Town and Country Planning Act 1990
Planning and Compulsory Purchase Act 2004

Appeal by A C Goatham & Son

Land off Pump Lane, Rainham

Rebuttal Proof of Evidence on Access, Safety, Transport and Accessibility

Prepared by Simon Tucker BSc (Hons) MCIHT
on behalf of the Appellant

PINS Ref: APP/A2280/W/20/3259868

LPA Ref: MC/19/1566

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Land off Pump Lane, Rainham

Rebuttal Proof Of Evidence of Simon John Tucker

8th February 2021

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Appendices

1.0 Introduction and Context

1.1 This rebuttal proof of evidence has been prepared on behalf of the appellant in response to specific issues raised by Mr Rand and Mr Jarvis across their evidence. In their evidence they confirm that the only reason for refusal being pursued on highway matters, is Reason for Refusal 5.

1.2 This rebuttal proof of evidence also covers third party responses forthcoming as part of the further consultation, including with regard to access arrangements.

1.3 It should please be noted that that my rebuttal proof of evidence does not address every part of the Council's proof of evidence, and this should not be taken as necessarily signposting my agreement.

2.0 Policy Tests and Definition of "Severe"

2.1 In the context of RfR5, at paragraph 2.1, Mr Rand refers to what he considers to be the relevant component of Policy T1 and confirms this to be test (i) only. It is common ground that none of the other parts of that policy apply because the appeal scheme satisfies them, where applicable. The test set out:

> "*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 At paragraph 2.4, reference is made to the NPPF, paragraph 109. The key tests in Policy T1 of Medway Local Plan are distinguishable in that they invite a notably higher test than NPPF in terms of traffic impact stating: "*The highway network has adequate capacity to cater for the traffic which will be generated by the development*". The Medway Local Plan 2003 was adopted and launched on 14 May 2003, replacing the

Medway Towns Local Plan 1992 and the Medway Local Plan Deposit Version 1999.

2.3 Given the date of the Local Plan it is clear that the relevant test under policy T1 is substantially inconsistent with up-to-date national policy and is 'out of date', in this relevant regard. It is my view that, whilst policy T1 nonetheless amounts to extant development plan policy, decision taking should instead prefer the test as set out in the NPPF. I maintain this notwithstanding that it is the case that both paragraph 109 of the NPPF and policy T1 are satisfied by the appeal development.

2.3.1 Although the reason for refusal refers only to Paragraph 109 of the NPPF that does clearly need to be read in the context of all the transport related policy section. The relevant extracts are set out in my proof of evidence at Section 3.

2.3.2 At Paragraph 2.5, Mr Rand refers to two appeal decisions. In relation to appeal decision APP/D3315/W/16/3157862 (his Appendix B), he specifically refers to paragraph 19. This not least overlooks the key point made at paragraph 16, which states:

"*There is no definition of the term 'severe' in either the Framework or in the Government's Planning Practice Guidance (PPG). There was a discussion at the Hearing into what is meant by 'severe', and the Appellant drew my attention to an appeal decision and an Inspector's report to the Secretary of State which consider the term. In the report to the Secretary of State7, the Inspector comments (paragraph 34) that the term 'severe' sets <u>a high bar for intervention</u> via the planning system in traffic effects arising from development, stating that: "<u>The Council agreed that mere congestion and inconvenience was not sufficient to trigger the 'severe' test but rather it was a question of the consequences of such congestion". I agree with my colleague's comments, which have influenced my determination of the appeal</u>...*"

[<u>my emphasis</u>]

2.4 The decision itself refers to a Secretary of State decision, namely APP/U1105/A/13/2208393, (**CD4.14**). Paragraphs 17 and 32 of this decision letter confirm that the Secretary of State agreed with the inspector, and at paragraph 182, the inspector noted that:

"*Paragraph 32 of the Framework indicates that development should only be refused on transport grounds where the residual cumulative impacts are severe. It was agreed that an <u>increase in queuing may be inconvenient but that in itself would not provide the</u>*

necessary justification to refuse permission. *Rather it was the consequence of queues in terms of driver behaviour, risk and safety that was the matter at issue*."

[my emphasis]

2.5 It is pertinent to note that these decisions refer to Paragraph 32, being the appropriate test at the date of the appeals, deriving from the 2012 version of the NPPF. At that time the test had read:

"*Plans and decisions should take account of whether:*

- *the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure*
- *safe and suitable access to the site can be achieved for all people*
- *improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe."*

[Para 32 – NPPF 2012]

Paragraphs 108 and 109 of the NPPF today advise:

- "*Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;*
- *Safe and suitable access to the site can be achieved for all users; and*
- *Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree*."

Para 108 – NPPF 2019

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

Para 109 – NPPF 2019

2.6 The updated version of NPPF therefore contains an important change, for introducing highway safety into the test. Nonetheless, the conclusions reached by the Secretary of State in APP/U1105/A/13/2208393 are correct upon observing that it is not congestion itself which causes the harm but the implications of it, for example in terms of amenity, and highway safety. In this case it is agreed common ground (reference Para 1.8 of Mr

Rand's evidence and paragraph 6.7 of the SOCG) that there are no such impacts arising from the development. On that basis alone it should be concluded that no severe, objectionable impact arises from the development.

2.7 The Council appears to found their assessment of severe on an American "*Highway Capacity Manual 2016*" as reported at paragraph 3.5 of Mr Rand's proof of evidence. I have requested a copy of that as it is not in general publication in the UK and indeed is not a document that I have ever previously been asked to consider in the context of a planning application or appeal. It is not a document recognised by the industry as being applicable to UK environment.

2.8 Mr Rand has not provided a copy of the 2016 document to which he refers, but has provided instead the 2003 version. That confirms that the document is based on research undertaken in the USA alone. I do not accept the application of this document to this appeal. Yet even if that were an appropriate metric to adopt, which I do not accept, I explain in detail in section 6 of my evidence why very limited (if any) credibility can be given to the findings of the modelling.

3.0 Choice of Modelling

3.1 At paragraph 2.3 Mr Rand refers to Medway Transport Assessment Guidance Note (Appendix A). He confirms the use of the Aimsum modelling is "optional". Despite this, at paragraph 4.9, he seeks to suggest (in my view, wrongly) the use of a strategic model is considered to be "*essential*" in determining the impact of the appeal scheme. It is certainly not "essential".

3.2 This is consistent also with the Council's own treatment of the application. Unsurprisingly, at no point during the pre-application discussions (when there was no response from the Council, at all) or during the application or up to the date of the appeal at the stage of Mr. Rand's proof of evidence, did the Council suggest to the appellant's team (including me), in any terms, that a run of the model was "essential" to consideration of the application. If this is what is now intended to be suggested by Mr. Rand, this would therefore mark a clear and untenable change in position from the Council. It is also one that has no proper basis.

3.3 For the reasons amply set out in my evidence the model is not suitable for consideration of planning applications (paragraph 10.5 of the Model Validation Report (CD12.5)).

3.4 In simple terms, the Medway Model provides outputs on two stages. Firstly it provides the distribution and assignment of traffic from the site in the context of future year flows on the network and then secondly provide a view on the impact of those flows. For the reasons set out in the following sections (in response to further comments from Mr Rand and Mr Jarvis) the model fails to provide any credible outputs in terms of capacity and / or congestion.

3.5 On that basis the overall impact of the scheme should be considered in the following, evidenced context:

1) Comparing the distribution and growth of traffic between the MAM methodology and DTA methodology shows slightly higher traffic flows from the MAM methodology.

2) Technical Note 3 provides an assessment of junction operation and link capacity based on MAM flows, using established Department for Transport and TRL software to consider operational impacts. These are industry standard processes and all show the impact of the scheme in terms of queuing is either acceptable or can be mitigated in a cost affective way;

3) Technical Note 4 provides the capacity assessments based on the DTA derived forecasts. These are industry standard processes and all show the impact of the scheme in terms of queuing is either acceptable or can be mitigated in a cost effective way;

4) In contrast, the MAM assessment of congestion and queuing cannot be made the subject of proper and required interrogation. Here, the Council is, in effect, wrongly inviting the Inspector to receive all outputs at pure face value, irrespective of the significant and undermining shortcomings in model validation. Of particular concern not least is that the modeller appears to have undertaken no optimisation or sense checking of the results themselves, which immediately renders them unreliable and misleading in terms of assessing development impact. They are not shown to be robust.

4.0 Response to Geographical Scope of Modelling

4.1 The evidence of Mr Rand (Para 4.8) suggests that one of benefits of the use of the Medway Ainsum Model (MAM) is that is allows the scheme to be considered in the wider context of reassignment and interaction of different traffic flows.

4.2 At paragraph 4.11 Mr Rand suggests the geographic scope of the TA was insufficient. This is strongly disputed. Indeed, a full scoping report was issued to Medway on 20th November 2018. This has never been adversely responded to, and the appellant reasonably (if not inevitably) proceeded thereafter on the basis that this was acceptable (of which the Council was well aware) as indeed is the case. The suggestion now made regarding sufficiency fails to reflect the clear line of discussion and approach between the appellant and Council, consistently during the course of the application and appeal. I find this comment very surprising.

4.3 Notwithstanding this, discussions were ongoing when Medway choose to run the MAM. Albeit I hold significant concerns about overall model validation and the extent to which it can (or has) properly assessed junction operation and the impact of it, I stated at the meeting on the 14th January 2020, there *may* be benefit is using the model for the specific purpose of considering the wider geographical distribution of traffic.

4.4 For that reason, it was agreed at the meeting on 22nd January 2020 that because Medway preferred the use of their modelled flows, I undertook localised junction modelling based on flow outputs from the model and this is what was submitted in Technical Note 3. I understand this is agreed subject to some minor validation points that I discuss below. A further two junctions have been more recently identified as being impacted on by the Council (Mr Rand's paragraph 3). I deal with these below.

5.0 Response to Model Validation and Functioning (Mr Jarvis Evidence)

5.1 At Section 3 of his evidence Mr Jarvis provides an overview / sales pitch for the benefits of micro-simulation modelling. Table 1 purports to show the significant benefits of such a model over individual junction assessments.

5.2 The summary of this (Table 1) is merely a generic list of potential benefits that a microsimulation model may have. If however the model is not properly utilising those features or they are not explicitly calibrated (and then validated to ensure they are behaving correctly) then the summary becomes meaningless.

5.3 In terms of assessing capacity of the single junctions, standalone models are generally more robust as ALL traffic is sent through the junctions that the development trips, whereas the microsimulation model may be diverting trips elsewhere or throttle traffic upstream. Moreover a miscoding within a microsimulation model can invalidate the whole appraisal whereas a miscoding within discrete models for individual junctions has a far more limited impact. Indeed it is possible to take a more conservative approach to the modelling of individual junctions, as adopted by the applicant, than when assessing the network as a whole, e.g. with respect to the saturation flows at Bowater roundabout.

5.4 The position Medway adopt in terms of model validation is confused. In response to commentary on the SOCG Medway have confirmed that they do not consider it essential that the model is validated to Webtag requirements. For the reasons set out in my evidence at Section 6.4 it clearly does not validate adequately.

5.5 Paragraph 4.6 of Mr Jarvis' evidence suggests that it validates well against these criteria, which is clearly not the case.

5.6 Table 2 is also misleading. There are instances where the flows, turns and journey times calibrate/validate to an acceptable degree well, but there are also instances where they do not (not acknowledged in the Council's evidence), as I have set out in my proof.

5.7 A key issue here is clearly that the delay in the immediate study area is not validated in any detail and the model relies on the validation of a handful of very long routes. This provides no comfort that the local area is accurately provided for in the base model.

5.8 **Appendix REB 1** provides further examples from that in my evidence that demonstrates there are sections that deviate significantly from the observed.

5.9 I also hold particular concerns about references in Mr Rand's evidence to use of a US based assessment tool. I reject this (new) approach. There are not least, significant differences in the use, design and appraisal of roundabouts between the UK and in the US. The UK generally has a high number of roundabouts and use the junction form quite widely including on the inter-urban road network and drivers are generally used to and comfortable with this.

5.10 In contrast, the US has few roundabouts and they are more likely to be in urban situations and this is reflected in their design that is arguably less capacity-led. The calibration of US junction appraisal differs therefore and this is further complicated in comparison terms as TRL adopted a linear model whereas the equivalent relationship in the US is concave as shown on Page 573 of the Highway Capacity Manual.

5.11 There will inevitably be similar differences in signal design reflecting different expectations in terms of lane widths and difference in signal timings. Ultimately it is not clear the extent to which AIMSUN parameters are localised to geographic region.

5.12 I have clearly explained the approach I have taken to model validation below.

6.0 Response to Model Outputs (Mr Jarvis Evidence)

6.1 At section 7 of his evidence, Mr Jarvis provides a description of model outputs that have not been presented before.

6.2 A first observation is that the results are present verbatim with no assessment by the modeller as to the credibility or robustness of those results. I have worked with numerous microsimulation models over my career and it is very often, if not always the case, that anomalies are shown in the results that require further investigation. That has not been undertaken here.

6.3 Furthermore, where modelling shows capacity issues it is standard practice that consideration should be given to for example optimising or revising signal timings in the future year assessments to improve capacity. Based on the outputs provided by Mr Jarvis this essential process has clearly not been undertaken by him and therefore the results present an unrealistic and unreliable situation of future capacity constraints.

6.4 A clear example of this is provided at Figure 3. The development network appears particularly constrained by the toucan crossing to the east of the Bowater Roundabout. This is evidently pivotal to the performance of the network given the extent to which it causes blocking back within the model. Future year future eastbound demand is only around 1200vph (slightly over half of the crossing stop line saturation flow) which is not at a level where one would expect an issue either with respect to the pedestrian crossing point or the funnel from the upstream the junction.

6.5 This requires more explanation to understand whether this is a miscoding of the AIMSUN model. The modulation of traffic demand from the upstream traffic signals should synchronise well with the crossing and it is clear that modest re-timing or linking of signals (if not already in place) would have significant (real world or model) benefit in this regard. Given the modest change in flows on these links as set out in Table 5 of my evidence that would represent cost effective mitigation.

6.6 My assessments of these links and junctions have considered individual junction operation in terms of timings and demonstrate that the junctions are operating within acceptable parameters.

7.0 Response to Validation of DTA modelling

7.1 At Paragraph 4.16 Mr Rand seeks (at this very late stage) to criticise the lack of model validation for the DTA assessments. It should firstly be noted that despite a significant number of requests, repeatedly made of the Council, for comments on the submission including an express request on 23rd December 2020), there has been no such suggestion made, up until this point (exchange of evidence). I reject the this sudden change of approach, and the apparent criticism is unfounded.

7.2 All of the modelling undertaken by my team and I are based on UK accepted industry standard software. Of particular relevance is that the algorithms of the individual junction models were empirically calibrated to UK circumstances by the TRL. Although now a private (not for profit company), at the time, TRL was established as an executive agency by the UK Government.

7.3 With respect to the Junctions algorithms these are generally conservatively calibrated (i.e. they fitted a curve through the middle of the dataset rather than assuming that the outlining points define the relationship). Upon further validation, the corrections will therefore generally be to increase capacity unless there is systemic bias (e.g. as a result of unequal lane usage).

7.4 It is most unlikely that there is systemic bias given that the majority of junctions are on dual carriageways where the ahead-traffic can use either approach lane. The risk is low.

7.5 With respect to geometry within the models, the Council has expressed no concerns and these are assumed agreed.

7.6 However, to test the appropriateness of the base models and directly respond to paragraph 4.16 of Mr Rand's evidence, I comment as below.

7.7 Queue surveys were undertaken at each of the junctions modelled and these were included in Appendix E of the submitted Transport Assessment (CD CH2.25). The SOCG confirms these to be agreed.

7.8 In preparing the models the queue surveys have been taken into account. A comparison of the 2018 base model queue results for each approach has been undertaken with the 2018 observed queue data on the ground. The data is provided below in Tables 1 and 2.

Table 1 – Queue Data Comparison (AM Peak) for Base Survey Year

Lower Rainham Road/ Yokosuka Way/ Gads Hill	Model Queue	Observed Queue
A289 Gads Hill	0.7	0.8
Lower Rainham Road E	16.8	14
Yokosuka Way	2.4	2.5
Lower Rainham Road W	0.7	3.6
Beechings Way/ Yokosuka Way/ Cornwallis Avenue	Model Queue	Observed Queue
Yokosuka Way	1.4	2.1
Beechings Way	3.5	4.6
Ito Way	1.4	4.1
Cornwallis Avenue	0.5	3.9
A2/ Will Adams Way/ Ito Way	Model Queue	Observed Queue
Ito Way	1.7	4.8
A2 East	1.7	13
Will Adams Way	4.5	2
A2 West	2.4	7
Bowaters Roundabout	Model Queue	Observed Queue
A2 London Road	6	9.1
Courteney Road	3.3	3
Hoath Way	7.5	5.5
A2 Sovereign Boulevard	8.6	7
Twydall Lane	7.7	9.9
Pump Lane/ A2	Model Queue	Observed Queue
Pump Lane	1.2	2.5
A2 Right Turn	0.7	1.3
Bloors Lane/ A2/ Playfootball	Model Queue	Observed Queue
Bloors Lane	9.1	9.9
London Road E	9.6	10.6
Playfootball Access	3	4.9
London Road W	16.3	22

Beechings Way/ Pump Lane	Model Queue	Observed Queue
Pump Lane	0.5	0.4
Beechings Way Right Turn	0.3	0.1
Beechings Way/ Pump Lane Mini Roundabout	Model Queue	Observed Queue
Beechings Way E	1.2	0.6
Pump Lane	0.5	0.3
Beechings Way W	0.9	0.4

Table 2 – Queue Data Comparison (PM Peak)

Lower Rainham Road/ Yokosuka Way/ Gads Hill	Model Queue	Observed Queue
A289 Gads Hill	3.6	2.5
Lower Rainham Road E	1.9	7.4
Yokosuka Way	1.0	2.0
Lower Rainham Road W	0.2	1.0
Beechings Way/ Yokosuka Way/ Cornwallis Avenue	Model Queue	Observed Queue
Yokosuka Way	3.5	2.9
Beechings Way	0.8	3.1
Ito Way	0.9	1.75
Cornwallis Avenue	0.3	2.4
A2/ Will Adams Way/ Ito Way	Model Queue	Observed Queue
Ito Way	2.1	7.8
A2 East	1.8	13
Will Adams Way	5.2	1.6
A2 West	1.9	13
Bowaters Roundabout	Model Queue	Observed Queue
A2 London Road	4.2	6.3
Courteney Road	6.3	3.8
Hoath Way	7.4	6.8
A2 Sovereign Boulevard	10	9.1
Twydall Lane	4	4.6
Pump Lane/ A2	Model Queue	Observed Queue
Pump Lane	0.6	1.1
A2 Right Turn	0.4	0.4
Bloors Lane/ A2/ Playfootball	Model Queue	Observed Queue
Bloors Lane	11.1	8.75
London Road E	7.5	7.25
Playfootball Access	1.1	2
London Road W	22.1	20
Beechings Way/ Pump Lane	Model Queue	Observed Queue

Pump Lane	0.2	0.2
Beechings Way Right Turn	0.1	0
Beechings Way/ Pump Lane Mini Roundabout	Model Queue	Observed Queue
Beechings Way E	0.3	0.3
Pump Lane	0.2	0.4
Beechings Way W	0.5	0

7.9 This shows the queues either accord well with, or are adequately comparable with, the observed queues on the ground at the majority of the junctions.

7.10 Bowaters Roundabout is specifically mentioned at Paragraph 4.18 of Mr Rand's evidence. Here, the original LINSIG model was developed in accordance with the best practice set out in LTN1/09. As noted by PBA the initial appraisal adopted 1900 pcu/hr saturation flows. In this regard LTN1/09 advises:

> "*saturation flows on approaches calculated using RR67 (TRRL, 1986) and a nominal 1900 pcu/h per lane on circulating carriageways will usually provide a conservative estimate for initial assessment if spiral road markings are used to remove the need for lane changing*".

7.11 The model was subsequently updated to RR67 saturation flows; these are slightly higher as anticipated by LTN1/09. It should be noted that that RR67 are empirical derived by TRL and do not require further calibration. LTN1/09 also cautions:

"5.4.1 'Multi-purpose microsimulation packages such as VISSIM, Paramics and Aimsun can be used to model signalised roundabouts (Figures 5.1 and 5.2)...' 'However, it must be stressed that accurate calibration is extremely important. Before such models are used to advise on design decisions, their lane utilisation and rate of discharge from signalised and 'give way' stoplines must be calibrated against either measured or estimated values from other capacity analysis models such as TRANSYT, LinSig, ARCADY or PICADY'

7.12 This confirms my concerns, highlighted above.

7.13 The Otterham Quay Lane/ A2 junction was not previously raised as an issue but in Mr Rand's Evidence at 4.14 it is highlighted as showing an impact from the latest model runs.

7.14 This junction has been modelled in a future year of 2029 with the proposed development traffic. The base 2019 flows and queue surveys are included in **Appendix REB2**. The baseline assessment accords well with the queue data for each approach. The forecast increase in traffic through the junction as a result of the development is modest at around 30 vehicles per hour. The results are shown below. The results show the junction is operating well within practical capacity and the increase in delay as a result of the development, is indiscernible.

Table 3 – Linsig Results – Otterham Quay Lane / A2

Scenario	Cycle Time	Practical Reserve Capacity (%)	Delay (pcuHr)
2019 Base AM Peak	180	23.2	11.25
2019 Base PM Peak	180	40.0	10.64
2029 Base AM Peak	180	14.0	13.06
2029 Base PM Peak	180	21.5	11.86
2029 + Dev AM Peak	180	11.9	13.63
2029 + Dev PM Peak	180	19.3	12.28

7.15 The Council query the increase in queue on the Gads Hill approach of the Lower Rainham Road/ Yokosuka Way/ Gads Hill, however this increase is from 7 to 15 PCUs per hour is not considered significant. The increase in queue on Gads Hill with the development traffic is 7 pcus and across a two lane approach equates to around 3-4 pcus per lane, which is modest. This increase in queue would not impact the operation of any junction further upstream and the overall delay is less than 25 seconds which is not significant. No further mitigation is required.

7.16 Similarly a new concern is raised about Beechings Way/ Pump Lane. The queue on Pump Lane is noted, however this will not extend back as far as the railway bridge and there will be no implication to junction operation upstream. No specific intervention is required.

7.17 If Medway provide model flows for the Pier Road/ Gillingham Gate Road West junction (these have not been provided), then the operation of this junction can be reviewed.

8.0 Response to Consultee Responses to Access Plan

8.1 I have reviewed the responses received direct to the appellant as result of the re-consultation on the access plans. A total of 22 responses were received and from a review of these none raise any specific issue or concern regarding the technical detailed of the access arrangements.

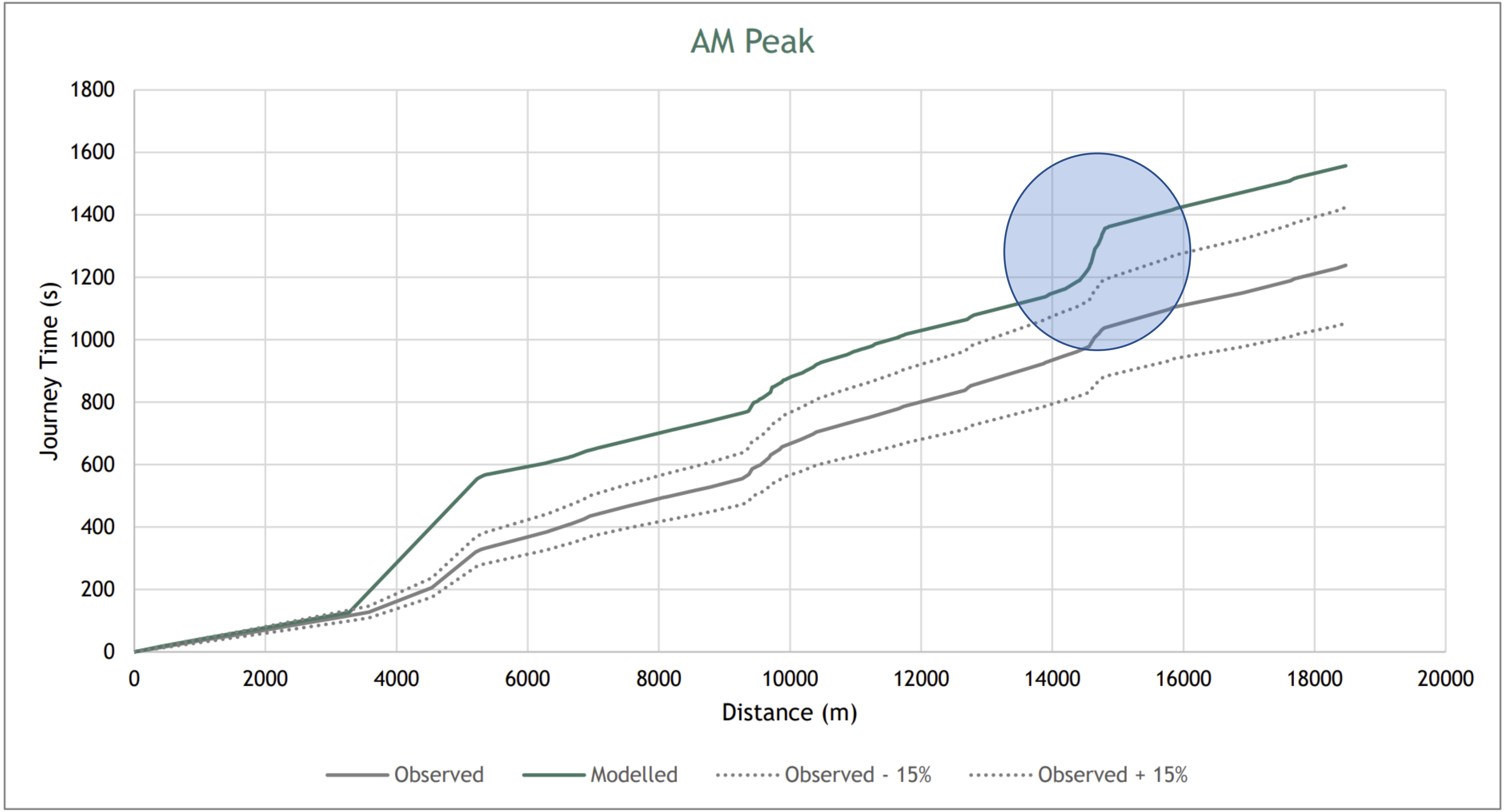
8.2 On that basis I conclude that there are no new issues arising in respect of the consultation that require technical rebuttal.

8.3 A significant proportion of the responses reiterate concerns about traffic impact and traffic impact on the A2 in particular. I have covered that in detail both in my evidence and in the above review.

Appendix REB 1

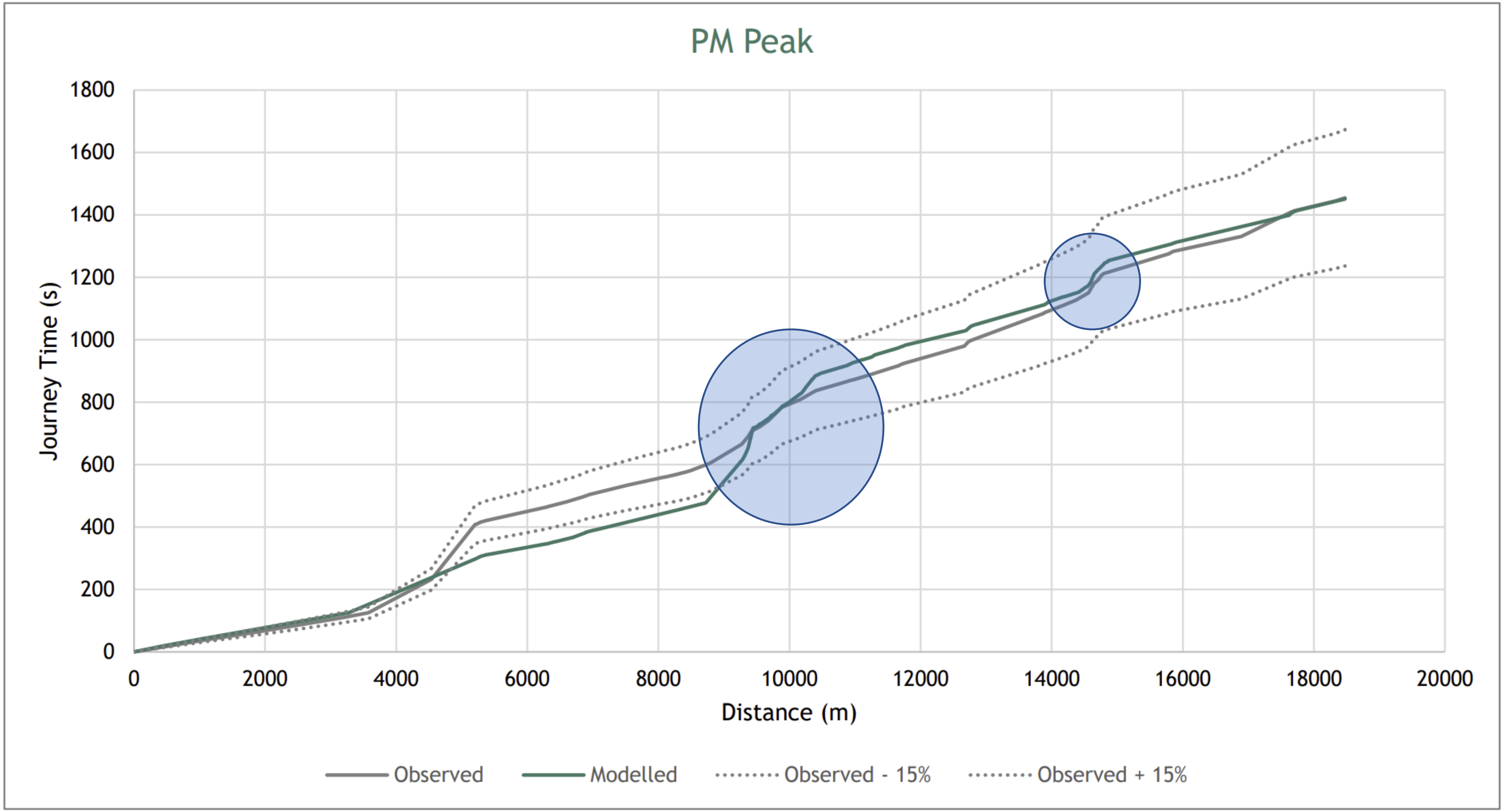
Journey Time Data Analysis: Microscopic Model

Route 6A: A289 and A278 Eastbound (Green)



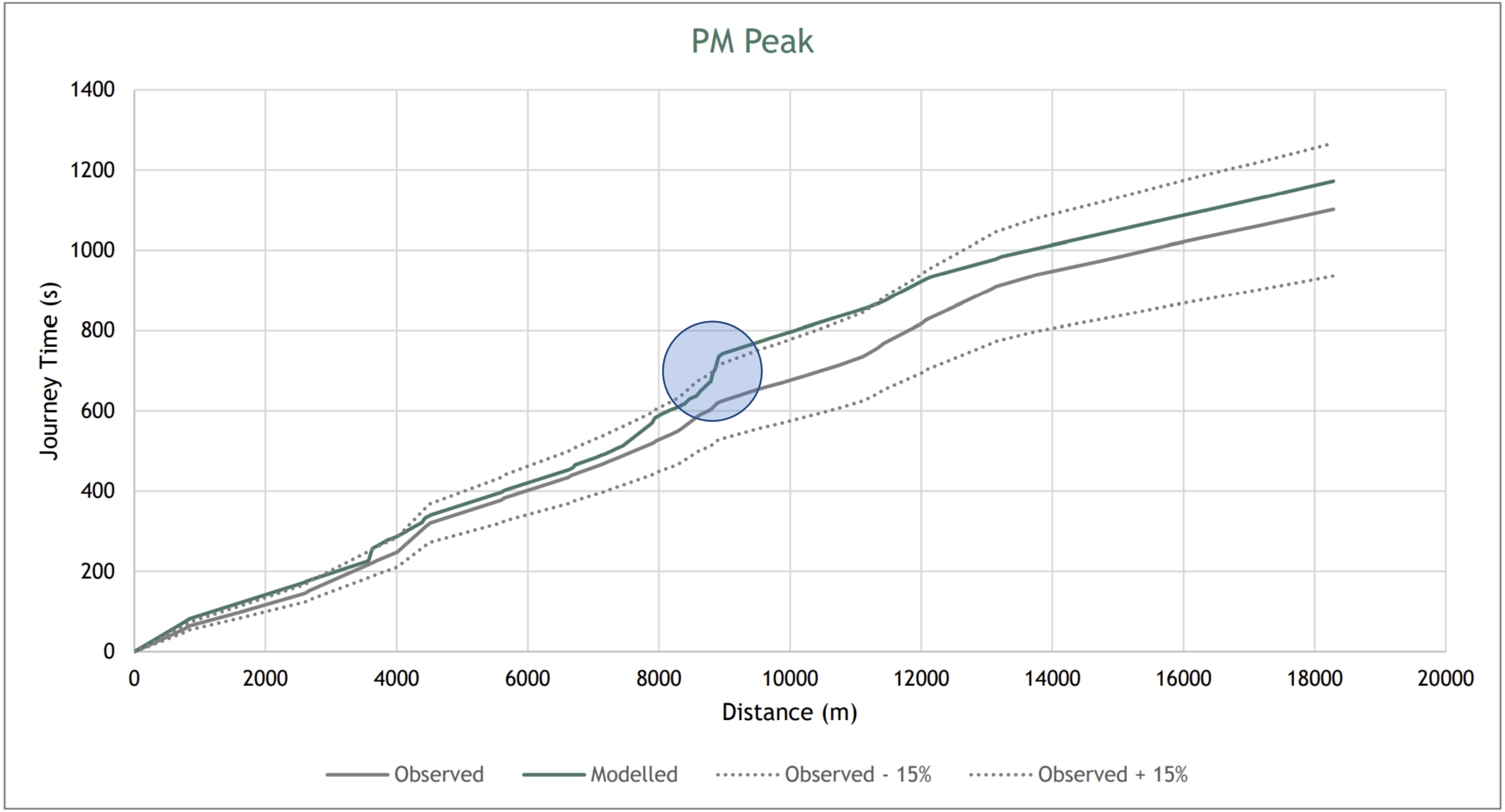
Journey Time Data Analysis: Microscopic Model

Route 6A: A289 and A278 Eastbound (Green)



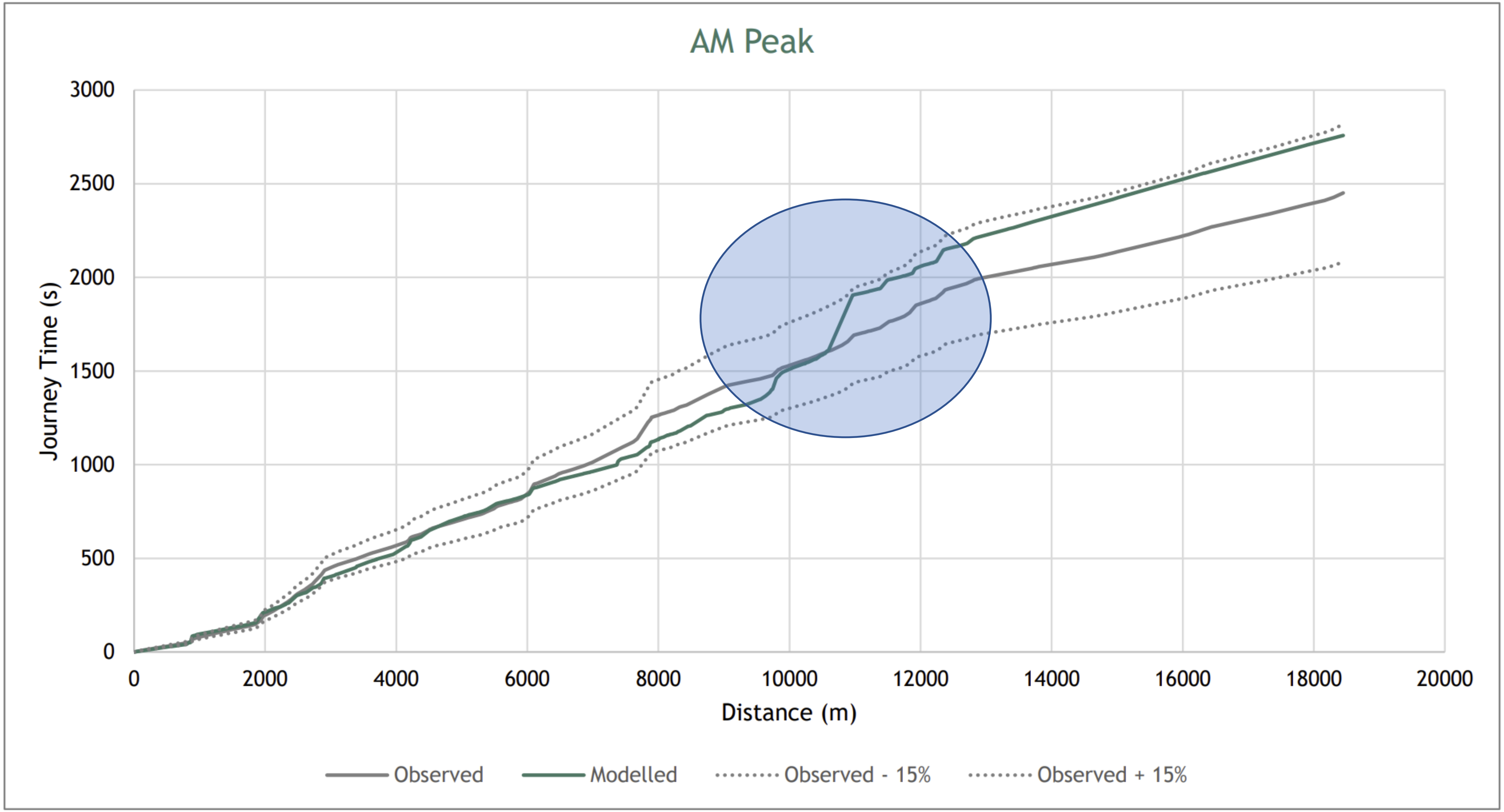
Journey Time Data Analysis: Microscopic Model

Route 6B: A289 and A278 Westbound (Green)

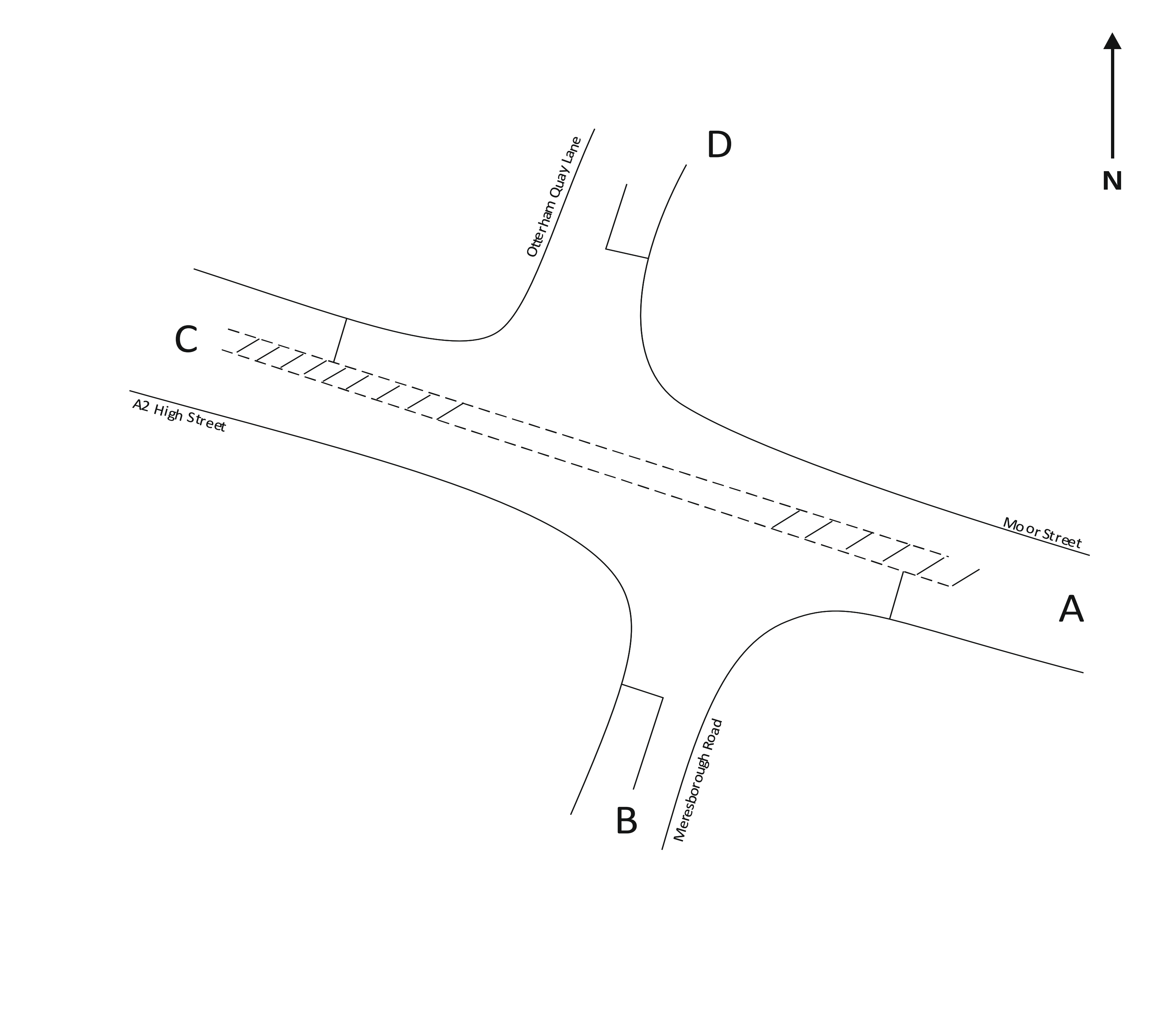


Journey Time Data Analysis: Microscopic Model

Route 7A: A2 Eastbound (Purple)



Appendix REB2



AXIOM
Traffic Limited

For and on behalf of:

dta

GILLINGHAM

THURSDAY 7th NOVEMBER 2019

0730-0930
1630-1830

Drawing N°:	**24738 - 07**
Site:	**7**
Location:	**Otterham Quay Lane / Moor Street / Meresborough Road**

DTA OUTPUT

AM PEAK 07:30 - 08:30
PM PEAK 17:00 - 18:00

Existing

SITE: 7
LOCATION: MOOR STREET / MERESBOROUGH ROAD / HIGH STREET / OTTERHAM QUAY LANE

A MOOR STREET
B MERESBOROUGH ROAD
C HIGH STREET
D OTTERHAM QUAY LANE

AM ALL VEHICLES

	A	B	C	D	Total
A	0	8	458	161	627
B	5	0	0	2	7
C	368	2	0	76	446
D	93	9	191	0	293
Total	466	19	649	239	1373

AM HGV

	A	B	C	D	Total
A	0	0	29	7	36
B	0	0	0	0	0
C	15	0	0	3	18
D	8	0	6	0	14
Total	23	0	35	10	68

PM ALL VEHICLES

	A	B	C	D	Total
A	0	11	509	144	664
B	9	0	4	7	20
C	463	2	0	148	613
D	123	3	87	0	213
Total	595	16	600	299	1510

PM HGV

	A	B	C	D	Total
A	0	0	12	1	13
B	0	0	0	0	0
C	12	0	0	1	13
D	2	0	0	0	2
Total	14	0	12	2	28

ACTUAL PEAK HOUR

AM PEAK 07:30 - 08:30
PM PEAK 17:00 - 18:00

QUEUE LENGTHS

JOB REF: 24738

JOB NAME: GILLINGHAM

SITE: 7 **DATE:** 07/11/2019

LOCATION: OTTERHAM QUAY LANE / MOOR STREET / MERESBOROUGH ROAD / HIGH STREET **DAY:** THURSDAY

NOTE: Queue Lengths recorded by the number of vehicles queuing at each 5-minute interval, by lane

TIME	ARM A MOOR STREET	ARM B MERESBOROUGH ROAD	ARM C HIGH STREET	ARM D OTTERHAM QUAY LANE	TIME	ARM A MOOR STREET	ARM B MERESBOROUGH ROAD	ARM C HIGH STREET	ARM D OTTERHAM QUAY LANE
	LANE 1	LANE 1	LANE 1	LANE 1		LANE 1	LANE 1	LANE 1	LANE 1
07:30	1	0	1	4	16:30	12	0	5	4
07:35	9	0	4	4	16:35	13	2	17	10
07:40	9	0	0	1	16:40	5	2	2	4
07:45	10	0	3	5	16:45	5	1	15	14
07:50	1	0	1	5	16:50	4	1	4	11
07:55	2	0	4	4	16:55	6	0	1	3
08:00	9	0	6	4	17:00	2	1	2	1
08:05	18	0	6	6	17:05	7	0	4	3
08:10	13	0	7	6	17:10	3	0	2	6
08:15	8	1	5	19	17:15	8	1	7	9
08:20	2	0	0	12	17:20	9	0	1	4
08:25	7	1	0	20	17:25	8	0	1	5
08:30	9	0	8	10	17:30	25	0	12	13
08:35	8	1	2	13	17:35	17	0	0	11
08:40	10	0	8	1	17:40	20	0	5	3
08:45	0	0	5	2	17:45	21	0	1	3
08:50	1	0	7	1	17:50	13	0	7	11
08:55	3	0	0	3	17:55	25	0	9	12
09:00	15	0	5	2	18:00	7	0	8	12
09:05	0	1	3	4	18:05	0	2	1	8
09:10	3	0	3	2	18:10	2	1	8	1
09:15	1	0	3	7	18:15	0	0	9	9
09:20	5	0	2	2	18:20	4	0	6	4
09:25	1	1	3	8	18:25	6	1	9	9
09:30	0	0	0	0	18:30	0	0	0	0

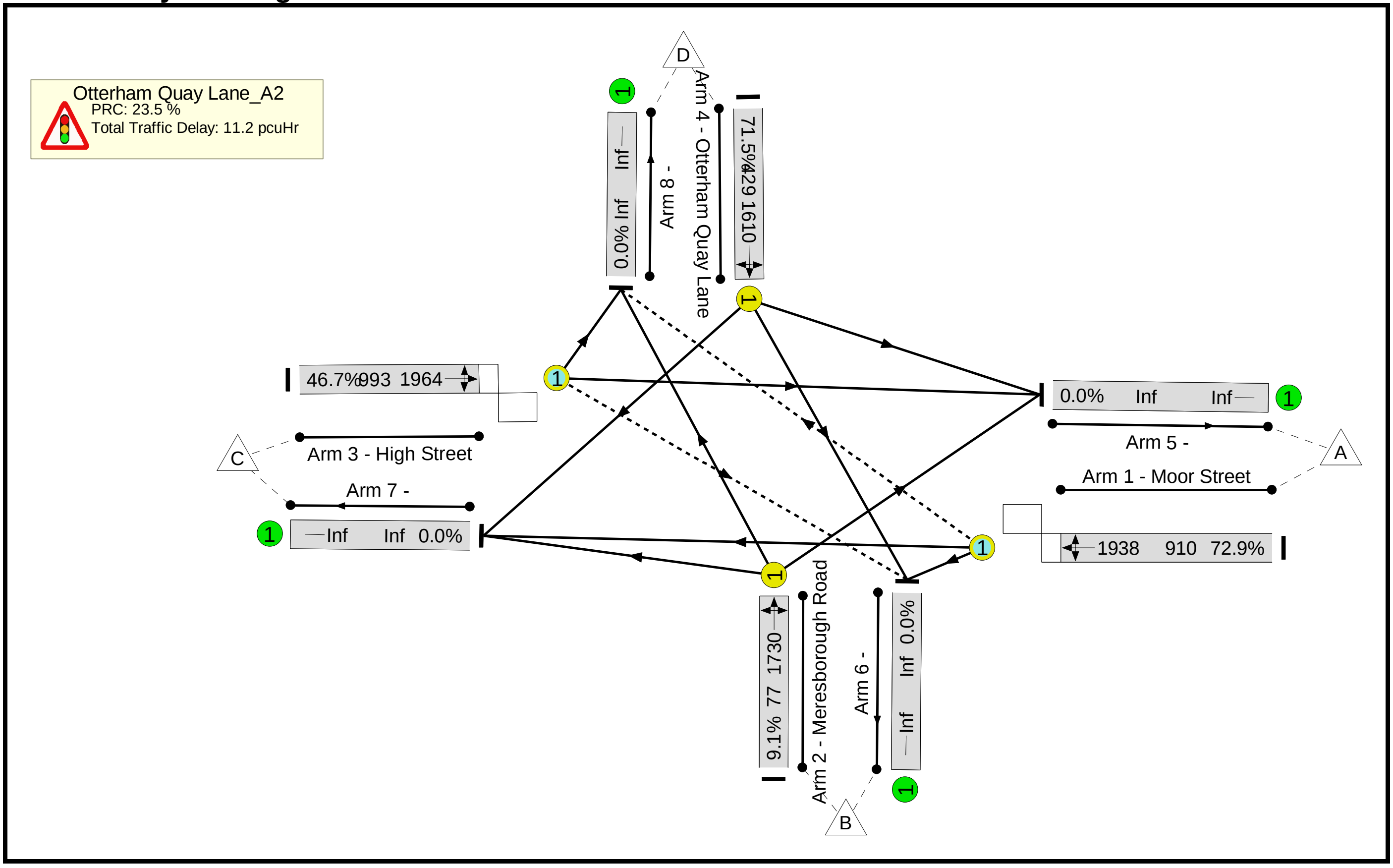
Basic Results Summary

User and Project Details

Project:	**Land at Pump Farm, Lower Rainham**
Title:	**Otterham Quay Lane/A2/Meresborough Road**
Location:	
Additional detail:	
File name:	Otterham Quay Lane_A2_RevA.lsg3x
Author:	
Company:	
Address:	

Scenario 1: 'Scenario 1' (FG1: '2019 Base AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

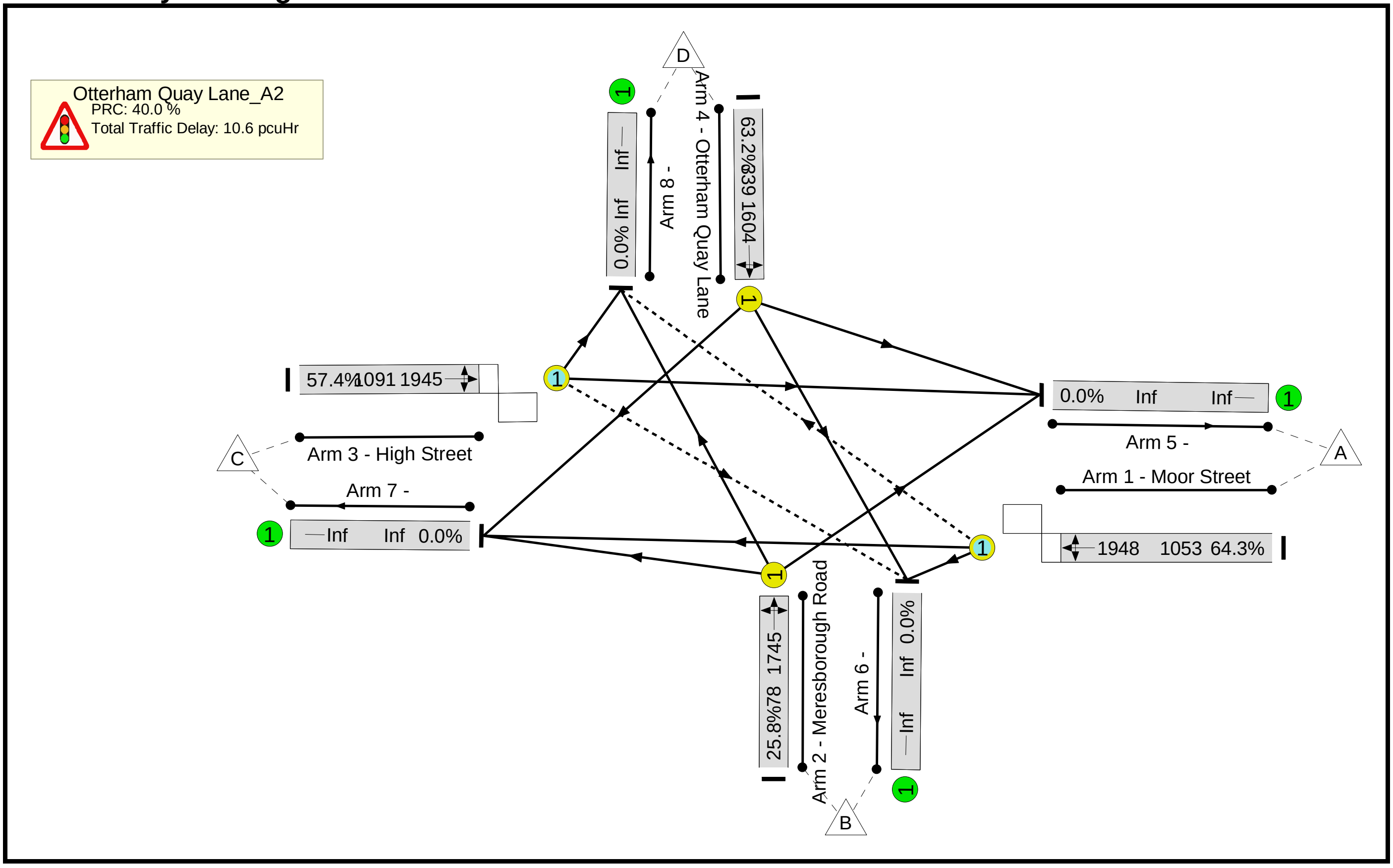
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Otterham Quay Lane/A2/Meresborough Road	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.9%**	**168**	**0**	**2**	**11.2**	**-**	**-**
Otterham Quay Lane_A2	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**72.9%**	**168**	**0**	**2**	**11.2**	**-**	**-**
1/1	Moor Street Left Ahead Right	O	C		2	89	-	663	1938	910	72.9%	166	0	2	4.9	26.7	17.2
2/1	Meresborough Road Right Left Ahead	U	D		1	7	-	7	1730	77	9.1%	-	-	-	0.2	108.4	0.4
3/1	High Street Ahead Right Left	O	A		2	89	-	464	1964	993	46.7%	2	0	0	2.3	18.2	9.2
4/1	Otterham Quay Lane Left Ahead Right	U	B		2	46	-	307	1610	429	71.5%	-	-	-	3.8	44.3	8.1

C1 PRC for Signalled Lanes (%): 23.5 Total Delay for Signalled Lanes (pcuHr): 11.25 Cycle Time (s): 180
PRC Over All Lanes (%): 23.5 Total Delay Over All Lanes(pcuHr): 11.25

Basic Results Summary

Scenario 2: 'New Scenario' (FG2: '2019 Base PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Otterham Quay Lane/A2/Meresborough Road	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**64.3%**	**103**	**0**	**44**	**10.6**	**-**	**-**
Otterham Quay Lane_A2	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**64.3%**	**103**	**0**	**44**	**10.6**	**-**	**-**
1/1	Moor Street Left Ahead Right	O	C		2	99	-	677	1948	1053	64.3%	101	0	44	4.1	21.9	13.5
2/1	Meresborough Road Right Left Ahead	U	D		1	7	-	20	1745	78	25.8%	-	-	-	0.6	114.2	1.1
3/1	High Street Ahead Right Left	O	A		2	99	-	626	1945	1091	57.4%	2	0	0	2.9	16.9	12.1
4/1	Otterham Quay Lane Left Ahead Right	U	B		2	36	-	214	1604	339	63.2%	-	-	-	3.0	49.7	7.2

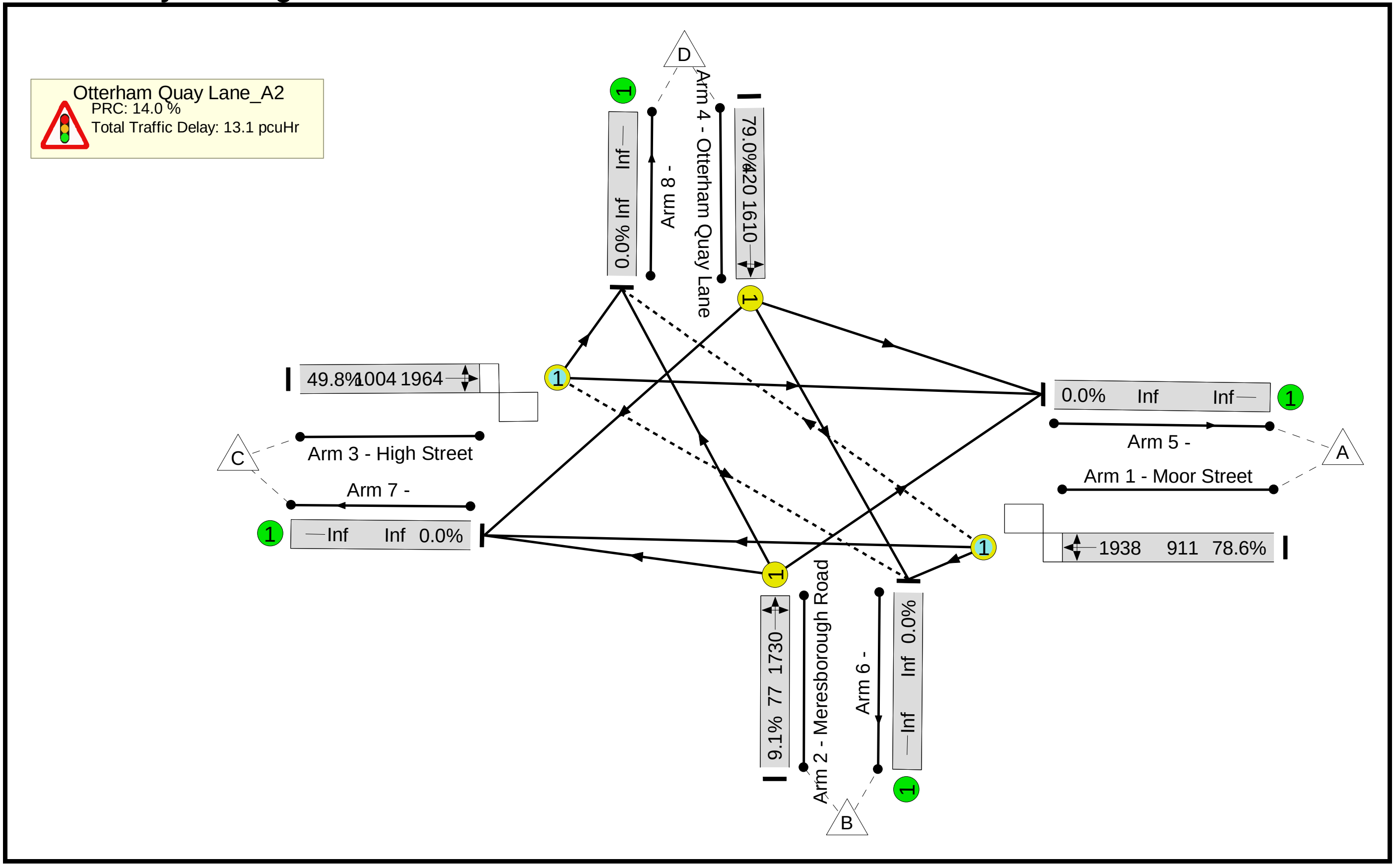
C1 PRC for Signalled Lanes (%): 40.0 Total Delay for Signalled Lanes (pcuHr): 10.64 Cycle Time (s): 180

PRC Over All Lanes (%): 40.0 Total Delay Over All Lanes(pcuHr): 10.64

Basic Results Summary

Scenario 3: 'New Scenario' (FG3: '2029 Base AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

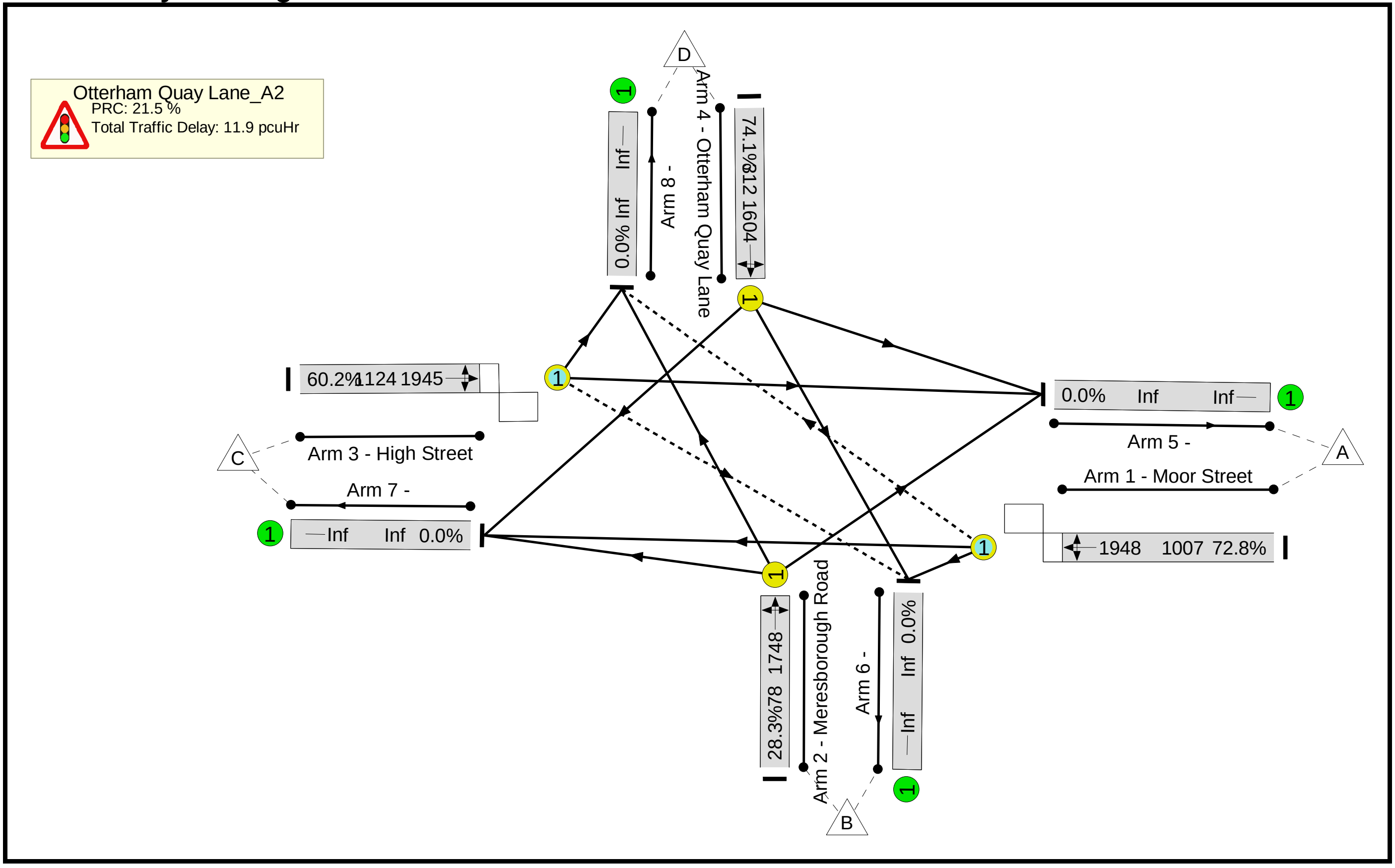
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Otterham Quay Lane/A2/Meresborough Road	-	-	-		-	-	-	-	-	-	**79.0%**	**181**	**0**	**2**	**13.1**	-	-
Otterham Quay Lane_A2	-	-	-		-	-	-	-	-	-	**79.0%**	**181**	**0**	**2**	**13.1**	-	-
1/1	Moor Street Left Ahead Right	O	C		2	90	-	716	1938	911	78.6%	179	0	2	5.7	28.6	16.7
2/1	Meresborough Road Right Left Ahead	U	D		1	7	-	7	1730	77	9.1%	-	-	-	0.2	108.4	0.4
3/1	High Street Ahead Right Left	O	A		2	90	-	500	1964	1004	49.8%	2	0	0	2.5	18.0	8.7
4/1	Otterham Quay Lane Left Ahead Right	U	B		2	45	-	332	1610	420	79.0%	-	-	-	4.7	50.5	9.6

C1 PRC for Signalled Lanes (%): 14.0 Total Delay for Signalled Lanes (pcuHr): 13.06 Cycle Time (s): 180
PRC Over All Lanes (%): 14.0 Total Delay Over All Lanes(pcuHr): 13.06

Basic Results Summary

Scenario 4: 'New Scenario' (FG4: '2029 Base PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

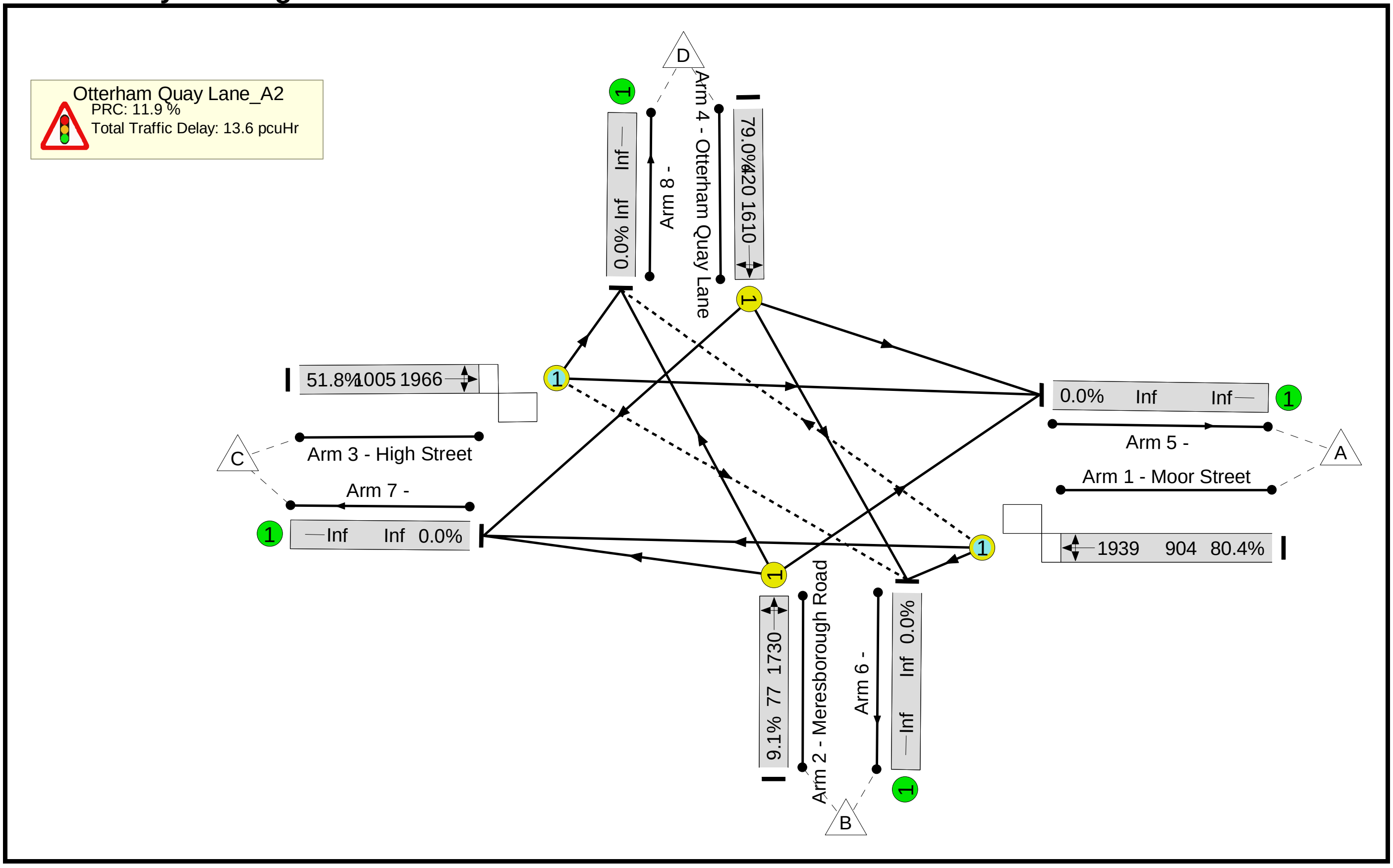
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Otterham Quay Lane/A2/Meresborough Road	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.1%**	**157**	**0**	**2**	**11.9**	**-**	**-**
Otterham Quay Lane_A2	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**74.1%**	**157**	**0**	**2**	**11.9**	**-**	**-**
1/1	Moor Street Left Ahead Right	O	C		2	102	-	733	1948	1007	72.8%	155	0	2	4.5	22.1	15.4
2/1	Meresborough Road Right Left Ahead	U	D		1	7	-	22	1748	78	28.3%	-	-	-	0.7	115.4	1.3
3/1	High Street Ahead Right Left	O	A		2	102	-	677	1945	1124	60.2%	2	0	0	3.1	16.3	11.7
4/1	Otterham Quay Lane Left Ahead Right	U	B		2	33	-	231	1604	312	74.1%	-	-	-	3.6	56.0	7.3

C1 PRC for Signalled Lanes (%): 21.5 Total Delay for Signalled Lanes (pcuHr): 11.86 Cycle Time (s): 180
PRC Over All Lanes (%): 21.5 Total Delay Over All Lanes(pcuHr): 11.86

Basic Results Summary

Scenario 5: 'Copy of Copy of New Scenario' (FG5: '2029 Base+Dev AM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

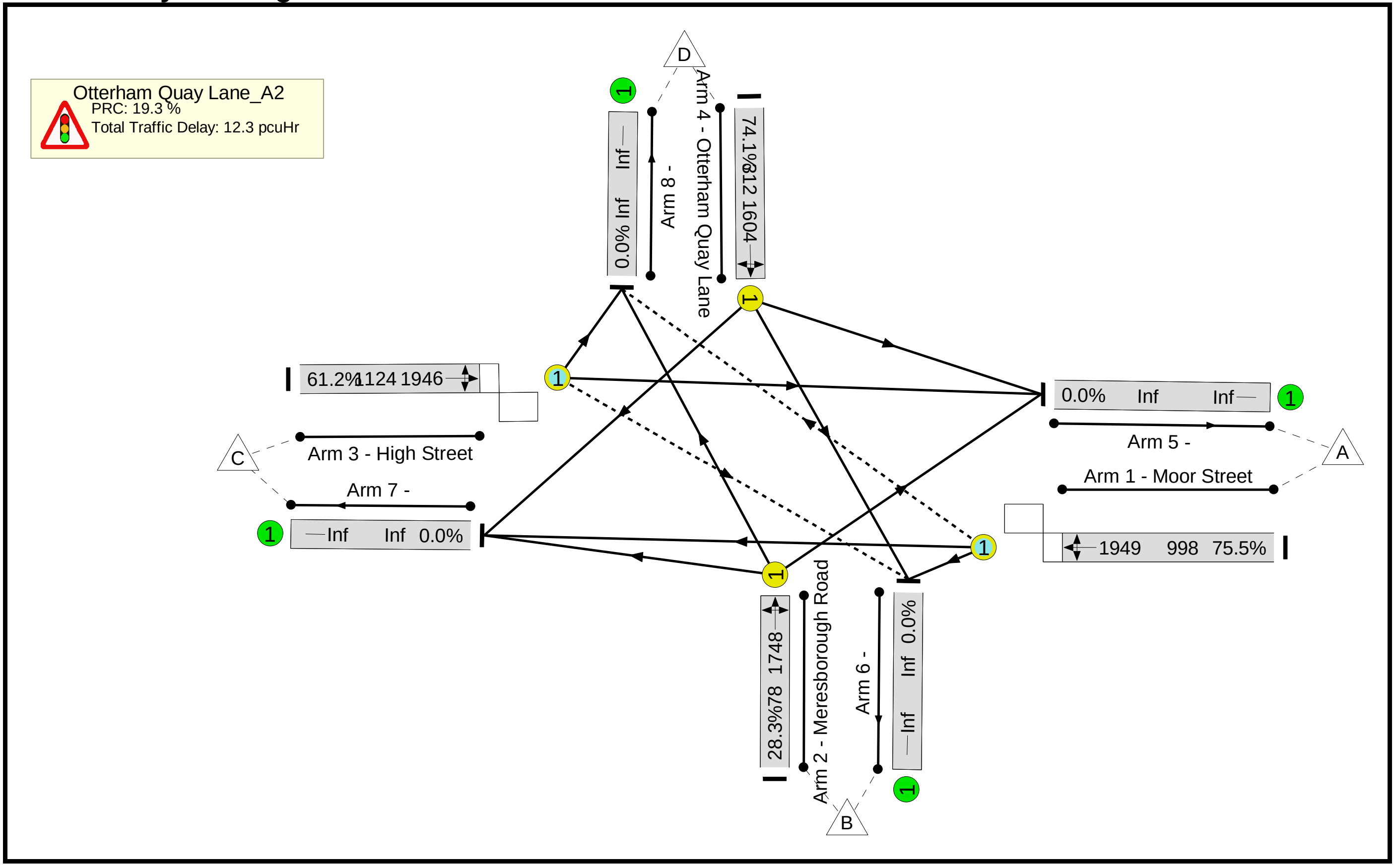
Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Otterham Quay Lane/A2/Meresborough Road	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.4%**	**181**	**0**	**2**	**13.6**	**-**	**-**
Otterham Quay Lane_A2	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**80.4%**	**181**	**0**	**2**	**13.6**	**-**	**-**
1/1	Moor Street Left Ahead Right	O	C		2	90	-	727	1939	904	80.4%	179	0	2	6.1	30.1	19.2
2/1	Meresborough Road Right Left Ahead	U	D		1	7	-	7	1730	77	9.1%	-	-	-	0.2	108.4	0.4
3/1	High Street Ahead Right Left	O	A		2	90	-	521	1966	1005	51.8%	2	0	0	2.7	18.5	9.9
4/1	Otterham Quay Lane Left Ahead Right	U	B		2	45	-	332	1610	420	79.0%	-	-	-	4.7	50.5	9.6

C1 PRC for Signalled Lanes (%): 11.9 Total Delay for Signalled Lanes (pcuHr): 13.63 Cycle Time (s): 180
PRC Over All Lanes (%): 11.9 Total Delay Over All Lanes(pcuHr): 13.63

Basic Results Summary

Scenario 6: 'Copy of Copy of Copy of New Scenario' (FG6: '2029 Base+Dev PM', Plan 1: 'Network Control Plan 1')

Network Layout Diagram



Basic Results Summary

Network Results

Item	Lane Description	Lane Type	Full Phase	Arrow Phase	Num Greens	Total Green (s)	Arrow Green (s)	Demand Flow (pcu)	Sat Flow (pcu/Hr)	Capacity (pcu)	Deg Sat (%)	Turners In Gaps (pcu)	Turners When Unopposed (pcu)	Turners In Intergreen (pcu)	Total Delay (pcuHr)	Av. Delay Per PCU (s/pcu)	Mean Max Queue (pcu)
Network: Otterham Quay Lane/A2/Meresborough Road	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**75.5%**	**157**	**0**	**2**	**12.3**	**-**	**-**
Otterham Quay Lane_A2	**-**	**-**	**-**		**-**	**-**	**-**	**-**	**-**	**-**	**75.5%**	**157**	**0**	**2**	**12.3**	**-**	**-**
1/1	Moor Street Left Ahead Right	O	C		2	102	-	753	1949	998	75.5%	155	0	2	4.8	23.0	16.4
2/1	Meresborough Road Right Left Ahead	U	D		1	7	-	22	1748	78	28.3%	-	-	-	0.7	115.4	1.3
3/1	High Street Ahead Right Left	O	A		2	102	-	688	1946	1124	61.2%	2	0	0	3.2	16.5	11.9
4/1	Otterham Quay Lane Left Ahead Right	U	B		2	33	-	231	1604	312	74.1%	-	-	-	3.6	56.0	7.3

C1 PRC for Signalled Lanes (%): 19.3 Total Delay for Signalled Lanes (pcuHr): 12.28 Cycle Time (s): 180
PRC Over All Lanes (%): 19.3 Total Delay Over All Lanes(pcuHr): 12.28