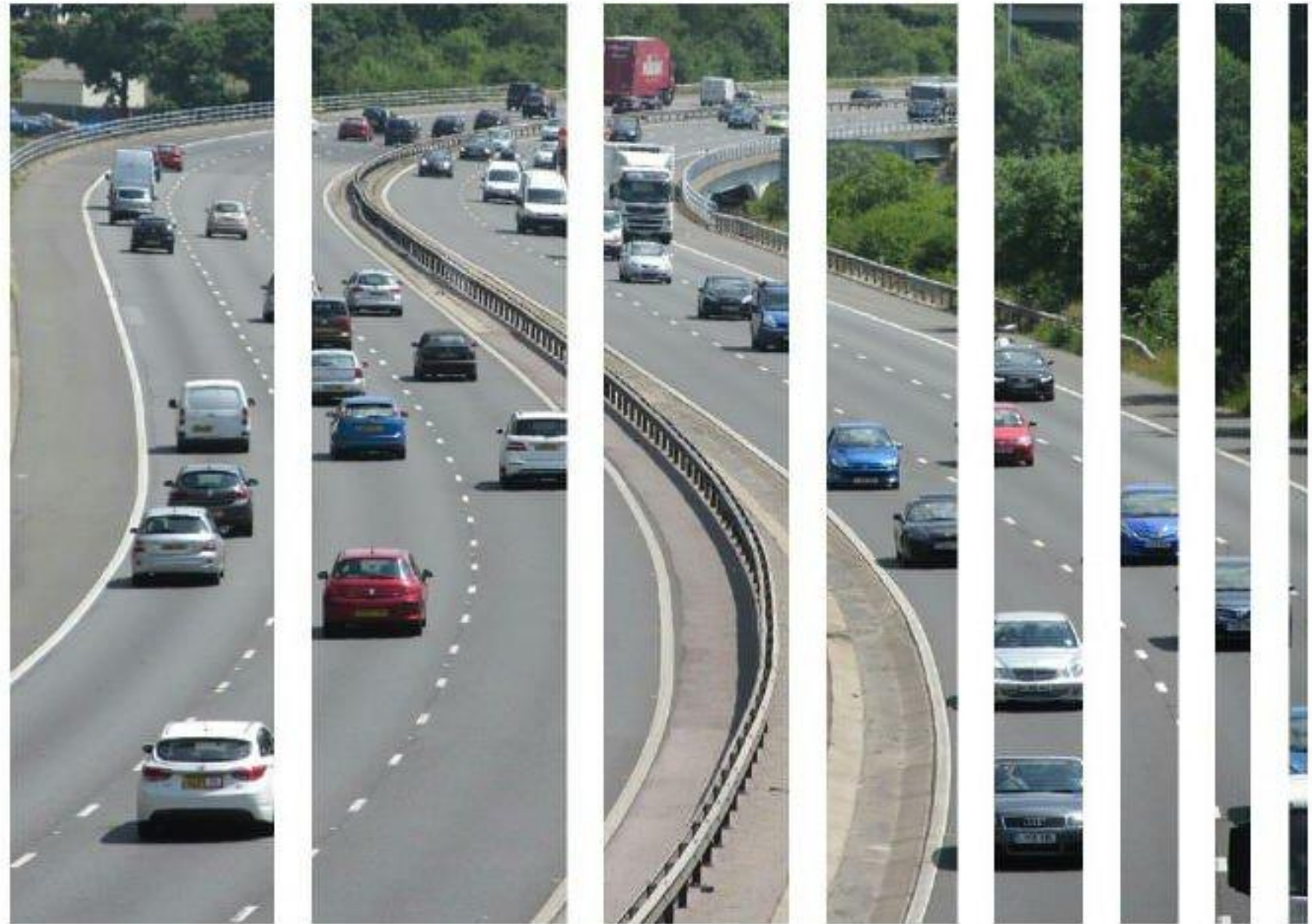




Havant Road, Emsworth

Transport Assessment

July 2016
Barratt Homes

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**RESIDENTIAL DEVELOPMENT
HAVANT ROAD, EMSWORTH**

TRANSPORT ASSESSMENT

CONTROLLED DOCUMENT

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RESIDENTIAL DEVELOPMENT HAVANT ROAD, EMSWORTH

TRANSPORT ASSESSMENT

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1. INTRODUCTION

- 1.1 This Transport Assessment (TA) has been prepared by Paul Basham Associates (PBA) on behalf of Barratt Homes (BH) to support a full planning application for a residential development comprising 192 dwellings at Havant Road, Emsworth.
- 1.2 The application site covers 6.23 hectares in total and is located approximately 1.8km east of Havant town centre and 1.6km west of Emsworth village centre. The application site is identified within **Figure 1**, with the proposed site layout included as **Appendix A**.



Figure 1: Site Location Plan

- 1.3 The site was first identified by Barratt Homes in 2007, with two public consultations undertaken in 2012 for residential developments of 180 and 136 units. Whilst these applications were not submitted, the initial transport appraisal was undertaken by Cole Easdon Transport Consultants, which has been used to inform this proposed application.
- 1.4 A public consultation was undertaken on 20th May 2016, and a Development Consultation Forum was undertaken on 9th June 2016, with pre-application discussions with Hampshire County Council (HCC) highways officers undertaken in June/ July 2016. The feedback received has informed the evolution of the development and the transport strategy promoted within this TA.
- 1.5 The scope of this TA reflects the principles of DfT's recently withdrawn 'Guidance on Transport Assessments' (March 2007), reviewing site accessibility, Personal Injury Accident data, car and cycle parking requirements, visibility and access arrangements, servicing arrangements, trip assignments, traffic impact and capacity assessment on the local road network (LRN) and

draws conclusions from the assessment.

- 1.6 A number of site visits have been undertaken to review the existing situation and identify the constraints, opportunities and site accessibility in relation to the highway network and local facilities.
- 1.7 A separate Full Residential Travel Plan (TP) has been prepared in conjunction with this TA (*document reference 041.0025/TP/1*), which seeks to facilitate and promote the use of sustainable transport modes, by providing a package of soft measures, supported by investment in on-site infrastructure. The TP will also include a detailed Action Plan and mode share targets, based on HCC Travel Plan guidance.

2.0 EXISTING CONDITIONS

Local Conditions

- 2.1 The application site comprises arable farmland (most recently used for grazing) located to the north of Havant Road, with the northern and western boundaries comprising the A27 trunk road and the boundary to the east characterised by residential development. The site and its surroundings are shown in **Figure 2**, with the existing site use demonstrated in **Photograph 1**.



Figure 2: Local Context



Photograph 1: Existing Site Use

- 2.2 The existing fields are accessed to the east of the site via a vehicle crossover leading to a gated entrance along Selangor Avenue. This access is demonstrated in **Photograph 2**. Another field gate access was present onto Havant Road until earlier this year when HCC removed this as part of their footway/ cycleway improvement works.



Photograph 2: Access to Existing Field along Selangor Avenue

Local Road Network

Havant Road

- 2.3 Havant Road has a carriageway width of 7m and is subject to a 30mph speed limit across the site frontage. Havant Road benefits from on-road cycle lanes along both sides of the carriageway along its length, and an off-road shared footway/ cycleway across the site frontage.
- 2.4 Havant Road provides a direct link between the centre of Havant and the centre of Emsworth. Havant Road also provides a direct link (with a set of double roundabouts 400m to the west) with the A27 trunk road, allowing commuter traffic from the site to access strategic roads without having to travel through the Local Road Network (LRN).
- 2.5 Havant Road itself has recently been subject to major improvement works, which included the widening of the footway on the northern (site) side of the carriageway to provide an off-road shared footway/cycleway, improved signage and improvements to the pedestrian refuge island to the east of the site.
- 2.6 An Automated Traffic Count (ATC) survey was undertaken on Havant Road between 3rd and 11th January 2016, which demonstrated average 85th percentile speeds of 35.3mph (westbound), 35.6mph (eastbound) and 5 day average westbound/eastbound traffic volumes of 10,536 and 10,360 respectively over a 24 hour period. The ATC results are summarised in **Figure 3**, and the outputs are included as **Appendix B** with the flows assessed in further detail in subsequent chapters of this TA.

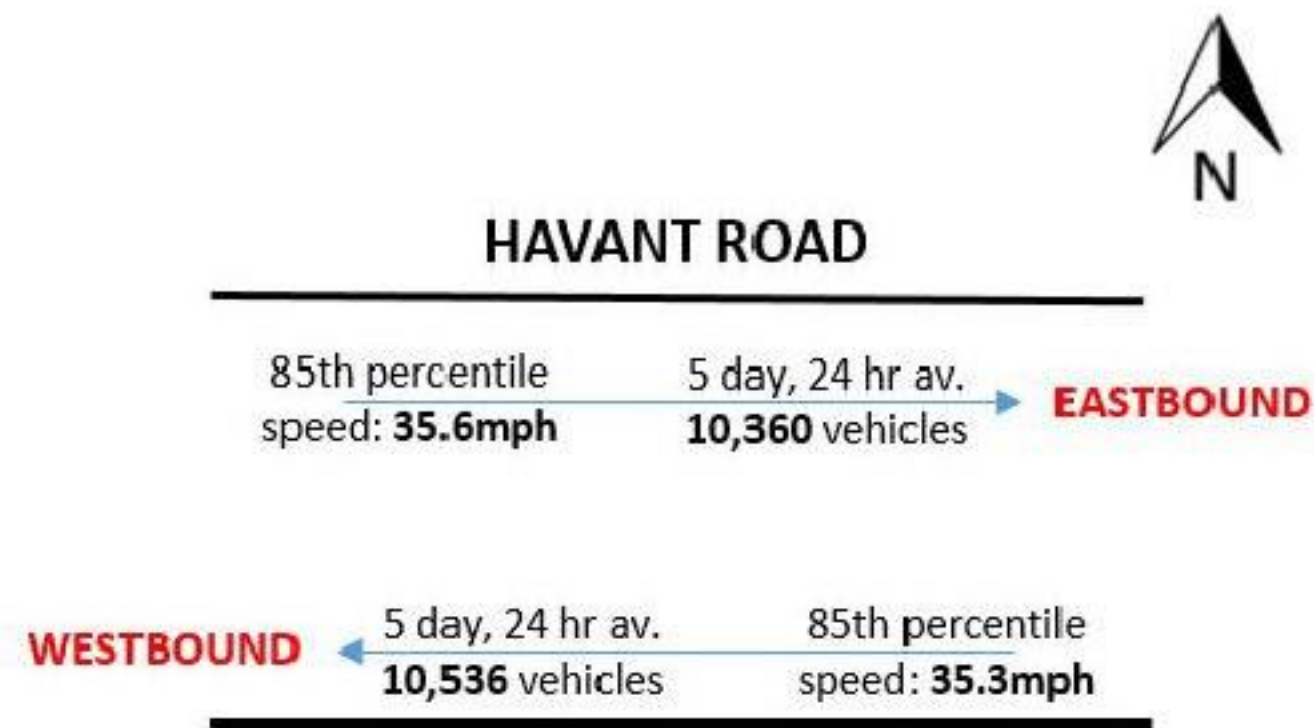


Figure 3: ATC Summary

- 2.7 Being on the site of a Roman Road, Havant Road has a straight alignment making visibility conditions favourable from the site frontage. As previously described, Havant Road is complemented by cycleways along both the northern and southern carriageway boundaries (including across the site frontage). As previously described, the site is also fronted by a recently improved shared footway/cycleway (in addition to the on-road cycleways) backed by hedgerow along the site boundary. Havant Road features across the site frontage are demonstrated in **Photograph 3**.



Photograph 3: Havant Road features across the site frontage

Wider Road Network

- 2.8 The A27 (directly to the west of the site) runs west-east from Salisbury (Wiltshire) and Pevensey (East Sussex) across the south of England, travelling via Romsey, Fareham, Havant, Chichester, Worthing, Brighton, Lewes and Polegate. The A27 provides a connection to the A3, M27 and A259, amongst other strategic roads. The site location relative to the Strategic Road Network (SRN) is demonstrated in **Figure 4**.

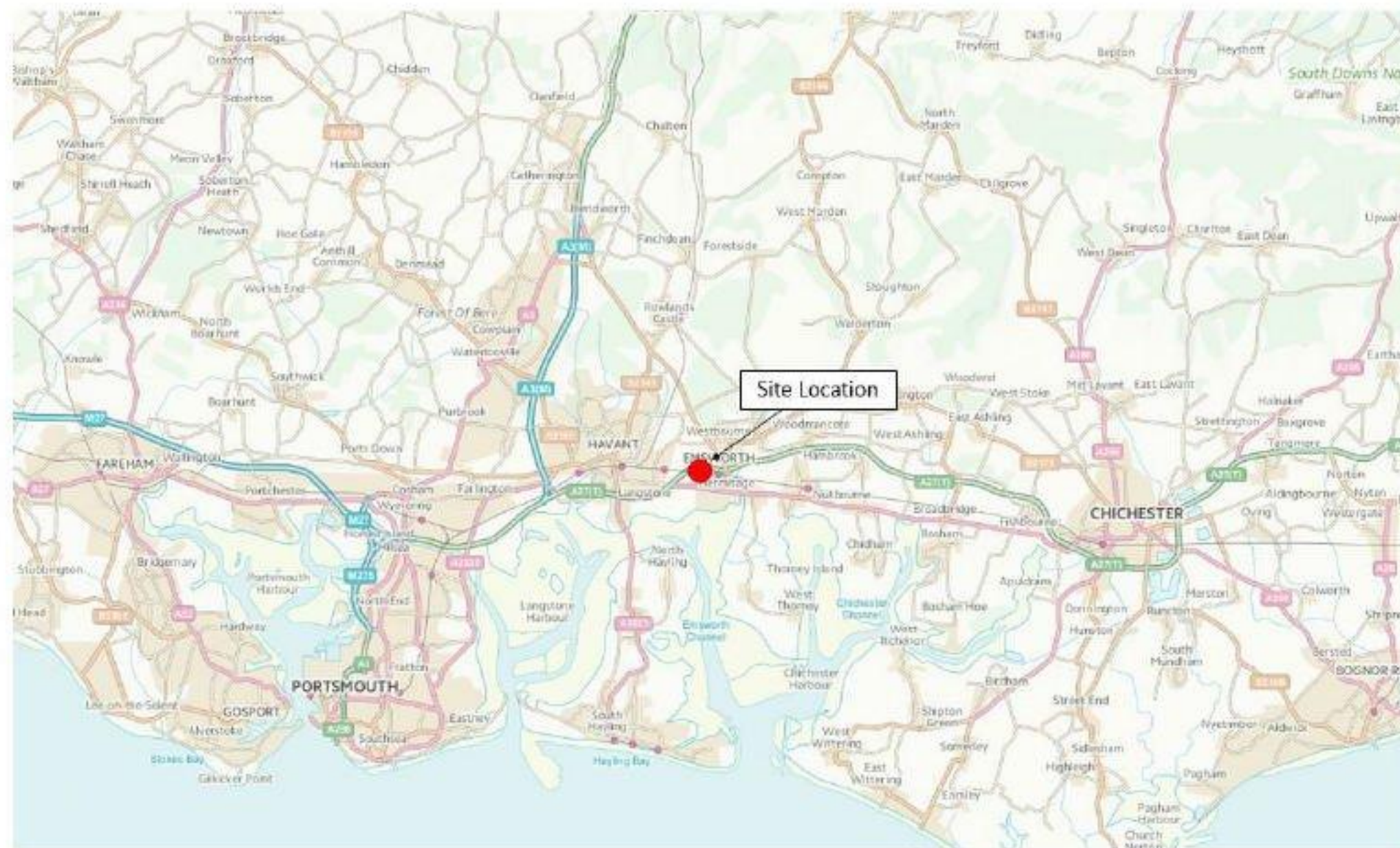


Figure 4: Site Location in relation to Strategic Road Network

- 2.9 Based on pre-application feedback received from HCC, the junctions within the vicinity of the site are assessed within this TA;
1. Havant Road/ North Street/ High Street roundabout to the east of the site; (the 'Emsworth Roundabout');
 2. Victoria Road/ North Street Junction.
 3. Havant Road/ A27 Slip Road/ Church Lane Roundabout;
 4. Emsworth Road/ Havant Road/ A27 Slip Road Roundabout;
 5. Southleigh Road/ Emsworth Road Junction.
- 2.10 The 'Emsworth Roundabout' is a four-arm roundabout linking the A259 (Havant Road) with North Street and High Street. High Street provides direct access to the centre of Emsworth and the seafront, whilst North Street provides access to Westbourne to the north (with no access to the A27), via the Victoria Road/ North Street junction. To the west, the A259 (Havant Road) travels past the site to the A27, with the A259 (eastbound) travelling through the villages of Prinsted and Nutbourne to the A27 and Chichester. Each entry arm provides two lanes, with each exit one-lane wide. The roundabout is supported by pedestrian refuge islands complete

with dropped kerbs and tactile paving on two of the arms (High Street and North Street).

- 2.11 The Victoria Road/ North Street/ Seagull Lane junction is located 320m to the north of the 'Emsworth Roundabout', and is a four-arm junction with priority given to North Street. To the north of the junction, North Street provides access to Westborne (with no access to the A27). Seagull Lane is a quiet road with no-through access, accessing a small industrial estate and a number of private garages. Victoria Road continues to the west and turns into Selangor Avenue, which comes out directly to the east of the site onto Havant Road. Whilst no pedestrian facilities are in place on the Victoria Road arm of the junction, the Seagull Lane arm is supported by dropped kerbs and tactile paving.
- 2.12 The Emsworth Road/ Havant Road/ A27 Slip Road Roundabout and the Havant Road/ A27 Slip Road/ Church Lane Roundabout form dumbbell roundabouts linking Havant and Emsworth with the A27 trunk road. The Havant Road/ A27 Slip Road/ Church Lane Roundabout provides southbound access on the A27 to Portsmouth, whilst the Emsworth Road/ Havant Road/ A27 Slip Road Roundabout provides northbound access on the A27 to Chichester and to Havant (passing the Southleigh Road/ Emsworth Road junction). No pedestrian facilities are provided in the vicinity of either junction, however an underpass under the A27 is in place for pedestrians wishing to travel between Havant and Emsworth.
- 2.13 The Southleigh Road/ Emsworth Road junction is provided as a signalised junction to the east of the Emsworth Road/ Havant Road/ A27 Slip Road Roundabout. Southleigh Road splits into two c.500m to the north of Emsworth Road, with a main arm provided with two-way access and the second arm provided with one-way access only from Emsworth Road (no access from Southleigh Road). Signals are provided on the Emsworth Road and Southleigh Road arms, as well as for Pook Lane to the south.

PIA Data

- 2.14 Personal Injury Accident (PIA) data has been assessed to consider the existing safety situation on the LRN, and in particular on Havant Road. Patterns displayed in the data can be assessed with regards to the proximity, frequency and severity of incidents that have occurred that may require further in depth consideration. At the pre-application stage, it was agreed that the extent of PIA data obtained was sufficient, however HCC made comment on the frequency of cycle accidents in the vicinity of junctions over the survey area.
- 2.15 The PIA data has been obtained from Hampshire Constabulary for a period of 5 years from 2010 to 2015. The PIA data is included in **Appendix C**.
- 2.16 There have been a total of 29 PIAs in the vicinity of the site (between the North Street/ High

Street/ Havant Road roundabout and west of the A27 junctions) during this period with no fatal incidents occurring. Eight of the 29 accidents were recorded as serious, and are summarised as the following:

1. Motorcycle collided with a goods vehicle while attempting to pass on Havant Road at Junction with A27 Westbound

Date of incident: 18/10/2015

2. Car turned right from Bath Road onto Havant Road, 'thinking the road was clear' and collided with a car travelling along Havant Road.

Date of incident: 22/09/2015

3. Car turned right from Nore Farm Avenue onto Havant Road and collides with cyclist.

Date of incident: 13/01/2015

4. Car rode over defective dividing lines between lane 1 and 2, unsettling motorcycle driver causing it to lose control on A27 westbound slip road.

Date of incident: 19/06/2014

5. Car turned right into Highland Road and crossed path of cyclist on Havant Road.

Date of incident: 10/06/2014

6. Car travelled along Emsworth Road entered roundabout and collided with cyclist travelling around roundabout

Date of incident: 15/04/2014

7. Car travelling along Havant Road did not slow completely at roundabout and collided with cyclist's rear wheel

Date of incident: 18/10/2013

8. Car travelling on A27 off slip approached roundabout and collided with the kerb & a road sign

Date of incident: 01/01/2013

2.17 21 'slight' accidents have been recorded over a five year period, roughly equating to one incident every three months, with a number of these located on the A27 slip road (both eastbound and westbound), and also on Havant Road at junctions with side roads.

2.18 The distribution and severity of the PIA incidents on the local road network is demonstrated in **Figure 5**, with yellow circles identifying 'slight' accidents and red circles identifying 'serious' accidents.

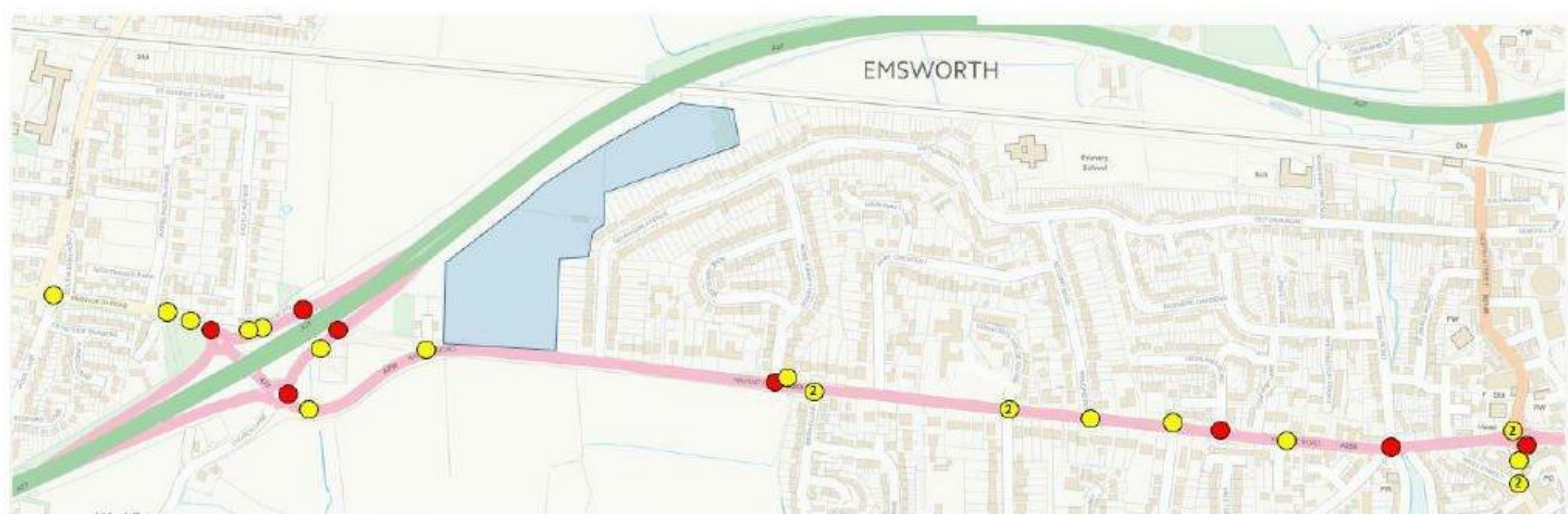


Figure 5: PIA Incidents in the vicinity of the site (2010-2015)

2.19 Whilst any PIA is regrettable, it can be seen that there is no particular pattern in the data, other than that the accidents tend to occur at junctions (as expected).

2.20 **Figure 6** identifies the recorded causes of PIA incidents.

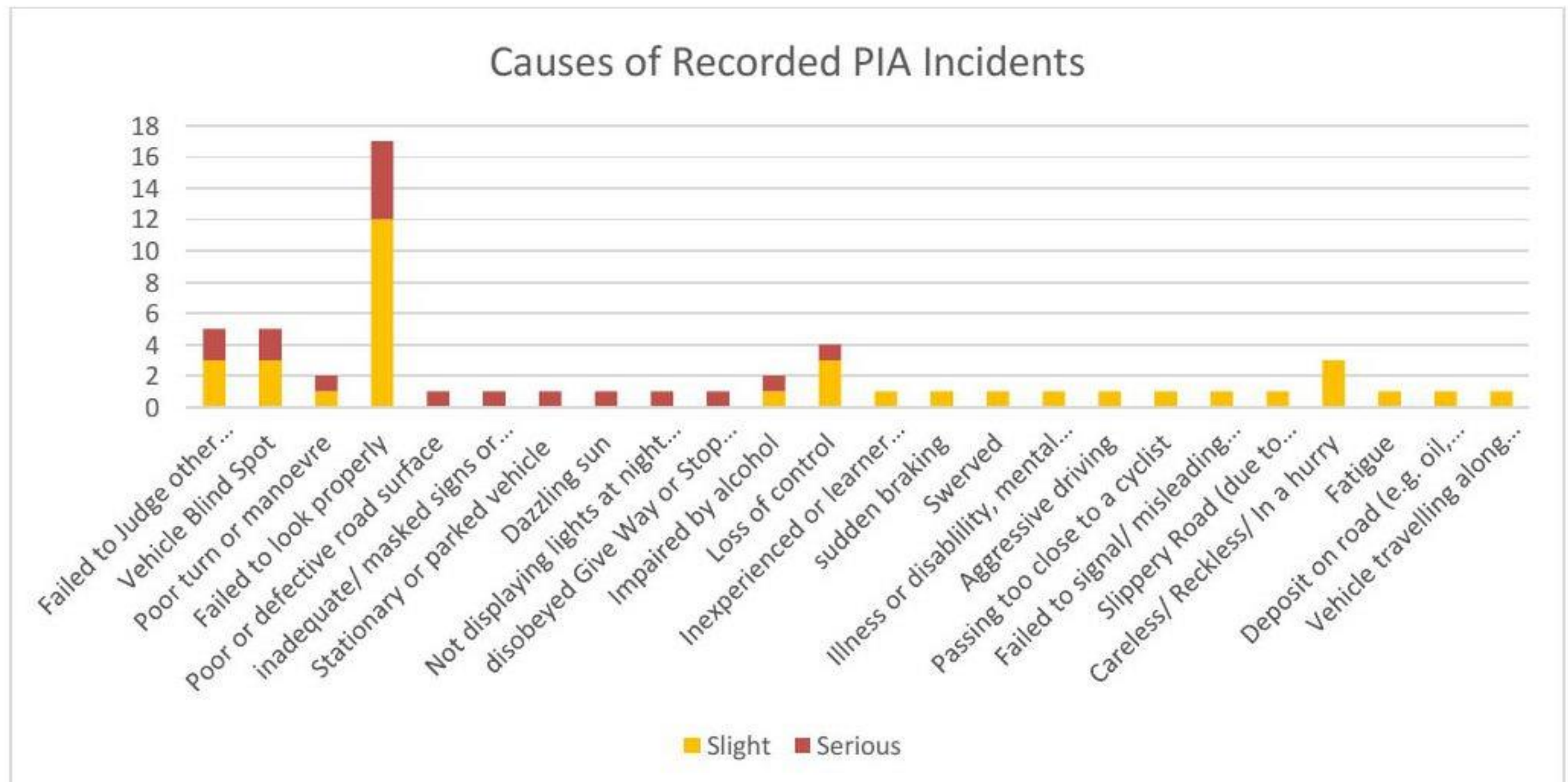


Figure 6: Causes of Recorded PIA Incidents (2010-2015)

2.21 When evaluating the 29 incidents, a number had more than one cause. Of these, the majority (of both 'slight' and 'serious' incidents) were attributed either to the driver failing to look properly, or failing to judge the other person's path or speed.

2.22 In addition, accidents recording cyclists have been separately identified, as demonstrated in **Figure 7**, with the causes of cycle incidents shown in **Figure 8**. Again, the yellow circles identify slight accidents and the red circles identify serious accidents.



Figure 7: PIA Incidents involving cyclists in the vicinity of the site (2010-2015)

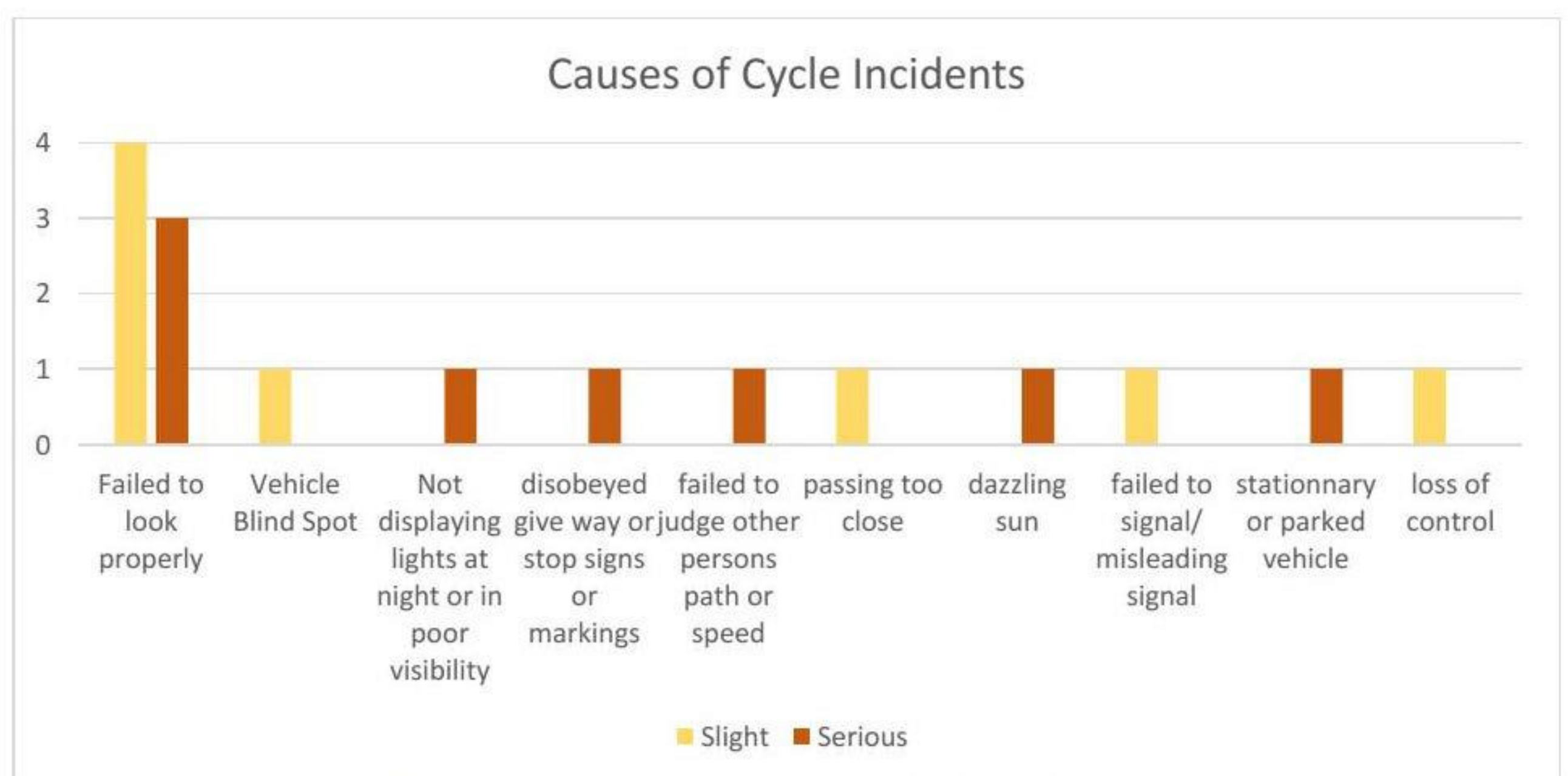


Figure 8: Causes of Cycle Incidents (2010-2015)

- 2.23 Of the 29 PIAs, 10 involved cyclists (4 serious incidents, 6 slight). Of these, the majority occurred at either the Emsworth Roundabout to the east of the site or the A27 dumbbell roundabouts to the west. As demonstrated in **Figure 8**, the cause of each incidents can be attributed only to driver error, rather than due to poor/ inadequate road conditions.
- 2.24 The high flows of traffic on Havant Road, as well as the Emsworth Roundabout to the east and the dumbbell roundabouts to the west, mean that the accidents identified in the vicinity of the site are not considered particularly high compared to the volume of traffic identified in the area.
- 2.25 Overall, the distribution, frequency and severity of the incidents does not suggest a trend in the PIAs, and none of the incidents attribute the design of the highway as a contributing factor

to the cause of the accident.

- 2.26 It is noteworthy that the recent improvements (January 2016) on Havant Road, specifically those involving the widening of the northern footway to accommodate cyclists off-road and the improvements to the pedestrian refuge island to accommodate cyclists, are expected to improve safety for all road users. Improvements were also introduced to the underpass of the A27, allowing cyclists to travel from Emsworth to Havant avoiding the dumbbell roundabouts.
- 2.27 It should also be noted that, whilst cycle access (to tie in with the existing cycle lanes) will be provided onto Havant Road, a second pedestrian/ cycle/ emergency access is proposed onto Selangor Avenue. From Selangor Avenue, it is expected that cyclists wishing to travel east will follow Selangor Avenue east to Emsworth's local centre & Emsworth railway station, with cyclists wishing to travel west towards Havant using the off-road cycle lanes on the site side of Havant Road, and the underpass under the A27. Therefore, cyclists will have little reason to cross Havant Road or any junction in the vicinity of the site (other than the site access).

3.0 ACCESSIBILITY

- 3.1 At the pre-application stage it was agreed that the site's proximity to local services is adequate, and that the bus service and cycle infrastructure was 'generally of a fair standard'. It was noted that travel by bus and cycle may be more desirable than walking, and a number of infrastructure improvements which HCC are aware of were also provided to inform our assessment.
- 3.2 Whilst this chapter focuses on 'site accessibility' for sustainable modes of transport, a Non-Motorised User (NMU) Audit has also been completed, which outlines potential opportunities and constraints with the existing NMU infrastructure in the vicinity of the site. The NMU is contained as **Appendix D**.
- 3.3 The application site is located 1.6km to the west of Emsworth local centre and 1.8km to the east of Havant town centre. The local facilities, services and amenities available within both Havant and Emsworth are illustrated in an 'Accessibility Map', included as **Appendix E**.
- 3.4 The site's proximity to existing local amenities, pedestrian, public transport and cycle networks presents an opportunity to encourage the use of sustainable transport and create a sustainable development, particularly by encouraging travel by bus and cycle. A summary of the local facilities and their associated walking and cycling distances from both the site access on Havant Road and the rear of the site is shown in **Table 1**.

Amenity	Approximate Walking Distance (site access)	Walking Time (minutes)	Cycle Time (minutes)	Approximate Walking Distance (rear of site)	Walking Time (minutes)	Cycle Time (minutes)
Local Primary School	900m	11	3	900m	11	3
Local Secondary School	1.5km	19	5	1.5km	19	5
Railway Station	1.9km	20	6	1.7km	21	6
Closest Post Office	1.5km	19	5	1.8km	23	6
Bank	1.6km	20	5	2km	25	8
Doctors	1.6km	20	5	2km	25	8
Dentist	1.4km	18	5	1.9km	20	6
Closest Bus Stop	160m	2	1	580m	7	2
Closest Convenience Store	400m	5	2	730m	9	2

Table 1: Distances to Local Facilities

- 3.5 The CIHT provides guidance for 'Providing for Journeys on Foot (2000)', which identifies 'desirable', 'acceptable' and 'preferred maximum' distances for certain locations. As demonstrated in **Table 2**, and referring to **Table 1**, each distance is considered to be within the 'preferred maximum', as recommended by the CIHT guidance.

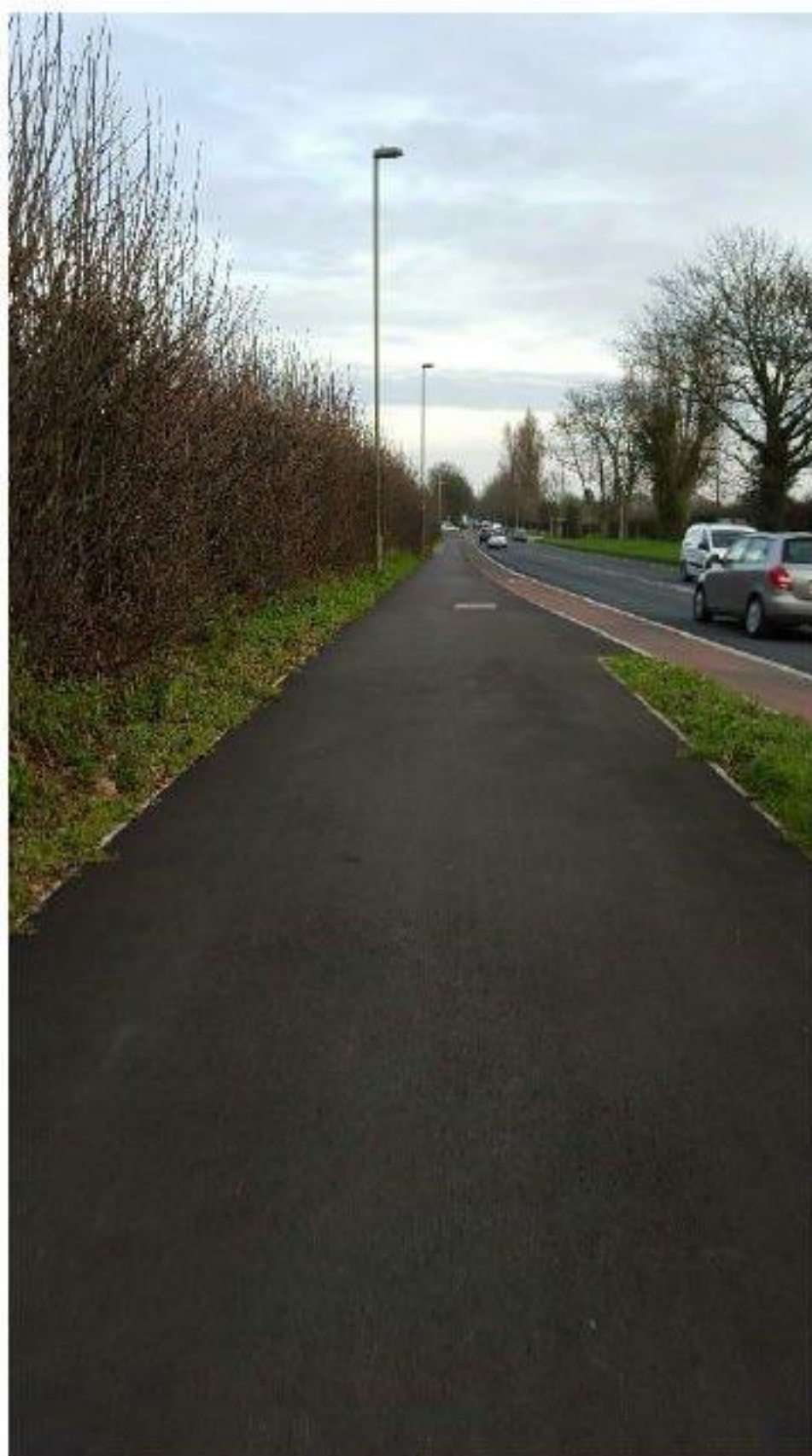
	Town Centre (m)	Commuting/ School/ Sight- Seeing (m)	Elsewhere (m)
Desirable	200	500	400
Acceptable	400	1000	800
Preferred Maximum	800	2000	1200

Table 2: CIHT Guidance for Providing for Journeys on Foot

Pedestrian & Cycle Network

Havant Road

- 3.6 Pedestrian and cycle facilities within the vicinity of the site have recently been substantially upgraded, to provide a shared footway/ off road cycleway across the site frontage and an on-road cycleway adjacent to this on both sides of the carriageway. The footway/ cycleway provision on Havant Road is demonstrated in **Photograph 4**.



Photograph 4: Pedestrian and Cycle Infrastructure across the Site Frontage

- 3.7 As part of the recent improvements, the pedestrian refuge island 120m to the east of the site has been improved also, and now provides a crossing for both pedestrians and cyclists to the bus stop on the opposite side of the carriageway, as shown in **Photograph 5**.



Photograph 5: Recently Upgraded Pedestrian Refuge Island on Havant Road

- 3.8 As described within the PIA section of this report, the majority of both pedestrian and cycle movement from the site along the pedestrian/ cycle desire lines does not require crossing on Havant Road, with the only specific movement observed to be to the bus stop in the westbound direction. In any case, the recently upgraded crossing is considered sufficient to accommodate pedestrian and cycle crossing on Havant Road.
- 3.9 To the west of the site towards Havant, the pedestrian/cycle facilities have also been improved, to provide a more user-friendly link to the underpass, which takes users along a vehicle-free route to Havant under the A27. The improved facilities in this area are demonstrated in **Photograph 6**.



Photograph 6: Recently Upgraded Shared Footway/ Cycleway to the west of the Site

Selangor Avenue

- 3.10 Selangor Avenue (onto which a separate footway/ cycleway is proposed) is supported by well-lit, continuous footways along the length of both sides of the carriageway, in a residential environment. The footways provide access to Emsworth Primary School and residential areas to the north, and Havant Road (and associated pedestrian/cycle infrastructure) to the south.
- 3.11 It was suggested by HCC that improvements should be sought to encourage walking trips '*such as the route to the school where the footways are of a poor standard and narrow in places*'.
- 3.12 At the junction of Selangor Avenue with Havant Road, a recently upgraded dropped kerb/ pedestrian tactile paving arrangement is provided, with appropriate signage for cyclists to dismount. This arrangement is demonstrated in **Photograph 7**.



Photograph 7: Selangor Avenue Crossing Arrangements

- 3.13 In the wider vicinity, the local highway network is conducive to walking/cycling activity with a gentle topography. National Cycle Route 2 passes along the southern site boundary along Havant Road on both sides of the carriageway, as demonstrated in **Photograph 4**. National Cycle Route 2 runs along the south coast between Emsworth town centre and Chichester to the east, and Havant railway station to the west (by way of the underpass under the A27).
- 3.14 Cycle routes on the wider road network are demonstrated in **Figure 9**, with green coloured routes representing off-road cycling facilities, purple coloured routes representing on-road cycle facilities, the yellow route representing National Cycle Route 2 and the red circle representing the site location.

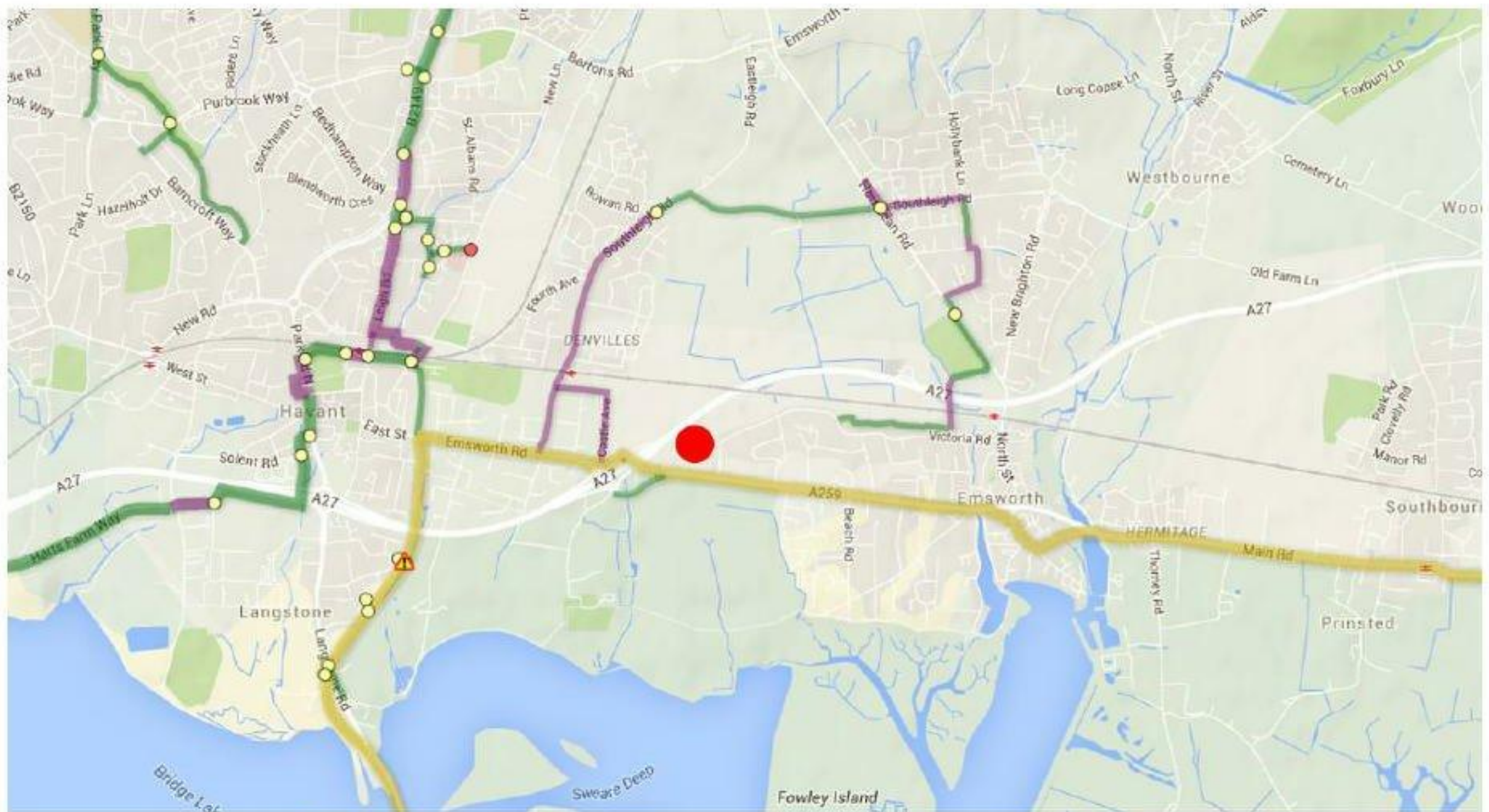


Figure 9: Local Cycle Routes (extract from www.sustrans.co.uk)

Bus Services

- 3.15 The site is supported by a pair of bus stops on Havant Road, approximately 280m from the site access, which are served by the Stagecoach Coastliner 700 bus service and two school buses; the 31A and the 145. A summary of these services is provided in **Table 3**.

Service	Route	Operator	Frequency		
			Monday - Friday	Saturday	Sunday and Public Holiday
700	Flansham Park – Bognor Regis – Chichester – Havant - Portsmouth	Stagecoach	Every 20 minutes	Every 20 minutes	Every 30 minutes
31A (School Bus)	Hayling Island – Southbourne – Chichester High School	Emsworth & District	Daily at 07:45	-	-
145 (School Bus)	Hambledon – Waterlooville – Havant - Emsworth	First	Daily at 16.15	-	-

Table 3: Summary of Local Bus Services

- 3.16 Both stops are supported by pole and flag signage with a covered, seated waiting area. The stop on the northern (site) side of the carriageway is demonstrated in **Photograph 8**, whilst the stop on the southern side can be easily accessed from the site via the pedestrian refuge island.



Photograph 8: Havant Road Bus Stop

Rail Services

- 3.17 Warblington Railway Station is located c.1.3km (15 minute walk/ 4 minute cycle) to the north west of the proposed site, with an underpass providing a safe route under the A27.
- 3.18 Warblington Railway Station is on the West Coast Way Line and provides direct access to destinations including Brighton (1h), Southampton Central (45m), Portsmouth Harbour (21m), Littlehampton (35m) and London Victoria (1h44m). Trains typically stop at a frequency of two per hour for services between Brighton and Southampton and at a frequency of one per hour for services to London.
- 3.19 The station can also be accessed via the Number 700 bus service (as previously described) which stops within 450m (a 6 minute walk) of Warblington Railway Station along Emsworth Road.

Summary

- 3.20 To summarise, the pre-application comments have stated that, whilst the site is situated in a reasonably accessible location, the focus should be on bus and cycle when encouraging sustainable travel rather than walking, and that the bus services and cycle infrastructure are 'generally of a fair standard'.
- 3.21 Whilst it is acknowledged that the walking distances to some services are higher than average, the majority are still within the preferred maximum walking distance as outlined by the CIHT 'Guidelines for Providing for Journeys on Foot'.
- 3.22 Pedestrian and cycle facilities on Havant Road have recently been upgraded to form an off-road shared footway/ cycleway from the site access, in addition to the former on-road cycle lanes, with an upgraded pedestrian refuge island also in place to the east of the site.
- 3.23 Footways on Selangor Avenue are in keeping with a residential environment, and are considered suitable for this development, following completion of an NMU.
- 3.24 It is considered that, if any improvements are sought towards improving footway infrastructure, these should be implemented through contributions.

4. PLANNING POLICY

National Planning Policy

4.1 The National Planning Policy Framework (NPPF), adopted in March 2012, acts as the national guidance for development planning and replaces the national Planning Policy Guidance and Plan Policy Statements, including Planning Policy Guidance 13 (PPG13): Transport.

4.2 Designed to make the planning system less complex and more accessible, the NPPF gives greater responsibility to local authorities, a 'presumption in favour of sustainable development', and encourages local planning authorities to 'positively seek' opportunities to meet the development needs of their area.

4.3 The NPPF paragraph 32 states:

"All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:

- The opportunities for sustainable transport have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- Safe and suitable access to the site can be achieved for all people; and*
- Improvements can be undertaken within the transport network that cost-effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe."*

4.4 This TA and accompanying Travel Plan accord with these principles. The NPPF also cites the following as key considerations with regards to transport and development planning to which this proposal's highway approach adheres:

- The development gives priority to pedestrian and cycle movements, and has access to public transport facilities;*
- The development has a safe and secure layout which minimises conflicts between traffic and cyclists or pedestrians, avoids street clutter, and where appropriate, establishes home zones; and*
- The development considers the needs of people with disabilities.*

Hampshire County Council Local Transport Plan 3 (LTP3 2011-2031)

4.5 LTP3 sets out HCCs transport strategy and identifies a range of policy objectives, based on the three guiding principles of "developing and supporting stronger communities, maximising

wellbeing and enhancing quality of place". The most relevant policy objectives to this TA are summarised as:

- *Continue to work to improve road safety through targeted measures that deliver reductions in casualties and to reduce the impact of traffic on community life and promote considerate driver behaviour*
- *Work with district authorities to agree coherent policy approaches to parking*
- *Invest in sustainable transport measures, including walking and cycling infrastructure*

Havant Borough Core Strategy (2011)

4.6 The Havant Borough Core Strategy (2011) is the principal document in the local plan. It covers the Borough of Havant, and sets out what services, facilities and infrastructure are needed, and when and how they will be delivered. It also includes a commitment to identify sufficient space for 6,300 new homes between 2006 and 2026.

4.7 The Core Strategy includes 'Core Strategy Policies', of which a number relate to this Transport Assessment:

Policy CS16 High Quality Design

1. Planning Permission will be granted for development that is designed to a high standard, which helps to create places where people want to live, work and relax. All development should demonstrate that its design:

d) Is well connected to and integrates with the immediate local area and the wider area by linking to existing pedestrian and cycle routes and encouraging people to use public transport where possible.

2. Produces a positive relationship between buildings, street and spaces both existing and proposed, where:

b) New streets are not dominated by vehicular traffic;

c) The layout of the development is legible, meaning it is easy to orientate oneself and move through.

Policy CS20 Transport and Access Strategy

Development will be permitted that:

- 1. Is consistent with and contributes to the implementation of the 'Reduce, Manage and Invest' strategy;*
- 2. Does not increase congestion and promotes better use of existing transport networks;*
- 3. Improves accessibility to goods, services and employment and promotes equality in the transport system;*
- 4. Provides transport management measures to ensure the safe and efficient operation of the strategic and local road network;*
- 5. ensures that highway design responds positively to the characteristics of the area and delivers a high quality public realm for all users;*
- 6. Maintains or improves the range of transport modes accessible to the users of the development site with specific emphasis on public transport, especially high quality/frequency buses and includes walking and cycling where appropriate;*

5.0 PROPOSED DEVELOPMENT

Accommodation Schedule

- 5.1 The proposed development comprises 192 dwellings, of which 30% would be affordable. The proposed accommodation schedule is summarised within **Table 4**, whilst the proposed site layout is included within **Appendix A**.

	Unit Type	Number of Dwellings
Affordable	1 Bedroom House/Flat	30
	2 Bedroom Flat	3
	2 Bedroom Coach House	6
	2 Bedroom House	6
	3 Bedroom House	11
	4 Bedroom House	1
	TOTAL	57
Private	1 Bedroom House/ Flat	33
	2 Bedroom Flat	11
	2 Bedroom Coach House	9
	2 Bedroom Bungalow	4
	2 Bedroom House	16
	3 Bedroom House	46
	4 Bedroom House	16
	TOTAL	135
	Total	192

Table 4: Accommodation Schedule

Car Parking Provision

- 5.2 Havant Borough Council's Draft Parking SPD (updated January 2016) will replace the previous standards which were based on guidance outlined in Planning Policy Guidance Note PPG13, which advised maximum standards. As PPG13 has now been superseded by the NPPF, (and minimum standards are now advised) the draft parking standards have been used to assess the level of car parking required at this development.
- 5.3 Havant's Draft Parking Standards identify both minimum and maximum parking standards for the district based upon accessibility. Outside of Havant or Waterlooville town centres (where this site is located), the minimum car parking requirements are used. These are outlined, along with the proposed car parking provision for the site, in **Table 5**.

Size of dwelling	Car Parking Requirements per Dwelling	Total Units	Total Requirements
1 Bedroom	1 space	63	63
2 Bedroom	2 spaces	55	110
3 Bedroom	2 spaces	57	114
4+ Bedroom	3 spaces	17	51
TOTAL	-	192	338

Table 5: HBC Draft Car Parking Standards

- 5.4 In addition to these minimum requirements, an additional 20% unallocated parking for visitors is required.
- 5.5 The development would provide a total of 338 residential spaces. Of these, 1 allocated space would be provided for any 1 bedroom unit, 1 to 2 spaces for 2 bedroom units, 2 spaces per 3 bedroom unit and 3 spaces per 4 bedroom unit. A further 22 spaces are intended for formal visitor parking spaces, totalling 360 parking spaces in total.
- 5.6 The proposed development would also be supported by a Full Residential Travel Plan which would again support the lower provision of parking and considers the urban design principles.
- 5.7 Based on the sustainable travel opportunities available in the surrounding area we would not anticipate any overspill parking occurring on the local road network and are therefore comfortable that any parking associated with this development would occur within the development boundaries. Whilst 22 formal visitor spaces are provided, there is ample opportunity within the site for further on-street visitor parking to occur.
- 5.8 Each parking bay measures 2.4m x 4.8m in width, in accordance with HBC's Draft Parking SPD (April 2015), with a 6m aisle width where appropriate.

Cycle Parking Provision

- 5.9 Havant Borough Council's Draft Parking SPD (January 2016) has again been consulted to assess the level of cycle parking required. The standards are outlined in **Table 6**.

Size of dwelling	Cycle Parking per Dwelling
	Long Stay
1 Bedroom	1 space per unit
2 Bedroom	2 spaces per unit
3 Bedroom	2 spaces per unit
4+ Bedroom	2 spaces per unit

Table 6: HBC Cycle Parking Standards

An additional 20% short-stay visitor parking is also required

- 5.10 Long-stay cycle parking will be provided for each unit within a dedicated cycle shed in the rear of each garden, or a garage (where provided and measuring at least 6m x 3m). For the flats, secure communal stores are proposed, which will be overlooked and well-lit to ensure that the stores are safe and user-friendly.

6.0 ACCESS ARRANGEMENT

- 6.1 The development site fronts onto Havant Road, which connects Emsworth with Havant and the A27 trunk road.
- 6.2 A seven day survey of traffic movements was undertaken in the vicinity of the site frontage between 3rd January 2016 and 11th January 2016. Based on the 5 day, 24 hour average there were a total of 10,536 vehicles travelling westbound and 10,360 vehicles travelling eastbound.
- 6.3 To inform the site access arrangement and design, a number of access options onto Havant Road have been considered using guidance outlined in TD42/95, the Havant Road ATC surveys, trip generation from the site, agreed trip distributions, safety for all road users and observations made on-site as to existing junction designs onto Havant Road.
- 6.4 Using DMRB guidance, total 5 day average daily Major Road flows of 20,896 and daily flows from the site access of 860, consideration should be given to a roundabout. Given the strong two-way movement of vehicles on Havant Road compared to the site access, a roundabout is not considered suitable for this particular development as roundabouts operate most successfully when there is a relatively balanced traffic flow across all roundabout arms. At present, none of the side road junctions onto Havant Road (from Selangor Avenue, Nore Farm Avenue, Park Crescent, Record Road etc.) take the form of a roundabout. Instead, a signalised junction and a simple priority junction have been considered, in accordance with pre-application discussions undertaken with HCC.

Junction Modelling

- 6.5 A signalised junction was tested using LinSig Modelling software in the 2021 future year + proposed development traffic and compared to a priority T junction tested in PICADY with the same level of traffic. The results demonstrate that a signalised junction would operate close to capacity in this scenario, whilst in comparison, a priority T junction would operate well within capacity.
- 6.6 The LinSig parameters used were as follows:
- 83 second cycle time (optimum cycle time);
 - Pedestrian phase at every cycle;
 - Space for two vehicles to wait to turn right into the site without blocking westbound traffic.

- 6.7 Due to the strong two-way movement on Havant Road, the most significant difference between the two junction arrangements would be the queue lengths given that, if a signalised junction is provided, traffic on Havant Road would be stopped in both directions for a period of time to allow green time to the site access arm. The difference in queue lengths between each junction option are demonstrated in **Table 7**.

Junction Arm	Queue Lengths – Signalised Junction		Queue Lengths – Simple Priority Junction	
	AM	PM	AM	PM
Site Access	2.1	0.9	2.04	0.75
Havant Road (westbound)	25.2	10.9	0.03	0.10
Havant Road (eastbound)	12.0	26.2	0	0

Table 7: Comparison of Signalised Junction and Priority Junction based on Queue Lengths

- 6.8 As demonstrated in **Table 7**, queue lengths and therefore waiting time on Havant Road are significantly longer when proposing a signalised junction on Havant Road compared to a simple priority junction. On a capacity basis therefore, a simple priority junction would be the most efficient and appropriate junction design.

Pedestrian/ Cycle Safety

- 6.9 During the pre-application stage, comments were raised over safety on Havant Road, particularly for cyclists. A signalised junction was therefore seen by HCC as potentially providing a greater level of safety for all road users.
- 6.10 Referring to **Chapter 2** of this report, a detailed assessment of Personal Injury Accidents has been undertaken along the length of Havant Road, with data obtained from Hampshire Constabulary for a five-year period. The assessment has demonstrated that, whilst 10 cycle incidents have occurred in the last five years, none involved road design issues, with each of the 10 incidents attributed solely to driver/ cycle error. In addition, the high level of flows on Havant Road mean that the 10 cycle accidents are not considered particularly high compared to the volume of traffic using the road each day.
- 6.11 Whilst a signalised junction may aid pedestrian/ cycle movement in the vicinity of the site, albeit already benefiting from a newly implemented off-road footway/ cycleway since the PIA data was recorded, longer queues (rather than free-flowing traffic) as anticipated when using a signalised junction may add to driver frustration and possibly more 'shunting' and similar accidents may occur.
- 6.12 It is not considered that a signalised crossing will particularly aid cyclists (other than turning right into the site) as both on-road and off-road dedicated cycle routes are in place in the vicinity

of the site. The desire line is such that pedestrians and cyclists would stay on the north (site) side of Havant Road, with very few wishing to cross. If crossing is desired, a recently upgraded pedestrian refuge island is in place to the east of the site, which is considered suitable for the expected low level of pedestrian/ cycle movements.

- 6.13 In addition, as previously described, a second pedestrian/ cycle/ emergency access is proposed onto Selangor Avenue to further improve safety for all road users.

Local Observations

- 6.14 DMRB TD42/95 guidance (para 2.5) states, *'The decision to provide a major/ minor priority junction rather than some other form of junction should be based on operational, economic and environmental considerations...However, sequences of junctions should not involve many different layout types. A length of route or bypass containing roundabouts, single lane dualling, ghost islands, simple priority junctions and grade separation would inevitably create confusion and uncertainty for drivers and may result in accidents. Safe road schemes are usually straightforward, containing no surprises for the driver.'*
- 6.15 Along the length of Havant Road, a number of simple priority T-junctions provide access to similar side roads, associated with a similar number of dwellings. The occasional junction is also provided with a right-turn lane. No junctions along Havant Road are provided with signals, and this environment can be transferred to this development. Using the guidance outlined above, a priority junction would therefore be considered the most suitable form of access to this development.
- 6.16 During the public consultation stage, concerns were raised over the waiting time for right-turning vehicles from Selangor Avenue onto Havant Road, particularly in the peak periods. A video survey was undertaken on 16th June 2016 during the AM peak period (where vehicles are most likely to be leaving Selangor Avenue). The surveys were undertaken for a three hour period (0700-1000), with the 0800-0900 period observed as the busiest hour.
- 6.17 The peak hour survey results are summarised in **Table 8**, with the full outputs included as **Appendix F**.

	In	Out
0800-0900	73	63

Table 8: Peak Hour Video Survey Results on Selangor Avenue

- 6.18 The results indicate a total of 136 movements (in/out), which is slightly higher than the 98 two-way movements anticipated from the site access in the AM Peak (as expected given the greater number of houses and school accessed on Selangor Avenue).

- 6.19 In addition to total movements, the queue length on Selangor Avenue waiting to turn onto Havant Road was monitored, with the results also provided in **Appendix F**. In the 0800-0900 peak hour, the highest number of queueing cars occurred at 08:55, with 6 cars waiting to turn onto Havant Road. In accordance with the slightly higher vehicle numbers, this is slightly higher than anticipated coming from the site access, as demonstrated in access modelling, which is contained in **Chapter 9** of this report.
- 6.20 In addition, the maximum waiting time at 08:55 (when the peak number of cars is registered as queuing on Selangor Avenue) is 37 seconds. Waiting times can be seen using the video survey, which can be made available on request.

Summary of Junction Type

- 6.21 To summarise, both a signalised junction and a simple priority junction have been assessed using appropriate modelling in the future year scenario, relevant guidance outlined in TD42/95, the Havant Road ATC surveys, trip generation from the site, agreed trip distributions, safety for all road users and observations made on-site and in the local area.
- 6.22 The junction modelling indicates that the junction operates just within capacity using a signalised arrangement, and well within capacity using a priority junction. In addition, queue lengths and therefore waiting time on Havant Road are significantly longer when proposing a signalised junction on Havant Road compared to a simple priority junction.
- 6.23 A detailed assessment of PIAs in the vicinity of the site and along the length of Havant Road has indicated no particular trend in data, with all accidents involving cyclists attributed to driver/cycle error. It is not considered that a signalised crossing will particularly aid cyclists (other than turning right into the site) as both on-road and off-road dedicated cycle routes are in place in the vicinity of the site.
- 6.24 Junctions in the vicinity of the site have been observed, with the majority provided as simple priority junction (with the occasional right-turn lane also provided). A video survey undertaken on Selangor Avenue indicates no particular queuing/ waiting time issue in the Peak hour.

Proposed Access Arrangement

- 6.25 The site is therefore proposed to be served by a single vehicular access point onto Havant Road, taking the form of a simple priority T-junction arrangement. As demonstrated in the General Arrangement drawing, included as **Appendix G**, the access road will measure 5.5m in width and be supported by 9m radii designed to accommodate large vehicles, including refuse and delivery vehicles entering and leaving the site. The proposed access would be built

to HCC adoptable standards.

- 6.26 A simple T-junction would sufficiently accommodate development traffic without unnecessary highways works on Havant Road, and could be implemented based upon the extent of highways land surrounding the carriageway. There are similar junctions within 100m of the proposed development which have similar traffic flows. During the AM peak when the level of traffic completing a right turn out of the site would be at its highest, there would still be less than 1 vehicle turning right every 2 minutes.
- 6.27 A modelling assessment using PICADY for the 2021 Baseline plus development flows show that a simple T-Junction (with a 5.5m wide access) would be more than sufficient to support the proposed development without significantly impacting upon flows on the existing LRN. The modelling results are presented in **Chapter 9** of this TA.
- 6.28 Visibility splays of 2.4m x 54.3m and 2.4m x 55m to the west and east respectively are achievable, reflective of the Manual for Streets requirements for the recorded 85th percentile speeds of 35.3mph and 35.6mph west and eastbound respectively. The visibility splays are demonstrated in **Appendix G** and speed surveys are attached as **Appendix B** for reference.
- 6.29 An independent Stage 1 Road Safety Audit (RSA) has been undertaken of the access design, and the full report including the Designers Response is provided in **Appendix H**. The RSA highlighted that the hazard paving was located in the wrong location. This issue has been noted in the Designers Response and drawings have been updated to reflect the recommendation.
- 6.30 A separate pedestrian/ cycle access is proposed onto Selangor Avenue to the east of the site, in the location demonstrated in **Photograph 2**. The pedestrian access will measure 3m wide and will be supported by bollards and appropriate signage to improve safety for cyclists. The pedestrian access is demonstrated in the site layout, included as **Appendix A**.

7.0 INTERNAL ROAD LAYOUT

7.1 The parameters of the site layout have been designed to create an attractive and permeable pedestrian and cycle environment. The development site's spine road measures 5.5m in width, after which the carriageways become narrower and more reflective of Manual for Streets (MfS) design guidance principles, with 4.8m being sufficient for a car and larger vehicle to pass. To summarise the design principles on which the scheme is based:

- Central spine road/avenue measures 5.5m to the block of flats, narrowing to 4.8m beyond this point;
- The entire length of the spine road is supported by 2m wide footways on either side of the carriageway;
- The loop road leading off the spine road measures 4.8m in width, supported by 2m wide footways on either side;

7.2 As the internal road moves out towards the periphery of the site into quieter cul-de-sacs, there will be shared-surface carriageways adopting 'home zone' principles.

7.3 In accordance with MfS design guidelines, all carriageway bends within the 'home zone' area of the proposed internal site design would achieve the required inter-visibility for vehicles travelling up to 15/20mph within the site, supported by planting maintained below 600mm in height (See **Appendix I**).

Servicing and Emergency Access

7.4 Tracking for a large 3-axle refuse vehicle has been completed on the proposed site layout to ensure that each property is located within convenient distance from the vehicle route. In keeping with MfS (paragraph 6.8.9) and Building Regulations guidance, no resident would be required to carry their bins greater than 30m to a collection point or kerb edge, and the refuse vehicle would be able to get within 25m of each property or collection point. Refuse vehicle tracking within the site is demonstrated in **Appendix J**, with tracking at the site access contained in **Appendix G**.

- 7.5 In keeping with access requirements for emergency service vehicles, the proposed layout incorporates space to accommodate turning movements for a fire tender (being smaller and more manoeuvrable than the large refuse vehicle). Each property would have fire tender access within 45m of the whole building, in line with Building Regulation requirements.
- 7.6 Emergency vehicle access is proposed via a separate access on Selangor Avenue, in the location of the existing gated access as demonstrated in **Photograph 2**. The emergency access is demonstrated on the site layout (included as **Appendix A**) and measures 3m in width, supported by lockable bollards. Beyond this point, the site layout has been designed so as to accommodate ease of movement for emergency vehicles.

8.0 DEVELOPMENT TRAFFIC IMPACT

8.1 This section of the TA assesses the likely vehicle trip generation associated with the proposed development.

8.2 The national system of trip generation analysis 'TRICS' has been considered to gain an indication of the trip rates for housing developments of comparable size, demographic, and location. Whilst the development includes provision for 30% affordable dwellings and 40% (77) flats, rates for 'private houses' only have been used to ensure a robust assessment. In addition, the development's accommodation schedule demonstrates over 60% one and two beds. The specific TRICS parameters used, which were agreed at the pre-application stage, are as follows:

- TRICS (v.7.3.1) database;
- 'Residential', 'Private Houses' use class;
- Sites in England and Wales only (with sites in Greater London excluded);
- 50-150 dwellings;
- Monday-Friday surveys only;
- 'Suburban Area' and 'Edge of Town' locations only.

8.3 The TRICS data outputs are attached as **Appendix K** for reference, whilst the peak period and daily trip rates per household and for a development of 192 dwellings are outlined within **Table 9**.

TRICS (v.7.2.4)	AM Peak (0800-0900)		PM Peak (1700-1800)		Total
	Arrivals	Departures	Arrivals	Departures	Daily
Trip Rate	0.145	0.362	0.329	0.174	4.479
192 Houses	28	70	63	33	860

Table 9: TRICS Trip Rates and Development Traffic

8.4 The TRICS trip rate analysis indicates a likely proposed trip generation of 860 daily vehicle trips, with 98 vehicle trips in the AM peak (0800-0900hrs) and 96 vehicle trips in the PM peak (1700-1800hrs). As the existing site is greenfield with no trip generation, the proposals' generated trips would all be additional to the LRN.

9.0 TRIP DISTRIBUTION

Site Access

- 9.1 In order to gain a greater understanding of how this additional traffic may impact the existing traffic trends in the area, baseline traffic surveys were conducted on Havant Road outside the proposed access. A summary of these traffic flows (using the 5 day, 24 hour average) is summarised within **Table 10**, whilst raw survey data is included as **Appendix B** for reference.

	Havant Road	
	EB	WB
AM Peak	710	1018
PM Peak	987	672
Daily Flows	10360	10536

Table 10: Baseline Traffic Flows on Havant Road

- 9.2 **Table 10** shows that daily westbound traffic flows on Havant Road are higher than the volume of traffic travelling east. In the AM peak (0800-0900), a higher volume of traffic has been observed to travel westbound (as expected due to the A27 junctions located to the west of the site), with the reverse demonstrated in the PM peak period (1700-1800).
- 9.3 The distribution of development traffic from the proposed site access during the AM and PM peak hours is expected to follow the trends observed on the Local Road Network. **Figure 10** demonstrates the future year (2021) traffic flows from the site access, using the trip rates previously identified.

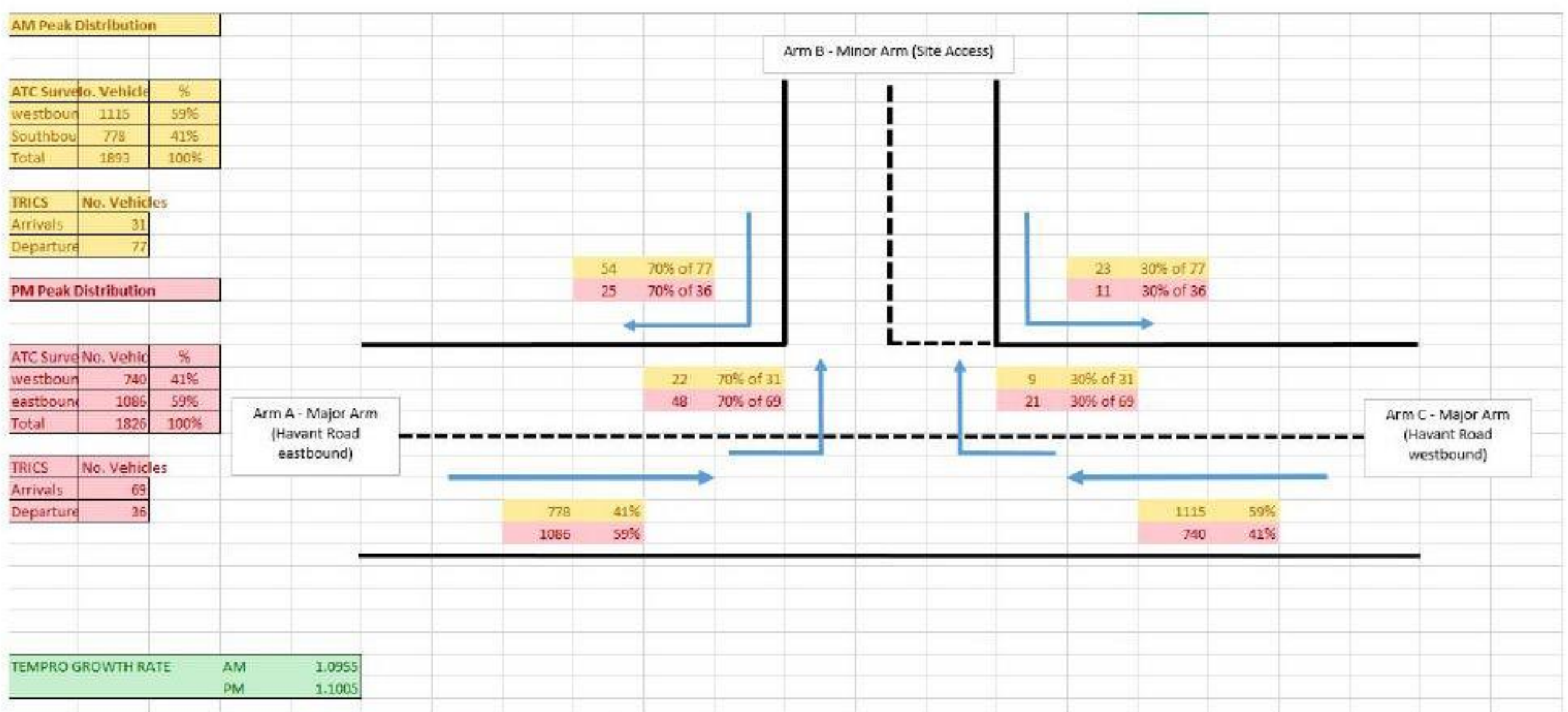


Figure 10: Future Year 2021 Distribution from Site Access

- 9.4 Traffic distribution from the site access is expected to follow the baseline trends identified on Havant Road, with the majority (70%) of traffic turning right out of the site in the AM peak towards the A27, and left into the site in the PM peak. In comparison, 30% of traffic is expected to travel left out of the site in the AM peak towards Emsworth, with the opposite occurring in the PM peak period.
- 9.5 The distributions from the site access at 70%/ 30% have been agreed in writing by HCC at the pre-application stage.

Turning Count Surveys

- 9.6 Turning count surveys were conducted during the peak hour periods in order to identify where existing traffic is flowing and inform where proposed development traffic is likely to be distributed on the local road network. Three surveys were undertaken on Thursday 4th February 2016 in the AM and PM peak periods at three locations:
1. 'Emsworth Roundabout' (Havant Road/ North Street/ High Street) to the east of the site;
 2. Emsworth Road/ Havant Road/ A27 Slip Road Roundabout;
 3. Havant Road/ A27 Slip Road/ Church Lane Roundabout.
- 9.7 Following pre-application discussions with HCC, further surveys were undertaken on Tuesday 12th July 2016 in the AM and PM peak periods at two locations:
4. Southleigh Road/ Emsworth Road junction to the west of the site;
 5. Victoria Road/ North Street junction to the east of the site.
- 9.8 The five surveyed junctions are shown in **Figure 11**, with a summary of the flow data demonstrated in **Tables 11 to 15**.

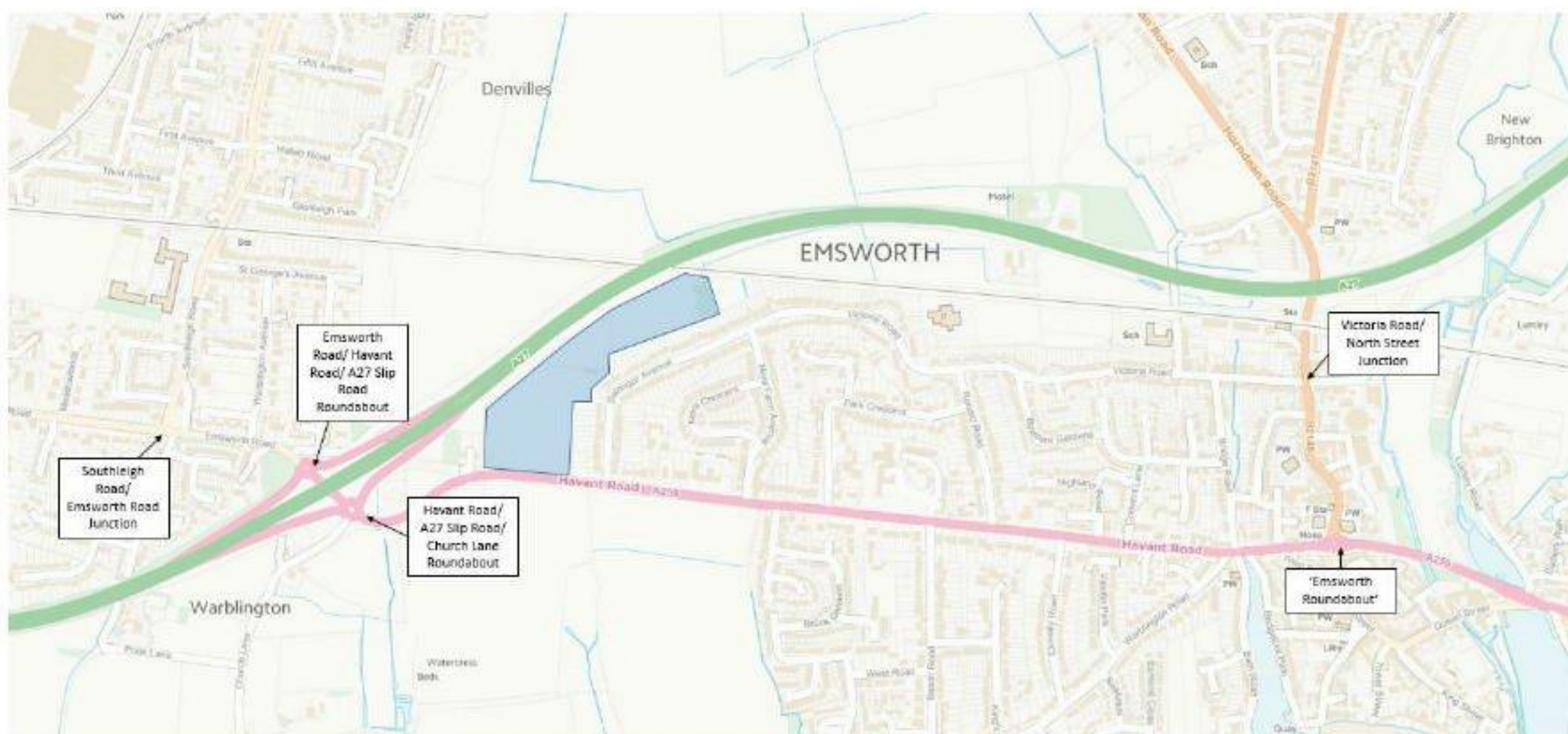


Figure 11: Turning Count Locations

Summary of Flow Data

'Emsworth Roundabout' (Havant Road/ North Street/ High Street)					
	North Street	A259 (E)	High Street	A259 (W)	TOTAL
AM (0800-0900)					
Flows	642	706	167	792	2303
PM (1700-1800)					
Flows	414	710	239	940	2303

Table 11: 'Emsworth Roundabout' (Havant Road/ North Street/ High Street) Turning Count Flows

Emsworth Road/ Havant Road/ A27 Slip Road Roundabout				
	Emsworth Road	A259	A27 EB Off Slip	TOTAL
AM (0800-0900)				
Flows	542	242	938	1724
PM (1700-1800)				
Flows	444	257	1320	2021

Table 12: Emsworth Road/ Havant Road/ A27 Slip Road Roundabout Turning Count Flows

Havant Road/ A27 Slip Road/ Church Lane Roundabout.					
	A259 (N)	A27 WB Off Slip	A259 (S)	Church Lane	TOTAL
AM (0800-0900)					
Flows	1139	66	1121	4	2293
PM (1700-1800)					
Flows	1293	115	761	0	2169

Table 13: Havant Road/ A27 Slip Road/ Church Lane Roundabout Turning Count Flows

Southleigh Road/ Emsworth Road Junction					
	Southleigh Road	Emsworth Road (E)	Pook Lane	Emsworth Road (W)	TOTAL
AM (0800-0900)					
Flows	431	457	45	323	1256
PM (1700-1800)					
Flows	271	623	32	439	1365

Table 14: Southleigh Road/ Emsworth Road Junction Turning Count Flows

Victoria Road/ North Street Junction					
	North Street (N)	Seagull Lane	North Street (S)	Victoria Road	TOTAL
AM (0800-0900)					
Flows	733	9	420	114	1276
PM (1700-1800)					
Flows	550	11	599	146	1306

Table 15: Victoria Road/ North Street Junction Turning Count Flows

TEMPRO Traffic Growth

- 9.9 In accordance with HCC guidance, analysis of the development traffic impact will be undertaken for 5 years from the baseline year (2021).
- 9.10 To factor up the baseline traffic data to the future year (2021), TEMPRO (NTEM adjusted) growth factors for the Emsworth district have been applied. The growth factors are demonstrated in **Table 16**, with the full TEMPRO outputs included as **Appendix L**. The TEMPRO growth rates have been agreed by HCC.

Period	Growth Rate	
	AM Peak	PM Peak
2016 – 2021	1.0955	1.1005

Table 16: TEMPRO Growth Rate (NTEM Adjusted)

10.0 JUNCTION CAPACITY ANALYSIS

- 10.1 As previously described, turning count surveys were completed on five junctions in the vicinity of the site in accordance with pre-application feedback from HCC highway officers.

Southleigh Road/ Emsworth Road Junction

- 10.2 Trip distribution analysis using turning count surveys and trip generation from the site has suggested that a total of 18 additional vehicles will travel through the Emsworth Road (N) arm of the Emsworth Road/ A27 roundabout in both the AM and PM Peaks and onto the Southleigh Road/ Emsworth Road junction 800m to the west of the site. This equates to a percentage increase in traffic of 1.43% in the AM Peak and 1.32% in the PM Peak.
- 10.3 It is therefore not considered necessary to formally assess this junction via a modelling analysis, as the volume of traffic from the site travelling through is negligible and within daily fluctuation.

Victoria Road/ North Street Junction

- 10.4 At the Victoria Road/ North Street Junction 1.8km to the north east of the site, trip distribution analysis using turning count surveys and trip generation from the site has suggested that a total of 11 additional vehicles will travel through the North Street arm of the 'Emsworth Roundabout' and onto the Victoria Road/ North Street junction in both the AM and PM Peak periods. This equates to a percentage increase in traffic of 0.9% in the AM Peak and 0.8% in the PM Peak.
- 10.5 Again, it is therefore not considered necessary to formally assess this junction, as the volume of traffic from the site travelling through is negligible and again within daily fluctuation levels.

Scope of Modelling

- 10.6 Based on the AM (0800-0900) peak and PM (1700-1800) peak periods, the three identified roundabouts and the site access have been modelled to gauge the traffic impact associated with the proposed development during peak network traffic periods.
- 10.7 To assess the proposed development's impact on the Local Highway Network, the modelling will consist of the following junctions:
- Site Access;
 - 'Emsworth Roundabout' (Havant Road/ North Street/ High Street) to the east of the site;
 - Havant Road/ A27 Slip Road/ Church Lane Roundabout;
 - Emsworth Road/ Havant Road/ A27 Slip Road Roundabout.

- 10.8 The junction modelling covers the following scenarios:
- Future Year 2021;
 - Future Year 2021 plus Proposed Development;
 - Future Year 2021 plus Proposed Development plus Mitigation Works (where required).
- 10.9 Modelling has been completed using ARCADY (for each roundabout) and PICADY (for the site access). The outputs for each model provide a ratio of flow to capacity (RFC) and maximum queue lengths associated with each stream (i.e. the arm of the junction). RFC values exceeding 0.85 signify the point at which capacity is being approached and the potential to improve capacity should be explored, whilst RFC values of 1.00 or degree of saturation at 100% represent the junction operating at capacity. The One Hour profile has been used in ARCADY, and ODTAB in PICADY, as the best approximation of the nature of the traffic flows.
- 10.10 All modelling has been completed using 'vehicle' values rather than PCUs and the appended traffic flow diagrams are also all in vehicles. The ARCADY model has been set to estimate 10% HGV traffic to ensure a robust assessment.
- 10.11 The method used to estimate the traffic generation of the proposed development and the method used to account for the future years and committed development is a 'worst case' scenario for the following reasons:
- The trip rates used to assess the proposed developments traffic generation are for 'Private Houses' only which produce significantly higher trip rates than mixed/affordable trip rates or mixed housing/flats trip rates;
 - The modelling and traffic generation does not quantify the impact of the Travel Plan which could achieve a modal shift with a sustainable transport strategy; and
 - The assessment does not take account the impact of peak spreading, whereby individuals may exit the development onto the LRN earlier or later to avoid travelling in the peak period.

Modelling Results

Site Access

- 10.12 Capacity modelling analysis for the proposed site access has been undertaken using PICADY modelling software for the 2021 scenario (with development).
- 10.13 The geometries used reflect those presented in the site access highways drawing (**Appendix G**).

10.14 The results for the modelling assessment are presented in **Table 17** and the full results are attached as **Appendix M**.

Scenario	Junction Arm	AM		PM	
		RFC	Max Queue	RFC	Max Queue
2021 (with development)	Site Access	0.704	2.04	0.443	0.75
	Havant Road (westbound)	0.030	0.03	0.090	0.10
	Havant Road (eastbound)	-	-	-	-

Table 17: Site Access Capacity Assessment

10.15 The modelling results demonstrate that the access to the proposed development performs well within capacity using a simple priority T-junction, with minimal queuing traffic on the minor arm (a maximum of 2-3 vehicles) and RFC values well below 0.85. As the maximum queue values are below 3 vehicles, based on NPPF Guidance the development will not have a 'severe' impact on the non-strategic or strategic road network.

10.16 In addition, the site access is expected to have no impact on the free-flowing traffic on Havant Road (eastbound) the majority of vehicles (70%) will be turning left into the site.

'Emsworth Roundabout'

10.17 The 'Emsworth Roundabout' capacity analysis has been completed using ARCADY. The modelling results are presented in **Table 18**, with the full ARCADY modelling outputs attached as **Appendix N**.

	Arm	AM		PM	
		RFC	Max Q	RFC	Max Q
Baseline 2021	1 – North Street	0.70	2.27	0.46	0.86
	2 – A259 (east)	0.69	2.21	0.63	1.66
	3 – High Street	0.30	0.42	0.37	0.58
	4 – A259 (west)	0.62	1.64	0.79	3.70
Baseline 2021 plus development	1 – North Street	0.71	2.39	0.47	0.89
	2 – A259 (east)	0.70	2.29	0.64	1.77
	3 – High Street	0.30	0.43	0.38	0.61
	4 – A259 (west)	0.64	1.76	0.80	3.89

Table 18: Emsworth Roundabout Capacity Assessment

10.18 The modelling results show that the Emsworth Roundabout operates within capacity in all scenarios, including the 2021 'with development' scenario. The maximum queue (4 vehicles) occurs on the A259 (west) arm in the PM Peak, as expected due to the addition of development

traffic.

- 10.19 As previously described, 30% of development traffic is expected to travel through this junction, equating to 24 vehicles in the AM Peak and 13 vehicles in the PM Peak. As shown in the modelling results, the slight increase in traffic is not expected to have a material impact on the operation of Emsworth Roundabout, including in the future year when considering development traffic.

A27/Church Lane Roundabout

- 10.20 The A27/ Church Lane roundabout capacity analysis has been completed using ARCADY, with geometries taken from OS mapping. The modelling results are presented in **Table 19**, with the full ARCADY modelling outputs attached as **Appendix O**. A diagram of the existing roundabout situation including geometries is included as **Appendix P**.

	Arm	AM		PM	
		RFC	Max Q	RFC	Max Q
Baseline 2021	1 – A27 Off-Slip	0.09	0.10	0.17	0.20
	2 – Havant Road	0.99	22.32	0.64	1.75
	3 – Church Lane	0.00	0.00	0.00	0.00
	5 – Emsworth Road	0.84	4.90	0.91	8.66
Baseline 2021 plus development	1 – A27 Off-Slip	0.09	0.10	0.20	0.25
	2 – Havant Road	1.03	38.27	0.66	1.90
	3 – Church Lane	0.00	0.00	0.00	0.00
	5 – Emsworth Road	0.85	5.41	0.98	21.34

Table 19: A27/ Church Lane Roundabout Capacity Assessment

**Arm 4 (the A27 On Slip) has no max. queue length or RFC, due to the 'no exit' nature of the arm*

- 10.21 The modelling results demonstrate that the A27/ Church Lane Roundabout is already operating over capacity in the 2021 baseline scenario on Arm 2 Havant Road (with a queue of 23 vehicles in the AM Peak period), and over capacity on Arm 5 Emsworth Road S (with a queue of 9 vehicles in the PM Peak period). During the baseline 2021 scenario the maximum queue length is 23 vehicles which are split between the two lanes on approach.
- 10.22 The proposed development is estimated to add a total 69 vehicles to this roundabout in the AM peak hour and 67 vehicles in the PM peak hour.

10.23 As previously described, the A27/ Church Lane Roundabout is already operating over capacity in the 2021 without development baseline scenario on Havant Road and Emsworth Road (S). The addition of development traffic results in a 2.7% increase in traffic on this roundabout in the AM Peak, and a 2.8% increase in traffic in the PM Peak. Whilst the percentage increase is minimal, it is noted that the queue lengths on both Arm 2 (Havant Road) and Arm 5 (Emsworth Road S) are increased, leading to further queueing and waiting time.

A27/ Church Lane Roundabout Mitigation Works

10.24 Whilst the increase in queue lengths on all but one arm of the roundabout show no material impact, the queue lengths on Havant Road (Arm 2) are increased by the development traffic, to 38 vehicles in the AM Peak Hour, and that the queue lengths on Emsworth Road (S) (Arm 5) are increased by the development traffic to 22 vehicles in the PM Peak hour (in the 2021 'with development' scenario). It is therefore considered that roundabout improvements are required to mitigate the impact of the development traffic.

10.25 A detailed assessment has been undertaken again using ARCADY software, which has demonstrated the required extent of improvements needed to be undertaken on the Havant Road and the Emsworth Road (S) arms of the roundabout to improve capacity and reduce the queue length in the 2021 'with development' scenario. The existing and proposed geometries are demonstrated in **Appendix P**.

10.26 As demonstrated in **Appendix P** only minor works are required, summarised as the following:

- Arm 2: Effective Flare Length increased from 42m to 73m;
- Arm 5: Approach Road Half Width increased from 5.06m to 6.35m;
- Arm 5: Entry Width increased from 7.40m to 8m.

10.27 Increasing the effective flare length on Havant Road, without increasing the entry width, will ensure that two lanes only are retained, however the increased length by which the two lanes are provided along Havant Road will ensure that two vehicles can queue for longer.

10.28 Increasing the Approach Road Half Width and Entry Width on Emsworth Road (S) will formalise the existing situation, whereby vehicles queue in two lanes in an informal manner (where no white lining is present).

10.29 A summary of the resulting ARCADY Outputs (using the revised geometries shown in **Appendix P**) are provided in **Table 20**, with the full outputs included as **Appendix Q**.

	Arm	AM		PM	
		RFC	Max Q	RFC	Max Q
2021 with Development & Mitigation	1 – A27 Off-Slip	0.09	0.10	0.20	0.25
	2 – Havant Road	0.99	23.48	0.64	1.72
	3 – Church Lane	0.00	0.00	0.00	0.00
	5 – Emsworth Road	0.74	2.77	0.85	5.44

Table 20: A27/ Church Lane Roundabout Mitigation ARCADY Assessment

10.30 As shown in **Table 20**, the junction mitigation works will provide queue lengths of 24 vehicles in the AM Peak and 2 vehicles in the PM Peak on the Havant Road arm; a decrease of 15 vehicles. On the Emsworth Road S arm, the queue will decrease to 3 vehicles in the AM peak and 6 vehicles in the PM Peak.

10.31 When comparing these results to **Table 19**, it is clear that these changes to the junction lining arrangements will result in substantial improvements in the queue lengths on Havant Road during the AM Peak Period and Emsworth Road in the PM Peak Period, resulting in RFCs and queue lengths in accordance with the 2021 baseline scenario; therefore mitigating the impact of the development and improvement over the 2021 'pre-development' scenario.

A27/ Emsworth Road Roundabout

10.32 The A27/ Emsworth Road roundabout capacity analysis has also been completed using ARCADY. The modelling results are presented in **Table 21**, with the full ARCADY modelling outputs attached as **Appendix R**.

	Arm	AM		PM	
		RFC	Max Q	RFC	Max Q
Baseline 2021	2 – Emsworth Road (S)	0.31	0.44	0.33	0.49
	3 – A27 Off-Slip	0.70	2.31	1.00	28.17
	4 – Emsworth Road (N)	1.00	18.28	1.11	32.23
Baseline 2021 plus development	2 – Emsworth Road (S)	0.32	0.47	0.34	0.50
	3 – A27 Off-Slip	0.71	2.44	1.02	38.81
	4 – Emsworth Road (N)	1.03	23.44	1.16	41.46

Table 21: A27/ Emsworth Road Roundabout Capacity Assessment

**Arm 1 (the A27 On Slip) has no max. queue length or RFC, due to the 'no exit' nature of the arm*

- 10.33 The modelling results demonstrate that the A27/ Emsworth Road Roundabout is already operating over capacity in the 2021 baseline future year scenario on Arm 3 A27 Off-Slip (with a queue of 29 vehicles in the PM Peak period), and on Arm 4 Emsworth Road N (with a queue of 19 vehicles in the AM Peak period and 33 vehicles in the PM Peak period). On Arm 3 the queue length is split between the two lanes on approach, however Arm 4 is provided with just one approach lane. In the 2021 'with development' scenario, traffic is expected to increase to 24 and 42 vehicles in the AM Peak and PM Peak respectively on Arm 4, with no particular increase in traffic expected on Arm 3.
- 10.34 As previously described, the A27/ Emsworth Road Roundabout is already operating over capacity in the 2021 future year scenario on both arms, however the addition of development traffic does impact the queue length on Arm 4 in particular.

A27/ Emsworth Road Roundabout Mitigation Works

- 10.35 Whilst the increase in queue lengths on all but one arm of the roundabout show no material impact, the queue lengths on Emsworth Road (N) (Arm 4) are increased by the development traffic by 9 vehicles in the AM Peak and by 5 vehicles in the PM Peak hour. It is therefore considered that roundabout improvements are required to mitigate the impact of the development traffic.
- 10.36 A detailed assessment has been undertaken again using ARCADY software, which has demonstrated the required extent of improvements needed to be undertaken on the Emsworth Road (N) arm of the roundabout to improve capacity and reduce the queue length in the 2021 'with development' scenario. The existing and proposed geometries are demonstrated in **Appendix S**.
- 10.37 As demonstrated in **Appendix S** only minor works are required, summarised as the following:
- Arm 4: Entry Width increased from 4.17m to 5.20m
 - Arm 4: Effective Flare Length increased from 0m to 28m
- 10.38 At present, the Emsworth Road (N) arm has just one lane on approach, with a large section of white lining separating the entry and exit lane. It is proposed to use some of this hatched area to increase the flare length and therefore the capacity of the arm, without impacting on third-party land.
- 10.39 A summary of the resulting ARCADY Outputs (using the revised geometries shown in **Appendix S**) are provided in **Table 22**, with the full outputs included as **Appendix T**.

	Arm	AM		PM	
		RFC	Max Q	RFC	Max Q
2021 with Development & Mitigation	2 – Emsworth Road (S)	0.32	0.47	0.34	0.50
	3 – A27 Off-Slip	0.71	2.44	1.02	38.84
	4 – Emsworth Road (N)	0.79	3.59	0.84	4.65

Table 22: A27/ Church Lane Roundabout Mitigation ARCADY Assessment

- 10.40 As shown in **Table 22**, the junction mitigation works will provide reduced queue lengths of just 4 vehicles in the AM Peak and 5 vehicles in the PM Peak on the Havant Road arm; a decrease of 24 vehicles in the AM Peak and 42 vehicles in the PM Peak compared to the 2021 'with development' scenario. It is recognised that the A27 Off-Slip will continue to operate over capacity, however due to the existing geometries able to accommodate this level of queuing clear of the A27 carriageway, no site specific works are proposed to the slip road, particularly when the development has a modest impact on traffic flows.
- 10.41 When comparing these results to **Table 21**, it is clear that the proposed changes to the junction lining arrangements will result in substantial improvements in the queue lengths on Emsworth Road (N), resulting in RFCs and queue lengths much lower than the 2021 baseline scenario; therefore mitigating the impact of the development.
- 10.42 It is therefore proposed that these works are carried out by the developer prior to occupation of the development, in accordance with the General Arrangement Drawing (as shown in **Figure 13** and also attached as **Appendix S**).

Summary

- 10.43 The results of the junction modelling shows that there is sufficient spare capacity at the Emsworth Roundabout to the east of the site to absorb the increase in background traffic growth and the additional development traffic without a noticeable impact on the level of operation or amount of queuing traffic.

- 10.44 The A27/ Church Lane Roundabout is already operating over capacity in the 2021 baseline scenario on Arm 2 Havant Road (with a queue of 23 vehicles in the AM Peak period), and over capacity on Arm 5 Emsworth Road S (with a queue of 9 vehicles in the PM Peak period). The proposed development is estimated to add a total 69 vehicles to this roundabout in the AM peak hour and 67 vehicles in the PM peak hour. The junction mitigation works will provide queue lengths of 24 vehicles in the AM Peak and 2 vehicles in the PM Peak on the Havant Road arm; a decrease of 15 vehicles. On the Emsworth Road S arm, the queue will decrease to 3 vehicles in the AM peak and 6 vehicles in the PM Peak.
- 10.45 The A27/ Emsworth Road is also operating over capacity in the 2021 baseline future year scenario on Arm 3 A27 Off-Slip (with a queue of 29 vehicles in the PM Peak period), and on Arm 4 Emsworth Road N (with a queue of 19 vehicles in the AM Peak period and 33 vehicles in the PM Peak period). On Arm 3 the queue length is split between the two lanes on approach, however Arm 4 is provided with just one approach lane. In the 2021 'with development' scenario, traffic is expected to increase to 24 and 42 vehicles in the AM Peak and PM Peak respectively on Arm 4, with no particular increase in traffic expected on Arm 3. At present, the Emsworth Road (N) arm has just one lane on approach, with a large section of white lining separating the entry and exit lane. It is proposed to use some of this hatched area to increase the flare length and therefore the capacity of the arm, without impacting on third-party land.

11.0 SUMMARY AND RECOMMENDATIONS

- 11.1 This Transport Assessment (TA) has been prepared by Paul Basham Associates (PBA) on behalf of Barratt Homes (BH) to support a full planning application for a residential development comprising 192 dwellings at Havant Road, Emsworth.
- 11.2 Havant Road itself has recently been subject to improvements along the site frontage, which include the provision of a shared off-road footway/ cycleway, and improvements to the pedestrian refuge island to the east to accommodate cyclists, as well as improved signage for cyclists.
- 11.3 Personal Injury Accident (PIA) data has been assessed to consider the existing safety situation on the LRN, and in particular on Havant Road. Overall, the distribution, frequency and severity of the incidents does not suggest a trend in the PIAs, and none of the incidents attribute the design of the highway as a contributing factor to the cause of the accident.
- 11.4 The application site is located 1.6km to the west of Emsworth local centre and 1.8km to the east of Havant town centre. Whilst it is acknowledged that the walking distances to some services are higher than average, the majority are still within the preferred maximum walking distance as outlined by the CIHT 'Guidelines for Providing for Journeys on Foot'.
- 11.5 A total of 360 parking spaces are proposed, of which 22 would be formal visitor spaces distributed through the site (with ample opportunity for additional informal visitor parking within the site). The proposed car parking strategy for the site uses a combination of garages and driveways, laybys and rear parking courts. Secure and covered long stay cycle parking is provided for each property across the site in accordance with HBC standards.
- 11.6 The site is proposed to be served by a single vehicular access point onto Havant Road, taking the form of a priority T-junction arrangement. A simple T-junction would sufficiently accommodate development traffic without unnecessary highways works on Havant Road, and could be implemented based upon the extent of highways land surrounding the carriageway, including required visibility splays in accordance with the recorded speeds on Havant Road.
- 11.7 A separate pedestrian/ cycle/ emergency access is proposed onto Selangor Avenue to the east of the site. The pedestrian access will measure 3m wide and will be supported by bollards and appropriate signage to improve safety for cyclists.

- 11.8 The internal road layout has been designed in accordance with Manual for Streets principles. Through the alignments and widths of the road, surface treatments and shared surface arrangements, the proposals create a low speed and attractive environment for all road users. Within the site, refuse carry distances and fire tender distances are in accordance with Manual for Streets guidance.
- 11.9 The TRICS database has been used to assess likely trip generation, with results indicating 860 daily vehicle trips, with 98 vehicle trips in the AM peak (0800-0900hrs) and 96 vehicle trips in the PM peak (1700-1800hrs). As the existing site is arable farmland with no trip generation, the proposals' generated trips would all be additional to the LRN.
- 11.10 Traffic distribution from the site access is expected to follow the baseline trends identified on Havant Road, with the majority (70%) of traffic turning right out of the site in the AM peak towards the A27, and left into the site in the PM peak. In comparison, 30% of traffic is expected to travel left out of the site in the AM peak towards Emsworth, with the opposite occurring in the PM peak period.
- 11.11 Turning Count Surveys have been completed on five junctions in the vicinity of the site, with three further analysed using ARCADY modelling software in the future year scenarios. The site access and the Emsworth Roundabout have been demonstrated to operate within capacity in all scenarios, whilst the A27 dumbbell roundabouts have been subject to mitigation assessments, which have demonstrated that all proposed mitigation works can be carried out within land under highway ownership.
- 11.12 This TA has comprehensively analysed the highways aspects of the proposed development. The proposed development presents a suitable highways design being neither detrimental in terms of highways safety or traffic impact, we therefore encourage HCC to look favourably upon this application in highway terms.