



LAND WEST OF B2132 BILSHAM ROAD, YAPTON

TRANSPORT ASSESSMENT

On Behalf of

GLEESON STRATEGIC LAND

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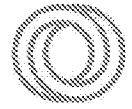
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1.0 INTRODUCTION

1.1 This Transport Assessment (TA) has been prepared on behalf of the applicant, Gleeson Strategic Land, in support of an Outline Planning Application for a proposed residential development on land located west of Bilsham Road, Yapton.

1.2 The development site comprises 11.7 hectares with the proposals being for the erection of up to 250 of mixed affordable and private dwellings. The site forms part of a larger area of land identified in the emerging Arun Local Plan, as Yapton SD7, which allocates land for a minimum of 500 dwellings, as illustrated on **Figure 1**.

1.3 Both sites have therefore been planned and designed as a single overall site but with the ability to be delivered separately. The two sites that make up the emerging allocation at Yapton will form two separate planning applications. It is likely that the combined total will be c.550 dwellings and for this reason the cumulative impact throughout this TA has been based on 550 dwellings.

Pre-Application Scoping

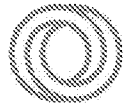
1.4 A pre-application meeting was held with Arun District Council (ADC) on the 8th August 2017 to discuss the proposals and to establish any foreseeable issues that may arise. No specific highway or transport concerns were raised by the planning officer.

1.5 A TA scoping report was subsequently submitted to the local highway authority, West Sussex County Council (WSCC), on the 16th August 2017 which set out the development proposals, assessment methodology and identified issues relating to the site and existing highway network. Several committed development sites are included in the assessment scope (see **Section 5**) to allow a robust test of the local highway network.

1.6 A meeting was held with the highway officer to discuss and agree the scope of the assessment on 28th August 2017 and WSCC provided a pre-application response on 5th September 2017. A copy of the scoping note and subsequent correspondence with WSCC has been included in **Appendix A**.

Assessment Methodology

1.7 A variety of sources have been utilised to inform the assessment including desktop research, site visits, traffic surveys and feedback from WSCC.



1.8 To properly assess the traffic impact and transport implications of the proposed development this report considers the following factors, structured as follows:

Section 2.0: Reviews national and local planning policy relevant to the application;

Section 3.0: Provides a detailed assessment of the existing site conditions, paying attention to existing sustainable infrastructure;

Section 4.0: Presents the development proposals;

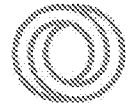
Section 5.0: Assesses the potential traffic generation of the development site, as well as identifying committed development traffic and residual background traffic growth;

Section 6.0: Summarises capacity assessments conducted at key locations on the local highway network;

Section 7.0: Looks at the impact of the development upon the Ford and Yapton Level crossings;

Section 8.0: Discusses potential mitigation measures and improvements; and

Section 9.0: Summarises and concludes the report.



2.0 PLANNING POLICY

National Planning Policy Framework (NPPF)

2.1 The National Planning Policy Framework (NPPF) of March 2012 provides a structure for development within the UK, with a presumption in favour of sustainability and promotion of economic growth.

2.2 To promote sustainable transport, the NPPF recognises that all development proposals generating significant travel movement should be supported by a Transport Statement or Assessment.

2.3 The National Planning Policy Framework (NPPF) sets out in paragraph 32 that “development should only be refused where the residual cumulative impacts of development are severe”.

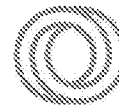
2.4 “Developments expected to generate significant movement should be located as such that the need to travel is reduced and the use of sustainable transport modes is maximised” (NPPF, paragraph 34).

2.5 “The location of these developments should allow for the efficient delivery of goods and supplies; prioritise pedestrian and cycle movements, have access to high quality public transport facilities, utilise safe and secure layouts which result in minimal street clutter and conflicts between traffic and non-motorised road users, incorporate facilities for low emission vehicles where practical, and show consideration for the needs of disabled users of all modes of transport” (NPPF paragraph 35).

Local Planning Policy

2.6 WSCC serve as the highway authority for all districts within West Sussex. WSCC’s Local Transport Plan (February 2011) (LTP3) sets out the strategy for the development of highway and transport infrastructure from 2011- 2026. LTP3’s overarching themes focus on:

- promoting economic growth;
- tackling climate change;
- providing access to services, employment and housing; and
- improving safety, security and health.



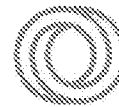
2.7 Arun District Council (ADC) refer to LTP3 for matters regarding highways and transportation within the district. LTP3 outlines several key issues within Arun and works to ensure new developments in the area contribute to address them; the key issues identified are as follows:

- increasing use of sustainable modes of transport;
- improving network efficiency to improve journey times and air quality;
- improving safety for all road users;
- discouraging HGVs from using unsuitable roads; and
- improving accessibility between communities within the District.

2.8 Regarding the proposed development the following parts of LTP3 have been taken into consideration in preparing this application:

- All new development should be designed to promote 'local living', for example shops, jobs and homes all being within easy reach of each other;
- New development should provide enough secure cycle parking to meet the needs of the development and be in proximity to public transport;
- Parking provision at new residential development should provide enough spaces to accommodate the expected number of vehicles at the site;
- New development will be required to integrate into the existing transport network and deliver enhancements to the infrastructure, stimulating regeneration, improving connectivity and encouraging long term sustainable travel behaviour;
- Continuing to work towards the development-led completion of the A259 Bognor Regis relief road [now open] and provide an associated package of measures, including junction improvements to Comet Corner (in Middleton-on-sea), traffic management measures (in Felpham and North Bersted) and a cycle route on Rowan Way; and
- Encouraging sustainable travel by improving the existing cycle and pedestrian network through improved signing, connecting routes where appropriate and repairing and maintaining surfaces.

2.9 The proposals in this application consider the implementation plan of LTP3, and where appropriate seek to deliver improvements or contributions to local transport infrastructure in accordance with the Plan.



3.0 EXISTING CONDITIONS

3.1 The development site is located to the west of the B2132 Bilsham Road in the village of Yapton, 7km northeast of Bognor Regis and 6km northwest of Littlehampton. The site currently comprises agricultural land and covers c.11.7 hectares.

3.2 The site sits along the southwestern boundary of Yapton. To the north and east is existing residential development, while located to the south and west are open fields and farmland.

3.3 The site has several points of access, the primary vehicle access being from the western side of the B2132 Bilsham Road, 45m south of West View Drive. **Figure 1** illustrates the site location and local highway network.

Local Highway Network

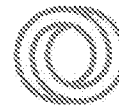
3.4 The B2132 Bilsham Road forms the main link into Yapton from the A259 to the south. The B2132 carriageway is c.6.5m in width, is subject to a 30mph speed limit and features many driveway accesses and side roads.

3.5 200m south of the site access, the B2132 speed limit increases to 40mph and continues to the A259, where it connects via a staggered priority junction known locally as 'Comet Corner'. The A259 runs from Bognor Regis to Littlehampton, whilst the B2132 continues southwards to Middleton-on-Sea.

3.6 To the north the B2132 continues into Yapton where it connects with the B2233 Burndell Road / Main Road at a mini-roundabout. The B2233 Burndell Road / Main Road forms the main route through Yapton. This road is also approximately 6.5m in width, is subject to a 30mph speed limit and also features many driveway accesses and side roads. The road connects with the A259 at the 'Oystercatcher' junction 1.3km from the south - eastern extent of the village by which time it is the B2233 Yapton Road.

3.7 2.3km to the northwest, the B2233, also known as Yapton Road, continues to the village of Barnham, and onwards to Eastergate, eventually leading to the westbound side of the A27 at Crockerhill.

3.8 At the north-western end of Yapton, the B2233 Main Road connects with the B2132 North End Road at a mini-roundabout. This road is similar in character to the B2233 and features driveways and side roads for its entire length up to Yapton Level Crossing. From the railway crossing the B2132 becomes Yapton Lane and continues north to the village of Walberton, eventually connecting with the A27.



3.9 The A27 is a strategic road north of Yapton running westwards to Chichester and connecting to the M27 at Portsmouth, and running eastwards to Worthing, Brighton and Eastbourne.

Existing Traffic Conditions

3.10 A fully classified Automatic Traffic Count (ATC) survey was undertaken by MHC Traffic between Wednesday 08th June 2016 – Tuesday 14th June 2016 along the B2132 Bilsham Road c.20m north of Graham Road. The surveys also recorded 85th percentile vehicle speeds.

3.11 Unfortunately, due to repeated vandalism and attempted theft of the counter equipment, data is only available for three days between the 8th June 2016 – 10th June 2016. **Table 3.1** summarises the average weekday traffic flow and 85th percentile speeds. The full survey data is included in **Appendix B**.

Table 3.1: B2132 Bilsham Road – ATC Survey Summary

	Northbound		Southbound		Two-Way	
	Traffic Flow	85% Speed	Traffic Flow	85% Speed	Traffic Flow	85% Speed
AM 08:00 – 09:00	153	34.7mph	484	35.5mph	637	35.7mph
PM 17:00 – 18:00	162		219		381	
Daily	3365		2466		5831	

3.12 Peak period Manual Classified Count (MCC) turning surveys were also conducted at the following junctions, along with queue length surveys:

- B2132 Bilsham Road / Graham Road;
- B2132 Bilsham Road / Mill View Drive / West View Drive;
- B2233 Burndell Road / B2132 Bilsham Road mini-roundabout;
- B2233 Main Road / Canal Road mini-roundabout;
- B2233 Main Road / B2132 North End Road mini-roundabout;
- B2132 Bilsham Road / A259 / B2132 Yapton Road staggered priority junction ('Comet Corner'); and
- B2233 Burndell Road / A259 ('Oyster Catcher').

3.13 The turning and queue length data collected has been used to establish the existing demand on local junctions as well as the amount of capacity available. **Section 5** provides a detailed assessment of the existing junction conditions.



Highway Safety Record

3.14 Personal Injury Accident (PIA) data has been obtained from WSCC for the latest five-year period available (01/08/2012 - 31/07/2017) for three study areas. These include:

- A27 Arundel Road / B2132 Yapton Lane;
- Yapton Village - B2132 North End Road / B2233 Main Road / B2132 Bilsham Road and B2233 Burndell Road; and
- A259 Between Felpham and Climping.

3.15 The full collision data and illustrated study areas are also included in **Appendix C**.

3.16 The data provided shows that a total of seven Road Traffic Collisions (RTC's) were recorded at the B2132 Yapton Lane / A27 Arundel Road, 38 RTC's in Yapton, Barnham and Ford villages and 37 RTC's on the A259. The RTC record for each study area are summarised in **Tables 3.2 – 3.4**.

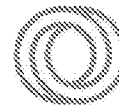
Table 3.2: RTC Summary – B2132 Yapton Lane / A27 Arundel Road

Road Use	Fatal	Serious	Slight	Total
Vehicle	0	0	4	4
Motorcycle	0	1	0	1
Cyclist	0	1	0	1
Pedestrian	0	0	1	1
Total	0	2	5	7

3.17 A total of seven collisions were reported within the B2132 Yapton Lane / A27 Arundel Road study area, two of which were serious in severity. Of the seven RTC's reported three (one slight and two serious) occurred at the A27 / B2132 junction while of the remaining four, one occurred c.315m west of the B2132 Yapton Lane, one occurred c.370m east of the B2132 Yapton Lane and two occurred on the B2132 Yapton Lane c.150m and c.350m south of the A27 respectively.

3.18 The contributing factors cited within the RTC records were:

- Failure to look properly;
- Loss of control;
- Black ice on the carriageway;
- Inexperienced driver; and



- Impaired by alcohol.

3.19 One RTC was also attributed to the road layout. This incident occurred at the entrance to the Hilton Hotel on the B2132 Yapton Lane. The RTC was slight in severity and occurred when a driver turned right from the access into the carriageway resulting in a collision with a car travelling south around the bend.

3.20 It is noted that according to freely available RTC information (Crashmap.co.uk) this is the only collision to have occurred at this location since 1999. It can therefore be concluded that the road layout is not inherently unsafe and that the increase in traffic because of the proposed development will not result in a detrimental impact upon highway safety.

Table 3.3: RTC Summary – Yapton, Barnham and Ford

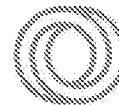
Road Use	Fatal	Serious	Slight	Total
Vehicle	0	2	19	20
Motorcycle	0	2	2	5
Cyclist	0	3	3	8
Pedestrian	0	0	7	6
Total	0	7	31	38

3.21 Of the 38 RTC's reported within Yapton and the surrounding local roads, seven involved vulnerable road users.

3.22 As shown on the RTC location plan in **Appendix C**, 14 of the 38 collisions occurred within Yapton, while of the remaining RTC's 12 are shown to have occurred in Barnham and 12 on other link roads between Yapton and the A259 and Ford areas.

3.23 The contributing factors highlighted in the collisions report are:

- Failure to give-way;
- Failure to look properly;
- Passing too close to cyclist;
- Loss of control;
- Inexperienced driver;
- Excessive speed;
- Impaired by alcohol; and a



- Medical episode.

3.24 It is also noted that no collisions were reported within c.600m of the proposed access on the B2132 Bilsham Road.

3.25 Given the existing character of the highway in the proposed access location it is considered that the presence of new access junctions will not result in an impact upon highway safety. The addition of the new accesses will help to further reinforce the street frontage as a residential area and help to reduce vehicle speeds.

3.26 There are also only two shunt type collisions reported at the B2132 Bilsham Road / B2233 Burndell Road mini - roundabout, indicating that the junction operates safely and that drivers have plenty of visibility. Therefore, no improvements to the junction are required based on highway safety.

Table 3.4: RTC Summary – A259

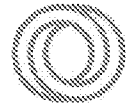
Road Use	Fatal	Serious	Slight	Total
Vehicle	2	3	16	21
Motorcycle	1	3	2	6
Cyclist	0	0	10	10
Pedestrian	0	0	1	1
Total	3	6	28	37

3.27 A total of 37 collisions were reported on the A259 within the selected study area between Climping to the east and Felpham to the west. Of the 37 RTC's three resulted in fatalities and six were classified as serious in severity.

3.28 Of the three fatal collisions, one occurred on the A259 c.300m north of the A259 / B2259 roundabout at Felpham when for unknown reasons a vehicle swerved onto the opposite side of the carriageway colliding head on with an oncoming vehicle.

3.29 The remaining two fatalities occurred at the Oystercatcher junction. The first involved a motorcyclist travelling eastbound on the A259 who was struck by a vehicle emerging from the B2233 Yapton Road.

3.30 The second fatality occurred when a driver failed to slow down or stop at the giveaway line of the B2233 Yapton Road and continued over the main carriageway into a ditch on the southern side of the A259 where the occupant was thrown from the vehicle.



3.31 In both cases at the Oystercatcher junction the RTC's was attributed to driver error, the first being failure to look properly and the second driving with undue care and attention.

3.32 Of the six RTC's classified as serious, two occurred at the Climping Roundabout, two at Comet Corner, one at Oystercatcher and one occurred on the A259 near Felpham c.500m from the A259 / B2259 roundabout. Three of the six serious collisions involved motorcyclists.

3.33 The contributing factors highlighted in the collisions report are:

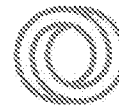
- Failure to look properly;
- Careless / reckless driving;
- Excessive speed;
- Disobeyed give-way or stop sign;
- Overloaded / poorly loaded vehicle;
- Failure to judge other persons path or speed;
- Passing too close to cyclist or pedestrian;
- Impaired by alcohol; and
- Following too close.

3.34 As illustrated on the RTC location plan in **Appendix C** only four collisions have occurred at or near the Oystercatcher and Comet Corner junctions respectively. In each case the collision was caused by driver error.

3.35 A high proportion of collisions have also been reported at the Climping Roundabout, which typically exhibits shunt type collisions between vehicles moving in slow moving traffic towards the give way line, or failure to give-way.

3.36 In summary, having considered the RTC data available, some trends have been identified. There are instances of shunt type collisions at the Climping Roundabout which are typical of roundabout junctions. However, given the low amount of development traffic that will likely use the junction it is not expected that the rate of collisions will change as a result.

3.37 In addition, while Oystercatcher and Comet corner have experienced fatal and serious collisions, these are not considered to be because of the geometry of the junction, but are a result of driver error.



3.38 The existing highway is therefore considered to be fit for purpose and is unlikely to be adversely affected because of the proposed development. There are however improvements which can be made to improve both the capacity and safety of the junctions, refer **Section 8.0**.

Sustainable Accessibility

3.39 Sustainable accessibility is a crucial factor in the determination of planning applications. This section reviews the site's available accessibility to public transport and local facilities via sustainable travel modes.

3.40 Guidance published by The Chartered Institute for Highways & Transportation (CIHT) recommends maximum walking distances of 2km for walking and 5km for cycling to key destinations. This guidance benchmarks the accessibility of the site.

Local Facilities

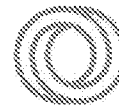
3.41 Yapton features several facilities and amenities, which support residential use. **Table 3.5** summarises these facilities and the walking distance from the centre of the site. The facility locations are shown on **Figure 2**.

Table 3.5: Local Facilities

Facility	Distance
Bilsham Stores, Bilsham Road (0645-2100)	700m
Meadowcroft Surgery, Bilsham Road	700m
Happy Days Play School, Drove Lane	750m
Co-op Local Store, Main Road (0700 – 2300)	800m
Fish & Chip Shop, Main Road	800m
Village Hall / Community Centre, Main Road	800m
Yew Tree GP Surgery, North End Road	850m
Yapton C of E Primary School, North End Road	950m

Walking & Cycling

3.42 A review of the existing walking and cycling network in Yapton shows that there are several opportunities for access to the site. The condition of the existing infrastructure has also been taken in to consideration. **Figure 2** also illustrates the existing Public Rights of Way (PRoW) and cycle network.



3.43 Footways are in place along both sides of most carriageways within the village. Street lighting is present, and the footway surfaces are in a good state of repair.

3.44 PRow 156-1 and 156-2 both cross over the site, providing direct connections with The Millers to the east and Bilsham Lane to the south. PRow 156-2 also connects with PRow 157 and 200-1 to the north west, which continue towards Drove Lane and Barnham.

3.45 Pedestrian and cycle access to the site will primarily come from the existing site access taken from the B2132 Bilsham Road, and PRow from The Millers and Tack Lee Road. The existing footways provide a safe and convenient route throughout the whole village.

3.46 As shown on **Figure 2** other routes in the local area suitable for leisure walking and cycling are also available which add to the existing accessibility of the site.

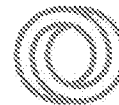
3.47 It is also noted that a new cycling link along the northern side of the A259 between Climping and Felpham is currently under construction. Existing PRow and footway provision along the B2132 Bilsham Road will allow for easy connection to this facility and serve to increase the sustainability of the site.

Public Transport – Bus Services

3.48 The nearest bus stops are located on Bilsham Road, within a 500m walk of the centre of the site. Bus stops are also accessible on the B2233 Burndell Road via Canal Road and provide shelters and real-time travel information. The bus stops and available routes are illustrated on **Figure 3**.

3.49 The stops are served by bus routes 141, 665 and 700. Route 700 runs from Littlehampton to Chichester, and is timed to connect with other Route 700 journeys eastwards to Brighton and westwards to Portsmouth. Route 66 also provides a regular service to Bognor Regis.

3.50 Routes 141 and 665 are school bus services and provide access to Westergate Six Village Academy and schools in Chichester. **Table 3.6** summarises the services available, destinations and frequencies. The current route maps and timetables have also been included in **Appendix D**.

**Table 3.6: Existing Bus Services**

Route No.	Route	Typical Frequency	First / Last Service
66	Bognor Regis – Westergate – Yapton – Westergate – Bognor Regis	Two Hourly (Mon-Sat)	07:36 / 18:06
141	Yapton – Bognor Regis – North Bersted - Chichester Bishop Luffa School	One per Day (Schooldays)	06:42 / 15:30
665	Littlehampton – Yapton - Westergate Six Villages Academy – Chichester High School	One per Day (Schooldays)	07:40 / 15:07
700	Brighton - Worthing - Littlehampton – Yapton – Bognor Regis – North Bersted – Chichester – Havant - Portsmouth	20 minutes (Mon-Sat) 30 minutes (Sun)	05:29 / 22:43 (M-F) 06:09 / 22:43 (Sat) 07:19 / 21:04 (Sun)

3.51 As shown, the existing bus provision is good with a regular twenty-minute service to key destinations including Brighton, Bognor Regis and Portsmouth. This opens opportunities for travel to work and school by bus, and thus contributes to the sustainability of the site.

Public Transport – Rail Services

3.52 Barnham railway station is located within 2.7km of the centre of the site, this station being situated on the West Coastway Line running between Brighton and Southampton as well as being the junction for the branch line to Bognor Regis.

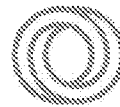
3.53 Barnham station acts as an interchange between fast and slow services and includes destinations at London Victoria, Gatwick Airport, Brighton, Portsmouth and Southampton. Services are available every 20-30 minutes. **Table 3.5** summarises average journey times to key destinations available directly from the station, whilst **Appendix D** contains relevant network and route maps.

Table 3.5: Rail Services from Barnham

Destination	Average Journey Time	Frequency
London Victoria	1 hour 30 minutes	4tph
Gatwick Airport	1 hour	4tph
Brighton	45 minutes	2tph
Portsmouth	40 – 45 minutes	2tph
Southampton	1 hour	2tph

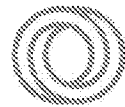
Tph = trains per hour (typical off-peak)

3.54 Ford railway station is located within 4.2km of the centre of the site and offers the same rail services as Barnham.



Summary

3.55 **Section 3.0** demonstrates that the site is accessible by all modes of transport. The local highway network is fit for purpose and allows for easy connection to main distributor roads and the strategic highway network. Access to regular bus and rail services is also convenient by walking and cycling modes. The site is therefore sustainable, and in keeping with the goals set out in the NPPF.



4.0 DEVELOPMENT PROPOSALS

4.1 The proposals in this Outline Application are for the erection of up to 250 residential dwellings, including access from the B2132 Bilsham Road, public amenity space and improvements to existing public rights of way.

4.2 The development design will be in accordance with local design policy and standards, including up to 30% affordable homes. The main spine road through the site will also be designed to standards as prescribed in WSCC's Local Design Guide and Manual for Streets (MfS), with suitable width to allow for vehicles to pass any areas where on-street parking may occur as requested by ADC; **Appendix E** contains the illustrative layout.

Access

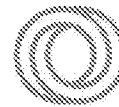
4.3 A vehicular access to the development is proposed from a new priority controlled junction located off the B2132 Bilsham Road c.25m south of Graham Road. Visibility splays will be provided in accordance with the observed 85th percentile speeds (2.4m x 59m) as illustrated on **Drawing 14-111/201**. As shown on the drawing the proposed visibility splays are achievable within the existing highway boundary.

4.4 A Stage 1 Road Safety Audit (S1RSA) of the proposed access has been undertaken by an independent road safety auditor. The audit report and designer's response can be found in **Appendix F**. The report concluded that proposed access design is suitable for the proposals and will operate safely.

4.5 A capacity assessment of the proposed access has been undertaken using PICADY 5, **Section 6** refers, and demonstrates that a simple priority controlled arrangement is a suitable access solution for the proposals.

4.6 The access will feature a 5.5m carriageway with a 2.0m footway along both sides at the junction itself. This will connect with the existing footway to the north along the western side of Bilsham Road and south to the existing bus stop. Once within the site a footway is only proposed along the northern side of the access road as there is no development frontage proposed on the southern side.

4.7 A 3.7m shared footway / cycleway is also proposed from Gladstone Road to the northeast, and will run west along the site boundary. This can also function as an emergency access if required; **Drawing 14-111/201** refers.



4.8 Refuse vehicles will be able to circulate through the development allowing access to bins and refuse stores within maximum carry limits of 25m. As this is an outline application, a detailed layout is not available; however, a comprehensive swept path assessment at detailed design stage will be undertaken.

Access to Landlink Land

4.9 The land adjacent to the site, owned and controlled by Landlink Estates, will also have a separate access taken from an upgraded Drove Lane thence to the B2233 Main Road. In its end state, the two sites will be linked with a single spine road between the Bilsham Road and Main Road accesses.

4.10 This would maximise the permeability of the site as well as having some benefits in reducing the off-site development traffic impact in the centre of Yapton, as residents of the development will be able to use the most logical route to / from their home within the site depending upon their journey origin or destination.

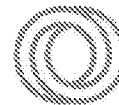
4.11 It is considered however, that a linked residential access road would not attract a significant amount of additional existing traffic through the site as a Manual for Streets (MfS) compliant layout would not be an attractive alternative in comparison to the existing highway.

4.12 A full Transport Assessment has also been prepared for the Landlink site to be submitted with their outline planning application.

Parking

4.13 ADC parking policy and standards state that 'all planning applications must be considered against current WSCC Guidance'. WSCC's 'Parking Guidance in New Residential Developments' (September 2010) provides a parking calculator based upon the number of habitable rooms per proposed unit.

4.14 As this is an outline application the final parking provision will be covered and agreed at reserved matters stage, however the illustrative layout seeks to provide a minimum of one allocated parking space per 1-2-bedroom property and 2+ allocated spaces per 3+ bedroom dwellings. In addition, the provision of unallocated spaces will also be considered.



Yapton to Barnham Cycle Link

4.15 WSCC have commented in the pre-application response that the development site should seek to deliver a cycle link between Yapton and Barnham, as part of the adopted walking and cycling strategy for the Arundel area.

4.16 An initial review of the existing highway and PRow network shows that there is limited scope to provide a shared foot / cycleway along the B2132 Yapton Road to Barnham. However, there is an existing PRow (200-1) running from Drove Lane along the route of the old canal to Church Lane to the south of Barnham (as shown on **Figure 2**).



5.0 TRIP GENERATION, TRAFFIC GROWTH & DISTRIBUTION

Trip Generation

5.1 The traffic generation for a residential development of 250 dwellings has been calculated using trip rates derived from comparable sites on the TRICS database. These were agreed with WSCC during the pre-application stage. For robustness, sites consisting of privately owned developments of greater than 100 dwellings were selected. The results are summarised below in **Table 5.1** and the full TRICS output can be found in **Appendix G**.

Table 5.1: Development Trip Rates

Time-Period	Arrival	Departure	Two-Way
AM 08:00 – 09:00	0.141	0.368	0.509
PM 17:00 – 18:00	0.313	0.165	0.478
Daily	2.134	2.242	4.376

5.2 Based on the approved trip rates above, the traffic generation for the proposed development of 250 dwellings is summarised in **Table 5.2**.

Table 5.2: Development Traffic Generation

Time-Period	Arrival	Departure	Two-Way
AM 08:00 – 09:00	35	92	127
PM 17:00 – 18:00	78	41	120
Daily	473	508	1094

5.3 Compared to the two-way vehicle movements observed in the ATC survey (refer **Section 3.0**), this equates to an increase in vehicle flows on the B2132 Bilsham Road of 19.9% in the AM peak and 31.4% in the PM peak. **Table 5.3** summarises.

Table 5.3: Development Traffic Impact on Bilsham Road

Time-Period	Existing Two-Way Traffic	Two-Way Development Traffic	% Increase
AM 08:00 – 09:00	637	127	19.9%
PM 17:00 – 18:00	381	120	31.4%
Daily	5832	1094	18.7%

5.4 While the percentage increase in vehicle trips appears to be high, this is only the case as the existing observed traffic flows are low. The capacity of the B2132 Bilsham Road is more than sufficient to accommodate these additional traffic movements.



Baseline Traffic Growth

5.5 To ensure a robust assessment the future 2022 base scenario has been created by taking account of committed developments (discussed below) in the local area of Yapton. Removing these total dwelling numbers from the TEMPro household numbers for the area will ensure that the distribution and assignment of the committed development traffic will reflect the future base scenario more accurately. **Appendix H** contains the output data.

Committed Development

5.6 Several committed development sites are located within Yapton, two of which are near to the site. The committed development sites identified include:

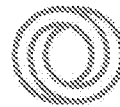
- Brookworth Homes (App No: F/15/PL) - 45 Dwellings;
- Land South of Fellows Gardens (App No: Y/30/13) - 34 Dwellings;
- Land North of Burndell Road (App No: APP/C3810/A/11/2155343) - 173 Dwellings; and
- Land at North End Road (App No: Y/93/14) – 38 Dwellings

5.7 To ensure a robust assessment traffic generated by these developments has been included in the future 2022 base model (**Appendix H** refers).

5.8 In addition, we are also aware of a proposed development for 56 dwellings (Ref: Y/1/17/OUT) on Land at Bonhams Field, Main Road, Yapton. This development has a resolution to grant as of July 2017, and we have taken this into account in the design of the proposed access.

5.9 There is also a recently consented development on Land South of Burndell Road for 108 dwellings (Ref: Y/80/16/OUT). The development traffic for this site has also been included in the future base scenario.

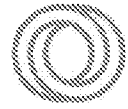
5.10 It is considered that by including these developments as part of the 2022 baseline that the TA will provide a representative and robust scenario through which the development proposals can be tested.



Distribution and Assignment

5.11 Development traffic has been distributed and assigned to the local highway network using a gravity model approach, 'based' upon the observed turning proportions. In addition, peak hour journey times to key destinations have also been considered to reflect routes car drivers will take.

5.12 This robust method is recommended in the Guidance for Transport Assessment (March 2007) and is representative of the journeys to and from the site that would be undertaken by vehicles during the AM and PM peak hours. **Appendix I** contains traffic flow diagrams illustrating the distribution and assignment.



6.0 TRAFFIC IMPACT ASSESSMENT

6.1 Capacity assessments of junctions identified within Yapton have been undertaken using industry standard assessment software ARCADY 7 & PICADY 5. To provide a comparison of exiting conditions and the impact of the development the following scenarios have been modelled:

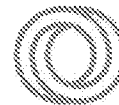
- 2017 Base
- 2022 Base (Including Committed)
- 2022 Base + Development (250 Units)

6.2 For a robust assessment, the impact of the proposed development has also been considered in the context of the adjacent Landlink site being developed for 300 dwellings. To this end the 2031 Base + Development scenario also includes the following sensitivity tests:

- 2031 Base
- 2031 Base + 550 units with linked thru-road;
- 2031 Base + 550 no thru-road.

6.3 The junctions assessed, as identified in **Section 3.0**, include the following:

- B2233 Burndell Road / Site Access Junction;
- B2233 Burndell Road / B2132 Bilsham Road mini-roundabout;
- B2233 Main Road / Canal Road mini-roundabout;
- B2233 Main Road / B2132 North End Road mini-roundabout;
- B2132 Bilsham Road / Loveys Road junction;
- B2132 Bilsham Road / Mill View / West View Drive junction;
- B2132 Bilsham Road / Graham Road junction;
- B2132 Bilsham Road / A259 / B2132 Yapton Road junction ('Comet Corner'); and
- B2233 Yapton Road / A259/ Climping Street junction ('Oyster Catcher').



6.4 The following tables summarise the peak hour capacity, queue lengths and delay expected at each of the assessed junctions. The results report the Ratio of Flow to Capacity (RFC), queue lengths in whole vehicles and delay in seconds. The ARCADY results also include a Level of Service (LOS) which indicates the level of traffic flow through the junction graded from A (free flow) to F (forced or breakdown in flow).

6.5 It is noted that the ARCADY assessments for the three mini-roundabout junctions required modifications via slope intercept corrections to validate the 2017 base scenario according to observed traffic conditions, refer **Appendix B**. The full assessment output reports are included in **Appendix J**.

Junction Capacity Assessment Summary

6.6 The remainder of this section summarises and comments on the junction capacity assessments. The results are set out in **Tables 6.1 - 6.9**.

Table 6.1: B2132 Bilsham Road / Proposed Site Access Priority Junction

	AM			PM		
	Queue (PCU)	Delay (min)	RFC	Queue (PCU)	Delay (min)	RFC
	2022 Base + Dev 250 Dwellings					
Site Access	0	0.18	0.068	0	0.13	0.042
B2132 Bilsham Road	0	0.14	0.030	0	0.11	0.041
	2031 Base + Dev 550 Dwellings					
Site Access	0	0.25	0.223	0	0.20	0.10
B2132 Bilsham Road	0	0.00	0.000	0	0.00	0.00
	2031 Base + Dev No Thru-Link Dev 550 Dwellings					
Site Access	0	0.26	0.234	0	0.20	0.104
B2132 Bilsham Road	0	0.00	0.000	0	0.00	0.000

6.7 As can be seen the proposed development access works with plenty of spare capacity and no queues are likely to form. The proposed access is therefore appropriate for 250 dwellings.

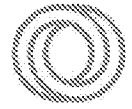
6.8 In addition, the sensitivity tests show that when the site is fully developed for 550 dwellings the junction continues to operate with plenty of spare capacity. This is the case if the internal spine road links the Landlink and Gleeson sites or not. The proposed junction is therefore considered a suitable access solution.

**Table 6.2: B2233 Burndell Road / B2132 Bilsham Road Mini-Roundabout**

	AM				PM			
	Queue (Veh)	Delay (min)	RFC	LOS	Queue (Veh)	Delay (min)	RFC	LOS
	2017 Base							
B2233 Burndell Road	1	0.13	0.50	A	1	0.11	0.37	A
B2132 Bilsham Road	2	0.13	0.61	A	0	0.06	0.21	A
B2233 Main Road	1	0.10	0.37	A	2	0.16	0.64	A
	2022 Base + Com							
B2233 Burndell Road	2	0.22	0.7	B	1	0.14	0.49	A
B2132 Bilsham Road	3	0.25	0.77	B	0	0.07	0.25	A
B2233 Main Road	1	0.12	0.44	A	4	0.28	0.8	C
	2022 Base + Dev 250 Dwellings							
B2233 Burndell Road	2	0.23	0.71	B	1	0.15	0.5	A
B2132 Bilsham Road	5	0.35	0.84	C	0	0.07	0.28	A
B2233 Main Road	1	0.13	0.46	A	5	0.34	0.83	C
	2031 Base							
B2233 Burndell Road	2	0.23	0.71	B	1	0.15	0.52	A
B2132 Bilsham Road	4	0.27	0.79	C	0	0.07	0.26	A
B2233 Main Road	1	0.13	0.47	A	4	0.31	0.81	C
	2031 Base + Dev 550 Dwellings							
B2233 Burndell Road	3	0.27	0.76	C	1	0.16	0.55	A
B2132 Bilsham Road	6	0.41	0.86	C	0	0.07	0.28	A
B2233 Main Road	1	0.14	0.51	A	6	0.43	0.87	D
	2031 Base + Dev 550 Dwellings no thru Link							
B2233 Burndell Road	3	0.31	0.78	C	1	0.18	0.59	B
B2132 Bilsham Road	12	0.76	0.94	E	1	0.08	0.33	A
B2233 Main Road	1	0.16	0.57	A	9	0.62	0.92	E

6.9 The capacity assessment shows that the mini-roundabout operates within capacity in the 2017 Base year, as validated against queue length surveys and video footage of the junction. As is also shown the junction will continue to operate within capacity (although above optimum capacity) up to the final build out year of 2031 with 550 dwellings in place.

6.10 It is noted that the junction operates close to maximum capacity in the 2031 Base + Dev 550 dwellings no thru link scenario, however this is a worst-case scenario and would be a temporary situation in the unlikely event that this does occur.

**Table 6.3: B2233 Main Road / Canal Road Mini-Roundabout**

	AM				PM			
	Queue (Veh)	Delay (min)	RFC	LOS	Queue (Veh)	Delay (min)	RFC	LOS
	2017 Base							
B2233 Main Road WB	2	0.00	0.70	A	0	0.00	0.28	A
Canal Road	1	0.01	0.54	A	0	0.00	0.11	A
B2233 Main Road EB	0	0.00	0.28	A	1	0.00	0.48	A
	2022 Base + Com							
B2233 Main Road WB	2	0.00	0.7	A	1	0.00	0.34	A
Canal Road	1	0.01	0.53	A	0	0.00	0.13	A
B2233 Main Road EB	0	0.00	0.26	A	1	0.00	0.53	A
	2022 Base + Dev 250 Dwellings							
B2233 Main Road WB	3	0.00	0.73	A	1	0.00	0.36	A
Canal Road	1	0.01	0.59	A	0	0.00	0.14	A
B2233 Main Road EB	0	0.00	0.29	A	2	0.00	0.61	A
	2031 Base							
B2233 Main Road WB	3	0.00	0.75	A	1	0.00	0.37	A
Canal Road	2	0.01	0.66	A	0	0.00	0.14	A
B2233 Main Road EB	0	0.00	0.30	A	2	0.00	0.63	A
	2031 Base + Dev 550 Dwellings							
B2233 Main Road WB	3	0.00	0.75	A	1	0.00	0.38	A
Canal Road	2	0.01	0.68	A	0	0.00	0.15	A
B2233 Main Road EB	0	0.00	0.32	A	2	0.00	0.64	A
	2031 Base + Dev 550 Dwellings no thru Link							
B2233 Main Road WB	4	0.00	0.80	A	1	0.00	0.42	A
Canal Road	4	0.03	0.82	A	0	0.00	0.16	A
B2233 Main Road EB	1	0.00	0.35	A	2	0.00	0.67	A

6.11 As can be seen the mini-roundabout operates with plenty of spare capacity in all scenarios. Therefore, no mitigation measures or improvements will be required in this location because of the proposed development.

**Table 6.4: B2233 Main Road / B2132 North End Road Mini-Roundabout**

	AM				PM			
	Queue (Veh)	Delay (min)	RFC	LOS	Queue (Veh)	Delay (min)	RFC	LOS
	2017 Base							
B2233 Yapton Road	0	0.00	0.19	A	0	0.00	0.27	A
NB2132 North End Road	0	0.00	0.15	A	1	0.00	0.54	A
B2233 Main Road	2	0.00	0.62	A	0	0.00	0.28	A
2022 Base + Com								
B2233 Yapton Road	0	0.00	0.21	A	0	0.00	0.33	A
NB2132 North End Road	0	0.00	0.19	A	2	0.01	0.70	A
B2233 Main Road	3	0.00	0.76	A	0	0.00	0.30	A
2022 Base + Dev 250 Dwellings								
B2233 Yapton Road	0	0.00	0.22	A	1	0.00	0.34	A
NB2132 North End Road	0	0.00	0.19	A	2	0.01	0.7	A
B2233 Main Road	4	0.00	0.79	A	0	0.00	0.32	A
2031 Base								
B2233 Yapton Road	0	0.00	0.23	A	1	0.00	0.35	A
NB2132 North End Road	0	0.00	0.21	A	3	0.01	0.77	A
B2233 Main Road	4	0.00	0.81	A	0	0.00	0.33	A
2031 Base + Dev 550 Dwellings								
B2233 Yapton Road	0	0.00	0.28	A	1	0.00	0.37	A
NB2132 North End Road	0	0.00	0.22	A	5	0.01	0.83	A
B2233 Main Road	4	0.00	0.82	A	1	0.00	0.34	A
2031 Base + Dev 550 Dwellings no thru Link								
B2233 Yapton Road	1	0.00	0.59	A	2	0.00	0.68	A
NB2132 North End Road	0	0.00	0.23	A	6	0.01	0.85	A
B2233 Main Road	6	0.00	0.87	A	1	0.00	0.38	A

6.12 On site observations indicate that although the mini-roundabout is busy incidents of queuing only occur occasionally throughout the peak hour, and those that do clear within a few seconds. This is reflected in the 2017 Base scenario where by the junction operates with spare capacity and slight delay at the give-way line.

6.13 This trend continues in each scenario as additional traffic is added to the highway network. In the worst-case scenario 2031 Base + Development no thru-link, the junction operates just over the optimal capacity threshold with an RFC of 0.87; however, it still has spare capacity, and the queue length is not significant.

**Table 6.5: B2132 Bilsham Road / Loveys Road**

	AM			PM		
	Queue (PCU)	Delay (min)	RFC	Queue (PCU)	Delay (min)	RFC
	2017 Base					
Loveys Road	0	0.16	0.054	0	0.12	0.035
B2132 Bilsham Road	0	0.13	0.025	0	0.11	0.036
2022 Base + Com						
Loveys Road	0	0.17	0.064	0	0.13	0.041
B2132 Bilsham Road	0	0.14	0.029	0	0.11	0.041
2022 Base + Dev 250 Dwellings						
Loveys Road	0	0.18	0.068	0	0.13	0.042
B2132 Bilsham Road	0	0.14	0.03	0	0.11	0.041
2031 Base						
Loveys Road	0	0.18	0.071	0	0.13	0.044
B2132 Bilsham Road	0	0.14	0.032	0	0.11	0.043
2031 Base + Dev 550 Dwellings						
Loveys Road	0	0.18	0.071	0	0.13	0.044
B2132 Bilsham Road	0	0.14	0.033	0	0.11	0.043
2031 Base + Dev 550 Dwellings No Thru-Link						
Loveys Road	0	0.2	0.078	0	0.14	0.047
B2132 Bilsham Road	0	0.15	0.034	0	0.11	0.044

6.14 As shown in **Table 6.5** the B2132 Bilsham Road Loveys Road junction is shown to operate with plenty of spare capacity in all scenarios. The impact of the development of 250 dwellings and the end state development of 550 dwellings will therefore not require any mitigation measures.

**Table 6.6: B2132 Bilsham Road / Mill View / West View Drive**

	AM			PM		
	Queue (PCU)	Delay (min)	RFC	Queue (PCU)	Delay (min)	RFC
	2017 Base					
B2132 Bilsham Road NB	0	0.16	0.114	0	0.13	0.023
Mill View	0	0.18	0.103	0	0.16	0.049
B2132 Bilsham Road SB	0	0.12	0.013	0	0.10	0.059
West View Drive	0	0.1	0.003	0	0.10	0.017
2022 Base + Com						
B2132 Bilsham Road NB	0	0.17	0.130	0	0.13	0.026
Mill View	0	0.2	0.118	0	0.17	0.057
B2132 Bilsham Road SB	0	0.12	0.015	0	0.11	0.065
West View Drive	0	0.09	0.003	0	0.10	0.019
2022 Base + Dev 250 Dwellings						
B2132 Bilsham Road NB	0	0.18	0.135	0	0.13	0.026
Mill View	0	0.21	0.123	0	0.18	0.058
B2132 Bilsham Road SB	0	0.13	0.016	0	0.11	0.066
West View Drive	0	0.09	0.003	0	0.10	0.020
2031 Base						
B2132 Bilsham Road NB	0	0.18	0.142	0	0.13	0.026
Mill View	0	0.20	0.131	0	0.18	0.061
B2132 Bilsham Road SB	0	0.12	0.016	0	0.11	0.071
West View Drive	0	0.09	0.003	0	0.10	0.021
2031 Base + Dev 550 Dwellings						
B2132 Bilsham Road NB	0	0.18	0.147	0	0.13	0.028
Mill View	0	0.21	0.131	0	0.18	0.061
B2132 Bilsham Road SB	0	0.13	0.016	0	0.11	0.071
West View Drive	0	0.09	0.003	0	0.10	0.021
2031 Base + Dev 550 Dwellings No Thru-Link						
B2132 Bilsham Road NB	0	0.19	0.154	0	0.14	0.027
Mill View	0	0.22	0.139	0	0.19	0.064
B2132 Bilsham Road SB	0	0.13	0.017	0	0.11	0.073
West View Drive	0	0.10	0.004	0	0.10	0.022

6.15 As is also shown in **Table 6.6** the B2132 Bilsham Road / Mill View / West View Drive junction is shown to operate with plenty of spare capacity in all scenarios. The impact of the development of 250 dwellings and the end state development of 550 dwellings will therefore not require any mitigation measures.

**Table 6.7: B2132 Bilsham Road / Graham Road**

	AM			PM		
	Queue (PCU)	Delay (min)	RFC	Queue (PCU)	Delay (min)	RFC
	2017 Base					
Loveys Road	0	0.17	0.028	0	0.13	0.005
B2132 Bilsham Road	0	0.13	0.007	0	0.00	0.000
2022 Base + Com						
Loveys Road	0	0.18	0.029	0	0.13	0.005
B2132 Bilsham Road	0	0.13	0.007	0	0.00	0.000
2022 Base + Dev 250 Dwellings						
Loveys Road	0	0.15	0.025	0	0.13	0.005
B2132 Bilsham Road	0	0.13	0.007	0	0.00	0.000
2031 Base						
Loveys Road	0	0.18	0.029	0	0.13	0.005
B2132 Bilsham Road	0	0.13	0.009	0	0.00	0.000
2031 Base + Dev 550 Dwellings						
Loveys Road	0	0.19	0.030	0	0.14	0.005
B2132 Bilsham Road	0	0.13	0.009	0	0.00	0.000
2031 Base + Dev 550 Dwellings No Thru-Link						
Loveys Road	0	0.20	0.032	0	0.14	0.005
B2132 Bilsham Road	0	0.13	0.010	0	0.00	0.000

6.16 As shown in **Table 6.7** the B2132 Bilsham Road / Graham Road junction is shown to operate with plenty of spare capacity in all scenarios. The impact of the development of 250 dwellings and the end state development of 550 dwellings will therefore not require any mitigation measures.

Comet Corner

6.17 The A259 / B2132 Yapton Road [a continuation of Bilsham Road] 'Comet Corner' is known to be a busy junction, with drivers experiencing difficulties progressing onto the A259 from the minor arms. **Table 6.8** summarises the existing and future conditions at the junction.

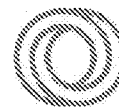
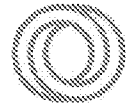


Table 6.8 – Comet Corner

	AM			PM		
	Queue (PCU)	Delay (min)	RFC	Queue (PCU)	Delay (min)	RFC
	2017 Base					
B2132 Yapton Road South to A259 West	0	0	0	0	0	0
B2132 Yapton Road South to A259 East / B2132 N	1	1	0.54	2	1	0.65
A259 East to B2132 Yapton Road North	0	0	0.04	0	0	0.05
B2132 Yapton Road North to A259 East	0	0	0.01	2	12	1.17
B2132 Yapton Road North to A259 West / B2132 Yapton Road South	4	1	0.83	19	5	1.15
A259 West to B2132 Yapton Road South	0	0	0.02	0	0	0.06
	2022 Base + Com					
B2132 Yapton Road South to A259 West	0	0	0	0	0	0
B2132 Yapton Road South to A259 East / B2132 N	4	2	0.86	20	12	2.14
A259 East to B2132 Yapton Road North	0	0	0.05	0	0	0.07
B2132 Yapton Road North to A259 East	1	41	1.21	5	32	1.96
B2132 Yapton Road North to A259 West / B2132 Yapton Road South	24	6	1.19	61	24	1.97
A259 West to B2132 Yapton Road South	0	0	0.03	0	0	0.09
	2022 Base + Dev 250 Dwellings					
B2132 Yapton Road South to A259 West	0	0	0	0	0	0
B2132 Yapton Road South to A259 East / B2132 N	7	3	0.98	28	43	3.42
A259 East to B2132 Yapton Road North	0	0	0.08	0	0	0.13
B2132 Yapton Road North to A259 East	2	23	1.41	7	41	2.3
B2132 Yapton Road North to A259 West / B2132 Yapton Road South	41	9	1.38	77	33	2.37
A259 West to B2132 Yapton Road South	0	0	0.03	0	0	0.09
	2031 Base					
B2132 Yapton Road South to A259 West	0	0	0	0	0	0
B2132 Yapton Road South to A259 East / B2132 N	22	8	1.45	51	32	***
A259 East to B2132 Yapton Road North	0	0	0.06	0	0	0.08
B2132 Yapton Road North to A259 East	1	57	1.67	9	40	3.56
B2132 Yapton Road North to A259 West / B2132 Yapton Road South	57	14	1.68	111	71	3.92
A259 West to B2132 Yapton Road South	0	0	0.03	0	0	0.11
	2031 Base + Dev 550 Dwellings					
B2132 Yapton Road South to A259 West	0	0	0	0	0	0
B2132 Yapton Road South to A259 East / B2132 N	39	16	2.31	74	54	***
A259 East to B2132 Yapton Road North	0	0	0.09	0	0	0.16
B2132 Yapton Road North to A259 East	3	36	1.76	12	56	6
B2132 Yapton Road North to A259 West / B2132 Yapton Road South	99	28	2.14	154	46	6.45
A259 West to B2132 Yapton Road South	0	0	0.04	0	0	0.13



6.18 As can be seen, the existing Comet Corner junction experiences significant delays, particularly in the PM peak, where traffic is unable to exit the minor arms easily. It is noted from the traffic surveys however that although vehicles wait for a long time, the queues do tend to clear within 5 minutes, before building up again.

6.19 The addition of background traffic growth and the inclusion of committed development causes the junction to operate above capacity with a significant impact upon queues and delay on the minor arms by 2022. This is further compounded by the introduction of the proposed development of 250 dwellings.

6.20 As a result the ratio of flow to capacity (RFC) exceeds 1.0 on all the minor arms in the 2022 Base plus Committed scenario, however the further impact of the 250 dwellings is relatively small in comparison.

6.21 This trend is also apparent when the whole development of 550 dwellings is considered against the end of the local plan period in 2031.

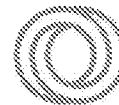
6.22 A potential improvement scheme deliverable within the existing highway boundary has been considered and is discussed in more detail in **Section 8**.

Oystercatcher

6.23 The A259 / B2233 Yapton Road [a continuation of Burndell Road] 'Oystercatcher' junction is also known to be a busy junction with traffic experiencing difficulties progressing onto the A259 from the minor arms. This is noted to be partly due to the volume of traffic on the A259 mainline, but also due to queues forming at the Climping Roundabout during the peak hours. **Table 6.9** summarises the existing and future conditions at the junction.

**Table 6.9 – Oystercatcher**

	AM			PM		
	Queue (PCU)	Delay (min)	RFC	Queue (PCU)	Delay (min)	RFC
2017 Base						
Climping St to A259 West / B2233 Yapton Road	0	0.1	0.05	0	0.1	0.08
Climping St to A259 East	0	0.2	0.08	0	0.6	0.19
A259 East to Yapton Road	1	0.3	0.54	1	0.3	0.54
B2233 Yapton Road to A259 East / Climping St	1	0.2	0.41	3	0.4	0.73
B2233 Yapton Road to A259 West	0	0.3	0.13	1	0.9	0.36
A259 West to Climping Street	0	0.1	0.01	0	0.2	0.03
2022 Base + Com						
Climping St to A259 West / B2233 Yapton Road	0	0.1	0.06	0	0.2	0.13
Climping St to A259 East	0	0.3	0.1	1	3.2	0.62
A259 East to Yapton Road	2	0.3	0.62	3	0.4	0.72
B2233 Yapton Road to A259 East / Climping St	1	0.2	0.54	22	2.6	1.08
B2233 Yapton Road to A259 West	0	0.5	0.18	4	5.4	0.99
A259 West to Climping Street	0	0.1	0.01	0	0.2	0.03
2022 Base + Dev 250 Dwellings						
Climping St to A259 West / B2233 Yapton Road	0	0.1	0.06	3	3.6	1.02
Climping St to A259 East	0	0.3	0.11	2	4.9	0.87
A259 East to Yapton Road	2	0.4	0.63	3	0.4	0.73
B2233 Yapton Road to A259 East / Climping St	1	0.3	0.58	28	3.2	1.13
B2233 Yapton Road to A259 West	0	0.5	0.19	4	6.0	1.03
A259 West to Climping Street	0	0.1	0.01	0	0.2	0.03
2031 Base						
Climping St to A259 West / B2233 Yapton Road	0	0.1	0.07	22	26.7	***
Climping St to A259 East	0	0.3	0.13	15	27.1	***
A259 East to Yapton Road	2	0.4	0.7	3	0.6	0.78
B2233 Yapton Road to A259 East / Climping St	2	0.3	0.61	105	12.6	1.86
B2233 Yapton Road to A259 West	0	0.6	0.25	10	15.1	1.74
A259 West to Climping Street	0	0.1	0.02	0	0.2	0.03
2031 Base + Dev 550 Dwellings						
Climping St to A259 West / B2233 Yapton Road	0	0.1	0.07	28	27.8	***
Climping St to A259 East	0	0.4	0.14	18	31.0	***
A259 East to Yapton Road	2	0.5	0.72	5	0.8	0.85
B2233 Yapton Road to A259 East / Climping St	2	0.4	0.69	158	40.8	3.11
B2233 Yapton Road to A259 West	0	0.7	0.27	14	45.9	2.98
A259 West to Climping Street	0	0.1	0.02	0	0.2	0.03



6.24 Like the Comet Corner junction, Oystercatcher will also be impacted by traffic growth and committed development traffic by 2022 although this is limited initially to increasing queuing on Yapton Road during the PM peak hour as this goes over theoretical capacity. The additional traffic generated by the proposed 250 dwellings will result some marginal increases in queuing on this arm but also takes the Climping Street arm to capacity, albeit queues are short due to light demand.

6.25 By 2031 further background growth takes both minor road arms significantly over-capacity and as such the impact of 550 dwellings on the combined site is more pronounced.

6.26 A potential improvement scheme for Oystercatcher has also been considered and is discussed in more detail in **Section 8**.



7.0 FORD AND YAPTON LEVEL CROSSINGS

7.1 WSCC have also requested the impact of the development on two local railway crossings be considered as part of the assessment. Traffic survey information for the level crossings has been collected including traffic flows, queue lengths, barrier down time and barrier call frequency. The survey data can be found in **Appendix K**.

7.2 LINSIG models of the railway crossings have also been created based upon the survey data. The model runs on a 3600 second cycle replicating the peak hour, with the barriers being called and remaining down for the observed average. The rest of this section discusses the impact of the development at these locations.

Ford Level Crossing

7.3 Ford Level Crossing is located c.2.5km to the north east of Yapton. Ford Road crosses the railway line and provides a link between the A259 to the south at Climping and the A27 at Arundel to the north. **Table 7.1** summarises the observed level crossing data. The barrier is on average called down every five minutes during the peak hour and remains down for an average of three minutes, refer **Table 7.3**, in part due to the platforms of Ford railway station being immediately adjacent.

Table 7.1 – Observed Ford Level Crossing

Time Period	Call down Frequency	Average Barrier Down Time	Max Observed Queue in Peak Hour		Average Queue over Peak Hour	
			Northbound	Southbound	Northbound	Southbound
AM 08:00 – 09:00	13 per hour	2 min 56 sec	42	21	23	13
PM 17:00 – 18:00	13 per hour	3 min 7 sec	31	30	12	25

7.4 Having reviewed the distribution and assignment of the proposed development traffic, the development is considered to have no material impact on the level crossing; any development traffic using Ford Level Crossing would be that wishing to reach the A27 at Arundel. This would route along North End Road from Yapton then turn right onto Ford Lane.

7.5 The assignment diagrams, refer **Appendix I**, show a worst-case development flow of 60 vehicles using North End Lane in the AM peak and 40 in the PM. A robust assumption that half head for Ford Level Crossing equates to 30 and 20 vehicles in each peak hour respectively; an assessment of the level



crossing has been undertaken in LINSIG, **Table 7.2** summarising, while the full LINSIG report is included in **Appendix L**.

Table 7.2 – Ford Level Crossing Capacity Assessment

	AM			PM		
	Queue (PCU)	Delay (s/pcu)	% Sat	Queue (PCU)	Delay (s/pcu)	% Sat
	2017 Base					
Ford Lane NB	25	74.2	50.4%	15	68.0	34.2%
Ford Lane SB	13	66.7	30.4%	25	74.6	51.3%
	2031 Base + 550 Dwellings					
Ford Lane NB	27	75.9	54.2%	17	68.9	36.7%
Ford Lane SB	15	67.5	32.6%	26	75.3	52.9%

7.6 As can be seen the model reflects the observed queues at the level crossing during the 2017 base scenario whilst in 2031 even with the addition of development traffic it would still operate within capacity.

Yapton Level Crossing

7.7 Yapton Level Crossing is located on the B2132 North End Road 1km north of the mini-roundabout junction with the B2233 Main Road. The level crossing was recently surveyed and assessed as part of a planning application for 175 dwellings on land at Tye Lane, Walberton (Ref: WA/44/17/OUT).

7.8 At WSCC's recommendation the data used to assess the level crossing in the Tye Lane application has been used to determine the impact of the development proposals in Yapton. Extracts from the TA used to inform this assessment have also been included in **Appendix K**. The observations at the level crossing are summarised in **Table 7.3**.

Table 7.3 – Observed Yapton Level Crossing

Time Period*	Call down Frequency	Average Barrier Down Time	Max Observed Queue in Peak Hour		Average Queue over Peak Hour	
			Northbound	Southbound	Northbound	Southbound
AM 07:15 – 08:15	12 per hour	52 seconds	23	9	12	4
PM 16:45 – 17:45	15 per hour	54 seconds	6	31	4	14

*data taken from Walberton application has a slightly different peak hour to that used in this TA.

7.9 An assessment of the level crossing was undertaken in LINSIG, the flows used include the traffic from the Tye Lane development as well as assuming no development traffic has turned off onto Ford Lane,



thereby representing a worst-case scenario. **Table 7.4** summarises the level crossing assessment, the full LINSIG report is being included in **Appendix L**.

Table 7.4 – Yapton Level Crossing Capacity Assessment

	AM			PM		
	Queue (PCU)	Delay (s/pcu)	% Sat	Queue (PCU)	Delay (s/pcu)	% Sat
	2017 Base					
B2132 North End Road NB	14	13.7	39.1%	3	10.5	12.1%
B2132 North End Road SB	4	10.7	13.7%	12	13.1	35.3%
	2031 Base + 550 Dwellings					
B2132 North End Road NB	20	15.4	48.9%	5	10.9	16.0%
B2132 North End Road SB	5	11.0	17.4%	16	2.4	42.8%

7.10 As at Ford the model for Yapton reflects the observed queues at the level crossing during the 2017 base scenario whilst in 2031 even with the addition of development traffic it would still operate within capacity.



8.0 MITIGATION MEASURES AND IMPROVEMENTS

8.1 As can be seen in **Section 6** the junctions tested in Yapton will operate within capacity up to the end of the Local Plan in 2031 with 550 dwellings being constructed on the site.

8.2 Those junctions to the south, however, at Oystercatcher and Comet Corner, where roads from Yapton join the A259 both operate near to or at capacity in the existing 2017 scenario. As such they will be significantly impacted by background traffic growth and cumulative committed development traffic and capacity improvements would be required at both locations irrespective of the development traffic generated.

8.3 To that end two potential improvement schemes have been prepared that will increase capacity and safety at both Oystercatcher and Comet Corner as illustrated on **Drawings 14-111/202** for the former and on **14-111/203** and **204** which are options for the latter. All have been subject to a Stage 1 Road Safety Audit and can be delivered wholly within existing highway land.

8.4 Both schemes are similar in design and comprise the introduction of a solid central refuge island on the A259. This will allow traffic exiting the northern and southern minor arms to give way to one direction of traffic on the major road at a time, thereby significantly reducing delay as well as increasing safety. The island will also allow for longer storage lengths for traffic turning right off the A259 onto the minor arms resulting in less likelihood of queues blocking the mainline traffic flow.

8.5 An assessment of the worst-case scenario '2031 plus 550 dwellings with no thru link' shows that both improvement schemes will significantly improve the operation of the junctions with a reduction in delay and queue lengths. **Tables 8.1** and **8.2** summarise.

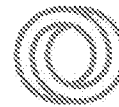
Table 8.1 – Comet Corner Improvement Scheme

Arm	AM				PM			
	Queue (Veh)	Delay (min)	RFC	LOS	Queue (Veh)	Delay (min)	RFC	LOS
	2031 Base + 550 Dwellings No Thru Link							
A259 East	0	0.0		A	0	0.0		A
B2132 Yapton Road N	1	0.2		B	0	0.2		B
A259 West	0	0.0		A	0	0.0		A
B2132 Yapton Road S	0	0.3		C	1	0.5		D

**Table 8.2 – Oystercatcher Improvement Scheme**

Arm	AM				PM			
	Queue (Veh)	Delay (min)	RFC	LOS	Queue (Veh)	Delay (min)	RFC	LOS
	2031 Base + 550 Dwellings No Thru Link							
A259 East	1	0.1		A	2	0.1		A
Climping Street	0	0.2		B	1	0.6		E
A259 West	1	0.1		A	2	0.1		A
B2233 Yapton Road	1	0.2		B	3	0.4		C

8.6 Both junctions will require improvements by 2022 regardless of the proposed development coming forward, whilst the proportion of the impact of the development is significantly less than the impact of natural background traffic growth. Accordingly, it is considered that improvement schemes could be best delivered by the local highway authority with appropriate and proportional highway contributions towards such schemes being made by the applicant; these may or may not be based upon our potential schemes depending upon any wider issues that the authority needs to address.



9.0 SUMMARY & CONCLUSION

9.1 This Transport Assessment has been prepared in support of an outline planning application for a proposed residential development of up to 250 dwellings on land west of the B2132 Bilsham Road, Yapton. Following scoping with WSCC the principle of the access is considered acceptable. The primary point of access is from a new priority junction off the B2132 Bilsham Road. This access will also feature new footway and pedestrian crossing facilities.

9.2 It has been demonstrated that the site is sustainable in terms of its accessibility to local facilities via non-car transport modes, and is located within convenient walking distance of bus stops offering services every 20 minutes.

9.3 Capacity assessments of key junctions in Yapton show that the highway network generally operates within capacity and that the introduction of development traffic will not result in a severe impact.

9.4 The Oystercatcher and Comet Corner junctions on the A259 have been identified as requiring capacity improvements by 2022 regardless of the proposed development coming forward and two potential schemes have been presented. Appropriate and proportionate highway contributions could therefore be made available to assist the WSCC's delivery of infrastructure improvements.

9.5 It is also considered appropriate for contributions to be made towards the delivery of a new footway / cycle link between Yapton and Barnham in line with the adopted walking and cycling strategy. This will help to improve non-motorised road user safety and improving sustainable links to Barnham railway station.

9.6 It is therefore the conclusion of this TA that the development proposals are sound in nature and conform to national and local planning policy with respect to sustainability and traffic impact. The proposed mitigation of traffic impact by contributions is also considered a reasonable way forward in helping WSCC to delivery their adopted infrastructure delivery program.

FIGURES

DRAWINGS

APPENDIX A

Scoping Note and Correspondence

APPENDIX B
Traffic Survey Data

APPENDIX C

Personal Injury Accident Data

APPENDIX D

Public Transport Information

APPENDIX E
Illustrative Masterplan

APPENDIX F

Stage 1 Road Safety Audit and Designers Response

APPENDIX G

TRICS Report

APPENDIX H

TEMPRO Growth Factors and Committed Development Flows

APPENDIX I

Traffic Flow Diagrams

APPENDIX J

Junction Capacity Assessments

APPENDIX K

Level Crossing Survey Data

APPENDIX L

Level Crossing Capacity Assessments