

Appendix K

VISSIM MODELLING NOTE



PUBLIC

TECHNICAL NOTE

DATE:	06 June 2022	CONFIDENTIALITY:	Public
SUBJECT:	Lancashire Central Cuerden VISSIM Assessment Note		
PROJECT:	70084465 – Lancashire Central	AUTHOR:	Jobson Joseph
CHECKED:	Pallavit Saraf	APPROVED:	HB

INTRODUCTION

WSP have been commissioned by Maple Grove Development Ltd. and Lancashire County Council (LCC) to prepare a Transport Assessment in support of a planning application for a mixed-use development at Lancashire Central, also known as the Cuerden Strategic Site. This Technical Note summarises the microsimulation modelling undertaken to support the Transport Assessment. Microsimulation models have been run for the 2037 future year scenarios including a Do-Minimum and Do-Something scenario. The Do-Minimum model includes the development flows from the consented planning application at the Cuerden Strategic Site, approved in 2017 (07/2017/0211/ORM). The Do-Something scenario, includes the revised development flows associated with the current proposals at the Site, based on the proposals as set out in the 2022 Transport Assessment undertaken by WSP. A comparison between the two modelled scenarios is provided within this note.

MODEL DEVELOPMENT

Existing Model

WSP has received the VISSIM models developed by Mott MacDonald in Version 5.40-03. Figure 1 shows the modelling extent. The 2024 DM and DS models were received. The 2024 Do-Something models were used as they included the off-site mitigation works associated with the previous application at the site (07/2017/0211/ORM) already coded in the model. The weekday AM (07:30-08:30) and PM (16:30-17:30) peak periods have been modelled for this study.

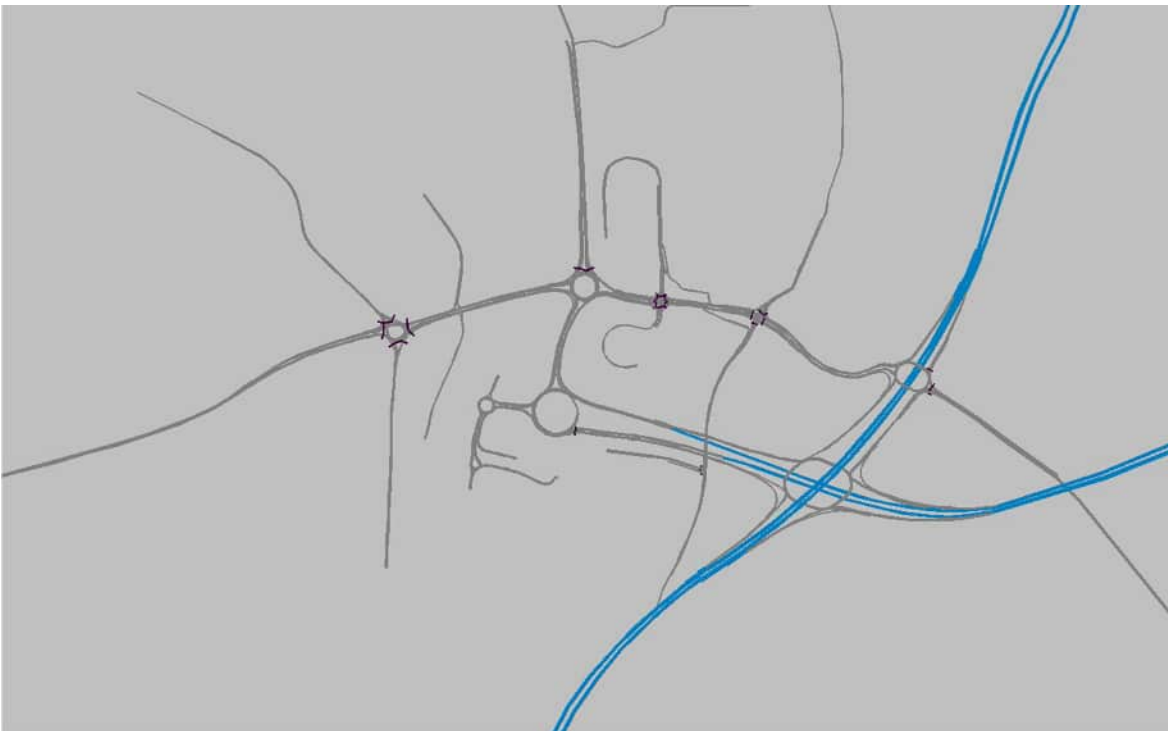


Figure 1 VISSIM Modelling Extent



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Model Update

The existing VISSIM models have 2024 background traffic and committed development in the model. For our purpose, background traffic for 2024 has been uplifted to 2037 using TEMPRO growth rates. Two scenarios were prepared:

- **Do-Minimum:** Existing committed development trips were removed from the model and revised committed development trips (including Consented Cuerden trips), as outlined within the Transport Assessment, were added into the model.
- **Do-Something:** In this scenario, the development trips associated with the 2017 consented scheme trips have been removed from the committed development and the revised Lancashire Central trips were added into the model traffic flows.

Below changes were done in the models:

- Desired speed decisions were added in model, wherever required.
- Development flows were missing in the existing model on Farrington Road/B2524 roundabout. This has been added.

Apart from above changes, no changes were done in the model.

MODELLED RESULTS

The following results set out the overall VISSIM model performance of the entirety of the modelling network using overall network performance statistics, journey time outputs taken from an average of 16 VISSIM runs for AM peak (07:30-08:30) and PM peak (16:30-17:30).

The following two scenarios were compared:

Scenario A- 2037 with committed development (Do Minimum)

Scenario B- 2037 with committed development and Lancashire Central development flows (Do-Something)

Overall Network Performance Statistics

Network performance statistics provide an indication to how the model is performing. They illustrate key statistics including:

- Total Time Taken (seconds) - Total travel time of vehicles traveling within the network or that have already left the network;
- Total Vehicles - Total number of vehicles which have already reached their destination and have left the network before the end of the simulation;
- Total Delay (seconds); Total delay of all vehicles that are in the network or have already left it;
- Average Vehicle Time (Seconds) - Average time a vehicle is within the model simulation period;
- Average Speed (mph) - Average speed of vehicles in the model simulation period;
- Average Delay / Vehicle - Average delay imposed on each vehicle within the model simulation period; and
- Latent Demand - Traffic volume that is unable to enter the modelling extents due to congestion issues. This is taken maximum and average of 10 runs at the end of entire modelling period.

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The below **Table 1** sets out the comparison of the network performance statistics for both scenarios.

Table 1 -2037 Network Performance Statistics comparison

NPE Statistics	AM Peak		PM Peak	
	Scenario A	Scenario B	Scenario A	Scenario B
Total Time Taken (s)	14381857	14162262	16652684	16005551
Total Vehicles	21548	21554	22127	21883
Total Delay (s)	6774232	6562609	8905091	8341063
Average Time (s) / Vehicle	668	658	754	734
Average Speed (mph)	36	37	32	33
Average Delay / Vehicle	315	305	403	384
Latent Demand (Average)	1075	960	1264	1272

From the above tables the results conclude:

- Comparison of Scenario A Do-Minimum and Scenario B Do-something results show that, the overall network performance improves for Scenario B during the AM and PM peak.
- It is also observed that the average vehicle time in the network is forecast to reduce from 315 seconds to 305 seconds in the AM peak and from 403 seconds to 384 seconds during the PM peak. In addition, it will also result in reduction in delay per vehicle along the network, with an increase in average speeds (mph) and increase throughput through the network.

Overall Journey Time

Journey time results have been extracted from the model to provide an overview of travel times along the routes undertaken as part of the traffic surveys and study area.

The below **Table 2** sets out the comparison of journey times for the 2037 Do-Minimum and 2037 Do something scenarios for both peak hours.

Appendix A illustrates the journey times in graphical format.

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Table 2 - Journey Time Results comparison

Journey time (seconds)	AM Peak		PM Peak	
	Scenario A	Scenario B	Scenario A	Scenario B
M65 WB	267	247	395	333
M65 EB	334	296	543	508
A6 EB	360	346	435	452
A6 WB	309	309	752	678
M65 NB	176	178	177	170
M65 SB	157	158	211	212

The above table concludes the following results:

- In AM peak, generally there is a notable decrease in all journey time routes except M65 NB & SB for Do-Something compared with the Do-Minimum scenario. There is a negligible change in journey times on the M65 northbound and southbound routes.
- In PM peak, generally there is a notable decrease in all journey time routes except A6 EB & M65SB for Do-Something compared with the Do-Minimum Scenario.
- It is also observed that the improvement in the journey times is significant in PM compared with the AM peak. The M65 WB and M65 EB routes are decreased by 62 seconds and 35 seconds respectively when compared with the Do-Minimum scenario.
- However, it was noticed there is an increase of 17 seconds for A6 EB in PM peak.

Overall Queue Comparison

Queue comparison results have been extracted from the model to provide an overview of queue length along the routes undertaken as part of the traffic surveys and study area.

The below **Table 3** sets out the comparison of average queue lengths for the 2037 Do-Minimum and Do-Something scenarios for both peak periods.

Table 3 - Queue Length Results Comparison

Average Length (meters)	AM Peak		PM Peak	
	Scenario A	Scenario B	Scenario A	Scenario B
1- A582 Farington Rd (W)	960.7	942.4	944.8	927.5
2- Left turn from A582 Farington Rd to B5254 Watkin Ln	2.8	3.2	6.6	6.3



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3- Left turn from B5254 Watkin Ln to A582 Lostock Ln	793.4	757.1	348.5	317.9
4- B5254 Watkin Ln (N)	680.8	644.0	218.3	111.9
5- A582 Lostock Ln (E)	162.6	149.8	760.3	708.4
6- Left turn from A582 Lostock Ln to Stanifield Ln	35.1	33.6	29.2	54.3
7- A5083 Stanifield Ln (S)	83.6	83.1	80.2	91.3
8- Left from A5083 Stanifield Ln to A582 Farington Rd	52.0	52.0	34.0	49.9
43- A582 Lostock Ln (W)	425.6	370.0	251.1	227.8
44- From A582 Lostock Ln to A6 London Way	0.1	0.0	0.1	0.2
45- A6 London Way (N)	433.0	321.5	964.7	916.6
46- Left from A6 London Way to A6 Lostock Ln	430.2	318.4	964.5	915.4
47- A6 Lostock Ln (E)	69.0	66.9	165.0	145.9
48- M65 (S)	98.1	94.8	461.8	357.5
9- A6 Lostock Ln (W)	83.8	87.4	213.3	255.1
10- Left from A6 Lostock Ln to Cuerden Way	82.9	86.6	212.5	255.6
11- A6 Lostock Ln (W)	43.7	45.4	86.6	74.0
12- Cuerden Way (N)	44.7	45.5	622.2	643.2
13- Left from Cuerden Way to A6 Lostock Ln	40.2	41.0	612.7	633.7
14- A6 Lostock Ln(E)	117.5	116.6	292.1	298.7
15- A6 Lostock Ln(E)	134.7	134.9	296.6	304.1
16- Left from A6 Lostock Ln to Craven Dr	136.2	135.5	298.0	305.5
17- Craven Dr (S)	28.1	29.0	253.1	263.2
18- Left from Craven Dr to A6 Lostock Ln	28.2	29.2	254.5	264.8
19- A6 Lostock Ln (W)	72.0	71.3	207.3	299.1
20- Left from A6 Lostock Ln to B6258 Station Rd	27.6	25.0	48.5	100.7



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21- A6 Lostock Ln (W)	52.6	53.9	238.1	347.9
22- B6258 Station Rd (SB)	182.5	150.4	938.4	927.8
23- Left from B6258 Station Rd to A6 Lostock Ln	156.0	116.2	773.6	806.5
24- A6 Lostock Ln(E) (lane 2)	270.6	271.9	170.4	178.7
25- A6 Lostock Ln(E) (lane1)	70.0	70.2	341.1	238.7
26- Wigan Rd (S)	507.7	502.3	464.6	397.3
57- Old Lostock Lane to A6	26.0	25.6	337.2	392.7
27- A6 Lostock Ln (W)	64.4	71.0	58.6	57.6
28- M6 (S)	303.2	256.3	181.4	123.9
29- M6 (N)	73.7	69.7	102.3	121.5
30- Church Rd (E)	96.0	82.4	274.8	197.0
53- A5083 Lydiate Ln (W)	9.2	7.5	44.8	21.9
54- A49 Wigan Rd (N)	70.6	73.5	86.3	81.1
55- A49 Wigan Rd (N) (Right turn)	8.5	5.3	4.0	3.1
56- A49 Wigan Rd (S)	338.2	325.9	285.9	260.4
31- M65 (W)	67.5	70.5	89.7	80.5
32- M6 (N)	44.3	50.5	95.1	84.7
33- M65 (E)	20.5	22.9	236.4	279.2
34- M6 (S)	194.6	183.6	300.2	246.8
35- Slip from M6 (E)	305.2	223.0	253.6	169.0
36- M65 (E)	107.5	104.9	121.2	96.5
37- Development access (W)	30.4	30.0	90.5	48.9
38- M65 (N)	10.5	8.1	8.3	8.5
39- Left from M65 (N)	36.0	42.5	54.2	51.0
41- Todd Ln S (N)	3.8	2.0	3.1	5.9



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42- Old School Ln (S)	0.0	0.0	0.1	0.0
40- Rdbt 1 North arm	0.0	0.0	0.0	3.7
49- Rdbt 1 East arm	0.1	0.1	0.0	4.2
50- Rdbt 1 South arm	0.1	0.0	7.6	0.0
51- Rdbt 2 East arm	3.1	2.9	14.0	0.0
52- Rdbt 2 South arm	0.4	0.4	6.4	0.0

The above tables conclude the following results:

- There is a notable decrease in the average queue length for the Do-Something scenario compared with the Do-Minimum in both AM and PM peaks.
- It is also observed that there's a significant decrease of queue length in PM compared with the AM peak. The queue lengths in A6 London Way (N) and B5254 Watkin Ln (N) are decreased by 111.5 meters in AM peak and 106.4 meters in PM peak respectively when compared with the Do-Minimum scenario.
- However, it was noticed there is an increase in queue length of 102.4 meters for A6 Lostock Ln(E) in PM peak.

CONCLUSION

A forecast year of 2037 has been selected for assessment and Committed development traffic (including the consented scheme) has then been added to the 2037 flows to form the Do Minimum scenario. The Do-Something scenario includes the revised development flows associated with the Cuerden Strategic Site, as set out in the Lancashire Central proposals.

In the AM peak and PM peak there is an increase in overall network performance in Do-Something scenario compared with the Do-Minimum scenario. It is also observed that journey time and queue length also improved significantly especially in PM peak for the Do-Something scenario.

Overall, the VISSIM modelling has shown that the impact of the proposed development traffic on the local highway network is less than the impact of the traffic flows associated with the consented scheme at the site. This supports the findings presented within the Transport Assessment, with the current application associated with reduced overall peak hour trip generation. The conclusions of the VISSIM modelling also supports the conclusions of the local junction modelling carried out to support the Transport Assessment.



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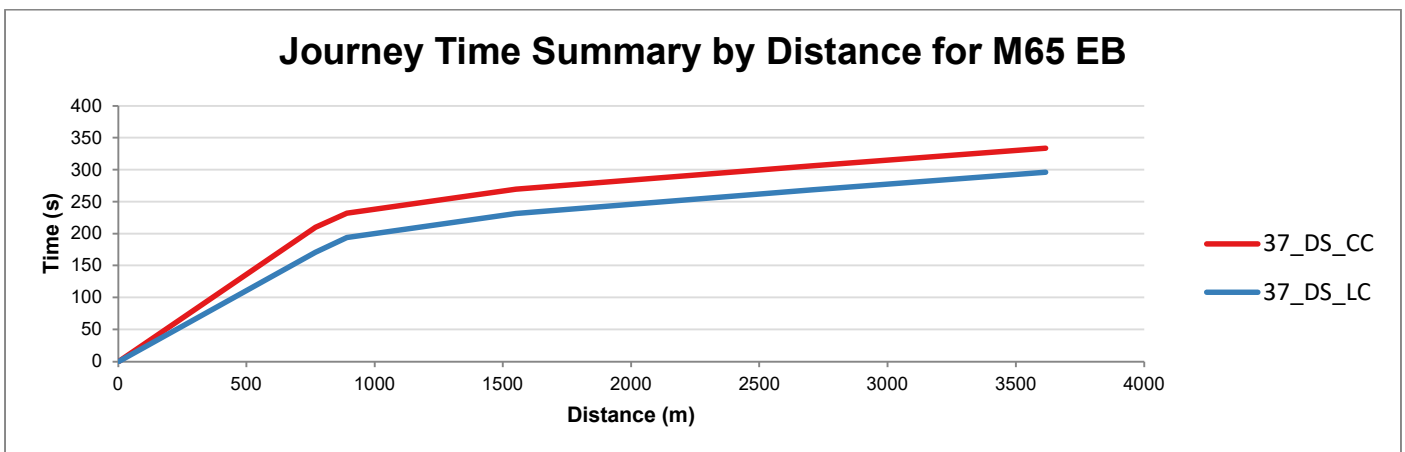
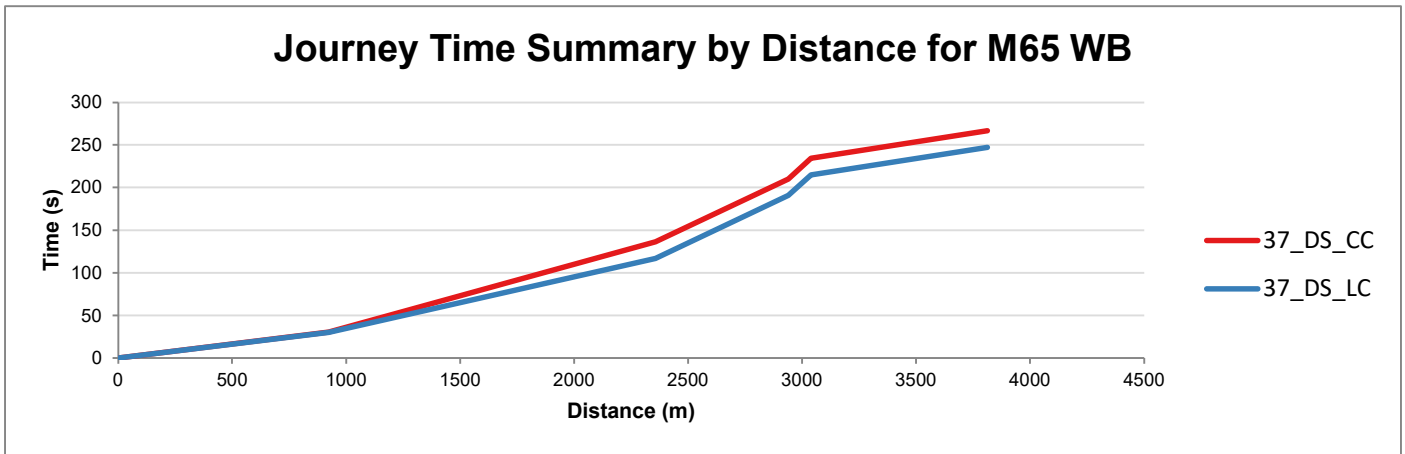
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APPENDIX A – JOURNEY TIME GRAPHS

*37_DS_CC provides the results of the Do-Minimum Scenario

*37_DS_LC provides the results of the Do-Something Scenarios

AM Peak

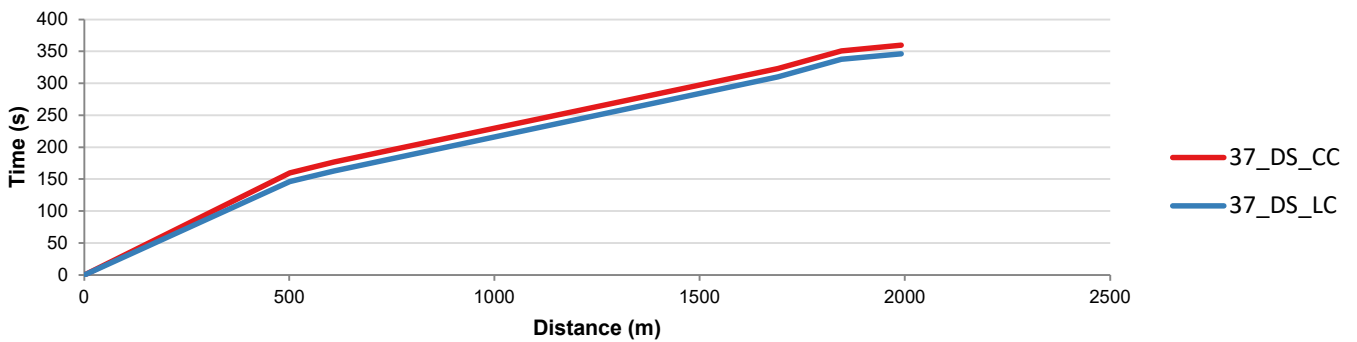




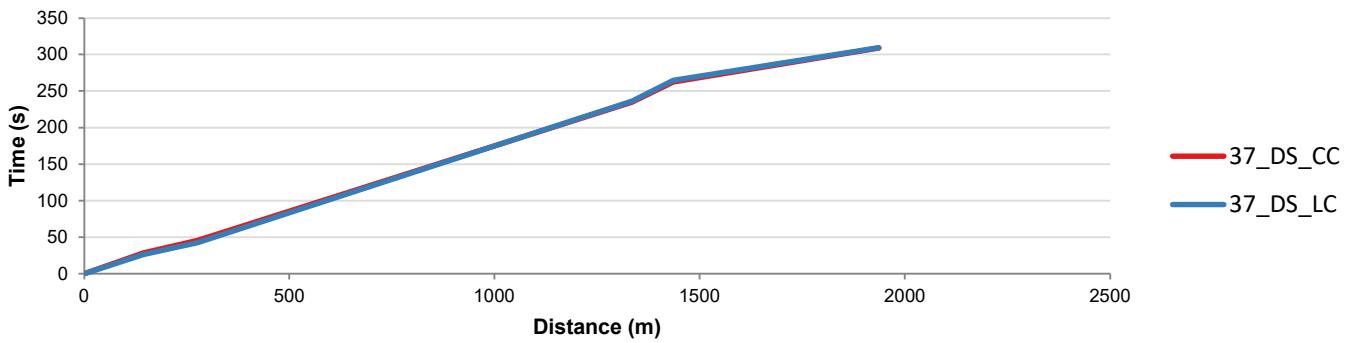
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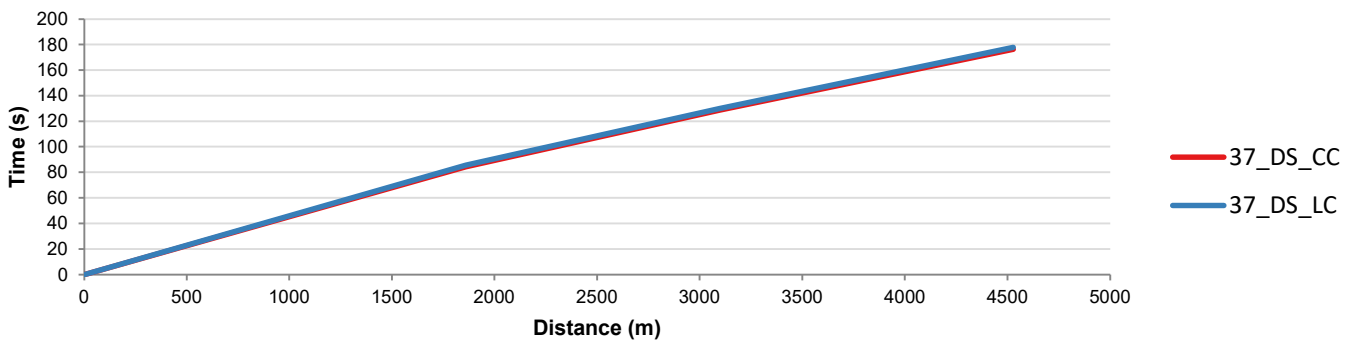
Journey Time Summary by Distance for A6 EB



Journey Time Summary by Distance for A6 WB



Journey Time Summary by Distance for M65 NB

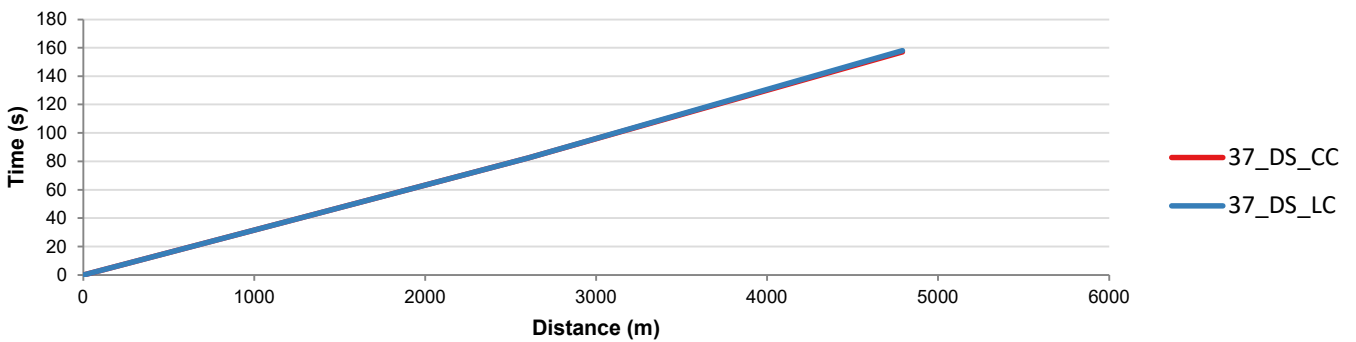




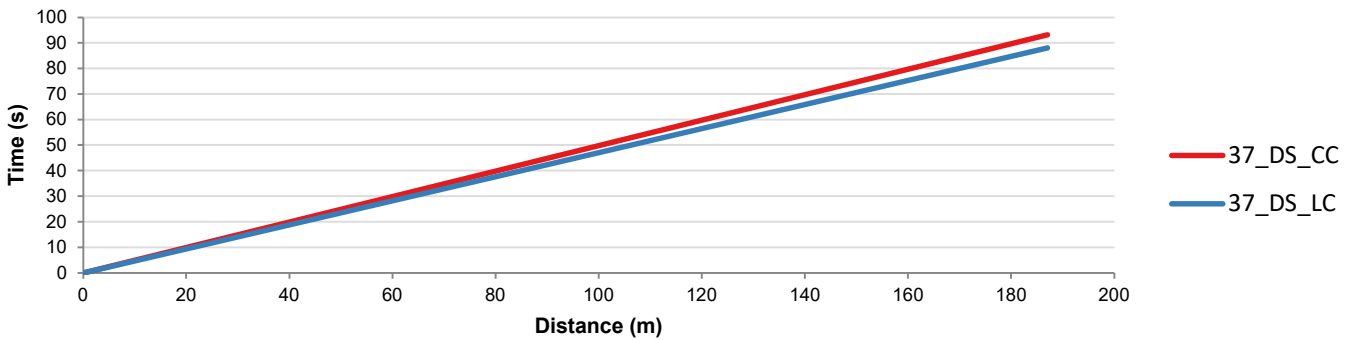
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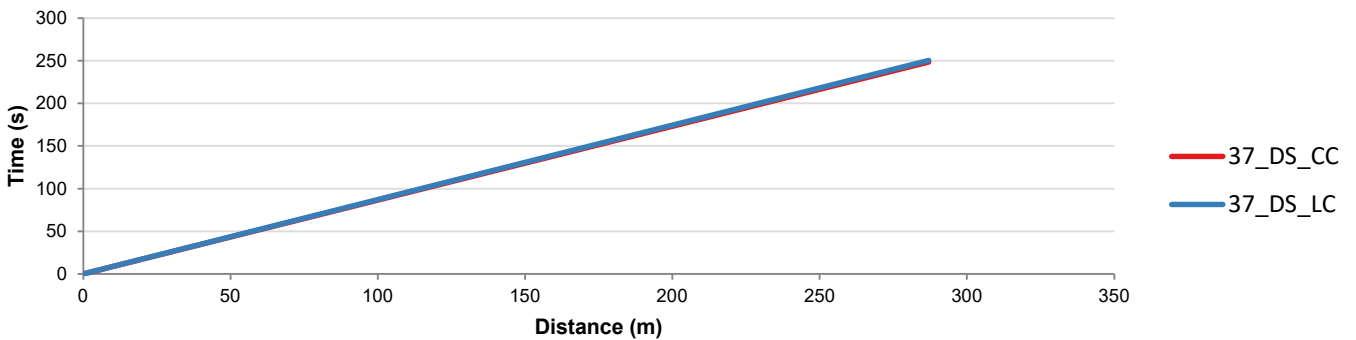
Journey Time Summary by Distance for M65 SB



Journey Time Summary by Distance for 71 - Station Rd SB



Journey Time Summary by Distance for 72 - Wigan Rd NB

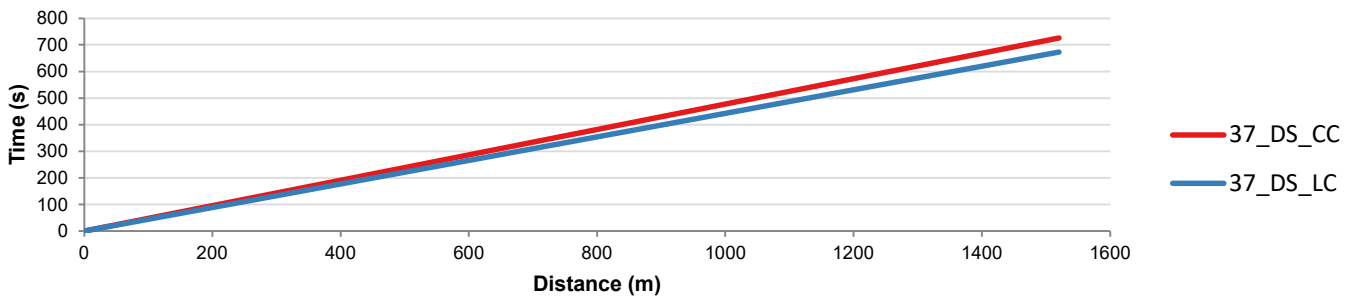




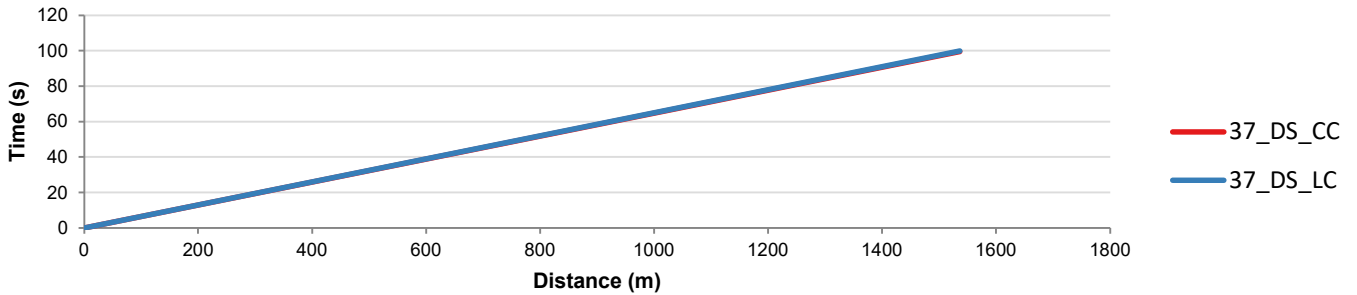
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Journey Time Summary by Distance for 101 - A582 - Centurion Way Rdbt



Journey Time Summary by Distance for 102 - A582 Lostock Ln (A5083 - B5254 Rdbt)

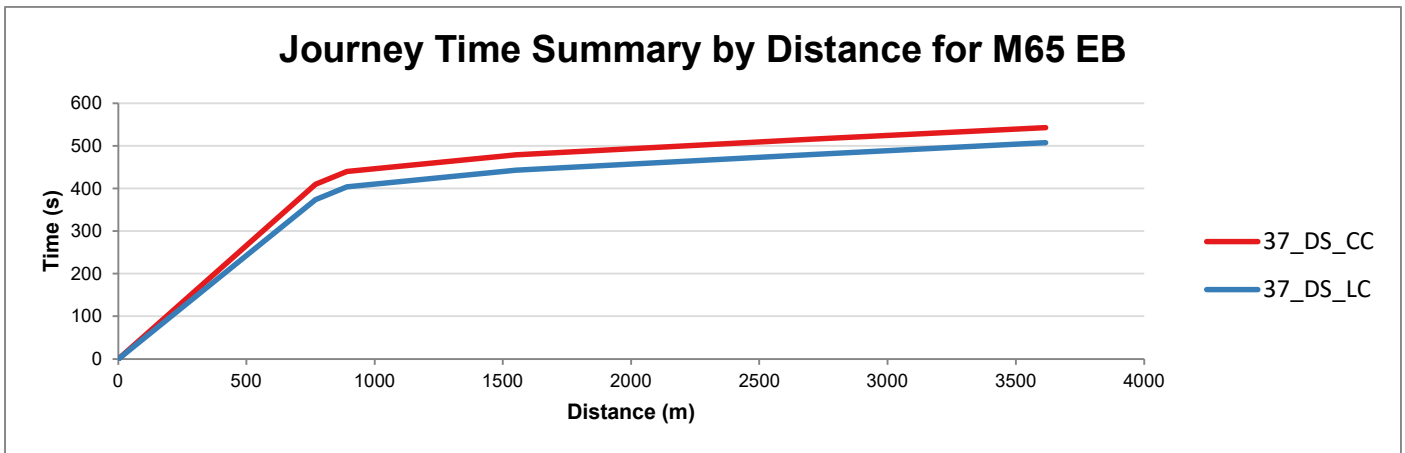
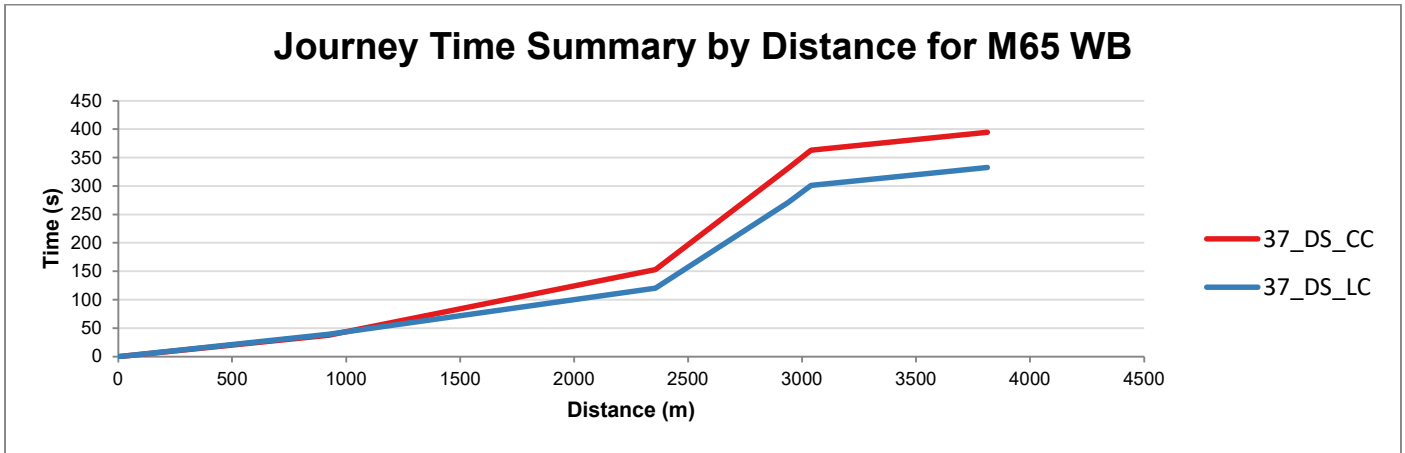




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PM Peak

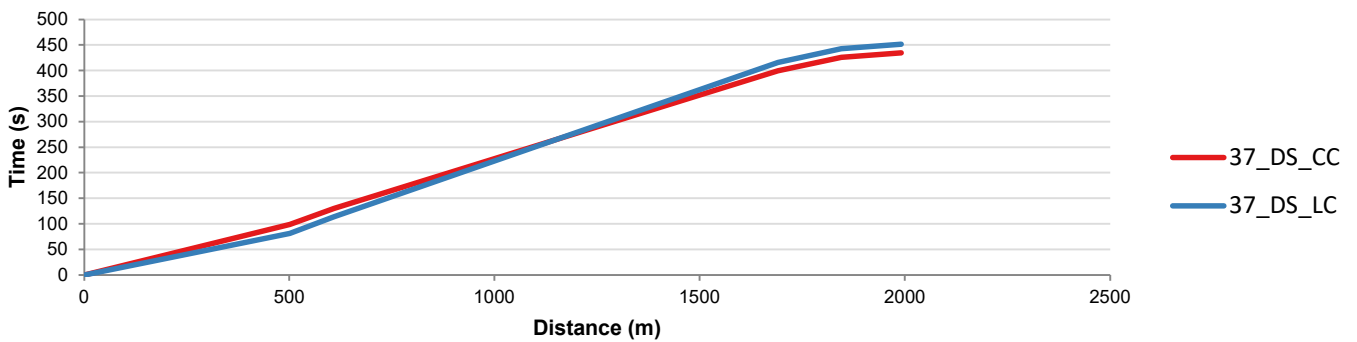




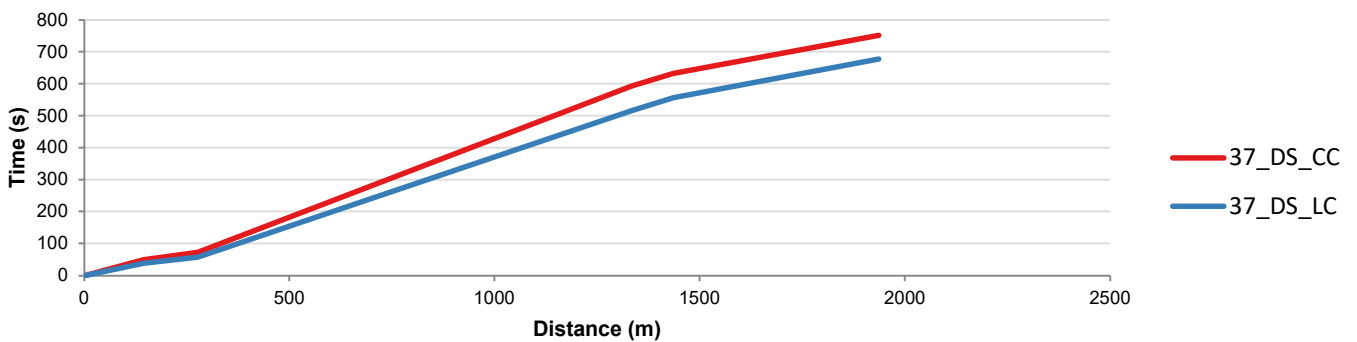
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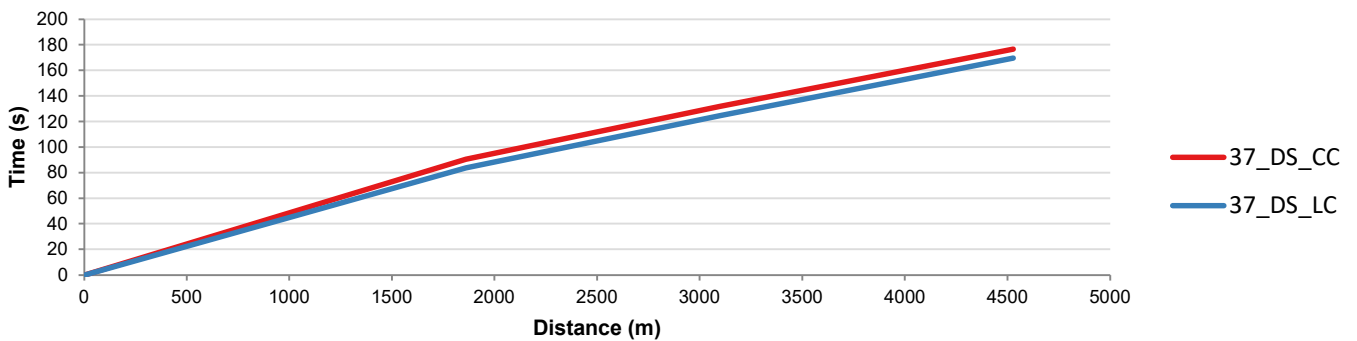
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Journey Time Summary by Distance for A6 WB



Journey Time Summary by Distance for M65 NB

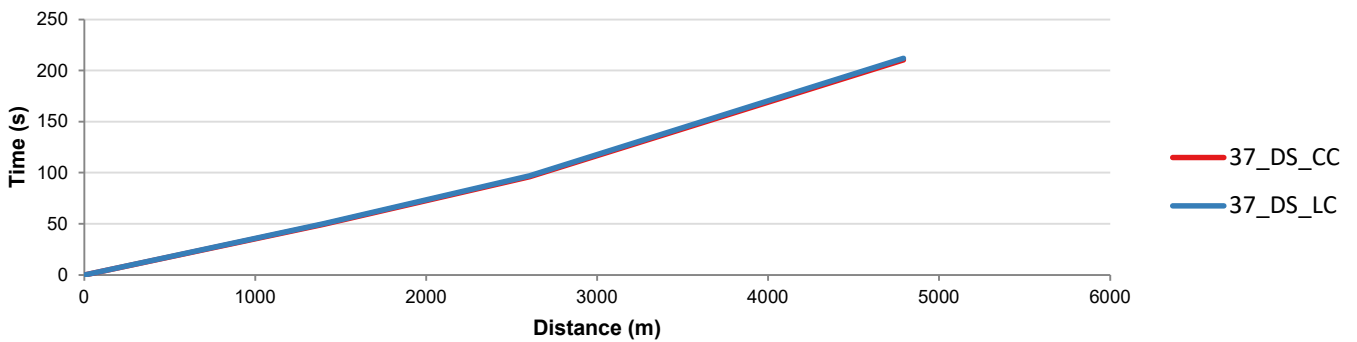




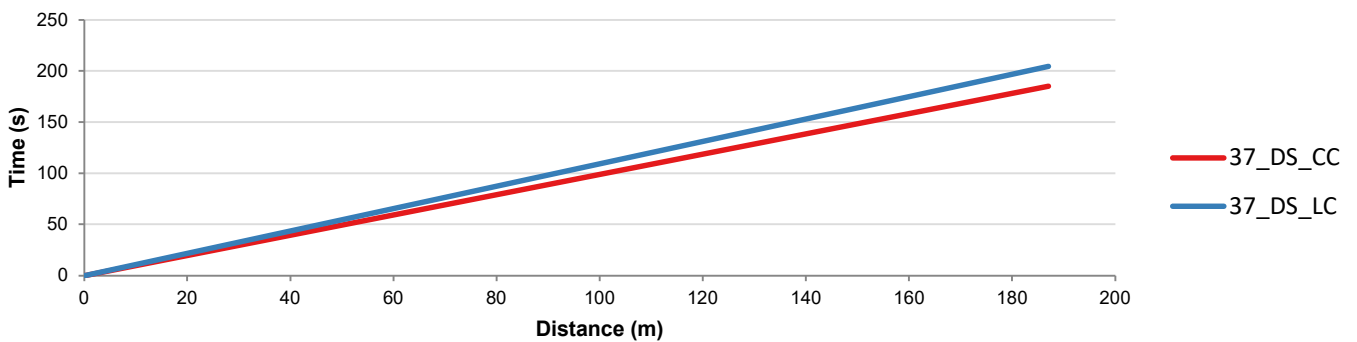
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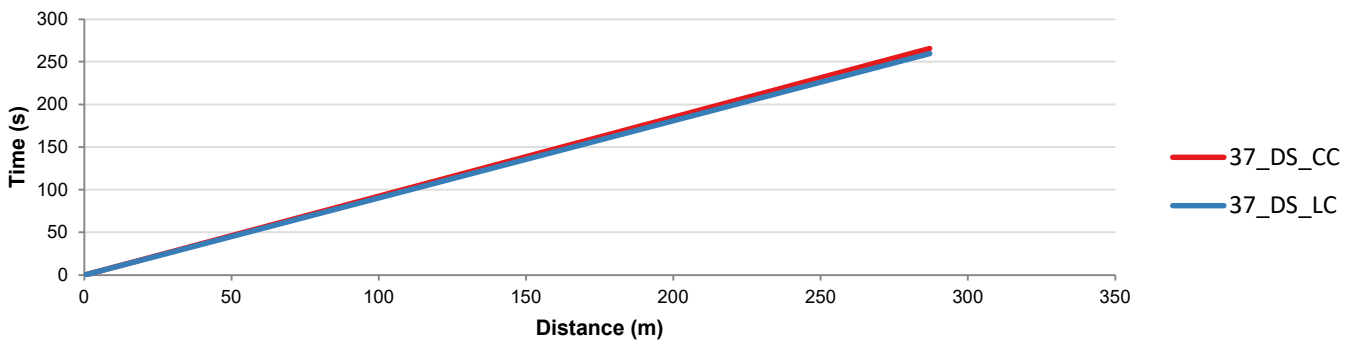
Journey Time Summary by Distance for M65 SB



Journey Time Summary by Distance for 71 - Station Rd SB



Journey Time Summary by Distance for 72 - Wigan Rd NB

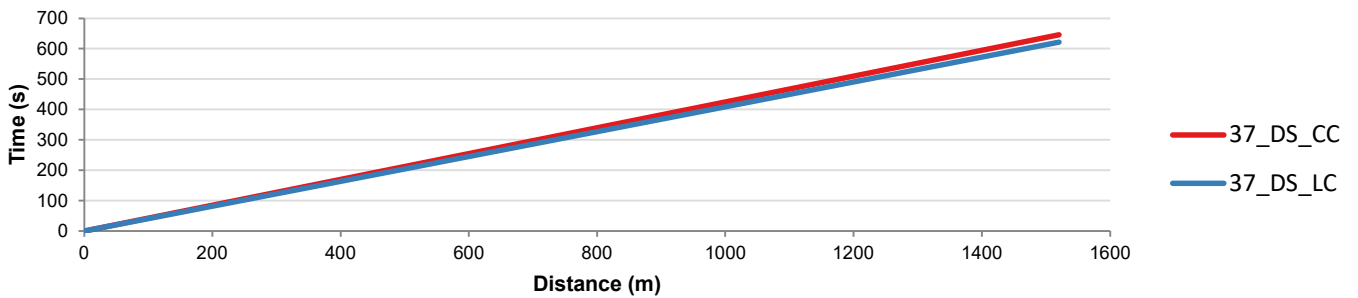




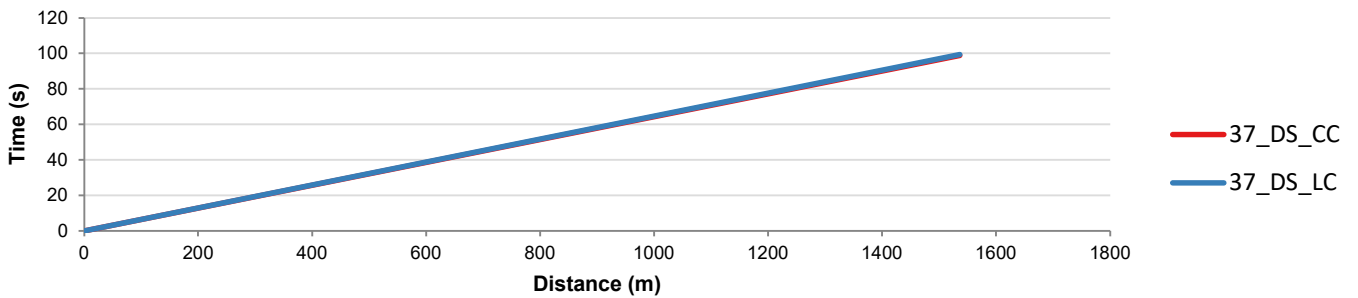
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Journey Time Summary by Distance for 101 - A582 - Centurion Way Rdbt



Journey Time Summary by Distance for 102 - A582 Lostock Ln (A5083 - B5254 Rdbt)





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