Tionscadal Éireann
Project Ireland
2040

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Bhaile Átha Cliath
Dublin City Council

NTA
Údarás Náisiúnta Iompair
National Transport Authority

M50 Cordon Report 2023

Report on Inbound People Movements Across the M50 Cordon

List of Abbreviations and Definitions

JTC:

- Junction Turning Counts

LGV:

- Light Goods Vehicle. LGV includes the following vehicle types: Van, Pick-Up, Car Delivery Vans, Minibus, Commercial Vehicles < 3.5 tonnes (single rear tyres)

M/C:

- Motorcycle. M/C includes the following: Motorcycles, Motor Scooters, Mopeds, Three-wheel motorcycles

NTA:

- National Transport Authority

OGV1:

- Ordinary Goods Vehicle 1. OGV1 includes the following vehicle types: 2-Axles Rigid Truck, 3-Axles Rigid Truck and Commercial Vehicles > 3.5 Tonnes (single rear tyres)

OGV2:

- Ordinary Goods Vehicle 2. OGV2 includes the following vehicle types: 4 or more Axles Rigid Truck, 3 Axle or more Articulated Truck, Vehicles in Category OGV1 towing trailer

P/C

- Pedal Cycle

PED

- Pedestrian

PSV

- Public Service Vehicle, excluding private / non-scheduled service vehicle

BUS

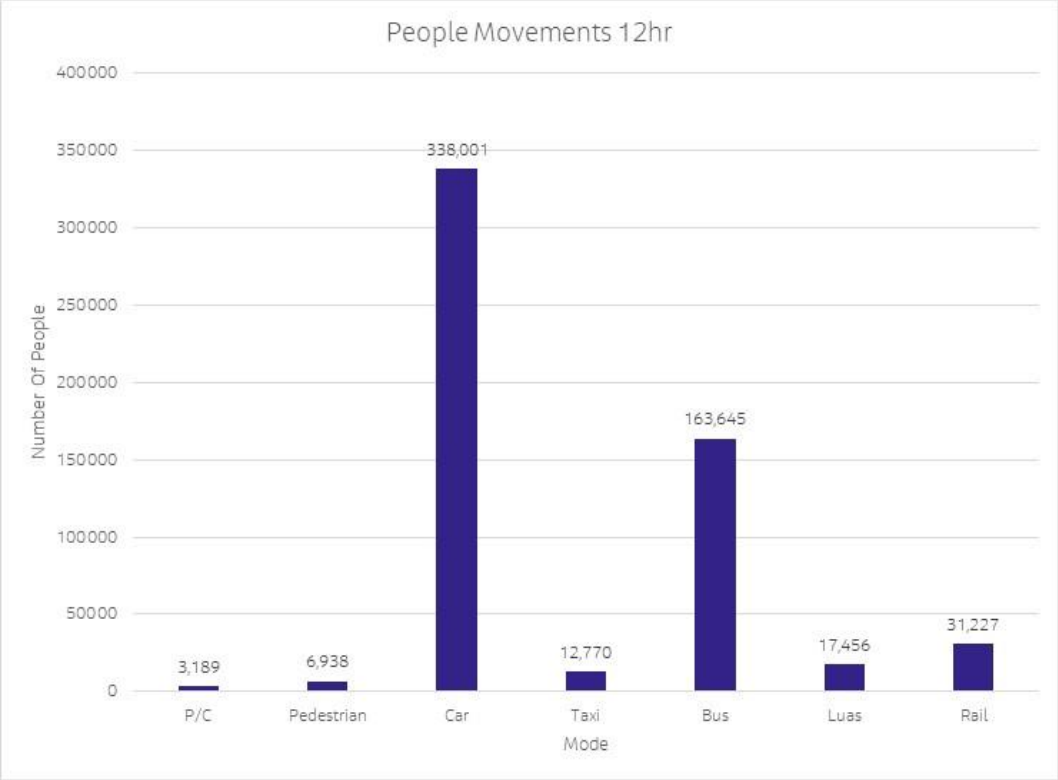
- Includes all public (PSV) / private, single / double deck, scheduled / non-scheduled service vehicles

Executive Summary

The M50 Cordon is a cordon of traffic survey locations that encloses Dublin City. Classified Junction Turning Counts and Pedestrian surveys were undertaken at 43 locations to determine the traffic flows crossing the M50 Cordon inbound during the key traffic periods for a typical weekday, i.e. AM (07:00 - 10:00), Lunch Time (10:00 - 13:00), School Run (13:00 - 16:00), PM (16:00 - 19:00) and 12hr (07:00 - 19:00).

Vehicle occupancy surveys were undertaken at 28 sites and Pedestrian and Cycle only surveys were undertaken at 4 locations along the Cordon at key pedestrian and cycle only routes i.e. parks and dedicated pedestrian and cycle corridors. In addition to this, Bus Occupancy surveys were undertaken at 31 bus stops to determine the number, occupancy and frequency of bus services crossing the M50 Cordon, as well as inbound movements via the Dublin Port Tunnel and M1. Passenger numbers from the Annual Luas Census (Transport Infrastructure Ireland) and Annual Rail Census (Iarnród Éireann) were also used to determine the passengers travelling across the M50 Cordon inbound via Luas and Heavy Rail, respectively. Based on the analysis of the 2023 survey data, the key results are:

- In terms of overall people movements, 222,455 (39%) of a total of 573,226 people travelling inbound towards the city between 07:00 and 19:00 used sustainable modes of travel, i.e. cycling, walking, bus, light rail and heavy rail. The 12 hour people movements across the M50 Cordon are illustrated below.



- The busiest time period for vehicles and cyclists was the AM peak with 120,207 crossing inbound towards the city. The busiest time period for Pedestrians was the AM peak with 2,228 crossing inbound.
- Between the hours of 07:00 and 19:00, cars were recorded to have the highest vehicular traffic split, accounting for 76% of the total inbound vehicle flows. Light Goods Vehicles (LGVs) recorded 12%, Ordinary Goods Vehicles 1 (OGV1) recorded 3%, Ordinary Goods Vehicles 2 (OGV2) recorded 2% and taxis recorded 2%. The remaining vehicle classifications recorded 2% or less of the total flows.
- In terms of vehicle occupancy, 85% of cars crossing inbound towards the city had single occupancy during the AM period (07:00 – 10:00) and 92% during the PM period (16:00 – 19:00) and 70% of taxis recorded single occupancy (i.e. driver-only) over the 12-hour survey period.
- Between 07:00 and 19:00, 67% of buses were at 25-49% capacity. Approximately 3% of buses were at 0-24% capacity, 20% were at 50-74% capacity, 8% were at 75-99% capacity and 2% were at 100% capacity.

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1 Introduction

The M50 Cordon is a closed screenline of traffic survey locations that encloses Dublin City. This report presents the findings of traffic surveys along the cordon, which were undertaken in November 2023 and captured the traffic movements crossing the M50 Cordon inbound towards the city.

The structure of this report is set out as follows:

- **Chapter 2** provides a definition of the M50 Cordon and sets out the methodology for the data collection;
- **Chapter 3** outlines
    - The traffic flows crossing the M50 Cordon inbound by vehicle classification;
    - The occupancy of the vehicles crossing the M50 Cordon in terms of the number of occupants per vehicle. Each vehicle type has been analysed per peak time periods and for the duration of the survey period.
- **Chapter 4** outlines the total number of people movements crossing the M50 Cordon inbound towards the city; and
- **Chapter 5** provides a commentary of the overall trends observed.

2 Definition and Methodology

2.1 Data Sources

To establish the movement of people across the M50 Cordon, a bespoke data collection exercise was carried out, comprising of the following surveys:

Junction Turning Counts (JTC):

- The JTC surveys were recorded in 15-minute intervals over a 12-hour period at 43 sites on the day of the survey. They were undertaken using telescopically mounted video cameras and were recorded for Car, LGV, OGV1, OGV2, Motorcycle, Pedal Cycle, Taxi and Bus.

Pedestrian and Cycle Only Surveys:

- In addition to the pedestrian and cycle flow data obtained from the JTC surveys, the NTA also undertook additional pedestrian and cycle only surveys at links that are only accessible by pedestrians or cyclists. The surveys were recorded in 15-minute intervals over a 12-hour period at 4 additional sites. The Pedestrian and Cycle Only surveys recorded the following classifications:
    - Adult Pedestrian;
    - Elderly Pedestrian;
    - Child Pedestrian < 5 years old;
    - Child Pedestrian < 16 years old; and
    - Mobility Impaired Pedestrian.

Vehicle Occupancy Surveys

- Vehicle Occupancy counts were also undertaken at survey points along the M50 Cordon. Vehicle Occupancy counts were carried out by a manual enumerator, who captured the occupancy of cars and taxis between 07:00 and 19:00 on the day of the survey. All information was recorded in hourly intervals.

Bus Occupancy Surveys

- Bus Occupancy surveys were undertaken at 31 bus stops inside the M50 Cordon in order to record the number of people travelling inbound into the city via bus. Manual enumerators recorded both occupancy of the bus at the bus stop, and the number of passengers boarding and alighting. These surveys also recorded the number of public and private buses passing the bus stop and the type of bus.

Luas Data

- A boarding and alighting Luas survey is carried out annually and, while not commissioned as part of the multi-modal cordon surveys, results of the Luas survey were used to supplement the surveys.

Heavy Rail Data:

- Since 2012, Iarnród Éireann has undertaken a census of passengers boarding and alighting on all services passing through all stations on the national rail network on 09/11/2023. While this rail survey was not commissioned as part of the multi-modal cordon surveys, results from the rail census were used to supplement the surveys.

Additional Two Weekly Vehicle Counts/Speed Surveys:

- Automatic Traffic Counts (ATCs) were carried out over a continuous two week period (between 10/11/2023 and 24/11/2023) in order to gather longer term data on daily movements at key points on the radial routes leading into the cordon.

The locations of all of the above surveys are illustrated in Figures 2-1 to 2-7 below.

2.2 Definition of the M50 Cordon

A map of the M50 Cordon is presented in Figure 2-1, and highlights the locations along the Cordon where JTC data has been collected on the movement of people into the city.

The M50 Cordon has been chosen to ensure, as far as possible, that any traffic flow (including cyclists and pedestrians) entering the city must pass through one of the locations where the surveys have been undertaken.

The data, as presented in this report, refers to movements in one direction only (i.e. inbound towards the city) across the various cordon points. Figure 2-2, below, is a map of the locations where pedestrian and cycle only links have been surveyed. Figure 2-3 shows the locations where the ATC surveys have been undertaken. Figure 2-4 shows the locations where the bus surveys have been undertaken and Figure 2-5 shows the locations where additional surveys were undertaken to capture bus services coming from the Dublin Port Tunnel. Figure 2-6 shows the locations where vehicle occupancy surveys were undertaken. Figure 2-7 shows the locations along the M50 Cordon where Luas and Rail Passenger counts have been used to inform the number of passengers crossing the Cordon on all Rail inbound services.

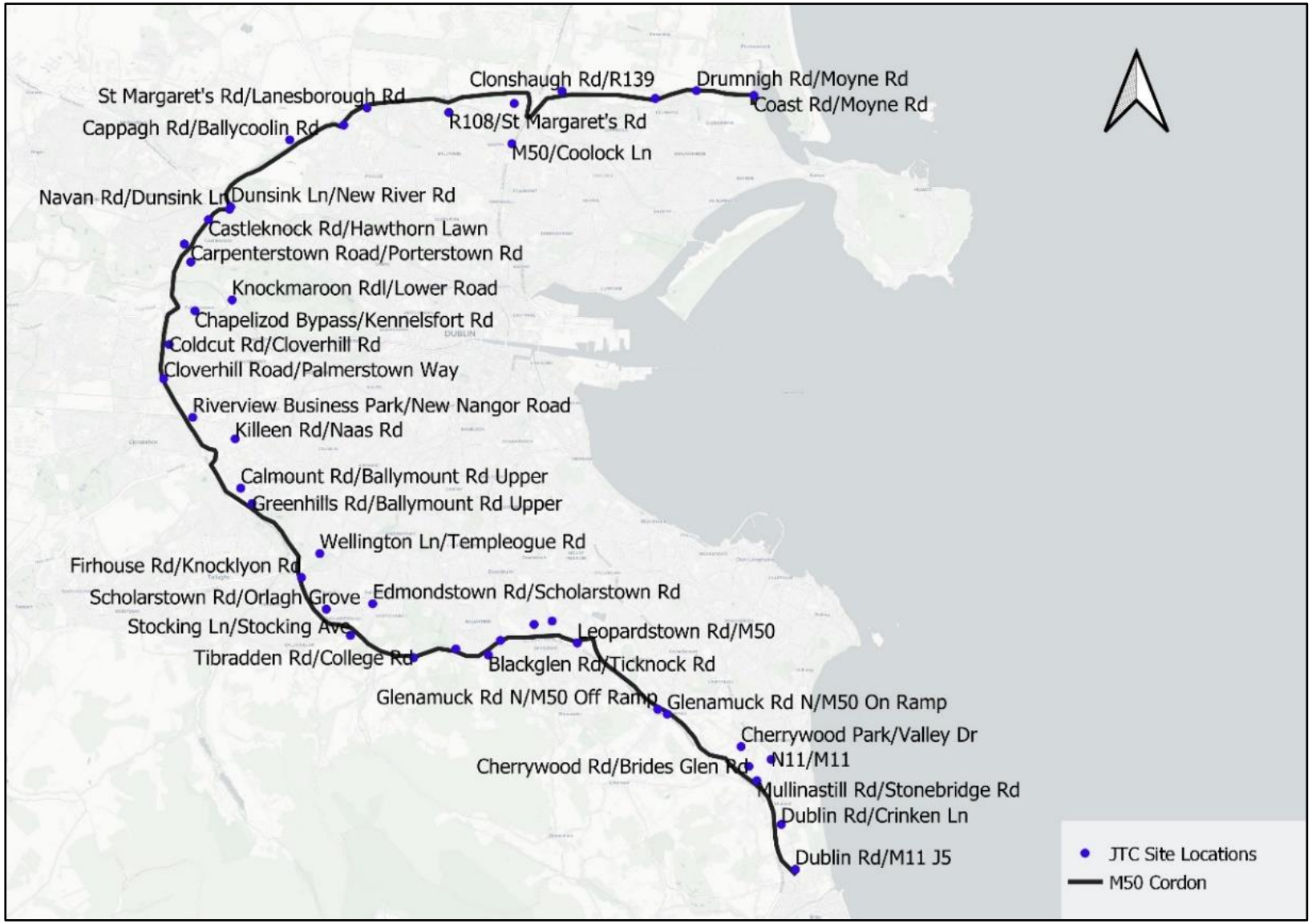


Figure 2-1:JTC Site Locations

Figure 2-2:Pedestrian Site Locations

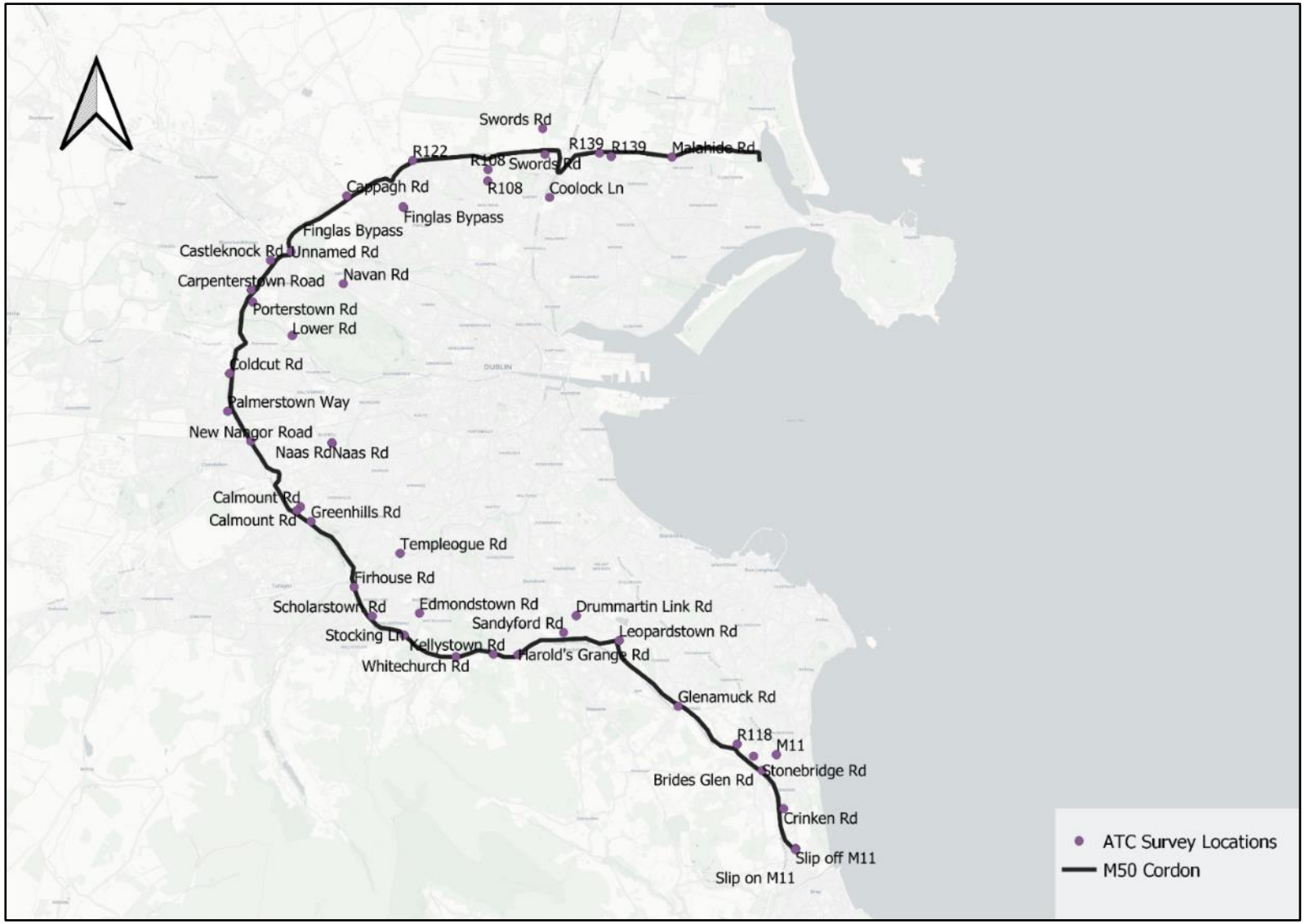


Figure 2-3:ATC Site Locations

Figure 2-4:Bus Occupancy Site Locations

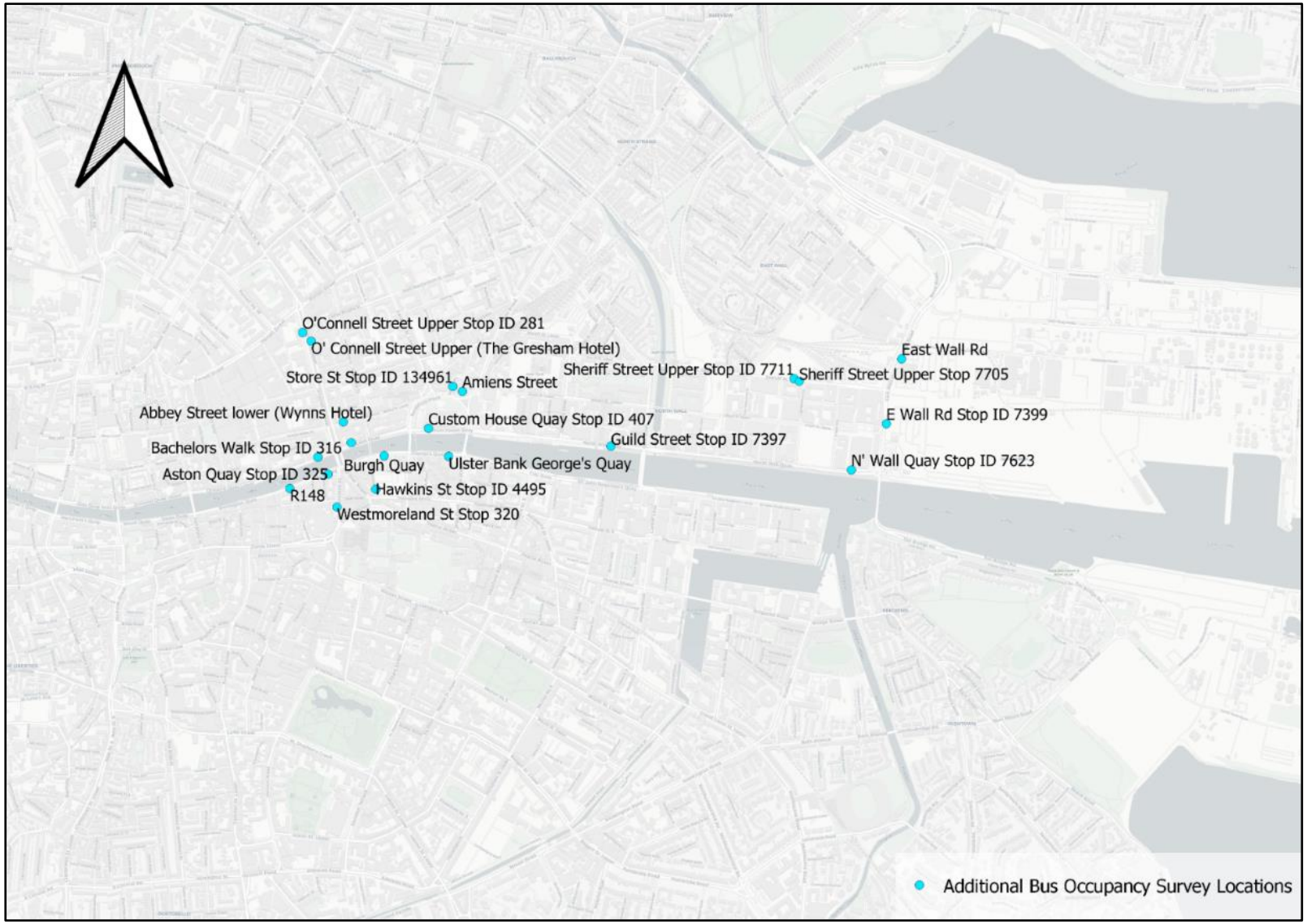


Figure 2-5:Additional Bus Occupancy Site Locations

Figure 2-6:Vehicle Occupancy Site Locations

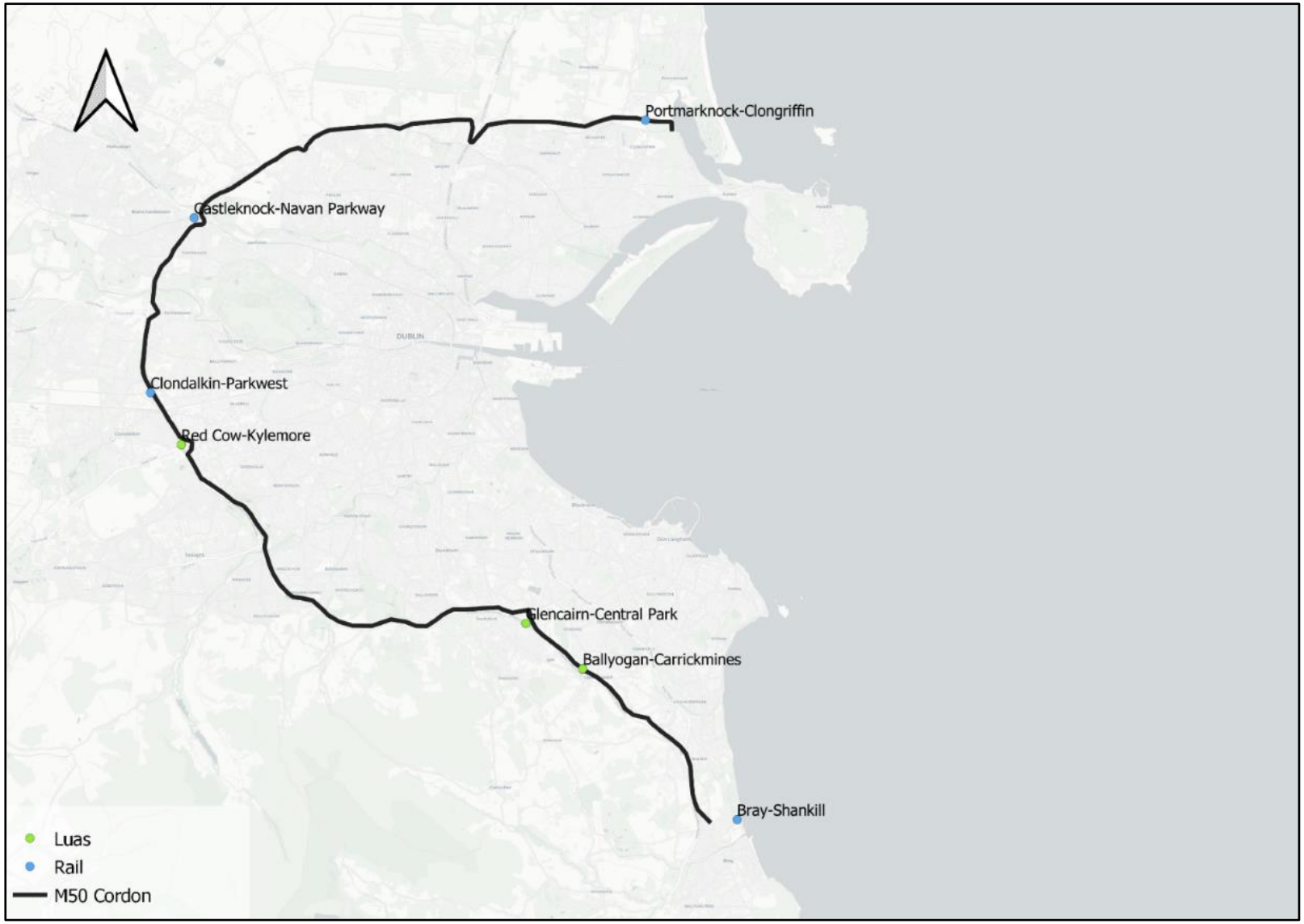


Figure 2-7:Locations where Luas and Rail lines cross the Cordon

2.3 Time Periods Analysed

Surveys were recorded at either 15-minute or one hour intervals, or, in the case of public transport services, when the bus or train was at a specific stop or station. Therefore, it is possible to understand trends throughout the day from the data. As such, the data was analysed for the following time periods:

- AM: 07:00 - 10:00
- Lunch Time (LT): 10:00 - 13:00
- School Run (SR): 13:00 - 16:00
- PM: 16:00 - 19:00
- 12hr: 07:00 - 19:00

3 M50 Cordon

3.1 Traffic Flow Surveys

3.1.1 Overview

This section outlines the classified vehicle, pedestrian and cycle flows crossing the M50 Cordon inbound, towards the city centre. This information was collected from the JTC traffic survey sites for Car, LGV, OGV1, OGV2, Motorcycle, Pedal Cycle, Taxi and Bus, as well as pedestrian survey sites. It should be noted that these surveys count the number of vehicles, cyclists and pedestrians crossing the cordon. However, the figures presented below do not include the number of people in each vehicle (vehicle occupancy). Therefore, these figures are not representative of the mode share. Total passenger flows and mode share are discussed in sections 4.4 and 4.5 of this report.

Table 3-1 presents the observed flows by vehicle classification crossing the M50 Cordon inbound during the time periods recorded in the 2023 survey.

Vehicle Classifications	AM 07:00-10:00	LT 10:00-13:00	SR 13:00-16:00	PM 16:00-19:00	12hr 07:00-19:00
Car	92,966	62,636	67,458	75,592	298,652
LGV	15,673	13,060	11,085	7,468	47,286
OGV1	3,194	4,072	3,150	1,155	11,571
OGV2	2,258	3,035	2,717	1,219	9,229
Motorcycle	663	316	369	459	1,807
Pedal Cycle	1,559	378	498	758	3,193
Taxi	2,642	2,653	2,731	1,702	9,728
Bus	1,252	1,012	972	948	4,184
Pedestrian	2,228	1,285	1,477	1,601	6,591
Total	122,435	88,447	90,457	90,902	392,241

Table 3-1:Movements Across the M50 Cordon Inbound

Figure 3-1 illustrates the overall flows for all vehicle types across the M50 Cordon per key time period. It is evident that the AM time period has the highest volume of overall traffic movements, with a total of 122,435 travelling inbound.

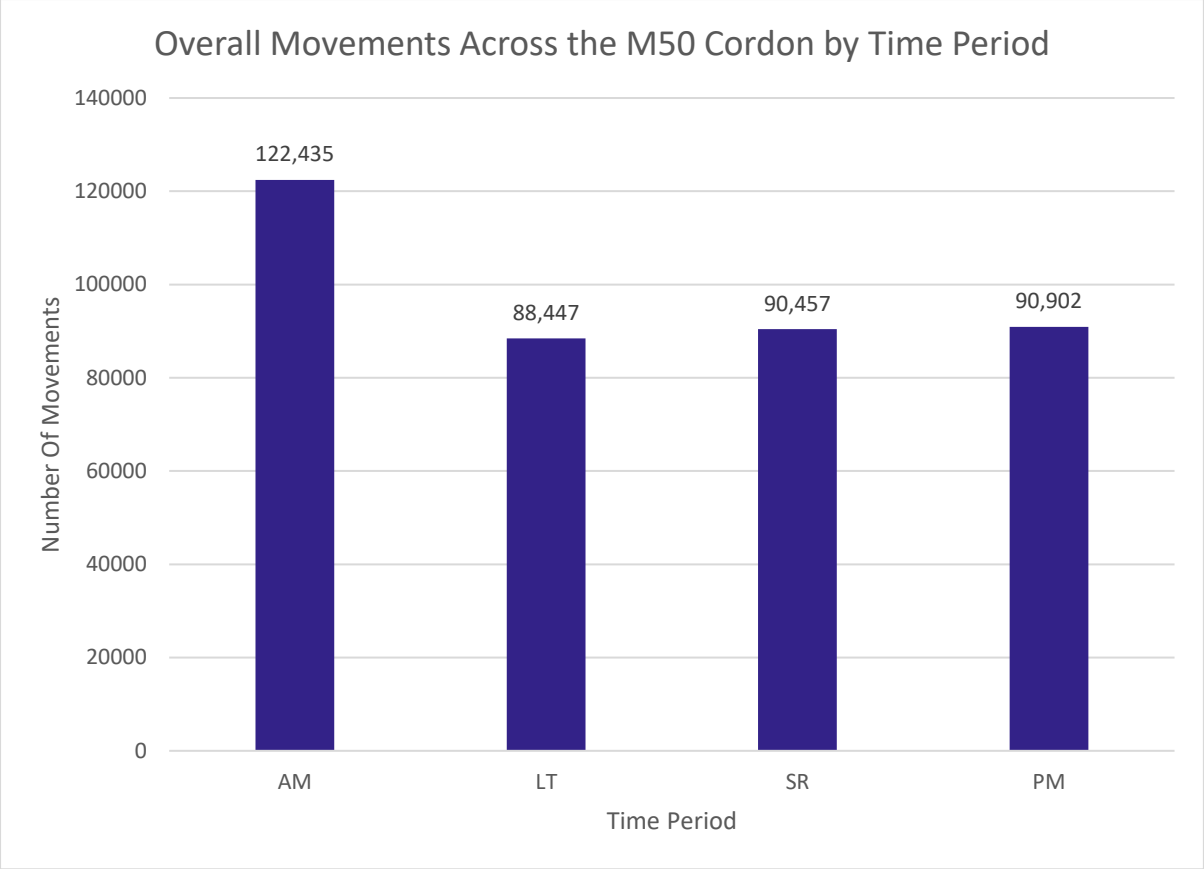


Figure 3-1:Total Movements across the M50 Cordon Inbound by Time Period

For further information, please refer to Appendix A, which presents additional graphs separated into the respective time periods surveys and survey site locations.

Figure 3-2 sets out the number of vehicles in each classification as recorded in the JTC surveys, as well as the number of pedestrians, over a 12-hour period (i.e. 07:00 – 19:00). This figure shows that car is the most common vehicle type, with 298,652 inbound movements in the 12-hour period, accounting for 76% of all crossings.

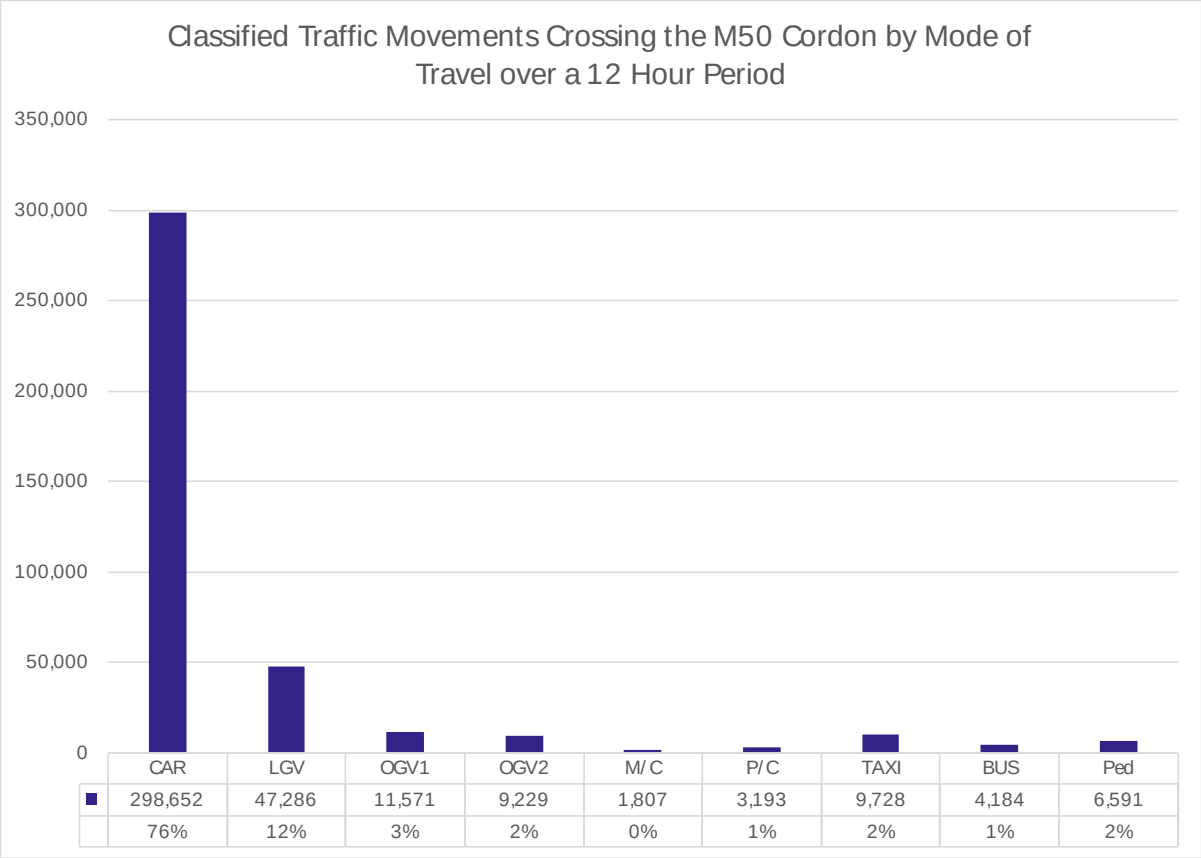


Figure 3-2:Total Number and Percentage of Vehicles crossing the M50 Cordon inbound by vehicle classification over a 12 hour period

3.1.2 Vehicle Classified Traffic Flows

The following sections provide a more detailed overview of the JTC survey results by vehicle classification and survey sites. Each vehicle class is analysed in turn providing information on the volume of vehicles per time period and per survey site.

Car

Figure 3-3 below presents the total number of cars crossing the M50 Cordon for each surveyed time period. Overall, it is evident that the AM time period has the highest volume of cars, with a total of 92,966 cars travelling inbound.

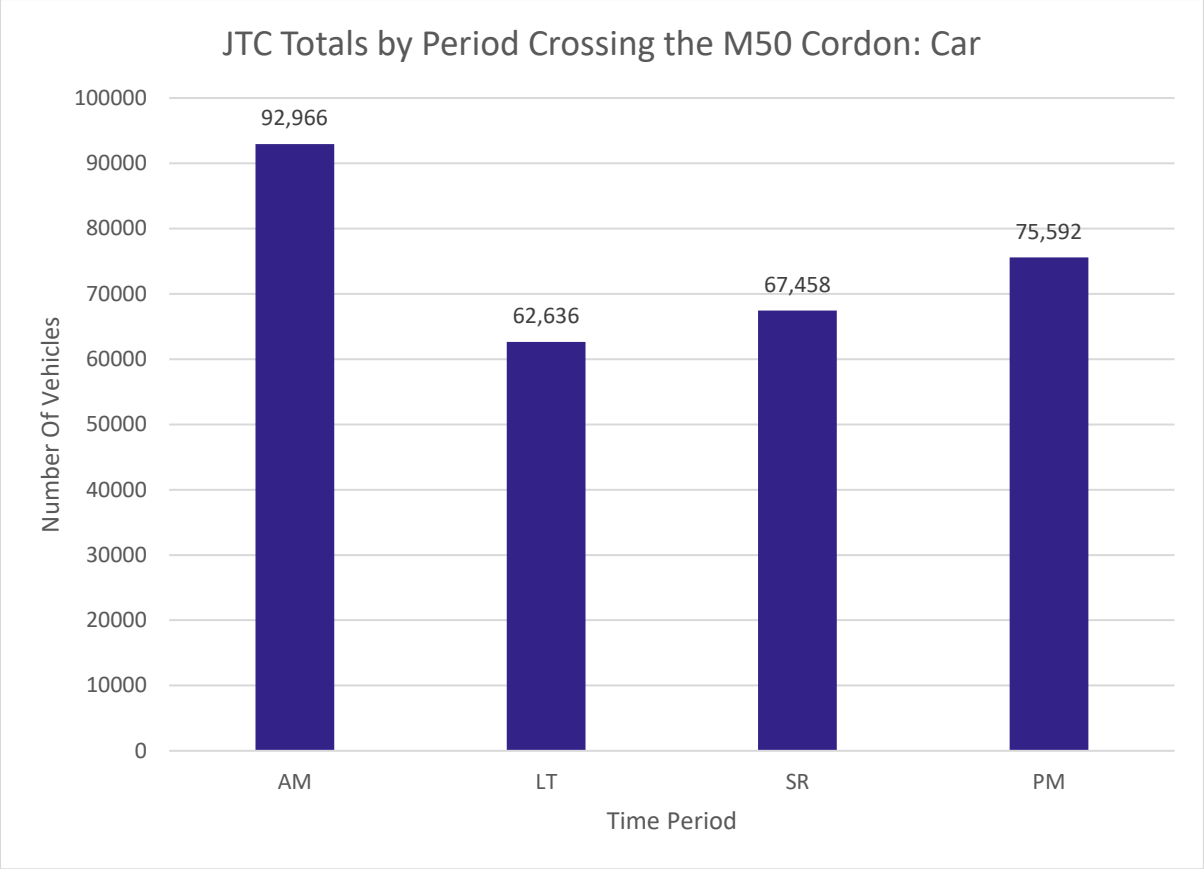


Figure 3-3:Total Number of Car journeys per Time Period

Figure 3-4 presents a further breakdown of the total number of cars, with reference to each site location. The busiest location for cars crossing the M50 Cordon was the Killeen Rd/Naas Rd junction, with a total of 17,708 cars travelling inbound through this junction over a 12-hour period.

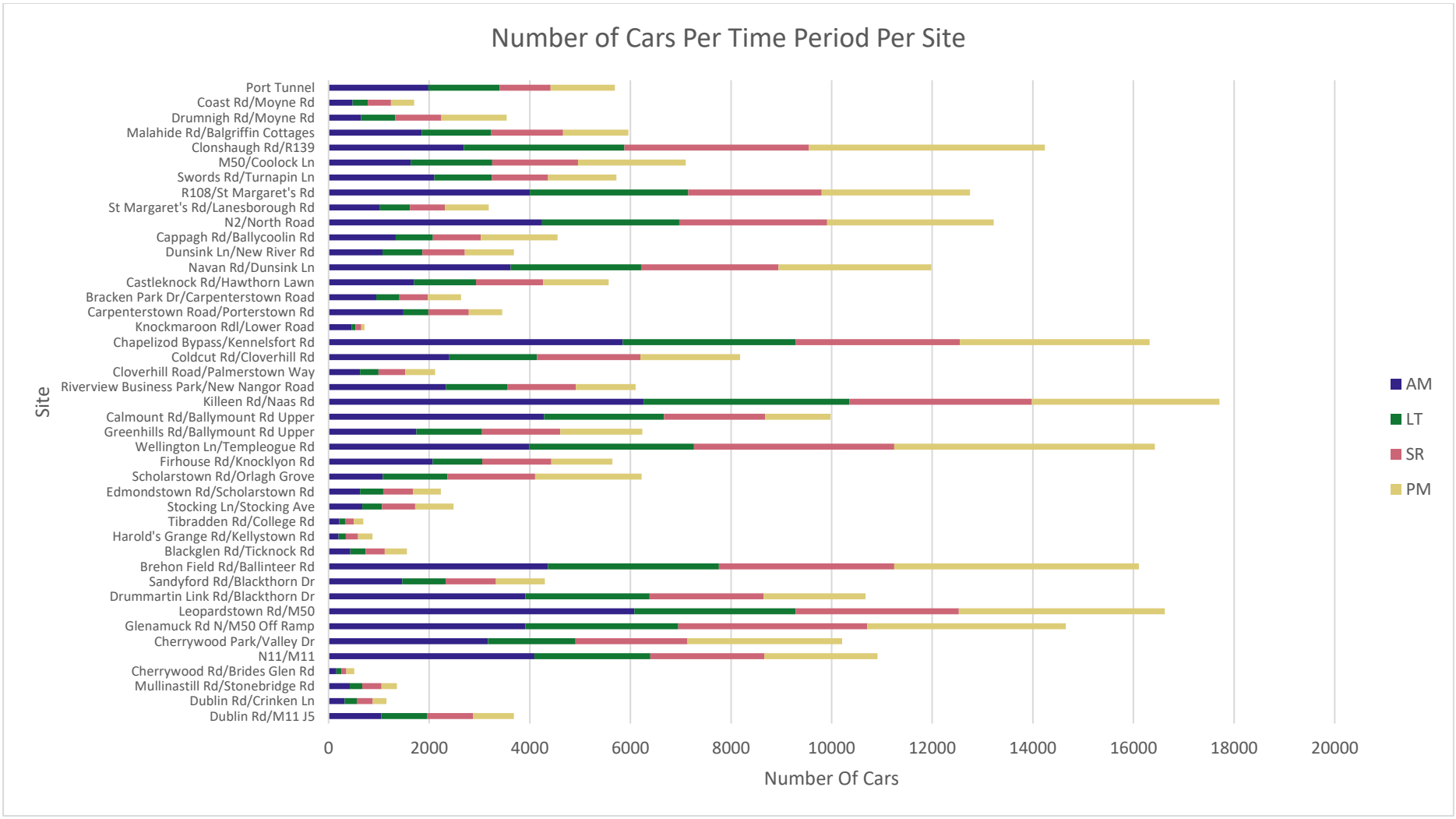


Figure 3-4:Number of Cars Crossing the M50 Cordon Inbound at all Sites Per Time Period

Please also refer to Appendix A for further information on the total number of cars, with reference to each individual time period.

Light Goods Vehicle

Figure 3-5 below presents the total number of LGVs crossing the M50 Cordon for each surveyed time period. Overall, it is evident that the AM time period has the highest volume of LGVs, with a total of 15,673 LGVs travelling inbound.

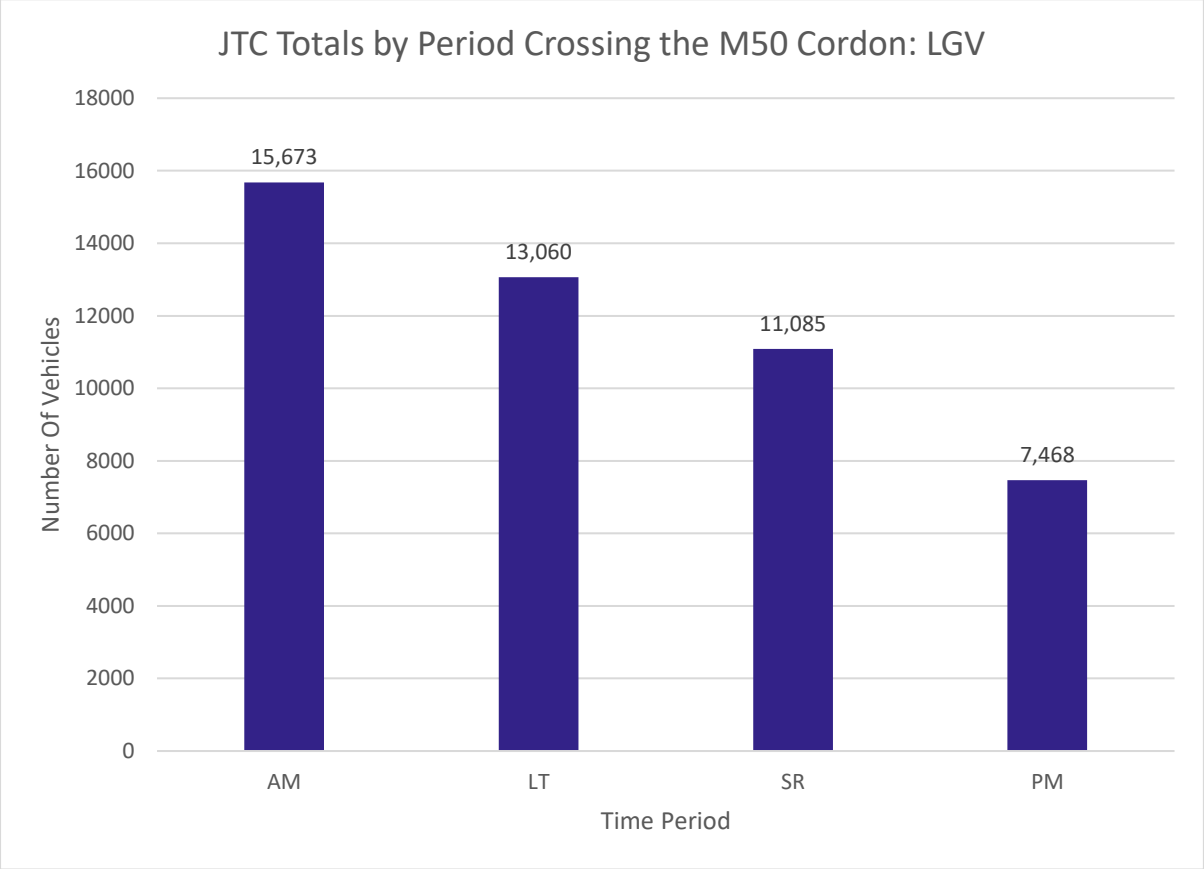


Figure 3-5:Total Number of LGV journeys per Time Period

Figure 3-6 presents a further breakdown of the total number of LGVs, with reference to each site location. The busiest location for LGVs crossing the M50 Cordon was the Killeen Rd/Naas Rd junction, with a total of 4,663 LGVs travelling inbound through this junction over a 12-hour period.

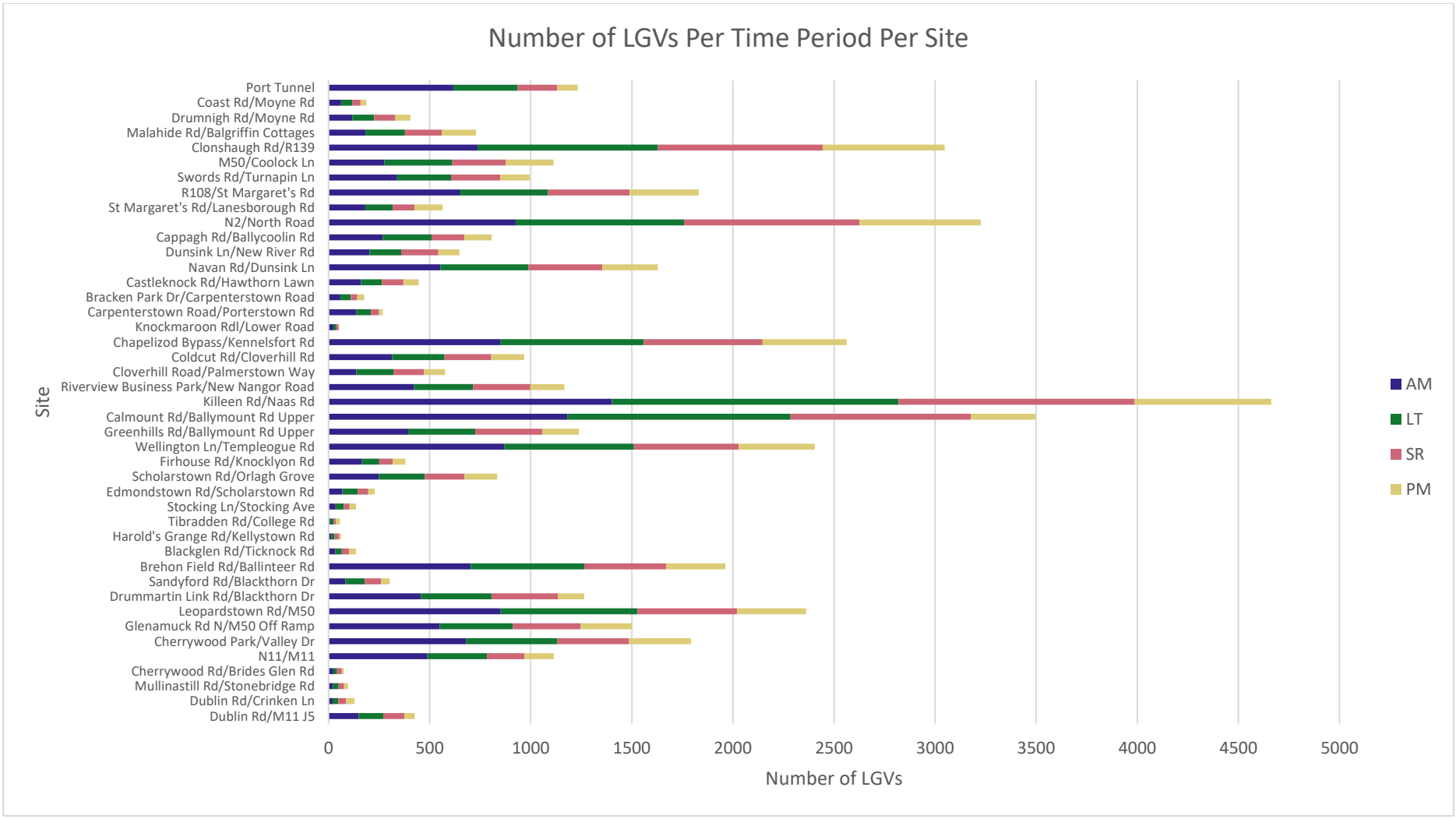


Figure 3-6:Number of LGVs Crossing the M50 Cordon Inbound at all Sites Per Time Period

Please also refer to Appendix A for further information on the total number of LGVs, with reference to each individual time period.

Ordinary Goods Vehicle 1

Figure 3-7 below presents the total number of OGV1s crossing the M50 Cordon for each surveyed time period. Overall, it is evident that the LT time period has the highest volume of OGV1s, with a total of 4,072 OGV1s travelling inbound.

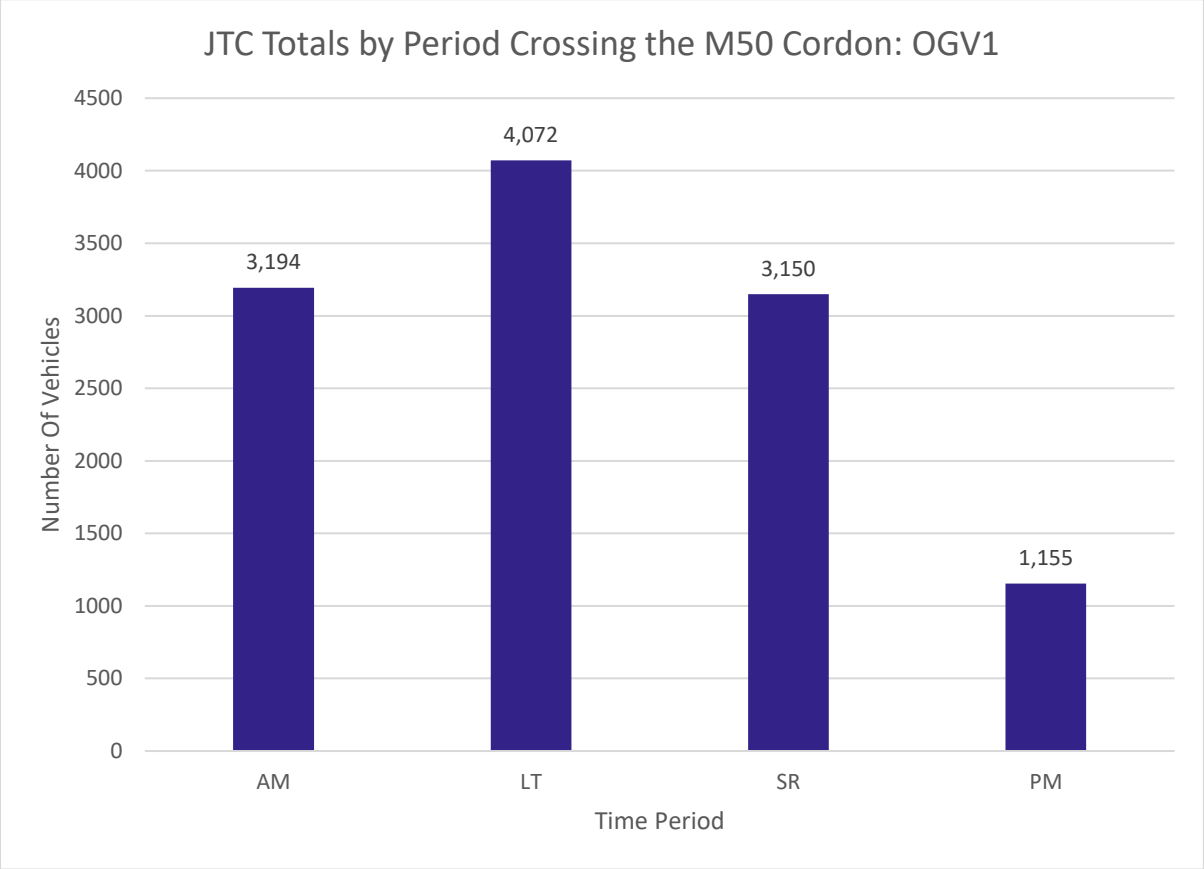


Figure 3-7:Total Number of OGV1 journeys per Time Period

Figure 3-8 presents a further breakdown of the total number of OGV1s, with reference to each site location. The busiest location for OGV1s crossing the M50 Cordon was the Killeen Rd/Naas Rd junction, with a total of 1,470 OGV1s travelling inbound through this junction over a 12-hour period.

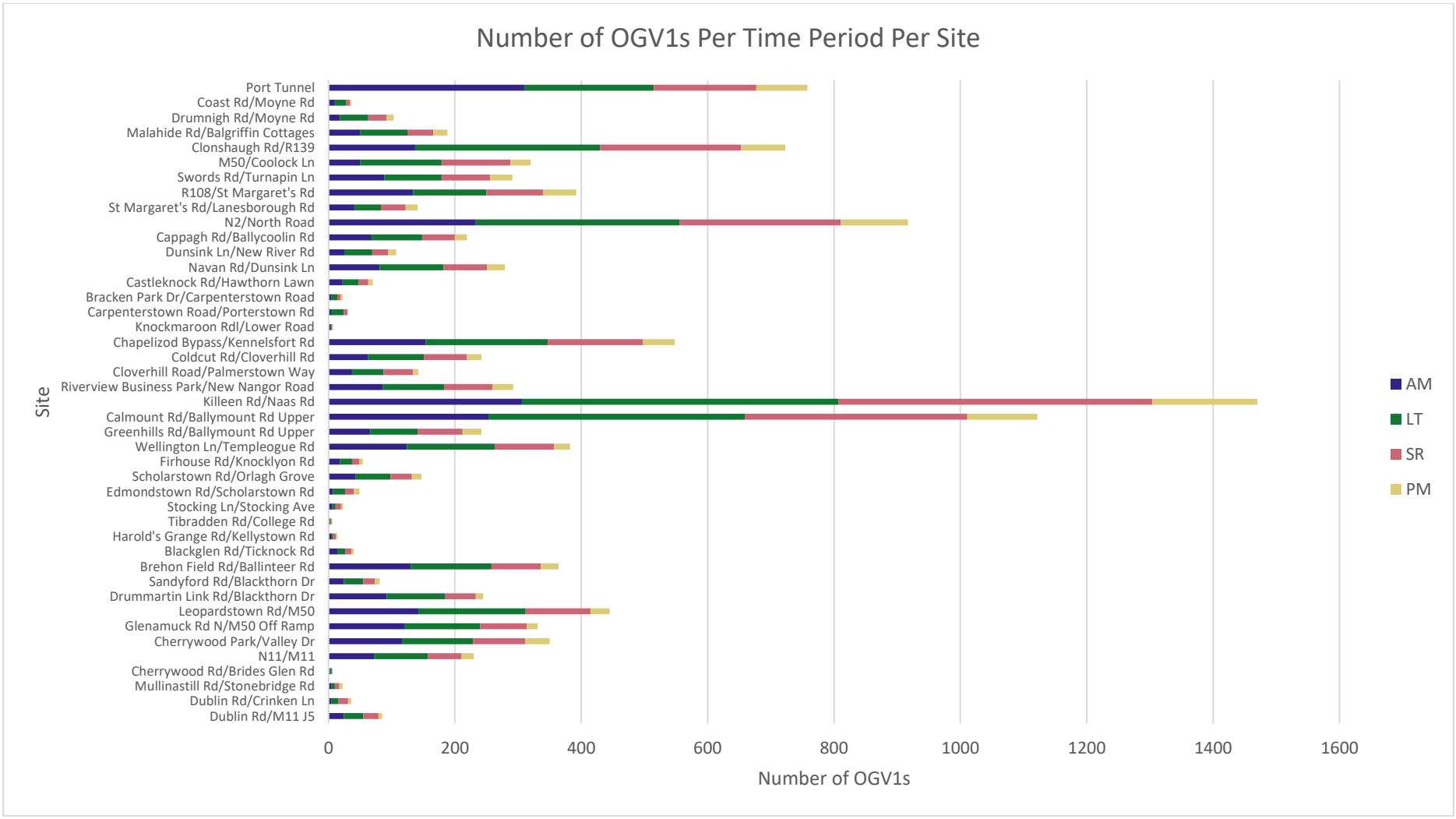


Figure 3-8:Number of OGV1s Crossing the M50 Cordon Inbound at all Sites Per Time Period

Please also refer to Appendix A for further information on the total number of OGV1s, with reference to each individual time period.

Ordinary Goods Vehicle 2

Figure 3-9 below presents the total number of OGV2s crossing the M50 Cordon for each surveyed time period. Overall, it is evident that the LT time period has the highest volume of OGV2s, with a total of 3,035 OGV2s travelling inbound.

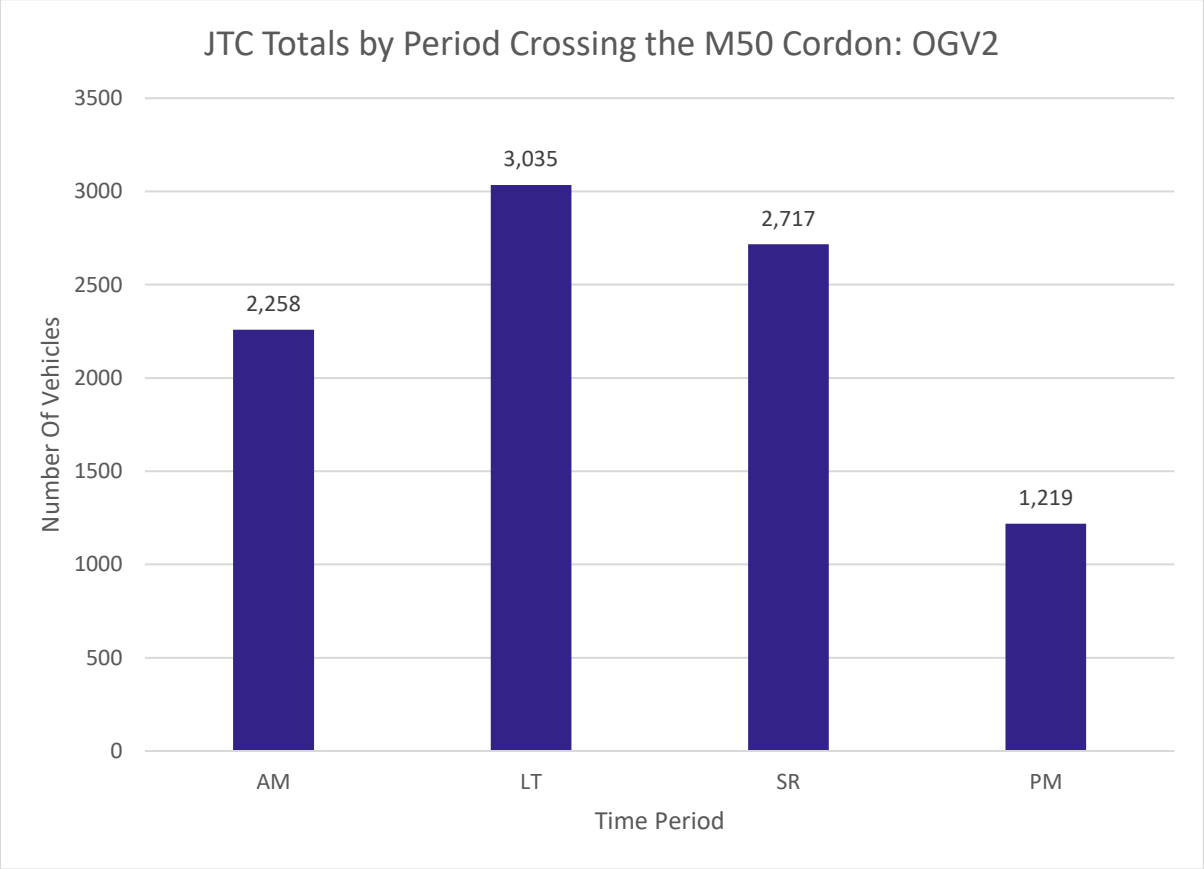


Figure 3-9:Total Number of OGV2 journeys per Time Period

Figure 3-10 presents a further breakdown of the total number of OGV2s, with reference to each site location. The busiest location for OGV2s crossing the M50 Cordon was the Port Tunnel junction, with a total of 3,636 OGV2s travelling inbound through this junction over a 12-hour period.

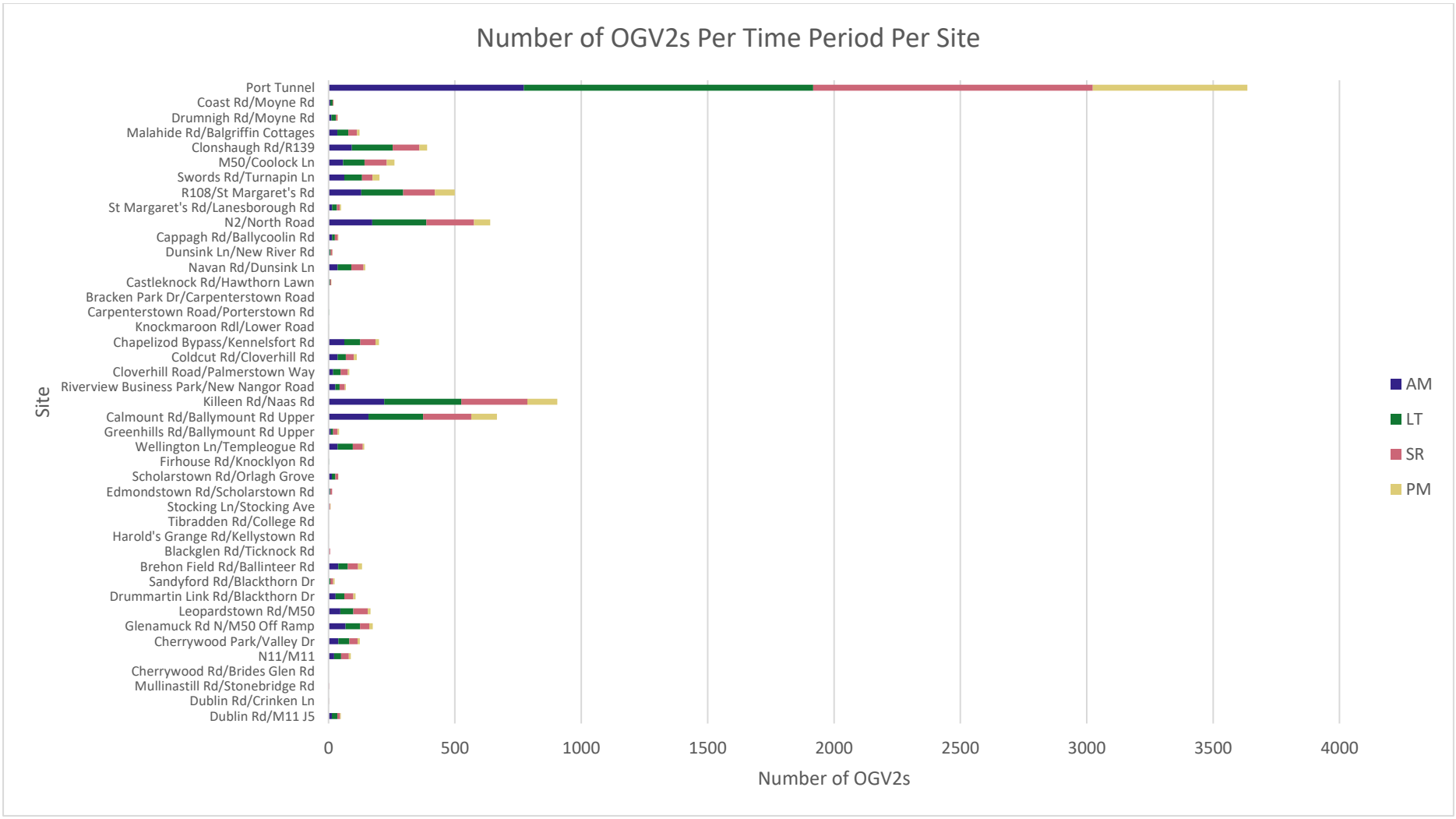


Figure 3-10:Number of OGV2s Crossing the M50 Cordon Inbound at all Sites Per Time Period

Please also refer to Appendix A for further information on the total number of OGV2s, with reference to each individual time period.

Motorcycle

Figure 3-11 below presents the total number of motorcycles crossing the M50 Cordon for each surveyed time period. Overall, it is evident that the AM time period has the highest volume of motorcycles, with a total of 663 motorcycles travelling inbound.

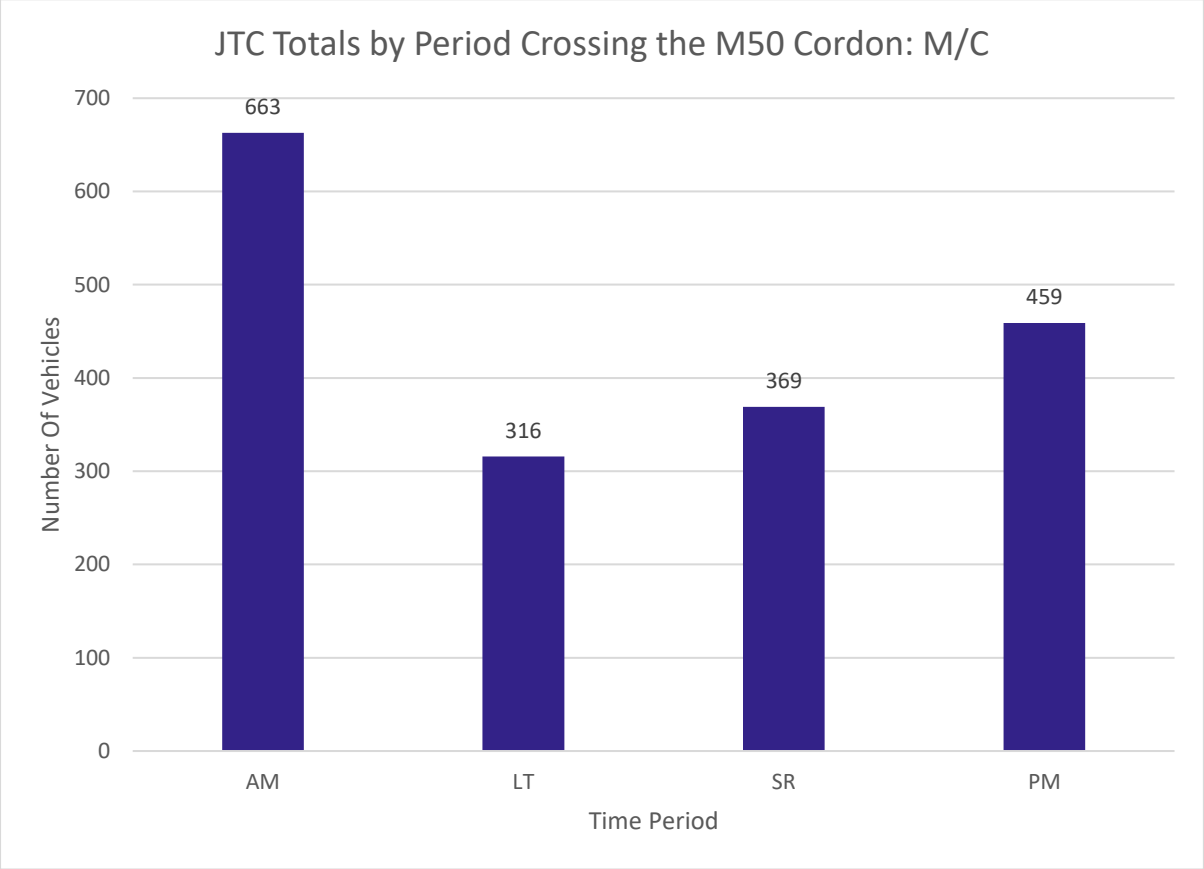


Figure 3-11:Total Number of Motorcycle journeys per Time Period

Figure 3-12 presents a further breakdown of the total number of motorcycles, with reference to each site location. The busiest location for motorcycles crossing the M50 Cordon was the Chapelizod Bypass/Kennelsfort Rd junction, with a total of 160 motorcycles travelling inbound through this junction over a 12-hour period.

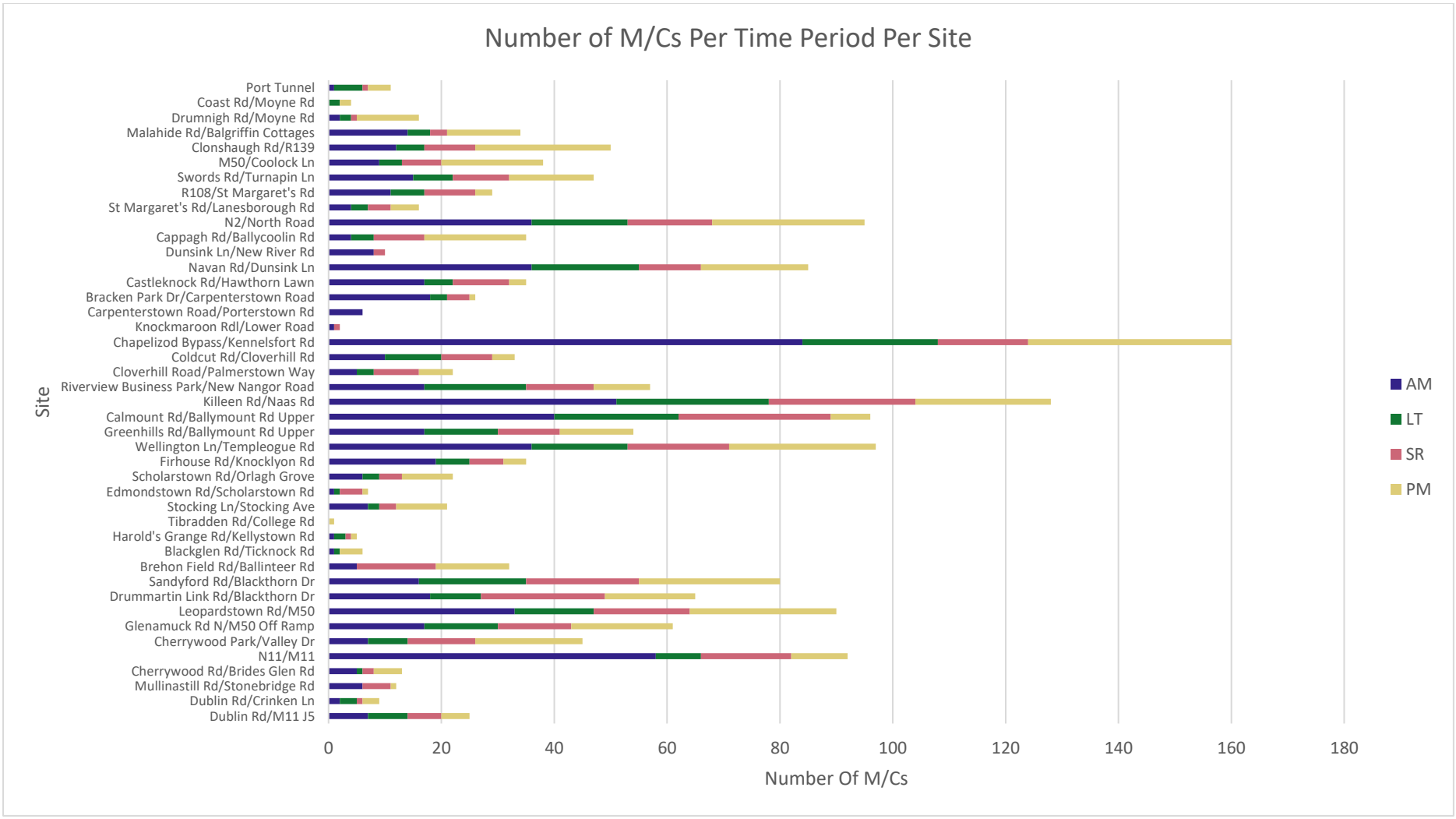


Figure 3-12:Number of Motorcycles Crossing the M50 Cordon Inbound at all Sites Per Time Period

Please also refer to Appendix A for further information on the total number of motorcycles, with reference to each individual time period.

Pedal Cycle

Figure 3-13 below presents the total number of pedal cycles crossing the M50 Cordon for each surveyed time period. Overall, it is evident that the AM time period has the highest volume of pedal cycles, with a total of 1,559 pedal cycles travelling inbound.

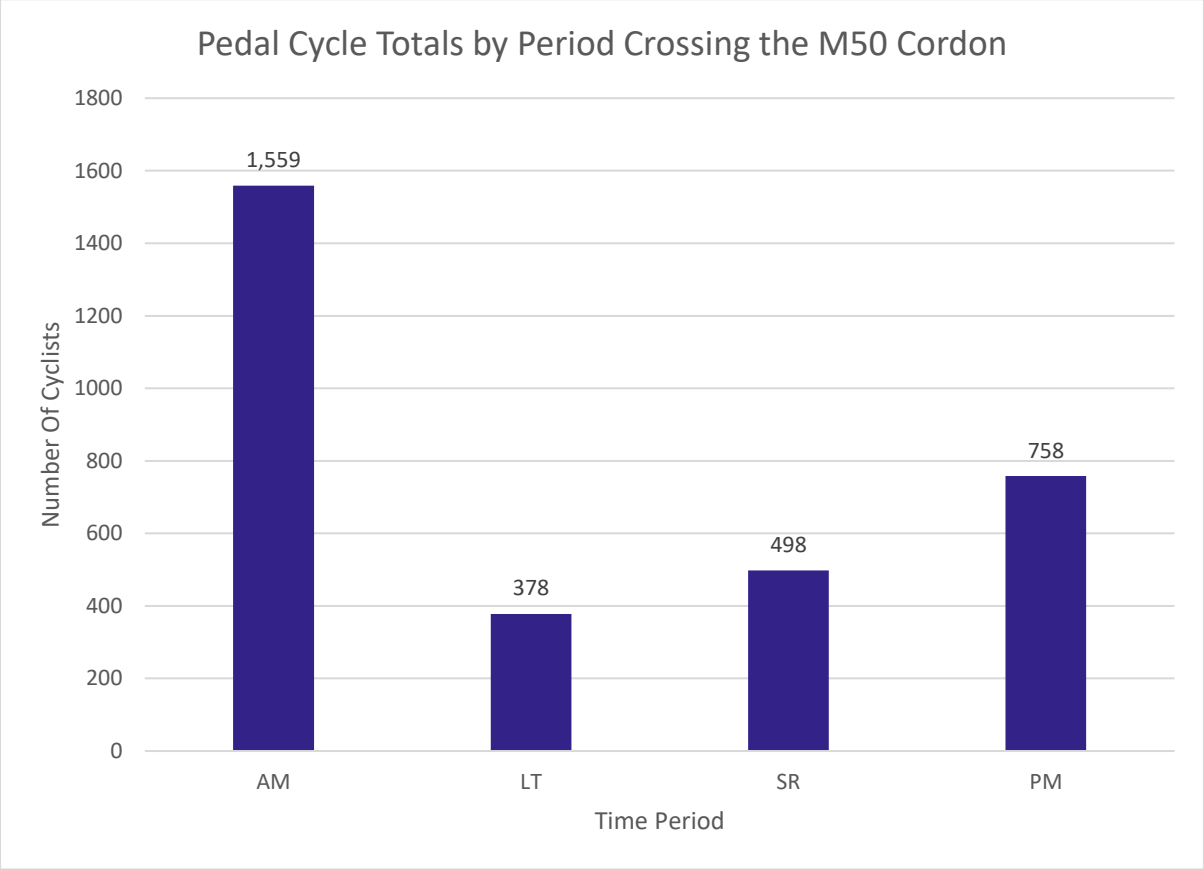


Figure 3-13:Total Number of Pedal Cycle journeys per Time Period

Figure 3-14 presents a further breakdown of the total number of pedal cycles, with reference to each site location. The busiest location for pedal cycles crossing the M50 Cordon was the Sandyford Rd/Blackthorn Dr junction, with a total of 205 pedal cycles travelling inbound through this junction over a 12-hour period.

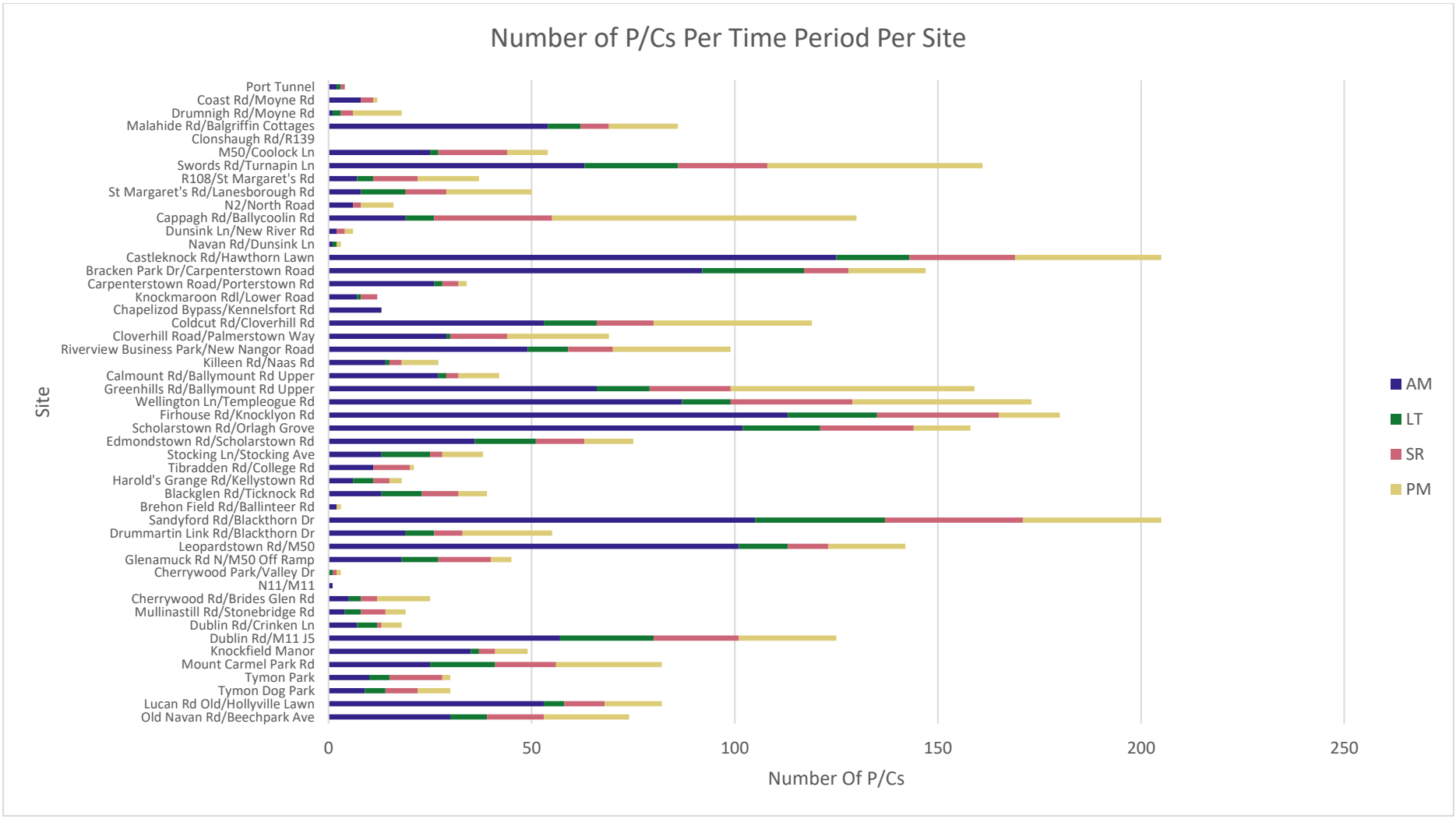


Figure 3-14:Number of Pedal Cycles Crossing the M50 Cordon Inbound at all Sites Per Time Period

Please also refer to Appendix A for further information on the total number of pedal cycles, with reference to each individual time period.

Taxi

Figure 3-15 below presents the total number of taxis crossing the M50 Cordon for each surveyed time period. Overall, it is evident that the SR time period has the highest volume of taxis, with a total of 2,731 taxis travelling inbound.

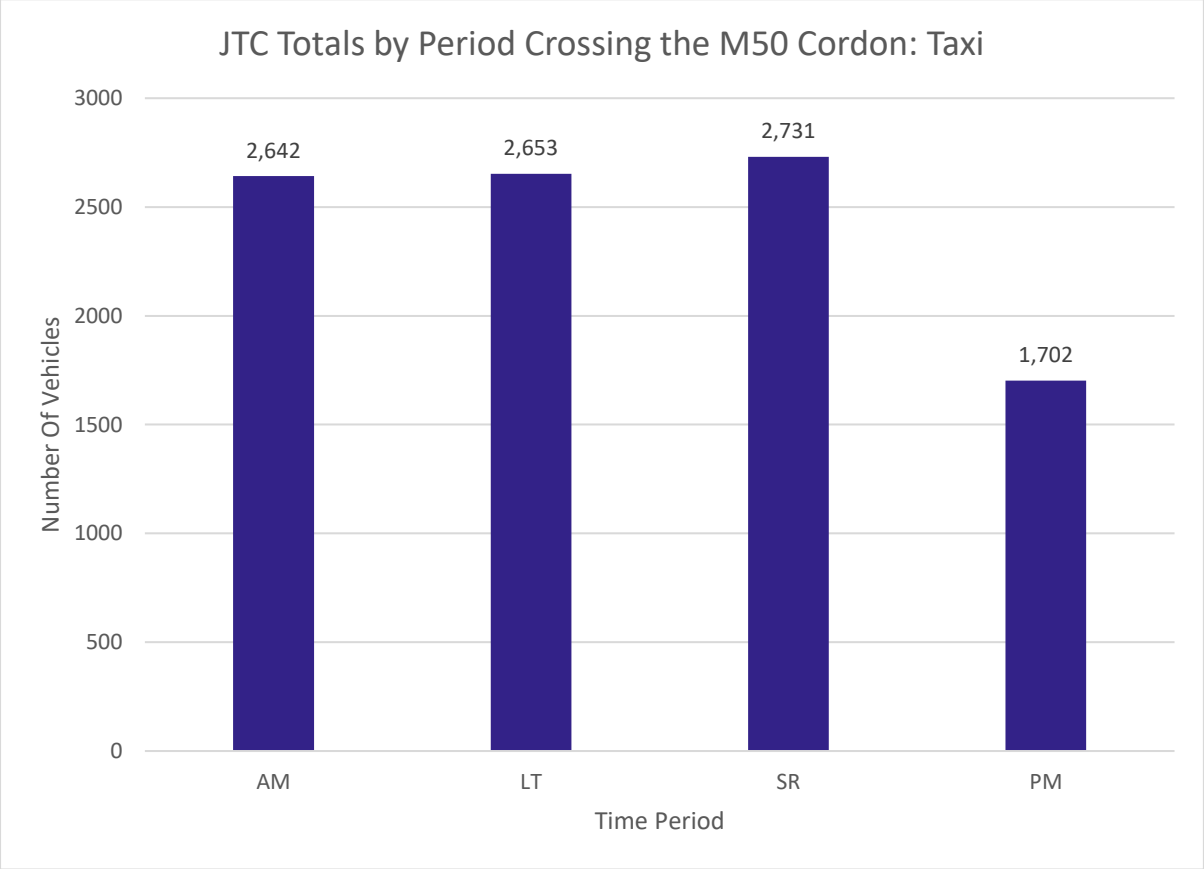


Figure 3-15:Total Number of Taxi journeys per Time Period

Figure 3-16 presents a further breakdown of the total number of taxis, with reference to each site location. The busiest location for taxis crossing the M50 Cordon was the Navan Rd/Dunsink Ln junction, with a total of 697 taxis travelling inbound through this junction over a 12-hour period.

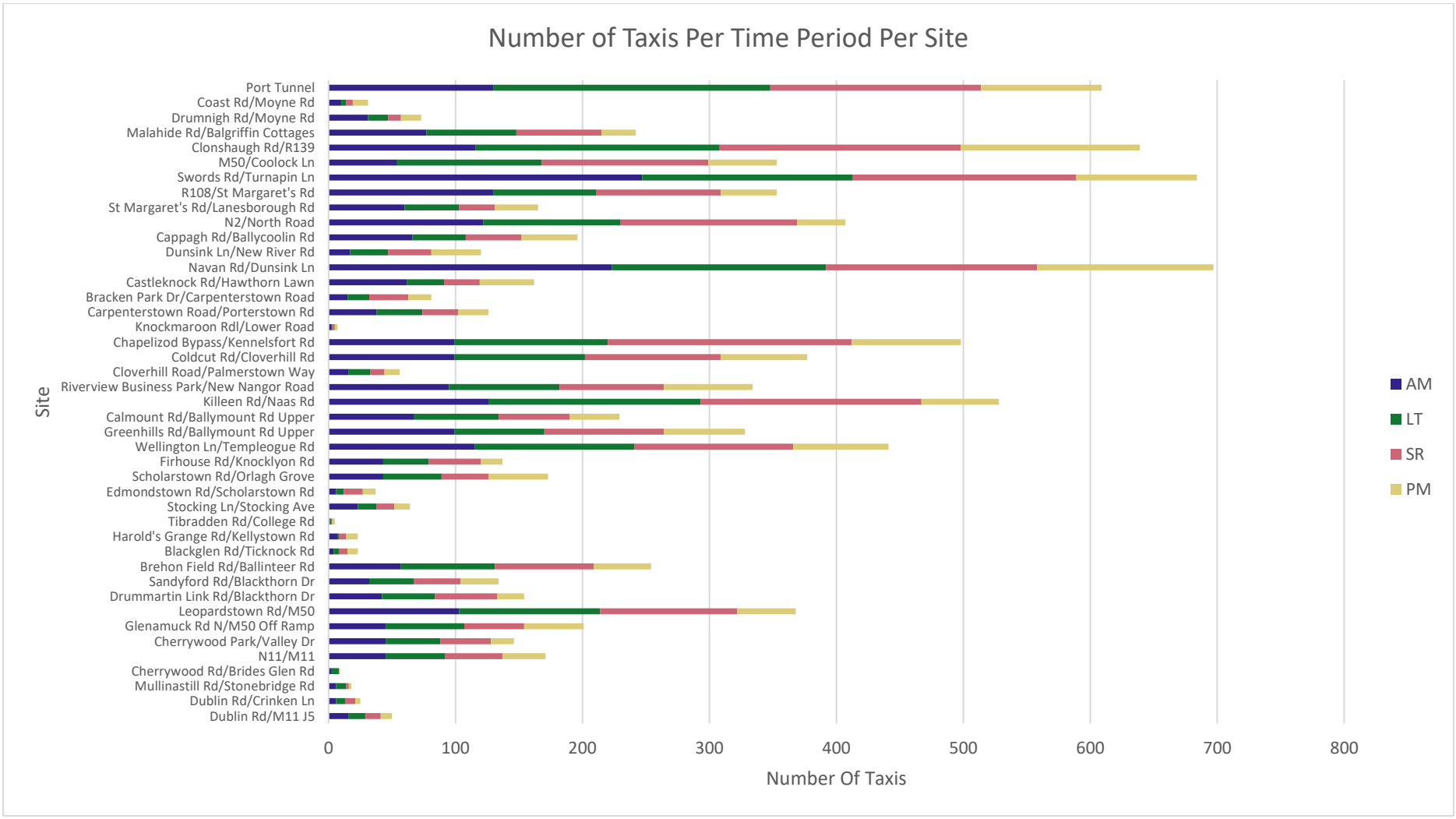


Figure 3-16:Number of Taxis Crossing the M50 Cordon Inbound at all Sites Per Time Period

Please also refer to Appendix A for further information on the total number of taxis, with reference to each individual time period.

Bus

Figure 3-17 below presents the total number of buses crossing the M50 Cordon for each surveyed time period. Overall, it is evident that the AM time period has the highest volume of buses, with a total of 1,252 buses travelling inbound.

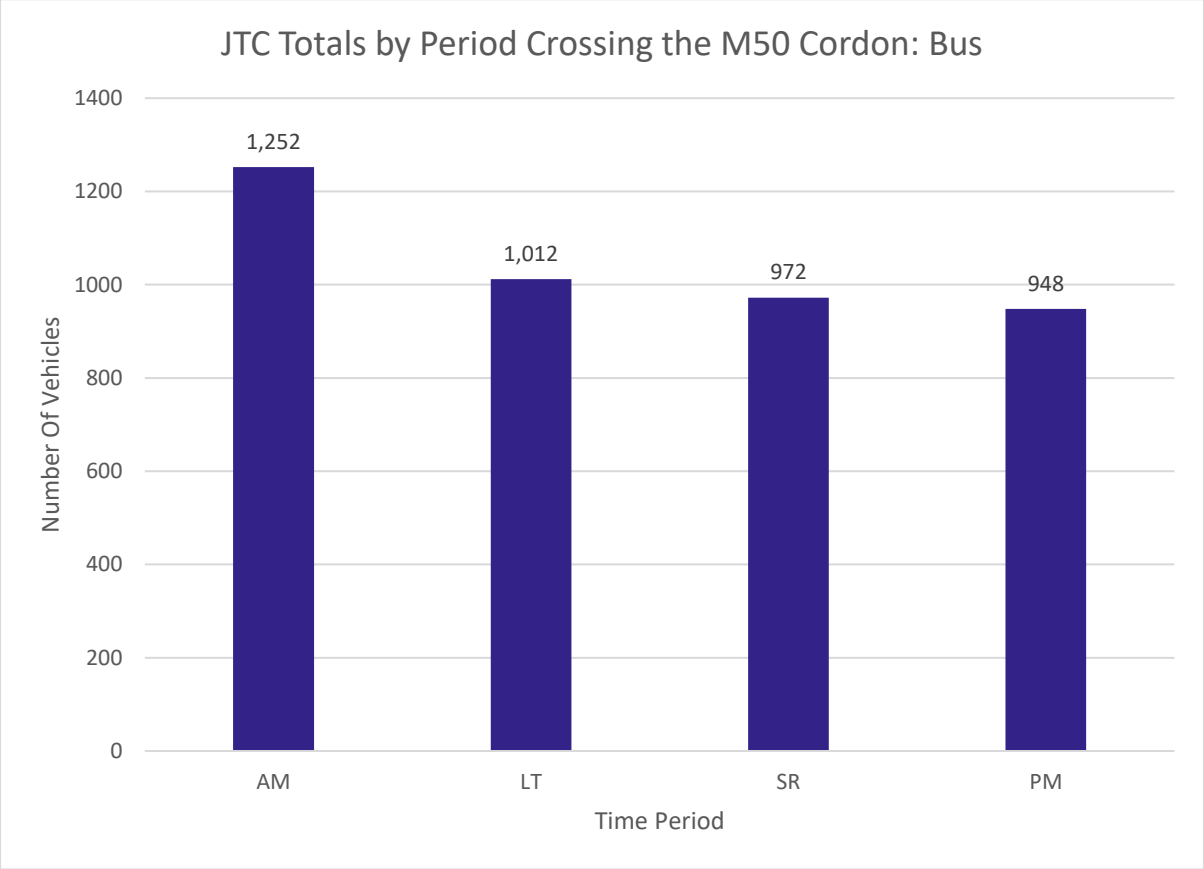


Figure 3-17:Total Number of Bus journeys per Time Period

Figure 3-18 presents a further breakdown of the total number of buses, with reference to each site location. The busiest location for buses crossing the M50 Cordon was the Chapelizod Bypass/Kennelsfort Rd junction, with a total of 529 buses travelling inbound through this junction over a 12-hour period.

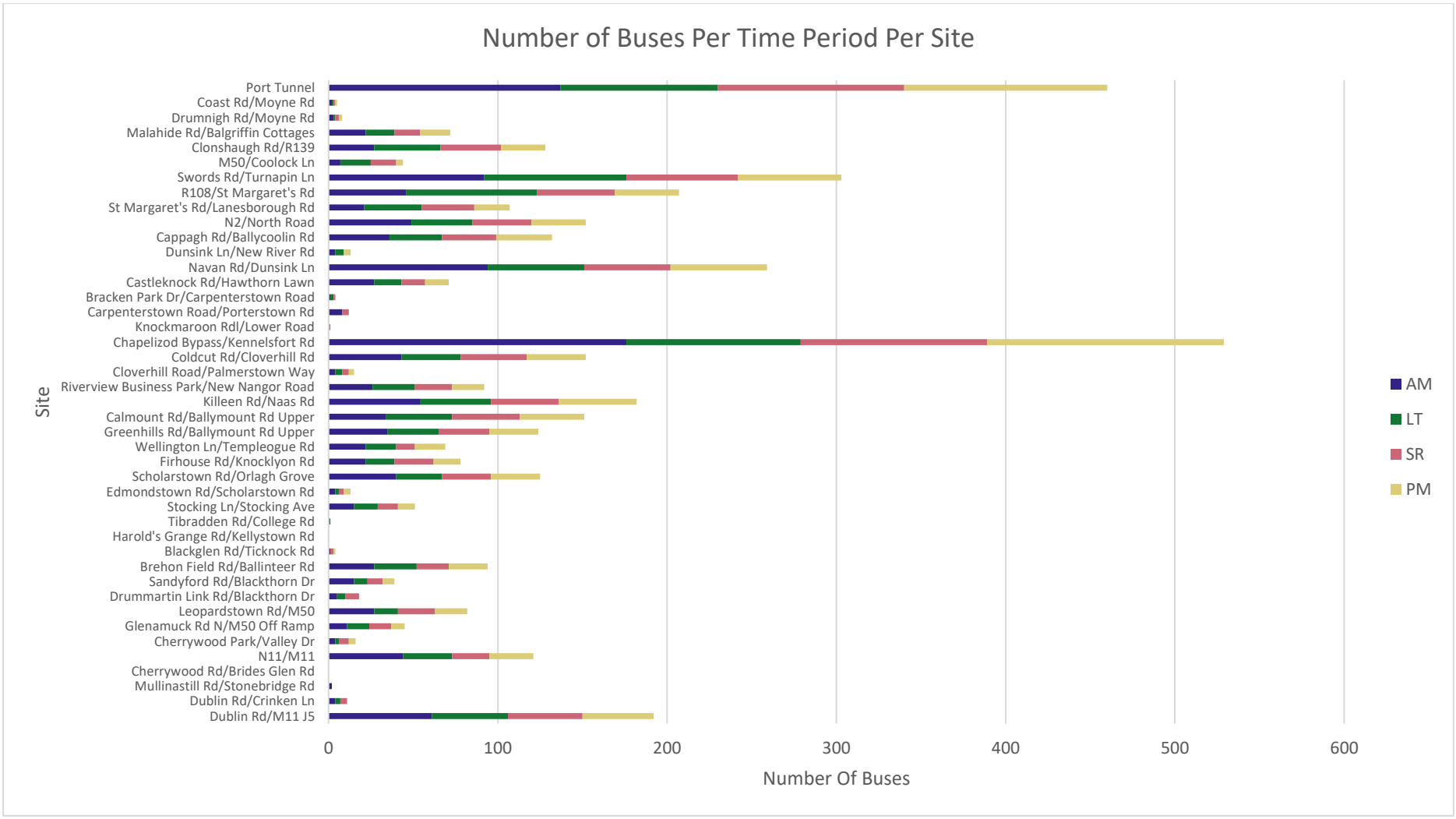


Figure 3-18:Number of Buses Crossing the M50 Cordon Inbound at all Sites Per Time Period

Please also refer to Appendix A for further information on the total number of buses, with reference to each individual time period.

Pedestrians

Figure 3-19 presents the total number of pedestrian movements crossing the M50 Cordon per surveyed time period. Overall, it is evident that the AM period has the highest volume of pedestrians, with a total of 2,228 pedestrians travelling inbound.

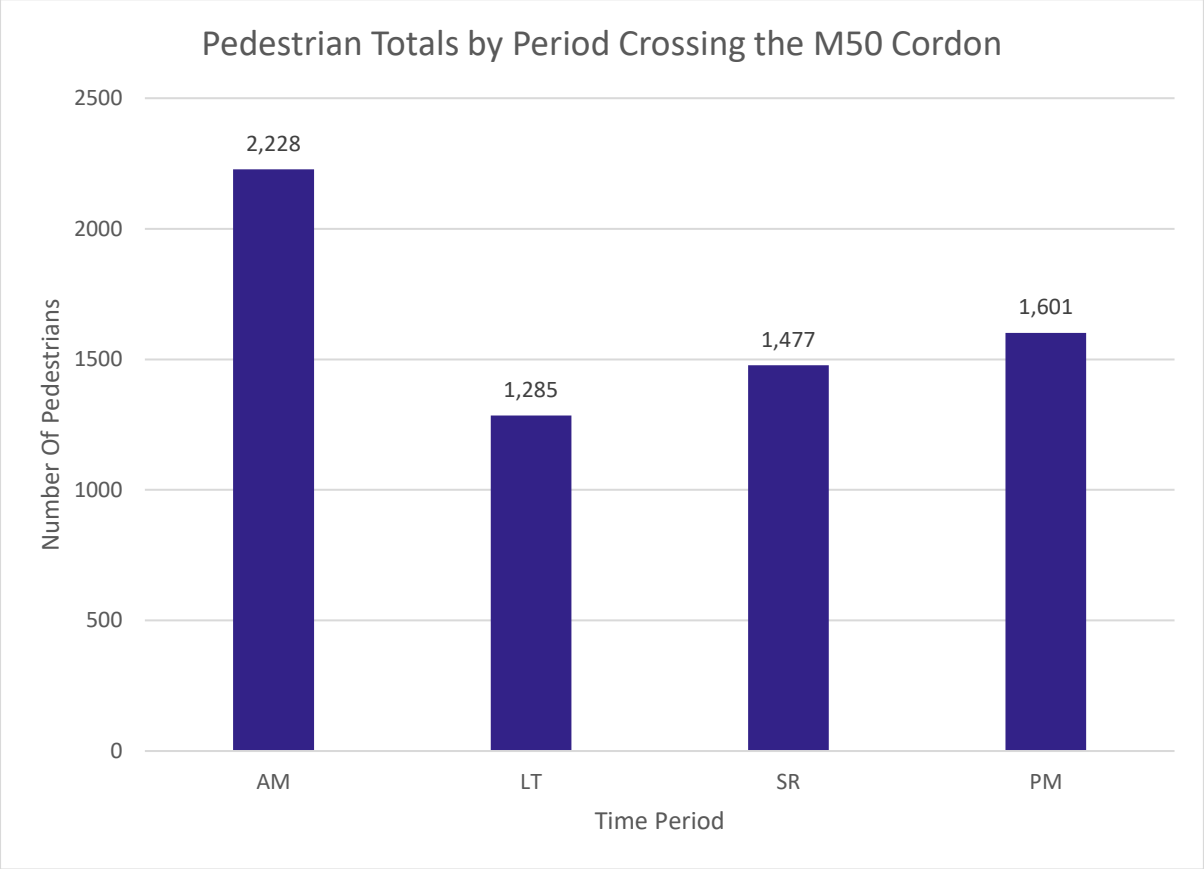


Figure 3-19:Total Pedestrians per Time Period

Figure 3-20 presents a further breakdown of the total number of pedestrian movements, with reference to each site location. The busiest location for pedestrians crossing the M50 Cordon was the Scholarstown Rd/Orlagh Grove, with a total of 652 pedestrians travelling inbound through this junction over a 12-hour period.

Please also refer to Appendix A for further information on the total number of pedestrian movements, with reference to each individual time period and the classified pedestrian types (i.e. adult, OAP, child < 5, child < 16 and mobility impaired).

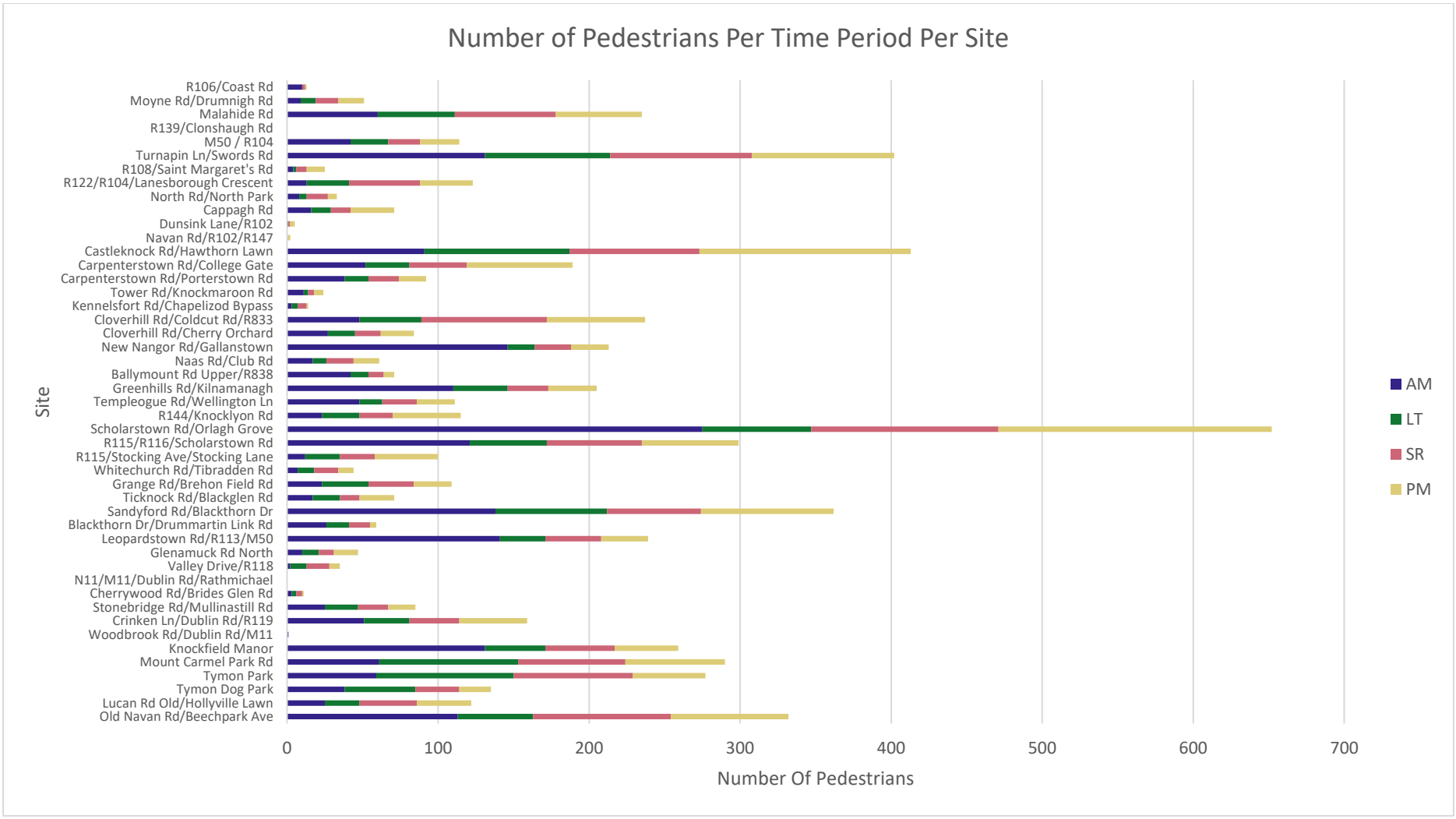


Figure 3-20:Total Pedestrians at all Sites per Time Period

3.1.3 Daily Movements Across the M50 Cordon

ATCs recorded traffic flows at 15-minute intervals at 38 sites on the main radial routes into and around the city for a period of two weeks to understand daily two-way traffic movements. These surveys were primarily used to provide insight into the variation in demand across the week. The results from these surveys show that the day with the highest number of vehicles is Friday, as can be seen in Figure 3-21.

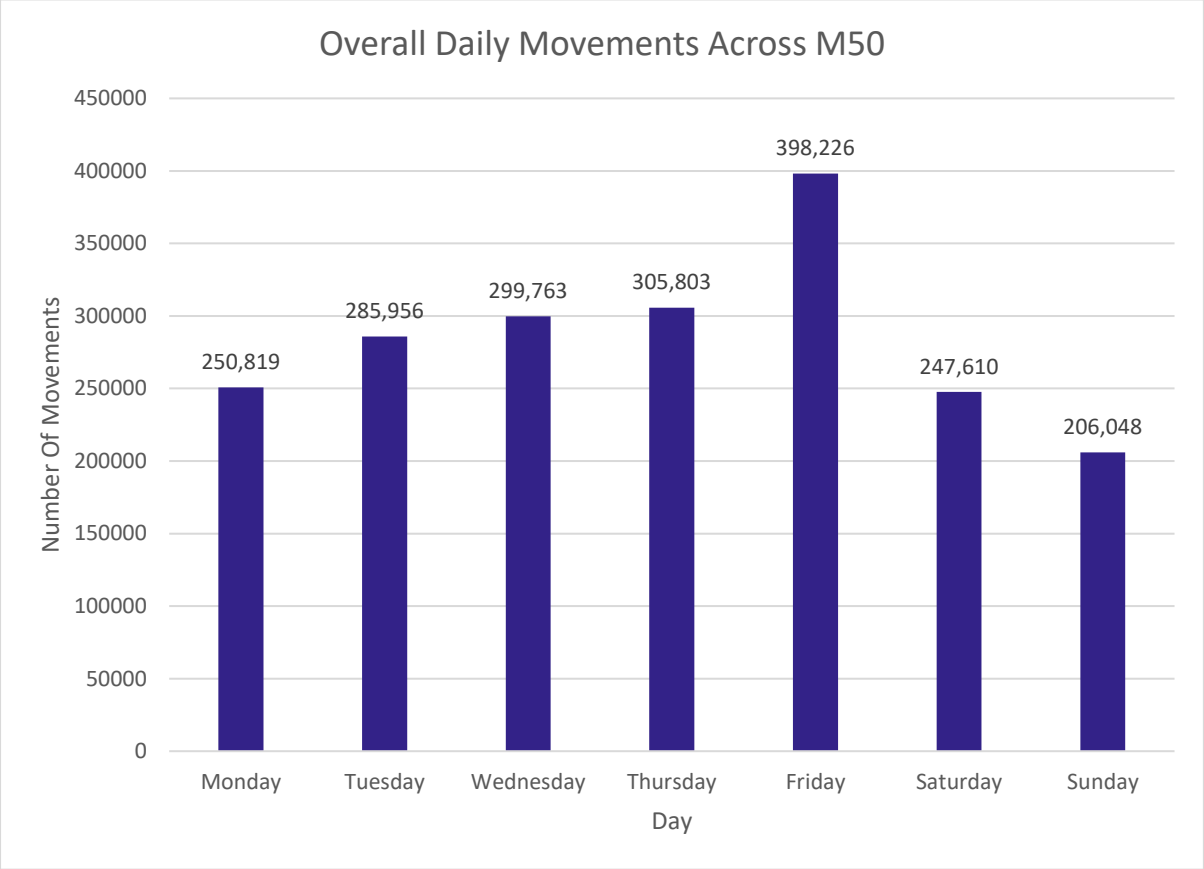


Figure 3-21:Average Daily Traffic at ATC Sites

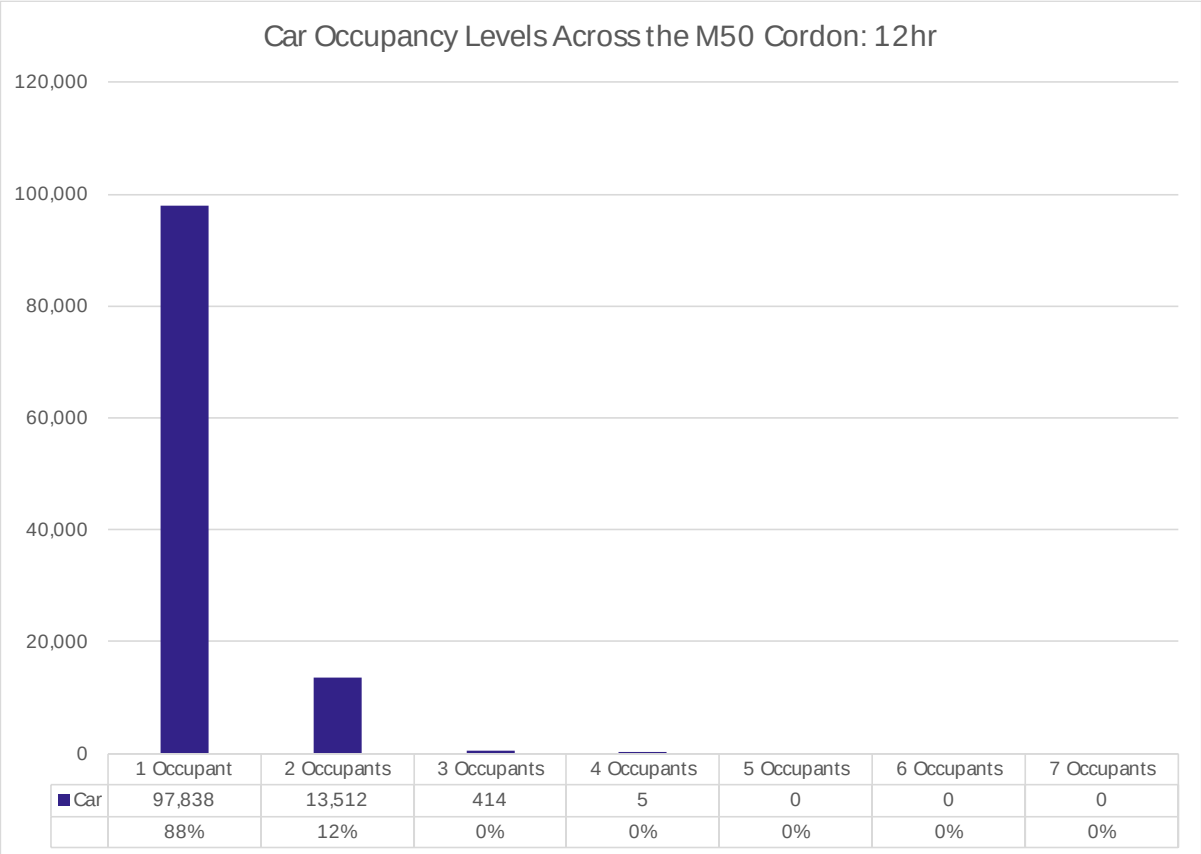
3.2 Vehicle Occupancy Data

3.2.1 Car Occupancy

In order to obtain accurate data reflective of a neutral weekday, car occupancy surveys were recorded in hourly intervals, over a 12-hour period (i.e. 07:00-19:00) on the day of the survey.

Figure 3-22, Figure 3-23, Figure 3-24, Figure 3-25 and Figure 3-26 display the observed vehicle occupancy for cars crossing the M50 Cordon inbound towards the city during the respective time periods. Please note these graphs display both the absolute values and the percentage occupancy for each time period.

During the 12-hour period (07:00 and 19:00) 88% of Cars crossing the M50 Cordon had one occupant, 12% had two occupants and <1% had three occupants.



	1 Occupant	2 Occupants	3 Occupants	4 Occupants	5 Occupants	6 Occupants	7 Occupants
Car	97,838	13,512	414	5	0	0	0
	88%	12%	0%	0%	0%	0%	0%

Figure 3-22:Car Occupancy: 12 Hour

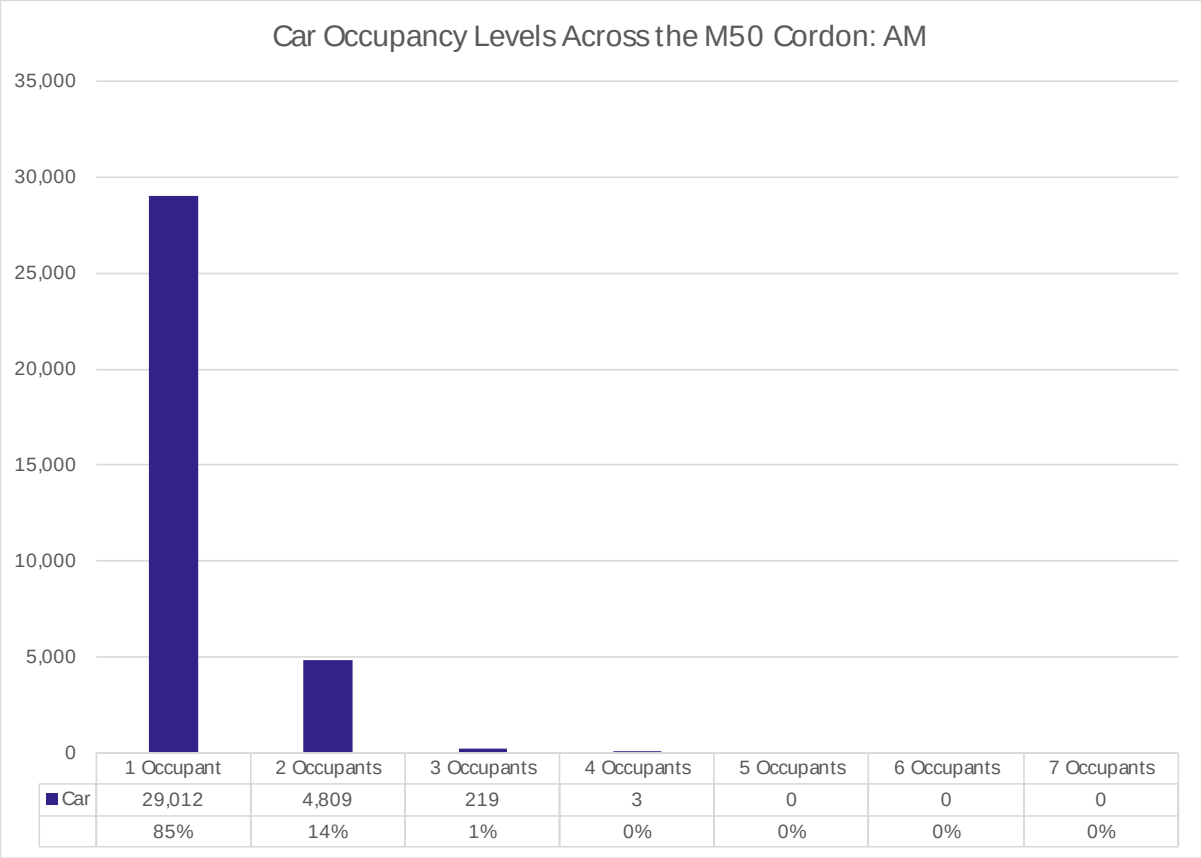
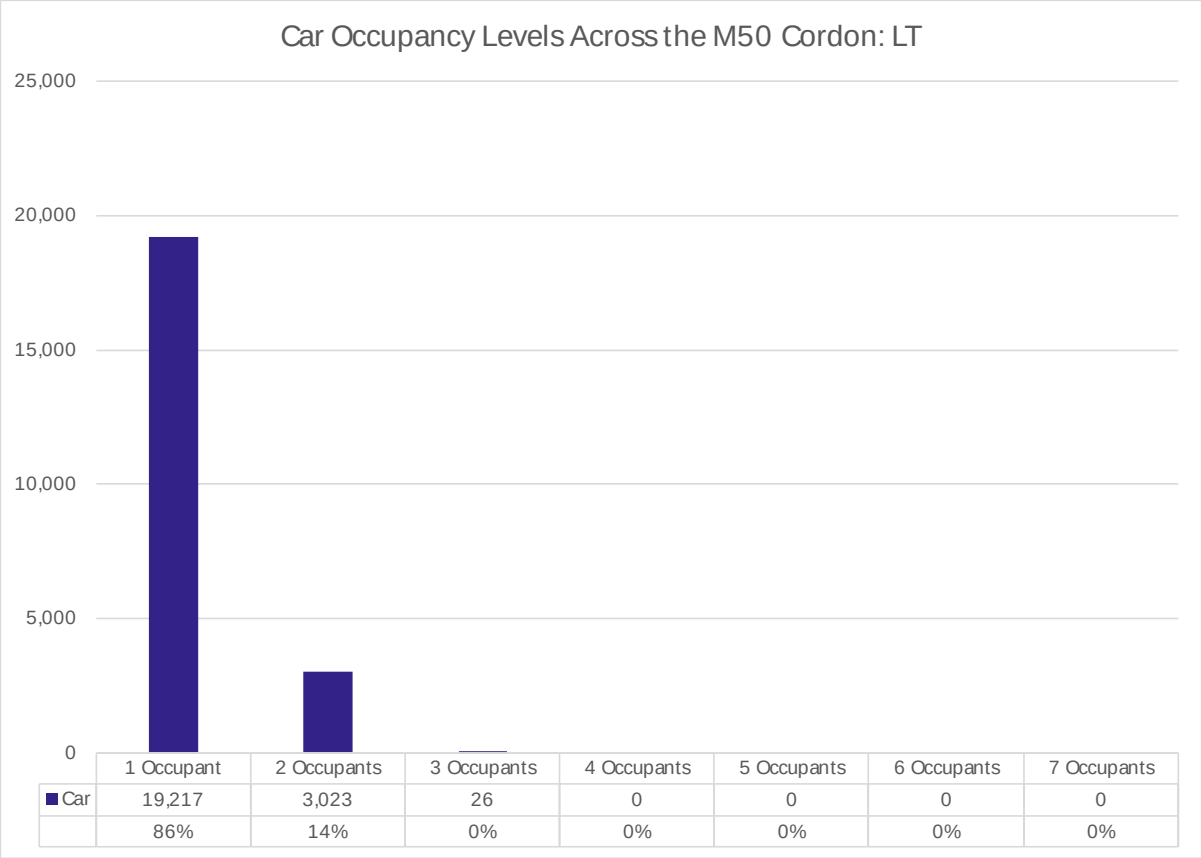
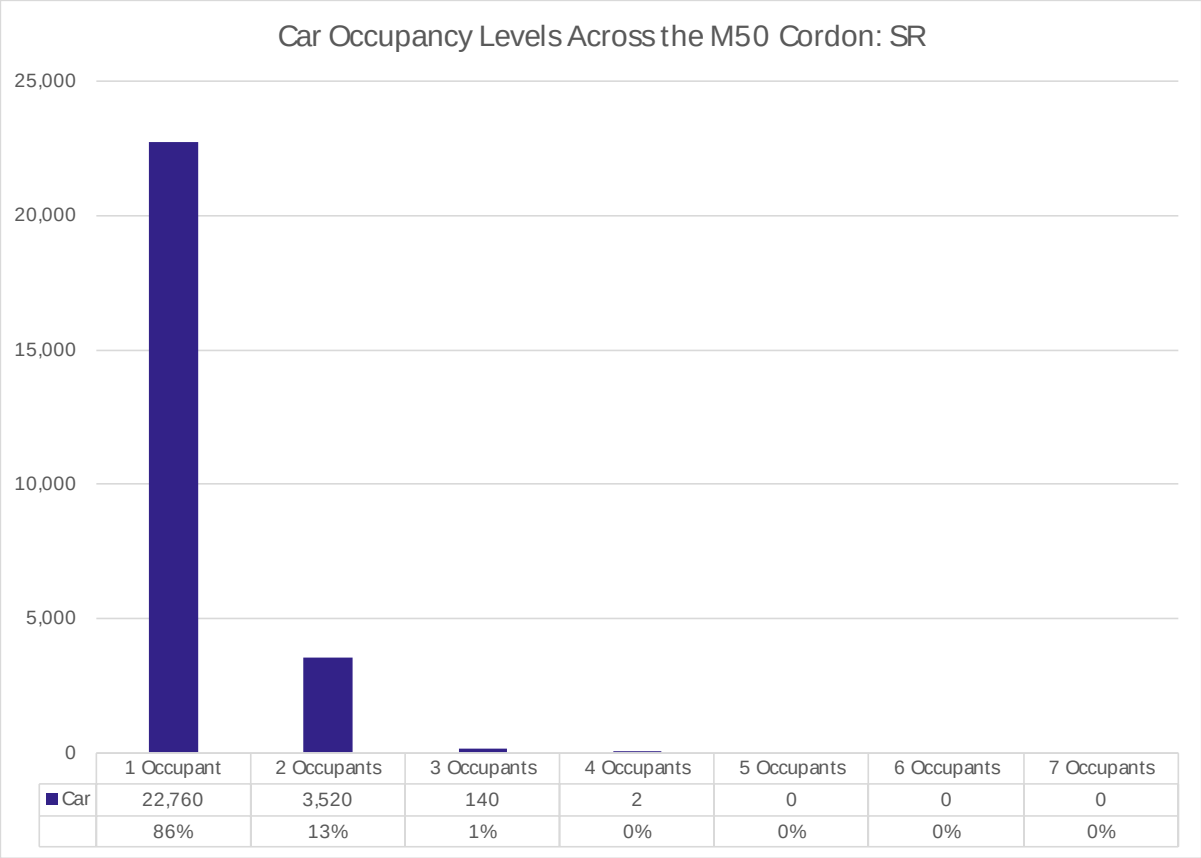


Figure 3-23:Car Occupancy: AM



	1 Occupant	2 Occupants	3 Occupants	4 Occupants	5 Occupants	6 Occupants	7 Occupants
Car	19,217	3,023	26	0	0	0	0
	86%	14%	0%	0%	0%	0%	0%

Figure 3-24:Car Occupancy: LT



	1 Occupant	2 Occupants	3 Occupants	4 Occupants	5 Occupants	6 Occupants	7 Occupants
Car	22,760	3,520	140	2	0	0	0
	86%	13%	1%	0%	0%	0%	0%

Figure 3-25:Car Occupancy: SR

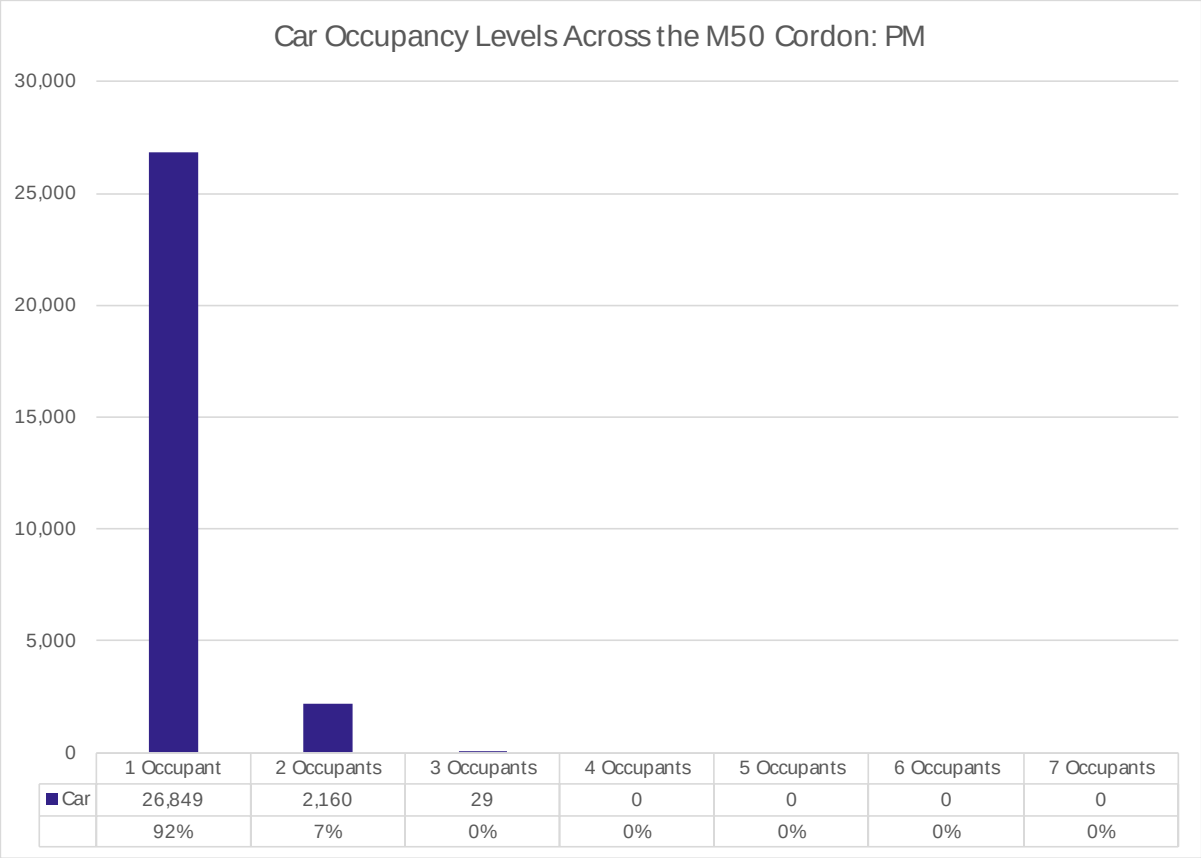


Figure 3-26:Car Occupancy: PM

Car Occupancy per site

Figure 3-27, Figure 3-28, Figure 3-29, Figure 3-30 and Figure 3-31 display the vehicle occupancy for cars crossing the M50 Cordon during the respective time periods, with further reference to each individual site location.

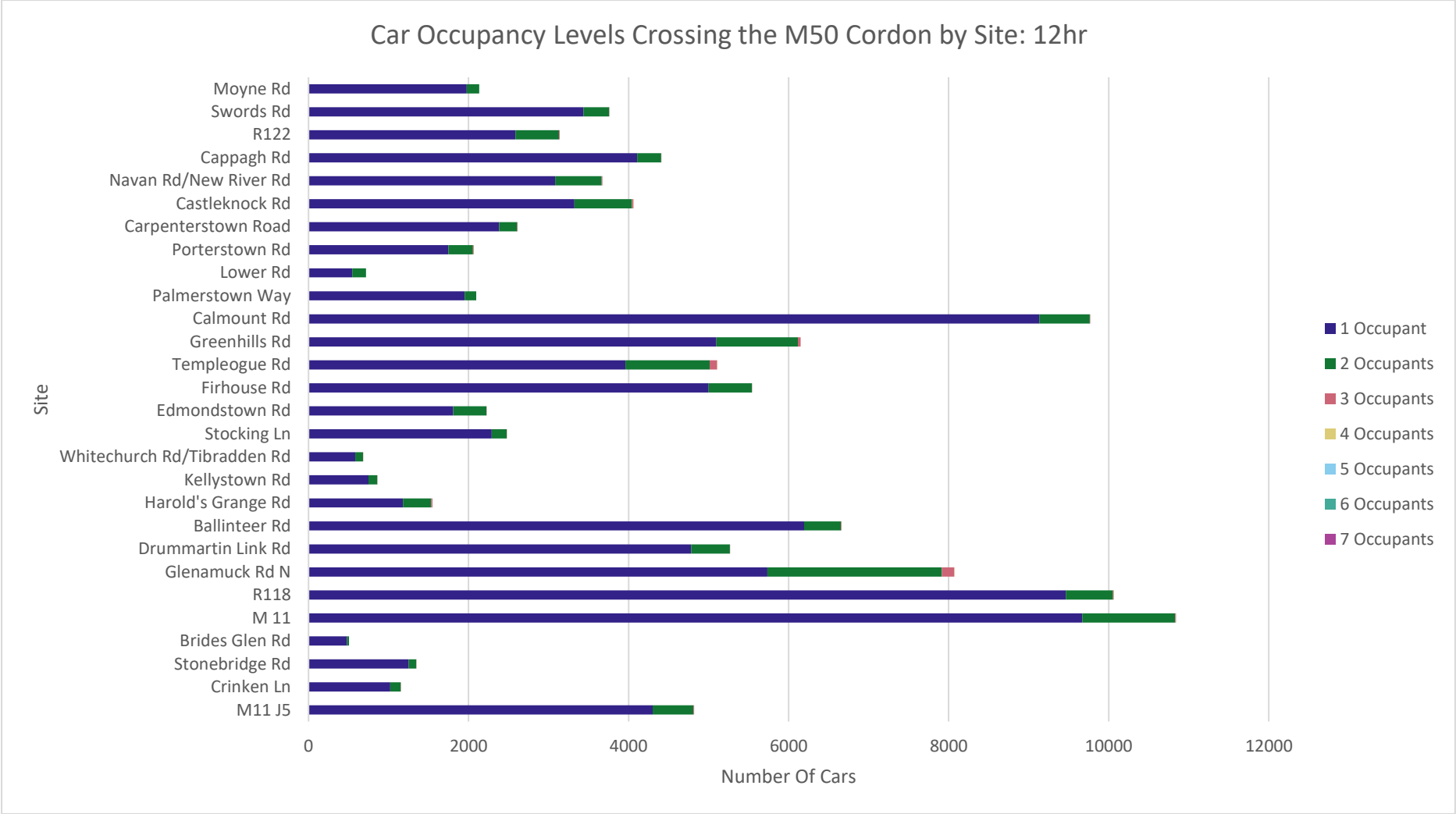


Figure 3-27:Car Occupancy per Site: 12 Hour

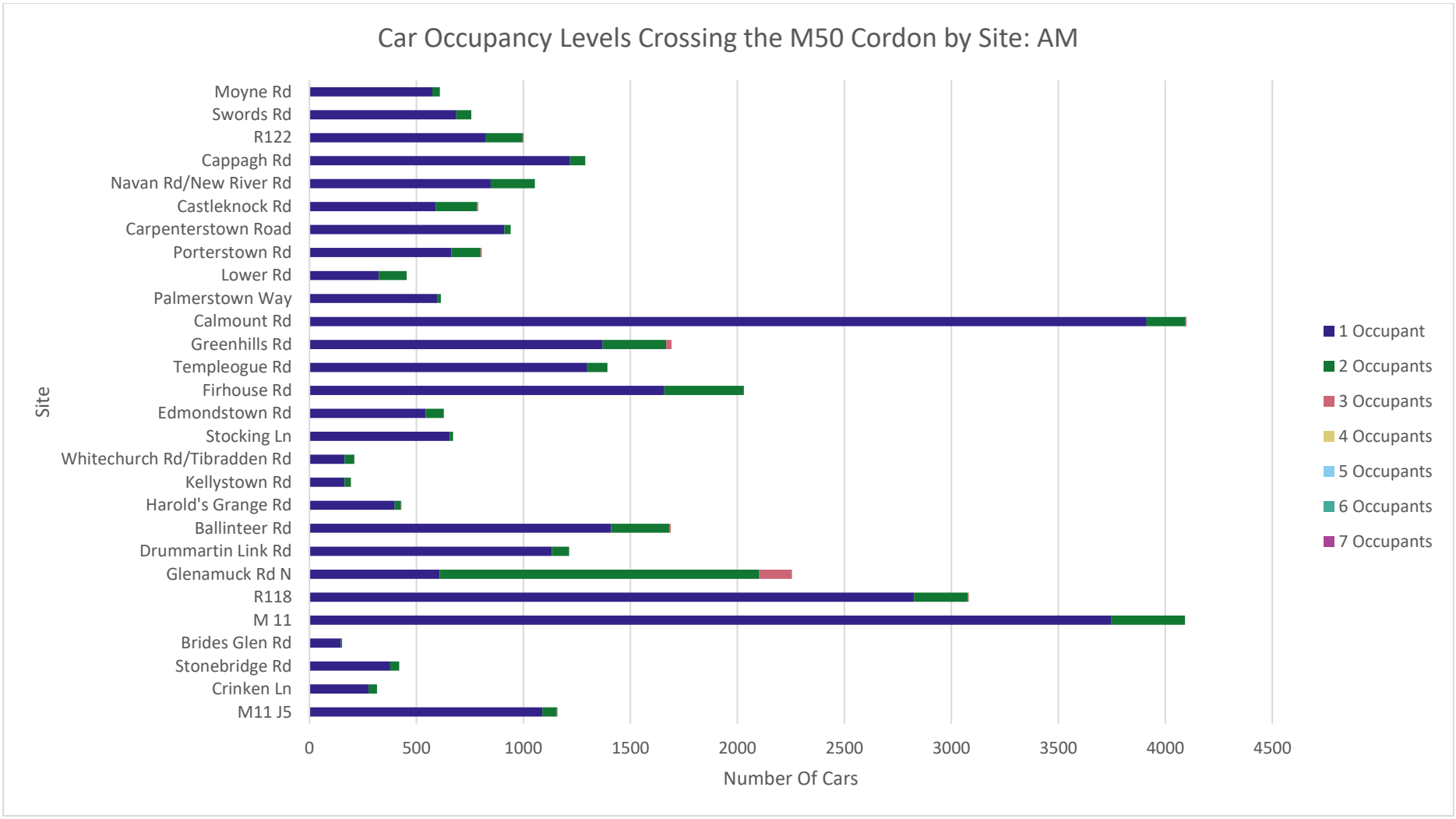


Figure 3-28:Car Occupancy per Site: AM

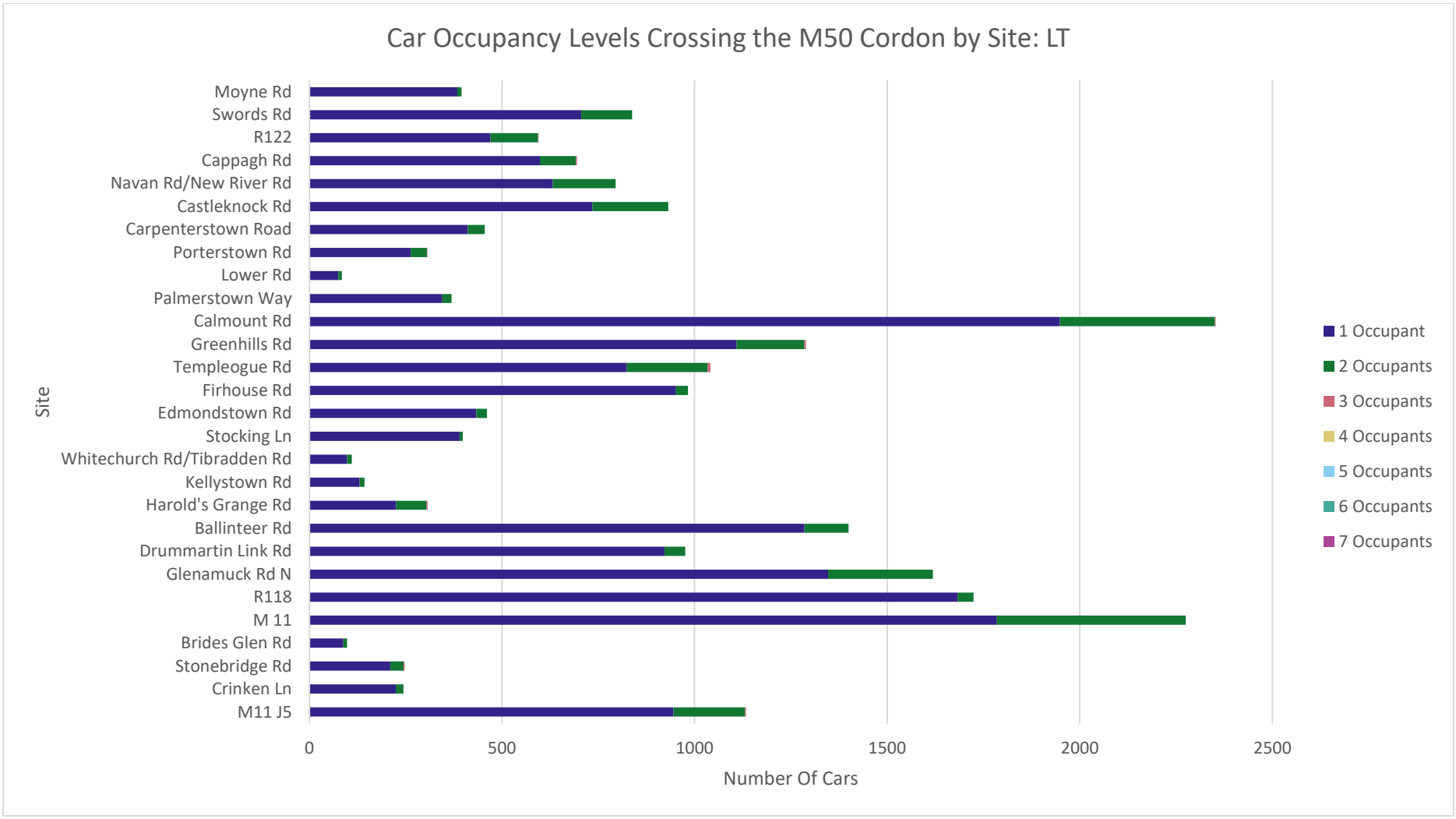


Figure 3-29:Car Occupancy per Site: LT

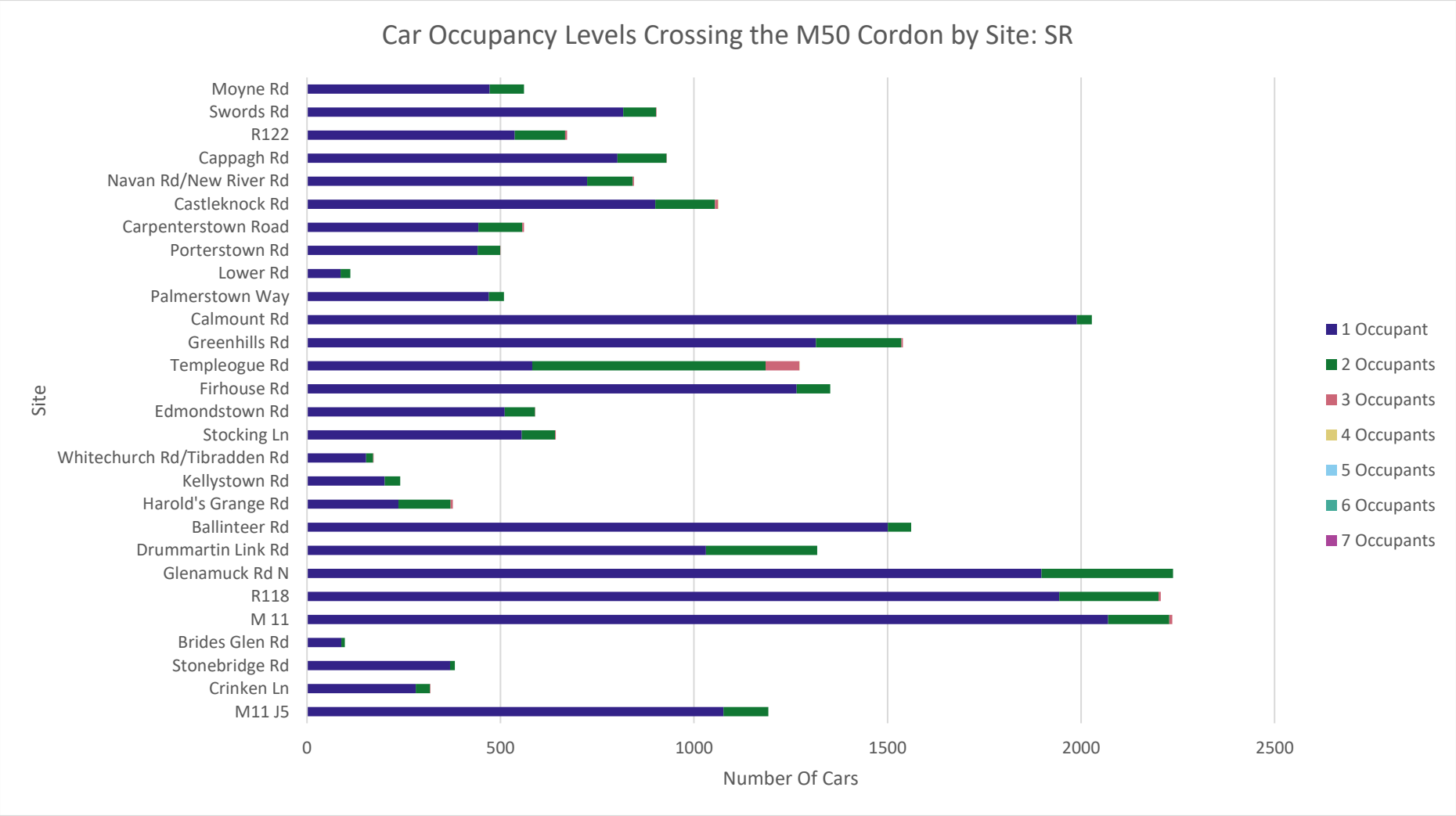


Figure 3-30:Car Occupancy per Site: SR

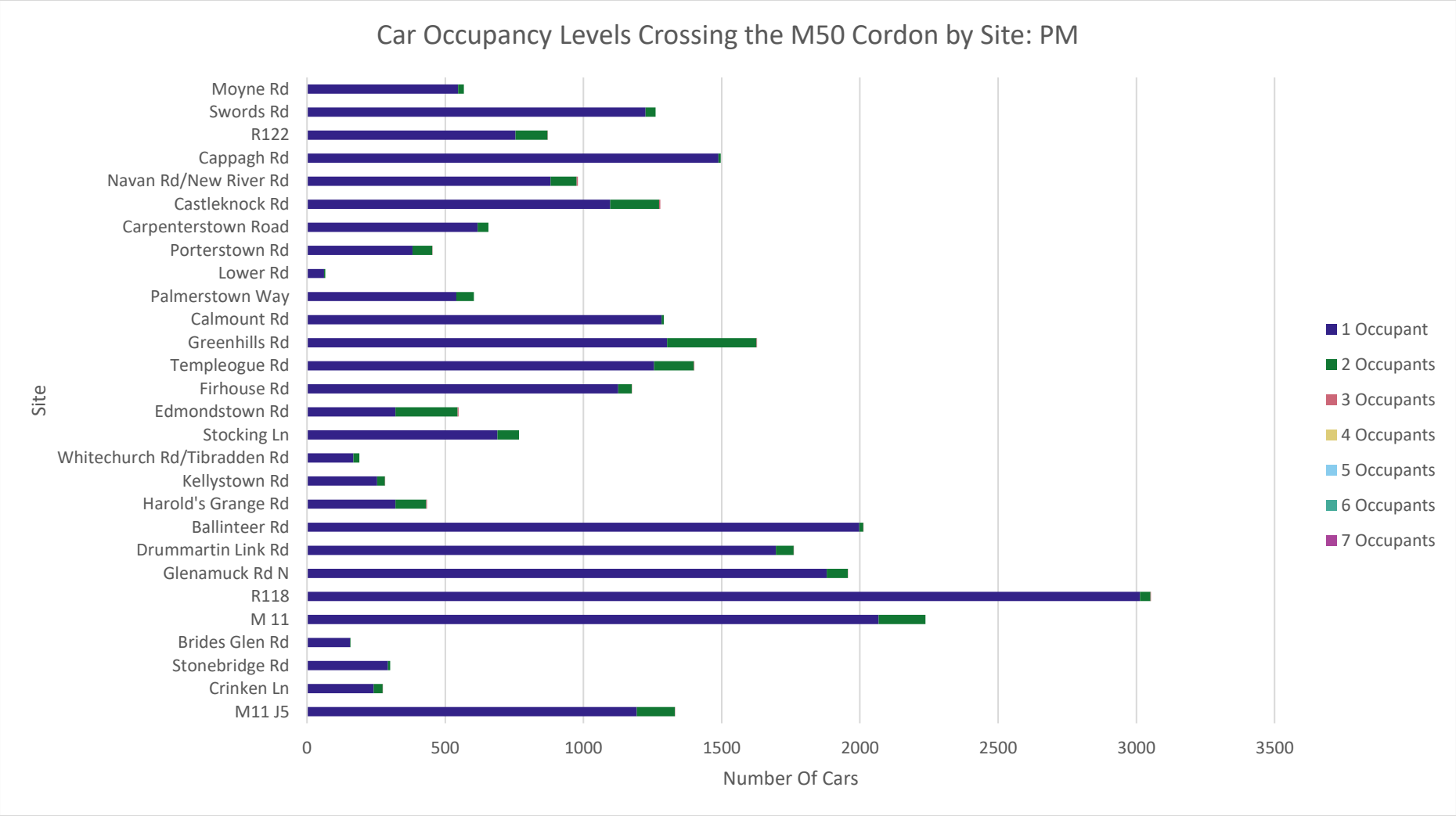


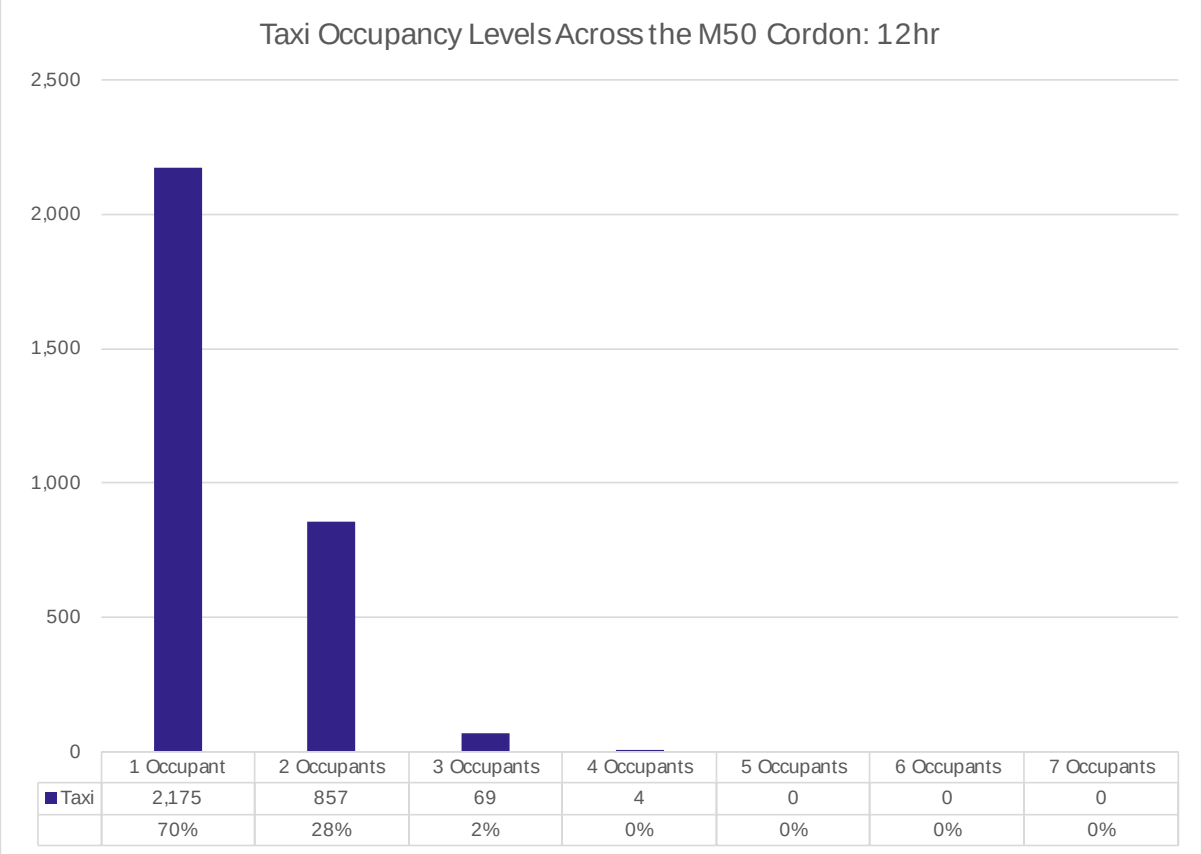
Figure 3-31:Car Occupancy per Site: PM

3.2.2 Taxi Occupancy

In order to obtain accurate data reflective of a neutral weekday, taxi occupancy surveys were recorded in hourly intervals, over a 12-hour period (i.e. 07:00-19:00) on the day of the survey.

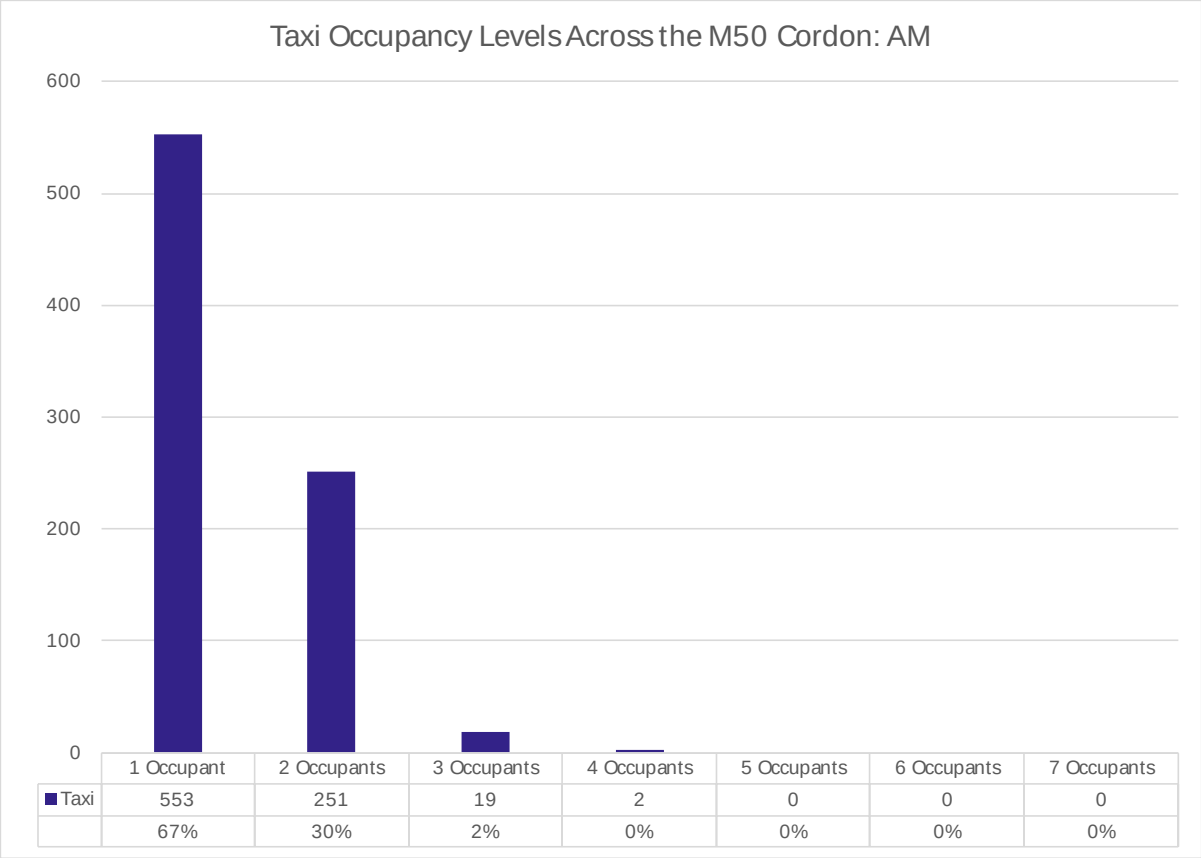
Figure 3-32, Figure 3-33, Figure 3-34, Figure 3-35 and Figure 3-36 display the observed vehicle occupancy for taxis crossing the M50 Cordon inbound towards the city during the respective time periods. Please note these graphs display both the absolute values and the percentage occupancy for each time period.

During the 12-hour period (07:00 and 19:00) 70% of Taxis crossing the M50 Cordon had one occupant, 28% had two occupants and 2% had three occupants.



	1 Occupant	2 Occupants	3 Occupants	4 Occupants	5 Occupants	6 Occupants	7 Occupants
Taxi	2,175	857	69	4	0	0	0
	70%	28%	2%	0%	0%	0%	0%

Figure 3-32:Taxi Occupancy: 12 Hour



	1 Occupant	2 Occupants	3 Occupants	4 Occupants	5 Occupants	6 Occupants	7 Occupants
Taxi	553	251	19	2	0	0	0
	67%	30%	2%	0%	0%	0%	0%

Figure 3-33:Taxi Occupancy: AM

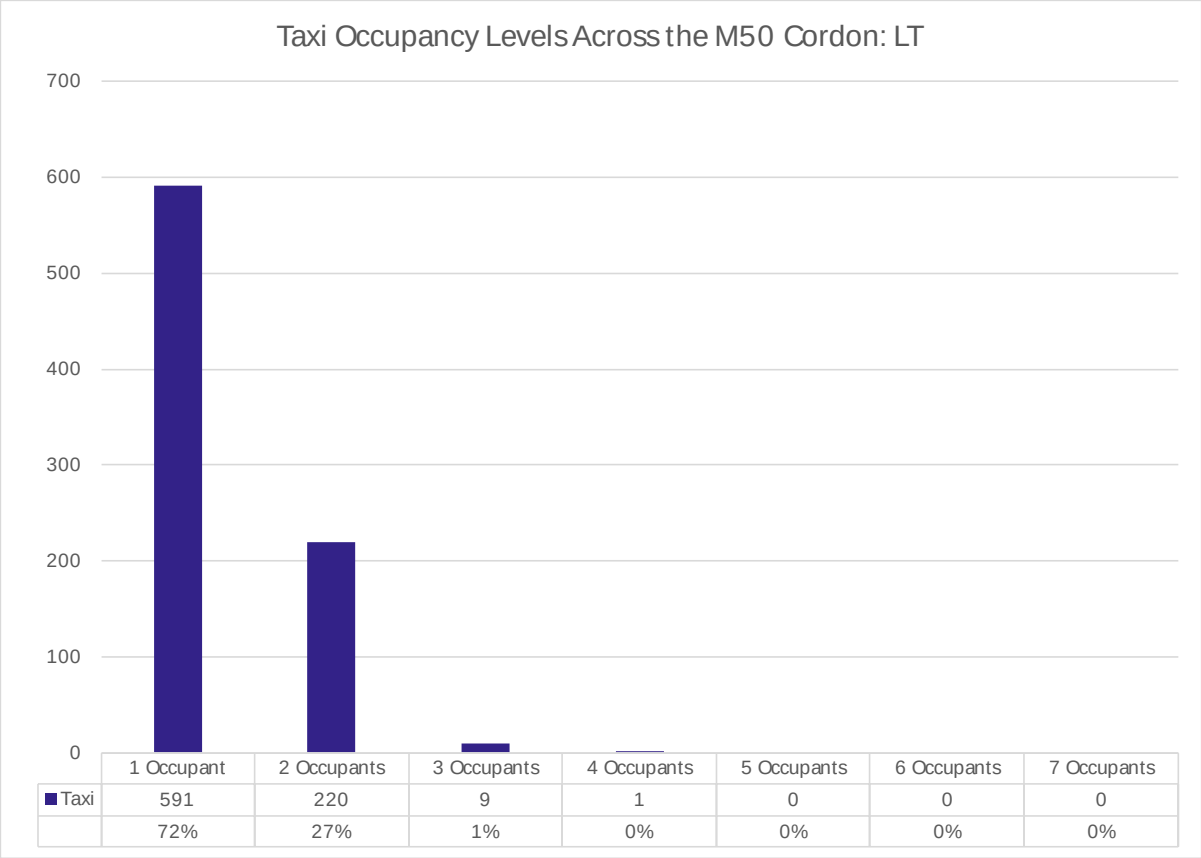


Figure 3-34:Taxi Occupancy: LT

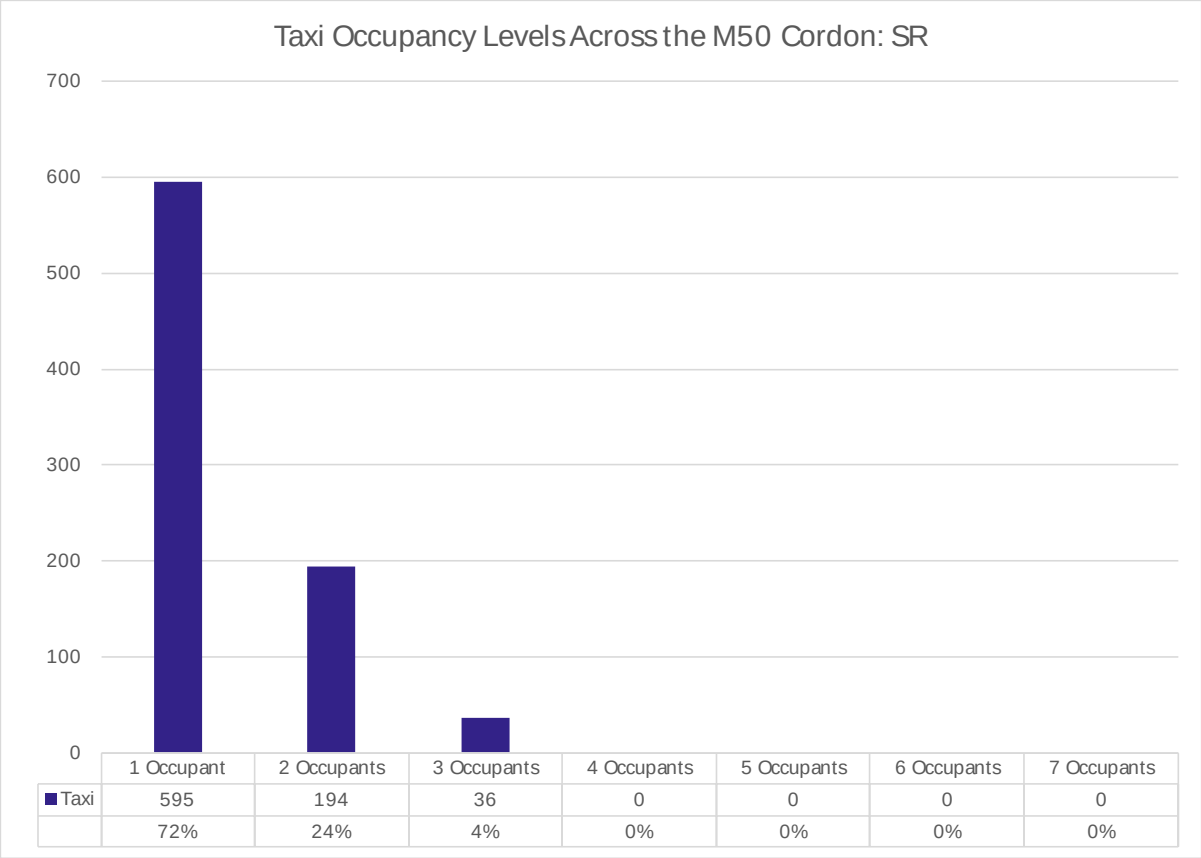


Figure 3-35:Taxi Occupancy: SR

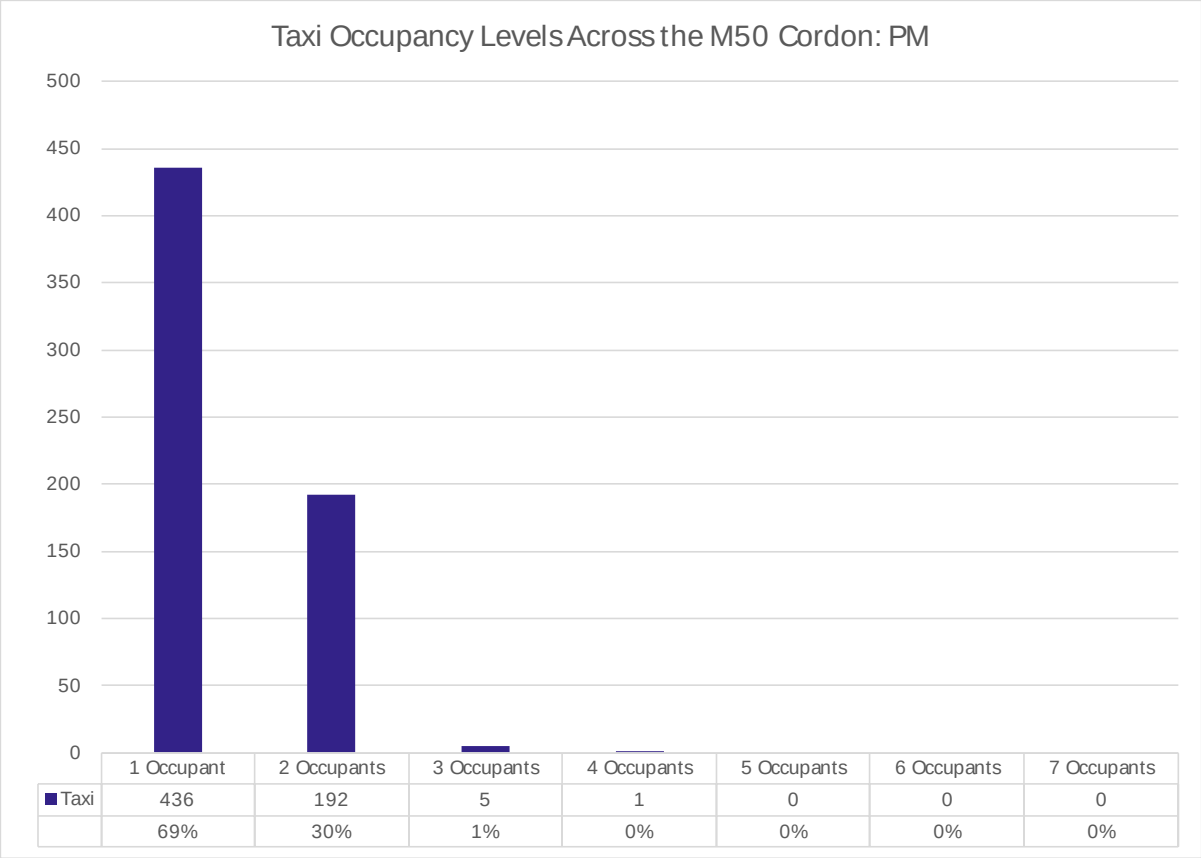


Figure 3-36:Taxi Occupancy: PM

Taxi Occupancy per site

Figure 3-37, Figure 3-38, Figure 3-39, Figure 3-40 and Figure 3-41 display the vehicle occupancy for taxis crossing the M50 Cordon during the respective time periods, with further reference to each individual site location.

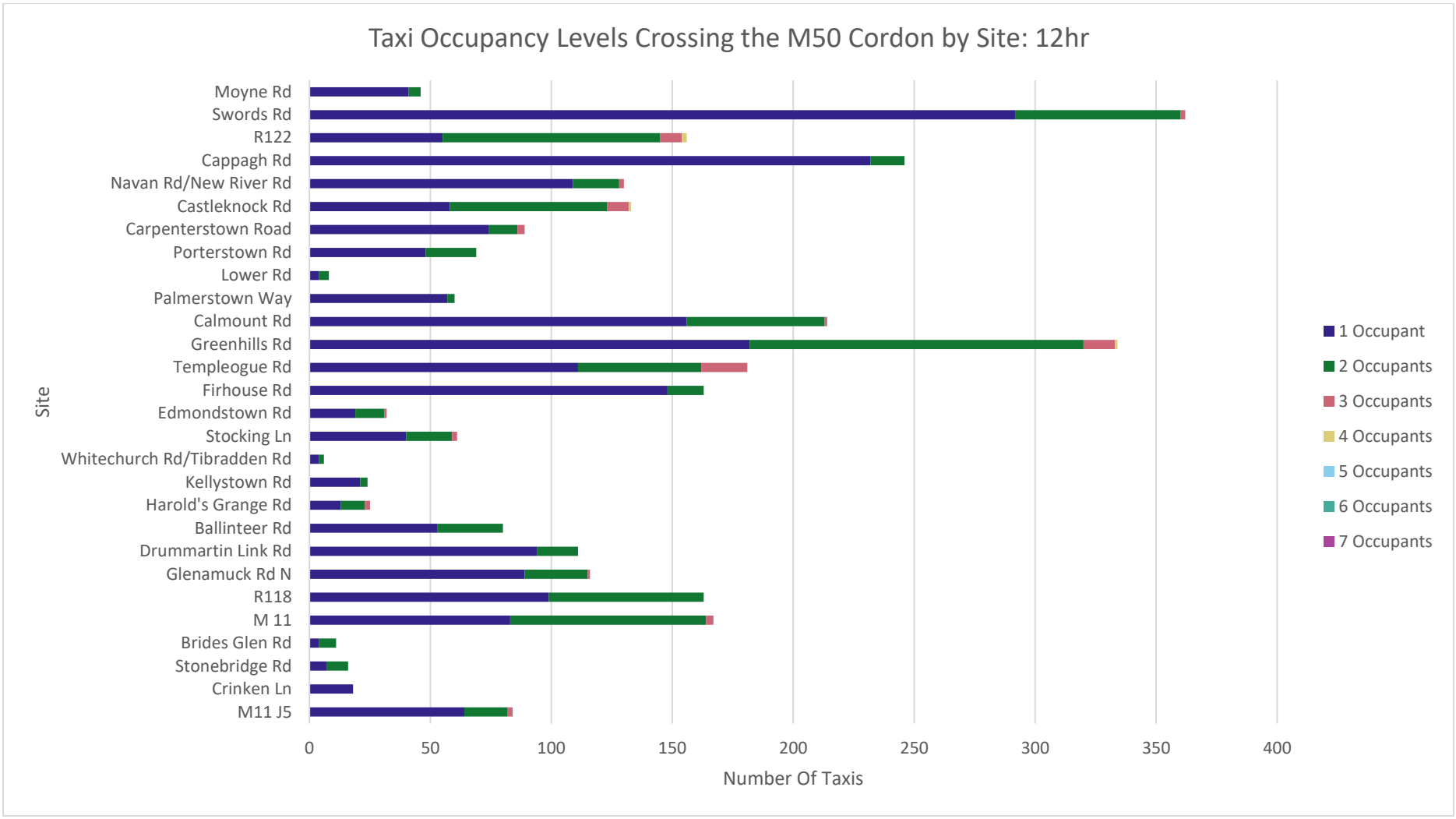


Figure 3-37:Taxi Occupancy per Site: 12 Hour

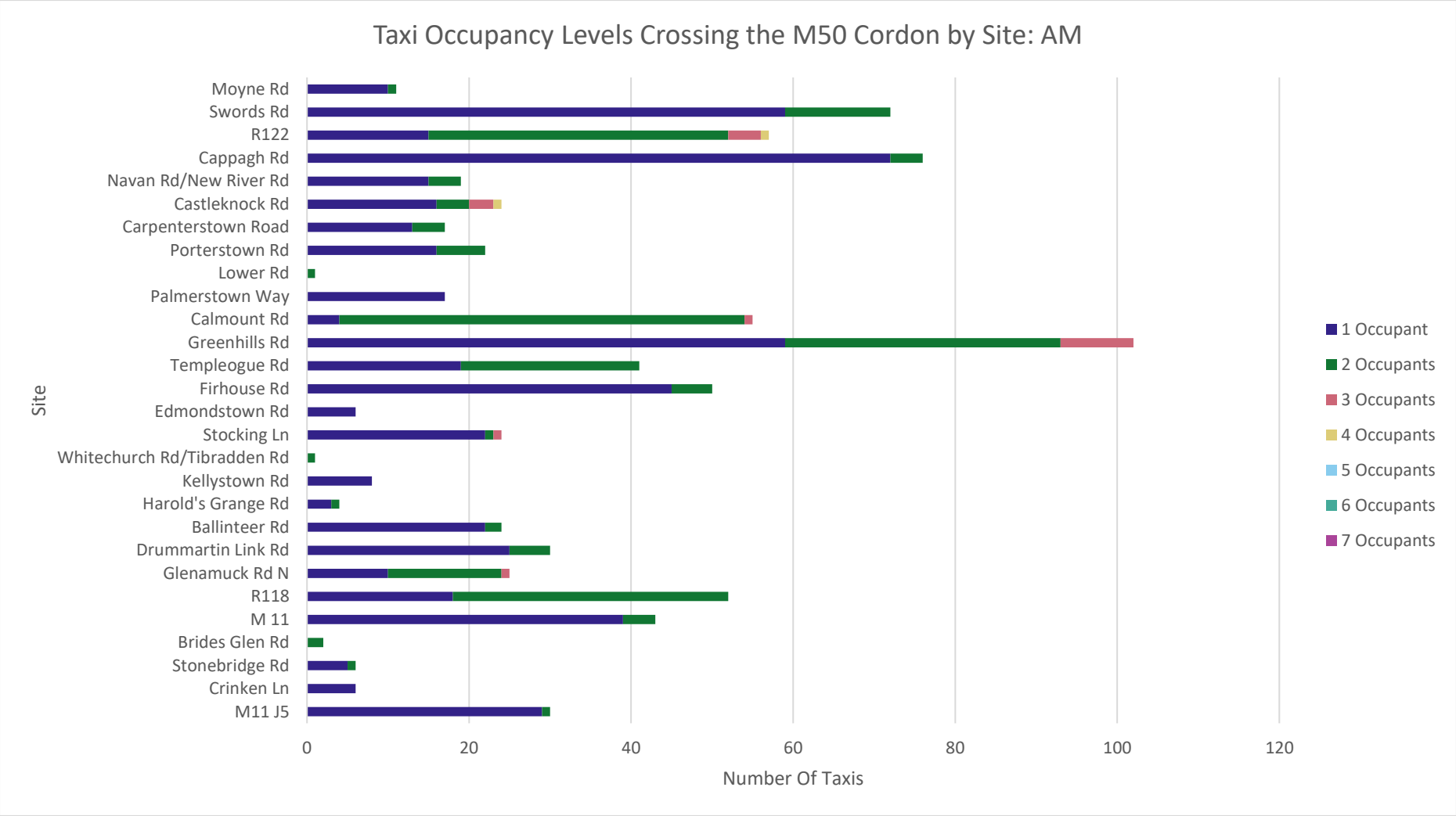


Figure 3-38:Taxi Occupancy per Site: AM

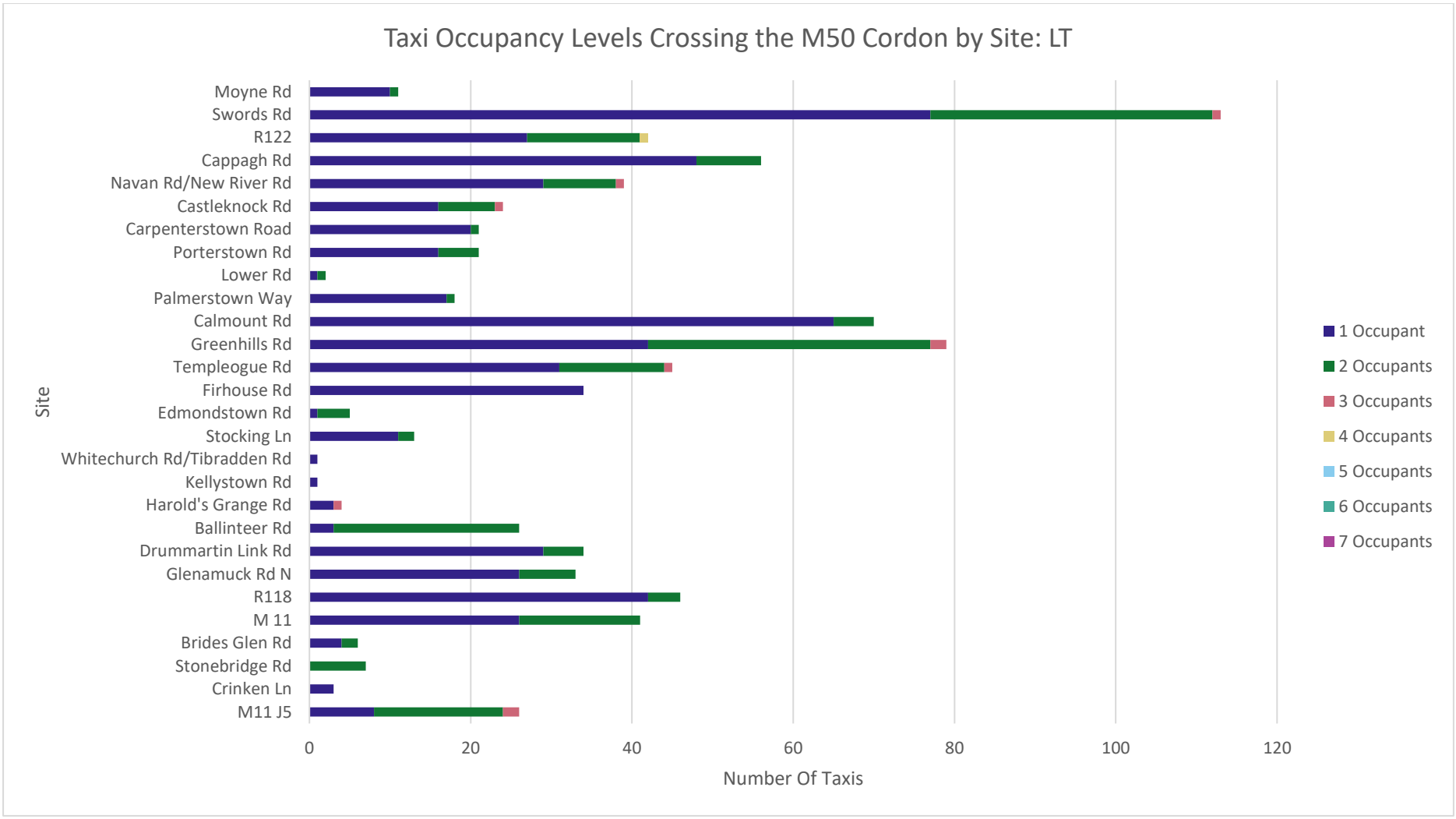


Figure 3-39:Taxi Occupancy per Site: LT

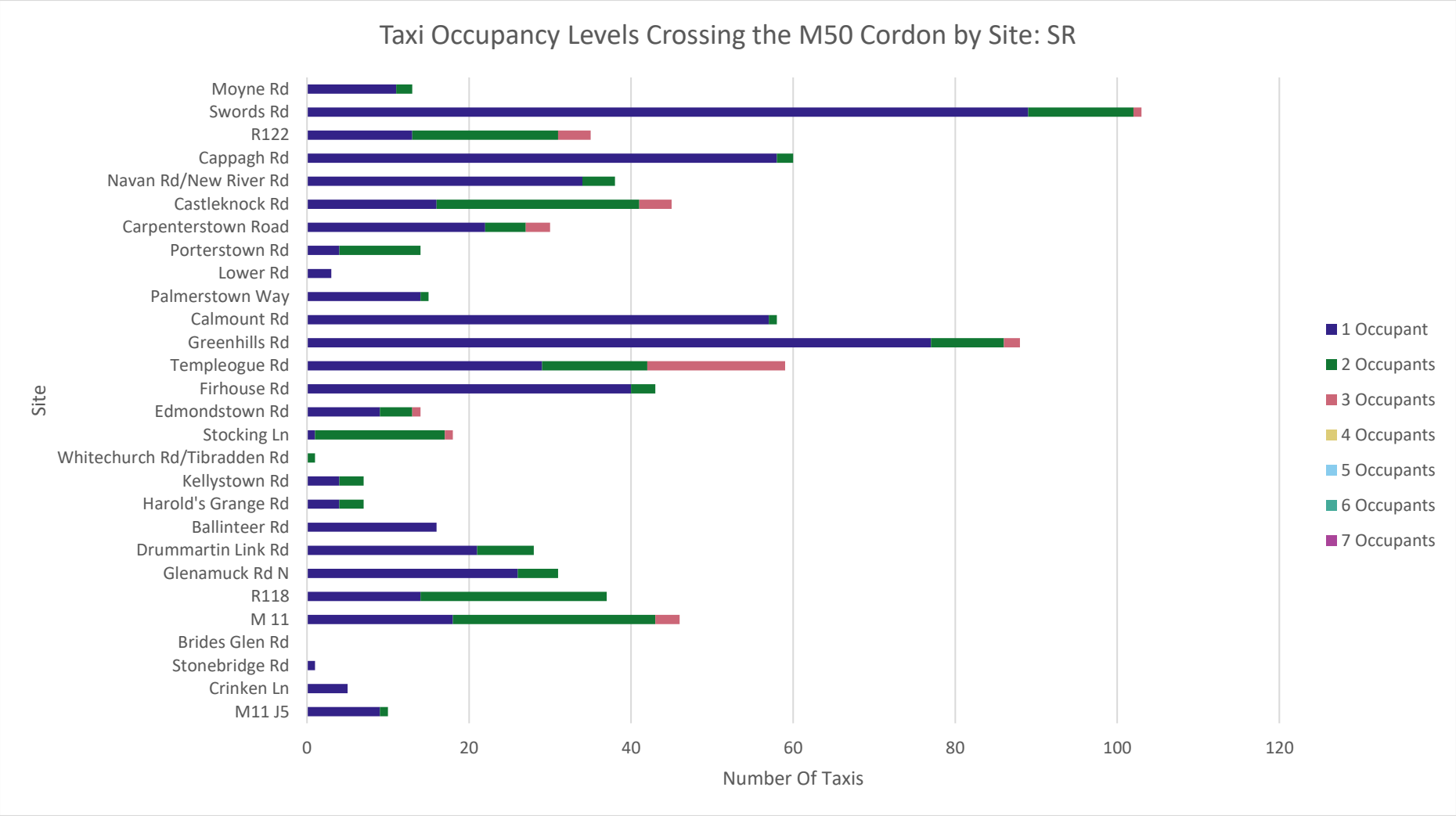


Figure 3-40:Taxi Occupancy per Site: SR

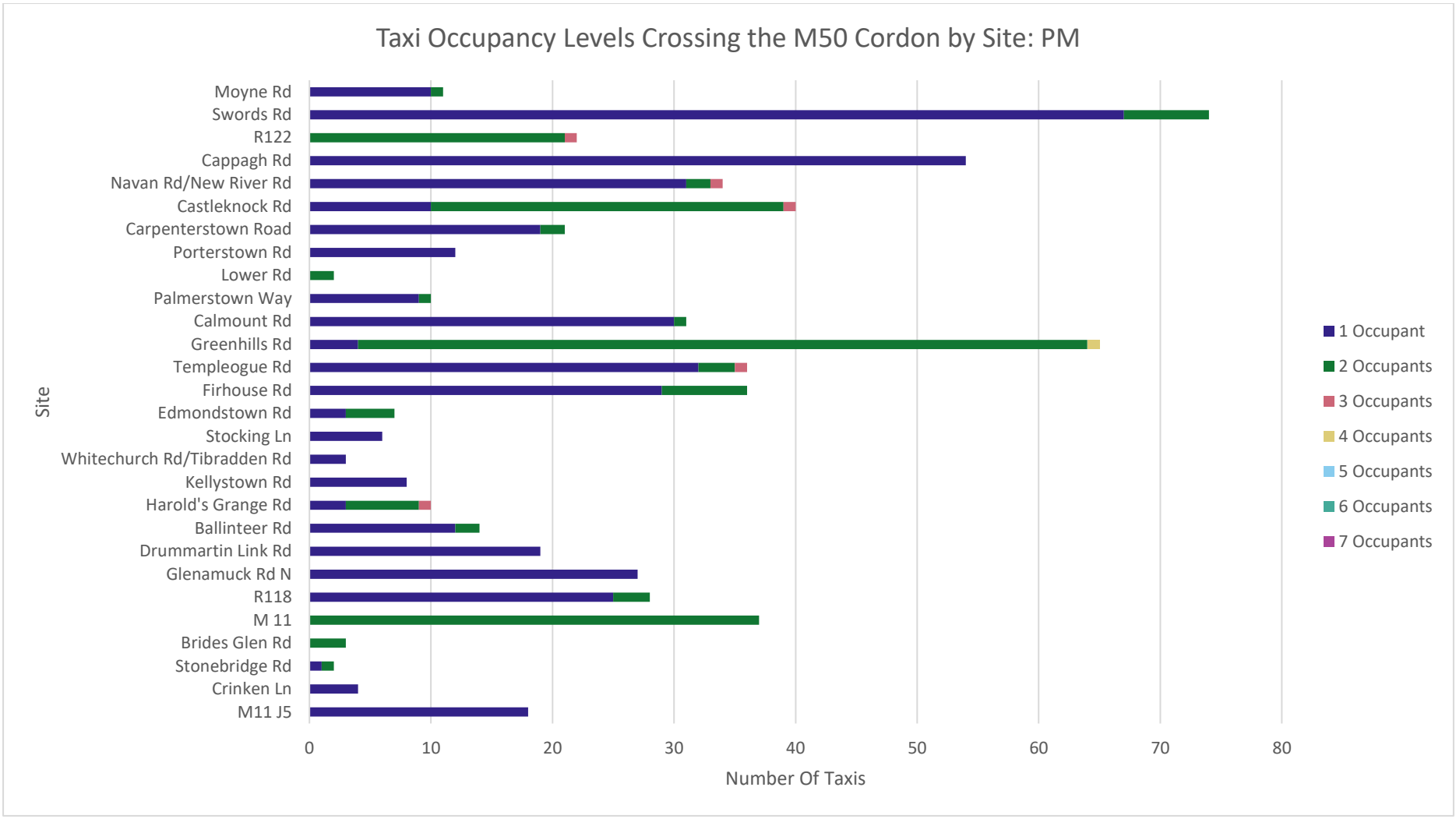


Figure 3-41:Taxi Occupancy per Site: PM

3.2.3 Bus Occupancy

Bus occupancy information was obtained from 31 bus stop survey locations, recorded at hourly intervals over a 12-hour period (i.e. 07:00 - 19:00) on the day of the survey.

Figure 3-42, Figure 3-43, Figure 3-44, Figure 3-45 and Figure 3-46 display the recorded bus occupancies crossing the M50 Cordon inbound towards the city during the respective time periods. The bus occupancies are displayed in terms of 5 different capacity bands (0-24%, 25-49%, 50-74%, 75-99% and 100%). Please note that these graphs display both the absolute values and the percentage occupancy for each time period. The figure below shows that, over the full 12-hour survey period, approximately 3% of buses were at less than 25% capacity, 67% were at between 25% and 49% capacity, 20% were at between 50% and 74% capacity, 8% were at between 75% and 99% capacity and approximately 2% were full.

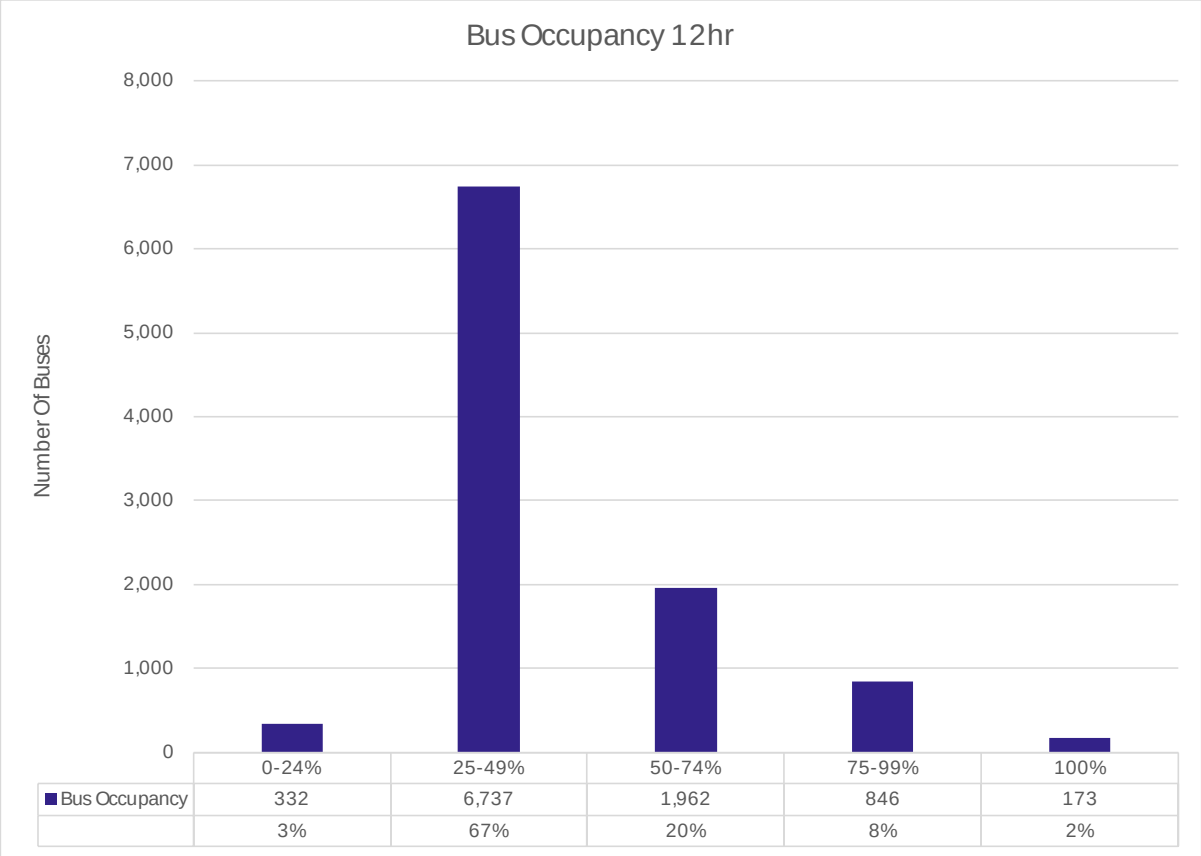


Figure 3-42:Bus Occupancy: 12 Hour

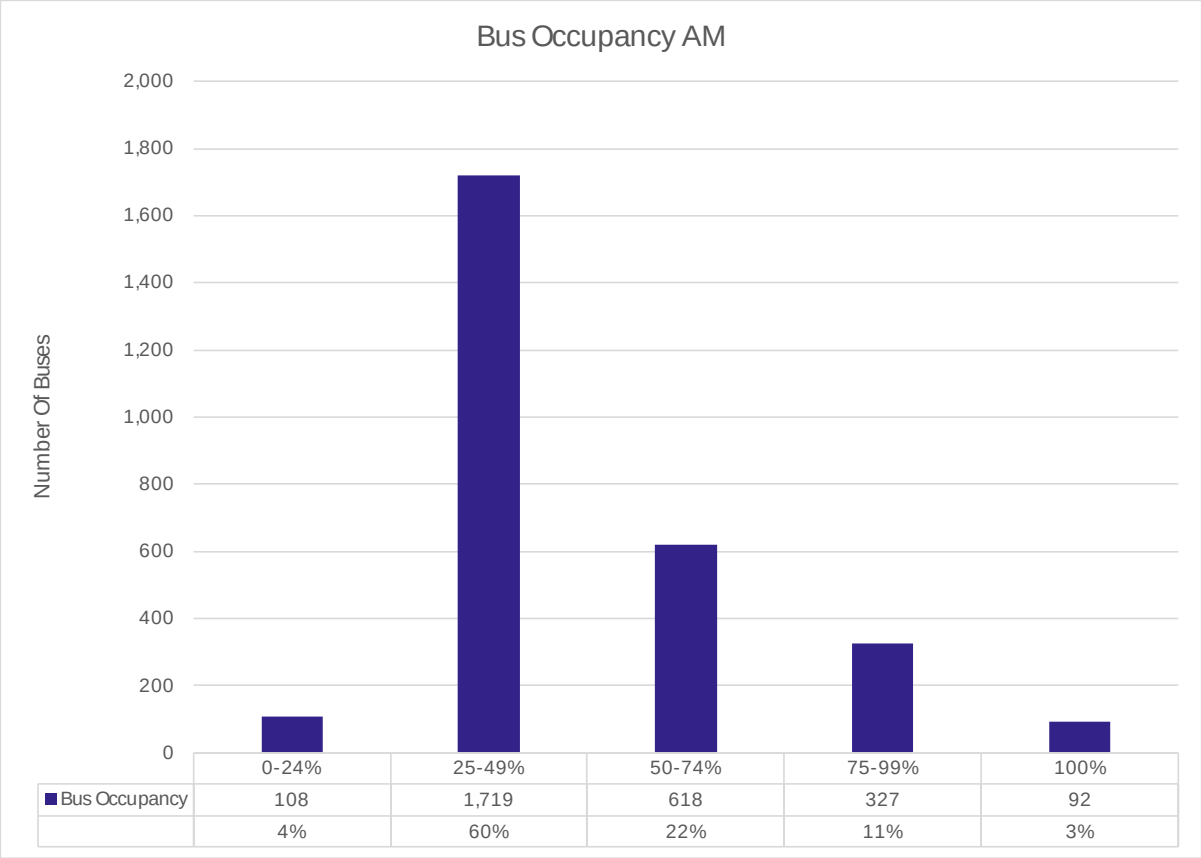


Figure 3-43:Bus Occupancy: AM

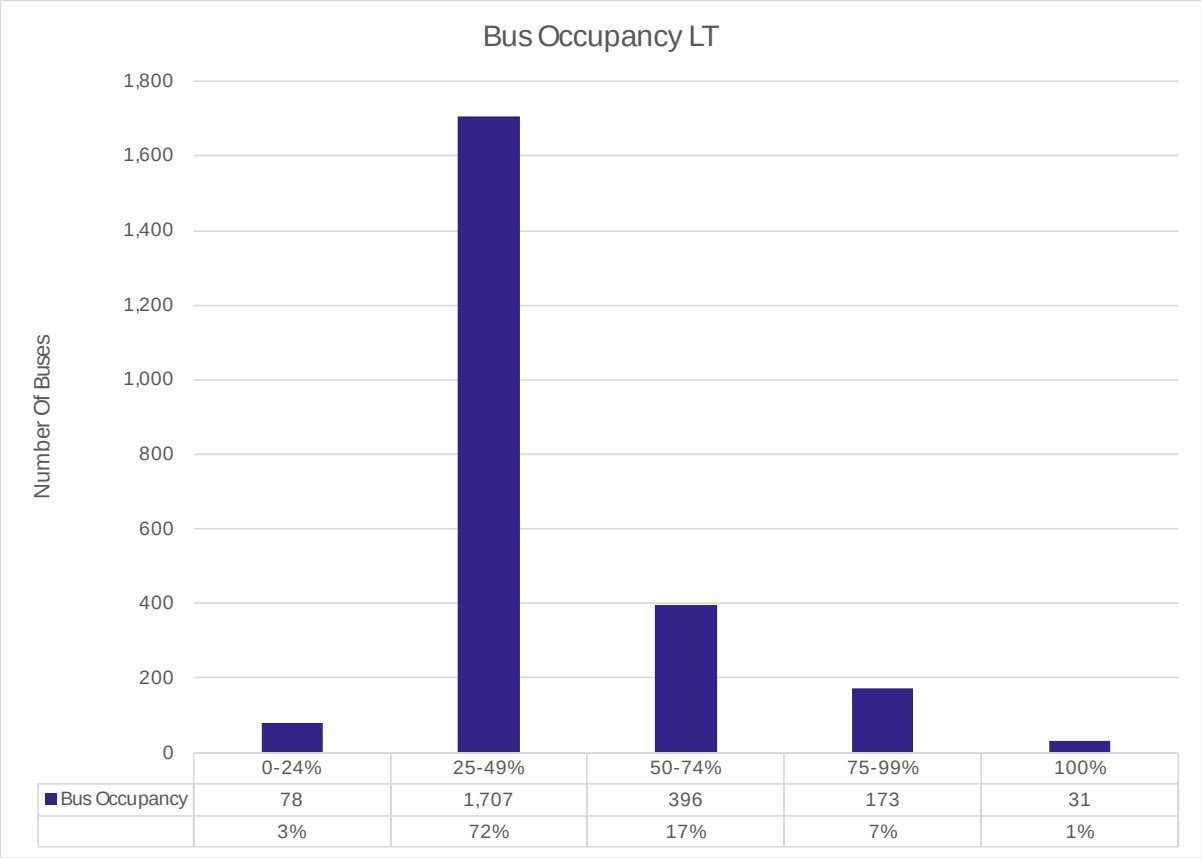


Figure 3-44:Bus Occupancy: LT

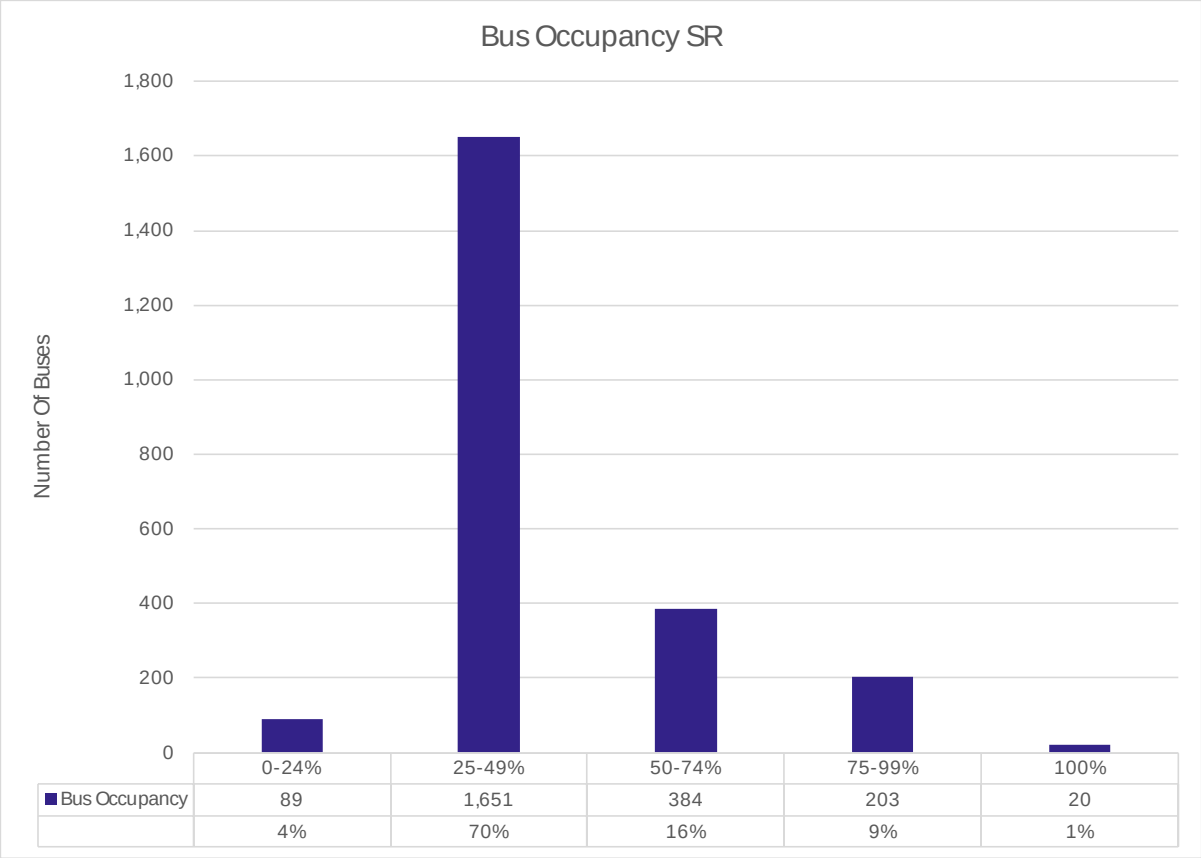


Figure 3-45:Bus Occupancy: SR

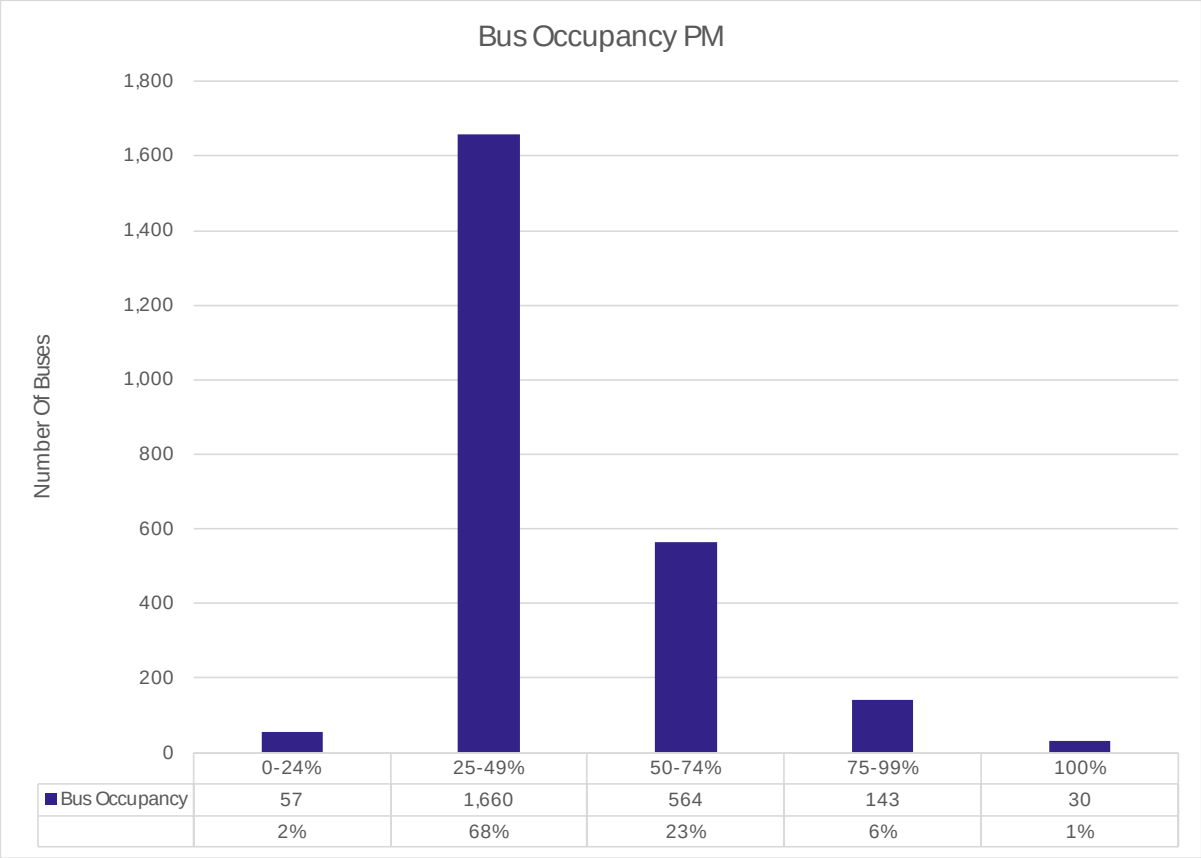


Figure 3-46:Bus Occupancy: PM

Bus Occupancy per Site

Figure 3-47, Figure 3-48, Figure 3-49, Figure 3-50 and Figure 3-51 display the vehicle occupancy for buses crossing the M50 Cordon during the respective time periods, with further reference to each individual bus stop location.

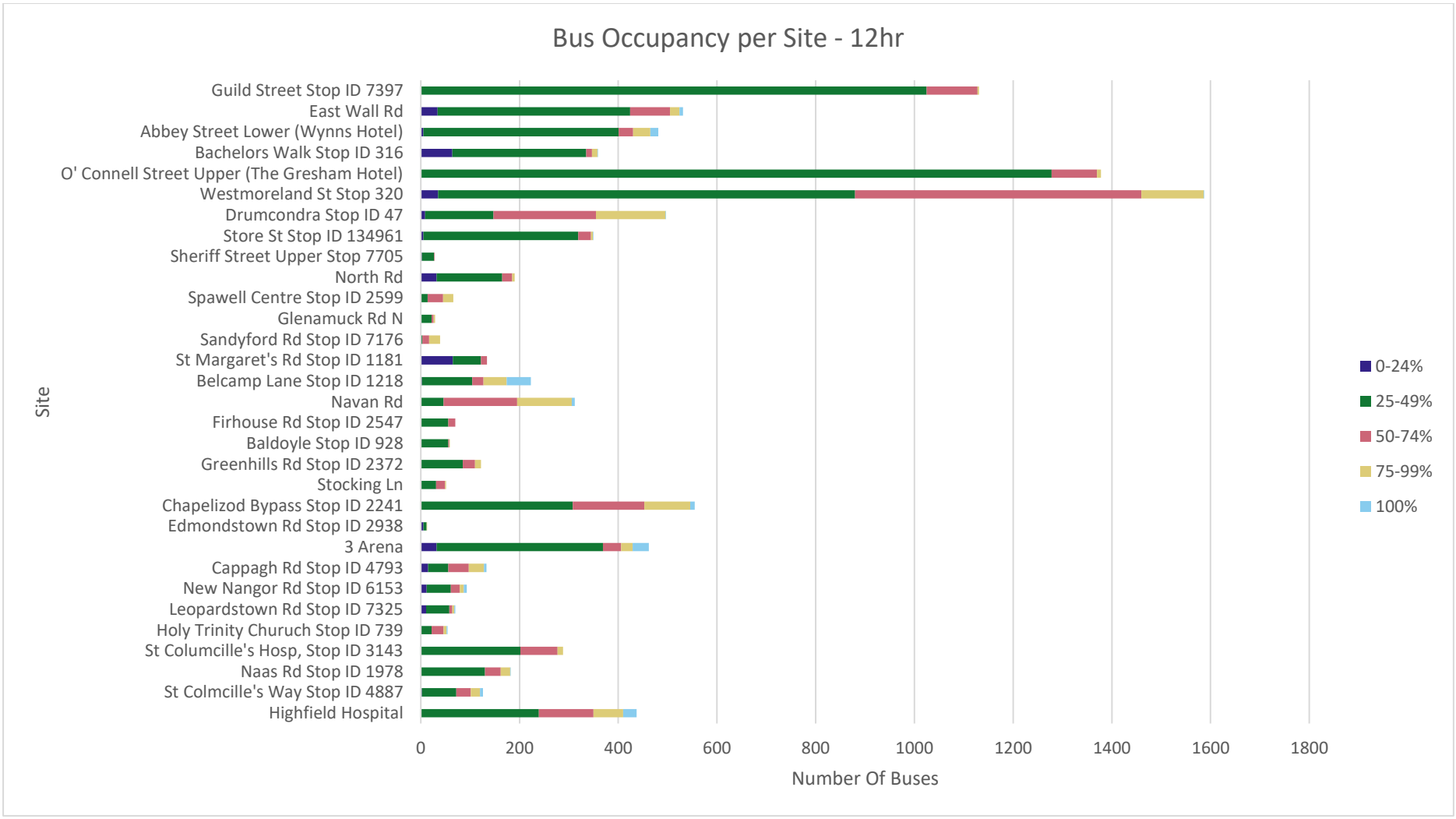


Figure 3-47:Bus Occupancy per Site: 12 Hour

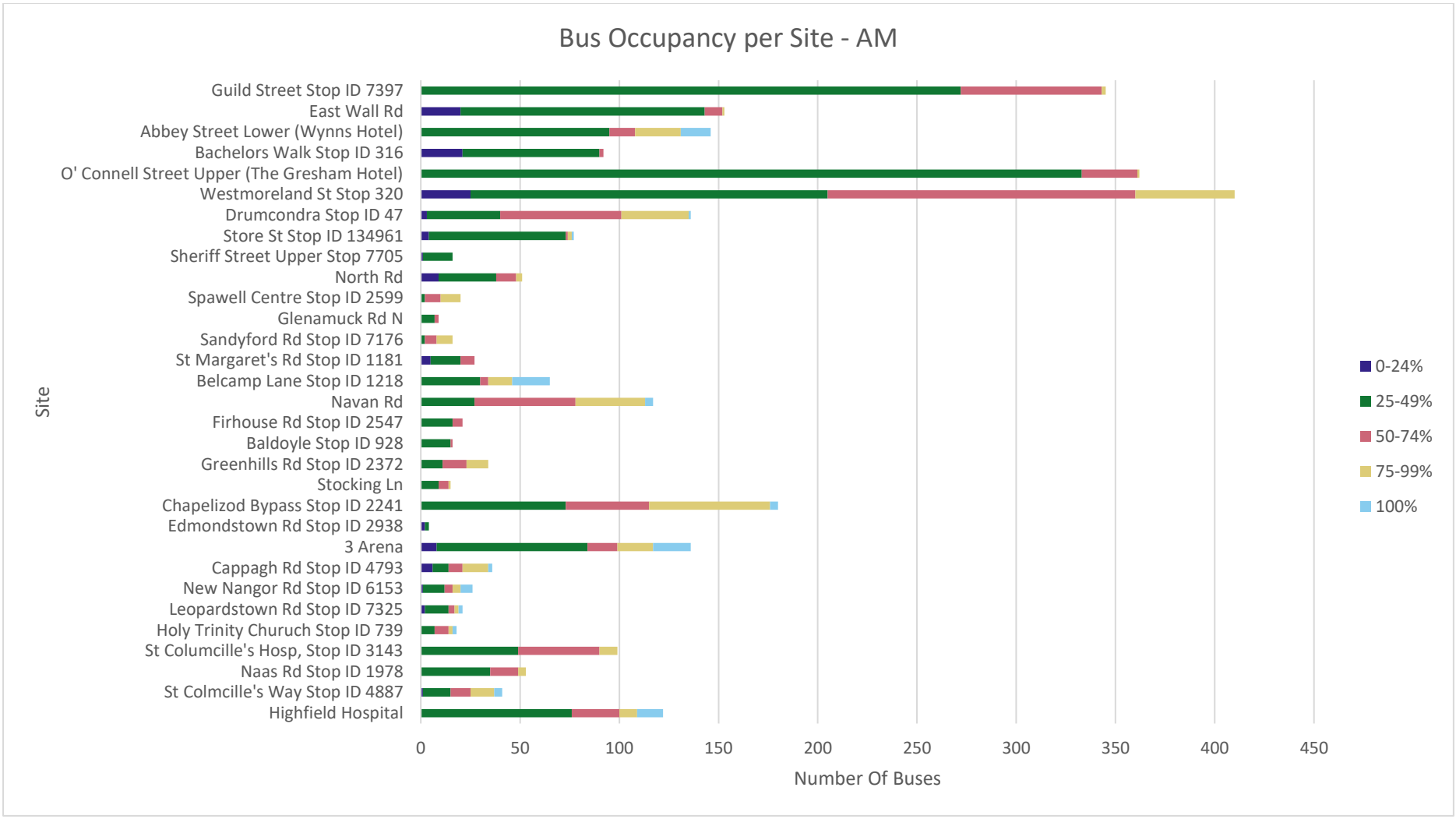


Figure 3-48:Bus Occupancy per Site: AM

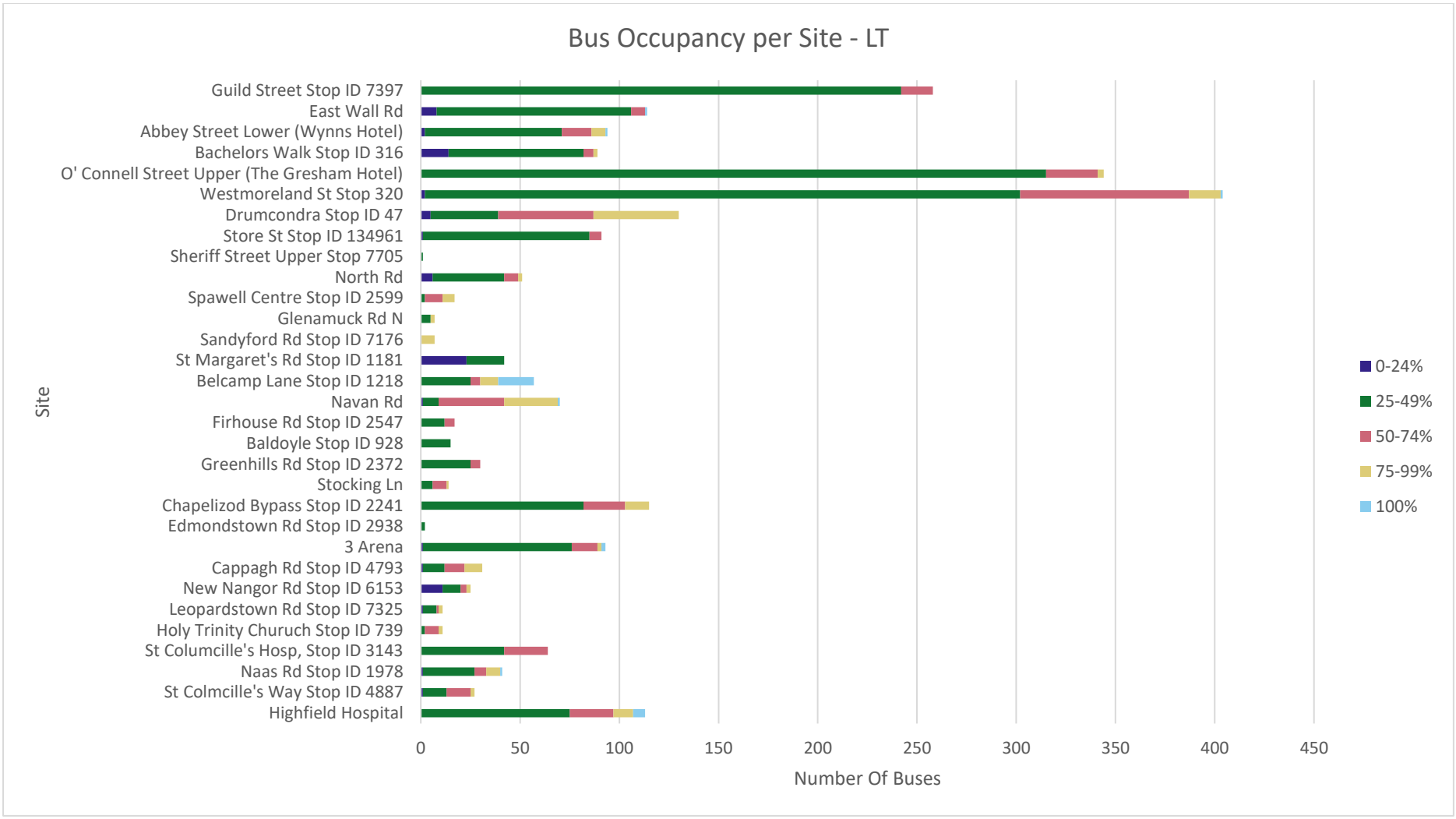


Figure 3-49:Bus Occupancy per Site: LT

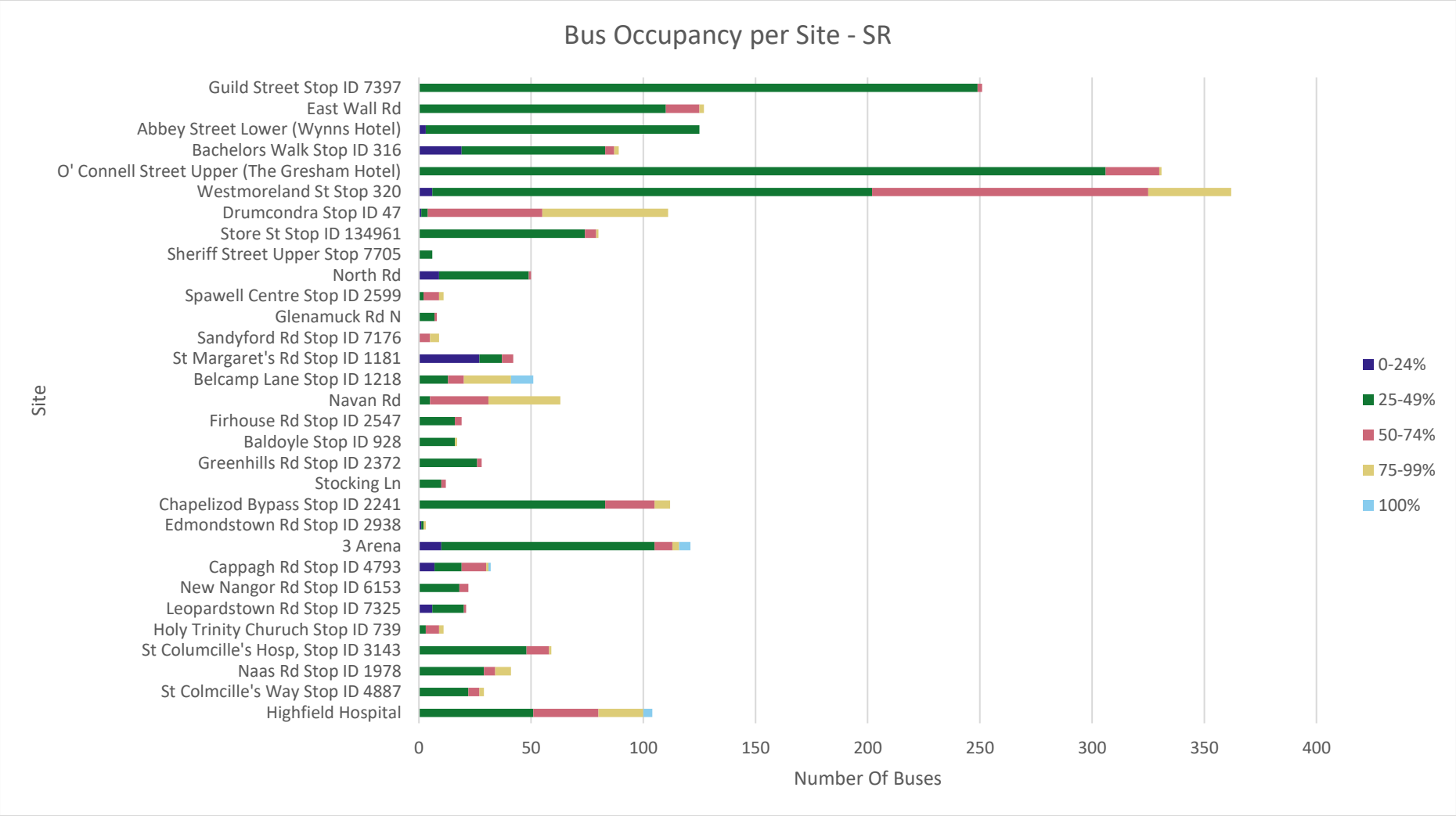


Figure 3-50:Bus Occupancy per Site: SR

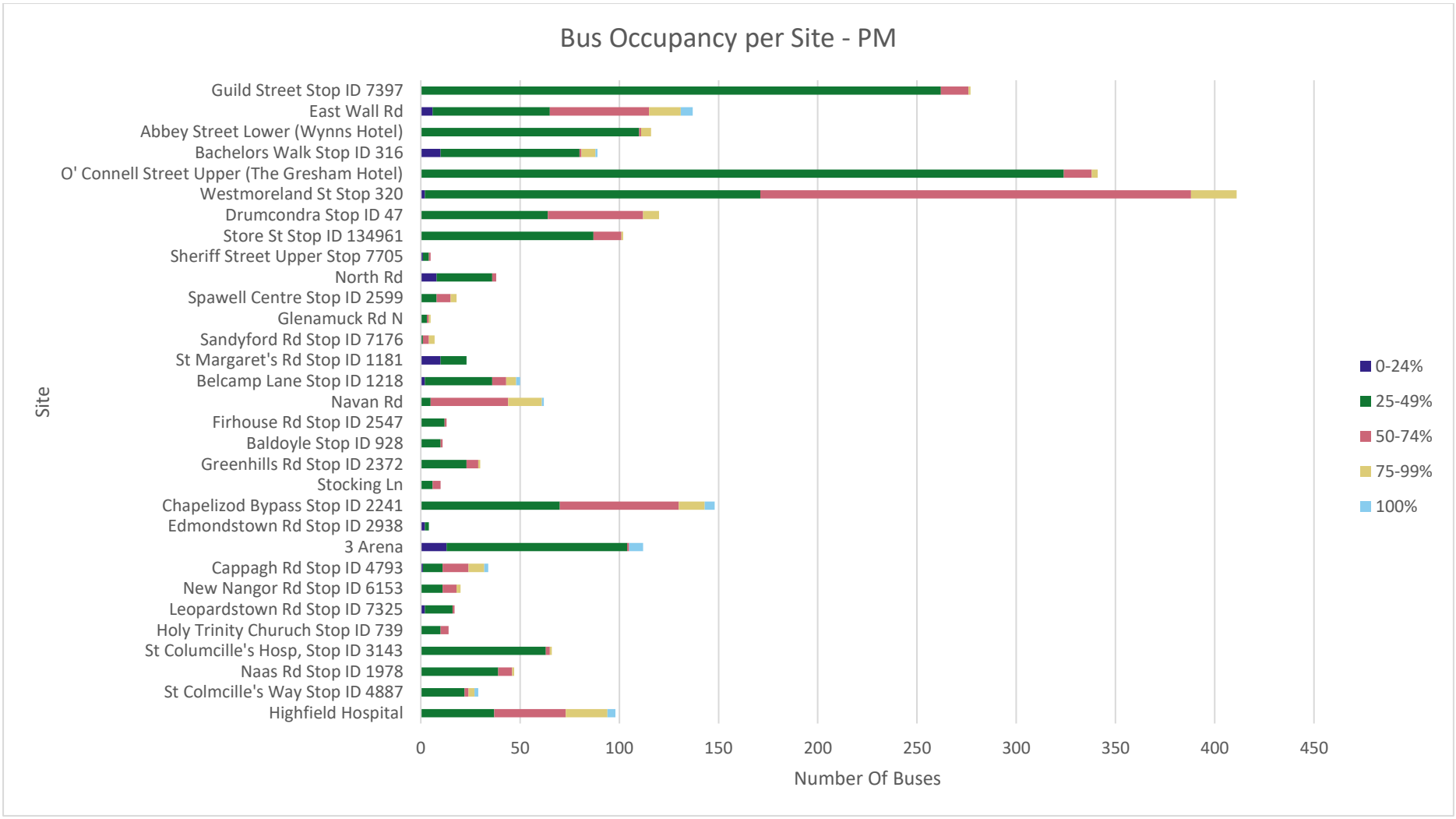


Figure 3-51:Bus Occupancy per Site: PM

4 People Movements

4.1 Methodology

Chapter 3 provided details on the number of vehicles, pedestrians and cyclists crossing the M50 Cordon. In order to convert these to total person trips crossing the cordon, it is necessary to estimate the occupancy of each vehicle type. Further details on how this was done is outlined below.

- Road Passenger Movements were calculated in the following ways:
    - Car and taxi people movements were calculated by taking the number of vehicles in the JTC surveys for each vehicle classification and multiplying these by a site-specific occupancy factor that was calculated by dividing the number of passengers by the number of vehicles. Where no equivalent site was available, an average factor from all sites was used.
    - Total bus passenger movements were calculated by applying average bus occupancy factors (as outlined in Appendix B) to the number of buses observed in the bus occupancy surveys.
    - Cyclist and pedestrian people movements were taken directly from the JTC surveys.
- Rail Passenger Movements were calculated in the following ways:
    - Luas movements include the number of passengers on Luas services between the Glencairn and Central Park stops and the Ballyogan and Carrickmines stops on the Green Line, and the number of passengers between the Red Cow and Kylemore stops on the Red Line.
    - Rail movements include passengers crossing the cordon inbound as recorded in the National Rail Census, which is a boarding and alighting survey conducted by Iarnród Éireann on a single day each year at every rail station throughout the country. The most recent survey was performed on 09/11/2023. While this is different to the dates of the other surveys, the Rail Census is considered representative of rail movements.

Section 4.4 presents the number of people moving inbound across the cordon for the following modes: Pedal Cycle, Pedestrian, Car, Taxi, Bus, Luas and Rail.

Section 4.5 presents the number and mode share of people moving inbound across the cordon.

4.2 Road Passenger Movements

Figure 4-1, Figure 4-2, Figure 4-3, Figure 4-4 and Figure 4-5 show the number of passenger trips for Pedal Cycle, Pedestrian, Car, Taxi and Bus crossing the M50 Cordon over the 12-hour survey period.

Figure 4-1:Road Passenger Movements per Mode per Site: 12 Hour

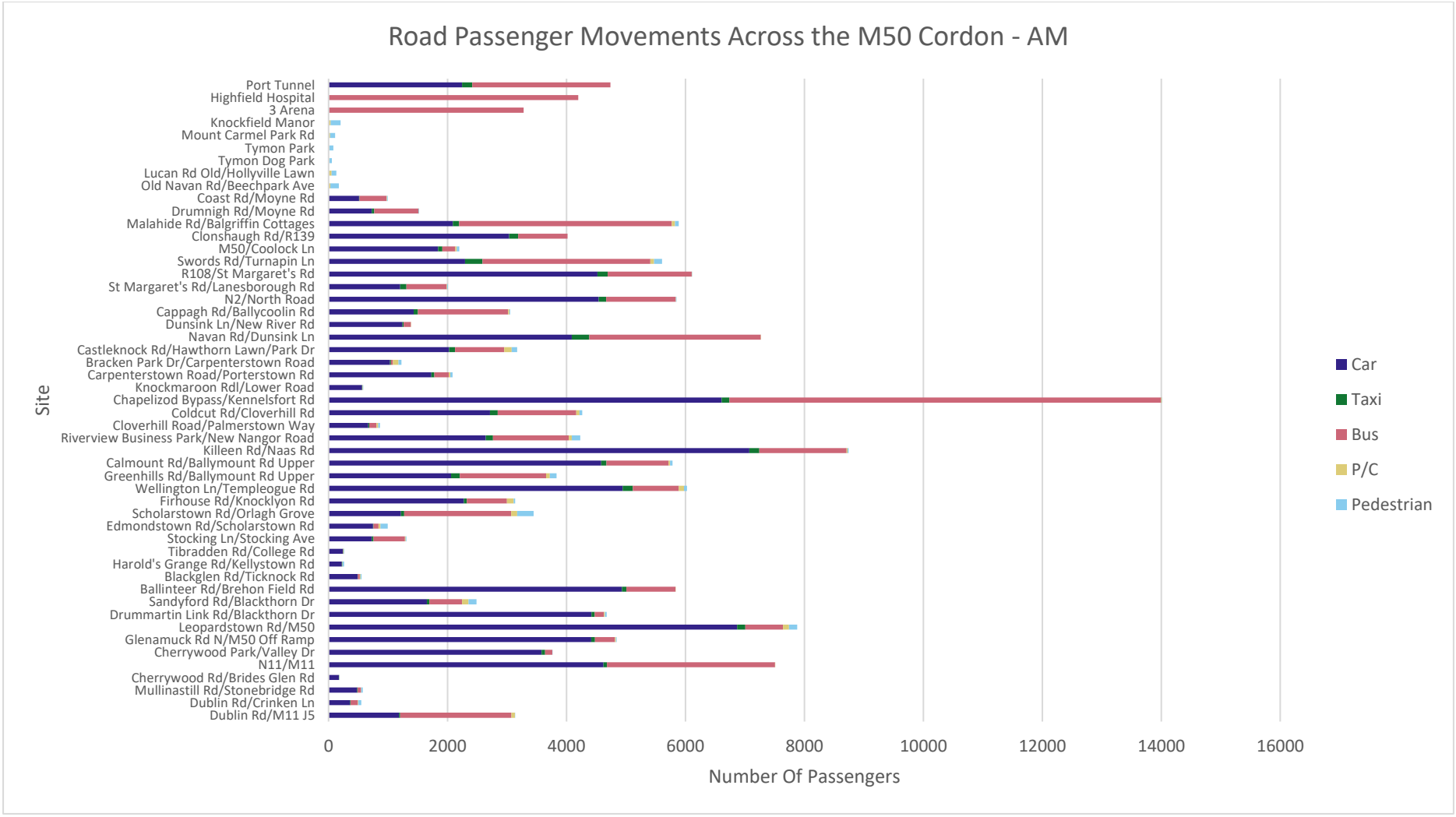


Figure 4-2:Road Passenger Movements per Mode per Site: AM

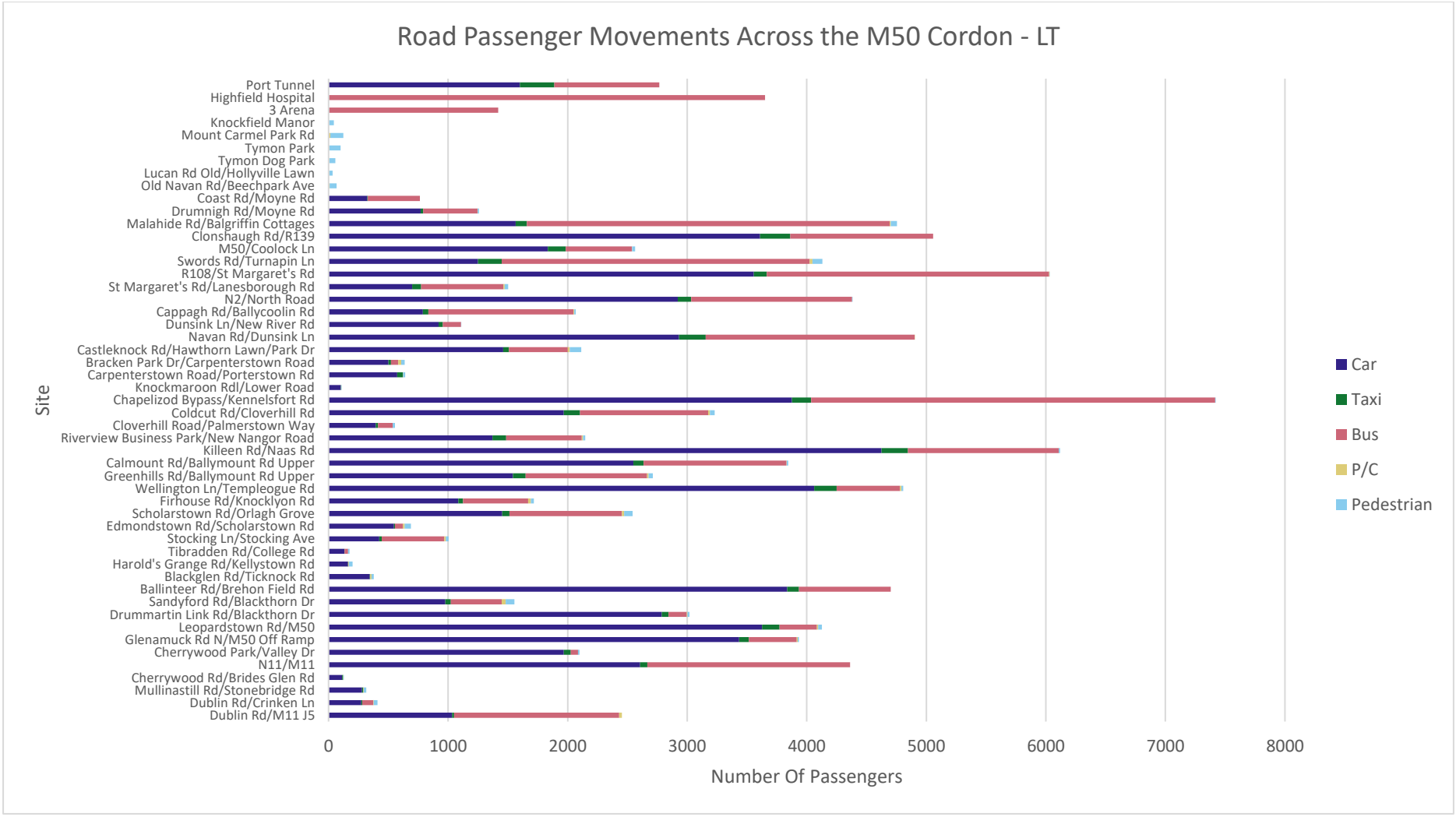


Figure 4-3:Road Passenger Movements per Mode per Site: LT

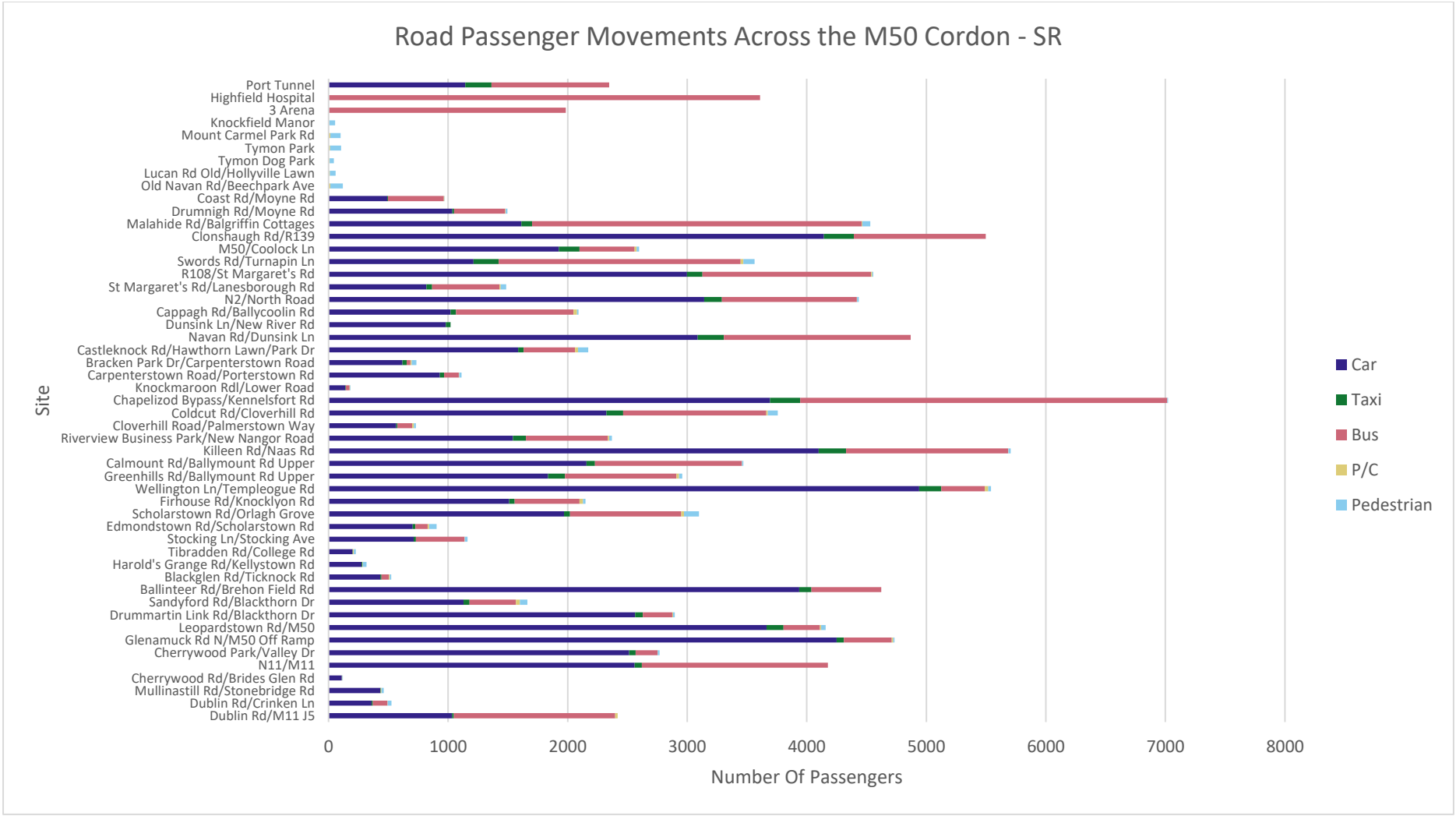


Figure 4-4:Road Passenger Movements per Mode per Site: SR

Figure 4-5:Road Passenger Movements per Mode per Site: PM

4.3 Rail Passenger Movements

4.3.1 Luas Passenger Movements

The Luas passenger figures are taken from the annual Luas count, carried out by TII. The line flow from the following stations along the M50 Cordon were used to determine the number of passengers crossing the M50 Cordon by Luas:

- Luas Green Line Site 1: Glencairn to Central Park (Northbound)
- Luas Green Line Site 2: Ballyogan to Carrickmines (Southbound)
- Luas Red Line: Red Cow to Kylemore (Eastbound)

Appendix C presents the breakdown of Luas passenger movements in further detail, while Figure 4-6 shows the total number of passengers crossing the M50 Cordon at all cordon points during each time period from 07:00 to 19:00. In total, 17,456 passengers crossed the M50 Cordon inbound over the 12-hour survey period.

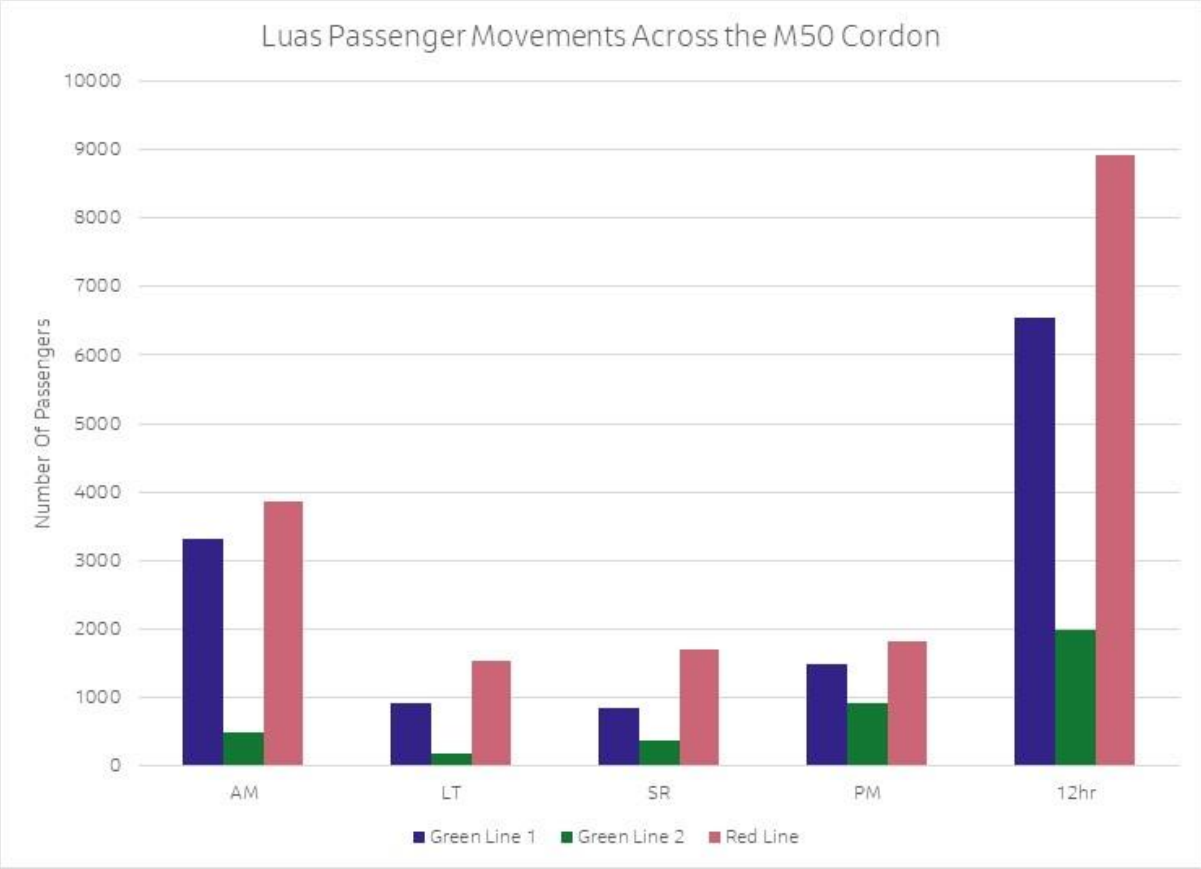


Figure 4-6:Luas Passenger Movements Across the M50 Cordon

4.3.2 Heavy Rail Passenger Movements

The National Rail Census is a survey carried out by Iarnród Éireann every year which records the boardings and alightings at every rail station in the country on a particular day. This report extracts the number of passengers that cross the M50 Cordon between Portmarnock and Clongriffin, Castleknock and Navan Road Parkway, Clondalkin and Parkwest and Bray and Shankill Rail Stations from that survey.

Services crossing the M50 Cordon include Northbound and Southbound DART services, Commuter services arriving from Dundalk, Maynooth, Longford, M3 Parkway and Portlaoise, Intercity services from Cork, Galway, Limerick, Ennis and Waterford into Heuston, and services from Rosslare Europort.

Figure 4-7 shows the number of passengers that crossed the M50 Cordon by type of train over a 12-hour period. In total, 31,227 people crossed the M50 Cordon inbound over the 12-hour survey period.

Appendix D presents the breakdown of heavy rail passenger movements in further detail.

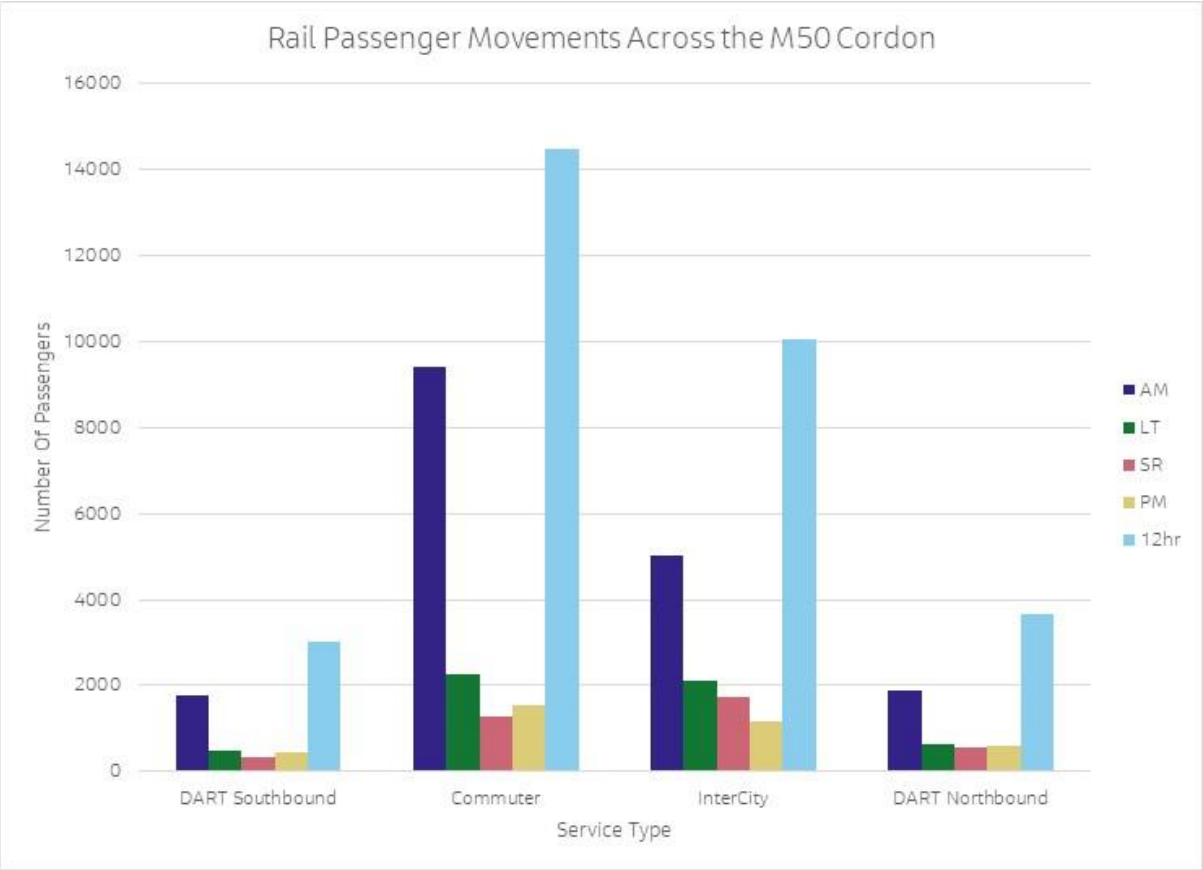


Figure 4-7:Heavy Rail Services - Passengers Inbound

4.4 Total Passenger Movements

Figure 4-8 and Figure 4-9 display the total number of passengers crossing the M50 Cordon by Pedal Cycle, Pedestrian, Car, Taxi, Bus, Luas and Rail for each time period.

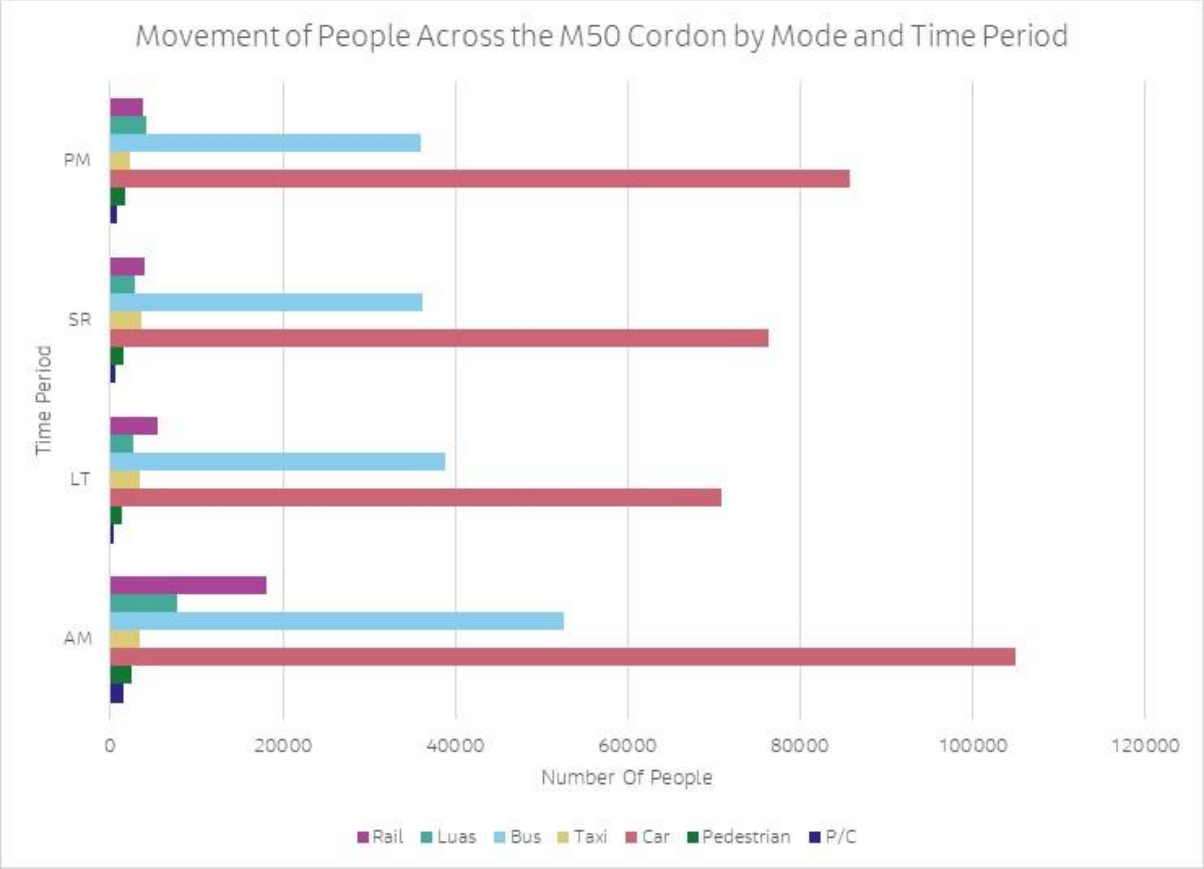


Figure 4-8:Car, Cycle, Taxi, Pedestrian and Rail Trips Inbound Across the M50 Cordon During Each Time Period

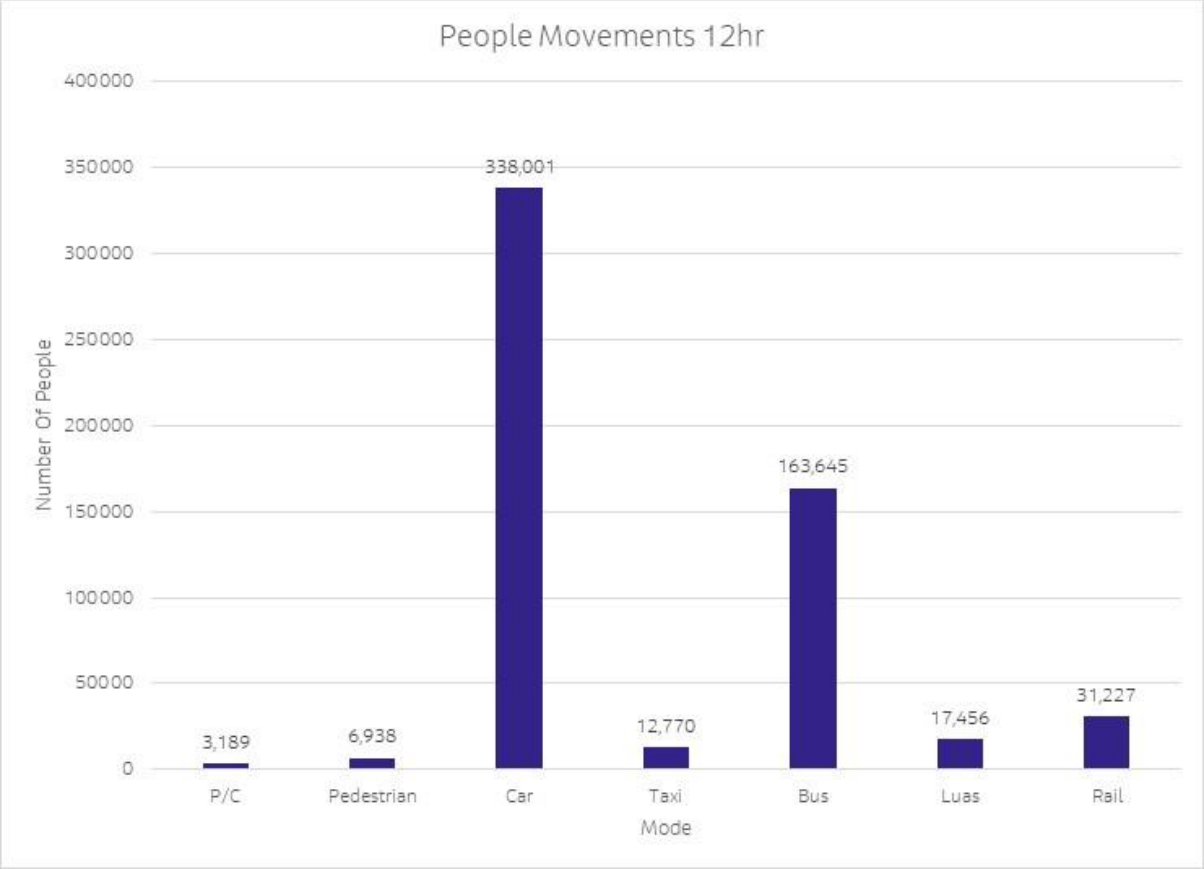


Figure 4-9:Trips Inbound across the M50 Cordon: 12 Hour

4.5 Modal Split

Table 4-1 shows the number of sustainable and vehicular modes crossing the M50 Cordon during the 12hr period.

Mode	Trips	% Trips
P/C	3,189	1%
Pedestrian	6,938	1%
Car	338,001	59%
Taxi	12,770	2%
Bus	163,645	29%
Luas	17,456	3%
Rail	31,227	5%

Table 4-1:Number of Journeys Across the M50 Cordon by Mode

As can be seen from Figure 4-10, the mode with the highest share over a 12 hr period is Car with 59%.

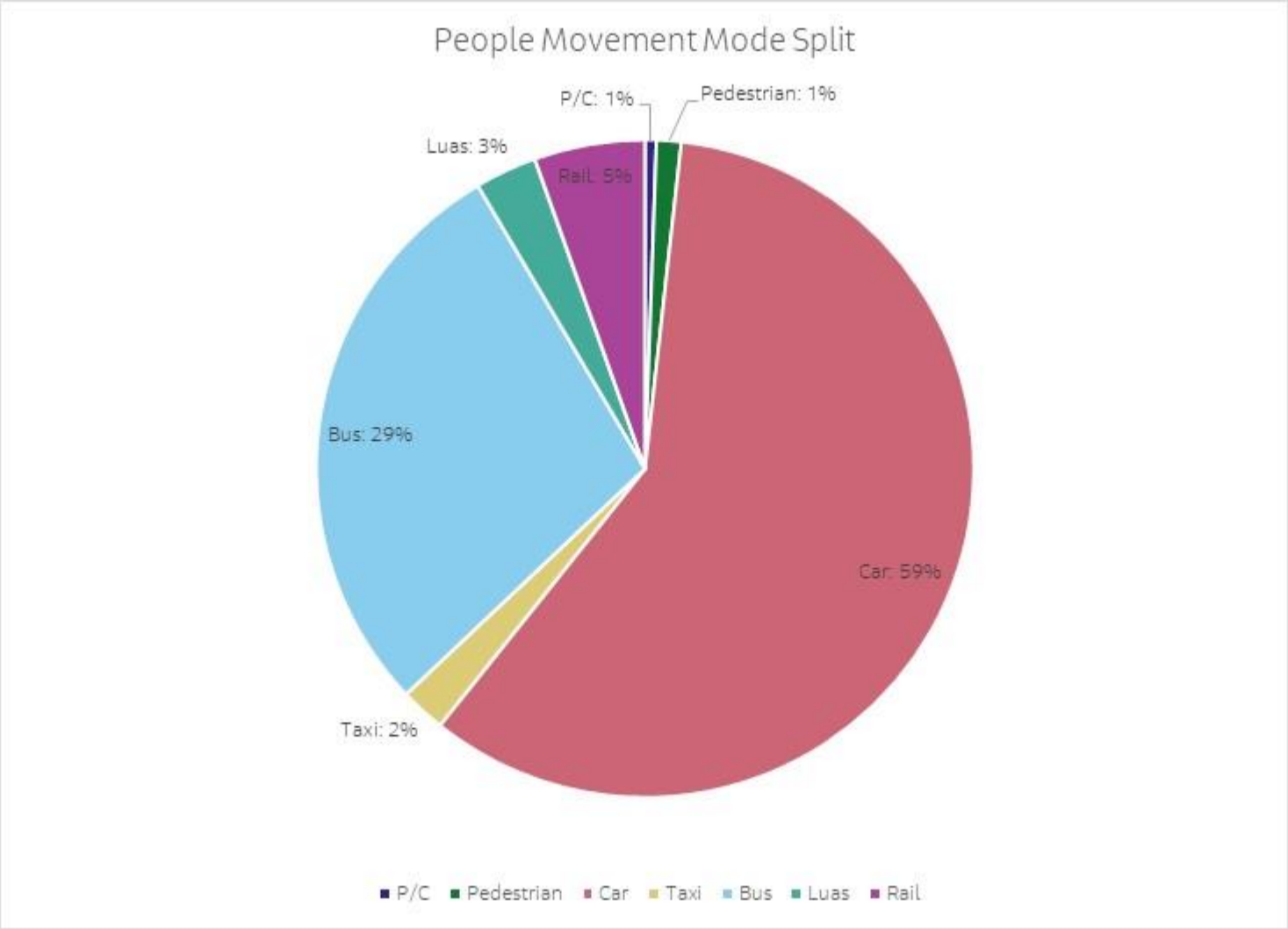


Figure 4-10:Mode share of people crossing the M50 Cordon by Sustainable and Vehicular Modes

4.6 Trend Analysis

As the surveys used for this report are repeated every year, a historical trend analysis can be performed. Table 4-2and Figure 4-11 show a comparison for the years 2019, 2022 and 2023. Note that, due to Covid-19 travel restrictions, comparable data is not available for 2020 and 2021.

This trend analysis shows that between 2022 and 2023, the total number of people movements crossing the M50 Cordon increased by 9%. This is an increase of 46,916 people, bringing the total number of people crossing the Cordon to 573,226 over a 12-hour period.

Public transport modes (Bus, Luas and Rail) saw an 18% increase, from 180,404 trips to212,328 trips. Bus patronage across the Cordon increased by 24,772 people movements, leading to a corresponding mode share increase from 26% to 29%. Luas patronage increased by 2,537 people movements, with the mode share remaining at 3%. Rail patronage increased by 4,615 people movements, with the mode share remaining at 5%.

In terms of active modes, there has been a 15% increase in cyclists, between 2022 and 2023 from 2,785 to 3,189, with the mode share remaining at 1%. Pedestrians saw a 15% increase, from 6,045 to 6,938, with the mode share also remaining at 1%.

The number of people using cars increased by 4%, from 324,205 to 338,001, going form 62% mode share to 59%. Taxi people movements fell by 1%, from 12,871 to 12,770, with the mode share remaining 2%.

Mode	2019 Trips	2022 Trips	2023 Trips	% Difference between 2022 and 2023
P/C	2,223	2,785	3,189	15%
Pedestrian	4,763	6,045	6,938	15%
Car	359,897	324,205	338,001	4%
Taxi	15,381	12,871	12,770	-1%
Bus	126,542	138,873	163,645	18%
Luas	15,424	14,919	17,456	17%
Rail	28,675	26,612	31,227	17%
Total	**552,905**	**526,310**	**573,226**	**9%**

Table 4-2 Historical Trend Analysis for the M50 Cordon

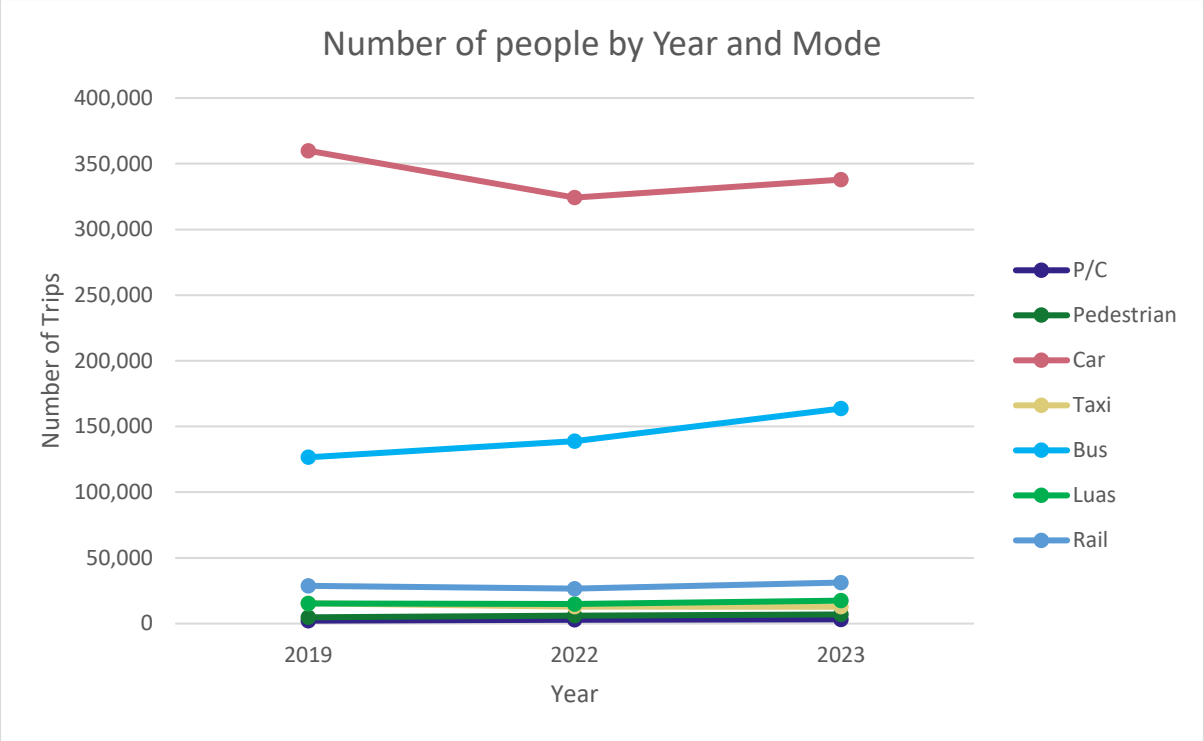


Figure 4-11 Number of People Crossing the M50 Cordon Inbound by Year and Mode

5 Key Results

Based on the analysis of the 2023 data, the key results are:

- The total number of vehicles, pedestrians and cyclists that crossed the M50 cordon inbound was 392,241 over 12 hours on the day of the survey.
- The busiest time period for vehicles and cyclists was the AM peak with 120,045 crossing inbound towards the city. The busiest time period for Pedestrians was the AM peak with 2,390 crossing inbound.
- Between the hours of 07:00 and 19:00, cars were recorded to have the highest vehicular traffic split, with 76% of the total inbound vehicle flows. Light Goods Vehicles (LGVs) recorded 12%, Ordinary Goods Vehicles 1 (OGV1) recorded 3%, Ordinary Goods Vehicles 2 (OGV2) recorded 2% and taxis recorded 2%. The remaining vehicle classifications recorded 2% or less of the total flows.
- In terms of vehicle occupancy, 85% of cars crossing inbound towards the city had single occupancy during the AM period (07:00 – 10:00) and 92% during the PM period (16:00 – 19:00) and 70% of taxis recorded single occupancy (i.e. driver-only) over the 12-hour survey period.
- Between 07:00 and 19:00, 67% of buses were at 25-49% capacity. Approximately 3% of buses were at 0-24% capacity, 20% were at 50-74% capacity, 8% were at 75-99% capacity and 2% were at 100% capacity.
- In terms of overall people movements, 222,455 (39%) of a total of 573,226 people travelling inbound towards the city between 07:00 and 19:00 used sustainable modes of travel, i.e. cycling, walking, bus, light rail and heavy rail.

Appendix A - Additional Graphs

Car Totals by Site and Time Period

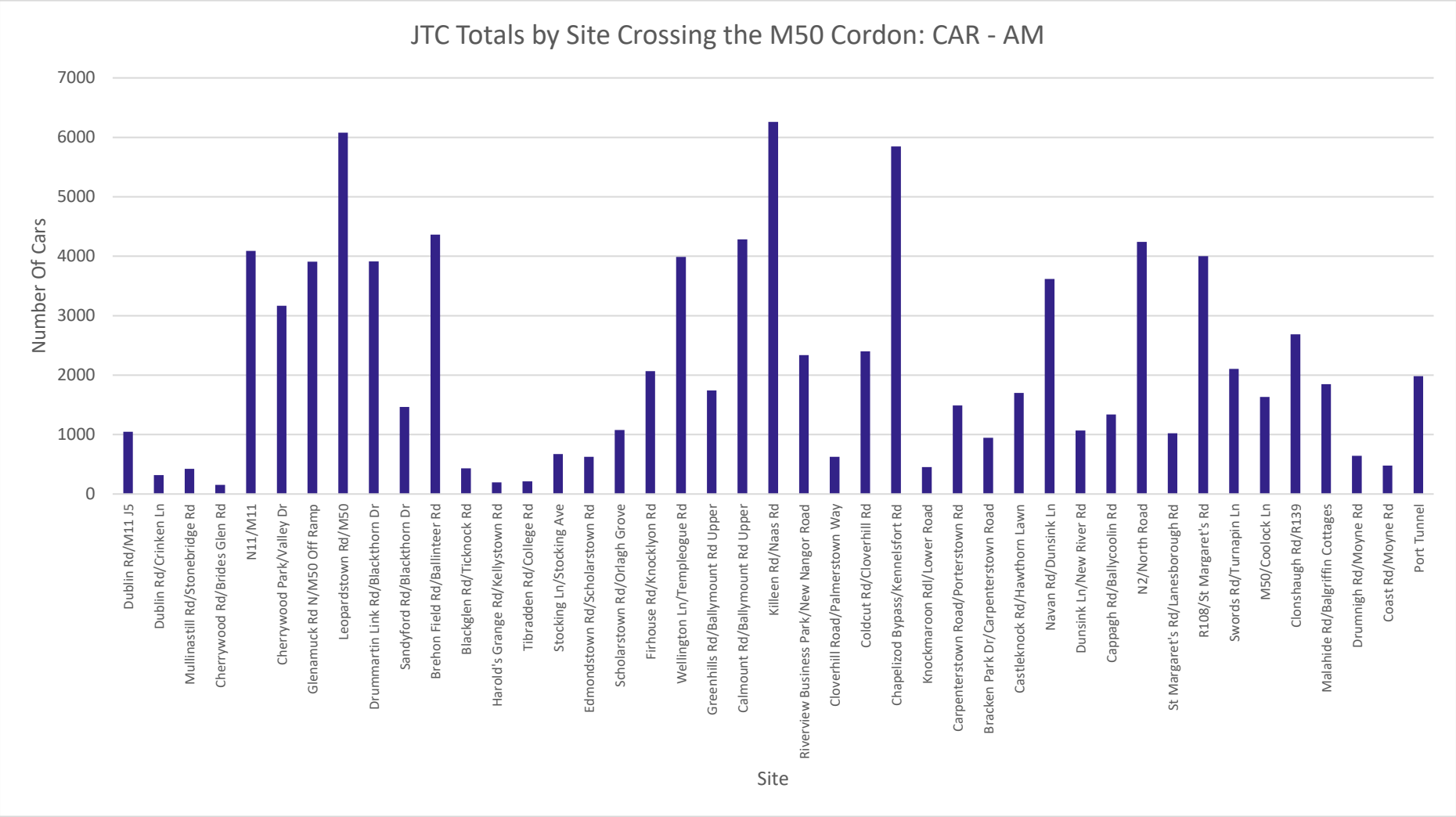


Figure 0-1:Number of Car Journeys for JTC Surveys for AM per Site

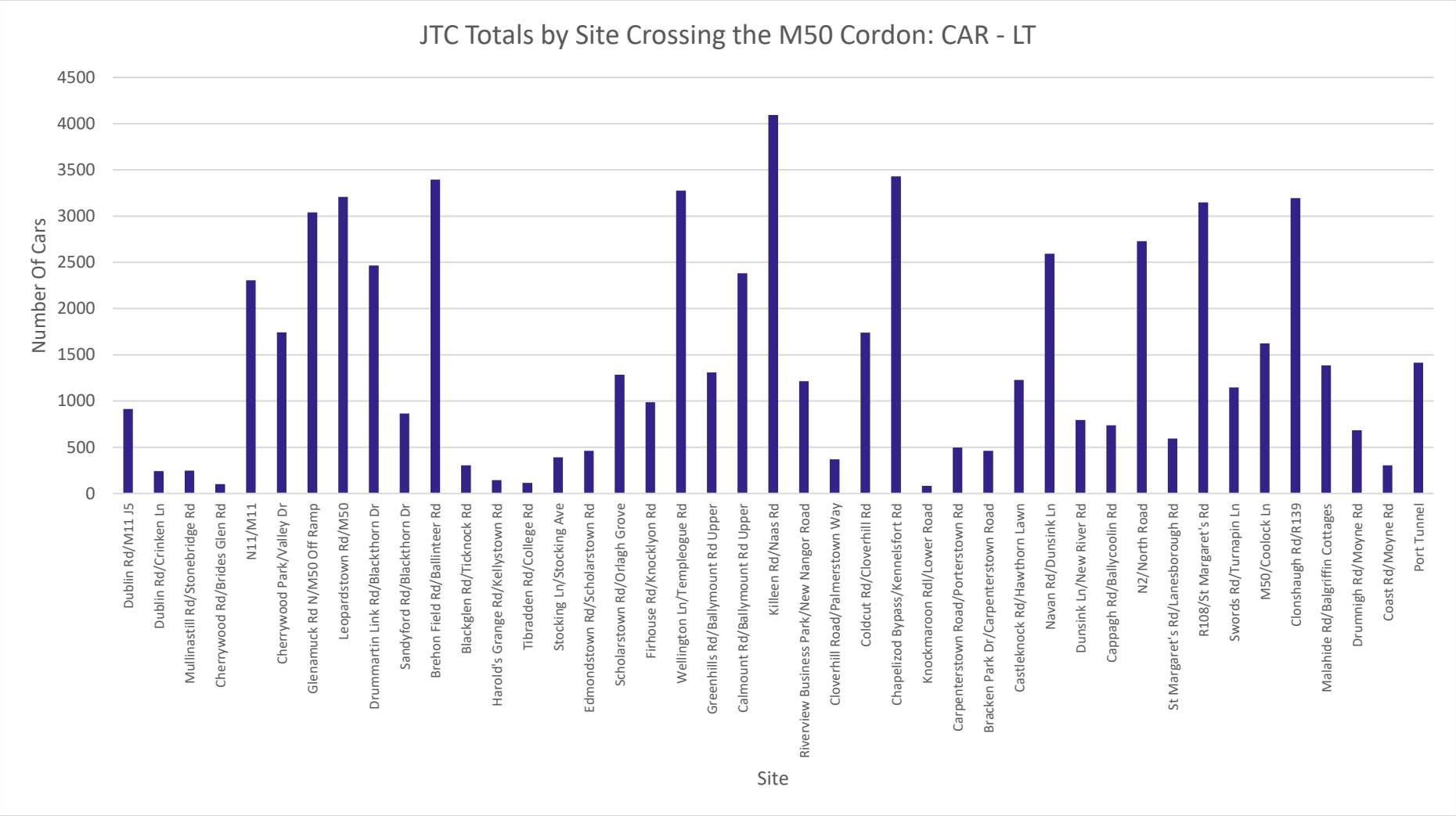


Figure 0-2:Number of Car Journeys for JTC Surveys for LT per Site

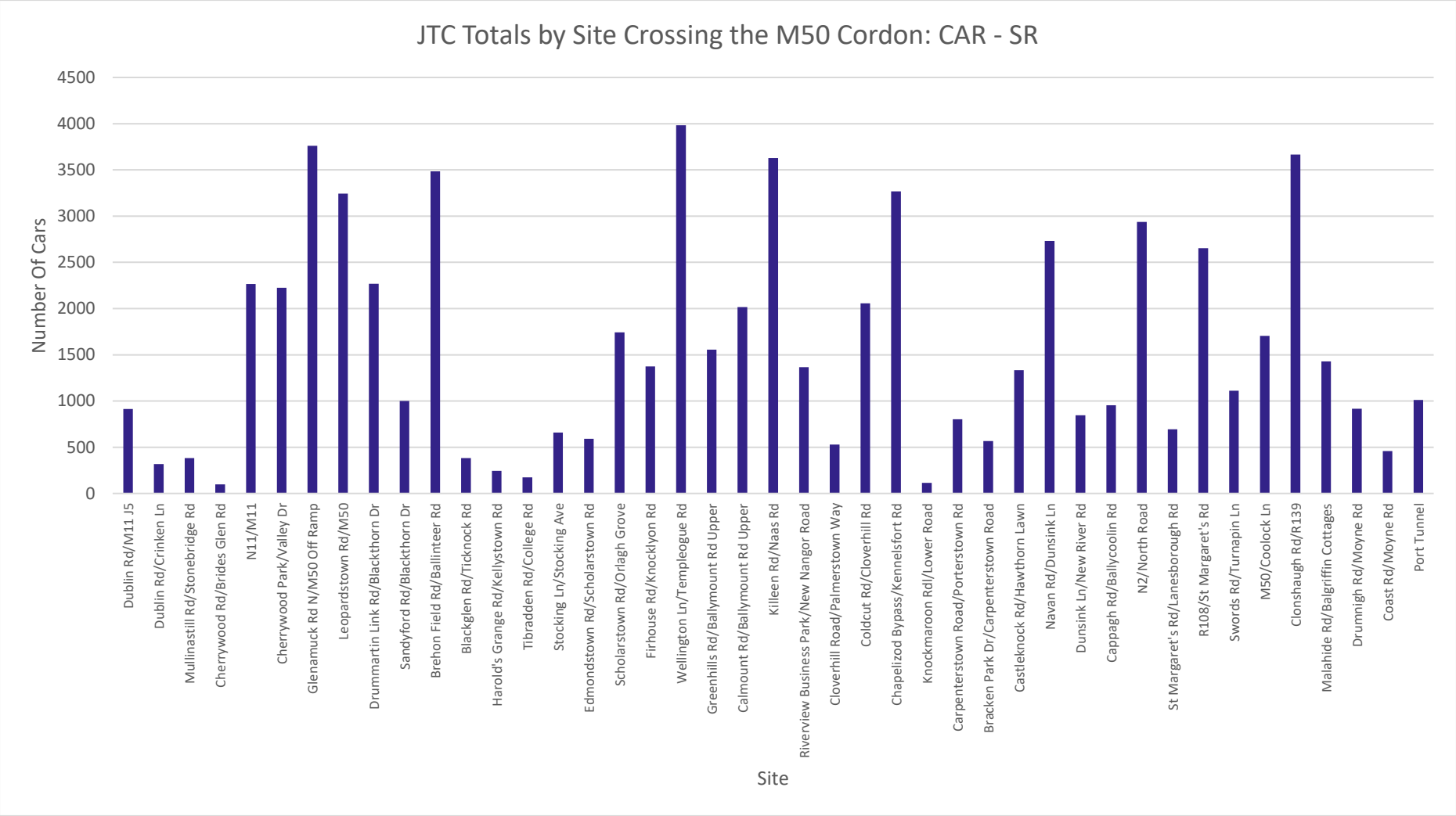


Figure 0-3:Number of Car Journeys for JTC Surveys for SR per Site

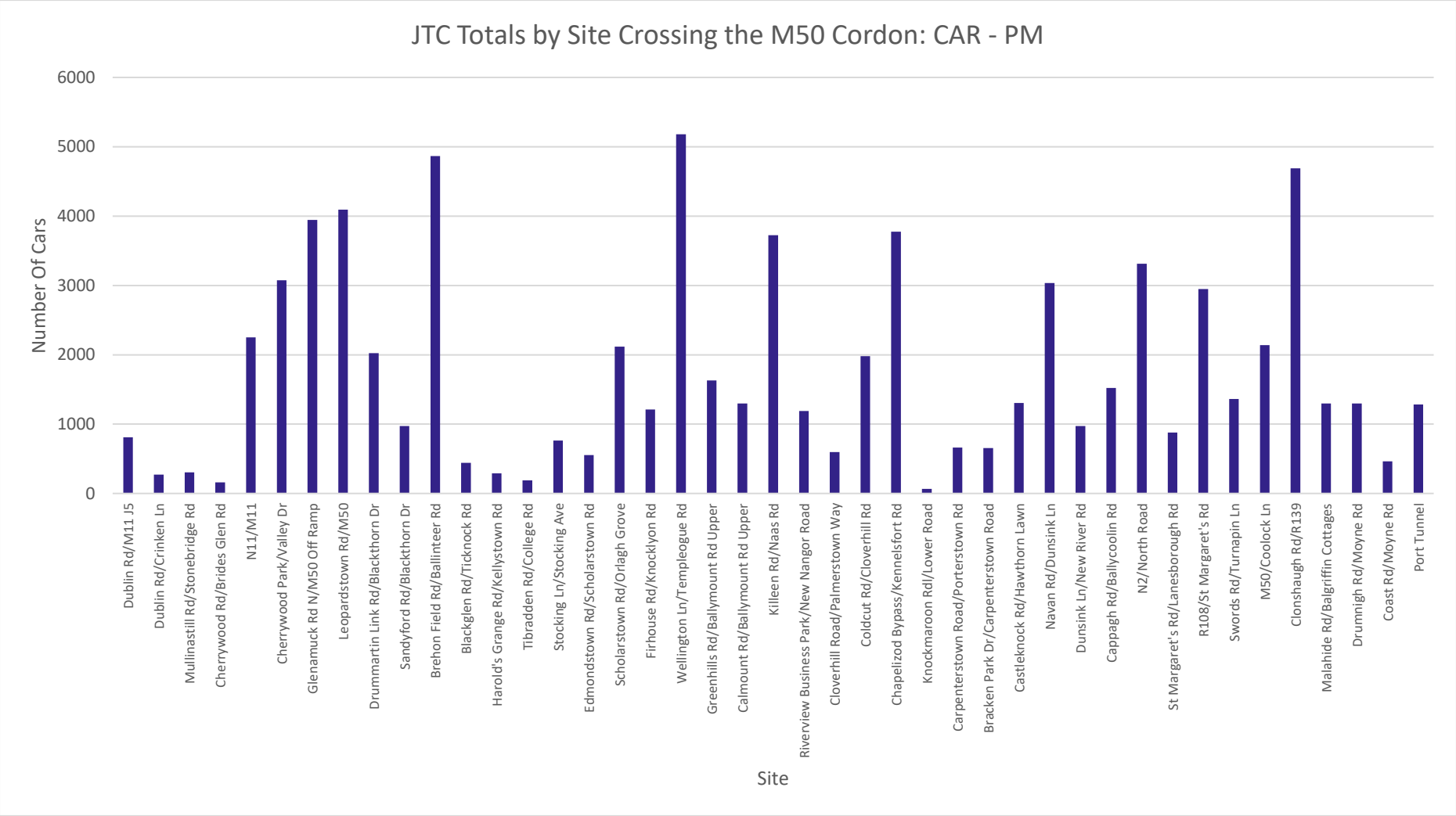


Figure 0-4:Number of Car Journeys for JTC Surveys for PM per Site

LGV Totals by Site and Time Period

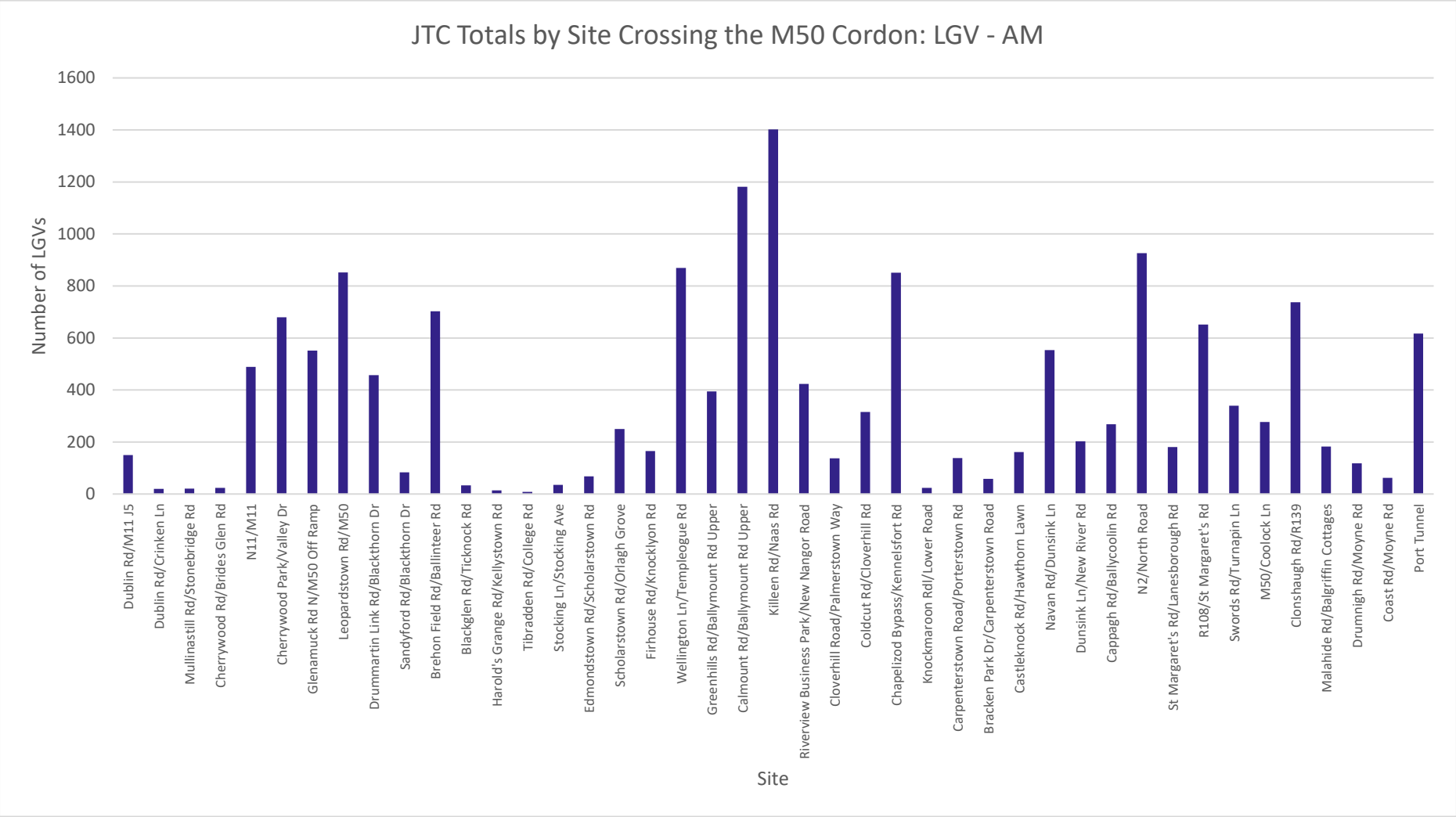


Figure 0-5:Number of Light Goods Vehicle Journeys for JTC Surveys for AM per Site

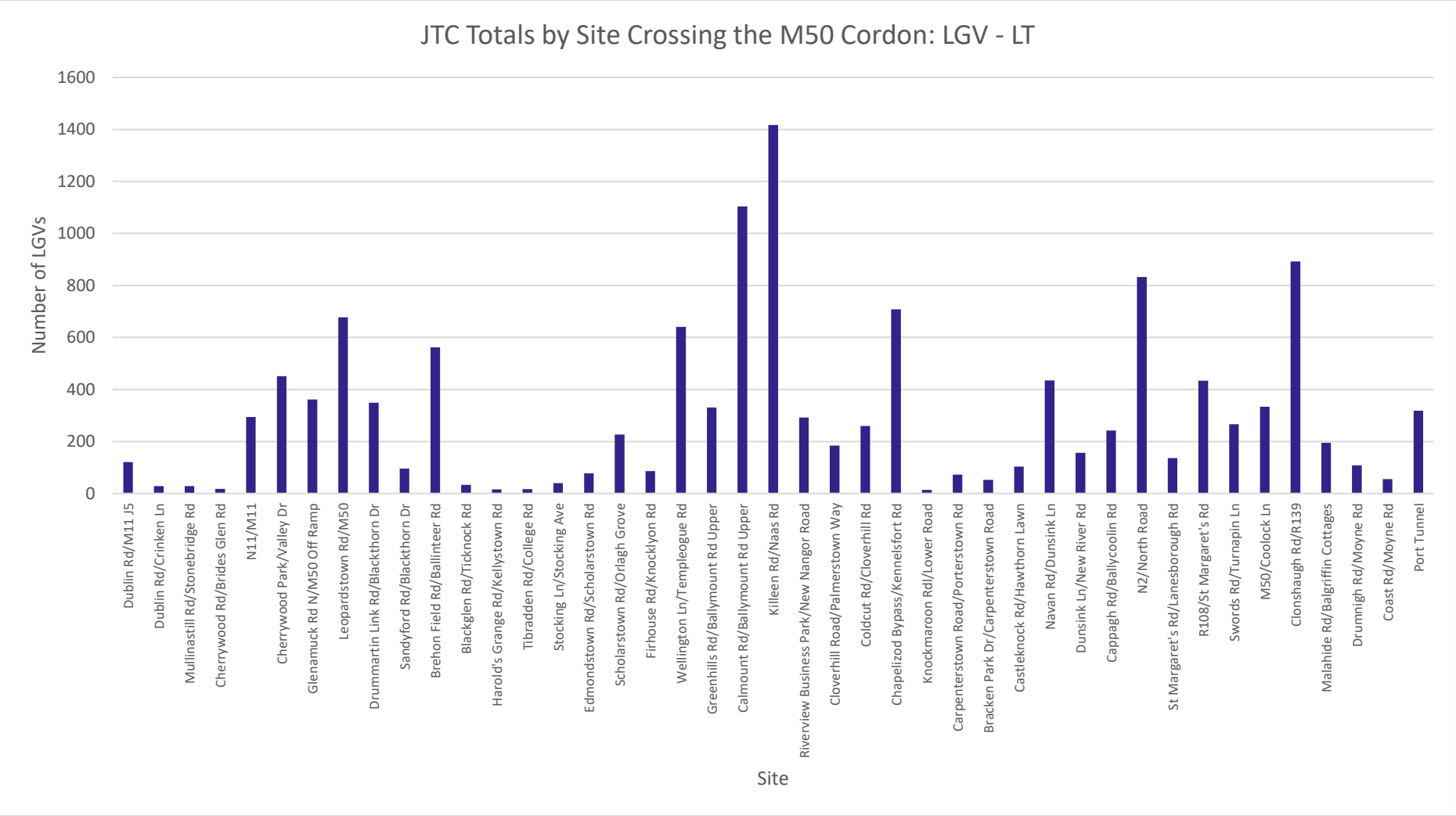


Figure 0-6:Number of Light Goods Vehicle Journeys for JTC Surveys for LT per Site

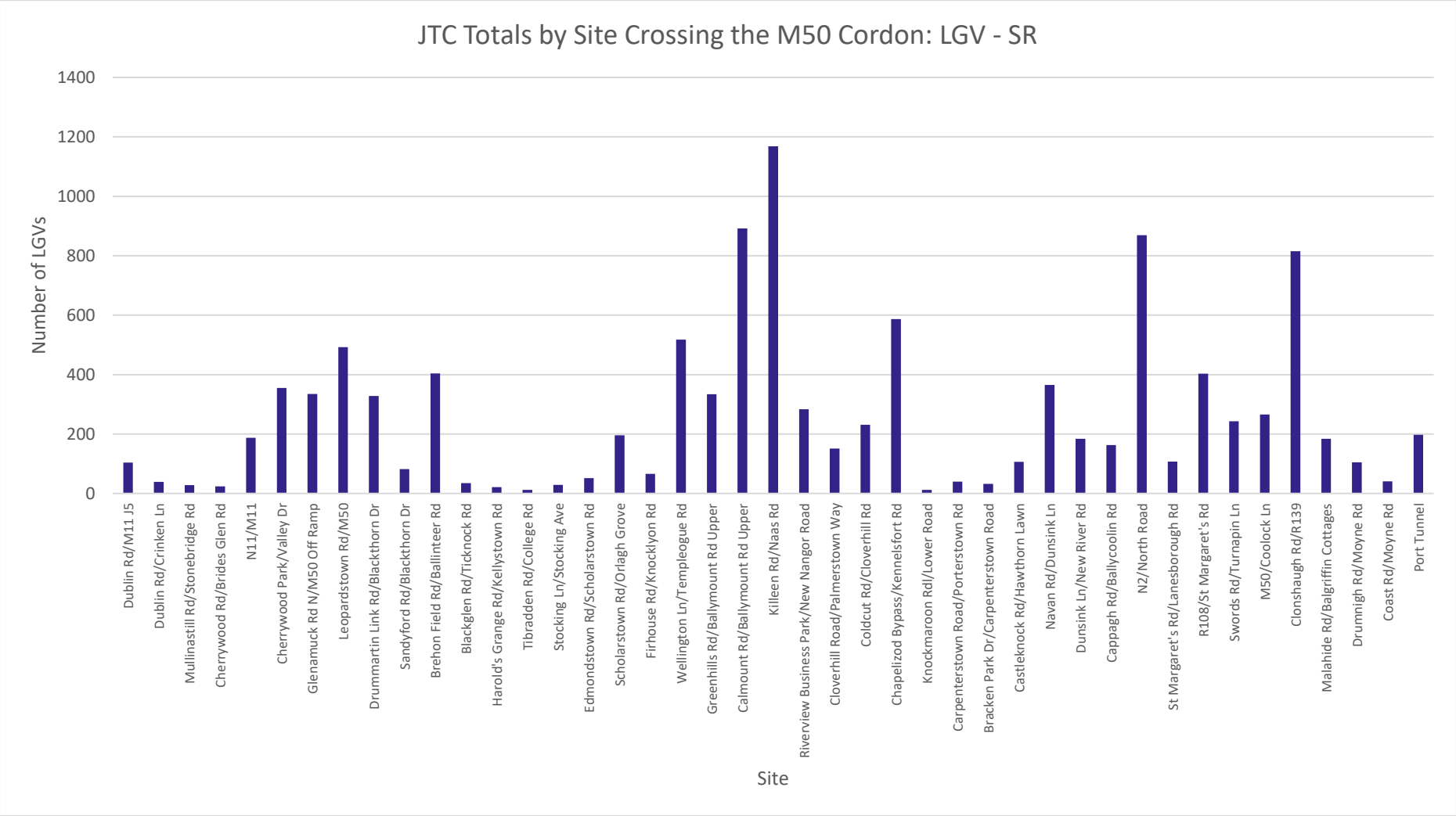


Figure 0-7:Number of Light Goods Vehicle Journeys for JTC Surveys for SR per Site

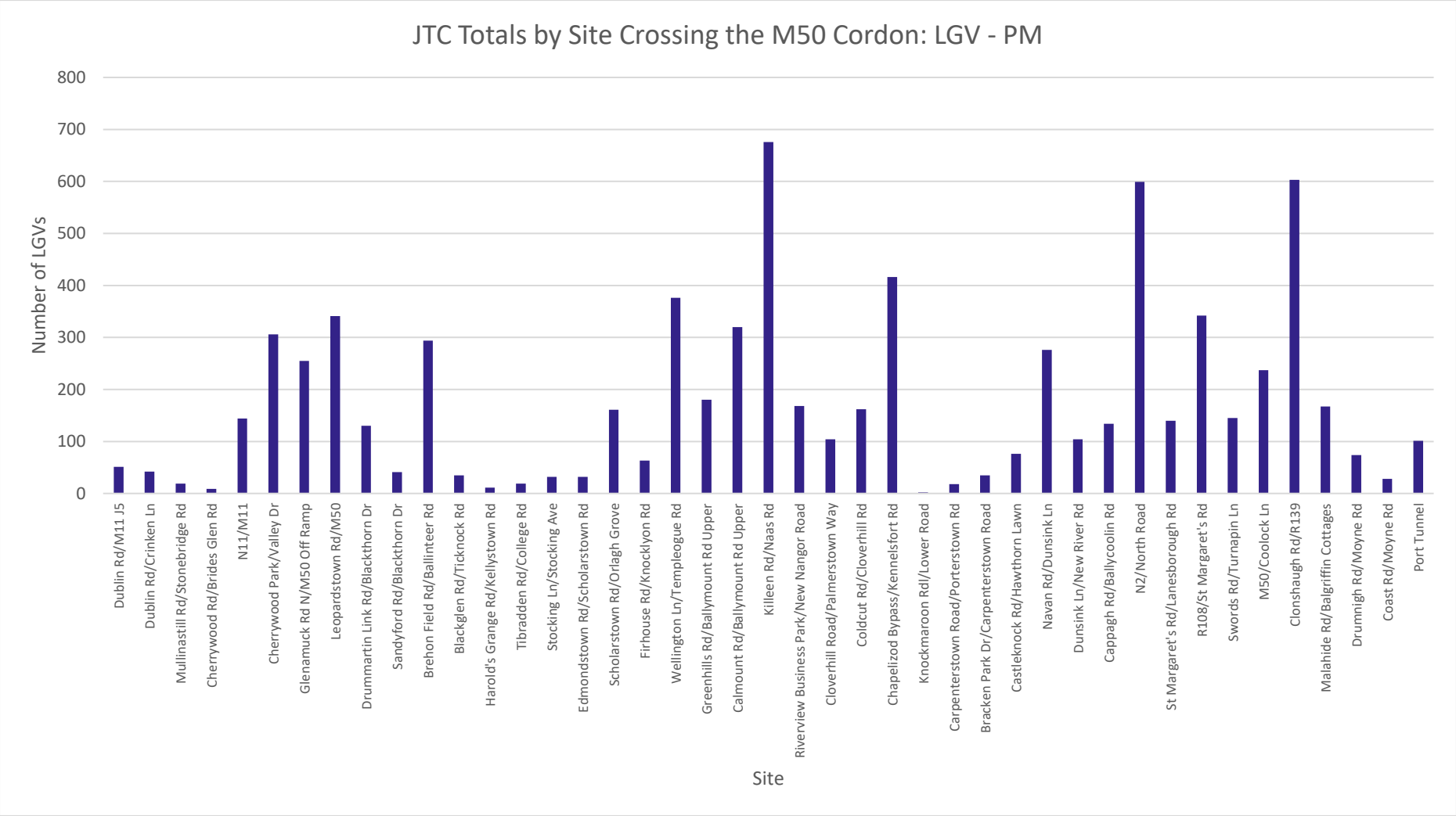


Figure 0-8:Number of Light Goods Vehicle Journeys for JTC Surveys for PM per Site

OGV Totals by Site and Time Period

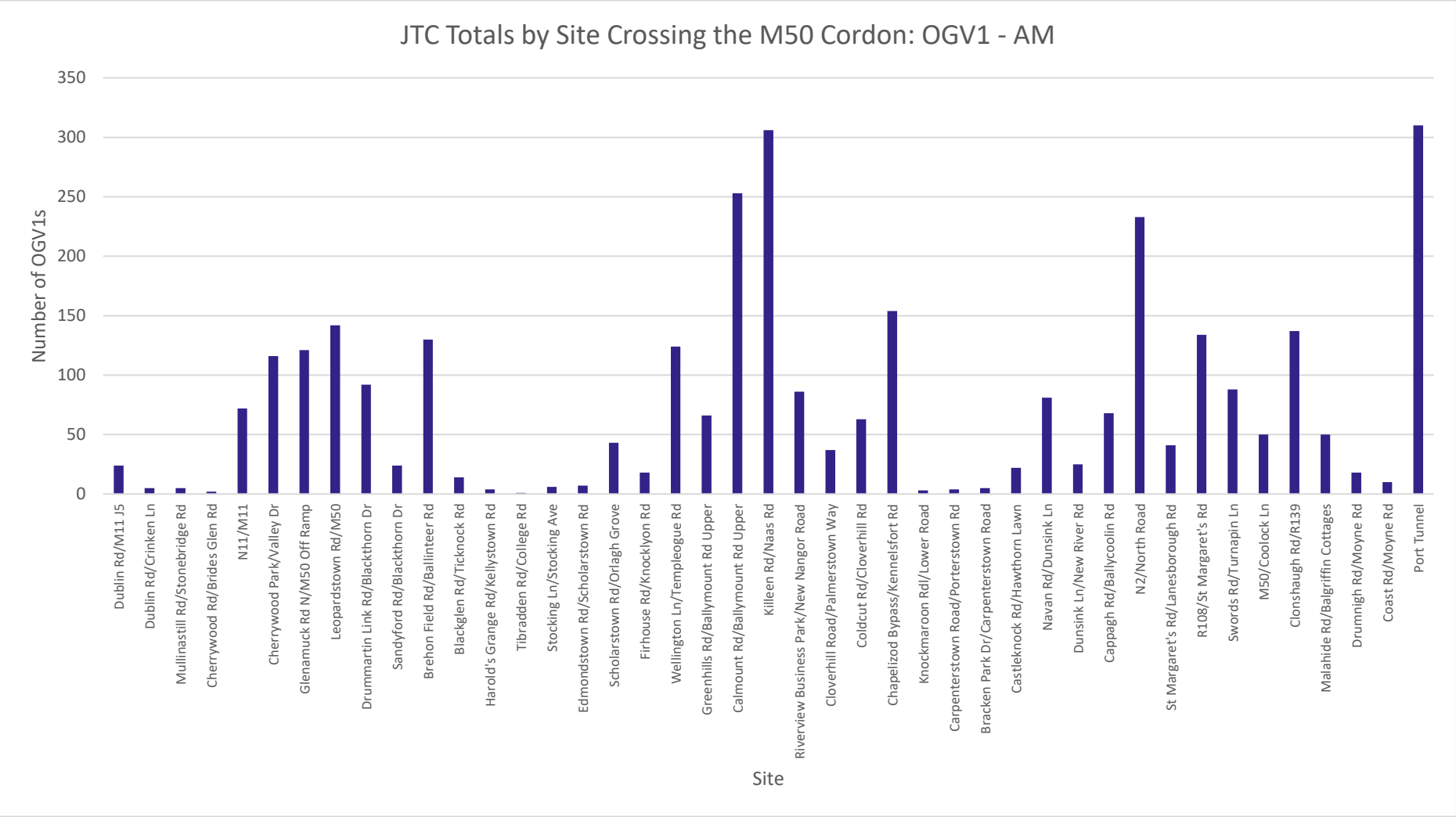


Figure 0-9:Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for AM per Site

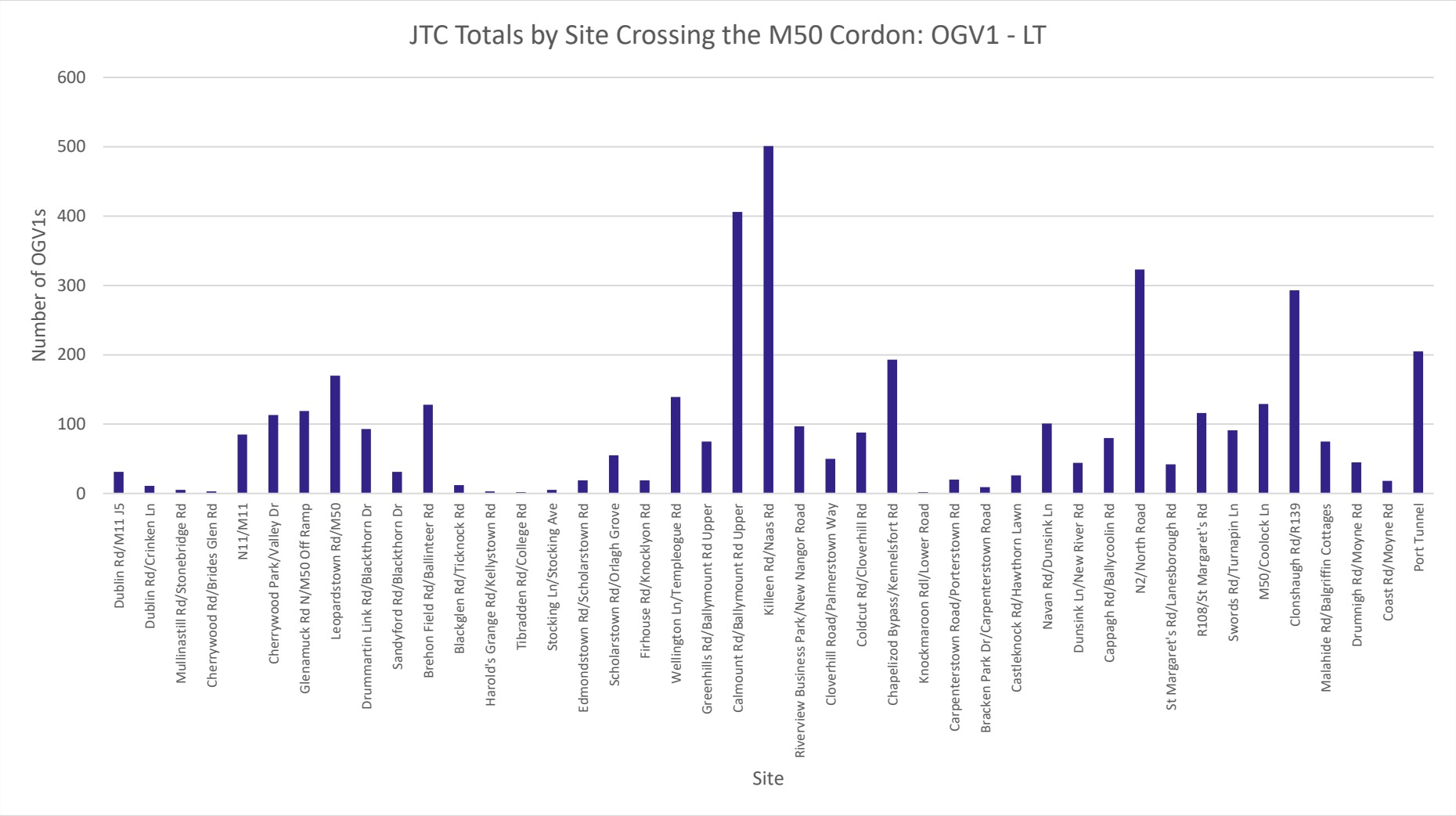


Figure 0-10:Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for LT per Site

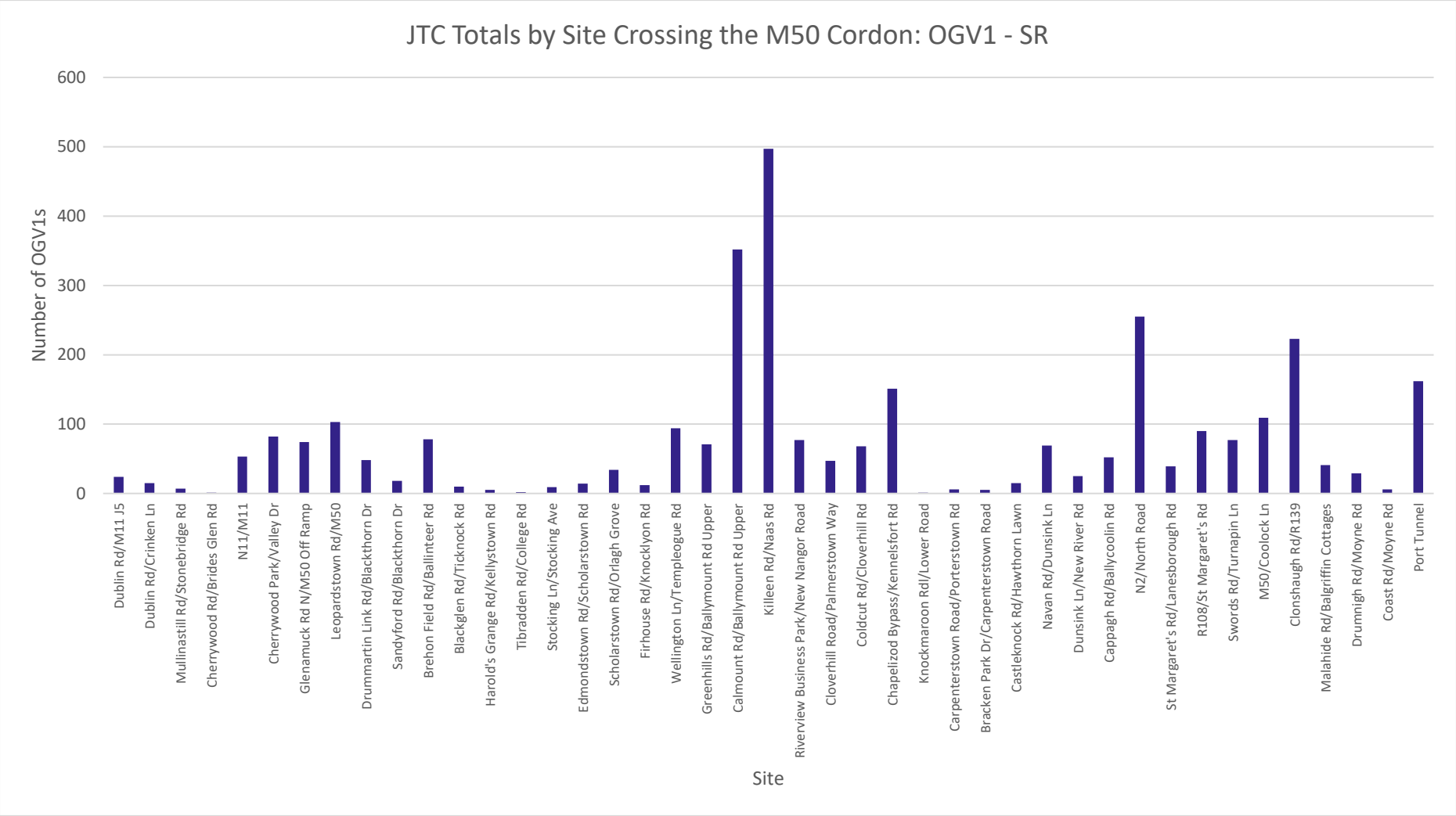


Figure 0-11:Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for SR per Site

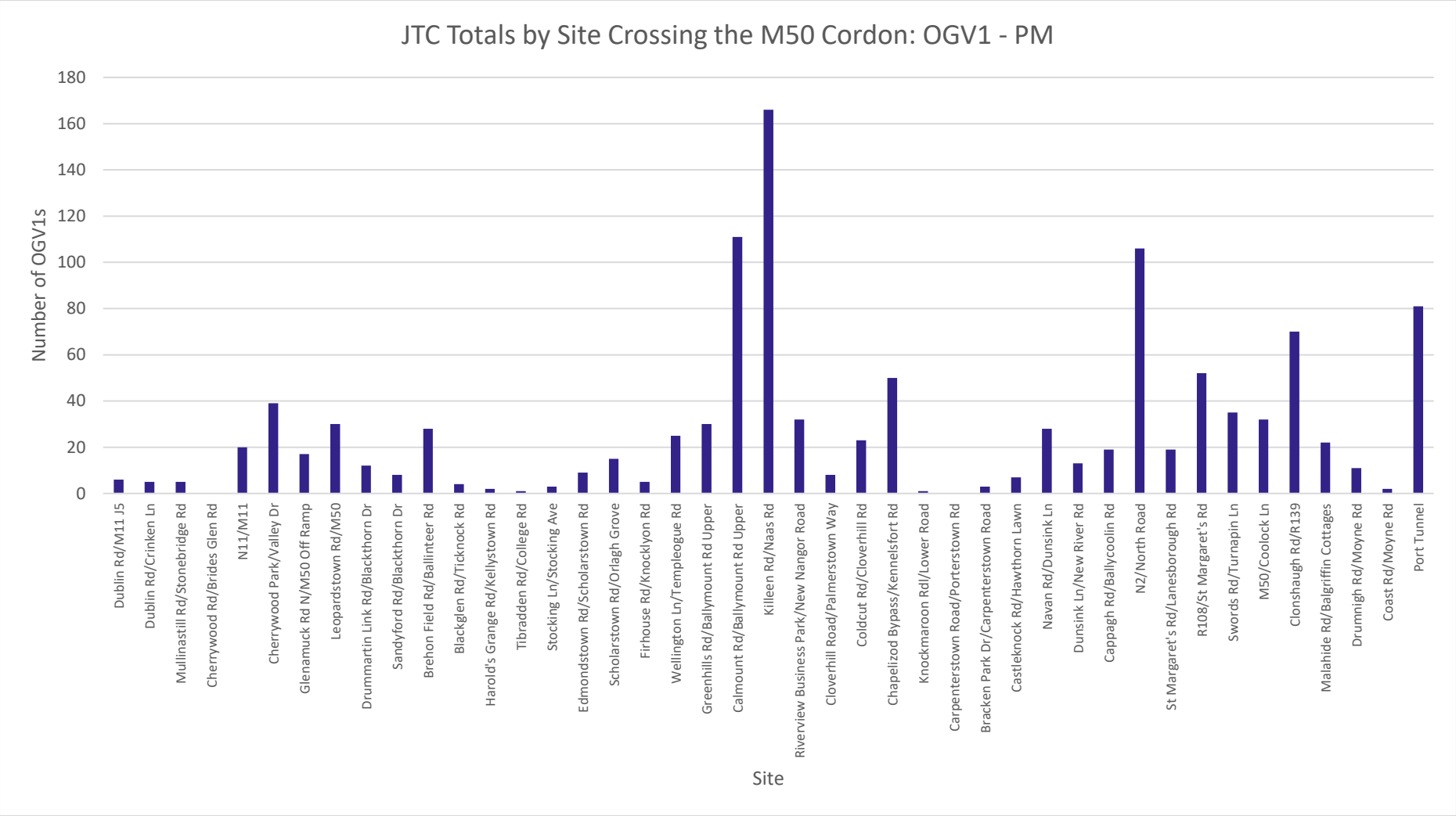


Figure 0-12:Number of Ordinary Goods Vehicle 1 Journeys for JTC Surveys for PM per Site

OGV 2 Totals by Site and Time Period

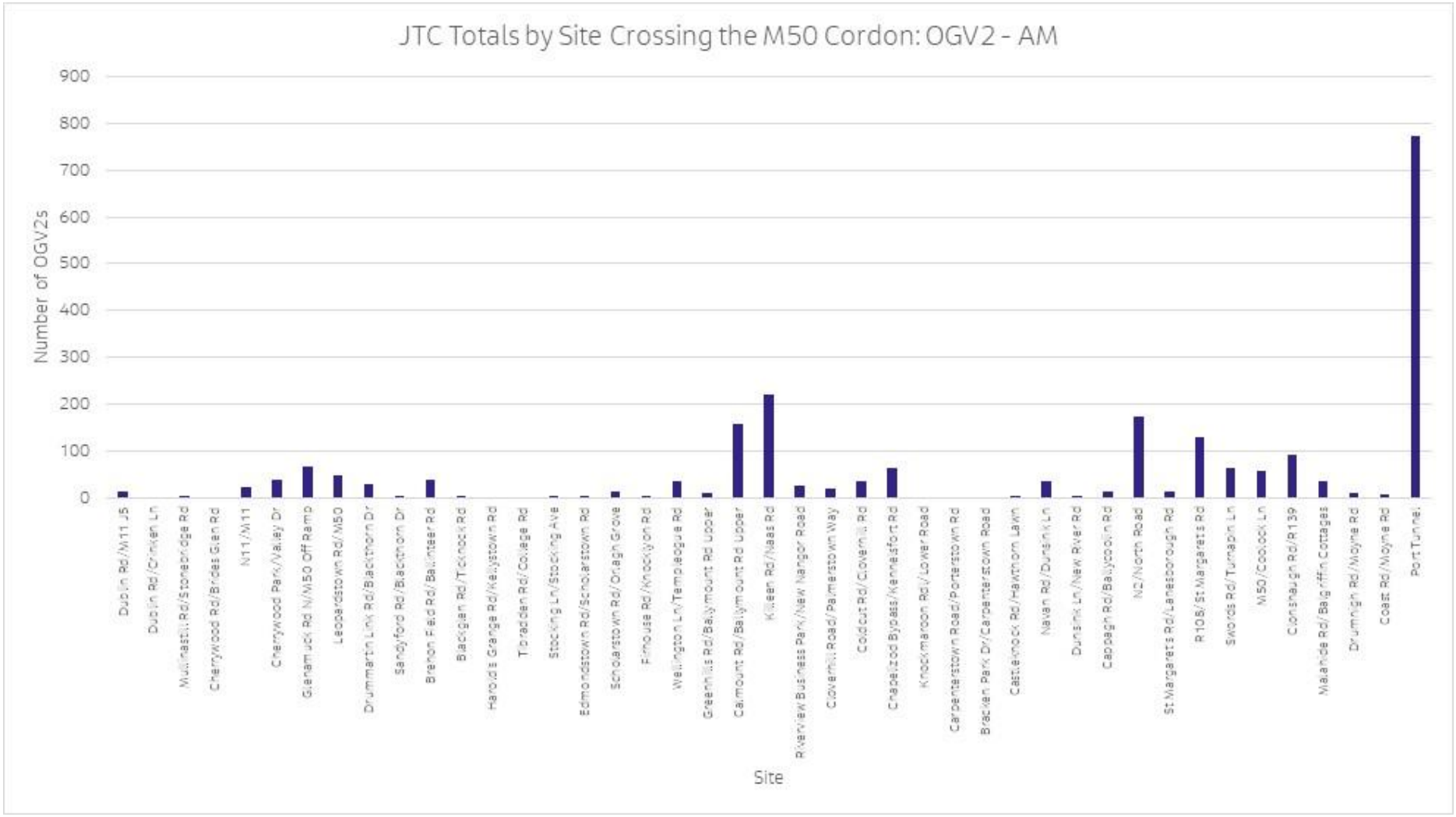


Figure 0-13:Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for AM per Site

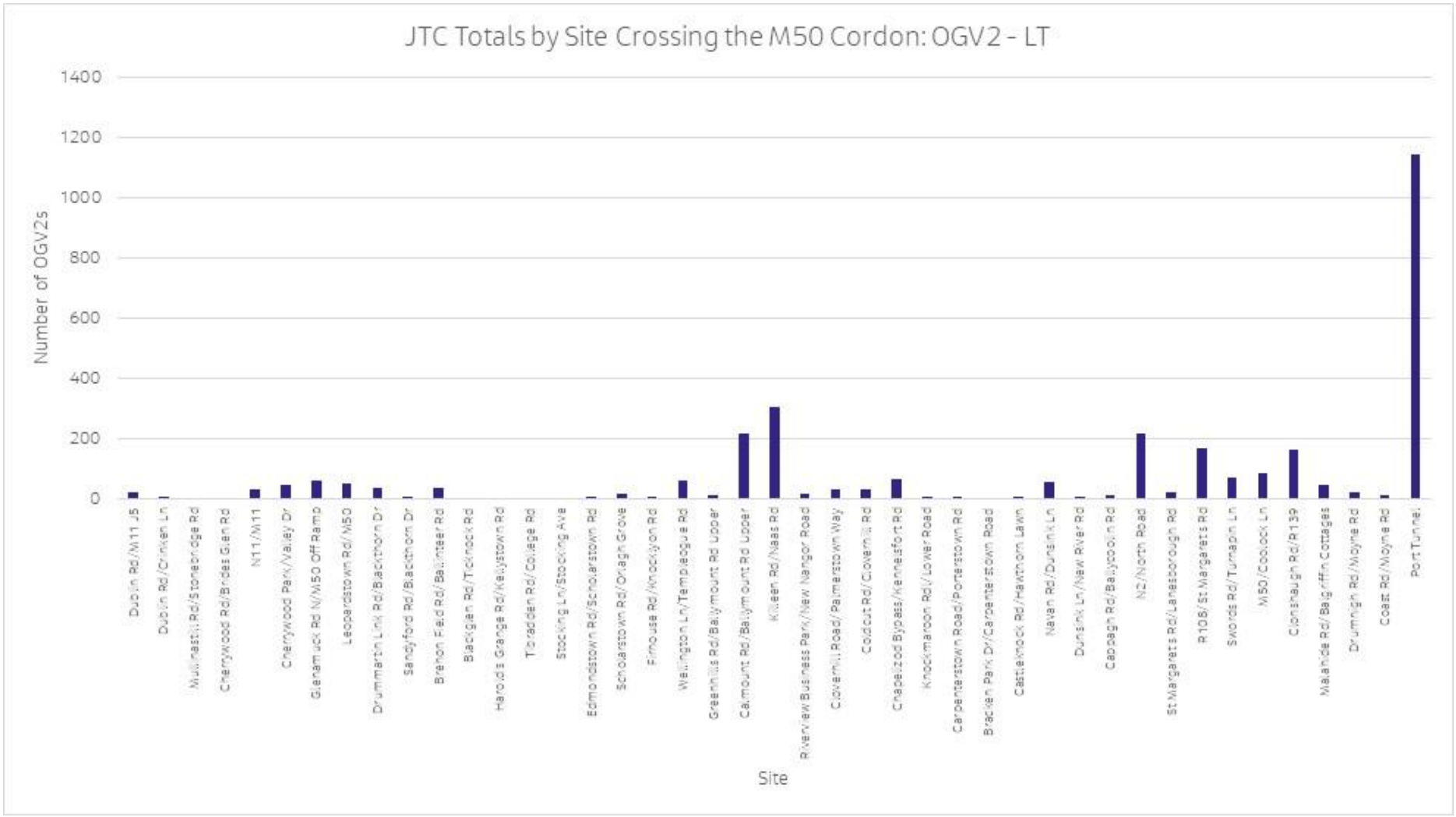


Figure 0-14:Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for LT per Site

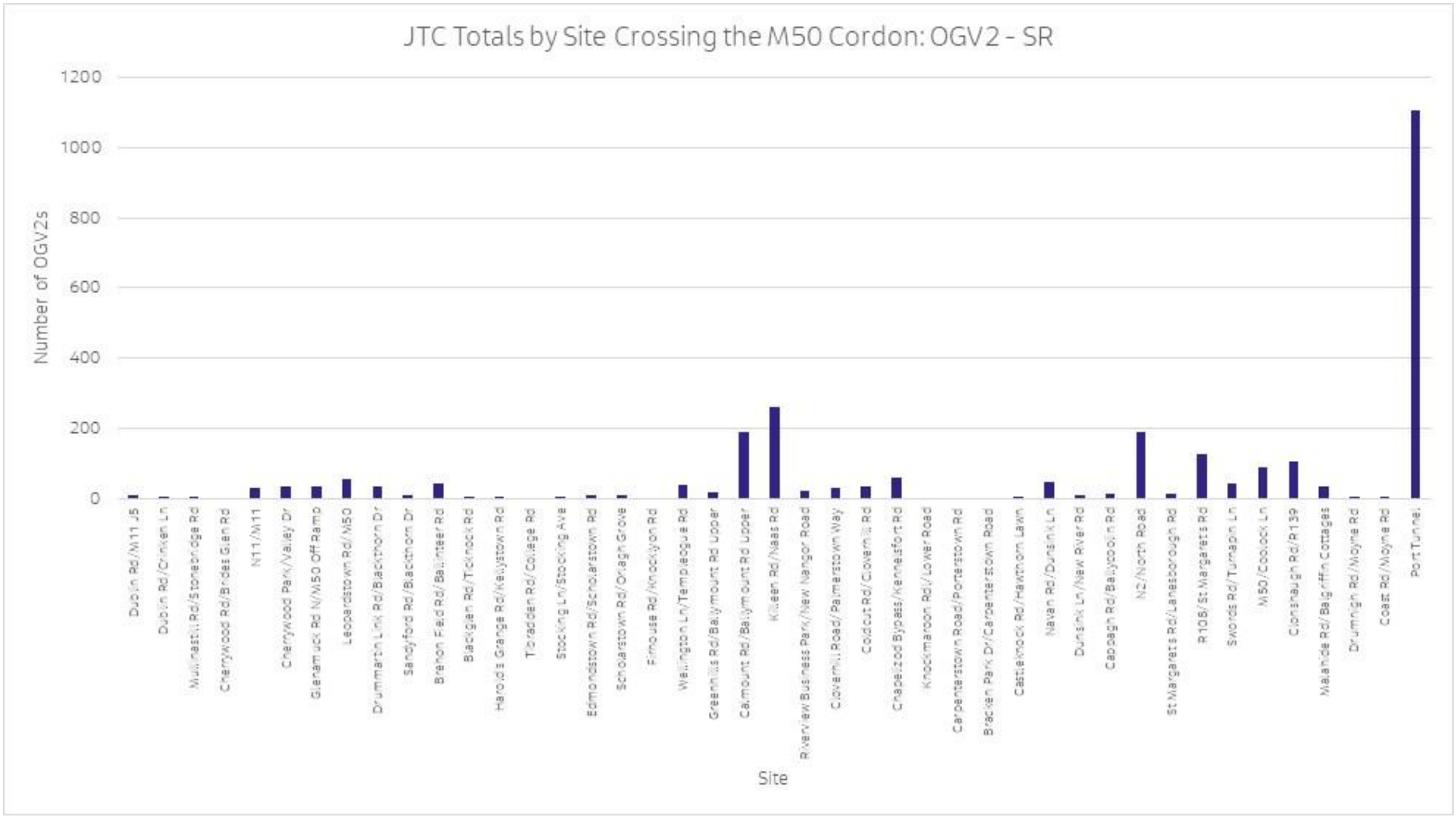


Figure 0-15:Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for SR per Site

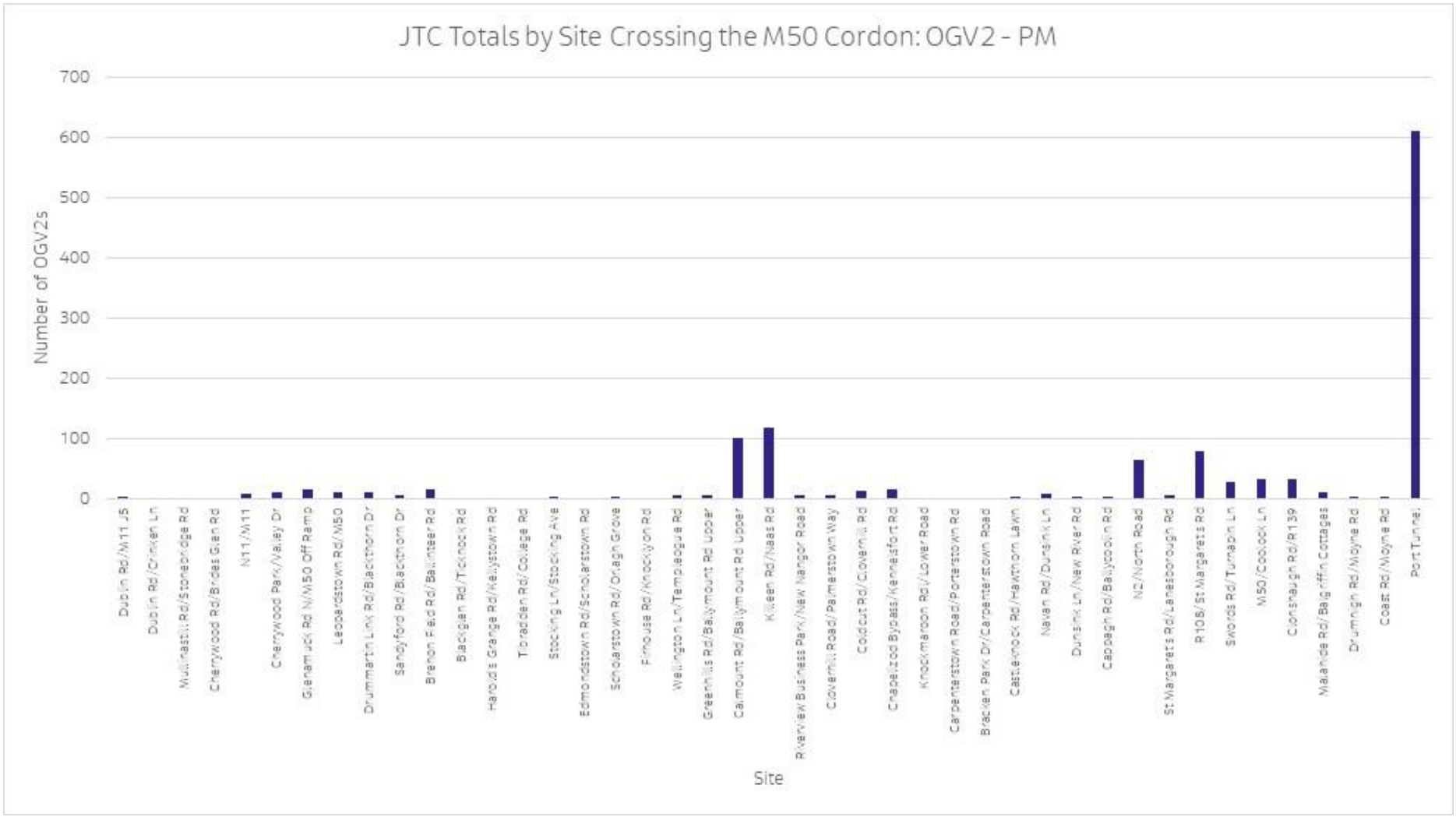


Figure 0-16:Number of Ordinary Goods Vehicle 2 Journeys for JTC Surveys for PM per Site

Motorcycle Totals by Site and Time Period

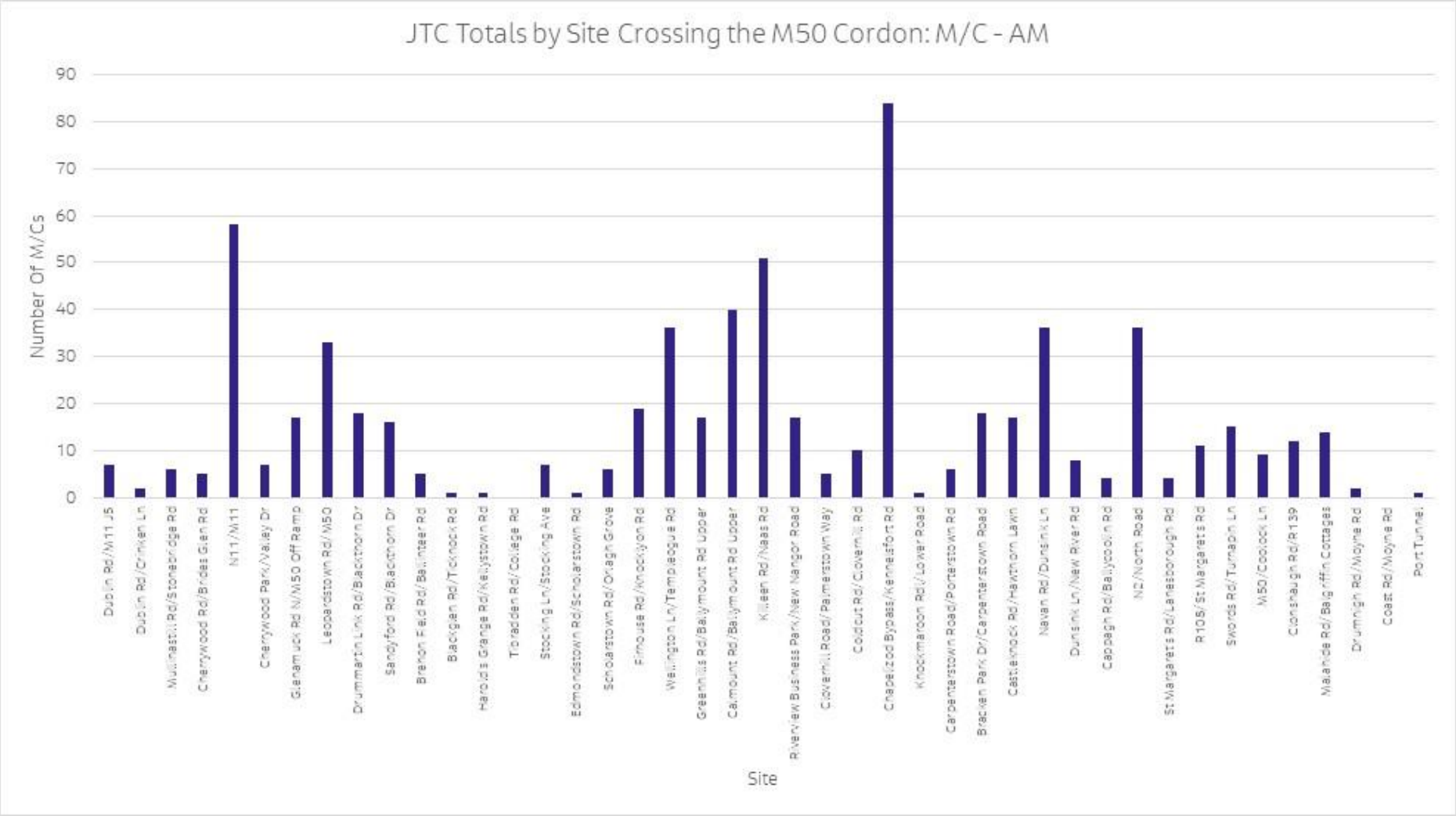


Figure 0-17:Number of Motorcycle Journeys for JTC Surveys for AM per Site

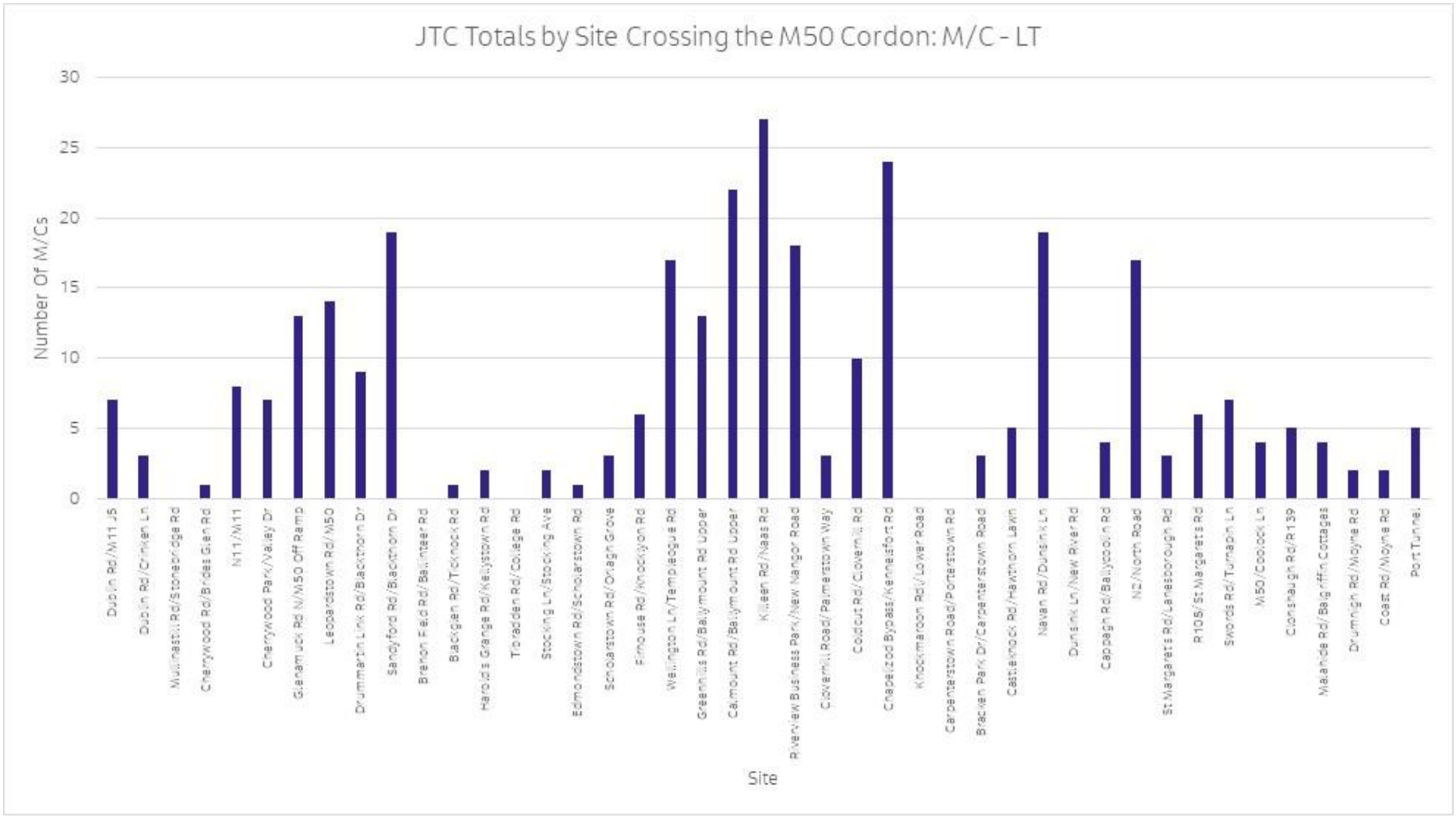


Figure 0-18:Number of Motorcycle Journeys for JTC Surveys for LT per Site

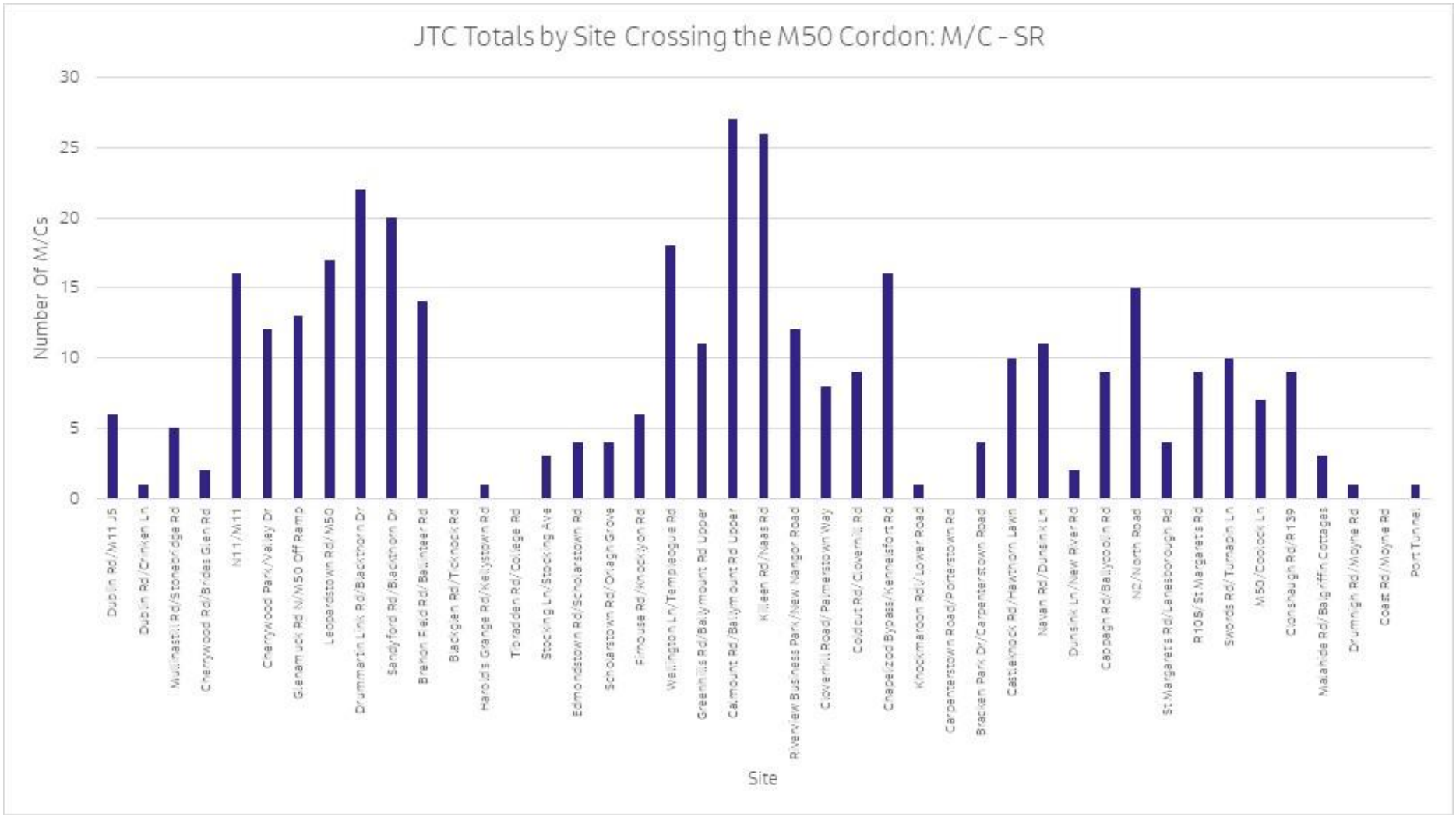


Figure 0-19:Number of Motorcycle Journeys for JTC Surveys for SR per Site

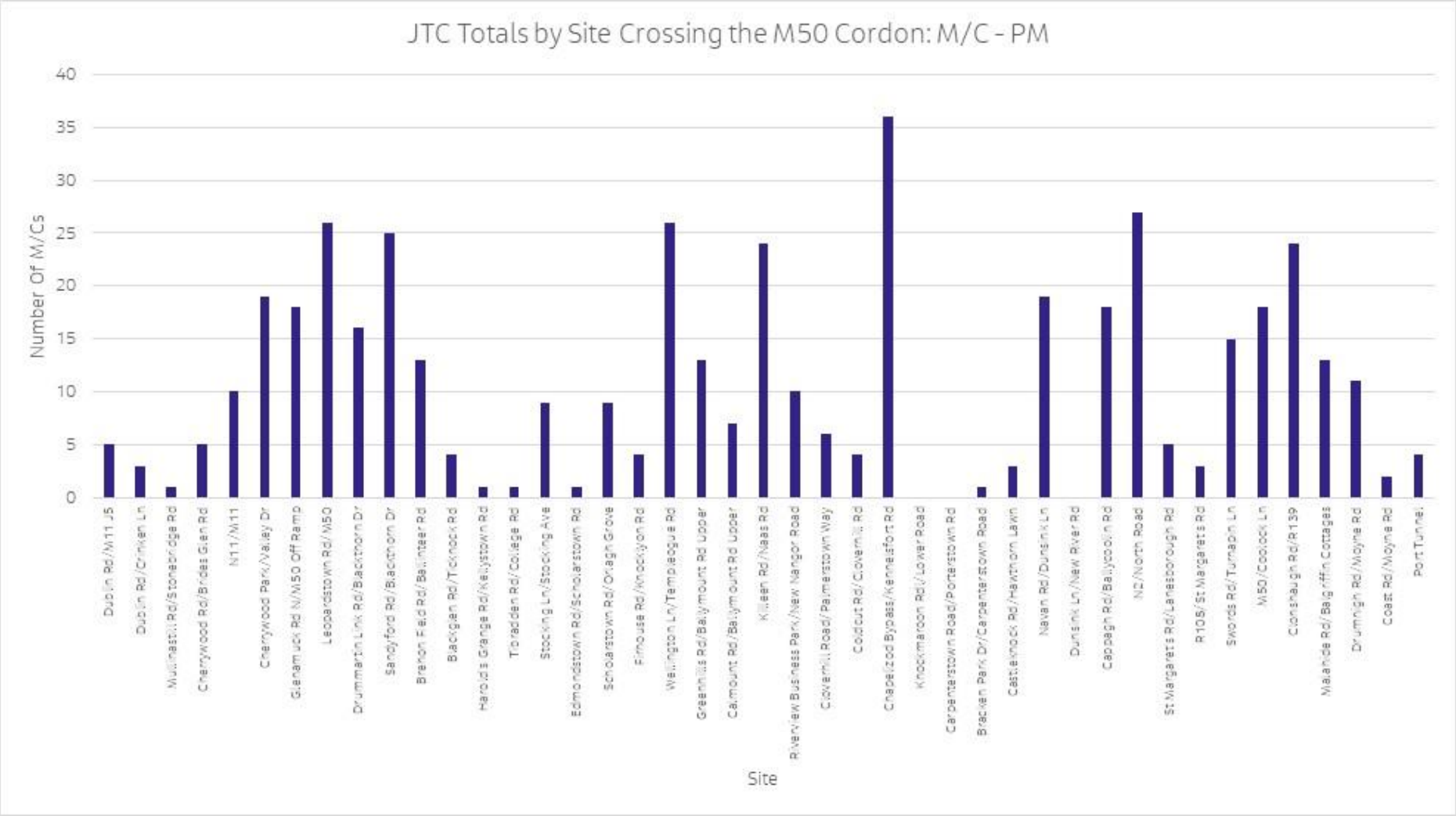


Figure 0-20:Number of Motorcycle Journeys for JTC Surveys for PM per Site

Pedal Cycle Totals by Site and Time Period

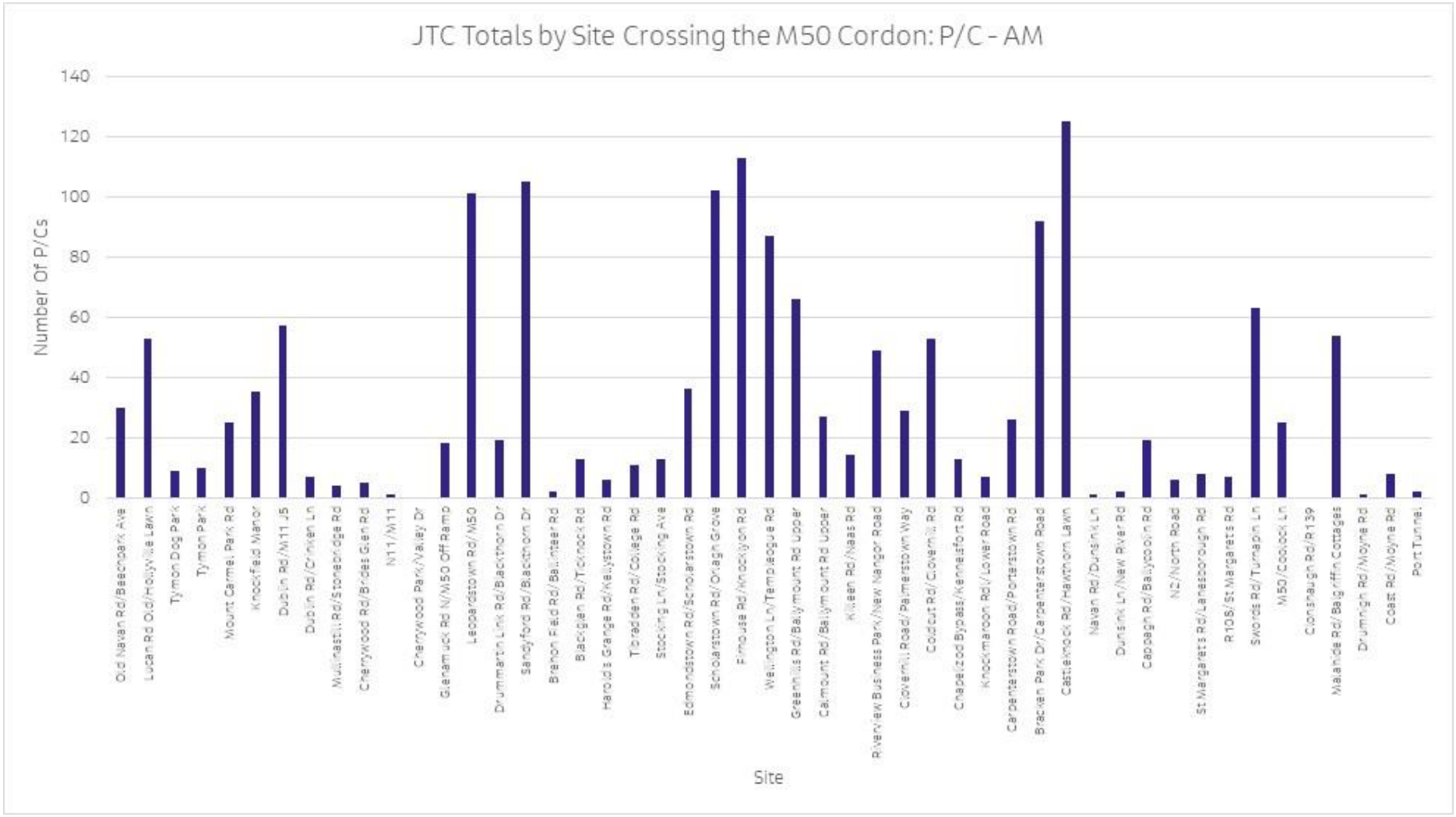


Figure 0-21:Number of Pedal Cycle Journeys for JTC Surveys for AM per Site

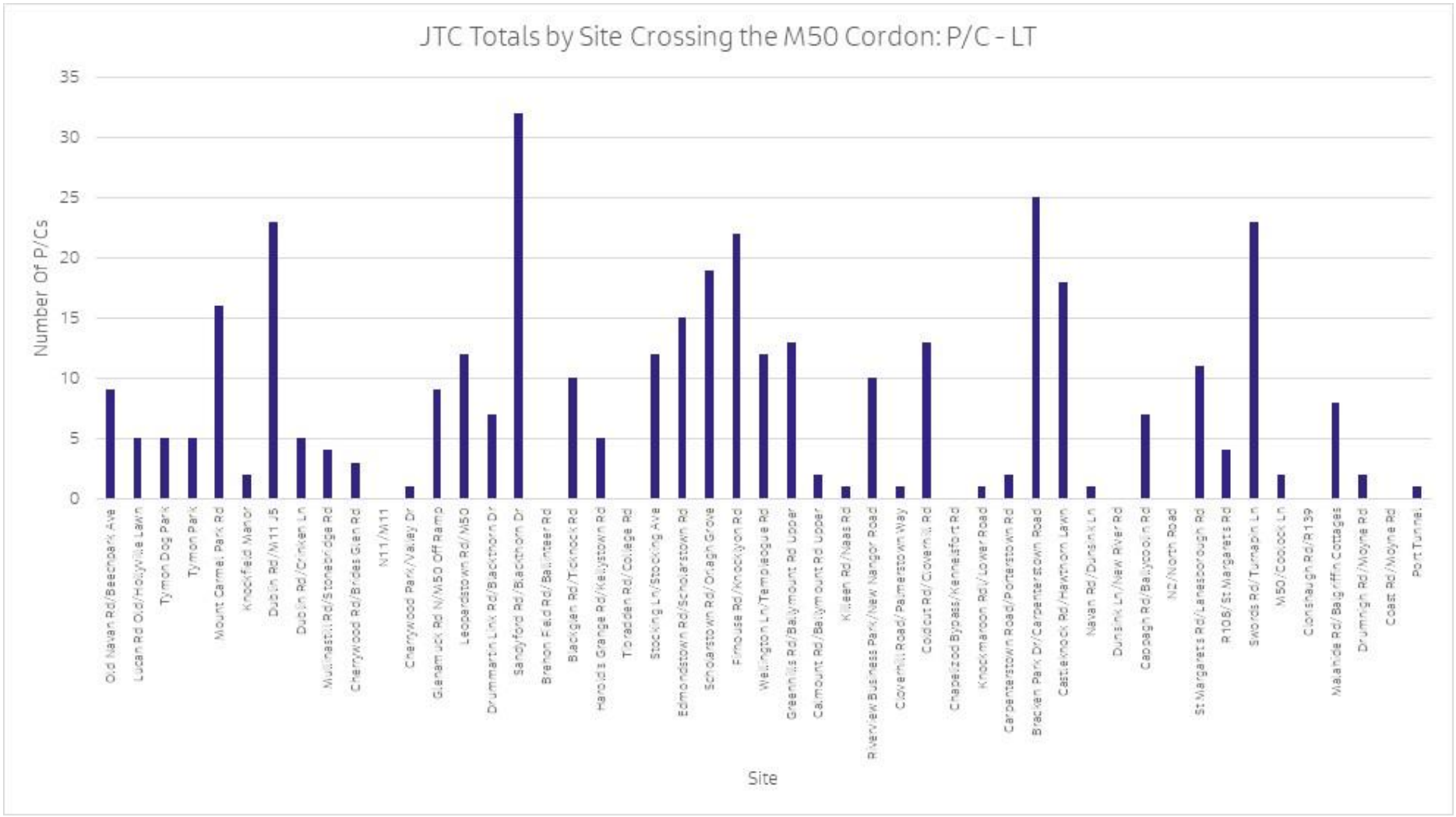


Figure 0-22:Number of Pedal Cycle Journeys for JTC Surveys for LT per Site

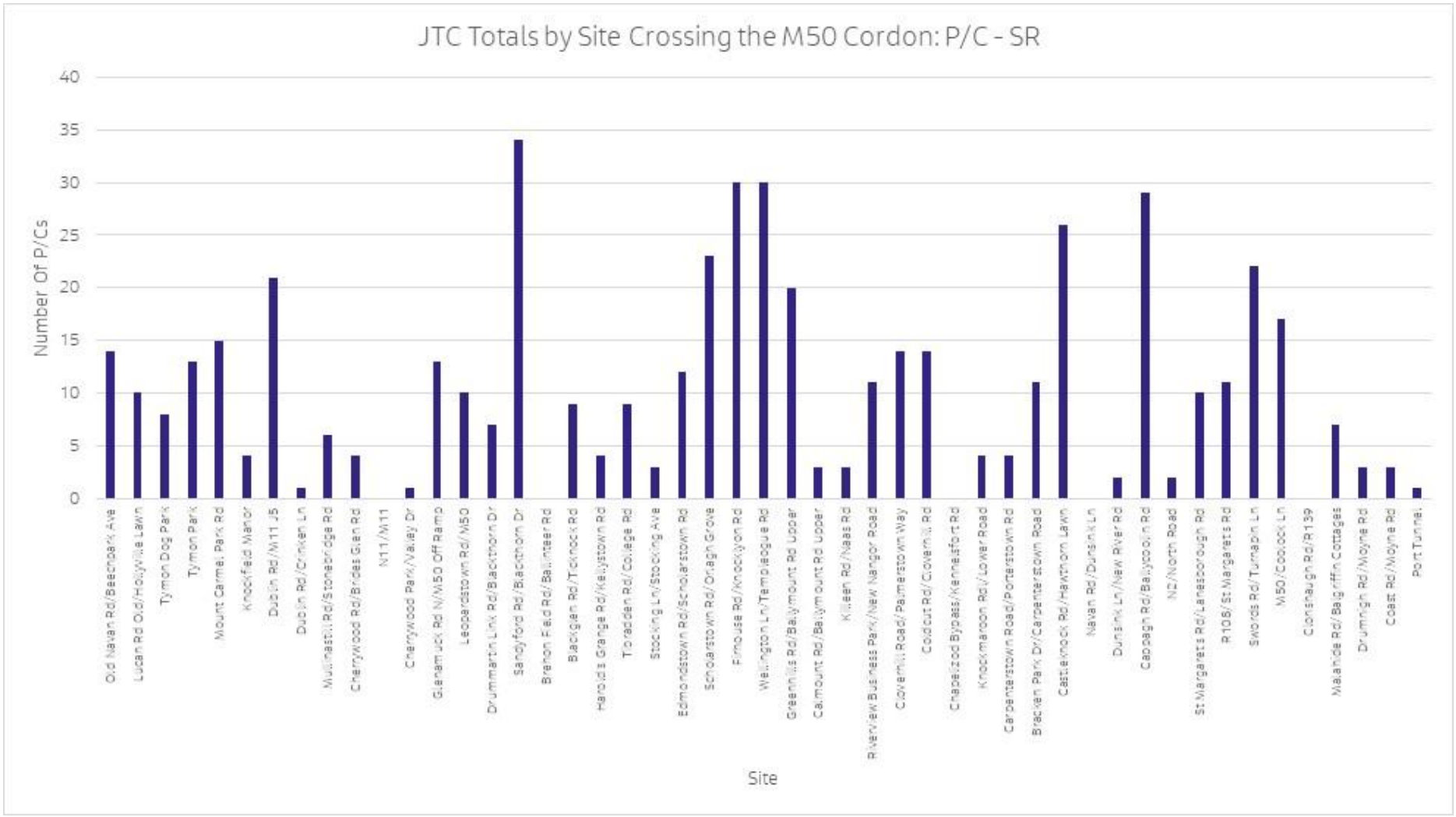


Figure 0-23:Number of Pedal Cycle Journeys for JTC Surveys for SR per Site

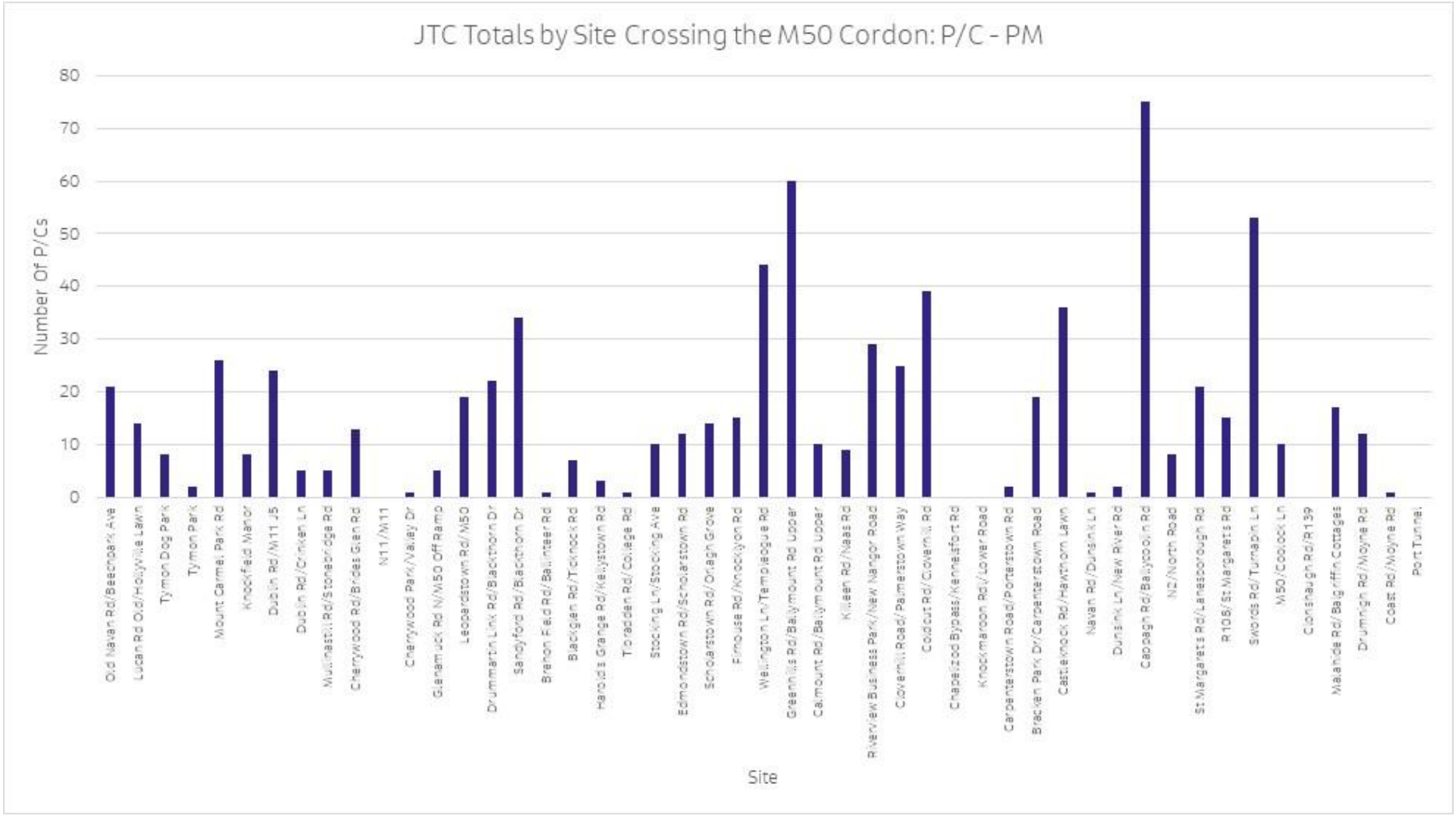


Figure 0-24:Number of Pedal Cycle Journeys for JTC Surveys for PM per Site

Taxi Totals by Site and Time Period

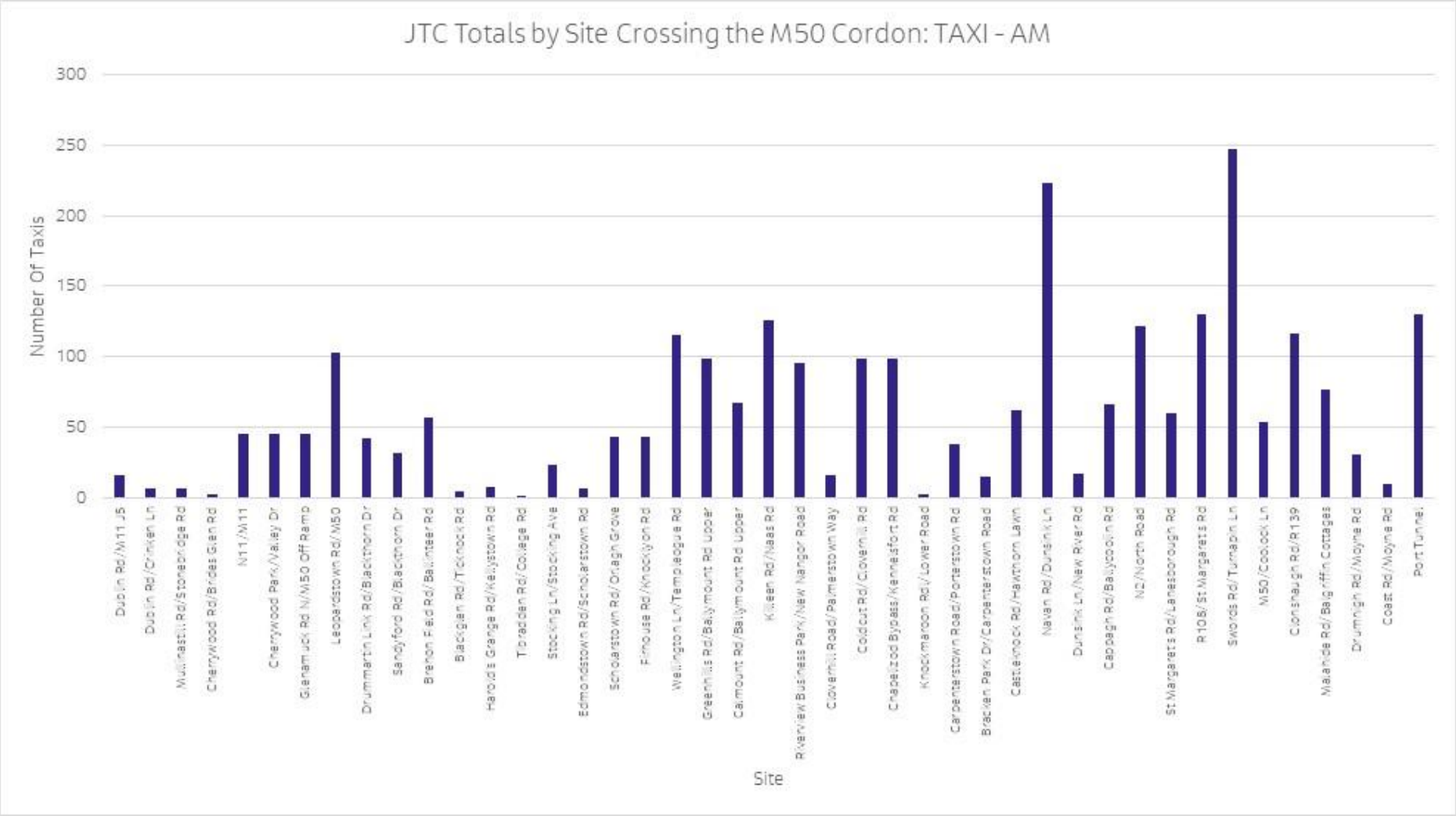


Figure 0-25:Number of Taxi Journeys for JTC Surveys for AM per Site

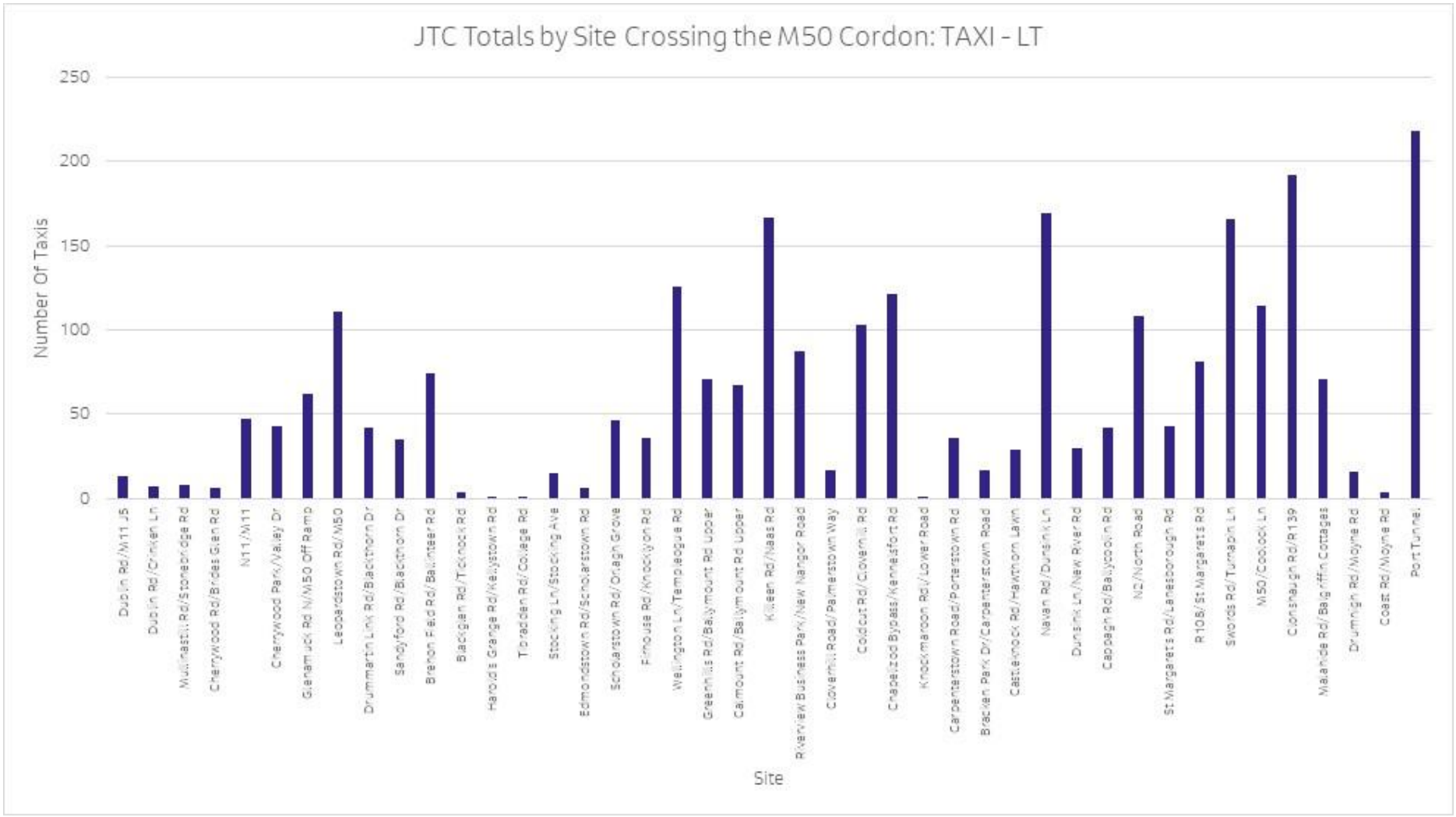


Figure 0-26:Number of Taxi Journeys for JTC Surveys for LT per Site

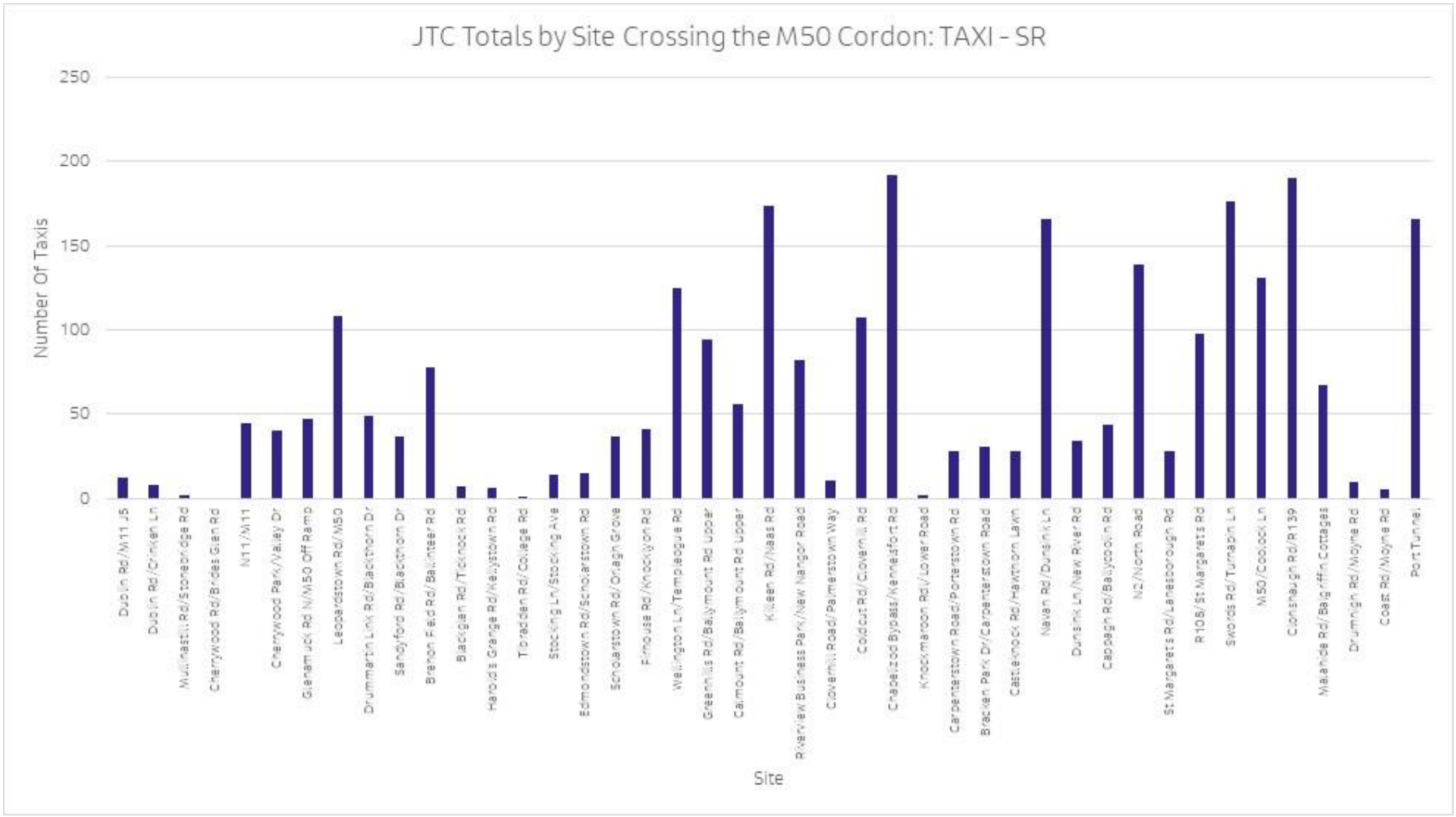


Figure 0-27:Number of Taxi Journeys for JTC Surveys for SR per Site

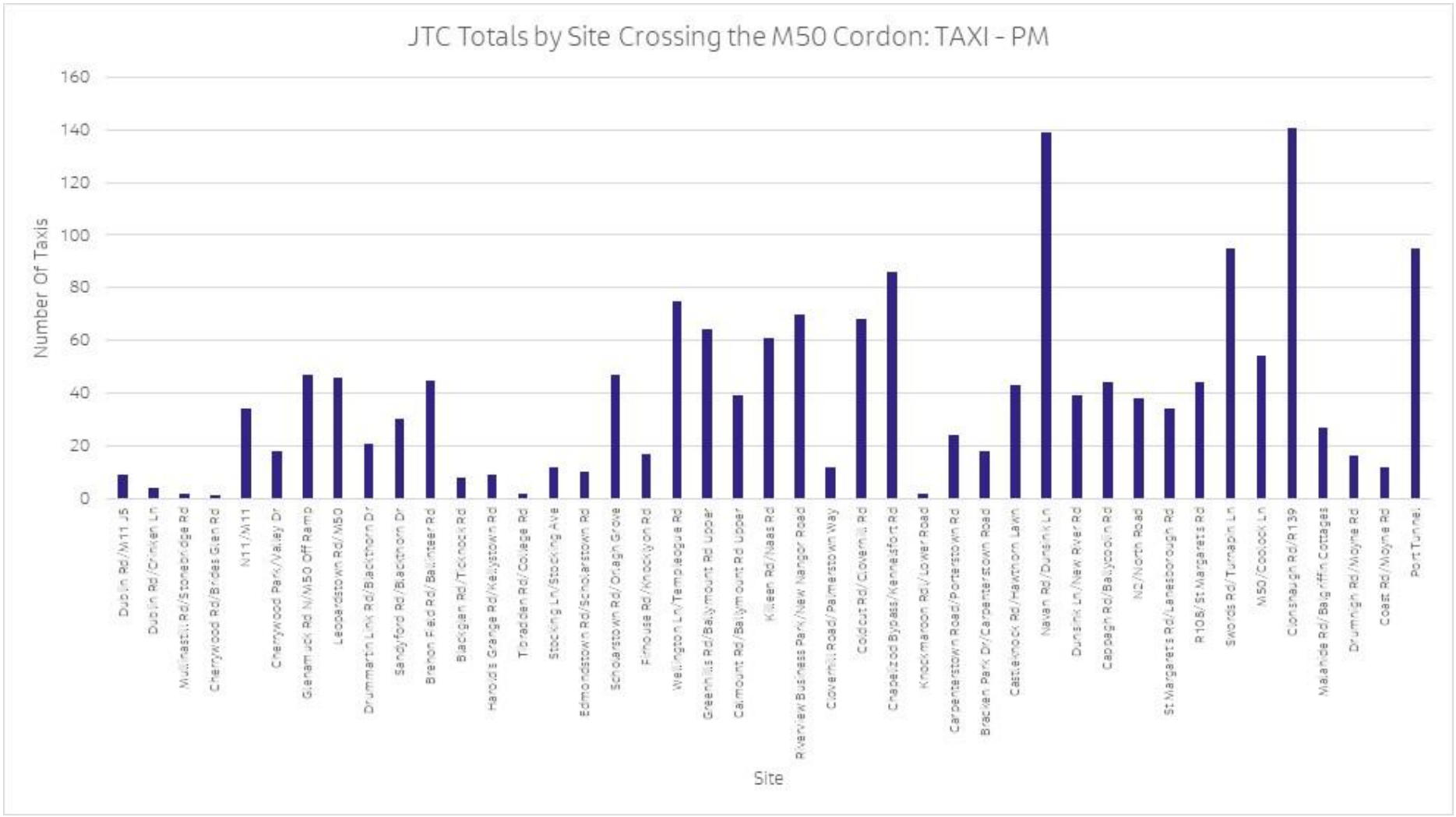


Figure 0-28:Number of Taxi Journeys for JTC Surveys for PM per Site

Bus Totals by Site and Time Period

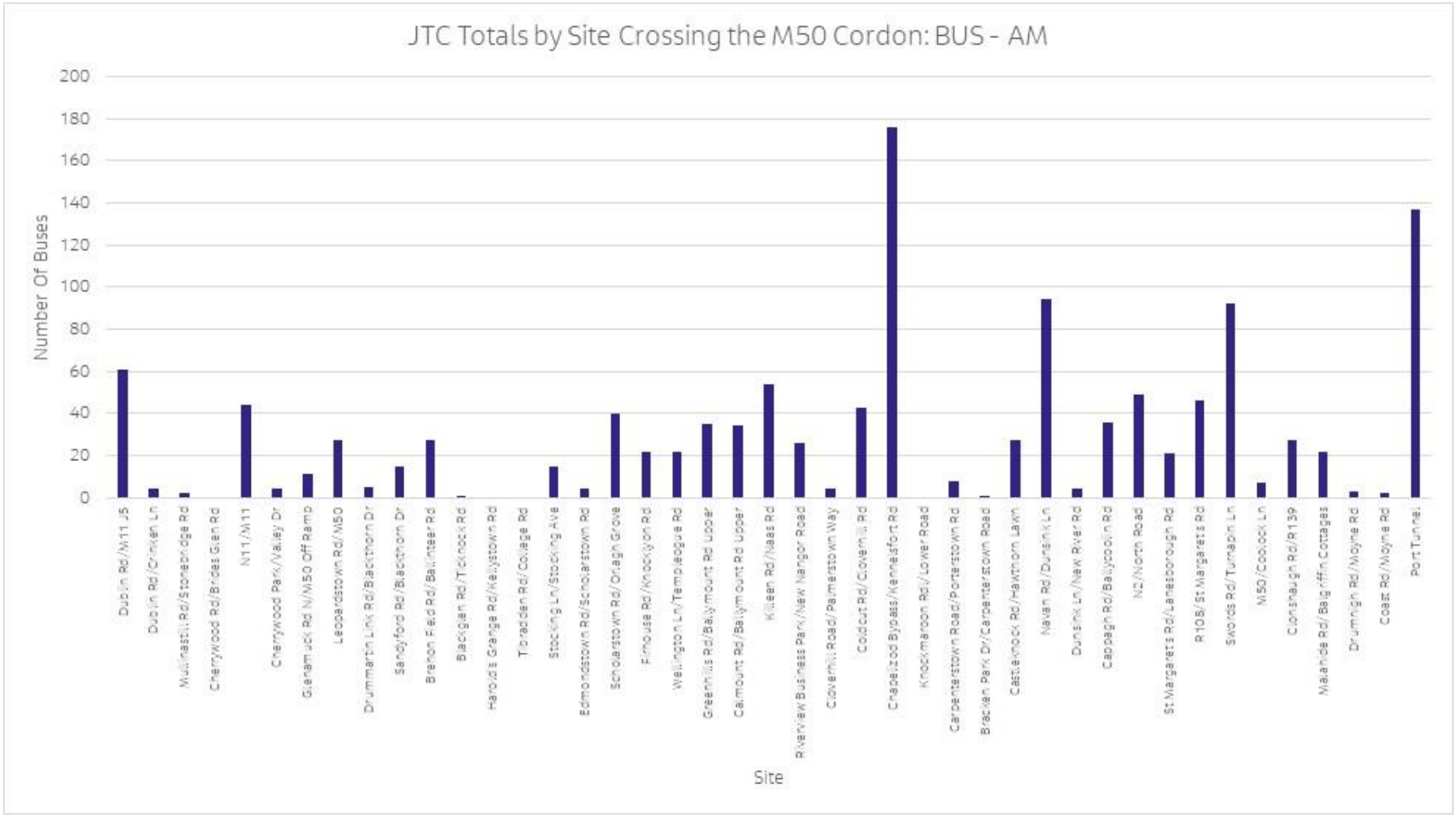


Figure 0-29:Number of Bus Journeys for JTC Surveys for AM per Site

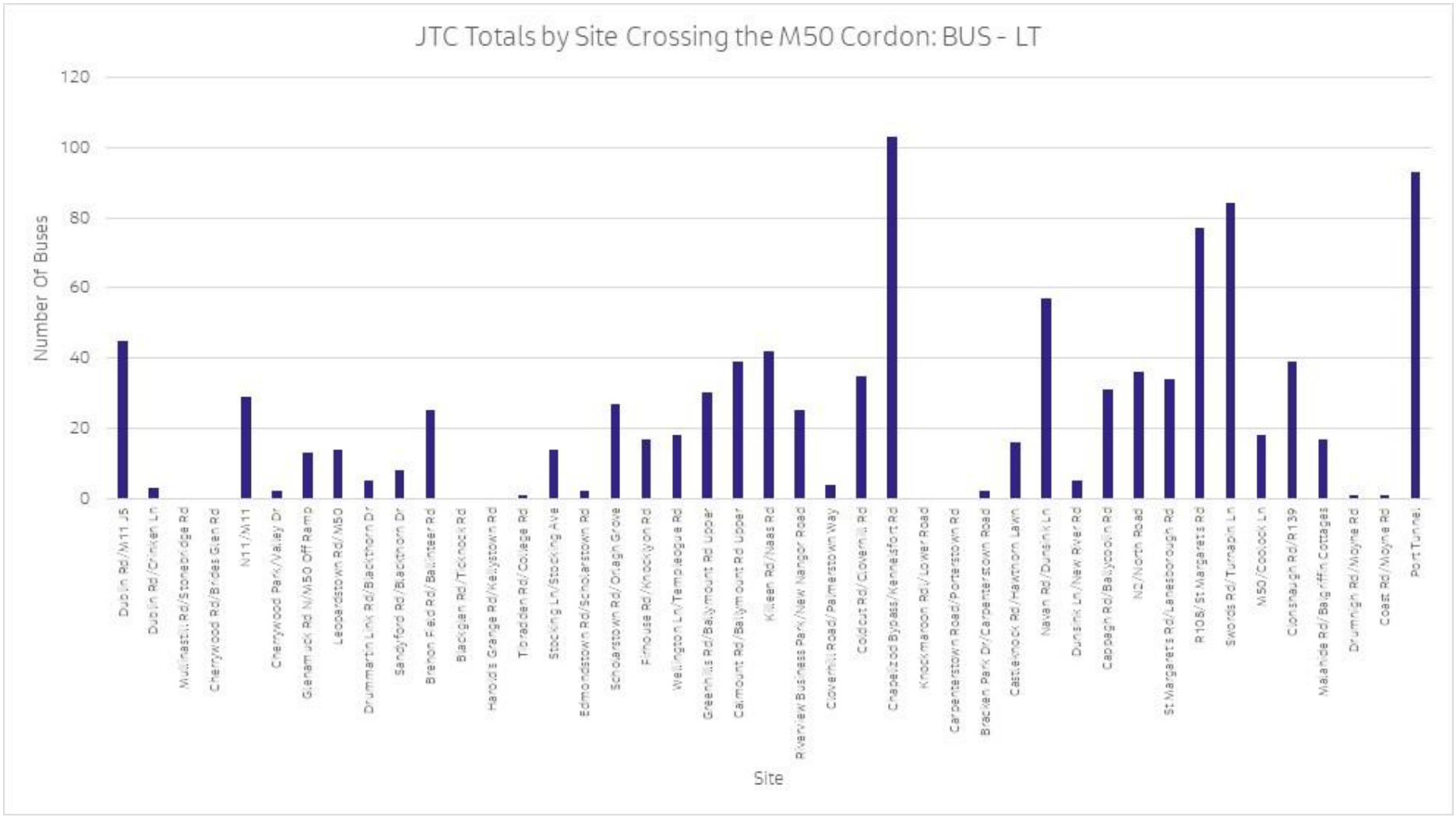


Figure 0-30:Number of Bus Journeys for JTC Surveys for LT per Site

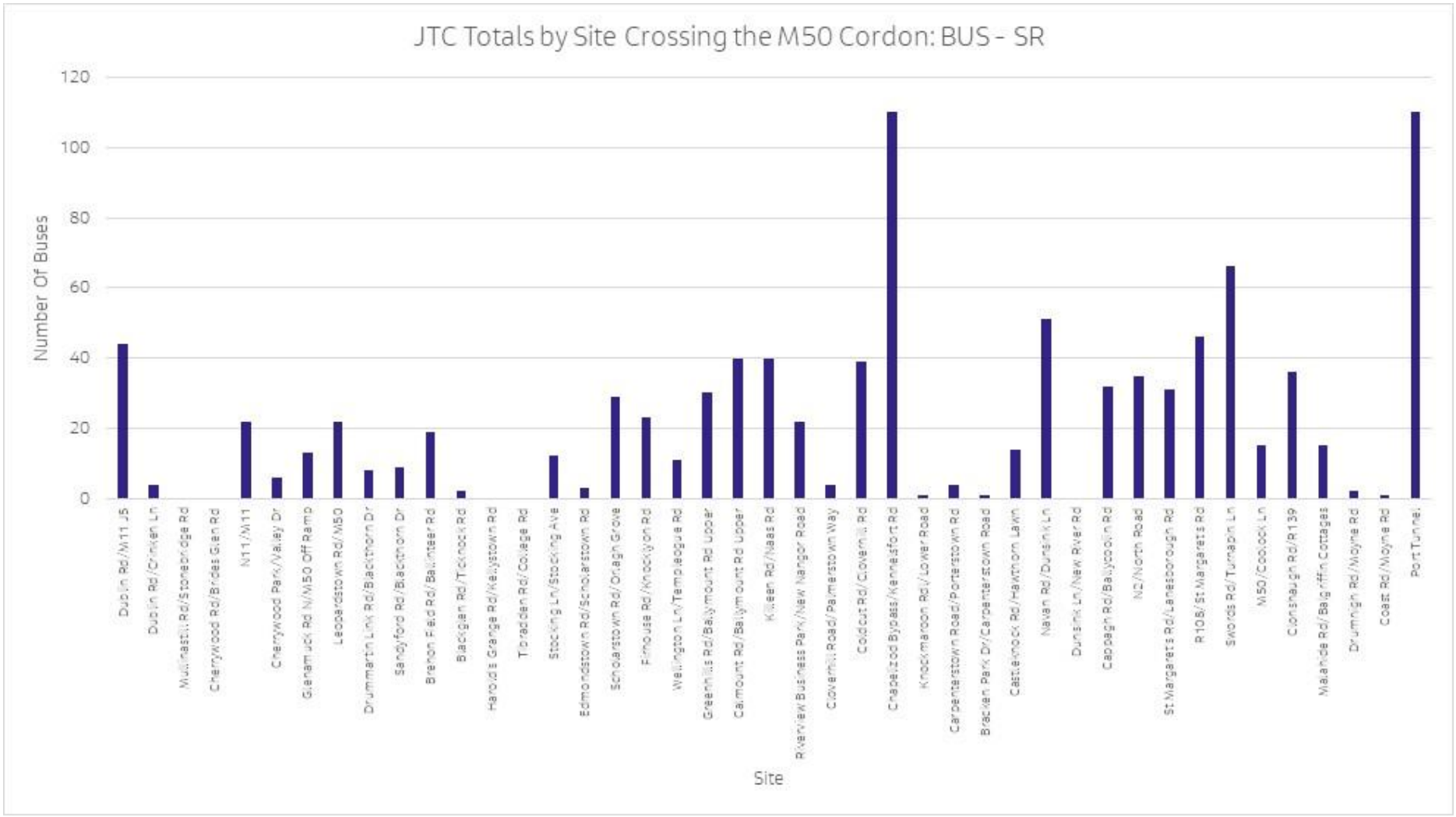


Figure 0-31:Number of Bus Journeys for JTC Surveys for SR per Site

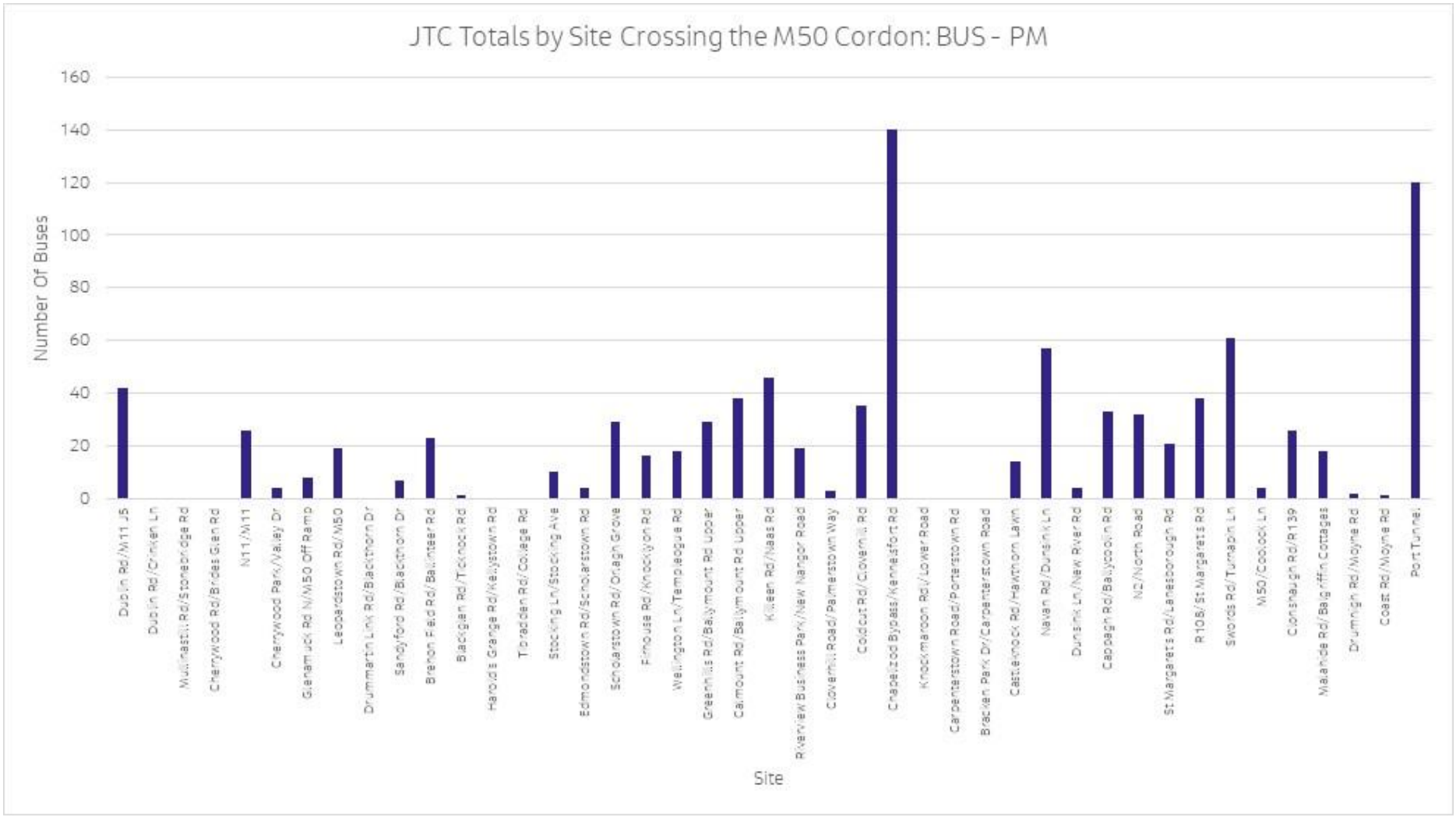


Figure 0-32:Number of Bus Journeys for JTC Surveys for PM per Site

Pedestrian Totals by Site and Time Period

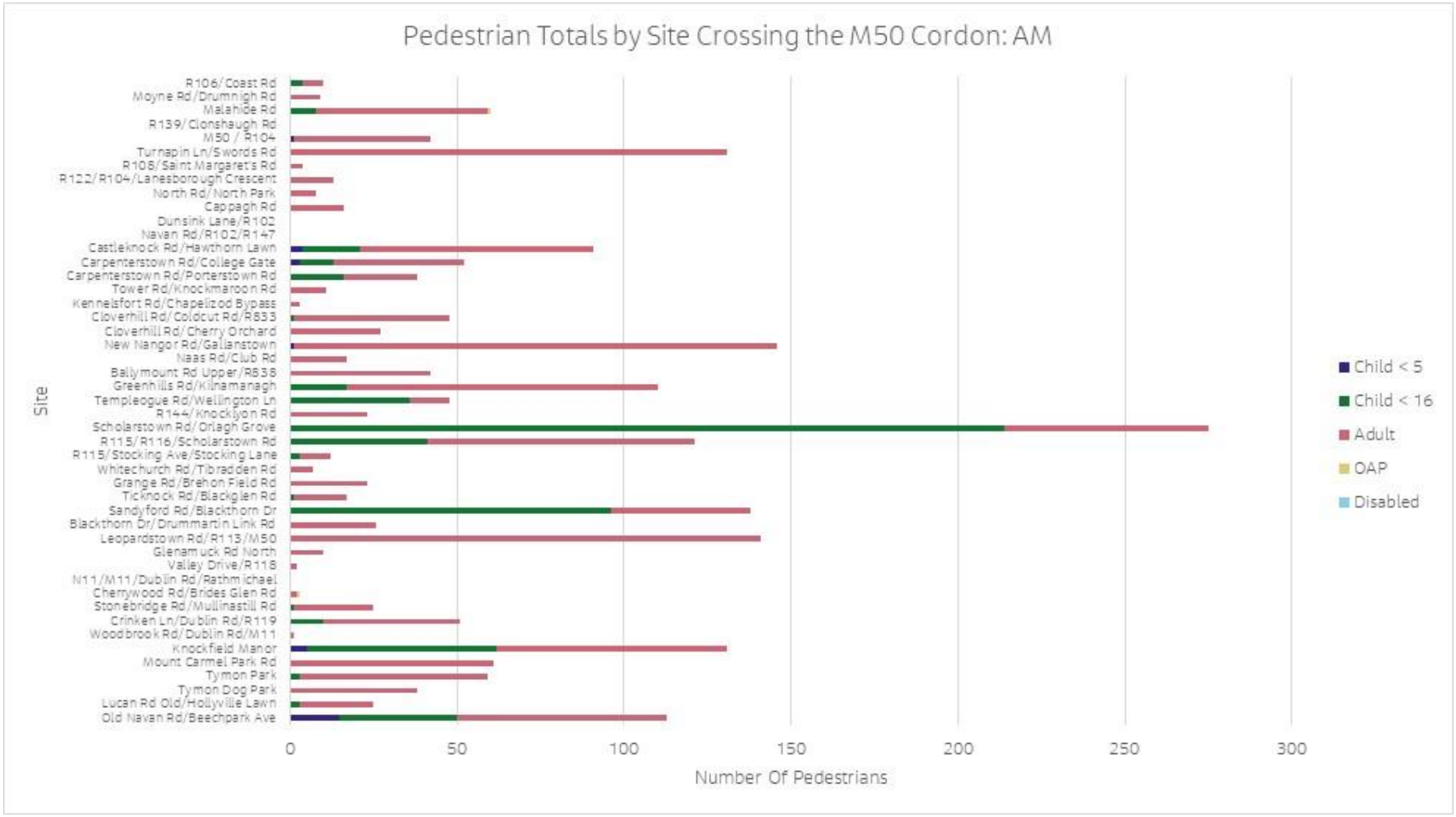


Figure 0-33:Number of Pedestrian Journeys for Ped Surveys for AM per Site

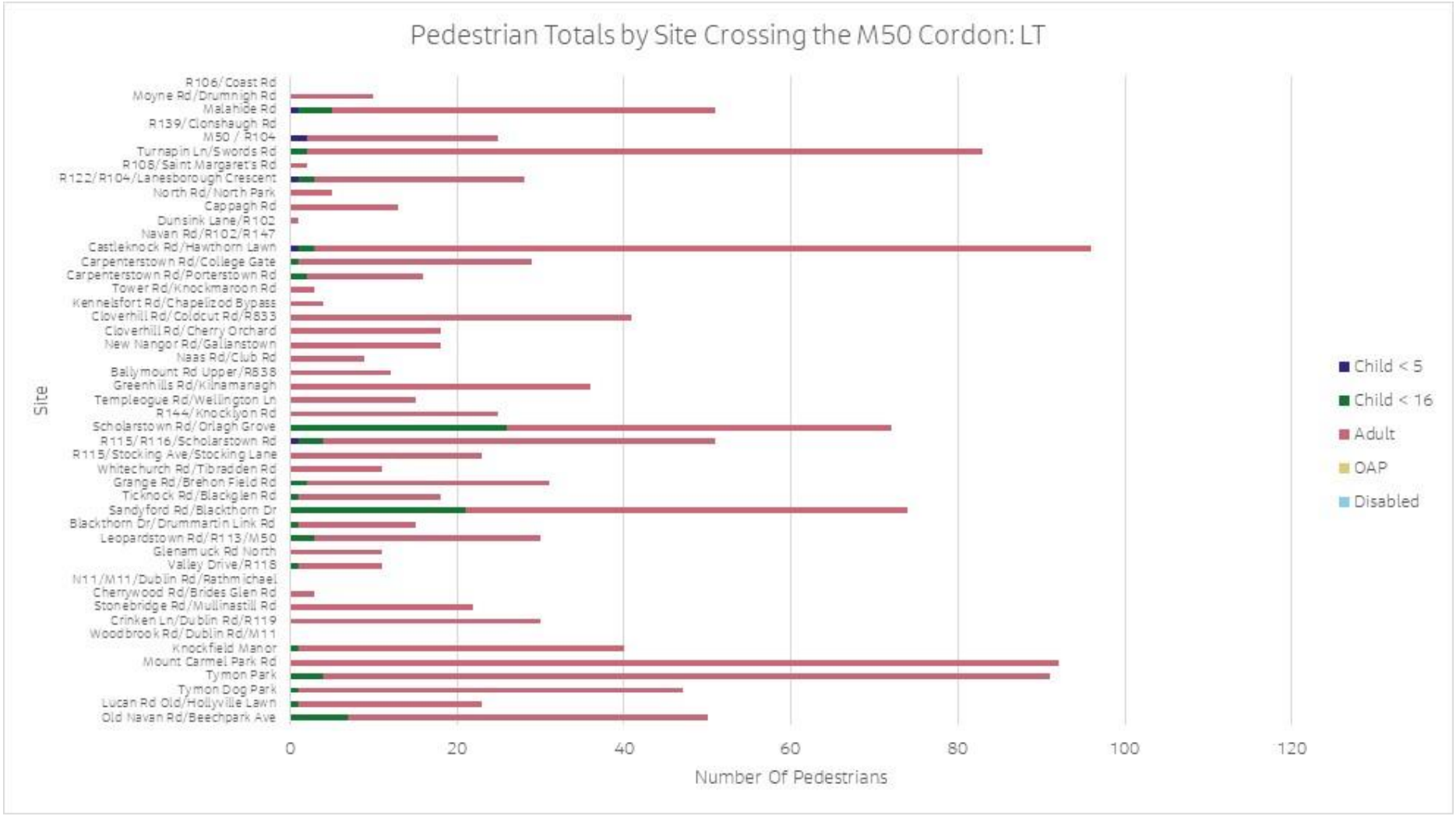


Figure 0-34:Number of Pedestrian Journeys for Ped Surveys for LT per Site

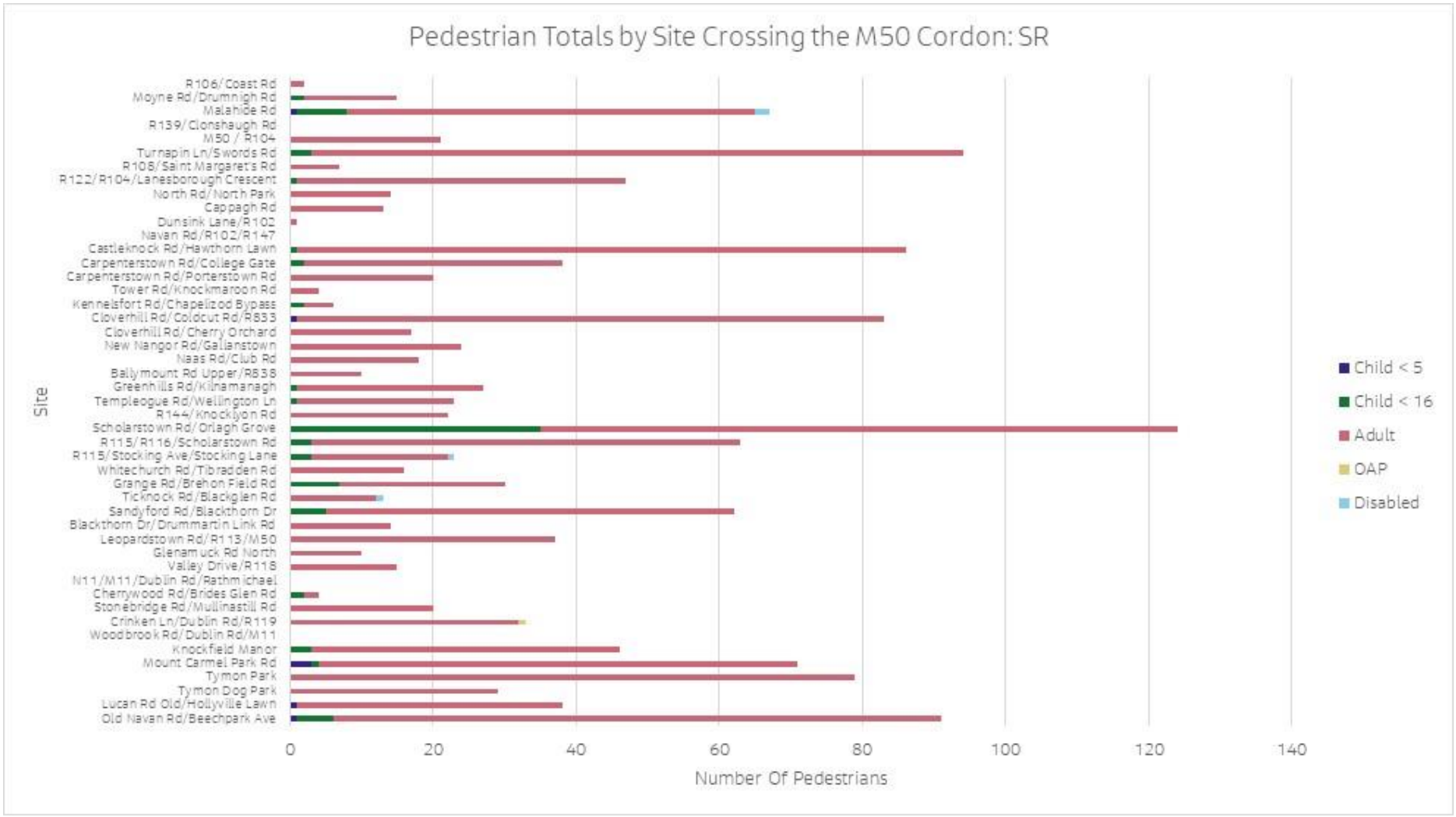


Figure 0-35:Number of Pedestrian Journeys for Ped Surveys for SR per Site

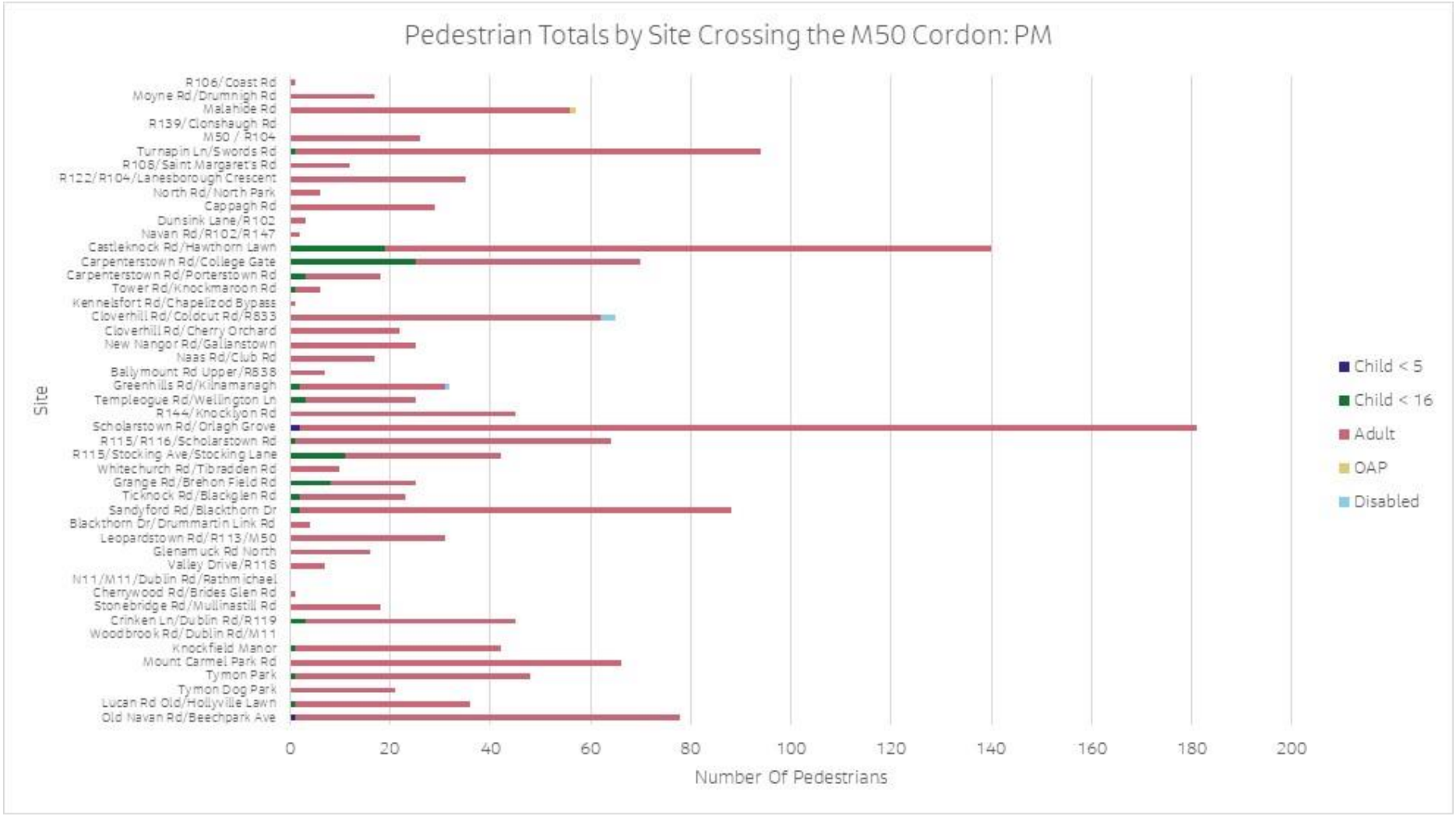


Figure 0-36:Number of Pedestrian Journeys for Ped Surveys for PM per Site

Total Person Movements by Time Period

Mode	Trips	% Trips
P/C	1,557	1%
Pedestrian	2,390	1%
Car	105,022	55%
Taxi	3,466	2%
Bus	52,656	28%
Luas	7,666	4%
Rail	18,055	9%

Table 0-1:AM Period Total Movements - M50 Cordon

Mode	Trips	% Trips
P/C	377	0%
Pedestrian	1,327	1%
Car	70,878	58%
Taxi	3,482	3%
Bus	38,866	32%
Luas	2,629	2%
Rail	5,495	4%

Table 0-2 LT Period Total Movements - M50 Cordon

Mode	Trips	% Trips
P/C	497	0%
Pedestrian	1,541	1%
Car	76,405	61%
Taxi	3,572	3%
Bus	36,209	29%
Luas	2,933	2%
Rail	3,931	3%

Table 0-3 SR Period Total Movements - M50 Cordon

Mode	Trips	% Trips
P/C	758	1%
Pedestrian	1,680	1%
Car	85,697	64%
Taxi	2,250	2%
Bus	35,914	27%
Luas	4,228	3%
Rail	3,746	3%

Table 0-4 PM Period Total Movements - M50 Cordon

Appendix B - Additional Bus Stop Survey Data

Bus Stop Flow Data

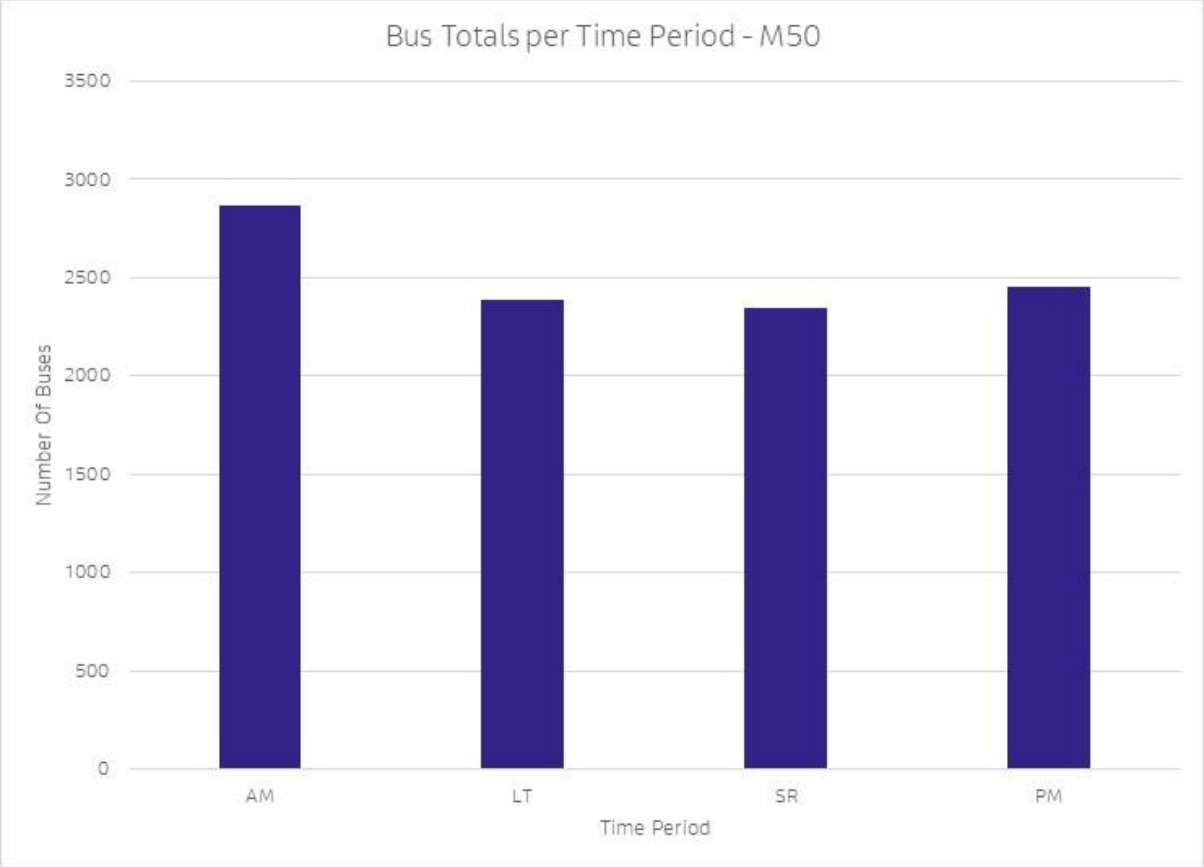


Figure 0-1:Total Buses per Time Period - M50

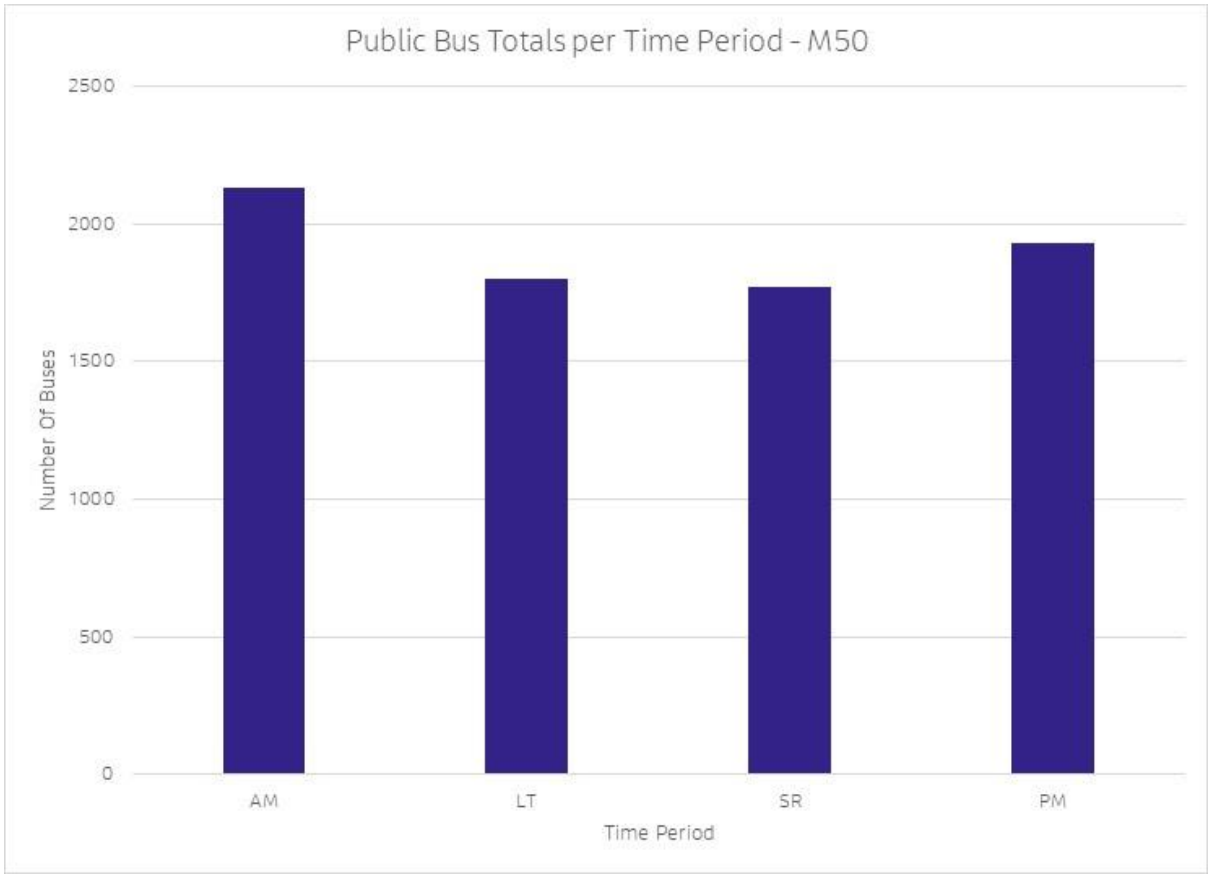


Figure 0-2:Public Buses Total per Time Period - M50

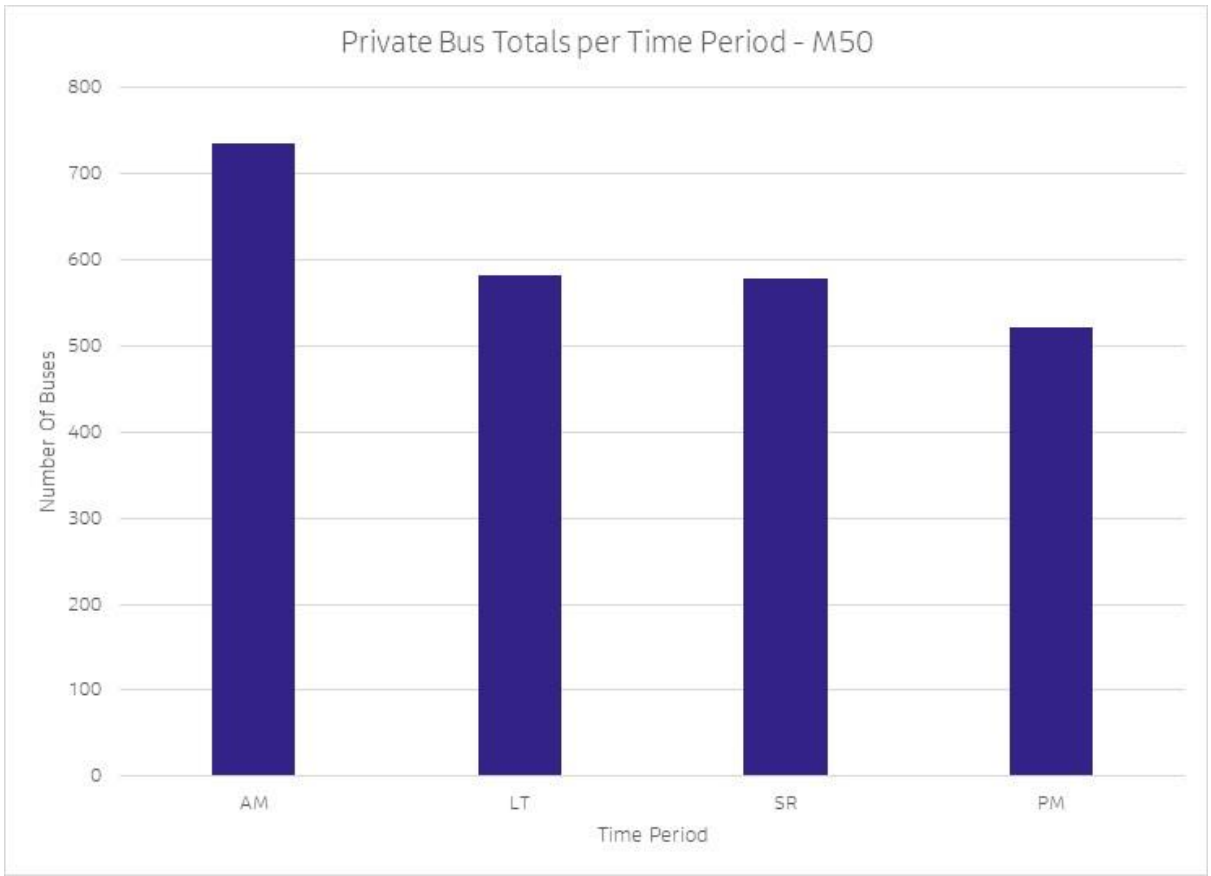


Figure 0-3:Private Buses Total per Time Period - M50

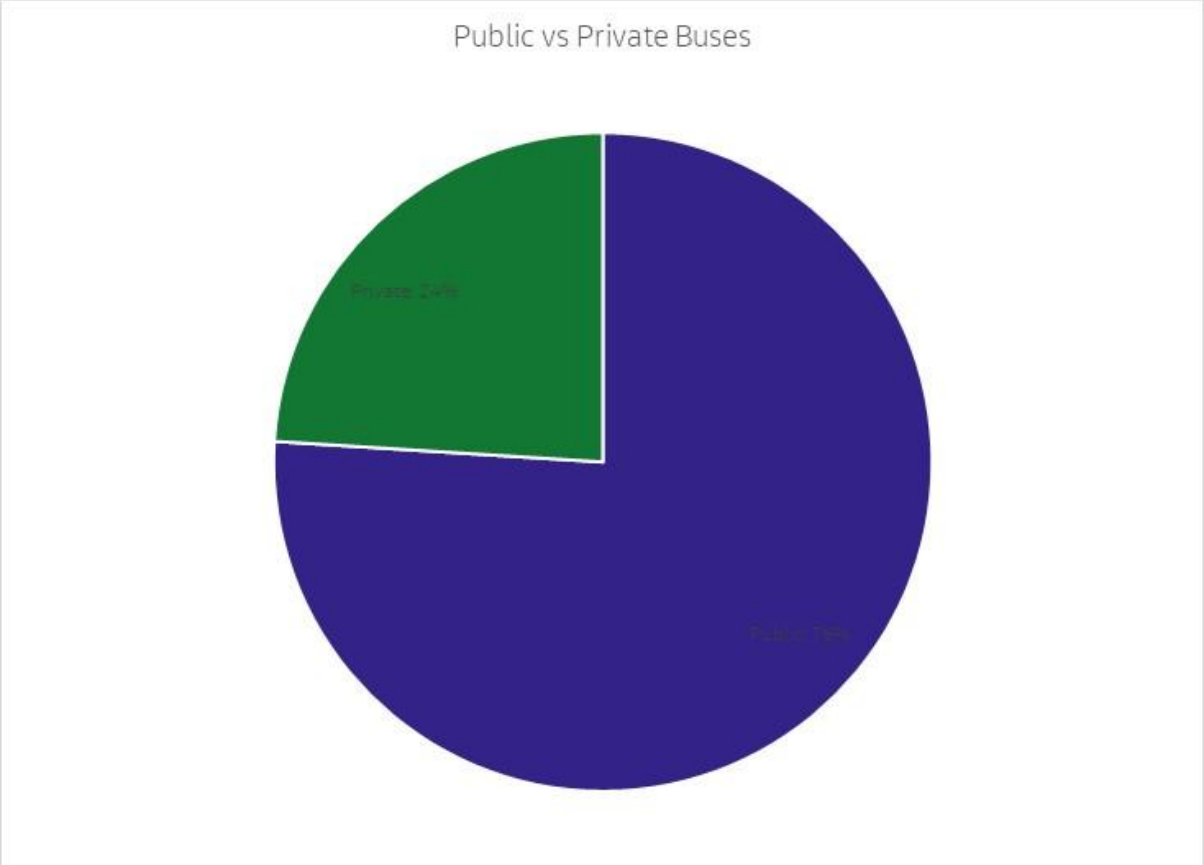


Figure 0-4:Private Buses vs Public Buses - M50

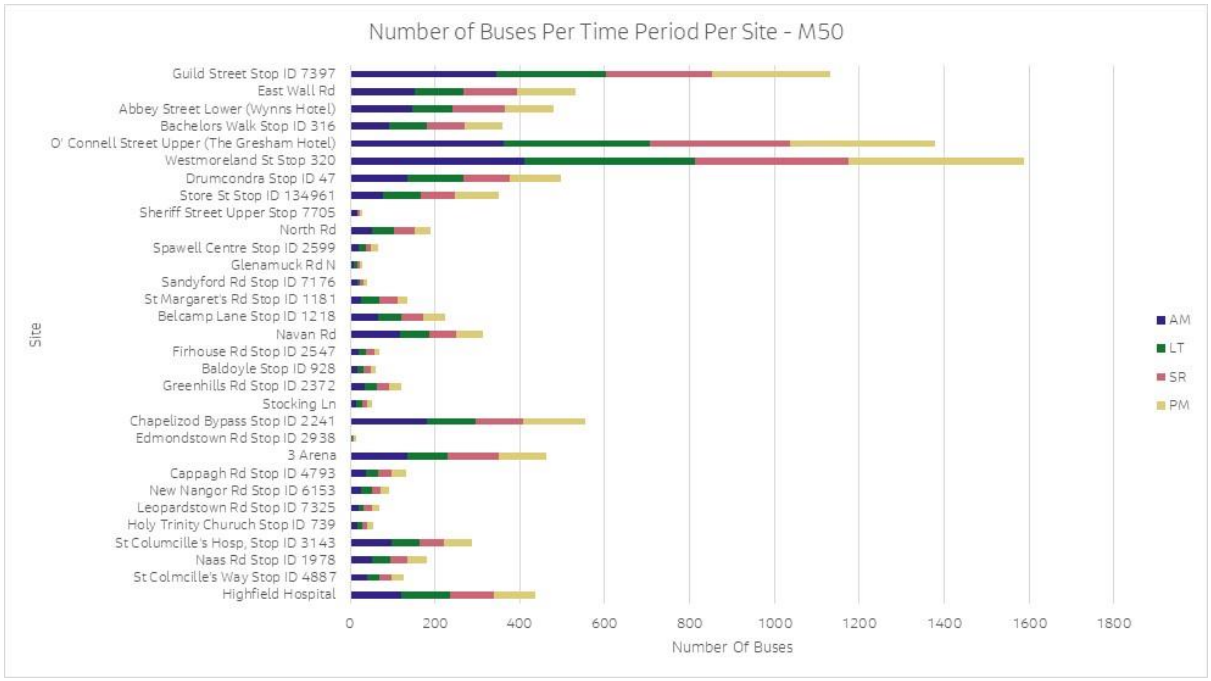


Figure 0-5:Number of Buses per Time Period Per Site - M50

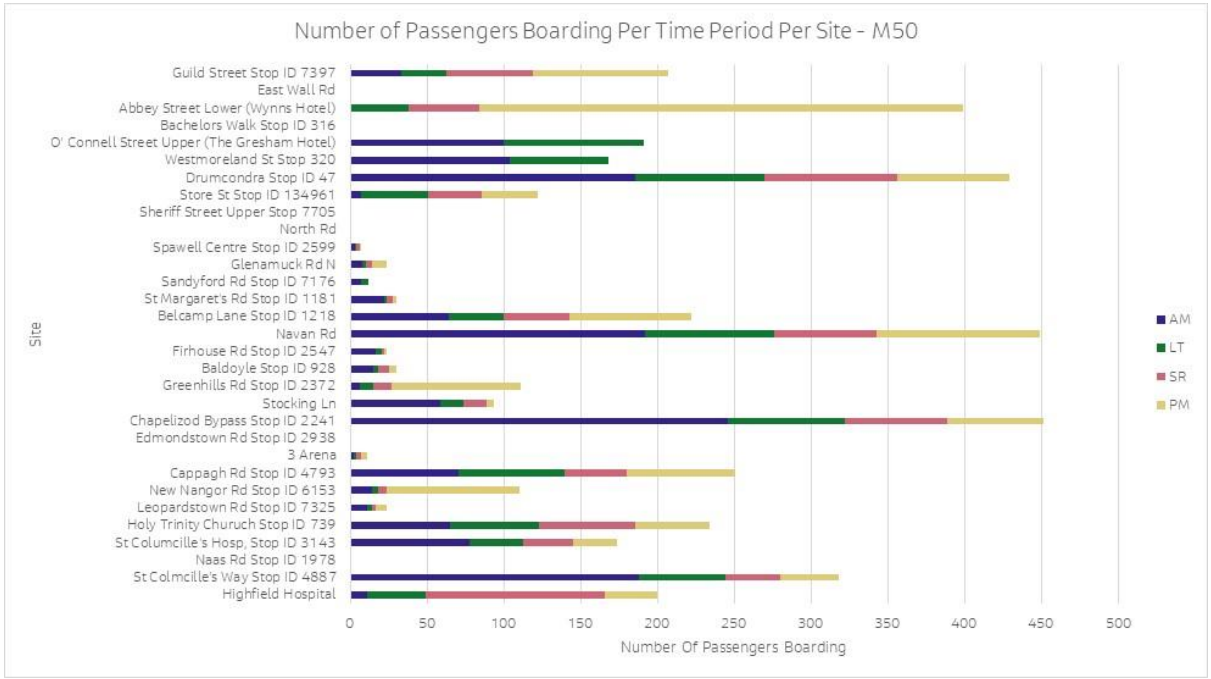


Figure 0-6:Number of Passengers Boarding per Time Period Per Site - M50

Bus Occupancy Methodology

The bus passenger trip numbers used throughout this report were calculated from the bus occupancy values via the following methodology.

First the average number of passengers for each bus type was calculated. These are standard industry bus occupancy values and are shown in the table below.

Average Occupancy of a Bus per Bus Type				
Double Decker	**Single Decker**	**Single Coach**	**Double Coach**	**Mini Bus**
94	37	55	79	16

Table 0-1:Average number of passengers per bus type

Then, working back from the average number of passengers per bus type, a value was calculated which corresponds with each occupancy percentage that was recorded in the bus surveys. This was calculated by taking the maximum passenger numbers per bus type, dividing the value by 100 and multiplying by the occupancy value.

Occupancy %	Double Decker Passenger Number	Single Decker Passenger Number	Single Coach Passenger Number	Double Coach Passenger Number	Mini Bus Passenger Number
0	0	0	0	0	0
5	5	2	3	4	1
10	9	4	6	8	2
15	14	6	8	12	2
20	19	7	11	16	3
25	24	9	14	20	4
30	28	11	17	24	5
35	33	13	19	28	6
40	38	15	22	32	6
45	42	17	25	36	7
50	47	19	28	40	8
55	52	20	30	43	9
60	56	22	33	47	10
65	61	24	36	51	10
70	66	26	39	55	11

75	71	28	41	59	12
80	75	30	44	63	13
85	80	31	47	67	14
90	85	33	50	71	14
95	89	35	52	75	15
100	94	37	55	79	16

Table 0-2:Occupancy Per Bus Type

Then, using the above table, the average number of passengers per bus type and occupancy range was calculated. The below table defines the ranges and the average passenger number for each range. The passenger numbers from the above table for each range are added together and the average calculated.

Average number of passengers per range					
Range	**Double Decker**	**Single Decker**	**Single Coach**	**Double Coach**	**Mini Bus**
0-24%	9	4	6	8	2
25-50%	33	13	19	28	6
51-74%	38	15	22	32	6
75-99%	61	24	36	51	10
100%	94	37	55	79	16

Table 0-3:Average passengers per range

The same process was then carried out to calculate the lower and upper passenger bounds of each bus type. These upper and lower bounds, along with the average passenger numbers can be seen in the below tables.

Lower Bound of passengers per range					
Lower	**Double Decker**	**Single Decker**	**Single Coach**	**Double Coach**	**Mini Bus**
0-24%	0	0	0	0	0
25-50%	5	2	3	4	1
51-74%	28	11	17	24	5
75-99%	52	20	30	43	9
100%	75	30	44	63	13

Table 0-4:Lower bound of passengers by range

Upper Bound of passengers per range					
Upper	**Double Decker**	**Single Decker**	**Single Coach**	**Double Coach**	**Mini Bus**
0-24%	19	7	11	16	3
25-49%	42	17	25	36	7
50-74%	66	26	39	55	11
75-99%	89	35	52	75	15
100%	94	37	55	79	16

Table 0-5:Upper bound of passengers by range

Bus Passenger Trips

The following graphs indicate how many passengers crossed each cordon on a bus during each time period at each site. The data in this section was taken from the Bus Occupancy surveys, where average bus occupancy values have been used to calculate the average number of passengers on board each bus.

Figure 0-7:Total Inbound Journeys – Buses Per Site - M50

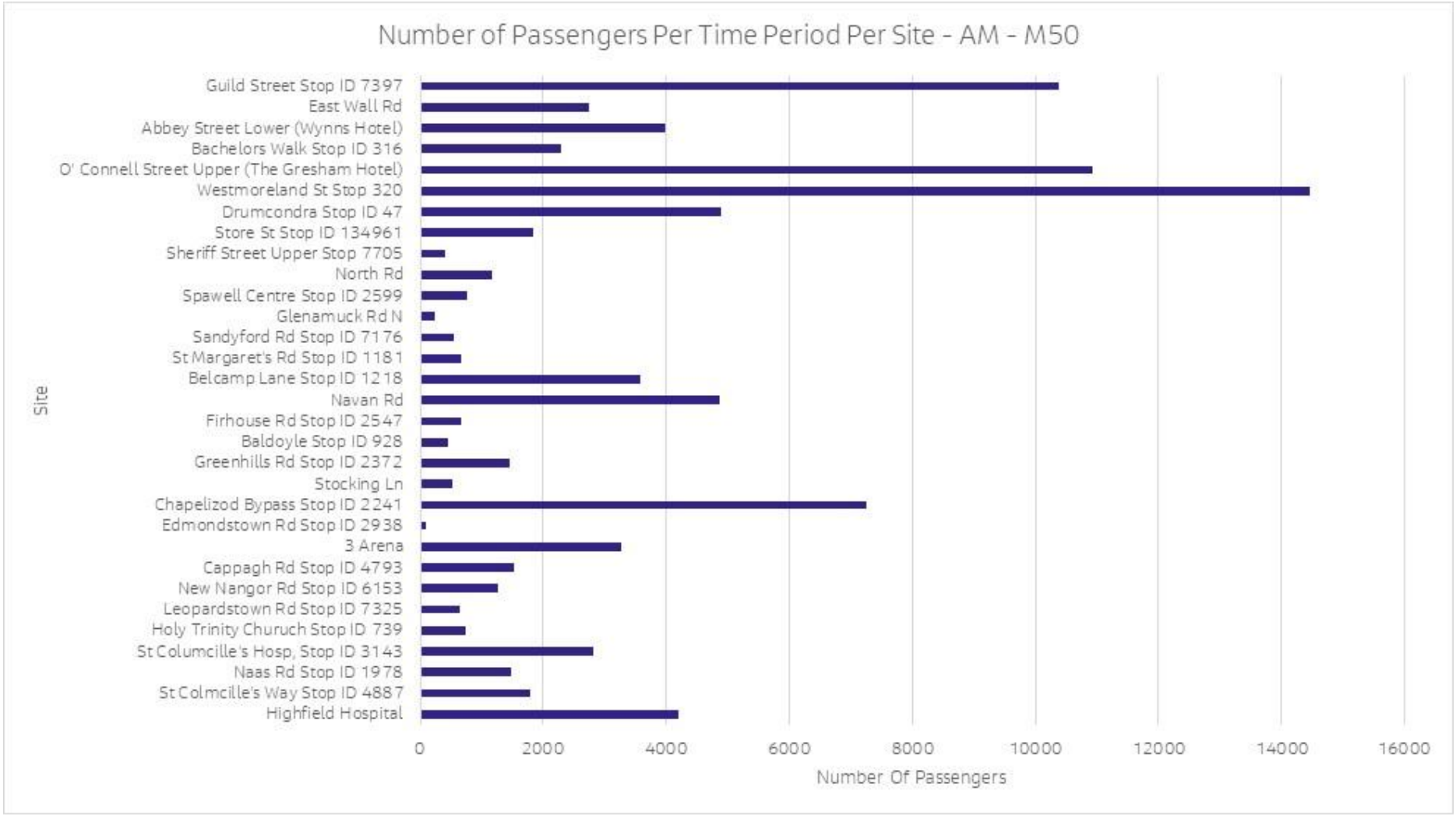


Figure 0-8:Bus Passengers - AM - M50

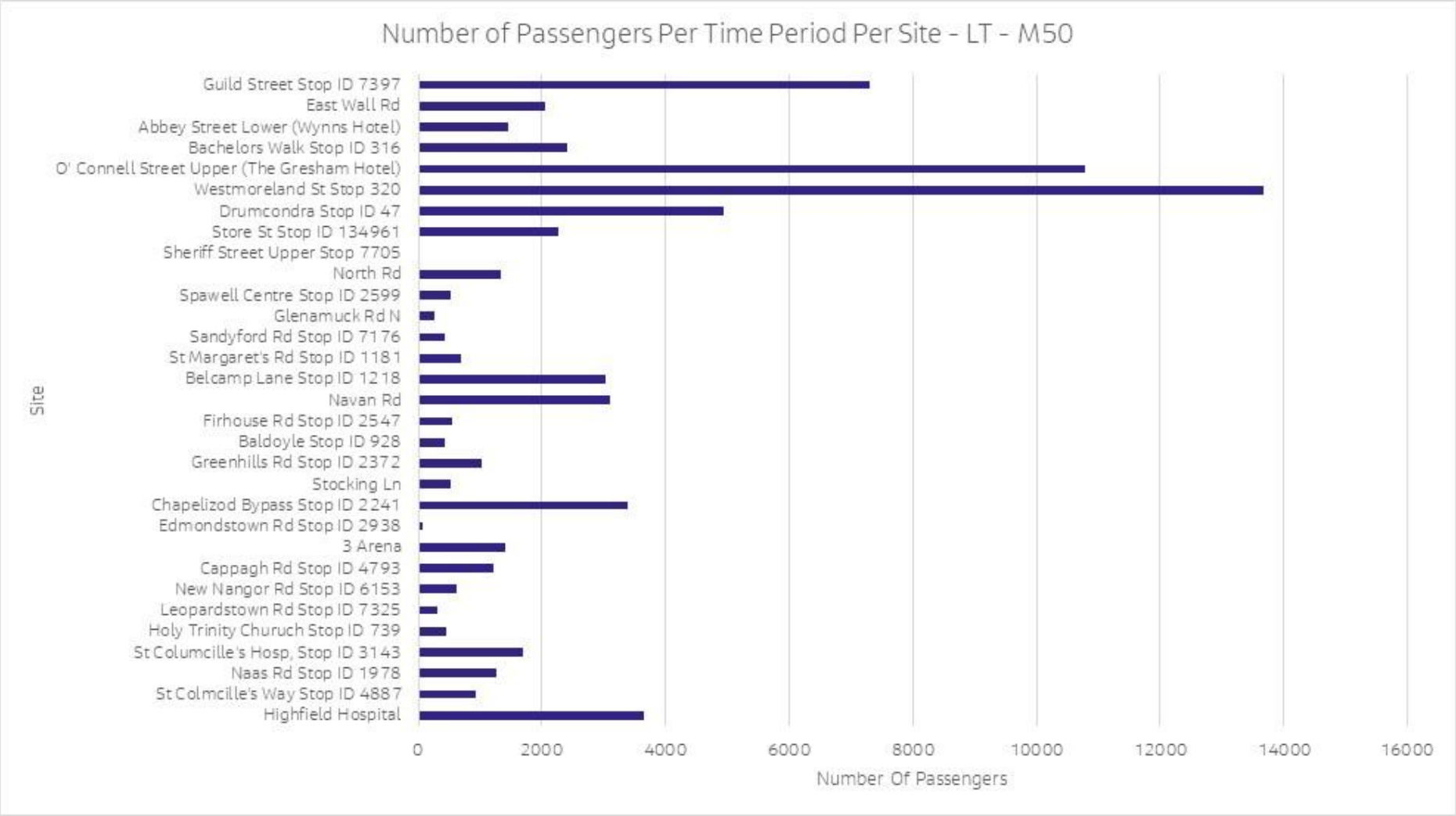


Figure 0-9:Bus Passengers - LT - M50

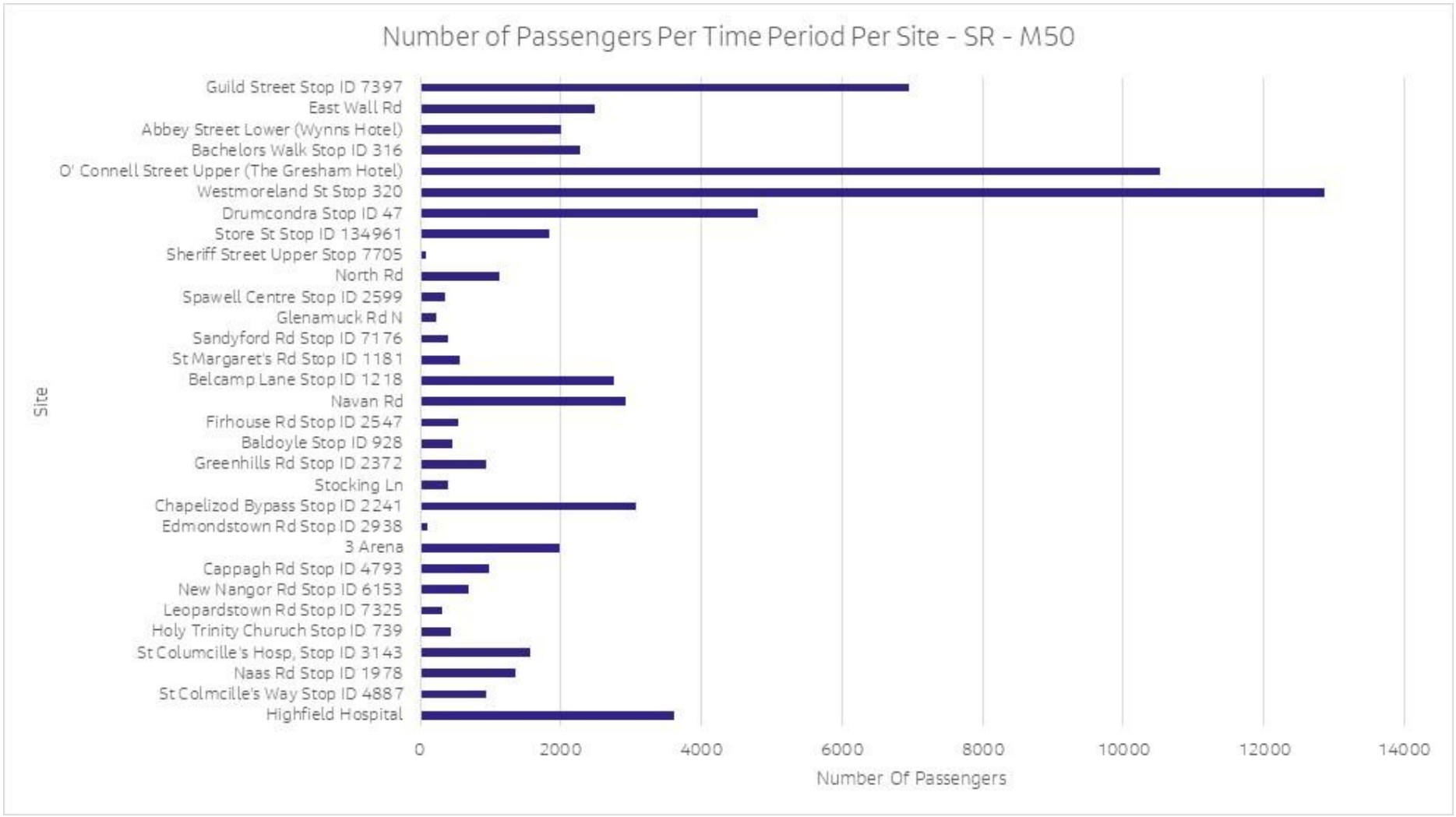


Figure 0-10:Bus Passengers - SR - M50

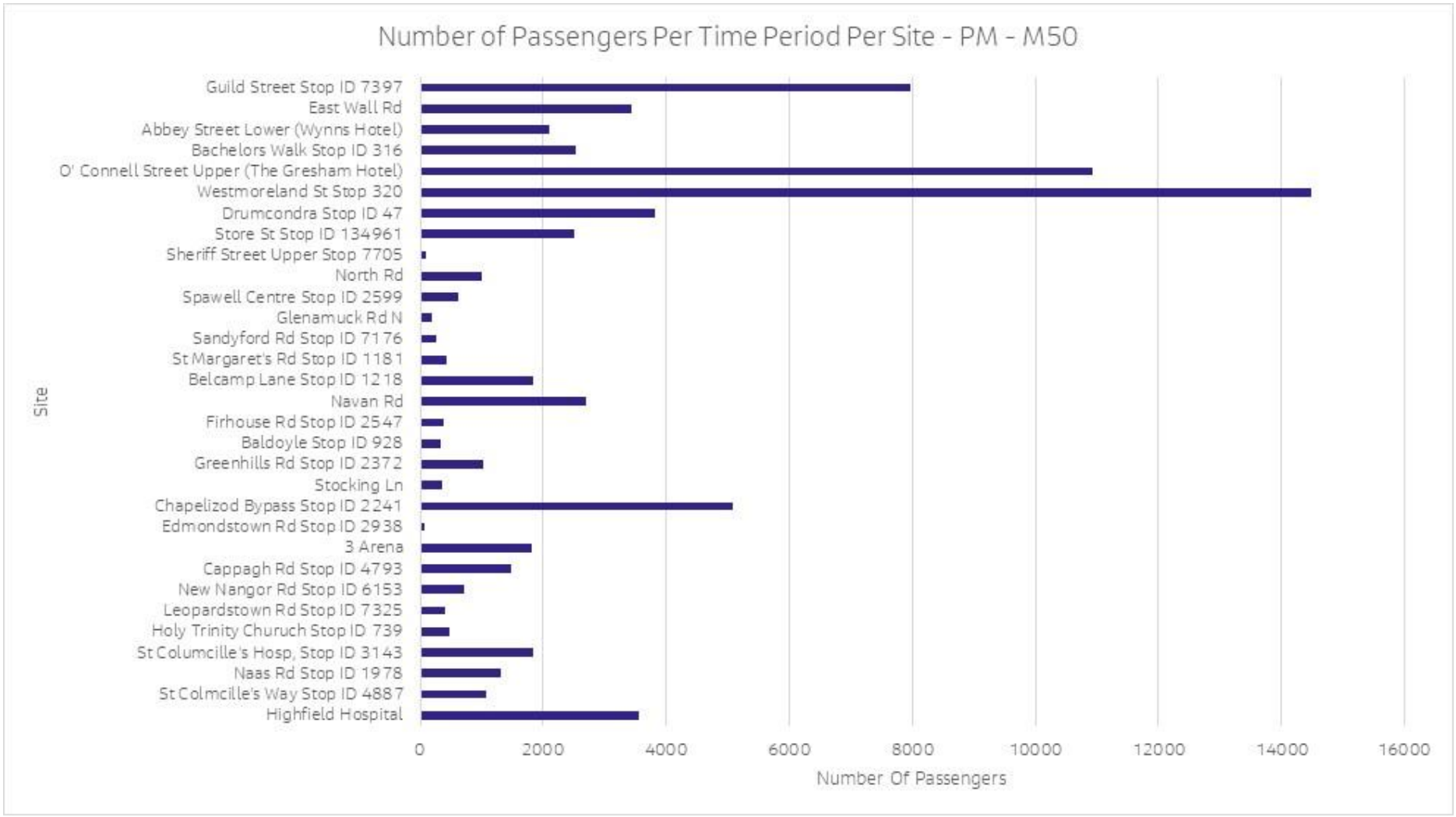


Figure 0-11:Bus Passengers - PM - M50

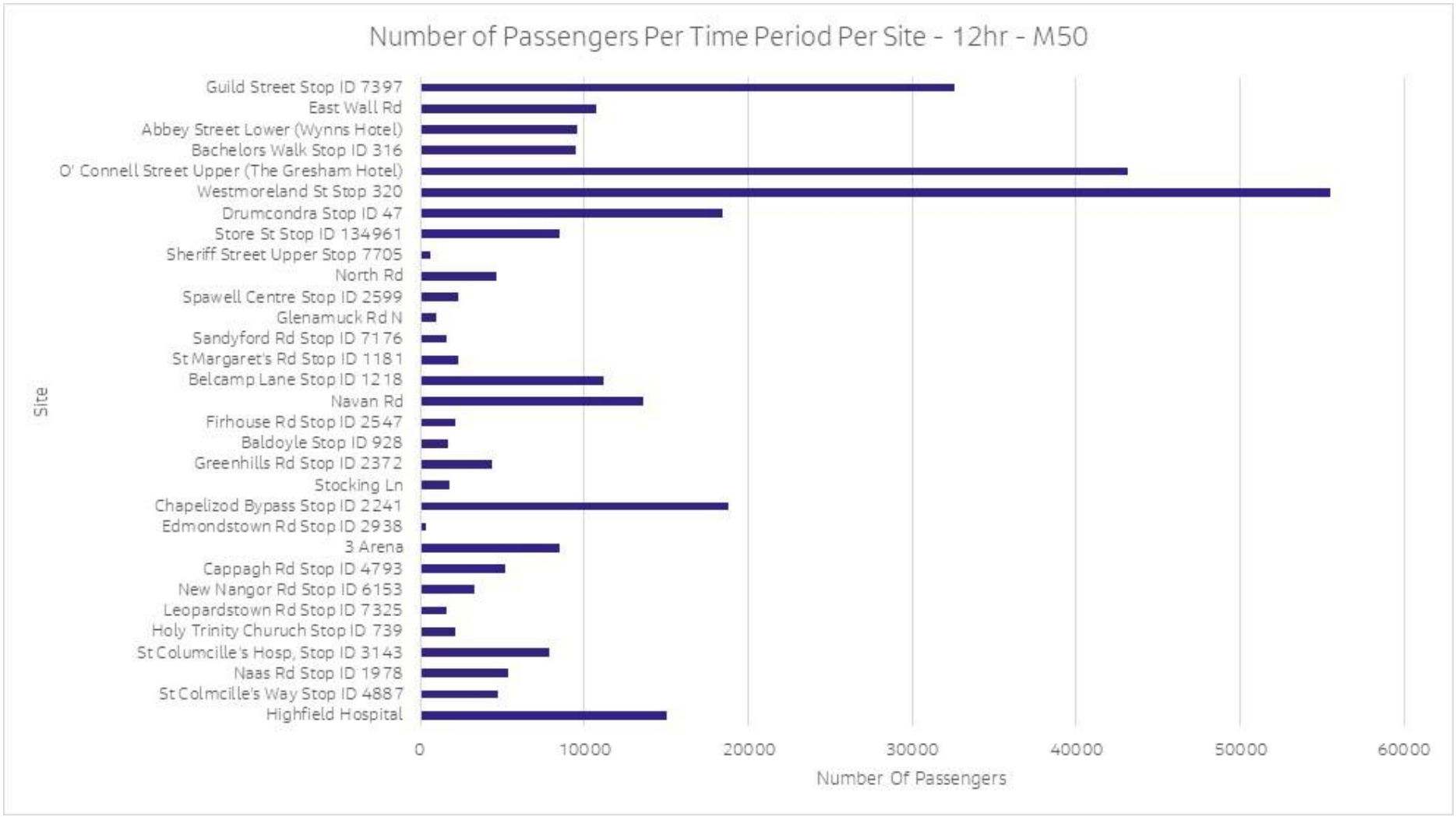


Figure 0-12:Bus Passengers - 12hr - M50

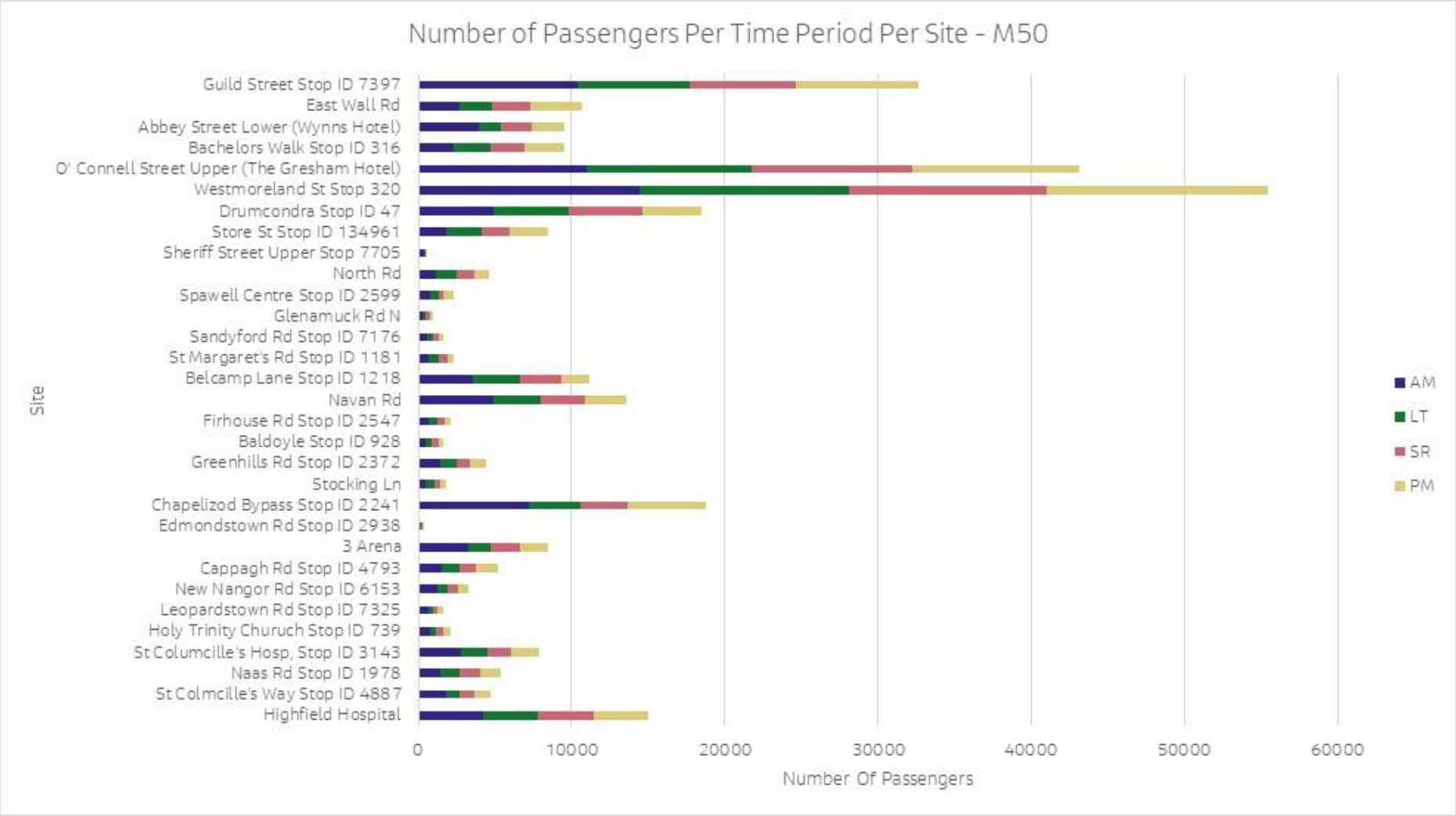


Figure 0-13:Total Passenger Trips Per Site Per Time Period - M50

Appendix C - Heavy Rail Data

The heavy rail passenger numbers are taken from the Annual Rail Census, carried out by Iarnród Éireann. The Passenger numbers from these services were taken from the following stations, where the train crossed the M50 Cordon, or the first station that the train stopped at, after crossing the Cordon.

- Bray to Shankill (DART Northbound and Rosslare InterCity Service)
- Connolly (Commuter)
- Clondalkin to Parkwest (Phoenix Park Tunnel Commuter and Portlaoise Commuter)
- Castleknock to Navan Parkway (Commuter)
- Portmarnock to Clongriffin (DART Southbound)
- Drumcondra (InterCity Sligo Line)
- Broombridge (Commuter)
- Heuston (InterCity)

All Rail Trips Inbound Across Cordon	Trips
AM	18,055
LT	5,495
SR	3,931
PM	3,746
12hr	31,227

Table 0-1:Rail Passengers per Time Period

Appendix D - Light Rail Data

The Luas passenger figures are taken from the annual Luas count, carried out by TII. The line flow from the following stations along the M50 Cordon were used to determine the number of passengers crossing the M50 Cordon by Luas:

- Luas Green Line Site 1: Glencairn to Central Park (Northbound/Inbound Movement across
- Cordon
- Luas Green Line Site 2: Ballyogan to Carrickmines (Southbound/Outbound Movement across Cordon)
- Luas Red Line: Red Cow to Kylemore (Eastbound Movement across Cordon)

All Luas Trips Inbound Across Cordon	**Trips**
AM	7,666
LT	2,629
SR	2,933
PM	4,228
12hr	17,456

Table 0-1:All Luas Trips by Time Period

Luas Green Line 1			
Time	**From**	**To**	
07:00	Glencairn	Central Park	4,344
08:00	Glencairn	Central Park	6,469
09:00	Glencairn	Central Park	2,289
10:00	Glencairn	Central Park	1,384
11:00	Glencairn	Central Park	1,125
12:00	Glencairn	Central Park	1,181
13:00	Glencairn	Central Park	1,210
14:00	Glencairn	Central Park	1,107
15:00	Glencairn	Central Park	1,629
16:00	Glencairn	Central Park	2,466
17:00	Glencairn	Central Park	2,881
18:00	Glencairn	Central Park	1,736

Table 0-2:Luas Green Line 1 - Hourly Trips

Luas Green Line 1	
Time Period	**Trips**
AM	3,311
LT	917
SR	849
PM	1,478
12hr	6,555

Table 0-3:Luas Green Line 1 - Trips by Time Period

Luas Green Line 2			
Time	**From**	**To**	
07:00	Ballyogan Wood	Carrickmines	26,751
08:00	Ballyogan Wood	Carrickmines	20,984
09:00	Ballyogan Wood	Carrickmines	7,861
10:00	Ballyogan Wood	Carrickmines	3,469
11:00	Ballyogan Wood	Carrickmines	4,155
12:00	Ballyogan Wood	Carrickmines	4,635
13:00	Ballyogan Wood	Carrickmines	5,094
14:00	Ballyogan Wood	Carrickmines	6,599
15:00	Ballyogan Wood	Carrickmines	12,852
16:00	Ballyogan Wood	Carrickmines	15,370
17:00	Ballyogan Wood	Carrickmines	16,212
18:00	Ballyogan Wood	Carrickmines	14,175

Table 0-4:Luas Green Line 2 - Hourly Trips

Luas Green Line 2	
Time Period	**Trips**
AM	503
LT	179
SR	372
PM	930
12hr	1,984

Table 0-5:Luas Green Line 2 - Trips by Time Period

Luas Red Line			
Time	**From**	**To**	
07:00	Red Cow	Kylemore	6,968
08:00	Red Cow	Kylemore	8,075
09:00	Red Cow	Kylemore	4,388
10:00	Red Cow	Kylemore	2,539
11:00	Red Cow	Kylemore	3,055
12:00	Red Cow	Kylemore	3,178
13:00	Red Cow	Kylemore	3,780
14:00	Red Cow	Kylemore	3,358
15:00	Red Cow	Kylemore	3,451
16:00	Red Cow	Kylemore	4,613
17:00	Red Cow	Kylemore	3,044
18:00	Red Cow	Kylemore	1,915

Table 0-6:Luas Red Line - Hourly Trips

Luas Red Line	
Time Period	**Trips**
AM	3,852
LT	1,533
SR	1,712
PM	1,820
12hr	8,917

Table 0-7:Luas Red Line - Trips by Time Period