

15. Population and Human Health

15.1. Introduction

15.1.1. This chapter reports the outcome of the assessment of Population and Human Health impacts associated with the construction and operation of the Proposed Scheme. While summaries are provided here, reference should also be made to Volume 4, Appendix 15.2 Population and Human Health Methodology for more detail in respect of the assessment methodology used and Volume 4, Appendix 15.3 Population and Human Health Baseline which provides more detail in respect of baseline information.

15.2. Approach and Methods

15.2.1. Volume 4, Appendix 15.2 Population and Human Health Methodology sets out the assessment methodology adopted for the assessment of the anticipated impacts on population and human health. It is noted that while ‘population’ and ‘human health’ are considered together and are complimentary, they are assessed separately, with a slightly different methodology taken in relation to consideration of population and its assets, to that taken when considering impacts on human health.

15.2.2. In terms of population / land use, the [Design Manual Roads and Bridges \(DMRB\) LA 112](#) sets out the requirements for assessing and reporting the environmental effects on population from construction, operation, and maintenance of roads projects. Professional judgement is also used to guide the assessment. The guidance requires reporting on the following elements:

- private property and housing
- community land and assets
- development land and businesses
- agricultural land holdings and
- walkers, cyclists, and horse-riders (WCH).

- 15.2.3. In relation to human health, DMRB LA 112 sets out the requirements for assessing and reporting the environmental effects on human health for construction, operation, and maintenance of roads projects. While regard is made of these requirements, it must be borne in mind that DMRB LA 112 provides a means to derive a human health outcome category and provides no mechanism to derive significance of effect.
- 15.2.4. In order to remain compliant with the requirements of [The Roads \(Scotland\) Act 1984 \(Environmental Impact Assessment\) Regulations 2017](#) (SSI 2017 No.137), in addition to DMRB LA 112, consideration is also made of The Institute of Environmental Management and Assessment (IEMA) Guide To '[Determining Significance for Human Health in Environmental Impact Assessment](#)' which sets out the requirements for assessing the direct and indirect effects, in an appropriate manner, of a proposed development on human health (including potential impacts / effects on physical, mental, and social wellbeing).

Study Area

- 15.2.5. Within DMRB LA 112, in terms of Land Use and Accessibility, there is a requirement for the study area to be based on the construction footprint / Proposed Scheme boundary (including temporary land take) plus a 500m area surrounding the Proposed Scheme Boundary as shown on Volume 3, Figure 15.1 Population and Human Health Receptors.
- 15.2.6. In relation to human health, DMRB LA 112 notes that the study area should be based on the extent and characteristics of the Proposed Scheme and the communities / wards directly and indirectly affected by the Proposed Scheme. Therefore, the population of the wider region has been considered for the population and human health study area. This includes the area within which the local and regional National Health Service (NHS) organisations operate.

Method of Baseline Collection

- 15.2.7. In line with DMRB LA 112 the process for developing the baseline comprises the following:
- desk based data collection
 - spatial data mapping and
 - consultation.
- 15.2.8. Where available, publicly available data such as census data and Health Profile reporting has been used to inform the baseline. Consideration has been made of the following:
- Scottish Government statistics
 - Public Health Scotland statistics
 - Scottish Public Health Observatory datasets
 - Local Authority reporting across the Loch Lomond and the Trossachs National Park (LLTNP) relevant to population and human health
 - Argyll and Bute Local Authority area as a whole (including for example Local Authority Profiles and data sourced from Joint Strategic Needs Assessments and Joint Strategic Plans) and
 - information at Data Zone level.
- 15.2.9. This is supplemented with Ordnance Survey (OS) Geographic Information System (GIS) data. While undertaken separately, the findings of the Agricultural Impact Assessment (AIA) and Walking Cycling Horse Riding Assessment Reports (WCHARs) are also incorporated with this chapter. For full details of the baseline see Volume 4, Appendix 15.3 Population and Human Health Baseline.

Consultation

- 15.2.10. In terms of consultation, and in line with relevant IEMA Guidance the following bodies were invited to comment as part of the wider consultation process on the Proposed Scheme proposals:
- Public Health Scotland
 - Argyll and Bute Council and
 - ScotWays.
- 15.2.11. No substantive issues were raised by the above bodies though ScotWays provided information regarding WCH routes which have been incorporated into this assessment. As part of the WCHAR and through wider stakeholder engagement exercises, consultation has also been undertaken with:
- Sustrans
 - Argyll and Bute Council
 - British Horse Society
 - Paths For All and
 - Loch Lomond and The Trossachs National Park Authority (LLTNPA)
- 15.2.12. A Land Interest Questionnaire (Volume 4, Appendix 15.5) was issued to relevant landowners in the area and detailed discussions have taken place between the design team and landowners. These discussions are confidential though relevant issues have been considered in this assessment.

- 15.2.13. To deliver on the various BNG and natural capital policy requirements, two approaches have been followed. First, habitat creation and enhancement of retained habitats on-site within the Proposed Scheme's Improvements to the LTS land take areas, the design for which has been prepared in collaboration with the Landscape design team. Secondly, the identification of enhancement sites in proximity to the Proposed Scheme. Sites were identified through consultation with Forestry and Land Scotland (FLS) as one of the main landowners in the area local to the Proposed Scheme. Proposals for each enhancement site were developed, in consultation with FLS to achieve biodiversity enhancements and minimise potential natural capital adverse effects. These enhancement sites have been included within the Proposed Scheme Boundary.
- 15.2.14. Early engagement with community stakeholders has also been undertaken via the wider community engagement being completed as part of the Proposed Scheme. Responses made and information provided from all consultation has been used to inform this assessment. Please see Chapter 6, Consultation and Scoping for further information. Note that responses made through the wider consultation process, as well as the early engagement with community stakeholders, alongside consultation for specific elements such as WCHAR, were used to inform the development of this population and human health assessment.

Assessment Methodology

- 15.2.15. LA 112 provides a means to derive a human health outcome category and provides no mechanism to derive significance of effect which is a requirement of the EIA Regulations. In order to address this gap, IEMA Guide To 'Determining Significance for Human health in Environmental Impact Assessment' has been used to set out the requirements for assessing the direct and indirect effects, in an appropriate manner, of a proposed development on human health. See Volume 4, Appendix 15.2: Population and Human Health Methodology for full methodology.
- 15.2.16. In meeting the requirements of both DMRB LA 112 and IEMA, the methodology sets out linkages between the IEMA wider determinants of health and DMRB LA 112 community aspects. Please see Table A15-2.1, Volume 4, Appendix 15.2: Population and Human Health Methodology for further details.

Limitations of the Assessment

- 15.2.17. Consideration of population and human health in scheme assessment is typically concerned with the population as a whole, or with groups (particularly those considered vulnerable) within it. Due to the low numbers of population directly within the study area, care has been taken to ensure that no individuals can be identified for privacy reasons. This has the limitation of making the assessment necessarily generic in part and limits the ability to describe indicative criteria for determining significance of impact. While no specific surveys were considered necessary, noting the assessment already benefits from WCHAR and AIA, it is to be recognised that due to the low numbers of people, specific surveys would also be considered disproportionate as effects would be discussed directly with sensitive receptors. Nevertheless, it is considered that the assessment remains robust in terms of consideration of population and applicable groups as a whole.
- 15.2.18. As noted, DMRB LA 112 provides for a health outcome, though it does not assign significance to this. This has required use of a separate piece of guidance (IEMA) to allow identification of significance. Where applicable, both assessment findings are presented. As such, it is considered that the assessment meets the requirements of both DMRB and IEMA guidance.
- 15.2.19. It is possible that the Appointed Contractor may require construction compounds to be located out with land identified in the Proposed Scheme. Should construction compounds be located out with the Proposed Scheme Boundary it will be the responsibility of the Appointed Contractor to assess the environmental impacts of the construction compounds and seek to mitigate these where possible.
- 15.2.20. Referenced baseline information and data which has been accessed from a variety of publicly available sources is correct at the time of publication.
- 15.2.21. The [Land Reform \(Scotland\) Act 2003](#) grants rights of responsible access on and over most land. It is therefore acknowledged that additional areas of privately-owned land within the study area may be used by walkers, cyclists and horse-riders.

15.2.22. The nature of the scope of the chapter topic requires objective and subjective (qualitative) assessments to be made of predicted impacts although quantitative assessment methods have been used where practicable.

15.3. Baseline Conditions

15.3.1. The complete set of baseline conditions can be found in Volume 4, Appendix 15.3: Population and Human Health Baseline. From a review of the population and human health baseline for Argyll and Bute Local Authority as a whole, as well as data from within this area (e.g. Ward level data), it has been possible to identify a number of groups within the population and communities of Lomond North ward, who, along with the population as a whole (wider groups) could be considered vulnerable in terms of their health and wellbeing. In addition to wider groups (adults and working people) vulnerable groups identified are summarised follows:

- families with children and adolescents (pregnant women, babies, children and adolescents)
- people who are physically or mentally disadvantaged (elderly people, people with physical disabilities, people with other health problems or impairments) and
- people who are materially disadvantaged.

15.3.2. Full explanation regarding the identification of vulnerable groups is captured in Volume 4, Appendix 15.3: Population and Human Health Baseline.

15.3.3. In addition to the population groups noted above, within the immediate study area, sensitive receptors have been identified in respect of land use and accessibility as follows:

- private property and housing – two private residences, both located approximately 270m from the Proposed Scheme (Laigh Glencroe (dwelling) and High Glencroe (dwelling))
- community land and assets – including the Rest and Be Thankful Car Park / Viewpoint and bus turning area

- agricultural land holdings – fields of improved and semi-improved pasture, agricultural outbuildings, small areas of forestry plantation and moorland / rough grazing. This has been quantified as Farm Holding No.1, Upland Estate No.1 and No.2 and Forestry Holding No.1
- WCH – please see Table 15.3.2 of Volume 4 Appendix 15-3. Note there are a number of walking routes in the area including the LLTNP Core Path (running immediately adjacent south the Croe Water), the OMR itself, and a Hill Walking Route (immediately adjacent north of the Croe Water) where they meet the A83. There are also paths leading to Beinn Luibhean and
- development land and business was also considered during identification of sensitive receptors, though none was identified within the immediate study area to Glen Croe.

15.3.4. Where possible, these have been identified in Volume 3, Figure 15.1 Population and Human Health Receptors. Within the wider area the following sensitive receptors are identified:

- Private property and housing - a large number of residential properties located at the villages of Succoth and Arrochar to the southeast, Lochgoilhead to the southwest and Cairndow to the northwest, all within a 15-minute drive of the Rest and Be Thankful Car Park / Viewpoint. Helensburgh is the closest area classified as urban (approximately 45-minute drive south), while Glasgow is the closest city (approximately 1 hour 15-minute drive south).
- Community land and assets - community services and facilities include the primary school catchment for Arrochar (non-denominational) / St Josephs (denominational) and secondary school catchment for Hermitage Academy (non-denominational) / Our Lady and St Patrick's (denominational) covers whole study area, resulting in the potential need for access along the A83. Religious facilities in the area include SS Peter & Paul RC Church and Arrochar Parish Church, which would require access via the A83 for some members of the community. An important community asset is a Fire Station and Mountain Rescue Centre, located at Arrochar.

- Development land and businesses - Arrochar also has the most economic activity in the wider area, with a small number of businesses including various hotel and guest house / B&B accommodation, shops, takeaway restaurants, health and beauty parlour, caravan park, petrol station and associated restaurant.
- Agricultural land holdings - the main land uses in the wider study area of the Proposed Scheme are improved / semi-improved grazing for livestock, and coniferous forestry plantation, though there are small pockets of native woodland planting. There are also large areas of rough grazing / moorland located in the upland areas.
- WCH - within the wider Glen Croe area are a number of walking and cycling trails. These include those associated with the Argyll Forest Park and provide access to the higher peaks in the area, including of particular note 'The Cobbler', with experienced hillwalkers enjoying the challenge of the climb from Honeymoon Bridge, along an improved walking route which is accessed via a car park and picnic spot immediately adjacent to the A83. This car park is also a popular picnic spot for travellers to rest and break up the journey from Glasgow to Argyll. Opportunities for 'off route' hiking are also possible in this area.

15.3.5. While the immediate locale of the Proposed Scheme is rural with a very low population, the A83 road does play a vital role in linking wider communities to the health, social, educational, recreational and economic facilities and opportunities that they require. In addition to providing a link to health centres, schools, colleges, and leisure facilities. In short, the A83 road has clear importance for health and wellbeing outcomes for individuals and the wider community. Communities in Cowal, Kintyre and Mid Argyll rely on the A83 as their main road access to Glasgow and Central Scotland without needing to rely on ferries or taking a detour.

Future Baseline

15.3.6. In the absence of the Proposed Scheme, it is anticipated that landslides and the associated closure of the A83 would continue to impact the ability of local residents and communities to access the health, social, educational, recreational and economic facilities and opportunities that they require. No proposed development or land zoned for development has been identified within the study area.

Sub-Topics Scoped Out of the Assessment

- 15.3.7. Health determinants that have been scoped out from further consideration are listed in Table 15.1. Please see A83 LTS Scoping Report for further details.
- 15.3.8. It is to be noted that it is not the purpose of the Proposed Scheme to provide protection to agricultural land holdings or receptors other than the A83 route itself. Any ongoing or continued risk of landslides during the operation of the Proposed Scheme to these receptors is then considered out of scope. It is however to be clarified that downgradient agricultural land holdings and WCH routes would benefit from the DFS and catch pit. Fewer landslides would lead to disruption impacts for those receptors. It is further clarified that the Proposed Scheme does not introduce any new or additional risk to those receptors. Note additional land owners have been identified however these relate to roads (i.e. Transport Scotland and Council ownership) and therefore they are scoped out of the assessment.

Table 15.1 - Sub-topics scoped out

Categories	Wider determinants of health (IEMA – Human health)	Community Aspect (DMRB LA 112 – Land use and accessibility)
Health related behaviours	Risk taking behaviour	Not applicable
Health related behaviours	Diet and nutrition	Not applicable
Social environment	Relocation	Not applicable
Social environment	Community safety	Not applicable
Social environment	Community identity, culture, resilience, and influence	Not applicable
Bio-physical environment	Climate change mitigation and adaptation	Not applicable
Bio-physical environment	Water quality or availability	Not applicable
Bio-physical environment	Radiation	Not applicable
Institutional and built environment	Built environment	Not applicable

15.4. Embedded Mitigation

- 15.4.1. It is important to recognise that in terms of population and human health, for many aspects the mitigation required will be outlined in specific technical chapters and reference should be made to those chapters for detail.
- 15.4.2. During operation there will be clear maintenance management protocols enacted and this will set out clear and concise information that states how the mitigation and management of environmental effects will be delivered and maintained.

- 15.4.3. General embedded mitigation measures are described below, however it should be noted that the iterative design process has acted to minimise agricultural land loss, incorporate a new WCH route and afforded redesign of the Rest and Be Thankful Car Park / Viewpoint (see Volume 3, Figure 9.4 Rest and Be Thankful Car Park Concept Design):
- Use of the alternative bus stop at / adjacent to the Rest and Be Thankful Car Park / Viewpoint during construction period noting that this alternative bus stop is already in use during periods where the A83 is closed (PHH-EMB-1).
- 15.4.4. With respect to paths (informal or formal), these will be realigned as close to their original alignment as practical to avoid extending WCH routes, where possible (PHH-EMB-2). Where the Proposed Scheme would affect existing paths, replacement network provision will be made to ensure routes remain open by providing suitable crossing points or diversions (PHH-EMB-3). Where new paths are required, they would be designed to be as fully accessible as possible (PHH-EMB-4). Of note, a new Active Travel Link is included in the Proposed Scheme and will link the Rest and Be Thankful Car Park / Viewpoint to forest trails and core path to the west of the OMR.

15.5. Potential Impacts

Construction Impacts

- 15.5.1. During construction, there are a number of impacts on land use and accessibility and on human health that would be typical for a road scheme. For example, it is anticipated that there would be some level of disruption or changes to access of community land and assets. Potential impacts such as disruption to access to public open space, recreation and leisure time activities as well as on WCH routes within the study and wider area would have consequent health and wellbeing outcomes by reducing opportunities for physical activity. Similarly, changes in access to public transport, or disruption to public transport could also have an impact on health outcomes.

- 15.5.2. In addition to those issues addressed directly via the population and human health assessment, there may be potential impact from construction activities on human health as follows:
- impact on air quality associated with construction activities (dust emissions) and additional vehicle movements (vehicle emissions) on the local road network due to construction traffic
 - impact of visual disturbance for users of local roads and recreational areas and
 - noise and vibration relating to construction activity and use of the OMR as a diversionary route.
- 15.5.3. These topics are considered in detail in relevant specialist chapters within this EIA Report and while the relevant findings will be noted here, reference should be made to those chapters for further detail (i.e. Volume 2, Chapter 7: Air Quality, Chapter 12: Geology, Soils and Groundwater, Chapter 14, Noise and Vibration and Chapter 19: Road Drainage and the Water Environment).
- 15.5.4. Impacts during construction and operation have been grouped and presented under respective IEMA categories with subheadings outlining the linked wider determinants of health and DMRB LA 112 community aspect (as outlined in Section 15.2). For full assessments refer to Appendix 15.4.

Health Related Behaviours

Physical activity / Walkers, cyclists and horse-riders (WCH)

- 15.5.5. Impacts on WCH routes have been outlined in Table 15.2 as follows. Note residual effect accounts for all embedded mitigation set out in Section 15.4:

Table 15.2 Potential Impacts on WCH Routes

Assessment Criteria	WCH Route	Potential Impact	Sensitivity	Impact Magnitude	Significance of effect
Population / Land use and accessibility	OMR	While no changes are predicted to journey length along the OMR, in respect of accessibility it is recognised that this route would be effectively closed for WCH users. Given the low numbers of WCH users anticipated on this route impact magnitude is considered moderate	Medium	Moderate	Moderate adverse (Significant) Temporary to the construction phase

Assessment Criteria	WCH Route	Potential Impact	Sensitivity	Impact Magnitude	Significance of effect
Human Health	OMR	During the construction of the Proposed Scheme users of the OMR would need to use alternative routes in the wider area. This would result in a temporary impact during the one-year construction period of the OMR Improvements. Whilst the LTS is being constructed WCH journeys along the OMR would be affected by the presence traffic leading to an adverse impact to safety as well as amenity (related impacts being noise, air quality and visual) throughout the four-year construction period.	Medium	Medium	Moderate adverse (Significant) DMRB finding: Negative – an adverse health impact is identified
Population / Land use and accessibility	Route 1	No changes are predicted to journey length along Route 1	Medium	No change	Neutral (not significant)

Assessment Criteria	WCH Route	Potential Impact	Sensitivity	Impact Magnitude	Significance of effect
Human Health	Route 1	Route 1 runs immediately adjacent the Proposed Scheme and it is noted that construction alongside the B828 will be required to construct the new active travel link. While closure is not anticipated, there would be temporary impact to the amenity of the journey (impacts being noise, air quality and visual) throughout the construction period.	Medium	Low	Minor adverse (not significant) DMRB finding: Negative – an adverse health impact is identified
Population / Land use and accessibility	Routes 6 and 11	Access to Routes 6 and 11 would be severed during the five-year construction period with no access possible to either the informal parking or the WCH route with the A83 being closed beyond its junction with the OMR.	Medium	Major	Very Large Adverse (Significant) Temporary to the construction phase

Assessment Criteria	WCH Route	Potential Impact	Sensitivity	Impact Magnitude	Significance of effect
Human Health	Route 6 and 11	Access to Route 6 and 11 will be severed and it is anticipated that WCH users would no longer have access to these routes. It is noted that there are suitable alternatives in the local and wider areas for which access is not impeded.	Medium	Minor	Slight Adverse (Not significant) Temporary to the construction phase
Population / Land use and accessibility	Route 13	No changes are predicted to journey length along Route 13	Medium	No change	Neutral (not significant)

Assessment Criteria	WCH Route	Potential Impact	Sensitivity	Impact Magnitude	Significance of effect
Human Health	Route 13	The northmost extent of Route 13 runs immediately adjacent the Proposed Scheme and it is noted that construction alongside the B828 will be required to construct the new active travel link. While closure is not anticipated, there would be temporary impact to the amenity of the journey (impacts being noise, air quality and visual) throughout the construction period.	Medium	Low	Minor adverse (not significant) DMRB finding: Negative – an adverse health impact is identified
Population / Land use and accessibility	Routes 2, 3, 4, 5, 7, 8, 9, 10, 12 and 14	No changes are predicted to journey length along these routes	Medium	No change	Neutral (not significant)

Assessment Criteria	WCH Route	Potential Impact	Sensitivity	Impact Magnitude	Significance of effect
Human Health	Routes 2, 3, 4, 5, 7, 8, 9, 10, 12 and 14	While closure of these routes are not anticipated, there would be temporary impact to the amenity of the journey (impacts being noise, air quality and visual) throughout the construction period.	Medium	Low	Minor adverse (not significant) DMRB finding: Negative – an adverse health impact is identified
Population / Land use and accessibility	Route 10	No changes are predicted to journey length along these routes	Very High	No change	Neutral (not significant)

Assessment Criteria	WCH Route	Potential Impact	Sensitivity	Impact Magnitude	Significance of effect
Human Health	Route 10	Amenity of the journey (impacts being noise, air quality and visual) throughout the construction period are considered negligible noting planting in the adjacent Proposed Scheme BNG area is by hand and does not involve construction plant or heavy machinery.	Very High	Negligible	Minor adverse (Not Significant) DMRB finding: Negative – an adverse health impact is identified

- 15.5.6. The OMR is of medium sensitivity and impact magnitude is considered moderate. While no changes are predicted to journey length along the OMR, in respect of accessibility it is recognised that this route would be effectively closed for WCH users. Effects are considered moderate adverse in respect of land use and accessibility. In respect of impacts on human health, magnitude of impact is considered medium and as a result Moderate adverse effects are attributed. Significant adverse effects have been identified in respect of Routes 6 and 11 where access would be severed during the construction phase.
- 15.5.7. While some WCH routes may have their immediate access severed during construction (Routes 6 and 11), these routes are recreational, of local designation and access to other suitable alternatives in the wider area is maintained throughout construction. Nevertheless, impact magnitude is Major and as a result Very Large Adverse effects are attributed. Of note, Impacts are direct, temporary to the construction phase and associated with a negative health outcome in line with DMRB LA 112.

Social environment

Housing / Private property and housing

- 15.5.8. Potential disruption to access at two properties immediately adjacent the Proposed Scheme and those in the wider 500m study area are considered slight adverse owing to medium sensitivity and minor impact magnitude. Construction works in respect of the OMR interventions would be undertaken in advance of the Long-Term Solution (LTS) along the A83, ensuring continued access provision across the study area. Health and wellbeing impacts as a result of minor access disruptions are considered minor adverse which is consistent with a negative health outcome in line with DMRB LA 112. No significant effects have been identified with respect to residential properties and it is considered viability of any property will not be compromised.
- 15.5.9. These adverse impacts are considered temporary to the construction phase and are reversible.

Open space, leisure and play / Community land and assets

- 15.5.10. The Rest and Be Thankful Car Park / Viewpoint is considered of high sensitivity and impacts as a result of disruption, temporary closure, changes to access, viability and amenity impacts are considered of major adverse magnitude. Effects are therefore considered large adverse. In respect of associated impacts on health and wellbeing, a moderate adverse impact is attributed which is consistent with a negative health outcome in line with DMRB LA 112.
- 15.5.11. There are no other community land and assets identified (WCH identified elsewhere) as being at risk of direct severance and no other significant impacts have been identified. Adverse impacts identified are considered temporary to the construction phase of the Proposed Scheme and are reversible.

Transport modes, access and connections

- 15.5.12. Health and wellbeing impacts as a result of loss of access to public transport (bus stop provision at Rest and Be Thankful Car Park / Viewpoint) are considered of high sensitivity and low impact magnitude. Minor adverse (not significant) effects are then attributed which is consistent with a Negative health outcome in line with DMRB LA 112. This reflects provision of an alternative bus stop throughout the construction period which ensures connectivity with the public transport network is maintained.

Social participation, interaction and support

- 15.5.13. Opportunities for community participation and interaction accessed or facilitated by the Rest and Be Thankful Car Park / Viewpoint or those which require transit through A83 (e.g. those in Ardgartan, Cairndow and neighbouring settlements) are considered of medium sensitivity. Owing to continued access provision / transit through the study area during construction on the OMR and A83 respectively, any disruption is considered of low magnitude. Health and wellbeing impacts as a result of loss of minor travel disruptions is considered minor adverse (not significant) which is consistent with a Negative health outcome in line with DMRB LA 112. This reflects that construction works in respect of the OMR interventions will be undertaken in advance of the LTS, ensuring continued access provision across the study area.

Economic environment

Education and training

- 15.5.14. Health and wellbeing impacts as a result of travel disruptions affecting access / journey times to education and training facilities in the wider study area is considered of low magnitude and low sensitivity resulting in minor adverse (not significant) effects which is consistent with a Negative health outcome in line with DMRB LA 112. This reflects that construction works in respect of the OMR interventions will be undertaken in advance of the LTS, ensuring continued access provision across the study area.

Employment and income / Development land and business

- 15.5.15. Health and wellbeing impacts as a result of travel disruptions affecting access / journey times to employment and income opportunities or wider development land and business in the wider study area is considered of low magnitude and low sensitivity resulting in minor adverse (not significant) effects which is consistent with a Negative health outcome in line with DMRB LA 112. This reflects that construction works in respect of the OMR interventions will be undertaken in advance of the LTS, ensuring continued access provision across the study area. Of note, use of the Rest and Be Thankful Car Park / Viewpoint by food stalls is considered ad-hoc and is of low / negligible sensitivity in line with DMRB and a slight adverse effect is then reported. It is anticipated that no other development land or business (not directly referenced in this Chapter) will be directly impacted by the Proposed Scheme and it is anticipated viability will not be compromised.

Bio-physical environment

Air quality

- 15.5.16. The Air Quality assessment (reported in Volume 2, Chapter 7: Air Quality) considers that any adverse air quality effects due to construction of the Proposed Scheme would be temporary and can be suitably minimised by the application of standard and appropriate mitigation measures. There is not expected to be a significant effect on local air quality at human health receptors during construction due to traffic management, as the existing background concentrations are very low. No residual effects are expected in relation to the construction traffic and the traffic management measures.

Water quality or availability

- 15.5.17. Population and human health impacts as a result of water quality or availability are not anticipated to be significant. A mix of Moderate and Minor adverse effects are anticipated on water quality across different tributaries during construction of the Proposed Scheme (see Volume 2, Chapter 19: Road Drainage and the Water Environment) however population and human health receptors have not been identified. As such, it is anticipated that neutral health outcomes as per DMRB could be expected i.e. no discernible health impact is identified and significance would be negligible.

Land quality

- 15.5.18. Population and human health impacts as a result of geology, soils and groundwater changes have not been identified. Of note, parameters relevant to human health are scoped out as unlikely to give rise to significant effects with assessment on peat only requiring further investigation through environmental assessment. See Volume 2, Chapter 12: Geology, Soils and Groundwater for further details. Population and human health impacts arising as a result of changes to agricultural land resource have been considered under Agricultural Land Holdings (Section 16.6.14) and through respective assessment tables contained in Appendix Volume 4, 15.4: Population and Human Health Assessment Tables (A15-5.5).

Noise and vibration

- 15.5.19. Significant impacts have been identified in respect of health and wellbeing. During the construction phase, the OMR will operate as the local diversion route for the Proposed Scheme along the A83. While construction noise has been scoped out of the noise and vibration assessment, noise impacts from the OMR diversion route are considered at three noise sensitive receptors, the OMR WCH route, Laigh Glencroe (dwelling) and High Glencroe (dwelling).
- 15.5.20. On the OMR WCH route, the transfer of traffic onto the OMR diversion will result in a significant (moderate) adverse effect. This is consistent with a negative health outcome in line with DRMB LA 112.
- 15.5.21. At Laigh Glencroe, traffic noise levels will be lower than at present because the OMR is further away than the A83. The noise decrease is determined to be not significant. This is consistent with a positive health outcome in line with DRMB LA 112.
- 15.5.22. At High Glencroe, traffic noise levels will be higher than present because the OMR alignment is closer than the A83. The noise increase is determined to be not significant because the absolute noise levels remain low. This is consistent with a negative health outcome in line with DRMB LA 112.
- 15.5.23. Effects are considered reversible and temporary to the construction phase.

Institutional and built environment

Health and social care services

- 15.5.24. Owing to continued access provision / transit through the study area during construction on the OMR and A83 respectively, any disruption is considered of low magnitude. Health and wellbeing impacts as a result of travel disruptions affecting access / journey times to health and social care services (of low sensitivity) in the wider study area are then considered minor adverse (not significant) which is consistent with a Negative health outcome in line with DMRB LA 112. This reflects that construction works in respect of the OMR will be undertaken in advance of the LTS, ensuring continued access provision across the study area.

Wider societal infrastructure and resources / Agricultural land holdings

15.5.25. Table 15.3 to 15.6 sets out the construction related impacts relating to the four land holdings identified as being directly affected by the Proposed Scheme. Note that no land take is anticipated from other private holdings not identified here.

Table 15.3 - Construction Impacts on Farm Holding No.1

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility – Land Take	<p>The landholding extends to c.89ha of which c.11.59ha (13.02% of the land holding) would be permanently lost within the Proposed Scheme Boundary as a result of land required for construction. In addition to this, there is also predicted to be a further effective loss of land amounting to c.1.43ha where access is severed to wider land parcels. A total, permanent loss of land equating to c.13ha (14.61% of the land holding).</p> <p>Remaining areas of land between the watercourses routeing between the A83 and OMR could potentially be deemed to be no longer workable from a farming perspective, however these areas have not been deemed to be required for the Proposed Scheme. Should discussion with the land holding deem these parcels no longer viable then appropriate compensation would need to be agreed however this falls outwith the EIA process.</p>	Medium	Moderate	Moderate Adverse (Significant), permanent

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility - Other	<p>Whilst access to all buildings will be maintained during the construction period, moderate adverse effects are anticipated through the disruption of access to farm buildings during construction works associated with the OMR.</p> <p>Construction works between the OMR and A83 has the potential to give rise to moderate severance issues for the farm which is considered of medium sensitivity owing to increased traffic utilising the OMR during the construction of improvements to the OMR (lasting one-year) and the four-year construction period along the line of the A83.</p>	Medium	Moderate	Moderate Adverse (Significant), temporary

Table 15.4 - Construction Impacts on Upland Estate No.1

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility – Land Take	Anticipated land take of c.0.37ha (0.03%) from the periphery of the estate.	Low	Minor	Slight Adverse (Not significant) Permanent
Population / Land use and accessibility - Other	Other land based activities in the wider area include forestry and upland / moorland based sporting activities. It is not anticipated that there would be direct construction related impacts on these activities, nor would access to the estate be affected.	Low	No Change	Neutral

Table 15.5 - Construction Impacts on Upland Estate No.2

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility – Land Take	Anticipated land take of c.0.05ha (<0.01%) from the periphery of the estate.	Low	Negligible	Slight Adverse (Not significant) Permanent
Population / Land use and accessibility - Other	Other land based activities in the wider area include forestry and upland / moorland based sporting activities. It is not anticipated that there would be direct construction related impacts on these activities, nor would access to the estate be affected.	Low	No Change	Neutral

Table 15.6 - Construction Impacts on Forestry Holding No. 1

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility – Land-take	<p>The Glen Croe Land Management Plan 2019 – 2028 notes that the Glen Croe Land Management Plan (LMP) covers 3082ha which is part of the wider national forest. The Proposed Scheme is predicted to result in a loss of c.97.65ha which includes the four areas identified for Biodiversity Net Gain (BNG) and Natural Capital enhancement. These areas have been discussed and agreed with Forestry and Land Scotland throughout the EIA process. The Proposed Scheme is predicted to result in a permanent loss of land amounting to c.3.2% of the land within the Glen Croe Land Management Plan area.</p>	Low	Minor	Slight Adverse (Not significant) Permanent

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility - Other	<p>Construction works on the A83 associated with the LTS has the potential to give rise to severance issues for the forestry holding owing to increased traffic utilising the OMR during the construction of improvements to the OMR (lasting c.one year) and the c.4-year construction period along the line of the A83.</p> <p>During the construction period the Rest and Be Thankful car park and viewpoint would be closed resulting in a major adverse impact, though it is noted that this would not affect forestry operations.</p>	Low	Moderate to Major	Slight Adverse (Not significant) Temporary

Operational Impacts

- 15.5.26. Impacts during operation have been grouped and presented under respective IEMA categories with subheadings outlining the linked wider determinants of health and DMRB community aspect (as outlined in Section 15.2). Unless otherwise stated, effects are considered permanent to the operation phase for one year in respect of land use and up to year 15 in respect of health outcome (in line with DMRB LA 112 reporting).

Health Related Behaviours

Physical activity / Walkers, cyclists and horse-riders (WCH)

- 15.5.27. Provision of an active travel link from the Rest and Be Thankful Car Park / Viewpoint to the forestry track west of the OMR provides WCH users with a dedicated path where currently WCH users must use the road. WCH users are attributed medium sensitivity and moderate magnitude and results in significant (moderate) beneficial effects in terms of permanent increased access and active travel provision. In respect of physical activity / WCH overall health benefits are associated with low sensitivity and medium impact magnitude resulting in minor beneficial effects for all groups. Note that all other active travel, hiking and walking routes are anticipated to be unaffected by operation.

Social environment

Housing / Private property and housing

- 15.5.28. Increased / improved access to the two residential properties with direct access to the OMR or A83, as well as more reliable, safer journeys along the A83 are anticipated during operation. This is associated with medium sensitivity and minor magnitude resulting in slight beneficial effects. In respect of human health, effects are considered minor beneficial.

Open space, leisure and play / Community land and assets

- 15.5.29. The provision of a new permanent active travel link from the redesigned Rest and Be Thankful Car Park / Viewpoint to the forestry track, running parallel to the B828 and west of the OMR, as well as improved access, safer and more reliable journeys along the A83 during operation is associated with medium sensitivity and moderate impact magnitude. This results in moderate (significant) beneficial effects. While the health benefits of the new active travel route are anticipated to be minor for all groups due in part to the many alternatives in the wider area (low sensitivity and medium magnitude) moderate (significant) health benefits are anticipated in respect of improved access, safer and more reliable journeys to community assets in the wider area (high sensitivity and medium magnitude).

Transport modes, access and connections

- 15.5.30. The improved provision / access to public transport (noting reconfiguration of the existing bus turning / bus stop area at the Rest and Be Thankful Car Park / Viewpoint) are anticipated to result in minor (non-significant) beneficial effects on health and wellbeing owing to high sensitivity and low impact magnitude. See Figure 9.4 for design detail.

Social participation, interaction and support

- 15.5.31. Beneficial (significant) impacts on health and wellbeing are anticipated due to improved safety and reliability of journeys along A83 (high sensitivity and medium magnitude) affording more resilient opportunities for community participation and interaction in the wider study area. These health and wellbeing benefits are an anticipated health outcome for wider groups and those falling within one of the identified vulnerable groups. This includes those opportunities facilitated by the Rest and Be Thankful Car Park / Viewpoint (e.g. for hillwalking and rambling groups utilising the Car Park as a meeting point). These Positive health outcomes are anticipated to be permanent long term effects.

Economic environment

Education and training

- 15.5.32. Moderate (significant) beneficial operational impacts are anticipated on education and training opportunities in the wider area due to improved access, as well as safer and more reliable journeys along the A83 (attributed high sensitivity and moderate impact magnitude). This is also anticipated to result in moderate beneficial impacts on health and wellbeing as a large part of the population will benefit from more robust access to assets (of which there are few alternatives) that the local economy is dependent upon (high sensitivity and medium magnitude).

Employment and income / Development land and business

- 15.5.33. Moderate (significant) beneficial operational impacts are anticipated on employment and business opportunities in the wider area due to improved access, as well as safer and more reliable journeys along the A83 (attributed high sensitivity and moderate impact magnitude). This is also anticipated to result in moderate beneficial impacts on health and wellbeing as a large part of the population will benefit from more robust access to assets (of which there are few alternatives) that the local economy is dependent upon (attributed high sensitivity and medium impact magnitude).

Bio-physical environment

Air quality

- 15.5.34. Changes in local air quality during operation of the Proposed Scheme are expected to be negligible and as such would be anticipated to have a neutral health outcome as per DMRB i.e. no discernible health impact is identified, and significance would be negligible. Please see Volume 2, Chapter 7: Air Quality for further detail.

Water quality or availability

- 15.5.35. A mix of Moderate and Minor beneficial effects are anticipated on water quality across different tributaries during operation of the Proposed Scheme (see Volume 2, Chapter 19: Road Drainage and the Water Environment). As such, it is anticipated that neutral health outcomes as per DMRB could be expected i.e. no discernible health impact is identified and significance would be negligible.

Land quality

- 15.5.36. Population and human health impacts as a result of geology, soils and groundwater changes have not been identified. Of note, parameters relevant to human health are scoped out as unlikely to give rise to significant effects with assessment on peat only requiring further investigation through environmental assessment. See Volume 2, Chapter 12: Geology, Soils and Groundwater for further details. Population and human health impacts arising as a result of changes to agricultural land resource have been considered under Agricultural Land Holdings (Section 15.6.17) and through respective assessment tables contained in Volume 4, Appendix 15.4: Population and Human Health Assessment Tables (A15-5.5).

Noise and vibration

- 15.5.37. In relation to noise and vibration during operation, Volume 2, Chapter 14: Noise and Vibration notes that the Proposed Scheme includes only minimal changes to the A83 alignment. Operational traffic movements are not expected to change vehicle flow, composition of vehicle types (e.g. cars and heavy vehicles), and vehicle speeds. Significant effects are not expected. As such, the Proposed Scheme is anticipated to have a neutral health outcome as per DMRB i.e. no discernible health impact is identified and significance would be negligible.

Institutional and built environment

Health and social care services

- 15.5.38. Moderate (significant) beneficial impacts are anticipated during operation in relation to health and social care services, which have few alternatives, in the wider area as a result of permanent improved access, safer and more reliable journeys along the A83 (high sensitivity and medium impact magnitude).

Wider societal infrastructure and resources / Agricultural Land Holdings

- 15.5.39. Tables 15-5.6 to 15-5.9 set out the operational impacts to the land holdings within the Proposed Scheme Boundary.
- 15.5.40. During operation it is anticipated that there will be no ongoing restrictions on other land based activities such as forestry or areas of moorland. As such, it is anticipated that residual impacts to these activities would be Neutral.

Table 15.7 - Operational Impacts on Farm Holding No.1

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility – farm operations	During the operation of the Proposed Scheme, it is anticipated that operational issues would occur as a result of new field boundaries and loss of OMR ownership by farm leading to gated accesses to fields where none currently exist. In addition to access operational issues, severance issues are also predicted relating to the requirement for fences to watercourses along revised field boundaries which would affect use of these watercourses as informal drinking supply for livestock.	Medium	Moderate	Moderate Adverse (Significant), Permanent to the operation phase of the Proposed Scheme
Population / Land use and accessibility – access to infrastructure	It is predicted that through the provision of a new lay-by on the OMR that access to agricultural buildings within the farm holding would be improved.	Medium	Minor	Slight Beneficial (Not Significant), Permanent to the operation phase of the Proposed Scheme

Table 15.8 - Operational Impacts on Upland Estate No.1

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility	It is not predicted that any operational impacts would occur.	Not applicable	Not applicable	Not applicable

Table 15.9 - Operational Impacts on Upland Estate No.2

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility	It is not predicted that any operational impacts would occur.	Not applicable	Not applicable	Not applicable

Table 15.10 - Operational Impacts on Forestry Holding No.1

Assessment Criteria	Potential Impact	Sensitivity	Impact Magnitude	Significance of Effect
Population / Land use and accessibility	It is not predicted that any operational impacts would occur as access would be retained along the OMR and the Rest and Be Thankful car park would continue to operate though with a revised design as set out in Volume 3, Figure 9.4 - Rest and Be Thankful Car Park Concept Design.	Low	No Change	Neutral

15.6. Mitigation

- 15.6.1. No specific required / additional mitigation, over and above that set out as Embedded Mitigation (Section 15.4) has been identified though, it is recognised that a Construction Environmental Management Plan (CEMP), Traffic Management Plan (TMP) and Community Engagement Plan will be enacted during the construction phase, as is standard for projects of this scale. The CEMP will include mitigation measures to minimise impacts on land use and agricultural holdings during construction.

Table 15.11 - Mitigation measures

Mitigation Reference	Mitigation Measures
PHH1	Construction Environmental Management Plan (CEMP), Traffic Management Plan (TMP) and Community Engagement Plan will be enacted during the construction phase. This will provide a framework for the implementation of construction activities including plans related to geology and land contamination, surface water and groundwater, air quality (e.g. dust), and noise and vibration. In respect of the Community Engagement Plan, this will ensure that local communities are kept informed of the nature and duration of the works.
PHH2	Any Land temporarily used for construction will be restored to a condition equivalent to its original state. This will be achieved by means of a Soil Resource Plan (SRP) following best practice set out in guidance such as DEFRA's Construction Code of Practice for the Sustainable Use of Soils on Construction Sites , SEPA Promoting the sustainable reuse of greenfield soils in construction sites or equivalent guidance.
PHH3	During construction on the Old Military Road, walking, cycling and horse riders will be convoyed through the route.

Mitigation Reference	Mitigation Measures
PHH4	Where unrestricted agricultural uses are to be resumed on land disturbed during the construction of the Proposed Scheme, the Appointed Contractor will be responsible for ensuring no long-term reduction in the quality of the disturbed land, through the adoption of good practice techniques in handling, storing and reinstating soils and field drains.

15.6.2. The absence of specific additional mitigation measures reflects the comprehensive nature of early scheme consideration and environmental led design (including consideration of population and human health) that has been undertaken. It is the case that for some elements of population and human health, effective communication is the best form of mitigation e.g. ensuring people are made aware of the need for delays, restricted access to facilities and amenities or other construction related impacts. An understanding of the Proposed Scheme and regular communication on the need for delays etc. will help to reduce the significance of impact on wellbeing. It is also anticipated that people will be more accepting of known delays caused by construction, particularly when informed of these, rather than being subject to ad-hoc / unplanned reactive responses to the need for temporary closure of the A83 and OMR (which will be phased to avoid both routes closed simultaneously).

- 15.6.3. Of particular note is that there are ongoing discussions with relevant landowners in respect of mitigation to impacts on agricultural activities. This could include issues around fencing (considered within embedded mitigation) or matters such as access to farm buildings. It is worth noting that the design of the OMR interventions and embedded mitigation was informed by the Agricultural Impact Assessment and amended to ensure continued safe access to key agricultural buildings. It is also the case that the design of the scheme has sought to minimise land take wherever possible – see Chapter 4 for further detail. No further detail on these mitigation measures is provided here as it is considered these are sensitive to the agricultural business. Nevertheless, it is anticipated that these will reduce impact. Note that matters such as financial compensation measures are outside the scope of this assessment.

15.7. Residual Effects

Residual Effects – Construction

- 15.7.1. Residual effects during the construction phase are as outlined in Table 15.12.

Table 15.12 - Residual Effects Construction

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Potential impact on 2 No. properties with direct access from A83 and OMR (Disruption to Access)	Minor	Slight adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant	Minor	Slight adverse
Potential impact on <30 No. properties within 500m of the Proposed Scheme (Disruption to Access)	Minor	Slight adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight adverse
Health and wellbeing outcome from construction works adjacent 2 No. houses with direct access from A83 and OMR	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor Adverse
Health and wellbeing outcome from construction works on <30 No. properties within 500m of the Proposed Scheme	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor Adverse
Potential impacts on Rest & Be Thankful viewpoint - disruption, temporary closure, changes to access and viability and amenity impacts	Major	Large Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified however significant effects remain.	Major	Large Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Potential impacts on Honeymoon Bridge (picnic area) - disruption, changes to access and viability and amenity impacts	Minor	Slight adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight adverse
Potential impacts on public open space, recreation and leisure time activities within the wider area - disruption, changes to access and viability or amenity impacts	Minor	Slight adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight adverse
Potential impacts on Community Assets within the wider area - disruption, changes to access and viability or amenity impacts	Minor	Slight adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight adverse
Potential impact on Community Assets within the wider area - increased demand on health and recreational facilities and other essential services from workforce	Minor	Slight adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight adverse
Health and wellbeing outcome from disruptions, amenity impacts and changes in access to public open space and other community facilities within the study and wider area	Medium	Moderate Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified however significant effects remain.	Medium	Moderate Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Health and wellbeing outcomes from loss of access to public transport / disruption to public transport routes	Low	Slight Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant	Low	Slight Adverse
Potential disruption to opportunities for community participation and interaction	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant	Low	Minor Adverse
OMR - In respect of accessibility it is recognised that this route would be effectively closed for WCH users	Moderate	Moderate Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant. PHH3 A convoy system will ensure walkers and cyclist users of the OMR can be safely moved through the OMR during construction with the mitigation reducing the significant effect to non-significant.	Minor	Slight Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
OMR - Temporary impact to human health as a result of loss of access to OMR during the one-year construction period. Whilst the LTS is being constructed WCH journeys along the OMR would be affected by the presence traffic leading to an adverse impact to safety as well as amenity (related impacts being noise, air quality and visual).	Medium	Moderate Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified. PHH3 A convoy system will ensure walkers and cyclist users of the OMR can be safely moved through the OMR during construction. Despite the implementation of the mitigation a residual significant effect is predicted.	Medium	Moderate Adverse
Route 1 - No changes are predicted to journey length along Route 1	No change	Neutral	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant	No change	Neutral
Route 1 - Construction alongside the B828 would result in temporary impacts to the amenity of the journey (impacts being noise, air quality and visual) throughout the construction of the Proposed Scheme and active travel link.	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor Adverse
Route 6 and 11 - Access would be severed during the construction period with no access possible to either the informal parking or the WCH route.	Major	Very Large Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified where possible, however a residual significant effect is predicted to occur even with mitigation in place.	Major	Very Large Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Route 6 and 11 - access to Route 6 and 11 will be severed and WCH users would no longer have access to these routes. It is noted that there are suitable alternatives in the local and wider areas for which access is not impeded.	Minor	Slight Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight Adverse
Route 13 - No changes are predicted to journey length along Route 13	No change	Neutral	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.	No change	Neutral
Route 13 - Construction alongside the B828 would result in temporary impacts to the amenity of the journey (impacts being noise, air quality and visual) throughout the construction of the Proposed Scheme and active travel link.	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor Adverse
Routes 2,3,4,5,7,8,9,12,14 - No changes are predicted to journey length along these routes	No change	Neutral	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.	No change	Neutral
Route 2,3,4,5,7,8, 9,10,12,14 - While closure of these routes are not anticipated, there would be temporary impact to the amenity of the journey (impacts being noise, air quality and visual) throughout the construction period.	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Route 10 - No changes are predicted to journey length along these routes	No change	Neutral	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.	No change	Neutral
Route 10 – Amenity related impacts to users of the Loch Lomond and Cowal Way associated with planting in adjacent BNG areas.	Low	Minor adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor adverse
Disruption related impacts to educational and skills attainment, maintenance or improvements in school availability, capacity or quality	Minor	Slight Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight Adverse
Potential impacts as a result of disruption or temporary closure to local businesses intersected by the Proposed Scheme	Minor	Slight Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight Adverse
Disruption (traffic) related impacts to employment and business opportunities in the wider area	Minor	Slight Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Minor	Slight Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Health and wellbeing impacts arising from disruption or temporary closure to local businesses intersected by the Proposed Scheme	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor Adverse
Health and wellbeing impacts as a result of disruption (traffic) related impacts to employment and business opportunities in the wider area	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor Adverse
Disruption (traffic) related impacts to health and social care services	Low	Minor Adverse	PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified to non-significant.	Low	Minor Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
<p>Farm Holding No.1: Anticipated land take of 12.37ha (14.10%) and effective land take as a result of viability issues with some remaining land parcels of 13.8ha (15.72% of farmland) associated with 1 no. private farm holding</p>	<p>Moderate</p>	<p>Moderate Adverse</p>	<p>PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.</p> <p>PHH2 Implementation of a Soil Resource Plan ensures any land temporarily used for construction will be restored to a condition equivalent to its original state.</p> <p>PHH4 Good practice techniques in handling, storing and reinstating soils and field drains ensures no long-term reduction in the quality of the disturbed land. A residual significant effect is predicted even with the implementation of the mitigation measures.</p>	<p>Moderate</p>	<p>Moderate Adverse</p>

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Farm Holding No.1: Disruption to access and / or viability of agricultural buildings	Moderate	Moderate Adverse	<p>PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.</p> <p>PHH2 Implementation of a Soil Resource Plan ensures any land temporarily used for construction will be restored to a condition equivalent to its original state.</p> <p>PHH4 Good practice techniques in handling, storing and reinstating soils and field drains ensures no long-term reduction in the quality of the disturbed land. A residual significant effect is predicted even with the implementation of the mitigation measures.</p>	Moderate	Moderate Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Farm Holding No.1: Severance issues at 1 no. private farm holding during construction works along OMR	Moderate	Moderate Adverse	<p>PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.</p> <p>PHH2 Implementation of a Soil Resource Plan ensures any land temporarily used for construction will be restored to a condition equivalent to its original state.</p> <p>PHH4 Good practice techniques in handling, storing and reinstating soils and field drains ensures no long-term reduction in the quality of the disturbed land. A residual significant effect is predicted even with the implementation of the mitigation measures.</p>	Moderate	Moderate Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
<p>Upland Estate No.1 Anticipated land take of c.0.37ha (0.03%) from the periphery of the estate.</p>	<p>Minor</p>	<p>Slight Adverse</p>	<p>PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.</p> <p>PHH2 Implementation of a Soil Resource Plan ensures any land temporarily used for construction will be restored to a condition equivalent to its original state.</p> <p>PHH4 Good practice techniques in handling, storing and reinstating soils and field drains ensures no long-term reduction in the quality of the disturbed land. Mitigation measures identified result in a non-significant residual effect.</p>	<p>Minor</p>	<p>Slight Adverse</p>

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
<p>Upland Estate No.2</p> <p>Anticipated land take of c.0.05ha (<0.01%) from the periphery of the estate.</p>	Negligible	Slight Adverse	<p>PHH1</p> <p>CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.</p> <p>PHH2</p> <p>Implementation of a Soil Resource Plan ensures any land temporarily used for construction will be restored to a condition equivalent to its original state.</p> <p>PHH4</p> <p>Good practice techniques in handling, storing and reinstating soils and field drains ensures no long-term reduction in the quality of the disturbed land. Mitigation measures identified result in a non-significant residual effect.</p>	Minor	Slight Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
<p>Forestry Holding No.1 Permanent loss of land amounting to 3.2% of the land within the Glen Croe Land Management Plan area.</p>	<p>Minor</p>	<p>Slight Adverse</p>	<p>PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.</p> <p>PHH2 Implementation of a Soil Resource Plan ensures any land temporarily used for construction will be restored to a condition equivalent to its original state.</p> <p>PHH4 Good practice techniques in handling, storing and reinstating soils and field drains ensures no long-term reduction in the quality of the disturbed land Mitigation measures identified result in a non-significant residual effect.</p>	<p>Minor</p>	<p>Slight Adverse</p>

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
<p>Forestry Holding No.1</p> <p>Severance issues for the forestry holding owing to increased traffic utilising the OMR during the construction of improvements to the OMR (lasting c.one year) and the c.4-year construction period along the line of the A83.</p>	<p>Moderate to Major</p>	<p>Slight Adverse</p>	<p>PHH1 CEMP, TMP and Community Engagement Plan will ensure construction related activities minimise effects on receptors identified.</p> <p>PHH2 Implementation of a Soil Resource Plan ensures any land temporarily used for construction will be restored to a condition equivalent to its original state.</p> <p>PHH4 Good practice techniques in handling, storing and reinstating soils and field drains ensures no long-term reduction in the quality of the disturbed land Mitigation measures identified result in a non-significant residual effect.</p>	<p>Moderate to Major</p>	<p>Slight Adverse</p>

Residual Effects – Operation

15.7.2. Residual effects during the operation phase are as outlined in Table 15.13. It is to be noted that no mitigation measures have been identified for the operational phase and, as such, some residual significant effects remain.

Table 15.13 - Residual Effects Operation

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Potential impact on 2 No. properties with direct access from A83 and OMR. Improved access provisions along OMR. A83 fully operation and therefore reduced disturbance on OMR.	Minor	Slight Beneficial	None identified	Minor	Slight Beneficial
Potential impact on <30 No. properties within 500m of the Proposed Scheme) - more reliable, safer journeys along A83	Minor	Slight Beneficial	None identified	Minor	Slight Beneficial
Health and wellbeing outcome from amenity / access improvements at 2 No. houses with direct access from A83 and OMR.	Minor	Minor Beneficial	None identified	Minor	Minor Beneficial
Health and wellbeing outcome from journey / access improvements on <30 No. properties within 500m of the Proposed Scheme)	Minor	Minor Beneficial	None identified	Minor	Minor Beneficial
Potential impacts on Rest & Be Thankful Car Park / Viewpoint - Provision of an active travel link from the Rest and Be Thankful Car Park / Viewpoint to the forestry track west of the OMR	Moderate	Moderate Beneficial	None identified	Moderate	Moderate Beneficial
Potential impacts on Community Assets in wider study area - Improved access, safer and more reliable journeys along the A83.	Moderate	Moderate Beneficial	None identified	Moderate	Moderate Beneficial
Health and wellbeing benefits as a result of improved access, safer and more reliable journeys to community assets in the wider area	Medium	Moderate Beneficial	None identified	Medium	Moderate Beneficial
Health and wellbeing outcomes from improved provision / access to public transport noting reconfiguration of the existing bus turning / bus stop area at the Rest and Be Thankful Car Park / Viewpoint.	Low	Minor Beneficial	None identified	Low	Minor Beneficial

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Health and wellbeing impacts as a result of improved safety and reliability of journeys along A83 affording more resilient opportunities for community participation and interaction	Medium	Moderate Beneficial	None identified	Medium	Moderate Beneficial
Potential impacts on Rest & Be Thankful Car Park / Viewpoint. Provision of an active travel link from the Rest and Be Thankful Car Park / Viewpoint to the forestry track west of the OMR	Moderate	Moderate Beneficial	None identified	Moderate	Moderate Beneficial
Health and wellbeing improvements as a result of active travel link from the Rest and Be Thankful Car Park / Viewpoint to the forestry track west of the OMR	Medium	Minor Beneficial	None identified	Medium	Minor Beneficial
Potential impacts on Employment and business opportunities in wider study area - Improved access, safer and more reliable journeys along the A83.	Moderate	Moderate Beneficial	None identified	Moderate	Moderate Beneficial
Health and wellbeing benefits as a result of improved access, safer and more reliable journeys in respect of employment and business opportunities in the wider area	Medium	Moderate Beneficial	None identified	Medium	Moderate Beneficial
Potential impacts on education and training opportunities in wider study area Improved access, safer and more reliable journeys along the A83.	Moderate	Moderate Beneficial	None identified	Moderate	Moderate Beneficial
Health and wellbeing benefits as a result of improved access, safer and more reliable journeys in respect of education and training opportunities in the wider area	Medium	Moderate Beneficial	None identified	Medium	Moderate Beneficial
Health and wellbeing benefits as a result of improved access, safer and more reliable journeys in respect of health and social care services in the wider area	Medium	Moderate Beneficial	None identified	Medium	Moderate Beneficial
Farm Holding No.1 - Anticipated operational access and viability issues as a result of new field boundaries and loss of OMR ownership	Moderate	Moderate Adverse	None identified	Moderate	Moderate Adverse

Reference	Pre-Mitigation Effect Magnitude	Pre-Mitigation Effect Significance	Mitigation Measures	Post-Mitigation Effect Magnitude	Post-Mitigation Effect Significance
Farm Holding No.1 - Improved access through provision of layby at agricultural buildings associated with 1 no. private farm holding.	Minor	Slight Beneficial	None identified	Minor	Slight Beneficial
Upland Estate No.1 - It is not predicted that any operational impacts would occur.	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Upland Estate No.2 - It is not predicted that any operational impacts would occur.	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Forestry Holding No.1 - It is not predicted that any operational impacts would occur.	No change	Neutral	None identified	No change	Neutral

Monitoring

- 15.7.3. The monitoring of the effects of this Proposed Scheme on population and human health will primarily take place in line with the recommendations set out within the specific chapters (Volume 2, Chapter 7: Air Quality, Chapter 12: Land quality, Chapter 14: Noise and Vibration and Chapter 19: Road Drainage and the Water Environment) for both construction and operation.
- 15.7.4. During construction, the appointed contractor will be required to undertake monitoring with respect to the effectiveness of the convoy system proposed for WCH users during construction along the OMR is undertaken. This is with a view to ensuring suitability, accessibility and frequency of service for all WCH users on the OMR. This may be achieved by registering the number of trips by convoy against a baseline understanding in addition to recording the type of WCH and collecting feedback from those users.
- 15.7.5. During construction, the appointed contractor will be required to undertake monitoring of traffic and parking arrangements to ensure that reduced provision as a result of construction works at the Rest and Be Thankful Car Park in particular does not have the effect of leading to a rise in vehicle parking along roadsides, verges or other informal, unsuitable or otherwise unsafe areas.
- 15.7.6. As noted in mitigation measure PHH2 any land temporarily used for construction will be restored to a condition equivalent to its original state. Monitoring of agricultural land reinstatement will be undertaken by the ECoW during the maintenance period for the Proposed Scheme.
- 15.7.7. Note that measures of compensation for affected land holdings are considered outside of the scope of EIA and as such no monitoring is proposed. It is however expected that there is continued engagement with the agricultural land holdings throughout construction.

Compliance with Planning Policy

- 15.7.8. The conclusion of the assessment of population and human health as a result of the construction and operation of the Proposed Scheme is compliant with the relevant policies identified in Volume 4, Appendix 15.1: Population and Human Health Legislation, Policy and Guidance. From a review of relevant policy, it should be more generally recognised that the Proposed Scheme, which improves resilience of the A83, encompasses the additional active travel link, improved OMR and car park improvements is supported and complementary to relevant policy.