Forecasting Report

A28 Chart Road

23-036-005 Rev A

January 2025

Charles & Associates

Document Control Sheet

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1 Introduction

1.1 Overview

1.1.1 Charles & Associates Consulting Engineers Ltd. (C&A) have been instructed by Kent County Council (KCC) to provide ongoing technical support in relation to a S106B planning appeal by the developer of the Chilmington Green development in Ashford, Kent. Specifically, C&A have been asked to provide transport modelling support to evidence KCC Highway's position at the forthcoming appeal.

1.1.2 Chilmington Green is a large-scale mixed-use development including up to 5,750 residential dwellings to the southwest of Ashford town centre. It is required to financially contribute towards the implementation of a highway improvement scheme on the A28 Chart Road as part of its planning consent (ref: 12/00400/AS) enshrined in a S106 agreement.

1.1.3 The proposed improvement scheme comprises the conversion of the A28 Chart Road, between the 'Tank' and 'Matalan' roundabouts from single lanes to two lanes in each direction. This will incorporate the improvement of both roundabouts and the Chart Road/Loudon Way signalised junction.

1.1.4 The Appellant is seeking to discharge the condition without delivering the consented mitigation scheme as part of the S106B appeal. KCC maintain that mitigation of the A28 corridor is required in the context of delivery of 5,750 homes and other land uses at Chilmington Green and have instructed the development of a microsimulation model of the network to demonstrate the impact of the development in the absence of mitigation.

1.2 Network Assessment

1.2.1 Given the importance of the Chart Road corridor in the surrounding network as well as the scale and potential impact of the proposed development, a microsimulation model was considered the best tool to assess the performance of the network before and after the introduction of the development traffic.

1.2.2 A VISSIM 2024 base year model was developed to appropriately reflect the road network and observed traffic conditions. Although the model was based on surveys conducted in 2023, subsequent 2024 surveys and site visits confirmed that the traffic conditions in both years were at similar levels. As a result, the model was built with the use of the observed 2023 traffic demand and validation was carried out using journey time surveys from 4th December 2024. Additionally, the queues observed during both the 2023 and 2024 surveys were documented and compared for the two survey years, further establishing the similarity in network performance, and these were further compared with the model for visual validation.

1.2.3 A Local Model Validation Report (LMVR, report 23-036-005) has been produced to provide further details regarding the construction and validation of the base model and its fitness for purpose.

1.2.4 Following this, a 2048 Do Minimum (DM) model and a 2048 Do Something (DS) model have been developed, for a typical weekday AM and PM peak periods, to provide a comparative assessment of the network with (DS) and without (DM) the Chilmington Green development.

1.2.5 This report presents how the DM and DS models were developed and compares the results from both models for understanding how A28 corridor would operate under both forecast scenarios.

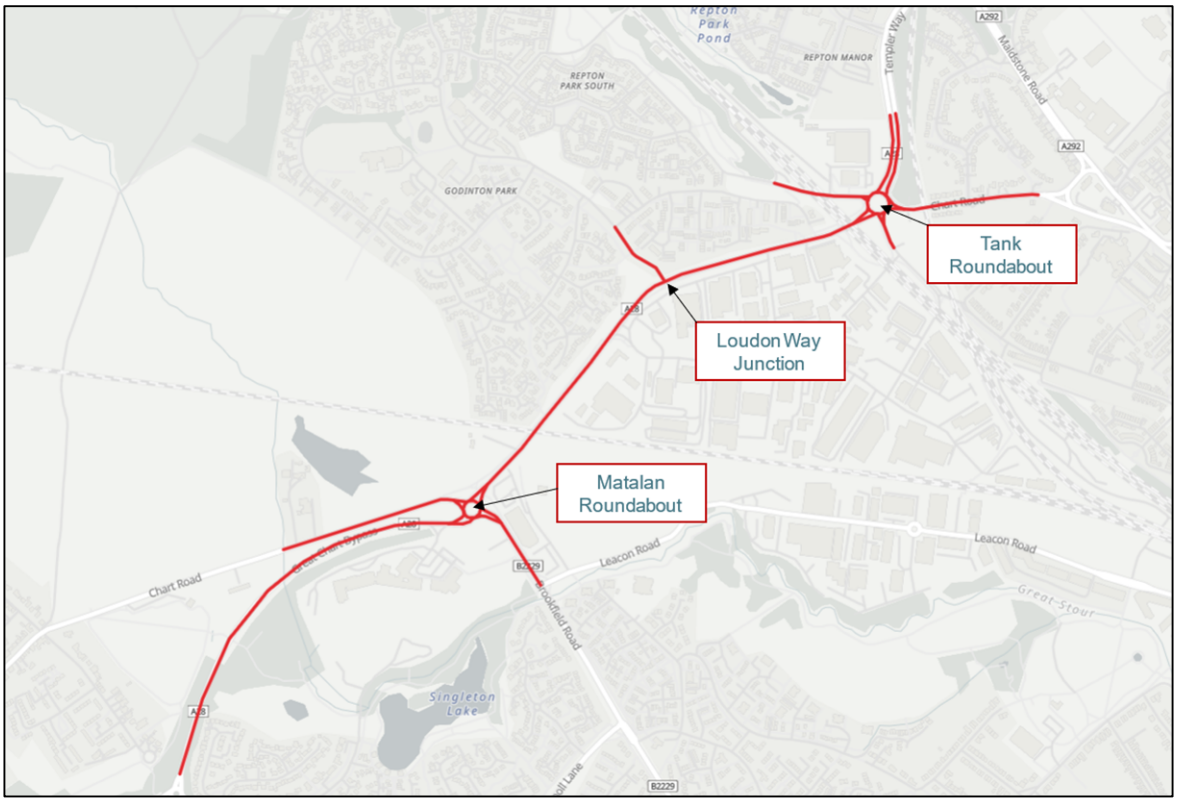
2 Forecast Model Development

2.1.1 This chapter describes the development of the 2048 DM and 2048 DS VISSIM models in terms of network development and forecast traffic demand.

2.2 Network Development

2.2.1 The modelled area is shown in the **Figure 2.1** below. The DM and DS scenarios retain the same network area; however, the proposed mitigation at the Matalan roundabout and Loudon Way signalised junction as part of the consented Possingham Farm Development[1] have been incorporated in the forecast network.

Figure 2.1: Modelled Network



2.2.2 The proposed changes at Matalan Roundabout and the Loudon Way junction incorporated within the model, as part of the consented Possingham Farm development are summarised below and shown in **Appendix A**.

- **Matalan roundabout**: The A28 Chart Road southbound approach was updated to provide two full entry lanes, a widened exit and the informal pedestrian crossing facility moved to the south, closer to the roundabout.

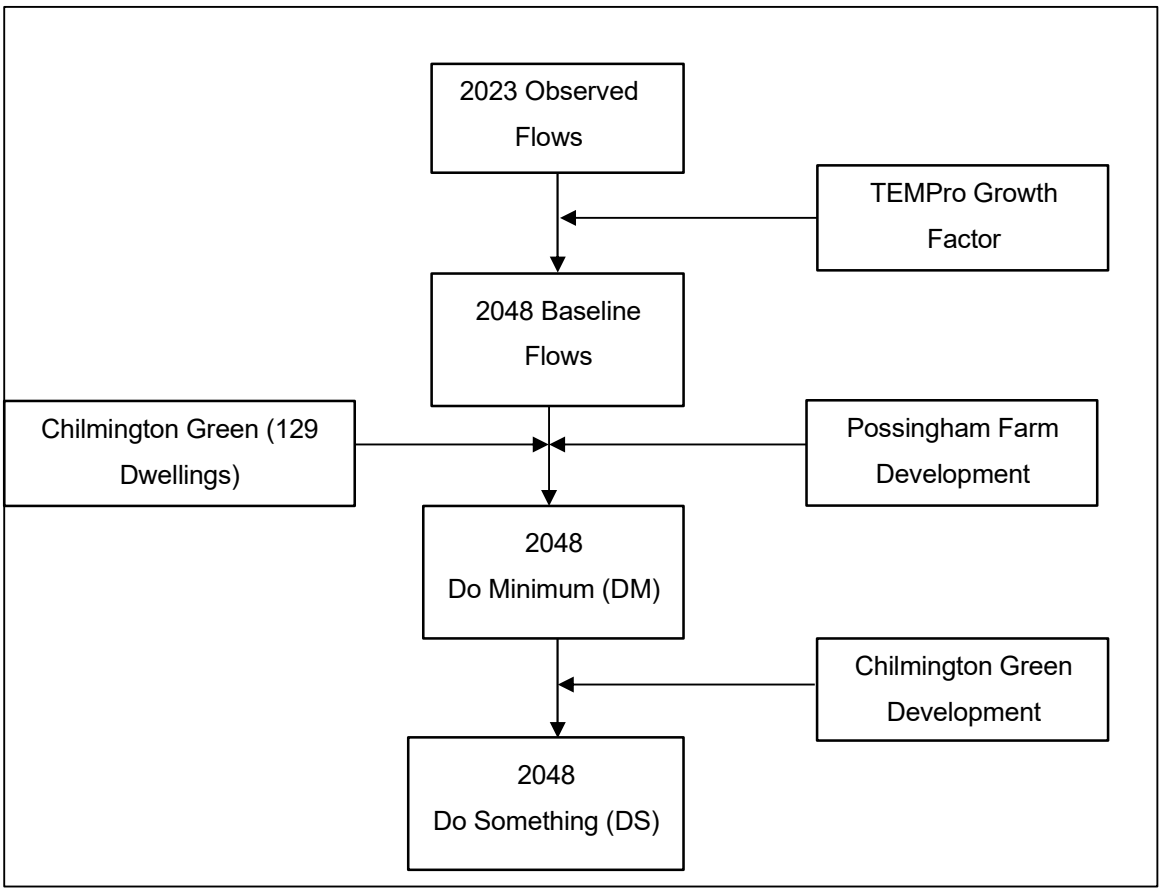
[1] Application ref: 22/00571/AS

- **Loudon Way**: The A28 Chart Road northbound is increased to two lanes with the nearside lane serving both left turning and straight-ahead traffic and the offside lane serving straight ahead only. The two northbound ahead lanes merge on exit to the north of the signals.

2.3 Forecast Traffic Flows

2.3.1 **Figure 2.2** below summarises the process undertaken for calculating the forecast traffic flows for both DM and DS scenarios, while details are provided in the subsequent section.

Figure 2.2: Forecast Traffic Flows Calculation for VISSIM



2.3.2 The forecast models were based on observed flows, in the form of turning movements, surveyed in 2023. These flows have been used for building the VISSIM base model, as discussed above. The Chilmington Green development is anticipated to be completed by 2048; hence, the forecast year is taken as 2048.

Background Traffic Growth

2.3.3 The TEMPro database has been used to calculate an appropriate growth factor to be applied to the base traffic flows to represent planned growth in Ashford up to 2048. The following parameters were applied to derive a headline growth factor:

- TEMPro Version: 8.1
- Result type: Trip ends by time period
- Area: Ashford
- Road Type: A Road
- Base Year: 2023
- Future Year: 2048
- Transport Mode: Car Driver
- Trip Purpose: All
- Time: Weekday (0700 -0959) and PM (1600 – 1859)
- Trip End Type: Origin/Destination

2.3.4 Chilmington Green, as a consented development of 5750 units, is included within the Local Plan assumptions for future households within TEMPro. Moreover, 271 units of the development had already been occupied by 2023 and therefore the associated traffic from these were captured by the 2023 traffic surveys. Subsequently, for calculating the growth factor between 2023 and 2048, an alternative assumption was applied within the planning policy adjustment function within TEMPro, to discount the remaining 5479 units of the Chilmington Green development that were later added in site specifically. This was done in order to avoid overestimating background traffic growth by effectively double-counting the Chilmington Green traffic which were incorporated directly into DS scenario.

2.3.5 The resultant 2023-2048 TEMPro growth factors applied to the base traffic surveys were as follows:

- AM Peak = 1.1071
- PM Peak = 1.1211

Committed Developments

2.3.6 In addition to the general background traffic growth reflecting planned growth in Ashford, it was necessary to also account for recent consented developments not included within TEMPro.

2.3.7 The one committed development accounted for site specifically is the Possingham Farm development (ref: 22/00571/AS) which was a speculative application consented at appeal in 2024. The trips generated by the Possingham Farm development, which would impact the A28 corridor, have been obtained from the Transport Assessment Addendum supporting the application.

2.3.8 Furthermore, to represent the consented position in the absence of the conditioned highway improvement scheme on the A28 Chart Road Corridor, the remaining dwellings at the Chilmington Green development up to the trigger point for the delivery of a financial bond to cover the cost of the proposed mitigation, were also added to the DM scenario. The agreed trigger for the delivery of the bond is 400 units, which given 271 units were already occupied by 2023 when the baseline surveys were undertaken, required the traffic relating to a further 129 dwellings at Chilmington Green to be incorporated into the DM assessment.

2.3.9 For the 2048 DS forecast scenario, the development trips of the remaining 5350 units of the Chilmington Green development were added on top of the 2048 DM scenario.

2.3.10 The resultant forecast traffic flows for the DM and DS scenarios, shown as network flow diagrams, are provided in **Appendix B**.

3 Forecast Results and Analysis

3.1.1 This chapter compares the results of 2048 DM and 2048 DS models in terms of the following network performance indicators:

- **Latent Demand**: The number of vehicles from the input flow that were unable to enter or use the network by the end of the simulation. Essentially, it captures unmet demand due to congestion or capacity limits.
- **Average delay (s)**: The average delay experienced by each vehicle, calculated by dividing the total delay by the sum of vehicles currently in the network and those that have already arrived at their destination.
- **Average Speed (mph)**: The overall average speed of vehicles, calculated by dividing the total distance travelled by the total travel time.
- **Average Stops**: The average number of stops made by each vehicle, calculated by dividing the total number of stops by the sum of vehicles in the network and those that have already completed their journey.
- **Total Travel Time (hrs)**: The total time spent by vehicles either travelling within the network or having already exited the network.
- **Vehicle Arrivals**: The total number of vehicles that have reached their destination and left the network before the simulation ended.
- **Journey Time (s)**: The total time taken by a vehicle to travel from one point to another, including all delays and stops along the way.

3.1.2 The results discussed below present the average values of five consecutive runs, as is best practice in microsimulation modelling. These runs all have a different random seed, in this way randomising when each vehicle enters the modelled network and replicating five different days on the road network.

3.2 Study Network

3.2.1 Once all the network and demand changes described above were made, the four forecast models (DM and DS for both AM and PM peaks) were run five times and the average results of the five runs were reviewed.

3.2.2 While all network performance indicators described above were examined, the key finding of the assessment was that the consented network (existing + Possingham Farm mitigation) cannot accommodate the forecast level of demand by some significant margin. This manifests in two ways – error in the error log file mentioning where and how many vehicles could not enter, as well as the latent demand indicator as presented in the table below.

Table 3.1: Latent Demand Model Outputs

Performance Indicator	AM Peak			PM Peak		
	2048 DM	2048 DS	Diff	2048 DM	2048 DS	Diff
Latent Demand	139	2243	2104	250	3360	3110

3.2.3 The 'latent demand' output indicates the number of vehicles that cannot enter the model network within each modelled scenario. This indicates a total breakdown of the operation of the network during all modelled scenarios in 2048, even before the full CG development traffic is added to the network. The level of latent demand increases significantly in the Do Something (With full CG development) scenario compared with the Do Minimum scenario.

3.2.4 As all of the other network performance indicators discussed above account only for the characteristics and performance of the traffic that was able to get on the network, due to the level of latent demand these were not considered representative and therefore have not been reported at this stage.

3.2.5 However, to enable some more meaningful outputs to be derived, the entry links to the core network were extended sufficiently in a separate 'extended network' model to accommodate the vehicles (latent demand) unable to enter the core model network.

3.3 Extended Network

3.3.1 It should be noted that the extended network is hypothetical as it does not account for junctions and delays beyond the scope of the original study network. Nevertheless, the results of the extended network model provide a more accurate indication of the full impact of the forecast traffic demand associated with the Chilmington Green development, as identified within the application Transport Assessment.

3.3.2 As the queues in the DS models are quite long, and certain links needed to be extended for 6-7 kilometres, it was considered that the best approach would be to extend all important approach links in the network for approximately the same length. In this way, traffic from each link would reach the study network at approximately the same time, thus not influencing the performance of the network. Exit links were not changed as they did not affect the level of latent demand of the model.

3.3.3 Due to the extension of the links, the loading period was also increased to allow for vehicles to reach the study network and load it at the appropriate level before the start of the peak hours. For this reason, taking account of the additional distance and speed decisions added to the extended links, 6 more minutes were added to the 15-minute loading period, with the demand in this period respectively increased by 40%.

3.3.4 Although the latent demand was more significant in the DS scenarios, both DM and DS scenarios were run within the extended network to allow for a fair comparison between the two sets of forecast assumptions. The results and presented and discussed below.

Table 3.2: Network Performance Results – Extended Network

Performance Indicator	AM Peak				PM Peak			
	2048 DM	2048 DS	Diff	% Diff	2048 DM	2048 DS	Diff	% Diff
Latent Demand	0	0	0	-	0	0	0	-
Average Delay (secs/veh)	508	1036	528	104%	576	1188	611	106%
Average Speed (mph)	25.6	14.4	-11	-44%	23.5	12.2	-11	-48%
Average Stops (Occurrences/veh)	38	77	39	104%	38	75	37	97%
Total Travel Time (hrs)	1400	2947	1548	111%	1530	3727	2197	144%
Completed Journeys (veh)	3814	3595	-219	-6%	3894	3746	-148	-4%

3.3.5 The model indicates a considerable worsening in the network performance in the DS scenarios, with the average delay doubling in both peaks (an increase of around ten minutes). Equally, the average speed decreases by 11 mph in both peaks, a decrease of 44% and 48% for AM and PM respectively. It should be noted that this is the average cruising speed within all of the network, inclusive of the extended links and as such includes free-flow cruising on the extended links prior to queue propagation.

3.3.6 The results also indicate that the average number of stops as well as the total travel time in the network have both doubled. The majority of the additional travel time on the network is time spent on the queues, unable to reach the final destination. This is further highlighted by the vehicle arrivals. As can be seen, the number of vehicles that were able to reach their final destination within the peak hour are greater than in the DM scenarios, a further indication that the modelled network is operating over capacity.

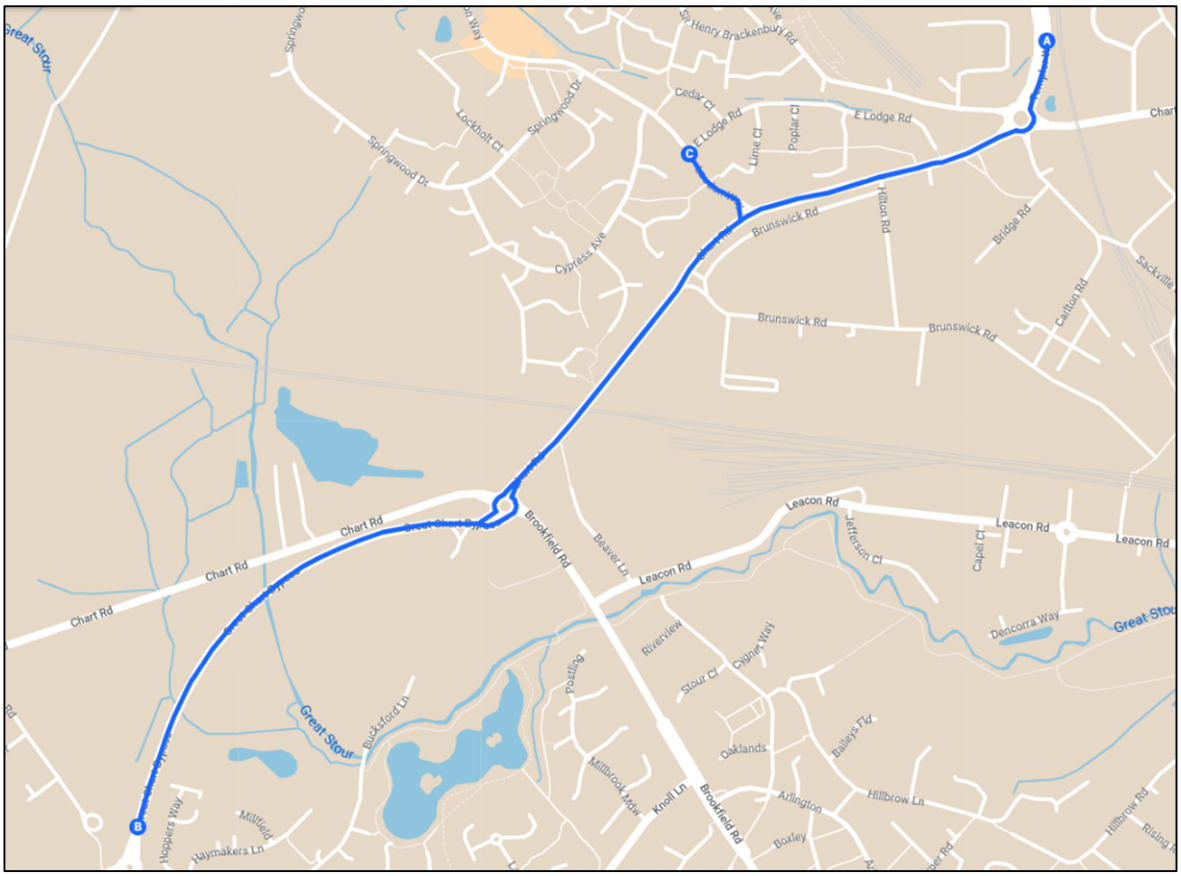
Journey Times

3.3.7 Journey time comparisons have been conducted on the same routes used for the base year model validation, with extended starts at the beginning of each link to fully capture the traffic demand in the model.

3.3.8 In total, four routes were analysed: A to B, B to A, B to C, and C to A.

3.3.9 Point A is located on Templer Way, north of Tank Roundabout; Point B is on the A28 Great Chart Bypass; and Point C is on Loudon Way, west of the Loudon Way/A28 junction. The figure below gives an indication of the routes considered, although this does not show the extended links into the network.

Figure 3.1: Journey Time Start and End Locations



3.3.10 The AM and PM journey times in seconds are summarised in the **Table 3.2** and **Table 3.3** below.

Table 3.2: AM Journey Time (seconds) Comparison

Route	DM	DS	Diff (DM – DS)	% Diff. (DM – DS)
B – A	1857	2433	576	31%
B - C	1794	2488	694	39%
C – A	537	944	407	76%
A – B	1263	1796	533	42%

3.3.11 The comparison between the DM and DS scenarios for the AM peak, as shown in the table above, indicates that journey times would be consistently longer in the DS scenario across all four routes.

Table 3.3: PM Journey Time Comparison

Route	DM	DS	Diff (DM – DS)	% Diff. (DM – DS)
B – A	1658	2348	689	42%
B - C	1527	2366	839	55%
C – A	1190	1539	350	29%
A – B	1615	2235	621	38%

3.3.12 The comparison between the DM and DS scenarios for the PM peak, as shown in the table above, again shows that journey times would be consistently longer in the DS scenario across all four routes.

4 Conclusions

4.1.1 This Forecasting Report summarises the development of 2048 forecast year models of the A28 Chart Rd corridor in Ashford, using VISSIM microsimulation modelling software. The developed forecast models represent a consented baseline (Do Minimum) and with Chilmington Green development (Do Something) to demonstrate the traffic impact of the development site on an unmitigated network. The note presents the key outputs from the models and provides a comparison between the DM and DS models where appropriate.

4.1.2 The performance of the 2048 DS scenarios indicates that a great number of vehicles will not be able to enter the study network, as the network will have reached full capacity in the DM alone.

4.1.3 A proxy extended network model was therefore developed, with simple entry link extensions, to allow all of the identified traffic demand to enter the network and enable a comparison of network performance indicators between the DM and DS scenarios.

4.1.4 The results of the microsimulation model indicate that the DS scenarios (both AM and PM peak periods) would operate substantially worse compared with the DM sceanrios, with a doubling of the average delay and almost half the average speed across the network.

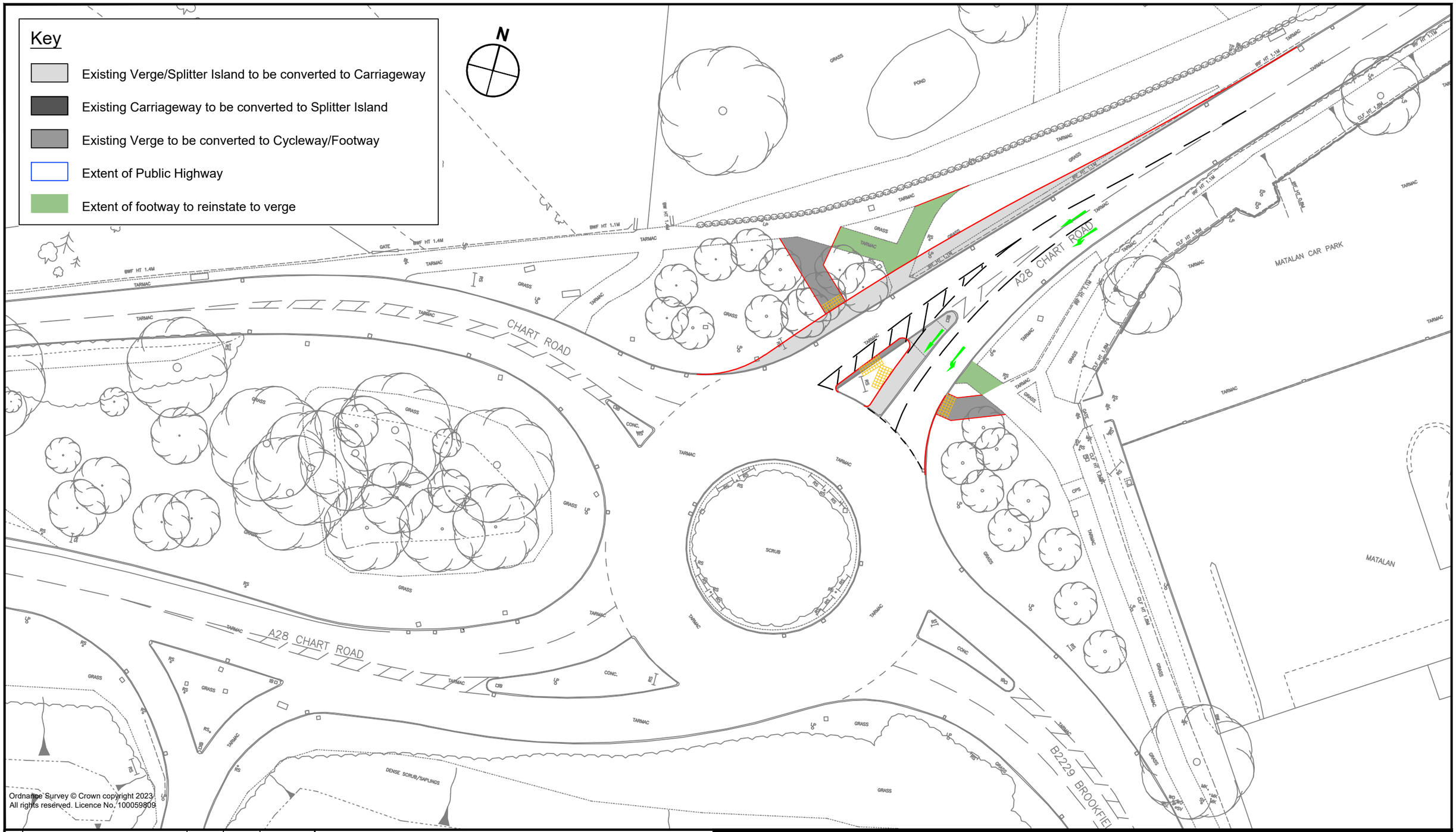
4.1.5 Journey times at the DS scenarios are also considerably worse along the main routes across the network.

4.1.6 The modelling exercise clearly indicates that comprehensive mitigation of the study corridor is required in order to accommodate the forecast demand associated with the full occupation of the Chilmington Green development.

Appendix A Committed Highway Works

Key

- Existing Verge/Splitter Island to be converted to Carriageway
- Existing Carriageway to be converted to Splitter Island
- Existing Verge to be converted to Cycleway/Footway
- Extent of Public Highway
- Extent of footway to reinstate to verge



REV.	DETAILS	DRAWN	CHECKED	DATE
A	Proposals modified on SW & NW arms.	JM	DSN	29.08.2024
B	NE A28 Entry geometry updated.	RB	ID	30.08.2024
C	NE A28 Entry geometry updated.	RB	ID	04.09.2024

INFORMATION ONLY

Notes:

1. This is not a construction drawing and is intended for illustrative purposes only.
2. White lining is indicative only.

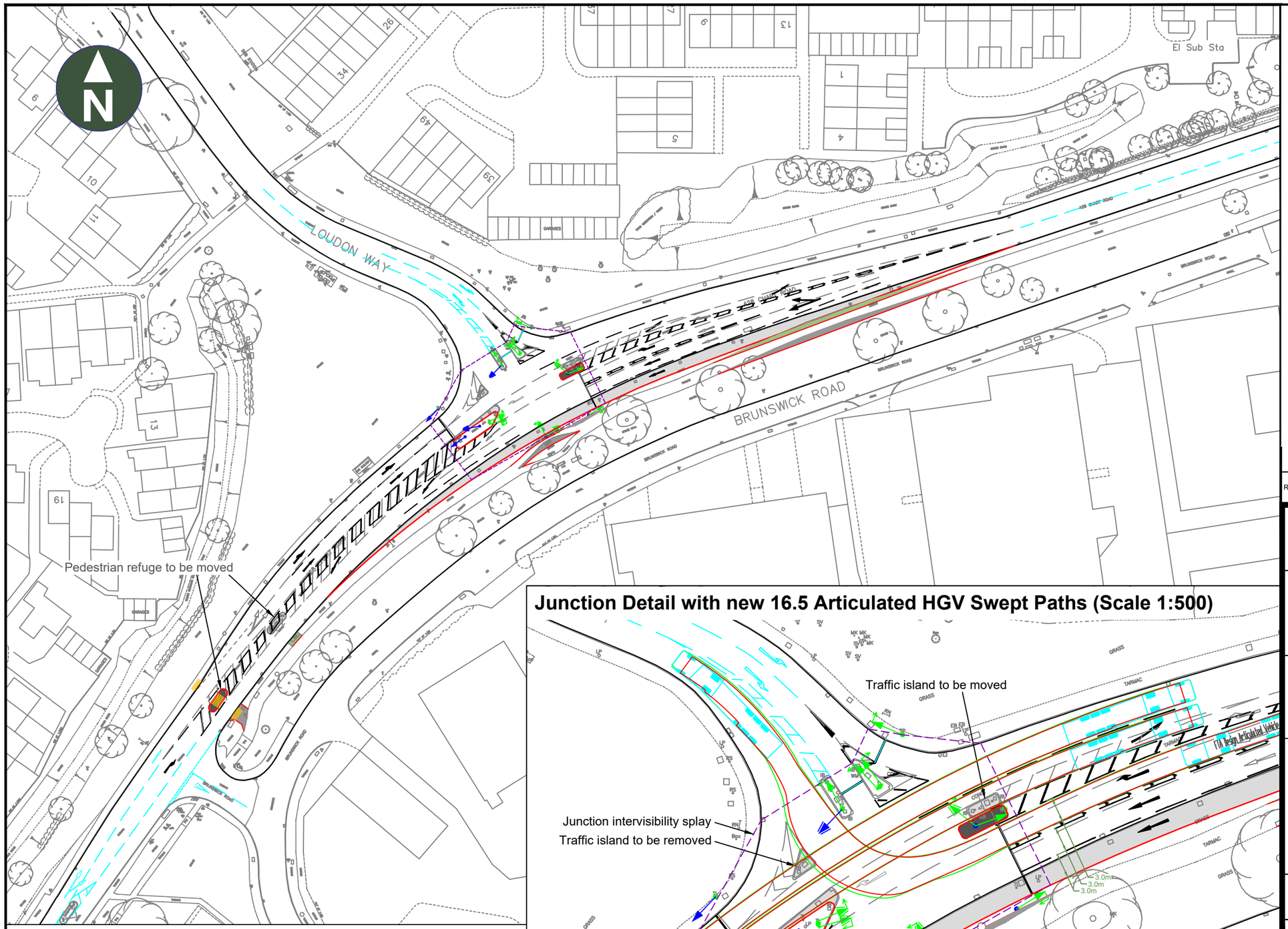
Possingham Farm

Hodson Homes

Proposed Capacity Improvements to A28/Brookfield Road Roundabout

SLR

DRAWN:	CHECKED:	DATE:	SCALES:	DRAWING NUMBER:	REVISION:
JM	ID	15.03.2024	1:500 at A3	226730/PD01	C



Junction Detail with new 16.5 Articulated HGV Swept Paths (Scale 1:500)

Signal Sequence

1	2	3
A28 Chart Road	A28 Right Turn	Loudon Way

Key

- Existing verge/footway to be carriageway construction
- Existing carriageway to have new footway construction
- Existing verge to be cycleway/footway construction
- Extent of footway to reinstate to verge
- Proposed kerblines
- Existing road marking to remain
- Proposed road marking
- Existing signals to be retained
- Proposed new traffic signal equipment

REV.	DETAILS	DRAWN	CHECKED	DATE

STATUS:
INFORMATION ONLY

CLIENT:
Hodson Homes

PROJECT:
Possingham Farm

DRAWING TITLE:
A28 Chart Rd / Loudon Way
Junction Improvement
Preliminary Design

SCALES:
1:1000 at A3

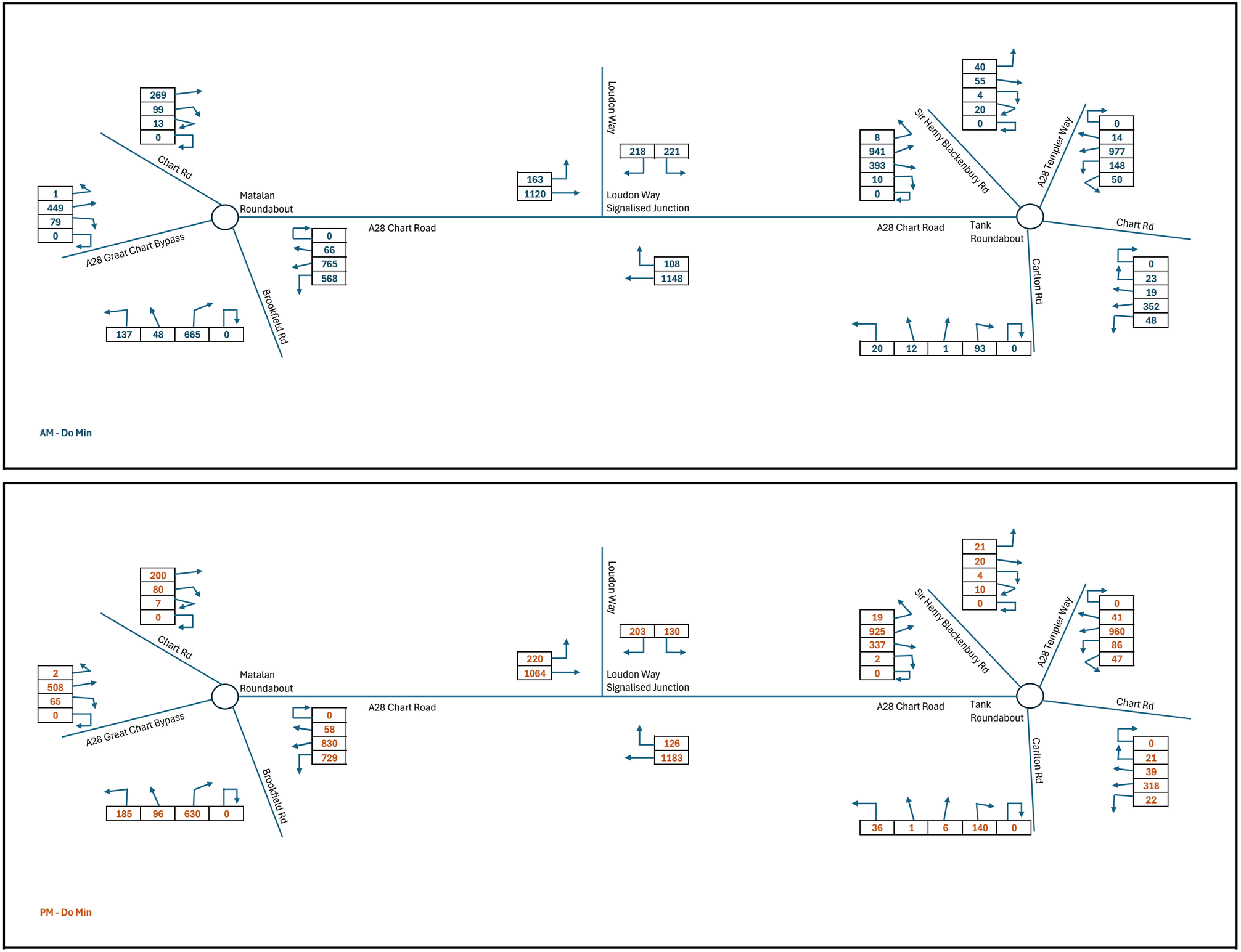
DRAWN:	CHECKED:	DATE:
RB	ID	28.08.24

SLR

DRAWING NUMBER: 226730/PD02

REVISION: -

Appendix B Forecast Traffic Flows


269
99
13
0
Chart Rd
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449
79
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A28 Great Chart Bypass
137
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665
0
Brookfield Rd
Matalan
Roundabout
0
66
765
568
A28 Chart Road
163
1120
Loudon Way
218
221
Loudon Way
Signalised Junction
108
1148
40
55
4
20
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Sir Henry Blackenbury Rd
8
941
393
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Tank
Roundabout
A28 Templer Way
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Chart Rd
Carlton Rd
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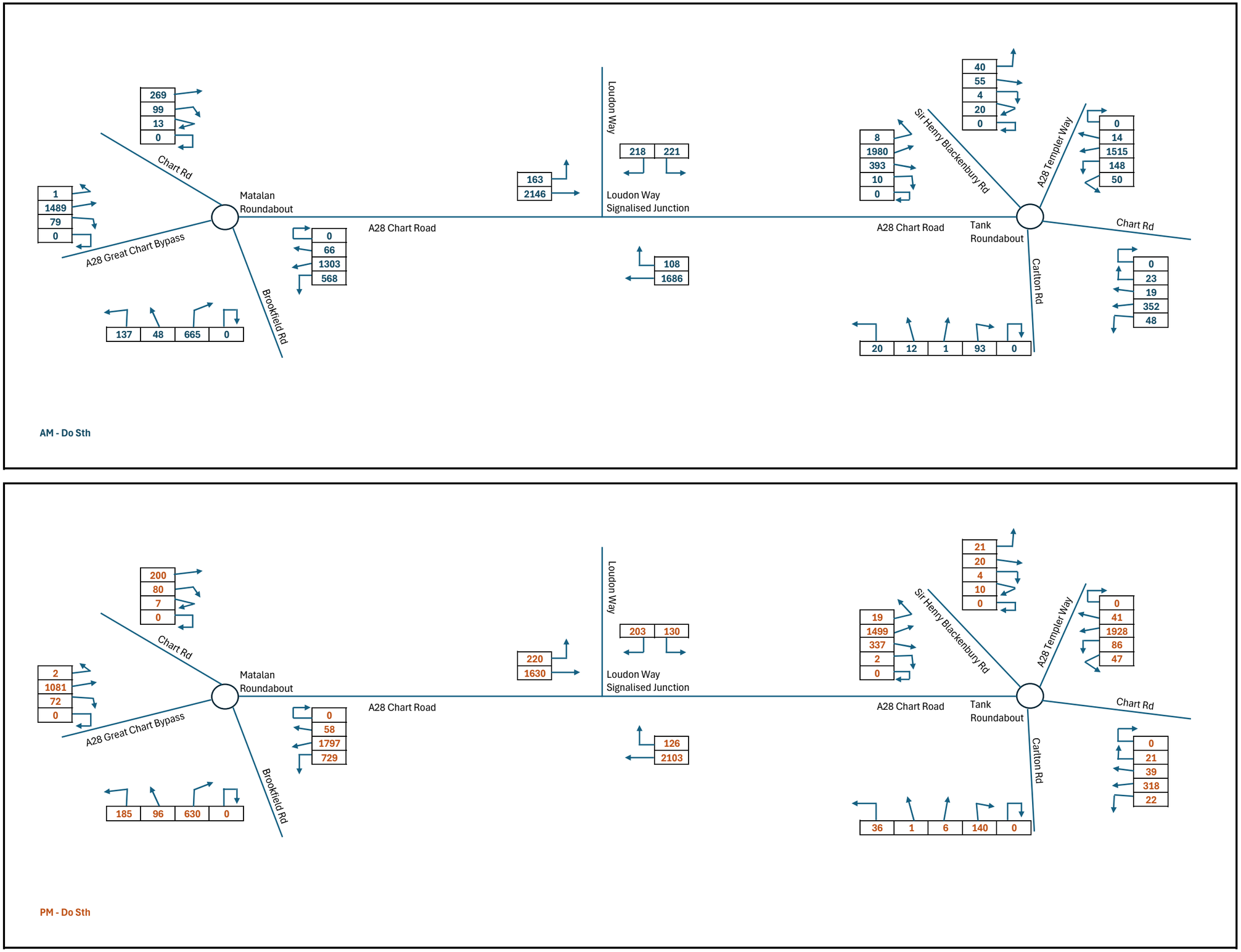
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PM - Do Sth