

APPENDIX A. HCC Response



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P/22/0165/OA

Date

8 April 2022

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For the attention of Peter Kneen

Dear Sir,

Land East of Newgate Lane East, Fareham. Outline Application With All Matters Reserved (Except Access) For Residential Development Of Up To 375 Dwellings, Access From Newgate Lane East, Landscaping And Other Associated Infrastructure Works

Thank you for consulting the County Council on the above planning application. The following comments have been provided by the County Council, both as an upper tier authority and in its capacity as local highway authority and authority responsible countryside services. It is noted that separate responses have been submitted on behalf of the County Council as Local Education Authority and Lead Local Flood Authority.

A summary of the comments is provided below, with the full technical response from the Local Highway Authority included in Appendix A, and countryside and rights of way in Appendix B.

The County Council notes that the new Fareham Borough Council Local Plan was submitted for examination in September 2021, with examination hearings subsequently taking place in March and April 2022. A report from the Inspector on the outcome of these hearings is expected shortly.

The Council notes that this site was removed from the emerging Plan by Fareham Borough Council following the Regulation 18 Draft Local Plan consultation. Representations were made by the local highway authority on the Regulation 18 Local Plan raising concerns about the proposed allocation. In summary, the local highway authority considered that, on the basis of the

evidence available at the time, the proposal would unacceptably undermine the purpose of the Newgate Lane improvements.

It is understood that the site's promoters have subsequently made representations objecting to the omission of this site from the Local Plan and that this matter is the subject of active consideration by the Planning Inspector examining the Local Plan.

In this context it is noted that the emerging Local Plan proposes a spatial distribution for growth in the borough and this has been supported by evidence which considers the cumulative impact of that specific spatial distribution on infrastructure and environmental considerations. Clearly, if the Inspector were to conclude that the Local Plan was unsound, and that there was merit in further consideration of new development sites to help address their concerns, this would be the subject of further work and evidence base preparation.

The impact of this development, were it to be granted for this planning application, has not featured as part of any such recent assessment to date. Noting the scale and location of the proposed development in relation to current highway improvements and other proposed development in the area, the County Council considers that granting permission at this time would be premature. This is particularly the case considering the advance stage of the Plan's preparation.

Notwithstanding the above, the Local Highway Authority has reviewed the evidence submitted by the applicant to date. On the basis of the information provided by the applicant in this regard, the County Council a local highway authority considers that the proposal is contrary to Paragraphs 110, and 111 of the National Planning Policy Framework.

The reasons for refusal may be overcome by the applicant submitting the information detailed in the recommendation in the full technical response set out in Appendix A. Should further information be forthcoming the Local Highway Authority will review its position accordingly.

In summary, the County Council has concerns that the proposal is premature in the context of the emerging Local Plan which is currently at a late stage in its preparation and that it is contrary to planning policy relating to highways operation, safety and accessibility. It therefore would recommend that the application be refused.

Yours faithfully,



Stuart Jarvis
Director of Economy, Transport and Environment

Appendix A: Full response of the Local Highway Authority

The comments below are in response to the Transport Assessment (TA) dated 27 January 2022 and residential Framework Travel Plan dated 24 January 2022 submitted as part of this application.

Background

The application land was previously included in the Borough Council's emerging local plan as an allocation for 475 dwellings known as HA2 and was removed from the emerging local plan, which is currently undergoing examination. When this site was a proposed allocation, the local highway authority raised the following objection to allocation HA2 (Hampshire County Council Draft Local Plan consultation response dated 8 December 2017):

'The purpose of the current improvements to Newgate Lane is to address existing traffic congestion and environmental issues on Newgate Lane and other corridors providing access to the Gosport peninsula and to facilitate better strategic access to jobs at the Solent Enterprise Zone at Daedalus (which is also the case for the proposed bypass of Stubbington that would pass through the gap between Fareham and Stubbington). An aim of the Enterprise Zone is to contribute to reducing the number and duration of vehicle trips on roads on the Gosport peninsula, in particular out commuting towards the A27 /M27 to access employment in the morning peak travel period. It is therefore the policy of the County Council to maintain the utility of the improvements provided to Newgate Lane in these terms. Consequently the proposed housing allocation which is likely to increase both the levels of out-commuting from the peninsula in the morning peak travel period and negate the purposes of the Newgate Lane improvements is not supported.'

In view of the above comments, Hampshire County Council objects to policy HA2 (Newgate Lane South).'

Furthermore, as noted in the TA, the County Council's is currently preparing its Local Transport Plan (LTP4) which will provide its primary transport policy to 2050. The draft LTP4 is currently subject to public consultation and can be found here: [Draft Local Transport Plan 4](#). The proposals set out in the scoping note are contrary to the draft policies of the emerging LTP4 in terms of access onto the local highway authority's primary road network. It is anticipated this document will be adopted as policy in 2022. Draft policy DM2 paragraph i) states that:

*'We will...only support requests for **NEW accesses onto A roads, the principal road network or traffic sensitive streets** where the strategic flow of traffic is prioritised and not compromised and when all other reasonable options (such as taking access from nearby side roads) has been considered;'*

Finally, regarding the approval of 99 dwellings accessed via Brookers Lane (P/19/1260/OA), it is correct as stated in the TA that the inspector found the site

acceptable, including with regard to accessibility. However, it is also noted that the appeal sites west of Newgate Lane (P/18/1118/OA and P/19/0460/OA) were not considered accessible, with the inspector concluding:

'The limitations are such that they would not be in an accessible area, with particular reference to public transport and walking facilities, and I do not regard the sites as being sustainably located.'

The sustainability credentials of this site will therefore need to be explored in detail, particularly in the context of LTP4.

Existing Conditions

Walking and Cycling

A Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) has been completed, assessing routes in the local area. However, while the WCHAR notes schools will be a primary trip generator, this assessment does not include routes to any of the catchment schools. The County Council's Children's Services department has confirmed there are no plans to reconsider catchment boundaries at this time. The development lies within the current catchment areas of the following schools. Approximate distances to these schools have been included in brackets.

- Crofton Anne Dale Infant and Junior (4,600m)
- Wallisdean Infant and Junior (2,900m)
- Fareham Secondary Academy (2,400m)
- Crofton Secondary (3,100m)

A WCHAR review should be completed for the routes to the catchment schools; particular attention should be paid to cycle provision given distances from the site. Furthermore, only footpath routes to Stubbington have been considered. These do not allow for cycling and, unless significant improvements are undertaken to surface and light the routes (none are proposed), these routes would not be suitable as amenity links. As such, the alternative routes to amenities within Stubbington, in addition to routes to schools, should be considered.

As identified in the WCHAR, there is an existing network of pedestrian and cycle facilities. Footways are provided linking to most amenities and there are cycle links towards Fareham, Gosport and Stubbington. However, there are some inadequacies in the existing provision. The applicant has proposed improvements, which are reviewed in the Development Proposals section below.

Regarding cycle provision, the BRT busway (Henry Cort Way) is open to cycles and provides a high-quality link to Fareham town centre, with the exception of one missing link on Redlands Lane as described below. Similarly, there is an off-road link south to Gosport Town Centre. The link towards Stubbington only extends as far as Crofton Secondary School. Consideration should be given to how pupils will access the catchment schools of Crofton Anne Dale Infant and Junior by cycle.

Connections to the south of the application site, via the consented Brokers Lane development (19/00516/OUT) are proposed, allowing access to Brokers Lane shared use pedestrian and cycle path. An onward connection across Newgate Lane East to Woodcote Lane is available. It should be noted that a financial contribution of £78,160 is secured from the Brokers Lane development towards pedestrian/ cycling improvements at the Brokers Lane crossing of Newgate Lane East. This contribution is not specifically towards implementation of a Toucan Crossing.

Tukes Avenue and Wych Lane, that form a primary link from the site to the BRT are not designated on Fareham Cycle Map as 'link roads convenient for cyclists'. The WCHAR states that these roads are a slow speed traffic environment, making the route comfortable and attractive for on-road cycling. This is considered acceptable for Tukes Avenue; however, Wych Lane is more heavily trafficked and has potentially higher speeds. Consideration should be given to improvements for cyclists on Wych Road, between Tukes Avenue and the Henry Cort Way.

The bus services in the vicinity are considered acceptable to adequately serve the development. The routes to bus stops are also appropriate, subject to the site access points being confirmed as deliverable and securing improvements to pedestrian and cycle (given the BRT has cycle parking available) facilities on these routes. All stops on Tukes Avenue have shelters, however there is no provision of Real Time Information (RTI) at the Stones Close and Woodcot Primary School stops; provision of RTI would significantly encourage travel by sustainable modes. A contribution of £16,000 towards the provision of RTI would be considered adequate mitigation.

The rail services from Fareham Rail Station are considered acceptable to adequately serve the development. There are links to the rail station via bus and cycle (noting the required improvements).

Regarding the assessment of the existing vehicular network operation, it was confirmed during pre-application discussions that the use of the Manual Classified Count (MCC) surveys undertaken in January 2019 are considered acceptable subject to the application being submitted prior to the end of January 2022 and being appropriately factored to account for traffic growth. It was also noted that additional traffic data covering a wider area is likely to be required, subject to agreement of traffic distribution and assignment. Both these points are covered in the Traffic Impact section below.

Whilst the peak hours identified in TA (Morning Peak Hour 07:45 – 08:45 and Evening Peak Hour 16:00-17:00) do not align with standard network peak hours (08:00- 09:00 and 17:00-18:00), the survey data shows that across the network, the accumulated total of highest traffic flows occur at the peak hours used in the TA. Therefore, the peak hours the applicant has used are considered suitable and applying the associated peak hour baseline flows in the junction modelling assessments is considered a robust approach.

In addition to the Manual Classified Counts (MCC) carried out in 2019, Automatic Traffic Counts (ATC) were completed in 2021 on Newgate Lane East, to the north and south of the old Newgate Lane/ Newgate Lane East junction. The table below compares the more recent ATC flows with the MCC data. The comparison between MCC and ATC recorded traffic flow volumes show the ATC flows were 9% higher in the AM peak and 3% higher in the PM peak.

Table 1. MCC and ATC Newgate Lane Data Comparison

PEAK PERIOD AND SURVEY DATA COLLECTION METHOD	NEWGATE LANE NB	NEWGATE LANE SB
MCC - AM	1,367	1,179
MCC - PM	1,293	1,512
MCC Total two-way flow	AM – 2,546 PM – 2,805	
ATC - AM	1,643	1,130
ATC - PM	1,128	1,762
ATC Total two-way flow	AM – 2,773 (9% increase on MCC flows) PM – 2,890 (3% increase on MCC flows)	

The traffic flow diagrams and junction models have been informed by the MCC counts rather than the ATC data. A proportion of the increase is expected to be due to background growth given the MCC data was collected in 2019 and the ATC data collected in 2021, however the TEMPRO growth as detailed in Table 6.6 of the TA is only 1.0209 in the AM and 1.0190 in the PM. This growth is lower than the observed difference in flow volumes.

In light of the higher flows observed via the ATC method of data collection compared to MCC in the 5-day peak average counts, a sensitivity junction model test should be provided by the applicant for the proposed site access in the 2037 future year scenario to demonstrate what the impact in the uplift in traffic on Newgate Lane East will have on junction capacity and operation to ensure that the proposed design can still accommodate this variance in demand. This additional assessment will ensure that the proposed site access junction model is robust and the impacts of the additional movements on the main arm are fully understood. Given the ATC data is only available for Newgate

Lane East, Newgate Lane traffic flows can be derived from the MCC counts for use in the assessment.

Regarding traffic flow diagrams, these show the baseline MCC traffic surveys, committed development flows, percentage trip distribution and forecast development flows within figures TF1 to TF35. However, it is noted that the traffic flow diagrams do not include the bypass straight ahead lane at the Newgate Lane/ Speedfield business park roundabout. The applicant should include this movement within the flow diagrams to allow clear transparency of flow data inputted into the junction models.

Additionally, the traffic flow diagrams and wider network junction models do not include the Gosport Road/ Palmerston Drive junction and the associated Newgate Lane flyover. This therefore leads to misleading and discrepant traffic flows coming in and out of neighbouring junctions. Following agreement of trip distribution and assignment, it is anticipated this junction should be modelled in order to ascertain any wider junction impacts associated with the additional trip generation of the proposed development, particularly given that the A32 Gosport Road represents a key local highway link.

Regarding the cycle counts on Newgate Lane, while useful, permanent cycle counters do not pick up all types of cycles and actual cycle movements are likely to be slightly higher than presented.

Personal Injury Accident (PIA) data recorded in the vicinity of the site for the latest available 5-year period have been provided within the TA. The study area for PIA analysis will be confirmed upon agreement of trip distribution and assignment. As stated in the TA, the signalised junction of A32 / Wych Lane is being upgraded and the Peel Common roundabout junction has further works underway to fully signalise this junction. In addition, the Quay Street roundabout will shortly undergo a complete resurface, which is anticipated to improve safety at this location.

The review of accident data and conclusions within the TA are accepted with the exception of the junction of Newgate Lane/ A32 Gosport Road interchange, where it is considered a cluster of personal injury accidents could be exacerbated by additional development traffic. It is noted that the current traffic distribution does not forecast development traffic to travel through this junction, however, this distribution is not accepted (comments below). The applicant should consider mitigation in this location.

Development Proposals

Pedestrian/ Cycle Site Access Arrangements

As noted above, no sustainable mode assessment or WCHAR has been carried out on the routes to the catchment schools. This is required.

Regarding links from the site to the existing pedestrian and cycle network, a number of access points are proposed as shown on drawing ITB10535-GA-013 Rev A. The comments below follow the numbering of this plan for reference.

Regarding access points 1 and 2 from the site to Public Right of Way (PROW) 76, which is a surfaced and lit footpath and cycleway, the following comments are made.

- No design or detailed access point location appears to have been submitted for access point 2. This is required.
- The applicant should confirm land within their control abuts the existing highway boundary.
- There are a number of significant trees in the vicinity, however, if access locations are carefully chosen at the detailed design stage should the development come forward, it is considered arboriculture and ecology constraints will be surmountable.

The following comments are made in relation to access point 3, linking from the development site to Tukes Avenue (in vicinity of 143 Tukes Avenue) shown on Drawings ITB10353-GA-301 Rev - and ITB10353-GA-305 Rev -. This utilises the existing gated access to the site and the adjoining service road, which is adopted highway.

- This is the only access point proposed on the eastern boundary of the site. This means future residents from the southern parcels would have to do a significant 'dog leg' to reach amenities in Bridgemary. Consideration should be given to additional pedestrian and cycle accesses on the eastern boundary of the site to achieve better connectivity.
- The applicant should confirm land within their control abuts the existing highway boundary.
- No Stage 1 Road Safety Audit (RSA1) has been carried out on these proposals. This is required and should be submitted for review.
- The link from the site to Tukes Avenue is unclear regarding vehicular and pedestrian priority. It is noted as shared use, however vehicular accesses and movements need to be carefully considered.
- The use of surface materials should be considered to reinforce the shared nature of the route.
- Adequate signage and cord paving should be shown to deal with the changing status of footways/shared surfaces.

- Cyclists exiting the site will have poor intervisibility with vehicles exiting the access roads to the rear of the existing houses. Suitable visibility should be demonstrated.
- The existing bellmouth junction with Tukes Avenue should be amended to a vehicle crossover arrangement to further highlight the presence and priority of pedestrians and cycles.
- Crossing points of Tukes Avenue are off the new/ proposed desire line. Consideration should be given to a crossing in the vicinity of this site access.
- A Traffic Regulation Order will be required to introduce parking restrictions and prevent parking on the service road.
- Additional wayfinding should be included to the BRT from this new link.

Access points 4 and 5 have been agreed under the Brookers Lane permission.

The following comments are made regarding access point 6:

- No RSA1 has been carried out on these proposals. This is required and should be submitted for review.
- Confirmation should be provided that the path from the built area of the proposed development, south of HMS Collingwood sports Pitches and north of the proposed retained western field, will it be lit and surfaced.
- The route is currently only proposed to accommodate pedestrians. This would be a more direct route from some proposed dwellings to the cycle provision on old Newgate Lane. Consideration should be given to an LTN1/20 compliant cycle route from old Newgate Lane to the built area of the proposed development.

Comments regarding access point 7 are made in the Vehicular Access Arrangements section below.

Regarding access points A, B and C, these link from the proposed site to the consented Brookers Lane development to the south. The three proposed pedestrian and cycle only connections are secured in the Brookers Lane permission under Condition 5. Should this application be permitted, delivery of these links should also be secured. However, should the Brookers Lane site not come forward, clarity should be provided regarding how links to Brookers Lane cycleway would be provided.

It is noted that no general vehicular connection is proposed between the site the consented Brookers Lane development, however an access for emergency vehicles is proposed. Regarding this proposed emergency access vehicle link

to the south, the consented Brookers Lane development includes the following Condition:

The development hereby permitted shall be carried out in general accordance with plan Ref CMP-01 Rev C and shall include:

- a) *Two pedestrian and cycling links at the southern boundary of the site to the Brookers Lane cycle link in the vicinity of the existing pedestrian accesses to Brookers Lane Playing fields;*
- b) *A suitable and direct internal path linking the north of the application site to the vehicular site access via the eastern boundary of the site;*
- c) *A pedestrian and/or cycle link to Heron Way to the east of the site;*
- d) *A single point of vehicular access to the development via Brookers Lane. No alternative or additional vehicular access points or links shall be provided. The internal site layout shall be designed to restrict the potential for any alternative or additional vehicular access points or links; and*
- e) *Suitable land up to the site boundary safeguarded for pedestrian and cycle only connections to the north as shown indicatively on masterplan drawing CMP-01 Rev C, only to be implemented should development on land to the north come forward. This land shall be dedicated as public highway if practicable.*

As the emergency access will not be open to general traffic, this may be deliverable; further liaison with Fareham Borough Council is required to confirm this point. However, given the uncertainty, the Emergency Services should confirm they are satisfied with the omission of this emergency link and that the remaining emergency accesses proposed are acceptable.

Off site Pedestrian/ Cycle Improvements

Following completion of a WCHAR review, a number of improvements have been identified to routes off site and in addition to the sustainable mode site access points. This includes works secured under the Brookers Lane planning permission (P/19/0460/OA). The suggested improvements are largely implementation of dropped kerbs and are considered acceptable.

However, regarding drawing ITB10535-GA-308, Walking and Cycling Route 2 to Woodcot Primary School/ BRT (sheet 2 of 2), while the dropped kerbs proposed are acceptable, as stated in the Existing Conditions section above, consideration should be given to an off-road cycle link adjacent to Wych Lane linking Tukes Avenue to the BRT. While Tukes Avenue is considered acceptable for cyclists of all abilities, this section of Wych Lane appears higher speed and significantly more heavily trafficked.

Regarding drawing ITB10535-GA-313, Walking and Cycling Route 6 to Solent Enterprise Zone (sheet 3 of 5), consideration should be given to lighting of the Brookers Lane/ Woodcot Lane pedestrian and cycle link. There are currently two lamp columns on Woodcot Lane, however the majority of the route is unlit. Liaison with the County Council's Street Lighting team will be required to ascertain deliverability of an appropriate lighting scheme.

Regarding access across Newgate Lane, three connections are proposed. Firstly, via connection from the site to the existing crossing at Brookers Lane/Woodcot Lane (proposed to be upgraded to a Toucan crossing), secondly at the site vehicular access, via a crossing of the northern arm of the proposed roundabout (two options submitted, as an uncontrolled crossing with refuge island and including a Toucan crossing) and finally via the exiting refuge north of the proposed vehicular access (comments above regarding cycle use of this crossing point). There is also an existing Toucan crossing in the vicinity of the western end of PROW 76, just south of the HMS Collingwood signalised junction. Given the presence of one existing and one proposed Toucan crossing to the north and south of the development site, it is considered acceptable for the crossings on the northern arm of the proposed site access roundabout and the crossing to the north of this at the existing bus stops to be uncontrolled.

Regarding access to PROWs, footpaths 74/ 71a/ 72 and footpaths 68/ 70 provide direct routes to Stubbington and have been assessed in the WCHAR. While these routes provide a slightly shorter distance to some areas of Stubbington, and are likely to be important recreational routes, there are alternative amenity links (surfaced and lit) via old Newgate Lane and Gosport Road into Stubbington. Given these routes are currently unsurfaced and unlit, running largely through open countryside, and alternative routes exist, it is considered acceptable they are not brought up to amenity link standard.

There is a missing cycle connection on Redlands Lane, from the northern end of Henry Cort Way to The Gillies, which connect to Fareham Town Centre, rail station and Wallisdean Infant and Junior schools. Improvements to this section should be considered by the applicant.

The route to the catchment schools of Wallisdean Infant and Junior and Fareham Secondary Academy north of Longfield Avenue has missing cycle connections, this should be considered in any future assessment. Similarly, the existing cycle provision on the western arm of the Longfield Avenue roundabout junction should be reviewed and improvements should be explored by the applicant.

It is noted the emerging Fareham LCWIP is likely to be adopted imminently and may raise other requirements or routes from the proposed development to amenities. The draft document is available for review via [Share Your Views On Fareham LCWIP – Commonplace](#) and the Transport Assessment should be updated to consider the findings.

Funding should be provided to undertake or update school travel plans for each catchment school, as well as to be used for investment in the promotion of sustainable travel. A contribution of £42,000 towards the producing and delivering School Travel Plans for the catchment schools is requested by our education department and this would be considered acceptable mitigation to cover this element, should the development be approved.

Vehicular Access Arrangements

Vehicular access is proposed via a new four-arm, 50m ICD roundabout at the junction of old Newgate Lane/ Newgate Lane East shown on drawing ITB10353-GA-102 Rev C. Regarding the design of this junction, the following comments can be made:

- Speed data provided in the TA lacks detail, including survey locations, weather information and the raw data. This should be provided for review.
- It is noted that using the out-of-date data supplied, and applying an uplift of 2.5mph due to missing weather data, the visibility requirements for the Newgate Lane East approaches would be 129m (Northbound) and 132m (Southbound) – both exceeding the 120m shown on the provided drawings. Visibility requirements based on updated speed surveys to TG3 should be demonstrated.
- No speed data has been provided for the old Newgate Lane approach from the west. This is required.
- The roundabout geometry shown on drawing ITB10353-GA-105 Rev B is considered acceptable at this in principle design stage. However, the gradient on approaches appears to be very flat. As such, the applicant should demonstrate suitable land is available to provide attenuation for surface water drainage required for the new roundabout. The type and location of drainage should be carefully considered to account for safety implications and accessibility for future maintenance. It is not appropriate to attenuate within the roundabout itself.
- The items raised in the RSA1 have been satisfactorily addressed, subject to acceptable indicative drainage proposals being provided. Confirmation from the auditor should be provided following any further design amendments.
- It should be noted that Ordinary Watercourse Consent will be required for diversion and culverting of the existing ditch on Newgate Lane East.
- Consideration should be given to an LTN1/20 compliant segregated cycle route from the access roundabout into the built area of the proposed development and connecting with old Newgate Lane.
- The arrangement for cyclists to leave the proposed cycle route on old Newgate Lane to and from south may require further consideration at detailed design should the scheme come forward.
- A suitable 'buffer' Of 0.5m is required to shared use routes adjacent 40mph roads and should be shown.

The operation of the proposed roundabout will require assessment once an acceptable design and trip distribution and assignment have been agreed.

Site Layout and Parking Provision

It is noted that the application is for outline consent only and matters of layout and parking will be determined at the Reserved Matters stage should the development come forward. However, the applicant should note the following points for any future reserved matters submission.

- Clarity should be provided regarding whether the internal layout will be offered for adoption, which is encouraged. For any internal areas being offered for adoption, early engagement with Hampshire County Council's Section 38 team is strongly advised.
- The development should be designed to comply with Manual for Streets in terms of the design criteria including geometry, visibility, provisions for emergency vehicles and arrangements for refuse storage and collection.
- An RSA1 will be required on the internal layout.
- Auto tracking will be required for the largest vehicles entering the site to ensure adequate turning is available on site to prevent the requirement for vehicles to reverse to/ from the public highway. Tracking speeds should be shown clearly on plans.
- With regards to the "Main Streets" a minimum 5.5 carriageway width as per MfS allows, is likely to be acceptable on a straight road, however, widening on bends may be required; provision of tracking of appropriate vehicles will confirm this.
- Regarding the cycleway provision, LTN1/20 Cycle Infrastructure Design should be referenced. Shared use provision may be acceptable where pedestrian and cycle numbers are anticipated to be low.
- The internal layout should be designed to a 20mph design speed, with 25m forward visibility provided accordingly.
- As stated in the TA, parking provision will be in accordance with Fareham Borough Council's Car & Cycle Parking Standards SPD (2009); this should include the quantum of the provision and the dimensions of parking spaces. The TA states "parking to be generally provided within curtilage of individual dwellings and within communal parking areas for apartments". It should be noted that in the SPD garages will not normally count towards overall parking provision. If this is the case the developer will need to demonstrate that it is the only means of parking a car and show adequate dimensions of garage spaces.

- A mixture of allocated and unallocated parking areas to be provided as part of the development. The overall parking demand should still be met.
- Parking or other features should not impede visibility at internal junctions.

Accessibility

Distances to key destinations as presented in Table 5.2 of the TA appear accurate from the centre of the site. It is noteworthy however that the site is c.700m north to south and c.400m east to west; therefore, depending upon a future resident's location within the site, these distances could vary significantly. There appears to be an adequate range of amenities within suitable walking and cycling distances. However, while the exact routes to amenities have not been provided, it is assumed these rely on delivery of all the pedestrian and cycle connections proposed on drawing ITB10535-GA-013 Rev A. As such, surety is required regarding the deliverability of these access points as set out in the Pedestrian/ Cycle Site Access Arrangements section above. In addition, investigation and delivery of improvements to pedestrian and cycle infrastructure as set out above is required to ensure a sustainable development.

Pedestrian and Cycle Demands and Route Choice

The pedestrian and cycle demand assessment does not include any of the catchment schools. This is inaccurate and should be corrected. The assessment will be reviewed in detail following this correction.

As highlighted in the TA, a financial contribution of £78,160 was secured from application 19/00516/OUT towards pedestrian and cycling improvements at the Brookers Lane crossing of Newgate Lane East. The value of this contribution was based on 50% of the estimated cost of installation of a Toucan crossing, however it is worth noting the contribution secured crossing improvements, not necessarily installation of a Toucan crossing. As stated in the TA, given the additional movements (albeit, currently underestimated due to the omission of catchment schools) upgrade of this uncontrolled crossing to a controlled Toucan crossing will be required due to the additional pedestrian and cycle movements forecast to be generated by this development. It should be noted this will result in additional delay on Newgate Lane East. Comments on the modelling of this Toucan crossing, forecasting the resulting delay, are provided in the Junction Capacity Testing section below.

A financial contribution of £78,160 is required to provide the remainder of the value needed for the Local Highway Authority to implement a Toucan crossing of Newgate Lane East at Brookers Lane/ Woodcot Lane. The applicant has confirmed in the TA this contribution is agreed.

Travel Plan

The Framework Travel Plan is of a good standard and is considered acceptable as submitted.

Traffic Impact

The study area for junction capacity assessment will be confirmed upon agreement of trip distribution and assignment.

Baseline Conditions

The methodology used as part of the Land at Newgate Lane South application (application ref: P/19/0460/OA) to understand the baseline traffic scenario with Stubbington Bypass in place (scenario DS2) is acceptable for use with respect to this application.

The 2019 baseline traffic flows have been adjusted using the same agreed methodology that was applied for the Land at Newgate Lane South application (application ref: P/19/0460/OA).

The Local Highway Authority's pre-application response noted that the 2019 base "DS2" traffic flows presented in the TA do not match the agreed DS2 base flows set out in the Transport Assessment Rev A dated April 2019 submitted under application P/19/0460/OA. The Applicant has clarified that this is due to different peak periods being assessed. A comparison is provided in response to pre-application comments, comparing the total junction flows at a number of key junctions in vicinity of the site. The total flow volumes through the junctions are higher in the observed peak hours (07:45-08:45) and (16:00-17:00) compared to the standard network peak hours used in application P/19/0460/OA. As such, this is considered acceptable for a robust assessment.

Trip Generation

To provide a robust assessment, it has been assumed in the TA that all dwellings will be privately owned houses. The forecast trip generation of 192 two-way vehicle movements in the AM peak hour and to 194 two-way vehicle movements during the PM peak hour is considered acceptable.

Traffic Distribution and Assignment

The methodology of using a combination of Travel to Work data and a gravity model is acceptable in principle for determining an appropriate forecast development traffic distribution. The Applicant has used the TEMPRO database to understand journey purpose; this assessment provides the following journey purpose splits, which have been used in the submitted development traffic distribution model:

- Commuting: 50.4% (HB and NHB Work and Employers Business); and
- Non-Commuting: 49.6% (HB and NHB Education, Shopping, Personal Business, Recreation / Social, Visiting Friends and Relatives, Holiday / Day Trip).

The applicant has submitted a clear method for deriving this split, which is accepted.

Regarding the employment trip distribution, both Gosport 001 and Fareham 013 mid-layer super output area (MSOA) data for residents from the 2011 Census has been used as requested during pre-application discussions. However, discrepancies are noted in the destination data as not all of the destinations noted are at MSOA level. The raw 2011 Census data and methodology used to generate the destinations and car trip percentages are required to gain a detailed understanding of the employment trip distribution.

The table below presents findings in relation to the route taken and journey time for each destination. The average journey time is noted where a range is provided on Google Maps. On some occasions, routing is via the Stubbington Bypass for destinations that are considered should route via the A27 and M27, north from the site access, given the more direct routing. This needs to be revisited.

The observed traffic proportions at the site access location in the AM peak show 73.7% of traffic northbound and 26.3% of traffic southbound on Newgate Lane East. The submitted distribution is not considered representative and the applicant should amend the assumptions identified in red in the table below and resubmit the traffic distribution.

Data has been reviewed for those destinations where the proportion of car trips is nearing or over 5% only, but it is noted that all locations need to be considered by the applicant.

DESTINATION	PROPORTION BY CAR (100%)	PEAK JOURNEY TIME AS PER THE APPLICANT'S TA	IS THE ROUTING CORRECT (Y/N)	IS THE PEAK JOURNEY TIME CORRECT (Y/N)*
Bridgemary	4.75%	First Route Option – 5mins	First Route Option – Y	First Route Option – Y
Eastleigh	5.61%	First Route Option – 39mins Second Route Option – 38mins Third Route Option - 37mins	First Route Option – Y Second Route Option – Y Third Route Option - N, this should not route via the bypass.	First Route Option – Y, 20mins variance Second Route Option – Y, 22mins variance. Third Route Option – N, 43mins journey time, 25mins variance.
Fareham	11.97%	First Route Option – 13mins Second Route Option – 13mins	First Route Option – Y Second Route Option – Y	First Route Option – Y, 6mins variance Second Route Option – N, 11mins journey time, 7mins variance.
Gosport	5.13%	First Route Option – 17mins	First Route Option – Y	First Route Option – Y, but 8mins variance

DESTINATION	PROPORTION BY CAR (100%)	PEAK JOURNEY TIME AS PER THE APPLICANTS TA	IS THE ROUTING CORRECT (Y/N)	IS THE PEAK JOURNEY TIME CORRECT (Y/N)*
Portsmouth	15.45%	First Route Option – 27mins Second Route Option – 34mins	First Route Option – Y Second Route Option – N, A27 should be relabelled as A27 Porchester Road	First Route Option – N, 22mins journey time, 12mins variance Second Route Option – N, 29mins journey time, 22mins variance.
Southampton	4.98%	First Route Option – 43mins Second Route Option – 42mins Third Route Option – 38mins	First Route Option – Y Second Route Option – Y Third Route Option - N, this should not route via the bypass.	First Route Option – Y, 30mins variance Second Route Option – Y, 30mins variance. Third Route Option – N, 53mins journey time, 35mins variance.
Stubbington	6.87%	First Route Option – 6mins	First Route Option – Y	First Route Option – Y
Swanwick	7.79%	First Route Option – 27mins Second Route Option – 20mins Third Route Option – 18mins	First Route Option – N, query why no one is routing this way Second Route Option – Y Third Route Option - N, this should not route via the bypass.	First Route Option – Y, 12mins variance Second Route Option – Y, 10mins variance. Third Route Option – N, 27mins journey time, 17mins variance.
Winchester	8.56%	First Route Option – 48mins Second Route Option – 45mins Third Route Option – 44mins	First Route Option – N, query why no one is routing this way Second Route Option – Y Third Route Option - N, this should not route via the bypass.	First Route Option – N, 53mins journey time, 25mins variance Second Route Option – N, 50mins journey time, 30mins variance Third Route Option – N, 55mins journey time, 30mins variance.

Regarding the non-employment distribution, a gravity model has been used, with a 20-minute catchment area proposed. 2011 Census data has been used to inform the population of destinations, to input into the gravity mode.

A similar review approach has been taken to the employment trip distribution. Data has been reviewed for those destinations where the proportion of car trips is nearing or over 5% only, but it is noted that all locations do need to be considered by the applicant. That is, the Applicant should reconsider the point highlighted in red in the below table and further destinations in Appendix O of the TA.

DESTINATION	PROPORTION BY CAR (100%)	PEAK JOURNEY TIME	IS THE ROUTING CORRECT (Y/N)	IS THE PEAK JOURNEY TIME CORRECT (Y/N)*
Fareham	21.15%	First Route Option – 13mins Second Route Option – 13mins	First Route Option – Y Second Route Option – Y	First Route Option – Y, 6mins variance Second Route Option – N, 11mins journey time, 7mins variance.
Stubbington	12.33%	First Route Option – 6mins	First Route Option – Y	First Route Option – Y

Assessment Years

The assessment years are considered appropriate.

Traffic Growth and Committed Development

The TEMPRO study area consisting of Gosport 001 MSOA and Fareham 013 MSOA is acceptable given the application site is split across these two zones. The applicants proposed method for upscaling traffic growth via an adjusted TEMPRO rate is considered acceptable and accurately reflected in the TA, traffic flow diagrams and junction modelling.

The proposed committed developments included within the TA assessment are acceptable. Furthermore, traffic forecast to be generated by the live application 'Land South of Longfield Avenue, Fareham' (P/20/0646/OA) is included in a sensitivity test.

However, Welborne Garden Village (P/17/0266/OA - up to 6,000 dwellings) committed development flows appear low. Traffic flow diagrams supplied in the Transport Assessment Addendum dated March 2019 prepared by WSP in support of application P/17/0266/OA forecasts a significant proportion of trips to exit the M27 J11 off-slip and travel via the A27 Gosport Road. Whilst the flow diagrams do not continue to the A27/ Gosport Road/ Quay Street junction and hence does not indicate the volume of trips routing via Newgate Lane, a total of 628 development vehicle trips travel southbound on the A27 Gosport Road in the AM peak and 427 vehicle trips in the PM peak. In comparison to the fewer than five vehicles travelling via Newgate Lane East, the routing is suggesting almost all trips are dispersed via alternate routes which is not considered realistic. The applicant should confirm how the committed development trips associated with Welborne Garden Village have been distributed from the A27 Gosport Road. This further information is required to ensure any additional trips associated with this development are accounted for in the site access junction modelling and off-site highway modelling.

Junction Capacity Testing

The following junctions are proposed to be included in the study area. Detailed junction capacity modelling has been carried out for these junctions:

- Newgate Lane East/ Newgate Lane/ Site Access roundabout (uncontrolled crossing);
- Newgate Lane East/ Newgate Lane/ Site Access roundabout (Toucan crossing);
- Peel Common roundabout;
- Newgate Lane/ HMS Collingwood access;
- Newgate Lane/ Speedfields Park roundabout
- Newgate Lane/ Longfield Avenue roundabout.

The study area for detailed junction capacity modelling will be confirmed following agreement of trip distribution and assignment.

The submitted TA does not include any details on the process for calibration or validation of the baseline junction models. Typically, this process would be undertaken using queue length surveys in order to ensure that the results of the baseline modelling reflect that of the observed transport conditions. Whilst queue length data is provided in Appendix G of the TA, no comparison against the baseline modelling is provided as a validation exercise.

The applicant should compare queue length data with the baseline models where appropriate to ensure the base models are validated and, if necessary, calibrated to observed conditions.

The assessment scenarios set out in paragraph 6.7.2 to the TA are acceptable. It is agreed that the 2021 baseline year is assessed using DS1 traffic flows (assuming no Stubbington Bypass), whilst the remaining scenarios are assessed using DS2 adjusted traffic flows as Stubbington Bypass is expected to be completed in 2022, ahead of occupation of the development should it come forward.

For each junction assessed, the model set up and inputs have been reviewed and the following comments can be made.

- Old Newgate Lane/ Newgate Lane East existing Junction Operation
 - No junction geometry drawings have been submitted and should be provided, including the width/length dimensions of the right turn

storage pocket. This must be supplied by the applicant in order to confirm the geometries applied within the junction modelling.

- Validate and, if necessary, calibrate the model using queue length data.
- It is noted from on-site observations that the existing junction layout operates satisfactorily. This junction was the subject of detailed VISSIM modelling assessment as part of the assessment of the appeal schemes west of Newgate Lane (P/18/1118/OA and P/19/0460/OA) and operated with a delay of less than 50 seconds per vehicle on the old Newgate Lane arm in the AM peak of the 2024 future year assessed under that application. As such, while further information is required to accurately review the modelling submitted under this application, it is expected the TA overestimates operational issues with the existing layout in the 2028 future year.

It should be noted that paragraph 4.4.33 of the TA is incorrect. The Local Highway Authority did not agree that the traffic impacts at the junction would be acceptable for the indicative arrow right turn arrangement. Paragraph 6.28 of Proof of Evidence of Nick Gammer in Respect of Highways and Transportation is copied below.

As set out above, currently, north and south bound traffic on Newgate Lane through this junction experiences free flow conditions. The introduction of additional queue lengths of over 100m and average per vehicle delay of over c.11 seconds for northbound traffic in the AM peak on the newly constructed and vital infrastructure of Newgate Lane East is unacceptable and represent a severe impact on the highway network under paragraph 109 of NPPF.

- Proposed Newgate Lane East/ Newgate Lane/ Site Access roundabout (uncontrolled crossing)
 - Updated modelling will be required following any design amendments.
 - The proposed Newgate Lane site access uses a 'direct' approach to inputting origin and destination flows, whereas for off-site unsignalised junction models a 'one hour' profile, including a 15-minute load time before and after the peak hour. The 'one hour' flow profile should be used for all models.
 - An even profile distribution of proposed development traffic flows has been included in the junction model for the peak hours. This assumes a flat distribution profile over the peak hour. The applicant should use the 'one hour' profile, with loading for the 15 minutes before and after the junction modelling period for a robust assessment.

- HGV Percentages significantly vary across time periods, with Newgate Lane West having a 20% and 33% HGV proportion. The applicant should confirm that HGV percentages are derived from traffic survey data in light of the reported HGV proportions on certain arms of the junction.
- It is noted that the junction modelling includes a warning that the Newgate Lane East (South) includes an effective flare length of 52.1m, with a warning message noting that the effective flare length is over 30m which is outside of the normal range and capacities should be treated with increasing caution. The geometry shown on drawing ITB10353-GA-105, includes an effective flare length of 18.91m and therefore given that the RFC for this arm in the AM in 0.84 this requires careful consideration as reducing the flare will result in a greater RFC and could lead to capacity issues. The applicant should therefore clarify the discrepancy between model geometry drawings and the effective flare length coded in the junction model and amend the junction modelling if required.
- Peel Common Roundabout
 - The model provided does not reflect the current scheme being constructed at Peel Common roundabout. An updated model can be provided by Hampshire County Council.
 - It is noted that some of the circulatory queuing is longer than the available storage area. These queues should be constrained to the storage area to prevent blocking back across the exits from the roundabout.
- Newgate Lane / HMS Collingwood Access / Speedfields Park
 - Stage 2 is missing from the stage sequence. When demanded it will appear for at least the phase C (right turn to HMS Collingwood) minimum green time. If a demand exists for phase E (Toucan across southbound lanes) the controller will move to stage 3 after the phase C minimum green time with the phase delay time applied.
 - In the AM peak it is noted that the Newgate Lane northbound flows have been locked per lane. There is no reasoning given for this.
 - The PM peak traffic flow on Newgate Lane southbound (J2 arm 1) has been split evenly across the 2 lanes. To reflect the on-street behaviour resulting from the downstream merge the southbound flows should be weighted with 60% in the nearside lane and 40% in the offside lane.

- Validate and, if necessary, calibrate the model using queue length data.
- Newgate Lane / Longfield Avenue Roundabout
 - No junction geometry drawings have been provided. This must be supplied by the applicant in order to confirm the geometries applied within the junction modelling.
 - Validate and, if necessary, calibrate the model using queue length data.
- Brookers Lane Toucan Crossing
 - Establishing the demand level at the crossing will be essential to understand the traffic impact on Newgate Lane. Correction of the pedestrian and cycle distribution is required to ascertain a reasonable estimate of the future demand.
 - The modelled cycle time in the AM peak is 90 seconds which indicates 40 demands across the peak hour. In the PM peak (1600-1700) the cycle time is 70 seconds which indicates 51 demands across that hour. Accurately predicting the demand level particularly in the AM peak will be vital. For example, should the demand actually be 50 appearances per hour in the AM peak the shorter 70 second cycle time has a significant impact on the Degree of Saturation on Newgate Lane northbound. At the modelled 90 sec cycle time this approach is just within capacity in 2028 AM 'with development traffic' (1.0% PRC) but goes over capacity in 2037 'with development traffic' (-3.8%). Reducing the cycle time due to increased demand pushes Newgate Lane northbound further over capacity in the AM peaks.
 - In the Linsig model the Stage 1 to 2 intergreen should be increased from 5 to 6 seconds to reflect the forced stage changes at the standalone crossing due to the lack of gaps in the peak hour flows along Newgate Lane.

Wider Highway Network Impact

Comment on the impact of the proposed development at the above locations will be made following agreement of trip distribution, assignment and resolution of the above modelling comments.

The study area for detailed junction capacity modelling will be confirmed following agreement of trip distribution and assignment.

It should also be noted that no consideration has been given to disruption caused due to construction of the proposed site access roundabout, including of diversion of traffic to unsuitable routes, which is considered an additional unnecessary impact by the Local Highway Authority.

Furthermore, the increase in traffic emissions due to the introduction of the new site access roundabout, causing all traffic to slow and then accelerate, do not appear to have been considered. Assessment of this impact is required.

These factors, relating to both the impact of roundabout construction on the wider network and also the longer-term carbon related impacts of the additional traffic and infrastructure will need to be considered further.

Previous Local Plan Assessment

The earlier version of the local plan referred to in the TA, including the proposed development site within allocation HA2, was revised before going to examination. As such, the current local plan proposals being tested at the currently underway examination do not include this site. Also, the Local Highway Authority objected to the HA2 allocation in the iteration of the local plan referenced in the TA as set out in the Background section above.

Furthermore, any threshold agreed with the County Council for the purpose of the Local Plan testing to identify 'severe' impacts applies to all proposed local plan sites on aggregate and not to individual sites. For a single site in isolation, a delay of less than the threshold stated for all sites on aggregate could be considered severe.

Recommendation

On the basis of the information submitted in support of the planning application, the Local Highway Authority would recommend that the Local Planning Authority refuse the application due to the following reasons:

1. The applicant has failed to demonstrate the development would not result in an unacceptable impact on highway operation and safety. On this basis the proposed development would be contrary to NPPF Paragraph 111 in that it would result in a severe impact on the road network.

Reason: In the interest of Highway Safety and Operation.

2. The applicant has failed to demonstrate that the development can be accommodated in a manner that would not cause increased danger and inconvenience to highway users, including those travelling by sustainable modes. On this basis the proposed development would be contrary to NPPF Paragraph 110.

Reason: In the interest of Highway Safety and Accessibility.

It may be possible that the reasons set out above, could be overcome following receipt of additional information as follows:

- A WCHAR review of routes to the catchment schools and amenities within Stubbington.
- Consideration of improvements for cyclists on Wych Road, between Tukes Avenue and the Henry Cort Way.
- Consideration of Redlands Lane cycle improvements, between the northern end of Henry Cort Way and The Gillies.
- Agreement of a contribution of 16,000 towards the provision of Real Time Information (RTI) at Tukes Avenue bus stops.
- A sensitivity junction model test for the proposed site access in the 2037 future year scenario, uplifted to the recorded ATC flows.
- Revised traffic flow diagrams to include the bypass straight ahead lane at the Newgate Lane/ Speedfield business park roundabout.
- Extended traffic flow diagrams to include the Gosport Road/ Palmerston Drive junction and associated Newgate Lane flyover.
- Consideration of PIA mitigation at Newgate Lane/ A32 Gosport Road interchange.
- Address comments relating to the design of the proposed pedestrian and cycle accesses.
- Address comments relating to the proposed southern emergency access link.
- Consideration of lighting of the Brookers Lane/ Woodcot Lane pedestrian and cycle link.
- Consideration of cycle improvements on the route to the catchment schools of Wallisdean Infant and Junior and Fareham Secondary Academy at, and north of, Longfield Avenue.
- Agreement of a contribution of £42,000 towards the producing and delivering School Travel Plans for the catchment schools.
- Address comments relating to the design of the proposed roundabout site access.
- Inclusion of the catchment schools in the pedestrian and cycle demand forecasts.
- Amend the routing and journey times for the destinations noted and resubmit a revised traffic distribution.
- Confirm the distribution of Welborne Garden Village committed development trips from the A27 Gosport Road.
- Compare queue length data with the baseline models to ensure the base models are validated to observed conditions. Calibrate baseline models if necessary.
- Geometry drawings for all off-site highway junction models.
- Updated modelling using a one-hour profile rather than direct flow input for the proposed site access.
- Confirm that HGV percentages are derived from traffic survey data.

- Clarify the discrepancy between the 18.91m effective flare length shown on drawing ITB10353-GA-105 and the 52.1m coded in the site access junction model.
- Provide modelling to reflect the current scheme being constructed at Peel Common roundabout.
- Address the modelling comments relating to Newgate Lane/ HMS Collingwood Access/ Speedfields Park junction.
- Address the modelling comments relating to Brookers Lane Toucan Crossing.

The County Council as Local Highway Authority reserve the position to provide an updated recommendation following review of additional details, should these be provided.

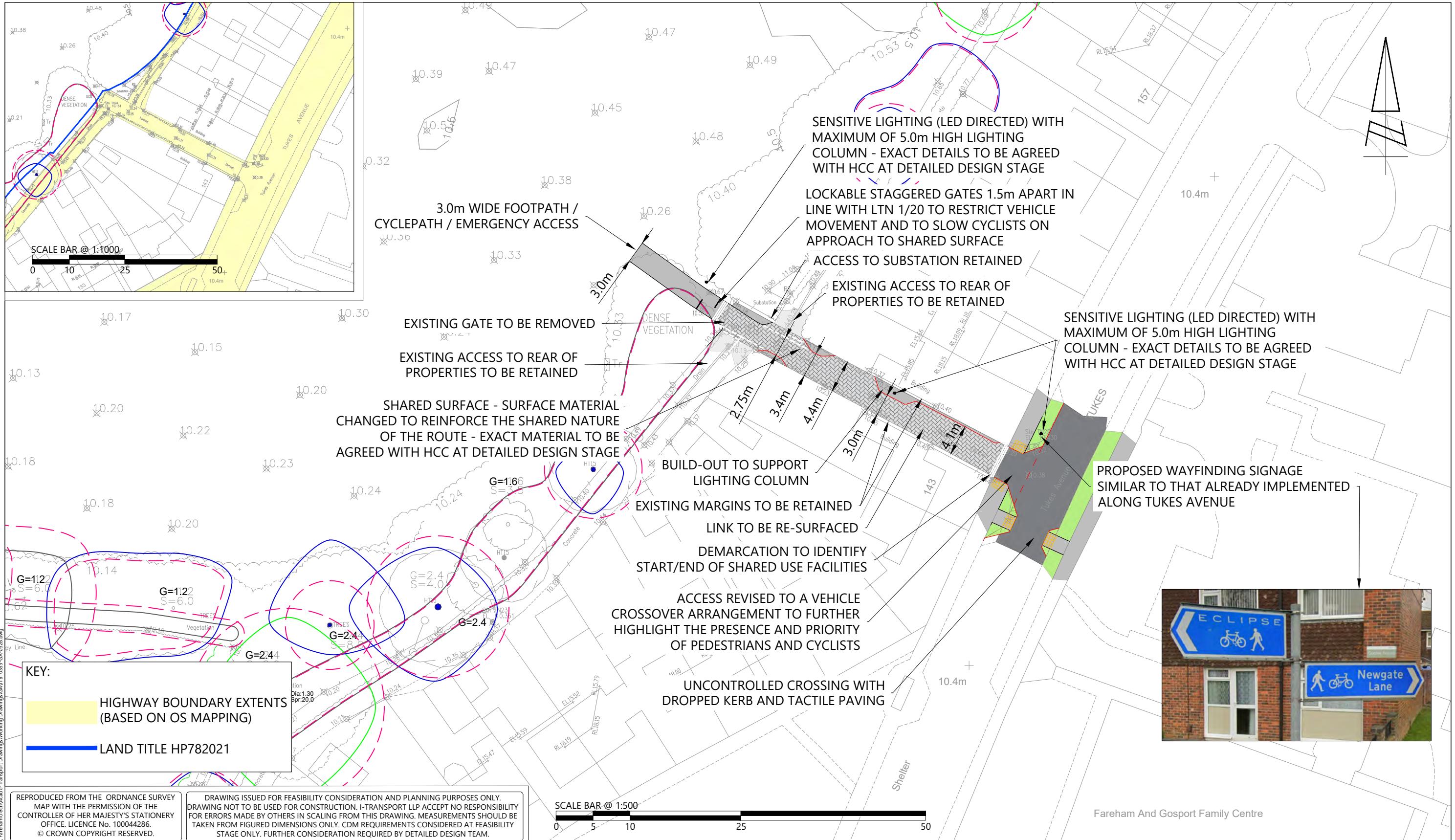
I trust that the above is clear, but I would ask you not to hesitate to contact Nick Gammer should you wish to discuss anything further.

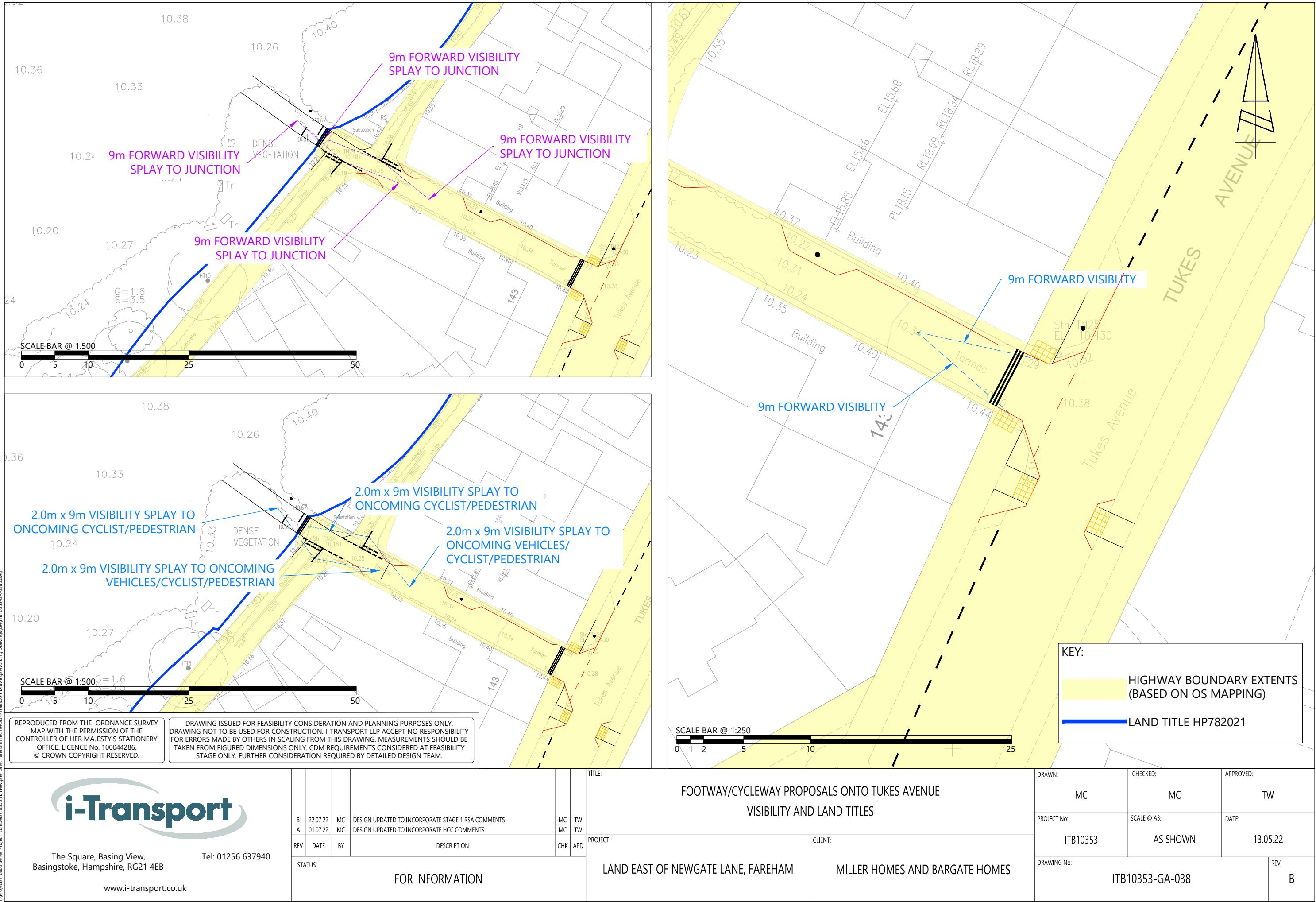
Appendix B: Countryside and Rights of Way comments

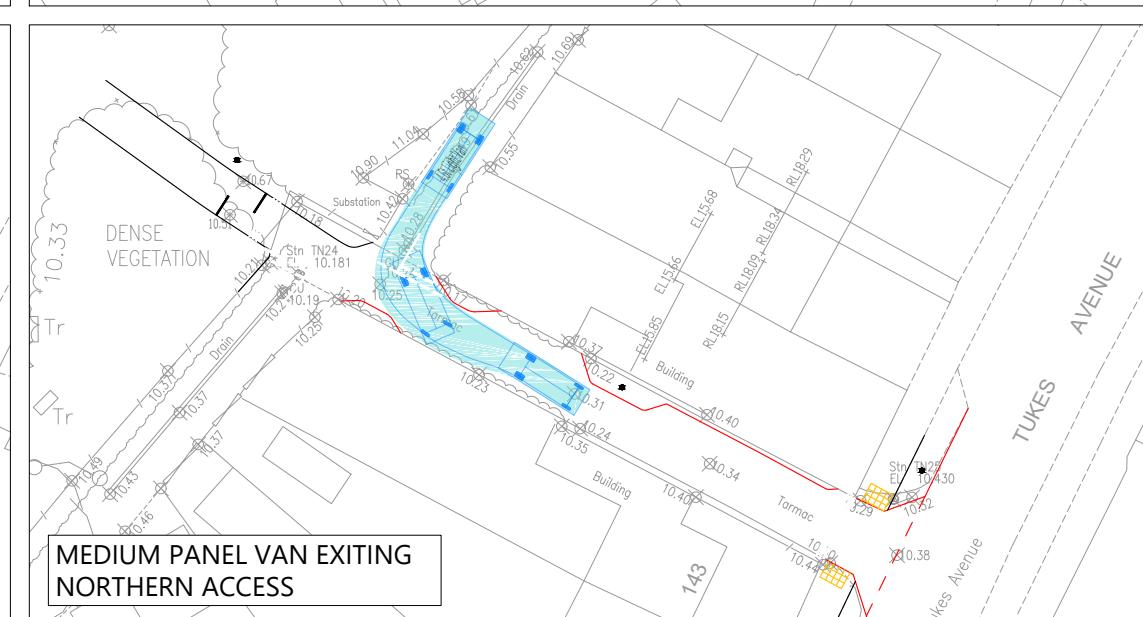
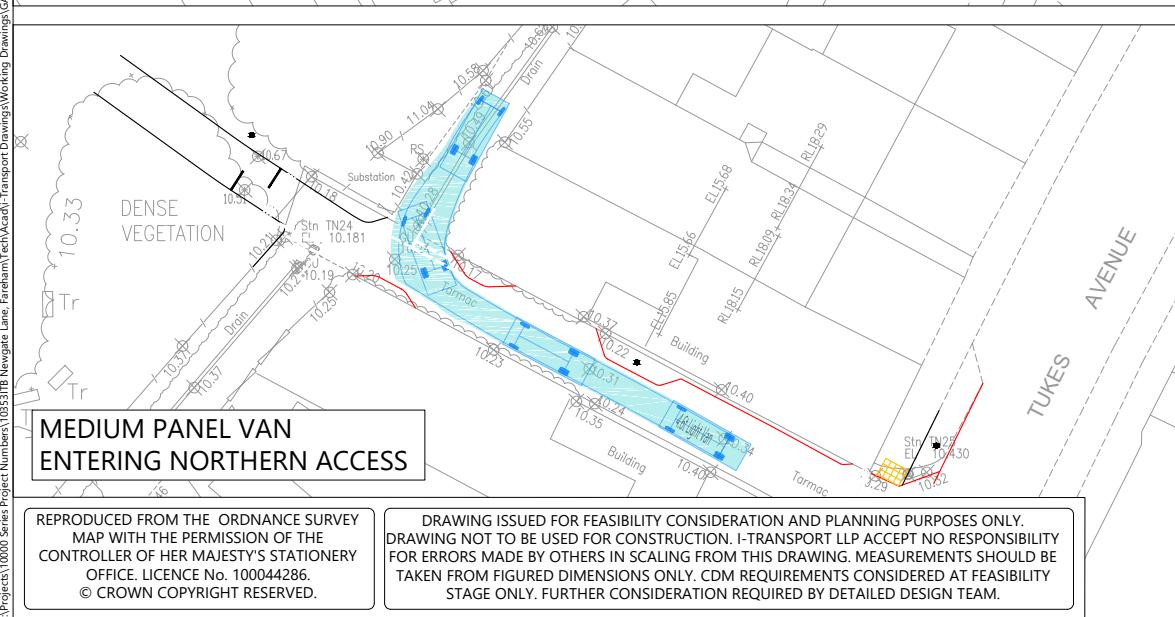
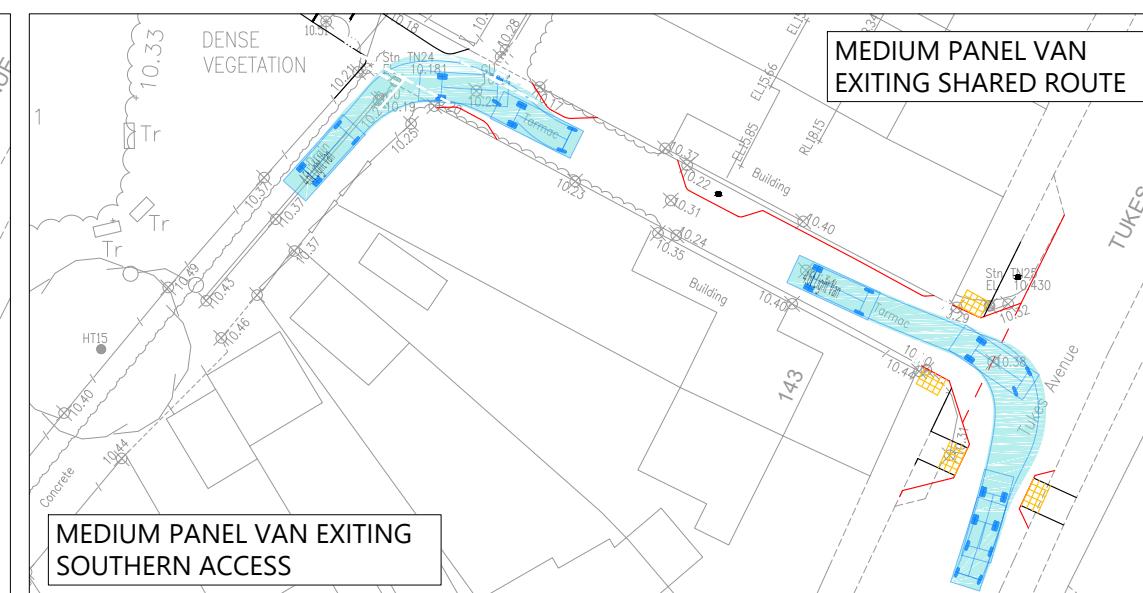
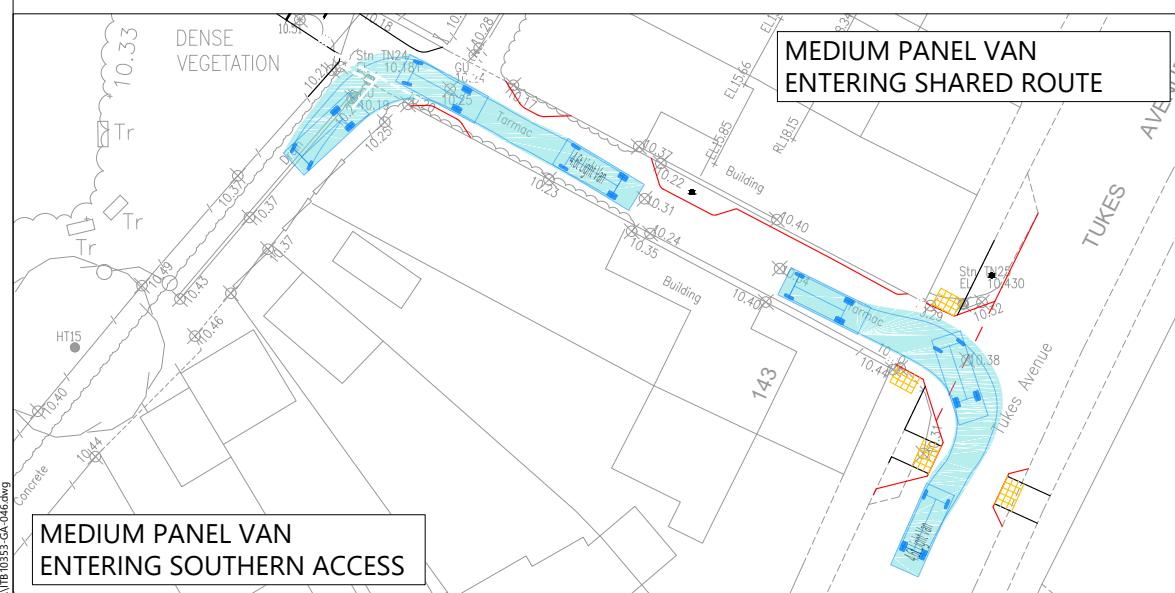
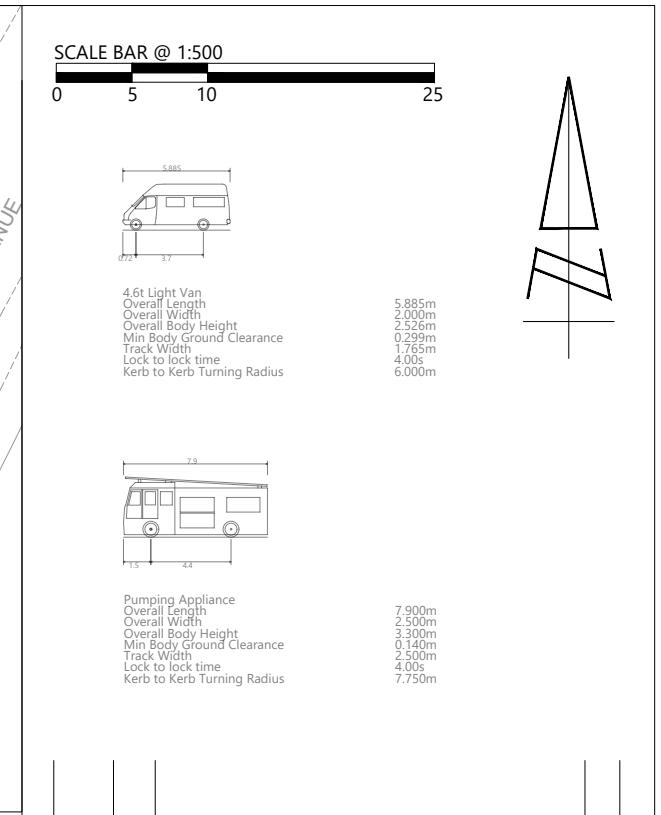
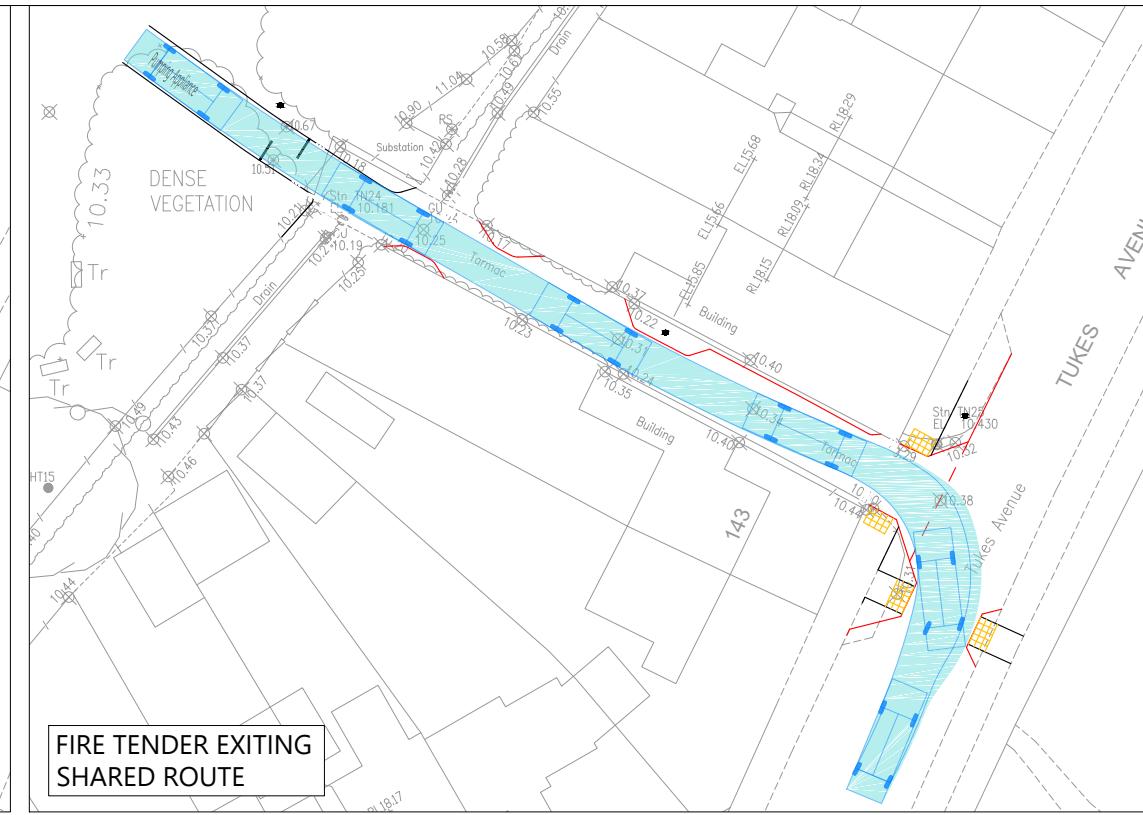
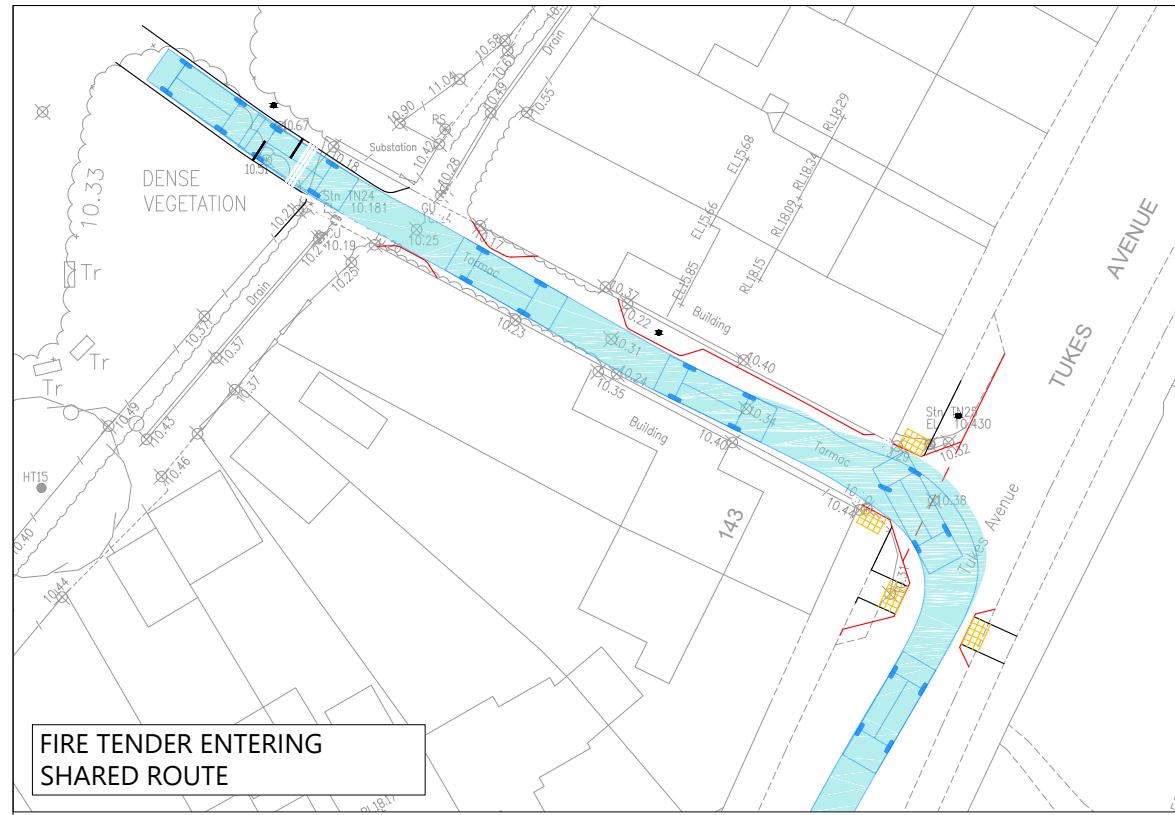
It is noted that the Walking, Cycling and Horse-riding Assessment and Review does not include horse riding which, while not relevant to the development proposed, is relevant to the scope of the TA. In particular FP 74 and FP 68 currently have permissive equestrian access. The TA does not assess the current use of Tanners Lane/FP by cyclists.

The Countryside Service would support any proposals to add to the rights of FP 68 which is likely to provide a better routes to local amenities, strategic greenspace and access to wider countryside or long distance routes (including the Meon Valley, Titchfield Canal and Titchfield Haven NNR) than FP 74 (as the route now crosses/truncated by the Stubbington bypass).

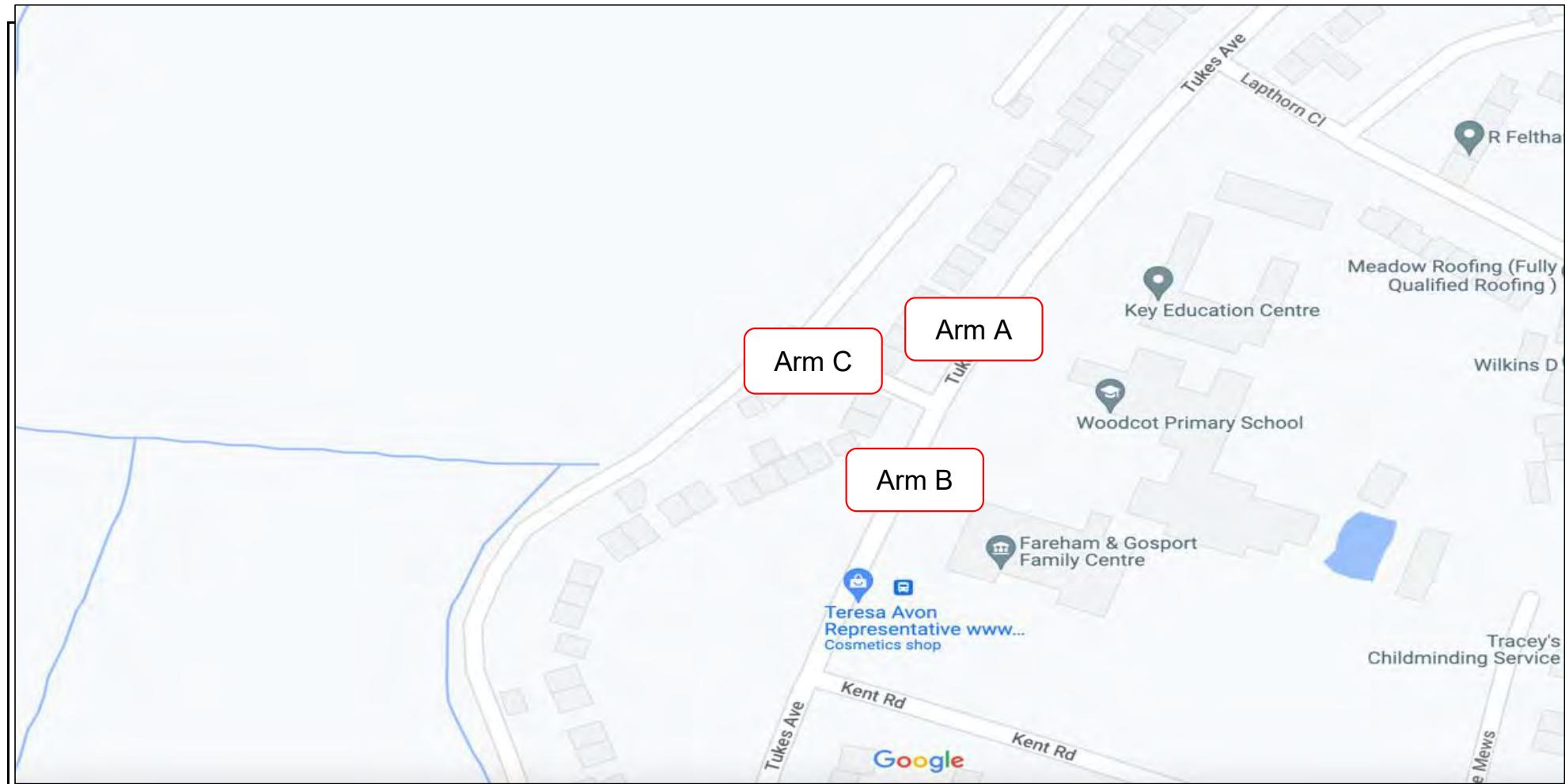
APPENDIX B. Tukes Avenue Improvement Scheme and RSA







Job ID	Project Name	Site Location	Google Coordinates	Survey Date	Survey Day	Survey Timings	Weather AM	Weather Inter Peak	Weather PM
IW0042	Newgate Lane, Gosport	Tukes Avenue / Service Road to the west	50.830749, -1.182451	10/05/2022	Tuesday	0000-0000hrs	Dry	Dry	Dry
				11/05/2022	Wednesday	0000-0000hrs	Dry	Rain	Rain
				12/05/2022	Thursday	0000-0000hrs	Dry	Dry	Dry



A-B		A-C		B-A		B-C		C-A		C-B	
Time Interval		Pedestrians	Cyclists on pavement								
00:00	00:15	0	0	0	0	0	0	0	0	0	0
00:15	00:30	0	0	0	0	0	0	0	0	0	0
00:30	00:45	0	0	0	0	0	0	0	0	0	0
00:45	01:00	0	0	0	0	0	0	0	0	0	0
01:00	01:15	0	0	0	0	0	0	0	0	0	0
01:15	01:30	0	0	0	0	0	0	0	0	0	0
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20:45	21:00	2	0	0	0	0	0	0	0	0	0
21:00	21:15	4	0	0	0	1	2	0	0	0	0
21:15	21:30	3	1	0	0	2	0	0	0	0	0
21:30	21:45	0	0	0	0	0	1	0	0	0	0
21:45	22:00	1	0	0	0	5	0	0	0	0	0
22:00	22:15	0	0	0	0	3	0	0	0	0	0
22:15	22:30	1	0	0	0	1	1	0	0	0	0
22:30	22:45	1	0	0	0	1	0	0	0	0	0
22:45	23:00	0	0	0	0	0	0	0	0	0	0
23:00	23:15	1	0	0	0	0	0	0	0	0	0
23:15	23:30	0	0	0	0	0	0	0	0	0	0
23:30	23:45	0	0	0	0	1	0	0	0	0	0
23:45	00:00	0	0	0	0	0	0	0	0	0	0
0000-0000hrs - Total		266	50	12	2	248	46	8	1	8	2
										11	0

A-B		A-C		B-A		B-C		C-A		C-B		
Time Interval	Pedestrians	Cyclists on pavement										
00:00	00:15	0	0	0	0	1	0	0	0	0	0	0
00:15	00:30	0	0	0	0	0	0	0	0	0	0	0
00:30	00:45	0	0	0	0	0	0	0	0	0	0	0
00:45	01:00	0	0	0	0	0	0	0	0	0	0	0
01:00	01:15	0	0	0	0	0	0	0	0	0	0	0
01:15	01:30	0	0	0	0	0	0	0	0	0	0	0
01:30	01:45	0	0	0	0	0	0	0	0	0	0	0
01:45	02:00	0	0	0	0	0	0	0	0	0	0	0
02:00	02:15	0	0	0	0	0	0	0	0	0	0	0
02:15	02:30	0	0	0	0	0	0	0	0	0	0	0
02:30	02:45	0	0	0	0	0	0	0	0	0	0	0
02:45	03:00	0	0	0	0	0	0	0	0	0	0	0
03:00	03:15	0	0	0	0	0	0	0	0	0	0	0
03:15	03:30	0	0	0	0	0	0	0	0	0	0	0
03:30	03:45	0	0	0	0	0	0	0	0	0	0	0
03:45	04:00	0	0	0	0	0	0	0	0	0	0	0
04:00	04:15	0	0	0	0	0	0	0	0	0	0	0
04:15	04:30	0	0	0	0	0	0	0	0	0	0	0
04:30	04:45	0	0	0	0	1	0	0	0	0	0	0
04:45	05:00	0	0	0	0	0	0	0	0	0	0	0
05:00	05:15	0	0	0	0	0	0	0	0	0	0	0
05:15	05:30	0	0	0	0	0	0	0	0	0	0	0
05:30	05:45	0	0	0	0	0	0	0	0	0	0	0
05:45	06:00	1	0	0	0	0	1	0	0	0	0	0
06:00	06:15	2	0	0	0	1	1	1	0	0	0	0
06:15	06:30	2	0	0	0	2	0	0	0	0	0	0
06:30	06:45	3	0	0	0	1	1	0	0	0	0	0
06:45	07:00	1	0	0	0	0	2	0	0	0	0	0
07:00	07:15	0	0	0	0	2	0	0	0	0	0	0
07:15	07:30	1	0	0	0	4	1	0	0	0	0	0
07:30	07:45	1	0	0	0	2	1	0	0	0	0	0
07:45	08:00	4	1	0	0	9	1	0	0	1	0	0
08:00	08:15	6	2	0	0	1	1	1	0	0	2	0
08:15	08:30	15	1	0	0	2	3	1	0	0	0	1
08:30	08:45	37	6	0	0	14	2	1	0	0	0	10
08:45	09:00	16	0	1	0	13	0	3	0	0	1	0
09:00	09:15	0	1	0	0	8	0	0	0	0	0	0
09:15	09:30	4	0	0	0	3	0	0	0	0	0	0
09:30	09:45	3	0	0	0	6	1	0	0	0	0	0
09:45	10:00	4	0	1	0	1	2	0	0	0	0	0
10:00	10:15	2	1	0	0	0	0	0	0	0	0	0
10:15	10:30	4	0	0	0	3	0	0	0	0	0	0
10:30	10:45	1	0	0	0	3	0	0	0	0	0	0
10:45	11:00	3	0	1	0	5	0	0	0	1	0	0
11:00	11:15	3	0	0	0	0	0	0	0	0	0	0
11:15	11:30	1	1	0	0	4	0	0	0	0	1	0
11:30	11:45	2	0	0	0	1	1	0	0	0	0	0
11:45	12:00	9	0	0	0	0	0	0	0	0	0	0
12:00	12:15	5	0	0	0	5	0	0	0	0	0	0
12:15	12:30	2	1	0	0	2	1	0	0	0	0	0
12:30	12:45	4	0	0	0	3	0	0	0	0	0	0
12:45	13:00	2	0	0	0	7	1	0	0	0	0	0
13:00	13:15	1	1	0	0	0	0	0	0	0	0	0
13:15	13:30	1	1	0	0	0	0	0	0	0	0	0
13:30	13:45	2	1	0	0	1	0	0	0	0	0	0
13:45	14:00	1	2	0	0	3	0	0	0	0	0	0
14:00	14:15	2	0	0	0	1	0	0	0	0	0	0
14:15	14:30	6	5	0	0	3	5	0	0	0	0	0
14:30	14:45	4	2	0	0	4	3	0	0	0	0	0
14:45	15:00	3	4	0	0	1	0	0	0	0	0	0
15:00	15:15	13	1	0	0	13	1	2	0	0	0	0
15:15	15:30	11	5	0	0	24	5	3	0	0	0	0
15:30	15:45	0	3	0	0	0	0	0	0	0	0	0
15:45	16:00	1	1	0	0	0	0	0	0	0	0	0
16:00	16:15	1	0	0	0	11	1	0	0	0	0	0
16:15	16:30	1	2	0	0	0	1	0	0	0	1	0
16:30	16:45	1	1	1	0	3	0	2	0	0	1	0
16:45	17:00	2	4	0	0	0	1	0	0	0	0	0
17:00	17:15	3	2	0	0	2	2	0	0	0	0	0
17:15	17:30	5	1	1	0	0	0	0	0	0	0	0
17:30	17:45	6	0	0	0	3	0	0	0	0	0	0
17:45	18:00	2	0	0	0	0	0	0	0	1	0	0
18:00	18:15	1	0	0	0	1	0	0	0	0	0	0
18:15	18:30	4	0	0	0	6	0	0	0	0	0	0
18:30	18:45	0	0	0	0	1	0	0	0	0	0	0
18:45	19:00	0	0	0	0	0	0	0	0	0	1	0
19:00	19:15	1	0	0	0	3	0	0	0	0	0	0
19:15	19:30	2	0	0	0	3	2	0	0	0	0	0
19:30	19:45	1	0	0	0	0	0	0	0	0	0	0
19:45	20:00	3	2	0	0	4	0	0	0	0	0	0
20:00	20:15	0	0	0	0	6	0	0	0	0	0	0
20:15	20:30	3	0	0	0	1	0	0	0	0	0	0
20:30	20:45	5	0	0	0	1	1	0	0	0	0	0
20:45	21:00	7	0	0	0	0	1	0	0	0	0	1
21:00	21:15	0	0	1	0	0	0	0	0	0	0	0
21:15	21:30	1	0	0	0	1	0	0	0	0	0	0
21:30	21:45	0	0	0	0	0	1	0	0	0	0	0
21:45	22:00	0	0	0	0	1	0	0	0	0	0	0
22:00	22:15	5	0	0	0	0	0	0	0	0	0	0
22:15	22:30	0	0	0	0	1	0	0	0	0	0	0
22:30	22:45	0	0	0	0	1	0	0	0	0	0	0
22:45	23:00	0	0	0	0	1	0	0	0	0	0	0
23:00	23:15	0	0	0	0	0	0	0	0	0	0	0
23:15	23:30	0	0	0	0	0	0	0	0	0	0	0
23:30	23:45	0	0	0	0	0	0	0	0	0	0	0
23:45	00:00	0	0	1	0	0	0	0	0	0	0	0
0000-0000hrs - Total		237	52	6	0	204	44	14	0	2	0	18

A-B		A-C		B-A		B-C		C-A		C-B		
Time Interval	Pedestrians	Cyclists on pavement										
00:00 - 00:15	0	0	0	0	0	0	0	0	0	0	0	0
00:15 - 00:30	0	0	0	0	0	0	0	0	0	0	0	0
00:30 - 00:45	0	0	0	0	0	0	0	0	0	0	0	0
00:45 - 01:00	0	0	0	0	0	0	0	0	0	0	0	0
01:00 - 01:15	0	0	0	0	0	0	0	0	0	0	0	0
01:15 - 01:30	0	0	0	0	0	0	0	0	0	0	0	0
01:30 - 01:45	0	0	0	0	0	0	0	0	0	0	0	0
01:45 - 02:00	0	0	0	0	0	0	0	0	0	0	0	0
02:00 - 02:15	0	1	0	0	0	0	0	0	0	0	0	0
02:15 - 02:30	0	0	0	0	0	0	0	0	0	0	0	0
02:30 - 02:45	0	0	0	0	0	0	0	0	0	0	0	0
02:45 - 03:00	0	0	0	0	0	0	0	0	0	0	0	0
03:00 - 03:15	0	0	0	0	0	0	0	0	0	0	0	0
03:15 - 03:30	0	0	0	0	0	0	0	0	0	0	0	0
03:30 - 03:45	0	0	0	0	0	0	0	0	0	0	0	0
03:45 - 04:00	0	0	0	0	0	0	0	0	0	0	0	0
04:00 - 04:15	0	0	0	0	0	0	0	0	0	0	0	0
04:15 - 04:30	0	0	0	0	0	0	0	0	0	0	0	0
04:30 - 04:45	0	0	0	0	0	1	0	0	0	0	0	0
04:45 - 05:00	0	0	0	0	1	0	0	0	0	0	0	0
05:00 - 05:15	0	0	0	0	0	0	0	0	0	0	0	0
05:15 - 05:30	0	0	0	0	0	0	0	0	0	0	0	0
05:30 - 05:45	0	0	0	0	0	0	0	0	0	0	0	0
05:45 - 06:00	0	0	0	0	0	0	0	0	0	0	0	0
06:00 - 06:15	0	0	0	0	1	0	1	0	0	0	0	0
06:15 - 06:30	0	0	0	0	0	0	0	0	0	0	0	0
06:30 - 06:45	0	0	0	0	3	1	0	0	0	0	0	0
06:45 - 07:00	0	0	0	0	6	0	0	0	0	0	0	0
07:00 - 07:15	5	0	0	0	3	0	0	0	0	0	0	0
07:15 - 07:30	2	1	0	0	2	0	0	0	0	0	0	0
07:30 - 07:45	1	0	0	0	5	1	0	0	0	0	0	0
07:45 - 08:00	2	1	0	0	8	2	0	0	0	0	3	0
08:00 - 08:15	2	2	0	0	4	2	0	0	0	0	0	0
08:15 - 08:30	6	3	0	0	2	0	0	0	0	1	1	0
08:30 - 08:45	47	5	0	0	15	2	2	0	0	0	6	0
08:45 - 09:00	6	0	1	0	9	0	3	0	0	0	2	0
09:00 - 09:15	4	0	0	0	2	0	0	0	0	0	0	0
09:15 - 09:30	2	0	0	0	3	1	0	0	0	0	0	0
09:30 - 09:45	7	0	0	0	1	0	0	0	1	0	0	0
09:45 - 10:00	1	0	0	0	5	0	0	0	1	0	0	0
10:00 - 10:15	3	0	1	0	0	0	0	0	0	0	0	0
10:15 - 10:30	7	0	0	0	7	0	0	0	1	0	0	0
10:30 - 10:45	5	1	1	0	3	1	0	0	0	0	0	0
10:45 - 11:00	4	0	0	0	3	0	0	0	0	0	0	0
11:00 - 11:15	1	0	0	0	7	0	0	0	0	0	0	0
11:15 - 11:30	4	0	1	0	4	0	0	0	0	1	0	0
11:30 - 11:45	3	0	0	0	6	0	0	0	0	0	0	0
11:45 - 12:00	5	0	0	0	5	1	1	0	0	0	1	0
12:00 - 12:15	2	0	0	0	0	1	0	0	0	0	0	0
12:15 - 12:30	3	0	0	0	6	1	0	0	0	0	0	0
12:30 - 12:45	2	0	1	0	5	0	0	0	1	0	0	0
12:45 - 13:00	1	0	0	0	3	0	0	0	0	0	0	0
13:00 - 13:15	3	0	0	0	1	0	0	0	0	0	0	0
13:15 - 13:30	4	0	0	0	1	0	0	0	0	0	0	0
13:30 - 13:45	4	0	0	0	3	1	0	0	0	0	0	0
13:45 - 14:00	1	0	0	0	7	0	0	0	0	0	0	0
14:00 - 14:15	5	1	0	0	0	0	0	0	0	0	0	0
14:15 - 14:30	9	3	0	0	0	0	0	0	0	0	0	0
14:30 - 14:45	7	0	1	0	8	0	0	0	1	0	0	0
14:45 - 15:00	4	1	0	0	0	1	0	0	0	0	0	0
15:00 - 15:15	16	1	3	0	9	0	0	0	0	0	2	0
15:15 - 15:30	6	0	2	0	49	5	4	0	0	0	0	0
15:30 - 15:45	3	0	0	0	7	3	0	0	2	0	0	0
15:45 - 16:00	7	2	0	0	13	0	0	0	0	0	0	1
16:00 - 16:15	2	0	0	0	0	2	0	0	0	0	0	0
16:15 - 16:30	6	2	0	0	7	3	0	0	0	0	0	0
16:30 - 16:45	8	2	0	0	0	1	0	0	0	1	0	0
16:45 - 17:00	1	1	0	0	1	1	0	0	0	0	0	0
17:00 - 17:15	2	4	0	0	11	2	0	0	0	0	0	0
17:15 - 17:30	4	5	0	0	0	1	0	0	0	0	0	0
17:30 - 17:45	8	1	0	0	1	2	0	0	0	0	0	0
17:45 - 18:00	5	0	0	0	4	2	0	0	0	0	0	0
18:00 - 18:15	2	0	0	0	2	0	0	0	0	0	0	0
18:15 - 18:30	1	0	0	0	3	0	0	0	0	0	0	0
18:30 - 18:45	0	0	0	0	3	0	0	0	0	0	0	0
18:45 - 19:00	5	0	0	0	2	0	0	0	0	0	0	1
19:00 - 19:15	5	2	0	0	4	0	0	0	0	0	0	0
19:15 - 19:30	4	1	0	0	1	4	0	0	0	0	0	0
19:30 - 19:45	2	1	0	0	3	0	0	0	0	0	0	0
19:45 - 20:00	1	0	0	0	1	0	1	0	0	0	0	0
20:00 - 20:15	1	0	0	0	3	0	2	0	0	0	2	0
20:15 - 20:30	2	0	0	0	2	0	0	0	0	0	0	0
20:30 - 20:45	1	1	0	0	0	1	0	0	0	0	0	0
20:45 - 21:00	1	0	0	0	2	2	0	0	0	0	0	0
21:00 - 21:15	2	0	0	0	0	1	0	0	0	0	0	0
21:15 - 21:30	1	0	0	0	0	0	0	0	0	0	0	0
21:30 - 21:45	0	0	0	0	0	0	0	0	0	0	0	0
21:45 - 22:00	0	0	0	0	1	0	0	0	0	0	0	0
22:00 - 22:15	0	0	0	0	0	0	0	0	0	0	0	0
22:15 - 22:30	0	1	0	0	0	1	0	0	1	0	0	0
22:30 - 22:45	0	0	1	0	0	0	0	0	0	0	0	0
22:45 - 23:00	0	0	0	0	2	0	0	0	0	0	0	0
23:00 - 23:15	1	0	0	0	0	0	0	0	0	0	0	1
23:15 - 23:30	0	0	1	0	0	0	0	0	0	0	0	0
23:30 - 23:45	0	0	0	0	0	0	0	0	0	0	0	0
23:45 - 00:00	0	0	0	0	0	1	0	0	0	0	0	0
0000-0000hrs - Total	259	43	11	0	271	45	16	0	8	1	18	1

Time Interval	Car	B - A (15-minute intervals)				P/C	Total	PCU	B - C (15-minute intervals)				P/C	Total	PCU		
		LGV	ODV1	ODV2	PSV/Coach				M/C	LGV	ODV1	ODV2	PSV/Coach				
00:00 - 00:15	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	
00:15 - 00:30	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	
00:30 - 00:45	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	
00:45 - 01:00	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	
01:00 - 01:15	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	
01:15 - 01:30	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	
01:30 - 01:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
01:45 - 02:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:00 - 02:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
02:15 - 02:30	1	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	
02:30 - 02:45	5	0	0	0	0	0	5	5	0	0	0	0	0	0	0	0	
02:45 - 03:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:00 - 03:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:15 - 03:30	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	
03:30 - 03:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
03:45 - 04:00	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	
04:00 - 04:15	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	
04:15 - 04:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
04:30 - 04:45	3	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0	
04:45 - 05:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
05:00 - 05:15	2	0	0	0	0	0	2	2	0	0	0	0	0	0	0	0	
05:15 - 05:30	4	1	0	0	0	0	5	5	0	0	0	0	0	0	0	0	
05:30 - 05:45	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
05:45 - 06:00	15	0	0	0	0	0	23	23	0	0	0	0	0	0	0	0	
06:00 - 06:15	20	5	0	0	0	0	1	26	21.2	98.15	98.30	0	0	0	0	0	
06:15 - 06:30	0	0	0	0	0	0	0	22	21.2	98.15	98.30	0	0	0	0	0	
06:30 - 06:45	22	5	0	0	0	0	1	27	21.2	98.15	98.30	0	0	0	0	0	
06:45 - 07:00	29	5	0	0	0	0	1	29	21.2	98.15	98.30	0	0	0	0	0	
07:00 - 07:15	20	5	0	0	0	0	1	29	21.2	98.15	98.30	0	0	0	0	0	
07:15 - 07:30	32	5	0	0	0	0	1	29	21.2	98.15	98.30	0	0	0	0	0	
07:30 - 07:45	32	5	0	0	0	0	1	29	21.2	98.15	98.30	0	0	0	0	0	
07:45 - 08:00	37	11	0	0	0	0	1	31	31	97.45	98.30	0	0	0	0	0	
08:00 - 08:15	0	0	0	0	0	0	0	37	31	97.45	98.30	0	0	0	0	0	
08:15 - 08:30	28	3	0	0	0	0	1	37	31	97.45	98.30	1	0	0	0	0	
08:30 - 08:45	38	7	0	0	0	0	1	32	30	98.42	98.30	0	0	0	0	2	
08:45 - 09:00	0	0	0	0	0	0	0	38	32	98.42	98.30	0	0	0	0	2	
09:00 - 09:15	40	1	0	0	0	0	1	46	44.4	98.00	99.15	0	0	0	0	0	
09:15 - 09:30	21	1	0	0	0	0	0	22	22	98.15	98.30	0	0	0	0	0	
09:30 - 09:45	0	0	0	0	0	0	0	22	22	98.15	98.30	0	0	0	0	0	
09:45 - 10:00	10	18	2	1	0	0	0	21	19.9	98.45	99.00	0	0	0	0	0	
10:00 - 10:15	16	9	2	1	0	0	0	20	10.0	98.15	98.30	0	0	0	0	0	
10:15 - 10:30	0	0	0	0	0	0	0	20	10.0	98.15	98.30	0	0	0	0	0	
10:30 - 10:45	24	4	0	0	0	0	0	1	29	23.2	102.0	104.05	0	0	0	0	0
10:45 - 11:00	21	4	2	0	0	0	0	0	28	30	104.05	104.00	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:15 - 11:30	18	1	2	0	0	0	0	0	23	24.4	115.05	115.00	0	0	0	1	0.2
11:30 - 11:45	17	2	1	0	0	0	0	0	23	22.9	113.00	114.05	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:00 - 12:15	17	5	1	0	0	0	0	0	25	27.7	12.00	12.15	0	0	0	0	0
12:15 - 12:30	19	0	0	0	0	0	0	0	20	19.4	12.15	12.30	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	20	19.4	12.15	12.30	0	0	0	0	0
12:45 - 13:00	15	4	0	0	0	0	0	0	25	24.8	12.45	13.00	0	0	0	0	0
13:00 - 13:15	26	5	2	0	0	0	0	0	33	34	13.00	13.15	0	0	0	1	0.4
13:15 - 13:30	16	3	1	0	0	0	0	0	33	34	13.00	13.15	0	0	0	0	0
13:30 - 13:45	20	4	0	0	0	0	0	0	25	28.2	13.30	13.45	1	0	0	0	1
13:45 - 14:00	16	3	1	0	0	0	0	0	22	20.9	13.45	14.00	0	0	0	0	0
14:00 - 14:15	17	3	1	0	0	0	0	0	26	20.9	14.00	14.15	0	0	0	0	0
14:15 - 14:30	20	3	1	0	0	0	0	0	25	26.5	14.30	14.45	1	0	0	0	1
14:30 - 14:45	0	0	0	0	0	0	0	0	25	26.5	14.30	14.45	1	0	0	0	1
14:45 - 15:00	22	2	2	0	0	0	0	0	27	29	15.00	15.15	1	0	0	0	1
15:00 - 15:15	44	6	1	0	0	0	0	0	32	32	15.00	15.15	1	0	0	0	1
15:15 - 15:30	44	6	1	0	0	0	0	0	23	63	15.9	15.15	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	23	63	15.9	15.15	0	0	0	0	0
15:45 - 16:00	21	5	0	0	0	0	0	0	27	25	15.45	16.00	0	0	0	0	0
16:00 - 16:15	20	2	0	0	0	0	0	0	25	24.8	15.45	16.00	0	0	0	0	0
16:15 - 16:30	0	0	0	0	0	0	0	0	20	18.6	15.45	16.00	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0	0	0	0	20	18.6	15.45	16.00	0	0	0	0	0
16:45 - 17:00	31	9	2	0	0	0	0	0	31	31	16.00	16.15	0	0	0	0	0
17:00 - 17:15	81	23	0	0	0	0	0	0	33	119	15.95	16.15	0	0	0	0	0
17:15 - 17:30	81	23	0	0	0	0	0	0	33	119	15.95	16.15	0	0	0	0	0
17:30 - 17:45	0	0	0	0	0	0	0	0	33	119	15.95	16.15	0	0	0	0	0
17:45 - 18:00	31	9	2	0	0	0	0	0	31	16.00	16.15	16.30	0	0	0	0	0
18:00 - 18:15	95	4	0	0	0	0	0	0	108	107.4	16.00	16.15	0	0	0	0	1
18:15 - 18:30	88	4	0	0	0	0	0	0	108	107.4	16.00	16.15	0	0	0	0	1
18:30 - 18:45	0	0	0	0	0	0	0	0	108	107.4	16.00	16.15	0	0	0	0	1
18:45 - 19:00	88	4	0	0	0	0	0	0	108	107.4	16.00	16.15	0	0	0	0	1
19:00 - 19:15	88	4	0	0	0	0	0	0	108	107.4	16.00	16.15	0	0	0	0	1
19:15 - 19:30	93	9	2	0	0	0	0	0	108	107.4	16.00	16.15	0	0	0	0	1
19:30 - 19:45	91	16	0	0	0	0	0	0	117	114.4	16.45	16.65	1	0	0	0	1
19:45 - 19:50	91	16	0	0	0	0	0	0	117	114.4	16.45	16.65	1	0</			

C - A (15-minute intervals)										C - B (15-minute intervals)									
Time Interval	Car	LGV	OGV1	OGV2	PSV/Coach	M/C	P/C	Total	PCU	Time Interval	Car	LGV	OGV1	OGV2	PSV/Coach	M/C	P/C	Total	PCU
00:00 - 00:15	0	0	0	0	0	0	0	0	0	00:00 - 00:15	0	0	0	0	0	0	0	0	0
00:15 - 00:30	0	0	0	0	0	0	0	0	0	00:15 - 00:30	0	0	0	0	0	0	0	0	0
00:30 - 00:45	0	0	0	0	0	0	0	0	0	00:30 - 00:45	0	0	0	0	0	0	0	0	0
00:45 - 01:00	0	0	0	0	0	0	0	0	0	00:45 - 01:00	0	0	0	0	0	0	0	0	0
01:00 - 01:15	0	0	0	0	0	0	0	0	0	01:00 - 01:15	0	0	0	0	0	0	0	0	0
01:15 - 01:30	0	0	0	0	0	0	0	0	0	01:15 - 01:30	0	0	0	0	0	0	0	0	0
01:30 - 01:45	0	0	0	0	0	0	0	0	0	01:30 - 01:45	0	0	0	0	0	0	0	0	0
01:45 - 02:00	0	0	0	0	0	0	0	0	0	01:45 - 02:00	0	0	0	0	0	0	0	0	0
02:00 - 02:15	0	0	0	0	0	0	0	0	0	02:00 - 02:15	0	0	0	0	0	0	0	0	0
02:15 - 02:30	0	0	0	0	0	0	0	0	0	02:15 - 02:30	0	0	0	0	0	0	0	0	0
02:30 - 02:45	0	0	0	0	0	0	0	0	0	02:30 - 02:45	0	0	0	0	0	0	0	0	0
02:45 - 03:00	0	0	0	0	0	0	0	0	0	02:45 - 03:00	0	0	0	0	0	0	0	0	0
03:00 - 03:15	0	0	0	0	0	0	0	0	0	03:00 - 03:15	0	0	0	0	0	0	0	0	0
03:15 - 03:30	0	0	0	0	0	0	0	0	0	03:15 - 03:30	0	0	0	0	0	0	0	0	0
03:30 - 03:45	0	0	0	0	0	0	0	0	0	03:30 - 03:45	0	0	0	0	0	0	0	0	0
03:45 - 04:00	0	0	0	0	0	0	0	0	0	03:45 - 04:00	0	0	0	0	0	0	0	0	0
04:00 - 04:15	0	0	0	0	0	0	0	0	0	04:00 - 04:15	0	0	0	0	0	0	0	0	0
04:15 - 04:30	0	0	0	0	0	0	0	0	0	04:15 - 04:30	0	0	0	0	0	0	0	0	0
04:30 - 04:45	0	0	0	0	0	0	0	0	0	04:30 - 04:45	0	0	0	0	0	0	0	0	0
04:45 - 05:00	0	0	0	0	0	0	0	0	0	04:45 - 05:00	0	0	0	0	0	0	0	0	0
05:00 - 05:15	0	0	0	0	0	0	0	0	0	05:00 - 05:15	0	0	0	0	0	0	0	0	0
05:15 - 05:30	0	0	0	0	0	0	0	0	0	05:15 - 05:30	0	0	0	0	0	0	0	0	0
05:30 - 05:45	0	0	0	0	0	0	0	0	0	05:30 - 05:45	0	0	0	0	0	0	0	0	0
05:45 - 06:00	0	0	0	0	0	0	0	0	0	05:45 - 06:00	0	0	0	0	0	0	0	0	0
06:00 - 06:15	0	0	0	0	0	0	0	0	0	06:00 - 06:15	0	0	0	0	0	0	0	0	0
06:15 - 06:30	1	0	0	0	0	0	0	1	1	06:15 - 06:30	0	0	0	0	0	0	0	0	0
06:30 - 06:45	0	0	0	0	0	0	0	0	0	06:30 - 06:45	0	0	0	0	0	0	0	0	0
06:45 - 07:00	0	0	0	0	0	0	0	0	0	06:45 - 07:00	0	0	0	0	0	0	0	0	0
07:00 - 07:15	1	0	0	0	0	0	0	1	1	07:00 - 07:15	0	0	0	0	0	0	0	0	0
07:15 - 07:30	0	0	0	0	0	0	0	0	0	07:15 - 07:30	0	0	0	0	0	0	0	0	0
07:30 - 07:45	1	0	0	0	0	0	0	1	1	07:30 - 07:45	0	0	0	0	0	0	0	0	0
07:45 - 08:00	0	0	0	0	0	0	0	0	0	07:45 - 08:00	0	0	0	0	0	0	0	0	0
08:00 - 08:15	1	0	0	0	0	0	0	1	1	08:00 - 08:15	0	0	0	0	0	0	0	0	0
08:15 - 08:30	0	0	0	0	0	0	0	0	0	08:15 - 08:30	0	0	0	0	0	0	0	0	0
08:30 - 08:45	0	0	0	0	0	0	0	0	0	08:30 - 08:45	0	0	0	0	0	0	0	0	0
08:45 - 09:00	0	0	0	0	0	0	0	0	0	08:45 - 09:00	0	0	0	0	0	0	0	0	0
09:00 - 09:15	0	0	0	0	0	0	0	0	0	09:00 - 09:15	0	0	0	0	0	0	0	0	0
09:15 - 09:30	0	0	0	0	0	0	0	0	0	09:15 - 09:30	0	0	0	0	0	0	0	0	0
09:30 - 09:45	0	0	0	0	0	0	0	0	0	09:30 - 09:45	0	0	0	0	0	0	0	0	0
09:45 - 10:00	0	0	0	0	0	0	0	0	0	09:45 - 10:00	0	0	0	0	0	0	0	0	0
10:00 - 10:15	0	0	0	0	0	0	0	0	0	10:00 - 10:15	0	0	0	0	0	0	0	0	0
10:15 - 10:30	0	0	0	0	0	0	0	0	0	10:15 - 10:30	0	0	0	0	0	0	0	0	0
10:30 - 10:45	0	0	0	0	0	0	0	0	0	10:30 - 10:45	0	0	0	0	0	0	0	0	0
10:45 - 11:00	0	0	0	0	0	0	0	0	0	10:45 - 11:00	0	0	0	0	0	0	0	0	0
11:00 - 11:15	0	0	0	0	0	0	0	0	0	11:00 - 11:15	0	0	0	0	0	0	0	0	0
11:15 - 11:30	0	0	0	0	0	0	0	0	0	11:15 - 11:30	0	0	0	0	0	0	0	0	0
11:30 - 11:45	0	0	0	0	0	0	0	0	0	11:30 - 11:45	0	0	0	0	0	0	0	0	0
11:45 - 12:00	0	0	0	0	0	0	0	0	0	11:45 - 12:00	0	0	0	0	0	0	0	0	0
12:00 - 12:15	0	0	0	0	0	0	0	0	0	12:00 - 12:15	0	0	0	0	0	0	0	0	0
12:15 - 12:30	0	0	0	0	0	0	0	0	0	12:15 - 12:30	0	0	0	0	0	0	0	0	0
12:30 - 12:45	0	0	0	0	0	0	0	0	0	12:30 - 12:45	0	0	0	0	0	0	0	0	0
12:45 - 13:00	0	0	0	0	0	0	0	0	0	12:45 - 13:00	0	0	0	0	0	0	0	0	0
13:00 - 13:15	0	0	0	0	0	0	0	0	0	13:00 - 13:15	0	0	0	0	0	0	0	0	0
13:15 - 13:30	0	0	0	0	0	0	0	0	0	13:15 - 13:30	0	0	0	0	0	0	0	0	0
13:30 - 13:45	0	0	0	0	0	0	0	0	0	13:30 - 13:45	0	0	0	0	0	0	0	0	0
13:45 - 14:00	0	0	0	0	0	0	0	0	0	13:45 - 14:00	0	0	0	0	0	0	0	0	0
14:00 - 14:15	0	0	0	0	0	0	0	0	0	14:00 - 14:15	0	0	0	0	0	0	0	0	0
14:15 - 14:30	0	0	0	0	0	0	0	0	0	14:15 - 14:30	0	0	0	0	0	0	0	0	0
14:30 - 14:45	0	0	0	0	0	0	0	0	0	14:30 - 14:45	0	0	0	0	0	0	0	0	0
14:45 - 15:00	0	0	0	0	0	0	0	0	0	14:45 - 15:00	0	0	0	0	0	0	0	0	0
15:00 - 15:15	0	0	0	0	0	0	0	0	0	15:00 - 15:15	0	0	0	0	0	0	0	0	0
15:15 - 15:30	1	0	0	0	0	0	0	1	1	15:15 - 15:30	0	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	0	0	15:30 - 15:45	0	0	0	0	0	0	0	0	0
15:45 - 15:50	0	0	0	0	0	0	0	0	0	15:45 - 15:50	0	0	0	0	0	0	0	0	0
15:50 - 15:55	0	0	0	0	0	0	0	0	0	15:50 - 15:55	0	0	0	0	0	0	0	0	0
15:55 - 16:00	0	0	0	0	0	0	0	0	0	15:55 - 16:00	0	0	0	0	0	0	0	0	0
16:00 - 16:15	0	0	0	0	0	0	0	0	0	16:00 - 16:15	0	0	0	0	0	0	0	0	0
16:15 - 16:30	0	0	0	0	0	0	0	0	0	16:15 - 16:30	0	0	0	0	0	0	0	0	0
16:30 - 16:45	0	0	0	0	0	0	0	0	0	16:30 - 16:45	0	0	0	0	0	0	0	0	0
16:45 - 16:50	0	0	0	0	0	0	0	0	0	16:45 - 16:50	0	0	0	0	0	0	0	0	0
16:50 - 16:55	0	0	0	0	0	0	0	0	0	1									

Arm A - Entry (15-minute intervals)										Arm A - Exit (15-minute intervals)									
Time Interval	Car	LGV	OGV1	OGV2	PSV/Coach	M/C	P/C	Total	PCU	Time Interval	Car	LGV	OGV1	OGV2	PSV/Coach	M/C	P/C	Total	PCU
00:00 - 00:15	1	0	0	0	0	0	0	0	1	00:00 - 00:15	2	0	0	0	0	0	0	1	1
00:15 - 00:30	1	0	0	0	0	0	0	0	1	00:15 - 00:30	2	0	0	0	0	0	0	2	2
00:30 - 00:45	0	0	0	0	0	0	0	0	0	00:30 - 00:45	2	0	0	0	0	0	0	2	2
00:45 - 01:00	0	0	0	0	0	0	0	0	0	00:45 - 01:00	1	0	0	0	0	0	0	1	1
01:00 - 01:15	0	0	0	0	0	0	0	0	0	01:00 - 01:15	2	0	0	0	0	0	0	2	2
01:15 - 01:30	0	0	0	0	0	0	0	0	0	01:15 - 01:30	1	0	0	0	0	0	0	1	1
01:30 - 01:45	0	0	0	0	0	0	0	0	0	01:30 - 01:45	2	0	0	0	0	0	0	2	2
01:45 - 02:00	1	0	0	0	0	0	0	0	1	01:45 - 02:00	0	0	0	0	0	0	0	0	0
02:00 - 02:15	2	0	0	0	0	0	0	2	2	02:00 - 02:15	0	0	0	0	0	0	0	0	0
02:15 - 02:30	1	0	0	0	0	0	0	1	1	02:15 - 02:30	1	0	0	0	0	0	0	1	1
02:30 - 02:45	0	0	0	0	0	0	0	0	0	02:30 - 02:45	5	0	0	0	0	0	0	5	5
02:45 - 03:00	0	0	0	0	0	0	0	0	0	02:45 - 03:00	4	0	0	0	0	0	0	1	1
03:00 - 03:15	1	0	0	0	0	0	0	1	1	03:00 - 03:15	0	0	0	0	0	0	0	0	0
03:15 - 03:30	0	0	0	0	0	0	0	0	0	03:15 - 03:30	2	0	0	0	0	0	0	2	2
03:30 - 03:45	0	0	0	0	0	0	0	0	0	03:30 - 03:45	3	0	0	0	0	0	0	1	1
03:45 - 04:00	0	0	0	0	0	0	0	0	0	03:45 - 04:00	4	0	0	0	0	0	0	1	1
04:00 - 04:15	1	0	0	0	0	0	0	2	2	04:00 - 04:15	2	0	0	0	0	0	0	2	2
04:15 - 04:30	2	0	0	0	0	0	0	2	2	04:15 - 04:30	3	2	0	0	0	0	0	2	2
04:30 - 04:45	1	0	0	0	0	0	0	1	1	04:30 - 04:45	2	0	0	0	0	0	0	1	1
04:45 - 05:00	1	0	0	0	0	0	0	1	1	04:45 - 05:00	3	0	0	0	0	0	0	1	1
05:00 - 05:15	0	0	0	0	0	0	0	0	0	05:00 - 05:15	4	2	0	0	0	0	0	2	2
05:15 - 05:30	0	0	0	0	0	0	0	0	0	05:15 - 05:30	4	1	0	0	0	0	0	1	1
05:30 - 05:45	1	0	0	0	0	0	0	1	1	05:30 - 05:45	4	1	0	0	0	0	0	3	3
05:45 - 06:00	0	0	0	0	0	0	0	0	0	05:45 - 06:00	5	0	0	0	0	0	0	5	5
06:00 - 06:15	3	0	0	0	0	0	0	3	3	06:00 - 06:15	15	6	0	0	0	0	0	1	1
06:15 - 06:30	6	0	0	0	0	0	0	7	6	06:15 - 06:30	21	5	0	0	0	0	0	2	2
06:30 - 06:45	11	0	0	0	0	0	0	11	11	06:30 - 06:45	22	5	0	0	0	0	0	1	1
06:45 - 07:00	9	0	0	0	0	0	0	9	9	06:45 - 07:00	21	5	0	0	0	0	0	1	1
07:00 - 07:15	9	1	0	0	0	0	0	10	10	07:00 - 07:15	22	5	0	0	0	0	0	3	3
07:15 - 07:30	2	0	0	0	0	0	0	2	2	07:15 - 07:30	18	7	0	0	0	0	0	2	2
07:30 - 07:45	7	0	0	0	0	0	0	7	7	07:30 - 07:45	24	5	0	0	0	0	0	1	1
07:45 - 08:00	21	4	0	0	0	0	0	26	27	07:45 - 08:00	37	11	0	0	0	0	0	3	3
08:00 - 08:15	1	0	0	0	0	0	0	1	1	08:00 - 08:15	20	4	0	0	0	0	0	1	1
08:15 - 08:30	24	2	1	0	0	0	0	25	25	08:15 - 08:30	29	3	0	0	0	0	0	3	3
08:30 - 08:45	33	4	0	0	0	0	0	38	37	08:30 - 08:45	38	7	0	0	0	0	0	2	2
08:45 - 09:00	1	0	0	0	0	0	0	1	1	08:45 - 09:00	25	4	0	0	0	0	0	1	1
09:00 - 09:15	21	4	0	0	0	0	0	1	26	09:00 - 09:15	40	1	0	0	0	0	0	1	1
09:15 - 09:30	13	1	0	0	0	0	0	31	32	09:15 - 09:30	21	1	0	0	0	0	0	2	2
09:30 - 09:45	1	0	0	0	0	0	0	1	1	09:30 - 09:45	10	0	0	0	0	0	0	1	1
09:45 - 10:00	10	0	0	0	0	0	0	22	22	09:45 - 10:00	16	3	1	0	0	0	0	2	2
10:00 - 10:15	10	1	5	1	0	0	0	1	6	10:00 - 10:15	18	9	0	0	0	0	0	3	3
10:15 - 10:30	14	2	1	0	0	0	0	1	15	10:15 - 10:30	19	10	0	0	0	0	0	3	3
10:30 - 10:45	14	2	0	0	0	0	0	2	17	10:30 - 10:45	24	4	0	0	0	0	0	1	1
10:45 - 11:00	11	2	0	0	0	0	0	1	17	10:45 - 11:00	24	5	1	0	0	0	0	2	2
11:00 - 11:15	11	1	1	0	0	0	0	0	21	11:00 - 11:15	12	11	1	0	0	0	0	1	1
11:15 - 11:30	14	3	1	0	0	0	0	4	17	11:15 - 11:30	24	7	1	0	0	0	0	2	2
11:30 - 11:45	23	1	0	0	0	0	0	1	24	11:30 - 11:45	29	1	0	0	0	0	0	1	1
11:45 - 12:00	1	0	0	0	0	0	0	0	0	11:45 - 12:00	26	2	0	0	0	0	0	1	1
12:00 - 12:15	21	7	0	0	0	0	0	0	28	12:00 - 12:15	25	12	0	0	0	0	0	1	1
12:15 - 12:30	18	5	0	0	0	0	0	0	23	12:15 - 12:30	25	19	0	0	0	0	0	1	1
12:30 - 12:45	20	2	0	0	0	0	0	0	22	12:30 - 12:45	25	20	1	0	0	0	0	1	1
12:45 - 13:00	22	0	0	0	0	0	0	0	23	12:45 - 13:00	25	21	0	0	0	0	0	1	1
13:00 - 13:15	22	0	0	0	0	0	0	0	23	13:00 - 13:15	25	22	0	0	0	0	0	1	1
13:15 - 13:30	22	0	0	0	0	0	0	0	23	13:15 - 13:30	25	23	0	0	0	0	0	1	1
13:30 - 13:45	22	0	0	0	0	0	0	0	23	13:30 - 13:45	25	24	0	0	0	0	0	1	1
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14:30 - 14:45	22	0	0	0	0	0	0	0	23	14:30 - 14:45	25	28	0	0	0	0	0	1	1
14:45 - 15:00	22	0	0	0	0	0	0	0	23	14:45 - 15:00	25	29	0	0	0	0	0	1	1
15:00 - 15:15	22	0	0	0	0	0	0	0	23	15:00 - 15:15	25	30	0	0	0	0	0	1	1
15:15 - 15:30	11	2	0	0	0	0	0	2	18	15:15 - 15:30	35	12	0	0	0	0	0	7	7
15:30 - 15:45	9	0	0	0	0	0	0	0	9	15:30 - 15:45	35	10	0	0	0	0	0	3	3
15:45 - 15:50	7	0	0	0	0	0	0	0	7	15:45 - 15:50	35	9	0	0	0	0	0	3	3
15:50 - 15:55	5	0	0	0	0	0	0	0	5	15:50 - 15:55	35	8	0	0	0	0	0	2	2
15:55 - 16:00	9	0	0	0	0	0	0	0	9	15:55 - 16:00	35	7	0	0	0	0	0	2	2
16:00 - 16:15	29	5	0	0	0	0	0	34	34	16:00 - 16:15	35	13	0	0	0	0	0	3	3
16:15 - 16:30	29	4	0	0	0	0	0	33	33	16:15 - 16:30	35	12	0	0	0	0	0	3	3
16:30 - 16:45	29	3	0	0	0	0	0	32	32	16:30 - 16:45	35	11	0	0	0	0	0	3	3
16:45 - 16:50	29	2	0	0	0	0	0	31	31	16:45 - 16:50	3								

Arm B - Entry (15-minute Intervals)															Arm B - Exit (15-minute Intervals)														
Time Interval	Car	LGV	OGV1	OGV2	PSV/Couch	M/C	P/C	Total	PCU	Time Interval	Car	LGV	OGV1	OGV2	PSV/Couch	M/C	P/C	Total	PCU										
00:00 - 00:15	1	2	0	0	0	0	0	0	0	00:15 - 00:30	4	2	0	0	0	0	0	0	0										
00:30 - 00:45	1	0	0	0	0	0	0	0	0	00:30 - 00:45	0	0	0	0	0	0	0	0	0										
00:45 - 01:00	1	0	0	0	0	0	0	0	0	00:45 - 01:00	1	0	0	0	0	0	0	0	0										
01:00 - 01:15	2	0	0	0	0	0	0	0	0	01:00 - 01:15	0	0	0	0	0	0	0	0	0										
01:15 - 01:30	1	0	0	0	0	0	0	0	0	01:15 - 01:30	0	0	0	0	0	0	0	0	0										
01:30 - 01:45	1	0	0	0	0	0	0	0	0	01:30 - 01:45	1	0	0	0	0	0	0	0	0										
01:45 - 02:00	0	0	0	0	0	0	0	0	0	01:45 - 02:00	1	0	0	0	0	0	0	0	0										
02:00 - 02:15	0	0	0	0	0	0	0	0	0	02:00 - 02:15	2	0	0	0	0	0	0	0	0										
02:15 - 02:30	1	0	0	0	0	0	0	0	0	02:15 - 02:30	1	0	0	0	0	0	0	0	0										
02:30 - 02:45	5	0	0	0	0	0	0	0	5	02:30 - 02:45	0	0	0	0	0	0	0	0	0										
02:45 - 03:00	0	0	0	0	0	0	0	0	0	02:45 - 03:00	1	0	0	0	0	0	0	0	0										
03:00 - 03:15	0	0	0	0	0	0	0	0	0	03:00 - 03:15	1	0	0	0	0	0	0	0	0										
03:15 - 03:30	2	0	0	0	0	0	0	2	0	03:15 - 03:30	0	0	0	0	0	0	0	0	0										
03:30 - 03:45	5	0	0	0	0	0	0	5	0	03:30 - 03:45	0	0	0	0	0	0	0	0	0										
03:45 - 04:00	3	0	0	0	0	0	0	3	0	03:45 - 04:00	0	0	0	0	0	0	0	0	0										
04:00 - 04:15	2	0	0	0	0	0	0	2	0	04:00 - 04:15	1	0	0	0	0	0	0	2	0										
04:15 - 04:30	3	1	0	0	0	0	0	3	1	04:15 - 04:30	0	0	0	0	0	0	0	2	0										
04:30 - 04:45	0	0	0	0	0	0	0	0	0	04:30 - 04:45	0	0	0	0	0	0	0	0	0										
04:45 - 05:00	3	0	0	0	0	0	0	3	0	04:45 - 05:00	1	0	0	0	0	0	0	1	0										
05:00 - 05:15	2	0	0	0	0	0	0	2	0	05:00 - 05:15	0	0	0	0	0	0	0	0	0										
05:15 - 05:30	4	0	0	0	0	0	0	4	0	05:15 - 05:30	0	0	0	0	0	0	0	0	0										
05:30 - 05:45	4	1	0	0	0	0	0	3	1	05:30 - 05:45	8	6	0	0	0	0	0	1	0										
05:45 - 06:00	5	0	0	0	0	0	0	5	0	05:45 - 06:00	0	0	0	0	0	0	0	0	0										
06:00 - 06:15	15	6	0	0	0	0	0	22	15	06:00 - 06:15	3	0	0	0	0	0	0	5	0										
06:15 - 06:30	20	5	0	0	0	0	0	26	21	06:15 - 06:30	6	0	0	0	0	0	0	7	6										
06:30 - 06:45	5	0	0	0	0	0	0	5	0	06:30 - 06:45	0	0	0	0	0	0	0	0	0										
06:45 - 07:00	19	7	0	0	0	0	0	25	24	06:45 - 07:00	5	0	0	0	0	0	0	0	0										
07:00 - 07:15	20	5	0	0	0	0	0	29	27	07:00 - 07:15	9	1	0	0	0	0	0	2	13										
07:15 - 07:30	5	0	0	0	0	0	0	5	0	07:15 - 07:30	0	0	0	0	0	0	0	0	0										
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08:00 - 08:15	37	11	0	0	0	0	0	51	51	08:00 - 08:15	21	4	0	0	0	0	0	0	27										
08:15 - 08:30	29	3	0	0	0	0	0	36	14	08:15 - 08:30	24	1	0	0	0	0	0	0	0										
08:30 - 08:45	37	11	0	0	0	0	0	51	51	08:30 - 08:45	21	4	0	0	0	0	0	0	27										
08:45 - 09:00	29	3	0	0	0	0	0	36	14	08:45 - 09:00	24	1	0	0	0	0	0	0	0										
09:00 - 09:15	40	1	0	0	0	0	0	44	44	09:00 - 09:15	21	4	0	0	0	0	0	1	0										
09:15 - 09:30	21	1	0	0	0	0	0	22	09	09:15 - 09:30	26	1	0	0	0	0	0	0	31										
09:30 - 09:45	19	5	0	0	0	0	0	20	14	09:30 - 09:45	19	1	0	0	0	0	0	0	0										
09:45 - 10:00	18	2	1	0	0	0	0	21	19	09:45 - 10:00	18	1	1	0	0	0	0	2	22										
10:00 - 10:15	18	9	2	0	0	0	0	21	19	10:00 - 10:15	10	5	1	0	0	0	0	0	21										
10:15 - 10:30	16	6	1	0	0	0	0	20	13	10:15 - 10:30	16	5	1	0	0	0	0	0	20										
10:30 - 10:45	24	4	0	0	0	0	0	29	20	10:30 - 10:45	14	1	0	0	0	0	0	0	17										
10:45 - 11:00	21	4	2	0	0	0	0	28	20	10:45 - 11:00	14	2	0	0	0	0	0	0	17										
11:00 - 11:15	18	1	2	0	0	0	0	24	24	11:00 - 11:15	15	1	2	0	0	0	0	0	16										
11:15 - 11:30	11	1	2	0	0	0	0	24	24	11:15 - 11:30	11	1	2	0	0	0	0	0	16										
11:30 - 11:45	17	2	1	0	0	0	0	24	24	11:30 - 11:45	17	1	2	0	0	0	0	0	16										
11:45 - 12:00	17	2	1	0	0	0	0	25	27	11:45 - 12:00	17	2	1	0	0	0	0	0	32										
12:00 - 12:15	17	2	1	0	0	0	0	25	27	12:00 - 12:15	17	2	1	0	0	0	0	0	32										
12:15 - 12:30	17	2	1	0	0	0	0	25	27	12:15 - 12:30	18	1	1	0	0	0	0	0	32										
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13:15 - 13:30	54	12	0	0	0	0	0	7	74	13:15 - 13:30	54	12	0	0	0	0	0	0	36										
13:30 - 13:45	54	14	0	0	0	0	0	6	6	13:30 - 13:45	54	14	0	0	0	0	0	0	36										
13:45 - 14:00	4	0	0	0	0	0	0	4	4	13:45 - 14:00	24	0	0	0	0	0	0	0	2										
14:00 - 14:15	0	0	0	0	0	0	0	0	0	14:00 - 14:15	0	0	0	0	0	0	0	0	0										
14:15 - 14:30	10	0	0	0	0	0	0	10	10	14:15 - 14:30	10	0	0	0	0	0	0	0	0										
14:30 - 14:45	13	0	0	0	0	0	0	13	16	14:30 - 14:45	13	0	0	0	0	0	0	0	0										
14:45 - 14:59	11	2	0	0	0	0	0	11	12	14:45 - 14:59	11	2	0	0	0	0	0	0	0										
14:59 - 15:15	11	2	0	0	0	0	0	11	12	14:59 - 15:15	11	2	0	0	0	0	0	0	0										
15:15 - 15:30	11	2	0	0	0	0	0	11	12	15:15 - 15:30	11	2	0	0	0	0	0	0	0										
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15:45 - 15:59	11	2	0	0	0	0	0	11	12	15:45 - 15:59	11	2	0	0	0	0	0	0	0										
15:59 - 16:00	112	20	3	0	0	0	0	120	109	15:59 - 16:00	121	19	1	0	0	0	0	0	0										
16:00 - 16:15	87	14	2	0	0	0	0	111	128	16:00 - 16:15	87	16	1	0	0	0	0	0	0										
16:15 - 16:30	81	23	0	0	0	0	0	13	119	16:15 - 16:30	29	5	0	0	0	0	0	0	41										
16:30 - 16:45	80	23	0	0	0	0	0	20	158	16:30 - 16:45	35	7	0	0	0	0													



Project ID and Name

Junction name: TUKES AVENUE / SERVIS F

Survey Date: 12/05/2021

Survey Day: Thursday

Road Safety Audit Report

**Incorporating
Stage 1 Completion of Preliminary Design;
Design Organisation Response to items raised; and
Auditor's View on the Design Organisation Response.**



Proposed Footpath Cyclepath
Emergency Access onto Tukes Avenue
Fareham

Client:
i-Transport

Client reference:
ITB10353-023

Fenley
2 Blaenant
Emmer Green
READING
RG4 8PH

E: office@fenley.co.uk
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Report Status 4

Job no RSA-22-056	Issue no 4	Date July 2022
Prepared by JJF	Verified by ZB	Approved by JJF
Filename and Path	Fenley/Road Safety Audits/RSA-22/RSA-22-056-4	

1.0 PROJECT DETAILS

Report Title:	Stage 1 Road Safety Audit
Date:	July 2022
Document reference and revision:	RSA-22-056-4
Prepared by:	Fenley Road Safety Limited
On behalf of the Overseeing Organisation:	Hampshire County Council
Design Organisation:	i-Transport
Project Sponsor:	Miller Homes and Bargate Homes

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
0	Stage 1 Road Safety Audit drafted for Audit Team discussions	JJF			4 th July 2022
1	Stage 1 Road Safety Audit finalised and issued to the Design Organisation	JJF	ZB	JJF	7 th July 2022
2	Stage 1 Road Safety Audit Report format amended to incorporate a row for inclusion of a Design Organisation Response in order to maintain a concise record of items raised		JJF		7 th July 2022
3	Design Organisation Response incorporated		Matthew Craddy on behalf of i-Transport		20 th July 2022
4	Auditor's View on the Design Organisation Response		JJF		26 th July 2022

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Appendices:

Stage 1	A1	Documents and Drawings provided for this Road Safety Audit
	A2	Item Location Plan
	A3	Drawings associated with the Design Organisation Response

2.0 INTRODUCTION

- 2.1 This report has been prepared by Fenley Road Safety Limited and results from a Stage 1 Road Safety Audit of proposed highway works along an existing service road off Tukes Avenue to form a footpath cyclepath and emergency link. The existing service road is situated between properties 143 and 145 and allows access to a concrete carriageway to the rear of the dwellings fronting Tukes Avenue, as well as a field gate associated with the application site. The proposed works include the resurfacing of the service road, the provision of build outs aimed at reducing speeds as well as to support lighting columns and the reconfiguration of the existing service road bellmouth with Tukes Avenue to form a vehicular crossover. It is understood that the development proposals associated with the scheme that is subject to this document includes the provision of circa. 375 dwellings on a parcel of land to the west of Tukes Avenue and east of Newgate Lane East.
- 2.2 The Audit Brief identifies that the proposals do not include any Departures from Standard, whether related to strategic decisions or otherwise.
- 2.3 The Road Safety Audit was undertaken during June and July 2022 in accordance with the initial and updated Road Safety Audit Brief and provided on the 21st June and 5th July 2022 by the Design Organisation, i-Transport, on behalf of the Project Sponsor, Miller Homes and Bargate Homes. The Road Safety Audit comprised of a site visit as well as an examination of the documents provided which are identified in **Appendix A1**. The Audit Team were satisfied that the Audit Brief was sufficient for the purpose of the Audit instructed.
- 2.4 The Road Safety Audit has been undertaken by an Audit Team whose qualifications and experience accord with the requirements of GG119 and have been approved by Mr George Carpenter of the Highway Development Agreements Team at Hampshire County Council to undertake Road Safety Audits of all stages within the County. The Audit Team consists of the following members:

Audit Team Leader

Jamie Fenning *BSc(Hons), MIHE, MCIHT, MSoRSA, Highways England RSA Certificate of Competency*
Road Safety / Highway Engineer

Audit Team Member

Zane Beswick *MCIHT, MSoRSA*
Road Safety / Highway Engineer

- 2.5 The site visit associated with this Road Safety Audit was undertaken during the afternoon of Tuesday 28th June 2022 between the hours of 18:30 and 20:00. The site visit involved walking and driving around the local highway network for a 90-minute period whilst observing the local infrastructure and current off-peak traffic and parking conditions. The weather during the site visit was overcast, the road surface was dry and visibility was good. A number

of pedestrians and cyclists were observed during the site visit. Vehicular traffic was also observed to include motorcycles, cars, passenger service vehicles, light and heavy goods vehicles as well as an emergency response vehicle. The traffic flow was moderate and free flowing. It was noted during the site visit, that vehicles park within the existing service road.

- 2.6 The terms of reference of this Road Safety Audit are as described in GG119. The scheme has been examined and this report compiled, only with regard to the safety implications for road users of the scheme as presented. It has not been examined or verified for compliance with any other standards or criteria. However, in order to clearly explain a safety problem or the recommendation to resolve a problem, the Audit Team may on occasion have referred to a design standard for information only. All comments and recommendations are referenced to the design drawings supplied with the Audit Brief and the location of road safety concerns raised have been illustrated beneath the items along with relevant photographs for clarity, where appropriate, as well as on the Location Plan attached at **Appendix A2**.

Design Organisation Response

- 2.7 In accordance with national standards, this Road Safety Audit was finalised and issued to the Design Organisation as per the Road Safety Audit Report Template within Appendix D of GG119, which can be provided upon request from either the Audit Team or Design Organisation. The format of the Audit Report was subsequently revised to incorporate these paragraphs under the sub-heading as well as sufficient space beneath the items and recommendation, within Section 4, for the inclusion of a Design Organisation Response. This is generally contained within a separate Design Organisation Response Report but is included within this document in order to maintain a single record of all problems, recommendations and responses for the benefit of a concise Road Safety Audit trail to be held on file for Quality Assurance purposes.
- 2.8 The Design Organisation Response has been prepared by:
- | | |
|--------------------------|------------------------|
| Name: | Matthew Craddy |
| Position / Organisation: | Associate, i-Transport |
- 2.9 Any drawings or documents associated with the Design Organisation Response are listed at **Appendix A3**, if applicable.
- 2.10 Upon the request of the Design Organisation and following receipt of the Design Organisation Response with any associated drawings, the Road Safety Audit Team Leader has provided a further comment on the item raised. The “Auditor’s View on the Design Organisation Response” is included within a row beneath each item, for clarity.

3.0 ITEMS RAISED IN ANY PREVIOUS ROAD SAFETY AUDITS

- 3.1 Fenley Road Safety Limited have not been made aware of any previous road safety audits associated with the scheme subject this document. The Audit Team has, however, previously undertaken a Stage 1 Road Safety Audit of a proposed roundabout along Newgate Lane East which is to form the vehicular access to the associated development as well as a series of further Stage 1 Road Safety Audits of schemes associated with proposed development; ref: RSA-22-072, 073, 074 and 075.

4.0 ITEMS RAISED AT THIS STAGE 1 ROAD SAFETY AUDIT

A.1	LOCAL ALIGNMENT
	<i>No Road Safety Concerns regarding LOCAL ALIGNMENT have been raised at this stage</i>
A.2	GENERAL
A.2.1	PROBLEM
Location:	Service Road
Summary:	Proposed buildouts may restrict use of route by Emergency Response Vehicles
Acc Type:	Loss of control type collisions
	The existing service road is 4.2 metres wide with a narrow margin both sides of the carriageway adjacent to property walls which form boundary treatment. The proposals include the provision of buildouts along the existing service road which reduce the carriageway width to 3.0 metres with a single buildout from the northern channel line to the east and buildouts both sides of the carriageway to the west. The Audit Team understand that emergency accesses are permitted to be a minimum of 2.75 metres wide in accordance with Association of Chief Fire Officers as stated in Manual for Streets, however, there are concerns that the buildouts form a chicane that will be impassable for larger Emergency Response Vehicles such as a Fire Appliance which could lead to loss of control type collisions.
	RECOMMENDATION:
	It is recommended that the proposed buildouts allow for the path of Emergency Response Vehicles travelling at the appropriate speed.
	Location Plan:

DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8th July 2022.

Agree - the design has been updated to reflect comments received within the Stage 1 RSA. Furthermore, vehicle swept path analysis has been undertaken to demonstrate that emergency response vehicles can navigate accordingly. This is presented in Drawing ITB10353-GA-046

AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022

Confirmation that the proposed infrastructure allows for emergency response vehicles addresses the road safety concern at this stage.

A.2.2 PROBLEM

Location: Service Road

Summary: Proposed buildouts may be an obstruction to vehicles accessing the service road to the rear of properties fronting Tukes Avenue

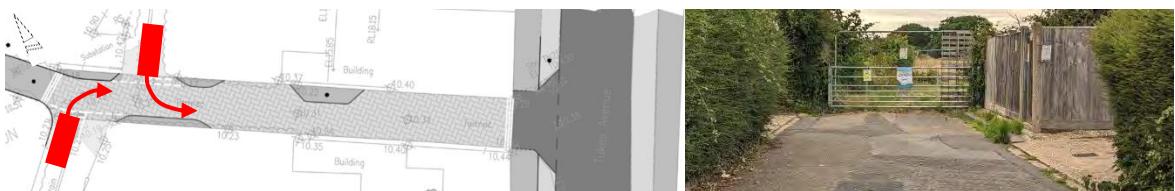
Acc Type: Loss of control type collisions

The existing service road is 4.2 metres wide and allows vehicular access to further rear access road to the north and south that are associated with the rear of properties fronting Tukes Avenue. The proposals include the provision of buildouts along the existing service road that reduce the carriageway width to 3.0 metres with one either side of the carriageway adjacent where the rear access roads priority junctions. No swept path analysis has been provided with the Audit Brief. The Audit Team have concerns that the proposed carriageway reduction from 4.2 metres to 3.0 metres may restrict vehicular access to / from the rear access road which could lead to loss of control type collisions.

RECOMMENDATION:

It is recommended that the proposals allow for vehicles to manoeuvre to and from the existing rear access roads.

Location Plan:



DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8th July 2022.

Agree - the design has been updated to reflect comments received within the Stage 1 RSA. Furthermore, vehicle swept path analysis has been undertaken to demonstrate a medium panel van can navigate accordingly. This is presented in Drawing ITB10353-GA-046

AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022

Confirmation that the proposed infrastructure allows for the expected vehicles to manoeuvre, addresses the road safety concern at this stage.

A.2.3	PROBLEM
Location:	Service Road
Summary:	Proposed buildouts may not be clearly visible
Acc Type:	Cyclist / vehicle collisions with kerbs
<p>The existing service road passes between properties 143 and 145 Tukes Avenue and is not subject to street lighting. The proposals include the provision of buildouts along the existing service road and street lighting with a column proposed within the buildout to the east and another just within the application site to the west. The scheme drawing notes that 'Sensitive lighting (LED directed) with maximum of 5.0 metre high lighting column – exact details to be agreed with HCC at detailed design stage', however, the Audit Team have concerns that the proposed buildouts will not be clearly visible during the hours of darkness, particularly should the sensitive lighting fail which could lead to a cyclist or vehicle striking the kerbs of the buildouts and a fall / personal injury or loss of control type collision respectively.</p>	
RECOMMENDATION: <p>It is recommended that measures are provided to ensure that the proposed buildouts are clearly visible.</p>	
Location Plan:	
DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20 th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8 th July 2022.	
<p>Agree -the buildouts will accommodate reflective bollards – exact details of bollards will be provided at detailed design stage.</p>	
AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022 <p>Confirmation that reflective bollards will be provided, addresses the road safety concern at this stage.</p>	
A.2.4	PROBLEM
Location:	Service Road
Summary:	Parking along the Service Road will restrict access
Acc Type:	Cyclist / vehicle collisions with kerbs
<p>The existing service road was observed to accommodate on-street parking with a car and motorcycle situated along the northern side of the carriageway in proximity to Tukes Avenue. The proposals include the works to the existing service road to provide a footway cycleway emergency access to a development of 375 dwellings. Whilst a pedestrian and cyclist will be able to pass a</p>	

parked vehicle, it is unlikely that an Emergency Response Vehicle will be able to pass which could lead to sideswipe type collision and secondary incidents as a result of delays in response times.

RECOMMENDATION:

It is recommended that measures are provided to prevent on-street parking along the proposed footway cycleway emergency access.

Location Plan:



DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8th July 2022.

Agreed – Firstly it should be noted, that whilst there are changes to the corridor, this currently serves the existing dwellings with vehicular access to the rear, and operates acceptably currently with the existing parked car and motorcycle with no recorded accident or issues.

The proposed arrangement which now provides a small buildout in this location, along with different surface material and signage should be sufficient to prevent on-street parking along this corridor. However, if required a TRO can be undertaken to provide double yellow lines at a later stage should parking be an issue.

AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022

Confirmation that parking restrictions could be pursued at a later stage should parking cause road safety concerns, addresses the road safety concern at this stage.

A.2.5	PROBLEM
Location:	Service Road
Summary:	Provision of resurfacing may remove the margin between the path of a vehicle and adjacent properties
Acc Type:	Vehicle collision with property structure

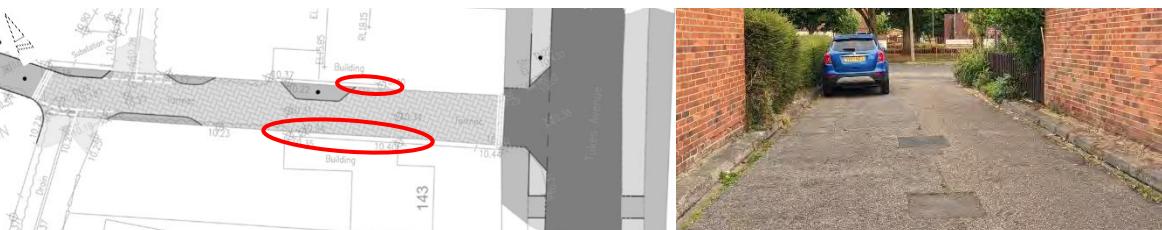
The existing service road is circa 4.2 metres wide and benefits from a narrow kerbed margin between the concrete carriageway and boundary / side wall of the adjacent properties. The proposals include highway works to the existing service road to allow access to a footway cycleway emergency access associated with a development of 375 dwellings to the west. The scheme drawing notes that 'link to be re-surfaced' and the 'access revised to a vehicle crossover arrangement ...'. No details of the proposed resurfacing have been provided at this stage, however, the Audit Team have concerns that the provision of a vehicular crossover will raise the

carriageway to the height of the margin which could lead to vehicle travelling closer to the adjacent properties and vehicle collisions with the property structure.

RECOMMENDATION:

It is recommended that an adequate margin is retained between the carriageway and adjacent properties.

Location Plan:



DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8th July 2022.

Agreed – the existing margin between the carriageway and adjacent properties is to be retained and is annotated on Drawing ITB10353-GA-032

AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022

Confirmation that the existing margin is to be retained, addresses the road safety concern at this stage.

A.3	JUNCTIONS
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A.3.1	PROBLEM
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Location:	Service Road
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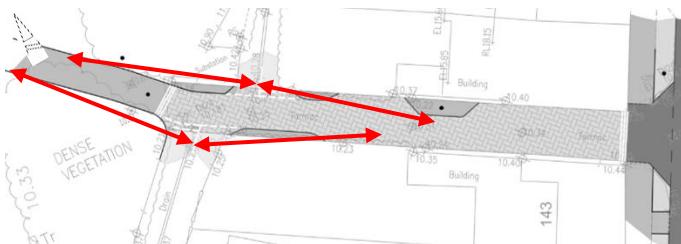
Summary:	Visibility between cyclists and users of the rear access road is limited
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Acc Type:	Vehicle to cyclist / pedestrian collision
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The existing service road forms a link between Tukes Avenue and the application site via a field gate as well as providing access to the rear access road associated with properties to the north and south. As observed on-site, vegetation and property boundaries restrict visibility from the rear access road. The proposals include works to upgrade the service road to allow access to a footway cycleway emergency access that accommodates a removable bollard to restrict general vehicular access. The scheme drawing provided with the Audit Brief illustrates that give-way road markings are to be provided at the rear access road junction with the service road and that a buildout is to be provided both sides of the carriageway just to the east. The proposed buildout increases the level of visibility that is achievable, however, the Audit Team have concerns that cyclists will proceed at speed on approach to the priority junctions and that the driver of egressing vehicles and cyclists will not become aware of one-another at a safe distance, which could lead to vehicle to cyclist type collisions.

RECOMMENDATION:

It is recommended that measures are provided and existing vegetation trimmed / maintained to ensure the level of achievable visibility is adequate.

Location Plan:**DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8th July 2022.**

Agree – the alignment of the shared footway/cycleway into the site along with staggered barriers will ensure that cyclists reduce speeds on the approach to the shared surface area.

The proposed buildouts have been revised to assist in improving visibility and encourage slow speeds.

Vehicles egressing the access points on the north and south side currently protrude onto the access road and has been in safe operation for a significant number of years. As part of these proposals this looks to build out the junction and increase the existing visibility i.e. this arrangement is a betterment.

Whilst this will now forms a shared use route for pedestrian, cyclists and vehicles, 9m forward visibility from both the east and west can be achieved on the approach to the access points on the southern and northern side of the access road, which allows approaching drivers, cyclists and pedestrians to clearly see any overhang of vehicles emerging from the access points. This equates to 10mph design speed.

Visibility of 2.0m x 9.0m can be achieved to the left and right from both the southern and northern access points.

In addition, where existing vegetation overhangs the highways, this will be trimmed back behind the proposed visibility splays.

AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022

Confirmation that the proposals increase the achievable level of visibility and measures will be provided to ensure that cyclists and pedestrians slow on approach to the existing service road, addresses the road safety concern at this stage.

A.4	WALKING, CYCLING AND HORSE RIDING
A.4.1	PROBLEM
Location:	Tukes Avenue
Summary:	Pedestrian visibility at the proposed uncontrolled crossing is restricted
Acc Type:	Vehicle cyclist collision with a pedestrian
	<p>The existing footway of Tukes Avenue is graded down to the existing carriageway to allow pedestrians level access across the existing service road. Property boundaries of the dwelling adjacent to the service road currently restricts visibility between pedestrians and users of the service road. The proposals include highway works to the junction of the service road with Tukes Avenue to form a vehicular crossover and provide tactile paving on the footway to ensure that pedestrians become aware they are crossing the service road. The scheme drawings illustrate that the width of the service road is to remain unchanged in proximity to Tukes Avenue. The Audit Team have concerns that although tactile paving is proposed, the configuration is to consist of two rows (800mm), which may be overstepped by a pedestrian leading to a pedestrian walking into the path of an approaching user of the service road. Furthermore, intervisibility between eastbound users of the service road and pedestrians is limited, which could lead to pedestrians stepping out into the path of an approaching vehicle or cyclist resulting in a collision.</p>
	RECOMMENDATION:
	<p>It is recommended that the configuration of tactile paving is increased to no less than 1200mm and that the proposed crossover is reduced in width to allow for adequate intervisibility to be achieved.</p>
	Location Plan:
	DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8th July 2022. <p>Agree – the vehicle crossover has been revised on the northern side to bring the uncontrolled crossing in line with the existing boundary. Drawing ITB10353-GA-032 has been revised to reflect this, and demonstrates that 9m forward visibility can be achieved to the crossing points which relates to a design speed of 10mph. In reality vehicles are likely to be travelling at slower speeds on the approach to the vehicle crossover. Furthermore, an additional row of tactile has been provided to both sides.</p>

AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022

Confirmation that the proposed tactile paving extends for a depth of 1200mm and that the forward visibility of 9 metres can be achieved, addresses the road safety concern at this stage.

A.4.2 PROBLEM

Location: Tukes Avenue

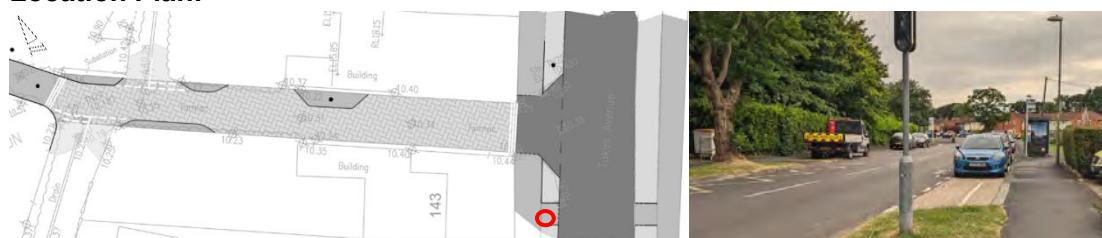
Summary: Existing street furniture will be an obstruction to pedestrians

Acc Type: Pedestrian collision with street lighting column

Tukes Avenue allows access to Woodcot Primary School that is situated to the east opposite the service road and benefits from school crossing warning signs as well as flashing signals. Uncontrolled pedestrian crossings are provided across Tukes Avenue to the north and south. The proposals include the provision of a 2.0 metre wide uncontrolled crossing point immediately to the south of the service road that will allow pedestrian access between the service road and primary school. The scheme drawings identify that the uncontrolled crossing is to be situated at the tangent of the existing service road corner radii. The Audit Team have concerns that an existing pole associated with an illuminated school crossing warning sign and flashing signals, is situated at the location of the proposed crossing which will be an obstruction to pedestrians and could lead to the need for a user to cross at full height kerbs. Full height kerbs are an obstruction and could lead to pedestrian trips falls and personal injuries.

RECOMMENDATION:

It is recommended that the proposed uncontrolled crossing or warning sign/pole is relocated appropriately.

Location Plan:

DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8th July 2022.

Agree – existing warning sign/pole to be relocated accordingly. Exact details to be provided at detailed design stage

AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022

Confirmation that the existing warning sign / pole will be relocated, addresses the road safety concern at this stage.

A.4.3	PROBLEM
Location:	Tukes Avenue
Summary:	Pedestrian visibility is limited by parked cars
Acc Type:	Vehicle pedestrian collision
	<p>Tukes Avenue is a single carriageway two-way road that is subject to a 30mph speed limit, accommodates parking bays and mature trees either side of the carriageway, allows access to Woodcot Primary School that is situated to the east opposite the service road and benefits from school crossing warning signs as well as flashing signals. Uncontrolled pedestrian crossings are provided across Tukes Avenue to the north and south. The proposals include the provision of a 2.0 metre wide uncontrolled crossing point immediately to the south of the service road that will allow pedestrian access between the service road and primary school. The Audit Team have concerns that visibility between a pedestrian and approaching drivers / riders will become restricted by parked cars. Restricted visibility at an uncontrolled pedestrian crossing point could lead to a pedestrian entering the carriageway into the path of a vehicle when it is not safe to do so, which could lead to a vehicle to pedestrian collision.</p>
	RECOMMENDATION:
	<p>It is recommended that the channel line of Tukes Avenue proposed uncontrolled crossing is formed on a buildout similar to the existing crossing points to the north and south.</p>
	Location Plan:
	DESIGN ORGANISATION RESPONSE provided by i-Transport on the 20 th July 2022 following formal issue of this Stage 1 Road Safety Audit on the 8 th July 2022.
	<p>Agree – a buildout on both sides has been provided to assist visibility and pedestrians crossing in similar arrangement to other buildouts along Tukes Avenue.</p>
	AUDITOR'S VIEW OF DESIGN ORGANISATION RESPONSE dated 26th July 2022
	<p>Confirmation that a build out is to be provided at the location of the crossing point, addresses the road safety concern at this stage.</p>
A.5	TRAFFIC SIGNS, CARRIAGEWAY MARKINGS AND LIGHTING
	<i>No Road Safety Concerns regarding TRAFFIC SIGNS, CARRIAGEWAY MARKINGS AND LIGHTING have been raised at this stage</i>

5.0 STAGE 1 ROAD SAFETY AUDIT TEAM STATEMENT

5.1 We certify that this Road Safety Audit has been carried out in accordance with GG119.

Audit Team Leader

Name: **Jamie Fenning** *BSc (Hons), MIHE, MCIHT, MSoRSA, HE RSA Certificate of Competency*

Signed:



Position: Road Safety / Highway Engineer

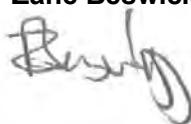
Organisation: Fenley Road Safety Limited

Date: 26th July 2022

Audit Team Member

Name: **Zane Beswick** *MCIHT, MSoRSA*

Signed:



Position: Road Safety / Highway Engineer

Organisation: Fenley Road Safety Limited

Date: 8th July 2022

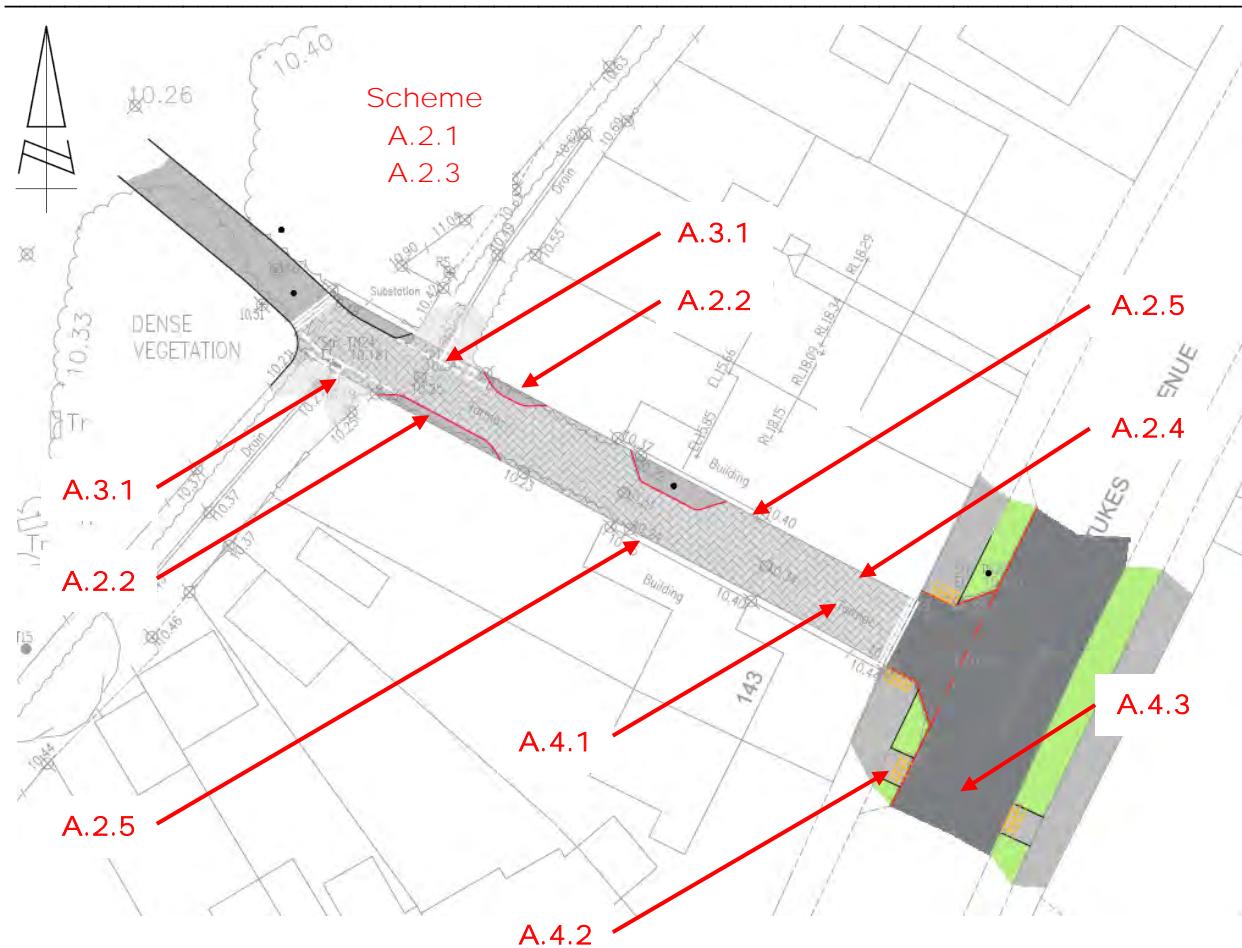
Appendix A1

Documents and Drawings provided for this Stage 1 Road Safety Audit

<u>Audit Stage</u>	<u>Doc. No.</u>	<u>Rev</u>	<u>Title</u>
Stage 1	ITB10353-023	-	GG119 Stage 1 Road Safety Audit Brief
	ITB13747-009	A	Non-motorised User Audit
	<u>Dwg No.</u>	<u>Rev</u>	<u>Title</u>
	ITB10353-GA-032	A	Footway / Cycleway / Emergency proposals into Tukes Avenue

Appendix A2

Item Location Plan



Appendix A3

Drawings associated with the Design Organisation Response

<u>Audit Stage</u>	<u>Drawing No.</u>	<u>Rev</u>	<u>Title</u>
Stage 1	ITB10353-GA-032	B	Footway / Cycleway / Emergency proposals into Tukes Avenue
	ITB10353-GA-038	B	Footway / Cycleway proposals onto Tukes Avenue Visibility and land titles
	ITB10353-GA-046	-	Footway / Cycleway / Emergency proposals onto Tukes Avenue Vehicle Swept Path Analysis

fenley

APPENDIX C. Footpath Lighting Report

Newgate Lane, Fareham, PO14 1BL



Lighting Assessment

5th August 2022
784-B041031

PRESENTED TO

i-Transport

PRESENTED BY

Tetra Tech
Executive Park,
Avalon Way,
Anstey,
Leicester,
LE7 7GR

DOCUMENT CONTROL

Document:	Detailed Lighting Assessment		
Project:	Newgate Lane		
Client:	i-Transport		
Job Number:	784-B041031		
File Origin:	O:\Acoustics Air Quality and Noise\Fee Earning Projects		
Revision:	1	Status:	First Issue
Date:	5 th August 2022		
Prepared by: Thomas Clements Assistant Environmental Consultant	Checked by: Matthew Smith Principal Environmental Consultant	Approved By: Nigel Mann Director	
Description of revision: First Issue			

EXECUTIVE SUMMARY

Tetra Tech Limited were commissioned by i-Transport to prepare a Lighting Assessment to appraise the lighting of footpaths at land along Newgate Lane, Fareham, PO14 1BL

Lighting plans have been designed by Tetra Tech and used to produce a model of the proposed development within DIALux software in accordance with the appropriate criteria.

The assessment has concluded that the risk of the proposed scheme resulting in exceedances of either the ILP pre-curfew or post-curfew obtrusive light limitations at local residential receptors will be low.

Following the installation of an appropriate lighting scheme as detailed in this report, the risk of the proposed development resulting in exceedances of 1 lux along potential bat foraging/commuting routes and dark corridors is low at all ecological receptor locations.

The assessment demonstrates that there is a low risk of significant adverse impacts on local sensitive residential and ecological receptors, and that the proposed development does not conflict with any national or local planning policies regarding lighting.

The dark skies assessment illustrates that the Upward Light Ratio (ULR) for the proposed development is 0.0%. This is below the 2.5% ULR criteria for the environmental zone E2. As such the indicative lighting scheme is not considered to result in detrimental impacts on the dark sky landscape.

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ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
CIBSE	Chartered Institute of Building Services Engineers
CIE	Commission on Illumination
ILP	Institution of Lighting Professionals
LDF	Local Development Framework
LP	Local Plan
CS	Core Strategy
DPD	Adopted Development Plan Documents
SPD	Adopted Supplementary Planning Documents
SG	Endorsed Supplementary Guidance Documents
NGR	National Grid Reference
PPS	Planning Policy Statement
NPPF	National Planning Policy Framework
Lx	Lux
ULR	Upward Lighting Ratio

1.0 INTRODUCTION

Tetra Tech Limited were commissioned by i-Transport to prepare a Lighting Assessment to appraise the lighting of footpaths at land along Newgate Lane, Fareham, PO14 1BL

1.1 SITE LOCATION AND CONTEXT

The development site currently consists of open land, the approximate national grid reference of which is 457397:103059. i-Transport is seeking to deliver adequate lighting along footpaths at land along Newgate Lane, Fareham.

The proposed development is bounded by:

- Agricultural land to the north of the Western Field footpath. There is no existing lighting at this location.
- Agricultural land to the east. There is no existing lighting at this location.
- Residential properties to the south of Woodcote Lane. There is some existing lighting from the residential properties present at this location.
- Newgate Lane to the west. There is some existing lighting from streetlights and residential properties present at this location.

Reference should be made to **Figure 1-1** for a visual representation of the application site and surrounding area.

1.2 LIGHTING DESIGN AND ASSESSMENT - OVERVIEW

The proposed development will require the installation of a number of luminaires that have the potential to increase existing light levels at sensitive locations within the vicinity of the site. The following stages have therefore been undertaken in order to produce a suitable lighting layout and assess potential impacts:

- Baseline survey;
- Quantitative assessment of potential lighting impacts at existing light sensitive receptors bordering the proposed development site, based on the proposed external lighting design;
- Formulation of appropriate mitigation measures, where necessary, in order to minimise the potentially detrimental impacts of the proposed lighting scheme.

Figure 1-1 – Site Boundary



2.0 POLICY, LEGISLATION AND RELEVANT AGENCIES

2.1 DOCUMENTS CONSULTED

The following documents were consulted during the undertaking of this assessment:

- Guidance Notes for the Reduction of Obtrusive Light, The Institution of Lighting Professionals, 2021;
- National Planning Policy Framework, Ministry of Housing, Communities & Local Government, July 2021;
- Planning Practice Guidance on Light Pollution, Ministry of Housing, Communities & Local Government, 1st November 2019;
- The Conservation of Habitats and Species Regulations, as amended, 2017;
- Environmental Protection Act, 1990;
- Statutory Nuisance from Insects and Artificial Light, Guidance on Sections 101 to 103 of the Clean Neighbourhoods and Environment Act 2005, DEFRA 2006;
- Artificial Lighting and Wildlife Interim Guidance: Recommendations to Help Minimise the Impact of Artificial Lighting, Bat Conservation Trust, 2014;
- BS EN 12464-2: Lighting of Work Places - Outdoor Work Places, British Standards Institute, 2007;
- BS EN 13201-4: Road Lighting – Methods of Measuring Lighting Performance, 2003;
- BS 5489-1: Code of Practice for the Design of Outdoor Lighting - Lighting of Roads and Public Amenity Areas, British Standards Institute, 2013;
- PLG 04- Guidance on Undertaking Environmental Lighting Impact Assessments, ILP, 2013;
- Bats and artificial lighting in the UK, Institution of lighting professionals, Bat Conservation Trust, 2018, and;
- Fareham Local Plan, June 2015 Adopted Version.

2.2 LEGISLATIVE FRAMEWORK

Light pollution was introduced within the Clean Neighbourhoods and Environment Act (2005) as a form of statutory nuisance under the Environmental Protection Act (1990), which was amended to include the following definition:

"(fb) artificial light emitted from premises so as to be prejudicial to health or nuisance;"

Although light was described as a statutory nuisance, no prescriptive limits or rules have been set for assessment. Guidance within the National Planning Practice Guidance with regards to Light pollution has been referred to while producing this assessment as well as documents produced by the International Commission on Illumination (CIE), Institution of Lighting Professionals (ILP) and the Chartered Institute of Building Services Engineers (CIBSE).

2.3 DESIGN STANDARDS

2.3.1 National Standards

The appropriate lighting design criteria for the scheme are contained within:

- BS EN 12464-2: Lighting of Work Places - Outdoor Work Places, 2014;
- BS 5489-1: Code of Practice for the Design of Outdoor Lighting - Lighting of Roads and Public Amenity Areas, 2020; and,
- BS EN 13201-2: Road Lighting - Performance Requirements, 2015.

Good lighting design also includes luminaires that have been selected to minimise light intrusion and glare to pedestrians and drivers, as discussed within the ILP document "Guidance Notes for the Reduction of Obtrusive Light".

2.3.2 Best Practice Design

As well as meeting the statutory design standards outlined in section 2.3.1, the external lighting design has sought to meet a number of criteria to ensure that the environmental effects of artificial lighting are managed to a high standard. These criteria are:

- All external lighting schemes must not have an upward lighting ratio (ULR) of more than 2.5%;
- All new column mounted luminaires shall be fitted with flat glass where appropriate to aid 2.5% upward light discharge;
- Where appropriate, luminaires on the site boundary will be fitted with light baffles to prevent light spill.
- Where possible, lighting will be controlled via Central Management System (CMS) time and light level sensors with controls capable of being adjusted and remotely set to adapt to local needs as required.

2.4 PLANNING POLICY AND GUIDANCE

2.4.1 National Policy

The National Planning Policy Framework (NPPF), February 2019 principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Practice Guidance (PPG) which previously guided planning policymaking. The NPPF broadly retains the principles of PPS 23: Planning and Pollution Control and with regard to light pollution, paragraph 180 states that:

"180 Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

c. limits the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation."

The National Planning Practice Guidance web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 and updated for lighting on 1st November 2019 to support the National Planning Policy Framework and make it more accessible. It states that “for maximum benefit, the best use of artificial light is about getting the right light, in the right place and providing light at the right time”. In light of this guidance, the assessment has considered the following implications of the proposed lighting design:

Does an existing lighting installation make the proposed location for a development unsuitable? For example, this might be because:

- the artificial light has a significant effect on the locality.
- users of the proposed development (e.g. a hospital) may be particularly sensitive to light intrusion from the existing light source.
- Will a new development, or a proposed change to an existing site, be likely to materially alter light levels in the environment around the site and/or have the potential to adversely affect the use or enjoyment of nearby buildings or open spaces?
- Will the impact of new lighting conflict with the needs of specialist facilities requiring low levels of surrounding light (such as observatories, airports and general aviation facilities)? Impacts on other activities that rely on low levels of light such as astronomy may also be a consideration but will need to be considered in terms of both their severity and alongside the wider benefits of the development.
- Is the development in or near a protected area of dark sky or an intrinsically dark landscape where new lighting would be conspicuously out of keeping with local nocturnal light levels, making it desirable to minimise or avoid new lighting?
- Would new lighting have any safety impacts, for example in creating a hazard for road users?
- Is a proposal likely to have a significant impact on a protected site or species? This could be a particular concern where forms of artificial light with a potentially high impact on wildlife and ecosystems (e.g. white or ultraviolet light) are being proposed close to protected sites, sensitive wildlife receptors or areas, including where the light is likely to shine on water where bats feed.
- Does the proposed development include smooth, reflective building materials, including large horizontal expanses of glass, particularly near water bodies? (As it may change natural light, creating polarised light pollution that can affect wildlife behaviour).

If the answer to any of the above questions is ‘yes’, consideration should be made for:

- where the light shines;
- when the light shines;
- how much light shines; and
- possible ecological impact.

2.4.2 Local Policy

Following a review of the adopted Fareham Local Plan, the following policy was identified as being relevant to potential light impacts associated with the proposed scheme:

"Policy DSP2: Environmental Impact

Development proposals should not, individually or cumulatively, have a significant adverse impact, either on neighbouring developments, adjoining land, or the wider environment, by reason of noise, heat, liquids, vibration, light or air pollution.."

3.0 METHODOLOGY

The Lighting Assessment includes the establishment of baseline ambient light conditions and an evaluation of impacts associated with the lighting design. This includes an assessment of change in light obtrusion at existing receptor locations.

Light modelling was undertaken using DIALux software, an independent lighting model which is capable of calculating daylight and artificial lighting scenes in interior and exterior scenarios. The model incorporates ILP, CIE 112 and BS EN 12464-2 calculation methodologies and is commonly used for lighting impact assessment.

3.1 LIGHTING DESIGN

The lighting scheme for the development was designed in accordance with the previously outlined standards and guidance. The design of the lighting has been undertaken in a manner such as to address two potentially conflicting needs; namely, on the one hand, to provide a safe environment for the movement of residents when the natural lighting levels fall and, on the other hand, to meet the light obtrusion limitations stated within the relevant standards and guidance in order to avoid any detriment to local amenity and wildlife.

Modelling for the assessment includes luminaires considered appropriate for the proposed residential areas of the development following the use of lights that are consistent with those used at nearby approved development and discussions with the lighting design team, as shown below.

Lighting modelled on Brookers Lane:

- DW Windsor Kirium Pro Mini 4LED A3 CLO 500mA UMSUG 42 0007 0000 100 4m Columns

Lighting modelled on Western Field:

- DW Windsor Pharola Bollard :- Acryl Satine Glazing + 180° Back Shield PHA NW B 2m Columns

3.2 QUANTITATIVE LIGHTING ASSESSMENT

3.2.1 Obtrusive Light

Baseline light conditions were determined during a site survey of the existing site and the surrounding area. A lighting model was subsequently developed to represent the proposed external lighting scheme and to enable the obtrusive light from the proposed development to be calculated at local receptors.

The ILP has developed an Environmental Zone classification system for the categorisation of sensitive receptor locations based on typical levels of baseline obtrusive light. This is summarised in **Table 3-1**.

Table 3-1 – Environmental Zones

Zone	Surrounding	Lighting Environment	Examples
E0	Protected	Dark (SQM 20.5+)	Astronomical Observable dark skies, UNESCO starlight reserves, IDA dark sky places
E1	Natural	Dark (SQM 20 to 20.5)	Relatively uninhabited rural areas, National Parks, Areas of Outstanding Natural Beauty, IDA buffer zones etc.
E2	Rural	Low district brightness (SQM ~15 to 20)	Sparingly inhabited rural areas, village or relatively dark outer suburban locations
E3	Suburban	Medium district brightness	Well inhabited rural and urban settlements, small town centres of suburban locations
E4	Urban	High district brightness	Town/city centres with high levels of night-time activity

For each Environmental Zone, recommended obtrusive light limits for exterior lighting installations have also been determined. These are summarised in **Table 3-2** to **Table 3-4**.

Table 3-2 shows the maximum allowable illuminance in the vertical plane for each Environmental Zone for pre-curfew scenarios (after 07:00 hours) and post-curfew scenarios (after 23:00).

Table 3-3 shows the maximum allowable luminous intensity emitted by the luminaires relative to the position of each luminous intensity receptor location depending on what the Environmental Zone is.

Table 3-4 shows the maximum allowable Upward Light Ratio (ULR) for each Environmental Zone. If the modelled maximum values of vertical illuminance, the modelled maximum luminous intensity and the ULR are below the criteria in the tables below, they pass the assessment.

Table 3-2 – Maximum Values of Vertical Illuminance on Properties

Light technical parameter	Application conditions	Environmental Zone				
		E0	E1	E2	E3	E4
Illuminance in the vertical plane (Ev)	Pre-curfew	n/a	2 lx	5 lx	10 lx	25 lx
	Post-curfew	n/a	<0.1 lx*	1 lx	2 lx	5 lx

* If the installation is for public (road) lighting then this may be up to 1 lx.

Table 3-3 – Limits for the Luminous Intensity of Bright Luminaires

Light technical parameter	Application conditions	Luminaire group (projected area A_p in m^2)						
		$0 < A_p \leq 0.002$	$0.002 < A_p \leq 0.01$	$0.01 < A_p \leq 0.03$	$0.03 < A_p \leq 0.13$	$0.13 < A_p \leq 0.50$	$A_p > 0.5$	
Maximum luminous intensity emitted by luminaire (I in cd)	E0	Pre-curfew	0	0	0	0	0	
		Post-curfew	0	0	0	0	0	
	E1	Pre-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	
		Post-curfew	0	0	0	0	0	
	E2	Pre-curfew	0.57 d	1.3 d	2.5 d	5.0 d	10 d	
		Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	
	E3	Pre-curfew	0.86 d	1.9 d	3.8 d	7.5 d	15 d	
		Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	
	E4	Pre-curfew	1.4 d	3.1 d	6.3 d	13 d	26 d	
		Post-curfew	0.29 d	0.63 d	1.3 d	2.5 d	5.1 d	
Aid to gauging A_p		2 to 5cm	5 to 10cm	10 to 20cm	20 to 40cm	40 to 80cm	>80cm	
Geometric mean of diameter (cm)		3.2	7.1	14.1	26.3	56.6	>80	
Corresponding AP representative area (m^2)		0.0008	0.004	0.016	0.063	0.251	>0.5	

NOTE:

1. D is the distance between the observer and the glare source in meters;
2. A luminous intensity of 0 cd can only be realised by a luminaire with a complete cut off in the designated directions;
3. A_p is the apparent surface of the light source seen from the observer position;
4. For further information refer to Annex C of CIE 150
5. Upper limits for each zone shall be taken as those with column $A_p > 0.5$

Table 3-4 – Maximum Values of Upward Light Ratio (ULR) of Luminaires

Light technical parameter	Environmental Zone				
	E0	E1	E2	E3	E4
Upward light ratio (ULR)/%	0	0	2.5	5	15

The assessment determined the lighting levels and Environmental Zone classification in the vicinity of the

proposed development. Modelling of the lighting scheme was undertaken and predicted obtrusive light values compared with the relevant guidelines, as detailed within **Table 3-2** to **Table 3-4**.

Any proposed roads will be lit in accordance with the relevant legislation. **Table 3-5** shows the relevant guidance when lighting roads and pedestrianised areas.

Table 3-5 – P Lighting Class

Class	Horizontal Illuminance		E_0 GR_L	
	\bar{E}_a [minimum maintained] lx	E_{min} [maintained] lx	E_{vmin} [maintained] lx	E_{scmin} [maintained] lx
P1	15,0	3,00	5,0	5,0
P2	10,0	2,00	3,0	2,0
P3	7,50	1,50	2,5	1,5
P4	5,00	1,00	1,5	1,0
P5	3,00	0,60	1,0	0,6
P6	2,00	0,40	0,6	0,2
P7	Performance not determined	Performance not determined		

a - To provide for uniformity, the actual values of the maintained average illuminance shall not exceed 1,5 times the minimum E value indicated for the class

For the purposes of this assessment, the footpath along Brookers Lane has been lit with columns mirroring the existing lighting along Woodcote Lane. The footpath in the Western Field has been lit to a suitable level to guide pedestrians along the path without causing significant light spillage.

The potential environmental effects of the proposed development are identified, as far as current knowledge of the site and development allows. The significance of potential environmental effects is assessed according to their scale (magnitude) and the sensitivity of the receptors.

For the purposes of this assessment, the effects of the development are considered to be ‘significant’ if:

- The development is predicted to exceed the maximum sky glow ULR at any surrounding receptor; and,
- The development is predicted to cause either an exceedance of the ILP obtrusive light trespass limitation at a receptor or if the development is predicted to cause an increase of more than 10% at an existing receptor where the ILP obtrusive light trespass limitation is already being exceeded.

4.0 BASELINE

This section provides a review of the existing lighting levels at the site in order to provide a benchmark against which to assess potential impacts associated with the development.

4.1 BASELINE SURVEY

4.1.1 Survey Conditions

A baseline lighting survey was undertaken on the Monday 1st August 2022. The survey was undertaken after 22:00 to establish the existing post curfew lighting conditions.

4.1.2 Existing Light Sources

Existing light sources surrounding the footpaths are external lights from residential properties and some street lighting along the roads immediately surrounding the site.

4.1.3 Survey Locations

Light monitoring was undertaken at a number of survey locations to determine variations in baseline light levels within the vicinity of the site. Where possible, monitoring at the boundary of the receptor locations was undertaken to provide the best possible representation of existing light obtrusion. Where this was not possible, monitoring was undertaken at the most appropriate representative location. Reference should be made to **Figure 4-1** for an illustrative site map of the monitoring locations.

The purpose of the survey is fourfold:

- The survey enables quantified light levels at (or as near as possible to) local sensitive receptor locations to be measured;
- The site survey also provides an understanding of any significant landforms and vegetation that can potentially provide a pathway screen between light sources and receptors;
- The survey enables the ILP environmental zone to be determined based on sound, quantified evidence; and,
- The survey enables existing significant sources of artificial light and natural screens to be accounted for outside of the quantified model predictions.

Figure 4-1 – Light Monitoring Locations

The survey therefore provides a robust understanding of the current artificial lighting illuminance levels currently experienced around the development site. The locations of all the light monitoring locations are summarised in **Table 4-1** below, and the results from the survey are contained in **Table 4-2**.

A series of measurements were taken at key points; a horizontal ground level measurement and four vertical measurements at 1.5m facing north, east, south and west in general accordance with the recommended monitoring method in the statutory guidance issued by the ILP. Illuminance levels can vary quite significantly over relatively small distances and even with slight changes in the plane of the lens. Therefore, the range of measurements taken over a monitoring length was recorded, to determine the minimum and maximum illuminance at receptor façades.

Table 4-1 – Base Light Monitoring Locations

Reference	Monitoring Location	Key Local Sources of Light
L1	Along Woodcote Lane	-
L2	Along Woodcote Lane	2 story house to S
L3	Along Brookers Lane	-
L4	Along Brookers Lane	-
L5	Outside 61 The Drive	Street light 6m E of location
L6	End of Heron Way	2 story house to NE
L7	Outside Tudor Lodge Nursing Home	Street light 5m NW outside nursing home entrance
L8	East of Newgate Lane	Street lights on road edge to W

4.1.4 Survey Results

The results of the monitoring are displayed in **Table 4-2**.

Table 4-2 – Survey Results

Reference	Recorded Illuminance (Lux)					Sky Quality (visual magnitudes per square arcsecond)
	Facing Up	Facing North	Facing East	Facing South	Facing West	
L1	0.01	0.01	0.01	0.01	0.04	18.90
L2	0.00	0.00	0.01	0.01	0.00	19.37
L3	0.1	0.02	0.01	0.00	0.00	18.95
L4	0.1	0.1	0.07	0.1	0.2	19.93
L5	0.27	0.38	0.62	0.16	0.02	17.88
L6	0.00	0.00	0.03	0.01	0.01	19.51
L7	0.59	1.04	0.04	0.78	0.64	17.63
L8	0.09	0.07	0.02	0.18	0.1	17.85

Following the environmental lighting survey, it was concluded that the proposed development site and the surrounding area should be classified as 'Environmental Zone E2 – Low District Brightness', in accordance with the ILP guidance limits outlined within **Table 3-2** for Sky Quality. This is considered representative of relatively dark outer suburban locations. Therefore, the permitted light trespass limit at an offsite receptor in the pre-curfew period (typically considered to be 07:00-23:00) is 5 lux and in the post curfew period (typically considered to be 23:00-07:00) is 1 lux.

4.2 RECEPTORS

The term 'receptors' includes any persons, locations or systems that may be susceptible to changes in environmental factors as a consequence of the development.

4.2.1 Residential Receptors

During the site survey, key residential properties were identified which have the potential to be affected by obtrusive light from the proposed development, as shown in **Table 4-3**. Reference should be made to **Figure 4-2** and **Figure 4-3** for an illustration of the residential receptors used for the purposes of this assessment. All

the identified residential receptors are considered to be within ILP Environmental Zone E2. Each receptor was input into the model at a height of 4.0m (bungalows and single-storey building at height of 1.5m) at a distance of 10 cm from the building façade to represent illuminance at first-floor window level, representing a typical bedroom, which is deemed to be the most sensitive receptor room.

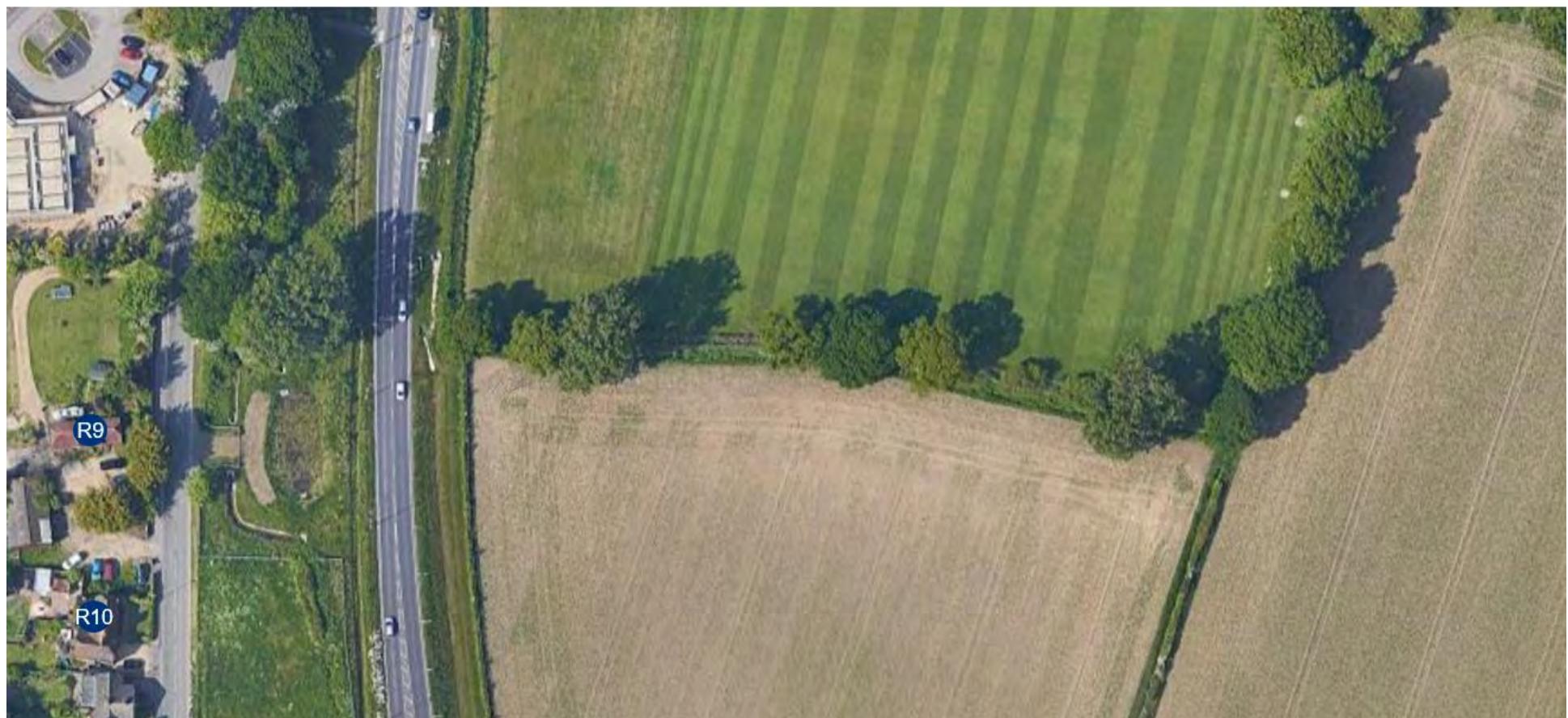
Table 4-3 – Residential Receptors

ID	Description	ILP Environmental Zone
R1	Minhaven, Woodcote Lane	E2
R2	Monymusk, Woodcote Lane	E2
R3	Glenwood, Woodcote Lane	E2
R4	57 The Drive	E2
R5	59 The Drive	E2
R6	61 The Drive	E2
R7	3 Fulmar Walk	E2
R8	7 Fulmar Walk	E2
R9	211 Newgate Lane	E2
R10	205 Newgate Lane	E2

Figure 4-2 – Modelled Residential Receptors Brookers Lane



Figure 4-3 – Modelled Residential Receptors Western Field



4.2.2 Ecological Receptors

Lighting associated with the operational phase of the proposed development has the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The Conservation of Habitats and Species Regulations (2017) and subsequent amendments require competent authorities to review planning applications and consents that have the potential to impact on National Site Network (NSN) designated sites (e.g. Special Areas of Conservation). For the purposes of this assessment, it was determined that a number of bat species could utilise the hedgerows and trees surrounding the site for commuting/foraging purposes. In order to represent a worst-case scenario, the assessment has assumed that potential bat species on site will be highly sensitive to artificial light.

For the purposes of the assessment, ecological receptor locations have been included at 17 points along the length of hedgerows and trees around and within the boundary of the site, at heights of 2m. Ecological receptors include locations where historical treelines and hedgerows are to be kept. **Table 4-4** below, provides a reference for these locations whilst a full spatial illustration of modelled ecological receptors is included in **Figure 4-4** and **Figure 4-5**

Table 4-4 – Ecological Receptors

ID	Description
E1 – E3	Treeline along Woodcote Lane
E4 – E7	Treeline along Brookers Lane
E8 – E9	Treeline along residential properties on The Drive
E10	Treeline along Newgate Lane
E11 – E17	Treeline along site boundary in Western Field

Figure 4-4 – Modelled Ecological Receptors Brookers Lane



Figure 4-5 – Modelled Ecological Receptors Western Field



5.0 LIGHTING ASSESSMENT

Potential impacts associated with the proposed lighting design at locations in the vicinity of the site were assessed as described in the following sections.

5.1 OBTRUSIVE LIGHT MODELLING

A proposed lighting design has been included within a DIALux model of the proposed development in accordance with appropriate criteria. Reference should be made to the figures below for a 3D representation of the proposed model. Buildings surrounding the development site were also included in the model at heights of 8m (2-storey building) and 4m (1-storey building). **Figure 5-1**, **Figure 5-2** and **Figure 5-3** show the lighting along Brookers Lane. **Figure 5-4**, **Figure 5-5**, and **Figure 5-6** show the lighting along the path in the Western Field.

The model is only able to accurately represent the effects of solid structures such as buildings and walls on light obtrusion. Non-solid barriers such as trees and hedges cannot be accurately modelled and therefore the effects of these are dealt with qualitatively outside the model calculations.

The assessment considers the effect of the proposed development in the pre-curfew and post-curfew periods. The assessment consists of a comparison between assumed baseline illuminance levels at each of the receptor locations against the predicted light obtrusion from the proposed development determined in lighting model. The assumed baseline illuminance levels are ILP Environmental Zone E2.

Where it was not practicable to measure existing illuminance at the receptor location, monitoring results from the nearest equivalent representative monitoring location are used.

The ULR of the proposed development has been calculated and referenced to the maximum permitted limitations for the relevant Environmental Zones of the receptor locations, as detailed in **Table 3-2** to **Table 3-4**.

Figure 5-1 – Detailed External Lighting Layout Brokers Lane



Figure 5-2 – Visual Representation of Proposed External Lighting Model Brookers Lane

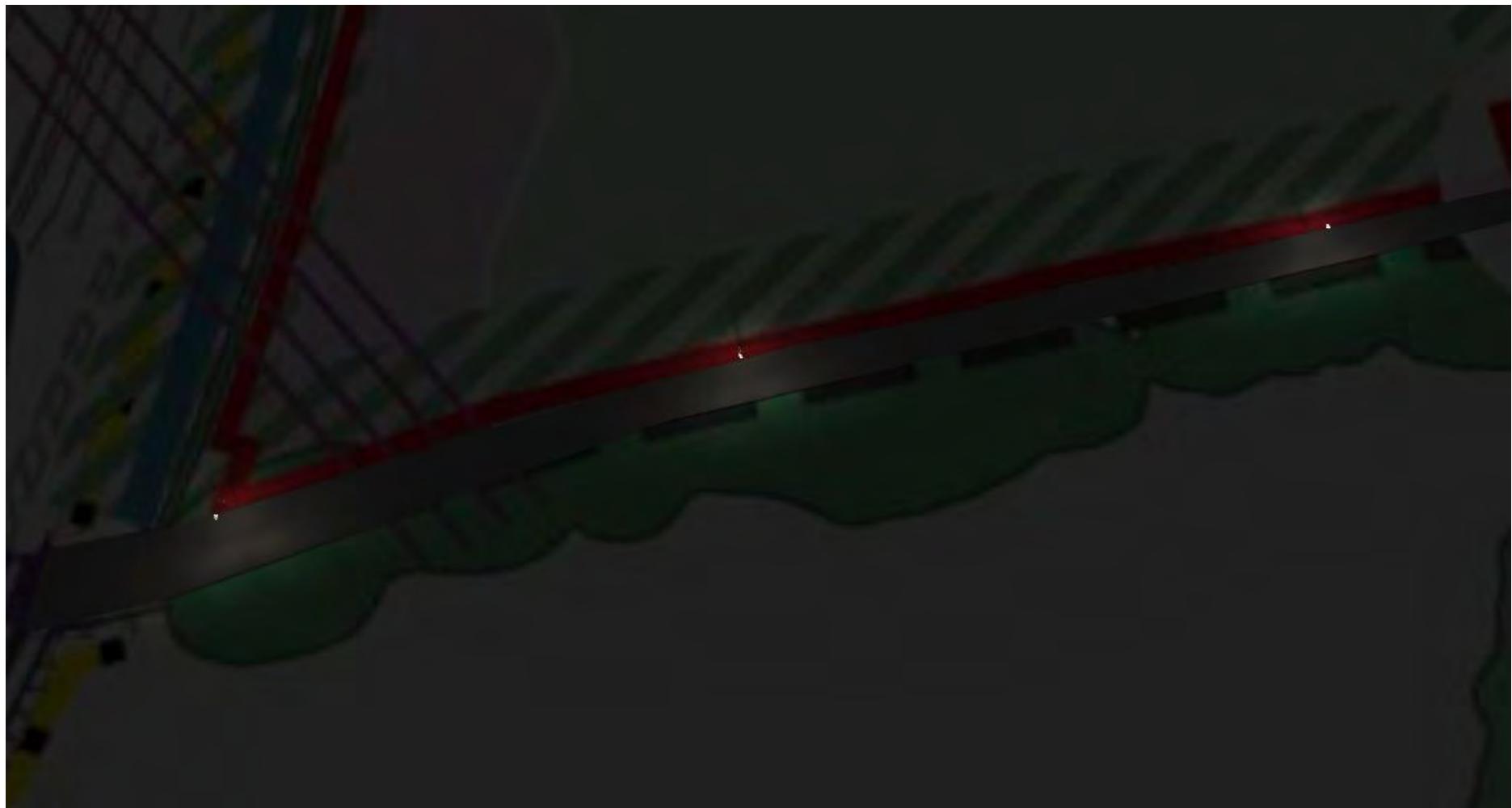


Figure 5-3 – Visual Representation of Lux Contours Brookers Lane

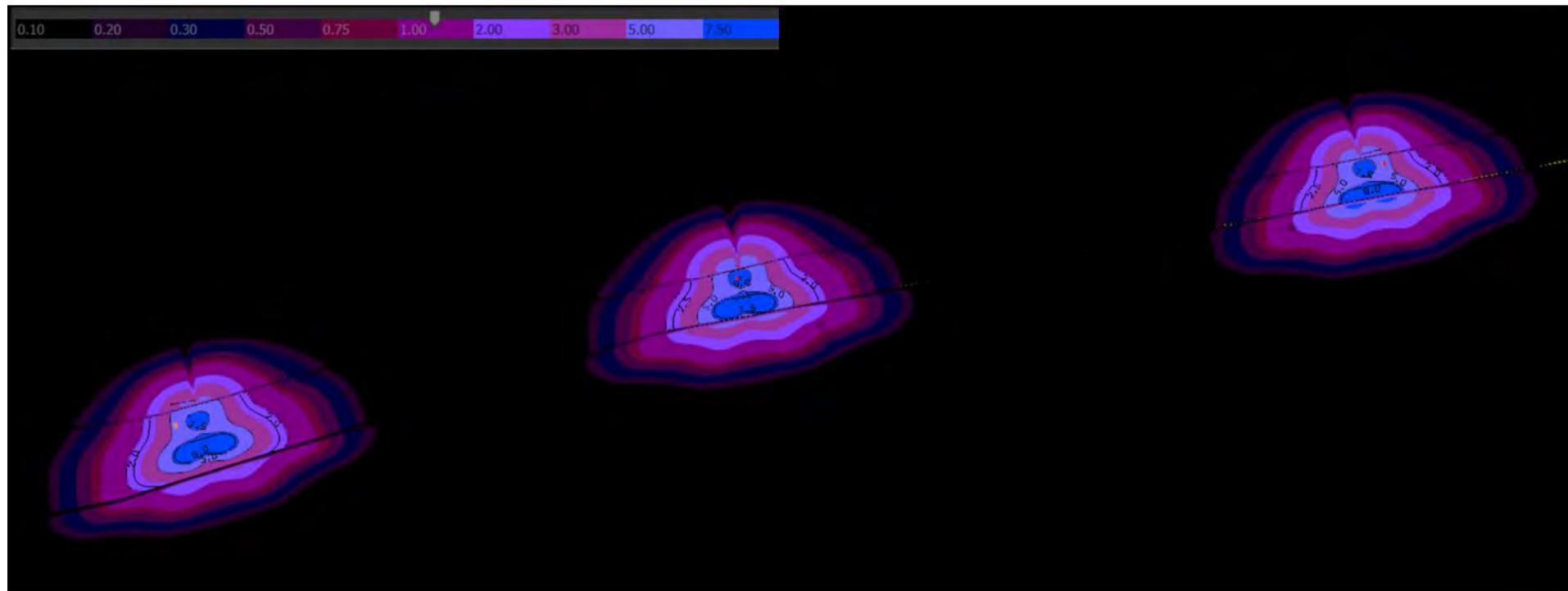


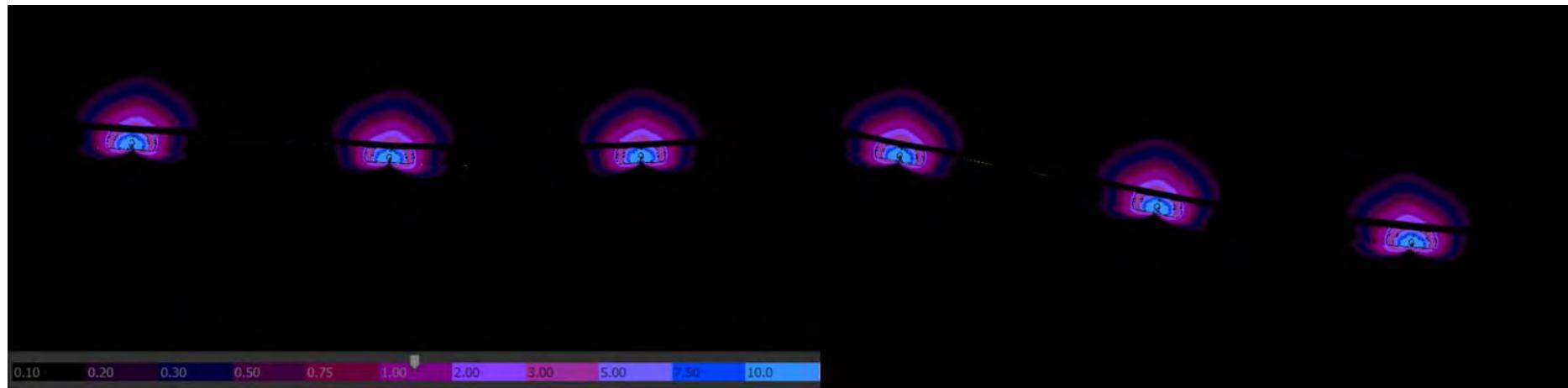
Figure 5-4 – Detailed External Lighting Layout Western Field



Figure 5-5 – Visual Representation of Proposed External Lighting Model Western Field



Figure 5-6 – Visual Representation of Lux Contours Western Field



The model is only able to accurately represent the effects of solid structures such as buildings and walls on light obtrusion. Non-solid barriers such as trees and hedges cannot be accurately modelled and therefore the effects of these are dealt with qualitatively outside the model calculations.

The ULR of the proposed development has been calculated and referenced to the maximum permitted limitations for the relevant Environmental Zones of the receptor locations, as detailed in **Table 3-2** to **Table 3-4**.

5.1.1 Model Results

Table 5-1 below, compares the modelled lighting arrangements to the ILP pre-curfew and post-curfew criteria limits for ILP Environmental Zone E2, in accordance with the classifications detailed in **Table 3-2** to **Table 3-4**.

Table 5-1 – Residential Receptor Assessment Results

ID	ILP Pre-curfew Criteria (Lx)	ILP Post-curfew Criteria (Lx)	Predicted Model Illuminance (lx)
R1	5.00	1.00	0.00
R2	5.00	1.00	0.00
R3	5.00	1.00	0.00
R4	5.00	1.00	0.01
R5	5.00	1.00	0.00
R6	5.00	1.00	0.00
R7	5.00	1.00	0.01
R8	5.00	1.00	0.01
R9	5.00	1.00	0.01
R10	5.00	1.00	0.00

As the proposed development site includes the installation of a public road, post-curfew lighting levels may be up to 1 lux as stated in **Table 3-2**. The assessment shows that the ILP pre-curfew and post-curfew Zone E2 criteria will not be exceeded any residential receptor locations as a result of lighting from the proposed development at, with a maximum predicted model illuminance of 0.01 lux at R4. Therefore, the proposed development is not predicted to result in any significant adverse impacts with respect to local sensitive residential receptors.

5.1.1.1 Ecological Receptors

It is believed that most bat emergence requires light levels below 1 lux for late emerging species, up to 14 lux for those that emerge earlier (Noctule and Pipistrelle). These lighting levels of 1 lux are required to ensure that bat commuting, and foraging routes are not impacted and that dark corridors beyond the limits of the site are retained. While some bat species, such as Pipistrelle are more tolerant with light levels above this criterion, it reflects worst-case assumptions concerning the sensitivity of those species present to background illuminance levels. As such, the assessment criteria represent a worst-case scenario in terms of impacts on emergence, commuting and foraging (Bat Conservation Trust, 2018).

When determining the likely impacts of lighting associated with the proposed development on sensitive ecological receptors, the assessment has considered the effect of lighting without mitigation. Impacts are considered potentially significant where predicted illuminance exceeds 1 lux at ecological receptors. If this is the case, further consideration should be given to mitigation measures. **Table 5-2** below, shows the modelled lighting arrangements for the ecological receptors surrounding the site vicinity and within the site.

Table 5-2 – Ecological Receptor Assessment Results

ID	Predicted Model Illuminance
E1	0.00
E2	0.00
E3	0.00
E4	0.08
E5	0.21
E6	0.07
E7	0.01
E8	0.00
E9	0.00
E10	0.03
E11	0.34
E12	0.29
E13	0.12
E14	0.12
E15	0.07
E16	0.03
E17	0.02

As shown in **Table 5-2**, light trespass associated with the proposed development does not exceed 1 lux at any of the 17 modelled ecological receptor locations adjacent to the site boundary and within the proposed site, with the maximum predicted model illuminance of 0.34 lux at E11. As such, lighting from the proposed development is not predicted to result in any significant adverse impacts with respect to local sensitive ecological receptors.

5.1.2 Dark Sky Assessment

The model has been used to calculate the predicted Upward Lighting Ratio (ULR) of the proposed external lighting scheme. Model outputs predict a sky glow figure (ULR) of 0.0%. As illustrated in **Table 3-2** to **Table 3-4**, the ILP sky glow limitation for an area classified as Environmental Zone E2 is 2.5% ULR. As such the indicative lighting scheme meets the ILP sky glow limitations and is therefore not considered to result in detrimental impacts on the dark sky landscape.

6.0 CONCLUSIONS

Tetra Tech Limited were commissioned by i-Transport to prepare a Lighting Assessment to appraise the lighting of footpaths at land along Newgate Lane, Fareham, PO14 1BL

Lighting plans have been designed by Tetra Tech and used to produce a model of the proposed development within DIALux software in accordance with the appropriate criteria.

The assessment has concluded that the risk of the proposed scheme resulting in exceedances of either the ILP pre-curfew or post-curfew obtrusive light limitations at local residential receptors will be low.

Following the installation of an appropriate lighting scheme as detailed in this report, the risk of the proposed development resulting in exceedances of 1 lux along potential bat foraging/commuting routes and dark corridors is low at all ecological receptor locations.

The assessment demonstrates that there is a low risk of significant adverse impacts on local sensitive residential and ecological receptors, and that the proposed development does not conflict with any national or local planning policies regarding lighting.

The dark skies assessment illustrates that the Upward Light Ratio (ULR) for the proposed development is 0.0%. This is below the 2.5% ULR criteria for the environmental zone E2. As such the indicative lighting scheme is not considered to result in detrimental impacts on the dark sky landscape.

APPENDIX A – REPORT CONDITIONS

This Report has been prepared using reasonable skill and care for the sole benefit of i-Transport ("the Client") for the proposed uses stated in the report by – Tetra Tech Limited. Tetra Tech Limited exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder's permission.

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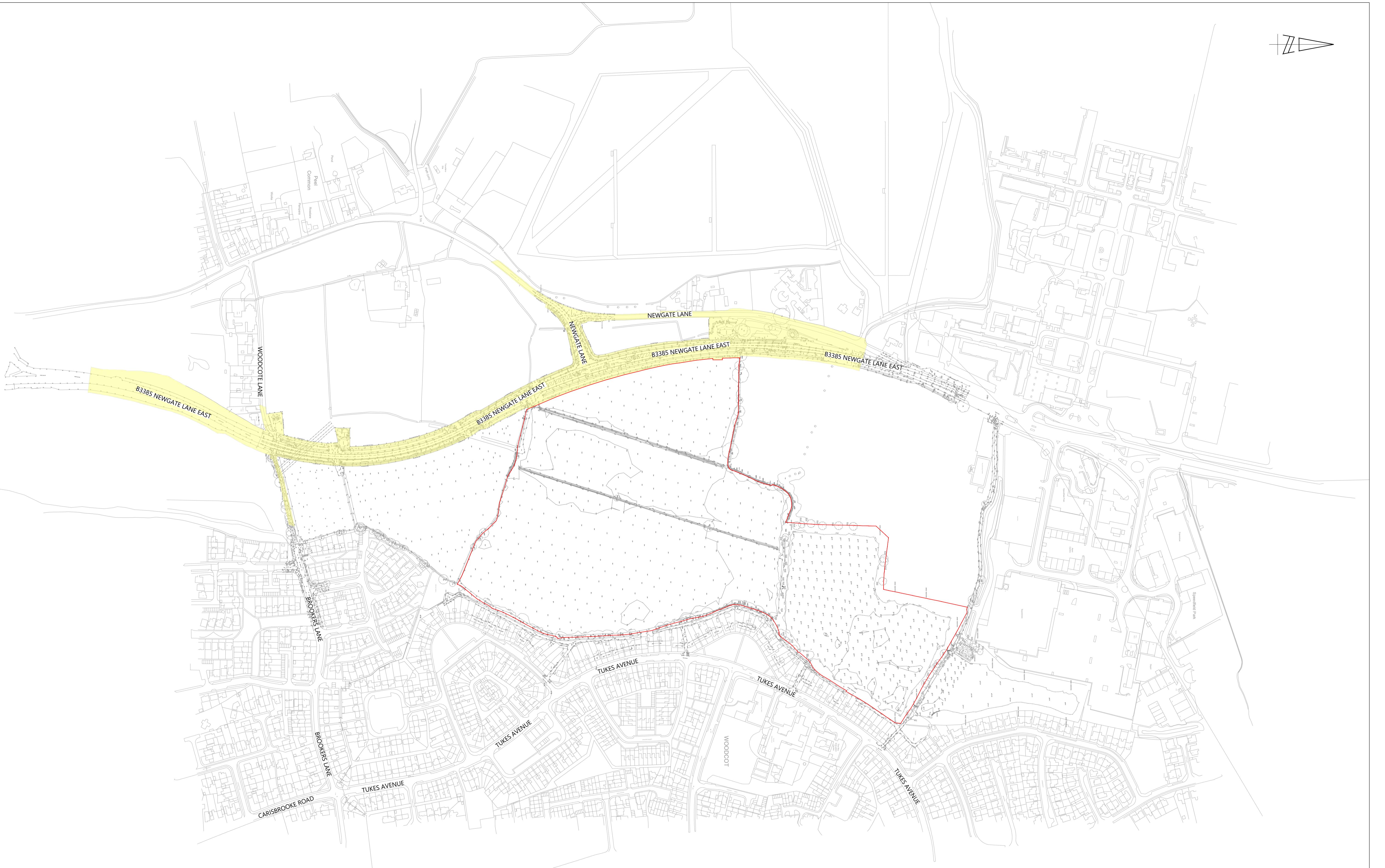
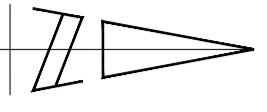
The report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections'. Environmental conditions can vary, and no warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times. No investigative method can eliminate the possibility of obtaining partially imprecise, incomplete or not fully representative information. Any monitoring or survey work undertaken as part of the commission will have been subject to limitations, including for example timescale, seasonal and weather-related conditions. Actual environmental conditions are typically more complex and variable than the investigative, predictive and modelling approaches indicate in practice, and the output of such approaches cannot be relied upon as a comprehensive or accurate indicator of future conditions. The "shelf life" of the Report will be determined by a number of factors including; its original purpose, the Client's instructions, passage of time, advances in technology and techniques, changes in legislation etc. and therefore may require future re-assessment.

The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction.

Tetra Tech Limited accept no liability for issues with performance arising from such factors.

APPENDIX D. Site Access Drawings and Supporting Information



The Square, Basing View,
Basingstoke, Hampshire, RG21 4EB
Tel: 01256 637940
www.i-transport.co.uk

SCALE BAR @ 1:2500
0 50 100 250

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STAGE ONLY. FURTHER CONSIDERATION REQUIRED BY DETAILED DESIGN TEAM.

KEY:

HIGHWAY BOUNDARY EXTENTS (BASED
ON OS MAPPING)

SITE BOUNDARY

A

07.12.21

MC

TOPO UPDATED

MC

TW

REV

DATE

BY

DESCRIPTION

OK

APD

PROJECT:

STATUS

FOR INFORMATION

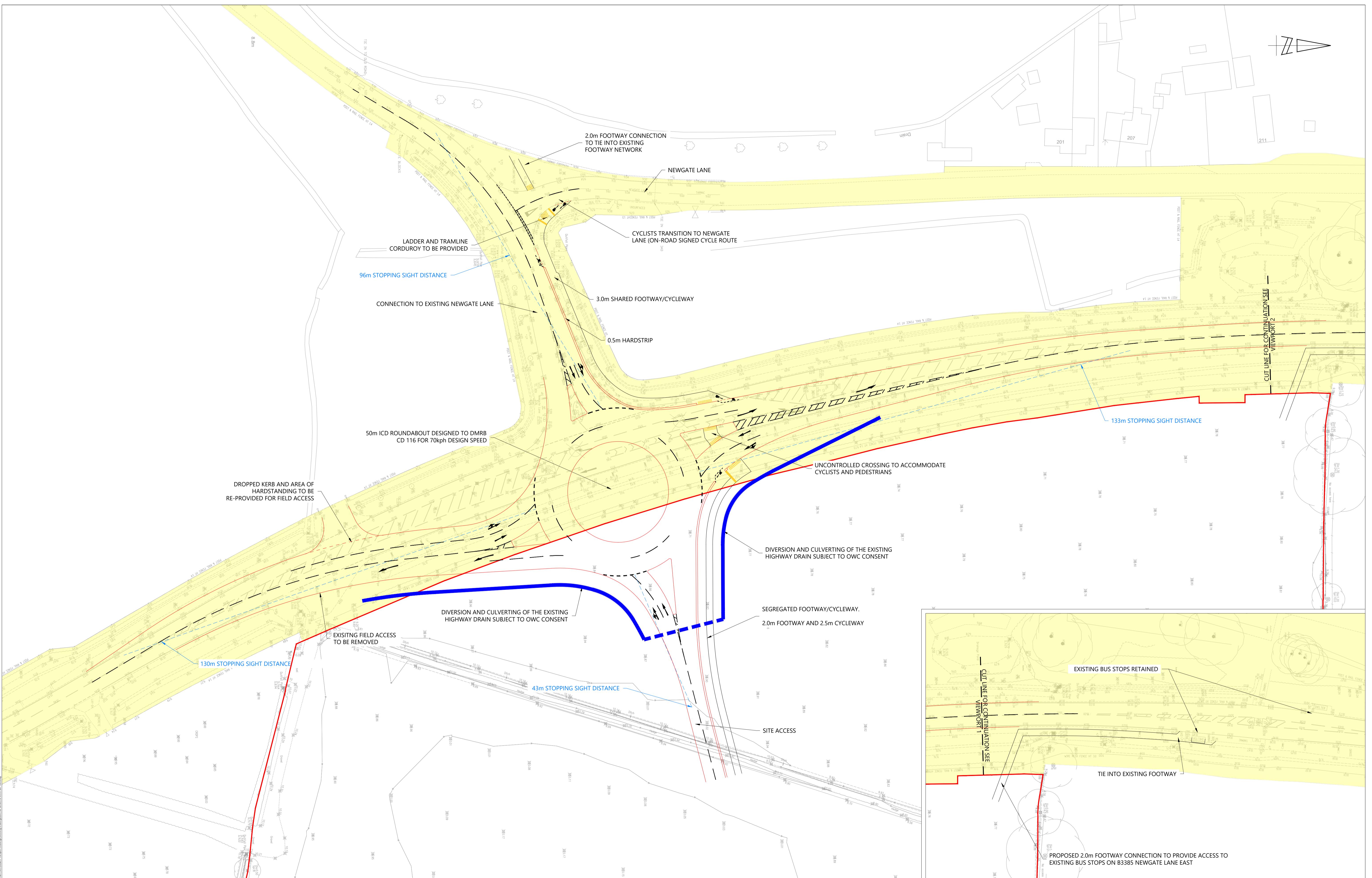
SITE LOCATION PLAN

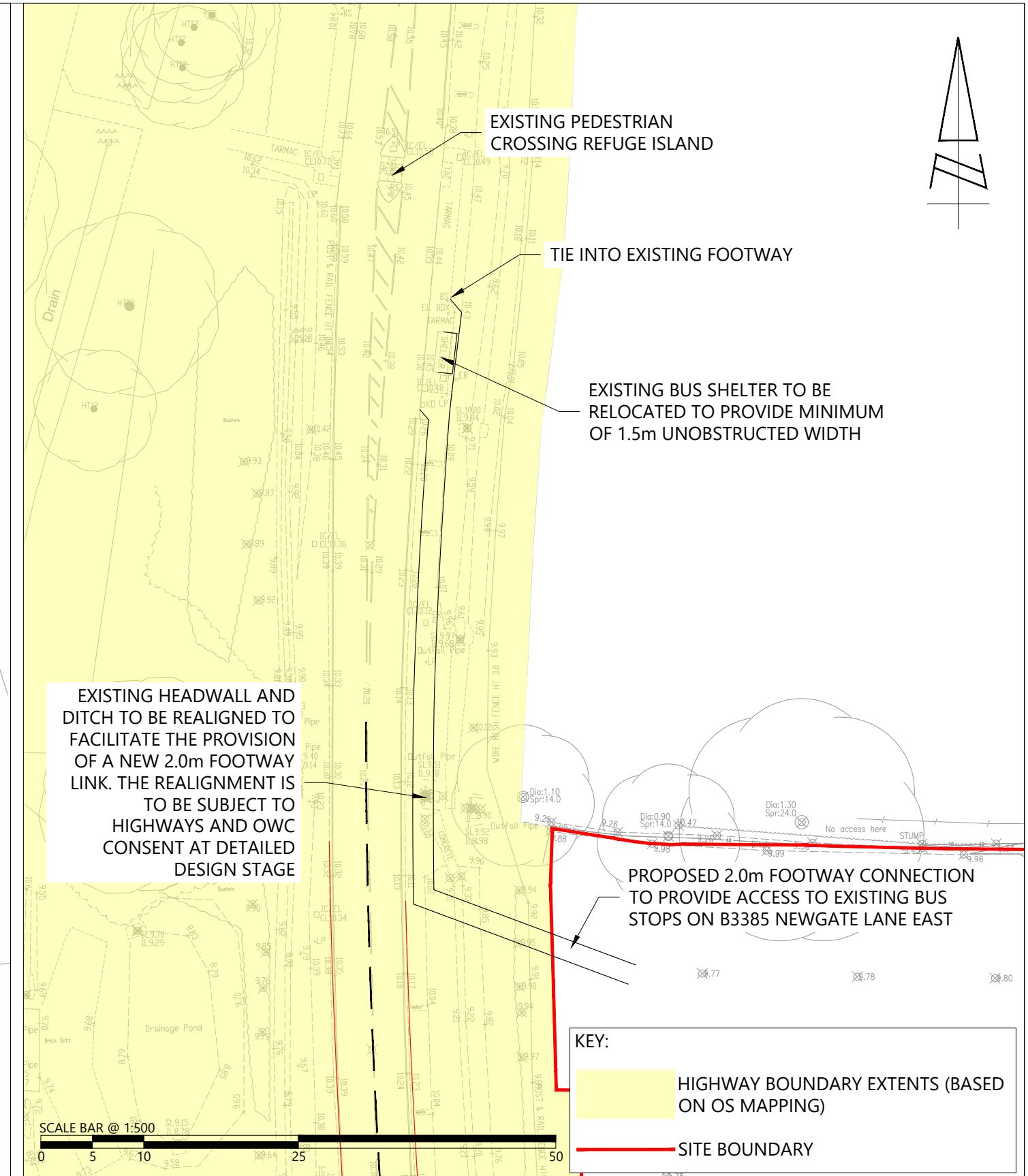
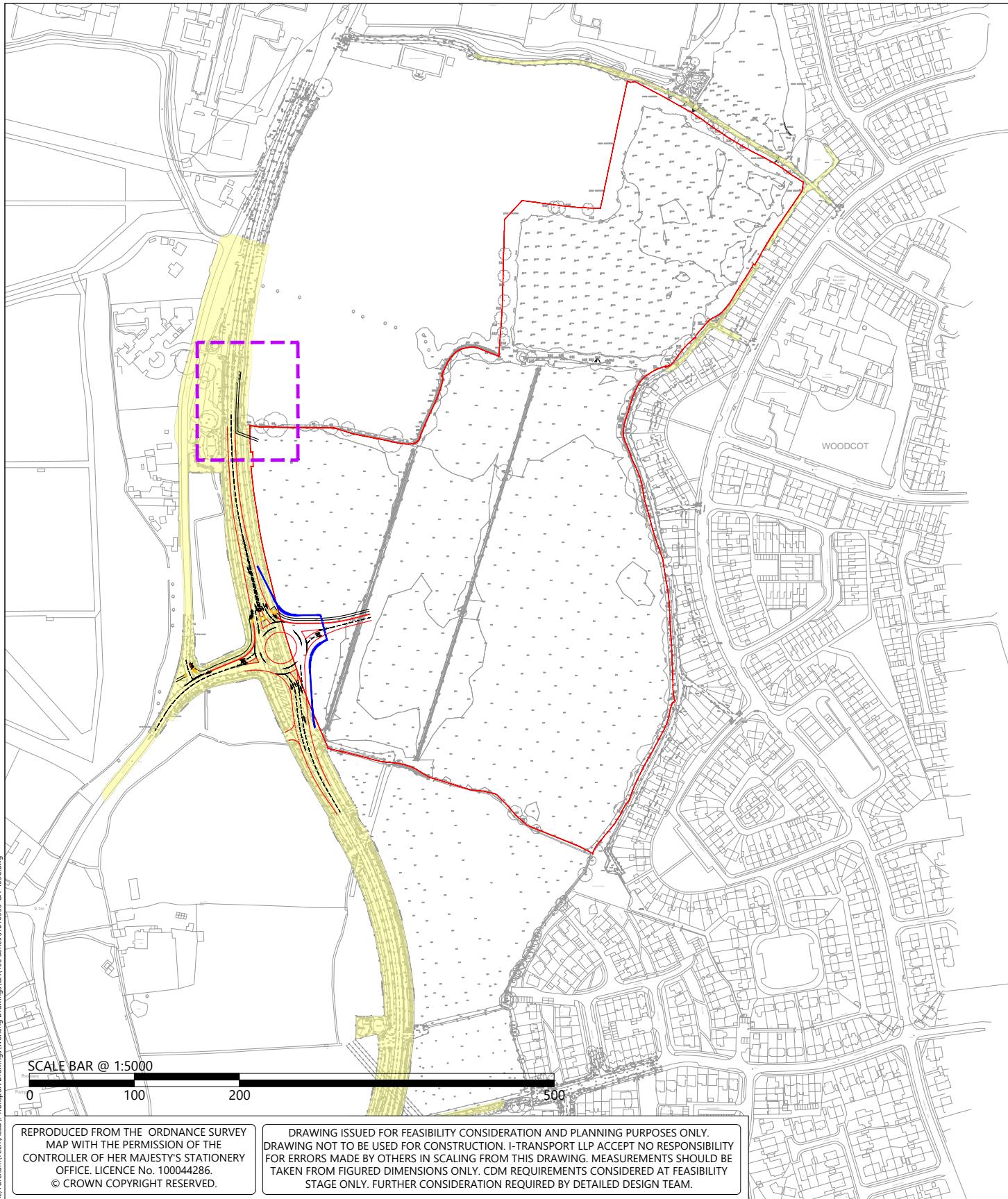
LAND EAST OF NEWGATE LANE EAST, FAREHAM

MILLER HOMES AND BARGATE HOMES

DRAWN:	CHECKED:	APPROVED:
MC	MC	TW
PROJECT No:	SCALE @ AT:	DATE:
ITB10353	1:2500	25.10.21
DRAWING No:	REV:	
ITB10353-GA-100	A	







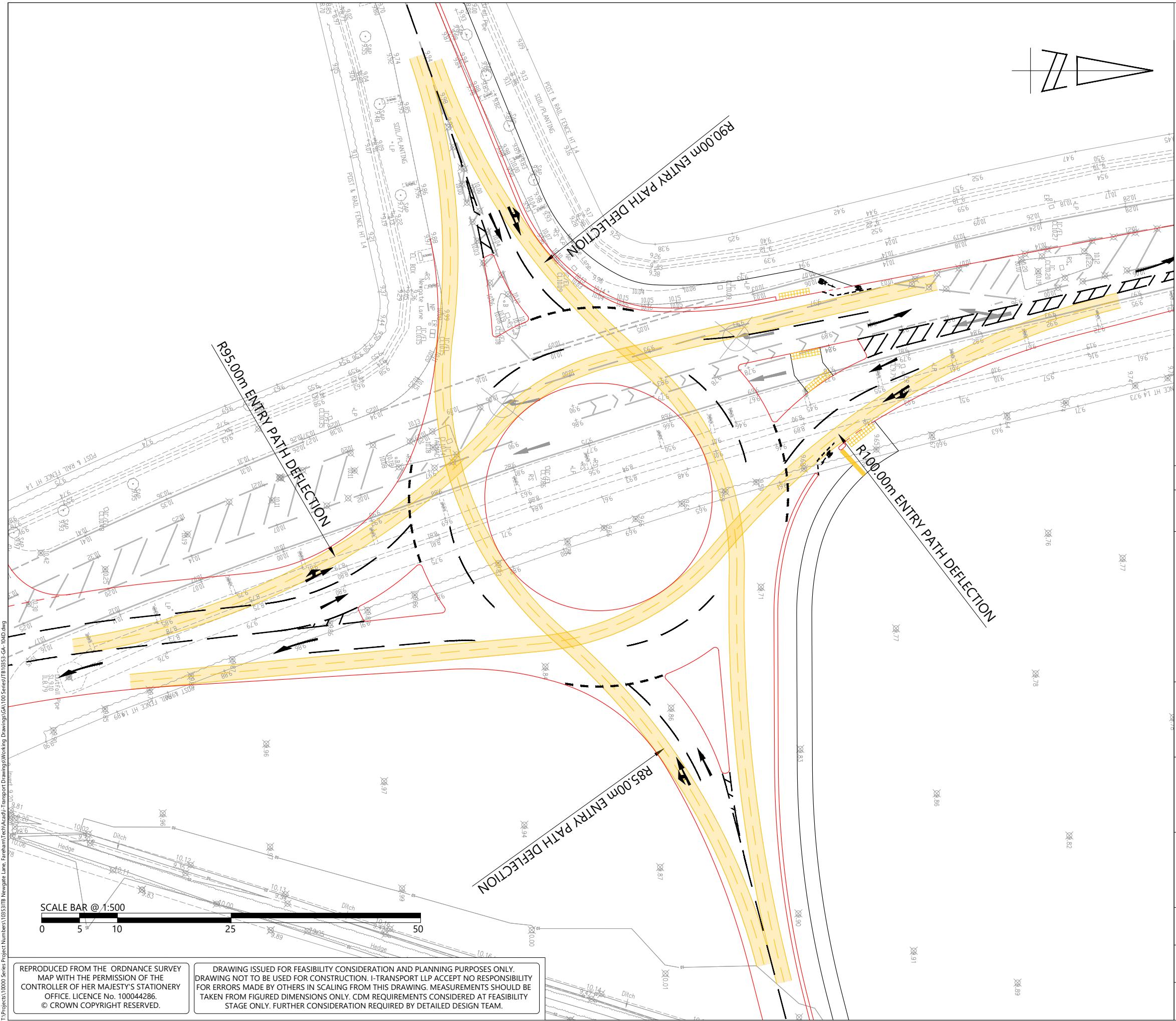
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C	21.07.22	MC	FLARE LENGTH INCREASED ON SOUTHERN ARM FOR CAPACITY	MC	TW	TITLE:
B	29.06.22	MC	DESIGN UPDATED TO INCORPORATE HCC COMMENTS	MC	TW	PROPOSED PEDESTRIAN CONNECTION TO EXISTING BUS STOPS
A	29.11.21	MC	ARRANGEMENTS REVISED TO TAKE ACCOUNT OF STAGE 1 ROAD SAFETY AUDIT	MC	TW	
REV	DATE	BY	DESCRIPTION	CHK	APD	
STATUS:	FOR INFORMATION		PROJECT:	CLIENT:		
			LAND EAST OF NEWGATE LANE EAST, FAREHAM	MILLER HOMES AND BARGATE HOMES		

DRAWN:	MC	CHECKED:	MC	APPROVED:	TW
PROJECT No:	ITB10353	SCALE @ A3:	AS SHOWN	DATE:	25.10.21
DRAWING No:	ITB10353-GA-103	REV:	C		



D	21.07.22	MC	FLARE LENGTH INCREASED ON SOUTHERN ARM FOR CAPACITY	MC	TW
C	29.06.22	MC	DESIGN UPDATED TO INCORPORATE HCC COMMENTS	MC	TW
B	25.01.22	MC	ARRANGEMENTS REVISED TO REMOVE OVERRUN AREA	MC	TW
A	29.11.21	MC	ARRANGEMENTS REVISED TO TAKE ACCOUNT OF STAGE 1 RSA	MC	TW

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**PROPOSED ROUNDABOUT TO NEWGATE LANE EAST
ENTRY PATH DEFLECTION**

PROJECT: LAND EAST OF NEWGATE | ANE EAST FAREHAM

MILLER HOMES AND BARGATE HOMES

DRAWN:	CHECKED:	APPROVED:
MC	MC	TW

PROJECT No:	SCALE @ A3:	DATE:
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ITB10353	1:500	25.10.21
DRAWING No:	ITB10353-GA-104	REV: D

