Pell Frischmann

Swarclett Wind Farm

Technical Appendix 11-1 Transport Assessment

April 2024

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1 Introduction

1.1 Purpose of the Report

Pell Frischmann Consultants Ltd (PF) have been commissioned by Wind2 Ltd on behalf of Swarclett Wind Farm Ltd (the Applicant), to undertake a Transport Assessment (TA) for the proposed Swarclett Wind Farm (the Proposed Development), located approximately 11 kilometres (km) southeast of Thurso, in The Highland Council (THC) administrative area.

The report identifies the key transport and access issues associated with the Proposed Development, including the route for abnormal loads. The TA identifies where the Proposed Development may require mitigation works to accommodate the predicted traffic; however, the detailed design of these remedial works is beyond the agreed scope of this report. Any mitigations works will be agreed with THC and Transport Scotland (TS) prior to construction and deliveries taking place.

1.2 Report Structure

Following this introduction, the TA report is structured as follows:

- Section Two describes the Proposed Development;
- Section Three reviews the relevant transport and planning policies;
- Section Four sets out the methodology used within this assessment;
- Section Five describes the baseline transport conditions;
- Section Six describes the trip generation and distribution of traffic in the Study Area;
- Section Seven summarises the traffic impact assessment;
- Section Eight considers mitigation proposals for development related traffic within the study network; and
- Section Nine summarises the findings of the TA and outlines the key conclusions.

2 Proposed Development

2.1 Site Location

The Proposed Development Site is located approximately 11km southeast of Thurso and 4km north of Loch Watten, within the THC administrative area. The site comprises an area of approximately 34 hectares (ha). The site is primarily grassland pastures including improved, semi-improved neutral marshy grasslands, used for rough grazing.

The location of the site is shown in Figure 1.

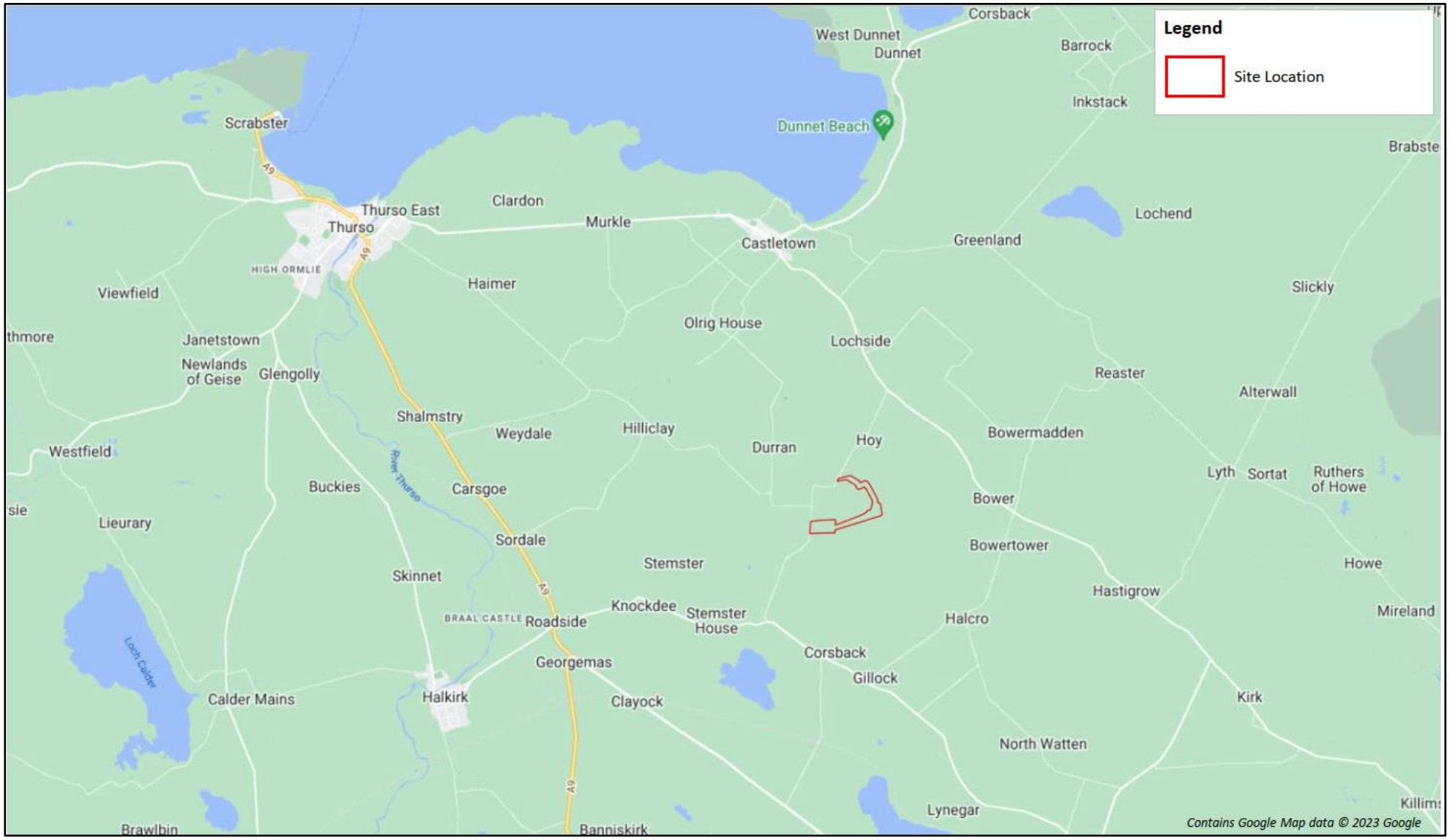
2.2 Proposed Development

The Proposed Development will comprise the following:

- two turbines, each with a maximum tip height of 149.9 metres (m);
- crane hardstandings adjacent to each turbine position;
- turbine foundations;
- Battery Energy Storage System (BESS) of up to 12MW;
- onsite access tracks between turbines and from the point of access to the turbines;
- onsite substation and maintenance building with welfare facility;
- on site electrical cabling between the turbines and the substation and energy storage system; and
- temporary construction compound(s).

A complete description of the Proposed Development for the purposes of the Environmental Impact Assessment (EIA) regulations is provided in the EIA Report Volume 2: Chapter 3, Description of the Development.

Figure 1 Site Location



2.3 Candidate Turbines

The Vestas V136 was selected by the Applicant as the candidate turbine for the purposes of this TA, to demonstrate a worst case in terms of transporting component loads. Details of the V136 turbine have been obtained directly from Vestas. The details of the components are summarised in Table 1.

Table 1 Turbine Component Size Summary

Component	Length (m)	Width (m)	Height / Min Diameter (m)	Weight (t)
V136 Blade	66.770	4.265	3.124	15.701
Base Tower	19.640	4.310	4.000	75.000
Mid Tower	29.960	4.025	3.650	64.000
Top Tower	30.000	3.667	3.238	45.500

A detailed Route Survey Report (RSR) outlining the turbine components in detail and the proposed access route is attached in Appendix A.

The selection of the final turbine model and specification will subject to a commercial procurement process following consent of the application. The assumed dimensions may therefore vary slightly from those assumed as part of this assessment and within the appended RSR.

The most appropriate Port of Entry (POE) for the site is Wick Harbour. The port has been previously used by renewables deliveries in the past for a number of wind farms including Burn of Whilk Wind Farm.

There will be a requirement to utilise a number of transport methods to move the various turbine components along the access routes. The access / egress from Wick Harbour is constrained and as such, a blade lifting trailer will likely be required to exit the port and the town for all blade loads. Once they have left the southern extents of the town, they would be transferred to a standard Super Wing Carrier, which would be used through to the site. This will provide a suitably robust assessment scenario based upon the known issues along the access routes.

Given the sizes of the proposed top tower sections, these along with other loads such as the hub and nacelle housing will be carried on a six-axle step frame trailer. The base and mid tower would be carried in a 4+7 clamp trailer.

Examples of the vehicles and trailers that are likely to transport loads are shown in Figure 2, 3 and 4.

Figure 2 Super Wing Trailer

Figure 3 Blade Lifter Trailer

Figure 4 Tower Trailer

3 Policy Context

3.1 Introduction

An overview of relevant transport planning policies has been undertaken and is summarised below for national and local government policies.

3.2 National Policy and Guidance

3.2.1 National Planning Framework (NPF4)

The National Planning Framework (NPF) is a long-term plan for Scotland that sets out where development and infrastructure is needed in the country. NPF4 sets out the Government's plan looking forward to 2045 that will guide spatial development, set out national planning policies, designate national developments and highlight regional spatial priorities. It is part of the development plan, and so influences planning decisions across Scotland.

NPF4 puts the climate and nature crises at the heart of the Scottish planning system and was adopted in February 2023.

Policy 11: Energy within the NPF4 notes that:

"Development proposals for all forms of renewable, low-carbon and zero emissions technologies will be supported. These include:

- *Wind farms including repowering, extending, expanding and extending the life of existing wind farms; and*
- *Energy storage, such as battery storage and pumped storage hydro.*

In addition, project design and mitigation will demonstrate how the following impacts are addressed:

- *Impacts on communities and individual dwellings, including, residential amenity, visual impact, noise and shadow flicker;*
- *Public access, including impact on long distance walking and cycling routes and scenic routes;*
- *Impacts on road traffic and on adjacent trunk roads, including during construction; and*
- *Cumulative impacts."*

3.2.2 Planning Advice Note (PAN) 75

Planning Advice Note (PAN) 75: Planning for Transport provides advice on the requirements for Transport Assessments. The document notes that:

"… transport assessment to be produced for significant travel generating developments. Transport Assessment is a tool that enables delivery of policy aiming to integrate transport and land use planning."

"All planning applications that involve the generation of person trips should provide information which covers the transport implications of the development. The level of detail will be proportionate to the complexity and scale of the impact of the proposal...For smaller developments the information on transport implications will enable local authorities to monitor potential cumulative impact and for larger developments it will form part of a scoping exercise for a full transport assessment. Development applications will therefore be assessed by relevant parties at levels of detail corresponding to their potential impact."

3.2.3 Onshore Wind Turbines; Online Renewables Planning Advice (May 2014)

The most recent Scottish Government advice note regarding onshore wind turbines was published in 2014. The advice note identifies the typical planning considerations in determining applications for onshore wind turbines including landscape impact, impacts on wildlife and ecology, shadow flicker, noise, ice throw, aviation, road traffic impacts, cumulative impacts and decommissioning.

In terms of road traffic impacts, the guidance notes that in siting wind turbines close to major roads, pre-application discussions are advisable. This is important for the movement of abnormal indivisible loads during the construction period, ongoing planned maintenance and for the decommissioning phase.

3.2.4 Transport Assessment Guidance (2012)

Transport Scotland's (TS) Transport Assessment Guidance was published in 2012. It aims to assist in the preparation of Transport Assessments (TA) for development proposals in Scotland such that the likely transport impacts can be identified and dealt with as early as possible in the planning process. The document sets out requirements according to the scale of development being proposed.

The document notes that a TA will be required where a development is likely to have significant transport impacts but that the specific scope and contents of a TA will vary for developments, depending on location, scale and type of development.

3.3 Local Policy and Guidance

3.3.1 West Highland and Islands Local Development Plan (2019)

The West Highland and Islands Local Development Plan (LDP) was adopted in September 2019 and is the Council's vision for the West Highlands and Islands area, focusing on four inter-related headline outcomes, namely; Growing Communities, Employment, Connectivity and Transport, and Environment and Heritage.

The LDP does not contain any specific transport policy guidance for the Proposed Development. However, within the Connectivity and Transport vison set out in the plan, reference is made to specific transport improvement schemes that would fall within the likely Study Area for the Proposed Development. Reference to the A87 is made and the following improvements proposed:

"A87 to A855 – Portree Link Road: Listed in the accompanying Action Programme, shown on the Spatial Strategy Map, listed in the Council's Capital Programme, and land safeguarded on Portree Settlement Map. Developer Contributions sought towards its completion."

3.3.2 Highland-wide Local Development Plan (2012)

The Highland-wide LDP was adopted by THC in April 2012 and is the established planning policy for the Highlands. It sets out a settlement strategy and spatial framework for how THC foresees development occurring in the forthcoming twenty-year period.

The LDP does not contain any specific transport policy guidance for the Proposed Development. However, Policy 56 is relevant with regards to general transport policy. The relevant transport elements from this policy are:

"Development proposals that involve travel generation must include sufficient information with the application to enable the Council to consider any likely on- and off- Site transport implications of the development and should:

- *incorporate appropriate mitigation on Site and/or off Site, provided through developer contributions where necessary, which might include improvements and enhancements to the walking/cycling network and public transport services, road improvements and new roads; and*
- *incorporate an appropriate level of parking provision, having regard to the travel modes and services which will be available and key travel desire lines and to the maximum parking standards laid out in Scottish Planning Policy or those set by the Council.*

When development proposals are under consideration, the Council's Local Development Strategy will be treated as a material consideration.

The Council will seek the implementation and monitoring of Green Travel Plans in support of significant travel generating developments."

3.3.3 The Inner Moray Firth Local Development Plan (2015)

The Inner Moray Firth Local Development Plan (IMFLDP) was adopted in 2015 and provides guidance for development within Inner Moray Firth area for 20 years. The Transport Appraisal document supports the IMFLDP and notes that the IMFLDP aims to:

- *optimise the use of existing infrastructure;*
- *reduces the need to travel;*
- *facilitates travel by public transport and freight movement by rail or water;*
- *provides safe and convenient opportunities for walking and cycling; and*
- *enables the integration of transport modes.*

3.3.4 Onshore Wind Energy Supplementary Guidance (2016)

The Onshore Wind Energy Supplementary Guidance was adopted by THC in 2016. In relation to traffic and transport interests, the guidance document notes that:

"All proposals should seek to avoid significant adverse effects on the public road network individually and cumulatively with other built and permitted proposals as well as valid planning applications not yet determined (the weight apportioned to each will reflect their position in the planning process).

The proposals for the use of the public roads and mitigation works will require the approval of the Roads Authority. Developers will be required to enter into a Section 96 (Roads Scotland Act) agreement with the Council to cover damage to the public roads by construction traffic and may be required to provide a bond as surety.

Developers will be required to undertake a Transport Assessment to establish the transport impacts of the construction traffic associated with the development, the suitability of the existing road network, the impact on existing road users and adjacent communities, and the requirement for any mitigation works."

3.3.5 Guidance on the Preparation of Transport Assessments (2014)

THC has prepared guidance on how Transport Assessments (TA) should be prepared for development sites within the Highlands. The guidance was published by THC in November 2014.

This TA has noted the guidelines and has provided the required assessment.

3.3.6 Roads and Transport Guidelines for New Developments (2013)

This THC document outlines the guidance and standards for the provision of infrastructure within THC administrative area, which includes the design and construction of all new roads associated with development proposals.

THC's Roads and Transport Guidelines for New Developments document provides guidance in relation to transport implications of onshore wind farm developments. The elements of the policy are applicable, namely:

"…a developer should be aware that the Council will require a Transportation Assessment (TA) to be submitted that must consider the existing road network, transportation constraints and potentially sensitive routes or communities.

A wind farm vehicular Site access must provide appropriate visibility splays and suitable surface water drainage. Within the Site, the wind turbines are likely to be located some distance from the nearest public road, requiring internal access tracks to be constructed. As the access tracks need to accommodate abnormal loads, they have to be of a suitable width. These tracks are normally constructed from hard-core material and the developer will usually be encouraged/allowed to use material obtained from borrow pits within the Site area, to reduce construction traffic. On-Site concrete batching should also be considered, as this can also result in a reduction of associated vehicles on the local road network.

A suitable turning area must be constructed within the Site, to accommodate abnormal load delivery vehicles, construction vehicles and future maintenance vehicles. During the construction period, a wheel-wash system shall be provided."

3.4 Policy and Guidance Summary

The Proposed Development can align with the stated policy objectives and the design of the Proposed Development and proposed mitigation measures will ensure compliance with national and local objectives.

4 Study Methodology

4.1 Introduction

There are three phases of the Proposed Development, which have been considered in this assessment and are as follows:

- the Construction Phase;
- the Operational Phase; and
- the Decommissioning Phase.

4.2 Project Phases – Transport Overview

Of the three phases, the construction phase is considered to have the greatest impact in terms of transport and potential impacts on the road network and any sensitive receptors. Construction plant, bulk materials and wind turbine components will be transported to site, potentially resulting in a significant increase in traffic on the Study Area.

The operational phase is restricted to occasional maintenance operations, which generate significantly lower volumes of traffic, considerably below typical daily traffic variation levels on the road network.

The decommissioning phase involves fewer trips on the road network than the construction phase, as minor elements of infrastructure are likely to be left in place, adding to local infrastructure that can potentially be used for further agricultural or leisure uses in the future.

4.3 Scoping Discussions

The Applicant submitted a request for scoping opinion to the Scottish Ministers in respect of the EIA which included a section considering traffic and transport. A full review of that scoping opinion and other correspondence relating to the scope of the study including pre-application advice is provided in EIA Report Volume 2: Chapter 11, Transport and Access.

5 Baseline Conditions

5.1 Access Arrangement

The Proposed Development will be accessed via an upgraded simple priority junction on the C1069 Poolhoy / Wester Road, located approximately 1.9km to the south of its junction with the B876, during the operational phase. The junction currently provides access to the site for agricultural purposes and this would be upgraded to the appropriate standards as set by THC.

Access during the construction phase of the Proposed Development, will be via a new access located approximately 470m to the south of the junction between the C1069 Poolhoy / Wester Road and the C1025 Thurso / Hilliclay / Bishophill Road. The construction access would be used for all abnormal loads associated with the turbine deliveries, as well as access for Heavy Goods Vehicles (HGVs) delivering construction materials and general site traffic. An indicative layout of the proposed junction on the C1069 Poolhoy / Wester Road and swept path assessment is presented in Appendix B as Drawing SK01 to SK03.

Following the construction phase, the southern access would be stopped up and only used in the event of turbine component replacements. All operational traffic for the purposes of site maintenance would access the site via the northern access, at the existing field access location.

Construction traffic associated with the delivery of materials to the Proposed Development will approach the site predominantly from the south on the C1069 Poolhoy / Wester Road which links to the wider local road network and local quarries. Other construction materials will originate from the A9(T) to the southwest. Minimal levels of HGV construction traffic is proposed to access the site from the local road network to the north. All Abnormal Indivisible Load (AIL) traffic access will also access the Proposed Development via the A9(T) from the POE at Wick Harbour, utilising proven abnormal load routes.

5.2 Study Determination

The Study Area has been based on those roads that are expected to experience increased traffic flows associated with the construction of the Proposed Development. The geographic scope was determined through a review of the other developments in the area, Ordnance Survey (OS) plans and an assessment of the potential origin locations of construction staff and supply locations for construction materials.

It is estimated that the majority of construction personnel will come from local settlements including Thurso to the northwest and Wick to the southeast. Those personnel travelling from the Thurso area will likely do so via the A9(T), before accessing the site from the west on the U2188 Weydale Road, U2196 Sordale / Hilliclay Road and C1069 Poolhoy / Wester Road. Those coming from the Wick area will likely come via the A882 to the east, before heading north to the site via the U1782 Dunn / Corsback Road, B874 and C1069 Poolhoy / Wester Road.

It is possible that some construction personnel may reside in local accommodation during the working week, in which case the traffic effect on the road network will be reduced.

Wherever practical, construction materials will be sourced from local suppliers, including two local quarries located to the south in close proximity to Loch Watten. It is considered that a number of route options are available to access the Proposed Development from the local quarries, the majority of which are unclassified roads. It would be proposed to route traffic via the shortest most direct routes, thus reducing the potential impacts of HGV traffic on the wider area and allowing for easier management of vehicles and construction personnel.

As detailed above, the likely POE used for the discharging of turbine components will be Wick Harbour, with AILs routing to the site via Martha Terrace / River Street, A99(T), A9(T), U2188 Weydale Road, C1025 Thurso / Hilliclay / Bishophill Road and C1069 Poolhoy / Wester Road. Full details of the AIL routes are provided later in the report.

Based on the above and taking cognisance of the scale of the Proposed Development and types of roads used to access the site, the Study Area for the assessment has therefore been assumed to be as follows:

- A9(T), between the B870 at Mybster and the U2188 junction;
- A9(T), between Thurso and the U2188 junction;
- A882, between Wick and the A9(T) junction;
- B874, between the A9(T) and the U1304 Faulds Road;
- U1782 Dunn / Corsback Road;
- U1304 Faulds Road;
- U1300 Gersa / Halcro Road, between the U1304 Faulds Road junction and the B870;
- U2188 Weydale Road, between the A9(T) and the C1025 Thurso / Hilliclay / Bishophill Road;
- C1025 Thurso / Hilliclay / Bishophill Road, between the U2188 Weydale Road and the C1069 Poolhoy / Wester Road;
- B876, between Wick and the C1069 Poolhoy / Wester Road; and
- C1069 Poolhoy / Wester Road, between the B876 and the B874.

The above can be seen on Figure 5, on the following page.

Effects associated with construction traffic generated by the Proposed Development will be most pronounced in close proximity to the site access junction and on the final approaches to the site. As vehicles travel away from the Proposed Development, they will disperse across the wider road network, thus diluting any potential effects. It is therefore expected that the effects relating to construction traffic are unlikely to be significant beyond the Study Area identified above.

Figure 5 Transport Assessment Study Area

5.3 Pedestrian and Cyclist Networks

There are limited pedestrian facilities in the immediate vicinity of the Proposed Development Site, reflecting the rural nature of the site. There are no facilities on the C1069 Poolhoy / Wester Road, where the proposed site access junction will be located. In addition, there are no facilities on any of the other local roads in the vicinity of the Proposed Development Site.

Further away from the Proposed Development in the wider Study Area, there are pedestrian facilities within the larger local settlements, including Thurso and Wick, which are commensurate with the scale of the settlements. With regards to the smaller settlements and roads within the Study Area, the following facilities are available:

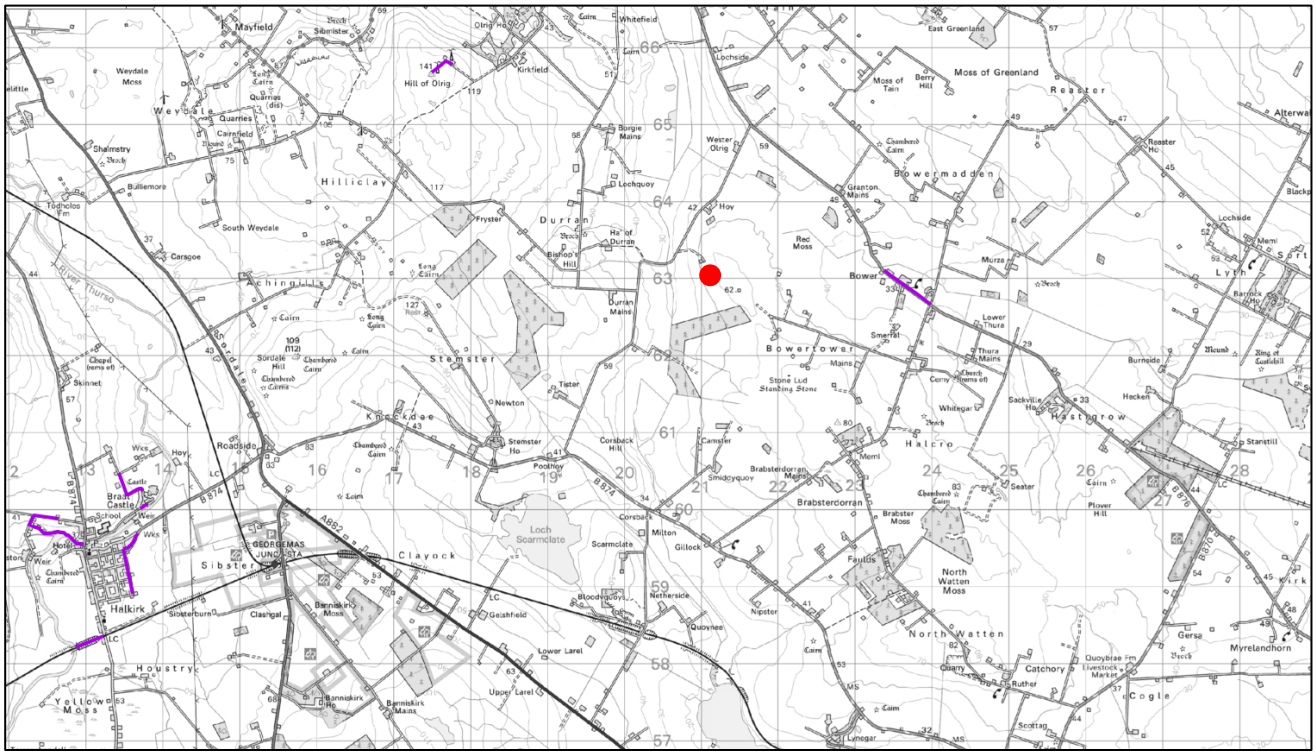
- Reiss (B876)
  - pedestrian footway on the southern side of the carriageway for a distance of approximately 570m
- B876
  - pedestrian footway on the northern side of the carriageway from Bower Primary School to Bower for a distance of approximately 750m
- Watten (A882)
  - pedestrian footway on the northern side of the carriageway on entry to the village from the east, from the vicinity of Loch Watten House, for a distance of approximately 565m
  - pedestrian footway on both side of the carriageway from Watten Primary School to Watten Village Hall, for a distance of approximately 215m
  - pedestrian footway on the southern side of the carriageway from Watten Primary School to the western extents of the village for a distance of approximately 380m
  - zebra crossing at Watten Primary School
- Spital (A9(T))
  - pedestrian footway on the western side of the carriageway on entry to the village from the south for a distance of approximately 210m, at which point it continues on the eastern side of the carriageway for a distance of approximately 350m
- Latheron
  - short sections of pedestrian footway on all sides of the A99(T) / A9(T) junction, with drop kerbs and tactile paving
  - pedestrian footway on the northern side of the carriageway on the western extents of the village, continuing through to Latheronwheel to the west
- Lybster (A99(T))
  - pedestrian footways on one or both sides of the carriageway through the village, with drop kerbs and tactile paving at crossing points
- Thrumster (A99(T))
  - pedestrian footways on at least one side of the carriageway through the village

It is considered that the level of pedestrian infrastructure is commensurate with the scale of the local settlements and their rural setting.

A review of THC's Core Path network[1] indicates that there are no Core Paths in the immediate vicinity of the Proposed Development Site, as can be seen in Figure 6 (the location of the proposed site access junction can be seen by the red marker). The closest Core Path (CA02.01) is located on the B876 to the north-east and is a short section of roadside footway.

[1] The Highland Council, Core Paths in Highland Council area plan: https://highland.maps.arcgis.com/apps/webappviewer/

Figure 6 Core Path Plan (The Highland Council)



A review of Sustrans' National Cycle Route (NCR) map[2] does not show any national cycle routes in the immediate vicinity of the Proposed Development Site or on the proposed construction access routes. The closest route is the on-road Inverness to John O' Groats route.

5.4 Road Access

A99(T)

The A99(T) follows the east coast of Caithness from Latheron in the south, where it meets the A9(T), through to Wick and John O' Groats in the north. It is a key trunk route in the northeast of the Highlands and is maintained by BEAR (North West) on behalf of TS. The road is a single carriageway road, operating with one lane in each direction. The national speed limit is in place outwith villages and settlements, where it reduces to 30, 40 or 50 miles per hour (mph). The road is considered to be in good condition and maintained to a high standard.

A9(T)

The A9(T) is a strategic link from the Highlands to the Central Belt, linking Polmont in the south with Scrabster in the north. It is a key trunk route in the northeast of the Highlands and is maintained by BEAR (North West) on behalf of TS. In the vicinity of the Proposed Development, the road is a single carriageway road, operating with one lane in each direction. The national speed limit is in place outwith villages and settlements, where it reduces to 30, 40 or 50mph. The road is considered to be in good condition and maintained to a high standard.

B876

The B876 is a B-class road maintained by THC, running from Castletown in the north to Reiss in the south, for a distance of 19.5km. The road is a single carriageway road, with one lane operating in each direction. The national speed limit is in place outwith villages and settlements, where it reduces to 30 or 40mph. The road is considered to be in good condition and maintained to a good standard.

[2] https://www.sustrans.org.uk/national-cycle-network

A882

The A882 is a A-class road maintained by THC, running from its junction with the A9(T) to the west and Wick in the east, for a distance of 23km. The road is a single carriageway road, with one lane operating in each direction. The national speed limit is in place outwith villages and settlements, where it reduces to 30mph. The road is considered to be in good condition and maintained to a good standard.

B870

The B870 is a B-class road maintained by THC, running from its junction with the B876 to the southeast of Bower to Glengolly, to the south of Thurso, for a distance of 37km. The road is a single track road of varying width through its length. In the vicinity of the Proposed Development, it is single track, with passing places and the national speed limit in place, except through the village of Watten, where it reduces to 30mph.

B874

The B874 is a B-class road maintained by THC, running from its junction with the A9(T) in the west to the A99(T) in the east, for a distance of 23km. The road is a single track road of varying width through its length. In the vicinity of the Proposed Development, it is single track, with passing places and the national speed limit in place.

C1025 Thurso / Hilliclay / Bishophill Road

The C1025 is a C-class road maintained by THC, running from Thurso in the north to the C1069 in the vicinity of the Proposed Development, for a distance of 10km. The road is a single track road of varying width through its length. In the vicinity of the Proposed Development, it is single track, with passing places and the national speed limit in place.

U2188 Weydale Road

The U2188 Weydale Road is an unclassified road maintained by THC, commencing at its junction with the A9(T) near Bulliemore and running in an easterly direction to its junction with the C1025 near Hilliclay, for a distance of approximately 3km. The road is a single track road of varying width through its length. In the vicinity of the Proposed Development, it is single track, with passing places and the national speed limit in place.

U2196 Sordale / Hilliclay Road

The U2196 Sordale / Hilliclay Road is an unclassified road maintained by THC, commencing at its junction with the A9(T) near Sordale and running in a north easterly direction to its junction with the C1025 at Hilliclay, for a distance of approximately 3.6km. The road is a single track road of varying width through its length. In the vicinity of the Proposed Development, it is single track, with passing places and the national speed limit in place.

C1069 Poolhoy / Wester Road

The C1069 is a C-class road maintained by THC, running from its junction with the B874 in the south with the B876 in the north for a distance of approximately 5.4km, passing the western Proposed Development Site boundary. The road is a single track road of varying width through its length. In the vicinity of the Proposed Development, it is single track, with passing places and the national speed limit in place.

U1782 Dunn / Corsback Road

The U1782 Dunn / Corsback Road is an unclassified road maintained by THC, commencing at its junction with the A882 in the south to the B874 in the north, running for a distance of approximately 2.96km. The road is a single track road of varying width through its length, with passing places and the national speed limit in place. The road provides access to the John Gunn & Sons quarry.

U1300 Gersa / Halcro Road

The U1300 Gersa / Halcro Road is an unclassified road maintained by THC, commencing at its junction with the B870 in the east running to the U1755 at Halcro in the west, running for a distance of approximately 4.84km. The road is a single track road of varying width through its length, with passing places and the national speed limit in place. The road provides access to the A & W Sinclair quarry.

U1304 Faulds Road

The U1304 Faulds Road is an unclassified road maintained by THC, commencing at its junction with the U1300 Gersa / Halcro Road in the north with the B874 in the south, for a distance of approximately 1.48km. The road is a single track road of varying width through its length, with passing places and the national speed limit in place.

General Road Suitability

A number of the roads within the Study Area form part of the agreed route network used for the extraction of timber and are therefore regularly used by HGV traffic. This includes the A9(T), A882 and A99(T) which are 'Agreed Routes' and the B876, B870 and B874, which are 'Consultation Routes'.

The Agreed Timber Route Map[3] has been developed by The Timber Transport Forum who are a partnership of the forestry and timber industries, local government, national government agencies, timber hauliers and road and freight associations. One of the key aims of the forum is to minimise the impact of timber transport on the public road network, on local communities and the environment and a way of achieving this is to categorise the roads leading to forest areas in terms of their capacity to sustain the likely level of timber haulage vehicles i.e., HGVs. The routes are categorised into four groups, namely; 'Agreed Routes', 'Consultation Routes', 'Severely Restricted Routes' and 'Excluded Routes'.

'Agreed Routes' are categorised as routes used for timber haulage without restriction as regulated by the Road Traffic Act 1988. A-roads are classified as 'Agreed Routes' by default unless covered by one of the other road classifications. Those links classed as 'Consultation Routes' are categorised as a route which is key to timber extraction, but which are not up to 'Agreed Route' standard. Consultation with the local authority is required, and it may be necessary to agree limits of timing, allowable tonnage etc. before the route can be used. B-roads are classified as 'Consultation Routes' by default unless covered by one of the other classifications. 'Severely Restricted Routes' are not normally to be used for timber transport in their present condition. These routes are close to being Excluded Routes. Consultation with the local authority is required prior to use. Finally, 'Excluded Routes' should not be used for timber transport in their present condition. These routes are either formally restricted, or are close to being formally restricted, to protect the network from damaging loads.

5.5 Existing Traffic Conditions

In order to assess the impact of construction traffic within the Study Area, Annual Average Daily Traffic (AADT) flows were obtained from the UK Department for Transport (DfT) traffic database[4]. Available 2019 flow information was obtained for all locations, as these flows would be unaffected by Covid-related travel restrictions. The traffic counts sites used were as follows:

1. A9(T), between the B870 at Mybster and the U2188 junction (DfT 10800, ATC count);
2. A9(T), between Thurso and the U2188 junction (DfT 40956, estimated count);
3. A882, between Wick and the A9(T) junction (DfT 30804, estimated count);
4. B874, between the A9(T) and the U1304 Faulds Road (DfT 811483, manual count); and
5. B876, between Wick and the C1069 Poolhoy / Wester Road (DfT 1013, estimated count).

DfT traffic data allow the traffic flows to be split in vehicle classes. The data was summarised into Cars/Light Goods Vehicles (LGVs) and HGVs (all goods vehicles >3.5tonnes gross maximum weight).

[3] http://timbertransportforum.org.uk/
[4] https://roadtraffic.dft.gov.uk/#6/55.254/-6.053/basemap-regions-countpoints

These traffic count sites were identified following a desk study and review of online mapping resources along the access routes to determine the location of sensitive receptors. A full receptor sensitivity and effect review is prepared in EIA Report Volume 2: Chapter 11, Transport and Access.

With regards to those other roads potentially used to access the Proposed Development Site, these are all single track roads with passing places, generally serving a small number of isolated dwellings and providing access to areas used for agricultural purposes. These roads are generally very lightly trafficked and should they be used by a significant number of construction vehicles; the percentage increase will likely be significant. As such rather than use the base flows to determine if an assessment is required, one has been undertaken regardless on the following roads:

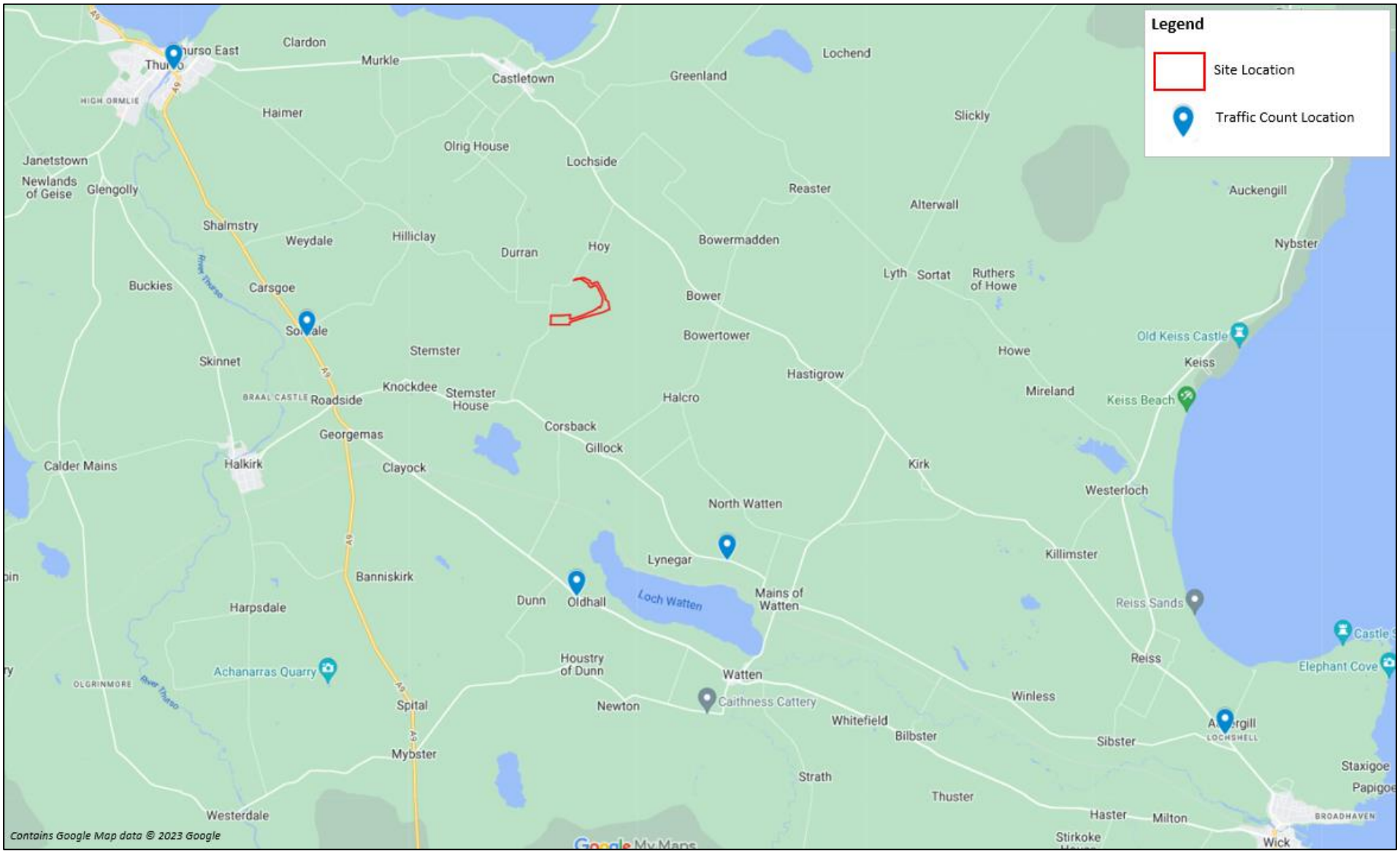
6. U1782 Dunn / Corsback Road;
7. U1304 Faulds Road;
8. U1300 Gersa / Halcro Road, between the U1304 Faulds Road junction and the B870;
9. U2188 Weydale Road, between the A9(T) and the C1025 Thurso / Hilliclay / Bishophill Road;
10. C1025 Thurso / Hilliclay / Bishophill Road, between the U2188 Weydale Road and the C1069 Poolhoy / Wester Road; and
11. C1069 Poolhoy / Wester Road, between the B876 and the B874.

Figure 7 shows the location of the surveys, while Table 2 summarises the AADT traffic data collected and used in this assessment.

Table 2 24-hour Average Traffic Data (2019)

Survey Location	Cars / LGV	HGV	Total	% HGVs
A9(T), between the B870 at Mybster and the U2188 junction	2,639	301	3,469	8.7%
A9(T), between Thurso and the U2188 junction	13,958	272	14,230	1.9%
A882, between Wick and the A9(T) junction	1,797	96	1,893	5.1%
B874, between the A9(T) and the U1304 Faulds Road	154	8	162	4.9%
B876, between Wick and the C1069 Poolhoy / Wester Road	3,469	172	3,641	4.7%

Figure 7 Traffic Count Location



5.6 Accident Review

Personal Injury Accident (PIA) data for the five-year period covering 2017 to 2021, was obtained from the online resource CrashMap[5] which uses data collected by the police about road traffic crashes occurring on British roads, where someone is injured.

TA Guidance[6] requires an analysis of the PIA on the road network in the vicinity of any development to be undertaken for at least the most recent 3-year period, or preferably a 5-year period, particularly if the site has been identified as being within a high accident area.

For the purposes of the PIA review, the following road links have been assessed:

- A9(T), between the B870 junction and the A836 junction in Thurso;
- U1782 Dunn / Corsback Road;
- U1304 Faulds Road;
- U1300 Gersa / Halcro Road, between the U1304 Faulds Road junction and the B870;
- U2188 Weydale Road, between the A9(T) and the C1025 Thurso / Hilliclay / Bishophill Road;
- C1025 Thurso / Hilliclay / Bishophill Road, between the U2188 Weydale Road and the C1069 Poolhoy / Wester Road;
- B876, between Wick and the C1069 Poolhoy / Wester Road;
- B874, between the A9(T) and the U1304 Faulds Road;
- A882, between Wick and the A9(T) junction; and
- C1069 Poolhoy / Wester Road, between the B876 and the B874.

The statistics are categorised into three categories, namely “Slight”, “Serious” and “Fatal”, for those accidents that result in a death. The locations and severity of the recorded accidents are summarised in Table 3, while Figure 8 shows their locations.

Table 3 Personal Injury Accident Summary

Survey Location	Slight	Serious	Fatal	HGV Incidents
A9(T), between the B870 junction and the A836 junction in Thurso	8	1	0	2
U1782 Dunn / Corsback Road	0	0	0	0
U1304 Faulds Road	0	0	0	0
U1300 Gersa / Halcro Road, between the U1304 Faulds Road junction and the B870	0	0	0	0
U2188 Weydale Road, between the A9(T) and the C1025 Thurso / Hilliclay / Bishophill Road	0	0	0	0
C1025 Thurso / Hilliclay / Bishophill Road, between the U2188 Weydale Road and the C1069 Poolhoy / Wester Road	0	0	0	0
B876, between Wick and the C1069 Poolhoy / Wester Road	3	2	0	0
B874, between the A9(T) and the U1304 Faulds Road	2	0	0	0
A882, between Wick and the A9(T) junction	11	1	1	2
C1069 Poolhoy / Wester Road, between the B876 and the B874	0	0	0	0
Total	**24**	**4**	**1**	**4**
Percentage	**82.8%**	**13.8%**	**3.4%**	**-**

[5] https://www.crashmap.co.uk/
[6] https://www.transport.gov.scot/media/4589/planning_reform_-_dpmtag_-_development_management__dpmtag_ref__17__-_transport_assessment_guidance_final_-_june_2012.pdf

Figure 8 PIA Locations

A summary analysis of the incidents indicates that:

- A total of 29 PIAs were recorded within the assessed area, within the last five-year period;
- Of those 29 PIAs, 24 were classified as "Slight" (82.8%), four were classified as "Serious" (13.8%) and there was one "Fatal" (3.4%) recorded;
- One of the "Slight" PIAs involved a pedestrian who was a child, and was struck by a car, this occurred in the vicinity of a junction in Watten;
- One "Fatal" PIA was recorded, which involved two cars, one of which was a young driver (16-20);
- No PIAs recorded involved a cyclist;
- Two PIAs recorded involved a motorcycle, one was classified as "Serious" and one was classified as "Slight".
- Four of the recorded PIAs involved an HGV, which were all classified as "Slight";
- Young drivers (16-20) were involved in seven accidents, six were classified as "Slight" and one was classified as "Fatal"; and
- No PIAs were recorded on the C1069 Poolhoy / Wester Road in the vicinity of the Proposed Development Site or the proposed site access junction or on the U2188 Weydale Road and C1025 Thurso / Hilliclay / Bishophill Road, which will be used by the AILs to access the Proposed Development Site.

In general, there are no clusters of PIAs at any location in the assessed area or high numbers of accidents involving HGVs for example. The majority of PIAs recorded occurred at or on approach to junctions / access to properties, where there is an increased interaction between vehicles.

Based on the information available, it has been established that there are no specific road safety issues within the immediate vicinity of the Proposed Development that currently require to be addressed or will be exacerbated by construction activities.

5.7 Future Baseline Traffic Conditions

5.7.1 2027 Traffic Flows

Construction of the Proposed Development could commence during 2027 if consent is granted and is anticipated to take approximately 12 months depending on weather conditions and ecological considerations.

To assess the likely effects during the construction, base year traffic flows were determined by applying a National Road Traffic Forecast (NRTF) low growth factor to the DfT surveyed traffic flows. The NRTF low growth factor for 2019 to 2027 is 1.049. These factors were applied to the survey data to estimate the 2027 Base traffic flows, as shown in Table 4. This will be used in the Construction Peak Traffic Impact Assessment.

Table 4 24-hour Average Traffic Data (2027)

Survey Location	Cars / LGV	HGV	Total	% HGV
A9(T), between the B870 at Mybster and the U2188 junction	2,768	316	3,639	8.7%
A9(T), between Thurso and the U2188 junction	14,642	285	14,927	1.9%
A882, between Wick and the A9(T) junction	1,885	101	1,986	5.1%
B874, between the A9(T) and the U1304 Faulds Road	162	8	170	4.9%
B876, between Wick and the C1069 Poolhoy / Wester Road	3,639	180	3,819	4.7%

Please note that variances may occur due to rounding.

5.8 Committed Developments

5.8.1 Onshore Wind Farm and Energy Related Planning Applications

A review of THC's Wind Turbine Map[7] and online planning portal[8], in addition to the Scottish Government's Energy Consents Unit portal[9] was undertaken to identify any consented developments within the vicinity of the Proposed Development which will generate significant traffic. The findings of this review are detailed in Table 5.

Table 5 Surrounding Wind Farm Planning Applications

Reference	Name	Number of Wind Turbines	Current Status
19/05624/FUL	Slickly Wind Farm	11	Consented
19/03015/FUL	Camster II Wind Farm	11	Consented
16/04966/S36	Golticlay Wind Farm	19	Consented
20/02286/FUL	Tacher A	1	Consented
20/02288/FUL	Tacher B	1	Consented
22/02324/FUL	Tacher C	1	Consented
15/01831/FUL	Achlachan 2	3	Consented
21/03750/S36	Limekiln Wind Farm	21	Consented
20/01905/S36	Limekiln Wind Farm Extension	5	Consented

Slickly Wind Farm was granted planning permission in August 2022 following a successful appeal process. Information submitted as part of the planning application indicates that some of the same construction access routes would be used as those identified for the Proposed Development, however it should however be noted that the Slickly Wind Farm developer (Statkraft) has indicated that construction of the scheme is schedule to begin in 2025. As such, it is considered that the construction of the two developments is highly unlikely to overlap and Slickly Wind Farm has not been included as a committed development within the Study Area.

Camster II Wind Farm was granted planning permission in July 2021 following a successful appeal process. Information submitted as part of the planning application indicates that some of the same construction access routes would be used as those identified for the Proposed Development, however it should however be noted that the Camster II Wind Farm developer (RWE) has indicated that construction of the scheme is schedule to begin in September 2023. As such, it is considered that the construction of the two developments is highly unlikely to overlap and Camster II Wind Farm has not been included as a committed development within the Study Area.

Golticlay Wind Farm was granted planning permission in March 2021 and is currently subject to a re-design process, with the developer (RWE) submitting a new scoping report to the Scottish Ministers. Information submitted as part of the planning application for the consented scheme indicates that some of the same construction access routes would be used as those identified for the Proposed Development. Consideration can only be given to those schemes that have extant planning permission and as such, only the consented scheme can be considered at this time. Given the timescales in terms of the scheme being granted planning permission and the likely time for the Proposed Development to progress through the planning process, it is considered that the construction of the two developments is highly unlikely to overlap and Golticlay Wind Farm has not been included as a committed development within the Study Area.

Tacher A, B and C turbines were granted planning permission in December 2020, November 2020 and September 2022, respectively. All three schemes were subject to a Section 42 application to vary the size of the turbines, which were all consented. Information submitted as part of the planning application indicates that some of the same construction access routes would be used as those identified for the Proposed Development.

[7]Wind Turbine map, The Highland Council, Source: https://www.highland.gov.uk/info/198/planning_-_long_term_and_area_policies/152/renewable_energy/4 (Updated: January 2022) (Date Sourced: 17/05/2022)
[8] View planning applications, The Highland Council, Source: https://www.highland.gov.uk/info/180/planning_-_applications_warrants_and_certificates/143/planning_permission/4 (Date Sourced: 17/05/2022)
[9] https://www.energyconsents.scot/ApplicationSearch.aspx?T=1

A review of the developers website[10], (CleanEarth Energy) advises that all three turbines are currently under construction and will therefore be completed before construction commences on the Proposed Development. As such, the Tacher wind turbines have not been included as a committed developments within the Study Area.

Limekiln Wind Farm and Limekiln Wind Farm Extension were granted planning permission in May 2022 by Scottish Ministers. Information submitted as part of the planning applications indicates that some of the same construction access routes would be used as those identified for the Proposed Development. A review of the developers website (Boralex) advises that delivery of turbines will commence in spring 2024, which would indicate construction starting on-site at the end of 2023. As such, the Limekiln Wind Farm developments have not been included as a committed developments within the Study Area.

Traffic flows associated with the consented wind farm developments detailed above have not been included in the 2027 Baseline Flows as the construction trips associated with the consented wind farms are temporary in nature and the inclusion of these traffic flows in the baseline will dilute the potential impact that the Proposed Development will have. The approach taken is therefore considered to be an overly robust assessment.

It should be noted that any crossover of traffic with the Proposed Development flows would be addressed via a wide area Construction Traffic Management Plan (CTMP), secured by planning condition on the Proposed Development's consent.

Projects in scoping or not yet determined cannot be included in cumulative assessments as they have yet to be determined. As traffic impacts are short lived for construction projects, the potential traffic impact is highly speculative and as such, cannot be included in the assessment.

5.8.2 Other Planning Applications

A review of the THC's online planning portal was also undertaken for other any other developments with planning consent, which should be considered within this assessment. The review examined consented developments whose trips are considered significant in scale (i.e., has associated traffic impact of over 10%).

The review did not identify any other significant traffic generating developments in the Study Area that may occur during the construction period associated with the Proposed Development.

It should be noted that the use of Low NRTF growth assumptions has provided a basis for general local development growth within the Study Area.

[10] https://cleanearthenergy.com/our-projects/projects-map/

6 Trip Generation and Distribution

6.1 Construction Phase

6.1.1 Trip Derivation

During the 12-month construction period, the following traffic will require access to the site:

- staff transport, in either cars or staff minibuses;
- construction equipment and materials, deliveries of machinery and supplies such as ready-mix concrete and crushed rock / aggregate materials;
- components relating to the battery storage element and associated infrastructure; and
- abnormal loads consisting of the wind turbine sections and a heavy lift crane.

Average monthly traffic flow data was used to establish the construction trips associated with the Proposed Development, based on the assumptions detailed in the following sections.

6.1.2 Construction Staff

Staff will arrive in non-HGV vehicles and where possible will be encouraged to car share. The workforce on site will depend on the activities undertaken but based on previous wind farm construction site experience for a project of this scale, it is considered that up to 20 staff will be onsite during the short peak period of construction.

For the purposes of estimating traffic movements, it was assumed that 40% of staff will be transported by minibus and 60% will arrive by car (single car occupancy was assumed as the worst case at this stage with potentially fewer movements through car sharing).

Based on these assumptions, staff transport cars and light vehicles will account for a maximum of 28 vehicle movements (14 inbound trips and 14 outbound trips) per day during the peak period of construction.

6.1.3 Abnormal Indivisible Load and Turbine Component Deliveries

The turbines are broken down into components for transport to the site. The nacelle, drive train, blade and tower sections are classified as AIL due to their weight, length, width and height when loaded. For the purposes of the report, the 'worst case' numbers of components requiring transport are illustrated in Table 6.

Table 6 Turbine Components

Components	Number of Components per turbine
Rotor Blades	3
Tower Sections	3
Nacelle	1
Hub	1
Drive Train	1
Nose Cone	1
Transformer	1
Ancillary	1
Site Parts	0.2

In addition to the turbine deliveries, a high-capacity erection crane will be needed to offload a number of components and erect the turbines. The crane is likely to be a mobile crane with a capacity up to 1,000 tonnes, escorted by boom and ballast trucks to allow full mobilisation on site. Smaller erector cranes will also be present to allow the assembly of the main cranes and to ease the overall erection of the turbines. AIL associated with the cranes will be escorted to site by civilian escort vehicles.

Escort vehicles will accompany the AIL convoys associated with the turbine components, to support the traffic management measures. Up to three vehicles will be deployed and it is assumed that three AIL turbine

component loads will be delivered per convoy. This will result in 6 convoys on the network, with a total of approximately 36 escort vehicle movements (18 inbound trips and 18 outbound trips).

Turbine components that do not classify as AILs, will be delivered in addition to these, resulting in a further 30 movements (15 inbound trips and 15 outbound trips). All of these deliveries are expected to occur over a period of approximately one month.

The escort vehicles have been assumed to be police cars and light goods vehicles. Motorcycles may be deployed, depending upon Police resources.

6.1.4 General Deliveries

Throughout the construction phase, general deliveries will be made to site via HGV. These will include fuel, site office supplies and staff welfare etc. At the height of construction, it is assumed that up to 40 journeys to site are made (20 inbound trips and 20 outbound trips) per month.

6.1.5 Material Deliveries

Various materials will need to be delivered to site to construct the site-based infrastructure. At the outset of the construction works, HGV deliveries will deliver plant and initial material deliveries to the site to enable the formation of the site compound and to deliver construction machinery.

Given the scale of the Proposed Development, it is not proposed to utilise onsite batching of concrete. As such, it has been assumed that all turbine and substation foundation concrete will be brought ready mixed to the site from one of the local suppliers to the southeast. There are a number of potential suppliers as illustrated in Table 7.

Table 7 Local Quarries

Company Name	Address	Distance	Route
John Gunn & Sons	Bower Quarry, Halkirk KW12 6UY	6.2 km	U1782 Dunn / Corsback Road, B874 and C1069 Poolhoy / Wester Road
A & W Sinclair	Quarry House Ruther Quarry, Wick KW1 5UW	10.8 km	U1300 Gersa / Halcro Road, U1304 Faulds Road, B874 and C1069 Poolhoy / Wester Road

The estimated total volume of concrete required on site is 1,460m³, based upon expected turbine foundation, substation foundation and miscellaneous uses across the Proposed Development Site. The individual deliveries associated with the ready mixed concrete have been estimated and result in 488 vehicle movements (244 inbound trips and 244 outbound trips).

Foundation calculations for the turbine bases and the substations are detailed in Table 8 below.

Table 8 Steel Reinforcement Deliveries

Element	Weight / Installation (t)	Total Weight (t)	Lorry Capacity (t)	Inbound Trips	Total Movements
Turbine Foundation	150	300	30	10	20
Substation Foundation	50	50	30	2	4

The onsite access tracks and crane hardstands will be constructed from crushed rock, with 100% of the material obtained from the one of the local suppliers to the southeast. The access tracks will generally be 6m in width and will be designed to accommodate 13tonne axle loads. In addition to the roads, crane pads will be constructed to enable the turbine erection process. The tracks, crane pads and compounds will require geotextile in the foundations.

The estimate of imported material is detailed in Table 9.

Table 9 Track Material Deliveries

Element	Volume / Installation (m³)	Total Weight (t)	Lorry Capacity (t)	Inbound Trips	Total Movements
Stone / Aggregates	17,938	39,464	20	1,974	3,948

Geotextile will be delivered to site in rolls. A total of 35 large rolls may be required at site and will be delivered by HGV which will result in 4 vehicle movements (2 inbound trips in and 2 outbound trips).

Cables will connect each turbine to the internal substation and control building. Trip estimates for the cable materials are provided below in Table 10 and 11. Three cables are to be provided within each cable trench and will be backfilled with cable sand. Geotextiles will be used to shield the trench and ducting will be used to protect the cable when it runs under roadways.

Table 10 Cable Trip Estimate

Element	Total Cable Length (m)	Length per Drum (m)	Number of Drums	Inbound Trips	Total Movements
Cables	7,575	500	15	2	4

Table 11 Cable Sand Trip Estimate

Element	Volume (m^3)	Total Weight (t)	Lorry Capacity (t)	Inbound Trips	Total Movements
Cable Sand	852	1,364	20	69	138

One substation building will be constructed on the site. This will require deliveries of building materials and structural elements and will result in 64 vehicle movements (32 inbound trips in and 32 outbound trips). Battery storage deliveries will result in a further 10 HGV vehicle movements for battery, invertor and cabin / building deliveries etc.

The resulting traffic generation estimates have been plotted onto the indicative construction programme to illustrate the peak journeys on the network. Table 12 illustrates the trip generation throughout the construction programme for each month, showing construction vehicle movements, i.e. an inbound and outbound trip.

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Table 12 Construction Traffic Profile

Activity	Class	Month											
		1	2	3	4	5	6	7	8	9	10	11	12
Site Establishment & Remediation	HGV	30	20									20	30
General Site Deliveries	HGV	40	40	40	40	40	40	40	40	40	40	40	40
Bulk Material Deliveries	HGV		987	987	987	987							
Ready Mix Concrete Deliveries	HGV					162	162	162					
Reinforcement	HGV					12		12					
Cable & Ducting Deliveries	HGV							4					
Cabling Sand	HGV							69	69				
Geotextile Deliveries	HGV		4										
Substation	HGV						21		21		21		
AIL Cranage	HGV									20			
AIL Deliveries	HGV									49			
AIL Escorts	Car & LGV									38			
Battery Storage	HGV								10				
Commissioning	Car & LGV										40	20	
Staff	Car & LGV	308	440	616	616	616	616	616	616	616	616	616	616
Total HGV	HGV	70	1,051	1,027	1,027	1,201	224	287	140	109	61	60	70
Total Cars / LGV	Car & LGV	308	440	616	616	616	616	616	616	654	656	636	616
Total Movements		378	1,491	1,643	1,643	1,817	840	903	756	763	717	696	686
Total HGV per Day		3	48	47	47	55	10	13	6	5	3	3	3
Total Cars / LGV per Day		14	20	28	28	28	28	28	28	30	30	29	28
Total per Day		17	68	75	75	83	38	41	34	35	33	32	31

Please note variances due to rounding may occur.
Assumes that 100% of total estimated stone aggregate requirements will be imported to site.

The peak of construction occurs in month five with a total of 83 daily vehicle movements, comprising 28 car / LGV movements and 55 HGV movements.

6.1.6 Distribution of Construction Trips

The distribution of Proposed Development construction traffic on the network will vary depending on the types of loads being transported. The assumptions for the distribution of construction traffic during the peak months are as follows:

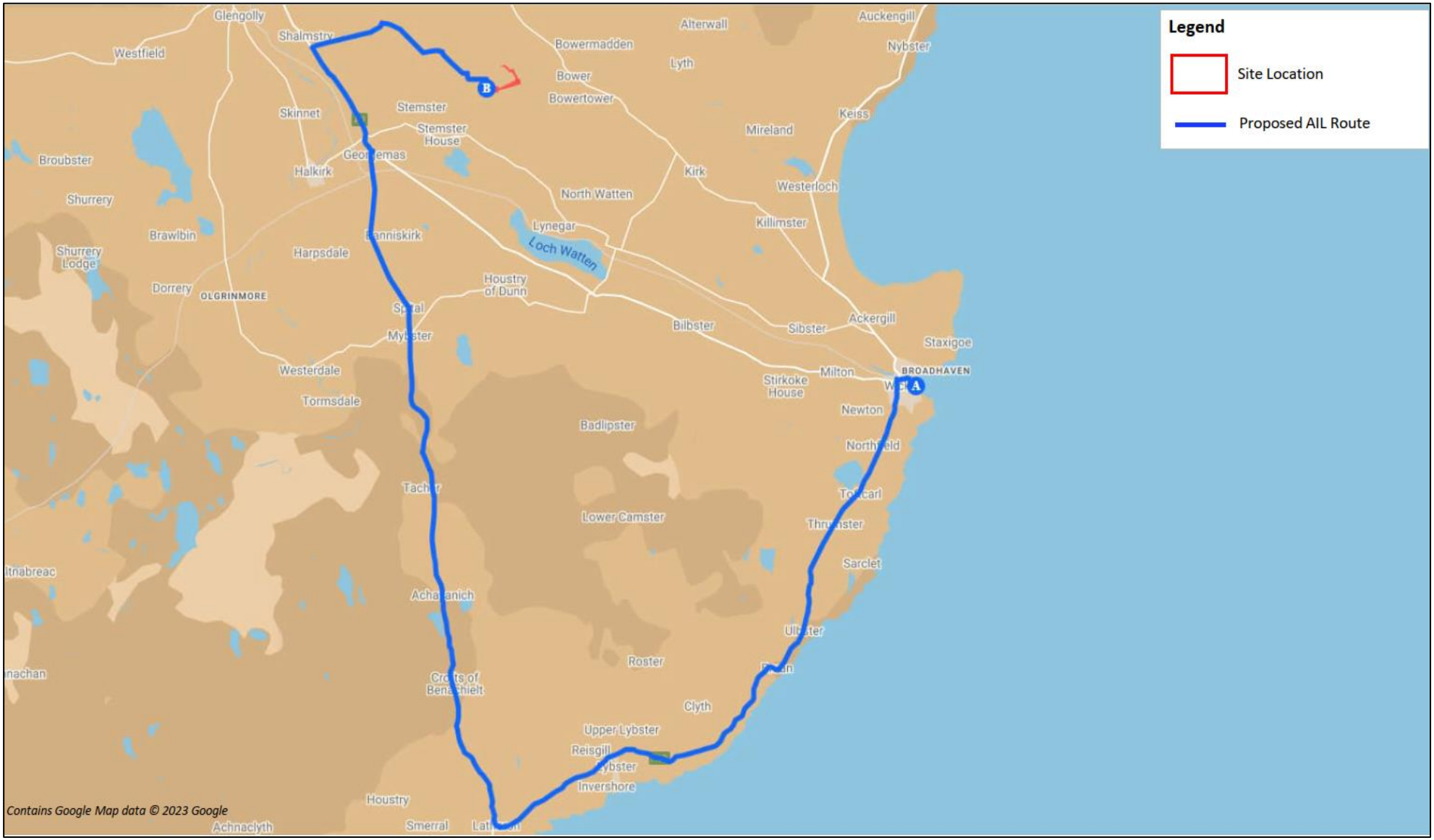
- all construction traffic enters the site via the proposed access on the C1069 Poolhoy / Wester Road;
- deliveries associated with aggregate materials and concrete materials, will be sourced from local quarries to the southeast, using the most direct routes. The Balance of Plant (BoP) contractor will confirm final quarry and material sourcing with THC in the final CTMP, however for the purposes of this assessment the following has been assumed:
    - John Gunn & Sons - U1782 Dunn / Corsback Road, B874 and C1069 Poolhoy / Wester Road;
    - A & W Sinclair - U1300 Gersa / Halcro Road, U1304 Faulds Road, B874 and C1069 Poolhoy / Wester Road
- HGV deliveries associated with the High Voltage (HV) electrical installation, control buildings, batteries, etc. will arrive via the A9(T) to the south, before travelling through to the Proposed Development Site on the B874 and C1069 Poolhoy / Wester Road;
- staff working at the site are likely to be based locally. It is assumed that 50% will be based to the northwest at Thurso, arriving from the A9(T) from the north, while 50% will be based to the southeast in Wick, arriving via the A882; and
- General site deliveries will be via the A9(T) from the south, before travelling through to the site on the B874 and C1069 Poolhoy / Wester Road. These are generally smaller rigid HGV vehicles.

For the purposes of preparing EIA Report Volume 2: Chapter 11, Transport and Access and this TA, it has been assumed that all abnormal load traffic will access from the Proposed Development Site via the following route:

- loads will depart Wick Harbour on Martha Terrace / River Street, turning on to the A99(T);
- loads will continue south on the A99(T) with blade loads making use of the blade transfer point located at the southern extents of Wick, to transfer the blade loads from the blade lifting trailer onto the standard Super Wing Carrier trailer;
- all loads then required to continue south on the A99(T) to the junction with the A9(T), where they will turn right, heading north;
- the loads will continue northbound until the junction with the U2188 Weydale Road, where they make a right turn, heading eastbound;
- at the end of the U2188 Weydale Road, the loads will make a right hand turn on to the C1025 Thurso / Hilliclay / Bishophill Road and travel eastbound to the junction with the C1069 Poolhoy / Wester Road; and
- at the junction, the loads will turn right onto C1069 Poolhoy / Wester Road and travel south for a short distance before turning left in to the Proposed Development Site.

The above AIL route is shown in Figure 9.

Figure 9 AIL Component Delivery Routes



The above route has been considered in full, within the AIL RSR, provided in Appendix A.

6.1.7 Peak Construction Traffic

Following the distribution and assignment of traffic flows to the Study Area, the resultant daily traffic during the peak of construction is summarised in Table 13.

Table 13 Peak Construction Traffic

Survey Location	Cars / LGV	HGV	Total
A9(T), between the B870 at Mybster and the U2188 junction	-	2	2
A9(T), between Thurso and the U2188 junction	14	-	14
A882, between Wick and the A9(T) junction	14	-	14
B874, between the A9(T) and the U1304 Faulds Road	14	46	60
B876, between Wick and the C1069 Poolhoy / Wester Road	-	-	-

Please note that variances may occur due to rounding.

6.2 Decommissioning Phase

Prior to decommissioning of the Proposed Development Site, a traffic assessment will be undertaken, and appropriate traffic management procedures followed.

The decommissioning phase will result in fewer trips on the road network than the construction or operational phases as it is considered likely that elements of infrastructure such as access tracks will be left in place and structures may be broken up on site to allow transport by a reduced number of HGVs.

7 Traffic Impact Assessment

7.1 Construction Impact

The peak month traffic data was combined with the future year (2027) traffic data to allow a comparison between the baseline results to be made. The increase in traffic volumes is illustrated in percentage increases for each class of vehicle. This is illustrated in Table 14.

Table 14 Peak Construction Traffic Network Impact

Survey Location	Cars / LGV	HGV	Total	Cars / LGV % Increase	HGV % Increase	Total % Increase
A9(T), between the B870 at Mybster and the U2188 junction	2,768	318	3,641	0.0%	0.7%	0.1%
A9(T), between Thurso and the U2188 junction	14,656	285	14,941	0.1%	0.0%	0.1%
A882, between Wick and the A9(T) junction	1,899	101	2,000	0.7%	0.0%	0.7%
B874, between the A9(T) and the U1304 Faulds Road	176	54	230	8.7%	545.9%	35.2%
B876, between Wick and the C1069 Poolhoy / Wester Road	3,639	180	3,819	0.0%	0.0%	0.0%

The total traffic movements are predicted to increase by 35.2% on the B874, which will be used by HGV vehicles transporting aggregates and concrete materials to the site and by staff travelling to and from the Proposed Development Site. All other roads identified above have increases below 1%. It is however assumed that the total traffic increase on the other more rural single track roads likely to be used to access the site will be in excess of 100% for total traffic due to the extremely low levels of existing traffic using them.

The highest total HGV traffic movements will increase by 545.9% again on the B874, as a result of the HGV traffic travelling to and from the quarry locations. Whilst this increase could be considered high, it is generally caused by the relatively low HGV flows on the road at this location. The increase will see an additional 46 HGV movements per day (23 inbound trips and 23 outbound trips), over the course of a typical 12-hour day on site, this will equate to approximately 4 HGV movements per hour.

With regards to the C1069 Poolhoy / Wester Road where the site access will be located, all HGV traffic accessing the site will be required to use this road. This will result in approximately 55 HGV movements per day, which will equate to approximately 5 movements per hour over the course of a typical 12-hour day on site.

It should be noted the construction phase is transitory in nature and the peak of construction activities is short lived, occurring over a relatively short timeframe when taking account of the whole construction programme.

A review of existing theoretical road capacity has been undertaken using the Design Manual for Roads and Bridges, Volume 15, Part 5 “The NESA Manual”. The theoretical road capacity has been estimated for each of the road links for a 12-hour period that makes up the Study Area. The results are summarised in Table 15.

Table 15 Theoretical Road Capacity

Survey Location	2027 Baseline Flow (total traffic)	2027 Base + Development Flows (total traffic)	Theoretical Road Capacity (12hr)	Spare Road Capacity %
A9(T), between the B870 at Mybster and the U2188 junction	3,639	3,641	21,600	83.1%
A9(T), between Thurso and the U2188 junction	14,927	14,941	21,600	30.8%
A882, between Wick and the A9(T) junction	1,986	2,000	21,600	90.7%
B874, between the A9(T) and the U1304 Faulds Road	170	230	3,360	93.2%

Survey Location	2027 Baseline Flow (total traffic)	2027 Base + Development Flows (total traffic)	Theoretical Road Capacity (12hr)	Spare Road Capacity %
B876, between Wick and the C1069 Poolhoy / Wester Road	3,819	3,819	21,600	82.3%

The results indicate there are no road capacity issues with the addition of construction traffic associated with the Proposed Development and significant spare capacity exists within the trunk and local road network to accommodate all construction phase traffic.

8 Proposed Traffic Mitigation Measures

8.1 Construction Phase

8.1.1 Construction Traffic Management Plan (CTMP)

During the construction period, a project website (if deemed necessary by THC), blog or Twitter feed will be regularly updated to provide the latest information relating to traffic movements associated with vehicles accessing the site. This will be agreed with THC.

The following measures will be implemented during the construction phase through the CTMP:

- agree AIL route modifications and improvements with THC and other relevant stakeholders. Works which will be required to facilitate turbine deliveries are outlined in the respective delivery route options RSR, which are presented in Appendix A;
- where possible, the detailed design process will minimise the volume of material to be imported to the Proposed Development Site to help reduce HGV numbers;
- a site worker transport and travel arrangement plan, including transport modes to and from the worksite (including pick up and drop off times);
- a Transport Management Plan for AIL deliveries;
- all materials delivery lorries (dry materials) should be sheeted to reduce dust and stop spillage on public roads;
- specific training and disciplinary measures should be established to ensure the highest standards are maintained to prevent construction vehicles from carrying mud and debris onto the carriageway;
- wheel cleaning facilities may be established at the site entrance, depending on the views of THC;
- normal site working hours will be limited to between 0700 and 1900 (Monday to Friday) and 0700 and 1300 (Saturday), though component delivery and turbine erection may take place outside these hours;
- appropriate traffic management measures will be put in place on the C1069 Poolhoy / Wester Road leading through to the site and at its junctions with the roads listed below, to avoid conflict with general traffic, subject to the agreement of THC:
    - C1025 Thurso / Hilliclay / Bishophill Road;
    - B874;
    - B876;
- typical measures will include HGV turning and crossing signs and / or banksmen at the site access and warning signs warning of increase HGV traffic and construction activity;
- provide construction updates on the project website and or a newsletter to be distributed to residents within an agreed distance of the Proposed Development Site;
- adoption of a voluntary reduced speed limits at locations to be agreed with THC;
- all drivers will be required to attend an induction to include:
    - a toolbox talk safety briefing;
    - the need for appropriate care and speed control;
    - a briefing on driver speed reduction agreements (to slow site traffic at sensitive locations through the villages); and
    - identification of the required access routes and the controls to ensure no departure from these routes.

THC are likely to request that an agreement to cover the cost of abnormal wear on its road network is made.

Video footage of the pre-construction phase condition of the abnormal loads access route and the construction vehicles route will be recorded to provide a baseline of the condition of the road prior to any construction work commencing. This baseline will provide evidence of any change in the road condition during the construction phase. Any necessary repairs will be coordinated with THC's roads team. Any damage caused by traffic associated with the Proposed Development during the construction period, that will be hazardous to public traffic, will be repaired immediately.

Damage to road infrastructure caused directly by construction traffic will be remediated, and street furniture that is removed on a temporary basis will be fully reinstated.

There will be a regular road review, and any debris and mud will be removed from the carriageway using an onsite road sweeper to ensure road safety for all road users.

Before the AILs traverse the routes from Wick Harbour, the following tasks will be undertaken to ensure load and road user safety:

- ensure any vegetation which may foul the loads is trimmed back to allow passage;
- confirm there are no roadworks or closures that could affect the passage of the loads;
- check no new or diverted underground services on the proposed route are at risk from the abnormal loads; and
- confirm the police are satisfied with the proposed movement strategy.

8.2 Abnormal Load Transport Management Plan

There are a number of traffic management measures that could help reduce the effect of abnormal load convoys.

All abnormal load deliveries will be undertaken at appropriate times (to be discussed and agreed with the local authority and police) with the aim to minimise the effect on the local road network. It is likely that the abnormal load convoys will travel in the early morning periods before peak times while general construction traffic will generally avoid the morning and evening peak periods.

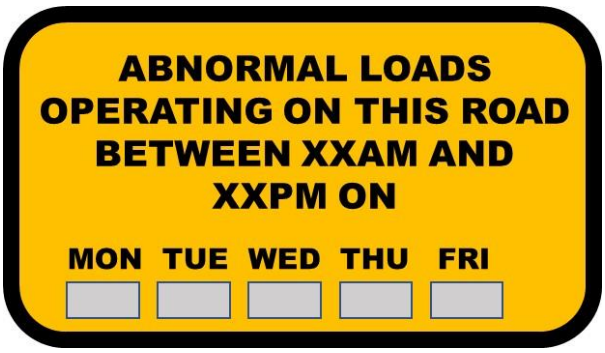
The majority of potential conflicts between construction traffic and other road users will occur with abnormal load traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more accustomed to them.

Potential conflicts between the abnormal loads and other road users can occur at a variety of locations and circumstances. The main potential conflicts are likely to occur:

- within Wick, where the loads are required to leave the harbour area and negotiate through the town;
- U2188 Weydale Road, C1025 Thurso / Hilliclay / Bishophill Road and C1069 Poolhoy / Wester Road, where the roads are narrow single carriageway roads and the loads requiring the full carriageway width;
- where traffic turns at a road junctions, requiring other traffic to be restrained on other approach arms; and
- in locations where high speeds of general traffic are predicted.

Advance warning signs will be installed on the approaches to the affected road network. Information signage could be installed to help assist drivers and an example is illustrated in Figure 10. Flip up panels (shown in grey) will be used to mask over days where convoys will not be operating. When no convoys are moving, the sign will be bagged over by the Traffic Management contractor.

Figure 10 Example Information Sign



This signage will assist in helping improve driver information and allow other road users to consider alternative routes or times for their journey (where such options exist).

The location and numbers of signs will be agreed post consent and will form part of the Traffic Management Proposal for the project.

The Abnormal Load Transport Management Plan will also include:

- procedures for liaising with the emergency services to ensure that police, fire and ambulance vehicles are not impeded by the loads. This is normally undertaken by informing the emergency services of delivery times and dates and agreeing communication protocols and lay over areas to allow overtaking;
- a diary of proposed delivery movements to liaise with the communities to avoid key dates such as local events;
- a protocol for working with local businesses to ensure the construction traffic does not interfere with deliveries or normal business traffic; and
- proposals to establish a construction liaison group to ensure the smooth management of the project / public interface with the applicant, the construction contractors, the local community, and if appropriate, the police forming the committee. This committee will form a means of communicating and updating on forthcoming activities and dealing with any potential issues arising.

8.3 Public Information

Information on the turbine convoys will be provided to local media outlets such as local papers and local radio to help assist the public.

Information will relate to expected vehicle movements from the PoE through to the Proposed Development Site access junction. This will assist residents becoming aware of the convoy movements and may help reduce any potential conflicts.

The applicant will also ensure information was distributed through its communication team via the project website, local newsletters, and social media.

8.4 Convoy System

A police escort will be required to facilitate the delivery of the predicted AILs. The police escort will be further supplemented by a civilian pilot car to assist with the escort duty. It is proposed that an advance escort will warn oncoming vehicles ahead of the convoy, with one escort staying with the convoy at all times. The escorts and convoy will remain in radio contact at all times where possible.

The abnormal loads convoys will be no more than three AILs long, or as advised by the police, to permit safe transit along the delivery route and to allow limited overtaking opportunities for following traffic where it is safe to do so.

The times in which the convoys will travel will need to be agreed with Police Scotland who have sole discretion on when loads can be moved.

8.5 Onsite Measures delivered using an Onsite Path Management Plan (OPMP)

Within the Proposed Development Site, consideration has been given to pedestrians and cyclists alike due to potential interactions between construction traffic and users of the paths and public roads. If required, a Path Planning Study will be conducted post consent and will be secured through a planning condition. Findings from the study will be used to formulate a set of measures into a Path Management Plan (OPMP).

Users of any paths will be separated from construction traffic through the use of barriers. Crossing points will be provided where required, with path users having right of way. Appropriate Traffic Signs Manual Chapter 8[11] compliant temporary road signage will be provided to assist at these crossing for the benefit of all users.

The principal contractor will ensure that speed limits are always adhered to by their drivers and associated subcontractors. Advisory speed limit signage will also be installed on approaches to areas where path users may interact with construction traffic.

[11] Department for Transport/Highways Agency, Department for Regional Development (Northern Ireland), Transport Scotland & Welsh Assembly Government (2009): Traffic Signs Manual, Chapter 8 – Traffic Safety Measures and Signs for Road Works and Temporary Situations

Signage will be installed on the Proposed Development Site exits that makes drivers aware of local speed limits and reminding drivers of the potential presence of pedestrians and cyclists in the area. This will also be emphasised in the weekly toolbox talks.

No scoping response has been received from The British Horse Society, however measures implemented on similar schemes will be given consideration as part of the Proposed Development. These measures are predominantly focused around the interactions between HGV traffic and horses. Horses are normally nervous of large vehicles, particularly when they do not often meet them. Horses are flight animals and will run away in panic if really frightened. Riders will do all they can to prevent this but, should it happen, it could cause a serious accident for other road users, as well as for the horse and rider.

The main factors causing fear in horses in this situation are:

- something approaching them, which is unfamiliar and intimidating;
- a large moving object, especially if it is noisy;
- lack of space between the horse and the vehicle;
- the sound of air brakes; and
- anxiety on the part of the rider.

The British Horse Society has previously recommended the following actions that will be included in the site training for all HGV staff:

- on seeing riders approaching, drivers must slow down and stop, minimising the sound of air brakes, if possible;
- if the horse still shows signs of nervousness while approaching the vehicle, the engine should be shut down (if it is safe to do so);
- the vehicle should not move off until the riders are well clear of the back of the HGV;
- if drivers are wishing to overtake riders, please approach slowly or even stop in order to give riders time to find a gateway or lay by where they can take refuge and create sufficient space between the horse and the vehicle. Because of the position of their eyes, horses are very aware of things coming up behind them; and
- all drivers delivering to the site must be patient. Riders will be doing their best to reassure their horses while often feeling a high degree of anxiety themselves.

8.6 Staff Travel Plan

A Staff Travel Plan will be deployed where necessary, to manage the arrival and departure profile of staff and to encourage sustainable modes of transport, especially car-sharing. A package of measures could include:

- appointment of a Travel Plan Coordinator (TPC);
- provision of public transport information;
- mini-bus service for transport of site staff;
- promotion of a car sharing scheme; and
- car parking management.

8.7 Operational Phase Mitigation

Site entrance roads will be well maintained and monitored during the operational life of the Proposed Development. Regular maintenance will be undertaken to keep the site access track drainage systems fully operation and to ensure there are no run-off issues onto the public road network.

9 Summary & Conclusions

Pell Frischmann Consultants Ltd has been commissioned by Wind2 Ltd on behalf of Swarclett Wind Farm Ltd (the Applicant), to undertake a Transport Assessment for the proposed Swarclett Wind Farm, located southeast of Thurso, in The Highland Council administrative area.

The Proposed Development will be accessed from the C1069 Poolhoy / Wester Road via new site access junction. The access junction will provide access to the Proposed Development Site for all abnormal loads associated with the turbine deliveries, as well as access for HGVs delivering construction materials and general site traffic.

Existing traffic data established a base point for determining the impact during the construction phase and was factored to future levels to help determine the effect of construction traffic on the local road network.

The construction traffic will result in a temporary increase in traffic flows on the road network surrounding the Proposed Development. The maximum traffic effect associated with construction of the Proposed Development is predicted to occur in month five of the construction programme. During this month, an average of 55 HGV movements is predicted per day and it is estimated that there will be a further 28 car / LGV movements per day to transport construction workers to and from the Proposed Development Site.

In addition a review of the theoretical road capacity was undertaken for the Study Area, which showed that with the addition of construction traffic associated with the Proposed Development, there was significant spare capacity within the road network.

A series of mitigation measures and management plans have been proposed to help mitigate and offset the impacts of the construction phase traffic flows for both general construction traffic and abnormal loads associated with the delivery of the turbine components. It is considered that these can be secured by condition with The Highland Council.

The Proposed Development will lead to a temporary increase in traffic volumes within the Study Area during the construction phase only. It is therefore concluded that there are no transport related matters which would preclude the construction of the Proposed Development Site.

Appendix A Route Survey Report

Appendix B Indicative Access Junction