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Environmental Impact Assessment Record of Determination

A83 Access to Argyll and Bute (Medium Term Solution)

Record Of Determination under Section 55A(1) to (4) of The Roads (Scotland) Act 1984 (as amended by The Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017)

A83 Access to Argyll and Bute (Medium Term Solution)

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Project Details

Description

The A83 through Glen Croe (refer to Figure 1) is the highest point on the A83 (approximately 265m Above Ordnance Datum (AOD)) and the adjacent hillsides have a history of instability resulting in landslides and debris flow hazards, which has increased in recent years due to the frequency of heavy, intense periods of rainfall, leading to frequent road closures and resultant diversion.

In addition to the development of a permanent solution to address the landslide and debris flow risk to the A83 (known as the 'Long-Term Solution' (LTS)), interventions to the existing Old Military Road (OMR), which operates when appropriate to do so as the local diversion of the trunk road when the A83 is closed are proposed. Such interventions seek to improve the operation, safety and resilience of the OMR as a temporary diversion and as such should be able to be delivered within a timescale to justify them as a 'Medium Term Solution' (MTS) while the LTS is being delivered.

The MTS interventions (the Proposed Scheme), which are located within the extents indicated on Figure 1, would include the following phased works:

Phase 1

- Realignment of approximately 250m of the OMR to reduce the risk of flooding and maintain the road as passable during a higher flood return period.

Phase 2

- Inclusion of geotechnical interventions to reduce the risk and impact of debris flow and boulder risk impacting the OMR, including extension to the existing debris protection bund and additional debris and rock fall fencing.
- Maintenance and localised improvement to existing drainage networks including clearing out ditches and channels.
- Localised widening on curves to improve the swept path of HGV traffic.
- Culvert strengthening, replacement, extension, and construction of headwalls to reduce the risk of the road becoming impassable due to overtopping.
- Bridge remedial works and maintenance to accommodate trunk road traffic where required.

Phase 3

Phases 1 and 2 are consented under The Roads (Scotland) Act 1984 as these interventions are necessary to ensure the safety of the road user. Other interventions, such as those focused on improving journey times beyond the immediate trunk road boundary, which includes widening the OMR to extend the length of two way traffic, would require consideration under a different consenting regime.

The requirement for EIA for those works will be considered separately to those works considered within this Record of Determination.

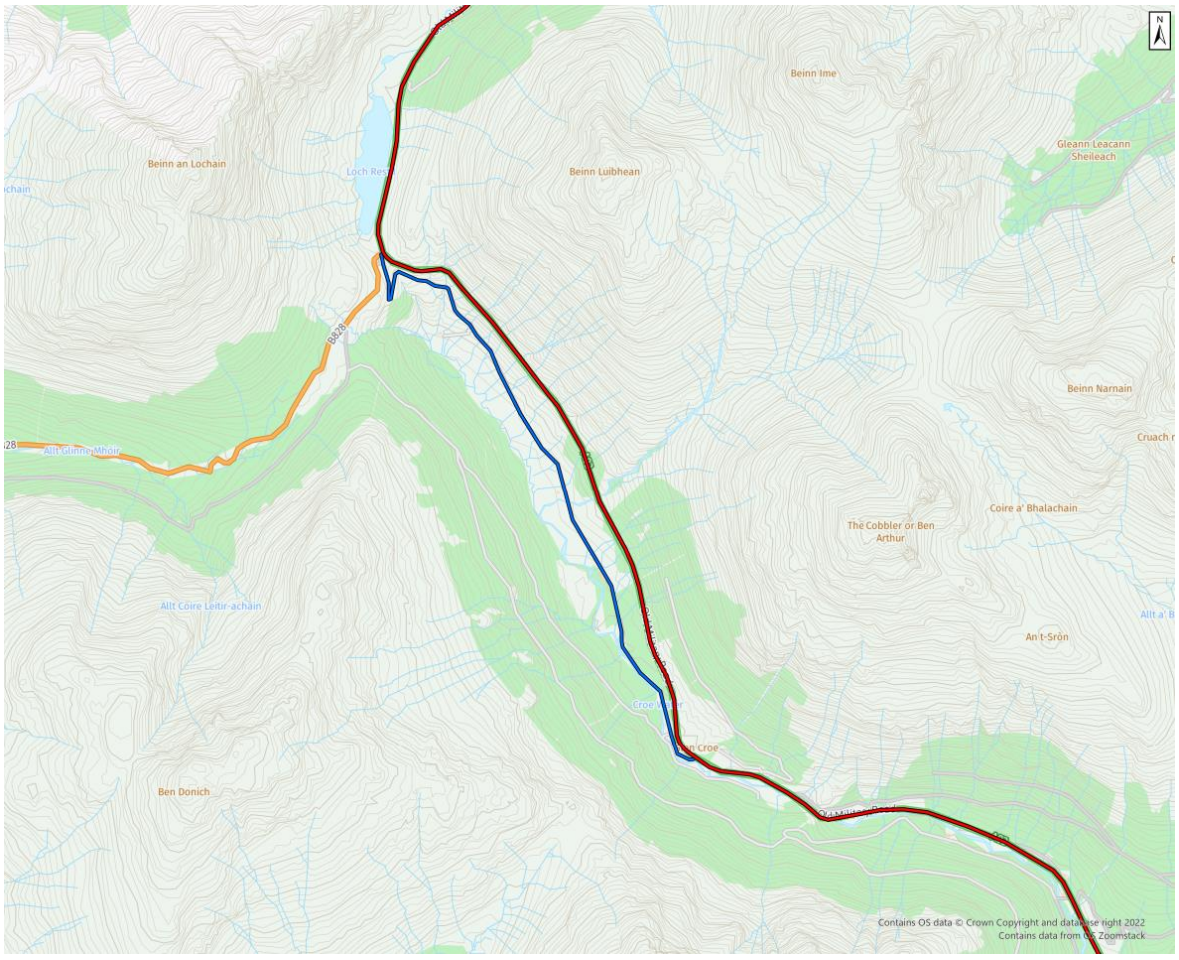


Figure 1 - Map showing the location of the OMR (blue line) within Glen Croe, running parallel with the existing A83 (red line)

A separate Strategic Environmental Assessment (SEA) Environmental Report has been prepared for the LTS within a wider study corridor encompassing the A83 and the wider Glen Croe – Access to Argyll and Bute (A83) – Strategic Environmental Assessment Environmental Report. The SEA reported on the potential environmental effects of the options (including alternative routes) taking into account environmental constraints. The LTS options for the affected section of the A83

through Glen Croe are subject to a separate design and assessment process to the works along the OMR.

Location

The A83 passes through the Loch Lomond and the Trossachs National Park and connects the central belt to Argyll and Bute in the west. The route through Glen Croe provides access between the communities (including the Islands) with the Central Belt of Scotland and urban settlements such as Glasgow.

The A83 Rest and Be Thankful is part of the Trunk Road Network (TRN) which is located within Argyll and Bute and runs from west of Ardgarten, along Glen Croe to the Rest and Be Thankful Viewpoint (Figure 2) before passing Loch Restil and dropping down the Bealach an Easain Dubh towards Glen Kinglas.

The Proposed Scheme interventions are located along the OMR within Glen Croe.

Figure 2 – Location Plan

Description of local environment

The OMR is situated within Glen Croe, surrounded to the north and south by steep slopes a number of summits including Beinn Ime; Ben Donich; Beinn Luibhen; The Brack; Beinn an Lochain and Ben Arthur (The Cobbler). Loch Restil is situated at the head of the glen to the north, and the Croe Water flows through the glen and is fed by a number of tributaries flowing down either side of the glen as can be seen in Figure 1.

To the west of the OMR Glen Croe is largely forested on the lower slopes. Similarly, there are trees on the eastern slopes however, tree cover within the glen reduces closer to the peaks. The eastern slopes of Glen Croe, on which the TRN is located is susceptible to landslip, with additional signs of landslip within the forested area on the west side of the glen.

The OMR was constructed in the 1740s as an access to Inveraray but was replaced in the 1940s by the A83 and subsequently became a private access. As well as being used as a temporary diversion route during the closure of the TRN, the OMR is also used by the landowner for land and property access, as well as heritage motor sport activities. The B828 runs east to west at the northern extent of Glen Croe and there are forestry tracks on the western slope with a Core Path running through the forest (designated by the Loch Lomond and the Trossachs National Park Authority (LLTNPA) Core Paths Plan). The Core Path connects to the wider network of Core Paths within the Loch Lomond and The Trossachs National Park (LLTNP).

The Proposed Scheme is located within the Argyll Forest Park (which was established in 1935) and the LLTNP. At the northern extent of the glen there is a viewpoint and car park known as the ‘Rest and Be Thankful’ viewpoint which offers a view south across the entire glen (Plate 1) and is the site of a Category C listed structure – ‘Rest and be Thankful’ Stone.

Plate 1 – the view south-east along Glen Croe from the Rest and Be Thankful car park

Beinn an Lochain Site of Special Scientific Interest (SSSI) is located c.30m to the north-west of the Proposed Scheme (refer to Figure 3) and is designated for siliceous scree (including boulder fields), tall herb ledge and upland assemblage. Beinn an Lochain provides one of the best representations of upland habitats in Scotland and is therefore notified as a SSSI for its upland habitat assemblage. Within the wider area the Glen Etive and Glen Fyne Special Protection Area (SPA) is located c.2.5km to the north of the Proposed Scheme and is designated for supporting a population of European importance of golden eagle *Aquila chrysaetos* (19 active territories in 2003, more than 4.2% of the GB population) (https://sitelink.nature.scot/site/10113).

The Cobbler (Beinn Artair) Geological Conservation Review (GCR) site, which is associated with mass movements, is located c.1.5km to the east of the OMR.

The glen is rural in nature and apart from the roads (and associated infrastructure) and a small number of scattered buildings including two residential properties, one situated at the northern end of the corridor on the valley floor below the Rest and Be Thankful car park and the other further south adjacent to the TRN.

Within Glen Croe, Transport Scotland (through their Operating Company – BEAR Scotland) have undertaken works to improve the resilience of both the TRN and the OMR including catch pits, earth mounding, fencing and the erection of a HESCO

bund (refer to Plates 2 and 3 below). It is understood that these measures were subject to separate Record of Determinations.

Plate 2 – HESCO bund on the OMR

Plate 3 – Catch-pit and fencing works on the A83

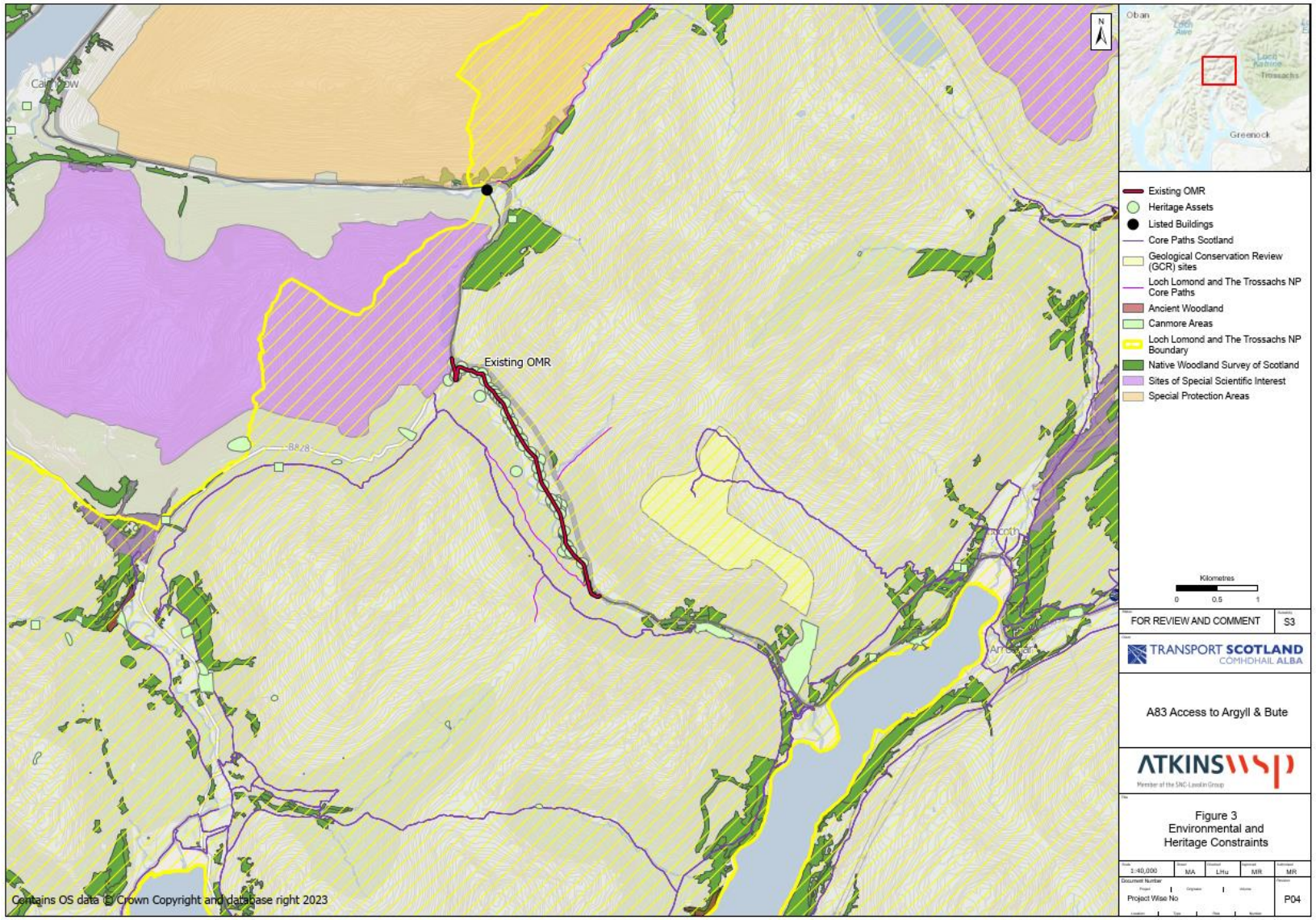


Figure 3 – Environmental and Heritage Constraints

Air quality

The Proposed Scheme does not lie within or close to an Air Quality Management Area (AQMA), areas where air quality strategy (AQS) objectives for human health may not be achieved. The nearest AQMA is almost 50km away, in East Dunbartonshire (refer to the Biodiversity section below for further information on designated ecological sites).

Air quality monitoring is not undertaken in Argyll and Bute. The closest continuous monitoring sites are at roadside locations in Greenock and Dunbarton, over 30km from the Proposed Scheme and are not representative of the study area. Monitoring at a rural location outside Glasgow has shown NO_2 annual mean concentrations consistently around 10 µg/m^3 over the last 15 years (Trends NO2 rural sites 2005-2019), and $PM_{2.5}$ concentrations just under 5 µg/m^3 at Auchencorth Moss, a rural location outside Edinburgh (PM25 long running monitoring 2010-2019).

Estimates of current and future year background pollutant concentrations in the UK are available on the DEFRA UK-AIR website. The background estimates, which are a combination of measured and modelled data, are available for each 1 x 1 km grid square throughout the UK for a reference year of 2018 which is the basis for the future year estimates up to 2030. These background estimates include contributions from all source sectors, e.g. road transport, industry and domestic and commercial heating systems.

Table 1 presents the range of annual mean concentrations for the key road traffic pollutants, NO_2, PM_{10} and $PM_{2.5}$ for the 12 grid squares covering the study area. The concentrations are provided for a base year of 2022.

X Coordinate	Y Coordinate	NO_2	$PM_{2.5}$	PM_{10}
222500 to 224500	704500 to 707500	1.40 to 2.04	3.80 to 3.86	5.60 to 6.05
Criterion		40	18	10

Table 1 - Defra Mapped Background Concentrations, 2022 (µg/m3)

Based on available air quality data, the relatively low traffic flow on the A83 (compared to urban areas) and the absence of other significant sources of air emissions, the air quality in the study area is expected to be well below relevant AQS objectives.

Cultural heritage

A review of available resources including the West of Scotland Archaeology Service (WoSAS) Historic Environment Record (HER) and the Scottish National Record of

the Historic Environment (SNRHE) have identified a single designated asset within a 2km assessment buffer surrounding the Proposed Scheme. A single Category C Listed Building is located at the western extent of the Proposed Scheme:

Glen Croe, Rest and be Thankful Stone (LB11816). There are no Scheduled Monuments, Inventory Garden & Designed Landscapes, Inventory Battlefields, Conservation Areas or World Heritage Sites within the 2km assessment buffer.

In addition, the following undesignated assets are listed on the SNRHE and are located within a 200m assessment buffer:

- Dumbarton – Tarbet – Inveraray – Tyndrum Military Road (WoSAS ID 21653, 21692);
- Croe Water, Settlement (WoSAS ID 21292);
- Laigh Glencroe, Farmstead (WoSAS ID 21588);
- Laigh Glencroe, Farmstead (WoSAS ID 21589);
- Mid Glen Croe, Sheepfolds, Buildings, Field Systems, Hut Circles, Cairn (WoSAS ID 44649);
- Glen Croe, Structures (WoSAS ID 68820);
- Glen Croe, Structure (WoSAS ID 68819);
- High Glen Croe, Kiln, Enclosures (WoSAS ID 44648);
- Rest and Be Thankful Memorial Stone (WoSAS ID 1789);
- Rest and be Thankful, Home Guard Stop Defence (Canmore ID 293674); and
- Rest and be Thankful, Cairn (WoSAS ID 66938).

A further 48 undesignated heritage assets have also been identified within 10m of the Proposed Scheme during advanced survey (CFA Archaeology Ltd, 2012. Old Military Road, Rest and Be Thankful Diversion Route: Cultural Heritage Assessment. Report No. 2115). These relate to the Old Military Road and comprise the military road itself, alongside 26 associated culverts, three rubble bridges and additional associated features.

There is the potential that the number of undesignated assets will increase through consultation with WoSAS, further review of HER data and through additional walkover survey of the Proposed Scheme.

Landscape and visual effects

The Proposed Scheme lies within the Loch Lomond and the Trossachs National Park (LLTNP). A National Park is defined as a sensitive designation within the EIA Regulations.

The Landscape Character Type (LCT) of the immediate area is the 'Upland Glens – Loch Lomond and the Trossachs' (LCT 252) (Upland Glens – Loch Lomond and the Trossachs). This LCT's key characteristics include "*often narrow with little flat glen floor, strongly enclosed by steep hill slopes of the adjacent 'Steep Ridges and Hills' and 'Highland Summits'*" and "*classic views channelled up and down the Glens, with steep side slopes framing landscapes that lie beyond them*." The immediate surrounding landscape comprises open views across Glen Croe to Ben Donich and The Brack. On the northern side, immediately above the A83, landslide netting and catch pits are in place.

The mountains surrounding the Proposed Scheme are part of the 'Highland Summits' LCT (LCT 251) (Highland Summits). This LCT's key characteristics include "*high mountains generally lying above 800 metres, but lower and intensely craggy in the core of the Trossachs where geology is particularly complex*". These mountains include the well-known 'Munro' peaks of Beinn Ime, Ben Arthur ("The Cobbler") and Ben Narnain as well as the high, but not Munro-height, mountains of Beinn an Lochain and Ben Donich.

The land within the glen itself is largely used for rough grazing agriculture on the lower slopes, with commercial coniferous woodland plantations on the mid-slopes.

Visual receptors include residents of isolated local residences, users of Core Paths, users of the Rest and Be Thankful Car Park viewpoint, users of the Butterbridge and Glen Mhor (B828 Glen Mhor Local Road), users of the A83 Argyll Coastal Route, users of the OMR, and hikers on hillwalking trails. Views are generally contained within Glen Croe and while the views include the A83 and OMR including the various safety interventions, the focus of the view is the open summits. Some views are constrained by forestry.

Biodiversity

Designated Sites

The Proposed Scheme is not located within any site designated for ecology and nature conservation. However, several designated sites are present within the vicinity, as follows:

- Beinn an Lochain Site of Special Scientific Interest (SSSI) - located c. 30m to the north-west and designated for habitats including siliceous scree, tall herb ledge and upland habitat assemblages;
- Glen Etive and Glen Fyne SPA – located c. 2.5km to the north and designated for breeding golden eagle populations; and

- Loch Lomond Woods Special Area of Conservation (SAC) a multi-location site, with the closest site being located c. 5.5km to the east. The SAC is designated for habitats (sessile oak woods rich in bryophytes) and otter populations.

Habitats

Broad habitat types recorded during the field surveys comprised the following:

- Semi-natural woodland and related habitats;
- Mires (including wet heath, flush and bog vegetation);
- Dry heaths;
- Grasslands and related vegetation;
- Habitats supporting aquatic vegetation; and
- Other habitats including fern communities, unvegetated inland cliff, largely unvegetated scree and coniferous plantation woodland (primarily comprising Sitka spruce).

The Croe Water is the main watercourse within the vicinity of the Proposed Scheme, with a catchment draining the surrounding steep mountainous area, including the facing slopes of Beinn Ime, Beinn Luibhean, Ben Arthur, Ben Donich and The Brack. Further background information on the Croe Water and its catchment is provided in the Road Drainage and the Water Environment section below.

Within the broad habitats listed above, the following priority features were identified:

- Several Annex I habitats including blanket bog, transition mire, alkaline fens, species-rich *Nardus* grassland on siliceous substrates in mountain areas, northern Atlantic wet heaths with *Erica tetralix* and European dry heaths and oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea;*Several Scottish Biodiversity List (SBL) priority habitats, including upland birch wood, wet woodland, blanket bog, upland flushes, fens and swamps, purple moor-grass and rush pasture, upland calcareous grassland, basic (calcareous) grassland, lowland meadow, upland heathland, inland rock and scree and oligotrophic lake and rivers; and
- A number of areas considered suitable to support or partially support groundwater dependant terrestrial ecosystems (GWDTEs) were recorded during the survey, including areas within the vicinity of the localised works to be undertaken as part of the Proposed Scheme.

Protected, Priority and Notable Species

Terrestrial

A desk-based study, comprising a search of publicly available (online) data and consultation with the local raptor study group confirmed the presence of a range of protected/notable species within the vicinity of the Proposed Scheme. Field surveys undertaken in 2021 and 2022 identified the presence of, or suitable habitat for, the following protected/notable species:

- Bats – eight bat roosts and suitable habitat for foraging/commuting bats was recorded within/directly adjacent to the Proposed Scheme;
- Otter – a single holt (likely non-breeding) and several spraints was recorded within/adjacent to the Proposed Scheme;
- Badger – latrines/dung pits scattered sparsely throughout Proposed Scheme area, and two setts (although these were over 100m from the Proposed Scheme);
- Pine marten – a den was noted within/directly adjacent to the Proposed Scheme, along with several other potential den sites;
- Scottish wildcat – no evidence recorded, although suitable habitat and features that could support den sites were noted;
- Red squirrel – suitable habitat within immediate vicinity of the Proposed Scheme and an incidental record of feeding evidence. In addition, numerous red squirrel records noted during the desk-based study;
- Birds – including breeding golden eagles within the wider vicinity, black grouse evidence (incidental record), barn owl roosts, a breeding bird assemblage typical of the location/habitats present and habitat suitable for additional species (including Schedule 1 species e.g. goshawk, red kite and long-eared owl) in the breeding and non-breeding seasons;
- Reptiles – suitable habitat for adder, common lizard and slow worm exists within/adjacent to the Proposed Scheme. An incidental record of a common lizard approximately 600 m to the south was also noted;
- Invertebrates – at the time of writing, no information relating to terrestrial invertebrates is available; however, it is possible that the survey area contains suitable habitat for a range of invertebrate species; and,
- Invasive Non-Native Species (INNS) - Japanese knotweed and rhododendron were recorded during field surveys, and records of additional species including Himalayan balsam and American mink were noted during the desk-based study.

Aquatic

Fish

Based on currently available information (including publicly available records and existing Proposed Scheme surveys), the Croe Water has been identified to support brown trout *Salmo trutta* and minnow *Phoxinus phoxinus*. Brown trout are SBL priority species listed under the UK Biodiversity Action Plan (UKBAP), and the presence of both mature and 0 age class fish, suggests the Croe Water supports a viable population of brown trout. In relation to the Water Framework Directive (WFD) the Croe Water was classed by SEPA as a river (ID: 10215) with a 'high' status for fish. The SEPA 'Obstacles to Fish Migration' data publication identified a 'Impassable Natural Waterfall or Other Natural Obstruction' downstream of the Proposed Scheme, which is likely to limit diadromous species usage within the Proposed Scheme.

Aquatic Invertebrates

Based on aquatic invertebrate surveys undertaken within the Proposed Scheme extents, watercourses that interact with the MTS support macroinvertebrate assemblages typical of high gradient, oligotrophic systems. Lotic Index for Flow Evaluation (LIFE) and Proportion of Sediment-sensitive Invertebrates (PSI) scores are indicative of fast flowing, well oxygenated watercourses with a low proportion of fine sediment. Based on the macroinvertebrate surveys undertaken, no SBL macroinvertebrates were recorded. Under WFD classification the status of Croe Water is 'moderate' for macroinvertebrates.

Aquatic Macrophytes

Species suited to acidic wetland habitat such as Tormentil *Potentilla erecta* and Lesser Spearwort *Ranunculus flammula* were recorded during surveys of the Proposed Scheme. Neither species is listed on the SBL and both are International Union for Conservation of Nature (IUCN) species of least concern, no other notable aquatic macrophytes were recorded within the Proposed Scheme extents.

Geology and soils

Geology

The majority of the Proposed Scheme is underlain by bedrock geology of the Beinn Bheula Schist Formation (British Geology Survey Geoindex (2022). BGS GeoIndex). The Beinn Bheula Schist Formation is metamorphic bedrock formed between 541 and 1,000 million years ago between the Tonian and Ediacaran periods (British

Geology Survey Geology Viewer (2022). BGS Geology Viewer) and comprises Psammite, Semipelite and Pelite along the Proposed Scheme. Additionally, in the northeast of the Proposed Scheme there is an area underlain by the South of Scotland granitic suite and to the southwest, there is an area underlain by Beinn Bheula Schist Formation characterised by Schist and Metawacke (Scottish Environment National Map of Scotland (2022), Soil Maps).

The 2022 Ground Investigation (Jacobs (2022), Access to Argyll and Bute (A83) Report on Preliminary Ground Investigation), undertaken by Raeburn, found ground conditions to be as expected, with granular soils found above Psammite, Semipelite and Pelite. Bedrock was encountered between 1.0 and 15.9 m below ground level (bgl) but was generally encountered at less than 10.0 m bgl.

The east of the Proposed Scheme is predominantly underlain by Glacial Till comprised of Diamicton, with some River Terrace Deposits comprising Gravel, Sand, Silt and Clay (British Geology Survey Geoindex (2022), BGS GeoIndex). The River Terrace Deposits are found along Croe Water. In contrast, the west of the Proposed Scheme predominately has no underlying superficial deposit geology, implying that bedrock may be located at or close to surface. To the northwest of the Proposed Scheme there are areas of Hummocky Glacial Deposits and Alluvium that are also found along Croe Water (British Geology Survey Geoindex (2022), BGS GeoIndex). The 2022 Ground investigation (Jacobs (2022), Access to Argyll and Bute (A83) Report on Preliminary Ground Investigation) found superficial deposits that were anticipated based on the mapped geology of the Proposed Scheme.

There are no geological designated sites (including Sites of Special Scientific Interest and Geological Conservation Review (GCR)) in the vicinity the Proposed Scheme (though it is noted that The Cobbler GCR site is located c.1.5km to the east of the OMR).

Soils

The majority of the soils within the Proposed Scheme boundary comprise Peaty Podzols which are defined as well drained, acidic soils with bright colours and an organic surface layer (Scottish Environment National Map of Scotland (2022) Soil Maps). To the northeast and north west of the Proposed Scheme are areas of Montain soils. The Proposed Scheme is described as being capable of use for rough grazing comprising moderate quality plants (Scottish Environment National Map of Scotland (2022) Soil Maps).

The James Hutton Carbon and Peatland Map has identified most of the site as within a class three peatland area. Class three is described as predominantly peaty soil with some peat soil. The vegetation is described as peatland or some peatland heath (Scotland's Soils (2023), Carbon and Peatland 2016 Map, Soil Maps).

Some smaller areas to the north of the site have been identified as within a class 5 peatland area which is described as a peat soil with no peatland vegetation present (Scotland's Soils (2023), Carbon and Peatland 2016 Map, Soil Maps).

Hydrogeology

The Proposed Scheme is underlain by a Low Productivity Bedrock Aquifer (British Geology Survey Geoindex (2022)). The aquifer is described as having small amounts of groundwater near surface weathered zones and secondary fractures, with virtually all flow through fractures and other discontinuities. No superficial deposit aquifers are present beneath the Proposed Scheme.

The majority of the Proposed Scheme lies within the Cowl and Lomond Groundwater WFD body (ID 150689), with the groundwater body having an overall status of Good in 2020 (SEPA Water Classification Hub (2015). SEPA Water Classification Hub). The northwest corner of the Proposed Scheme falls within the Oban and Kintyre Groundwater WFD body (ID 150698), which also had an overall classification of Good in 2020 (SEPA Water Classification Hub (2015)).

Historical ground investigation data showed that groundwater levels in the area are highly variable. Three rounds of groundwater monitoring were carried out between February and March 2009. The groundwater monitoring showed that groundwater levels recorded in February at the beginning of the monitoring period were generally higher than in at the end of the monitoring period in March and that they varied between 3.26 m bgl to 9.10 m bgl.

As noted in the Biodiversity section areas considered suitable to support groundwater dependant terrestrial ecosystems (GWDTE) have been identified within proximity to the Proposed Scheme.

Contaminated Land

There is no Artificial Ground (Made Ground) within 250m of the site (British Geology Survey Geoindex (2022)). However, the 2022 Ground Investigation (Jacobs (2022), Access to Argyll and Bute (A83) Report on Preliminary Ground Investigation) found Made Ground in several locations to a maximum depth of 1.80 m bgl, which was associated with the earth works along the various roads and tracks along the Proposed Scheme. The Made Ground generally comprises gravelly soils, with occasional fragments of tarmac, cobbles and boulders.

A review of historical mapping and aerial photography found no sources of land contamination linked to land use within the Proposed Scheme boundary. A disused quarry is mapped in the OS mapping presented in Figure 2, located to the northeast of the A83, in the centre of the Proposed Scheme. However, no other evidence

relating to the existence of this quarry has been found in other historical maps or aerial imagery.

A review of the Scottish Pollutant Release Inventory (SPRI) (SEPA Scottish Pollutant Release Inventory (2022). Scottish Pollution Release Inventory found no designated releases of specified pollutants to air, water or land from Scottish industrial facilities at or within 250m of the Proposed Scheme.

Material assets and waste

The following key materials are anticipated to be required for construction of the Proposed Scheme. These are estimated to be likely maximum quantities required for the Proposed Scheme.

Activity	Anticipated Maximum Material Quantity Likely Required	Material Type Required
Pavement (including Foundation)	650m^3	Asphalt and aggregate
Fencing	1,400m	Debris Flow Catch fence/ Rockfall Catch fence
Imported Fill	8,500 m^3	Debris protection bund and junction re-alignment

Table 2 – Key materials required

The Scottish Environment Protection Agency's (SEPA) Waste Sites and Capacity Tool (SEPA Waste Site Information) identifies that there are 19 landfill sites in the region of Argyll & Bute, with a total remaining capacity of 267,939 tonnes at the end of 2021. Depending on the final destination of the arisings, the appropriate SEPA exemptions and consents will be in place to ensure it is suitable for its intended purpose and has followed all appropriate regulatory process.

The following site arisings are likely to be generated during construction of the Proposed Scheme. These are estimated to be likely maximum quantities for the Proposed Scheme.

Activity	Site Arising	Disposal/ Regulation
Surfacing	200m^3 surface course	Non-hazardous inert waste
Earthworks Cut (inc Debris Protection Bund Working Platform)	5,000m^3	Non-hazardous inert waste

Activity	Site Arising	Disposal/ Regulation
Fill (reused earthworks cut)	200m^3	Reuse on site

Table 3 – Key site arisings and disposal

Noise and vibration

Within the usual operational study area for noise assessments (600m around the Proposed Scheme extents) there are two residential receptors and a small number of non-residential receptors (Site of Special Scientific Interest and footpaths). Residential receptors are:

- Laigh Glencroe (224423, 705555) is 35m west of the A83 and 100m east of the OMR. The A83 runs at a higher elevation than the property and the OMR runs at a lower elevation.
- High Glen Croe (223328, 706978) is 250m southwest of the A83 and 140m southwest of the OMR. Both roads run at a higher elevation than the property.

Daily traffic on the A83 is understood to be around 4500 vehicles per day, of which about 10% are HGV. Current traffic levels on the OMR are negligible in terms of noise generation.

Road traffic noise is expected to be the dominant noise source for baseline conditions, with levels higher at Laigh Glencroe than High Glen Croe due to the proximity of the A83.

Population and human health

The Proposed Scheme is in a rural location however there are a small number of properties on the lower flanks of Glen Croe.

There are no designated footpaths within the Proposed Scheme extents, though there is a core path (designated by the LLTNPA) in the woodland area c.350m to the west. There are also a few walking routes in the wider area, including Beinn an Lochain, Ben Donich (via the Rest and Be Thankful), and Beinn Luibhean. There are no designated cycle routes in the area, however, cyclists (and walkers) are known to use the OMR.

There is a car park at the Rest and Be Thankful which provides a parking area and viewpoint for visitors to the area.

Road drainage and the water environment

The Croe Water is the main watercourse in the vicinity of the Proposed Scheme, with a catchment draining the surrounding steep mountainous area, including the facing slopes of Beinn Ime, Beinn Luibhean, Ben Arthur, Ben Donich and The Brack.

The Croe Water passes under the A83 and the OMR before flowing south east, parallel and to the west of the OMR. The local topography results in a large number of relatively short, high energy, dynamic channels flowing into the Croe Water, which each respond rapidly to rainfall events and yield high potential for sediment supply and transport.

SEPA flood maps (SEPA Flood Maps) have classified river flooding as 'High' risk for the area adjacent to the Croe Water's main channel, with a more extensive high risk zone (10% or greater annual exceedance probability) and wider flood plain to the north west of Ben Arthur, as well as at Ardgartan, where the river discharges into Loch Long at Ardgartan.

In relation to the WFD, the Croe Water water body was classified by SEPA in 2020 as a surface water body with an overall status of 'Moderate', with ecology and water quality factors preventing attainment of 'Good' (target) status (Water Classification Hub).

Private water supplies may be present, serving local properties, plus there is potential for non-potable supplies in relation to agricultural activities.

There are no designated sites relating to the water environment in Glen Croe, including downstream.

Climate

Scotland's environment web data shows that the climate in Tarbet and Cairndow is recorded as warm and temperate (ClimateTrends). According to Koppen - Geiger classification system (Köppen Climate Classification System), this climate is classified as a temperate oceanic climate (Cfb). The average annual temperature in Tarbet is 7.0 °C and the rainfall averages 2,005 mm per year. In Cairndow, the average annual temperature is 6.8 °C and rainfall averages approximately 1,983 mm per year.

The climate in Glen Croe is expected to be similar with high volumes of rainfall throughout the year. The Climate Change (Scotland) Act (Climate Change (Emissions Reduction Targets) (Scotland) Act 2019) sets out targets of reducing greenhouse gas emissions by 100% before 2045.

Accidents and Disasters

The following factors and associated distances have been adopted in order to capture internal and external influencing factors which may have high adverse consequences on the Proposed Scheme.

Manmade features

- Airports and airfields within 13km (the legal distance of the safeguarding zone for licensed airports in the UK);
- Major Accident Hazard (MAH) and Bulk Fuel facilities within 3km (distance to furthest MAH installation centre point whose Consultation Zone (CZ) overlaps the Proposed Scheme);
- Major Accident Hazard pipelines within 1km (distance to furthest MAH pipeline whose CZ overlaps the Proposed Scheme);
- Nuclear installations within 3km (distance to The Land Use Planning Outer Consultation Zone);
- Fuel retail sites (including Liquified Natural Gas, Liquified Petroleum Gas) within 500m;
- Rail infrastructure within 500m; and
- Transmission (gas, electrical, oil/fuels) crossing the Proposed Scheme.

Natural features

- with the potential to create risks within 3km (chiefly hydrological and geological, for example dam failure and seismic activity respectively); and
- with the potential to create risks within 1km (chiefly hydrological and geological, for example flood risk and unstable ground conditions respectively).

The following internal and external influencing factors have been identified for the Proposed Scheme:

Manmade / Natural Feature	Feature	Distance and Direction from Proposed Scheme
Natural	Ground stability – landsides	Adjacent
Natural	Wildfire	Adjacent
Natural	Croe Water - flooding	Adjacent

Table 4 – Internal and External Influencing Factors

Policies and plans

This Record of Determination (RoD) has been undertaken in accordance with all relevant regulations, guidance, policies and plans, notably including the Environment and Sustainability guidance within the Design Manual for Roads and Bridges (DMRB) and Transport Scotland's Environmental Impact Assessment Guidance (Guidance - Environmental Impact Assessments for road projects (transport.gov.scot)).

Description of main environmental impacts and proposed mitigation

Air quality

Impacts

Sensitive human health and ecological receptors for the purposes of air quality assessment are defined in DMRB LA 105 as 'residential properties, back gardens, schools, hospitals, care homes, public open spaces, public access' and 'internationally, nationally and locally designated sites of ecological conservation importance on protected species and on habitats and other species identified as being of principal importance for the conservation of biodiversity'.

Air quality at sensitive human health and ecological receptors may be affected by a change in traffic flow, road alignment or dust emissions where they are located within 200m of an affected road.

There is potential for short-term construction impacts on air quality due to fugitive dust associated with on-site activities such as earthworks and laying of road surfaces, material handling and storage, and construction vehicle exhaust emissions. Emissions from the works will be properly managed through a construction environmental management plan. Therefore, there are unlikely to be significant effects at the nearest sensitive receptors.

The traffic flow on the A83 is relatively low in volume and is not expected to change significantly in composition as a result of the Proposed Scheme. Due to the remote location of the Proposed Scheme, there are only a few human health receptors within the study area, including farm buildings off the OMR and one residential dwelling between the A83 and the OMR.

Air pollutant concentrations are currently below legislated criteria for human health for the key traffic pollutants, NO_2, PM_{10} and $PM_{2.5}$. Therefore, the interventions are unlikely to have a significant effect on human health receptors within 200m of the Proposed Scheme.

The Beinn an Lochain SSSI is adjacent to the B828, which may experience additional traffic with the interventions. The SSSI contains some habitats that are susceptible to the effects of additional nutrient deposition. There will be a slight increase in nitrogen deposition as traffic is rerouted with the interventions onto the B828, however existing concentrations of NO_2 are very low therefore the intervention

should not cause a significant change in the rate of nitrogen deposition. The most sensitive bog habitat is set back from the road edge.

Mitigation

Provided good practice in terms of construction working methods and dust mitigation techniques are adhered to during the works, impacts on air quality during construction are not anticipated to be significant for human health and amenity due to the limited receptors in the area. Additional dust mitigation when working in the vicinity of ecological sites is recommended, given their proximity to the interventions.

Any impacts related to construction would be temporary (i.e. during the period of the works only) and can be suitably minimised by the application of industry standard mitigation measures in terms of dust minimisation, suppression and mitigation.

Cultural heritage

Impacts

During the construction of the Proposed Scheme, there is the potential for direct impacts on known heritage assets. Any known heritage assets within the Proposed Scheme have the potential to be altered or removed in entirety by the works. A programme of archaeological mitigation may be required prior to construction in order to mitigate the potential direct impacts on known and unknown heritage assets.

In addition, the Proposed Scheme has the potential to impact upon the setting of a number of undesignated assets. The OMR itself retains cultural heritage significance, given its age and historic use. The Proposed Scheme proposals would directly impact on this and the widening would to some degree change its character but not significantly. The area of most character is at the northern extent which would have less intervention.

It is not anticipated that there will be any significant indirect impacts on any of the assets identified, however further assessment may be required to confirm.

With the following mitigation the works are not expected to result in significant impacts on cultural heritage interests during the operational phase.

Mitigation

Provided the following mitigation measures are adhered to, impacts on heritage assets are not anticipated to be significant:

- A programme of archaeological investigations will be required prior to construction of the Phase 2 interventions in order to mitigate the potential impacts on known and unknown heritage assets. This programme of works will follow a Written Scheme of Investigation to be agreed with Transport Scotland's Archaeological Adviser in consultation with WoSAS, with the aim of preserving by record any archaeological remains encountered.

Landscape and visual effects

Impacts

During the construction phase, there will be a temporary visual impact because of vehicles and plant in the vicinity of the works. Moreover, there will be a temporary visual impact on the local landscape character however these would all be minor given the works involve alterations to the existing road.

The interventions would include the extension of the debris protection bund and geotechnical solutions to reduce debris flow including rockfall and debris fencing. These would be located within a landscape where there are currently stabilisation works being carried out and where there is existing and further proposed interventions. There will be some localised widening of road curves. Interventions such as the debris protection bund and debris fences are temporary and would be experienced in the context of the existing works on the OMR and A83, though not as large as the latter. Although the landscape is sensitive, the scale is such that the Proposed Scheme would be experienced as no greater than the existing baseline situation where the interventions which have been implemented along the OMR and A83(T) are similar in nature. For example, the existing HESCO bund is locally visually intrusive for users of the OMR but when viewed from a distance is not obvious and does not detract from the scenic experience (see Plate 4). The works to the OMR itself are not likely to have any significant detrimental visual or landscape impact particularly as the area at the northern extent is unlikely to be significantly altered. Moreover, the OMR sits lower than the A83 in the landscape. The visual and landscape impact of the associated protective and land stabilisation works will be noticeable but in the context of the existing works will not detract further for landscape and visual receptors.

Mitigation

The following mitigation measures should be adhered to during the works:

- Minimal works in the location of the iconic hairpin bends to the northern extent of the Proposed Scheme to ensure their retention;
- Careful siting of construction compounds;

- Minimise required extent of land take and vegetation removal for construction;
- Removal of any measures no longer required once the Long-Term Solution is in place (for example, the debris protection bund and debris fencing).

Plate 4 – the view south-east along Glen Croe from the Rest and Be Thankful car park. The location of the existing HESCO bund is circled.

Biodiversity

Impacts

Designated Sites

Glen Etive and Glen Fyne SPA and Loch Lomond Woods SAC are within 10km of the Proposed Scheme. There are pathways by which the Proposed Scheme could result in impacts on European sites. Consideration of qualifying features of each of the two designated sites, European otter and golden eagle, will be required as part of the Habitats Regulations Assessment.

In the absence of mitigation, impacts in terms of habitat fragmentation are possible as a result of new culverts and bridge works (otter), displacement and mortality through construction works and increased vehicular use along the OMR during the operational phase (otter and golden eagle). With embedded mitigation, however, these impacts should be non-significant.

Beinn an Lochain SSSI is located very close to the northern extent of the Proposed Scheme. Given that the SSSI is at a greater altitude than the Proposed Scheme and there are no hydrological pathways, it is not anticipated that there will be any significant impacts to this site from the localised works to the OMR during the construction phase or during the operational phase.

Habitats

Terrestrial habitats

Several Annex I and SBL priority habitats were noted, as well as areas considered suitable to support GWDTE (see Mitigation section within the Geology and Soils section below (Hydrology for GWDTE information)). It is anticipated that small, localised areas of habitat will be permanently lost to facilitate the works (e.g. areas of localised widening on bends and installation of new bund) and other areas are likely to be temporarily lost, e.g. to facilitate establishment of temporary works areas). Habitat losses are not considered likely to be significant due to the small scale and localised nature of the works, and abundance of similar habitats in the wider area. In addition, large parts of the Proposed Scheme are situated within lower value habitat such as semi-improved grassland (grazing land). In the absence of mitigation, impacts in terms of habitat deterioration are possible as a result of run off/pollution/sediment deposition during construction, and also through increased vehicular use along the OMR during the operational phase. With embedded mitigation, however, these impacts should be non-significant.

Aquatic habitats

There is potential for impacts to watercourses (and associated fish, aquatic invertebrate and macrophyte assemblages) mediated through potential water quality and sediment transfer impacts associated with construction activities. Further information on potential impacts to watercourses is provided in the Road Drainage and the Water Environment section.

Protected and Priority Species

There is potential for impacts to a number of protected and priority species including:

- Localised direct loss of wildlife habitats;
- Fragmentation and isolation of habitats;
- Mortality and injury to species; and
- Temporary disturbance and displacement to species from noise, light or other visual stimuli.

Bat, otter and pine marten resting sites and individuals may be affected directly and indirectly during construction, as a result of proposed works such as culvert/bridge upgrades, maintenance and localised road improvements and widening. Works may result in the loss of suitable habitat (loss of bat roosts) and disturbance to these species. During the operational phase with increased motor use on the OMR, impacts may include increased mortality and species displacement for a time, prior to returning to historic use. The general construction mitigation measures outlined below, if adhered to, should ensure no significant impacts to these species groups.

Breeding birds, including black grouse, golden eagle, barn owl and the general assemblage of breeding species may be affected by the Proposed Scheme during both construction and operation. Habitat loss is not considered likely to cause any significant impacts due to the localised nature of the works and their very close proximity to the existing carriageway. The general construction mitigation measures outlined below, if adhered to, will ensure no offences with regard to damage to active nests or any eggs or young are caused. Disturbance and/or displacement impacts are considered possible. However, no significant impacts are considered likely if the embedded mitigation measures are adhered to.

Based on the information currently available on reptiles, terrestrial invertebrates and Schedule 1 birds it is not possible to wholly assess impacts to these species groups. However, following the general construction mitigation measures outlined below should ensure no significant impacts to these species groups.

Although badger and wildcat are unlikely to be affected by the Proposed Scheme, vigilance should be maintained, and mammal mitigation measures should be adhered to, to protect animals commuting through the site during construction.

A full data consultation and further surveys for protected and priority species will be undertaken to inform the Proposed Scheme. Following further desk-based assessments and survey work, the above assessments will be updated if required and appropriate mitigation measures will be confirmed.

Licensing

- A licence may be required for roosting bats (including the bat roost located in a bridge which forms part of the OMR). Additional survey/monitoring is required to inform if a licence will be required for otter, pine marten and red squirrel.
- The appropriate licenses will be obtained under The Water Environment (Controlled Activities) Regulations 2011 (CAR) for any works affecting the water environment (see Road Drainage and the Water Environment section).

Mitigation

The following general mitigation measures will be adhered to during the works:

- Design measures for the Proposed Scheme will minimise land take where possible;
- Temporary works areas will be reinstated on a like-for-like or better basis;
- An Ecological Management and Mitigation Plan (EcMMP) will be created which will detail the ecological mitigation for the Proposed Scheme, including measures to protect retained features from indirect impacts such as fencing. This would be applied in conjunction with the measures in the Construction Environmental Management Plan (CEMP), which will include general environmental measures such as pollution control. The EcMMP will cover working methods to avoid harm to species which may be found within the works footprint, including bats, badger, birds, otter, pine marten, wildcat and reptiles;
- Material storage areas and site compounds will be sited sensitivity to avoid the requirement for additional land-take (these areas will also be subject to pre-construction surveys);
- Excavations will be filled or covered overnight, or ramps (such as wooden boards) provided at no greater than a 45° angle to allow animals to escape. This will avoid the accidental trapping of animals (should they be present within the Proposed Scheme);
- Exposed pipes will be capped if left attended if they are in locations where there is a risk of animals becoming trapped;
- Where possible, vegetation clearance will be minimised and undertaken outside the core bird nesting season (1 March to 31 August, though it should be noted that variation in dates is possible, for example from geographical variations in climate, or due to a particularly mild winter) to avoid damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection of vegetation to be cleared for breeding birds and their occupied nests by a suitably qualified ecologist no more than 24 hours prior to any works being undertaken. If any nesting birds are identified during the survey they will be left in situ for their entire nesting period and alternative approaches to the work proposed. This may include leaving an exclusion zone around the nests to avoid disturbance;
- Pre-construction protected species surveys and any required monitoring will take place;
- Any temporary lighting will be directed towards areas of construction and will not shine on adjacent areas; and
- Further mitigation specific to protected species would be defined following any further survey/desk-based assessment, the HRA (as detailed in the Impacts section above) and correspondence with NatureScot. Mitigation could include, if required, works under appropriate licences.

Geology and soils

Impacts

Geology and Soils

The works are to involve the removal of some of the underlying geology and soils and subsequently would impact the places where soil and geology is removed. The soils along the Proposed Scheme are predominantly Peaty Podzols, the removal and excavation of which may result in the release of stored carbon. As the site works are to only involve upgrade to the existing road rather than the creation of a new road, the risk to the underling soil is considered to be low.

The Proposed Scheme will have geotechnical interventions that will make the OMR more resilient, through improving debris protection bunds and rockfall fencing as a result this would have a low impact on the soil and geology of the site.

The number of measures to provide resilience would not be significant and are not particularly sensitive in terms of soils or geology, and with the appropriate scale of mitigation, significant impacts could be avoided.

Hydrogeology

Geological logs from the 2022 ground investigation (Jacobs (2022), Access to Argyll and Bute (A83) Report on Preliminary Ground Investigation) showed that the east of the Proposed Scheme is underlain by Glacial Till comprising Diamicton, while the west has no mapped superficial deposits (British Geology Survey Geoindex (2022), BGS GeoIndex). No significant sources of contamination have been identified on or in close proximity to the Proposed Scheme. The site is underlain by a Low Productivity Bedrock Aquifer. Based on the geological conditions at the site and the lack of identified sources of contamination there is likely to be a low risk to groundwater from the construction of the Proposed Scheme.

Historical ground investigation data from the site recorded groundwater levels between approximately 3 and 9 m bgl. Based on the proposed works and the recorded groundwater levels in the area there is likely to be a low risk of groundwater flooding from construction of the Proposed Scheme. However, further review of existing groundwater data should be carried out once the Proposed Scheme design has been finalised. If dewatering is required as part of the works then abstraction and discharge permits may be required,

The NVC assessment has identified a number of areas with the potential to support GWDTEs, some of these are in close proximity to the localised works. It is recommended that further investigation of potential GWDTEs is carried out to better understand the potential impacts from the construction works.

Contaminated Land

Despite the British Geological Survey Geoindex (BGS GeoIndex) not mapping any Made Ground on site, the 2022 Ground Investigation (Jacobs (2022), Access to Argyll and Bute (A83) Report on Preliminary Ground Investigation) identified Made Ground, associated with the construction of the road and tracks, across the Proposed Scheme to a maximum depth of 1.8 m bgl. As such, there is the potential for contamination to be present across the Proposed Scheme. However, the risk of contaminated land is considered to be low due to the nature of the Made Ground previously encountered and the nature of the development.

The operational scheme will incorporate hardstanding and it is unlikely that current and future road users will come into contact with the underlying soils and potential contamination. As the current and future workforce of the Proposed Scheme will be required to break ground and may therefore come into contact with the underlying soils, health and safety risks should be considered in regard to contaminated soils during construction.

Mitigation

The following mitigation measures will be provided to minimise the impact on geology and soils, groundwater and contaminated land. However, whether this would fully mitigate the impact are dependent on the scale of contamination present on site.

Geology and Soils

The following mitigation measures are proposed to minimise the impact on geology and soil:

- The Contractor will produce a Soils and Materials Management Plan (SMMP) which will set out the measures required for the retention of material on site as well as the protection of geological features. The SMMP will also detail measures relating to soil excavation, compaction and the stockpiling of materials.

Hydrogeology and Contaminated Land

- The Contractor will produce a CEMP and SMMP which will detail measures for the protection of the underlying hydrogeology, as well as measures to minimise the impact of contaminated land.

Material assets and waste

Impacts

During construction there will be a requirement for bulk construction materials which would lead to resource depletion particularly of virgin materials.

During construction, there are potential impacts in terms of waste. Given the proposed level of cut (4,800m^3), anticipated to be sent off-site for disposal, it is unlikely that that this will have an adverse effect on remaining landfill capacity in the region.

Mitigation

Materials will be sourced from recycled or reused origin where practical within the design requirements. Even where this is not possible it is not considered that this is likely to have any significant effects.

It is anticipated that any surplus arisings will be sent to a local quarry for processing into useable fill material for use on other schemes

Provided the following mitigation measures are followed during the course of the works, impacts during construction are not anticipated to be significant:

- A SMMP, and a Site Waste Management Plan (SWMP) will be put in place and adhered to by the contractor. These documents will set out the measures to be implemented to minimise waste and the management of materials throughout the construction of the interventions.

Noise and vibration

Impacts

The Proposed Scheme interventions are expected to cause temporary noise and vibration impacts. In line with DMRB LA 111 *Noise and Vibration* study areas, distances of 300m for noise and 100m for vibration are normally sufficient to encompass sensitive receptors potentially affected.

As the Proposed Scheme interventions will not change the traffic flows and will not alter how the A83 and OMR are used, operational noise impacts are not expected.

Mitigation

Impacts from construction will be controlled by the adoption of best practicable means (BPM), as defined in Section 72 of the Control of Pollution Act. This includes the adoption of the advice contained within BS 5228 ‘Code of practice for noise and vibration control on construction and open sites’, Part 1 Noise and Part 2 Vibration.

No operational road traffic noise impacts are expected, therefore, no mitigation is proposed.

Population and human health

Impacts

There are two residential properties within the Glen Croe corridor. Due to the general lack of screening in the area, construction noise is likely to be audible to visitors at the Rest and Be Thankful viewpoint and potentially other hillwalkers and cyclists in the area. Noise during operation of the road is unlikely to be significant, given that the Proposed Scheme would not increase traffic in the area but instead provide an alternative to the A83.

There are some agricultural buildings adjacent to the OMR. The widening of the OMR would not directly impact on these.

During construction, there is the potential for a temporary impact on pedestrians and cyclists, but impacts are unlikely to be significant as their numbers are likely to be low. Pedestrians at the Rest and Be Thankful viewpoint will be unaffected due to the distance of the viewpoint from the works.

The A83 is an important route for the communities and industries at the western extent of Argyll and Bute. The closure of the A83 therefore has a detrimental impact on these communities and the economy of this area. The provision of a medium-term solution to ensure a route is always available for these communities and businesses, even when the A83 is closed and until the permanent solution is implemented, would have a significant benefit to the wider population. The provision of this route would also ensure greater retained connectivity to resources, community facilities and amenities and more easily allow local communities to visit family and friends, as well as provide greater resilience to the provision of emergency services in the wider area.

The land on the lower slopes of Glen Croe is currently used for grazing and the Proposed Scheme proposals would lead to the loss of some of this through the widening of the OMR. The loss of this would be linear and not significant and would

not substantially reduce the workability of the agricultural fields or the viability of farming operations.

During operation, there will be a beneficial impact on safety for vehicular travellers and non-motorised travellers due to the reduced risk of impact from landslide events. Traffic dynamics will remain unchanged during the operational phase and will not result in significant impacts as a result of noise or vibration. Minimising the loss of agricultural land will also help reduce any impact on the existing land uses.

Mitigation

Provided the following mitigation measures are followed during the course of the works, impacts during construction are not anticipated to be significant:

- The Principal Contractor will develop a Community Engagement Plan (particularly for local residents) to keep them informed of the work and likely disruptions. This will include the methods in which the local and surrounding community will be engaged and contact details for key site management. Local Transport providers will also be informed and using their information dissemination facilities to help inform local communities of any disruption to public transport. Local Rescue Services (Police, Fire, Ambulance and Mountain Rescue) will also be kept informed.
- Access will be maintained for the two residential properties and agricultural buildings at all times. Any loss of access to agricultural holdings to be discussed with the landowner.
- Work during hours of darkness will be avoided as far as practicable, and where necessary, directed lighting would be used to minimise light pollution/glare. Lighting levels would be kept to the minimum necessary for security and safety.
- Ensure the Traffic Management Plan includes for maintaining safe access to walking routes (including for cyclists) during construction and operation. Advance notice to local rambling, cycling or horse-riders clubs and relevant officers in the Local Authority and Local Tourist Office.
- Clear signage to be provided at all times – both for motorised users and Walkers, Cyclists and Horse-riders (WCH). Signs to be placed along walking routes at least one month in advance of works. These signs would note the potential for the works to startle horses and horse riders are to proceed with extreme caution.
- Minimise land take for construction (including those areas of temporary land take for compounds etc.) where possible, with careful consideration to be given to the phasing of land take for construction works to enable early release of land and thereby minimise the extent of disruption. Fencing and reseeding of any agricultural land will be provided as soon as possible.

Road drainage and the water environment

Impacts

There is the potential for an impact on water quality, during construction, as a result of potential spillage of fuels, oils and mobilisation of silt. The proposal also includes a number of culverts and bridge alterations within Glen Croe which have the potential to affect flood risk and water quality of the Croe Water during the construction phase, including possible adverse effect on sensitive receptors downstream.

Runoff from the OMR will likely be discharged to the Croe Water or tributaries, with potential contaminants including sediment and dissolved metals.

The installation of culverts and also additional permanent bunding and debris flow barriers upslope of the OMR has the potential to alter flow pathways and sediment transport patterns, individually and cumulatively within the Croe Water catchment during the operational phase. This could influence deposition and scour processes in and adjacent to installed culverts for a number of small, high energy tributary channels. Debris flow barriers, placed across watercourses, have the potential to incrementally accumulate bed material and debris. If this material is left to build up behind the fence there is the potential for the fence to be outflanked by the watercourses due to greater bank erosion, affecting the resilience of the debris fence and the OMR.

Mitigation

The design of the culverts and bridge crossings will ensure that the flood risk to the Proposed Scheme and adjacent areas are not increased by the proposals.

Provided the following mitigation measures are adopted during the delivery and lifespan of the Proposed Scheme, impacts during construction and operation are not anticipated to be significant:

- The hydraulic capacity of cross drainage and hydraulic structures shall either be retained or increased to convey the 2% annual exceedance probability (equivalent to a 50 year return period) design flow.
- All on-site activities will adhere to and implement appropriate measures based on SEPA Guidance for Pollution Prevention (GPP) and Pollution Prevention Guidelines (PPGs), plus other applicable good practice guidance, including specific controls for hydrocarbon, sediment and runoff management;
- The Water Environment (Controlled Activities) Regulations 2011 (CAR) requires licences to be sought for design and construction activities affecting watercourses including engineering works (culverts and bridges) and discharges (outfalls, attenuation and treatment);

- Mitigation measures to address the fluvial geomorphological processes and impacts and maximise sustainability of the Proposed Scheme will be implemented. Likely measures include installing catch pits upstream of culvert crossings, providing scour pools or bed protection at the outlets and bank protection where these are considered necessary and significant landscape and visual impacts can be avoided. Realignments of watercourses will be minimised. Planting to stabilise the hillside and reduce the sediment supplied to the watercourses will also be considered. Maintenance of the debris fences will ensure that bed material and debris build-up will be routinely managed/removed. Ideally the maintenance regime would include keeping a record of the date/frequency of the maintenance and the volumes of material/debris that is removed/repositioned.
- The Contractor will be required to provide a detailed Construction Method Statement which will include proposed mitigation measures for specific activities including any requirements identified through the pre-CAR consultation process;
- A surface water quality monitoring plan should develop site specific monitoring protocols during the construction phase and be included as part of the CEMP and risk assessment methods statements;
- Element of the Proposed Scheme is anticipated to require a Construction Site Licence from SEPA, with associated approvals prior to commencing construction;
- Operational runoff from the Proposed Scheme shall be appropriately attenuated, and treated, in accordance with the Design Manual for Roads and Bridges or as otherwise agreed with SEPA and the local authority, taking into account traffic data, impermeable area, rainfall and receiving waterbody characteristics; and
- Maintenance of installed structures and design features shall be undertaken to ensure appropriate attenuation, drainage patterns and treatment occurs throughout the operational phase.

Climate

Impacts

There is potential for greenhouse gas emissions through the use of machinery, vehicles and materials used (containing recycled and virgin materials) during construction.

The proposed works are not expected to result in an increase in greenhouse gas emissions during operation of the Proposed Scheme as there will be no significant change in traffic volumes at this location, with this road only operational when the A83 is closed.

Mitigation

Provided the following mitigation measures are followed during the course of the works, impacts are not anticipated to be significant:

- local suppliers will be used as far as practicable to reduce travel time and greenhouse gas emitted as part of the works;
- Where feasible, carrying out measures to reduce GHG emissions from material use and waste, including:
  - The sustainable re-use of soil and aggregate materials won from excavation;
  - The re-use, where possible of materials and waste generated from construction works;
  - The use of materials with lower embodied carbon, such as those with a higher recycled content.
  - Procuring locally sourced materials where reasonably practicable;
  - Careful consideration of material quantity requirements to avoid over-ordering and generation of waste materials, while also reducing transportation-related emissions.

The appointed contractor will develop and implement a plan to reduce energy consumption and GHG emissions throughout construction, including, for example:

- Monitoring of fuel use on-site;
- Training of plant operatives in fuel efficient driving techniques;
- Consideration of renewable/ and or low carbon energy sources.

Climate Vulnerability

Impacts

Construction

Adverse impacts on construction activities could occur during extreme weather, these include:

- During a heatwave or drought the construction programme may need to be reviewed with those activities that are less vulnerable to the hot weather, or need less water, being prioritised.
- Heavy rain could cause flooding that inundates the site or construction compounds. It may also prevent access to the site and/or disrupt supply chains for construction materials.

- During fog, lightning or high winds it may not be possible to work safely, for example operating tall cranes or erecting scaffolding.
- Extreme weather can increase landslide risk which could increase safety risk to construction workers.

Operation

Potential operational impacts on the Proposed Scheme's assets:

Road surfaces and pavements:

- Warmer winters could reduce winter maintenance and associated traffic disruption (less road salting and freeze thaw damage).
- Hotter summers could damage materials (rutting, shrinkage and expansion) increasing maintenance requirements and associated traffic disruption.
- Heavier rain and wetter winters could increase pot hole formation (by weakening the soil beneath the carriageway) increasing maintenance requirements and associated traffic disruption.

Structures (including embankments, earthworks and bridges):

- Hotter summers could reduce the asset lives of structures (over expansion and buckling) increasing maintenance requirements and associated traffic disruption.
- Climate change could cause soil instability by increasing the risk of: subsidence, high groundwater levels (affecting earth pressures), heave, soil washout and soil saturation. This could increase maintenance requirements and associated traffic disruption.
- Larger storm events could increase scour around the Proposed Scheme's assets and increase maintenance requirements.

Drainage infrastructure:

- Drier summers in combination with hotter temperatures could dry out soils and so increase erosion. This may cause increased sedimentation within the Proposed Scheme drainage infrastructure that reduces its drainage capacity and so increases the risk of flooding which causes traffic disruption. Additional maintenance work to prevent flooding may also cause traffic disruption.
- Heavier rain and wetter winters could increase the risk of pluvial or surface flooding. Flooding and additional associated maintenance requirements could both cause traffic disruption.
- Warmer winters could reduce freeze thaw erosion which can damage underground assets. Reducing maintenance requirements and associated traffic disruption.

Road technology and street furniture:

- High winds in more regular storms could overload small structures and signage and damage roadside planting and furniture. Repair and maintenance may cause traffic disruption.

Landscaping:

- Drier summers could damage the Proposed Scheme's landscaping. More regular maintenance may cause traffic disruption.

Potential operational impacts on the Proposed Scheme's end users (driver experience):

- The Proposed Scheme will significantly reduce the roads vulnerability to landslide risks, improving safety for drivers and reducing delays.

Mitigation

Mitigation for climate vulnerability will first seek to avoid impacts and then, where this is not possible, to minimise them and/or reduce their adverse consequences to acceptable levels. It should be noted however, that not all climate impacts will be adverse and some could be realised regardless of whether or not the Proposed Scheme goes ahead.

Construction impacts relating to extreme weather would be mitigated by adherence to best practice, for example undertaking construction risk assessments and implementation of severe weather plans and emergency response plans.

During its operation, the Proposed Scheme will include a wide range of climate vulnerability mitigation measures which will primarily be embedded into the design. These will include:

- Specifying appropriate material quality standards;
- Undertaking appropriate ground investigations and slope-stability analysis
- Including climate change allowances in the drainage design

Accidents and Disasters

Impacts

A review of major event categories has been undertaken. It has been identified that during construction and operation the Proposed Scheme will potentially be vulnerable to major accidents and/or disasters associated with landslides, fluvial flooding and wildfires.

Mitigation

Provided the following mitigation measures are adhered to, the vulnerability of the Proposed Scheme to major accidents and/or disasters should be managed to be as low as reasonably practicable (ALARP):

- The provision of appropriate ground stabilisation and retention measures to prevent land movement and landslip affecting the OMR.
- The design of culverts and bridge crossings will ensure that the flood risk to the Proposed Scheme and adjacent areas are not increased by the proposals.
- Constructing and managing the Proposed Scheme in accordance with:
  - Environmental, Health and Safety Management systems;
  - Supplier management environmental health and safety standards (e.g. Construction Skills Certification Scheme);
  - Risk management systems; and
  - Construction and Environmental Management systems (including a CEMP).

Assessment cumulative effects

In terms of cumulative effects with other development or projects, the only other project in the area are the works ongoing by Transport Scotland's Operating Company on the A83. The on-going work to provide resilience measures for the A83 combined with the rock fall and retentions measures as part of the Scheme, are not considered to result in significant cumulative effects.

This proposal is considered a Medium-Term Solution which could see the removal of elements such as the debris protection bund following the completion of the Long-Term Solution.

Assessments of the environmental effects

As detailed in the Description of Main Environmental Impacts and Proposed Mitigation section, there are no significant effects anticipated on any environmental receptors as a result of the Proposed Scheme.

Statement of case in support of a Determination that a statutory EIA is not required

This is a relevant project in terms of [section 55A(16)] of the Roads (Scotland) Act 1984 as it is a project for the improvement of a road, and the completed works (together with any area occupied by apparatus, equipment, machinery, materials, plant, spoil heaps, or other such facilities or stores required during the period of construction) exceed 1 hectare in area. The works are also situated in whole within the Loch Lomond and the Trossachs National Park, which is a sensitive area within the meaning of regulation 2(1) of the Environmental Impact Assessment (Scotland) Regulations 1999.

The project has been subject to screening using the Annex III criteria to determine whether a formal Environmental Impact Assessment is required under the Roads (Scotland) Act 1984 (as amended by The Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017). Screening using Annex III criteria, reference to consultations undertaken and review of available information has not identified the need for a statutory EIA.

The project will not have significant effects on the environment by virtue of factors such as:

Characteristics of the scheme:

- realignment of approximately 250m of existing road to reduce the risk of flooding and maintain the road as passable during a higher return period.
- inclusion of geotechnical solution to reduce the risk and impact of debris flow and boulder risk impact the OMR, including extension to the existing debris protection bund and additional debris and rock fall fencing.
- maintenance and localised improvement to existing drainage network including clearing out ditches and channels.
- localised widening on curves to improve the swept path of HGV traffic;
- culvert strengthening, replacement, extension, headwalls; and

- bridge remedial works and maintenance to accommodate trunk road traffic.

Location of the scheme:

- The scheme lies wholly within the LLTNP.
- The scheme lies c.30m from the Beinn an Lochain SSSI and is c.2.5km from the Glen Etive and Glen Fyne SPA.
- The current land use is primarily rough grazing for livestock with the habitat in the immediate area surrounding the Proposed Scheme comprising grazed upland heathland.
- The scheme does not lie within any sites designated for significant historical, cultural, or archaeological significance. The OMR however has some cultural significance itself but has no formal designation.

Consultation:

An Environmental Steering Group has been set up for the Access to Argyll and Bute project and the following have contributed to the various proposals discussed as part of this:

- NatureScot;
- Historic Environment Scotland (HES);
- Loch Lomond and The Trossachs National Park Authority (LLTNPA);
- Scottish Forestry;
- Argyll and Bute Council;
- Scottish Environment Protection Agency (SEPA)

Characteristics of potential impacts of the scheme:

- No significant impacts on any features of cultural heritage interest are anticipated.
- Impacts on air quality or noise levels would be temporary during the construction period and controlled through the application of a CEMP. No operational impacts predicted to occur. Significant impacts are not predicted to occur.
- There will be a small loss of some habitats as a result of works to construct the Proposed Scheme however it is not predicted that this habitat loss, or any impacts to protected species or designated sites would result in any significant effects with the application of the mitigation measures set out.
- There is potential for an impact on water quality during construction as a result of potential spillage of fuels, oils and mobilisation of silt. However, with pollution prevention measures in place, this risk is considered to be negligible.

- It is not predicted that significant effects would occur to landscape and visual receptors with the intervention not predicted to compromise the surrounding landscape or visitors' experience of it.
- During construction, there will be a temporary impact as a result of materials and waste. Topsoil will be re-used as far as possible on site.

References of supporting documentation

An EIA Screening Assessment (Atkins WSP Joint Venture (2023), A83AAB-AWJ-EGN-MTS_MB0-RP-LE-000001) has been undertaken and informed the content of this Record of Determination.

Given the nature and scale of the works to construct and operate the Proposed Scheme it has been demonstrated through the application of standard mitigation as set out within this Record of Determination that a statutory EIA is not required for the MTS works to the OMR.

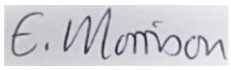
Determination

I have determined that an EIA ~~is~~/is not* required for this project.

Environmental Advisor

NAME: Elizabeth Morrison

POSITION: Transport Scotland Environmental Advisor

SIGNATURE: 

DATE: 8/11/23

Authorisation to publish Notice of Determination, acting on behalf of Scottish Ministers:

NAME: Morna Cannon

POSITION: Interim Director Low Carbon Economy

SIGNATURE: 

DATE: 12/12/2023

**Delete as appropriate*

Annex A

"sensitive area" means any of the following:

- land notified under sections 3(1) or 5(1) (sites of special scientific interest) of the Nature Conservation (Scotland) Act 2004
- land in respect of which an order has been made under section 23 (nature conservation orders) of the Nature Conservation (Scotland) Act 2004
- a European site within the meaning of regulation 10 of the Conservation (Natural Habitats, &c.) Regulations 1994
- a property appearing in the World Heritage List kept under article 11(2) of the 1972 UNESCO Convention for the Protection of the World Cultural and Natural Heritage
- a scheduled monument within the meaning of the Ancient Monuments and Archaeological Areas Act 1979
- a National Scenic Area as designated by a direction made by the Scottish Ministers under section 263A of the Town and Country Planning (Scotland) Act 1997
- an area designated as a National Park by a designation order made by the Scottish Ministers under section 6(1) of the National Parks (Scotland) Act 2000.

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