

The National Cycle Route 5 provides a route which links Anglesey, Snowdonia and Connah's Quay before following a disused railway alignment into the heart of Chester. Route 568 also links to Route 5 near Shotton and provides a route along River Dee to Chester.

The site offers access to a broad scope of developed areas to provide cyclists with a range of employment, retail and leisure destinations.

By Bus

The CIHT document, '*Buses in Urban Developments*' (2018) suggests a maximum walking distance of 400m to a bus stop with single high frequency services and 250m within towns and city centres.

The site access on Gladstone Way is located within 200m walking distance to the existing bus stops for both northbound and southbound services. These services comprise the number 11 which provides a half hourly service between Holywell and Chester; and the X9 which provides a 2 hourly service between Mold and Wrexham. Bus service timetables are provided as **Appendix E**.

The bus facilities are located well within the recommended maximum walking distance and provide good connectivity to the surrounding conurbations.

By Train

The CIHT document '*Planning for Walking*' (2015) suggests that people will walk up to 800m to access a railway station.

The closest railway station to the site is Hawarden Station which is approximately 1.1km walking distance, measured from the site access on Gladstone Way. The station is regularly served by the Arriva Trains Service between Bidston and Wrexham. From Bidston, connecting services provide rail services between Liverpool and West Kirby.

The station lies beyond the suggested walking distance of 800m. Whilst this may deter some train users, it is generally accepted that people are prepared to walk longer distances to major fixed node transport hubs.

3.4 Background Traffic Flows

To inform the assessment, 2016 Automatic Traffic Count (ATC) traffic flow data have been obtained from FCC for Gladstone Way and Crosstree Lane. In order to identify the passing traffic flow adjacent to the site access on Gladstone Way, the split of northbound traffic on Gladstone Way at its junction with Cross Tree Lane, has been assumed at 90% ahead, 10% right turn. Similarly, the split of traffic entering Gladstone Way from Cross Tree Lane has been assumed at 90% northbound, 10% southbound.

Traffic flow data for Ash Lane have been obtained from an ATC installed for a 7 day period, from the 9th July 2018.

Traffic flow data have also been obtained from classified turning counts undertaken on Monday 9th July 2018 at the following junctions.

- A494/A550 (12hr counts)
- A55/A550 (12hr counts)
- A550/B5125 [both] (peak hour counts)

The data collection, for the four junctions listed above, also included the collection of queue surveys to assist with validation of junction models.

A review of the data has confirmed that the peak hours for background traffic are from 0800 to 0900 hours and from 1630 to 1730 hours in the AM and PM, respectively.

Figure 2 shows the derived Background Traffic Flows on the network of interest.

3.5 Committed Development

It was confirmed that agreed traffic flows for the Northern Gateway committed development, consented in 2012, should be included within the assessment.

The Northern Gateway mixed-use development involves the construction of;

- B1, B2 and B8 Employment use up to 223,347 sqm
- Up to a maximum of 7,779 sqm of Car Dealership
- Local retail space up to 4,646 sqm
- Up to a maximum of 689 residential units.

A supplementary Transport Statement was provided by Vectos on behalf of Praxis. The trip generation and distribution of the Northern Gateway site on the A494 / A550 / B5129 junction have been provided by Vectos directly from the Paramics model developed to inform its traffic impact assessment. It is understood that the majority of traffic accessing the Northern Gateway development does so from the A494 via the Drome Corner interchange with the A548 and B5441.

The distribution of the Northern Gateway traffic flows through the remainder of the network of interest to this TA, is based on existing turning proportions.

The resultant Committed Development Flows are shown in **Figure 3**.

4 Development Proposals

4.1 Proposed Development

The proposals are for up to 250 residential units. Based on the current timeframe for the adoption of the LDP, it is assumed that, subject to obtaining planning approval, construction of the development would start in 2022.

4.2 Access Strategy

Access to the site would be provided via two simple priority junctions located on Gladstone Way and Ash Lane, shown on **Figure 4** and **Figure 5**, respectively.

The primary access junction is anticipated to be the westernmost access onto Gladstone Way, given the connectivity to the surrounding highway network.

As noted, the site is well located to take advantage of sustainable travel options including walking, cycling and existing bus services between Chester, Wrexham, and Mold.

4.3 Traffic Generation

Trip rates have been derived from a sample of representative sites from the TRICS database, and are summarised below:

250 Houses	Trip Rates (TRICS)			Traffic Generation		
	Arr	Dep	Total	Arr	Dep	Total
AM Peak (0800 – 0900)	0.16	0.45	0.62	41	113	154
PM Peak (1700 – 1800)	0.41	0.23	0.64	103	57	160

A trip distribution pattern has been derived using the 2011 census using data sets WU03EW - *Location of usual residence and place of work by method of travel to work (MSOA level)*, for the two adjacent super output areas Flintshire 011 and 013 (W02000068 and W02000070) to ensure a broad representation of destinations.

The derived Development Trip Distribution and Development Traffic Flows are shown in **Figure 6** and **Figure 7**, respectively.

4.4 Multi Modal Trips

The likely modal split of people travelling to work has been calculated using mode splits within the 2011 census data for the two local MSOA as identified above. Arrival and departure trips have then been calculated by comparison of vehicle trips (car, taxi and motorcycle) against the vehicle trips derived from TRICS:

Mode	Mode Share	AM Peak Trips		PM Peak Trips	
		Arrival	Departure	Arrival	Departure
Rail	1.1%	1	2	1	1
Bus	3.7%	2	5	5	3
Taxi	0.3%	0	0	0	0
Motorcycle	0.5%	0	1	1	0
Driving	78.2%	41	112	102	56
Passenger	6.1%	3	9	8	4
Cycle	2.3%	1	3	3	2
Walking	7.7%	4	11	10	6
Other	0.3%	0	0	0	0
Total	100%	52	143	131	72

From the above data it can be seen that, initially at least, the development is likely to generate a relatively low number of non-car mode trips.

In terms of pedestrian trips, the development provides direct connections to the existing footways. It is considered that providing links into the existing infrastructure will be sufficient to cater for the expected pedestrian footfall from the development proposals.

With respect to cycle trips, the proposed development benefits from a reasonably low trafficked connection to the existing local cycle network via Ash Lane, which in turn links to the strategic cycle network adjacent to the River Dee. The existing infrastructure is considered to be sufficient to accommodate the anticipated additional cycle traffic.

The multi modal trip generation estimate also suggests low usage of public transport. Therefore, the existing public transport provision is considered appropriate to accommodate the anticipated additional trips.

5 Forecast Traffic Flows

5.1 Scope of Assessment

The following table shows the total future year junction inflow and the anticipated development traffic flows at each identified junction:

Junction	AM Flow		PM Flow	
	Future Year Base Flows	Development Flows	Future Year Base Flows	Development Flows
A494/A550	3904	69	4195	71
A55/A550	2128	28	1955	30
A550/B5125 (easternmost junction)	1233	28	1339	30
A550/B5125 (westernmost junction)	1308	50	1337	53
Gladstone Way/Site Access	1390	118	1041	124
Ash Lane/Site Access	236	35	217	36

Based on the two-way development traffic flows identified above, the potential increases in traffic through the A55/A550 junction during both peak hours non-material, when considering the form of the junction and the background traffic flows.

Therefore, it is the operational capacity of the following junctions that will be assessed within this TA.

- A494/A550
- A550/B5125 (westernmost)
- A550/B5125 (easternmost)
- Ash Lane/Site Access
- Gladstone Way/Site Access

5.2 AADT Flows

The following table summarises the changes in AADT flows through the A494/A550 junction. In order to convert the 12 hour ATC data in to 24 hours, a factor of 1.27 was derived from the Highway England's Webtris data for a site on the A494, approximately 2km north of its junction with the A550. The assessment also applies a factor of 7.80 to convert the AM/PM peak hour committed development flows taken from **Figure 3**, to 24 hours.

Link	2037 Base Flows	Development Flows
A494 Slip Roads (east)	22834	435
A494 Slip Roads (west)	19325	98
A550	10405	572
B5129 (north)	32842	39
B5129 (south)	23635	0

5.3 Assessment Year and Traffic Growth

As noted, the assumed start of construction year is 2022. The assessment also assumes a total construction period of 5 years.

The assessment year for the local highway network is 2027, which is 5 years following the start of construction. The assessment year for the strategic highway network is 2037, which is 10 years following the final construction year.

Anticipated background traffic growth has been derived using NTEM 7.2 datasets for Flintshire, specifically super output area Flintshire 011 (W02000068), along with 2015 NTM forecasts for Urban roads (all types) in TEMPRO version 7.2. Growth factors are summarised in the table below.

Year	Factor	
	AM Peak	PM Peak
2016 to 2027	1.1036	1.0998
2018 to 2027	1.0789	1.0765
2018 to 2037	1.1541	1.1499

The 2027/2037 (Future Year) Background Flows are shown in **Figure 8**.

5.4 Base and Assessment Traffic Flows

The Future Year Base Flows have been derived by combining the Future Year Background Flows (**Figure 8)**, with the Committed Development Flows (**Figure 3)** and are shown in **Figure 9**.

The Future Year Assessment Flows have been derived by combining the Future Year Base Flows (**Figure 7)**, with the Development Traffic Flows (**Figure 5)** and are shown in **Figure 10**.

6 Traffic Impact Assessment

6.1 Assessment Scenarios

In order to assess the operation of the highway network in relation to the proposals, the following AM and PM peak hour scenarios have been considered:

- Future Year Base Scenario (2027/37 traffic flows without development traffic); and
- Future Year Assessment Scenario (2027/37 traffic flows with development traffic).

The operational assessment for each junction type utilises industry-standard junction capacity assessment software: LINSIG v3 for traffic signal junctions; and PICADY (Junctions 9) for priority junctions.

To ensure that the geometric parameters of the junction models reflect existing junction geometry, all geometric data has been input from measurements taken from available Ordnance Survey mapping, observations during site visits. Additionally, the signal layout for the A494/A550 junction has been derived from an “as-built” plan provided by FCC.

The results of the operational assessment of the identified junctions are presented in the following section along with a summary of the assessment findings.

6.2 Methodology

For the purposes of validating each model, the operational of performance of the junction was initially tested against the 2018 background traffic flows and the results compared against observed queue surveys collected for the same time period.

The operational performance of each junction was then tested against the Future Year Base Scenario to give a datum against which the likely traffic impact of the development proposals can be considered. The junction was re-tested against the Future Year Assessment Scenarios to identify the impacts as a result of the development generated traffic and to confirm any requirement for improvements to mitigate the likely traffic impact.

6.3 A494/A550

The results of the validation assessment are summarised in **Table 6.1**, with all queues shown in PCUs. The corresponding LINSIG outputs for each flow scenario are included as **Appendix F**.

Link	Description	Link	Description
1/1	A494 (w) offslip Left	**4/2+4/1**	A494 (E) offslip Ahead Left
1/2	A494 (w) offslip Ahead Left	**4/3**	A494 (E) offslip Ahead
1/3	A494 (w) offslip Ahead	**5/1**	circulatory (east) Ahead
2/1	circulatory (west) Ahead	**5/2**	circulatory (east) Right Ahead
2/2	circulatory (west) Right Ahead	**5/3**	circulatory (east) Right
2/3	circulatory (west) Right	**6/1+6/2**	B5129 (S) Ahead Left
3/1	B5129 (N) Left	**7/1+7/2**	A550 Ahead Left
3/2+3/3	B5129 (N) Ahead		

Link	2018 AM Peak				2018 PM Peak			
	Validation Model		Queue Survey		Validation Model		Queue Survey	
	DoS	MMQ	Ave	Max	DoS	MMQ	Ave	Max
1/1	33.1%	2.3	3.6	6	40.7%	2.1	4.7	10
1/2	35.5%	2.7	3.1	4	43.9%	2.4	2.8	5
1/3	35.5%	2.7	3.6	5	43.9%	2.4	3.7	7
2/1	36.6%	2.7	3.7	8	32.1%	2.5	6.2	12
2/2	37.1%	2.9	3.2	5	34.9%	2.8	3.9	7
2/3	33.3%	2.8	5.0	7	31.8%	2.7	5.2	10
3/1	31.2%	0.4	3.2	6	25.9%	0.2	3.0	6
3/2+3/3	34.4 : 29.7%	0.5	3.3	7 : 6	60.6 : 60.6%	1.8	5.3	10 : 10
4/2+4/1	30.6 : 30.4%	2.3	3.4	9 : 3	28.4 : 27.6%	2.0	3.5	7 : 5
4/3	32.4%	2.5	3.0	5	56.0%	4.6	4.4	6
5/1	32.2%	1.8	5.5	9	36.9%	2.3	4.3	8
5/2	32.4%	2.1	2.7	5	35.7%	2.7	3.8	6
5/3	30.8%	2.3	3.8	7	36.5%	3.0	6.4	9
6/1+6/2	32.6 : 35.5%	0.7	2.6	3 : 9	63.1 : 63.1%	2.7	3.7	5 : 8
7/1+7/2	42.8 : 42.8%	0.5	2.1	5 : 5	50.5 : 50.5%	0.6	3.7	9 : 8
PRC	110.4%		N/A		42.6%		N/A	
Cycle Time	45 secs		~45 secs		45 secs		~45 secs	

DoS	Degree of Saturation (Practical Maximum 90%)
MMQ	Mean Max Queue - PCU's
PRC	Practical Reserve Capacity

Table 6.1 – A494/A550 Queue Validation Summary

The Mean Max Queue presented in LINSIG is comparable to the average queue reported by the traffic survey observer, in so far as it is the average of the largest queues in a given period.

From **Table 6.1**, it can be seen that the queues predicted by the model, for signal controlled lanes (1&2 and 4&5), are largely comparable to the average queues observed during the traffic surveys. However, this is not the case for lanes 2/1 and 5/1 which are both the kerbside lane of the circulatory carriageway used by traffic existing the roundabout. In both cases, traffic can also choose the middle lane to exit the roundabout, although observations show that the majority of drivers prefer to queue in the inside lane.

Notwithstanding the above, the available capacity within these lanes, and the adjacent lanes, would suggest that lane choice will not present an issue in the assessment scenarios.

The queues predicted by the model for lanes controlled by give way markings, (3, 6 and 7), are typically lower than those observed. This is presumed to be as a result of the hybrid control incorporated at this roundabout which cannot be accurately modelled using current discrete junction analysis software due to traffic pulsing through from upstream signal controlled intersections. Although queues may therefore be under reported, the capacity of each lane is considered to be accurate.

Therefore, despite the minor inconsistencies against observed queues, the model is considered appropriate for predicting the operation of the junction under future traffic flow conditions.

The results of the capacity assessment are summarised in **Table 6.2.**

Link	Description	Link	Description
1/1	A494 (w) offslip Left	**4/2+4/1**	A494 (E) offslip Ahead Left
1/2	A494 (w) offslip Ahead Left	**4/3**	A494 (E) offslip Ahead
1/3	A494 (w) offslip Ahead	**5/1**	circulatory (east) Ahead
2/1	circulatory (west) Ahead	**5/2**	circulatory (east) Right Ahead
2/2	circulatory (west) Right Ahead	**5/3**	circulatory (east) Right
2/3	circulatory (west) Right	**6/1+6/2**	B5129 (S) Ahead Left
3/1	B5129 (N) Left	**7/1+7/2**	A550 Ahead Left
3/2+3/3	B5129 (N) Ahead		

Link	Future Year AM Peak				Future Year PM Peak			
	Base Flows		Assessment Flows		Base Flows		Assessment Flows	
	DoS	MMQ	DoS	MMQ	DoS	MMQ	DoS	MMQ
1/1	40.9%	2.9	44.2%	3.0	42.4%	2.3	42.8%	2.3
1/2	43.6%	3.4	46.6%	3.5	45.7%	2.7	46.4%	2.8
1/3	43.6%	3.4	47.0%	3.5	45.3%	2.7	46.0%	2.7
2/1	38.8%	4.3	38.3%	3.4	36.7%	3.9	45.2%	4.8
2/2	41.4%	4.3	41.0%	3.7	41.0%	4.1	41.5%	4.0
2/3	40.0%	3.6	39.5%	3.5	41.3%	3.4	33.9%	2.5
3/1	38.2%	0.6	39.0%	0.7	31.5%	0.4	31.9%	0.4
3/2+3/3	45.0 : 45.0%	1.0	46.3 : 46.3%	1.0	75.1 : 75.1%	3.5	70.3 : 63.2%	2.7
4/2+4/1	37.8 : 37.8%	2.9	36.5 : 36.5%	2.9	38.5 : 38.1%	2.6	45.2 : 44.1%	3.0
4/3	41.3%	3.2	38.9%	3.1	75.8%	6.7	82.1%	7.6
5/1	38.1%	1.6	40.3%	2.0	39.4%	2.4	35.3%	2.1
5/2	35.0%	2.2	36.9%	2.4	38.0%	2.8	35.8%	2.4
5/3	31.7%	2.3	33.2%	2.4	37.7%	3.2	40.3%	3.5
6/1+6/2	42.1 : 43.9%	1.2	42.4 : 44.4%	1.2	81.3 : 81.3%	8.2	82.9 : 82.9%	8.7
7/1+7/2	57.6 : 57.6%	1.1	63.7 : 63.7%	1.4	73.8 : 73.8%	2.2	66.9 : 66.9%	1.7
PRC	56.1%		41.4%		10.7%		8.6%	
Cycle Time	45 secs		45 secs		45 secs		45 secs	

DoS	Degree of Saturation (Practical Maximum 90%)
MMQ	Mean Max Queue - PCU's
PRC	Practical Reserve Capacity

Table 6.2 – A494/A550 Assessment Model Results

From **Table 6.2**, it can be seen that the junction is predicted to operate with no capacity issues under both the Base and Assessment Flow conditions, with only small increases in queueing predicted on all arms in both peak hours with the addition of the development traffic. The largest increase in queuing can be seen on arm 7/1+7/2 where the queue increase by 1.6. It can therefore be concluded that the operational performance of the junction will not be detrimentally affected by the additional traffic from the development proposals.

6.4 A550/B5125 (westernmost)

The results of the validation assessment are summarised in **Table 6.3**, with all queues shown in PCUs. The corresponding PICADY outputs for each flow scenario are included as **Appendix G**.

Arm	Description							
A	The Highway (E)							
B	Mossley Court							
C	B5125							
D	A550							
Movement	**2018 AM Peak**				**2018 PM Peak**			
	Validation Model		**Queue Survey**		**Validation Model**		**Queue Survey**	
	RFC	**Queue**	**Ave**	**Max**	**RFC**	**Queue**	**Ave**	**Max**
B-ACD	0.20	0.0	0.4	1	0.02	0.0	0.3	1
A-BCD	0.46	1.1	3.0	5	0.47	1.5	2.5	5
D-ABC	0.72	2.5	3.8	6	0.66	1.9	3.8	6
C-ABD	0.00	0.0	0.4	5	0.01	0.0	0.08	1
RFC	Ratio Flow to Capacity (Practical Maximum 0.85)							
Queue	Maximum Queue (PCU's)							

Table 6.3 – A550/B5125 (westernmost) Queue Validation Summary

From **Table 6.3**, it can be seen that the queues predicted by the model are largely comparable to the average queues observed during the traffic surveys with maximum observed queues peaking slightly above that in each case. One notable exception is for the B5125 during the AM is predicted to operate with 0.0 RFC although a maximum queue of 5 PCUs was observed. On inspection, the queue was registered during one single segment in the survey, with no other queueing during the period. The model is therefore appropriate for predicting the operation of the junction under future traffic flow conditions.

The results of the capacity assessment are summarised in **Table 6.4**.

Arm	Description							
A	The Highway (E)							
B	Mossley Court							
C	B5125							
D	A550							
Movement	**Future Year AM Peak**				**Future Year PM Peak**			
	Base		**Assessment**		**Base**		**Assessment**	
	RFC	**Queue**	**RFC**	**Queue**	**RFC**	**Queue**	**RFC**	**Queue**
B-ACD	0.02	0.0	0.02	0.0	0.03	0.0	0.03	0.0
A-BCD	0.52	1.4	0.54	1.5	0.54	1.9	0.60	2.4
D-ABC	0.82	4.0	0.93	8.0	0.74	2.6	0.80	3.6
C-ABD	0.00	0.0	0.00	0.0	0.01	0.0	0.01	0.0
RFC	Ratio Flow to Capacity (Practical Maximum 0.85)							
Queue	Maximum Queue (PCU's)							

Table 6.4 – A550/B5125 (westernmost) Assessment Model Results

From **Table 6.4**, it can be seen that in the Base Flow scenario, the junction is predicted to operate with no capacity constraints for all movements, however the A550 approach has an RFC 0.82 in the AM peak, approaching the maximum practical capacity (0.85). The results for the Assessment Flow scenario predict that the RFC values for the A550 approach will increase to 0.93. Although this is within the theoretical capacity of the junction, it is above the practical maximum of 0.85 and therefore results in an increased prediction of likely queueing.

It should be noted that in the AM peak, the number of development trips predicted to arrive at the A550 Give Way line is 37 PCUs, which equates to approximately 1 vehicle every 2 minutes.

6.5 A550/B5125 (easternmost)

The results of the validation assessment are summarised in **Table 6.5**, with all queues shown in PCUs. The corresponding PICADY outputs for each flow scenario are included as **Appendix H**.

Arm	Description							
A	Glynne Way							
B	A550							
C	The Highway							
D	Rectory Lane							
Movement	**2018 AM Peak**				**2018 PM Peak**			
	Validation Model		**Queue Survey**		**Validation Model**		**Queue Survey**	
	RFC	**Queue**	**Ave**	**Max**	**RFC**	**Queue**	**Ave**	**Max**
B-ACD	0.69	2.1	2.8	4	0.54	1.2	3.6	6
A-BCD	0.02	0.0	0.3	2	0.01	0.0	0.0	0
D-ABC	0.05	0.1	0.25	1	0.04	0.0	0.6	2
C-ABD	0.25	0.6	2.2	4	0.47	1.2	3.3	5
RFC	Ratio Flow to Capacity (Practical Maximum 0.85)							
Queue	Maximum Queue (PCU's)							

Table 6.5 – A550/B5125 (easternmost) Queue Validation Summary

From **Table 6.5**, it can be seen that the queues predicted by the model are largely comparable to the average queues observed during the traffic surveys, albeit slightly lower than observed during the PM peak on arms B and C. The model is therefore considered appropriate for predicting the operation of the junction under future traffic flow conditions.

The results of the capacity assessment are summarised in **Table 6.6**.

Arm	Description							
A	Gladstone Way (N)							
B	Site Access							
C	Gladstone Way (S)							
Movement	**Future Year AM Peak**				**Future Year PM Peak**			
	Base		**Assessment**		**Base**		**Assessment**	
	RFC	**Queue**	**RFC**	**Queue**	**RFC**	**Queue**	**RFC**	**Queue**
B-ACD	0.76	3.0	0.79	3.4	0.61	1.5	0.66	1.9
A-BCD	0.02	0.0	0.02	0.0	0.01	0.0	0.01	0.0
D-ABC	0.06	0.1	0.06	0.1	0.04	0.0	0.05	0.0
C-ABD	0.28	0.7	0.34	0.9	0.53	1.6	0.56	1.7
RFC	Ratio Flow to Capacity (Practical Maximum 0.85)							
Queue	Maximum Queue (PCU's)							

Table 6.6 – A550/B5125 (easternmost) Assessment Model Results

From **Table 6.6**, it can be seen that in the Base Flow scenario, the junction is predicted to operate with no capacity constraints for all movements. The results for the Assessment Flow scenario predict that the junction will continue to operate with no capacity constraints, even with the addition of the development traffic.

6.6 Gladstone Way/Site Access

The results of the capacity assessment for the proposed access on Gladstone Way are summarised in **Table 6.7**. The corresponding PICADY outputs are included as **Appendix I**.

Arm	Description			
A	Gladstone Way (N)			
B	Site Access			
C	Gladstone Way (S)			
Movement	**Future Year AM Peak**		**Future Year PM Peak**	
	RFC	**Queue**	**RFC**	**Queue**
B-AC	0.34	0.5	0.13	0.2
C-AB	0.05	0.1	0.12	0.3
RFC	Ratio Flow to Capacity (Practical Maximum 0.85)			
Queue	Maximum Queue (PCU's)			

Table 6.7 – A550/B5125 (easternmost) Assessment Model Results

From **Table 6.7**, it can be seen that junction is appropriate given the level of anticipated traffic and will not result in any notable queuing.

6.7 Ash Lane/Site Access

The results of the capacity assessment for the proposed access on Ash Lane are summarised in

Arm	Description			
A	Ash Lane (S)			
B	Site Access			
C	Ash Lane (N)			
Movement	**Future Year AM Peak**		**Future Year PM Peak**	
	RFC	**Queue**	**RFC**	**Queue**
B-AC	0.06	0.1	0.03	0.0
C-AB	0.01	0.0	0.01	0.0
RFC	Ratio Flow to Capacity (Practical Maximum 0.85)			
Queue	Maximum Queue (PCU's)			

Table 6.8. The corresponding PICADY outputs are included as **Appendix J**.

Arm	Description			
A	Ash Lane (S)			
B	Site Access			
C	Ash Lane (N)			
Movement	**Future Year AM Peak**		**Future Year PM Peak**	
	RFC	**Queue**	**RFC**	**Queue**
B-AC	0.06	0.1	0.03	0.0
C-AB	0.01	0.0	0.01	0.0
RFC	Ratio Flow to Capacity (Practical Maximum 0.85)			
Queue	Maximum Queue (PCU's)			

Table 6.8 – A550/B5125 (easternmost) Assessment Model Results

From **Table 6.8**, it can be seen that junction is appropriate given the level of anticipated traffic of the development with no notable queueing predicted.

7 Outline Travel Plan

7.1 Context

This section outlines the proposed scope and content of a Travel Plan which would seek to confirm the suitability of the site with regard to access to sustainable travel choices for residents of the proposed development.

A number of initiatives are set out below which seek to influence and encourage the adoption of sustainable transport choices.

Furthermore, a coordinator role will be established to deal with any ongoing travel planning matters associated with the site. It is envisaged that the role will involve:

- ensuring travel planning promotional material is readily available to all residents;
- ensuring that any feedback regarding travel issues is taken on board and circulated; and
- implementing and overseeing travel planning initiatives, as appropriate.

7.2 Sustainable Travel Opportunities

The Sustainable Access Audit (Section 3.3) demonstrates that the site is ideally located to benefit from access to local amenities including schools, community centres and health centres. The existing infrastructure means that good access is provided enabling access for all, regardless of mobility.

The site is located such that two bus services are accessible within the appropriate walking distance providing services to Holywell, Chester, Mold and Wrexham. These links to surrounding conurbations provide a sustainable travel opportunity for residents who work in such locations.

When considering cycling, it has been established that it is possible reach a number of employment and leisure sites, including Deeside industrial estate. Although cycle standards are not provided for residential developments, the proposals will include cycle storage within the curtilage, as a minimum.

In summary it can be concluded that the site provides excellent opportunities for residents to travel to and from the site via sustainable modes.

7.3 Objectives

The key objectives considered in the identification of the travel planning initiatives are:

- To encourage use of sustainable modes of travel to the site;
- To ensure that residents have easy access to relevant travel information and are able make informed travel choices; and
- To maximise and promote travel benefits to residents

7.4 Travel Planning Promotion and Initiatives

7.4.1 Travel Information Pack

The provision of current and relevant information is a key element of promoting alternative travel choices. To that end it is proposed that a Travel Information Pack will be compiled to be provided to each resident. The pack will include information relating to walking and cycling routes along with information on the location of local facilities. Information on bus and rail journeys will also be provided.

7.4.2 Travel Planning Initiatives

Support public transport: The nearest bus stops are located within 200 metres walking distance from the site access and further public transport connections can be accessed from Hawarden railway station, approximately 1.1km walking distance from the site.

The combination of bus and train services provides frequent, high quality journey options. The scheduling of services means that residents will have good access to a range of destinations.

Support walking and cycling access: Walking and cycling are healthy, cheap and convenient methods of transport and are particularly useful for short trips.

The site can be easily accessed on foot from a number of local facilities and key destinations. A plan showing the location of the site in relation to key destinations will be made available to residents via the suggested promotional material.

Cycling routes and information will also be provided.

8 Summary

This report has been prepared to support the promotion of the HW005 Mancot site into the upcoming LDP. It is proposed that the site could accommodate up to 250 units. Based on the current timeframe for the adoption of the LDP, it is assumed that construction of the development would start in 2022.

The scope of the assessment has been agreed with FCC and WG. A policy review has compared the proposals against current transport and land use policies at the national and local level. The review identifies that the site accords with current planning policy, and particularly, is ideally located to facilitate sustainable and active travel options.

A review of the site, the local highway network has been presented along with a sustainable access audit which found that the site is well placed to encourage walking, cycling and travel by bus.

Background traffic flow data have been obtained from FCC, a newly installed ATC and from classified turning counts undertaken on Monday 9th July 2018. The classified turning counts, also included the collection of queue survey data to assist with validation of junction models.

Traffic flows for the Northern Gateway development have been considered within the assessment with flow data provided directly from the Paramics model for the A494/A500 junction, and distributed through the network of interest using background turning ratios.

Traffic flows for the proposals have been derived from the TRICS database and distributed across the network of interest using 2011 census data. An investigation of the likely modal split has identified that 78% of trips will be by private car, with walking representing the next biggest mode share with nearly 8%.

The scope of the traffic impact assessment has been identified following a review of traffic flows through the identified network of interest where it was concluded that development traffic flows through the A55/A550 where non-material.

The assessment year for the local highway network is 2027, which is 5 years following the start of construction. The assessment year for the strategic highway network is 2037, which is 10 years following the final construction year. Traffic growth has been applied to the background traffic flows.

The operational impacts of the development generated traffic on the highway network have been assessed for the AM and PM peak hours. It has been concluded that the operational performance of the assessed junctions would not be detrimentally affected by the development proposals.

An outline Travel Plan has been proposed which seeks to confirm the suitability of the site with regard to access to sustainable travel choices for residents of the proposed development. A number of initiatives have been identified for inclusion into a Full Travel Plan sufficient to support a formal planning application.

In summary, this TA has shown that the traffic associated with a residential allocation at the proposed development site can be accommodated on the highway network with no detriment to operation, or road safety. As such, there are no traffic or transport planning reasons why the site should not be included within the LDP.

Figure 2

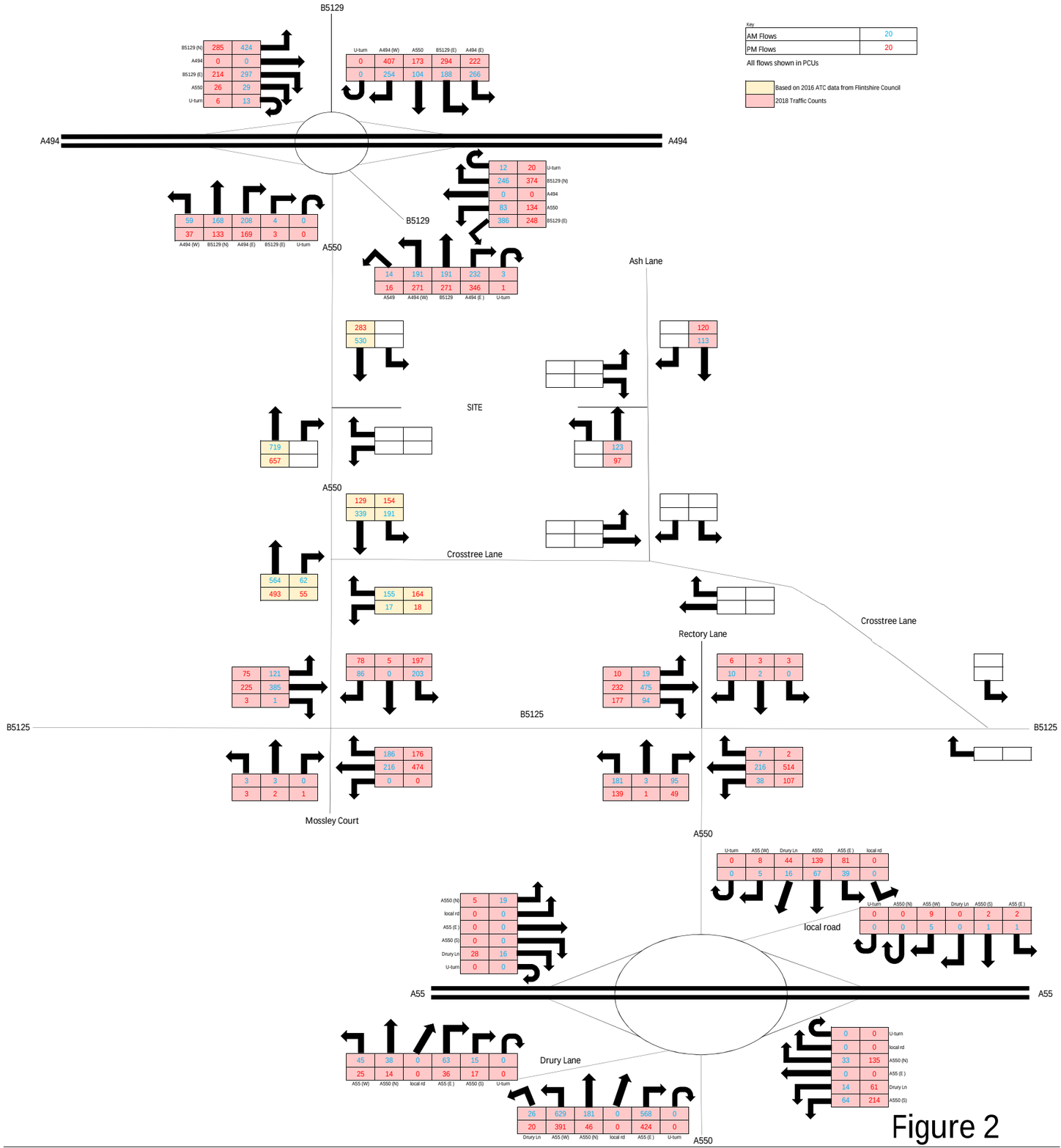
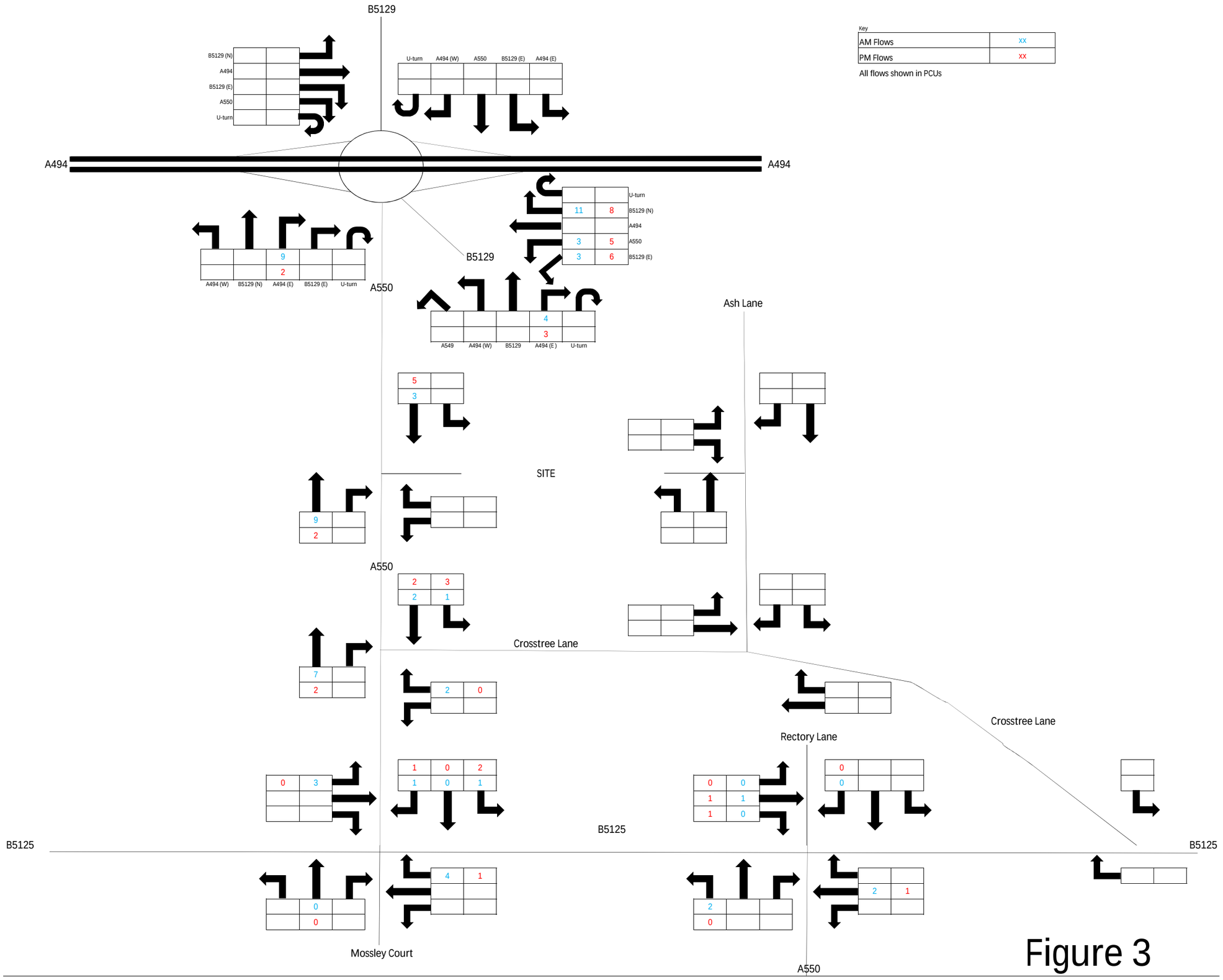


Figure 2

BACKGROUND TRAFFIC FLOWS

SWECO

Figure 3



Key

AM Flows	xx
PM Flows	xx

All flows shown in PCUs

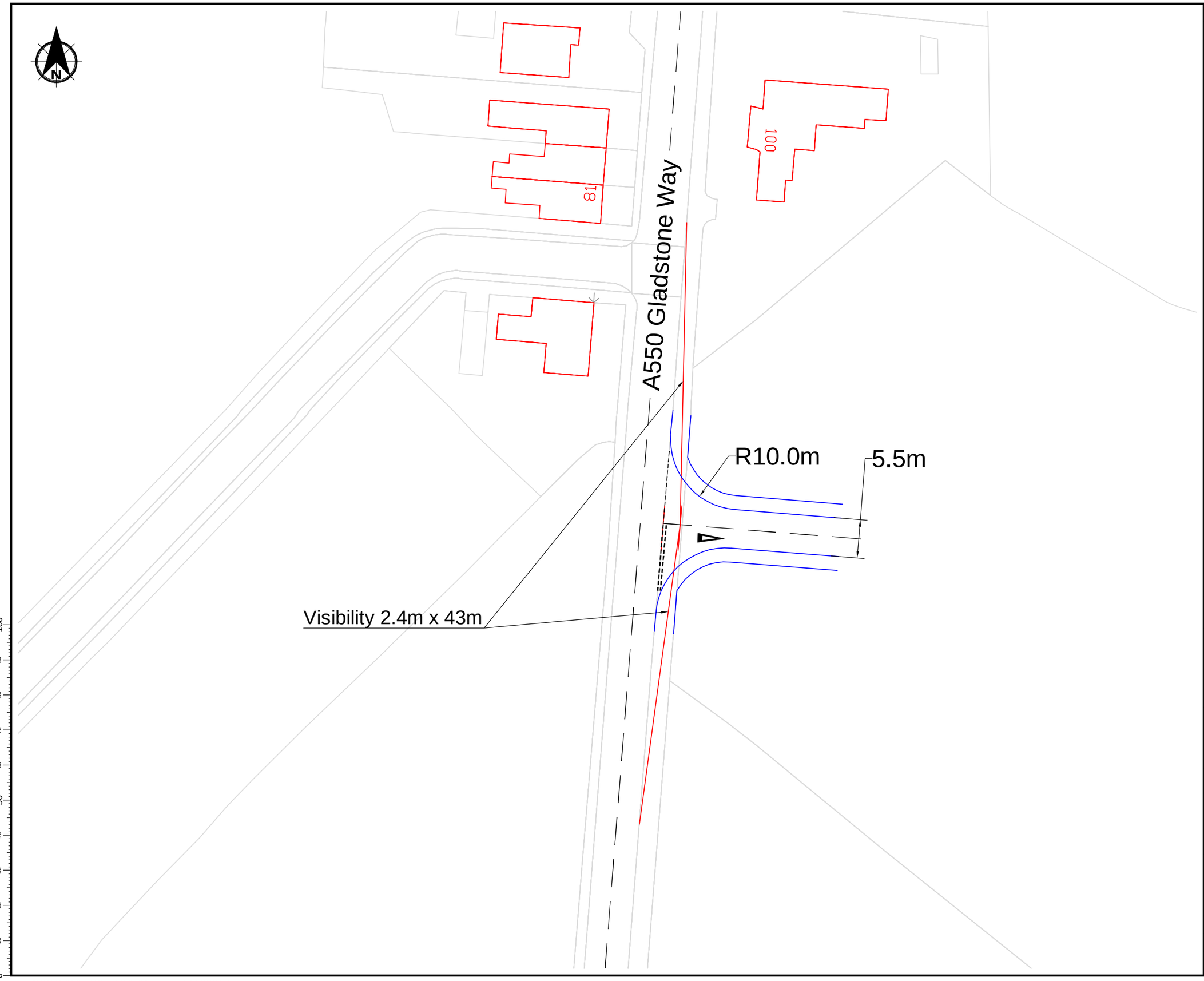
Figure 3

COMMITTED DEVELOPMENT FLOW

Model 1 - RAF Sealand 60 C MOVA

SWECO

Figure 4



NOTES

1. NOTES

Rev.	Date	Amendment Details	Drawn	Chk'd	App'd

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SWECO

Client
HAWARDEN ESTATES

Drawing Status
PLANNING

Project Title
HW005 MANCOT

Promotion to the
Local Development Plan

Drawing Title
FIGURE 4
PROPOSED SITE ACCESS
GLADSTONE WAY

Scale	Designed	Drawn	Checked	Approved
1:500	IB	IB	MWD	MWD
Original Size	**Date**	**Date**	**Date**	**Date**
A3	30.07.18	30.07.18	30.07.18	30.07.18

Drawing Number	Revision
120574_SK01a	/

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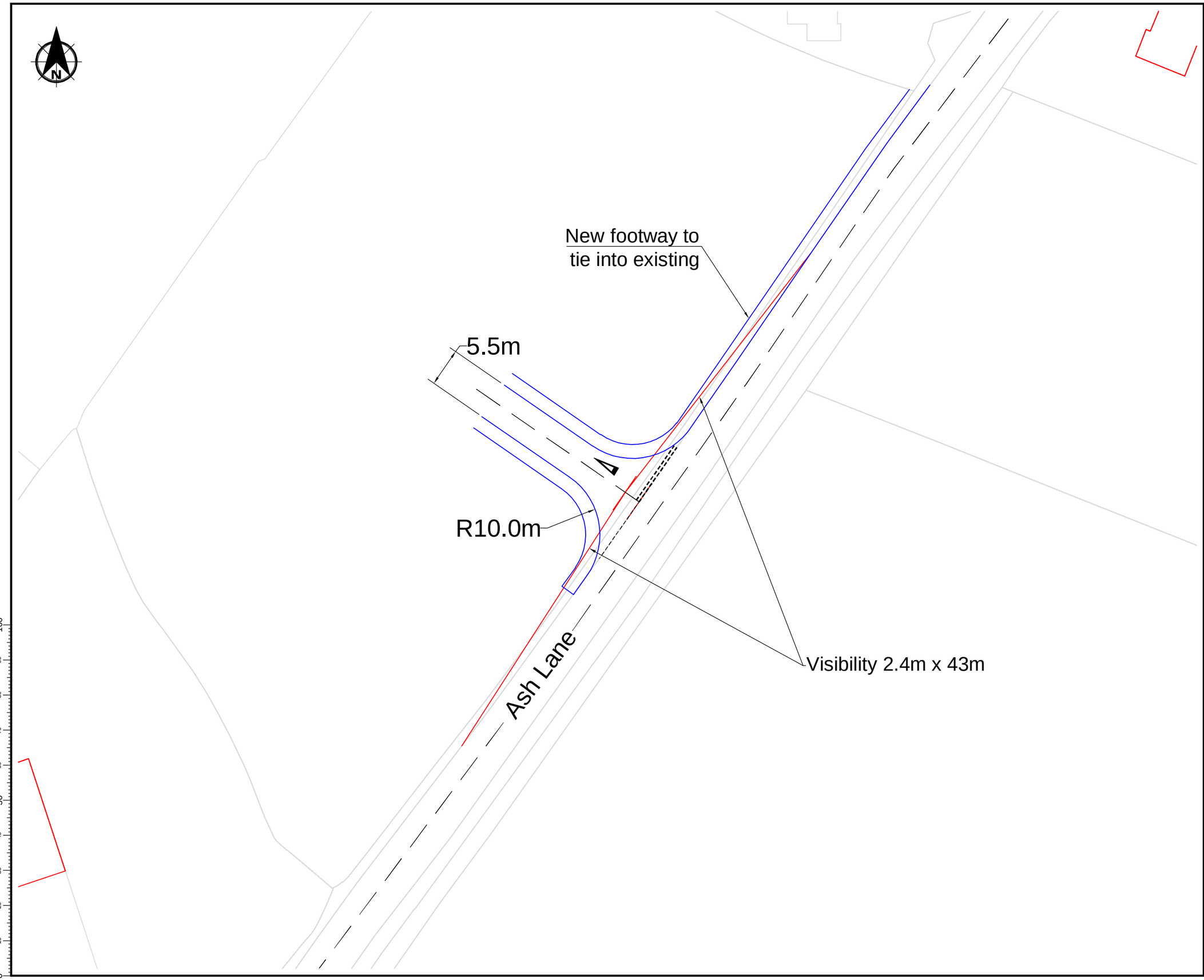
Figure 5



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SWECO

Client
HAWARDEN ESTATES

Drawing Status
PLANNING

Project Title
HW005 MANCOT

Promotion to the
Local Development Plan

Drawing Title
FIGURE 5
PROPOSED SITE ACCESS
ASH LANE

Scale	Designed	Drawn	Checked	Approved
1:500	IB	IB	MWD	MWD
Original Size	**Date**	**Date**	**Date**	**Date**
A3	30.07.18	30.07.18	30.07.18	30.07.18

Drawing Number
120574_SK01b

Revision
/

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Figure 6

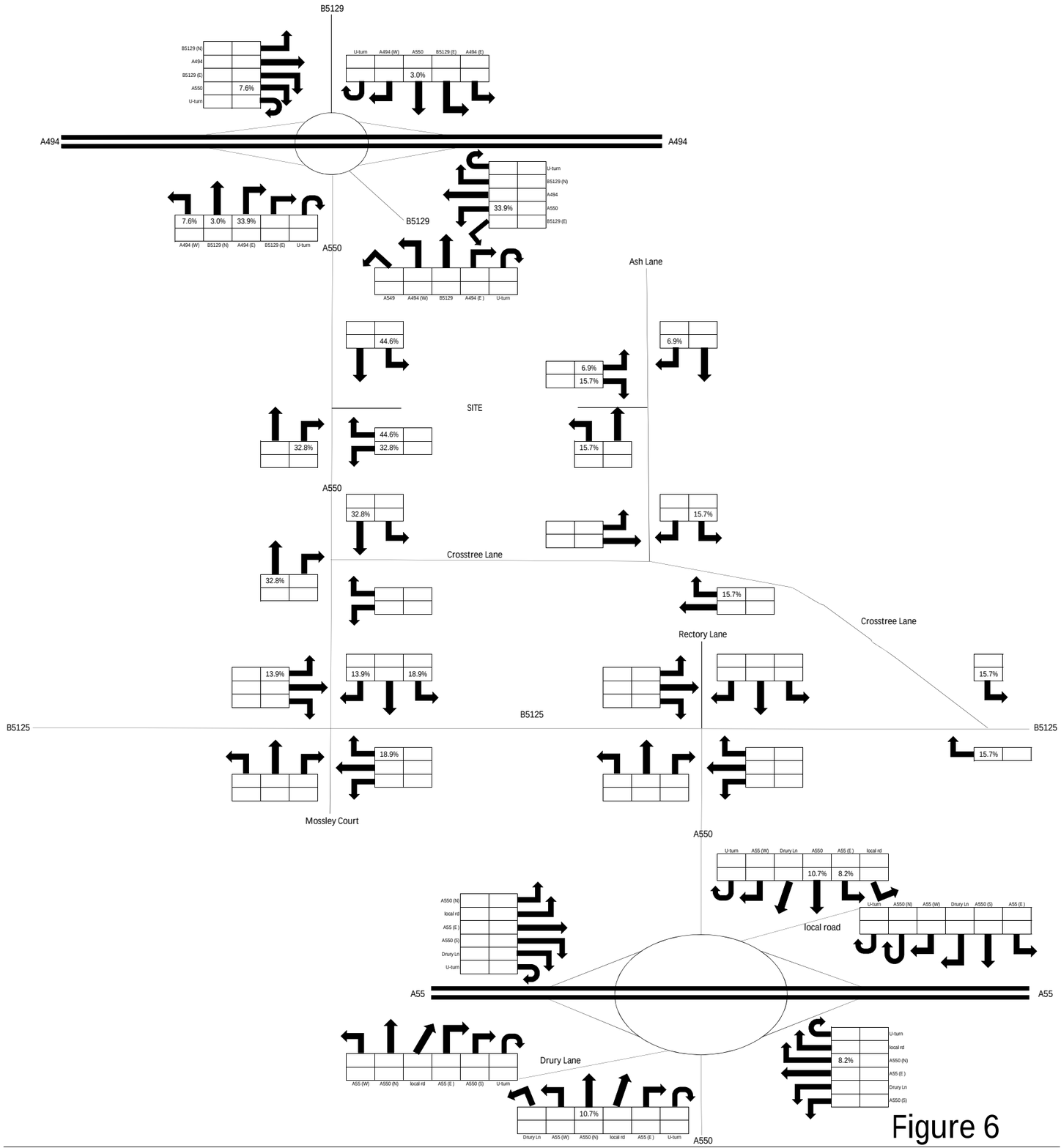


Figure 6

DEVELOPMENT TRIP DISTRIBUTION

SWECO

Figure 7

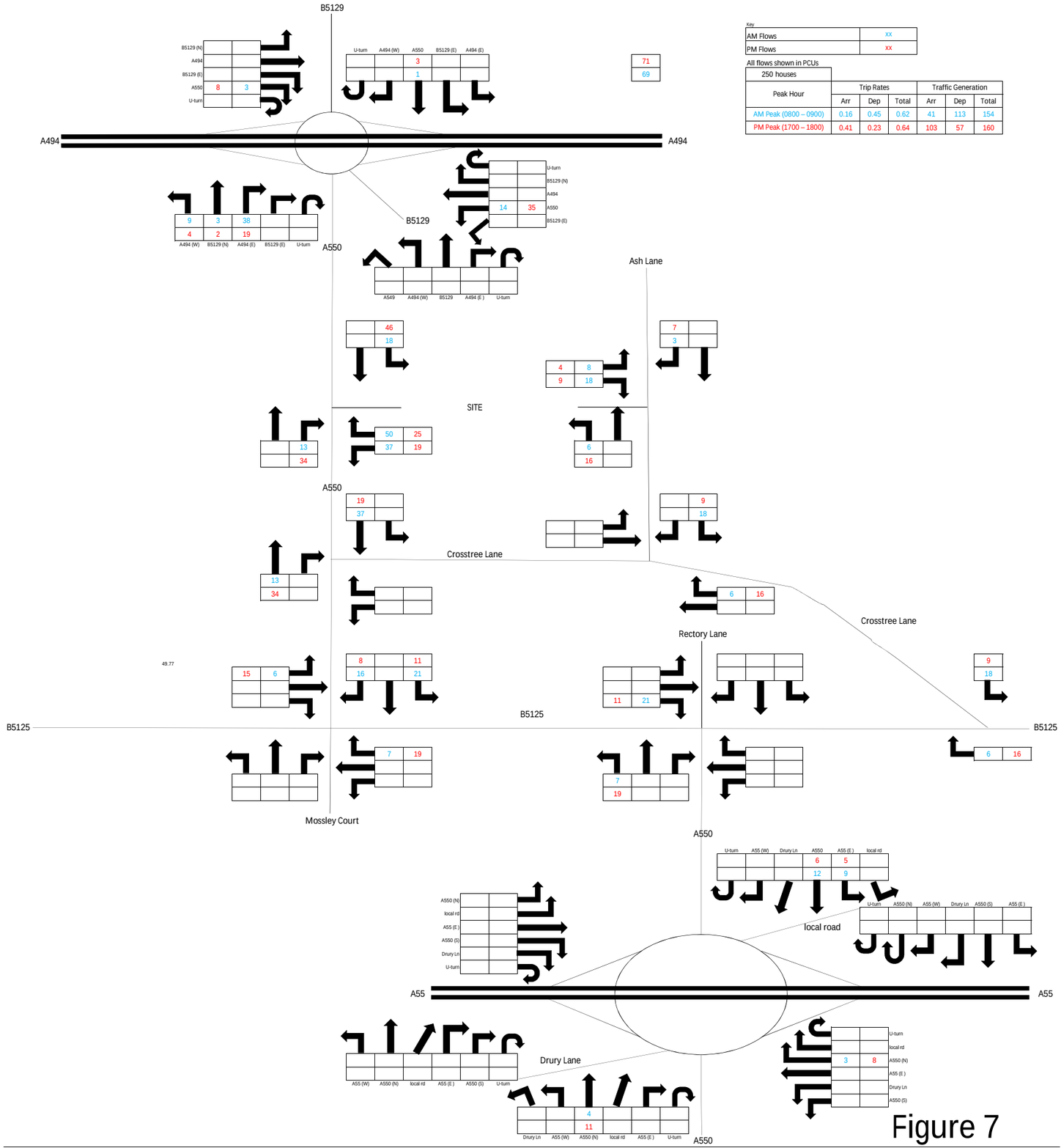


Figure 7

DEVELOPMENT TRAFFIC FLOWS

SWECO

Figure 8

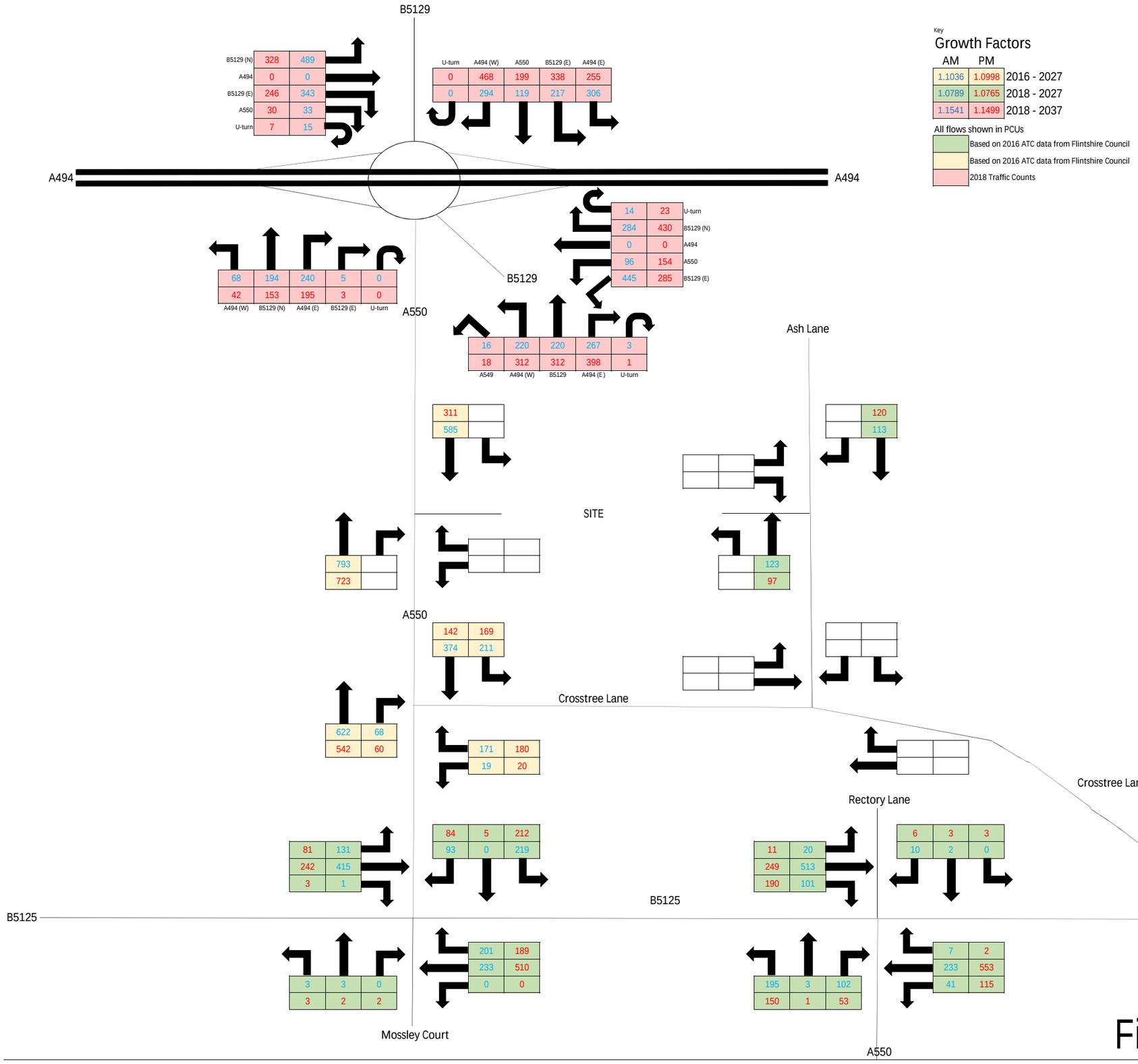
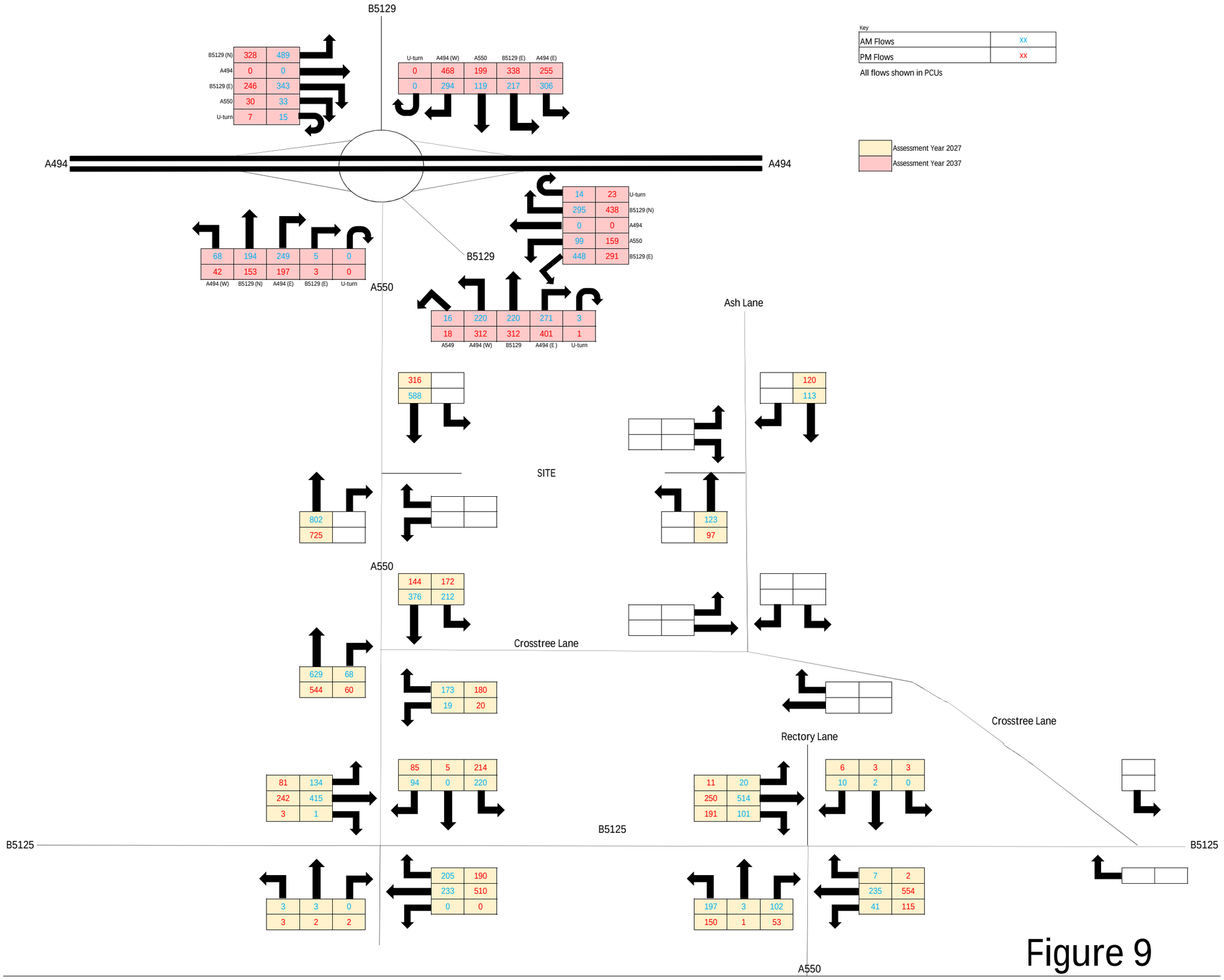


Figure 8

FUTURE YEAR BACKGROUND FLOWS

SWECO

Figure 9



Key

AM Flows	xx
PM Flows	xx

All flows shown in PCUs

Assessment Year 2027

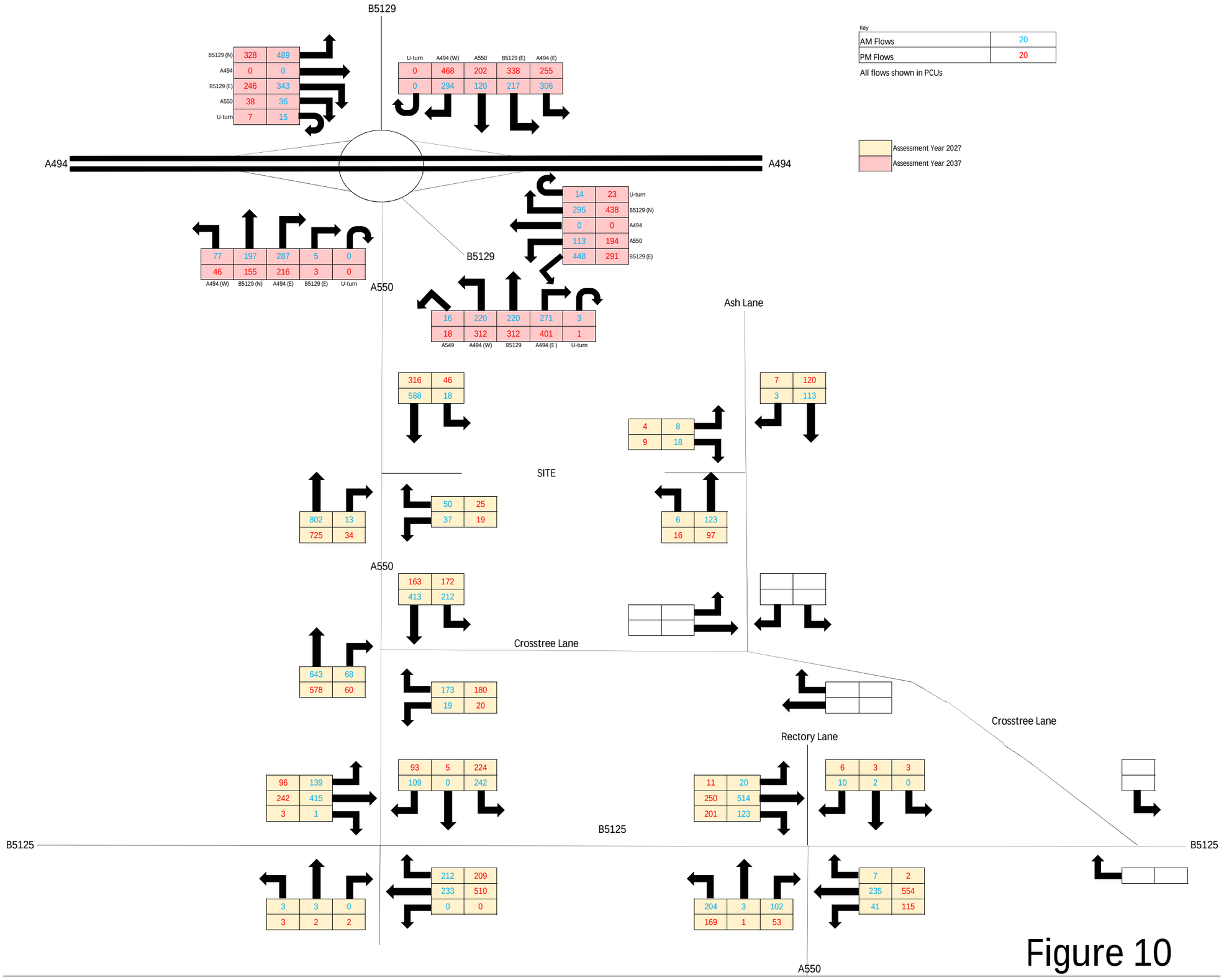
Assessment Year 2037

Figure 9

FUTURE YEAR BASE FLOWS

SWECO

Figure 10



Key

AM Flows	20
PM Flows	20

All flows shown in PCUs

Assessment Year 2027

Assessment Year 2037

Figure 10

FUTURE YEAR ASSESSMENT FLOWS

SWECO