

Highgate*Transportation*

Pagham South

**Proposed Residential Development and Community Hub
Pagham Road, Pagham**

**Transport Assessment
P/140/16/OUT**

TA/01/A

March 2017

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Contents	Page
1.0 Introduction	1
2.0 Transport Network	6
3.0 Traffic Survey Results and Existing Highway Condition	16
4.0 Local Services and Amenities	20
5.0 Proposed Development	21
6.0 Trip Generation and Distribution	27
7.0 Forecast Traffic Flows	42
8.0 Impact Appraisal – Local Highway Network	48
9.0 Impact Appraisal – Wider Highway Network	49
10.0 Travel Plan Measures	54
11.0 Transport Policy Background	55
12.0 Section 106 Heads	56
13.0 Summary and Conclusions	57

List of Figures

Figure 1.1	Pagham and Site Locations
Figure 1.2	Illustrative Masterplan Extract
Figure 1.3	The Pagham South Study Area
Figure 2.1	Site Location Plan
Figure 2.2	The Existing Site and Local Highway Network
Figure 2.3	Pagham Harbour Cycle Route Plan
Figure 2.4	Existing bus stops on Pagham Road
Figure 2.5	Location of Committed Developments and Local Plan Housing Sites within Pagham
Figure 3.1	2014 ATC Survey Location, Pagham Road South of Summer Lane
Figure 3.2	2016 ATC Survey Location, Pagham Road South of Sea Way
Figure 4.1	Illustrative Masterplan Extract
Figure 5.1	Proposed Northern Site Access Junction
Figure 5.2	Proposed Southern Site Access Junction
Figure 5.3	Link to Pagham Harbour Cycle Route
Figure 6.1	AM & PM Residential Peak Hour Distribution Diagram
Figure 6.2	AM & PM Retail Peak Hour Distribution Diagram
Figure 6.3	AM & PM Care Home Peak Hour Distribution Diagram
Figure 6.4	AM & PM Primary School Peak Hour Distribution Diagram
Figure 6.5	AM & PM Residential Peak Hour Traffic Movements
Figure 6.6	AM & PM Retail Peak Hour Traffic Movements
Figure 6.7	AM & PM Care Home Peak Hour Traffic Movements
Figure 6.8	AM & PM Primary School Peak Hour Traffic Movements
Figure 6.9	AM Development Traffic Turning Movement Diagram
Figure 6.10	PM Development Traffic Turning Movement Diagram
Figure 7.1	Committed Development P/58/15 Turning Movement Diagram (AM/PM peak hour)

Figure 7.2	Committed Development P/125/14 Turning Movement Diagram (AM/PM peak hour)
Figure 7.3	2022 Forecast Turning Movement Diagram (AM Peak Hour)
Figure 7.4	2022 Forecast Turning Movement Diagram (PM Peak Hour)
Figure 7.5	2022 Turning Movement Diagram for Pass-By Trips (AM peak hour)
Figure 7.6	2022 Turning Movement Diagram for Pass-By Trips (PM peak hour)
Figure 7.7	2022 Forecast Turning Movement Diagram (AM peak hour) with Development
Figure 7.8	2022 Forecast Turning Movement Diagram (PM peak hour) with Development

List of Appendices

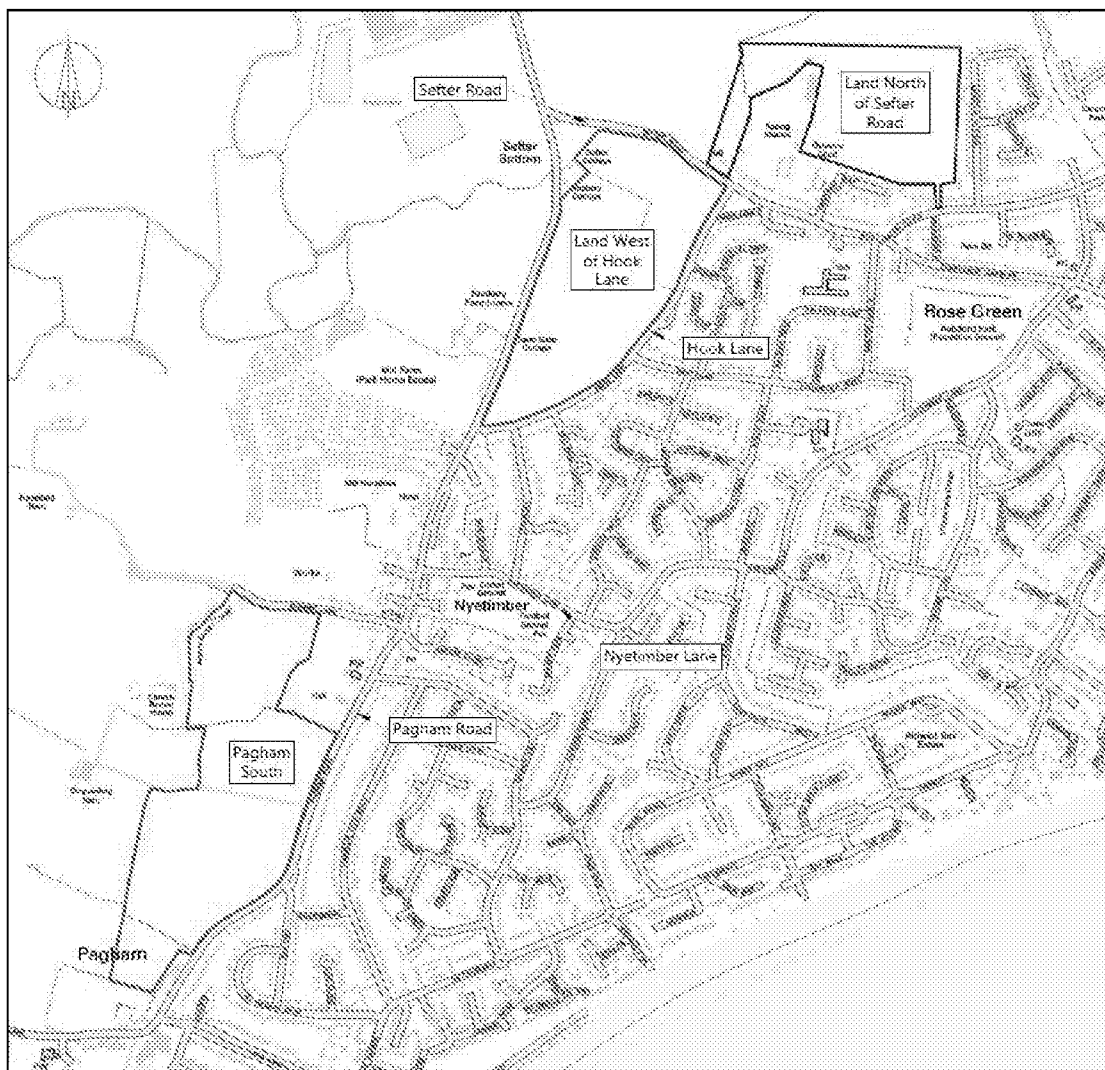
Appendix 1	WSCC Highways Consultation Response and HTP Response Note
Appendix 2	Illustrative Masterplan
Appendix 3	Highway Record Plans
Appendix 4	Pagham Harbour Cycle Route Plan
Appendix 5	Bus Route 600 Timetable and Route Map
Appendix 6	Accident Records
Appendix 7	Traffic Survey Results – Pagham Road along Site Frontage
Appendix 8	Traffic Survey Results – Wider Highway Network
Appendix 9	Traffic Survey Results – Turning Movement Diagrams
Appendix 10	Plan Showing Local Services and Amenities
Appendix 11	Walking Isochrone Mapping
Appendix 12	Cycling Isochrone Mapping
Appendix 13	Internal Movement Strategy and Access to Wider PRow Network Plans
Appendix 14	Plans of the Proposed Site Access Junctions with Pagham Road
Appendix 15	Stage 1 Road Safety Audit and Designer's Response
Appendix 16	Design Audit
Appendix 17	Swept Path Analysis of Site Access Junctions and Bus Layby Visibility
Appendix 18	Proposed Link to Pagham Harbour Cycle Route
Appendix 19	TRICS Information
Appendix 20	Census 2011 Data
Appendix 21	TEMPRO Data
Appendix 22	PICADY Outputs – Site Access Junctions
Appendix 23	Wider Area - Highway Network Peak Hour Distribution Diagrams
Appendix 24	Wider Area - Highway Network Traffic Turning Movement Diagrams
Appendix 25	Wider Area - Modelling Reports
Appendix 26	Residential Travel Plan

1.0 Introduction

- 1.1 Highgate Transportation Limited have been appointed by Hanbury (PM) Limited to prepare the Transport Assessment to support their planning application for residential development and creation of a community hub on land at Pagham South and which lies to the west of Pagham Road. The planning application (ref: P/140/16/OUT) is submitted in outline with all matters reserved except for access.
- 1.2 This report is Revision A of the original Transport Assessment (TA/01) submitted in December 2016, further to the consultation response from West Sussex County Council (WSCC) acting as Local Highway Authority (dated 27th January 2017). The WSCC highways consultation response and our responses are included in **Appendix 1** for reference.
- 1.3 TA/01 considered the development impact arising from the proposals at Pagham South. The second report (ATA/01), the Addendum Transport Assessment, took account of the cumulative impact arising if the residential development proposed at the two other Pagham sites identified in the emerging Arun Local Plan (Sefter Road and Hook Lane) come forward. The highway consultants for the three main sites have been working together to ensure that the same parameters are used in the various studies to support the sites, and this approach has been agreed with highway officers. The locations of the Pagham South, Sefter Road and Hook Lane sites are shown in **Figure 1.1** on page 2.
- 1.4 ATA/01 was updated in January to include for additional junction modelling and assessments years (ATA/02), and ATA/03 was provided to specifically focus on the traffic impact arising from all the proposed Pagham sites on the strategic road network and surrounding junctions.
- 1.5 The Pagham South proposal is to provide:
 - i. Up to 400 residential dwellings.
 - ii. A care home with up to 70 beds.
 - iii. A Local Centre comprising up to 2,000sqm GFA, with food sales limited to a 500sqm GFA convenience store.
 - iv. A single form entry primary school (210 pupils).
 - v. Other community uses – sports pitches and a Scout Hut.
 - vi. An area for allotments with up to 20 plots.
 - vii. Access to the development from two new junctions with Pagham Road and associated pedestrian facilities.
 - viii. The safeguarding of land to help link the existing cycle route between Pagham Harbour and Chichester with Pagham Road via the site.
- 1.6 Key changes from TA/01 are as follows:
 - i. Reconsidered the proposed junction arrangement; removal of the right turn lane for the southern access, the provision of an extension to the footways at the bellmouth of the access junctions and the provision of a supporting Design Audit.

- ii. Widening of all the proposed pedestrian refuge islands to 2.0m.
- iii. Revised approach for distributing and discounting the trip generation for the local centre traffic and update flow diagrams and modelling accordingly.
- iv. Revised approach to discounting primary school traffic and update flow diagrams and modelling accordingly.
- v. Remodelled the signalised junction at Rose Green Road/ Gossamer Lane/ Nyetimber Lane/ Grosvenor Gardens and provide the full LinSig modelling outputs.
- vi. Included modelling for the Rose Green Road/ Gossamer Lane/ Carlton Avenue junction.
- vii. Provision of an updated Residential Travel Plan, with more detail on travel vouchers and trip rate targets.
- viii. Consideration of the likely highway-related Section 106 contributions.

Figure 1.1 – Pagham and site locations



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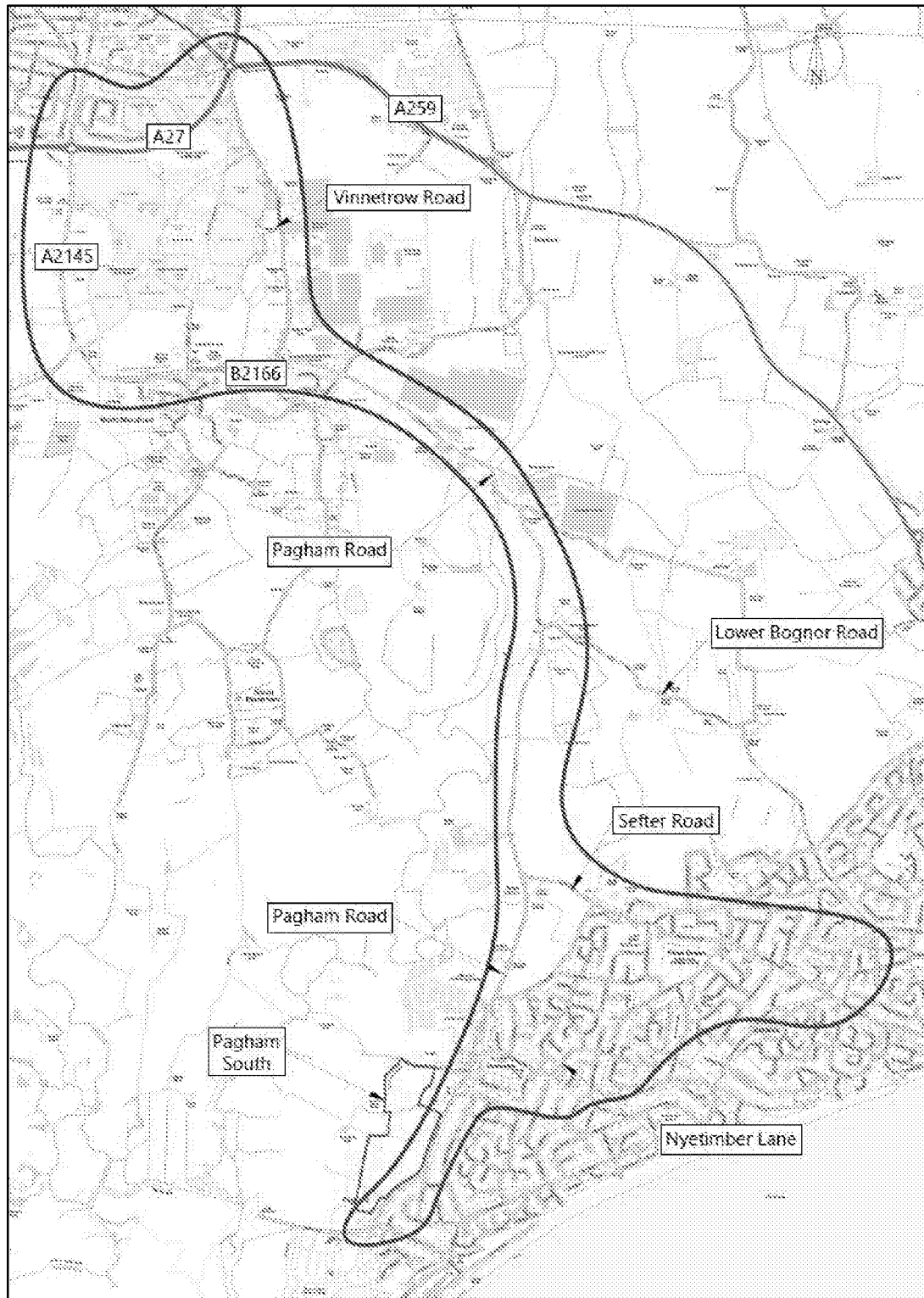
- 1.7 An illustrative masterplan has been prepared and subsequently updated to illustrate additional cycle routes and links between the committed development site on land north of Summer Lane. One of the guiding principles has been to ensure that the development has an appropriate level of connectivity between the proposed and the adjacent uses. The internal layout follows the guidance set out in Manual for Streets to ensure a development that encourages walking and cycling. The masterplan confirms that one of the proposed access locations is to the south of Summer Lane and the other to the south of Sea Way. The illustrative masterplan is contained in **Appendix 2** and an extract is shown below in **Figure 1.2**.

Figure 1.2 – Illustrative masterplan extract



- 1.8 Pre-application and post application discussions have taken place with highway officers at WSCC and at Highways England to agree the scope of and amendments to the assessment for Pagham South, including the study area which is shown in **Figure 1.3** below.

Figure 1.3 - The Pagham South study area



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1.9 The purpose of this study is to:

- i. Confirm that the proposed site accesses can be provided with sufficient junction visibility and capacity and that they are suitable for all users.
- ii. Show that the proposed development is permeable and has good connectivity with the surrounding transport network.
- iii. Assess the impact of the proposed development at Pagham South on the wider highway network.
- iv. Confirm the Travel Plan measures that will support the proposed development.
- v. Identify if other mitigation measures are required as a result of development at Pagham South.

1.10 This Transport Assessment concludes that there are no transport related reasons why the development at Pagham South should be refused planning permission.

2.0 Transport Network

Highway Network

2.1 From the Chichester Bypass (A27T) to the north, Pagham is served by the B2145 and the B2166 (Pagham Road). The B2166 also provides access to Bognor Regis (via Lower Bognor Road), which is accessed from the site via Nyetimber Lane or Hook Lane and Sefter Road, into Aldwick Road. To the north and east of Bognor, the area is served by the A249 and the A29. Pagham Road links the B2166 to the north with the harbour to the south.

2.2 **Figure 2.1** below is a plan of the site location within the wider highway network.

Figure 2.1 – Site location plan



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- 2.3 Opposite the site, Pagham Road is residential in character with accesses to individual properties and a 2.0 metre wide footway, reducing to around 1.5 metres south of the junction with Sea Way. It is 7.3 metres wide, lit and subject to a 30mph speed restriction.
- 2.4 There is also widening of the carriageway to allow on street car parking on Pagham Road opposite the site, to the north of the junction with Sea Way. The photographs below provide views of Pagham Road in the vicinity of the proposed site access junctions.

Photograph 1 – view north on Pagham Road, from proposed northern site access location



Photograph 2 – view south on Pagham Road, from proposed northern site access location



Photograph 3 – view north on Pagham Road, towards the junction with Sea Way



Photograph 4 – view south on Pagham Road, looking towards the proposed southern access from the opposite side of the road



2.5 Summer Lane is a narrow cul-de-sac providing access to a small number of existing residential properties. As part of the recent planning consent on land to the north, modifications to Summer Lane at its junction with Pagham Road are proposed in order to accommodate an additional 90 dwellings.

2.6 Traffic survey results and existing highway conditions within Pagham and beyond are considered in detail in **Section 3.0**.

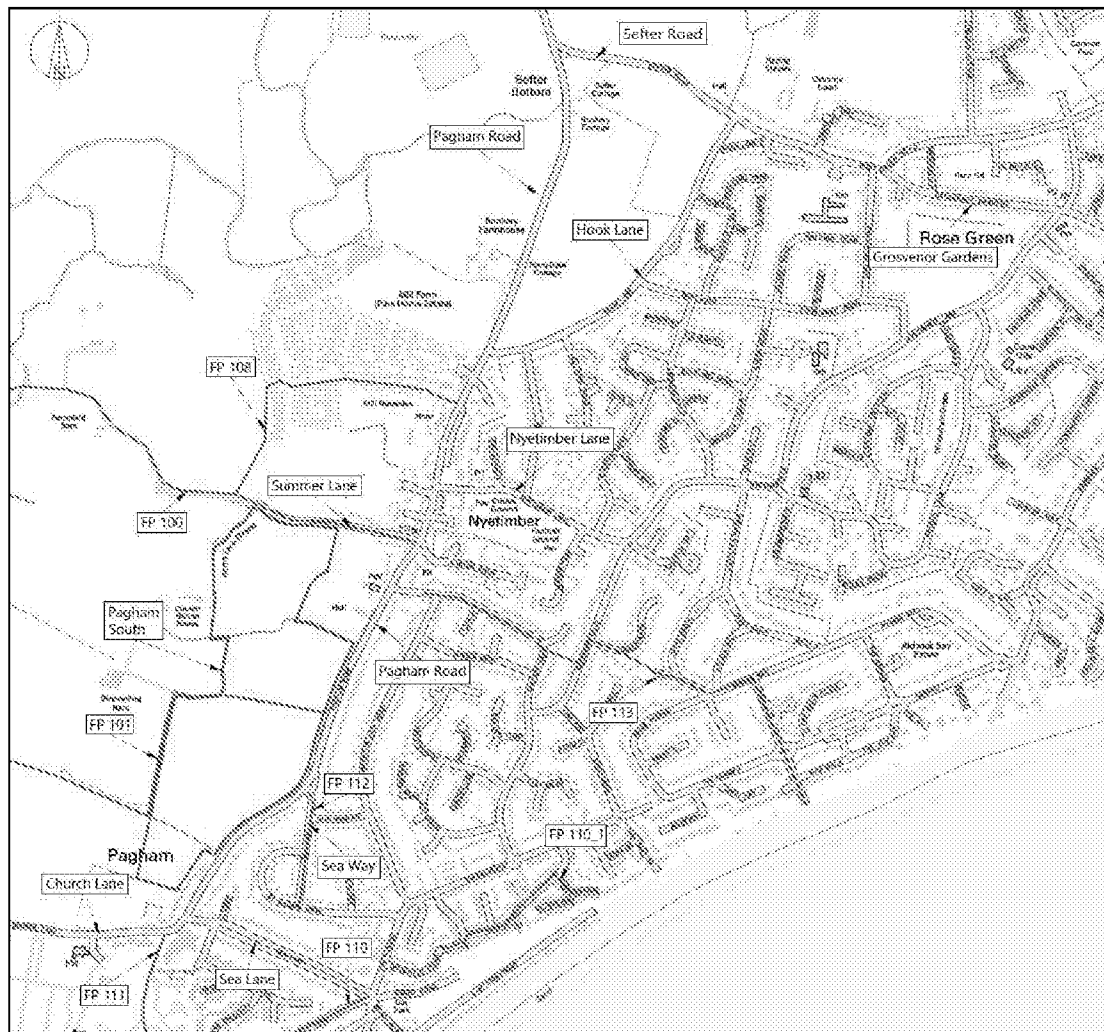
Pedestrian and cycle facilities

2.7 Summer Lane also forms Public Right of Way (PRoW) FP 100 which connects to FP 108 to the north and to the south is FP101, which bisects the application site and has an access point with Pagham Road.

2.8 Because of the extensive provision of the local pedestrian network, this location is considered to be well connected by existing footways to the wider Pagham area and beyond. Proximity to local services and amenities is considered in detail in **Section 4.0**.

2.9 **Appendix 3** contains a copy of the highway records, including the PRoW in the vicinity of the site. **Figure 2.2** below shows the Pagham South site in the context of the local highway network including the existing PRoW.

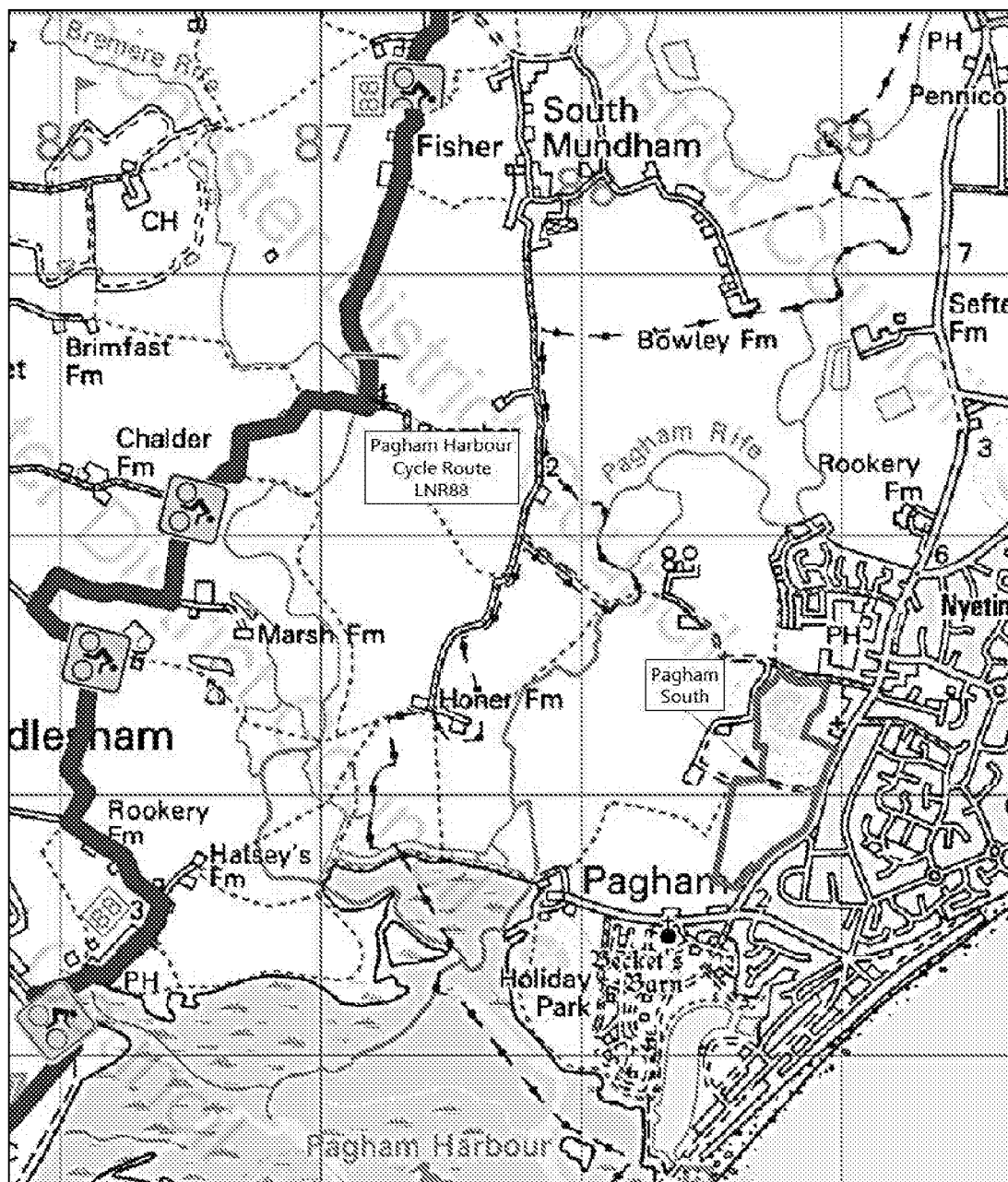
Figure 2.2 – Pagham South and local highway network



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- 2.10 Whilst there are no dedicated cycle facilities in Pagham, the roads are lit, generally of a flat gradient and subject to a 30mph speed limit, which would encourage cycling within the village and out towards Bognor Regis.
- 2.11 In terms of cycling from Pagham towards Chichester the route is currently on-road and generally unlit between the Hook Road junction with Pagham Road and the A27 (7.0 km) with various speed limits. However, the Pagham Harbour cycle route, which is classified as LNR 88, links Pagham Harbour with Chichester via North Mundham and provides an alternative to the B2145 and B2166 route which is also narrow in places. It is located approximately 1.2 kilometres from the Pagham South site.
- 2.12 The Pagham Harbour Cycle Route plan is contained in **Appendix 4** and an extract also showing the location of the Pagham South site forms **Figure 2.3** below.

Figure 2.3 – Pagham Harbour Cycle Route extract



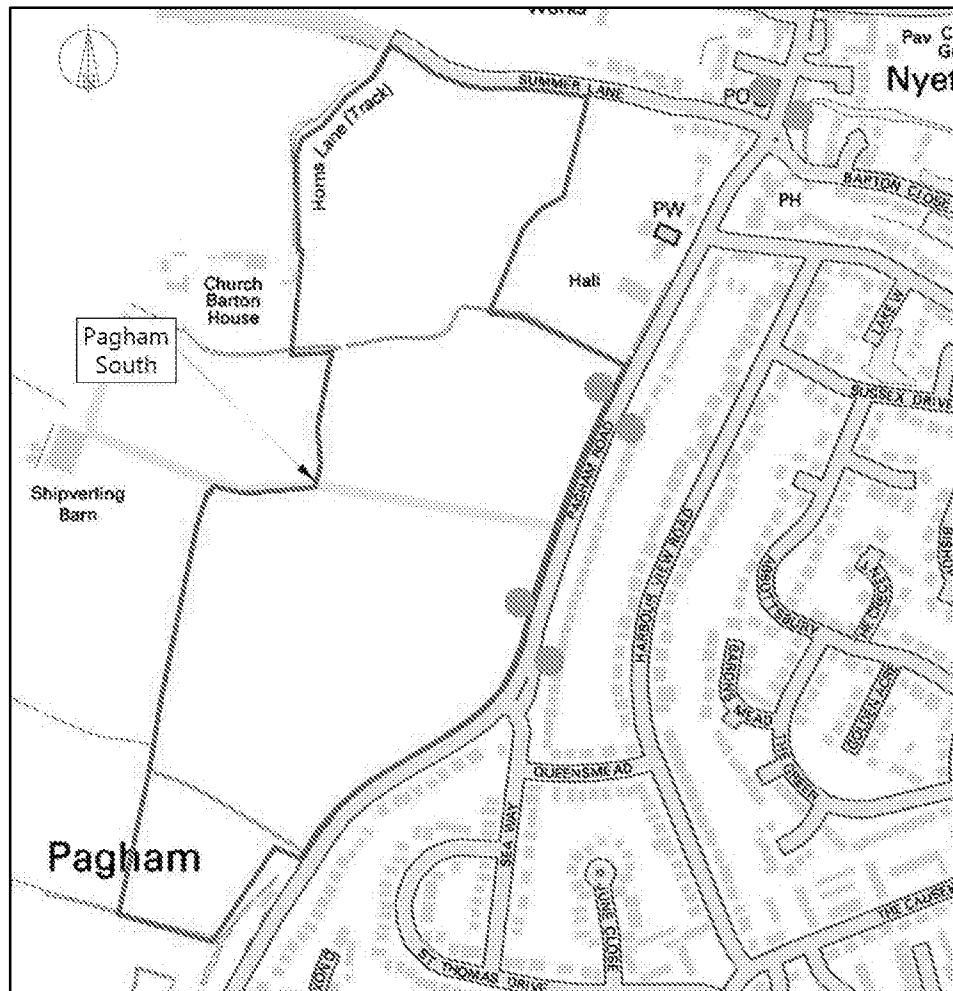
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Public Transport Network

- 2.13 Pagham Road is a bus route with existing bus stops close to the junction with Summer Lane as well as south of the Village Hall and north of the junction with Sea Way, as shown on **Figure 2.4** below. These bus stops are served by route number 600, operated by Stagecoach as a new, comprehensive and high quality service between Chichester and Bognor Regis. A route plan and timetables are contained in **Appendix 5**. Service 600 operates from early morning into the evening at 20 minute intervals Monday to Saturday, with an hourly service after 1900 hours. It also operates as an hourly service on Sundays.

- 2.14 Bus route 600 also provides access to Chichester rail station, which includes direct services to a number of locations including London, Gatwick, Brighton, Portsmouth and Southampton. There is also a rail station at Bognor Regis, which is within easy cycling distance of the application site.

Figure 2.4 – Existing bus stops on Pagham Road in the vicinity of the site frontage (shown blue):



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- 2.15 It is therefore reasonable to include that the site is already well served by public transport.
- 2.16 In summary, it is considered that the location of the development would give future residents a realistic choice of travel mode for all journeys, reducing reliance on the private car.

Accident Records

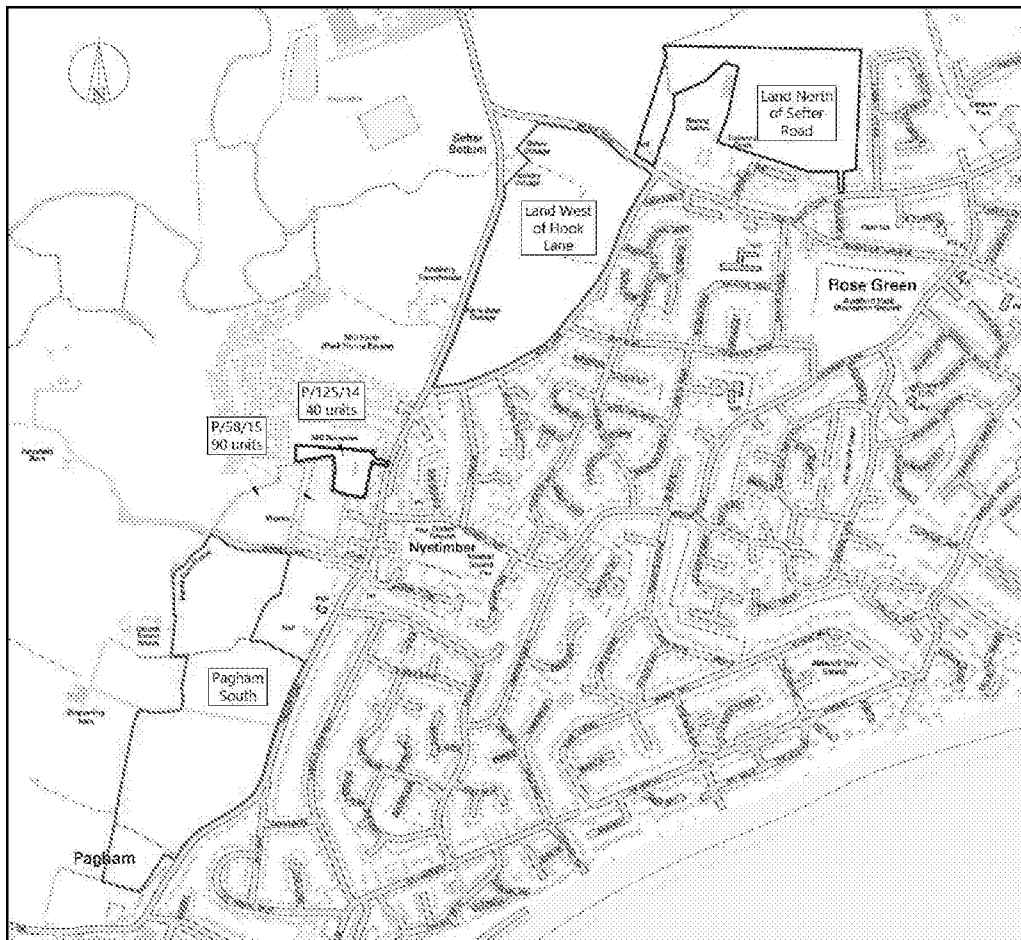
- 2.17 **Appendix 6** contains a copy of the accident records, which have been obtained for the whole study area for the latest five year period available (July 2011 – June 2016). This shows that there were 173 collisions recorded (with 223 casualties), 83% of which were slight and only one accident (2011) was recorded as a fatal (1 casualty). A further summary is provided as follows:
- i. Of the 173 collisions, 72% occurred at a junction (70% at a Give Way arrangement).
 - ii. 7% of collisions involved pedestrians.
 - iii. The weather was recorded as 'fine' in 87% of collisions.
 - iv. 81% of collisions occurred during daylight hours.
 - v. 12% of casualties were pedal cyclists.
- 2.18 No vehicle collisions have been recorded along the site frontage on Pagham Road.
- 2.19 The fatal accident occurred on the A27 approximately 125 metres west of the roundabout junction with the B2145 in December 2011 during the hours of darkness, when a vehicle travelling westbound hit a pedestrian crossing the dual carriageway. The report states that the pedestrian was impaired by alcohol and wearing dark clothes.
- 2.20 Two collisions occurred at the junction of Nyetimber Lane and Pagham Road, one serious and one slight, both involving pedestrians.
- 2.21 Two collisions occurred at the junction of Hook Lane and Pagham Road, both recorded as slight; one when a northbound vehicle collided with the rear of a stationary vehicle waiting to turn right into Hook Lane, and one when a vehicle turned right into Hook Lane into the path of a southbound vehicle.
- 2.22 Two collisions occurred at the junction of Hook Lane with Sefter Road, one recorded as slight when a vehicle turned right out of Hook Lane onto Sefter Road into the path of an oncoming vehicle, and the other was serious where the driver of a car experienced a medical episode at the wheel and lost control of the vehicle.
- 2.23 One collision was recorded at the junction of Sefter Road with Pagham Road, which was slight and involved a vehicle loss of control following a failure to stop for a police car.
- 2.24 Four collisions have been recorded at the junction of Sefter Road with Rose Green; three slight collisions (one medical episode) and one serious collision involving a pedestrian, when a young child ran into the road from between parked vehicles.
- 2.25 Three (slight) collisions have been recorded at the junction of Nyetimber Lane with Gossamer Lane, one involving a pedestrian who walked out into the road into an oncoming car.

- 2.26 Eight collisions occurred on the roundabout junction of Gossamer Lane with Aldwick Street, three of which were recorded as serious. The majority of collisions recorded at this roundabout junction involved a vehicle hitting a pedal cyclist.
- 2.27 Three collisions occurred at the junction of Aldwick Road and Lower Bognor Road, one recorded as serious, and all involved a pedal cyclist. It is recognised that there may be an issue with awareness of pedal cycles at this roundabout junction and that of Aldwick Street with Aldwick Road to the southwest.
- 2.28 Six collisions occurred at or near the Lower Bognor Road junction with Pagham Road generally through loss of control type incidents; one of which was recorded as serious resulting from a head-on collision. One of the slight injury accidents was as a result of a medical episode and one involved a pedal cyclist.
- 2.29 Twelve collisions were recorded on Pagham Road (B2166) near Runcton and were related to right-turning vehicle manoeuvres at side roads/accesses or loss of control type collisions.
- 2.30 Five (slight) collisions occurred at the Pagham Road junction with Vinnetrow Road resulting from misjudged vehicle speeds and paths, one of which involved a pedal cycle.
- 2.31 Two collisions have been recorded at the junction of the B2166 with the B2145, one of which was serious and involved a motorcycle stationary at the roundabout hit by a vehicle from behind. A further eight accidents were recorded on the B2145 between the B2166 and the A27, three of which was recorded as serious and three involved pedestrians.
- 2.32 The accidents occurring on the A27 will be analysed further in the Addendum TA.
- 2.33 It is considered that the accident record detailed above is typical for this type of highway network during a five year period, and that generally no patterns highlighting an accident black-spot or underlying road safety issue are evident. It is noted in **paragraphs 2.26** and **2.27** that there may be an issue with awareness of pedal cyclists at some junctions. This may require education and advertising to tackle the road safety issue, rather than hard engineering measures.
- 2.34 Therefore, it is considered that the proposed development at Pagham South should not be refused on the grounds of road safety within the wider highway network.

Committed Development

- 2.35 Planning approval was recently obtained for the following developments in Pagham, which are shown on **Figure 2.5**:
- i. P/58/15 – Land at Summer Lane (90 residential units).
 - ii. P/125/14 – 251 Pagham Road (42 residential units).

Figure 2.4 – Location of committed developments and other Local Plan housing sites within Pagham



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Other Local Plan Housing Sites in Pagham

- 2.36 There are two other housing sites within Pagham identified in the emerging Local Plan which are Hook Lane and Sefton Road and are also shown in **Figure 2.5**. Both sites and their cumulative impact are assessed in the Addendum Transport Assessments as discussed in **paragraphs 1.3 and 1.4**.

A27 (T) - Chichester Bypass

- 2.37 It has been agreed that the two junctions on the A27 bypass likely to be used directly by Pagham South development traffic are the B2145 Whyke junction directly north of the site and the A259 Bognor Road junction to the east of this.
- 2.38 At present Highways England are in the process of developing improvement schemes for this section of the A27, but at this stage there are no specific proposals approved or funding allocated. Therefore it has been agreed that the two A27 schemes approved within the Chichester Local Plan are to be used for assessment purposes on the A27 Whyke and Bognor Road junctions.

3.0 Traffic Survey Results and Existing Highway Conditions

Traffic Survey Results - Pagham Road along the Site Frontage

- 3.1 An automatic traffic survey was carried out on Pagham Road to the south of Summer Lane in June 2014 and this showed peak hour weekday two-way traffic flows of around 450 vehicles and 85th percentile speeds of around 33mph. **Table 3.1** below summarises the survey results and the ATC survey location is shown indicatively on **Figure 3.1** for ease of reference.

Table 3.1 – ATC survey results at Pagham Road south of Summer Lane

	0800-0900 (vehicle flow)	1700-1800 (vehicle flow)	85 th Percentile Speeds
Northbound	258	182	33mph
Southbound	159	346	33mph
Two-way Total	417	528	-

Figure 3.1 – 2014 ATC survey location, Pagham Road south of Summer Lane

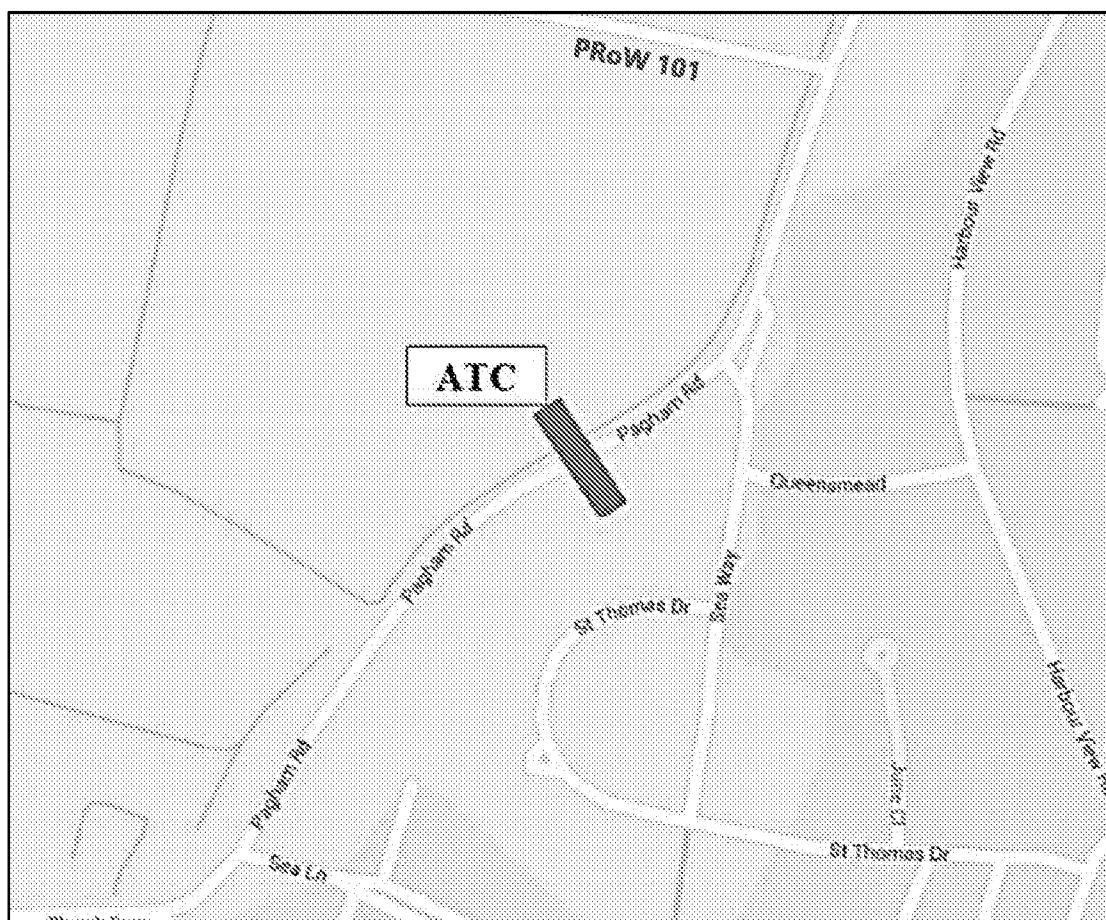


- 3.2 In addition, an automatic traffic survey was carried out on Pagham Road to the south of Sea Way in June 2016 and this also showed peak hour weekday two-way traffic flows of around 450 vehicles and 85th percentile speeds of around 33mph. **Table 3.2** below summarises the survey results and the location is illustrated in **Figure 3.2**.

Table 3.2 – ATC survey results at Pagham Road south of Sea Way

	0800-0900 (vehicle flow)	1700-1800 (vehicle flow)	85 th Percentile Speeds
Northbound	218	243	33mph
Southbound	159	282	33mph
Two-way Total	377	525	-

Figure 3.2 – 2016 ATC survey location, Pagham Road south of Sea Way



3.3 The results of these surveys are contained in **Appendix 7**.

Traffic Survey Results – The Wider Study Area

3.4 Traffic conditions are typically free flowing on the wider highway network with congestion sometimes occurring within the peak periods at the A27 Chichester Bypass junctions and within Bognor Regis.

3.5 As part of the scoping discussions with officers it was agreed to have peak period turning count surveys carried out at the following junctions:

- i. Pagham Road j/w Nyetimber Lane.

- ii. Pagham Road j/w Hook Lane.
- iii. Pagham Road j/w Sefter Road.
- iv. Sefter Road j/w Hook Lane.
- v. Nyetimber Lane j/w Gossamer Lane/Gossamer Gardens.
- vi. Gossamer Lane j/w Aldwick Road/Barrack Lane.
- vii. Aldwick Road j/w B2166 Lower Bognor Road.
- viii. B2166 Lower Bognor Road j/w Pagham Road.
- ix. B2166 j/w Vinnetrow Road.
- x. B2166 j/w B2145.
- xi. A27 j/w B2145.
- xii. A27 j/w Vinnetrow Road/Bognor Road.
- xiii. Nyetimber Lane j/w Tabard Gate/Cardinal's Lane.

3.6 This study area is shown on **Figure 1.3** above (see **Section 1.0**).

3.7 The surveys were carried out in July 2016 and the results of the AM and PM peak hour flows are summarised in **Table 3.3** below. The survey data is contained in **Appendix 8** for reference and peak hour turning movement diagrams for each of the 13 junctions are contained in **Appendix 9**.

Table 3.3 – Traffic flow data within the study area (2016)

Road	Peak Hour Two-Way Flow			
	AM 0800-0900		PM 1700-1800	
	Total 2-Way Flow	HGV & PSV	Total 2-Way Flow	HGV & PSV
Pagham Road south of Nyetimber Lane	401	27	952	22
Nyetimber Lane west	136	5	278	1
Pagham Road north of Nyetimber Lane	439	28	910	21
Pagham Road south of Hook Lane	510	23	694	22
Hook Lane west	309	7	361	5
Pagham Road north of Hook Lane	401	16	433	16
Pagham Road south of Sefter Road	401	16	433	17
Sefter Road	332	9	432	9
Pagham Road north of Sefter Road	717	23	839	26
Sefter Road west of Hook Lane	332	8	432	14
Hook Lane east	334	6	437	11
Sefter Road east of Hook Lane	622	12	799	15
Gossamer Lane north	737	22	796	19
Nyetimber Lane east	631	29	607	19
Grosvenor Gardens	394	5	514	8
Rose Green Road (eastbound only)	218	5	167	4
Gossamer Lane south	877	24	966	22
Aldwick Road west	553	29	604	20
Aldwick Street	569	18	695	13
Barrack Lane	307	15	301	7

Table 3.3 Continued

Road	Peak Hour Two-Way Flow			
	AM 0800-0900		AM 0800-0900	
	Total 2-Way Flow	Total 2-Way Flow	Total 2-Way Flow	Total 2-Way Flow
Pagham Road south of Lower Bognor Road	707	21	799	22
Lower Bognor Road	546	6	711	6
Pagham Road north of Lower Bognor Road	1,249	27	1,502	26
B2166 Lagness Road east of Vinnetrow Road	1,361	60	1,502	37
Vinnetrow Road	591	27	610	18
B2166 Lagness Road west of Vinnetrow Road	1,310	52	1,371	43
Mill Lane	78	1	69	0
Junctions:				
Aldwick Road j/w Lower Bognor Road	932	32	1,097	24
B2166 j/w B2145	2,072	99	2,105	57
B2145 j/w A27 - Whyke Roundabout	4,224	431	4,304	187
Bognor Road j/w A27 - Bognor Road Roundabout	4,285	311	4,521	189

Existing Highway Conditions

- 3.8 From the above surveys and from observation, existing local highway conditions close to the site can generally be described as not busy during traditional highway network peak times, but get busier further away from the site.

4.0 Local Services and Amenities

- 4.1 A range of services and amenities are found close to the application site and these are set out in **Table 4.1** below and shown in the plan that forms **Appendix 10**.

Table 4.1 – Services and amenities

Amenities/Facilities	Distance
The Village Pre-School	280m
Pagham Village Hall	280m
Pagham United Reformed Church	340m
The Lamb Inn	450m
Crown Racing (bookmakers), Post Office, Nyetimber Stores (newsagents)	500m
Indian and Chinese Takeaway	530m
The Bear Inn	550m
Tesco Express, Hair Salon, Tea Shop	610m
The Lion	620m
Pagham Cricket Club	630m
The Co-operative food, Dentist, Barber, Cafe	650m
Inglenook Hotel	680m
Pagham Football Club	700m
Fish and Chip Cafe	900m
Rose Green Primary Schools	1.9km
Craigweil News (newsagents), Hair Studio, Beauty Salon	2.4km
The Southern Co-Operative, Florists	2.5km
The Co-operative food, Lloyds Pharmacy, Rose Green Post Office	2.5km
Vaaru Cycles	4.7km
Bognor Regis Rail Station	5.9km
Chichester Rail Station	9.8km

- 4.2 It can be seen from **Table 4.1** that there is a wide range of services and amenities within walking and cycling distance of the application site, including the village hall, and that Pagham is well served by a range of facilities including a variety of small shops, primary schools, leisure and sports facilities and post offices.
- 4.3 Walking and cycling isochrones for Pagham South are provided in **Appendix 11** and **Appendix 12** respectively.
- 4.4 From this it can be concluded that the site is well served by local services and amenities, which can be accessed by walking, cycling and through public transport (see **paragraphs 2.7 to 2.16**).

5.0 Proposed Development and Access Strategy

- 5.1 For the purposes of this Transport Assessment study the proposed development and access strategy at Pagham South is assumed to comprise:
- i. 400 residential dwellings.
 - ii. A care home with 70 beds which will form the remainder of the retirement village.
 - iii. A Local Centre comprising 2,000sqm GFA with food sales limited to a 500sqm GFA convenience store. The other local centre uses are typically expected to include a doctor's surgery, a day nursery, a restaurant/café and other small retail units. However, as the small retail units are most likely to give the highest trip rates during the traditional highway network peak hours, the remaining 1,500sqm will be assumed to be small retail units (A1, A2, A3) for the purpose of the transport assessment work.
 - iv. A single form entry primary school (210 pupils).
 - v. Other community uses – one sports pitch and Scout Hut.
 - vi. An area for allotments with 20 plots.
 - vii. Access to the development from two new priority junctions with Pagham Road that includes a right turn lane and associated pedestrian refuges.
 - viii. The safeguarding of land to help link the existing cycle route between Pagham Harbour and Chichester with Pagham Road via the site.
 - ix. An access strategy that is a Manual for Streets based development which includes a high level of permeability through the site for pedestrians and cyclists and good connections to the existing footway and PRoW network as well as an internal layout that encourages walking and cycling.
 - x. An access strategy that also includes a local centre, primary school and other facilities as part the proposals to encourage walking and cycling trips from within the development and from the adjacent residential area.
- 5.2 The proposed northern site access junction is located to the south of Summer Lane and will provide vehicular access to the land to the north of footpath 101. It is assumed to serve 170 dwellings including the 40 dwellings that will form part of the retirement village, the 70 bed care home, the local centre, the primary school and the sports pitch.
- 5.3 The proposed southern site access junction is located to the south of Sea Way and will provide vehicular access to the land south of footpath 101. It is assumed to serve 230 dwellings, the scout hut and the allotments.
- 5.4 It should be noted that apart for pedestrian, cycle and emergency access there will be no vehicular access from the development to footpath 101.
- 5.5 The planning application is submitted in outline with all matters reserved except for access. The illustrative masterplan forms **Appendix 2** and for ease of reference **Figure 1.2** is repeated below. The internal movement strategy is set out further on the plan contained in **Appendix 13**, along with a plan demonstrating access from the site to the wider PRoW network.

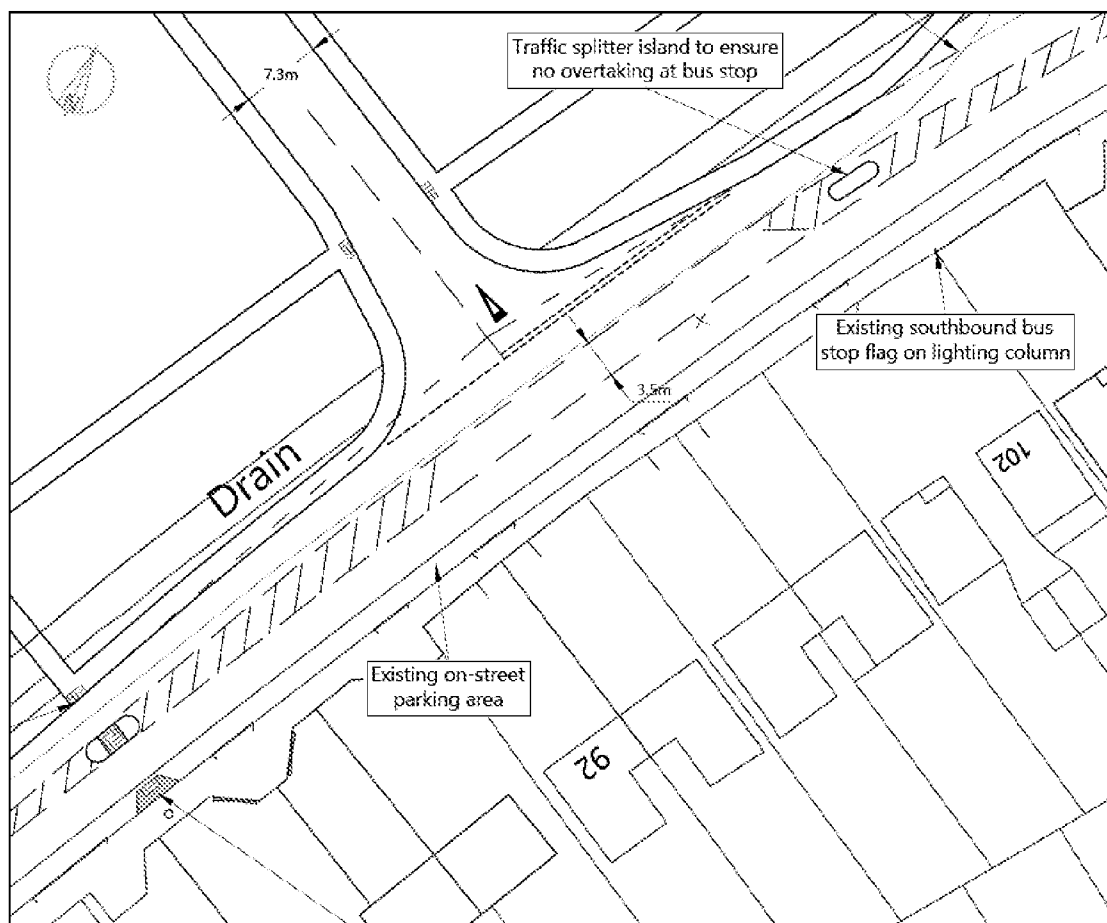
Figure 1.2 – Illustrative masterplan extract



- 5.6 From this it can be seen that the internal layout follows the guidance set out in Manual for Streets to ensure a development that encourages walking and cycling.
- 5.7 One of the guiding principles during its preparation of the masterplan has been to ensure that the development has an appropriate level of connectivity between the proposed and the adjacent uses and this is evident from the layout.

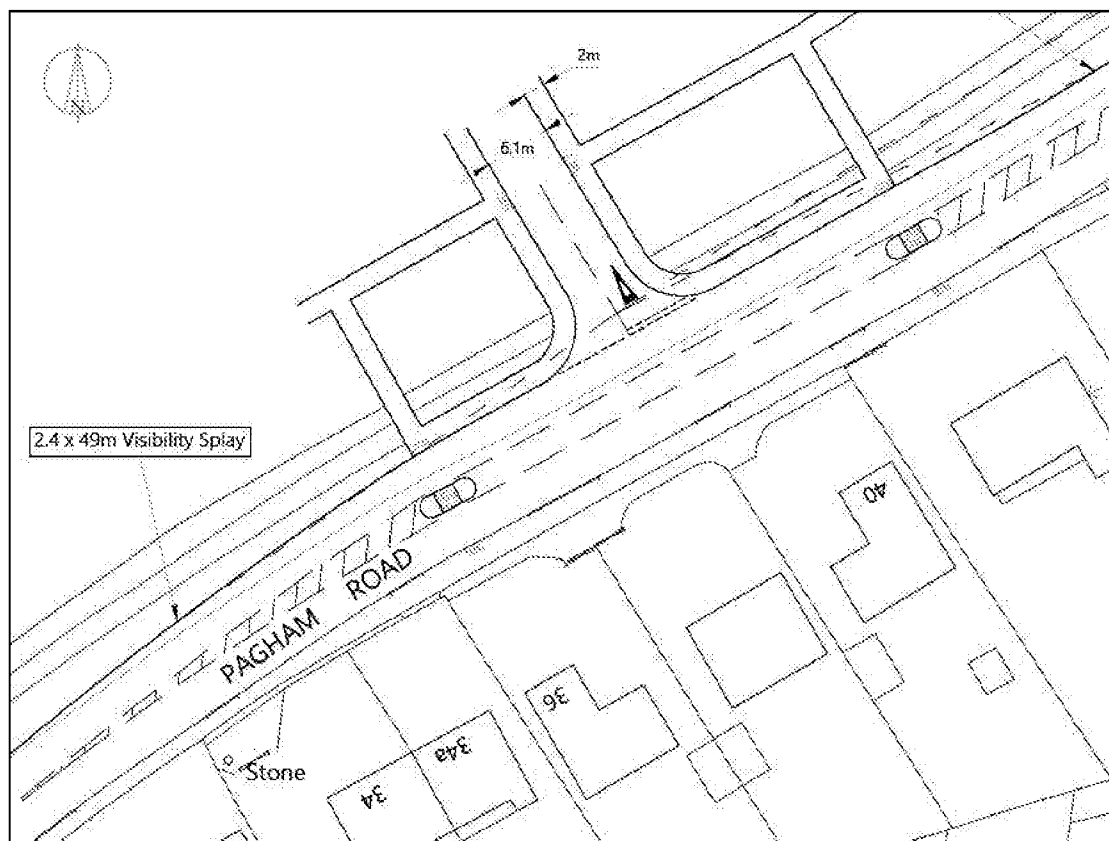
- 5.8 It can be seen from the above that links for non-motorised users have been provided to the permitted development on land north of Summer Lane, which are conveniently located and provide direct access to the proposed school and local centre. Furthermore, a cycle link has also been proposed to the Scout Hut, to the south of the site.
- 5.9 It is acknowledged from WSCC consultation response that a form of traffic management would be required on the access road to the school, given its straight alignment. It is considered that this can be addressed as part of the reserved matters application(s) once the siting of the school has been confirmed.
- 5.10 **Appendix 14** contains plans showing the layout of the proposed site access junctions with Pagham Road and the associated pedestrian facilities and **Figures 5.1** and **5.2** show extracts below.

Figure 5.1 – Proposed northern site access junction



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Figure 5.2 – Proposed southern site access junction



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5.11 The access junctions have evolved from the original designs through the public consultation process, Road Safety Audit and discussions with WSCC, and can be summarised as:

i. Pagham Road (North) – HTp/1616/01/H

This priority junction has been designed with a ghost island right turn lane and to accommodate the HGV manoeuvres that would be associated with a convenience store.

The site access road is provided with a width of 7.3 metres and two 2.0 metre footways. From this plan (**Appendix 14**) it can be seen that based on the measured speeds of 33mph as set out in **Table 3.1**, a visibility splay of 2.4 metres by 49 metres can be achieved, but also that visibility splays in excess of this could be achieved if required. This level of visibility has been agreed with the highway officer.

A proposed 2.0 metre wide pedestrian refuge island is also shown in **Figure 5.1** to the south of the site access road, with a proposed build-out within the parking area to facilitate both existing pedestrian movements to Footpath 101 and new movements safely.

A dropped kerb crossing point with tactile paving is also shown on the full plan contained in **Appendix 14** to the north of the site access and relocated bus stop, to assist pedestrian desire lines to the north in the vicinity of the Village Hall.

ii. Pagham Road (South) – HTp/1616/02/H

This priority junction has been designed to accommodate pedestrian desire lines, with two 2.0 metre wide pedestrian refuge islands. The site access road is provided with a width of 6.1 metres and two 2.0 metre footways.

From this plan (**Appendix 14**) it can be seen that based on the measured speeds of 33mph, as set out in **Table 3.2**, a visibility splay of 2.4 metres by 49 metres can be achieved, but also that visibility splays in excess of this could be achieved if required. As set out above, this level of visibility has also been agreed with the highway officer.

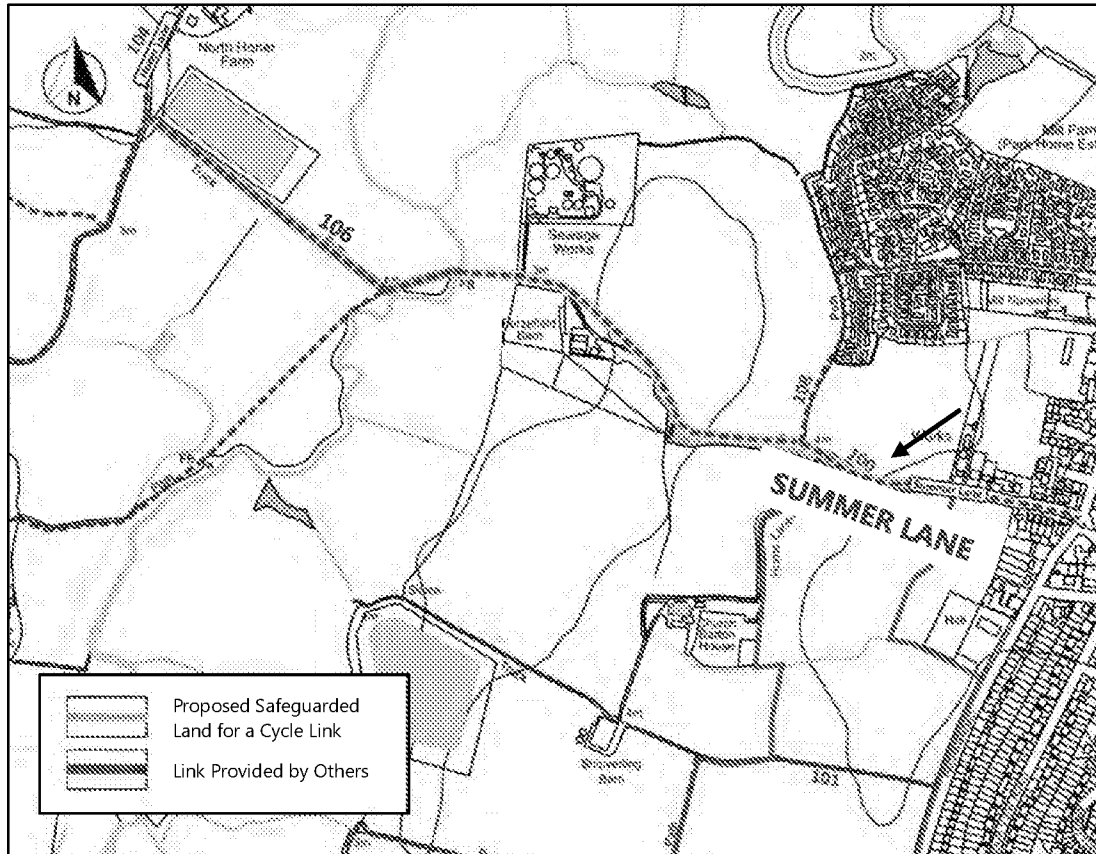
iii. The plans contained in **Appendix 14** also show pedestrian linkages from the site to the local bus stops.

- 5.12 The proposed site access junctions have been the subject of an independent Stage 1 Road Safety Audit, and this is contained in **Appendix 15** together with the designer's response. This has informed the design of the access junctions contained in **Appendix 14**, and the location and form of pedestrian facilities to be provided.
- 5.13 A Design Audit is contained in **Appendix 16** that references relevant design guidance and sets out the design evolution and reasoning behind the design of the access junctions.
- 5.14 **Appendix 17** contains the swept path analysis of site access junctions including the modified bus layby at the northern junction. A further visibility splay plan (HTp/1616/10) is also contained in **Appendix 17**, which demonstrates that even with a bus parked in the bus layby adjacent to the northern access a 90 metre visibility splay can still be achieved.
- 5.15 Therefore it can be concluded that the proposed site access junctions are deliverable, can be provided with sufficient junction visibility, and are suitable for all users.

Cycle Link

- 5.16 It is a WSCC aspiration to secure cycling to Chichester from Pagham via lightly-trafficked roads or off-road tracks. The route is envisaged to run between the site and LNR 88 via South Mundham, and would require converting Footpaths 100, 106 and 104 to bridleways. Securement of land for upgrading the whole route is not within the applicant's control.

- ### Figure 5.3 – Link to Pagham Harbour cycle route



5.18 As the planning application is in outline it is anticipated that one of the planning conditions will refer to the council's parking requirements. The development's parking strategy is to allow for these requirements and to have a local centre car park that is of sufficient capacity to allow for drop off and pick up for the primary school and for the sports pitch use.

5.19 Where-ever possible, private parking will be served from the ends of turning heads in order to deter parking within areas provided for turning.

5.20 Travel Plan Measures are discussed in detail in **Section 10.0**.

6.0 Trip Generation and Distribution

Trip Generation

- 6.1 The development trip generation has been identified for the following land uses:
- i. Residential – houses privately owned (400).
 - ii. A care home with 70 bedrooms.
 - iii. A single-form entry primary school (210 pupils).
 - iv. A convenience store of 500sqm GFA.
 - v. Small retail units (A1, A2, A3) of up to 1,500sqm.
- 6.2 The scouts hut, sports pitches and allotments have not been included in the trip generation assessment as they are not expected to generate trips on the local highway network during weekday peak hours.
- 6.3 As set out in **paragraph 1.3**, the trip rates used have been agreed with highway officers West Sussex County Council either as part of the cumulative traffic impact assessment work being carried out jointly by the three consultants, or as part of individual discussions where uses are particular to our individual site.
- 6.4 The full TRICS reports are contained in **Appendix 19** and the vehicular trip rates and resultant development traffic associated with each land use is summarised in **Table 6.1** below.
- 6.5 From the masterplan it is assumed that the local centre, school, care home and 170 houses will be accessed from the northern site access with Pagham Road, as set out in **Table 6.1**. The remaining 230 houses will be accessed via the southern site access junction with Pagham Road. There will be no vehicular through-route across the site, although pedestrian and cycle links will be created.

Residential

- 6.6 The trip rate agreed with highway officers is based on the following search criteria for privately owned houses:
- i. 03 – Residential, A – Houses privately owned.
 - i. All multi-modal weekday surveys in England, Scotland and Wales, excluding greater London.
 - ii. From 50 to 491 units.
 - iii. In Edge of Town Centre, Suburban Area and Edge of Town locations.
 - iv. One survey was excluded on the bequest of Highways England as it had an unrepresentative peak hour trip rate.
- 6.7 It was also agreed with WSCC to use the higher AM peak hour arrival trip rate of 0900-1000 in place of the surveyed 0800-0900 trip rate.

Care Home

- 6.8 The search criteria for the care home trip rates was:
- i. 05 – Health, F – Care Home (elderly residential).
 - ii. All multi-modal weekday surveys for sites in England, excluding Greater London.
 - iii. For care homes with between 40 and 90 bedrooms.

Primary School

- 6.9 The trip rate agreed with highway officers is based on the following search criteria for privately owned houses:
- i. 04 – Education, A – Primary.
 - ii. All multi-modal weekday UK surveys excluding Greater London.
 - iii. For schools with up to 447 pupils.
 - iv. Sites in Suburban Area, Edge of Town and Neighbourhood Centre areas.

Convenience Store

- 6.10 The search criteria for the convenience store trip rates was:
- i. 01 – Retail, O – Convenience Store.
 - ii. Multi-modal weekday surveys for sites in England, excluding Greater London.
 - iii. For stores with up to 550sqm GFA.
 - iv. Sites in Suburban Area, Edge of Town and Neighbourhood Centre areas.

Small Retail Units

- 6.11 The search criteria for the small retail units trip rates was:
- i. 01 – Retail, I – Shopping Centre (Local Shops).
 - ii. All multi-modal weekday surveys for sites in England, excluding Greater London.
- 6.12 The resultant TRICS sites were then assessed for representative rates with reference to the person trip rates used in the Arun Transport Study. Survey TW-01-I-02 was therefore selected.

Table 6.1 – Vehicular trip assessment associated with each development access

Land Use		Units	Forecast Trip Attraction (per unit)			
			AM Peak Hour		PM Peak Hour	
			Arrival	Departure	Arrival	Departure
Northern access onto Pagham Road						
Proposed Houses	Trip Rates	/unit	0.144	0.359	0.299	0.179
	Total Trips	170	25	61	51	30
Local Centre - Convenience Store	Trip Rates	/100sq m GFA	8.382	7.666	11.415	10.826
	Total Trips	500sqm	42	38	57	54
Local Centre – small shops (A1/A2/A3)	Trip Rates	/100sq m GFA	4.074	3.519	3.333	5.926
	Total Trips	1,500 sqm	61	53	50	89
Care Home	Trip Rates	/bed	0.071	0.045	0.071	0.115
	Total Trips	70	5	3	5	8
Primary School – (210 pupils)	Trip Rates	/Pupil	0.267	0.195	0.071	0.076
	Total Trips	210	56	41	15	16
Total Northern Access			189	196	178	197
Southern access onto Pagham Road						
Proposed Houses	Trip Rates	/unit	0.144	0.359	0.299	0.179
	Total Trips	230	33	83	69	41
Overall Total (North + South)			222	279	247	238

6.13 From this it can be seen that development traffic is expected to be in the order of around 500 vehicles in the busiest peak hour (AM); with around 485 vehicle movements in the PM peak hour.

Local Centre Trips

- 6.14 Further to **Table 6.1** above, it is generally accepted and has been agreed with the highway officer that retail development generates very few new vehicular trips on the local highway network. In reality the trips associated with the local centre would already be on the local network and diverted or transferred to the site instead of heading elsewhere; giving rise to an increase in trips through junctions in the immediate vicinity of the site, but no increase would result on the wider network. This is recognised in the TRICS Research Report 14/1 (Pass-By and Diverted Trips), which sets out that convenience stores, as proposed on site, are more likely to produce pass-by trips rather than generate new trips on the network.
- 6.15 Currently there are no prescriptive discount rates that can be applied for linked, pass-by and diverted trips within transport modelling, and regard must instead be given to a site by site analysis and justification. This is now set out below.
- 6.16 The local centre has been proposed as part of this scheme in order to serve the future residents of the site, and as such increase the sustainability of the residential development. It is therefore considered that a fair proportion of the car trips forecast using the TRICS database will be internal to the site i.e. not present on the local highway network, and also likely to be replaced by walking and cycling.
- 6.17 It is considered likely that there will be a high level of linked trips associated with the local centre uses i.e. trip purpose for more than one land use/on-site destination, for example such as convenience store and bakery or dry-cleaners (or primary school). Thereby using the TRICS assessment without discounting would be double-counting the likely number of vehicular trips. The prevalence of linked trips in a situation as presented by the mixed land-uses proposed on the Pagham South site is also supported by the TRICS Research Report 14/1.
- 6.18 In terms of catchment area of the site's proposed local centre, the walking isochrones contained in **Appendix 11** demonstrate that there is a fair level of existing dwellings located within 500 metres and 1.0 kilometres of the proposed local centre. As set out in **Table 4.1**, there are a number of existing local retail opportunities within Pagham as close as 500 metres from the site. As such, it is further demonstrated that there will be limited scope for new or diverted vehicular trips on the local highway network based on the catchment areas of existing facilities. Furthermore, the presence of existing, well-served bus stops within close proximity to the site access and local centre, with dedicated pedestrian routes facilitating direct access, provides more confidence in the sustainability and accessibility of the site and proposed land uses.
- 6.19 Therefore, for the purposes of this assessment, it has been agreed with the highways officer that a reduction of 60% in vehicular trips associated with the local centre retail land uses (convenience store and local shops) will be allowed for in the peak hours to take account of containment within the development and linked trips, as well as the likely increase in walking and cycling modal share to/from these land uses from the residential areas on site and in the surrounding area.

- 6.20 In terms of the remaining vehicular trips (40%), 75% of these are anticipated to be pass-by and therefore already on the local highway network. Consequently, 10% of the originally forecast vehicular trips (25% of remaining vehicular trips) are proposed to be added onto the local highway network as new trips, within an agreed catchment area immediately surrounding the site, and distributed at the site access junction using the ATC distribution of traffic, as per recent agreement with the highway officer. Distribution of the local centre trips on the wider highway network is set out in **Section 9.0**. It is considered that this 10% for new vehicular trips during peak hours will be suitable to account for the range of uses that could be part of the resultant local centre development.
- 6.21 The resulting trips are set out in **Table 6.2** below and have been agreed with the highway officer.

Table 6.2 – Reduction in retail traffic

Land Use	AM Peak Hour (0800-0900)		PM Peak Hour (1700-1800)	
	Arrival	Departure	Arrival	Departure
Convenience Store	42	38	57	54
Local Shops	61	53	50	89
(a) Total	103	91	107	143
(b) Discount (60%) – containment/ linked trips	62	55	64	86
(c) Total Trips = (a)-(b)	41	36	43	57
(d) Pass-by Trips 75% of (c)	31	27	32	43
New Trips on Network = (c) - (d)	10	9	11	14

- 6.22 It can be seen from **Table 6.2** above that 19 vehicle trips will be added to the local highway network traffic during the AM peak hour associated with the proposed local centre land uses, with 58 existing vehicle trips on Pagham Road past the site access diverted to/from the northern site access during that peak hour.
- 6.23 It can also be seen from **Table 6.2** above that 25 vehicle trips will be added to the local highway network traffic during the PM peak hour associated with the proposed local centre land uses, with 75 existing vehicle trips on Pagham Road past the site access diverted to/from the northern site access during that peak hour.
- 6.24 In summary, the retail trips associated with this convenience store and small retail units will be contained locally within the Pagham area. It is considered that these retail trips will not travel north beyond the Nyetimber Lane junction with Pagham Road.

Primary School Trips

6.25 For the purposes of this assessment, it is considered that a reduction in vehicle trips associated with the on-site school can also be allowed for, as agreed with officers at WSCC, to take account of containment within the development and to ensure no double-counting with the residential trip rates.

6.26 It is proposed that the trip discount for primary school traffic is based on the WSCC primary school contributions calculation in terms of working out additional child product using the following criteria:

Dwelling size	Occupancy	
	Houses	Flats
1 bed	1.5	1.3
2 bed	1.9	1.9
3 bed	2.5	2.4
4+ bed	3.0	2.8

6.27 WSCC set out that, *"According to 2011 census data, there are 14 persons per 1000 population in each school year group for houses and 5 persons per 1000 population in each school year group for flats. There are 7 year groups for primary (years R to 6)..."*

6.28 On this basis it can be calculated that the Pagham South development of 400 dwellings could on average generate around 1,000 people (if considering an average mix of 2, 3 and 4+ bed houses).

6.29 If 14 children per 1,000 population are expected per year group and a one-form entry primary school is provided on site, it could be expected that the Pagham South site will generate a need for circa 98 school places; 14 x 7 (the number of year groups within a one-form entry primary school), which is around 47% of school places when compared to a 210 pupil intake.

6.30 Therefore, it has been agreed with the highway officer to discount the primary school vehicular trips by 50% to reflect the calculation set out in **paragraph 6.29** above, which also reflects the central location of the primary school within the Pagham South site.

6.31 Therefore the resulting vehicular trips based on a 50% reduction in the AM peak hour (0800-0900) are set out in **Table 6.3** below.

Table 6.3 – Reduction in primary school traffic

Land Use	AM Peak Hour (0800-0900)		PM Peak Hour (1700-1800)	
	Arrival	Departure	Arrival	Departure
(a) Primary School	56	41	15	16
(b) Discount (50% AM)	28	21	-	-
Total Trips (a)-(b)	28	20	15	16

- 6.32 Further to the trip discounting set out in **Table 6.2** and **Table 6.3** above, the resultant forecast peak hour traffic flows for the proposed development are summarised in **Table 6.4** below.

Table 6.4 – Vehicular trip generation summary

Land Use	AM Peak Hour (0800-0900)		PM Peak Hour (1700-1800)	
	Arrival	Departure	Arrival	Departure
Northern access				
Residential (170 dwellings)	25	61	51	30
Local Centre - retail	10	9	11	14
Care Home (70 beds)	5	3	5	8
Primary School	28	20	15	16
Total Northern Access	69	93	82	68
Southern access				
Residential (230 dwellings)	33	83	69	41
Overall Total (North and South)	102	176	151	109

- 6.33 From applying a discount to the forecast development traffic for the local centre and primary school land uses, it can be seen that development traffic associated with the northern site access junction is expected to be in the order of around 160 vehicles in the AM peak hour and 150 in the PM peak hour. When taking into account **Table 6.2**, there will also be 58 and 75 of the existing vehicle movements on Pagham Road diverted through the site access junction in the AM and PM peak hours respectively.

- 6.34 Therefore, the Pagham South development traffic is forecast to total around 278 and 260 vehicular movements associated with the proposed land uses in the AM and PM peak hours respectively.

Pedestrian Trip Generation Review

- 6.35 Further to the WSCC consultation comments (contained in **Appendix 1**), a TRICS assessment using the data contained in **Appendix 19** has been carried out to demonstrate the level of pedestrian movements across Pagham Road likely to be associated with the Pagham South residential development. This is set out in **Table 6.5** below.

Table 6.5 – Residential Trips

Mode of Travel		Units	Forecast Trip Attraction (per unit)			
			AM Peak Hour		PM Peak Hour	
			Arrival	Departure	Arrival	Departure
Walk	Trip Rates	/unit	0.039	0.158	0.083	0.039
	Total Trips	400	16	63	33	16

- 6.36 Further to **Table 6.5** above, it can be seen that there may be typically around 80 pedestrian trips during the AM peak hour and typically 50 pedestrian movements in the PM peak hour respectively.
- 6.37 Whilst it is not expected that all of these pedestrian movements will cross Pagham Road or even in the same location, it can nevertheless still be concluded that the level of pedestrian movements anticipated over Pagham Road and the existing level of proposed and forecast traffic in this location (see **Section 3.0** and **Section 7.0**) is appropriate for uncontrolled crossing points.
- 6.38 Therefore, it is concluded that pedestrian movements over Pagham Road arising from the site and existing desire lines (i.e. to Footpath 101) will be suitably accommodated for by the proposed pedestrian refuge islands (see **Appendix 14**) and the uncontrolled crossing with dropped kerbs and tactile paving to the north of the site proposed by the Village Hall.

Trip Distribution – Site Access Junctions

- 6.39 The trip distribution at each of the proposed site accesses has been based on the following, as represented diagrammatically below in **Figure 6.1** to **Figure 6.4**:
- Residential – as per the agreed methodology for the consented scheme to the north of Summer Lane, using the 2011 journey to work census data, with 98% of development trips to/from the north and 2% to/from the south during both AM and PM peak hours.
 - Care Home – it is considered that the trip distribution at the access points would reflect that of the residential distribution set out above.

- iii. Retail Use – further to **paragraphs 6.14 to 6.24**, it is considered that the trip distribution during peak hours at the northern site access would broadly reflect the existing traffic flow distribution on Pagham Road, as set out in **Section 3.0**, with an AM peak split of 58% north and 42% south and a PM peak split of 46% north and 54% south, which has been distributed using 2011 census data. This has since been agreed with highways officers as a fair representation at the site access due to the location of the site and existing facilities in Pagham.
- iv. Primary School – in the immediate vicinity of the site, in consideration of the existing housing density in Pagham and a review of household census data, it is considered that a split of 12.4% south and 87.6% north on Pagham Road is likely to be representative of trip generation for this land use during both peak hours.

6.40 The relevant census data is contained in **Appendix 20** for reference.

Figure 6.1 – AM & PM residential peak hour distribution diagram

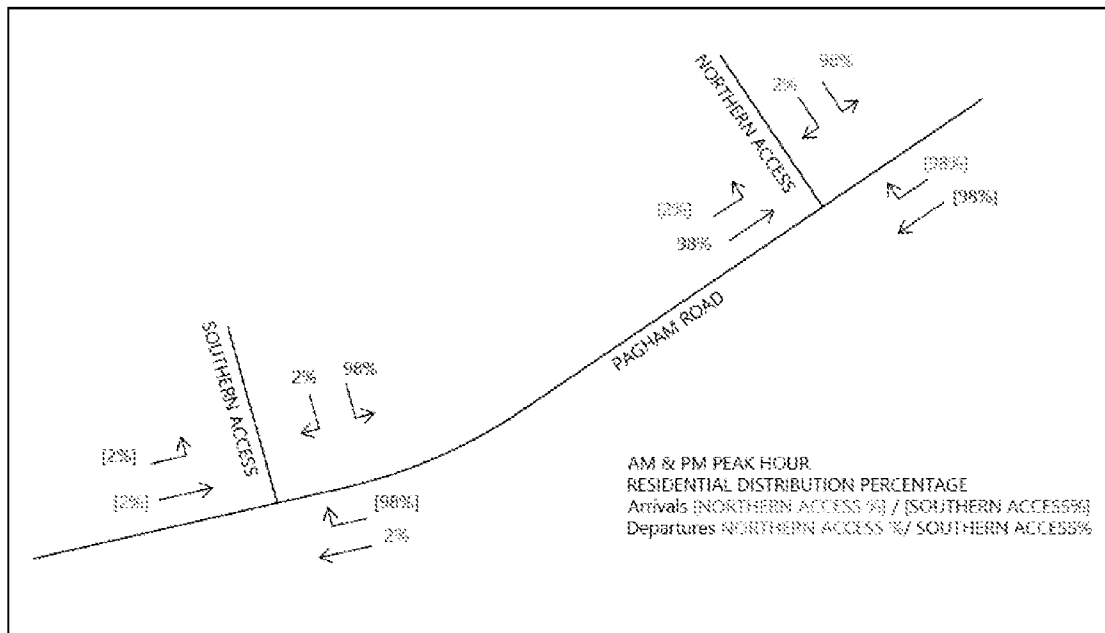


Figure 6.2 – AM & PM retail peak hour distribution diagram

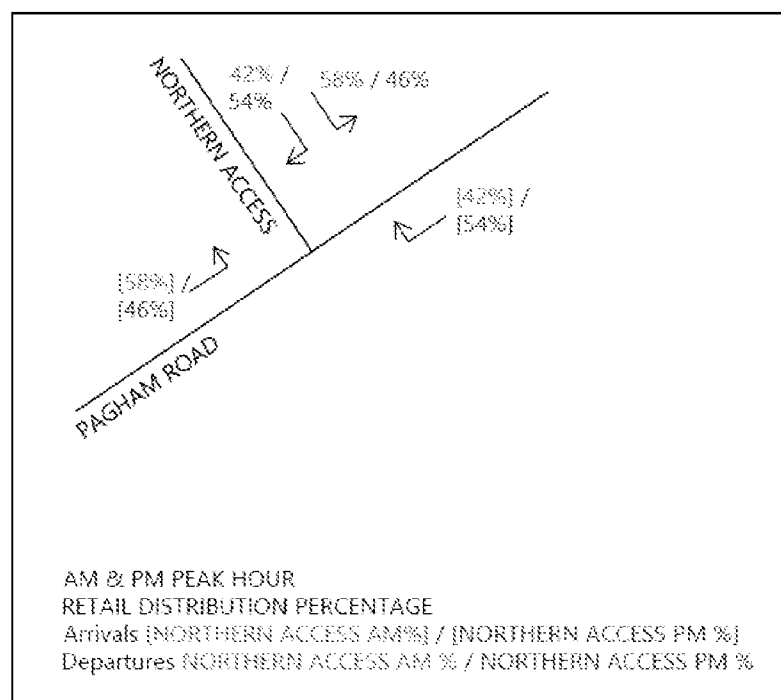


Figure 6.3 – AM & PM care home peak hour distribution diagram

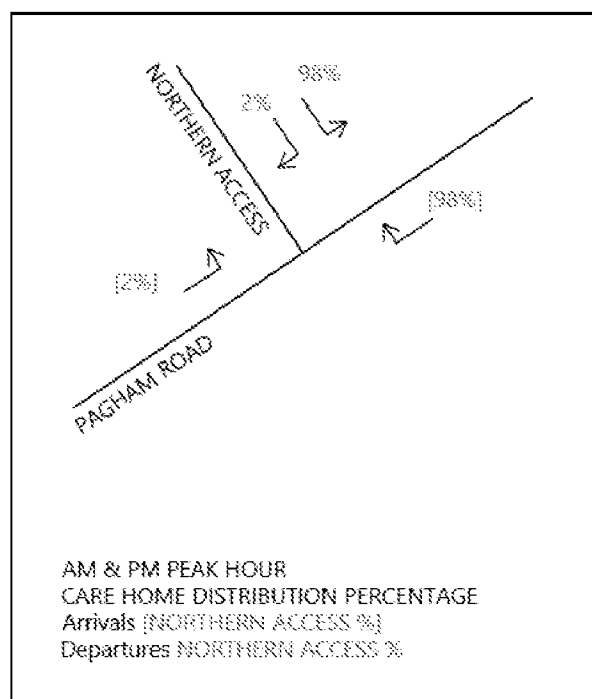
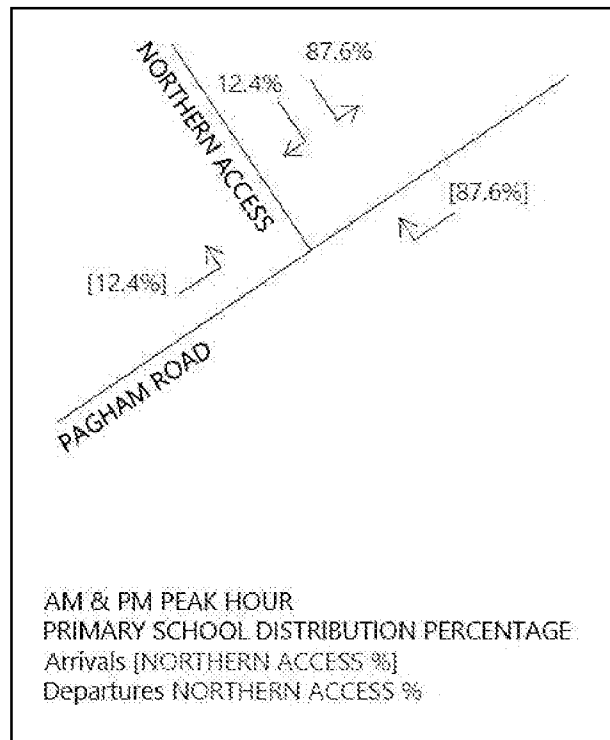


Figure 6.4 – AM & PM primary school peak hour distribution diagram



6.41 These distributions have been applied to the development traffic and illustrated in the following **Figure 6.5** to **Figure 6.8**.

Figure 6.5 – AM & PM residential peak hour traffic movements

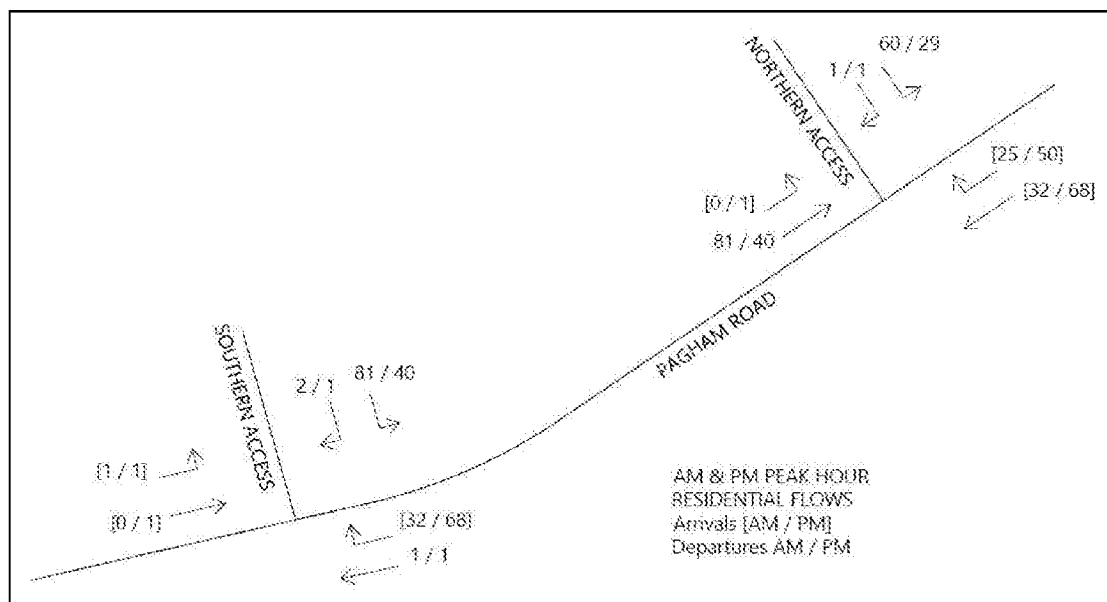
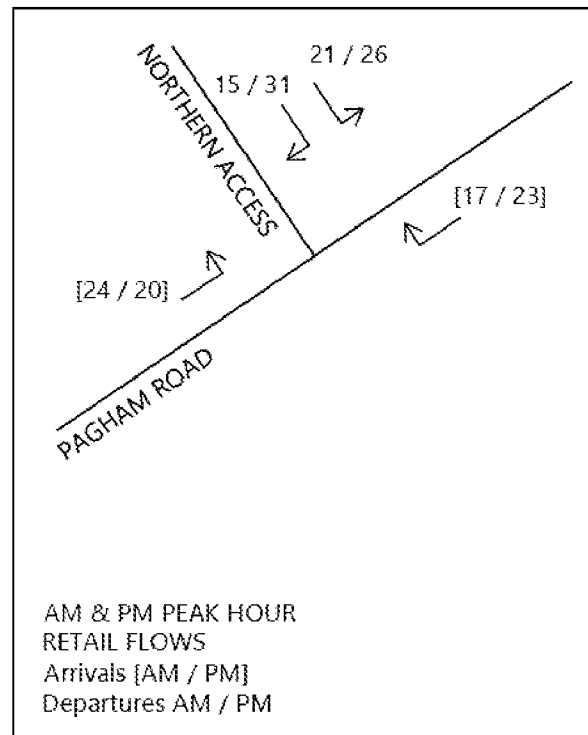


Figure 6.6 – AM & PM retail peak hour traffic movements



6.42 The above turning movement flows include for pass-by trips i.e. vehicles already on the Pagham Road, and as such these will not be added onto the local highway network as new trips, but be a redistribution of existing traffic flows past the site. These pass-by trips can be summarised as:

- i. AM Departures
11 to the south and 16 to the north
- ii. AM Arrivals
18 from the south and 13 from the north.
- iii. PM Departures
23 to the south and 20 to the north
- iv. PM Arrivals
15 from the south and 17 from the north.

Figure 6.7 – AM & PM care home peak hour traffic movements

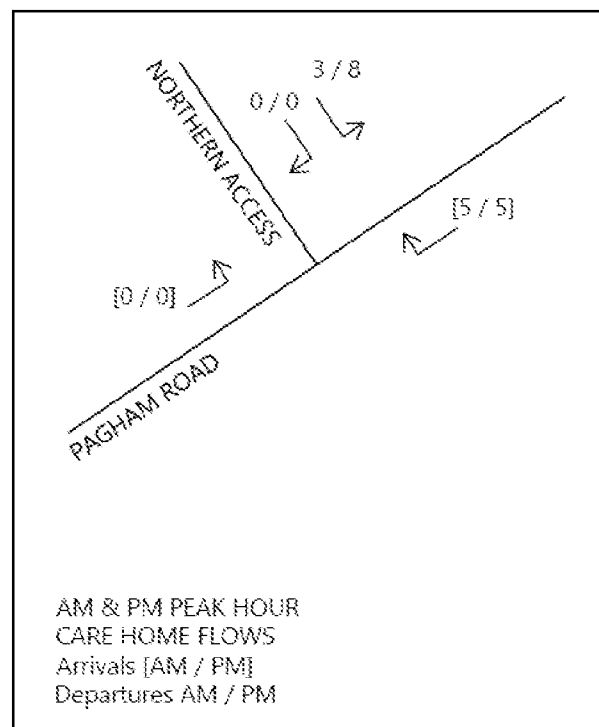
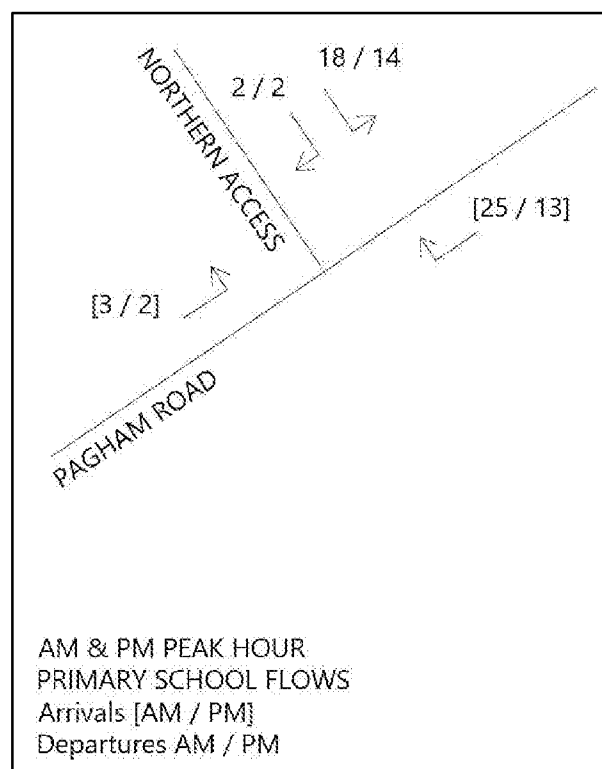


Figure 6.8 – AM & PM primary school peak hour traffic movements



- 6.43 These traffic flows have been combined to present development traffic diagrams for both site access junctions with Pagham Road in **Figure 6.9** and **Figure 6.10** below for the AM and PM peak hours respectively. As set out in **paragraph 6.42** above, the flows diagrams below include for pass-by trips as part of the development flows, but these will be diverted from the Pagham Road flows as appropriate.

Figure 6.9 – AM development traffic turning movement diagram

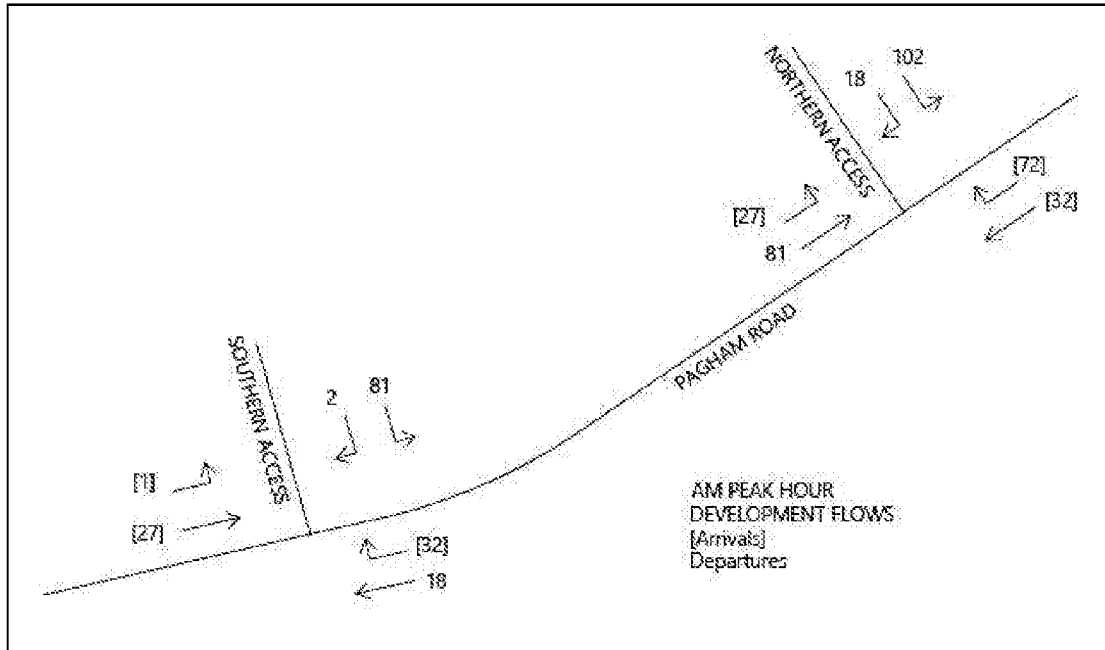
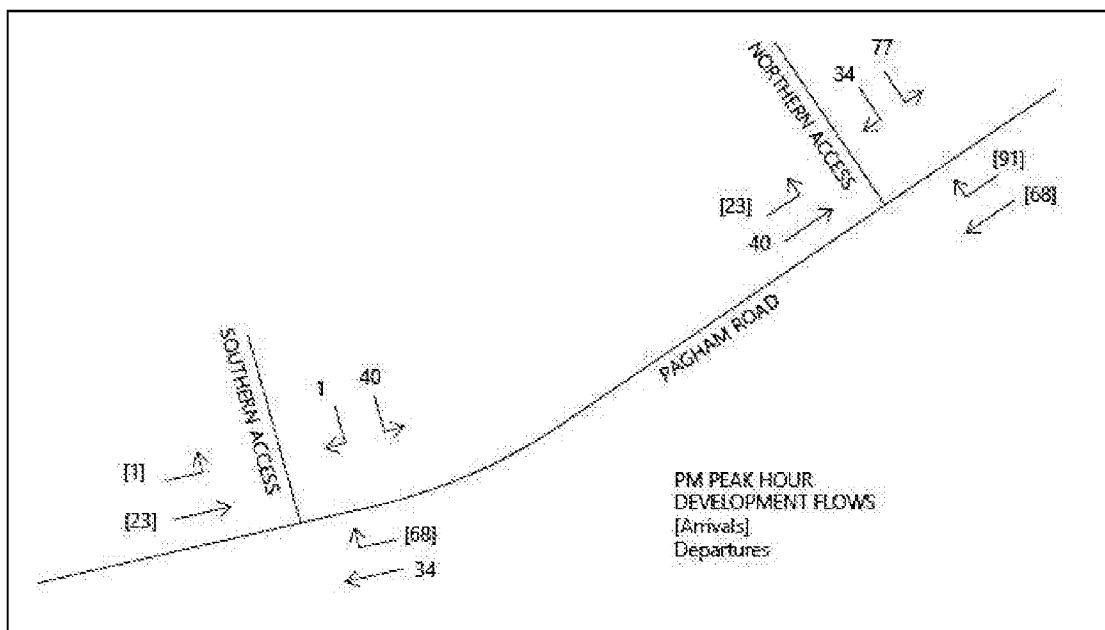


Figure 6.10 - PM development traffic turning movement diagram



Trip Distribution – Wider Highway Network

6.44 The distribution on the wider highway network is discussed in detail in **Section 9.0**.

7.0 Forecast Traffic Flows

Forecast Traffic Flows at the Proposed Site Access junctions

- 7.1 It has been agreed with the highway officer that a future year of 2022 is suitable for assessing the impact of the Pagham South development on the local highway network. It has been further agreed that no additional uplift in the growth rate for Arun will be required as part of this assessment that focuses on the local highway network of Pagham as the Pagham network is effectively contained to Pagham traffic. Furthermore, whilst it is appreciated that the emerging Arun Local Plan includes an increased level of uplift in housing supply, it is considered that by 2022 these additional dwellings will not have come forward. In terms of including the other two large sites in Pagham, land north of Hook lane and land north of Sefton Road, these are accounted for within the cumulative studies and therefore are not dealt with in TA/01/A as these are not yet committed development.
- 7.2 A growth factor has been applied to the peak hour traffic flow information for Pagham Road set out in **Table 3.2** using the TEMPRO dataset (version 7.0) for Urban Principal roads in Arun 19 (E02006560), as agreed with the highway officer, to forecast 2022 traffic flows using the NTM Version AF15 2010-2040 for adjusted growth factors.
- 7.3 The local growth figures and traffic flows are set out in **Table 7.1** below. The TEMPRO data is contained in **Appendix 21** for reference.

Table 7.1 – Traffic growth factors and resultant traffic flows on Pagham Road

Traffic Growth Factors (2016-2022)		2016 Measured Flows		Forecast Flows	
		Northbound	Southbound	Northbound	Southbound
AM	1.0976	218	243	239	267
PM	1.0981	159	282	175	310

Committed development

- 7.4 The two committed development sites, Land at Summer Lane (90 dwellings, ref: P/58/15) and 251 Pagham Road (40 dwellings, ref: P/125/14), are to be added to the 2022 traffic flows for the purposes of this assessment. It is however recognised that these sites may have been included for within the background growth rates from TEMPRO. **Figure 7.1** below sets out the turning movements for the Land at Summer Lane site and **Figure 7.2** sets out those turning movements associated with the Land at 251 Pagham Road site (based on the trip rates set out in the Land at Summer Lane TA).

Figure 7.1 – Committed development P/58/15 turning movement diagram (AM/PM peak hour)

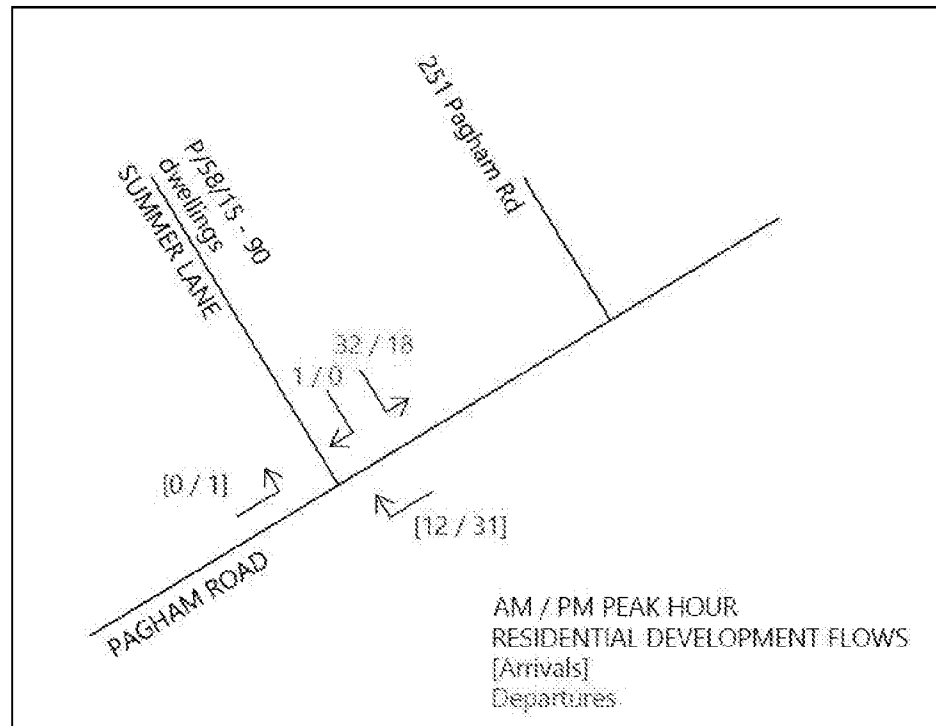
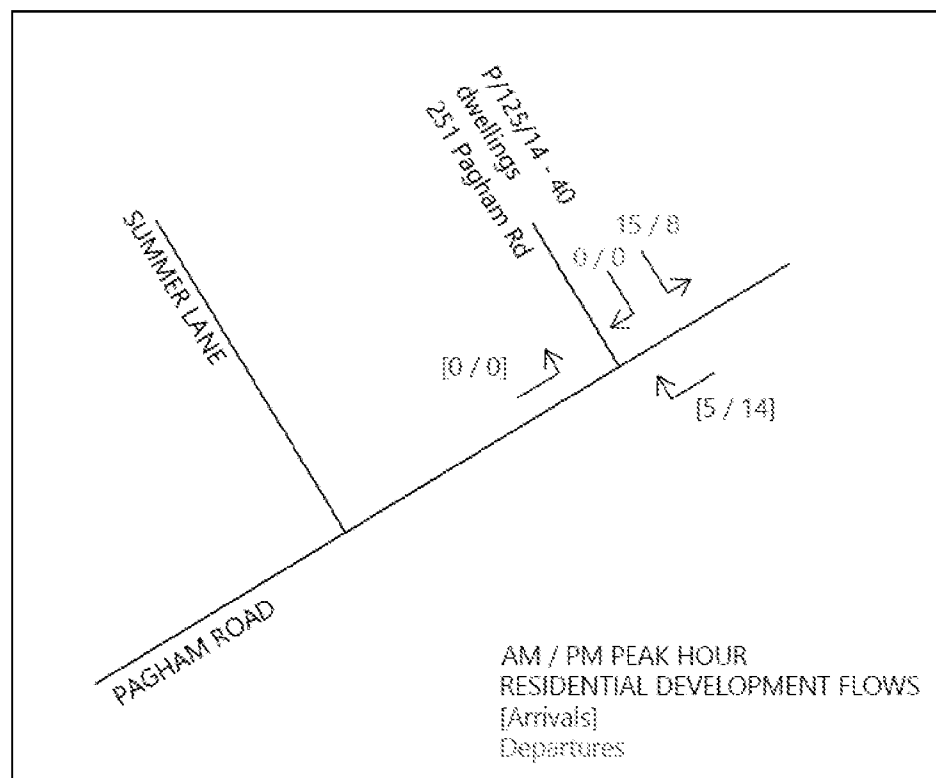


Figure 7.2 – Committed development P/125/14 turning movement diagram (AM/PM peak hour)



2022 Traffic Flows

- 7.5 The information for 2022 flows on Pagham Road from **Table 7.1** has been combined with the committed development trips shown in **Figure 7.1** and **Figure 7.2** above to provide 2022 forecast base flows past the site accesses on Pagham Road.

Figure 7.3 – 2022 forecast turning movement diagram (AM peak hour)

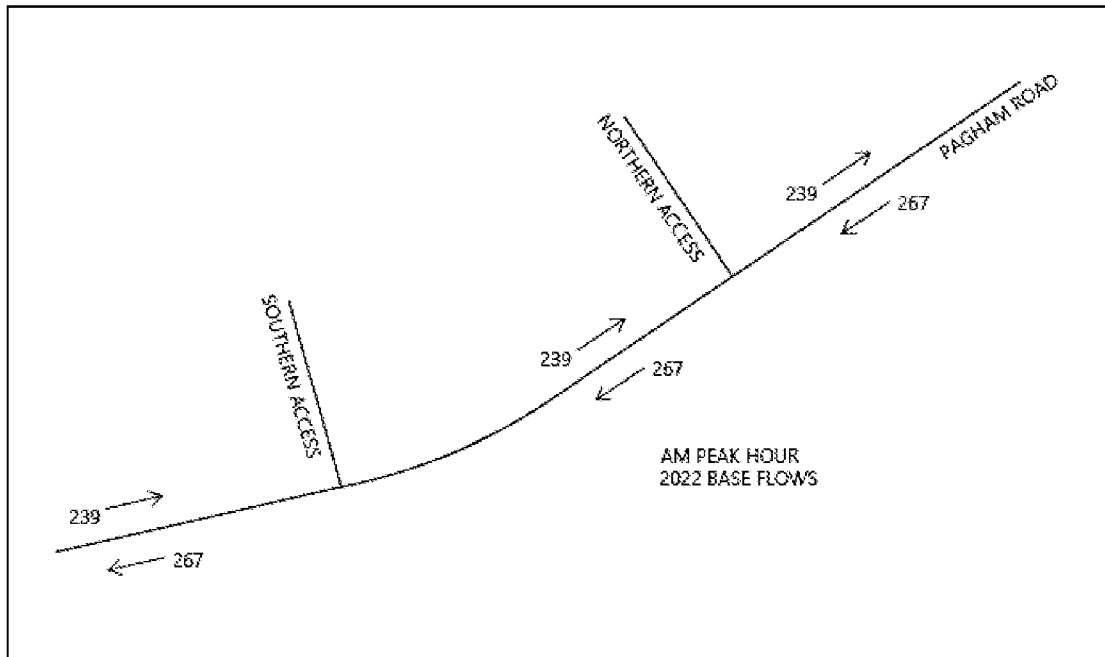
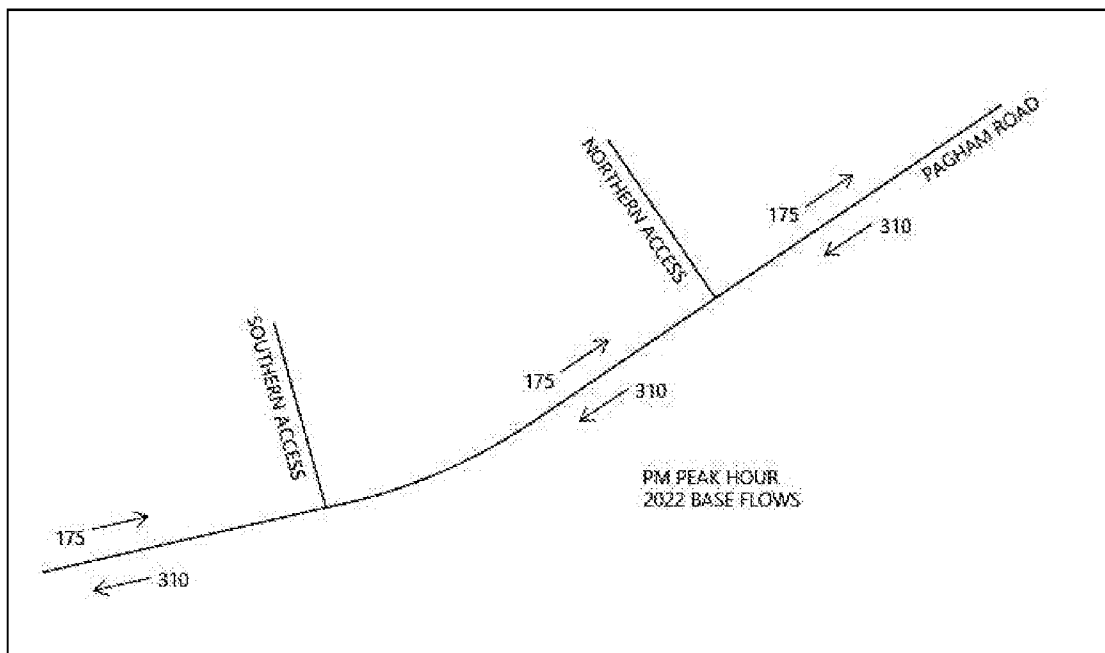


Figure 7.4 – 2022 forecast turning movement diagram (PM peak hour)



- 7.6 These forecast Pagham Road flows are presented in **Figure 7.5** and **Figure 7.6** below to take account of the diversion of pass-by trips.

Figure 7.5 – 2022 turning movement diagram for pass-by trips (AM peak hour)

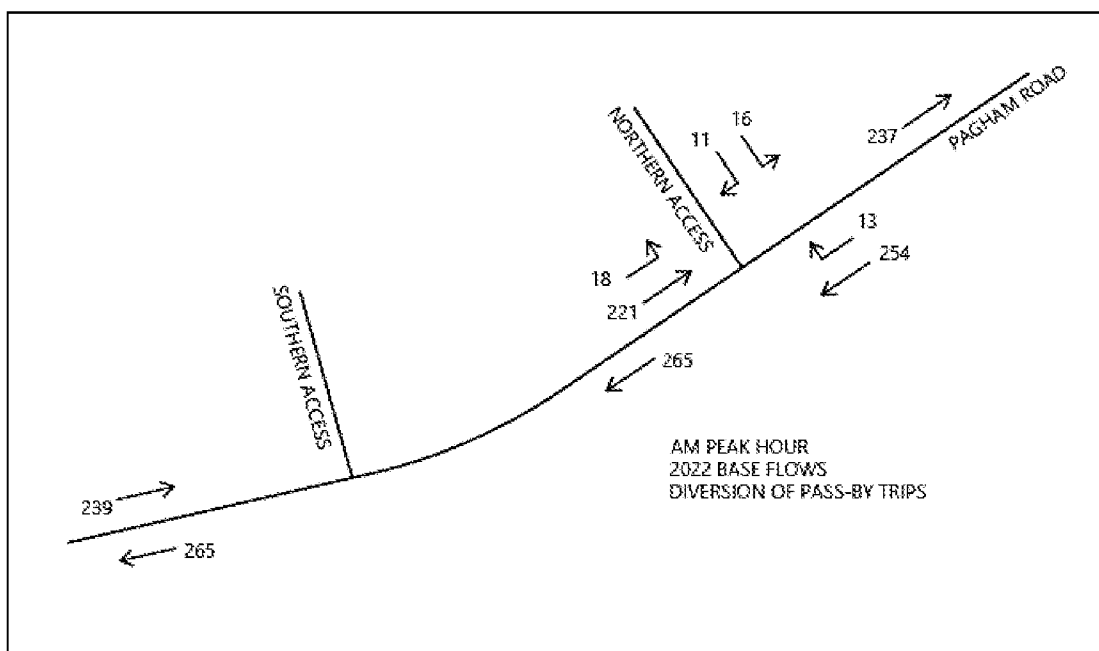
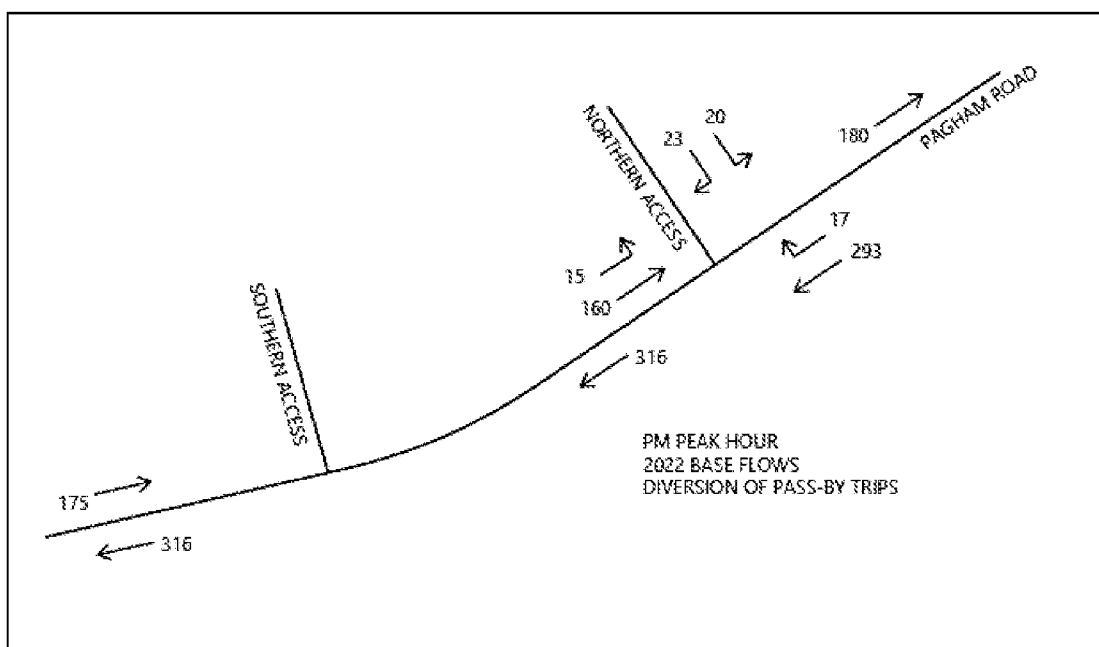


Figure 7.6 – 2022 turning movement diagram for pass-by trips (PM peak hour)



2022 Traffic Flows with Development Traffic

- 7.7 The information from **Figures 7.3 to 7.6** has been combined with the development trip distribution figures shown in **Figure 6.9** and **Figure 6.10** to give the forecast traffic flows for a 2022 with development scenario. This is set out diagrammatically below for the AM and PM peak hours in **Figure 7.7** and **Figure 7.8** respectively.

Figure 7.7 – 2022 forecast turning movement diagram (AM peak hour) with development

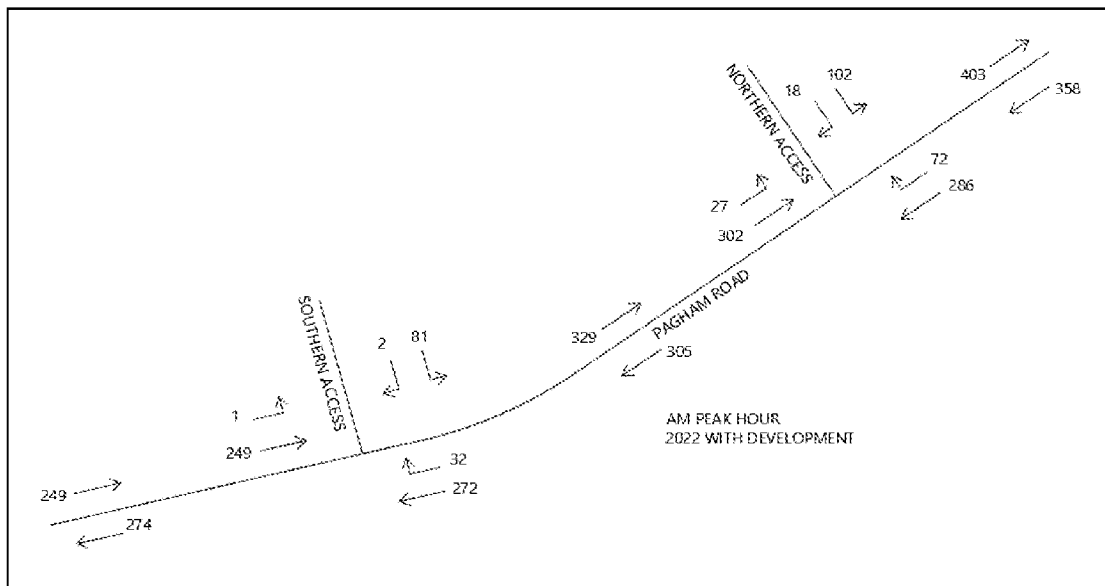
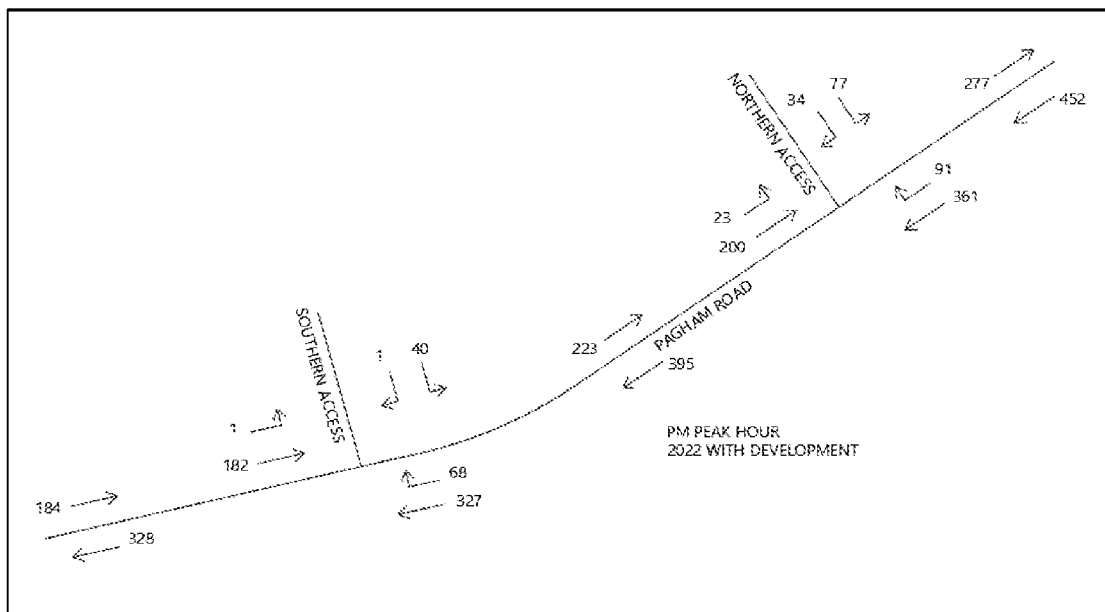


Figure 7.8 – 2022 forecast turning movement diagram (PM peak hour) with development



Forecast Traffic Flows – Wider Highway Network

- 7.8 The forecast traffic flows on the wider highway network are considered in **Section 9.0**.

8.0 Impact Appraisal – Local Highway Network

- 8.1 The highway capacity of the proposed site access junctions has been assessed for a 'with development' scenario in 2022 using PICADY software and the results are contained in **Appendix 22** and summarised for each junction in **Tables 8.1** and **8.2** below.

Table 8.1 – Northern site access 'with development' PICADY results 2022

Arm	AM Peak (0800-0900)			PM Peak (1700-1800)		
	RFC	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)
Site Access	0.21	0	7	0.20	0	8
Pagham Road	0.11	0	6	0.13	0	6

Table 8.2 – Southern site access 'with development' PICADY results 2022

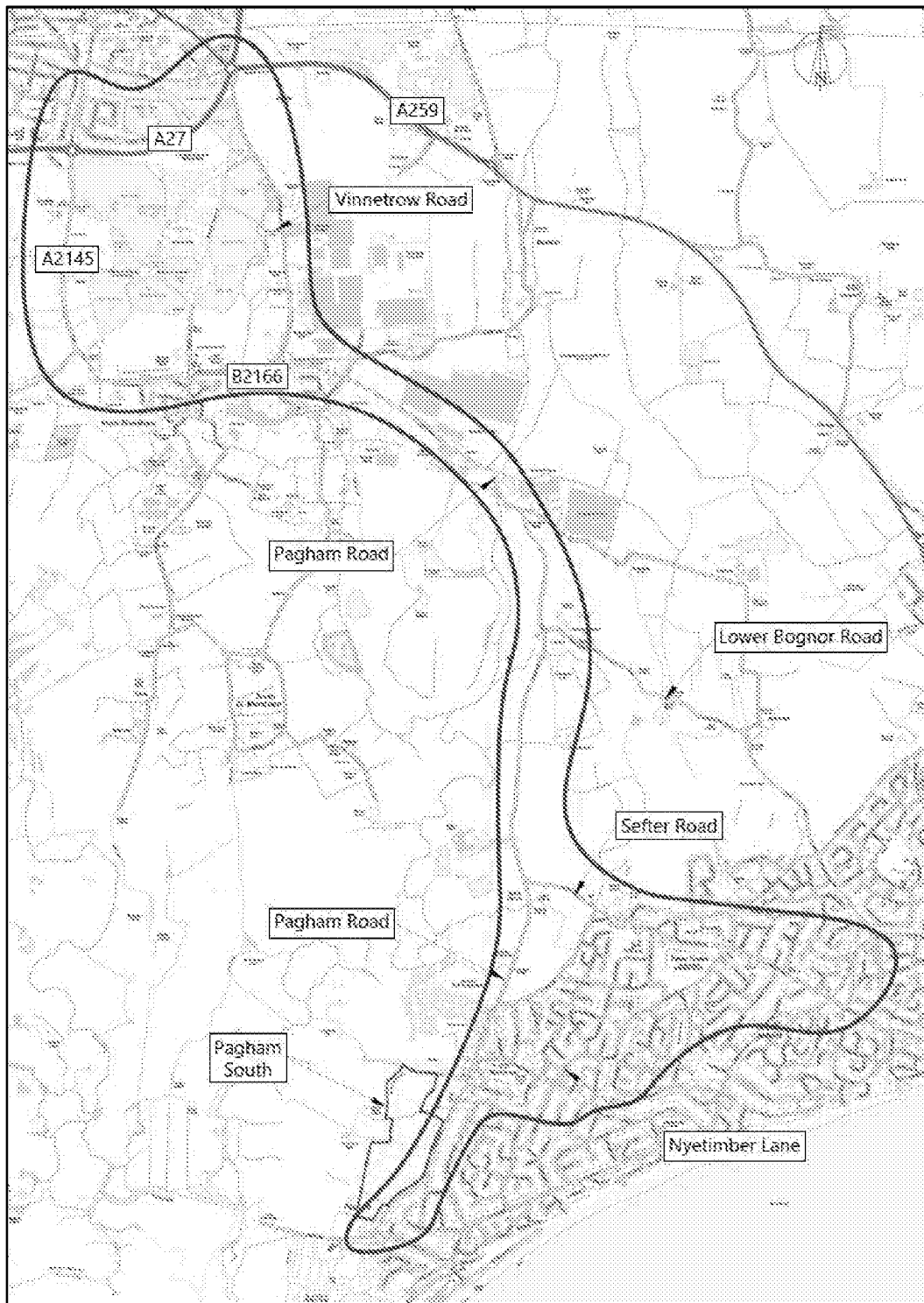
Arm	AM Peak (0800-0900)			PM Peak (1700-1800)		
	RFC	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)
Site Access	0.14	0	7	0.07	0	6
Pagham Road	0.07	0	5	0.16	0	5

- 8.2 These tables show that both of the proposed site access junctions work well within capacity in a design year of 2022. This modelling includes for the modifications to the access junctions, i.e. the removal of the ghost right turn lane from the southern access.

9.0 Impact Appraisal – Wider Highway Network

- 9.1 This section of the study considers the impact arising on the wider highway network identified within the study area shown in **Figure 1.3** which is replicated below for ease of reference.

Figure 1.3 – The study area



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- 9.2 In the first instance the trip generation and distribution figures discussed in **Section 6.0** have been expanded to cover the study area. A comparison has then been made with the existing traffic flows (growthed to the design year of 2022) at the junctions identified in **paragraph 3.5** in order to confirm the locations where the change in traffic flow due to the application proposals requires capacity analysis to quantify the impact.

Expanded Trip Distribution and Development Traffic Flows

- 9.3 The residential trip distribution has been based on 2011 journey to work census data, which sets out that 56% of work journeys travel northward on to Pagham Road towards and beyond Chichester and 44% travel to/from the east towards the Bognor direction. It is agreed that an allowance of 10% can be made to account for an element of residential trips being retained in Pagham i.e. not work related. As such, the distribution northward is proposed at 50%, with 40% to/from the east towards Bognor.
- 9.4 The wider trip distribution for the residential element can be summarised as follows:
- i. B2166 50%
 - ii. Nyetimber Lane 24% (into Gossamer Lane east 19.6%)
 - iii. Hook Lane 24% (Rose Green Road east 19.6%)
 - iv. Pagham Road south 2%
- 9.5 The wider trip distribution for the retail element is based on a review of housing numbers from census 2011 data (KS401UK for the 2011 super output area – lower layer Arun ward 019A-F), a breakdown of which is contained in **Appendix 20** for reference, and the percentage of traffic turning to/from the site access is as follows:
- i. AM peak hour south on Pagham Road – Arrival 58%, Departure 42%
 - ii. PM peak hour south on Pagham Road – Arrival 46%, Departure 54%
 - iii. AM peak hour north on Pagham Road – Arrival 42%, Departure 58%
 - o Nyetimber Lane – Arrival 15%, Departure 18.5%
 - o Nyetimber Lane junction with Cardinals Drive – Arrival 4.5%, Departure 9%
 - iv. PM peak hour north on Pagham Road – Arrival 54% Departure 46%
 - o Nyetimber Lane – Arrival 17%, Departure 14%
 - o Nyetimber Lane junction with Cardinals Drive – Arrival 9%, Departure 7.5%
- 9.6 The wider trip distribution for the primary school element is also based on housing numbers, but includes the Arun 18A, D and E wards, and can be summarised is as follows for all traffic (see data contained in **Appendix 20** for reference):
- i. Pagham Road north 87.6%
 - o Nyetimber Lane 56.4% (into Gossamer Lane east 22.8%)
 - o Hook Lane 20.2% (Rose Green Road east 9.9%)
 - ii. Pagham Road south 12.4%

- 9.7 The wider peak hour traffic distribution diagrams are contained in **Appendix 23** and the resulting turning movement flow diagrams for a 2022 scenario are contained in **Appendix 24** for reference.
- 9.8 It can be seen from the flow diagrams contained in **Appendix 23** that Pagham South development trips will result in the following during the traditional highway network peak hours:
- i. B2166 junction with the B2145 (81/80 trips AM/PM respectively).
 - ii. B2166 junction with Vinnetrow Road (104/102 trips AM/PM respectively).
 - iii. Lower Bognor Road junction with Pagham Road (104/102 trips AM/PM respectively).
 - iv. Nyetimber Lane (82/72 trips AM/PM respectively).
 - v. Hook Lane (60/55 trips AM/PM respectively).
 - vi. Rose Green Road east (46/43 trips AM/PM respectively).
 - vii. Gossamer Lane east (52/47 trips AM/PM respectively).
- 9.9 From the modelling in TA/01, it could be seen that the Gossamer Lane junction with Aldwick Street operated well within capacity and therefore has not been re modelled in this revised TA; flows through this junction have been marginally reduced in any event. Furthermore, the traffic flows at the Nyetimber Lane junction with Tabard Gate and Cardinal's Drive and the modelling results, as set out in ATA/02, are low and therefore not remodelled for this assessment.
- 9.10 The following junctions have therefore been modelled for this assessment:
- i. Nyetimber Lane priority junction with Pagham Road.
 - ii. Hook Lane priority junction with Pagham Road.
 - iii. Sefter Road priority junction with Pagham Road.
 - iv. Lower Bognor Road priority junction with Pagham.
 - v. Rose Green Road junction with Grosvenor Gardens.
 - vi. B2166 roundabout junction with Vinnetrow Road.
 - vii. Nyetimber Road signalised junction with Grosvenor Gardens.
- 9.11 Therefore these junctions have been modelled in the respective modelling programmes, PICADY, ARCADY (both Junctions 9) and LINSIG (version 3), and the results are tabulated below in **Table 9.1** for both 2022 base and 2022 with development scenarios. The modelling reports are contained in **Appendix 25** for reference.

Table 9.1 – Junction modelling results 2022

Junction	Test Scenario	AM Peak (0800-0900)			PM Peak (1700-1800)		
		RFC (%)	Queue (Veh)	Delay (s)	RFC (%)	Queue (Veh)	Delay (s)
PICADY							
Pagham Road j/w Nyetimber Lane	2022	0.22	0	9	0.38	1	14
	2022 + Dev.	0.30	0	11	0.52	1	19
	Difference	+0.08	0	+2	+0.14	0	+5
Pagham Road j/w Hook Lane	2022	0.42	1	12	0.47	1	12
	2022 + Dev.	0.48	1	14	0.55	1	14
	Difference	+0.06	0	+2	+0.08	0	+2
Pagham Road j/w Sefter Road	2022	0.66	2	24	0.40	1	16
	2022 + Dev.	0.69	2	28	0.41	1	16
	Difference	+0.03	0	+4	+0.01	0	0
Pagham Road j/w Lower Bognor Road	2022	1.12	31	247	0.90	6	94
	2022 + Dev.	1.18	41	330	0.99	10	148
	Difference	+0.06	+10	+83	+0.09	+4	+54
Rose Green Road j/w Grosvenor Gds	2022	0.94	9	81	1.07	27	182
	2022 + Dev.	0.98	12	103	1.12	38	246
	Difference	+0.04	+3	+22	+0.05	+11	+64
ARCADY							
B2166 j/w Vinnetrow Road	2022	0.71	2	9	0.81	4	26
	2022 + Dev.	0.75	3	10	0.86	5	37
	Difference	+0.04	+1	+1	+0.05	+1	+11
LINSIG							
Nyetimber Lane j/w Grosvenor Gds	2022	0.92	13	70	0.81	11	46
	2022 + Dev.	0.97	18	88	0.88	13	58
	Difference	+0.05	+5	+18	+0.07	+2	+12

9.12 It can be seen from the above that:

- i. The Nyetimber Lane junction with Pagham Road will continue to work well within capacity in the future year of 2022 with the addition of Pagham South traffic.
- ii. The Hook Lane junction with Pagham Road will continue to work well within capacity in the future year of 2022 with the addition of Pagham South traffic.
- iii. The Sefter Road junction with Pagham Lane will continue to operate well within capacity in 2022 with the addition of Pagham South traffic.
- iv. The Lower Bognor Road junction with Pagham Road will operate over capacity in the 2022 AM peak hour and reach capacity in the PM peak hour. However, it can be seen that, with the development traffic added on, there is only a minimal increase in RFC of 0.06 and 0.09 during the AM and PM peak hours respectively.

It has been discussed and agreed with the highway officer that queuing on the Lower Bognor Road priority junction is all on the minor arm (Lower Bognor Road) and that the drivers using this arm realistically have earlier opportunities to choose a different route and therefore there is an expectation that some of the traffic on this arm in the future will choose a different part of the network to get to their destinations and as such the Lower Bognor Road arm of the junction will not materially change in terms of queueing and delay.

- v. The Rose Green Rose junction results in **Table 9.1** reflect the northern Rose Green Road arm, which is shown to be operating at capacity. However, the queue results contained in **Appendix 8** demonstrate that in reality there are very limited queues on this arm of three vehicles in the AM peak and up to seven in the PM peak. Therefore the above results should be treated with caution as the junction is obviously working more efficiently in reality than can be demonstrated theoretically. Nevertheless, it can be seen that the addition of the Pagham South traffic will not have a material effect on the operation of the junction.
 - vi. The B2166 junction with Vinnetrow Road will continue to operate within capacity in 2022 with the addition of Pagham South traffic.
 - vii. The Nyetimber Lane junction with Grosvenor Gardens signalised junction will reach capacity in the future year of 2022 with and without the addition of Pagham South traffic. However, it can be seen that with the development traffic added on, there is only a minimal increase in RFC of 0.05 and 0.07 during the AM and PM peak hours respectively, with additional queue lengths of up to only five vehicles in the busiest peak hour.
- 9.13 Therefore it is concluded that the Pagham South development traffic will not create a highway safety issue, and can be accommodated on the local and wider highway network without detriment.
- 9.14 Engineering-type mitigation measures on the wider highway network are not proposed as a result of the Pagham South development. It is considered that the draft Section 106 Heads outlined in **Section 12.0**, combined with the measures set out in the proposed Residential Travel Plan aimed at reducing car travel will assist in further reducing traffic impact in any event.

10.0 Travel Plan Measures

- 10.1 It is agreed that the location of the development will give future residents a realistic choice about how they chose to travel, without there being a reliance upon the use of the private car.
- 10.2 Travel plan measures have been included as part of the development proposals, in line with West Sussex County Council's Travel Plan guidance for the residential element of the site further to discussion with the highway officer, such as:
- i. Cycle storage at a ratio to meet or exceed the Council's minimum parking ratio.
 - ii. Ensure the provision of good connectivity to walking and cycling links and permeability through the site to the wider highway network.
 - iii. Ensure the provision of good connectivity to public transport links in the surrounding area.
 - iv. Provision of up to date public transport timetable information on noticeboards in communal areas and in the Welcome Pack.
 - v. Provision of a travel vouchers offered for each residential unit to the value of £150, which will cover a range of sustainable travel incentive such as contribution towards a new bike and/or accessories, contribution towards a bus season ticket, cycle training, etc. These will be made available for take-up for a period of 12 months following first occupation.
 - vi. The provision of a second and final promotion of the £150 travel vouchers for residents of the development to claim if the trip rate target is missed.
- 10.3 A Residential Travel Plan has been developed further in collaboration with West Sussex County Council officers during the planning application process to ensure the development of a good quality and effective document. The Residential Travel Plan to accompany the development is contained in **Appendix 26**.
- 10.4 Individual Travel Plans will also be required for the care home and primary school, and it is expected that an umbrella Travel Plan Statement will be sought to cover the local centre land uses. However, the developer will accept a planning condition for the provision of these documents; it is assumed that these Travel Plans will follow the same ethos as the Residential Travel Plan.
- 10.5 Key elements of the Travel Plan documents will be to:
- i. Reduce the need to travel, especially by car.
 - ii. Sustainable accessibility.
 - iii. Deal with residual trips.
 - iv. Mitigation measures.

11.0 Transport Policy Background

11.1 The policy background for development in Pagham is found in:

- i. National Planning Policy Framework (NPPF), March 2012.
- ii. West Sussex Local Transport Plan 2011 to 2026.
- iii. Arun Local Plan.
- iv. Pagham Neighbourhood Plan.

National Policies

11.2 The government have set out their planning policies for England, and how these are to be applied, in the National Planning Policy Framework (NPPF, 2012). In transport terms paragraph 32 of the NPPF sets out that, "Development should only be prevented where the residual cumulative impacts of development are severe".

11.3 This Transport Assessment has shown that committed development and development traffic from Pagham South can be accommodated on the highway network, and that the residual cumulative impacts are not severe.

11.4 The Addendum Transport Assessment will take account of development at the two other sites in the emerging Arun Local Plan and will show that the Pagham South development can be accommodated on the local highway network without detriment to local highway safety.

Local Policies

11.5 The main thrust of the West Sussex Local Transport Plan, the Arun Local Plan and the Pagham Neighbourhood Plan in respect of a development such as proposed at Pagham South include:

- i. Helping to reduce the need for travel.
- ii. Encouraging the use of sustainable modes of transport.
- iii. Locating development where it will be close to a range of services and facilities.
- iv. Supporting development with Travel Plan measures.
- v. Ensuring that access provision is safe for all users.
- vi. Ensuring parking provision is appropriate and facilities are available for delivery vehicles.

11.6 From **Sections 4.0, 5.0 and 6.0** it has been shown that the proposed development will promote sustainable travel and accessibility and safety for all.

Conclusions

11.7 It is therefore reasonable to conclude that:

- i. The proposed development at Pagham South is sustainably located and will provide future residents with a realistic alternative choice to the private car.
- ii. The proposals are compliant with national and local transport related planning policies.

12.0 Section 106 Heads

- 12.1 This section of the report outlines the potential Section 106 contributions relating to the local highway network and modes of travel.
- 12.2 Section 106 obligations are still being discussed with officers at WSCC and it considered that the following may be included:
- i. The safeguarding of land off site within the land owners control to assist WSCC in their aspiration to create a cycle link to Chichester.
 - ii. Provision and implementation of the Residential Travel Plan and associated measures and monitoring.
 - iii. Assistance towards bus infrastructure improvements.
- 12.3 The above measures and contributions are to be discussed in more detail with WSCC and Arun District Council as the application progresses.

13.0 Summary and Conclusions

Summary

- 13.1 This Transport Assessment has been prepared to support the planning application for residential development and creation of a community hub on land at Pagham South. The planning application is submitted in outline with all matters reserved except for access.
- 13.2 The transport assessment work has been prepared as two freestanding reports and this report (TA/01) should be read first as it considers the development impact arising from the proposals at Pagham South. This report is referred to as the Transport Assessment.
- 13.3 The second report (ATA/01) is referred to as the Addendum Transport Assessment. It takes account of the cumulative impact arising if the residential development proposed at the two other Pagham sites identified in the emerging Local Plan (Sefter Road and Hook Lane), as well as the Osborne site, come forward.
- 13.4 For the purposes of this Transport Assessment study the proposed development and access strategy at Pagham South is assumed to comprise:
- i. 400 residential dwellings.
 - ii. A care home with 70 beds.
 - iii. A Local Centre comprising up to 2,000sqm GFA, with food sales limited to a 500sqm GFA convenience store.
 - iv. A single form entry primary school (210 pupils).
 - v. Other community uses – one sports pitch and Scout Hut.
 - vi. An area for allotments with 20 plots.
 - vii. Access to the development from two new priority junctions with Pagham Road that includes a right turn lane and associated pedestrian refuges.
 - viii. The safeguarding of land to help link the existing cycle route between Pagham Harbour and Chichester with Pagham Road via the site.
 - ix. An access strategy that is a Manual for Streets based development which includes a high level of permeability through the site for pedestrians and cyclists and good connections to the existing footway and PRoW network as well as an internal layout that encourages walking and cycling.
 - x. An access strategy that also includes a local centre, primary school and other facilities as part the proposals to encourage walking and cycling trips from within the development and from the adjacent residential area.
- 13.5 The purpose of this study is to:
- i. Confirm that the proposed site accesses can be provided with sufficient junction visibility and capacity and that they are suitable for all users.
 - ii. Show that the proposed development is permeable and has good connectivity with the surrounding transport network.
 - iii. Assess the impact of the proposed development at Pagham South on the wider highway network.

- iv. Confirm the Travel Plan measures that will support the proposed development.
- v. Identify if other mitigation measures are required as a result of development at Pagham South.

13.6 Key changes from TA/01 are as follows:

- i. Reconsidered the proposed junction arrangement; removal of the right turn lane for the southern access, the provision of an extension to the footways at the bellmouth of the access junctions and the provision of a supporting Design Audit.
- ii. Widening of all the proposed pedestrian refuge islands to 2.0m.
- iii. Revised approach for distributing and discounting the trip generation for the local centre traffic and update flow diagrams and modelling accordingly.
- iv. Revised approach to discounting primary school traffic and update flow diagrams and modelling accordingly.
- v. Remodelled the signalised junction at Rose Green Road/ Gossamer Lane/ Nyetimber Lane/ Grosvenor Gardens and provide the full LinSig modelling outputs.
- vi. Included modelling for the Rose Green Road/ Gossamer Lane/ Carlton Avenue junction.
- vii. Provision of an updated Residential Travel Plan, with more detail on travel vouchers and trip rate targets.
- viii. Consideration of the likely highway-related Section 106 contributions.

Conclusions

- 13.7 The proposed site access junctions can be provided with sufficient junction visibility and capacity, and are suitable for all users.
- 13.8 The masterplan demonstrates the new development is permeable for pedestrians and cyclists, and has good connectivity to the surrounding transport network.
- 13.9 The impact of the Pagham South development on the local highway network is not severe, and is able to be accommodated.
- 13.10 It is considered that the Travel Plan measures proposed to support the development are suitable, and will help to improve sustainability of the site by encouraging new and existing residents to walk, cycle and reduce car miles travelled.
- 13.11 This study confirms that no further mitigation measures are required.
- 13.12 This Transport Assessment concludes that there are no transport related reasons why the development at Pagham South should be refused planning permission.