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## INTRODUCTION

- 14.1 This chapter of the EIAR provides an assessment of the current and forecast traffic generation arising at the existing Kilsaran quarry development at Kilrainy and Kilrathmurry near Clonard.
- 14.2 This chapter evaluates the relative influence of development generated traffic arising and the impact upon the capacity and operation of the receiving road network. The study examines site infrastructure and access arrangements serving the existing development site located in the townlands of Kilrainy and Kilrathmurry, Co. Kildare.
- 14.3 This chapter of the EIAR was prepared by Julian Keenan, a Director of Trafficwise Ltd. Julian Keenan has over thirty years engineering experience including approximately seven years in Local Government in the UK and over 23 years of private engineering consultancy services in Ireland. Holding a principal degree in Civil Engineering from UCG, Mr. Keenan has specialised in Roads Design and Traffic & Transportation Planning for approximately 25 years. Consultancy experience includes advising clients in relation road schemes, residential, commercial, industrial and leisure developments for which the key work involves the provision of professional services in the design and appraisal of schemes including the preparation of planning applications and appeals. Mr. Keenan has represented clients at An Bord Pleanála oral hearings for commercial development and strategic infrastructure development and has represented landowners and stakeholders and Local Authorities in relation to various road schemes and infrastructural works. He has given sworn evidence before the Property Arbitrator and has provided expert witness testimony in the High Court.

## TRAFFIC STUDY METHODOLOGY

- 14.4 Based upon weighbridge records for 2019 (pre-pandemic) and weighbridge records for 2022 (post-pandemic) together with vehicle records and statistics relating to this and other similar sites operated by Kilsaran, this chapter provides a review of traffic generation rates for various traffic streams arising from the current permitted and the future proposed development. The 2019 and 2022 records are considered the latest available records that depict 'normal' operations at the quarry, as 2020 and 2021 were subject to periods of Covid lockdown.
- 14.5 Classified turning count surveys undertaken on the receiving road network identify baseline traffic conditions. The traffic surveys were carried out by Traffinomics Ltd. (formerly Abacus Transportation Surveys). In the interest of a comprehensive appraisal of the receiving road traffic characteristics the report provides an assessment of the traffic flow variations recorded on the receiving roads network that includes the current haul routes to the existing development at Kilrainy and Kilrathmurry. Notwithstanding the potential occasional need for deliveries to local construction projects the current haul route is principally Local Road L5002/L5001 to the north of the site which connects to Regional Road R148 (former N4 National Primary Route).
- 14.6 This chapter provides an evaluation of the potential traffic generation of the permitted development at the existing site and this is compared with the detailed weighbridge records of operations during 2019 and 2022 and compared with the forecast potential traffic scenario arising from the proposed development; all assessment scenarios consider the site operating at rates of material extraction, processing and manufacture that are directly comparable .
- 14.7 This chapter identifies how past, existing and future traffic associated with the development is accommodated on the receiving local road network. Where considered appropriate, measures are discussed regarding the management of traffic generated by the proposed development together with local signing improvements, road improvements and general road maintenance.

- 14.8 The advice to local authorities in Spatial Planning and National Roads (Guidelines for Planning Authorities - January 2012), Chapter 3, 'Development Management and Roads' is to make sure that development located close to national roads and their junctions can be catered for by the design assumptions underpinning such roads and junctions thereby avoiding potentially compromising the capacity and efficiency of the national road. The assessments provided in this traffic study show that the traffic generated by the proposed development will not give rise to a premature or unacceptable reduction in the level of service available to road users on national roads or their junctions in the vicinity of the existing development.
- 14.9 The guidance documents and following legislation and standards were taken into consideration in the preparation of this chapter.
- EPA (2002) Guidelines on the Information to be Contained in Environmental Impact Statements;
  - EPA (2003) Advice Notes on Current Practice in the Preparation of Environmental Impact Statements;
  - Kildare County Development Plan 2023-2029;
  - Department of Transport, Tourism and Sport (2019) 'Traffic Signs Manual';
  - Transport Infrastructure Ireland (TII) (2014) PE-PDV-02045 'Traffic and Transport Assessment Guidelines', referred to hereafter as the TTA Guidelines;
  - TII (2016) PE-PAG-02039 Project Appraisal Guidelines for National Roads 'Unit 16.1 – Expansion Factors for Short Period Traffic Counts';
  - TII (2021) PE-PAG-02017 Project Appraisal Guidelines for National Roads 'Unit 5.3 – Travel Demand Projections';
  - TII (2016) PE-PAG-02016 Project Appraisal Guidelines for National Roads 'Unit 5.2 – Data Collection';
  - TII (2023) 'Rural Road Link Design' DN-GEO-03031;
  - TII (2023) 'Geometric Design of Junctions' (priority junctions, direct accesses, roundabouts, grade separated and compact grade separated junctions) DN-GEO-03060; and
  - Other relevant TII Publications (Standards).

### Threshold Approach for a Traffic and Transport Assessment

- 14.10 In Ireland, a Traffic and Transport Statement (TTS) must accompany all planning applications for developments that could potentially act as traffic generators. A Traffic and Transport Statement is a brief outline of the transport requirements for the development and is used as a first step to identify the likely impact of any development. The Traffic and Transport Statement is also used to determine if further, more detailed traffic modelling analysis is required to evaluate potential impact upon the capacity of links and junctions on the receiving road network.
- 14.11 An in-depth analysis of the impact of a development in terms of traffic is carried out through the preparation of a Traffic and Transport Assessment (TTA). TII-PE-PDV-02045 'Traffic and Transport Assessment Guidelines' recommend the following thresholds for undertaking a TTA:

“Applications that exceed any of the following thresholds will be required to produce full TTAs, in addition to completing a TTS. The TTS should summarise the findings of the TTA and briefly outline the mitigating measures proposed by the developer or agent:

- Industry GFA in excess of 5,000 sq.m

- Distribution and Warehousing GFA in excess of 10,000 sq.m
- 100 trips (in/out combined) in the peak hour
- Development traffic exceeds 10% of two-way traffic flow on adjoining road
- Development traffic exceeds 5% of two-way traffic flow on adjoining road if congestive or sensitive
- 100 on-site parking spaces”

14.12 In accordance with the above guidance the scope of this assessment includes locations on the local roads network considered as having the ‘potential’ to experience traffic flow fluctuations of between +5% and +10% based upon the potential traffic generation of the site if operating at the its respective existing and proposed potential capacity.

## EXISTING ENVIRONMENT

### Site Location

14.13 The existing development is located in the townlands of Kilrainy and Kilrathmurry, Co. Kildare. The site is located 7.5 km north of Edenderry, 12 km west of Enfield, 8 km southeast of Kinnegad and approximately 4 km to the south of Clonard (5 km by road) and approximately 3 km to the south of the R148 Regional Road. The area can generally be considered rural in nature where there is a dispersed mix of single dwelling houses and farms. Some commercial and industrial sites are located adjacent to the R148 on the outskirts of Clonard. The site is accessed directly from Local Road L5002 which forms part of the north-western boundary of the site. The site is generally set within an agrarian landscape and is bounded by mature hedgerow and farmlands. The L5002 road frontage boundary of the existing site is characterised by dense hedgerow with palisade fencing at the existing splayed entrance.

### Existing Site Access

14.14 The site is accessed from the L5002 local road by an existing established entrance, on the western boundary of the application site. The site is located approximately 3.5km south of the L5001 local road junction with the R148 close to Leinster Bridge. The L5002 road, which serves the site, runs from its junction with the L5001 to the north of the site to where it meets the R401 regional road c. 1.5km southwest of the site entrance. The R401 is the regional road linking the towns of Kinnegad and Edenderry.

14.15 Access to the national road network is via the L5002 and L5001 local roads leading north from the site entrance to the R148 from which the M4 motorway is accessed via Junction 10 (eastbound) or Junction 12 (westbound) at Kinnegad in the west or via Junction 9 (eastbound & westbound) at Enfield. The greater Dublin area is accessible along the M4 from M4 Junction 9 and 10, the west is accessible via M4 Junction 12 heading towards Mullingar (M4) and Athlone (M6), heading west.

14.16 The site entrance was widened previously and consists of a splayed entrance with concrete pillars and metal fencing and gates. The entrance is set-back from the edge of the public road. The L5002/L5001 local roads from the existing site entrance to the R148 regional road were previously widened by the applicant at their expense, from an average carriageway width of c. 3.7 m to c. 6.2m to facilitate the safe passing of HGV vehicles along this designated section of the haulage route.

## Overview of Existing Development

14.17 The existing quarry site is described fully in EIAR Chapter 2 'Project Description' with details of the existing site layout shown in EIAR Chapter 2, **Figure 2-1**. The planning application covers an area of approximately 51.7 hectares.

### Sand and Gravel Pit

14.18 Within the sand and gravel pit area, aggregates of various sizes are produced using processing plants which crush, wash and screen the raw excavated materials. Silt disposal lagoons are located within the working area along the southern boundary. Processed stockpiles of aggregates that are awaiting use in the concrete batching plant or haulage off-site are located in the centre of the site along with the wheelwash, weighbridge and staff facilities.

14.19 Planning permission was granted under Kildare County Council Ref. No. **97/1731** and **03/2754 (PL09.209480)** for sand and gravel extraction.

- **97/1731** sand and gravel extraction – granted 30 December 1998 by Kildare County Council, subject to 31 conditions. This permission allowed a total of 5 years operation and provided for a maximum output of 90,000 tonnes / annum.
- **03/2754** extension to sand and gravel extraction area and processing (crushing, washing, screening), concrete, expansion of output to 250,000 tonnes per annum. Notification of a decision to grant was issued by Kildare County Council (KCC) on 6 October 2004. A third-party appeal was made on the notification of the KCC decision (**PL09.209480**), with a decision to grant issued by An Bord Pleanála dated 27 June 2005. This permission will expire in January 2024.

### Quarry

14.20 The quarry area occupies a low hill, rising to c. 120m AOD, and is located immediately east of the sand and gravel pit through which access to the quarry is gained from the main site entrance. The existing sand and gravel site facilities (i.e., office, weighbridge, wheelwash, canteen, toilets and effluent treatment system) also serve the existing quarry personnel.

14.21 Planning permission was granted under Kildare County Council Ref. No. **99/2042 (PL09.123207)** for quarrying which the continued use was extended under Ref. No. **16/1246**.

- **99/2042** permission for a quarry development over 13.2ha in the townland of Kilrainy. Other aspects of the development included drilling, blasting, crushing and screening of rock; the provision of an effluent treatment system; the utilisation of the existing access via existing S&G pit, and full site restoration.
- A notification decision to grant was issued by Kildare County Council in December 2000. A third-party appeal was made on the decision (**PL09.123207**), with a decision to grant issued by An Bord Pleanála dated 13 February 2002. This permission was for a 15-year duration which was to expire on the 12 February 2017.
- **16/1246** In accordance with Section 42 of the Planning and Development Act, 2000 (as amended), an extension of duration for 5 no. additional years of operation within existing footprint was granted. The existing permission was due to expire on the 12 February 2022 but was extended by 56 days during the Covid-19 pandemic.

14.22 The existing development site has a permitted output of c. 360,000 tonnes per annum, currently split between the quarry output of c. 110,000 tonnes and the sand and gravel pit output of c. 250,000 tonnes.

- 14.23 Manufacturing facilities currently in operation at the site include a concrete manufacturing facility (readymix). Ancillary facilities at the quarry include the office, weighbridge, canteen, toilets and bunded fuel storage areas.
- 14.24 Readymix concrete trucks, aggregate haulage trucks and cement tankers have been associated with transporting and delivering materials to and from the existing facility since after 2004 when planning permissions for extraction of materials and manufacture of value-added products at Kilrathmurry Sand and Gravel Pit were granted under Kildare County Council Planning Ref. No. **03/2754 (PL09.209480)**.
- 14.25 Traffic surveys show that traffic using the local road network in the area is predominately composed of private cars accessing one-off housing and local amenities although there is a very modest background HGV content. Traffic volumes on the receiving road network serving the quarry are considered relatively light.

### Receiving Road Network

- 14.26 The existing development in the townlands of Kilrainy and Kilrathmurry is an operational sand and gravel pit and a now dormant quarry accessed by a combined entrance which is located on Local Road L5002 approximately 3 kilometres south of the junction of L5001 with Regional Road R148, which junction is located approximately 220m east of the Boyne River (County Boundary Kildare/Meath) and approx. 0.5 kilometres north of the M4 mainline carriageway. The existing site enjoys frontage along the Local Road L5002 and direct vehicular access via an approved single simple priority entrance located on the eastern side of the road. For the transport of aggregates the existing site is exclusively serviced from R148 with all vehicles turning right out of the site. In the case of local supply a small number of readymix concrete trucks use the L5002 to the south of the site.
- 14.27 Local Road L5002/L5001 between the site and R148 is a single lane carriageway. The metalled carriageway surface varies in width measuring approximately 6m over the primary haul route to the R148. Accommodating a verge varying in width up to 4m on either side, save for in the vicinity of the M4 overbridge there are generally no centreline road markings but there are road edge markings as is typical of the regional road network. The road is subject to a posted speed limit of 80kph.
- 14.28 The haul route was widened as part of the grant of planning permission under Kildare County Council Ref. No. **97/1731** and confirmed under subsequent permissions Ref. Nos. **03/2754** and **99/2042 (PL09.123207)**. The following **Table 14-1** provides road and roadway cross-sectional measurements at intervals of 200m between the existing site access and R148.

**Table 14-1**  
**Haul Road L5002/5001 Cross-section Measurements**

CHAINAGE	VERGE East	ROAD	VERGE West	CHAINAGE	VERGE East	ROAD	VERGE West
0m	1.0m	6.0m	0.7m	1800m	0.0m	6.5m	0.5m
200m	1.2m	6.5m	1.3m	2000m	1.1m	6.6m	0.8m
400m	1.2m	6.3m	1.0m	2200m	0.7m	6.6m	1.1m
600m	2.0m	6.5m	1.5m	2400m	0.0m	6.0m	0.5m
800m	2.0m	6.1m	1.6m	2600m	2.0m	6.6m	1.4m
1000m	1.0m	6.5m	1.0m	2800m	0.7m	6.0m	0.9m

CHAINAGE	VERGE East	ROAD	VERGE West	CHAINAGE	VERGE East	ROAD	VERGE West
1200m	4.0m	6.5m	1.0m	3000m	1.0m	6.0m	0.5m
1400m	2.0m	5.7m	0.6m	3200m	0.1m	5.8m	0.9m
1600m	0.6m	5.7m	0.6m	3400m	0.5m	6.0m	1.0m
<b>Average</b>	<b>1.2m</b>	<b>6.2m</b>	<b>0.9m</b>				

- 14.29 The road surface of the haul route L5002/L5001 is general considered to be in a good state of repair. It is noted that the carriageway in the vicinity of the existing site access and to the west was observed to be in a good state of repair relative to the general condition of the entire haul route to R148. The carriageway locally shows no significant signs of serious structural defects and there is no evidence of variable edge settlement. Traffic surveys show that the predominant flow of traffic from the existing development is to and from the north of the site.
- 14.30 The character of the area is rural. The L5002 and L5001 haul road is relatively straight and the site access is located on a straight and level section of the road. The splayed existing entrance is flanked by palisade fencing. The overall quarry site has a road frontage of approximately 500m along which there are no footways. The verges either side of the access are generally narrow with vegetation extending to the road edge in many places.

### Traffic Surveys

- 14.31 In establishing the scope of the study it was estimated that the influence of traffic generated by the proposed development was not likely to be significant beyond the immediate haul route serving the site. In the interest of a comprehensive assessment of traffic patterns on the local roads network in the vicinity of the proposed development classified traffic turning count surveys have been commissioned at the entrance to the existing site and at the R148/L5001 junction to the north. Further survey data collection also includes a 7-day automatic traffic counter (ATC) survey to the north of the exiting site access on the haul route to R148. The manual traffic surveys were carried out by Traffinomics Ltd. during school term on Tuesday 18-Nov-2021 and covered the period 07:00-19:00hrs. The survey data is aged 18 months. Traffic data collected within 2 years of an assessment is generally considered contemporary and thus satisfactory for the purposes of traffic analysis. This is especially so in the context of the location of the proposed development which is unlikely to have experienced significant network traffic growth since the traffic surveys were conducted.
- 14.32 The week-long ATC survey commenced at midnight on Wednesday 17-Nov-2021. A copy of the base survey data including location mapping is provided in **Appendix 14-1** and the listed site references are as follows:
  - Site 1 R148/L5001 Priority T-junction
  - Site 2 L5001 Kilsaran Site Access T-junction
- 14.33 The Covid-19 Pandemic measures did not include for travel restrictions during the traffic surveys. TII traffic statistics for the M4 motorway show that by the end of 2021 ordinary traffic characteristics had returned to what was considered pre-Covid levels. In order to confirm what, if any potential effect the pandemic might have had, the 5-day moving average traffic flow statistics for the M4 Motorway have been referenced. The traffic surveys were undertaken in mid-November. Comparing the traffic flow statistics for the same week in 2019 as the week of the survey in 2021 confirms that the surveyed flows are close to pre-pandemic values. The statistics show that car traffic during the

traffic surveys in 2021 is 4% lower than in 2019 whilst HGV traffic is practically the same. Normal daily network traffic flows are accepted to fluctuate day to day by as much as  $\pm 10\%$  so the difference of 4% in car traffic could reasonably be accounted for in ordinary daily fluctuations accordingly no specific correction or factoring of the survey is thought necessary to account for the possible effects of Covid. Ordinarily the local road network in rural areas does not experience significant annual growth and on that basis and on the basis of this assessment against TII records, the November 2021 traffic data is considered contemporary and valid for use in this assessment.

14.34 Based upon the characteristics of the traffic flows and trends on M4 Motorway the survey data is considered a valid baseline for the purposes of the assessments provided in this chapter. **Appendix 14-2**, Figures 1 through 4 show in network flow diagram format the surveyed local roads traffic flows and identifies separately that portion of traffic generated at the existing development. **Appendix 14-2** shows the following:

- Figure 1 Daily Network Traffic Flows (07:00-19:00hrs)
- Figure 2 Morning Peak Hour Network Traffic Flows (08:00-09:00hrs)
- Figure 3 Evening Peak Hour Network Traffic Flows (17:00-18:00hrs)
- Figure 4 Development Peak Hour Network Traffic Flows (09:00-10:00hrs)

14.35 As is standard industry practice, the surveys were carried out on a 'neutral' day of the week. Generally, traffic flows manifest on a neutral day are considered more likely to be representative of typical weekday traffic conditions on the local roads network. Based upon inspection of weighbridge data for 2019 and 2022 the traffic flows manifest in the traffic surveys in the month of November 2021 are representative of above average traffic generation at the quarry for that time of year. Examination of 2019 weighbridge data by month shows an average daily HGV trip generation in the order of 70 and a maximum of 85 trips. The weighbridge data for 2022 shows a monthly average of 50 and a maximum of 87 trips.

14.36 As is the commercial and demand driven nature of quarrying, the day of the traffic survey in November 2021 was during a particularly intensive period when the quarry was supplying aggregate for the construction of a windfarm in Offaly. These figures are borne out in the ATC data which shows elevated HGV traffic generation in the week commencing 15-Nov-2021 with a return to average HGV trip generation in the week commencing 22-Nov-2021. In the interest of a comprehensive assessment **Appendix 14-2** also includes network flow diagrams that show the typical average and upper value site traffic generation for which the HGV flows as derived from the 2019 weighbridge data and light vehicle traffic as derived from the 2021 surveys. HGV traffic generation in 2019 is higher than manifest in 2022. From examination of the 2019 and 2022 weighbridge records of HGV trip generation it is considered that the 2019 weighbridge records are likely a better forecast or model of the traffic characteristics of the existing development operating close to the levels of extraction and production currently permitted. Both the 2019 and 2022 sets of data analyses are carried through for comparison but it is the 2019 data that underpins the various calculations. **Appendix 14-2** shows the following:

- Figure 5 Daily Average Traffic Generation
- Figure 6 Daily Upper Value Traffic Generation

### Network Traffic Flows – L5002

14.37 Based upon the ATC survey data on L5002 north of the existing development access the average total two-way 24 hr weekday traffic flow recorded for the week commencing 22-Nov-2021 was 581 vehicles, of which 288 travelled northbound and 293 travelled southbound. Of those 288 northbound vehicles 210 were light vehicles made up of cars and vans whilst 78 were HGV primarily



arising at the development site. Of those southbound vehicles 216 were light vehicles whilst 78 were HGV again practically all HGV having a destination at the existing development. The HGV content of the traffic flow on L5002 in the absence of the development would be in the order of 0.5%. **Appendix 14-2** sets out in network flow diagram format the surveyed daily and peak hour traffic flows in the study area.

- 14.38 The morning and evening peak hour periods for general network traffic flow on the L5002 north of the site were recorded in the traffic survey as being 07:30-08:30hrs and 16:45-17:45hrs respectively whilst the peak hour for traffic generation at the existing quarry site was recorded as 09:00-10:00hrs.
- 14.39 The ATC count surveys for the week commencing 22-Nov-2021 recorded an average morning peak hour traffic flow on the L5002 north of the site in the period 08:00-09:00hrs and comprised 18 cars and 8 HGV northbound together with 20 cars and 6 HGV southbound. Reference **Appendix 14-2** Figures 2 for a network diagram of the morning peak hour traffic flows recorded in the turning count survey of 18-Nov-2021.
- 14.40 The ATC count surveys for the week commencing 22-Nov-2021 recorded an average development peak hour traffic flow on the L5002 north of the site in the period 09:00-10:00hrs and comprised 14 cars and 12 HGV northbound with 9 cars and 10 HGV southbound. Reference **Appendix 14-2** Figures 5 and 6 for development daily traffic flows in network flow diagram format.
- 14.41 The ATC count surveys for the week commencing 22-Nov-2021 recorded an average evening peak hour traffic flows on the L5002 north of the site in the period 17:00-18:00hrs and comprised 23 cars and 0 HGV northbound together with 21 cars and 4 HGV southbound. Reference **Appendix 14-2** Figure 4 for a network flow diagram of the evening peak hour traffic flows recorded in the turning count survey of 18-Nov-2021.

#### *Existing Site – Surveyed Traffic Generation (18-Nov-2021)*

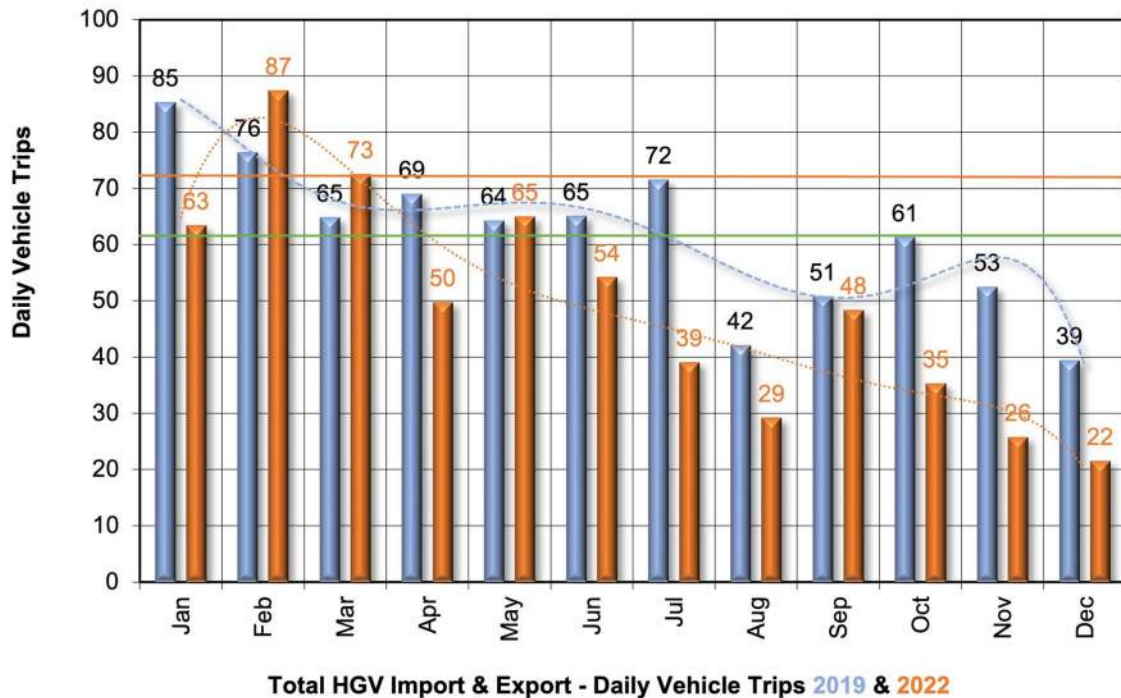
- 14.42 Based upon survey data for Site 2 (Existing Kilsaran Access) the total number of vehicle trips (a trip includes for the inbound and outbound movement i.e. 1 Trip = 2 Movements) between 07:00 and 19:00hrs on the day of the survey (18-Nov-2021) was 11 cars and 118 HGV. **Appendix 14-2** Figure 1 for daily traffic flows. A review of weighbridge records for the site and cross-reference with the 7-day ATC survey confirms that traffic generation on the day of the turning count was unusually elevated. The reason for the increased activity at the site was a contract requiring the delivery of aggregates for the construction of a windfarm development in Co. Offaly. **Appendix 14-2** Figure 5 and 6 are based upon assessment of weighbridge data for 2019 and confirm that the average daily traffic generation is 70 HGV trips per day whilst the typical upper value is 85 HGV trips per day. Weighbridge data for 2022 shows a reduced level of activity where the average daily traffic generation is 50 HGV trips per day whilst the typical upper value is 87 HGV trips per day.
- 14.43 Bearing in mind the temporal uplift in trip generation during the turning count surveys the recorded morning peak hour site traffic generation in the period 08:00-09:00hrs comprised 3 cars and 13 HGV movements inbound and 1 car and 15 HGV movements outbound.
- 14.44 The development peak hour site traffic generation in the period 09:00-10:00hrs comprised 1 car and 19 HGV movements inbound together with 1 car and 14 HGV movements outbound.
- 14.45 The evening peak hour site traffic generation in the period 17:00-18:00hrs comprised 1 car and 1 HGV movement inbound together with 13 cars and 1 HGV movement outbound.

#### *Calibration/Validation of Surveyed Traffic Generation (18-Nov-2021)*

- 14.46 The weighbridge records and delivery dockets for the years 2019 and 2022 have been examined in order to calibrate or validate the traffic survey data. The following **Figure 14-1** is a graph of the surveyed total HGV traffic generation of the existing site set against the recorded traffic flows.

- 14.47 The data comprises all HGV traffic movements including those transporting aggregates and readymix concrete from the site and HGV delivering cement for use in the onsite manufacture of the value-added product. The figures are based upon the average daily traffic flow recorded each month. The blue columns show 2019 data whilst the orange columns summarise the 2022 statistics. The dotted blue line shows the polynomial average monthly HGV traffic generation over the course of 2019 and the dotted orange line shows the corresponding data for 2022. The 'red' line indicates the results of the 2019 weighbridge assessment and shows the 85<sup>th</sup> percentile traffic generation rate often used as the upper value figure in the assessment of road network capacity and junction analyses, the 'green' line shows the average traffic generation of the site. The 85<sup>th</sup> percentile or upper value traffic generation is 73 trips per day (68 in 2022), the average daily traffic generation is 62 trips per day (50 in 2022). The typical maximum by month is 85 trips per day (87 in 2022).
- 14.48 The classified turning count survey data is representative of traffic generation which is significantly higher than the typical average for the reasons set out above. In the forecast of future traffic flows these factors are taken into account in the traffic analyses where average annual daily generated traffic flows and upper values are derived from the long-term weighbridge data of 2019 and are calculated by first principles and comparison based upon the proposed operational volumes of material and product transported.

Figure 14-1  
Total Daily HGV Generation at Existing Site 2019 & 2022



- 14.49 Figure 1 of **Appendix 14-2** shows separately the surveyed quarry generated traffic flows arising on the local roads network. The annual average and upper value daily HGV traffic generation of the site as derived from the 2019 weighbridge records are provided in **Appendix 14-2** Figures 5 and 6 respectively.

### Existing Permitted Development Traffic Characteristics

- 14.50 The rate of extraction of aggregates previously permitted is 360,000t per annum (250,000t sand and gravel and 110,000t stone). The volume of value-added product that can be derived from the

extracted materials 30,000m<sup>3</sup> of readymix. From the total volume of aggregates extracted at the development a certain proportion is exported directly and a portion is used on-site to produce readymix concrete.

- 14.51 It can be appreciated that the generation of HGV and the volume of product transported by each vehicle leaving the site is not only product dependent but is commercially driven.
- 14.52 The development provides aggregates and stone derived products for building. Product is delivered to a broad spectrum of construction projects in correspondingly diverse quantities. Product is delivered in the quantity prescribed by the various purchasers and clients. There are projects which by their nature may require many loads and logistical efficiency is typically the objective in those cases. Such efficiency is achieved by ensuring that in the case of multiple loads as many as practicable are full loads. Equally there are smaller deliveries arising from specific demands relating to finite activities on larger sites or simply arising on smaller jobs or works such as house extensions.

*Product Transportation Statistics*

- 14.53 Based upon an assessment of weighbridge data the haulage of aggregate from the site does not typically occur all in full loads. Over the course of 2019 the average payload of vehicles leaving the site with aggregates was recorded as 22.5 tonnes, the average recorded in 2022 is consistent with this figure. The aggregate transportation vehicles in the Kilsaran fleet are predominantly the eight-wheeler and articulated types. The concrete wagons in the Kilsaran fleet are predominantly rigid vehicles with a maximum payload of 8m<sup>3</sup>. Articulated concrete wagons in the fleet have a maximum payload of 10m<sup>3</sup>. The average payload of concrete wagons leaving the site with product over the course of 2019 was 6m<sup>3</sup> with a similar value in 2022. The import of materials to the site includes for the constituents of products that cannot be won directly on site. In the case of concrete production this includes cement, fine aggregates and some additives. Based upon an assessment of weighbridge data the haulage of materials to the site is typically in full loads. The average payload of vehicles hauling cement to the site was 31 tonnes. The annual average daily generation rate for vehicles importing cement is <1 HGV trip per day. The following **Table 14-2** provides a summary of the vehicle types.

**Table 14-2**  
**Existing Haulage Vehicle Types**

ACTIVITY	PRINCIPLE VEHICLE TYPE	GROSS WEIGHT	NO. OF AXLES	OTHER VEHICLE TYPE	GROSS WEIGHT	NO. OF AXLES
Aggregates Haulage	Articulated Trailer	40t	5	Rigid Truck	32t	4
Concrete Export	Concrete Mixer	32t	4	Rigid Truck	36t	5
Cement Import	Articulated Tanker	40t	5	Articulated Concrete Mixer	40t	5

*Existing Development Traffic Generation*

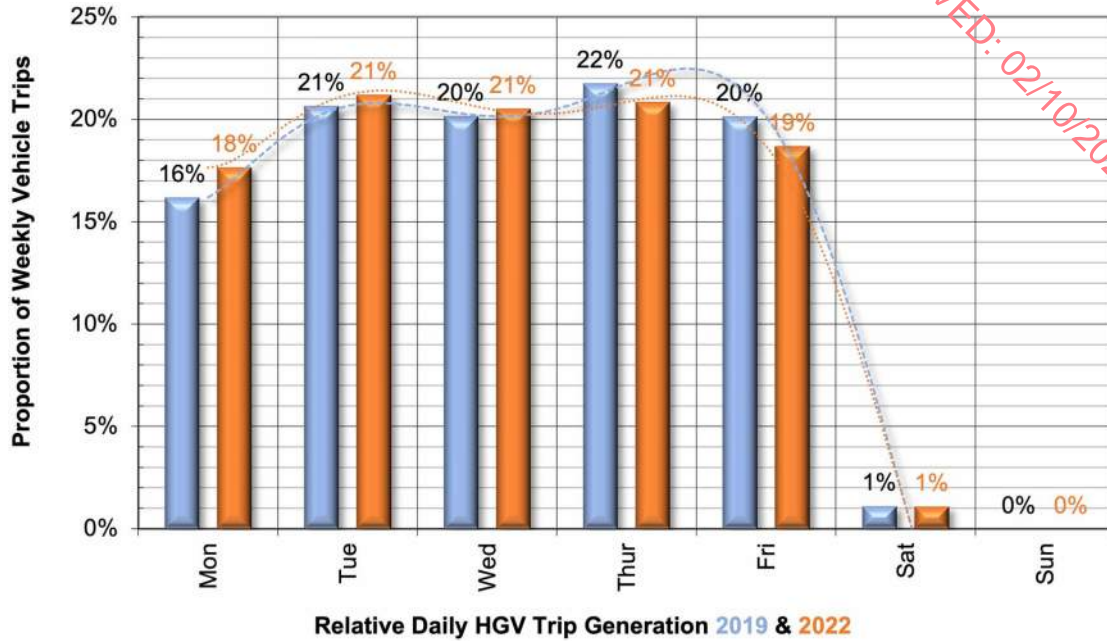
- 14.54 The following **Table 14-3** is based upon the above recorded weighbridge statistics for 2019 and 2022 and provides a summary of the potential traffic movements generated by the development set against the permitted annual rate of extraction of materials. The figures are based upon the empirically derived relationship that 1m<sup>3</sup> of readymix concrete requires 1.9t of aggregate. As a cross-check of relative quantities readymix concrete generally requires approximately 0.32t of cement per 1m<sup>3</sup>. The development site does not operate during Christmas or Easter or during the builder’s

holiday or on bank holidays or the Saturday preceding a bank holiday. The site is permitted to be operated on Saturdays but weighbridge records show that the site does not generate traffic every Saturday. Counting as a half day those Saturdays when the site was operational, the site was operational for 268 days during 2019. Counting only Monday – Friday the site is operational for 245 days per annum. The following calculations are based upon the conservative estimate of an equivalent 250 working days per annum which is based on the assumption that Saturdays equate to 20% of the typical daily rate of aggregate extraction and concrete production and that the site does not operate on the Saturday of a bank holiday. **Table 14-3** shows that the permitted development operating at a rate of extraction of 360,000t of aggregate per annum and manufacturing 30,000m<sup>3</sup> of concrete has the potential to generate an average of 74 HGV trips per day. Ordinarily the volume of product transported from a quarry site is not only product dependent but is commercially driven accordingly the rate of production and extraction can fluctuate throughout the year as is highlighted in the above **Figure 14-1** which shows a peak generation of 85 HGV trips per day associated with the operation of the existing development at the rates manifest in 2019 the corresponding peak in 2022 was 87 HGV trips per day.

**Table 14-3**  
Existing Traffic Generation based upon 2019 and 2022 Records

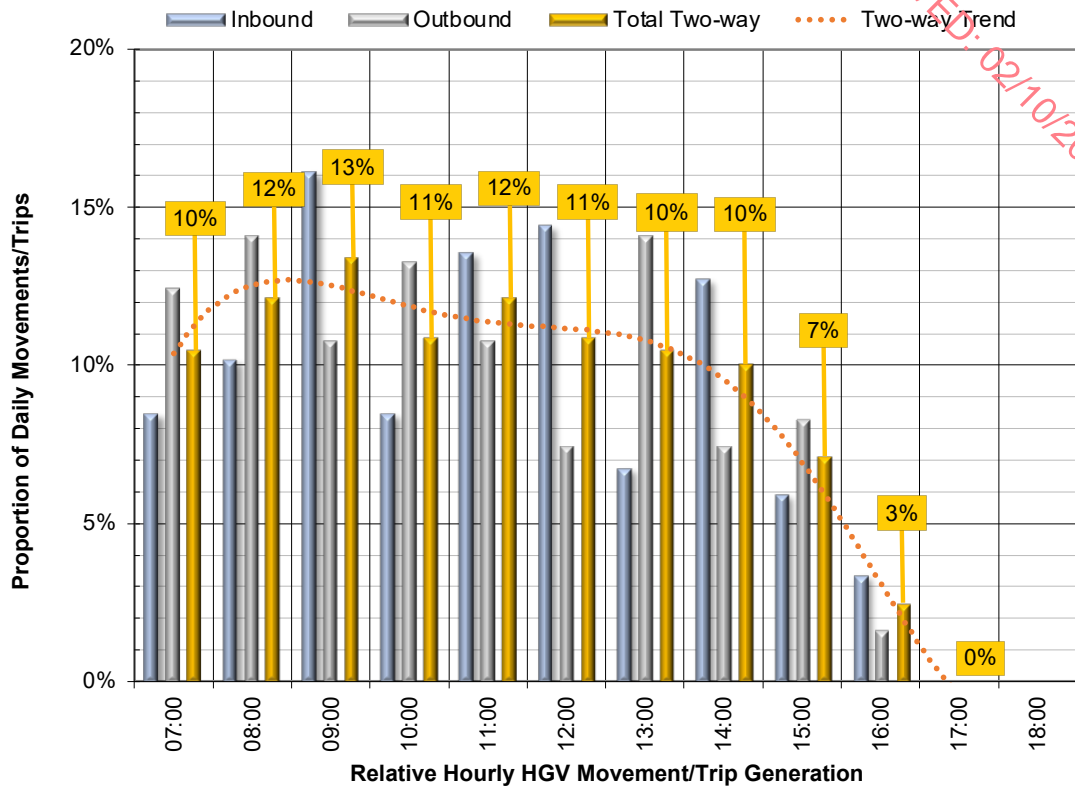
MATERIAL	EXTRACTED PRODUCED	AGGREGATE (USED)/EXPORT	AVERAGE LOAD	ANNUAL LOADS	DAILY LOADS
Aggregates	360,000t	303,000t	22.5t	13,467	54
Concrete	30,000m <sup>3</sup>	(57,000t)	6m <sup>3</sup>	5,000	19
Cement	9,600t	NA	31t	310	1
<b>TOTAL</b>		<b>360,000t</b>			<b>74</b>

Figure 14-2  
Daily Proportions of HGV Generation at Existing Site 2019 and 2022



14.55 **Figure 14-1** shows the seasonal variance in traffic generation at the existing development. The weighbridge records and delivery dockets for the years 2019 and 2022 show that traffic generation at the exiting site is relatively consistent throughout the working week. The following **Figure 14.2** is a graph of the surveyed total HGV traffic generation of the existing site by day of the week. Since Saturday represents such a comparatively low daily volume it should be borne in mind that on the basis of only Monday-Friday and 245 working days 'Daily Loads' figure in **Table 14-3** would be 78 no.

Figure 14 - 3  
Hourly Proportions of Daily HGV Generation at Existing Site



14.56 Based upon the turning count surveys of 18-Nov-2021, **Figure 14-3** is a graph of the proportion of the daily development generated HGV traffic manifest in each hour of the day. **Figure 14-3** shows the proportions of inbound and outbound HGV movements together with and proportion of total two-way HGV traffic movement generation and confirms that the peak development hour is 09:00-10:00hrs.

## PROPOSED DEVELOPMENT

### Overview of Proposed Development

#### *Operational Phase (Extraction, Production and Export)*

14.57 The application site is indicated on an extract from the 1:50,000 scale Ordnance Survey Discovery series map in EIAR Chapter 1, **Figure 1-1**.

14.58 The proposed development consists of the following:

- Quarry development and associated processing previously permitted under P. Reg. Ref. No. 99/2042 and ABP Ref. PL09.123207) to include drilling, blasting, crushing and screening of rock; and lateral extension to same, with an overall extraction area of c. 6.2 hectares with no vertical deepening below the existing quarry floor. The appropriate period of planning register reference 99/2042 was extended by order dated 03/02/2017 by P. Reg. Ref. No. 16/1246;
- Importation of up to 35,000 tonnes per annum of processed fine aggregate, principally sand for use in readymix concrete production on site;
- Use of buildings and structures associated with the sand and gravel pit previously granted planning permission under P. Reg. Ref. No. 03/2754 comprising of the crushing, washing and screening plant with associated silt disposal lagoons; readymix concrete batching plant including powerhouse; prefabricated office; weighbridge; workshop building with concrete laboratory and bunded fuel tanks; aggregate storage bays; and one liquid effluent treatment system unit;
- Closure of the existing site entrance with provision of a new site entrance located to the north of the existing entrance; realignment of the main internal site access road from the new site entrance to the central processing area with provision of a new wheelwash system; acoustic fence screening (c.2m in height x 170m in length); and new screening berms along the western and northern site boundaries;
- Restoration of the site lands will be to a combination of beneficial agricultural and ecological after-uses;
- All associated site works within an overall application area of c. 51.7 hectares. The proposed operational period is for 10 years plus 2 years to complete restoration (total duration sought 12 years).
- Provision is also made for 3 no. sections of road improvements (widening) along the haul route between the site entrance and the R148 regional road. The proposals at the identified locations include for works in the public road and verge that aim to achieve a consistent carriageway width of 6.0m along with provision of verge widening on the inside of the three bends to improve forward visibility and intervisibility for all opposed traffic including traffic generated by the proposed development.

#### *Restoration (Reinstatement to Agricultural Use and Nature Conservation Habitat Areas)*

14.59 Upon the cessation of extraction operations, it is proposed to return the lands within the planning application area to natural habitat, refer to EIAR **Figure 2-3**.

14.60 The only material requirements in respect of the planned restoration scheme are those topsoils and subsoils already present on site, having been stripped and stockpiled within the existing operational site area.

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## Proposed Development Traffic

### Traffic Generation

- 14.61 The existing development is permitted to manufacture value added product including readymix derived from aggregates won on site. The current sand and gravel permission and the now lapsed quarry permission set out above permitted the extraction of aggregates up to a maximum extraction rate of 360,000t per annum consisting of 250,000t of sand and gravel and 110,000t of quarried stone.
- 14.62 Based upon the current reserves and the market for aggregates and value-added product it is forecast that the future rate of extraction will be 250,000t per annum entirely associated with the production of aggregates from quarrying.
- 14.63 The current proposal seeks permission for continuance of extraction of aggregates with a proposed rate of 250,000t per annum with the volume of readymix concrete production remaining as it is at 30,000m<sup>3</sup> per annum.
- 14.64 It is proposed to cease sand and gravel extraction. It is proposed instead to import up to 35,000 tonnes of fine aggregate, principally sand for use in the manufacture of readymix concrete. In the interest of operational logistical efficiency, those vehicles used to import the fine aggregate will also be used to export aggregates processed from the rock extracted at the quarry.
- 14.65 **Table 14-4** shows the materials balance and corresponding estimate of HGV traffic generation arising from the proposed development.

**Table 14-4**  
Proposed Traffic Generation based upon 2019 and 2022 Records

MATERIAL	EXTRACT	IMPORT	AGGREGATES (USED)/EXPORT	AVERAGE LOAD	YEARLY TRIPS	DAILY TRIPS
Aggregates <sup>1</sup>	250,000t	---	228,000t	22.5t	10,133 (1,555) <sup>2</sup>	40 – (6) <sup>2</sup>
Fine Aggregates	---	35,000t		22.5t	1,555	6
Concrete	30,000m <sup>3</sup>	---	(57,000t)	6m <sup>3</sup>	5,000	19
Cement	---	9,600t	NA	31t	310	1
<b>TOTAL</b>			<b>285,000t</b>			<b>60</b>

- 14.66 The same quantum of aggregates will be used in the manufacture of readymix concrete and thus a reduced total volume of aggregate will be exported from the site. It follows therefore that the traffic generation arising from the proposed future operation of the site will be lower than was manifest by the pre-existing quarry and the sand and gravel and production operations. The average daily HGV trip generation will potentially reduce from 74 HGV to 60 HGV or by approximately 20% from the pre-existing levels shown in **Table 14-3**.

<sup>1</sup> Extracted aggregates exported from by trucks that enter the site empty save for those backhauling (see note 2 below)

<sup>2</sup> Trucks importing fine aggregates to site will be used to backhaul/export processed aggregates won on site accordingly nett truck movements reduced by total number of fine aggregates trucks



- 14.67 For the purposes of assessment, it is assumed that the total volume of traffic generated in the future by all extraction and importation activities, and by processing and production activities (including production of aggregates and concrete) will be on average 60 trips per day. The extractive industry is acknowledged to be market or demand driven and this gives rise to fluctuations in the weekly and monthly volumes of material extracted, processed and transported to and from the development site. The volume of product transported from a quarry site is commercially driven accordingly the rate of production and extraction can fluctuate throughout the year and this is borne out in the review of weighbridge data that indicates a typical variance in HGV trip generation in the order of approximately  $\pm 15$  trips per day to address certain demands when required. The upper value of traffic generation is estimated to be 75 HGV per day, reduced from the pre-existing peak monthly value of 87 HGV recorded in 2022.
- 14.68 The HGV traffic generation rate forecast under the current application equates to an average of approximately 7 No. vehicle trips per hour throughout the working day between the hours of 07:00-16:00hrs. But for a small number of local readymix deliveries this HGV traffic uses the L5002/5001 haul route between the site access and Regional Road R148 Dublin Road.
- 14.69 The forecast traffic generation of the site is 7 HGV trips per hour which from analysis of HGV traffic generation at other similar quarry facilities is expected to show a typical hourly deviation from the average of approximately  $\pm 2-3$  vehicle trips per hour over the typical hours of quarry operations.

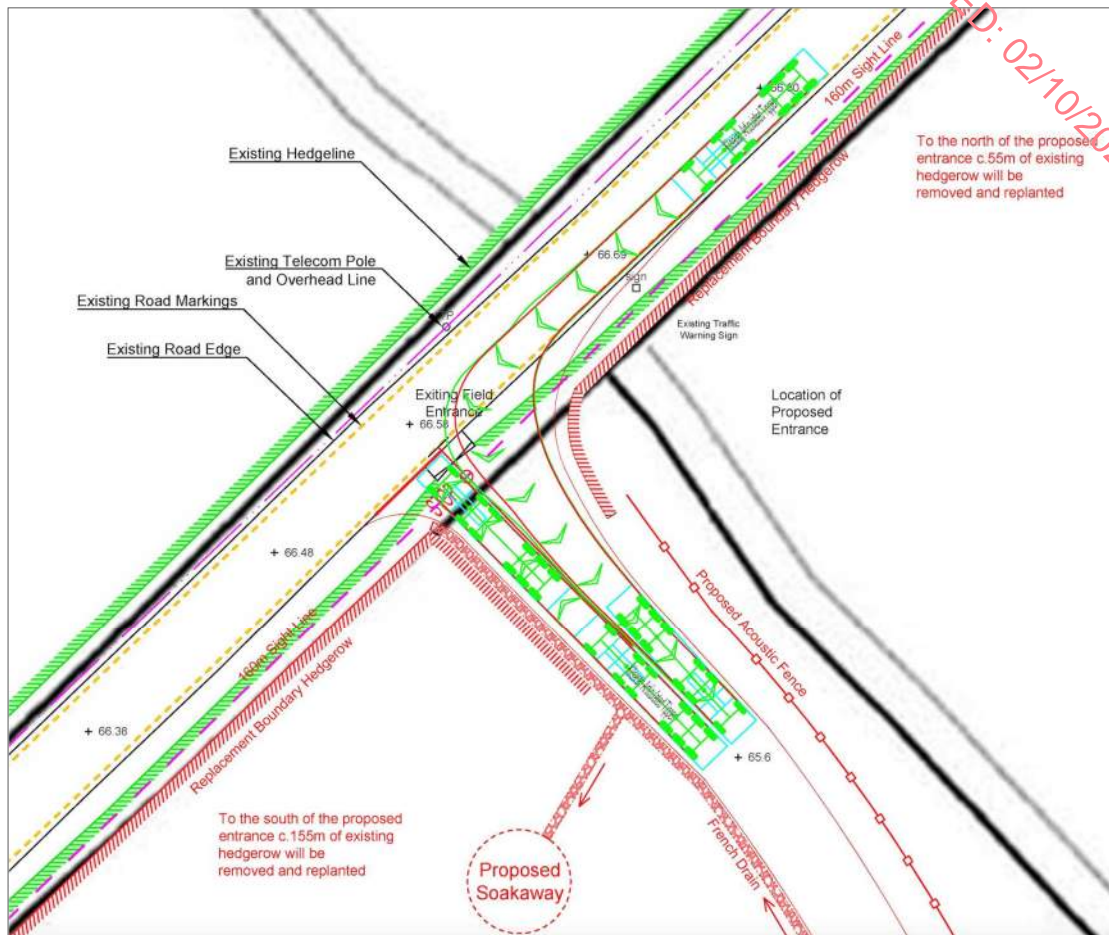
#### *Proposed Access Improvement*

- 14.70 The only proposed construction phase work that would be carried out is the construction of a proposed new site entrance and internal access road together with a perimeter screening berm. The new entrance is proposed to be located approximately 230m north along the L5002 from the existing site entrance. It will consist of a splayed entrance designed in accordance with TII Publication DN-GEO-03060 that will accommodate the safe opposed passage of HGV. The proposed design includes for the provision of standard visibility sightlines of 160m in both directions from a set-back distance of 3m from the carriageway edge. A new internal access road will run from the proposed new site entrance in a southerly direction directly to the existing central processing/manufacturing area and it will terminate at the existing weighbridge. The new internal road will be paved at the entrance area and for its entire length. The new internal road will generally be c.6m in width. It is further proposed to install an acoustic fence, set back c. 3m to the northern side of the new access road for a distance of c. 170m from the site entrance into the site to provide acoustic screening for residence R4 of HGV traffic entering and exiting the site along the new access. The acoustic timber fencing will be c. 2m in height and will be constructed with high quality boards in such a way that eliminates gaps that sound can easily travel through. Further details of the proposed fencing are provided in EIAR Chapter 2, **Appendix 2-A**. Following completion of construction of the new entrance and access road, the existing site entrance and access road will be closed and the existing wheelwash will be relocated to the outbound carriageway of the new internal road and will be set back c.100m from the new site entrance.
- 14.71 Closure of the existing entrance and relocation of the existing internal access road to the north east will not only improve the standard of the access and sightlines but it will also have the added benefit of moving the HGV traffic away from the closest residence to the west of the site. This residence is referenced as (R3) in EIAR **Figure 2-2** and in other chapter figures of the EIAR. The current road configuration sees HGV traffic come within 30m of that residence. The revised road configuration will increase the distance between the house and the access road to more than 300m. A new screening berm (c. 100m) will be placed along the western boundary in the location of the existing internal access road and wheelwash. This will further provide screening of the site with the nearest local residences to the west. The closest residence to the proposed new entrance will be R4, being

located c. 210m northeast. The proposed new acoustic fence will be located between the new entrance access road and R4.

- 14.72 The proposed new development access junction with the public road has been designed in accordance with Transport Infrastructure Ireland's Design Geometry publications formerly the National Roads Authority's Design Manual for Roads and Bridges. All HGV traffic will be required to access the site from the R148. As set out in the planning submission, occasionally there may be ready mixed concrete deliveries arising from specific local demands relating to finite activities or simply arising on smaller jobs or works such as local house building or extensions and the like. Ordinarily the demand for local supply of materials is very low and this is reflected in the site records nevertheless where such occasional local demand arises and in the interest of logistical sense it is reasonable that these vehicles might turn left from the site access. Excepting this occasional local demand, no general HGV haulage traffic will be permitted to turn left from the new access so the turning radius for traffic turning left from the access is appropriately sized to reflect the very low frequency for HGV to turn left. The turning radius on the northern side accords with the requirements set out in TII-DN-GEO-03060 para 5.6.5 'Corner Radii'. Given that HGV comprise a significant proportion of the turning movements to/from the north the turning radius incorporates the compound curve included at TII-DN-GEO-03060 Appendix C.
- 14.73 Site Entrance Layout Drawing Kilsaran Panning **Drawing KC2E** (excerpt provided in **Figure 14-3** below) shows the proposed new development access junction which provides a single safe point of access from L5002 for the proposed development. Lines of sight to the north and south of the access accord with the requirements of TII Publications. Entrance Layout Plan KC2E confirms the achievement of visibility sightlines. Routine hedgerow maintenance will ensure that TII Standard visibility sightlines of 160m measured to the nearside edge of the public carriageway will remain unobstructed from a set-back of 3.0m.
- 14.74 TII DN-GEO-03060 advises that the key geometric parameters of the access junction design and layout should be development having regard to that standard. The standard advises that the swept path of vehicles likely to use the access junction should then be checked using a computer-based programme to ensure safe movements.

**Figure 14-3**  
**Vehicle Swept Path Assessment of Proposed Upgraded Development Site Access**



- 14.75 **Figure 14-3** is an excerpt from Site Entrance Layout Drawing KC2E and shows a vehicle swept path analyses undertaken using the proprietary software Autodesk Vehicle Tracking which provides an analysis of the proposed access junction to check that provision has been made for the space and geometry required to manoeuvre specified design vehicles. Haulage of materials from the site will be by both rigid and articulated tipper trailer vehicles. The Kilsaran fleet articulated vehicle is 13.5m in length (10m trailer) and an 8-wheel tipper is 9.5m in length (concrete wagon), both vehicle types are the same width at 2.5m. The following **Figure 14-4** and **Figure 14-5** show the vehicle dimensions and turning dynamics of the Kilsaran fleet articulated vehicle and rigid tipper/concrete vehicles.
- 14.76 The vehicle shown in **Figure 14-4** is confirmed as the design vehicle used in the swept path assessment of the upgraded site access as shown above in **Figure 14-3**.

Figure 14-4  
Kilsaran Fleet Articulated Vehicle

Overall Length	13.50m
Overall Width	2.50m
Track Width	2.40m
Lock-to-lock Time	6 sec
Kerb-to-kerb Radius	6.30m

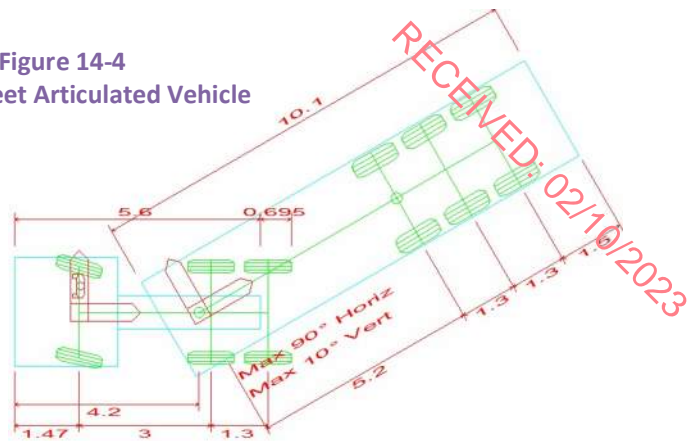
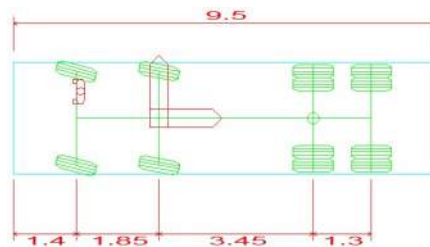


Figure 14-5  
Kilsaran Fleet Rigid 8-Wheel Tipper Vehicle

Overall Length	9.50m
Overall Width	2.50m
Track Width	2.40m
Lock-to-lock Time	6 sec
Kerb-to-kerb Radius	9.50m



- 14.77 The vehicle swept path turning assessment undertaken for the proposed new development site access is shown to scale on 'Site Entrance Layout Plan KC2E'. **Figure 14-4** shows a plan of the articulated assessment vehicle together with dimensions and steering characteristics. The analyses of entry and exit manoeuvres provided in 'Site Entrance Layout Plan' KC2E confirms that the assessment HGV is accommodated by the proposed geometry of the upgraded access junction without the vehicle over-running the verge or occupying any part of the opposing traffic lane on the L5002.
- 14.78 As set out above, the proposed development access has been designed in accordance TII-DN-GEO-03060 which is the standard for national primary roads. The proposed new junction incorporates standard geometry appropriate to the type of vehicles that will service the development. There are no departures or relaxations applied and a swept path analysis confirms that the turning movements of vehicles are suitably accommodated without vehicles crossing into opposing lanes.
- 14.79 The revised boundary measures will be such as to be set back from the road edge to accommodate unobstructed sightlines in both directions. The boundary hedgerow will be replanted or reconstituted from indigenous species and will be set back for the sightlines such as to accommodate seasonal growth.
- 14.80 Given the fundamental geometry of the proposed access and confirmation in the submitted drawings of compliance with the appropriate standard it is respectfully submitted that a Road Safety Audit is not required at this stage. It is respectfully suggested that a Safety Audit would be more worthwhile at the detailed design stage where the scope of the audit could be extended to include not only the proposed development access but also the scheme of road improvement works identified in this

chapter. A condition of planning is respectfully invited requiring that the Applicant, as part of the agreed scheme of road improvement works, will be required to prepare a detailed Roads Safety Audit to include the agreed road improvements (details set out below) and the proposed new relocated site access.

### *Roads Condition and Strengthening Works*

- 14.81 Arising from a request for further information made by the Planning Authority in respect to a previous application referenced 22/83 (see EIAR Chapter 1 for full description of that application) Trafficwise Ltd. commissioned a detailed structural analysis of the full 3.5km length of the L5002 principal haul route between the proposed development and the R148 to the north. This has included a Visual Condition Survey (VCS) to determine the Pavement Condition Index (PCI), cross-section measurement of the verge and carriageway, and a Falling Weight Deflectometer (FWD) survey together with coring of the pavement layers. Based on the data collected and traffic information provided, strengthening overlays were estimated.
- 14.82 The structural analysis was carried out by Milestone Pavements Technologies and includes Falling Weight Deflectometer (FWD) testing which is a non-destructive test that determines the load bearing capacity of a pavement structure. In addition to the FWD tests Milestone also undertook a visual condition survey together with coring of the pavement which involves cutting and extraction of the upper bound layers from the pavement in order to investigate pavement condition. A copy of the 'Pavement Condition Survey Report' is attached as **Appendix 14-4** and provides a detailed description of the testing procedure together with tabulated results and instruction relating to the interpretation of the deflection readings and accompanying deflection plots.
- 14.83 Based on the data collected and based upon the forecast traffic information provided in this chapter of the EIAR, strengthening works and overlays have been estimated and these are set out in Table 6 of the Milestone 'Pavement Condition Survey'.

### *Roads Improvement Works*

- 14.84 The L5002/L5001 local roads from the existing site entrance to the R148 regional road were previously widened by the applicant at their expense, from an average carriage width of c. 3.7 m to c. 6.2m to facilitate the safe passing of HGV vehicles along the designated section of the haulage route. It is acknowledged that there are narrow sections or pinch points along the route. Since any works to the public road would be subject to agreement with the Road Authority and subject to the appropriate licences, the Applicant together with Trafficwise Ltd. met at the proposed development site with George Willoughby Senior Executive Engineer and Cyril Buggie Municipal District Engineer on Wednesday 14th September 2022. The purpose of the meeting was to carry out a joint inspection of the existing haul route between the site access junction and the R148 and to discuss road improvement measures for the continued accommodation of development traffic along the haul route. During the site inspection the key constraints on the haul route were identified and discussed together with what improvements beyond the boundaries of the public road would be feasible subject to agreement and consent of third-party land owners.
- 14.85 At the site meeting a set of draft proposals were presented by the Applicant based upon Ordnance Survey mapping of the haul route. Matters were progressed on the basis of these drawings and a package of objectives and corresponding road improvement measures was formulated subject to detail design, subject to agreement and further subject to the Applicant securing consent from third party land owners.
- 14.86 The Milestone 'Pavement Condition Survey Report' attached as **Appendix 14-4** provides details of the strengthening works and overlays estimated as required to accommodate existing network traffic and the traffic generated by the proposed development. The strengthening works set out in

- the report apply to the entire haul route including the locations where widening and improvement works are proposed.
- 14.87 It is proposed to provide 3 no. sections of road improvement along the haul route and these are identified and detailed in the following maps attached in **Appendix 14-5**:
- Map Ref. PR1 (Approx. centre of works at chainage 1120m from R148)
  - Map Ref. PR2 (Approx. centre of works at chainage 1800m from R148)
  - Map Ref. PC1 (Approx. centre of works at chainage 2160m from R148)
- 14.88 The proposed works at each of the locations is described in brief on the corresponding maps. Subject to agreement with Kildare County Council and subject to the appropriate licences the proposals at the identified locations include for works in the public road and on third party lands that aim to achieve a consistent carriageway width of 6.0m whilst also implementing verge widening on the inside of the three bends to improve forward visibility and intervisibility for all opposed traffic including traffic generated by the proposed development.
- 14.89 Each of the road widening and improvement locations requires the set-back of the existing public road boundaries on the inside of the bends and thus requires the use of third-party lands. In each case landowner consent has been secured by the Applicant. Appropriate landowner consent letters accompany the planning submission documentation.
- 14.90 In addition to the widening or passing area improvements it was clear from the road condition surveys that a comprehensive road improvement scheme will be required to also incorporate road strengthening and overlay. The road widening at the improved areas will incorporate full depth construction to the standard specification of Kildare County Council and will be subject to final overlay across the full road width of the improved/widened section thus resulting in a consistent and uniform road surface. Road markings will accord with the requirements of the Traffic Signs Manual.
- 14.91 As is ordinarily the case the final detail and detailed specifications of the road improvement and strengthening works including boundary treatments will be subject to agreement with Kildare County Council. Having agreed in principle that the works are appropriate and having secured the required landowner consent it is respectfully submitted that the detailed design of road improvement and strengthening works can be agreed by way of planning condition prior to commencement of the proposed development. It is understood that the overall scheme of road improvement will incorporate appropriate advance warning and advisory signing both at the development site access and at local constrictions.
- 14.92 Close examination of the submitted suite of drawings confirms that the road improvement works chiefly involve a series of localised road repair/reconstruction and strengthening schemes together with localised widening and notwithstanding the benefits to road safety, these works should not significantly alter the character of the existing road. The works in the public road are those of road improvement and maintenance. It is considered likely that the required works will take approximately six weeks to complete. As with most road works carried out under agreement with, or directly by the Roads Authority, there will be some short-term direct impact arising on L5002/L5001 due to the proposed road improvement works. No specific analysis of general network operation and impact upon capacity is considered necessary for the short-term impacts arising from the L5002/L5001 improvement works since the only impact is likely to entail delays to road users due to traffic control and traffic management measures during the roadworks.
- 14.93 There are a number of details that will require the agreement of Kildare County Council prior to the commencement of the development as follows:

- Binder course overlay of L5002 roadway at widening and as per Road Condition Survey Report;
  - The construction detail for the road widening will be in accordance with TII Specifications and will be agreed with Kildare County Council prior to works commencing;
  - The construction detail for the road strengthening works will be in accordance with TII specifications and will be agreed with Kildare County Council prior to works commencing;
  - The roadway will be marked with edge of carriageway markings in both directions in accordance with the Traffic Signs Manual – Chapter 7;
  - Where the road width is 6.0m and/or above the improved section of roadway should be marked with a centreline in accordance with the Traffic Signs Manual – Ch. 7;
  - Include line markings at the development access junction to the satisfaction of Kildare County Council and in accordance with the Traffic Signs Manual – Chapter 7.
- 14.94 The proposed scheme of road improvement and strengthening is set out above and has been agreed in principle with the Municipal District Engineer. The appropriate landowner consent to carry out the works including hedge removal/relocation accompany the planning submission. The detailed design and specification for all works affecting the public road will be subject to agreement with Kildare County Council and subject to the appropriate licences. It is intended that affected public road boundaries will be replaced with fencing to Kildare County Council specification and that all affected hedgerow will be replanted with indigenous species. It is proposed that a detailed landscaping and replanting scheme will be included as part of the detailed design to be agreed by condition of planning prior to commencement of the proposed development.
- 14.95 Should Kildare County Council be minded to grant planning permission for the proposed development the Applicant respectfully invites that an appropriate condition of planning is applied to ensure that the suggested road improvement works are undertaken to the satisfaction of Kildare County Council and to the appropriate standards, as set out above.

#### *Haul Routes*

- 14.96 It is proposed to maintain the same haul route regime for transporting aggregates and value-added product as described above.

#### *Light and Private Vehicle Generation*

- 14.97 The typical traffic generation arising from employee vehicles is estimated from the turning count survey of 18-Nov-2021 to be in the order of 22 trips per day by private car. Given the working hours at the site, employee trips are generally manifest on the road network well outside the typical morning peak with half or 11 no. arriving before 07:00hrs and 6 no. arriving before 08:00hrs. Employees departing the site do so generally in the evening commuter peak hour period where 13 no. vehicle are recorded to leave the site between 17:00-18:00hrs. The volume of private cars is not considered significant in the context of the carrying capacity of the receiving road network and the connected greater regional and national network.
- 14.98 Other non-HGV related trips arise from sales and technical staff and also from sundry visitors involved with the day-to-day operation of the site including maintenance staff, meter readers, sales people, the postman etc. These trips are generally distributed throughout the day with typically less than 1 no. trips per hour.

#### *Traffic Generation during Restoration Period*

- 14.99 Where feasible, restoration of exhausted and redundant areas will be carried out at the earliest opportunity. However, it is envisaged that the majority of restoration proposals at the rock quarry

will only be carried out after extraction operations at the site have ceased whereupon it is proposed to return the worked lands to combined beneficial agricultural and habitat after-uses.

- 14.100 The only material requirements in respect of the planned restoration scheme are those topsoils and subsoils already present on site and which are either still in-situ over the rock extraction area or which were previously stripped and stockpiled within the existing operational site area. The traffic generation arising during the restoration period will be chiefly by site operatives and little or no material will be transported to or from the site. It follows therefore that traffic impact arising during the restoration period is not likely to be significant and thus the impact upon the receiving road network can reasonably be considered likely to be negligible.

#### Road Safety Authority Collision Records

- 14.101 The Road Safety Authority website [www.rsa.ie](http://www.rsa.ie) provides an online record of collision statistics spanning 2005-2016. The RSA data shows a single recorded collision on the L5001 haul route that collision was categorised as serious with one casualty. Few details of the circumstances are provided. The collision occurred between 16:00-19:00hrs on a Sunday in 2015 so it follows that no development traffic was involved or contributed to the collision.

## Assessment of Development Traffic

### Overview

- 14.102 The capacity of any road network is dictated by the operation of the links and junctions within that network. Capacity assessments of the key junctions in the vicinity of the site are modelled for base and future year scenarios in order to provide a comparative basis upon which to evaluate the incremental impact of the proposed development and to appraise the overall performance of the road network under future assumed network traffic flow criteria. To prepare a traffic network model various base assumptions are made with respect to the future growth of traffic on the receiving road network.

### Scope of Assessment

- 14.103 Regarding the choice of appropriate assessment years TII (2014) PE-PDV-02045 'Traffic and Transport Assessment Guidelines' advise as follows;

*"Timescale: Traffic volumes for opening year, opening +5 and opening year +15. These timescales are fairly standard and should be expected".*

- 14.104 The applicant aspires to have planning permission granted and to continue operations under that permission in 2024. For the purposes of this traffic assessment 2024 has therefore been selected as the 'opening year' as generally referred to in the assessment of development traffic. In line with the guidance provided in TII PE-PDV-02045, modelling analyses of the capacity of the receiving road network have been carried out for the following:

- Opening Year (Assumed 2024)
- Opening Year +5yrs (2029)
- Opening Year +15yrs (2039).

- 14.105 Opening year, +5yrs and +15yrs are the standard assessment years. It is acknowledged that the extractive term of the application is for 10 years and therefore the +15yr assessment falls outside this timeframe. The standard assessment years are nonetheless included as a basis of application of engineering judgement. Published national traffic growth figures are based upon projected regional and national economic growth and development. The future year assessments in this chapter allow for traffic growth on the receiving local road in accordance with the published growth rates for



national roads. It is considered unlikely that the receiving roads in the study area would experience such growth. The future year forecasts of network traffic can therefore be considered robust. The application is for a 10-year permission with the year of opening being 2024, in this context it can be appreciated that the results of the robust analyses for 2029 (Opening +5yrs) and 2039 (Opening +15yrs) provide sufficiently accurate models from which to determine and assess traffic impact in 2034 (Opening Year +10yrs). On occasion traffic assessments provide a test of alternative assumptions and can include sensitivity tests often based on extreme or very robust scenarios. The standard assessment for 2039 (Opening +15yrs) can be considered such a sensitivity analysis of receiving road capacity.

14.106 The following junctions have been included in the scope of the modelling assessments

- Site 1: L5001/R148 Dublin Road

*Traffic Growth Rates*

14.107 For the purposes of the traffic assessment traffic generation arising directly from the proposed development has been assumed not to grow over time. Background traffic flows on the public road network (R148 and L5001/5002) have been assumed to grow in accordance with the latest growth factors published by Transport Infrastructure Ireland (TII) in Oct 2021 in the document PE-PAG-02017 ‘Project Appraisal Guidelines: Unit 5.3 Travel Demand Projections’.

14.108 Central growth rate factors have been used in the derivation of the future traffic flows from the surveyed 2021 flows. The forecast central growth rate factors for Kildare (excluding Metropolitan Area) assume traffic growth rates of 1.97% per annum for light vehicles and 3.78% for heavy vehicles between 2016 and 2030 and 0.62% per annum for light vehicles and 1.55% for heavy vehicles thereafter to 2040.

14.109 Baseline traffic flows are as surveyed and will be used as a base for comparison of the analyses for future year junction performance. The growth indices used to derive Opening Year (2024) and; Opening Year +5yrs (2029) and Opening Year +15yrs (2039) flows from the surveyed (2021) flows are as follows.

14.110 National Primary Road Medium Growth Rates (Applied to All Roads)

- 2021-2024 (Opening Year).....1.0603 (Cars).....1.1177 (HGV)
- 2021-2029 (Opening Year +5yrs).....1.1689 (Cars).....1.3456 (HGV)
- 2021-2039 (Opening Year +15yrs).....1.2601 (Cars).....1.6038 (HGV)

14.111 TII growth factors have been applied directly to peak hour traffic data. Growth factors are not always directly applicable to peak hour periods (the peak hour generally spreads out as opposed to intensifying). Ignoring this factor and adding growth directly to the peak hour generally results in robust calculations favoured by traffic experts in the assessment of road networks.

14.112 No substantial other permitted developments have been discovered by reference to the planning register that might be considered likely to give rise to significant increases on the local receiving road network in the short-term. The application of TII growth rates to the receiving network is considered likely to account for the cumulative traffic arising as a result of economic growth and development locally over the specified assessment period.

*Scenarios Analysed*

14.113 The main corridor upon which the continued traffic generation of the development will have an impact is L5001/5002 and R148 Dublin Road accordingly the scope of future year assessments focuses on the operation of R148/L5001 junction. The assessments aim to show that the

infrastructure provided by the receiving road network including the strategic Regional Road network is suitable to accommodate the forecast traffic arising from the proposed development.

- 14.114 The various 'do-nothing' and 'do-something' traffic flow scenarios have been assessed for the Opening Year 2024, Opening Year +5yrs and the Design Year of 2039. As shown in **Figure 14-3** the volume of development traffic trails off in the evening peak hour. The period of greatest impact is the morning network peak hour where the combination of network and development traffic flow is highest. The assessments examine impact on capacity in the morning peak hour. A baseline assessment using only the current 2021 surveyed flows is provided. The future year assessments include for scenarios both with and without the proposed development so that the incremental impact of development traffic can be evaluated.
- 14.115 The Transport Research Laboratory (TRL) suite of programs has been used to assess network junction performance in the identified peak hours. The 'do something' scenarios include for the forecast assessment morning peak hour upper value development traffic flows set out in **Appendix 14-2** Figure 7 being added to forecast network flows (with development traffic removed) derived from the 2021 traffic surveys factored as set out above. The baseline traffic flows (without the development) are set out in network flow diagram format in **Appendix 14-2** as follows:
- Figure 8 Peak Hour Baseline Flows (2024 Year of Opening)
  - Figure 9 Peak Hour Baseline Flows (2029 Year of Opening +5yrs)
  - Figure 10 Peak Hour Baseline Flows (2039 Year of Opening +15yrs)

### Modelling Software

- 14.116 TRL Junctions 10 suite of junction modelling programs has been used to assess relative junction performance and the likely incremental impact arising from development generated traffic as forecast. The program PICADY 10 (Priority Intersection Capacity And Delay) has been used to assess the future performance of the priority junction between R148/L5001 on the network. PICADY 10 is primarily intended as a means of assessing junction performance and the outputs provide performance indicators for roads designers and planners with regards to capacity, queuing and delay.
- 14.117 An 85% level of saturation corresponding to a Ratio of Flow to Capacity (RFC) of 0.850 is generally accepted at priority junctions in urban areas, and 0.75 in rural areas, although these figures should not be considered in isolation and should be viewed together with queuing and delay information.
- 14.118 The following provides a summary of the salient output results for each assessment. The output results of the analyses should primarily be viewed as a performance indicator facilitating a comparative assessment between the various traffic flow scenarios from which to assess the impact of the development.
- 14.119 The infrastructure upon which the proposed development relies is already in place so an assessment of existing infrastructure at 2021 using the surveyed existing traffic flows has been provided to afford a means by which to calibrate (through observation of the existing scenario) the models of future assessment value traffic scenarios.
- 14.120 The modelling analyses of the receiving road network include various traffic flow scenarios aimed at providing a comprehensive assessment of the capacity of the existing infrastructure under various assumptions and various development scenarios between the forecast year of opening 2024 and the Design Year of 2039 15 years after the opening of the proposed development. The criteria for each assessment and each of the scenarios is specifically set out and clearly detailed. Output results for all junction assessments are included in **Appendix 14-3**.
- 14.121 The various assessment traffic flow scenarios are as follows.

- Scenario 1 (S1): 2021 baseline assessment of the existing infrastructure using only the traffic flows recoded in the traffic surveys. This analysis is provided as a frame of reference and a standard comparator which may be verified or otherwise calibrated by observation.
- Scenario 2 (S2): 2024 Year of Opening baseline assessment which includes for the TII forecast growth in network traffic flows. No flows from specific developments are included.
- Scenario 3 (S3): 2024 Year of Opening assessment that includes the network traffic flows of Scenario 2. Flows forecast to arise from the proposed development are considered.
- Scenario 4 (S4): 2029 Year of Opening +5 years baseline assessment which includes for the TII forecast growth in network traffic flows. No flows from specific developments are included.
- Scenario 5 (S5): 2029 Year of Opening + 5 years assessment that includes the network traffic flows of Scenario 4. Flows forecast to arise from the proposed development are considered.
- Scenario 6 (S6): 2039 Year of Opening +15 years baseline assessment which includes for the TII forecast growth in network traffic flows. No flows from specific developments are included.
- Scenario 7 (S7): 2039 Year of Opening + 15 years assessment that includes the network traffic flows of Scenario 6. Flows forecast to arise from the proposed development are considered.

14.122 The relative traffic generation and distribution flows arising from the proposed development are shown in **Appendix 14-2** Figure 7. It is assumed for the purposes of the traffic assessments that the entire development will be operational in 2024.

14.123 The surveyed and forecast baseline future traffic flows on the road network within the study scope are summarised in **Appendix 14-2** Figures 8, 9 and 10.

**Table 14-5**  
**PICADY 10 Modelling Assessment Results R148/L5001 (Do Nothing Scenarios)**

**Arm A: R148 (East) Arm B: L5001 Arm C: R148 (West)**

SCENARIO	STREAM	QUEUE		DELAY	RFC	LOS	JUNCTION		RESIDUAL CAPACITY
		Ave	95%				Delay	LOS	
Survey Year <b>2021<sup>3</sup> (S1)</b> With Dev.	B-AC	0.2	0.5	11.25	0.13	<b>B</b>	0.89	<b>A</b>	172% Stream B-AC
	C-B	0.0	0.5	8.57	0.01	<b>A</b>			
Opening Year <b>2024<sup>4</sup> (S2)</b> Do Nothing	B-AC	0.1	0.5	8.28	0.07	<b>A</b>	0.43	<b>A</b>	212% Stream B-AC
	C-B	0.0	0.5	8.51	0.01	<b>A</b>			
Opening +5yrs <b>2029<sup>5</sup> (S4)</b> Do Nothing	B-AC	0.1	0.5	8.70	0.09	<b>A</b>	0.46	<b>A</b>	179% Stream B-AC
	C-B	0.0	0.5	8.81	0.02	<b>A</b>			

<sup>3</sup> Assessment Traffic Flows: Appendix 14-2 Figure 2

<sup>4</sup> Assessment Traffic Flows: Appendix 14-2 Figure 8

<sup>5</sup> Assessment Traffic Flows: Appendix 14-2 Figure 9

SCENARIO	STREAM	QUEUE		DELAY	RFC	LOS	JUNCTION		RESIDUAL CAPACITY
		Ave	95%				Delay	LOS	
Opening +15yrs 2039 <sup>6</sup> (S6) Do Nothing	B-AC	0.1	0.5	9.39	0.10	A	0.49	A	149% Stream B-AC
	C-B	0.0	0.5	9.13	0.02	A			

14.124 The results of PICADY 10 modelling analyses of the existing R148/L5001 priority junction subject to the current surveyed traffic flows and the forecast 2024, 2029 and 2039 morning peak hour traffic flow scenarios are summarised in **Table 14-5** for the current scenario and the Do-Nothing Scenarios whilst **Table 14-6** summarises the results for the Do-Something Scenarios.

**Table 14-6**  
**PICADY 10 Modelling Assessment Results R148/L5001 (Do Something Scenarios)**

Arm A: R148 (East) Arm B: L5001 Arm C: R148 (West)

SCENARIO	STREAM	QUEUE		DELAY	RFC	LOS	JUNCTION		RESIDUAL CAPACITY
		Ave	95%				Delay	LOS	
Opening Year 2024 <sup>7</sup> (S5) With Dev.	B-AC	0.1	0.5	10.91	0.13	B	0.83	A	172% Stream B-AC
	C-B	0.0	0.5	8.40	0.02	A			
Opening +5yr 2029 <sup>8</sup> (S6) With Dev.	B-AC	0.2	0.5	11.44	0.14	B	0.85	A	144% Stream B-AC
	C-B	0.0	0.5	8.70	0.02	A			
Opening +15yr 2039 <sup>9</sup> (S7) With Dev.	B-AC	0.2	0.5	12.04	0.16	B	0.86	A	121% Stream B-AC
	C-B	0.0	0.5	9.03	0.02	A			

14.125 The results of the analyses serve to confirm that the existing priority junction on the R148 Dublin Road has sufficient capacity to accommodate the traffic arising from the proposed development. Considering forecast network traffic growth and the development of the proposed site only the existing junction is shown to operate with a level of service A and considerable residual capacity in both the year of opening and future years.

<sup>6</sup> Assessment Traffic Flows: Appendix 14-2 Figure 10

<sup>7</sup> Assessment Traffic Flows: Appendix 14-2 Figure 8 + Figure 7

<sup>8</sup> Assessment Traffic Flows: Appendix 14-2 Figure 9 + Figure 7

<sup>9</sup> Assessment Traffic Flows: Appendix 14-2 Figure 10 + Figure 7

## DESCRIPTION OF LIKELY SIGNIFICANT IMPACT

- 14.126 The above figures suggest that the average hourly traffic generation rate of 7 HGV trips for the proposed development will be approximately 20% less than the current average as recorded from the weighbridge data. The assessment shows that the proposed development has less potential to generate HGV traffic than the pre-existing development. The network capacity assessments confirm that the R148/L5001 junction will operate satisfactorily with the proposed development in place. The level of service and operation of the junction will be comparable to the current operation as assessed under Scenario 1 of **Table 14-5**.
- 14.127 Overall, the proposed development at the Kilrainy and Kilrathmurry, with an annual extraction rate of 250,000t and an importation rate of 35,000t together with a manufacturing rate of 30,000m<sup>3</sup> of concrete will generate similar, but slightly lower levels of traffic as previously arose. In practice the rate of HGV traffic generation will be approximately reduced by 20% from that recorded at the weighbridge for the pre-existing development. It follows that in practice the current proposal insofar as it relates to traffic generation is equivalent to a continuance of operations at approximately 80% of the pre-existing HGV traffic levels. In practice there will be no change in the characteristics of the traffic generated by the site but there is potential for a reduction of 20% in the pre-existing volumes of traffic generated by the site on a day-to-day basis.
- 14.128 Similarly, the traffic volumes described above and associated with the proposed development would continue to use the same haul route to R148. Given the potential reduction in pre-existing traffic generation levels at the site it follows that there will be no significant impact on the local roads network over that previously manifest.
- 14.129 The road improvement works proposed to the existing haul route involve a series of localised road repair/reconstruction and strengthening schemes together with localised widening works that should not significantly alter the character of the existing road. The works are partially on third party lands where it is proposed to widen the road and provide improved forward visibility. The associated works in the public road are those of road improvement and maintenance. It is considered likely that the required works will take approximately six weeks to complete. There will be some short-term direct impact arising on L5002/L5001 due to the proposed road improvement works which will principally entail delays to road users due to traffic control and traffic management measures during the roadworks.

## DESCRIPTION OF MITIGATION MEASURES

### General

- 14.130 Aggregate haulage lorries will continue to turn right out of the site albeit from the proposed new entrance and will use the prescribed haul route along L5002/L5001 to R148. Haulage vehicles both to and from the site will be regularly maintained, serviced and replaced at intervals.
- 14.131 In order to prevent transport of soil and dirt out of the site onto public roads, a new wheelwash facility will be provided for all HGV's exiting the site (relocated under the current proposal). All the aggregates haulage vehicles are required to pass through the wheelwash prior to leaving the site. Any accidentally spilled material will be removed from the public road by Kilsaran Concrete in a safe and timely manner.
- 14.132 The existing site access on L5002 has historically been granted permission and has been shown to function satisfactorily in its present location, as part of the planning application it is proposed to discontinue the use of the existing quarry site access in favour of a relocated access designed in

accordance with TII Publication DN-GEO-03060. The proposed new access affords improved geometry together with the provision of visibility sightlines that accord with current national roads design standards. The proposed development works include not only the construction of the proposed new site entrance and internal access road with associated new wheelwash, internal security barrier but also include the erection of acoustic screen fencing and additional perimeter screening berm to the southwest which will assist to mitigate noise arising from traffic accessing the site.

- 14.133 There are currently a number of advance warning signs on the southbound approach located 100m 200m and 400m in advance to the site access. It is proposed that in combination with the proposed relocation of the access new advance signs are erected with the agreement of the Local Authority. The suggested layout will show a standard junction ahead warning sign which indicates to drivers which side of the road the entrance is on. It is proposed to augment the sign with an information plate reading 'Quarry Entrance 200m'. If the Planning Authority considers it worthwhile a second set of similar signs can be placed at 100m distance from the site access. The size of the signs and the details of legend size etc. will be designed in accordance with the Traffic Signs Manual and the precise location agreed with the planning authority. The following **Image 14-1** provides a suggested layout.

**Image 14-1**  
**Proposed Advance Signage**



## Roads Condition and Strengthening Works

- 14.134 Based on the data collected and based upon the forecast traffic information provided in this chapter of the EIAR, strengthening works and overlays have been estimated and these are set out in Table 6 of the Milestone 'Pavement Condition Survey' a copy of which is attached as **Appendix 14-4**.

## Roads Improvement Works

- 14.135 It is proposed to provide 3 no. sections of road improvement along the haul route and these are identified and detailed in the following maps attached in **Appendix 14-5**:
- Map Ref. PR1 (Approx. centre of works at chainage 1120m from R148)
  - Map Ref. PR2 (Approx. centre of works at chainage 1800m from R148)
  - Map Ref. PC1 (Approx. centre of works at chainage 2160m from R148)
- 14.136 The proposed works at each of the locations is described in brief on the corresponding maps. Subject to agreement with Kildare County Council and subject to the appropriate licences the proposals at the identified locations include for works in the public road and on third party lands that aim is to achieve a consistent carriageway width of 6.0m whilst also implementing verge widening on the inside of the three bends to improve forward visibility and intervisibility for all opposed traffic including traffic generated by the proposed development.
- 14.137 The road widening at the improved areas will incorporate full depth construction to the standard specification of Kildare County Council and will be subject to final overlay across the full road width of the improved/widened section thus resulting in a consistent and uniform road surface. Road markings will accord with the requirements of the Traffic Signs Manual. Overall scheme design will be agreed with the Planning Authority at the detailed design stage. Based upon a site meeting with Kildare County Council engineers it is understood that road improvement works will incorporate appropriate advance warning and advisory signing both at the development site access and at local constrictions.

## Site Access and Junction Capacity

- 14.138 The existing access and the receiving road are lightly trafficked and will continue to be lightly trafficked in the context of the ultimate capacity of the simple priority access arrangement. The relatively low levels of network and development traffic can be appreciated from a review of the traffic count data together with the graphical analyses and network flow analyses presented in **Appendix 14-1** and **Appendix 14-2** respectively together with the junction modelling reports of **Appendix 14-3**. The existing quarry traffic does not give rise to capacity issues at local junctions and there are unlikely to be capacity issues arising at the junctions on the haul route as a result of the proposed development.
- 14.139 It is proposed to construct a new entrance approximately 230m north along the L5002 from the existing site entrance. The new entrance will consist of a splayed entrance designed in accordance with TII Publication DN-GEO-03060 that will accommodate the safe opposed passage of HGV. The proposed design includes for the provision of standard visibility sightlines of 160m in both directions from a set-back distance of 3m from the carriageway edge. Following completion of construction of the new entrance and access road, the existing site entrance and access road will be closed and the existing wheelwash will be relocated to the outbound carriageway of the new internal road and will be set back c.100m from the new site entrance.

## Haul Route Maintenance and Management

- 14.140 The primary haul route is between the site and the greater roads network includes the L5002 and L5001 that connects directly to R148. From a walk-over inspection of the haul route it is generally considered to be in a good state of repair with no evidence of structural failure. There are some localised surface defects which require routine maintenance. All roads require a schedule of ongoing maintenance in order to remain serviceable. Notwithstanding the extended period of

operation, there is no proposed increase in the volume of traffic using the local road accordingly current annual maintenance costs are unlikely to increase since no additional traffic means there will be no additional wear and tear arising from the activities of the quarry. Given the historic use of these routes by the existing development it is unlikely that any specific road strengthening works, excepting those proposed above, would be required for the proposed continuance of development traffic at similar but reduced levels. Over the extended life of the quarry no additional maintenance works would arise on an annual basis over and above those currently manifest. It is however acknowledged that the current proposal will result in the extension of time over which the haul route is subject to development traffic. It must be acknowledged that inherent in the proposed effective continuance of quarrying activity is the extension of contributions and payments to the planning authority a proportion of which is allocated to the county schedule of ongoing road maintenance.

- 14.141 The proposed development site will be serviced by Kilsaran Fleet vehicles. The Kilsaran Fleet is fitted with the proprietary vehicle tracking system 'MotionMetrics'. Vehicle tracking is used by Kilsaran to improve and monitor various transport operational efficiencies and to police driver behaviour. The system enables Kilsaran to better manage their fleet operations through the gathering of real-time and historical performance data relating to vehicles. The vehicle tracking hardware generally improves driver behaviour where the technology records movement and can detect speed violation and driving inputs (acceleration, braking, cornering etc.). Kilsaran employs a regimen of continuous driver training and drivers are informed of prescribed haul routes and restrictions. Signing will be erected internally to reinforce the restriction and to remind HGV drivers of the restriction on turning left from the site. Drivers found in breach of any restricted movements will be subject to disciplinary procedures. The proposed access road into the site measures approximately 400m from the public road to the weighbridge which affords significant queuing for large vehicles. The existing arrangement similarly has a relatively long access road and accordingly has not given rise to queuing on the public road.



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## APPENDICES

### **Appendix 14-1**

Traffic Survey Data

### **Appendix 14-2**

Network Traffic Flow Diagrams

### **Appendix 14-3**

Junction Modelling Assessment Reports

### **Appendix 14-4**

Road Condition Survey Report

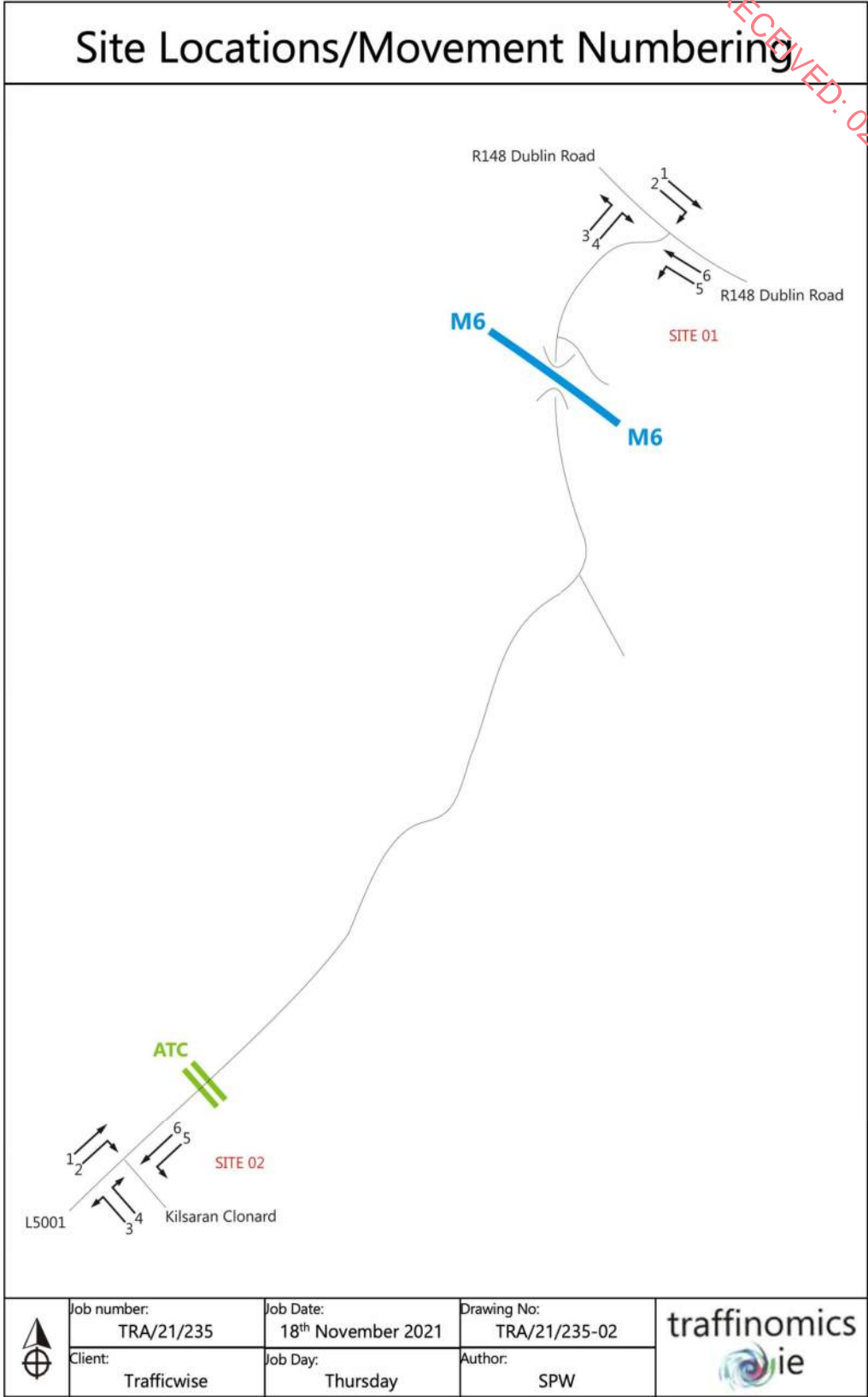
### **Appendix 14-5**

Road Improvement Works

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**Appendix 14-1**  
Traffic Survey Data  
Turning Count Survey – 18-Nov-2021

RECEIVED: 02/10/2023



TRAFFINOMICS LIMITED

KILSARAN CLONARD TRAFFIC COUNTS  
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

DECEMBER 2021

TRA/21/235

RECEIVED: 02/10/2023

SITE: 01

DATE: 18th November 2021

LOCATION: R148 Dublin Road/L5001

DAY: Thursday

TIME	MOVEMENT 1					TOT	PCU	MOVEMENT 2					TOT	PCU	MOVEMENT 3					TOT	PCU		
	CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS				
07:00	75	4	0	7	1	87	97	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
07:15	102	3	3	3	0	111	116	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	1
07:30	98	5	0	5	0	108	115	2	0	0	0	0	2	2	1	0	0	0	0	0	0	1	1
07:45	78	11	1	6	4	100	112	0	0	0	1	0	1	2	4	0	0	0	0	0	0	4	4
<b>H/TOT</b>	<b>353</b>	<b>23</b>	<b>4</b>	<b>21</b>	<b>5</b>	<b>406</b>	<b>440</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>6</b>	
08:00	72	15	5	8	2	102	117	1	1	0	0	0	2	2	0	1	0	0	0	0	1	1	
08:15	76	19	3	3	3	104	112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:30	64	14	4	3	0	85	91	1	0	0	0	0	1	1	2	0	0	0	0	0	2	2	
08:45	53	18	3	5	0	79	87	2	0	0	0	0	2	2	2	0	0	0	0	0	2	2	
<b>H/TOT</b>	<b>265</b>	<b>66</b>	<b>15</b>	<b>19</b>	<b>5</b>	<b>370</b>	<b>407</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>	<b>5</b>		
09:00	42	13	0	6	1	62	71	2	0	0	0	0	2	2	1	0	0	0	0	0	1	1	
09:15	59	9	3	8	1	80	93	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	
09:30	49	11	4	4	0	68	75	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1	
09:45	50	9	3	2	1	65	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>H/TOT</b>	<b>200</b>	<b>42</b>	<b>10</b>	<b>20</b>	<b>3</b>	<b>275</b>	<b>309</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>		
10:00	36	6	4	10	0	56	71	0	1	0	1	0	2	3	0	0	0	0	0	0	0	0	
10:15	30	12	3	8	3	56	71	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	
10:30	35	13	0	5	0	53	60	0	1	0	0	0	1	1	1	0	0	0	0	0	1	1	
10:45	36	8	4	9	0	57	71	1	0	0	0	0	1	1	3	1	0	0	0	0	4	4	
<b>H/TOT</b>	<b>137</b>	<b>39</b>	<b>11</b>	<b>32</b>	<b>3</b>	<b>222</b>	<b>272</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>5</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>6</b>		
11:00	40	14	1	5	0	60	67	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	
11:15	26	6	5	7	1	45	58	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	
11:30	37	15	4	4	0	60	67	0	0	0	1	0	1	2	2	0	0	0	0	0	2	2	
11:45	40	11	1	7	0	59	69	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1	
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12:00	32	7	6	8	1	54	68	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3	
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12:45	29	7	2	3	1	42	48	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1	
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TRAFFINOMICS LIMITED

KILSARAN CLONARD TRAFFIC COUNTS  
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

DECEMBER 2021

TRA/21/235

RECEIVED: 02/10/2023

SITE: 01

DATE: 18th November 2021

LOCATION: R148 Dublin Road/L5001

DAY: Thursday

TIME	MOVEMENT 4					TOT	PCU	MOVEMENT 5					TOT	PCU	MOVEMENT 6					TOT	PCU
	CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS		
07:00	6	0	0	1	0	7	8	2	2	0	1	0	5	6	27	2	0	2	0	31	34
07:15	4	1	0	4	0	9	14	1	0	0	2	0	3	6	47	3	0	6	0	56	64
07:30	8	1	0	5	0	14	21	1	0	0	0	0	1	1	38	5	0	5	3	51	61
07:45	4	0	0	4	0	8	13	2	0	0	3	0	5	9	39	5	0	3	1	48	53
<b>H/TOT</b>	<b>22</b>	<b>2</b>	<b>0</b>	<b>14</b>	<b>0</b>	<b>38</b>	<b>56</b>	<b>6</b>	<b>2</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>14</b>	<b>22</b>	<b>151</b>	<b>15</b>	<b>0</b>	<b>16</b>	<b>4</b>	<b>186</b>	<b>211</b>
08:00	5	1	0	1	0	7	8	1	1	0	4	0	6	11	34	13	1	6	3	57	68
08:15	6	0	0	3	1	10	15	4	0	1	5	0	10	17	42	14	2	9	1	68	82
08:30	2	2	0	4	0	8	13	2	1	0	2	0	5	8	37	6	1	11	0	55	70
08:45	5	2	0	6	0	13	21	1	0	0	1	0	2	3	36	5	1	8	1	51	63
<b>H/TOT</b>	<b>18</b>	<b>5</b>	<b>0</b>	<b>14</b>	<b>1</b>	<b>38</b>	<b>57</b>	<b>8</b>	<b>2</b>	<b>1</b>	<b>12</b>	<b>0</b>	<b>23</b>	<b>39</b>	<b>149</b>	<b>38</b>	<b>5</b>	<b>34</b>	<b>5</b>	<b>231</b>	<b>283</b>
09:00	5	0	0	1	0	6	7	1	0	0	5	0	6	13	33	8	0	1	0	42	43
09:15	1	0	0	3	1	5	10	2	1	0	5	0	8	15	43	11	1	8	0	63	74
09:30	5	0	0	4	0	9	14	3	0	0	5	0	8	15	32	6	0	4	1	43	49
09:45	1	1	0	6	0	8	16	2	2	0	2	0	6	9	38	9	3	11	0	61	77
<b>H/TOT</b>	<b>12</b>	<b>1</b>	<b>0</b>	<b>14</b>	<b>1</b>	<b>28</b>	<b>47</b>	<b>8</b>	<b>3</b>	<b>0</b>	<b>17</b>	<b>0</b>	<b>28</b>	<b>50</b>	<b>146</b>	<b>34</b>	<b>4</b>	<b>24</b>	<b>1</b>	<b>209</b>	<b>243</b>
10:00	4	1	0	1	0	6	7	0	3	0	3	0	6	10	50	6	4	5	0	65	74
10:15	1	0	0	3	0	4	8	7	1	0	4	0	12	17	36	2	1	7	1	47	58
10:30	0	0	0	4	0	4	9	0	2	0	2	0	4	7	31	6	1	9	2	49	63
10:45	1	1	0	5	0	7	14	3	0	0	1	0	4	5	31	7	0	5	0	43	50
<b>H/TOT</b>	<b>6</b>	<b>2</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>21</b>	<b>38</b>	<b>10</b>	<b>6</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>26</b>	<b>39</b>	<b>148</b>	<b>21</b>	<b>6</b>	<b>26</b>	<b>3</b>	<b>204</b>	<b>244</b>
11:00	1	0	0	2	0	3	6	2	2	0	5	0	9	16	39	9	3	7	0	58	69
11:15	0	1	1	2	0	4	7	2	1	1	3	0	7	11	39	9	4	6	0	58	68
11:30	1	1	0	4	0	6	11	1	0	0	3	0	4	8	39	7	1	8	0	55	66
11:45	2	0	0	2	0	4	7	1	1	0	3	0	5	9	32	10	2	10	1	55	70
<b>H/TOT</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>10</b>	<b>0</b>	<b>17</b>	<b>31</b>	<b>6</b>	<b>4</b>	<b>1</b>	<b>14</b>	<b>0</b>	<b>25</b>	<b>44</b>	<b>149</b>	<b>35</b>	<b>10</b>	<b>31</b>	<b>1</b>	<b>226</b>	<b>272</b>
12:00	4	0	1	5	0	10	17	3	1	0	3	0	7	11	35	8	2	8	0	53	64
12:15	2	1	0	0	0	3	3	1	0	0	3	0	4	8	47	8	2	4	0	61	67
12:30	2	0	2	3	0	7	12	4	0	0	4	0	8	13	24	10	0	3	0	37	41
12:45	3	0	0	1	0	4	5	2	0	0	5	0	7	14	36	14	3	8	2	63	77
<b>H/TOT</b>	<b>11</b>	<b>1</b>	<b>3</b>	<b>9</b>	<b>0</b>	<b>24</b>	<b>37</b>	<b>10</b>	<b>1</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>26</b>	<b>46</b>	<b>142</b>	<b>40</b>	<b>7</b>	<b>23</b>	<b>2</b>	<b>214</b>	<b>249</b>

TRAFFINOMICS LIMITED

KILSARAN CLONARD TRAFFIC COUNTS  
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

DECEMBER 2021

TRA/21/235

RECEIVED: 02/10/2023

SITE: 01

DATE: 18th November 2021

LOCATION: R148 Dublin Road/L5001

DAY: Thursday

TIME	MOVEMENT 1					TOT	PCU	MOVEMENT 2					TOT	PCU	MOVEMENT 3					TOT	PCU	
	CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			
13:00	33	5	1	6	0	45	53	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1
13:15	31	3	6	6	1	47	59	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1
13:30	43	7	2	9	0	61	74	2	0	0	0	0	2	2	3	0	0	0	0	0	3	3
13:45	40	7	2	9	0	58	71	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0
<b>H/TOT</b>	147	22	11	30	1	211	257	5	1	0	0	0	6	6	4	1	0	0	0	0	5	5
14:00	35	4	4	7	0	50	61	0	1	0	0	0	1	1	2	0	0	0	0	0	2	2
14:15	53	7	4	8	1	73	86	1	0	0	0	0	1	1	0	1	0	0	0	0	1	1
14:30	27	8	2	4	0	41	47	1	0	1	0	0	2	3	0	0	0	0	0	0	0	0
14:45	36	5	1	2	0	44	47	1	0	0	0	0	1	1	1	0	0	0	0	0	1	1
<b>H/TOT</b>	151	24	11	21	1	208	242	3	1	1	0	0	5	6	3	1	0	0	0	0	4	4
15:00	47	10	3	7	0	67	78	0	0	0	0	0	0	0	0	0	0	1	0	1	1	2
15:15	50	3	1	10	1	65	80	3	0	0	0	0	3	3	1	1	0	0	0	0	2	2
15:30	54	4	2	1	0	61	63	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
15:45	48	4	1	6	1	60	69	2	0	0	0	0	2	2	0	1	0	0	0	0	1	1
<b>H/TOT</b>	199	21	7	24	2	253	290	5	0	0	0	0	5	5	2	2	0	1	0	0	5	6
16:00	42	7	6	3	2	60	69	3	0	0	0	0	3	3	0	1	0	0	0	0	1	1
16:15	49	11	1	10	2	73	89	3	0	0	0	0	3	3	2	1	1	0	0	0	4	5
16:30	65	6	0	7	1	79	89	1	0	0	0	0	1	1	3	2	0	0	0	0	5	5
16:45	67	3	1	3	0	74	78	3	0	0	0	0	3	3	2	0	0	0	0	0	2	2
<b>H/TOT</b>	223	27	8	23	5	286	325	10	0	0	0	0	10	10	7	4	1	0	0	0	12	13
17:00	55	1	0	4	0	60	65	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2
17:15	61	2	1	5	0	69	76	4	0	0	0	0	4	4	2	1	0	0	0	0	3	3
17:30	76	1	0	2	0	79	82	3	0	0	0	0	3	3	4	1	0	0	0	0	5	5
17:45	58	3	0	3	0	64	68	0	0	0	0	0	0	0	4	1	0	0	0	0	5	5
<b>H/TOT</b>	250	7	1	14	0	272	291	7	0	0	0	0	7	7	12	3	0	0	0	0	15	15
18:00	47	2	1	4	0	54	60	1	0	0	1	0	2	3	1	0	0	0	0	0	1	1
18:15	50	2	1	2	0	55	58	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
18:30	39	1	0	5	1	46	54	3	0	0	0	0	3	3	1	0	0	0	0	0	1	1
18:45	39	2	0	4	0	45	50	3	0	0	0	0	3	3	2	1	0	0	0	0	3	3
<b>H/TOT</b>	175	7	2	15	1	200	222	8	0	0	1	0	9	10	4	1	0	0	0	0	5	5
<b>P/TOT</b>	2386	349	106	269	30	3140	3573	58	6	1	4	0	69	75	59	14	1	1	0	0	75	77

TRAFFINOMICS LIMITED

KILSARAN CLONARD TRAFFIC COUNTS  
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

DECEMBER 2021

TRA/21/235

RECEIVED: 02/10/2023

SITE: 01

DATE: 18th November 2021

LOCATION: R148 Dublin Road/L5001

DAY: Thursday

TIME	MOVEMENT 4					TOT	PCU	MOVEMENT 5					TOT	PCU	MOVEMENT 6					TOT	PCU
	CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS		
13:00	1	1	0	6	0	8	16	1	1	0	1	0	3	4	39	5	0	11	0	55	69
13:15	1	0	0	1	0	2	3	1	0	0	3	0	4	8	36	10	4	9	1	60	75
13:30	2	0	0	1	0	3	4	1	2	0	3	0	6	10	46	12	1	6	0	65	73
13:45	1	0	0	8	0	9	19	0	2	1	0	0	3	4	43	9	1	6	2	61	71
<b>H/TOT</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>22</b>	<b>43</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>7</b>	<b>0</b>	<b>16</b>	<b>26</b>	<b>164</b>	<b>36</b>	<b>6</b>	<b>32</b>	<b>3</b>	<b>241</b>	<b>289</b>
14:00	3	2	0	5	0	10	17	3	1	0	0	0	4	4	45	12	2	8	2	69	82
14:15	3	0	0	1	0	4	5	1	0	0	4	0	5	10	44	5	5	9	0	63	77
14:30	1	1	0	0	0	2	2	2	0	0	10	0	12	25	42	6	0	7	0	55	64
14:45	5	1	0	3	0	9	13	4	1	0	2	0	7	10	46	10	0	9	1	66	79
<b>H/TOT</b>	<b>12</b>	<b>4</b>	<b>0</b>	<b>9</b>	<b>0</b>	<b>25</b>	<b>37</b>	<b>10</b>	<b>2</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>28</b>	<b>49</b>	<b>177</b>	<b>33</b>	<b>7</b>	<b>33</b>	<b>3</b>	<b>253</b>	<b>302</b>
15:00	4	1	0	7	0	12	21	1	1	0	2	0	4	7	60	12	1	8	1	82	94
15:15	4	1	0	4	0	9	14	6	0	0	2	0	8	11	66	10	2	8	0	86	97
15:30	3	0	0	0	0	3	3	2	2	0	2	0	6	9	72	10	5	8	0	95	108
15:45	4	1	0	1	0	6	7	5	3	0	0	0	8	8	91	22	4	11	3	131	150
<b>H/TOT</b>	<b>15</b>	<b>3</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>30</b>	<b>46</b>	<b>14</b>	<b>6</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>26</b>	<b>34</b>	<b>289</b>	<b>54</b>	<b>12</b>	<b>35</b>	<b>4</b>	<b>394</b>	<b>450</b>
16:00	2	0	0	0	0	2	2	3	1	1	0	0	5	6	69	15	0	6	1	91	100
16:15	4	2	0	1	0	7	8	6	1	0	2	1	10	14	73	27	3	9	2	114	129
16:30	1	2	0	0	0	3	3	4	2	0	1	0	7	8	94	17	1	3	0	115	119
16:45	3	0	0	0	0	3	3	6	0	0	1	0	7	8	95	6	1	7	0	109	119
<b>H/TOT</b>	<b>10</b>	<b>4</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>15</b>	<b>16</b>	<b>19</b>	<b>4</b>	<b>1</b>	<b>4</b>	<b>1</b>	<b>29</b>	<b>36</b>	<b>331</b>	<b>65</b>	<b>5</b>	<b>25</b>	<b>3</b>	<b>429</b>	<b>467</b>
17:00	2	0	0	1	0	3	4	10	1	0	0	0	11	11	122	6	2	8	0	138	149
17:15	3	0	0	0	0	3	3	9	1	2	0	0	12	13	106	3	2	4	0	115	121
17:30	9	2	0	0	0	11	11	6	1	0	0	0	7	7	95	6	2	2	0	105	109
17:45	4	1	0	0	0	5	5	3	1	0	0	0	4	4	75	8	1	6	0	90	98
<b>H/TOT</b>	<b>18</b>	<b>3</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>22</b>	<b>23</b>	<b>28</b>	<b>4</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>34</b>	<b>35</b>	<b>398</b>	<b>23</b>	<b>7</b>	<b>20</b>	<b>0</b>	<b>448</b>	<b>478</b>
18:00	4	1	0	0	0	5	5	5	0	0	0	0	5	5	103	8	1	4	0	116	122
18:15	1	0	0	0	0	1	1	4	0	0	0	0	4	4	71	8	2	6	1	88	98
18:30	0	0	0	0	0	0	0	5	0	0	1	0	6	7	80	7	0	3	0	90	94
18:45	5	0	0	0	0	5	5	4	1	0	0	0	5	5	83	3	0	6	0	92	100
<b>H/TOT</b>	<b>10</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>11</b>	<b>18</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>20</b>	<b>21</b>	<b>337</b>	<b>26</b>	<b>3</b>	<b>19</b>	<b>1</b>	<b>386</b>	<b>413</b>
<b>P/TOT</b>	<b>143</b>	<b>29</b>	<b>4</b>	<b>113</b>	<b>2</b>	<b>291</b>	<b>442</b>	<b>140</b>	<b>40</b>	<b>6</b>	<b>108</b>	<b>1</b>	<b>295</b>	<b>439</b>	<b>2581</b>	<b>420</b>	<b>72</b>	<b>318</b>	<b>30</b>	<b>3421</b>	<b>3900</b>

TRAFFINOMICS LIMITED

KILSARAN CLONARD TRAFFIC COUNTS  
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

DECEMBER 2021

TRA/21/235

RECEIVED: 02/10/2023

SITE: 02

DATE: 18th November 2021

LOCATION: L5001/Kilsaran Quarry Access

DAY: Thursday

TIME	MOVEMENT 1					TOT	PCU	MOVEMENT 2					TOT	PCU	MOVEMENT 3					TOT	PCU	
	CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			
07:00	2	0	0	0	0	2	2	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
07:15	5	0	0	0	0	5	5	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
07:30	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	1	1	0	0	1	3	4	1	0	0	0	0	1	1	0	0	0	1	0	1	2	2
<b>H/TOT</b>	<b>13</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>15</b>	<b>16</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	
08:00	4	1	0	0	0	5	5	0	1	0	0	0	1	1	0	0	0	2	0	2	5	
08:15	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:30	2	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:45	3	2	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>H/TOT</b>	<b>12</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>16</b>	<b>16</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>5</b>	
09:00	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
09:15	2	0	0	0	1	3	4	0	0	0	1	0	1	2	0	0	0	0	0	0	0	
09:30	2	0	1	0	0	3	4	0	0	0	1	0	1	2	0	0	0	0	0	0	0	
09:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>H/TOT</b>	<b>8</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>10</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:15	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	1	0	1	2	
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
10:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>H/TOT</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	
11:00	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	0	1	2	
11:15	2	1	0	0	0	3	3	0	0	0	1	0	1	2	0	0	0	0	0	0	0	
11:30	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
11:45	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	0	1	2	
<b>H/TOT</b>	<b>8</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>11</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>2</b>	<b>5</b>	
12:00	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
12:15	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	1	2	
12:30	3	0	1	0	0	4	5	0	0	0	1	0	1	2	0	0	0	0	0	0	0	
12:45	1	1	1	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>H/TOT</b>	<b>8</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	



TRAFFINOMICS LIMITED

KILSARAN CLONARD TRAFFIC COUNTS  
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

DECEMBER 2021

TRA/21/235

RECEIVED: 02/10/2023

SITE: 02

DATE: 18th November 2021

LOCATION: L5001/Kilsaran Quarry Access

DAY: Thursday

TIME	MOVEMENT 4					TOT	PCU	MOVEMENT 5					TOT	PCU	MOVEMENT 6					TOT	PCU	
	CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			
07:00	1	0	0	1	0	2	3	1	0	1	3	0	5	9	2	0	0	0	0	0	2	2
07:15	0	0	1	6	0	7	15	0	0	0	1	0	1	2	1	0	0	0	0	0	1	1
07:30	0	0	0	3	0	3	7	0	0	0	1	0	1	2	2	0	0	0	0	0	2	2
07:45	0	0	0	3	0	3	7	0	0	0	4	0	4	9	0	1	0	0	0	0	1	1
<b>H/TOT</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>13</b>	<b>0</b>	<b>15</b>	<b>32</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>9</b>	<b>0</b>	<b>11</b>	<b>23</b>	<b>5</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>6</b>
08:00	0	0	0	2	0	2	5	1	0	0	2	0	3	6	1	0	0	0	0	0	1	1
08:15	0	1	0	4	0	5	10	0	0	0	6	0	6	14	2	2	0	0	0	0	4	4
08:30	0	0	0	5	0	5	12	0	1	0	3	0	4	8	5	0	0	0	0	0	5	5
08:45	0	0	0	4	0	4	9	0	0	0	1	0	1	2	3	0	1	0	0	0	4	5
<b>H/TOT</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>16</b>	<b>36</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>12</b>	<b>0</b>	<b>14</b>	<b>30</b>	<b>11</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>	<b>15</b>
09:00	0	0	0	1	0	1	2	0	0	0	4	0	4	9	1	0	0	0	0	0	1	1
09:15	0	0	0	5	0	5	12	0	0	0	5	0	5	12	1	1	0	0	0	0	2	2
09:30	0	0	0	3	0	3	7	0	1	0	3	0	4	8	3	0	0	0	0	0	3	3
09:45	0	0	0	4	0	4	9	0	0	0	5	0	5	12	1	2	0	0	0	0	3	3
<b>H/TOT</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>13</b>	<b>30</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>17</b>	<b>0</b>	<b>18</b>	<b>40</b>	<b>6</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>9</b>
10:00	0	1	0	2	0	3	6	0	0	0	4	0	4	9	2	2	0	0	0	0	4	4
10:15	0	0	0	3	0	3	7	0	0	0	3	0	3	7	4	3	0	0	0	0	7	7
10:30	0	0	0	4	0	4	9	0	0	0	3	0	3	7	0	0	0	0	0	0	0	0
10:45	0	1	0	6	0	7	15	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
<b>H/TOT</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>17</b>	<b>37</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>10</b>	<b>23</b>	<b>6</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>12</b>	<b>12</b>
11:00	0	0	0	0	0	0	0	0	0	0	6	0	6	14	2	2	0	0	0	0	4	4
11:15	0	0	0	4	0	4	9	0	0	0	3	0	3	7	3	0	0	0	0	0	3	3
11:30	0	0	0	4	0	4	9	0	0	0	3	0	3	7	1	1	0	0	0	0	2	2
11:45	0	0	0	3	0	3	7	0	0	0	3	0	3	7	1	0	0	0	0	0	1	1
<b>H/TOT</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>11</b>	<b>0</b>	<b>11</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>0</b>	<b>15</b>	<b>35</b>	<b>7</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10</b>	<b>10</b>
12:00	0	0	0	2	0	2	5	0	0	0	3	0	3	7	2	1	0	0	0	0	3	3
12:15	0	0	0	1	0	1	2	0	0	0	4	0	4	9	1	0	0	0	0	0	1	1
12:30	0	0	0	3	0	3	7	0	0	0	3	0	3	7	2	0	1	0	0	0	3	4
12:45	0	0	0	2	0	2	5	0	0	0	6	0	6	14	1	0	0	0	0	0	1	1
<b>H/TOT</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>8</b>	<b>18</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>16</b>	<b>0</b>	<b>16</b>	<b>37</b>	<b>6</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>8</b>	<b>9</b>

TRAFFINOMICS LIMITED

KILSARAN CLONARD TRAFFIC COUNTS  
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

DECEMBER 2021

TRA/21/235

RECEIVED: 02/10/2023

SITE: 02

DATE: 18th November 2021

LOCATION: L5001/Kilsaran Quarry Access

DAY: Thursday

TIME	MOVEMENT 1					TOT	PCU	MOVEMENT 2					TOT	PCU	MOVEMENT 3					TOT	PCU			
	CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS					
13:00	1	2	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:15	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:30	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13:45	2	0	0	0	0	2	2	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0
<b>H/TOT</b>	<b>7</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
14:00	1	1	0	0	0	2	2	0	0	0	1	0	1	2	0	0	0	0	0	0	0	0	0	0
14:15	1	1	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	1	0	1	0	1	2	0
14:30	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	2	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>H/TOT</b>	<b>6</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>9</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>0</b>
15:00	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	3	0	0	0	0	3	3	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
15:30	7	0	0	0	0	7	7	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0
15:45	2	0	0	0	0	2	2	0	0	0	1	0	1	2	1	0	0	0	0	0	1	1	1	0
<b>H/TOT</b>	<b>17</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>17</b>	<b>17</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>0</b>
16:00	7	0	0	0	0	7	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1	1	0
16:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0
<b>H/TOT</b>	<b>14</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>0</b>
17:00	3	0	0	0	0	3	3	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0
17:15	6	0	0	0	0	6	6	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1	1	0
17:30	5	0	0	0	0	5	5	0	0	0	0	0	0	0	2	0	0	0	0	0	2	2	2	0
17:45	6	0	0	0	0	6	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>H/TOT</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>20</b>	<b>20</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>0</b>
18:00	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:30	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>H/TOT</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>P/TOT</b>	<b>123</b>	<b>15</b>	<b>3</b>	<b>0</b>	<b>2</b>	<b>143</b>	<b>147</b>	<b>3</b>	<b>2</b>	<b>0</b>	<b>7</b>	<b>0</b>	<b>12</b>	<b>21</b>	<b>6</b>	<b>2</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>16</b>	<b>16</b>	<b>26</b>	<b>0</b>	<b>0</b>

TRAFFINOMICS LIMITED

KILSARAN CLONARD TRAFFIC COUNTS  
MANUAL CLASSIFIED JUNCTION TURNING COUNTS

DECEMBER 2021

TRA/21/235

RECEIVED: 02/10/2023

SITE: 02

DATE: 18th November 2021

LOCATION: L5001/Kilsaran Quarry Access

DAY: Thursday

TIME	MOVEMENT 4					TOT	PCU	MOVEMENT 5					TOT	PCU	MOVEMENT 6					TOT	PCU	
	CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			CAR	LGV	OGV1	OGV2	BUS			
13:00	0	0	0	4	0	4	9	0	0	0	1	0	1	2	3	0	0	0	0	0	3	3
13:15	0	0	0	2	0	2	5	0	0	0	1	0	1	2	3	0	0	0	0	0	3	3
13:30	0	0	0	3	0	3	7	0	0	0	5	0	5	12	2	1	0	0	0	0	3	3
13:45	0	0	0	8	0	8	18	0	0	0	0	0	0	0	3	2	0	0	0	0	5	5
<b>H/TOT</b>	0	0	0	17	0	17	39	0	0	0	7	0	7	16	11	3	0	0	0	0	14	14
14:00	0	0	0	2	0	2	5	0	0	0	0	0	0	0	2	1	0	0	0	0	3	3
14:15	0	0	0	1	0	1	2	0	0	0	2	0	2	5	3	0	0	0	0	0	3	3
14:30	0	0	0	1	0	1	2	0	0	0	8	0	8	18	1	1	0	0	0	0	2	2
14:45	0	0	0	4	0	4	9	0	0	0	4	0	4	9	5	0	1	0	0	0	6	7
<b>H/TOT</b>	0	0	0	8	0	8	18	0	0	0	14	0	14	32	11	2	1	0	0	0	14	15
15:00	0	0	0	7	0	7	16	0	0	0	1	0	1	2	2	1	0	0	0	0	3	3
15:15	0	0	0	2	0	2	5	0	0	0	3	0	3	7	2	0	0	0	0	0	2	2
15:30	0	0	0	0	0	0	0	1	0	0	2	0	3	6	4	2	0	0	0	0	6	6
15:45	0	0	0	1	0	1	2	0	0	0	0	0	0	0	3	2	0	0	0	0	5	5
<b>H/TOT</b>	0	0	0	10	0	10	23	1	0	0	6	0	7	15	11	5	0	0	0	0	16	16
16:00	0	0	0	1	0	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0	1	1
16:15	0	1	0	0	0	1	1	0	0	0	1	0	1	2	4	1	0	0	2	0	7	9
16:30	0	0	0	0	0	0	0	0	0	0	2	0	2	5	5	0	0	0	0	0	5	5
16:45	0	0	0	1	0	1	2	0	0	0	1	0	1	2	7	0	0	0	0	0	7	7
<b>H/TOT</b>	0	1	0	2	0	3	6	0	0	0	4	0	4	9	17	1	0	0	2	0	20	22
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	1	0	6	7
17:15	1	0	0	0	0	1	1	1	0	0	0	0	1	1	14	0	0	0	0	0	14	14
17:30	7	0	0	0	0	7	7	0	0	0	0	0	0	0	5	0	0	0	0	0	5	5
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6	6
<b>H/TOT</b>	8	0	0	0	0	8	8	1	0	0	0	0	1	1	30	0	0	0	1	0	31	32
18:00	0	1	0	0	0	1	1	0	0	0	0	0	0	0	3	0	0	0	0	0	3	3
18:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	4	4
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	1	0	0	5	6
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6	6
<b>H/TOT</b>	0	1	0	0	0	1	1	0	0	0	0	0	0	0	17	0	0	1	0	0	18	19
<b>P/TOT</b>	9	5	1	112	0	127	273	4	2	1	110	0	117	261	138	27	3	1	3	0	172	178

RECEIVED: 02/10/2023

**Appendix 14-1**

Traffic Survey Data

Automatic Traffic Counter Survey – 18-Nov-2021 to 24-Nov-2021

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

Thursday 18th November 2021

TRA/21/235

**SITE 01  
NORTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0
0200	0	1	0	0	0	0	1	1
0300	0	1	0	0	0	0	1	1
0400	0	1	0	0	0	0	1	1
0500	0	6	0	0	0	0	6	6
0600	0	15	3	0	2	0	20	23
0700	0	11	3	0	14	1	29	48
0800	0	15	4	0	15	0	34	54
0900	0	8	1	1	14	0	24	43
1000	0	4	1	0	14	0	19	37
1100	0	10	4	0	10	0	24	37
1200	0	8	3	1	9	0	21	33
1300	0	7	1	0	17	0	25	47
1400	0	7	3	0	10	0	20	33
1500	0	18	1	0	7	0	26	35
1600	0	14	2	0	2	0	18	21
1700	0	25	6	0	0	0	31	31
1800	0	4	2	0	0	0	6	6
1900	0	7	1	0	0	0	8	8
2000	0	4	0	0	0	0	4	4
2100	0	2	0	0	0	0	2	2
2200	0	0	0	0	0	0	0	0
2300	0	1	1	0	0	0	2	2
<b>07-19</b>	0	131	31	2	112	1	277	425
<b>06-22</b>	0	159	35	2	114	1	311	461
<b>06-00</b>	0	160	36	2	114	1	313	463
<b>00-00</b>	0	169	36	2	114	1	322	472

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

Thursday 18th November 2021

TRA/21/235

**SITE 01  
SOUTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	2	0	0	0	0	2	2
0100	0	1	0	0	0	0	1	1
0200	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0
0500	0	1	0	0	0	0	1	1
0600	0	11	2	0	5	0	18	25
0700	0	4	3	0	8	0	15	25
0800	0	14	3	1	11	0	29	44
0900	1	10	2	0	16	0	29	49
1000	0	7	5	0	11	0	23	37
1100	0	9	2	0	15	0	26	46
1200	0	8	0	1	15	0	24	44
1300	0	8	4	0	7	0	19	28
1400	0	15	2	0	14	0	31	49
1500	0	14	2	0	6	0	22	30
1600	0	17	4	0	4	1	26	32
1700	0	21	8	0	1	0	30	31
1800	0	15	2	0	1	0	18	19
1900	0	10	1	0	0	0	11	11
2000	0	12	2	0	1	0	15	16
2100	0	10	0	0	0	0	10	10
2200	0	5	0	0	0	0	5	5
2300	0	1	1	0	0	0	2	2
<b>07-19</b>	<b>1</b>	<b>142</b>	<b>37</b>	<b>2</b>	<b>109</b>	<b>1</b>	<b>292</b>	<b>435</b>
<b>06-22</b>	<b>1</b>	<b>185</b>	<b>42</b>	<b>2</b>	<b>115</b>	<b>1</b>	<b>346</b>	<b>497</b>
<b>06-00</b>	<b>1</b>	<b>191</b>	<b>43</b>	<b>2</b>	<b>115</b>	<b>1</b>	<b>353</b>	<b>504</b>
<b>00-00</b>	<b>1</b>	<b>195</b>	<b>43</b>	<b>2</b>	<b>115</b>	<b>1</b>	<b>357</b>	<b>508</b>

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

Friday 19th November 2021

TRA/21/235

**SITE 01  
NORTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	0	1	0	0	0	1	1
0100	0	0	1	0	0	0	1	1
0200	0	1	0	0	0	0	1	1
0300	0	0	0	0	0	0	0	0
0400	0	1	0	0	0	0	1	1
0500	0	7	0	0	0	0	7	7
0600	0	15	5	0	2	0	22	25
0700	0	10	4	0	14	1	29	48
0800	0	16	6	0	9	0	31	43
0900	0	15	1	1	9	0	26	38
1000	0	5	0	0	13	0	18	35
1100	0	11	3	1	9	0	24	36
1200	0	14	3	0	11	0	28	42
1300	0	8	3	0	9	0	20	32
1400	0	10	2	0	16	0	28	49
1500	0	14	3	0	13	0	30	47
1600	0	23	0	0	3	0	26	30
1700	0	30	5	0	0	0	35	35
1800	0	10	3	0	0	0	13	13
1900	0	6	1	0	0	0	7	7
2000	0	2	1	0	0	0	3	3
2100	0	2	1	0	0	0	3	3
2200	0	1	0	0	0	0	1	1
2300	0	2	0	0	0	0	2	2
<b>07-19</b>	0	166	33	2	106	1	308	448
<b>06-22</b>	0	191	41	2	108	1	343	485
<b>06-00</b>	0	194	41	2	108	1	346	488
<b>00-00</b>	0	203	43	2	108	1	357	499

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

Friday 19th November 2021

TRA/21/235

**SITE 01  
SOUTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	4	0	0	0	0	4	4
0100	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0
0300	0	1	0	0	0	0	1	1
0400	0	0	0	0	0	0	0	0
0500	0	1	0	0	0	0	1	1
0600	0	11	1	0	7	0	19	28
0700	0	7	3	0	5	0	15	22
0800	0	8	6	0	10	0	24	37
0900	1	10	4	1	9	0	25	36
1000	0	4	4	1	11	0	20	35
1100	0	7	2	0	8	0	17	27
1200	0	9	0	0	10	0	19	32
1300	0	14	2	0	15	0	31	51
1400	0	16	2	0	14	0	32	50
1500	1	21	2	0	9	0	33	44
1600	0	17	1	0	5	1	24	32
1700	0	13	4	0	1	0	18	19
1800	0	12	4	0	2	0	18	21
1900	0	10	0	0	2	0	12	15
2000	0	8	1	0	0	0	9	9
2100	0	3	1	0	0	0	4	4
2200	0	13	0	0	0	0	13	13
2300	0	2	0	0	0	0	2	2
<b>07-19</b>	<b>2</b>	<b>138</b>	<b>34</b>	<b>2</b>	<b>99</b>	<b>1</b>	<b>276</b>	<b>405</b>
<b>06-22</b>	<b>2</b>	<b>170</b>	<b>37</b>	<b>2</b>	<b>108</b>	<b>1</b>	<b>320</b>	<b>461</b>
<b>06-00</b>	<b>2</b>	<b>185</b>	<b>37</b>	<b>2</b>	<b>108</b>	<b>1</b>	<b>335</b>	<b>476</b>
<b>00-00</b>	<b>2</b>	<b>191</b>	<b>37</b>	<b>2</b>	<b>108</b>	<b>1</b>	<b>341</b>	<b>482</b>



**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

**Saturday 20th November 2021**

**TRA/21/235**

**SITE 01  
NORTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	0	0	0	0	0	0	0
0100	0	1	0	0	0	0	1	1
0200	0	1	0	0	0	0	1	1
0300	0	0	0	0	0	0	0	0
0400	0	2	0	0	0	0	2	2
0500	0	2	0	0	0	0	2	2
0600	0	6	1	0	0	0	7	7
0700	0	7	3	0	0	0	10	10
0800	0	3	1	0	0	0	4	4
0900	0	11	2	0	0	0	13	13
1000	0	10	3	0	0	0	13	13
1100	0	12	1	1	0	0	14	15
1200	0	17	2	0	0	0	19	19
1300	0	9	2	0	0	0	11	11
1400	0	22	0	0	0	0	22	22
1500	1	11	0	0	0	0	12	11
1600	0	9	0	0	0	0	9	9
1700	0	11	1	0	0	0	12	12
1800	0	2	1	0	0	0	3	3
1900	0	10	0	0	0	0	10	10
2000	0	7	0	0	0	0	7	7
2100	0	4	1	0	0	0	5	5
2200	0	8	0	0	0	0	8	8
2300	0	0	0	0	0	0	0	0
<b>07-19</b>	<b>1</b>	<b>124</b>	<b>16</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>142</b>	<b>142</b>
<b>06-22</b>	<b>1</b>	<b>151</b>	<b>18</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>171</b>	<b>171</b>
<b>06-00</b>	<b>1</b>	<b>159</b>	<b>18</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>179</b>	<b>179</b>
<b>00-00</b>	<b>1</b>	<b>165</b>	<b>18</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>185</b>	<b>185</b>

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

Saturday 20th November 2021

TRA/21/235

**SITE 01  
SOUTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	1	0	0	0	0	1	1
0100	0	3	0	0	0	0	3	3
0200	0	3	0	0	0	0	3	3
0300	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	0	0	0
0600	0	8	0	0	0	0	8	8
0700	0	2	0	0	0	0	2	2
0800	0	4	0	0	0	0	4	4
0900	0	5	3	0	0	0	8	8
1000	0	10	2	1	0	0	13	14
1100	0	9	1	0	1	0	11	12
1200	0	10	0	0	0	0	10	10
1300	0	14	2	0	0	0	16	16
1400	0	16	2	0	0	0	18	18
1500	1	10	5	0	0	0	16	15
1600	0	22	2	0	0	0	24	24
1700	0	17	0	0	0	0	17	17
1800	0	7	2	0	0	0	9	9
1900	0	6	1	0	0	0	7	7
2000	0	3	1	0	0	0	4	4
2100	0	5	1	0	0	0	6	6
2200	0	4	0	0	0	0	4	4
2300	0	3	0	0	0	0	3	3
<b>07-19</b>	<b>1</b>	<b>126</b>	<b>19</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>148</b>	<b>149</b>
<b>06-22</b>	<b>1</b>	<b>148</b>	<b>22</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>173</b>	<b>174</b>
<b>06-00</b>	<b>1</b>	<b>155</b>	<b>22</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>180</b>	<b>181</b>
<b>00-00</b>	<b>1</b>	<b>162</b>	<b>22</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>187</b>	<b>188</b>

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

**Sunday 21st November 2021**

**TRA/21/235**

**SITE 01  
NORTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	3	0	0	0	0	3	3
0100	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0
0300	0	1	0	0	0	0	1	1
0400	0	1	0	0	0	0	1	1
0500	0	1	0	0	0	0	1	1
0600	0	6	0	0	0	0	6	6
0700	0	5	0	0	0	0	5	5
0800	0	5	0	0	0	0	5	5
0900	0	7	2	0	0	0	9	9
1000	1	12	3	0	0	0	16	15
1100	0	5	0	0	0	0	5	5
1200	0	15	2	1	0	0	18	19
1300	0	6	0	0	0	0	6	6
1400	0	7	0	0	0	0	7	7
1500	0	8	2	0	0	0	10	10
1600	0	14	1	0	0	0	15	15
1700	0	9	0	0	0	0	9	9
1800	0	6	1	0	0	0	7	7
1900	0	6	0	0	0	0	6	6
2000	0	3	0	0	0	0	3	3
2100	0	4	0	0	0	0	4	4
2200	0	0	1	0	0	0	1	1
2300	0	0	0	0	0	0	0	0
<b>07-19</b>	<b>1</b>	<b>99</b>	<b>11</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>112</b>	<b>112</b>
<b>06-22</b>	<b>1</b>	<b>118</b>	<b>11</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>131</b>	<b>131</b>
<b>06-00</b>	<b>1</b>	<b>118</b>	<b>12</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>132</b>	<b>132</b>
<b>00-00</b>	<b>1</b>	<b>124</b>	<b>12</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>138</b>	<b>138</b>

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

**Sunday 21st November 2021**

**TRA/21/235**

**SITE 01  
SOUTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	5	0	0	0	0	5	5
0100	0	3	0	0	0	0	3	3
0200	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0
0500	0	0	0	0	0	0	0	0
0600	0	1	0	0	0	0	1	1
0700	0	1	0	0	0	0	1	1
0800	0	4	1	0	0	0	5	5
0900	0	3	0	0	0	0	3	3
1000	0	7	0	0	0	0	7	7
1100	0	11	0	0	0	0	11	11
1200	0	10	2	0	0	0	12	12
1300	0	12	3	0	0	0	15	15
1400	0	7	0	0	0	0	7	7
1500	0	7	0	0	0	0	7	7
1600	0	10	0	0	0	0	10	10
1700	0	14	0	0	0	0	14	14
1800	0	11	1	0	0	0	12	12
1900	0	4	0	0	0	0	4	4
2000	0	4	0	0	0	0	4	4
2100	0	5	0	0	0	0	5	5
2200	0	3	0	0	0	0	3	3
2300	0	1	0	0	0	0	1	1
<b>07-19</b>	0	97	7	0	0	0	104	104
<b>06-22</b>	0	111	7	0	0	0	118	118
<b>06-00</b>	0	115	7	0	0	0	122	122
<b>00-00</b>	0	123	7	0	0	0	130	130

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

**Monday 22nd November 2021  
TRA/21/235**

**SITE 01  
NORTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0
0200	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0
0400	0	3	0	0	0	0	3	3
0500	0	7	2	0	0	0	9	9
0600	0	20	3	0	2	0	25	28
0700	0	12	1	0	11	1	25	40
0800	0	16	1	0	13	0	30	47
0900	0	12	3	0	14	0	29	47
1000	0	14	1	0	12	0	27	43
1100	0	12	1	0	21	0	34	61
1200	0	14	0	0	7	0	21	30
1300	0	12	1	1	12	0	26	42
1400	0	11	2	2	9	0	24	37
1500	0	10	1	1	12	0	24	40
1600	0	13	1	0	3	0	17	21
1700	0	15	4	0	1	0	20	21
1800	0	5	2	0	0	0	7	7
1900	0	4	1	0	0	0	5	5
2000	0	4	1	0	0	0	5	5
2100	0	0	0	0	0	0	0	0
2200	0	3	1	0	0	0	4	4
2300	0	2	0	0	0	0	2	2
<b>07-19</b>	0	146	18	4	115	1	284	437
<b>06-22</b>	0	174	23	4	117	1	319	474
<b>06-00</b>	0	179	24	4	117	1	325	480
<b>00-00</b>	0	189	26	4	117	1	337	492

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

**Monday 22nd November 2021**

**TRA/21/235**

**SITE 01  
SOUTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	1	0	0	0	0	1	1
0100	0	0	0	0	0	0	0	0
0200	0	1	0	0	0	0	1	1
0300	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0
0500	0	2	0	0	0	0	2	2
0600	0	15	1	0	3	0	19	23
0700	0	6	7	0	9	0	22	34
0800	0	17	1	0	10	0	28	41
0900	0	10	3	0	18	0	31	54
1000	0	11	3	0	16	0	30	51
1100	0	17	2	1	17	0	37	60
1200	0	6	2	0	12	0	20	36
1300	0	10	2	1	9	0	22	34
1400	0	12	2	1	13	0	28	45
1500	0	11	1	0	5	0	17	24
1600	0	15	4	0	6	1	26	35
1700	0	19	2	0	4	0	25	30
1800	0	14	5	0	1	0	20	21
1900	0	8	2	0	0	0	10	10
2000	0	6	2	0	0	0	8	8
2100	0	5	0	0	0	0	5	5
2200	0	2	0	0	1	0	3	4
2300	0	1	0	0	0	0	1	1
<b>07-19</b>	0	148	34	3	120	1	306	465
<b>06-22</b>	0	182	39	3	123	1	348	510
<b>06-00</b>	0	185	39	3	124	1	352	516
<b>00-00</b>	0	189	39	3	124	1	356	520

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

Tuesday 23rd November 2021

TRA/21/235

**SITE 01  
NORTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0
0200	0	1	0	0	0	0	1	1
0300	0	0	0	0	0	0	0	0
0400	0	2	0	0	0	0	2	2
0500	0	7	1	0	0	0	8	8
0600	0	24	5	0	0	0	29	29
0700	0	21	2	0	11	1	35	50
0800	0	15	6	1	7	0	29	39
0900	0	10	2	2	6	0	20	29
1000	0	6	2	0	10	0	18	31
1100	0	8	2	0	3	0	13	17
1200	0	8	4	0	9	0	21	33
1300	0	14	0	1	12	0	27	43
1400	0	13	0	0	7	0	20	29
1500	0	6	3	0	10	0	19	32
1600	0	8	0	0	1	0	9	10
1700	0	24	2	0	0	0	26	26
1800	0	12	2	0	0	0	14	14
1900	0	3	1	0	0	0	4	4
2000	0	3	0	0	0	0	3	3
2100	0	3	1	0	0	0	4	4
2200	0	1	0	0	0	0	1	1
2300	0	1	0	0	0	0	1	1
<b>07-19</b>	0	145	25	4	76	1	251	353
<b>06-22</b>	0	178	32	4	76	1	291	393
<b>06-00</b>	0	180	32	4	76	1	293	395
<b>00-00</b>	0	190	33	4	76	1	304	406

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

**Tuesday 23rd November 2021  
TRA/21/235**

**SITE 01  
SOUTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	3	1	0	0	0	4	4
0100	0	1	0	0	0	0	1	1
0200	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0
0400	0	1	0	0	0	0	1	1
0500	0	1	0	0	0	0	1	1
0600	0	13	2	0	3	0	18	22
0700	0	9	6	0	4	0	19	24
0800	0	18	3	0	5	0	26	33
0900	1	5	2	0	9	0	17	28
1000	0	4	3	0	6	0	13	21
1100	1	4	1	0	9	0	15	26
1200	0	11	1	0	11	0	23	37
1300	0	14	3	0	7	0	24	33
1400	0	11	2	0	11	0	24	38
1500	0	10	1	0	4	0	15	20
1600	0	14	3	0	5	1	23	31
1700	0	20	5	0	2	0	27	30
1800	0	13	6	0	0	0	19	19
1900	0	13	2	0	0	0	15	15
2000	0	6	1	0	0	0	7	7
2100	0	6	0	0	1	0	7	8
2200	0	3	0	0	0	0	3	3
2300	0	3	0	0	1	0	4	5
<b>07-19</b>	<b>2</b>	<b>133</b>	<b>36</b>	<b>0</b>	<b>73</b>	<b>1</b>	<b>245</b>	<b>339</b>
<b>06-22</b>	<b>2</b>	<b>171</b>	<b>41</b>	<b>0</b>	<b>77</b>	<b>1</b>	<b>292</b>	<b>392</b>
<b>06-00</b>	<b>2</b>	<b>177</b>	<b>41</b>	<b>0</b>	<b>78</b>	<b>1</b>	<b>299</b>	<b>400</b>
<b>00-00</b>	<b>2</b>	<b>183</b>	<b>42</b>	<b>0</b>	<b>78</b>	<b>1</b>	<b>306</b>	<b>407</b>



**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

Wednesday 24th November 2021

TRA/21/235

**SITE 01  
NORTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	0	0	0	0	0	0	0
0100	0	0	0	0	0	0	0	0
0200	0	1	0	0	0	0	1	1
0300	0	1	0	0	0	0	1	1
0400	0	6	0	0	0	0	6	6
0500	0	4	1	0	0	0	5	5
0600	0	16	6	0	0	0	22	22
0700	0	12	0	0	11	1	24	39
0800	0	13	1	0	7	0	21	30
0900	0	12	3	0	15	0	30	50
1000	1	4	1	0	8	0	14	24
1100	0	4	1	0	7	0	12	21
1200	0	9	0	0	5	0	14	21
1300	0	10	1	1	7	0	19	29
1400	0	8	1	0	6	0	15	23
1500	0	12	3	1	6	0	22	30
1600	0	12	4	0	1	0	17	18
1700	0	19	1	0	0	0	20	20
1800	0	11	4	0	0	0	15	15
1900	0	7	0	0	0	0	7	7
2000	0	3	1	0	0	0	4	4
2100	0	2	0	0	0	0	2	2
2200	0	2	0	0	0	0	2	2
2300	0	1	0	0	0	0	1	1
<b>07-19</b>	1	126	20	2	73	1	223	319
<b>06-22</b>	1	154	27	2	73	1	258	354
<b>06-00</b>	1	157	27	2	73	1	261	357
<b>00-00</b>	1	169	28	2	73	1	274	370

**TRAFFINOMICS LIMITED**

**KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT**

Wednesday 24th November 2021

TRA/21/235

**SITE 01  
SOUTHBOUND**

RECEIVED 02/10/2023

TIME	PCL/MCL	CAR*	LGV**	OGV 1	OGV 2	BUS	TOTAL	PCU
0000	0	1	0	0	0	0	1	1
0100	0	1	0	0	0	0	1	1
0200	0	0	0	0	0	0	0	0
0300	0	0	0	0	0	0	0	0
0400	0	0	0	0	0	0	0	0
0500	0	2	0	1	0	0	3	4
0600	0	15	2	0	3	0	20	24
0700	0	8	4	0	4	0	16	21
0800	0	15	3	0	7	0	25	34
0900	0	8	3	0	11	0	22	36
1000	0	4	6	0	9	0	19	31
1100	0	4	4	0	8	0	16	26
1200	0	7	1	0	5	0	13	20
1300	0	3	0	0	8	0	11	21
1400	0	12	1	0	6	1	20	29
1500	0	16	4	0	4	0	24	29
1600	0	16	5	0	5	0	26	33
1700	0	16	1	0	5	0	22	29
1800	0	15	3	0	0	0	18	18
1900	0	7	1	0	1	0	9	10
2000	0	6	0	0	0	0	6	6
2100	0	6	0	0	0	0	6	6
2200	0	5	0	0	0	0	5	5
2300	0	1	0	0	0	0	1	1
<b>07-19</b>	0	124	35	0	72	1	232	327
<b>06-22</b>	0	158	38	0	76	1	273	373
<b>06-00</b>	0	164	38	0	76	1	279	379
<b>00-00</b>	0	168	38	1	76	1	284	384

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TRAFFINOMICS LIMITED

KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY AUTOMATIC TRAFFIC COUNT  
 SITE 01 NORTHBOUND  
 WEEK COMMENCING: Thursday 18th November 2021 TRA/21/235

TIME PERIOD	Thursday 18th November 2021	Friday 19th November 2021	Saturday 20th November 2021	Sunday 21st November 2021	Monday 22nd November 2021	Tuesday 23rd November 2021	Wednesday 24th November 2021	Average
0000	0	1	0	3	0	0	0	1
0100	0	1	1	0	0	0	0	0
0200	1	1	1	0	0	1	1	1
0300	1	0	0	1	0	0	1	0
0400	1	1	2	1	3	2	6	2
0500	6	7	2	1	9	8	5	5
0600	20	22	7	6	25	29	22	19
0700	29	29	10	5	25	35	24	22
0800	34	31	4	5	30	29	21	22
0900	24	26	13	9	29	20	30	22
1000	19	18	13	16	27	18	14	18
1100	24	24	14	5	34	13	12	18
1200	21	28	19	18	21	21	14	20
1300	25	20	11	6	26	27	19	19
1400	20	28	22	7	24	20	15	19
1500	26	30	12	10	24	19	22	20
1600	18	26	9	15	17	9	17	16
1700	31	35	12	9	20	26	20	22
1800	6	13	3	7	7	14	15	9
1900	8	7	10	6	5	4	7	7
2000	4	3	7	3	5	3	4	4
2100	2	3	5	4	0	4	2	3
2200	0	1	8	1	4	1	2	2
2300	2	2	0	0	2	1	1	1
07-19	277	308	142	112	284	251	223	228
06-22	311	343	171	131	319	291	258	261
06-00	313	346	179	132	325	293	261	264
00-00	322	357	185	138	337	304	274	274

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WEEK COMMENCING: Thursday 18th November 2021  
TRA/21/235

SITE 01 SOUTHBOUND

KILSARAN, CLONARD TRAFFIC COUNT/SPEED SURVEY  
AUTOMATIC TRAFFIC COUNT

TRAFFINOMICS LIMITED

TIME PERIOD	Thursday 18th November 2021	Friday 19th November 2021	Saturday 20th November 2021	Sunday 21st November 2021	Monday 22nd November 2021	Tuesday 23rd November 2021	Wednesday 24th November 2021	Average
0000	2	4	1	5	1	4	1	3
0100	1	0	3	3	0	1	1	1
0200	0	0	3	0	1	0	0	1
0300	0	1	0	0	0	0	0	0
0400	0	0	0	0	0	1	0	0
0500	1	1	0	0	2	1	3	1
0600	18	19	8	1	19	18	20	15
0700	15	15	2	1	22	19	16	13
0800	29	24	4	5	28	26	25	20
0900	29	25	8	3	31	17	22	19
1000	23	20	13	7	30	13	19	18
1100	26	17	11	11	37	15	16	19
1200	24	19	10	12	20	23	13	17
1300	19	31	16	15	22	24	11	20
1400	31	32	18	7	28	24	20	23
1500	22	33	16	7	17	15	24	19
1600	26	24	24	10	26	23	26	23
1700	30	18	17	14	25	27	22	22
1800	18	18	9	12	20	19	18	16
1900	11	12	7	4	10	15	9	10
2000	15	9	4	4	8	7	6	8
2100	10	4	6	5	5	7	6	6
2200	5	13	4	3	3	3	5	5
2300	2	2	3	1	1	4	1	2
07-19	292	276	148	104	306	245	232	229
06-22	346	320	173	118	348	292	273	267
06-00	353	335	180	122	352	299	279	274
00-00	357	341	187	130	356	306	284	280

**TRAFFINOMICS LIMITED**

**CLASSIFICATION SCHEMES:**

**Scheme F Classification Scheme (Non-metric)**

Scheme F is an attempt to implement the FHWA's visual classification scheme as an axle-based classification scheme. This is one of several interpretations.

Vehicle Class	Class	Vehicle Type	No. of Axles	Axle spacing in feet					
				Axle 1 to 2	Axle 2 to 3	Axle 3 to 4	Axle 4 to 5	Axle 5 to 6	
PCL/MCL	1	motorcycle	2	<6.0					
CAR*	2	passenger car	2	6.0 - 10.0					
		car + 1 axle trailer	3	<10.0	10.0 - 18.0				
LGV**	3	car + 2 axle trailer	4	<10.0		<3.5			
		pickup	2	10.0 - 15.0					
		pickup + 1 axle trailer	3	10.0 - 15.0	10.0 - 18.0				
		pickup + 2 axle trailer	4	10.0 - 15.0		<3.5			
BUS	4	pickup + 3 axle trailer	5	9.9 - 15.0				<3.5	
		bus	2	>20.0					
		bus	3	>19.0					
OGV 1	5	single unit truck - dual rear axle	2	14.9 - 20.0					<3.5
		3 axle truck	3		<18.0				
OGV 2	7	4 axle truck	4						
		2S1	3		>18.0				
		2S2	4		>5.0	>3.5			
		3S1	4		<5.0	>10.0			
		3S2	5		<6.1		3.5 - 8.0		
		5 axle combination	5						
		6 axle combination	6				3.5 - 5.0		
		3S3	6						
		2S1-2	5						
		3S1-2	6			>6.0			
13	truck	7 or more						>10.0	

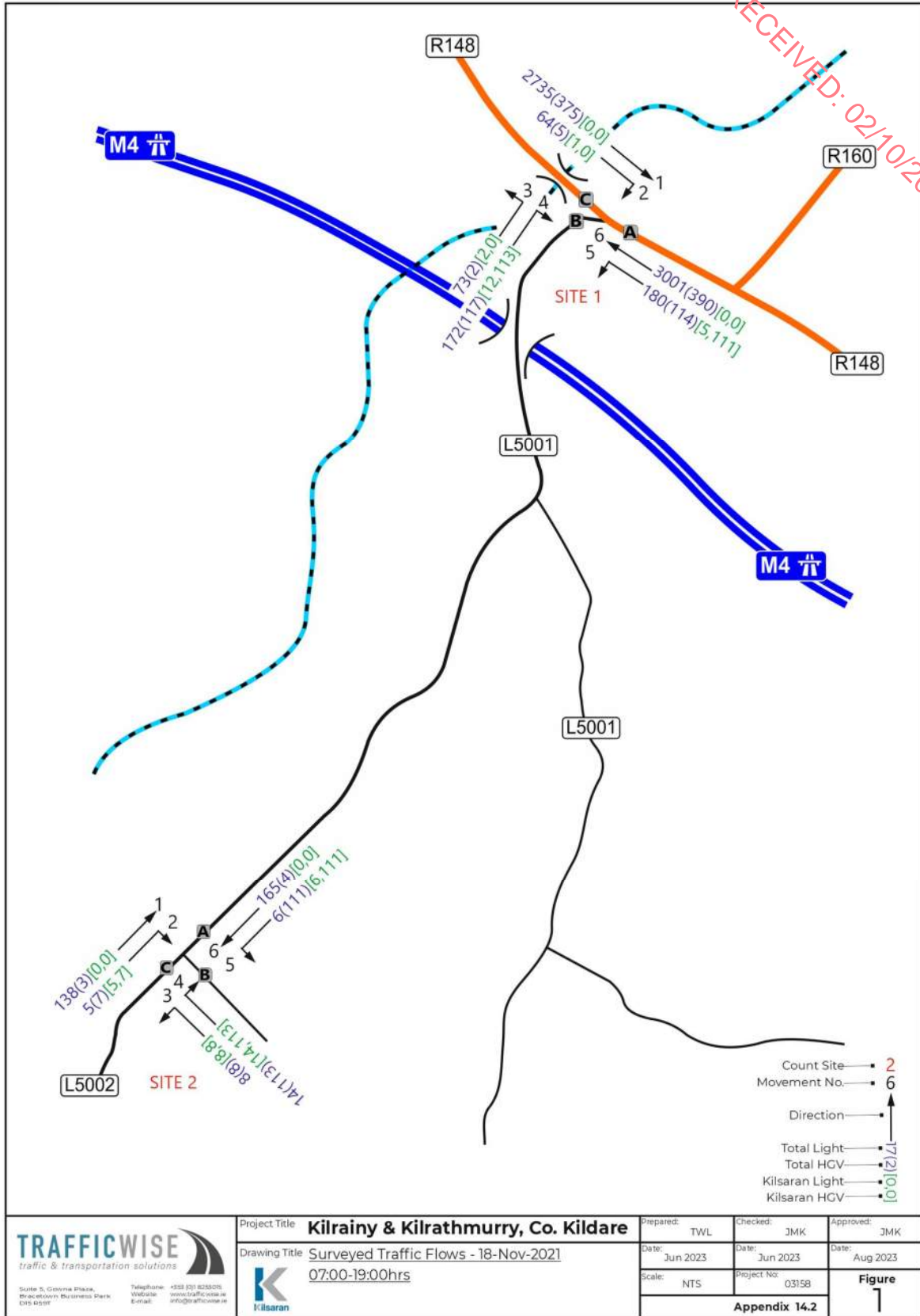
Car\* Cars and LGV based cars  
 LGV\*\* Light Goods Vehicles with the exception of LGV based on cars

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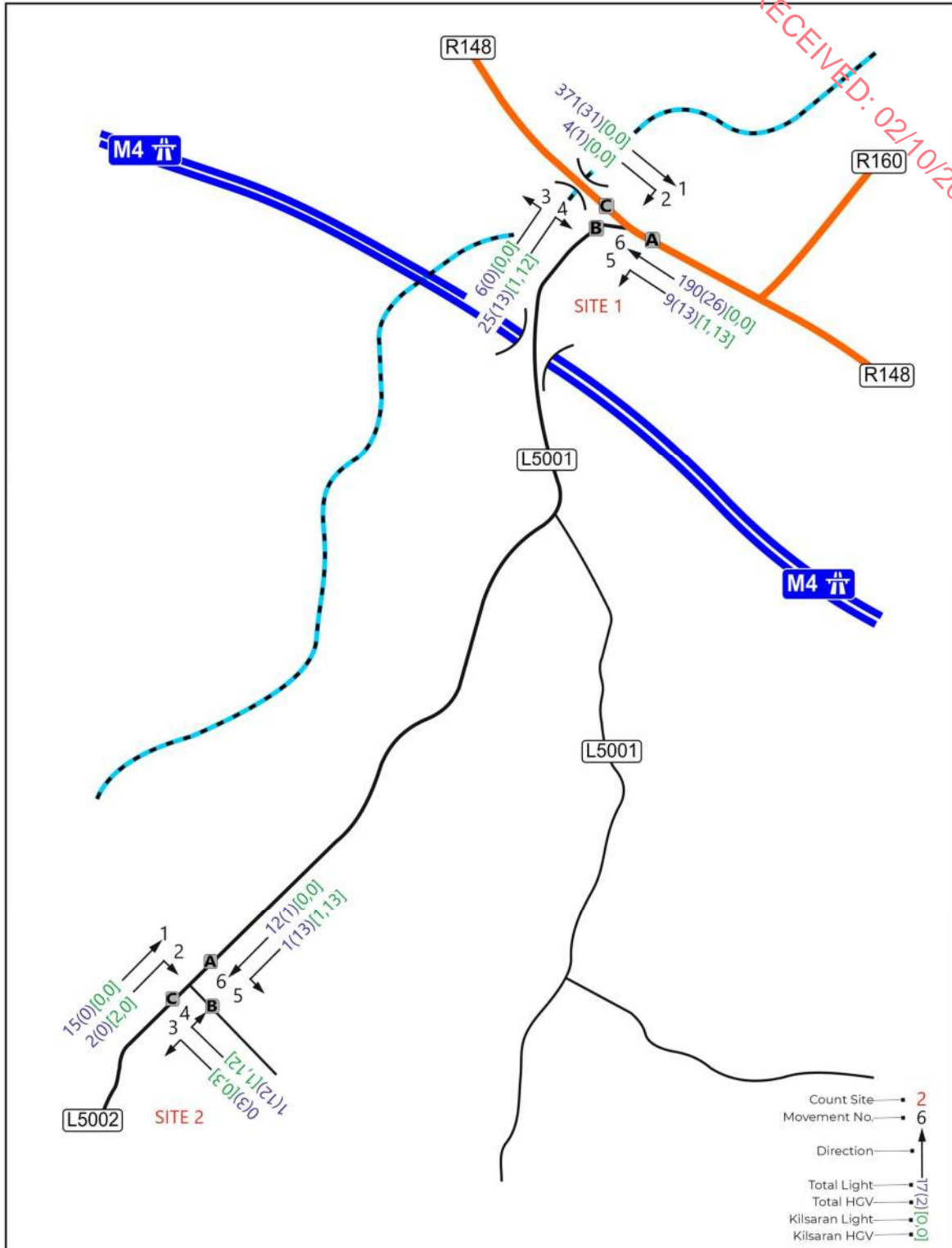
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**Appendix 14-2**  
Network Traffic Flow Diagrams

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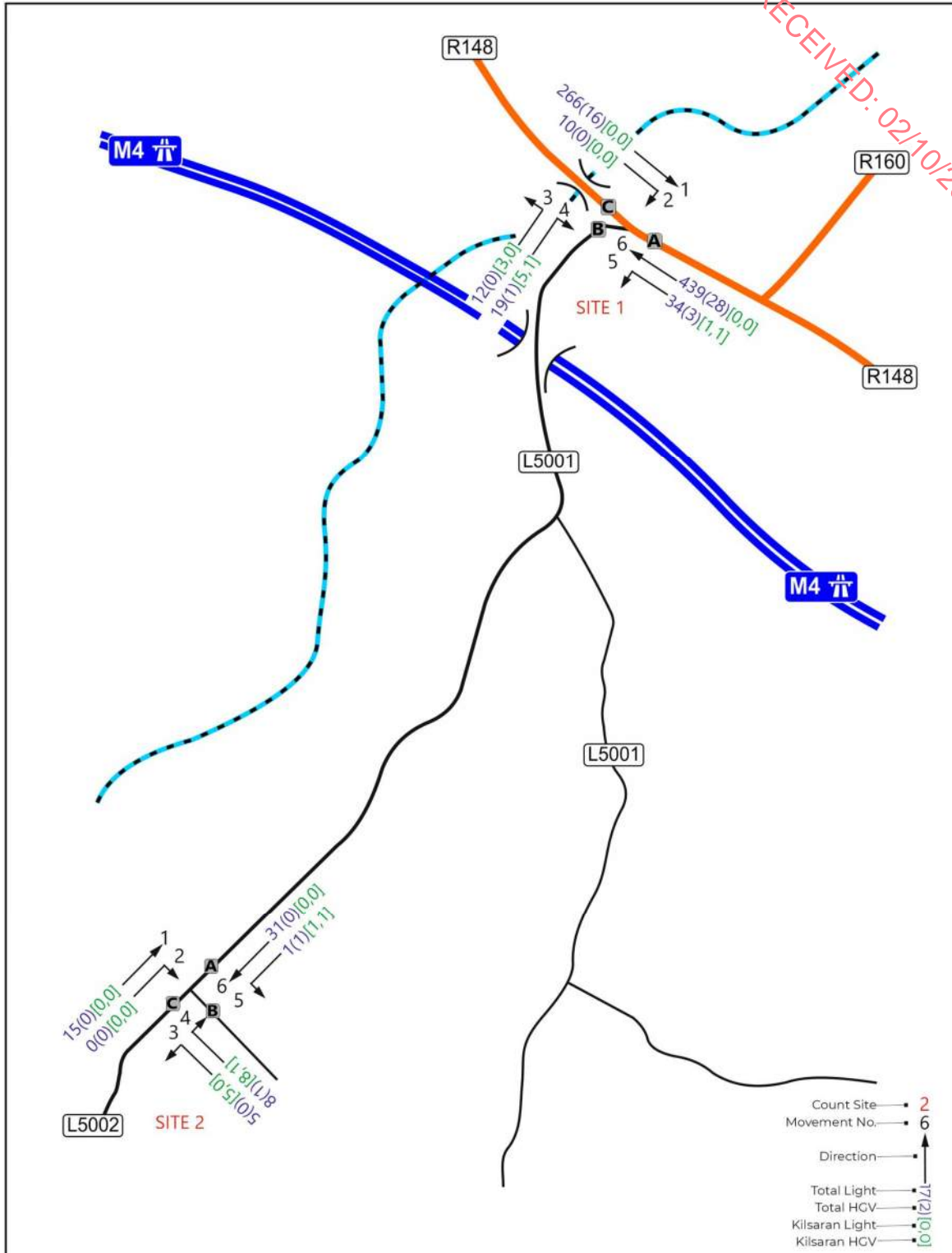
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<p>traffic &amp; transportation solutions</p> <p>Units: 5, Cornelia Place, Breda/Green Business Park, OIS B507</p> <p>Telephone: +353 (0) 4235015 Website: www.trafficwise.ie Email: info@trafficwise.ie</p>	Project Title	<b>Kilrainy &amp; Kilrathmurry, Co. Kildare</b>			
	Drawing Title	Surveyed Traffic Flows - 18-Nov-2021 AM Peak Hour 08:00-09:00hrs			
	Prepared:	TWL	Checked:	JMK	
	Date:	Jun 2023	Date:	Jun 2023	
Scale:	NTS	Project No:	03158	Date:	Aug 2023
<b>Appendix 14.2</b>				<b>Figure 2</b>	

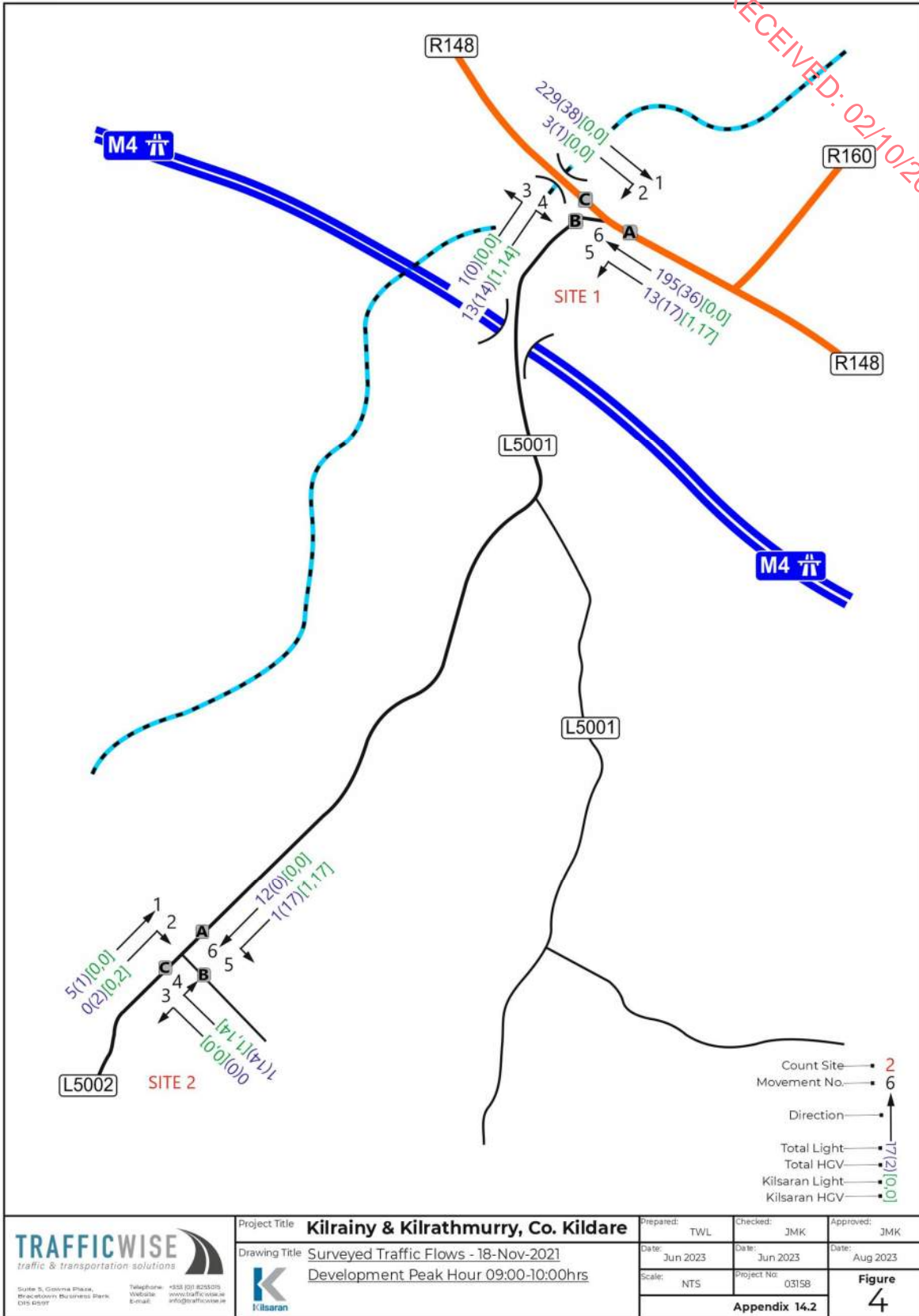


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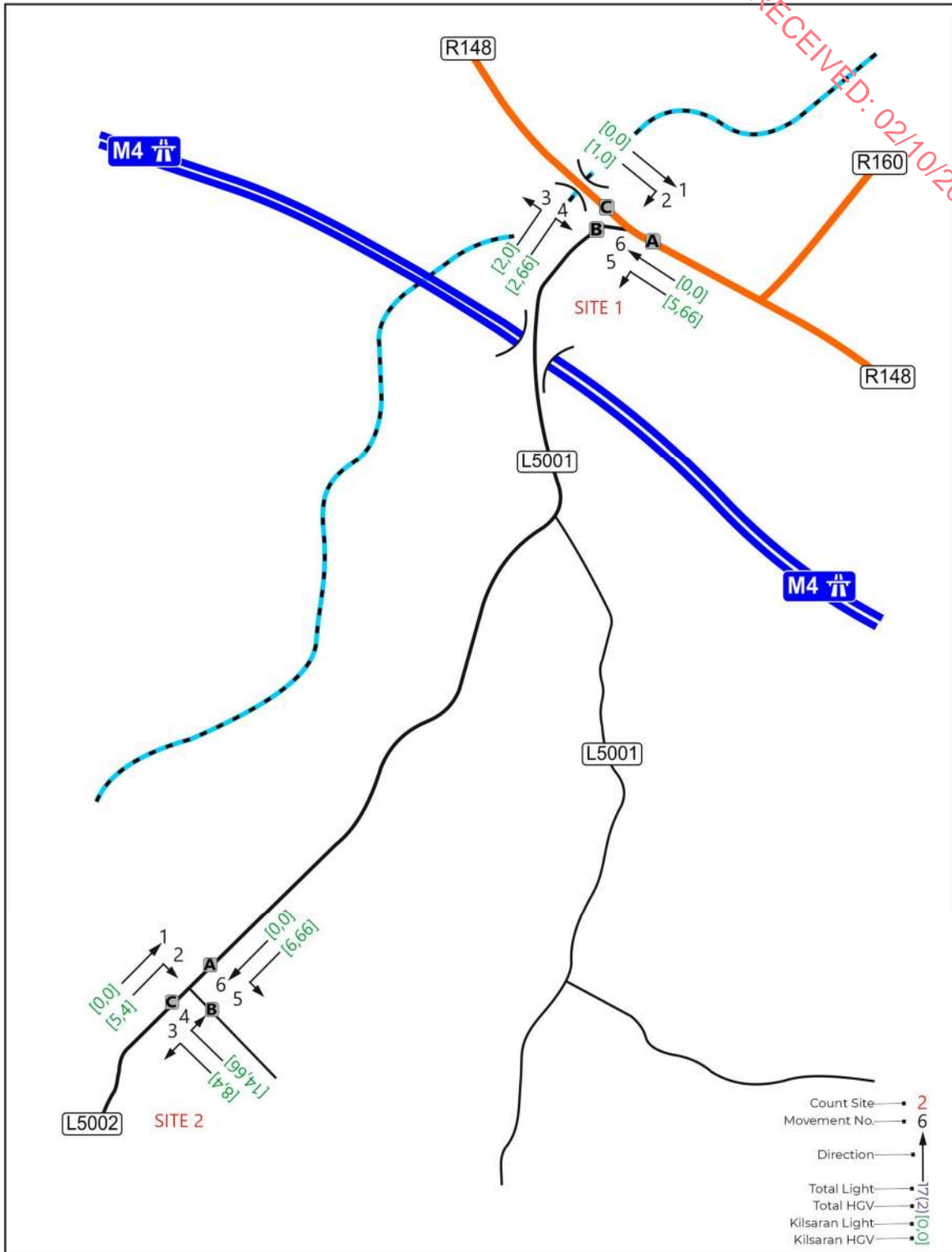


<p>traffic &amp; transportation solutions</p> <p>Suite 5, Corvick Plaza, Blackoburn Business Park, D15 R507</p> <p>Telephone: +353 (0) 4523215 Website: www.trafficwise.ie E-mail: info@trafficwise.ie</p>	Project Title <b>Kilrainy &amp; Kilrathmurry, Co. Kildare</b>	Prepared: TWL	Checked: JMK	Approved: JMK
	Drawing Title <u>Surveyed Traffic Flows - 18-Nov-2021</u> PM Peak Hour 17:00-18:00 hrs	Date: Jun 2023	Date: Jun 2023	Date: Aug 2023
		Scale: NTS	Project No: 03158	Figure 3
		Appendix 14.2		

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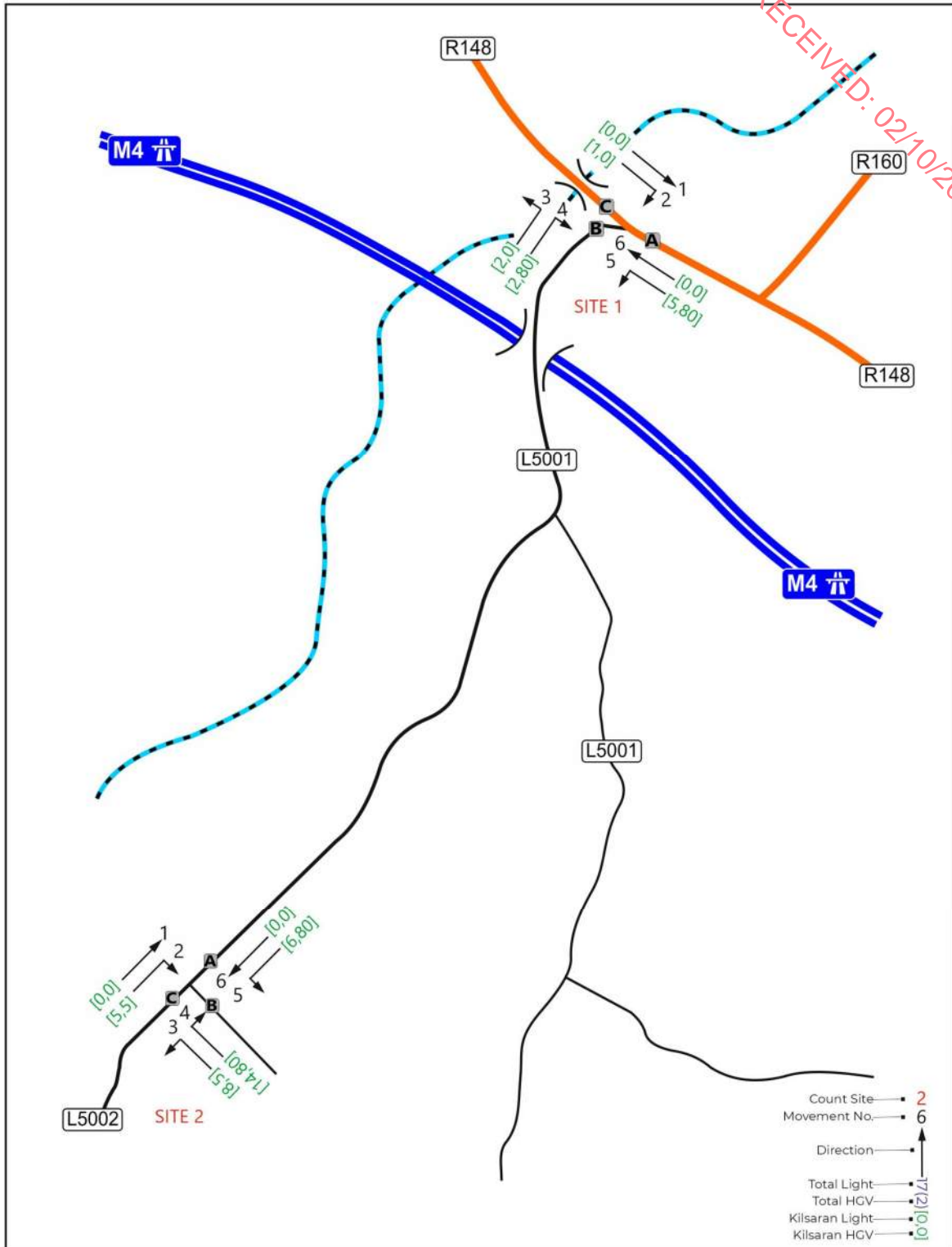


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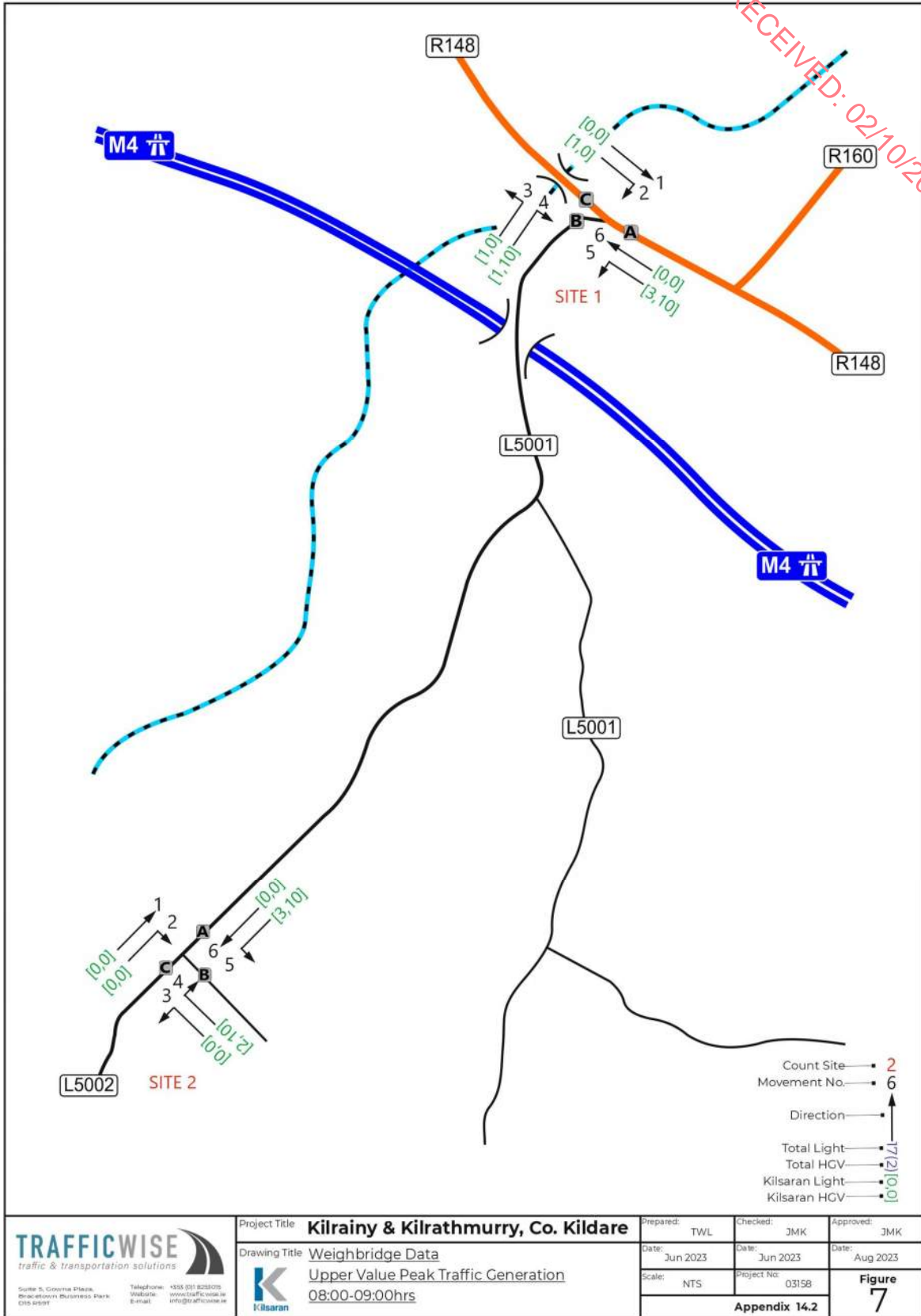
<p>traffic &amp; transportation solutions</p> <p>Suite 8, Corvina Plaza, Brackishan Business Park, D15 B50T Telephone: +353 (0) 455070 Website: www.trafficwise.ie Email: info@trafficwise.ie</p>	Project Title	<b>Kilrainy &amp; Kilrathmurry, Co. Kildare</b>	Prepared:	TWL	Checked:	JMK	Approved:	JMK
	Drawing Title	Weighbridge Data	Date:	Jun 2023	Date:	Jun 2023	Date:	Aug 2023
		Average Daily Traffic Generation	Scale:	NTS	Project No:	03158	<b>Figure 5</b>	
		07:00-19:00hrs	<b>Appendix 14.2</b>					

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<p>traffic &amp; transportation solutions</p> <p>Suite 5, Governor Plaza, Blackoburn Business Park, D15 B597</p> <p>Telephone: +353 (0) 403603 Website: www.trafficwise.ie Email: info@trafficwise.ie</p>	Project Title	<b>Kilrainy &amp; Kilrathmurry, Co. Kildare</b>	Prepared:	TWL	Checked:	JMK	Approved:	JMK
	Drawing Title	<u>Weighbridge Data</u>	Date:	Jun 2023	Date:	Jun 2023	Date:	Aug 2023
		Upper Value Daily Traffic Generation	Scale:	NTS	Project No:	03158	<b>Figure 6</b>	
		07:00-19:00hrs	<b>Appendix 14.2</b>					

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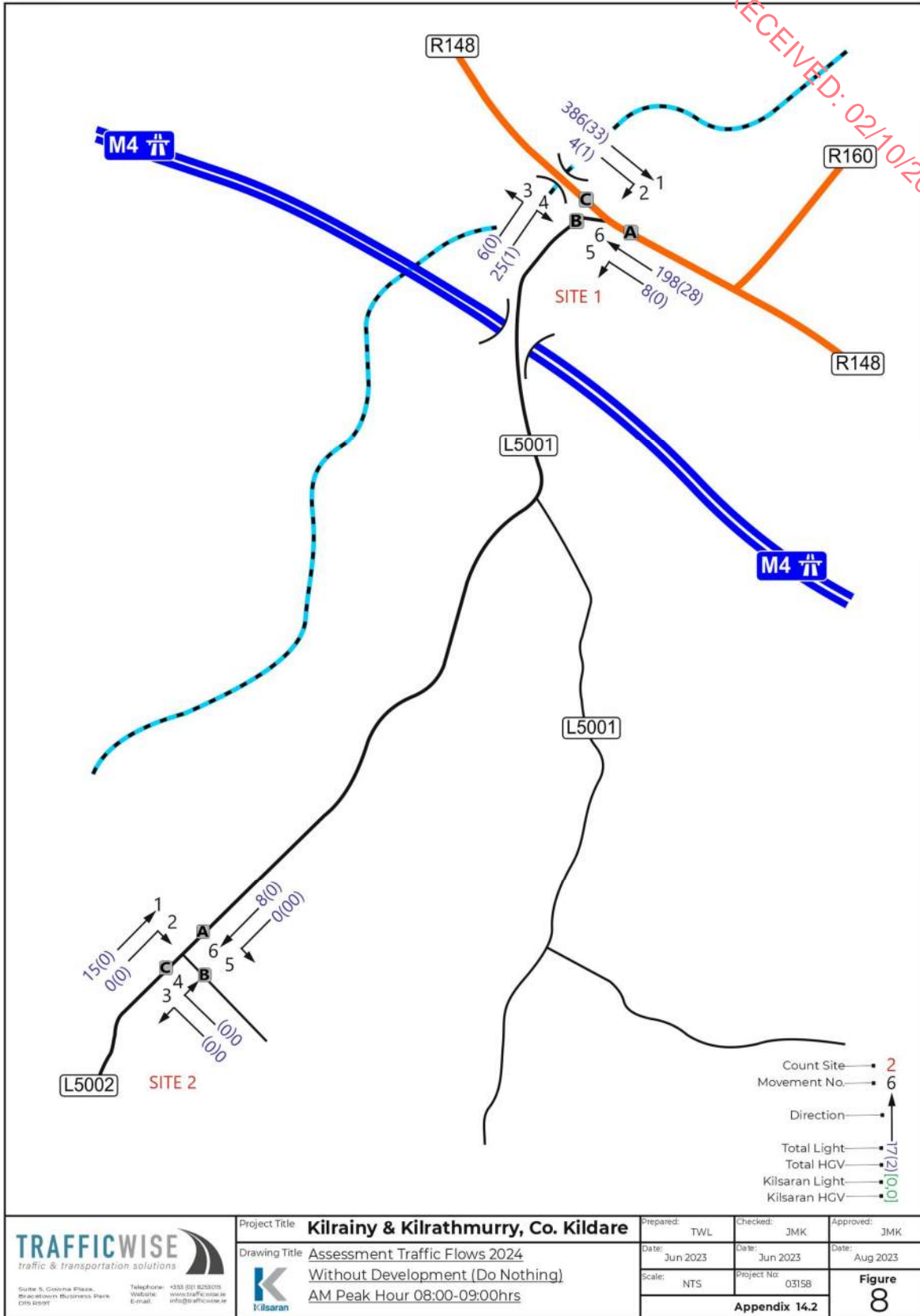
Suite 5, Coronia Plaza,  
Bracklenny Business Park,  
D15 239T

Telephone: +353 (0) 8233075  
Website: www.trafficwise.ie  
E-mail: info@trafficwise.ie

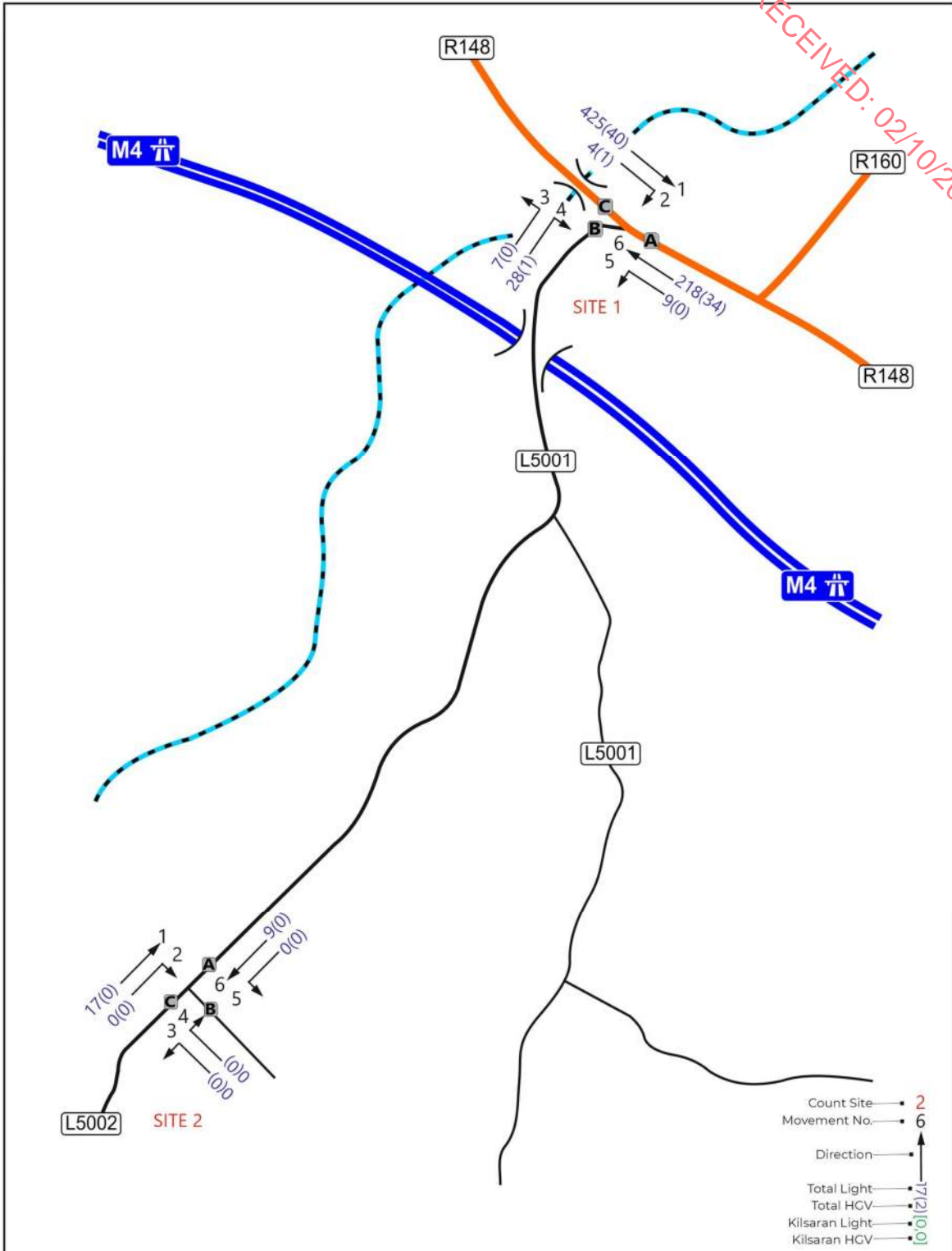
Project Title	<b>Kilrainy &amp; Kilrathmurry, Co. Kildare</b>		
Drawing Title	Weighbridge Data Upper Value Peak Traffic Generation 08:00-09:00hrs		
Prepared:	TWL	Checked:	JMK
Date:	Jun 2023	Date:	Jun 2023
Scale:	NTS	Project No:	03158
Appendix 14.2			Figure 7

Approved:	JMK
Date:	Aug 2023

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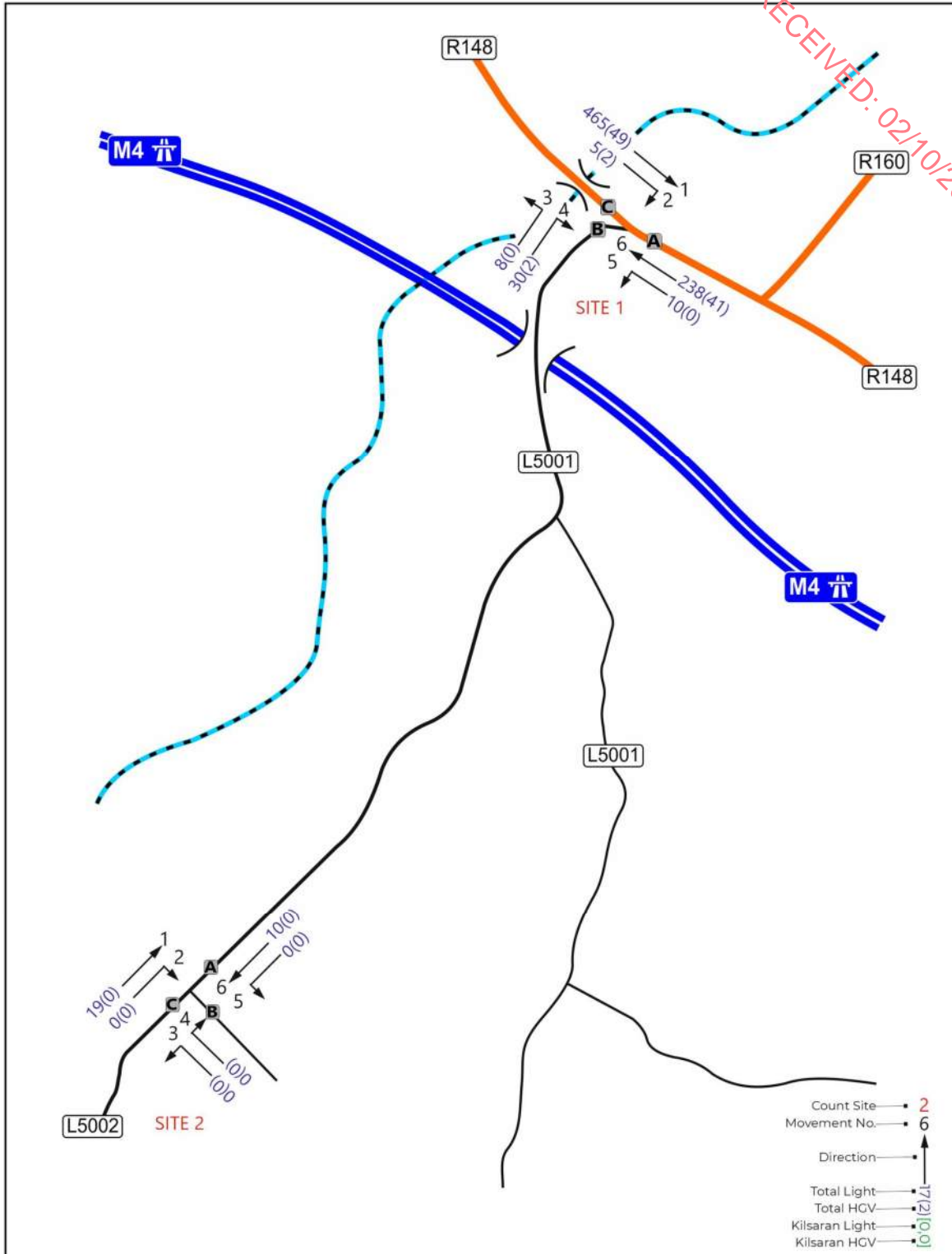


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<p>traffic &amp; transportation solutions</p> <p>Suite 5, Geneva Plaza, Bracklons Business Park, D15 850T</p> <p>Telephone: +353 (0) 4023205 Website: www.trafficwise.ie E-mail: info@trafficwise.ie</p>	<b>Project Title</b> Kilrainy & Kilrathmurry, Co. Kildare	<b>Prepared:</b> TWL	<b>Checked:</b> JMK	<b>Approved:</b> JMK
	<b>Drawing Title</b> Assessment Traffic Flows 2029 Without Development (Do Nothing) AM Peak Hour 08:00-09:00hrs	<b>Date:</b> Jun 2023	<b>Date:</b> Jun 2023	<b>Date:</b> Aug 2023
		<b>Scale:</b> NTS	<b>Project No:</b> 03158	<b>Figure</b> 9
	<b>Appendix 14.2</b>			

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<p>traffic &amp; transportation solutions</p> <p>Suite 5, Gorman Plaza, Bray Business Park, D15 R501</p> <p>Telephone: +353 (0) 453625 Website: www.trafficwise.ie Email: info@trafficwise.ie</p>	Project Title	<b>Kilrainy &amp; Kilrathmurry, Co. Kildare</b>	Prepared:	TWL	Checked:	JMK	Approved:	JMK
	Drawing Title	Assessment Traffic Flows 2039 Without Development (Do Nothing) AM Peak Hour 08:00-09:00hrs	Date:	Jun 2023	Date:	Jun 2023	Date:	Aug 2023
			Scale:	NTS	Project No:	03158	<b>Figure 10</b>	
			<b>Appendix 14.2</b>					



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**Appendix 14-3**  
Junction Modelling Assessment Reports

<b>Junctions 10</b>
<b>PICADY 10 - Priority Intersection Module</b>
Version: 10.0.4.1693 © Copyright TRL Software Limited, 2021
For sales and distribution information, program advice and maintenance, contact TRL Software: +44 (0)1344 379777 software@trl.co.uk trisoftware.com
<b>The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution</b>

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Filename: 2023 Forecast.j10  
 Path: \\Mac\Dropbox\PROJECT\03158 KILSARAN Clonard\05 Junction Analysis\01 Raw Analysis  
 Report generation date: 8/22/2023 4:02:07 PM

«2021 Surveyed, AM  
 »Results

Summary of junction performance

AM									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
<b>2021 Surveyed</b>									
Stream B-AC	D9	0.2	0.5	11.25	0.13	B	0.89	A	129 %
Stream C-B		0.0	0.5	8.57	0.01	A			[Stream B-AC]
<b>2024 Do Something</b>									
Stream B-AC	D10	0.1	0.5	10.91	0.13	B	0.83	A	128 %
Stream C-B		0.0	0.5	8.40	0.02	A			[Stream B-AC]
<b>2029 Do Something</b>									
Stream B-AC	D11	0.2	0.5	11.44	0.14	B	0.85	A	107 %
Stream C-B		0.0	0.5	8.70	0.02	A			[Stream B-AC]
<b>2039 Do Something</b>									
Stream B-AC	D12	0.2	0.5	12.04	0.16	B	0.86	A	88 %
Stream C-B		0.0	0.5	9.03	0.02	A			[Stream B-AC]

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.*

File summary

File Description

Title	
Location	
Site number	
Date	11/18/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	DESKTOP-QJ7CHST\julian.keenan
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75	✓				✓	Delay	0.85	36.00	20.00		500

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D9	2021 Surveyed	AM	ONE HOUR	07:45	09:15	15	✓

# 2021 Surveyed, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.13	11.25	0.2	0.5	B	40	61
C-A						372	557
C-B	0.01	8.57	0.0	0.5	A	5	7
A-B						20	30
A-C						198	297

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### Main Results for each time segment

#### 07:45 - 08:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	33	8	406	0.082	33	0.0	0.1	9.632	A
C-A	305	76			305				
C-B	4	1	442	0.009	4	0.0	0.0	8.210	A
A-B	17	4			17				
A-C	163	41			163				

#### 08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	40	10	390	0.101	39	0.1	0.1	10.259	B
C-A	364	91			364				
C-B	4	1	435	0.010	4	0.0	0.0	8.358	A
A-B	20	5			20				
A-C	194	49			194				

#### 08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	48	12	368	0.132	48	0.1	0.1	11.244	B
C-A	446	111			446				
C-B	6	1	425	0.013	5	0.0	0.0	8.571	A
A-B	24	6			24				
A-C	238	59			238				

#### 08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	48	12	368	0.132	48	0.1	0.2	11.253	B
C-A	446	111			446				
C-B	6	1	425	0.013	6	0.0	0.0	8.571	A
A-B	24	6			24				
A-C	238	59			238				

#### 08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	40	10	390	0.101	40	0.2	0.1	10.273	B
C-A	364	91			364				
C-B	4	1	435	0.010	5	0.0	0.0	8.360	A
A-B	20	5			20				
A-C	194	49			194				

#### 09:00 - 09:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	33	8	406	0.082	33	0.1	0.1	9.655	A
C-A	305	76			305				
C-B	4	1	442	0.009	4	0.0	0.0	8.212	A
A-B	17	4			17				
A-C	163	41			163				

**Queue Variation Results for each time segment**

**07:45 - 08:00**

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.09	0.00	0.00	0.09	0.09			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

**08:00 - 08:15**

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.11	0.00	0.00	0.11	0.11			N/A	N/A
C-B	0.01	0.01	0.25	0.45	0.48			N/A	N/A

**08:15 - 08:30**

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.15	0.03	0.26	0.47	0.49			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

**08:30 - 08:45**

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.15	0.03	0.25	0.45	0.48			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

**08:45 - 09:00**

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.11	0.00	0.00	0.11	0.11			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

**09:00 - 09:15**

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.09	0.00	0.00	0.09	0.09			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

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# Junctions 10

## PICADY 10 - Priority Intersection Module

Version: 10.0.4.1693  
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Filename: 2023 Baselines.j10

Path: \\Mac\Dropbox\PROJECT\03158 KILSARAN Clonard\05 Junction Analysis\01 Raw Analysis

Report generation date: 8/22/2023 4:09:19 PM

### «2024 Do Nothing, AM »Results

#### Summary of junction performance

AM									
Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	
2021 Surveyed									
Stream B-AC	D9	0.2	0.5	11.25	0.13	B	0.89	A	172 %
Stream C-B		0.0	0.5	8.57	0.01	A			[Stream B-AC]
2024 Do Nothing									
Stream B-AC	D10	0.1	0.5	8.28	0.07	A	0.43	A	212 %
Stream C-B		0.0	0.5	8.51	0.01	A			[Stream B-AC]
2029 Do Nothing									
Stream B-AC	D11	0.1	0.5	8.70	0.09	A	0.46	A	179 %
Stream C-B		0.0	0.5	8.81	0.02	A			[Stream B-AC]
2039 Do Nothing									
Stream B-AC	D12	0.1	0.5	9.39	0.10	A	0.49	A	149 %
Stream C-B		0.0	0.5	9.13	0.02	A			[Stream B-AC]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

#### File summary

##### File Description

Title	
Location	
Site number	
Date	11/18/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	DESKTOP-QJ7CHST\julian keenan
Description	

#### Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

#### Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75	✓				✓	RFC/DOS	0.85	36.00	20.00		500

#### Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

#### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Results for central hour only	Run automatically
D10	2024 Do Nothing	AM	ONE HOUR	07:45	09:15	15	✓	✓

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# 2024 Do Nothing, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D10 - 2024 Do Nothing, AM	Time results are shown for central hour only. (Model is run for a 90 minute period.)
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.07	8.28	0.1	0.5	A	32	32
C-A						419	419
C-B	0.01	8.51	0.0	0.5	A	5	5
A-B						8	8
A-C						226	226

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### Main Results for each time segment

#### 08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	29	7	498	0.058	29	0.0	0.1	7.677	A
C-A	377	94			377				
C-B	4	1	438	0.010	4	0.0	0.0	8.311	A
A-B	7	2			7				
A-C	203	51			203				

#### 08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	35	9	470	0.075	35	0.1	0.1	8.276	A
C-A	461	115			461				
C-B	6	1	429	0.013	5	0.0	0.0	8.510	A
A-B	9	2			9				
A-C	249	62			249				

#### 08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	35	9	470	0.075	35	0.1	0.1	8.278	A
C-A	461	115			461				
C-B	6	1	429	0.013	6	0.0	0.0	8.510	A
A-B	9	2			9				
A-C	249	62			249				

#### 08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	29	7	498	0.058	29	0.1	0.1	7.682	A
C-A	377	94			377				
C-B	4	1	438	0.010	5	0.0	0.0	8.313	A
A-B	7	2			7				
A-C	203	51			203				

### Queue Variation Results for each time segment

#### 08:00 - 08:15

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.06	0.03	0.25	0.45	0.48			N/A	N/A
C-B	0.01	0.01	0.25	0.45	0.48			N/A	N/A

#### 08:15 - 08:30

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.03	0.26	0.47	0.49			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

#### 08:30 - 08:45

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.00	0.00	0.08	0.08			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

#### 08:45 - 09:00

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.06	0.00	0.00	0.06	0.06			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

<b>Junctions 10</b>
<b>PICADY 10 - Priority Intersection Module</b>
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 Report generation date: 8/22/2023 4:04:45 PM

«2024 Do Something, AM  
 »Results

Summary of junction performance

AM									
Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	
<b>2021 Surveeyed</b>									
Stream B-AC	D9	0.2	0.5	11.25	0.13	B	0.89	A	129 %
Stream C-B		0.0	0.5	8.57	0.01	A			[Stream B-AC]
<b>2024 Do Something</b>									
Stream B-AC	D10	0.1	0.5	10.91	0.13	B	0.83	A	128 %
Stream C-B		0.0	0.5	8.40	0.02	A			[Stream B-AC]
<b>2029 Do Something</b>									
Stream B-AC	D11	0.2	0.5	11.44	0.14	B	0.85	A	107 %
Stream C-B		0.0	0.5	8.70	0.02	A			[Stream B-AC]
<b>2039 Do Something</b>									
Stream B-AC	D12	0.2	0.5	12.04	0.16	B	0.86	A	88 %
Stream C-B		0.0	0.5	9.03	0.02	A			[Stream B-AC]

*Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.*

File summary

File Description

Title	
Location	
Site number	
Date	11/18/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	DESKTOP-QJ7CHST\julian keenan
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75	✓				✓	Delay	0.85	36.00	20.00		500

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Results for central hour only	Run automatically
D10	2024 Do Something	AM	ONE HOUR	07:45	09:15	15	✓	✓

# 2024 Do Something, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D10 - 2024 Do Something, AM	Time results are shown for central hour only. (Model is run for a 90 minute period.)
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

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## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.13	10.91	0.1	0.5	B	44	44
C-A						419	419
C-B	0.02	8.40	0.0	0.5	A	6	6
A-B						21	21
A-C						226	226

### Main Results for each time segment

#### 08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	40	10	402	0.098	39	0.1	0.1	9.932	A
C-A	377	94			377				
C-B	5	1	445	0.012	5	0.0	0.0	8.184	A
A-B	19	5			19				
A-C	203	51			203				

#### 08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	48	12	378	0.128	48	0.1	0.1	10.902	B
C-A	461	115			461				
C-B	7	2	435	0.015	7	0.0	0.0	8.402	A
A-B	23	6			23				
A-C	249	62			249				

#### 08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	48	12	378	0.128	48	0.1	0.1	10.910	B
C-A	461	115			461				
C-B	7	2	435	0.015	7	0.0	0.0	8.402	A
A-B	23	6			23				
A-C	249	62			249				

#### 08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	40	10	402	0.098	40	0.1	0.1	9.946	A
C-A	377	94			377				
C-B	5	1	445	0.012	5	0.0	0.0	8.185	A
A-B	19	5			19				
A-C	203	51			203				

### Queue Variation Results for each time segment

#### 08:00 - 08:15

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.11	0.00	0.00	0.11	0.11			N/A	N/A
C-B	0.01	0.01	0.25	0.45	0.48			N/A	N/A

#### 08:15 - 08:30

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.14	0.03	0.26	0.47	0.49			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:30 - 08:45

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.15	0.03	0.25	0.45	0.48			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:45 - 09:00

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.11	0.00	0.00	0.11	0.11			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A



<b>Junctions 10</b>
<b>PICADY 10 - Priority Intersection Module</b>
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 Report generation date: 8/22/2023 4:09:58 PM

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«2029 Do Nothing, AM  
 »Results

Summary of junction performance

AM									
	Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity
<b>2021 Surveyed</b>									
Stream B-AC	D9	0.2	0.5	11.25	0.13	B	0.89	A	172 %
Stream C-B		0.0	0.5	8.57	0.01	A			[Stream B-AC]
<b>2024 Do Nothing</b>									
Stream B-AC	D10	0.1	0.5	8.28	0.07	A	0.43	A	212 %
Stream C-B		0.0	0.5	8.51	0.01	A			[Stream B-AC]
<b>2029 Do Nothing</b>									
Stream B-AC	D11	0.1	0.5	8.70	0.09	A	0.46	A	179 %
Stream C-B		0.0	0.5	8.81	0.02	A			[Stream B-AC]
<b>2039 Do Nothing</b>									
Stream B-AC	D12	0.1	0.5	9.39	0.10	A	0.49	A	149 %
Stream C-B		0.0	0.5	9.13	0.02	A			[Stream B-AC]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	
Site number	
Date	11/18/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	DESKTOP-QJ7CHST\julian keenan
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75	✓				✓	RFC/DOS	0.85	36.00	20.00		500

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Results for central hour only	Run automatically
D11	2029 Do Nothing	AM	ONE HOUR	07:45	09:15	15	✓	✓

# 2029 Do Nothing, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D11 - 2029 Do Nothing, AM	Time results are shown for central hour only. (Model is run for a 90 minute period.)
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.09	8.70	0.1	0.5	A	36	36
C-A						465	465
C-B	0.02	8.81	0.0	0.5	A	6	6
A-B						9	9
A-C						252	252

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### Main Results for each time segment

#### 08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	32	8	484	0.067	32	0.1	0.1	7.965	A
C-A	418	105			418				
C-B	5	1	425	0.013	5	0.0	0.0	8.569	A
A-B	8	2			8				
A-C	227	57			227				

#### 08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	40	10	453	0.087	40	0.1	0.1	8.698	A
C-A	512	128			512				
C-B	7	2	415	0.016	7	0.0	0.0	8.807	A
A-B	10	2			10				
A-C	277	69			277				

#### 08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	40	10	453	0.087	40	0.1	0.1	8.701	A
C-A	512	128			512				
C-B	7	2	415	0.016	7	0.0	0.0	8.807	A
A-B	10	2			10				
A-C	277	69			277				

#### 08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	32	8	484	0.067	32	0.1	0.1	7.971	A
C-A	418	105			418				
C-B	5	1	425	0.013	5	0.0	0.0	8.570	A
A-B	8	2			8				
A-C	227	57			227				

### Queue Variation Results for each time segment

#### 08:00 - 08:15

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.07	0.03	0.25	0.45	0.48			N/A	N/A
C-B	0.01	0.01	0.25	0.45	0.48			N/A	N/A

#### 08:15 - 08:30

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.09	0.03	0.26	0.47	0.49			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:30 - 08:45

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.10	0.03	0.25	0.45	0.48			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:45 - 09:00

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.07	0.00	0.00	0.07	0.07			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

Junctions 10
PICADY 10 - Priority Intersection Module
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Filename: 2023 Forecast.j10  
 Path: \\Mac\Dropbox\ PROJECT\03158 KILSARAN Clonard\05 Junction Analysis\01 Raw Analysis  
 Report generation date: 8/22/2023 4:06:01 PM

RECEIVED: 02/10/2023

«2029 Do Something, AM  
 »Results

Summary of junction performance

AM									
Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	
<b>2021 Surveyed</b>									
Stream B-AC	D9	0.2	0.5	11.25	0.13	B	0.89	A	129 %
Stream C-B		0.0	0.5	8.57	0.01	A			
<b>2024 Do Something</b>									
Stream B-AC	D10	0.1	0.5	10.91	0.13	B	0.83	A	128 %
Stream C-B		0.0	0.5	8.40	0.02	A			
<b>2029 Do Something</b>									
Stream B-AC	D11	0.2	0.5	11.44	0.14	B	0.85	A	107 %
Stream C-B		0.0	0.5	8.70	0.02	A			
<b>2039 Do Something</b>									
Stream B-AC	D12	0.2	0.5	12.04	0.16	B	0.86	A	88 %
Stream C-B		0.0	0.5	9.03	0.02	A			

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

File summary

File Description

Title	
Location	
Site number	
Date	11/18/2021
Version	
Status	(new file)
Identifier	
Client	
Job number	
Enumerator	DESKTOP-QJ7CHST\julian keenan
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75	✓				✓	Delay	0.85	36.00	20.00		500

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Results for central hour only	Run automatically
D11	2029 Do Something	AM	ONE HOUR	07:45	09:15	15	✓	✓

# 2029 Do Something, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D11 - 2029 Do Something, AM	Time results are shown for central hour only. (Model is run for a 90 minute period.)
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.14	11.44	0.2	0.5	B	48	48
C-A						465	465
C-B	0.02	8.70	0.0	0.5	A	7	7
A-B						22	22
A-C						252	252

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### Main Results for each time segment

#### 08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	43	11	394	0.110	43	0.1	0.1	10.257	B
C-A	418	105			418				
C-B	6	2	433	0.015	6	0.0	0.0	8.444	A
A-B	20	5			20				
A-C	227	57			227				

#### 08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	53	13	367	0.144	53	0.1	0.2	11.432	B
C-A	512	128			512				
C-B	8	2	421	0.018	8	0.0	0.0	8.701	A
A-B	24	6			24				
A-C	277	69			277				

#### 08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	53	13	367	0.144	53	0.2	0.2	11.444	B
C-A	512	128			512				
C-B	8	2	421	0.018	8	0.0	0.0	8.701	A
A-B	24	6			24				
A-C	277	69			277				

#### 08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	43	11	394	0.110	43	0.2	0.1	10.273	B
C-A	418	105			418				
C-B	6	2	433	0.015	6	0.0	0.0	8.446	A
A-B	20	5			20				
A-C	227	57			227				

### Queue Variation Results for each time segment

#### 08:00 - 08:15

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.12	0.00	0.00	0.12	0.12			N/A	N/A
C-B	0.01	0.01	0.25	0.45	0.48			N/A	N/A

#### 08:15 - 08:30

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.17	0.03	0.26	0.47	0.49			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:30 - 08:45

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.17	0.03	0.25	0.46	0.48			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:45 - 09:00

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.12	0.00	0.00	0.12	0.12			N/A	N/A
C-B	0.01	0.00	0.00	0.01	0.01			N/A	N/A

# Junctions 10

## PICADY 10 - Priority Intersection Module

Version: 10.0.4.1693  
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Filename: 2023 Baselines.j10

Path: \\Mac\Dropbox\PROJECT\03158 KILSARAN Clonard\05 Junction Analysis\01 Raw Analysis

Report generation date: 8/22/2023 4:10:29 PM

### «2039 Do Nothing, AM »Results

#### Summary of junction performance

AM									
Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	
2021 Surveyed									
Stream B-AC	D9	0.2	0.5	11.25	0.13	B	0.89	A	172 %
Stream C-B		0.0	0.5	8.57	0.01	A			[Stream B-AC]
2024 Do Nothing									
Stream B-AC	D10	0.1	0.5	8.28	0.07	A	0.43	A	212 %
Stream C-B		0.0	0.5	8.51	0.01	A			[Stream B-AC]
2029 Do Nothing									
Stream B-AC	D11	0.1	0.5	8.70	0.09	A	0.46	A	179 %
Stream C-B		0.0	0.5	8.81	0.02	A			[Stream B-AC]
2039 Do Nothing									
Stream B-AC	D12	0.1	0.5	9.39	0.10	A	0.49	A	149 %
Stream C-B		0.0	0.5	9.13	0.02	A			[Stream B-AC]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

#### File summary

##### File Description

Title	
Location	
Site number	
Date	11/18/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	DESKTOP-QJ7CHST\julian keenan
Description	

#### Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

#### Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75	✓				✓	RFC/DOS	0.85	36.00	20.00		500

#### Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

#### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Results for central hour only	Run automatically
D12	2039 Do Nothing	AM	ONE HOUR	07:45	09:15	15	✓	✓

RECEIVED: 02/10/2023

# 2039 Do Nothing, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D12 - 2039 Do Nothing, AM	Time results are shown for central hour only. (Model is run for a 90 minute period.)
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.10	9.39	0.1	0.5	A	39	39
C-A						514	514
C-B	0.02	9.13	0.0	0.5	A	7	7
A-B						10	10
A-C						279	279

RECEIVED: 02/10/2023

### Main Results for each time segment

#### 08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	35	9	461	0.076	35	0.1	0.1	8.448	A
C-A	462	116			462				
C-B	6	2	413	0.015	6	0.0	0.0	8.850	A
A-B	9	2			9				
A-C	251	63			251				

#### 08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	43	11	426	0.101	43	0.1	0.1	9.381	A
C-A	566	141			566				
C-B	8	2	402	0.019	8	0.0	0.0	9.134	A
A-B	11	3			11				
A-C	307	77			307				

#### 08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	43	11	426	0.101	43	0.1	0.1	9.387	A
C-A	566	141			566				
C-B	8	2	402	0.019	8	0.0	0.0	9.134	A
A-B	11	3			11				
A-C	307	77			307				

#### 08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	35	9	461	0.076	35	0.1	0.1	8.454	A
C-A	462	116			462				
C-B	6	2	413	0.015	6	0.0	0.0	8.853	A
A-B	9	2			9				
A-C	251	63			251				

### Queue Variation Results for each time segment

#### 08:00 - 08:15

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.03	0.26	0.47	0.50			N/A	N/A
C-B	0.02	0.02	0.25	0.45	0.48			N/A	N/A

#### 08:15 - 08:30

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.11	0.03	0.26	0.47	0.49			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:30 - 08:45

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.11	0.03	0.25	0.45	0.48			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:45 - 09:00

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.08	0.00	0.00	0.08	0.08			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

# Junctions 10

## PICADY 10 - Priority Intersection Module

Version: 10.0.4.1693  
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Filename: 2023 Forecast.j10  
Path: \\Mac\Dropbox\PROJECT03158 KILSARAN Clonard\05 Junction Analysis\01 Raw Analysis  
Report generation date: 8/22/2023 4:06:41 PM

### «2039 Do Something, AM

#### »Results

#### Summary of junction performance

AM									
Set ID	Queue (Veh)	95% Queue (Veh)	Delay (s)	RFC	LOS	Junction Delay (s)	Junction LOS	Network Residual Capacity	
2021 Surveyed									
Stream B-AC	D9	0.2	0.5	11.25	0.13	B	0.89	A	129 %
Stream C-B		0.0	0.5	8.57	0.01	A			[Stream B-AC]
2024 Do Something									
Stream B-AC	D10	0.1	0.5	10.91	0.13	B	0.83	A	128 %
Stream C-B		0.0	0.5	8.40	0.02	A			[Stream B-AC]
2029 Do Something									
Stream B-AC	D11	0.2	0.5	11.44	0.14	B	0.85	A	107 %
Stream C-B		0.0	0.5	8.70	0.02	A			[Stream B-AC]
2039 Do Something									
Stream B-AC	D12	0.2	0.5	12.04	0.16	B	0.86	A	88 %
Stream C-B		0.0	0.5	9.03	0.02	A			[Stream B-AC]

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle. Junction LOS and Junction Delay are demand-weighted averages. Network Residual Capacity indicates the amount by which network flow could be increased before a user-definable threshold (see Analysis Options) is met.

#### File summary

##### File Description

Title	
Location	
Site number	
Date	11/18/2021
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	DESKTOP-QJ7CHST\julian.keenan
Description	

#### Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perHour	s	-Min	perMin

#### Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Show lane queues in feet / metres	Show all PICADY stream intercepts	Calculate residual capacity	Residual capacity criteria type	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)	Use iterations with HCM roundabouts	Max number of iterations for roundabouts
5.75	✓				✓	Delay	0.85	36.00	20.00		500

#### Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

#### Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Results for central hour only	Run automatically
D12	2039 Do Something	AM	ONE HOUR	07:45	09:15	15	✓	✓

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# 2039 Do Something, AM

## Data Errors and Warnings

Severity	Area	Item	Description
Warning	Demand Sets	D12 - 2039 Do Something, AM	Time results are shown for central hour only. (Model is run for a 90 minute period.)
Warning	Queue variations	Analysis Options	Queue percentiles may be unreliable if the mean queue in any time segment is very low or very high.

## Results

### Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max 95th percentile Queue (Veh)	Max LOS	Average Demand (Veh/hr)	Total Junction Arrivals (Veh)
B-AC	0.16	12.04	0.2	0.5	B	52	52
C-A						514	514
C-B	0.02	9.03	0.0	0.5	A	8	8
A-B						23	23
A-C						279	279

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### Main Results for each time segment

#### 08:00 - 08:15

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	47	12	386	0.121	47	0.1	0.1	10.592	B
C-A	462	116			462				
C-B	7	2	420	0.017	7	0.0	0.0	8.727	A
A-B	21	5			21				
A-C	251	63			251				

#### 08:15 - 08:30

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	57	14	356	0.161	57	0.1	0.2	12.024	B
C-A	566	141			566				
C-B	9	2	407	0.022	9	0.0	0.0	9.031	A
A-B	25	6			25				
A-C	307	77			307				

#### 08:30 - 08:45

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	57	14	356	0.161	57	0.2	0.2	12.041	B
C-A	566	141			566				
C-B	9	2	407	0.022	9	0.0	0.0	9.031	A
A-B	25	6			25				
A-C	307	77			307				

#### 08:45 - 09:00

Stream	Total Demand (Veh/hr)	Junction Arrivals (Veh)	Capacity (Veh/hr)	RFC	Throughput (Veh/hr)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-AC	47	12	386	0.121	47	0.2	0.1	10.612	B
C-A	462	116			462				
C-B	7	2	420	0.017	7	0.0	0.0	8.727	A
A-B	21	5			21				
A-C	251	63			251				

### Queue Variation Results for each time segment

#### 08:00 - 08:15

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.14	0.00	0.00	0.14	0.14			N/A	N/A
C-B	0.02	0.02	0.25	0.45	0.48			N/A	N/A

#### 08:15 - 08:30

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.19	0.03	0.26	0.47	0.49			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:30 - 08:45

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.19	0.03	0.26	0.47	0.50			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A

#### 08:45 - 09:00

Stream	Mean (Veh)	Q05 (Veh)	Q50 (Veh)	Q90 (Veh)	Q95 (Veh)	Percentile message	Marker message	Probability of reaching or exceeding marker	Probability of exactly reaching marker
B-AC	0.14	0.00	0.00	0.14	0.14			N/A	N/A
C-B	0.02	0.00	0.00	0.02	0.02			N/A	N/A



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**Appendix 14-4**  
Road Condition Survey



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# **Pavement Condition Survey**

L5001/L5002 Clonard

**Client:** Trafficwise

**Address:** Bracetown Business Park, Dublin 15.

**Site:** L5001/L5002 Clonard

**Date:** 07-June-2022

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**Contents:**

1. Introduction
2. Site Details
3. Visual Condition Survey
  - 3.1. Background to Survey
  - 3.2. Survey Details
  - 3.3. Pavement Condition Index Results
4. Verge and Carriageway Measurement
5. FWD Survey
  - 5.1. Description of Testing
  - 5.2. FWD Details
  - 5.3. Date of Survey
  - 5.4. Tabulated Deflections
  - 5.5. Deflection Graphs
  - 5.6. Pavement Construction
  - 5.7. Traffic Loading

6. Back-analysis

7. Strengthening Proposals

Appendix A: Treatment Measures and Rating Scheme Tables

Appendix B: Pavement Pictures

Appendix C: Verge and Carriageway Widths

Appendix D: Tabulated Deflections

Appendix E: Deflection Graphs

Appendix F: Core Logs

## 1. Introduction:

A pavement condition survey was required on the L5001/L5002, near Clonard as part of a planning application. This included a Visual Condition Survey (VCS) to determine the Pavement Condition Index (PCI), cross-section measurement of the verge and carriageway, and a Falling Weight Deflectometer (FWD) survey along with coring of the pavement layers. Based on the data collected and traffic information provided, strengthening overlays were estimated as necessary.

## 2. Site Details

The test section was part of the L5001/L5002 east of Clonard, as shown in Figure 1. Testing commenced at the junction with the R148 (Chainage 0) and proceeded south for 3,500 metres, finishing just past the Kilsaran entrance. Deflections were measured at 50 metre intervals in the nearside wheel-track of each lane, staggered by 25 metres between lanes.

**Figure 1: L5001/L5002 Clonard Site Map**



### 3. Visual Condition Survey

#### 3.1. Background to Survey

Visual Condition Surveys are inspections carried out to assess pavement surface conditions. Surface distress is damage observed on the pavement surface and there are four major categories:

- Surface Defects: Ravelling, Bleeding
- Pavement Deformation: Rutting, Surface Distortion
- Cracks: Alligator Cracking, Edge Cracking and Breakup, Other Cracking (longitudinal, transverse, reflection, slippage, etc.)
- Surface Openings: Patching, Potholes, Road Disintegration

The purpose of condition rating is to be able to compare a pavement segment relative to other segments. The *Department of Transport, Tourism and Sport 'Flexible Roads Manual'* contains a rating scheme based solely on visual pavement distresses. This scheme rates a pavement from 1 for failed to 10 for excellent. Tables of ratings and treatment measures from the manual are reproduced in Appendix A.

#### 3.2. Survey Details

A field inspection was carried out to record observations such as details of pavement surfacing and defects, changes in surface appearance and length of individual segments along which the condition remains the same.

#### 3.3. Pavement Condition Index Results

This 3500 metres section of the L5001/L5002 was divided into three individual segments of similar construction and condition. Each of the segments were rated based on the criteria in the *'Flexible Roads Manual'*.

As is normally the case, no segment is entirely consistent, and none will have all the types of distresses listed in the manual for any particular rating. Therefore, some averaging and judgement is required to determine the PCI results contained in Table 1. Pictures of the segments detailed in Table 3 can be found in Appendix B.

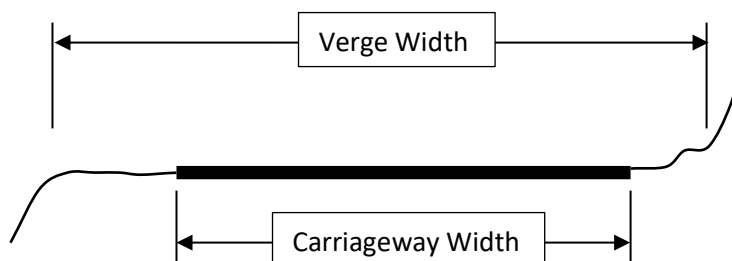
**Table 1: L5001/L5002 PCI Results**

Section	Chainage	Description	Picture	Rating
A	0 to 890	Very good condition, no visible defects.	B1, B2, B3, B4, B5, B6,	9
B	890 to 2600	Some bleeding and surface distortion. Infrequent instances of edge damage or cracking.	B7, B8, B9, B10, B11	7
C	2600 to 3500	No structural distresses or surface defects. Road shape is good.	B12, B13, B14	8

**4. Verge and Carriageway Measurement**

Measurement of verge and carriageway widths were carried out at 40 metre intervals. The carriageway refers to the width of the road that is surfaced. The verge width includes the ground between the surfaced road and the fence, hedge or wall adjacent to it on both sides. Any point where the ground level fell significantly from the existing road level was also considered to be the extent of the verge. This is illustrated in Figure 2, and results are tabulated in Appendix C.

**Figure 2: Verge and Carriageway Measurement**



## 5. FWD Survey

### 5.1. Description of testing

A load pulse is produced by dropping a known mass and is transmitted to the pavement through the loading plate. The load cell measures the load imparted to the pavement surface. Geophones mounted radially from the centre of the load plate measure the pavement deflection in response to the load.

In this case the load level was set at 40kN and the load pulse applied through a 300mm diameter plate. Deflections at each geophone were measured at a resolution of 1 micron. At each test point at least 3 drops were made, after an initial drop to settle the loading plate.

### 5.2. FWD Details

Testing was carried out using the Primax 1500 FWD manufactured by Sweco. Readings were taken from 9 geophones mounted radially from the centre of the load plate and positioned as follows:

Geophone Number	D1	D2	D3	D4	D5	D6	D7	D8	D9
Distance from centre of load(mm)	0	300	450	600	900	1200	1500	1800	2100

### 5.3. Date of Survey

The survey took place on May 5<sup>th</sup>, 2022.

### 5.4. Tabulated Deflections

The deflection bowl created by the FWD load pulse is influenced by the stiffness of the different pavement layers. Deflection values are tabulated in Appendix D as follows:

D1: Indication of overall pavement performance

D1-D2: Indicates condition of upper pavement layers

D9: Indication of sub-grade condition

Guidance on deflection criteria provided in D.T.T.A.S. publication '*Guidelines on the Depth of Overlay to be used on Rural Regional and Local Roads*' is reproduced in Table 2 and Table 3. Values contained in Appendix D are highlighted according to the colour key shown.

**Table 2: Central and SCI Deflection Criteria for Rural Regional and Local Roads**

Central Deflection (D1)	SCI (D1-D2)	Comment
<300	<150	Good load spreading ability
300-500	150-250	Good to poor load spreading ability
501-800	251-400	Poor to bad load spreading ability
>800	>400	Bad load spreading ability

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**Table 3: Outer Deflection Criteria for Rural Regional and Local Roads**

Outer Deflection (D9)	Comment
<15	Stiff subgrade
15-30	Stiff to moderate subgrade
31-45	Moderate to weak subgrade
>45	Weak subgrade

Average deflection values for seven sub-sections with deflections of similar magnitude are presented in Table 4. Based on these average deflection values the structural condition of the pavement could be summarised as follows:

- The pavement structure generally has good load spreading ability on a stiff to moderate subgrade.
- The structure is particularly strong on the newer section from Chainage 250 to 850.
- Weaker sub-sections are identified from Chainage 2025 to 2275, and from Chainage 3225 to 3500.

**Table 4: Average Deflection Values**

Chainage		Southbound			Northbound		
From	To	D1	D1-D2	D9	D1	D1-D2	D9
0	250	189	62	24	245	75	27
250	850	82	18	13	115	32	14
850	1400	225	74	19	288	92	23
1400	2025	261	83	22	263	84	23
2025	2275	348	120	27	422	145	31
2275	3225	242	76	22	264	80	22
3225	3500	481	133	44	501	162	38



### 5.5. Deflection Graphs

The selected deflection parameters are plotted against distance in Appendix E. Deflection and deflection difference graphs are useful for showing relative differences in the condition of the layers.

### 5.6. Pavement Construction

Knowledge of the pavement structure is required to analyse FWD data and estimate layer stiffness.

Seven cores were taken at 500 metre intervals to investigate the bound layers of the pavement. Once the core was removed, the granular sub-base was investigated. The depth of each layer was measured and the results, along with pictures of the cores, are shown in Appendix F.

### 5.7. Traffic Loading

For the purpose of calculating the overlay requirements of the pavement an estimate of the number of heavy goods vehicles (HGV's), or standard axles (8.16 tonnes) is required. Table 5 contains information provided on predicted traffic volumes at different stages between 2022 and 2042, with and without the proposed development. The table also contains the estimated total traffic loading in million standard axles (MSA) based on these predicted volumes.

**Table 5: Traffic Loading**

Year	With Development		Without Development	
	AADT	% HGV	AADT	% HGV
2022	560	26%	376	1%
2027	603	22%	419	1%
2037	654	23%	470	2%
2042	486	2%	486	2%
<b>M.S.A.</b>	<b>1.230</b>		<b>0.062</b>	

## 6. Back-analysis

Pavement layer moduli values were estimated from the FWD deflections by the RoSy Design program using the back calculation method. The calculation of road surface deflection is based on the theory of elasticity and the method of equivalent thickness as framed by J.M. Kirk and N. Odemark on the basis of Boussinesq's equations. The main inputs include surface deflection, structural layer thickness, Poissons ratio and initial moduli estimates.

## 7. Strengthening Proposals

Once the back-analysis is complete, and the stresses and strains in the pavement are estimated, the number of axles to failure can be calculated. Where this is less than the predicted traffic loading for the design period, strengthening is required.

Table 6 shows the overlay strengthening proposals for this pavement based on predicted traffic for the development for a 20 year design life from 2022 to 2042. Analysis found that without the development, no overlay will be required for the same period.

**Table 6: Strengthening Proposals**

Chainage (m)		Asphalt Concrete Overlay
From	To	
0	890	No Overlay Required
890	950	55mm
950	2100	No Overlay Required
2100	2275	40mm
2275	3275	No Overlay Required
3275	3500	40mm

Estimated stiffness values are based on inputs such as layer thickness and temperature, therefore inaccurate input information will lead to inaccurate output data. The values are also based on the non-destructive FWD test and should be considered in the context of any additional detailed information regarding the pavement structure.

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**Appendix A:**  
**Treatment Measures and Rating System Tables**

Table A1: Treatment Measures

Overall Rating	Treatment Measures	Surface	Structure
		<p><b>10</b></p> <p><b>Routine Maintenance</b></p>	
<p><b>9</b></p>			
		<p><b>8</b></p> <p><b>7</b></p> <p><b>Resealing &amp; Restoration of Skid Resistance</b></p>	
Poor			
<p><b>6</b></p> <p><b>5</b></p> <p><b>Surface Restoration</b></p> <p>—</p> <p>Carry out localised repairs and treat with surface treatment or thin overlay.</p>		Fair	Fair
		Poor	
<p><b>4</b></p> <p><b>3</b></p> <p><b>Structural Overlay</b></p> <p>—</p> <p>Required to strengthen road. Localised patching and repairs required prior to overlay.</p>		Poor Overall	
		<p><b>2</b></p> <p><b>1</b></p> <p><b>Road Reconstruction</b></p> <p>—</p> <p>Needs full depth reconstruction with extensive base repair.</p>	
Failed Overall			

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Table A2: Rating System

Overall Rating	Primary Rating Indicators*	Secondary Rating Indicators*
10	<u>No visible defects.</u>	Road surface in perfect condition, like new.
9	<u>Less than 10 % of surface with surface defects<sup>1</sup></u>	Road surface in very good condition.
8	<u>10% to 30% of surface with surface defects<sup>1</sup></u>	Little or No Other defects.
7	<u>Greater than 30% of surface with surface defects<sup>1</sup></u>	Little or No Other defects. Old surface with aged appearance.
6	<u>Less than 20% of other Cracking<sup>2</sup> may be present.</u> <u>Patching generally in good condition.</u> <u>May be out of shape requiring some reduction in driver speed.</u>	Surface defects <sup>1</sup> may be present. No structural distresses <sup>3</sup>
5	<u>Greater than 20% Cracking<sup>2</sup> present.</u> <u>Patching generally in fair condition.</u> <u>Out of shape requiring reduction in driver speed.</u> <u>Very localised structural distress<sup>3</sup> (&lt; 5 sq.m of surface) may be present.</u>	Surface defects <sup>1</sup> may be present.
4	<u>Structural Distress<sup>3</sup> present.</u> <u>Rutting or Alligator Cracking for 5% to 25% of surface.</u> <u>Short lengths of Edge Breakup/Cracking.</u> <u>Small number of Potholes.</u>	Other defects may be present.
3	<u>Significant areas of Structural distress<sup>3</sup>.</u> <u>Rutting or Alligator Cracking for 25% to 50% of surface.</u> <u>Significant continuous lengths with Edge Breakup/Cracking.</u> <u>Frequent Potholes.</u>	Other defects may be present.
2	<u>Large areas of Structural distress<sup>3</sup>.</u> <u>Rutting or Alligator Cracking for over 50% of surface.</u> <u>Severe Rutting (over 75 mm deep).</u> <u>Extensive Patching in very poor condition.</u> <u>Many Potholes.</u>	Very difficult to drive on.
1	<u>Severe Structural distress<sup>3</sup> with extensive loss of pavement surface.</u> <u>Road Disintegration of surface.</u> <u>Many large and deep Potholes.</u> <u>Patching in failed condition.</u>	Severe Deterioration Virtually undriveable.

\*Individual pavements will not have all the types of distress listed for any particular rating. They may have only one or two types.

Note 1: Surface Defects = ravelling or bleeding.

Note 2: Other Cracking = longitudinal, transverse, reflection or slippage cracking.

Note 3: Structural Distress = rutting, alligator cracking, edge breakup/cracking or potholes.

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**Appendix B**  
**Pavement Pictures**

**Picture B1: Section A – Chainage 0 - Junction with R148**



**Picture B2: Section A – Chainage 45 – Transverse Joint between HRA and SMA surfaces**



**Picture B3: Section A - Chainage 165 – Transverse Joint between SMA and HRA surfaces**



**Picture B4: Section A – Chainage 215 – Transverse Joint in HRA**





**Picture B5: Section A – HRA Surface approaching Motorway Bridge**



**Picture B6: Section A – HRA Joint south of Motorway Bridge**



**Picture B7: Section A – Chainage 890 - Transverse Joint from HRA to older surface**



**Picture B8: Section B – Chainage 1200**



**Picture B9: Section B – Chainage 1750 – Bleeding in wheel-tracks**



**Picture B10: Section B – Chainage 2080 – Gully and Edge Damage**



**Picture B11: Section B – Chainage 2200 – Patching/Edge Damage**



**Picture B12: Section B – Chainage 2600**



**Picture B13: Section C – Chainage 2800**



**Picture B14: Section C – Chainage 3120**



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**Appendix C:**  
**Verge and Carriageway Widths**

**Table C1: Verge and Carriageway Widths**

Chainage	Carriageway	Verge	Other	Comments
0	45.5			At junction
40	6.4	10		
80	6.5	7.8		
120	5.7	8		House Hedge RHS
160	5.7	7.9		House Hedge RHS
200	5.6	7.3		
240	6.1	12.9		
280	6.4	13.4		
320	6.5		13.6	Beside Road Junction
360	6.5	12.8		
400	6.5	12.6		
440	6.6	14.8		
480	6.5	15.3		
520	6.2	9.4		Verge is barrier to barrier at bridge
560	6.2			Bridge
600	6.2			Bridge
640	6.2	8.2		Verge is barrier to barrier at bridge
680	6.1	12.5		
720	6.1		7.2	Entrance RHS, Barrier LHS
760	6.2	8.2		Barrier to barrier
800	6.1	10.6		
840	6.1	11		Gate on LHS
880	6.1	11.6		House Hedge RHS
920	5.4	11.1		House Hedge RHS
960	5.7	7.2		Gate on LHS
1000	5.1	6.9		
1040	5.2			Gate to house LHS, No verge RHS
1080	5.3			Gate to house LHS, No verge RHS
1120	4.9			No verge
1160	6.7		9.1	Junction LHS, No verge RHS
1200	5.3	6.7		
1240	4.9	5.3		
1280	6	7.9		
1320	5.5	6.2		No verge LHS
1360	4.9	5.3		No verge LHS

**Table C1: Verge and Carriageway Widths (continued)**

Chainage	Carriageway	Verge	Other	Comments
1400	5.9	6.9		No verge LHS
1440	5.8	7.6		
1480	5.7	7.5		
1520	4.9	5.5		
1560	4.9	5.1		No verge LHS
1600	5.6	6.7		
1640	4.8	5.5		
1680	5.3	6.1		
1720	5.2	5.9		
1760	5.2	5.7		
1800	4.8	5.7		
1840	4.8	5.2		
1880	5.1	6		
1920	5.6	6.9		Farmyard wall on LHS
1960	4.8	5.7		
2000	5.6	8.3		
2040	5.3	7.2		
2080	5.4	9.8		
2120	5.4	11.1		House Fence RHS
2160	4.7	5.7		
2200	5	5.8		House RHS and LHS
2240	5.7	7.6		
2280	5.7	8.6		
2320	5.7	9.4		
2360	5.5	9.4		
2400	5.9	9.3		House entrance LHS
2440	5.5	7.7		
2480	5.4	7.5		
2520	4.5	5.9		
2560	4.9	7.2		
2600	5.7	7.8		Farmhouse wall RHS
2640	5.8	8.4		Farmhouse wall RHS
2680	5.3	7.4		Wall (Stone)
2720	4.5	6.1		
2760	5.2	9.3		
2800	5.6	8.7		Fence RHS



**Table C1: Verge and Carriageway Widths (continued)**

Chainage	Carriageway	Verge	Other	Comments
2840	5.7	8.7		
2880	5.6	8		
2920	5.6	7.9		
2960	5.6	8.7		
3000	5.8	8.6		
3040	5.7	8.2		
3080	5.7	8.3		
3120	5.6	7.4		
3160	5.7	8.7		
3200	5.6	8.1		
3240	5.6	8.7		
3280	6	8.7		
3320	4.6	6.1		
3360	4.7	5.8		
3400	5.4	6.8		
3440	5.6	8		
3480	5.7	8.9		

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**Appendix D:  
Tabulated Deflections**

**Table D1: Southbound Deflection Values**

Chainage	D1	D1-D2	D9
0	202	65	22
50	241	97	16
100	205	82	12
150	303	102	29
200	80	8	39
250	103	18	23
300	71	17	12
350	69	17	8
400	63	16	8
450	84	23	13
500	71	18	14
550	96	19	18
650	73	16	10
700	76	15	12
750	78	19	10
800	82	16	16
850	136	24	23
900	412	164	16
950	93	29	14
1000	269	67	23
1050	255	90	16
1100	146	47	16
1150	189	55	24
1200	316	96	32
1250	195	64	18
1300	198	70	16
1350	186	65	15
1400	216	63	25
1450	374	108	28
1500	276	85	21
1550	306	113	19
1600	180	46	21
1650	248	77	31
1700	452	145	27
1750	231	54	28

**Table D2: Northbound Deflection Values**

Chainage	D1	D1-D2	D9
0	319	118	23
25	234	70	17
75	362	128	21
125	288	82	38
175	115	14	44
225	150	37	18
275	78	16	16
325	76	17	11
375	76	18	9
425	78	17	13
475	77	18	14
525	76	17	14
650	85	18	13
675	89	19	12
725	79	17	13
775	127	39	18
825	137	37	15
875	399	145	23
925	568	249	19
975	280	84	22
1025	317	106	13
1075	258	66	22
1075	216	68	14
1175	310	72	44
1225	263	74	27
1275	238	76	25
1325	234	73	20
1375	201	49	22
1425	350	108	37
1475	212	69	16
1525	318	118	27
1575	165	42	21
1625	261	81	23
1675	186	43	32
1725	234	67	20

Table D1: Southbound Values (cont'd)

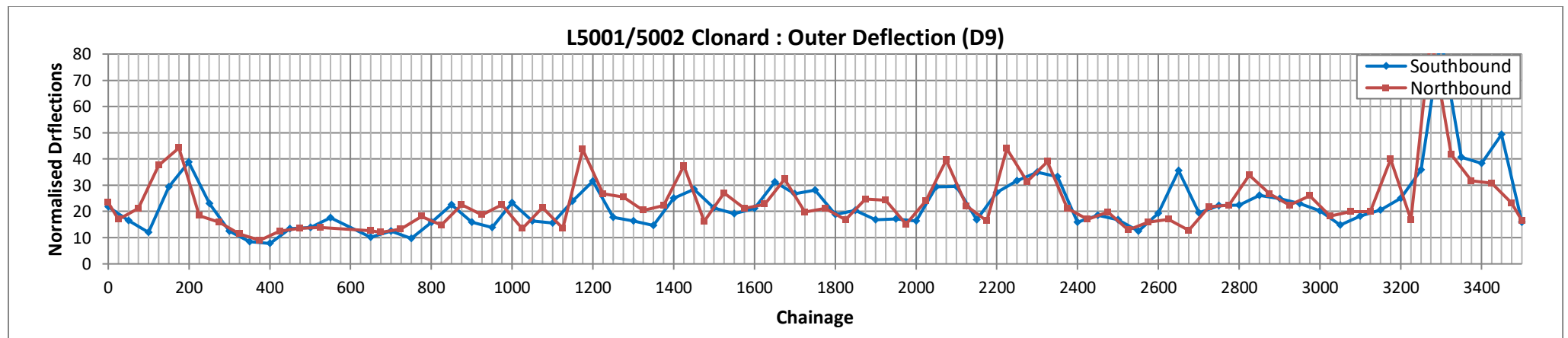
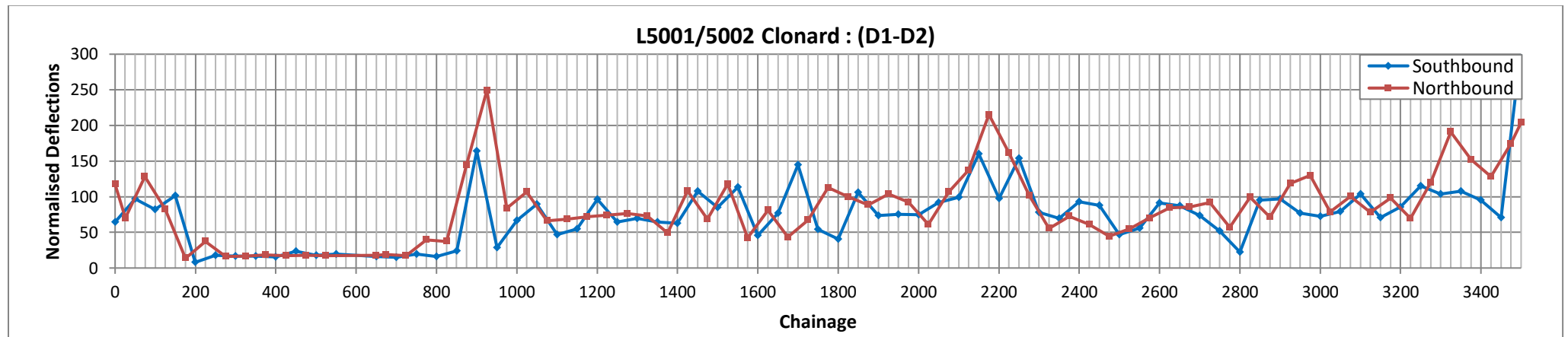
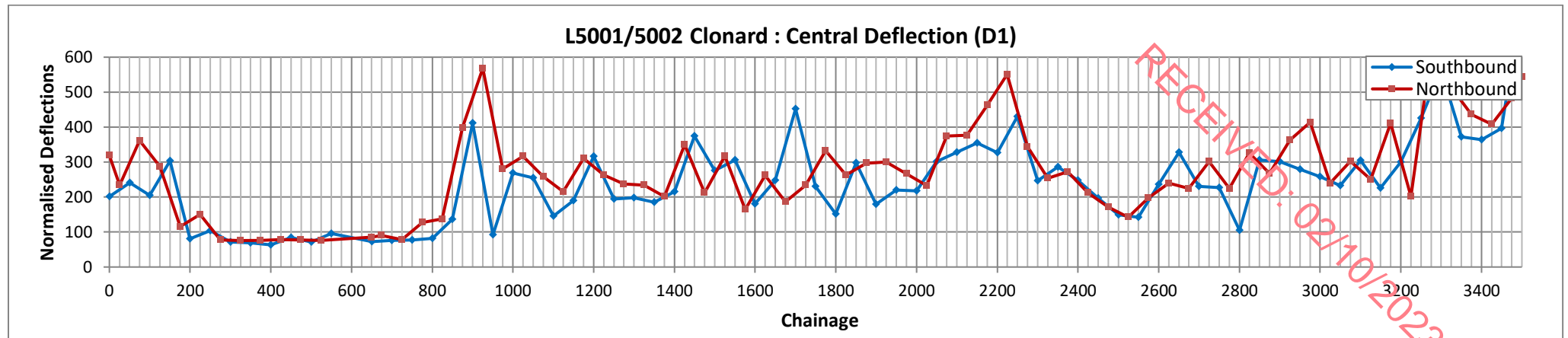
Chainage	D1	D1-D2	D9
1800	151	40	19
1850	298	106	20
1900	179	74	17
1950	220	75	17
2000	218	75	16
2050	301	92	29
2100	328	99	30
2150	354	160	17
2200	327	97	27
2250	430	154	32
2300	246	78	35
2350	286	70	33
2400	248	93	16
2450	197	88	19
2500	149	47	17
2550	142	56	13
2600	237	91	19
2650	328	87	36
2700	230	73	19
2750	227	52	22
2800	105	22	22
2850	306	95	26
2900	301	97	25
2950	279	77	23
3000	258	73	20
3050	233	80	15
3100	305	104	18
3150	226	71	21
3200	300	86	25
3250	425	115	36
3300	564	104	86
3350	372	107	41
3400	364	95	38
3450	396	71	49
3500	761	309	16

Table D2: Northbound Values (cont'd)

Chainage	D1	D1-D2	D9
1775	332	113	21
1825	263	100	17
1875	296	88	25
1925	300	104	24
1975	266	92	15
2025	233	61	24
2075	374	107	40
2125	376	137	22
2175	463	215	16
2225	551	162	44
2275	344	102	31
2325	254	55	39
2375	273	73	21
2425	211	61	17
2475	171	45	20
2525	142	55	13
2575	198	70	16
2625	240	84	17
2675	224	86	13
2725	301	92	22
2775	225	57	22
2825	326	99	34
2875	268	71	27
2925	362	119	22
2975	414	130	26
3025	240	78	18
3075	303	100	20
3125	251	78	20
3175	411	98	40
3225	201	69	17
3275	622	120	87
3325	514	191	42
3375	436	152	32
3425	408	128	31
3475	483	175	23
3500	543	204	17

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**Appendix E:  
Deflection Graphs**



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**Appendix F**  
**Core Logs**

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<b>Core No.:</b> L5001/1		<b>Chainage:</b> 250	<b>Lane:</b> Southbound
	<b>Depth (mm)</b>	<b>Description</b>	
	45	Hot Rolled Asphalt	
	55	Asphalt Concrete	
	62	Asphalt Concrete	
	78	Asphalt Concrete	




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<b>Core No.:</b> L5001/2		<b>Chainage:</b> 750	<b>Lane:</b> Northbound
	<b>Depth (mm)</b>	<b>Description</b>	
	40	Hot Rolled Asphalt	
	50	Asphalt Concrete	
	80	Asphalt Concrete	
80	Asphalt Concrete		

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Core No.: L5001/3	Chainage: 1250	Lane: Southbound
	Depth (mm)	Description
	5	Surface Dressing
	100	Asphalt Concrete
	25	Surface Dressing
	135	0-40mm Crushed Rock (not shown)
	10	Surface Dressing (not shown)


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Core No.: L5001/4		Chainage: 1750	Lane: Northbound
		Depth (mm)	Description
		15	Surface Dressing
		90	Surface Dressing
		20	Surface Dressing
		110	Wet Mix (not shown)
		30	Surface Dressing (not shown)


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<b>Core No.:</b> L5001/5	<b>Chainage:</b> 2250	<b>Lane:</b> Southbound
	<b>Depth (mm)</b>	<b>Description</b>
	10	Surface Dressing
	85	Asphalt Concrete
	20	Surface Dressing
	Debonded	
	30	Surface Dressing

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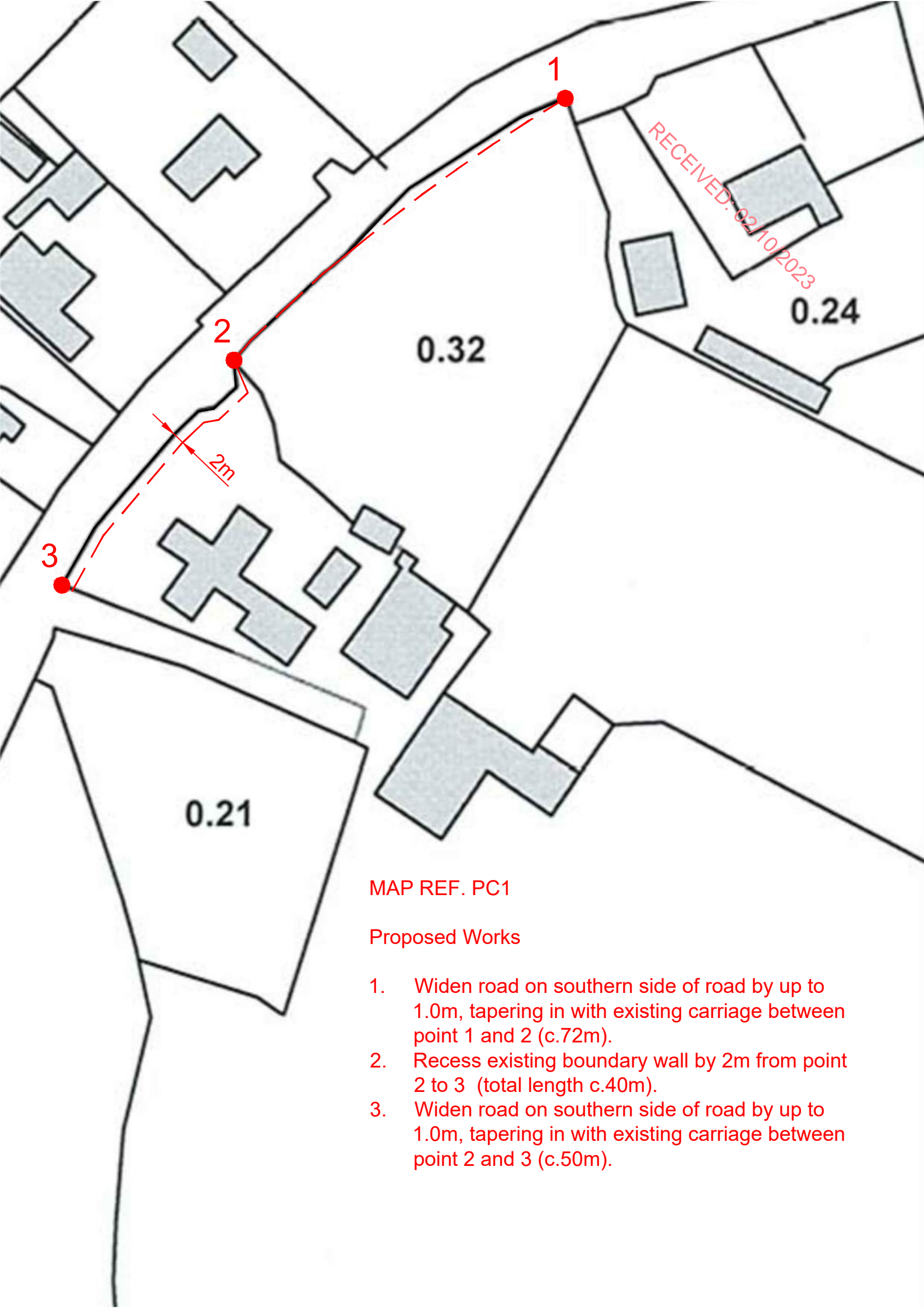
Core No.: L5001/6	Chainage: 2750	Lane: Northbound
	Depth (mm)	Description
	10	Surface Dressing
	80	Asphalt Concrete
	20	Surface Dressing
	50	Wet Mix
30	Surface Dressing	

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	<b>Core No.:</b> L5001/7	
	<b>Chainage:</b> 3250	<b>Lane:</b> Southbound
	<b>Depth (mm)</b>	<b>Description:</b>
	10	Surface Dressing
	75	Asphalt Concrete
80		
35	Surface Dressing	

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**Appendix 14-5**  
Road Improvement Works



MAP REF. PC1

Proposed Works

1. Widen road on southern side of road by up to 1.0m, tapering in with existing carriage between point 1 and 2 (c.72m).
2. Recess existing boundary wall by 2m from point 2 to 3 (total length c.40m).
3. Widen road on southern side of road by up to 1.0m, tapering in with existing carriage between point 2 and 3 (c.50m).



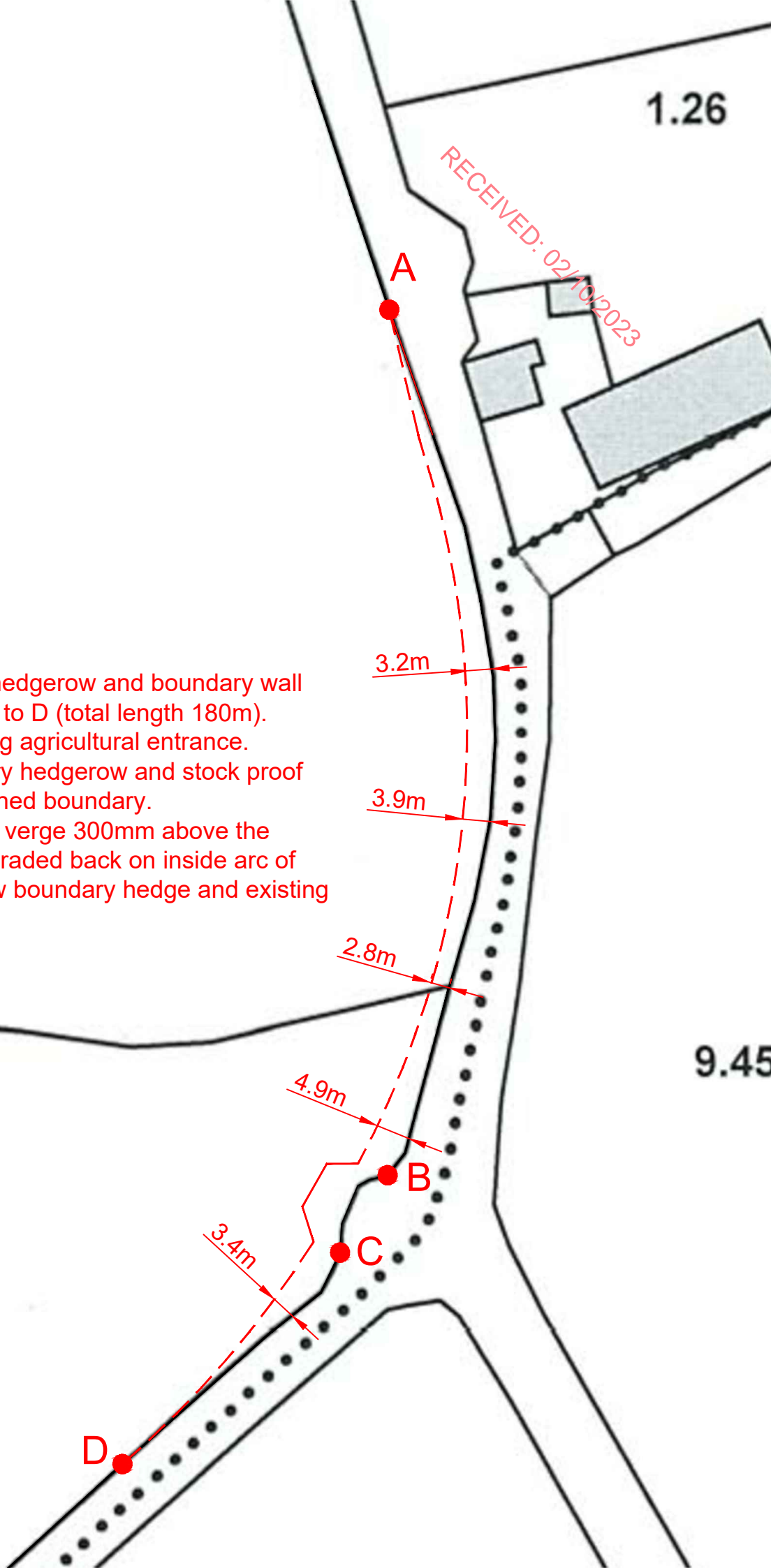
1.26

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MAP REF. PR1

Section 1

1. Remove existing hedgerow and boundary wall from A to B and C to D (total length 180m).
2. Recess the existing agricultural entrance.
3. Reinststate boundary hedgerow and stock proof fence along realigned boundary.
4. Provide a grassed verge 300mm above the existing carriage graded back on inside arc of bend between new boundary hedge and existing carriage.



9.45

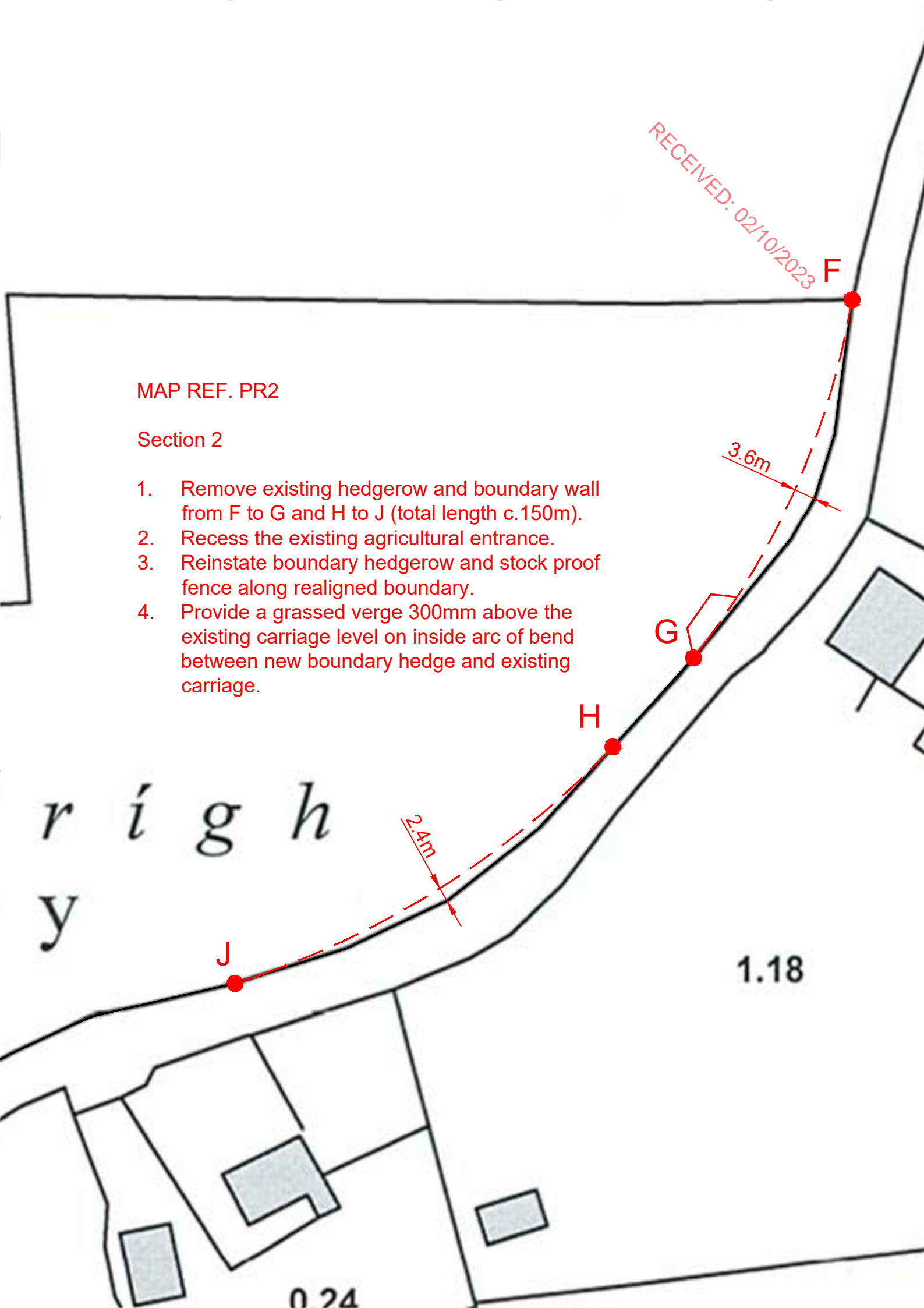
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MAP REF. PR2

Section 2

1. Remove existing hedgerow and boundary wall from F to G and H to J (total length c.150m).
2. Recess the existing agricultural entrance.
3. Reinststate boundary hedgerow and stock proof fence along realigned boundary.
4. Provide a grassed verge 300mm above the existing carriage level on inside arc of bend between new boundary hedge and existing carriage.

*r í g h*  
*y*



1.18

0.24