# Appendix 13.1: Sloy Pumped Hydro Storage Scheme: Transport Assessment

Pell Frischmann

# Sloy Pumped Storage Scheme

## Volume 4, Appendix 13.1: Transport Assessment

October 2024

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# 1 Introduction

## 1.1 Purpose of the Report

Pell Frischmann Ltd. (PF) have been commissioned by ASH design+assessment Ltd. (ASH) on behalf of SSE Generation Limited (SSE) (the Applicant), to undertake a Transport Assessment (TA) for the proposed conversion of the current Sloy Hydroelectric Power Station into a pumped storage scheme (the Proposed Development). The site is located in the grounds of the existing Sloy Hydroelectric Power Station, immediately north of the power station, adjacent to the Inveruglas Visitor Centre, within the Loch Lomond and the Trossachs National Park Authority (LLTNPA) administrative area.

The report identifies the key transport and access issues associated with the Proposed Development and 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 the LLTNPA and Transport Scotland prior to construction works 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.

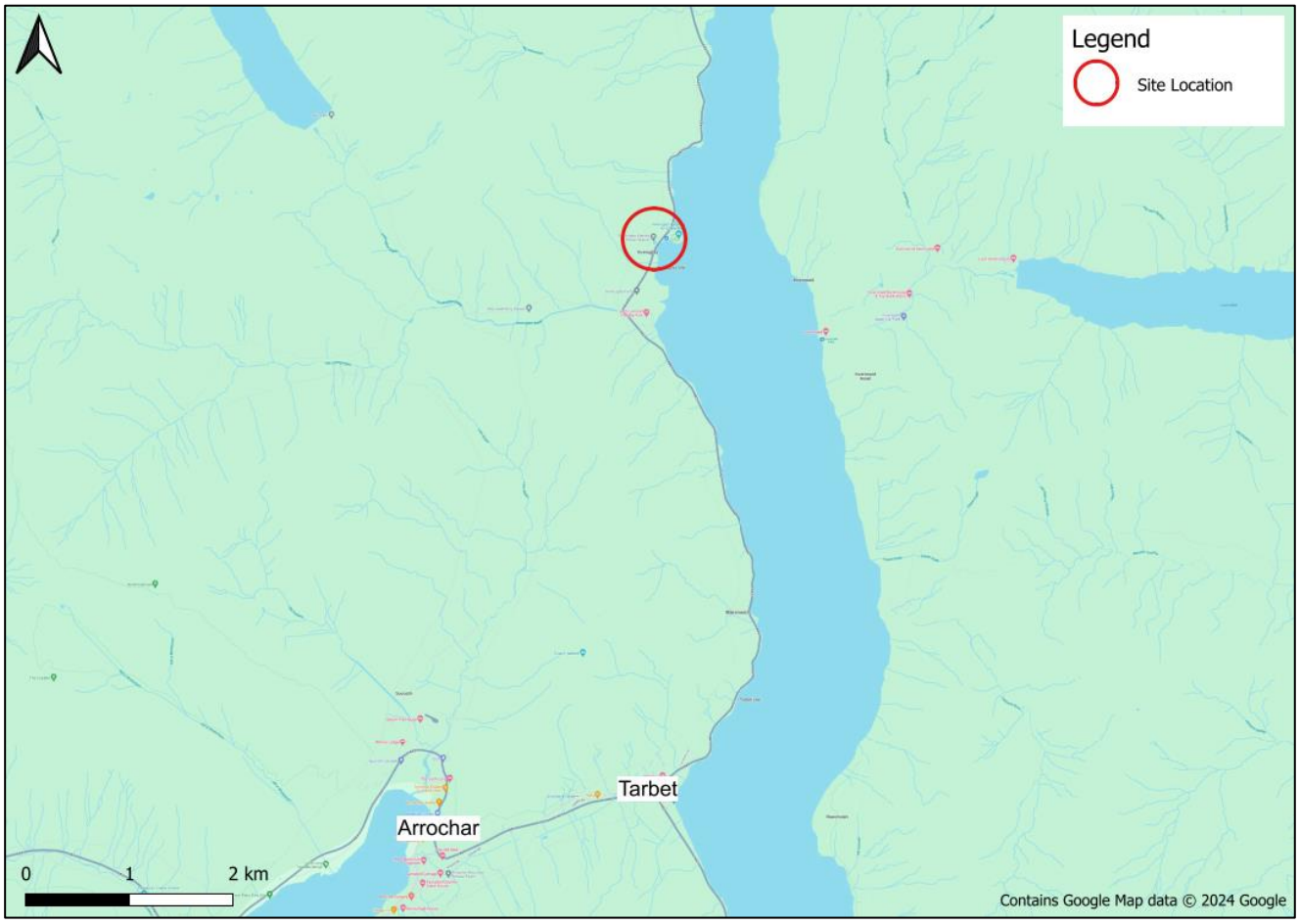
# 2 Proposed Development

## 2.1 Site Location

The Proposed Development site is located in the grounds of the existing Sloy Hydroelectric Power Station, immediately north of the power station, adjacent to the Inveruglas Visitor Centre, which is located on the banks of Loch Lomond, approximately 5 kilometres (km) to the north of Tarbet,

The location of the site is shown in Figure 1.

**Figure 1 Site Location**




## 2.2 Proposed Development

The Proposed Development would convert the existing Sloy Hydroelectric Power Station at Inveruglas into a pumped storage scheme, by the introduction of two new pumps, located in the grounds of the existing hydroelectric scheme, immediately north of the power station.

The new pumps would enable water to be pumped through up to three of the existing four penstocks from Loch Lomond to Loch Sloy during times of low demand (typically overnight) or oversupply (when there is too much renewable energy being generated from wind farms, run-of-river hydro schemes, marine devices etc).

The principal permanent components of the Proposed Development would comprise:

- A new surface building to house electrical switchgear, pump infrastructure and gantry crane(s);
- Two new underground, multi-stage pumps, located within a new below ground pump hall;
- A small new transformer compound containing the switchgear and transformers required to power the pumps;

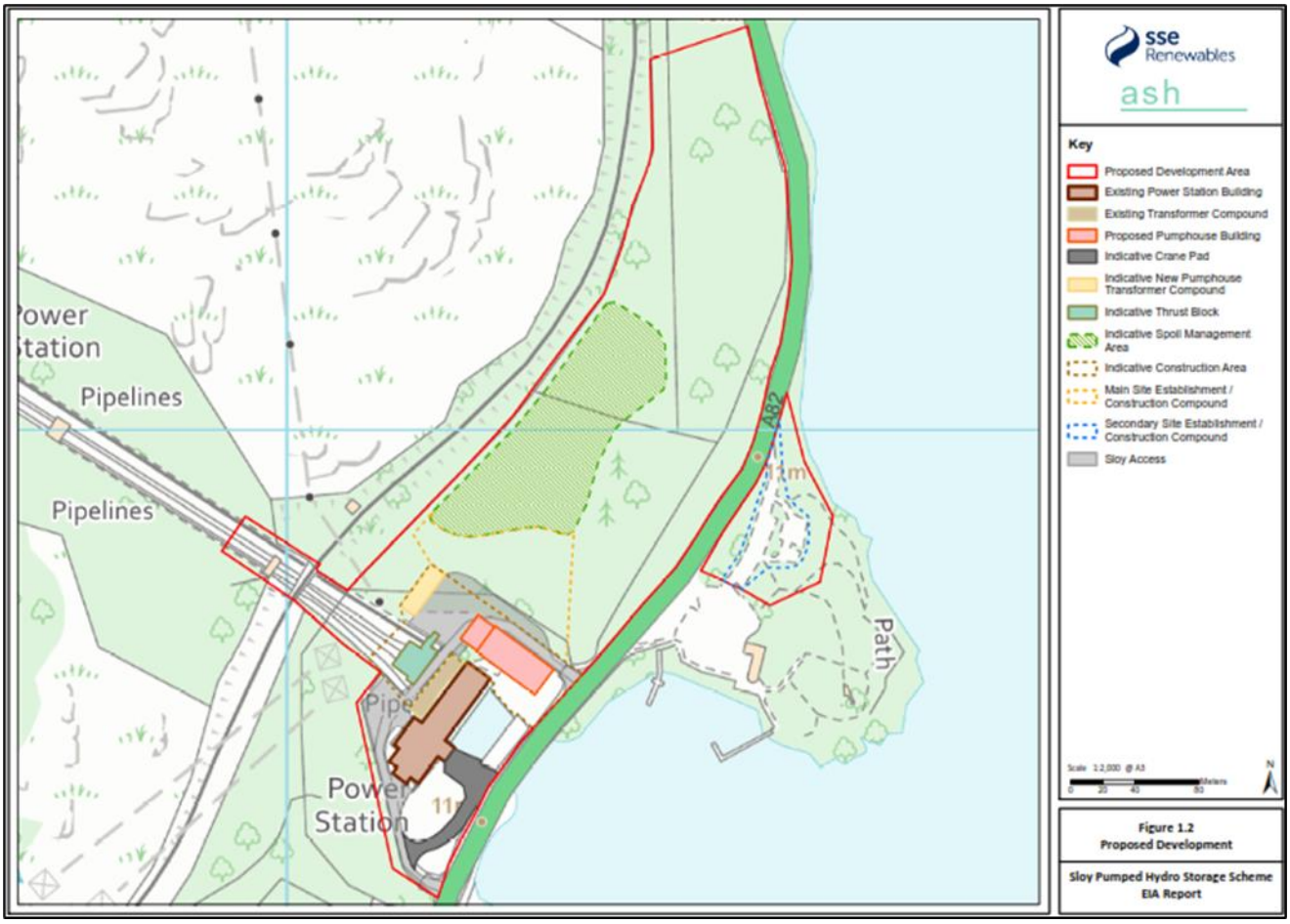
- A new section of intake structure, connecting the pumps to the existing tailrace;
- New buried pipelines to take the water from the two new pumps to connect into (up to) three of the existing four penstocks;
- Reconfiguration of Sloy Hydroelectric Power Station internal road for vehicular access;
- Reinstatement of areas affected by construction of the Proposed Development with new profiled earthworks, and planting;
- Dismantling (to enable construction access) and reinstatement of Sloy Hydroelectric Power Station's listed northern entrance gates, gate pillars and a short section of walling;
- Creation of a site establishment area in the woodland to the north of the existing Sloy Hydroelectric Power Station and an area for on-site storage of excavated rock spoil;
- Regrading of the main construction compound / site establishment area and the reinstatement of the area to an improved condition to the existing, in order to achieve the Applicant's biodiversity net gain (BNG) targets; and
- Creation of a secondary construction compound / site establishment area and vehicle holding area in the overflow car park to the north of the Inveruglas Visitor Centre car park, including permanent upgrades to the access junction and reinstatement post-construction.

In addition to the works relating to the conversion of the existing Sloy Hydroelectric Power Station into a pumped hydro storage scheme, the Applicant is proposing to upgrading the existing 32MW G4 turbine to 40MW. The works in relation to this would take place during the construction phase of the Proposed Development and the relevant programmes are aligned so that the station outages required by both work packages are aligned.

During construction, there would be the requirement for a temporary construction compound area, a site establishment area, and improvements to the access junction from the A82 Trunk Road (T) to both the main Site area and construction compound area within the overflow car park, as well as the temporary storage of excavated rock spoil resulting from the pump excavations.

The layout of the Proposed Development is shown in Figure 2.

**Figure 2 Proposed Site Layout**




A complete description of the Proposed Development for the purposes of the Environmental Impact Assessment (EIA) regulations is provided in **EIA Report Volume 1, Chapter 4: Description of Development**.

# 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) (2023)

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.

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."*

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

### 3.2.2 Planning Advice Note (PAN) 75 (2005)

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 Transport Assessment Guidance (2012)

Transport Scotland's 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 LLTNPA Local Development Plan (2016)

The LLTNPA Local Development Plan (LDP) (2017-2021) which will remain in place until 2024 sets out how development can make the National Park a greats place to live, invest, visit and experience. The vision for the LDP is to *"…show how development can significantly contribute to achieving the National Park Partnership's Plan Outcomes, which form the Vision for this Plan.".*

Renewable Energy Policy 1 relates specifically to those schemes located within the boundary of the Park. Proposals for renewable energy schemes will be supported where the siting, design, access and scale of the proposal will not have a significant adverse impact on a number of areas, including traffic and transport. The Policy states that:

*"All renewable energy developments must be assessed in regard to:*

*I. The Overarching Policies and related LDP Policies; and*
*II. The Renewable Energy Planning Guidance*

*In particular, the renewable energy technologies listed below, should in addition, comply with the following criteria listed here.*

*Hydro Energy*

*a) Engineering works, the siting, design or scale of the powerhouse, head ponds, weirs, penstocks and tailraces other ancillary buildings or works, access requirements and other support infrastructure do not generate significant adverse impact;*
*b) Does not alter the river profile and the water supply to the powerhouse would not result in an inadequate flow of water in any stream which would reduce its ecological value or visual attractiveness as a natural feature;*
*c) Pipes to, and power lines from, the powerhouse are placed underground; and*
*d) Sufficient landscape measures are included to integrate the proposal into the landscape setting and reinstatement measures are taken to restore the physical conditions of the site when construction is complete."*

LLTNPA are currently updating the Development Plan Scheme and are in the process of identifying the work requirements and timescales needed to complete the various stages involved in preparing a new LDP. It is expected that this will be published in 2024.

### 3.3.2 LLTNPA Renewable Energy Planning Guidance (2017)

The LDP renewable energy policy set out criteria hydro energy projects within the National Park. The Planning Guidance is an update to the previously adopted guidance, which was adopted in June 2013. It focuses on three main technologies namely hydro, wind and biomass, providing guidance on appropriate locations, types and scales of development within the National Park. It also details specific considerations and good practice that should be taken into account when preparing a proposal and recommended procedures for submitting a planning application.

Specifically in relation to traffic and transport, the “Hydro topic advice” section within the Planning Guidance advises the following:

*“Hydro developments may have an impact on the road network during the construction phase. Development proposals will require to be accompanied by a transport statement. This should include a description of the site access, location of proposed laydown areas and anticipated length of operations. It should also identify anticipated vehicle movements to and from the site, the frequency and size of deliveries along with peak periods of activity throughout the day and the types of vehicles to be used. The statement should also provide an assessment of suitability of the road network and existing structures (bridges and culverts) to accommodate anticipated heavy loads during construction. Statutory consultees for transport include Transport Scotland, where the trunk road network would be affected, and local authority roads departments.*

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

- the construction phase; and
- the operational phase.

## 4.2 Project Phases – Transport Overview

Of the two phases, the construction phase is considered to have the greatest potential impact in terms of transport and impacts on the road network and sensitive receptors. Construction plant and bulk materials will be transported to site, potentially resulting in a significant increase in traffic on the study area network.

The operational phase is restricted to occasional maintenance and general operational review of the site which generate significantly lower volumes of traffic that are not considered to be in excess of daily traffic variation levels on the road network. It is estimated that at most, the operational phase would generate two to three car / LGV trips per day, which is comparable with the existing Sloy Hydroelectric Power Station.

With proper maintenance, it is anticipated that the Proposed Development will remain functional indefinitely. Therefore, the effects of the decommissioning phase have been scoped out of the assessment.

## 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 the **Traffic and Transport Chapter** of the **EIA Report** (**Volume 1: Chapter 13**).

# 5 Baseline Conditions

## 5.1 Access Arrangement

The Proposed Development site is currently accessed via two simple priority junctions on the A82(T). The southern junction is used for the day-to-day operation of the existing Sloy Hydroelectric Power Station, while the northern junction acts as a secondary access and the gates are normally locked.

It is anticipated that the northern junction would be used exclusively by construction vehicles during the construction of the Proposed Development. This would allow construction traffic to be separated from operational traffic while utilising an existing access junction.

To facilitate construction of the Proposed Development, the existing northern gates, gate posts and a short section of walling (which are all part of the Category A listed Sloy Hydroelectric Power Station schedule) would be carefully dismantled and stored prior to construction, to enable sufficient junction width for the maximum swept path of anticipated delivery vehicles. The junction would be fully reinstated, upon completion of construction. In addition, there would be a requirement to remove vegetation and rock from the northern visibility splay, to achieve the required visibility splay of 4.5m x 160m. The proposed junction arrangement and visibility splay drawing can be seen in Annex A as Drawing SK_0001.

With regards to the secondary construction compound area, site establishment area and vehicle holding area proposed within the overflow carpark for the Inveruglas Visitor Centre, this would be accessed via the existing northern access junction at this location, which currently provides access for southbound traffic on the A82(T) only, due to the existing junction geometry. The junction is gated and currently locked however, with access to the overflow carpark taken from the main Visitor Centre car park. It is proposed that the junction is upgraded to allow for construction access and egress from both northbound and southbound vehicles. An indicative junction layout and visibility splay drawing, together with swept path analysis can be seen in Annex A as Drawing SK_0002 and SK_0003.

No construction vehicles would be allowed to enter the public car park at Inveruglas and the gate between the two parking areas would remain closed for the duration of the works.

A Stage 1 Road Safety Audit has been undertaken on the proposed site access arrangements and is included as Annex B.

## 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.

The study area for the assessment, previously detailed as part of the scoping exercise is assumed to be as follows:

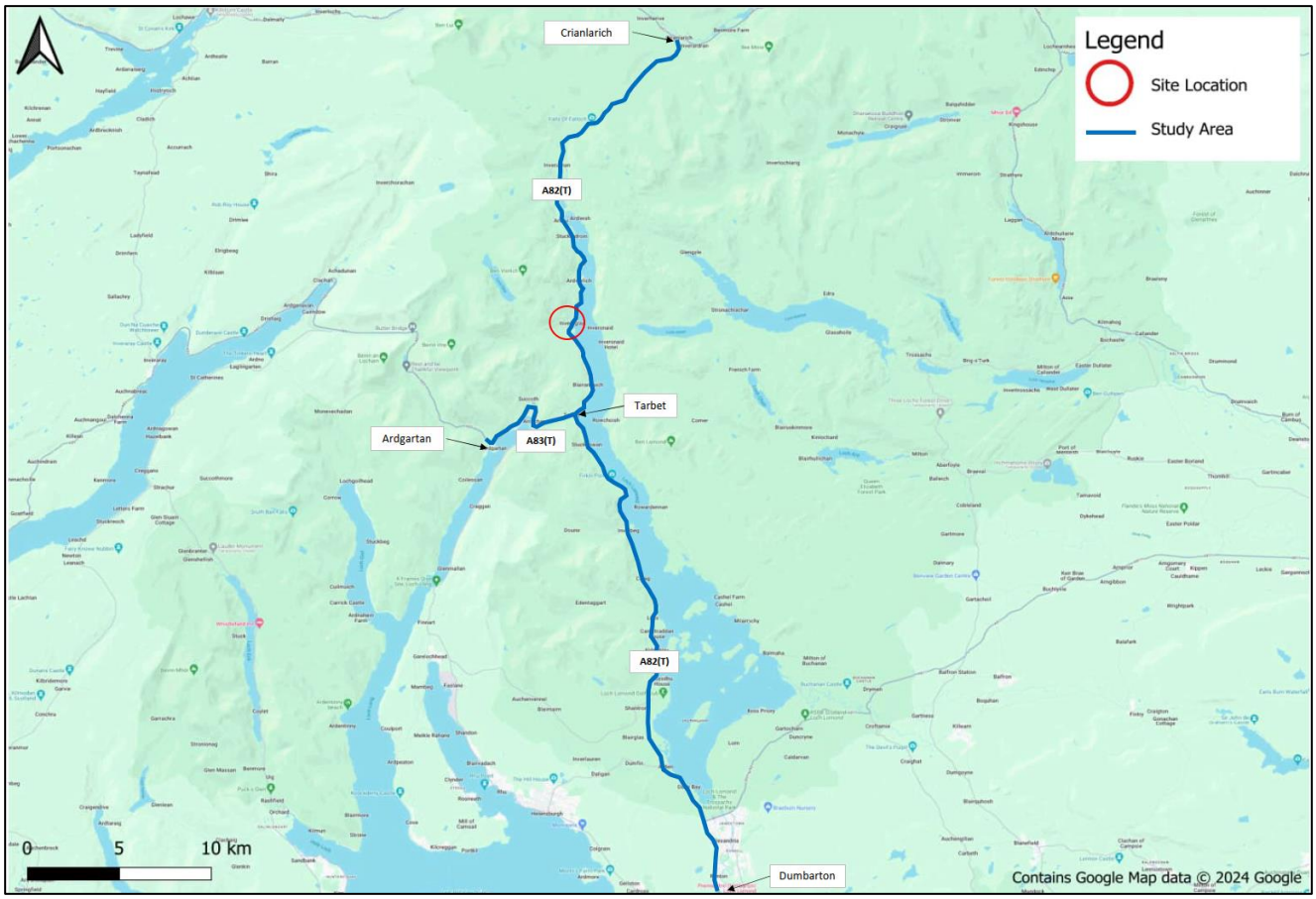
- A82(T) between Tarbet and Crianlarich;
- A83(T) between Tarbet and Ardgartan; and
- A82(T) between Tarbet and Dumbarton.

The above study area is illustrated in Figure 3.

Effects associated with construction traffic generated by the Proposed Development would 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 would 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 3 Transport Assessment Study Area**




## 5.3 Pedestrian and Cyclist Networks

Within the vicinity of the site access junctions, there is a section of the Three Lochs Way. There is a footway located along the western side of the A82(T) terminating in the vicinity of the northern access junction, where it continues on the opposite side of the carriageway for a short section, providing access to the Inveruglas Visitor Centre.

To the south of the southern access junction, the footway continues along the western side of the A82(T), narrowing and becoming a footpath. There are sections running parallel to the carriageway and sections segregated, taking account of the topography of roadside verges through this location. The footpath continues to the access junction for the Sloy Switching Station, where it heads westbound past the switching station, before heading south towards Tarbet.

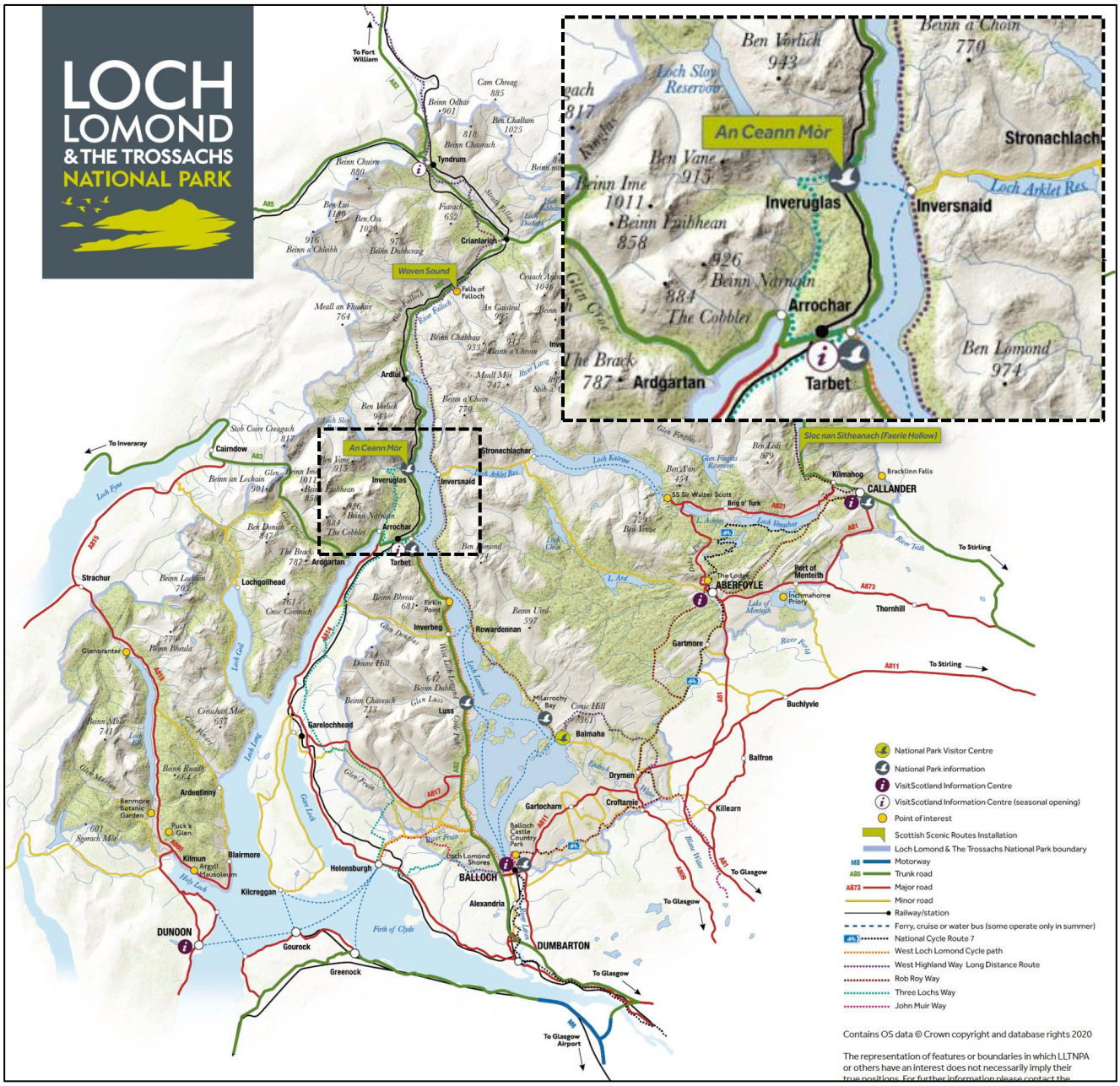
Further away from the Proposed Development in the wider study area, there are pedestrian facilities within the local settlements, including Tarbet, Crianlarich and Dumbarton, which are commensurate with the scale of the settlements.

A review of the LLTNPA map[1] of the park and information from The Loch Lomond & Cowal Way organisation[2] shows a number of walking and cycling routes within the study area, the closest of which are which are summarised below and shown in Figure 4.

[1] https://www.lochlomond-trossachs.org/plan-your-visit/map-downloads/
[2] https://www.lochlomondandcowalway.org/map-page/

- Three Lochs Way – Starting at Balloch, links Loch Lomond, The Gareloch and Loch Long and passes through Helensburgh, Garelochhead, Arrochar, and Tarbet before finishing at Inveruglas on Loch Lomondside;
- West Loch Lomond Cycle Path – Starting at the Visit Scotland Visitor Centre in Balloch running along the western side of Loch Lomond and its numerous facilities to the A82(T) in Tarbet; and
- The Loch Lomond & Cowal Way – Scotland's most diverse long distance footpath. It runs the length of the Cowal Peninsula, beginning at Portavadie in the south of Cowal and finishing at Inveruglas at Loch Lomond, passing through the communities of Tighnabruaich, Glendaruel, Strachur, Lochgoilhead and Arrochar.

**Figure 4 LLTNPA Map of the National Park**




A review of Sustrans' National Cycle Network (NCN) map[3] does not show any national cycle routes in the immediate vicinity of the Proposed Development Area. The closest route lies to the south in Balloch and

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

Alexandria, where sections of NCN route 7 pass. The NCN route 7 runs between Sunderland and Inverness and comprises a combination of traffic free and on-road routes.

## 5.4 Road Access

### A82(T)

The A82(T) is part of the Scottish trunk road network and is managed and maintained by Amey between Balloch and the Erskine Bridge, and by Bear Scotland for the remainder of its length on behalf of Transport Scotland. The A82(T) runs from Glasgow to Fort William and Inverness, passing along the shores of Loch Lomond and Loch Ness. The A82(T) is one of the principal north / south routes in Scotland providing a key link between the Central Belt and the Highlands.

The section of the A82(T) closest to the Proposed Development, is a single carriageway road with one lane operating in each direction. The speed limit on the A82(T) varies, however on the section that passes the site, a 50 miles per hour (mph) limit is in place. There are sections to the north of the Proposed Development where this increases to the national speed limit and locations for example within Tarbet and other settlements where this reduces to 30 or 40mph.

The road is considered to be in good condition and maintained to a high standard by Bear Scotland and Amey.

### A83(T)

The A83(T) is part of the Scottish trunk road network and is managed and maintained by Bear Scotland as part of the North West Unit. The A83(T) runs from Campbeltown to Tarbet. The speed limit on the A83(T) varies, however on the section within the study area, the national speed limit is in place, reducing to 30mph through Arrochar and Tarbet.

The road is considered to be in good condition and maintained to a high standard by Bear Scotland.

### 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 sections of the A82(T) and A83(T) which are ‘Agreed Routes’.

The Agreed Timber Route Map[4] 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.

[4] http://timbertransportforum.org.uk/

## 5.5 Existing Traffic Conditions

In order to assess the impact of development traffic on the study area, one Automatic Traffic Count (ATC) site was established in November 2023, in the vicinity of the northern site access junction. The ATC survey was conducted over a 7-day period, recording vehicle classifications, direction of travel and speeds. The count site was as follows:

1. A82(T) in the vicinity of the northern site access junction to the power station.

In addition to the ATC data, further traffic count data was obtained from the Transport Scotland database and Department for Transport (DfT) database. With regards to the traffic data obtained from Transport Scotland and DfT databases, 2023 has been used. The traffic data allow the traffic flows to be split into vehicle classes. The data was summarised into Cars/Light Goods Vehicles (LGVs) and HGVs (all goods vehicles >3.5tonnes gross maximum weight).

Traffic data has been used for the following locations:

2. A82(T) at Ardlui (ref. 30769);
3. A82(T) to the north of Tarbet (ref. ATCCS001);
4. A83(T) to the west of Tarbet (ref. ATC08090); and
5. A82(T) south of Tarbet (ref. ATC08119).

A National Road Traffic Forecast (NRTF) low growth factor was applied to the ATC, Transport Scotland and DfT data, to bring the traffic data up to the base year of 2024. The NRTF low growth factor for 2023 to 2024 is 1.005.

These sites were identified as being areas where sensitive receptors on the access routes would be located. A full receptor sensitivity and effect review is prepared in the **Traffic and Transport Chapter** of the EIA Report **(Volume 1: Chapter 13).**

Figure 5 shows the location of the surveys, while Table 1 summarises the annual average daily traffic (AADT[5]) traffic data collected and used in this assessment.

[5] Number of vehicles that travel past the count point (in both directions) on an average day of the year.

**Figure 5 Traffic Count Locations**

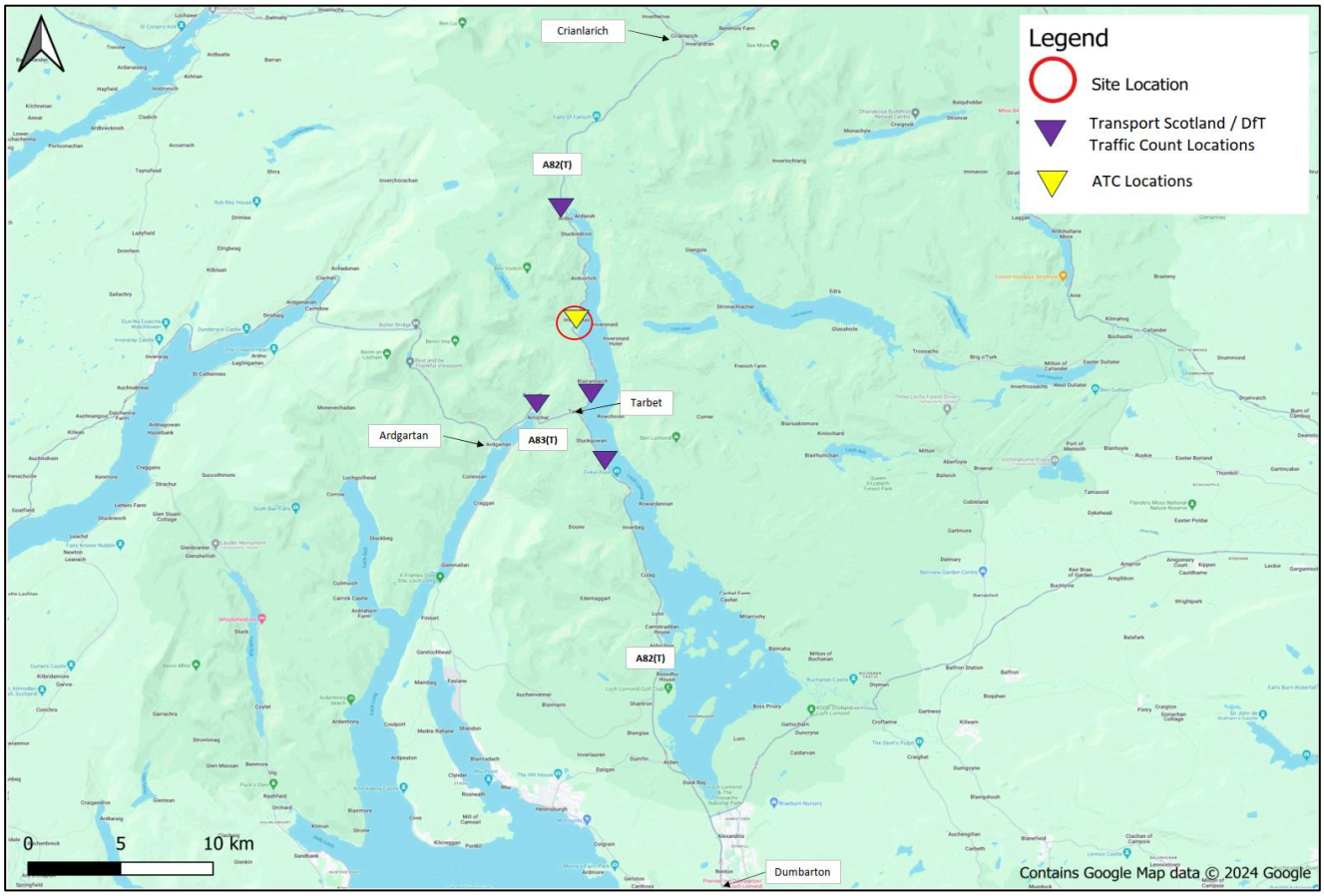



**Table 1 24-hour Average Traffic Data (2024)**

| Survey Location | Data Source | Cars/LGV | HGV | Total |
|---|---|---|---|---|
| A82(T), Ardlui | Transport Scotland | 4,243 | 227 | 4,470 |
| A82(T), site frontage | ATC | 2,582 | 777 | 3,359 |
| A82(T), north of Tarbet | Transport Scotland | 4,149 | 366 | 4,514 |
| A83(T), west of Tarbet | Transport Scotland | 3,842 | 919 | 4,761 |
| A82(T), south of Tarbet | Transport Scotland | 7,337 | 1,666 | 9,003 |

*Please note that variances may occur due to rounding.*

It should be noted that the variation in data on the A82(T) between the project specific ATC data and the Transport Scotland data is due to the ATC data being based on a 7-day period survey, undertaken in November 2023, while the Transport Scotland survey data is based on AADT. Whilst the project specific ATC data is lower that the Transport Scotland data, it is considered that this will allow for a suitably robust assessment on the A82(T) at the site frontage to be undertaken, as the baseline flows will be lower, meaning that the potential impacts of construction traffic will not be diluted.

As noted above the ATC undertaken to inform the study also collected seven-day speed data and a summary of this can be seen in Table 2 below, together with the speed data from the Transport Scotland database. Note DfT data does not include vehicle speed information.

**Table 2 Speed Summary**

| Survey Location | Data Source | Mean Speed (mph) | 85%tile Speed (mph) | Speed Limit (mph) |
|---|---|---|---|---|
| A82(T), site frontage | ATC | 40.7 | 47.6 | 50 |
| A82(T), north of Tarbet | Transport Scotland | 37.6 | 42.7 | 50 |
| A83(T), west of Tarbet | Transport Scotland | 27.4 | 31.5 | 30 |
| A82(T), south of Tarbet | Transport Scotland | 53.0 | 59.6 | 60 |

The speed survey data indicates that speed limits are broadly being adhered to within the study area, including along the A82(T) in the vicinity of the Proposed Development site access junctions. The 85th percentile speed to the west of Tarbet on the A83(T) in the vicinity of Arrochar is marginally over the posted speed limit of 30mph and as such, Police Scotland may wish to consider enforcement spot checks in these areas as part of their wider road policing measures.

## 5.6 Accident Review

Personal Injury Accident (PIA) data for the five-year period covering 2019 to 2023 for the A82(T) 1km north and south of the existing site access junctions, was obtained from the Transport Scotland in line with the requirement set out in the Scoping Opinion.

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.

PIA statistics are typically categorised into three categories, namely “Slight”, for damage only incidents, “Serious”, for injury accidents and “Fatal”, for those accidents that result in a death, however Transport Scotland allow for four categories within the “Serious” classification, namely “Serious”, “Very Serious”, “Moderately Serious” and “Less Serious”.

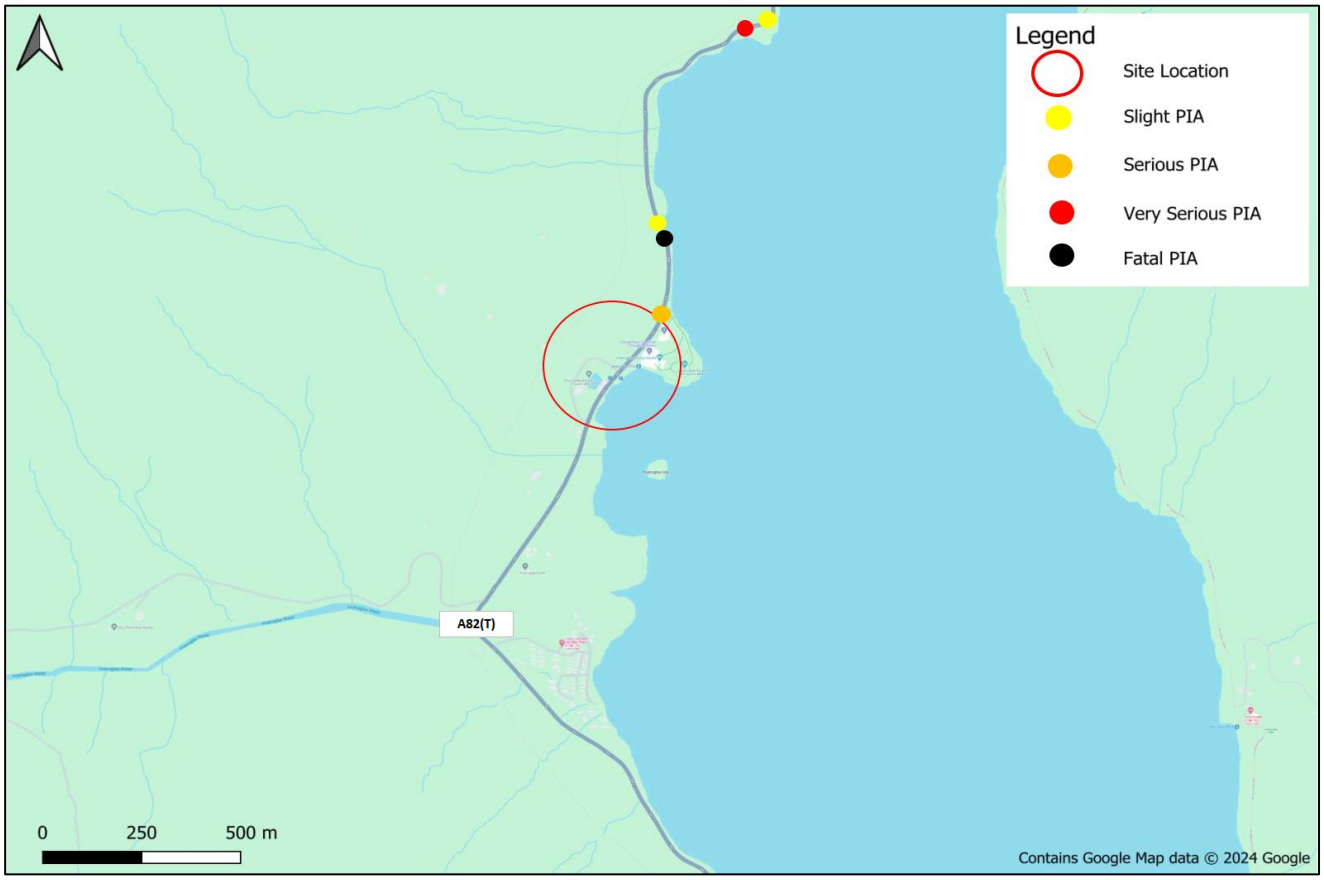
The locations and severity of the recorded accidents within the 1km north and south of the site access junctions has been summarised in Table 3, while Figure 6 shows their locations. Note, only those classifications which have a recorded accident have been included.

**Table 3 Personal Injury Accident Summary**

| Survey Location | Slight | Serious | Very Serious | Fatal | HGV PIA |
|---|---|---|---|---|---|
| A82(T), 1km north of the site access junctions | 2 | 1 | 1 | 1 | 1 |
| A82(T), 1km south of the site access junctions | - | - | | - | - |
| **Total** | **2** | **1** | **1** | **1** | **1** |
| **Percentage** | **40.00%** | **20.00%** | **20.00%** | **20.00%** | **-** |

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

**Figure 6 PIA Locations**




A summary analysis of the incidents indicates that:

- A total of five PIAs were recorded within 1km north and south of the access junctions in the last five-year period.
- Of those five PIAs, two were classified as “Slight” (40.0%), one was classified as “Serious” (20.0%), one was classed as “Very Serious” (20.0%) and there was one “Fatal” (20.0%).
- No PIAs recorded involved a cyclist or pedestrian.
- One PIAs recorded involved a motorcycle, which was classified as “Serious”. This was a two vehicle accident, with the other vehicle being a car. The accident occurred on a bend during daylight hours.
- One of the recorded PIAs involved an HGV, which was classified as “Fatal”. This was a two vehicle accident, with the other vehicle being a car. The accident occurred on a bend, in darkness, with no street lighting present.

In general, there are no clusters of PIAs at any location within 1km of the site access junctions or high numbers of accidents involving HGVs for example. 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 would be exacerbated by the construction of the Proposed Development. The majority of recorded accidents occurred on or approach to bends on the carriageway or in the vicinity of junctions, where there is an increased level of vehicle interaction.

## 5.7 Future Baseline Traffic Conditions

### 5.7.1 2027 Traffic Flows, excluding Committed Development Trips

Construction of the Proposed Development could commence during 2027 if consent is granted and is anticipated to take approximately 36 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 NRTF low growth factor to the surveyed traffic flows. The NRTF low growth factor for 2024 to 2027 is 1.016. This growth factor has been 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 |
|---|---|---|---|
| A82(T), Ardlui | 4,311 | 231 | 4,542 |
| A82(T), site frontage | 2,623 | 789 | 3,412 |
| A82(T), north of Tarbet | 4,215 | 372 | 4,587 |
| A83(T), west of Tarbet | 3,904 | 933 | 4,837 |
| A82(T), south of Tarbet | 7,454 | 1,693 | 9,147 |

*Please note that variances may occur due to rounding.*

## 5.8 Committed Developments

A review of the LLTNPA online planning portal[7], in addition to the Scottish Government's Energy Consents Unit portal[8] was undertaken to identify any consented developments within the vicinity of the Proposed Development which would generate significant traffic. 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 relevant committed developments for inclusion within the assessment.

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.

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.

Should any projects currently going through planning which may be granted planning consent at the same time as the Proposed Development, the Applicant would welcome the opportunity to engage with other developers in consultation with LLTNPA and other relevant bodies, for example Transport Scotland, to ensure appropriate traffic management measures would be implemented to minimise any cumulative impacts. For example should any construction activities be undertaken at the same time, it is suggested that this could be mitigated through the use of an overarching Traffic Management and Monitoring Plan (TMMP) for all of the relevant sites.

[7] https://eplanning.lochlomond-trossachs.org/OnlinePlanning/search.do?action=simple&searchType=Application
[8] https://www.energyconsents.scot/ApplicationSearch.aspx?T=1

# 6 Trip Generation and Distribution

## 6.1 Construction Phase

### 6.1.1 Trip Derivation

During the approximate 36-month construction period, the following traffic will require access to the site:

- staff transport, in either cars or staff minibuses;
- site clearance / tree felling;
- import of materials, including concrete and general building materials;
- M&E components;
- removal of spoil material;
- removal of felled timber;
- import of fuel for construction plant;
- daily movements associated with servicing a large construction site and compound; and
- occasional delivery of larger items of plant.

In terms of major items of construction plant which will work on the site, these will include:

- cranage;
- 'Moxy' 40 Tonne dumper trucks;
- telehandlers;
- small (4 Tonne to 6 Tonne) dumper trucks;
- excavators (Back-actors and 360o tracked excavators);
- low loaders (for plant and materials delivery);
- ready mixed concrete trucks;
- drilling rigs; and
- rock crushing plant.

The existing Sloy Hydroelectric Power Station site is a working industrial site with daily activity / vehicle movement in and around the site. Activity associated with the Proposed Development will occur either within the existing Sloy Hydroelectric Power Station site itself, or immediately adjacent to it, to the north of the site, or in the secondary compound area located within the Inveruglas Visitor Centre overflow car park.

Average daily traffic flow data were used to establish the construction trips associated with the site based on the assumptions detailed in the following sections. The calculations assume that there are 50 working weeks per year, and work will take place six days per week.

### 6.1.2 Construction Staff

It is estimated that an average of 75 people would be working on-site during the construction phase, increasing to 100 at peak periods of construction activity. This includes both site based supervisory / management staff and construction site workers.

It is anticipated that these staff would live locally during the construction phase, travelling to the site by minibus to reduce the number of single occupancy car trips and number of car parking spaces required on-site. Current proposals are to secure an off-site location, most likely to the south of the Proposed Development where site staff can park during their shift and be transported to and from the site in minibuses. The minibuses would enter the existing Sloy Hydroelectric Power Station via the southern access junction, which is used by operational staff and drop the construction staff within the site, before turning and exiting via the same junction.

For the purposes of estimating traffic movements, it was assumed that 80% of staff would be transported by minibus and 20% would 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 (17 seater minibus) would account for a maximum of 50 vehicle movements (25 inbound trips and 25 outbound trips) per day during the peak period of construction.

### 6.1.3 Movement of Plant, Materials and Equipment

It is estimated that there would be around 2,500 HGV deliveries to site during the course of the construction works. Of these around 75% would be deliveries of concrete using 6m$^3$ ready-mix lorries. The rest would primarily be deliveries of temporary site facilities, construction plant, pipework, mechanical and electrical plant (i.e. pumps, motors, switchgear etc.), reinforcing steel and miscellaneous building items. The latter would generally use 40 foot articulated lorries.

In terms of vehicle movements associated with concrete deliveries, it is estimated that over the three month period where concrete related works are being carried out, there will be 1,250 vehicle movements per month (625 inbound trips and 625 outbound trips).

Delivery of all other materials are estimated to result in 36 vehicle movements per month (18 inbound trips and 18 outbound trips) over the course of the 36 month programme.

### 6.1.4 Material Excavation

The proposed construction activities would result in a maximum of 40,000m$^3$ of rock excavations. The excavated rock would be used productively in the construction of the new works, where feasible. However, it is envisaged that there would be a surplus of excavated rock spoil, overall.

For the purposes of the assessment, it has been assumed that 12,000m$^3$ of excavated material would remain on-site, with 28,000m$^3$ transported off-site to be used on Forestry Land Scotland / RTS Forestry projects or similar.

For the purposes of the assessment, it has been assumed that the material would leave the site heading south on the A82(T) / A83(T). This would equate to approximately 6,160 vehicle movements (3,080 inbound trips and 3,080 outbound trips) using a standard 20 tonne capacity HGV tipper.

### 6.1.5 Timber Felling

There would be a requirement for timber felling and extraction associated with the construction of the Proposed Development. It is currently estimated that there would be in the order of 0.8 hectares of timber to be felled, of varying quality and type. Current estimates based on the quality of the timber suggest in the order of 260 tonnes will be extracted from the site, occurring during the second month of the construction programme.

For the purposes of the assessment, it has been assumed that all timber extracted will be done using a dedicated timber articulated lorry, which has a payload capacity of approximately 25 tonne, with the material leaving the site heading south on the A82(T) / A83(T).

Based on the above, it is therefore assumed that a total of 22 vehicle movements (11 inbound trips and 11 outbound trips) will be required to extract the timber from the site.

### 6.1.6 Abnormal Load Deliveries

Abnormal Indivisible Loads (AILs) are not currently expected to be required in relation to bringing project specific components to site for the Proposed Development. Should this change however, it would be proposed to undertake a Route Survey Report for the AILs from the Port of Entry (POE) through to the site, in full consultation with TS and other relevant parties. It is considered that if required, this can be conducted post consent and secured through a planning condition.

With regards to the G4 turbine deliveries, there are no abnormal loads currently proposed in relation to transporting components to the site. The largest predicted loads at this time, would be transported as oversized

loads. Where necessary escort vehicles would accompany any oversized loads to support the traffic management measures.

### 6.1.7 General Deliveries HGV and Cars / LGVs

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

In addition, an allowance for a further one delivery for every ten members of site staff have been allowed for by Car / LGV. This equates to 220 vehicle movements per month (110 inbound trips and 110 outbound trips).

### 6.1.8 G4 Turbine Replacement Project

The objective of the G4 Turbine replacement works is to increases the generation capacity of the unit from 32.4MW to 40MW in line with the other units within the existing station, which were upgraded in the late 1990s.

The works are estimated to take approximately 6 months and would be programmed to commence approximately 20 months in to the wider construction programme for the Proposed Development, to align with Proposed Development related outages.

It is estimated that an additional 10 people would be required for construction of the G4 turbine works, over and above that required for the Proposed Development. Current proposals are for them to use the existing southern access for the operational power station site. As a worst case assumption it has been assumed that those people would travel by Car / LGV resulting in 20 vehicle movements per day (10 inbound trips and 10 outbound trips).

In terms of vehicular movements associated with components for the G4 turbine replacement project, information provided by the Applicant has suggested that there would be a total of 12 HGV vehicle movements (6 inbound trips and 6 outbound trips). It is currently estimated that half of these would occur at the start of the programme and half at the three month stage.

### 6.1.9 Peak Construction Traffic

The maximum traffic effect associated with construction of the Proposed Development is predicted to occur in months 14 to 16 of the programme. During each of these months, a total of 3,332 vehicle movements are predicted, comprising 1,320 Car / LGV movements and 2,012 HGV movements. This equates to an average of the following vehicle movements per day:

- Cars / LGV: 60 vehicle movements (30 inbound trips and 30 outbound trips); and
- HGV: 92 vehicle movements (46 inbound trips and 46 outbound trips).

## 6.2 Trip Distribution

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

- all construction traffic enters the site via the proposed accesses on the A82(T);
- deliveries associated with ready-mix concrete will be sourced from local concrete suppliers, which for the purpose of this assessment will originate from the A83(T) / A82(T) to the south. The Balance of Plant (BoP) contractor will confirm final sourcing with LLTNPA in the final Construction Traffic Management Plan (CTMP);
- HGV deliveries associated with cabling and electrical and mechanical equipment, etc. will arrive predominantly from the Central Belt and will travel to the site via the A82(T) from the south;
- Material being exported off-site to be used on FLS projects or similar, will travel south on the A82(T) before heading west on the A83(T);

- staff working at the site are likely to be based locally. It is assumed that 90% will come from the A82(T) to the south and 10% from the north; and
- general site deliveries will arrive predominantly from the south via the A82(T).

The resulting development trips are summarised in Table 5.

**Table 5 Peak Construction Traffic**

| Survey Location | Cars/LGV | HGV | Total |
|---|---|---|---|
| A82(T), Ardlui | 6 | 0 | 6 |
| A82(T), site frontage | 56 | 92 | 148 |
| A82(T), north of Tarbet | 56 | 92 | 148 |
| A83(T), west of Tarbet | 0 | 88 | 88 |
| A82(T), south of Tarbet | 56 | 4 | 60 |

Please note minor variances due to rounding may occur.

# 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 6.

**Table 6 Peak Construction Traffic Network Impact**

| Survey Location | Cars/LGV | HGV | Total | Cars/LGV % Increase | HGV % Increase | Total % Increase |
|---|---|---|---|---|---|---|
| A82(T), Ardlui | 4,317 | 231 | 4,548 | 0.1% | 0.0% | 0.1% |
| A82(T), site frontage | 2,679 | 881 | 3,560 | 2.1% | 11.7% | 4.3% |
| A82(T), north of Tarbet | 4,271 | 464 | 4,735 | 1.3% | 24.8% | 3.2% |
| A83(T), west of Tarbet | 3,904 | 1,021 | 4,925 | 0.0% | 9.4% | 1.8% |
| A82(T), south of Tarbet | 7,510 | 1,697 | 9,207 | 0.8% | 0.2% | 0.7% |

The highest total traffic movement increase within the study area is on the A82(T) along the site frontage, where it is predicted to increase by 4.3%. This is considered to be below daily traffic variation levels on the road network. On the rest of the public road network within the study area, the next highest total traffic increase (3.2%) is on the A82(T) north of Tarbet.

The total HGV traffic movements will increase by 24.8% on the A82(T) north of Tarbet. This is not considered to be a significant increase, with only 92 HGV movements per day predicted, which equates to approximately eight two-way movements per hour over a typical 12 hour working day. On the rest of the public road network, the highest HGV traffic increase is 11.7%, which is on the A82(T) along the site frontage.

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 NESA Manual, formerly part of the Design Manual for Roads and Bridges, Volume 15, Part 5. 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 7.

**Table 7 Theoretical Road Capacity**

| Survey Location | 2027 Baseline Flow (total traffic) | 2027 Base + Development Flows (total traffic) | Theoretical Road Capacity (12hr) | Spare Road Capacity % |
|---|---|---|---|---|
| A82(T), Ardlui | 4,542 | 4,548 | 28,800 | 84.2% |
| A82(T), site frontage | 3,412 | 3,560 | 28,800 | 87.6% |
| A82(T), north of Tarbet | 4,587 | 4,735 | 28,800 | 83.6% |
| A83(T), west of Tarbet | 4,837 | 4,925 | 28,800 | 82.9% |
| A82(T), south of Tarbet | 9,147 | 9,207 | 28,800 | 68.0% |

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

# 8 Proposed Traffic Mitigation Measures

## 8.1 Construction Phase

### 8.1.1 Construction Traffic Management Plan (CTMP)

The CTMP would be agreed with LLTNPA and Transport Scotland prior to construction works commencing, with proposed measures to be included provided below.

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

- where possible, the detailed design process would minimise the volume of material to be imported to 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 (if required);
- 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 LLTNPA and Transport Scotland;
- normal site delivery hours would be limited to between 07:00 and 19:00 (Monday to Saturday) and 07:00 to 15:00 hours (Sundays), with some key periods within the programme requiring 24 hour working. In the event of work being required outwith standard hours, e.g., abnormal load deliveries, commissioning works or emergency mitigation works, the Local Authority would be notified prior to these works taking place, wherever possible;
- appropriate traffic management measures would be put in place on the A82(T) to avoid conflict with general traffic, subject to the agreement of LLTNPA. Typical measures would include HGV turning and crossing signs and/or banksmen at the site access and warning signs;
- provide construction updates on the project website and or a newsletter to be distributed to residents within an agreed distance of the site;
- adoption of a voluntary reduced speed limits at locations to be agreed with LLTNPA and Transport Scotland;
- all drivers would 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.

Transport Scotland are likely to request that an agreement to cover the cost of abnormal wear on the A82(T) in the vicinity of the Proposed Development is put in place.

Video footage of the pre-construction phase condition of the construction vehicles route would be recorded to provide a baseline of the condition of the road prior to any construction work commencing. This baseline would provide evidence of any change in the road condition during the construction phase. Any necessary repairs would be coordinated with TS. Any damage caused by construction traffic associated with the Proposed Development, that would be hazardous to public traffic, would be repaired immediately.

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

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

## 8.2 Abnormal Load Transport Management Plan (if required)

There are a number of traffic management measures that could help reduce the effect of AIL convoys on the public road network should the current situation change and AILs are required. These measures would be enacted for example, should the proposed pump sections be classed as AILs.

All abnormal load deliveries would be undertaken at appropriate times (to be discussed and agreed with LLTNPA, TS and police) with the aim to minimise the effect on the local road network. It is likely that the abnormal load convoys would travel in the early morning periods before peak times.

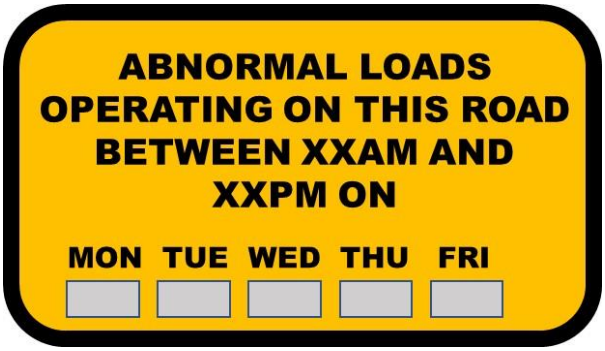
The majority of potential conflicts between construction traffic and other road users would occur with abnormal load traffic. General construction traffic is not likely to come into conflict with other road users as the vehicles are smaller and road users are generally more accustomed to them.

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:

- at locations where there are significant changes in the horizontal alignment of the carriageway, requiring the loads to use 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 would 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 7. Flip up panels (shown in grey) would be used to mask over days where convoys would not be operating. When no convoys are moving, the sign would be bagged over by the Traffic Management contractor.

**Figure 7 Example Information Sign**




This signage would 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 would be agreed post consent and would form part of the Traffic Management Proposal for the project.

The Abnormal Load Transport Management Plan would 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 would form a means of communicating and updating on forthcoming activities and dealing with any potential issues arising.

The Abnormal Load Transport Management Plan would be conducted post consent and would be secured through a planning condition.

## 8.3 Public Information

Should AILs be required, information on the AIL convoys would be provided to local media outlets such as local papers and local radio to help assist the public if deemed necessary.

Information would relate to expected vehicle movements from the POE through to the site access junction. This would assist residents becoming aware of the convoy movements and may help reduce any potential conflicts.

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

## 8.4 Convoy System (if required)

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

The abnormal loads convoys would be no more than three AIL 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 would travel would need to be agreed with Police Scotland who have sole discretion on when loads can be moved.

## 8.5 Path Management Plan (PMP)

In the immediate vicinity of the 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 would be conducted post consent and secured through a planning condition. Findings from the study would be used to formulate a set of measures into a Path Management Plan (PMP), which could be a standalone document or form part of the CTMP.

Appropriate Traffic Signs Manual Chapter 8 compliant temporary road signage would be provided to assist at crossing points for the benefit of all users.

The principal contractor would ensure that speed limits are always adhered to by their drivers and associated subcontractors. This is particularly important within close proximity to the Core Paths, Rights of Way and at crossing points. Advisory speed limit signage would also be installed on approaches to areas where path users may interact with construction traffic.

Signage would be installed on the site exit that makes drivers aware of local speed limits and reminding drivers of the potential presence of pedestrians and cyclists in the area. This would also be emphasised in the weekly toolbox talks.

## 8.6 Staff Travel Plan

A Staff Travel Plan would 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;
- minibus service for transport of site staff;
- promotion of a car sharing scheme; and
- car parking management.

## 8.7 Operational Phase Mitigation

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

# 9 Summary & Conclusions

Pell Frischmann Ltd. has been commissioned by ASH design+assessment Ltd. on behalf of SSE Generation Limited (the Applicant), to undertake a Transport Assessment for the proposed conversion of the existing Sloy Hydroelectric Power Station into a pumped storage scheme. The site is located in the grounds of the Sloy Hydroelectric Power Station, immediately north of the power station, adjacent to the Inveruglas Visitor Centre, within the Loch Lomond and the Trossachs National Park (LLTNP).

The Proposed Development will be accessed from the A82(T) via the existing access junctions to the Sloy Hydroelectric Power Station. It is anticipated that the northern junction would be used exclusively by construction vehicles during the construction of the Proposed Development, while the southern access would be used by construction personnel accessing the site and by existing operational traffic.

In addition, an upgraded access will be provided on the A82(T) to provide access the secondary construction compound area, within the overflow carpark for the Inveruglas Visitor Centre.

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

The construction traffic would 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 months 14 to 16 of the programme. During these months, a total of 3,332 vehicle movements are predicted, comprising 1,320 Car / LGV movements and 2,012 HGV movements. This equates to an average of the following vehicle movements per day:

- Cars / LGV: 60 vehicle movements (30 inbound trips and 30 outbound trips); and
- HGV: 92 vehicle movements (46 inbound trips and 46 outbound trips).

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 both the construction and operational phase traffic flows. It is considered that these can be secured by condition with LLTNPA.

The Proposed Development would lead to a temporary increase in traffic volumes within the study area during the construction phase only, however this can be appropriately and effectively managed. The operational phase would be restricted to occasional maintenance and general operational review of the site which generate significantly lower volumes of traffic that are not considered to be in excess of daily traffic variation levels on the road network. It is estimated that at most, the operational phase would generate two to three car / LGV trips per day, which is comparable with the existing Sloy Hydroelectric Power Station. It is therefore concluded that there are no transport related matters which would preclude the construction of the Proposed Development.

# Annex A Site Access Junction Drawings





PROPOSED JUNCTION ROAD MARKINGS
SCALE 1:250




| CHAINAGE | 0.000 | 10.000 | 20.000 | 30.000 | 40.000 | 50.000 | 60.000 | 70.000 | 72.164 |
|---|---|---|---|---|---|---|---|---|---|
| EXISTING GROUND LEVEL | 31.152 | 29.138 | 26.666 | 22.298 | 13.953 | 12.348 | 12.118 | 11.566 | 11.519 |

SECTION A-A

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL WORKS TO BE EXECUTED IN ACCORDANCE WITH THE DMRB, THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAYS WORKS, DESIGN MANUAL FOR ROADS AND BRIDGES, AND TRAFFIC SIGNS MANUAL.
3. ALL WORKS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENT OF THE STATUTORY AUTHORITIES AND CONSTRUCTION DESIGN MANAGEMENT REGULATIONS.
4. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.
5. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL EXISTING SERVICES AND DRAINAGE CONNECTIONS PRIOR TO COMMENCING WORKS.
6. A PROGRAMME OF VEGETATION MANAGEMENT SHALL BE IMPLEMENTED FOR THE DURATION OF THE CONSTRUCTION PERIOD IN ORDER TO MAXIMISE VISIBILITY TO THE LEFT AND TO ENSURE THAT THE APPROVED SIGHT DISTANCE TO THE LEFT IS PROVIDED AT ALL TIMES.
7. THE NORTH ACCESS IS TO BE USED BY CONSTRUCTION TRAFFIC ONLY, WHICH SHALL BE RESTRICTED BY A CONTRACTUAL AGREED TRAVEL PLAN.
8. WARNING SIGNS TO TSRGD DIAG. 506.1 "SIDE ROAD AHEAD" TO BE PROVIDED ON THE TRUNK ROAD APPROACHES TO THE NORTH ACCESS WITH VEHICLE ACTIVATED FLASHING SIGN TO DIAG 511 "HEAVY PLANT CROSSING" TO WARN TRAFFIC ON THE TRUNK ROAD OF VEHICLES EMERGING FROM THE NORTH ACCESS.

LEGEND:

- VISIBILITY SPLAY RIGHT (2.0m x 160m) TARGET HEIGHT 0.26m & 1.05m
- VISIBILITY SPLAY LEFT (2.0m x 105m) TARGET HEIGHT1.05m
- VISIBILITY SPLAY LEFT (2.0m x 90m) TARGET HEIGHT 0.26m
- ADDTIONAL AREA TANGENTIAL TO EDGE OF CARRIAGEWAY

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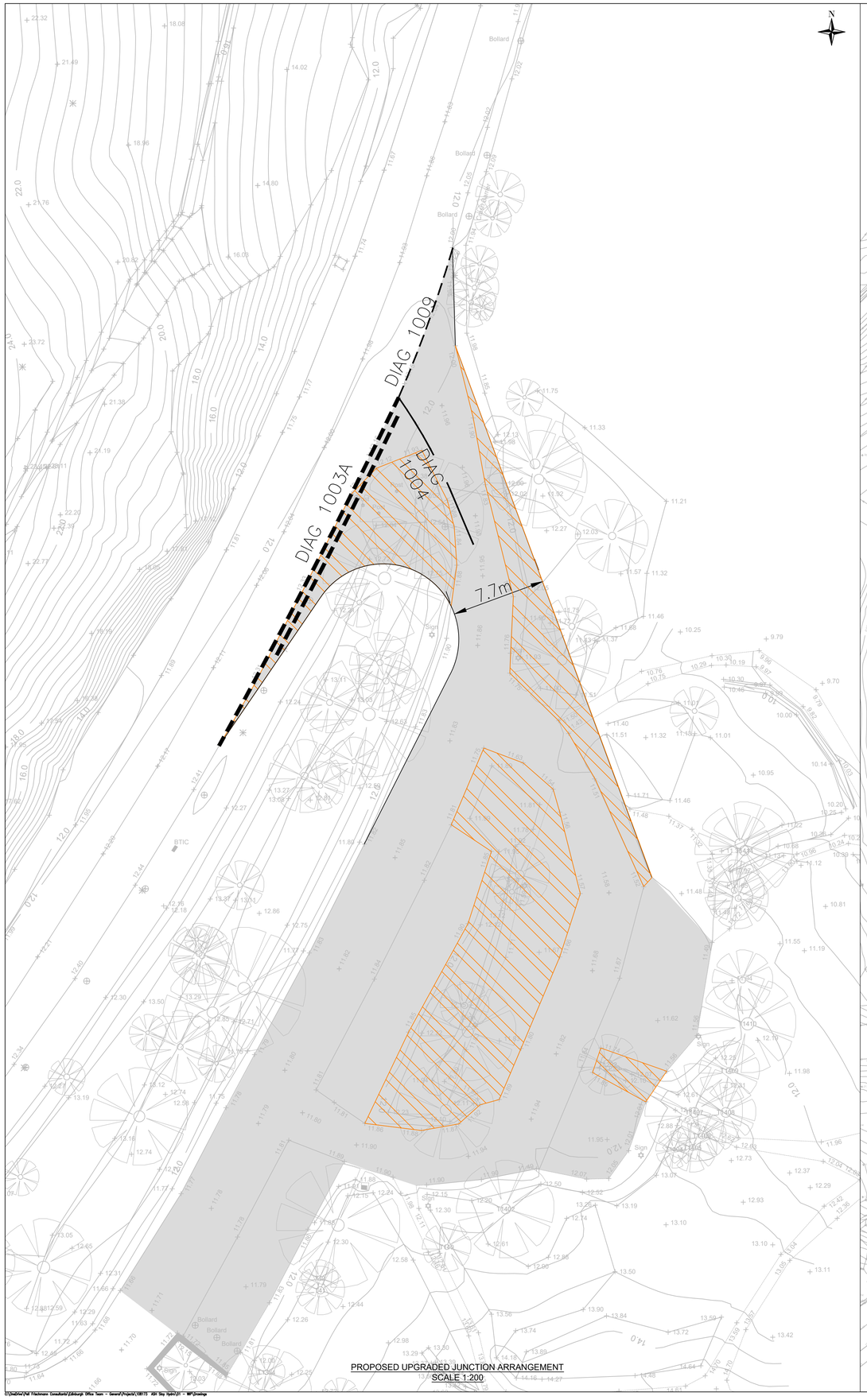
Client
SSE GENERATION LIMITED

Project
SLOY PUMPED STORAGE SCHEME

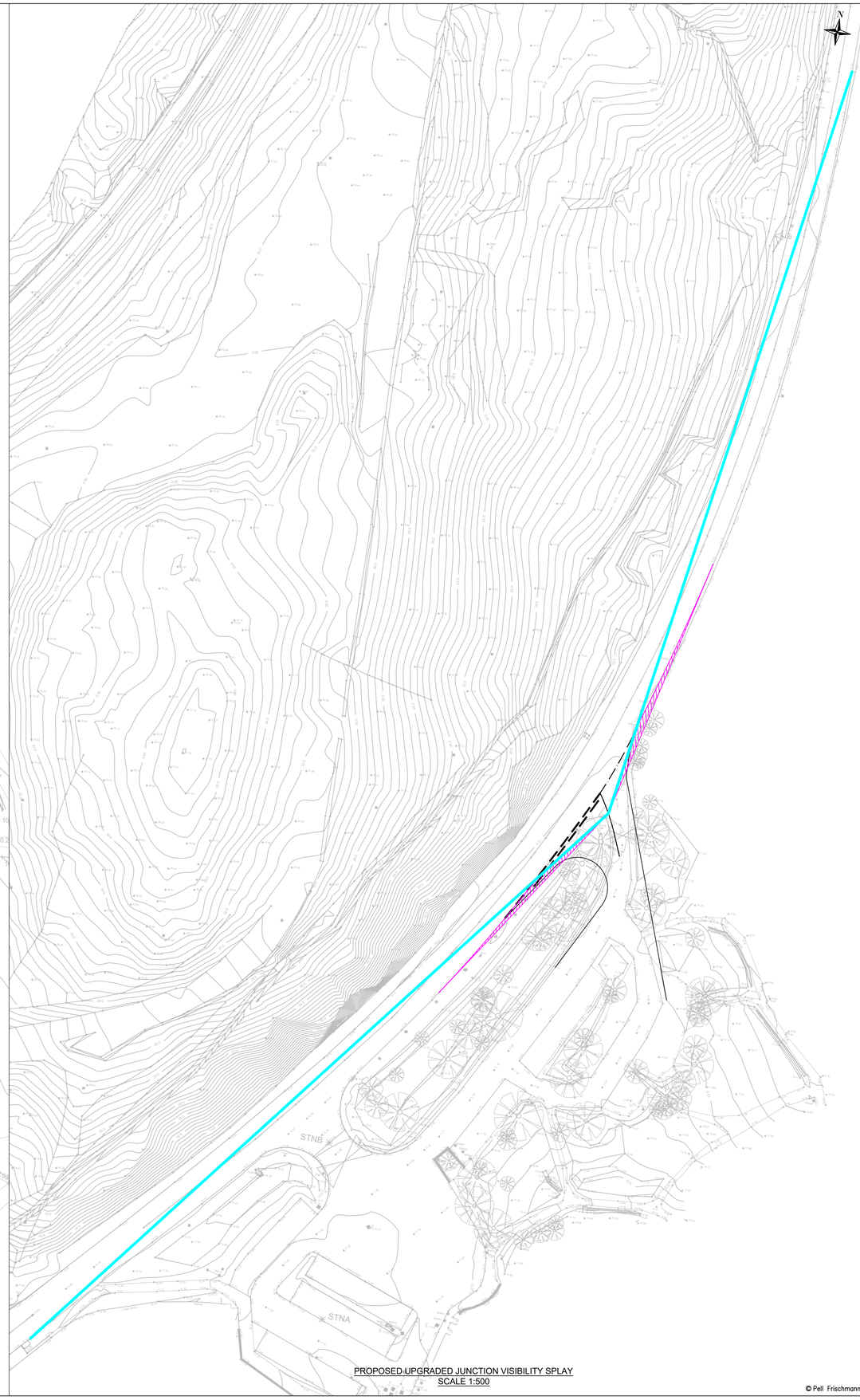
Drawing Title
A82 EXISTING JUNCTION VISIBILITY SPLAY

| | Name | Date | Scale | 1:500 @ A1 |
|---|---|---|---|---|
| Designed | | 24/04/24 | File | 108179_SK_0001 |
| Checked | | 24/04/24 | Drawing Status | DRAFT |

Drawing No. 108179_SK_0001
Revision B




PROPOSED UPGRADED JUNCTION ARRANGEMENT
SCALE 1:200




PROPOSED UPGRADED JUNCTION VISIBILITY SPLAY
SCALE 1:500

NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL WORKS TO BE EXECUTED IN ACCORDANCE WITH THE DMRB, THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAYS WORKS, DESIGN MANUAL FOR ROADS AND BRIDGES, AND TRAFFIC SIGNS MANUAL.
3. ALL WORKS TO BE CARRIED OUT IN COMPLIANCE WITH THE REQUIREMENT OF THE STATUTORY AUTHORITIES AND CONSTRUCTION DESIGN MANAGEMENT REGULATIONS.
4. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER IMMEDIATELY SO THAT CLARIFICATION CAN BE SOUGHT PRIOR TO COMMENCEMENT OF WORKS.
5. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL EXISTING SERVICES AND DRAINAGE CONNECTIONS PRIOR TO COMMENCING WORKS.
6. A PROGRAMME OF VEGETATION MANAGEMENT SHALL BE IMPLEMENTED FOR THE DURATION OF THE CONSTRUCTION PERIOD IN ORDER TO MAXIMISE VISIBILITY TO THE LEFT AND TO ENSURE THAT THE APPROVED SIGHT DISTANCE TO THE LEFT IS PROVIDED AT ALL TIMES.
7. THE NORTH ACCESS IS TO BE USED BY CONSTRUCTION TRAFFIC ONLY, WHICH SHALL BE RESTRICTED BY A CONTRACTUAL AGREED TRAVEL PLAN. INVERGLAS VISITOR CENTRE ACCESS MUST NOT BE USED.
8. WARNING SIGNS TO TSRGD DIAG. 506.1 "SIDE ROAD AHEAD" TO BE PROVIDED ON THE TRUNK ROAD APPROACHES TO THE NORTH ACCESS WITH VEHICLE ACTIVATED FLASHING SIGN TO DIAG 511 "HEAVY PLANT CROSSING" TO WARN TRAFFIC ON THE TRUNK ROAD OF VEHICLES EMERGING FROM THE NORTH ACCESS.

LEGEND:

- PROPOSED ROAD CONSTRUCTION/RESURFACING
- VISIBILITY SPLAY (4.5m x 160m)
- ADDTIONAL AREA TANGENTIAL TO EDGE OF CARRIAGEWAY
- EXTENTS OF VEGETATION CLEARANCE

Pell Frischmann
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www.pellfrischmann.com

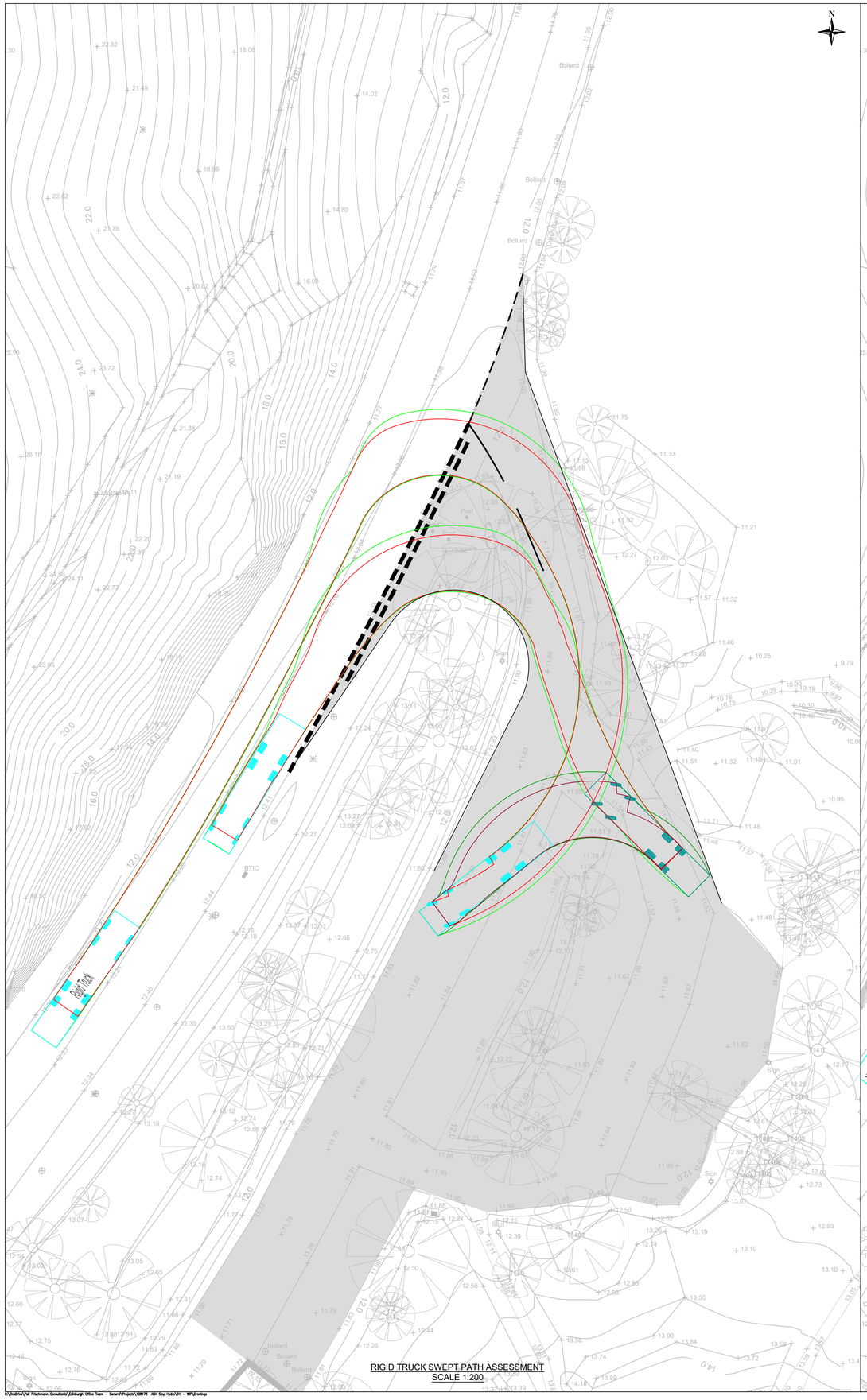
Client
SSE GENERATION LIMITED

Project
SLOY PUMPED STORAGE SCHEME

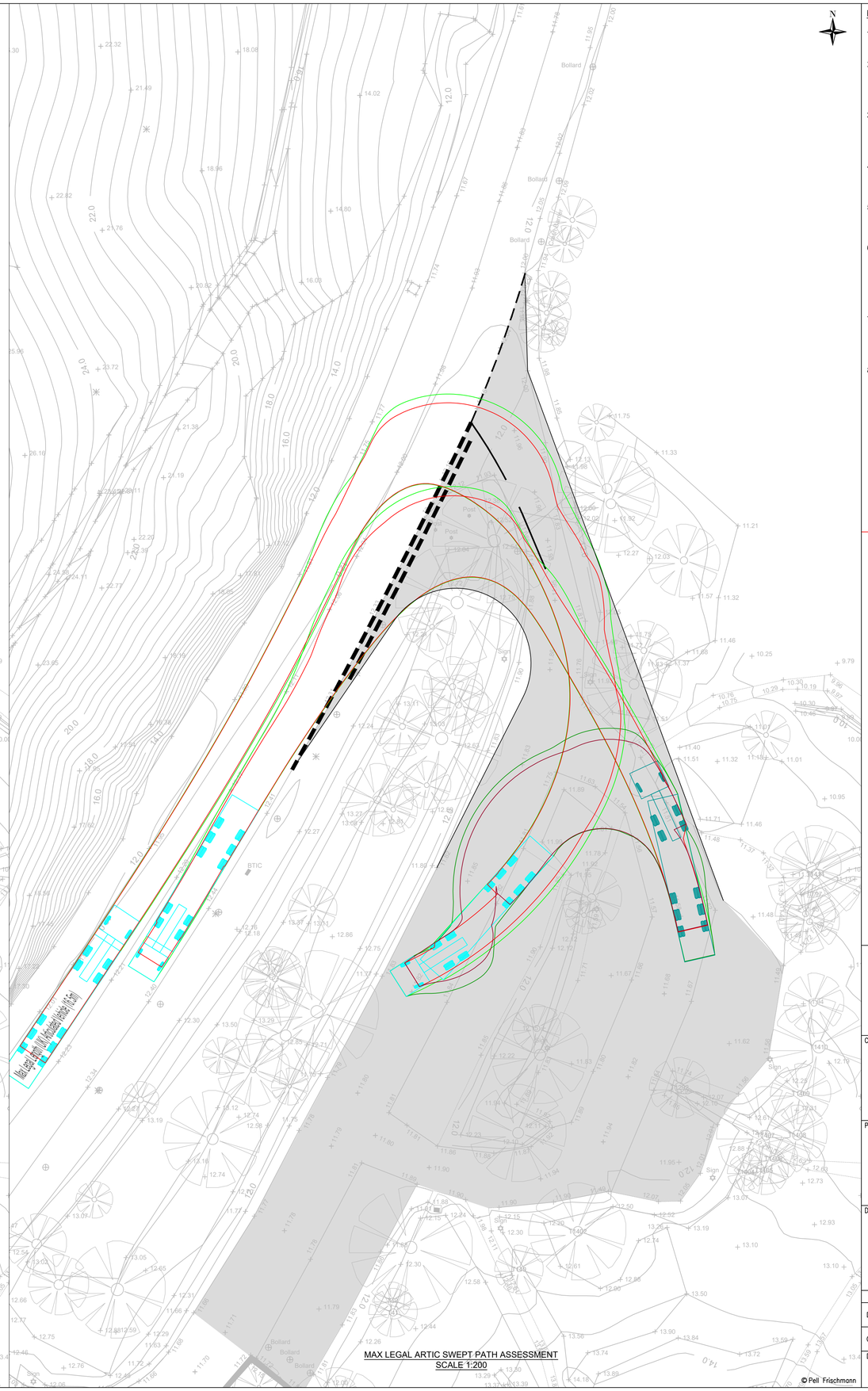
Drawing Title
A82 UPGRADED JUNCTION GENERRAL ARRANGEMENT & VISIBILITY SPLAY

| | Name | Date | | |
|---|---|---|---|---|
| | | | Scale | AS SHOWN |
| Designed | [redacted] | 24/04/24 | File | 108179_SK_0002 |
| Checked | [redacted] | 24/04/24 | Drawing Status | DRAFT |

Drawing No. 108179_SK_0002
Revision C




RIGID TRUCK SWEPT PATH ASSESSMENT
SCALE 1:200




MAX LEGAL ARTIC SWEPT PATH ASSESSMENT
SCALE 1:200



NOTES:

1. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.
2. ALL WORKS TO BE EXECUTED IN ACCORDANCE WITH THE DMRB, THE MANUAL OF CONTRACT DOCUMENTS FOR HIGHWAYS WORKS, DESIGN MANUAL FOR ROADS AND BRIDGES, AND TRAFFIC SIGNS MANUAL.
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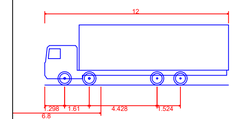
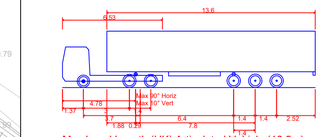



Rigid Truck

| | |
|---|---|
| Overall Length | 12.000m |
| Overall Width | 2.500m |
| Overall Body Height | 3.928m |
| Min Body Ground Clearance | 0.412m |
| Track Width | 2.471m |
| Lock to lock time | 6.00s |
| Kerb to Kerb Turning Radius | 11.900m |




Max Legal Length (UK) Articulated Vehicle (16.5m)

| | |
|---|---|
| Overall Length | 16.500m |
| Overall Width | 2.550m |
| Overall Body Height | 3.681m |
| Min Body Ground Clearance | 0.411m |
| Max Track Width | 2.500m |
| Lock to lock time | 6.00s |
| Kerb to Kerb Turning Radius | 6.530m |

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Client

SSE GENERATION LIMITED

Project

SLOY PUMPED STORAGE SCHEME

Drawing Title

A82 UPGRADED JUNCTION
SWEPT PATH ASSESSMENT

| | Name | Date | | |
|---|---|---|---|---|
| Designed | | 24/04/24 | Scale | AS SHOWN |
| Checked | | 24/04/24 | File | 108179_SK_0003 |
| | | | Drawing Status | DRAFT |

Drawing No. 108179_SK_0003

Revision C

# Annex B Stage 1 Road Safety Audit

Pell Frischmann

# Sloy Pumped Storage Scheme

## Stage 1 Road Safety Audit

August 2024

| | | | | | | |
|---|---|---|---|---|---|---|
| **Report Ref.** | | **108173-PEF-XX-XX-TAU-H-000001** | | | | |
| **File Path** | | **https://pellf.sharepoint.com/sites/EdinburghOfficeTeam/Shared Documents/General/Projects/108173 ASH Sloy Hydro/01 - WIP/Reports/Road Safety Audit/108173-PEF-XX-XX-TAU-H-000001 RSA report.docx** | | | | |
| **Rev** | **Suit** | **Description** | **Date** | **Originator** | **Checker** | **Approver** |
| C01 | A2 | Final | 23 July 2024 | [redacted] | [redacted] | [redacted] |
| C02 | A2 | Final | 19 August 2024 | [redacted] | [redacted] | [redacted] |
| | | | | | | |
| | | | | | | |

Ref. reference. Rev revision. Suit suitability.

**Prepared for**

**SSE Generation Limited**

Inveralmond House
200 Dunkeld Road
Perth
PH1 3AQ

**Prepared by**

**Pell Frischmann**

G37B Trinity Walk
Market Walk
Wakefield
WF1 1QR

# Contents



## Figures



## Tables



## Appendices

| Executive Summary | |
|---|---|
| **Site Name** | Sloy Pumped Storage Scheme. |
| **Location** | Within the grounds of the existing Sloy Hydroelectric Power Station, immediately north of the power station, adjacent to the Inveruglas Visitor Centre, which is located on the banks of Loch Lomond, approximately 5km to the north of Tarbet. |
| **Summary** | This report presents the results of a Stage 1 Road Safety Audit carried out on highway junction improvement works at two accesses on the A82 during the construction phase - one directly serving the development site, and the other to the secondary construction compound area, site establishment area and vehicle holding area in the vicinity. |

# 1 Introduction

This report results from a Stage 1 Road Safety Audit (RSA) of the proposals to modify two existing junctions which lie on the A82. One, currently unused, will be opened to provide access for construction vehicles to and from the Sloy Hydroelectric Power Station during the construction phase. The other, to the north and on the opposite side of the A82, will provide access to a new secondary construction compound, site establishment area and vehicle holding area, within the overflow car park north of the Inveruglas Visitor Centre car park. These works will include permanent upgrades to the secondary access junction, which would remain in place following completion of the construction works.

The Audit Team membership was as follows:

- David Spaul, an Associate employed by Pell Frischmann in Wakefield (Team Leader); and
- Usman Khan, a Senior Transport Planner employed by Pell Frischmann in Wakefield.

An RSA Brief has not been provided, however the information provided for this RSA is scheduled in **Appendix A**, which includes Volume 4, Appendix 13.1: Transport Assessment.

The Audit took place during July 2024. The Audit comprised an examination of documents provided by the Client, which are listed in **Appendix A**. The Audit team has not visited the site at this stage but have undertaken a desktop review utilising Google Streetview (dated November 2021).

The terms of reference of the Audit are as described in the Design Manual for Roads and Bridges GG 119 'Road Safety Audit' document. The Audit Team has examined and reported only on the road safety implications of the scheme as presented and has not examined or verified the compliance of the design to any other criteria. However, to clearly explain a safety problem or the recommendation to resolve a problem, the Audit Team may on occasion refer to a design standard for information only. Any Audit comments should not be construed as implying that a technical audit has been undertaken in any respect.

Any problem that has been identified is described in section 2 of this report and in each case a recommendation is given. The location of each problem is shown in **Appendix B**.

No information in this Audit should be regarded as a direct instruction to include or remove a measure from within the scheme. Responsibility for designing the scheme lies with the Designer and as such the Audit Team accepts no design responsibility for any changes made to the scheme as a result of this Audit.

As with GG119, this Audit has a maximum shelf life of five years. If the scheme does not progress to the next stage in its development within this period, then the scheme should be re-audited.

The Proposed Development would convert the current Sloy Hydroelectric Power Station into a pumped hydro storage scheme. This development site is in the grounds of the existing hydroelectric scheme, immediately north of the power station and adjacent to the Inveruglas Visitor Centre, which is located on the banks of Loch Lomond, approximately 5km to the north of Tarbet,

The Proposed Development site is currently accessed via two simple priority junctions on the A82(T). The southern junction is used for the day-to-day operation of the existing Sloy Hydroelectric Power Station, while the northern junction acts as a secondary access and the gates are normally locked. It is anticipated that the northern junction would be used exclusively by construction vehicles during the construction of the Proposed Development. This would allow construction traffic to be kept separate from operational traffic. The existing northern gates, gate posts and a short section of walling would be carefully dismantled and stored prior to construction, to enable sufficient junction width for the maximum swept path of anticipated delivery vehicles. The junction would be fully reinstated, upon completion of construction.

With regards to the secondary construction compound area, site establishment area and vehicle holding area proposed within the overflow carpark for the Inveruglas Visitor Centre, this would be accessed via the existing

northern access junction at this location, which currently provides access for southbound traffic from the A82 only, due to the existing junction geometry. The junction is gated and currently locked however, with access to the overflow carpark taken from the main Visitor Centre car park. It is proposed that the junction is upgraded to allow for access and egress for both northbound and southbound vehicles.

**Figure 1 Junction Location Plan**

# 2 Items Raised at the Stage 1 Audit

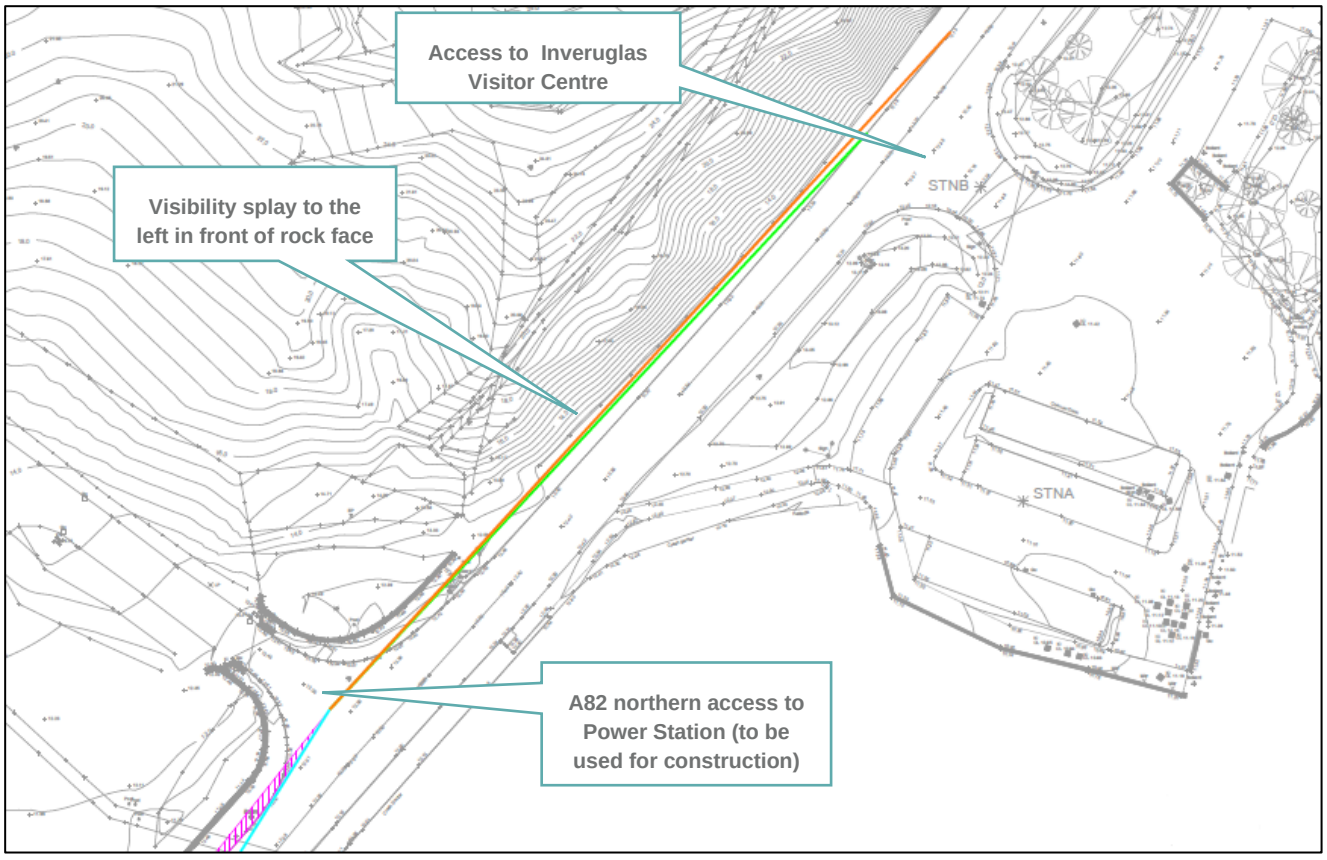
## 2.1 Problem 1

Location: Northern access to the Power Station on the A82

Summary: Poor visibility to the left between emerging construction vehicles and southbound traffic on the A82

It is proposed to utilise the northern access to the power station, currently not used, to facilitate construction vehicle access to the Proposed Development site. The available visibility to the left for emerging vehicles will be 2m x 105m which is below standard for the speed limit on the A82. This visibility is constrained by the existing rock face along the western verge of the A82 but assumes that the vegetation in front of the rock is cut back. Visibility of traffic travelling southbound on the A82 and approaching the northern access may be further compromised by the presence of queuing traffic waiting to turn right into the visitor centre, approximately 90 metres north of the northern access. The poor visibility may result in collisions between right-turning construction vehicles emerging from the development site, and southbound traffic on the A82, causing injury to the vehicle occupants.

**Figure 2 Visibility splay to the left for drivers emerging from the construction access**




Recommendation

It is not possible to cut back / remove the rock face (to improve the visibility to the left for emerging construction vehicles) without disruption once the vegetation in front of the rock face is cut back / removed. However, by reducing speeds on the A82 it is possible to give emerging drivers greater opportunity to emerge safely by improving gap acceptance. The following is therefore recommended for the duration of the construction works:

- The speed limit, currently 50mph, is reduced on the A82 at this location;
- Vegetation within the visibility splay is cut back and maintained; and
- Road works signage in accordance with the Traffic Signs Manual Chapter 8 is present.

# 3 Audit Team Statement

**Table 1 Audit Team Statement**

| | |
|---|---|
| We certify that this Road Safety Audit has been carried out based on the principles of DMRB GG 119 Road safety audit. | |
| **Road Safety Audit Team Leader** | |
| Name: | [redacted] |
| Signed: | [redacted] |
| Position: | Associate |
| Organisation: | Pell Frischmann |
| Date: | 22/07/2024 |
| **Road Safety Audit Team Member** | |
| Name: | [redacted] |
| Signed: | [redacted] |
| Position: | Senior Transport Planner |
| Organisation: | Pell Frischmann |
| Date: | 22/07/2024 |

# Appendix A Schedule of Documents Provided

| Document reference / Drawing No. | Revision | Title or Description |
|---|---|---|
| 108173 - Sloy Pumped Storage Scheme_TA_v2 | B | Volume 4, Appendix 13.1: Transport Assessment (June 2024) |
| 108179_SK_0001 | B | A82 Existing Junction Visibility Splay |
| 108179_SK_0002 | B | A82 Upgraded Junction General Arrangement & Visibility Splay |
| 108179_SK_0003 | B | A82 Upgraded Junction Swept Path Assessment |
| A82SLO_1(1) | - | Sloy Power Station North Access<br>Departures Determination December 2010 |

# Appendix B Problem Location Plan