LAND OFF PUMP LANE, RAINHAM

APP/A2280/W/20/3259868

PROOF OF EVIDENCE

January 2021

Medway Council

RESIDENTIAL DEVELOPMENT
LAND OFF PUMP LANE
RAINHAM

PROOF OF EVIDENCE

CONTROLLED DOCUMENT

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1. INTRODUCTION

Qualifications and Experience

1.1 I, James Rand, have an Honours Degree in Geography and a Master's Degree in Transport Planning and Engineering, both from the University of Southampton. I am a Principal Transport Planner at Paul Basham Associates, and have worked in the industry for over 8 years.

1.2 Whilst at Paul Basham Associates and I have provided transport advice on a range of development proposals including large mixed-use schemes, residential, employment, care, education and retail uses, on behalf of both private and public sector clients. Whilst on secondment to West Sussex County Council's highway development control team, I was responsible for preparing statutory consultation responses to planning applications within West Sussex and supporting officers through reviews of junction modelling submitted by applicants.

1.3 I have undertaken works including but not limited to the preparation of Transport Assessments, Travel Plans, Environmental Impact Assessments, highway engineering and S106 transport negotiations, appeal documentation such as written statements, statements of case, statements of common ground and appeared at planning appeals.

1.4 The evidence which I have prepared and provided for this appeal (ref. APP/A2280/W/20/3259868) is given in accordance with my training and experience and I can confirm that the opinions expressed are my true and professional ones.

The Appeal

1.5 This Proof of Evidence (PoE) has been prepared on behalf of Medway Council (MC) in relation to a planning appeal by A C Goatham & Son pertaining to a site known as Land off Pump Lane, Rainham, Kent, ME8 7TJ.

1.6 The application that is the subject of this appeal was submitted to Medway Council and has the reference number MC/19/1566. The application was outline in nature with matters of appearance, landscaping, layout and scale reserved, and sought permission for, "*redevelopment of land off Pump Lane to include residential development comprising of approximately 1,250 residential units, a local centre, a village green, a two form entry primary school, a 60 bed extra care facility, an 80 bed care home and associated access (vehicular, pedestrian, cycle).*"

1.7 The application was refused on 12 June 2020 with the Decision Notice outlining 9 reasons for refusal. Four of these reasons for refusal relate to highways matters as follows:

- *Reason for Refusal 4: The applicant has failed to satisfy Highways England that the development not materially affect the safety, reliability and/or operation of the Strategic Road Network (SRN). This is contrary the tests set out in department for Transport Circular 2/13 paragraphs 9 & 10 and the NPPF at paragraph 109.*
- *Reason for Refusal 5: The cumulative impact from the increased additional traffic cannot be accommodated on the highway in terms of its overall network capacity without a severe impact. This is contrary to Local Plan policy T1 and the NPPF at paragraph 109.*
- *Reason for Refusal 6: The cumulative impact from the increased additional traffic from the development is unlikely to be able to create a safe highway environment. This is contrary to Local Plan policy T1 and the NPPF at paragraph 109.*
- *Reason Refusal 7: No assessment nor technical details have been provided regarding the two new access points along Pump Lane to serve the proposed development, therefore it has not been possible to appropriately assess the adequacy of these access points. This is contrary to Policy T1 of the Medway Local Plan 2003 and paragraph 109 of the NPPF.*

1.8 Since the appeal was submitted, discussions between the Council and the appellant have been held and a Highways Statement of Common Ground (SoCG) produced. As such, Reasons for Refusal 6 & 7 are no longer to be pursued by Medway Council. Subject to the Appellant providing an executed Section 106 agreement which secures the mitigation required by Highways England to ensure there will be no material adverse impact on the strategic highway network, the Council will no longer pursue Reason for Refusal 4.

My Role & Scope of Evidence

1.9 Medway's Integrated Transport department awarded a professional service contract to the Waterman Group in October 2019 to provide support to Medway Council's Transport Planner in reviewing the proposals. The lead consultant reviewed the documentation submitted by the applicants and email correspondence between the parties, but unfortunately had to take a leave of absence at short notice in November 2020 and remains on long term sick leave.

1.10 Paul Basham Associates were approached by the Council in December 2020, after the planning appeal had been submitted. I was asked by the Council to review Reason for Refusal 5 (RFR5) and to reach a view as to whether I felt able to defend this reason for refusal in evidence at a Public Inquiry. Having reviewed all of the associated documentation, I came to the conclusion that RFR5 was entirely justified and thus able to provide my expertise at the forthcoming inquiry.

1.11 The appellants and the Council adopted different approaches to modelling the impact of the development on the local road network, as outlined in the Highways SoCG. Broadly, the appellant's approach is based on individual junction assessments, whilst the Council utilise the Medway Aimsun Model, which was developed on the Council's behalf by SWECO. A Proof of Evidence has been prepared by SWECO, to whom I defer detailed and technical matters pertaining to the development and application of the Medway Aimsun Model.

1.12 In this proof of evidence, I set out the Council's case in relation to Reason for Refusal 5 in the context of the relevant planning policy framework and any other material considerations, deferring to SWECO's proof of evidence where necessary. I consider the main issue to be whether the additional development traffic would result in cumulative severe impact on the local road network, taking into account mitigation works put forward by the appellant.

2. RELEVANT PLANNING POLICIES

2.1 The current saved policies for Medway include the Medway Local Plan 2003, which contains policy T1 relating to the impact of development, as RFR5 references. The relevant part of the policy is as follows:

> *In assessing the highways impact of development, proposals will be permitted provided that:*
> *(i) The highway network has adequate capacity to cater for the traffic which will be generated by the development, taking into account alternative modes to the private car.*

2.2 The submission version of the emerging Local Plan, known as Future Medway, has not yet been published. According to the local development scheme, a draft version of the plan is to be published in 2021.

2.3 Medway Council provide further planning guidance online and encourage applicants to consult this before submitting planning applications. The accompanying text states that although these documents do not have the status of formal supplementary planning documents, they are a material consideration in determining planning applications. One such guidance document is the Transport Assessments Guidance Note (Appendix A), which introduces the Medway Aimsun Model and an optional protocol for its use in Transport Assessments (TAs).

2.4 The National Planning Policy Framework (NPPF) was originally published in March 2012 and revised in July 2018. It was subsequently updated in February 2019 and acts as the central guidance for development planning. Paragraph 109 is referenced in RFR5, which states:

> *Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or if the residual cumulative impacts on the road network would be severe.*

2.5 In the absence of a definition of severe impact within the NPPF, it is instructive to consider recent appeal decisions issued by the planning inspectorate. As per the planning officer's report, the appeal decision APP/D3315/W/16/3157862 states that it is not additional congestion itself that could constitute a severe impact, but the consequences of that congestion. The decision considers it, '*is necessary to consider the impact of the full development on the 'carrying capacity' of the road; would it significantly erode the free flow of traffic and driver/pedestrian safety and would the critical junctions be overloaded?*' (para. 19, appendices p. 13, Appendix B). It is therefore necessary to consider the impact of the development on the local road network on this basis.

2.6 Appeal decision APP/B1605/W/14/3001717 (attached as **Appendix C**) pertains to a site in Leckhampton and outlines that the determination of the impact of a scheme must take into account the, *'cumulative effect of all expected development … rather than the individual contribution of each development in turn,'* even if the latter is marginal (Inspectors Report paragraph 223, appendices p.47). Furthermore, the appeal decision outlined that proposals should be dismissed if they increase demand for use of a link or junction that is already over-capacity, taking account of any mitigation (IR226-227, appendices p.48). The inspector concluded that, *'taking account of [mitigation] measures… the residual cumulative effects of development proposed would increase demand for use of sections of the highway network which are already operating at over-capacity levels, contributing to a severe impact…,"* (IR238, appendices p.50) and the Secretary of State expressly agreed with this (para 14, appendices p.24). The High Court subsequently refused the appellants permission to proceed with a challenge against this decision, the judge noting that a development could "wash its own face" in terms of highway impact, but the residual cumulative impacts could still be severe if the road network was already over capacity. A summary of the High Court decision is also attached in **Appendix C**.

3. IMPACT ON THE LOCAL ROAD NETWORK

3.1 The Council assessed the impact of the development on the local road network through the use of the Medway Aimsun Model (MAM). The Council's Transport Assessments Guidance Note (**Appendix A**) states that the MAM enables the council to assess and potentially contest TAs that are based on independent modelling (para 16, section 1, appendices p.6).

3.2 Full details of the development of the MAM and the methodology used to assess the impact of the development on the local road network are included in SWECO's proof of evidence. The MAM consists of 8 main sub-networks covering the local planning authority's area. The modelling assessments of the appeal scheme analyse the impact of the development on the three sub-networks closest to the site, known as Subnetwork 2, Subnetwork 3 and Subnetwork 7 as shown in **Figure 1**, from SWECO's report Pump Lane and Lower Rainham Transport Impact Appraisal (appendices p. 91, **Appendix D**).

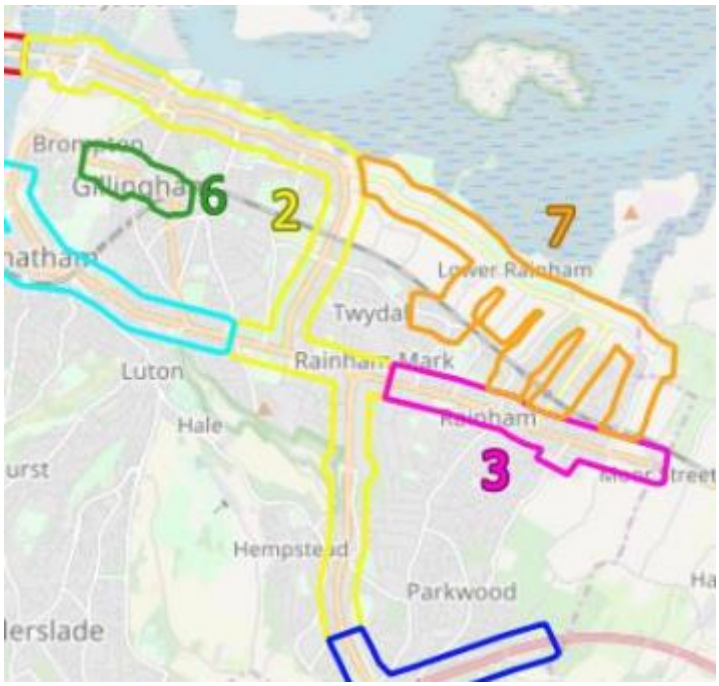

Figure 1: Location of Subnetworks 2, 3 & 7 in the Medway Aimsun Model

3.3 The modelling assessment includes the mitigation works proposed by the appellant within their TA at the Lower Rainham Road/Yokosuka Way/Gads Hill roundabout, the Bloors Lane/A2/PlayFootball signalised junction and on Pump Lane at the railway bridge. The years of assessment include 2028 and 2037, respectively the best case scenario for full occupation and the end of the emerging local plan period. Details of the committed developments and highway works included in each scenario are set out within SWECO's report Pump Lane and Lower Rainham Transport Impact Appraisal (**Appendix D**) and further detailed in Peter Canavan's letter to Simon Tucker dated 14th December 2020 (**Appendix E**). The forecast traffic generation does not include any growth associated with the emerging Local Plan.

3.4 For each year of assessment, the impact of the development on the local road network has been determined by comparing the performance of the network with and without the development in the AM and PM peaks.

3.5 The MAM produces a number of outputs relating to the performance of the network as set out in the SWECO report Pump Lane and Lower Rainham Transport Impact Appraisal (appendices p. 63, **Appendix D**). One of the key performance metrics the model reports is Level of Service (LoS) which is a measure based on the average delay experienced by vehicles. Different delay values are assigned an alphabetical grade, from A to F. The thresholds for the various levels of service are shown in **Table 1** and are drawn from the Highway Capacity Manual (2016).

Level of Service	Delay (sec/veh)		Definition
	Signalised	Unsignalised	
A	≤10	≤10	Free flow conditions
B	10-20	10-15	Reasonably free flow conditions
C	20-35	15-25	Stable flow conditions
D	35-55	25-35	Approaching unstable flow, ability to manoeuvre restricted due to congestion
E	55-80	35-50	Unstable flow, at or near capacity
F	> 80	> 50	Forced or breakdown flow, demand > capacity

Table 1: Level of Service Criteria

3.6 Details of how LoS has been calculated in the MAM is included in Section 2: Methodology of SWECO's report (appendices p. 62, **Appendix D**) and proof of evidence. To summarise, LoS for each junction is based on the average of the queue delay at each approach, weighted by the flow on each approach. Logically, as the amount of capacity at each junction decreases, the greater the delay, and the greater the queue. Therefore, although LoS is based on vehicle delay values, information on capacity and vehicle queues can be inferred.

3.7 By definition, where the LoS is F, demand is greater than capacity and traffic flow has broken down. Vehicles arrive at a faster rate than they can depart, junctions are overloaded and vehicle queues quickly increase.

3.8 If the addition of development traffic is such that the LoS of a junction worsens to F, it is likely to constitute a severe impact. This would mean the development traffic has taken the junction over capacity, and the delay values can be inspected to numerically quantify the magnitude of the change in average delay (and therefore infer information on the change in queues).

3.9 If a junction is already operating over capacity (at a LoS of F), small increases in traffic flow can result in disproportionately large increases to delay (and therefore queues). This is also the case for links between junctions. It is therefore possible that a severe impact can arise from even small increases in traffic flow. This is reflected in the Leckhampton Appeal Decision (**Appendix C**) and Highways England's stated view in relation to this application that "*any impact on a severely congested network is in itself severe as the additional traffic will only serve to increase vehicle delay, journey times and queue lengths*," and this is attached as **Appendix F** (appendices p. 147).

3.10 LoS scores can be viewed as a summary statistic of the conditions and the MAM produces a variety of more nuanced outputs across a variety of scales (individual links, junctions, sub-network) as detailed in Table 2 of SWECO's report (**Appendix D**). The MAM is capable of modelling the impact of capacity issues, queues and delays at junctions on the links between them. This is chiefly observed through the change in journey time on a link. This takes into account the impact of development at multiple junctions in the route cumulatively, demonstrating the impact of the development on wider basis than individual junctions. The measure can therefore demonstrate that impact on individual junctions that may not be severe in and of themselves can contribute to a severe impact when considered cumulatively.

3.11 During and since the application, the appellants queried some aspects of the methodology, including the trip rates used and the configuration of the model around the development area. The council do not agree with the appellant's trip rates but the Council undertook additional modelling with multiple scenarios including those based on the appellant's trip rates and desired configuration of the model.

3.12 The results of the assessment using the appellant's trip rates and desired configuration of the model are referred to as "LRR Scenario 6" within the SWECO report Pump Lane and Lower Rainham Transport Impact Appraisal Addendum 2 (2028 Results), attached as **Appendix G**. LRR Scenario 6 is the most favourable modelling scenario to the appellant because:

- It uses the appellant's trip rates, lower than those in other scenarios
- It is based on the configuration of the model around the development area requested by the appellants
- The year of assessment is 2028, rather than 2037 and therefore only contains committed developments likely to be complete by that year.

3.13 For these reasons, of the modelling assessments undertaken by SWECO to determine the impact of the development, the network would be expected to perform best in LRR Scenario 6. The council considers that the results of LRR Scenarios 4 & 5 are more realistic, given they use the council's trip rates, but the following assessment is based on the results of LRR Scenario 6. All references to figures and pages relate to SWECO's report in **Appendix G**.

Subnetwork 7

3.14 Broadly, Subnetwork 7 covers Lower Rainham Road and the roads that extend southwards from it. As Subnetwork 7 is the closest of the three modelled subnetworks to the site it experiences the greatest increase in traffic flow arising from the development. The existing flows in the reference case are comparatively low, and as a result of these two factors, the percentage change in key statistics of travel time, delay, vehicle speed and mean queue are substantial (Figures 12 & 13, appendices p. 175).

3.15 However, the LoS for junctions in this subnetwork do not alter as a result of the development (Table 17, appendices p. 176). In effect, the volume of existing traffic flows is such that there is sufficient capacity to accommodate the traffic arising from the development on the junctions in this subnetwork.

3.16 The SWECO report also includes assessment of travel time along specific links in the subnetwork (appendices pp. 177-179). One such link is Lower Rainham Road westbound, which experiences a 131% increase in travel time arising from the development in the AM peak. As such, the time taken for a vehicle to travel the length of this link would increase from c. 7 minutes to c. 16 ½ minutes, as a result of the development (Table 19, appendices p.178). This primarily arises because the additional traffic arising from the development results in increased delays at the Lower Rainham Road/Yokosuka Way/Gads Hill roundabout at the western end of Lower Rainham Road. The roundabout forms part of Subnetwork 2. In my view, the magnitude of the increase in travel time constitutes a severe impact on the operation of this part of the road network.

3.17 All of the junctions in Subnetwork 7 are east of the site access on Lower Rainham Road, and thus this increase in westbound travel time does not impact the LoS at junctions in this subnetwork.

Subnetwork 2

3.18 Broadly, Subnetwork 2 covers the A289 corridor from the Medway Tunnels through to the A2, the A2 corridor from Watling Street to Sovereign Boulevard, and the A278 from the A2 towards the M2 J4. As shown through observed traffic data and reflected by public objection letters to the planning application, the A289, A2 & A278 are key arterial routes in Medway. In the reference case, traffic volume, delays and queues are comparatively high compared to Subnetwork 7 (Tables 3 & 4, appendices p.163). In general terms, there is less spare capacity in this subnetwork than Subnetwork 7, and the addition of the development traffic substantially worsens the operation of the Subnetwork.

3.19 This can be seen through the comparison of LoS results for the reference case and LRR Scenario 6. Drawing from Tables 5 & 6, appendices p. 166 **Appendix G**, the junctions that experience a worsening of LoS as a result of the development are set out in **Table 2** alongside those that are already at LoS F. The average delay values have been extracted from the model and for the avoidance of doubt, the results are inclusive of the mitigation works proposed by the appellant.

	AM Peak		PM Peak	
	LoS	Average delay (sec/veh)	LoS	Average delay (sec/veh)
A289 Pier Road / Maritime Way Roundabout			C -> F	30 -> 86
A289 Pier Road / Gillingham Gate Road West	D -> E	41 -> 56	D -> F	50 -> 81
A289 Pier Road / Gillingham Gate Road East			B -> C	17 -> 32
A289 Pier Road / Church Street / Strand			B -> C	19 -> 26
A289 Lower Rainham Road/Yokosuka Way/Gads Hill Roundabout	F -> F	102 -> 122		
A2 / Woodlands Road / Rotary Gardens	D -> F	36 -> 160	C -> E	33 -> 58
A2 Bowaters Roundabout	B -> F	20 -> 88	D -> F	52 -> 156
Eastcourt Lane / South Avenue	F -> F	1237 -> 1212	D -> F	28 -> 1022
A2 London Road / Bloors Lane			C -> D	32 -> 41
A289 Ito Way / A2 Sovereign Boulevard Roundabout	A -> F	10 -> 186		
A2 / Pump Lane	A -> E	2 -> 38	A -> D	9 -> 35

Table 2: Subnetwork 2 junctions that are at LoS F or experience change in LoS due to appeal scheme

3.20 The development would result in a worsening of the LoS to F in at least one of the peaks at 6 junctions within Subnetwork 2. This is considered to constitute cumulative severe impact, which is supported by inspection of the average delay values underpinning the changes in LoS.

3.21 In addition, the LoS at the Lower Rainham Road/Yokosuka Way/Gads Hill roundabout on the A289 is already F in the reference case in the AM peak. The LoS remains at F when the development traffic is added to the network, despite the appellant's proposed mitigation works. The average delay value significantly worsens, and this results in significant increases in travel time on Lower Rainham Road (as per para 3.16 above). Given the junction is already over capacity and the increase in delay, this constitutes a severe residual cumulative impact and insufficient capacity exists to accommodate the development even with the appellant's mitigation, contrary to the NPPF and Policy T1 of the Medway Local Plan.

3.22 The impact of the development on the operation of these junctions is also illustrated by the change in travel times on several routes within the Subnetwork (Tables 7 & 8, appendices p.168). The most substantial increases in percentage terms are on the A2 Eastbound (Watling Street to Sovereign Boulevard) with 113% and 94% increases in the AM and PM peak, which equates to additional travel time for each vehicle of approx. 12 & 7 minutes respectively along the link. Similarly, in the AM peak on the A289 (Church Street) to A278 (Hoath Way) route, additional travel time equates to approx. 9 minutes. These routes cover multiple junctions and the additional travel time are in effect a summation of the cumulative impact of the development across multiple junctions. In my view, the magnitude of the increase in travel time on these routes illustrates the severe impact the development would have on the operation of these parts of the road network.

Subnetwork 3

3.23 Broadly, Subnetwork 3 covers the A2 corridor from the east of the Bowaters roundabout to Otterham Quay Lane. In comparison to the other modelled subnetworks, the percentage impact of the development on travel time, delay, vehicle speeds and mean queue is low but still results in an 11% increase in the mean queue in the AM peak. In the PM peak, this figure rises to 46% (Figures 8 & 9, appendices pp. 170-171).

3.24 The development worsens the LoS at each of the four junctions in this Subnetwork in both peaks when compared to the reference case, as shown in **Table 3**. This is drawn from Tables 11 & 12, appendices p. 172 **Appendix G** and the average delay values have been extracted from the model.

	AM Peak		PM Peak	
	LoS	Average delay (sec/veh)	LoS	Average delay (sec/veh)
A2 High Street / Mierscourt Road	C -> E	33 -> 76	D -> E	43 -> 58
A2 / Otterham Quay Lane / Meresborough Road	D -> **F**	53 -> 95	D -> **F**	38 -> 148
A2 / Maidstone Road	C -> D	31 -> 55	C -> D	27 -> 36
A2 / Station Road	C -> D	31 -> 52	C -> D	34 -> 38

Table 3: Subnetwork 3 junctions that experience change in LoS due to appeal scheme

3.25 In particular, the LoS at the Otterham Quay Lane / A2 / Meresborough Road junction worsens from D to F. Again, the model shows the junction as being over capacity and therefore contrary to Policy T1 of the Medway Local Plan. Furthermore, inspection of the average delay values underpinning the changes in LoS demonstrates that the cumulative impact of the development is severe, particularly in the PM peak.

3.26 The impact of the development on the operation of these junctions is also illustrated by the change in travel times along the part of the A2 in the subnetwork (summarised in Tables 13 & 14, appendices p.173). In the PM peak, the addition of development traffic results in additional travel time of approximately five minutes in a westbound direction. This route travels through all four the junctions set out in Table 3 and in my view, the magnitude of the increase in travel time on this route illustrates the severe impact the development would have on the operation of this part of the road network.

Summary

3.27 The assessment shows that the development would result in substantial additional travel time across the modelled network in 2028. The additional development traffic results in a significant worsening of the operation of a large number of junctions, despite the mitigation works proposed by the appellant, taking 6 junctions over capacity as summarised by the change in LoS, relating to average delay values. The severity of the impact at these junctions is further evidenced by the change in travel time for various routes on the road network. It is therefore considered that the development results in a severe impact on the operation of 6 individual junctions as shown in Figure 2:

1. A289 Pier Road / Maritime Way Roundabout
2. A289 Pier Road / Gillingham Gate Road West
3. A2 / Woodlands Road / Rotary Gardens
4. A2 Bowaters Roundabout
5. A289 Ito Way / A2 Sovereign Boulevard Roundabout
6. A2 / Otterham Quay Lane / Meresborough Road

3.28 Furthermore, the A289 Lower Rainham Road/Yokosuka Way/Gads Hill Roundabout (identified as Junction 7 in Figure 2) is already over capacity in the AM peak, and the addition of development traffic further exacerbates delays, despite the mitigation works proposed by the appellant. Average delay at the roundabout increases from 102 seconds/vehicle to 122 seconds/vehicle and this results in significant increases in journey times on this part of the network. The cumulative residual impact on this junction is also considered to be severe.

3.29 The significant worsening of the operation of the network across a large number of junctions and routes, despite mitigation works proposed by the appellant, is considered to individually and collectively constitute a severe residual cumulative impact, contrary to NPPF para 109. The development also fails to meet to the requirements of T1 of the Medway Local Plan.

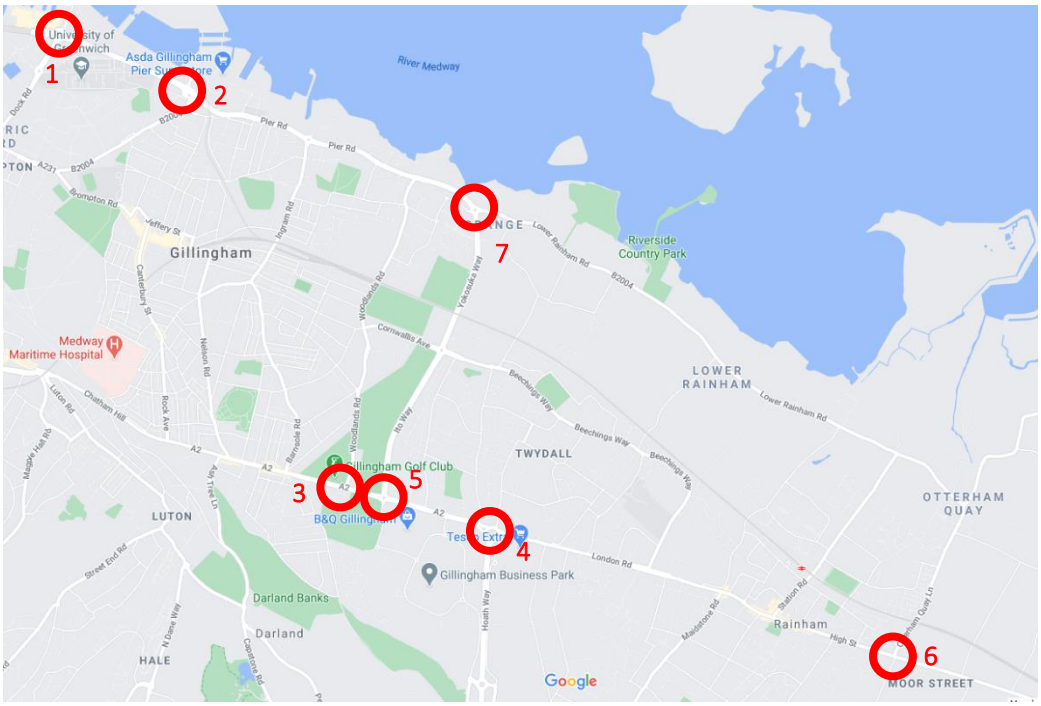

Figure 2: Cumulative residual severe impact at Junctions

3.30 To reiterate, this assessment is based on the results of the modelling scenario most favourable to the applicant where:

- It uses the appellant's trip rates, lower than those in the strategic model
- It is based on the configuration of the model around the development area requested by the appellants
- The year of assessment is 2028, rather than 2037 and therefore only contains committed developments likely to be complete by that year.

3.31 Given that the development fails the relevant policy tests regardless of the trip rates used, further debate of the trip rates used in the Council's modelling is unnecessary.

3.32 Additional modelling assessments have been undertaken for a future year of 2037, in line with the end of the emerging local plan period as set out in SWECO's Pump Lane and Lower Rainham Transport Impact Appraisal Addendum report (2037 results) attached here as **Appendix H**. In the reference case, the network performs worse in 2037 than 2028, due to traffic growth associated with committed developments that are forecast to be complete in the intervening years. As a result, the subnetworks perform worse in the scenarios that include the development traffic in 2037 than the equivalent scenarios in 2028.

3.33 It is therefore considered that the results of the assessments using the MAM demonstrate that the appeal scheme fails the relevant policy tests set out in the Medway Local Plan and the NPPF.

4. MODELLING APPROACH

4.1 For the reasons set out above, the Council considers that the development would have a severe impact upon the local road network. The assessment was completed using the Medway Aimsun Model, as set out by the Council's Transport Assessments Guidance Note (**Appendix A**).

4.2 This document acknowledges the use of the MAM is optional and that it is at the applicant's discretion as to whether to accept this method or undertake a TA based on independent modelling. It also states that the MAM, '*will enable the council to assess and potentially contest TAs based on independent modelling,'* (para 16, section 1, appendices p.6).

4.3 As I was approached to support Medway Council in relation to this scheme in December 2020, many of the discussions between the appellant and the council pre-date my involvement. The council's Transport Planning officer has prepared an overview of correspondence as it pertains to modelling approaches and parameters, which is attached as **Appendix I**.

4.4 Having reviewed the correspondence and submissions, I believe a fair summary to be that the appellants proceeded on the basis of independent junction models in their Transport Assessment (**CD5.25**) and, as evidenced through the content of their submissions including Technical Note 1 (**CD6.2**) Technical Note 2 (**CD6.7**), continued with this approach. The focus of the appellant's Technical Note 3 (**CD6.11**) changed to the MAM, until Technical Note 4 (**CD12.6**) was received in January 2021, presenting modelling results based on the appellant's revised trip rates.

4.5 The extent to which the appellants intend to rely on their independent modelling is unclear but the Council are not satisfied that the appellant's modelling submissions accurately and fully quantify the impact of the development on the road network. The Council's concerns can be grouped into two general categories relating firstly to the choice of assessment method, and secondly specific concerns relating to the appellant's models.

Choice of Assessment Method

4.6 In some circumstances, individual junction models can be an appropriate basis on which to determine the impact of a development on the local road network. Broadly speaking, individual junction models require inputs relating to the geometries of the junction, the anticipated traffic movements through the junction, and signal operation (if relevant). Individual junction models inherently have a narrow focus and are only capable of providing performance outputs (delay, queue, capacity) relating to the junction and immediate approaches. An individual model must be created for each junction to be assessed in isolation, and the models do not interact with one another. The focus of the models is the junctions themselves and impacts on links between junction are beyond the scope of the models.

4.7 Strategic models are generally more sophisticated than individual junction models and allow the impact of schemes to be assessed on a wider basis. These models are generally bespoke and the scope is tailored depending on their purpose. They can incorporate a wide range of inputs and outputs, including interactions between them and feedback loops.

4.8 The specifics of the MAM are set out in SWECO's evidence but the primary advantages of its use are that it offers the following, all of which are not accounted for within the methodology followed by the applicant:

- Sophisticated distribution of vehicle trips responding to performance across the network
- Interactions between junctions, where queues from one junction block back through another
- Impact on capacity of vehicles changing lanes and individual vehicle acceleration/deceleration
- Wide area assessment such as corridor journey time analysis, strategic road network impacts and analysis of individual links

4.9 The use of a strategic model is considered to be essential in determining the impact of the appeal scheme. The scale of the appeal proposal is such that its impacts are not limited to localised junctions. This is particularly the case in this instance because of the nature of the local road network, with a significant proportion of the additional trips travelling some distance on key arterial routes. Furthermore, many of the key arterial routes and junctions on them are at or approaching capacity, such that it is crucial to understand the performance of links, the inter-relationships between junctions and how vehicles may distribute in response to real time network performance.

4.10 The appellant's methodology based on individual junction models does not and cannot fully and accurately capture the impact of the appeal scheme on links, the inter-relationships between junctions and the distribution of vehicles in response to real time network performance. The appellant's methodology is therefore insufficient and cannot be relied upon as an accurate quantification of the impact of the development on the operation of the road network. In addition, there are a number of specific issues with the appellant's modelling submissions in and of themselves that render the appellant's model outputs inaccurate and insufficient.

Critique of the appellant's modelling submissions

i) Geographical scope

4.11 The geographical scope of the modelling the appellant submitted in the TA was insufficient. This was expressed to the appellants by Council officers during the application and subsequent discussions. The Council's initial highways response to the application (appendices p. 242, **Appendix J**) outlined the additional junctions that the Council considered required assessment at the time, consisting of a series of junctions along Lower Rainham Road, Hoath Way roundabout and Otterham Quay Lane/A2 junction. No modelling of these junctions have ever been submitted by the appellant. Through the Council's modelling as summarised in **Figure 2**, it has been identified that the development results in a severe residual cumulative impact at the Otterham Quay Lane/A2 junction.

4.12 An email from Robert Neave to Jacqueline Aggiss dated 14th February 2020 (appendices pp. 249-249 **Appendix K**) outlined the additional junctions and link corridors that the Council considered required assessment at that time. The appellant submitted modelling of 5 junctions in Technical Note 3 (**CD6.11**), 3 of which were new junction models, being High Street/ Station Road, A2 / Woodlands Road / Rotary Gardens and Pier Road/Maritime Way (using traffic flows from the strategic model). Models of the Bowaters roundabout & A2 / Bloors Lane were also revised at this point using flows from the strategic model. However, the appellants have not modelled the impact of the scheme upon links, merely critiqued the flows from the SWECO models.

4.13 SWECO's modelling of the impact of the development in 2028 (**Appendix G**) that was undertaken since also shows that the development results in a severe impact on the operation Pier Road/Gillingham Gate Road West. This has not been modelled by the appellant.

4.14 In summary, of the 7 junctions which the council's modelling has identified as being severely impacted by the proposals, the appellants have not modelled Otterham Quay Lane/A2 junction or Pier Road/Gillingham Gate Road West. Additionally, no modelling assessment of the impact upon links has been submitted. I therefore consider that the appellant's modelling assessment in and of itself is insufficient in scope to accurately assess the impact of the development on the road network.

ii) Lack of validation/calibration

4.15 Following submission of the TA, the appellant increased the external trip generation of the development, as set out in the appellant's Technical Notes 1 & 2. Technical Note 4 (CD12.6) was submitted in January 2021 and presents modelling results using the appellant's revised trip generation calculations.

4.16 Crucially, none of the appellant's models appear to have been through a validation process. The Department for Transport (DfT) publish guidance on the conduct of transport studies. Known as WebTAG (Web Transport Analysis Guidance), it includes advice on how to conduct transport appraisals. For projects or studies that require government approval, the guidance is expected to be used, and if government approval is not required, it serves as a best practice guide. TAG Unit M4 Forecasting and Uncertainty (extract appendices p. 256 Appendix L) requires at paragraph 7.1.3 that "*as a prerequisite to all model forecasting, it is assumed that the model will be developed and validated for a recent year (the base year).*" In practical terms, validation of individual junction models is often undertaken by comparing the model outputs of the base year against recorded queue lengths. No validation or calibration of the individual junction models (through comparison to recorded queue lengths or otherwise) has been submitted to the Council and I therefore presume this has not been done.

4.17 The appellant has failed to demonstrate that the individual junction models accurately represent current junction performance. As it has not been proven that the base models are accurate, it follows that the accuracy of the forecasting of junction operation in future years cannot be determined. This issue pertains to all of the individual junction models the appellant has submitted in relation to this development, including those utilising flows derived from the strategic model. In this way, the appellant's modelling fails to accurately and reliably demonstrate the impact arising from the proposals and thus the relevant policy tests cannot be applied using the appellant's modelling. By comparison, the Council's MAM is fully validated and calibrated (as explained within SWECO's proof of evidence).

4.18 An additional related issue has also been identified in specific relation to the appellant's modelling of the Bowaters roundabout. The model has been created in LinSig, a program used to model signalised junctions published by JCT. As above, no validation of the junction model appears to have been carried out. Individual lanes in LinSig models have a "saturation flow," measured in passenger car units (PCU) /hour, which is akin to the maximum traffic flow possible. In the original model submitted within the TA at Appendix K (CD5.25), this has manually been set at 1900 pcu/hr on all lanes without explanation. In the revised models of this junction that includes the higher traffic flows derived from the strategic model (submitted within Technical Note 3 at Appendix D, CD6.11) and those that are based on the appellant's higher trip rates (submitted as part of Technical Note 4, CD12.6), the saturation flows have been calculated based on the lane geometries, producing higher saturation flows on the majority of lanes in the model. All else being equal this would result in better junction performance and the basis for increasing the saturation flows in the revised models is unclear.

iii) Appellant's modelling results

4.19 Finally, although the appellant's submissions cannot be relied upon as an accurate assessment of the impact of the development on the road network, it is worth noting that the appellant's own models show the development has a substantial cumulative impact that I consider to be severe, even using the appellant's trip generation calculations. For non-signalised junctions, the individual junction models measure performance through the use of the Ratio of Flow to Capacity (RFC), with a figure of 0.85 representing the point at which interventions should be considered, and a figure of 1 representing the junction being at capacity. The following paragraphs relate to the modelling results contained within the appellant's Technical Note 4 (CD12.6).

4.20 In the AM peak at the Beechings Way/Yokosuka Way/Cornwallis Avenue/Ito Way roundabout, when development traffic is added, the RFC is 1.00 and the queue more than doubles from approx. 11 PCUs to 27 (Table 3, p.3, CD12.6). The delay also increases from 30 seconds to 66 seconds. Given the magnitude of these increases, I consider that the appellant's model shows the development results in a severe residual impact on the operation of this junction.

4.21 The appellant's model of the Ito Way/A2/Will Adams Way roundabout shows that as a result of the development, the RFC on Will Adams Way is pushed over capacity, from 0.99 to 1.05 in the AM peak and the queue results show an increase from 26 PCU to 65 PCU (Table 4, p.4, CD12.6). In the PM peak, the model shows the RFC on Will Adams Way changes from 1.06 to 1.13 and the associated queue increasing from 72 PCU to 129. This equates to 742m of queueing, which results in approx. 11.5 minutes delay for vehicles. The majority of traffic arriving at Will Adams Way in the PM peak is likely from the nearby employment areas, and on this basis, the queue would stretch through and block three other

roundabouts – Will Adams Way/B&Q retail park, Will Adams Way/Grosvenor Road/Academy Drive and Grosvenor Road/Bailey Drive/Valentine Close. Given the magnitude of the increase in delay and queue and that this results in 'blocking-back' of other junctions, I consider that the development results in a severe residual cumulative impact on the operation of this junction and indeed the other junctions that would become blocked. This is a type of interaction that the individual junction modelling methodology does not account for.

4.22 The appellant asserts that the "increase in queue is a direct result of background traffic growth and not the proposed development," (para 2.5, p.4, CD12.6) because the modelling results for a 2018 Base + Development scenario show the junction operating within capacity. In my view, this is misleading because such a scenario is impossible. It would take several years for the development to be fully built and occupied, during which time background traffic growth would occur. The NPPF test of severe impact relates to the cumulative residual impact, i.e. taking into account background traffic growth, and the 2029 Base + Development results show that queueing and delay would be significant such that the cumulative impact is severe. In addition, the 2029 base results show the junction operating over capacity and this will be the case regardless of whether the appeal scheme proceeds. As per the Leckhampton appeal decision, this in itself also constitutes a severe impact. The appellant's own modelling results therefore show the development fails to meet the requirements of Policy T1 of the Medway Local Plan and paragraph 109 of the NPPF.

4.23 The appellant's modelling results of other junctions show results that are of concern. The Lower Rainham Road/Yokosuka Way/Gads Hill roundabout model shows that when the development traffic is added, the RFC value for the Gads Hill approach in the PM peak is 0.95, close to capacity and beyond the point at which interventions would normally be considered. The queues and delays on this arm approximately double as a result of the development and the mitigation scheme proposed by the appellants does not benefit this arm of the junction (Table 2, p.3, CD12.6). Finally, the appellant's model of the Pump Lane/Beechings Way priority junction shows that the junction would be almost at capacity once development traffic is added in the AM peak, with an RFC of 0.98 (Table 9, p.6, CD12.6), beyond the point at which interventions should be considered. The model shows a queue of 13.9 PCUs, which equates to approximately 80m, where the distance to the tunnel under the railway is 125m.

4.24 Based on the appellant's modelling results, the development would result in a significant impact on these of these latter two junctions that I would not consider severe in isolation. However, when the impact of the development is viewed as a whole, I consider that the impact at these two junctions contribute to my professional view that the appellant's modelling demonstrates that the development results in an overall severe cumulative residual impact, cumulatively across the road network.

Summary

4.25 The use of a strategic model, such as the MAM, to model the impact of the appeal scheme on the road network offers significant benefits, allowing the performance of links to be assessed, inter-relationships between junctions to be taken into account and sophisticated distribution of vehicle trips in response to real time network performance. The appellant's methodology using individual junction models does not account for any of these aspects. Furthermore, the geographical scope of the appellants modelling in and of itself is insufficient as the council's modelling identifies further areas that the appellants have not considered. All of the appellants models that have been submitted do not appear to have been through a process of baseline validation against recorded data, and it is therefore impossible to determine how accurate the future forecasts of junction operation are. Even then, the appellant's models show that the development results in impacts at 2 individual junctions that I consider severe, exacerbated by impacts at additional junctions that contribute to a cumulative severe impact on the network.

4.26 On the basis of the appellant's submissions, the appellant has failed to provide a full and accurate assessment of the impact of the proposals on the road network, and thus the relevant policy tests cannot be applied. Even if the issues with the appellant's model submissions were not a consideration, the appellant's modelling demonstrates the scheme would have a severe residual cumulative impact on the operation of the road network.

4.27 Moreover, the results of the Council's fully calibrated and validated modelling assessment demonstrate that there is insufficient capacity to accommodate the traffic arising from the appeal scheme and that it would have a severe residual cumulative impact on the operation of the road network. The appeal scheme therefore fails to meet the requirements of policy T1 of the adopted Medway Local Plan 2003 and paragraph 109 of the NPPF.

Mitigation

4.28 The modelling results presented by both the appellant and the council incorporate mitigation works put forward by the applicant. However, as outlined above, the appeal scheme has a severe residual cumulative impact on the local road network.

4.29 In theory, it could be possible to reduce the impact of the development on the road network so as not to be severe if additional mitigation were to be secured. However, the appellants have submitted no evidence as to mitigation works that could adequately mitigate the impact of the scheme.

4.30 In some circumstances, highway authorities may develop highway capacity improvement schemes to mitigate the cumulative impacts of planned growth – for example as may be developed as part of a Local Plan. However, no such schemes exist and have not yet been developed for the emerging Local Plan. Moreover, the appeal scheme does not form part of the emerging local plan allocations and would not have therefore been accounted for in any case.

4.31 The appellants have offered to provide a contribution of an unspecified amount. However, given that there are no identified council-led capacity improvement schemes and that no such schemes that would sufficiently mitigate the impact of the development have been proposed by the appellant, there is no sound basis on which to calculate the contribution that would be required to mitigate the impact of the development to an acceptable degree, even if this was achievable.

5. SUMMARY

5.1 This Proof of Evidence has been prepared on behalf of Medway Council to defend a planning appeal against the decision of the council to refuse an outline planning application (ref: MC/19/1566) for a development of approximately 1250 residential units, a local centre, two form entry primary school, a 60 bed extra care facility an 80 bed care home and associated access on a site known as Land off Pump Lane, Rainham.

5.2 This PoE relates to Reason for Refusal 5, relating to the impact of additional traffic arising from the development on the local road network, which the council contends is severe, contrary to the requirements of the NPPF and also the Medway Local Plan.

5.3 The appellants and the council adopted different approaches to modelling the impact of the development on the local road network. Broadly, the appellant's approach is based on individual junction assessments, whilst the council utilised a strategic model developed by SWECO on the council's behalf, known as the Medway Aimsun Model. Matters relating to the development and application of the Medway Aimsun Model are dealt with in SWECO's proof of evidence.

5.4 The council's modelling assessment shows that the development results in severe cumulative residual impact on the road network, as observed through travel time and delay, and the scheme therefore fails to meet the requirements of paragraph 109 of the NPPF and policy T1 of Medway Council's adopted Local Plan. Specifically, the council's modelling demonstrates a severe residual cumulative impact at 7 individual junctions and numerous links on the road network, having regard to previous appeal decisions on this matter. The evidence shows that this is the case even when using the modelling scenario most favourable to the appellant, in terms of the trip rate assumptions, years of assessment and model configuration. This also takes into account the mitigation measures put forward by the appellant.

5.5 The council's guidance makes clear that the Medway Aimsun Model will enable the council to assess and contest Transport Assessments based on independent modelling, as is the case here. The council's model is more sophisticated than the appellant's use of individual junction models, in that it incorporates, for example, interactions between junctions and it allows analysis on a wider basis than individual junctions through tools such as corridor journey time analysis.

5.6 The use of a strategic model is essential to accurately determine the impact of the appeal scheme because its scale is such that its impacts are not limited to local junctions. This is particularly the case because of the nature of the road network, with key arterial routes that would be operating near/at capacity even without the appeal scheme, in close proximity to the site. It is therefore crucial to understand the impact on links between junctions, the interrelationships between them and how vehicles will behave in response to this, which the appellant's chosen modelling methodology cannot analyse.

5.7 It is therefore considered that the appellant's methodology is insufficient to fully and accurately quantify the impact of the development on the operation of the road network. There are additional issues with the appellant's models, as submitted, that further render them inadequate to assess the impact of the development. The appellants individual junction models do not cover two junctions which the council's modelling shows will be severely impacted, and the appellants have not themselves modelled the impact of the scheme on any links, rather critiquing the council's modelling.

5.8 Furthermore, none of the appellant's junction models appear to have been validated or calibrated, as is required by Department for Transport guidance. As it is therefore impossible to determine the accuracy of the appellant's models in replicating existing behaviour at each junction, it is also impossible to determine the accuracy of the models in predicting future behaviour at each junction. A similar specific issue has been identified in the appellant's modelling of the Bowaters roundabout.

5.9 Finally, even if the above issues were disregarded, in my view the appellant's models as submitted demonstrate that the appeal scheme would result in a severe residual cumulative impact at two junctions individually, and cumulatively on a wider basis.

5.10 The appellant's models are therefore an insufficient and inaccurate basis on which to judge the impact of the development, yet still demonstrate a severe residual cumulative impact. For the avoidance of doubt, the council's position is that its own modelling assessment is the appropriate basis on which to assess the cumulative residual impact of the development, which is considered to be severe.

5.11 The appeal scheme is therefore contrary to the requirements of policy T1 of the Medway Local Plan and paragraph 109 of the NPPF. The appeal scheme would result in a severe residual cumulative impact on the road network, and the council's decision to refuse the application should therefore be upheld.