Appendix 12.1
Transport Assessment

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Proposed Data Centre, Naas, County Kildare

Reference number 2232-SYS-XX-XX-RP-D-0001

23/11/2023

TRANSPORT ASSESSMENT

SYSTRA

PROPOSED DATA CENTRE, NAAS, COUNTY KILDARE

TRANSPORT ASSESSMENT

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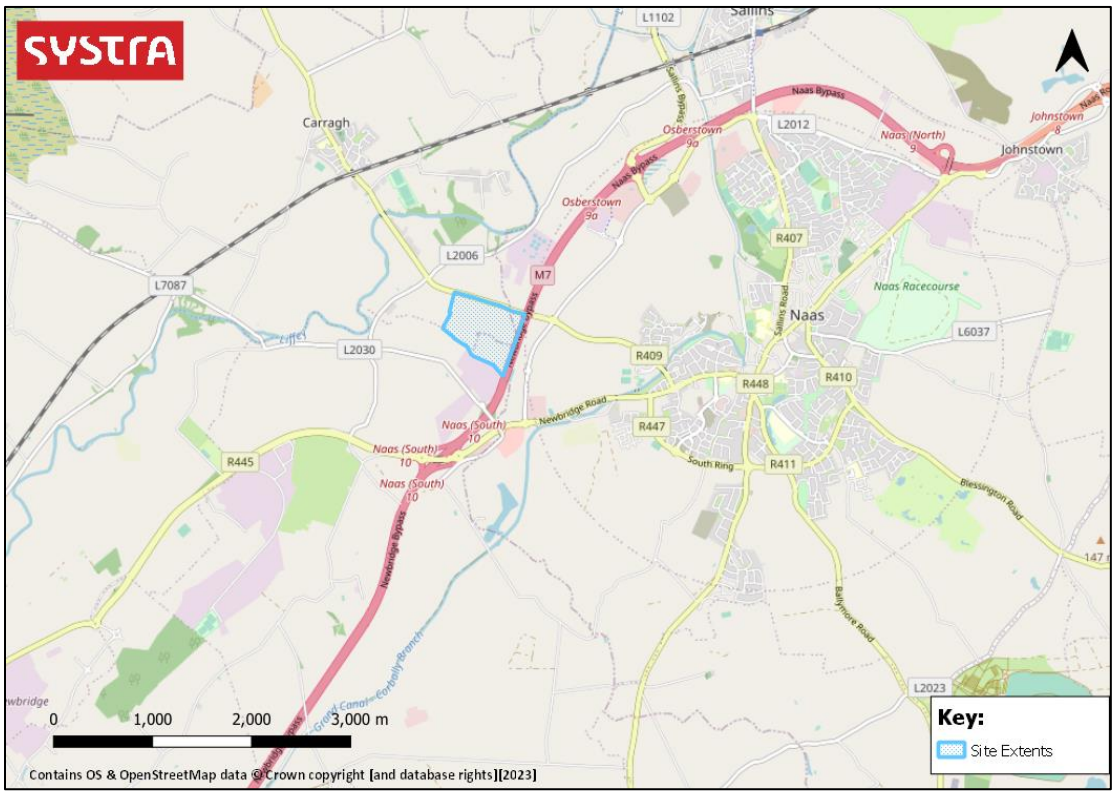
1. INTRODUCTION

1.1 Context

1.1.1 SYSTRA (UK) Ltd has been appointed to provide transportation consultancy services in relation to a proposed data centre located in Naas, County Kildare. The proposed data centre is located to the west of the town of Naas, with the site bound by the M7 to its east, the M7 Business Park to the south, the R409 to the north and agricultural land to the west. The site will be accessed from the R409 along the northern boundary of the site. **Figure** 1 illustrates the site red line boundary relative to Naas and the M7.

Figure 1. Site Location



1.1.2 The proposed development comprises 6 no. two storey data centre buildings, an administration / management building, car parking, landscaping and other associated works. The key elements of the proposed development are listed below:

- Site Area – 37.51Ha;
- Gross Floor Area (GFA) of each data centre building – Approximately 27,261sqm in total;
- An administration / management building; and
- 210 car parking spaces across the campus.

1.1.3 Access to the development for all vehicles will be taken from a new priority junction on R409, which provides access to Naas Town Centre to the east of the site and towards the villages of Caragh and Blackwood to the west.

1.1.4 Cyclists and pedestrians will also be able to access the site using the proposed access.

1.2 Purpose of this Report

1.2.1 This Transport Assessment (TA) describes and evaluates the baseline transport environment, provides forecasts of the traffic impacts of the proposed development, and assesses the potential impact of this demand on the surrounding network.

1.2.2 The report also details the proposed access arrangements to the development for all travel modes, and identifies necessary mitigation measures required to support the development and limit adverse impacts on the surrounding network.

1.2.3 The TA has been undertaken in line with the guidelines set out in Transport Infrastructure Ireland's (TII's) 'Traffic and Transport Assessment Guidelines'.

1.3 Structure of the Report

1.3.1 This report is structured as set out below, and seeks to provide a full and robust assessment of the existing transport conditions and the potential impacts of the proposed development on the local transport network.

- **Section 2: Policy Review** – Provides an outline and review of the relevant national, regional and local transport planning policy and guidance, in the context of the proposed development;
- **Section 3: Existing Site Conditions** – Sets out information concerning transport conditions prevailing in the area surrounding the site, including pedestrian and cycle facilities, public transport services, the local highway network and parking infrastructure;
- **Section 4: Proposed Development** – Outlines the characteristics of the development proposals and how they will be integrated in the adjoining transport network;
- **Section 5: Proposed Travel Characteristics** – Presents the outcome of a trip generation assessment undertaken to identify people trip generation and travel patterns associated with the proposed development;
- **Section 6: Traffic Impact Assessment** – Details the results of initial junction surveys and subsequent link flow assessment. The chapter also introduces the Traffic Impact Assessment addendum; and
- **Section 7: Summary & Conclusion** – Summarises the key points arising from the work carried out to inform the TA, and presents a final conclusion.

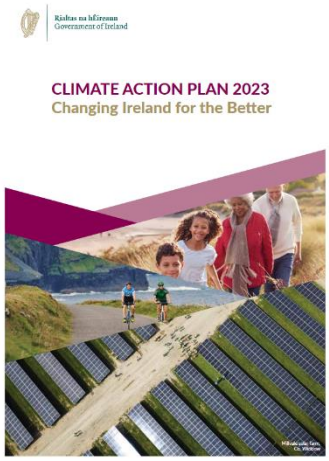
1.3.2 A Traffic Impact Assessment (TIA) will be submitted to KCC as an addendum to this Transport Assessment. This TIA will provide details of a VISSIM model, prepared by SYSTRA, to assess the impact of the development proposals on the local road network.

2. TRANSPORT POLICY

2.1 National Policy

Climate Action Plan 2023

2.1.1 The Climate Action Plan 2023 (CAP23) is the second annual update to Ireland's Climate Action 2019. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings.



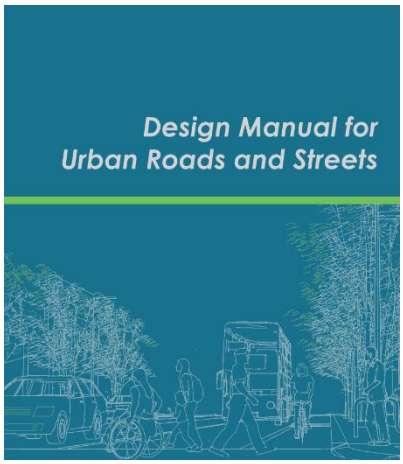
2.1.2 The plan implements the carbon budgets and sectoral emissions ceilings, and sets out a roadmap for taking decisive action to halve Ireland's emissions by 2030, and reach net zero no later than 2050, as committed to in the Programme for Government. CAP23 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

2.1.3 In terms of transport, CAP23 pledges to adopt the 'Avoid – Shift – Improve' approach, and targets a 50% reduction in emissions by 2030. It also aims to:

- Reduce the total distance driven across all journeys by 20%.
- Ensure that walking, cycling and public transport account for 50% of all journeys.

Ireland 2040 Our Plan: National Planning Framework

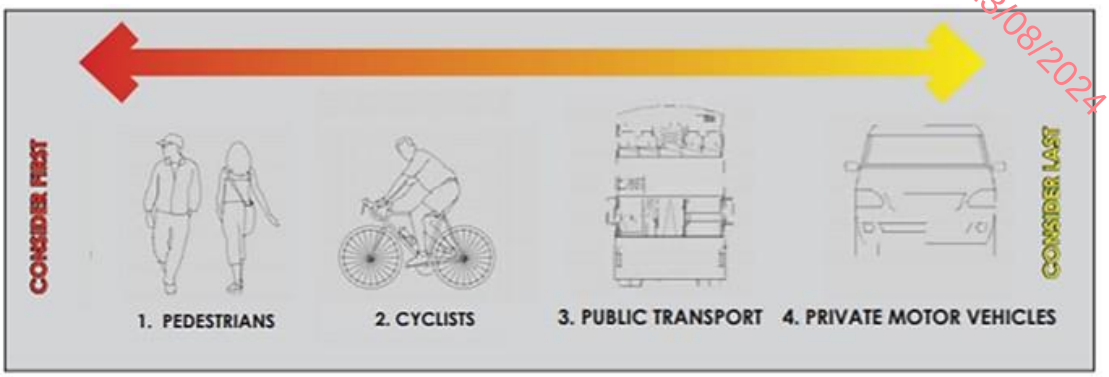
2.1.4 The National Planning Framework (NPF) outlines the strategic planning and development strategy for the whole of Ireland and all its regions for the next 20 years. The document co-ordinates National, Regional and Local Authority policies and activities through one central strategy, providing a reference point to adhere to.



The primary objective of the Design Manual for Urban Roads & Streets (DMURS), published by the Department of Transport, is to set out an integrated design approach for streets in urban areas which balances the needs of all users, and is influenced by the surrounding context of the street.

The manual aims to promote a sustainable approach to design which promotes real alternatives to the car. To achieve this the needs of sustainable modes must be considered before that of the private car. This is outlined in the user shown in **Figure 2.**

Figure 2. DMURS User Hierarchy



2.2 Regional Policy

Transport Strategy for the Greater Dublin Area 2022-2042

2.2.1 This strategy provides a framework for the planning and delivery of transport infrastructure and services in the Greater Dublin Area (GDA) over the next two decades. The Strategy sets out measures that the NTA believes are essential in meeting the objectives of the transport strategy to foster sustainable development and to fully integrate land use planning and transport planning, as a means of reducing travel demand both in terms of numbers of trips made and the length of trips. The objectives of the Strategy are:

- An Enhanced Natural and Built Environment
- Connected Communities and Better Quality of Life
- A Strong Sustainable Economy
- An Inclusive Transport System

2.3 Local Policy

Kildare County Development Plan 2023-2029

2.3.1 The Kildare County Development Plan sets out the strategy and objectives for development policy over the plan period. The Plan seeks to support the Transport Strategy for the Greater Dublin Area whilst facilitating transport infrastructure improvements within and around the county's key towns, including Naas.

2.3.2 In particular, the plan identifies the following objectives and actions to be undertaken during the plan period:

- **TM O31:** Ensure the delivery of robust and efficient cycle and walking infrastructure in Naas by enhancing permeability and improving linkages between Naas Town Centre, surrounding residential and employment areas, Sallins Railway Station and the Northwest Quadrant.

- **TM A16:** Progress the delivery of key measures outlined in the Naas / Sallins Transport Strategy 2020 on a phased basis as funding is secured.

Naas Local Area Plan 2021-2027

2.3.3 The area in which the proposed development is located is designated for 'Data Centre' land use within the Naas Local Area Plan 2021-2027. The document further states that:

> *"These lands are identified exclusively for Data Centres, to ensure the location of these types of proposals are controlled proximate to service areas of the county. The Council will not consider any alternative use on these lands, other than those associated with Data Centres (Objective EDO 1.12)."*

2.3.4 'Objective EDO 1.12' noted within the above excerpt taken from the Naas Local Area Plan 2021-2027 is contained within 'Policy ED 1 – Enterprise and Economic Development' states the following:

> *"Facilitate the location of Data Centre development on land designated P: Data Centre at Caragh Road South and Jigginstown for the identified land use only subject to appropriate environmental assessments, heat mapping, transport impact assessments and consideration of the cumulative impact on the electricity network supply capacity and targeted reductions in greenhouse gas emissions."*

Naas Sallins Transport Strategy (2020)

2.3.5 The Naas Sallins Transport strategy identifies the actions, objectives and aspirations the Council has towards making transport infrastructure improvements in and around Naas, including specific and deliverable measures to improve public transport services and the environment for walking and cycling.

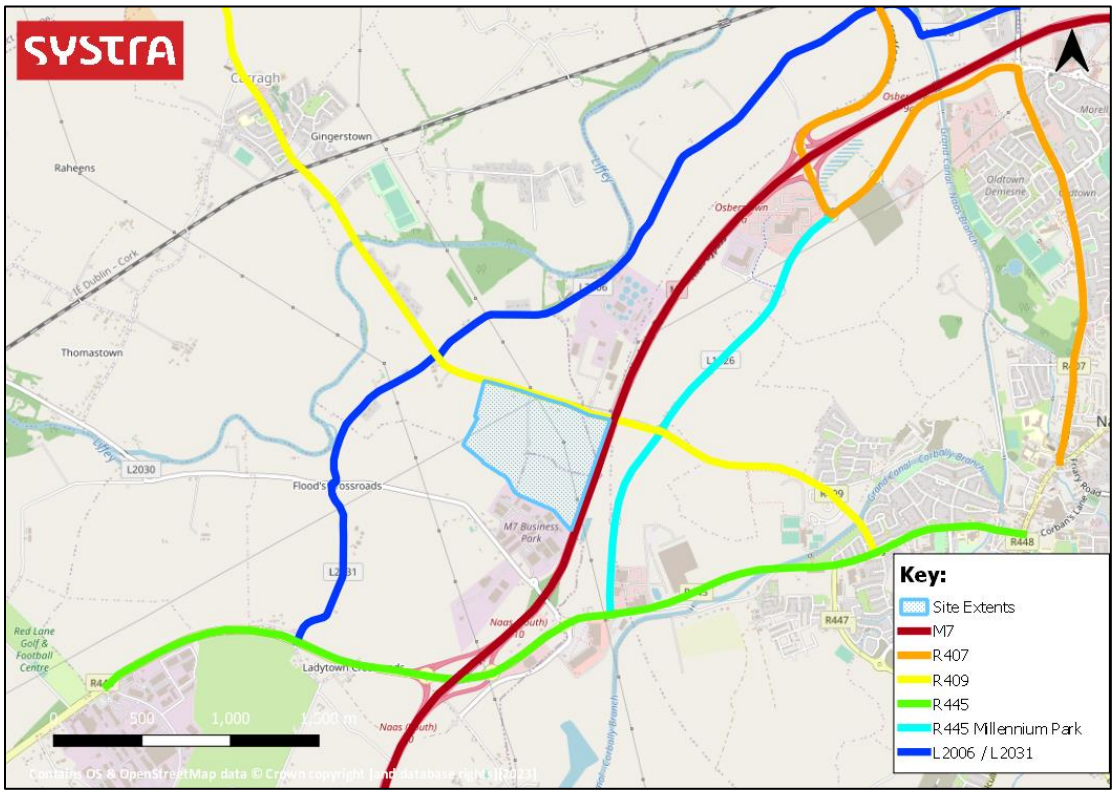
2.3.6 These measures do not currently extend to a commitment to assess the feasibility of improvements to these modes in the area of the proposed data centre development site.

3. EXISTING TRANSPORT CONDITIONS

3.1 Local Road Network

3.1.1 This section provides a brief summary of the surrounding road network, while a more extensive investigation will be undertaken in the emerging TA. **Figure 3** illustrates the key routes of the surrounding road network.

Figure 3. Local Road Network



R409

3.1.2 The R409 travels in a generally south-east to north-west direction, providing access to Naas Town Centre to the east of the site, and towards the villages of Carragh and Blackwood to the west. In the vicinity of the site the R409 comprises a single carriageway, with one traffic lane running in each direction and with a 60km/h speed limit in place.

3.1.3 The proposed development will be accessed from the R409, along the north boundary of the site.

M7 Motorway

3.1.4 Aligned to the immediate east of the site, the M7 motorway connects Limerick in the south-west to Dublin in the north-east. It provides access to a number of major settlements to the southwest of Dublin including Naas, Newbridge, Kildare and Portlaoise.

3.1.5 The M7 can be accessed from the site via two recently developed junctions, at Millennium Park and the Sallins Bypass to the north-east (Junction 9a), and Newhall Retail Park to the south (Junction 10). Both junctions can be accessed via the R409 and the R445 Millennium Park, either to the north or south. These junctions are equidistant distance from the site at a distance of approximately 2.5km.

R445 and R445 Millennium Park

3.1.6 The R445 is a regional road which connects Newbridge to the south-west to Naas town centre to the north-east via the M7 junction 10. R445 Millennium Park is a newer link which runs north from the R445 east of M7 junction 10 and to the east of the motorway, to connect to the R409, M7 junction 9a, the R407 and the northern residential areas of Naas.

L2006 and L2030

3.1.7 These two local roads offer an alternative, more lightly trafficked route to the site from the M7 junction 10. Vehicles would travel westwards along the L2030 to connect with the L2006 to travel northwards to the R409.

3.2 Pedestrian and Cycle infrastructure

3.2.1 The R409 along the north boundary of the site has no existing pedestrian infrastructure. Footways are provided on both sides of the R409 approximately 100m east of the M7 boundary of the site, which then connects to a network of pedestrian and cycle ways travelling along the R409 and R445 Millennium Park Road towards the town of Naas and surrounding commercial areas respectively.

3.2.2 Travelling north, east and south from the R409 / R445 roundabout to the east of the M7, shared pedestrian/cycle paths are provided on both sides of each of the roads. These paths are segregated from the road carriageway by verges and bollards, and street lighting is provided along their entirety. **Figure 4** illustrates the general characteristics of the R409 travelling towards Naas.

Figure 4. General Characteristics of R409 (Travelling Towards Naas)

3.3 Public Transport

3.3.1 The nearest bus stops to the site are located approximately 1.8km to the southeast along the R445 at Newhall Retail Park. The bus stops around Newhall Retail Park provide half hourly services between Kildare/Newbridge and Dublin City Centre (126 Go-Ahead service), and half hourly services between Kildare/Portlaoise and Maudlings/Dublin Airport (726 Dublin Coach service). There is also a 2-3 hourly service between Newbridge and Sallins Train Station (821 TFI Local Link service) which passes by the site along the R409 but does not have any nearby designated stops.

3.3.2 The nearest train station is located at Sallins & Naas, approximately 4.5km to the northeast of the site. An approximate half hourly service to/from Dublin Heuston is provided, with these services originating/continuing from either Newbridge or Portlaoise. Bus services between the train station and Naas are also available (Services 123 and 126) which allows for linked public transport journeys.

4. THE PROPOSED DEVELOPMENT

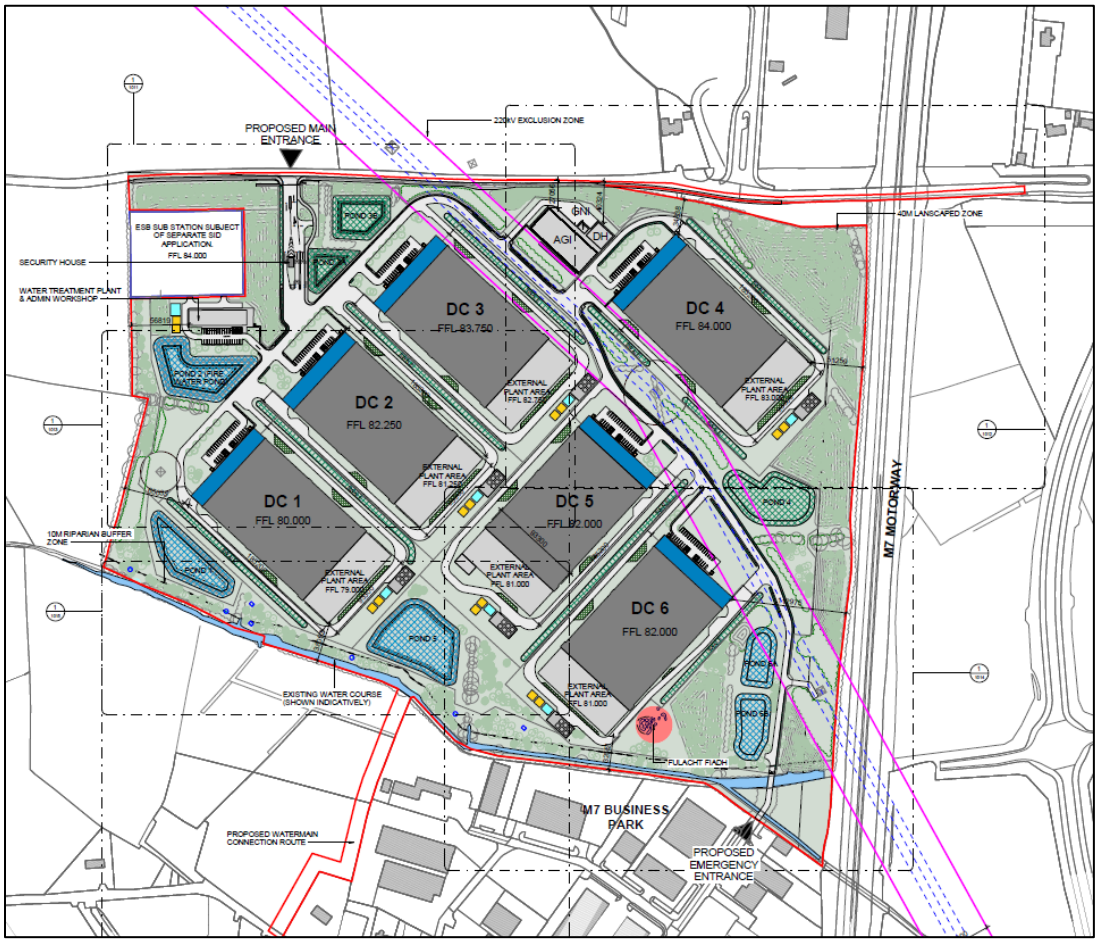
4.1 Overview

4.1.1 The proposed development comprises 6 no. two storey data centre buildings, an administration / management building, car parking, landscaping and other associated works. The key elements of the proposed development are:

- Site Area – 37.51Ha;
- Gross Floor Area (GFA) of each data centre building – Approximately 27,261sqm in total;
- An administration / management building; and
- 210 car parking spaces across the campus.

4.1.2 An indicative layout of the proposed development is illustrated by **Figure 5**, detailing the location of each data centre building and associated car parking. A full-sized version of the site layout in provided in **Appendix A**.

Figure 5. Indicative Site Layout



4.2 Site Access

4.2.1 The main site located towards the north-western corner of the site. Access will be achieved from the R409 via a new priority junction.

4.2.2 A secondary, emergency access will also be provided at the south-eastern corner of the site, accessed through the M7 Business Park via the Newbridge Road / M7 Business Park roundabout.

4.3 Car Parking

4.3.1 The current Kildare County Development Plan (2023-2029) does not set out appropriate car parking standards for the bespoke land use of the proposed development. However and as stated previously, this site is specifically designated for the land use of 'Data Centres' within the Naas Local Area Plan.

4.3.2 It is proposed that, of the 27,261sqm of each proposed data centre building, 4,800sqm of this will be assigned as office / admin space. When considering the six data centre buildings and the additional administration / management building's GFAs, this would equate to 29,100sqm of total office / admin GFA across the campus.

4.3.3 Car parking standards for an 'Office Park' land use set out within the current Kildare County Development Plan state a maximum parking limit of 1 space per 50sqm (where the GFA exceeds 1,500sqm). Applying this standard to the assigned use of office / admin space across the campus would equate to a maximum car parking level of 582 car parking spaces.

4.3.4 Based on the bespoke operational requirements of the data centre, it is proposed to provide 30 car parking spaces at each of the six data centre buildings, with an additional 30 car parking spaces located at the administration / management building. This equates to a total of 210 car parking spaces across the proposed development, which is well within the maximum parking level set out by the 'Office Park' standards within the current Kildare County Development Plan.

4.3.5 Of the 30 parking spaces that will be provide at each unit and the administration / management building, two will be designated for disabled use only, while nine will be for EV charging only.

4.4 Pedestrian and Cycle Facilities

4.4.1 As described in Section 3 of this report, the R409 has no existing infrastructure for pedestrians in the immediate area of the proposed site access junction. The nearest footways are approximately 100m to the east of the access and extend from there towards the town of Naas and to surrounding commercial areas.

4.4.2 In order to provide appropriate pedestrian and cyclist access to the proposed development, the applicant will upgrade active travel infrastructure on the R409. Full details of the proposed works are included on drawings 2232-DOB-ZZ-ZZ-DR-C-1600 (**Appendix B)**. Key aspects of the proposed improved VRU works along the R409 are as follows:

- Transition of the existing cycle path and footpath to a single 2.0m wide 'off-road' shared surface, which maintains existing carriageway widths on the bridge structure in accordance with TII Transition zone detail (CC-SCD-05106).
- The 2.0m shared surface crossing the bridge structure shall transition to a separated 1.8m off road cycle path and 2.0m footpath on the west side of the bridge once clear of the existing traffic barrier restrictions. This arrangement shall continue along the R409 for the extent of the proposed development boundary.
- The proposed arrangement shall be constructed to allow for a 3.0m wide bus stop carriageway where the proposed cycle track shall transition to a 1.8m 'on-road' arrangement for the extent of the bus stop as indicated below.
- A proposed shared surface shall be proposed at the main site entrance to facilitate all VRU's travelling to and from the site.
- The road will be provided with public lighting and full details of this are included in this application.
- New roadside drainage will be provided along the southern section of the road where new kerbs are to be installed as part of the proposed improvement works.

Cycling Parking

4.4.3 The Kildare County Development Plan does not outline appropriate cycle parking standards for this bespoke land use type. In the context of land uses which are accounted for in this document, the *Warehousing* land use seems most appropriate given much of the floorspace within the development proposals will not be utilised by employees, but instead will hold the computing infrastructure of the data centre.

4.4.4 The parking standards relating to *Warehousing* stipulate a rate of 1 stand per 1000m^2 which would equate to 27 stands. With 1 stand being 5 cycle parking bays, the provision of 27 stands would result in 135 being required.

4.4.5 It is understood that 225 staff are anticipated to be employed by the proposed development. With 135 cycle parking spaces being required, ~60% of staff would have a dedicated cycle parking space. As will be demonstrated in Section 5, the established travel mode share of the ward within which the development is located is very car dependent - 92.7% of the population are single occupancy car users in travel to work to education.

4.4.6 That being said, the developer should ensure that a reasonable provision of cycle facilities are provided at the proposed development to encourage active travel trips to the development. As such, the development will incorporate a total of 104 cycle spaces, with 16 provided per Data Centre building – which equates to cycle parking for 57% of permanent staff at each Data Centre – and 8 spaces provided at the administration building.

4.5 Public Transport

4.5.1 The proposed pedestrian and cycle infrastructure on the R409 will be accompanied the provision of a bus stop adjacent to the proposed development – approximately 100m east of the vehicular access junction. This stop will be constructed in accordance with *Kneeling Bus Option 1* (National Cycle Manual p. 164) whereby the cycle lane runs along the carriageway side of the bus layby, with no deflection for cyclists. The detail of this bus stop is illustrated in **Appendix B**.

5. TRIP GENERATION AND DISTRIBUTION

5.1 Summary of Approach

5.1.1 This section of the TA presents the forecast trip generation of the proposed development by all modes of travel.

5.1.2 The standard approach to trip generation within a TA is to use the TRICS database to identify similar operational sites, and to use this historic survey data to forecast development trips.

5.1.3 In this instance, due to the bespoke land use on the site, SYSTRA has adopted a 'first principles' approach to trip generation, based upon operational information provided to us by our client.

5.1.4 As a bespoke land use, in order to define the travel characteristics of the proposed development, it is fundamental that a number of key elements are understood:

- The proposed total number of staff;
- The breakdown of staff by category (admin, security, maintenance etc.);
- Shift patterns / working hours for each category of staff;
- The potential transport modal split of staff;
- The anticipated daily activity of HGVs accessing the site; and
- Geographical distribution of staff.

5.1.5 Each of these elements are explored further within this section.

5.2 Proposed Total Number of Staff

5.2.1 The applicant has provided the information shown in **Table 1**, which lists the expected number of staff assigned to each individual data centre building, and across the entire site by category. The 'Total Facility Staff' value includes for all six data centre buildings and administration building staff. These values are based upon a typical data centre building operation for the size of this proposed development.

Table 1. Expected Total Number of Staff by Category (Typical Working Day)

CATEGORY OF STAFF	STAFF PER DATA CENTRE BUILDING	TOTAL FACILITY STAFF	TOTAL DAY TIME OCCUPANCY
Tenant Security	4	24	10
Cleaners	2	20	8
M&E Engineers	10	60	24
Engineering Support	6	30	12
Technical Support	4	24	10

CATEGORY OF STAFF	STAFF PER DATA CENTRE BUILDING	TOTAL FACILITY STAFF	TOTAL DAY TIME OCCUPANCY
Administration Staff	2	12	12
Landlord Management	N/A	20	8
Landlord Engineering Support	N/A	25	10
Landlord Security	N/A	10	4
Total Staff	**28**	**225**	**98**
Anticipated Customers / visitors	25	125 - 175	50 - 70

5.2.2 **Table 1** indicates that the total expected number of operational staff and customers / visitors related to the entire proposed development would be between 350 and 400. These are daily total values and do not take into account shift patterns.

5.3 Shift Patterns / Working Hours

5.3.1 The data centre campus will operate 24 hours a day, 7 days per week. Shift patterns for each of the defined staff categories are listed below:

- Security and Cleaning staff – 12 hour shifts, typically 7am-7pm and 7pm-7am;
- General and Landlord Management staff – Typically more conventional hours such as 8:30am - 5:30pm. Arrivals and departures can be variable as they may be attending other facilities;
- Maintenance staff – May work across multiple facilities and working patterns will be primarily out of hours shift work and therefore arrive and depart the campus outside typical peak hours; and
- Visitors, Customers and Subcontractors – Attendance will be variable dependent upon the tenants of each building and their needs. These would typically arrive and depart the facility outside of peak traffic hours given the site is 24 hours operated.

5.3.2 From the information provided by the applicant and the end operator regarding staff numbers, expected shift patterns and working hours – based upon similar colocation data centre facilities and with the exception of Administration staff - the daily occupancy typically equates to 40% of the total staff numbers. This gives a total daytime occupancy of 98 staff for the whole campus.

5.3.3 The quantum of customers, visitors and support staff can be variable based upon the tenants within the facility and their needs. These would typically arrive and depart from the facility outside peak traffic hours given the site is 24 hours operated. All customers arriving on site will likely require pre-approval which is operated by Landlord Management.

5.3.4 Forecast trip generation for arrivals and departures during peak traffic hours is based on figures from similar data centres, with the total dedicated staff and personnel arriving during the AM peak period and departing during the PM peak expected to be 56. However, this may vary based upon the Tenant demand, with customer and visitor arrivals dependent on the type of campus facility. Therefore, to provide a robust estimate of peak hour trips at the data centre, it has been assumed that up to an additional 50 persons could arrive and depart the site during peak hours. This totals 106 two-way trips during both the AM and PM peak periods.

5.3.5 **Table 2** indicates the expected number of generated facility staff trips during the typical network morning (08:00-09:00) and evening (17:00-18:00) peak hours that have been considered by this TA.

Table 2. Generated Staff Trips During Typical Peak Hours

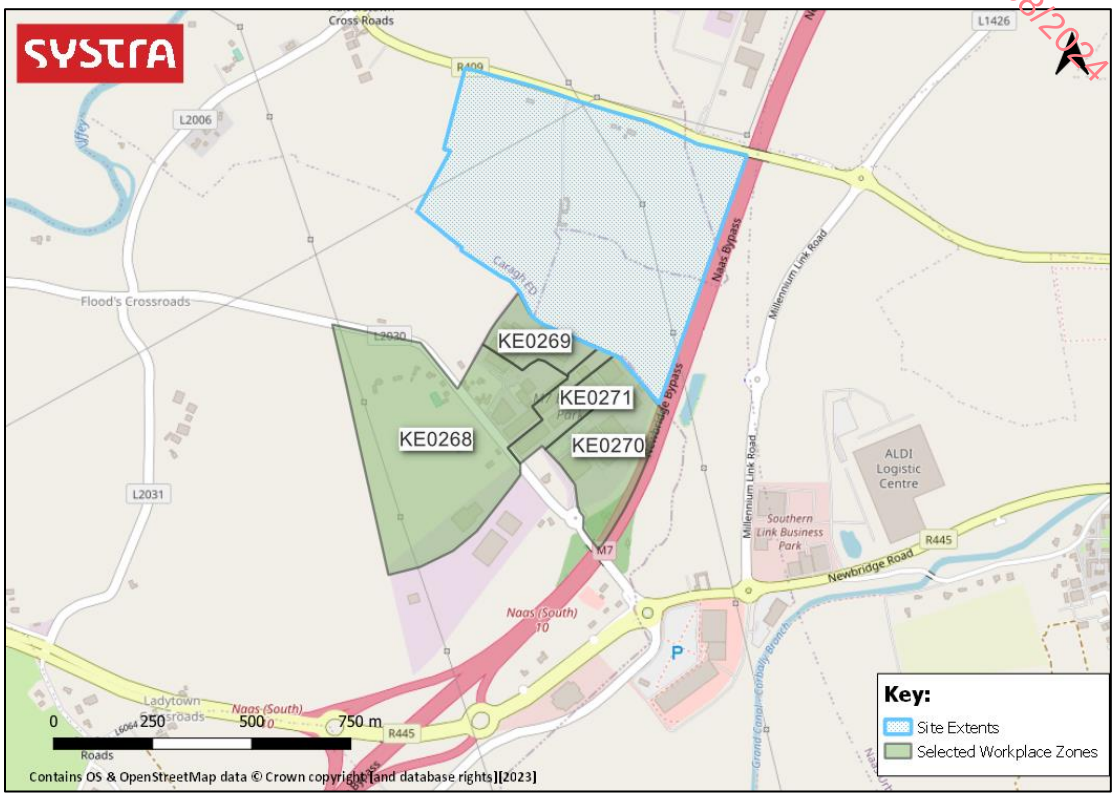
	AM PEAK PERIOD			PM PEAK PERIOD		
Category	Arrival	Departure	Total	Arrival	Departure	Total
Engineering Support	12	-	12	-	12	12
Technical Support	10	-	10	-	10	10
Administration Staff	12	-	12	-	12	12
Landlord Management	8	-	8	-	8	8
Landlord Engineering Support	10	-	10	-	10	10
Landlord Security	4	-	4	-	4	4
TOTALS	56	-	56	-	56	56

5.4 Transport Modal Split of Staff

5.4.1 2016 Ireland Census information has been interpreted in order to identify an appropriate travel to work mode share for the proposed development. As the site is currently unoccupied, and there are no other significant workplaces located within the specific 'Workplace Zone' (as identified within the Census) in which the site is situated, commuting information relating to the 'Workplace Zones' associated with the M7 Business Park to the immediate south of the

site has been utilised in this methodology. **Figure 6** illustrates the zones within the Census which have been included in the analysis.

Figure 6. 2016 Ireland Census Workplace Zones Used for Mode Share Analysis



5.4.2 It is acknowledged that the M7 Business Park is not identical to the proposed development in terms of land use, active travel and public transport availability.

5.4.3 **Table 3** indicates the transport mode share identified from the specified 'Workplace Zones' when interpreting the question of 'Population aged 5 years and over by means of travel to work, school or college'. Whilst it is acknowledged the Census question interpreted does not specifically ask about workplaces, there are no schools or colleges located within the specified zones selected for this analysis.

Table 3. 2016 Ireland Census Transport Mode Share

MODE OF TRANSPORT	PERCENTAGE SHARE
Walking	0.8%
Cycling	0.8%
Public Transport	2.0%
Vehicle Passenger	3.7%
Vehicle Driver	92.7%

5.4.4 As indicated by **Table 3**, information gathered for the 2016 Ireland Census across the 'Workplace Zones' associated with the M7 Business Park suggest that 3.6% of people travel to work using active or sustainable modes of transport, with 96% of people travelling via private vehicle. The interpreted mode share suggests a vehicle occupancy rate of approximately 1.04 people per vehicle.

5.5 Geographical Distribution of Staff

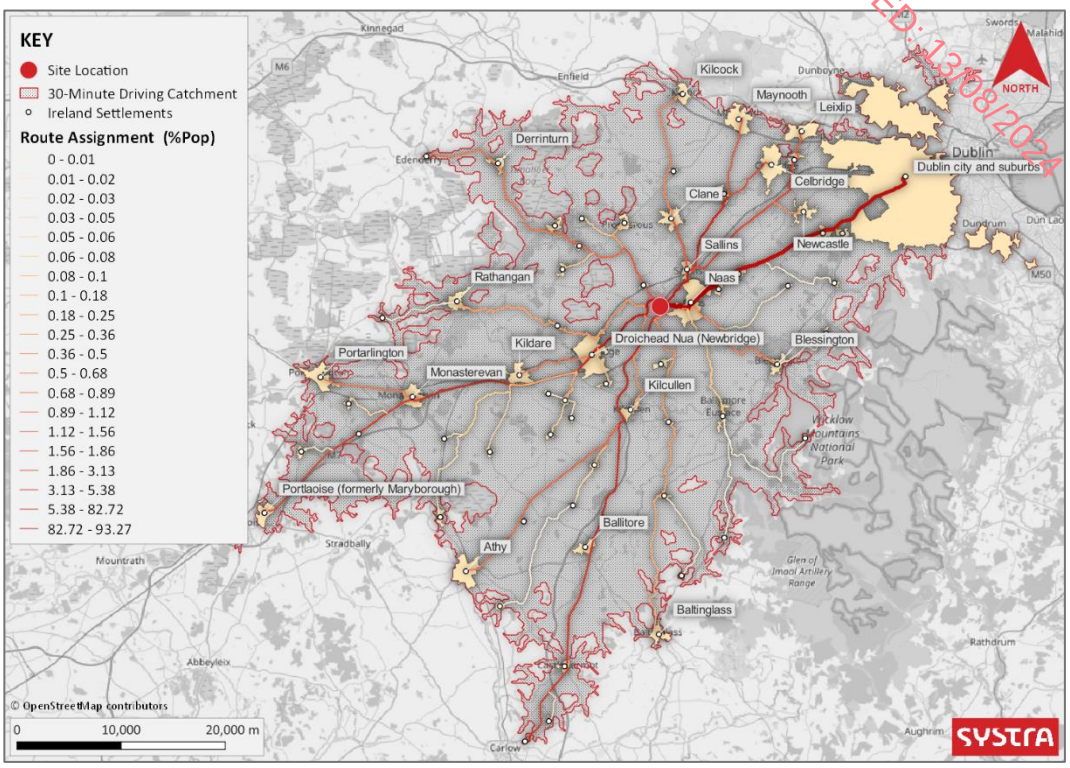
5.5.1 For the purposes of assessing the likely distribution and assignment of vehicle trips associated with the development proposals, a gravity model has been utilised which considers settlements within a 30-minute driving catchment from the site. To derive the percentage of trip origins / destinations from the identified settlements (δ) a simple gravity model formula has been applied:

$$\delta = \frac{Population}{Cost\ (Distance)}$$

5.5.2 It should be noted that while Dublin is theoretically accessible within a 30-minute driving catchment from the site, the accessible areas of the city pertain to outer suburbs and not the city centre. As such, the *effective accessible population* has been scaled by a factor of 0.33, or 33% of the city's population accordingly.

5.5.3 **Figure 7** shows the settlements that fall within the 30 minute driving catchment, along with the indicative assignment of traffic to / from the development. The width of the lines representing route assignment are a function of the destination population as a percentage of aggregate population within the catchment area. A larger, full-sized version of this figure is provided in **Appendix C**.

Figure 7. Traffic Assignment



5.5.4 The distribution demonstrated in **Figure 7** stipulates that 52% of vehicle trips will assign via the Millennium Park Roundabout to access the M7, with the majority of traffic heading north to destinations such as Dublin, Celbridge and Newcastle. It is estimated that 19% of vehicle trips will assign via the Bundle of Sticks Roundabout to the south, with the remaining 29% vehicle trips associated with settlements such as Naas, Rathangan and Blessington which will not assign on to the M7 junctions.

5.6 Anticipated Daily Activity of HGVs

5.6.1 Once operational, it is estimated that each of the data centre buildings would generate 2 HGV trips per day (4 two-way trips), with the administration building generating 1 HGV trip per day (2 two-way trips). This would equate to 26 daily two-way HGV trips being generated by the proposed development once operational.

5.6.2 HGVs will require security access prior to entering the site, and trips will typically fall outside of peak traffic hours.

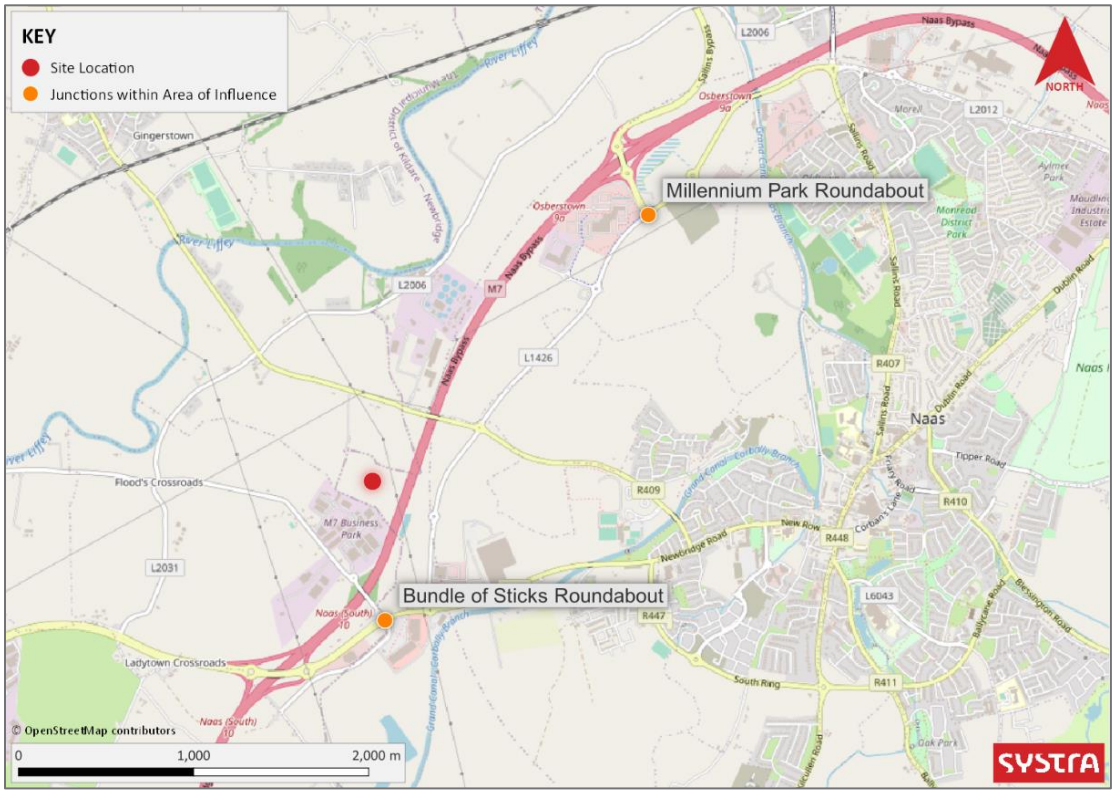
6. TRAFFIC IMPACT ASSESSMENT

6.1 Introduction

6.2 Link Flow Assessment

6.2.1 In order to inform the potential extents of the area of influence for the emerging TA, two traffic surveys were conducted to quantify weekday peak hour traffic volumes on the north arm of the Millennium Roundabout and the west arm of the Bundle of Sticks Roundabout, with the location of these junctions shown in **Figure 8**.

Figure 8. Surveyed Junctions



The ATC data indicated that the network peak hours are 08:00 – 09:00 in the AM and 17:45 – 18:45 in the PM. **Table 4** below summarises the peak hour traffic flows at these two junctions.

Table 4. Peak Hour Link Flows at Surveyed Junctions

Site	Base					
	AM Period (08:00 - 09:00)			PM Period (17:45 - 18:45)		
	East	West	Two-Way	East	West	Two-Way
L1: Bundle of Sticks Roundabout	1015	645	1660	871	954	1825
L2: Millennium Park Roundabout	503	680	1183	679	573	1252

6.2.2 A link flow assessment of the junctions within the area of influence has been conducted by applying the vehicle assignment outcomes to the anticipated vehicle trip generation of the

proposed development. The outcomes of this analysis are presented in **Table 5** below, with the %Δ column demonstrating the percentage uplift in vehicle trips with the proposed development considered.

Link Flow Analysis

Site	Base							
	AM Period (08:00 - 09:00)			PM Period (17:45 - 18:45)			AM Peri	
	East	West	Two-Way	East	West	Two-Way	East	West
L1: Bundle of Sticks Roundabout	1015	645	1660	871	954	1825	1035	645
L2: Millennium Park Roundabout	503	680	1183	679	573	1252	503	732

Site	Base						Base + Development							
	AM Period (08:00 - 09:00)			PM Period (17:45 - 18:45)			AM Period (08:00 - 09:00)				PM Period (17:45 - 18:45)			
	East	West	Two-Way	East	West	Two-Way	East	West	Two-Way	%Δ	East	West	Two-Way	%Δ
L1: Bundle of Sticks Roundabout	1015	645	1660	871	954	1825	1032	645	1677	1.01%	871	971	1842	0.92%
L2: Millennium Park Roundabout	503	680	1183	679	573	1252	503	735	1238	4.63%	734	573	1307	4.37%

6.2.3 **Table 5** indicates that the proposed development is expected to increase traffic volumes on the west arm of the Bundle of Sticks Roundabout by approximately 1%, and by approximately 4% on the north arm of the Millennium Park Roundabout.

6.2.4 This uplift is considered minimal in the context of existing flows and robust peak hour calculation (with the inclusion of customers and visitors). Notwithstanding this conclusion, SYSTRA are developing a VISSIM model to assess the traffic impact of the development proposals on the local road network. To support the model a series of additional traffic surveys have been undertaken, which are further described in the following section.

6.2.5 For the purpose of providing a robust VISSIM model, the study area has been extended beyond the initial traffic surveys undertaken. This wider study area is demonstrated by **Figure 9** in the following section which indicates the junctions that will be considered in the modelling exercise.

6.3 Wider Traffic Baseline

2023 Traffic Surveys

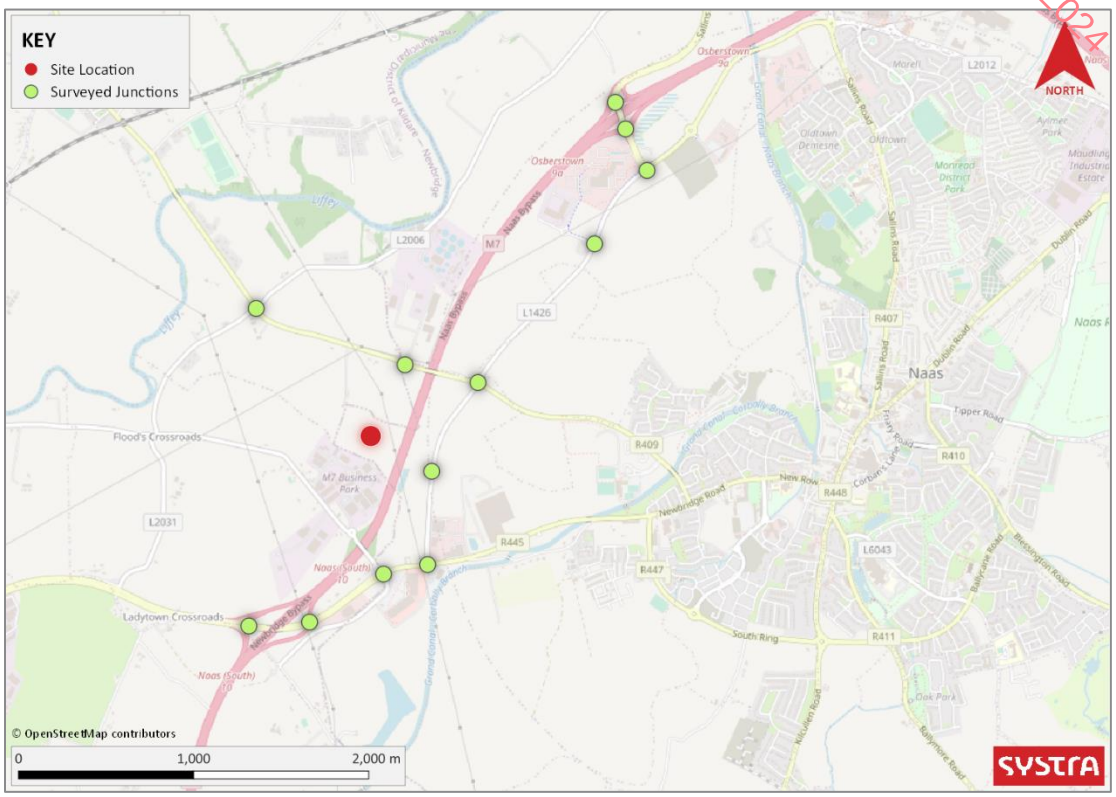
6.3.1 In order to gain an understanding of the existing volumes of traffic that use the road network in the area of the proposed development, traffic surveys were carried out on Tuesday 28th March 2023 at a total of twelve junctions around the site:

- Site 1 - M7 J9a Northbound slips / Sallins Bypass roundabout;
- Site 2 – M7 J9a Southbound slips roundabout;
- Site 3 – R445 Millennium Park / M7 J9a Link Road roundabout;
- Site 4 - R445 Millennium Park / Millennium Park access roundabout;
- Site 5 - R445 Millennium Park / R409 roundabout;
- Site 6 – R409 / Osberstown Business Park access priority junction;
- Site 7 – R409 / L2006 Newhall / L2006 Osberstown priority junction;
- Site 8 - R445 Millennium Park roundabout (between Sites 7 and 9);
- Site 9 - R445 / R445 Millennium Park roundabout;
- Site 10 – R445 / Jigginstown Road roundabout;
- Site 11 – M7 J10 Southbound slips / R445 roundabout; and

- Site 12 – M7 J10 Northbound slips / R445 roundabout.

6.3.2 The locations of these junctions are shown in **Figure 9**.

Figure 9. 2023 Traffic Survey Locations



6.3.3 Automatic Traffic Count (ATC) data has also been collected at six locations around the proposed development site:

- Site 1 - R445 Millennium Park south of access to Kerry Global Centre;
- Site 2 - R445 Millennium Park north of R409 roundabout;
- Site 3 – R409 to the west of the M7;
- Site 4 - R445 Millennium Park north of R445 roundabout;
- Site 5 – R445 1.25 km east of Ladytown Business Park; and
- Site 6 – R445 southwest of the M7 overpass.

6.3.4 The ATC surveys were undertaken for a total of seven days to provide 5-day and 7-day average traffic flows as well as vehicle speed information. However, only six days' data was collected at Site 1 due to equipment damage.

7. TRAFFIC IMPACT ASSESSMENT

7.1.1 In order to comprehensively model the traffic impact from the proposed data centre, SYSTRA has developed a VISSIM microsimulation model of the adjacent road network. This includes Junctions 9A and 10 of the M7, the M7 itself between these junctions, the R409 and the R445 that runs parallel to the M7, between the aforementioned two junctions.

7.1.2 The travel characteristics for the data centre have been calculated from a first principles approach, based on staff numbers and shift patterns, anticipated visitor numbers and Census data. Growth factors to calculate the forecast future year of 2037 have been agreed with KCC to reflect the growth aspirations of Naas Sallins Transport Strategy. These equate to 20% for through traffic on the M7 and 23% on the local roads.

7.2 Network Statistics Comparison

7.2.1 **Tables 6** and **7** provide a comparison of the network statistics for the entire modelled network for the weekday AM and PM time periods. This is based on the forecast year of 2030, with and without development related traffic from the proposed data centre.

Table 5. AM Peak Comparison of Network Statistics

	2030 Base	2030 Base with Development	Diff.
Average delay (s)	46.9	47.0	0.1
Total delay (s)	175.3	176.2	0.9
Average stopped delay (s)	6.4	6.6	0.2
Average network speed (mph)	42.9	42.8	0
Total Vehicles	12387	12416	29
Latent Demand	183	189	6

7.2.2 As **Table 6** clearly demonstrates, the proposed data centre will have a negligible impact on the modelled network during the AM peak period, with minimal increases for each of the measured statistics.

Table 6. PM Peak Comparison of Network Statistics

	2030 Base	2030 Base with Development	Diff.
Average delay (s)	56.3	57.1	0.8
Total delay (s)	261.5	266.2	4.7
Average stopped delay (s)	9.1	9.2	0.1
Average network speed (mph)	41.6	41.4	0
Total Vehicles	15475	15549	74
Latent Demand	379	381	2

7.2.3 Similar to the AM period, **Table 7** clearly demonstrates, the proposed data centre will have a negligible impact on the modelled network during the PM peak period, with minimal increases for each of the measured statistics.

7.3 Journey Time Comparison

7.3.1 Travel times were extracted from both peak periods for all of the routes shown below in **Figure 10** below.

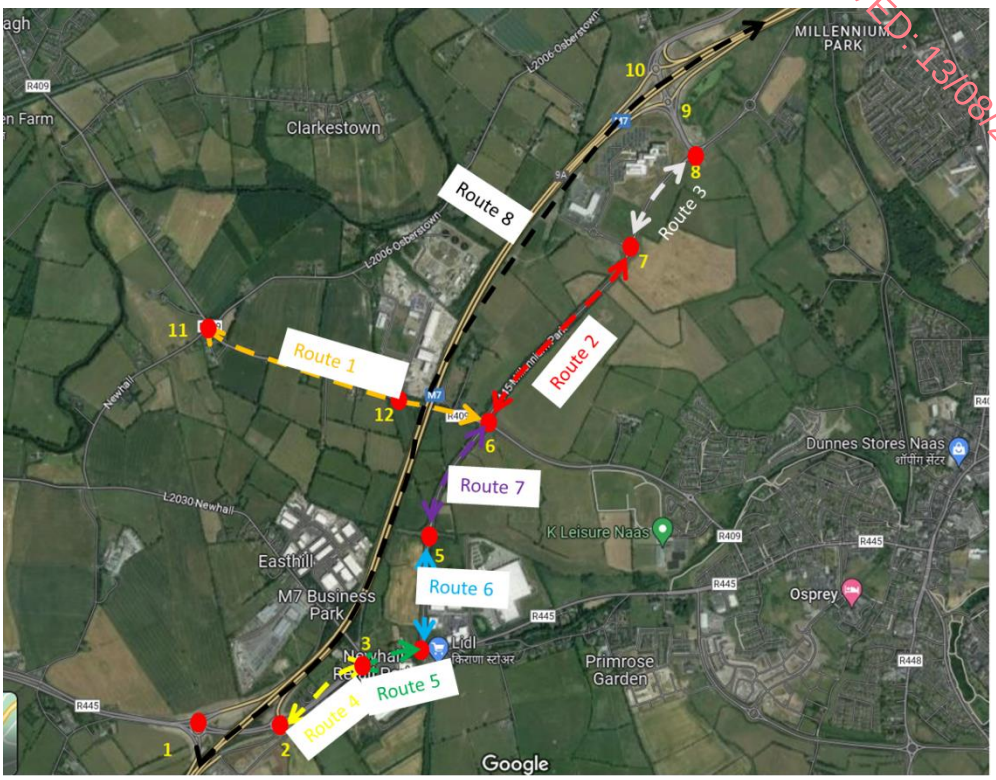


Figure 10. Journey Time Routes for Comparison

7.3.2 **Tables 8** and **9** provide a comparison of the journey times for eight routes indicated by **Figure 10**. This is for the weekday AM and PM time periods, for the forecast year of 2030, and with and without development related traffic from the proposed data centre.

Table 7. AM Peak Journey Time Comparison

Route	2030 Base (s)	2030 Base with Development (s)	Difference (s)
Route 1 EB	131.6	146.2	14.5
Route 2 EB	74.2	74.1	-0.1
Route 3 EB	41.9	41.8	0.0
Route 3 WB	39.1	39.2	0.1
Route 2 WB	70.7	70.8	0.1
Rout 1 WB	91.6	97.3	5.7
Route 4 EB	78.6	82.0	3.4
Route 5 EB	39.9	40.2	0.3
Route 6 EB	42.6	42.6	0.0
Route 7 EB	88.9	89.3	0.3
Route 7 WB	46.8	46.9	0.1
Route 6 WB	44.8	45.3	0.4
Route 5 WB	19.3	19.4	0.1
Route 4 WB	63.9	63.9	0.0
Route 8 SB	120.9	121.3	0.4
Route 8 NB	121.3	121.2	-0.1

7.3.3 Overall, **Table 8** indicates that the additional traffic generated by the proposed data centre during the weekday AM period will result in a minor increase in journey times, along each route within the modelled area. It is noted that Route 1 (eastbound) will see an increase of approximately 15 seconds. SYSTRA would note that this route on the R409, where the development will be accessed from, is approximately 1.3km in length. As such an additional 15 seconds would not have a perceivable impact to drivers.

Table 8. PM Peak Journey Time Comparison

Route	2030 Base (s)	2030 Base with Development (s)	Difference (s)
Route 1 EB	88.8	104.5	15.7
Route 2 EB	69.9	69.9	-0.1
Route 3 EB	43.1	43.1	0.0
Route 3 WB	48.2	47.9	-0.3
Route 2 WB	83.0	83.6	0.5
Rout 1 WB	95.4	102.9	7.5
Route 4 EB	106.1	110.0	3.9
Route 5 EB	60.9	62.2	1.2
Route 6 EB	44.0	44.1	0.1
Route 7 EB	125.0	125.3	0.3
Route 7 WB	47.1	47.1	0.0
Route 6 WB	45.9	45.6	-0.3
Route 5 WB	22.4	22.7	0.4
Route 4 WB	110.8	111.6	0.8
Route 8 SB	129.4	130.4	1.0
Route 8 NB	118.9	118.9	0.0

7.3.4 As with the AM period, **Table 9** indicates that the additional traffic generated by the proposed data centre during the weekday PM period will result in a minor increase in journey times, along each route within the modelled area. Similar to the AM period, Route 1 (eastbound) will see an increase of approximately 16 seconds, but over a distance of approximately 1.3km, drivers are would not notice this increase in journey time.

7.4 Summary of Modelling Results

7.4.1 Having carried out a robust and comprehensive modelling exercise, the results of the VISSUM models clearly indicate that the proposed development will not have a detrimental impact to the operation of the local and strategic road network. This includes Junctions 9A and 10 of the M7.

7.4.2 The results of the analysis indicate that the proposed data centre will have a negligible impact on the adjacent road network, including Junctions 9A and 10 of the M7. SYSTRA would therefore conclude that no off-site works are required to mitigate the development impact.

7.4.3 The methodology and detailed results of the traffic modelling exercise are set out in SYSTRA's Model Development Report, reference **2232-SYS-XX-XX-RP-D-003**. A copy of the VISSIM modelling files can be provided on request.

8. SUMMARY AND CONCLUSIONS

8.1 Summary

8.1.1 SYSTRA Ltd has been commissioned by the Herbata Ltd. to provide transport and highways advice in relation to the proposed Data Centre near Naas, County Kilkenny.

8.1.2 This Transport Assessment describes and evaluates the baseline transport environment, forecasts multi-modal travel demand from the proposed development, and assesses the potential impact of this demand on the surrounding network.

Proposed Development

8.1.3 The proposed development comprises 6 no. two storey data centre buildings, an administration / management building, car parking, landscaping and other associated works. The key elements of the proposed development are listed below:

- Site Area – 37.51Ha;
- Gross Floor Area (GFA) of each data centre building – Approximately 27,261sqm in total;
- An administration / management building; and
- 210 car parking spaces across the campus.

8.1.4 In order to provide appropriate pedestrian and cyclist access to the proposed development, the applicant will provide a 2m wide segregated cycle path and pathway along the southern side of the R409 (Caragh Road) between the proposed vehicular access junction and the existing shared pathway located on the western side of the bridge over the M7. A 2m shared surface will be provided over the M7.

8.1.5 The proposed pedestrian and cycle infrastructure on the R409 will be accompanied the provision of a bus stop adjacent to the proposed development – approximately 100m east of the vehicular access junction. This stop will be constructed in accordance with *Kneeling Bus Option 1* (National Cycle Manual p. 164) whereby the cycle lane runs along the carriageway side of the bus layby, with no deflection for cyclists.

Trip Generation

8.1.6 Due to the bespoke land use on the site, SYSTRA has adopted a 'first principles' approach to trip generation, based upon operational information provided to us by our client. As a bespoke land use, in order to define the travel characteristics of the proposed development, it is fundamental that a number of key elements are understood:

- The proposed total number of staff;
- The breakdown of staff by category (admin, security, maintenance etc.);
- Shift patterns / working hours for each category of staff;
- The potential transport modal split of staff;
- The anticipated daily activity of HGVs accessing the site; and
- Geographical distribution of staff.

8.1.7 The result of this analysis indicates that 56 two-way person trips are anticipated to be made in the AM and PM peak periods.

8.1.8 The results of the analysis indicate that the proposed data centre will have a negligible impact on the adjacent road network, including Junctions 9A and 10 of the M7. SYSTRA would therefore conclude that no off-site works are required to mitigate the development impact.

8.2 Conclusions

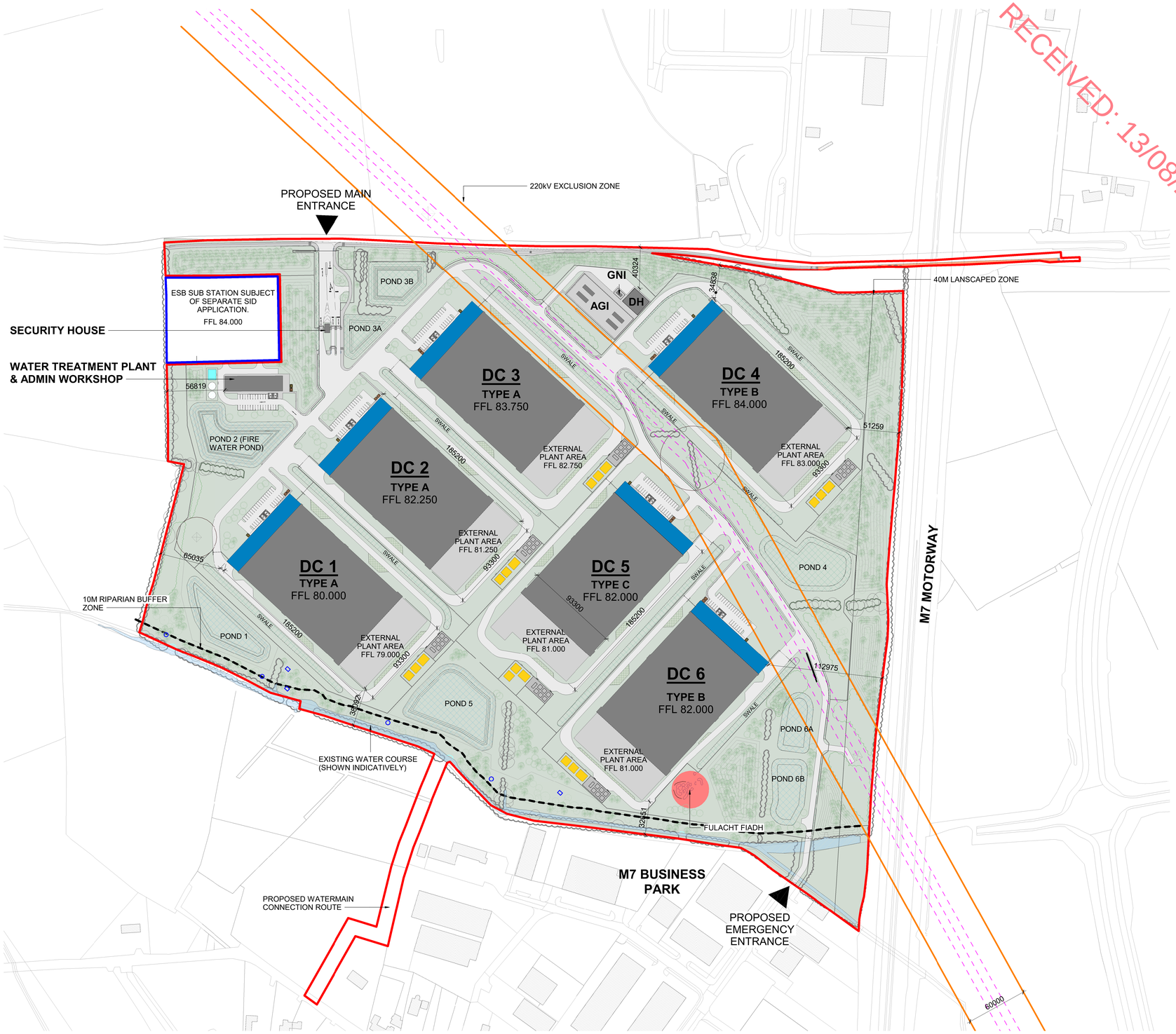
8.2.1 The proposed development is considered to be well placed to take advantage of the surrounding transport network. Dedicated pedestrian and cycle infrastructure as part of the application will encourage sustainable transport trips where possible.

8.2.2 Furthermore, the area in which the proposed development is located is designated for 'Data Centre' land use within the Naas Local Area Plan 2021-2027. The document further states that:

> *"These lands are identified exclusively for Data Centres, to ensure the location of these types of proposals are controlled proximate to service areas of the county. The Council will not consider any alternative use on these lands, other than those associated with Data Centres (Objective EDO 1.12)."*

8.2.3 The site therefore aligns with sustainable transport best practices and the wider policy set out by the Naas Local Area Plan 2021 – 2027.

APPENDIX A – INDICATIVE SITE LAYOUT



RECEIVED: 13/08/2024

1 **A1010 - PROPOSED SITE PLAN**
1 : 1500

LEGEND:

- PLANNING APPLICATION BOUNDARY
- OTHER LANDS UNDER CONTROL OF THE APPLICANT
- 220KV EXISTING OVERHEAD POWERLINES
- EXCLUSION ZONE SURROUNDING 220kV POWERLINES (63 METRES)
- PYLON
- PROPOSED HYDRANT PUMP ROOM
- PROPOSED HYDRANT PUMP ROOM STORAGE - REFER TO ENGINEERS DRAWINGS
- PROPOSED SPRINKLER TANK COMPOUND - REFER TO ENGINEERS DRAWINGS
- ADMIN BLOCK OF DATA CENTRE
- PROPOSED FUEL COMPOUND - REFER TO ENGINEERS DRAWINGS
- PROPOSED FENCING
- PROPOSED LOCATION FOR BAT HOUSE (4MX4M)
- PROPOSED LOCATION FOR BAT BOX
- PROPOSED BICYCLE STORAGE
- PROPOSED SMOKE SHELTER
- EXISTING TREES/HEDGES
- PROPOSED TREES/HEDGES
- PROPOSED 'WET' PONDS (PERMANENT WATER BODIES)
- PROPOSED 'DRY' PONDS & SWALES
- PROPOSED FIREFIGHTING ACCESS LAY BY
- DC — PROPOSED DATA CENTRE
- AGI — PROPOSED ABOVE GROUND INSTALLATIONS
- DH — PROPOSED DISTRICT HEATING
- GNI — PROPOSED BIO-GAS INJECTION POINT COMPOUND

TOTAL NO. CAR PARKING: 210
NO. EV CHARGING POINTS: 63
NO. DISABLED CAR PARKING: 14
TOTAL NO. BICYCLE PARKING: 104

All levels shown are to the Irish Transverse Mercator (ITM) and are displayed in meters (m).
All levels shown relate to the Malin Head datum.
All dimensions shown in millimeters (mm)

All dimensions to be checked on site. Figured dimensions take preference over scaled dimensions. Any errors or discrepancies to be reported to the architect. This drawing may not be edited or modified by the recipient.

A0

HERBATA GREEN ENERGY DATA

Notes.

LEGEND

1. PROPRIETARY INSULATED METAL CLADDING SYSTEM ON STEEL STRUCTURE (EUROBOND FLAT PROFILE PANELS OR OTHER APPROVED) TO DATA HALL AREA. COLOUR TONE - MEDIUM GREY.
2. PROPRIETARY INSULATED METAL CLADDING SYSTEM ON STEEL STRUCTURE (EUROBOND FLAT PROFILE PANELS OR OTHER APPROVED). TO ADMIN AREA. COLOUR TONE - MEDIUM DARK GREY.
3. PROPRIETARY INSULATED METAL CLADDING SYSTEM ON STEEL STRUCTURE (EUROBOND FLAT PROFILE PANELS OR OTHER APPROVED) TO ADMIN AREA. COLOUR TONE - DARK GREY.
4. PROPRIETARY INSULATED METAL CLADDING SYSTEM ON STEEL STRUCTURE (EUROBOND FLAT PROFILE PANELS OR OTHER APPROVED) TO ADMIN AREA. COLOUR TONE - OFF-WHITE.
5. PROPRIETARY INSULATED METAL CLADDING SYSTEM ON STEEL STRUCTURE (EUROBOND FLAT PROFILE PANELS OR OTHER APPROVED) TO ADMIN AREA. COLOUR TONE - LIGHT GREY.
6. SELECTED ALUMINIUM RAINSCREEN CLADDING SYSTEM OR OTHER APPROVED IN SELECTED COLOUR AROUND ENTRANCE.
7. SELECTED GLAZED CURTAIN WALL SYSTEM WITH GLAZED AND SPANDREL PANELS IN SELECTED COLOUR.
8. SELECTED VERTICAL ALUMINIUM FINS IN SELECTED COLOUR.
9. SELECTED HORIZONTAL MICRO LOUVRES SET INTO PANELS TO PLANT ROOM FACADE
10. SELECTED PARALON OR OTHER APPROVED ROOF FINISH LAID TO MANUFACTURERS SPECIFICATION ON STEEL STRUCTURE TO ENGINEERS FUTURE DETAILS.
11. SELECTED SEDUM ROOF FINISH ON BLUE ROOF ATTENUATION LAYER.
12. ALUMINIUM CANOPY IN SELECTED COLOUR. COLOUR TONE - LIGHT GREY.
13. 2.4m HIGH PALLISADE SECURITY FENCE AROUND PLANT AREAS, DATA BUILDINGS AND ASSOCIATED STRUCTURES.
14. 1.2m HIGH AGRICULTURAL TIMBER POST AND WIRE MESH FENCING TO WESTERN BOUNDARY HEDGE.
15. 1.2m HIGH TIMBER POST AND RAIL FENCE TO SURROUND PONDS.
16. 2.4m HIGH PALLISADE SECURITY FENCE AROUND ENTIRE SITE.
17. SELECTED SEDUM ROOF FINISH.
18. EXTERNAL METAL LOUVRE TO ACOUSTIC SCREEN WALL.
19. ACOUSTIC PANEL.

KEY PLAN
TRUE NORTH

Rev.	Date	Description
P09	22/04/2024	ISSUE FOR PLANNING
P08	03/11/2023	PLANNING ISSUE
P07	02/08/2023	PLANNING ISSUE
P06	11/07/2023	PLANNING ISSUE
P05	02/06/2023	DRAFT PLANNING ISSUE
P04	28/04/2023	STAGE 2 ISSUE
P03	10/03/2023	DRAFT ISSUE
P02	28/02/2023	DESIGN FREEZE - STAGE 2
P01	24/02/2023	Pre-Planning

STATUS: PLANNING
PROJECT: HERBATA DATA CENTRE CAMPUS
PROJECT ADDRESS: NAAS, CO. KILDARE
DWG TITLE: OVERALL PROPOSED SITE PLAN
DWG NO.: 22217-RKD-ZZ-ZZ-DR-A-1010
REV: P09 | SUITABILITY: S3 | PROJECT NO.: 22217 | SCALE: 1:1500
DATE: 03/11/2023 | DRN: RCD | CHK: KOS

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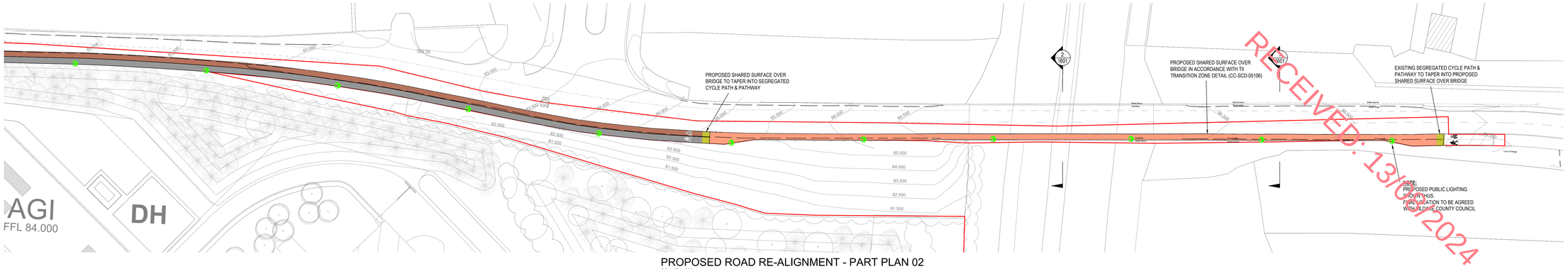
T: +44 (0)20 8783 5890

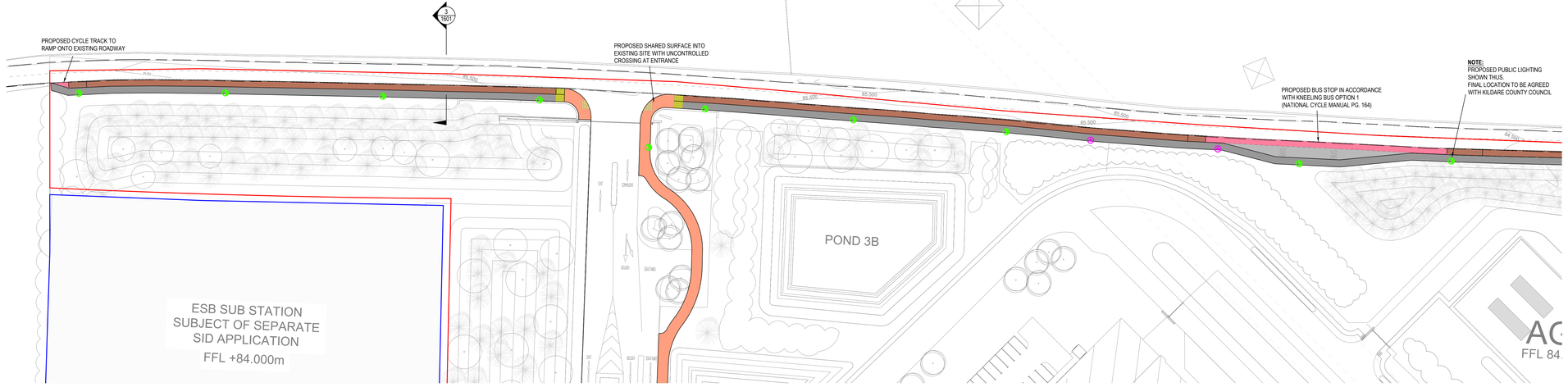
BSM
Est. 1968

DONNACHADH O'BRIEN
& ASSOCIATES CONSULTING ENGINEERS

APPENDIX B – R409 IMPROVEMENTS



PROPOSED ROAD RE-ALIGNMENT - PART PLAN 02
SCALE 1:500



PROPOSED ROAD RE-ALIGNMENT - PART PLAN 01
SCALE 1:500

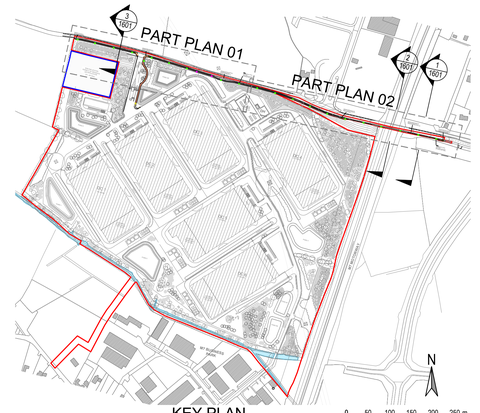
GENERAL LEGEND:

- EXISTING FOOTPATH (IF REQUIRED)
- PROPOSED NEW FOOTPATH (CONC)
- PROPOSED SHARED SURFACE
- PROPOSED RAISED CYCLE TRACK
- PROPOSED ON-ROAD CYCLE TRACK
- PROPOSED TACTILE PAVING SURFACING (@ UNCONTROLLED)
- PROPOSED CORDUROY TACTILE PAVING SURFACING

SERVICES LEGEND:

- PR PUBLIC LIGHTING LIGHT COLUMN (10m)
- PR PUBLIC LIGHTING LIGHT COLUMN (5m)

NOTE:
ALL DRAWINGS TO BE READ IN CONJUNCTION WITH SABRE ELECTRICAL SERVICES LTD.
REF : SES 04723 SERIES



KEY PLAN
SCALE 1:5000

All dimensions to be checked on site. Figured dimensions take preference over scaled dimensions. Any errors or discrepancies to be reported to the author. This drawing may not be edited or modified by the recipient.

A0

HERBATA GREEN ENERGY DATA

Notes:

1. DO NOT SCALE OFF THIS DRAWING. ALWAYS WORK TO NOTED DIMENSIONS.
2. ALL DIMENSIONS MUST BE VERIFIED ON SITE BEFORE COMPLETING SHOP DRAWINGS OR SETTING OUT THE WORKS.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER DISCIPLINES DRAWINGS, REPORTS AND SPECIFICATIONS
4. REFER TO ARCHITECTS DRAWINGS FOR ALL SITE & APPLICATION BOUNDARIES
5. REFER TO SURVEY DRAWINGS FOR EXISTING SERVICES LAYOUTS AND MANHOLE INFORMATION
6. ALL EXISTING SURFACES TO BE REINSTATED FOLLOWING DIVERSION OF SERVICES /CONSTRUCTION OF NEW SERVICES
7. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND LEVELS WITH ARCHITECTURAL DRAWINGS PRIOR TO START OF CONSTRUCTION. ANY DISCREPANCIES TO BE NOTIFIED TO THE ENGINEER & ARCHITECT FOR RESOLUTION
8. CONTRACTOR TO ENSURE ALL WATER & WASTEWATER RELATED WORKS ARE IN ACCORDANCE WITH THE IRISH WATER WATER CODE OF PRACTICE & STANDARD INFRASTRUCTURE CODE OF PRACTICE & STANDARD DETAILS DOCUMENTS
9. TESTING OF ALL GRAVITY SEWERS AND MANHOLES SHALL BE IN ACCORDANCE WITH IRISH WATER CODE OF PRACTICE FOR WASTEWATER INFRASTRUCTURE SECTION 4.10 TESTING OF GRAVITY SEWERS & MANHOLES

KEY PLAN
TRUE NORTH

Rev.	Date	Description
P09	24/04/2024	ISSUED FOR PLANNING
P08	03/11/2023	ISSUED FOR PLANNING
P07	07/09/2023	ISSUED FOR PLANNING
P06	08/08/2023	ISSUED FOR PLANNING
P05	20/07/2023	ISSUED FOR INFORMATION
P04	13/07/2023	PROGRESS ISSUE
P03	10/07/2023	PROGRESS ISSUE
P02	06/06/2023	SITEPLAN UPDATED
P01	25/05/2023	PROGRESS ISSUE

STATUS: PLANNING

PROJECT: HERBATA DATA CENTRE CAMPUS

PROJECT ADDRESS: NAAS, CO. KILDARE

DWG TITLE: PROPOSED R409 ROAD RE-ALIGNMENT

DWG NO.: 2232-D0B-ZZ-ZZ-DR-C-1600

REV: P09 | SUITABILITY: S3 | PROJECT NO: DOBA2232 | SCALE: AS SHOWN | DATE: 28/04/2023 | DRN: MF | CHK: RK

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BSM Est. 1968

DONNACHADH O'BRIEN
& ASSOCIATES CONSULTING ENGINEERS

APPENDIX C – TRAFFIC ASSIGNMENT

KEY

- Site Location
- 30-Minute Driving Catchment
- Ireland Settlements

Route Assignment (%Pop)

- 0 - 0.01
- 0.01 - 0.02
- 0.02 - 0.03
- 0.03 - 0.05
- 0.05 - 0.06
- 0.06 - 0.08
- 0.08 - 0.1
- 0.1 - 0.18
- 0.18 - 0.25
- 0.25 - 0.36
- 0.36 - 0.5
- 0.5 - 0.68
- 0.68 - 0.89
- 0.89 - 1.12
- 1.12 - 1.56
- 1.56 - 1.86
- 1.86 - 3.13
- 3.13 - 5.38
- 5.38 - 82.72
- 82.72 - 93.27

NORTH

Kinnegad
M6
Enfield
Kilcock
Dunboyne
Maynooth
Leixlip
M2
Swords
Malahide
Derrinturn
Edenderry
Dublin
Dublin city and suburbs
Celbridge
Clane
Dundrum
Dún Laoghaire
M50
Sallins
Newcastle
Rathangan
Naas
Droichead Nua (Newbridge)
Blessington
Kildare
Portarlington
Monasterevan
Kilcullen
Ballymore Eustace
Wicklow Mountains National Park
Portlaoise (formerly Maryborough)
Ballitore
Stradbally
Athy
Mountrath
Glen of Imaal Artillery Range
Baltinglass
Rathdrum
Abbeyleix
Carlow
Aughrim

0 10,000 20,000 m

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SYSTRA

Appendix 12.2
Microsimulation Assessment Report

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Proposed Data Centre, Naas, County Kildare
Reference number 2232-SYS-XX-XX-RP-D-0003

04/10/2023

MICROSIMULATION ASSESSMENT REPORT & FINDINGS

SYSTRA

NAAS DATA CENTRE

MICROSIMULATION ASSESSMENT REPORT

IDENTIFICATION TABLE	
Client/Project owner	Herbata Ltd
Project	Proposed Data Centre, Naas, County Kildare
Study	Microsimulation Assessment Report & Findings
Type of document	Final V2
Date	04/10/2023
Reference number	2232-SYS-XX-XX-RP-D-0003
Number of pages	25

APPROVAL

Version	Name		Position	Date	Modifications
1	Author	S Kallahalli	Senior Transport Planner	24/07/2023	
	Checked by	S Livingstone	Associate Director	25/07/2023	
	Approved by	A Archer	Director	25/07/2023	
2	Author	S Kallahalli	Senior Transport Planner	03/08/2023	Minor text amendments
	Checked by	S Livingstone	Associate Director	03/08/2023	
	Approved by	A Archer	Director	03/08/2023	
3	Author	S Kallahalli	Senior Transport Planner	04/10/2023	Minor text amendments
	Checked by	S Livingstone	Associate Director	04/10/2023	
	Approved by	A Archer	Director	04/10/2023	

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1. INTRODUCTION

1.1 Overview

1.1.1 SYSTRA Ltd (SYSTRA) has been appointed by Herbata Ltd to provide transportation consultancy services in relation to a proposed data centre located in Naas, County Kildare. The proposed data centre is located to the west of the town of Naas, with the site bound by the M7 to its east, the M7 Business Park to the south, the R409 to the north and agricultural land to the west.

1.1.2 Access to the data centre will be taken from the R409, from the northern boundary of the site. The location of the site is indicated by Figure 1-1.

1.1.3 In conjunction with the Transport Assessment (SYSTRA Report **2232-SYS-XX-XX-RP-D-0001**), SYSTRA has developed a microsimulation model of the local and national network around the NAAS area to assess the impact of proposed data centre.

1.1.4 This report outlines the development of the microsimulation model and the assessment results of base year and forecast year.

1.1.5 The area considered for modelling to assess the new development is as shown the figure 1-1 below.

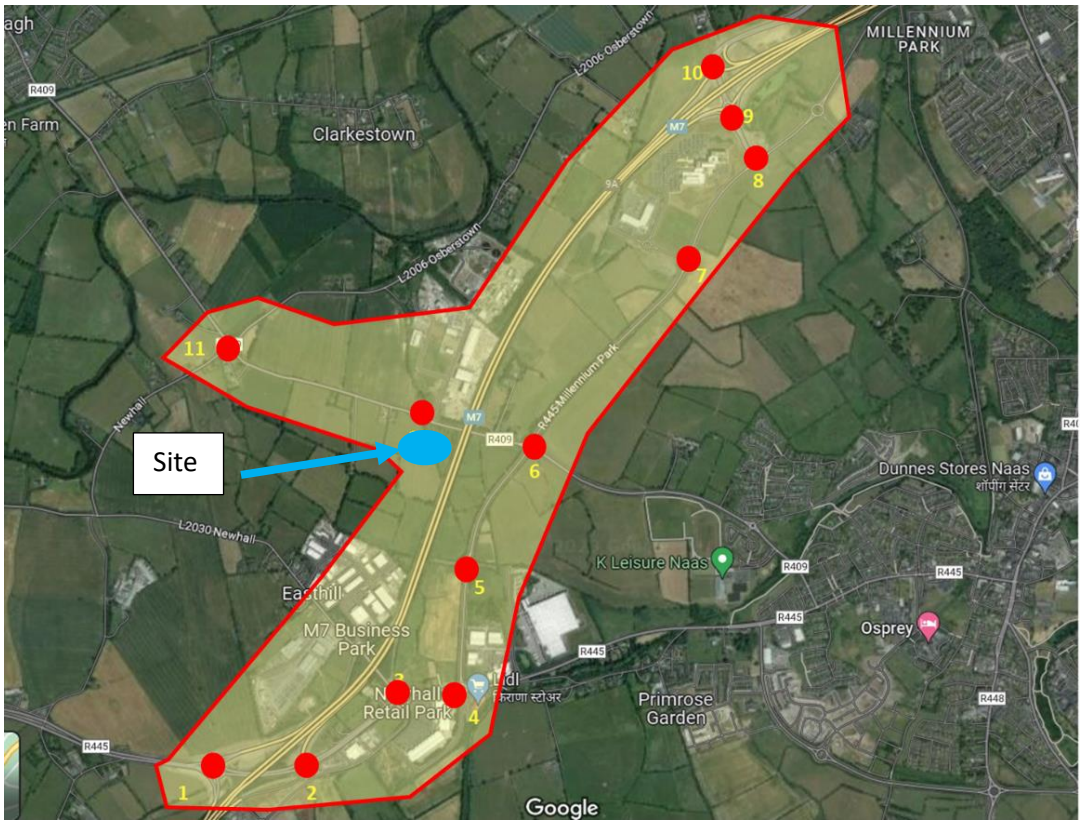


Figure 1-1: Area of Scope

1.1.6 The extent of the VISSIM model has been agreed with Kildare County Council (KCC). In total 12 major junctions were identified for modelling. The M7 mainline was also modelled as the part of the exercise.

1.2 Modelling Software

1.2.1 The traffic model has been developed using VISSIM microsimulation software (version 2022-07). VISSIM allows for the 'linked' modelling of multiple junctions which will allow them to be modelled simultaneously, to capture the impact of upstream and downstream flows on the network and explicitly modelling the effects of queueing. In addition, VISSIM allows the impact of individual driver behaviour characteristics on a network operation and junction performance to be modelled in detail.

1.3 Report Structure

1.3.1 The report is divided into the following chapters:

- Section 2 Data Collection;
- Section 3 Model Development, Calibration and Validation;
- Section 4 Modelling Results;
- Section 5 Further Mitigation; and
- Section 6 Summary & Conclusion.

2. DATA COLLECTION

2.1 Overview

2.1.1 The development and calibration of the VISSIM model required traffic data from several sources to ensure that the model accurately replicated the base year traffic volumes, patterns and network operation. This chapter will outline the data gathered as part of the model development.

2.2 Traffic Surveys

2.2.1 Data from a number of surveys was collected as part of the Local Area Model (LAM) process which was used to inform the VISSIM model development. A summary of the traffic data used in the microsimulation model is shown graphically in Figure 2.1 below and is as follows:

- 12 Junction Turning Counts (JTCs) undertaken for one weekday on 28th March 2023;
- Journey Time Surveys undertaken along the M7, R409 and R445 Millennium Park during peak hours on one weekday on 28th March 2023; and
- ATC surveys at six locations across the study area to record vehicle speeds. The ATC surveys recorded data between 24th and 30th March 2023.

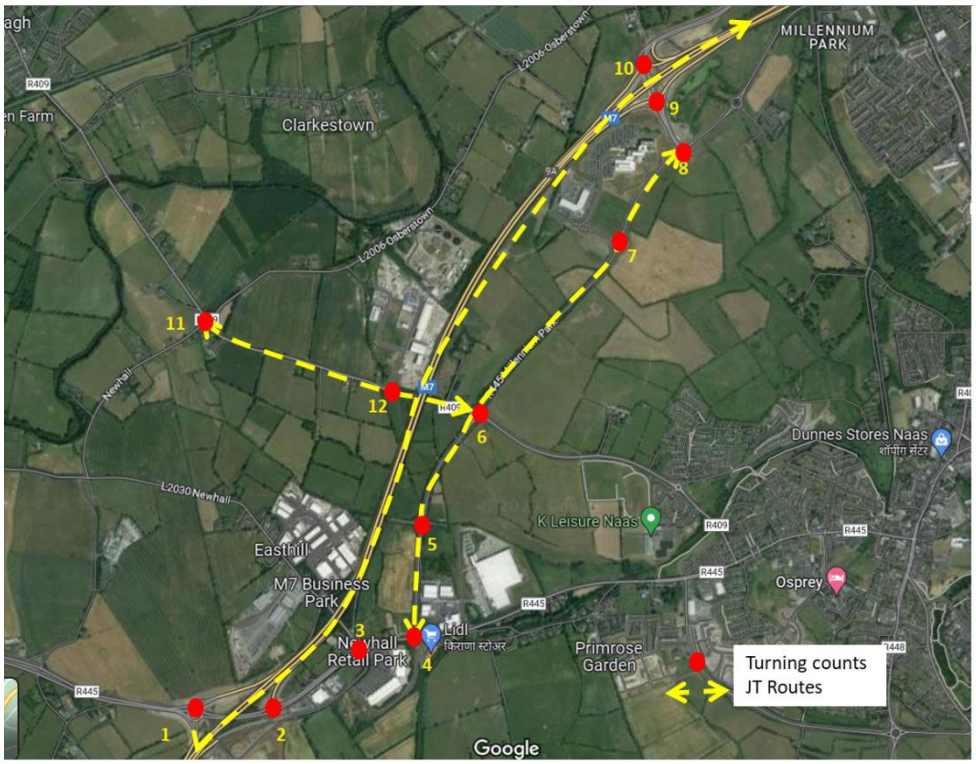


Figure 2-1 Available Data within Model Extents

3. MODEL DEVELOPMENT, CALIBRATION AND VALIDATION

3.1 Overview

3.1.1 This section of the report describes the development, calibration and validation of the VISSIM model. The models have been developed in line with the guidelines set out in the TII Project Appraisal Guidelines (PAG) Unit 5.2: Construction of Traffic Models.

3.2 Network Development

3.2.1 The model was constructed to include the following junctions:

- Sallins Bypass/ M7 Slip Road Roundabout;
- R445 Millennium Park/M7 Slip Road Roundabout;
- Sallins Road /R445 Millennium Park Roundabout;
- R445 Millennium Park/Irish Volvo dealer access Roundabout;
- R445 Millennium Park /R409 Roundabout;
- R445 Millennium/Unnamed Road Roundabout:
- Newbridge Road Roundabout;
- Bundle of Sticks Roundabout;
- R445/M7 Slip Road Roundabout;
- R445/M7 Slip Road Roundabout;
- R445/Osberstown Business Park entry Junction and
- R409/Newhall Junction.

3.2.2 The full model extents is illustrated by Figure 3.1 which shows the VISSIM base year model.

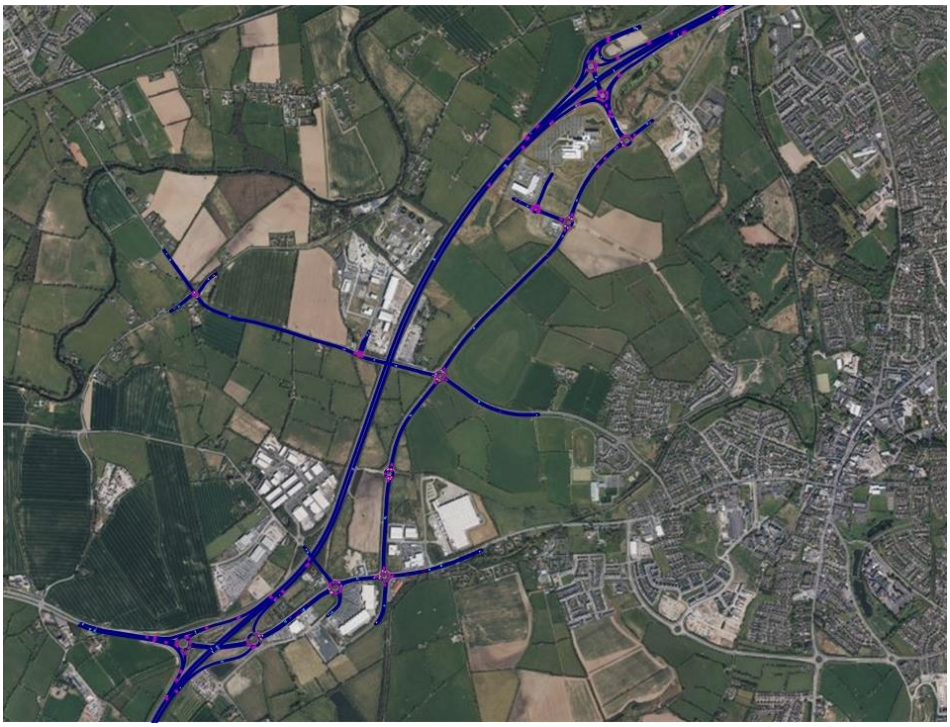


Figure 3-1 VISSIM Microsimulation Model Extents

3.3 Model Specification

3.3.1 AM and PM peak hour models were built for the study area. Each modelled hour covered a 90 minuted period, consisting of a 15 minute pre-peak, a peak hour, and a 15 min cooling-down period. Calibration, validation and all model outputs are produced from the peak hour.

3.3.2 The hourly routes were built, for light vehicles (cars, motorcycles and LGVs) and heavy vehicles (OGV1 and OGV2). The peak hours modelled were 07:30 to 08:30 and 16:15 to 17:15. The pre-peak time periods were required to pre-load the network with sufficient traffic volumes to reflect observed conditions. The post peak is required to allow vehicles to clear the model so that full outputs can be extracted and presented.

3.3.3 The VISSIM model has been developed to the specifications shown in Table 3-1:

Table 3-1:Model Specification

Parameter	Specification
Base Year	2023
Modelling Time Periods	AM (07:15 – 08:45) & PM (16:00 – 17:30)
Peak Hour Evaluation Period	AM (07:30 – 08:30) & PM (16:15 – 17:15)
Warm Up Period	15 min before peak hour
Vehicle Types	Lights (Cars and LGVs), HGVs (OGV1/OGV2)
VISSIM Version	2022.00.07

3.4 Vehicle Classification

3.4.1 VISSIM uses individual vehicle models that are grouped into vehicle types, which are then subsequently grouped into vehicle classes. Vehicle classes for Car, LGV, HGV and Bus were used within the model.

3.5 Model Assignment

3.5.1 Traffic was assigned to the VISSIM network using the 'Static assignment' feature. Vehicles were loaded onto the network in the form of a matrix that was specific to a vehicle type and 1 hour time period.

3.6 Driving Behaviour Parameters

3.6.1 VISSIM has a default set of driving behaviour parameters that are used when building the model network. They contain various parameters which impact the car following, lane change and vehicular reactions to traffic signals. The behaviours are associated to different link types so all vehicles travelling along a specific link display the same driving behaviour properties.

3.6.2 When developing the network, the driving behaviour / link types used throughout the model were:

- Urban (motorised) – All non-motorway links;
- Motorway Merge – M7 merging areas; and

- Motorway Diverge – M7 diverge areas.

3.6.3 The Motorway and Urban driving behaviours are the default VISSIM behaviours, whilst the Merge and Diverge behaviours are amended versions of the Motorway link type, with variations to safety reduction and lane change parameters to better reflect the behaviour of merging / diverging vehicles.

3.7 Priority Control

3.7.1 Priority rules are used to model give way parameters for roundabouts and priority junctions. They have been placed at all give-way locations within the model.

3.8 Random Seed Criteria

3.8.1 The stochastic nature of micro-simulation models means that by simply changing the random seed number, the sampling of values from specified distributions is changed and this will create different model results. VISSIM uses random seeds to vary traffic conditions, including the pattern in which vehicles are released into the network. This is designed to represent daily variations between traffic conditions. Without this variation, the model would not reflect the variability that exists in actual traffic conditions.

3.8.2 The model was run for 10 random seeds to be consistent with industry guidance and for the purpose of the assessment, the results are representative of random seeds between 42 and 51 (increased by 1 increments each run).

3.9 Model Calibration

3.9.1 The base year models have been calibrated based on link flows in accordance with the criteria set out in the TII Project Appraisal Guidelines (PAG) Unit 5.2: 'Construction of Traffic Models'. The PAG specify permissible differences between observed and modelled link flows. There are two calibration criteria set out in PAG for link calibration, individual flow calibration and Geoff Havers (GEH) Statistics. A summary of the calibration criteria is shown in Table 3.2.

Table 3-2 PAG Link Calibration Criteria

Criteria	Acceptability Guideline
Individual flows with GEH < 5	More than 85% of cases

3.10 Link Calibration

3.10.1 The difference between modelled and observed link flows was compared for all vehicles with respect to the criteria outlined in Table 3.2. A summary of the calibration results is presented in Tables 3.3-3.4 for the AM and PM Peak hour.

Table 3-3 AM Peak Hour Link Calibration Summary

Junction	Description	Model	Count	GEH
	Sallins Bypass SB to Sallins Bypass SB	0	0	0.00

Site 1-M7 NB off slip/Sallins Bypass	Sallins Bypass SB to Sallins Bypass NB	604	609	0.20
	Sallins Bypass SB to M7 NB on slip	79	78	0.11
	M7 NB off slip to Sallins Bypass SB	671	592	3.14
	M7 NB off slip to Sallins Bypass NB	313	271	2.46
	M7 NB off slip to M7 NB on slip	0	0	0.00
	Sallins Bypass NB to Sallins Bypass SB	203	206	0.21
	Sallins Bypass NB to Sallins Bypass NB	0	0	0.00
	Sallins Bypass NB to M7 NB on slip	140	144	0.34
Site 2-M7 SB off slip/ Sallins Bypass	Sallins Bypass SB to Sallins Bypass SB	0	0	0.00
	Sallins Bypass SB to M7 SB on slip	444	427	0.81
	Sallins Bypass SB to Sallins Bypass NB	467	441	1.22
	Sallins Bypass NB to Sallins Bypass SB	282	280	0.12
	Sallins Bypass NB to M7 SB on slip	136	132	0.35
	M7 SB off slip to Sallins Bypass SB	64	66	0.25
	M7 SB off slip to M7 SB on slip	1	2	0.82
	M7 SB off slip to Sallins Bypass NB	171	171	0.00
Site 3-R445/Roundabout Link Rd.	Roundabout Link Rd. to Roundabout Link Rd.	1	1	0.00
	Roundabout Link Rd. to R445(SW)	355	347	0.43
	Roundabout Link Rd. to R445(NE)	277	260	1.04
	R445(SW) to Roundabout Link Rd.	281	280	0.06
	R445(SW) to R445(SW)	11	10	0.31
	R445(SW) B to R445(NE) C	312	317	0.28
	R445(NE) to Roundabout Link Rd.	139	136	0.26
	R445(NE) to R445(SW)	222	229	0.47
Site 4-R445 Millennium Park/Millennium Park Access	R445 (N) to R445 (N)	1	1	0.00
	R445 (N) to Millennium Park Access	161	157	0.32
	R445 (N) to R445(S)	417	404	0.64
	Millennium Park Access to R445 (N)	70	72	0.24
	Millennium Park Access to Millennium Park Access	0	0	0.00
	Millennium Park Access to R445(S)	24	22	0.42
	R445(S) to R445 (N)	536	547	0.47
	R445(S) to Millennium Park Access	94	100	0.61
Site 5-R445/R409	R445(N) to R445(N)	0	0	0.00
	R445(N) to R409(W)	114	110	0.38
	R445(N) to R445(S)	120	115	0.46
	R445(N) to R409(E)	200	196	0.28
	R409(W) to R445(N)	224	228	0.27
	R409(W) to R409(W)	1	1	0.00
	R409(W) to R445(S)	54	55	0.14
	R409(W) to R409(E)	220	227	0.47
	R445(S) to R445(N)	108	119	1.03
	R445(S) to R409(W)	23	28	0.99
	R445(S) to R445(S)	0	0	0.00
	R445(S) to R409(E)	6	7	0.39
	R409(E) to R445(N)	311	310	0.06
	R409(E) to R409(W)	77	79	0.23
	R409(E) to R445(S)	27	29	0.38
	R409(E) to R409(E)	0	0	0.00
	Industrial Estate Access to R409(W)	3	2	0.63

Site 6-Industrial Estate Access	Industrial Estate Access to R409(E)	15	15	0.00
	R409(W) to Industrial Estate Access	13	13	0.00
	R409(W) to R409(E)	500	511	0.49
	R409(E) to Industrial Estate Access	42	40	0.31
	R409(E) to R409(W)	172	173	0.08
Site 7-R209/Newhall	R409(NW) to Newhall	101	100	0.10
	R409(NW) to R409(SE)	500	428	3.34
	R409(NW) to L2006 Osberstown	18	17	0.24
	Newhall to R409(NW)	59	62	0.39
	Newhall to R409(SE)	87	85	0.22
	Newhall to L2006 Osberstown	45	45	0.00
	R409(SE) to R409(NW)	172	138	2.73
	R409(SE) to Newhall	31	32	0.18
	R409(SE) to L2006 Osberstown	4	6	0.89
	L2006 Osberstown to R409(NW)	4	4	0.00
	L2006 Osberstown to Newhall	30	31	0.18
	L2006 Osberstown D to R409(SE)	10	10	0.00
Site 8-R445 Millennium Park /Unused Arm	R445(N) to R445(N)	0	1	1.41
	R445(N) to R445(S)	199	200	0.07
	R445(S) to R445(N)	140	152	0.99
	R445(S) to R445(S)	0	0	0.00
Site 9-R445 Millennium Park /Commercial Centre Access	R445(N) to R445(N)	0	0	0.00
	R445(N) to R445(W)	98	94	0.41
	R445(N) to Commercial Centre Access	20	19	0.23
	R445(N) to R445(E)	80	77	0.34
	R445(W) to R445(N)	91	93	0.21
	R445(W) to R445(W)	1	1	0.00
	R445(W) to Commercial Centre Access	64	65	0.12
	R445(W) to R445(E)	633	643	0.40
	Commercial Centre Access to R445(N)	11	13	0.58
	Commercial Centre Access to R445(W)	34	32	0.35
	Commercial Centre Access to Commercial Centre Access	0	0	0.00
	Commercial Centre Access to R445(E)	31	31	0.00
	R445(E) to R445(N)	39	41	0.32
	R445(E) to R445(W)	509	508	0.04
	R445(E) to Commercial Centre Access	40	41	0.16
	R445(E) to R445(E)	2	2	0.00
Site 10-R445/Jigginstown Rd.	Roundabout Link Rd. to R445(SW)	82	80	0.22
	Roundabout Link Rd. to Jigginstown Rd.(S)	13	13	0.00
	Roundabout Link Rd. to R445(E)	172	178	0.45
	R445(SW) to Roundabout Link Rd.	228	225	0.20
	R445(SW) to R445(SW)	1	1	0.00
	R445(SW) to Jigginstown Rd.(S)	30	31	0.18
	R445(SW) to R445(E)	612	616	0.16
	Jigginstown Rd.(S) to Roundabout Link Rd.	11	12	0.29
	Jigginstown Rd.(S) to R445(SW)	10	11	0.31
	Jigginstown Rd.(S) to R445(E)	12	11	0.29
	R445(E) to Roundabout Link Rd.	121	125	0.36

	R445(E) to R445(SW)	484	482	0.09
	R445(E) to Jigginstown Rd.(S)	29	28	0.19
	R445(E) to R445(E)	2	2	0.00
Site 11-M7SB/R445	M7 SB off slip to R445(W)	393	413	1.00
	M7 SB off slip to M7 SB on slip	4	3	0.53
	M7 SB off slip to R445(E)	157	165	0.63
	R445(W) to R445(W)	0	0	0.00
	R445(W) to M7 SB on slip	84	83	0.21
	R445(W) to R445(E)	731	737	0.22
	R445(E) to R445(W)	304	303	0.06
	R445(E) to M7 SB on slip	268	271	0.18
	R445(E) to R445(E)	0	1	1.41
Site 12-M7NB/R445	R445(W) to M7 NB off slip	543	553	0.43
	R445(W) to R445(W)	0	2	2.00
	R445(W) to R445(E)	348	331	0.92
	M7 NB on slip to M7 NB off slip	0	0	0.00
	M7 NB on slip to R445(W)	288	295	0.41
	M7 NB on slip to R445(E)	474	493	0.86
	R445(E) to M7 NB off slip	56	58	0.26
	R445(E) to R445(W)	635	653	0.71
	R445(E) to R445(E)	0	0	0.00

Table 3-4 PM Peak Hour Link Calibration Summary

Junction	Description	Model	Count	GEH
Site 1-M7 NB off slip/Sallins Bypass	Sallins Bypass SB to Sallins Bypass SB	0	0	0.00
	Sallins Bypass SB to Sallins Bypass NB	624	630	0.24
	Sallins Bypass SB to M7 NB on slip	91	88	0.32
	M7 NB off slip to Sallins Bypass SB	498	387	5.28
	M7 NB off slip to Sallins Bypass NB	178	120	4.75
	M7 NB off slip to M7 NB on slip	1	1	0.00
	Sallins Bypass NB to Sallins Bypass SB	402	409	0.35
	Sallins Bypass NB to Sallins Bypass NB	0	0	0.00
	Sallins Bypass NB to M7 NB on slip	192	199	0.50
Site 2-M7 SB off slip/Sallins Bypass	Sallins Bypass SB to Sallins Bypass SB	0	0	0.00
	Sallins Bypass SB to M7 SB on slip	476	487	0.50
	Sallins Bypass SB to Sallins Bypass NB	271	266	0.31
	Sallins Bypass NB to Sallins Bypass SB	407	411	0.20
	Sallins Bypass NB to M7 SB on slip	292	290	0.12
	M7 SB off slip to Sallins Bypass SB	188	194	0.43
	M7 SB off slip to M7 SB on slip	3	4	0.53
	M7 SB off slip to Sallins Bypass NB	327	336	0.49
Site 3-R445/Roundabout Link Rd.	Roundabout Link Rd. to Roundabout Link Rd.	0	0	0.00
	Roundabout Link Rd. to R445(SW)	443	460	0.80
	Roundabout Link Rd. to R445(NE)	153	152	0.08
	R445(SW) to Roundabout Link Rd.	388	392	0.20
	R445(SW) to R445(SW)	11	12	0.29
	R445(SW) B to R445(NE) C	290	287	0.18
	R445(NE) to Roundabout Link Rd.	313	310	0.17
	R445(NE) to R445(SW)	460	463	0.14
Site 4-R445 Millennium Park/Millennium Park Access	R445 (N) to R445 (N)	5	5	0.00
	R445 (N) to Millennium Park Access	105	105	0.00
	R445 (N) to R445(S)	800	816	0.56
	Millennium Park Access to R445 (N)	188	187	0.07
	Millennium Park Access to Millennium Park Access	0	0	0.00
	Millennium Park Access to R445(S)	105	108	0.29
	R445(S) to R445 (N)	498	493	0.22
	R445(S) to Millennium Park Access	51	52	0.14
Site 5-R445/R409	R445(N) to R445(N)	1	1	0.00
	R445(N) to R409(W)	305	312	0.40
	R445(N) to R445(S)	196	200	0.28
	R445(N) to R409(E)	397	409	0.60
	R409(W) to R445(N)	126	121	0.45
	R409(W) to R409(W)	0	0	0.00
	R409(W) to R445(S)	41	41	0.00
	R409(W) to R409(E)	107	106	0.10
	R445(S) to R445(N)	186	192	0.44
	R445(S) to R409(W)	40	44	0.62
	R445(S) to R445(S)	9	9	0.00
	R445(S) to R409(E)	24	28	0.78
	R409(E) to R445(N)	235	240	0.32

	R409(E) to R409(W)	256	250	0.38
	R409(E) to R445(S)	31	33	0.35
	R409(E) to R409(E)	0	0	0.00
Site 6-Industrial Estate Access	Industrial Estate Access to R409(W)	15	15	0.00
	Industrial Estate Access to R409(E)	44	43	0.15
	R409(W) to Industrial Estate Access	5	4	0.47
	R409(W) to R409(E)	230	224	0.40
	R409(E) to Industrial Estate Access	17	19	0.47
	R409(E) to R409(W)	583	586	0.12
Site 7-R209/Newhall	R409(NW) to Newhall	53	54	0.14
	R409(NW) to R409(SE)	230	174	3.94
	R409(NW) to L2006 Osberstown	14	13	0.27
	Newhall to R409(NW)	127	128	0.09
	Newhall to R409(SE)	46	44	0.30
	Newhall to L2006 Osberstown	37	38	0.16
	R409(SE) to R409(NW)	583	464	5.20
	R409(SE) to Newhall	121	122	0.09
	R409(SE) to L2006 Osberstown	8	9	0.34
	L2006 Osberstown to R409(NW)	17	18	0.24
	L2006 Osberstown to Newhall	37	37	0.00
	L2006 Osberstown D to R409(SE)	12	12	0.00
Site 8-R445 Millennium Park /Unused Arm	R445(N) to R445(N)	0	1	1.41
	R445(N) to R445(S)	275	282	0.42
	R445(S) to R445(N)	264	272	0.49
	R445(S) to R445(S)	0	1	1.41
Site 9-R445 Millennium Park /Commercial Centre Access	R445(N) to R445(N)	0	0	0.00
	R445(N) to R445(W)	127	134	0.61
	R445(N) to Commercial Centre Access	80	83	0.33
	R445(N) to R445(E)	66	67	0.12
	R445(W) to R445(N)	127	131	0.35
	R445(W) to R445(W)	1	1	0.00
	R445(W) to Commercial Centre Access	137	139	0.17
	R445(W) to R445(E)	537	546	0.39
	Commercial Centre Access to R445(N)	79	79	0.00
	Commercial Centre Access to R445(W)	187	185	0.15
	Commercial Centre Access to Commercial CentreAccess	3	2	0.63
	Commercial Centre Access to R445(E)	98	101	0.30
	R445(E) to R445(N)	59	62	0.39
	R445(E) to R445(W)	652	639	0.51
	R445(E) to Commercial Centre Access	106	107	0.10
	R445(E) to R445(E)	0	0	0.00
Site 10-R445/Jigginstown Rd.	Roundabout Link Rd. to R445(SW)	186	188	0.15
	Roundabout Link Rd. to Jigginstown Rd.(S)	9	9	0.00
	Roundabout Link Rd. to R445(E)	158	166	0.63
	R445(SW) to Roundabout Link Rd.	242	238	0.26
	R445(SW) to R445(SW)	1	2	0.82
	R445(SW) to Jigginstown Rd.(S)	23	25	0.41
	R445(SW) to R445(E)	635	646	0.43
	Jigginstown Rd.(S) to Roundabout Link Rd.	18	19	0.23

	Jigginstown Rd.(S) to R445(SW)	34	36	0.34
	Jigginstown Rd.(S) to R445(E)	16	13	0.79
	R445(E) to Roundabout Link Rd.	197	201	0.28
	R445(E) to R445(SW)	751	749	0.07
	R445(E) to Jigginstown Rd.(S)	15	14	0.26
	R445(E) to R445(E)	1	1	0.00
Site 11-M7SB/R445	M7 SB off slip to R445(W)	386	390	0.20
	M7 SB off slip to M7 SB on slip	0	0	0.00
	M7 SB off slip to R445(E)	290	289	0.06
	R445(W) to R445(W)	0	0	0.00
	R445(W) to M7 SB on slip	263	262	0.06
	R445(W) to R445(E)	616	617	0.04
	R445(E) to R445(W)	427	440	0.62
	R445(E) to M7 SB on slip	512	535	1.01
	R445(E) to R445(E)	0	3	2.45
Site 12-M7NB/R445	R445(W) to M7 NB off slip	484	486	0.09
	R445(W) to R445(W)	0	5	3.16
	R445(W) to R445(E)	629	622	0.28
	M7 NB on slip to M7 NB off slip	0	3	2.45
	M7 NB on slip to R445(W)	140	144	0.34
	M7 NB on slip to R445(E)	256	257	0.06
	R445(E) to M7 NB off slip	152	155	0.24
	R445(E) to R445(W)	657	667	0.39
	R445(E) to R445(E)	0	3	2.45

3.10.2 Tables 3-3 (AM peak) and 3-4 (PM Peak) demonstrate that 100% of the link flows achieve a GEH of less than 5.

3.11 Model Validation

3.11.1 The models have been validated against Journey Times observed on site. The validation criteria for Journey Times is outlined in PAG Unit 5.2: 'Construction of Traffic Models' and is summarised below in Table 3.5.

Table 3-5 PAG Journey Time Calibration Criteria

Type	Validation Criteria	Acceptability Guideline
Journey Times	Times within 15% or 1 minute if higher	More than 85% of cases

3.12 Journey time Validation

3.12.1 Journey times were extracted from the model and compared against the 4 routes shown previously in Figure 3.2. For the model to be validated, 85% of the modelled journey times must be within 15% of the observed or 1 minute if higher. Figure 3.2 below shows the Journey

3.12.2 Time Routes that were validated along with the various sections. Tables 3.6 – 3.7 present the results of the journey times comparison for both peaks. The results indicate that all routes within the model meet TII journey time validation criteria for both time periods.

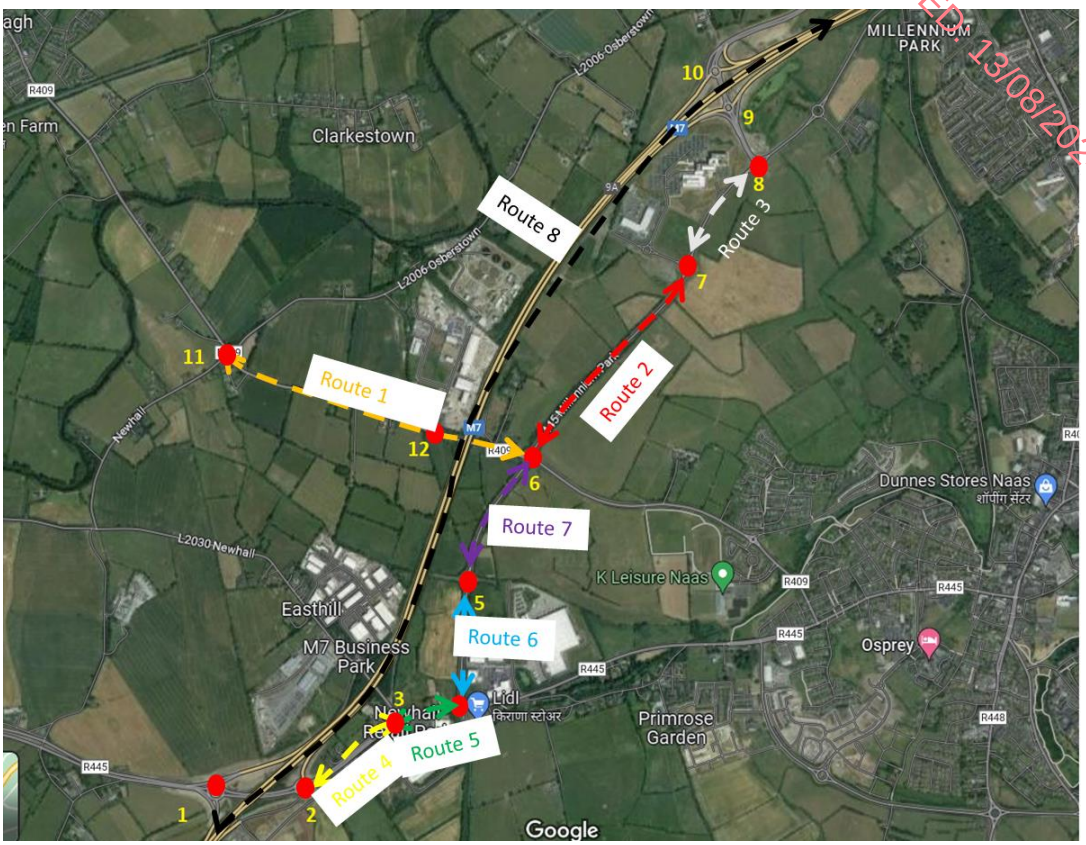


Figure 3-2 Journey Time Routes and Sections

Table 3-6 AM Peak Hour Journey Time Validation

Route	Observed	Modelled	% Difference
Route 1 EB	98	101	2.6%
Route 2 EB	67	71	6.0%
Route 3 EB	37	41	12.0%
Route 3 WB	38	38	0.8%
Route 2 WB	68	69	1.2%
Rout 1 WB	91	90	0.9%
Route 4 EB	39	38	1.5%
Route 5 EB	26	29	10.7%
Route 6 EB	42	42	0.7%
Route 7 EB	100	87	13.0%
Route 7 WB	44	47	6.6%
Route 6 WB	46	44	3.5%
Route 5 WB	22	19	12.8%
Route 4 WB	71	61	13.7%
Route 8 SB	124	119	3.8%
Route 8 NB	130	119	8.7%

Table 3-7 Weekday Network Peak Journey Time Validation

Route	Observed	Modelled	% Difference
Route 1 EB	86	85	0.9%
Route 2 EB	67	69	2.4%
Route 3 EB	37	42	14.8%
Route 3 WB	38	42	10.6%
Route 2 WB	71	75	6.3%
Rout 1 WB	84	93	10.3%
Route 4 EB	39	34	12.9%
Route 5 EB	33	32	2.6%
Route 6 EB	40	44	9.4%
Route 7 EB	99	111	11.8%
Route 7 WB	42	47	11.8%
Route 6 WB	42	45	7.4%
Route 5 WB	24	23	5.0%
Route 4 WB	74	84	13.7%
Route 8 SB	129	124	4.1%
Route 8 NB	121	118	2.7%

3.12.3 The journey time validation results demonstrate that 100% of modelled journey times validate to the observed journey times in both the AM and PM peak and therefore, accord with all PAG criteria.

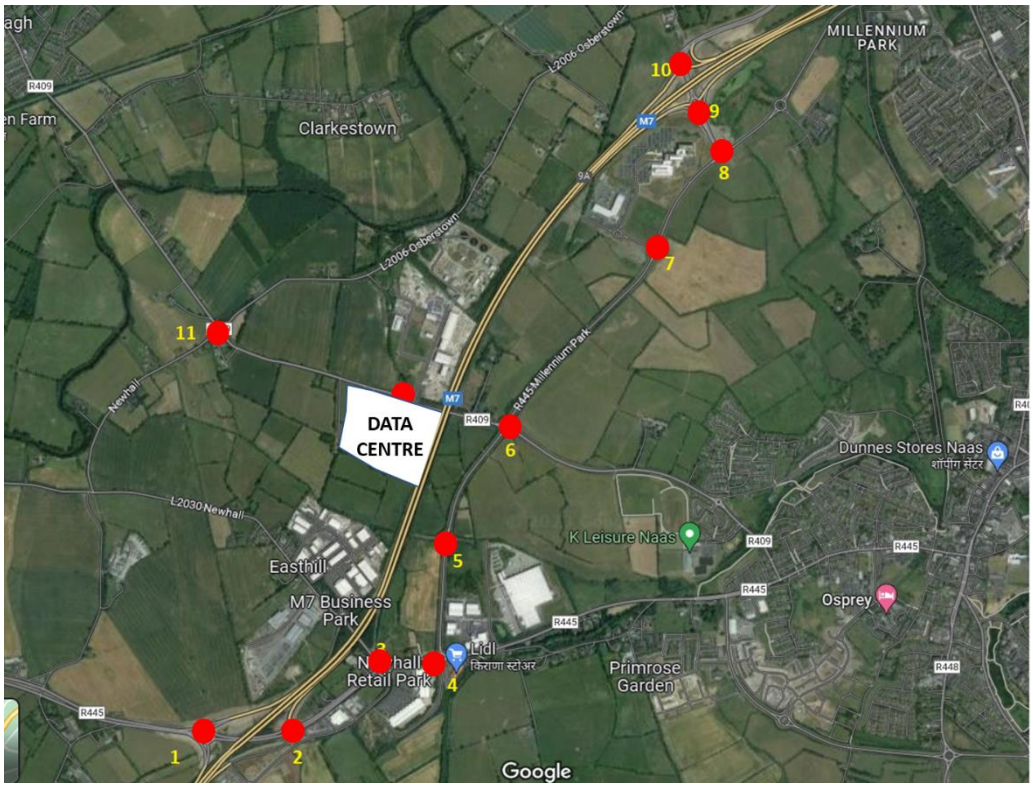
4. MODELLING RESULTS

4.1 Overview

4.1.1 This chapter of the report gives an overview of the modelling results for the new data centre proposals. Fore ease of reference, the location of the data centre in the context of the modelled network is indicated in Figure 4-1.

- An entry and exit has been added on to the R409. Due to the addition of the new lane there is a introduction of a new 3 arm priority junction;
- As per the Naas data centre TA, it is estimated that 52 inbound (entry) trips in the AM - 4 from the west and 52 from the east - and 52 outbound trips in the PM - 4 to the west and 52 to the east. This is indicated by Table 4-1 (extracted from the Transport Assessment (SYSTRA Report **2232-SYS-XX-XX-RP-D-0001**); and
- As agreed with KCC, we have modelled a single forecast year of 2030, This is for the 2030 base and 2030 base plus data centre development.

Figure 4-1: Proposed Data Centre Location



4.2 2030 Forecast Year

4.2.1 As agreed with KCC, the 2030 forecast year takes into consideration the future aspirations of the Naas Sallins Transport Strategy. In order to model the 2030 future year scenario, the base traffic volumes have been uplifted by 20% on the local roads and 23% for the M7 mainline through traffic. These factors have been applied to the AM and PM peak periods, and were derived from the models for the Naas Sallins Transport Strategy.

4.3 Data Centre Peak Hour Traffic Generation

4.3.1 Table 4-1 indicates the AM and PM peak hour traffic generation. This has been extracted from the supporting TA and derived from a first principles approach.

Table 4-1 Data Centre AM & PM Traffic Generation

	AM PEAK PERIOD			PM PEAK PERIOD		
Category	Arrival	Departure	Total	Arrival	Departure	Total
Engineering Support	12	-	12	-	12	12
Technical Support	10	-	10	-	10	10
Administration Staff	12	-	12	-	12	12
Landlord Management	8	-	8	-	8	8
Landlord Engineering Support	10	-	10	-	10	10
Landlord Security	4	-	4	-	4	4
TOTALS	56	-	56	-	56	56

4.4 Network Statistics Comparison

4.4.1 Tables 4-2 and 4-3 provide a comparison of the network statistics for the entire modelled network for the weekday AM and PM time periods. This is based on the forecast year of 2030, with and without development related traffic from the proposed data centre.

Table 4-2 AM Peak Comparison of Network Statistics

	2023 Base	2030 Base	2030 Base with Development	Diff.
Average delay (s)	25.3	46.9	47.0	0.1
Total delay (hr)	79.9	175.3	176.2	0.9
Average stopped delay (s)	1.6	6.4	6.6	0.2
Average network speed (mph)	47.8	42.9	42.8	0
Total Vehicles	10623	12387	12416	29
Latent Demand (Veh)	0	183	189	6

4.4.2 As Table 4-2 clearly demonstrates, the proposed data centre will have a negligible impact on the modelled network during the AM peak period, with minimal increases for each of the measured statistics, in comparison to the 2030 base.

Table 4-3 PM Peak Comparison of Network Statistics

	2023 Base	2030 Base	2030 Base with Development	Diff.
Average delay (s)	31.6	56.3	57.1	0.8
Total delay (hrs)	124.1	261.5	266.2	4.7
Average stopped delay (s)	2.5	9.1	9.2	0.1
Average network speed (mph)	46.3	41.6	41.4	0
Total Vehicles	13215	15475	15549	74
Latent Demand (veh)	0	379	381	2

4.4.3 Similar to the AM period, Table 4-3 clearly demonstrates, the proposed data centre will have a negligible impact on the modelled network during the PM peak period, with minimal increases for each of the measured statistics, in comparison to the 2030 base.

4.5 Journey Time Comparison

4.5.1 Travel times were extracted from both peak periods for all of the routes shown below in Figure 4.2 below.

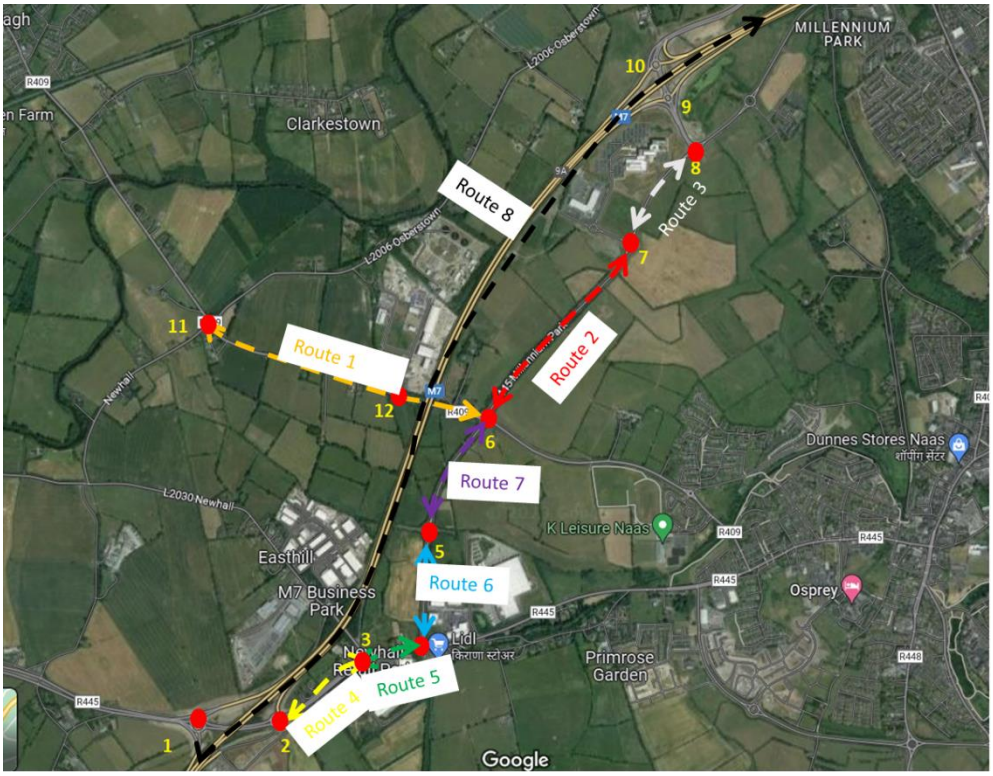


Figure 4-2 Journey Time Routes for Comparison

4.5.2 Tables 4-4 and 4-5 provide a comparison of the journey times for eight routes indicated by Figure 4-2. This is for the weekday AM and PM time periods, for the forecast year of 2030, and with and without development related traffic from the proposed data centre.

Table 4-4 AM Peak Journey Time Comparison

Route	2030 Base (s)	2030 Base with Development (s)	Difference (s)
Route 1 EB	131.6	146.2	14.5
Route 2 EB	74.2	74.1	-0.1
Route 3 EB	41.9	41.8	0.0
Route 3 WB	39.1	39.2	0.1
Route 2 WB	70.7	70.8	0.1
Rout 1 WB	91.6	97.3	5.7
Route 4 EB	78.6	82.0	3.4
Route 5 EB	39.9	40.2	0.3
Route 6 EB	42.6	42.6	0.0
Route 7 EB	88.9	89.3	0.3
Route 7 WB	46.8	46.9	0.1
Route 6 WB	44.8	45.3	0.4
Route 5 WB	19.3	19.4	0.1
Route 4 WB	63.9	63.9	0.0
Route 8 SB	120.9	121.3	0.4
Route 8 NB	121.3	121.2	-0.1

4.5.3 Overall, Table 4-4 indicates that the additional traffic generated by the proposed data centre during the weekday AM period will result in a negligible increase in journey times, along each route within the modelled area. It is noted that Route 1 (eastbound) will see an increase of approximately 15 seconds. SYSTRA would note that this route on the R409, where the development will be accessed from, is approximately 1.3km in length. As such an additional 15 seconds would not have a perceivable impact to drivers.

Table 4-5 PM Peak Journey Time Comparison

Route	2030 Base (s)	2030 Base with Development (s)	Difference (s)
Route 1 EB	88.8	104.5	15.7
Route 2 EB	69.9	69.9	-0.1
Route 3 EB	43.1	43.1	0.0
Route 3 WB	48.2	47.9	-0.3
Route 2 WB	83.0	83.6	0.5
Rout 1 WB	95.4	102.9	7.5
Route 4 EB	106.1	110.0	3.9
Route 5 EB	60.9	62.2	1.2
Route 6 EB	44.0	44.1	0.1
Route 7 EB	125.0	125.3	0.3
Route 7 WB	47.1	47.1	0.0
Route 6 WB	45.9	45.6	-0.3
Route 5 WB	22.4	22.7	0.4
Route 4 WB	110.8	111.6	0.8
Route 8 SB	129.4	130.4	1.0
Route 8 NB	118.9	118.9	0.0

4.5.4 As with the AM period, Table 4-5 indicates that the additional traffic generated by the proposed data centre during the weekday PM period will result in a minor increase in journey times, along each route within the modelled area. Similar to the AM period, Route 1

(eastbound) will see an increase of approximately 16 seconds, but over a distance of approximately 1.3km, drivers are would not notice this increase in journey time.

4.6 Summary of Modelling Results

4.6.1 Having carried out a robust and comprehensive modelling exercise, the results of the VISSIM models clearly indicate that the proposed development will not have a detrimental impact to the operation of the local and strategic road network. This includes Junctions 9A and 10 of the M7.

4.6.2 A copy of the VISSIM modelling files can be provided on request.

5. SUMMARY AND CONCLUSION

5.1 Summary

5.1.1 SYSTRA Ltd has been appointed to provide transportation consultancy services in relation to a proposed data centre located in Naas, County Kildare. The proposed data centre is located to the west of the town of Naas, with the site bound by the M7 to its east, the M7 Business Park to the south, the R409 to the north and agricultural land to the west.

5.1.2 In conjunction with the Transport Assessment (SYSTRA Report **2232-SYS-XX-XX-RP-D-0001**), SYSTRA has developed a microsimulation model of the local and national network around the NAAS area to assess the impact of proposed data centre.

5.1.3 The development and calibration of the VISSIM model required traffic data from several sources to ensure that the model accurately replicated the base year traffic volumes, patterns and network operation. The model was developed in line with the guidelines set out in the TII Project Appraisal Guidelines (PAG) Unit 5.2: Construction of Traffic Models and meets all of the calibration and validation criteria.

5.1.1 The travel characteristics for the data centre have been calculated from a first principles approach, based on staff numbers and shift patterns, anticipated visitor numbers and Census data. Growth factors to calculate the forecast future year of 2030 have been agreed with KCC to reflect the growth aspirations of Naas Transport Strategy. These equate to 20% for through traffic on the M7 and 23% on the local roads.

5.2 Overall Conclusion

5.2.1 In order to comprehensively model the traffic impact from the proposed data centre, SYSTRA has developed a VISSIM microsimulation model of the adjacent road network. This includes Junctions 9A and 10 of the M7, the M7 itself between these junctions, the R409 and the R445 that runs parallel to the M7, between the aforementioned two junctions.

5.2.2 The results of the analysis indicate that the proposed data centre will have a negligible impact on the modelled road network, including Junctions 9A and 10 of the M7. SYSTRA would therefore conclude that no off-site works are required to mitigate the development's impact.

SYSTRA provides advice on transport, to central, regional and local government, agencies, developers, operators and financiers.

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