Future Hoo

Road Design Development Report

July 2022

Shaping the future of Hoo

MEDWAY

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Future Hoo Design Development Report – Road Scheme

1. Introduction and Purpose of the Report

1.1 The purpose of this report is to set out the design development work undertaken on the Council's proposals for highways improvements on the Hoo Peninsula ('the scheme') that has led to a design freeze in early summer 2022. The report will be updated prior to the submission of the planning application for the scheme to evidence the optioneering process followed to reach the application scheme design.

1.2 It describes in high-level terms the options that have been considered for each phase of the scheme, appraises them against an optioneering framework (section 3) and presents the recommended design to be taken forward for assessment ('the Assessment Design') (section 4).

1.3 The options considered in this report are options that have been developed throughout the design development of the scheme (including prior to both rounds of consultation), and therefore includes options that were not subject to the public consultation process.

1.4 The matters discussed in this report finalises 'Stage 1' of the Council's preparation work for the planning application for the scheme through the achievement of a design freeze for the scheme.

1.5 'Stage 2' will comprise the assessment of the likely scheme effects and the identification of appropriate mitigation (including design development measures where necessary which may mean that the final application design differs from that presented in this report) on the basis of that Assessment Design. This is primarily to be achieved through the Environmental Impact Assessment and Habitats Regulations processes and the production of a Transport Assessment. Following Stage 2, it is intended that an application for planning permission for the application, mitigated design will be submitted in February 2023. There will be ongoing engagement with stakeholders during Stage 2.

Scheme development background

1.6 Estimates of population growth in Medway indicates that a substantial amount of new homes will be required by 2037 to accommodate growth within the area. Medway's new Local Plan will guide the locations for these new homes. Progress to date on the

Local Plan (as seen in its consultations to date) has identified opportunities for growth particularly on the Hoo Peninsula, which could potentially deliver at least 10,600 homes through the Local Plan process.

1.7 However, the scale of housing growth proposed on the Hoo Peninsula is dependent on strengthened connections and significant upgrades to transport and environmental infrastructure. This cannot be achieved through piecemeal private sector investment and instead requires upfront public sector commitment.

1.8 Consequently, in 2017, Medway Council put forward an expression of interest for Housing Infrastructure Funding (HIF), a funding source established by the government to bring forward essential strategic infrastructure to unlock land for housing, which would allow Medway to deliver transport and environmental infrastructure on the Hoo Peninsula to support housing delivery.

1.9 Medway Council's expression of interest was followed by the preparation and submission of a formal bid for funding to deliver the highways improvements discussed in this report as well as a new railway station at Sharnal Street, improvements to the existing Grain railway line and re-instatement of a passenger mainline connection on the Peninsula, alongside the creation of blue and green networks to protect existing landscape and ecology designations, providing active travel links and maintaining settlement boundaries as part of SEMS.

1.10 The application for funding was supported by economic analysis and appraisal of the highways proposals, undertaken in accordance with standard highways project development (known as 'WebTAG'), as requested by Homes England (referred to in this document as 'the Business Case). The Business Case highlighted that the Hoo Peninsula is currently constrained by having a single A class access road (the A228) which connects to the A289 at its western ends and links existing communities to the strategic road network. The existing highway network is close to, and in some areas, at capacity, which is creating severe congestion on the A289 and A228 during peak times. Junctions on the A289, including Four Elms Roundabout and Anthony's Way, and the A228 Main Road junction, have been shown through modelling to be at breaking point with trip growth from up to 2,000 additional homes.

1.11 The HIF bid demonstrated that significant further housing growth cannot be permitted on the Peninsula without significant highways investment. Additionally, given the

number of environmental designations on the Peninsula, environmental improvements, through the delivery of SEMS, would be required to ensure biodiversity and landscape effects are effectively managed to avoid, mitigate or compensate against the direct and indirect impacts of housing growth. The rail scheme is also proposed, to help to make the Peninsula more sustainable by promoting a modal shift away from the car, whilst also alleviating pressure on the road network and increasing future resilience. In November 2019, the Government announced that Medway Council were successful in their bid for £170m HIF funding, to be spent between across three interventions on the Hoo Peninsula:

- A £14m Strategic Environmental Management Scheme (SEMS) to deliver large-scale new publicly accessible (where appropriate) open spaces, covering 300 hectares of community parkland, woodland and nature reserves, managed for both wildlife and for public access.
- A £63m investment in a new train station at Sharnal Street and a reinstated passenger service on the Grain branch line; and
- An £86m upgrade of the existing road network with the provision of new infrastructure including slip roads, junctions and interchanges on the A228 and A289 and wider highway improvements, as well as a new relief road to access the Peninsula via Woodfield Way.

Need for the scheme

Business Case

1.12 The Business Case evidences the high commuting mode share for residents living on the Hoo Peninsula when compared against the Medway, regional and national averages. 73.8% of residents drive to work, much higher than the averages for Medway (63.5%), Southeast England (60.8%) and England (57.0%). Additionally, the percentage that travel by train, bus, cycle and on foot are all significantly lower than the local, regional and national average, reflective of the Peninsula's island location and limited existing infrastructure.

1.13 The high car mode share for commuting trips leads to significant levels of peak hour congestion. Key congestion hot-spots are currently seen on the A289 corridor at:

- A289 approaches to Four Elms Roundabout
- Approaches to Sans Pareil Roundabout

- Approaches to Anthony's Way Roundabout

1.14 The congestion leads to extended and unreliable journey times and diversion of trips onto unsuitable roads. This has also led to the declaration of Air Quality Management Areas (AQMA), including:

- Central Medway AQMA – Covers Frindsbury Road, Cuxton Road, Strood Centre, Rochester Centre and Chatham Centre, as well as Luton Road, High Street and Rainham Road in Chatham.
- Four Elms Hill – Applies to the section of the A228 through Chattenden.
- Gillingham – An area along Pier Road.

1.15 The Business Case indicates that several junctions operate close to or at capacity in the 2016 baseline and that the number of junctions operating over capacity will increase significantly when committed and outline development plans are brought forward. It indicates that both the A289 and A228 corridors are congested at present, and there is little spare capacity in the network to cope with planned growth. Significant mitigations are therefore needed to facilitate housing growth on the Peninsula.

Scheme Objectives

1.16 The Business Case has informed the development of strategic objectives for the scheme. In turn, these objectives have been used to shape scheme development. The strategic objectives are shown in Table 1.

Table 1: Strategic objectives

SO1	Enable housing growth on the Hoo Peninsula
SO2	Support sustainable economic growth in Medway
SO3	Improve connectivity to and from the Hoo Peninsula
SO4	Improve accessibility and reduce severance on the Hoo Peninsula
SO5	Protect and enhance the built and natural environment

Scheme Development

1.17 Since the award of the HIF funding extensive design and traffic modelling has been undertaken to develop an appropriate scheme, which is comprised of six phases. Table 2 lists these phases, with more detail provided in Section 3.

Table 2: Highway design phases

Phase 1	A289/HIGHAM ROAD TO UPCHAT ROUNDABOUT
Phase 2	UPCHAT ROUNDABOUT to A228 / MAIN ROAD JUNCTION HOO
Phase 3	A228 BELL'S LANE ROUNDABOUT
Phase 4	ROPER'S LANE ROUNDABOUT & RAIL STATION ACCESS ROAD
Phase 5	A289 FOUR ELMS ROUNDABOUT
Phase 6	SANS PAREIL ROUNDABOUT & A289 WULFERE WAY

1.18 The traffic modelling undertaken to develop the design for the scheme (building on what was used for the Business Case) is based on and consistent with the strategic model being developed to support the Local Plan. The Future Hoo modelling includes all committed developments and committed highway improvements up to November 2037. For the purposes of assessing the traffic impacts of the scheme a reasonable worst-case scenario has been adopted for the 2037 design year. This includes for 10,600 new homes (as considered in the Business Case) and employment sites across the Peninsula. Traffic impacts associated with the proposed passenger rail service at Ropers Lane have been included within the model used for trip generation assessment. The scheme design has been developed, in part, by assessing interventions through the strategic model to ensure the wider network impacts are understood and acceptable. These designs have then been tested through local modelling as part of an iterative process.

1.19 The design has also been informed by the feedback obtained through two rounds of public consultation on the Future Hoo proposals, the first undertaken between January and April 2021 and the second between November and January 2022. Medway Council's Future Hoo team has also engaged extensively with stakeholders, including the Hoo Consortium (the consortium of land promoters with potential residential sites located on the Hoo Peninsula), statutory bodies and wider stakeholders, to ensure the scheme supports the delivery of housing in line with the emerging design principles set out in the consultation version of the Hoo Development Framework (HDF). More detail on the consultation and engagement that has taken place is set out in the "*Future Hoo Consultation Cabinet Report*".

2. Optioneering Framework

2.1 This section of this report outlines the criteria against which the reasonable alternatives for those parts of the scheme have been considered to determine whether they should be taken forward as the Assessment Design, as part of the design development process for the scheme.

2.2 At this stage of design and baseline environmental knowledge, the assessment of each option against the identified criteria has been necessarily high level. As such, a Red Amber Green (RAG) rating system has been applied. Options have been taken forward on the basis of their overall RAG performance against the identified criteria set out below, with the option that scored the most 'Green' ratings combined with the least 'Red' ratings for each phase being progressed to the Assessment Design stage, save where a criterion is fundamental to the delivery of that phase (as explained where necessary in section 3).

2.3 Table 3 below outlines the criteria that each option has been assessed against and outlines an explanation of the RAG scoring criteria that have been applied for each criteria. An explanation for the specific RAG rating for each option is included in the appraisal tables set out in section 3. Generally, a red rating for any criteria will result in an option being discounted unless there are specific circumstances to the contrary. Other ratings (green and amber) will need to be balanced across the criteria depending on the specific option. The reasons for identifying a preferred option are set out following each summary table.

Table 3: Appraisal and RAG scoring criteria

Criteria	Green Rating	Amber Rating	Red Rating
Fit with Objectives	Fully meets at least 3 objectives	Meets at least 1 objective	Meets no objectives
Traffic Performance	Improves junction or link capacity	Junction or link close to capacity	Junction or link below acceptable level of service
Environmental	No potential adverse effects/potential improvement	Potential for adverse effects but needs further investigations	Clear that likely adverse effects will arise

Criteria	Green Rating	Amber Rating	Red Rating
Landtake	Involves the least amount of potential development land or the least amount of third-party land overall	Involves the second least amount of development land or third-party land	Involves either the highest amount of third party landtake or could lead to high levels of compensation being required
Affordability	Cheapest Option	Middle ground option (if applicable)	Most expensive option
NPPF Compliance (the Medway Local Plan was adopted in 2003 and the emerging Local Plan has not yet been consulted on at Regulation 19 stage. Therefore, in the absence of an up to date Local Plan, the NPPF is being used to assess policy compliance))	No NPPF policy issues	Potential for Policy concerns – further evidence would be needed to show compatible	Clear Policy Compliance Issues
Buildability	No major buildability issues	Some constraints but likely to be surmountable with further investigation	Insurmountable constraints
Community/Stakeholder (expressed at both consultations and in engagement)	Most Favoured Option	Mean Favoured Option (where relevant)	Most Non-Favoured Option

2.4 These criteria have been applied where it has been possible or necessary to develop full reasonable alternatives that have been able to be considered by the multi-

disciplinary team that are working on the Future Hoo highways project (as described in section 3). However, not all phases have required a multi criteria optioneering process to be carried out by virtue of the nature of the works proposed.

2.5 Furthermore, the criteria have not been applied to initial design ‘concepts’ that were developed and evaluated by the highways design team only at an early stage to see if they could in fact be considered to be ‘reasonable alternatives’ to be appraised by the wider team. This was done on the basis of whether these concepts would be able, in basic terms, to meet the objectives of the scheme and/or able to be built. This is described where necessary in section 3.

3. Design Development

Design Development Overview – Business Case and Assessment Design

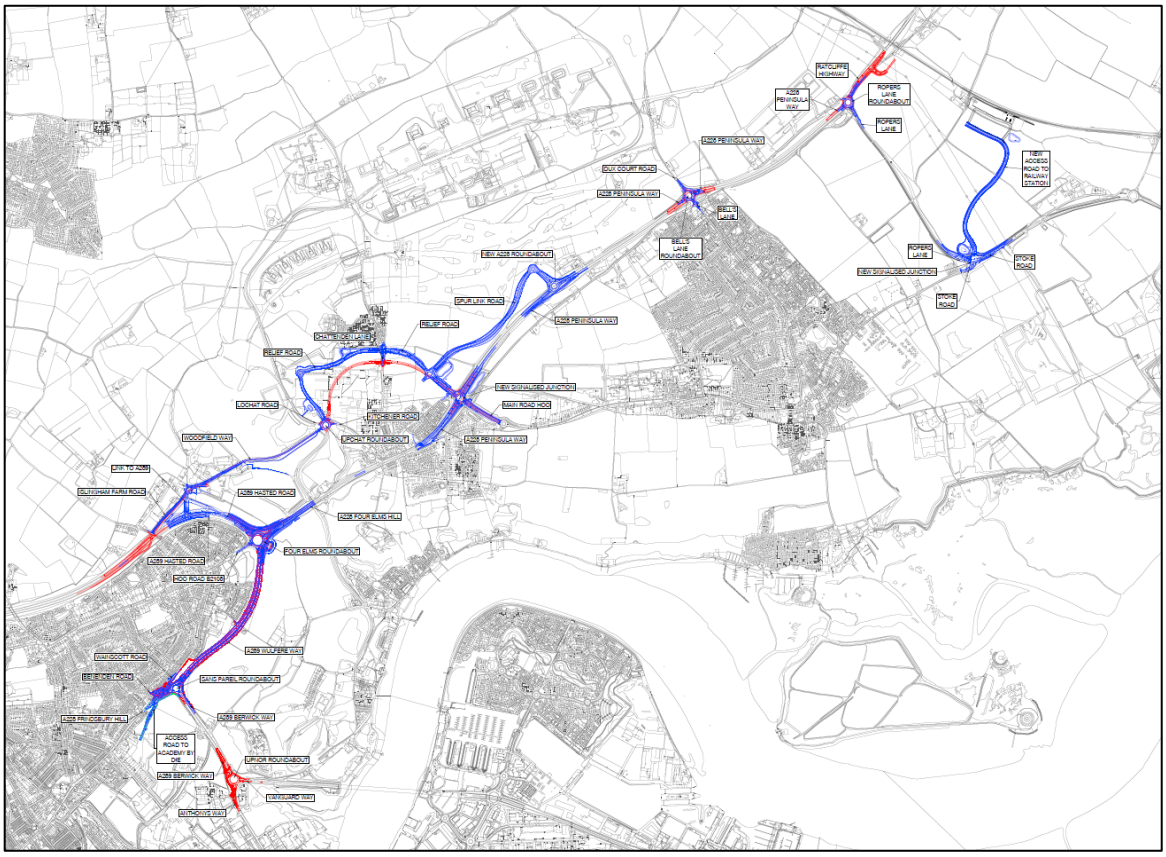
3.1 At Business Case stage, the Council set out a high level indicative layout ('the Business Case baseline scheme') for each phase, setting out the principles of the interventions proposed on the basis of the level of traffic modelling at the time and a desk level understanding of the environmental constraints at each location.

3.2 Following the HIF application, the Business Case baseline scheme layout has been subject to review and change through stakeholder engagement, consultation, committed developments being brought forward and design development informed by on-going localised traffic modelling. This has impacted the footprint of the scheme and required interventions.

3.3 Figure 1 below compares the Business Case scheme layout and Assessment Design taking into account the outcomes of this report. The Assessment Design (blue) is overlaid on the Business Case layout (red).

3.4 Please note that the Anthony's Way Roundabout improvement works have been brought forward by Medway Council outside of the HIF scheme to relieve existing congestion levels and this work has been completed on site.

Figure 1: Business Case scheme layout (red) and Assessment Design (blue)



PHASE 1 – A289/HIGHAM ROAD TO UPCHAT ROUNDABOUT

3.5 The Business Case baseline scheme comprised a new grade-separated junction on the A289 Hasted Road near the Higham Road overbridge, widening and improvements to Islingham Farm Road and improvements to Woodfield Way to Upchat Roundabout. These elements were identified as required to assist in providing network capacity for predicted traffic flows in 2037.

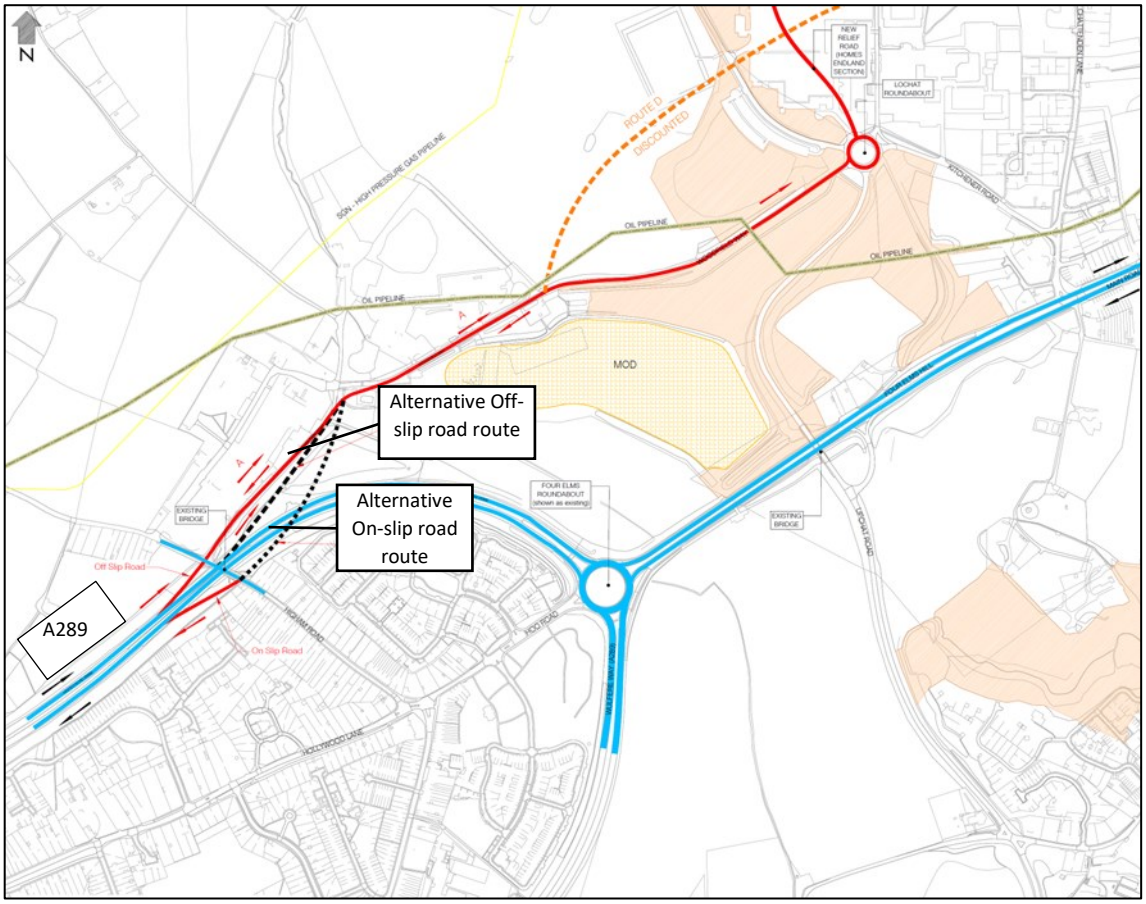
A289 Hasted Road / Higham Road Interchange

3.6 Traffic modelling indicated that a link to and from the A289 via Islingham Farm Road and Woodfield Way would provide a direct and effective access route to and from the Peninsula and provide network resilience.

3.7 Figure 2 below shows the existing road layout and the outline options for a road link connection explored in the Business Case baseline scheme (in red). This route required construction of two slip roads to enable traffic egress from the higher level Islingham Farm Road / Higham Road junction to the lower level A289. The slip roads

would facilitate free-flow merge and diverge of traffic to and from A289, minimising impact to the A289 traffic flows. This design concept, as further developed as explained in the following paragraphs is referred to as 'Option 1' for this phase.

Figure 2: Option 1 (in red) at Business Case stage

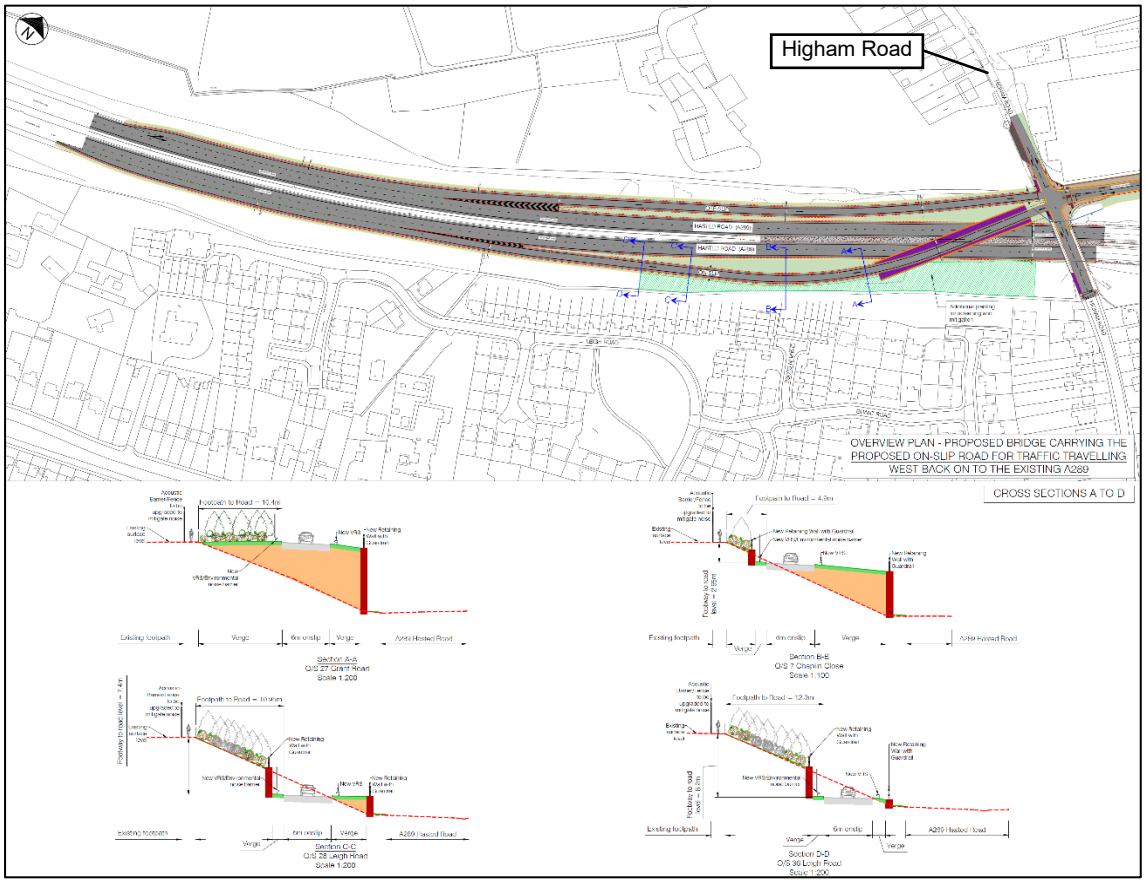


3.8 Alternative slip road routes were considered, as shown in Figure 2, but were not taken forward as viable options (and therefore for consideration as reasonable alternative options) due to the buildability constraints posed by topography, alignment of existing highways, land take, local land use, and the proximity to housing and environmentally protected areas for both the on and off slips.

3.9 Design Standards require a minimum distance of 1000m between the existing At-grade Four Elms Roundabout and traffic joining from a new grade separated junction. This limited the potential tie-in position of a new on-slip to the A289 to the west of the existing Higham Road bridge. Following the Business Case submission, design development of this junction identified that an additional overbridge would be required to accommodate traffic flows.

3.10 Figure 3 below therefore shows the refined preliminary layout of the link road at the junction of Higham Road / Islingham Farm Road and a new overbridge for the proposed A289 on-slip which now formed part of Option 1.

Figure 3: Option 1 - Preliminary Layout Grade Separated Junction Layout



3.11 The above slip road arrangement was the preferred layout as it delivered free movement to and from the A289 via slip roads with no additional strategic road delays predicted.

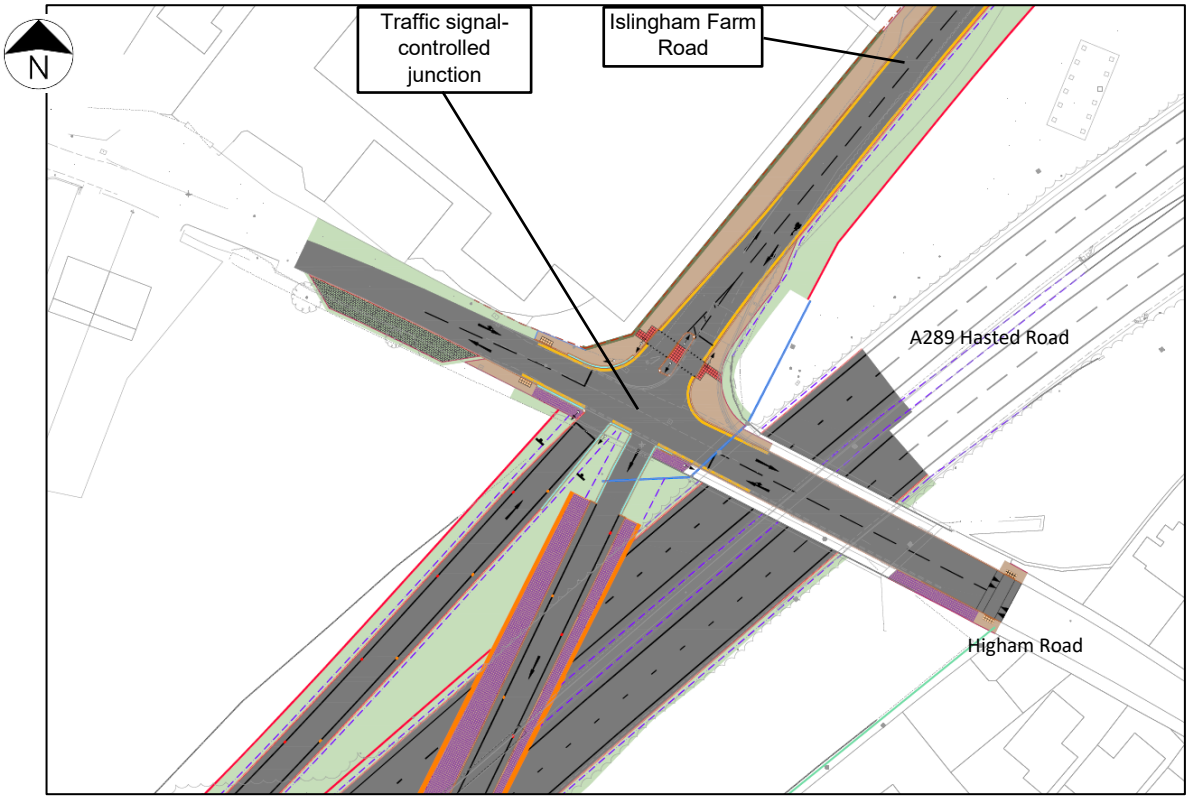
3.12 A potential at-grade junction on A289 between the existing Higham Road and Four Elms Roundabout (as established in option 2 below) was not considered at this stage as the preferred route was found to deliver an effective link to the A289 and initial modelling indicated it would operate without causing delays to the strategic road network.

Higham Road Junction

3.13 Modification works to Higham Road junction were proposed as part of Option 1 to accommodate a grade-separate junction. Following the refinement work undertaken

discussed above, a traffic signal-controlled junction with restricted movements was proposed to manage predicted traffic flows and improve pedestrian facilities. The refined Option 1 layout at this junction is shown in Figure 4.

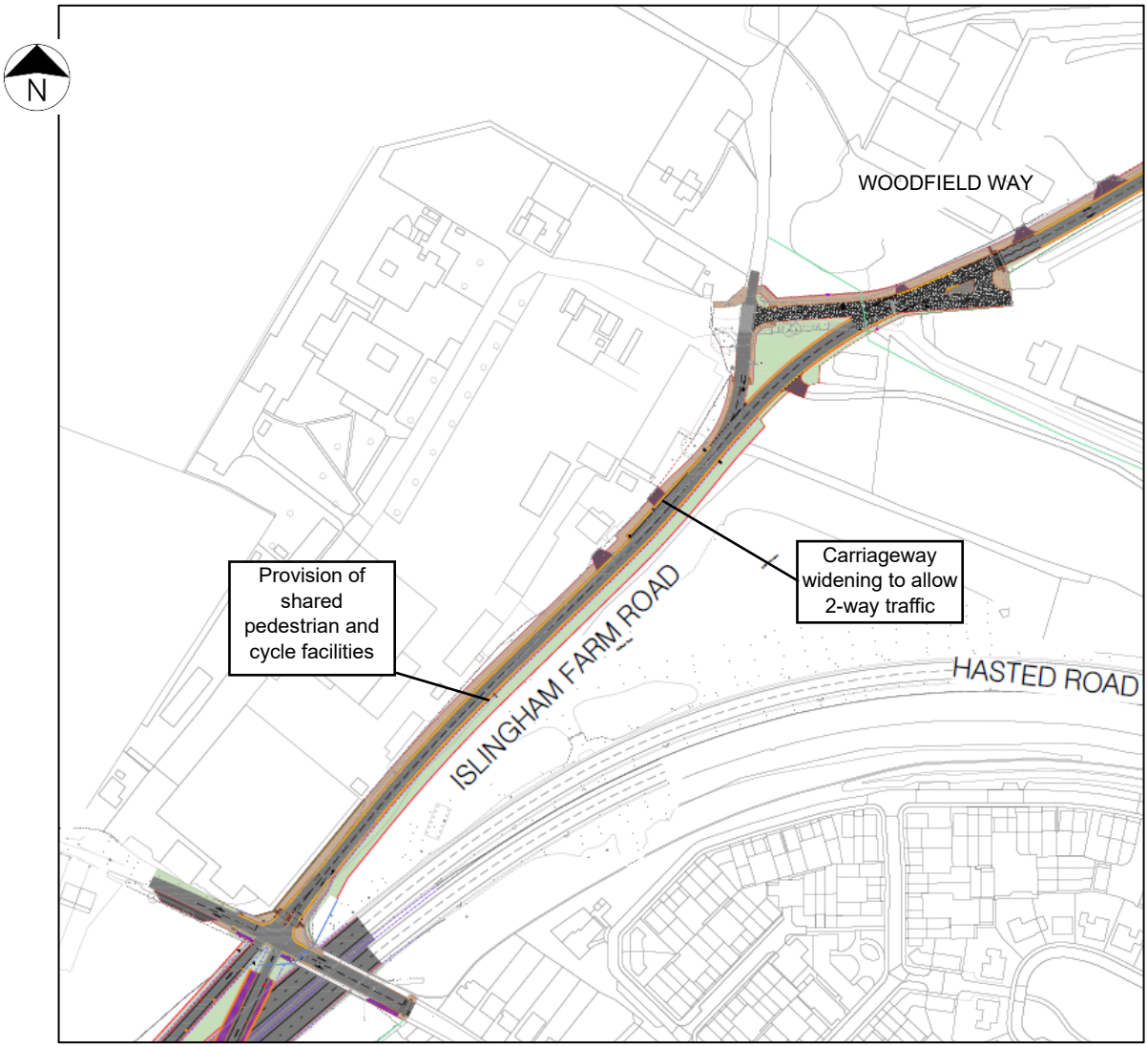
Figure 4: Option 1 - Proposed Higham Road Junction Improvements



Islingham Farm Road

3.14 Modifications to Islingham Farm Road were proposed as part of the Business Case baseline scheme to accommodate predicted traffic flows, with no later refinements proposed within the Option 1 concept. These included widening the single lane carriageway to allow 2-way traffic, provision of pedestrian and cycle facilities and street lighting, as shown in Figure 5 below.

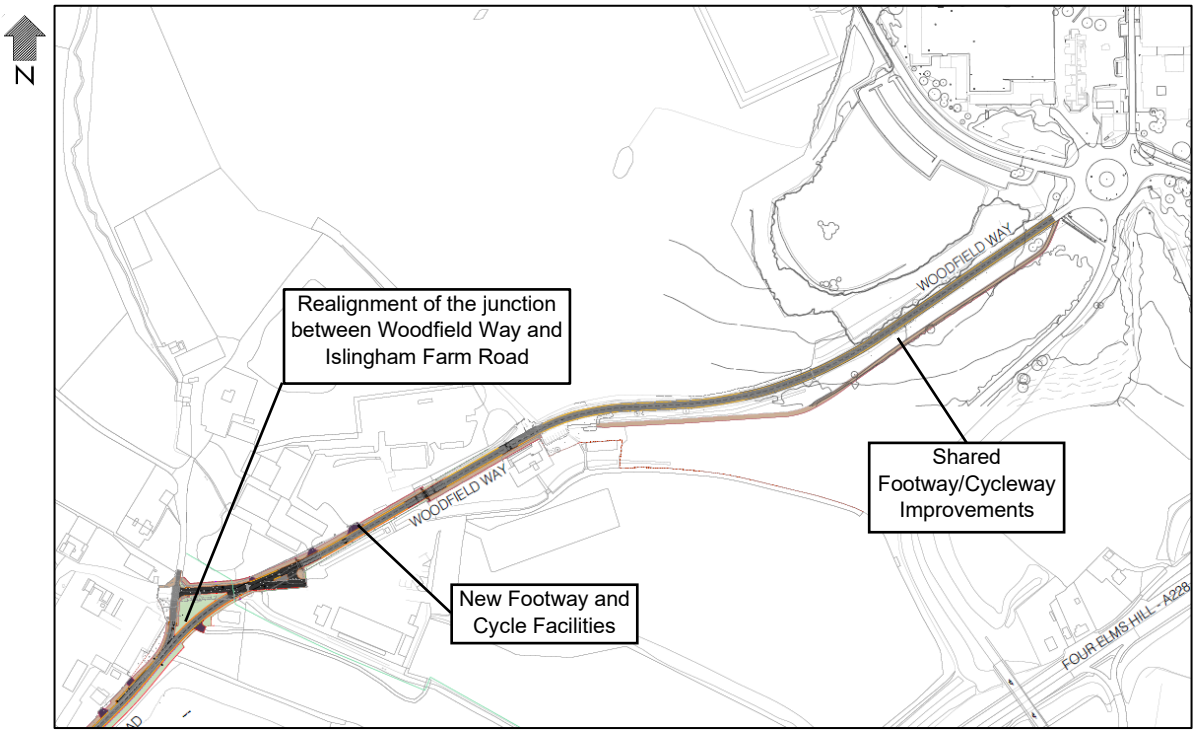
Figure 5: Option 1 - Proposed Widening of Islingham Farm Road



Woodfield Way

3.15 Modifications to Woodfield Way were proposed as part of the Business Case baseline scheme to utilise as much of the existing highway as possible and accommodate predicted traffic flows, with no later refinements proposed within the Option 1 concept. These included realignment of the junction between Woodfield Way and Islingham Farm Road, provision of pedestrian and cycle facilities and street lighting and maintaining safe access between the various MoD sites as shown in Figure 6 below.

Figure 6: Option 1 - Proposed Modifications to Woodfield Way



3.16 However, both prior to and during Round 1 of consultation, residents of Islingham Farm Road, Grant Road and Higham Road expressed concerns about the Option 1 route and the associated A289 slip roads. These concerns were largely about impacts associated with noise, light, traffic volumes and visual intrusion to local communities. Residents were also concerned about the impacts of the proposed changes to Higham Road, Islingham Farm Road and Woodfield Way (and the junction between them) in the Option 1 layout.

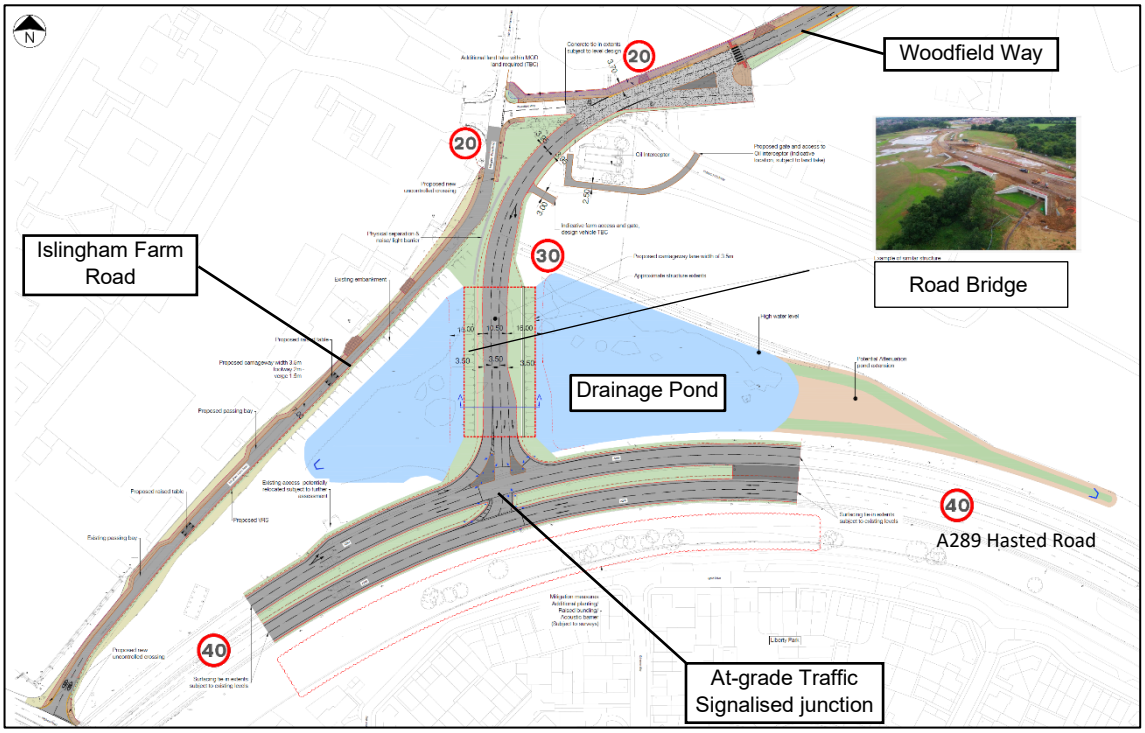
3.17 During discussions in April 2021, residents suggested several high-level alternative concepts for layouts that might mitigate the need for the A289 slip roads from the Higham Road Bridge. These included grade separated junctions, tunnels and additional offline roundabouts.

3.18 The suggested alternative concepts were considered by the highways design team to not be viable reasonable alternatives as they could not be able to accommodate traffic flows, comply with design standards, and would lead to, visual intrusion and impact on private land and the SSSI; and therefore would not at a basic level meet the objectives for the scheme

3.19 However, considering the significant level of objection raised to Option 1, further work was undertaken to determine if there was a viable alternative option suitable for further design development.

3.20 Figure 7 below shows the layout therefore developed for Option 2 – Alternative Route and at-grade Junction. This outlines an at-grade signalised junction on the A289 (between Higham Road and Four Elms Roundabout), a structure spanning the drainage attenuation pond and a connection to Woodfield Way.

Figure 7: Option 2 – Alternative Route and At-grade Junction



3.21 Initial traffic modelling determined that an at-grade signalised junction with restricted traffic movements and no active travel provision could provide an appropriate junction form, which could be considered for further design development. This is a relatively simple junction operation which would operate in two stages where the A289 runs as one stage and the relief road runs as a second.

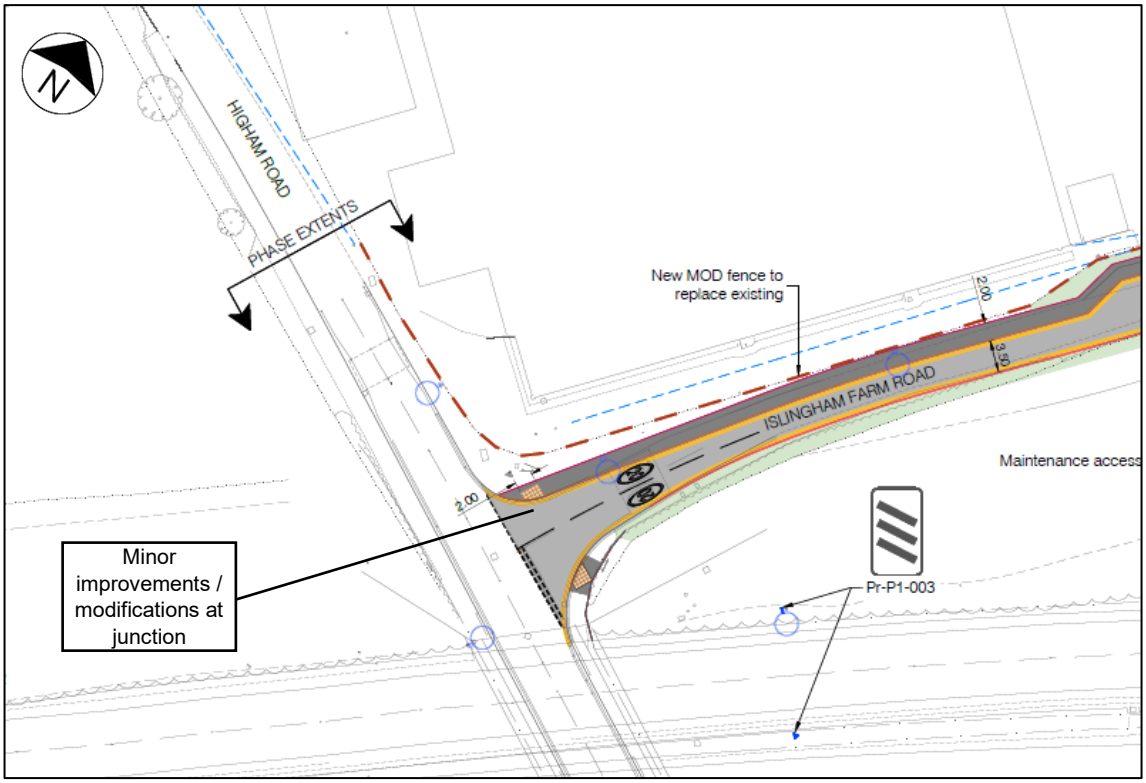
3.22 Work was also undertaken to allay concerns that the introduction of an at-grade junction would impact A289 journey times and lead to additional stop/start traffic with a potential increase in air and noise impacts. Traffic modelling showed that ensuring that the introduction of a traffic signal junction was phased with the traffic signals at

Four Elms Roundabout would enable the A289 to operate with a reasonable level of service accommodating the predicted 2037 traffic flows and mitigating these impacts.

Higham Road Junction

3.23 For Option 2, the A289 grade-separated junction at Higham Road is not required. Figure 8 therefore below shows minor improvements required at the junction of Islingham Farm Road and Higham Road that are needed in the Option 2 scenario. These include a new footway crossing, a new footway, new signing and provision of street lighting.

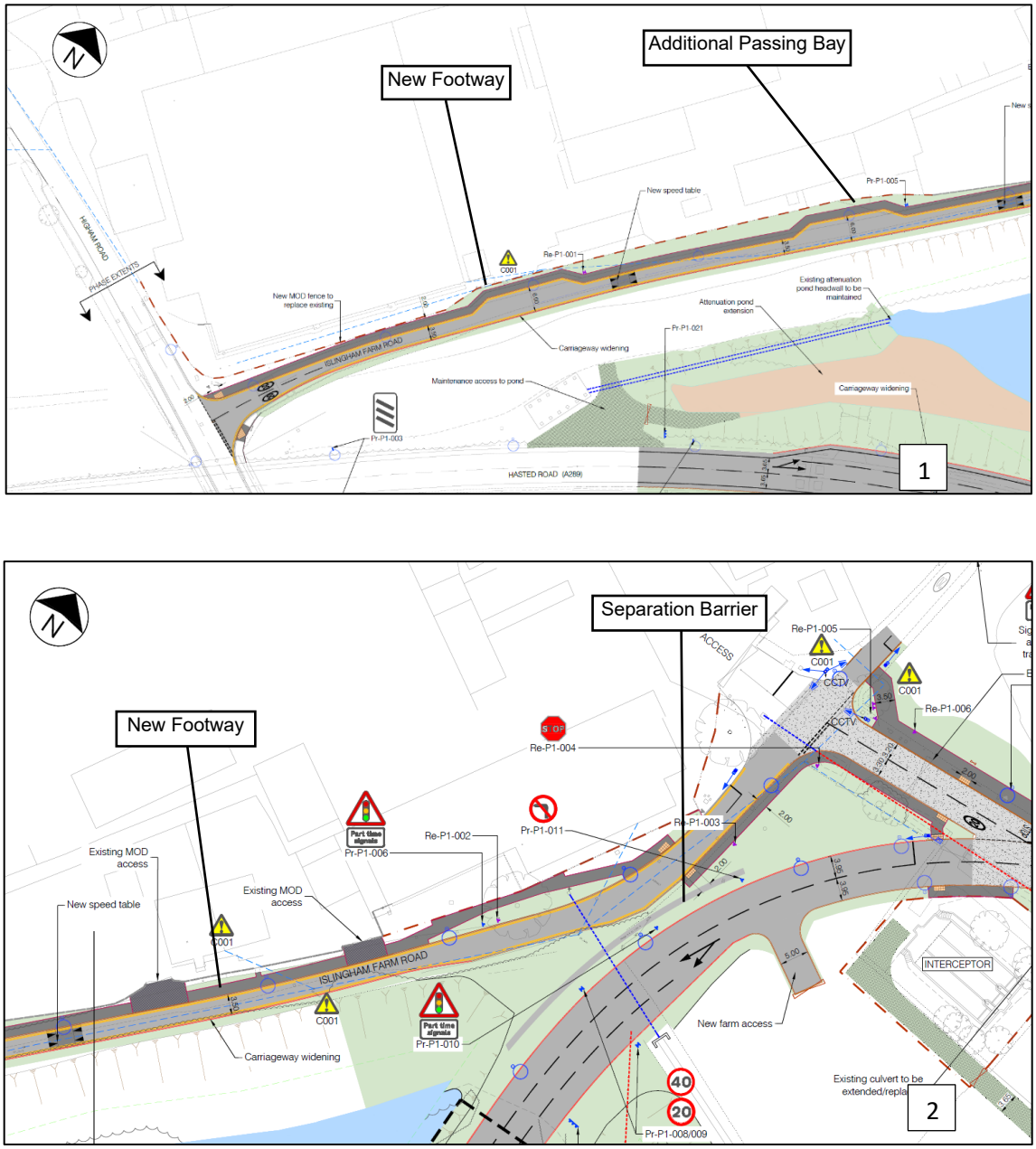
Figure 8: Option 2 - Proposed minor changes to Higham Road / Islingham Farm Road Junction



Islingham Farm Road

3.24 In the Option 2 scenario, improvements/modifications to Islingham Farm Road are reduced to maintaining existing a single lane road width, the provision of active travel connectively, local safety improvements to control traffic, and street lighting, as shown in Figure 9 below.

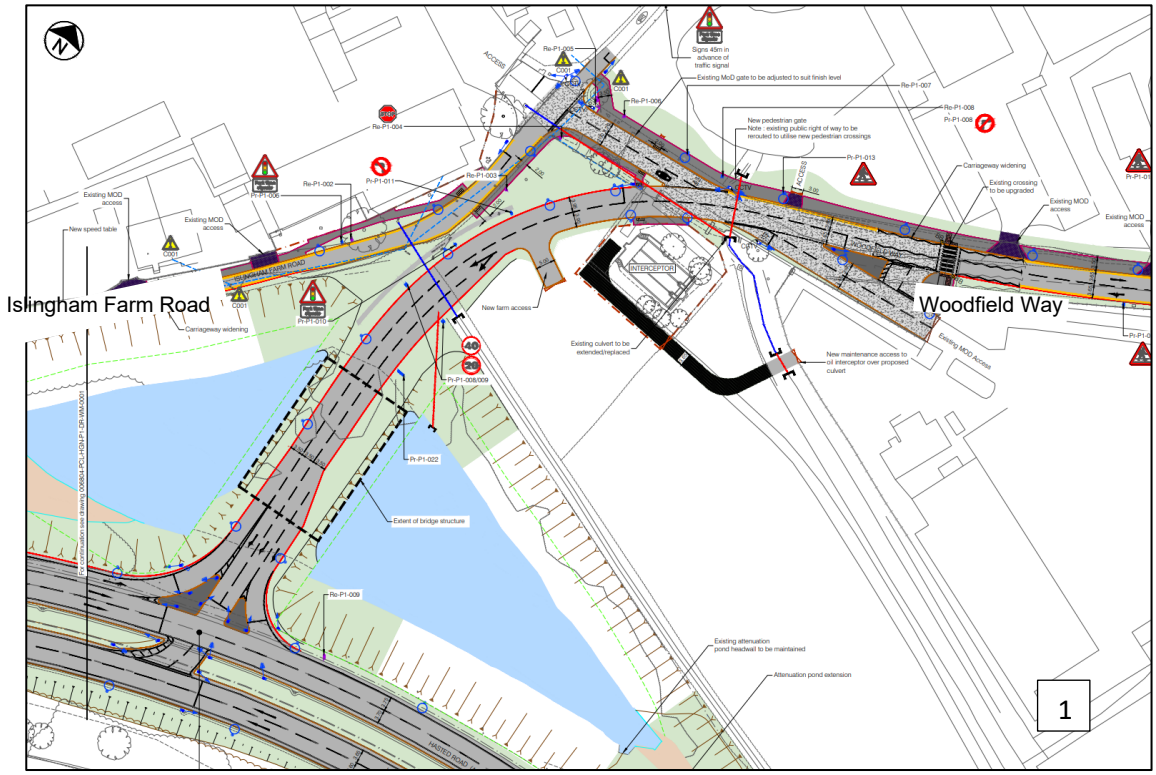
Figure 9: Option 2 - Proposed revised improvements to Islingham Farm Road

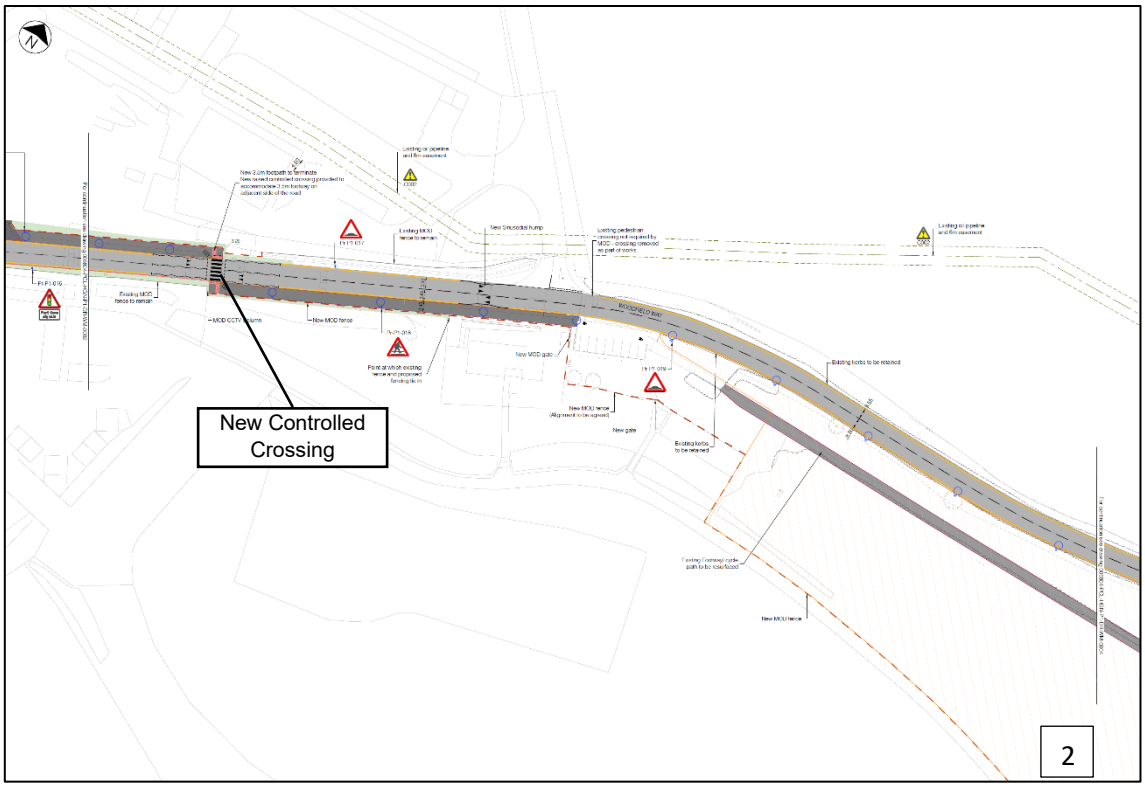


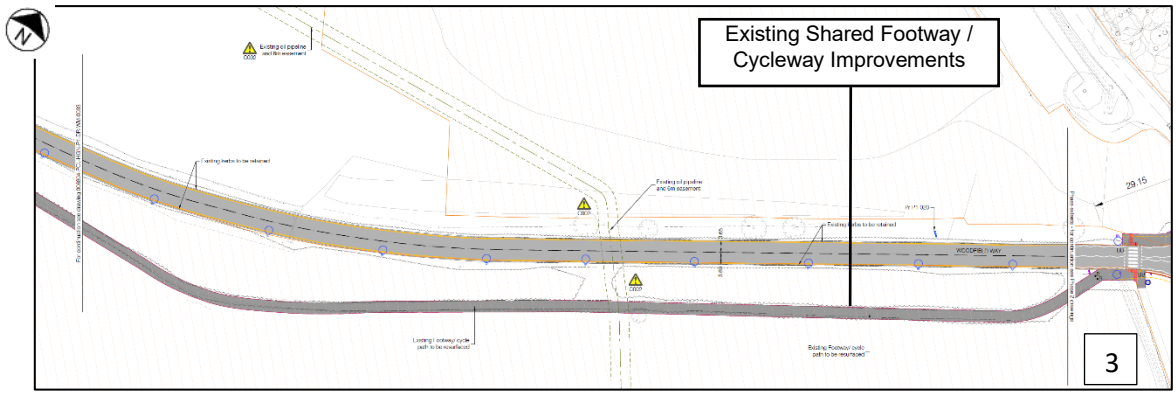
Woodfield Way

3.25 In the Option 2 scenario, a new access link road from the A289 Hasted Road to Woodfield Way is introduced. This route requires realignment of the lower section of Woodfield Way taking through traffic away from Islingham Farm Road. The new access road from Woodfield Way also has additional exit lanes to optimise traffic release. Figure 10 below shows the realignment and associated changes to Woodfield Way in the Option 2 scenario.

Figure 10: Option 2: Proposed Realignment and Improvements to Woodfield Way







Phase 1: Options Appraisal Tables

Criteria 1: Fit with Project Objectives

Option / Objective	SO1	SO2	SO3	SO4	S05	Overall RAG Score
1 Grade Separated Junction Layout					Refer to criteria 3	
2 Alternative Route						

Criteria 2: Traffic Performance

Option No	Traffic performance
1 Grade Separated Junction Layout	Provides relatively free flows condition with uncontrolled merge on to the A289, improved capacity on Islingham Farm Road and mitigates attraction for more local traffic on the side roads.
2 Alternative Route	Introduces new at-grade junction arrangement on the A289. Capacity achieved through coordinated phased operation with the Four Elms Roundabout capacity improvements. The signal controlled junction introduced an additional stop/start arrangement on the dual carriageway. The new access road from Woodfield Way has additional exit lanes to optimise traffic release.

Criteria 3: Environmental

Option No	Environmental
1 Grade Separated Junction Layout	Carriageway closer to residential properties, leading to a reduction in air quality, increase in noise exposure, and a detrimental impact on views from these properties. This option would also likely lead to permanent severance of public footpath RS129 from Leigh Road to Hollywood Lane, and temporary disruption to National Cycle Route 1 on Higham Road and Islingham Farm Road. Option 1 will require the loss of most of the existing vegetation along the carriageway verges, and also contains the only confirmed sighting and record of a hazel dormouse in the highway study area.
2 Alternative route	Preferred environmentally as impacts on air quality, noise, landscape and visual and public rights of way are considered to be less significant than Option 1 (as Option 2 is further from residential properties). As it crosses an existing, previously excavated balancing pond for the highway, it leads to less landtake and lower scale of intrusive works. However, Option 2 would have a slightly greater impact on cultural heritage receptors compared to Option 1. It is also at greater risk of flooding and appropriate mitigation would need to be applied.

Criteria 4: Land

Option No	Land
1 Grade Separated Junction Layout	New slips roads and bridge lie within the Highway boundary. Widening on Islingham Farm Road and new route connection to Woodfield Way requires land take from the MoD.
2 Alternative route	New A289 at-grade junction lies within the Highway boundary. New link road predominately on Medway Council land. Requires small amount of land from MoD to tie into Woodfield Way. Minimal land take required on Islingham Farm Road.

Criteria 5: Affordability

Option No	Affordability
1 Grade Separated Junction Layout	More expensive due to need for embankments, long slip roads and various structures.
2 Alternative route	Less expensive due to reduced scope of works by providing the A289 at-grade junction, which provides significant construction programme and cost saving.

Criteria 6: NPPF

Option No	NPPF
1 Grade Separated Junction Layout	This option falls within flood zone 2 and 3 areas. Paragraph 159 of the NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary mitigation should be proposed through a site-specific flood-risk assessment. Potential for noise, light pollution and visual intrusion impacts (Paragraphs 130 and 185(a) and (c) of the NPPF). EIA will need to assess impacts and propose mitigation.
2 Alternative route	This option falls within flood zone 2 and 3 areas. Paragraph 159 of the NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary mitigation should be proposed through a site-specific flood-risk assessment.

Criteria 7: Buildability

Option No	Buildability
1 Grade Separated Junction Layout	Site constraints and requirement to maintain traffic access during construction of the grade separate junction and slip roads impose significant elongated build programme. Night works and weekend road closures will also be required to provide safe working at key stages of the build.
2 Alternative route	The at-grade junction layout provides greater flexibility in both build sequence and duration.

Criteria 8: Community/Stakeholder

Option No	Community/Stakeholder
1 Grade Separated Junction Layout	A significant level of objection was raised to the original proposal for a grade separated junction at the A289 / Higham Road junction.
2 Alternative route	The proposed at-grade junction layout and new access route to Woodfield Way away from Islingham Farm Road was well received.

Summary Table

Option No	Fit Against Objectives	Traffic	Enviro	Land	Affordability	NPPF	Buildability	Community/ Stakeholder
1 Grade Separated Junction Layout								
2 Alternative route								

Conclusion

3.26 Option 2 is the preferred option. This option is better environmentally and has considerably fewer challenges and less impacts during construction. There was also significant community and stakeholder objection to option 1.

PHASE 2 – UPCHAT ROUNDABOUT to A228 / MAIN ROAD JUNCTION HOO

3.27 The Business Case baseline scheme proposed a new relief road connecting the Upchat Roundabout (at Woodfield Way) to the A228 Main Road junction at Hoo. The works included a new relief road across the Homes England development site (Section 1 Relief Road) connecting to a new traffic signalised junction at Chattenden Lane and then continuing across the Gladman development site (Section 2 Relief Road) connecting to a new signalised junction replacing the at-grade four arm A228 Main Road Roundabout. These infrastructure works were identified to provide network capacity for the predicted HIF Hoo traffic flows in 2037 and future access to the development sites.

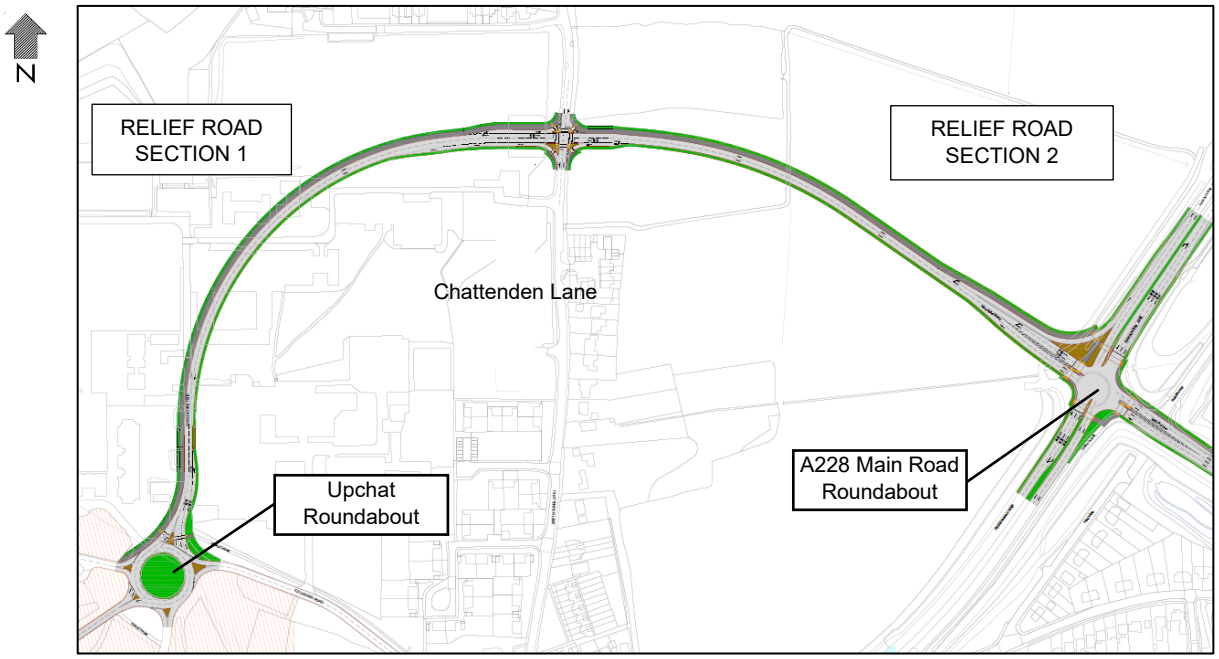
3.28 As part of design development it was identified as part of the Business Case baseline scheme that the existing A228 Main Road Roundabout was required to be converted

into a traffic signalised junction with additional lanes to accommodate the dominant A228 flows and manage and facilitate side road traffic demand. The potential to introduce a grade separated junction layout or underpass was dismissed as a viable reasonable alternative at an early stage due to the associated higher costs, increased land take, impact on adjacent properties, requirement to divert and pump watercourses and future maintenance regimes which would arise, meaning that such a proposal would not meet the scheme objectives in basic terms.

3.29 It was also proposed at this location that the Ratcliffe Highway would be closed to vehicular traffic, to, alongside the SEMS proposals for a shared use bridge adjacent to the roundabout, create a quiet equestrian / active travel route. Following consultation feedback, and as the shared use bridge is now no longer proposed as part of HIF (but will instead be funded later in time by Section 106 contributions) as a design refinement, this road closure is no longer proposed.

3.30 Figure 11 below shows the proposed relief road alignment and junction modifications at Upchat Roundabout, Chattenden Lane and the A228 Main Road Roundabout in the Business Case baseline scheme – Option 1. The relief road alignment shown was based on early masterplans of the potential development sites and primary road corridors across open land.

Figure 11: Option 1: Proposed Relief Road Alignment and Junctions (Business Case baseline scheme)



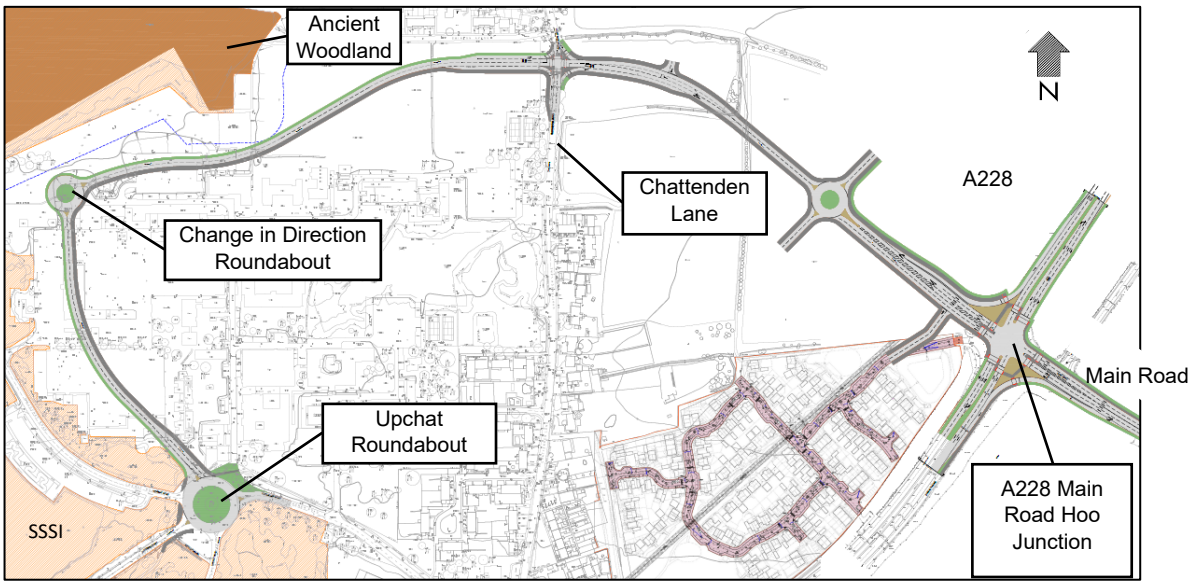
Revised Relief Road Alignment

3.31 Design development through ongoing stakeholder engagement with Homes England (as developer rather than HIF funder) led to a realignment of Section 1 of the relief road (Upchat Roundabout to Chattenden Lane). It was proposed to realign the road to towards the perimeter of the site to maximise development potential. The realignment required a 'change of direction' roundabout and additional road length.

3.32 The west site boundary is part of a Site of Special Scientific Interest (SSSI) and Ancient Woodland. The acceptability of the proximity of the road to these sites is subject to the outcome of the ongoing Environmental Impact Assessment (EIA) and ongoing engagement with Natural England during the assessment phase.

3.33 For the Section 2 of the relief road (Chattenden Lane to the A228) liaison with Gladman (developer) led to refinements to the local junction and connectivity requirements, which have been incorporated into the revised relief road design – Option 2. Figure 12 below shows the changes to both sections of the relief road which make up Option 2.

Figure 12: Option 2 - Revised Relief Road Alignment and Junctions



Phase 2 – Relief Road: Options Appraisal Tables

Criteria 1: Fit with Project Objectives

Option / Objective	SO1	SO2	SO3	SO4	S05	Overall RAG Score
1 Relief Road alignment & junctions	Refer to criteria 4					
2 Revised alignment & junctions					Refer to criteria 3	

Criteria 2: Traffic Performance

Option No	Traffic performance
1 Relief Road alignment & junctions	Provides shortest, most direct and unimpeded traffic route.
2 revised alignment & junctions	Provides a longer traffic/bus route, provides less severance to housing access, introduces roundabout requiring further slowing/braking of vehicles.

Criteria 3: Environmental

Option No	Environmental
1 Relief Road alignment & junctions	Option 1 is further from the SSSI and therefore, is likely to have less potential impact on the SSSI from traffic – i.e. reduced potential noise impacts on species such as nightingale and air quality impacts on habitats. Impacts on the SSSI resulting from proposed housing development have not been considered.
2 revised alignment & junctions	Option 2 is closer to the SSSI and therefore, is likely to have more potential impacts from traffic, although impacts resulting from housing have not been considered. Potential effects will be considered through the EIA process and mitigation (such as buffer planting to the SSSI or noise barriers) proposed where necessary.

Criteria 4: Land

Option No	Land
1 Relief Road alignment & junctions	Requires the smallest amount of land area from the Homes England development site but induces severance across the site and reduces build opportunities.
2 Revised alignment & junctions	Requires more land take, but optimises development build space and preferred by Homes England.

Criteria 5: Affordability

Option No	Affordability
1 Relief Road alignment & junctions	Less expensive.
2 Revised alignment & junctions	More expensive due to increased length of road and additional roundabout.

Criteria 6: NPPF

Option No	NPPF
1 Relief Road alignment & junctions	Pre-application engagement (Paragraph 39) with Homes England (HE) as landowner suggested this option would adversely impact on development potential of site for future housing. The NPPF seeks to significantly boost the supply of homes (Paragraph 60). Assessment through the EIA is required to understand whether there would be an adverse effect on the SSSI and/or loss or deterioration of irreplaceable habitats. Paragraph 104(d)) seeks to avoid/mitigate any adverse effects. Discussions with Natural England (and other statutory consultees) are also underway in line with Paragraph 39-43. In addition, an open space assessment may be required as road (eastern part of alignment) crosses protected Open Space Land as allocated in the Medway Local Plan proposals map (2003): Paragraph 99(a) of the NPPF. The nearby AQMA should be taken into consideration under Paragraph 174(e). Impact on best and most versatile agricultural land (Para 174(b) of the NPPF will need to be assessed.

Option No	NPPF
2 Revised alignment & junctions	The Option 2 road alignment moved closer to the Site of Special Scientific Interest (SSSI) and Ancient Woodland compared to Option 1. Therefore, potentially a more sensitive location. Assessment through the EIA is required to understand whether there would be an adverse effect on the SSSI and/or loss or deterioration of irreplaceable habitats. Paragraph 104(d)) seeks to avoid/mitigate any adverse effects. Discussions with Natural England (and other statutory consultees) are also underway in line with Paragraph 39-43. In addition, an open space assessment may be required as road (eastern part of alignment) crosses protected Open Space Land as allocated in the Medway Local Plan proposals map (2003). The nearby AQMA should be taken into consideration under Paragraph 174(e). Potential impact on best and most versatile agricultural land (Para 174(b) of the NPPF will need to be assessed.

Criteria 7: Buildability

Option No	Buildability
1 Relief Road alignment & junctions	Provides the shortest build duration and reduced earthworks requirement.
2 Revised alignment & junctions	Increased build scope and duration with greater environmental constraints/consideration building adjacent to the SSSI.

Criteria 8: Community/ Stakeholder

Option No	Community/Stakeholder
1 Relief Road alignment & junctions	This option was less favourable with the owner/developer of the site due to impact on potential future development.
2Revised alignment & junctions	This option brings the road closer to the SSSI and Ancient Woodland and therefore concerns will need to be discussed with Natural England and other stakeholders about potential impacts to demonstrate that impacts will be avoided/mitigated.

Summary Appraisal Table

Option No	Fit Against Objectives	Traffic	Enviro	Land	Affordability	NPPF	Buildability	Community/ Stakeholder
Relief Road								
1 Relief Road alignment & junctions								
2 Revised alignment & junctions								

Conclusion

3.34 Option 2 is the preferred option. Although the cost of option 2 is higher, it is not prohibitive and other factors, such as enabling housing growth on the Peninsula, and therefore meeting the project objectives, have been prioritised. The potential impact on the SSSI is an important factor but these impacts will be able to be fully considered and mitigated through the EIA process.

Phase 2: Spur Road

3.35 The planning approval of development at Kingsnorth significantly added to the baseline traffic flows. Updated strategic and local traffic modelling identified an unacceptable level of service at the A228 southbound approach to the Main Road junction and additional capacity was required to achieve an acceptable level of service.

3.36 As discussed above, concepts for a new underpass or a grade separated junction for the A228 primary traffic flows were considered by the highways design team, but were deemed not to be reasonable alternatives.

3.37 As such an alternative modification/concept was taken forward for a spur road from the relief road to a new roundabout on the A228.

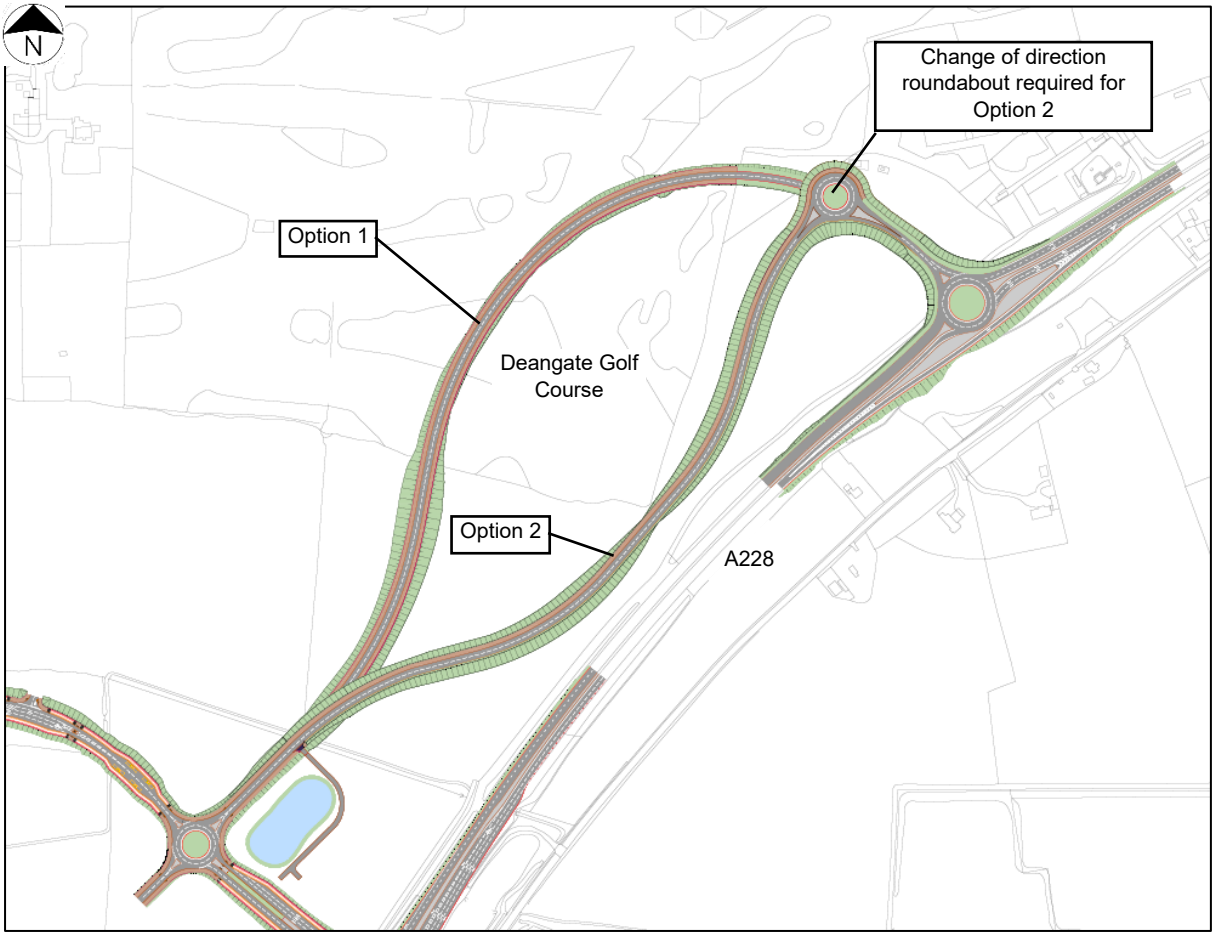
Spur Road – Alignment Selection

3.38 Following extensive engagement with key stakeholders, and taking account of environmental and engineering constraints (such as utilities and land usage), alternative alignments for the proposed Spur Road concept were considered as follows and as shown on Figure 14 & 15:

- Option 1 - free flow route alignment without junction passing partly through the ex Deangate Golf Course land

- Option 2 - route with a change of direction roundabout

Figure 14 & 15: Option 1 - Free flow route alignment without junction and Option 2 – Route with change of direction roundabout



Phase 2 – Spur Road: Options Appraisal Tables

Criteria 1: Fit with Project Objectives

Option / Objective	SO1	SO2	SO3	SO4	S05	Overall RAG Score
1 (freeflow alignment without junctions)					Refer to criteria 3	
2 (route with development access)						

Criteria 2: Traffic Performance

Option No	Traffic performance
1 (free flow alignment without junctions	Acceptable in traffic performance terms
2 (route with development access	Acceptable in traffic performance terms

Criteria 3: Environmental

Option No	Environmental
1 (free flow alignment without junctions	Considered to have greater ecological impacts than Option 2 due to direct impacts on potential habitats within the former golf course. However, there are no other significant differences between the two options at this stage.
2 (route with development access	No significant environmental issues

Criteria 4: Land

Option No	Land
1 (free flow alignment without junctions	Less efficient in terms of using potential third party developable space.
2 (route with development access	Minimises the impact on potential third party developable space.

Criteria 5: Affordability

Option No	Affordability
1 (free flow alignment without junctions	Less expensive as requires no intermediate junction/roundabout to facilitate the free flow alignment design standards.
2 (route with development access	Slightly more expensive due to additional change of direction roundabout required near the Deangate Golf Course.

Criteria 6: NPPF

Option No	NPPF
1 (free flow alignment without junctions	Assessment through the EIA is required to understand the impacts (Paragraph 104(d)) seeking to avoid/mitigate any adverse effects. In addition, an open space assessment may be required as Option 1 goes through the former Deangate Ridge Golf Course, covered by a designation of Area of Local Landscape Importance and Open Space Land on the Medway Local Plan proposals map (2003). Potential impact on best and most versatile agricultural land (Para 174(b) of the NPPF) will also need to be assessed.
2 (route with development access	The alignment of the Spur Road avoids going through the former Deangate Ridge Golf Course Open Space designation. Less potential policy conflicts than Option 1, although further assessment through the EIA is required. Potential impact on best and most versatile agricultural land (Para 174(b) of the NPPF) will also need to be assessed.

Criteria 7: Buildability

Option No	Buildability
1 (free flow alignment without junctions	The scope of the off-line highway works are generally similar for both options. Phasing and sequence can be optimised to tie-in with other works and make efficient use of material arisings.
2 (route with development access	The scope of the off-line highway works are generally similar for both options. Phasing and sequence can be optimised to tie-in with other works and make efficient use of material arisings.

Criteria 8: Community/ Stakeholder

Option No	Community/Stakeholder
1 (free flow alignment without junctions	This option is less favourable with the owner/developer of the adjacent sites due to impact on potential future development.
2 (route with development access	This option makes better use of developable land, places the road close to the existing A228 and avoids the Deangate Golf Course. It was also more popular with consultees at public consultation.

Summary Appraisal Table

Option No	Fit Against Objectives	Traffic	Enviro	Land	Affordability	NPPF	Buildability	Community/ Stakeholder
1 (free flow alignment without junctions								
2 (route with development access								

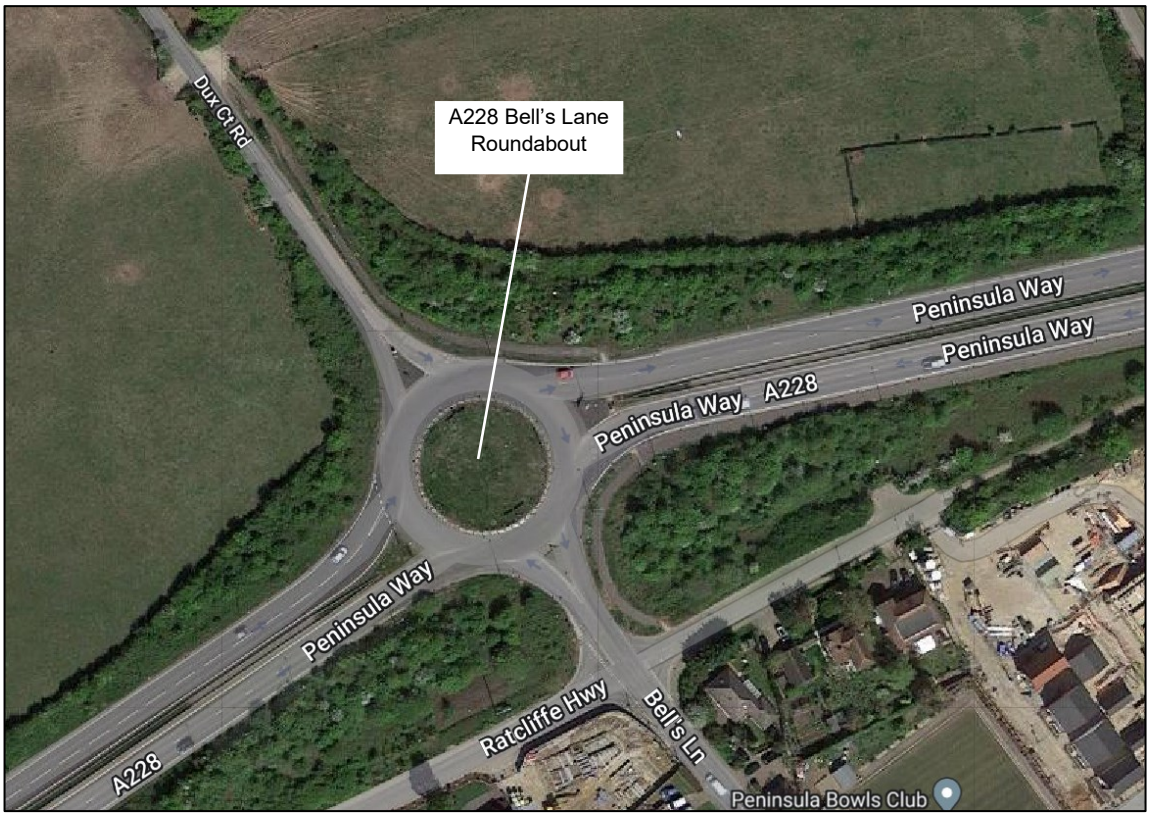
Conclusion

3.39 Option 2 was selected as the preferred option. This option facilitates active travel provision, has reduced impact on the environment, avoids the former Deangate Golf Course, minimises the impact on the potential developable space and provides improved connectivity options for future developments.

PHASE 3 – A228 BELL'S LANE ROUNDABOUT

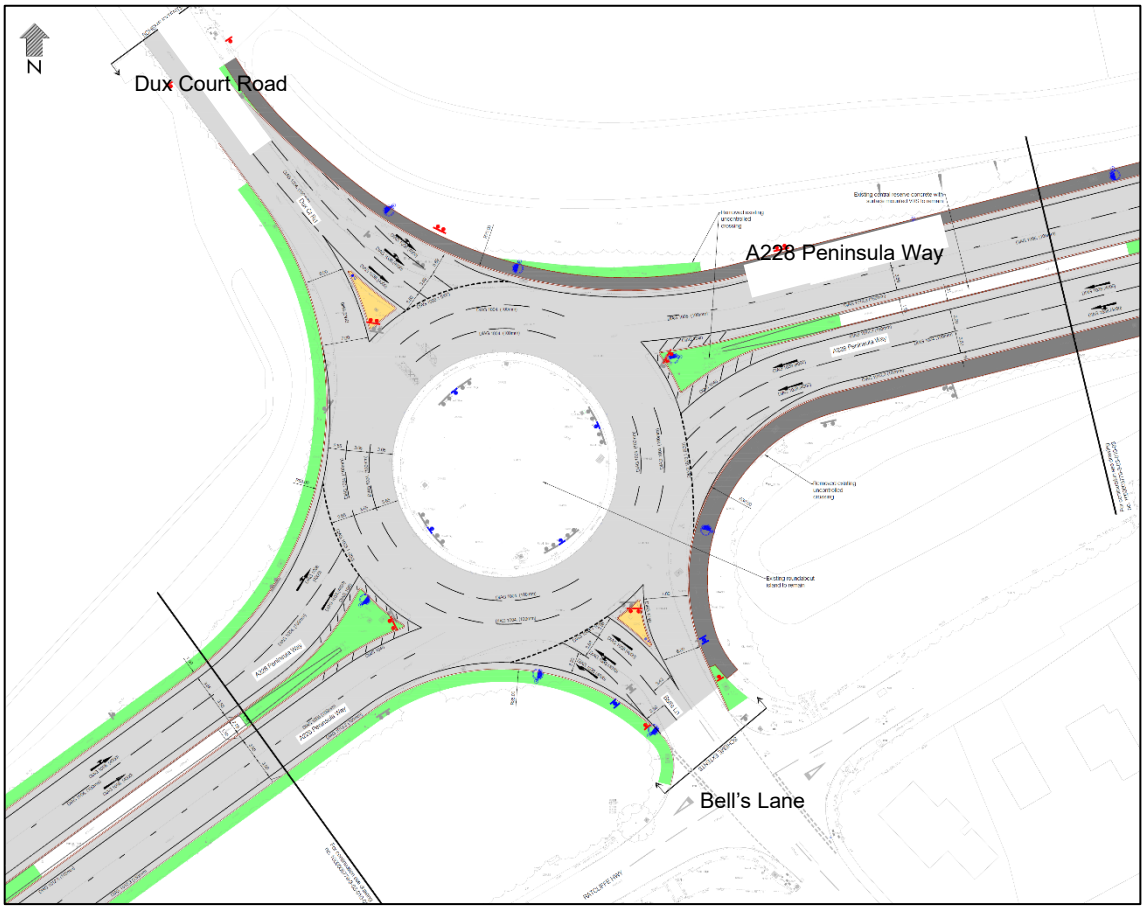
3.40 The Business Case baseline scheme comprised local capacity improvements to the existing at-grade four arm roundabout at the intersection of the A228, Bell's Lane and Dux Court Road. These improvements were identified to provide network capacity for the modelled traffic flows in 2037.

3.41 The A228 Bell's Lane Roundabout forms Phase 3 of the HIF project. The existing layout, shown below, comprises an at-grade 4-arm roundabout, with no traffic signal control or active travel provision. The current traffic experiences a low level of service at peak times and is heavily congested on all arms. Side road access from Bell's Lane and Dux Court Road have limited opportunity to access the roundabout in peak times. Capacity improvements are required to accommodate the modelled future traffic flows.



3.42 In the Business Case baseline scheme, local capacity improvements were identified at Bell's Lane Roundabout and included additional widths at the roundabout approaches as shown in Figure 16 below. These could be accommodated within the existing Highway boundary.

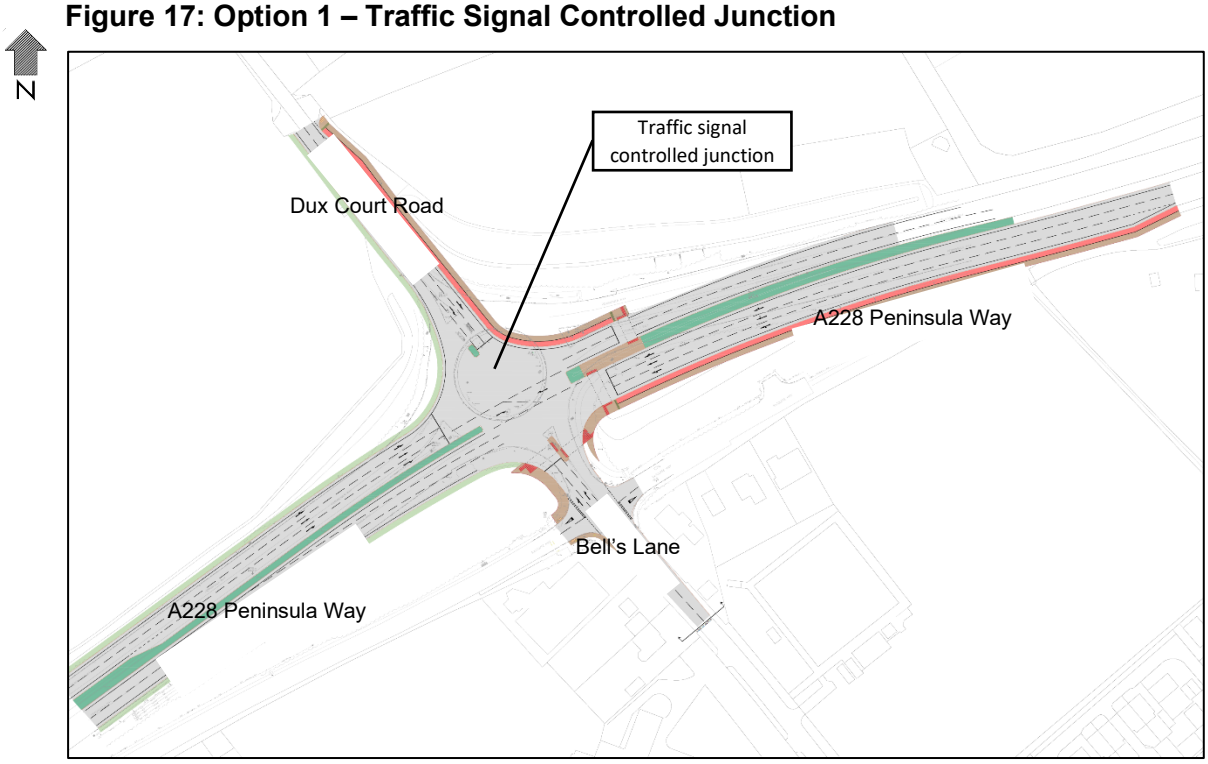
Figure 16: Local Capacity Improvements (Business Case baseline scheme)



3.43 The strategic model and mode share assumptions were reviewed as part of development of the emerging Local Plan and project modelling and the revised trip distribution patterns created service problems on the A228 easterly arm and Dux Court Road, incurring long delays and queueing. The roundabout layout was found to be unsuitable for the increased traffic flows and therefore a new layout needed to be developed (i.e. the Business Case baseline scheme would now need to be discounted).

3.44 An assessment was undertaken for the potential to convert this roundabout to a traffic signalised junction to enable greater control, balance flows from all arms and achieve more throughput, as well as to improve active travel facilities. The suggested layout is shown in Figure 17 below and forms Option 1.

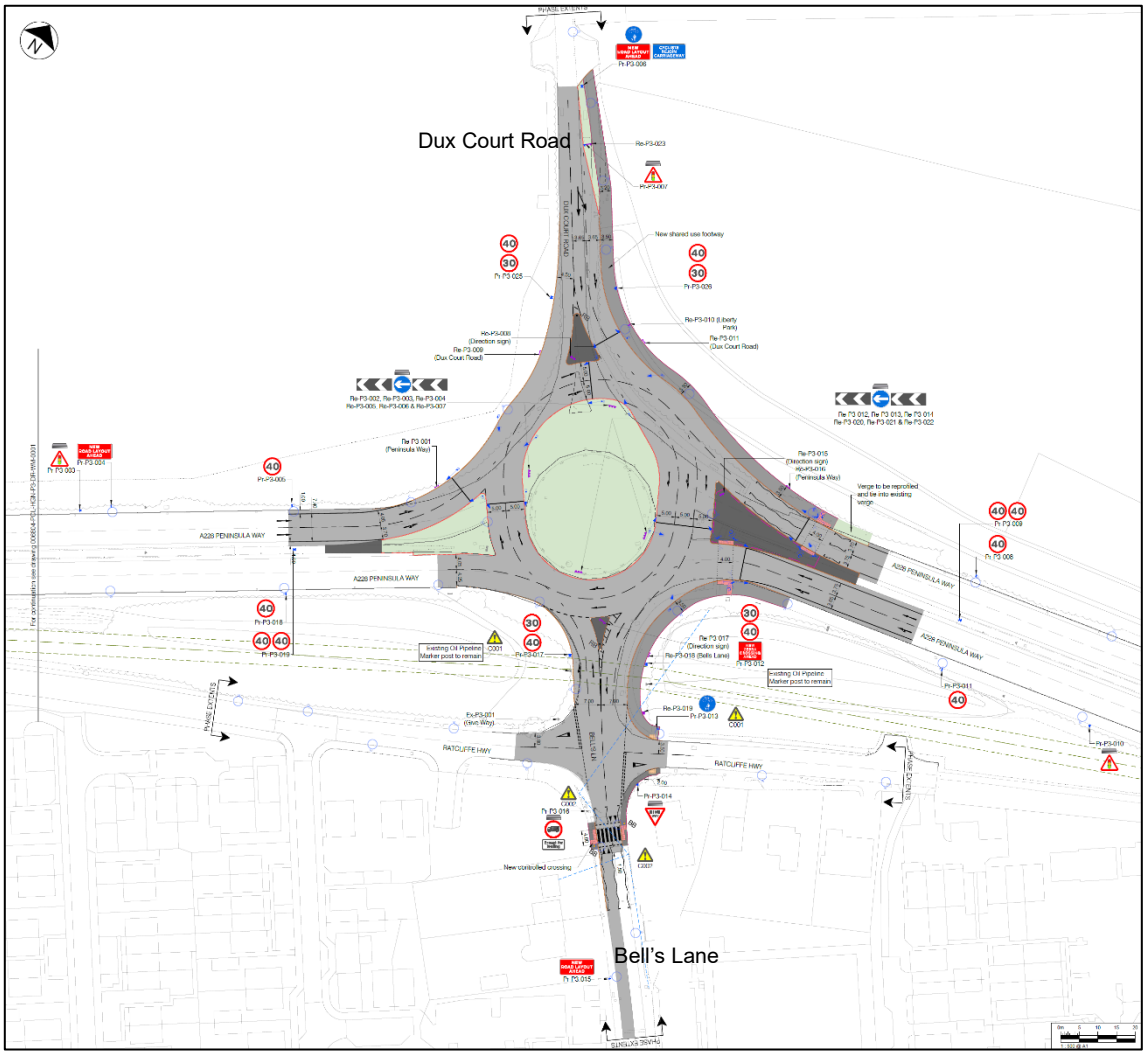
Figure 17: Option 1 – Traffic Signal Controlled Junction



3.45 Testing using micro-simulation modelling software indicated that the traffic signal installation would require 3 lanes on the east approach to meet capacity demands. The layout also requires provision of suitable gaps in traffic to allow right turners across the dual carriageway. This was deemed an unacceptable level of risk and so dedicated traffic lanes were required.

3.46 However, it was noted that this would require the diversion of strategic fuel pipeline, and combined with poor traffic modelling results, led to the development of an alternative option. Option 2 was therefore developed comprising an enlarged signal-controlled roundabout as shown in Figure 18 below. This proposal involved widening the roundabout to the north, avoiding key utilities and providing internal stop lines that would assist to control and protect right turn movements. This option was modelled and was found to deliver an acceptable level of service to accommodate all traffic movements.

Figure 18: Option 2 – Enlarged Roundabout with Traffic Signal Control



Phase 3: Options Appraisal Tables

Criteria 1: Fit with Project Objectives

Option / Objective	SO1	SO2	SO3	SO4	S05	Overall RAG Score
1 Signalised Junction				Refer to criteria 2	Refer to criteria 3	
2 Signalised roundabout						

Criteria 2: Traffic Performance

Option No	Traffic performance
1 (Traffic signals)	Traffic modelling post-Business Case found that the traffic signal installation required 3 lanes from the east to meet capacity demands along with a right turn flare on the junction approach. There would also need to be gap acceptance for right turners across the busy dual carriageway. Modelling with separately signalled right turns was shown to create unacceptable queuing and delays.
2 (Roundabout & Signals)	The enlarged roundabout and traffic signals provide the required traffic flow management and capacity, provides additional space to allow more efficient build and remains within the existing highway boundary.

Criteria 3: Environmental

Option No	Environmental
1 (Traffic Signals)	The least favoured environmental option (although with an expectation of few significant impacts), due mainly to the necessity of diverting a fuel pipeline as that would lead to additional temporary working areas and vegetation removal.
2 (Roundabout and Signals)	A better environmental option, due mainly to less impact from temporary works and vegetation removal.

Criteria 4: Land

Option No	Land
1 (Traffic signals)	Proposed layout lies within the highway boundary. Impact on utilities along the A289 requires increased widening and easement.
2 (Roundabout & traffic signals	Proposed layout lies within the highway boundary. Junction modification provide greater space and flexibility for simplifying the construction build.

Criteria 5: Affordability

Option No	Affordability
1 (traffic signals)	Widening of the A289 approaches, introduction of traffic signals, extensive utility diversions introduce additional costs.
2 (Roundabout and traffic signals)	Layout simplifies build construction, has reduced widening on the A289 and optimises existing road construction and is therefore less expensive.

Criteria 6: NPPF

Option No	NPPF
1 (traffic signals)	Traffic modelling suggests that unacceptable queuing and delays. Therefore, potential conflict with paragraph 111 of the NPPF.
2 (roundabout and traffic signals)	Traffic modelling shows that the proposed signalised roundabout scheme would operate at an acceptable level. Therefore, considered to be compliant with paragraph 111 of the NPPF.

Criteria 7: Buildability

Option No	Buildability
1 (Traffic signals)	Widening of the A228 approaches, introduction of traffic signals and extensive utility diversions introduce programme elongation and further constrains build flexibility.
2 (Roundabout and traffic signals)	Layout simplifies build with greater flexibility in sequencing, has reduced widening on the A228 and optimises existing road construction.

Criteria 8: Community/ Stakeholder

Option No	Community/Stakeholder
1 (Traffic signals)	Concern was raised regarding the introduction of traffic signals and stop/start impact on traffic.
2 (Roundabout and traffic signals)	This option optimises the signal phasing to reduce stop/start impact and provides greater opportunity for increased active travel crossings, responding to public support for active travel provision as part of the wider scheme.

Summary Appraisal Table

Option No	Fit Against Objectives	Traffic	Enviro	Land	Affordability	NPPF	Buildability	Community/ Stakeholder
1 (Traffic signals)								
2 (Roundabout and traffic signals)								

Conclusion

3.47 Option 2 with the enlarged roundabout and traffic signals provides the required traffic flow management and capacity, provides additional space to allow more efficient build and remains within the existing highway boundary.

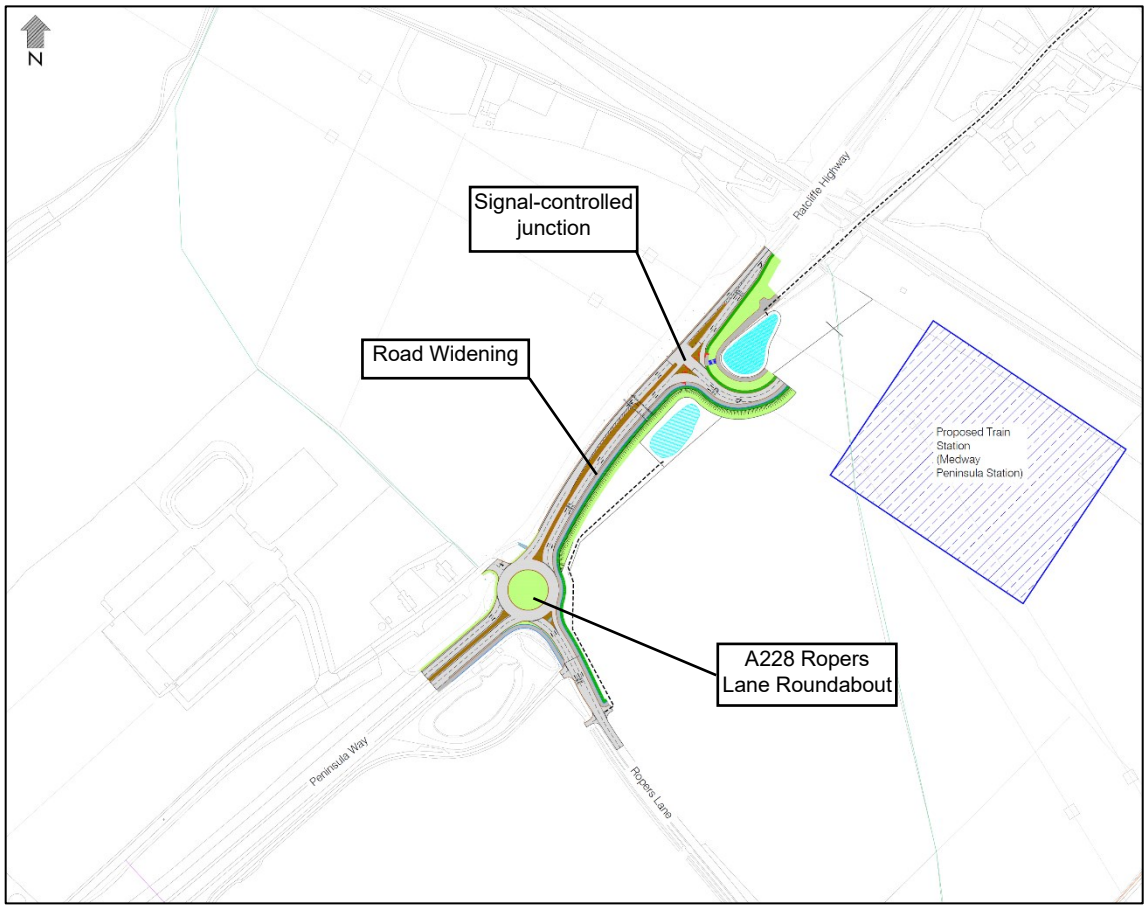
PHASE 4 – ROPER'S LANE ROUNDABOUT & RAIL STATION ACCESS ROAD

3.48 The Business Case baseline scheme comprised local capacity improvements to the existing A228 Ropers Lane Roundabout, a new signal-controlled junction on the A228 Ratcliffe Highway and new access road to a proposed new railway station from the A228. These improvements were identified to provide network capacity for the modelled traffic flows in 2037 and direct access to the proposed railway station.

3.49 The A228 Ropers Lane Roundabout site forms Phase 4 of the HIF project. The existing layout, shown below, comprises an at-grade 4-arm roundabout, with no traffic signal control or active travel provision. The current traffic experiences a good level of service but side road access from a cul-du-sac has limited opportunity to access the roundabout in peak times.

3.50 Figure 19 below shows Business Case baseline local capacity improvements at Ropers Lane Roundabout and include widening on two approaches to the roundabout. The proposed rail station access road off the 2 lane Ratcliffe Highway, northeast of the roundabout, would have required road widening, a signal-controlled junction and extensive earthworks and drainage.

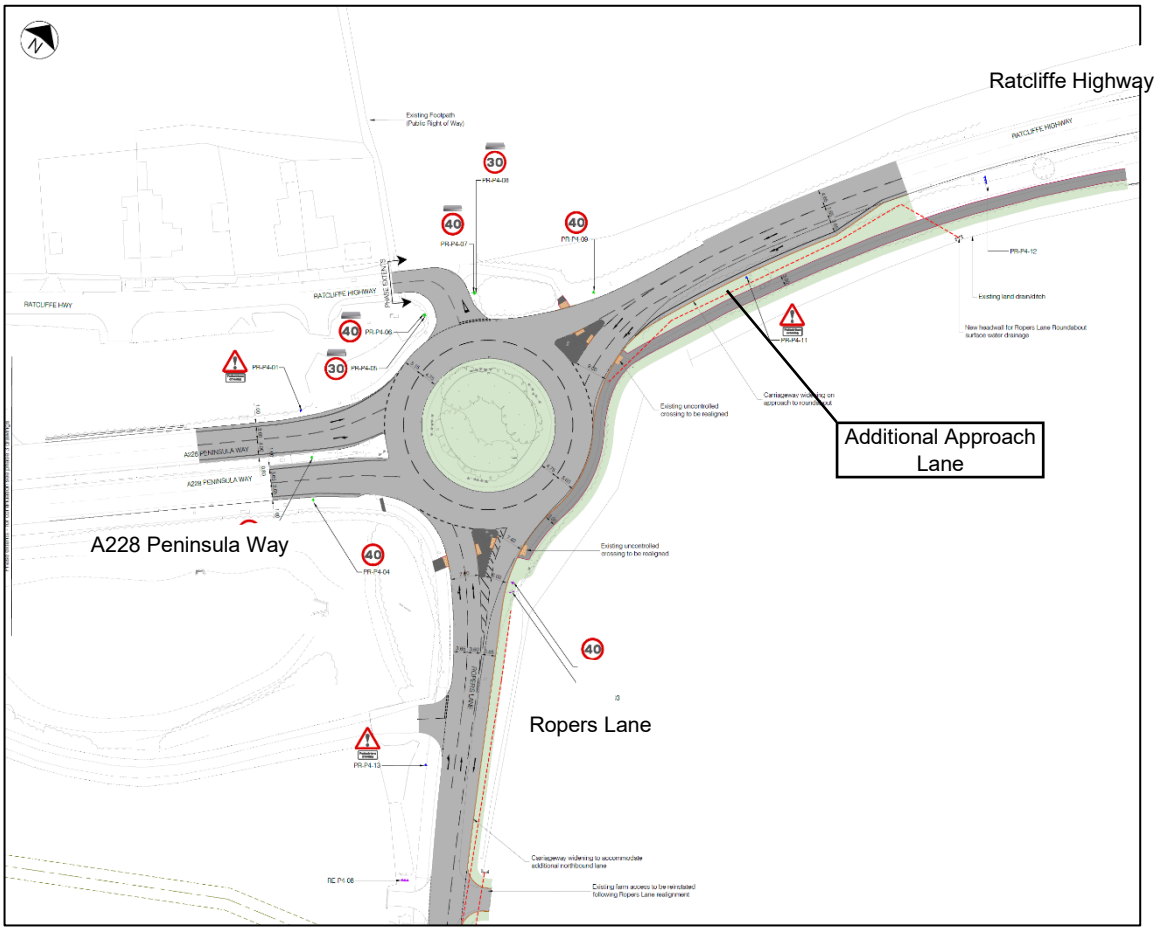
Figure 19: Local Capacity Improvements to Ropers Lane Roundabout, Proposed Junction and Rail Station Access Road (Business Case baseline scheme)



ROPERS LANE ROUNDABOUT

3.51 As part of the proposed rail station design development, it was determined that the concept location of the station was not favoured due to the conflict with significant utilities. An alternative location approximately 700m to the southeast was identified and would require a new entry point and extended length of access road. The relocation of the proposed rail station meant that reduced capacity improvement works to the Ropers Lane Roundabout are necessary, as such the design being taken forward is shown in Figure 20 below.

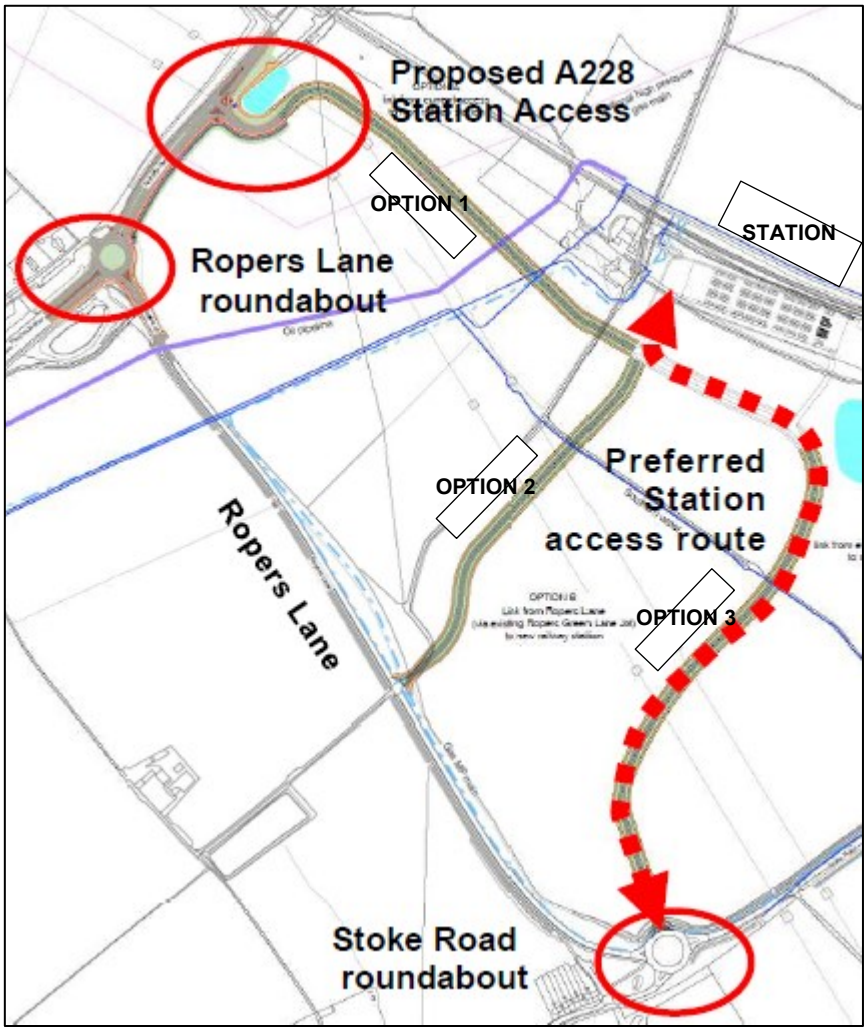
Figure 20: Ropers Lane Roundabout – Revised Improvements



New Rail Station Access Road – ROUTE OPTIONS

3.52 Having established a new location for the rail station various options were considered for the new access road route and entry points (as shown in Figure 21 below) to account for this new location.

Figure 21: New Rail Station Location and Access Road Options



- Option 1 - access via Ratcliffe Highway (613m road length)
- Option 2 - access via Ropers Lane / Ropers Green Lane Junction (524m road length)
- Option 3 - access via Stoke Road Roundabout (716m road length)

3.53 Discussions with Church Commissioners on their future development site and the requirements for the proposed rail station defined considerations on the route selection. Each of the route options also encountered its own constraints as follows:

- Option 1 – requires crossing a Saxon Road, cross over high-pressure gas main, culverting of watercourses and provision of a new traffic junction with Ropers Green Lane.

- Option 2 – requires a new signal controlled junction on Ropers Lane, fragmented the development space, diversion of utilities, culverting of watercourses and needs to accommodate overhead pylon easements.
- Option 3 – requires a new junction connection to Stoke Road Roundabout, diversion of utilities, culverting of watercourses and needs to accommodate overhead pylon easements.

Phase 4 – Rail Access Road: Options Appraisal Tables

Criteria 1: Fit with Project Objectives

Option / Objective	SO1	SO2	SO3	SO4	S05	Overall RAG Score
1 (via Ratcliffe highway)					Refer to criteria 3	
2 (via Ropers Lane/Ropers Green Junction)				Restricted accessibility due to poor level of service on Ropers Lane	Refer to criteria 3.	
3 (via Stoke Road Roundabout)					Refer to criteria 3.	

Criteria 2: Traffic Performance

Option No	Traffic performance
1 (via Ratcliffe highway)	Provides dedicated route off the Ratcliffe Highway, would share the predicted station/development traffic with Ropers Lane. Bus access is quite onerous and increased journey times due to required new junction at Ropers Green Lane.
2 (via Ropers Lane/Ropers Green Junction)	Requires all station/development traffic to use signalised junction on Ropers Lane. Capacity issues and poor level of service on Ropers Lane due to signal phasing and active travel crossing requirements.
3 (via Stoke Road Roundabout)	Connects directly to the Stoke Road Junction, ties into active travel routes recently provided on Stoke Road

Criteria 3: Environmental

Option No	Environmental
1 (via Ratcliffe highway)	Greatest potential for negative impacts of the three, due to impacts on potential ecological receptors, nearby residential receptors for air and noise impacts, passing through the floodplain, and severing a footpath and part of the National Cycle Network.
2 (via Ropers Lane/Ropers Green Junction)	Shortest option and therefore has the lowest potential for impacts on unknown archaeological receptors. However, Ropers Green Lane is an important corridor for bats - some potential direct impact from vegetation loss, and potential noise and light impacts from the highway.
3 (via Stoke Road Roundabout)	'Middle' scored route option environmentally, with potential for impacts on reptiles, water vole, buried archaeology, and ALC Grade 1 agricultural land (greatest landtake of the three options). However, unlike Option 2, it will not affect the key bat corridor to the west.

Criteria 4: Land

Option No	Land
1 (via Ratcliffe highway)	Increased area of land required for the longer route and impacts Roper's Green Lane access. However, provides more of a perimeter route.to optimise development space.
2 (via Ropers Lane/Ropers Green Junction)	Acceptable route for landowner as minimises impact on development potential and is adjacent to headline. Potential impact on the adjacent Saxon Road and imposed archaeological requirements both temporary and permanent.
3 (via Stoke Road Roundabout)	Preferred route of landowner as minimises impact on development potential.

Criteria 5: Affordability

Option No	Affordability
1 (via Ratcliffe highway)	Medium road length to the new station location, various utility crossings and new junction requirement, make use of original proposed junction on Ratcliffe Highway.
2 (via Ropers Lane/Ropers Green Junction)	Shortest road length, but new traffic signal controlled junction on Ropers Lane and utility diversions.
3 (via Stoke Road Roundabout)	Longest road length, new connection to Stoke Roundabout, significant additional drainage attenuation requirements.

Criteria 6: NPPF

Option No	NPPF
1 (via Ratcliffe highway)	Potential for option to be within Flood Zones 2 and 3. Paragraph 159 of the NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere. Paragraph 167 states that where appropriate, applications should be supported by a site-specific flood-risk assessment to justify proposed mitigation. Utilities have been identified in this area and are likely to be considered as Essential Infrastructure as stated in Annex 3 of the NPPF: Flood risk vulnerability classification.
2 (via Ropers Lane/Ropers Green Junction)	The proposed access via Roper's Lane/Roper's Green Lane minimises impact on developable land - the NPPF seeks to significantly boost the supply of homes (Paragraph 60). Requires all station/development traffic to use signalised junction on Ropers Lane. Modelling demonstrates capacity issues and poor level of service on Ropers Lane due to signal phasing and active travel crossing requirements. Therefore, potential conflict with Paragraph 111 of the NPPF.
3 (via Stoke Road Roundabout)	The proposed access via Stoke Roundabout minimises impact on the developable area of the site. The NPPF seeks to significantly boost the supply of homes (Paragraph 60). The option ties into the active travel routes provided on Stoke Road therefore supported by Paragraph 110 (a) appropriate opportunities to promote sustainable transport modes and (b) safe and suitable access to the site can be achieved for all users.

Criteria 7: Buildability

Option No	Buildability
1 (via Ratcliffe highway)	Requires construction of the new access off the Ratcliffe Highway to accommodate level differences and therefore necessitating large scale earthworks.
2 (via Ropers Lane/Ropers Green Junction)	Location of the Saxon road will introduce significant constraints on the build. New signalised junction on Roper Lane will require extensive online utility diversions inducing traffic delays due to sign lane working on this busy road.
3 (via Stoke Road Roundabout)	Offers a relatively flexible construction phasing and limits impact to the busy road network. Earthworks profile can be better optimised to reduce off-site disposal.

Criteria 8: Community/ Stakeholder

Option No	Community/Stakeholder
1 (via Ratcliffe highway)	This route provided a viable option but was not favoured by the landowners.
2 (via Ropers Lane/Ropers Green Junction)	This route was not favoured by the landowners.
3 (via Stoke Road Roundabout)	This route was favoured by the landowners.

Summary Appraisal Table

Option No	Fit Against Objectives	Traffic	Enviro	Land	Affordability	NPPF	Buildability	Community/ Stakeholder
1 via Ratcliffe highway								
2 via Ropers Lane/ Ropers Green Junction								
3 via Stoke Road Roundabout								

Conclusion

3.54 Option 3 was selected as the preferred option. This option connects directly to the Stoke Road Junction, ties into active travel routes recently provided on Stoke Road, has good buildability options and minimises the impact on the potential developable space.

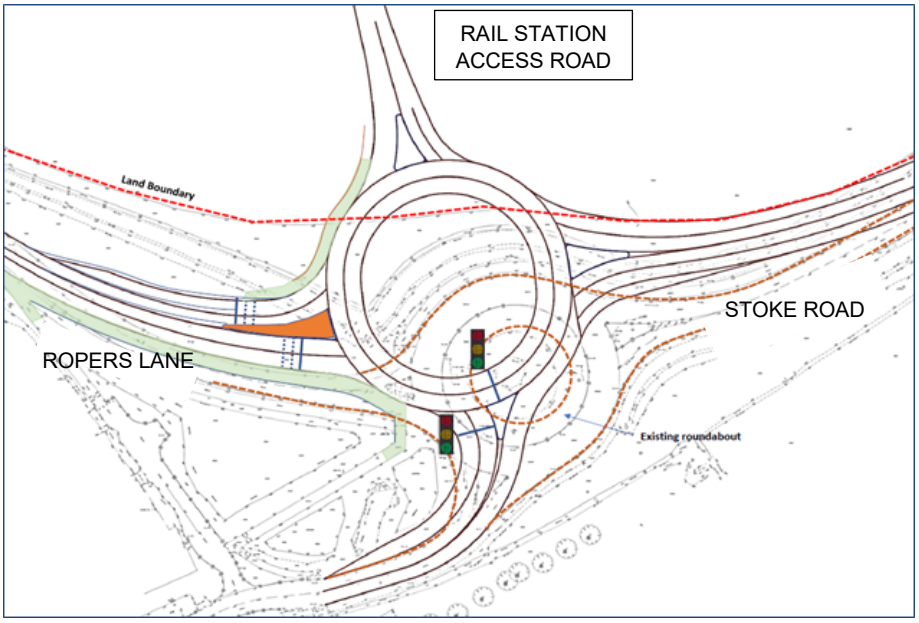
RAIL STATION ACCESS ROAD JUNCTION (at Stoke Road Roundabout)

3.55 Planning approval of development works at Kingsnorth significantly added to the existing traffic flows and these were included in the updated baseline model for the HIF scheme. In addition, trip generation levels in the model were increased to reflect a reasonable worst-case scenario (defined by National Highways). Predicted flows at the existing Stoke Road Roundabout increase from circa 2,000 to circa 4,000 vehicles per hour.

3.56 Capacity checks on the existing Stoke Road roundabout incorporating the approved Kingsnorth development and new rail station access road identified inadequate traffic capacity for the projected 2037 flows. Capacity improvements would now be required, and the following options were assessed:

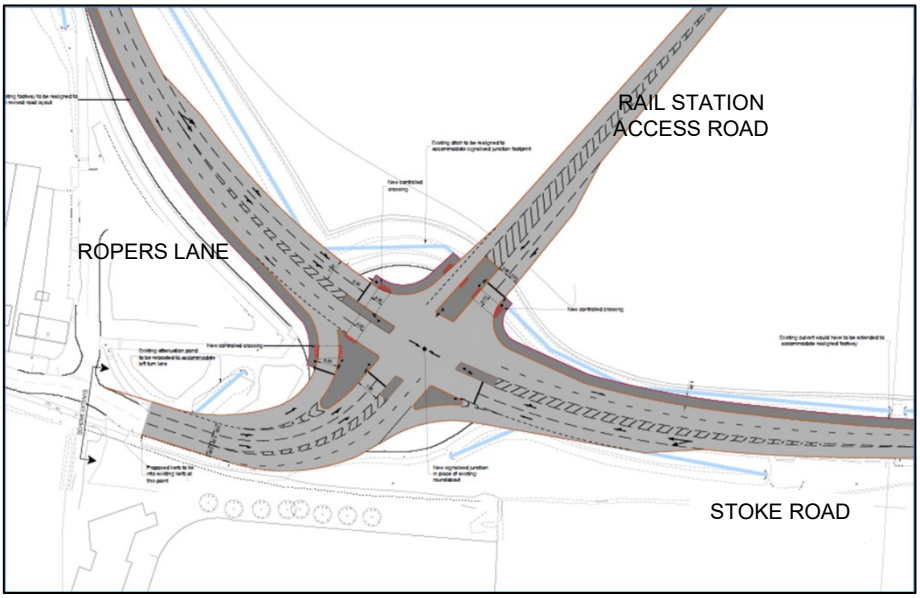
- Option 1 - Expanded Roundabout with Partial Signal Control
- Option 2 - Traffic Signal Controlled Junction
- Option 3 - New Access off Ropers Lane (Signal Controlled)

Figure 22: Option 1 - Expanded Roundabout with Partial Signal Control



3.57 The layout required part-signalising the roundabout to create gaps for traffic to emerge with signals applied to the Stoke Road West arm only. To achieve design standards the expanded roundabout would require land take, utility diversions and realignment of existing drainage paths. The traffic capacity requirements provide limited opportunity to incorporate full active travel enhancements.

Figure 23: Option 2 - Traffic Signal Controlled Junction



3.58 The existing roundabout would be replaced with a traffic signal junction and could be delivered with little additional land take for road space. Signalised crossings could be incorporated for enhanced safe cycling and walking movements promoting active travel. This is a particularly important consideration for the rail station access, to promote sustainable transport.

Figure 24: Option 3 - New Access off Ropers Lane (Signal Controlled)

3.59 An alternative junction location was investigated to see if rail station access could be taken off Ropers Lane with a view to retaining the layout of the existing Stoke Road Roundabout. Results showed that a junction would struggle to cope and that the existing roundabout would still not provide an acceptable level of service. Liaison with developers identified a potential cross-roads requirement at the alternative location and coupled with the rail access, the junction would not cope with predicted traffic flows.

Phase 4 – Rail Station Access Road Junction: Options Appraisal Tables

Criteria 1: Fit with Project Objectives

Option / Objective	SO1	SO2	SO3	SO4	S05	Overall RAG Score
1 (expanded roundabout with partial signal control)					Refer to criteria 3.	
2 (Traffic signal controlled junction)					Refer to criteria 3.	
3 (New access off Ropers Lane (signal controlled)				Refer to criteria 2		

Criteria 2: Traffic Performance

Option No	Traffic performance
1 (expanded roundabout with partial signal control)	The traffic capacity requirements provided limited opportunity to incorporate full active travel enhancements.
2 (Traffic signal controlled junction)	A traffic signal-controlled junction provides for enhanced facilities for active travel, better management of the dominant east/west traffic movement whilst accommodating side road traffic flows
3 (New access off Ropers Lane (signal controlled)	Updated modelling indicated that junction would struggle to cope and that the existing roundabout would still not provide an acceptable level of service.

Criteria 3: Environmental

Option No	Environmental
1 (expanded roundabout with partial signal control)	Highest potential for environmental impacts (landscape, ecology and heritage) due to additional land take required for enlarged roundabout junction.
2 (Traffic signal controlled junction)	Requires more land than Option 3 but less than Option 1. Option 2 is the 'middle' option in terms of likely environmental effects, requiring significant carriageway widening and works near existing residential housing.
3 (New access off Ropers Lane (signal controlled)	The junction option with the least impact as it has the least footprint and is the furthest away from existing residential properties. Option 3 is therefore the environmentally favoured option.

Criteria 4: Land

Option No	Land
1 (expanded roundabout with partial signal control)	To achieve design standards the expanded roundabout would require significant land take, utility diversions and realignment of existing drainage paths.
2 Traffic signal controlled junction)	Land take requirements are minimised. Utility works manged within the existing highway boundary.
3 (New access off Ropers Lane (signal controlled))	This option is the furthest from residential receptors. However, it still has land take on both sides of Ropers Lane with extensive utility diversion into adjacent land.

Criteria 5: Affordability

Option No	Affordability
1 (expanded roundabout with partial signal control)	Layout provides greater flexibility in build programme and associated cost saving compared to other options.
2 Traffic signal controlled junction)	Layout is fairly constrained, requiring a phased approach which will lengthen programme and therefore, cost.
3 (New access off Ropers Lane (signal controlled))	This option offers the lowest cost build.

Criteria 6: NPPF

Option No	NPPF
1 (expanded roundabout with partial signal control)	No significant policy issues.
2 Traffic signal controlled junction)	The option incorporates signalised crossings for enhanced safety for pedestrians and cyclists. This is aligned with paragraph 112 which minimise the scope for conflicts between pedestrians, cyclists and vehicles. The application will need to be assessed within a Transport Assessment in line with Paragraph 113. No other significant policy issues.
3 (New access off Ropers Lane (signal controlled))	Modelling indicates that this option does not provide an acceptable level of service as the proposed junction would have difficulty accommodating anticipated traffic flows. Potential conflict with paragraph 111 of the NPPF where development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

Criteria 7: Buildability

Option No	Buildability
1 (expanded roundabout with partial signal control)	Modified layout and increased size better accommodate utility diversion works and traffic phasing. Provide greater opportunity form maintaining traffic flows.
2 (Traffic signal controlled junction)	Limited working space will prolong the programme of works as the ability to undertake works concurrently is significantly reduced.
3 (New access off Ropers Lane (signal controlled)	Restricted space for creation of new junction and undertaking utility works, this creates a protracted programme and increased delays to the road network.

Criteria 8: Community/ Stakeholder

Option No	Community/Stakeholder
1 (expanded roundabout with partial signal control)	Concern was raised by the adjacent landowner regarding extent of land take to accommodate this junction form and the loss of developable space.
2 (Traffic signal controlled junction)	The proposed conversion of Stoke Road Roundabout to a signalised junction was introduced at the later stages of design development, this was due to planning approval of an adjacent site at Kingsnorth and a subsequent significant increase in baseline traffic flows. As a result, this element of the scheme was not included in the Consultation Round 2 and is now the subject of supplementary engagement with the community and stakeholders.
3 (New access off Ropers Lane (signal controlled)	This option was not favoured by the adjacent landowner.

Summary Options Appraisal Table

Option No	Fit Against Objectives	Traffic	Enviro	Land	Affordability	NPPF	Buildability	Community/ Stakeholder
1 (expanded roundabout with partial signal control)								
2 (Traffic signal controlled junction)								
3 (New access off Ropers Lane (signal controlled)								

Conclusion

3.60 Option 2 was selected as the preferred option. This Option provides enhanced facilities for active travel, better management of the dominant east/west traffic

movement whilst accommodating side road traffic flows and ensures optimal traffic flow management by signal control, whilst minimising land requirements. A new drainage attenuation pond provides increased areas for ecology and biodiversity over and above the existing vegetated central island and adjacent arable land.

PHASE 5 – A289 FOUR ELMS ROUNDABOUT

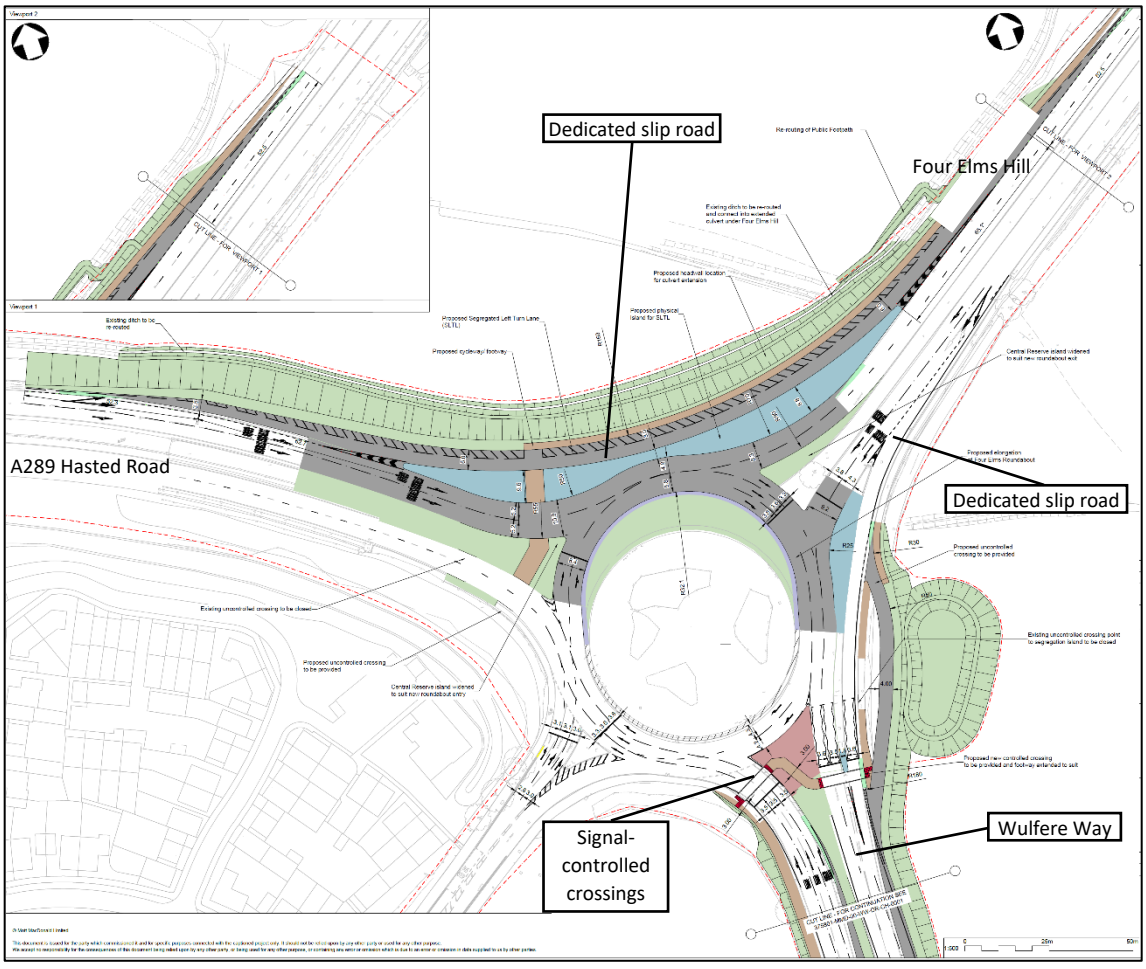
3.61 The Business Case baseline scheme comprised significant capacity improvements to the existing Four Elms Roundabout. These improvements were identified to provide network capacity for the predicted HIF Hoo traffic flows in 2037 and builds on a previous Local Growth Fund (LGF) scheme which had already identified the requirement for significant capacity changes to this roundabout.

3.62 The A289 Four Elms Roundabout forms Phase 5 of the HIF project. The existing layout, shown below, comprises an at-grade 4-arm roundabout, with no traffic signal control or active travel provision. The current traffic experiences a low level of service at peak times and is heavily congested on all arms. Side road access from B2108 Hoo Road have limited opportunity to access the roundabout in peak times. Capacity improvements are required to accommodate the predicted future2037 flows.

3.63 Through engagement, consultees suggested high level concepts of underpasses, grade separated junctions, off-line roundabouts and overbridges for safer active travel. These suggestions were reviewed and dismissed as reasonable alternatives due to their likely environmental and visual impacts, failings in traffic performance andcompliance with design standards, and the need for land take and utility works, which meant the project objectives would not be able to be met in simple terms.

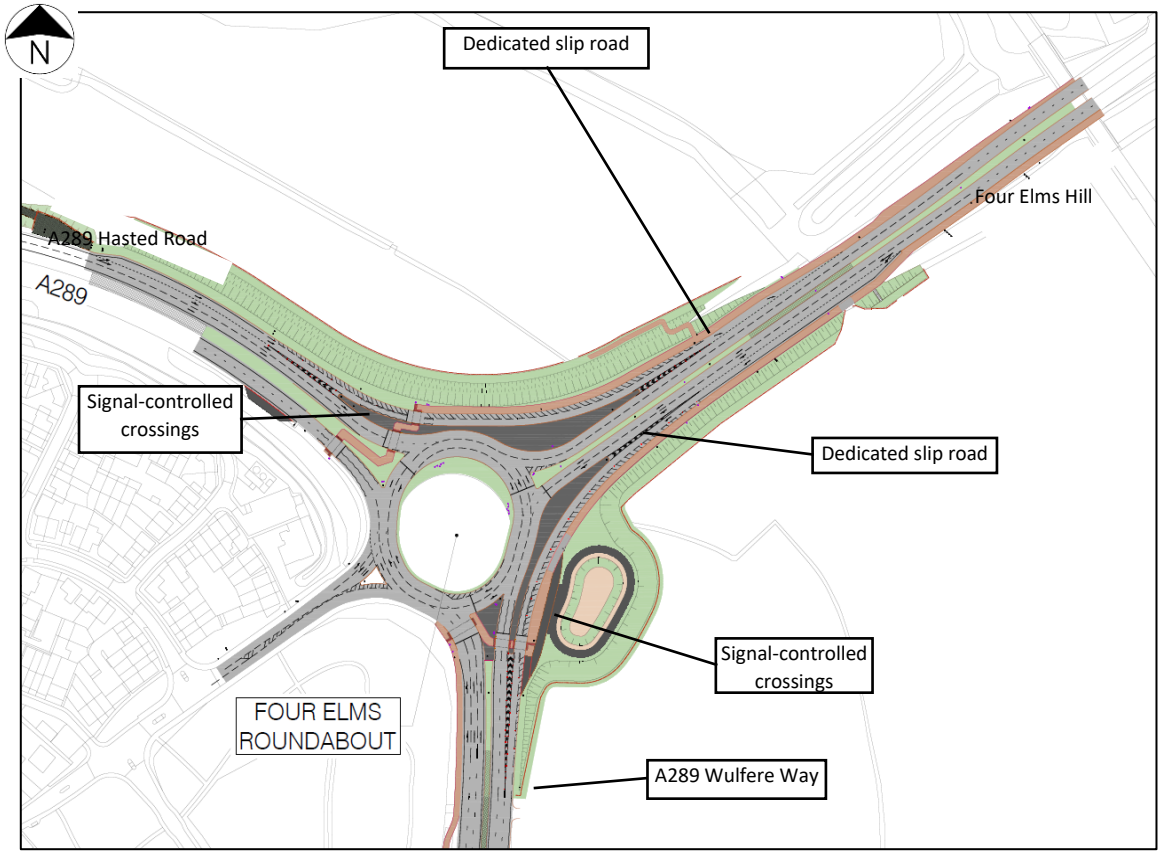
3.64 Figure 25 below shows the capacity improvements at the Four Elms Roundabout, which include a dedicated slip road from the A289 Hasted Road to the A228 Four Elms Hill northbound, a dedicated slip road from the southbound A289 Four Elms Hill on to the A289 Wulfere Way, the introduction of traffic signal controls on the roundabout, widening on approaches to the roundabout and the introduction of signal-controlled crossings to encourage active travel.

Figure 25: Capacity Improvements (Business Case)



3.65 As part of design development minor local adjustments to the layout were determined to optimise capacity through the junction and improve active travel opportunities. Figure 26 below shows the developed layout of Four Elms Roundabout Improvements.

Figure 26: Developed Four Elms Roundabout Improvements



Options Appraisal

3.66 As set out above, the design for Phase 5 has developed to optimise the Business Case proposals. However, reasonable alternatives have not been considered (as they have not needed to be developed) and therefore, there are no option appraisal tables for this Phase.

PHASE 6 – SANS PAREIL ROUNDABOUT & A289 WULFERE WAY

3.67 The Business Case baseline scheme comprised significant capacity improvements to the existing at-grade four arm Sans Pareil Roundabout, the A289 Wulfere Way dual carriageway and the at-grade A289 Anthony's Way Roundabout. These improvements were identified to provide network capacity for the predicted HIF Hoo traffic flows in 2037 and builds on a previous Local Growth Funded (LGF) scheme which had already identified the requirements for significant capacity improvements at

these sites. The Anthony's Way Roundabout improvement works have been brought forward by Medway Council outside of the HIF scheme to relieve existing congestion levels and this work has been completed on site.

3.68 Since submission of the Business Case, the design of this phase 6 has developed in engagement with stakeholders and the public, however, this has all been within the same overall concept of capacity improvements to the junction and associated changes to the roads which access into the junction. They are therefore not alternative 'options' for the scheme. This section of the report therefore explains how the phase has developed within that conceptual context but does not describe them as options.

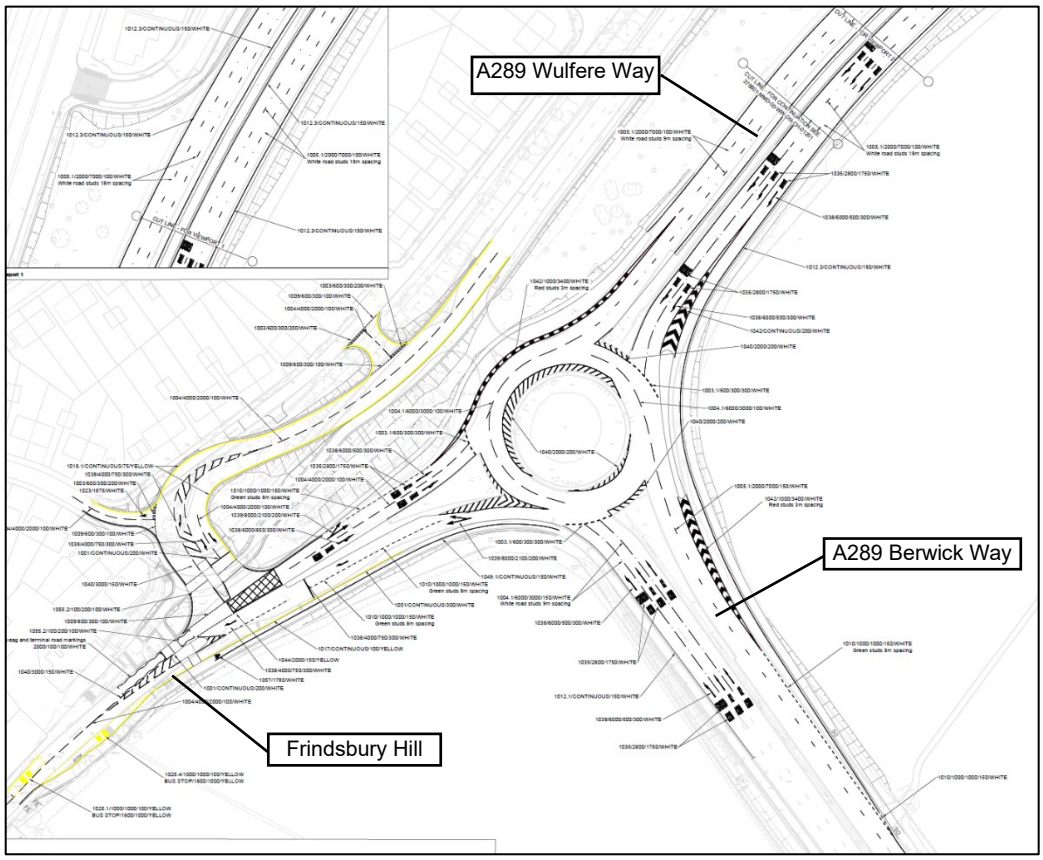
A289 SANS PAREIL ROUNDABOUT

3.69 The existing layout, shown below, comprises an At-grade 4-arm roundabout, with no traffic signal control or active travel provision. The current traffic experiences a low level of service at peak times and is heavily congested on all arms. Side road access from Wainscott Road and Benenden Road have limited opportunity to access the roundabout in peak times. Capacity improvements are required to accommodate the predicted future 2037 traffic flows.

3.70 Figure 27 below shows the Business Case baseline scheme capacity improvements at the Sans Pareil Roundabout which included a dedicated slip road from A228 Frindsbury Hill through to A289 Wulfere Way, closing off the Wainscott Road arm on to the roundabout and providing a new signal-controlled junction on Frindsbury Hill. The relocation of the Sans Pareil Roundabout to the west had been previously considered

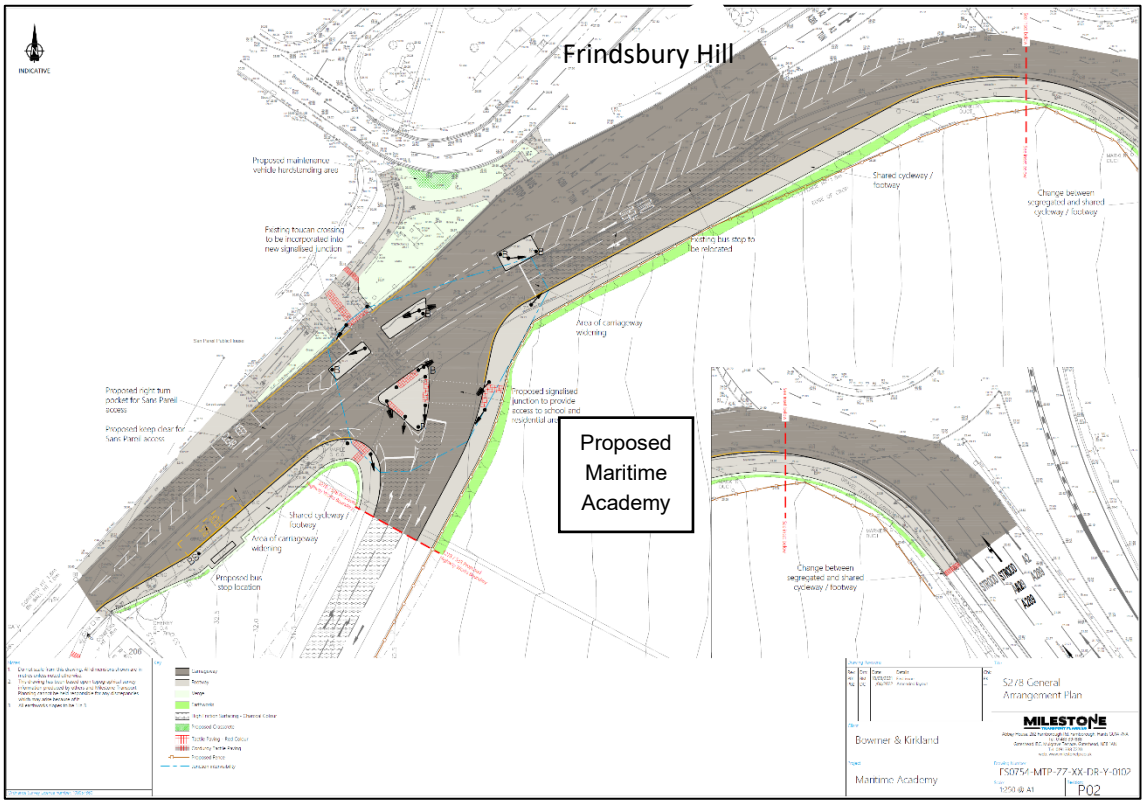
in a previous Local Growth Fund scheme and was value engineered to reduce land acquisition and meet the budget and programme requirements.

Figure 27: Capacity Improvements- Sans Pareil Roundabout



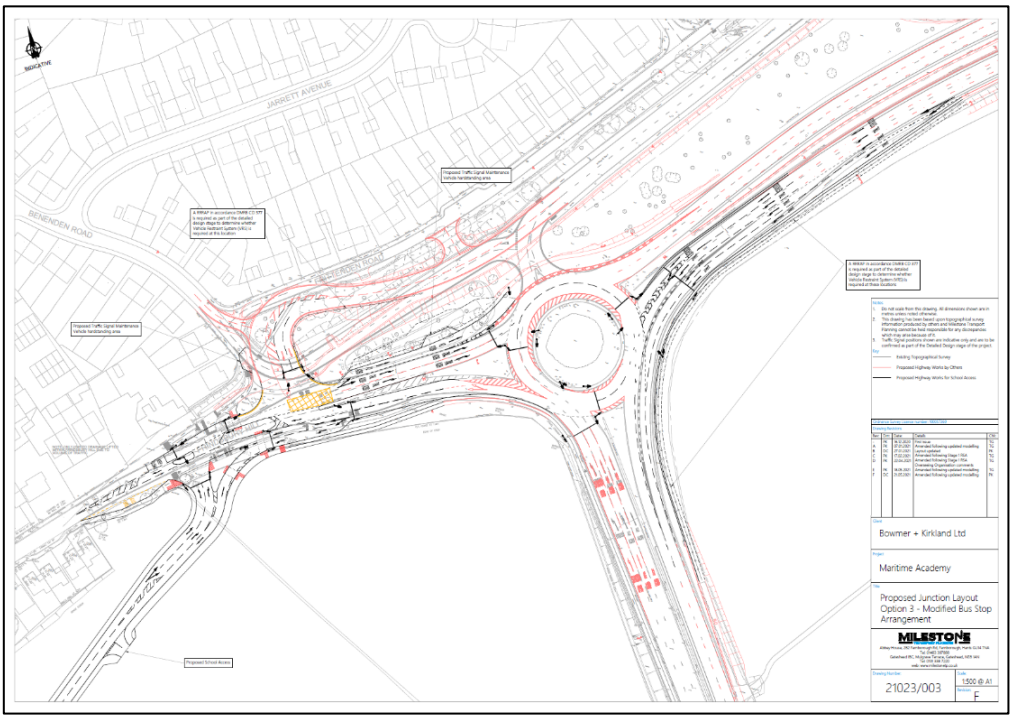
3.71 During the design development process the Department for Education proposed and received planning approval for a new academy with access off Frindsbury Hill. This introduced additional traffic movements and flows and now became the extant baseline for the HIF scheme. Figure 28 below shows the proposed access/junction to the Maritime Academy off Frindsbury Hill being funded by DfE.

Figure 28: Proposed Maritime Academy access off Frindsbury Hill



3.72 The introduction of this junction and access road prior to the opening of the academy required modification to the Business Case baseline scheme to manage and accommodate travel flows to mitigate any abortive works. The modified layout is shown in Figure 29 below, with the red detail showing the proposed future HIF requirement.

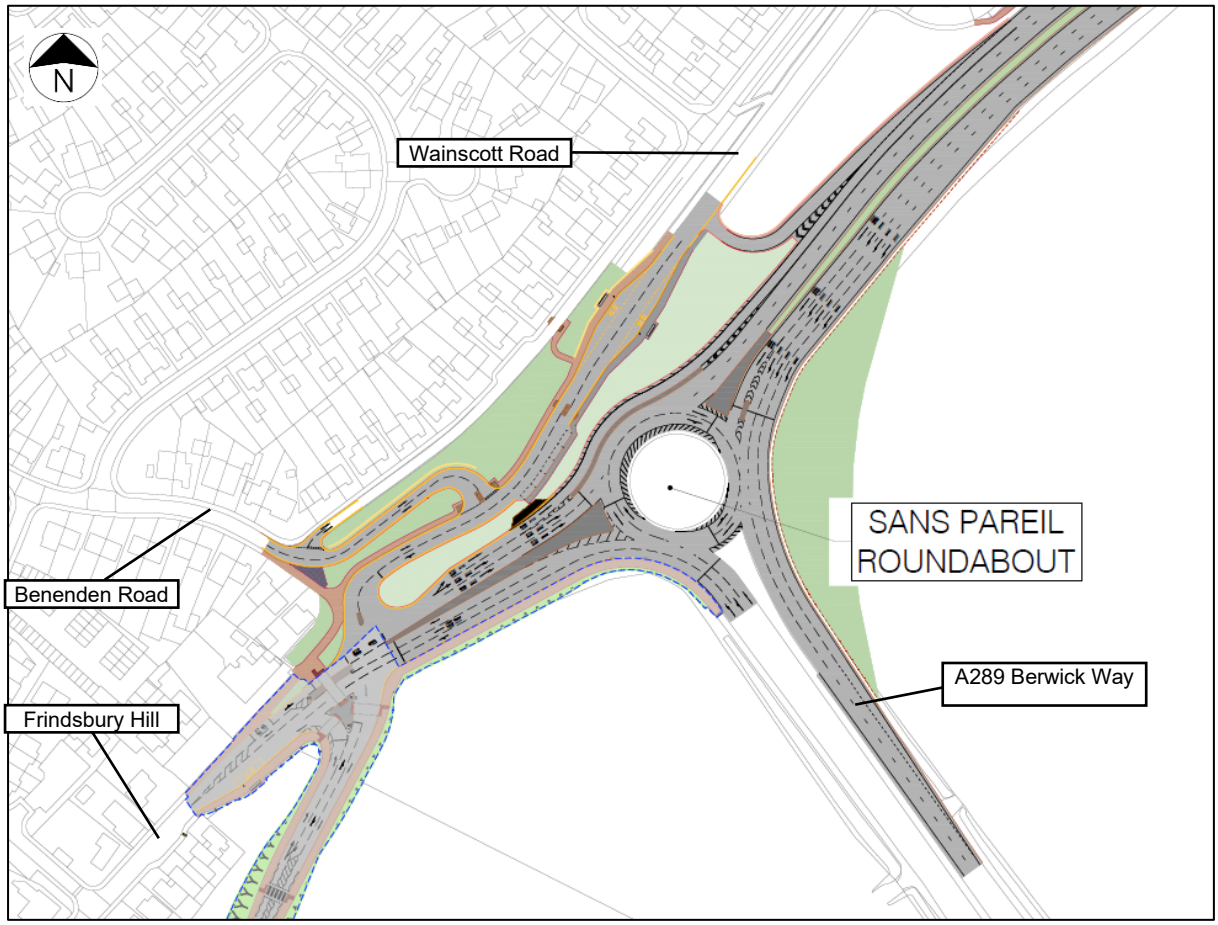
Figure 29: Refined Sans Pareil Roundabout design to account for Maritime Academy access



3.73 Following this refinement, ongoing consultation with Councillors and Residents identified concerns regarding the consequential modified layout of Wainscott Road and Benenden Road and sought various local improvements and realignments to mitigate the impact of the scheme whilst maintaining bus access to Wainscott Road and reducing the visual impact from loss of some green space.

3.74 Figure 30 below shows the design developed to account for this feedback. This has been taken forward for the next stages of assessment and engagement and consequential development.

Figure 30: Maritime Academy access off Frindsbury Hill and Sans Pareil Roundabout



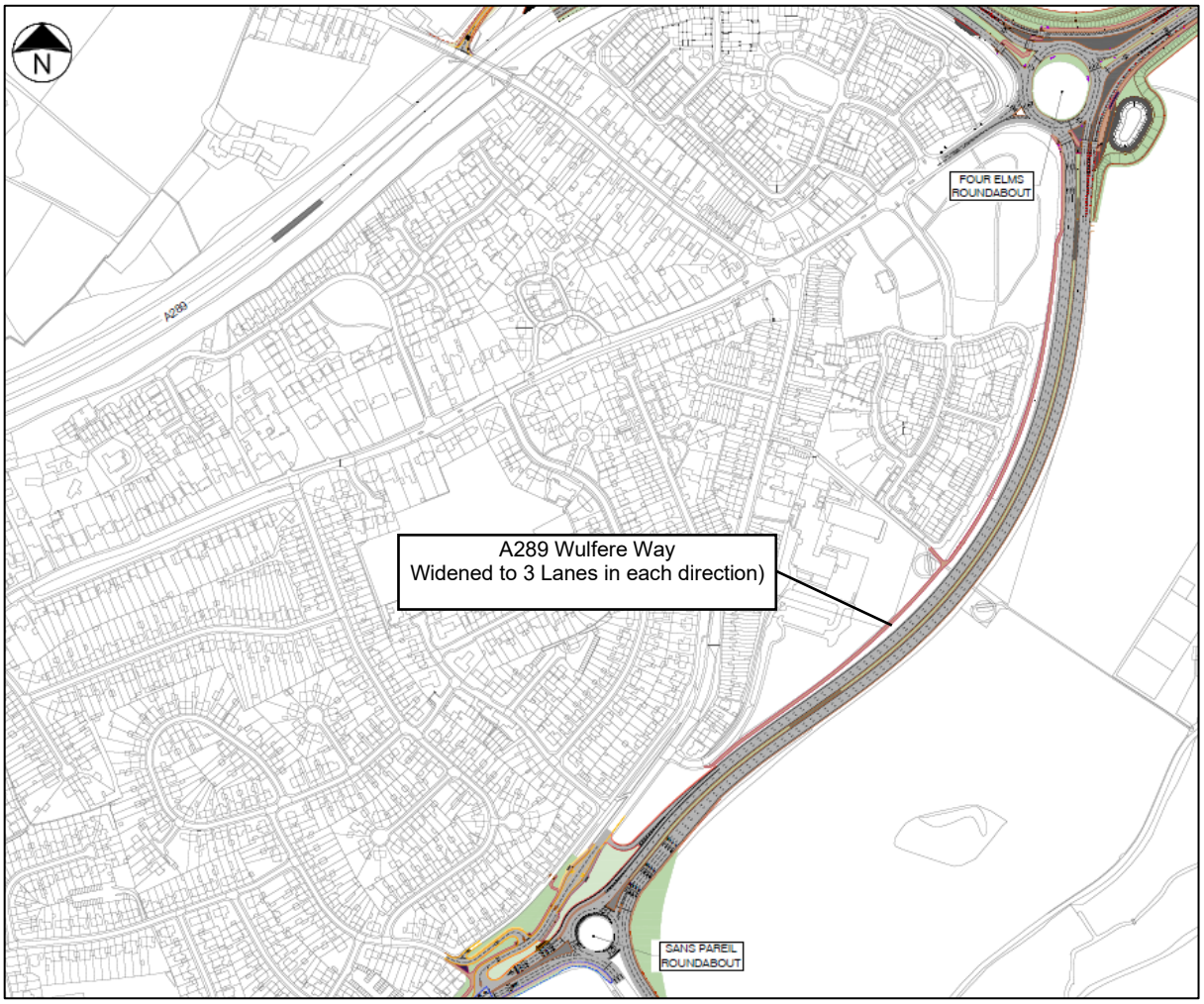
A289 WULFERE WAY

3.75 The existing layout, shown below, comprises a 2-lane dual carriageway between the Sans Pareil Roundabout and the Four Elms Roundabout. Capacity improvements are required to accommodate the predicted future 2037 traffic flows.

3.76 As part of a previous LGF scheme capacity improvements on the A289 Wulfere Way had been identified and the requirement for an additional lane in each direction determined. Capacity checks for the HIF Scheme have identified that the increase to 3 lanes in each direction provided the required capacity for HIF when the junctions at either end had associated capacity improvements.

3.77 Taking into account land constraints, utilities and available space in the highway boundary, it was determined that central reserve widening and the introduction of a lower speed limit could accommodate most of the improvement works (rather than extending outside of the highway boundary) and this has been taken forward for the next stages of assessment and design development as shown in Figure 31 below.

Figure 31: A289 Wulfere Way - Capacity Improvements



Options Appraisal

3.78 As set out above, the design for Phase 6 has developed to optimise the Business Case proposals, particularly in light of stakeholder and community feedback. However, alternative 'options' have not been considered and therefore, there are no option appraisal tables for this Phase. Engagement with the local community and stakeholders will be continuing during the assessment stage of this project to further refine the design.

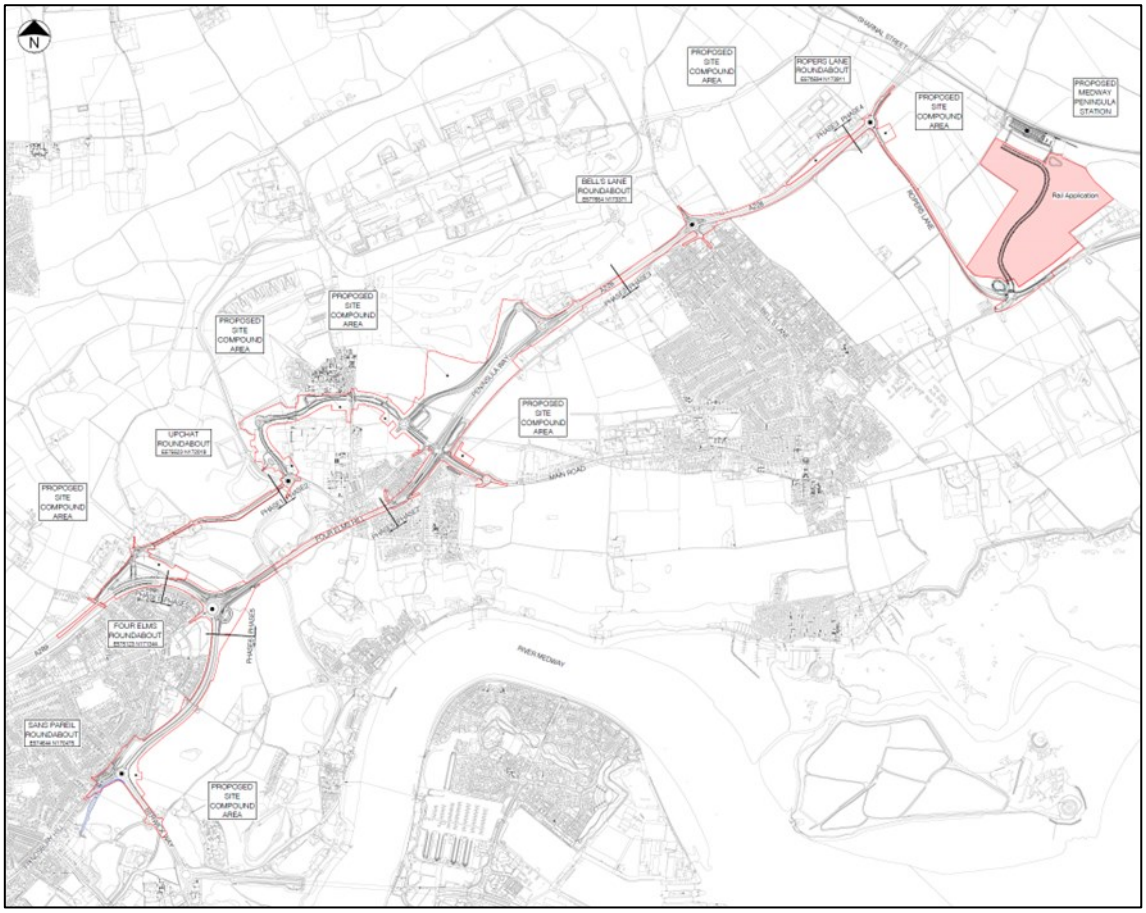
4. Assessment Design: Design to be taken forward for Assessment

4.1 This section outlines the Assessment Design proposed to be taken forward for each phase. This is the scheme that will be taken forward for further assessment and refinement.

4.2 For each phase this section gives a high level overview of the key features of the highways design, the proposals for non-motorised user provision, the environmentally focussed design measures known at this stage (with further measures likely to be developed as part of the EIA process), and, further to section 3, highlights where the chosen option has been able to respond positively to consultation and stakeholder engagement.

4.3 Figure 32 below shows the overall extent of the road element of the scheme at this Assessment Design stage. General Arrangement drawings for this design, and for each phase can be found at Appendix 1.

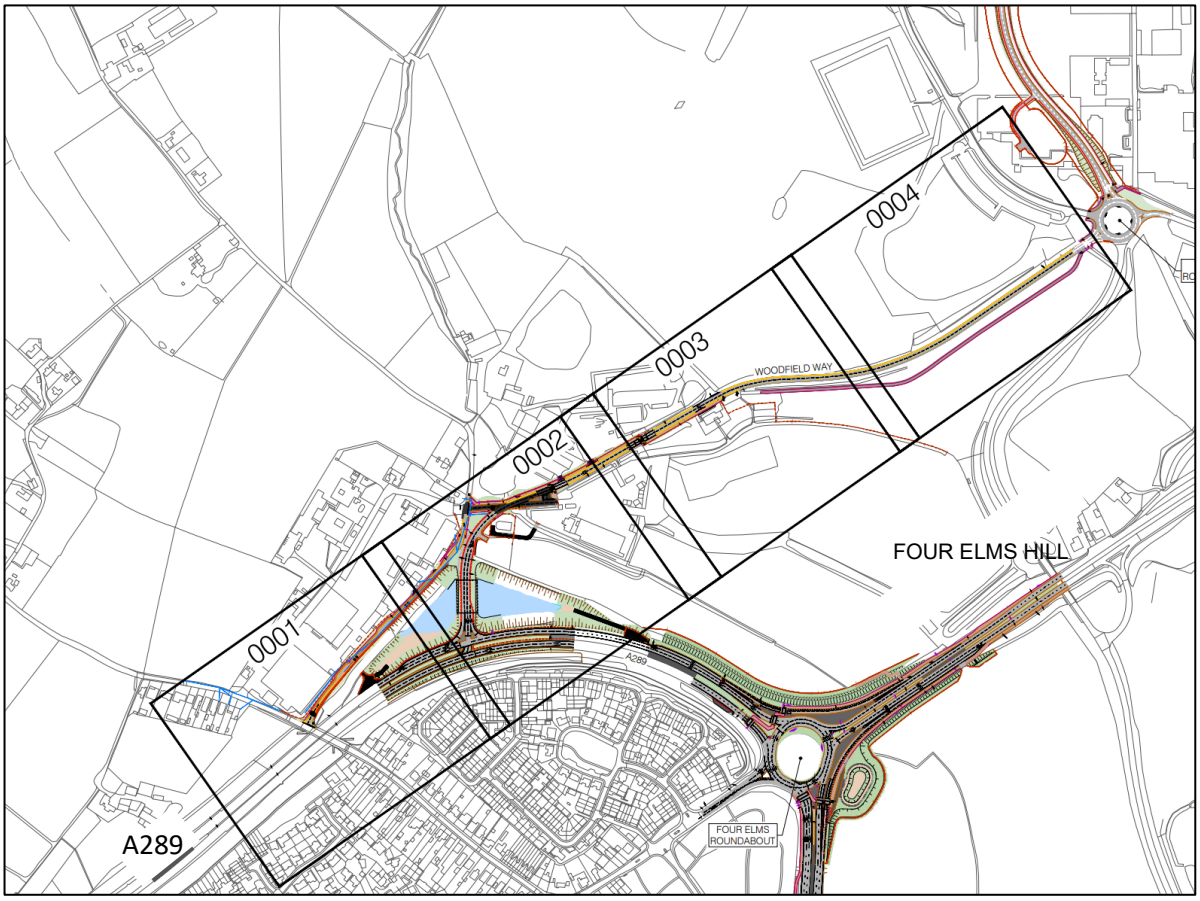
Figure 32 : Scheme Extents



PHASE 1 – A289 HIGHAM ROAD TO UPCHAT ROUNDABOUT

4.4 Figure 33 below shows the overall extent of Phase 1 between A289 / Higham Road to Upchat Roundabout.

Figure 33: Phase 1 – Extents (4 sheets)



Highway Design

4.5 The proposed Assessment Design highway interventions include the following:

Table 4: Highway design interventions

Location	Intervention
A289 Hasted Road	• new at-grade traffic signal controlled junction
New Link Road	• new road connecting A289 to Woodfield Way • new structure spanning existing attenuation pond
Islingham Farm Road	• local realignment, new footway and new passing bays
Woodfield Way	• signal controlled access to MoD Sites (demand only) • new footway and cycle facilities

Walking, Cyclists and Horse Riding Provision

4.6 A new footway is proposed along Islingham Farm Road, where there is currently no footway provision and all traffic modes share the existing single lane road.

4.7 Improvements along Woodfield Way include the provision of several crossing points and the introduction of a shared footway/cycleway which will provide links with Islingham Farm Road and Upchat Roundabout.

4.8 Street lighting is proposed along the new pedestrian route, which will take into account the sensitivity of the adjacent SSSI.

Environmental Measures

4.9 The proposed structure over the attenuation pond requires relocation of existing Great Crested newts prior to construction and mitigation measures to flora and fauna.

4.10 On the A289 screening measures are proposed at the boundary with Liberty Park. Screening is also proposed as a separation between the new link road to Woodfield Way and Islingham Farm Road. Mitigation is subject to the outcome of the EIA.

4.11 Adjacent to the SSSI existing verges are to remain and work restricted to be within the existing kerblines.

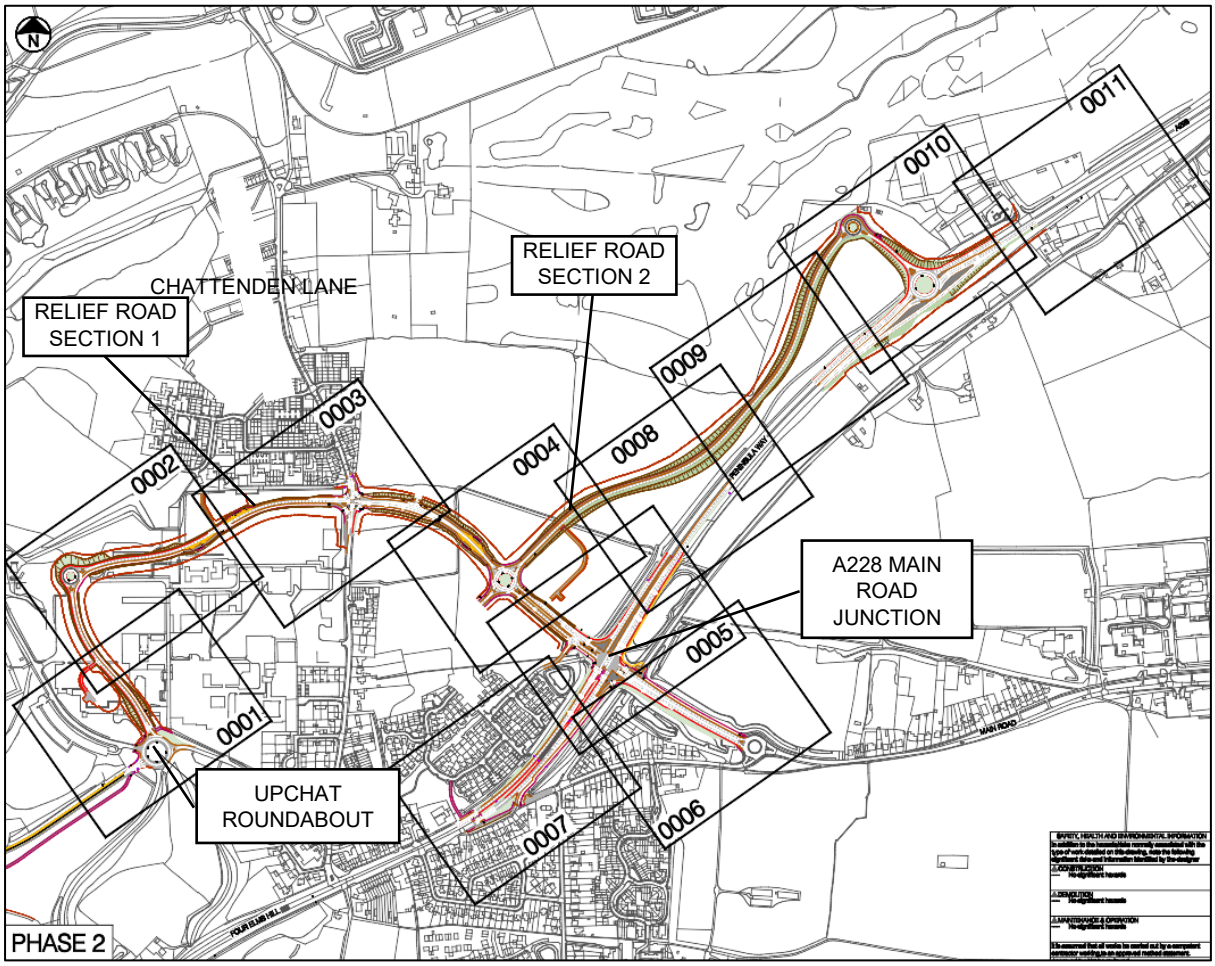
Community/Stakeholder

4.12 A significant level of objection was raised to the original proposal for a grade separated junction at the A289 / Higham Road junction. As discussed in chapter 3, investigations were undertaken to determine if an alternative hybrid/compromise option could be suitable for further development. An alternative at-grade signalised junction on the A289 (between Higham Road and Four Elms Roundabout) was determined and welcomed by the community at Round 2 of the consultation. This was taken forward for development and forms the Assessment Design.

PHASE 2 – UPCHAT ROUNDABOUT to A228 / MAIN ROAD JUNCTION HOO

4.13 Figure 34 below shows the overall extent of Phase 2 between Upchat Roundabout and the A228.

Figure 34: Phase 2 - Extents (11 Sheets)



Highway Design

4.14 The proposed Assessment Design highway interventions include the following:

Table 5: Highway design interventions

Location	Intervention
Upchat Roundabout	• new arm for the proposed relief road egress • new arm for the proposed local development
Relief Road	SECTION 1 • new drainage attenuation ponds. • provision of bus stops to encourage active travel. SECTION 2 • new roundabout to facilitate access to development. • new spur road and junction with the A228 to relieve the A228 Main Road junction and provide access and network resilience.

Location	Intervention
	• provision of bus stops to encourage active travel.
A228 / Main Road Junction	• reconfiguration from the existing roundabout to a signal controlled junction for capacity and future growth. • relocation of access road into the Abbey Homes site.
A228 Peninsula Way	• new A228 roundabout to relieve the Main Road junction and provide access to developments • provision of street lighting between junctions • reduced traffic speed limit
Main Road	• widening of existing road to two lanes in each direction • left in/out movement only permitted at junction of Ratcliffe Highway with Main Road Hoo

Walking, Cyclists and Horse Riding Provision

Relief Road

4.15 A new footway and dedicated cycle lane are proposed along the length of Section 1. This provision has been restricted to one side of the road to discourage migration and egress into the adjacent protected SSSI and Ancient Woodland. Along Section 2, footways and cycle lanes are provided on both sides of the road along with linkages into potential development sites.

4.16 At the A228 / Main Road junction a signal controlled crossing is proposed for enhanced pedestrian and cyclist safety.

4.17 At the recently completed Abbey Homes development a new footway link is proposed connecting a new signalised controlled crossing on the A228 to Songbird Crescent, this forms a more direct access through the site to a proposed school site.

4.18 Street lighting is proposed along the route and will take into account the presence of the SSSI and Ancient Woodland.

4.19 No equestrian requirements have been identified along this section of the scheme, but should be encouraged as part of potential adjacent development schemes.

Environmental Measures

4.20 The alignment of the relief road for Section 1 is subject to the guidelines and buffer zones working adjacent to the SSSI and Ancient Woodland.

4.21 For the adjacent residential properties along Swinton Avenue screening in the form of landscaping is proposed to provide a separation from the new relief road.

4.22 At the newly completed Abbey Homes development, fencing is proposed to provide screening to the new footway link for residents on Songbird Crescent.

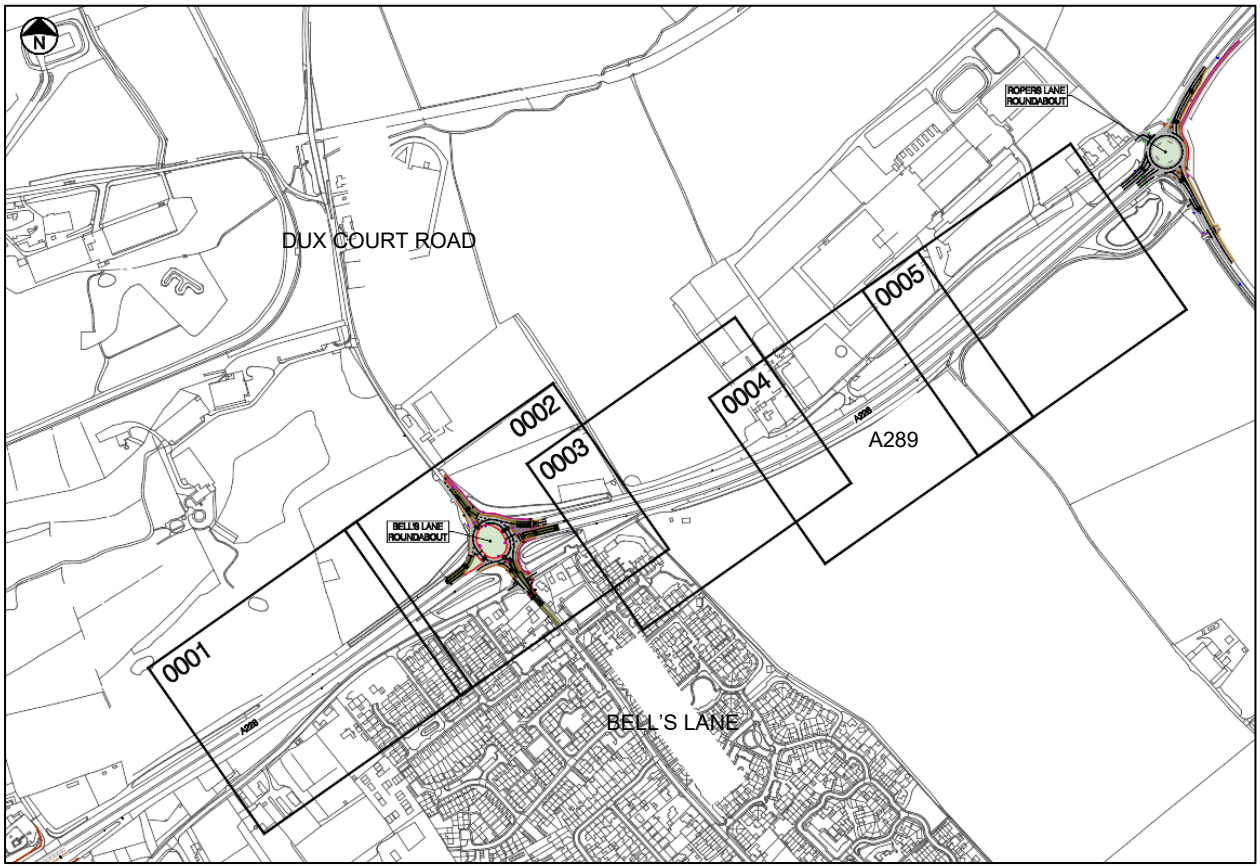
Community/Stakeholder

4.23 The alignment of the proposed relief road and spur road have been revised to better accommodate evolving developer requirements. The chosen route was also preferred at consultation.

PHASE 3 – A228 BELL'S LANE ROUNDABOUT

4.24 Figure 35 below shows the overall extent of Phase 3 at the Bell's Lane Roundabout on the A228.

Figure 35: Phase 3 – Extents (5 Sheets)



Highway Design

4.25 The proposed Assessment Design highway interventions include the following:

Table 6: Highway design interventions

Location	Intervention
Bell's Lane Roundabout	• enlargement of existing roundabout (the council may feel it prudent to consider placing any necessary ducting during construction of the roundabout for the provision of any additional measures if in the future there is evidential growth in vehicle movements)
A228 Peninsula Way	• provision of street lighting between junctions • reduced traffic speed limit
Bell's Lane Roundabout	• enlargement of existing roundabout and provision of traffic signal control to accommodate capacity and all movements
Dux Court Road	• local road widening and safety improvements
Bell's Lane	• local road widening and safety improvements

Walking, Cyclists and Horse Riding Provision

4.26 Footway and cycle link improvements and connectively between Dux Court Road and Bell's Lane are proposed. An on-demand staged signal controlled crossing across the A228 Peninsula Way is proposed.

4.27 Street lighting improvements and extensions on the approaches to the roundabout are proposed to comply with current standards.

4.28 Equestrian requirements have been identified along this section of the scheme and the existing linkage across Bell's Lane to Ratcliffe Highway is proposed to be maintained. The opportunity to cross Bell's Lane will be increased due to the phased operation of the roundabout.

4.29 Consideration is being given to a proposed Pegasus Equestrian Crossing on the A228. This will be considered as part of the assessment process.

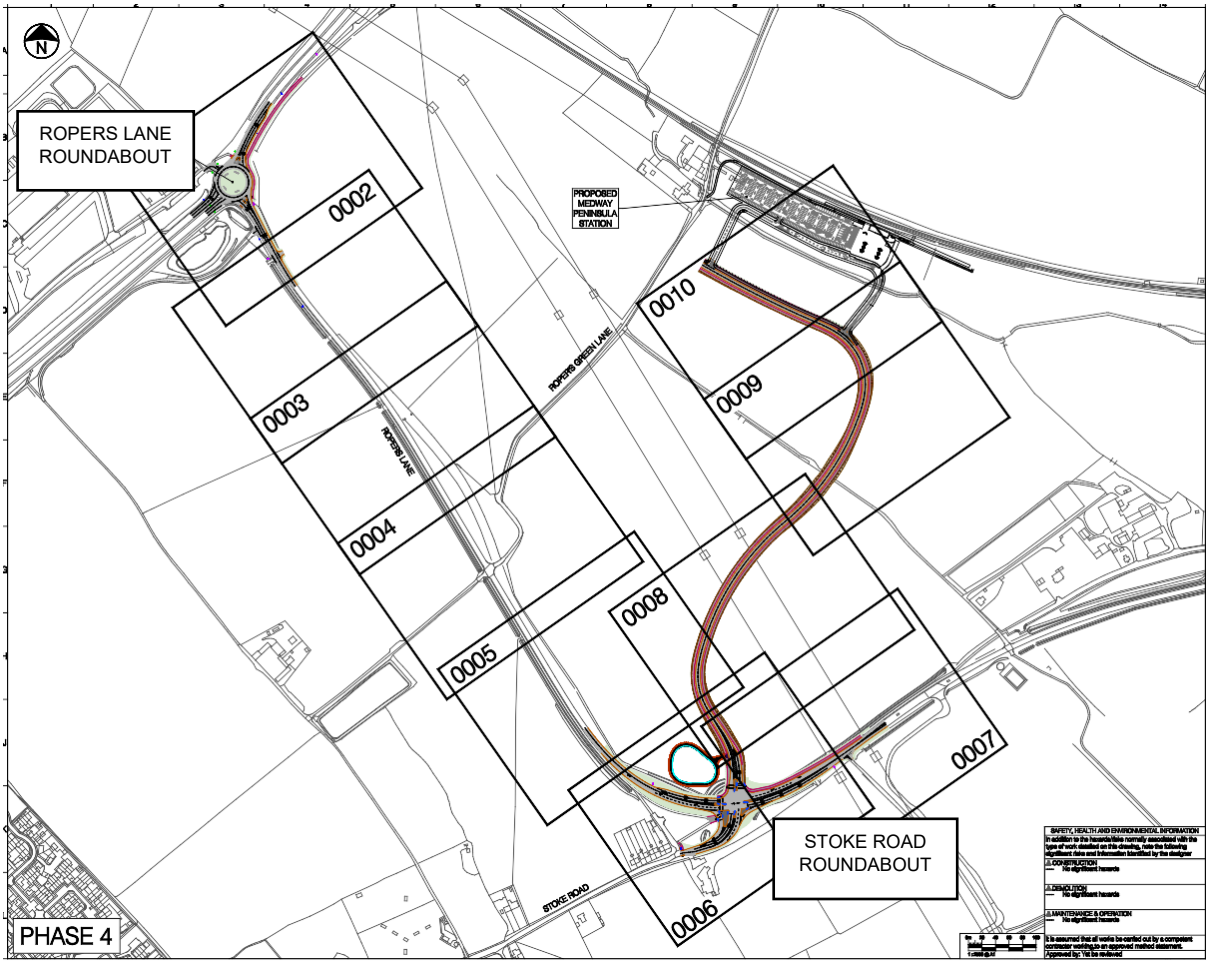
Environmental Measures

4.30 The site lies within the existing highway boundary. Local landscaping is envisaged to mitigate the local widening and improve safety and visibility requirements.

PHASE 4 – ROPERS LANE ROUNDABOUT & RAIL STATION ACCESS ROAD

4.32 Figure 36 below shows the overall extent of Phase 4 at Ropers Lane Roundabout on the A228 and Stoke Road Roundabout.

Figure 36: Phase 4 - Extents (10 Sheets)



Highway Design

4.33 The proposed Assessment Design highway interventions include the following:

Table 7: Highway design interventions

Location	Intervention
Ropers Lane Roundabout	• local widening to roundabout approaches to provide capacity
A228 Peninsula Way	• provision of street lighting • reduced traffic speed limit
Stoke Road Roundabout	• conversion to a signalised junction for capacity and access improvements

Location	Intervention
	• provision of new drainage attenuation pond
Station Access Road	• provision of a road and bus route linking the proposed rail station to Stoke Road/Ropers Lane.

Walking, Cyclists and Horse Riding Provision

4.34 Footway modifications are proposed at Ropers Lane Roundabout to improve connectivity between Sharnal Street and Ropers Lane. At Stoke Road Roundabout the conversion to a traffic signal controlled junction will facilitate the provision of signal controlled crossings to encourage active travel. The station access road will also be developed with footway/cycleway provision.

4.35 Street lighting improvements are proposed along the route.

4.36 Equestrian desire lines and improvements have not been identified along this section of the scheme.

Environmental Measures

4.37 At Stoke Road Roundabout, landscaping and screening works are envisaged to mitigate the impact of converting the roundabout to a signalised junction and allowing a greater through flow of traffic.

4.38 A new drainage attenuation pond will provide water flow control and also encourage biodiversity at this location.

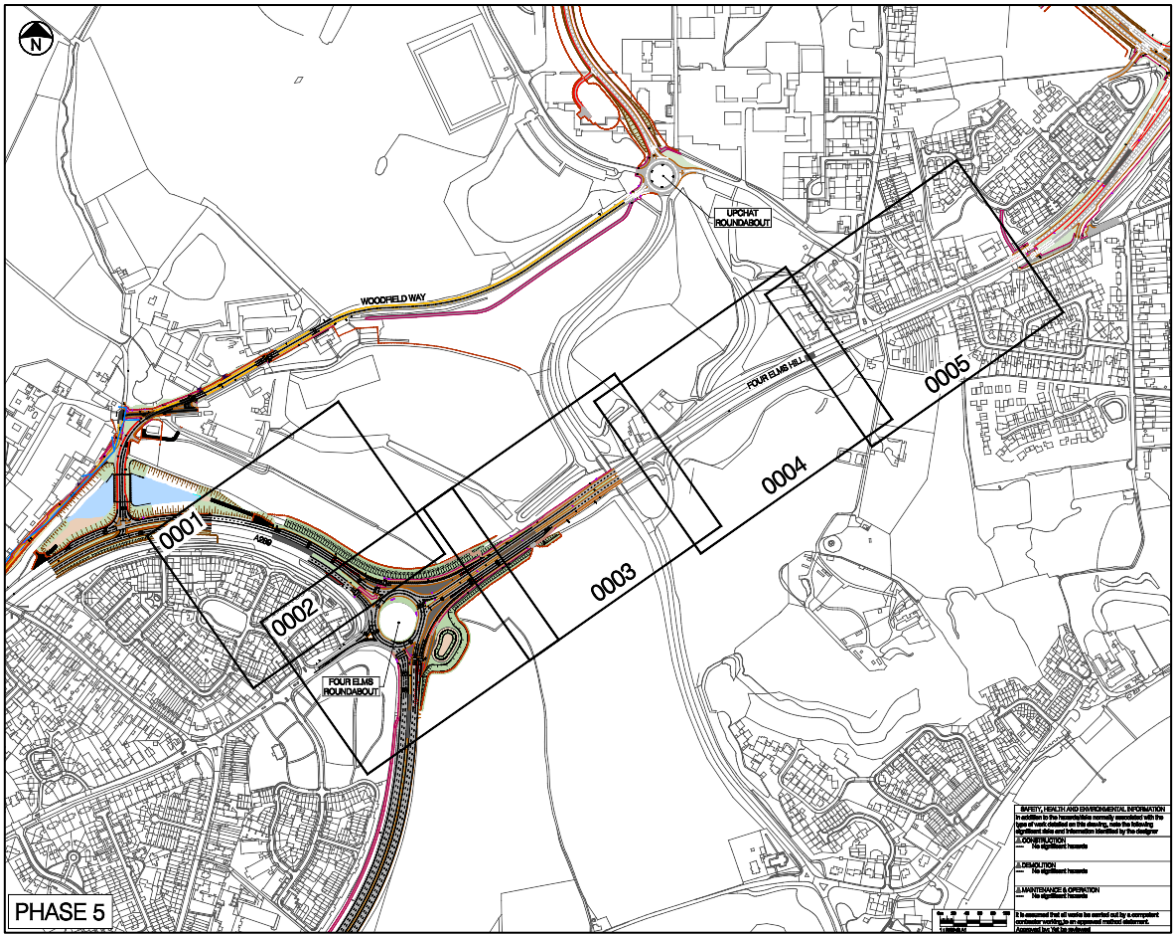
Community/Stakeholder

4.39 The proposed conversion of Stoke Road Roundabout to a signalised junction was introduced at the later stages of design development, this was due to planning approval of an adjacent site at Kingsnorth and a subsequent significant increase in baseline traffic flows. As a result, this element of the scheme was not included in the Consultation Round 2 and is now the subject of supplementary engagement with the community local to the roundabout and key stakeholders.

PHASE 5 – A289 FOUR ELMS ROUNDABOUT

4.40 Figure 37 below shows the overall extent of Phase 5 at Four Elms Roundabout, the intersection of the A228 Four Elms Hill and the A289 Hasted Road and A289 Wulfere Way dual carriageways.

Figure 37: Phase 5 - Extents (5 Sheets)



Highway Design

4.41 The proposed Assessment Design highway interventions include the following:

Table 8: Highway design interventions

Location	Intervention
Four Elms Roundabout	• enlargement of existing roundabout and approaches • provision of traffic signal control to accommodate future capacity and improve access from Hoo Road • provision of new drainage attenuation pond • provision of signal controlled crossings • provision of emergency crossover points

Location	Intervention
A289 Hasted Road	• provision of dedicated A289 slip road to A228 (Grain bound) • reduced traffic speed limit
A228 Four Elms Hill	• improved dedicated A228 slip road to A289 (Strood bound) • reduced traffic speed limit

Walking, Cyclists and Horse Riding Provision

4.42 Footway modifications are proposed at Four Elms Roundabout to improve pedestrian and cycle connectivity between Hoo Road and the A228 Four Elms Hill. The introduction of traffic signal controls on the roundabout and the phased operation facilitates the provision of signal controlled crossings on the A228 and A289, providing safer routes for active travel.

4.43 Equestrian desire line and improvements have not been identified or proposed along this section of the scheme.

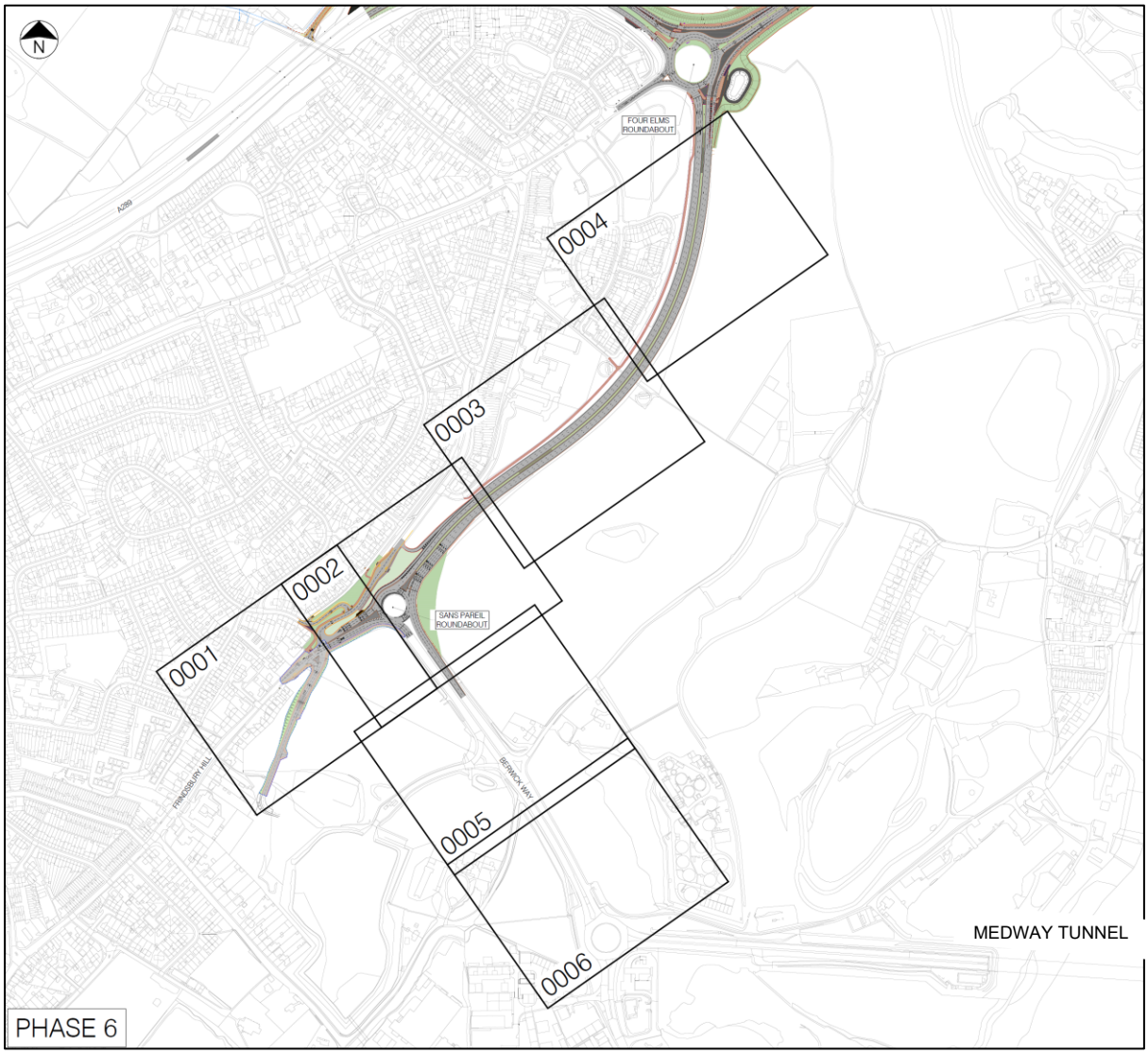
Environmental Measures

4.44 Landscaping is envisaged to mitigate the visual and other impacts of the enlarged junction layout. On Four Elms Hill additional measures including quiet surfacing, noise barriers and pollution absorbing landscaping will be considered as part of the EIA process.

PHASE 6 – SANS PAREIL ROUNDABOUT & A289 WULFERE WAY

4.45 Figure 38 below shows the overall extent of Phase 6 at Sans Pareil Roundabout, the intersection of the A228 Frindsbury Hill and the A289 Berwick Way and A289 Wulfere Way dual carriageways.

Figure 38: Phase 6 - Extents (6 SHEETS)



Highway Design

4.46 The proposed Assessment Design highway interventions include the following:

Table 9: Highway design interventions

Location	Intervention
Sans Pareil Roundabout	• enlargement of existing roundabout and approaches, • provision of traffic signal control to accommodate future capacity. • provision of a dedicated slip lane from Frindsbury Hill to A228 Wulfere Way
A289 Wulfere Way	• widening of the existing carriageway to provide three lanes in each direction

Location	Intervention
	• reduced traffic speed limit • new footway/cycleway link connecting the facilities at Four Elms Roundabout and Sans Pareil. • East bound on slip to Wulfere Way from Wainscott Road
A289 Berwick Way	• widening of slip road from A289 Wulfere Way to two lanes into Berwick Way with controlled merge • reduced traffic speed limit
A228 Frindsbury Hill	• creation of new signal controlled access to Wainscott Road. This will build on the proposed Maritime Academy junction currently being progressed by DfE.
Wainscott Road	• access to Wainscott Road relocated to Frindsbury Hill • access to Benenden Road realigned. • Slip road onto A289 Wulfere Way.

Walking, Cyclists and Horse Riding Provision

4.47 The Sans Pareil Roundabout has no pedestrian or cycle desire line. Upgrades to existing facilities are proposed along the southern edge of the phase, in conjunction with Maritime Academy junction proposals for increased connectivity.

4.48 Equestrian requirements have not been identified along this section of the scheme.

Environmental Measures

4.49 The proposed roundabout remodelling reduces the amount of green space and landscaping east of the A228 Frinsbury Hill and both sides of the Wainscott Road. Enhanced landscaping is proposed to mitigate the visual, noise and pollution impact and the scope and extent are subject to the outcome of the ongoing EIA.

Community/Stakeholder

4.50 As described in section 3, the Assessment Design presented for this phase has been the subject of on-going refinement over time and reflects a snapshot of that design development. Alongside undertaking the assessment process, the Future Hoo team will be continuing to engage with the local community and parish councillors on the design to be presented as part of the planning application for the scheme.

5. Next Steps

5.1 The next step is for the Future Hoo team to assess the likely impacts of the design outlined in this report, principally (but not exclusively) through the continuation of the Environmental Impact Assessment, Habitats Regulation Assessment and Transport Assessment processes.

5.2 The Future Hoo team will look for opportunities to further enhance the scheme through these assessment processes. Options for further mitigation will be explored where significant adverse effects are identified and, where appropriate, these will be embedded in the design.

5.3 The team will continue to engage with stakeholders as appropriate during this assessment stage.

5.4 The final scheme layout to be taken forward remains subject to the outcome and confirmation of various factors and engagement and include:

- continued work on developing the Mode Share to be applied;
- results of ongoing site investigation works, archaeology etc;
- results of the Environmental Impact Assessment and mitigation works;
- engagement; and
- outcome of planning decision and any conditions

5.5 Following completion of the assessments, a planning application will be prepared and submitted in Q1 2023 seeking planning permission for the scheme. The Council will also be seeking confirmation from the Secretary of State of a Compulsory Purchase Order and Side Roads Order in Q1 2023 based on the application design of the scheme.