Local Plan 2036

Havant BOROUGH COUNCIL

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Southleigh – A27 Junction

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Havant Borough Local Plan 2036

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DRAFT FOLLOWING COST REVIEW

Southleigh – A27 Junction

Purpose of this paper	To consider options for connecting the Southleigh development area to the wider road network specifically the requirement for a new access point to the A27.
Why?	The existing road network is unlikely to provide the capacity that would be required of it with the 2100 additional homes and new retail and businesses to be provided within the Southleigh development area. It is therefore necessary to consider how additional capacity in the road network can be provided and one way this could be done is by providing a new access onto the A27. This new access could potentially offer additional road network resilience and offer opportunities to reduce traffic and improve air quality on nearby routes.
Objectives	▪ Identify in broad terms the justification for a new junction on the A27 ▪ If it is considered that a new junction is required, to undertake initial feasibility design work to arrive at costed estimates for the work required ▪ Consider how the provision of new capacity in the highway network made possible by any new junction can be used to improve all modes of travel, particularly sustainable modes such as walking, cycling and public transport

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Executive Summary

The proposed 'Southleigh' development of 2,100 homes with associated retail and commercial provision on land between Denvilles and Emsworth will result in additional traffic on the existing road network.

This report considers the options for accommodating this additional traffic, in particular whether there is a demonstrable need for a new junction onto the A27 south coast trunk road and if so, what form this junction could take to meet the requirements of the network operator, Highways England.

Chapters 2-10 review the current situation and consider the need for further studies later in the design stage relating to noise, air quality and sustainable travel amongst others. Chapters 11-13 then consider the likely impacts of the development on the local network and the various interventions that can be made to reduce the requirement for a new junction. Whilst there are considerable opportunities for the new development to minimise its reliance on the private car, the scale and nature of the development and its interaction with the local road network means that a new junction will almost certainly be required. Finally, chapters 14-18 then consider the form the junction could take, its buildability and impact on other local infrastructure and the opportunities the recommended junction offers to improve sustainable transport. Chapter 19 concludes with cost estimates of the various junction options considered in the report.

Subject to detailed traffic modelling of the development it is considered that a new A27 junction incorporating a link to the surrounding local road network will be required as there is insufficient capacity in the existing local network to accommodate the additional traffic.

The form of the proposed junction is considered and three options recommended for further study:

- Option 1 – a new road linking Warblington junction to Southleigh with the existing eastbound on-slip at Warblington converted to a two-way road, the eastbound access to the A27 being provided at a separate junction incorporating access to the existing eastbound service area (£18.0M);
- Option 4C / 4D – a new road linking Warblington junction to Southleigh with the existing eastbound on-slip at Warblington converted to a two-way road linking to a new all-moves (4C) or east-facing (4D) junction north of the railway, with access to the eastbound and westbound service areas taken from the slip roads within the new junction. Warblington interchange becomes west facing only. Option 4D is the preferred option (£31.5M).

The report also considers the opportunities for incorporating improved sustainable travel into the junction designs, as well as considering the effect on the two service areas. The junction options offer the opportunity to strengthen sustainable travel east-west links between Havant and Emsworth.

The impact of a junction proposals on the two private service areas is considered in outline but clearly this will ultimately be a matter for those private operators to resolve. In the preferred option two services areas may not be required since that option offers a cross-carriageway connection which currently does not exist.

An assessment of all the options considered has been carried out in accordance with Highways England's 'Early Assessment and Sifting Tool' (EAST) which supports the recommendations made in the report.

Both cost estimates include an allowance for professional services but exclude the costs of service diversions, alterations to service areas and landscaping.

1. Introduction

The Local Plan Context

1.0 Havant Borough Council's Local Plan 2036 has identified the land between Denvilles and Emsworth as suitable for comprehensive development as a Strategic Development Area (SDA) to be known as 'Southleigh'. The development could provide much needed infrastructure alongside approximately 2,100 new housing units.

1.1 When large sites such as Southleigh are developed, it is good practice that this happens in a comprehensive manner with the entire infrastructure planned alongside development. Following extensive research, and an assessment of all the land across the borough, the Southleigh area between Denvilles and Emsworth has been identified as an area suitable for development, which would bring with it wider benefits. This can be achieved through the creation of a master plan.

1.2 The master plan establishes key design elements, such as:

- A basic road layout;
- How much and what kind of housing is needed;
- Local shops, facilities and a new school;
- The size, types and location of green spaces.

1.3 The master plan sets the framework for future planning applications, and will provide greater certainty to both residents and future developers about what will be expected on the site. The master plan will feed directly into Havant Borough Council's work on the Local Plan 2036.

1.4 The master planning process is well advanced, being co-ordinated by Levitt Bernstein under contract to Havant Borough Council.

Scoping of the Study

1.5 That process has identified apparent shortfalls in local highway capacity and it is considered that to address this deficit a new opportunity to join the A27 between its interchanges at Warblington and Fishbourne, through a new junction located in the vicinity of Emsworth, needs to be created to avoid overloading the local road network.

1.6 This Study has been commissioned to consider various options for the form and layout of any proposed A27 junction to address the shortfall in existing highway infrastructure.

1.7 The Study will also consider opportunities to manage other environmental factors including water, air quality and noise, the impact on the historic environment and other associated issues directly relating to the creation of the new junction.

Scoping Question	How this will be addressed by this Study
What is the plan trying to achieve?	To establish the requirement for a new access point onto the A27 and, should such a need be established, to provide costed estimates for any options for the junction layout
What is the sustainability context?	Additional travel demand generated by the new Southleigh development area needs to be accommodated on the existing

Scoping Question	How this will be addressed by this Study
	highway network. However the opportunity exists to minimise the need to travel by the private car by the design of the development, therefore
What is the sustainability baseline?	Existing traffic flows, air quality and other environmental information will be collected and subjected to a test whereby the modelled impact of additional traffic generated by the Southleigh development
What are the key sustainability issues?	The existing site is open agricultural land with a number of highways and a railway crossing the overall site. It is bounded by residential areas, open space and woodland. Some minor watercourses cross the site, with a pronounced spring line running east-west at the north-south midpoint. The development will change the nature of the agricultural land to become partially built up with increases in traffic, noise, light and water outflow.

Table 1: Scoping Remit

1.8 The emerging Master Plan for Southleigh envisages a landscaped margin along the A27 which could be used for a variety of purposes including public open space, noise attenuation and drainage. Part of this margin would be subsumed by any new junction.

Wider Context

1.9 Havant Borough lies at the eastern end of the Partnership for Urban South Hampshire (PUSH) sub-region whose purpose is to ensure effective cross-boundary planning of new development and associated infrastructure.

1.10 Work carried out to date by PUSH includes the commissioning of a sub-regional transport model (SRTM) from Systra which allows the impact of new development to be modelled onto the existing road network, whilst accommodating natural growth and other external factors.

1.11 Havant Borough Council has also commissioned more detailed modelling work from Systra for Hayling Island, and a Borough-wide Transport Assessment (TA) based on the SRTM to investigate and if necessary suggest mitigations measures for the transport impacts generated by the proposals in the Local Plan. As part of this work, SRTM model runs have identified which junctions and nodes:

- Are already experiencing congestion
- Will experience congestion with natural growth (i.e. without the developments associated with the Local Plan)
- Will experience congestion with traffic associated with new Local Plan 2036 development

Figure 1: The Partnership for Urban South Hampshire Sub-Region

Source: http://www.havant.gov.uk/sites/default/files/documents/ADOPTED%20CORE%20STRATEGY%20.pdf

1.12 This work has already demonstrated a number of junctions in the vicinity of the Southleigh development are experiencing congestion, even at today's traffic level, or will do so with the addition of natural growth from non-Local Plan induced traffic. In the vicinity of the Southleigh site these are located at:

a. Bartons Road / Horndean Road / Emsworth Common Road;
b. Horndean Road / Southleigh Road;
c. Bartons Road / Petersfield Road.

1.13 There are also several other network links which SRTM model runs informing the TA have shown will be under 'severe' or 'significant' stress with or without the Southleigh development. The A27 trunk road around Havant, between Warblington and Broadmarsh, will experience flows in excess of capacity by 2036 which will result in 'severe' congestion on the surrounding road network as traffic is expected to divert onto less suitable local roads to avoid this congestion.

1.14 All work in this report is subject to confirmation by traffic modelling incorporating the Southleigh development which has not been carried out to date. Engineering judgement has therefore been applied using experience from similar developments regarding the resulting impact on the local, regional and national road networks.

2. Existing road network

A27 - south coast trunk road

2.1 The A27 trunk road, managed by Highways England, provides the main east-west route along the south coast and passing through the Borough is a grade separated all-purpose dual carriageway (AP-DC). The speed limit is 'national' (60 / 70mph depending on vehicle class). The A27 is a direct extension of the M27 'South Coast' motorway which finishes at its junction 12 at Portsbridge, Portsmouth; other than a change in road sign colour many road users are unaware of the change to A27 as it continues three / four lanes wide with hard shoulder as far as Broadmarsh.

2.2 Between Broadmarsh (the interchange with the A3M motorway) and Warblington, and onwards to Chichester, the A27 is two lanes wide with a 1m hard strip. There are no interchanges on the eight mile section between Warblington and the next junction at Fishbourne, although ½ mile east of Warblington service areas are provided in both directions, and emergency access is available at three intermediate locations. There is no cross-carriageway connection between the service areas and formal access is by vehicle from the A27 only, although it is known that local people (and locally based employees) take access informally on foot from adjacent footpaths, particularly from Washington Road (footpath 71).

2.3 Immediately to the east of Warblington interchange, the A27 rises slightly to cross the West Coastway railway line on a radius of approximately 1,000m and crests approximately 7m above the railway line at the bridge. Once over the railway bridge the road descends to meet the rising local ground level at the location of the service area accesses as the topography rises between two small watercourses.

Local Roads

2.4 Below those with the status of 'trunk road', the road layout in the Havant area is historically constrained by the presence of the West Coastway railway line, which links Brighton with Southampton. Following a route along the coastal plain, when built this railway was provided with few bridged crossings in order to save money; in fact before the building of the A27 between Warblington and Chichester in the late 1980s there were only four bridged road crossings of the railway between Havant and Chichester (at Park Road North in central Havant dating from 1938, and at Washington Road (now footpath only), North Street and Lumley Road in Emsworth which all date from the railway's original construction in the 1840s). All other road crossings of the railway are by means of level crossings, some supplemented by pedestrian footbridges.

2.5 Before the A27 was built in its current form (in stages between 1963 and 1988), the original south coast road followed the route between Havant and Emsworth is now indicated by the following roads:

- West Street (pedestrianised)
- East Street (unclassified)
- Emsworth Road (unclassified)
- Havant Road (A259)

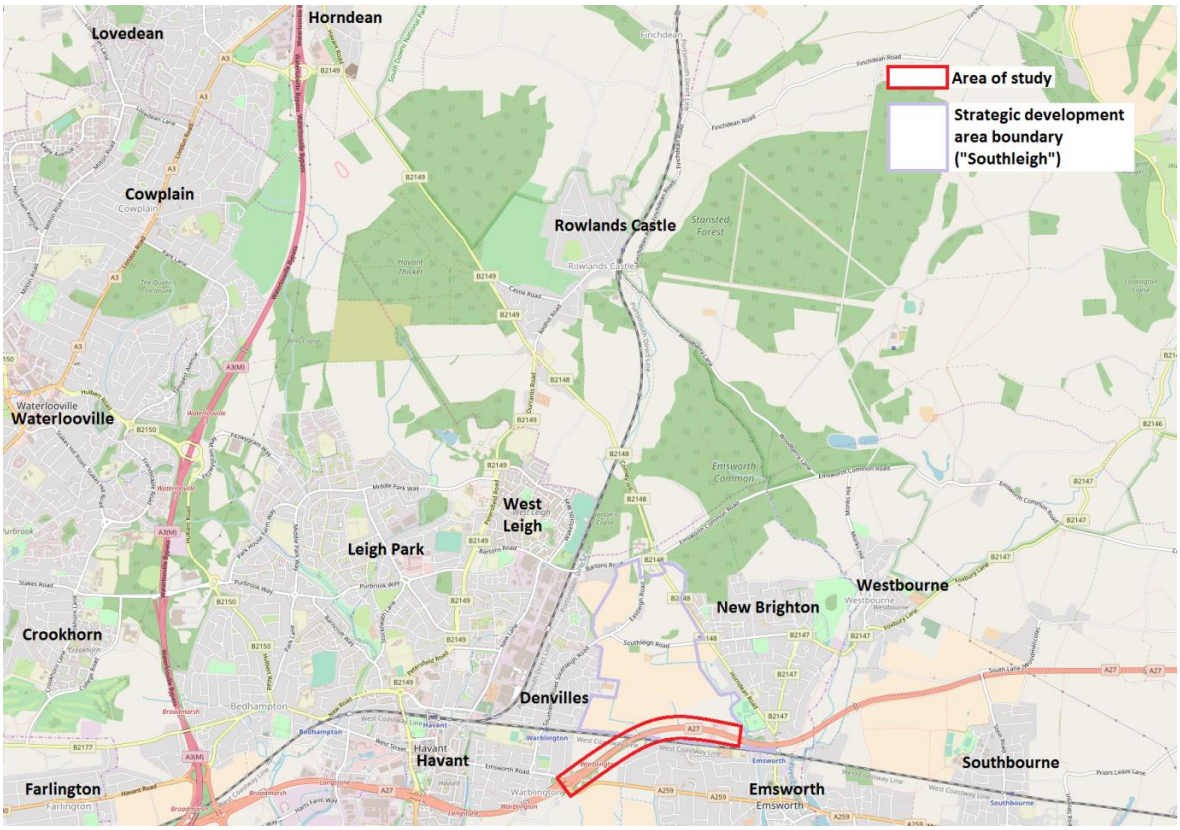
2.6 Of these roads, only Havant Road now forms a primary route function, today as the A259. The unclassified Emsworth Road offers access between the A27 and the east of the town centre, and also access to Southleigh Road which is an important distributor road between Havant and the rural parts of West Sussex including Westbourne.

2.7 The B2149 runs northwards from Havant town centre along Park Road North and Petersfield Road; likewise, the B2148 runs northwards from Emsworth along Horndean Road and Comley Hill where there is a 7.5t weight restriction on the railway overbridge. These roads meet in Rowlands Castle and continue (as the B2149) to Horndean where most traffic joins junction 2 of the A3M.

2.8 Lastly, the B2147 runs north-eastwards from Emsworth and connects to Southleigh Road and then continues through Westbourne into rural West Sussex.

2.9 The outline layout is shown in the following figures, where the potential site for the new junction is shown as a red box.

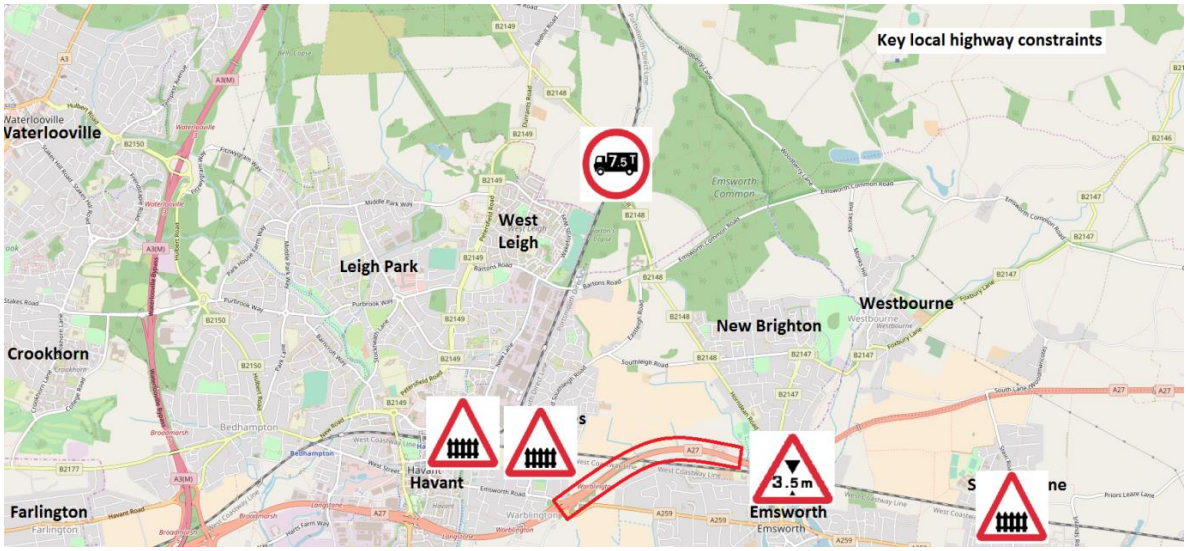
Figure 2: Local road network and area of study for new junction



Source: Open StreetMap © creative commons licence

3. Existing constraints and traffic patterns on local roads

Figure 3: Local road network constraints



Source: Open StreetMap © creative commons licence

Southleigh Road

3.1 Southleigh Road comprises three sections: urban with direct residential frontage in Denvilles and New Brighton, and between these two ends, rural with one frontage in the central section. Most of the urban sections have been widened to a minimum of 6.4m with 1.8m footways. The rural section has an off-road cycle track on its southern side for its entire length. A bus route (service 27) operates every 2 hours along Southleigh Road as part of its route between Havant and Emsworth.

3.2 The usability of Southleigh Road as a major element of the local transport network is constrained by a level crossing adjacent to Warblington station. Since 2007 the train service frequency has increased, along with the amount of time that the road is closed by the crossing gates. Currently there are ten trains per hour crossing Southleigh Road which can represent over 20 minutes per hour ‘down time’ at peak times.

3.3 This uncertainty in journey time created by the level crossing influences the flow of traffic in the wider area. Due to the length of the alternative routes, many drivers avoid the possibility of being delayed at the crossing by avoiding Southleigh Road altogether, using alternative routes either through Havant town centre on the B2149 or through Emsworth on the B2148.

3.4 Warblington School is located in Denvilles at the west end of Southleigh Road, adjacent to and on the south west side of the railway line. The station at Warblington faces the school on the east side of Southleigh Road and is served by one stopping train per hour, with others passing through non-stop. There is no footbridge across the railway, so when the level crossing is closed there is no

access from the school to or from the eastbound platform. This has led to reports of pupils abusing the crossing to avoid missing the infrequent train home, or being late for school in the morning. To address this issue a new 3m wide off-road shared status cycle track along the south side of the railway has been built as part of the School's recent major redevelopment. This cycle track links Southleigh Road to Havant railway station which has a wider range of more frequent train services, and has become a popular east-west route now designated part of National Cycle Network route 2.

3.5 A bid for Community Infrastructure Levy (CIL) funding in 2018 was successful and this will allow designs to be progressed with Network Rail for a new footbridge crossing at the Station. The proposal will have to pass through Network Rail's GRIP process, although delivery is likely to be well into the 2020s.

B2148 / B2149 from Horndean

3.6 Although the A3M / A27 route is the trunk road route for traffic to / from the north heading east, many drivers for the coastal towns and villages between Warblington and Chichester prefer to use the B2149 from A3M junction 2 via Rowlands Castle, and then the B2148 to join the A259 at Emsworth. This route is constrained by sections of 30mph limit at Rowlands Castle, poor geometry and a weight limit at Comley Hill, and low railway and road bridges at North Street in Emsworth which precludes the use of the route by vehicles over 3.5m high. The B2149 / B2148 route also gives access to Emsworth Common Road, which although unclassified forms a fast and popular alternative route to Chichester using the B2146 via Funtington. This route is especially popular during morning peak times when congestion for eastbound traffic on the A27 approaching Chichester can stretch for several miles.

A259 from Emsworth

3.7 Traffic heading west on the A259 towards Havant and the A27 is frequently delayed joining Warblington interchange. This is caused by traffic from Havant heading for the A27 to Portsmouth which results in a constant flow across the A259 entry arm. A recent planning permission for development of 154 houses at Selangor Avenue (site H7 in the Local Plan 2036) just east of the A27 Warblington interchange, includes provision for a signalised 'T' junction combined with a toucan crossing which will be located some 350m east of the roundabout.

3.8 The A259 is used as a diversion route should the A27 between Warblington and Chichester is closed for any reason. This limits the ability to carry out any reassignment of carriageway capacity.

3.9 Bus service 700 operates every twenty minutes along the A259 between Havant and Emsworth.

4. Accommodating traffic from other new development

4.1 Although the largest individual component, the Southleigh development is only one element of the overall provision of new residential and business accommodation planned within the horizon of the Local Plan 2036.

4.2 Within the East Hampshire District Council area, a significant residential development site to the south east of Horndean (700 units with associated infrastructure) is currently at outline planning permission stage. If this progresses it will add to traffic volumes at A3M junction 2 for which partial signalisation is proposed. It could be expected that some local traffic from this development site will use the B2148 route to Emsworth and / or the B2149 into Havant town centre which are the closest major retail centres to Horndean.

4.3 Other smaller scale developments planned, permitted or under construction are (references are to draft Local Plan 2036 sites) include:

- H7 - Land at Selangor Avenue - 147
- H8 - Land West of Horndean Road - 125
- H9 - West of Coldharbour Farm - 53
- H16 - Land East of Castle Avenue - 260
- H17 - Land South of Bartons Road - 175
- H19 - Former Oak Park School - 99
- H21 - Land West of Crematorium - 90
- H25 - Southleigh Park House - 35
- H27 - Helmsley House - 15
- H35 - Former Colt Site, New Lane - 90
- H38 - Former SSE Offices, Bartons Road - 45
- plus 750 in Havant Town Centre Regeneration Schemes

4.4 The individual Transport Assessments for these developments (where applications have been made) seems to support the initial results of modelling carried out in the SRTM as part of the Local Plan 2036 process in showing that there is likely to be capacity in the local road system only up to this scale of development.

4.5 Clearly once these sites have been developed out, engineering judgement suggests that the local road system may be unlikely to be able to accommodate the additional 2,100 houses proposed within the strategic development area of Southleigh. At this stage, in the absence of detailed modelling specific to the Southleigh development, the report that follows is based on this judgement and is subject to the caveat in paragraph 1.14 above.

5. Sustainable travel

5.1 At present the Southleigh site is semi-rural agricultural land separating Denvilles (east Havant) and Emsworth. Apart from Douglas Cottages and Southleigh Farm (currently in use as light industrial and a vet's practice) in Southleigh Road there are no other buildings and there is no general right of public access in the southern part of the site. In the northern part of the Southleigh site, the hamlet of East Leigh lies to the east of Eastleigh Road with the private site of Southleigh Park House (currently used for office accommodation but with permission for conversion / redevelopment for housing) to the east of the hamlet, set in its historic landscape.

Walking

5.2 Walking routes are limited to the footways in Southleigh Road and Bartons Road which in turn link with Horndean Road to the east. Eastleigh Road has no footway.

5.3 To the north east of the development site, east of Horndean Road, a network of permissive paths crosses Hollybank Woods which ultimately give access to public rights of way leading into Southleigh Forest and the South Downs National Park via a recently upgraded crossing of Emsworth Common Road.

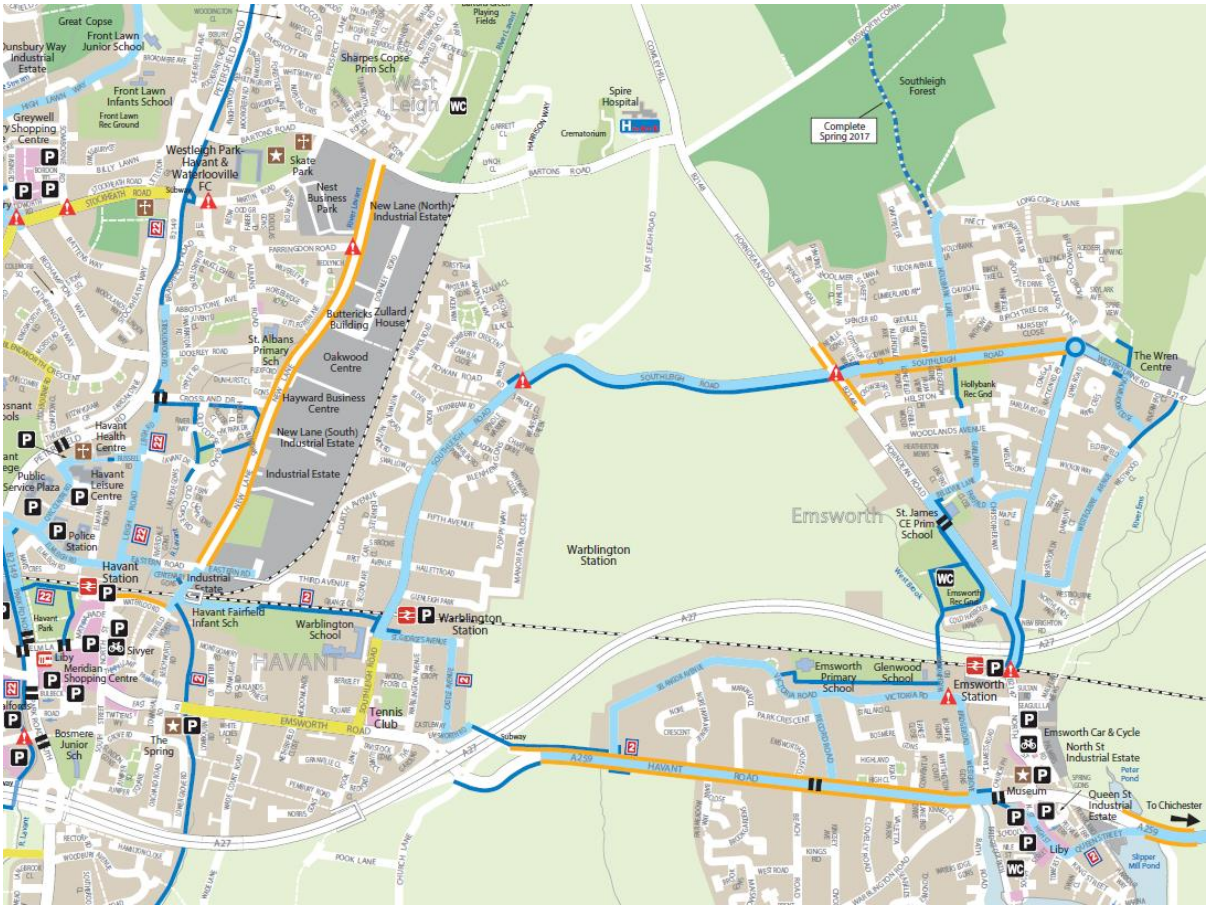
Cycling

5.4 Dedicated cycling infrastructure has been introduced across the Borough since the late 1990s. At present, the rural section of Southleigh Road between Denvilles and Horndean Road has an off road shared cycle track along its south side. Within Denvilles on-road cycle routes follow roads linking to Warblington station and School (and thence to National Cycle Route 2), and across a railway footbridge to Havant town centre.

5.5 To the east, the cycle route north from Emsworth Station is well developed. Washington Road (footpath 71) provides a north-south route passing under the railway and A27 and continuing through Emsworth Recreation Ground and along the west side of Horndean Road before crossing it using a toucan crossing and continuing northwards through quiet roads and ultimately linking to routes to Rowlands Castle and Westbourne.

5.6 The 2017 local cycle network is shown on the following extract from the Council's Cycle Map.

Figure 4: Local cycle network 2017



Source: © Havant Borough Council

Public Transport

5.7 Public transport provision directly to and through the site at present is low. With one exception (see below), public transport serves locations peripheral to the Southleigh site.

Rail

5.8 Emsworth railway station is served by Southern Railway services to Havant, Portsmouth, Southampton, Chichester, Brighton, Gatwick Airport and London Victoria. Four trains per hour serve the station on weekdays with a slightly lower level of service on Sundays.

5.9 Warblington railway station is served by an hourly Southern Railway service between Portsmouth and Littlehampton. Onward connections are available to other destinations. A 3m wide off-road cycle track links Warblington station to Havant station.

5.10 Havant railway station is the major station in the area. As well as the trains serving Emsworth and Warblington, main line services between Portsmouth and London Waterloo operate three times per hour on weekdays. From December 2018 this will increase to four trains per hour.

Bus

5.11 Bus services 20 / 21 (Stagecoach) operate along Bartons Road and into Wakefords Way, some 300m from the north-west extent of Southleigh. These commercial services link Havant, Leigh Park and Portsmouth with a combined 15-minute frequency on weekdays and hourly on Sundays.

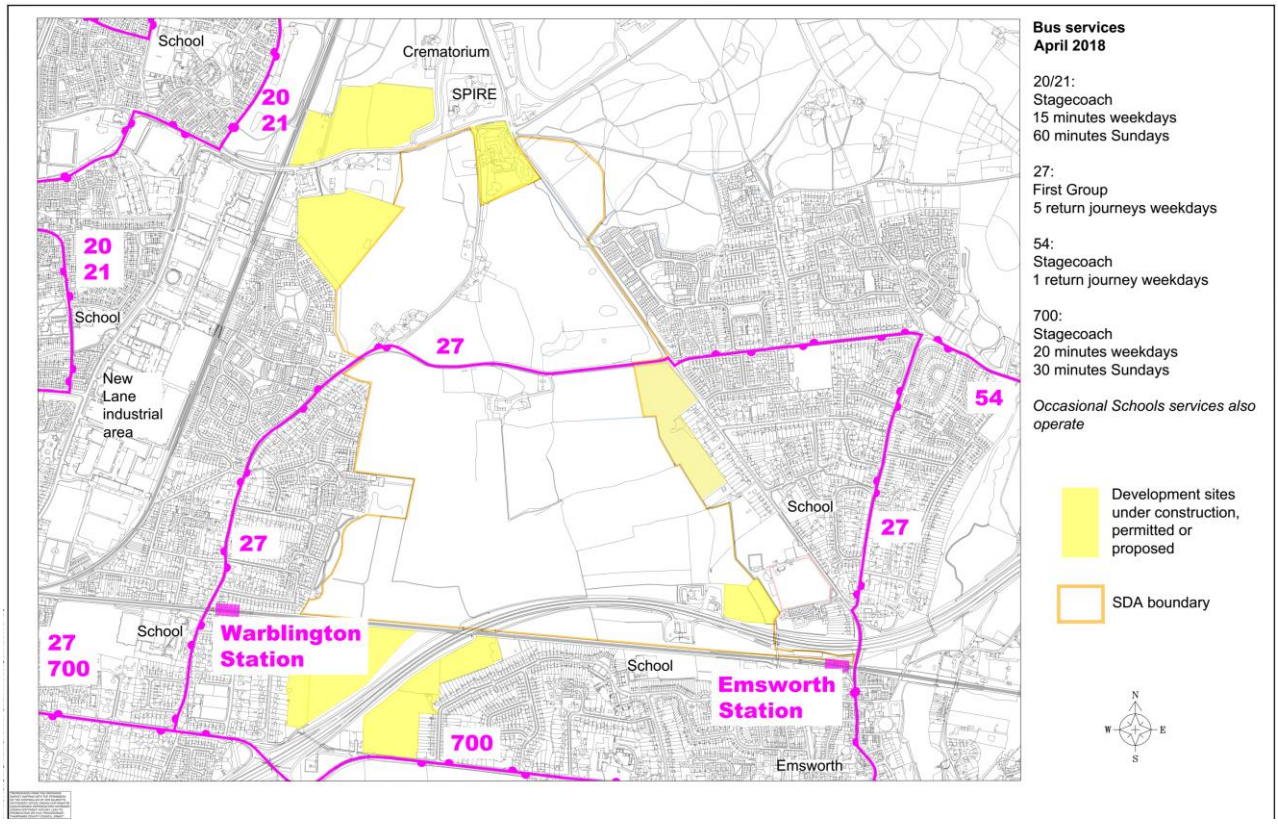
5.12 Bus service 27 (First) is a service operated under contract to Hampshire County Council linking Emsworth with Denvilles, Havant, Leigh Park and Rowlands Castle. It operates five times a day at 2-hourly intervals, on weekdays only with a first departure at 9am.

5.13 Bus service 54 (Stagecoach) is a service operated under contract to West Sussex County Council providing a single return journey to/from Chichester. The overall service operates on weekdays only between Petersfield, Compton, Funtington and Chichester with five return journeys; one of these diverts via Westbourne as far as the New Brighton Road roundabout.

5.14 Bus service 700 (Stagecoach) operates along the A259 every 20 minutes on weekdays and 30 minutes on Sundays, linking Portsmouth, Havant, Emsworth, Chichester and Bognor Regis. This is a commercial service and is the main route in the Emsworth area. The route uses the A259 and passes through the Warblington A27 interchange.

5.15 Schools services also operate across the area, most operating one return journey during the morning and afternoon to a variety of educational destinations.

Figure 5: Local public transport (bus, rail) network 2018



6. Air quality

Local Sites of Concern

Havant

6.1 Air quality in central Havant is a concern with Park Road North and Park Road South regularly exceeding statutory levels of particulates and NO_2. This is mainly due to the high proportion of HGV traffic using the route and reflects its role linking the node on the trunk road network (A27 Langstone interchange) with the major industrial / manufacturing centre at New Lane. The north-south route was originally built as a town centre by-pass in 1938, but now acts as a severance barrier between the 'old' town centre to the east and the newer Retail Parks on the west. The corridor was reconfigured in 2013 and Mova provided for the three interlinking sets of traffic lights in 2017. However, this only addresses current levels of traffic and it is expected that air quality will become a significant issue along this corridor even before the development of Southleigh.

Emsworth

6.2 North Street in Emsworth is likely to experience a reduction in through traffic with the provision of the new junction as (under most options) through traffic from the north using Horndean Road and heading for the A259 (east) will divert onto Southleigh's new north-south spine road. This will result in improved air quality in central Emsworth.

Development Effect

6.3 The provision of a new A27 junction will (under most options) attract more traffic to the area; some of this, as above, will be diverted from alternative routes and so a local increase in traffic around a junction site may be offset by lower levels of traffic elsewhere. The design of the junction and the landscaping provided around it will therefore be critical to reduce the impact on air quality in the area. The likely raised elevation of the junction and the adjacent landscaping / drainage buffer could be successfully used to reduce the negative air quality effects of the additional traffic. This will be a matter for the detailed design stage.

7. Noise

7.1 The area to be developed is currently open agricultural countryside but is affected by noise from both the railway and the existing A27. The railway is approximately 1m above the surrounding ground level; the A27 crosses this on an overbridge with the carriageway level being some 7m above the rails at this point, i.e. approximately 8m above surrounding ground level. As the A27 extends eastwards the local ground level also rises such that by the time the service areas take access to the A27 some 300m east of the bridge, the accesses are at or slightly below local ground level.

7.2 The existing A27 was built in the late 1980s and the planting alongside the road, primarily on the embankments and cuttings, is now mature and acts as an acoustic barrier particularly during the summer.

7.3 Although noise attenuation fencing has been erected on the south side of the A27, to the north noise is only attenuated by deciduous roadside trees and other dense planting. This elevated position at the overbridge means that the impact of noise from the A27 will affect most of the area to be developed. With grade separation a new junction is likely to exceed the height above datum that already exists on the existing A27 carriageway over the bridge deck, with an assumed increased in height of up to 7m above the existing A27 carriageway. The arrangement of the entrance and exit ramps to the A27 (and of any link roads in some layout options) from any new grade separated junction may in themselves act as attenuation for the mainline traffic, but traffic on the ramps and connecting roads would be at this elevated height, which may have an impact on residences south of the railway in Selangor Avenue and Victoria Road. In mitigation, traffic speed on these links would be lower than the national speed limit (probably 40 – 50mph) and assuming surfacing was of a low-noise material the extent of any increased noise envelope could be limited by careful design.

7.4 Localised lengths of sound attenuation fencing, combined with extensive landscaping in the buffer strip between the A27 and the development, will also contribute to reducing the effect on Southleigh and surrounding areas of noise from the A27 and the new junction.

7.5 In most options the junction connects to the wider road network and this will attract additional traffic away form existing routes – primarily through Havant town centre (Park Road North and Park Road South) and Emsworth (North Street). Noise levels on these roads are therefore likely to be reduced.

8. Drainage

8.1 It is recognised that the water environment in the Emsworth / Warblington area is complex and subject to rapid flooding. Currently the Havant Borough Local Plan includes Emsworth - specific policy guidance (DM25 “Managing Flood Risk in Emsworth”) for proposals in the urban area of Emsworth which would partially impact on the Southleigh development site. The Local Plan 2036 proposes new policies E12 (“Managing Flood risk in New Development”) and E13 (“Drainage Infrastructure in New Development”) which together strengthen and expand these requirements to the whole of the Borough including the whole of the area covered by this study.

8.2 Extensive areas of water will feature north of the A27 as part of Southleigh’s SuDS provision in order to address the limited opportunities for increasing off-site flow which is limited by the West Brook (to the east) and Nore Farm Stream (to the west) both of which pass downstream through urban areas and have a history of property level flooding.

8.3 Another line of water features will lie north of Southleigh Road intercepting the spring line. Flow from the site southwards into the West Brook or Nore Farm Stream will be limited to existing green field values, and if possible will offer a reduction in order to reduce flood risk downstream, in line with the policies mentioned above.

8.4 More detail is contained in the Southleigh consultation reports available online through the Local Plan 2016 website[1].

[1] http://www.havant.gov.uk/sites/default/files/documents/Southleigh%20Master%20Plan%20%28low%20res%29.pdf

9. Natural environment, heritage and landscape

Natural Environment

9.1 The existing A27 was built in the late 1980s and the planting alongside the road, primarily on the embankments and cuttings, is now mature and acts as an acoustic and visual barrier particularly during the summer.

9.2 The site of the junction and associated infrastructure is mostly laid to agricultural use and has been for many years. The construction of the A27 dual carriageway in the mid 1980s has represented the only disturbance since the construction of the railway in the 1840s. As such the environment has been heavily modified and most of the site is laid to single crop produce with limited biodiversity.

Heritage

9.3 The site of Southleigh is close to several known archaeological remains. There is the possibility that development of the junction and any associated infrastructure such as adjacent links roads may result in the discovery of further remains.

9.4 The known sites are:

- Havant Road follows the route of the roman road between Havant and Chichester
- Remains of a roman villa / farmstead in the fields south of Havant Road
- Warblington Castle and associated historic landscape south of Havant Road[2]
- Copsey's Nursery development site: an archaeological evaluation found a probable enclosure of late Bronze Age to early Iron Age date in the south-west section of the site.

9.5 A watching brief will be in force during site investigation and construction works associated with the junction and associated infrastructure.

Landscape

9.6 The location of the junction is in open agricultural countryside with a low rise residential area immediately to the south, separated from the junction site by the railway. Any elevated junction involving a new bridge within the junction will create a visual barrier northward from the residential area. The A27 crosses the railway on an elevated structure which regains local ground level within 400m either side of the crossing. The A27 follows the coastal plain, which extends to the north as far as Southleigh Road; further north of this point, which is marked by a local spring line, the landscape transitions into the lower slopes of the South Downs with smaller fields and more tree cover.

9.7 In open countryside an elevated junction form would be visually intrusive; however, given the development of Southleigh over adjacent land it is probable that the junction would not be visible

[2] https://historicengland.org.uk/listing/the-list/list-entry/1154484

from vantage points to the north (e.g. Bartons Road) due to the urban form of the intervening development (see next section).

9.8 The emerging master plan for the new development proposes an extensive area of planting and water features which will act as a further buffer between the A27 and Southleigh itself. This is partly required to accommodate the extensive sustainable drainage system (SuDS) that Southleigh will require.

9.9 Any new junction will affect the roadside vegetation but this can be mitigated by new planting and landscaping in the buffer zone.

9.10 Later stages of the design will address these issues in more detail by carrying out a Landscape Visual Impact Assessment (LVIA) and an Environmental Impact Assessment (EIA).

10. Streetscape and urban environment

10.1 The plan for Southleigh envisages the area as an urban extension to Denvilles and Emsworth. Although planned to have considerable areas of open space and landscaping, the emerging master plan indicates that development closest to the A27 will be of higher density and height which will not only create a sense of enclosure to the south but also act as a barrier against traffic noise from the elevated sections of highway, both within the junction itself and from connecting roads.

10.2 The landscape / drainage buffer north of the A27 allows routing of the cycle and walking network to be designed as part of the landscape. The design of other links can also be incorporated and softened within the landscaping delivered within the overall Southleigh development.

10.3 Later stages of the design will address these issues in more detail by carrying out a Landscape Visual Impact Assessment (LVIA) and an Environmental Impact Assessment (EIA).

11. Southleigh traffic flows

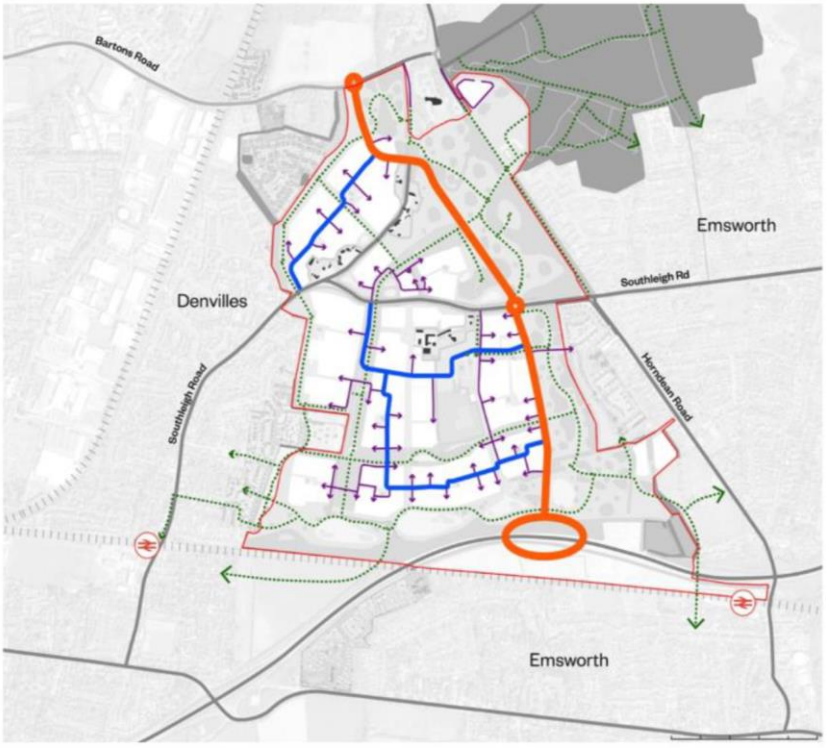
The Opportunity

11.1 The development of Southleigh offers the opportunity to overcome the issues arising from the limited capacity of the Southleigh Road level crossing by providing an additional bridged crossing of the railway line and / or direct access to the A27 in some form.

11.2 The emerging masterplan for Southleigh envisages the extended built up area weighted towards Denvilles with a green gap between Southleigh and Emsworth. This green gap, which acts as an extension of existing woodland and open space and stretches north and north-eastwards into the South Downs National Park, is partly defined by a new north-south spine road marking the eastern boundary of the proposed built up area. This spine road would have a limited number of accesses and is currently envisaged as a 40mph, 7.3m wide road with verges and shared cycle tracks both sides, in an overall corridor (once drainage swales and other services are included) of some 25 to 30m in width. Roundabout junctions (subject to detailed design) would be provided where it crosses Southleigh Road and where it meets Bartons Road. Since it is planned as an urban road, crossing points for cyclists and pedestrians could be provided using light controlled crossings at key points.

11.3 South of Bartons Road, it is suggested in the emerging masterplan that the existing Horndean Road B2148 is fully or partially extinguished as a motor road, remaining a 'green way' footway, cycle track and equestrian route. Therefore, the spine road would be expected to become part of the B2148. This is shown on the following map.

Figure 6: Emerging Master Plan for Southleigh



Source: © Havant Borough Council (Levitt Bernstein)

11.4 As soon as the road network of Southleigh connects with the existing road network then traffic from the existing network will be attracted onto it, either by design (i.e. the diversion of the B2148 through the site) or by convenience (i.e. as another route between Denvilles and Emsworth). Modelling the effects of the around 2,100 extra houses has been complicated by the model's earlier inability to account for the level crossing on Southleigh Road but there is now confidence in the results which show negative effects on the existing road network for the locally committed developments even before accounting for Southleigh.

11.5 The options presented in Section 13 below are therefore untested in terms of detailed transport modelling at present and reflect current understanding of the behaviour of local and regional traffic. Modelling has only been carried out at the strategic level (as the SRTM) without the addition of the proposed road layout and connections for Southleigh.

11.6 Following sharing of a draft of this report in June 2018, Network Rail has stated that should the Southleigh development site incorporate a new means of crossing the railway it will seek to close the Southleigh Road level crossing (whilst retaining a proposed footbridge).

12. Avoiding the need for a new junction

12.1 Before considering the way that a junction onto the A27 could be accommodated, consideration needs to be given to reducing the volume of traffic the new development generates in and of itself, such that a connection only needs to be made to the local road network (option A in paragraph13.2 below). This involves consideration of sustainable transport modes (walking, cycling, and public transport) and associated techniques to reduce the need to travel and if travel is necessary to provide good access to destinations by means other than the private car.

Bus and Rail

12.2 The master plan envisages a layout for Southleigh where no property is more than 400m from a potential bus route. The key locations to be linked by bus services would be Emsworth town centre and railway station, local schools at Emsworth and Warblington, Havant Academy, local employment sites and Havant town centre, College and railway station. A possible solution would be to introduce new bus services linking Havant and Emsworth to supplement contracted service 27 through Southleigh with relatively high frequency.

12.3 The layout of the development must ensure that bus penetration is possible and available from an early stage, otherwise new residents will develop a dependency on the car which will in turn mean that the bus service struggles to become viable. The majority operator in the area, Stagecoach, has produced a guide to developers[3] which indicates good practice in design and also offers ways of funding the initial service level by means of an agreement between the bus company and the developer, rather than through a S106 transport contribution which thus removes the responsibility for bus service specification from the local authority. Where bus services are properly considered at the outset, in development location, master planning and detailed design, high levels of service take-up are achievable. Indeed, across a very wide variety of scenarios, appropriate development can help catalyse improved bus services that achieve mode shift across a wider area. This can help to offset the residual car-borne traffic from a proposal.

12.4 Alternatively, a form of demand responsive service (DRS) could be implemented covering the Southleigh development and linking to the surrounding significant destinations.

Walking and Cycling

12.5 A good walking and cycling environment will encourage shorter journeys to be made without recourse to the car. Walking and cycling networks, built into the development from the start as part of the master plan, will link key destinations within and around Southleigh itself, providing additional opportunities for changing journey mode. The cycle network in the Emsworth area is already well developed, and the public rights of way network offers a means of accessing by foot the main centres of interest such as local and town centre shops, railway stations and bus stops, the South

[3] http://www.stagecoach.com/~/media/Files/S/Stagecoach-Group/Attachments/pdf/bus-services-and-new-residential-developments.pdf

Downs National Park and the coast. This is before considering the opportunities offered by the highway network itself. The master plan envisages the creation of a network of walking and cycling routes in and through Southleigh including a new strategic east-west route north of the railway utilising the landscape buffer between the built-up area of Southleigh and the A27, although to best effect this would require a crossing of the railway. The master plan envisages an extension of the open space adjacent to Hollybank Woods southwards along the eastern boundary of Southleigh's built up area, as far south as the A27, partly to accommodate the SuDS required. The walking and cycling environment includes safe 'at grade' crossings of the main spine road and the creation of a 5km long 'Park Run' circuit to encourage the take-up of outdoor activity.

12.6 Placing local facilities within Southleigh reduces the need to travel. Shops, education and employment opportunities therefore need to feature within the overall design of the new development.

13. Options for connecting to existing roads

13.1 In broad terms there are four ways to connect Southleigh to the existing road network, irrespective of whether a new junction onto the A27 is required.

Connection Option A. Connect to local roads north of railway only

13.2 In this option Southleigh connects only to local roads – Horndean Road (B2148), Southleigh Road, Eastleigh Road and Bartons Road. Modelling of key junctions such as Bartons Road / B2149, Bartons Road / B2148 etc. for committed future developments (excluding Southleigh) indicates there is a level of capacity potentially available to accommodate some additional traffic, but probably only up to the level of other locally committed development outside of the Southleigh footprint. The modelling would have to be re-run to confirm future capacity with Southleigh in place were this option to be considered.

13.3 The southern section of Southleigh Road is already experiencing increased congestion at the level crossing because of recent development at the former Copsey's Nursery site in Fifth Avenue. Other routes via Emsworth are constrained by the low bridge at Emsworth railway station at the junction of North Street B2148 with the A259. This latter junction is already congested in the morning and evening peak. Therefore, the only 'unrestricted' routes out of Southleigh and which are therefore most likely to attract traffic from it are Southleigh Road (east) to Westbourne, Emsworth Common Road (east) to Funtington, Bartons Road (west) to A27, Havant and Leigh Park, and Horndean Road B2148 (north) to Rowlands Castle and A3M junction 2. Each of these routes indicate significant additional traffic flow with committed development excluding Southleigh.

Connection Option B. Connect to A27 only

13.4 The sole access for private and commercial traffic would be from the A27. In this scenario, no traffic would be attracted from the external road network onto any new junction, so it could be provided to a lower standard than would be required for a fully connected junction. Since the junction would only be used by traffic to/from Southleigh, its layout could be arranged using loops on the entrance and exit ramps, which is the only layout capable of achieving a 1km weaving length between it and the existing Warblington interchange as required by the Design Manual for Roads and Bridges (DMRB).

13.5 Within Southleigh, external links would be provided for walking and cycling, thereby encouraging the use of these modes for short journeys. Bus penetration would be achieved using bus gate(s) at key points, like that implemented at Dunsbury Hill Farm.

13.6 Difficulties with this type of layout are that the existing road network crosses the Southleigh site at Southleigh Road, and that Eastleigh Road (and the houses fronting it) lies wholly within it. These issues could be overcome by adopting option C below. Irrespective of this, it is unlikely that such an access arrangement would be acceptable and is not reflected in the master plan.

Connection Option C. Connect to local roads OR A27

13.7 The crossing of the Southleigh site at Southleigh Road could be used to create a hybrid layout combining options (A) and (B) above, with development north of Southleigh Road and fronting Eastleigh Road connected to the local roads and the areas south of Southleigh Road only connecting to the A27. Modelling would need to be undertaken to determine the capacity of the local road network to accommodate the 700 or so houses that would connect to the local road network in the area north of Southleigh Road. The A27 junction could be of the low capacity type as it only needs to accommodate the 1,100 -1,300 houses in the southern part of the site. Bus penetration could be achieved using bus gate(s). As with option B above, it is unlikely that such an access arrangement for the southern part of the site would be acceptable and is not reflected in the master plan.

Connection Option D. Connect to local roads AND A27

13.8 The spine road serving Southleigh would be designed as a link road from the wider network onto the A27. Traffic from the surrounding road network would use the spine road as a route to gain access to the A27 in preference to other routes including those through Emsworth (B2148) and central Havant (B2149). The design of the spine road would therefore need to reflect its use as part of a longer route, probably replacing the lower end of the current B2148 and being ultimately designated as such.

13.9 The effect of a spine road connecting local roads and Southleigh to the A27 would reasonably be expected to be that:

- Traffic from eastern areas of Havant with destinations to Chichester etc. would use Bartons Road to access the link;
- Traffic from Horndean / Rowlands Castle and the surrounding rural areas would be attracted away from the ‘back route’ via Funtington, especially when the A27 is not congested at Chichester;
- Traffic from Rowlands Castle would use the link instead of the B2149 through Havant town centre, reducing traffic and improving air quality on the latter route;
- Traffic from Westbourne / north Emsworth would use this route to access the A27 in preference to travelling via Emsworth and the A259;
- Traffic flow in the lower section of the B2148 (North Street) could be expected to be significantly lower than at present as traffic diverts from the current B2148 onto the new link road;
- With the benefit of a TRO, heavy goods traffic through central Havant on the B2149 could be re-routed to access the New Lane industrial zone via Bartons Road and the link road onto the A27 - this would benefit air quality and reduce traffic flow through Park Road North and Park Road South;
- Should the new road layout offer an opportunity for traffic from Southleigh and the surrounding roads to cross the railway, then the existing Southleigh Road level crossing would be closed. This would improve road safety near Warblington School and would reduce traffic in the Denvilles area.

13.10 An access arrangement of this type would be most acceptable of these four options, and is reflected in the master plan.

14. Rejected junction options

14.1 Discussions with Highways England have confirmed that:

- Grade separation is required;
- Minimise number of new ramps (i.e. on-slips and off-slips);
- To be no reduction in mainline A27 speed limit;
- A new junction, additional to the Warblington and Fishbourne interchanges, would only be acceptable for a development in excess of 10,000 units.

14.2 This has ruled out some at grade options which were considered within the early 'option sifting' phase of this study:

- 'T' junction controlled by traffic lights;
- conventional roundabout;
- 'hamburger' roundabout with traffic signals (currently a rejected option for Fishbourne below).

Rejected Fishbourne hamburger option © Highways England

14.3 These discarded options were initially considered because they took account of the fact that the next six junctions east of the Southleigh site, on the Chichester by-pass, are all roundabouts or traffic light controlled. Proposals to upgrade the Chichester by-pass included possible removal of some or all of these at-grade junctions, but are currently not being progressed by Highways England; therefore, it was considered that an at grade junction at Southleigh would not have been out of keeping with the following section of the route.

14.4 However Highways England's view was that the Southleigh junction would be the first at-grade junction at the end of a significant length of grade separated dual carriageway – potentially the first such junction since joining the motorway network hundreds of miles away. They were not supportive of a non-grade separated junction so close to the end of the grade separated section (i.e. within 0.9 km of Warblington interchange).

14.5 Discarding these at-grade junction arrangements leaves a smaller range of options involving various degrees of grade-separated connection incorporating the existing Warblington interchange or building a new junction, in various configurations. These are considered in the following section.

15. Options for the junction

15.1 The connection of Southleigh's spine road onto the A27 will need to be considered in terms of the impact on and proximity to the existing Warblington interchange. The critical factor is the Design Manual for Roads and Bridges' (DMRB) requirement for a weaving length of 1km between junctions on all-purpose dual carriageways. The impact of any junction on the existing service areas, and on development sites other than those within the boundary of Southleigh also needs to be considered.

15.2 Following Highways England's input it is confirmed that the new junction will need to be grade separated and will need to minimise the number of ramps (on- or off-slips) created on the mainline A27. Their requirement for developments of fewer than 10,000 units at a single location is to avoid completely new junctions, however junction improvements and reconfigurations would be acceptable.

15.3 Five distinct options to providing the junction have subsequently been identified which meet the requirements of Highways England.

Option 1

The new Southleigh spine road connecting directly to the Warblington interchange obviates the need for a completely new junction on the A27. There is no space to fully connect the spine road directly to the Warblington interchange and so partial diversion of the eastbound on-slip along the spine road is required to create the space at the roundabout.

Option 2

A junction layout which is laid out with looped ramps connecting more than 1000m from Warblington (connection options B and C above).

Option 3

A junction layout which provides a lane gain / lane drop between the new junction and the Warblington interchange and thus partially overcomes the restriction on the short weaving length with a reduced length of 500 – 800m permitted.

Option 4

A junction layout providing some or all moves onto the A27 with the new junction and the Warblington interchange linked by one or two separate link road(s).

Option 5

A new junction with closure of the existing Warblington interchange – effectively extending the A259 back eastwards on itself from the Warblington interchange to a new Southleigh A27 junction.

15.4 The following sections consider each of these options in turn. Within each option there are various iterations possible, with different slip road and route variants, but the following represents the high-level approaches to possible provision of a junction which have been agreed with Highways England.

15.5 Highways England is not supportive of a completely new junction serving less than 10,000 units. This is a key condition of their operating licence[4] which states that junctions under this threshold will only be entertained where it can be demonstrated that the strategic road network can continue to operate safely and that the junction is the only means by which the development can proceed. Although along the A27 corridor (between Havant and Chichester) there are various sites being brought forward in the respective Local Plan updates, no site contributes 10,000 units in a single location to meet this trigger criteria, nor in fact does the combined number of development units along this section of the corridor approach this threshold figure.

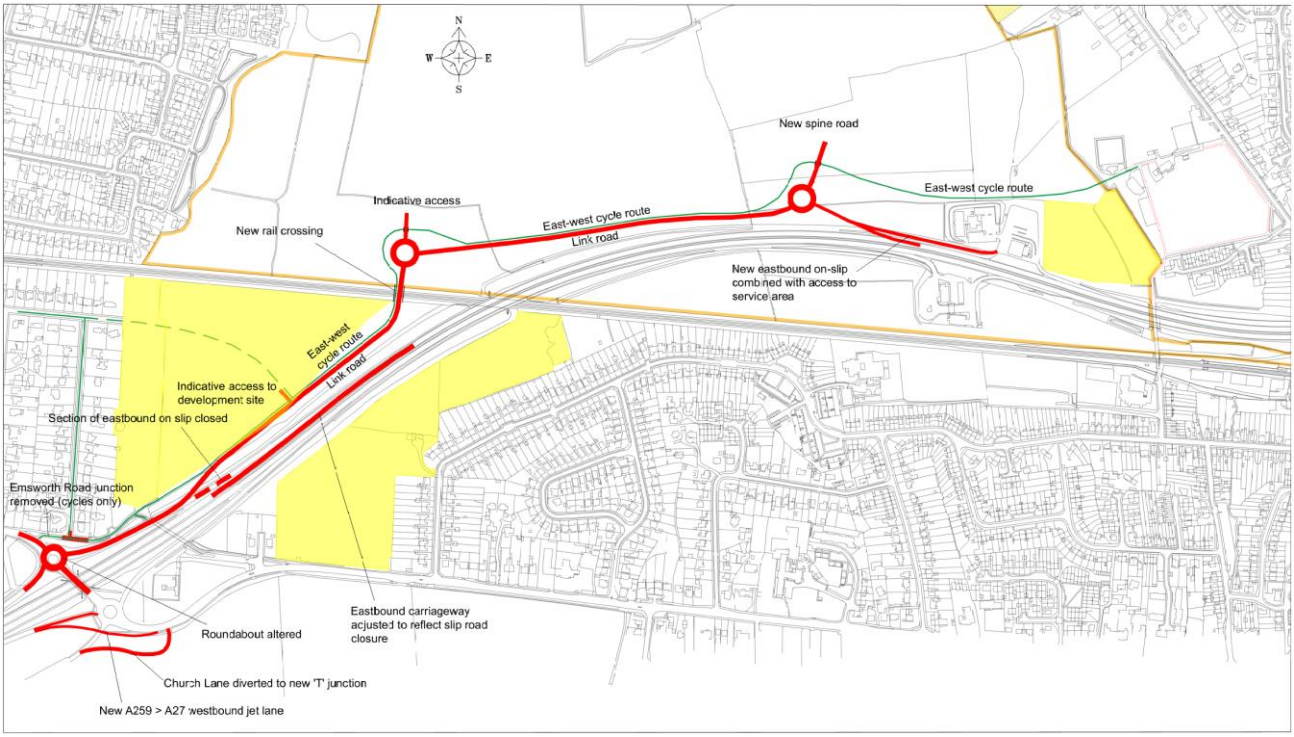
15.6 Network Rail has stated that any crossing of the railway will attract 'air rights' due to the value of the land being unlocked for development. To offset this possibility, should such a link allow traffic currently using Southleigh Road as a through route between the north and south parts of Denvilles to be diverted onto it, thus allowing the closure of the Southleigh Road level crossing to traffic (albeit with a retained foot / cycle crossing) in accordance with their national Level Crossings Closure Programme[5], then the 'air rights' may be waived or reduced. A nominal £100,000 has been included in the junction estimates for a balancing figure for air rights because every option in some way allows traffic currently using Southleigh Road to divert either onto the A27 itself or to use a new parallel or separate link road crossing the railway.

15.7 No estimate has been included for costs associated with the possible closure of Southleigh Road and associated re-signing or other civil engineering works associated with the closure.

[4] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/431389/strategic-highways-licence.pdf

[5] https://www.networkrail.co.uk/communities/safety-in-the-community/level-crossing-safety/reducing-risk-level-crossings/

Option 1: most moves at Warblington



15.8 This option uses the existing Warblington interchange as the main connection point between the new Southleigh infrastructure and the A27. Only the arrangements for the eastbound on-slip are significantly changed.

15.9 The two-way spine road serving Southleigh is connected to the northern roundabout within Warblington interchange. The spine road would start from the existing northern roundabout and initially follow the route of the eastbound on-slip over the existing subway. Once past the subway, the link road would diverge from the route of the A27 and cross the railway on a new overbridge to enter Southleigh. The eastbound access to the A27 would be maintained by a new east-facing on-slip from a junction on the spine road north of the railway. Access to the eastbound service area could then be taken as a spur from this on-slip. In this way, eastbound traffic for the eastbound service area would leave the A27 at the Warblington interchange and follow the new link road alongside the A27 until reaching the eastbound on-slip.

15.10 At the northern roundabout at Warblington, the Emsworth Road arm leading to central Havant would need to be reconfigured. The ‘T’ junction close to the roundabout which currently gives access to the eastern end of Emsworth Road and Castle Avenue should be closed (although remaining open for cycles and pedestrians), with Castle Avenue being converted into a cul-de-sac at its southern end. This will simplify traffic movements in the vicinity of the roundabout. Access into this part of Warblington (south of the railway and east of Southleigh Road) would still be possible via Warblington Avenue and St Georges Avenue. The northern roundabout itself would need to be enlarged to accommodate the additional two-way traffic from the east on the spine road. It is possible that the roundabout would need to be signalised (or would need to be changed to a signalised junction) to reduce delay for traffic leaving Emsworth Road given additional traffic flows both from the west (traffic from the Portsmouth direction leaving the A27 heading for Southleigh) and the south (traffic from A27 Chichester / A259 Emsworth heading for Southleigh). This level of detail would be informed by modelling.

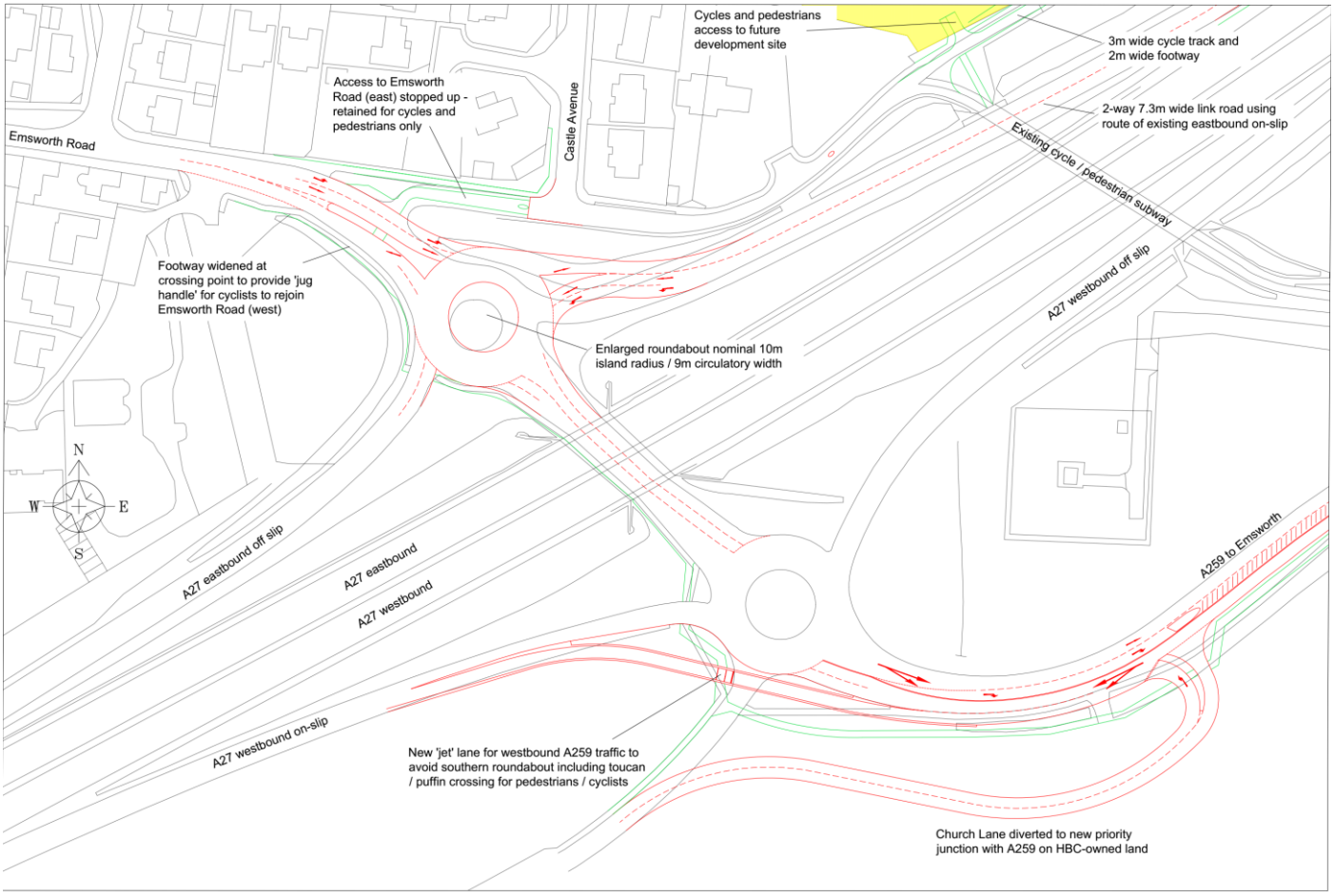
15.11 The southern roundabout at Warblington would similarly need to be re-configured to avoid any detrimental effect, in particular on westbound A259 traffic. Traffic on the A259 already experiences significant congestion as it is unable to freely join the roundabout due to the high volume of turning traffic accessing the A27 westbound on-slip or eastern Havant. The volume of traffic turning across the entry arm of the A259 would significantly increase under this option since traffic from Southleigh (and the surrounding road network linked to it) heading for the A27 westbound on-slip, and westbound traffic from Chichester accessing Southleigh, would significantly add to the existing flow across the A259 arm. The potential increase in congestion on the A259 could be mitigated by providing a westbound 'jet lane' from the A259 directly onto the A27 westbound on-slip although this in turn requires moving the Church Lane junction away from the roundabout to become a 'T' junction further east on the A259. This would require the use of agricultural land south of the A259 which is in the ownership of Havant Borough Council. Removing the traffic on the A259 bound for the A27 westbound from the southern roundabout would shorten queue lengths on the A259 and reduce congestion, even with additional volumes across the junction entry arm.

15.12 The additional turning traffic using the south roundabout may conceivably add to delay in traffic leaving the A27 westbound off-slip with the potential for queues onto the westbound mainline. Modelling will demonstrate whether signalisation of this arm would be required.

15.13 The link road would require its own crossing of the railway and would affect the amount of developable land in the triangular 'land further east of Castle Avenue' site (H16 in the draft Local Plan 2036). Since the link road would be designed as a local road, access to this site could be taken as a 'T' junction from it. For traffic from the Warblington interchange headed towards Chichester mileage would not change, and from Southleigh in the Chichester direction access would be direct. However, traffic heading to Southleigh from Chichester would be effectively 'doubling back', leaving Warblington interchange before heading back east along the new link road. This represents poor efficiency of the junction, given that traffic leaving the A27 westbound off slip would be delayed by traffic from Southleigh accessing Portsmouth using the southern roundabout (possibly requiring signalisation of this arm of the junction to avoid queueing onto the A27 westbound mainline) and means the attractiveness of the Southleigh link road as an alternative to traveling through the centre of Havant on the B2149 is reduced.

15.14 Traffic for the eastbound service area would need to use Warblington interchange and the link road to take access as a spur from the new eastbound on-slip.

15.15 The option meets Highways England's request to consider no additional junctions with the existing four ramps being maintained with only the location of the eastbound on-slip changing. In fact, there is potentially a net reduction of one connection to the mainline since the access to the eastbound service area would be from within the junction.

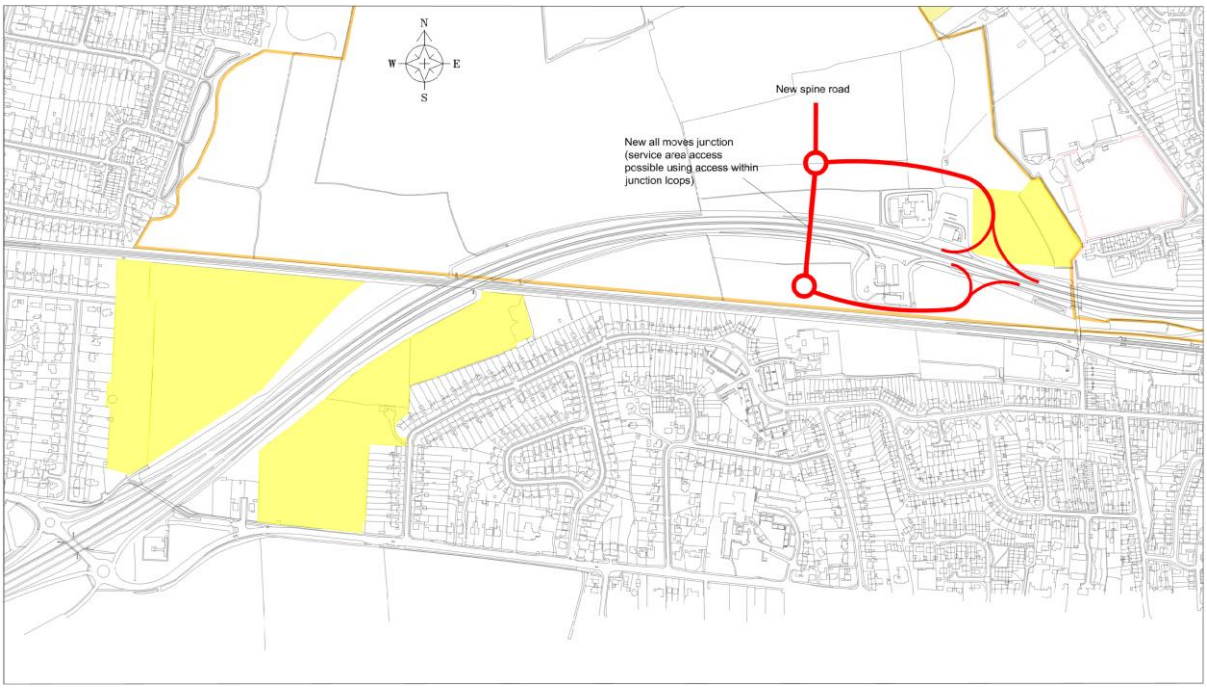


Warblington interchange reconfigured for Option 1

15.16 This option only requires one new significant structure (the bridge over the railway) which could be engineered to minimise the structure's width (see section 18). The link road could also provide an additional access to adjoining land in the south-west of Southleigh for development. It is a relatively low-cost option compared to other options. Detailed modelling is required to further consider the impact on traffic leaving the A259 (i.e. to justify the jet lane or the degree of signalisation or re-modelling at Warblington Interchange).

15.17 Based on lower cost being balanced by the inefficient traffic routing through the junction, especially for Southleigh-bound traffic from the east, this option is ranked second and is **RECOMMENDED SUBJECT TO FURTHER DETAILED MODELLING**.

Option 2: low capacity loops



15.18 This option creates a new DMRB-compliant junction 1km to the east of the Warblington interchange to directly serve the new development and the associated infrastructure.

15.19 Configuring the entrance and exit ramps onto the A27 as low speed loops is the only layout which would allow the weaving length on the A27 mainline to meet the all-purpose dual carriageway requirement of 1000m spacing to Warblington interchange (the layout of which would remain unchanged). The loops would have minimum radii of 30m on the exits and 50m on the entries, with the layout significantly constrained by the railway to the south of the A27 where a retaining structure alongside the railway would be required to overcome the height difference between the A27 and the loop onto the overbridge.

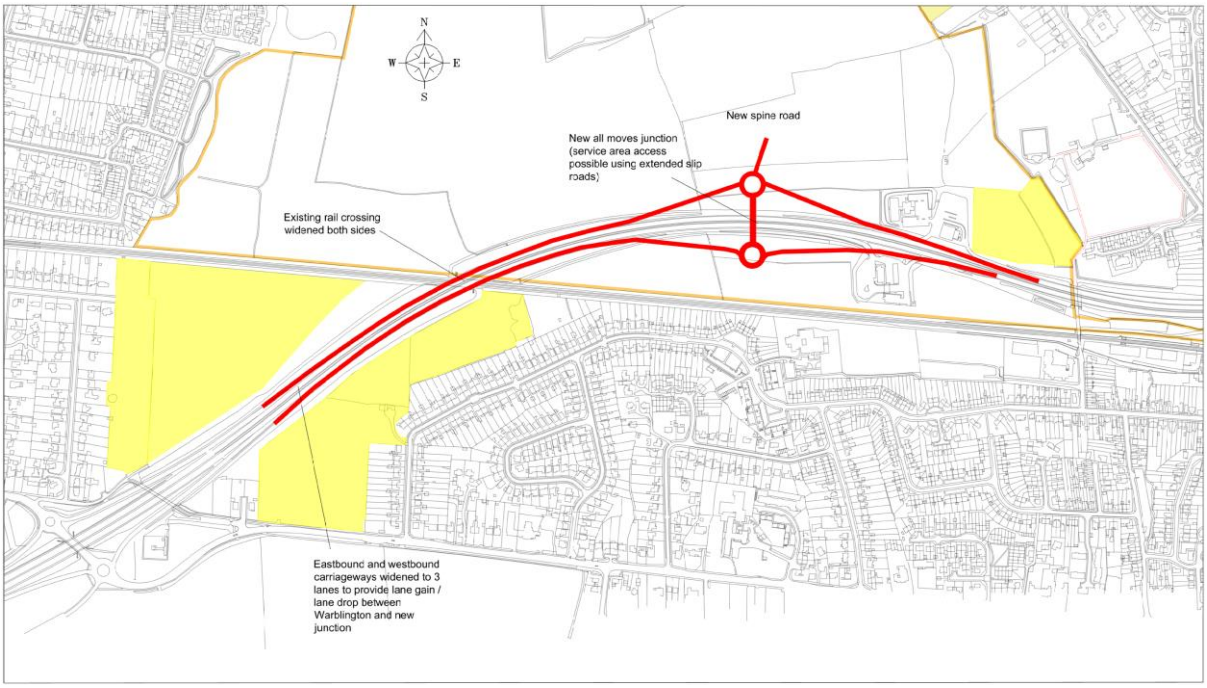
15.20 This layout is a low speed, low capacity junction more suited to rural and / or low flow environments, and is only likely to be only be acceptable if traffic flow on the roads linking to the junction could be restricted by not including a connection to the wider road network outside of Southleigh as in connection options (B) or (C) above. This is not what the development master plan envisages and it is unlikely that such an access arrangement would be acceptable.

15.21 Development of the Coldharbour Farm Road extension site (reference H9 in the draft Local Plan 2036) east of the eastbound service area – currently approved in outline at the time of writing this report - would make implementation of this junction option impossible as the loops on the north side of the A27 require this land. This junction layout would also compromise development of the 'Interbridges West' site south of the A27.

15.22 The option does not meet Highways England's request to consider no additional junctions with the existing four ramps being replaced with eight. Neither does it meet geometric standards for a junction with the expected flows through it.

15.23 Therefore option 2 is **DISCOUNTED**.

Option 3: lane gain / lane drop



15.24 This option combines a new DMRB-compliant junction serving the development infrastructure and links it to Warblington interchange by means of lane gain / lane drop between the junctions.

15.25 The limited weaving distance available between the existing Warblington interchange and the proposed new Southleigh junction could be addressed by providing a lane gain / lane drop on the mainline of the A27 between a new junction and the existing Warblington interchange. This is a similar arrangement to that which exists on the A3M between junctions 4 and 5 where the two lane carriageway between of the merges of the adjacent junctions is widened by the addition of a third lane between the noses of the on-slip and off-slip; the extra lane is marked using TSRGD diagram 1010 markings instead of the usual diagram 1005.1 lane markings. This arrangement allows vehicles wholly moving between the two junctions to remain in 'lane 1', whilst traffic joining or leaving the mainline can use this additional lane to leave the main carriageway at any point along its length, effectively increasing the weaving length and allowing a closer junction spacing.

Example of lane gain / lane drop between J4 and J5 of the A3M (credit: Google)

15.26 The lane gain involves widening the existing carriageway by 3.65m – the width of a single traffic lane – on both sides. The A27 railway overbridge cannot accommodate this within the width of the existing deck, so widening of the bridge would be required. Unfortunately, this will not be possible on the westbound carriageway due to limited headroom over the railway caused by the super-elevation of the structure; the east side of the deck is 900mm lower than the west side and is at the limit of railway clearance. Widening would however be possible on the west side since this would result in increased headroom over the railway on that side.

15.27 The widening of the carriageway could be accommodated within the existing highway boundary by steepening of the existing embankments. This involves loss of vegetation on those existing embankments.

15.28 There would be no impact on traffic flow at Warblington interchange, with all traffic from the spine road and Southleigh joining the A27 mainline at the new junction site.

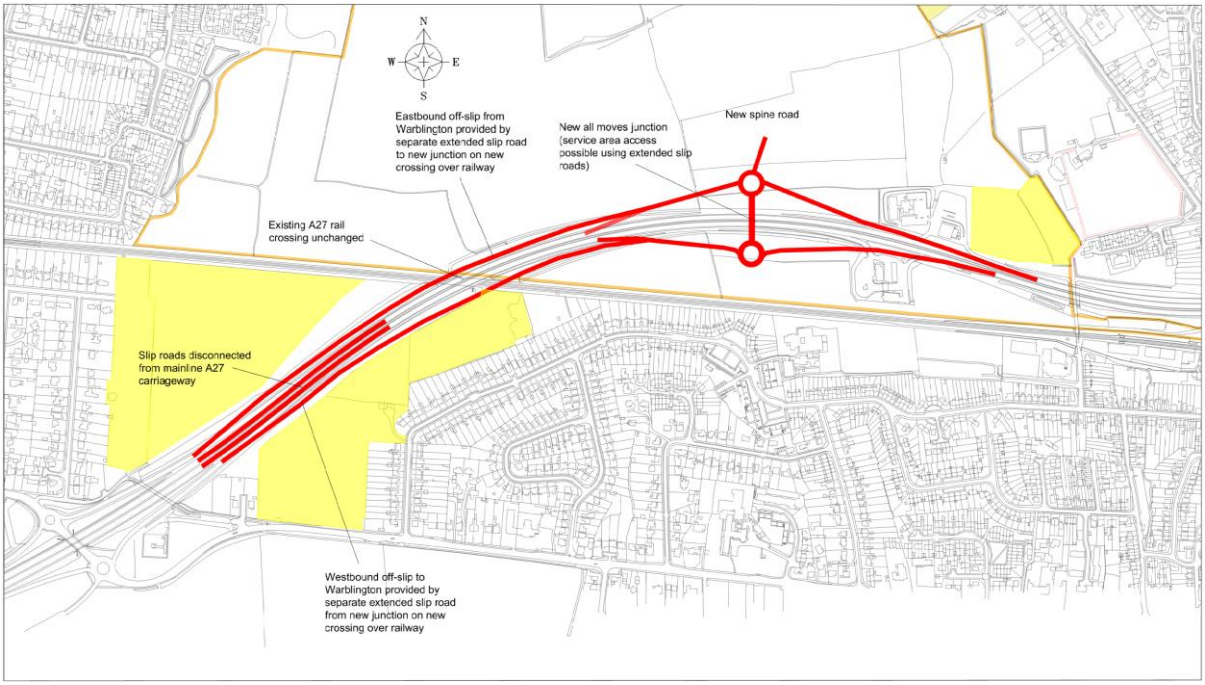
15.29 The option does not meet Highways England's request to consider no additional junctions with the existing four ramps being replaced with eight.

15.30 Due to the headroom issue at the rail overbridge for the westbound lane gain / lane drop meaning this option could not be delivered in this form, this option is **DISCOUNTED**.

Option 4: parallel links

15.31 The weaving restriction on the A27 mainline carriageway could be accommodated by linking the new junction to Warblington using parallel link road(s). There are three ways these could be configured, although each sub-option has a number of possible variants.

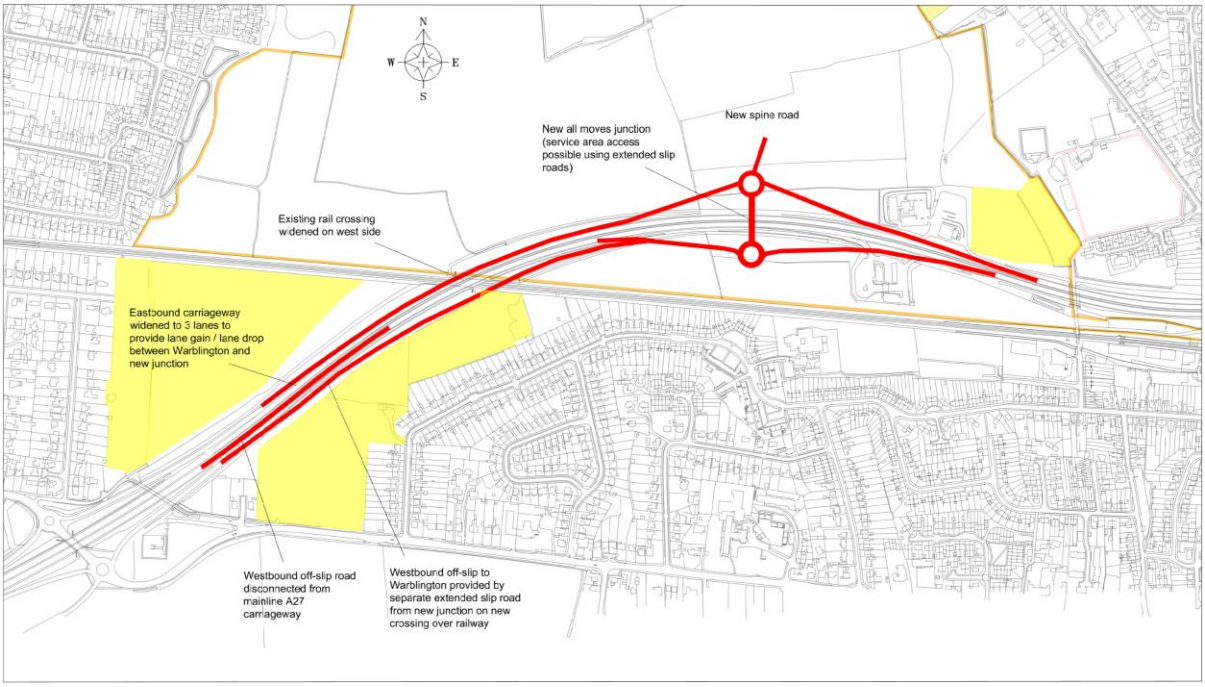
Option 4A: fully parallel link roads



15.32 A full all-moves junction is provided for the new development, with the east facing slip roads from Warblington interchange extended to meet the west-facing slip roads at the new junction without connecting to the mainline of the A27. Traffic between Warblington and Chichester would need to pass through the new Southleigh junction.

Example of parallel slip roads – J30 to J31 on M25. Traffic from the J31 roundabout has to pass through J30 to access the M25 northbound. However, traffic from the south (right) on the mainline M25 can access both junctions 30 and 31 directly (credit: Bing Maps ©)

Option 4B – combination lane gain / lane drop and single parallel link road

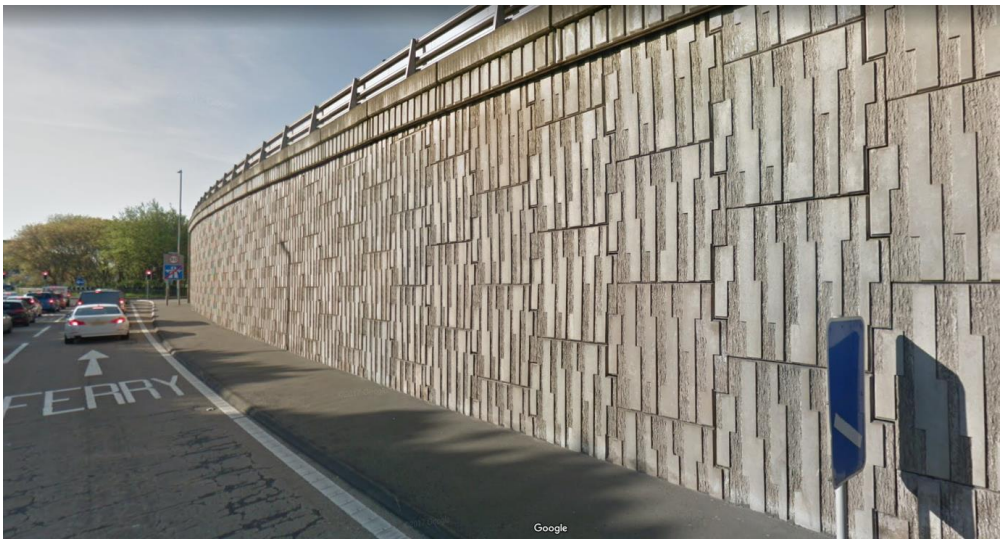


15.33 A combination of options 3 and 4A, a full all-moves junction is provided for the new development with only west-bound traffic using a parallel slip road described above (to overcome the headroom restriction on the A27 overbridge), with eastbound traffic using lane gain / lane drop since this side of the existing A27 overbridge can be widened without affecting headroom over the railway.

Example of parallel link roads on the A38 in Plymouth. Traffic from the previous junction (nearest the camera) merges with the off-slip from the A38 mainline (centre) and to access the A38 proper must pass through the succeeding junction furthest from camera (credit: Google ©). This would be the arrangement adopted for eastbound traffic from Warblington in option 4A above, having to pass through the new Southleigh junction to access the A27 mainline. Note however how close the slip road can be placed to the main carriageway.

Design issues and features common to options 4A and 4B

15.34 The use of parallel link roads requires a new skew crossing of the railway for each link road. The link road(s) could be provided within the existing highway boundary but only by use of near vertical retaining walls which would fundamentally change the appearance of the A27 from adjoining land. This is particularly problematic on the southern side of the A27 where permission has been granted for new development ('Land at Selangor Avenue', H7 in the draft Local Plan 2036, 147 houses) where the developer has assumed the existing embankment vegetation as a visual and noise buffer between the A27 and their site.



With the adoption of a parallel slip road for westbound traffic from the new Southleigh junction linking to Warblington interchange, this type of retaining wall would directly face the new development at Selangor Avenue under options 4A and 4B, replacing the existing wooded embankment (credit: Google ©)

15.35 Using parallel slip roads overcomes the issue of limited headroom over the railway identified in option 3 above, in that the bridge carrying the westbound parallel link road could be set at the required headroom over the railway.

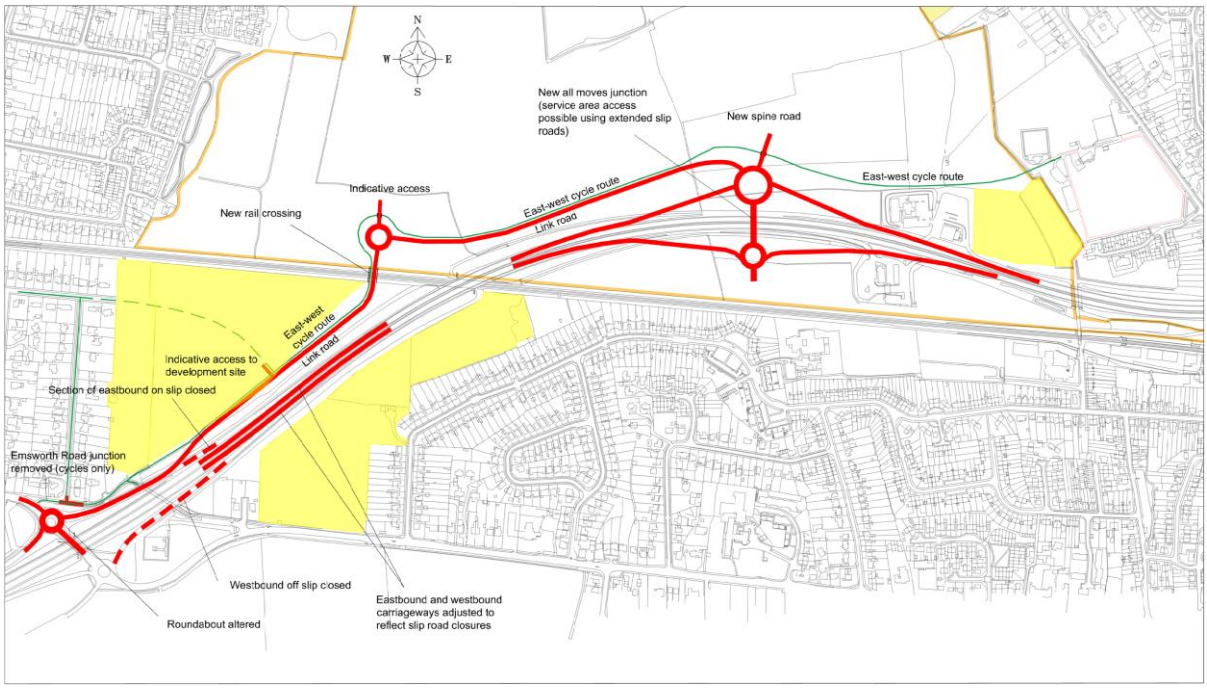
15.36 A consideration for the westbound parallel link road is the proximity of a high-pressure gas main close to the foot of the A27 embankment on its south side. This would require protection or diversion if the embankment was to be replaced by a more substantial structure such as a retaining wall. Once development of the Selangor Avenue (H7) site proceeds such diversion for the gas main would almost certainly be near impossible to achieve without a longer route (and associated higher cost).

15.37 In both options 4A and 4B there would however be no impact on traffic flow at Warblington interchange, with all traffic from the spine road and Southleigh joining the A27 mainline at the new junction site. Traffic for Warblington from the A27 (east) would use the new junction first, and then the link road alongside the A27 to access Warblington with no overall effect on mileage.

15.38 Neither option meets Highways England's request to consider no additional junctions with the existing four ramps being replaced with six (option 4A) or seven (option 4B).

15.39 Due to the significant cost implication especially of option 4A (requiring three bridges), and the visual and engineering impact of both options, these options are **NOT RECOMMENDED**.

Option 4C – new all-moves Southleigh junction linked to Warblington



15.40 This option provides an all-moves junction at Southleigh which is connected to the existing Warblington interchange which therefore becomes west-facing only.

15.41 This is a development of option 1, where the link road is located to the north of the A27 and allows two-way flow. Elements of this option apply as in option 1 above in terms of the layout of the link road; however instead of the link road being part of Southleigh's spine road as in option 1, this link road joins Warblington interchange to a new all-moves junction north of the railway, effectively combining them into one.

15.42 There are a number of options for the layout of the parts of the new network north of the railway which would need to be modelled at detailed design stage; however the most effective layout would appear to be one which allows all moves at the new Southleigh junction and to retain only west-facing ramps at Warblington interchange. This has the added benefit of removing the A27 westbound off-slip from the southern Warblington roundabout (since this traffic leaves the A27 at the new junction to the east) in combination with reduced traffic volumes on the link road – in turn reducing congestion on the A259 westbound at Warblington interchange. Unlike in option 1, therefore, this option does not require the introduction of a 'jet lane' for westbound A259 traffic joining the A27.

15.43 Traffic from the Warblington interchange to Chichester would use the link road to access the new Southleigh junction and thence the A27. In the reverse direction, traffic for Warblington would leave the A27 at the new junction and follow the link road to Warblington. Overall mileage would not change leading to an efficient layout.

15.44 As with option 1, the link road would require its own crossing of the railway and would affect the amount of developable land in the triangular 'land further east of Castle Avenue' site (H16 in the

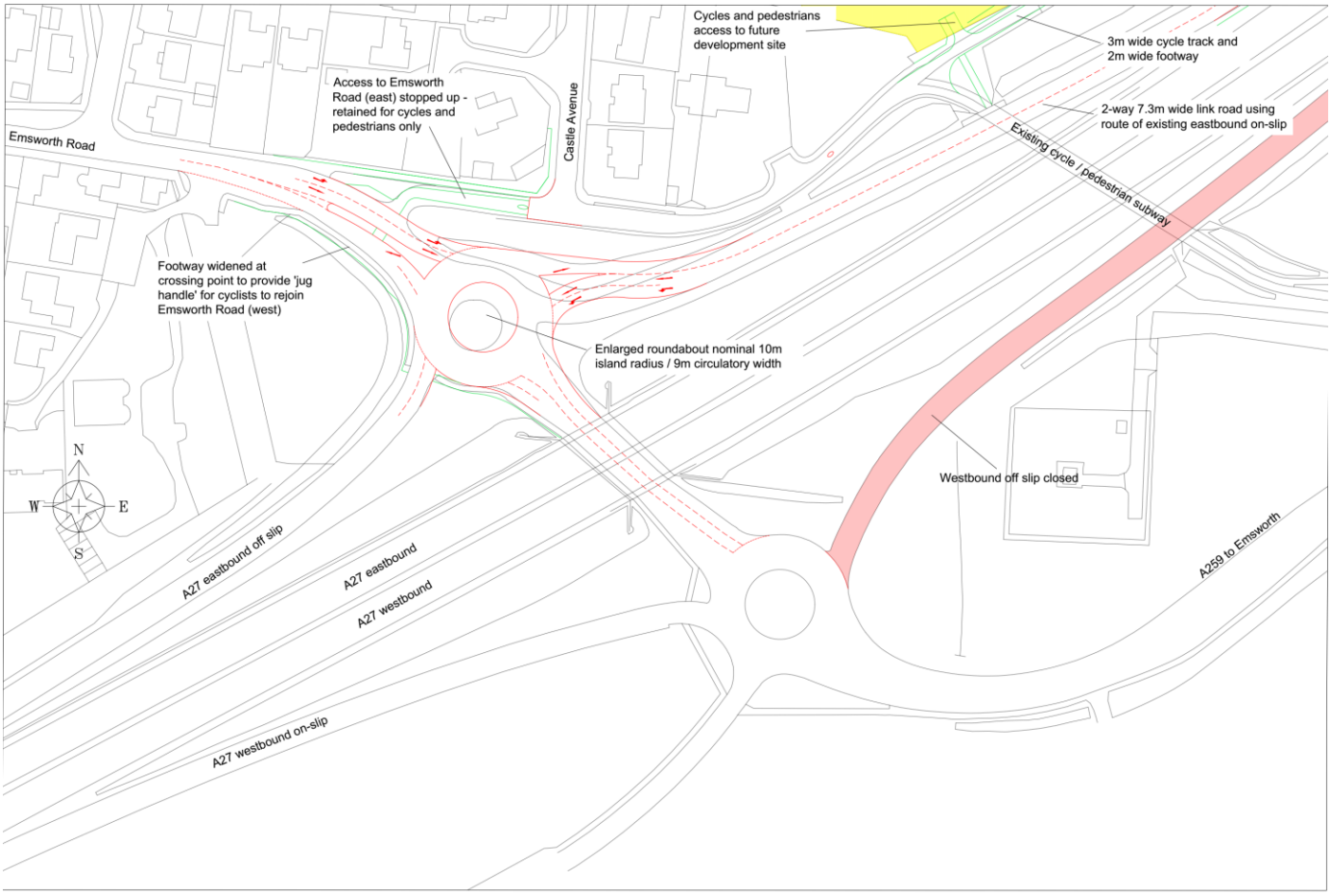
draft Local Plan 2036). However, since the link road would be designed as a local road, access to H16 could be taken as a 'T' junction from it.

15.45 The option requires two substantial structures, one within the junction itself and the other carrying the link road over the railway. As with option 1, the railway crossing could be engineered to cross at 90º to provide additional opportunities for access to adjacent land in the south-west of Southleigh area.

15.46 The option does not meet Highways England's request to consider no additional junctions with the existing four ramps being replaced with six.

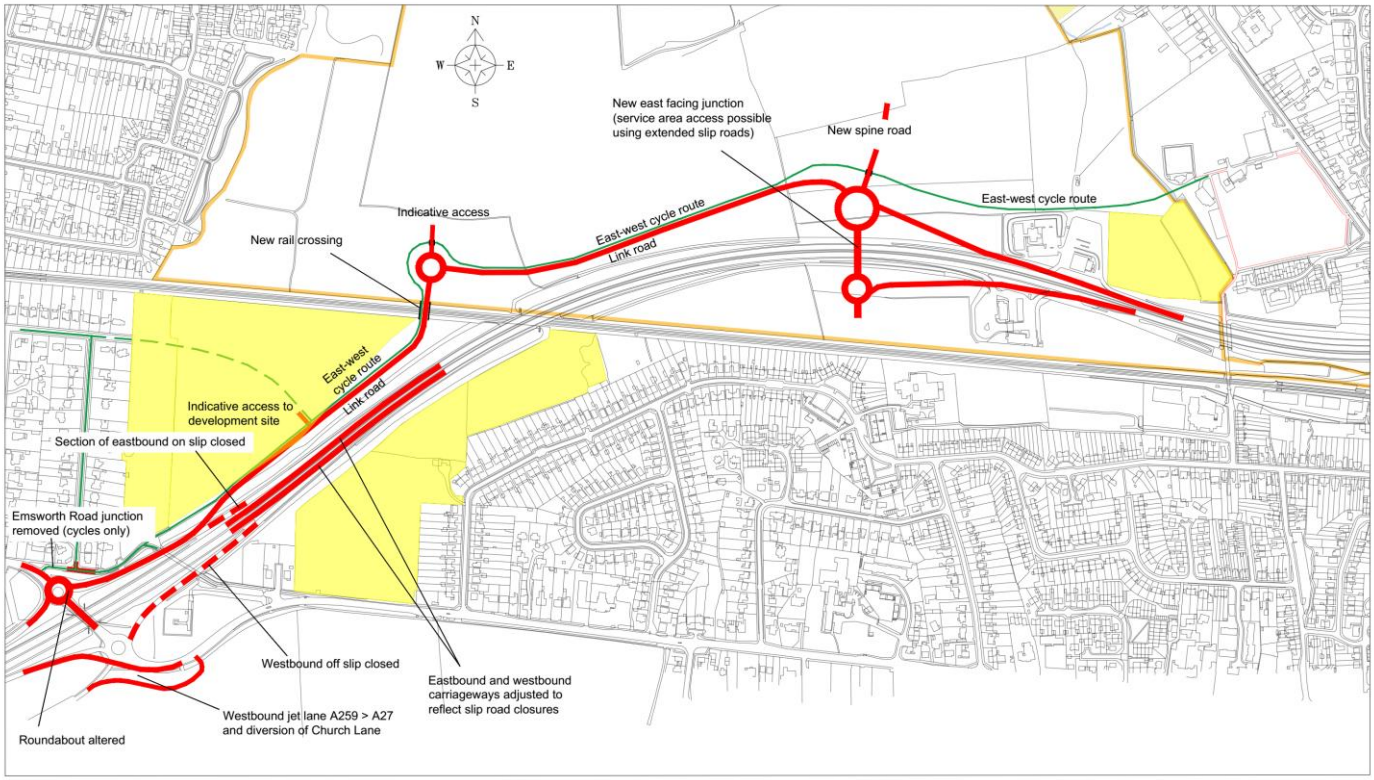
15.47 Access to the service areas could be accommodated from the east facing slip roads in the new junction, or the crossing of the A27 would offer the opportunity to rationalise the two sites into one new site. This is considered later in this report.

15.48 This option has previously been considered the preferred option. However due to the range of opportunities opened by Option 4D (greater traffic efficiency, access to 'Interbridges West' etc.) it is now an option **RECOMMENDED SUBJECT TO FURTHER DETAILED MODELLING**.



Warblington interchange reconfigured for Option 4C

Option 4D – new east facing Southleigh junction linked to Warblington



15.49 This option provides an east facing junction at Southleigh which is connected to the existing Warblington interchange which becomes west-facing only. It effectively splits the all moves at Warblington into two parts linked by a new road crossing the railway.

15.50 This is a further development of options 1 and 4C, where the link road is located to the north of the A27 and allows two-way flow.

15.51 Traffic from the Warblington interchange to Chichester would use the link road to access the new Southleigh junction and thence the A27. In the reverse direction, traffic for Warblington would leave the A27 at the new westbound off slip and follow the link road to Warblington. Overall mileage would not change leading to an efficient layout.

15.52 As with Option 1, at the northern roundabout at Warblington, the Emsworth Road arm leading to central Havant would need to be reconfigured. The ‘T’ junction close to the roundabout which currently gives access to the eastern end of Emsworth Road and Castle Avenue should be closed (although remaining open for cycles and pedestrians), with Castle Avenue being converted into a cul-de-sac at its southern end. This will simplify traffic movements in the vicinity of the roundabout. Access into this part of Warblington (south of the railway and east of Southleigh Road) would still be possible via Warblington Avenue and St Georges Avenue. The northern roundabout itself would need to be enlarged to accommodate the additional two-way traffic from the east on the spine road. It is possible that the roundabout would need to be signalised (or would need to be changed to a signalised junction) to reduce delay for traffic leaving Emsworth Road given additional traffic flows both from the west (traffic from the Portsmouth direction leaving the A27 heading for Southleigh) and the south (traffic from A259 Emsworth heading for Southleigh). This level of detail would be informed by modelling.

15.53 The southern roundabout at Warblington would similarly need to be re-configured to avoid any detrimental effect, in particular on westbound A259 traffic. Traffic on the A259 already experiences significant congestion as it is unable to freely join the roundabout due to the high volume of turning traffic accessing the A27 westbound on-slip or eastern Havant, and this will increase with proposed development along the A259 in West Sussex. The volume of traffic turning across the entry arm of the A259 would significantly increase under this option since traffic from Southleigh (and the surrounding road network linked to it) heading for the A27 westbound on-slip would significantly add to the existing flow across the A259 arm. The potential increase in congestion on the A259 could be mitigated by providing a westbound 'jet lane' from the A259 directly onto the A27 westbound on-slip although this in turn requires moving the Church Lane junction away from the roundabout to become a 'T' junction further east on the A259. This would require the use of agricultural land south of the A259 which is in the ownership of Havant Borough Council. Removing the traffic on the A259 bound for the A27 westbound from the southern roundabout would shorten queue lengths on the A259 and reduce congestion, even with additional volumes across the junction entry arm.

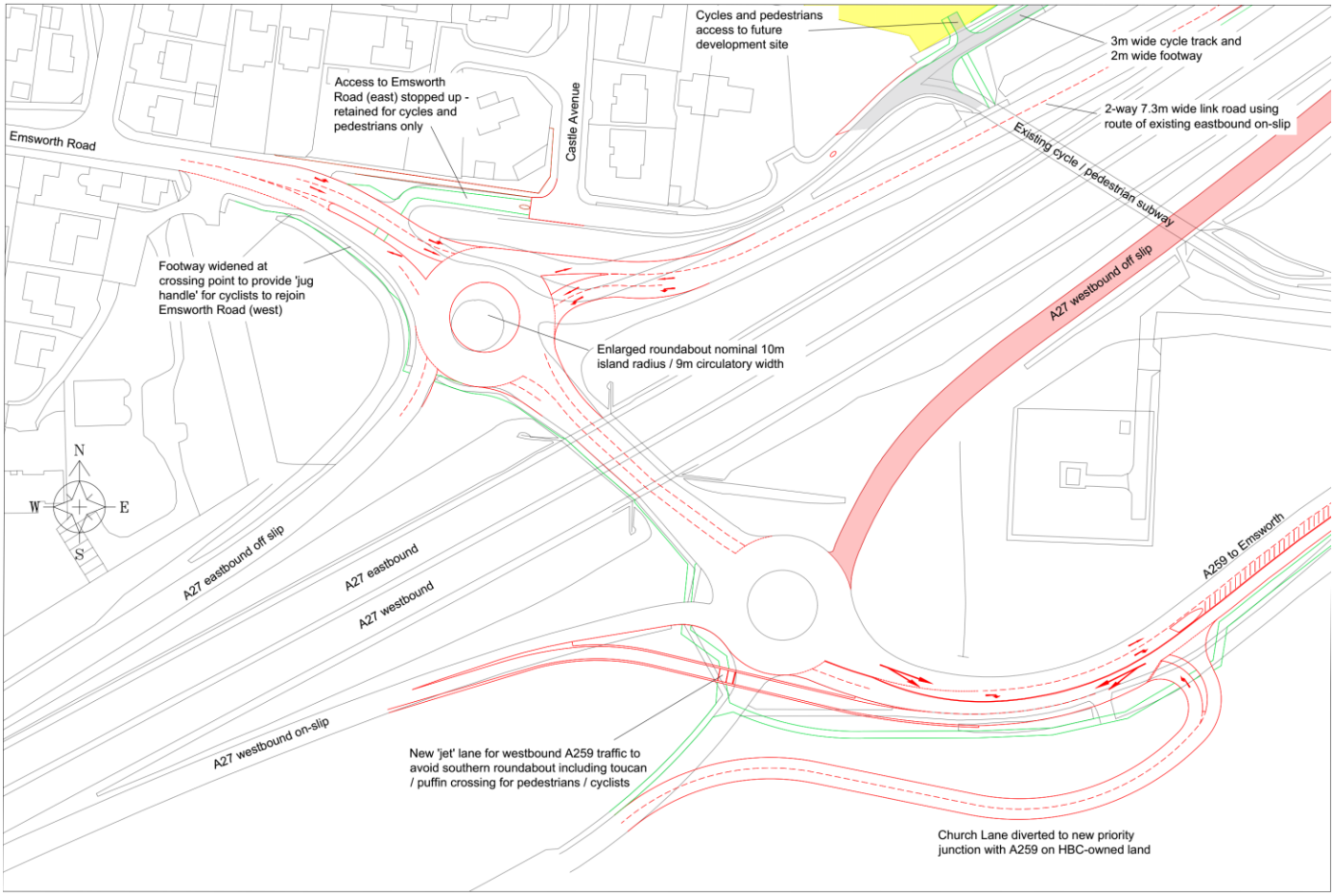
15.54 As with option 1, the link road would require its own crossing of the railway and would affect the amount of developable land in the triangular 'land further east of Castle Avenue' site (H16 in the draft Local Plan 2036). However since the link road would be designed as a local road, access to H16 could be taken as a 'T' junction from it.

15.55 The option requires two substantial structures, one within the junction itself and the other carrying the link road over the railway. As with option 1, the railway crossing could be engineered to cross at 90^{o} to provide additional opportunities for access to adjacent land in the south-west of Southleigh area.

15.56 The option meets Highways England's request to consider no additional junctions with the existing four ramps being maintained, albeit repositioned.

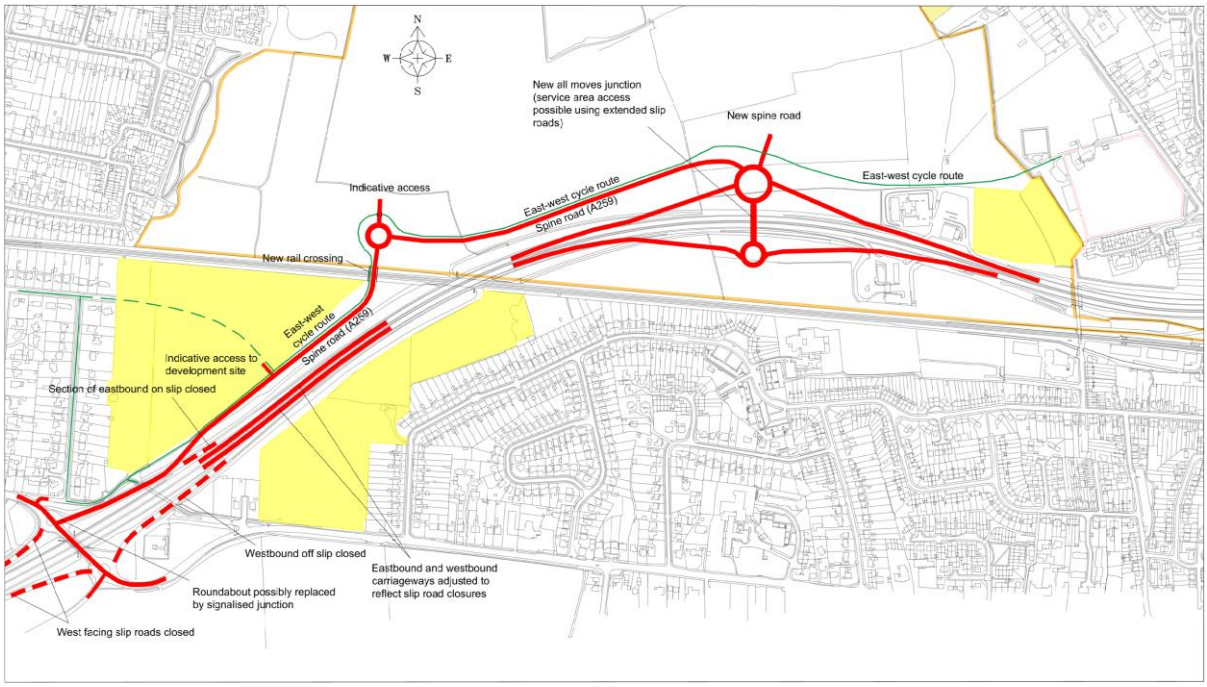
15.57 Access to the service areas could be accommodated from the east facing slip roads in the new junction, or the crossing of the A27 would offer the opportunity to rationalise the two sites into one new site. This is considered later in this report.

15.58 Due to the efficiency of traffic flow that this layout offers, and the access to Interbridges West this is the **PREFERRED OPTION**.



Warblington interchange reconfigured for Option 4D

Option 5 – replace Warblington with new all-moves Southleigh junction

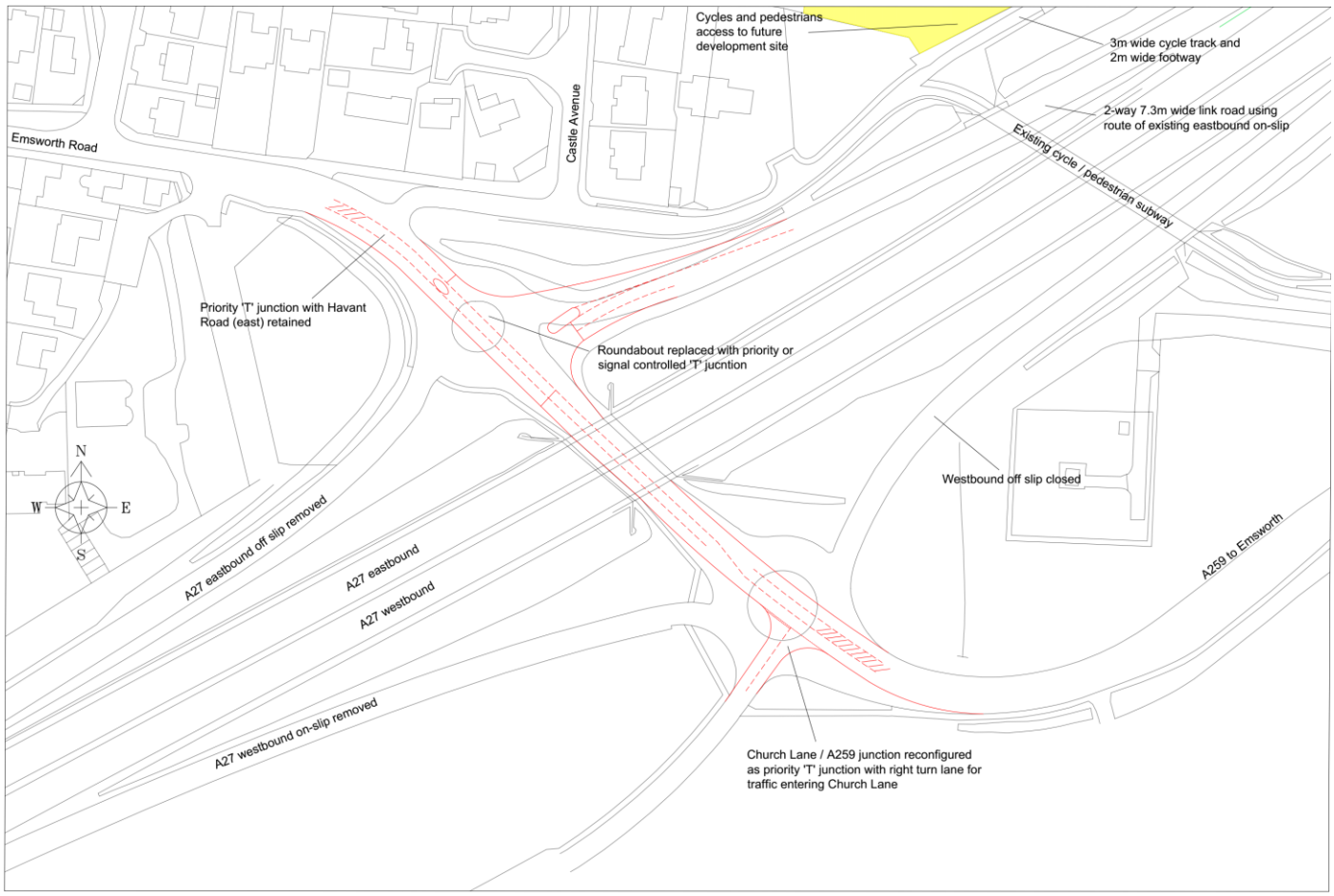


15.59 This option replaces Warblington interchange with a new all-moves junction at Southleigh.

15.60 This is effectively the reverse of option 1 and a development of options 4C and 4D. Slip roads to / from the A27 at the existing Warblington interchange would be completely removed and the A259 extended from the existing northern roundabout alongside the A27 (initially using the route of the eastbound on-slip) to a new all-moves junction giving full access to the A27 adjacent to the service areas. The A259 through Emsworth is an urban road and this extension would be the same so side road access could be taken from it into adjacent sites such as H16. This option has the advantage of meeting the 1km junction spacing requirement for all-purpose dual carriageways, and removing the existing close spacing between Langstone and Warblington Interchanges which is a cause of existing congestion on the mainline A27. It meets Highways England's request to consider no additional junctions by replacing one existing junction with a new one in a new location. Havant Road (east) junction could remain open under this option.

15.61 This layout would potentially improve access between Havant and Emsworth along the A259 as the existing roundabouts would be replaced by either a single roundabout or more likely a traffic light 't' junction (subject to confirmation by modelling). This would add a platooning control to the movement of traffic from Emsworth especially in the morning peak. An indicative junction layout is shown on the next page.

15.62 This option meets Highways England's requirements by removing the Warblington Interchange and replacing it with the new Southleigh Interchange.



Warblington interchange reconfigured for Option 5

15.63 The option requires two substantial structures, one within the junction itself and the other carrying the link road over the railway. The railway crossing could be engineered to cross at 90º to provide additional opportunities for access to adjacent land in the south-western part of Southleigh.

15.64 The more significant disadvantage of this option is that traffic headed west for the A27 from Emsworth on the A259 would have to 'double back' on itself to gain access to the A27. This could have one or both of two effects:

- More traffic would use Emsworth Road and travel through Havant town centre to join the A27 at Langstone;
- More traffic would leave the A259 at North Street Emsworth and use the B2148 Horndean Road to access the spine road through Southleigh to the new junction.

These effects would be exacerbated by additional traffic from the A259 because of development in West Sussex along the A259 corridor.

15.65 For these reasons, this option is **NOT RECOMMENDED**.

16. Sustainable transport

16.1 Demand for the new junction can be somewhat mitigated by ensuring suitable sustainable transport opportunities are built into the Southleigh development. How this is done is a matter for the master planning process currently underway. It is unlikely that significant reductions in volumes of traffic will be achieved to remove the need for a new junction.

16.2 The following comments are offered in relation to the various layout and connection options considered.

Walking and cycling

16.3 Ensuring walking and cycling is built in from the earliest stages will be key success factors in reducing the environmental impact of Southleigh. Key links will need to be introduced or existing links reinforced, to Emsworth town centre, Emsworth, Warblington and Havant railway stations, schools including Warblington, Havant Academy, Emsworth Primary, Glenwood, St Alban's, St James and Sharp Copse, to Horndean Road (for access to New Brighton), to Bartons Road (for the employment area in New Lane and Leigh Park shopping centre) and to Havant town centre.

16.4 Access to Warblington station has value but the lower frequency of service and access issues makes Emsworth and Havant more appropriate destinations. A new footbridge planned at Warblington station will help to improve the pedestrian experience at this location by offering the opportunity to cross the railway even whilst the level crossing is closed. A cycle gully is proposed to enable cyclists to use the bridge.

16.5 The new development provides substantial opportunities to improve the walking and cycling environment, with new east-west routes linking Denvilles with Emsworth, circuits on the site itself, off-road infrastructure (with all significant new roads being provided with parallel off road segregated cycle tracks, and internal roads laid out to operate as cycle and walking friendly 'quiet roads') and the opportunity to act as a sustainable travel gateway into the National Park. As an example, one of the 'green routes' is intended to be 5km in length to provide a measured 'Parkrun' circuit.

16.6 A key east-west walking and cycling route can be provided north of the A27 through the landscaped buffer zone. This is indicated as crossing the railway west of the A27 to give access to areas of Warblington to the south via St Georges Avenue. How this east-west route crosses the railway and /or interacts with the link road and / or junction will be critical to its success.

16.7 The master plan indicates a network of walking and cycling routes linking Southleigh to Denvilles, Bartons Road, Hollybank, Southleigh Road and Horndean Road. This therefore provides a base against which to test the impact of the new junctions outlined above.

Option 1

16.8 The spine road route could offer a shared or segregated cycle route alongside it, with a crossing of the railway giving access to destinations south of the railway along the line of route (i.e. into the Castle Avenue site H16). The east-west route crossing of the spine road would be by a toucan crossing because the road at this point, joining the junction, would be at ground level. The crossing would be 100m from the new junction and so the cycle route would need to be routed through the landscape buffer area.

Options 2, 3, 4A and 4B

16.9 It would not be possible to provide walking or cycling infrastructure as part of this option. A separate crossing of the railway either as shown in the master plan (i.e. into the Castle Avenue site H16) or by means of a foot crossing at Warblington Station would be necessary.

Options 4C, 4D and 5

16.13 The link road route could offer a shared or segregated cycle route alongside it, with a crossing of the railway giving access to destinations south of the railway along the line of route (i.e. into the Castle Avenue site H16). The east-west route crossing of the spine road would be by means of an underpass because the road at this point, joining the grade separated junction, would be 6 - 7m above surrounding ground level.

Public transport

16.14 As an existing rural site, public transport provision directly within the site at present is poor.

16.15 Railway stations are located at Emsworth, Warblington and Havant. The level of service at each station is set out in the respective franchise agreements for the operation of passenger services and the only significant change planned within the period of the next franchise round is the increase (from three per hour to four per hour) of trains on the Portsmouth – Havant – Guildford – London Waterloo route.

16.16 Bus services in the wider area are 20 / 21 (Stagecoach), 27 (First) and 700 (Stagecoach), but service 27 is the only service which directly serves the Southleigh area, running along Southleigh Road. Service 54 (Stagecoach) is likely to remain peripheral to the network. Service 27 is operated under contract to Hampshire County Council and its longevity is currently uncertain.

16.17 To encourage travel by means other than the private car and to minimise the amount of traffic generated by the development which then adds to the need for access to the A27, Southleigh needs to be accessible to public transport and to this end the master plan envisages a layout where no property is more than 400m from a potential bus route. The key locations to be linked by bus services would be Emsworth town centre and railway station, local schools at Emsworth and Warblington, Havant Academy, local employment sites and Havant town centre, College and railway station.

16.18 Direct links are required to both Havant and Emsworth (especially the railway stations), but this needs to be balanced with the bus services being able to serve Southleigh comprehensively. To achieve this, two separate route opportunities have been identified, one offering a direct link to Havant and the other a direct link to Emsworth, whilst both serve various parts of Southleigh, Denvilles and north Emsworth. These two routes are shown below as the ‘green’ and ‘blue’ routes respectively. The blue route is re-introducing a former route which formerly linked Emsworth with Leigh Park via Bartons Road and which could now offer a service to facilities closer to the Spire Hospital and Crematorium which currently have no bus access.

16.19 Operating these two new services at a relatively high frequency would offer the opportunity to serve the northern and southern sections of the site without creating a significantly circuitous route which would detract from passengers who do not require destinations in Southleigh.

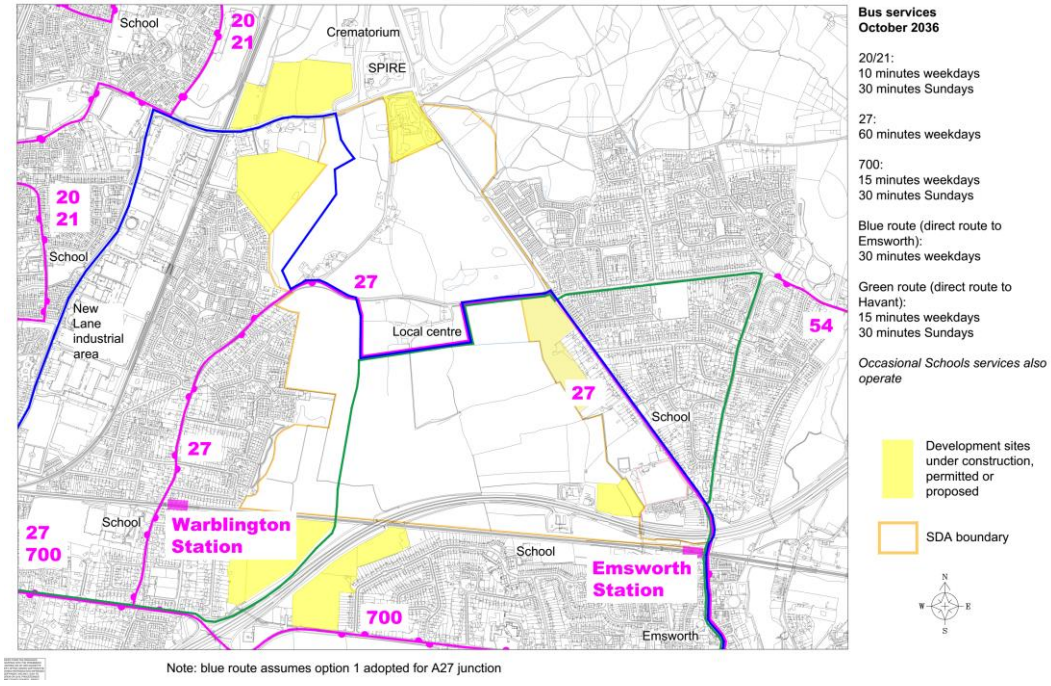
16.20 Since the preferred junction options create a new link from Warblington / A27 into Southleigh with connections to Southleigh Road etc., consideration could also be given to amending the route of the existing contracted service 27 to operate direct via Horndean Road instead of via the east end of Southleigh Road and New Brighton Road. This would help to overcome some of the operational issues relating to the level crossing adjacent to Warblington School with the impact of possible delays at the level crossing reduced on the remainder of the route by taking a shorter route into Emsworth, allowing more recovery time.

16.21 Stagecoach has stated that their development plan for service 700 would see an increase to four buses per hour at some point in the relatively near future but this route will remain peripheral to Southleigh.

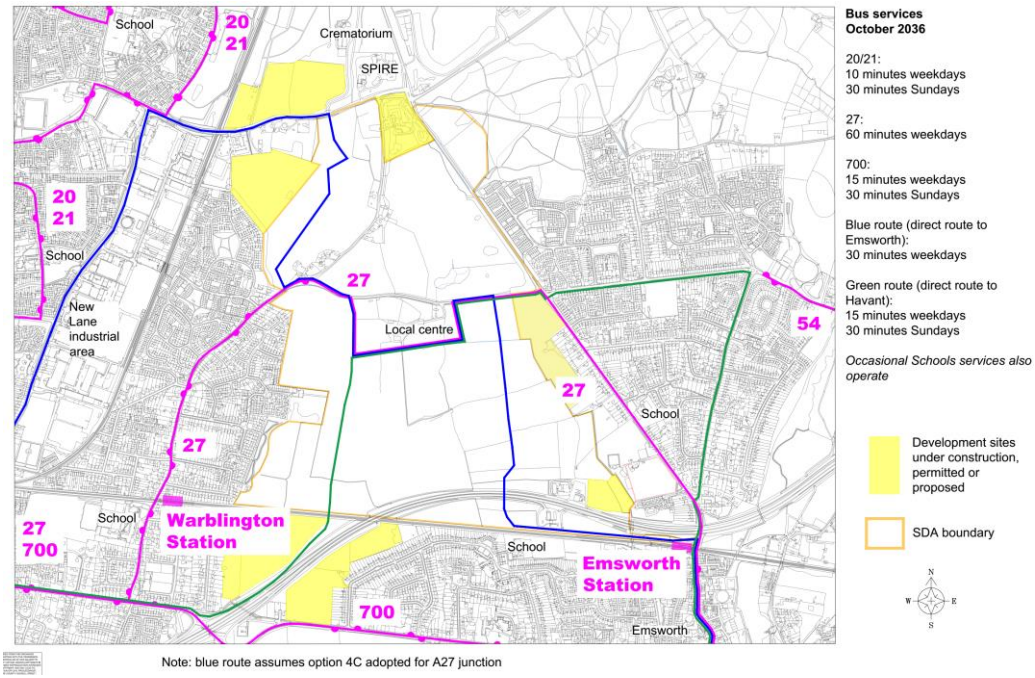
16.22 It is assumed that initially Southleigh services would require financial support and would operate under contract, hence their routes and frequency could be initially set by the local authority in agreement with the developer. No route changes to commercial services (20, 21 and 700) are proposed in the plan to serve Southleigh, although over the period of the Local Plan it could be reasonably expected that these existing services would see a frequency increase in response to general population growth and the additional market opportunity by new development elsewhere. The suggested frequency for the proposed green route would offer the possibility of joining this to existing services 20 and 21 offering a through, albeit indirect, service from Southleigh to Portsmouth, although it would be reasonably expected that by the time Southleigh was developed a multi-modal ticket would be available to allow transfer at Havant onto trains for Portsmouth.

16.23 An alternative approach would be to provide demand responsive services (DRS) into the new development. These are types of service which can be booked to make a specific journey. Whilst attractive to residents, DRS type service do have a disadvantage for 'inward' travel especially for people unfamiliar to the area.

16.24 A possible initial bus network is shown on the following page for both preferred junction options.



Possible year 2036 bus network showing revised route 27 and new 'blue' and 'green' routes giving access to and through Southleigh. The frequencies of services are indicative but reflect likely increases in response to population growth. This network assumes adoption of preferred option 1 for the A27 junction.



Possible year 2036 bus network showing revised route 27 and new 'blue' and 'green' routes giving access to and through Southleigh. The frequencies of services are indicative but reflect likely increases in response to population growth. This network assumes adoption of preferred option 4C or 4D for the A27 junction.

17. Effect on service areas

17.1 Two service areas are located some 700m east of the Warblington interchange, one on each side of the A27 and not linked by any bridging structure. The older of the two, opened on the eastbound carriageway in the early 1990s soon after the A27 was built, offers 'Shell' fuel, a 'Deli2Go' convenience outlet with 'Costa' franchise, HGV parking area, Starbucks and a Travelodge hotel. The more recent service area on the westbound carriageway offers 'BP' fuel, 'Wild Bean' café, Marks and Spencer food franchise and lorry parking area. There is local pressure to create a pedestrian and cycle access to the westbound convenience store but this is resisted at present since such an access would be likely to attract non-pedestrian access – bicycle and powered two-wheelers in particular - onto the A27.

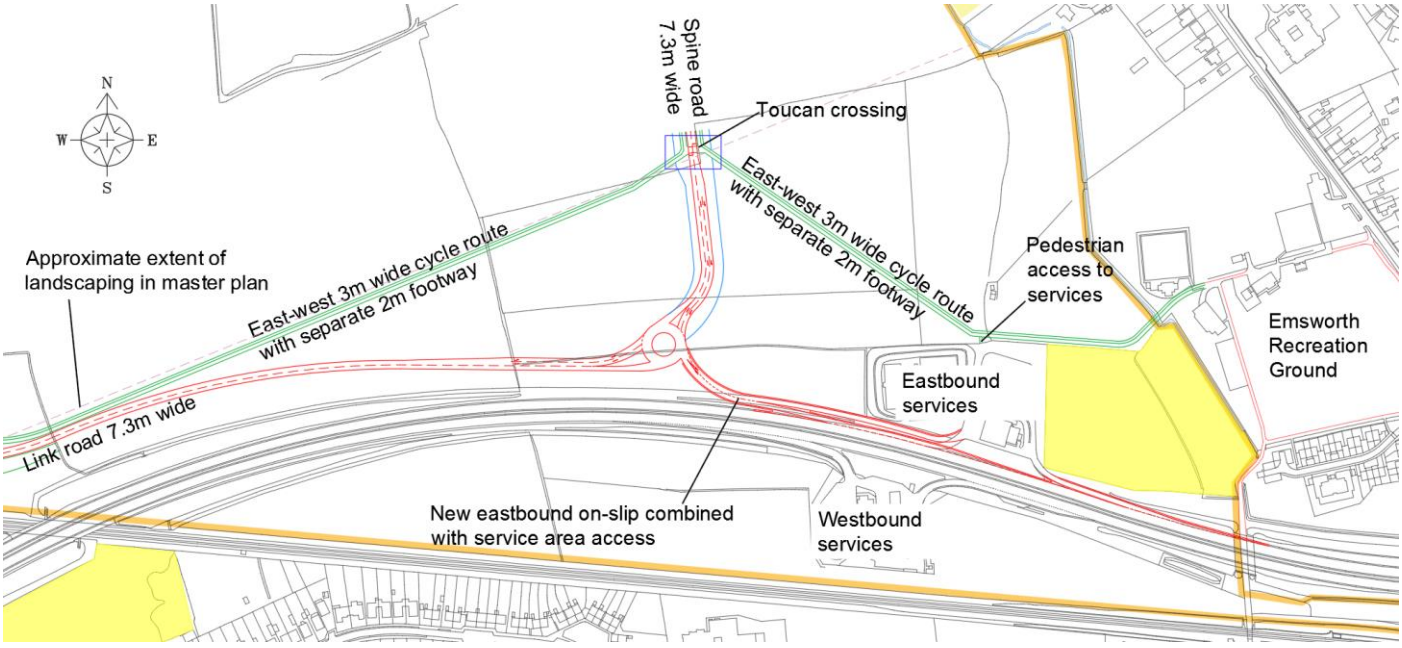
17.2 The two service areas are not linked and are in different land ownerships.

17.3 The location of the service areas has direct impact on most of the options, and in all cases direct access onto the A27 would need to be revised. The outline impacts are as follows:

Option 1

17.4 Eastbound: access likely to be affected. If new eastbound on-slip is close to the existing railway bridge, then lane gain / lane drop could be used between the on-slip and the service area off slip (as is the case, for example, on the A34 southbound at The Ridgeway). However the preferred layout places the junction further east and combines the eastbound on-slip with the service area access, so traffic for the service area would leave the A27 at Warblington and use the link road to gain access. Leaving the service area would be unchanged.

17.5 Westbound: not affected.



Option 1 layout showing accommodation of service area access at A27 (eastbound) junction

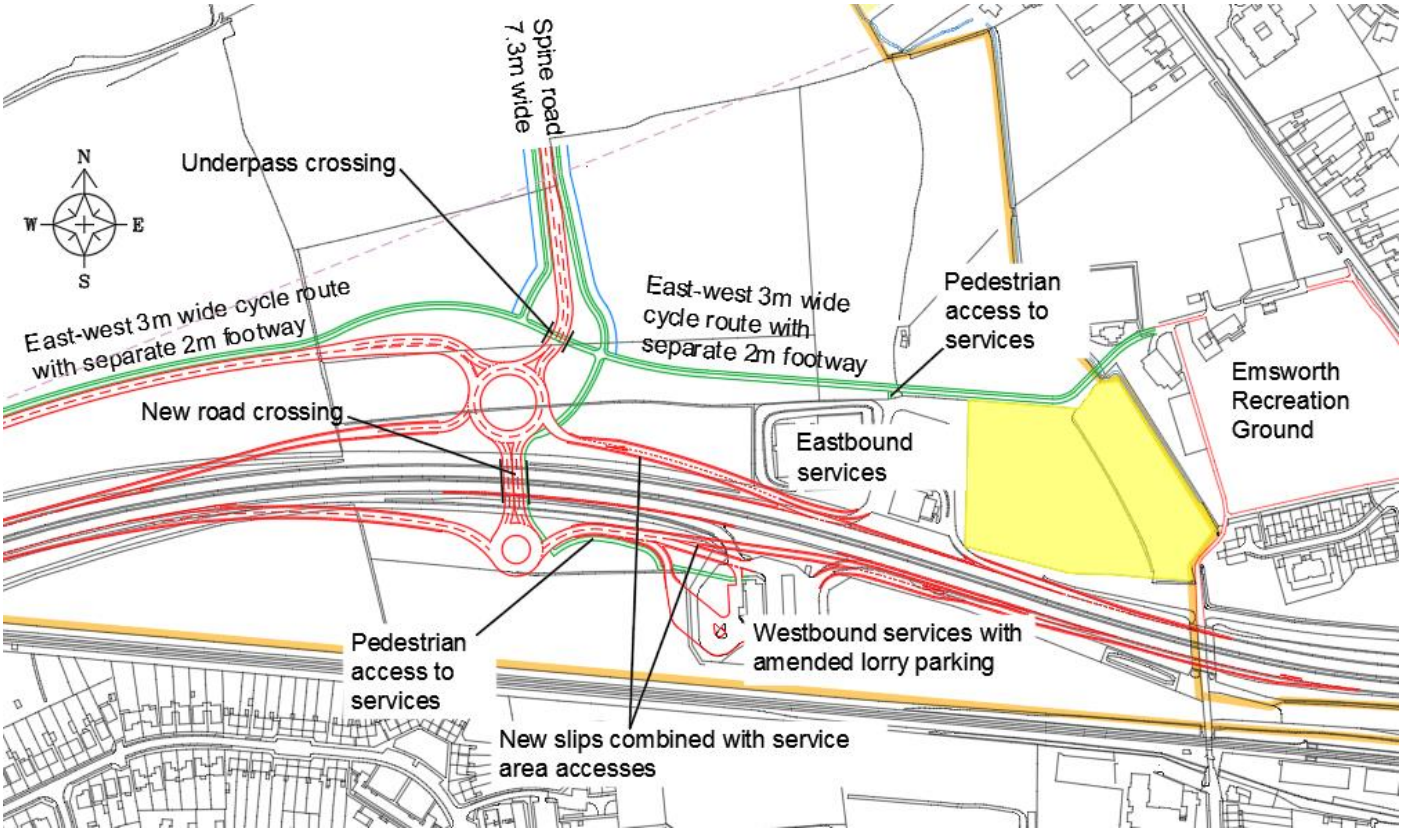
Option 2

17.6 Access to both service areas would be changed to operate from additional junctions within the new loop layout. This option has however been discounted.

Options 3, 4A, 4B, 4C, 4D and 5

17.7 Both service areas would be affected by the location of the slip roads for the new all moves junction.

17.8 In the simplest layout, both service areas are accessed from the east facing slip roads of the new all moves junction. The eastbound services take access from the slip road before it joins the A27 mainline, with the service area exit remaining to the east of the end of the proposed on-slip. The westbound services would be accessed from an elongated A27 off-slip and the service area exit could be onto the westbound off-slip further west of the access point. This scenario maintains full operation of both service areas and is shown in the following drawing.

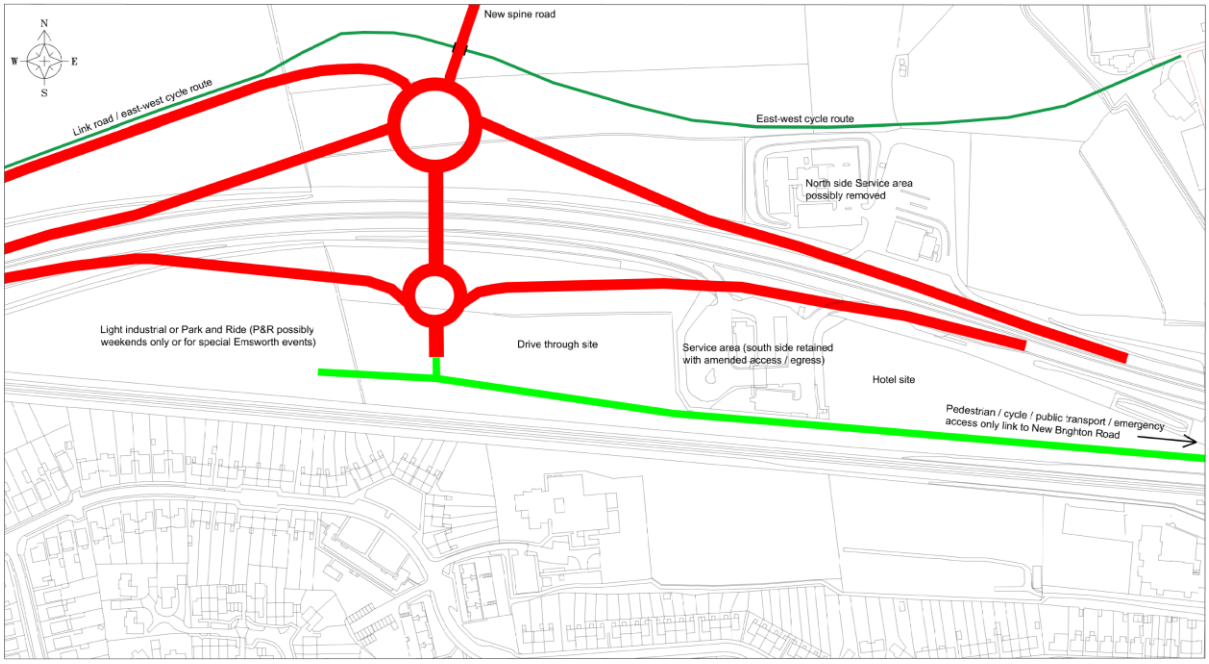


Possible layout for retaining both service areas whilst accounting for new all moves A27 junction

17.9 However, the provision of a new all moves junction and the creation of a link across the carriageway in these junction options offers an opportunity to replace the two separate service areas with a single facility. The options are considered in the following paragraphs.

Retain services south of the A27

17.10 There are a number of locations where this could be located. The master plan for Southleigh requires areas of landscaping for drainage, noise attenuation and landscaping to the north of the A27 and so it is logical to consider a site to the south of the A27 ('Interbridges West') accessed from the new junction. This access could also be used for other related uses such as a hotel, light industrial and / or park and ride.



Possible layout for land at 'Interbridges West' accounting for new junction

17.11 The principle of developing this area of land has been subject to a number of enquiries in the recent past. It is currently in private ownership and although earlier plans, linked to the westbound service area, envisaged a hotel and industrial development, more recent suggestions have included residential use.

17.12 None of the suggestions brought forward to date have been considered acceptable by the Local Planning Authority and are now deemed premature until such time as the format of the A27 junction has been agreed with Highways England, to avoid prejudicing the junction options available. Without direct vehicle access to the A27, access to any development on the 'Interbridges West' site needs to be taken from a long cul-de-sac from a proposed light-controlled cross-roads junction in New Brighton Road, and will be subject to a 3.5m headroom restriction by both the A27 overbridge and the railway bridge at Emsworth station.

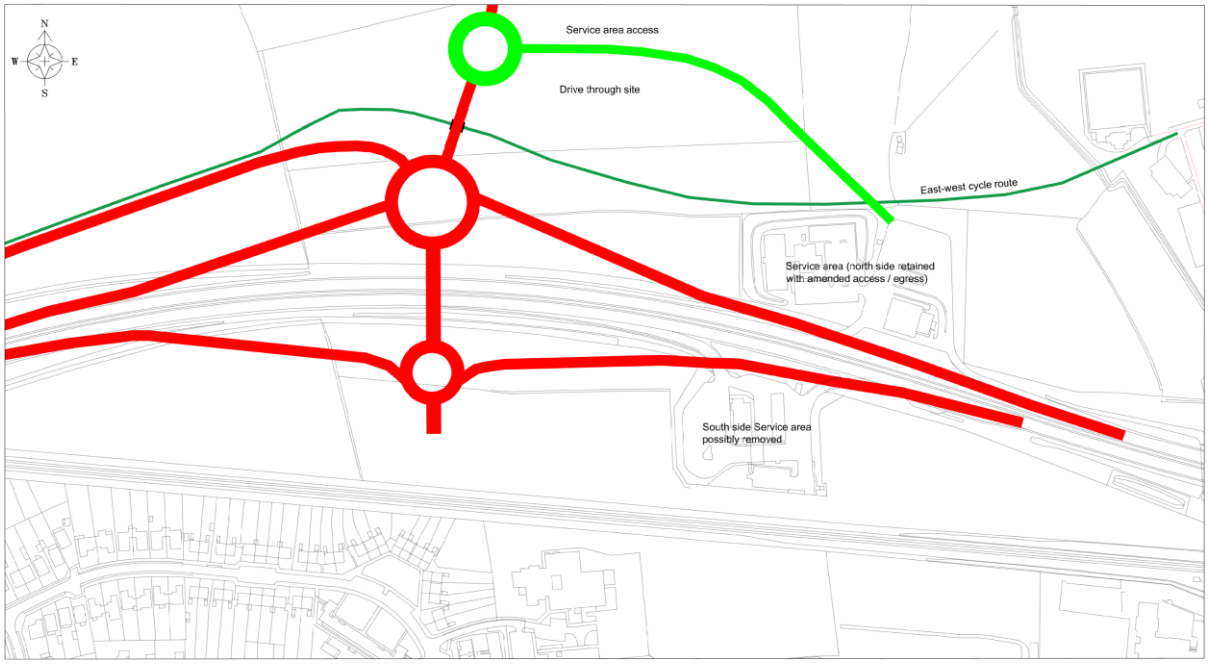
17.13 The positive potential for access to the A27 from this site, and therefore its future use for industrial / hotel / service area, should be considered and could be seen as a 'value add' for the site owner.

17.14 An active travel / public transport / emergency vehicle access could still be taken from New Brighton Road into the service area, crossing Washington Road and using the route of the westbound service area's sewerage rising main. This limited access would use the currently suggested route into 'Interbridges West' which of course to date takes no account of the proposed A27 junction. Because this link would be open to use only by emergency / public transport / active travel modes, the junction with New Brighton Road currently proposed by the Interbridges West developer - a light-controlled cross roads - could be simplified.

Retain services north of the A27

17.15 Alternatively the northern (eastbound) service area could be retained. It would lose its existing direct access to / from the A27 which would need to be replaced by a new access either from the new junction or a separate junction on the spine road. With the development of H9 the principle of a developed strip alongside the A27 on its north side at this eastern end has been established and retention of the service area would be an extension of this. The open space of Southleigh would commence at the service area's northern boundary and continue northwards.

17.16 Additional facilities such as a drive-through could be provided along the access road into the service area.



Possible layout for retaining existing eastbound services accounting for new junction

Service areas: conclusion

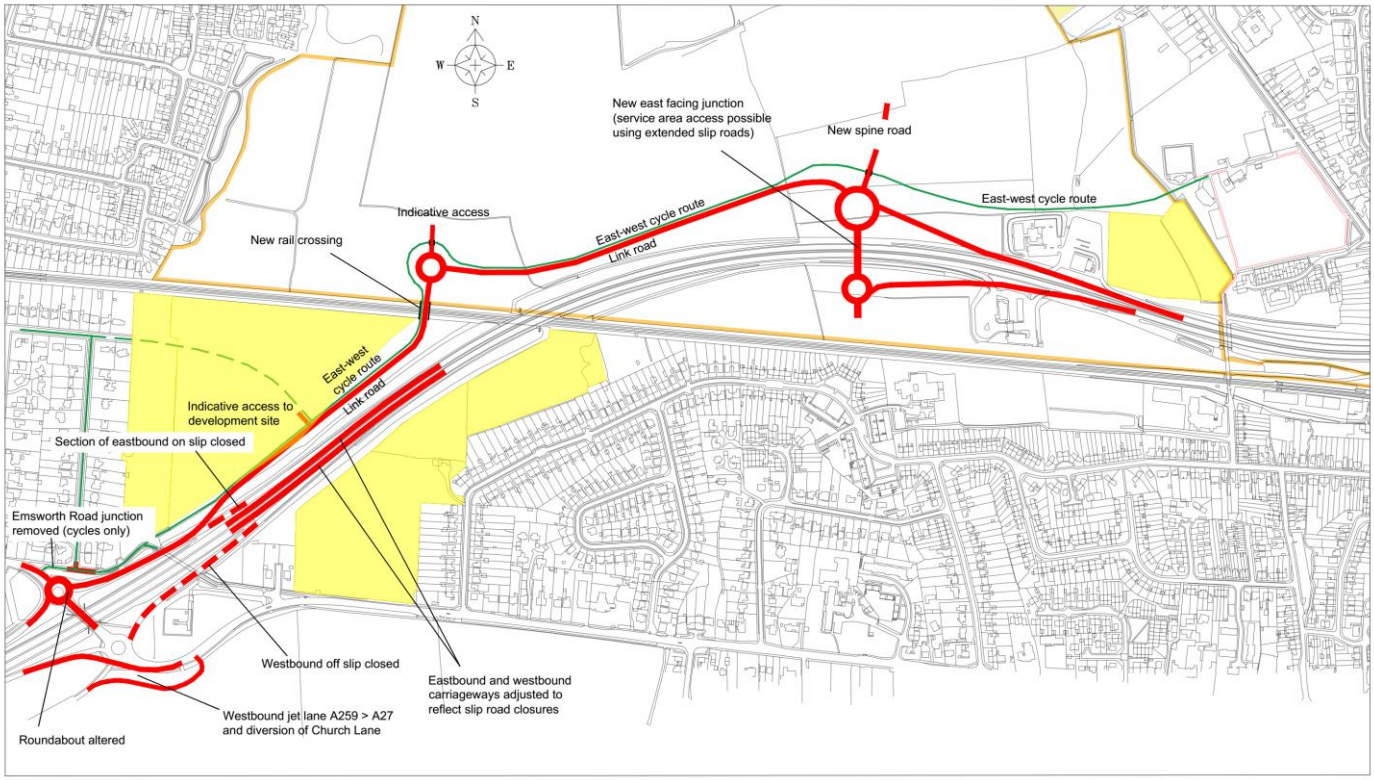
17.17 The provision of the service areas is in the control of the two site owners, Shell and BP.

17.18 In summary there is no reason why the implementation of the new junction in these options would require the service areas to close, with access possible to either or both sites taken from the new junction or roads connecting to it. This is perhaps best left as a matter for the operators (BP and Shell) to come to agreement over which one, or both, of the service areas should remain open should Option 4C remain as the preferred option. Were option 1 to be adopted the situation does not arise of course.

17.19 Discussions will need to be held with Highways England and the service area owners and franchise operators especially during the construction phase when access to / from the service areas may be adversely affected within the overall construction period of 28 months. The construction of the earthworks for the junction slip roads in options 2, 3, 4 and 5 directly affect the access to the service areas. Only in option 1 would it be possible to maintain access throughout the construction period.

18. Detailed design and land considerations

Preferred option 4D – estimate £31.5m



Land requirements

18.1 The land required for the preferred option is as follows:

- Warblington jet lane / Church Lane diversion: Havant Borough Council
- Warblington interchange: public highway (Hampshire)
- A27 eastbound on-slip: public highway (Highways England)
- Private land reference site H16
- Network Rail
- Private land (Southleigh site)
- Highways England (mainline verges and embankments)
- 2 x Service area operators (Shell and BP)
- Private land (Interbridges West site)

18.2 Early discussions should be held with the promoters of site H16 (‘land east of Castle Avenue’) and of the Interbridges West site to avoid development being brought forward which would frustrate implementation of the preferred (or any) option. The junction and link road offers those developers

additional benefits which could be considered as betterment: for 'land east of Castle Avenue', the opportunity to access the development site directly from the link road, and for Interbridges West, the opportunity to connect directly to the A27 junction for a wider range of development (the current plans, with access from New Brighton Road, are constrained by the 3.6m headroom bridges).

18.3 Compensation is likely to be required to replace the service areas, or for closure / loss of earnings during the construction period.

Buildability and effect on A27 during construction

18.4 The methods used to build the junction will have an impact on project cost and impact especially on A27 journey time.

18.5 The designer's sequence of construction indicates the following construction sequence for preferred option 4D.

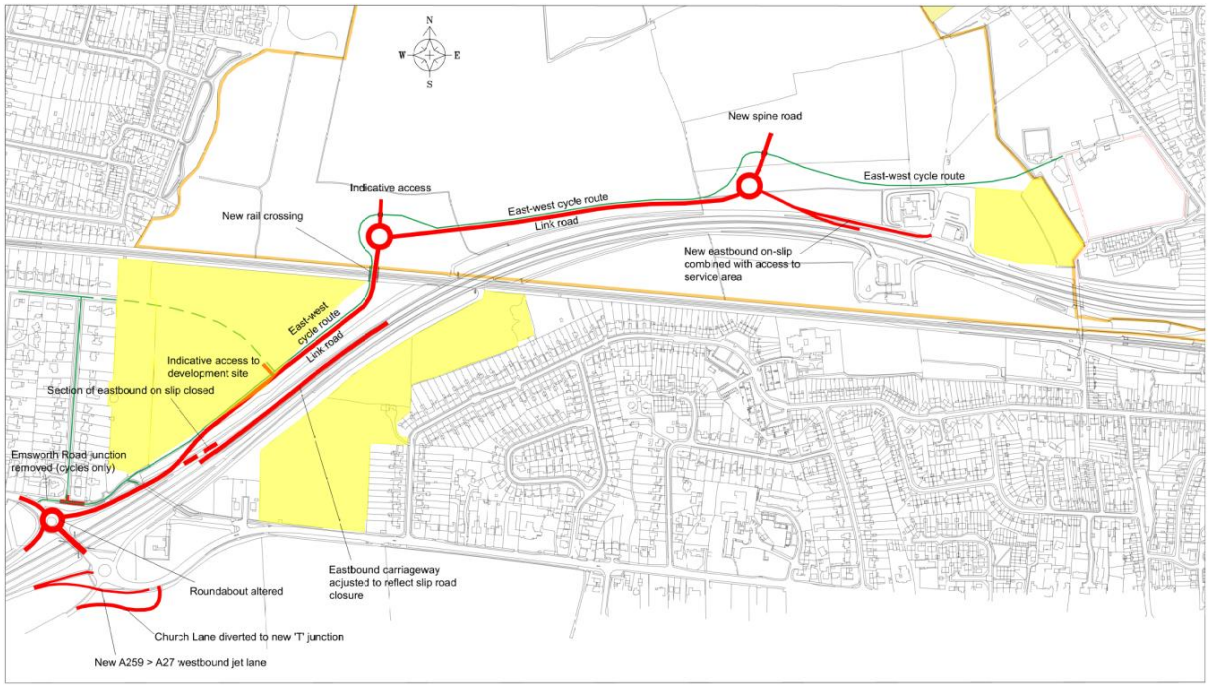
- Closure of service areas
- Earthworks for and paving of new junction slip roads, A27 bridge abutment and link road including pipework for drainage, cables, ducts etc.
- Temporary closure of A27 for bridge beam placement
- Construction of junction roundabouts and link road
- Reconfigure northern Warblington roundabout including Castle Avenue closure and creation of cycle tracks etc.
- Tie in link road to east facing on-slip and open new junction and link road to traffic, closing westbound off-slip at Warblington to traffic at the same time (traffic from A27 east to Warblington would now use new junction and link road)
- Remove westbound off-slip at Warblington and carry out associated works to southern Warblington roundabout including jet lane and Church Lane diversion
- Replace or re-open service areas

18.6 It is estimated that the build time from start of earthworks to opening of the junction and link road would be 28 months. During this time a temporary 50mph speed limit would be applied to the A27 as is usual roadworks practice; however it is expected that a limited number of overnight mainline closures would also be necessary:

- To complete tie-ins between slip roads and the mainline on the A27
- Placing of overbridge deck
- Eastbound on-slip closure for approximately 1 week duration 24x7 for tie-in work to link road (diversion via westbound A27 to Langstone and return on mainline)
- Various overnight restrictions at the two Warblington roundabouts to allow surfacing / tie-in works

18.7 The Southleigh north-south spine road, service area access and any other connecting works could follow to a separate timetable.

Recommended for further study option 1 – estimate £21.0M



Land requirements

18.8 The land required for the preferred option is as follows:

- Warblington jet lane / Church Lane diversion: Havant Borough Council
- Warblington interchange: public highway (Hampshire)
- A27 eastbound on-slip: public highway (Highways England)
- Land south of A259 (Havant Borough Council)
- Private land reference site H16
- Network Rail
- Private land (Southleigh site)
- Highways England (mainline verges and embankments)
- 1 x Service area operator (BP)

18.9 Early discussions should be held with the promoter of site H16 ('land east of Castle Avenue') to avoid development being brought forward which would frustrate implementation of the preferred (or any) option. The junction and link road offers the developer additional benefits which could be considered as betterment, such as the opportunity to access the development site directly from the link road.

18.10 Compensation is likely to be required loss of earnings for the Shell service area during the construction period due to the proximity of the works and the traffic management associated with the construction.

Buildability and effect on A27 during construction

18.11 The methods used to build the junction will have an impact on project cost and impact especially on A27 journey time.

18.12 The designer's sequence of construction indicates the following construction sequence for Option 1.

- Earthworks for and paving of new junction slip road and link road including drainage, cables, ducts etc.
- Construction of overbridge on link road over railway
- Reconfigure northern Warblington roundabout including Castle Avenue closure and creation of cycle tracks etc.
- Tie in link road to east facing on-slip (including direct access to service area from on-slip) and open new junction and link road to traffic to maintain eastbound access to A27
- Reconfigure southern Warblington roundabout including diversion of Church Lane and provision of jet lane from A259 onto A27 westbound on-slip.

18.13 It is estimated that the build time from start of earthworks to opening of the junction and link road would be 18 months. During this time a temporary 50mph speed limit would be applied to the A27 as is usual roadworks practice; however it is expected that a limited number of overnight mainline closures would also be necessary:

- To complete tie-in between slip road and the mainline on the A27 (eastbound) including lane gain / lane drop opening
- Eastbound on-slip closure for approximate 1 week duration 24x7 of tie-in work to link road (diversion via westbound A27 to Langstone and return on mainline)
- Various overnight restrictions at the two Warblington roundabouts to allow surfacing / tie-in works

18.14 The spine road and any other connecting works could follow to a separate timetable.

Issues common to options 1 and 4D

Buildability and effect on railway during construction

18.15 The methods used to build the junction will have an impact on project cost and impact on Network Rail's assets.

18.16 The designer's statement below indicates the design and construction sequence for both the preferred option 4D and for alternative option 1.

- Clear span of structure to be minimum 13.2m – this places the works site beyond the Network Rail boundary and matches the existing A27 overbridge
- Minimum clearance of 4.889m from top of rail to underside of bridge – this matches the existing A27 structure but Network Rail likely to require the revised headroom of 5.450m in new structures
- Bridge deck depth 1.60m assumed

- Use of portal frame bridge structure – meaning the only in-situ construction work adjacent to railway would be piling / excavation for and concrete pouring of, bridge abutment foundations with top surface slightly below ground level.
- Network Rail has provided as-built records for the A27 overbridge and the illustrative works reflects the existing structure in terms of span and that piling was necessary for the abutments
- Concrete portal frame units can be lifted into place in one railway possession. Portal frame includes abutment wall and deck and can be manufactured off site in 1m / 1.5m wide units and placed by crane
- Wing walls cast in situ
- Earthworks built up either side of completed structure will not affect railway operation.

18.17 It will be necessary to check signal sighting distances and the structure should be designed to avoid additional or re-signalling. This has a long lead in time and is very expensive, hence the wider span to maintain sight lines to signals.

18.18 The alignment of the link road will be subject to further detail. In highway terms it is best designed to run parallel to the A27 and thus the railway crossing would be on a 61^{o} skew. For options 4A and 4B such skew crossings are the only means considered since these options with parallel / extended slip roads are designed to only occupy existing highway land. The portal frame method of construction proposed would take this skew into account with the 1m / 1.5m wide units placed perpendicular to the tracks with the highway aligned diagonally over the rectangular deck.

18.19 However there is no requirement in other options, particularly those preferred, for this to be the case, and so, recognising that the link road also serves a 'distributor road' purpose, the alignment could be adjusted so that the road crosses the railway at 90^{o}, with perhaps an access road into Southleigh taken from a roundabout or other junction immediately north of the railway crossing to regulate traffic speed at what would otherwise be a sharp turn north of the railway crossing. This would reflect the lowest costs for the railway crossing as per the cost estimates given below, and is shown on the accompanying illustrative layout drawings.

18.20 The minimum width of the deck of the railway crossing structure (i.e. crossing the railway at 90 degrees to the track) would be 15m. This comprises:

- East side margin / parapet clearance: 0.85m
- Carriageway: 7.3m
- Verge: 1m
- Cycle track: 3m
- Footway: 2m
- West side margin / parapet clearance: 0.85m

18.21 For comparison, a route running parallel to the A27 requires a deck width of 23m to allow for the 61^{o} skew of the crossing.

Programming

18.22 Road space will need to be booked with Highways England for the construction works themselves and any closures or carriageway possessions.

18.23 Road space will also need to be booked on local roads at Warblington.

18.24 A railway possession will need to be booked with Network Rail to allow the erection of the overbridge on the link road. This must be booked a minimum of 12 months in advance.

18.25 Arrangements must be made with operators of the service area(s) regarding temporary access or closure during the works.

19. Cost estimates

19.1 The estimated costs of the various options are listed in the following table. These estimates assume no significant diversion of existing statutory services. It is assumed that due to the betterment opportunity offered by the junction and link road to the private landowners that the cost for land will be a factor of the difference between the planned residential use and the alternative use e.g. light industrial / service area / hotel for Interbridges.

19.2 The following costs assume 90º perpendicular crossings of the railway where required with a 15m deck width for an independent structure in options 1, 4C, 4D and 5. An alternative bridge deck width would be 23m for a 61º skew crossing parallel to the A27, which would carry a premium in cost. Detail design of Southleigh and clarification of the role of the spine road and link road will verify which crossing layout is feasible.

19.3 The costs EXCLUDE land and re-provision / compensation costs associated with the service areas, landscaping, resultant changes to the local road network, provision of the Southleigh development's spine road (estimated at £9M) and any statutory undertaker changes required because of the implementation of the junction and its associated link road(s).

19.4 All costs are in £M.

Cost element	OPTION 1 RANK: 2)	OPTION 2	OPTION 3	OPTION 4A	OPTION 4B	OPTION 4C	OPTION 4D (RANK: 1)	OPTION 5
Professional services	1.0	1.0	1.5	1.5	1.5	1.5	1.5	1.5
Construction	17.0	11.0	30.0	59.0	54.0	33.0	30.0	38.0
Total	18.0	12.0	31.5	60.5	55.5	34.5	31.5	39.5
Indicative contribution rates per house (£)								
	8,571	5,714	15,000	28,810	26,429	16,429	15,000	18,810

19.5 Putting these costs into context, the cost is split pro-rata to each of the 2,100 housing units as an indication of contribution cost. This indicates contribution ranges of £5,714 to £28,810 per house before the exclusions listed above. The preferred option represents a contribution of £15,000 per house; the second ranked option, £8,571.

Appendix 1

Department for Transport 'Early Assessment and Sifting Tool' (EAST)

A1.1 EAST has been designed by the Department for Transport. It is an online / offline standardised decision support tool that has been developed to quickly summarise and present evidence on options in a clear and consistent format. It provides decision makers with relevant, high level, information to help them form an early view of how options perform and compare. The tool itself does not make recommendations and is not intended to be used for making final funding decisions.

A1.2 EAST considers the impact / effect / cost (as appropriate) of various options identified in the development of a proposal.

A1.3 Some of the main headings within EAST are made up of a sub-set of considerations. For example, the 'Economic growth' heading in the 'Economic' section of the tool includes consideration of:

- Connectivity
- Reliability
- Resilience
- Delivery of housing
- Wider economic impacts

A1.4 Likewise the 'Carbon emissions' heading includes:

- Activity
- Embedded carbon
- Carbon content
- Efficiency

A1.5 Socio-distributional impacts and the regions covers the following sub-headings:

- Social and distributional impacts
- Regeneration
- Regional imbalance

A1.6 Local environment includes:

- Air quality
- Noise
- Natural environment, heritage and landscape
- Improve streetscape and urban environment

A1.7 Finally, well being covers the following issues:

- Severance
- Physical activity
- Injury or deaths
- Crime
- Enjoying access to a range of goods, services, people and places
- Terrorism

A1.8 The guidance for the use of the tool emphasises that detailed, accurate figures for each category considered within the assessment are not required. The tool works on the relative positive, neutral or negative effect of each element considered.

A1.9 An EAST assessment for each of the options considered within this study has been undertaken with the results available separately (but are summarised in Appendix 2). The assessments support the choice of preferred option (4D) and second choice option (1).

Appendix 2

BENEFITS AND EFFECTS OF THE DIFFERENT OPTIONS

FEATURE	OPTION 1	OPTION 2	OPTION 3	OPTION 4A	OPTION 4B	OPTION 4C	OPTION 4D	OPTION 5
Air quality	Deterioration affecting Castle Avenue area due to traffic on link road. Deterioration due to increased traffic at Warblington interchange partially mitigated by 'jet lane' free flow conditions	Deterioration affecting Coldharbour Farm and Victoria Road areas due to traffic at elevated junction	Deterioration affecting Victoria Road area due to traffic on widened A27 and using elevated junction	Deterioration affecting Castle Avenue, Victoria Road and Selangor Avenue areas due to parallel link roads and elevated junction	Deterioration affecting Victoria road and Selangor Avenue due to parallel link road and elevated junction	Deterioration affecting Selangor Avenue, Victoria Road and Castle Avenue areas due to link road and elevated junction. Improvement at Warblington interchange due to removal of some flows	Deterioration affecting Selangor Avenue, Victoria Road and Castle Avenue areas due to link road and elevated junction. Improvement at Warblington interchange due to removal of some flows	Deterioration affecting Selangor Avenue, Victoria Road and Castle Avenue areas due to link road and elevated junction.
Cultural heritage	No specific issues identified at this stage.							
Visual impact	View of link road from Castle Avenue	View of elevated junction from Victoria Road / Selangor Avenue	View of elevated junction from Victoria Road. Temporary loss of vegetation screening on both sides of A27 embankment between Warblington interchange and Southleigh junction	View of elevated junction from Victoria Road. Permanent loss of vegetation screening on both sides of A27 embankment between Warblington interchange and Southleigh junction (replaced by vertical walls)	View of elevated junction from Victoria Road. Temporary loss of vegetation screening on north side A27 embankment and permanent loss of vegetation screening on south side of A27 embankment between Warblington interchange and Southleigh junction	View of elevated junction from Victoria Road. View of link road from Castle Avenue	View of elevated junction from Victoria Road. View of link road from Castle Avenue	View of elevated junction from Victoria Road. View of link road from Castle Avenue
Landscape	Slight impact with new infrastructure matching levels of existing A27	Major impact with new junction above levels of existing A27	Major impact with new junction above levels of existing A27	Major impact with new junction above levels of existing A27	Major impact with new junction above levels of existing A27	Major impact with new junction above levels of existing A27	Major impact with new junction above levels of existing A27	Major impact with new junction above levels of existing A27
Nature conservation	All options will significantly affect the existing vegetation on the A27 mainline embankments but this can be mitigated within the Southleigh development.							
Geology and soils	Subject to site investigation it is not anticipated that any contaminated land will be encountered. Records of the A27 construction in the mid 1980s will be used to support the earthworks and structural design.							
Materials	All options require importing of material for new embankments which unless won as part of the Southleigh phased build-out will have to be imported from remote sites by road. Although a railway passes through the site the creation of a temporary railway siding to bring materials to site is not considered viable without resignalling of the local blocks and successfully overcoming pathing constraints.							
Noise and vibration	Slight increase in Castle Avenue area due to proximity of link road north of A27. Increase in the area surrounding Warblington interchange	Increase in Coldharbour Farm and Victoria Road areas due to grade separated junction	Slight increase along scheme extent due to widening of A27 to three lanes in each direction. Increase in Victoria Road area due to grade separated junction	Increase along scheme extent due to addition of two extra lanes in each direction. Increase in Victoria Road area due to grade separated junction	Slight increase along north side of scheme extent due to widening of A27 to three lanes in each direction. Increase along south side of scheme extent due to addition of two extra lanes in each direction. Increase in Victoria Road area due to grade separated junction	Slight increase in Castle Avenue area due to proximity of link road north of A27. Increase in the area surrounding Warblington interchange. Increase in Victoria Road area due to grade separated junction	Slight increase in Castle Avenue area due to proximity of link road north of A27. Increase in the area surrounding Warblington interchange. Increase in Victoria Road area due to grade separated junction	Slight increase in Castle Avenue area due to proximity of link road north of A27. Increase in Victoria Road area due to grade separated junction
Effects on all travellers	No significant adverse effects on drivers due to construction works being carried out while the A27 remains open. Temporary speed limits during construction and limited closures for short periods (mostly overnight) at key construction stages. No PRoWs exist on site at present so increased public access in all options by all modes reduces severance caused by the A27. Safety is a primary consideration when designing new non-motorised user facilities. Options 1, 4C and 5 score very well on accessibility as they create a new low-speed (30mph / 40mph) link separate from the mainline A27 between Warblington interchange and the new Southleigh junction.							
Community and private assets	Requires part of H16 development site. Access to eastbound services amended	Requires all of H9 and part of 'Interbridges West'. Access to service areas amended.	Requires part of 'Interbridges West'. Service areas affected	Requires part of 'Interbridges West'. Service areas affected – amended access or rebuilt	Requires part of 'Interbridges West'. Service areas affected – amended access or rebuilt	Requires part of H16 development site and part of 'Interbridges West'. Service areas	Requires part of H16 development site and part of 'Interbridges West'. Service areas	Requires part of H16 development site and part of 'Interbridges West'. Service areas

			– amended access or rebuilt			affected – amended access or rebuilt	affected – amended access or rebuilt	affected – amended access or rebuilt
Road drainage and water environment	Link road and junction drainage attenuation provided as part of the Southleigh development	Junction drainage attenuation provided as part of the Southleigh development	All road drainage will be taken to the existing A27 drainage system. Junction drainage attenuation provided as part of the Southleigh development	All road drainage will be taken to the existing A27 drainage system. Junction drainage attenuation provided as part of the Southleigh development	All road drainage will be taken to the existing A27 drainage system. Junction drainage attenuation provided as part of the Southleigh development	All road drainage will be taken to the existing A27 drainage system with link road and junction drainage attenuation provided as part of the Southleigh development	All road drainage will be taken to the existing A27 drainage system with link road and junction drainage attenuation provided as part of the Southleigh development	Link road and junction drainage attenuation provided as part of the Southleigh development
Construction duration (months) estimated	18	12	24	30	30	28	28	24
Construction costs £M estimated	18.0	12.0	31.5	60.5	55.5	34.5	31.5	39.5

Appendix 3

IMPACT OF OPTIONS ON WARBLINGTON INTERCHANGE TRAFFIC PATTERNS AND FLOWS

JUNCTION ARM	OPTION 1	OPTION 2	OPTION 3	OPTION 4A	OPTION 4B	OPTION 4C	OPTION 4D	OPTION 5
A27 E/B OFF SLIP	More traffic due to access from Portsmouth to Southleigh	No change	No change	No change	No change	No change	More traffic due to access from Portsmouth to Southleigh	Closed
A27 E/B ON SLIP	Becomes 2-way link to Southleigh and E/B A27 on-slip placed further east	Possible additional traffic accessing Southleigh from Havant	Possible additional traffic accessing Southleigh from Havant	Possible additional traffic accessing Southleigh from Havant	Possible additional traffic accessing Southleigh from Havant	Becomes 2-way link to Southleigh and all-moves A27 junction	Becomes 2-way link to Southleigh and E/B A27 on-slip placed further east	Becomes 2-way A259 to Southleigh and all-moves A27 junction
A27 W/B OFF SLIP	More traffic due to access from Chichester to Southleigh	Possible additional traffic accessing Havant from Southleigh	Possible additional traffic accessing Havant from Southleigh	Possible additional traffic accessing Havant from Southleigh	Possible additional traffic accessing Havant from Southleigh	Closed	Closed	Closed
A27 W/B ON SLIP	More traffic due to traffic from Southleigh for Portsmouth	No change	No change	No change	No change	No change	More traffic due to traffic from Southleigh for Portsmouth	Closed
EMSWORTH ROAD	More delay due to traffic leaving A27 E/B and W/B off slips for Southleigh	Minor delay due to possible traffic redistribution accessing Southleigh link for B2147/B2148	Minor delay due to possible traffic redistribution accessing Southleigh link for B2147/B2148	Minor delay due to possible traffic redistribution accessing Southleigh link for B2147/B2148	Minor delay due to possible traffic redistribution accessing Southleigh link for B2147/B2148	Minor delay due to possible traffic redistribution accessing Southleigh link for B2147/B2148	More delay due to traffic leaving A27 E/B and W/B off slips for Southleigh	North roundabout possibly replaced by priority or signalised 'T' junction with Havant Road A259. Havant Road (east) junction could remain.
HAVANT ROAD A259	More delay due to traffic leaving A27 W/B off slip for Southleigh and joining A27 W/B on-slip from Southleigh; jet lane partially mitigates by providing direct W/B A259 to A27 on-slip	Possible additional traffic accessing Havant from Southleigh	Possible additional traffic accessing Havant from Southleigh	Possible additional traffic accessing Havant from Southleigh	Possible additional traffic accessing Havant from Southleigh	Benefits from less delay by closure of W/B A27 off slip	More delay due to traffic joining A27 W/B on-slip from Southleigh; jet lane partially mitigates by providing direct W/B A259 to A27 on-slip	North roundabout possibly replaced by priority or signalised 'T' junction with Emsworth Road. South roundabout replaced by priority junction with Church Lane
OVERALL red = increased delay [pink = small increase] green = reduced delay grey = removed