Transport Assessment

Land at Penllergaer Business Park

September 2025

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1 Introduction

1.1 Overview

1.1.1 This Transport Assessment has been prepared by Hydrock, now Stantec on behalf of Stoford Properties Ltd in support of a full planning application submission for the redevelopment of Mechatronics Systems Wales Ltd to provide a Distribution Centre on land at Penllergaer Business Park. The building is designed as a 'last mile' facility, processing and sorting goods from higher up the supply chain, which are then loaded into vans to be delivered directly to customers.

1.1.2 As part of the development, it is proposed to provide 12,465m^2 (GEA) of B8 and ancillary B1 use classes, together with associated parking, servicing yard areas, landscaping and engineering works, including modifications to the existing access junction including the provision of a fourth arm on the existing Heol Y Ddraig roundabout junction.

1.2 Background information

1.2.1 Pre-application planning advice has been obtained from Swansea City Council, as the Local Highway Authority. A Transport Scoping Note (ref: 3525-HYD-XX-XX-RP-TP-3001) was issued on 16th October 2024. The note sets out the principle of the proposed use, the associated highway works, and the scope of junction analysis required as part of the supporting Transport Assessment.

1.2.2 A full pre-application response was received from the local highway authority in February 2025.

1.2.3 The Transport Scoping Note submitted as part of the pre-planning application, together with the Highways Response is presented in full in Appendix A.

1.3 Site history

1.3.1 A review of the City and County of Swansea Council's planning portal suggests that there have been no planning applications submitted for the site in the most recent 5-year period. Historic planning consents associated with the site include the erection of an electronics assembly and test facility (B1 / B8 Use Class), falling under planning application reference: 98/1152. There is no information in relation to traffic generation and resultant highway impact connected to that application that is available in the public domain.

1.4 Structure of report

1.4.1 Following this introductory section, this Transport Assessment is structured as follows:

- Review relevant national and local policy
- Provides a description of the site location/ background and summary of existing highway network, including high level road safety analysis within the vicinity of the site
- Sets out the connectivity of the site, fully considering walking, cycling and public transport movements in the context of the Active Travel Act and Safe Routes in the Community Guidance
- Description of development proposals including parking strategy, servicing and access arrangements for pedestrians, cyclists and delivery / operational vehicles
- Vehicular trip generation based on a first principled approach of the likely operations onsite

- Sets out the agreed committed development sites and growth factors applied
- Analysis of microsimulation modelling
- Summary and conclusions

1.4.2 The application is accompanied by a Travel Plan (TP) which should be read on conjunction with this TA. The TP includes measures and initiatives to encourage sustainable transport. The TP will include sustainable targets, an Action Plan of responsibilities / target dates and a monitoring schedule, in accordance with Travel Plan guidance.

2 Transport policy context

2.1.1 This section of the Transport Assessment sets out the Local and National Policy relevant to the proposed development.

2.2 Planning Policy Wales (Edition 12 2024)

2.2.1 The Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.

2.2.2 Chapter 4.0 of PWW covers the theme of 'Active and Social Places' and the transportation components of place making.

2.2.3 The principle of the PWW policy is to encourage sustainable travel as set out in paragraph 4.1.1:

> 4.1.1 The planning system should enable people to access jobs and services through shorter, more efficient and sustainable journeys, by walking, cycling and public transport. By influencing the location, scale, density, mix of uses and design of new development, the planning system can improve choice in transport and secure accessibility in a way which supports sustainable development, increases physical activity, improves health and helps to tackle the causes of climate change and airborne pollution by:
>
> - Bringing services to people to reduce the need to travel. This is not about preventing travel altogether, it is about planning ahead for better physical and digital connectivity to support access to more local services, and more home and remote working. If more people can walk and cycle for everyday trips, we will reduce our dependency on cars;
>
> - Allowing people and goods to move easily from door to door by accessible, sustainable and efficient transport. To achieve this, we will need to invest in reliable, efficient and affordable transport services that people want to use, can use and do use. We also need the transport infrastructure to support those services. We will make sure our transport infrastructure is safe, accessible, well maintained and future proofed, to adapt to climate change;
>
> - Where we need new transport infrastructure, we will use the sustainable transport hierarchy to give priority to meeting the demand for travel by walking, cycling and public transport ahead of private motor vehicles; and,
>
> Encouraging people to make the change to more sustainable transport. If we are going to meet our climate change targets, we also need people to travel differently. Which means making it easier to do the right thing. We will do this by making low carbon sustainable transport more attractive and more affordable, and by adopting innovations.

2.2.4 The proposed development site will be accessible by walking, cycling and public transport.

2.2.5 Llwybr Newydd, the Wales Transport Strategy 19 provides the strategic policy framework for transport related activities in Wales. This sets out the long term vision for transport, with ambitions over the next 20 years, as well as five year priorities.

2.2.6 The Welsh Government have set out a hierarchy for sustainable transport in relation to new development as follows:

> 4.1.12 It is Welsh Government policy to require the use of a sustainable transport hierarchy in relation to new development, which prioritises walking, cycling and public transport ahead of the private motor vehicles.

2.2.7 Figure 2-1 indicates the sustainable transport hierarchy for planning:

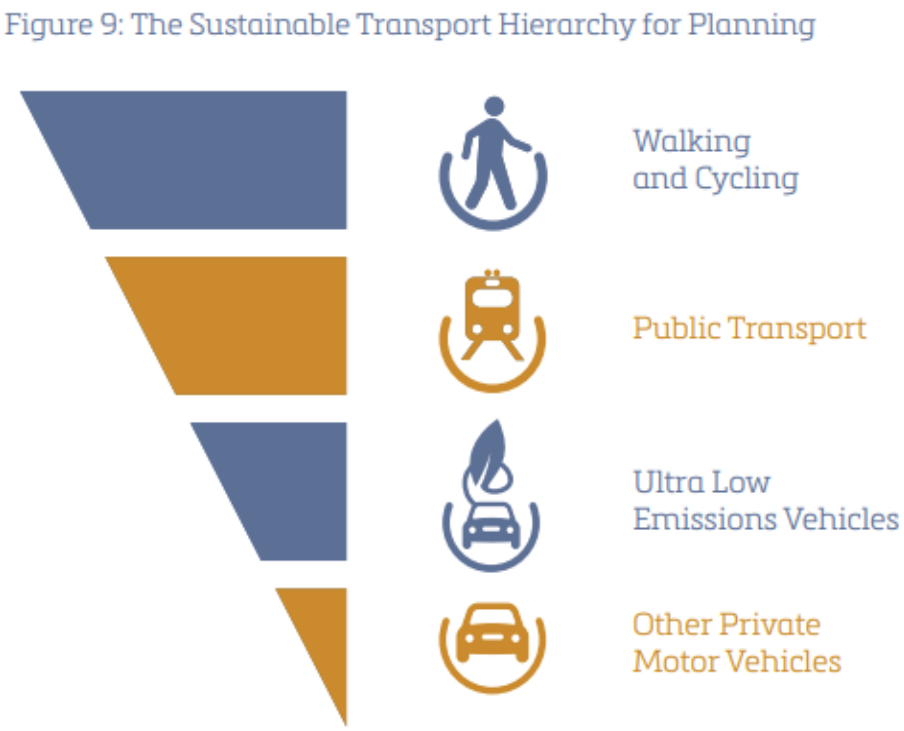


Figure 2-1 The Sustainable Transport Hierarchy for Planning

2.3 Swansea Local Development Plan

2.3.1 Policy T5 states that proposals must ensure that the design of development, together with any supporting transport measures and infrastructure maximises the accessibility of the site via public transport and active travel.

3 Existing conditions

3.1.1 The development site is located in the Penllergaer Business Park, approximately 7.5km north-west of Swansea City Centre, South Wales. The site is bounded by:

- The A48 to the north
- Heol Y Ddraig to the east
- Open space to the south and west.

3.1.2 The location of the site in its local context is shown in Figure 3-1 below.

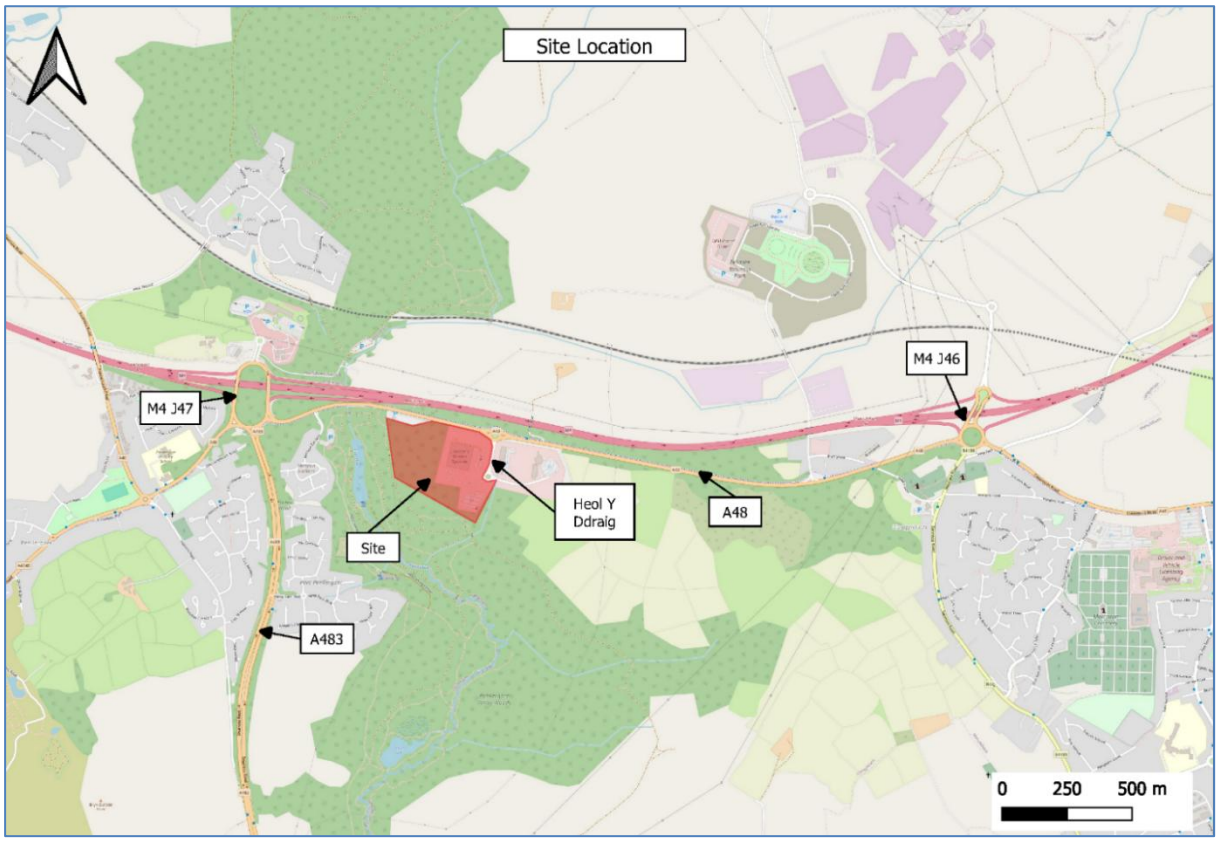


Figure 3-1 Site location and local highway network

3.2 Local highway network

Overview

3.2.1 Table 3-1 provides a brief summary of the highway network within the immediate vicinity of the site.

Table 3-1 Local Road network

Pedestrian footway	Street lighting	Crossing facility	Description
Internal road network			

✓	✓	✓	The development site benefits from an existing access junction which connects from the existing roundabout junction to the internal road network, and provides links to the existing parking court. There are pedestrian footways and street lighting along the extent of the carriageway.
Heol Y Ddraig			
✓	✓	✓	Heol Y Ddraig provides the main vehicles access to the development site, accessed from the A48 roundabout junction to the north. Pedestrian footways are provided on both sides of the carriageway and street lighting is provided along the extent of the carriageway. A pedestrian crossing is provided at the roundabout which serves the existing access junction.
A48			
✓	✓		The A48 is a main distributor road which runs in an east-west alignment and provides connections to the M4 Junction 46 to the east and Junction 47 to the west,
M4			
	✓		The M4 is part of the SRN which provides connections to Port Talbot, Bridgend and Cardiff to the east, and M4 junction 49, Carmarthen and the A48 to the west.

3.3 Highway safety

3.3.1 The CrashMap personal injury collision data website has been reviewed for the latest available five-year period between 1st January 2019 – 31st December 2023. The study area includes Heol Y Ddraig and the A48, as is shown in Figure 3-2.

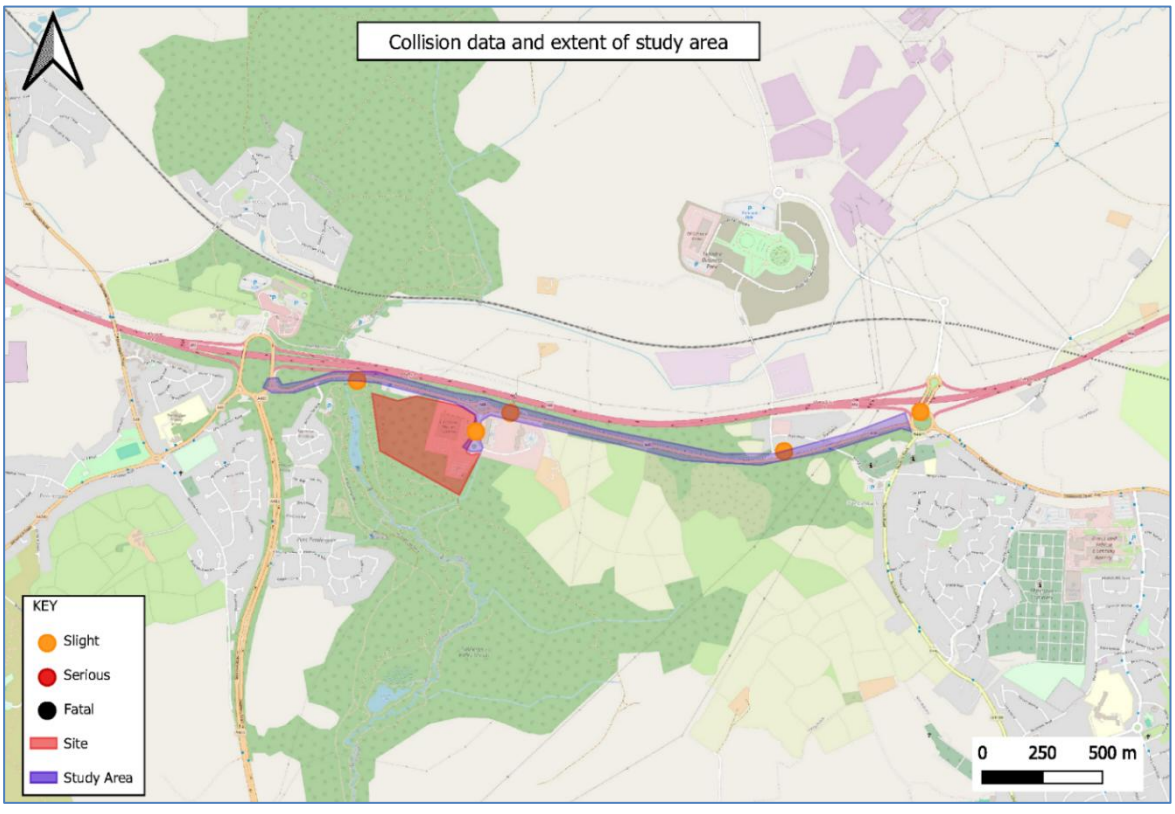


Figure 3-2 Personal injury collision data

3.3.2 An initial review of CrashMap shows that there has been a total of seven incidents recorded within the study area over the most recent five-year period, six of which resulted in slight incidents and one serious incident.

3.3.3 The incidents are described in detail below:

- Serious: the incident occurred at the roundabout along the A48. It involved a motorcycle colliding with the central island of the roundabout.
- Slight: the incident occurred along the A48. It involved a van proceeding normally along the carriageway colliding with a car turning right.
- Slight: the incident occurred at the roundabout with the A48 and B4489. It involved a van proceeding normally along the carriageway colliding with a lamp post.
- Slight: the incident occurred along the A48. It involved three vehicles, a good vehicle in the act of turning right, a goods vehicle in the act of turning left and a car proceeding normally along the carriageway colliding.
- Slight: the incident occurred along the A48. It involved a motorcycle.
- Slight: the incident occurred along the A48. It involved a car proceeding normally along the carriageway colliding with a tree.
- Slight: the incident occurred along in the internal road off the A48. It involved a car proceeding normally along the carriageway colliding with a cyclist turning right.

4 Connectivity to the site by non-car modes

4.1 Introduction

4.1.1 This section of the Transport Assessment sets out the connectivity of the site to the surrounding area by sustainable modes of travel, as well as accessibility to local facilities and amenities.

4.1.2 As requested by the Local Highway Authority an Active Travel Audit has been updated of key walking and cycling routes surrounding the site. This report is presented in full in Appendix B of this Transport Assessment. A review of three walking routes surrounding the site (following guidance set out in Appendix H of the Active Travel Act Guidance 'Walking and Cycling Route Audit Tool'), shows that the site benefits from access to well maintained, lit, shared cycleway-footways and existing crossing points which provide direction connections to public transport facilities and residential areas. The existing connectivity of the site will aid in promoting employees of the proposed development site to travel to site by sustainable modes.

4.2 Walking and cycling

4.2.1 The Heol Y Ddraig has two-metres on both sides of the carriageway which are well lit. This links to the A48 roundabout junction, which has a shared cycleway footway along the northern side of the carriageway providing connections to the east and west. A crossing facility with dropped kerbs and tactile paving is located at the Heol Y Ddraig-A48 roundabout junction.

4.2.2 A 30-minute walk and cycle distance from the development site are shown in Figure 4-1 below.

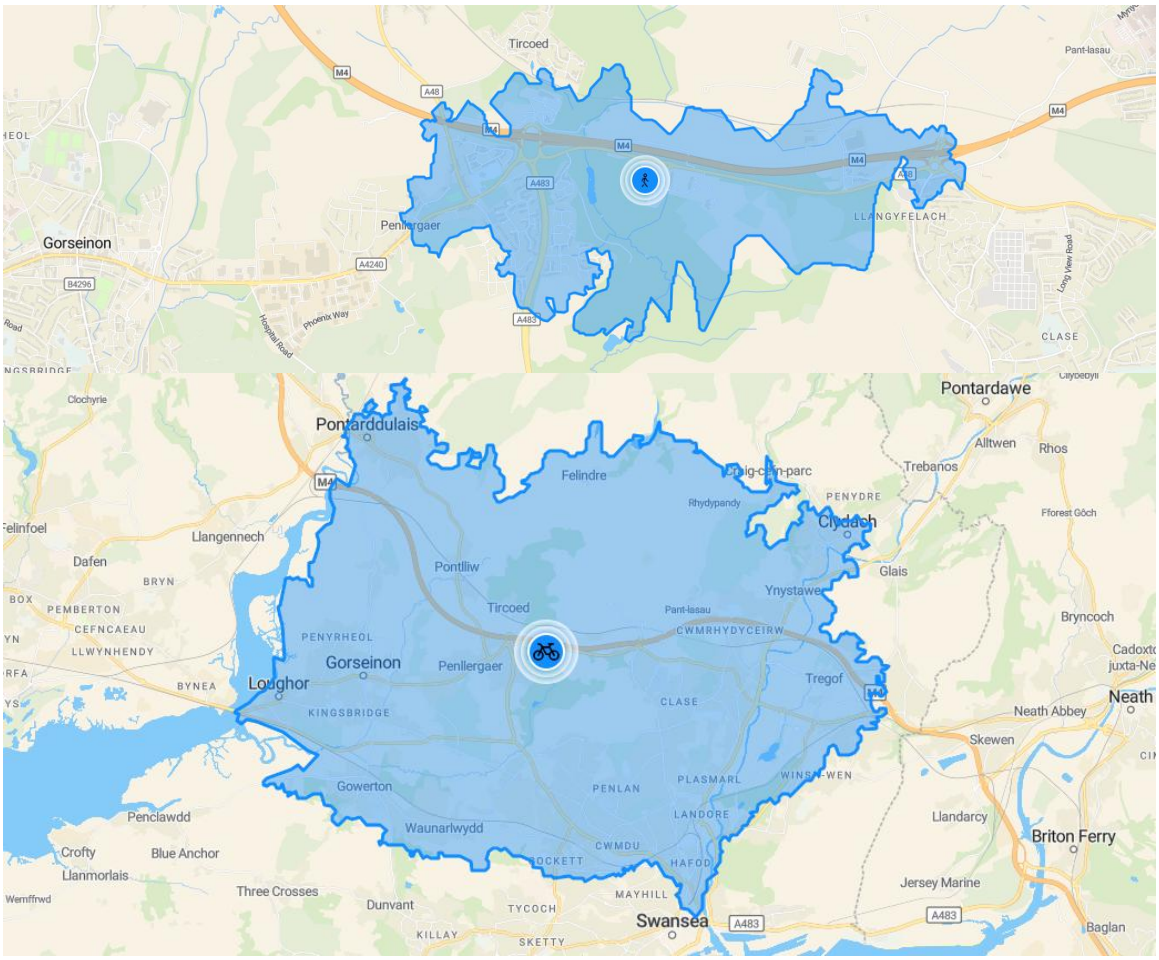


Figure 4-1 30-minute walk and cycle distance from the development site

4.2.3 Based on the City and County of Swansea Council's Public Right of Way (PRoW) Map shows that there are no PRoWs located on the site or surrounding its boundary.

4.2.4 A planning permission has been granted to provide an Active Travel Route link Penllergaer to Fforestfach via Penllergare Valley Woods (2023/0498/FUL). This will provide an off-road cycle route from the A48 (approximately 800m to the west of site) to Woodford Road, connecting the site to residential areas.

4.2.5 This scheme will offer wider connectivity and expand opportunities for active travel journeys by providing walking and cycling links from Penllergaer to Fforestfach. This would improve active travel connections east and west by linking to the shared use path on the A48 and towards Gorseinon.

4.3 Public transport

Bus

4.3.1 The closest bus stop to the site is located along the A48, approximately 1.4km west of the site access (17-minute walk, 5-minute cycle). This bus stop is serviced by services 46, 53, and X13.

4.3.2 The location of bus stops in the vicinity of the site is shown in Figure 4-2 below.

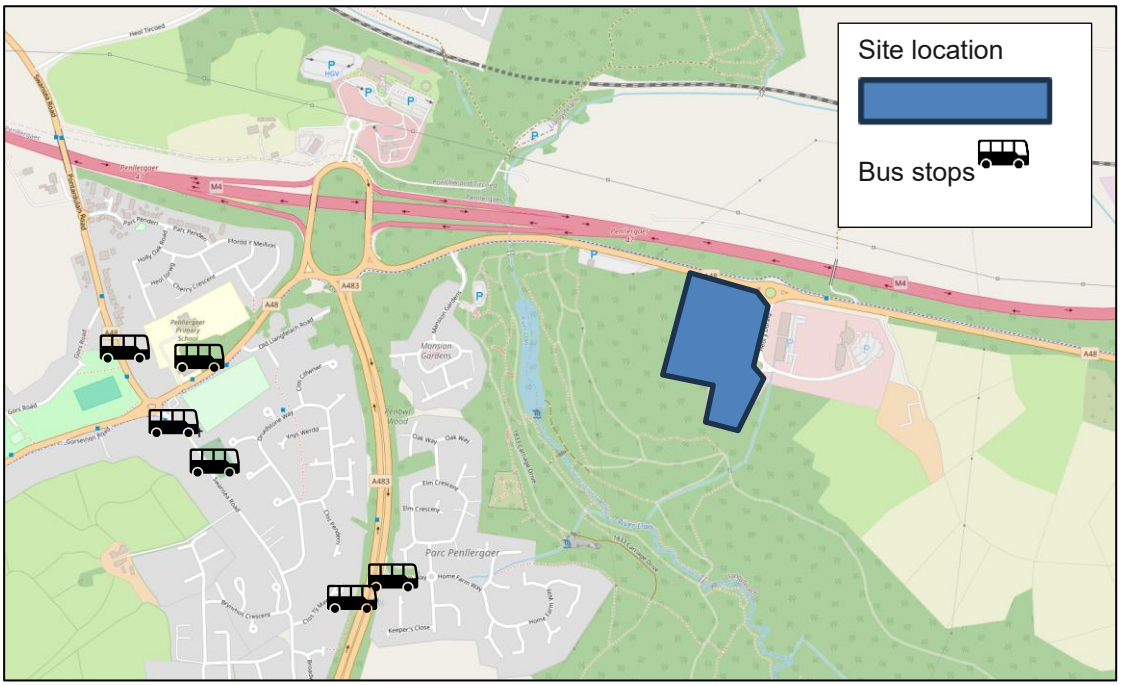


Figure 4-2 Bus stop within the vicinity of the site

4.3.3 The 46 service provides eastbound and westbound connections between Morriston and Gowerton via Llangfelach and Penllergaer. There are a total of seven services available throughout a typical weekday and Saturday in each direction, with no services available on Sundays. Services at these bus stops operate between 08:10 and 18:24. The 46-bus service runs along the A48, adjacent to the site.

4.3.4 The X13 service runs between Swansea bus station and Llandelio. The service stops every hour between 07:25 and 23:28

4.3.5 The 53 service runs between Swansea and Tircoed. The service runs three times a day, between the times of 10:54 and 15:34.

Rail

4.3.6 The site's nearest railway station is Gowerton, located approximately 5km to the south-west. This station is served by a three every hour in each direction, providing connections to Gowerton, Lanelli, Camarthen, Fishguard, Pembroke Dock, and Milford Haven to the west, and Swansea, Neath, Cardiff Central, Bridgend and Newport to the east.

4.4 Census data review

4.4.1 A review of 2011 Census data, for the Middle Super Output area in which the site is located and has been undertaken to highlight how people employed within this area of Penllergaer travel to work. This will be used to establish the likely travel modes of the staff to the proposed development.

4.4.2 It should be noted that 2011 Census data has been used, as the Office for National Statistics has issued a warning in relation to the use of 2021 Census mode of travel data due to inaccuracies in the data. This is due to Covid-19, when an increased proportion of people were working from home or were being furloughed, at the time when the data was collected.

4.4.3 The method of travel to work for the area in which the site is located is presented in Table 4-1. This excludes people that are not currently working or working from home.

Table 4-1 Method of travel to work (Swansea 004)

Method of travel to work	%
Driving a car or van	82
Passenger in a car or van	7
On foot	5
Bus, minibus or coach	3
Bicycle	1
Other	2

4.4.4 It can be seen from the table above that approximately 82% of those employed within the area in which the site is located drive to work, 7% car share, 5% walk and 3% travel by public transport.

4.4.5 Census data has also been used to review the location of usual residence and place of work. This highlights the key locations staff employed within the area of Penllergaer travel from and is summarised in Table 4-2 below.

Table 4-2 Location of usual residence (Swansea 004)

Usual residence	%
Swansea	71
Carmarthenshire	13
Neath Port Talbot	10
Bridgend	2
Powys	1
Rhondda Cynon Taf	1
Other	2

4.4.6 It can be seen from the table above that 71% of those employed within the area in which the site is located also live within Swansea, and approximately 8% live and work within the same area in which the site is located.

4.4.7 The distribution centre would create a range of employment opportunities for residents within proximity of the site. The data presented above shows that there is an existing demand for those that live and work in Swansea, and opportunities to encourage sustainable travel for existing residential areas surrounding the development site.

4.5 Connectivity and accessibility summary

4.5.1 The site benefits from good footways link to the surrounding residential areas, and the choice of travel options by walking, cycling or bus offers a realistic potential for staff of the proposed development to travel by sustainable modes of transport, as an alternative to a private car.

4.5.2 Travel measures encourage and promote sustainable travel behaviour are also set out in the supporting Travel Plan.

5 Development proposals

5.1 Overview and layout

5.1.1 This Transport Assessment has been produced in support of a planning application for the redevelopment of the existing Mechatronics Systems Wales building, located within Penllergaer Business Park, to provide a storage and distribution centre. The building is designed as a 'last mile' facility, processing and sorting goods from higher up the supply chain, which are then loaded into vans to be delivered directly to customers.

5.1.2 Goods are delivered to the site by HGVs for sorting, typically overnight. Staff working in the building unload these goods, process and sort them so they are ready to be loaded into vans. As set out below, the site design has a maximum capacity for 216 vans to leave the site in a given hour. The processing and sortation of goods within the building therefore has to be completed well in advance of the first vans of the day arriving to the loading area.

5.1.3 The proposed redevelopment will consist of:

- A last mile distribution centre with a total GEA of 12,465m^2 consisting of use Class B8 with ancillary Use Class B1.
- A total of 221 car parking spaces for staff working in the warehouse, including 12 accessible parking spaces and two EV accessible spaces.
- A total of 72 van loading bays
- A total of 72 van waiting bays
- A total of 755 van storage bays
- 9 HGV docks and two van docks within the service yard
- A total of 36 bicycle spaces with a sheltered cycle compound at the main entrance
- A total of 28 motorcycle spaces.

5.1.4 The layout has been designed to include:

- Pedestrian/cycle connections from the main building entrance the existing footway provision along Heol Y Ddraig
- Cycle parking in the immediate vicinity of the entrance, with showers, lockers and changing facilities also provided within the main building
- Motorcycle parking located within the staff the car park

5.2 Pedestrian access

5.2.1 Pedestrian access to the development site is be gained via the existing simple priority junction from Heol Y Ddraig. Pedestrians can access the site via the existing footway provision along the western side of Heol Y Ddraig.

5.2.2 The existing footway provision will connect to the internal footway onsite. Informal crossing facilities are located onsite which will provide direct access to a dedicated cycle compound and to the main building entrance.

5.2.3 The footway located along the western side of Heol Y Ddraig provides access to an existing informal dropped kerb pedestrian crossing point provided at the roundabout junction. This

provides access to the eastern side of the Heol Y Ddraig, which connects to the existing bus stops located along the A48.

5.3 Vehicle access

5.3.1 As part of the redevelopment, it is proposed to utilise and modify the following junctions to provide access to the distribution centre, this includes:

- Utilising and widening the existing simple priority onto Heol Y Ddraig, to provide two-way access to the main warehouse entrance, staff parking and a dedicated HGV and refuse storage yard
- Modifications to the exiting Heol Y Ddraig roundabout junction to provide single lane egress from the van loading bays
- Amendments to the existing Heol Y Ddraig roundabout junction to provide a fourth arm to facilitate two-way access for the van storage bays.

5.3.2 A Stage 1 Road Safety Audit has been produced of the S278 work associated with the access arrangement and submitted as part of this planning application.

5.3.3 Heol Y Ddraig priority junction has been provided as a dedicated staff access, which separates out the majority of operational vehicles and staff movements. A shared cycleway footway has been provided along the northern side of the access road, which connects to the existing footway located along the western side of Heol Y Ddraig. An uncontrolled crossing point provides direct access to the main warehouse entrance and the cycle storage.

5.3.4 A service yard is also accessed via the Heol Y Ddraig priority junction which would be used for HGV deliveries and refuse collection. HGVs and refuse vehicles accessing the yard would not be required to access the main staff car park, operating via a one-way system and exiting the loading bay via the roundabout junction.

5.3.5 A General Arrangement Plan of the proposed access junctions is presented in full Appendix C.

5.3.6 Swept paths analysis has been carried out of a range of vehicles that are likely to access the development, as presented in full in Appendix D, including:

- 16.5m Articulated vehicle
- 11.5m refuse vehicle
- 7.7m fire tender
- Mercedes Benz Sprinter Van
- A large car

Visibility splays

5.3.7 A visibility splay has been carried out at the Heol Y Ddraig priority junction based on the 30mph speed of the road. This shows that the appropriate visibility splay (2.4m x 43m) can be achieved within land owned by the application or within highway land.

5.3.8 Visibility splays have also been carried on the new fourth arm of the existing Heol Y Ddraig roundabout, which shows that the required visibility splay can be achieved for vehicles exiting the site of vehicles approaching the roundabout from the east. This shows that the required visibility splay for the 30mph road (2.4m x 43m) can be achieved within land owned by the application or within highway land.

5.3.9 Visibility splays are presented in Appendix E.

Car park access

5.3.10 The staff car park will be accessed via a simple priority junction from Heol Y Ddraig, with the internal layout subject to an advisory 20mph speed limit. Adequate junction radii and visibility splays are provided at this access junction.

5.4 Building operations

Operations and logistics

5.4.1 The development proposals consist of a distribution centre which operates 24/7. As set out above, HGVs mainly deliver goods from the supply chain to the site overnight. The staff working in the distribution centre must be present before this to receive these goods, process and sort them ready for the first van departures of the day.

Delivery operations

5.4.2 As part of the operation, the 72 van loading bays can turn over three times within any hour such that the maximum throughput of vans in a given hour is 216.

5.4.3 The provision of van storage on site is reflective of the need to make the supply chain more sustainable by allowing operators to source lower emissions vehicles in the first instance and to then ultimately allow a move to an electric vehicle fleet. A by-product of the fleet vans being stored on site is that it enables the opportunity for modal shift of van drivers to commute by sustainable modes (and also widens the scope of people that can be employed as drivers). If there was no van storage on site, the van drivers would by definition have to drive the van to the site. Once the van storage is utilised and the occupier fleet available, van drivers will travel to the site by their chosen method of transport to collect a van. Equally at the end of the day's deliveries, drivers will return their van to the van storage area and then depart from the site in their chosen method.

5.4.4 Any van drivers who drive to the site will leave their personal vehicle in a vacated van storage bay, and on this basis there would never be a situation where there is a shortage of spaces for the drivers cars. The proposed van storage spaces provided onsite would house the van fleet overnight while the vans are not out on deliveries.

5.4.5 Vans are loaded to ensure that they deliver goods for a whole route in a single journey. This ensures efficiency of the operation and reduces vehicle movements.

5.5 Parking standards

5.5.1 The City and County of Swansea Council apply the CSS Wales Parking Standards. It is proposed that the redevelopment of the site will consist of a last-mile distribution centre with a floor area of 12,465m^2. The required car and cycle parking standards for Distribution Centres with a gross floor area of over 1,000sqm is set out in Table 5-1 below.

Table 5-1 CSS Wales Parking Standards: Distribution Centres >1,000m2

Type		Adopted standard
Operational parking		25% of Gross Floor Area
Non-operational parking		1 space per 80m^2
Disabled parking		5% of parking provision
	Long stay	1 stand per 500m^2

Cycle parking	Short stay	No standard
Electric Vehicle Charging Spaces		No locally adopted standard

5.5.2 Due to the nature of the building and operations, it is not appropriate to directly apply Swansea's parking standards to the full floorspace of the distribution centre. A total of 755 overnight van storage spaces are proposed to serve the operational needs of the unit and to allow vans to be stored on site overnight. Warehouse employees and visitors will not be permitted to make use of these storage spaces for parking purposes.

5.5.3 The proposed level of van storage has been derived based upon the forecast operations of the site and on operational efficiencies to avoid multiple trips to and from the site, minimising empty running of vehicles. The provision is also designed to future proof operations at the site and allow the adoptions of EV fleets to be maximised.

5.5.4 A total of 211 car parking spaces ware proposed, of which includes 12 accessible parking bays. The number of spaces is reflective of the requirement for warehouse workers to start and end their shifts at times where the scope for modal shift is limited and reflective of the nature of the operation whereby shifts overlap.

5.5.5 A total of 36 secure and lit cycle spaces will also be provided on-site which is in accordance with standards.

Accessible parking

5.5.6 The City and County of Swansea Parking Standards states that for Distribution Centres with a gross floor area of over 1,000sqm require 5% of the total parking provision to be allocated to accessible parking. As part of the development, it is proposed to provide a total of 12 accessible parking bays.

5.5.7 As part of the development, it is proposed to provide 12 accessible parking spaces located immediately in front of the main entrance to the warehouse building, in accordance with the adopted standards.

Electric Vehicle (EV) Charging

5.5.8 City and County of Swansea do not have any locally adopted standards. The development has been designed to meet the standards set out in the Building Regulations Infrastructure for the Charging of Electric Vehicles, Approved Document S.

5.5.9 As part of the development, it is proposed to provide a total of 22 EV charging points for cars, which is 10% of the total staff parking provision.

5.6 Servicing

Refuse

5.6.1 It is proposed that all servicing will be undertaken onsite with refuse collection undertaken on-site.

5.6.2 Refuse stores are located within the HGVs loadings bays, with refuse vehicles accessing the site via the simple priority junction and exiting the site via the roundabout junction. Swept path analysis has been carried out to show an 11.2m refuse vehicle safely accessing the site and exiting in a forward gear.

Fire

5.6.3 Swept path analysis for has been undertaken to show that a fire tender can service manoeuvre onsite, servicing the proposed building within 25m of the external building area, and exit in a forward gear.

5.7 Construction

5.7.1 A draft Construction Traffic Management Plan (CTMP) has been provided and submitted as part of this planning application for consultation and agreement with the LHA. The CTMP sets out details of how construction traffic will be managed onsite, and the impact minimised on the surrounding highway network.

6 Trip generation and distribution

6.1 Overview

6.1.1 This section sets out the trip generation and methodology to calculate the trip generation of the proposed development.

6.2 Operation of Last Mile Distribution Centre

6.2.1 While the specific occupier and detailed operational schedules are not yet confirmed, the assessment draws upon industry experience and comparable facilities to establish a representative operational profile.

6.2.2 The site is expected to accommodate Heavy Goods Vehicles (HGVs) arriving and departing typically at night. These HGVs will deliver goods from regional or national distribution centres, manufacturers, or import hubs. Upon arrival, goods will be unloaded and sorted within the warehouse facility.

6.2.3 Following sorting, goods will be loaded onto Light Goods Vehicles (LGVs) by the drivers for the final last mile delivery to end customers. The facility includes 72 loading bays, enabling up to 72 LGVs to be processed simultaneously. At peak operational capacity, it is anticipated that each bay could accommodate up to three LGV movements per hour, equating to a potential turnover of 216 LGV trips per hour. The LGVs deliver to customer doors and therefore the majority of operation will be during the working day and into the evening.

6.2.4 Each loading bay is used 3 times an hour, such that there is a 20 minute time period in which each van has to be loaded. With 72 vans being loaded in each 20 minute window, potentially over multiple hours, the only way the building can operate efficiently and effectively is if the goods inward from the supply chain have been processed and sorted well in advance.

6.2.5 To achieve this, staff working in the building have to operate at a completely different and earlier time schedule from the van drivers, with no crossover. If the van drivers were to arrive before or at the same time as the building staff, the van drivers would have to sit and wait for the goods to be processed, the inefficiency of which would significantly harm the viability of the operation.

6.2.6 Therefore, there will simply be no period of time in which both building staff are arriving/departing and vans are leaving the site to undertake deliveries. We consider that the assessment provided is ultra-robust as it has tested the intense part of the operation within the peak hours

6.3 Trip generation

6.3.1 The proposed trip generation of the distribution centre has been based on the first principles approach of the turnover of the proposed van loading spaces.

Operational trips

6.3.2 As part of the development, it is proposed to provide 72 van loading spaces on-site which have the potential to turn over three times during any hour.

6.3.3 The operational vehicle movements will consist of vehicle movements providing deliveries to customers and HGVs. The onsite layout provides a total of 9 HGV docks and two van docks located within the service yard. Therefore, to provide a robust assessment of the likely vehicle trip generation during the peak periods, this Transport Assessment has assumed that all 11 of these spaces would turn-over once in a given hour.

6.3.4 As agreed during pre-app discussions, the development impacts are to be assessed during the network peak hours. As such, the trips in any given hour as based on the first principles approach are presented in Table 6-1 below.

Table 6-1 First Principles trip generation during any hour

Time	No. of arrivals		No. of departures		Total no. of trips
	Cars/lights	HGVs	Cars/lights	HGVs	
Any hour	216	11	216	11	454

6.3.5 As above, the trips in Table 6.1 will be applied to the AM and PM highway peak hours.

6.3.6 The location of the large residential areas within close proximity of the site could also increase the opportunity for staff to travel by sustainable modes and reduce the reliance on single occupancy car trips. The above assessment is robust in that it assumes that all van drivers commute by car, whereas they would have a choice of using sustainable modes.

6.4 Vehicle distribution

Operational distribution

6.4.1 The distribution of the last mile delivery vehicles identifies key desire lines to Swansea city centre, Llanelli, and main cities towards the east.

6.4.2 It is likely that vehicles will be spilt over the local highway network, with approximately:

- 50% of vehicle trips likely to travel to and from Junction 46 of the M4, serving Swansea east, Neath, Port Talbot and Swansea City Centre via the A48 Clasemont Road.
- 50% of vehicle trips like to travel to and from Junction 47 of the M4, serving Swansea west, Swansea City Centre, Gorseinon, Loughor, Gowerton, Llanelli and Carmarthen.

6.4.3 The likely vehicle routing strategy for the operational vehicles of the last mile distribution centre is shown in Figure 6-1 and presented in Table 6-2 below.

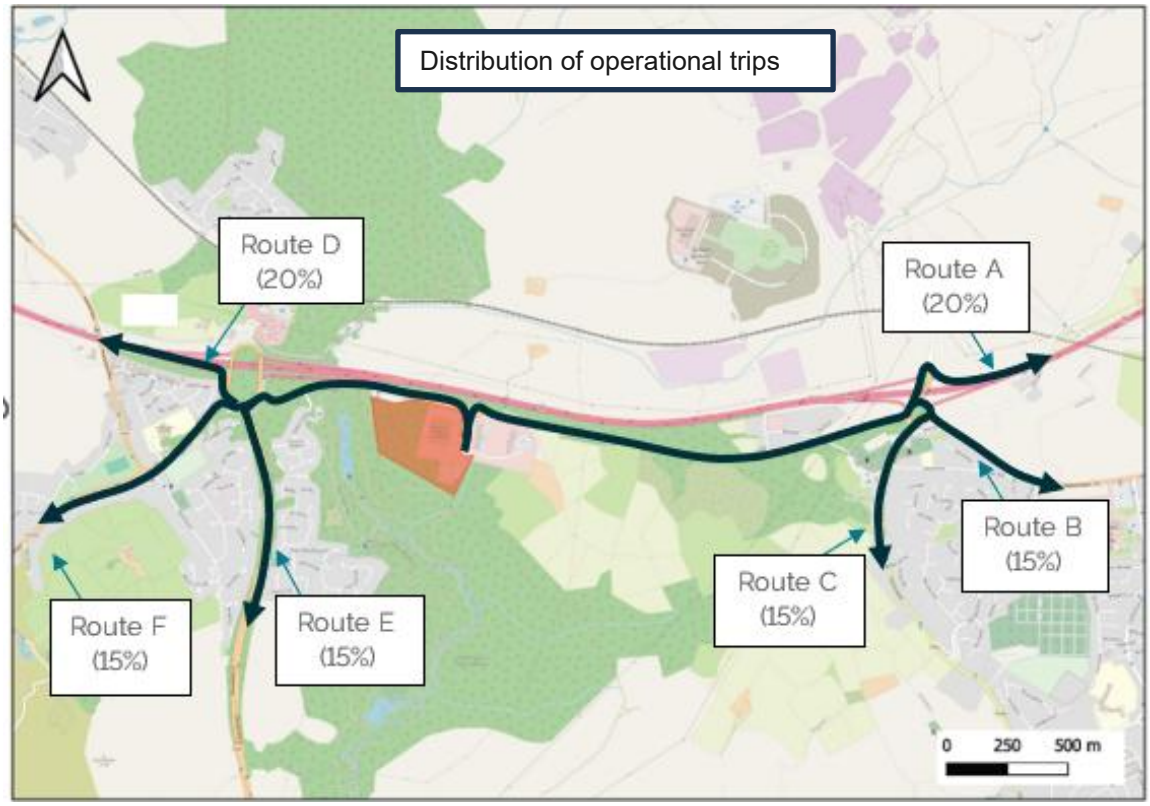


Figure 6-1 Distribution of operational trips

Table 6-2 Distribution description: Operational trips

Routes	Description	Distribution (%)	No. vehicle trips			
			AM peak		PM peak	
			Arrivals	Departures	Arrivals	Departures
A	Junction 46: M4 east	20	44	44	44	44
B	A48 Clasemont Road	15	33	33	33	33
C	Swansea Road B4489	15	33	33	33	33
D	Junction 46: M4 eest	20	44	44	44	44
E	A483 Swansea Road	15	33	33	33	33
F	A48-A4240	15	33	33	33	33

7 Committed development

7.1.1 The requirement to consider committed development has been agreed with the local highway authority as part of the scoping process.

7.1.2 It is recognised that there are a number of residential and mixed-use development currently under development/ or within the planning process, as detailed below:

- Land South of the A4240 Parc Mawr Penllergaer Swansea (850 residential dwellings): Currently built out approximately 100 units, further Reserved Matter planning permissions required for future phases.
- Land North of Llewellyn Road Penllergaer, Swansea (166 residential dwellings): built out around 150 units.
- Land North of Garden Village, Swansea (705 residential dwellings): currently 70 units are built out, and working to approximately 70 units per year.

7.1.3 A summary of the list of committed developments site which were provided by Swansea Council are presented in Table 7-1 below. These committed development sites are included in the forecast year scenarios of the microsimulation modelling which has been undertaken.

Table 7-1 Summary of committed development sites

Size	Units Already Built in 2025	Build Out Rate		Total Vehicle Trips					
				AM Peak			PM Peak		
		2027	2037	Arr	Dep	Tot	Arr	Dep	Tot
Land North of Llewellyn Road Penllergaer, Swansea									
166 dwellings	150 dwellings	166	166	14	61	75	45	22	67
Land North of Garden Village, Swansea									
750 dwellings 500 pupil school	70 dwellings	210	750	239	338	576	286	177	466
Land South of the A4240 Parc Mawr Penllergaer Swansea									
850 dwellings	100 dwellings	300	850	195	366	560	243	179	421

7.1.4 As detailed above, a number of these committed development sites are already built and occupied, therefore, this has been taken into account and the committed development flows have been factored appropriately based on the likely built out rate.

7.1.5 It is noted that whilst the Transport Assessments presented peak hour development trips only, these have been factored using TRICS data to provide hourly profiled trip matrices covering the modelling periods (07:00 to 10:00 and 15:00 to 19:00). This provides a robust assessment.

7.2 Traffic Growth

7.2.1 NTM/TEMPro locally adjusted core traffic growth factors have been derived from TEMPro v8.0. Given that the committed development sites outlined above represent a significant amount of future growth in Penllergaer, alternative planning assumptions have been applied in TEMPro to avoid double counting, as agreed with Swansea Council.

7.2.2 This has been done by reducing the future housing projections for the Swansea 004 MSOA based on the projected number of residential dwellings as a result of each respective committed development site.

7.2.3 This approach will avoid the double-counting of traffic on the basis that the excluded sites are calculated explicitly, as set out above. With reference to committed development phasing schedule set out in Table 7-2, a summary of the projected number of residential dwellings expected to be delivered, including the estimated year of delivery, is set out in.

Table 7-2 Projected number of dwellings to be delivered

Future Assessment Year Scenario	Dwellings Built
2027	340
2037	1,546

7.2.4 Having regard to the content set out in Table 7-2, locally adjusted traffic growth factors have been sourced from NTM/TEMPro based on based on the criteria set out in Table 7-3.

Table 7-3 NTM / TEMPro Search Criteria

Scenario	Core
Result Type	Trip ends by time period
Area Definition	Swansea 004
Base Year	2025
Future Year	2027 / 2037
Trip Purpose	All purposes
Area Type	All
Road Type	All
Transport Mode	Car driver
Trip end Type	Origin/Destination

7.2.5 The resulting factors used for cars are summarised in Table 7-4.

Table 7-4 NTEM / TEMPro Adjusted Growth Factors

Assessment Year	NTM Adjusted Growth Factor	
	AM Peak	PM Peak
2027	0.9707	0.9637
2037	0.8734	0.8385

7.2.6 As shown in Table 7-4 the level of committed development is in excess of any expected background growth. The adjusted growth factors suggest that a 3% (2027) and 13% (2037) reduction should be applied to the base trips in the model before adding on the committed development flows.

7.2.7 In order to undertake a robust assessment no growth has been applied to the base year trips and the growth comes solely from the committed developments which far outweighs the NTEM adjusted growth factors.

7.3 Effective Traffic Growth

7.3.1 Based on the additional committed development traffic and growth in background traffic, a summary of the effective traffic growth in Swansea 004 MSOA by year and time period is presented in Table 7-5.

Table 7-5 Summary of Effective Traffic Growth

Time Period	2025	Effective Growth | Absolute Increase (% Increase)	
		2027	2037
AM Peak (07:00 – 10:00)	26,350	+285 (+1.1%)	+1,086 (+5.2%)
PM Peak (15:00 – 19:00)	33,865	+331 (+1.0%)	+1,242 (+4.6%)

7.4 Committed Highway Schemes and Infrastructure

7.4.1 As discussed with Swansea Council there were no committed and / or planned highway schemes or transport infrastructure in the study area that is expected to come forward between 2025 and 2037.

7.5 Extent of junction capacity analysis

7.5.1 The extent of the junction capacity analysis was agreed as part of the pre-application discussions with the local highway authority and includes the following junctions:

- Junction 1: Penllergaer Business Park internal roundabout
- Junction 2: Penllergaer Business Park internal access junction
- Junction 3: A48 / Penllergaer Business Park roundabout
- Junction 4: A48 / Penllergare Valley Woods access junction
- Junction 5: A48 / Bryntywod junction
- Junction 6: M4 Junction 46
- Junction 7: M4 Junction 47
- Junction 8: A48 / A4240 Gorseinon / Swansea Road roundabout
- Junction 9: A48 Clasemont Road / Pant Lasau Road junction

7.5.2 The model study area, as agreed with Swansea Council, is shown in Figure 7-1 below.

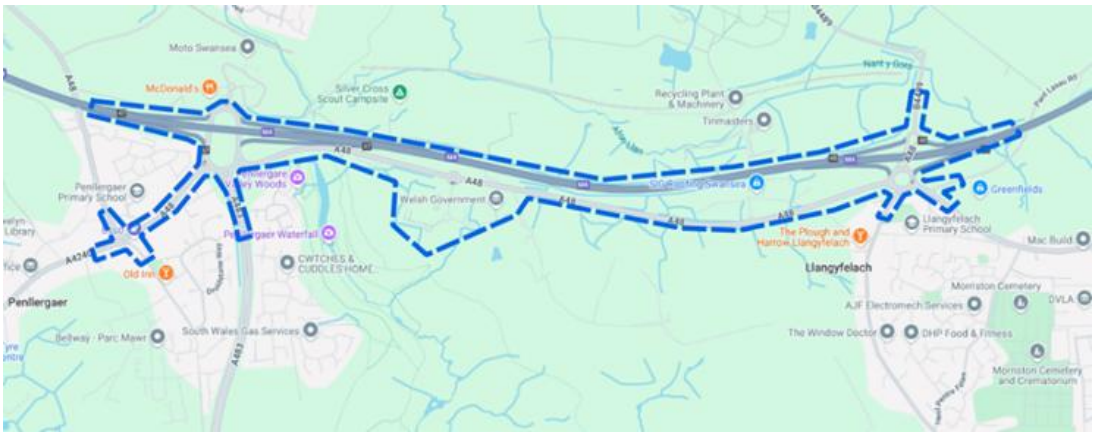


Figure 7-1 Model Study Area

7.5.3 It was agreed with Swansea Council that a microsimulation model is considered to be the most appropriate tool to assess the impacts of the proposed development. A Model Specification Report was issued to and agreed with Swansea Council 22 April 2025 (35251-HYD-XX-XX-RP-TP-2001 P01).

7.5.4 The results of the Aimsun Model carried out a summarised in Chapter 8 below.

8 Microsimulation traffic model

8.1 Background

8.1.1 In support of this planning application for the development of a last mile distribution centre on the Land at Penllergaer Business Park, Swansea, a microsimulation model was developed in Aimsun of the full extent of junctions agreed with Swansea Council.

8.1.2 The Chapter of the Transport Assessment provides a summary of the following documents which set out the full results of the Aimsun microsimulation model.

8.1.3 The following reports should be read in conjunction with the Transport Assessment:

- Land at Penllergaer Business Park - Model Validation Report P01: 35251-HYD-XX-XX-RP-TP-8001 (presented in full in Appendix F)
- Land at Penllergaer Business Park - Future Year Modelling Report P02: 35251-HYD-XX-XX-RP-TP-8002 (presented in full in Appendix G)

8.2 Model Overview

8.2.1 The model covers Junction 46 and Junction 47 of the M4 along with the A48 which runs parallel to the M4. The model has been developed to be representative of the year 2025 and covers the following time periods:

- AM peak period (07:00 to 10:00 hours).
- PM peak period (15:00 to 19:00 hours).

8.2.2 The model considers the following vehicle types:

- Cars: comprising private cars and taxis.
- Light goods vehicles (LGVs): with a gross vehicle weight of less than 3.5t.
- Heavy goods vehicles (HGVs): with a gross vehicle weight greater than 3.5t.
- Buses: comprising all public service buses.

8.3 Model Validation Report

8.3.1 The Model Validation Report sets out the development, calibration, and validation of the Penllergaer, Swansea Aimsun Model in line with the updated Model Specification Report.

8.3.2 The model has been developed to be representative of the year 2025 and covers the time periods agreed with Swansea Council, which have been chosen to capture the peak periods including the primary school peaks:

- AM peak period: 07:00 to 10:00.
- PM peak period: 15:00 to 19:00.

8.3.3 In addition, a 15-minute warm-up period has also been modelled in order to generate an initial starting point for the model.

8.3.4 The data used to validate the model includes:

- Journey time data
- Queue length data
- Journey time validation
- Queue length validation
- Saturation flow validation

8.3.5 The microsimulation model has been fully calibrated and validated and accurately reflects traffic flows, journey times and queue lengths for 2025. As such, it is concluded that the model is a suitable tool to assess forthcoming development proposals.

Forecasting Methodology

8.3.6 The forecasting methodology and approach taken to derive the future year matrices and Development future year matrices are summarised below.

Do Minimum

8.3.7 The following outline methodology has been used to estimate the forecast year traffic demand for the 2027 opening year and 2037 future year scenarios:

- All committed and/or allocated sites to be included in the forecast year scenarios have been agreed with Swansea Council
- The trip generation for each site has been taken from the relevant Transport Assessments
- NTEM growth factors at district level have been derived from TEMPro with alternative development assumptions to avoid double counting of development trips.

With Development

8.3.8 The vehicle trip generation and distribution as outlined within Chapter 6 of this Transport Assessment was applied to the AM and PM peak highway periods.

8.3.9 Development trips have been assigned to arrive and depart to/from the site access onto the network using the distribution analysis carried out. Three new centroids have been connected to the proposed site accesses in order for development trips to be assigned onto the network, with cars, LGVs and HGVs assigned to their relevant access points.

8.4 Future Year Modelling Report

8.4.1 This report sets out the methodology adopted in developing the future year scenarios for the proposed development and describes the data that has been outputted from the model.

Modelling Results

8.4.2 The following section presents the results of the Aimsun modelling.

8.4.3 To assess the impact of the proposed development, a 2027 opening year and 2037 future year has been assessed. The following scenarios have initially been modelled:

- 2027/2037 Do Minimum: Base traffic + consented committed developments.
- 2027/2037 With Development: Base traffic + consented committed developments + proposed development

Analysis of Network Wide Model Statistics

8.4.4 In 2027, the modelling shows that the proposed development without any mitigation is predicted to increase network delay by +7.6s per km in the AM peak and +15.9s in the PM peak. This equates to an increase in network-wide mean queueing of +42.5 and +89.0 vehicles and a decrease in network-wide speed of -2.7km/h and -3.4km/h.

8.4.5 In terms of network throughput (which is an indicator of network capacity), reasonably small variations in the number of vehicles either queueing inside the model (vehicles inside) and vehicles queueing outside of the model (vehicles waiting to enter) is predicted. These results suggest that in the AM peak the network would operate broadly similar with the development in place, however in the PM peak the impacts would be more noticeable.

8.4.6 In 2037, the modelling shows that the proposed development is predicted to increase network delay by +5.4s per km in the AM peak and +24.9s in the PM peak. This equates to an increase in network-wide mean queueing of +37.1 and +182.6 vehicles and a decrease in network-wide speed of -1.9km/h and -3.8km/h.

8.4.7 In terms of network throughput (which is an indicator of network capacity), there are noticeable issues with vehicles waiting to enter in both peak periods with the development in place (366 and 227 vehicles). Whilst this also occurs in the Do Minimum AM peak (234 vehicles) the development increases this suppressed demand. These results suggest that the development gives rise to impacts on the wider highway network which are likely to require mitigation.

Journey Time Analysis

8.4.8 Journey time statistics have been extracted from Aimsun for the pre-defined journey time validation routes for each future assessment year scenario in order to understand the impact of the proposed development.

8.4.9 A total of eight journey time routes have been analysed that cover key routes and congested junctions within the model. The journey time routes defined are listed below and shown in Figure 8-1:

- Route 1A - M4 west to A48 east (via M4)
- Route 1B - A48 west to M4 east (via M4)
- Route 2A - A4240 Gorseinon Road to M4 east (via A48)
- Route 2B - M4 east to A4240 Gorseinon Road (via A48)
- Route 3A - A483 to M4 east (via M4)
- Route 3B - A4 east to A483 (via M4)
- Route 4A - B4489 Swansea Road to M4 west (via M4)
- Route 4B - M4 west to B4489 Swansea Road (via M4)

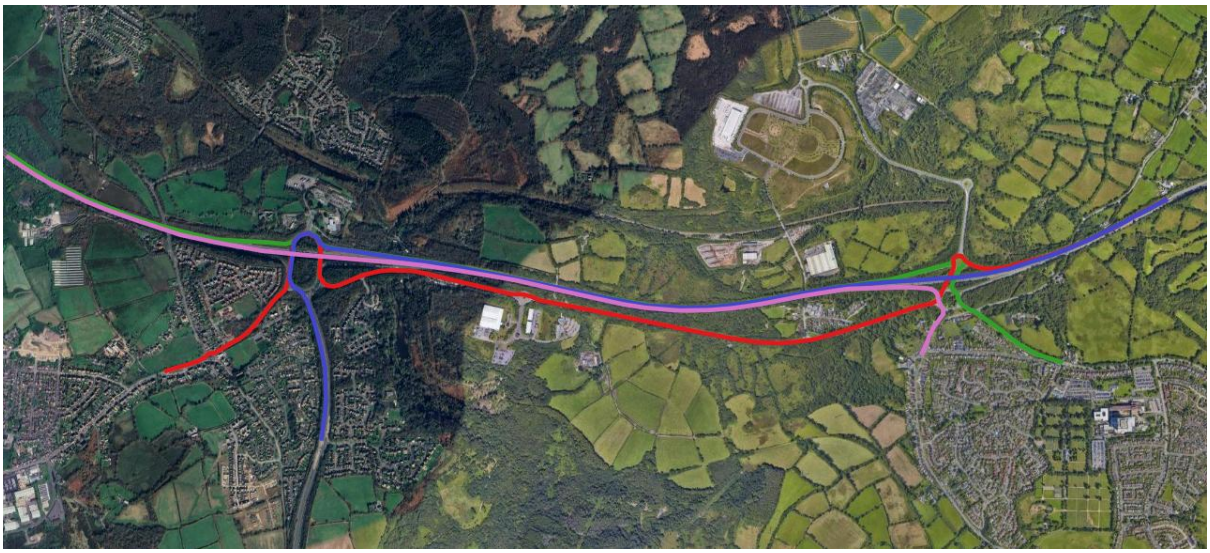


Figure 8-1 Journey time routes

8.4.10 In validating transport models, it is usual practice to consider that journey times that are modelled to within 15% of observed journey times (or within 1 minute if higher than 15%) are acceptable. This is because journey times can typically vary by 15% from day-to-day with shorter journey times experiencing much larger relative variations. This threshold has therefore been adopted for the purpose of this analysis in order to determine whether the proposed development would give rise to a material impact on journey times.

8.4.11 Notwithstanding this, whilst a development may give rise to a material impact on journey times, this does not necessarily mean that it should automatically be considered to be severe. Rather it suggests that drivers would experience an increase in journey time that is beyond what they would expect to encounter on a day-to-day basis.

8.4.12 However, it does provide a minimum threshold below which a journey time impact should not be considered to be severe. Determining the severity of an increase is subjective and should be considered on a case-by-case basis, however for the purpose of this assessment the severity of an impact is defined as:

- For journey times less than 600s (ten minutes) an impact of ≥ 180s (three minutes) is considered severe.
- For journey times more than 600s (ten minutes) an impact of ≥ 30% is considered severe.
- For journey times of exactly 600s (ten minutes) both of the criteria set out above would apply.

8.4.13 Table 8-1 and Table 8-2 presents the peak period journey time impact (both absolute and relative) for each future assessment year scenario, compared to the corresponding scenario with the proposed development in place. Note these statistics also include wait time in virtual queues to capture any suppressed demand outside of the model.

Table 8-1 Journey Time Analysis | AM Peak | 07:00 – 10:00

Route	2025 Base	2027 Do Minimum	2027 With Dev	Absolute Change (% Change)	2037 Do Minimum	2037 With Dev	Absolute Change (% Change)
Route 01-A	04:19	04:19	04:22	00:03 (1.3%)	04:18	04:21	00:03 (1.0%)
Route 01-B	04:09	04:11	04:20	00:05 (2.1%)	05:33	05:41	00:08 (2.5%)
Route 02-A	07:53	10:24	12:58	02:34 (24.7%)	23:16	27:49	04:34 (19.6%)
Route 02-B	06:27	06:30	07:19	00:50 (12.8%)	06:22	07:14	00:52 (13.7%)
Route 03-A	05:12	05:34	06:31	00:57 (17.0%)	07:14	08:34	01:20 (18.4%)
Route 03-B	04:55	05:32	05:46	00:14 (4.3%)	09:41	09:47	00:06 (1.1%)
Route 04-A	03:28	03:28	03:48	00:20 (9.6%)	04:52	05:16	00:24 (8.2%)
Route 04-B	03:58	03:58	04:01	00:03 (1.4%)	03:58	04:00	00:02 (1.0%)

Table 8-2 Journey Time Analysis | PM Peak | 15:00 – 19:00

Route	2025 Base	2027 Do Minimum	2027 With Dev	Absolute Change (% Change)	2037 Do Minimum	2037 With Dev	Absolute Change (% Change)
Route 01-A	04:06	04:07	04:09	00:02 (0.9%)	04:07	04:08	00:01 (0.5%)
Route 01-B	04:26	04:37	05:01	00:24 (8.6%)	06:25	07:05	00:40 (10.4%)
Route 02-A	07:30	08:09	09:06	00:57 (11.7%)	11:52	17:19	05:27 (45.9%)
Route 02-B	07:16	08:03	16:11	08:08 (101.1%)	15:26	33:58	18:32 (120.1%)
Route 03-A	04:39	04:46	05:17	00:31 (10.9%)	05:51	07:29	01:38 (27.9%)
Route 03-B	04:45	05:30	05:45	00:15 (4.7%)	09:31	10:04	00:33 (5.8%)
Route 04-A	03:58	04:14	06:59	02:45 (65.0%)	06:06	09:59	03:54 (64.0%)
Route 04-B	03:47	03:47	03:50	00:02 (1.0%)	03:48	03:49	00:02 (0.7%)

8.5 Mitigation Scheme

8.5.1 The micro simulation modelling has highlighted that mitigation at Junction 47 would be required to accommodate the likely volume of traffic generated by the proposed development.

8.5.2 The proposed mitigation includes utilising the existing white lining and provide an additional lane on the southern circulatory along with a two-lane flared exit to the A48 west.

8.5.3 The existing site layout is shown in Figure 8-2 below.

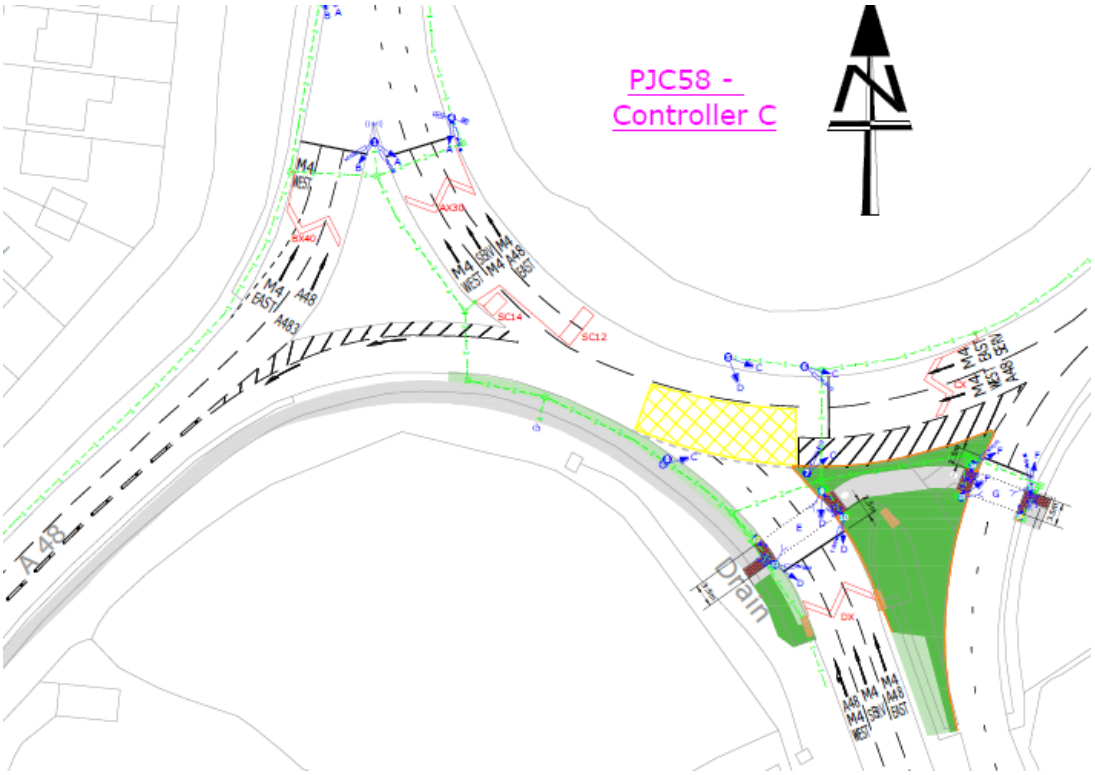


Figure 8-2 Junction 47: Existing arrangement

8.5.4 The proposed mitigation measures are shown in Figure 8-3 below.

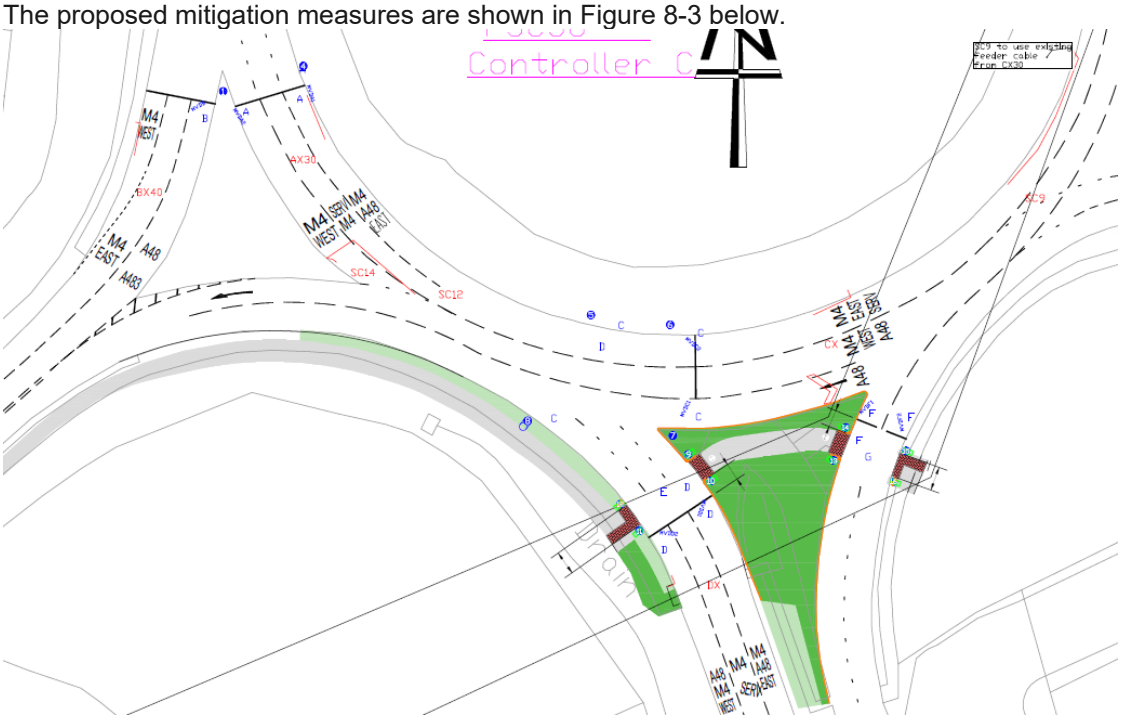


Figure 8-3 Junction 47: Proposed Mitigation Measures

8.5.5 The proposed mitigation measures at Junction 47 are presented in full in Appendix H. This includes swept path analysis of a 16.5m artic manoeuvring through the proposed roundabout junction (with a default speed of 15kph).

8.5.6 A Stage 1 RSA has also been undertake of the proposed Junction 47 mitigation measures, and submitted as part of this planning application.

9 Mitigation Modelling Results

9.1.1 The section of the Transport Assessment set out the results of the mitigation modelling.

9.1.2 To assess the impact of the proposed development, a 2027 opening year and 2037 future year has been assessed. The following scenarios have been modelled:

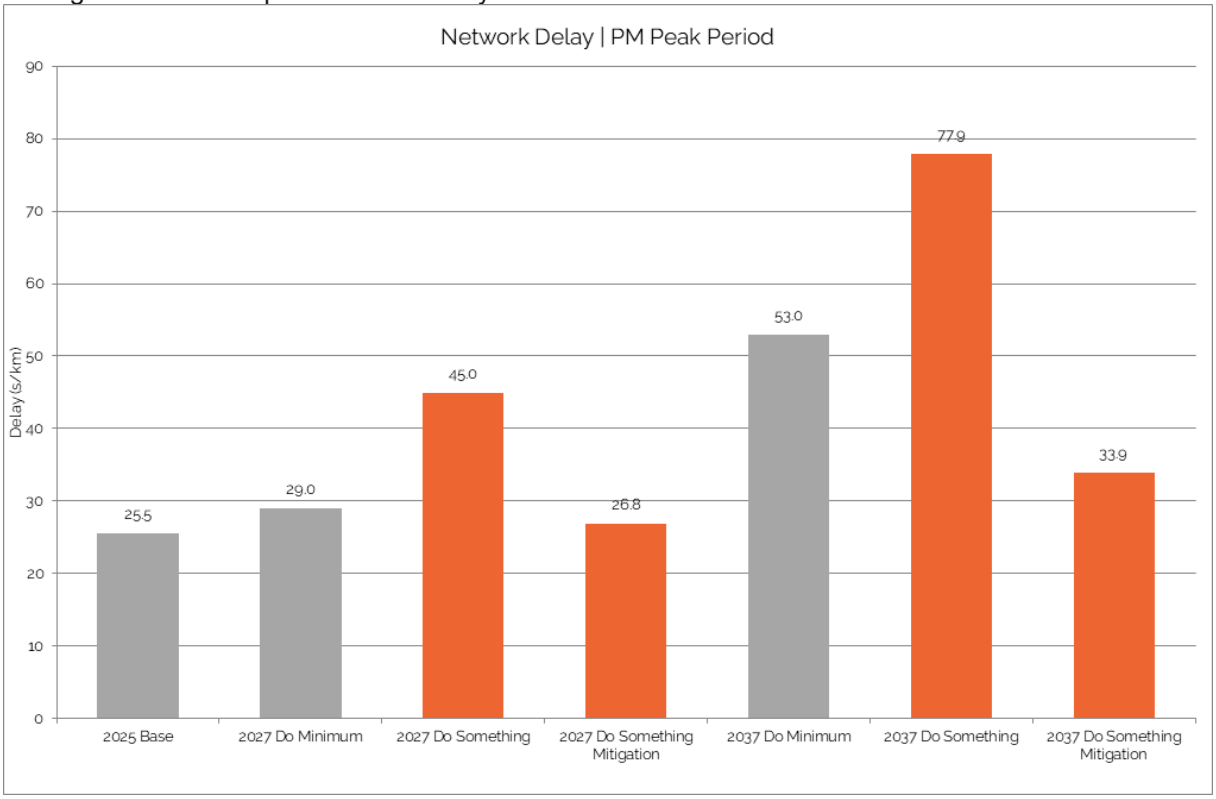
- 2027/2037 Do Minimum: Base traffic + consented committed developments.
- 2027/2037 With Development Mitigation: Base traffic + consented committed developments + proposed development + mitigation.

Network Wide Model Statistics

9.1.3 Network statistics provide a strategic overview of the performance of the whole network. These statistics have been extracted to understand the wider network impacts across each of the modelled scenarios.

9.1.4 The network wide model statistics for each future assessment year scenario are presented in full the Future Year Modelling Report (35251-HYD-XX-XX-RP-TP-8002 P03).

9.1.5 The figures below set provide a summary of the network statistics and



present the average delay incurred by vehicles travelling through the network in the modelled time period and is calculated as the difference between actual travel time and free flow travel (Delay (unit: sec / km). These figures provide an overview of model performance and can be used as a general indicator of network conditions.

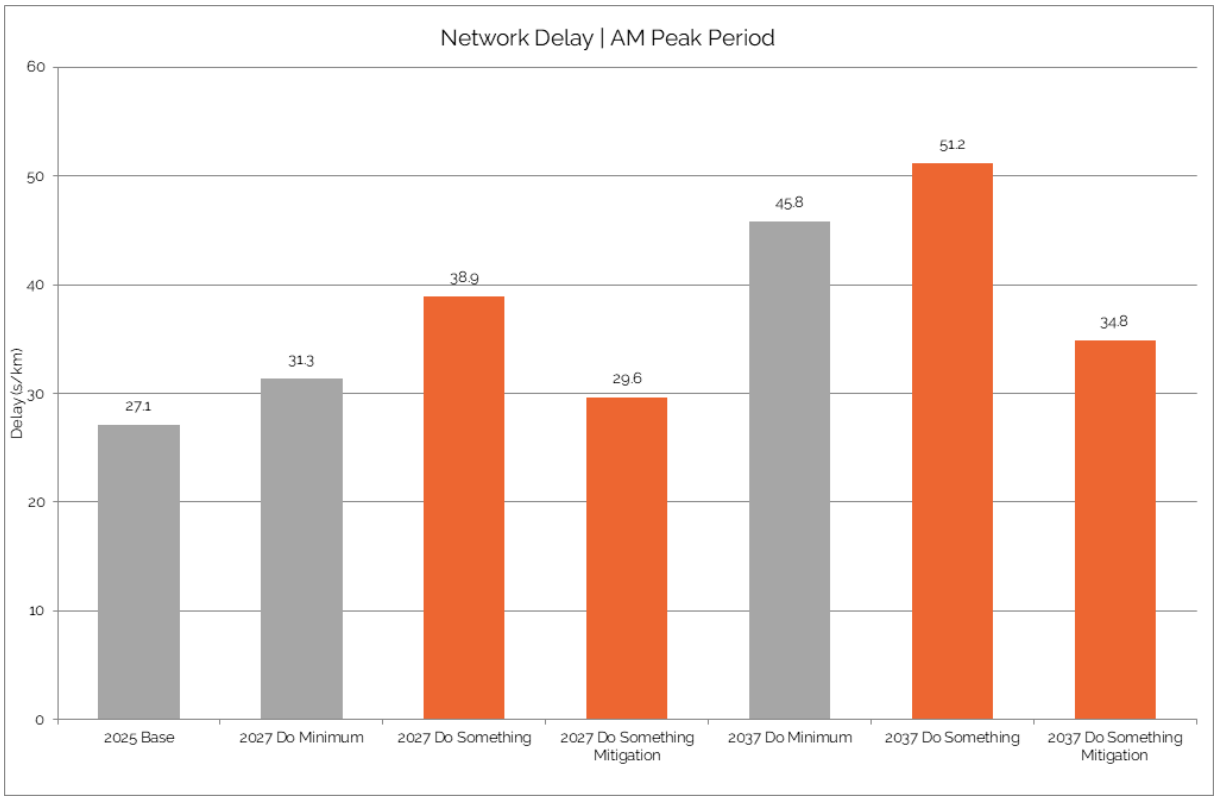


Figure 9-1 Network Delay - AM Peak Period

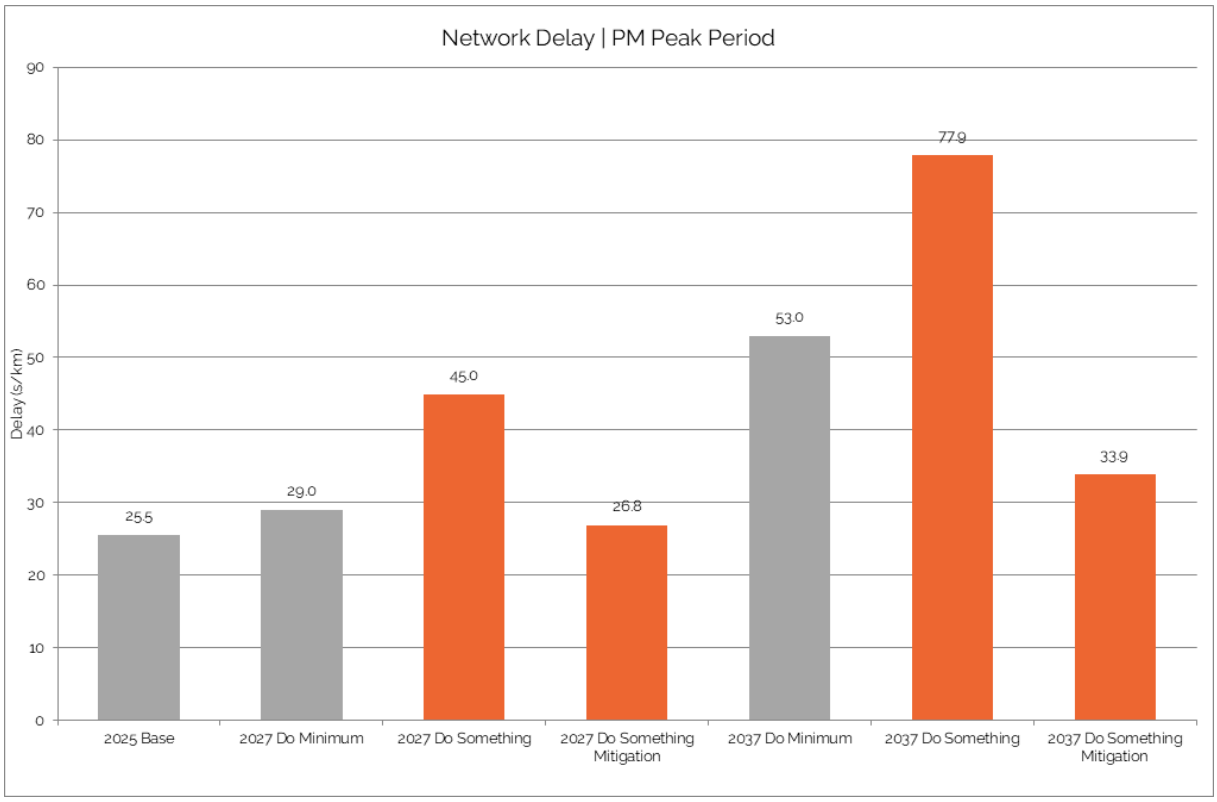


Figure 9-2 Network Delay - PM Peak Period

9.2 Analysis of Network Wide Model Statistics

9.2.1 The 2027 modelling results are summarised below.

- The proposed development with mitigation is predicted to reduce network delay by-1.5s per km in the AM peak and -2.2s in the PM peak compared to the Do Minimum scenario.
- This equates to a reduction in network-wide mean queueing of -16.4 and -19.9 vehicles and an increase in network-wide speed of +0.4km/h and +1.3km/h
- In terms of network throughput (which is an indicator of network capacity), reasonably small variations in the number of vehicles either queueing inside the model (vehicles inside) and vehicles queueing outside of the model (vehicles waiting to enter) is predicted.
- The results show that the proposed mitigation more than offsets the impact of the proposed development.

9.2.2 The 2037 modelling results are summarised below.

- In 2037, the modelling shows that the proposed development is predicted to reduce network delay by -11.0s per km in the AM peak and -19.2s in the PM peak.
- This equates to a decrease in network-wide mean queueing of -88.8 and -97.5 vehicles and an increase in network-wide speed of +3.4km/h and +6.6km/h.
- In terms of network throughput (which is an indicator of network capacity), there are noticeable increases in vehicles out and a reduction in vehicles in, which highlights that, where previously there were still vehicles inside the model at the end of the peak period due to congestion, these vehicles are now travelling through the model.
- The results show that the proposed mitigation more than offsets the impact of the proposed development.

9.3 Journey Time Analysis

9.3.1 Full details of Journey Time Analysis are presented in full in Table 13 and Table 14 of the Future Year Modelling Report (Appendix G).

9.3.2 The results show that across all of the time periods and scenarios assessed, the modelling suggests that in the 2027 scenario the proposed development with mitigation would overall provide a net benefit to the network with a total reduction of -16 and -25 seconds when averaged across all routes.

9.3.3 The largest residual journey time increase occurs for Route 04-A in the PM peak period, where journey times are forecast to increase by 2 minutes and 50 seconds.

9.3.4 Similarly, in the 2037 scenario it is shown that the development with mitigation also provides an overall net benefit to the network with a reduction in total journey time when averaged across all routes of around 6 and 12 minutes in each peak period.

9.4 Junction Statistics

9.4.1 As agreed with Swansea Council, key junctions have been identified where detailed junction statistics have been extracted for all future assessment year scenarios with and without the proposed development in place, including:

- Junction 47 Penllergaer Interchange
- M4 Junction 46

- Penllergaer Business Park / A48
- A48 Clasemont Road / Pant Lasau Road.

9.4.2 The full results of the junction statistics is set out in Chapter 5 of the Future Year Modelling Report.

M4 Junction 47 Penllergaer Interchange

9.4.3 Whilst an increase in flow is predicted on some arms of the junction, in particular the A48 East, this is not predicted to give rise a noticeable increase in mean queueing or delay. In all cases, any increase in delay is less 25s and any increase in queueing is less than two vehicles.

9.4.4 The result show that with the proposed development and mitigation in place compared to the Do Minimum scenario, there is a significant decrease in delay of up to 413s and decreases in mean queue of up to 30 vehicles with the proposed development and mitigation in place compared to the Do Minimum scenario.

9.4.5 These benefits are due to the proposed mitigation scheme adding capacity at the junction.

M4 Junction 46

9.4.6 Whilst an increase in flow is predicted on some arms of the junction, in particular the A48 West, this is not predicted to give rise to a noticeable increase in mean queuing or delay.

9.4.7 In most cases, any increase in delay is less than 30s and any increase in queueing is less than three vehicles. Notwithstanding this, the B4489 results show a larger increase in delay of 90s in the 2027 and 2037 PM peak, however this equates to an increase in mean queue of only 13 vehicles

Penllergaer Business Park

9.4.8 Whilst an increase in flow is predicted on all arms of the junction as a result of the proposed development, this is not predicted to give rise to a noticeable increase in mean queuing or delay.

9.4.9 In all cases, any increase in delay is less than 2s and any increase in queueing is less than one vehicle.

A48 Clasemont Road / Pant Lassau Road

9.4.10 Whilst an increase in flow is predicted on the A48 Clasemont Road, this is not predicted to give rise to a noticeable increase in mean queuing or delay.

9.4.11 In all cases, any increase in delay is less than 20s and any increase in queueing is less than two vehicles.

9.5 Conclusion

9.5.1 The modelling demonstrates that the proposed development is predicted to increase congestion on the existing highway network, however as shown this impact can be mitigated with the proposed highway mitigation scheme. The proposed mitigation is predicted to lead to significant decreases in queueing, delay and journey times which leads to a general betterment of the network compared to the Do Minimum scenario.

9.5.2 The development would not therefore give rise to impacts that are considered to be severe and the proposed mitigation ensures the development provides a betterment to the existing highway network.

10 Summary and Conclusion

10.1 Introduction

10.1.1 This Transport Assessment has been prepared by Hydrock, now Stantec on behalf of Stoford Properties Ltd in support of a full planning application submission for the redevelopment of Mechatronics Systems Wales Ltd to provide a Distribution Centre on land at Penllergaer Business Park. The building is designed as a 'last mile' facility, processing and sorting goods from higher up the supply chain, which are then loaded into vans to be delivered directly to customers.

10.1.2 As part of the development, it is proposed to provide 12,465m^2 (GEA) of B8 and ancillary B1 use classes, together with associated parking, servicing yard areas, landscaping and engineering works, including modifications to the existing access junction including the provision of a fourth arm on the existing Heol Y Ddraig roundabout junction.

10.2 Site location

10.2.1 The development site is located in the Penllergaer Business Park, approximately 7.5km north-west of Swansea City Centre, South Wales.

10.2.2 The site benefits from good footways link to the surrounding residential areas, and the choice of travel options by walking, cycling or bus offers a realistic potential for staff of the proposed development to travel by sustainable modes of transport, as an alternative to a private car.

10.3 Census data review

10.3.1 A review of 2011 Census data, for the Middle Super Output area in which the site is located and has been undertaken to highlight how people employed within this area of Penllergaer travel to work. This has been used to establish the likely travel modes of the staff to the proposed development.

10.3.2 Approximately 82% of those employed within the area in which the site is located drive to work, 7% car share, 5% walk and 3% travel by public transport.

10.3.3 Census data also shows that 71% work and live within Swansea, and approximately 8% work and live within the same area in which the site is located.

10.3.4 The last mile distribution centre would create a range of employment opportunities for residents within proximity of the site. Census data shows that there is an existing demand for those that live and work in Swansea, and opportunities to encourage sustainable travel for existing residential areas surrounding the development site.

10.4 Development proposals

10.4.1 The proposed distribution centre has been designed as a last mile facility. Goods are delivered to the site for sorting by HGVs, typically overnight. Staff working in the building unload these goods, process and sort them so they are ready to be loaded into vans. For efficiency reasons, the processing and sortation of goods within the building therefore has to be completed well in advance of the first vans of the day arriving to the loading area. The proposed redevelopment will consist of:

- A last mile distribution centre with a total GEA of 12,465m^2 consisting of use Class B8 with ancillary Use Class B1.

- A total of 221 car parking spaces for staff, including 12 accessible parking spaces and two EV accessible spaces.
- A total of 72 van loading bays
- A total of 72 van waiting bays
- A total of 755 van storage bays
- 9 HGV docks and two van docks within the service yard
- A total of 36 bicycle spaces with a sheltered cycle compound at the main entrance
- A total of 28 motorcycle spaces.

10.4.2 The onsite layout has been designed to include:

- pedestrian/cycle connections from the main building entrance to existing footway provision along Heol Y Ddraig
- Cycle parking in the immediate vicinity of the entrance, with showers, lockers and changing facilities also provided within the main building
- Motorcycle parking located within the staff the car park

Vehicle access

10.4.3 As part of the redevelopment, it is proposed to utilise and modify the following junctions to provide access to the distribution centre, this includes:

- Utilising and widening the existing simple priority onto Heol Y Ddraig, to provide two-way access to the main warehouse entrance, staff parking and a dedicated HGV and refuse storage yard
- Modifications to the exiting Heol Y Ddraig roundabout junction to provide single lane egress from the van loading bays
- Amendments to the existing Heol Y Ddraig roundabout junction to provide a fourth arm to facilitate two-way access for the van storage bays

10.4.4 Swept paths analysis has been carried out of a range of vehicles that are likely to access the development, including:

- 16.5m Articulated vehicle
- 11.5m refuse vehicle
- 7.7m fire tender
- Mercedes Benz Sprinter Van
- A large car

Delivery operations

10.4.5 As part of the operation, the 72 van loading bays can turn over three times within any hour such that the maximum throughput of vans in a given hour is 216.

10.4.6 The provision of van storage on site enables the van drivers to commute by sustainable modes. If there was no van storage on site, the van drivers would by definition have to drive the van to the site. Van drivers will travel to the site by their chosen method of transport to collect a van. Equally at the end of the day's deliveries, drivers will return their van to the van storage area and then depart from the site in their chosen method.

10.4.7 Any drivers who drive to the site will leave their personal vehicle in a vacated van storage bay.

10.5 Total trip generation

10.5.1 It is anticipated that the distribution centre would generate up to 454 two-way vehicle movements during the morning and evening peak periods. Due to the nature of the operation of the site, there is no period of time in which warehouse staff movements and van movements coincide.

10.6 Committed development

10.6.1 It is recognised that there are a number of residential and mixed-use development currently under development/ or within the planning process, as detailed below:

- Land South of the A4240 Parc Mawr Penllergaer Swansea (850 residential dwellings): Currently built out approximately 100 units, further Reserved Matter planning permissions required for future phases.
- Land North of Llewellyn Road Penllergaer, Swansea (166 residential dwellings): built out around 150 units.
- Land North of Garden Village, Swansea (705 residential dwellings): currently 70 units are built out, and working to approximately 70 units per year.

10.7 Extent of junction capacity analysis

10.7.1 The extent of the junction capacity analysis was agreed as part of the pre-application discussions with the local highway authority and includes the following junctions:

- Junction 1: Penllergaer Business Park internal roundabout
- Junction 2: Penllergaer Business Park internal access junction
- Junction 3: A48 / Penllergaer Business Park roundabout
- Junction 4: A48 / Penllergare Valley Woods access junction
- Junction 5: A48 / Bryntywod junction
- Junction 6: M4 Junction 46
- Junction 7: M4 Junction 47
- Junction 8: A48 / A4240 Gorseinon / Swansea Road roundabout
- Junction 9: A48 Clasemont Road / Pant Lasau Road junction

10.7.2 It was agreed with Swansea Council that a microsimulation model is considered to be the most appropriate tool to assess the impacts of the proposed development.

10.7.3 The model has been developed to be representative of the year 2025 and covers the time periods agreed with Swansea Council, which have been chosen to capture the peak periods including the primary school peaks:

- AM peak period: 07:00 to 10:00.
- PM peak period: 15:00 to 19:00.

10.7.4 The following scenarios have been modelled:

- 2027/2037 Do Minimum: Base traffic + Consented committed developments.
- 2027/2037 With Development: Base traffic + Consented committed developments + Proposed development
- 2027/2037 With Development Mitigation: Base traffic + Consented committed developments + Proposed development + Mitigation

10.8 Mitigation Scheme

10.8.1 The micro simulation modelling has highlighted that mitigation at Junction 47 would be required to accommodate the likely volume of traffic generated by the proposed development.

10.8.2 The proposed mitigation includes utilising the existing white lining to provide an additional lane on the southern circulatory along with a two-lane flared exit to the A48 south.

10.8.3 The results show that across all of the time periods and scenarios assessed, the modelling suggests that in the 2027 scenario the proposed development with mitigation would overall provide a net benefit to the network with a total reduction of -16 and -34 seconds when averaged across all routes.

10.8.4 Similarly, in the 2037 scenario it is shown that the development with mitigation also provides an overall net benefit to the network with a reduction in total journey time when averaged across all routes of around 6 and 12 minutes in each peak period.

10.9 Conclusions

10.9.1 As set out throughout this report, the modelling demonstrates the impact can be mitigated with the proposed highway mitigation scheme. The proposed mitigation is predicted to lead to significant decreases in queueing, delay and journey times which leads to a general betterment of the network compared to the Do Minimum scenario.

10.9.2 The development would not therefore give rise to impacts that are considered to be severe and the proposed mitigation ensures the development provides a betterment to the existing highway network.

Appendix A LHA: Pre-Application Response

Appendix B Active Travel Audit

Appendix C General Arrangement Plans: Access

Appendix D Swept path analysis

Appendix E Visibilty splays

Appendix F Model Validation Report

Appendix G Future Year Modelling Report

Appendix H Junction 47 Mitigation Measures