

# Red John Pumped Storage Hydro Scheme

Volume 2, Chapter 15 - Traffic and  
Transport

ILI (Highlands PSH) Ltd.

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### Quality information

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# 15 Traffic and Transport

## 15.1 Introduction

15.1.1 This chapter considers the transport impacts resulting from the construction, operation and decommissioning of the Development. During the lifecycle of the Development, the construction phase is associated with the highest levels of traffic, and so this chapter focuses on this phase. The specific objectives of the chapter are to:

- Describe the transport and traffic baselines;
- Describe the assessment methodology and significance criteria used in completing the impact assessment;
- Describe the personal effects, including direct, indirect and cumulative effects;
- Describe the mitigation measures proposed to address likely significant effects; and
- Assess the residual effects remaining following the implementation of mitigation.

15.1.2 To provide context for the transport impacts related to the construction of the Development - the period which will generate the greatest amount of traffic - a summary of the main engineering elements and their related construction activities is provided in Table 15.1: Summary of Main Engineering Elements and Related Construction Activities.

**Table 15.1: Summary of Main Engineering Elements and Related Construction Activities**

Element	Related Activities
Headpond	Drilling and blasting, excavation, material movement, excess spoil removal, concrete pouring.
Waterways	Tunnelling, excavation, material movement, delivery of steel reinforcement and precast tunnel lining, concrete pouring.
Power Cavern	Drilling and blasting, material movement, excess spoil removal, concrete pouring.
Tailpond Inlet / Outlet	Cofferdam installation, excavation, delivery of steel reinforcement, concrete pouring.
Access Tunnels	Excavation, material movement, concrete pouring.

15.1.3 Due to the scale of the Development, the amount of traffic associated with the construction of the Development is likely to be significant compared to existing levels. However, all necessary steps will be taken to ensure that the level of daily construction traffic movements does not cause a significant detrimental impact to the surrounding area and nearby communities. More detailed information regarding the expected daily vehicle movements for construction related traffic is provided in Section 15.5.26.

15.1.4 As outlined in the embedded mitigation and design evolution in Chapter 3: Alternatives and Design Evolution, as much material as possible for the construction of the Development will be generated from materials extracted on-site. This has been informed by the Site Investigation (SI) works carried out which show that suitable material is available on-site. The determination of the actual quantity of suitable material will be subject to further SI;

however, the volumes that have been used to determine the traffic impact of the construction of the Development represent a reasonable worst case scenario. Any shortfall in suitable material will have to be compensated by import from external sources, specifically quarries in the general location of the Development.

15.1.5 All Figures referred to in this chapter are included in Volume 3: Figures.

## 15.2 Legislation, Policy and Guidance

15.2.1 There is no published guidance on the assessment of traffic impacts associated with temporary construction activities. However, the methodology detailed in the (now Chartered) Institution of Highways and Transportation's (IHT) 'Guidelines for Traffic Impact Assessments' (Ref 1), recommends that the environmental impact of the traffic generated by a development should be assessed taking cognisance of the Institute of Environmental Assessment 'Guidelines for the Environmental Assessment of Road Traffic, 1993' (Ref 2). This EIA Chapter takes into consideration these pieces of guidance and focuses on:

- The potential impacts on local roads and the users of those roads; and
- The potential impacts on land uses and environmental resources fronting those roads, including the relevant occupiers and users.

15.2.2 Reference has also been made to the Scottish Government's, 'Transport Assessment Guidance (TAG) 2012,' (Ref 3) which now supersedes the IHT Guidelines, outlines the necessary considerations in the preparation of a Transport Assessment.

### **Scottish Planning Policy**

15.2.3 Scottish Planning Policy (SPP) is a statement of the Scottish Government's policy on nationally important land use planning matters and the latest version was published in June 2014.

15.2.4 In respect to transportation, Section 290 of the policy indicates that "*Development proposals that have the potential to affect the performance or safety of the strategic transport network need to be fully assessed to determine their impact. Where existing infrastructure has the capacity to accommodate a development without adverse impacts on safety or unacceptable impacts on operational performance, further investment in the network is not likely to be required. Where such investment is required, the cost of the mitigation measures required to ensure the continued safe and effective operation of the network will have to be met by the developer.*" (Ref 4)

### **Planning Advice Note 75 – Planning For Transport**

15.2.5 SPP is supported by the document Planning Advice Note 75 (PAN 75) – Planning for Transport produced by the Scottish Government in August 2005 (Ref 5).

15.2.6 PAN 75 states that "*the early involvement of interested parties will positively inform transport planning by building consensus and minimising potential future areas of objection*".

15.2.7 The Applicant has previously carried out public consultation with local residents that could potentially be affected by the construction of the Development and will continue to do so to ensure that the appropriate measures are taken to mitigate any perceived construction-related impacts. Ongoing consultation with interested parties will be crucial to ensure the success of the Development's Construction Traffic Management Plan (CTMP).

### **Highland Wide Local Development Plan**

- 15.2.8 In April of 2012, THC published the Highland Wide Local Development Plan (HwLDP) (Ref 6) to guide development and investment. Section 5 of the plan sets out the Council's vision which includes:
- Ensuring that the special quality of the natural, built and cultural environment in the Highlands is protected and enhanced; and
  - Providing opportunities which encourage economic development and create new employment across the area focusing on many key sectors including energy.
- 15.2.9 Within the HwLDP, Policy 57 states that the "*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.*" The purpose of this chapter is to provide information regarding the travel generation and associated mitigation measures caused by the construction, operation and decommissioning of the Development.
- 15.2.10 Additionally, Policy 67 states that the Council will have regard to "proposals able to demonstrate significant benefits including by making effective use of existing and proposed infrastructure or facilities." The Development will utilise the existing road network and access tracks where possible to reduce the impact on the surrounding road network wherever possible.

### **Local Development Plan**

- 15.2.11 In the Inverness Local Development Plan (LDP) (As Continued in Force – April 2012) (Ref 7) specific policy allocations with respect to individual settlements are set out and advice for sensitive areas is given.
- 15.2.12 Section 13.2 of the LDP relates to Dores and the area surrounding the village and notes that "there are exceptional views through Loch Ness and the Great Glen from the approach to Dores. These and the setting of the village's listed buildings must be protected" and "the B851 and B862 run through Dores. Further measures to calm traffic need to be explored".
- 15.2.13 The village of Dores is seen to be a highly sensitive area, meaning that it will be unsuitable to route conventional construction traffic via the B852 and B862 through the village for the duration of the construction. However, it is likely that infrequent construction traffic such as the delivery of abnormal indivisible loads (AILs) required for the Tailpond works only will pass through the village to access Compound 2. All other AiLs will use other routes as shown on Figure 15.1 (Volume 3).
- 15.2.14 Section 14.2 of the LDP identifies the B851 at Strathnairn, the area encompassing Inverarnie, Farr and Broomhill - Croftcroy, and states "the B851 is narrow and poorly aligned in places. Consideration needs to be given to segregated pedestrian / cycle routes and measures for restricting traffic speeds". The Applicant or Construction Contractor will ensure that a road condition survey will be carried out to identify any unsuitable areas of the route that construction traffic will use which will enable the required mitigation measures to be identified to ensure the safety of pedestrians and road users and to maintain access.
- 15.2.15 The LDP also identifies: land in and near Dores as suitable for up to 8 houses and the possible relocation of the primary school at Aldourie; land in and around Inverarnie as suitable for up to 6 houses; land in and around Farr as suitable for up to 6 houses; and land

around Croftcroy as suitable for up to 2 houses. However, due to the distance from the Development and the scale of any development that will occur, it is highly unlikely that these areas of land will be affected by construction, operational or decommissioning activities or the increase in construction traffic in the area.

### 15.3 Methodology

#### **Assessment Methods and Guidance**

- 15.3.1 Existing traffic data was gathered and reviewed to assess the potential impact of traffic movements on the local road network. In accordance with the Guidelines for the Environmental Assessment of Road Traffic (Institute for Environmental Assessment, 1993) the method used was based on a comparison between predicted traffic flows on potentially affected roads with and without construction traffic, in percentage terms.
- 15.3.2 To establish a baseline it was necessary to obtain traffic flow data from available sources. Department for Transport (DfT) traffic flow data was found to be unavailable for the roads included in the Study Network (as shown on Figure 15.1, Volume 3), therefore, it was necessary to deploy traffic surveys to count vehicle flows. The data collection confirmed the existing traffic levels including Light Goods Vehicles (LGVs) and HGVs using these roads. By combining these baseline traffic flows with the forecast levels of construction traffic it was possible to predict the likely significant effects caused by the Development throughout the Study Network.
- 15.3.3 It is anticipated that the traffic associated with the enabling works of the construction phase, along with other plant, equipment and welfare facilities will be transported to the Development Site by road. Other materials may be generated on-site such as the establishment of a concrete batching plant(s), although it is recognised that construction material outwith the main source of rock excavated from the Development could be required (although considered unlikely) and that this will be transported to the Development Site.
- 15.3.4 The use of the B851 and southern section of the B862 represents the most direct route to the Development Site from the closest quarries, should it be necessary to import construction materials. Thereafter, the vehicles would leave the public road network and continue their route on a network of internal site Access Tracks to be constructed as part of the Development. Further use of the external road network will be minimised by the use of these internal access tracks for the movement of materials and plant around the Development Site during the main construction phase. There will, however, be points on the external network where it will be necessary for construction vehicles to cross. Vehicles using the specific crossing points will be controlled by traffic management methods such as temporary signals and marshals when required.

#### **Surveys Undertaken**

- 15.3.5 Traffic flow data was used to assess the anticipated impact to traffic on the Study Network resulting from the presence of construction traffic for the Development. The roads included in the Study Network are listed in Section 15.3.10 below and shown on Figure 15.1 (Volume 3).
- 15.3.6 The A9 trunk road was not included in the transport impact assessment as it has been determined that it has sufficient capacity to be able to accommodate construction traffic related to the Development. It was therefore not necessary to request traffic data from Transport Scotland. To establish the baseline conditions for the Study Network, it was

necessary to carry out two-way traffic counts at the locations illustrated in Figure 15.1: Study Network and Traffic Count Points (Volume 3) as traffic data was not available for these roads. .

- 15.3.7 Background traffic flows are predicted to increase on the local road network regardless of the Development. The future design year traffic flows have been forecast utilising the Department for Environment, Transport and the Regions (DETR) publication, 'National Road Traffic Forecasts (Great Britain)' (Ref 8) (NRTF) 'low' growth assumptions. 'Low' growth has been chosen primarily due to the rural location of the Development and that it is unlikely that this area will experience a significant rise in traffic levels.
- 15.3.8 In their scoping response, THC stated that the anticipated impacts from cumulative developments should be assessed. Several known cumulative developments have been identified and these are summarised in It is necessary to investigate any developments in the surrounding area to establish the cumulative impact that the construction of these developments will have on the local area if they were to be constructed in the same timeframe. Table 15.14 shows the developments that have the potential to be under construction at the same time as the Development
- 15.3.9 The Applicant will ensure that a Road Condition Survey is carried out prior to any enabling works or construction commencing. The results of this survey will determine the areas which require remedial works to ensure they are suitable to accommodate the construction traffic associated with the Development whilst maintaining accessibility and safety for existing road users. Furthermore, the current condition of the highway network will be documented that will allow a 'Wear and Tear Agreement' to be made with THC to ensure that the condition of the highway network is kept to a similar level post-construction as it is pre-construction.

### **Road Network**

- 15.3.10 In order to accurately assess the possible impacts that construction, operational and decommissioning activities will have on the surrounding area, it is important to identify the roads which will be the focus of assessment. Road access to the Development is possible via a network of secondary and tertiary roads (the study network shown on Figure 15.1, Volume 3). These are:
- The B862 Dores Road is a 2-way single carriageway which runs from Inverness to Fort Augustus, in a generally south-westerly direction. Some parts of the B862 do include single track with passing places towards Fort Augustus;
  - The B851 (Errogie to Culloden Moor Road) runs in a south-westerly direction from the A9(T) from its junction near Daviot Bridge. Road standard is a mixture of 2-way single carriageway and single track road (with passing places);
  - The B861 (Inverness to Inverarnie Road) runs in a generally southerly direction from Inverness to the junction of the B851 in Inverarnie. Road standard is a mixture of 2-way single carriageway and single track road (with passing places);
  - The C1064 (Ashie Moor Road, part of the General Wade Military Road network), which runs south-west from Inverness past / through the Development Site to its junction with the B862 Dores Road just south of Kindrummond. It comprises a mixture of 2-way single carriageway on the southern periphery of Inverness and then single track road with passing places;

- The C1076, which starts at the junction of the C1064 / U1084 and follows the contour of the southern shore of Loch Ashie and travels in a generally southern direction for 6 miles to its junction with the B851. It is a single track road with passing places;
- The C1068 (Daviot to Dunlichity Road), which starts at the junction with A9(T) Inverness Road and runs in a south-westerly direction to its junction with the C1076. It is a single track road with passing places; and
- The U1084 Darris Road, which begins from its junction with the B862 and runs in a south-easterly direction to its junction with the C1064 Ashie Moor Road. It is a single track road with passing places.

15.3.11 The aforementioned roads will form the base of the traffic impact assessment in this EIA chapter that will enable the determination of the magnitude of change with regards to traffic that will be caused by the Development. To assess the impact, it is necessary to obtain baseline flows for these roads. Figure 15.1 (Volume 3) illustrates the locations in which traffic flows were recorded.

#### **Other Networks**

15.3.12 Other transport networks, namely walking routes and cycle routes, have the potential to be impacted by the Development. A number of paths traverse across the Development Site, some of which form part of much longer distance recreational routes. These include:

- The Trail of the Seven Lochs;
- The South Loch Ness Trail (Loch Tarff – Torbeck); and
- The Highland Council core path IN12.05 (Drumashie Moor).

15.3.13 As this chapter focuses on the traffic and transport impacts of the Development, these networks will not be assessed in this chapter. However, they are covered in greater detail in Chapter 14: Socio-Economics and Recreation.

## **15.4 Baseline Environment**

15.4.1 In order to assess the potential impacts of the Development, it is necessary to determine the conditions, resources and receptors that currently exist in the areas that have the potential to be affected by the Development.

#### **Receptors**

15.4.2 Receptors are locations or land uses categorised by their degree of sensitivity (or Environmental Value) with guidance provided in the Department for Transport's (2008) Design Manual for Roads and Bridges (DMRB), Volume 11, Section 2, Part 5, HA 205/08, '*Assessment and Management of Environmental Effects.*' (Ref 9).

15.4.3 Table 15.2 provides guidance used in this assessment to quantify the sensitivity of the receptors to the effect of the predicted traffic associated with the Development.

**Table 15.2: Sensitivity of Receptors**

Sensitivity	Receptor Description
Very High	Nationally or internationally important site with special sensitivity to increases in road traffic.
High	Regionally important site with special sensitivity to increases in road traffic.
Medium	Residential (with frontage on to road under consideration), educational, healthcare, leisure, public open space or town centre / local centre land use.
Low	Employment or out of town retail land use, such as retail park.
Negligible	No adjacent settlements.

15.4.4 In terms of magnitude of effect (or magnitude of change), the IEA guidelines point to changes (increases) in traffic in excess of 30%, 60% and 90% as being representative of 'Slight', 'Moderate' and 'Substantial' impacts respectively. The categories shown in Table 15.3: Magnitude of Change reflects IEA guidance and has been used in this assessment to quantify the magnitude of effect of the predicted traffic associated with the Development.

**Table 15.3: Magnitude of Change**

Magnitude	Description
High	Considerable deterioration / improvement in local conditions or circumstances (>90% increase in traffic)
Medium	Readily apparent change in conditions or circumstances (60 – 90% increase in traffic)
Low	Perceptible change in conditions or circumstances (30 – 60% increase in traffic)
Negligible	Very small change in conditions or circumstances (10 – 30% increase in traffic)

**Defining Significance**

15.4.5 Criteria are applied to the percentage increases to establish whether significant environmental effects are likely. These criteria take into account the sensitivity of the receptors or the resources likely to be affected and any changes in the composition of traffic, specifically if more Heavy Goods Vehicles (HGVs) are anticipated. The criteria are a 30% or more increase in total movements or of HGVs, or a 10% increase where sensitive locations are present such as schools.

15.4.6 The significance of each impact is considered against the criteria within the IEA (1993) guidelines, where possible. However, the IEA guidelines state that: *“for many effects there are no simple rules or formulae which define the thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor backed-up by data or quantified information wherever possible. Such judgements will include the assessment of the numbers of people experiencing a change in environmental impact as well as the assessment of the damage to various natural resources.”*

15.4.7 The assessment of the significance of the effect of traffic changes along the identified study routes as a result of the Development, should have regard to both the magnitude of the traffic increase (change) and the receptor's environmental value (sensitivity). The level of

significance can be determined from the matrix in Table 15.4: Approach to Assessment of Effects (based upon the guidance given in HA 205/08).

**Table 15.4: Approach to Assessment of Effects**

Magnitude of Change	Sensitivity or Value of Resource / Receptor				
	Very High	High	Medium	Low	Negligible
High	Major	Major	Moderate	Moderate	Minor
Medium	Major	Moderate	Moderate	Minor	Negligible
Low	Moderate	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Minor	Negligible	Negligible	Negligible

- 15.4.8 The significance of the effects on receptors will, therefore, be evaluated against the IEA guidelines and, where possible, in line with the criteria used for the other environmental topic areas covered in the EIA report. These criteria are subjective but take into account the numbers of receptors affected, their sensitivity and the length of the period for which they will be impacted. Mitigation, where appropriate, will be identified and incorporated into the construction planning and design of the Development.
- 15.4.9 Properties which lie on the proposed site access route are likely to be affected by traffic associated with pre-construction, construction, operational and decommissioning works. The access route for all conventional construction vehicles will be via the B851 from its junction with the A9 until its junction with the B862, then via the B862 until its junction with the C1064 and then via the site access.
- 15.4.10 It is anticipated that no conventional construction traffic will enter Dores via the B862 from Inverness; however this route may be required for the transportation of larger AILs that cannot be transported via the B851 or the Caledonian Canal.
- 15.4.11 Any AILs that are transported to the Development Site via road will be required to adhere to the guidance and mitigation that will be included in the finalised CTMP. By doing so, the impact on pedestrians and road users will be mitigated as much as possible.
- 15.4.12 Given the rural and relatively remote location of the Development, access to site is limited to a few options. The route which has been selected for conventional construction traffic seeks to minimise disruption to residential areas and highly sensitive points in the area surrounding the Development. However, there are still many settlements and properties that have the potential to be impacted by the construction of the Development and it is important that appropriate mitigation measures are used to lessen the impact on them.
- 15.4.13 A summary of the main traffic impact receptors for the Development can be found in Table 15.5 with relative sensitivity level as advised by Table 15.2: Sensitivity of Receptors.
- 15.4.14 As the village of Dores and the other settlements on the B862 do not lie on the main construction traffic route to site, they have not been included in Table 15.5: Summary of Main Traffic Receptors as any construction traffic that will use the B862 will be under escort, infrequent in occurrence and be transported at off-peak times. Therefore any impact will be Negligible.

**Table 15.5: Summary of Main Traffic Receptors**

Name	Description	Address	Proximity*	Sensitivity
Ach-Na-Sidhe Bed & Breakfast	Bed & breakfast accommodation with 4 rooms with frontage access to the C1064	Wester Drumashie, Dores, IV2 6TU	0.1 km	Medium
Achnabat	Farm property with frontage access to the B862	B862	3.3 km	Medium
Torness	3 homes with frontage access on to the B862	B862	7.6 km	Medium
Aberarder	3 homes with frontage access on to the B851	B851	15.9 km	Medium
Croachy	18 homes and church with frontage access on to the B851	B851	19.5 km	Medium
Riverside Cottages	3 self-catered holiday cottages	Farr, B851, IV2 6XB	24.3 km	Medium
Farr	Hamlet with 9 homes with frontage access on to B851	B851	26.4 km	Medium
Farr Primary School	43 enrolled pupils and 16 in nursery with frontage access to the B851	Farr Primary, Farr, B851, IV2 6XJ	27.2 km	High
Dalvourn Holiday Cottages	6 self-catered holiday cottages	Dalvourn Farm, Farr, IV2 6XJ	27.7 km	Medium
Inverarnie	Village with 28 homes, shop, sports facilities and community hall	B851	28.3 km	Medium

\* distances are calculated from grid reference NH 6087232908 (site access point on existing C1064)

15.4.15 The most notable settlement is Inverarnie, located 13 km to the east of the Development Site, which is comprised of 28 homes, a shop, sports facilities and a community hall. Croachy, 6.6 km south-east of the Development Site, consists of 18 homes and a church with frontage access on to the B851. Farr Primary School, located 7.8 km to the north-east, has 43 enrolled pupils with a further 16 children in nursery.

15.4.16 There are many settlements and individual properties in the area surrounding the Development – some of which are shown in Table 15.5 that are likely to be affected by construction-related traffic. To maintain readability, many of the minor traffic receptors have not been included in Table 15.5.

#### **Baseline Traffic Flow**

15.4.17 Automated Traffic Counters (ATCs) were installed at 11 locations - illustrated in Figure 15.1 (Volume 3) - on the Study Network to establish baseline traffic flows. The counts were carried out over 10 working days in June / July 2018 and an average of the flows has been calculated to give an Average Daily Flow (ADF). Given that the traffic counts were carried out during the some of the peak summer months, it is reasonable to assume that the results

of the traffic survey represent a worst case scenario for the area. The ADF for all 11 points are provided in Table 15.6: Baseline Traffic Flow Data.

**Table 15.6: Baseline Traffic Flow Data**

Road	Count Point	Bicycle	Motorcycle	Car	Bus	LGV + Large Car	HGV	Total Vehicles
B862	C1	24	61	880	8	1232	123	2327
	C2	12	16	197	3	278	34	540
	C10	8	13	128	4	258	33	444
C1064	C3	22	8	69	0	126	14	240
	C5	33	10	118	0	148	75	384
C1076	C4	14	8	36	0	56	9	122
B861	C6	20	15	312	3	386	55	791
C1068	C7	5	3	58	0	111	10	187
	C9	15	2	67	0	85	10	178
B851	C8	9	21	357	3	671	130	1192
	C11	9	15	151	4	301	71	551

- 15.4.18 As expected, the B862 north of Dores was found to be the area with the highest traffic volume; with approximately double the flow of the B851 north of Inverarnie. These results reaffirm the need for conventional construction traffic to avoid using the B862 north of Dores as a substantial increase in HGV traffic is likely to have a detrimental impact on conditions in and around the village.
- 15.4.19 A significant decrease in traffic was observed near Croachy compared to Inverarnie which indicates that the majority of traffic on the B851 dissipates on to the B861 and the various properties on the B851 between Inverarnie and Croachy. It was also observed that on average, approximately 60 HGVs per day use the B851 to access the B861, possibly to avoid congestion on the A9(T) on the approach to Inverness.
- 15.4.20 The point on the C1064 closest to the proposed site access was observed to have an ADF of 240 vehicles with 22 of the 240 vehicles being pedal cycles.
- 15.4.21 Due to the anticipated opening year of construction being 2020, it is necessary to factor up the data obtained from the ATCs to account for the natural growth in traffic between now and the beginning of construction. The flows in Table 15.6: Baseline Traffic Flow Data were factored up using 'low' growth rates for the expected year of opening in 2020 and the results are shown in Table 15.7: 2020 Baseline Traffic Flow Data.

**Table 15.7: 2020 Baseline Traffic Flow Data**

Road	Count Point	Bicycle	Motorcycle	Car	Bus	LGV + Large Car	HGV	Total Vehicles
B862	C1	24	62	894	8	1252	125	2364
	C2	12	16	200	3	282	34	549
	C10	8	13	130	4	262	33	451
C1064	C3	22	8	70	0	128	14	243
	C5	33	10	120	0	150	77	390
C1076	C4	14	8	36	0	57	9	124
B861	C6	20	15	317	3	392	56	803
C1068	C7	5	3	59	0	112	10	190
	C9	15	2	68	0	86	10	181
B851	C8	9	21	363	3	682	132	1211
	C11	9	16	154	4	306	72	560

- 15.4.22 As expected, the anticipated 2020 traffic flows were found to be very similar to those observed in 2018 with point 'C1' on the B862 remaining the point with the highest traffic volume.
- 15.4.23 The point with the highest volume of traffic on the Study Network that will be used by construction traffic for the Development was found to be 'C8' near Inverarnie with 1211 vehicles. This equates to approximately one vehicle passing per minute when averaged over 18 hours (06:00-00:00) and less than one vehicle per minute when averaged across a 24 hour period using the predicted 2020 traffic levels.
- 15.4.24 Point 'C11' on the B852 near Croachy is anticipated to have a baseline ADF of 560 vehicles in 2020. This equates to one vehicle passing approximately every two minutes when averaged over 18 hours (06:00-00:00) and approximately one vehicle every two and a half minutes when averaged across a 24 hour period.
- 15.4.25 Point 'C10' on the B862 near Torness is anticipated to have a 2020 ADF of 451 vehicles. This equates to one vehicle passing approximately every two and a half minutes when averaged over 18 hours (06:00-00:00) and approximately one vehicle every three minutes when averaged across a 24 hour period.
- 15.4.26 Point 'C3' on the C1064 near the proposed primary site access is anticipated to have an ADF of 243 vehicles in 2020. This equates to one vehicle passing approximately every five minutes when averaged over 18 hours (06:00-00:00) and approximately one vehicle every six minutes when averaged across a 24 hour period.
- 15.4.27 Given the relatively low volumes of traffic on the proposed construction traffic route to site, it is likely that the perceived impact of the construction traffic will be significant as any meaningful increase in traffic will be more obvious. However, appropriate mitigation measures will be in place to lessen the impact of construction traffic as much as possible.

## 15.5 Assessment of Effects

- 15.5.1 After the establishment of the baseline conditions, it is possible to accurately assess the effects of the proposed construction works related to the Development. The purpose of this

section is to identify and discuss the most significant effects and their magnitude so that appropriate mitigation can be implemented.

### **Construction**

#### *Junction and Carriageway Alterations*

- 15.5.2 Alterations to existing junctions and road surfaces in addition to the creation of several new access points is necessary as part of the Development's enabling works, to provide safe and efficient access to construction vehicles. All junction and carriageway alterations will conform to The Highland Council's (2013) 'Road and Transport Guidelines for New Developments' (Ref 10) and the DMRB standards where applicable.

#### *C1064 Realignment*

- 15.5.3 Prior to construction of the Headpond and as part of the enabling works, the C1064 will be realigned to provide sufficient space for the Headpond and Landscape Embankment to be constructed. The extent of the realignment and indicative cross section is shown in Figure 2.21: C1064 Realignment (Volume 3). This will require the clearance of a 30 m wide corridor through forestry and vegetation to provide a suitable sub-base for the new carriageway alignment to be constructed upon.
- 15.5.4 The new alignment will correspond to the current standard of the C1064 and be comprised of a single track road with passing places.
- 15.5.5 Upon completion of construction of the new C1064 alignment, the existing C1064 will be stopped-up and removed from the list of public roads. Access will be maintained to the Ach-Na-Sidhe Bed & Breakfast over the former section of C1064. Once the realignment of the C1064 has been completed, site clearance and construction work will begin on the Headpond.

#### *Ach-Na-Sidhe Bed & Breakfast Access*

- 15.5.6 A new access point will be constructed on the new C1064 alignment to provide suitable horizontal visibility for vehicles using the Ach-Na-Sidhe Bed & Breakfast access road. Given the volume of construction vehicles that is anticipated to make use of the C1064 past the property for the duration of the construction works, it is crucial that turning vehicles in and out of this junction have adequate visibility to safely use the access point. The approximate location for the new access point is at grid reference approximately NH 60603 32748.
- 15.5.7 Additionally, the increased visibility at this location will provide pedestrians with a safe place to cross the C1064 as it will provide sufficient reaction time for pedestrians and oncoming vehicles. This will also help to mitigate the potential for severance between the core paths and trails in the area surrounding the Development.
- 15.5.8 An agreement will be made between the relevant parties to ensure that access to the Ach-Na-Sidhe Bed & Breakfast will be always remain available after the section of the existing C1064 is no longer a public road.
- 15.5.9 The indicative layout of the new access point is shown in Figure 2.25: Public Road Crossing 3 (Volume 3).

#### *Site Access*

- 15.5.10 The primary site access point will be located in the proximity of grid reference approximately NH 60756 33231 where an existing forestry track will intersect the new alignment of the C1064. Enabling works for this access point will include the widening of the junction and

improvements to horizontal visibility to make it suitable for the volume of HGVs entering and exiting the Development Site. The indicative layout of the site access point post-enabling works is shown in Figure 2.25: Public Road Crossing 3.

B852 and B862 Crossing Points

15.5.11 To enable construction traffic to move through the Development Site to the various compounds and construction locations, a temporary on-site haulage road will be constructed that will require access points across both the B862 and B852. These crossing points are discussed in greater detail below.

15.5.12 The indicative locations of the crossing points are shown in Figure 2.23: Temporary Access Track (Volume 3).

B852 Compound 2 Access

15.5.13 A new permanent junction will be constructed to provide access to Compound 2 on the B852. When operational; this Compound will primarily be used for carrying out maintenance for the Tailpond Screen.

15.5.14 The indicative layout of the Compound 2 junction on the B852 is shown in Figure 2.23: Public Road Crossing 1 (Volume 3).

Public Road Crossings

15.5.15 It is anticipated that three public road crossings will be used by construction traffic over the duration of construction. A summary of these locations is provided in Table 15.8: Public Road Crossings below.

**Table 15.8: Public Road Crossings**

Crossing Point No.	Approximate Location (Grid Reference)	Crossing Description
1	NH 58750 33159	Crossing B852 with Temporary Access Track, conveyor belt, telemetry cable, and Spillway. As shown on Figure 2.24: Public Road Crossing 1
2	NH 59621 33482	Crossing B862 with Temporary Access Track, conveyor belt, telemetry cable, and Spillway. As shown on Figure 2.4 Development layout - Above Ground.
3	NH 60833 33083	Crossing newly aligned C1064 with Temporary / Permanent Access Track, telemetry cable, conveyor belt, and Spillway. As shown on Figure 2.25: Public Road Crossing 3 and 4
4	NH 60610 32690	Realignment of C1064. As shown on Figure 2.25: Public Road Crossing 3 and 4

15.5.16 It is anticipated that the public road crossings will consist of temporary two-way signals due to the duration of the works rather than using marshals. The crossing will be a conventional crossroads (at-grade junction) that will cross the public roads where grade and visibility is optimal to ensure the safety of pedestrians and existing road users. Both lanes of the public road at crossing points will need to be widened to allow traffic to pass during operation of the lights. The crossroads will also have new signage and line markings warning drivers of new road layout ahead.

- 15.5.17 Temporary road closures may be required to construct both the Spillway and conveyor belt. The Spillway is anticipated to be a permanent pipe that will be constructed underneath the road and as such may require a temporary road closure for a prolonged period of time or a single lane closure over a widened section of road to allow the pipe to be constructed under the road.
- 15.5.18 A temporary conveyor belt system will be utilised to facilitate the movement of the significant volume of material generated from the underground excavation works. This will significantly reduce the number of HGVs required to move the material internally through the Development Site and across the public road crossings listed previously. It is possible for the conveyor belt to be erected above ground or below ground at these crossings; however this has not been confirmed at this stage. Should the over ground option be selected, it will have a minimum height clearance of 5.1 m above the public road to prevent any access restrictions or collisions and will be covered to prevent material from coming into contact with pedestrians or vehicles.
- 15.5.19 Upon completion of construction, Crossing Points 1 (over the B852) and 2 (over the B862) will have their temporary traffic signals, road markings, signage and overhead gantry (if applicable) removed and the public road will be reinstated to its pre-construction condition. Crossing point 2 will be replaced with locked fence gates with the possibility of being used for future farming purposes, subject to any necessary permits from THC. The temporary gantry, along with the conveyor, will also be removed to ensure that the crossing points are reinstated to pre-construction condition. Should a box culvert be used to allow the conveyor to pass under the road instead of using the overhead gantry, then it is anticipated that this will remain in place after completion of construction works.

*Temporary Road Closures*

- 15.5.20 As noted previously, there may be a requirement for public roads to be temporarily closed to enable the construction and / or installation of components related to the Development and to ensure the safety of the public and construction workers. If required, it is anticipated that these temporary road closures will occur at each public road crossing identified in Table 15.8: Public Road Crossings to facilitate the construction of the Spillway and conveyor. It may also be necessary to temporarily close the B852 near Compound 2 to facilitate the launching of the TBM. This would involve excavating below the B852 to create a shaft for the TBM to be lowered into and may require strengthening works to be carried out to ensure the stability of the B852. Details of any road closures that are required will be provided in the finalised CTMP.
- 15.5.21 The Construction Contractor will ensure that the necessary Temporary Traffic Regulation Orders (TTROs) are obtained to allow for the temporary closures to be imposed prior to any construction taking place. Any temporary road closures will have appropriate traffic management systems to reduce the impact to road users and any necessary diversions will be in agreement with THC. Given the volume of traffic that is anticipated to be using the B852 south of Dores and B862 north of Dores on a daily basis in 2020, it may be necessary for any road closures on these roads to be carried out overnight to minimise disruption for AILs, if required.
- 15.5.22 Should any overnight construction works be required, notice shall be provided to THC and local residents that would likely be affected, prior to the works taking place.

*Material Sourcing*

- 15.5.23 A desktop exercise was undertaken to identify quarries where aggregates and materials for the concrete batching plant may be sourced if required. However it should be noted that it is the intention to source aggregates and materials within the Development Site and this exercise is purely to demonstrate that sources are available locally, if absolutely necessary.
- 15.5.24 The exercise revealed that there are four suitable sources in the surrounding area that can provide the necessary materials if required. As mentioned previously, all conventional construction traffic will utilise the B851 and B862 and approach the Development Site from the south, should any importation of material be required.
- 15.5.25 Table 15.9: Local Concrete and Aggregate Suppliers provides a summary of potential suppliers, including their address and the route required to access the Development.

**Table 15.9: Local Concrete and Aggregate Suppliers**

Supplier Name	Address	Proximity*	Routing	Concrete	Aggregates
Accumix Concrete (Inverness) Ltd	Concrete Block Works, Mid Lairgs Quarry, Inverness IV2 6XN	32.9 km	B851, B862 then C1064	Yes	No
A Ross & Sons	Mid Lairgs Quarry, Daviot, IV2 6XN	33.3 km	B851, B862 then C1064	No	Yes
Lafarge Tarmac	Daviot Quarry, West Daviot, Inverness IV2 5XL	35.5 km	A9(T) south, B851, B862 then C1064	No	Yes
Breedon Aggregates Ltd	Inverness Concrete Plant, Longman Industrial Estate, Inverness IV1 1SU	45.6 km	Stadium Road, A9(T) south, B851, B862 then C1064	Yes	No

\* distances are calculated from grid reference NH 6087232908 (site access point on existing C1064)

*Forecasted Construction Traffic Levels*

- 15.5.26 With an anticipated construction start year of 2020, it is necessary to use the calculated baseline traffic flows in Table 15.7: 2020 Baseline Traffic Flow Data and combine these with the expected volume of construction traffic for the Development Site. Once this has been carried out, the relative increase in traffic can be calculated to enable the impact to be assessed and any for any required mitigation measures to be identified.
- 15.5.27 The anticipated volume of construction-related traffic has been calculated by determining the material, plant and personnel requirements for all construction activities and assigning the associated vehicles to stages in the construction process. This construction programme is approximate and has been developed for the purpose of estimating traffic flows. The appointed Construction Contractor will be responsible for the preparation of a detailed construction programme.

- 15.5.28 The volume of construction traffic for the Development has been calculated under the assumption that 87% of the material generated from the excavation works and 95% of the material generated from the underground works will be re-used for construction, resulting in 13% and 5% of material from each process being unsuitable material for the construction of the Embankment (as shown in Appendix 5.2: MMA, Volume 5). However, this material may be suitable for the creation of the Landscape Embankment and other uses within the Development Site such as upgrading of access roads and recreational paths. Section 5.8 of Appendix 5.2: MMA (Volume 5) discusses the volume of usable and unusable material that will be generated during the construction of the Development. The MMA indicates that there will be approximately 12,000 m<sup>3</sup> of excess material. Although it is likely that the excess material will be used on-site, to enable a worst case impact assessment it has been assumed that it will be required to be taken off-site.
- 15.5.29 Vehicle movements associated with site clearance and forestry works have also been included in the traffic impact assessment.
- 15.5.30 The traffic impact assessment has been carried out under the assumption that all construction traffic travels along all road links in the study area that each site worker will travel individually to the Development Site by car, therefore creating a worst case scenario for each of the road links on the study network. This will not happen in reality, as all conventional construction traffic will use the route specified in the Framework CTMP in Appendix 15.1 (Volume 5) and site worker traffic will be the focus of mitigation measures to reduce its impact. Furthermore, it is assumed that no construction traffic will use the C1064 north of its junction with the U1084, the C1068, the C1067 or the B861 under normal circumstances.
- 15.5.31 Table 15.10: Worst Case Traffic Impact Assessment for All Vehicles displays the relative increase that the busiest period of construction – month 37 - will have on the baseline traffic volume as well as an average for the whole construction period excluding the peak month.

**Table 15.10: Worst Case Traffic Impact Assessment for All Vehicles**

Road	Count Point	2020 ADF Baseline	Month 37 ADF (All Vehicles)	Baseline + Month 36 ADF	% Increase
B862	C1	2364	820*	3184	35 %
	C2	549	820*	1369	149 %
	C10	451	820	1271	182 %
C1064	C3	243	820	1063	337 %
	C5	390	820*	1210	210 %
C1076	C4	124	820*	944	661 %
B861	C6	803	820*	1623	102 %
C1068	C7	190	820*	1010	432 %
	C9	181	820*	1001	453 %
B851	C8	1211	820	2031	68 %
	C11	560	820	1380	146 %

  

Road	Count Point	2020 ADF Baseline	Average Month ADF (All Vehicles)	Baseline + Average Month ADF	% Increase
B862	C1	2364	482*	2846	20 %
	C2	549	482*	1031	88 %
	C10	451	482	933	107 %
C1064	C3	243	482	725	198 %
	C5	390	482*	872	124 %
C1076	C4	124	482*	606	389 %
B861	C6	803	482*	1285	60 %
C1068	C7	190	482*	672	254 %
	C9	181	482*	663	266 %
B851	C8	1211	482	1693	40 %
	C11	560	482	1042	86 %

\*Conventional construction traffic will follow the designated construction traffic route giving no increase at these points, however to allow for consideration of exceptional use, for instance in the event of a road closure due to an accident, the full traffic flow has been modelled at these points even though this will not occur in the normal course of events.

15.5.32 The analysis of the worst case scenario for each road link has revealed that, as expected, the greatest percentage increases would occur on the minor 'C' class roads on the Study Network due to their small baseline traffic flows. However, as mentioned previously, only the C1064 from its junction with the B862 until its junction with the C1076 will be subjected to construction traffic under normal circumstances.

15.5.33 Should the 'C' class network be required for use by construction traffic, it will likely be temporary in the event of the B851 and / or the B862 being unusable e.g. due to a significant road traffic collision. Details of any contingency plans related to access will be provided in the finalised CTMP.

- 15.5.34 On the main construction traffic route to site, during the peak month of construction, it is expected that a 68% increase in traffic would occur on the B851 near Inverarnie, a 146% increase would occur near Croachy, the B862 through Torness would experience a 182% increase in traffic and the C1064 near the main site entrance would experience a 337% increase in traffic. The increase in traffic levels are significant in percentage terms. However it is noted that this is from a low baseline level. The predicted maximum traffic levels within the Study Area remain modest and well within the capacity of these roads. Mitigation measures would also significantly lower the predicted number of site worker vehicles on the road network which would then result in traffic associated with the Development being lower than predicted above (as discussed in Section 15.7).
- 15.5.35 When averaged across the other 69 months of construction activities, the anticipated traffic impact is significantly lower than in the peak month of construction, with a 198% increase in traffic anticipated at the main site entrance on the C1064. Elsewhere, it is anticipated that traffic would increase on average by 40% near Inverarnie on the B851, by 86% near Croachy and by 107% near Torness. On average, this results in one additional vehicle passing a single point on the Study Network approximately every one and a half minutes over the duration of a 12 hour workday.
- 15.5.36 Given the duration of the construction period, the number of daily vehicle trips will fluctuate significantly compared to the average. For example, there are anticipated to be a total of 400 daily vehicle movements to and from site in month 56 of construction, but only 104 daily vehicle movements in month eight. It should be noted however, that these values are subject to change once the Construction Contractor has established their own construction programme.
- 15.5.37 As mentioned previously, the values used in the traffic impact assessment represent a reasonable worst case scenario and do not reflect the conditions that are likely in fact to occur. This is due to the mitigation that is proposed in 28 15.6.5 that will be in place to significantly reduce the number of trips associated with site workers which is the largest contributor to the number of daily trips for the majority of the construction period.
- 15.5.38 An increase in HGV traffic is likely to be the most noticeable impact that local residents and road users experience during the construction of the Development. It is therefore important to determine the anticipated increase in HGV traffic on the Study Network. Table 15.11: Worst Case Traffic Impact Assessment for HGVs Only is similar to Table 15.10, but only displays the anticipated increase in HGV traffic associated with the construction of the Development.

**Table 15.11: Worst Case Traffic Impact Assessment for HGVs Only**

Road	Count Point	2020 ADF Baseline	Month 37 ADF (HGVs Only)	Baseline + Month 37 ADF (HGVs Only)	% Increase
B862	C1	125	186*	311	149%
	C2	34	186*	220	547%
	C10	33	186	219	564%
C1064	C3	14	186	200	1329%
	C5	77	186*	263	242%
C1076	C4	9	186*	195	2067%
B861	C6	56	186*	242	332%
C1068	C7	10	186*	196	1860%
	C9	10	186*	196	1860%
B851	C8	132	186	318	141%
	C11	72	186	258	258%

  

Road	Count Point	2020 ADF Baseline	Average Month ADF (HGVs Only)	Baseline + Average Month ADF (HGVs Only)	% Increase
B862	C1	125	64*	189	51%
	C2	34	64*	98	188%
	C10	33	64	97	194%
C1064	C3	14	64	78	457%
	C5	77	64*	141	83%
C1076	C4	9	64*	73	711%
B861	C6	56	64*	120	114%
C1068	C7	10	64*	74	640%
	C9	10	64*	74	640%
B851	C8	132	64	196	48%
	C11	72	64	136	89%

\*Conventional construction traffic will follow the designated construction traffic route giving no increase at these points, however to allow for consideration of exceptional use, for instance in the event of a road closure due to an accident, the full traffic flow has been modelled at these points even though this will not occur in the normal course of events.

15.5.39 Similar to the values calculated in Table 15.10, the anticipated percentage increase in HGV traffic in Table 15.11 is magnified due to the low baseline traffic volumes. As before, the minor 'C' class roads – excluding the C1064 – would only be used as part of a contingency plan as a result of the B851 and / or B862 being unusable. During the peak month, it is anticipated that the C1064 near the main site entrance would experience a 1329% increase in HGV traffic, the B851 would experience a 141% increase near Inverarnie and a 258% increase near Croachy and the B862 would see an increase of 564% near Torness.

- 15.5.40 As mentioned previously, the low baseline volume of HGVs on the Study Network results in a significant percentage increase, but attention should be given to the traffic volume increase. 186 additional HGVs on the Study Network each day equates to approximately 16 HGVs passing any one point per hour or one HGV every four minutes during a 12-hour workday.
- 15.5.41 Outwith the peak month of construction, the anticipated increase in HGV traffic throughout the Study Network is significantly lower in all areas as the ADF of HGVs is approximately one third of the peak month ADF. At these times, a 457% increase in HGV traffic is expected on the C1064 near the main site entrance, which equates to approximately one additional HGV movement every 12 minutes when averaged across a 12-hour workday. Elsewhere, it is anticipated that there will be a 48% increase in HGVs through Inverarnie, an 89% increase through Croachy and a 194% increase near Torness. Due to the low volume of HGVs passing each hour, they would likely only contribute to a negligible change in conditions for local residents.
- 15.5.42 The following points should be considered in relation to the impact of the increase in HGV traffic:
- The increase in traffic during the construction phase is temporary and will fluctuate. Although the anticipated HGV movements during the peak month is on average 186 per day, HGV movements are predicted to be 60 per day or less for 43 months of the construction phase;
  - To determine the reasonable worst case scenario, it has been assumed that all ready-mix concrete will be imported to the Development Site and that no batching plants will be used;
  - Conventional construction traffic will be restricted to the route to site specified in the Framework CTMP in Appendix 15.1 and therefore the worst case scenarios identified previously will not reflect the movement of construction traffic in practice;
  - ALL deliveries are included in the anticipated daily HGV movements to give an accurate representation of the number of HGV movements to and from the Development Site;
  - The high percentage increases in HGV traffic highlighted in Table 15.11 are a result of the existing low number of HGVs on the Study Network. It is anticipated that there will be sufficient 'headroom' to accommodate the additional HGVs without severance or substantial delays to existing road users due to the low baseline; and
  - Excluding Dores, Inverarnie, Farr and Scaniport, the Study Network is predominantly rural in nature with little frontage development, punctured only with intermittent field and private dwelling accesses. Therefore, the number of local residents which will be impacted by construction traffic will be low.

*Abnormal Indivisible Loads*

- 15.5.43 There will be a requirement for a significant number of AILs to be delivered to the Development Site during the construction phase. These AILs include the delivery of large construction plant vehicles e.g. the TBM, excavators, dumpers, cranes etc. and components such as turbines, generators and transformers. At present, it is estimated that there will be 816 trips related to AILs; however this value is subject to change and it should be noted that many of these trips relate to construction plant that only require an escorted delivery due to their weight and / or their width marginally exceeding the 2.9 m limit for standard

transportation. Table 15.12: Estimated Abnormal Indivisible Load Summary details the components that are anticipated at this stage.

**Table 15.12: Estimated Abnormal Indivisible Load Summary**

Component	Estimated Size (m) (WxHxL)	Approximate Weight (t)	Additional Information
TBM	10.0 x 10.0 x 20.0	350	Approximately 150 m long upon assembly, 2400 t in total
Turbine	9.0 x 3.0 x 8.5	150	Assumed largest section is the casing
Generator – Stator	4.1 x 5.9 x 8.6	23	Transport weight provided by supplier
Generator – Rotor Spider	3.1 x 2.9 x 4.2	53	Transport weight provided by supplier
Transformer	4.8 x 5.5 x 3.8	128	Estimated

15.5.44 As mentioned previously, large construction plant vehicles will also be required to be delivered for use on-site due to the scale of the earthworks that are to be carried out. The estimated breakdown of large plant vehicles is provided in

15.5.45 Table 15.13: Large Plant Summary. However, these are subject to change and only represent an indicative volume of required trips.

**Table 15.13: Large Plant Summary**

Indicative Plant Type	AIL Trips	Primary Method of Transport	Secondary Method of Transport (If Required)	Secondary Method Requirements
Excavators	100			
Dumpers	300			
Bulldozers	20			
Loaders	100			
Crushers	20	Road	Road	Smaller construction plant vehicles would have to be used that are better suited for transportation to the Development.
Screeners	20			
Cranes	50			
Concrete batching plant	20			
Various components	100			
Tunnel Boring Machine	46			
Generators		Canal	Road	Would be required to be delivered in smaller components and assembled on the Development Site.
Turbines	40			
Transformers				

15.5.46 It is anticipated that AILs which cannot be delivered to the Development Site by road from their supplier will be delivered by a vessel to a suitable port in the Inverness area. From

there, they will either be delivered by a suitable road transporter or by barge via the Caledonian Canal. At present, it is anticipated that the TBM sections, turbines, generators and transformers will be delivered via the Caledonian Canal.

- 15.5.47 The maximum vessel size that can be accommodated on the Caledonian Canal has the following dimensions:
- Length: 45.7m
  - Width: 10.6m
  - Height: 27.3m
  - Draught: 4.1m
- 15.5.48 Due to these maximum dimensions, it is anticipated that the AILs which have been identified to require transportation by barge to the Development can be transported on the Caledonian Canal. A separate assessment would be required to determine the extent of any works that would be required e.g. dredging of the Caledonian Canal in areas which have accumulated a build-up of material which may limit the maximum vessel draft.
- 15.5.49 AILs which are not suitable for transportation by barge on the Caledonian Canal and cannot be transported by road without substantial remedial works will be required to be reduced in size or be delivered in smaller components and assembled on-site.
- 15.5.50 Example vehicles, pieces of equipment, plant and components were selected that represent the typical dimensions and weight of what is anticipated to be delivered to the Development Site during the construction period. From these, nine were selected to be included in a Swept Path Analysis (SPA) assessment to determine if the local road network can accommodate the AILs and to demonstrate the suitability of the chosen route for the vehicle type under assessment. The SPA assessment also provides an indication of the level of remedial works which would be required to provide safe and efficient access to site for any AILs.
- 15.5.51 It is recommended that AIL deliveries with a maximum width between 4.4 m and 5.0 m be routed through Dores on the B862 from Inverness due to the favourable road geometry and the shorter travel distance compared to using the B851. All other AILs excluding the components listed in Table 15.12: Estimated Abnormal Indivisible Load Summary should be transported via the B851 through Inverarnie due to the anticipated number of deliveries which are required.
- 15.5.52 AIL deliveries will be carried out at off-peak times to minimise traffic disruption to the local road network and to maintain accessibility for local residents.
- 15.5.53 The results of the SPA assessment are discussed in Appendix 15.2: Swept Path Analysis (Volume 5) and shown in Appendix 15.3: Swept Path Analysis Drawings (Volume 5).

#### **Construction Potential Effects**

- 15.5.54 The potential effects listed in the IEA Guidelines for the Environmental Assessment of Road Traffic are listed below. Through the identification and discussion of impacts and effects related to each of these topics, the traffic impact of the Development can be determined:
- Visual impact (considered in Chapter 11: Landscape and Visual Assessment);
  - Severance (for motorists or pedestrians);
  - Increased journey times for non-construction traffic;
  - Pedestrian delay, intimidation, loss of amenity;

- Road accidents and safety;
- Hazardous loads (not considered as no hazardous substances will be transported to the Development Site);
- Air quality (covered in the CEMP);
- Dust and dirt (covered in the CEMP); and
- Ecological impact (considered in Chapter 6: Terrestrial Ecology and Chapter 8: Ornithology).

15.5.55 It is likely that the main transport impacts will be associated with the movements of commercial HGVs (defined as goods vehicles exceeding a gross vehicle weight of 7.5 tons) travelling to and from the Development Site during the early construction phase of the Development bringing materials and equipment via the local road network. This would also apply at the end of the construction phase.

*Visual Impact of Construction Traffic*

15.5.56 Chapter 11: Landscape and Visual Assessment details the anticipated visual impact of construction traffic routes and are represented by Viewpoints 10 and 11, as shown on Figure 11.5 (Volume 5) and the associated visualisations in Volume 4.

*Severance*

15.5.57 According to the IEA (1993) guidelines, severance is “*the perceived division that can occur within a community when it becomes separated by a major traffic artery.....severance could equally be applied to residents, motorists or pedestrians*”.

15.5.58 An increase in construction traffic can make it more difficult for pedestrians to cross a road or for traffic to enter a carriageway. For there to be a perceived division, a significant increase in traffic is required.

15.5.59 The levels of HGV traffic associated with the worst case scenario equate to approximately 16 HGV movements per hour, therefore the magnitude of the effect of severance is considered to be low. In light of their sparse population, it is not expected that a large number of people will be affected by severance in the settlements of Inverarnie, Farr and Croachy. It is considered that the demand for crossing the B851 will be low, even within settlements, and this is especially true of the settlements at Farr and Inverarnie which are primarily situated on the west side of the B851.

15.5.60 Pedestrians traversing the various trails and core paths in the area are likely to be affected by an increase in construction traffic; however, this is likely to be a negligible effect as approximately 16 HGV movements per hour are anticipated. Horizontal visibility is above average in most areas which will allow pedestrians to cross any road on the Study Network safely and without any significant delay.

15.5.61 The sensitivity of pedestrians and cyclists that may experience severance during the construction phase of the Development is medium as despite the lack of segregated infrastructure and dedicated crossing points on the Study Network, the number of pedestrians and cyclists that are likely to be affected is low. Due to the low volume of construction traffic passing each way per hour, the magnitude of change is considered low; therefore the significance is considered **Minor Adverse** and therefore **Not Significant**.

*Increased Journey Time for Non Construction Traffic*

- 15.5.62 HGVs by their very nature travel slower than the average vehicle and can delay other road users by increasing their journey times. It is not uncommon for a 'convoy' effect to occur when suitable overtaking opportunities for vehicles are few and far between. Increased journey times can lead to driver frustration. If HGVs do cause a 'convoy' effect then this can cause delays for vehicles wishing to join the carriageway that the HGVs are travelling on.
- 15.5.63 The levels of HGV traffic associated with the worst case scenario equate to approximately 8 HGV movements each way per hour therefore the magnitude of the effect of HGVs on increased journey times is considered to be low. Furthermore, the majority of existing journeys on the B851 are considered to be associated with the settlements of Inverarnie, Farr and Croachy which are approximately 4.3 km, 6.1 km and 12.9 km respectively from the junction with the A9(T).
- 15.5.64 The journey to and from Croachy would take approximately 16 minutes to complete assuming an average speed of 50 kph (31 mph). Even if the average speed for this journey were to drop to 40 kph (25 mph), for instance, this would add only 4 minutes to the journey. This does not suggest however that HGV traffic will be travelling at an average of 40 kph on the B851. The magnitude of the effect of HGV traffic on driver delay is therefore considered to be low.
- 15.5.65 Due the low volume of vehicles using the B851 and B862 south-east of Dores on a daily basis, as demonstrated in Table 15.7: 2020 Baseline Traffic Flow Data, it can be concluded that the sensitivity is medium. Single track roads with passing places have been estimated to have a capacity of 100 – 300 vehicles per hour; therefore it can be assumed that the B862 and B851 have sufficient capacity to accommodate an increase in traffic volume (Ref 11). Furthermore, the anticipated number of HGV movements each way per hour is low therefore the significance is considered to be **Minor Adverse** and therefore **Not Significant**.

*Pedestrian Delay, Intimidation and Loss of Amenity*

- 15.5.66 An increase in construction traffic can make it more difficult for pedestrians to cross a road. Pedestrians can also experience intimidation and the degree to which this is true is affected by the volumes of traffic, the proportion of HGV traffic and its proximity to pedestrians.
- 15.5.67 Conventional construction traffic will use the B851, B862 and C1064 which are for the most part through rural areas where there is no existing pedestrian infrastructure. Despite the lack of dedicated infrastructure, much of the Study Network is used by pedestrians and cyclists due to the presence of long distance and recreational routes such as the South Loch Ness Trail.
- 15.5.68 The B851 has limited pedestrian infrastructure adjacent to it in the settlements of Inverarnie and Farr and a new footpath has been constructed at Croachy South. These footpaths will be unaffected by construction traffic for the Development therefore there will be no loss of amenity or access in these areas.
- 15.5.69 The increase in HGV traffic will increase the perception of intimidation for any pedestrians or cyclists travelling on the B851, B862 and C1064 especially as there is no segregated infrastructure separating the various modes of transport on all three roads.

- 15.5.70 The number of pedestrians or cyclists that are likely to be impacted by construction traffic is low and the magnitude of the effect is considered to medium; therefore the effect is considered **Minor Adverse** and **Not Significant**.

*Road Accidents and Safety*

- 15.5.71 Road accidents are attributable to a variety of local factors but an increase in traffic on any particular route theoretically has the potential to increase the frequency of accidents. By extracting data from roadcrash.co.uk for the years 2012 through 2016 for the Study Network, the total number of accidents resulting in an injury has been discovered.
- 15.5.72 The B851 experienced no serious and three slight injury accidents. Considering that two of the three accidents involved issues with the road surface, it can be concluded that the causes of these accidents were not directly related to traffic volume (i.e. an increase in traffic volume would not affect this type of accident). However, given the potential for a significant increase in HGV traffic, frequent monitoring of the road's surface should be carried out to ensure that any issues are quickly resolved to mitigate any potential safety issues.
- 15.5.73 For the B861, there were no serious and two slight injury accidents in the same time period. One of these was due to a vehicle rear-ending another vehicle and the other was due to adverse conditions caused by ice. Due to the infrequency of these accidents and their causes, it is unlikely that an increase in the volume of traffic will result in an increase in these accident types.
- 15.5.74 The B862 was found to be home to the greatest amount of accidents with one serious and seven slight injury accidents. The single serious injury accident and three of the slight injury accidents involved only one vehicle in each instance, two slight injury accidents were due to head-on collisions between vehicles, one was due to a rear-ending in a poor visibility area and the last was due to a collision between two vehicles on a straight section of road. Due to the nature of the aforementioned accidents, it is possible that the risk of head-on collisions may increase in relation to an increase in the volume of road traffic as the B862 is narrow in many areas.
- 15.5.75 The C1064 experienced one serious injury accident and two slight injury accidents. The serious injury accident was found to be due to a collision between a vehicle and a bicycle and the two slight injury accidents were both caused by ice on the road. Due to the C1064's use as part of the National Cycle Route 78 from the junction with the U1064 until the junction with the B862 at Scaniport, an increase in traffic on this route has the potential to reduce the safety of cyclists. However, it cannot be concluded that an increase in traffic will correlate to an increase in accidents with cyclists on this road due to the rarity of past accidents.
- 15.5.76 The C1076 only experienced one slight injury accident which involved a minor collision between two vehicles when passing on a bend. Due to the current provision of passing places on this road, it is not considered likely that an increase in traffic volume will result in an increase in this type of accident as any increase is likely to be negligible.
- 15.5.77 There were no fatal, serious or slight injury accidents recorded on the C1068 and U1084 from 2012 through 2016.
- 15.5.78 Considering the low rate of accidents on the Study Network at present (two serious and 15 slight from 2012 through 2016) and the fact that the worst case scenario will produce just

16 HGV movements per hour, the sensitivity and magnitude of change are both considered to be low. Therefore the significance is considered to be **Negligible** and therefore **Not Significant**.

#### *Air Pollution*

15.5.79 Air pollution tends only to be a problem in heavily congested areas. The IEA guidelines reference the Department of Transport's threshold for problematic air quality once an eight hour average concentration of nine parts per million (ppm) or a one hour peak concentration of 35 ppm, in relation to carbon monoxide, occurs at least once a year. The traffic flows required to produce this level of carbon monoxide are well in excess of those that will be experienced on the road network in question (the IEA guidelines reference an example whereby a flow of 1000 vehicles per hour, with an average speed of 40 kph, would be estimated to give a one-hour concentration of 2.4 ppm at 10 m from the centre of the road).

15.5.80 The sensitivity of the Study Network to air pollution is considered to be medium due to the potential ecological and environmental impact and the magnitude of change is considered to be negligible. Therefore, the significance of the effect is considered to be **Negligible** and therefore **Not Significant**.

#### *Dust and Dirt*

15.5.81 Construction traffic travelling to, from and throughout the Development is likely to disturb the surface of the access tracks which will produce dust and dirt. Nearby properties and public roads may be impacted as a result of dangerous road conditions and dust clouds. Should a large quantity of dirt be spread over a public road, vehicles could lose traction in adverse weather conditions which could lead to road traffic accidents and an overall reduction in road user safety.

15.5.82 As there will be a high volume of construction traffic travelling to, from and within the Development via public roads, the magnitude of change is considered to be high. Despite a low number of neighbouring properties, the sensitivity is considered to be medium due the presence of the three public road crossing points which are likely cause a significant amount of dirt to be spread on to the Study Network. The significance of this effect is considered to be **Moderate Adverse** and therefore **Significant**.

#### *Ecological Impact*

15.5.83 Chapters 6: Terrestrial Ecology and Chapter 8: Ornithology discuss the anticipated ecological impact that construction traffic and site deliveries will have such as disturbance on designated sites (for example Creag nan Clag SSSI) or features (such as Red Throated Diver and Slavonian Grebe), and protected species (badger, pine martin, otter and red squirrel) from collision risk or injury to species. This includes potential effects to the Slavonian Grebe and Red Throated Diver during breeding seasons which is outlined in further detail within Chapter 8: Ornithology.

#### **Operational Phase Effects**

15.5.84 The operational phase of the Development requires minimal vehicle trips to the Development Site, which are primarily attributed to the workforce. The number of vehicles visiting the Development Site will likely be negligible as it is anticipated that there will be a small workforce during operation.

- 15.5.85 During the operational phase of the Development it is likely that maintenance will have to be carried out to repair or replace components which are approaching the end of their lifespan such as turbines and generators. Detailed information regarding the number of vehicles which would be required to carry out maintenance is currently unknown.
- 15.5.86 During the replacement of components such as turbines, it is anticipated that the use of the Caledonian Canal will be required to transport the components. To facilitate this, the haulage road from Compound 1 to Compound 2 would be reinstated to allow AIL transporters to access the Development from Compound 2 and all necessary traffic management measures will be implemented to mitigate the impact on road users.
- 15.5.87 Other maintenance work may include the replacement of the Headpond lining and the Spillway Pipe. The number of HGV movements associated with these maintenance works is anticipated to be negligible compared to that of the construction phase therefore any perceived impact associated will be negligible.
- 15.5.88 The number of HGV and AIL movements will be low and would likely only result in minor disruption to local residents and road users. It can be concluded that the significance of the operational effects of the Development is **Minor Adverse** and therefore **Not Significant**.

#### **Decommissioning Effects**

- 15.5.89 The volume of materials, construction plant vehicles and workers that would be required during the decommissioning of the Development would be substantially less than those required during the construction phase, as described in Section 2.16 of Chapter 2: Project and Site Description. There would also be significantly fewer AILs required as it would be possible to dismantle many of the large components to make them suitable for transportation on the local road network.
- 15.5.90 The anticipated volume of vehicles which would be required during the decommissioning of the Development is low and the sensitivity of the local road network to such an increase in traffic is also low. The decommissioning effects of the Development are considered to be **Negligible** and therefore **Not Significant**.

## **15.6 Cumulative Effects**

- 15.6.1 It is necessary to investigate any developments in the surrounding area to establish the cumulative impact that the construction of these developments will have on the local area if they were to be constructed in the same timeframe. Table 15.14 shows the developments that have the potential to be under construction at the same time as the Development.

**Table 15.14: Nearby Cumulative Developments**

<b>Development</b>	<b>Description</b>	<b>Location*</b>	<b>Status</b>	<b>Start Date</b>
EE telecommunications tower	15 m high lattice telecommunications tower with ancillary equipment in a fenced compound at Farr.	7.5 km E	Application Permitted	Unknown
Underground water main	New underground water main from Dores to Loch Ashie treatment works	2.1 km NNW**	Screening	Unknown
Tulloch Homes	446 new homes on the south side of Inverness of the B862	10.7 km NNE	Application Permitted	Unknown

Development	Description	Location*	Status	Start Date
Ness Castle (Phase 2)	137 new homes off the B862	9.7 km NNE	Application Permitted	04/05/18
Scaniport	5 new homes off the B862	7.9 km NNE	Awaiting Decision	Unknown
B851 Junction with the A9	Change of use of existing buildings to office, use for maintenance of vehicles & fleet vehicles used for temporary and permanent road engineering	12.45 km NE	Under Consideration	Unknown
Coire Glas PSH	Revised application for the SSE 1500 MW PSH scheme	53 km SW	Under Consideration	2021

\* Distances are calculated from the central grid reference of the Development

\*\* As a linear feature, the distance was measured to the location referenced on the screening application

15.6.2 The EE telecommunication tower, underground water main and the small residential development at Scaniport would be unlikely to cause any significant impact in conjunction with the traffic impact associated with the Development. All three developments are small in scale and their respective transport impact would likely be low due to the low volume of traffic associated with their construction.

15.6.3 Construction traffic related to the Tulloch Homes and Ness Castle residential developments would likely be routed through Inverness or via the B8082 from the A9. Given that the Development's construction traffic – excluding AILs – will be routed via the B851, the cumulative impact would likely be negligible. This is due to the anticipated use of night time AIL deliveries, where possible, to mitigate the traffic impact on the local road network.

15.6.4 The change of use of the development adjacent to the B851 junction on the A9 would likely only generate a negligible volume of additional vehicles on the local road network due to the scale of the proposed works.

15.6.5 The Coire Glas EIA Report details the development's anticipated construction traffic distribution on the local road network. It is anticipated that traffic associated with this development will only use the A82, A86, A87 and Kilfinnan Road and therefore any cumulative impact will be negligible.

## 15.7 Mitigation and Monitoring

### Embedded Mitigation

15.7.1 A Construction Traffic Management Plan will be developed in consultation with THC, Transport Scotland (as necessary), Police Scotland and other stakeholders following award of consent. The structure of this document will expand upon the information included in the Framework CTMP provided in Appendix 15.1 which includes the following:

- The agreed route for construction traffic including any abnormal loads;

- The necessary agreements and timing restrictions for construction traffic for example Monday – Saturday working ,, prohibition during school drop-off and pick-up times, and prohibition during loading times at commercial premises;
- Details of a proposed Condition Survey on access routes;
- Proposals for maintenance of the agreed routes for the duration of the construction phase;
- Proposals for monitoring and agreeing maintenance costs;
- Escort arrangements for abnormal loads;
- Route signing;
- Details of the advanced notification to the general public warning of any construction transport movements, specifically AILs;
- Details of information and road signage warning road users of forthcoming AIL transport and construction traffic movements;
- Arrangements for regular road maintenance and cleaning, e.g. road sweeping in the vicinity of the site access point as necessary, drain clearing, wheel cleaning / dirt control arrangements;
- Arrangements for winter road maintenance e.g. de-icing and snow clearing;
- Details of actions that must be taken by the Construction Contractor to mitigate the traffic impact of site workers travelling to the Development Site;
- Construction Contractor speed limits; and
- Community and emergency services liaison details.

#### **Additional Mitigation Measures**

##### *Site Worker Traffic*

- 15.7.2 It has been established that traffic associated with site workers travelling to and from the Development Site is the largest source of site traffic that will impact the surrounding road network. For the purpose of the traffic impact assessment, it was assumed that each worker will travel individually by car in order to represent a worst case scenario. However, the finalised CTMP will include measures that will seek to reduce single occupant trips by stipulating the need for minibus or coach services to and from accommodation areas and promoting car sharing when travelling outside of the Development Site boundary.

##### *Construction Traffic*

- 15.7.3 As stated in Appendix 5.2: Material Management Appraisal (Volume 5), it is anticipated that all of the material generated from excavation works will be used in the construction of the Headpond Embankment and the Landscape Embankment. For the purpose of this impact assessment, it has been assumed that 12,000 m<sup>3</sup> will be required to be removed from the Development Site in order to represent a worst case scenario. However, in practice it is unlikely that any material will be required to be removed from the Development Site which will significantly reduce the number of daily HGV movements.
- 15.7.4 To further reduce the impact of construction traffic, on-site concrete batching plant(s) will be utilised. This will reduce the need for ready mixed concrete to be delivered to the Development Site and thus reduce the impact on the road network. Some of the raw materials for the concrete may be able to be sourced on-site, thus reducing the amount of

vehicles associated with the concrete production further. Over the duration of the construction phase, this could result in a significant reduction in construction traffic.

- 15.7.5 It is anticipated that pre-cast concrete tunnel lining sections will be delivered via the Caledonian Canal which will further reduce the number of HGV movements associated with the construction of the Development.

*Site Traffic Restrictions*

- 15.7.6 To mitigate the impact of disruption to local residents and road users, the finalised CTMP will detail the hours for which construction can take place and therefore the hours in which construction traffic will be travelling to and from the Development Site. At present, this is assumed to be 07:00 – 19:00 Monday to Friday and 07:00 to 12:00 on Saturdays with no construction taking place on Sundays (other than below ground tunnelling which may take place 24 hours per day, 7 days per week); however this is yet to be confirmed and is subject to an agreement between all relevant parties before construction commences. Should (other) construction work be required to take place on a Sunday, approval from would be required from THC prior to any work taking place.
- 15.7.7 In addition to a restriction on construction hours, there may also be a requirement for restrictions on when construction traffic can pass sensitive areas such as Farr Primary School. Due to the school's proximity to the B851 and the single lane nature of the road as it passes the school, it may be necessary to prevent construction traffic from passing this point during school drop-off and pick-up periods due to the potential for children to be on the road and congestion caused by waiting vehicles.

*Road Safety*

- 15.7.8 To improve the safety of road users and pedestrians, signage will be present near site access points to warn the public that they are likely to experience a high volume of HGV movements in the area. This, in addition to any necessary traffic management measures, will help mitigate any potential safety issues near access points on public highways. Further information related to the type and location of any road signs will be provided in the finalised CTMP.
- 15.7.9 The Construction Contractor will arrange for winter maintenance to be carried out when required to maintain the safety of road users and site workers. This would include de-icing activities such as gritting and the ploughing of snow when required. Details of any winter maintenance would be included in the finalised CTMP and would be subject to an agreement with THC.

*Temporary Site Entrance Relocation*

- 15.7.10 Species of conservation concern (Red Throated Diver and Slavionan Grebe) have been found to be present at Loch na Curra adjacent to the C1064. As this road provides access to the main site entrance, the increase in traffic associated with the construction of the Development may result in an unacceptable level of disturbance to protected wildlife at Loch na Curra due to the increase in noise and vibration. Should it be found that the level of disruption is unacceptable, then the site access point will be relocated from the C1064 to 'Public Road Crossing 2' on the B862 for the duration that the protected species are anticipated to be present at Loch na Curra. Chapter 8: Ornithology identifies and discusses the species of conservation concern that may be adversely impacted by construction traffic.

- 15.7.11 Should it be necessary to temporarily relocate the site entrance to mitigate any disruption, then it is anticipated that remedial action will be required to maintain road user safety on the B862 due to the increase in traffic. The trimming and / or removal of roadside vegetation and trees at the hairpin bend south-east of Kindrummond Farm Cottage would be necessary as existing visibility on the narrow bend is poor. Roadside vegetation trimming and / or removal would also be required at the site access point as there would be a significant increase in construction traffic using the junction. Temporary traffic signals are anticipated to be in operation at this location throughout the duration of the Development's construction; however, visibility improvements will maintain road user safety in the event of traffic signal failure.
- 15.7.12 The B862 between 'Public Road Crossing 2' and the B862 / C1064 junction is largely comprised of single track road with passing places. To facilitate the passing of two HGVs on the road, it would be necessary to widen the existing passing places on this section of the B862 as many are only suitable for small vehicles to pass each other safely.
- 15.7.13 Additionally, to maintain the safety of road users and to further mitigate the impact on species of conservation concern that are present in the area, the use of TTROs should be investigated to temporarily reduce vehicle speeds on the public road network near site access points and public road crossings to 30 mph. The finalised CTMP will detail the extent of any mitigation measures and remedial work which is required for the Development.

#### *Decommissioning*

- 15.7.14 Should it be necessary to decommission the Development, a decommissioning plan will be created prior to any decommissioning works taking place. This plan will detail the measures that are to be implemented to mitigate the disruption caused during decommissioning. Section 2.16 of Chapter 2: Project and Site Description details the decommissioning process.

#### **Monitoring**

- 15.7.15 The Applicant is aware that local communities have felt several years of negative experiences as a result of poor monitoring and enforcement of Traffic Management Plans (TMPs) for nearby developments and forestry works. The monitoring and enforcement of the Development's CTMP will be a key responsibility of the Construction Contractor to ensure that any negative impacts associated with construction traffic are quickly addressed and that suitable action is taken. This is in addition to the creation of a Project Liaison Group (PLG) as outlined in the CEMP.
- 15.7.16 Further information regarding the possible monitoring methods and enforcement of mitigation measures can be found in the Framework CTMP in Appendix 15.1. The methods identified in the framework CTMP will form the base from which the finalised CTMP will expand on.

## **15.8 Residual Effects**

- 15.8.1 The mitigation measures discussed previously will assist in mitigating the majority of temporary traffic impacts associated with the construction phase of the Development. Table 15.15: provides a summary of the potential effects, mitigation and residual effects discussed in this chapter.

- 15.8.2 The residual effects associated with the operation and decommissioning of the Development have not been considered as it has been determined that any traffic impact associated with operational or decommissioning works will likely be Negligible.

**Table 15.15: Summary of Effects – Construction Phase**

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Severance	Increase in the amount of traffic on the roads used by construction vehicles resulting in perception that a road is less safe to cross or that parts of a settlement or property become isolated	Minor Adverse	Use of excess material for Landscape Embankment will reduce HGV trips.  Use of concrete batching plants to significantly reduce the number of HGV trips.  HGVs to follow defined routes to and from the Development Site.	Negligible	Not Significant
Increased journey time for non-construction traffic	Increase in slow moving HGV traffic which results in a convoy of vehicles being unable to overtake the HGV. This in turn leads to increased journey times, driver frustration and drivers taking unnecessary risks	Minor Adverse	Instruct HGV drivers to stop at suitable locations allowing vehicles to pass.  Use of concrete batching plants to significantly reduce the number of HGV trips.  Use of excess material for Embankment enhancement and Landscape Embankment will reduce HGV trips.  Detailed CTMP.  Use of the Caledonian Canal to import pre-cast tunnel lining sections from supplier.	Negligible	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Increased journey time for non-construction traffic (cont.)	Traffic management associated with abnormal load deliveries may involve local road closures and local diversion of traffic	Major Adverse	Escort vehicles to accompany abnormal load.  Abnormal load delivery to be programmed in such a way so as to cause minimal disruption i.e. at night or during off-peak hours.  Implementation of the finalised CTMP.	Minor Adverse	Not Significant
Traffic Increase due to site workers	Site workers travelling to the Development Site by personal vehicle will increase the volume of traffic on the local road network which may cause delay to other road users	Major Adverse	Construction Contractor will organise mini-bus services to facilitate the movement of site workers from accommodation areas to the Development and encourage car sharing. Implementation of the CTMP  On-site accommodation to be used to house site workers.	Minor Adverse	Not Significant
Pedestrian Delay	Increase in the amount of traffic on the routes used by vehicles associated with the construction phase resulting in increased perception of danger when travelling on the Study Network	Minor Adverse	Use of excess material for Embankment enhancement and Landscape Embankment will reduce HGV trips.	Negligible	Not Significant
Pedestrian intimidation			HGVs to follow defined routes to and from the Development Site which will be signposted.	Minor Adverse	
Pedestrian loss of amenity			Instruct HGV drivers to abide by advisory speed limit in local area.	Minor Adverse	

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
Road accidents and safety	<p>Increase in slow moving HGV traffic which results in a convoy of vehicles being unable to overtake the HGV. This in turn leading to increased journey times, driver frustration and drivers taking unnecessary risks.</p> <hr/> <p>Abnormal loads may need to overrun footways to negotiate some junctions along the delivery route to site.</p> <hr/> <p>Adverse weather could result in poor road conditions which could lead to road traffic accidents occurring.</p>	Minor Adverse	<p>Use of excess material for Embankment enhancement and Landscape Embankment will reduce HGV trips.</p> <hr/> <p>HGVs to follow defined routes to and from the Development Site which will be signposted.</p> <hr/> <p>Educate HGV drivers to stop at suitable locations allowing vehicles to pass.</p> <hr/> <p>Abnormal load vehicle speeds will be low and will be escorted.</p> <hr/> <p>Footways will be closed on a temporary basis if abnormal loads require incurring onto pedestrian space.</p> <hr/> <p>Winter maintenance will be carried out on public roads which will be used by construction traffic to maintain road user safety.</p>	Negligible	Not Significant
Air Pollution	An increase in traffic has the potential to cause environmental and ecological damage due a reduction in air quality	Negligible	<p>Use of excess material for Embankment enhancement and Landscape Embankment will reduce HGV trips.</p> <hr/> <p>Contractors will organise mini-bus services to facilitate the movement of site workers from accommodation areas to the Development and encourage car sharing.</p>	Negligible	Not Significant
Dust and Dirt	Construction traffic travelling to, from and throughout the Development is likely to disturb the surface of the access tracks which will produce dust and dirt. Should a large quantity of dirt be spread over a public road,	Moderate Adverse	Implementation of the CEMP. Wheel washing and road cleaning will be carried out at public road crossings and site access points.	Minor Adverse	Not Significant

Receptor	Description of Effect	Effect	Additional Mitigation	Residual Effects	Significance
	vehicles could lose traction could lead to road traffic accidents and an overall reduction in road user safety.				

## 15.9 References

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