Land at North West Sittingbourne

Transport Assessment

On behalf of **Persimmon Homes**

Project Ref: 27239-5504 | Rev: - | Date: March 2018

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Report Title: **Transport Assessment**

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For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved

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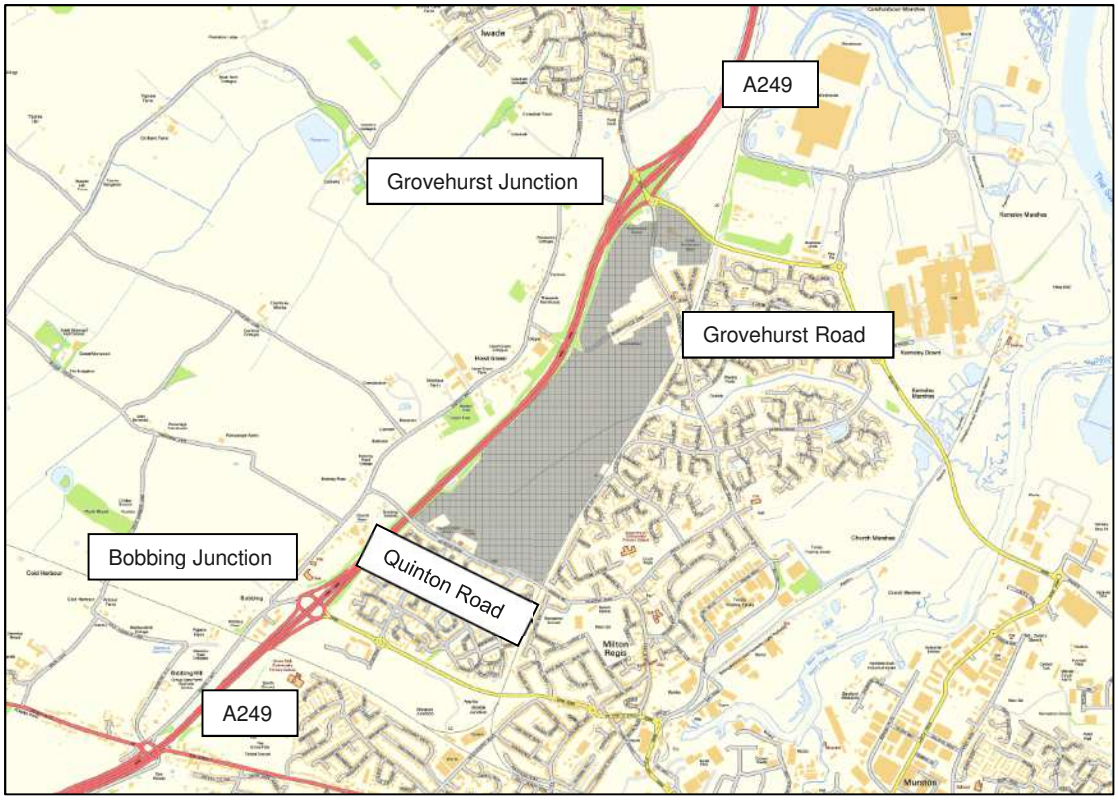
1 Introduction

1.1.1 Persimmon Homes have appointed Peter Brett Associates LLP (PBA) to provide transport support in relation to a mixed use development at North West Sittingbourne.

1.1.2 The site is approximately 75 hectares in area and is identified within the adopted Local Plan (Policy MU1) as suitable for residential development, primary and secondary schools, community uses and open space. The site has been identified by Swale Borough Council as having significant potential to meet the Borough's future growth needs in a sustainable location.

1.2 Site location

1.2.1 The approximate site location can be seen on the plan below.



1.2.2 The site lies adjacent to the A249 which runs north / south immediately to the west of the site, and is north of the A2 and M2 corridors. The site is bound by Quinton Road to the south, the A249 to the west and the Sheppey to Sittingbourne rail line to the east. Grovehurst Road passes through the site to the north and Swale Way forms the north boundary.

1.2.3 The site falls into the ownership of several land owners with the various land parcels comprising the site identified as :

- Land between Quinton Road and Bramblefield Lane (Persimmon)
- Land at Quinton Road (Redrow)
- Land at Pheasant Farm (Persimmon)
- Land at Great Grovehurst Farm (GH Dean)

1.2.4 Swale Borough Council requires the site to be considered as a whole for masterplanning purposes. Accordingly, a Development Framework document has been developed jointly between the land owners as required by the MU1 Policy. The Development Framework

document evolves the Local Plan proposals into a proposed masterplan, based upon detailed and site specific technical evidence and with consideration to viability and deliverability.

1.2.5 This Transport Assessment assesses two development scenarios:

- The masterplan for the whole allocation site (cumulative assessment).
- A combined assessment of the Persimmon Homes and GH Dean parcels, the subject of the planning applications supported by this Transport Assessment.

1.2.6 This Transport Assessment also, in effect, provides an assessment of the Local Plan development, incorporating explicit allowance for a number of sites (including Iwade).

1.3 Transport ethos

1.3.1 In developing the proposals for North West Sittingbourne, accessibility and movement issues have been considered a particularly important element. The centre of the site lies around 1.8km distance (crow fly) from the town centre of Sittingbourne and this creates opportunities for sustainable travel.

1.3.2 New development at North West Sittingbourne will generate new activity and add to the economic growth and activity of the town, as well as meeting housing demand in Swale. The test of the acceptability of development, in transport terms, should be made against the likelihood that transport impacts of the development would be unmanageable or intolerable. The National Planning Policy Framework (NPPF) paragraph 32, bullet 3 sets this test as being where the residual cumulative impacts of development would be severe.

1.3.3 In the case of the North West Sittingbourne site, the importance of its proximity to the local sustainable transport opportunities and the town centre has been recognised and responded to. For example, the Kemsley rail halt lies adjacent to the site providing a link to Sittingbourne and a direct link to London. This facility will provide an important travel mode opportunity for new residents and for students attending the proposed secondary school on site.

1.3.4 The town centre (and Sittingbourne train station) is within a short cycle ride (around 10 minutes) or bus journey from the site, and achievable as a 20 - 30 minute walk from the site.

1.3.5 Bus services already operate on Grovehurst Road and Quinton Road with routes passing the site. These services will be supported and enhanced through additional patronage from the site and additional routes through the site.

1.3.6 Pedestrian accessibility to the site is good with the existing pedestrian footway network abutting the site and Public Rights of Way (PROWs) passing through the site. The pedestrian network will be extended and enhanced as a result of the development.

1.3.7 However, modern life also revolves around flexibility and a degree of choice and many people continue to rely on the car to access facilities, even in urban centres. Therefore, the design of the development takes into account the need to cater for vehicles. Vehicular access will be provided from Grovehurst Road and Quinton Road in accordance with the Local Plan Policy and Development Framework.

1.3.8 A Framework Travel Plan has been prepared for the development that seeks to encourage and promote the use of sustainable modes for all those living within the site.

1.3.9 Mitigation measures will be promoted, both physical highway works where needed and sustainable transport initiatives to encourage use of alternative modes.

1.4 Report Structure

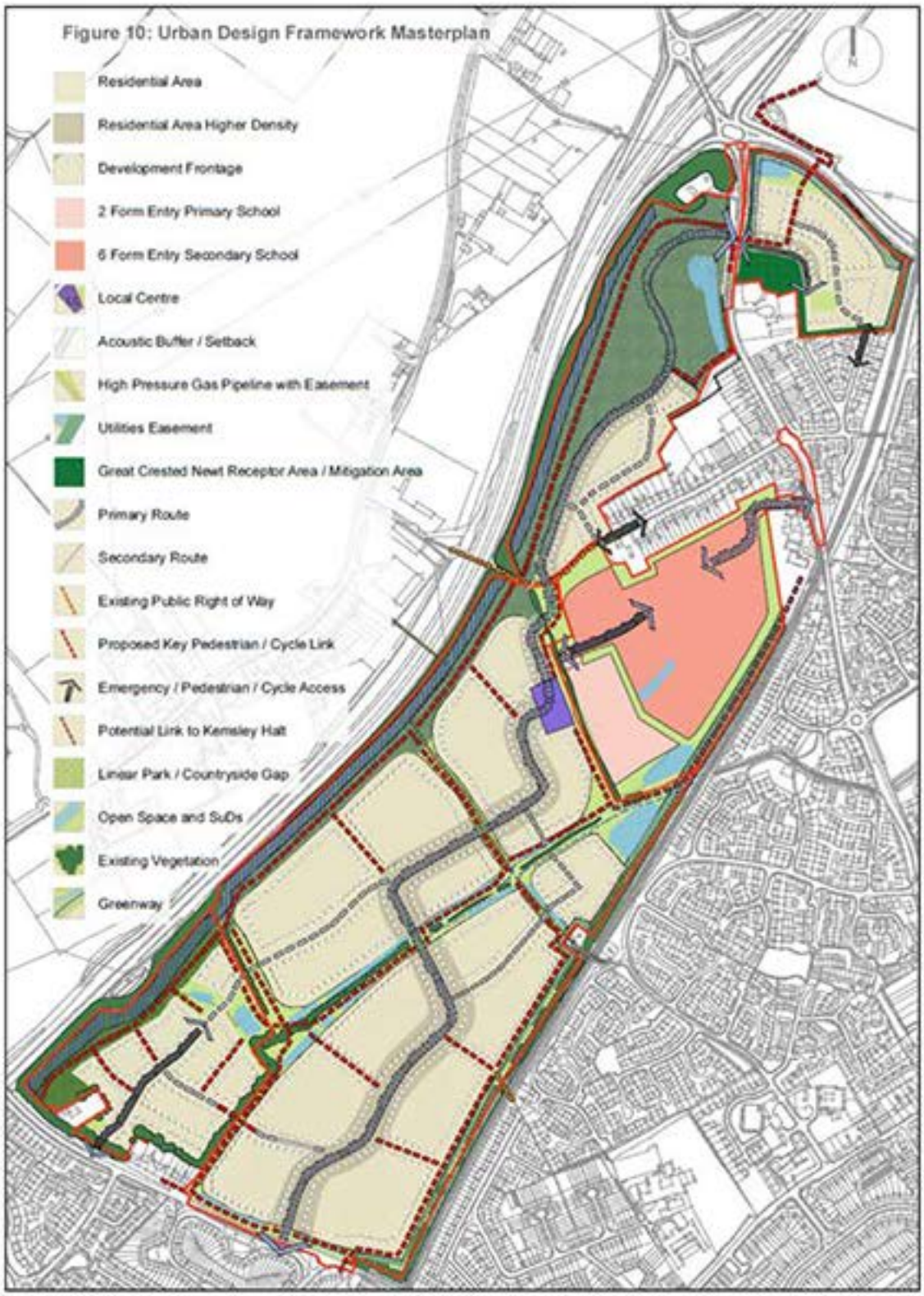
1.4.1 This Transport Assessment is based upon a scoping exercise completed with, and agreed with, highway officers at Kent County Council (KCC) and Highways England (HE).

1.4.2 This report follows the format set out below:

- Section 2 sets out the development proposals including the proposed parking provision.
- Section 3 sets out the proposed access strategy for the site.
- Section 4 provides a review of national and local policy and a description of how the proposed development responds to and accords with these policies.
- Section 5 provides a review of the local transport network context, including access by all transport modes.
- Section 6 provides a review of the observed traffic count data, and crash data.
- Section 7 derives the baseline traffic flows for assessment.
- Section 8 derives the predicted traffic generation and distribution to and from the site resulting from the proposed development.
- Section 9 provides an overview of the modelling methodology and approach.
- Sections 10 to 25 provide capacity analysis for each of the junctions considered.
- Sections 26 to 29 provide capacity analysis for each of the proposed access junctions.
- Section 30 considers the merge and diverge analysis completed for the A249 corridor.
- Section 31 provides the summary and conclusions of the report.

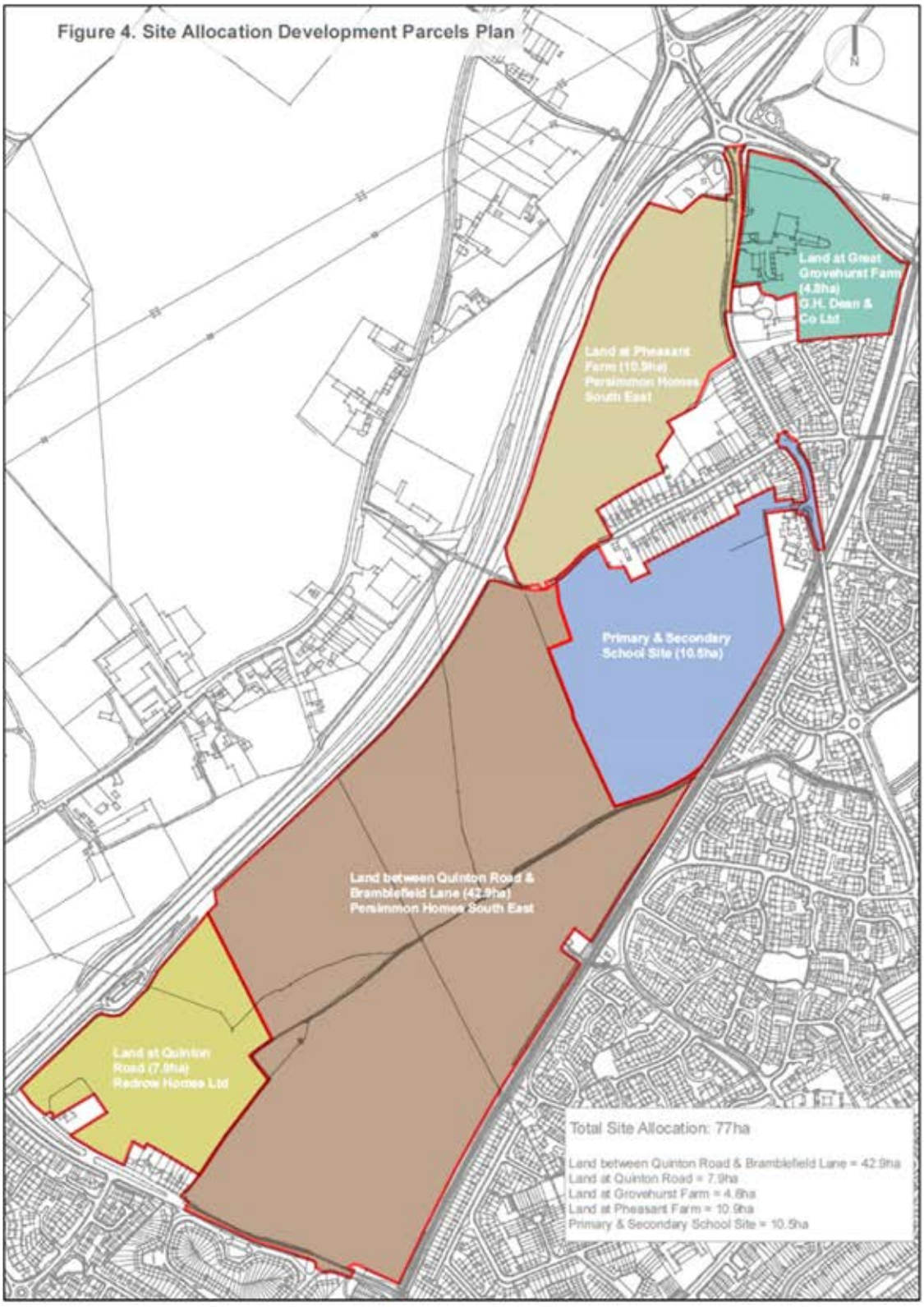
2 Development proposals

2.1.1 The site comprises four land ownership areas that have been considered cumulatively within the masterplanning exercise and Transport Assessment report. The Development Framework Figure 10 illustrates the masterplan and is shown below for reference.



2.1.2 The Development Framework Figure 4 illustrates the four land ownership areas that have been considered cumulatively within the masterplanning exercise and this is shown below for reference.

Figure 4. Site Allocation Development Parcels Plan



2.1.3 The following paragraphs consider each of the four development areas in turn.

2.2 Land between Quinton Road and Bramblefield Lane (Persimmon), including Primary and Secondary school site

2.2.1 This parcel of the site comprises approximately 42 hectares of agricultural land, bordered to the west by the A249 and the east by the railway line. Quinton Road borders the parcel to the south and Bramblefield Lane borders the parcel to the north.

2.2.2 Access to this parcel will be directly via Quinton Road to the south and from the north through the Land at Pheasant Farm via Grovehurst Road. The Quinton Road access junction will comprise a priority give way junction with a right turn bay, whilst the Grovehurst Road access will incorporate a staggered priority junction with a right turn bay. A spine road will connect these two access points, also passing through the Land at Pheasant Farm (described below).

2.2.3 A further access will be available to serve the secondary school on site via the medical centre access on Grovehurst Road. Additional emergency access could be achieved from Bramblefield Lane if considered necessary by officers.

2.2.4 This development area will need to accommodate an easement to the high pressure gas pipeline crossing the site and to integrate the existing PROWs that cross the site. This development area is proposed to deliver the following :

- 1,100 residential units.
- A new local centre with retail provision to meet local requirements.
- A 2 form entry primary school.
- A 6 form entry secondary school.
- A Linear Park along the western boundary that would act as a multifunctional area (open space, play area, noise buffer, ecological mitigation and enhancement area).
- Greenways of multi-functional public open space to serve the development and also the wider community.
- Potential links to Kemsley rail halt.
- Provision for bus access to serve the site.

2.3 Land at Quinton Road (Redrow)

2.3.1 The land at Quinton Road comprises approximately 8 hectares of agricultural land forming the south western quadrant of the overall site allocation.

2.3.2 The site is bound by Quinton Road and a number of residential properties to the south and the A249 to the west. Access to this parcel of land will be gained directly from Quinton Road as a simple priority junction and internally from within the wider development masterplan.

2.3.3 This area is proposed to deliver the following :

- 200 residential dwellings.
- A Linear Park along the western boundary of the site that would act as a multifunctional area (open space, play area, noise buffer, ecological mitigation and enhancement area).

2.4 Land at Pheasant Farm (Persimmon)

2.4.1 Land at Pheasant Farm comprises an area of approximately 10.5 hectares towards the northern part of the MU1 site allocation. The site is bounded by the A249 to the west and Bramblefield Lane to the south. The eastern boundary of the site is formed by Grovehurst Road and properties along Bramblefield Lane.

2.4.2 Access to this area will be directly from a new staggered priority junction with a right turn bay on Grovehurst Road and from internally within the wider development allocation. Emergency access could be achieved from Bramblefield Lane if considered necessary by officers.

2.4.3 This site will deliver the following :

- 100 residential units
- New links connecting the site to the wider site allocation and also to existing neighbouring areas.

2.5 Land at Great Grovehurst Farm (GH Dean)

2.5.1 The land at Great Grovehurst Farm has an area of approximately 5 hectares located to the north eastern part of the site allocation. The site is enclosed by Swale Way to the north, Grovehurst Road to the west, the Sittingbourne to Sheerness railway line to the east and the Godwin Close / Danes Mead estate to the south.

2.5.2 Access to the site will be provided via a staggered priority junction with a right turn bay on Grovehurst Road.

2.5.3 The site will deliver the following :

- Up to 110 residential units (although 120 residential units are assessed within this Transport Assessment).
- New links to connect the site with the rest of the development allocation.
- A multi purpose green corridor will be provided around the boundaries of the site.
- Open space.

2.6 Cumulative development proposal

2.6.1 In summary, the North West Sittingbourne site will cumulatively deliver :

- 1,520 residential units.
- A new local centre with retail provision to meet local requirements.
- A 2 form entry primary school.
- A 6 form entry secondary school.
- A Linear Park along the western boundary.
- Greenways of multi-functional public open space.
- Potential links to Kemsley rail halt.
- Provision for bus access to serve the site.
- New links connecting the site to the neighbouring areas.

2.7 Vehicular access junctions

2.7.1 Vehicular access to the site will be made via the following site access points:

- Quinton Road.
- Grovehurst Road.
- Grovehurst Road (medical centre access).

2.7.2 The form of the proposed access junctions is described below and has been the subject of a detailed modelling exercise, the output of which is described at sections 26 to 29.

2.8 Quinton Road vehicular access (Persimmon parcel)

The site spine road will form an access on Quinton Road in the form of a priority junction located approximately 80m west of the junction with Knightsfield Road.

The access will comprise a flare at the give way line to allow right turning and left turning vehicles to wait alongside one another. A right turn bay will be provided on Quinton Road for vehicles entering the site. A footway and / or cycleway will be provided alongside the east and west sides of the access road.

2.9 Quinton Road vehicular access (Redrow parcel)

2.9.1 The parcel of land at the south west corner of the site will be served by a simple priority junction access on Quinton Road. Whilst this access would provide independent access to this parcel of land, there will be an internal connection to and from the wider North West Sittingbourne site provided by the masterplan.

2.9.2 A footway will be provided along the east and west sides of the access road which will link with the external pedestrian network on Quinton Road. The east footway will be extended to link with the existing bus stop on Quinton Road. In addition, an uncontrolled pedestrian crossing will provide access to the footway on the southern side of Quinton Road and Sonora Way.

2.9.3 It is further proposed that a gateway feature be provided to the west of the site access on Quinton Road along with speed cushions to denote the change in environment for drivers and enforce the existing 30mph speed limit.

2.10 Grovehurst Road vehicular access

2.10.1 At the north end of the spine road a vehicular access will be provided on Grovehurst Road in the form of a staggered priority junction located approximately 150m south of the Grovehurst Road junction with the A249. On the opposite side of Grovehurst Road a similar access will be provided to the land at Great Grovehurst Farm.

2.10.2 The proposed access is a right left staggered priority junction providing right turn bays for traffic entering the site on both sides of Grovehurst Road. It is proposed that the existing 30mph restriction on Grovehurst Road be located further north to encompass the proposed site access and to be commensurate with an uncontrolled pedestrian crossing at this location. On this basis visibility splays are provided in accordance with Manual for Streets.

2.11 Grovehurst Road vehicular access (medical centre)

2.11.1 A further vehicular access is proposed from Grovehurst Road, utilising the location of the existing medical centre access. It is intended that this access will serve the medical centre, as existing, and the secondary school proposed on site. There would not be a vehicular route from the secondary school to the remainder of the North West Sittingbourne site.

2.11.2 Whilst the existing access could be retained to serve the medical centre and secondary school, highway officers have previously suggested that an adjustment to this junction (to incorporate a right turning bay) may be required. On this basis an alternative design has also been shown within this report that includes a right turn bay.

2.11.3 Hence, there are two options for this site access, one option would retain the existing access and the other option would incorporate a right turning bay. We would expect highway officers to advise with respect to their requirements as part of the Reserved Matters Application for the school site when KCC bring this forward for detailed planning.

2.11.4 A footway provision can be made on the north side of this access road to enter the secondary school site from Grovehurst Road.

2.12 Walking and cycling access points

2.12.1 Pedestrian and cycle access to the site will be available from a number of locations on the site boundary. These comprise the following :

- Grovehurst Road will provide access to the east and west parcels of the site. To the west a footway / cycleway will be provided from Grovehurst Road and follow the east / south side of the spine road through the site. To the east, a walking and cycling route will be available from Grovehurst Road and passing through the land at Great Grovehurst Farm to connect with the existing footway / cycleway on the south side of Swale Way. This would provide onward access to the employment areas along this corridor.
- A further walking and cycling route will be available through the land at Great Grovehurst Farm to connect with Godwin Close on the south boundary. This provides a route to and from Kemsley village.
- The entrance to the medical centre will be retained and amended to provide a pedestrian footway leading to the secondary school site.
- The existing PROW crossing the site from east to west will be retained within the masterplan.
- Access will be available from Quinton Road. This will comprise walking and cycling facilities within the site frontage and site access junctions. This will be complemented by crossing facilities at the spine road junction and at the existing shuttle working signals to the east.
- From the west a walking and cycling route is provided from Sheppey Way along Bramblefield Lane (incorporating national Cycle Route 1) and crossing the A249 into the site.
- A walking / cycling route on Sheppey Way (from Bramblefield Lane towards Iwade) will be contributed towards by the Development. This is in accordance with policy and will connect with the provision being made on Sheppey Way by existing development at Iwade.
- The Public Right of Way crossing the Sheerness Line (serving Kemsley rail halt) will also be retained within the development layout.

2.13 Vehicle parking provision

2.13.1 Residential parking provision on site is proposed to be provided in line with Kent County Council Interim Guidance Note 3 (IGN3) - minimum parking standards for ‘suburban’ areas, which are shown in the table below.

Parking Standards – Suburban Areas		
1 & 2 Bed Flats	1 space per unit	Not Allocated
1 & 2 Bed Houses	1 space per unit	Allocation possible
3 bed houses	1.5 spaces per unit	Allocation of one space possible
4+ bed Houses	2 independently accessible spaces per unit	Allocation of both spaces possible
Garages	Additional to standards above	

Visitor Parking	On-street areas - 0.2 spaces per unit	

2.13.2 With respect to the education uses, it is expected that the parking provision will be provided in accordance with the Kent and Medway Structure Plan 2006 – SPG4 standards as summarised below. This will be for KCC to confirm when they bring forward the Reserved Matters Application for this site.

Parking Standards – SPG4	
Primary School	1 space per staff + 10%
Secondary School	1 space per staff + 10%

2.13.3 With respect to non-residential and non-education uses, parking will be provided in accordance with local standards suitable for the uses promoted.

2.13.4 In addition to the parking provision on site at the schools as described above, consideration will need to be given to suitable drop off facilities. This will be a consideration during the detailed design of the school site and the Reserved Matters Application to be submitted by KCC as they bring the school sites forward.

2.14 Cycle parking provision

2.14.1 IGN3 does not provide cycle parking standards and hence these are proposed to be based upon the Kent and Medway Structure Plan 2006 – SPG4 standards, which are summarised in the table below.

Cycle Parking Standards (Minimum)	
Individual Residential Dwellings	1 space per bedroom
Flats & Maisonettes	1 space per unit
Primary School	1 space per 50 pupils
Secondary School	1 space per 7 pupils/students

2.14.2 In line with the guidance, cycle parking spaces for individual residential dwellings :

"should be provided within the curtilage of the residential dwelling. Where a garage is provided it should be of a suitable size to accommodate the required cycle parking provision"

2.14.3 Cycle parking provision for flats and maisonettes :

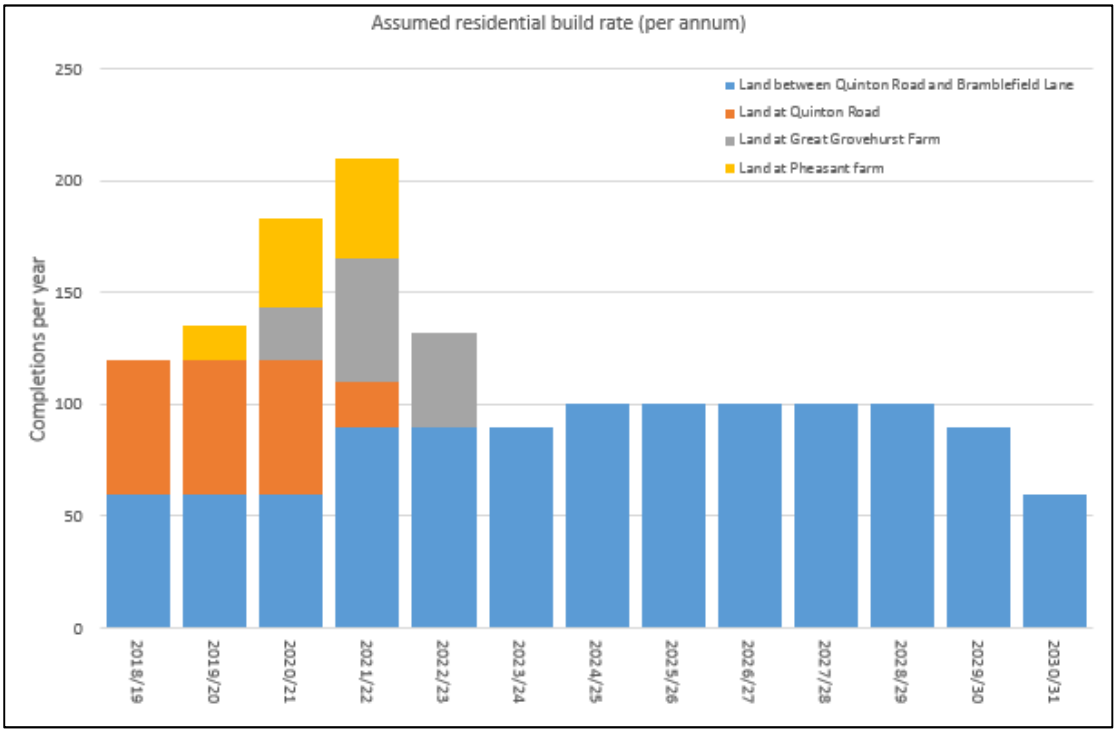
"should be provided as a secure communal facility where a suitable alternative is not available"

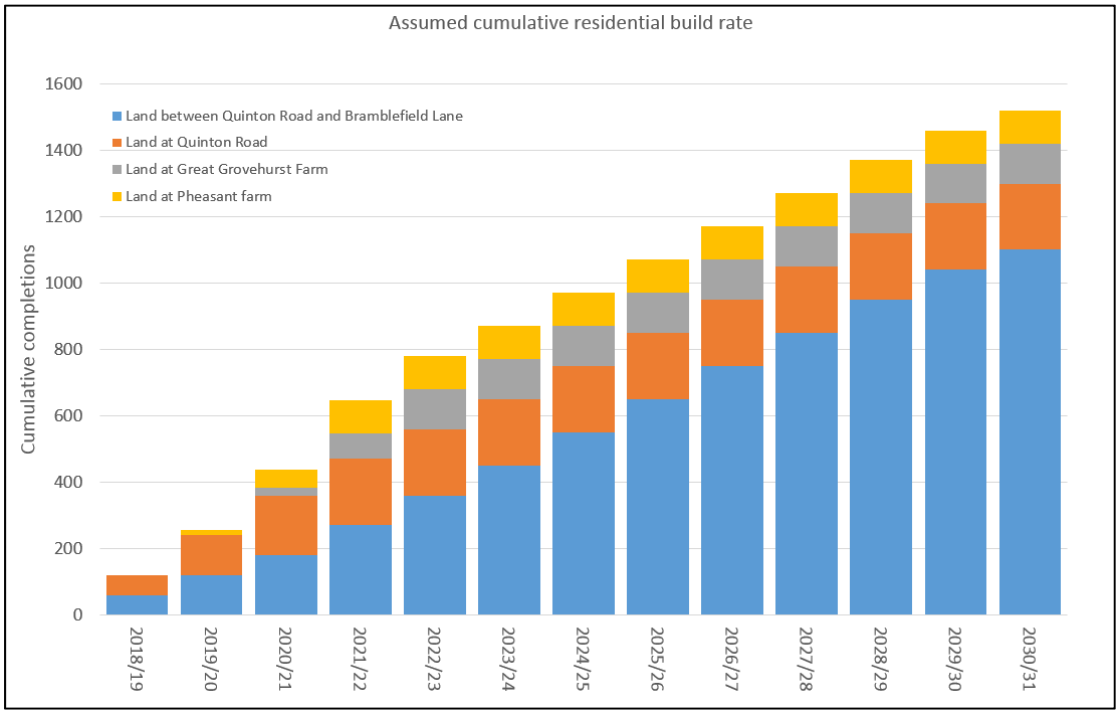
2.15 Phasing of development

2.15.1 It is anticipated that the first planning permissions will be granted during 2018, allowing the development to be commenced later that year or early in 2019. The table below provides an indication of the anticipated build rate for delivery of the residential units across the four parcels of development adopted for the purposes of this assessment.

Year	Land between Quinton Road and Bramblefield Lane	Land at Quinton Road	Land at Great Grovehurst Farm	Land at Pheasant Farm	Total	Cumulative
2018/19	60	60			120	120
2019/20	60	60		15	135	255
2020/21	60	60	23	40	183	438
2021/22	90	20	55	45	210	648
2022/23	90		42		132	780
2023/24	90				90	870
2024/25	100				100	970
2025/26	100				100	1070
2026/27	100				100	1170
2027/28	100				100	1270
2028/29	100				100	1370
2029/30	90				90	1460
2030/31	60				60	1520
Total	**1100**	**200**	**120**	**100**	**1520**	**1520**

2.15.2 The above table is also represented as two graphs below indicating the anticipated timing for each development area to progress and complete as well as the cumulative completions.





2.15.3 It is noted that during the first 5 years of development there will be around 100 to 200 units completed per annum. This reflects the simultaneous build out on each of the four masterplan areas. Thereafter, it is anticipated that around 60 to 100 units would be completed each year on the single largest area. Whilst the above build rates have been assumed for the purposes of assessment, the actual delivery will inevitably be dependent upon market conditions and the ability to sell houses over the coming years.

2.15.4 With respect to schools on site, the 2 form entry primary school is intended to meet the education needs generated by the residential uses on site. Therefore, the primary school will be delivered at an early stage in the development.

2.15.5 KCC has indicated that they expect the primary school to initially be fitted out as a 1 form entry school and then, when the development of the allocation is sufficiently progressed, a further form entry will be made available. The Development Framework for the site indicates that a 1 form entry school will be available by 450 completions (2020 / 2021) and 2 forms at around 1100 units (2026 / 2027). This has been assumed for assessment purposes.

2.15.6 The 6 form entry secondary school will have a larger catchment area and, in view of its scale, is likely to take longer to deliver. Again, KCC has indicated that they expect the development to be phased, with 3 forms of entry initially provided, prior to a future expansion to 6 forms of entry. The Development Framework for the site indicates that a 3 form entry school will be available by 650 completions (2021 / 2022) and 6 forms at around 1250 units (2027 / 2028). This has been assumed for assessment purposes.

2.15.7 The convenience store and any community facilities on site will be provided to meet the needs of the residents on site. The timing of these will be dependent upon the demand generated by the development and can hence be flexible.

3 Access strategy

3.1.1 The following section considers the access strategy to the site for all modes. It draws upon details from the Local Plan Policy MU1, the masterplan philosophy, Development Framework and technical findings from later sections within this Transport Assessment.

3.2 Local Plan – Policy MU1

3.2.1 With respect to access to the site the Local Plan provides the context for what is expected of a Transport Strategy for the site. The relevant Local Plan extracts relating to transport matters provide the following guidance and requirements :

"6.6.7 A key issue affecting the allocation is the need for a new junction, between Grovehurst Road and the A249 which has been identified as necessary by the Highway Authorities. The main vehicular access into the allocation will need to have regard to the layout of this junction. There will also need to be pedestrian and cycle way links across the A249 utilising the existing right of way along Bramblefield Lane, both to facilitate use of the open space uses on either side and to enable a continuous pedestrian and cycle route to Kemsley rail halt and the new schools at the Quinton Road site. Existing pedestrian/cycle links across the Grovehurst/A249 Junction will be retained and may need to be improved as part of the major remodelling of the junction rather than in any interim improvement scheme. Improvements to bus routes serving the site and the rail halt will be required, whilst improvements to station facilities at Kemsley should be explored."

"6.6.9…….Access points are available from Grovehurst Road and Quinton Road, although the Transport Assessment will establish the need for, scale and nature of any off-site highway improvements necessary to mitigate unacceptable traffic impacts at the Grovehurst/A249 Junction and Bobbing/A249 Junction and elsewhere on the local highway network. Highways England and Kent County Council have, in principle, agreed the appropriateness of an interim improvement scheme to the Grovehurst Road/A249 junction to accommodate increases in traffic arising from Local Plan allocations. Development at the North West Sittingbourne allocation will be expected to contribute to the funding of the interim scheme although some development is likely to be acceptable in advance of it. The Transport Assessment will therefore need to inform the timing of transport mitigations to complement the phasing proposals in the Masterplan/development brief. Pedestrian/cycle links across the A249 will need to be improved via Bramblefield Lane and Old Sheppey Way commensurate with the interim improvement of the Grovehurst Road/A249 junction and at the junction itself as part of the ultimate junction remodelling."

"Land North of Quinton Road"

"6.6.17 This site comprises 60.9 ha of farm land, located to the north of Quinton Road between the A249 to the west and the railway line to the east. It is well related to existing residential development although the railway line provides a significant barrier limiting access between the site with residential development to the east. The western boundary of the site is formed by the A249 embankment and its northern boundary by Bramblefield Lane. Although the site has convenient access to Kemsley railway station, there is a need to improve both the links to it and the facilities at the station."

"Land at Pheasant Farm Grovehurst Road/Bramblefield Lane, Sittingbourne"

"6.6.25 The whole of the site is included within the allocation for purposes both of open space provision, but, critically because it meets the purpose of securing an appropriate access strategy facilitating a spine road through the site linking access points from Quinton Road to Grovehurst Road. The northern end of such an access would be located close to the A249 Grovehurst interchange, where vehicle speeds are reasonably high. Transport Assessment work will need to demonstrate that an acceptable access can be formed in this location, taking into account the proximity of interim and longer term mitigation arrangements proposed for the Grovehurst /A249 interchange……."

"Land at Great Grovehurst Farm, Sittingbourne"

"6.6.27 …….The site is well related to existing residential development to the south where a secondary means of access could be provided. Adjacent to the site is Great Grovehurst Farm, a listed building.

6.6.28 This site is well located in terms of accessibility. Kent Highway Services advise that this site has the option to take access from Swale Way, Grovehurst Road and possibly Godwin Close and Danes Mead. Formation of any new residential road junctions directly onto Swale Way may prove difficult due to level differences, traffic volumes, and visibility issues. A more suitable alternative may be to achieve access opposite the main spine road serving the whole allocation (situated in the Pheasant Farm section of the allocation described above). It will be for the developer to demonstrate that acceptable accesses could be formed, given the traffic volumes and speeds, through the submission of a Traffic Impact Assessment.

6.6.29 Re-modelling of the A249/Grovehurst Road interchange is anticipated in the future, due to the increased use of Swale Way as further development in the centre of the town and at North East Sittingbourne commences, as well as from this allocation. Land to the north of Swale Way has already been safeguarded, through a section 106 agreement attached to an implemented planning permission, and is likely to be used to facilitate the interim improvements to the A249/Grovehurst Road junction. Should the Transport Assessment indicate an interim scheme which has any additional requirement, this will need to be taken into account in the Masterplan/development brief for the overall allocation or planning applications for this site."

"Policy MU1……..

7. Be supported by a transport assessment and access strategy in the Masterplan /development brief to determine the need and timing for improvements to the transport network and phasing of development and address the following:

a. The scale, nature and timing of interim improvements at Grovehurst Road/A249 junction and if necessary at the Bobbing/A249 junction;

b. Identification of vehicular access points from Quinton Road and Grovehurst Road and mitigation of traffic impacts on the local road network and existing neighbourhoods by defining an appropriate quantum of development relative to these access points;

c. The timing of any necessary off site highway improvements relative to the phasing of development;

d. Identification of improvements to the public transport network between the site and Sittingbourne;

e. Encouragement of increased rail use from Kemsley Halt through enhancement of the facilities there and public pedestrian and cycle links;

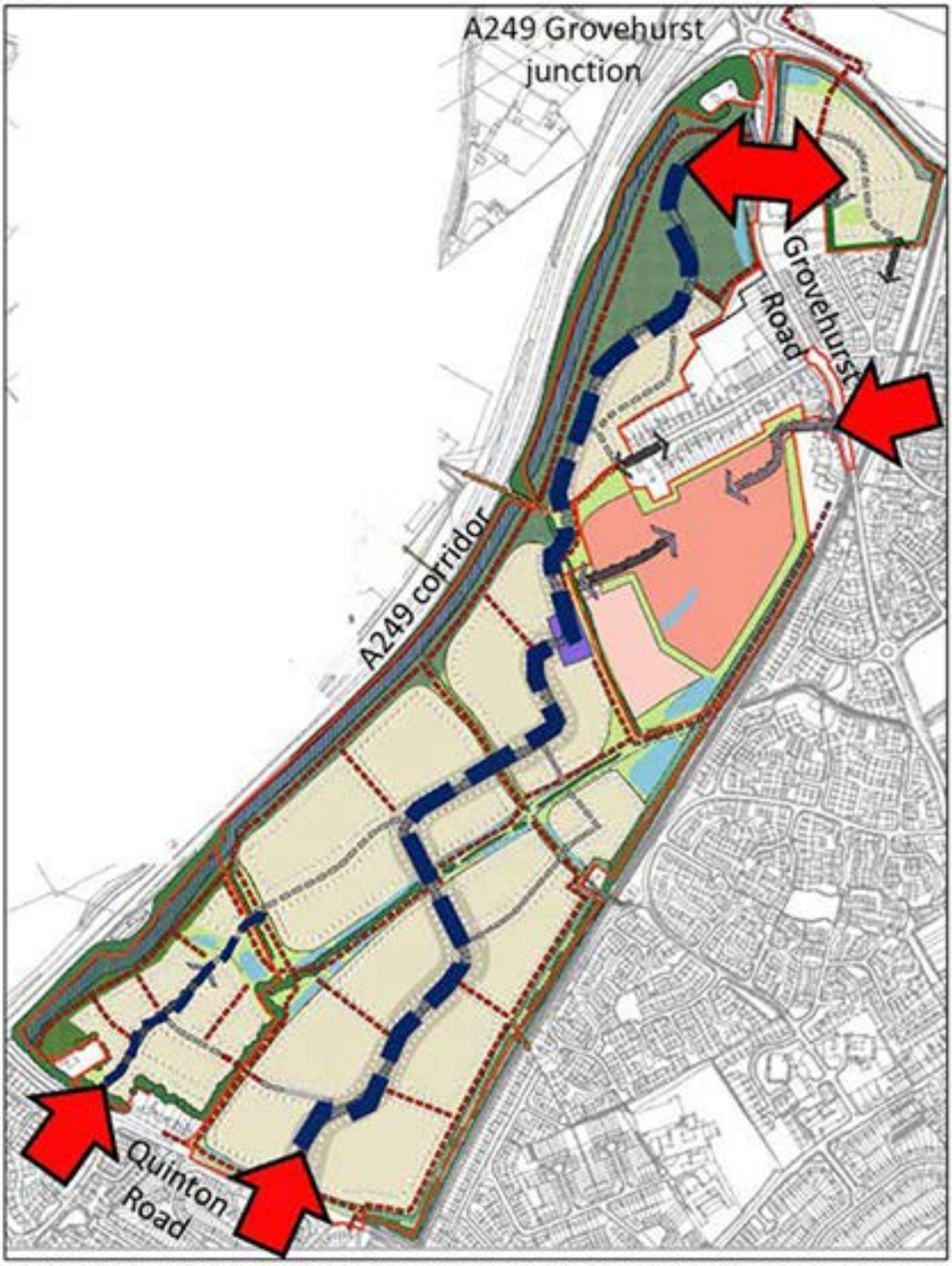
f. Secure safe and attractive pedestrian and cycle links within the development and to the adjacent network including links to Iwade over the A249;

g. Have regard to the availability of land to the north of Swale Way already safeguarded for the remodelling of the A249/Grovehurst Road junction and should the mitigation design require it, within any other relevant allocation."

3.2.2 The following paragraphs consider access by each mode in the context of the Local Plan requirements and with regard to the masterplanning output and findings of this Transport Assessment report.

3.3 Highway access strategy

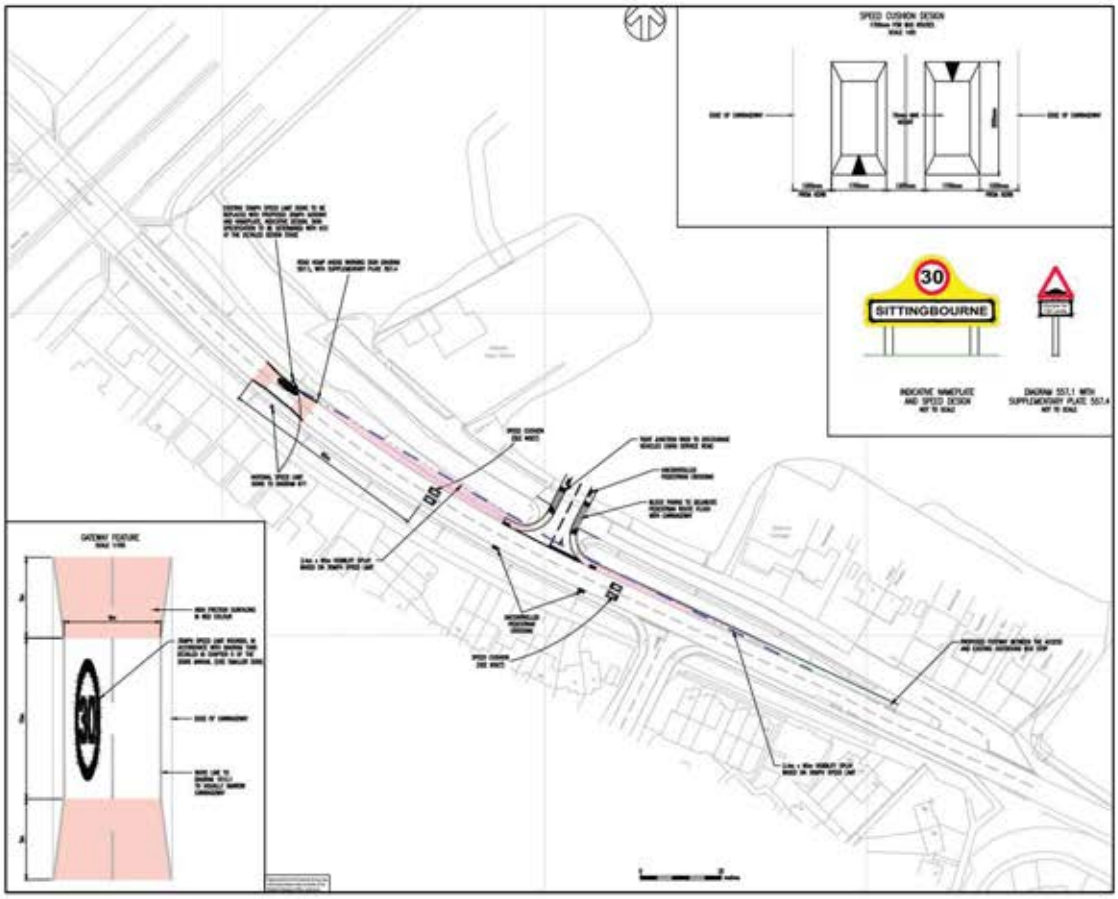
3.3.1 Direct highway access to the site will be gained from four locations as indicated by the plan below.



3.3.2 Direct highway access from the south will be via two priority junctions from Quinton Road. The west junction will be a simple priority junction and will predominantly serve the Redrow parcel of land.

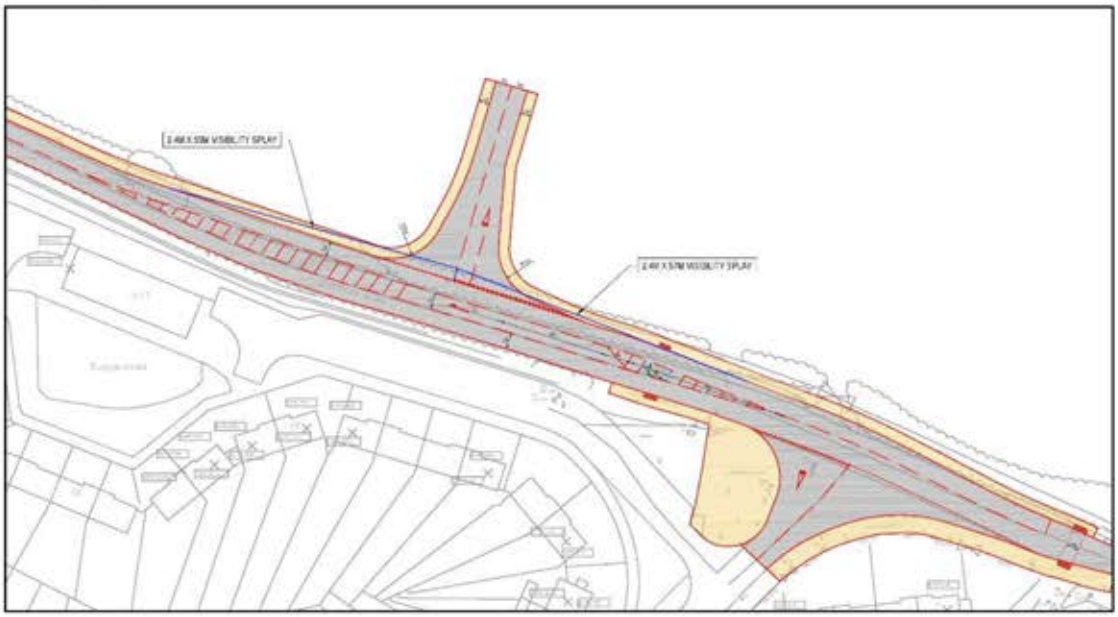
3.3.3 Redrow's consultants have designed this access with visibility splays of 2.4m x 90m and with a gateway feature implemented to the west of the site access along with speed cushions to denote the change in environment for drivers and to enforce the existing 30mph speed limit.

3.3.4 The proposed access layout has been designed by the consultants working for Redrow Homes and is shown below (and included as Appendix 3a).



3.3.5 To the east of this the spine road passing through the site will form an access on Quinton Road in the form of a priority junction (with right turn bay) located approximately 80m west of the junction with Knightsfield Road.

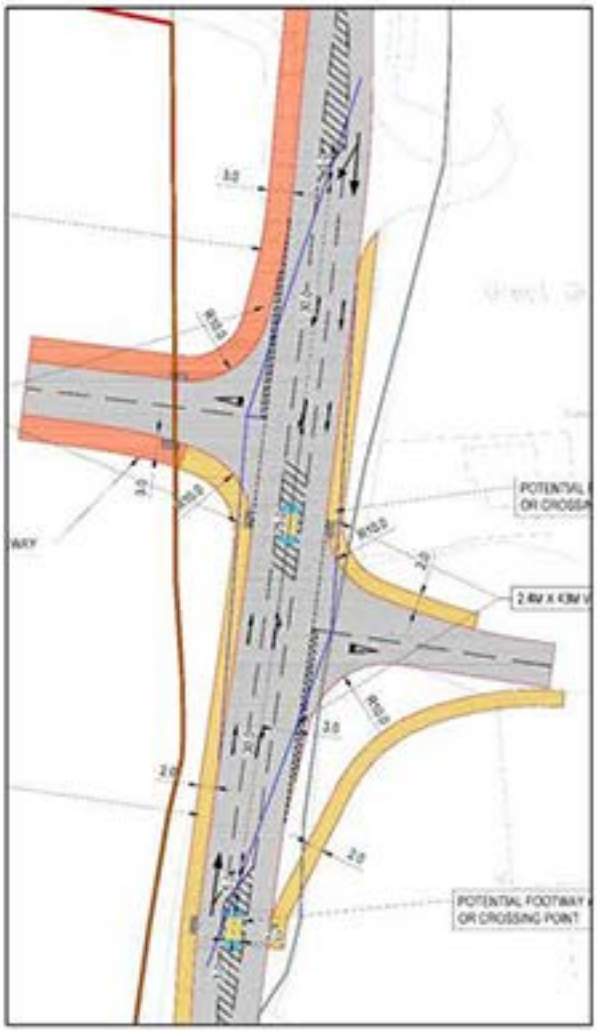
3.3.6 The proposed access layout is shown below and included as Appendix 3b along with the swept path analysis. This shows that a large refuse vehicle can enter and exit the site in forward gear.



3.3.7 The access will comprise a flare at the give way line to allow right turning and left turning vehicles to wait alongside one another. A right turn bay will be provided on Quinton Road for vehicles entering the site. This will be achieved by widening into the site frontage. Appropriate visibility splays of 57m (east) and 55m (west) are shown based upon the 85th percentile speeds described at section 6.6.

3.3.8 At the north end of the spine road a vehicular access will be provided on Grovehurst Road in the form of a staggered priority junction located approximately 150m south of the Grovehurst Road junction with the A249. On the opposite side of Grovehurst Road access will be provided to the land at Great Grovehurst Farm.

3.3.9 The proposed access layout is shown opposite and included as Appendix 3c along with the swept path analysis. This layout has been informed by the detailed modelling exercise described later within this Transport Assessment.



3.3.10 The proposed access is a right left staggered priority junction providing right turn bays for traffic entering both sides of Grovehurst Road.

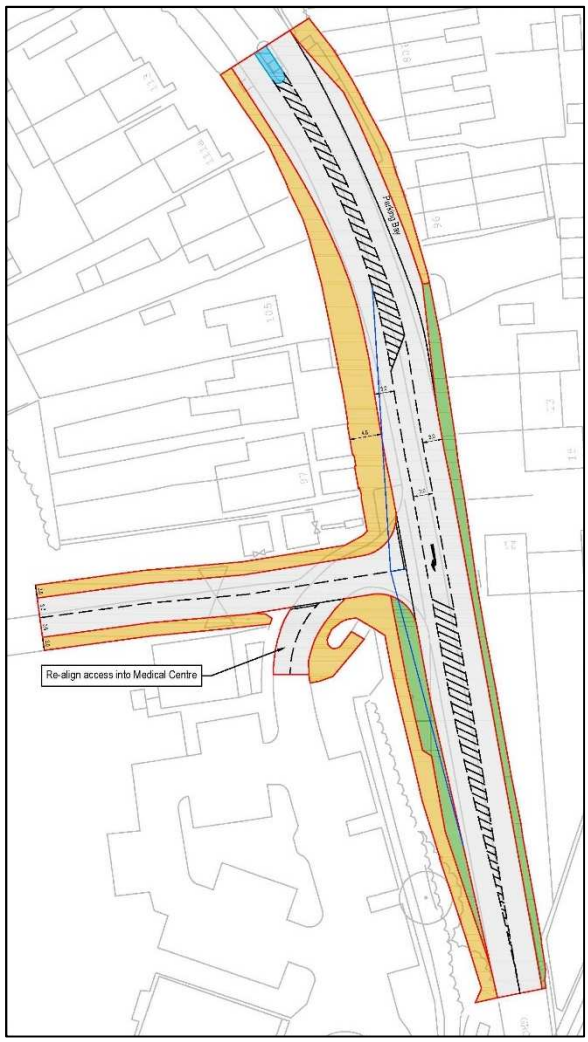
3.3.11 It is proposed that the existing 30mph zone to the south would be extended further north to begin to the north of the proposed Grovehurst Road staggered priority junction. This extension would be commensurate with a site access and uncontrolled pedestrian crossing facility.

3.3.12 Visibility splays of 2.4mx 43m are shown in accordance with Manual for Streets for a 30mph speed restriction.

3.3.13 A further vehicular access is proposed from Grovehurst Road, utilising the location of the existing medical centre access. It is intended that this access will serve the medical centre, as existing, and the secondary school proposed on site. However, there would not be a vehicular route from the secondary school to the remainder of the North West Sittingbourne site.

3.3.14 The modelling analysis completed within this Transport Assessment confirms that the existing site layout would suffice in capacity terms if serving the existing medical centre and proposed school. Hence, it is proposed

that the existing junction is retained although a footway would be provided on the north side of the access road to serve the secondary school as shown above and in Appendix 3d.



3.3.15 However, discussions with highway officers have previously suggested that an upgrade to this junction (to incorporate a right turning bay) may be required to serve the school. This would need to be decided at Reserved Matters application stage by KCC. Nevertheless, a design has been derived that includes a right turn bay and this is shown opposite and included as Appendix 3e.

3.3.16 Visibility splays of 2.4m x 43m have been shown which are consistent with a 30mph zone as set out within Manual for Streets. The visibility splay to the left would only need to go to the lane marking on the outside of the right turn bay because there is a solid island to the north (and another could be placed at the start of the right turn bay) that would prevent southbound vehicles crossing into the northbound lane.

3.3.17 Prior to occupation, it is intended that access will be provided from Quinton Road for both the spine road and the Redrow site. To the north it is intended to provide an access to the land at Great Grovehurst Farm and Pheasant Farm prior to occupation on each of these sites. Hence, it is anticipated that four access junctions will be formed prior to occupation on each of the relevant development parcels on the basis that each parcel of development will begin independently.

3.3.18 The proposed secondary school access from Grovehurst Road would be constructed as the secondary school is progressed and will be fully open for use prior to opening of the secondary school. The timing of this would be in the control of KCC to meet their needs in a timely fashion.

3.3.19 The direct vehicular access points from Quinton Road and Grovehurst Road would be connected through the site via a new spine road. This spine road will comprise a 6.75m wide carriageway with traffic management characteristics incorporated to deter external through traffic movements whilst allowing permeability and route choice for residents on site.

3.3.20 It is intended that the spine road through the site will not be a through route attractive to general traffic, but will instead serve the needs of the development, both for private vehicles, walking and cycling and public transport. Hence the spine road will be designed accordingly at junctions and crossing points, and with walking and cycling infrastructure alongside it, but with sufficient width to accommodate bus movements. A vehicular connection will also be made between the Persimmon site and Redrow site providing further permeability to and from Quinton Road and within the site.

3.3.21 For the purposes of assessment, the completion of the spine road within the site has been assumed at 2022 / 23. At this stage the land at Great Grovehurst Farm (120 units) and Pheasant Farm (100 units) will be built out and accessed independently from Grovehurst Road. In addition, the Redrow site will be complete (200 units) and accessed independently

from Quinton Road. The Persimmon site will have 360 completions by this time and accessed independently from Quinton Road. At this stage, and as a minimum, an emergency access can be provided for both the Persimmon and Redrow sites via a link connecting the two sites.

3.3.22 On completing the spine road through the site (assumed at 2023) it is anticipated that traffic patterns would adjust to the availability of new routes. Hence, a proportion of the Redrow and Persimmon site traffic would divert to Grovehurst Road and a proportion of the Pheasant Farm and Great Grovehurst Farm traffic would head south through the site to Quinton Road. Beyond 2023 the build out would continue with both access locations available.

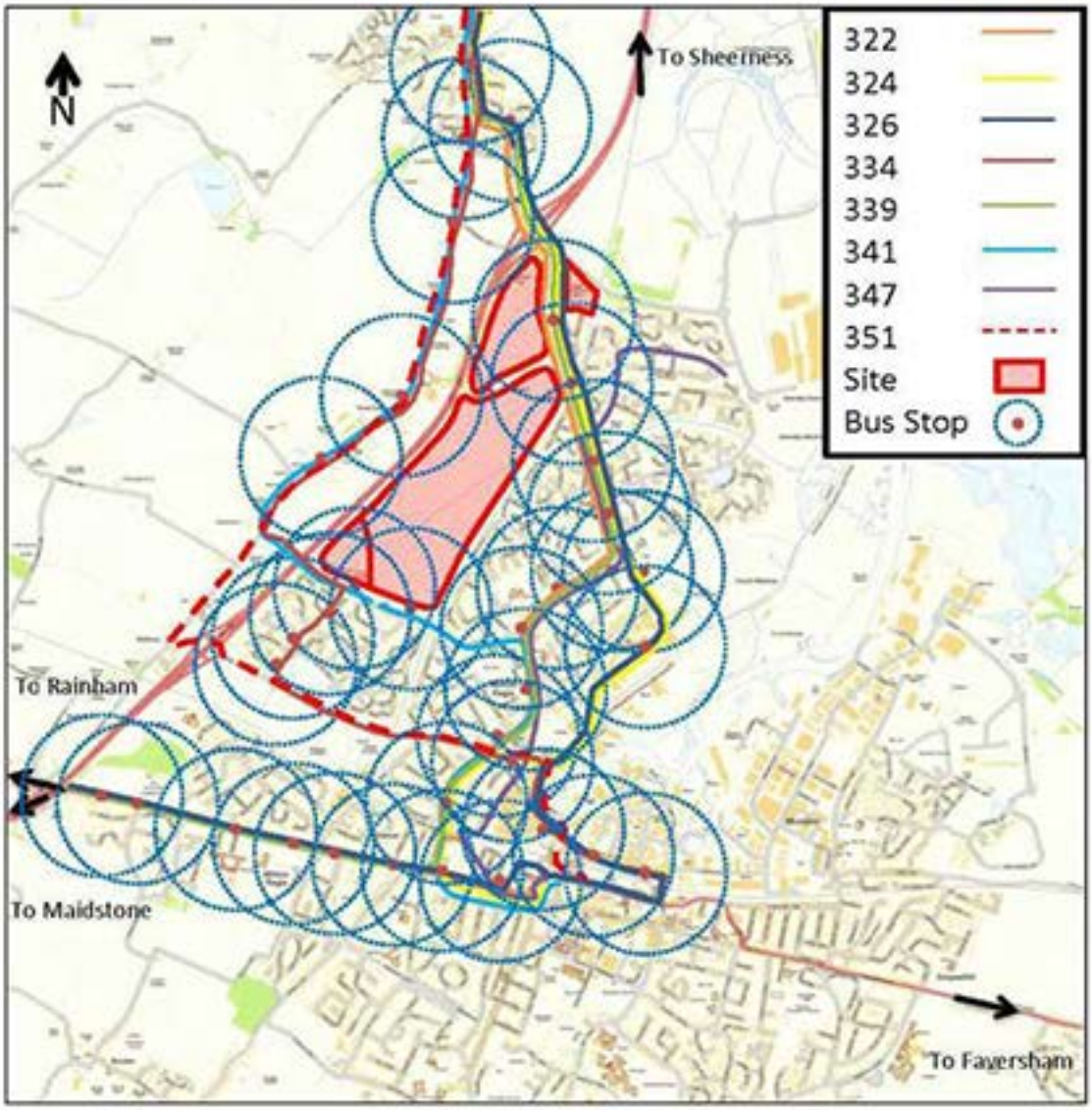
3.3.23 On the basis of the above it has been assumed appropriate to assess a completion year of 2031 and an interim year of 2023. The interim year of 2023 assesses the scenario whereby the spine road is not yet complete as a through route, but is imminent. Hence, this scenario will assess the maximum number of units on site without the ability to pass through the site. A 2031 assessment coincides with the build out period and Local Plan horizon.

3.3.24 A number of off site mitigation schemes will be required as part of the wider highway access strategy. Schemes have been identified and these are considered in turn later within this Transport Assessment.

3.3.25 The detailed triggers for each mitigation scheme would need to be the subject of further and detailed negotiation with the highway authority.

3.4 Public Transport access strategy - bus

3.4.1 Connecting the site by bus to the town centre, rail station and other local amenities will be important. Bus services already pass along Quinton Road to the south and Grovehurst Road to the east. Further bus services are available along Sheppey Way to the west. These existing routes, along with existing bus stops and frequencies are illustrated below along with the existing 400m (5 minute walk) catchment areas.



3.4.2 Whilst the existing bus infrastructure illustrated above provides accessibility to the bus network it is proposed that the development will support and enhance this through the provision and initiatives described below.

3.4.3 Without any further infrastructure provision, the development would provide additional support to the existing bus services through additional patronage generated by the residents on site. It is noted from the figure above that a significant proportion of the development site sits within a 400m (5 minute walk) radius of existing bus stops. This confirms that the site is already well connected to the existing bus infrastructure.

3.4.4 Nevertheless, in order to increase the attractiveness and convenience of the bus mode, and hence the propensity of residents to use the bus, it would be appropriate for the development to enhance the local bus services.

3.4.5 With respect to infrastructure the masterplan makes provision within the site for bus services to penetrate the site. This is through an appropriately sized spine road (6.75m) to allow two way bus working and three on site bus stop locations (shelters) at suitable spacings and close to key activity locations. Footways will be provided on site to allow ease of access to bus shelters.

3.4.6 Aside from the infrastructure it is proposed to enhance bus services serving the site adopting one or more of the approaches listed below:

- Diversion of existing services through the development. This could include diversion of route 334 from Sheppey Way to pass through the site for example.
- Increased frequency of existing services to allow a proportion of these to pass through the site. Route 347 serving Kemsley may lend itself to this approach for example.
- A stand alone and dedicated service to and from the site linking with key destinations such as the town centre and rail station.

3.4.7 It is important to demonstrate that a proposed stand alone bus service could be viable in its own right. Whilst it is likely that some pump priming of the services will be required during the build out period of development this is typical and this support will be provided by the developer. Thereafter it will be important to know that the service could be viable under its own resources.

3.4.8 Revenue to cover the cost of running the additional services would come from a couple of sources. The primary source of patronage to support enhanced bus services will be the residents of the new development. However, it would be reasonable to expect a proportion of existing residents along the route of any enhanced service (external to the site) to switch to using this bus provision. The anticipated income from the new residents only is considered below.

• Houses proposed	1520	
• Persons per household	2.43	(Census 2011)
• New residents	3,694	
• Average bus journeys per person per annum	36.5	(NTS Table BUS0110a)
• Annual bus journeys	134,831	(two way trips)
• One way fare	£2.00	(approximately)
• **Annual revenue**	**£269,662**	

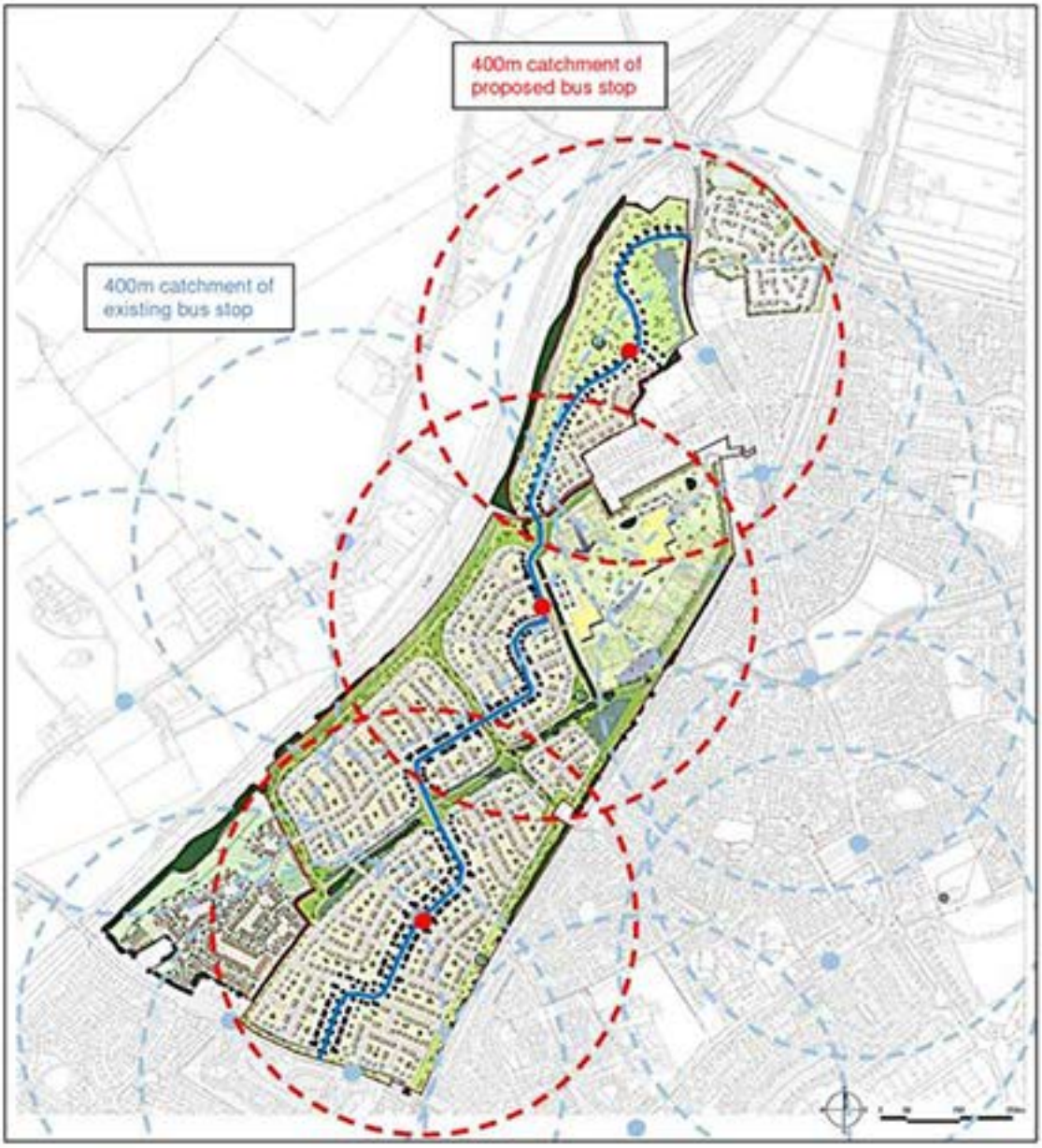
3.4.9 It is therefore anticipated that an annual income of around £270,000 would be generated by residents on site and this could be used to support an enhanced bus service, directly serving the site. This income may be supplemented by increased patronage from existing residents on the route of such an enhanced service.

3.4.10 The funding of a bus is approximately £100,000 - £150,000 per annum, dependent upon the type of bus used and service offered. It is reasonable to assume that two Sprinter minibuses could be funded by the revenue generated by the site.

3.4.11 Based upon two buses being funded, a service frequency of around 20 minutes could be achieved between the site and the rail station in Sittingbourne town centre for example. This would assume a 40 minute circular journey time for each bus. In reality, a dedicated bus service may not need to operate a 20 minute frequency in the middle of the day and at weekends. This would reduce the cost, and hence strengthen the viability of the service.

3.4.12 The manner in which the revenue generated could be used would need to be the subject of detailed discussions with the local bus operators (Arriva and Chalkwell). However, at this stage it is reasonable to expect that a service of three buses per hour (20 minute frequency) could be achieved between the site and Sittingbourne town centre, either with new Sprinter buses provided and / or an enhancement of existing services and their diversion into the site.

3.4.13 Based upon the above, the figure below illustrates the proposed bus strategy for the development.



3.5 Public Transport access strategy - rail

3.5.1 Kemsley rail halt sits adjacent to the site and presents an excellent opportunity for new residents to commute to work from the site and for secondary school pupils to access the site.

3.5.2 There is no vehicular access to the station or vehicle or cycle parking and the station is unmanned. There are two public entrances to the station (one on either side of the railway line), accessed via footways that lead from the western side of Grovehurst Road. These provide step-free access to both platforms.

3.5.3 Services at Kemsley rail halt typically operate twice per hour between Sittingbourne and Sheerness, with interchange provided at Sittingbourne for onward connections to Canterbury, Ramsgate, the Medway Towns and London.

3.5.4 Positive discussions have been held with Network Rail with respect to linking the site directly with Kemsley rail halt for pedestrians and cyclists. In principle this would seem acceptable.

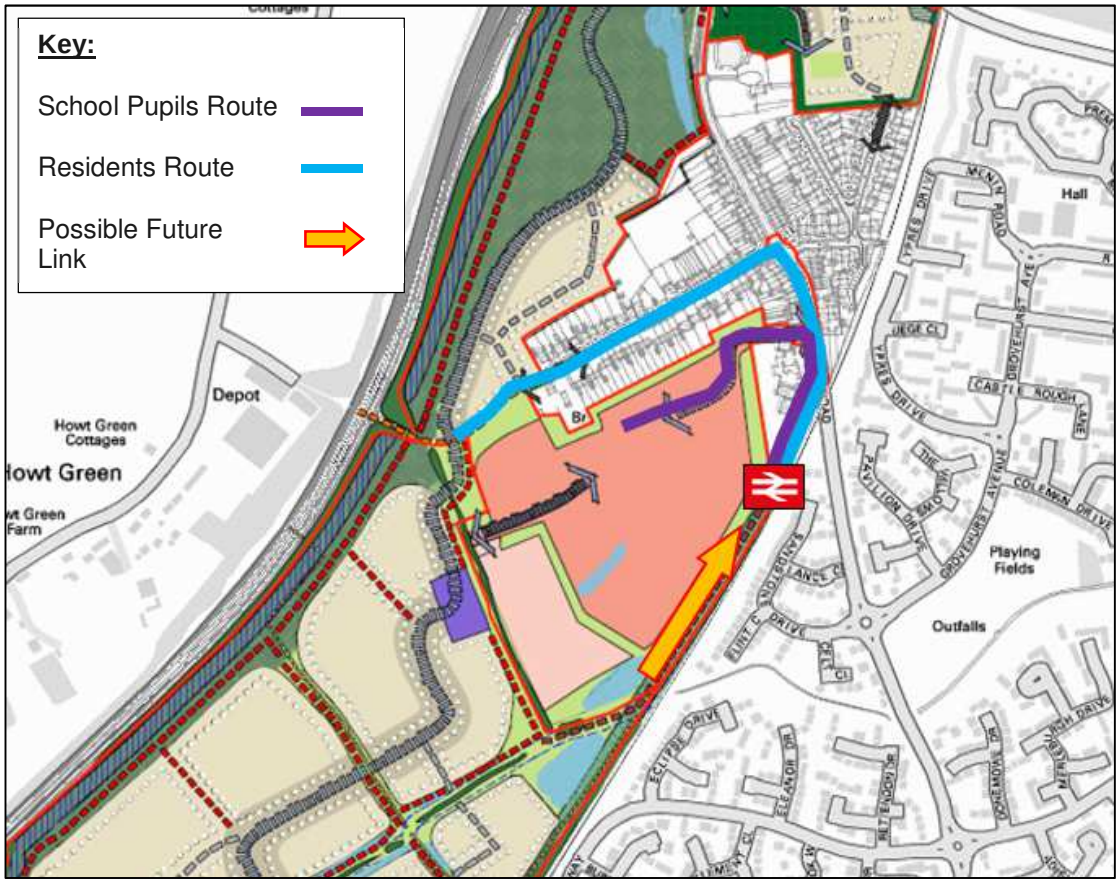
3.5.5 Providing such a direct pedestrian connection through the site and to the Network Rail boundary would need to pass through the area identified for the schools within the Local Plan and the masterplan.

3.5.6 The school sites will be transferred to KCC to masterplan and build out to meet their requirements. Therefore, the provision of a direct pedestrian access between Kemsley rail halt and the wider site would be in the control of KCC and hence its delivery would need to be included within a Reserved Matters Application for the school site. Nevertheless, the concept masterplan submitted with the Persimmon application indicates how this may be achieved.

3.5.7 Without a link through the school site, access from the site to Kemsley rail halt can still be provided in two ways as summarised below:

- Secondary school pupils using the train would logically use the medical centre access to / from Grovehurst Road and thereafter the existing accesses to the platforms indicated in purple below.
- Residents from the wider site would use the on site walking routes to access Bramblefield Lane and thereafter Grovehu rst Road indicated in blue below.

3.5.8 These two routes are illustrated below.



3.5.9 It is proposed that the development would provide a contribution to improve facilities at Kemsley rail halt and hence increase the attractiveness of this for residents and school pupils.

3.5.10 Whilst the details of a contribution would be subject to the S106 negotiation and agreement, previous conversations with Network Rail and Southeastern have suggested that the following items could inform the considerations on upgrade contributions:

- CCTV coverage of the station area.
- Improved lighting for the station area.
- Fencing upgrade at platform entrances.
- Covered cycle parking.
- Upgrade of waiting shelters.

- Improvement to customer information system.
- Improved signage.

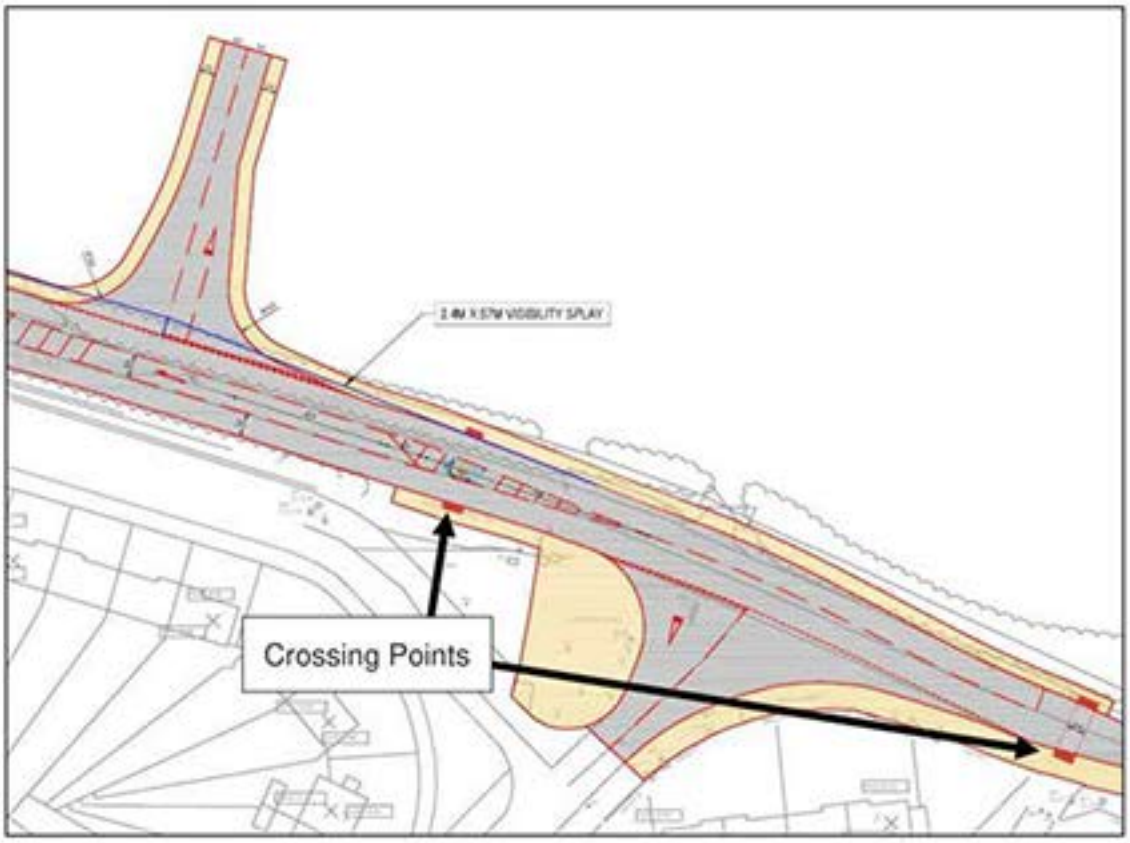
3.6 Walking and cycling access strategy

3.6.1 Pedestrian and cycle access to the site will be available from a number of locations on the site boundary and wider routes. These are described below.

3.6.2 At the south boundary a footway will be provided on the north side of Quinton Road within the site frontage. This may be set back from the carriageway or alongside it. This facility will connect the two access points on Quinton Road and extend east as far as the existing shuttle working signals on Vicarage Lane.

3.6.3 A crossing point will be created on Quinton Road at the spine road access using a pedestrian refuge and dropped kerbs and tactile paving. This will provide access to the existing footway on the south side of Quinton Road and hence a route between the site and Knightsfield Road and The Meads.

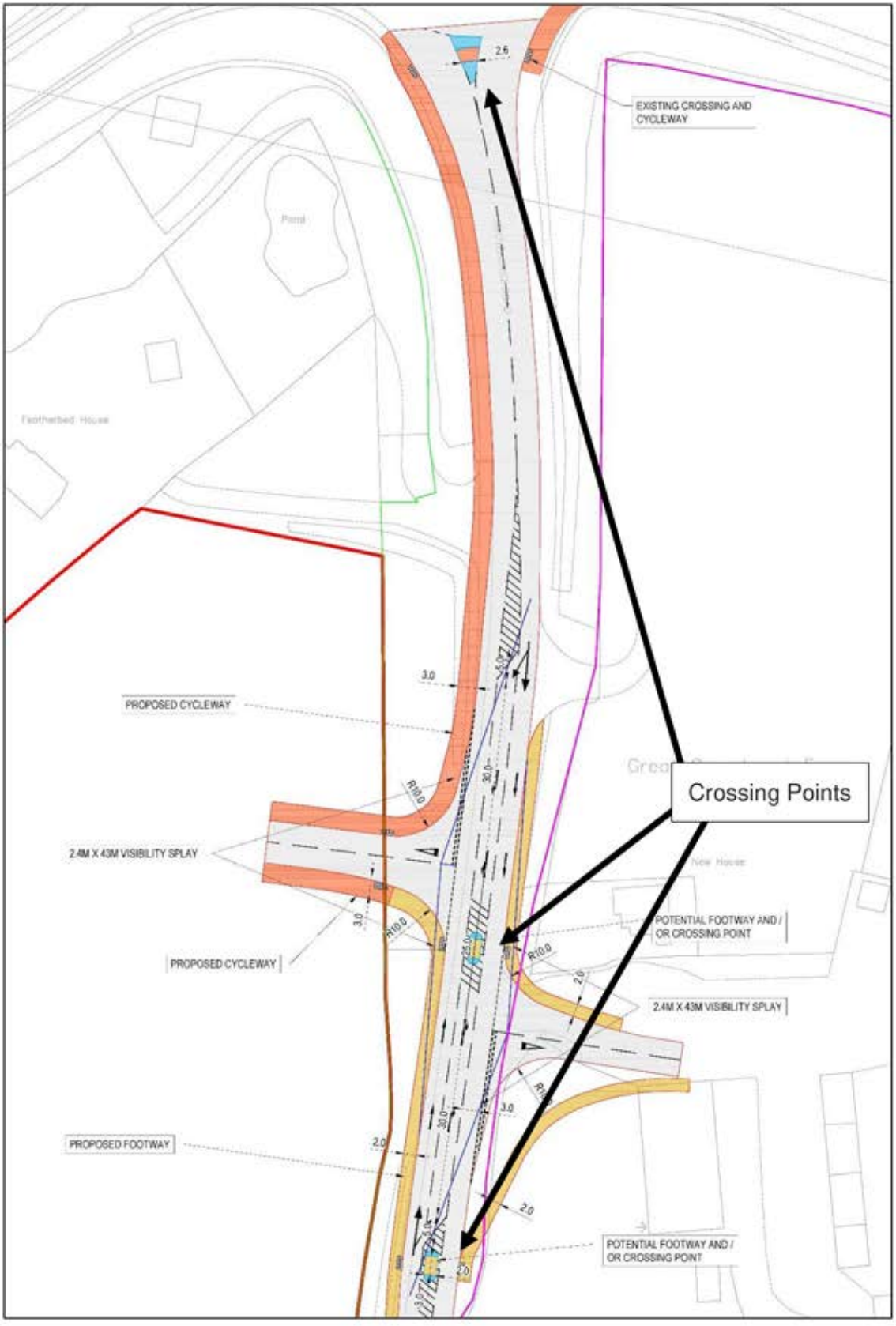
3.6.4 A signal controlled crossing point can be provided to the east where the existing signal controlled shuttle working across the rail line exists. This could be provided as a toucan crossing and would provide a route to the existing footway / cycleway on the south side of Quinton Road / Vicarage Road. The crossing facilities described above are illustrated below.



3.6.5 A footway / cycleway will be provided on the east / south side of the spine road as it approaches Grovehurst Road. This will connect with the existing footway on the west side of Grovehurst Road.

3.6.6 The vehicular access from Grovehurst Road will incorporate a pedestrian crossing facility in the form of a dropped kerb, tactile paving and refuge within the hatched central reserve. This will provide connectivity between the main site and the land at Great Grovehurst Farm.

3.6.7 Upgrade of the existing footway to a shared cycleway / footway is proposed on the west side of Grovehurst Road heading north (from the site access) to the roundabout. At this location cyclists will be able to cross Grovehurst Road and connect with the existing cycleway on the south side of Swale Way. The crossing facilities described above are illustrated below.



3.6.8 A walking and cycling route will be available through the land at Great Grovehurst Farm to connect with the existing footway / cycleway on the south side of Swale Way. This would provide onward access to the employment areas along this corridor.

3.6.9 The walking and cycling connections to Swale Way would connect with the existing route on the west side of the Nicholls Transport depot which runs from the Nicholls access, northbound and under the rail line. This creates a connection to the Ridham / Kemsley Strategic Employment Area. The underpass beneath the railway has been resurfaced, lined and lit under the terms of a s106 Agreement.

3.6.10 A walking and cycling route will be available through the land at Great Grovehurst Farm to connect with Godwin Close on the south boundary. This provides a route to Kemsley village and to Kemsley Paper Mill.

3.6.11 The existing Public Right of Way (PROW) connecting Bramblefield Lane with Sheppey Way will be retained. This incorporates National Cycle Route 1 and would hence provide a walking and cycling access to the site.

3.6.12 A walking / cycling route on Sheppey Way (from Bramblefield Lane towards Iwade) will be contributed towards by the Development. This is in accordance with policy and will connect with the provision being made on Sheppey Way by existing development at Iwade. The sketch below illustrates a potential scheme within the highway boundary.

3.6.13 The entrance to the medical centre will be retained and amended to allow vehicular access to the secondary school. This will also provide a pedestrian footway leading to the secondary school site.

3.6.14 The existing PROW crossing the site from east to west provides access to the site from Middletune Avenue and Newbridge Avenue via an at grade crossing of the rail line. This PROW currently passes alongside the A249 before connecting with the PROW from Bramblefield Lane and crossing the A249 corridor. A route broadly in line with the existing alignment will be retained and hence existing journeys will remain possible.

3.6.15 The spine road access will incorporate shared walking and cycling facilities on its east side and a footway on the west side as it approaches Quinton Road to the south. On reaching Quinton Road an appropriate length of footway would be provided within the site frontage to allow pedestrians to cross and use the existing footway on the south side of Quinton Road.

3.6.16 A pedestrian link will be provided at the south west corner of the Persimmon site to connect with the existing convenience store on Quinton Road.

3.6.17 Internal pedestrian links will be provided between the Persimmon site and the Redrow site.

3.6.18 A pedestrian access will be provided to Quinton Road through the Redrow site. This would connect with the existing footway on the south side of Quinton Road.

3.6.19 Footpath ZU11 and the eastern part of ZR108 provide pedestrian / cycle access to The Meads Local Centre where there is a range of shops including a convenience store, public house, community centre and medical centre.

3.6.20 The masterplan will make provision for walking and cycling. For example, the spine road passing through the site will incorporate a walking and cycling corridor along its length.

3.6.21 A network of paths and footways on site will allow for ease of movement around the site, including the convenience store, community facilities, school and potential routes to Kemsley rail halt.

3.6.22 The development will implement an upgrade of the Bobbing junction to mitigate highway capacity effects. This will include signal control of the off slips. It would be possible to include pedestrian crossing facilities within the signal control upgrade to assist pedestrian movements between the site and The Meads and Bobbing village.

3.6.23 The masterplan has been developed to promote walking and cycling, particularly along desire lines through the development, linking to the external access points. Given the proximity of the proposed local centres, primary and secondary school and nearby employment, walking and cycling have the potential to be attractive alternatives to the private car. The on-site facilities will include provision of the following where appropriate:

- Street and path lighting.
- On-site roads will be designed to 20mph.
- Tactile and coloured surfacing.
- Signage to direct pedestrians and cyclists to key facilities and places of interest, including distances.

3.6.24 The provision of the walking and cycling network through the site would present an opportunity for a more direct route to Kemsley rail halt for residents of The Meads.

3.6.25 The figure below illustrates the various walking and cycling access points in the context of the masterplan.

3.7 Construction related traffic

3.7.1 The development will be constructed in a number of phases over a period of around 13 years. It is expected that construction would start simultaneously from the north and south with the two access locations on Quinton Road and the staggered access from Grovehurst Road providing construction access for the four development parcels.

3.7.2 It is expected that a Construction Management Plan (CMP) would be a condition of planning permission and that this would be submitted to Kent County Council, prior to the construction progressing. The purpose of the plan will be to manage construction and delivery vehicle movements to and from the site.

3.7.3 The CMP will set out a number of principles to ensure the proactive management of construction and delivery vehicles with respect to parking on site, operational times and agreed routes for example.

3.8 Summary

3.8.1 The above paragraphs demonstrate that the site will integrate with the existing transport network for all modes and be permeable for through journeys by sustainable modes. The development will enhance the transport network as appropriate, not only to meet the needs of residents on site, but also to provide a benefit to existing residents surrounding the site.

4 Policy context

4.1.1 This section provides a review of national, regional and local planning and transport policy guidance in relation to the proposed development.

4.2 National Planning Policy Framework

4.2.1 The National Planning Policy Framework (NPPF) was adopted in March 2012 and is the current over-arching planning framework for Local Planning Authorities.

4.2.2 The NPPF highlights that sustainable development is made up of three elements that are mutually dependent on each other – economic, social and environmental. It further mentions that

"plans and decisions need to take local circumstances into account, so that they respond to the different opportunities for achieving sustainable development in different areas."

4.2.3 The document is divided into a series of sections, and these are intended to provide guidance in specific circumstances. Section 4 of the document relates to the promotion of sustainable transport. In paragraph 30, planning authorities are encouraged to support a pattern of development which facilitates the use of sustainable modes of transport.

4.2.4 The NPPF recognises that different policies should be applied in different communities in order to achieve this balance, and that opportunities to maximise sustainable modes of transport will vary between urban and rural areas. The North West Sittingbourne site is well located with existing connections to the town centre by all modes of transport and would be able to further enhance sustainable transport connections through its delivery.

4.2.5 Section 32 lists a number of considerations for planning authorities to apply in their decision making when reviewing Transport reports. These include the need to consider that opportunities for sustainable transport have been taken up, if the access arrangements are safe and suitable and if there are cost effective improvements to the transport network that could be made. Paragraph 32 of the Framework states that:

"'Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe"

and that

"Plans and decisions should take account of whether safe and suitable access to the site can be achieved for all people".

4.2.6 Importantly, NPPF advises that development should only be refused on transport grounds if the residual cumulative impacts are likely to be "severe". The definition of "severe" in this context is unique to the individual site under consideration. However, it may be helpful to consider that within the context of the Environmental Impact Assessment "severe" impacts are often described as those that would have a national or regional significance. In this respect it is clear that NPPF is seeking to strike a positive balance between potential local traffic impacts and local economic or social benefits.

4.2.7 It is reasonable to suggest that within most urban settings, the existing traffic conditions will be busy, with congestion at peak periods, perhaps at weekends and even at other times as well. However, NPPF is suggesting that planning authorities should not allow this to stifle valuable economic development, in locations that are the best connected to encourage the use of alternative modes of transport.

4.2.8 The proposed site falls firmly into this category. Although mitigation of potential traffic impacts can be undertaken, the test is whether any residual impacts could be considered "severe" in the context of NPPF, and it is clear from the assessment that follows that this is not the case.

4.2.9 Section 34 of the NPPF requires developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes maximised.

4.2.10 The location of the North West Sittingbourne site is consistent with this policy objective as it ensures that residents, visitors and employees associated with the development will have access to a range of transport modes, including access to bus services. Footways are provided alongside the local carriageways along with formal crossing points to ensure access for pedestrians. On site cycle facilities will also be provided.

4.2.11 Paragraph 34 of the NPPF requires developments that generate significant movements to be located where the need to travel will be minimised and where maximum use of sustainable transport modes is possible. The North West Sittingbourne site will connect with existing sustainable transport networks and enhance these, thereby providing a choice of travel modes for existing and future residents.

4.2.12 Paragraph 35 of the NPPF requires opportunities for sustainable travel to be exploited and should therefore give priority to pedestrians and cyclists and be accessible by public transport facilities. Developments should also 'create safe and secure layouts which minimise conflicts between traffic, cyclists or pedestrians. The masterplan responds to this through provision of dedicated walking and cycling infrastructure on site that connects to the external network and on site facilities.

4.3 National Planning Practice Guidance

4.3.1 The National Planning Practice Guidance (NPPG) sets out current guidance for different aspects to development. For the purposes of this document, the guidance within the NPPG 'Travel Plans, Transport Assessments and Statements' document is considered.

4.3.2 The NPPG sets out the following with regards to Transport Assessments:

"Transport Assessments and Transport Statements primarily focus on evaluating the potential transport impacts of a development proposal… The Transport Assessment or Transport Statement may propose mitigation measures where these are necessary to avoid unacceptable or "severe" impacts… Transport Assessments and Statements can be used to establish whether the residual transport impacts of a proposed development are likely to be "severe" …"

4.3.3 It is noted within the NPPG that Transport Assessments can positively contribute towards:

- *encouraging sustainable travel;*
- *lessening traffic generation and its detrimental impacts;*
- *reducing carbon emissions and climate impacts;*
- *creating accessible, connected, inclusive communities;*
- *improving health outcomes and quality of life;*
- *improving road safety; and*
- *reducing the need for new development to increase existing road capacity or provide new roads.*

4.3.4 The proposed development will encourage the use of sustainable travel modes by future residents and provide mitigation measures to avoid "severe" impacts as necessary.

4.4 Local Transport Plan for Kent 4 (LTP4)

4.4.1 Kent's fourth Local Transport Plan was adopted during August 2017 and sets out KCCs plans to meet its role of enabling

"planned, sustainable growth and ensure the necessary infrastructure is in place, which will stimulate regeneration and encourage people and businesses to come to Kent. To be able to travel easily, safely and quickly to our destinations we need a transport network thatcan cater for current demand, enables economic growth, and supports a growing population."

4.4.2 The LTP4 document replicates the infrastructure requirements up to 2031 identified within the Growth and Infrastructure Framework (GIF) document. The GIF sets out the transport schemes necessary to address current and future capacity issues.

4.4.3 As the Local Transport Authority, KCC have a statutory duty to produce a LTP for the county of Kent. This strategy must identify the transport priorities for the county, as well as emphasising the investment required to support growth. The Kent and Medway GIF provides the evidence base for LTP4.

4.4.4 The LTP4 states the following ambition for Kent :

"To deliver safe and effective transport, ensuring that all Kent's communities and businesses benefit, the environment is enhanced and economic growth is supported."

4.4.5 To achieve this ambition the LTP4 document sets out five overarching policies that are targeted at delivering specific outcomes as summarised below.

- *Policy: Deliver resilient transport infrastructure and schemes that reduce congestion and improve journey time reliability to enable economic growth and appropriate development, meeting demand from a growing population.*

  Outcome 1: Economic growth and minimised congestion.

- *Policy: Promote affordable, accessible and connected transport to enable access for all to jobs, education, health and other services.*

  Outcome 2: Affordable and accessible door-to-door journeys.

- *Policy: Provide a safer road, footway and cycleway network to reduce the likelihood of casualties, and encourage other transport providers to improve safety on their networks.*

  Outcome 3: Safer travel

- *Policy: Deliver schemes to reduce the environmental footprint of transport, and enhance the historic and natural environment.*

  Outcome 4: Enhanced environment

- *Policy: Provide and promote active travel choices for all members of the community to encourage good health and wellbeing, and implement measures to improve local air quality.*

  Outcome 5: Better health and wellbeing

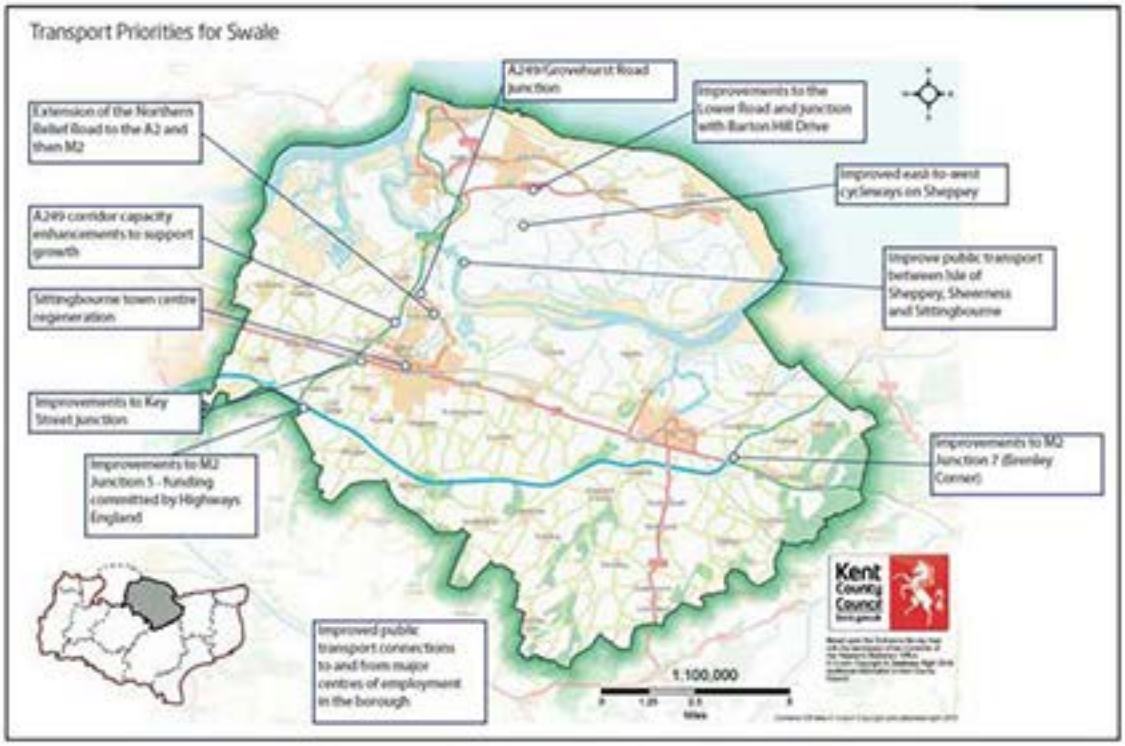
4.4.6 Kent's transport priorities in LTP4 are described as being strategic, countywide or local. The strategic priorities are infrastructure projects that KCC may not directly deliver or operate and are likely to affect a number of districts. Some of these are national priorities. Countywide priorities include promotion of road safety, sustainable travel and maintenance and upgrade of transport assets.

4.4.7 The LTP4 document brings together local priorities from individual Local Plans and supporting Transport Strategies that set out the transport infrastructure requirements to support growth in each district / borough. Many of these priorities are also highlighted in the GIF.

4.4.8 With respect to Swale the LTP4 document identifies the following :

- Capacity issues at M2 Junction 5 is acting as a major barrier to growth in the Borough.
- Junction 7 of the M2 is key for development across East Kent, with growth loading traffic on to a junction already operating over capacity.
- A corridor study of the A249 is needed to define what improvements to the principal junctions (Grovehurst, Key Street and Bobbing) will be required to support the new allocations in the Local Plan, with the A249 / Grovehurst Road Junction already identified in the GIF.
- On the Isle of Sheppey, serious congestion on the A2500 is a barrier to growth.
- On the Isle of Sheppey east-west travel is challenging and links to the mainland are largely dependent upon the Sheerness-Sittingbourne branch line.

4.4.9 The following transport priorities are illustrated for Swale in LTP4.



4.4.10 The proposed development will support the outcomes defined within LTP4 by promoting sustainable travel opportunities, enhancing walking and cycling infrastructure, extending public transport connectivity and off site highway infrastructure upgrades.

4.5 Growth without Gridlock – A transport delivery plan for Kent

4.5.1 Growth without Gridlock, published in December 2010, identifies a package of transport measures that KCC proposed to unlock growth potential within Kent. The plan sets out KCC's priorities for the county and their offer to government to deliver them.

4.5.2 With regard to Swale, the document advises that the key transport challenges are:

- Securing the necessary infrastructure to open up key development areas for housing and employment.
- Delivering capacity improvements on the strategic road network.
- Regeneration of Sittingbourne town centre

4.5.3 The proposals within the document for Swale include major road infrastructure including:

- Sittingbourne Northern Relief Road extension to the A2;
- The A249 at Grovehurst, Key Street and Bobbing junctions.
- M2 Junction 5 capacity improvement;

4.6 Swale Borough Local Plan

4.6.1 The Swale Borough Local Plan was adopted on 26 July 2017 and forms part of the development plan for Swale. The development plan is the system of statutory planning documents against which planning applications are determined.

4.6.2 The Swale Borough Local Plan is the key planning document for Swale, setting out the vision and overall strategy for the area and how it will be achieved for the period to 2031. Applications for planning permission will be determined in accordance with the Local Plan.

4.6.3 The Council has an overarching vision for the Borough to transform its economic, social and environmental prospects, making it one of the best places in Britain in which to live, work, learn and invest. The Local Plan has been prepared to support these priorities.

4.6.4 Paragraph 4.1.1 of the Local Plan states :

"…….When considering development proposals, we will take a positive approach which reflects the national presumption in favour of sustainable development. We will always work pro-actively with developers to find solutions which mean that proposals can be approved as sustainable development and thereby secure improvements to the economic, social and environmental conditions in our area.

Planning applications that accord with the policies in the Local Plan (and, where relevant, policies in neighbourhood plans) will be approved without delay, unless material considerations indicate otherwise."

4.6.5 The North West Sittingbourne site is an allocated site (considered below) and is being promoted in accordance with the Local Plan Policies.

4.6.6 Paragraph 4.1.24 of the Local Plan relates to the Local Plan transport strategy and states :

"Our Local Plan transport strategy:

- *encourages sustainable travel by the use of alternatives to the private car;*
- *improves transport infrastructure by the removal of pinch points which are barriers to development and growth;*
- *promotes alternative access to services by reducing the need to travel and supporting independence; and*
- *helps improve road safety by reducing the number of people killed or seriously injured."*

4.6.7 The proposed development will encourage and enhance the use of sustainable transport modes and will provide residential units in close proximity to amenities. Residents will have a choice of travel mode by which to make their journey.

4.6.8 Policy ST1 within the Local Plan sets out the means by which all development proposals must deliver sustainable development. With respect to transport Policy ST1 states :

Policy ST 1 - Delivering sustainable development in Swale

To deliver sustainable development in Swale, all development proposals will, as appropriate:

…..

5. Offer the potential to reduce levels of out-commuting and support the aims of the Swale Local Transport Strategy;

….."

4.6.9 With respect to assessing the capacity for growth the Local Plan states at paragraph 4.2.14:

"The local highway authority advise that the local road network is adequate (subject to site specific improvements) to accommodate growth levels indicated by objectively assessed need in the first part of the plan period. There are implications both for the strategic and local road networks beyond 2021/22, which will need to be kept under review. For the strategic road network, improvements to Junction 5 of the M2 are programmed to commence by 2020. For the other A249 junctions within the local network, mitigation schemes have been identified and implementation will be carried out in tandem with the build out of development schemes. For the local road network, whilst the likely traffic impact of growth can be accommodated in the short to medium term, there would be stresses toward the end of the plan period."

4.6.10 This Transport Assessment provides a detailed assessment of the highway network improvements that are necessary to address the impact of the proposed development in accordance with the above.

4.6.11 Policy ST4 sets out the list of sites allocated for development to allow Swale to meet the Local Plan development targets and identifies the North West Sittingbourne site for residential development.

4.6.12 The Local Plan sets out a strategy for Sittingbourne. Paragraph 4.3.49 states :

"To promote sustainable transport we are focusing on improving the quality of bus journeys, in particular the accessibility and facilities for passengers in central Sittingbourne. Within the town centre, major proposals will provide a central focus for bus and rail services in the vicinity of the station, which has been boosted by the award of £2.5m from the South East Local Economic Partnership local growth fund. Central Sittingbourne regeneration will also contribute to improvements to the highway network and traffic management within the town centre. A bus quality partnership will aim to improve public transport conditions and services at the town and in its centre, alongside additional routes to new developments and better walking and cycling routes."

4.6.13 Paragraph 4.3.52 states :

"At the north-west of the town, good connections to rail, bus and roads will enable a new community of 1,500 dwellings to be focused there. This location offers excellent connections to the existing urban area and beyond and is located close to Kemsley rail station and to the A249. It has significant potential to provide new schools, major open space and biodiversity enhancements."

4.6.14 Paragraph 4.3.56 and 4.3.57 state :

"These allocations will give rise to a series of improvements needed to the highway network, notably at junctions with the A249 to the west of the town and particularly at its junctions with Key Street and Grovehurst Road. Crucially, beyond limited planned improvements to Junction 5 of the M2, major improvements are now programmed for completion by 2024.

Although not required to support current local plan growth targets, the final section of the Sittingbourne Northern Relief Road to the A2 is needed to improve traffic and air quality conditions in central and eastern areas of the town. It will also enable the full benefits of changes in traffic management in the town centre to be realised. The proposals are identified as a safeguarded 'Area of Search', the alignment for this road being progressed as part of a future Local Plan review."

4.6.15 It is evident from the above paragraphs that the North West Sittingbourne site is a key allocation. It will support and enhance local public transport services and hence contribute to the objectives of the bus quality partnership as well as provide other infrastructure including schools and open space.

4.6.16 Section 5 of the Local Plan sets out the core planning policies whilst section 5.2 considers the promotion of sustainable transport. The Local Plan recognises the key role that transport will play in the delivery of the Local Plan strategy. Paragraph 5.2.1 states :

"…..The transport network needs to strike a balance between providing adequate capacity for current and future residents and business needs, whilst minimising any negative environmental, social and health impacts. This can be achieved through improvements to the capacity of the highway network and through provision of an integrated sustainable transport network."

4.6.17 With respect to impact of development, the Local Plan states at paragraph 5.2.3 :

"The National Planning Policy Framework (NPPF) continues the core principle of sustainable development, through means such as using technology to reduce the need to travel, using planning policies and decisions to actively manage patterns of growth to make the fullest use of public transport, walking and cycling and focusing significant developments in areas which are or can be made sustainable. Only if the residual cumulative impacts of development are 'severe' when all of these policy measures have been explored and exhausted, is there a reason to prevent development on transport grounds. 'Severe' in terms of the NPPF is not defined."

4.6.18 And paragraph 5.2.8 relates to the Strategic Road Network (A249 and M2 within Swale) and states :

"For the SRN, development proposals are likely to be acceptable if they can be accommodated within the existing capacity of a section (or link or key junction) of the relevant part of the network; or they do not increase the demand for use of that section which is already operating over capacity, taking account of any mitigation and/ or capacity enhancement measures which may be proposed. Generally, development should only be prevented or refused where the residual cumulative impacts of development are severe. Safety of the SRN is the key consideration for judging impact of proposed development."

4.6.19 This transport assessment considers the highway mitigation measures necessary to offset the effects of the proposed development and hence accord with the Local Plan.

4.6.20 Paragraph 5.2.17 states :

"A Quality Bus Partnership has been established and is led by Kent County Council Highways, with regular meetings and input from bus operators in the area and Swale Borough Council. This has the objectives of improving services and expanding use of buses in the Borough and liaison on the progress and proposals of the Local Plan so that bus provision is made from the earliest stages of new development."

4.6.21 The principle of the Quality Bus Partnership is for KCC, Swale BC, Arriva, Chalkwell and other KCC bus contract operators to share common objectives of creating a public transport network acknowledged as an increasingly attractive alternative to private car use and seeking increased use of local bus services.

4.6.22 In summary, KCC and Swale BC will provide infrastructure, and enhancements to this, for bus services where appropriate and possible, whilst Arriva and Chalkwell will provide the bus services to use this infrastructure.

4.6.23 Paragraph 5.2.36 notes the need for strategic sites (including North West Sittingbourne) to provide improvements to the A249 junctions and states :

"This Local Plan continues to focus on Sittingbourne as the main urban area, with strategic allocations for housing and employment proposed to the north west and north east of the town. This utilises existing capacity on the A249 and the built and anticipated sections of the SNRR. The Grovehurst and Key Street interchanges with the A249 are nearing capacity and will require improvement to accommodate traffic arising from development proposed in the Local Plan. The impact on the Bobbing junction of further land allocations will also need to be evaluated. Suitable interim mitigation will be provided through strategic development allocations in the plan impacting on these junctions. S.278 or S.106 contributions will be pooled towards both interim mitigation and more major long term improvement schemes, the latter of which will also require support from public funding."

4.6.24 This transport assessment details the interim scheme promoted by the development at Grovehurst and assesses the impact at Bobbing junction along with the mitigation scheme required at this location.

4.6.25 Policy CP2 sets out the policy with respect to sustainable transport as follows:

"Policy CP 2

Promoting sustainable transport

New development will be located in accordance with Policy ST1 to Policy ST7, Local Plan allocations, approved Neighbourhood Plans and Community Right to Build initiatives, which minimise the need to travel for employment and services and facilitate sustainable transport. Actions by the public, private and voluntary sector will adopt an integrated approach to the provision of transport infrastructure. Development proposals will, as appropriate:

1. Contribute to transport network improvements, where capacity is exceeded and or safety standards are unacceptably compromised, with particular emphasis on those identified in the Infrastructure Delivery Schedule;

2. Make best use of capacity in the network by working together with transport providers to improve the transport network in the most sustainable way, and extending it where necessary, as demonstrated by Transport Assessments and Travel Plans in support of development proposals;

3. Support the provision of major new transport infrastructure in accordance with national and local transport strategies;

4. Maintain and improve the highway network at key points to improve traffic flows and respond to the impact of new development and regeneration, as set out in the Local Transport Strategy;

5. Improve safety, through measures such as adequate parking, lighting and traffic management schemes;

6. Achieve alternative access to all services through promoting access to sustainable forms of transport particularly bus, cycling and rail transport and improving interchange between them from the earliest stages of development;

7. Provide integrated walking and cycling routes to link existing and new communities with local services and facilities, public transport and the Green Grid network; and

8. Facilitate greater use of waterways for commercial traffic, where this would not have an unacceptable adverse environmental impact, through working with the Port of Sheerness and other bodies."

4.6.26 The proposed development will enhance capacity on the highway network as necessary to mitigate its impact and promote the use of sustainable transport through appropriate Travel Plan measures. This will include enhancements to local walking, cycling and public transport provision.

4.6.27 Section 6 of the Local Plan details the site allocations. Section 6.6 deals with mixed use allocations including the largest of these at North West Sittingbourne. With respect to this site the Local Plan notes that it has :

"been identified as having significant potential to meet the Borough's future growth needs in a sustainable location that minimises impacts on the wider countryside due to its relative self-containment."

4.6.28 Hence, the Local Plan recognises the sustainable location of the site and identifies it for a minimum of 1,500 dwellings along with open space, primary and secondary schools, local health facilities enhancement and improvement to bus and rail facilities.

4.6.29 Paragraphs 6.6.7 to 6.6.9 state :

"A key issue affecting the allocation is the need for a new junction, between Grovehurst Road and the A249 which has been identified as necessary by the Highway Authorities. The main vehicular access into the allocation will need to have regard to the layout of this junction. There will also need to be pedestrian and cycle way links across the A249 utilising the existing right of way along Bramblefield Lane, both to facilitate use of the open space uses on either side and to enable a continuous pedestrian and cycle route to Kemsley rail halt and the new schools at the Quinton Road site. Existing pedestrian/cycle links across the Grovehurst/A249 Junction will be retained and may need to be improved as part of the major remodelling of the junction rather than in any interim improvement scheme. Improvements to bus routes serving the site and the rail halt will be required, whilst improvements to station facilities at Kemsley should be explored.

Transport assessment work will also need to assess wider impacts in the A249 corridor between the Key Street and Grovehurst junctions and measures may be required to address any impacts arising. The assessment will also need to consider the phasing of development relative to any interim or longer term improvements to junction 5 of the M2.

The Masterplan/Development Brief should be informed by a Transport Assessment for the allocation which seeks to mitigate the impact of development traffic on surrounding roads including junctions with the strategic road network and within existing neighbourhoods. Access points are available from Grovehurst Road and Quinton Road, although the Transport Assessment will establish the need for, scale and nature of any off-site highway improvements necessary to mitigate unacceptable traffic impacts at the Grovehurst/A249 Junction and Bobbing/A249 Junction and elsewhere on the local highway network. Highways England and Kent County Council have, in principle, agreed the appropriateness of an interim improvement scheme to the Grovehurst Road/A249 junction to accommodate increases in traffic arising from Local Plan allocations. Development at the North West Sittingbourne allocation will be expected to contribute to the funding of the interim scheme although some development is likely to be acceptable in advance of it. The Transport Assessment will therefore need to inform the timing of transport mitigations to complement the phasing proposals in the Masterplan/development brief. Pedestrian/cycle links across the A249 will need to be improved via Bramblefield Lane and Old Sheppey Way commensurate with the interim improvement of the Grovehurst Road/A249 junction and at the junction itself as part of the ultimate junction remodelling."

4.6.30 In summary, the proposed development will contribute towards an interim upgrade to the A249 Grovehurst junction that will accommodate Local Plan growth, and promote a mitigation

scheme on the Bobbing junction. These schemes are considered in detail at section s10 and 11 of this Transport Assessment along with other schemes to mitigate local junctions. Pedestrian and cycle routes across the site using the Bramblefield Lane PROW will be incorporated to the masterplan and appropriate enhancements made.

4.6.31 Policy MU1 sets out the Local Plan policy relating to North West Sittingbourne as follows :

"Policy MU 1

Land at north-west Sittingbourne

Planning permission will be granted for mixed uses on land at North West Sittingbourne, as shown on the Proposals Map and will comprise a minimum of 1,500 dwellings, community facilities and structural landscaping and open space adjacent the A249. Development proposals will:

1. Be in accordance with a Masterplan/Development brief prepared by the landowners/developers involved in the delivery of the allocation, in consultation with the Borough Council and which reflects the requirements of this policy;

2. Be in accordance with Policy CP4 and in particular, achieve an integrated landscape strategy to provide a minimum of 22 ha natural and semi-natural greenspace and other open space as a continuous buffer along the A249 that will form part of the important local countryside gap between Sittingbourne and Bobbing/Iwade in accordance with Policy DM25 and Policy New A17 for Iwade, as well as contributing toward an appropriate link between the two via Bramblefield Lane/old Sheppey Way. This area will link to a network of green spaces and corridors throughout the allocation to achieve open space provision;

3. Ensure that, through both on and off site measures, any significant adverse impacts on European sites through recreational pressure will be mitigated in accordance with Policies CP7 and DM28, including a financial contribution towards the Strategic Access Management and Monitoring Strategy;

4. Provide on-site flood mitigation measures;

5. Integrate heritage assets, having regard to their setting;

6. Be accompanied by a Health Impact Assessment in accordance with Policy CP5;

7. Be supported by a transport assessment and access strategy in the Masterplan development brief to determine the need and timing for improvements to the transport network and phasing of development and address the following:

a. The scale, nature and timing of interim improvements at Grovehurst Road/A249 junction and if necessary at the Bobbing/A249 junction;

b. Identification of vehicular access points from Quinton Road and Grovehurst Road and mitigation of traffic impacts on the local road network and existing neighbourhoods by defining an appropriate quantum of development relative to these access points;

c. The timing of any necessary off site highway improvements relative to the phasing of development;

d. Identification of improvements to the public transport network between the site and Sittingbourne;

e. Encouragement of increased rail use from Kemsley Halt through enhancement of the facilities there and public pedestrian and cycle links;

f. Secure safe and attractive pedestrian and cycle links within the development and to the adjacent network including links to Iwade over the A249;

g. Have regard to the availability of land to the north of Swale Way already safeguarded for the remodelling of the A249/Grovehurst Road junction and should the mitigation design require it, within any other relevant allocation.

8. Achieve a mix of housing in accordance with Policy CP3, including provision for affordable housing in accordance with Policy DM8;

9. Achieve suitable means of sustainable energy production and carbon reduction measures compliant with Policy DM20;

10. Secure new primary and secondary schools on site, with dual public/school use facilities (including a land reservation for its provision), to include land for artificial playing pitches; and

11. Provide appropriate community facilities and other infrastructure within the site to meet the needs of future residents, including those within the Local Plan Implementation and Delivery Schedule, in particular those arising from primary health care, libraries and community, learning and skills services".

4.6.32 A Development Framework has been produced by the site promoters and this has been shared with the local authority. This transport assessment addresses the requirements of item 7 within the policy.

4.6.33 Section 7 of the Local Plan sets out development management policies and in particular section 7.2 sets out those related to managing transport demand. Paragraph 7.2.1 states :

"This policy is designed to support the National Planning Policy Framework core principles of managing patterns of growth to make the best possible use of public transport, walking and cycling and focusing development in sustainable locations….."

4.6.34 The proposed development is located such that it provides connections to sustainable modes of transport for future residents which can be enhanced as a result of the development. On site design will provide walking and cycling routes and a route suitable for a bus to pass through the site. Policy DM6 sets out the policy relating to the management of transport demand and impact as follows :

"Policy DM 6

Managing transport demand and impact

1. Development proposals generating a significant amount of transport movements will be required to support their proposal with the preparation of a Transport Assessment (including a Travel Plan), which will be based on the Council's most recent strategic modelling work. The Highways Agency may also require a Transport Assessment if development is deemed to impact on the strategic road network.

2. In assessing impacts on the highway network, development proposals will:

a. demonstrate that opportunities for sustainable transport modes have been taken up;

b. where the residual cumulative impact of development on traffic generation would be in excess of the capacity of the highway network and/or lead to a decrease in safety, environmentally acceptable improvements to the network agreed by the Borough Council and the Highway Authority will be expected. Such works will be carried out by the developer or a contribution made towards them in accordance with Policy CP6. If such works cannot be carried out and the residual cumulative impacts of development are severe, then the development will be refused.

c. avoid the formation of a new direct access onto the strategic or primary distributor route network where possible, or unless identified by the Local Plan. Other proposals for new access onto the networks will need to demonstrate that they can be created in a location acceptable to the Borough Council and appropriate Highway Authority. Proposals involving intensification of any existing access onto a strategic, primary or other route will need to demonstrate that it is of a suitable capacity and safety standard or can be improved to achieve such a standard;

d. integrate air quality management and environmental quality into the location and design of, and access to, development and, in so doing, demonstrate that proposals do not worsen air quality to an unacceptable degree especially taking into account the cumulative impact of development schemes within or likely to impact on Air Quality Management Areas; and

e. not result in the loss of usable wharfage or rail facilities.

3. The location, design and layout of development proposals will demonstrate that:

a. priority is given to the needs of pedestrians and cyclists, including the disabled, through the provision of safe routes which minimise cyclist/pedestrian and traffic conflict within the site and which connect to local services and facilities;

b. existing public rights of way are retained, or exceptionally diverted, and new routes created in appropriate locations;

c. access to public transport is integrated into site design and layout where appropriate;

d. the safe and efficient delivery of goods and supplies and access for emergency and utility vehicles can be accommodated; and

e. it includes facilities for charging plug-in and other ultra low emission vehicles on major developments."

4.6.35 The development responds to these requirements. This transport assessment document sets out the effects of the development on the local highway network and the mitigation measures proposed to address this. In addition, the masterplan will provide a walking and cycling network on site to facilitate priority being given to these modes in navigating the site and linking with the external network. Existing PROWs will be retained and enhanced on site. Buses will serve the site directly with the provision of a service along the spine road.

4.6.36 With respect to parking policy the Local Plan advises that the Borough Council currently applies guidance and standards developed by Kent County Council for residential and non-residential uses. The Council will continue to apply the extant Kent County Council guidance and standards to development proposals until local standards are developed.

4.7 Swale Transport Strategy – Draft

4.7.1 The draft transportation strategy for Swale considers the issues regarding transport in Swale and potential solutions to these in the context of national and local policies. The transportation action plan is structured into four main sections, those being :

- Encouraging sustainable travel
- Improvements to transport infrastructure
- Alternative access to services
- Road Safety

4.7.2 It is intended that the strategy will provide a detailed policy framework for the district which will support and complement the Local Plan. It will identify the transportation solutions that are considered to be necessary to support or unlock future development.

4.7.3 The key transport issues in Swale are set out by the document as being :

- Congestion at M2 Junction 5 acts as a barrier to further development in Swale.
- Capacity improvements required at A249 Key Street and Grovehurst interchanges.
- Rural areas of the borough are remote from main centres and less well served by public transport.
- Public transport tends to be inaccessible to the mobility impaired.
- Traffic congestion with school/ employment commuting into Sittingbourne, causing rural rat-runs in the south of town and air quality issues.
- Transport interchange between cycle routes, bus services, and train services is poor, therefore encouraging the use of cars to rail stations, which add to problems with parking and congestion.
- Not enough uptake of sustainable transport.
- No current parking strategy.
- Constrained viability of new developments to provide significant infrastructure contributions.

4.7.4 The draft Transport Strategy summarises the transportation modelling of the planned development in Swale looking at a 'Do Minimum' scenario which assumes only background growth, and two 'Do Something' scenarios, one assuming the construction of 540 dwellings per annum, and one assuming the construction of 740 dwellings per annum.

4.7.5 The document explains that across the borough there is scope to improve the levels of walking and cycling, and in particular travel by bus. All new developments will be required to provide for sustainable transport by:

- ensuring that all housing and employment developments are served by bus routes, with fully accessible stops within 400m of any part of the site;
- ensuring there is space for secure cycle provision;
- ensuring that local amenities are within walking distance;
- prioritising walking and cycling routes, making them direct and secure through design.

4.7.6 With respect to sustainable transport the document sets out a number of actions, including those listed below:

- Implement the Swale Cycling Strategy.
- Secure and sheltered cycle parking covered by CCTV to be provided at all train stations.
- Use the Quality Bus Partnerships to ensure that the needs of the whole Borough are being met and that the expertise of the bus operators is fully utilised.
- Ensure that new developments provide kickstart funding to make a bus service viable from the outset.

4.7.7 With respect to transport infrastructure the document recognises that

"it is not realistic to aim to remove all congestion at all times"

4.7.8 and that

"major road building solutions are not likely to be affordable solely using developer contributions or community infrastructure levy, but notwithstanding this, developers will be

required to contribute proportionately to improvements to the highway directly and indirectly affected by their proposals."

4.7.9 The strategy advises that capacity improvements and safety improvements at key junctions will be required, particularly where queuing traffic would impact on the strategic road network (M2 or A249). The document sets out a number of actions including :

- Improve capacity at M2 junction 5.
- Improve capacity at the A249 Grovehurst junction.

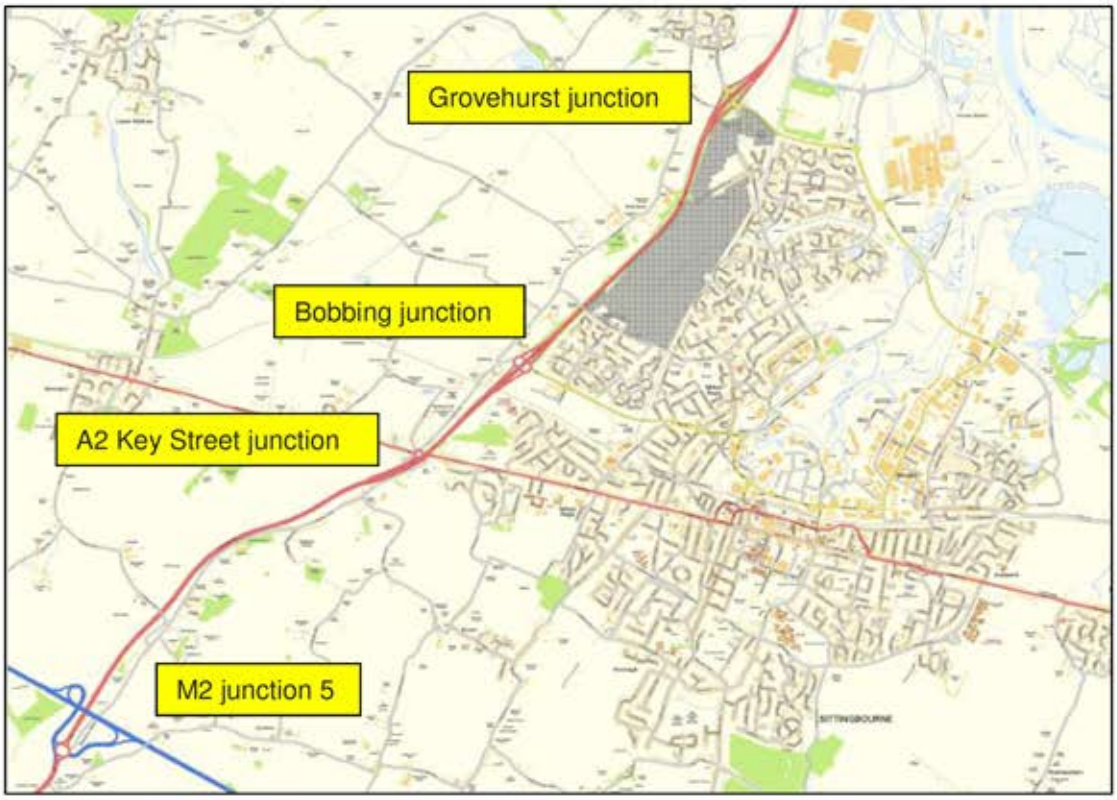
4.7.10 The Transport Strategy sets a number of targets to maintain traffic volumes, increase proportion of mode share by sustainable modes, improve public transport reliability and safety. The proposed development will support and provide opportunities for sustainable travel and will offset effect of development traffic as appropriate at junctions off site.

5 Existing transport network

5.1.1 The following section considers the existing transport network serving the site for all transport modes.

5.2 Strategic highway network

5.2.1 Access to the site from the strategic highway network is via the A249 trunk road dual carriageway. This route is maintained by HE and borders the site on its western side. The A249 is a strategic route that links Maidstone with Sheerness on the Isle of Sheppey and also serves as a link between the M2 and M20 motorway corridors.



5.2.2 The A249 is accessed from the site via the B2005 Grovehurst Road to the north west and Bobbing junction to the south west. The Grovehurst Road junction is a grade separated dumbbell junction, comprising two roundabouts connected by a single bridge over the A249. The photos below provide an overview of this junction.

View looking west towards the south roundabout from Swale Way

View looking south towards the north roundabout from the B2005 Grovehurst Road

5.2.3 The B2005 Grovehurst Road junction layout allows all movements to be made between Grovehurst Road and the A249. The east roundabout provides access to Swale Way and the B2005 Grovehurst Road, whilst the west roundabout provides access to Iwade. Both roundabouts provide on and off slips to the A249.

View looking north along the A249 from the Grovehurst Road junction

5.2.4 Heading south on the A249 traffic passes through the Bobbing junction. The Bobbing junction is a four arm grade separated junction that comprises a gyratory below the A249 main line. Slip roads serve merging and diverging traffic to and from the A249 main line.

View looking towards southbound off slip at Bobbing junction

View looking towards southbound on slip at Bobbing junction

5.2.5 Access from the site to Bobbing junction is gained via Quinton Road and Sheppey Way, or Sonora Way and the B2006 Staplehurst Road.

5.2.6 Heading further south the A249 passes through the A2 Key Street junction and thereafter intersect the M2 at Junction 5 (some 8km south of the Grovehurst Road junction). This interchange comprises a five arm roundabout, with the M2 on and off slips forming the east and west arms and the A249 forming the north and south arms. Maidstone Road forms the fifth, north-eastern arm of the junction.

5.2.7 The M2 passes over the top of the A249 at this location. The roundabout is partially signal controlled with the A249 north and M2 east arms subject to signal control. The circulatory is two lanes at the southern end of the roundabout, widening to three lanes on the western side, four lanes on the northern side, three lanes between the A249 (north arm) and M2 (westbound) on/off slips, and two lanes on the eastern side of the roundabout.

5.2.8 The A249 comprises two lanes in each direction at this junction, Maidstone Road has one lane in each direction and the M2 on/off slips have two lanes. The M2 (eastbound) off slip flares at the entry of the roundabout to three lanes. The A249 south arm has a filter lane to the M2 (eastbound) on slip.

5.3 Local highway network

5.3.1 The site will be directly accessed from the B2005 Grovehurst Road to the north and Quinton Road to the south. The B2005 Grovehurst Road partially borders the site to the north east, whilst Quinton Road borders the site to the south.

5.3.2 The B2005 Grovehurst Road is predominantly residential in nature along much of its length. At its north extent the B2005 Grovehurst Road connects with the A249 Grovehurst Road junction. Heading south from this location the B2005 Grovehurst Road is a wide single carriageway and is subject to the national speed limit (60mph) and benefits from a street lighting regime. This continues past the proposed site access.

View north along the B2005 Grovehurst Road on the approach to the A249 junction

5.3.3 Approximately 150m south of the proposed site access, the speed limit reduces to 30mph as the road enters the built up area and is flanked by residential properties on both sides. Footways are also provided on both sides of the road.

View south along Grovehurst Road within Kemsley

5.3.4 Heading further south the B2005 Grovehurst Road passes through the staggered crossroads of Bramblefield Land and Hurst Lane. At this location is a convenience store and post office. Sections of cycleway are provided on the south west and south east corners of the junction whilst pedestrian crossing refuges are located north and south of this junction.

5.3.5 Continuing south a parking layby is provided on the east side of the road on the approach to the medical centre access.

View north on Grovehurst Road at medical centre access

5.3.6 The B2005 Grovehurst Road continues south as a wide route passing Kemsley rail halt. The direct residential frontage disappears south of the station although a footway continues on the west side of the road to the roundabout with Grovehurst Avenue.

View south on Grovehurst Road south of roundabout with Grovehurst Avenue

5.3.7 South of this roundabout the B2005 Grovehurst Road widens and comprises a mix of parking laybys, bus stops, intermittent direct frontage, further roundabouts, pedestrian crossings, a footway on the west side and a footway / cycleway on the east side.

View south towards roundabout with Attlee Way

5.3.8 To the south, Quinton Road borders the site and performs the role of a local distributor road, with no direct access for private dwellings. It is subject to a 30mph speed limit and features street lighting along its length.

5.3.9 A footway is provided alongside the south side of Quinton Road from The Meads Avenue heading west across the A249 and Sheppey Way. A 7.5T weight restriction (except for access) applies to Quinton Road and the national speed limit (60mph) applies to the west end as it crosses over the A249.

View west along Quinton Road to location of proposed site access

View west along Quinton Road towards existing convenience store

5.3.10 To the east of the proposed site access, Quinton Road crosses over the railway line via a single lane bridge. Traffic movements are controlled by shuttle working signal control.

View west along Quinton Road towards single file signals over rail bridge

5.3.11 Bramblefield Lane penetrates the site on it's eastern side. This road is an existing residential cul-de-sac and also forms part of National Cycle Route 1. The route of NCR1 has been stopped up to motor vehicle traffic where it crosses the A249 between Bramblefield Lane and Sheppey Way.

View west along Bramblefield Lane

5.3.12 To the north, Swale Way is a 40mph single carriageway route connecting with the B2005 Grovehurst Road junction. A footway / cycleway is provided along its southern side and it features street lighting along its length.

5.3.13 Swale Way forms part of the Sittingbourne Northern Relief Road (SNRR), which aims to link the A249 (at the Grovehurst Road junction) with the A2 corridor to the east of Sittingbourne, via the industrial areas to the north and north-east of the town.

5.3.14 The SNRR is almost complete, with the exception of the final link to the A2. There remains an aspiration to construct the final section of the SNRR, however funding has not yet been secured.

5.3.15 To the west of the A249 the Grovehurst Road provides access to Iwade. This settlement has been the subject of significant development over recent years and continues to be identified for growth within the Local Plan. The Iwade development is accessed from the Grovehurst Road junction to its east and Sheppey Way to its north and south.

5.3.16 Sheppey Way is a single carriageway route that connects the Isle of Sheppey to the north with the A2 to the south. It passes through Iwade and Bobbing and connects with Bobbing junction and the Key Street junction.

5.3.17 Sheppey Way provides a connection between Quinton Road and Bobbing junction. It forms a priority junction with Quinton Road incorporating a right turn bay facility. Continuing south it is subject to the national speed limit for a single carriageway and is unlit until the vicinity of the school. A footway is provided on the east side of the carriageway for the full length whilst a footway heads south on the west side in the vicinity of the school. Cycleways are marked on street in both directions.

5.3.18 The route continues south towards Bobbing junction where it forms a large priority junction with the west arm of Bobbing junction.

5.4 Walking and Cycling

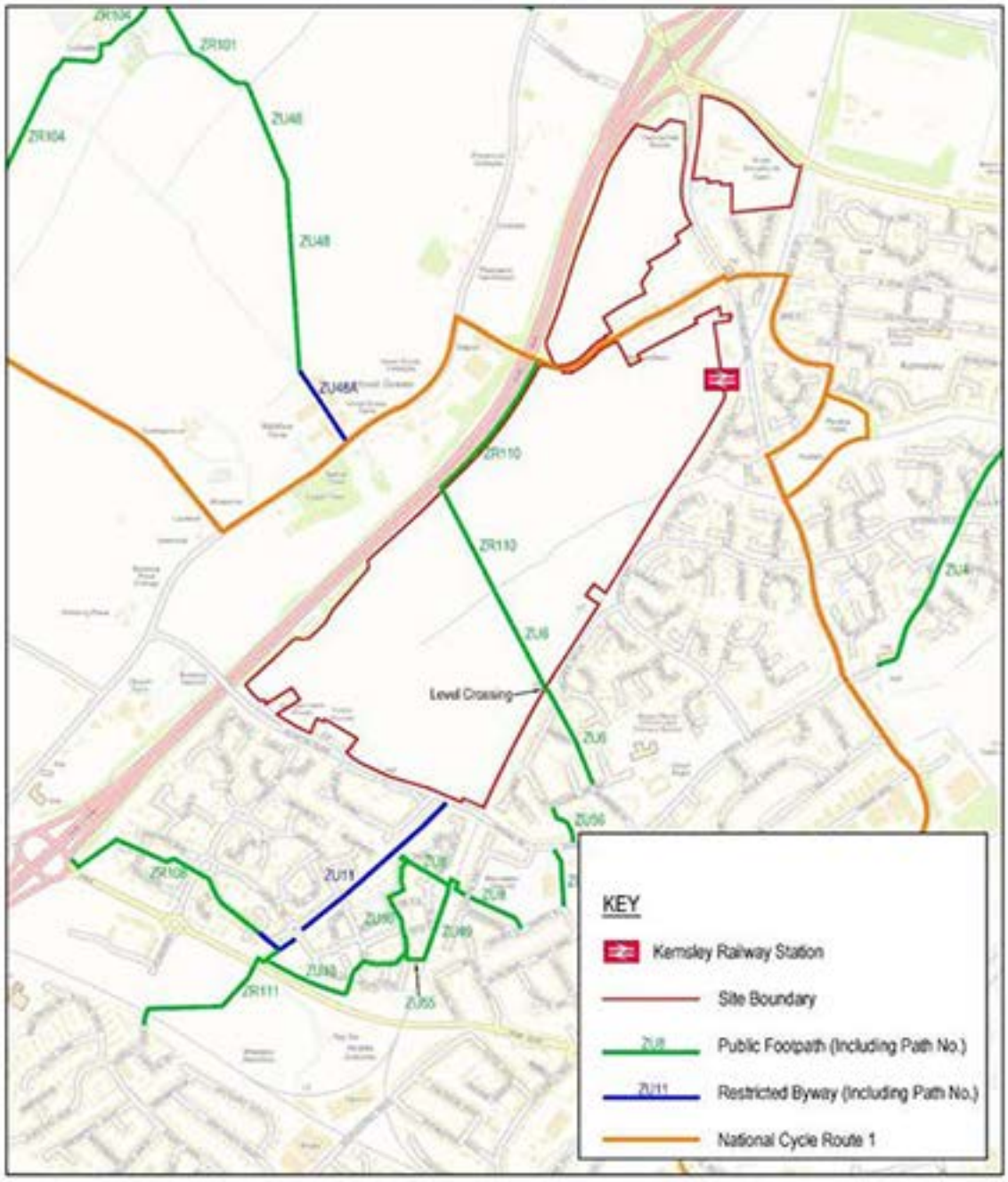
5.4.1 There is a network of walking and cycling links serving the site and local surrounds. These are described below.

5.4.2 A footway runs along the western side of the entire length of Grovehurst Road, from the A249 Grovehurst Road junction in the north to the Saffron Way / North Street junction in the south. This route crosses the railway line adjacent to Kemsley rail halt on a footbridge, connecting with footways running along either side of Saffron Way and North Street and hence providing a pedestrian link into Sittingbourne town centre.

5.4.3 In addition, there is also a footway running along the eastern side of one section of Grovehurst Road. This extends from the northern most property on this road to just south of the junction with Hurst Lane.

5.4.4 There is a Public Right of Way passing through the site. Route ZU6 starts at the junction of Middletune Avenue and Newbridge Avenue, to the south east of the site, and continues north west, crossing the railway line between Sittingbourne and Kemsley rail halt via an at-grade crossing before continuing into the site.

5.4.5 As it crosses the middle section of the site, route ZU6 turns into route ZR110, continuing in a north easterly direction alongside the A249 dual-carriageway before terminating at Bramblefield Lane. These routes can be seen on the plan below.



5.4.6 On Bramblefield Lane the route is on street for cyclists although this is a lightly trafficked cul de sac amenable to cycle journeys. Within the site the route continues as a hard surfaced walk / cycle route heading west towards the A249. The route crosses the A249 via a cycle / footbridge and continues on street to Iwade to the north and Howt Green to the south.

5.4.7 The nearest existing cycle route to the site is National Route 1 (NR1) which includes a mix of on and off road sections through Sittingbourne. It is to the north of the site and follows Bramblefield Lane to the east through to the existing residential area on the eastern side of the railway line via a footbridge and then heads south to Sittingbourne town centre and the train station. The route to the west crosses the A249 and continues north to Sheerness and west to Gillingham and beyond. To the east of the site it continues along Ypres Drive and Grovehurst Avenue before running along Grovehurst Road, Saffron Way, Mill Way and Eurolink Way.

5.4.8 To the west of the site the route splits and continues south west towards Rainham (via Sheppey Way and Stickfast Lane), and north through Iwade towards the Isle of Sheppey.

5.4.9 The route is on-carriageway for the majority of this section, although there is a short off-road section along Saffron Way between the North Street and Langley Road junctions, facilitated by a shared footway / cycleway along both sides of the road at this location.

5.4.10 A shared pedestrian/cycle route is provided along Sonora Way, to the south of the site, providing off-carriageway access through the residential area to the B2006. This route will assist in providing a pedestrian and cycle route between The Meads and the proposed site, particularly for school children.

Shared pedestrian / cycle route along Sonora Way

5.4.11 No footways are provided on Quinton Road in the vicinity of the proposed site access location. The masterplan frontage on Quinton Road would include a pedestrian footway which would provide a link to the existing footway to the east of the site. This route would enable access to Milton Regis High Street which has local facilities including medical facilities and retail uses.

5.4.12 Further afield footways are typically provided adjacent to the local highway network surrounding the site and these enable access to Sittingbourne town centre where amenities and potential employment opportunities exist. In addition, there are a number of local businesses located on Eurolink Way close to Sittingbourne town centre and Eurolink Business Park. These areas can be accessed by walking and cycling.

5.4.13 There are two at-grade railway crossings located on the eastern boundary of the site. The first, known as 'Foxgrove, ELR – SEJ2, 44m 70ch' is located off Volante Drive and is a User Worked Level Crossing with no public access. Network Rail have previously confirmed that there is no current intention to close this crossing in the near future. The crossing can be seen below.

Foxgrove Railway Crossing

5.4.14 The second railway crossing, located further south between Volante Drive and Middletune Avenue, is known as 'Vicarage' (ELR: SEJ2, Mileage: 44m 58ch, Status: Footpath with wicket gates). The crossing is located along Public Right of Way ZU6. Network Rail have previously confirmed that there is no current intention to close this crossing in the near future.

Top left: view from the west (site), top right: view from the east, bottom left: looking north from the west (site), bottom right: looking south from the west (site)

5.5 Rail

5.5.1 The nearest rail station to the site is Kemsley rail halt, located alongside the B2005 Grovehurst Road approximately 100m south of the access with the medical centre.

View looking along the Sheppey to Sittingbourne rail line

5.5.2 There are two public entrances to the station (one on either side of the railway line), accessed via footways that lead from the western side of Grovehurst Road. These provide step-free access to both platforms.

5.5.3 There is no vehicular access to the station or vehicle or cycle parking and the station is unmanned. A gated pedestrian access is also accessible from the adjoining medical centre.

View at Kemsley rail halt

5.5.4 Services at Kemsley rail halt typically operate twice per hour between Sittingbourne and Sheerness, with interchange provided at Sittingbourne for onward connections to Canterbury, Ramsgate, the Medway Towns and London.

5.5.5 There are two services operating direct from Kemsley rail halt to London Victoria (not stopping at Sittingbourne) on weekday mornings, departing at 0633 and 0713, and two weekday evening services arriving from Victoria at 1827 and 1945.

5.5.6 The ability to board a train directly to London (within an approximately 10 minute walk) would provide a significant benefit to residents of the proposed development. In addition, the walking and cycling route through the site would facilitate a more direct connection to Kemsley rail halt for existing residents at The Meads.

5.5.7 A summary of services from Kemsley rail halt is shown in the table below.

Destination	AM Peak (0800-0900) (Departures)	PM Peak (1700-1800) (Arrivals)	Mon-Fri Daytime (Departures)	Saturday (Departures)
Sittingbourne	1	2	2	2
Sheerness-on-sea	1	2	2	2
London Victoria	2	2	0	0

5.5.8 Sittingbourne station is located approximately 2km (around a 20 – 30 minute walk) south-east of the site. This station features a car park with space for 253 vehicles, and whilst there are no disabled parking spaces available, parking is free for disabled customers displaying a valid International Blue Badge. The station also features 106 sheltered cycle storage spaces, together with a staffed ticket office, self-service ticket machines, payphones, toilets, baby changing facilities, waiting rooms and a buffet serving cold drinks and light refreshments.

5.5.9 The station can be reached by train from Kemsley rail halt via the half-hourly shuttle between Sittingbourne and Sheerness.

5.5.10 Trains from Sittingbourne station serve London Victoria and St Pancras International, via Gillingham, Chatham and Rochester, and also Canterbury, Dover and Ramsgate. In addition, there is also the half-hourly shuttle service to Kemsley rail halt and Sheerness together with a few early morning weekday commuter services to London Cannon Street and Blackfriars in the City (and vice versa in the evenings).

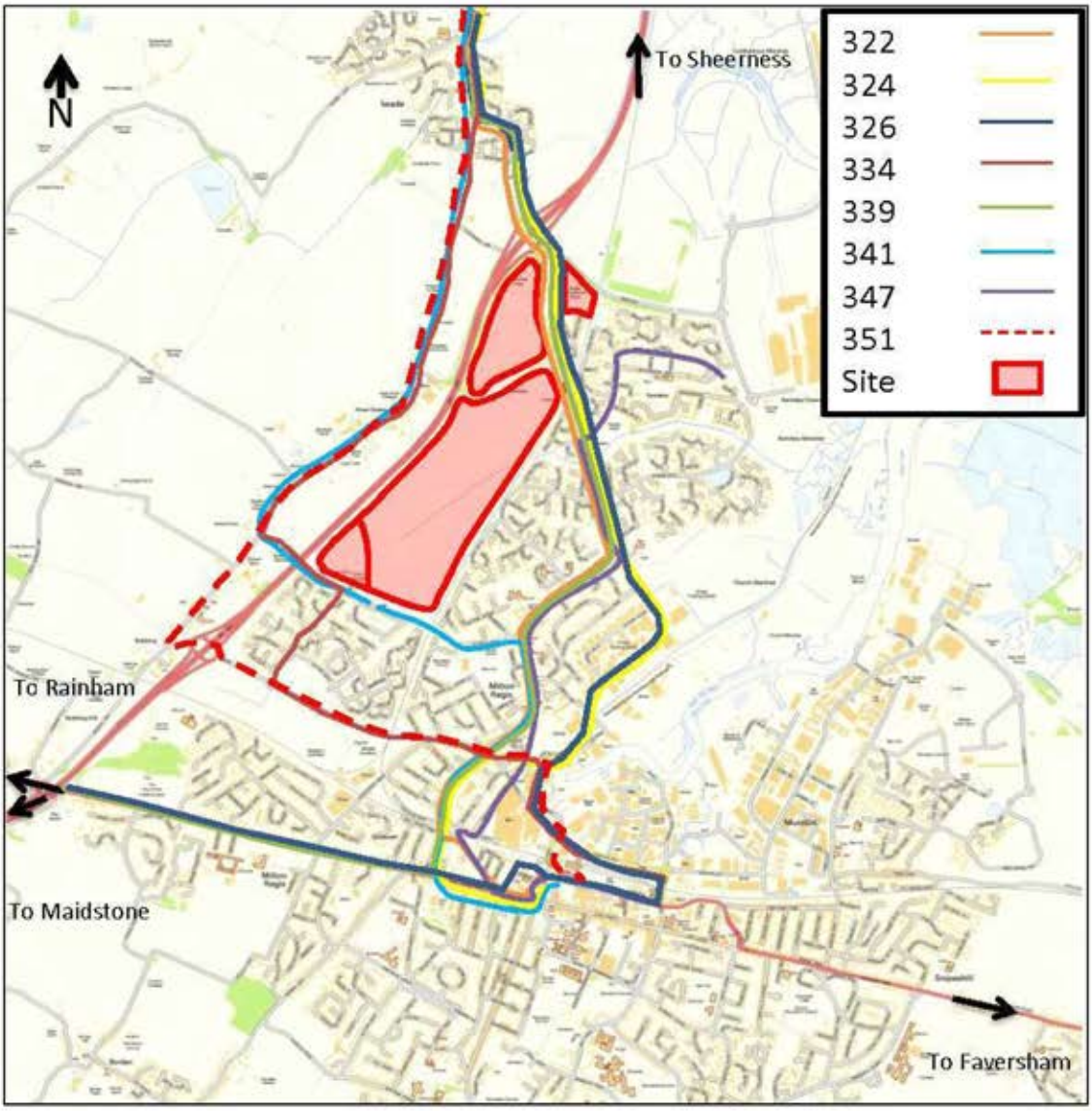
5.5.11 A summary of services from Sittingbourne station to various destinations is shown in the table below. Services shown are departures from Sittingbourne to each destination for the weekday AM peak, weekday daytime and also Saturdays, and arrivals at Sittingbourne from each destination for the weekday PM peak. All services to Canterbury, Dover and Ramsgate originate from London.

Destination	AM Peak (0800-0900) (Departures)	PM Peak (1700-1800) (Arrivals)	Mon-Fri Daytime (Departures)	Saturday (Departures)
Gillingham	5	5	5	5
London St Pancras	2	2	3	3

London Victoria	3	2	3	3
London Cannon Street	4	4	4	4
London Blackfriars	4	4	5	5
Canterbury East	2	2	2	2
Dover Priory	3	1	3	3
Ramsgate	2	2	2	2
Kemsley / Sheerness	2	2	2	2

5.6 Bus

5.6.1 Local bus routes within the vicinity of the site can be seen on the plan below.



Existing bus route network

5.6.2 The nearest bus stops to the site are on the B2005 Grovehurst Road, adjacent to the entrance to Grovehurst Surgery, approximately 50m from the medical centre vehicular and pedestrian access on the B2005 Grovehurst Road and around 500m (around a 5-6 minute walk) from the main vehicular access to the site.

5.6.3 The northbound bus stop sits in a dedicated lay-by and consists of a flagpole with timetable information. The southbound bus stop meanwhile does not feature any physical infrastructure. There is no footway on the eastern side of Grovehurst Road at the southbound bus stop although buses do stop here if summoned.

5.6.4 Additional bus stops on the B2005 Grovehurst Road are located approximately 90m north of the junction with Hurst Lane, approximately 160m (around a 2 minute walk) from the main vehicular site access. The northbound bus stop consists of a 'Bus Stop' sign attached to a lighting column.

5.6.5 The bus stops on Grovehurst Road provide access to the following services:

- 339, operated by Chalkwell. This runs once per day on weekdays only, from Sheerness to the Hempstead Valley Shopping Centre in Gillingham, via Minster, Queenborough, Iwade and Sittingbourne. The service departs from Grovehurst Road for Hempstead Valley at 0958 and arrives back at 1405 (where it continues on to Sheerness).
- 322 Chalkwell service. This departs at 1215 for the prisons on the Isle of Sheppey, and arrives back at 1656 (where it continues on to Sittingbourne). It is a weekday only service.
- 324 Chalkwell service, running between Sheerness, Faversham and Canterbury. This departs at 0958 for Canterbury and arrives back at 1424, where it continues on to Sheerness. It runs on Mondays, Wednesdays and Fridays only.
- 326 Chalkwell service, running between Sheerness, Sittingbourne and Chatham. This departs from Sheerness at 0951 for Chatham and arrives back at 1252 where it continues on to Sheerness. It runs on Mondays to Friday only.

5.6.6 Additional bus stops are located further south on the B2005 Grovehurst Road, beyond the junction with Grovehurst Avenue and approximately 800m (around a 10-minute walk) from the main vehicular site access. These are served by the 347, operated by Arriva Kent & Surrey, and run between the Kemsley residential estate (to the east of the site) and Sittingbourne town centre. This is a frequent service that runs four times per hour Monday to Friday and three times per hour on Saturdays.

5.6.7 Bus stops are located on Quinton Road, approximately 100m from the east site access onto this road and 140m from the west site access. They both consist of a flagpole with a 'Bus Stop' sign attached, and are served by the 341. This is operated by Arriva Kent & Surrey, and runs once per day on weekdays only. It departs at 0807 for Sittingbourne town centre and returns at 1535, where it continues on to Iwade.

5.6.8 Bus stops are also located on Sonora Way, approximately 400m (around a five-minute walk) from the proposed site entrance. These bus stops are served by the 334 and 351, operated by Arriva Kent & Surrey. The 334 runs once per hour Monday to Saturday between Maidstone, Detling, Sittingbourne, Iwade, Queenborough and Sheerness and the 351 runs once in the AM and once from Iwade to Snipeshill Sittingbourne Community College. Both bus stops feature a 'Bus Stop' sign, timetable information and yellow 'Bus Stop' road markings.

5.6.9 A summary of the bus services operating regularly (i.e. at least once per hour for the duration of the day) in the vicinity of the site is shown in the table below. The 347 serves bus stops on Grovehurst Road whilst the 334 serves stops on Sonora Way.

Route		AM Peak (0800-0900) (Departures)	PM Peak (1700-1800) (Arrivals)	Mon-Fri Daytime (Departures)	Saturday (Departures)
347	Kemsley – Milton Regis – Sittingbourne Town Centre	4	4	4	3
334	Sheerness – Iwade – Sittingbourne – Maidstone	1	1	1	1

Summary of bus services operating in the vicinity of the site (high frequency services only)

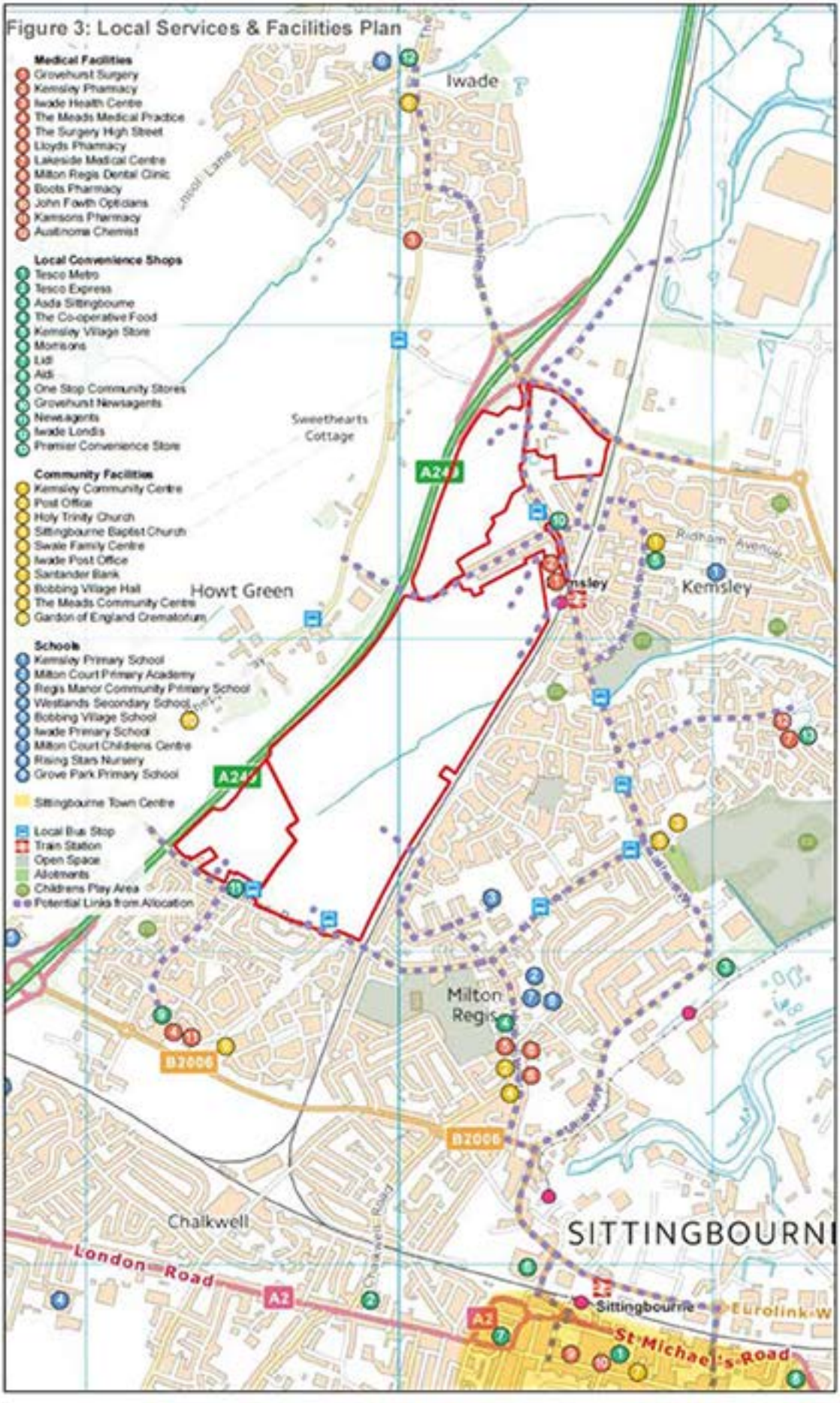
5.6.10 Previous discussions between PBA and both Arriva and Chalkwell confirmed that there are no capacity issues on existing services and both operators were amenable to providing a route through the site once an appropriate number of units are occupied and a through route is achievable.

5.7 Local Facilities

5.7.1 There are a number of local facilities within walking and cycling distance of the (centre of the) site making sustainable travel an option to meet a proportion of daily needs.

5.7.2 These include a supermarket, a post office, a Doctor's surgery and a railway station. The location of these, plus additional facilities can be seen on the Development Framework Figure 3, reproduced below for reference.

Figure 3: Local Services & Facilities Plan



6 Existing traffic conditions

6.1.1 In order to provide an understanding of existing traffic conditions, a traffic survey exercise has been completed at junctions agreed with highway officers and described below.

6.2 Highways England junctions

6.2.1 The following junctions on the Highways England network have been surveyed and assessed.

- A249 / Swale Way / Grovehurst Road (Grovehurst junction)
- A249 / B2006 / Sheppey Way (Bobbing Junction)

6.3 Kent County Council junctions

6.3.1 The following junctions on the KCC network have been surveyed and assessed.

- A249 Grovehurst Junction
- A249 Bobbing Junction
- Quinton Road / Sonora Way
- Quinton Road / Sheppey Way
- Vicarage Road / Laxton Way
- B2006 Staplehurst Road / Windmill Road
- B2006 Staplehurst Road / Staple Close / Crown Road / B2006 St Paul's Street / Chalkwell Road
- Vicarage Road / North Street / High Street
- B2006 St Paul's Street / King Street / B2005 Mill Way / B2006 Mill Way
- B2006 / Sonora Way / Vellum Drive
- B2006 St Paul's Street / High Street / Millen Road
- B2006 Mill Way / The Wall / B2006 Eurolink Way / Milton Road
- B2006 Eurolink Way / Crown Quay Lane
- A2 St Michael's Road / B2006 Crown Quay Lane
- Vicarage Road Signals
- Grovehurst Road / Medical Centre Access

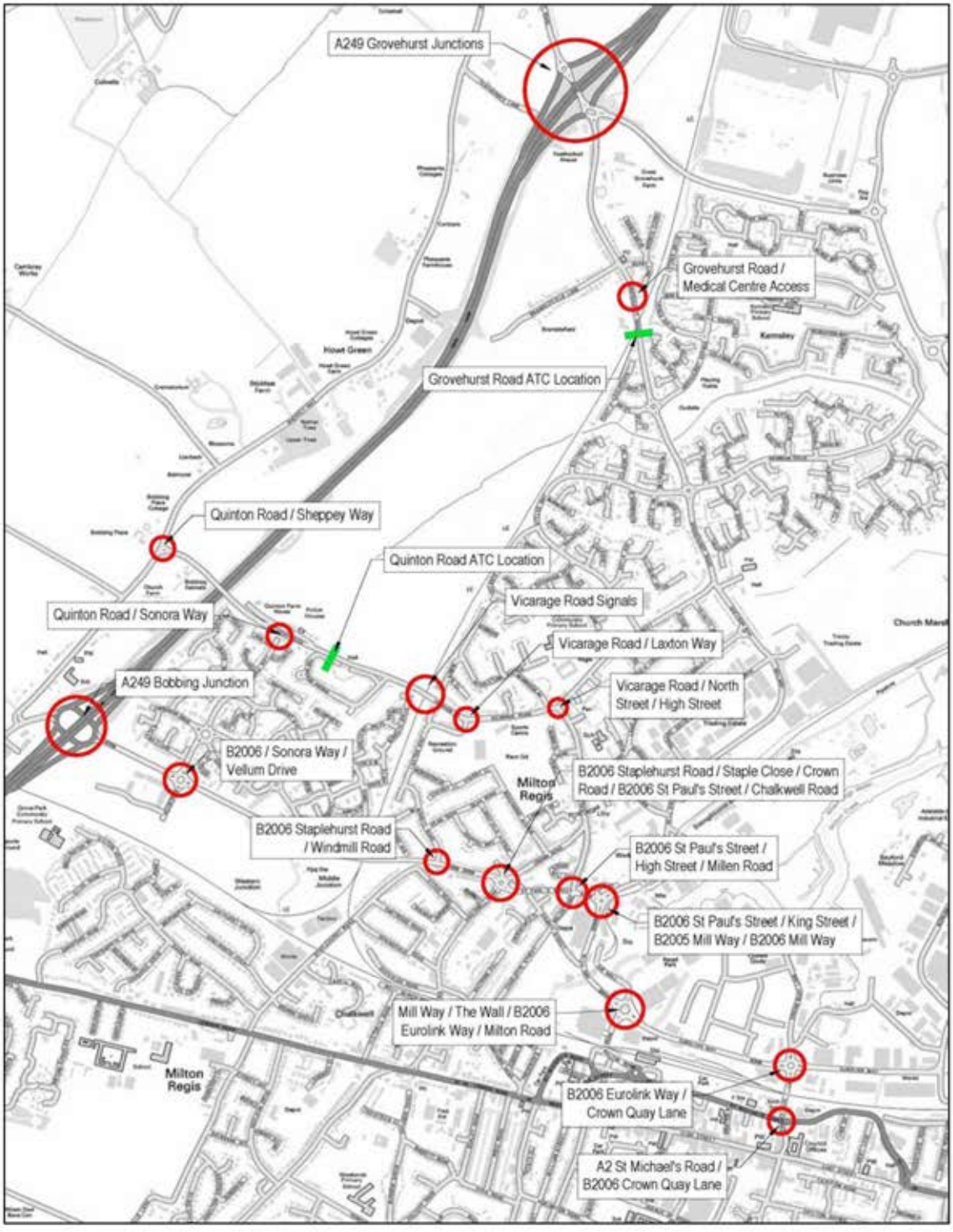
6.4 Form of traffic surveys

6.4.1 The Manual Classified Count (MCC) surveys were undertaken on 3rd November 2015 between the hours of 0700-1000 and 1600-1900. Queue lengths were also recorded at 5 minute intervals. Weather conditions on the day of the survey were recorded as 'cloudy and dry'.

6.4.2 On the day of the surveys, the survey company informed PBA that the traffic signals at the Crown Quay Lane / St Michael's Road junction were not working correctly. This junction was re-surveyed on Tuesday 1st December 2015.

6.4.3 In addition to the MCCs, Automatic Traffic Counters (ATCs) were laid along Grovehurst Road and Quinton Road (within the vicinity of the proposed site access points) from 4th November 2015 for a period of one week.

6.4.4 The locations of the above listed junctions can be seen on the plan below. The raw survey data can be seen in Appendix 6a.

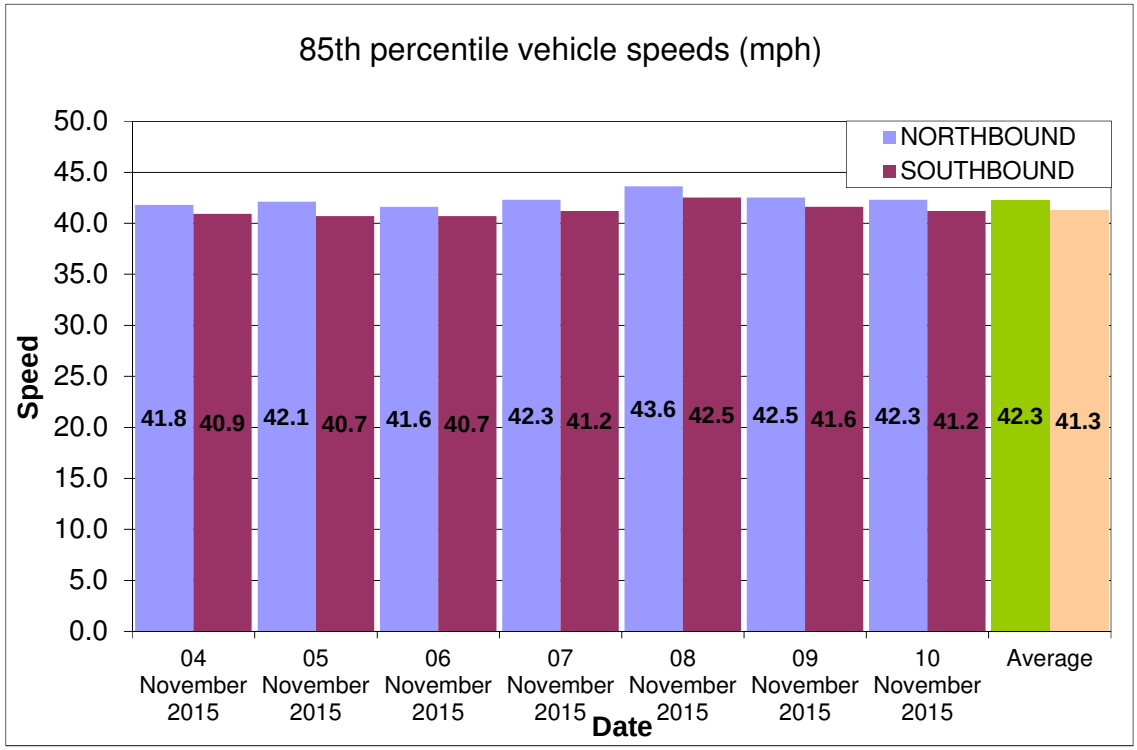


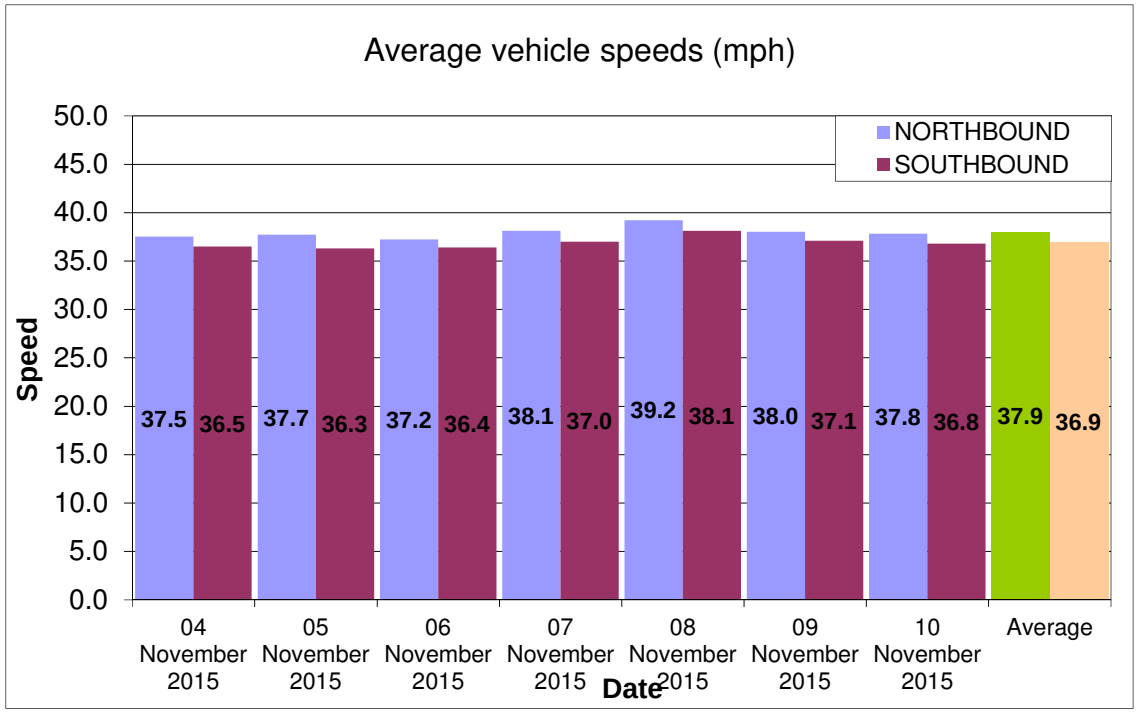
6.5 MCC traffic survey findings

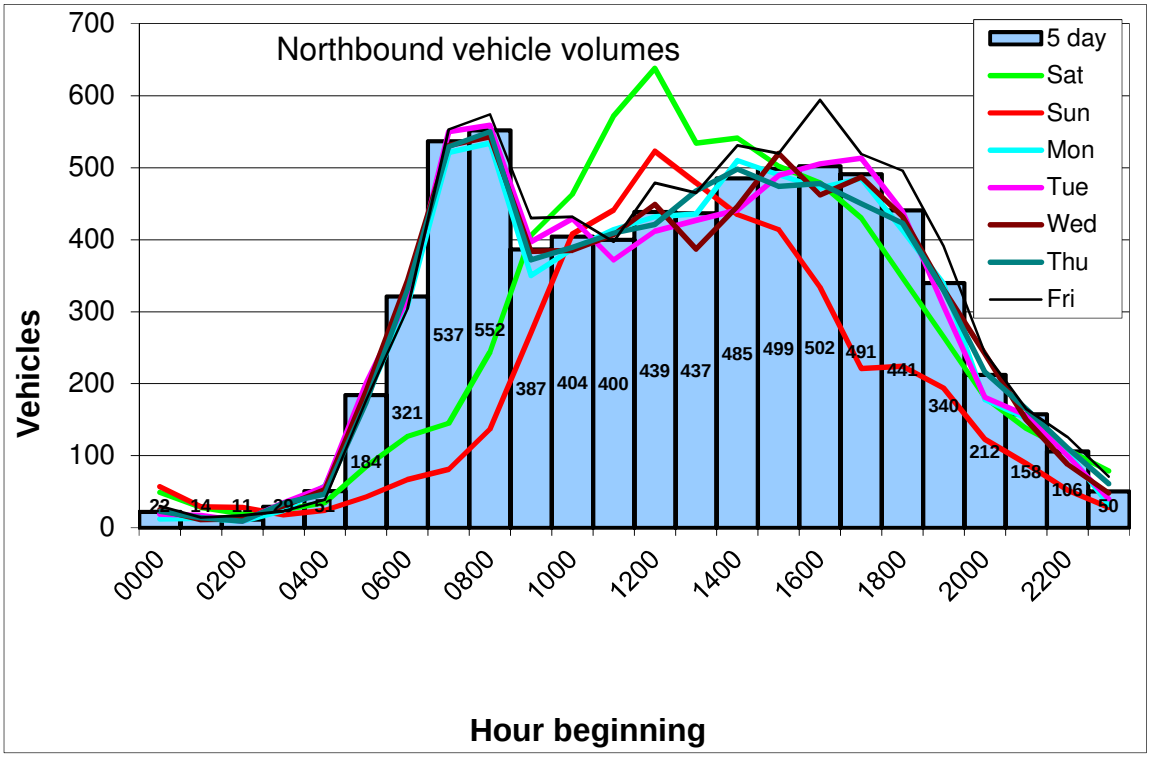
6.5.1 The results of the MCC survey showed that across the network (on the basis of network throughput) the AM peak hour occurred between 0750-0850 and the PM peak hour occurred between 1700-1800. These peak hours have been adopted for assessment purposes. Base year turning flows for these time periods are shown at Figures 6.1 to 6.2.

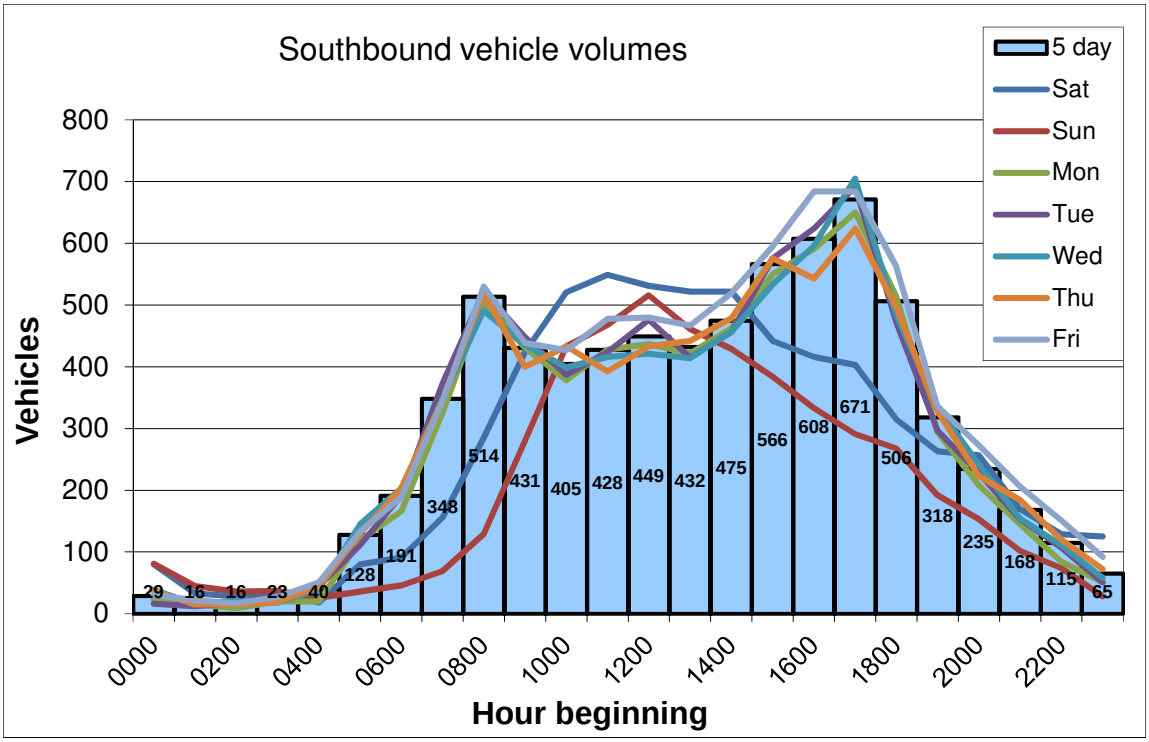
6.6 ATC data

6.6.1 With respect to the ATC data collected for Grovehurst Road this is illustrated by the graphs below.







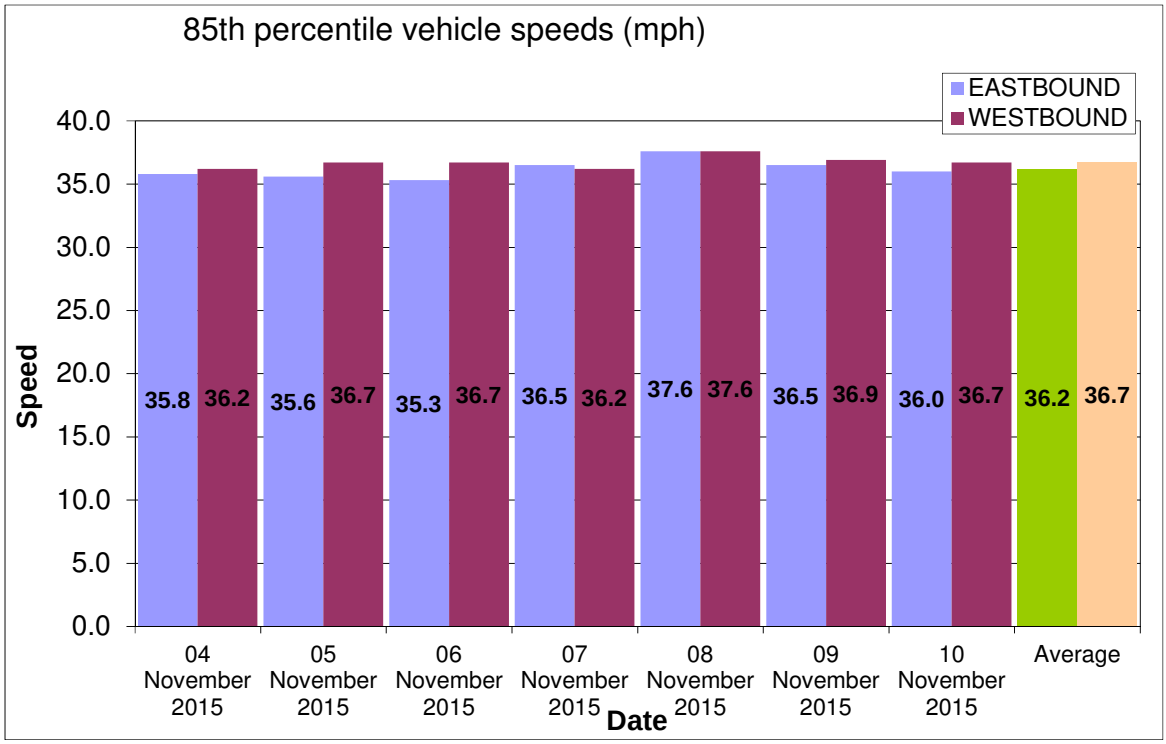


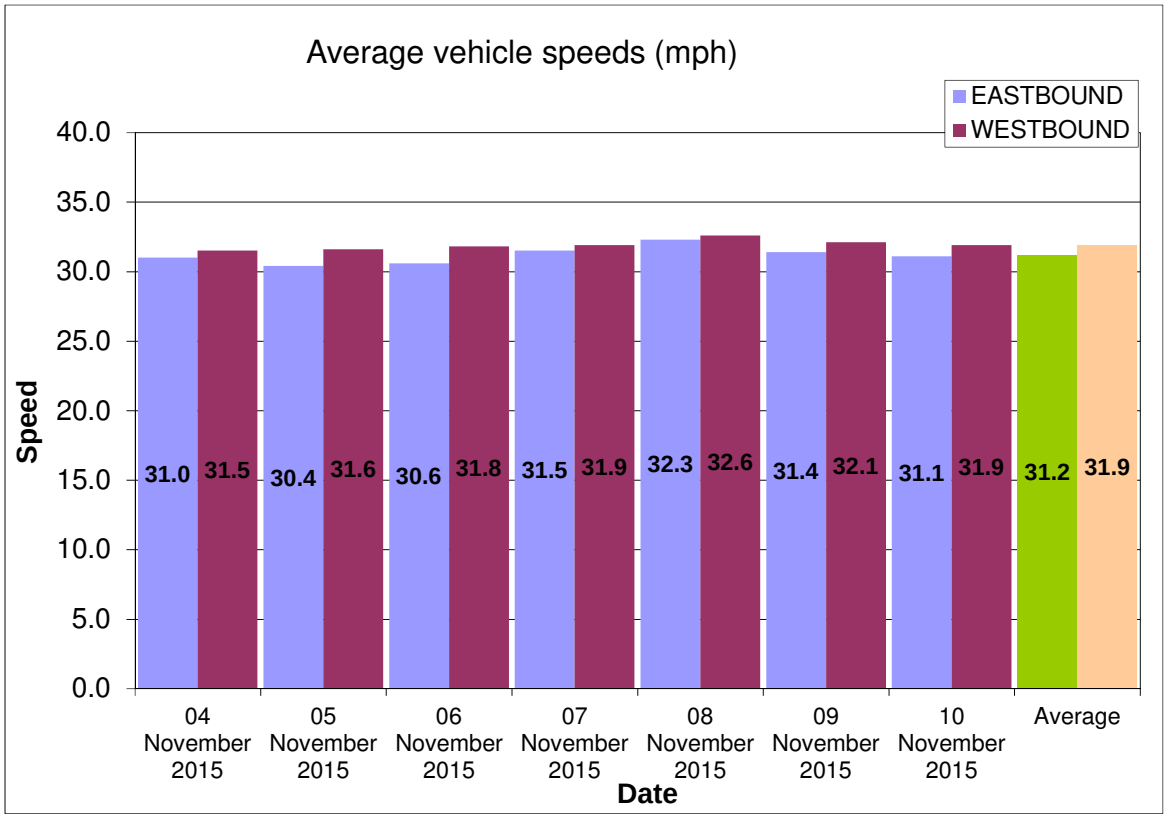
6.6.2 With respect to Grovehurst Road it is noted from the graphs above that :

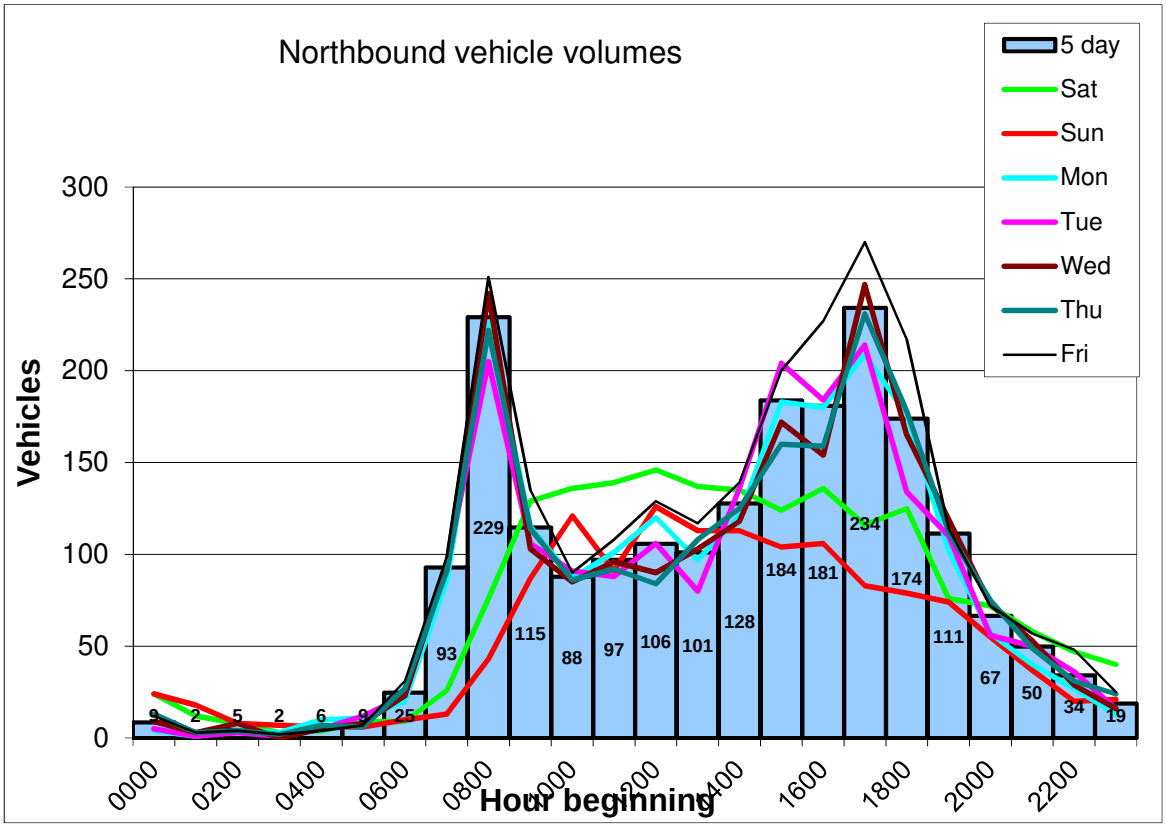
- The AM peak hour occurred between 0800-0900. This corresponds with the manual counts which showed a peak hour across the network of 0750-0850 .
- The PM peak hour occurred between 1700-1800. This corresponds with the manual counts which showed a peak hour across the network of 1700-1800.
- The average speed across the 7 day period was 38mph northbound and 37mph southbound

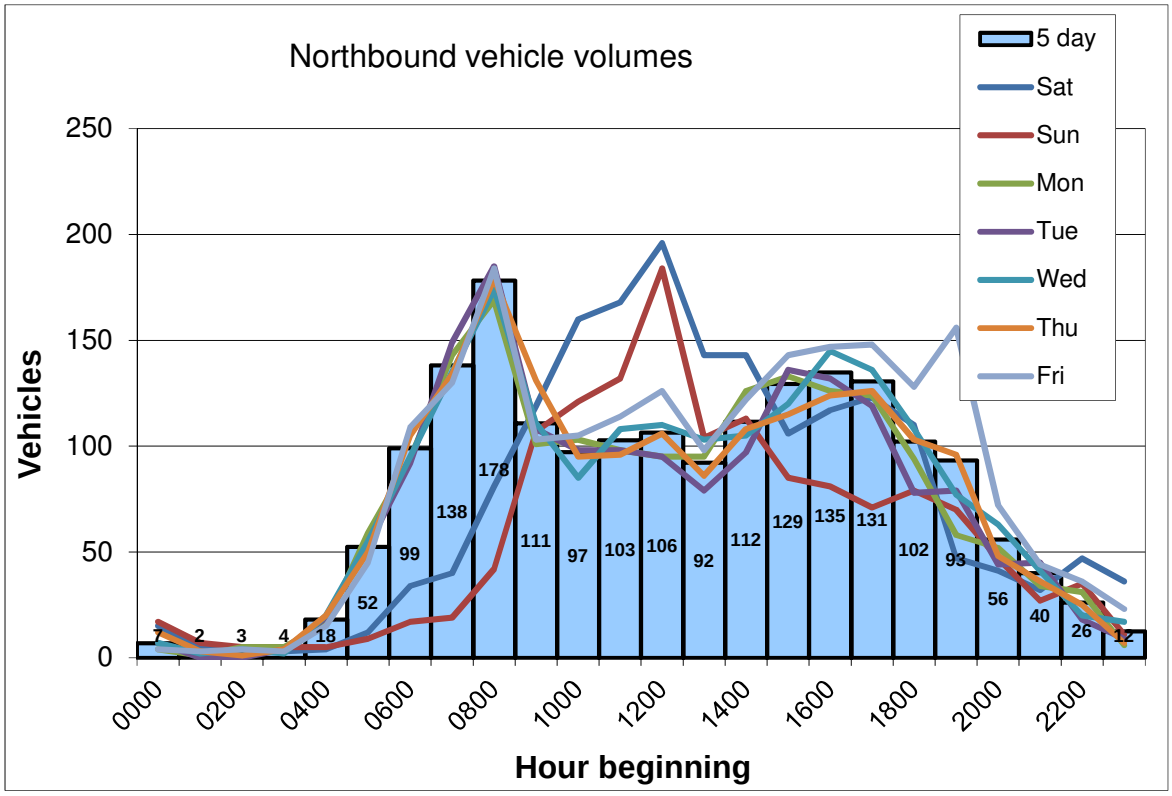
- The 85th percentile speed across the 7 day period was 42mph northbound and 41mph southbound.

6.6.3 With respect to the ATC data collected for Quinton Road this is illustrated by the graphs below.









6.6.4 With respect to Quinton Road it is noted from the graphs above that :

- The AM peak hour occurred between 0800-0900. This corresponds with the manual counts which showed a peak hour across the network of 0750-0850
- The PM peak hour occurred between 1700-1800. This corresponds with the manual counts which showed a peak hour across the network of 1700-1800.

- The average speed across the 7 day period was 31mph eastbound and 32mph westbound
- The 85th percentile speed across the 7 day period was 36mph eastbound and 37mph westbound.

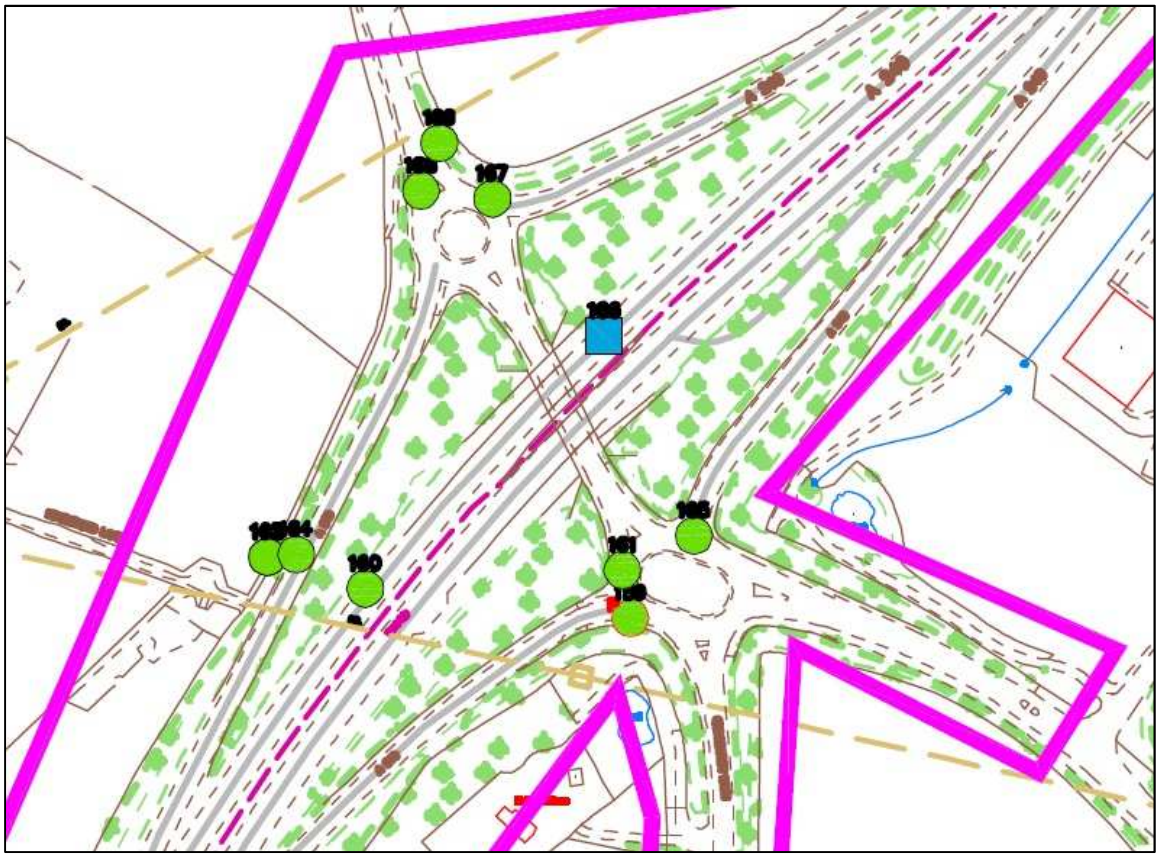
6.7 Queue observations

6.7.1 Queues were recorded at 5 minute intervals and the data collected is included at Appendix 6b.

6.8 Crash Data

6.8.1 A review of collision data obtained from Kent County Council covering a five year period to July 2017 has been undertaken. The study areas can be seen on the plans below along with a summary of the number of collisions :

6.9 Grovehurst Junctions



	Vehicles Only Involved	Cyclist Involved	Pedestrian Involved	**Total**
'Slight' Accident	8	0	1	**9**
'Serious' Accident	1	0	0	**1**
'Fatal' Accident	0	0	0	**0**

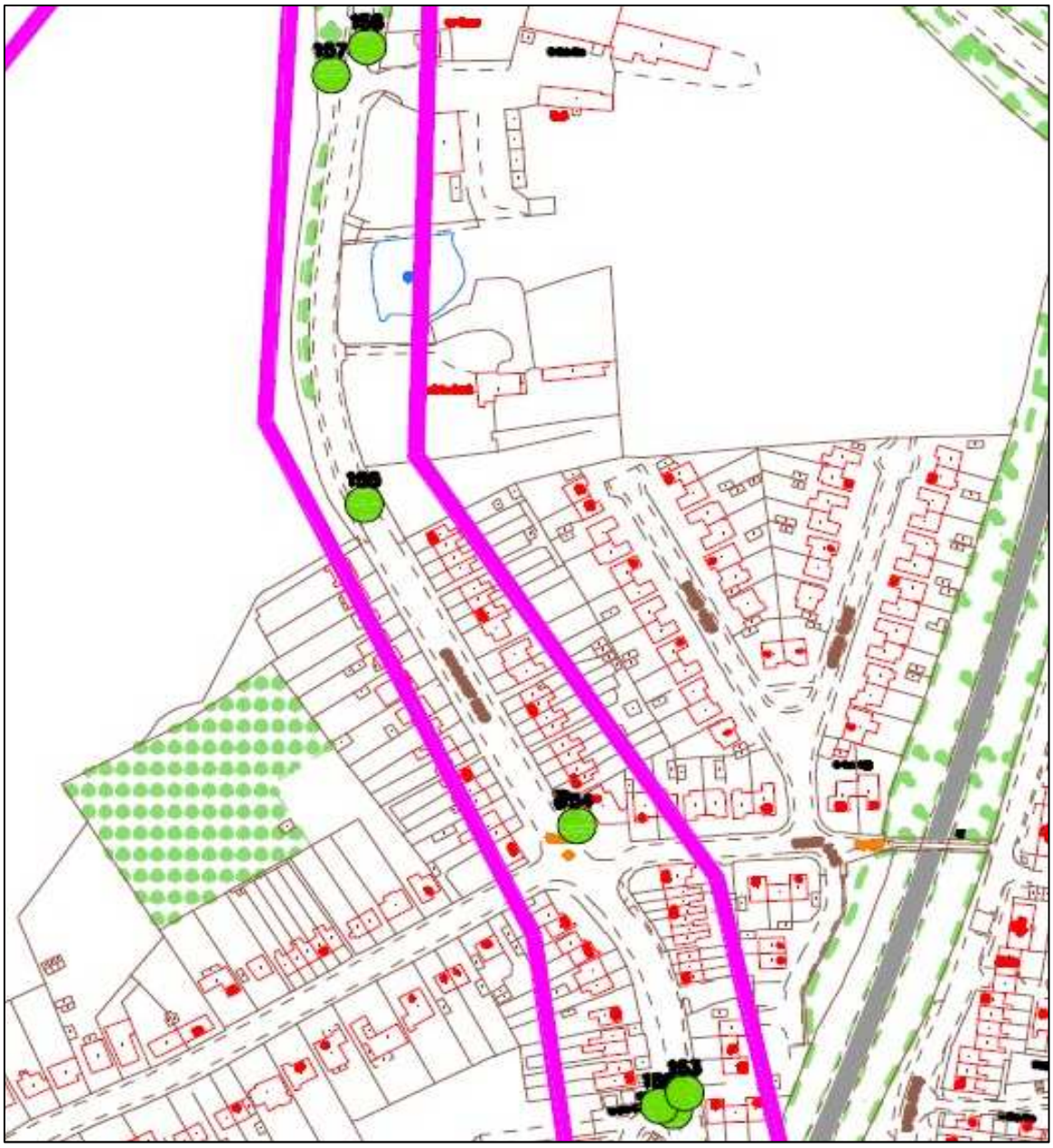
6.10 Bobbing Junction

	Vehicles Only Involved	Cyclist Involved	Pedestrian Involved	Total
'Slight' Accident	10	1	0	**11**
'Serious' Accident	0	1	0	**1**
'Fatal' Accident	0	0	0	**0**

6.11 Key Street Junction

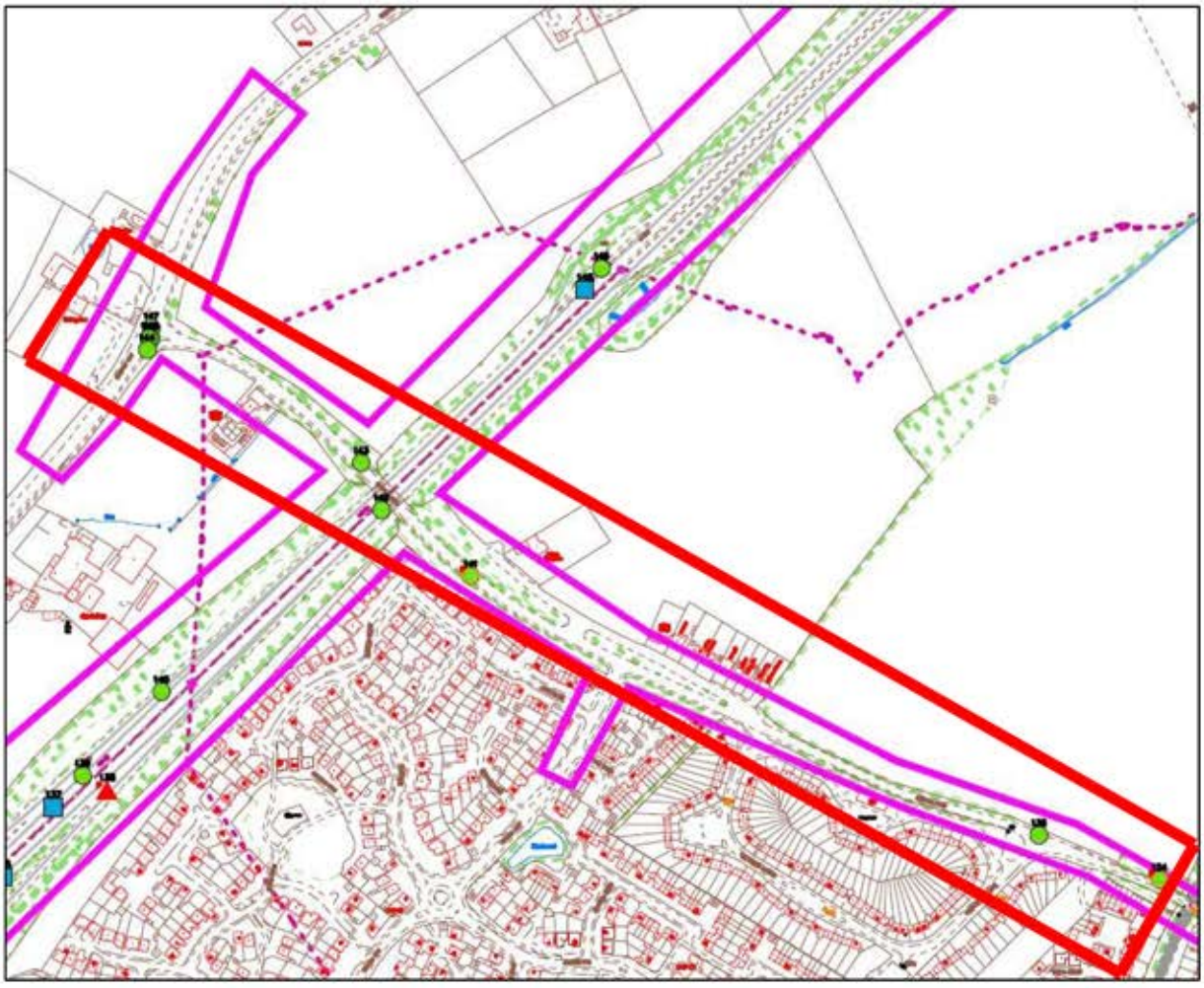
	Vehicles Only Involved	Cyclist Involved	Pedestrian Involved	**Total**
'Slight' Accident	19	2	1	**22**
'Serious' Accident	4	0	0	**4**
'Fatal' Accident	0	0	0	**0**

6.12 Grovehurst Road



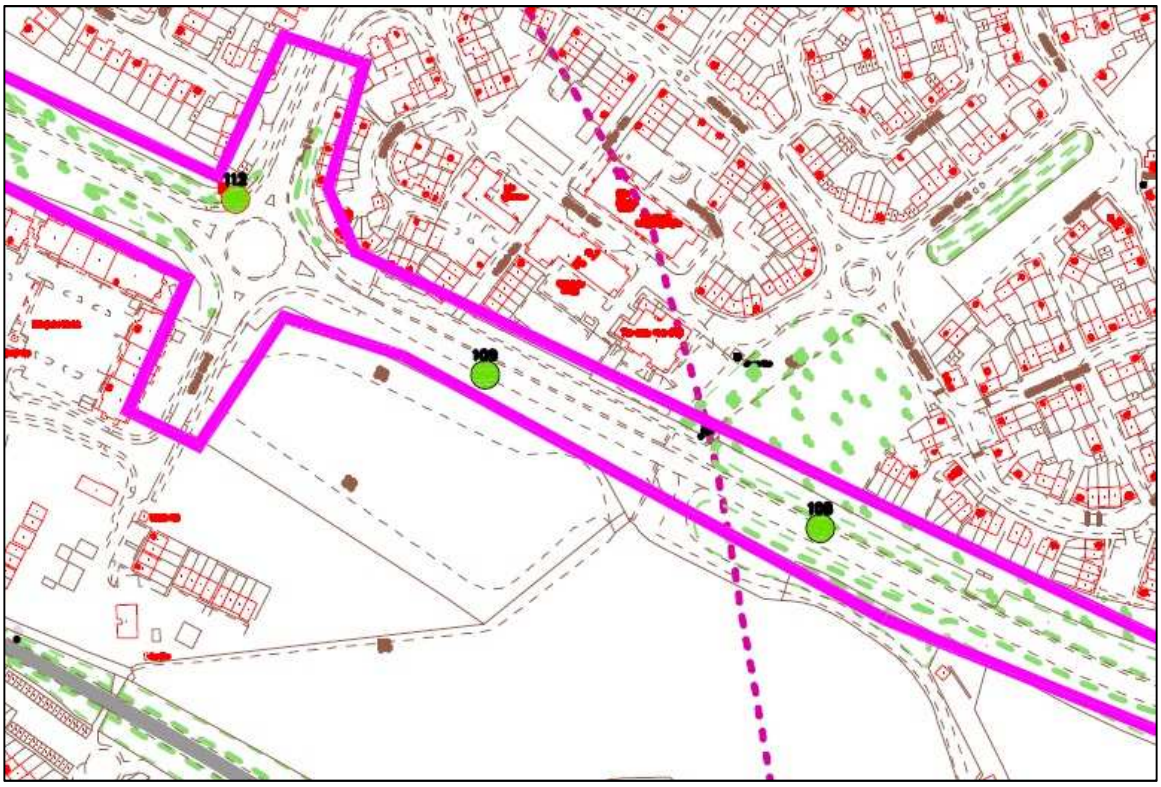
	Vehicles Only Involved	Cyclist Involved	Pedestrian Involved	Total
'Slight' Accident	3	4	0	**7**
'Serious' Accident	0	0	0	**0**
'Fatal' Accident	0	0	0	**0**

6.13 Quinton Road



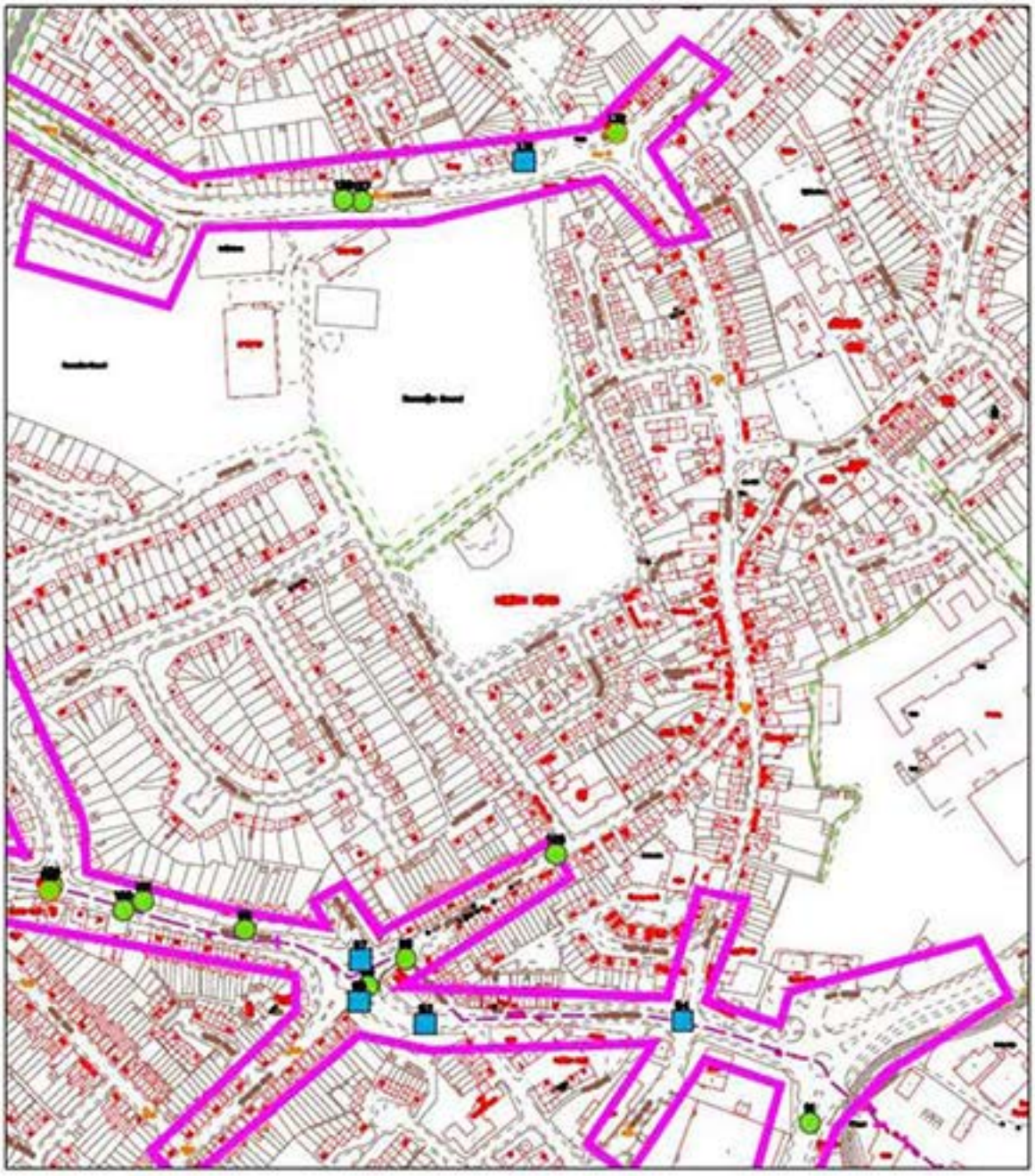
	Vehicles Only Involved	Cyclist Involved	Pedestrian Involved	Total
'Slight' Accident	7	0	2	**9**
'Serious' Accident	0	0	0	**0**
'Fatal' Accident	0	0	0	**0**

6.14 B2006 corridor



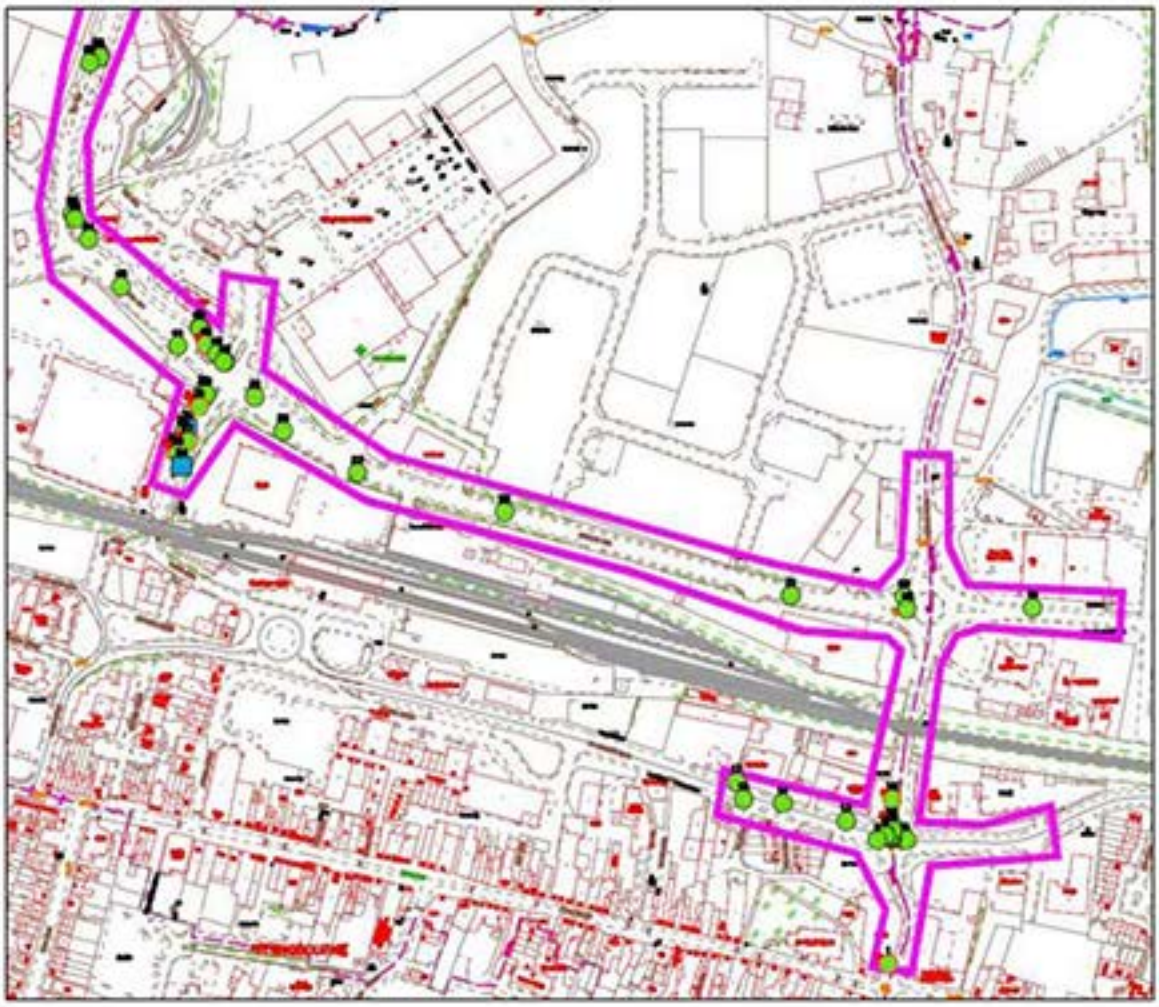
	Vehicles Only Involved	Cyclist Involved	Pedestrian Involved	**Total**
'Slight' Accident	2	0	1	**3**
'Serious' Accident	0	0	0	**0**
'Fatal' Accident	0	0	0	**0**

6.15 Milton Regis junctions



	Vehicles Only Involved	Cyclist Involved	Pedestrian Involved	Total
'Slight' Accident	8	2	2	**12**
'Serious' Accident	1	4	0	**5**
'Fatal' Accident	0	0	0	**0**

6.16 Town Centre junctions



	Vehicles Only Involved	Cyclist Involved	Pedestrian Involved	Total
'Slight' Accident	34	2	10	**46**
'Serious' Accident	0	1	2	**3**
'Fatal' Accident	0	0	0	**0**

6.17 Summary of Crashes :

6.17.1 A summary of the locations on the local highway network in the vicinity of the site where crash data has been obtained is shown in the table below.

	Fatal Incidents	'Serious' Incidents	'Slight' Incidents
Grovehurst Junctions	0	1	9
Bobbing Junction	0	1	11
Key Street Junction	0	4	22
Grovehurst Road	0	0	7
Quinton Road	0	0	9
B2006	0	0	3
Milton Regis	0	5	12
Town Centre	0	3	46
TOTAL	**0**	**14**	**119**

7 Baseline traffic flows

7.1.1 The following section considers the baseline traffic flows adopted for assessment purposes.

7.2 Assessment years

7.2.1 During the scoping exercise conducted with Officers it was agreed that a forecast horizon of 5 years and 10 years post planning application would be acceptable for the KCC and HE networks respectively.

7.2.2 However, since the scoping exercise was completed the build out programme for the site has been considered and it is anticipated that the site will be complete in 2031. This date coincides with the Local Plan horizon. On this basis an assessment horizon of 2031 has been adopted for both KCC and HE junctions.

7.2.3 In addition, an interim year of 2023 has been assessed on the basis that this is expected to be the year when a route is completed through the site, connecting Quinton Road and Grovehurst Road. The assessment will review the effect of the development up until the point when the through route is available.

7.3 Background traffic

7.3.1 In order to represent forecast background traffic, growth factors have been derived based upon Tempro growth factors. The Tempro growth factors have been adjusted to remove double counting as described below.

7.3.2 The 2015 observed traffic flows have been factored to 2031 using Tempro 7 factors. The factor for Rural Trunk Road has been extracted based upon Swale Areas 007, 009 and Swale Areas 010 to 013. These are the areas surrounding the NW Sittingbourne site.

- 2015 – 2031 AM growth factor from Tempro = 1.2159 (rural trunk road)
- 2015 – 2031 PM growth factor from Tempro = 1.2154 (rural trunk road)
- 2015 – 2031 AM growth factor from Tempro = 1.1583 (urban principal road)
- 2015 – 2031 PM growth factor from Tempro = 1.1579 (urban principal road)

7.3.3 These factors have been adjusted to remove double counting from the committed residential development sites (scoped with highway officers) which are added explicitly to the background traffic flows. The committed development sites are considered in detail at section 7.4 below but can be summarised (in terms of residential units) as:

- SW11/0159 Morrison's Mill Way - 150 residential units left to build out.
- SW14/501588 Stones Farm, Bapchild - 600 houses.
- SW14/505440 Spirit of Sittingbourne - 215 residential units.
- SW/02/1180 - Land at East Hall Farm – 314 residential units left to build out.
- SW/08/1127 – Land at Coleshall Farm, Iwade – 145 residential units left to build out.
- Iwade allocations – 572 residential units.

7.3.4 Tempro currently assumes 640 housing deliveries per annum within the local plan, equating to an allowance in Tempro of 16 x 640 = 10,240 units during the period 2015 to 2031.

7.3.5 The NW Sittingbourne site will deliver 1,520 units and the committed development sites above will deliver 1,996 units leaving a total of 10,240 – 1,520 – 1,996 = 6,724 units to be delivered by other sites.

7.3.6 Hence 6,724 / 10,240 = 0.656 (65.6%) of the full Tempro growth factor will be delivered by sites other than NW Sittingbourne site and committed development sites above. This would adjust the background growth to the following values :

- 2015 – 2031 AM growth factor from Tempro and adjusted = 1.1418 (rural trunk road)
- 2015 – 2031 PM growth factor from Tempro and adjusted = 1.1414 (rural trunk road)
- 2015 – 2031 AM growth factor from Tempro and adjusted = 1.1040 (urban principal road)
- 2015 – 2031 PM growth factor from Tempro and adjusted = 1.1037 (urban principal road)

7.3.7 Hence, the above growth factors are considered to represent Tempro growth factors, but adjusted to remove double counting for NW Sittingbourne and committed development.

7.3.8 However, these factors need to be adjusted further to reflect a revised Swale target of 776 deliveries per annum rather than 640 per annum included within Tempro. This equates an additional 136 units per annum not included in the latest version of Tempro. This represents an increase of 16 x 136 = 2,176 units during the period 2015 to 2031.

7.3.9 An additional 2,176 units during 2015 to 2031 on top of the background of 6,724 units calculated above represents an increase of (6,724 + 2,176) / 6,724 = 1.324 (32.4%). This increase needs to be applied to the growth factors to derive the following values :

- 2015 – 2031 AM growth factor from Tempro and adjusted = 1.1876 (rural trunk road)
- 2015 – 2031 PM growth factor from Tempro and adjusted = 1.1872 (rural trunk road)
- 2015 – 2031 AM growth factor from Tempro and adjusted = 1.1376 (urban principal road)
- 2015 – 2031 PM growth factor from Tempro and adjusted = 1.1372 (urban principal road)

7.3.10 Hence, the factors above represent adjusted growth factors for 2015 to 2031 which makes an allowance for the double counting of the NW Sittingbourne site and committed development sites, and the higher delivery target of 776 units per annum.

7.3.11 The 2023 growth factors have been derived by interpolating the 2015 to 2031 growth factors derived above. On this basis the 2015 to 2023 background growth factors are :

- 2015 – 2023 AM growth factor = 1.0938 (rural trunk road)
- 2015 – 2023 PM growth factor = 1.0936 (rural trunk road)
- 2015 – 2023 AM growth factor = 1.0688 (urban principal road)
- 2015 – 2023 PM growth factor = 1.0686 (urban principal road)

7.3.12 The above growth factors have been applied to the 2015 observed data to derive 2023 and 2031 background traffic data. This is illustrated at Figures 7.1 to 7.4.

7.4 Committed development sites

7.4.1 In addition to the Tempro growth factor a number of sites have been explicitly considered at the request of KCC officers. A number of these have been added to the background traffic for explicit inclusion to the baseline traffic flows. The committed development sites considered and / or added are summarised below.

- SW11/0159 Morrison's Mill Way. The superstore is built out and will therefore be included within the survey counts. The accompanying 150 residential units were not built out at the time of the survey and are hence added explicitly.
- SW14/501588 Stones Farm, Bapchild. An application for 600 houses.

- SW14/505440 Spirit of Sittingbourne Regeneration Site. Mixed use development on six parcels of land comprising 215 residential dwellings, 3,158m^2 A1 retail, 308 space multi storey car park, 1,713m^2 cinema and a 2,320m^2 A3 restaurant.
- SW/13/0215 - Eurolink V / Land North of Swale Way, construction of up to 43,000m^2 of business park.
- SW/02/1180 - Land at East Hall Farm, application for 795 residential units, employment, open space and supporting facilities At the time of the traffic surveys 481 units and 8,448m^2 of employment was already built out.
- SW/08/1127 – Land adj. Coleshall Farm, Iwade, An application for a mixed use development of 324 residential dwellings and 3,000m^2 commercial employment floor area. At the time of the surveys 179 units already built out.
- Allocated Iwade sites. A total allocation for 572 residential units across 3 sites. No planning application as yet, but considered close enough to the site to include explicitly. It is considered that the information within this Transport Assessment can be used to support a future application for the Iwade sites for consistency.
- SW/16/507689/OUT - Frognal Lane mixed use development. A review of the Transport Assessment indicates no assessment was made for any of the junctions considered within this Transport Assessment. It is therefore assumed that no significant effect arises from the Frognal Lane development on the junctions considered within this Transport Assessment and hence no explicit account is taken of this development.
- SW/17/503888/OUT redevelopment of transport depot at Lydbrook Close to residential. A review of the Transport Assessment indicates no net discernible impact at any of the junctions considered within this Transport Assessment. It is therefore assumed that no significant effect arises from the Lydbrook Close development on the junctions considered within this Transport Assessment and hence no explicit account is taken of this development.
- SW/14/506167 FloPlast site on Sheppey Way. A review of the Transport Assessment indicates a reduction in traffic flow as a result of the development. Hence no explicit account is taken of this development.
- SW/16/507877 Crown Quay Lane – A review of the Transport Assessment for this site indicates an impact at 4 of the junctions included within this Transport Assessment. Therefore, explicit account has been taken of the traffic flows for this site in the baseline scenario.
- SW/10/0444 Kemsley Paper Mill – A review of the 2010 ES shows only a modest level of traffic generation from the proposed Kemsley Mill development during the morning and evening peak hours. It has been considered reasonable to assume that the background traffic growth factors make an allowance for this.

7.4.2 The traffic flows from the Transport Assessment reports for the above sites have been extracted for the network assessed within this Transport Assessment.

7.4.3 With respect to the Iwade allocations the traffic generation has been calculated on the same basis as the NW Sittingbourne site (described in section 8). The distribution of the Iwade traffic has been based upon the Coleshall Farm distribution.

7.4.4 The committed development traffic flows are illustrated individually at Figures 7.5 to 7.20.

7.5 Baseline traffic flows

7.5.1 The baseline traffic flows for 2023 and 2031 have been derived by adding together the background traffic flows and committed development traffic flows. It has been assumed that all committed development traffic flows are completed by 2023. The 2023 and 2031 baseline traffic flows are illustrated at Figures 7.21 to 7.24.

8 Traffic generation and distribution

8.1.1 The following section considers the traffic generation and distribution of the proposed development traffic.

8.2 Development trip generation rates

8.2.1 The traffic generation from the proposed development has been calculated using the TRICS database. TRICS is a nationally recognised database of typical traffic generation parameters for different types of development.

8.2.2 The trip generation rates have been agreed with highway officers. Whilst the development will include a proportion of affordable housing, officers have requested that private housing trip generation rates be used for robustness.

8.2.3 Residential sites have been selected from the TRICS database based on the following criteria:

- Private Houses
- Within England, Scotland or Wales (excluding Greater London)
- A minimum of 200 units
- Surveyed from 2005 onwards
- Surveyed on a weekday

8.2.4 With respect to Secondary schools the following filtering has been applied :

- Within England (excluding London)
- With between 500 – 2500 pupils
- Surveyed from 2005 onwards
- Surveyed on a weekday
- Edge of town locations

8.2.5 The following table summarises the average trip rates agreed for the residential and secondary school land uses.

	AM Peak			PM Peak		
	In	Out	2 way	In	Out	2 way
Residential	0.124	0.403	0.527	0.367	0.205	0.572
Secondary School	0.162	0.098	0.260	0.017	0.028	0.045

8.2.6 The 2007 'KCC Guide to Development Contributions and the Provision of Community Infrastructure - Incorporating 2008 figures' document states that the Pupil Product Ratio (PPR) for primary school children is 0.28 per house and 0.20 for secondary school children. However, KCC highway officers have requested that a PPR of 0.35 is used for primary school children.

8.2.7 Other uses on site at the local centre are provided for residents of the site and hence are not expected to generate external trips, particularly during peak hours. Therefore, the local centre uses have not been explicitly allowed for within the assessment but are assumed to be inherent within the residential trip generation rates.

8.3 Development trip generation at full build out (2031)

8.3.1 The residential trip generation is derived by multiplying the trip generation rates above with the development quantum at full build out.

8.3.2 With respect to the education uses, and using the PPRs above :

- The development would generate demand for 1520 x 0.35 = 532 primary school places
- The development would generate demand for 1520 x 0.20 = 304 secondary school places

8.3.3 At full build out the development proposed would create :

- A 2FE primary school would create 30 pupils x 2 forms x 7 years = 420 pupil places
- A 6FE primary school would create 30 pupils x 6 forms x 7 years = 1,260 pupil places

8.3.4 Therefore, the majority of primary school pupils generated by the site could be accommodated within the 2FE being provided on site. A total of 532 – 420 = 112 pupils would need to travel off site and it is assumed that these trips would be implicit within the residential trip generation rates. Hence, for the purposes of assessment it is reasonable to assume that there would be no importing of primary school vehicular trips to the site from external areas.

8.3.5 The secondary school being proposed could accommodate all of the secondary school demand for places generated by the site. For the purposes of assessment, it is assumed that 304 secondary school places would be filled by demand from within the development, whilst 1,260 – 304 = 956 (76%) of the secondary school places would be filled by pupils from outside the site. The trip generation from the secondary school, calculated using the trip rates within the scoping note, have been adjusted to 76% to allow for this.

8.3.6 Based upon the data above the table below summarises the traffic generation calculated for the proposed development at 2031.

	AM Peak			PM Peak		
	In	Out	2 way	In	Out	2 way
Residential	188	613	801	558	312	869
Secondary School	155	94	249	16	27	43
Total	**343**	**707**	**1050**	**574**	**339**	**912**

8.3.7 It is noted that at 2031 the proposed development is anticipated to generate 1050 vehicle trips during the morning peak hour and 912 during the evening peak hour.

8.3.8 The 2031 residential traffic generation can be divided between the four areas as summarised within the table below.

	AM Peak			PM Peak		
	In	Out	2 way	In	Out	2 way
Great Grovehurst Farm	15	48	63	44	25	69
Pheasant Farm	12	40	53	37	21	57

Persimmon	136	443	580	404	226	629
Redrow	25	81	105	73	41	114
Total	**188**	**613**	**801**	**558**	**312**	**869**

8.4 Development trip generation at the interim assessment year (2023)

8.4.1 The residential trip generation is derived by multiplying the trip generation rates above with the development quantum of 780 units at 2023. With respect to the education uses, a similar calculation can be completed as for the full build out.

8.4.2 Based upon the data above the table below summarises the traffic generation calculated for the proposed development at 2023.

	AM Peak			PM Peak		
	In	Out	2 way	In	Out	2 way
Residential	97	314	411	286	160	446
Secondary School	77	46	123	8	13	21
Total	**174**	**361**	**534**	**294**	**173**	**467**

8.4.3 It is noted that at 2023 the proposed development is anticipated to generate 534 vehicle trips during the morning peak hour and 467 during the evening peak hour.

8.4.4 The 2023 residential traffic generation can be divided between the four areas as summarised within the table below.

	AM Peak			PM Peak		
	In	Out	2 way	In	Out	2 way
Great Grovehurst Farm	15	48	63	44	25	69
Pheasant Farm	12	40	53	37	21	57
Persimmon	45	145	190	132	74	206
Redrow	25	81	105	73	41	114
Total	**97**	**314**	**411**	**286**	**160**	**446**

8.5 Development trip distribution

8.5.1 The distribution of trips generated by the residential element of the development has been calculated using Census 2011 data (Mid Super Output Area (MSOA)). The distribution data was used in conjunction with driving route information from an extract of digital road network in GIS to derive the proportion of the total generated trips that pass through each of the junctions analysed.

8.5.2 The distribution of trips generated by the secondary school element of the development has been based on a spreadsheet based gravity model which incorporates all competing secondary schools, weighted according to their pupil roll numbers. On this basis the proportion of pupils attending the proposed school that live in each Census output area can be calculated.

8.5.3 Based upon the methodology above the development traffic generation is shown on Figures 8.1 to 8.8.

9 Junction modelling assessments

9.1.1 The following chapters of this TA consider each of the junctions assessed in turn and detail the modelling completed for each. The findings from the modelling are described and used to inform the need, or otherwise, for mitigation to address development effects at each junction.

9.1.2 The scenarios modelled are listed below and comprise the assessment for morning and evening peak hours for each.

- 2015 base year
- 2023 baseline
- 2031 baseline
- 2023 baseline plus Development (ie Persimmon and GH Dean sites)
- 2023 baseline plus cumulative MU1 site
- 2031 baseline plus Development (ie Persimmon and GH Dean sites)
- 2031 baseline plus cumulative MU1 site

9.1.3 Each junction has been modelled using either the Junctions9 software package (for roundabouts and priority junctions) or Linsig (for signal controlled junctions).

9.1.4 The geometric input to each model has been based upon measurements taken from OS mapping data. Figures showing the geometric inputs adopted are included at Appendices relevant to that particular junction.

9.1.5 The turning flows adopted within each model are taken from the turning flow diagrams detailed earlier within this report. Hence :

▪ 2015 base year	Figures 6.1 to 6.4
▪ 2023 baseline	Figures 7.21 to 7.22
▪ 2031 baseline	Figures 7.23 to 7.24
▪ 2023 baseline plus Persimmon and GH Dean sites	Figures 9.1 to 9.2
▪ 2023 baseline plus cumulative MU1 site	Figures 9.5 to 9.6
▪ 2031 baseline plus Persimmon and GH Dean sites	Figures 9.3 to 9.4
▪ 2031 baseline plus cumulative MU1 site	Figures 9.7 to 9.8

9.1.6 The results from the modelling exercise are presented such that a colour coding system has been adopted to demonstrate the following:

- Green indicates that the approach arm is operating within the desirable capacity parameters generally adopted for new junctions. This is typically an RFC of 0.85 for priority and roundabout junctions and 90% for signal controlled junctions.

- Amber indicates that the approach arm exceeds desirable capacity parameters but remains within theoretical capacity. This is typically an RFC of 0.85 to 1.00 for priority and roundabout junctions and 90% to 100% for signal controlled junctions. Amber does not necessarily indicate unacceptable operation for an existing junction

- Red indicates that the approach arm exceeds theoretical capacity parameters. This is an RFC greater than 1.00 for priority and roundabout junctions and greater than 100% for signal controlled junctions.

10 A249 Grovehurst junction

10.1.1 This junction is a grade separated dumbbell arrangement with a roundabout either side of the A249 corridor.

10.1.2 The west roundabout is a four arm junction whereby the north and south arms are the northbound on and off slips respectively to the A249. The west arm is Grovehurst Road providing access to Iwade, whilst the east arm is the bridge crossing the A249 and connecting with the east roundabout.

10.1.3 The east roundabout is a five arm junction whereby the north and south arms are the north and south slips respectively to the A249. The north east arm is Swale Way that provides access to the industrial areas to the east. The south east arm is Grovehurst Road that provides access to the site. The west arm is the bridge crossing the A249 and connecting with the west roundabout.

10.2 Percentage effect of development

10.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

West roundabout	AM	PM
2023 baseline	2183	2243
2023 with MU1	2262	2317
% increase	**3.6%**	**3.3%**
2031 baseline	2313	2386
2031 with MU1	2450	2479
% increase	**5.9%**	**3.9%**

East roundabout	AM	PM
2023 baseline	3398	3216
2023 with MU1	3605	3365
% increase	**6.1%**	**4.6%**
2031 baseline	3606	3417
2031 with MU1	3938	3626
% increase	**9.2%**	**6.1%**

10.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 3.3% and 5.9% at the west roundabout and between 4.6% and 9.2% at the east roundabout.

10.3 2015 base year

10.3.1 This junction has been modelled as a linked double roundabout. A calibration exercise has been completed which makes an intercept adjustment to each entry arm such that the model queue more closely reflects the observed queue. This exercise results in a significant negative adjustment being made to a number of entry arms which, in effect, removes capacity from the roundabout within the model.

10.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 10a. The geometric inputs to the models are included as Appendix 10b.

	AM			PM		
West roundabout	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
NB off slip	0.88	0.55	7	0.96	0.98	13
Grovehurst Rd	0.93	1.11	8	0.83	1.07	4
Bridge link	0.29	0.06	0	0.48	0.08	1

	AM			PM		
East roundabout	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Bridge link	0.65	0.09	2	0.61	0.11	2
SB off slip	1.02	1.84	17	0.89	0.88	6
Swale Way	1.01	1.82	18	1.00	1.33	23
Grovehurst Rd	0.90	0.78	7	0.92	0.97	8

10.3.3 The results of the 2015 base year model show :

- The west roundabout is operating near to theoretical capacity in both the AM and PM scenarios.
- The east roundabout exceeds theoretical capacity in both the AM and PM peak periods.
- Queues are evident on the southbound off slip during the morning peak hour and Swale Way during both peak hours.
- Queues are evident on the northbound off slip during the evening peak hour.

10.4 2023 and 2031 baseline

The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 10a.

2023 West roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
NB off slip	1.14	4.41	69	1.21	7.20	101
Grovehurst Rd	1.70	32.62	285	1.36	13.61	76
Bridge link	0.31	0.06	1	0.52	0.08	1

2023 East roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Bridge link	0.68	0.10	2	0.61	0.11	2
SB off slip	1.37	14.50	117	1.01	2.03	17
Swale Way	1.28	10.82	101	1.29	9.96	174
Grovehurst Rd	1.17	5.75	61	1.28	10.44	95

2031 West roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
NB off slip	1.22	7.85	111	1.29	10.86	159
Grovehurst Rd	1.79	39.68	343	1.44	18.80	99
Bridge link	0.31	0.06	0	0.52	0.08	1

2031 East roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Bridge link	0.68	0.10	2	0.62	0.11	2
SB off slip	1.49	21.47	169	1.10	3.74	34
Swale Way	1.37	15.36	144	1.37	14.53	253
Grovehurst Rd	1.24	8.66	89	1.34	13.65	128

10.4.1 The results of the modelling show :

- Both roundabout junctions are predicted to exceed theoretical capacity at both 2023 and 2031.
- Significant queues and delays are predicted on all arms except the bridge for all scenarios.

10.5 2023 and 2031 with Development

10.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 10a.

2023 West roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
NB off slip	1.17	5.57	84	1.26	9.20	134
Grovehurst Rd	1.75	35.91	308	1.40	16.71	88
Bridge link	0.30	0.06	0	0.51	0.08	1

2023 East roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Bridge link	0.68	0.10	2	0.63	0.12	2
SB off slip	1.44	18.60	148	1.07	3.09	38
Swale Way	1.34	13.45	124	1.32	11.74	203
Grovehurst Rd	1.33	12.77	142	1.34	13.26	127

2031 West roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
NB off slip	1.27	9.89	145	1.34	13.29	200
Grovehurst Rd	1.87	45.39	382	1.50	22.94	117
Bridge link	0.31	0.06	0	0.51	0.08	1

2031 East roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Bridge link	0.68	0.10	2	0.63	0.12	2
SB off slip	1.61	29.56	241	1.21	7.73	61
Swale Way	1.47	21.60	189	1.43	17.91	296
Grovehurst Rd	1.49	22.22	242	1.43	18.72	179

10.5.2 The results of the modelling show :

- Both roundabout junctions are predicted to exceed theoretical capacity at both 2023 and 2031.
- Significant queues and delays are predicted on all arms except the bridge for all scenarios.
- The effect of the development is to increase queues and delays at both junctions when compared to the baseline.

10.6 2023 and 2031 with cumulative MU1 site

10.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 10a.

2023 West roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
NB off slip	1.17	5.61	84	1.26	9.20	134
Grovehurst Rd	1.75	36.16	310	1.41	16.75	88
Bridge link	0.31	0.06	0	0.51	0.08	1

2023 East roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Bridge link	0.68	0.10	2	0.63	0.12	2
SB off slip	1.44	18.75	149	1.08	3.28	30
Swale Way	1.34	13.54	125	1.33	11.99	207
Grovehurst Rd	1.35	13.55	150	1.34	13.34	129

2031 West roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
NB off slip	1.27	9.96	147	1.34	13.27	200
Grovehurst Rd	1.87	45.63	384	1.50	23.05	117
Bridge link	0.31	0.06	0	0.51	0.08	1

2031 East roundabout	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Bridge link	0.68	0.10	2	0.63	0.12	2
SB off slip	1.61	29.65	242	1.22	8.26	65
Swale Way	1.47	21.71	190	1.43	18.21	300
Grovehurst Rd	1.50	23.11	252	1.43	19.00	182

10.6.2 The results of the modelling show :

- Both roundabout junctions are predicted to exceed theoretical capacity at both 2023 and 2031.
- Significant queues and delays are predicted on all arms except the bridge for all scenarios.
- The effect of the development is to increase queues and delays at both junctions when compared to the baseline.

10.7 Findings

10.7.1 It is evident from the junction modelling above that the junction is predicted to exceed capacity parameters at both roundabouts and for both forecast years assuming the baseline scenario.

10.7.2 The addition of development traffic (either the Development or the cumulative MU1 site) exacerbates the forecast queues and delays and hence there is a need for the development to implement mitigation measures at this location.

10.8 Mitigation

10.8.1 The issue of mitigation at this location was the subject of much discussion with Highways England and KCC (as the highway authorities) and Swale Borough Council during the Local Plan process. With respect to this junction the Local Plan provides the following advice and requirements at section 6.6 (Land at North West Sittingbourne) and Policy MU1.

"6.6.7 A key issue affecting the allocation is the need for a new junction, between Grovehurst Road and the A249 which has been identified as necessary by the Highway Authorities. The main vehicular access into the allocation will need to have regard to the layout of this junction.....Existing pedestrian/cycle links across the Grovehurst/A249 Junction will be

retained and may need to be improved as part of the major remodelling of the junction rather than in any interim improvement scheme……."

"6.6.9 ……. Highways England and Kent County Council have, in principle, agreed the appropriateness of an interim improvement scheme to the Grovehurst Road/A249 junction to accommodate increases in traffic arising from Local Plan allocations. Development at the North West Sittingbourne allocation will be expected to contribute to the funding of the interim scheme although some development is likely to be acceptable in advance of it……."

10.8.2 It is clear from the Local Plan extracts above that an interim improvement scheme is required to deliver the Local Plan and that the MU1 allocation site is expected to contribute towards this. It is also clear that an appropriate interim improvement scheme has already been agreed, in principle, with the highway authorities.

10.8.3 An interim improvement scheme is illustrated below and included at Appendix 10c. This is the mitigation scheme that is being promoted by the development and it is intended that the development will part fund the implementation of this in line with Local Plan policy. It is expected that the Planning Authority will collect contributions from other development sites that are forecast to impact upon this junction as they come forward.

10.8.4 The proposed mitigation scheme comprises :

<u>East roundabout</u>

- A left filter lane for the southbound off slip (on land specifically reserved for the comprehensive remodelling of the A249 Grovehurst junction) with a corresponding give way on Swale Way plus an increased entry width and flare length for the southbound off slip entering roundabout.

- Increased entry width and flare length for Swale Way
- Increased entry width and flare length for Grovehurst Road
- Increased entry width and flare length for bridge link

West roundabout

- Increased roundabout diameter
- Increased entry width and flare length for NB off slip
- Increased entry width and flare length for Grovehurst Road
- Increased entry width and flare length for bridge link
- Stopping up of the gyratory between the bridge link entry and exit.
- Partial signal control.

10.8.5 The Local Plan advises that some development is likely to be acceptable in advance of the interim scheme coming forward. The quantum of development considered acceptable is not defined and this would need to be subject to discussion with the highway authorities to agree a suitable trigger point.

11 A249 Bobbing junction

11.1.1 This junction is a grade separated gyratory whereby the A249 passes overhead. The north and south arms comprise the on and off slips to the A249. The west arm is Sheppey Way and the east arm is the B2006.

11.2 Percentage effect of development

11.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	2964	3268
2023 with MU1	3161	3461
% increase	**6.6%**	**5.9%**
2031 baseline	3188	3516
2031 with MU1	3614	3939
% increase	**13.4%**	**12.0%**

11.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 5.9% and 6.6% at 2023 and between 12.0% and 13.4% at 2031.

11.3 2015 base year

11.3.1 This junction has been modelled as a large roundabout. A calibration exercise has been completed which makes an intercept adjustment to each entry arm such that the model queue more closely reflects the observed queue. This exercise results in a significant negative adjustment being made to a number of entry arms which, in effect, removes capacity from the roundabout within the model.

11.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 11a. The geometric inputs to the models are included as Appendix 11b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006	0.89	0.54	7	0.88	0.37	7
A249 NB off slip	0.94	1.10	9	0.98	1.21	14
Sheppey Way	0.80	0.35	4	0.87	0.50	6
A249 SB off slip	0.91	0.64	8	0.90	0.83	7

11.3.3 The results of the 2015 base year model show :

- The roundabout is operating near to theoretical capacity in both the AM and PM scenarios.

11.4 2023 and 2031 baseline

11.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 11a.

	AM			PM		
2023 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006	1.05	2.08	36	1.03	1.49	33
A249 NB off slip	1.24	7.25	68	1.31	8.34	107
Sheppey Way	0.92	0.75	9	0.99	1.34	18
A249 SB off slip	1.10	3.16	50	1.06	2.69	28

	AM			PM		
2031 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006	1.14	4.73	75	1.11	3.10	77
A249 NB off slip	1.34	13.12	110	1.43	14.77	179
Sheppey Way	0.99	1.32	17	1.06	2.37	37
A249 SB off slip	1.18	5.19	80	1.14	4.96	50

11.4.2 The results of the 2023 and 2031 baseline models show :

- All arms are predicted to exceed theoretical capacity during both peak hours except Sheppey Way.
- Sheppey Way is predicted to approach theoretical capacity during both peak hours during 2023 and exceed theoretical capacity during the 2031 PM peak hour.
- Significant queues are predicted on the off slips during both peak hours.

11.5 2023 and 2031 with Development

11.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 11a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006	1.15	4.82	77	1.06	1.98	48
A249 NB off slip	1.21	7.11	65	1.39	11.58	161
Sheppey Way	0.97	1.16	14	1.03	1.91	28
A249 SB off slip	1.13	3.59	58	1.11	4.05	41

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006	1.35	13.99	236	1.18	5.85	128
A249 NB off slip	1.22	7.98	84	1.62	28.15	352
Sheppey Way	1.13	4.29	58	1.15	5.23	73
A249 SB off slip	1.32	11.21	144	1.27	10.65	94

11.5.2 The results of the 2023 and 2031 modelling with Development show :

- All arms are predicted to exceed theoretical capacity during both peak hours except Sheppey Way during 2023 AM peak hour.
- Significant queues are predicted on all arms.
- The effect of the development is to increase queues and delays when compared to the baseline.

11.6 2023 and 2031 with cumulative MU1 site

11.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 11a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006	1.18	6.13	96	1.07	2.16	53
A249 NB off slip	1.17	6.03	58	1.43	13.06	185
Sheppey Way	0.99	1.40	18	1.04	2.14	31
A249 SB off slip	1.16	4.22	67	1.13	4.96	46

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006	1.39	16.26	272	1.19	6.37	138
A249 NB off slip	1.21	7.48	81	1.65	30.17	385
Sheppey Way	1.16	5.05	66	1.17	5.83	79
A249 SB off slip	1.35	12.12	155	1.30	11.75	102

11.6.2 The results of the 2023 and 2031 modelling with the cumulative MU1 site show :

- All arms are predicted to exceed theoretical capacity during both peak hours except Sheppey Way during 2023 AM peak hour.
- Significant queues are predicted on all arms.
- The effect of the development is to increase queues and delays when compared to the baseline.

11.7 Findings

11.7.1 It is evident from the junction modelling above that the junction is predicted to exceed capacity parameters for both forecast years assuming the baseline scenario.

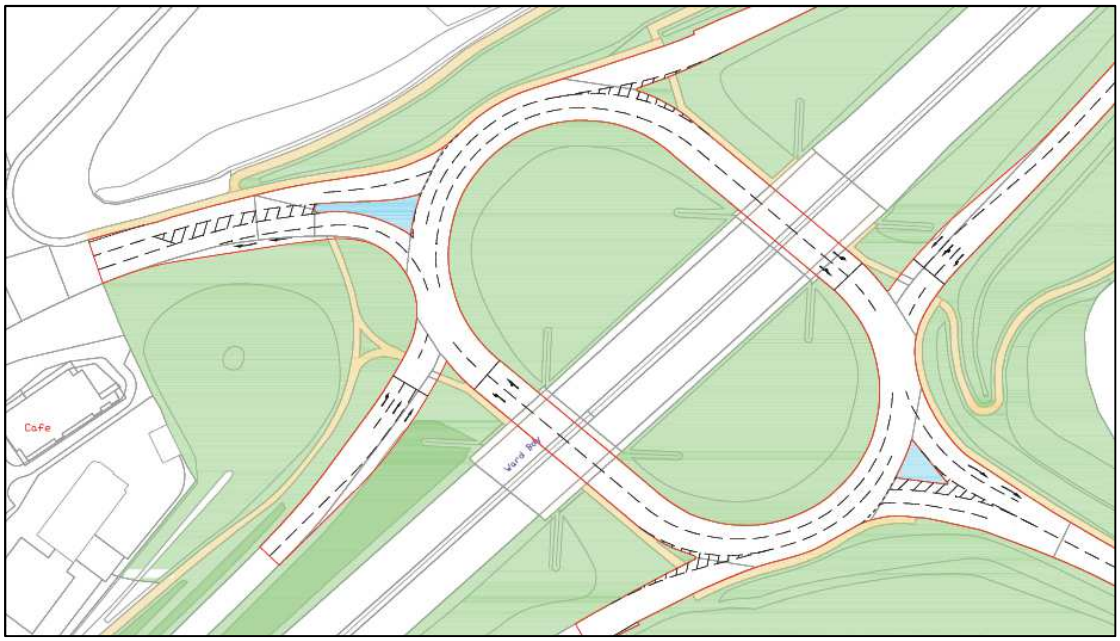
11.7.2 The addition of development traffic (either the Development or the cumulative MU1 site) exacerbates the forecast queues and delays and hence there is a need for the development to implement mitigation measures at this location.

11.8 Mitigation

11.8.1 A mitigation scheme has been developed for this junction comprising

- Signal control of the A249 off slip arms.
- Flaring of both A249 off slip arms such that each is 3 lanes at the stop line.
- Flaring of the Sheppey Way exit arm such that 2 lanes (merging to one) exit from the roundabout.
- Flaring of the B2006 exit arm such that 2 lanes (merging to one) exit from the roundabout.
- 3 lanes marked on the gyratory after each stop line.

11.8.2 The mitigation scheme is illustrated below and included at Appendix 11c.



11.8.3 A 2023 and 2031 with development plus mitigation model has been developed for this junction using the Linsig software package and assuming the cumulative MU1 allocation traffic flows. The results from the mitigation models are summarised below for each controller, whilst the full LINSIG output is included as Appendix 11d.

2023 with mitigation	AM			PM		
Controller 1	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A249 Westbound Off-slip Left Ahead	23.3 : 23.3%	0.7	1	15.5 : 16.4%	0.5	1
A249 Westbound Off-slip Ahead	70.0%	2.3	5	70.1%	2.1	4
B2006 - Entry Ahead	59.0 : 56.3%	0.7	2	65.1 : 65.1%	0.9	2
Internal Gyratory 001 Ahead	74.7%	2.0	3	70.5%	3.2	5
Internal Gyratory 001 Ahead Right	72.2%	1.7	3	69.7%	3.2	5
Internal Gyratory 002 Right	1.7%	0.0	0	1.3%	0.0	0
Internal Gyratory 002 Right	16.8%	0.1	0	12.1%	0.1	0
Internal Gyratory 002 Right	9.1%	0.0	0	6.4%	0.0	0
Internal Gyratory 003 Ahead	27.3%	0.2	0	31.3%	0.2	0

Internal Gyratory 003 Right	31.8%	0.2	0	29.3%	0.2	0
Internal Gyratory 003 Right	27.0%	0.2	0	26.0%	0.2	0
PRC for signalised arms (%)	20.6			27.6		
Cycle Time (s)	30			28		

Controller 2 2023 with mitigation	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A249 - Eastbound Off-Slip Left Ahead	57.4 : 57.4%	1.6	3	68.1 : 68.1%	2.2	4
A249 - Eastbound Off-Slip Ahead	57.6%	1.5	3	64.9%	1.9	4
Sheppey Way - Entry Ahead	64.2 : 64.2%	0.9	1	74.2 : 74.2%	1.4	2
Internal Gyratory 004 Ahead	65.8%	2.8	6	72.0%	2.1	4
Internal Gyratory 004 Ahead Right	58.4%	2.0	4	67.5%	1.9	4
Internal Gyratory 005 Right	8.5%	0.0	0	14.4%	0.1	0
Internal Gyratory 005 Right	15.2%	0.1	0	21.9%	0.1	0
Internal Gyratory 005 Right	15.4%	0.1	0	20.9%	0.1	0
Internal Gyratory 006 Ahead	27.4%	0.2	0	36.8%	0.3	0
Internal Gyratory 006 Right	25.9%	0.2	1	31.4%	0.2	1
Internal Gyratory 006 Right	24.0%	0.2	0	29.8%	0.2	0
PRC for signalised arms (%)	36.9			25.0		
Cycle Time (s)	30			28		

Controller 1 2031 with mitigation	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A249 Westbound Off-slip Left Ahead	25.2 : 25.2%	0.7	1	17.1 : 17.3%	0.5	1
A249 Westbound Off-slip Ahead	76.6%	2.9	6	76.4%	2.6	5
B2006 - Entry Ahead	68.5 : 68.5%	1.1	2	74.0 : 74.0%	1.4	3
Internal Gyratory 001 Ahead	83.5%	3.1	4	83.6%	2.9	4
Internal Gyratory 001 Ahead Right	81.0%	2.7	4	82.8%	2.8	4
Internal Gyratory 002 Right	1.8%	0.0	0	1.4%	0.0	0
Internal Gyratory 002 Right	19.8%	0.1	0	13.1%	0.1	0
Internal Gyratory 002 Right	8.3%	0.0	0	7.0%	0.0	0
Internal Gyratory 003 Ahead	37.3%	0.3	0	37.8%	0.3	0
Internal Gyratory 003 Right	33.5%	0.3	0	31.2%	0.2	0
Internal Gyratory 003 Right	30.0%	0.2	0	28.4%	0.2	0
PRC for signalised arms (%)	7.8			7.7		
Cycle Time (s)	30			28		

Controller 2 2031 with mitigation	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A249 - Eastbound Off-Slip Left Ahead	64.7 : 64.7%	2.0	3	83.2 : 83.2%	3.8	6
A249 - Eastbound Off-Slip Ahead	67.9%	2.1	4	81.5%	3.4	6

Sheppey Way - Entry Ahead	72.0 : 72.0%	1.3	2	83.4 : 83.4%	2.5	3
Internal Gyratory 004 Ahead	69.2%	3.1	6	76.6%	3.2	6
Internal Gyratory 004 Ahead Right	65.0%	2.3	5	73.7%	2.7	5
Internal Gyratory 005 Right	9.3%	0.1	0	15.6%	0.1	0
Internal Gyratory 005 Right	17.2%	0.1	0	26.7%	0.2	0
Internal Gyratory 005 Right	18.1%	0.1	0	26.2%	0.2	0
Internal Gyratory 006 Ahead	30.3%	0.2	0	40.0%	0.3	0
Internal Gyratory 006 Right	28.9%	0.2	1	37.2%	0.3	3
Internal Gyratory 006 Right	26.9%	0.2	0	35.4%	0.3	1
PRC for signalised arms (%)	30.0			8.2		
Cycle Time (s)	30			28		

11.8.4 It is evident from the output results above that a signal controlled scheme at this location would work within capacity. This demonstrates mitigation of the development and additional capacity to serve the Local Plan traffic flows at 2031.

11.8.5 In addition to highway capacity, the proposed signal control of the slip roads could incorporate “on demand” pedestrian crossing facilities. This would facilitate pedestrian movements between Bobbing and The Meads, for walking to school journeys for example.

11.8.6 It is intended that the Development would contribute towards the implementation of the signal controlled scheme. It is considered reasonable that other Local Plan developments that would generate traffic passing through this junction should also contribute towards its implementation.

11.8.7 The trigger point for implementation would need to be agreed with the highway authorities.

12 Quinton Road / Sonora Way

12.1.1 This junction is a simple priority junction whereby Sonora Way gives way to traffic on Quinton Road. The location of this junction is illustrated opposite.

12.2 Percentage effect of development

12.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	573	423
2023 with MU1	820	678
% increase	**43.1%**	**60.1%**
2031 baseline	610	450
2031 with MU1	1155	1015
% increase	**89.4%**	**125.3%**

12.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 43.1% and 60.1% at 2023 and between 89.4% and 125.3% at 2031.

12.3 2015 base year

12.3.1 This junction has been modelled as a simple priority junction.

12.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 12a. The geometric inputs to the models are included as Appendix 12b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Sonora Way (Left out)	0.15	0.11	0	0.04	0.10	0
Sonora Way (Rt out)	0.21	0.15	0	0.19	0.14	0
Quinton Road (W)	0.06	0.09	0	0.07	0.09	0

12.3.3 The results of the 2015 base year model show :

- The junction is predicted to operate well within desirable capacity parameters.

12.4 2023 and 2031 baseline

12.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 12a.

2023 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Sonora Way (Left out)	0.16	0.11	0	0.05	0.10	0
Sonora Way (Rt out)	0.23	0.15	0	0.20	0.14	0
Quinton Road (W)	0.07	0.09	0	0.08	0.09	0

2031 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Sonora Way (Left out)	0.17	0.11	0	0.05	0.10	0
Sonora Way (Rt out)	0.24	0.16	0	0.21	0.15	0
Quinton Road (W)	0.07	0.09	0	0.08	0.09	0

12.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to operate well within capacity parameters for all scenarios.

12.5 2023 and 2031 with Development

12.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 12a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Sonora Way (Left out)	0.17	0.12	0	0.05	0.12	0
Sonora Way (Right out)	0.31	0.18	0	0.37	0.19	1
Quinton Road (W)	0.07	0.09	0	0.08	0.09	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Sonora Way (Left out)	0.22	0.16	0	0.12	0.27	0
Sonora Way (Right out)	0.49	0.26	1	0.78	0.54	3
Quinton Road (W)	0.09	0.10	0	0.09	0.09	0

12.5.2 The results of the 2023 and 2031 with Persimmon and GH Dean development model show :

- The junction is predicted to operate well within capacity parameters for all scenarios.

12.6 2023 and 2031 with cumulative MU1 site

12.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 12a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Sonora Way (Left out)	0.20	0.12	0	0.14	0.12	0
Sonora Way (Right out)	0.32	0.19	1	0.39	0.20	1
Quinton Road (W)	0.17	0.10	0	0.13	0.09	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Sonora Way (Left out)	0.26	0.17	0	0.33	0.38	1
Sonora Way (Right out)	0.53	0.30	1	0.82	0.70	4
Quinton Road (W)	0.20	0.11	0	0.14	0.09	0

12.6.2 The results of the 2023 and 2031 with cumulative MU1 development model show :

- The junction is predicted to operate within desirable capacity parameters for all scenarios.

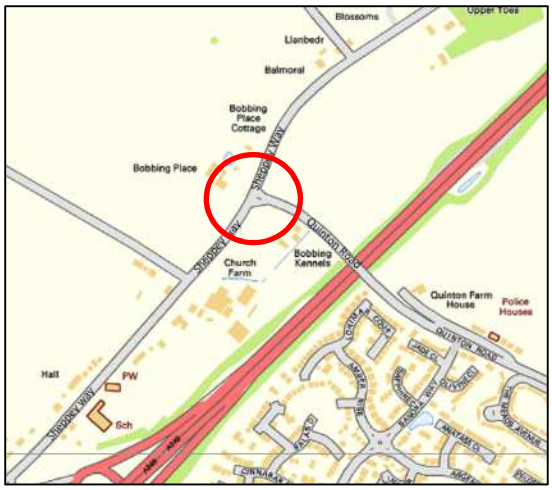
12.7 Findings

12.7.1 It is evident from the junction modelling above that the junction is predicted to operate within desirable capacity parameters for all scenarios.

12.7.2 On this basis it is not considered necessary to implement mitigation measures as a result of the development at this location.

13 Quinton Road / Sheppey Way

13.1.1 This junction is a priority junction whereby the Quinton Road arm gives way to traffic on Sheppey Way. A right turn bay is provided for vehicles turning in to Quinton Road. The location of this junction is illustrated opposite.



13.2 Percentage effect of development

13.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	672	558
2023 with MU1	723	608
% increase	**7.6%**	**9.1%**
2031 baseline	715	593
2031 with MU1	832	711
% increase	**16.3%**	**19.8%**

13.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 7.6% and 9.1% at 2023 and between 16.3% and 19.8% at 2031.

13.3 2015 base year

13.3.1 This junction has been modelled as a priority junction with a right turn bay.

13.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 13a. The geometric inputs to the models are included as Appendix 13b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Quinton Rd (left out)	0.19	0.10	0	0.07	0.09	0
Quinton Rd (right out)	0.15	0.14	0	0.11	0.12	0
Sheppey Way (S)	0.15	0.10	0	0.15	0.10	0

13.3.3 The results of the 2015 base year model show :

- The junction is predicted to operate well within desirable capacity parameters.

13.4 2023 and 2031 baseline

13.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 13a. The results of the 2023 and 2031 baseline models show :

	AM			PM		
2023 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Quinton Rd (left out)	0.20	0.11	0	0.07	0.10	0
Quinton Rd (right out)	0.17	0.14	0	0.12	0.13	0
Sheppey Way (S)	0.16	0.11	0	0.16	0.10	0

	AM			PM		
2031 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Quinton Rd (left out)	0.22	0.11	0	0.08	0.10	0
Quinton Rd (right out)	0.18	0.15	0	0.12	0.13	0
Sheppey Way (S)	0.17	0.11	0	0.18	0.11	0

13.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

13.5 2023 and 2031 with Development

13.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 13a.

	AM			PM		
2023 with Development	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Quinton Rd (left out)	0.24	0.11	0	0.09	0.09	0
Quinton Rd (right out)	0.17	0.15	0	0.12	0.13	0
Sheppey Way (S)	0.18	0.11	0	0.20	0.11	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Quinton Rd (left out)	0.32	0.12	1	0.13	0.10	0
Quinton Rd (right out)	0.20	0.16	0	0.14	0.15	0
Sheppey Way (S)	0.21	0.11	0	0.27	0.12	0

13.5.2 The results of the 2023 and 2031 with Persimmon and GH Dean development model show :

- The junction is predicted to operate well within desirable capacity parameters for all scenarios.

13.6 2023 and 2031 with cumulative MU1 site

13.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 13a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Quinton Rd (left out)	0.25	0.11	0	0.10	0.09	0
Quinton Rd (right out)	0.17	0.15	0	0.12	0.14	0
Sheppey Way (S)	0.18	0.11	0	0.21	0.11	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Quinton Rd (left out)	0.34	0.13	1	0.14	0.10	0
Quinton Rd (right out)	0.20	0.16	0	0.14	0.15	0
Sheppey Way (S)	0.22	0.12	0	0.29	0.12	0

13.6.2 The results of the 2023 and 2031 with cumulative MU1 development model show :

- The junction is predicted to operate well within desirable capacity parameters for all scenarios.

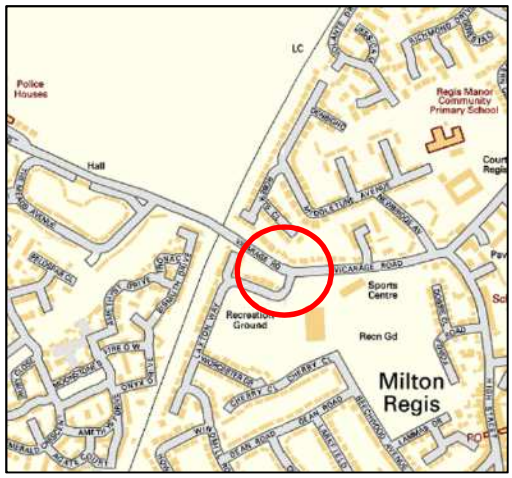
13.7 Findings

13.7.1 It is evident from the junction modelling above that the junction is predicted to operate within desirable capacity parameters for all scenarios.

13.7.2 On this basis it is not considered necessary to implement mitigation measures as a result of the development at this location.

14 Vicarage Road / Laxton Way

14.1.1 This junction is a simple priority junction whereby Laxton Way gives way to traffic on Vicarage Road. The location of this junction is illustrated opposite.



14.2 Percentage effect of development

14.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	535	399
2023 with MU1	612	477
% increase	**14.3%**	**19.6%**
2031 baseline	570	424
2031 with MU1	671	524
% increase	**17.7%**	**23.6%**

14.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 14.3% and 19.6% at 2023 and between 17.7% and 23.6% at 2031.

14.3 2015 base year

14.3.1 This junction has been modelled as a simple priority junction.

14.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 14a. The geometric inputs to the models are included as Appendix 14b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Laxton Way	0.10	0.11	0	0.08	0.11	0
Vicarage Road (W)	0.06	0.08	0	0.02	0.09	0

14.3.3 The results of the 2015 base year model show :

- The junction is predicted to operate well within desirable capacity parameters.

14.4 2023 and 2031 baseline

14.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 14a. The results of the 2023 and 2031 baseline models show :

2023 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Laxton Way	0.11	0.11	0	0.09	0.11	0
Vicarage Road (W)	0.06	0.08	0	0.02	0.09	0

2031 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Laxton Way	0.12	0.12	0	0.09	0.11	0
Vicarage Road (W)	0.7	0.08	0	0.02	0.09	0

14.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

14.5 2023 and 2031 with Development

14.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 14a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Laxton Way	0.11	0.12	0	0.10	0.11	0
Vicarage Road (W)	0.08	0.08	0	0.02	0.09	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Laxton Way	0.13	0.12	0	0.13	0.11	0
Vicarage Road (W)	0.13	0.08	0	0.04	0.08	0

14.5.2 The results of the 2023 and 2031 with Persimmon and GH Dean development model show :

- The junction is predicted to operate well within desirable capacity parameters for all scenarios.

14.6 2023 and 2031 with cumulative MU1 site

14.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 14a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Laxton Way	0.12	0.12	0	0.11	0.11	0
Vicarage Road (W)	0.09	0.08	0	0.03	0.08	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Laxton Way	0.13	0.12	0	0.13	0.11	0
Vicarage Road (W)	0.13	0.08	0	0.04	0.08	0

14.6.2 The results of the 2023 and 2031 with cumulative MU1 development model show :

- The junction is predicted to operate well within desirable capacity parameters for all scenarios.

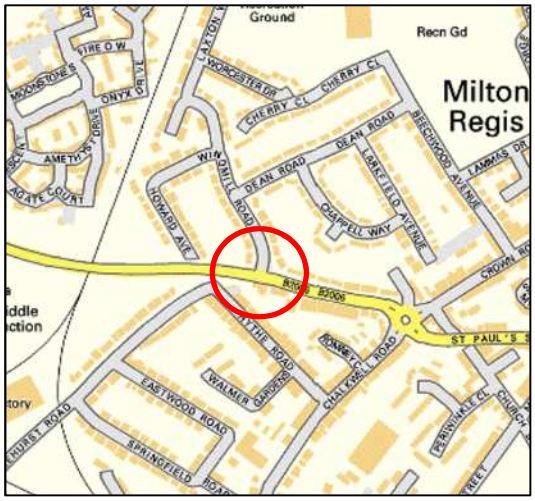
14.7 Findings

14.7.1 It is evident from the junction modelling above that the junction is predicted to operate within desirable capacity parameters for all scenarios.

14.7.2 On this basis it is not considered necessary to implement mitigation measures as a result of the development at this location.

15 B2006 Staplehurst Road / Windmill Road

15.1.1 This junction is a priority junction whereby Windmill Road gives way to traffic on the B2006 Staplehurst Road. A right turn bay is provided for traffic turning in to Windmill Road. The location of this junction is illustrated opposite.



15.2 Percentage effect of development

15.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	1922	2260
2023 with MU1	1960	2295
% increase	**1.9%**	**1.5%**
2031 baseline	2033	2391
2031 with MU1	2117	2472
% increase	**4.1%**	**3.4%**

15.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 1.5% and 1.9% at 2023 and between 3.4% and 4.1% at 2031.

15.3 2015 base year

15.3.1 This junction has been modelled as a priority junction with a right turn bay.

15.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 15a. The geometric inputs to the models are included as Appendix 15b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Windmill Road	0.30	0.20	0	0.10	0.13	0
B2006 (E)	0.09	0.14	0	0.17	0.14	0

15.3.3 The results of the 2015 base year model show :

- The junction is predicted to operate well within desirable capacity parameters.

15.4 2023 and 2031 baseline

15.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 15a. The results of the 2023 and 2031 baseline models show :

2023 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Windmill Road	0.40	0.26	1	0.13	0.16	0
B2006 (E)	0.12	0.17	0	0.20	0.16	0

2031 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Windmill Road	0.45	0.31	1	0.14	0.17	0
B2006 (E)	0.13	0.18	0	0.23	0.18	0

15.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

15.5 2023 and 2031 with Development

15.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 15a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Windmill Road	0.42	0.28	1	0.14	0.16	0
B2006 (E)	0.12	0.17	0	0.22	0.17	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Windmill Road	0.53	0.37	1	0.17	0.17	0
B2006 (E)	0.16	0.19	0	0.28	0.19	0

15.5.2 The results of the 2023 and 2031 with Persimmon and GH Dean development model show :

- The junction is predicted to operate well within desirable capacity parameters for all scenarios.

15.6 2023 and 2031 with cumulative MU1 site

15.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 15a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Windmill Road	0.43	0.28	1	0.14	0.16	0
B2006 (E)	0.13	0.17	0	0.23	0.17	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Windmill Road	0.54	0.38	1	0.17	0.17	0
B2006 (E)	0.16	0.19	0	0.28	0.19	0

15.6.2 The results of the 2023 and 2031 with cumulative MU1 development model show :

- The junction is predicted to operate well within desirable capacity parameters for all scenarios.

15.7 Findings

15.7.1 It is evident from the junction modelling above that the junction is predicted to operate within desirable capacity parameters for all scenarios.

15.7.2 On this basis it is not considered necessary to implement mitigation measures as a result of the development at this location.

16 B2006 Staplehurst Road / Staple Close / Crown Road / B2006 St Paul's Street / Chalkwell Road

16.1.1 This junction is a five arm roundabout on the B2006 Staplehurst Road corridor. The east and west arms are formed by the B2006 Staplehurst Road which links to Bobbing junction in the west and the B2005 in the east.

16.1.2 Crown Road and Chalkwell Road form the north and south arms and distribute traffic to residential areas. Staple Close is a small residential cul-de-sac. The location of this junction is illustrated opposite.

16.2 Percentage effect of development

16.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	2481	2842
2023 with MU1	2520	2878
% increase	**1.5%**	**1.3%**
2031 baseline	2627	3009
2031 with MU1	2712	3091
% increase	**3.3%**	**2.7%**

16.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 1.3% and 1.5% at 2023 and between 2.7% and 3.3% at 2031.

16.3 2015 base year

16.3.1 This junction has been modelled as a five arm roundabout junction.

16.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 16a. The geometric inputs to the models are included as Appendix 16b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Crown Rd	0.46	0.25	1	0.18	0.12	0
St Paul's St	0.45	0.11	1	0.76	0.19	3
Chalkwell Rd	0.27	0.06	0	0.51	0.12	1

Staplehurst Rd	0.79	0.21	4	0.63	0.12	2
Staple Close	0.01	0.26	0	0.00	0.20	0

16.3.3 The results of the 2015 base year model show :

- The junction is predicted to operate within maximum capacity parameters.

16.4 2023 and 2031 baseline

16.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 16a. The results of the 2023 and 2031 baseline models show :

	AM			PM		
2023 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Crown Rd	0.62	0.44	2	0.24	0.15	0
St Paul's St	0.58	0.14	1	0.87	0.37	7
Chalkwell Rd	0.32	0.07	1	0.60	0.16	2
Staplehurst Rd	0.94	0.66	13	0.78	0.21	4
Staple Close	0.01	0.40	0	0.00	0.29	0

	AM			PM		
2031 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Crown Rd	0.72	0.64	2	0.27	0.16	0
St Paul's St	0.62	0.16	2	0.93	0.65	12
Chalkwell Rd	0.34	0.08	1	0.67	0.19	2
Staplehurst Rd	1.00	1.65	36	0.83	0.27	5
Staple Close	0.02	0.48	0	0.01	0.33	0

16.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to exceed desirable maximum capacity parameters during the 2023 AM and PM peak hours on the B2006 Staplehurst Road and St Paul's Street respectively.
- The junction is predicted to reach theoretical maximum capacity parameters during the AM peak hour at 2031 for the B2006 Staplehurst Road.

16.5 2023 and 2031 with Development

16.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 16a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Crown Rd	0.63	0.47	2	0.24	0.15	0
St Paul's St	0.58	0.14	1	0.88	0.40	7
Chalkwell Rd	0.32	0.07	1	0.61	0.16	2
Staplehurst Rd	0.95	0.78	16	0.79	0.22	4
Staple Close	0.01	0.42	0	0.00	0.29	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Crown Rd	0.74	0.69	3	0.27	0.17	0
St Paul's St	0.63	0.16	2	0.97	1.00	19
Chalkwell Rd	0.35	0.08	1	0.69	0.21	2
Staplehurst Rd	1.04	2.96	71	0.85	0.31	6
Staple Close	0.02	0.51	0	0.01	0.35	0

16.5.2 The results of the 2023 and 2031 models show :

- The junction is predicted to exceed desirable maximum capacity parameters during the 2023 AM and PM peak hours for the B2006 Staplehurst Road and St Paul's Street respectively.
- The junction is predicted to exceed theoretical maximum capacity parameters during the AM peak hour at 2031 for the B2006 Staplehurst Road.

16.6 2023 and 2031 with cumulative MU1 site

16.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 16a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Crown Rd	0.64	0.48	2	0.24	0.15	0
St Paul's St	0.58	0.14	1	0.89	0.42	8
Chalkwell Rd	0.32	0.07	1	0.61	0.16	2
Staplehurst Rd	0.96	0.86	18	0.79	0.22	4
Staple Close	0.01	0.42	0	0.00	0.29	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Crown Rd	0.74	0.70	3	0.27	0.17	0
St Paul's St	0.63	0.16	2	0.97	1.09	21
Chalkwell Rd	0.35	0.08	1	0.69	0.22	2
Staplehurst Rd	1.04	3.20	77	0.85	0.31	6
Staple Close	0.02	0.51	0	0.01	0.35	0

16.6.2 The results of the 2023 and 2031 models show :

- The junction is predicted to exceed desirable maximum capacity parameters during the 2023 AM and PM peak hours for the B2006 Staplehurst Road and St Paul's Street respectively.
- The junction is predicted to exceed theoretical maximum capacity parameters during the AM peak hour at 2031 for the B2006 Staplehurst Road.

16.7 Findings

16.7.1 It is evident from the junction modelling above that the proposed development has an impact on the performance of this junction although this is demonstrated to be modest in terms of the modelling output.

16.7.2 It is further evident that the percentage effect of development at this junction is predicted to be low, ranging from 1.3% to 3.3%.

16.7.3 On the basis of the above findings it is not considered necessary or appropriate to implement mitigation measures as a result of the development at this location.

17 Vicarage Road / North Street / High Street

17.1.1 This junction is a three arm mini roundabout junction. The west arm is formed by Vicarage Road, the east arm by North Street and the south arm by High Street. The location of this junction is illustrated opposite.

17.2 Percentage effect of development

17.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	838	704
2023 with MU1	900	771
% increase	**7.4%**	**9.5%**
2031 baseline	892	749
2031 with MU1	955	817
% increase	**7.1%**	**9.0%**

17.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 7.4% and 9.5% at 2023 and between 7.1% and 9.0% at 2031.

17.3 2015 base year

17.3.1 This junction has been modelled as a mini roundabout.

17.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 17a. The geometric inputs to the models are included as Appendix 17b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
North Street	0.60	0.20	2	0.31	0.11	0
High Street	0.18	0.11	0	0.29	0.12	0
Vicarage Road	0.36	0.11	1	0.33	0.11	1

17.3.3 The results of the 2015 base year model show :

- The junction is predicted to operate well within desirable capacity parameters.

17.4 2023 and 2031 baseline

17.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 17a. The results of the 2023 and 2031 baseline models show :

2023 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
North Street	0.65	0.23	2	0.33	0.11	1
High Street	0.19	0.11	0	0.32	0.12	1
Vicarage Road	0.38	0.12	1	0.35	0.11	1

2031 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
North Street	0.70	0.27	2	0.35	0.12	1
High Street	0.21	0.12	0	0.34	0.13	1
Vicarage Road	0.41	0.12	1	0.38	0.12	1

17.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

17.5 2023 and 2031 with Development

17.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 17a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
North Street	0.67	0.25	2	0.36	0.12	1
High Street	0.20	0.11	0	0.34	0.13	1
Vicarage Road	0.42	0.12	1	0.38	0.12	1

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
North Street	0.73	0.31	3	0.37	0.12	1
High Street	0.23	0.12	0	0.39	0.14	1
Vicarage Road	0.47	0.13	1	0.41	0.13	1

17.5.2 The results of the 2023 and 2031 with Persimmon and GH Dean development model show :

- The junction is predicted to operate well within desirable capacity parameters for all scenarios.

17.6 2023 and 2031 with cumulative MU1 site

17.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 17a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
North Street	0.67	0.26	2	0.37	0.12	1
High Street	0.21	0.11	0	0.35	0.13	1
Vicarage Road	0.44	0.13	1	0.39	0.12	1

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
North Street	0.73	0.31	3	0.37	0.12	1
High Street	0.23	0.12	0	0.40	0.14	1
Vicarage Road	0.47	0.13	1	0.41	0.13	1

17.6.2 The results of the 2023 and 2031 with cumulative MU1 development model show :

- The junction is predicted to operate well within desirable capacity parameters for all scenarios.

17.7 Findings

17.7.1 It is evident from the junction modelling above that the junction is predicted to operate within desirable capacity parameters for all scenarios.

17.7.2 On this basis it is not considered necessary to implement mitigation measures as a result of the Development at this location.

18 B2006 St Paul's Street / King Street / B2005 Mill Way / B2006 Mill Way

18.1.1 This junction is a four arm roundabout on the B2006 St Pauls Street corridor which forms the west arm. The B2005 / B2006 Mill Way forms the north and south arms. King Street is a cul-de-sac to the north serving commercial development. A further access is provided at the south east corner of the roundabout to an area of commercial use. The location of this junction is illustrated opposite.

18.2 Percentage effect of development

18.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	2795	3385
2023 with MU1	2865	3456
% increase	**2.5%**	**2.1%**
2031 baseline	2951	3578
2031 with MU1	3085	3715
% increase	**4.6%**	**3.8%**

18.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 2.1% and 2.5% at 2023 and between 3.8% and 4.6% at 2031.

18.3 2015 base year

18.3.1 This junction has been modelled as a four arm roundabout junction.

18.3.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 18a. The geometric inputs to the models are included as Appendix 18b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Mill Way (E)	0.45	0.08	1	0.46	0.07	1
Mill Way (S)	0.47	0.08	1	0.85	0.26	6
St Pauls Street	0.68	0.14	2	0.60	0.12	2
King Street	0.06	0.08	0	0.08	0.09	0

18.3.3 The results of the 2015 base year model show :

- The junction is predicted to be operating within acceptable capacity parameters for both peak hours.

18.4 2023 and 2031 baseline

18.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 18a. The results of the 2023 and 2031 baseline models show :

2023 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Mill Way (E)	1.04	2.90	31	0.55	0.10	1
Mill Way (S)	0.62	0.10	2	1.02	2.13	56
St Pauls Street	1.20	9.64	177	0.83	0.29	5
King Street	0.67	2.17	2	0.12	0.12	1

2031 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Mill Way (E)	1.06	3.75	43	0.99	1.39	18
Mill Way (S)	0.65	0.11	2	1.18	7.37	202
St Pauls Street	1.31	14.97	266	1.04	2.45	44
King Street	0.71	2.43	2	0.61	1.25	1

18.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to exceed theoretical maximum capacity parameters during both peak hours.

18.5 2023 and 2031 with Development

18.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 18a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Mill Way (E)	1.05	3.38	37	0.56	0.10	1
Mill Way (S)	0.62	0.11	2	1.04	2.95	81
St Pauls Street	1.25	11.99	215	0.84	0.31	5
King Street	0.68	2.33	2	0.12	0.12	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Mill Way (E)	1.10	4.96	60	1.01	2.16	28
Mill Way (S)	0.67	0.12	2	1.29	12.82	334
St Pauls Street	1.41	20.15	348	1.10	5.02	93
King Street	0.73	2.64	2	0.69	1.73	2

18.5.2 The results of the 2023 and 2031 models show :

- The junction is predicted to exceed theoretical maximum capacity parameters during both peak hours.

18.6 2023 and 2031 with cumulative MU1 site

18.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 18a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Mill Way (E)	1.05	3.48	39	0.75	0.23	3
Mill Way (S)	0.63	0.11	2	1.05	3.11	96
St Pauls Street	1.27	12.74	228	0.91	0.52	8
King Street	0.69	2.36	2	0.23	0.26	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Mill Way (E)	1.11	5.15	63	1.01	2.25	30
Mill Way (S)	0.67	0.12	2	1.30	13.42	347
St Pauls Street	1.42	20.94	360	1.11	5.36	99
King Street	0.73	2.67	2	0.70	1.77	2

18.6.2 The results of the 2023 and 2031 models show :

- The junction is predicted to exceed theoretical maximum capacity parameters during both peak hours.

18.7 Findings

18.7.1 It is evident from the junction modelling above that the proposed development has an impact on the performance of this junction.

18.7.2 However, it is noted that the junction is operating over capacity assuming baseline conditions with an allowance for Local Plan development growth included.

18.7.3 It is further evident that the percentage effect of development at this junction is predicted to be relatively low, ranging from 2.1% to 4.6%.

18.7.4 On the basis of the above findings it is not considered necessary or appropriate to implement mitigation measures as a result of the development at this location.

19 B2006 / Sonora Way / Vellum Drive

19.1.1 This junction is a four arm roundabout on the B2006 corridor which forms the east and west arms. Sonora Way forms the north arm and Velum Drive the south. Bobbing junction lies to the west of this junction. The location of this junction is illustrated opposite.

19.1.2 A calibration exercise has been completed which makes an intercept adjustment to each entry arm such that the model queue more closely reflects the observed queue. This exercise results in a significant negative adjustment being made to a number of entry arms which, in effect, removes capacity from the roundabout within the model.

19.2 Percentage effect of development

19.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	2265	2694
2023 with MU1	2449	2889
% increase	**8.1%**	**7.2%**
2031 baseline	2398	2854
2031 with MU1	2823	3303
% increase	**17.7%**	**15.8%**

19.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 8.1% and 7.2% at 2023 and between 15.8% and 17.7% at 2031.

19.3 2015 base year

19.3.1 This junction has been modelled as a four arm roundabout junction. The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 19a. The geometric inputs to the models are included as Appendix 19b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	0.92	0.97	9	0.94	0.68	12
Velum Drive	0.03	0.06	0	0.15	0.08	0
B2006 (W)	0.88	0.42	7	0.93	0.61	10

Sonora Way	0.92	0.98	8	0.88	1.25	5

19.3.2 The results of the 2015 base year model show :

- The junction is predicted to operate within maximum theoretical capacity parameters.
- In both peak hours the B2006 arms and Sonora Way arm exceed the desirable maximum capacity parameter of 0.85.

19.4 2023 and 2031 baseline

19.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 19a. The results of the 2023 and 2031 baseline models show :

	AM			PM		
2023 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	1.11	3.79	43	1.07	2.37	54
Velum Drive	0.03	0.06	0	0.18	0.09	0
B2006 (W)	1.04	1.77	37	1.12	3.59	78
Sonora Way	1.16	4.52	43	1.18	6.46	28

	AM			PM		
2031 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	1.17	6.16	65	1.14	4.26	91
Velum Drive	0.04	0.06	0	0.19	0.09	0
B2006 (W)	1.10	2.98	69	1.19	6.03	117
Sonora Way	1.25	7.97	65	1.25	9.37	39

19.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to exceed theoretical maximum capacity parameters during both peak hours.

19.5 2023 and 2031 with Development

19.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 19a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	1.15	5.40	56	1.10	2.88	67
Velum Drive	0.04	0.06	0	0.18	0.09	0
B2006 (W)	1.06	2.21	49	1.19	6.20	120
Sonora Way	1.33	10.36	97	1.24	8.74	40

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	1.29	11.35	113	1.20	6.94	131
Velum Drive	0.04	0.06	0	0.20	0.09	0
B2006 (W)	1.17	5.50	112	1.40	16.29	314
Sonora Way	1.82	40.45	364	1.41	17.71	98

19.5.2 The results of the 2023 and 2031 models show :

- The junction is predicted to exceed theoretical maximum capacity parameters during both peak hours.

19.6 2023 and 2031 with cumulative MU1 site

19.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 19a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	1.17	6.07	61	1.11	3.31	74
Velum Drive	0.04	0.06	0	0.18	0.09	0
B2006 (W)	1.07	2.42	55	1.23	7.77	146
Sonora Way	1.42	13.38	132	1.26	9.83	48

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	1.29	11.38	113	1.22	7.43	138
Velum Drive	0.04	0.06	0	0.20	0.09	0
B2006 (W)	1.18	5.96	120	1.44	18.66	355
Sonora Way	1.81	40.06	364	1.44	19.74	112

19.6.2 The results of the 2023 and 2031 models show :

- The junction is predicted to exceed theoretical maximum capacity parameters during both peak hours.

19.7 Findings

19.7.1 It is evident from the junction modelling above that the junction is predicted to exceed capacity parameters assuming baseline traffic conditions.

19.7.2 The addition of development traffic (either the Development or the cumulative site) exacerbates the forecast queues and delays significantly.

19.7.3 The percentage effect of development traffic is also significant at this junction, ranging from 7.2% to 17.7%.

19.7.4 On the basis of the above findings it is considered that there is a need for the development to implement mitigation measures at this location.

19.8 Mitigation

19.8.1 A mitigation scheme has been developed for this junction comprising

19.8.2 The proposed mitigation changes to be applied to B2006 (East) are as follows:

- The entry width of this arm has been increased from 6.42m to 8.00m
- The effective flare length of this arm has been increased from 15.2m to 24.7m
- The entry radius of this arm has been increased from 18.2m to 26.5m
- The conflict angle for this arm has been decreased from 37 degrees to 36 degrees.

19.8.3 The proposed mitigation changes to be applied to B2006 (West) are as follows:

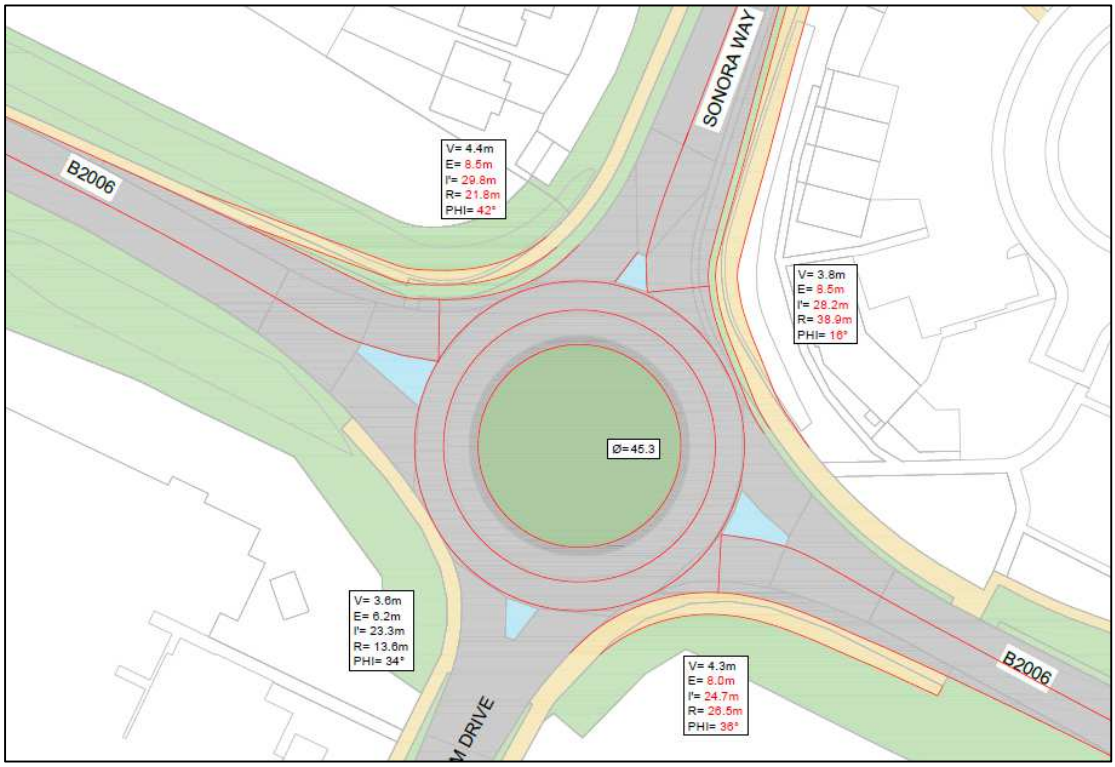
- The entry width of this arm has been increased from 6.75m to 8.50m
- The effective flare length of this arm has been increased from 14.4m to 29.8m
- The entry radius of this arm has been increased from 19.9m to 21.8m
- The conflict angle for this arm has been decreased from 43 degrees to 42 degrees.

19.8.4 The proposed mitigation changes to be applied to Sonora Way are as follows:

- The entry width of this arm has been increased from 6.24m to 8.50m

- The effective flare length of this arm has been increased from 19.2m to 28.2m
- The entry radius of this arm has been increased from 20.4m to 38.9m
- The conflict angle for this arm has been decreased from 38 degrees to 16 degrees.

19.8.5 The proposed mitigation scheme is shown below whilst the drawing is also included as Appendix 19c.



19.8.6 A 2023 and 2031 with development plus mitigation model has been developed for this junction using the Junctions9 software package and assuming the cumulative MU1 allocation traffic flows. The results from the mitigation models are summarised below whilst the full Junctions9 output is included as Appendix 19d.

2023 with mitigation	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	0.81	0.36	4	0.84	0.24	5
Velum Drive	0.04	0.07	0	0.21	0.11	0
B2006 (W)	0.81	0.20	4	0.94	0.55	12
Sonora Way	0.81	0.36	4	0.58	0.23	1

2031 with mitigation	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
B2006 (E)	0.95	1.02	12	0.94	0.56	12
Velum Drive	0.05	0.08	0	0.27	0.14	0
B2006 (W)	0.90	0.36	8	1.11	3.01	91
Sonora Way	1.15	3.72	65	0.73	0.33	3

19.8.7 With the proposed mitigation geometry the junction is predicted to work better than the respective baseline scenarios. The proposed scheme is therefore demonstrated to offset the effect of the proposed development.

19.8.8 It is intended that Development would implement the mitigation measure or provide the equivalent monetary contribution to the local highway authority to implement an alternative appropriate scheme of their choice.

19.8.9 The trigger point for implementation of the scheme will be agreed with the local highway authority.

20 B2006 St Paul's Street / High Street / Millen Road

20.1.1 This junction is a four arm crossroads on the B2006 corridor which forms the east and west arms. High Street forms the north arm and Millen Road the south, both of which give way to the B2006. Right turns out of Millen Road and High Street are banned.

20.1.2 The location of this junction is illustrated opposite.

20.2 Percentage effect of development

20.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	1907	2233
2023 with MU1	1946	2275
% increase	**2.1%**	**1.9%**
2031 baseline	2013	2360
2031 with MU1	2102	2455
% increase	**4.4%**	**4.0%**

20.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 1.9% and 2.1% at 2023 and between 4.0% and 4.4% at 2031.

20.3 2015 base year

20.3.1 This junction has been modelled as a four arm crossroads junction. The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 20a. The geometric inputs to the models are included as Appendix 20b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Millen Road (out left)	0.07	0.11	0	0.15	0.14	0
Millen Road (out straight)	0.00	0.22	0	0.01	0.32	0
St Pauls Street (E)	0.01	0.07	0	0.01	0.05	0
High Street (out left)	0.50	0.24	1	0.21	0.13	0

High Street (out straight)	0.12	0.25	0	0.02	0.25	0
St Pauls Street (W)	0.03	0.06	0	0.04	0.07	0

20.3.2 The results of the 2015 base year model show :

- The junction is predicted to operate within desirable maximum capacity parameters.

20.4 2023 and 2031 baseline

20.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 20a. The results of the 2023 and 2031 baseline models show :

	AM			PM		
2023 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Millen Road (out left)	0.08	0.12	0	0.17	0.16	0
Millen Road (out straight)	0.00	0.27	0	0.01	0.46	0
St Pauls Street (E)	0.01	0.07	0	0.01	0.05	0
High Street (out left)	0.67	0.41	2	0.28	0.17	0
High Street (out straight)	0.19	0.43	0	0.04	0.37	0
St Pauls Street (W)	0.05	0.06	0	0.06	0.06	0

	AM			PM		
2031 baseline	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Millen Road (out left)	0.09	0.12	0	0.19	0.17	0
Millen Road (out straight)	0.00	0.29	0	0.01	0.55	0
St Pauls Street (E)	0.01	0.07	0	0.01	0.05	0
High Street (out left)	0.75	0.57	3	0.31	0.18	0
High Street (out straight)	0.27	0.61	0	0.05	0.44	0
St Pauls Street (W)	0.05	0.05	0	0.06	0.06	0

20.4.2 The results of the baseline models show :

- The junction is predicted to operate within desirable maximum capacity parameters.

20.5 2023 and 2031 with Development

20.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 20a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Millen Road (out left)	0.08	0.12	0	0.17	0.16	0
Millen Road (out straight)	0.00	0.27	0	0.01	0.48	0
St Pauls Street (E)	0.02	0.07	0	0.05	0.05	0
High Street (out left)	0.69	0.44	2	0.28	0.17	0
High Street (out straight)	0.21	0.46	0	0.04	0.38	0
St Pauls Street (W)	0.05	0.06	0	0.06	0.06	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Millen Road (out left)	0.09	0.12	0	0.20	0.18	0
Millen Road (out straight)	0.00	0.30	0	0.02	0.63	0
St Pauls Street (E)	0.03	0.07	0	0.12	0.05	0
High Street (out left)	0.82	0.80	4	0.33	0.19	1
High Street (out straight)	0.37	0.96	1	0.05	0.49	0
St Pauls Street (W)	0.05	0.05	0	0.07	0.06	0

20.5.2 The results of the 2023 and 2031 models show :

- The junction is predicted to operate within desirable maximum capacity parameters.

20.6 2023 and 2031 with cumulative MU1 site

20.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 20a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Millen Road (out left)	0.08	0.12	0	0.17	0.16	0
Millen Road (out straight)	0.00	0.28	0	0.01	0.49	0
St Pauls Street (E)	0.02	0.07	0	0.05	0.05	0
High Street (out left)	0.70	0.45	2	0.28	0.17	0
High Street (out straight)	0.21	0.47	0	0.04	0.39	0
St Pauls Street (W)	0.05	0.06	0	0.06	0.06	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Millen Road (out left)	0.09	0.12	0	0.20	0.19	0
Millen Road (out straight)	0.00	0.30	0	0.02	0.64	0
St Pauls Street (E)	0.03	0.07	0	0.13	0.05	0
High Street (out left)	0.83	0.85	5	0.33	0.19	1
High Street (out straight)	0.39	1.05	1	0.06	0.50	0
St Pauls Street (W)	0.05	0.05	0	0.07	0.06	0

20.6.2 The results of the 2023 and 2031 models show :

- The junction is predicted to operate within desirable maximum capacity parameters.

20.7 Findings

20.7.1 It is evident from the junction modelling above that the junction is predicted to operate within desirable maximum capacity parameters for all scenarios.

20.7.2 On this basis it is not considered necessary to implement mitigation measures as a result of the development at this location.

21 B2006 Mill Way / The Wall / B2006 Eurolink Way / Milton Road

21.1.1 This junction is a four arm signal controlled crossroads on the B2006 corridor which forms the east and west arms. The Wall forms the north arm and serves the retail park whilst Milton Road forms the south arm, passing under the rail line.

21.1.2 The east and west arms have three lanes on the approach to the junction whilst the north and south arms have two. Pedestrian crossing facilities are incorporated to the junction layout.

21.1.3 The location of this junction is illustrated opposite.

21.2 Percentage effect of development

21.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	2822	3356
2023 with MU1	2889	3425
% increase	**2.4%**	**2.1%**
2031 baseline	2969	3535
2031 with MU1	3100	3669
% increase	**4.4%**	**3.8%**

21.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 2.1% and 2.4% at 2023 and between 3.8% and 4.4% at 2031.

21.3 2015 base year

21.3.1 This junction has been modelled as a four arm signal controlled crossroads using the Linsig software package. The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 21a. The geometric inputs to the models are included as Appendix 21b.

	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Eurolink Way Ahead Left	57.6 : 57.6%	5.6	8	78.0 : 78.0%	8.7	11
Eurolink Way Right	15.5%	0.5	1	25.9%	1.0	2

Milton Road Left Ahead Right	69.4 : 69.4%	5.2	10	82.2 : 82.2%	7.4	15
Mill Way Left Ahead	71.0%	5.1	17	77.4%	6.2	17
Mill Way Ahead Right	58.0 : 58.0%	3.6	10	57.6 : 57.6%	3.6	9
Retail Park Right Left Ahead	31.7 : 31.7%	1.2	2	81.0 : 81.0%	4.9	7
Cycle time	108			106		
PRC	26.7%			9.5%		

21.3.2 The results of the 2015 base year model show :

- The junction is predicted to operate within desirable maximum capacity parameters of 90%.

21.4 2023 and 2031 baseline

21.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 21a. The results of the 2023 and 2031 baseline models show :

2023 baseline	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Eurolink Way Ahead Left	83.5 : 83.5%	10.1	13	129.4 : 129.4%	139.3	146
Eurolink Way Right	13.1%	0.4	1	29.0%	1.2	3
Milton Road Left Ahead Right	81.2 : 81.2%	6.9	14	99.2 : 99.2%	17.9	29
Mill Way Left Ahead	95.0%	13.8	34	94.8%	13.0	28
Mill Way Ahead Right	87.7 : 87.7%	9.2	20	84.9 : 84.9%	8.8	19
Retail Park Right Left Ahead	39.2 : 39.2%	1.8	2	97.1 : 97.1%	10.8	14
Cycle time	108			106		
PRC	-5.6%			-43.8%		

2031 baseline	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Eurolink Way Ahead Left	87.4 : 87.4%	11.3	15	134.6 : 134.6%	163.0	170
Eurolink Way Right	13.9%	0.5	1	30.6%	1.3	3

Milton Road Left Ahead Right	86.3 : 86.3%	8.2	15	105.3 : 105.3%	32.3	45
Mill Way Left Ahead	98.4%	19.0	40	97.5%	16.3	32
Mill Way Ahead Right	94.2 : 94.2%	13.1	25	91.6 : 91.6%	11.8	25
Retail Park Right Left Ahead	41.2 : 41.2%	1.9	2	103.3 : 103.3%	17.1	20
Cycle time	108			106		
PRC	-9.3%			-49.5%		

21.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to exceed theoretical capacity parameters (100%) during the evening peak hour and exceed desirable capacity parameters (90%) during the morning peak hour.

21.5 2023 and 2031 with Development

21.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 21a.

2023 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Eurolink Way Ahead Left	84.4 : 84.4%	10.4	13	132.1 : 132.1%	151.5	159
Eurolink Way Right	13.1%	0.4	1	29.0%	1.2	3
Milton Road Left Ahead Right	82.2 : 82.2%	7.1	14	100.7 : 100.7%	20.7	32
Mill Way Left Ahead	96.4%	15.6	36	95.4%	13.6	29
Mill Way Ahead Right	90.5 : 90.5%	10.5	22	86.6 : 86.6%	9.4	21
Retail Park Right Left Ahead	39.2 : 39.2%	1.8	2	97.1 : 97.1%	10.8	14
Cycle time	108			106		
PRC	-7.2%			-46.8%		

2031 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Eurolink Way Ahead Left	89.5 : 89.5%	12.3	16	140.4 : 140.4%	190.1	197

Eurolink Way Right	13.9%	0.5	1	30.6%	1.3	3
Milton Road Left Ahead Right	88.6 : 88.6%	8.9	17	108.7 : 108.7%	42.3	55
Mill Way Left Ahead	102.0%	29.6	52	99.5%	19.6	36
Mill Way Ahead Right	100.0 : 100.0%	21.6	37	95.5 : 95.5%	14.9	30
Retail Park Right Left Ahead	41.2 : 41.2%	1.9	2	103.1 : 103.1%	16.8	20
Cycle time	108			106		
PRC	-13.3%			-56.0%		

21.5.2 The results of the 2023 and 2031 models show :

- The junction is predicted to exceed theoretical capacity parameters (100%) during the evening peak hour at 2023,
- The junction is predicted to exceed theoretical capacity parameters (100%) during both peak hours at 2031.

21.6 2023 and 2031 with cumulative MU1 site

21.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 21a.

2023 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Eurolink Way Ahead Left	84.8 : 84.8%	10.5	14	133.0 : 133.0%	155.6	163
Eurolink Way Right	13.1%	0.4	1	29.0%	1.2	3
Milton Road Left Ahead Right	82.4 : 82.4%	7.2	14	101.2 : 101.2%	21.7	33
Mill Way Left Ahead	96.8%	16.2	37	95.6%	13.9	29
Mill Way Ahead Right	91.4 : 91.4%	11.0	23	87.2 : 87.2%	9.7	21
Retail Park Right Left Ahead	39.2 : 39.2%	1.8	2	97.1 : 97.1%	10.8	14
Cycle time	108			106		
PRC	-7.6%			-47.7%		

2031 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Eurolink Way Ahead Left	89.8 : 89.8%	12.4	16	141.3 : 141.3%	194.2	201
Eurolink Way Right	13.9%	0.5	1	30.6%	1.3	3
Milton Road Left Ahead Right	88.8 : 88.8%	9.0	17	109.2 : 109.2%	43.9	57
Mill Way Left Ahead	102.6%	32.0	54	99.7%	20.0	36
Mill Way Ahead Right	100.7 : 100.7%	23.3	39	95.9 : 95.9%	15.4	30
Retail Park Right Left Ahead	41.2 : 41.2%	1.9	2	103.3 : 103.3%	17.1	20
Cycle time	108			106		
PRC	-14.0%			-56.9%		

21.6.2 The results of the 2023 and 2031 models show :

- The junction is predicted to exceed theoretical capacity parameters (100%) during the evening peak hour at 2023,
- The junction is predicted to exceed theoretical capacity parameters (100%) during both peak hours at 2031.

21.7 Findings

21.7.1 It is evident from the junction modelling above that the proposed development has an impact on the performance of this junction although this is demonstrated to be modest in terms of the modelling output.

21.7.2 It is further evident that the percentage effect of development at this junction is predicted to be low, ranging from 2.1% to 4.4%.

21.7.3 On the basis of the above findings it is not considered necessary or appropriate to implement mitigation measures as a result of the development at this location.

22 B2006 Eurolink Way / Crown Quay Lane

22.1.1 This junction is a four arm roundabout on the B2006 corridor which forms the east and west arms. Crown Quay Lane forms the north and south arms. The location of this junction is illustrated opposite.

22.2 Percentage effect of development

22.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	2560	2612
2023 with MU1	2607	2663
% increase	**1.8%**	**1.9%**
2031 baseline	2688	2744
2031 with MU1	2779	2842
% increase	**3.4%**	**3.6%**

22.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 1.8% and 1.9% at 2023 and between 3.4% and 3.6% at 2031.

22.3 2015 base year

22.3.1 This junction has been modelled as a four arm roundabout junction. The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 22a. The geometric inputs to the models are included as Appendix 22b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Eurolink Way (E)	0.34	0.06	1	0.45	0.07	1
Crown Quay Lane (S)	0.42	0.08	1	0.40	0.09	1
Eurolink Way (W)	0.58	0.10	1	0.44	0.07	1
Crown Quay Lane (N)	0.05	0.06	0	0.05	0.04	0

22.3.2 The results of the 2015 base year model show :

- The junction is predicted to operate within desirable maximum capacity parameters.

22.4 2023 and 2031 baseline

22.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 22a. The results of the 2023 and 2031 baseline models show :

2023 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Eurolink Way (E)	0.48	0.08	1	0.67	0.12	2
Crown Quay Lane (S)	0.58	0.12	1	0.54	0.12	1
Eurolink Way (W)	0.83	0.27	5	0.62	0.11	2
Crown Quay Lane (N)	0.11	0.07	0	0.08	0.05	0

2031 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Eurolink Way (E)	0.51	0.09	1	0.71	0.14	2
Crown Quay Lane (S)	0.62	0.14	2	0.58	0.14	1
Eurolink Way (W)	0.89	0.39	7	0.66	0.12	2
Crown Quay Lane (N)	0.12	0.08	0	0.08	0.06	0

22.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to operate within desirable maximum capacity parameters for all scenarios with the exception of Eurolink Way (west arm) during the 2031 morning peak hour.

22.5 2023 and 2031 with Development

22.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 22a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Eurolink Way (E)	0.49	0.08	1	0.67	0.12	2
Crown Quay Lane (S)	0.58	0.12	1	0.55	0.13	1
Eurolink Way (W)	0.85	0.31	6	0.63	0.11	2
Crown Quay Lane (N)	0.11	0.08	0	0.08	0.05	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Eurolink Way (E)	0.53	0.09	1	0.73	0.15	3
Crown Quay Lane (S)	0.63	0.14	2	0.61	0.15	2
Eurolink Way (W)	0.93	0.59	12	0.68	0.12	2
Crown Quay Lane (N)	0.12	0.08	0	0.09	0.06	0

22.5.2 The results of the 2023 and 2031 models show :

- At 2023 the junction is predicted to operate within desirable maximum capacity parameters.
- The Eurolink Way (west arm) exceeds maximum desirable capacity parameters at 2031 during the AM peak hour.

22.6 2023 and 2031 with cumulative MU1 site

22.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 22a.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Eurolink Way (E)	0.49	0.08	1	0.68	0.12	2
Crown Quay Lane (S)	0.58	0.12	1	0.56	0.13	1
Eurolink Way (W)	0.86	0.32	6	0.63	0.11	2
Crown Quay Lane (N)	0.11	0.08	0	0.08	0.05	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Eurolink Way (E)	0.53	0.09	1	0.73	0.15	3
Crown Quay Lane (S)	0.63	0.14	2	0.62	0.16	2
Eurolink Way (W)	0.94	0.64	13	0.67	0.12	2
Crown Quay Lane (N)	0.12	0.08	0	0.09	0.06	0

22.6.2 The results of the 2023 and 2031 models show :

- The junction is predicted to operate within desirable maximum capacity parameters with the exception of Eurolink Way (west arm) during the morning peak hour.

22.7 Findings

22.7.1 It is evident from the junction modelling above that the proposed development has an impact on the performance of this junction although this is demonstrated to be modest in terms of the modelling output.

22.7.2 It is further evident that the percentage effect of development at this junction is predicted to be low, ranging from 1.8% to 3.6%.

22.7.3 On the basis of the above findings it is not considered necessary or appropriate to implement mitigation measures as a result of the development at this location.

23 A2 St Michael's Road / B2006 Crown Quay Lane

23.1.1 This junction is a four arm signal controlled crossroads on the A2 corridor which forms the east and west arms. Crown Quay Lane forms the north and south arms. Each arm has two lanes on the approach to the junction.

23.1.2 The location of this junction is illustrated opposite.

23.2 Percentage effect of development

23.2.1 The table below summarises the percentage effect of development traffic. This is based upon a comparison of junction throughput between the baseline scenarios and the "baseline plus MU1 allocation" scenarios.

	AM	PM
2023 baseline	2632	2737
2023 with MU1	2658	2762
% increase	**1.0%**	**0.9%**
2031 baseline	2780	2887
2031 with MU1	2831	2936
% increase	**1.8%**	**1.7%**

23.2.2 It is noted that the MU1 development traffic is predicted to increase traffic flows between 0.9% and 1.0% at 2023 and between 1.7% and 1.8% at 2031.

23.3 2015 base year

23.3.1 This junction has been modelled as a four arm signal controlled crossroads using the Linsig software package. The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 23a. The geometric inputs to the models are included as Appendix 23b.

	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A2 St Michaels Road (E) Ahead Right Left	90.6 : 90.6%	11.1	21	85.2 : 85.2%	8.6	17
Crown Quay Lane (S) Left Ahead Right	79.0 : 79.0%	6.0	11	82.0 : 82.0%	6.4	12
A2 St Michaels Road (W) Left Ahead Right	108.6 : 108.6%	34.0	43	117.1 : 117.1%	50.8	58

Crown Quay Lane (N) Right Left Ahead	113.8 : 113.8%	59.3	71	110.5 : 110.5%	45.3	54
Cycle time	108			103		
PRC	-26.5%			-30.1%		

23.3.2 The results of the 2015 base year model show :

- The junction is predicted to be operating in excess of theoretical maximum capacity parameters (100%) in both time periods.

23.4 2023 and 2031 baseline

23.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Junctions9 output is included as Appendix 23a. The results of the 2023 and 2031 baseline models show :

2023 baseline	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A2 St Michaels Road (E) Ahead Right Left	115.8 : 124.9%	91.0	103	103.0 : 103.0%	30.7	44
Crown Quay Lane (S) Left Ahead Right	86.0 : 86.0%	7.4	14	95.9 : 95.9%	12.1	19
A2 St Michaels Road (W) Left Ahead Right	126.3 : 126.3%	79.1	87	141.0 : 141.0%	109.3	116
Crown Quay Lane (N) Right Left Ahead	141.2 : 141.2%	155.4	169	153.0 : 153.0%	181.3	193
Cycle time	108			103		
PRC	-56.9%			-70.0%		

2031 baseline	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A2 St Michaels Road (E) Ahead Right Left	122.1 : 130.3%	116.2	128	108.8 : 108.8%	52.8	66
Crown Quay Lane (S) Left Ahead Right	91.5 : 91.5%	9.4	16	101.5 : 101.5%	19.2	27
A2 St Michaels Road (W) Left Ahead Right	133.8 : 133.8%	99.0	107	149.1 : 149.1%	129.0	137

Crown Quay Lane (N) Right Left Ahead	149.0 : 149.0%	183.6	198	160.6 : 160.6%	206.7	219
Cycle time	108			103		
PRC	-65.6%			-78.4%		

23.4.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to exceed theoretical maximum capacity parameters (100%) during both peak hours.

23.5 2023 and 2031 with Development

23.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 23a.

2023 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A2 St Michaels Road (E) Ahead Right Left	116.3 : 125.7%	93.3	105	103.4 : 103.4%	32.2	45
Crown Quay Lane (S) Left Ahead Right	86.6 : 86.6%	7.6	14	97.0 : 97.0%	13.1	20
A2 St Michaels Road (W) Left Ahead Right	126.7 : 126.7%	80.0	88	141.3 : 141.3%	109.9	117
Crown Quay Lane (N) Right Left Ahead	143.1 : 143.1%	162.3	176	153.9 : 153.9%	184.4	197
Cycle time	108			103		
PRC	-59.0%			-71.0%		

2031 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A2 St Michaels Road (E) Ahead Right Left	123.1 : 132.4%	121.7	133	109.9 : 109.9%	57.7	71
Crown Quay Lane (S) Left Ahead Right	92.2 : 92.2%	9.7	17	103.9 : 103.9%	23.7	31
A2 St Michaels Road (W) Left Ahead Right	134.5 : 134.5%	100.7	109	149.8 : 149.8%	130.8	139

Crown Quay Lane (N) Right Left Ahead	153.2 : 153.2%	199.2	214	162.9 : 162.9%	214.5	227
Cycle time	108			103		
PRC	-70.3%			-81.0%		

23.5.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to exceed theoretical maximum capacity parameters (100%) during both peak hours.

23.6 2023 and 2031 with cumulative MU1 site

23.6.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 23a.

	AM			PM		
2023 with Development	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A2 St Michaels Road (E) Ahead Right Left	116.4 : 126.1%	94.0	106	103.5 : 103.5%	32.7	46
Crown Quay Lane (S) Left Ahead Right	86.6 : 86.6%	7.6	14	97.2 : 97.2%	13.3	20
A2 St Michaels Road (W) Left Ahead Right	126.7 : 126.7%	80.0	88	141.3 : 141.3%	109.9	117
Crown Quay Lane (N) Right Left Ahead	143.6 : 143.6%	164.0	178	154.3 : 154.3%	185.9	198
Cycle time	108			103		
PRC	-59.5%			-71.4%		

	AM			PM		
2031 with Development	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
A2 St Michaels Road (E) Ahead Right Left	123.2 : 132.8%	122.4	134	110.1 : 110.1%	58.3	72
Crown Quay Lane (S) Left Ahead Right	92.4 : 92.4%	9.9	17	104.1 : 104.1%	24.2	32
A2 St Michaels Road (W) Left Ahead Right	134.5 : 134.5%	100.7	109	149.8 : 149.8%	130.8	139

Crown Quay Lane (N) Right Left Ahead	153.9 : 153.9%	201.7	217	163.3 : 163.3%	216.0	229
Cycle time	108			103		
PRC	-71.0%			-81.4%		

23.6.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to exceed theoretical maximum capacity parameters (100%) during both peak hours.

23.7 Findings

23.7.1 It is evident from the junction modelling above that the proposed development has an impact on the performance of this junction although this is demonstrated to be modest in terms of the modelling output.

23.7.2 It is further evident that the percentage effect of development at this junction is predicted to be low, ranging from 0.9% to 1.8%.

23.7.3 On the basis of the above findings it is not considered necessary or appropriate to implement mitigation measures as a result of the development at this location.

24 Vicarage Road signals

24.1.1 An existing traffic signal junction on Vicarage Road controls traffic passing over the rail line to the east of the site.

24.1.2 The location of this junction is illustrated opposite.

24.2 2015 base year

24.2.1 This junction has been modelled as a signal controlled shuttle working junction using the Linsig software package.

24.2.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 24a. The geometric inputs to the models are included as Appendix 24b.

	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Vicarage Road (W) Ahead	31.7%	1.9	6	25.3%	1.4	5
Vicarage Road (E) Ahead	31.7%	1.8	5	25.1%	1.4	4
Cycle time	120			120		
PRC	183.7%			255.5%		

24.2.3 The results of the 2015 base year model show :

- The junction is predicted to operate well within capacity parameters.

24.3 2023 and 2031 baseline

24.3.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Linsig output is included as Appendix 24a. The results of the 2023 and 2031 baseline models show :

2023 Baseline	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Vicarage Road (W) Ahead	33.9%	2.1	6	27.0%	1.6	5

Vicarage Road (E) Ahead	33.9%	2.0	5	26.9%	1.5	4
Cycle time	120			120		
PRC	165.4%			233.0%		

2031 Baseline	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Vicarage Road (W) Ahead	36.1%	2.2	7	28.7%	1.7	5
Vicarage Road (E) Ahead	36.1%	2.1	6	28.7%	1.6	4
Cycle time	120			120		
PRC	149.1%			213.2%		

24.3.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

24.4 2023 and 2031 with Development

24.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 24a.

2023 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Vicarage Road (W) Ahead	38.6%	2.4	7	29.9%	1.8	5
Vicarage Road (E) Ahead	38.3%	2.3	6	30.4%	1.7	5
Cycle time	120			120		
PRC	133.2%			196.0%		

2031 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Vicarage Road (W) Ahead	43.1%	2.8	9	34.7%	2.1	6
Vicarage Road (E) Ahead	43.9%	2.7	7	34.1%	2.0	5
Cycle time	120			120		
PRC	105.2%			159.3%		

24.4.2 The results of the 2023 and 2031 models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

24.5 2023 and 2031 with cumulative MU1 site

24.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 24a.

2023 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Vicarage Road (W) Ahead	40.2%	2.5	8	32.5%	2.0	6
Vicarage Road (E) Ahead	40.5%	2.4	6	31.9%	1.9	5
Cycle time	120			120		
PRC	122.1%			176.6%		

2031 with Development	AM			PM		
	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)	Deg Sat (%)	Total Delay (pcuHr)	Mean Max Q (pcu)
Vicarage Road (W) Ahead	44.6%	2.9	9	35.4%	2.2	6
Vicarage Road (E) Ahead	44.6%	2.7	7	35.6%	2.1	6

Cycle time	120	120
PRC	101.8%	152.7%

24.5.2 The results of the 2023 and 2031 models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

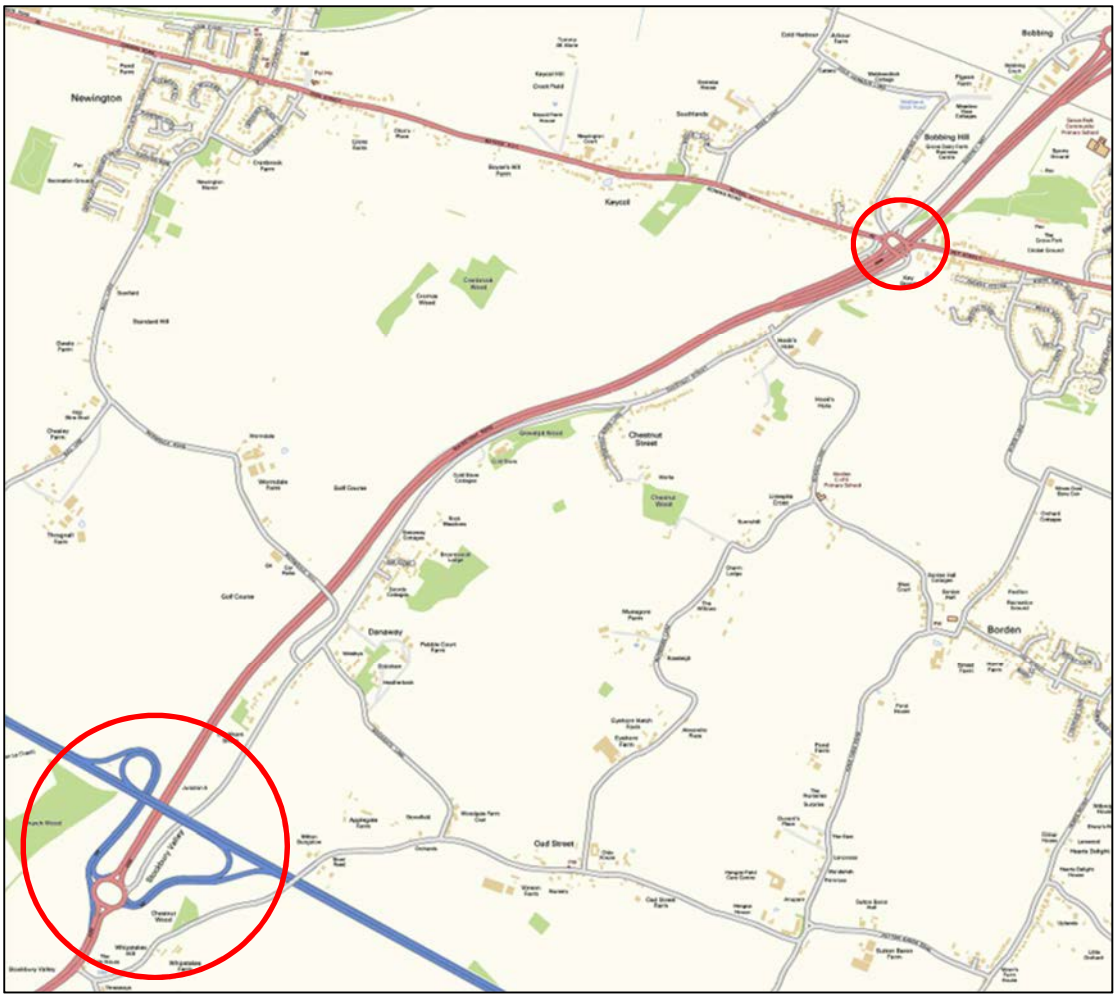
24.6 Findings

24.6.1 It is evident from the junction modelling above that the junction is predicted to operate within desirable capacity parameters for all scenarios.

24.6.2 On this basis it is not considered necessary to implement mitigation measures as a result of the development at this location.

25 Other off site junctions

25.1.1 In addition to the junctions assessed within the preceding sections, consideration has been given to two further junctions; those being the A249 / A2 Key Street junction and the M2 Junction 5 as illustrated below.



25.2 A249 / A2 Key Street junction

25.2.1 The proposed development will undertake capacity upgrades of the Grovehurst junction and the Bobbing junction on the A249.

25.2.2 With respect to the Key Street junction the proposed development is predicted to generate 148 and 131 traffic movements through this junction during the morning and evening peak hours respectively. None of the development traffic uses the slip roads at this junction (as interchange with the A249 corridor occurs at Bobbing and Grovehurst) and hence this traffic relates to movement between local roads at this junction.

25.2.3 Upgrade of the A249 / A2 Key Street junction is being addressed by other development sites as identified within the adopted Local Plan, most notably the South West Sittingbourne site.

25.3 M2 Junction 5

25.3.1 Highways England have recently completed a consultation exercise on a proposal to provide additional capacity at the M2 Junction 5 (Stockbury Roundabout). Funding for the improvements will come from the Road Investment Strategy (RIS) which is being used to increase the capacity and condition of the network in key areas. The south east will benefit

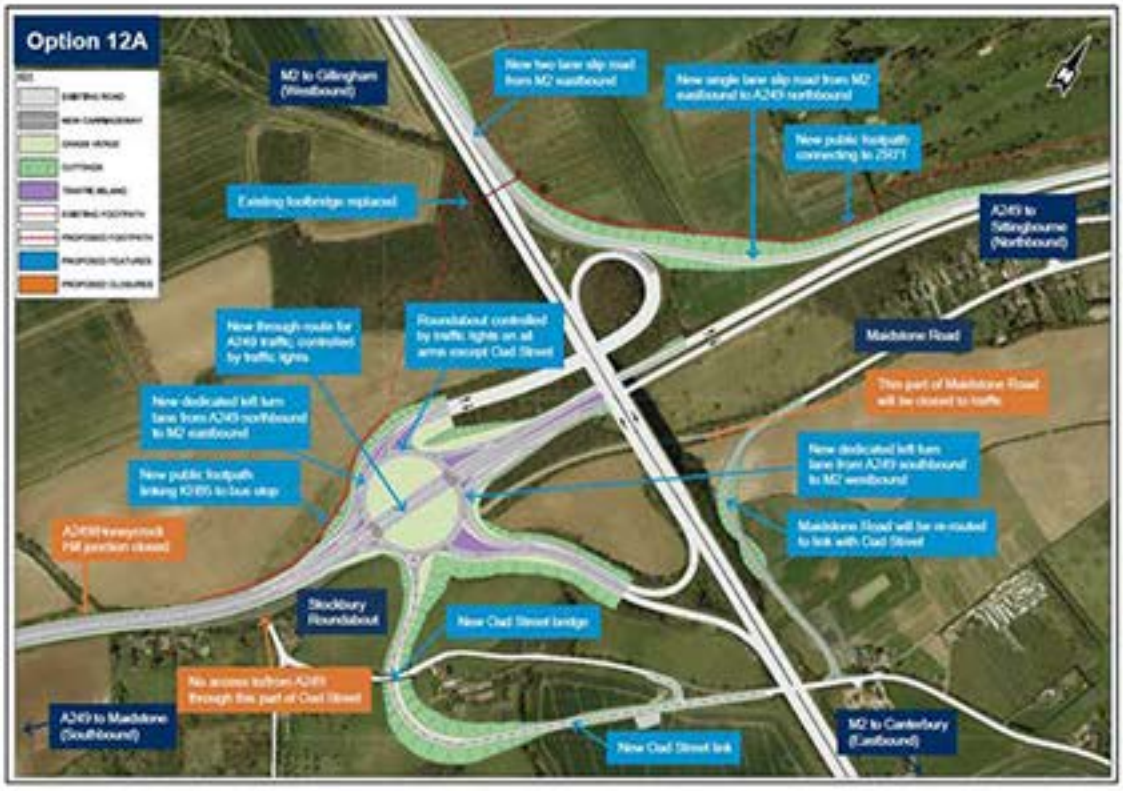
from £2.2 billion of road investment with a number of major improvement projects including the M2 Junction 5.

25.3.2 The proposal is designed to relieve congestion, improve journey times and support development in Kent and the Thames Estuary corridor, including within Swale Borough Council. The scheme objectives are set out by Highways England as :

- Increase the capacity of the junction to support future growth in housing, employment and the economy.
- Improve safety for all users of the junction to reduce accident numbers.
- Improve reliability of journey times through the junction.
- Deliver a high standard of highway design that is in keeping with the local environment.
- Minimise any adverse environmental impacts where feasible.

25.3.3 A number of options for improving the M2 Junction 5 were considered and were the subject of various traffic and environmental surveys and assessments. For an option to be taken forward to public consultation it must achieve the scheme objectives, be affordable and offer value for money.

25.3.4 The proposal (Option 12A) is illustrated below and is designed to support the demand anticipated in the Swale Borough Council Local Plan. The public consultation material confirms that it would significantly reduce congestion and delay at the junction, in addition to providing wider economic, development and accessibility benefits.



25.3.5 On the above basis it is expected that the scheme will provide sufficient capacity to serve the MU1 Allocation Site traffic generation.

25.3.6 The timetable for delivery is anticipated as follows :

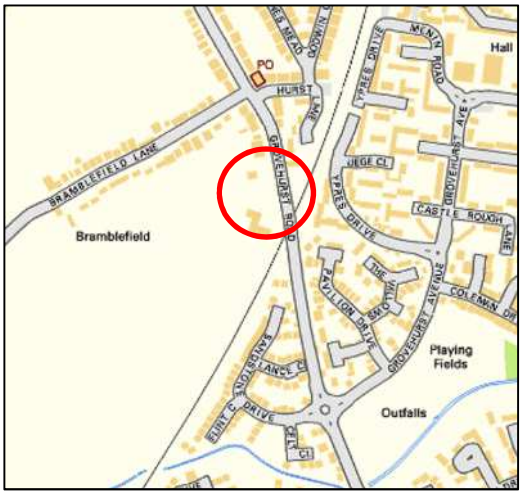
- December 2017 - Public Consultation Report to document feedback received.
- Early 2018 - Preferred Route Announcement.

- Spring 2018 - A Statement of Community Consultation (SoCC) setting out the process for the statutory public consultation, subject to the scheme being classed as a Nationally Significant Infrastructure Project.
- Winter 2018 - A planning application will be submitted as a Development Consent Order application (if the scheme is declared a NSIP) or via the Highways Act 1980.
- 2019 - The Planning Inspectorate will evaluate the scheme and the application
- 2019 / 2020 - The Planning Inspectorate will give a recommendation to the Government. The Government will decide whether to give the scheme consent.
- 2020/2021 - If planning consent is granted by Government construction will commence (subject to funding being released).
- 2022 - Junction improvements will be fully open for traffic.

26 Grovehurst Road / Medical Centre access

26.1.1 This junction is a simple priority junction whereby the medical centre egress gives way to traffic on Grovehurst Road. This junction will also serve the secondary school site in the development scenarios.

26.1.2 The location of this junction is illustrated opposite.



26.2 2015 base year

26.2.1 This junction has been modelled as a simple priority junction using the Junctions9 software package.

26.2.2 The results from the 2015 models are summarised below whilst the Junctions9 output is included as Appendix 26a. The geometric inputs to the models are included as Appendix 26b.

	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.03	0.18	0	0.14	0.18	0
Grovehurst Road (N)	0.07	0.08	0	0.05	0.07	0

26.2.3 The results of the 2015 base year model show :

- The junction is predicted to operate well within capacity parameters.

26.3 2023 and 2031 baseline

26.3.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline model. The results from the 2023 and 2031 baseline models are summarised below whilst the Linsig output is included as Appendix 26a. The results of the 2023 and 2031 baseline models show :

2023 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.05	0.22	0	0.18	0.22	0
Grovehurst Road (N)	0.09	0.07	0	0.07	0.07	0

2031 baseline	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.05	0.23	0	0.20	0.24	0
Grovehurst Road (N)	0.10	0.07	0	0.08	0.06	0

26.3.2 The results of the 2023 and 2031 baseline models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

26.4 2023 and 2031 with Development

26.4.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus Development model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 26c and geometry at Appendix 29d.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.14	0.18	0	0.20	0.21	0
Grovehurst Road (N)	0.27	0.08	1	0.09	0.06	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.26	0.22	0	0.25	0.23	0
Grovehurst Road (N)	0.50	0.12	2	0.13	0.06	0

26.4.2 The results of the 2023 and 2031 models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

26.5 2023 and 2031 with cumulative MU1 site

26.5.1 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model. The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 26c

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.15	0.18	0	0.20	0.21	0
Grovehurst Road (N)	0.28	0.08	1	0.09	0.06	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.26	0.22	0	0.25	0.23	0
Grovehurst Road (N)	0.50	0.12	2	0.13	0.06	0

26.5.2 The results of the 2023 and 2031 models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

26.6 Potential right turn bay scheme

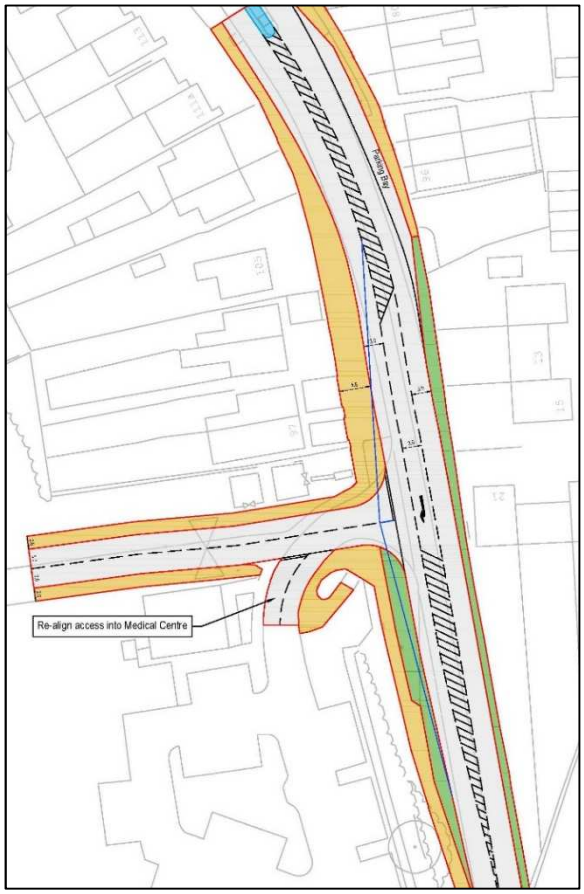
26.6.1 The analysis predicts that the existing access layout could appropriately serve the predicted traffic flows, including those from the development.

26.6.2 However, previous discussions held with highway officers at KCC suggest that they may wish to see a form of upgrade to include a right turn bay implemented here as a result of this junction serving the school site.

26.6.3 Therefore, an alternative access junction scheme has also been derived that incorporates a 3.0m wide right turn bay for traffic turning in to the medical centre / site access. This is illustrated opposite and included at Appendix 26e.

26.6.4 The 2015 model described above has been adopted to produce a 2023 and 2031 baseline plus cumulative MU1 site model with a right turn bay included.

26.6.5 The results from the 2023 and 2031 models are summarised below whilst the Junctions9 output is included as Appendix 26f.



2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.16	0.20	0	0.22	0.24	0
Grovehurst Road (N)	0.15	0.13	0	0.04	0.11	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Medical centre access	0.29	0.24	0	0.27	0.26	0
Grovehurst Road (N)	0.26	0.15	0	0.06	0.12	0

26.6.6 The results of the 2023 and 2031 models show :

- The junction is predicted to operate well within desirable maximum capacity parameters for all scenarios.

26.7 Findings

26.7.1 It is evident from the junction modelling above that the existing junction is predicted to operate within desirable capacity parameters for all scenarios.

26.7.2 On this basis it is not considered necessary to implement upgrade an or mitigation measures as a result of the development at this location.

26.7.3 However, should highway officers consider that the alternative scheme with a right turn bay would be a more appropriate proposal to serve the medical centre and secondary school site (compared to the existing layout) then this could be implemented as shown. This would need to be decided at Reserved Matters application stage by KCC.

26.7.4 The access from Grovehurst Road would be constructed as the secondary school is progressed and will be fully open for use prior to opening of the secondary school. The timing of this would be in the control of KCC to meet their needs in a timely fashion.

27 Quinton Road site access (Persimmon)

27.1.1 The site spine road will form an access on Quinton Road in the form of a priority junction located approximately 80m west of the junction with Knightsfield Road.

27.1.2 The access will comprise a flare at the give way line to allow right turning and left turning vehicles to wait alongside one another. A right turn bay will be provided on Quinton Road for vehicles entering the site as shown at section 3.3

27.2 2023 and 2031 cumulative assessment

27.2.1 This junction has been modelled as a priority junction with right turn bay using the Junctions9 software package. The 2023 and 2031 cumulative assessment scenarios have been modelled as a worst case.

27.2.2 The results from the 2023 and 2031 model are summarised below whilst the Junctions9 output is included as Appendix 27a. The geometric inputs to the models are included as Appendix 27b.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Site Access (left out)	0.07	0.11	0	0.03	0.10	0
Site Access (right out)	0.21	0.13	0	0.10	0.11	0
Quinton Road (E)	0.02	0.09	0	0.05	0.09	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Site Access (left out)	0.16	0.17	0	0.06	0.12	0
Site Access (right out)	0.66	0.30	2	0.34	0.16	1
Quinton Road (E)	0.04	0.10	0	0.10	0.11	0

27.2.3 The results of the 2023 and 2031 modelling shows :

- The junction is predicted to operate well within capacity parameters.

28 Quinton Road site access (Redrow)

28.1.1 The access road to the Redrow development parcel will form an access on Quinton Road in the form of a priority junction.

28.1.2 The access will comprise a simple priority junction as shown at section 3.3

28.2 2023 and 2031 cumulative assessment

28.2.1 This junction has been modelled as a priority junction using the Junctions9 software package. The 2023 and 2031 cumulative assessment scenarios have been modelled as a worst case.

28.2.2 The results from the 2023 and 2031 model are summarised below whilst the Junctions9 output is included as Appendix 28a. The geometric inputs to the models are included as Appendix 28b.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Site Access (left out)	0.10	0.09	0	0.05	0.09	0
Site Access (right out)	0.03	0.11	0	0.01	0.11	0
Quinton Road (E)	0.04	0.08	0	0.11	0.09	0

2031 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Site Access (left out)	0.09	0.09	0	0.05	0.09	0
Site Access (right out)	0.03	0.12	0	0.01	0.12	0
Quinton Road (E)	0.04	0.08	0	0.10	0.09	0

28.2.3 The results of the 2023 and 2031 modelling shows :

- The junction is predicted to operate well within capacity parameters.

29 Grovehurst Road site access

29.1.1 The site spine road will form an access on Grovehurst Road at the north extent of the site. This will form the west arm of a staggered priority junction with the east arm serving the east part of the site (land at Great Grovehurst Farm).

29.1.2 A Right Left staggered priority junction is proposed providing right turning bays to both sites as described at section 3.3

29.2 2023 and 2031 cumulative assessment

29.2.1 This junction has been modelled as a staggered priority junction with right turn bays using the Junctions9 software package. The 2023 and 2031 cumulative assessment scenarios have been modelled as a worst case.

29.2.2 The results from the 2023 and 2031 model are summarised below whilst the Junctions9 output is included as Appendix 29a. The geometric inputs to the models are included as Appendix 29b.

2023 with Development	AM			PM		
	RFC	Delay (mins)	Max Q	RFC	Delay (mins)	Max Q
Site Access (east)	0.10	0.15	0	0.05	0.15	0
Grovehurst Rd (S)	0.01	0.12	0	0.02	0.14	0
Site Access (west)	0.18	0.25	0	0.10	0.26	0
Grovehurst Rd (N)	0.02	0.13	0	0.06	0.13	0

2031 with Development	AM			PM		
	RFC	Delay16 (mins)	Max Q	RFC	Delay (mins)	Max Q
Site Access (east)	0.22	0.16	0	0.11	0.14	0
Grovehurst Rd (S)	0.01	0.13	0	0.02	0.14	0
Site Access (west)	0.21	0.29	0	0.11	0.28	0
Grovehurst Rd (N)	0.06	0.14	0	0.18	0.15	0

29.2.3 The results of the 2023 and 2031 modelling shows :

- The junction is predicted to operate well within capacity parameters.

30 A249 merge and diverge analysis

30.1.1 This section considers the merge and diverge traffic volumes for the A249 corridor between Grovehurst junction, the Bobbing junction and the Key Street junction. This review was requested by Highways England.

30.1.2 Reference has been made to the Design Manual for Roads and Bridges (DMRB) document TD 22/06 titled "Layout of Grade Separated Junctions". This document provides guidance on the merge and diverge layouts required to serve particular flow combinations on the mainline and on / off slip roads.

30.1.3 The graphs at Figure 2/3 AP and Figure 2/5 AP within TD22/06 have been adopted for review as these relate to All Purpose roads rather than motorways. The flows on the mainline and the merging and diverging flows have been plotted on these graphs for the following scenarios:

- 2023 base
- 2023 base plus MU1 development
- 2031 base
- 2031 base plus MU1 development

30.1.4 The traffic flows on each graph have been taken from the traffic flow diagrams derived within this Transport Assessment.

30.2 A249 Grovehurst Junction

30.2.1 Appendix 30a contains the graphs for the Grovehurst junction. The following is noted from these graphs.

- At 2023 the addition of the MU1 development does not alter the merges needed when compared to the baseline.
- At 2023 the addition of the MU1 development does not alter the diverges needed when compared to the baseline.
- At 2031 the addition of the MU1 development does not alter the merges needed when compared to the baseline.
- At 2031 the addition of the MU1 development does not alter the diverges needed when compared to the baseline.

30.2.2 It is evident from the graphs that the addition of the MU1 development does not alter the format of merge or diverge needed at Grovehurst junction when compared to the baseline. Therefore, no additional mitigation is necessary with respect to merge / diverge layouts as a result of the MU1 development.

30.3 A249 Bobbing junction

30.3.1 Appendix 30b contains the graphs for the Bobbing junction. The following is noted from these graphs.

- At 2023 the addition of the MU1 development does not alter the merges needed when compared to the baseline.
- At 2023 the addition of the MU1 development does not alter the diverges needed when compared to the baseline.
- At 2031 the addition of the MU1 development does not alter the merges needed when compared to the baseline.

- At 2031 the addition of the MU1 development does not alter the diverges needed when compared to the baseline.

30.3.2 It is evident from the graphs that the addition of the MU1 development does not alter the format of merge or diverge needed at Bobbing junction when compared to the baseline. Therefore, no additional mitigation is necessary with respect to merge / diverge layouts as a result of the MU1 development.

30.4 A249 Key Street junction

30.4.1 Appendix 30c contains the graphs for the Key Street junction. The following is noted from these graphs.

- At 2023 the addition of the MU1 development does not alter the merge needed when compared to the baseline.
- At 2023 the addition of the MU1 development does not alter the diverge needed when compared to the baseline.
- At 2031 the addition of the MU1 development does not alter the merge needed when compared to the baseline.
- At 2031 the addition of the MU1 development pushes the layout from a type A to straddle the boundary with type D due to the increased traffic on the mainline, rather than the diverge.

30.4.2 It is evident from the graphs that the addition of the MU1 development does not alter the format of merge or diverge needed at the Key Street junction when compared to the baseline. However, at 2031 PM the increase of mainline traffic, as a result of development traffic when compared to the baseline, does push the marker to the boundary with a type D diverge.

30.4.3 It is not considered that the addition of the development traffic on the mainline at this location would warrant mitigation of the diverge type and hence no additional mitigation is proposed with respect to merge / diverge layouts as a result of the MU1 development.

31 Summary

31.1.1 Persimmon Homes have appointed PBA to provide transport support in relation to a mixed use development at North West Sittingbourne. The site is identified within the adopted Local Plan (Policy MU1) as suitable for residential development, primary and secondary schools, community uses and open space.

31.1.2 The site lies adjacent to the A249 which runs north / south immediately to the west of the site and is bound by Quinton Road to the south and the Sheppey to Sittingbourne rail line to the east. Grovehurst Road passes through the site to the north and Swale Way forms the north boundary.

31.1.3 The site falls into the ownership of several land owners with the various land parcels comprising the site. Swale Borough Council requires the site to be considered as a whole for masterplanning purposes. Accordingly, a Development Framework document has been developed jointly between the land owners as required by the MU1 Policy. This Transport Assessment assesses two scenarios:

- The masterplan for the whole allocation site (cumulative assessment).
- A combined assessment of the Persimmon Homes and GH Dean parcels, the subject of the planning applications supported by this Transport Assessment.

31.1.4 In developing the proposals for North West Sittingbourne, accessibility and movement issues have been considered a particularly important element. The adjacent rail halt and proximity to the town centre of Sittingbourne creates excellent opportunities for sustainable travel. This was a factor in the site's allocation. A Framework Travel Plan has been prepared for the development that seeks to encourage and promote the use of sustainable modes for all those living within the site.

31.1.5 However, modern life also revolves around flexibility and a degree of choice and many people continue to rely on the car to access facilities, even in urban centres. Therefore, the design of the development takes into account the need to cater for vehicles.

31.1.6 With respect to access to the site the Local Plan provides the context for what is expected of a Transport Strategy for the site. Direct highway access from the south will be via two priority junctions from Quinton Road. Quinton Road borders the site and performs the role of a local distributor road, with no direct access for private dwellings in the vicinity of the site.

31.1.7 A spine road passing through the site will form a route from Quinton Road to Grovehurst Road. The access junction at Grovehurst Road will be a staggered priority junction. A further vehicular access is proposed from Grovehurst Road, utilising the location of the existing medical centre access. It is intended that this access will serve the medical centre, as existing, and the secondary school proposed on site. The B2005 Grovehurst Road is predominantly residential in nature along much of its length.

31.1.8 It is intended that the spine road through the site will not be a through route attractive to general traffic, but will instead serve the needs of the development, both for private vehicles, walking and cycling and public transport. Hence the spine road will be designed accordingly at junctions and crossing points, and with walking and cycling infrastructure alongside it, but with sufficient width to accommodate bus movements. A vehicular connection will also be made between the Persimmon site and Redrow site providing further permeability to and from Quinton Road and within the site.

31.1.9 Bramblefield Lane penetrates the site on it's eastern side as an existing residential cul-de-sac. To the north, Swale Way is a 40mph single carriageway route, connecting with the B2005 Grovehurst Road junction and forming part of the Sittingbourne Northern Relief Road. To the west of the A249 the Grovehurst Road provides access to Iwade. Sheppey Way is a single carriageway route that connects the Isle of Sheppey to the north with the A2 to the south. It

passes through Iwade and Bobbing and connects with Bobbing junction and the Key Street junction.

31.1.10 Access to the site from the strategic highway network is via the A249 trunk road dual carriageway. The A249 is accessed from the site via the B2005 Grovehurst Road to the north east and Bobbing junction to the south west. Access from the site to Bobbing junction is gained via Quinton Road and Sheppey Way, or Sonora Way and the B2006 Staplehurst Road. Each of these A249 grade separated junctions allow all movements.

31.1.11 A number of off site mitigation schemes will be required as part of the wider highway access strategy. Schemes have been identified and detailed within this Transport Assessment. The detailed triggers for each mitigation scheme would need to be the subject of further and detailed negotiation with the highway authority.

31.1.12 Pedestrian and cycle access to the site will be available from a number of locations on the site boundary and wider routes. At the south boundary a footway will be provided on the north side of Quinton Road within the site frontage. This facility will connect the two access points on Quinton Road and extend east as far as the existing shuttle working signals on Vicarage Lane. A crossing point will be created on Quinton Road to provide access to the existing footway on the south side of Quinton Road and a pedestrian link to the local centre facilities at the Meads. A pedestrian link will be provided at the south west corner of the Persimmon site to connect with the existing convenience store on Quinton Road.

31.1.13 The vehicular access from Grovehurst Road will incorporate a pedestrian crossing facility in the form of a dropped kerb, tactile paving and refuge within the hatched central reserve. This will provide connectivity between the main site and the land at Great Grovehurst Farm. Upgrade of the existing footway to a shared cycleway / footway is proposed on the west side of Grovehurst Road heading north (from the site access) to the roundabout. At this location cyclists will be able to cross Grovehurst Road and connect with the existing cycleway on the south side of Swale Way. The entrance to the medical centre will also provide a pedestrian footway leading to the secondary school site. A footway runs along the western side of the entire length of Grovehurst Road, from the A249 Grovehurst Road junction in the north to the Saffron Way / North Street junction in the south.

31.1.14 A walking and cycling route will be available through the land at Great Grovehurst Farm to connect with the existing footway / cycleway on the south side of Swale Way. This would provide onward access to the employment areas along this corridor. The walking and cycling connections to Swale Way would connect with the existing route on the west side of the Nicholls Transport depot which runs from the Nicholls access, northbound and under the rail line. This creates a connection to the Ridham / Kemsley Strategic Employment Area. A further walking and cycling route will be available through the land at Great Grovehurst Farm to connect with Godwin Close on the south boundary. This provides a route to Kemsley village and to Kemsley Paper Mill.

31.1.15 The existing Public Right of Way (PROW) connecting Bramblefield Lane with Sheppey Way will be retained. This incorporates National Cycle Route 1 and would hence provide a walking and cycling access to the site. Bramblefield Lane provides a route on street for cyclists and within the site this route continues as a hard surfaced walk / cycle route heading west towards the A249. The route crosses the A249 via a cycle / footbridge and will continue on street to Iwade to the north.

31.1.16 A walking / cycling route on Sheppey Way (from Bramblefield Lane towards Iwade) will be contributed towards by the Development. This is in accordance with policy and will connect with the provision being made on Sheppey Way by existing development at Iwade.

31.1.17 The existing PROW crossing the site from east to west provides access to the site from Middletune Avenue and Newbridge Avenue via an at grade crossing of the rail line. A route broadly in line with the existing alignment will be retained and hence existing journeys will remain possible.

31.1.18 Footpath ZU11 and the eastern part of ZR108 provide pedestrian / cycle access to The Meads Local Centre where there is a range of shops including a convenience store, public house, community centre and medical centre.

31.1.19 A shared pedestrian/cycle route is provided along Sonora Way, to the south of the site, providing off-carriageway access through the residential area to the B2006. This route will assist in providing a pedestrian and cycle route between The Meads and the proposed site, particularly for school children.

31.1.20 The development will implement an upgrade of the Bobbing junction and this will include signal control of the off slips. It would be possible to include pedestrian crossing facilities within the signal control upgrade to assist pedestrian movements between the site and The Meads and Bobbing primary school.

31.1.21 There are a number of local facilities within walking and cycling distance of the (centre of the) site making sustainable travel an option to meet a proportion of daily needs. These include a supermarket, a post office, a Doctor's surgery and a railway station.

31.1.22 Connecting the site by bus to the town centre, rail station and other local amenities will be important. Whilst the existing bus infrastructure provides accessibility to the bus network it is proposed that the development will support and enhance this. The development would provide additional support to the existing bus services through additional patronage generated by the residents on site. The masterplan makes provision within the site for bus services to penetrate the site and provides a number of bus stop locations close to key activity locations.

31.1.23 The nearest bus stops to the site are on the B2005 Grovehurst Road, adjacent to the entrance to Grovehurst medical centre vehicular and pedestrian access. The bus stops on Grovehurst Road provide access to services to Sheppey, Sheerness, Gillingham, Minster, Queenborough, Iwade Faversham , Canterbury, Chatham and Sittingbourne. Bus stops are also located on Quinton Road, close to the east site access . Further bus stops are also located on Sonora Way.

31.1.24 Aside from the infrastructure it is proposed to enhance bus services serving the site. This may be through diversion of existing services through the development and / or a stand alone and dedicated service to and from the site linking with key destinations such as the town centre and rail station. It is anticipated that an annual bus fare income would be generated by residents on site to fund two Sprinter minibuses. This would be expected to provide a service frequency of around 20 minutes between the site and the rail station in Sittingbourne town centre for example.

31.1.25 The nearest rail station to the site is Kemsley rail halt, located alongside the B2005 Grovehurst Road approximately 100m south of the access with the medical centre. This facility presents an excellent opportunity for new residents to commute to work from the site (and direct to London for example) and for secondary school pupils to access the site. The development will provide a contribution for upgrade of facilities at the rail halt, thus further enhancing its attractiveness to residents. There are two public entrances to the station (one on either side of the railway line), accessed via footways that lead from the western side of Grovehurst Road. These provide step-free access to both platforms. Services at Kemsley rail halt typically operate twice per hour between Sittingbourne and Sheerness, with interchange provided at Sittingbourne for onward connections to Canterbury, Ramsgate, the Medway Towns and London. Positive discussions have been held with Network Rail with respect to linking the site directly with Kemsley rail halt for pedestrians and cyclists. Sittingbourne station is located approximately 2km south-east of the site.

31.1.26 Residential parking provision on site is proposed to be provided in line with Kent County Council minimum residential parking standards for 'suburban' areas, and in accordance with the Kent and Medway Structure Plan standards for non residential uses.

31.1.27 A review of national, regional and local planning and transport policy guidance has been completed in relation to the proposed development. This Transport Assessment sets out the response to, and compliance with, policy made by this site.

31.1.28 In order to provide an understanding of existing traffic conditions, a traffic survey exercise has been completed at junctions agreed with highway officers. The results of the MCC survey showed that across the network (on the basis of network throughput) the AM peak hour occurred between 0750-0850 and the PM peak hour occurred between 1700-1800. These peak hours have been adopted for assessment purposes.

31.1.29 It is anticipated that the site will be complete in 2031 and this date coincides with the Local Plan horizon. On this basis an assessment horizon of 2031 has been adopted for both KCC and HE junctions. In addition, an interim year of 2023 has been assessed on the basis that this is expected to be the year when a route is completed through the site.

31.1.30 In order to represent forecast background traffic, growth factors have been derived based upon Tempro growth factors. The Tempro growth factors have been adjusted to remove double counting of committed development sites. The growth factors have been applied to the 2015 observed data to derive 2023 and 2031 background traffic data.

31.1.31 In addition to the Tempro growth factor a number of sites have been explicitly considered at the request of KCC officers. A number of these have been added to the background traffic for explicit inclusion to the baseline traffic flows. This includes explicit allowance for the sites at Iwade, which are not yet subject to planning applications, but could adopt the basis of this Transport Assessment for that purpose.

31.1.32 The traffic generation from the proposed development has been calculated using the TRICS database. The distribution of trips generated by the residential element of the development has been calculated using Census 2011 data in conjunction with driving route information from an extract of digital road network in GIS.

31.1.33 Each of the junctions assessed has been the subject of detailed modelling. The findings from the modelling have informed the need, or otherwise, for mitigation to address development effects at each junction.

31.1.34 From the assessment completed it is evident that the A249 Grovehurst junction requires mitigation as a result of the proposed development. Indeed, the baseline assessment confirms that this junction will require upgrade works regardless of development at MU1. The issue of mitigation at this location was the subject of much discussion with Highways England and KCC (as the highway authorities) and Swale Borough Council during the Local Plan process. It is clear from the Local Plan that an interim improvement scheme is required to deliver the Local Plan and that the MU1 allocation site is expected to contribute towards this. It is also clear that an appropriate interim improvement scheme has already been agreed, in principle, with the highway authorities. An interim improvement scheme is illustrated within this Transport Assessment and it is intended that the development will part fund the implementation of this in line with Local Plan policy. The Local Plan advises that some development is likely to be acceptable in advance of the interim scheme coming forward. The quantum of development considered acceptable is not defined and this would need to be subject to discussion with the highway authorities to agree a suitable trigger point. It is expected that the Planning Authority will collect contributions from other development sites that are forecast to impact upon this junction as they come forward.

31.1.35 Similarly, it is evident that Bobbing junction is predicted to exceed capacity parameters for both forecast years assuming the baseline scenario. The addition of development traffic (either the Development or the cumulative MU1 site) exacerbates the forecast queues and delays and hence there is a need for the development to implement mitigation measures at this location. A mitigation scheme has been developed for this junction comprising partial signal control and widening entry and exit arms. This scheme demonstrates mitigation of the development and additional capacity to serve the Local Plan traffic flows at 2031. It is intended that the Development would contribute towards the implementation of the signal controlled

scheme. It is considered reasonable that other Local Plan developments that would generate traffic passing through this junction should also contribute towards its implementation.

31.1.36 The modelling of the B2006 / Sonora Way / Vellum Drive roundabout suggests that the junction is predicted to exceed capacity parameters assuming baseline traffic conditions. The addition of development traffic (either the Development or the cumulative site) exacerbates the forecast queues and delays significantly and hence it is considered that there is a need for the development to implement mitigation measures at this location. A mitigation scheme has been developed for this junction comprising additional flaring on approach arms. With the proposed mitigation geometry the junction is predicted to work better than the respective baseline scenarios. The proposed scheme is therefore demonstrated to offset the effect of the proposed development. It is intended that Development would implement the mitigation measure or provide the equivalent monetary contribution to the local highway authority to implement an alternative appropriate scheme of their choice.

31.1.37 Merge and diverge traffic volumes for the A249 corridor between Grovehurst junction, the Bobbing junction and the Key Street junction have been reviewed as requested by Highways England. It is demonstrated that for each merge or diverge the addition of the MU1 development does not alter the merges or diverges needed when compared to the baseline with the exception of the A249 Key Street junction diverge at 2031 PM. The increase of mainline traffic, as a result of development traffic when compared to the baseline, does push the marker to the boundary with a type D diverge. It is not considered that the addition of the development traffic on the mainline at this location would warrant mitigation of the diverge type and hence no additional mitigation is proposed with respect to merge / diverge layouts as a result of the MU1 development.