



FORTY ACRE FARM, BEDHAMPTON

TRANSPORT ASSESSMENT

May 2018

Barratt David Wilson Homes

RESIDENTIAL DEVELOPMENT
FORTY ACRE FARM
BEDHAMPTON

TRANSPORT ASSESSMENT

CONTROLLED DOCUMENT

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Prepared by:	Jessica Lloyd		April 2018
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Barratt David Wilson Homes
Tollbar House
Tollbar Way
Hedge End
Southampton
SO30 2UH



Paul Basham Associates Ltd
Lancaster Court
8 Barnes Wallis Road
Fareham
Hampshire
PO15 5TU

**RESIDENTIAL DEVELOPMENT
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BEDHAMPTON**

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1. INTRODUCTION

- 1.1 This Transport Assessment (TA) has been prepared by Paul Basham Associates (PBA) on behalf Barratt David Wilson Homes (BDWH) to support a full planning application for a residential development comprising 320 residential dwellings, a 66-bedroom care home, allotments, habitat mitigation zone, provision of public open space and associated infrastructure at Forty Acre Farm, Bedhampton. The site location is demonstrated in **Figure 1**, with the site layout attached as **Appendix A**.

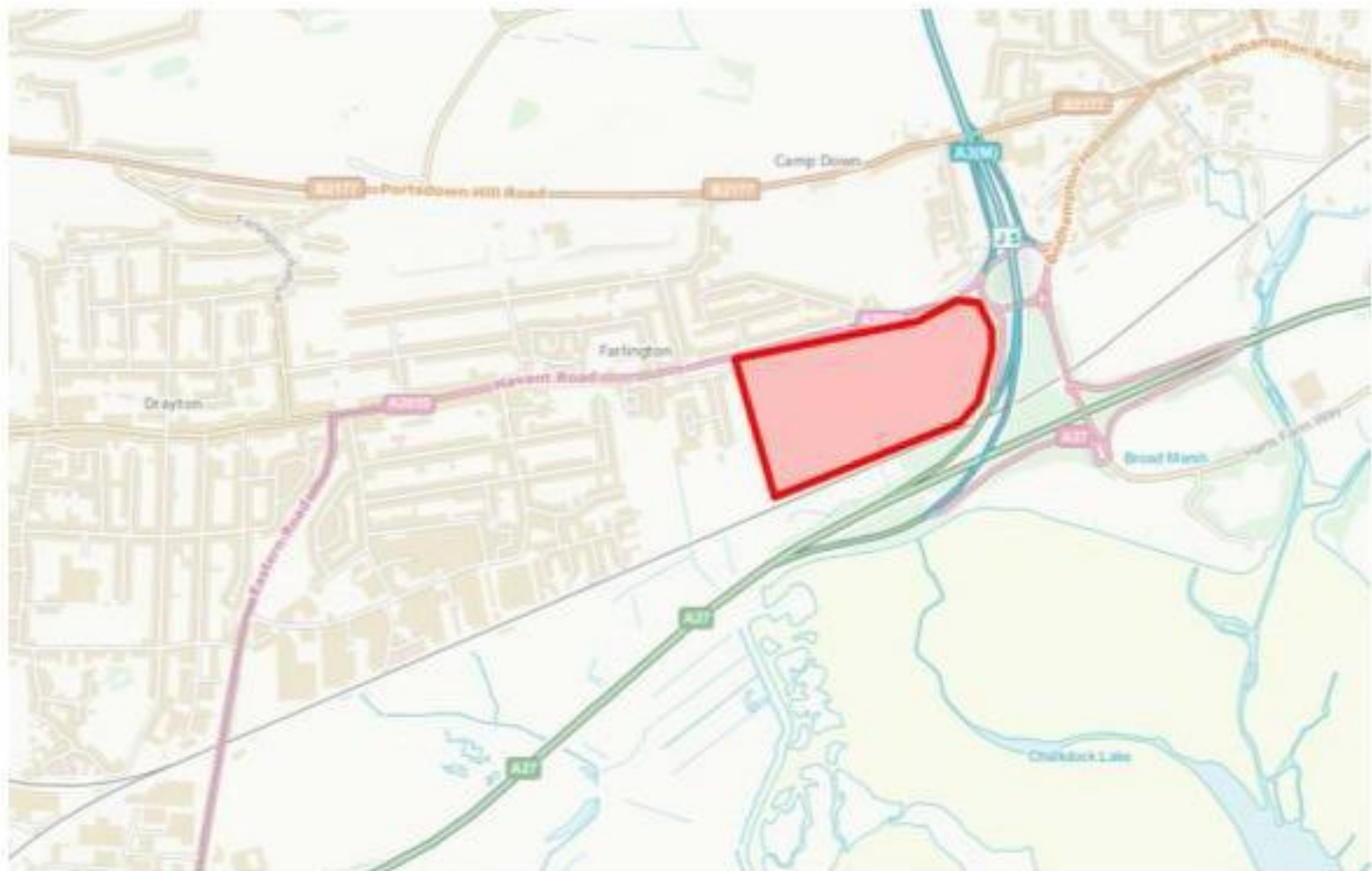


Figure 1: Site Location

- 1.2 The scope of this TA reflects the principles of the recently revoked DfT's 'Guidance on Transport Assessments' (March 2007) reviewing; site accessibility, personal injury accident (PIA) data, the proposed accommodation schedule, car and cycle parking requirements, visibility and access arrangements, servicing, trip assessments, traffic impact and capacity assessment on the local road network (LRN), makes recommendations for any mitigation measures and draws conclusions from the overall assessment.
- 1.3 A Transport Scoping Note (TSN) was submitted to Hampshire County Council (HCC) Development Control Officers, which set out the baseline traffic conditions on Havant Road (A2030), development trip rates, traffic distribution, scope of capacity assessment and accident review, the principle of access design into the site and a general assessment regarding site accessibility. The meeting minutes are provided in **Appendix B**.
- 1.4 A separate Full Residential Travel Plan (FTP) has been prepared in conjunction with this TA, which

seeks to facilitate and promote the use of sustainable transport modes, by providing a package of soft measures, supported by investment in infrastructure. The FTP will also include a detailed action plan and mode share targets, based on HCC Travel Plan guidance.

- 1.5 The proposed site was included in Havant Borough Council's Draft Local Plan Housing Statement (December 2016) under site reference UE68 indicatively for 300 dwellings. Being included as a 'site considered suitable for early release' means that the site is free of constraints that cannot be mitigated, is available for development and sustainable development could be achieved on the site. The site map from the Housing Statement is demonstrated in **Figure 2**.



Figure 2: Site Map from HBC Housing Statement

- 1.6 The site has also been identified in Havant Borough Council's Draft Local Plan (2036) which was out for public consultation between 8th January to 16th February 2018. The site is identified as Policy H14: Forty Acres with policy stating that a Transport Assessment and Travel Plan are required to support a planning application. The policy also outlined that infrastructure should be delivered in a coordinated manner across the site and nearby sites and that off-site highway improvements are made including a pedestrian and cycle crossing on the Rusty Cutter roundabout. The site map from the Draft Local plan is demonstrated in **Figure 3**.



Figure 3: Site Map from HBC Draft Local Plan (2036)

2. EXISTING SITE CONDITIONS

- 2.1 The site is circa 9.67 hectares and currently operates as a farm with weekly car boot sales.
- 2.2 The existing site is accessed via a single bellmouth taken from Havant Road (see **Photograph 1**). Opposite the existing site access is a right-turn lane providing access into residential development on Auriol Drive. As part of the development proposals, this access would be closed.



Photograph 1: Existing Site Access

- 2.3 The site is located on the western boundary of Bedhampton, within Havant Borough Council and is bounded to the south by railway lines and the A27/A3(M), with Havant Road to the north, residential development to the west and the A3(M) off-slip to the east. The site has good access to local facilities, being within 1km of Drayton local centre and within 900m of the A27 and A3(M). The site and its surroundings are demonstrated in **Figure 4**.



Figure 4: Site Context

Location

- 2.4 The site is located to the west of Bedhampton, on the south side of the A2030 (Havant Road). There is a footway flanking the northern side of the Havant Road carriageway which varies in width between 1.5m-2m and demonstrated in **Photograph 2**.



Photograph 2: Existing Pedestrian Conditions on Havant Road

- 2.5 The local facilities, services and amenities available within Drayton and Bedhampton are illustrated in an Accessibility Map attached as **Appendix C**. In Drayton local centre there is a convenience store and post office.
- 2.6 Given the recently confirmed catchment area for the proposed development, the schools assigned to the children within the development would be Bidbury Infant and Bidbury Junior school located

approximately 1.8km (from the centre of the proposed development to the pedestrian entrance to the schools) to the east of the site. Bidbury Infant and Bidbury Junior Schools are accessible via Havant Road, Bedhampton Hill and Bedhampton Road. The schools are therefore within the CIHT suggested acceptable (preferred maximum) walking distance for schools of 2km. As part of this TA and pre-application liaison with HCC, the route to school has been assessed along with proposed mitigation to help improve the pedestrian route towards Bidbury Infant and Bidbury Junior School and around the Rusty Cutter Roundabout. This is discussed more within **Section 4** of this TA under off-site improvements.

- 2.7 The nearest secondary schools within Hampshire County Council jurisdiction are Crookhorn College located c. 3.4km to the north east of the site and Purbrook Park School located c. 3.9km (from the centre of the site) to the north west of the site.
- 2.8 There are also a number of pre-schools and nurseries to the north and east of the site including Peacock Pre-school, Phoenix Pre-School, Farlington Day Nursery, The Wendy House, Bidbury Pre-School and St Thomas More's Pre-School.
- 2.9 In terms of health provision there are multiple Doctors surgeries in Drayton, Bedhampton, Widley and Cosham, with the closest 1.9km (taken from the centre of the site) to the west of the site. The closest pharmacy is 1.7km (taken from the centre of the site) to the west of the site in Drayton. The nearest dentist is in Farlington, to the west on Havant Road. The nearest hospital with Accident and Emergency facilities is Queen Alexandra Hospital located approximately 4km west of the site.
- 2.10 The site's proximity to existing local amenities, pedestrian and cycle networks presents an opportunity to encourage the use of sustainable transport and create a sustainable development. A summary of walking, cycling and bus times from the centre of the site is shown in **Table 1**.

Amenity	Approximate Walking Distance (Centre of Site)	Approximate Walking Time (Minutes)	Approximate Cycle Time (Minutes)	Approximate time by bus (Minutes)
Local Primary School	1.8km	24	7	7
Local Secondary School	3.4km	26	9	8
Post Office	1.2km	13	5	6
Closest Bus Stop	400m	2	1	-
Closest Convenience Store	1km	12	4	5
Bedhampton Train Station	2km	25	8	8
Bedhampton Local Centre	2km	25	8	6
Supermarket	2.4km	27	10	12

Table 1: Distances to Local Facilities

Pedestrian Network

- 2.11 The local footway network around the site benefits from a gentle topography and footways of sufficient width.
- 2.12 Within the vicinity of the site there are currently footways on the northern side of Havant Road which are approximately 1.5-2m. These footways are facilitated by dropped kerbs, tactile paving and pedestrian crossing points to the east and west. Approximately 170m to the east of the existing site access is a formal crossing point, which currently provides access from the northern footway to the bus stop located on the southern side of the carriageway. An example of the pedestrian infrastructure on Havant Road is demonstrated in **Photograph 3**.



Photograph 3: Existing Pedestrian Crossing facilities

- 2.13 Travelling west along the A2030 the footway runs on both sides of the carriageway approximately 170m from the proposed site's western access. At this point there is an informal pedestrian crossing with a pedestrian refuge island but no dropped kerb or tactile paving. This crossing is due to be upgraded as part of the development proposals. Continuing west into Drayton and Farlington footways flank either side of the carriageway with multiple pedestrian refuge island crossing points. At the junction of Gant Road and Havant Road there is a signalised pelican crossing to aid pedestrian movements to and from the local facilities.
- 2.14 Travelling east, Havant Road (A2030) forms a junction with the Rusty Cutter Roundabout (A3(M), A27, Bedhampton Hill and Havant Road). There is a pedestrian route around the north of the Rusty Cutter to connect with Bedhampton. This includes dropped kerbs and tactile paving across the A3(M) on-slip and off-slip towards Bedhampton Hill. These crossing points are demonstrated in **Photographs 4 and 5**.



Photograph 4: Pedestrian crossing A3(M) on-slip



Photograph 5: A3(M) off-slip

- 2.15 Havant Road benefits from street lighting, which helps create a safe and attractive pedestrian environment. This would help to encourage the use of local footways by future residents.

Cycle Network

- 2.16 The LRN also benefits from gentle gradients which help to make cycling a more attractive mode of transport. Furthermore, an off-road footway/cycleway currently runs along the northern side of Havant Road from the junction of Havant Road/E Lodge Park.

2.17 To the east of the site a signposted network link and partly off-road cycle track is available around the north of the Rusty Cutter Roundabout and onto the A27 and Teardrop junction connecting towards the Harts Farm Way Industrial Estate. From the Rusty Cutter roundabout a signposted network link is also available along Lower Road to connect towards Bedhampton Local Centre. A snapshot of the Havant Borough Cycle Network 2017 in vicinity of the site is provided in **Figure 5**.



Figure 5: Havant Borough Cycle Network 2017

2.18 Whilst for the majority of Havant Road there are no dedicated on-road cycle lanes, the width of the road ensures that cars are able to pass without disturbing cyclists on the road. Frequent dropped kerbs on the northern side of the carriageway allows for cyclists to dismount safely.

2.19 There are also two National Cycle Network (NCN) routes within the vicinity of the site. The 22 is an on-road route from Banstead to Portsmouth and the Isle of Wight. Route number 222 runs to the west of the site and is a partially traffic free route which connects to Portsmouth and NCN Route 2 to the south and Horndean and Clanfield to the north. A typical cycle to Portsmouth takes approximately 30 minutes.

2.20 The cycle routes under the National Cycle Network within the vicinity of the site are summarised in **Figure 6**, with purple lines representing on-road routes, and green representing traffic-free routes.



Figure 6: Local Cycle Routes (Map from www.sutrans.org.uk)

Bus Services

2.21 The site is supported by two pairs of bus stops on Havant Road both within 200m either side of the site accesses (400m from the centre of the site). Both sets of bus stops benefit from shelters (except the eastern eastbound bus stop), seating, timetables and are served by Stagecoach services 21 and 23. A further service operated by First Group is available from the 'Sunshine Inn E bound' bus stop approximately 800m west of the proposed developments western access. A summary of the services is provided in **Table 2**.

Service	Route	Stop	Operator	Frequency		
				Monday - Friday	Saturday	Sunday and Public Holiday
21	Havant – Portsmouth	Forty Acres/Havant Road	Stagecoach	Every 10 minutes from 06:00 am - 23:30 pm	Every 10 minutes from 06:50 am - 23:30 pm	Every 20 minutes from 07:54 am - 22:16 pm
23	Leigh Park - Southsea	Forty Acres/Havant Road	Stagecoach	10 services a day from 07:10 am - 18:09 pm	10 services a day from 07:10 am - 18:09 pm	12 services a day from 09:30 am - 16:59 pm
22	Highbury – Cosham – Drayton - Farlington	Sunshine Inn E Bound	First	Every 10 minutes from 05:17 am – 00:20 am	Every 10 minutes from 06:53 am - 00:20 am	Every 20 minutes from 07:41 am - 23:57 pm

Table 2: Local Bus Services

2.22 The closest bus stop to the east is referred to as 'Forty Acres (W-Bound)' on Havant Road. This bus stop is equipped with a shelter, bench and bus timetables (see **Photograph 6**). The east bound bus stop consists of a flag and pole, timetable and bench (see **Photograph 7**).



Photograph 6: Forty Acres W-bound



Photograph 7: Forty Acres E-bound

2.23 The bus stops to the west of the site are referred to as 'Rectory Avenue NE-bound' and 'Rectory Avenue SW-bound'. Both stops benefit from shelter, seating, timetabling information and laybys (see **Photographs 8 and 9**).



Photograph 8: Rectory Avenue NE-bound



Photograph 9: Rectory Avenue SW-bound

2.24 The 21 service provides a service every 10 minutes to Portsmouth and Havant. The service operates all day Monday to Saturday from 06:00 to 19:00, providing an alternative to the private vehicle. On Sundays the service reduces to every 20 minutes operating from 08:00 to 22:00. A journey to Portsmouth Hard Interchange from Forty Acres averages 40 minutes and journeys to Havant Bus Station take approximately 10 minutes.

2.25 The 23 service provides a regular service from Leigh Park to Southsea. This service operates every 10 minutes from 06:00 to 23:00 Monday-Friday and from 07:00 to 23:00 Saturdays. On Sundays the service runs every 20 minutes from 08:00 to 23:00. This service connecting Leigh Park, Cosham,

Portsmouth and Southsea provides a realistic opportunity for commuters who may work in the area. A typical journey from Havant Road to Portsmouth City Centre on the 23 takes on average 50 minutes.

- 2.26 The 22 First Bus provides a service every 70 minutes (Monday – Sunday) between Cosham, Drayton and Farlington, providing a frequent service to local facilities for less mobile residents, albeit with reduced service hours on Sundays (09:00-17:00).
- 2.27 HCC requested that contact was made with Stagecoach to understand if the above services could be routed through the site. Stagecoach confirmed that they would not consider a service diversion as it would cause unnecessary delay to passengers.

Rail Services

- 2.28 Bedhampton Railway Station is located approximately 2km to the east of the proposed development, approximately an 8-minute cycle or an 8-minute journey on the number 23 bus service.
- 2.29 The station is equipped with 20 sheltered and secure cycle storage spaces, customer help points, CCTV and daytime (Monday – Saturday) staffing.
- 2.30 Bedhampton Railway Station provides direct access to destinations including Portsmouth and Southsea, London Waterloo and Guildford. Trains typically stop at a frequency of two per hour during the day for services between Portsmouth and Southsea and London Waterloo. Journeys to Portsmouth and Southsea take approximately 15 minutes with journeys to London Waterloo taking approximately 96 minutes.
- 2.31 In the AM and PM peaks there are trains roughly every 20 minutes in a westerly direction (to Portsmouth) and hourly in a northerly (to London) and easterly (Littlehampton) direction providing opportunities for commuters.
- 2.32 Bedhampton Railway Station provides an attractive option for commuters to Littlehampton, London and Portsmouth.

Summary of Site Accessibility

- 2.33 The site is situated to the east of Drayton which hosts a selection of facilities and amenities including convenience stores, eateries and a public house all of which are in walking distance of the site and supported by pedestrian infrastructure. Furthermore, the site is located within an established residential area and is considered suitable to encourage sustainable development as identified by HBC's Draft Local Plan and Housing Statement

- 2.34 The site is also on a high frequency bus corridor thereby providing an opportunity to participate in sustainable travel to surrounding destinations including Portsmouth and Havant.

Local Road Network

- 2.35 The A2030 (Havant Road) is a single carriageway road c.9.m wide, which runs through the centre of Bedhampton and Drayton. Havant Road (A2030) runs east to west from the Rusty Cutter Roundabout (A3(M), A27 and Bedhampton Hill) across the site frontage to the west of the site and terminates at the roundabout of High Street, London Road, Spur Road and Havant Road. Havant Road is subject to a 40mph speed restriction along the majority of the site frontage, although this decreases to 30mph roughly 60m west of the proposed western access into the development site.
- 2.36 On the northern side of the carriageway there is a footway for pedestrians (See **Photograph 2**), with no pedestrian footway on the southern side of the carriageway across the majority of the site frontage. The road environment is demonstrated in **Photograph 10**. Regular street lighting columns are present on the north side of Havant Road across the site frontage.



Photograph 10: Havant Road (A2030) Environment

- 2.37 Traffic surveys have been commissioned in the vicinity of the site along Havant Road to establish the existing traffic situation on the Local Road Network (LRN) in order to fully understand the likely impact of the development. These surveys were undertaken in November 2015 with the results presented in **Table 3** and attached as **Appendix D**.

Botley Road	AM Peak (0800-0900) Volume (%)	PM Peak (1700-1800) Volume (%)	Daily Flow (7-Day Average)	Daily 85%ile Speeds
Eastbound	683 (58.3%)	445 (40.4%)	7666	40.5mph
Westbound	489 (41.7%)	657 (59.6%)	7384	40.3mph

Table 3: A2030 (Havant Road) Traffic Survey Summary

2.38 **Table 3** demonstrates that the A2030 carries a moderate level of traffic with a slightly greater flow of traffic eastbound over a 24-hour period. In the AM peak there is a slight greater flow of traffic in the eastbound direction (i.e. towards A3(M) and A27), whereas in the PM peak there is a stronger flow of traffic westbound (i.e. away from the A3(M) and A27).

2.39 Pre-application discussions with HCC Development Control Officers, have indicated that the following are the key junctions within immediate vicinity of the site that require review as part of this TA;

- Rusty Cutter Roundabout (Havant Road, Bedhampton Hill, A3(M) and A27);
- Auriol Drive (eastern) and Havant Road;
- Bedhampton Hill and Havant Road; and
- A27 Tear Drop Junction.

2.40 The Rusty Cutter roundabout is a partially signalised roundabout which connects Havant Road to the A3(M), A27 and Bedhampton Hill. Bedhampton Hill runs east to west and offers a route towards Bedhampton Local Centre. The A3(M) connects London to Portsmouth and operates as an A road for its majority. The A27 operates between Salisbury in the west to Pevensey in the east. The roundabout is supported by dropped kerbs and tactile paving on the northern arms of the roundabout (A3(M) on and off-slips) and eastern arms across Bedhampton Hill.

2.41 The Auriol Drive and Havant Road junction is approximately 9m wide and is facilitated by a ghost island right turn lane and serves the residential properties of Auriol Drive.

2.42 The Bedhampton Hill and Havant Road junction is a left out only junction onto Havant Road towards the Rusty Cutter roundabout. The junction is demarcated with a 'Keep Clear Sign' to ensure vehicles travelling west along Havant Road are able to turn right into Bedhampton Hill with no queuing on Havant Road blocking this manoeuvre.

2.43 The A27 Teardrop junction is a partially signalised junction/roundabout which provides access to the A27 (eastbound and westbound) and Harts Farm Way. The A27 off-slip is signalised, but Harts Farm Way is not.

2.44 As a result of the Public Consultation event, undertaken on 2nd November 2017, it was also requested by a Portsmouth City Councillor and Portsmouth City Council (PCC) Highways that junctions within PCC jurisdiction were investigated in terms of traffic impact. Therefore, the Havant Road/Lower Farlington Road and Havant Road/Eastern Road junctions have also been assessed as part of this TA.

Personal Injury Accident Data

2.45 Personal Injury Accident (PIA) data has been acquired from Hampshire Constabulary to assess and consider the existing safety situation on the local road network, in particular; Havant Road along the site frontage, Rusty Cutter roundabout and A27 Teardrop junction. The report obtained from Hampshire Constabulary detailing all the accidents is attached as **Appendix E**.

2.46 The patterns displayed in the data have been assessed with regards to the proximity, frequency and severity of incidents that have occurred that may require further in-depth consideration. The PIA data has been collected for a period of 5 years from January 2012 to December 2017 and is outlined in **Figure 7**.



Figure 7: PIA Incidents

2.47 There has been a total of 65 PIAs during this 5 year period; of which there were 0 fatalities, 12 serious injury accidents and 53 slight injury accidents. However, 16 of these PIA's occurred on the A27 and A3(M) which given the very large volumes of traffic using such strategic roads does not suggest a significant trend.

2.48 A cluster of 14 PIAs; 1 serious and 13 slight incidents occurred at the Rusty Cutter roundabout. The one serious incident involved a motorist and a cyclist with the motorist passing too close to the cyclist.

The accident occurred in 2012 and since there have been improvements works at the Rusty Cutter roundabout including the implementation of a footway/cycleway around parts of the roundabout including up to the A27 Teardrop junction. Given the large volume of traffic utilising this roundabout accidents are expected and given the spread of accident timeframes and causation factors this is not a cause of concern.

- 2.49 Three PIA's were recorded which involved pedestrians (reference numbers: 120264040, 120297738 and 150029129). The accidents were evenly distributed across the local road network suggesting no highway design issues with all accidents reporting failing to look properly as a causation factor.
- 2.50 One serious PIA (reference number: 140079681) was reported opposite the proposed eastern site access, and the report from HCC is included as **Appendix E**. The accident was caused by a vehicle travelling along Havant Road losing control and veering into the path of an oncoming vehicle. This accident was a result of human error, and not a result of highway design.
- 2.51 A second cluster is apparent at the Rectory Avenue and Havant Road junction with 6 slight accidents (reference numbers: 130254105, 160351687, 110419494, 120100631, 120122498, 150029129). All incidents were a result of human errors, such as failing to look properly, aggressive driving, careless/reckless/in a hurry or failing to judge a person's speed. The junction exhibits good visibility enhanced by the wide footway along Havant Road and tactile paving and dropped kerbs for pedestrians. None of these incidents involved pedestrians. Therefore, the accidents here are not a result of highway design or a cause of concern.
- 2.52 The frequency and distribution of these PIAs and causation factors do not indicate any cause for concern.

3. PLANNING POLICY

National Planning Policy Framework

- 3.1 Adopted 1st April 2012, the National Planning Policy Framework (NPPF) acts as the central guidance for development planning and replaces all national planning policy guidance including Planning Policy Guidance 13 (PPG13): Transport.
- 3.2 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.
- 3.3 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."

- 3.4 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)

- 3.5 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; and
- Invest in sustainable transport measures, including walking and cycling infrastructure.

Havant Borough Council's Core Strategy (2011)

- 3.6 Havant Borough Council's Local Plan is incorporated into their Core Strategy which was adopted in March 2011.
- 3.7 In accordance with the Core Strategy the proposed development would be required to comply with the following policies:
- DM11 'Planning for More Sustainable Travel'
 - DM12 'Mitigating the Impacts of Travel'
 - DM13 'Car and Cycle Parking on Residential Development'
 - DM15 'Safeguarding Transport Infrastructure'
- 3.8 The site Masterplan will ensure policies DM11 and DM13 are met with safe and secure parking spaces in accordance with standards, appropriate and safe access to public transport and pedestrian friendly streets with low vehicle speeds.
- 3.9 In accordance with Policy DM12, this Transport Assessment and an accompanying Travel Plan identify hard infrastructure improvements and behavioural change measures to ensure the impact of travel are mitigated.
- 3.10 In accordance with Policy DM15 'Safeguarding Transport Infrastructure' the proposed development would not be prejudicial to the future provision of strategic transport infrastructure.

Local Development Status

- 3.11 Through the Pre-Application discussions with HCC and HBC it was agreed that the following developments should be assessed and determined whether these should be included as 'Committed Development':
- APP/14/00199 Bedhampton Hill;
 - 02/52646/016 and APP/13/00592 Former Depot Site (Harts Farm Way);
 - APP/12/00504 and APP/16/00161 Former ICTS House, Solent Road; and

- APP/14/00724 Former Havant Road Retail Park.

- 3.12 David Wilson Homes' 'Land at Portsdown Hill (APP/14/00199) was at 50% occupation during Summer 2016 when traffic surveys were completed for the Forty Acre Farm proposals after receiving full planning consent in April 2014. Therefore, 50% of the site traffic will be added as 'Committed development' equating to 24 dwellings.
- 3.13 The Former Depot Site (Harts Farm Way) application received outline planning permission in December 2007 and received an extension of the time limit to implement the outline planning permission in June 2011. A number of Reserved Matters applications were submitted between June 2013 and February 2015. It is therefore considered that the development would be fully built and occupied given the nature of the development by the time traffic surveys were completed for this development application and therefore this site will not be treated as a 'Committed Development'. This development has also been counted in the TEMPRO growth factors through the NTEM Planning Data Version 7 (July 2016) after being identified in Havant Borough Council's Annual Monitoring Report (2014).
- 3.14 The APP/16/00161 application for former ICTS House was to extend the existing planning permission to include Class A1 uses on the site whereby the existing (outline) planning permission comprised of *'948sqm of Class B1c (light industry) and/or Class B2 (general industrials) and/or Class B8 use (storage and distribution), to include ancillary trade counters and Class B1a Use (offices), with associated access and car parking.'* This application was approved in April 2016. The APP/12/00504 for the original outline planning application referred to above was granted permission in November 2012 with Reserved Matters approved in November 2015. This site will therefore be included as a 'Committed Development'.
- 3.15 The former Havant Road retail park application was to re-develop the site to provide 86 residential units. Whilst the former Havant Road Retail Park has been considered, upon further investigation the proposed development resulted in a decrease in vehicle trip numbers compared to its then existing use as a 26-lane bowling alley and a DIY store with a Garden Centre of 3,755sqm. This application and development has been considered as a 'Committed Development', but to present a worst-case assessment no reductions in traffic have been attributed.

3.16 In January 2018, HBC also released a Draft Local Plan (2036) for consultation between 8th January and 16th February 2018. Under policy H15: Forty Acres, a reference is made to infrastructure being coordination across nearby site policies H41, H44 and H45. Whilst these sites have not been treated as 'committed developments' as no applications have been submitted these are included within a Sensitivity Test in **Chapter 8** of this TA as requested by HCC.

4. PROPOSED DEVELOPMENT

- 4.1 The proposed development would consist of 320 residential dwellings with a mix of 30% affordable housing and 70% private and a 66-bedroom care home. A summary of the accommodation schedule is provided within **Table 4**, whilst the proposed development site layout is included as **Appendix A**. The development also incorporates allotments, a habitat mitigation zone, public open space and associated infrastructure.

General Residential				
Affordable Housing		Private Housing		Total
Size of Dwelling	Unit Numbers	Size of Dwelling	Unit Numbers	
1 Bedroom	20	1 Bedroom	0	20
2 Bedroom	36	2 Bedroom	69	105
3 Bedroom	40	3 Bedroom	127	167
4 Bedroom	0	4 Bedroom	28	28
Care Home				
66 Bedrooms				

Table 4: Accommodation Schedule

- 4.2 All of the 66 bedrooms of the care home would be single occupancy with shared communal facilities (lounges, dining, bistro, bathrooms etc). The care home would be staffed 24 hours a day with approximately 60 full time jobs, which would be operated over 3 shift patterns thus leaving 20 members of staff on site at a time.

Access Arrangement

- 4.3 The site would be served by two vehicular access points onto Havant Road (the principle of which was agreed through pre-application discussions and a concept design check with HCC and Engineering Consultancy). Both accesses would be of bellmouth arrangements 7m wide supported by 15m radii. The access roads would reduce in width to 5.5m approximately 20m into the site. Such dimensions would allow two vehicles to pass when concurrently turning in and out of the access and would allow large vehicles to enter and exit the site safely without utilising the other side of the road. The access would be constructed to HCC adoptable standards and delivered through a Section 278 agreement. The proposed access arrangement is demonstrated in **Appendix F**.
- 4.4 Both accesses would be flanked by 2.0m wide pedestrian footways either side which would connect to a 3m wide footway/cycleway creating a continuous footway/cycleway along the southern side of Havant Road between the Forty Acres W-bound bound bus stop and Havant Road NE-bound bus stop.
- 4.5 According to the Design Manual for Roads and Bridges (DMRB) TD 42/95, a ghost island right turn lane should be "considered" given the total quantum of traffic generated by the site (1584 vehicles) and the existing flows on Havant Road (11,237 daily two-way movements).

- 4.6 Given the size of the proposed development, two accesses are proposed both facilitated by right turn lanes. Both right turn lanes have been designed in accordance with DMRB and consultation with Hampshire County Council (HCC). Both ghost island right turn lanes would be 3.0m, with through lanes 3.05m wide, as agreed with HCC. The turning lengths are 10m in accordance with paragraph 7.32 of TD 42/95. The taper length is 15m in accordance with design speeds for 70kph as outlined in paragraph 7.34 of TD 42/95. The deceleration length is 40m in accordance with design speeds of 70kph in relation to Table 7/5a and paragraphs 7.40 and 7.55 of TD 42/95.
- 4.7 A jug handle arrangement is proposed on the western extent of the footway/cycleway to provide a continuous connection for cyclists travelling to the site from Drayton/Cosham and a pedestrian crossing at the existing informal crossing point. This includes creating a build out into the existing bus layby on the north side of Havant Road whilst also creating a cycle lane within the existing hatching for the bus layby. A swept path analysis has been undertaken through this arrangement with a 12.5m long single decker bus to ensure a bus can still enter and exit the layby sufficiently. This is demonstrated in **Appendix F**.
- 4.8 A modelling assessment using PICADY for a 2026 Baseline plus development flows was completed as a sensitivity test to support the pre-application enquiry to assess the operation of a single vehicular access with 100% of the vehicle trips, should only one proposed access be used more than the other. This sensitivity test demonstrated that this would work well within capacity with minimal queues, but from a design and layout perspective two accesses provides a more permeable layout.
- 4.9 An independent Stage 1 Road Safety Audit (RSA) has been undertaken of the accesses and footways, and the full report including the Designers Response is provided in **Appendix G**. The RSA highlighted the following issues which have been addressed in the latest designs:
- No margin strip on the footway/cycleway;
 - Fencing required on the southern edge of the footway/cycleway;
 - Risk of pedestrians waiting in the bus layby;
 - Existing street furniture needs to be moved;
 - No cycle access and exit points demarcated;
 - Risk of pedestrian/cyclist collision at eastern bus stop;
 - No crossing facilities for cyclists;
 - Hatching around the refuge island; and
 - Confusing road markings.

- 4.10 Whilst the majority of issues have been addressed the hatching around the refuge island will remain as previously proposed. The pedestrian refuge is 2.5m wide in accordance with Hampshire County Council's guidelines which is sufficient for the proposed end user and provides a safe crossing width.
- 4.11 In order to inform visibility requirements, the results of the 7-day speed survey on Havant Road (**Appendix D**) have been used. The results of this survey (summarised previously in **Table 3**) demonstrate that visibility splays of 4.5m x 120m in the primary direction and secondary direction would be required, with the x-distance determined through the pre-application. This drawing is attached as **Appendix F** for reference. These visibility splay lengths, calculated using DMRB guidance and speeds surveys were confirmed as acceptable to HCC Highways through the pre-application and concept design check process.
- 4.12 A 3m wide footway/cycleway will be created from the south-eastern bus stop on Havant Road which would extend across the site frontage and to an improved pedestrian crossing to the west of the site to the northern side of Havant Road to improve connectivity and permeability of the site as well as ensuring all parts of the site are easily accessible.
- 4.13 A concept design check has been completed in November 2017 with HCC and Engineering Consultancy for the accesses, footway/cycle and jug handle arrangement/upgraded pedestrian crossing to the west of the site. Engineering Consultancy confirmed they were satisfied with the junction form whilst a recommendation for a 1m separation strip from the live carriageway should be implemented which has been addressed in the latest designs attached as **Appendix F**. The Concept Design Check report from Engineering Consultancy is attached as **Appendix H**.
- 4.14 Through discussions of the access design HCC also requested a PV Squared calculation was completed to understand whether the traffic flow and pedestrian demand would warrant the need for a signalised crossing across Havant Road. To complete the calculations the 2015 traffic surveys were used along with the results from a pedestrian survey undertaken on 29th November 2017. The PV Squared value equated to 0.42×10^8 which suggests that a signalised pedestrian crossing across Havant Road is not required. The results were discussed in a meeting at HCC offices in January 2018 where it was confirmed a crossing was not required.

Internal Layout

- 4.15 The internal carriageways have been designed to a width of 5.5m and would be supported by 2m footways in line with MfS guidance. Where there is perpendicular parking directly fronting the carriageway, the carriageway is 6m to ensure vehicles can enter and exit the vehicle parking spaces. The carriageway geometries would provide sufficient space for a car and larger vehicle (e.g. refuse

vehicle) to pass.

- 4.16 The internal roads have been designed to accommodate the occasional Heavy Goods Vehicle (HGV's), such as refuse vehicles/emergency service/food home delivery etc and can cater for occasional on street visitor parking.
- 4.17 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.
- 4.18 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 (Rogers Cory Partnership (RCP) drawings are attached as **Appendix I**).
- 4.19 The care home element of the site will remain privately operated with a gated vehicle entrance to ensure only vehicles associated with the care home are able to enter.
- 4.20 Segregated pedestrian routes are provided through the site taking pedestrians to a large attractive area of open space along with footpaths for leisure or dog walking.

Refuse and Servicing

- 4.21 Provision for servicing of the site is provided with adequate on-site turning facilities for refuse and emergency vehicles, therefore ensuring such vehicles can enter and exit the proposed development site in a forward gear. A vehicle tracking exercise completed by RCP demonstrating turning manoeuvres is attached as **Appendix J**.
- 4.22 Access to all dwellings can be achieved within 45m of the proposed units and would not require emergency vehicles to reverse more than 20m, in line with building Regulation requirements (RCP drawings attached in **Appendix K**).
- 4.23 The care home would also be serviced on site with emergency service vehicles and waste collection vehicles able to enter the care home parking court turn and leave in a forward gear. A layby has also been provided within the care home to allow vehicles such as minibuses and delivery vans to wait without obstructing free flow of the car park.

Parking

- 4.24 The number of parking spaces required to serve the mix of residential dwellings and care home has been informed by Havant Borough Council's (HBC) Parking Supplementary Planning Document (2016),

which given the development's location are as set out in **Table 5**.

General Residential						
Allocated Parking			Unallocated Parking			Total
Unit Type	Unit Numbers	Minimum Standards	Unit Type	Unit Numbers	Shared Parking	
1 Bedroom	0	1	1 Bedroom	20	0.9	18
2 Bedroom	87	2	2 Bedroom	18	1.3	197
3 Bedroom	167	2	3 Bedroom	0	1.9	334
4 Bedroom	28	3	4 Bedroom	0	2.4	84
Care Home						
66 Bedrooms		1 space per 4 residents and 1 space per staff				17 for residents and 20 for staff

Table 5: HBC Car Parking Standards

- 4.25 The development would provide a total of 694 spaces for C3 General Residential. Of these, 541 spaces are allocated spaces, 97 are provided in garages and 56 spaces are unallocated for the flatted development. A further 64 spaces are provided for formal visitor parking spaces in accordance with the 20% (0.2 per dwelling) standards requested by HBC.
- 4.26 The proposed development would also provide 28 spaces for the care home element which includes 2 disabled spaces. Gates would be provided upon the entrance into the care home's parking court in order to prevent unauthorised use of the parking spaces provided. Given the dependency level of the residents they will not have the capacity to drive and therefore the car parking management has been designed to ensure that there is adequate provision at all times for relatives, families, staff and emergency services. Staff wishing to park in the car park must also ask consent from the management in advance and will be encouraged to travel by bike, on foot or by public transport. Families who are moving residents and their furniture into the home will be allocated a dedicated space in advance. Therefore, whilst the provision does not meet the proposed standards of 37, no residents will own/drive a vehicle negating the need for 17 spaces and therefore the provision of 28 is considered sufficient to cater for all care home user demands.
- 4.27 The development therefore meets HBC's standards when using both the allocated and shared/communal parking standards. Given that the site is in a sustainable and accessible location with access to high frequency bus services to Portsmouth City Centre and Havant and being within a 10-minute cycling distance of Bedhampton Railway Station, the location is recognised as accessible and that the level of parking proposed is appropriate for the quantum and mix of housing and will not generate additional on-street parking demand.
- 4.28 The proposed development would also be supported by a Full Residential Travel Plan which would again support the parking provision and considers the urban design principles/incentivises alternative modes of travel.

4.29 An additional 4 parking spaces have also been provided to cater for the allotments which is considered sufficient the intended local use.

4.30 Based on the sustainable travel opportunities available in the surrounding area we would not anticipate any over spill parking occurring on the local road network and are therefore comfortable that any parking associated with this development would occur within the development boundaries.

4.31 The site would also provide cycle parking in accordance with HBC standards as outlined in **Table 6**.

Unit Type	Unit Numbers	HBC Cycle Parking Standard	
		Long Stay	Short Stay
1 Bedroom	20	1	1
2 - 3 Bedroom	272	2	1
4 Bedroom	28	2	1
Nursing and Rest Homes	66 Bedrooms	1 long stay cycle space per 6 staff and 1 loop/hoop per 4 units	

Table 6: HBC Cycle Parking Standards

4.32 Based on the accommodation schedule, the site would need to provide a total of 620 cycle spaces for the C3 General Residential and 20 for the care home element. For the general residential use this would be provided in rear garden sheds for the houses or within the garages for those dwellings with garages, and communal storage is proposed for the flats (see IDP plan included as **Appendix L**). For the care home covered cycle storage would be provided adjacent to the car park and main building entrance and provides storage for 8 cycles. As highlighted previously, residents of the care home would not be physically able to drive or cycle and so it is only staff that are likely to need to store bicycles and these 8 spaces are adequate to accommodate all demand.

Offsite Highway Works

4.33 Offsite highway works are proposed to facilitate pedestrian movements along the northern site boundary between the bus stops east and west of the accesses along Havant Road.

- 4.34 The footway/cycleway would be a minimum of 3m wide including a 0.5m buff strip and include an upgraded pedestrian crossing at the western end of the footway to facilitate pedestrian movements to the north of Havant Road. The 0.5m buff strip is considered suitable for the footway/cycleway and avoids unnecessary maintenance for the local council whilst still proving a separation from the live carriageway as required through the Concept Design Check. A jug handle arrangement is also proposed on the western extent of the footway/cycleway to provide a continuous connection for cyclists travelling eastbound. This includes creating a build out into the existing bus layby on the north side of Havant Road whilst also creating a cycle lane within the existing hatching for the bus lay by. The eastern westbound bus stop would also be relocated to the back edge of the footway under these proposals.
- 4.35 Pedestrian and cycle improvements are also proposed along the route to Bidbury Infant and Bidbury Junior School. Photographs of the existing route conditions are outlined below with photographs starting at the footpath which connects from Bedhampton Road to the Bidbury Schools and finishing at the Rusty Cutter roundabout.



Photograph 11: Pedestrian footpath from Bedhampton Road to Bidbury Schools



Photograph 12: Pedestrian footpath on southern side of Bedhampton Road



Photograph 13: Signalised junction of Bedhampton Road/Hulbert Road



Photograph 14: Pedestrian Refuge Island crossing on Bedhampton Road



Photograph 15: Junction of Bedhampton Road/Nursery Road



Photograph 16: Junction of Bedhampton Road/Brookside Road



Photograph 17: Pedestrian footway along southern side of Bedhampton Road



Photograph 18: Pedestrian footway along southern side of Bedhampton Hill



Photograph 19: Pedestrian footway along northern side of Bedhampton Hill



Photograph 20: Junction of Bedhampton Hill/Bedhampton Hill (Beefeater entrance)



Photograph 21: Pedestrian footway along northern side of Bedhampton Hill



Photograph 22: End of footway/cycleway on Bedhampton Hill at Rusty Cutter Roundabout

4.36 Improvements are proposed as a result of pre-application discussions with HCC who have confirmed the schools are within an acceptable walking distance. The improvements proposed include widening the existing footway along Bedhampton Hill on the north/western side to form a c.3m wide footway/cycleway utilising highway verge. This footway/cycleway would continue c.43m north of the junction serving the Rusty Cutter Beefeater Pub (also called Bedhampton Hill) which would also see improvements in the form of tactile paving and an improved pedestrian refuge island to HCC standards. At the end of the footway/cycleway, a pedestrian refuge island would be provided within the existing hatching of the right turn lane to Maple Wood which would be wide enough to facilitate a cyclist waiting at the island. For cyclists travelling southbound on Bedhampton Hill a dropped kerb is proposed to allow cyclists to use the new crossing. Signage and a dropped kerb would be provided for cyclists travelling northbound to join the carriageway. A plan demonstrating the proposals is attached as **Appendix M**.

4.37 To the east of the new pedestrian refuge island the southern side of Bedhampton Hill/Bedhampton Road provides the best and quickest route to the local schools which involves fewer junctions to cross and provides a wider footway. Pedestrians travelling towards the local schools can travel along the southern side of the carriageway up to the signalised crossing located directly in front of the entrance to the footpath which connects to the infants and junior schools.

4.38 Improvements are proposed at the Rusty Cutter roundabout for traffic and pedestrians/cycles. A signalised crossing would be provided across the A3(M) northbound on-slip. This would result in the Havant Road and Circulatory West arms of the roundabout becoming signalised to allow pedestrians to cross safely. A new signal head is also to be provided at the A3(M) southbound off-slip to allow pedestrians to see clearly when they are able to cross. Both crossings would utilise red time phases within the junction design to minimise delay to vehicle traffic as much as possible. The detail of the Rusty Cutter highway works is explained in greater detail within **Chapter 7** of this TA.

5. TRIP GENERATION AND ASSIGNMENT

Trip Generation

- 5.1 In order to establish the number of trips the proposed development would generate, the industry standard TRICS database has been consulted. By comparing the site to those with similar characteristics, it is possible to calculate the spread and volume of trips across the day.
- 5.2 Due to the mixed-use nature of the development the following land uses have been assessed:
- 03 Residential – A Houses Privately Owned
 - 05 Health – F Care Home (Elderly Residential)
- 5.3 The criteria used included sites in England only (excluding Greater London), located within ‘suburban’ and ‘edge of town’ locations. Surveys were only included where undertaken on weekdays (no weekend data). The TRICS data outputs are attached as **Appendix N** for reference whilst the peak period and daily trip generation for the proposed development is presented in **Table 7**.

TRICS	AM Peak (0800-0900)		PM Peak (1700-1800)		Total Daily Trips
	Arrivals	Departures	Arrivals	Departures	
Trip Rate per unit (Private Houses)	0.127	0.381	0.325	0.189	4.580
Trip Generation (320 Houses)	41	122	104	61	1466
Trip Rate per reside (Care Homes)	0.084	0.066	0.049	0.092	1.848
Trip Generation (66 Care Home)	5	4	3	6	122
TOTAL	172		174		1588

Table 7: Proposed Trip Generation

- 5.4 The trip rate assessment indicates that the proposed development would generate approximately 172 vehicle trips in the AM peak (0800-0900hrs), 174 vehicle trips in the PM peak (1700-1800hrs) and approximately 1588 trips across the day.
- 5.5 The existing site has been treated as ‘greenfield’ in terms of development traffic with the above traffic added to the base network.
- 5.6 The trip generation outlined in **Table 7** acts as a worst-case scenario where all general residential units have been treated as ‘Private Houses’. The site layout indicates a mix of affordable (30%) and private units, as well as some flats. Therefore, the trip generation is likely to be lower than that outlined, however, to ensure a robust approach the trip generation for all private houses is used for junction

modelling and access design.

- 5.7 No trip rates have been assigned to the allotments, given the expectation of local use outside of peak times (evenings/weekends/seasonal).
- 5.8 The above trip rates were agreed with HCC through the pre-application process.

Consented Development

- 5.9 Pre-application liaison with HCC revealed a number of consented developments that would need to be considered when assessing road network and junction capacity. After reviewing all development in **Chapter 3** the following sites only will be taken into consideration as 'committed development':
- APP/14/00199 Bedhampton Hill (50% off development trips)
 - APP/12/00504 and APP/16/00161 Former ICTS House, Solent Road

Trip Assignment

- 5.10 Having estimated the number of trips likely to be generated by the site, traffic distribution diagrams have been created using the 2011 'Travel to Work' Census data for Havant 018 (Bedhampton). Data set WF01BEW has been assessed to determine the likely destinations and route residents of the proposed development would use and by which proportion. **Table 8** shows the main destinations and the percentage of Bedhampton residents that commute to each destination along with the most likely route used. **Table 9** then summarises each route by percentage of residents expected to use each one.

Destination	Percentage	Route Assignment
Portsmouth	11.0%	A27 WB
Bedhampton	9.0%	Bedhampton Hill/Bedhampton Road
Waterlooville	7.5%	A3 (M)
Cosham	6.7%	Havant Road WB
Hilsea	6.6%	A27 WB
Chichester	5.5%	A27 EB
Fareham	4.1%	A27 WB
West Leigh, Havant	3.9%	Bedhampton Hill/Bedhampton Road
Farlington	3.8%	Havant Road WB
Emsworth, Chidham, Bosham	3.7%	A27 EB
Winchester	3.4%	A27 WB
East Hampshire	3.3%	A27 EB
Hayling Island	2.9%	A27 EB
London	2.8%	A3 (M)
Southampton	2.7%	A27 WB
Southsea	2.4%	A27 WB
Cowplain	2.3%	A3 (M)
Widley, Havant	2.2%	A3 (M)
Portchester	1.9%	A27 WB
Purbrook Way, Havant	1.9%	A3 (M)
Gosport	1.8%	A27 WB
Surrey	1.7%	A3 (M)

Eastleigh	1.5%	A27 (WB)
Bedfordshire/Hertfordshire/Berkshire	1.1%	A3 (M)
West Sussex	0.8%	A27 EB
Fratton	0.7%	A27 WB
South and South West (Bath, Wiltshire, Cornwall)	0.6%	A27 WB
Horndean	0.6%	A3 (M)
North	0.4%	A3 (M) NB
Basingstoke	0.4%	A27 WB
Dorset	0.3%	A27 WB
Hart	0.3%	A3 (M)
Witterings	0.3%	A27 EB
Chandlers Ford	0.3%	A27 WB
Test Valley	0.3%	A27 WB
Rushmoor	0.2%	A3 (M)
East Sussex	0.2%	A27 EB
New Forest	0.1%	A27 WB
Essex	0.1%	A27 EB
Isle of Wight	0.1%	A27 WB
TOTAL	100%	N/A

Table 8: 2011 Census 'Travel to Work' Data

Route Assignment	Percentage
A27 Westbound	42.5%
A27 Eastbound	20.0%
A3 (M)	27.5%
Bedhampton Hill/Bedhampton Road	5%
Havant Road Westbound	5%
TOTAL	100%

Table 9: Route Assignment by Percentage

5.11 Based on these traffic distributions approximately 95% of AM development traffic would travel east on Havant Road utilising the Rusty Cutter roundabout, with 27.5% travelling on to the A3(M) and 62.5% using the Tear Drop junction to access the A27 with 5% travelling west towards Drayton and Cosham. For the PM peak it is estimated that 5% would be arriving from the east and 95% from the west.

5.12 However, the above route assignment is for 'Travel to Work' trips only and excludes other trips such as leisure or school runs. It is therefore proposed that more than 5% of the development traffic would travel west, with the supermarket and local shops being located to the west of the development. If these are linked trips, then vehicles may use Havant Road to access the A27 where they can travel east or west or continue travelling west along Havant Road to Cosham. As a result, the following split (**Table 10**) and route assignment (**Table 11**) from the site is proposed.

Route Assignment	AM Peak (0800-0900)	PM Peak (1700-1800)
Havant Road East	85%	85%
Havant Road West	15%	15%

Table 10: Development Traffic Distribution

Route Assignment	Percentage
A27 Westbound	35%
A27 Eastbound	20%
A3 (M)	25%
Bedhampton Hill/Bedhampton Road	5%
Havant Road Westbound	15%
TOTAL	100%

Table 11: Updated Route Assignment

5.13 The route assignment figures demonstrated above were agreed through the pre-application with HCC Highways. The resulting traffic distribution diagrams are attached as **Appendix O**.

5.14 Based on the housing distribution within the proposed site layout (attached as **Appendix A**) and the distribution agreed at the pre-application stage with 85% of trips travelling to/from the east and 15% to/from the west, it is proposed that 60% of all vehicle trips would utilise the eastern access whilst 40% would utilise the western access. This distribution is a result of a higher housing density in the western portion of the site but with more vehicles wishing to travel east and therefore may use internal roads to travel across to the eastern access. Using this distribution, this would result in the following vehicle split:

TRICS	AM Peak (0800-0900)		PM Peak (1700-1800)		Total Daily Trips
	Arrivals	Departures	Arrivals	Departures	
Eastern Access (60%)	28	76	65	40	953
Western Access (40%)	18	50	42	27	635
TOTAL	172		174		1588

Table 12: Proposed Vehicle Splits Between Accesses

TEMPro Traffic Growth

5.15 In line with HCC guidance, analysis of the traffic impact will be undertaken for 2023, five years from the date of lodging the planning application. The development also considers an additional assessment for 10 years from lodging the application (2028).

5.16 To factor up the base traffic data to the required assessment years, TEMPRO (NTEM) version 7 growth factors for 'Havant' have been applied dependent on the baseline year of the surveys. The growth factors applied are given in **Table 13**.

Period	Growth Rate	
	AM Peak	PM Peak
2015-2023	1.1299	1.1260
2015-2028	1.1869	1.1821
2016-2023	1.1193	1.1137
2016-2028	1.1758	1.1693
2017-2023	1.1009	1.0965
2017-2028	1.1565	1.1511

Table 13: TEMPRO Growth (NTEM Adjusted)

6. PERCENTAGE IMPACT ASSESSMENTS

- 6.1 In order to assess the percentage impact on the local road network a comparison between the baseline conditions and the total number of development trips proposed to use such junctions (and/or arm of a junction) has been completed. This has been done using Baseline 2028 values as this is when the site is likely to be fully built and occupied.
- 6.2 To assess the proposed development's percentage impact on the highway network as requested at the pre-application stage by HCC and at a request from Portsmouth City Council, percentage impact assessments have been completed for the following junctions:
- Rusty Cutter roundabout
 - A27 Teardrop junction
 - Havant Road/Auriol Drive
 - Havant Road/Bedhampton Hill
 - Bedhampton Hill/Portsdown Hill Road/Bedhampton Road
 - Havant Road/Farlington Road
 - Havant Road/Eastern Road
- 6.3 The results of the percentage impact assessments have been used to inform the scope of junction modelling required, as agreed at the pre-application stage. However, it should be noted that HCC requested that as a minimum the Rusty Cutter Roundabout and A27 Teardrop junction should be modelled (despite very small percentage impacts in traffic volumes).
- 6.4 As per the junction turning count surveys at the Rusty Cutter roundabout and A27 Teardrop junction the peak hours are confirmed as:
- AM – 07:30-08:30
 - PM – 16:00-17:00
- 6.5 Aside from the site accesses, the proposed development would add the largest volume of traffic (85%) to the Rusty Cutter roundabout. The impact of development on the roundabout is outlined in **Table 14** using 2028 Baseline figures.

Rusty Cutter Roundabout	AM Peak (0800-0900)			PM Peak (1600-1700)		
	Baseline	Development	Increase	Baseline	Development	Increase
	5475	146	2.6%	5362	148	2.8%

Table 14: Impact of Development on Rusty Cutter Roundabout

- 6.6 An additional 146 vehicle movements would be routed through the roundabout in the AM peak as a result of the proposed development, and this figure slightly increases to 148 vehicles in the PM peak.

This equates to a 2.6% increase in traffic in the AM peak through the Rusty Cutter and a 2.8% increase in the PM peak, which is considered a modest increase.

- 6.7 Through the pre-application process HCC also requested a percentage impact assessment on each arm of the Rusty Cutter. The results of this percentage impact assessment are demonstrated in **Table 15**.

	AM Peak (0800-0900)			PM Peak (1700-1800)		
	Baseline	Development	Increase	Baseline	Development	Increase
Havant Road	1015	108	10.6%	962	59	6.13%
A3(M) North	1676	12	0.72%	1356	27	1.99%
Bedhampton Hill	728	4	0.55%	829	5	0.60%
A27	1232	9	0.73%	1533	21	1.37%
A3(M) South	824	16	1.94%	682	37	5.43%

Table 15: Impact of Development on Rusty Cutter Roundabout Arms

*Totals marginally above those identified in Table 14 due to rounding.

- 6.8 The percentage impact assessment on the arms of the Rusty Cutter roundabout demonstrates, as expected, the Havant Road arm would experience the largest increase in the AM peak (10.6%). In the PM peak the largest percentage increase is again seen on the Havant Road arm (6.13%) with the A3(M) south arm having a similar percentage increase of 5.43% to due to arrivals from the east. These percentage increases are considered modest.
- 6.9 Based on the distributions presented in **Table 10**, 25% of vehicles would travel north onto the A3(M), 5% would cross the roundabout and travel towards Bedhampton and 55% would turn right and continue onto the A27 Teardrop junction. The proposed impact on the A27 Teardrop junction is outlined in **Table 16**, with 2028 Baseline figures.

Tear Drop Junction	AM Peak (0800-0900)			PM Peak (1600-1700)		
	Baseline	Development	Increase	Baseline	Development	Increase
	5353	79	1.48%	5725	58	1.01%

Table 16: Impact of Development on Teardrop Junction

- 6.10 As displayed in **Table 16**, this therefore equates to 79 vehicles using the Teardrop Junction in the AM peak and 58 vehicles in the PM peak resulting in a 1.48% increase in traffic volumes in the AM peak and 1.01% in the PM peak, which is considered an even more modest increase.
- 6.11 At the more local junctions the percentage impact assessments have been included as one summary in **Table 17**.

Junction	Total Percentage Impact AM (development vehicles/total vehicles)	Total Percentage Impact PM (development vehicles/total vehicles)
Havant Road/Auriol Drive	(146/1593) 9.17%*	(148/1752) 8.45%*
Havant Road/Bedhampton Hill	(146/1839) 7.94%	(148/2029) 7.29%
Bedhampton Hill/Portsdown Hill/Havant Road	(11/2461) 0.45%	(10/2614) 0.38%
Havant Road/Farlington Road	(23/1975) 1.16%	(19/2239) 0.85%
Havant Road/Eastern Road	(15/2173) 0.69%	(14/2669) 0.52%

Table 17: Percentage Impact on Local Road Network (2028)

* No additional vehicles turning into/out of Auriol Drive

- 6.12 **Table 17** demonstrates that the proposed development should not have a material impact on the operation of the Bedhampton Hill/Portsdown Hill/Havant Road, Havant Road/Farlington Road and Havant Road/Eastern Road. With percentage increases at these junctions in both the AM and PM peak not exceeding 1.2%. It is therefore considered that the impact to these junctions would be modest and no further junction assessment work is required for these junctions.
- 6.13 Given the percentage increases at the Havant Road/Auriol Drive and Havant Road/Bedhampton Hill junctions exceeding 5% these two junctions have been considered in more detail in **Chapter 7**.

7. JUNCTION CAPACITY ANALYSIS

Scope of Modelling

- 7.1 In accordance with the percentage impact assessment to assess the proposed development's impact on the local highway network, the modelling will consist of the following junctions:
- Site Accesses
 - Havant Road/Auriol Drive
 - Havant Road/Bedhampton Hill
 - Rusty Cutter Roundabout
 - A27 Tear Drop Junction
- 7.2 The junction assessments cover the following scenarios as agreed with HCC through the pre-application stage:
- Baseline 2016
 - Baseline 2023
 - Baseline 2023 + 'Committed Development'
 - Baseline 2023 + 'Committed Development' + 50% of Proposed Development
 - Future Year Baseline (2028) + 'Committed Development'
 - Future Year Baseline (2028) + 'Committed Development' + Proposed Development
- 7.3 The Baseline 2016 junction models for the Rusty Cutter roundabout and A27 Teardrop junction have been agreed with HCC Intelligent Transport Systems Team and Highways England respectively.
- 7.4 Modelling of the Rusty Cutter and A27 Teardrop junction has been completed using the network peak periods which were identified as 07:30-08:30 and 16:00-17:00.
- 7.5 Modelling has been completed using Junction 9 for roundabouts and T-junctions and LinSig for the signalised junctions. The outputs for each model provide a ratio of flow to capacity (RFC) or degree of saturation (DoS) for LinSig outputs and maximum queue lengths associated with each stream (i.e. the arm of the junction). RFC values exceeding 0.85 or degrees of saturation at 90% 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 degrees of saturation at 100% represent the junction operating at capacity.
- 7.6 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 flat or mixed/affordable 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 including the implementation of the footway along the southern boundary of Havant Road and pedestrian/cyclists' improvements towards Bedhampton schools;
- The assessment does not take account the impact of peak spreading, whereby individuals may exit the development onto the local road network earlier or later to avoid travelling in the peak period; and
- Where TEMPro growth factors have been applied, this assumes a percentage of traffic growth occurring on all links and junctions which would in part be attributed to new developments. Where we have included committed developments in our modelling assessment it is likely there would be an element of double counting with TEMPRO accounting for development growth traffic and our committed development scenarios accounting for development growth traffic.

Modelling Results

Site Access

- 7.7 Capacity modelling analysis for the proposed site accesses has been undertaken using Junction 9 modelling software for the following timescales;
- Baseline 2023 plus committed development plus 50% proposed development; and
 - Baseline 2028 plus committed development plus 100% proposed development.
- 7.8 Modelling has been completed on each of the two accesses, with 60% of the vehicle trips proposed to use the eastern access and 40% proposed to use the western access. The results of the modelling assessment are presented in **Tables 18** and **19** respectively and the full results are attached as **Appendix P**.

Site Access (Eastern – 60%)		AM			PM		
		RFC	Max Q	Delay (s)	RFC	Max Q	Delay (s)
Baseline 2023 Plus Committed Development Plus 50% Proposed Development	Site Access Road	0.26	0.4	17.24	0.15	0.2	15.60
	Havant Road	0.01	0.0	7.44	0.02	0.0	8.54
Baseline 2028 Plus Committed Development Plus Proposed Development	Site Access Road	0.28	0.4	18.29	0.15	0.2	16.46
	Havant Road	0.01	0.0	7.54	0.02	0.0	8.72

Table 18: Site Access (Eastern) Modelling

Site Access (Western – 40%)		AM			PM		
		RFC	Max Q	Delay (s)	RFC	Max Q	Delay (s)
Baseline 2023 Plus Committed Development Plus 50% Proposed Development	Site Access Road	0.15	0.2	15.90	0.10	0.1	14.96
	Havant Road	0.01	0.0	7.39	0.01	0.0	8.24
Baseline 2028 Plus Committed Development Plus Proposed Development	Site Access Road	0.19	0.3	16.73	0.11	0.1	15.70
	Havant Road	0.1	0.0	7.49	0.01	0.0	8.40

Table 19: Site Access (Western) Modelling

7.9 The modelling results demonstrate that the proposed accesses to the development perform well within capacity in all scenarios, with minimal queuing on the minor arms and RFC values well below 0.85. The maximum queue values are all below 1 vehicle, and based on NPPF guidance will not have a 'severe' impact on the local road network.

Havant Road/Auriol Drive

7.10 Capacity analysis of the eastern Havant Road/Auriol Drive T-Junction has been completed using Junctions 9 software. The modelling results are presented in **Table 20**, with the full Junctions 9 modelling outputs attached as **Appendix Q**.

Havant Road/Auriol Drive		AM			PM		
		RFC	Max Q	Delay (s)	RFC	Max Q	Delay (s)
Baseline 2016	Track	0.03	0.0	11.36	0.00	0.0	0.0
	Havant Road (East)	0.03	0.0	7.29	0.05	0.1	7.15
	Auriol Drive	0.09	0.1	9.09	0.04	0.0	8.36
	Havant Road (West)	0.00	0.0	0.0	0.00	0.0	0.0
Baseline 2023	Havant Road (East)	0.04	0.0	7.70	0.06	0.1	7.50
	Auriol Drive	0.11	0.1	9.93	0.05	0.1	8.82
	Havant Road (West)	0.00	0.0	0.00	0.00	0.0	0.000
Baseline 2023 Plus Committed Development	Havant Road (East)	0.04	0.0	7.73	0.06	0.1	7.53
	Auriol Drive	0.11	0.1	9.99	0.05	0.1	8.86
	Havant Road (West)	0.0	0.0	0.00	0.00	0.0	0.00
Baseline 2023 Plus Committed Development Plus 50% Proposed Development	Havant Road (East)	0.04	0.0	7.96	0.06	0.1	7.65
	Auriol Drive	0.11	0.1	10.41	0.05	0.1	9.09
	Havant Road (West)	0.0	0.0	0.00	0.00	0.0	0.00
Baseline 2028	Havant Road (East)	0.04	0.0	7.90	0.07	0.1	7.69
	Auriol Drive	0.11	0.1	10.31	0.05	0.1	9.08
	Havant Road (West)	0.0	0.0	0.00	0.00	0.0	0.00
Baseline 2028 Plus Committed Development	Havant Road (East)	0.04	0.0	7.94	0.07	0.1	7.72
	Auriol Drive	0.11	0.1	10.36	0.05	0.1	9.12
	Havant Road (West)	0.00	0.0	0.00	0.00	0.0	0.00
Baseline 2028 Plus Committed Development Plus Proposed Development	Havant Road (East)	0.04	0.0	8.46	0.07	0.1	7.98
	Auriol Drive	0.12	0.2	11.36	0.05	0.1	9.63
	Havant Road (West)	0.00	0.0	0.00	0.00	0.0	0.00

Table 20: Havant Road/Auriol Drive Modelling

7.11 The modelling results demonstrate that with both the committed development and proposed development the Havant Road/Auriol Drive junction would work significantly under capacity with highest RFC values of 0.12 and the longest delays of 11.36 seconds seen on the Auriol Drive arm in the Baseline 2028 plus committed development plus proposed development scenario (AM peak). However, when compared with the Baseline 2028 plus committed development scenario the proposed development results in a 1 second increase in delay and 0.01 increase in RFC which would not be considered to cause a severe impact to the operation of the local road network.

7.12 The 'Track' arm was only modelled in the Baseline 2016 model as the access was present in the turning count surveys and will be closed as part of the development proposals.

Havant Road/Bedhampton Hill

7.13 Capacity analysis of the eastern Havant Road/Bedhampton Hill junction has also been completed using Junctions 9 software. The modelling results are presented in **Table 21**, with the full Junctions 9 modelling outputs attached as **Appendix R**.

Havant Road/Bedhampton Hill		AM			PM		
		RFC	Max Q	Delay (s)	RFC	Max Q	Delay (s)
Baseline 2016	Bedhampton Hill	0.21	0.3	9.39	0.24	0.4	9.48
	Havant Road (West)	0.00	0.0	0.00	0.00	0.0	0.00
	Havant Road Slip Road	0.27	0.4	11.94	0.34	0.6	12.85
Baseline 2023	Bedhampton Hill	0.24	0.24	10.13	0.28	0.4	10.21
	Havant Road (West)	0.00	0.00	0.00	0.00	0.0	0.00
	Havant Road Slip Road	0.31	0.31	12.83	0.38	0.7	13.96
Baseline 2023 Plus Committed Development	Bedhampton Hill	0.24	0.24	10.16	0.28	0.4	10.24
	Havant Road (West)	0.00	0.00	0.00	0.00	0.0	0.00
	Havant Road Slip Road	0.31	0.31	12.85	0.38	0.7	13.99
Baseline 2023 Plus Committed Development Plus 50% Proposed Development	Bedhampton Hill	0.25	0.25	10.42	0.28	0.4	10.37
	Havant Road (West)	0.00	0.00	0.00	0.00	0.0	0.00
	Havant Road Slip Road	0.31	0.31	13.05	0.38	0.7	14.11
Baseline 2028	Bedhampton Hill	0.26	0.26	10.53	0.30	0.5	10.61
	Havant Road	0.00	0.00	0.00	0.00	0.0	0.00

	(West)						
	Havant Road Slip Road	0.33	0.33	13.34	0.40	0.7	14.60
Baseline 2028 Plus Committed Development	Bedhampton Hill	0.26	0.26	10.57	0.30	0.5	10.64
	Havant Road (West)	0.00	0.00	0.00	0.00	0.0	0.00
	Havant Road Slip Road	0.33	0.33	13.36	0.40	0.7	14.63
Baseline 2028 Plus Committed Development Plus Proposed Development	Bedhampton Hill	0.27	0.27	0.27	0.30	0.5	10.94
	Havant Road (West)	0.00	0.00	0.00	0.00	0.0	0.00
	Havant Road Slip Road	0.34	0.34	13.80	0.41	0.7	14.90

Table 21: Havant Road/Bedhampton Hill Modelling

7.14 The modelling results demonstrate that the Havant Road/Bedhampton Hill junction operates well under capacity with a highest RFC value of 0.41 which is seen in the Baseline 2028 plus committed development plus proposed development PM scenario, an increase of only 0.01 when compared with the Baseline 2028 plus committed development. The delay values also remain low in all scenarios with the longest delay at 14.90 again seen in the Baseline 2028 plus committed development plus proposed development scenario with the proposed development only increasing delay by 0.27 seconds.

7.15 It is recognised that the junction model may not be wholly representative of real time operations due to the keep clear box markings. Highway works are also proposed at the Rusty Cutter roundabout (explained below) which could also affect the operation of this junction. However, it is prudent to note that the percentage impact at this junction as a result of the proposed development remains relatively low at 7.94% in the AM peak and 7.29% in the PM peak. This is further demonstrated in the minimal increases in RFC, queue and delay values when the scenarios without the proposed development are compared to scenarios with proposed development.

Rusty Cutter Roundabout

7.16 The Rusty Cutter roundabout is a partially signalised roundabout which connects Havant Road, the A27, Bedhampton Hill and the A3(M). The roundabout has signals operating on the A3(M) southbound off-slip, A3(M) northbound off-slip and the south and north circulatory sections. The remaining arms are controlled by give way movements.

- 7.17 Due to the roundabout being partially signalised, the roundabout has been modelled in two separate programmes with parameters from each being combined. Firstly, the junction was modelled in Junctions 9 as a roundabout, with the slope and intercept values taken from each output and included in the LinSig models. This allows the junctions to be modelled as partially signalised (an approach accepted by Highways England and Hampshire County Council).
- 7.18 In order to construct the model, traffic signal timings were purchased from Hampshire County Council's Intelligent Transport Systems team in November 2016. The baseline model was agreed with Hampshire County Council and Highways England and has been validated by queue length surveys. The models have been optimised.
- 7.19 Through discussion with HCC and HBC it has been requested that a signalised crossing is provided on the A3(M) northbound on-slip to allow pedestrians to cross the junction safely. As these works would only come forward as a result of the development the proposals have been modelled for the following scenarios only:
- Baseline 2023 Plus Committed Development Plus 50% of Proposed Development
 - Baseline 2028 Plus Committed Development Plus Proposed Development
- 7.20 As a result of providing a signalised crossing, the Havant Road and Circulatory West arms have become signalised, thus providing the opportunity for pedestrians to cross during the Intergreen period which has been set at 8 seconds. A range of Intergreens have been tried between 7-10 seconds, however it is felt that 8 seconds provides a realistic crossing time to allow pedestrians including the elderly and children to cross the on-slip without severely hindering the operation of the junction. Consequently, the crossing has introduced time where traffic is not free flowing and thus has affected the overall capacity of the Rusty Cutter roundabout. The cycle times of the junction have also been altered to 68 seconds in the AM peak and 65 seconds in the PM to improve capacity, queue lengths and delay. To ensure the remaining junction arms (including other signalised arms) are not impacted by the introduction of new signals the model deliberately constrains the Havant Road arm to ensure predicted queueing does not exceed the capacity of the Circulatory West arm. Queues are therefore higher on the Havant Road arm than in the scenarios where no development traffic is added. In order to ensure capacity remains adequate a third lane is also proposed on the Circulatory West arm making use of the existing grass verge of the roundabout. This also provides a more symmetrical junction as the other circulatory arms have 3 lanes. A plan indicatively demonstrating the proposals is attached as **Appendix S**.

7.21 The modelling results using the agreed model and model with the signalised crossing are outlined in **Table 22**, with the full modelling outputs attached as **Appendix T**.

Rusty Cutter Roundabout		AM			PM		
		DoS	Max Q	Delay (s)	DoS	Max Q	Delay (s)
Baseline 2016 (agreed model)	A3 NB Off Slip	82.9%	15.4	34.3	82.9%	12.9	41.7
	Havant Road	48.1%	1.9	5.5	51.6%	2.7	4.5
	A3 SB Off Slip	75.1%	9.9	19.3	71.5%	9.0	24.2
	Bedhampton Hill	48.0%	2.4	4.3	37.2%	2.5	3.2
	A27	39.7%	0.1	2.2	49.6%	1.1	2.3
	Circulatory South	80.5%	14.3	30.4	77.5%	14.5	22.3
	Circulatory North	61.9%	7.0	22.6	80.6%	8.7	19.7
Baseline 2023 (agreed model)	A3 NB Off Slip	92.7%	21.0	48.9	88.6%	15.5	47.9
	Havant Road	59.3%	3.1	8.1	63.3%	4.4	6.2
	A3 SB Off Slip	82.7%	12.0	21.2	83.0%	11.7	30.1
	Bedhampton Hill	60.5%	3.5	6.6	44.0%	3.4	4.5
	A27	44.4%	0.9	2.3	55.3%	2.0	2.5
	Circulatory South	90.1%	19.1	41.0	88.3%	19.4	30.8
	Circulatory North	71.8%	9.2	27.1	85.2%	10.5	21.6
Baseline 2023 Plus Committed Development (agreed model)	A3 NB Off Slip	92.7%	21.0	48.9	88.6%	15.5	47.9
	Havant Road	60.0%	3.3	8.3	63.4%	4.4	6.3
	A3 SB Off Slip	82.7%	12.0	21.2	83.2%	11.7	30.2
	Bedhampton Hill	60.6%	3.5	6.7	44.2%	3.4	4.5
	A27	44.5%	0.9	2.3	55.5%	2.0	2.5
	Circulatory South	90.1%	19.1	41.0	88.7%	19.6	31.3
	Circulatory North	71.8%	9.2	27.1	85.2%	10.5	21.6
Baseline 2023 Plus Committed Development Plus	A3 NB Off Slip	93.4%	19.1	47.7	93.6%	15.8	57.5
	Havant Road	61.5%	7.0	26.5	88.6%	10.1	43.8

50% Proposed Development (with signalised crossing)	A3 SB Off Slip	83.4%	11.4	21.6	81.7%	10.1	27.6
	Bedhampton Hill	62.1%	3.3	6.6	44.7%	3.0	4.3
	A27	44.5%	0.9	2.4	55.5%	1.9	2.5
	Circulatory South	95.7%	22.5	52.7	92.6%	20.3	34.8
	Circulatory West	64.4%	10.9	25.9	79.1%	11.0	12.9
	Circulatory North	66.9%	9.5	20.2	84.7%	11.3	25.4
Baseline 2028 (agreed model)	A3 NB Off Slip	94.5%	23.3	53.3	93.3%	18.5	59.0
	Havant Road	65.5%	3.9	10.0	70.0%	5.4	8.2
	A3 SB Off Slip	86.8%	14.9	23.5	87.1%	13.1	33.0
	Bedhampton Hill	67.6%	4.3	8.6	47.6%	3.9	5.2
	A27	46.7%	1.4	2.4	58.0%	2.3	2.6
	Circulatory South	97.4%	27.4	68.2	92.7%	23.1	38.9
	Circulatory North	75.4%	10.4	28.0	89.5%	12.3	25.6
Baseline 2028 Plus Committed Development (agreed model)	A3 NB Off Slip	97.4%	26.6	68.7	93.3%	18.5	59.0
	Havant Road	66.2%	3.8	10.1	70.1%	5.4	8.3
	A3 SB Off Slip	86.8%	14.9	23.5	84.4%	13.5	33.3
	Bedhampton Hill	67.8%	4.3	8.7	47.9%	3.9	5.3
	A27	46.8%	1.4	2.4	58.2%	2.3	2.6
	Circulatory South	94.8%	24.4	55.1	93.0%	23.3	39.4
	Circulatory North	75.4%	10.4	27.6	89.5%	12.7	26.3
Baseline 2028 Plus Committed Development Plus Proposed Development (signalised crossing)	A3 NB Off Slip	98.2%	25.3	70.1	98.5%	21.0	83.2
	Havant Road	100.5%	19.7	117.2	106.4%	36.7	173.1
	A3 SB Off Slip	87.5%	12.9	24.2	86.9%	11.4	30.1
	Bedhampton Hill	70.3%	4.1	10.0	49.0%	3.3	5.0
	A27	46.8%	1.2	2.5	58.2%	2.32	2.7
	Circulatory South	101.0%	32.8	90.6	97.8%	28.1	55.3
	Circulatory West	55.9%	11.3	17.6	79.0%	11.1	11.7
	Circulatory North	72.8%	10.8	24.6	86.7%	12.7	29.0

Table 22: Rusty Cutter Modelling

- 7.22 The modelling results demonstrate that capacity in the AM peak the Rusty Cutter roundabout experiences issues in the Baseline 2023 scenario on the A3(M) NB off-slip and Circulatory South arms. These arms therefore also experience capacity issues in the later scenario runs. It is clear that the capacity issues are a result of the growth in the baseline traffic as opposed to the level of traffic being added to the roundabout from the proposed development.
- 7.23 It is also clear that greater capacity issues are seen in the 'plus proposed development' scenarios however this is more of a result of the signalised crossing than the increase in traffic resulting from the development as greater waiting time is introduced by the new signals.
- 7.24 As aforementioned, the Havant Road arm has been deliberately constrained in the scenarios with the signalised crossing to ensure that queues from the Circulatory West arm do not back up onto the Circulatory South or A3(M) NB off-slip arms. Therefore, in the Baseline 2028 Plus Committed Development Plus Proposed Development (with signalised crossing), whilst the DoS values appear high on the A3 NB Off-slip, Havant Road and Circulatory South arms in the AM peak the queues remain modest at 25.3, 19.7 and 32.8 respectively (against the space available for queuing) which should not hinder the operation of the roundabout. In the PM peak similar DoS values are experienced on the same arms, however, again, queues remain modest.
- 7.25 Therefore, the highway works proposed allows pedestrians to safely cross the Rusty Cutter roundabout through the implementation of a signalised crossing without having a 'severe' impact on the operation of this roundabout. The modelling results also suggest that it is a result of the growth in baseline traffic as opposed to development traffic that creates capacity issues and therefore the proposed development itself does not have a 'severe' impact on the operation of the roundabout. The highway works proposed also relieves capacity issues created through the implementation of a crossing (as requested by HBC/HCC) and therefore provides a betterment to pedestrians, cyclists and motorists.
- 7.26 It is also prudent to note that an improvement scheme is proposed by HBC to improve the 3-lane link road between the A27 Teardrop junction and the Rusty Cutter roundabout with works commencing Spring 2018 and completion due in Autumn 2019. It is unclear at present how these works could affect the operation of the Rusty Cutter.

A27 Teardrop Junction

7.27 The A27 Teardrop junction is a partially signalised teardrop shaped roundabout/junction which connects the A27 east to the A3(M), Bedhampton and the Industrial Estate of Harts Farm Way. The junction has signals operating the A27 off-slip and the A27 circulatory arm from the Rusty Cutter roundabout. The Harts Farm Way arm and A27 eastbound junctions are therefore controlled by give way movements.

7.28 The A27 Teardrop junction has therefore been modelled with the same principles as the Rusty Cutter by combining parameters from Junctions 9 and LinSig. The baseline 2016 model has been agreed with Highways England, whilst also being validated against queue length surveys. The modelling results have been optimised to identify the most appropriate signal timings whilst the cycle time remains as per the agreed models. The results of the modelling are outlined in **Table 23** whilst the outputs for LinSig are attached as **Appendix U**.

A27 Teardrop Junction		AM			PM		
		DoS	Max Q	Delay (s)	DoS	Max Q	Delay (s)
Baseline 2016	To/From Rusty Cutter	72.3%	1.3	3.5	46.1%	0.4	1.6
	A27 East	89.9%	11.8	40.5	56.8%	5.2	12.1
	Harts Farm Way	32.4%	0.5	2.7	83.1%	4.9	7.5
	Circulatory Southbound	69.5%	6.5	15.3	61.0%	3.8	20.2
Baseline 2023	To/From Rusty Cutter	81.0%	2.1	5.1	51.3%	0.5	1.8
	A27 East	84.6%	11.0	28.7	62.2%	6.1	13.2
	Harts Farm Way	37.4%	0.3	3.0	95.0%	9.3	13.7
	Circulatory Southbound	84.3%	10.0	23.4	67.9%	4.6	22.5
Baseline 2023 Plus Committed Development	To/From Rusty Cutter	81.0%	2.1	5.1	51.5%	0.5	1.8
	A27 East	84.6%	11.0	28.7	66.8%	6.6	14.8
	Harts Farm Way	37.4%	0.3	3.0	91.7%	8.0	12.7
	Circulatory Southbound	84.3%	10.0	23.4	62.3%	4.2	19.8
Baseline 2023 Plus Committed Development Plus 50% Proposed Development	To/From Rusty Cutter	82.2%	2.3	5.4	51.8%	0.5	1.8
	A27 East	85.1%	11.1	29.2	67.6%	6.7	15.0
	Harts Farm Way	37.7%	0.3	3.1	93.4%	9.6	16.6

	Circulatory Southbound	84.8%	10.1	23.5	64.3%	4.4	20.1
Baseline 2028	To/From Rusty Cutter	85.0%	2.8	6.4	53.8%	0.6	1.9
	A27 East	88.9%	12.6	33.29	66.5%	6.6	13.9
	Harts Farm Way	40.1%	0.3	3.2	97.7%	17.9	24.2
	Circulatory Southbound	87.7%	11.6	26.2	71.2%	5.0	23.1
Baseline 2028 Plus Committed Development	To/From Rusty Cutter	85.0%	2.8	6.4	54.1%	0.6	1.9
	A27 East	88.9%	12.6	33.9	70.1%	7.2	15.7
	Harts Farm Way	40.0%	0.3	3.2	97.0%	12.3	21.0
	Circulatory Southbound	87.7%	11.6	26.2	65.3%	4.5	20.7
Baseline 2028 Plus Committed Development Plus Proposed Development	To/From Rusty Cutter	87.4%	3.4	7.5	54.7%	0.6	1.9
	A27 East	89.8%	13.0	35.4	71.8%	7.4	16.2
	Harts Farm Way	40.9%	0.3	3.3	97.1%	12.1	20.6
	Circulatory Southbound	88.5%	11.7	26.6	69.8%	5.1	23.4

Table 23: A27 Teardrop Junction Modelling

7.29 The modelling results demonstrate that the junction experiences capacity issues from the Baseline 2023 on the Harts Farm Way arm in the PM peak whilst the AM peak operates sufficiently under capacity. As a result of the proposed development the DoS values increase by 0.1% in the 2028 Baseline suggesting that the development would not have a severe impact on the operation of this junction. However, queue and delay values remain low even when the junction is nearing capacity with maximum queue values of 12.3 and delays of 23.4 seconds. This is also outlined in **Table 16** which highlights the percentage impact as 1.48% in the AM peak and 1.01% in the PM. No mitigation works are therefore proposed at this junction given the very minimal impact resulting from the development.

Transport Contributions

7.30 As part of this development and in accordance with HBC's Draft Local Plan (2036) pedestrian and cyclist improvements are proposed along Havant Road to provide a 3m wide footway/cycleway along the southern carriageway of Havant Road with a pedestrian/cyclist crossing provided to the west of the site. Off-site infrastructure improvements are also proposed along the pedestrian route towards Bidbury Infant and Junior Schools. Such improvements would provide a wider strategic benefit and thus the cost of these works should be deducted from any transport contribution.

8. SENSITIVITY TEST

- 8.1 As part of the pre-application process with HCC it was requested that a review of the draft Havant Borough Local Plan 2036 was completed as part of this TA in order to perform a modelling exercise with a sensitivity test of the Strategic Road Network (Rusty Cutter roundabout and A27 Teardrop junction). HBC released their Draft Local Plan 2036 in January 2018 and was out for public consultation from Monday 8th January to Friday 16th February 2018.
- 8.2 The draft local plan states that the evidence base is not complete with work still required on the Borough Wide Transport Assessment (amongst others). PBA have therefore reviewed the Local Plan in order to complete a Sensitivity Test within the junction modelling to ensure the cumulative impact of housing sites provisionally allocated in the Local Plan is assessed. The review concluded that the following proposed development sites should be considered in the sensitivity test:
- Policy H41: 560 Dwellings at Land East of College Road, Campdown
 - Policy H44: 100 Dwellings at Land to the north of Fort Purbook
 - Policy H45: 95 Dwellings at Former South Downs College Car Park
- 8.3 These three allocations have been chosen to be included in the assessment due to their location and scale in relation to the proposed development at Forty Acre Farm. The draft Local Plan wording for Policy H15: Forty Acre Farm also outlines that infrastructure should be coordinated with policies H41, H44 and H45.
- 8.4 Given that no applications have been submitted for the above sites, for modelling purposes, the trip rates identified in this TA (and agreed with HCC) have been used to ascertain likely trip generation from the 3 site allocations. The trip generation for the AM (0800-0900) and PM (1700-1800) peak periods is outlined in **Table 24**.

TRICS	AM Peak (0800-0900)		PM Peak (1700-1800)	
	Arrivals	Departures	Arrivals	Departures
Trip Rate per unit (Private Houses)	0.127	0.381	0.325	0.189
Trip Generation (755 Houses)	96	288	245	143
TOTAL	384		388	

Table 24: Sensitivity Test Trip Generation

8.5 In order to identify how traffic generated by these 3 sites would distribute onto the local road network, the 2011 Census data for 'Travel to Work' (data set: WF01BEW) has been assessed using the local Purbrook/Widley output area. The same distribution percentages have been used for all 3 allocations due to their location and proximity and this is outlined in **Table 25**.

Destination	Percentage	Route Assignment
Portsmouth	35%	A27 WB
Southampton	4%	A27 WB
East Hampshire	5%	A3 (M)
Fareham	5%	A27 WB
Gosport	2%	A27 WB
Waterlooville	12%	A3
West Leigh	2%	Purbook Way
North Havant	1%	Bedhampton Road
Widley	7%	Stakes Road
Emsworth	1%	A27EB
Havant	9%	Bedhampton Road
Hayling Island	1%	A27 EB
Winchester	5%	A27 WB
Surrey	1%	A3 (M)
Sussex	5%	A27 EB
Bedhampton	3%	Bedhampton Road
Cowplain	1%	A3
London	1%	A3 (M)

Table 25: Sensitivity Test Trip Distributions

8.6 The results of the distributions suggest that the highest proportion of vehicle trips are towards Portsmouth with the second highest towards Waterlooville with a higher percentage of vehicle trips utilising the A27 westbound.

8.7 Of the destinations outlined in **Table 25**, vehicle trips towards Emsworth, Hayling Island and Sussex only would result in trips utilising the Rusty Cutter roundabout and Teardrop junction to travel eastbound on the A27. This therefore equates to 7% of development trips. This value has therefore been applied to the likely developments' cumulative trip generation outlined in **Table 26**.

TRICS	AM Peak (0800-0900)		PM Peak (1700-1800)	
	Arrivals	Departures	Arrivals	Departures
7% of Trip Generation	7	20	17	10

Table 26: Sensitivity Trip Generation through SRN

- 8.8 These 'allocation' trips have therefore been added to the model with all departures utilising the A3(M) southbound off-slip arm of the Rusty Cutter to access the A27 Eastbound on-slip of the A27 Teardrop junction, travelling east and the arrivals utilising the A27 Westbound off-slip arm of the A27 Teardrop junction and A27 arm of the Rusty Cutter to access the A3(M) travelling north. The distribution diagram of the HBC Local Plan Sensitivity Test is attached as **Appendix V**.
- 8.9 This modelling assessment work was submitted to HCC in March 2018 as part of a Strategic Network Junction Modelling Transport Network.
- 8.10 The LinSig models have been run using the Baseline 2028 Plus Committed Development Plus Proposed Development Plus HBC Local Plan Sensitivity Test with the results displayed in **Table 27** and the full outputs attached as **Appendix W**.

HBC Local Plan Sensitivity Test		AM			PM		
		DoS	Max Q	Delay (s)	DoS	Max Q	Delay (s)
Baseline 2028 Plus Committed Development Plus Proposed Development Plus HBC Local Plan Sensitivity Test (with signalised crossing)	Rusty Cutter A3 NB Off Slip	98.2%	25.3	70.1	98.5%	21.0	83.2
	Havant Road	100.5%	19.7	117.2	106.4%	36.7	173.1
	A3 SB Off Slip	87.1%	12.8	23.0	86.8%	11.7	30.8
	Bedhampton Hill	71.2%	4.1	10.3	49.2%	3.3	5.0
	A27	47.1%	1.2	2.5	59.0%	0.3	2.7
	Circulatory South	101.5%	34.1	95.9	98.6%	30.0	60.7
	Circulatory West	56.1%	11.3	17.6	79.6%	11.2	12.0
	Circulatory North	75.8%	11.1	27.1	86.7%	12.7	28.9
Baseline 2028 Plus Committed Development Plus Proposed Development Plus HBC Local Plan Sensitivity Test	A27 Teardrop To/From Rusty Cutter	87.4%	3.4	7.5	55.2%	0.6	2.0
	A27 East	90.5%	13.5	36.6	73.0%	7.6	16.5
	Harts Farm Way	40.9%	0.3	3.3	97.3%	12.4	21.4
	Circulatory Southbound	88.5%	11.7	26.6	69.8%	5.1	23.4

Table 27: Sensitivity Test SRN Modelling

- 8.11 The results of the SRN junction modelling sensitivity test demonstrate that similar DoS values are seen in the earlier scenario runs with the largest increase at the Rusty Cutter roundabout seen on the Circulatory South arm of 0.8% in the PM peak and at the A27 Teardrop junction on the A27 East arm in the AM peak of 0.7%. Both increases are modest and do not result in significant increases in queue or delay values.
- 8.12 For the Rusty Cutter roundabout the sensitivity test model run demonstrates that, with the proposed highway works of implementing a signalised pedestrian crossing and thus making Havant Road and Circulatory West signalised and an additional lane to the Circulatory West arm, the additional traffic from the sensitivity test does not cause further capacity issues given that such values remain similar to the Baseline 2028 Plus Committed Development Plus Proposed Development (with signalised crossing).
- 8.13 No further off-site highway works are therefore proposed as a result of additional traffic from the sensitivity test.

9. CONCLUSION

- 9.1 This Transport Assessment has been prepared by Paul Basham Associates on behalf of Barratt David Wilson Homes to support a full planning application for the residential development of 320 dwellings and a 66-bedroom care home at Forty Acre Farm, Bedhampton. The scope of the TA has been guided by pre-application feedback with HCC on a scoping note produced by PBA along with a Concept Design Check with HCC and Engineering Consultancy on the access designs.
- 9.2 The scope of this TA reflects the principles of the recently withdrawn DfT's 'Guidance on Transport Assessments' (March 2007), reviewing site accessibility, personal injury accident data, the proposed accommodation schedule, car and cycle parking requirements, visibility and access arrangements, servicing arrangements, trip assessments, traffic impact and capacity assessment on the local road network (LRN) and draws conclusions from the overall assessment.
- 9.3 The proposed development consists of 320 residential dwellings with 30% affordable housing and 70% private housing. A 66-bedroom care home would also be provided on site along with allotments, a habitat mitigation zone, provision of open space and associated infrastructure.
- 9.4 The proposed site is located to the west of Bedhampton, and east of Drayton and is within the recommended walk/cycle distances of public transport infrastructure, with bus stops located on Havant Road either side of the proposed site accesses offering a high frequency service. The proposed site exhibits good accessibility to local amenities and pedestrian and cycle networks, and as such is in an appropriate location for sustainable development.
- 9.5 PIA data for the most recent five years has been reviewed along Havant Road (across the site frontage), the Rusty Cutter roundabout and A27 Teardrop junction. Within the study area there has been a total of 65 PIA's, with 0 fatalities, 12 serious injuries and 53 slight accidents. A cluster of 14 PIAs (1 serious and 13 slight) were reported at the Rusty Cutter roundabout of Havant Road, Bedhampton Hill, A3(M) and A27. This roundabout has recently been partly signalised which should help mitigate against future accident occurrences. The roundabout also experiences high traffic volumes and therefore the incident causes, dispersion and frequency are not a cause of concern. A small cluster is also visible at the Rectory Avenue and Havant Road junction with 6 slight accidents. All accidents were a result of human error as opposed to highway design. 1 serious accident was also reported opposite the proposed site access; however, analysis of the HCC reports determines the accident was a result of human error, and is not a result of highway design. The frequency and distribution of the PIAs and causation factors do not indicate any cause for concern.
- 9.6 The development would be served by two vehicular accesses both facilitated by ghost island right turn

lanes. Both accesses would be of bellmouth arrangements 7m wide supported by 15m radii with 2.0m wide footways flanking both sides of the access road which connect to a 3m wide footway/cycleway which borders the north of the site along Havant Road. The access designs have been subject to a HCC Concept Design Check in November 2017 which raised no issues in principle with the accesses and pedestrian improvements designed.

- 9.7 The trip generation associated with the proposed development has been calculated using the industry standard TRICS database. The trip generation assessment indicated the proposed development would generate a total of 1584 daily vehicle trips, with 172 vehicle trips in the AM peak and 174 vehicle trips in the PM peak.
- 9.8 The proposed development intends to provide a total of 758 parking spaces for the general housing with 694 spaces for residents and 64 visitor parking bays. This level of parking is in accordance with Havant Borough Council's Parking Standards for allocated and unallocated spaces and visitor parking. The development would also provide cycle parking in accordance with HBC standards. The care home would have 28 parking spaces and 8 cycle storage spaces which given the intended end users is considered sufficient to cater for all demand.
- 9.9 The internal site carriageways are designed to a width of 5.5m and are supported by 2m footways in line with MfS guidance. Where parking directly fronts carriageways, the width is increased to 6m to ensure vehicles can enter and exit the parking spaces. As the internal roads move out toward the periphery of the site into quieter cul-de-sacs, shared-surface carriageways are proposed adopting 'home zone' principles with active property frontages. The geometries would accommodate the passing of 2 vehicles and allow cyclists and pedestrians to safely manoeuvre through the site. The care home would have a gated access to prevent unauthorised use of the parking with a refuse vehicle and fire appliance able to turn on site. A delivery layby is also provided to ensure the car park of the care home can remain free flowing.
- 9.10 It has been established through pre-application discussions with Hampshire County Council highway officers that several junctions on the local road network need to be assessed in terms of quantifying the impact of the development. These junctions are:
- Site Accesses;
 - Havant Road/Auriol Drive;
 - Havant Road/Bedhampton Hill;
 - Rusty Cutter Roundabout; and
 - A27 Teardrop Junction.

- 9.11 Percentage impact assessments have also been completed for local junctions to reaffirm the scope of junction modelling, identifying that, as a result of the proposed development, less than a 1.2% increase in traffic is seen at the Havant Road/Lower Farlington Road junction, Havant Road/Eastern Road junction and Bedhampton Road/Portsdown Hill Road/Bedhampton Hill roundabout.
- 9.12 The modelling results do not present a severe impact of the proposed development on any of the junctions modelled when also considering committed development with the growth in baseline traffic resulting in the largest increases in RFC/DoS, queue and delay. Through pre-application discussions with HCC and HBC a signalised crossing across the A3(M) northbound on-slip of the Rusty Cutter roundabout was requested. In order to provide this Havant Road and the Circulatory West arms had to become signalised affecting the capacity of these arms. Whilst the modelling results of the junction with the highway works suggest that the A3(M) northbound off-slip, Circulatory South and Havant Road arms breach capacity, the queues on these arms remain modest which is important to ensure that the traffic continues to flow around the roundabout without queues backing up to other arms. The highway works proposed are therefore deemed sufficient to ensure pedestrians and cyclists can safely cross the north of the Rusty Cutter and also ensure traffic flows around the roundabout without causing severe delay or queues. It is therefore still considered that the proposed development would not result in a severe impact on the operation of the Rusty Cutter roundabout and it is instead the growth in baseline traffic and required pedestrian works that would have the greater impact on capacity.
- 9.13 A package of offsite highway improvements are proposed as part of the development. This includes the provision of a 3m wide footway/cycleway along the southern side of Havant Road and improvements along the pedestrian route to Bidbury Infant and Junior Schools. Along this route it is proposed to extend the existing footway/cycleway from the Rusty Cutter roundabout up to the junction of Bedhampton Hill and the Rusty Cutter Beefeater Restaurant along with upgrading an existing pedestrian crossing and implementing a new pedestrian island to facilitate east to west movements across Bedhampton Hill. Improvements are also proposed around the Rusty Cutter roundabout. This includes the provision of a signalised crossing across the A3(M) northbound on-slip which also results in the signalisation of the Havant Road and Circulatory West traffic arms and the implementation of a third lane on the Circulatory West arm. Such improvements would provide a wider strategic benefit and thus the cost of these works should be deducted from any wider transport contribution.

- 9.14 As part of pre-application liaison, HCC requested that a Sensitivity Test was completed to include a review of HBC's Draft Local Plan (2036). As such three 'allocated' sites were identified for review due to their scale and proximity to Forty Acre Farm, which equated to an additional 755 houses. A review of the likely distributions from these sites was conducted as part of this TA identifying 7% of vehicle trips are likely to utilise the SRN in proximity to Forty Acre Farm (Rusty Cutter roundabout and A27 Teardrop). These two junctions have been re-modelled with the additional 'allocated sites' vehicle trips which demonstrates that very minor increases in DoS, queue and delay values are seen with the largest DoS increase at the Rusty Cutter roundabout being 0.8% and 0.7% at the A27 Teardrop junction. No further mitigation works are therefore required to support additional traffic resulting from the sensitivity test.
- 9.15 This Transport Assessment has demonstrated that the proposed development would not have a significant impact on the operation of the local highway network. We would therefore encourage HCC and HBC to look favourably upon the highway matters of this application.