





# A Global Centre of Rail Excellence in Wales

# Transport assessment

March 2021



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# 1 Introduction

# 1.1 Background

Ove Arup and Partners (Arup) has been commissioned by the Welsh Government (WG) to prepare a Transport Assessment (TA) in support of a planning application for the development of the Global Centre of Rail Excellence (GCRE) at Onllwyn and Nant Helen Open Cast mine in the Swansea Valley, south of the Brecon Beacons National Park in Wales. The GCRE would offer world class rolling stock and infrastructure testing facilities, with additional research and development, maintenance, storage and decommissioning facilities.

The planning application will cover the following 'core facilities' that are likely to be the significant elements of the GCRE development and are listed in Table 1.

Table 1: Proposed GCRE Facilities

Core Facility	Description
Rolling Stock Test Oval	A 6.9km test oval providing a maximum line speed of 110mph with one track and space provision for a second subject to future market demand
	25kv Overhead Line Equipment (OLE) and 3rd and 4th rail electrification
	Tunnel for pressure testing
	European Train Control System (ETCS) Level 1 and 2 signalling
	4-road testing maintenance shed
	New connection from the Onllwyn branch line
Infrastructure Test	4.5km high tonnage infrastructure test loop
Track	Platform and station environment
Storage and	Maintenance shed
Maintenance	Warm storage sidings with OLE
	Cold storage sidings
Other Facilities	Research, development, education and training centre including laboratories and office space
	Staff facilities and overnight accommodation

Due to the length of rail infrastructure proposed being over 2km the application is subject to the Developments of National significance (Wales) Regulations 2016. This requires a full planning application to be submitted to the Planning Inspectorate (Wales) for a determination to be made on behalf of the Welsh Government.

The red line boundary of the area is shown in Figure 1 and the rail network in the surrounding Swansea Valley area is shown in Figure 2.

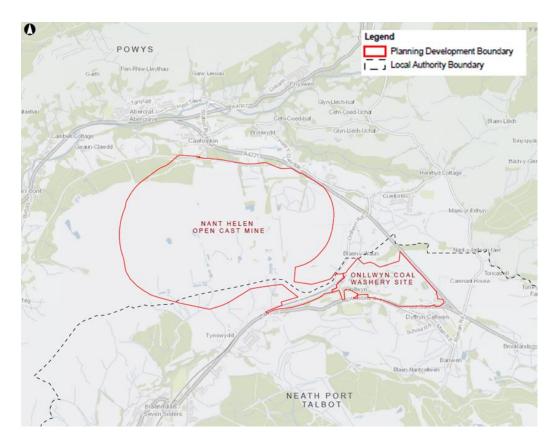


Figure 1: Redline Boundary Plan.

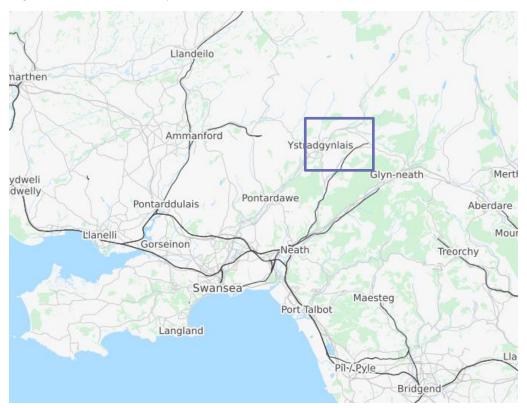


Figure 2: South Wales Railway Network with site area shown © Open Street Map

This TA is one of several documents in support of the Planning Application. The purpose of a TA is to investigate the transportation conditions for all modes,

including the available facilities/routes for pedestrians and cyclists, public transport systems and the highway network. The effects of the redevelopment of the site are then considered including quantifying additional travel demand from both the construction and operation phases of the planned facility, and the range of proposed measures required to mitigate impacts on the local transport network and cater for the increased movement to and from the development site.

Full regard has also been given to the guidance set out within Technical Advice Note 18: Transport as part of ensuring a comprehensive approach to assessment.

# 1.2 Current Use of the Development Site

The site currently accommodates the Onllwyn Distribution Centre a preparation and washery facility for the mining process undertaken on site. The facility was constructed in 1998 and is operated by Celtic Energy.

In August 2016 opencast mining on the site ceased and the facility was mothballed but in January 2019 opencast mining activities recommenced and it is now anticipated mining activity will continue for around two to two and a half years.

Most of the site ground level varies between 220m and 335m AOD. Large areas of the site have previously been mined and backfilled. The site's topography means that the existing mining operation is not readily visible from the nearby settlements of Onllwyn, Seven Sisters, Ystradgynlais, Caehopkin, Abercrave or Coelbren.

# 1.3 Report Structure

The report is structured as follows:

- Chapter 2 sets out the policy context for the development;
- Chapter 3 describes the existing conditions and characteristics of the local transport network;
- Chapter 4 describes the development proposals and transport strategy;
- Chapter 5 details the trip generation methodology, and subsequent trip rates;
- Chapter 6 outlines the Transport Implementation Strategy;
- Chapter 7 presents the assessment of the Transport Implementation Strategy for the development;
- Chapter 8 presents a Framework Travel Plan; and
- Chapter 9 presents the findings and recommendations of the report.

# 2 Legislation and Policy Context

This section reviews national, regional and local planning and transportation policy relevant to the proposed development.

# 2.1 National Policy

#### **2.1.1 Taking Wales Forward 2016-2021**

Taking Wales Forward is the current Programme for Government and sets out how the Welsh Government will deliver more and better jobs through a stronger, fairer economy, improve and reform its public services to build a united, connected and sustainable Wales.

It emphasises that the UK withdrawal from the European Union creates some uncertainty and challenges, but the Welsh Government's mandate is clear: The Welsh Government's relentless focus will be on driving improvement in the economy and public services. To create a prosperous and secure Wales, Welsh Government will support rural transport, and invest in transport to ensure that people can travel easily to jobs.

#### **2.1.2** Well-being of Future Generation (Wales) Act (2015)

The Well-being of Future Generations 2015 Act is about improving the social, economic, environmental and cultural well-being of Wales with an overarching aim of creating a Wales we all want to live in, now and in the future. The Act puts in place seven Well-being Goals as shown in Figure 3.

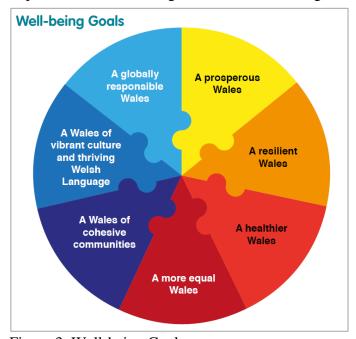


Figure 3: Well-being Goals

The 2015 Act places a duty on public bodies in Wales and those listed in the Act to work to improve the economic, social, environmental and cultural well-being of Wales. To help do this they must set and publish Well-being Objectives and think more about the long term, work better with people and communities and each other, look to prevent problems and take a more joined-up approach.

The Act identifies the following five ways of working that public bodies must act in accordance with (the Sustainable Development Principles):

- **Long term:** The importance of balancing short-term needs with the need to safeguard the ability to also meet long-term needs;
- **Integration:** Considering how the public body's well-being objectives may impact upon each of the well-being goals, on their other objectives, or on the objectives of other public bodies;
- **Involvement:** The importance of involving people with an interest in achieving the well-being goals, and ensuring that those people reflect the diversity of the area which the body serves;
- Collaboration: Acting in collaboration with any other person (or different parts of the body itself) that could help the body to meet its well-being objectives; and
- **Prevention:** How acting to prevent problems occurring or getting worse may help public bodies meet their objectives.

#### 2.1.3 Wales Transport Strategy (2008)

Published in 2008 the overarching aim of the Wales Transport Strategy is to promote sustainable transport networks that safeguard the environment whilst strengthening the country's economic and social performance. The strategy has been prepared in the context of the One Wales programme, a progressive agenda for Wales. The strategy sets out several policy outcomes, delivered through strategic priorities. These include;

- Reducing environment impacts from transport;
- Integrating local transport;
- Improving access between key settlements and sites;
- Enhancing international connectivity;
- Increasing safety and security.

#### Reducing environment impacts from transport

Road schemes can contribute positively to reducing environmental impacts. For example, removing congestion by increasing road capacity and making journeys more reliable by providing better overtaking opportunities can reduce CO2 emissions. In addition, bypassing settlements can remove traffic and improve air quality for existing communities.

#### **Integrating local transport**

Tackling congestion and ensuring journey reliability requires an integrated package of solutions that take account of a variety of local factors. This might include improvements to the public transport network, creation of more opportunities for walking and cycling, park and ride facilities and any future potential for road pricing.

Improving safety along transport corridors, by removing heavy traffic flows, can enhance opportunities for sustainable forms of travel, including walking and cycling. This is furthered by the Welsh Government 'Safe Routes in Communities' scheme.

#### Improving access between key settlements and sites

The most effective way of improving access to essential services will be to improve links within key settlements, links between key settlements and links between employment sites and their hinterland.

In rural areas, bus and car are likely to remain the main modes of transport and therefore priority should be given to improving the reliability of the road system and developing rural public transport including community transport, taxis and innovative services such as demand responsive transport.

#### 2.1.4 Active Travel Act (2013) and Interactive Mapping

The Active Travel (Wales) Act 2013 makes it a legal requirement for Local Authorities in Wales to map and plan for suitable routes for Active Travel and to build and improve their infrastructure for walking and cycling every year. It creates new duties for highways authorities to consider the needs of walkers and cyclists and make better provision for them. It also requires both the Welsh Government and local authorities to promote walking and cycling as a mode of transport so that local communities rely less on cars when making short journeys.

In the context of transport schemes and improvements, there is significant opportunity to reconfigure existing infrastructure so that it better meets the needs of existing and new settlements and facilitates active travel. For example, bypass road schemes can address settlement severance and in doing so provide opportunities for active travel because pedestrians and cyclists would no longer need to compete with significant volumes of vehicular traffic for short journeys in the locality.

#### 2.1.5 Planning Policy Wales Edition 10 (2018)

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). The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

Chapter 3 (Strategic and Spatial Choices) identifies five key aspects of good design, as summarised in Figure 4. It states good design is inclusive design, placing people at the heart of the design process.

It must reduce inequality of access to essential services, education and employment and design measures with design measures improving accessibility by walking, cycling and public transport.



Figure 4: Five Aspects of Good Design (PPW 10)

It is also noted that good design should avoid the creation of car-based developments by maximising opportunities for people to make sustainable and healthy travel choices for their daily journeys. To maximise accessibility by sustainable non-car modes, infrastructure proposed within the site should be integrated with existing infrastructure such as the strategic cycling network.

Chapter 4 (Active and Social Places) discusses the *well-connected cohesive communities' components of placemaking*, covering transport, housing retail and commercial development, community facilities and recreational spaces. With regards to transport, it states people should have access to jobs and services through more efficient and sustainable journeys, by walking, cycling and public transport.

It is also noted that land use and transport planning should be integrated, including:

- Within and between different types of transport;
- Between transport measures and land use planning;

- Between transport measures and policies to protect and improve the environment; and
- Between transport measures and policies for education, health, social inclusion and wealth creation.

The sustainable transport hierarchy in the policy, Figure 5, prioritises walking, cycling and public transport ahead of the private motor vehicles in order to:

- Reduce the need to travel;
- Prevent car-dependent developments in unsustainable locations; and
- Support the delivery of schemes located, designed and supported by infrastructure which prioritises access and movement by active and sustainable transport.

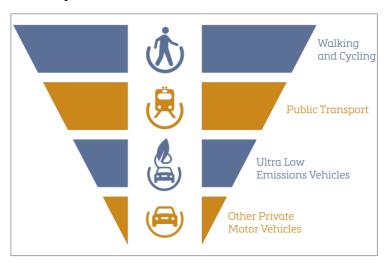


Figure 5: Sustainable Transport Hierarchy (PPW Edition 10)

To encourage the use of Ultra Low Emission Vehicles (ULEVs), PPW 10 states the planning system should support the provision of ULEV charging points as part of new developments. Where car parking is provided for new non-residential development, planning authorities should seek a minimum of 10% of car parking spaces to have ULEV charging points. PPW 10 also notes that is may be appropriate for some to be 'passive', with the necessary underlying infrastructure provided to enable installation and activation in the future'.

Chapter 5 (Productive and Enterprising Places) considers the economic theme of place-making. It states the provision of sustainable transport infrastructure is essential in order to build prosperity, tackle climate change, reduce airborne pollution and to improve the social, economic, environmental and cultural wellbeing of Wales.

Development plans should support public transport routes, including improved facilities for bus users, park & ride schemes and new railway stations. They should also identify the need for new transport interchange sites.

# **Technical Advice Note 18: Transport (March 2007)**

The Advice Note elaborates on the relationship between land use planning and transport infrastructure by outlining a range of key principles that should be adopted in ensuring that new development can create a basis for sustainable travel patterns. These include the following:

- ensuring new development is located where there is, or will be, good access by public transport, walking and cycling, thereby minimising the need for travel and fostering social inclusion;
- managing parking provision;
- ensuring that new development and major alterations to existing developments include appropriate provision for pedestrians (including those with special access and mobility requirements), cycling, public transport, and traffic management and parking/servicing;
- encouraging the location of development near other related uses to encourage multi-purpose trips;
- promoting cycling and walking; and
- supporting the provision of high quality, inclusive public transport.

The advice note sets out that TAs should be secured for developments that generate significant levels of movement or are likely to have a significant effect on patterns of movement.

It is suggested that a development exceeding the land use gross floor area thresholds would trigger the need for a TA unless local planning authorities set out a different scale of development trigger point based on local sensitivities. Currently the GCRE does not fall into the land use categorised within the TAN18.

With regards to traffic impact, the traffic impacts of a development are considered to be material where any turning movement at a junction is anticipated to increase by 5% or more. However, if the capacity of the junction is near to being exceeded, a smaller material increase would normally be considered material.

#### 2.2.1 Network Rail Welsh Route Study (March 2016)

The Network Rail Welsh Route Study examines options to build a better railway for Wales and the borders. The study sets out the strategic vision for the railway between 2019 and 2043 and assesses demand for passenger and freight services in order to identify the long-term priorities for rail. This long term planning is intended to enable economic growth, reduce carbon and the transports sector's impact on the environment, improve the quality of life for communities and individuals, and improve the affordability and value of money of the railway.

The study identifies key corridors and highlights expected increases in passenger and freight flows. The Freight Market Study identifies freight service requirements and includes consideration of the Onllwyn Branch which is currently

a freight only line. The study forecasts that freight paths along the Onllwyn Branch could increase to 1-6 trains per day in 2043 as illustrated in Figure 6 an extract from the Route Study.

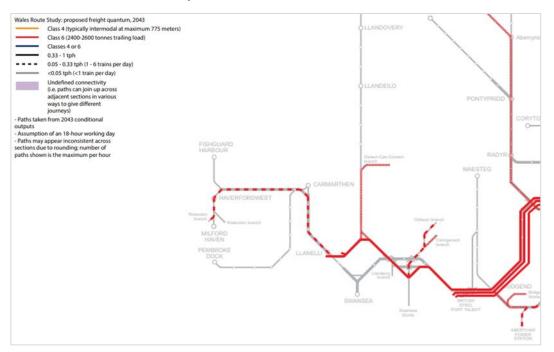


Figure 6: Welsh Route Study forecasted freight paths in 2043 (Source: Network Rail Welsh Route Study, 2016)

The South Wales Main Line (SWML) from Swansea to the Severn Tunnel is the primary freight route in Wales. This section of line is double tracked throughout, with freight passing loops. The SWML accommodates a limited mix of long-distance high speed, regional and local passenger services alongside freight trains. The line serves a number of stations of varying sizes, with more notable stations including Bridgend (which provides links to the Vale of Glamorgan line, and Maesteg branch line), Port Talbot Parkway and Neath. Peak passenger demand into Swansea from the east is forecast to be close to capacity by 2043. However additional services identified in the 2043 Indicative Train Service Specification (ITSS) will accommodate the increased demand.

The ITSS is a list of possible or proposed train services including characteristics such as origin, destination and routeing. This is further illustrated in Figure 7. Although the ITSS does not directly include the Onllwyn branch as it is not a passenger service, the increase in demand of passenger services along the South Wales Main line will affect the remaining rail capacity for movements to the GCRE site.

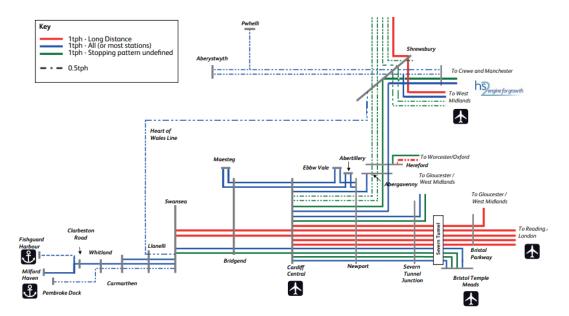


Figure 7: The indicative Train Service Specification (ITSS) for 2043 - Wales Route (excluding the Valley lines)

# 2.3 Regional Policy

#### **2.3.1 Joint transport plan for South West Wales (2015-2020)**

The joint Transport Plan for South West Wales (JTP) is between four local authorities comprising of Carmarthenshire, Neath Port Talbot, Swansea and Pembroke. The Plan influences transport policy in the region for the period 2015-2020 and beyond.

The vision of the JTP is to improve transport and access within and beyond the region to facilitate economic regeneration, reduce deprivation and support the development and use of more sustainable and healthier mode of transport.

The majority of proposals set out in the document are located within Swansea and Neath Port Talbot town centres and do not directly impact or affect the GCRE site.

# 2.4 Local Policy

The site location lies in both the Neath Port Talbot, and Powys boundary and therefore, both local authority policies will be taken into consideration.

# 2.4.1 Neath Port Talbot Local Development Plan 2011-2026, (Adopted 2016)

The Local Development Plan (LDP) guides future development in the Neath Port Talbot area providing a clear vision setting out where, when and how much new development can take place between 2011-2026. The overarching policies relate to matters considered to be of primary importance for the whole of the County Borough.

Strategic Policy SP20 Transport Network states that 'transport systems and infrastructure will be developed in safe, efficient and sustainable manner through the following measures:

- 1. Implementing key transport projects and supporting schemes identified in the JTP;
- 2. Promoting connectivity and access to public transport through improving bus and rail facilities;
- 3. Supporting enhancements to the walking and cycling network;
- 4. Promoting park and share schemes along key highway routes;
- 5. Promoting efficient use and links to the transport network through the identification of a road hierarchy;
- 6. Restricting development which would have an unacceptable impact on highway safety;
- 7. Requiring development proposals to be designed to provide safe and efficient access and promote sustainable transport
- 8. Requiring appropriate parking provisions;
- 9. Facilitating movement of freight by means other than road.

Policy TR2 Design and Access of New Development state that to permit development proposals the following criteria should be satisfied where relevant:

- 10. 'The development does not compromise the safe, effective and efficient use of the highway network and does not have an adverse impact on the highway safety or create unacceptable levels of traffic generation;
- 11. Appropriate levels of parking and cycling facilities are provided and the access arrangements for the site allow for the safe manoeuvring of any service vehicles associated with the planning use;
- 12. The development is accessible by a range of travel means, including public transport and safe cycle and pedestrian routes;
- 13. Transport Assessments and Travel Plans are provided for developments that are likely to create significant traffic generation.'

# 2.4.2 Neath Port Talbot Local Development Plan 2011-2026, Parking Standards, Supplementary Planning Guidance (Adopted 2016)

This supplementary planning guidance (SPG) sets out guidance on the provision of car and cycle parking within Neath Port Talbot including standards for different land uses. This guidance will be used in determine the adequacy and design of proposed car and cycle parking arrangements for GCRE.

# 2.4.3 Powys County Council Local Development Plan 2011-2026 (Adopted 2018)

This Local Development Plan (LDP) sets out the Council's vision, objectives, policies and proposals for the sustainable development and use of land in Powys for the period 2011-2026.

The Planning Policy T1 Travel, Traffic and Transport Infrastructure states that transport in development proposals should incorporate the following principal requirement:

- 1. Safe and efficient flow of traffic for all transport users, including more vulnerable users, and especially those making 'Active Travel' journeys by walking and cycling;
- 2. Manage any impacts to the network and the local environment to acceptable levels and mitigate and adverse impacts; and
- 3. Minimise demand for travel by private transport and encourage, promote and improve sustainable forms of travel including Active Travel opportunities in all areas

Transport infrastructure improvements that support sustainable growth, maximise the efficiency and safety of the transport systems, improve public and private transport integration and encourage passenger and freight rail operations will be supported.

Policy T2 Safeguarding of disused transport infrastructure prevents the developments proposal from restricting future reuse for transport purposes.

# 2.4.4 Powys County Council Local Development Plan 2011-2026, Supplementary Planning Guidance (Adopted 2018)

The SPG states that 'all developments are expected to meet highway standards to ensure safe and efficient transport network. Developments should in particular promote pedestrian and cycle friendly access. Schemes that generate significant amounts of traffic or travel may be required to demonstrate sustainability through satisfactory travel plans and/or transport assessments.

Enhancement and improvements to provide new or upgrade existing transport infrastructure (including Public Right of Way (PROW), pedestrian and cycling facilities and Active Travel routes and related facilities) may be sought through planning obligations.'

The type of planning obligation is assessed on the developments individual merits and there are no set thresholds. Developments may be subject to planning obligations where there is a requirement to mitigate the identified development impacts in respect to transport or traffic requirements

# 2.5 Summary

The chapter has set out the policy context against which this TA should be considered. Key policy documents have been found to be relevant to the proposed development are likely to influence the way people access the site in future. The main points and relevance are:

- The site must plan for successful transport by public transport, walking and cycling and prioritise design for these modes over the needs of the private car.
- The development should lead to an improvement in accessibility to key facilities.
- The development should consider the rail movements to the site with the potential increased frequency of the Onllwyn freight line anticipated for 2043, to reduce the need for future highway deliveries.
- The development should encourage the use of ULEVs and the provision of charging points.
- The development should accord with the Neath Port Talbot and Powys County Council SPG for car and cycle parking.
- The TA should consider measures required for all modes to minimise and mitigate the effects of development.

# **3 Transport Evaluation**

#### 3.1 Introduction

Nant Helen is in the Swansea Valley, south of the Brecon Beacons National Park. It is bordered to the north and west by woodlands and to the south by marshy grasslands and farmland. The site currently comprises an opencast coal mine and two previously restored mines.

The sites regional context is shown in Figure 8 and the planning application site boundary is shown on shown in Figure 9. For the purposes of this TA, the elements of the GCRE are referred to as 'the project'.



Figure 8: Regional Context

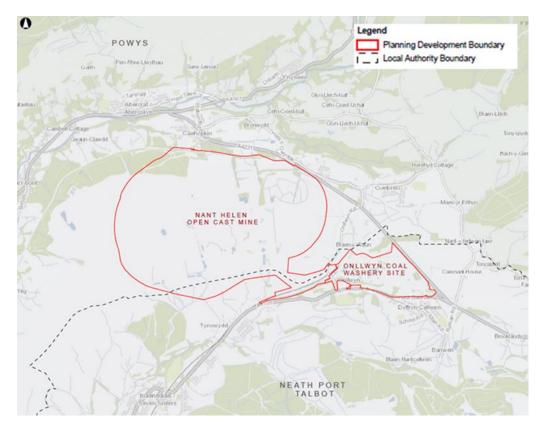


Figure 9: Site Boundary

The study area for the TA is proposed to encompass all highways, walking and cycling routes that surround the site. The study area includes following junctions and the links between them:

- A4109/Heol Gaer and Main Road priority junction;
- A4109/unnamed off-slip;
- A4109/Onllwyn Road priority junction;
- A4109/B4242 priority junction;
- A4109 and A465 junction; and
- A4067 and A4221 priority junction.

These junctions are illustrated in Figure 16 of section 3.5.2.

#### 3.2 Active Travel

#### **3.2.1 Walking**

From the A4109/Onllwyn Road junction a continuous footway (part of the highway) is present adjacent to the eastern side of carriageway of the A4019 southbound towards Severn Sisters. Footways are also adjacent to both carriageways to the north of the A4109/Onllwyn Road junction towards Banwen.

At the priority T junction with Main Road and A4109, approximately 750m northeast from A4109/Onllwyn Rd junction, the footway continues on the eastern

side of the carriageway into Banwen and on the western side of the carriageway towards the A4221 which terminates at the A4109/ Heol Gaer overbridge.

There are several Public Rights of Way (PRoW) which pass through the site. These PRoW's link east to west connecting several villages including Penrhos and Onllwyn onto Banwen and north to south between Caehopkin and Severn Sisters. The PROW through and near the proposed site are shown in Figure 10.

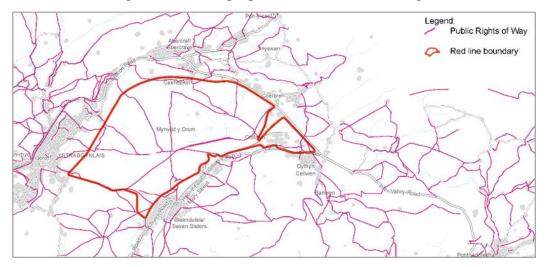


Figure 10: Public Right of Way (PRoW)

# 3.2.2 Cycling

National Cycle Network (NCN) 43 connects the site to Swansea via a mix of on carriageway and traffic free cycle route. The route runs along the north and western boundary of the study area and through Ystalyfera, Cilmaengwyn, Pontardawe, Clydach and along the River Tawe through Swansea where it connects with NCN 4, as illustrated in Figure 11.

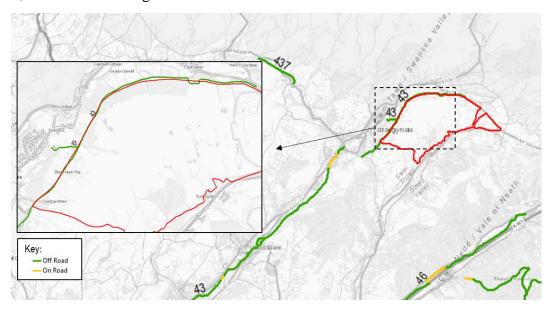


Figure 11: National Cycle Network (NCN)

The Active Travel Map for both Neath and Powys do not show any future routes that are planned near the site that would directly affect GCRE. The closest active travel routes planned are walking routes within Seven Sisters along the A4109 and an integrated cycle way between Seven Sisters and Banwen away from the road and through the grass land that lies between.

The Active Travel map of proposed future routes is shown in Appendix G.

# 3.3 Public Transport

#### 3.3.1 Bus

There are two bus stops known as Coelbren Turn on either side of A4019 at the Onllwyn Rd T junction located within 400m of the existing washery southern site access from Onllwyn Road. Each bus stop includes a waiting shelter but there is no timetable information present.

Four bus services serve these bus stops as illustrated in Figure 12 and are detailed in Table 2. Figure 12 shows the services provide access to Crynant, Seven Sisters, Neath and Swansea that stop at the Coelbren Turn and other services that do not serve the site directly.

There are currently no buses providing an east-west cross valley route operating within vicinity of Onllwyn Road Junction.

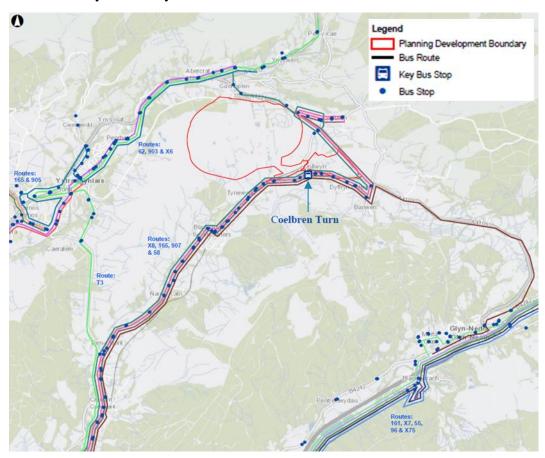


Figure 12: Bus services and bus stop locations

Table 2: Bus services calling at bus stops located close to development site

			Buses per hour service frequency (service period)	
Operator	Service	Destination	Weekday	Saturday
NAT	58	Swansea   Banwen	1 (10:43 - 15:03)	1 (10:43 - 15:03)
First Group	907	Coelbren   Neath via Seven Sisters, Crynant, Nath College	Two daily one way services (07:43 and 17:19)	None
First Group	X8	Swansea   Banwen via Neath	1 (06:44 - 19:24)	1 (06:44-19:24)
DANSA	165	Min yr Awel   Crynant	One daily (17:13)	None

#### 3.3.2 Rail

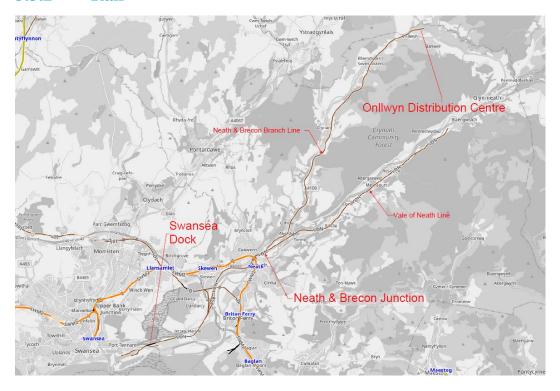


Figure 13: Railway Network

The Neath and Brecon branch line connecting to the Onllwyn Distribution Centre remains open to freight trains with access via Neath and Brecon Junction, there are no passenger services. Trains accessing the branch line are currently required to travel to Swansea docks and shunt to the Neath and Brecon Junction or travel to Swansea Burrows sidings to turn around.

The single-line branch line route operates using a physical token-block signalling system up-chainage from Neath & Brecon Junction and allows 1 train to pass at a time using an electronic token system. The current frequency of the railway is one train per day.

#### 3.3.3 Local Highway Network

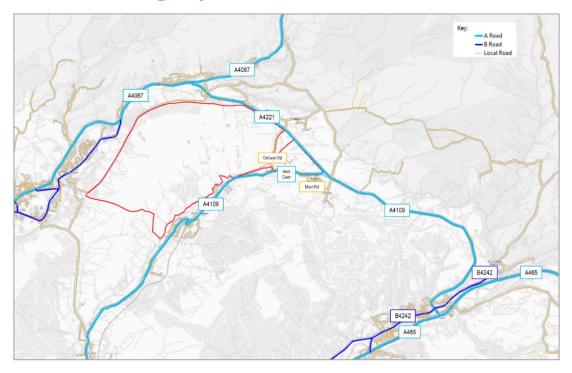


Figure 14: Highway Network

The north of the site is bounded by the A4221 with a posted speed limit of 40mph. To the west, the A4221 joins the A4067 at a priority junction near Caehopkin. The A4067 runs roughly parallel to western site boundary separated by woodland and connects south to Swansea and the M4 at Junction 45, and north to the Brecon Beacons.

The A4221 continues east of the site meeting the A4109 to the north of Banwen, with a posted speed limit of 30mph. From this point the A4109 to the southeast passes the primary site access at Onllwyn Road and 15km to the south connects to the A465 at Tonna providing an onward route to Junction 43 of the M4. The A4109 is crossed by a rail link with an underbridge vehicle height limit of 4.6m north of the Onllwyn Road junction. Onllwyn Road has a 7.5 tonne weight restriction north of the washery site access and several minor junctions connecting to private entries.

To the southwest of the junction at Banwen the A4109 connects to the A465 at Glyneath from where the A465 provides an onward route to destinations towards Merthyr Tydfil.

#### 3.3.4 Road Traffic Collision

Basic records of Personal Injury Accidents (PIA) that occurred in the study area between 2014 and 2018 (the most recent five-year period which data is available)

have been obtained from DfT road safety data (STATS19), as compiled by Crashmap.

The term 'Accident' is defined by the Department for Transport (DfT) as: 'personal injury occurring on the public highway (including footways) in which at least one road vehicle or a vehicle in collision with a pedestrian is involved and which becomes known to the police within 30 days of its occurrence. The vehicle need not be moving and accidents involving stationary vehicles and pedestrians, or users are included. One accident may give rise to several casualties. "Damage only" accidents are not included in this publication'.

A 'Slight Accident' is defined as: 'one in which at least one person is slightly injured but no person is killed or seriously injured', a 'Serious Accident' is defined as: 'one in which at least one person is seriously injured but no person (other than a confirmed suicide) is killed', and a Fatal Accident is defined as "an accident in which at least one person is killed'.

Accidents that have occurred during the 2014 to 2018 period are listed in Table 3, and shown in Figure 15. Most accidents that have been of a slight severity along the various A roads. Three serious accidents and two fatal accidents have occurred along the A4109.

There is no evidence to suggest that the highway design, traffic conditions, or capacity were the main cause of the accidents.

Table 3: Personal Injury Accidents within the study area 2014-2018

Incident	Number of		
Severity	Incidents	Location	
Slight	7	A4221 and A4067 Junction	
Slight	4	Various points along the A4221	
Slight	1	Heol Gaer and A4221/A4109 T Junction	
Slight	8	Along the A4109	
Slight	2	Along A465 slip road westbound	
Slight	1	Along A465 off slip road to A4109	
Slight	2	A4109 in Onllwyn residential area	
Serious	3	Along the A4109	
Fatal	1	Along the A4109, near proximity to private farm junction	
Fatal	1	Along the A4109	

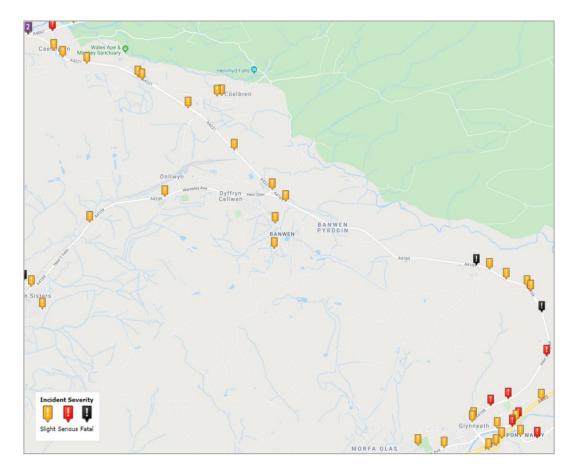


Figure 15: Traffic accident locations 2014-2018. Source: Crashmap

## 3.3.5 Traffic Surveys

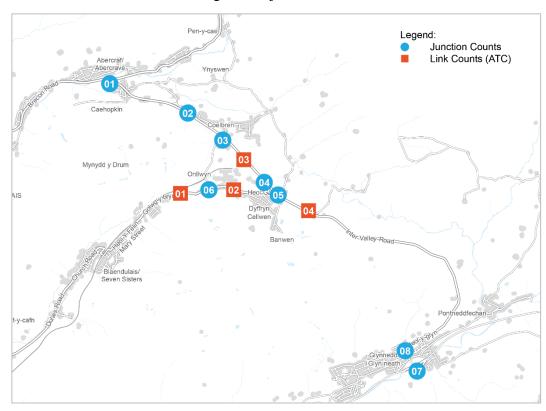
To understand the pattern of existing traffic movements on the network, traffic surveys were carried out on Tuesday 7<sup>th</sup> January 2020. The type and location of counts were agreed in advance with NPTCBC and are illustrated in Figure 16.

Automatic Traffic Counts (ATC) were carried out at the following locations:

- ATC 1: A4109, west of Onllwyn Road;
- ATC 2: A4109 Main Road, west of Heol Bryn Seion;
- ATC 2: A4221, south of Onllwyn Road; and
- ATC 3: A4109 Inter-Valley Road, east of Roman Road.

Junction Turning Counts (JTC) and Queue Length surveys were also carried out for the time period 07:00-19:00 on at the following locations:

- JTC 1: A4067 and A4221 priority-controlled T-Junction;
- JTC 4: A4221 and CPL South Wales Coal priority-controlled T-Junction;
- JTC 5: A4221 and A4109/Heol Gaer priority-controlled T-Junction;
- JTC 6: Onllwyn Road and A4109 priority-controlled T-Junction;
- JTC 7: A4109 and A465 priority-controlled T-Junction; and



#### • JTC 8: A4109 and B4242 signalised junction.

Figure 16: Traffic Count Survey Locations

Surveyed traffic flows for the identified AM (08:00-09:00) and PM (15:00-16:00) peak hours as well as 24-hour AADT are illustrated spatially within Figures A1-A4 of Appendix A. Corresponding figures showing the percentage HGVs are presented as Figures A5-A6. A high proportion of HGV movements were recorded which might be anticipated as a result of the extant land use in the study area.

A resurvey was undertaken using a seven-day Automatic Traffic Count (ATC) during the period Wednesday 9<sup>th</sup> December to Tuesday 15<sup>th</sup> December 2020. All Junction Turning Counts 1-8 were also re-surveyed with the addition of two additional junctions:

- JTC 2: A4221 and Nant Helen priority-controlled T-Junction; and
- JTC 3: A4221 and Onllwyn Road priority controlled staggered junction.

During the ATC re-survey period in December, schools were required to change to home schooling due to increased COVID-19 restrictions which came into force on Monday 14<sup>th</sup> December. COVID-19 has had an impact on the number of journeys undertaken but for the purpose of this assessment it has been assumed that in the medium term traffic volumes in the area will resume previous trends/volumes.

The average traffic flows from the December re-surveys were lower than the January survey data. Through dialogue with NPT and PCC it was agreed that in

order to provide a robust assessment the December data would not be used for junction analysis except for the additional JTC 2 and JTC 3.

The ATC data comparison is included as Appendix E for reference.

#### 3.3.6 Traffic Flow Seasonality

WebTAG¹ sets out neutral months most likely to be representative of daily traffic. The timescales associated with data processing and preparation of this TA have dictated the need to complete traffic surveys within a non-neutral month. To adjust for this a seasonality factor has been applied to correct the assumed traffic volumes.

The adjustment factor is presented in Table 4, and is based on a comparison of ATC data collected on the A4221 during the survey period, and a permanent count site on the A4221 in a similar location<sup>2</sup>.

Table 4: Traffic Count Seasonality Adjustment Factor

Count Source	Two-Way Traffic Flow
ATC 3 (January 2020 GCRE Survey)	3,366 (A)
ATC 3 (December 2020 GCRE Re-Survey)	2,515 (A1)
DfT Count Site (2018)	4,039 (B)
2018 - 2020 TEMPro Regional Growth Factor	1.0237 (C)
DfT Count Site (Growthed to 2020): B×C	4,135 (D)
Seasonality Factor (to factor January counts to neutral month)	(D/A) = 1.23
Seasonality Factor (to factor December counts to neutral month)	(D/A1) = 1.64

The calculation indicated that the traffic network flows during the January surveys were 23% lower than the Annual Average Daily Flow and 64% lower in December. This seasonality factors have been used to uplift base and future traffic flows to account for this seasonality difference.

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<sup>&</sup>lt;sup>1</sup> WebTAG Unit M1.2 Data Sources and Surveys, para. 3.3.6

<sup>&</sup>lt;sup>2</sup> DfT Road Traffic Statistics, Site number: <u>74082</u>

# 4 Development Proposals

# 4.1 Masterplan

The proposed site for the scheme includes rolling stock and infrastructure testing facilities and storage facilities, which will consist of the components outlined in Table 5.

Table 5: Proposed GCRE Facilities

Core Facility	Description
Rolling Stock Test Oval	A 6.9km test oval providing a maximum line speed of 110mph with one track and space provision for a second subject to future market demand
	25kv Overhead Line Equipment (OLE) and 3rd and 4th rail electrification
	Tunnel for pressure testing
	European Train Control System (ETCS) Level 1 and 2
	signalling
	4-road testing maintenance shed
	New connection from the Onllwyn branch line
Infrastructure Test	4.5km high tonnage infrastructure test loop
Track	Platform and station environment
Storage and	Maintenance shed
Maintenance	Warm storage sidings with OLE
	Cold storage sidings
Other Facilities	Research, development, education and training centre including
	laboratories and office space
	Staff facilities and overnight accommodation
	Perimeter security fence (1.8m in height)

Figure 17 illustrates the preliminary location of the proposed layout and a further detailed drawing can be found in Appendix B. Both the illustration and detailed drawing should be treated as an indicative as elements of the Masterplan are subject to change.

The GCRE development will have a perimeter security fence with a height of 1.8m. It is acknowledged that the facility may attract train enthusiasts and leisure trips passing by who would try to view GCRE. Although no formal provision for viewing the facility is currently proposed, recognising the sensitivity of some of the likely activities / testing which the facility would accommodate, and the potential impact of such visitors has been considered following concerns raised by NPTCBC and PCC. It is likely that any such visitors would arrive by car and without a designated area for such visitors to park, there is a potential risk of visitors parking on the highway or PROWs. NPTCBC and PCC have therefore requested for car parking opportunities to be explored and some potential car parking. Given that no formal viewing area is currently proposed, it is recommended that the traffic generated from these types of visitors is monitored and an appropriately worded condition added to any future decision in terms of the implementation of suitable traffic management measures should visits of this nature cause concerns.

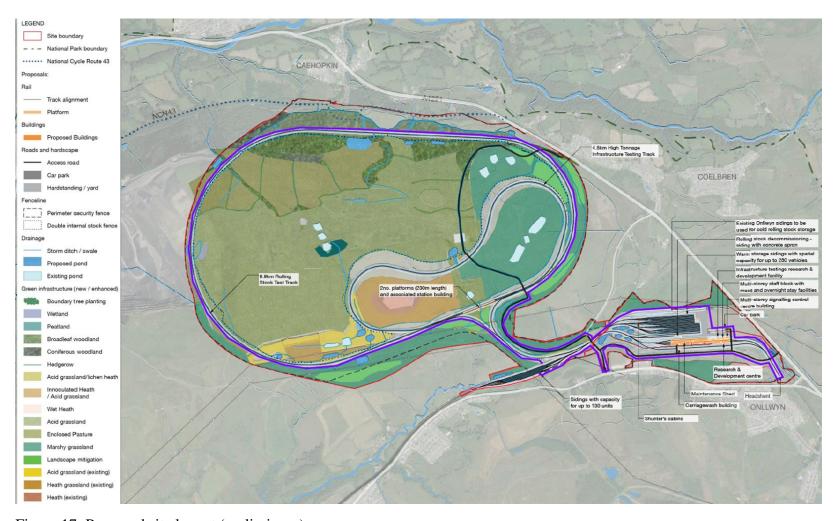


Figure 17: Proposed site layout (preliminary)

#### 4.1.1 Site Access

It is proposed to provide access from the external highway network at three locations:

- The existing junction of the A4109 Wembley Avenue with Onllwyn Road;
- The existing A4221 Celtic Energy Nant Helen access road; and
- The existing A4221 Washery and Distribution centre access.

The three access points are shown in Figure 18. A network of internal access roads would be provided which are shown on Figure 17. These include a maintenance track around the perimeter of each of the rail testing loops.

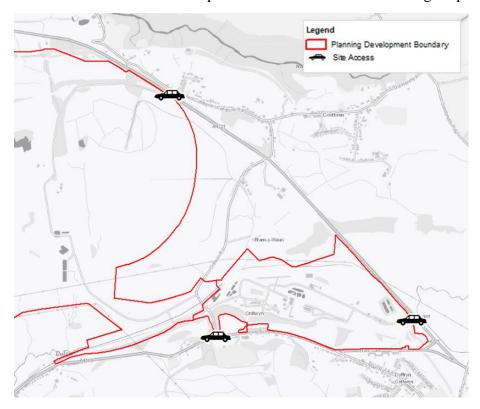


Figure 18: Proposed Site Access (Preliminary)

There is an additional secondary access from Onllwyn Road via the Onllwyn Road/A4221 staggered junction but as a secondary access. A sensitivity analysis has been carried out to assess the A4221/Onllwyn Road junction however, any car parking will likely be near the A4221 Washery and Distribution centre access.

During operation, it is assumed that car users will use the existing washery access if travelling from west or east on the A4221, and the Onllwyn Road/Wembley access if traveling from the south. Onllwyn Road will be discouraged from being used from the A4221. Management of the access is further covered withing the Framework Travel Plan.

Emergency access will be possible via multiple access points. Further consideration in construction and operational plans will be developed when a contractor is appointed.

# 4.2 Committed Development

The scoping exercise completed with NPTCBC and PCC has identified one committed development within the study area to be considered.

A proposed residential area of 80 dwellings in Glynneath will be accessed via the A4109. A Construction Environmental Management Plan (CEMP) (Planning ref: P2020/0861) has been submitted in association with application P2020/0195 granted on 14 September 2020. The CEMP received approval October 2020 and construction will be undertaken to a three-phase plan over two years.

It is expected that the transport impacts of construction of this development will be negligible. As a result the committed development has not been considered within this TA.

Correspondence with the local authorities is included as Appendix F.

# 4.3 Phasing

The GCRE site is a major development and a range of options for development phasing have been considered. It is envisaged that development will take place over three main phases:

- *Phase One*: The opening of a 4.5km test loop, largely for testing infrastructure and some stabling facilities, in 2023.
- *Phase Two*: The addition of a 6.9km test loop primarily for testing passenger rolling stock, in 2024.
- *Phase Three:* The addition of expanded stabling facilities and research facilities in 2025.

The development of subsequent phases will depend on the success of earlier phases, availability of funding, and commercial decisions. As a result, several development options comprising of the three phases have been considered:

- Option A: Develop Phase 1 only;
- Option B: Develop Phase 1 and 2 only; and
- Option C: Develop Phase 1, 2 and 3.

It is assumed that during each development phase, all construction staff travel to/from site each day during peak hours with an average vehicle occupancy of 2.5 construction staff per vehicle. All delivery vehicles are assumed to be HGVs, 50% of which will arrive/depart from site within the peak hour.

Phase Two would generate the highest volume of daily construction traffic movements for a construction scenario. As a result, this has been used to represent a worst-case construction scenario in relation to additional traffic movements.

Development Option C would generate the highest volume of daily operational traffic for a development scenario. As a result, this has been used to represent a worst-case operational scenario in relation to additional traffic movements.

# **5** Future Travel Demand

#### 5.1 Introduction

This chapter presents a forecast of the future travel demand expected to be generated by the proposed development during the construction and operational stages of the development. These form the basis for understanding how demand will be distributed across the transport networks. Vehicular trip forecasts will also enable the impact of the proposed development to be quantified at each of the junctions to be assessed.

# 5.2 Key Methodology Assumptions

The methodology for projecting travel demand has been the subject of scoping dialogue with NPTCBC to determine and agree overarching assumptions. Given the outline nature of the planning application, and potential for change to the proposed masterplan at subsequent planning stages, a robust approach has been taken in forecasting development related vehicular trips to determine a worst-case scenario for junction assessment. The key assumptions include:

- AM and PM peak hours correspond with surrounding highway network peak hours of 08:00-09:00 and 15:00-16:00 respectively;
- Deliveries of construction materials will be primarily undertaken by road, with typical rail infrastructure delivered by train;
- Staff mode share and distribution has been calculated by reference to 2011 Census Travel to Work Data for the Neath Port Talbot 002 MSOA. An annual average daily estimate of 142 during phase two construction (worst case scenario), and an upper estimate of 118 operational staff has been used;
- Once GCRE is operational it is assumed that a daily visiting test team of 30 people arriving in four minibuses has been assumed;
- Extant trips associated with the Celtic Energy site and Nant Helen have been removed from the network based on closure of this facility. See chapter 5.4.3;
- No committed development sites within the study area have been included;
- Seasonality factors of +23% applied to observed January 2020 traffic counts and +64% applied to the observed December 2020 traffic counts to account for difference in traffic flows during January and December survey period;
   and
- Traffic flows for with and without development scenarios calculated for the following future year scenarios using TEMPro traffic growth factors:
  - 2020 Base Year;
  - 2024 Construction Phase;
  - 2026 Opening Year; and
  - 2035 Future Year Assessment.

#### 5.3 Construction

# 5.3.1 Construction Phasing, Workforce and Deliveries

Vehicular trips associated with staff and delivery of construction materials have been estimated for each of the three construction phases outlined in section 4. A breakdown of estimated delivery and staffing requirements for each construction element is provided in Appendix C and summarised in Table 6. Assumptions on translating overall staff and delivery estimates into daily trip generation is discussed further in Section 5.3.2.

Table 6: Summary of construction workforce and associated deliveries

Phase	Construction Element	One-way Daily Deliveries Veh (AADT)	One-way Daily Staff Veh (AADT)
	Earthworks (for Track)	0	4
	Power	3	6
	Staff Facilities	2	4
Phase 1	Train Storage	5	20
Pha	High Tonnage Infrastructure Test Loop	5	24
	Signalling	2	3
	Infrastructure, Access Roads and Rail Crossings	2	3
	Miscellaneous	16	14
	Earthworks (for proposed trackwork)	0	4
	Power	1	2
	Rolling Stock and Infrastructure Testing	3	24
	Large Railroad Test Loop	9	53
Phase 2	Carriage Wash Facility	1	2
Pha	Central Control Centre	1	2
	Staff Facilities	1	2
	Additional Track - Testing Facilities	2	8
	Train Storage	5	18
	Access Roads and Rail Crossings	9	19
	Earthworks (for proposed trackwork)	0	4
33	Switches and Crossings Upgrades	1	2
Phase 3	Additional Infrastructure	2	6
P.	Rolling Stock Decommissioning	1	2
	Train Storage	13	23

Deliveries to the site are likely to be made via a mix of road and rail vehicle movements. Whilst the exact split of deliveries is not known at this stage, a logical approach has been taken to generate assumptions around the split of vehicles. It has been assumed that equipment associated with the track works (formation, ballast, sleepers, rails, clips etc.) and other rail infrastructure (overhead line equipment, switches and crossings etc.) will primarily be delivered

by rail. This is commonplace for typical rail maintenance and upgrade works, and as such wider infrastructure and storage is in place to make such deliveries to the site possible via the existing rail freight network.

As noted in Table 6, around 22 deliveries by rail are estimated in Phase 1 of construction, with a further 40 trains estimated in Phase 2 and 12 trains in Phase 3. Delivery trains are likely to vary in length, depending on the quantity and timings of construction materials required. The frequency of deliveries by rail is estimated to be much lower than by road, and each train will be scheduled according to the operational capacity of the branch line, thus a maximum of one rail vehicle delivery per day as per the existing frequency.

There may be opportunities for the appointed contractor(s) to explore the potential for the delivery of other construction materials for buildings and civils works to also be delivered by rail, but for the purposes of generating a worst-case scenario for of highway junction capacity assessment, it is assumed that these construction materials will be delivered by road. Phase 2 has been used to assess construction trips, as it represents the construction phase with the greatest number of construction workforce required and highest number of construction vehicle deliveries.

# **5.3.2** Construction Vehicle Trip Generation

Translating overall staff and delivery estimates into daily trip generation requires several assumptions. Conservative assumptions have been used to ensure that construction traffic is not underestimated and so it is considered the assessment represents a worst-case scenario in traffic terms. The relevant assumptions are summarised as follows:

- Phase 2 of construction used for assessment as this is likely to generate highest construction related traffic;
- Peaks for arrivals and departures to the site correspond with the existing AM and PM network peak hours;
- All phase 2 construction elements take place at the same time, and 50% of deliveries arrive and depart within each of the AM and PM peak hours;
- Rather than averaging the number of daily deliveries across the whole construction phase, the frequency of delivery vehicles has been condensed over a quarter of the construction element duration i.e. four times more intense than averaging deliveries over the full construction period. This accounts for more intense peaks in delivery of materials, such as the delivery of materials at the start of the construction element;
- All of the construction staff travel to site each day in the AM peak hour and leave in the PM peak hour with an average occupancy of 2.5 persons per vehicle; and
- All delivery vehicles are OGV2 for purposes of PCU conversion.

The resultant vehicular trips associated with Phase 2 of construction are presented in Table 7.

Table 7: Phase 2 Daily Construction Vehicle Trip Generation

Time Period	Construction Staff		Deliveries (PCUs)	
Time Period	Arrivals	Departures	Arrivals	Departures
AM Peak Hour (08:00-09:00)	142	0	76	76
PM Peak Hour (15:00-16:00)	0	142	76	76

# 5.4 Operation

### 5.4.1 Assessment of Employment Potential

An assessment of the employment potential of GCRE has been made within the Outline Business Case (OBC) for the proposed development. This considers the direct on-site employment that the various options could support.

For the purposes of the vehicular trip generation, the upper estimate of 118 staff has been used which represents a robust worst-case assessment of the impact of the facility on surrounding transport networks.

Table 8: OBC On-site Operational Staff Estimation

CA- PP C-A	Staff Estimate			
Staff Category	Option A	Option B	Option C	
Support Staff	29	29	29	
R&D/Technical Staff	32	72	89	
Total	61	101	118	

#### **Mode Share**

The mode split breakdown for the site has been derived through reference to 2011 Census Travel to Work Data for the Neath Port Talbot 002 Mid-layer Super Output Area (MSOA), consistent with the distribution calculations discussed in Section 5.4.3. The existing Celtic Energy Site is located within this MSOA and will ensure that the mode split is representative of existing travel patterns in the immediate local area to best represent future mode share at GCRE.

Given the relatively isolated location and surrounding topography it is expected that transport mode split will be car dominated. Modal split data for the Neath Port Talbot 013 MSOA is presented in Table 9, along with the likely number of employees by mode, based on a total of 118 staff.

Table 9: Existing Mode Split - Neath Port Talbot 002 MSOA

Travel Mode	<b>Existing Mode Share</b>	GCRE Person Trips
Driving a car or van	80.1%	95
Passenger in a car or van	8.1%	10
On foot	5.7%	7
Bus, minibus or coach	3.7%	4
Bicycle	0.8%	1
Motorcycle, scooter or moped	0.8%	1

Travel Mode	Existing Mode Share	GCRE Person Trips
Train	0.6%	1
Taxi	0.2%	0
Total	100.0%	118

# **5.4.2** Operational Vehicle Trip Generation

Whilst the private vehicular mode share is likely to be around 20% lower based on the mode share analysis above, for the purposes of junction assessment it is assumed that all staff trips will be made by car. It is also unlikely that all staff trips will be made within the peak hours, however it is assumed that 90% of staff will arrive/depart in the AM and PM peak and there will be no staff movement outside of this, representing a worst-case for junction assessment.

The operational phase of the development will also generate delivery vehicle trips on an ad-hoc basis, such as the delivery of rolling stock vehicles for testing. Whilst it is not possible to quantify these deliveries in detail at this stage of the project, a high-level assumption of 30 HGV delivery vehicles per day is assumed, with 10 arrivals and 10 departures during each of the AM and PM peak hours. HGVs are converted to Passenger Car Units (PCUs) using a factor of 2.3. Again, this represents a robust worst-case assessment of the impact of the facility on surrounding transport networks. If deemed necessary, an update of the assessment can be provided once an end operator is in place.

GCRE will attract visiting testing teams once operational. It has been assumed that a typical test team of around 30 people will arrive/depart daily in four minibuses during the AM and PM peak hours.

NPTCBC and PCC have raised the potential issue of GCRE attracting un-planned visitors i.e. train enthusiasts and leisure trips passing by the site to view GCRE. At this point in time, and given the commercial sensitivities of some of the likely testing / activity within the site, these types of visits would not be encouraged and mitigation should only be implemented should future monitoring show that visitors of this nature are causing problems on the local highway network. Therefore, non-visitor trips are not included in this assessment as it is assumed these will be unlikely to arrive/depart during peak hours if any such visit were to occur.

Table 10 presents a summary of the worst-case vehicular trip generation during the GCRE operational phase.

Table 10: Operational Vehicular Trip Generation

Operatio	Operatio Staff		Deliveries (PCUs)		Planned Visitors	
nal	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
AM	106	12	23	23	4	0
PM	12	106	23	23	0	4
AADT	118	118	69	69	4	4

## 5.4.3 Comparison of Access traffic

Extant trips associated with the Celtic Energy site and Nant Helen have been removed from the network based on closure of this facility. Table 11 and Table 12 shows the comparison of the extant traffic against the projected development traffic entering and digressing from the site for both the construction and operation of GCRE.

Table 11: Extant vs proposed vehicles at Nant Helen Access

Peak	Construction		Diff	Operation		Diff
	Extant	Proposed		Extant	Proposed	
AM Peak (PCU)	4	0	-4	4	0	-4
PM Peak (PCU)	11	0	-11	11	0	-11
AADT (Veh)	147	0	-147	147	0	-147

Table 12: Extant vs proposed vehicles at Celtic Energy Access

Peak	Construction		Diff	Operation		Diff
	Extant	Proposed		Extant	Proposed	
AM Peak (PCU)	62	183	+121	62	98	+36
PM Peak (PCU)	44	183	+139	44	98	+54
AADT (Veh)	268	177	-91	268	177	-91

# 5.5 Trip Distribution and Assignment

In order to inform the highway capacity assessment, the additional vehicle trips generated by the proposed development need to be distributed onto the local highway network in a manner which is likely to represent the movement patterns from the site. The distribution and assignment of staff and deliveries have been assessed separately, as discussed in the following sections.

Figure 19 shows the potential routes that can be used to access the site and which have been assumed in traffic distribution.

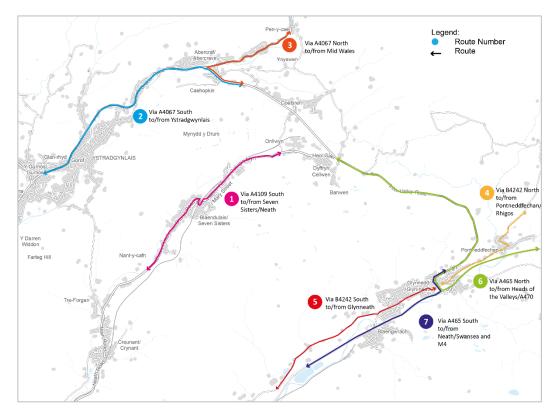


Figure 19: Traffic distribution route options

# 5.5.1 Delivery Vehicle Trip Distribution and Assignment

The distribution of delivery vehicles during the construction phase has been estimated based on the likely geographical spread of construction materials. During the operational phase of the development, it is assumed that delivery vehicles will primarily be routed via the M4 and A465. The delivery vehicle distributions are summarised in Table 13 and illustrated spatially in Figures A9-A10 in Appendix A.

Table 13: Construction and Operational Delivery Trip Distribution and Assignment Summary

	Route	Construction	Operation
1	Via A4109 South to/from Seven Sisters/Neath	20%	-
2	Via A4067 South to/from Ystradgynlais	-	-
3	Via A4067 North to/from Mid-Wales	10%	-
4	Via B4242 North to/from Pontneddfechan/Rhigos	-	-
5	Via B4242 South to/from Glynneath	-	-
6	Via A465 North to/from Heads of the Valleys/A470	30%	_
7	Via A465 South to/from Neath/Swansea and M4	40%	100%

### 5.5.2 Staff Vehicle Trip Distribution and Assignment

Assumptions on the distribution of construction and operational staff have been determined through reference to 2011 origin/destination census data from the WU03EW Location of usual residence and place of work by method of travel to work census category, with place of work set to Neath Port Talbot 002 MSOA.

The assignment of development traffic for both construction and operation has been determined by examination of the highway network. This exercise has been undertaken by attributing each set of trips to the destination via the most likely route. Where several feasible routes could be used, the development trips have been split accordingly. The staff vehicle distribution calculations are summarised in Table 14 and illustrated spatially in Figure A9 in Appendix A.

Table 14: Staff Vehicle Trip Distribution and Assignment Summary

	Route	Percentage
1	Via A4109 South to/from Seven Sisters/Neath	57%
2	Via A4067 South to/from Ystradgynlais	10%
3	Via A4067 North to/from Mid-Wales	20%
4	Via B4242 North to/from Pontneddfechan/Rhigos	1%
5	Via B4242 South to/from Glynneath	5%
6	Via A465 North to/from Heads of the Valleys/A470	7%
7	Via A465 South to/from Neath/Swansea and M4	0%

### 5.5.3 Visitor Trip Distribution and Assignment

The distribution of visitor vehicles during the operational phase has been estimated based on the likely geographical spread of hotel and accommodation, assuming that each testing team will remain local during their test trials. Majority of accommodation is located within Swansea, and some located nearer the site via Ystradgynlais and Glynneath. During the operational phase of the development, it is assumed that visitors will primarily be routed via the A4109 as this is the most direct route to the main access from Swansea. The delivery vehicle distributions are summarised in Table 15 and illustrated spatially in Figures A15 in Appendix A.

Table 15: Visitor Vehicle Trip Distribution and Assignment Summary

	Route	Percentage
1	Via A4109 South to/from Seven Sisters/Neath	70%
2	Via A4067 South to/from Ystradgynlais	20%
3	Via A4067 North to/from Mid-Wales	-
4	Via B4242 North to/from Pontneddfechan/Rhigos	-
5	Via B4242 South to/from Glynneath	-
6	Via A465 North to/from Heads of the Valleys/A470	5%
7	Via A465 South to/from Neath/Swansea and M4	5%

# 5.5.4 Sensitivity Test

A sensitivity test has been carried out, which tests a higher percentage of construction delivery traffic travelling to/from the west via the A4067 from Ystradgynlais. Deliveries from the west are likely to come from J45 of the M4 and take the A4067 to the site. The construction delivery access will remain as before via the Washery Access.

After some concern expressed by the LA's from consultation, staff and visitor routing has also been changed so that all those travelling to/from the west of GCRE will travel via the A4221/Onllwyn Road staggered junction as this is seen

to be the most likely route if travelling to the southern access of GCRE located on Onllwyn Road/Wembley Avenue. Prior to this it was assumed all those travelling from the west will access GCRE via the Washery access due to the Onllwyn Road access being a secondary access.

The junctions included in the sensitivity test are:

- JTC 1: A4067 and A4221 priority-controlled T-Junction;
- JTC 2: A4221 and Nant Helen priority-controlled T-Junction;
- JTC 3: A4221 and Onllwyn Road priority controlled staggered junction; and

Results of the Junction modelling can be found in Appendix D and summarised in Chapter 7.2. The construction delivery vehicle distributions are show in Table 16.

Table 16: Sensitivity Test - Construction Delivery Trip Assignment summary

	Route	Construction
1	Via A4109 South to/from Seven Sisters/Neath	20%
2	Via A4067 South to/from Ystradgynlais	10%
3	Via A4067 North to/from Mid-Wales	10%
4	Via B4242 North to/from Pontneddfechan/Rhigos	-
5	Via B4242 South to/from Glynneath	-
6	Via A465 North to/from Heads of the Valleys/A470	30%
7	Via A465 South to/from Neath/Swansea and M4	30%

# **5.6** Background Traffic Growth

In order to generate traffic flows for the future assessment years of 2024, 2026 and 2035, background traffic growth factors have been derived from the DfT's Trip End Model Presentation Program (TEMPro) version 7.2b.

The geographical area has been set at the Neath Port Talbot local authority area. Origin/Destination growth rates for Car Driver trips have been obtained for the AM and PM peak hours and the adjusted local growth figure for NPTCBC has been calculated. The resultant traffic growth factors are presented in Table 17.

Table 17: TEMPro Future Year 2024, 2026 and 2035 Traffic Growth Factors

Base Year	Future Year	AM	PM	AADT
2020	2024	1.0329	1.0325	1.0349
2020	2026	1.0490	1.0485	1.0518
2020	2035	1.1215	1.1216	1.1277

# **5.7** Committed Development

It has been agreed with NPTCBC that the Glynneath residential development would have a negligible impact on GCRE and therefore not included within the assessment.

Extant trips associated with the Celtic Energy site and Nant Helen (i.e. those entering/exiting via the Washeries and Nant Helens site access) which is due to close have been removed from the network based on the existing turning proportions at each junction. These trips are shown in Figures A9-A14 in Appendix A.

# 5.8 Development Trips

Resultant development trips for the construction phase are illustrated spatially in Appendix A Figures A19-A24.

Resultant development trips for the operational phase are illustrated spatially in Appendix A Figures A25-A30.

### 5.9 2020 Base Year Traffic Flows

The network traffic flows for the 2024 future year scenarios have been derived by applying the seasonality factor set out in Table 17 to the 2020 traffic count data. The resultant 2020 base year traffic flows are shown in Figures A31-A34 in Appendix A. The seasonality factor is included within all future year scenarios.

### **5.10 2024** Construction Year Traffic Flows

The network traffic flows for the 2024 future year scenarios have been derived by applying the growth factors set out in Table 17 to the 2020 traffic count data. The resultant 2024 traffic flows with and without construction trips are shown in Figures A47-A50 in Appendix A.

# **5.11 2026 Opening Year Traffic Flows**

The network traffic flows for the 2026 future year scenarios have been calculated by applying the growth factors set out in Table 17 to the 2020 traffic count data. The resultant 2026 traffic flows for with and without operational trips are shown in Figures A51-A54 in Appendix A.

#### 5.12 2035 Future Year Traffic Flows

The network traffic flows for the 2035 future year scenarios have been calculated by applying the growth factors set out in Table 17 to the 2020 traffic count data. The resultant 2031 traffic flows for with and without operational trips are shown in Figures A55-A58 in Appendix A.

# **6** Transport Implementation Strategy

### 6.1 Introduction

In accordance with TAN 18, this chapter is intended to draw together the elements of a Transport Implementation Strategy as part of demonstrating how the development will contribute to overarching policy objectives.

The policy context in Chapter 2 highlighted the importance of sustainability in national, regional and local policy guidance. The GCRE site should therefore be aligned with policy in order to maximise the benefits for the area.

# 6.2 Objectives

This TA has described the development and resulting trip generation. These proposals are relevant to a range of overarching objectives, ranging from the day-to-day efficiency of the development to broader planning and transport aspirations to encourage more sustainable travel patterns. The Transport Implementation Strategy is therefore underpinned by the following over-arching objectives:

Objective 1	Provision and management of infrastructure to minimise disruption during construction and support operation of the proposed development.
Objective 2	To enable walking, cycling and public transport trips to GCRE where feasible, given the rural location of the proposed development.
Objective 3	To facilitate continued safe access along PRoWs.
Objective 4	To ensure level crossing facilities along the existing rail line are of a suitable standard to provide safe crossings.

# **6.3** Measures of Mitigation

This section sets out the mitigation measures that will be implemented for each mode of transport.

The transport related measures proposed in relation to the GCRE are:

- integration of the existing walking and cycling links within the proposed Masterplan;
- provision of pedestrian access points and internal traffic-free routes contributing to a high-quality public realm;
- provision of cycle parking spaces around the site and at a level that meets both Neath Port Talbot County Council and Powys County Council SPG guidance;

- provision of improved bus stops providing direct access to the site, and potential to improve bus frequency to make bus travel an option to the site;
- development and high-quality passenger facilities; and
- a travel plan to provide employees sustainable options of travel.

#### **6.3.1** Construction: Active Travel

#### Walking

All PROWs will be protected from all construction activity and potential conflict will be minimised. Alternative walking routes will be provided with appropriate signage and crossings where necessary to ensure safe accessibility. The provision of facilities for pedestrians should be specified within the Construction Traffic Management Plan (CTMP) to minimise disruption during construction of the GCRE and enable safe walking within and surrounding the development.

#### **Cycling**

The NCN 43 runs along the western perimeter of the site boundary and therefore should not conflict with any construction work. Traffic management will be in place to further ensure the free running if the cycle route.

Temporary cycle storage facilities should be provided for construction workers who live within cycling distance. The provision of facilities for cyclists should be specified within the CTMP to encourage active travel accessibility to/from the development.

## **6.3.2** Operational: Active Travel

#### Walking

There are a mix of footpaths and bridleways within and surrounding the site. The paved PROW located on the A4221/Onllwyn Road junction has poor pedestrian crossing facilities across Onllwyn Road. Although it is not expected that traffic will significantly increase at this junction, the infrastructure standard for pedestrian crossings should be agreed on in the reserve matters process as Onllwyn Road creates severance between the bridleways and paved footpaths across the GCRE site.

Pedestrian access to the site will be provided from Onllwyn Road by provision of a surfaced footway and the requirement for an improved crossing at the Wembley Avenue priority T. This would include an improved crossing of Wembley Avenue to Onllwyn Road to include, as a minimum, dropped kerbs and tactile paving.

All PROWs will be clearly signed and will provide safe pedestrian infrastructure if there is conflict between the PROWs and the proposed development/rail alignment. The provision of facilities for pedestrians should be specified within the Travel Plan to promote Active Travel to/from the GCRE.

NPTCBC and PCC have raised concerns over the potential of the GCRE to attract non-planned visits i.e. train enthusiasts and leisure trips passing by the site who

stop to view the facility. Although no formal provision for viewing the facility is currently proposed, recognising the sensitivity of some of the likely activities / testing which the facility would accommodate, the potential impact of such visitors has been considered. It is likely that these visitors will arrive by car due to the location and surrounding topography of the area which may result in a parking impact on highway and PROWs with on street parking surrounding GCRE. The need for such parking should be monitored and an appropriately worded condition added to any future decision in terms of the implementation of suitable traffic management measures should visits of this nature cause concerns.

#### **Cycling**

The development will connect with the existing NCN 43 and the local network of cycling routes to enable better cycling accessibility. A direct shared pedestrian/cycle route from Ystradgynlais to Onllwyn should be provided, making use of the existing PROWs within the site area, and be designed to Welsh Government Active Travel design standards. Safe pedestrian/cycling infrastructure will be provided if there is conflict between the proposed rail alignment.

The site will provide cycle parking at all points of pedestrian access excluding the existing A4221 Washery and Distribution centre access. The number of cycle stands should be determined by NPTCBC parking standard guidance as a minimum which is included in Table 18. Cycle parking will include covered shelters, appropriate lighting, and CCTV to cater for long and short stay parking requirements. Staff lockers, changing, and showering facilities will be provided as part of the project.

The provision of facilities for cyclists should be specified within the Travel Plan to encourage active travel to/from the GCRE.

#### **6.3.3** Construction: Public Transport

#### Bus

GCRE should collaborate where possible with existing bus operators, NPTCBC and PCC to provide a service that benefits construction workers in key neighbouring towns if existing services do not satisfy demand to encourage use of public transport.

The provision of bus services for construction workers should be explored in more detail and specified within the CTMP. The CTMP will co-ordinate with the existing bus service timetable to minimise disruption during construction of the GCRE, and the existing bus operations.

### 6.3.4 Operational: Public Transport

#### Bus

Access to the site by bus will remain at the existing Coelbren Turn bus stop located on the T-junction of Onllwyn Road and Wembley Avenue/A4109.

The existing bus waiting facilities which consist of a shelter will be improved to provide a timetable board, bus flag, and real time information for improved waiting facilities for users. Other infrastructure may also include a bus border kerb and a bus layby to improve bus boarding/alighting facilities and encourage use of public transport.

GCRE will collaborate with existing bus operators and NPTCBC to provide a service that benefits employers in key neighbouring towns if existing services do not satisfy demand. This will be detailed within the Travel Plan that will also specify the provision of facilities for bus users to enable better public transport accessibility to/from the GCRE.

#### Rail

Although not part of this project, future consideration should be given to opening the rail line to passenger services if a suitable business case could be identified.

#### **6.3.5** Construction: Vehicular Access

Primary vehicular access to site will remain the same as that described in section 4.1.1 for the construction period. The A4221 Washery and Distribution centre access will be the main access and Onllwyn Road/Wembley Road will be the secondary access entrance and managed through the CTMP. The provision of wayfinding signage should be specified within the CTMP and aim to minimise conflict with other users and delivery disruptions during the construction of the GCRE project.

### **6.3.6** Operational: Vehicular Access

Primary vehicular access to the site will remain the same as that described in section 4.1.1 for operation of GCRE. The A4221 Washery and Distribution centre access will be the main access and Onllwyn Road/Wembley Road will be the secondary access entrance and managed the travel plan .The provision of facilities to include clear way finding signage should be specified within the Travel Plan to support the operation of the proposed development given its semi-rural location and distance from the main strategic motorway network.

### 6.3.7 Construction: Car Parking

During construction of the development, a temporary car park and compound will be made available to support the operation of construction. This will be detailed in the CTMP to minimise any disruption this may cause.

#### 6.3.8 Operation: Car Parking

The development will provide a car park within the site boundary of a capacity determined by applying local parking standards to the nature and location of the development. NPTCBC Parking Standards use a designated zone derived from the six zones set out in the Wales Parking Standards 2014. Each zone has differing designated levels of parking for development management purposes. Looking at

the current washery site, the designated zone is *Zone 5 – Countryside*. A countryside area is an area *including small villages*, with a few local facilities within walking distance. Motorised travel is required for most journeys, although there is some local employment.

Car parking standards using NPT LDP 2016 are assessed on land use of the proposed development as specified within the Town and Country Planning (use classes) Order 1987. Since GCRE will have a research and development multi storey building which is assumed to be larger than 1,000 m<sup>2</sup>, the land use falls under *Class B1 Business: Offices*.

Table 18: Wales Parking Standards (2014) for Use Class B1 and A2 for Zone 4 to 6.

Mode	Development	Requirement
Car	Offices (>1000m <sup>2</sup> )	1 space per 20m <sup>2</sup>
Cycle	Short Stay	1 stand per 200 m <sup>2</sup>
Cycle	Long Stay	1 stand per 1000 m <sup>2</sup>

Disabled parking spaces sized to meet guidance will be positioned within 50 metres of the facility served by the car park. As the development will be a new employment premises, the recommended proportion is that a minimum of 5% of the total car park capacity should be dedicated for blue badge holders.

The level of car parking to be provided will be discussed and agreed as part of the reserved matters process.

The car park facilities will encourage the use of Ultra Low Emission Vehicles (ULEVs) by provision of a minimum of 10% of car parking spaces with charging points as encouraged by PPW Edition 10.

The GCRE development may attract unplanned visitors i.e. train enthusiasts and leisure trips passing by the site to view GCRE. It is likely that these visitors will arrive by car due to the location and topography of the area. As there is no allocated area for such visitors, there is a potential impact of visitors parking on the highway and PROWs. Future car parking provision could mitigate any impact from these types of visitors. Scope for the mitigation of unplanned visitors and more detailed work will be developed during the detailed design/reserved matters and the following should be considered:

- A specific visitor allocation in the day given in a non-peak hour which allows visitors and train enthusiasts to park within the GCRE site and view the facility;
- Parking regulations applied to surrounding local highways to discourage on street parking;
- Provision of a Park and Ride facility for visitors which performs a bus tour of GCRE on set days.

At this point in time, and given the commercial sensitivities of some of the likely testing / activity within the site, these types of visits would not be encouraged and mitigation should only be implemented should future monitoring show that visitors of this nature are causing problems on the local highway network. Precise wording of any conditioning and monitoring scheme will be decided on during the reserved matters process.

# 7 Assessment of Transport Implementation Strategy

The assessment measures of the transport impact strategy and the key objectives are set out in detail in Sections 6. The mitigation measures are taken forward for appraisal against the baseline conditions of current infrastructure for the operation of GCRE, and the baseline conditions including the additional construction traffic generated by the construction of GCRE.

A qualitative assessment using a seven-point assessment scale presented in chapter 7.1 has been used to assess the impact for public transport, active travel, and car parking.

A quantitative assessment has been carried out for highways based on junction capacity using modelling software and is presented in chapter 7.2.

# 7.1 Public Transport, Active Travel and Car Parking

The mitigation measures for walking, cycling, bus, rail, and car parking are taken forward for appraisal against the baseline conditions of current infrastructure for the operation and construction of GCRE.

The impact of measures against the objectives has been assessed according to a seven-point scale as set out in Figure 20.

Figure 20: Seven Point Assessment Scale of Transport Implementation Strategy Impact

Large Beneficial Impact	+++
Moderate Beneficial Impact	++
Slight Beneficial Impact	+
Neutral	0
Slight Adverse Impact	-
Moderate Adverse Impact	
Large Adverse Impact	

Table 19: Assessment summary for Transport Implementation Strategy – Construction

_	ort Implementation : Mitigation Measures	Provision and To enable management of walking, cycling		Objective 3 To facilitate continued safe access along PRoWs.	Objective 4  To ensure level crossing facilities along the existing rail line are of a suitable standard to provide safe crossings.
king	CTMP to minimise disruption during construction of the GCRE and enable safe walking within and surrounding the development.	+++	+++	+++	+++
Walking	CTMP to ensure the safety of pedestrians at all existing level crossings and aim to minimise disruption during construction of the GCRE	+++	0	++	+++
	Temporary cycle storage facilities for construction workers	0	+++	0	0
Cycle	The provision of facilities for cyclists should be specified within the CTMP to encourage active travel accessibility to/from the development.	+++	+++	+	0
	Ensure a bus service for construction workers is provided.	0	+++	0	0
Bus	The CTMP will co- ordinate with the existing bus service timetable to minimise disruption during construction of the	+++	+++	0	0

_	ort Implementation : Mitigation Measures	Objective 1  Provision and management of infrastructure to minimise disruption during construction and support operation of the proposed development.	To enable walking, cycling and public transport trips to GCRE where feasible, given the rural location of the proposed development.	Objective 3 To facilitate continued safe access along PRoWs.	Objective 4  To ensure level crossing facilities along the existing rail line are of a suitable standard to provide safe crossings.
	GCRE, and the existing bus operations.				
Temp Car Park	During construction of the development, a temporary car park will be made available on site and of suitable size as deemed necessary within the CTMP to support the operation of construction. This will be detailed in the CTMP to minimise any disruption this may cause.	+++	-	-	0

Table 20: Assessment summary for Transport Implementation Strategy - Operation

_	ort Implementation r: Mitigation Measures	Provision and management of infrastructure to minimise disruption during construction and support operation of the proposed development.	To enable walking, cycling and public transport trips to GCRE where feasible, given the rural location of the proposed	Objective 3 To facilitate continued safe access along PRoWs.	Objective 4  To ensure level crossing facilities along the existing rail line are of a suitable standard to provide safe crossings.
		Operation	development.		e. 333712g51
Walking	Travel Plan to enforce safe pedestrian infrastructure and to promote Active Travel to/from the GCRE.	0	+++	++	0

Transport Implementation Strategy: Mitigation Measures	Objective 1  Provision and management of infrastructure to minimise disruption during construction and support operation of the proposed development.	To enable walking, cycling and public transport trips to GCRE where feasible, given the rural location of the proposed development.	Objective 3 To facilitate continued safe access along PRoWs.	Objective 4  To ensure level crossing facilities along the existing rail line are of a suitable standard to provide safe crossings.
Integration of existing walking footpaths in Onllwyn, into the proposed masterplan.	0	+++	+++	0
Onllwyn Road junction improvements (north and south) to create safe pedestrian crossings.	0	+++	+++	0
Provide safe pedestrian infrastructure where proposed rail alignment creates conflict with existing PROWs.	0	+++	+++	+++
Pedestrian wayfinding signs within site.	0	++	+	0
Footpaths to be kept separate from road and rail network within site.	0	+++	+++	0
All public level crossing within the site, and along the existing rail alignment will be upgraded to provide a safe pedestrian crossing.	0	0	+++	+++
Private level crossing will also be upgraded where necessary and discussed with residents and NPTCBC.	0	0	+++	+++
All footbridges will be assessed for safety and	0	0	+++	+++

_	ort Implementation : Mitigation Measures	Provision and management of infrastructure to minimise disruption during construction and support operation of the proposed development.	To enable walking, cycling and public transport trips to GCRE where feasible, given the rural location of the proposed development.	Objective 3 To facilitate continued safe access along PRoWs.	To ensure level crossing facilities along the existing rail line are of a suitable standard to provide safe crossings.
	upgraded where appropriate if there is conflict with the GCRE rail alignment				
	Integration of existing NCN 43 into the proposed masterplan.	0	+	++	0
Cycle	Cycle parking at all points of pedestrian access. High quality cycle parking facilities including shelter, lighting, and CCTV.	0	++	0	0
O	Direct cycle route from Ystradgynlais to Onllwyn, making use of existing PROWs to be included in the masterplan.	0	++	+++	0
	Travel Plan to enforce safe cycle infrastructure.	0	+++	++	0
Bus	To update existing bus stop to include bus shelter, timetable, lighting, and real time information.	0	+++	0	0
B	To improve bus boarding/alighting facilities by including a bus border kerb and bus layby.	0	++	0	0

_	rt Implementation : Mitigation Measures	Objective 1  Provision and management of infrastructure to minimise disruption during construction and support operation of the proposed development.	Provision and management of infrastructure to minimise disruption during construction and support operation of the proposed  To enable walking, cycling and public transport trips to GCRE where feasible, given the rural		To ensure level crossing facilities along the existing rail line are of a suitable standard to provide safe crossings.
	Travel Plan to enforce bus service for employees.	0	+++	0	0
	Safe pedestrian access routes will be provided within all new car parks	0	+++	+	0
Car parking	The car park facilities will encourage the use of Ultra Low Emission Vehicles (ULEWs) and will have a minimum of 10% of car parking spaces to have ULEV charging points as encourages by PPW Edition 10	0	-	0	0
	Disabled parking spaces will be positioned within 50 metres of the facility served by the car park and which are adequate in size and number.	0	-	0	0

The appraisal assesses all mitigation measures that are identified to ensure that the GCRE aligns with TAN18, as defined in the TIS. The impact of these measures ranges from having a neutral to large beneficial impact against the objectives set out in the TIS, with the exception of car parking facilities which has a slight adverse impact. Although the objectives of the GCRE are to enable travel options via sustainable modes of transport, car parking facilities will need to be provided given the rural location of the site and the expectation that workforce and visitors may change over time and not all be locally based.

The number of available parking spaces should be determined by applying local parking standards to the nature of the proposed facilities within the site and ensure there is enough provision for the construction and operation purposes of the

GCRE only. These should be reviewed on a regular basis as part of the GCRE Travel Plan.

# 7.2 Highways

Junction capacity assessment has been undertaken using forecast vehicle movements to assess the impact of the proposed development on six key junctions surrounding the site. The trip generation forecast is detailed in Chapter 5 and the eight junctions are:

- 1. A4067 and A4221 priority junction;
- 2. A4221 and Nant Helen access priority junction;
- 3. A4221 and Onllwyn Road priority staggered junction;
- 4. A4221 and CPL South Wales Coal entrance priority junction;
- 5. A4221 and A4109/Heol Gaer junction;
- 6. Onllwyn Road and A4109 priority junction;
- 7. A4109 and B4242 signalised junction; and
- 8. A4109 and A465 junction.

Junction assessment was undertaken using Junctions 9 and LinSig modelling software. The software uses junction geometries and traffic volumes to calculate junction capacity including traffic queues, and delays that may be affected by the additional traffic generated by the GCRE.

Two time periods representing the weekday AM and PM peak hours assessed for seven scenarios (as set out in section 5):

- A. 2020 existing situation;
- B. 2024 Future traffic flow;
- C. 2024 Future traffic flow with Phase Two Construction Traffic;
- D. 2026 Future traffic flow;
- E. 2026 Future traffic flow with Operational Development Trips;
- F. 2035 Future traffic flow; and
- G. 2035 Future traffic flow with Operational Development Trips.

The percentage impact from the predicted construction traffic at these junctions is summarised in Table 21 with detailed analysis and calibration information presented in Appendix D and summarised in Table 22.

Despite representing a significant percentage increase in some scenarios (particularly 6) with predicted traffic growth and traffic resulting from both construction and operational movements all eight junctions continue to operate within capacity and without any material queues. The predicted increase in traffic volumes has a minor impact on the junction capacity for all scenarios assessed. Junction 7 shows capacities with Degree of Saturation between 85.3% during Phase 2 Construction in the PM peak and 86.3% in 2035 operational year in the

PM Peak. The general agreed operational capacity of a junction is at a ratio of 90% for traffic signals.

This assessment for the construction Phase 2 represents the worst-case scenario; therefore, this short-term impact is considered minor on the junction, and deemed able to operate within capacity with a PRC of 6% (over the practical capacity of 0%). The construction traffic impacts the delay by 12 seconds on the A4109 South arm. The CTMP will look to reduce this impact on the A4190/B4242 signalised junction.

This assessment for the operational phase represents the worst-case scenario assuming all trips will be made by vehicle and all operation staff and planned visitors arrive and depart in the AM and PM peaks. Given this is unlikely and the junction has a PRC of 9% (over the practical capacity of 0%), the impact of operational traffic is considered minor on the junction and deemed able to operate within capacity. The operational traffic impacts the delay by 13 and 3 seconds on High Street (W) and A4109 (S) respectively. The operational management plan of GCRE and the Travel Plan will look to reduce this impact on the A4190/B4242 signalised junction.

Detailed analysis and calibration information is presented in Appendix D.

#### **Sensitivity Test**

The junctions included in the sensitivity test are:

- JTC 1: A4067 and A4221 priority-controlled T-Junction;
- JTC 2: A4221 and Nant Helen priority-controlled T-Junction;
- JTC 3: A4221 and Onllwyn Road priority controlled staggered junction; and

The percentage impact from the sensitivity test on the three junctions tested is summarised in Table 21 with detailed analysis and calibration information presented in Appendix D.

The three junctions most affected from the redistributed construction delivery traffic, and the re-routeing of staff and visitor traffic to A4221/Onllwyn Road access to GCRE from the West, continue to operate within capacity and without any material queues. The predicted increase in traffic volumes has a negligible impact on the junction capacity for all scenarios assessed.

Therefore, if the secondary access on Onllwyn Road/Wembley avenue were to be used as a main access, the predicted traffic travelling to/from the west of GCRE using the A4221/Onllwyn Road junction to access this, will still be able to operate. The affect on junction capacity assessed is not significant and full analysis is presented in Appendix D.

#### **Construction Method Statement**

A construction method statement will be included within the Framework Construction Traffic Management Plan and will be further developed once a contractor is appointed post permission. The construction method statement will include information on the following:

- Loading/unloading;
- Storage;
- Dust management;
- washing facility;
- 278 agreement; and
- Road safety audit.

Table 21: Junction impact by traffic flow with development traffic

		Percentage Impact by Junction							Sensitivity Analysis			
	1	2	3	4	5	6	7	8	1	2	3	
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	5%	3%	3%	29%	26%	48%	11%	18%	7%	6%	6%	
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	0%	5%	6%	35%	23%	39%	9%	16%	2%	8%	9%	
Figure A49 - 2024 With Phase 2 Construction Traffic, 24hr AADT Veh	-1%	-3%	0%	-2%	-1%	6%	0%	0%	-1%	-3%	0%	
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	2%	-2%	-1%	9%	10%	29%	4%	7%	2%	-2%	-1%	
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	-1%	2%	3%	14%	8%	24%	3%	6%	-1%	2%	3%	
Figure A53 - 2026 With Operational Development Trips, 24hr AADT Veh	-1%	-3%	-1%	-3%	-2%	5%	0%	0%	-1%	-4%	-1%	
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	2%	-2%	-1%	8%	10%	28%	4%	7%	2%	-2%	-1%	
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0%	1%	3%	13%	8%	22%	3%	6%	0%	2%	3%	
Figure A57 - 2035 With Operational Development Trips, 24hr AADT Veh	-1%	-3%	-1%	-2%	-2%	5%	0%	0%	-1%	-3%	-1%	

Note: Trips associated with the current mining and washery operation have been removed from the forecast scenarios. As a result, some junctions indicate reduced traffic volumes (shown as negative figures) despite the addition of traffic associated with GCRE construction and/or operation.

Table 22: Summary of Junction Analysis

Scenario Name	Queue	Delay (s/pcu)	RFC	LOS	DoS	PRC
Junction 1	<u>'</u>			_	_	
Figure A31 - 2020 Base, AM Peak Hour (08:00-09:00) PCUs	1	9	0.32			
Figure A32 - 2020 Base, PM Peak Hour (15:00-16:00) PCUs	0	8	0.28			
Figure A35 - 2024 Base, AM Peak Hour (08:00-09:00) PCUs	1	10	0.33			
Figure A36 - 2024 Base, PM Peak Hour (15:00-16:00) PCUs	0	8	0.29			
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	1	10	0.33			
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	1	9	0.29			
Figure A39 - 2026 Base, AM Peak Hour (08:00-09:00) PCUs	1	10	0.36			
Figure A40 - 2026 Base, PM Peak Hour (15:00-16:00) PCUs	1	9	0.31			
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	1	10	0.30			
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	9	0.29			
Figure A43 - 2035 Base, AM Peak Hour (08:00-09:00) PCUs	1	10	0.31			
Figure A44 - 2035 Base, PM Peak Hour (15:00-16:00) PCUs	0	9	0.29			
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	1	10	0.33			
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	1	9	0.31			
Junction 2						
Figure A31 - 2020 Base, AM Peak Hour (08:00-09:00) PCUs	0	7	0.01			
Figure A32 - 2020 Base, PM Peak Hour (15:00-16:00) PCUs	0	10	0.02			
Figure A35 - 2024 Base, AM Peak Hour (08:00-09:00) PCUs	0	7	0.01			
Figure A36 - 2024 Base, PM Peak Hour (15:00-16:00) PCUs	0	11	0.02			
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	0	7	0.01			
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	0	11	0.02			

Scenario Name	Queue	Delay (s/pcu)	RFC	LOS	DoS	PRC
Figure A39 - 2026 Base, AM Peak Hour (08:00-09:00) PCUs	0	7	0.01			
Figure A40 - 2026 Base, PM Peak Hour (15:00-16:00) PCUs	0	11	0.02			
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	7	0.00			
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	11	0.01			
Figure A43 - 2035 Base, AM Peak Hour (08:00-09:00) PCUs	0	7	0.00			
Figure A44 - 2035 Base, PM Peak Hour (15:00-16:00) PCUs	0	11	0.01			
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	7	0.00			
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	11	0.01			
Junction 3						
Figure A31 - 2020 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.10			
Figure A32 - 2020 Base, PM Peak Hour (15:00-16:00) PCUs	0	8	0.08			
Figure A35 - 2024 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.10			
Figure A36 - 2024 Base, PM Peak Hour (15:00-16:00) PCUs	0	8	0.09			
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	0	8	0.11			
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	0	8	0.09			
Figure A39 - 2026 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.12			
Figure A40 - 2026 Base, PM Peak Hour (15:00-16:00) PCUs	0	8	0.10			
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	8	0.11			
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	8	0.09			
Figure A43 - 2035 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.11			
Figure A44 - 2035 Base, PM Peak Hour (15:00-16:00) PCUs	0	8	0.09			
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	8	0.12			
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	9	0.10			

Scenario Name	Queue	Delay (s/pcu)	RFC	LOS	DoS	PRC
Junction 4		(a, <b>F</b> = a)				
Figure A31 - 2020 Base, AM Peak Hour (08:00-09:00) PCUs	0	10	0.06			
Figure A32 - 2020 Base, PM Peak Hour (15:00-16:00) PCUs	0	13	0.02			
Figure A35 - 2024 Base, AM Peak Hour (08:00-09:00) PCUs	0	11	0.06			
Figure A36 - 2024 Base, PM Peak Hour (15:00-16:00) PCUs	0	13	0.02			
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	0	11	0.06			
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	0	13	0.02			
Figure A39 - 2026 Base, AM Peak Hour (08:00-09:00) PCUs	0	11	0.07			
Figure A40 - 2026 Base, PM Peak Hour (15:00-16:00) PCUs	0	14	0.03			
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	12	0.13			
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	15	0.16			
Figure A43 - 2035 Base, AM Peak Hour (08:00-09:00) PCUs	0	11	0.09			
Figure A44 - 2035 Base, PM Peak Hour (15:00-16:00) PCUs	0	14	0.09			
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	11	0.10			
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	14	0.06			
Junction 5						
Figure A31 - 2020 Base, AM Peak Hour (08:00-09:00) PCUs	0	6		A		
Figure A32 - 2020 Base, PM Peak Hour (15:00-16:00) PCUs	0	7		A		
Figure A35 - 2024 Base, AM Peak Hour (08:00-09:00) PCUs	0	7		A		
Figure A36 - 2024 Base, PM Peak Hour (15:00-16:00) PCUs	0	7		A		
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	0	6		A		
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	0	7		A		
Figure A39 - 2026 Base, AM Peak Hour (08:00-09:00) PCUs	0	6		A		

Scenario Name	Queue	Delay (s/pcu)	RFC	LOS	DoS	PRC
Figure A40 - 2026 Base, PM Peak Hour (15:00-16:00) PCUs	0	8		A		
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	7		A		
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	8		A		
Figure A43 - 2035 Base, AM Peak Hour (08:00-09:00) PCUs	0	6		A		
Figure A44 - 2035 Base, PM Peak Hour (15:00-16:00) PCUs	0	7		A		
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	7		A		
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	8		A		
Junction 6						
Figure A31 - 2020 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.07			
Figure A32 - 2020 Base, PM Peak Hour (15:00-16:00) PCUs	0	9	0.11			
Figure A35 - 2024 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.08			
Figure A36 - 2024 Base, PM Peak Hour (15:00-16:00) PCUs	0	9	0.11			
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	0	8	0.08			
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	0	9	0.11			
Figure A39 - 2026 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.08			
Figure A40 - 2026 Base, PM Peak Hour (15:00-16:00) PCUs	0	9	0.12			
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	9	0.11			
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	1	12	0.33			
Figure A43 - 2035 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.09			
Figure A44 - 2035 Base, PM Peak Hour (15:00-16:00) PCUs	0	11	0.26			
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	0	9	0.10			
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	0	11	0.27			
Junction 7						

Scenario Name	Queue	Delay (s/pcu)	RFC	LOS	DoS	PRC
Figure A31 - 2020 Base, AM Peak Hour (08:00-09:00) PCUs	5	36			0.63	43%
Figure A32 - 2020 Base, PM Peak Hour (15:00-16:00) PCUs	6	43			0.74	22%
Figure A35 - 2024 Base, AM Peak Hour (08:00-09:00) PCUs	5	36			0.65	38%
Figure A36 - 2024 Base, PM Peak Hour (15:00-16:00) PCUs	7	44			0.76	19%
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	7	43			0.75	20%
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	9	58			0.83	6%
Figure A39 - 2026 Base, AM Peak Hour (08:00-09:00) PCUs	6	37			0.66	36%
Figure A40 - 2026 Base, PM Peak Hour (15:00-16:00) PCUs	7	46			0.77	16%
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	6	39			0.69	34%
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	7	53			0.81	16%
Figure A43 - 2035 Base, AM Peak Hour (08:00-09:00) PCUs	6	39			0.71	27%
Figure A44 - 2035 Base, PM Peak Hour (15:00-16:00) PCUs	8	52			0.83	9%
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	7	41			0.74	25%
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	9	63			0.87	9%
Junction 8						
Figure A31 - 2020 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.23			
Figure A32 - 2020 Base, PM Peak Hour (15:00-16:00) PCUs	1	10	0.39			
Figure A35 - 2024 Base, AM Peak Hour (08:00-09:00) PCUs	0	8	0.24			
Figure A36 - 2024 Base, PM Peak Hour (15:00-16:00) PCUs	1	11	0.40			
Figure A47 - 2024 With Phase 2 Construction Traffic, AM Peak Hour (08:00-09:00) PCUs	0	8	0.24			
Figure A48 - 2024 With Phase 2 Construction Traffic, PM Peak Hour (15:00-16:00) PCUs	1	11	0.40			
Figure A39 - 2026 Base, AM Peak Hour (08:00-09:00) PCUs	0	9	0.26			
Figure A40 - 2026 Base, PM Peak Hour (15:00-16:00) PCUs	1	11	0.43			

Scenario Name	Queue	Delay (s/pcu)	RFC	LOS	DoS	PRC
Figure A51 - 2026 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	1	9	0.30			
Figure A52 - 2026 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	1	12	0.45			
Figure A43 - 2035 Base, AM Peak Hour (08:00-09:00) PCUs	1	9	0.28			
Figure A44 - 2035 Base, PM Peak Hour (15:00-16:00) PCUs	1	11	0.44			
Figure A55 - 2035 With Operational Development Trips, AM Peak Hour (08:00-09:00) PCUs	1	9	0.30			
Figure A56 - 2035 With Operational Development Trips, PM Peak Hour (15:00-16:00) PCUs	1	12	0.47			

#### Notes:

- 1. Junction results presented for the worst arm in each scenario
- 2. Junction 5 is modelled as a linked junction using Junctions9 'Lane Simulation' feature, thus RFC results not available and Level of Service (LOS) results presented as alternative

### **8** Framework Travel Plan

#### 8.1 Introduction

This section of the Transport Assessment sets out a Framework Travel Plan (FTP) for the proposed GCRE project. This section is intended to act as guide for the development of a full Travel Plan once an operator has been established. The purpose of a Travel Plan is to set out commitments, initiatives, and monitoring to encourage modal shift towards sustainable transport through commitment to measures by setting time bounded targets.

Travel Plans should be managed as a live document which evolves with the development and in which stakeholders including the developer, management company, visitors, and importantly local authorities have a role in developing and monitoring.

This FTP has been produced in accordance with local and national planning requirements, in particular the Well-being of Future Generation (Wales Act (2015), Active Travel Act (2013) and Technical Advice Note 18: Transport (2007). All policies are outlined in Chapter 2.

A travel survey will be completed once GCRE opens. Until this survey is completed it is not possible to define the appropriate Travel Plan targets and timescales, hence the targets outlined in this FTP represent a consideration of the potential levels expected.

# 8.2 Benefits of Travel Plans

Travel Plans aim to benefit employers, employees, visitors, the wider community, and the environment by supporting national and regional policy in the objective to provide sustainable development.

Modal shift away from the reliance on the private car would result in a reduction in road traffic accidents, congestion on the wider road network, reduced stress, healthier lifestyles, greater work productivity, environmental protection, improved access for employees/visitors/deliveries and the reduction of social exclusion through the provision of choice between modes of transport. The everyday function of the GCRE is to research, develop and test rail infrastructure and rolling stock. Therefore, this FTP will focus on the employees and visitors that could arrive by sustainable transport modes.

#### Benefits include:

- Health improvements from increased cycling and walking by staff working at the site:
- Improved, and better utilised, pedestrian and cycling environments from
  potential measures to improve access and ease for those who walk and cycle
  from the site;

- Cleaner air for the local community through a reduction in CO2 emissions generated by the transport to and from the site;
- Convenience from improved transport choices for all employees and visitors;
- Ensuring different entrances to and from the site are clearly communicated to the different users i.e. main entrance for visitors versus service/delivery driver entrances. This will maintain smooth operation of the site;
- Reduced congestion on the wider highway network beyond the assessed junctions; and
- Improved quality of life for employees: time savings, reduced stress and improved health can all lead to lifestyle improvements.

# 8.3 Objectives and Goals of the Travel Plan

The overall objectives of the Travel Plan for GCRE should be to achieve a situation where employees and visitors can make informed travel decisions based on comprehensive information about a range of transport modes. The Travel Plan objectives can be summarised as follows:

- To minimise the environmental impact of the travel demand generated by the development through raising travel awareness amongst employees and providing information to visitors, encouraging them to use sustainable modes of transport;
- To manage site deliveries so that conflicts with pedestrians and other vehicles can be minimised;
- Encouraging multi-occupancy car usage; and
- Maximising accessibility for walking, cycling and public transport as sustainable transport modes.

#### 8.4 Measures

To achieve the targets, it will be necessary to implement Travel Plan measures to ensure employees and visitors to the site are informed about their travel options and encouraged to consider sustainable modes. It is not possible at this stage to fully define which measures are most appropriate for the site, as the measures need to be tailored to the needs and aspirations of future employees and visitors.

The most appropriate measures will be selected following the initial Travel Plan survey, although the following outlines some potential measures which are likely to be appropriate:

- Raising awareness of the health benefits of walking on public notice boards and by providing employees with transport information;
- Providing clear pedestrian and cycle wayfinding in and around the site;
- Ensuring that all walking routes near the site are lit and well-maintained;

- The promotion of Bike2Work days and other local/national initiatives designed to raise cycling levels;
- The provision of staff lockers, changing and clothes storage facilities to encourage staff to cycle to work;
- Advertising the benefits of public transport, such as not needing to own a car/second car;
- Advertising public transport routes on staff information boards and any visitor websites;
- The circulation of a bi-annual newsletter to all site employees via email etc., which would detail Travel (Plan) information and updates; and
- The provision of a welcome pack for each new employee in conjunction with local/green travel recruitment policy, which will detail the various travel options available to them and highlight the Travel Plan's measures and targets will be introduced at the site to encourage staff to travel by sustainable modes.

### 8.5 Travel Plan Coordinator

Quantitative, realistic, and achievable targets should be outlined in the Framework Travel Plan and a Travel Plan Coordinator (TPC) should be appointed for the development. The TPC should develop these initial targets, which should be subject to periodic reviews and should reflect the targets set out in relevant planning policy guidance. The TPC would be responsible for:

- Implementation and day-to-day running of the Travel Plan(s), demonstrating full commitment and enthusiasm towards them;
- Undertake monitoring consistent with the agreed framework, assisted by the individual phase/building travel plan representatives (where appropriate), and ensure that the results are communicated to NPTCBC and PCC;
- Communicating the travel plan across the entire site, acting as a point of contact for staff based at the site requiring information, and updating the website as required;
- Communicate the site access and most convenient route to those entering by car from the East, West and South of the site;
- Periodically reviewing and updating the Travel Plan; and
- Organising meetings of the various working groups.

The role will be in place prior to the facility becoming operational, ensuring that sustainable travel information is available from the outset. On appointment, the travel plan coordinator will contact NPTCBC and PCC to advise that work has commenced on delivering the travel plan. Subsequent changes in contact details will be passed to NPTCBC and PCC within two weeks of any change.

# 8.6 Targets

To meet the overarching aim of reducing unsustainable travel to and from the GCRE, a set of targets should be developed for the occupants of the development. These targets should be derived from the trip generation information found in Section 5. It should be recognised that the targets to be effective in reducing unsustainable travel they need to be 'SMART':

- Specific
- Measurable
- Achievable
- Realistic
- Time-bound

The TPC for the site should endeavour to develop initial targets, which would be subject to periodic reviews and should reflect the targets set out in policy guidance.

# 8.7 Monitoring, Reporting and Review

Monitoring of the Travel Plan will show how well it is performing in meeting the target mode shares and any other targets. Monitoring will also assist in enabling the resources used to implement the Travel Plan to be allocated against appropriate travel plan measures.

The Monitoring Framework for GCRE will include the following:

- Undertake travel questionnaire surveys for all those covered by targets, including employees and visitors;
- Visual surveys on an annual basis to assess the use of cycle parking and inform any change in provision (quantity or facilities);
- Record comments made by management and employees on the Travel Plan;
- Record uptake of funded travel plan measures; and
- Produce annual monitoring reports.

#### 8.8 Conclusions

The site should include measures to encourage walking and cycling with the upgrading of active travel infrastructure such as pedestrian crossings surrounding the site and provision of covered cycle parking spaces, allowing for the proposed facilities to be integrated within the existing local infrastructure.

A list of measures has been identified from which a Travel Plan Coordinator for the site can develop a full Travel Plan, to be delivered within six months of occupancy/opening.

# 9 Summary

This Transport Assessment has considered the transport implications of the Global Centre of Rail Excellence project site, a proposed development in Onllwyn and Nant Helen located in the Swansea Valley. The development will occupy an existing preparation and washery facility and an open cast mine site.

As a result of the existing use of the site the local highway network is well placed to accommodate HGV movements and associated site traffic. That is an additional 34 HGV vehicles at any given time on the network in the worst-case scenario. Assessment of key junctions in the local highway network indicates that the sufficient spare capacity to cater for additional demand (total of 352 vehicle trips on the network in the worst-case construction scenario and 304 vehicle trips during operation) without detriment to the assessed network. This assessment has included both construction and operational scenarios. The development will include a car park for proposed research/office space. This is to be determined in accordance with local car parking standards as part of the reserved matters planning process. Provision will be made within the car park for Ultra Low Emission Vehicles charging points.

There is a regular bus service which calls at nearby bus stops and provides north-south connectivity. There are long distance Active Travel routes at the periphery of the site and further PRoWs both within the site and across the local area.

The site is connected to the national rail network by an operational freight only railway line which is an important asset given the intended use of the site as a rail testing facility. It is also anticipated that the railway line can be used to transport rail related construction materials to the site during the construction phases. The line does not however have any passenger services, but introduction of passenger services may warrant further investigation as part of a regional transport solution.

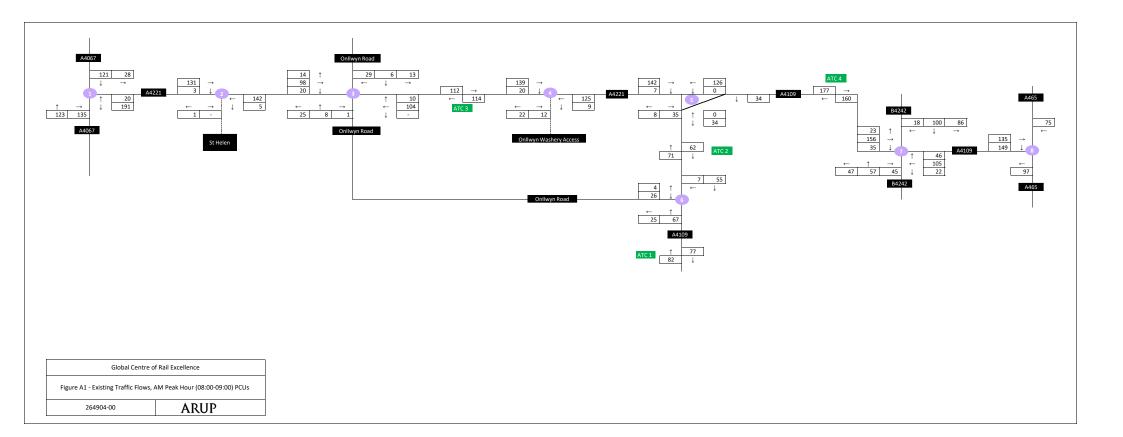
A key measure of success for the GCRE site will therefore be the integration of the development with the facilities in order to make sustainable travel attractive to the site particularly for employees based at the site.

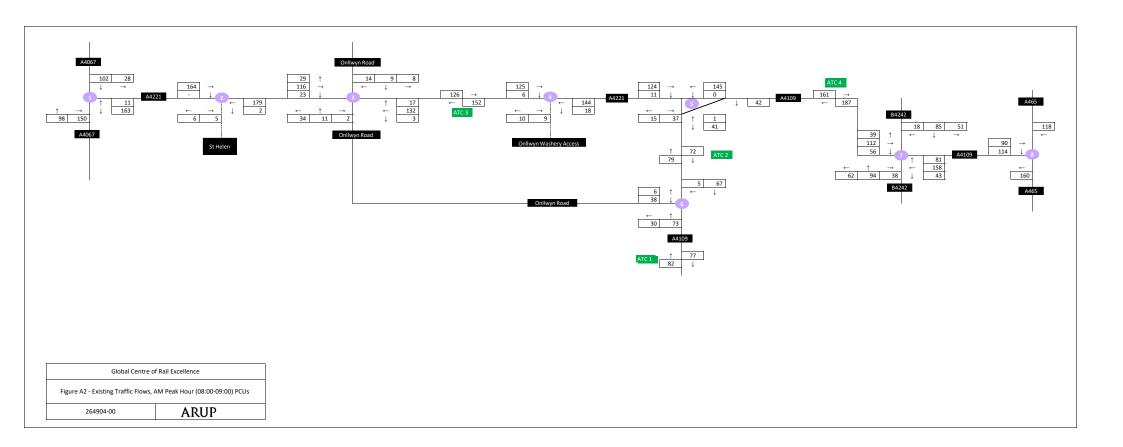
The GCRE site will adopt a site wide Travel Plan and use this as a means of monitoring the transport conditions and encouraging sustainable transport. This Transport Assessment includes a Framework Travel Plan that can be taken forward and developed into an agreed document for the proposed development once an agreed operator is established.

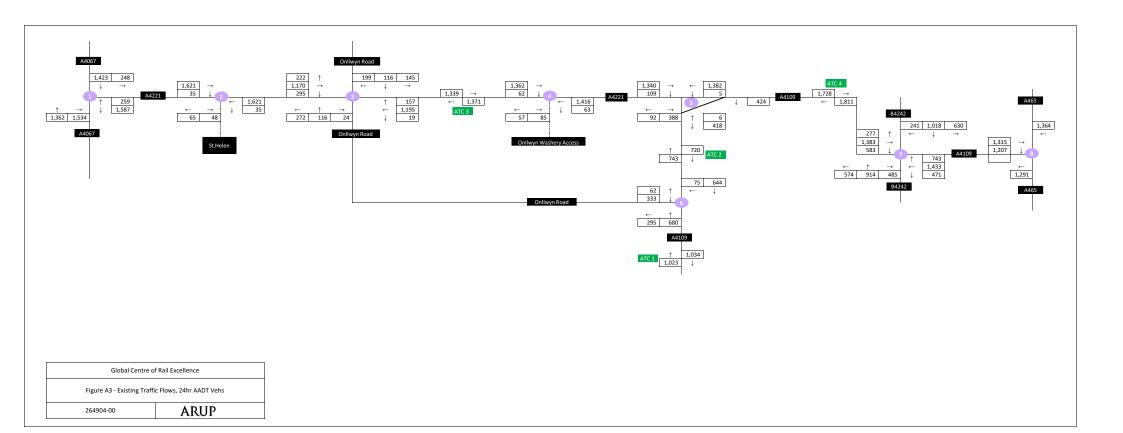
The GCRE site will also be required to implement a site wide Construction Traffic Management Plan to establish protocols during construction and to be used a means of monitoring during the construction programme to ensure health and safety at the site and impacted area accords with best practice.

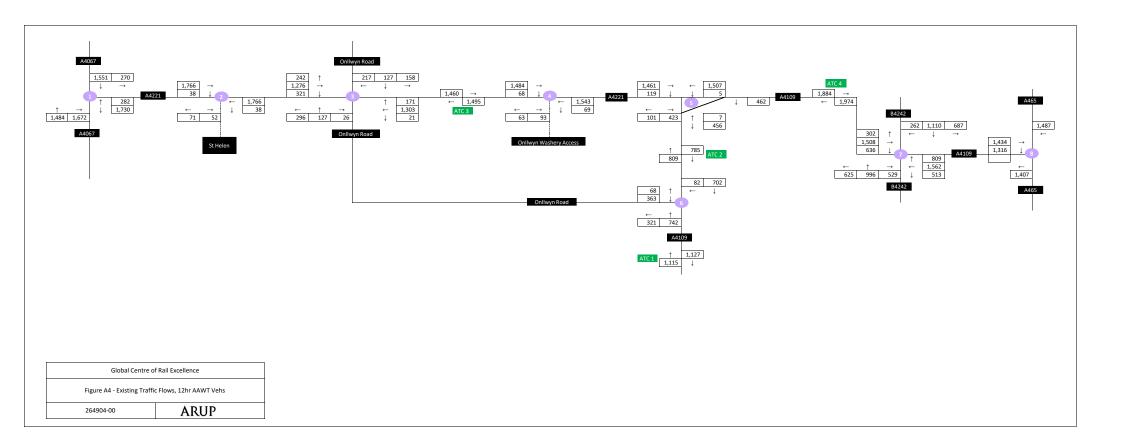
# **Appendix A**

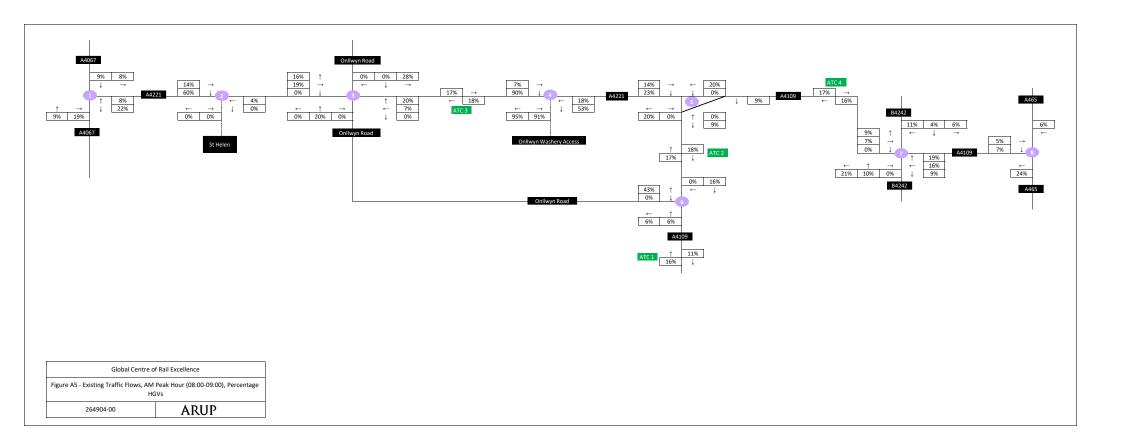
# Traffic Flow Diagrams

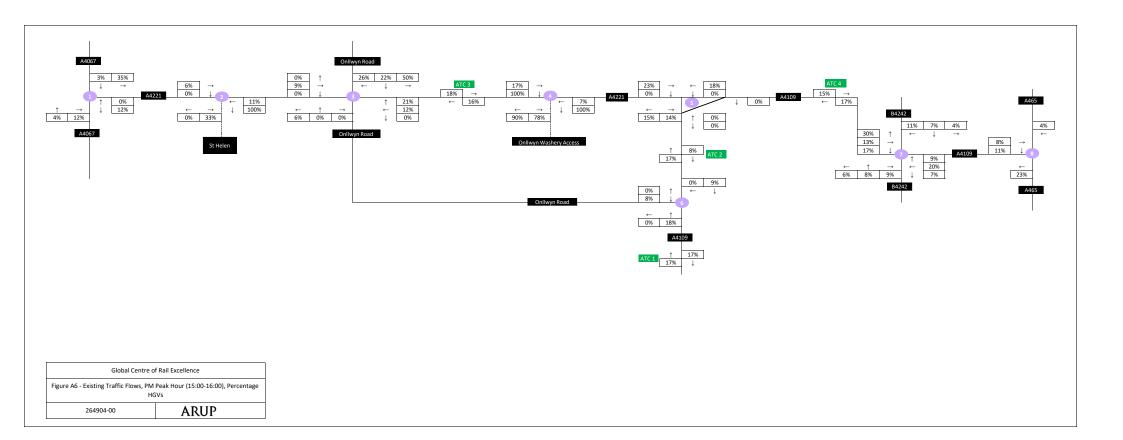


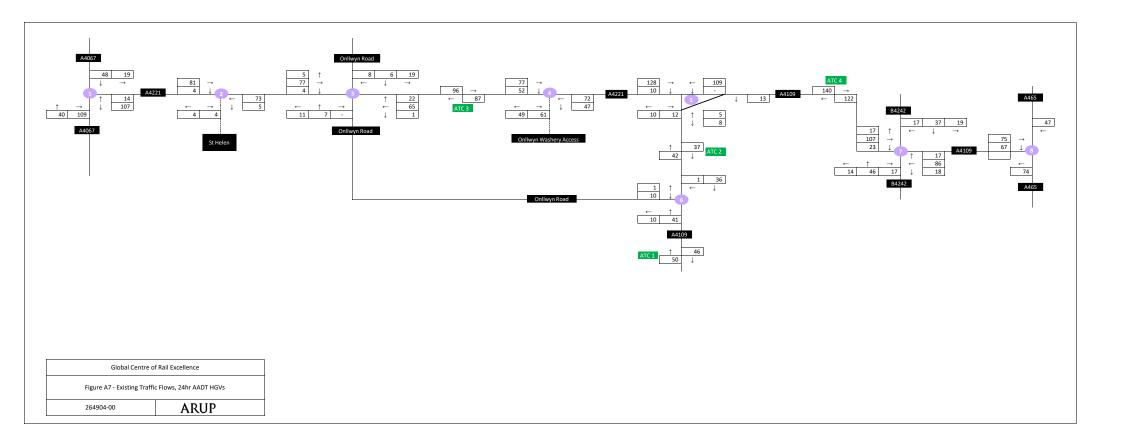


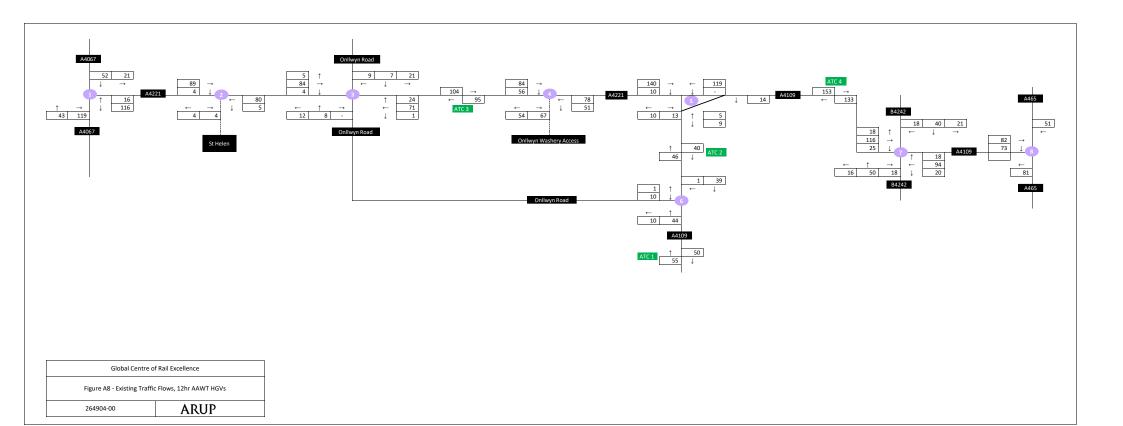


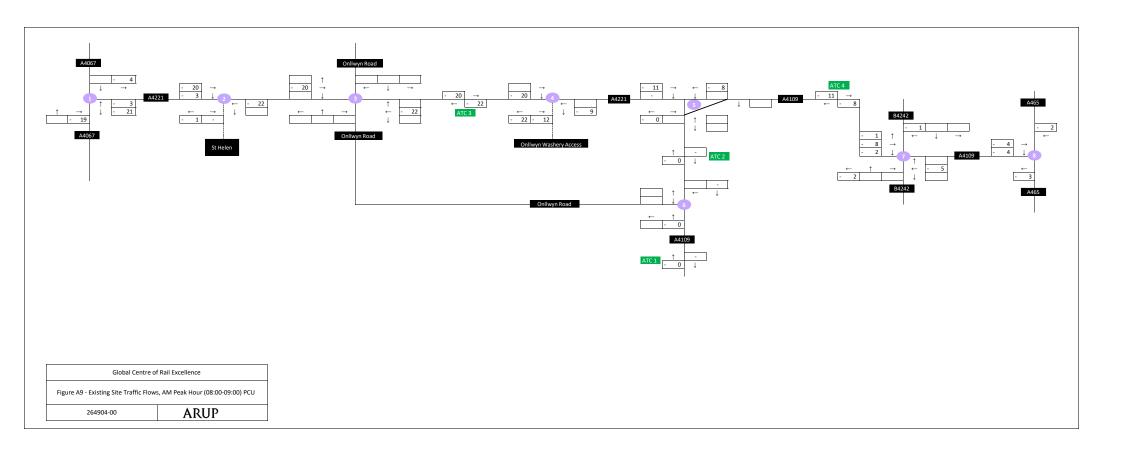


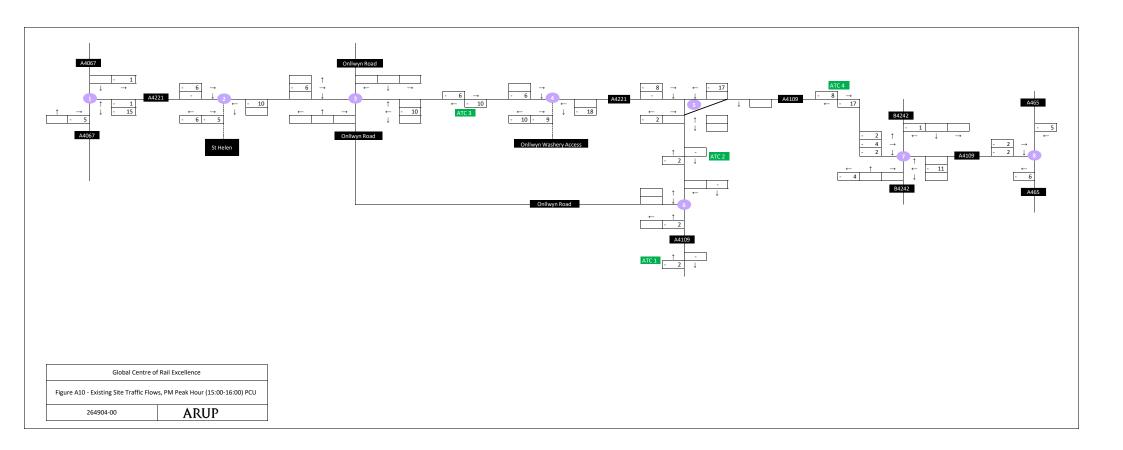


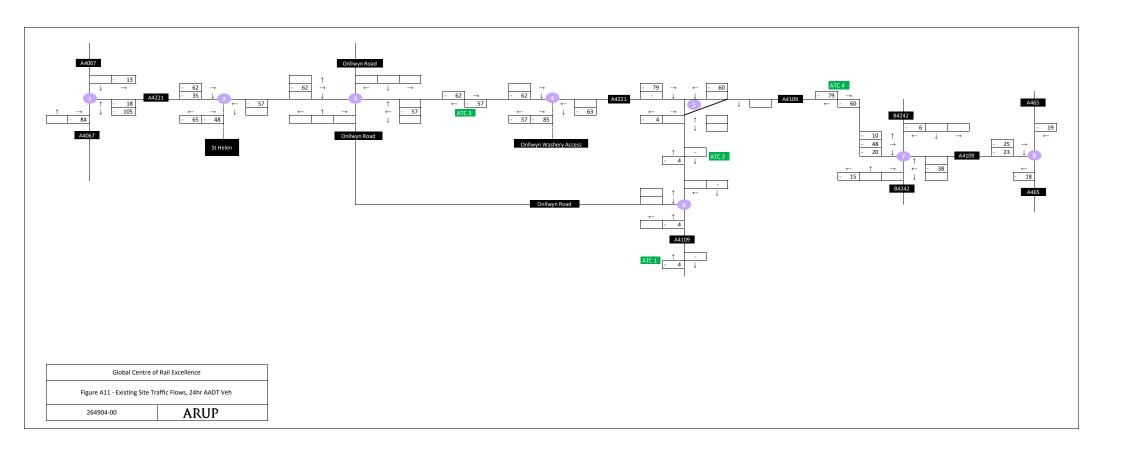


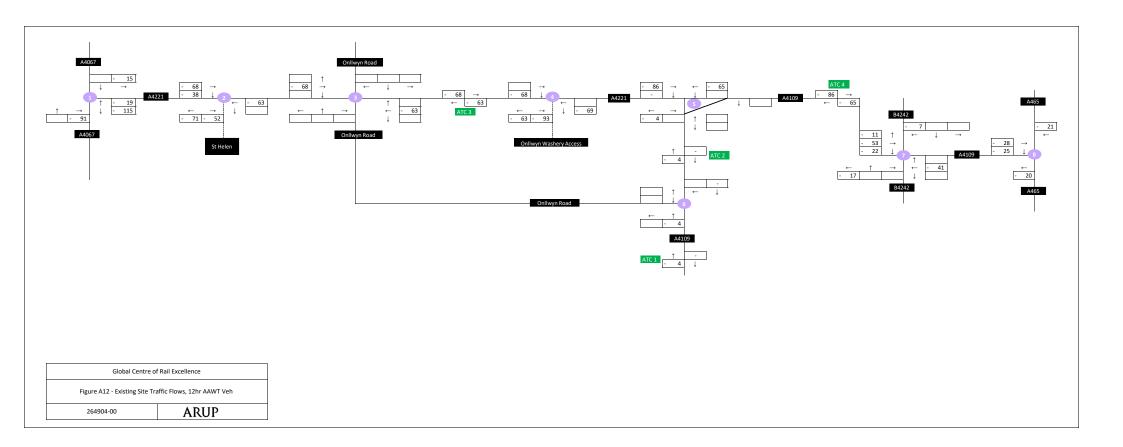


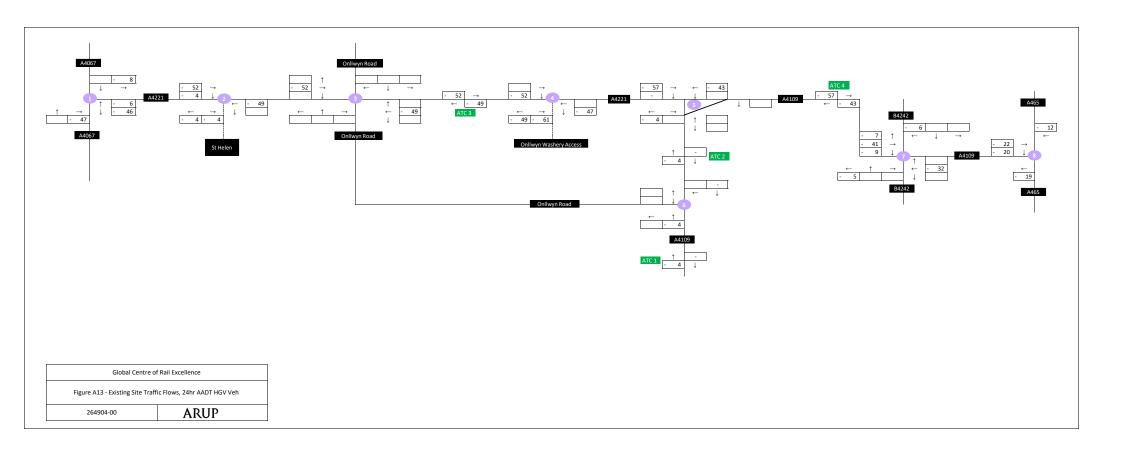


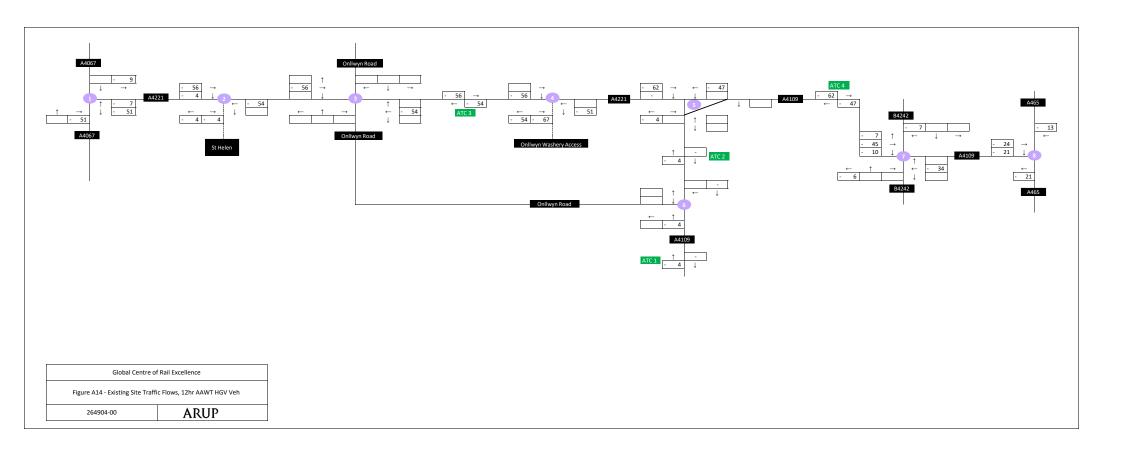


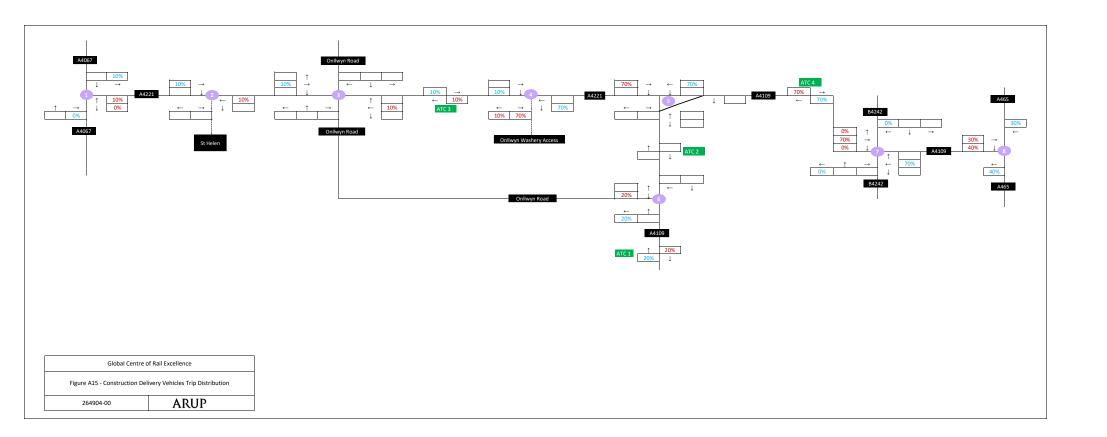


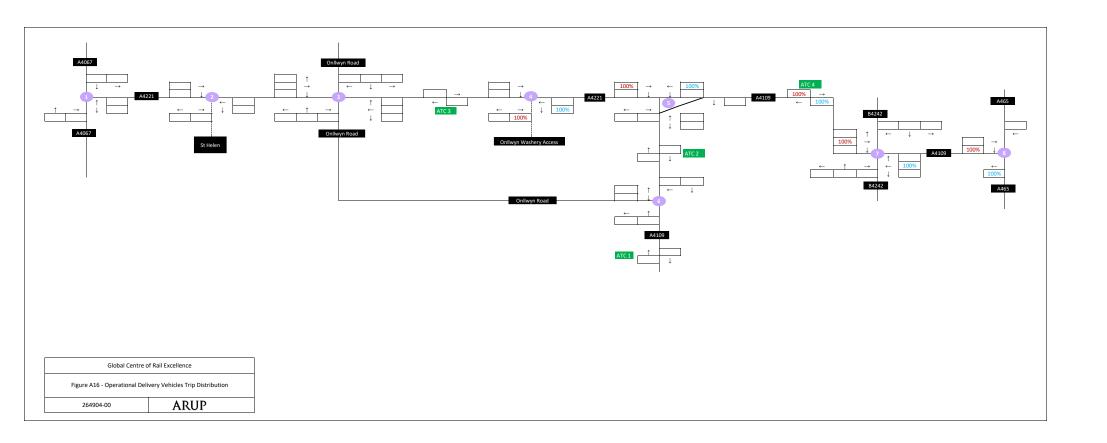


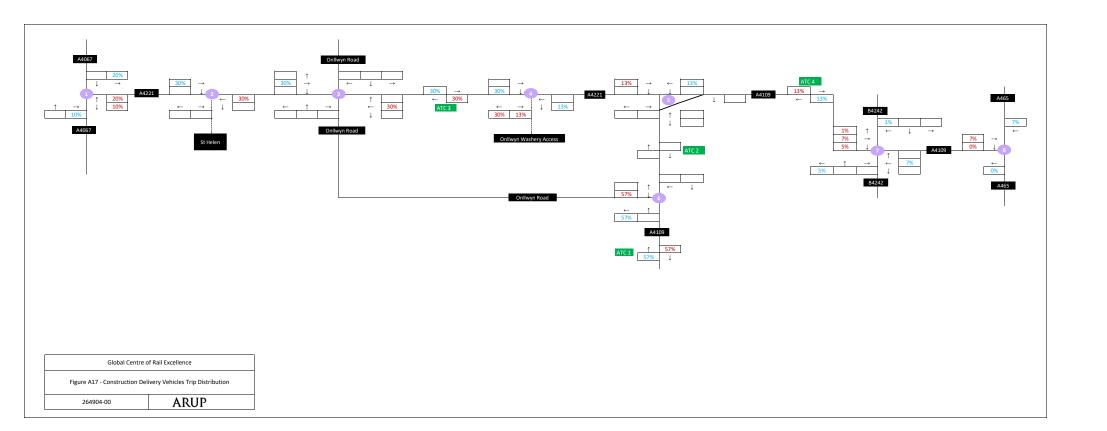


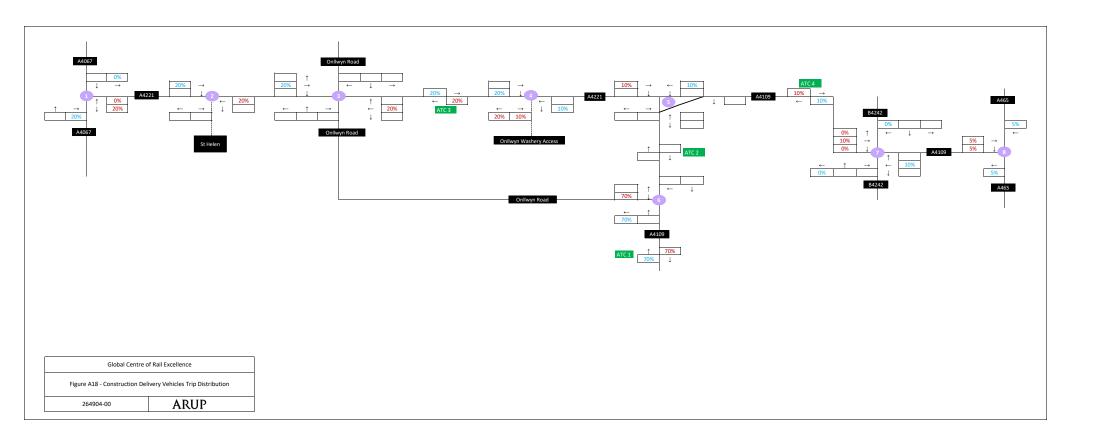


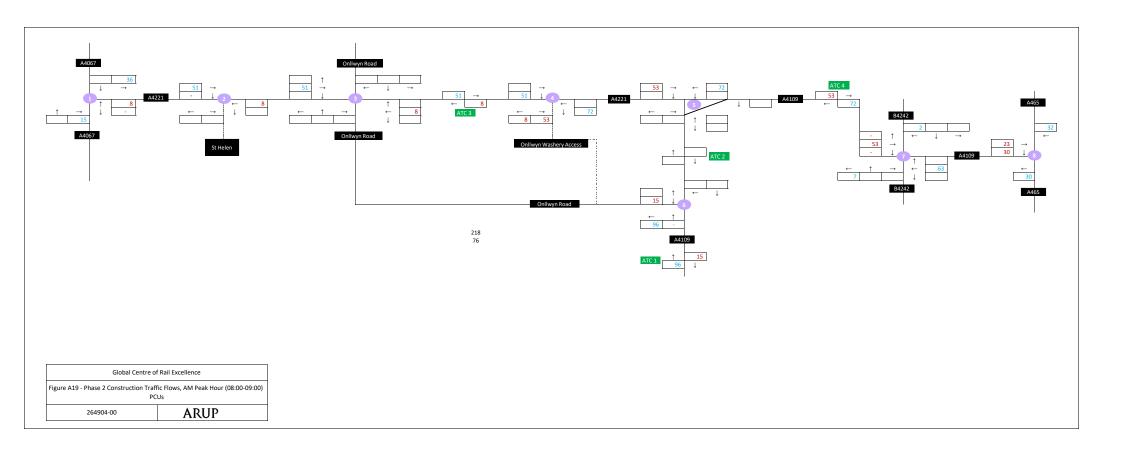


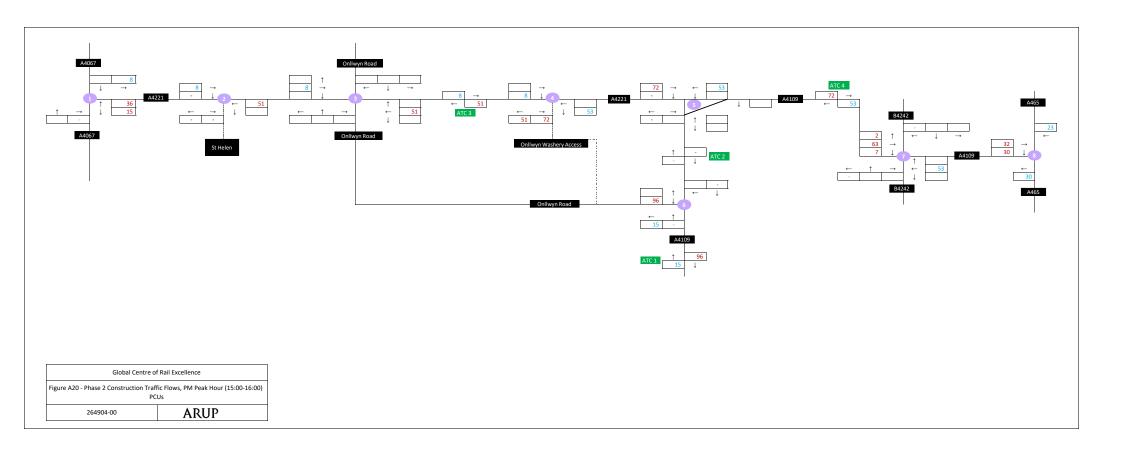


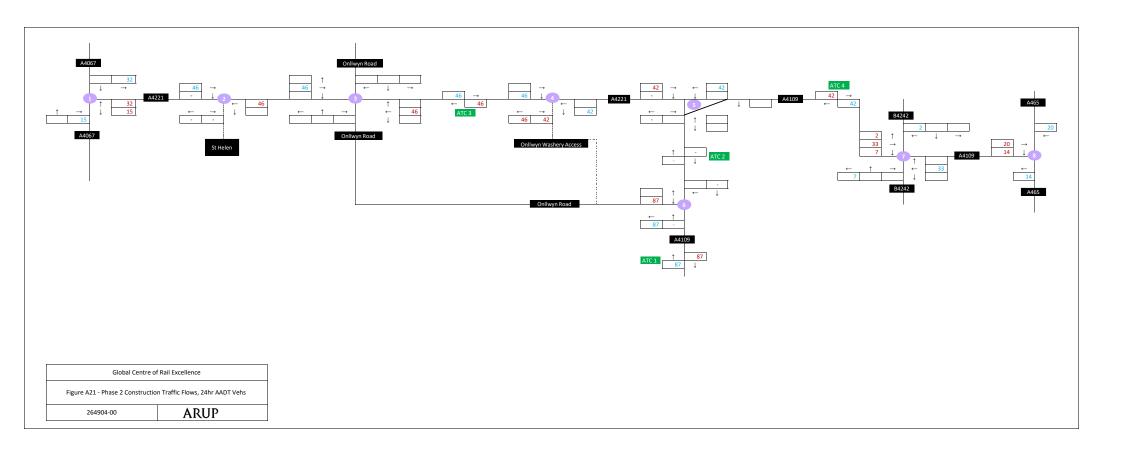


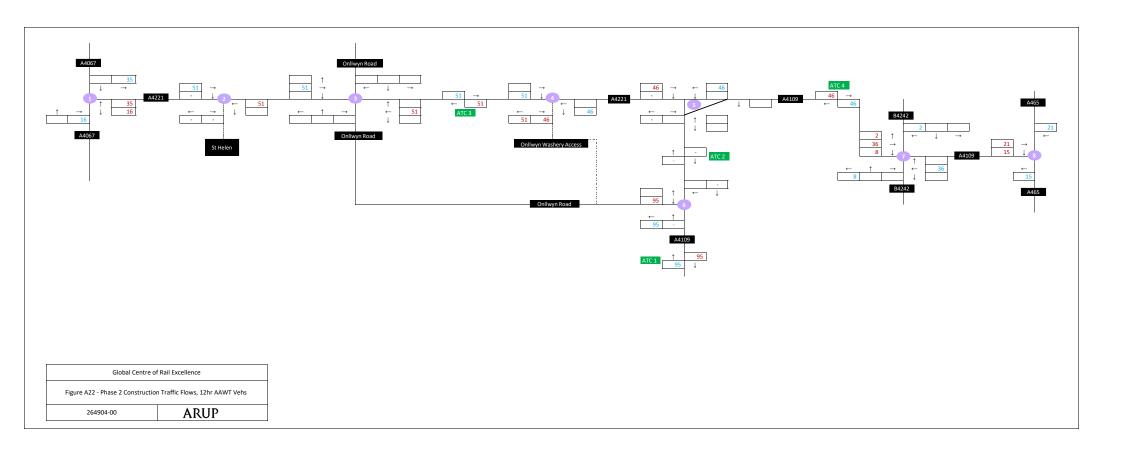


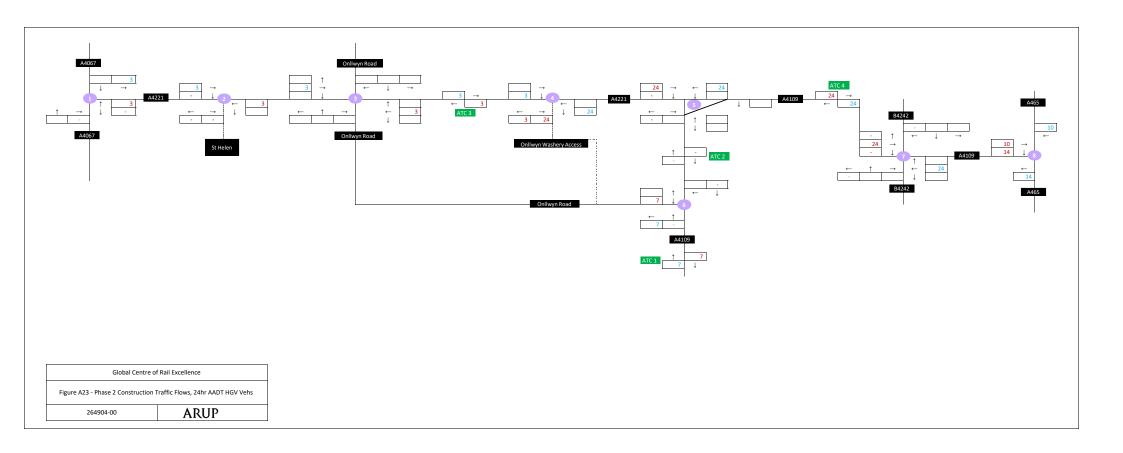


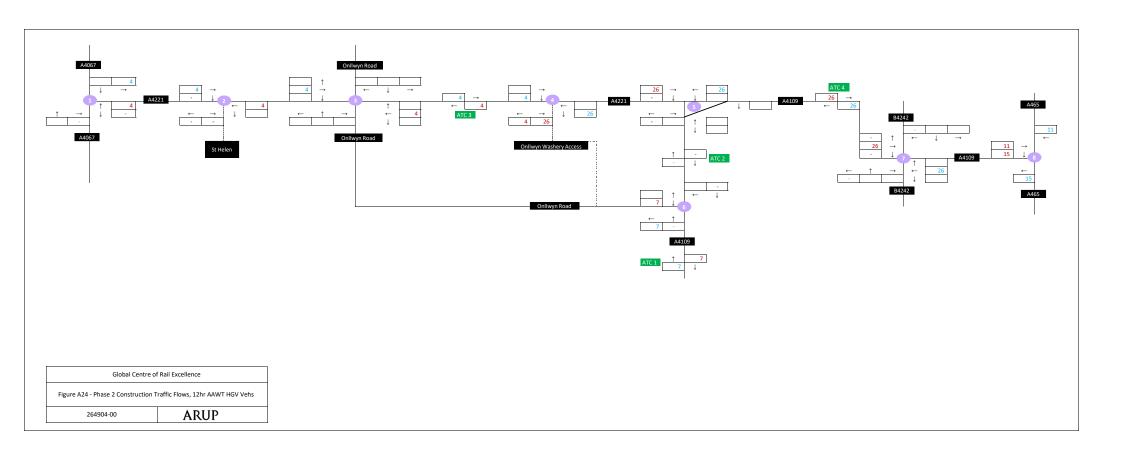


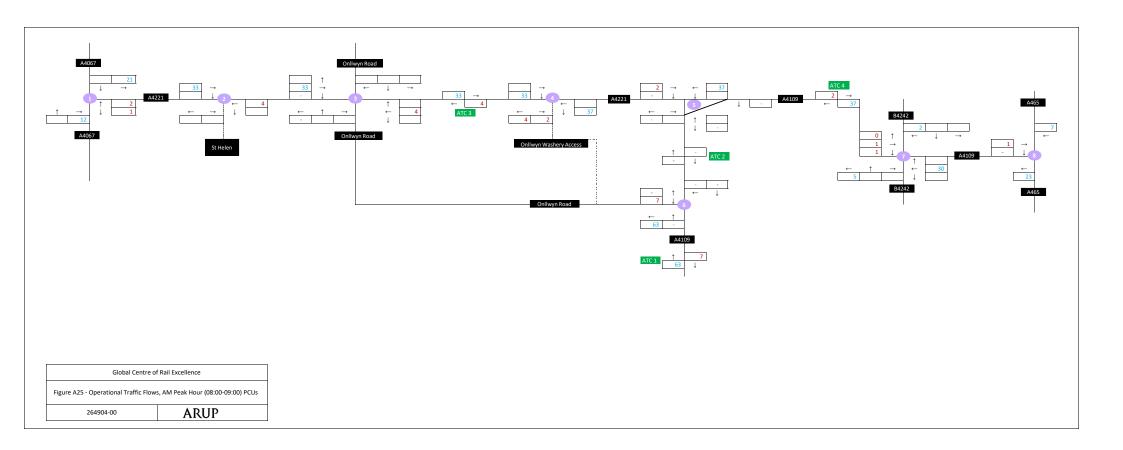


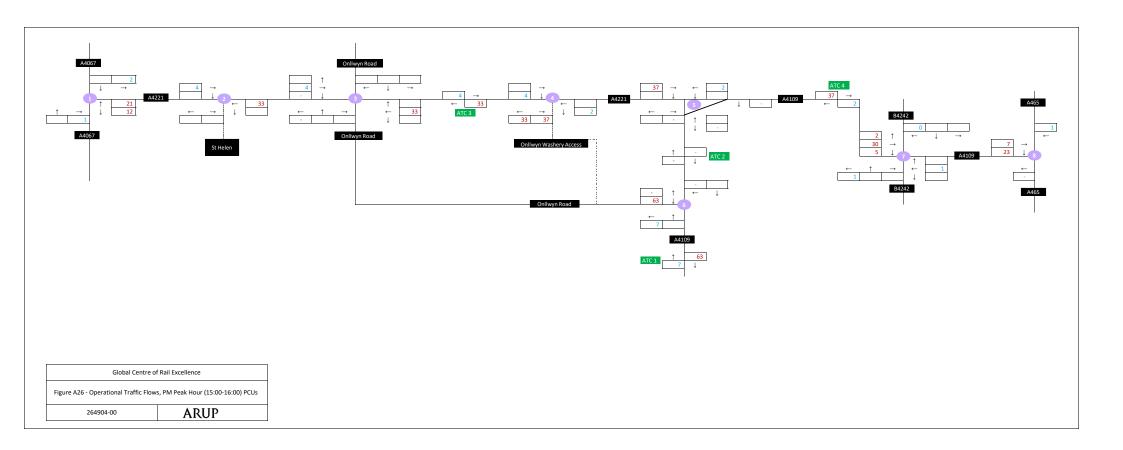


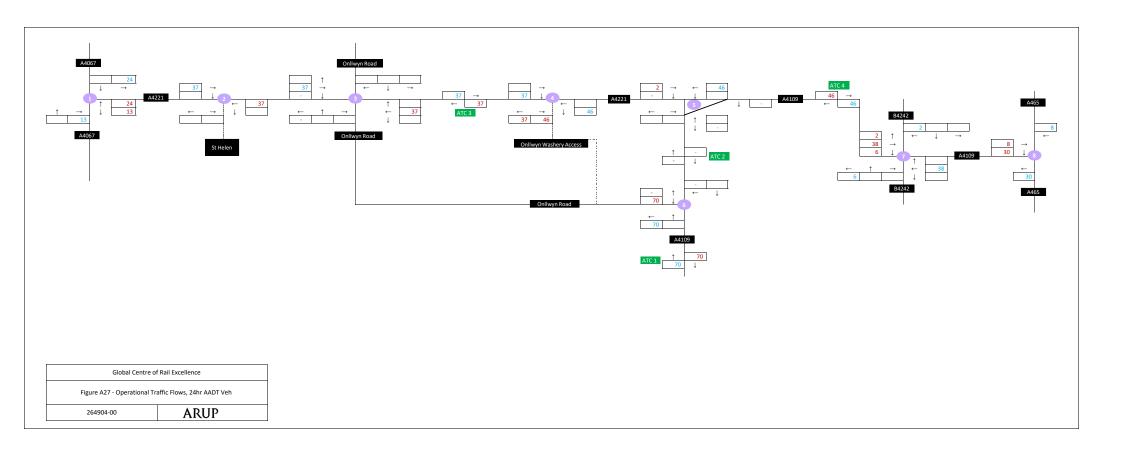


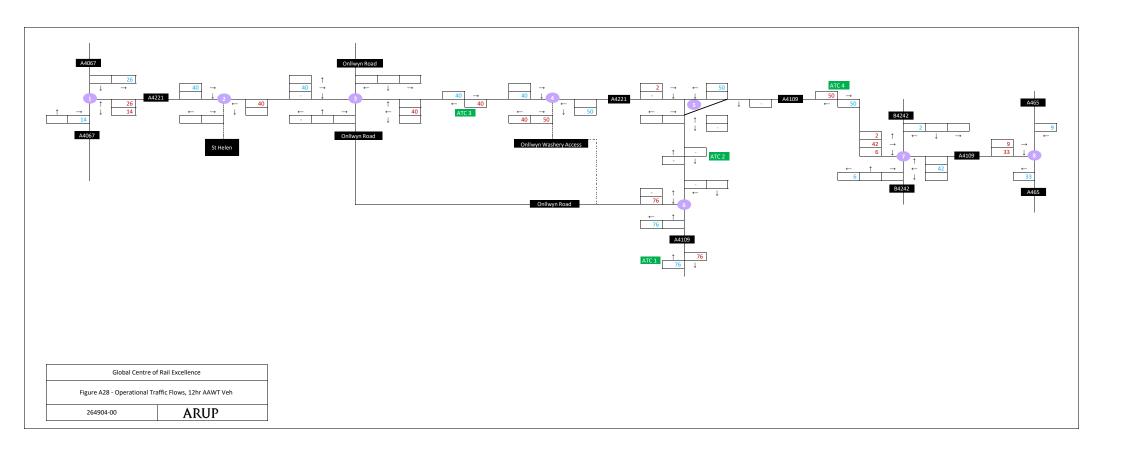


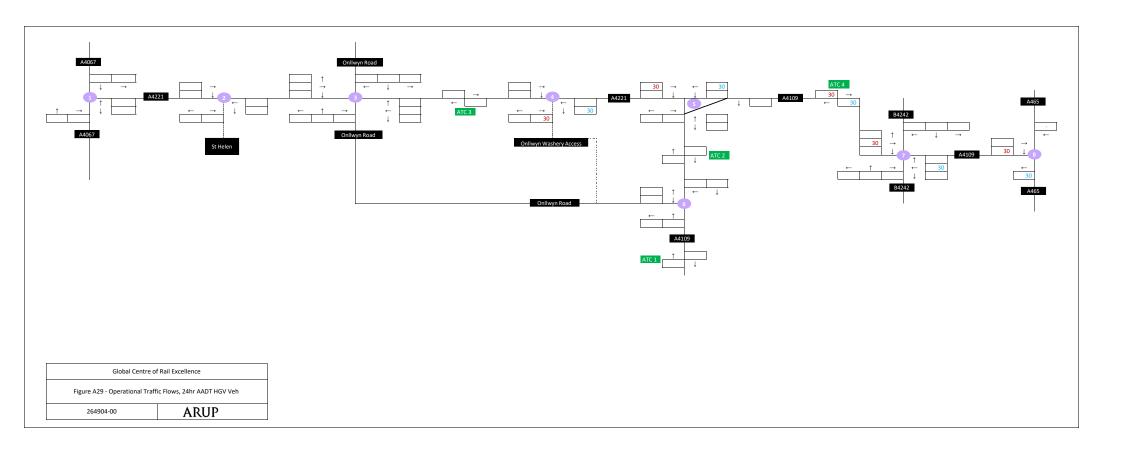


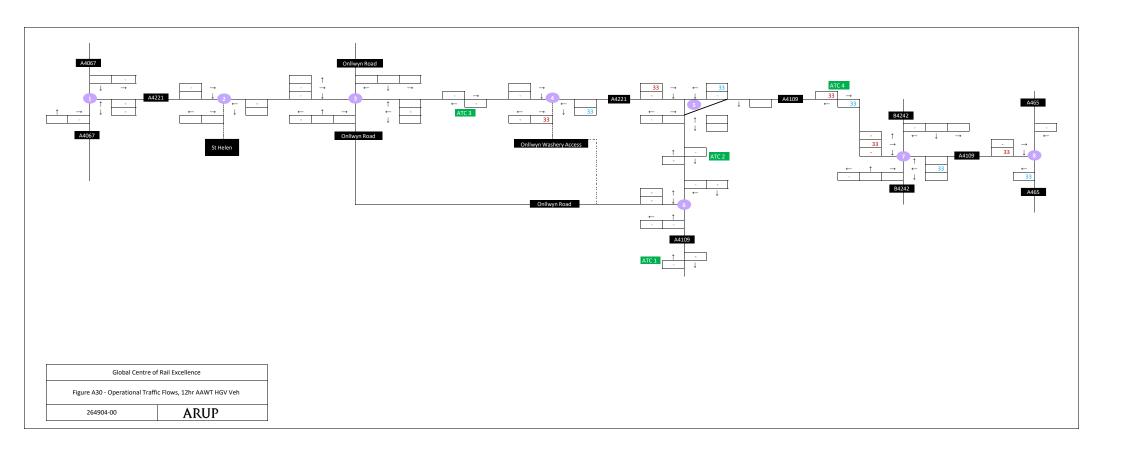


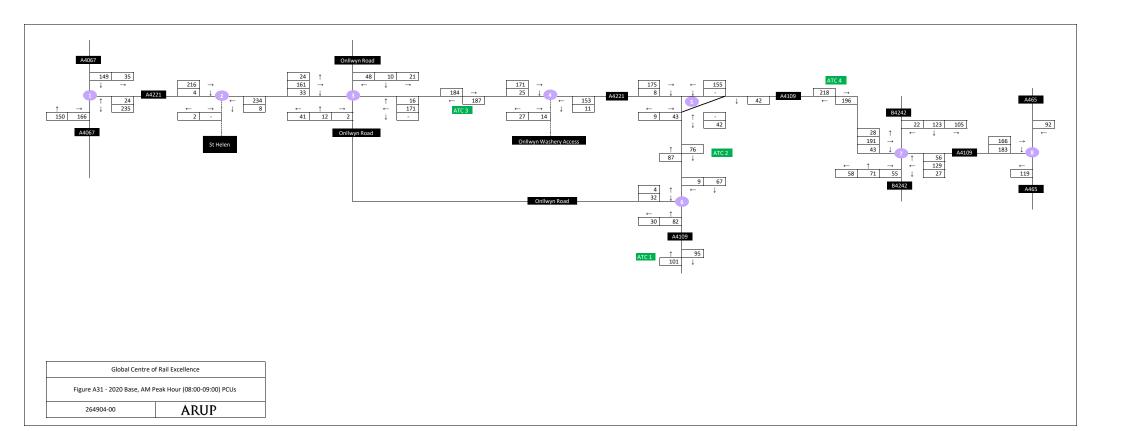


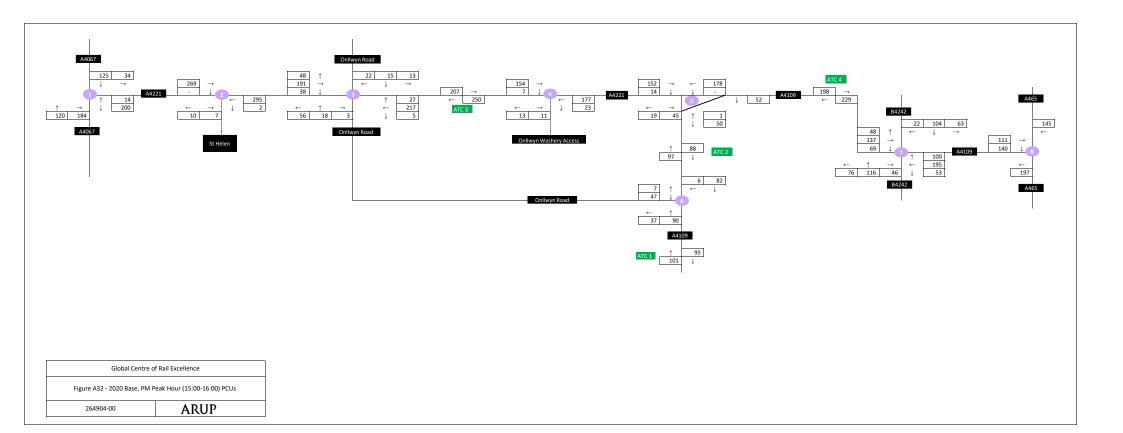


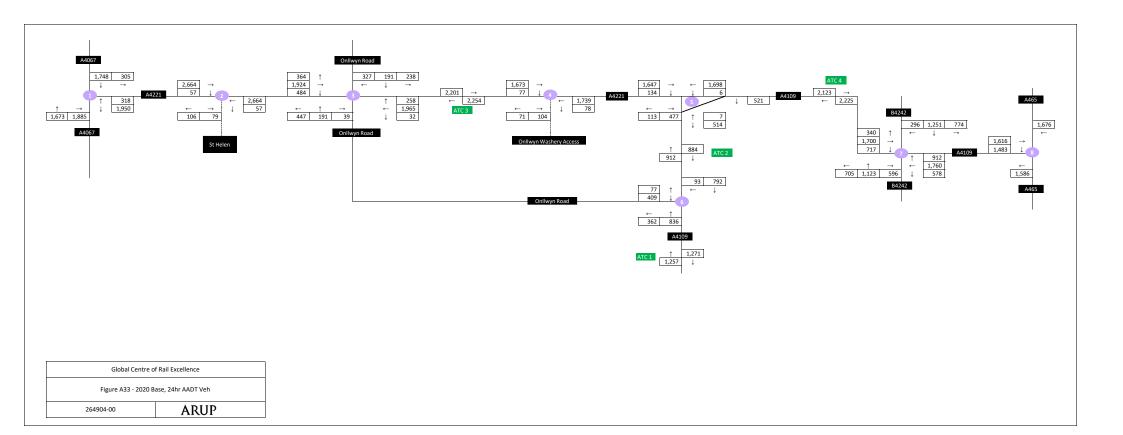


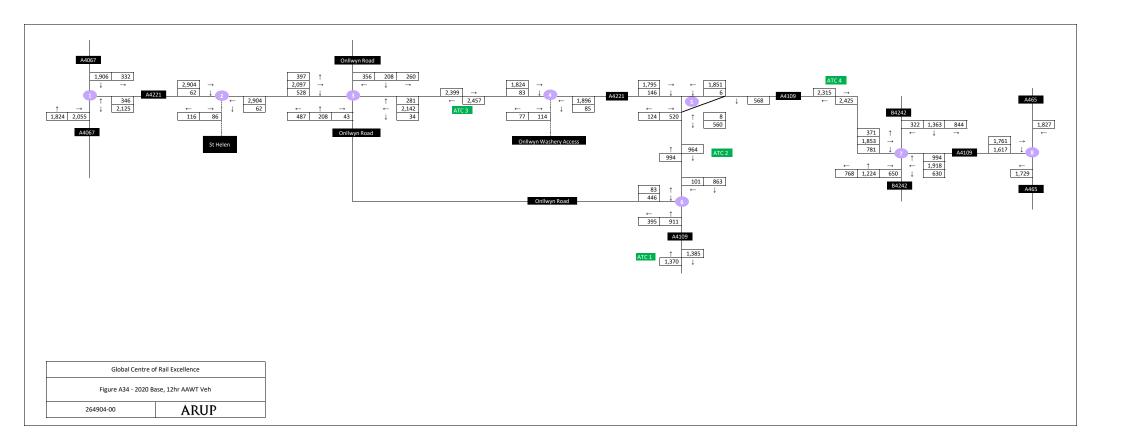


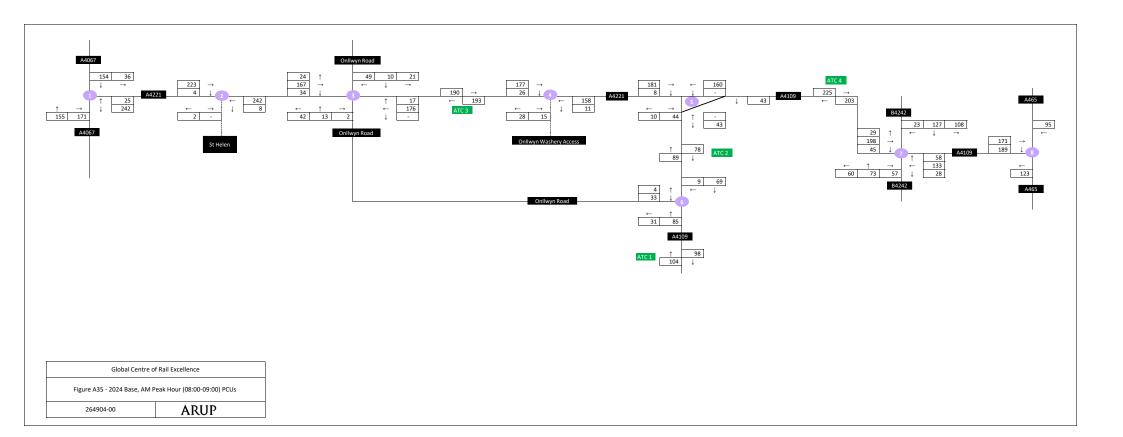


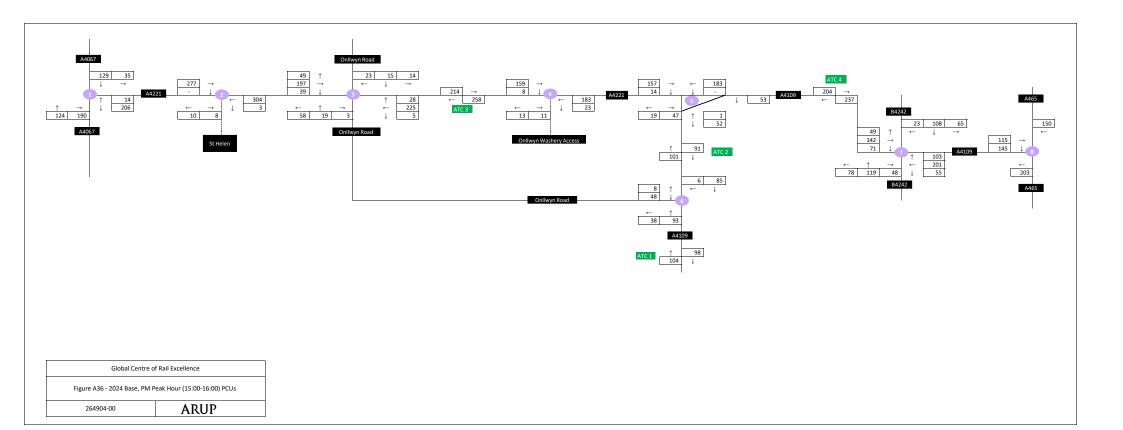


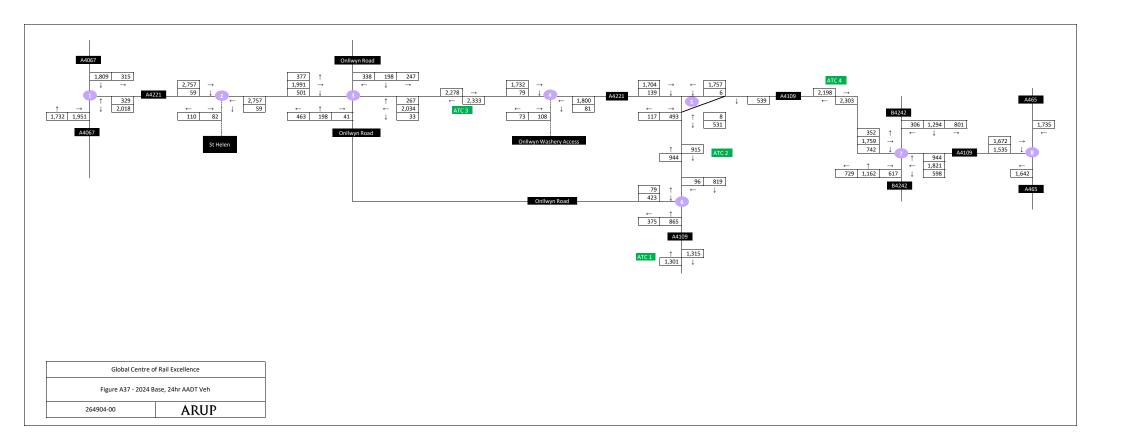


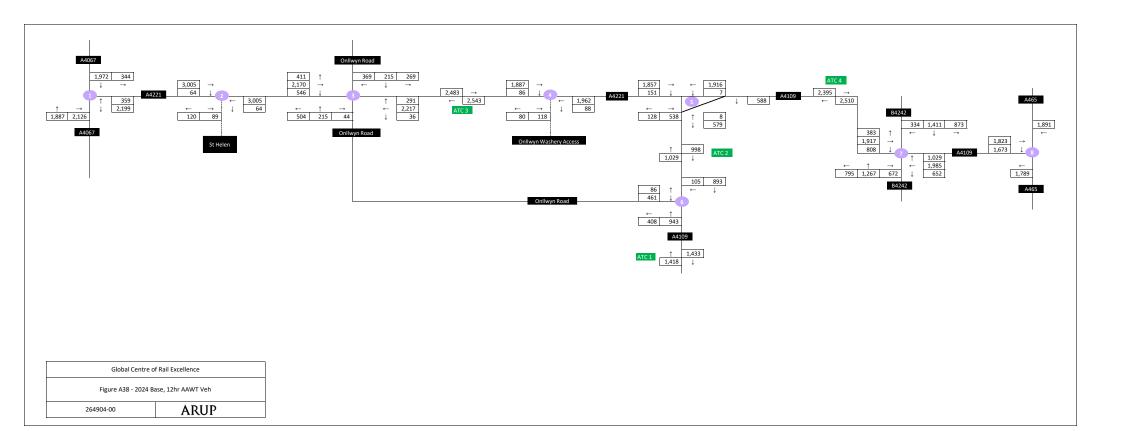


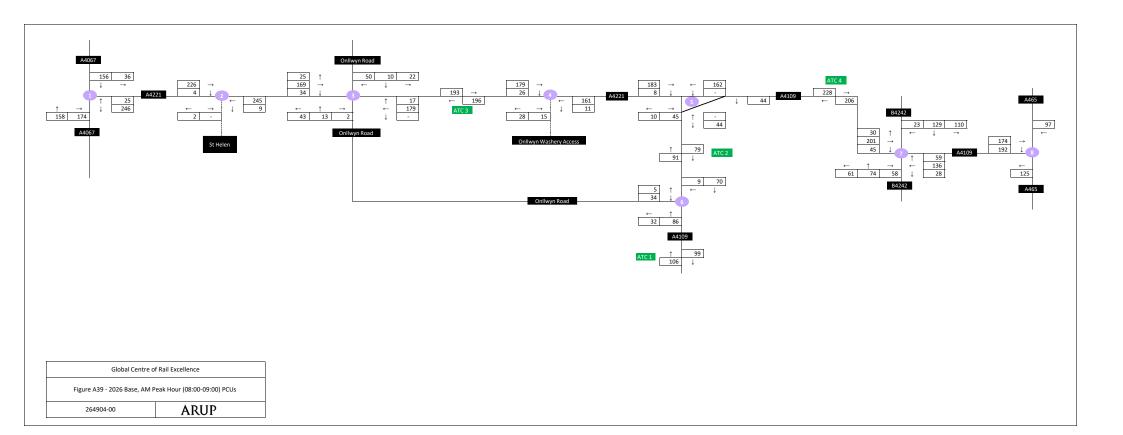


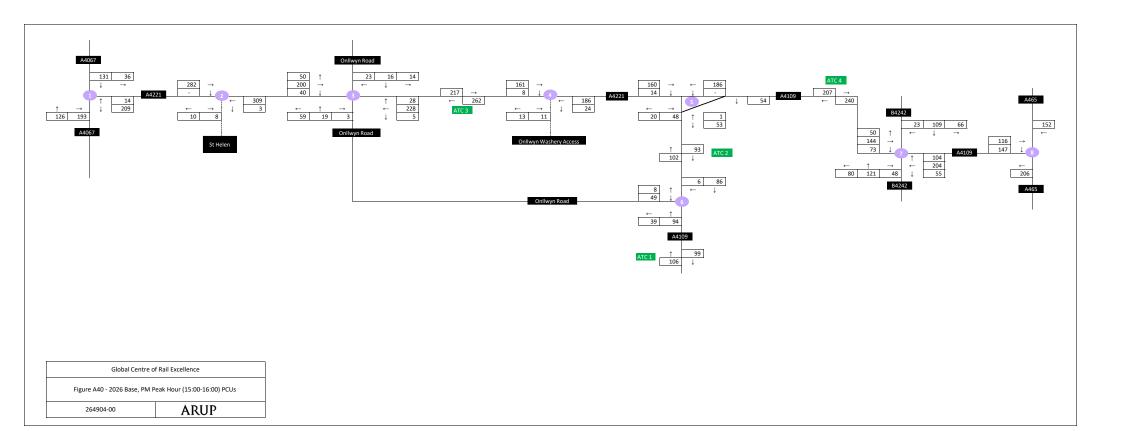


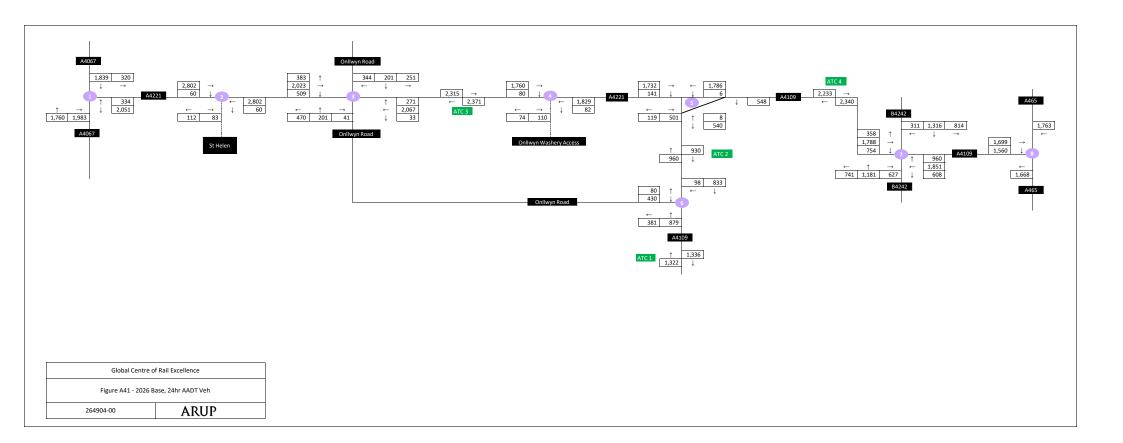


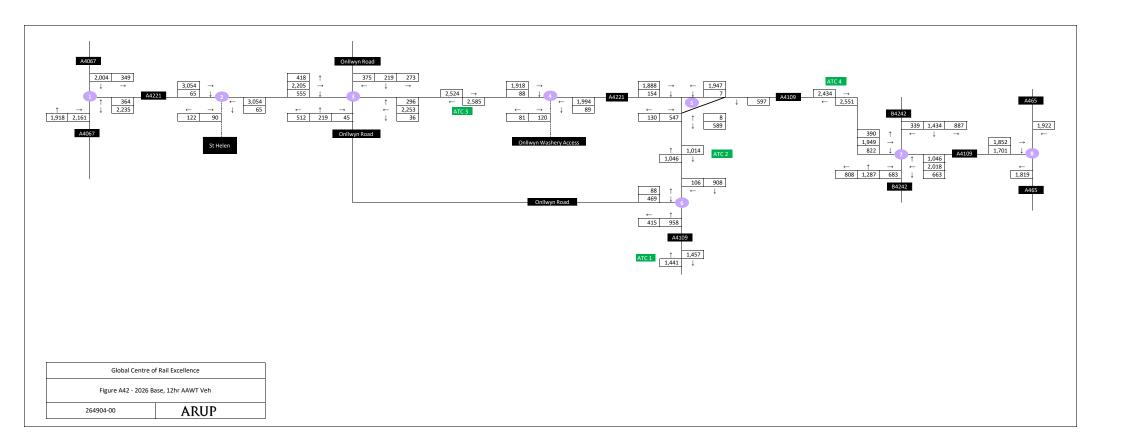


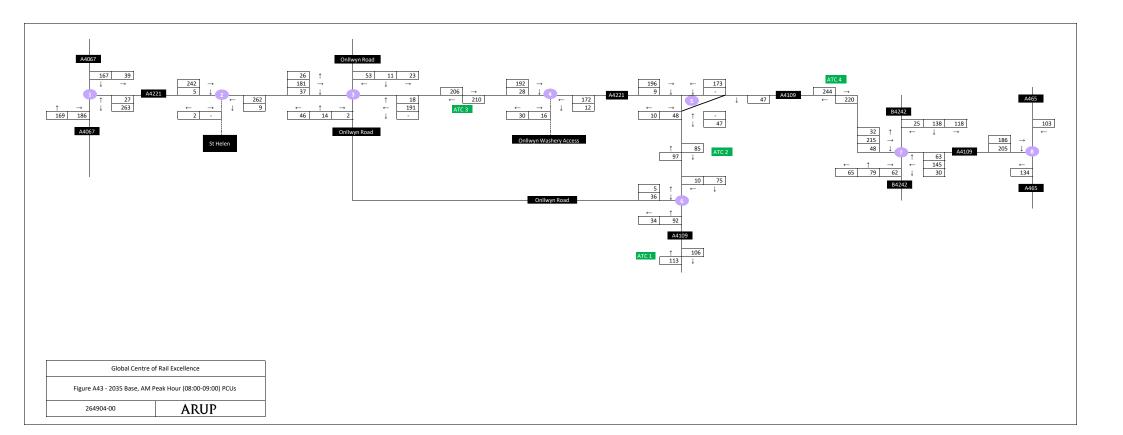


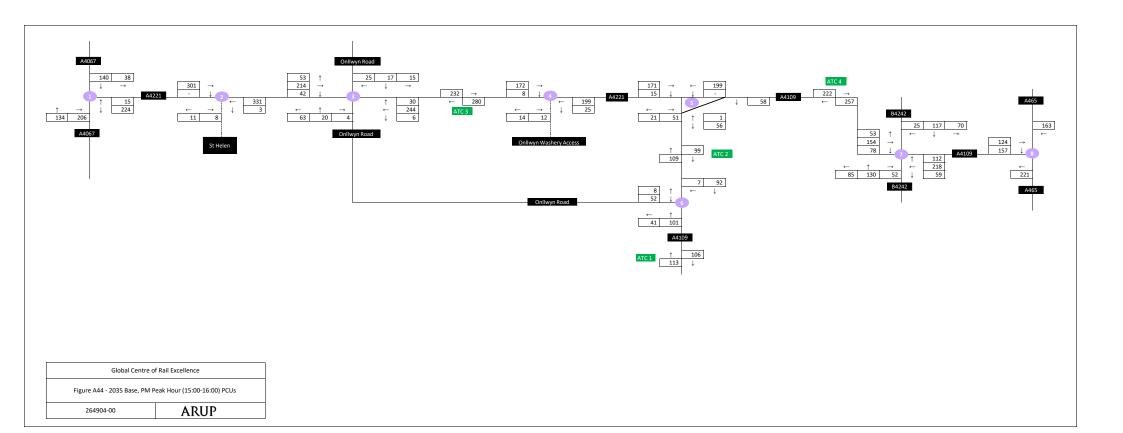


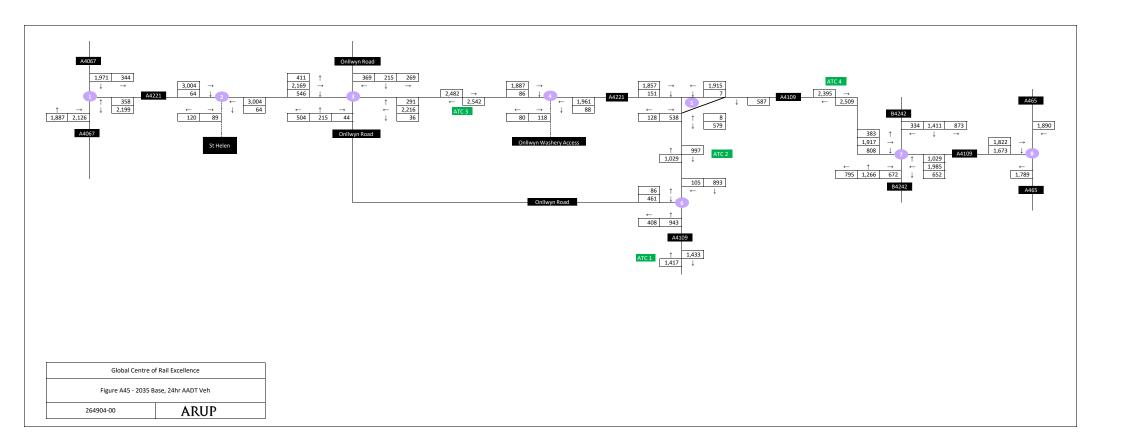


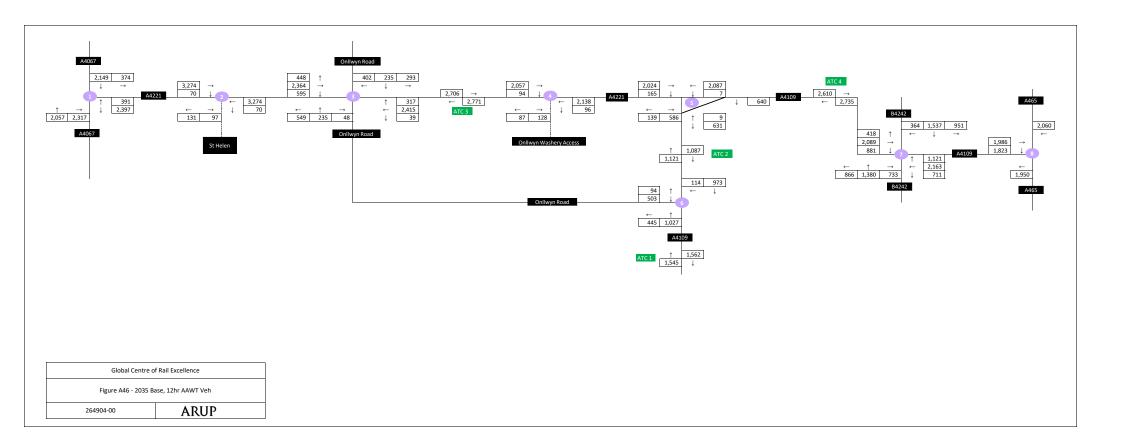


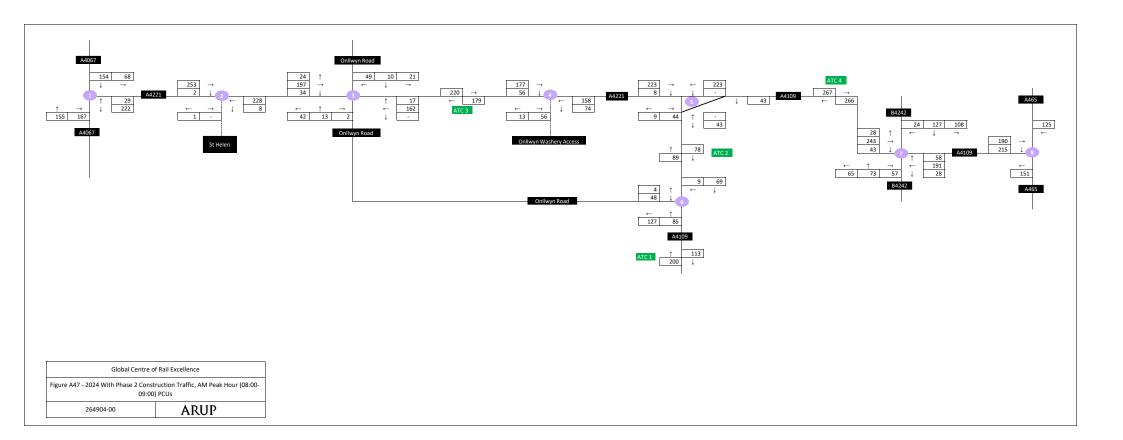


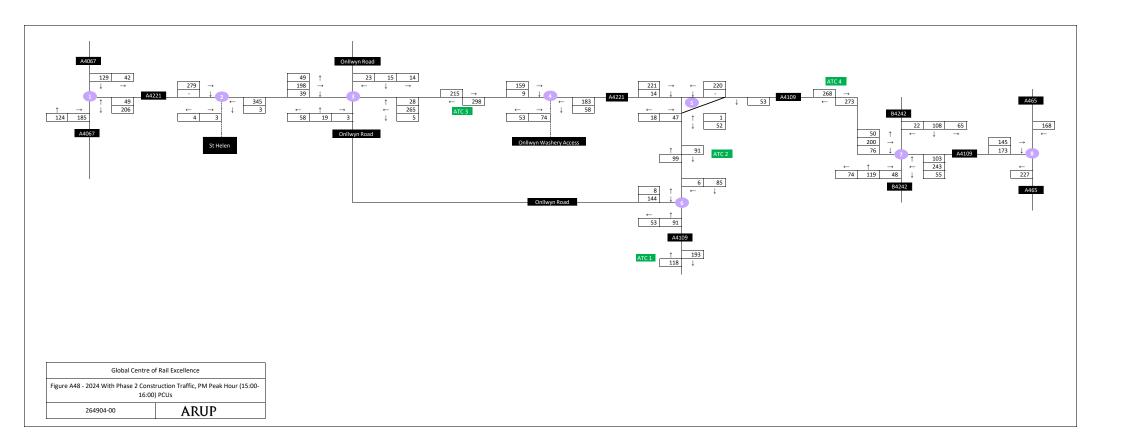


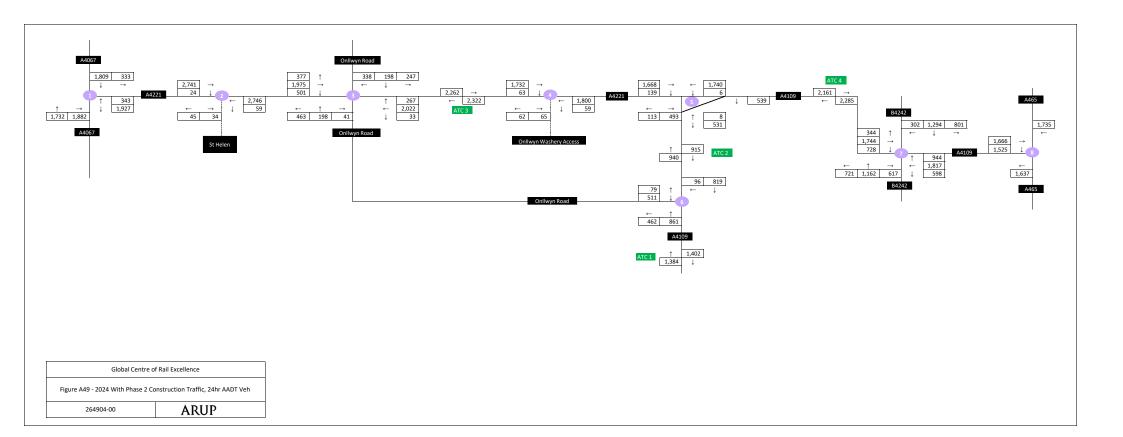


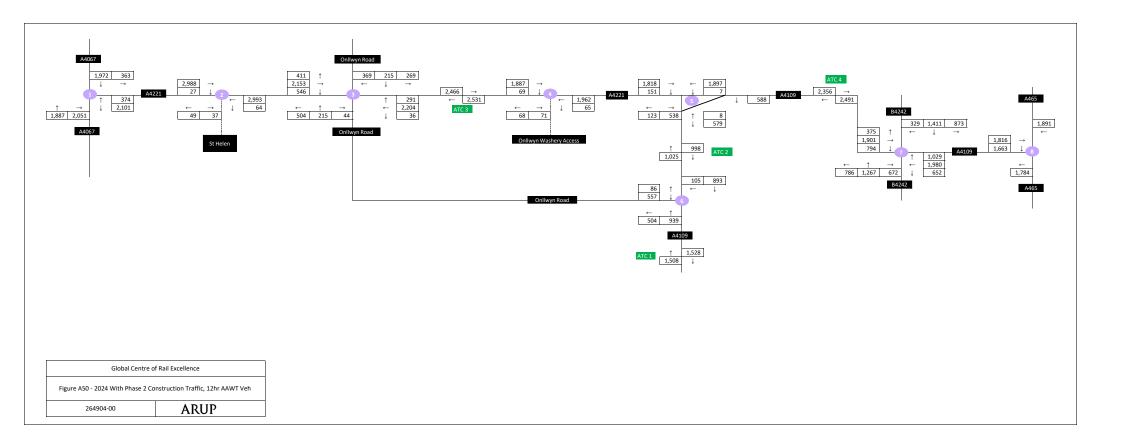


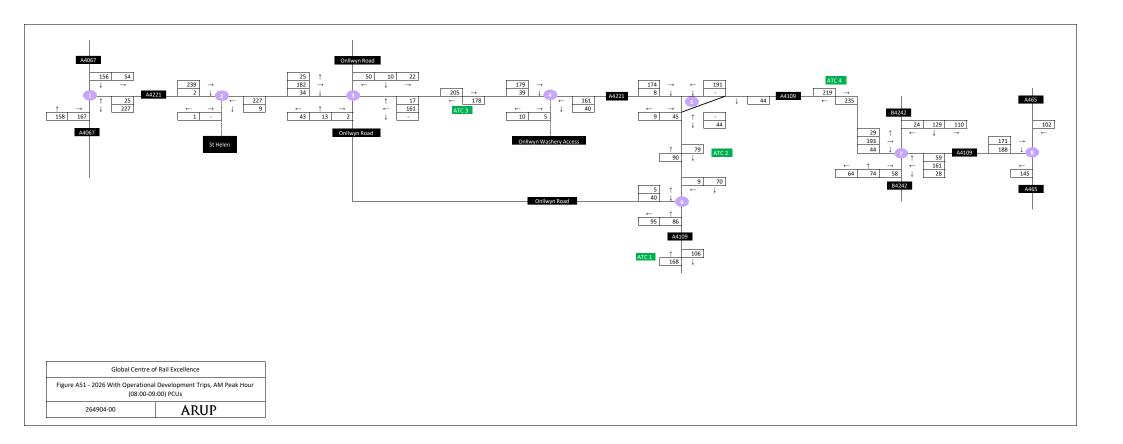


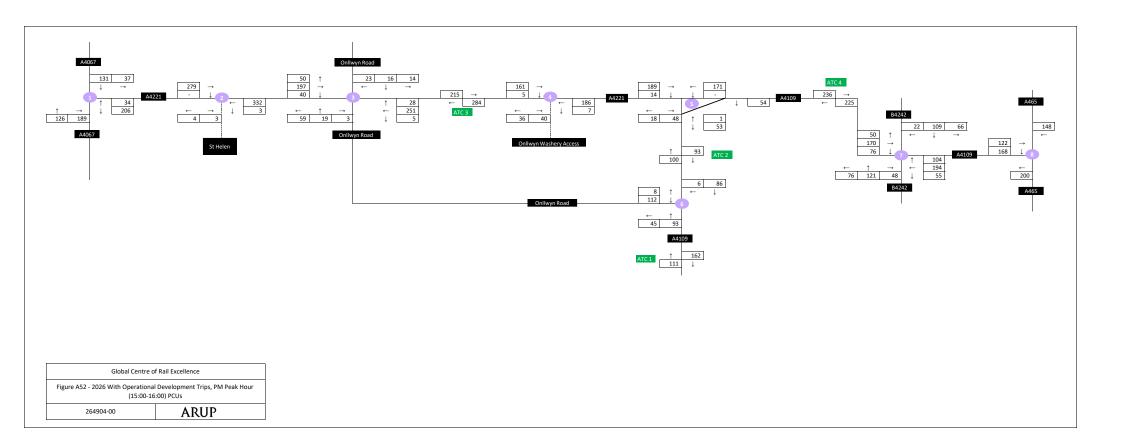


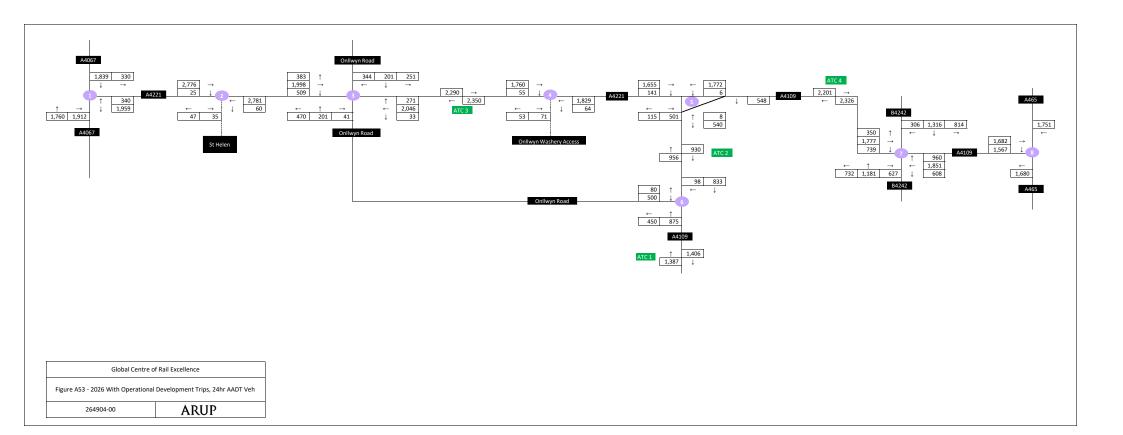


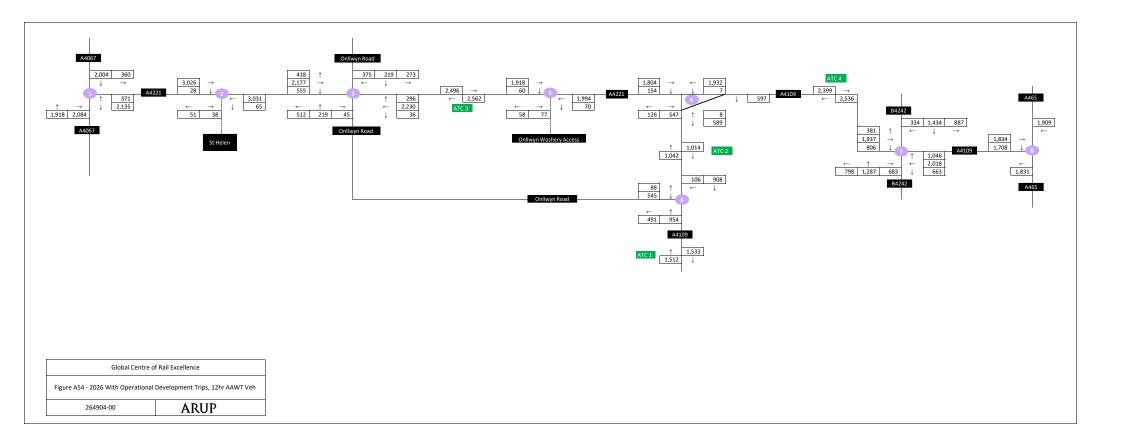


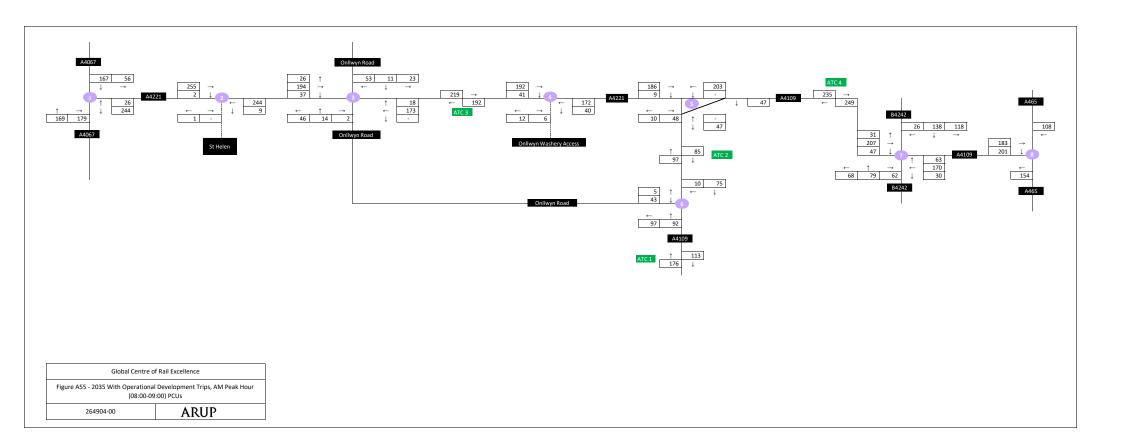


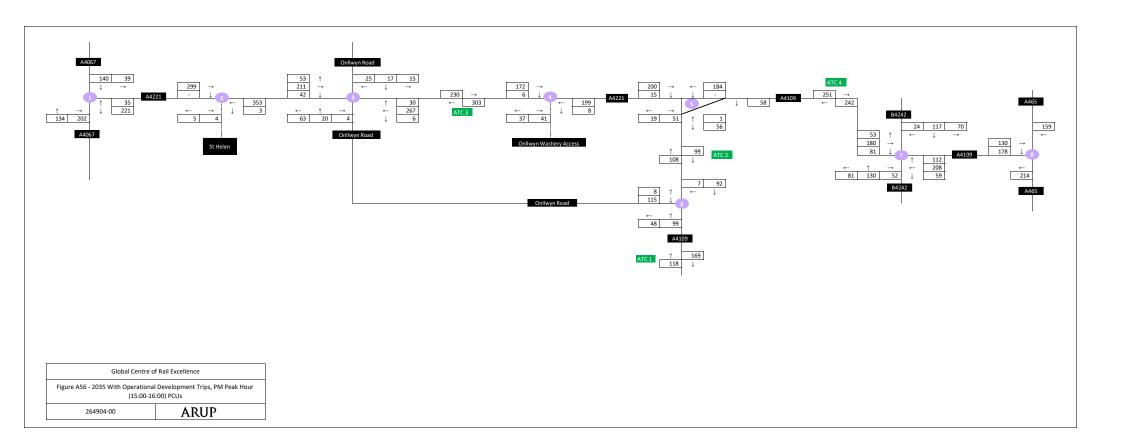


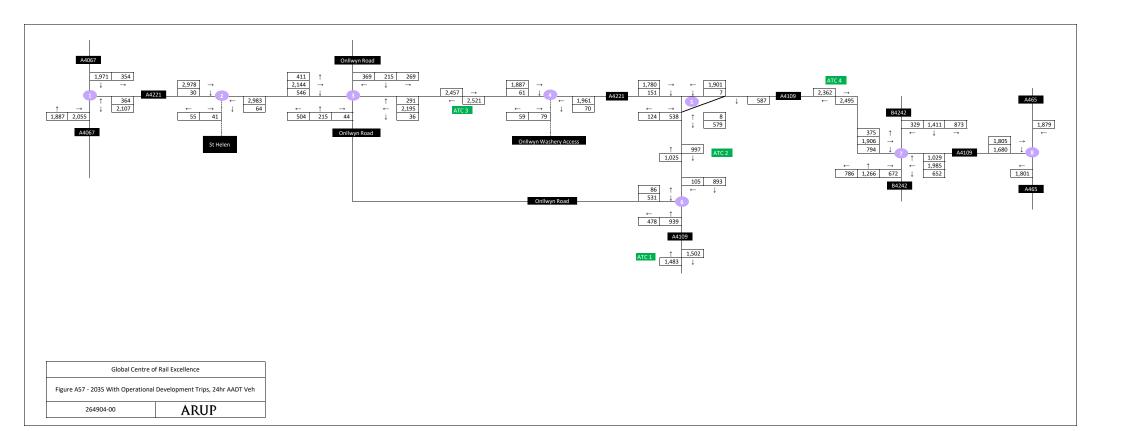


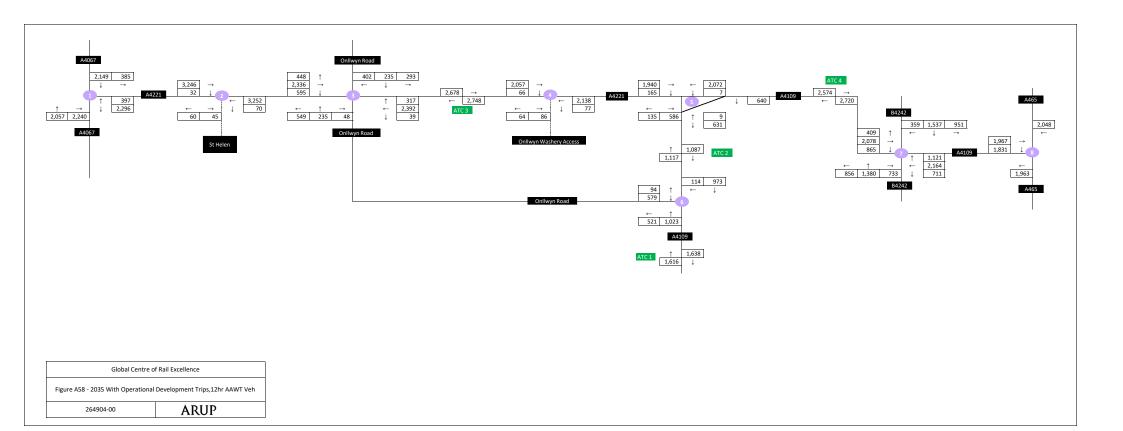






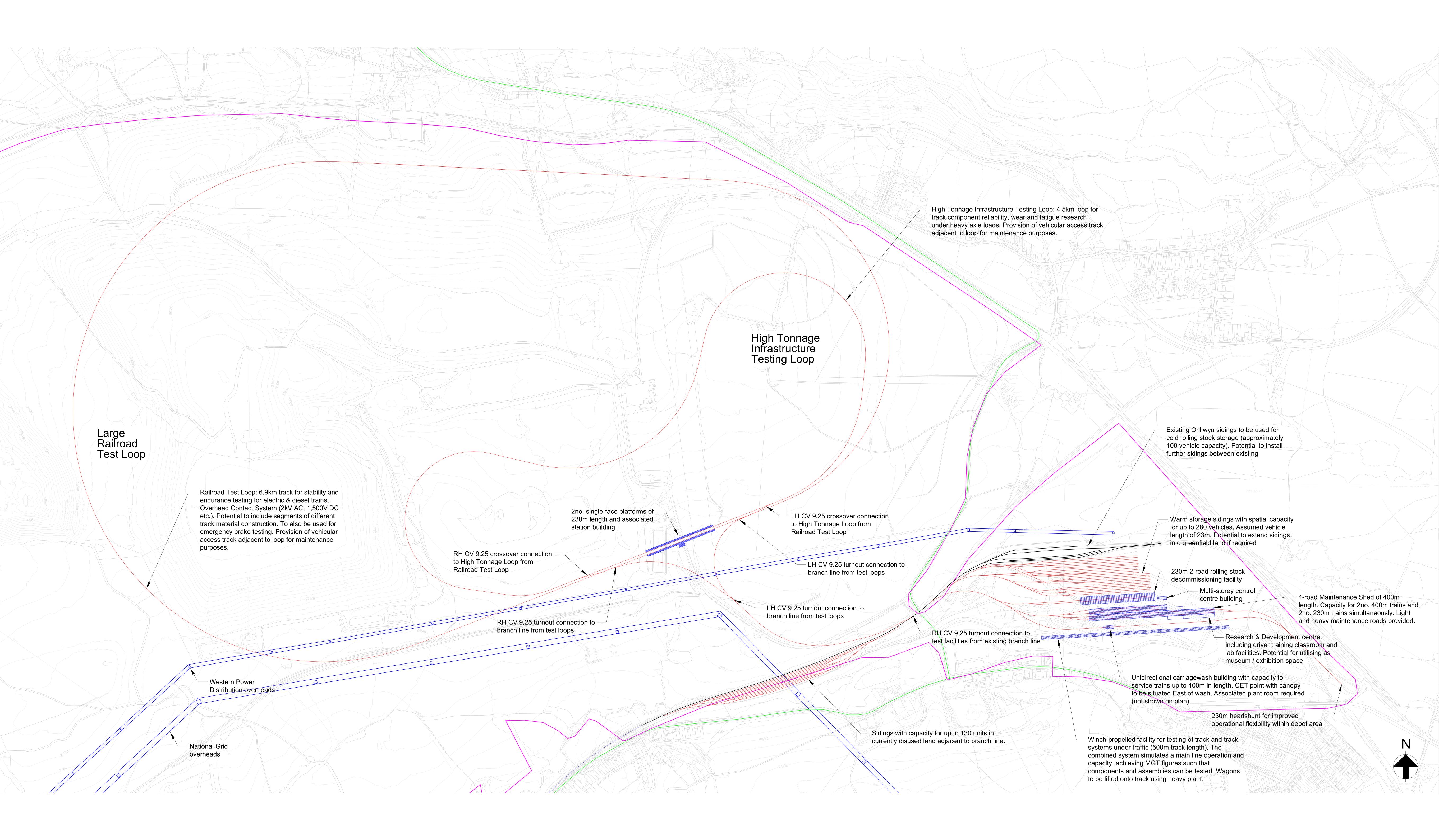






# Appendix B

# Preliminary Development Sketch



# **Appendix C**

# Construction Element Phasing

Element	Detail		Soure of Line Item ure Testing & Initial Warm Storage	Means of delivery #1	Means of delivery #2	Visitors	Workforce	Duration (month)	No. of Mat'ls Veh Movements (1-way)	Duration (work days)	Delivery Vehicles	One-way Daily Deliveries Vehs (AADT)	One-way Daily Staff Veh (AADT)	One-way Daily Deliveries Vehs (Note 1&2)	One-way Daily Staff Veh (Note 3)
Earthworks (for Track)	Earthworks Cuttings into rock Embankments	Part of commercial deal with CE Part of commercial deal with CE Part of commercial deal with CE	Requirement for rail Requirement for rail Requirement for rail	On-site On-site On-site		N/A N/A N/A	10 N/A N/A		N/A N/A	360 0	0	0	4 0 0	0	0 0
Earthworks (for frack)		DNO MC intake room and customer MV room for MV	Electrical Supply Filenote: Location: \\globa/\europe\Cardiff\obs\264000\264904-00\4 Internal			,	NA	N/A	III/A			0			
	Primary sub station  Connection to Mains Electricity	ring provision for site	Project Data\4-30 Drawings\4-34 Electrical\2020-04-16 Issue\  Requirement for facility. Based entirely on assumption	Road Road	N/A N/A	100	5	6	3	120	3	1	2	0.5	2
	Additional Infrastructure (Substations,	2 additional sub-station required for general site supplies, 2 additional sub stations required for Shore	Electrical Supply Filenote: Location: \\globa\\europe\Cardiff\Jobs\264900\264904-00\4 Internal										_		-
Power	transformers etc.)	Supplies  8no. 10m x 3m modular site cabin buildings.	Project Data\4-30 Drawings\4-34 Electrical\2020-04-16 Issue\	Road	N/A	100	5	6	6	120	6	1	2	0.5	2
		Full MEP installation. Male and female accessible toilets. Typical mess facilities (running hot water, fridge, microwave)													
	Staff Facilities	Fully ventilated PPE storage room, male and female changing rooms.  Desktop computers.	Base requirement for operations at the Infrastructure Testing Facility. Units calculated using similar real-life depot examples.	Road	N/A	100	5	1	6	20	6	1	2	1	2
		Fibre cables exist running along branch line to existing washery.													
Staff Facilities	IT equipment & technology (Basic WIFI & 4G/5G Connection)	Buried cabled connection from washery required. Resilience required due to increased level of usage and increased sophistication of work being undertaken.	Base requirement for operations at the Infrastructure Testing Facility. Based on assumption.	Road	N/A	100	5	1	2	20	,	1	2	0.5	,
Junitedities	,	Rail (incl. clips etc) Sleepers (at 700mm spacing)		Rail Rail			10	4	1 trains (x20 wagons) 3 trains (x20 wagons)	80 80	5	1 1	4	0.5 0.5	4
		Ballast (200mm depth) Track Drainage (chambers and pipework) Geotextile (4.5m x 100m)	Base requirement for operations at the Infrastructure Testing Facility. Units calculated using standard provision over unit		Road N/A	80/20 100	10 10	4	6 trains (x20 wagons) + 5 trucks 25	80 80	5 25	1	4	0.5	4
	New Track System		lengths of track.  Base requirement for operations at the Infrastructure Testing	Road	N/A	100			0 - assume materials	0	1	0	0	0	0
High Tonnage Infrastructure	Vehicular access road	Gravel track running in parrallel with rail  OLE cantilever structures over 4km of track. Assumed	Facility. Calculated using track length.  Base requirement for operations at the Infrastructure Testing Facility. Units calculated using standard provision over unit	N/A	N/A	N/A	N/A	N/A	already exist on site	0	0	0	0	0	0
Test Loop	OLE 25kV	structure spacing of 40m through plain line track. Rail (incl. clips etc)	lengths of track.	Rail Rail	Road Road	70/30 80/20	20 10	4	1 train + 5 trucks 1 train (x15 wagons)	80 60	5 0	1 0	8	0.5 0	8 4
		Sleepers (at 700mm spacing) Ballast (200mm depth) Track Drainage (chambers and pipework)		Rail Rail Road	Road Road N/A	80/20 70/30 100	10	3	3 trains (x20 wagons) 7 trains (x20 wagons) 18	60 60	5 0 18	0	4	0.5 0	4 2
	Serviceable Track: Warm Storage sidings Switches and Crossings for Warm Storage	Geotextile (4.5m x 100m)		Road		100			2	0	2	0	0	0	0
	Sidings	All new BV8 units - hand operated points  5.0km total siding length to be serviced. 2.5km of cable		Rail	Road	80/20	10	3	1 train + 1 truck	60	1	1	4	0.5	4
		length adjacent to stabled train required. Additional 1km" required for connecting into proposed substation Shore supply voltage between 400° – 850°. Cabling to be provided between alternate sidings. 1no. lineside pillar, 1no. ground box and 2no. plug to be provided at													
	Shore Supplies	philar, and, ground box and 2nd, plug to be provided at 50m intervals along track. Bollard lighting to be provided along alternate sidings. 2.5km of bollard lighting and associated cabling		Road	N/A	100	4	3	4	60	4	1	2	0.5	2
Train Storage	Lighting for Storage tracks / maintenance	required (4.1km of track). Assumed bollard spacing of 8m. Potential to change to floodlighting at later design	Inclusion of warm storage sidings for the stabling of the Angel Trains rolling stock fleet. Units calculated using standard provision over unit lengths of track.			100				60				0.5	
	Mainline Neath & Brecon Signalling Upgrades	Outside of project scope.	provision over unit renguis or track.	Road	N/A	100	N/A	N/A	1	0	1	0	0	0.5	0
	Facility Signalling (HTL & Sidings)	Basic signalling for operation of stabling sidings and infrastructure test track only.	Required for rail to function. Approximate number of signals calculated.	Road	N/A	100	2	3	1	60	4	í	1	0.5	1
Signalling	Shunters cabin	Small facility signal box occupied by shunter. Responsible for the control of all train movements within the through sidings area. Drainage ditches, ponds and culverts for test loop and	Required for rail to function / for efficient rolling stock movements. I required.  Base requirement for operations at the infrastructure Testing	Road	N/A	100	4	1	1	20	1	1	2	0.5	2
	Drainage Retaining Walls	sidings in the Washeries  Retaining walls in south	Facility. Designed by John Smith's team.  Base requirement for operations at the Infrastructure Testing Facility. Designed by John Smith's team.	Road	N/A	100	6	6	100	120	30	0	2	0.5	2
Infrastructure, Access Roads & Rail Crossings	Rail Crossings	One land bridge/tunnel & one bridge crossing Column-mounted CCTV cameras providing full	Base requirement for operations at the Infrastructure Testing Facility. Designed by John Smith's team. Basic security requirement. Units calculated from assumed	Road	N/A	100	5	6	10	120	10	1	2	0.5	2
Miscellaneous	Security & CCTV for Site	perimeter coverage of site.	fenceline length.	Road	N/A	100	10	3	4 (50 panels/truck)	60	4	1	4	0.5	4
	Standard Palisade Perimeter Fencing	2.1m metallic palisade fencing.  New internal highway through washeries and across	Basic security requirement. Assumed fenceline length.	Road	N/A	70	10	4	= 50 trucks	80	50	1	4	1.5	4
	Internal highways Soft Landscaping	inner test track, including upgrade of existing roads	Calculated on basis of tarmac roads  ock Test Track & Testing Facilities	Road	N/A	100	10	12	3000 HGV's	240 0	3000 0	13	0	25 0	0
Earthworks (for proposed	Earthworks Cuttings into rock	Part of commercial deal with CE Part of commercial deal with CE	Requirement for rail Requirement for rail	N/A	N/A	N/A	N/A	N/A	N/A N/A	360 0	0	0	4 0	0	4 0
trackwork)	Embankments	Part of commercial deal with CE  1 sub-station required for site supplies	Requirement for rail  Electrical Supply Filenote: Location:	N/A	N/A	N/A	N/A	N/A	N/A	0	0	0	0	0	0
Power	Additional Infrastructure (Substations, transformers etc.)	1 sub stations required for Shore Supplies 2 further for OLE supplies 400m Maximum Vehicle Length on 2no. Roads, 230m	\\globaf\europe\Cardiff\jobs\264000\264904-00\4 Internal Project Data\4-30 Drawings\4-34 Electricaf\2020-04-16 Issue\	Road	N/A	100	5	3	5	60	5	1	2	0.5	2
	Testing Maintenance Shed	on 2no. Roads  All equipment to be situated on carriage wash road.		Road	N/A	100	50	12	250	240	250	2	20	2.5	20
Rolling Stock & Infrastructure Testing	CET, Diesel & Water Filling Facility for Rolling Stock being tested	Single CET point required. Canopy of 25m length to be provided to cover CET point. Manual sanding to be proposed. Concrete Apron.	Typical feature within rolling stock depot. Assumed to be used by fleets using stabling facility (CET unlikely to be required by trains undergoing testing).	Road	N/A	100	10	12	20	240	20	1	4	0.5	4
Large Railroad Test Loop		Rail (incl. clips etc)		Rail	Road	90/10	15	6	1 trains (x20 wagons) + 5 trucks	120	5	1	6	0.5	6
		Sleepers (at 700mm spacing)		Rail	Road	90/10	15	6	10 trains (x20 wagons) + 10 trucks 12 trains (x20 wagons)	120	10	1	6	0.5	6
	New Track System	Ballast (200mm depth) Track Drainage (chambers and pipework) Geotextile (4.5m x 100m)	Base requirement for operations at the Infrastructure Testing Facility. Units calculated using standard provision over unit lengths of track.	Rail Road Road		90/10 100 100	15 15	6	+ 10 trucks 40	120 120 0	10 40 2	1 1 0	6 6 0	0.5 1 0	6 6 0
		OLE cantilever structures over 4km of track. Assumed	Base requirement for operations at the Infrastructure Testing Facility. Units calculated using standard provision over unit	Rodu					2						
	OLE 25kV  Third Rail or Other DC Electrification	structure spacing of 40m through plain line track.  3rd rail electrification for 6.8km, for the purpose of running DC electric rolling stock. 750V system to support rolling stock used in Southeast England and on	lengths of track.  Aspirational requirement. Driven by needs of train operators / manufacturers. Potential to be designed-out at later design	Rail	Road	70/30	30	9	2 trains + 10 trucks	180	10	1	12	0.5	12
	Systems	MerseyRail.  Multi-aspect signalling for access / egress from High Tonnage Test Loop (HTL) to be adapted to allow access	stage.	Rail	Road	70/30	5	9	2 trains + 10 trucks	180	10	1	2	0.5	2
	Facility Signalling (Sitewide)	onto rolling stock test loop. 2no. Signals require replacement. No ETCS	Required for rail to function. Approximate number of signals calculated.	Road	N/A	100	3	3	1	60	1	1	1	0.5	1
	Vehicular access road	Gravel track running in parrallel with rail	Base requirement for operations at the Infrastructure Testing Facility. Calculated using track length.	N/A	N/A	N/A	N/A	N/A	0 - assume materials already exist on site	0		0	0	0	0
	Station Environment (2no. Single-faced Platforms)	2no. 230m length NR-compliant platforms. Modular pre-cast concrete platforms to be constructed off-site to minimise implication on HTL operations.	Means of testing platform interface with static / dynamic train gauge. Interest in facility expressed by multiple train operators / manufacturers during industry engagement.	Road	N/A	100	20	6	120	120	120	1	8	2	8
	Standard Palisade Perimeter Fencing for additional test tracks	2.1m metallic palisade fencing.	Basic security requirement. Assumed fenceline length.	Road	N/A	100	15	12	(50 panels/truck) = 135 trucks	240	135	1	6	1.5	6
Carriage Wash Facility	Carriage wash building, plant room & all specialist equipment	For cleaning of all trains at the facility (testing and stabling). Includes all foundations, civils and structural works (steelwork and cladding), MEP and P-way.	Aspirational requirement. Potential to be designed-out at later design stage.	Road	N/A	100	5	4	6	80	6	1	2	0.5	2
Central Control Centre	Manned building responsible for the central control of train movements	Supersedes the signalling control box proposed at phase 1. A central points control system would be used for the control of the upgraded points. Controllable via video display units. Can interface with either axie counters or track circuits, where required.	Required to maximise efficiency of trains moving around facility. Works in-line with new automatic points introduced at this phase.	Road	N/A	100	6	3	20	60	6	1	2	0.5	2

													1		
		Removal of pre-existing modular units and replace with permanent structure. All previous facilities, with furthe											1		
		lay-down and mess facilities. Computer access provision	n										1		
		within staff block. Overnight accommodation provision											1		
	Improved Staff Facilities (Multi-storey	for 10no. Staff (including those using the testing facilities). Further accessible toilet and wash facility	Required to allow for additional workforce introduced with										1		
Staff Facilities	Unit)	provision. Connected to rolling stock maintenance shed	rolling stock testing facilities.	Road	N/A	100	5	1	10	20	6	1	2	1	2
	Additional track in washery area for	Reused track, formation, track drainage, ballast.	Base requirement for operations at the Infrastructure Testing Facility. Units calculated using standard provision over unit						1 trains (x5 wagons) +				1		
	rolling stock testing	geotextiles, sleepers (concrete), clips, baseplates.	lengths of track.	Rail	Road	80/20	10	2	2 trucks	40	2	1	4	0.5	4
Additional Track - Testing	Switches and Crossings: Testing Facility	Powered points - Cables and power to be provided to	Base requirement for operations at the Infrastructure Testing						1 trains (x20 wagons)						
Facilities	(Cv9.25 Units)	all point locations.	Facility. Units calculated using track layout	Rail	Road	80/20	10	2	+ 10 trucks	40	10	1	4	0.5	4
		Rail (incl. clips etc)		Rail	Road	80/20	10	3	1 train (x10 wagons) + 10 trucks	60	10	1	4	0.5	4
		Sleepers (at 700mm spacing)	Ī	Rail	Road	80/20	5	3	3 trains (x20 wagons)	60	0	0	2	0	2
											_			_	
		Ballast (200mm depth) Track Drainage (chambers and pipework)	+	Road	N/A	70/30 100	5	3	6 trains (x20 wagons)	60	0 14	1	2	0.5	2
	Serviceable Track: Warm Storage sidings	Geotextile (4.5m x 100m)		Road	N/A	100		ĺ	1	0	1	0	0	0	0
	Switches and Crossings for Warm Storage														4
	Sidings	All new BV8 units - hand operated points		Kail	Road	80/20	10	3	1 train + 1 truck	60	1	1	4	0.5	4
		5.0km total siding length to be serviced. 2.5km of cable											1 '		
		length adjacent to stabled train required. Additional											1 '		
		1km" required for connecting into proposed substation Shore supply voltage between 400V - 850V. Cabling to											1 '		
		be provided between alternate sidings. 1no. lineside											1 '		
		pillar, 1no. ground box and 2no. plug to be provided at											1 '		
	Shore Supplies	50m intervals along track. Bollard lighting to be provided along alternate sidings.	-	Road	N/A	100	3	3	3	60	3	1	1	0.5	1
		2.5km of bollard lighting and associated cabling											1		
	Linkston for Share or hands for sinks	required (4.1km of track). Assumed bollard spacing of	Inclusion of warm storage sidings for the stabling of the Angel										1 '		
Train Storage	area	8m. Potential to change to floodlighting at later design stage.	Trains rolling stock fleet. Units calculated using standard provision over unit lengths of track.	Road	N/A	100	3	3	3	60	3	1	1	0.5	1
		Required adjacent to track in vicinity of residential	Worth checking with Young Youn who is completing the Noise												
Noise Mitigation	Acoustic Barriers	areas (NW on main test track).	and Vibration assessment.							0		0	0	0	0
	Access Roads	New and upgraded access roads to outer loop, washeries road formed in Phase 1	Base requirement for operations at the Infrastructure Testing Facility. Designed by John Smith's team.	Road	N/A	100		7 6	900 HGV's	120	900	8	3	15	3
					1,411										
		Amendments where necessary to the ditches, ponds											1		
		and culverts which Celtic Energy may be incorporating this as part of the Earthworks. New drainage features	Base requirement for operations at the Infrastructure Testing										1 '		
	Drainage	to be installed at the Washeries.	Facility. Designed by John Smith's team.	Road	N/A	100	10	6	25	120		0	4	0	4
			Base requirement for operations at the Infrastructure Testing		N/A			L				0	4	0	4
	Retaining Walls	Retaining wall around Pylon and in South  3 No bridge crossings for Commoners, one of which is	Facility. Designed by John Smith's team.  Base requirement for operations at the Infrastructure Testing	Road	N/A	100	10	ь	160	120		0	4	0	4
Access Roads & Rail Crossings	Rail Crossings	also for access	Facility. Designed by John Smith's team.	Road	N/A	100	20	9	200	180	20	1	8	0.5	8
		Column-mounted CCTV cameras providing full	Basic security requirement. Units calculated from assumed					L	(50 panels/truck)		_		1 . '		
	Fencing	perimeter coverage of site.	fenceline length.	Road	N/A	100	10	ь	= 32	120	5	1	4	0.5	4
	Security & CCTV for Site	2.1m metallic palisade fencing.	Basic security requirement. Assumed fenceline length.	Road	N/A	100	10	1	2	20	5	1	4	0.5	4
		NA - not sure what other internal roads may be required that aren't covered in the 'Access Roads and											1 '		
	Internal highways	Rail Crossings? -IA'	Not required - Covered in above section							0		0	0	0	0
Miscellaneous	Soft Landscaping									0		0	0	0	0
Miscellaneous		Phase 3 - Asp	irational Facilities / Features Requirement for rail	N/A	N/A	N/A	10	18	N/A		0	Ph	nase 3		_
Miscellaneous  Earthworks (for proposed	Soft Landscaping  Earthworks Cuttings into rock	Part of commercial deal with CE	irational Facilities / Features Requirement for rail Requirement for rail	N/A N/A	N/A N/A	N/A N/A	10 N/A	18 N/A	N/A N/A	0 360 0	0	0 Ph 0	0 nase 3 4 0	0 0	4 0
	Earthworks		Requirement for rail							360		Ph 0	nase 3	0	4
Earthworks (for proposed	Earthworks Cuttings into rock	Part of commercial deal with CE Part of commercial deal with CE	Requirement for rail Requirement for rail	N/A	N/A	N/A	N/A	N/A	N/A	360 0	0	0 0	nase 3 4 0	0	4 0
Earthworks (for proposed	Earthworks Cuttings into rock Embankments	Part of commercial deal with CE Part of commercial deal with CE As part of phases 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This	Requirement for rail Requirement for rail Requirement for rail Entirely aspirational. Should the operational potential of fully	N/A	N/A	N/A	N/A	N/A	N/A	360 0	0	0 0	nase 3 4 0	0	4 0
Earthworks (for proposed trackwork)	Earthworks Cuttings into rock Embankments  All hand points to be upgraded to	Part of commercial deal with CE Part of commercial deal with CE As part of phases 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all points to	Requirement for rail  Requirement for rail  Requirement for rail  Return a for rail  Entirely aspirational. Should the operational potential of fully owered points within the facility be realised, this could be	N/A	N/A N/A	N/A N/A	N/A	N/A	N/A	360 0 0	0	0 0	nase 3 4 0	0 0 0	4 0
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Earthworks (for proposed trackwork)	Earthworks Cuttings into rock Embankments  All hand points to be upgraded to powered points	Part of commercial deal with CE  As part of phases 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all opionists to automatic, electronically controlled units. Single-storey person that the proposal means for single-storey person to the proposal means for single-storey person to the proposal person to the propos	Requirement for rail Requirement for rail Requirement for rail Requirement for rail Entirely aspirational. Should the operational potential of fully powered points within the facility be realised, this could be made part of the sycheme. One for detailed design. Key requirement, though not paramount to the operation of	N/A N/A	N/A N/A	N/A N/A	N/A	N/A	N/A N/A	360 0 0	0 0	Ph 0 0 0	4 0 0 0	0 0 0	4 0 0
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Earthworks (for proposed trackwork) S&C Upgrades	Earthworks Cuttings into rock Embanisments  All hand points to be upgraded to powered points Research & Development / Education  Stationary Testing Facilities &	Part of commercial deal with CE  As part of planes 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all options to automatic, electronically controlled units. Single-storey permanent building (50m x 10m) with Laboratory / workshop to be capable of stationary testing i.e., aerodynamic testing, tilling equipment for district of the control of the control of the capable of stationary for the control of the capable of the control of the capable of the cap	Requirement for rail Requirement for rail Requirement for rail Requirement for rail Entirely aspirational. Should the operational potential of fully powered points within the facility be realised, this could be made part of the key otheren. One for detailed design. Key requirement, though not paramount to the operation of Little understanding of stationary testing equipment within	N/A N/A Road Road	N/A N/A N/A N/A	N/A N/A 100 100	N/A	N/A	N/A N/A	360 0 0 0	5 20	Ph 0 0 0	4 0 0 0	0 0 0 0 0 0 1	4 0 0
Earthworks (for proposed trackwork) S&C Upgrades	Earthworks Cuttings into rock Embanisments  All hand points to be upgraded to powered points Research & Development / Education  Stationary Testing Facilities &	Part of commercial deal with CE  As part of phases 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all options to suppose a mean for the upgrade of all options to submissions of the upgrade of the up	Requirement for rail  Requirement for rail  Requirement for rail  Requirement for rail  Security of the rail  Security of the security of the security of the  Security of the security of the security of the  Security of the security of the security of  Security of the security of  Security of the security of  Securi	N/A N/A Road Road	N/A N/A N/A N/A	N/A N/A 100 100	N/A	N/A	N/A N/A	360 0 0 0	5 20	Ph 0 0 0	4 0 0 0	0 0 0 0 0 0 1	4 0 0
Earthworks (for proposed trackwork) S&C Upgrades	Earthworks Cuttings into rock Embanisments  All hand points to be upgraded to powered points Research & Development / Education  Stationary Testing Facilities &	Part of commercial deal with CE  As part of planes 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all options to automatic, electronically controlled units. Single-storey permanent building (50m x 10m) with Laboratory / workshop to be capable of stationary testing i.e., aerodynamic testing, tilling equipment for district of the control of the control of the capable of stationary for the control of the capable of the control of the capable of the cap	Requirement for rail  Requirement for rail  Requirement for rail  Requirement for rail  Security of the rail  Security of the security of the security of the  Security of the security of the security of the  Security of the security of the security of  Security of the security of  Security of the security of  Securi	N/A N/A Road Road	N/A N/A N/A N/A	N/A N/A 100 100	N/A	N/A	N/A N/A	360 0 0 0	5 20	Ph 0 0 0	4 0 0 0	0 0 0 0 0 0 1	4 0 0
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Earthworks (for proposed trackwork) S&C Upgrades Additional infrastructure	Earthworks Cuttings into rock Embanisments  All hand points to be upgraded to powered points Research & Development / Education  Stationary Testing Facilities & Laboratories	Part of commercial deal with CE  As part of phases 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all opionists to automatic, electronically controlled units. Single-storey perment building (50m x 10m) with tuboratory / workshop to be capable of stationary testing e.g. aerophamine testing, tilling equipment for determining rolling characteristics, weighing and discretion extension, and the customers before the control testing e.g. aerophamine testing, tilling and the customers testing e.g. aerophamine testing, tilling and the customers testing of the particular testing e.g. aerophamine testing, tilling and the customers testing of the particular testing e.g. are possible of the particular testing tilling and the customers tring (or at least pay for) their own ist to be installed as required. Facility for treatment and removal of hazardoxic facility. All contained and retired of reusable components - wheel seets, logges, logge frames, buffers, springs, couplings, Compressing and shredding of remaining materials. 1 siding on concrete foron. Large static contributions for demolition. Facility or 1 carriage length covered does and containmation or outlinemation.	Requirement for rail Settively spirational. Should the operational potential of fully ownered points within the faility be related, this could be made part of the key scheme. One for detailed design, key requirement, though not paramount to the operation of utility understanding of stationary testing equipment within Aspirational proposed as an applicational requirement with further investigation to be completed at a later design stage.  Aspirational requirement. Raised as a potential USP for the facility during industry engagement since typically the rail industry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- ministry are poor a training materially components for re- ministry.	N/A N/A Road Road	N/A N/A N/A N/A	N/A N/A 100 100	N/A	N/A	N/A N/A	360 0 0 0 80 60	5 20	Ph 0 0 0	4 0 0 0	0 0 0 0 0 0 1	4 0 0
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Earthworks (for proposed trackwork) S&C Upgrades Additional infrastructure	Earthworks Cuttings into rock Embanisments  All hand points to be upgraded to powered points Research & Development / Education  Stationary Testing Facilities & Laboratories	Part of commercial deal with CE  As part of phases 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposed may be a proposed may b	Requirement for rail Settively spirational. Should the operational potential of fully ownered points within the faility be related, this could be made part of the key scheme. One for detailed design, key requirement, though not paramount to the operation of utility understanding of stationary testing equipment within Aspirational proposed as an applicational requirement with further investigation to be completed at a later design stage.  Aspirational requirement. Raised as a potential USP for the facility during industry engagement since typically the rail industry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- ministry are poor a training materially components for re- ministry.	N/A N/A Road Road Road	N/A N/A N/A N/A N/A N/A N/A Road	N/A N/A 100 100 100	N/A	N/A	N/A	360 0 0 0 80 60	0 0 5 20 15	1 1 0 0	we 3 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 5 1	2 2 2 4
Earthworks (for proposed trackwork) S&C Upgrades Additional infrastructure	Earthworks Cuttings into rock Embanisments  All hand points to be upgraded to powered points Research & Development / Education  Stationary Testing Facilities & Laboratories	Part of commercial deal with CE  As part of phases 1.8.2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all options to automatic, electronically controlled units. Single-storey permanent building (50m x 10m) with Laboratory / workshop to be capable of stationary testing e.g. aerodynamic testing, Illing equipment for discretions reside feature states, welling the stock of the control stationary testing e.g. aerodynamic testing, Illing equipment for discretion testing feature states are stated to the state of the s	Requirement for rail Settively spirational. Should the operational potential of fully ownered points within the faility be related, this could be made part of the key scheme. One for detailed design, key requirement, though not paramount to the operation of utility understanding of stationary testing equipment within Aspirational proposed as an applicational requirement with further investigation to be completed at a later design stage.  Aspirational requirement. Raised as a potential USP for the facility during industry engagement since typically the rail industry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- ministry are poor a training materially components for re- ministry.	N/A N/A Road Road	N/A N/A N/A N/A N/A	N/A N/A 100 100	N/A	N/A	N/A N/A S 5 20 20 20	360 0 0 85 60	0 0 5 20	Ph 0 0 0	4 0 0 0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4 0 0
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Earthworks (for proposed trackwork) S&C Upgrades Additional infrastructure	Earthworks Cuttings into rock Embanisments All hand points to be upgraded to powered points Research & Development / Education  Stationary Testing Facilities & Laboratories  Decomissioning Facility	Part of commercial deal with CE  As part of phases 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all options to satiomatic, electronically controlled units. Single-Stocy pender building (Son 1 2001) with Luboratory / workshop to be capable of stationary testing e.g. aerobyman testing, tilling equipment for determining rolling characteristics, weighing and distortion testing facility. Alternatively, could assume CEE provides the building distortion testing facility. Alternatively, could assume CEE provides the building and the customess tring of art least pay for) their own 3t to be installed as required. So the control of th	Requirement for rail Settively spirational. Should the operational potential of fully ownered points within the faility be related, this could be made part of the key scheme. One for detailed design, key requirement, though not paramount to the operation of utility understanding of stationary testing equipment within Aspirational proposed as an applicational requirement with further investigation to be completed at a later design stage.  Aspirational requirement. Raised as a potential USP for the facility during industry engagement since typically the rail industry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- ministry are poor a training materially components for re- ministry.	N/A N/A Road Road Road	N/A N/A N/A N/A N/A N/A N/A N/A Road Road	N/A N/A N/A 100 100 100 100 100 80/20 80/20 70/30	N/A	N/A	N/A N/A N/A 5 20 15 15 15 11 train (s 15 wagons) 3 trains (s/20 wagons)	360 0 0 0 80 60 120 120 60 60 60	0 0 5 20 15	1 1 1 0 0 0	we3 4 0 0 0 0 2 2 2 2 2 4 4 2 2 4 4 2 2	0 0 0 0 0 1	2 2 4 4 2 2
Earthworks (for proposed trackwork) S&C Upgrades Additional infrastructure	Earthworks Cuttings into rock Embanisments All hand points to be upgraded to powered points Research & Development / Education  Stationary Testing Facilities & Laboratories  Decomissioning Facility  Decomissioning Facility  Serviceable Track: Warm Storage sidings Switches and Crossings for Warm Storage  Switches and Crossings for Warm Storage	Part of commercial deal with CE  As part of phases 1 & 2, only the points proposed for rolling stock testing within phase 2 are powered. This proposal means for the upgrade of all opionists to automatic, electronically controlled units. Single-storey permitten building (50m x 10m) with Luboratory / workshop to be capable of stationary testing e.g. aerophamine testing, tilling equipment for determining rolling characteristics, weighing and distortion testing e.g. aerophamine testing, tilling exharacteristics, weighing and advanction extensing or the position of the control of the properties of the control of the properties of the control of the properties of the properti	Requirement for rail Settively spirational. Should the operational potential of fully ownered points within the faility be related, this could be made part of the key scheme. One for detailed design, key requirement, though not paramount to the operation of utility understanding of stationary testing equipment within Aspirational proposed as an applicational requirement with further investigation to be completed at a later design stage.  Aspirational requirement. Raised as a potential USP for the facility during industry engagement since typically the rail industry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- facility during industry engagement since typically the rail industry are poor a training materially. Components for re- ministry are poor a training materially components for re- ministry are poor a training materially components for re- ministry.	N/A N/A Road Road Road	N/A N/A N/A N/A N/A N/A N/A Road Road	100 100 100 100 100 100	N/A	N/A	N/A N/A N/A 5 20 15 15 20 1 train (x 15 wagons) 3 trains (x 20 wagons) 7 trains (x 20 wagons) 2 2	360 0 0 0 60 60 120 120 60 60 60 60	0 0 5 20 15	1 1 1 0 0	2 2 2 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	2 2 2 4 4
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# **Appendix D**

# Junction Modelling Results

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## D1 Introduction

Junction assessments have been undertaken for six junctions using LinSig for a signalised junction and PICADY software for priority junctions.

Junction capacity in the above software packages is measured as the Ratio of Flow to Capacity (RFC) (PICADY) and Practical Reserve Capacity (PRC) (LinSig). RFC is a measure of the volume of traffic making a turning movement at the junction, divided by the capacity of that movement; ascertained from the geometric measurements of the junction. As stated in the DMRB Vol. 6, the generally agreed operational capacity of a junction is at a ratio of 0.85 for roundabouts and priority junctions. Junctions can still operate within capacity with an RFC value of up to 1.00, however as practical capacity is approached delays will increase.

PRC is a measure of how much additional traffic could pass through a junction and is calculated from the maximum degree of saturation on each lane. Another measure that can be assessed with LinSig is the Degree of Saturation (DoS). DoS is a measure of the volume of traffic making a turning movement at the junction divided by the capacity of that movement, ascertained from the geometric measurements of the junction and, where appropriate, signal timings. The generally agreed operational capacity of a junction is at a ratio of 90% for traffic signals.

These parameters have been used to summarise the operational effectiveness of individual junctions in accordance with the following pre-determined thresholds:

<b>Within Practical Capacity</b> – <i>junctions with an RFC below 0.85 or PRC above 0% have been deemed to operate within practical capacity.</i>
Over Practical Capacity, Approaching Theoretical Capacity – junctions with an RFC of between 0.85-0.99 or a PRC of between -10% and 0%.
<b>Over Theoretical Capacity</b> - junctions with an RFC over 1.00 or PRC below -10% have been deemed to operate over theoretical capacity with substantial queuing delays.

Interaction between the junctions has been considered because of the predicted queues; some of the junctions are located close to one another, as a result of which excessive queues may affect the operation of adjacent junctions 'blocking back'. The mean maximum queue forecast to occur on each arm of the junction has been monitored for this reason.

Differences between model and survey queue lengths were overcome by calibrating model junction arms, which involved applying a capacity adjustment. The percentage applied takes into account site-specific conditions once all geometric features have been calculated for a junction arm. Such conditions, which are not taken into account and may require a correction could include driver behaviour, changes in signage, re-marking of the junction or complete resurfacing.

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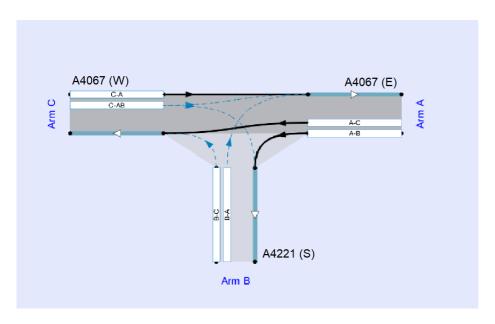
### D2 A4067 / A4221

Priority T junction modelled in Junctions 9. The junction is located north of the site in Abercave, the junction between A4067 and A4221.

The AM peak period was observed between 08:00 to 09:00 and the PM peak period was observed between 15:00 to 16:00.

The traffic volumes were input into the traffic model as an hourly flow. The software then synthesis a 15-minute profile (a bell curve) which represents a peak within a peak.

The traffic model and/ or additional results are available upon request.



#### **2020 Base**

During both the AM and PM peak the junction is operating within practical capacity and does not experience any notable queues.

#### **2024 Base**

3% additional traffic has been forecast between 2020 and 2024. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### 2024 + Phase 2 Construction Traffic

In 2024 the additional traffic through the junction, due to the Phase 2 construction, is forecast to be 5% in the AM peak and 9% in the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### **2026 Base**

5% additional traffic has been forecast between 2020 and 2026. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

### 2026 + Operational Development Trips

In 2026 the additional traffic through the junction, due to the development, is forecast to be 7% during the PM peak (no additional traffic during the AM peak). This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

The development results in reduced HGV movements in operation of the development, with overall traffic increasing due to the high level of existing HGV movements from the current Washery and Nant Helen.

#### **2035 Base**

12% additional traffic has been forecast between 2020 and 2036. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

### 2035 + Operational Development Trips

In 2035 the additional traffic through the junction, due to the development, is forecast to be reduced to 7% during the AM peak and increased to 11% during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

The development results in reduced HGV movements in operation of the development, with overall traffic increasing due to the high level of existing HGV movements from the current Washery and Nant Helen.

AM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
A4221 Left Turn	0.6	7.88	0.32	A
A4221 Right Turn	0.1	9.38	0.06	A
A4067 Right Turn	0.4	7.93	0.25	A
2024 Base				
A4221 Left Turn	0.6	8.03	0.33	A
A4221 Right Turn	0.1	9.51	0.06	A

A4067 Right Turn	0.4	8.04	0.26	A
2024 With Phase 2 C	onstruction '	Traffic Flow	vs	
A4221 Left Turn	0.5	7.85	0.3	A
A4221 Right Turn	0.1	9.59	0.07	A
A4067 Right Turn	0.4	8.13	0.26	A
2026 Base				
A4221 Left Turn	0.6	8.1	0.33	A
A4221 Right Turn	0.1	9.57	0.06	A
A4067 Right Turn	0.4	8.1	0.27	A
2026 With Operation	ıal Developm	ient Trips		
A4221 Left Turn	0.5	7.85	0.31	A
A4221 Right Turn	0.1	9.51	0.06	A
A4067 Right Turn	0.4	8.07	0.26	A
2035 Base				
A4221 Left Turn	0.7	8.49	0.36	A
A4221 Right Turn	0.1	9.89	0.07	A
A4067 Right Turn	0.5	8.38	0.29	A
2035 With Operation	ıal Developm	ient Trips		
A4221 Left Turn	0.6	8.19	0.33	A
A4221 Right Turn	0.1	9.8	0.07	A
A4067 Right Turn	0.5	8.34	0.28	A

PM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
A4221 Left Turn	0.4	6.57	0.26	A
A4221 Right Turn	0	8.39	0.03	A
A4067 Right Turn	0.4	7.64	0.28	A
2024 Base				
A4221 Left Turn	0.4	6.66	0.27	A
A4221 Right Turn	0	8.48	0.04	A
A4067 Right Turn	0.4	7.76	0.29	A
2024 With Phase 2 Cons	truction Tr	affic Flows		
A4221 Left Turn	0.4	7.11	0.29	A
A4221 Right Turn	0.1	8.97	0.12	A
A4067 Right Turn	0.4	7.71	0.28	A
2026 Base				
A4221 Left Turn	0.4	6.7	0.28	A
A4221 Right Turn	0	8.52	0.04	A
A4067 Right Turn	0.5	7.82	0.29	A
2026 With Operational I	Developmen	t Trips		
A4221 Left Turn	0.4	6.91	0.28	A
A4221 Right Turn	0.1	8.79	0.08	A
A4067 Right Turn	0.4	7.76	0.29	A
2035 Base				
A4221 Left Turn	0.5	6.94	0.3	A
A4221 Right Turn	0	8.74	0.04	A
	-			

A4067 Right Turn	0.5	8.1	0.31	A
2035 With Operationa	ıl Developn	nent Trips		
A4221 Left Turn	0.5	7.16	0.3	A
A4221 Right Turn	0.1	9.04	0.09	A
A4067 Right Turn	0.5	8.03	0.31	A

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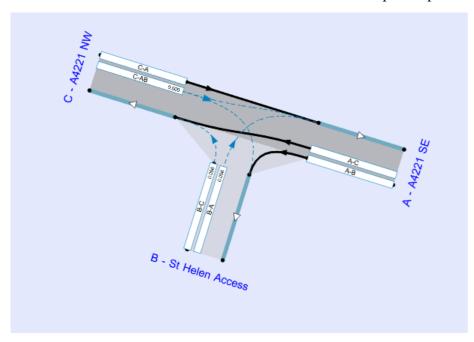
## D3 Nant Helen Access Road

Priority T junction modelled in Junctions 9. The site access junction is to the west of the site along the A4221.

The AM peak period was observed between 08:00 to 09:00 and the PM peak period was observed between 15:00 to 16:00.

The traffic volumes were input into the traffic model as an hourly flow. The software then synthesis a 15-minute profile (a bell curve) which represents a peak within a peak.

The traffic model and/ or additional results are available upon request.



Merge and Diverge lanes on the A4221 have not been accounted for within the model due to a lack of supporting data to validate the model. Any calibration would only further increase the capacity of the model. Therefore, it is acceptable for these to not be considered.

#### **2020 Base**

During both the AM and PM peak the junction is operating within practical capacity and does not experience any notable queues.

#### **2024 Base**

3% additional traffic has been forecast between 2020 and 2024. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### 2024 + Phase 2 Construction Traffic

In 2024 the additional traffic through the junction, due to the Phase 2 construction, is forecast to be 6% in the AM peak and 9% in the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### **2026 Base**

5% additional traffic has been forecast between 2020 and 2026. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

### 2026 + Operational Development Trips

In 2026 the additional traffic through the junction, due to the development, is forecast to be 3% during the AM peak and 7% during

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the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

The development results in reduced HGV movements in operation of the development, with overall traffic increasing due to the high level of existing HGV movements from the current Nant Helen operation.

#### **2035** Base

12% additional traffic has been forecast between 2020 and 2035. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

### 2035 + Operational Development Trips

In 2035 the additional traffic through the junction, due to the development, is forecast to be 10% during the AM peak and 14% during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

The development results in reduced HGV movements in operation of the development, with overall traffic increasing due to the high level of existing HGV movements from the current Nant Helen operation.

AM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
St Helen Left Turn	0	0	0	A
St Helen Right Turn	0	0	0	A
A4221 NW Right Turn	0	7.35	0.01	A
2024 Base				

St Helen Left Turn	0	0	0	A				
St Helen Right Turn	0	0	0	A				
A4221 NW Right Turn	0	7.30	0.01	A				
2024 With Phase 3 Construction Traffic Flows								
St Helen Left Turn	0	0	0	A				
St Helen Right Turn	0	0	0	A				
A4221 NW Right Turn	0	7.04	0	A				
<b>2026 Base</b>								
St Helen Left Turn	0	0	0	A				
St Helen Right Turn	0	0	0	A				
A4221 NW Right Turn	0	7.28	0.01	A				
2026 With Operational	2026 With Operational Development Trips							
St Helen Left Turn	0	0	0	A				
St Helen Right Turn	0	0	0	A				
A4221 NW Right Turn	0	7.14	0	A				
2035 Base								
St Helen Left Turn	0	0	0	A				
St Helen Right Turn	0	0	0	A				
A4221 NW Right Turn	0	7.20	0.01	A				
2035 With Operational	2035 With Operational Development Trips							
St Helen Left Turn	0	0	0	A				
St Helen Right Turn	0	0	0	A				
A4221 NW Right Turn	0	7.06	0	A				

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PM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
St Helen Left Turn	0	5.47	0.02	A
St Helen Right Turn	0	10.43	0.02	В
A4221 NW Right Turn	0	0	0	A
2024 Base				
St Helen Left Turn	0	5.52	0.02	A
St Helen Right Turn	0	10.50	0.02	В
A4221 NW Right Turn	0	0	0	A
2024 With Phase 3 Constr	uction Traf	fic Flows		
St Helen Left Turn	0	5.54	0.01	A
St Helen Right Turn	0	10.68	0.01	В
A4221 NW Right Turn	0	0	0	A
2026 Base				
St Helen Left Turn	0	5.53	0.02	A
St Helen Right Turn	0	10.56	0.02	В
A4221 NW Right Turn	0	0	0	A
2026 With Operational Do	evelopment '	Гrips		
St Helen Left Turn	0	5.51	0.01	A
St Helen Right Turn	0	10.59	0.01	В
A4221 NW Right Turn	0	0	0	A
2035 Base				
St Helen Left Turn	0	5.58	0.02	A
St Helen Right Turn	0	10.83	0.02	В

A4221 NW Right Turn	0	0	0	A
2035 With Operational D	evelopme	nt Trips		
St Helen Left Turn	0	5.59	0.01	A
St Helen Right Turn	0	10.83	0.01	В
A4221 NW Right Turn	0	0	0	A

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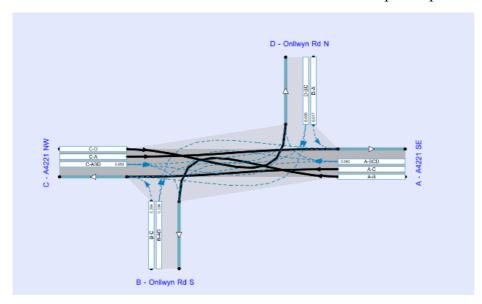
# D4 A4221/Onllwyn Road

Priority staggered junction modelled in Junctions 9. The junction is to the east of the site along the A4221.

The AM peak period was observed between 08:00 to 09:00 and the PM peak period was observed between 15:00 to 16:00.

The traffic volumes were input into the traffic model as an hourly flow. The software then synthesis a 15-minute profile (a bell curve) which represents a peak within a peak.

The traffic model and/ or additional results are available upon request.



Merge and Diverge lanes on the A4221 have not been accounted for within the model due to a lack of supporting data to validate the model.

Any calibration would only further increase the capacity of the model. Therefore, it is acceptable for these to not be considered.

#### **2020 Base**

During both the AM and PM peak the junction is operating within practical capacity and does not experience any notable queues.

#### **2024 Base**

3% additional traffic has been forecast between 2020 and 2024. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### 2024 + Phase 2 Construction Traffic

In 2024 the additional traffic through the junction, due to the Phase 2 construction, is forecast to be 6% in the AM peak and 10% in the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### **2026 Base**

5% additional traffic has been forecast between 2020 and 2026. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## 2026 + Operational Development Trips

In 2026 the additional traffic through the junction, due to the development, is forecast to be 4% during the AM peak and 8% during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

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\(\(\Gamma\) LOBALIEUROPEICARDIFFJOBS\(\gamma\) 64000\(\gamma\) 64904-004 INTERNAL PROJECT DATA\(\gamma\)-50 REPORTS\(\text{TRANSPORTAPPENDIX\(\gamma\)\(\gamma\) 2021\(\gamma\) 121 DRAFT 2\(\gamma\)\(\gamma\) 1221 APPENDIX D\_ JUNCTION MODELLING RESULTS DOCX

The development results in reduced HGV movements in operation of the development, with overall traffic increasing due to the high level of existing HGV movements from the current Washery and Nant Helen.

#### **2035** Base

12% additional traffic has been forecast between 2020 and 2035. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

### 2035 + Operational Development Trips

In 2035 the additional traffic through the junction, due to the development, is forecast to be 11% during the AM peak and 15% during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

The development results in reduced HGV movements in operation of the development, with overall traffic increasing due to the high level of existing HGV movements from the current Washery and Nant Helen.

AM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
Onllwyn Rd S (Left Turn)	0.1	5.00	0.06	A
Onllwyn Rd S (Right Turn)	0	8.19	0.03	A
A4221 SE	0.1	6.09	0.03	A
Onllwyn Rd N (Left Turn)	0	7.02	0.03	A
Onllwyn Rd N (Right Turn)	0.1	6.43	0.10	A
A4221 NW	0.1	5.55	0.07	A

2024 Base					
Onllwyn Rd S (Left Turn)	0.1	5.03	0.06 A		
Onllwyn Rd S (Right Turn)	0	8.27	0.03 A		
A4221 SE	0.1	6.08	0.03 A		
Onllwyn Rd N (Left Turn)	0	7.05	0.03 A		
Onllwyn Rd N (Right Turn)	0.1	6.48	0.10 A		
A4221 NW	0.1	5.55	0.07 A		
2024 With Phase 3 Construction Traffic Flows					
Onllwyn Rd S (Left Turn)	0.1	5.00	0.06 A		
Onllwyn Rd S (Right Turn)	0	8.29	0.03 A		
A4221 SE	0.1	6.20	0.03 A		
Onllwyn Rd N (Left Turn)	0	7.15	0.03 A		
Onllwyn Rd N (Right Turn)	0.1	6.57	0.11 A		
A4221 NW	0.1	5.43	0.07 A		
2026 Base					
Onllwyn Rd S (Left Turn)	0.1	5.05	0.06 A		
Onllwyn Rd S (Right Turn)	0	8.3	0.03 A		
A4221 SE	0.1	6.07	0.03 A		
Onllwyn Rd N (Left Turn)	0	7.06	0.04 A		
Onllwyn Rd N (Right Turn)	0.1	6.52	0.11 A		
A4221 NW	0.1	5.55	0.07 A		
2026 With Operational Development Trips					
Onllwyn Rd S (Left Turn)	0.1	5.01	0.06 A		
Onllwyn Rd S (Right Turn)	0	8.25	0.03 A		
A4221 SE	0.1	6.18	0.03 A		
Onllwyn Rd N (Left Turn)	0	7.11	0.04 A		

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\(\(\text{GLOBALIEUROPEICARDIFFUOBS)}\(\text{264504-904-904-INTERNAL PROJECT DATA/4-50 REPORTS\(\text{TRANSPORT\(\text{APPENDIX\(\text{2021}\)0121 DRAFT \(\text{2021}\)\_01\_21 APPENDIX \(\text{D\_\_JUNCTION MODELLING RESULTS DOCX\)}\)

Global Centre of Rail Excellence Welsh Government Transport Assessment

Onllwyn Rd N (Right Turn)	0.1	6.52	0.11	A
A4221 NW	0.1	5.55	0.07	A
2035 Base				
Onllwyn Rd S (Left Turn)	0.1	5.11	0.07	A
Onllwyn Rd S (Right Turn)	0	8.49	0.03	A
A4221 SE	0.1	6.04	0.04	A
Onllwyn Rd N (Left Turn)	0.1	7.14	0.04	A
Onllwyn Rd N (Right Turn)	0.1	6.66	0.12	A
A4221 NW	0.1	5.56	0.08	A
2035 With Operational Develop	nent Trip	S		
Onllwyn Rd S (Left Turn)	0.1	5.07	0.07	A
Onllwyn Rd S (Right Turn)	0	8.43	0.03	A
A4221 SE	0.1	6.15	0.04	A
Onllwyn Rd N (Left Turn)	0.1	7.19	0.04	A
Onllwyn Rd N (Right Turn)	0.1	6.67	0.12	A
A4221 NW	0.1	5.49	0.08	A

PM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
Onllwyn Rd S (Left Turn)	0.1	5.53	0.08	A
Onllwyn Rd S (Right Turn)	0.0	7.41	0.05	A
A4221 SE	0.1	6.13	0.06	A
Onllwyn Rd N (Left Turn)	0	8.21	0.02	A
Onllwyn Rd N (Right Turn)	0.1	8.11	0.07	A

A4221 NW	0.2	5.33	0.08	A
2024 Base				
Onllwyn Rd S (Left Turn)	0.1	5.58	0.09	A
Onllwyn Rd S (Right Turn)	0.1	7.50	0.05	A
A4221 SE	0.1	6.11	0.06	A
Onllwyn Rd N (Left Turn)	0	8.23	0.02	A
Onllwyn Rd N (Right Turn)	0.1	8.22	0.07	A
A4221 NW	0.2	5.33	0.09	A
2024 With Phase 3 Construction	Traffic F	lows		
Onllwyn Rd S (Left Turn)	0.1	5.69	0.09	A
Onllwyn Rd S (Right Turn)	0.1	7.70	0.05	A
A4221 SE	0.1	5.94	0.06	A
Onllwyn Rd N (Left Turn)	0	8.24	0.02	A
Onllwyn Rd N (Right Turn)	0.1	8.36	0.07	A
A4221 NW	0.2	5.37	0.09	A
2026 Base				
Onllwyn Rd S (Left Turn)	0.1	5.60	0.09	A
Onllwyn Rd S (Right Turn)	0.1	7.54	0.05	A
A4221 SE	0.1	6.10	0.06	A
Onllwyn Rd N (Left Turn)	0	8.26	0.02	A
Onllwyn Rd N (Right Turn)	0.1	8.25	0.07	A
A4221 NW	0.2	5.32	0.09	A
2026 With Operational Develop	ment Trip	S		
Onllwyn Rd S (Left Turn)	0.1	5.66	0.09	A
Onllwyn Rd S (Right Turn)	0.1	7.64	0.05	A
A4221 SE	0.1	6.00	0.06	A

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Onllwyn Rd N (Left Turn)	0	8.25	0.02	A
Onllwyn Rd N (Right Turn)	0.1	8.31	0.07	A
A4221 NW	0.2	5.36	0.09	A
2035 Base				
Onllwyn Rd S (Left Turn)	0.1	5.70	0.09	A
Onllwyn Rd S (Right Turn)	0.1	7.74	0.05	A
A4221 SE	0.1	6.07	0.07	A
Onllwyn Rd N (Left Turn)	0	8.36	0.08	A
Onllwyn Rd N (Right Turn)	0.1	8.46	0.08	A
A4221 NW	0.2	5.31	0.1	A
2035 With Operational Developm	ent Trips			
Onllwyn Rd S (Left Turn)	0.1	5.77	0.09	A
Onllwyn Rd S (Right Turn)	0.1	7.85	0.05	A
A4221 SE	0.1	5.97	0.07	A
Onllwyn Rd N (Left Turn)	0	8.35	0.02	A
Onllwyn Rd N (Right Turn)	0.1	8.53	0.08	A
A4221 NW	0.2	5.35	0.1	A

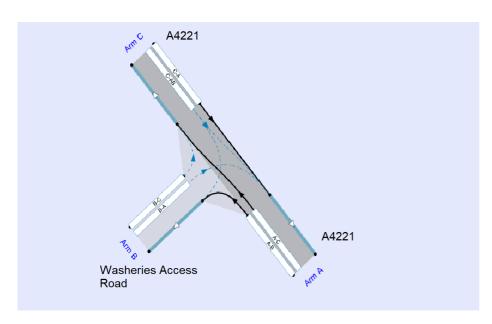
## **D6** Washeries Access Road

Priority T junction modelled in Junctions 9. The site access junction is to the east of the site along the A4221.

The AM peak period was observed between 08:00 to 09:00 and the PM peak period was observed between 15:00 to 16:00.

The traffic volumes were input into the traffic model as an hourly flow. The software then synthesis a 15-minute profile (a bell curve) which represents a peak within a peak.

The traffic model and/ or additional results are available upon request.



#### **2020 Base**

During both the AM and PM peak the junction is operating within practical capacity and does not experience any notable queues.

## **2024 Base**

3% additional traffic has been forecast between 2020 and 2024. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### 2024 + Phase 2 Construction Traffic

In 2024 the additional traffic through the junction, due to the Phase 2 construction, is forecast to be 33% in the AM peak and 40% in the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

The right turn from the Washery onto the A4221 shows that the LOS reaches the Level of Service C - 'Stable Flow' in this worst-case scenario, due to the queueing delay in the PM peak. This queue would only impact the GCRE site and queues would not affect the strategic network or local highway.

## **2026 Base**

5% additional traffic has been forecast between 2020 and 2026. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## 2026 + Operational Development Trips

In 2026 the additional traffic through the junction, due to the development, is forecast to be 14% during the AM peak and 19%

during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### **2035 Base**

12% additional traffic has been forecast between 2020 and 2035. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## 2035 + Operational Development Trips

In 2035 the additional traffic through the junction, due to the development, is forecast to be 21% during the AM peak and 26% during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

Queue (PCU)	Delay (s)	RFC	LOS
0.1	10.49	0.04	В
0	7.7	0.03	A
0.1	9.63	0.06	A
0.1	10.56	0.04	В
0	7.76	0.03	A
0.2	9.57	0.06	A
struction <b>T</b>	raffic Flov	vs	
0	11.66	0.02	В
0.1	8.18	0.12	A
	0.1 0 0.1 0.1 0 0.2 struction T	0.1 10.49 0 7.7 0.1 9.63 0.1 10.56 0 7.76 0.2 9.57 struction Traffic Flow 0 11.66	(PCU) (s)  0.1 10.49 0.04  0 7.7 0.03  0.1 9.63 0.06   0.1 10.56 0.04  0 7.76 0.03  0.2 9.57 0.06  struction Traffic Flows  0 11.66 0.02

A4221 Right Turn	0.3	10.17	0.13	В
2026 Base				
Washeries Left Turn	0.1	10.57	0.04	В
Washeries Right Turn	0	7.77	0.03	A
A4221 Right Turn	0.2	9.55	0.06	A
2026 With Operational	Developmo	ent Trips		
Washeries Left Turn	0	11.17	0.02	В
Washeries Right Turn	0.1	7.58	0.06	A
A4221 Right Turn	0.2	9.8	0.09	A
2035 Base				
Washeries Left Turn	0.1	10.67	0.05	В
Washeries Right Turn	0	7.9	0.04	A
A4221 Right Turn	0.2	9.42	0.07	A
2035 With Operational	Developmo	ent Trips		
Washeries Left Turn	0	11.21	0.02	В
Washeries Right Turn	0.1	7.75	0.06	A
A4221 Right Turn	0.3	9.67	0.1	A

PM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
Washeries Left Turn	0	10.33	0.02	В
Washeries Right Turn	0	13.25	0.02	В
A4221 Right Turn	0	10.31	0.02	В
2024 Base				

Washeries Left Turn	0	10.35	0.02	В
Washeries Right Turn	0	13.33	0.02	В
A4221 Right Turn	0	10.27	0.02	В
2024 With Phase 3 Cons	truction Ti	affic Flows	\$	
Washeries Left Turn	0.2	11.96	0.09	В
Washeries Right Turn	0.3	15.34	0.16	C
A4221 Right Turn	0	10.36	0.02	В
2026 Base				
Washeries Left Turn	0	10.37	0.02	В
Washeries Right Turn	0	13.36	0.02	В
A4221 Right Turn	0	10.24	0.02	В
2026 With Operational	Developme	nt Trips		
Washeries Left Turn	0.1	11.14	0.06	В
Washeries Right Turn	0.2	14.11	0.09	В
A4221 Right Turn	0	10.21	0.01	В
2035 Base				
Washeries Left Turn	0	10.46	0.02	В
Washeries Right Turn	0	13.55	0.03	В
A4221 Right Turn	0	10.11	0.02	В
2035 With Operational	Developme	nt Trips		
Washeries Left Turn	0.1	11.24	0.06	В
Washeries Right Turn	0.2	14.34	0.09	В
A4221 Right Turn	0	10.09	0.01	В

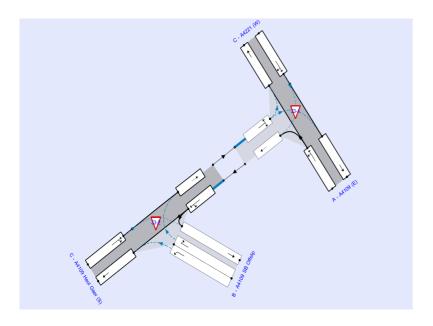
## D8 A4221 / A4109 Heol Gaer

Priority T junction modelled in Junctions 9. To understand the traffic movement between both junctions the 'lane based' model was used. The Dyfren Cellwen Town access, off the A4221, is to the east of the site.

The AM peak period was observed between 08:00 to 09:00 and the PM peak period was observed between 15:00 to 16:00.

The traffic volumes were input into the traffic model as an hourly flow. The software then synthesis a 15-minute profile (a bell curve) which represents a peak within a peak.

The traffic model and/ or additional results are available upon request.



#### **2020 Base**

During both the AM and PM peak the junctions operate within capacity and do not experience any notable delays or queues.

## **2024 Base**

3% additional traffic has been forecast between 2020 and 2024. This has a negligible impact on the junction which continues to operate without any noticeable delays or queues.

#### 2024 + Phase 2 Construction Traffic

In 2024 the additional traffic through the junction, due to the Phase 2 construction, is forecast to be 30% in the AM peak and 27% in the PM peak. This has a negligible impact on the junction which continues to operate without any noticeable delays or queues.

#### **2026** Base

5% additional traffic has been forecast between 2020 and 2026. This has a negligible impact on the junction which continues to operate without any noticeable delays or queues.

## 2026 + Operational Development Trips

In 2026 the additional traffic through the junction, due to the development, is forecast to be 16% during the AM peak and 13% during the PM peak. This has a negligible impact on the junction which continues to operate without any noticeable delays or queues.

## **2035** Base

12% additional traffic has been forecast between 2020 and 2035. This has a negligible impact on the junction which continues to operate without any noticeable delays or queues.

## 2035 + Operational Development Trips

In 2035 the additional traffic through the junction, due to the development, is forecast to be 23% during the AM peak and 21% during the PM peak. This has a negligible impact on the junction which continues to operate without any noticeable delays or queues.

Queue (PCU)	Delay (s)	RFC	LOS
0	0		A
0.1	6.37		A
0.1	0.59		A
0	0		A
0.1	6.1		A
0	0		A
0	0		A
0.3	6.88		A
0	0.55		A
0	0		A
	0 0.1 0.1 0 0.1 0 0 0.3	(PCU) (s)  0 0  0.1 6.37  0.1 0.59  0 0  0.1 6.1  0 0  0 0  0.3 6.88  0 0.55	(PCU) (s)  0 0 0.1 6.37 0.1 0.59 0 0 0.1 6.1 0 0 0 0 0.3 6.88 0 0.55

Southern Junction - A4109 SB Offslip	0.2	6.31	A
Southern Junction - A4109 Heol Gaer (S)	0	0.01	A
2024 With Phase 2 Construction Traffic	Flows		
Northern Junction - A4109 (E)	0	0	A
Northern Junction - A4109 Heol Gaer (S)	0.1	6.85	A
Northern Junction - A4221 (W)	0	0.43	A
Southern Junction - A4109 Heol Gaer (N)	0	0	A
Southern Junction - A4109 SB Offslip	0.1	6.32	A
Southern Junction - A4109 Heol Gaer (S)	0	0	A
2026 Base			
Northern Junction - A4109 (E)	0	0	A
Northern Junction - A4109 Heol Gaer (S)	0.1	6.47	A
Northern Junction - A4221 (W)	0.1	0.47	A
Southern Junction - A4109 Heol Gaer (N)	0	0	A
Southern Junction - A4109 SB Offslip	0.1	6.04	A
Southern Junction - A4109 Heol Gaer (S)	0	0	A
2026 With Operational Development Tr	ips		
Northern Junction - A4109 (E)	0	0	A
Northern Junction - A4109 Heol Gaer (S)	0.1	6.49	A
Northern Junction - A4221 (W)	0.1	0.44	A
Southern Junction - A4109 Heol Gaer (N)	0	0	A
Southern Junction - A4109 SB Offslip	0.1	5.95	A
Southern Junction - A4109 Heol Gaer (S)	0.1	3.45	A
2035 Base			
Northern Junction - A4109 (E)	0	0	A
Northern Junction - A4109 Heol Gaer (S)	0.1	6.37	A

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Northern Junction - A4221 (W)	0	0.51	A
Southern Junction - A4109 Heol Gaer (N)	0	0	A
Southern Junction - A4109 SB Offslip	0.2	6.07	A
Southern Junction - A4109 Heol Gaer (S)	0	0	A
2035 With Operational Development Tr	ips		
Northern Junction - A4109 (E)	0	0	A
Northern Junction - A4109 Heol Gaer (S)	0.2	6.57	A
Northern Junction - A4221 (W)	0	0.44	A
Southern Junction - A4109 Heol Gaer (N)	0	0	A
Southern Junction - A4109 SB Offslip	0.1	5.83	A
Southern Junction - A4109 Heol Gaer (S)	0.1	3.72	A

PM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
Northern Junction - A4109 (E)	0	0		A
Northern Junction - A4109 Heol Gaer (S)	0.2	7.12		A
Northern Junction - A4221 (W)	0.1	0.92		A
Southern Junction - A4109 Heol Gaer (N)	0	0		A
Southern Junction - A4109 SB Offslip	0.1	5.78		A
Southern Junction - A4109 Heol Gaer (S)	0	0		A
2024 Base				
Northern Junction - A4109 (E)	0	0		A
Northern Junction - A4109 Heol Gaer (S)	0.2	7.27		A
Northern Junction - A4221 (W)	0	0.83		A

	5.55	
		A
	0	A
ows		
	0	A
.2	7.52	A
	0.63	A
	0	A
.1	5.67	A
	0	A
	0	A
.1	7.48	A
.1	0.83	A
	0	A
.1	5.77	A
-	0	A
	0	A
.2	7.35	A
.1	0.75	A
	0	A
.1	5.52	A
.2	3.58	A
	0	A
	2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 2 1 1 1 2 1	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Northern Junction - A4109 Heol Gaer (S)	0.2	7.62	A
Northern Junction - A4221 (W)	0	0.88	A
Southern Junction - A4109 Heol Gaer (N)	0	0	A
Southern Junction - A4109 SB Offslip	0.1	5.53	A
Southern Junction - A4109 Heol Gaer (S)	0	0	A
2035 With Operational Development Tr	ips		
Northern Junction - A4109 (E)	0	0	A
Northern Junction - A4109 Heol Gaer (S)	0.2	7.51	A
Northern Junction - A4221 (W)	0.1	0.69	A
Southern Junction - A4109 Heol Gaer (N)	0	0	A
Southern Junction - A4109 SB Offslip	0.1	5.77	A
Southern Junction - A4109 Heol Gaer (S)	0.2	3.77	A

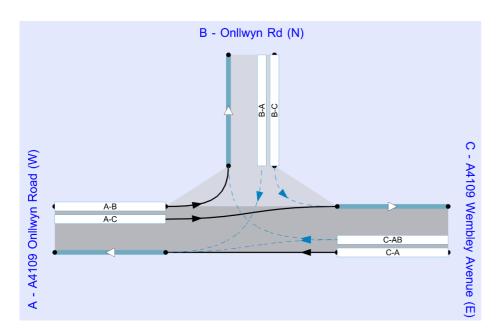
## D9 A4109 / Onllwyn Road

Priority T junction modelled in Junctions 9. The site access junction is to the south east corner of the site along the A4109.

The AM peak period was observed between 08:00 to 09:00 and the PM peak period was observed between 15:00 to 16:00.

The traffic volumes were input into the traffic model as an hourly flow. The software then synthesis a 15-minute profile (a bell curve) which represents a peak within a peak.

The traffic model and/ or additional results are available upon request.



#### **2020 Base**

During both the AM and PM peak the junction is operating within practical capacity and does not experience any notable queues.

## **2024 Base**

3% additional traffic has been forecast between 2020 and 2024. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### 2024 + Phase 2 Construction Traffic

In 2024 the additional traffic through the junction, due to the Phase 2 construction, is forecast to be 53% in the AM peak and 44% in the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### **2026** Base

5% additional traffic has been forecast between 2020 and 2026. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## 2026 + Operational Development Trips

In 2026 the additional traffic through the junction, due to the development, is forecast to be 36% during the AM peak and 30% during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## **2035** Base

12% additional traffic has been forecast between 2020 and 2035. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## 2035 + Operational Development Trips

In 2035 the additional traffic through the junction, due to the development, is forecast to be 43% during the AM peak and 37% during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

AM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
Onllwyn Road Left Turn	0	7.2	0.01	A
Onllwyn Road Right Turn	0.1	8.06	0.07	A
A4109 Right Turn	0	5.56	0.02	A
2024 Base				
Onllwyn Road Left Turn	0	7.22	0.01	A
Onllwyn Road Right Turn	0.1	8.11	0.08	A
A4109 Right Turn	0	5.57	0.02	A
2024 With Phase 2 Const	ruction Tra	affic Flows		
Onllwyn Road Left Turn	0	7.42	0.01	A
Onllwyn Road Right Turn	0.1	8.62	0.11	A
A4109 Right Turn	0	5.83	0.02	A

2026 Base				
Onllwyn Road Left Turn	0	7.24	0.01	A
Onllwyn Road Right Turn	0.1	8.14	0.08	A
A4109 Right Turn	0	5.58	0.02	A
2026 With Operational D	evelopmen	t Trips		
Onllwyn Road Left Turn	0	7.35	0.01	A
Onllwyn Road Right Turn	0.1	8.39	0.09	A
A4109 Right Turn	0	5.74	0.02	A
2035 Base				
Onllwyn Road Left Turn	0	7.27	0.01	A
Onllwyn Road Right Turn	0.1	8.23	0.08	A
A4109 Right Turn	0	5.61	0.02	A
2035 With Operational D	evelopmen	t Trips		
Onllwyn Road Left Turn	0	7.39	0.01	A
Onllwyn Road Right Turn	0.1	8.51	0.1	A
A4109 Right Turn	0	5.78	0.02	A

PM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
Onllwyn Road Left Turn	0	5.13	0.01	A
Onllwyn Road Right Turn	0.1	9.13	0.11	A
A4109 Right Turn	0	5.57	0.01	A
2024 Base				
Onllwyn Road Left Turn	0	5.15	0.01	A

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Onllwyn Road Right Turn	0.1	9.19	0.11	A		
A4109 Right Turn	0	5.58	0.01	A		
2024 With Phase 2 Const	ruction Tra	affic Flows				
Onllwyn Road Left Turn	0	5.69	0.01	A		
Onllwyn Road Right Turn	0.5	12.28	0.33	В		
A4109 Right Turn	0	5.62	0.01	A		
2026 Base						
Onllwyn Road Left Turn	0	5.16	0.01	A		
Onllwyn Road Right Turn	0.1	9.22	0.11	A		
A4109 Right Turn	0	5.59	0.01	A		
2026 With Operational Development Trips						
Onllwyn Road Left Turn	0	5.46	0.01	A		
Onllwyn Road Right Turn	0.4	11.05	0.26	В		
A4109 Right Turn	0	5.6	0.01	A		
2035 Base						
Onllwyn Road Left Turn	0	5.19	0.01	A		
Onllwyn Road Right Turn	0.1	9.37	0.12	A		
A4109 Right Turn	0	5.62	0.01	A		
2035 With Operational D	evelopmen	t Trips				
Onllwyn Road Left Turn	0	5.5	0.01	A		
Onllwyn Road Right Turn	0.4	11.26	0.27	В		
A4109 Right Turn	0	5.63	0.01	A		

## D10 A4109 / B4242

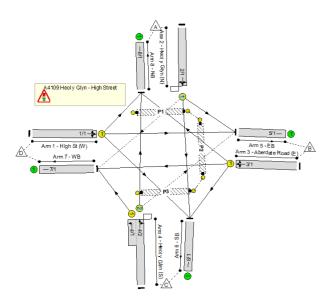
Signalised cross roads modelled in LinSig 3. The junction is located south of the site in Glyn Neath, served by the A465.

The AM peak period was observed between 08:00 to 09:00 and the PM peak period was observed between 15:00 to 16:00.

The traffic volumes were input into the traffic model as an hourly flow. The software assumes a flat profile across the hour and optimises the traffic signal times based on those volumes.

The traffic signal phases, stages and cycle time are based on site observations

The traffic model and/ or additional results are available upon request.



#### **2020 Base**

During both the AM and PM peak the junction is operating within practical capacity and does not experience any notable queues.

## **2024 Base**

3% additional traffic has been forecast between 2020 and 2024. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### 2024 + Phase 2 Construction Traffic

In 2024 the additional traffic through the junction, due to the Phase 2 construction, is forecast to be 15% in the AM peak and 13% in the PM peak. There is a negligible impact on the junction which continues to operate within capacity and without any noticeable queues in the AM peak.

In the PM peak, Heol-Y-Glyn/A4109 South has a DoS of 85.3%. The general agreed operational capacity of a junction is at a ratio of 90% for traffic signals. This assessment represents the worst-case scenario; therefore, this short-term impact is considered minor on the junction, and deemed able to operate within capacity with a PRC of 6% (over the practical capacity of 0%). The construction traffic impacts the delay by 12 seconds on the A4109 South arm.

## **2026 Base**

5% additional traffic has been forecast between 2020 and 2026. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

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## 2026 + Operational Development Trips

In 2026 the additional traffic through the junction, due to the development, is forecast to be 10% during the AM peak and 8% during the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### **2035** Base

12% additional traffic has been forecast between 2020 and 2035. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## 2035 + Operational Development Trips

In 2035 the additional traffic through the junction, due to the development, is forecast to be 17% during the AM peak and 16% during the PM peak. There is negligible impact on the junction which continues to operate within capacity and without any noticeable queues in the AM peak.

In the PM peak, High Street (W) and Heol Y Glyn/A4109 (S) has a DOS of 86.3% and 84.9% respectively. The general agreed operational capacity of a junction is at a ratio of 90% for traffic signals. This assessment represents the worst-case scenario assuming all trips will be made by vehicle and all operation staff and planned visitors arrive and depart in the AM and PM peaks. Given this is unlikely and the junction has a PRC of 6% (over the practical capacity of 0%), the impact of operational traffic is considered minor on the junction and deemed able to operate within capacity. The operational traffic impacts the delay by 13 and 3 seconds on High Street (W) and A4109 (S) respectively.

AM Peak			
	Queue (PCU)	Delay (s)	DoS
2020 Base			
High St (W)	3.4	29.3	47.70%
Heol y Glyn (N)	5.1	33.0	63.00%
Aberdate Road (E)	5	33.1	61.60%
Heol y Glyn (S) Left + Ahead : Right	3.6	35.7	61.1 : 61.1%
2024 Base			
High St (W)	3.5	30.3	49.20%
Heol y Glyn (N)	5.4	33.1	65.40%
Aberdate Road (E)	5.2	33.5	63.60%
Heol y Glyn (S) Left + Ahead : Right	3.8	36.2	63.1 : 63.1%
2024 With Phase 2 Construction Tra	ffic Flows		
High St (W)	3.8	35.1	59.50%
Heol y Glyn (N)	7.1	36.7	72.40%
Aberdate Road (E)	5.6	43.1	74.90%
Heol y Glyn (S) Left + Ahead : Right	5.2	39.0	72.0 : 72.0%
2026 Base			
High St (W)	3.5	29.8	50.00%
Heol y Glyn (N)	5.7	33.9	66.40%
Aberdate Road (E)	5.1	33.0	64.50%
Heol y Glyn (S) Left + Ahead : Right	3.9	37.1	64.4 : 64.4%
2026 With Operational Development	Trips		
High St (W)	3.6	31.2	52.80%
Heol y Glyn (N)	6.2	36.1	69.40%

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Aberdate Road (E)	5.2	35.6	67.30%
Heol y Glyn (S) Left + Ahead : Right	4.5	39.2	69.4 : 69.4%
2035 Base			
High St (W)	3.8	29.7	53.40%
Heol y Glyn (N)	6.4	36.6	71.00%
Aberdate Road (E)	5.7	35.9	69.20%
Heol y Glyn (S) Left + Ahead : Right	4.4	39.3	68.7 : 68.7%
2035 With Operational Development	Trips		
High St (W)	3.9	32.7	56.30%
Heol y Glyn (N)	6.9	38.6	73.90%
Aberdate Road (E)	5.9	38.3	72.10%
Heol y Glyn (S) Left + Ahead : Right	5.1	41.1	73.5 : 73.5%

PM Peak			
	Queue (PCU)	Delay (s)	DoS
2020 Base			
High St (W)	5.3	40.8	71.60%
Heol y Glyn (N)	6	42.5	73.50%
Aberdate Road (E)	3.7	34.3	54.20%
Heol y Glyn (S) Left + Ahead : Right	6.2	34.1	73.2 : 73.2%
2024 Base			
High St (W)	5.6	42.6	73.70%
Heol y Glyn (N)	6.3	44.0	75.80%
Aberdate Road (E)	3.9	33.1	56.20%
Heol y Glyn (S) Left + Ahead : Right	6.6	36.1	75.4 : 75.4%

2024 With Phase 2 Construction Tra	ffic Flov	vs	
High St (W)	6.3	58.3	83.20%
Heol y Glyn (N)	8.6	48.6	82.70%
Aberdate Road (E)	4.1	40.6	64.30%
Heol y Glyn (S) Left + Ahead : Right	8.8	45.8	85.3 : 85.3%
2026 Base			
High St (W)	5.7	43.4	74.90%
Heol y Glyn (N)	6.7	45.8	77.30%
Aberdate Road (E)	3.9	34.5	56.80%
Heol y Glyn (S) Left + Ahead : Right	6.8	36.7	76.4 : 76.4%
2026 With Operational Development	Trips		
High St (W)	6.2	52.9	80.60%
Heol y Glyn (N)	7.3	45.0	78.50%
Aberdate Road (E)	4.1	38.4	61.90%
Heol y Glyn (S) Left + Ahead : Right	7.4	39.3	79.4 : 79.4%
2035 Base			
High St (W)	6.6	49.9	80.30%
Heol y Glyn (N)	7.6	51.8	82.50%
Aberdate Road (E)	4.4	35.7	60.80%
Heol y Glyn (S) Left + Ahead : Right	7.9	41.6	81.8 : 81.8%
2035 With Operational Development	Trips		
High St (W)	7.5	63.0	86.50%
Heol y Glyn (N)	8.2	50.4	83.20%
Aberdate Road (E)	4.6	39.2	66.30%
Heol y Glyn (S) Left + Ahead : Right	8.8	44.8	84.9 : 84.9%

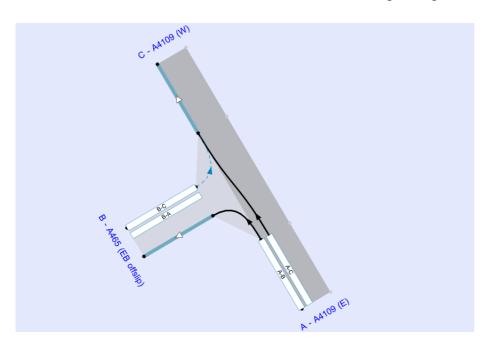
## D11 A465 / A4109

Priority T junction modelled in Junctions 9. The grade separated junction is located south of the site along the A465 (Heads of the Valleys Road).

The AM peak period was observed between 08:00 to 09:00 and the PM peak period was observed between 15:00 to 16:00.

The traffic volumes were input into the traffic model as an hourly flow. The software then synthesis a 15-minute profile (a bell curve) which represents a peak within a peak.

The traffic model and/ or additional results are available upon request.



#### **2020 Base**

During both the AM and PM peak the junction is operating within practical capacity and does not experience any notable queues.

## **2024 Base**

3% additional traffic has been forecast between 2020 and 2024. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### 2024 + Phase 2 Construction Traffic

In 2024 the additional traffic through the junction, due to the Phase 2 construction, is forecast to be 22% in the AM peak and 20% in the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

#### **2026** Base

5% additional traffic has been forecast between 2020 and 2026. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## 2026 + Operational Development Trips

In 2026 the additional traffic through the junction, due to the development, is forecast to be 12% in the AM peak and 11% in the PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

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## **2035** Base

12% additional traffic has been forecast between 2020 and 2035. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

## 2035 + Operational Development Trips

In 2035 the additional traffic through the junction, due to the development, is forecast to be 19% in the AM peak and PM peak. This has a negligible impact on the junction which continues to operate within capacity and without any noticeable queues.

AM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
A465 EB Off-slip	0.4	8.27	0.23	A
2024 Base				
A465 EB Off-slip	0.4	8.36	0.24	A
2024 With Phase 2 Const	truction Tr	affic Flows		
A465 EB Off-slip	0.5	9.11	0.3	A
2026 Base				
A465 EB Off-slip	0.4	8.41	0.24	A

2026 With Operation	al Developn	nent Trips		
A465 EB Off-slip	0.5	8.89	0.28	A
2035 Base				
A465 EB Off-slip	0.4	8.63	0.26	A
2035 With Operation	al Developn	nent Trips		
A465 EB Off-slip	0.5	9.13	0.3	A

PM Peak				
	Queue (PCU)	Delay (s)	RFC	LOS
2020 Base				
A465 EB Off-slip	0.8	10.41	0.39	В
2024 Base				
A465 EB Off-slip	0.8	10.64	0.4	В
2024 With Phase 2 Con	struction T	raffic Flows		
A465 EB Off-slip	1	11.65	0.45	В
2026 Base				
A465 EB Off-slip	0.8	10.76	0.4	В

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2026 With Operational Development Trips							
A465 EB Off-slip	0.9	11.37	0.44	В			
2035 Base	2035 Base						
A465 EB Off-slip	0.9	11.38	0.43	В			
2035 With Operational Development Trips							
A465 EB Off-slip	1.1	12.03	0.47	В			

# Appendix E

## ATC Data

#### JTC Survey Comparrison

January Survey						
Junction	AM Total (PCUs) 0800-0900	PM total (PCUs) 1500-1600				
A4067/A4221	1	5,354	618	550		
A4221/A4109	3	3,123	351	374		
Onllwyn Road/A4109	4	1,745	183	219		
B4242/A4109	5	7,306	456	483		
A465/A4109	6	4,323	740	837		

December Survey						
Junction	Junction		112 hr total (veh)	AM Total (PCUs) 0800-0900	PM total (PCUs) 1500-1600	
A4067/A4221		1	5,263	512	623	
A4221/A4109		5	3,073	309	366	
Onllwyn Road/A4109		6	1,700	173	209	
B4242/A4109		7	6,906	633	788	
A465/A4109		8	3,836	386	425	

	% Difference					
12 hr	AM	PM				
-2%	-17%	13%				
-2%	-12%	-2%				
-3%	-5%	-5%				
-5%	39%	63%				
-11%	-48%	-49%				

#### ATC Survey Comparrison

January Survey						
Hours	Site 1	Site 2	Site 3	Site 4	Total	
0000 - 0100	4	6	7	13	30	
0100 - 0200	1	1	2	3	7	
0200 - 0300	1	0	2	2	5	
0300 - 0400	0	0	3	4	7	
0400 - 0500	4	2	10	11	27	
0500 - 0600	26	32	61	101	219	
0600 - 0700	71	51	158	226	504	
0700 - 0800	118	93	246	338	795	
0800 - 0900	171	115	326	360	972	
0900 - 1000	140	102	180	210	632	
1000 - 1100	137	98	226	258	718	
1100 - 1200	159	114	206	223	701	
1200 - 1300	150	94	223	245	713	
1300 - 1400	135	98	218	259	710	
1400 - 1500	143	111	230	301	785	
1500 - 1600	142	156	276	338	911	
1600 - 1700	167	109	275	352	904	
1700 - 1800	159	128	253	316	855	
1800 - 1900	99	87	176	235	597	
1900 - 2000	87	61	97	118	363	
2000 - 2100	80	54	79	109	322	
2100 - 2200	34	18	48	52	152	
2200 - 2300	19	14	57	65	155	
2300 - 0000	10	7	11	20	48	

December Survey						
Hours	Site 1	Site 2	Site 3	Site 4	Total	
0000 - 0100	4	4	7	9	24	
0100 - 0200	2	1	3	5	11	
0200 - 0300	0	0	2	3	6	
0300 - 0400	2	1	4	4	11	
0400 - 0500	3	2	14	15	34	
0500 - 0600	23	19	50	69	161	
0600 - 0700	46	35	97	125	303	
0700 - 0800	79	65	163	233	539	
0800 - 0900	117	93	180	241	631	
0900 - 1000	119	89	169	226	602	
1000 - 1100	112	87	176	217	592	
1100 - 1200	133	98	201	245	678	
1200 - 1300	124	99	206	269	697	
1300 - 1400	127	100	219	285	731	
1400 - 1500	126	96	224	264	709	
1500 - 1600	157	128	260	318	863	
1600 - 1700	138	108	225	282	753	
1700 - 1800	137	100	198	256	691	
1800 - 1900	102	77	139	182	500	
1900 - 2000	70	53	82	118	323	
2000 - 2100	49	35	61	91	236	
2100 - 2200	35	23	40	58	156	
2200 - 2300	20	16	20	33	90	
2300 - 0000	7	5	11	17	39	

% Difference							
Site 1	Site 2	Site 3	Site 4	Total			
10%	-36%	-1%	-27%	-17%			
64%	21%	50%	70%	56%			
-57%	0%	-7%	48%	11%			
0%	0%	33%	-11%	51%			
-21%	4%	39%	35%	26%			
-12%	-40%	-18%	-31%	-27%			
-35%	-32%	-38%	-45%	-40%			
-33%	-31%	-34%	-31%	-32%			
-31%	-19%	-45%	-33%	-35%			
-15%	-13%	-6%	8%	-5%			
-18%	-11%	-22%	-16%	-18%			
-16%	-14%	-2%	10%	-3%			
-17%	4%	-8%	10%	-2%			
-6%	2%	0%	10%	3%			
-12%	-14%	-3%	-12%	-10%			
11%	-18%	-6%	-6%	-5%			
-17%	-1%	-18%	-20%	-17%			
-14%	-22%	-22%	-19%	-19%			
3%	-11%	-21%	-22%	-16%			
-20%	-13%	-15%	0%	-11%			
-39%	-35%	-23%	-16%	-27%			
1%	29%	-16%	12%	3%			
6%	13%	-64%	-49%	-42%			
-34%	-23%	1%	-17%	-18%			

## Appendix F

# Local Authority Correspondence

#### **Aneesah Irshad**

From: Alex Welch

**Sent:** 09 October 2020 12:42

To: Justin W. Griffiths; Steve Jones
Cc: Damian Barry; Aneesah Irshad
Subject: GCRE - TA Meeting Notes

#### Both,

Thanks again for finding the time to discuss your comments on the TA and wider application. Please find below the action points as we have taken them, can you please check and provide any amendments at the earliest opportunity. If you are happy that they are a true representation of the conversation we would appreciate confirmation by reply.

#### Re Survey

- Both Local Authorities have instructed the resurvey to take place as soon as possible during Covid but excluding the October half term to enable a better representation of traffic movements. This would include a 7 day ATC and 12 hour Classified Junction Turning Count on a neutral day of all previous survey points plus 2 additional junctions Onllwyn Road/Coelbren cross roads and Celtic Energy access on the A4221. (AW/AI)
- Scope for timing of survey (i.e. submission/Powys street works department/survey operation availability) to be considered (DB/AW/AI)

Visitors/Enthusiasts – How are we going to dissuade passengers from parking on certain roads?

- Currently assessed as a close facility but acknowledgement that we will need to address a potential demand from enthusiasts. (DB to discuss with client/masterplanner)
- Concern of enthusiast parking on Onllwyn Road and A4221 as no parking restrictions exist, especially if the view of GCRE is visible. (AW/AI to speak internally with colleagues to check views). Therefore, mitigation is to be considered i.e. Management plan, P&R, Car park overspill etc... but preference is for parking facility to be on site.
- Consideration of PROW through site should also be considered. (DB (through PROW discussion)/AW/AI)

#### Access to site

- A4221/Onllwyn Road This will only be a secondary access and is not considered a main access point to site however should still be considered within the TA. (AI/AW)
- Currently no live traffic movements are considered at the Celtic energy access. Existing flows from Celtic Energy/resurvey to be considered within TA anticipated that GCRE flows will be less. (AW/AI)
- Celtic energy access to be included within junction assessment in TA. However no details of any future schemes are available and are very much at the ideas stage (AW/AI)

#### Active Travel

- Mention of PROW to be active travel compliant between Ystrad and site More detail required.. what upgrades are needed/if any? (AW/AI)
- Wembley/Onllwyn Road junction what is required? Traffic orders/Visitor provision? (AW/AI)

#### Distribution of flows

• To be reconsidered – Powys distribution too low. Current distribution closely linked to existing census travel to work but will be amended/uplifted to provide a robust case for Powys. (AW/AI)

### Other (Alex/Aneesah)

- AT routes to be discussed in more detail;
- TA is currently only carried out for 11 years and should be 15. This will be revised;
- Use percentages within conclusions to make the TA easier for reader to digest. i.e. HGV will reduce by xx% etc;
- Consideration of emergency access required;
- Include a plan of routes from Glynneath to site for construction traffic etc so it's easy to digest visually;
- Parking standards using NPT LDP 2016 to be included;
- Include note of new development within Glynneath. Dates and number of residential dwellings unknown (**DB to ask Steve Ball**). Impact will be negligible but should be mentioned within TA;
- Site is on hill so expected that mode split will be car dominant and this should be reflected within TA; and
- Construction Method Statement needed (loading/unloading, storage, dust management, washing facility etc) and mention of 278 agreement and road safety audit that will be required this is included within the Framework Construction Traffic Management Plan and will be further developed once a contractor is appointed post permission.

Kindest regards,

Alex

### Alex Welch

Transport | Consulting West BA(Hons) MSc CTPP MCIHT MTPS

#### Arup

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## Appendix G

Active Travel Map: Seven Sisters

## Map 5 - Seven Sisters

Neath Port Talbot Council The Quays, Brunel Way Baglan Energy Park Neath SA11 2GG



Produced by the Active Travel web site. Gynhyrchwyd gan y wefan Teithio Llesol.

