17 SUMMARY OF EFFECTS

17.1 INTRODUCTION

This chapter presents a summary of the key findings of the assessment of the environmental effects of construction of the scheme. In Section 17.2, the residual environmental effects of the proposals are reported assuming all mitigation set out in the ES and collated in Annex C was delivered. A summary of the environmental effects of the project is also presented in the environmental impact tables presented in Annex D. Section 17.3 summarises the effects of the proposals on the River Fillan. Cumulative effects of the proposals are considered in Section 17.4.

17.2 SUMMARY OF SIGNIFICANT EFFECTS

17.2.1 Traffic

- The construction of the scheme would result in a significant increase in HGV movements (some 18%). In a worst case scenario all the HGVs would travel through the village but it is likely that they would be routing to a variety of destinations.
- The identification of approved receptor sites for the disposal of excess materials associated with earthworks and the import of bulk materials required to make up design levels would be the responsibility of the contractor. Haulage routes would be subject to agreement with Transport Scotland. Specific consideration would be given to the potential sensitivity of communities located along potential routes when choosing routes.
- Traffic flows on the existing A82 route at scheme opening would reduce from 5,700 AADT to approximately 3,000 AADT on the western section and 3,400 AADT to 700 AADT on the southern section.

17.2.2 The Transport and Planning Policy Context

- The proposed scheme broadly complies with National Government guidance and Structure and Local Plan policies.
- No land designated for development land within Crianlarich would be directly affected by the scheme.
- Mitigation has been defined for any potentially significant impact on the environment to ensure that any residual effects are reduced to the minimum for safe implementation of the road.
- The scheme would not in itself lead to an increase in traffic in the National Park and would remove traffic from Crianlarich village with some benefits to residents and visitors.
- The scheme would be built in a sensitive location at the edge of Crianlarich and with the Loch Lomond and the Trossachs National Park. The design of the scheme has taken account of this as well as the importance of the natural and cultural heritage of the area.
- No significant potential for cumulative effects with other projects has been identified.

17.2.3 Land Use

- The construction of the scheme would result in the change of land use of some 13ha (of which 3ha are outwith the site boundary).

- Construction of the scheme would result in the realignment of the spur linking Crianlarich to the West Highland Way by some 100m to the south. The realigned path would pass under the new road by means of an underpass.
- Some 2ha of plantation forest would be removed to facilitate construction and a further 3ha would be felled (in agreement with the Forestry Commission) to ensure a wind-firm edge for the remaining forest. Felling of this small amount of immature commercial timber is not considered to be significant.
- There are some 67 properties within 300m of the scheme of which 57 are residential and ten are commercial/community buildings. No property demolitions would be required for construction of the scheme and there would be no land lost from any gardens of properties or from public open space.
- Access to all properties would be maintained during construction and operation of the scheme.
- There would be benefits to local and strategic traffic once the bypass was operational.

17.2.4 Geology and Soils

- No sites designated for their geological interest would be affected by the proposals.
- No geological resources of particular significance have been identified which would be affected by the works and no significant effects are predicted.
- No significant areas of contaminated land have been identified which could be affected by the works.
- There would be disturbance to extensive areas of peat and soils during construction. The contractor would be required to remove peat from below the new road (some 133,800m^3 of material of which 35,800m^3 would be peat/soft soils). Some of the material which was removed would be re-used and buried in the earthworks for the scheme (some 65,000m^3) and some (anticipated to be some 68,800m^3) would be disposed of off–site (in accordance with best practice).
- Disturbance and loss would be reduced to the minimum necessary for the works and all best practice measures implemented to reduce impacts on peat and the quality of the remaining soils and peat.
- Tracking over peat by construction vehicles would be discouraged unless essential to avoid unnecessary compression of peat which would remain *in situ*.
- Implementation of best management practices including the design of the works would ensure that any impacts to soils were minimised.
- Implementation of best management practices and the committed mitigation measures would ensure that the risk of subsidence of the new road due to the decomposition of buried peat would be avoided and the risk of peat slides avoided.

17.3 SUMMARY

Permanent

- Residual effects on, or changes to, the hydrological and hydrogeological environments or flooding within the proposed scheme corridor are predicted to be minor or negligible, providing that the mitigation measures are implemented. Removal of extensive areas of peat would affect the local hydrology and has potential to change the habitats in the area. They are likely to become drier and grass and rush species could become more prevalent. The habitats at the edge of watercourses could similarly change to reflect this.

Construction

- Providing that SEPA guidance and best practice requirements are followed during construction and pollution prevention measures implemented, construction is not predicted to result in significant adverse effects on the aquatic environment.
- Dewatering may be required during the construction of the sections of the road in cuttings. Although groundwater levels are near surface, the aquifer units are heterogeneous and only of limited thickness. Therefore it is unlikely that significant volumes of water would be encountered during any dewatering operation. However, there may be some local impacts on springs and any burns seasonally dependent on baseflow, particularly if dewatering takes place during summer months.
- The proposed works and drainage from the construction site would not significantly affect the quality of the receiving watercourses provided all committed mitigation measures were successfully implemented.

Operational

Routine Operation

- The outline design for the scheme was developed in accordance with SEPA's requirements and following best practice and SUDS guidance. Checks were made of the effects of run-off and these indicate that the potential impacts would not be significant. The detailed design would require that all detention basins, filter drains and other SUDS systems were installed and maintained. It is therefore not predicted that any significant adverse effects on surface water and groundwater quality would occur as a result of the routine operation of the scheme.

Accidents and Pollution Incidents

- The mitigation measures include filter drains, detention basins and other SUDS measures which would help mitigate the impacts from extreme pollution events. The detention basins and the filter trench would each have an underdrains which would act as a thirds level of SUDS treatment. Each detention basin outfall would be fitted with cut-off valves for use in an emergency. The basins would hold large volumes of run-off and contaminated water, allowing time for pollution response plans to move into action and the resulting cleanup to take place. All drainage measures would be designed in accordance with best practice to meet SEPA's requirements and the risk of pollution to groundwater would therefore be controlled. Catchment drainage plans, contingency plans, emergency response procedures and joint response plans would be developed for the scheme in accordance with SEPA's guidance.

17.3.1 Ecology and Nature Conservation

- No statutory designated sites would be directly impacted on by the proposals.
- The proposed scheme lies within 0.2km of the River Fillan part of the River Tay SAC which is designated for its international nature conservation value. Implementation of best management practices during construction and design and implementation of effective drainage features including detention basins and other SUDS measures would ensure that there were no significant indirect effects on the river.
- The qualifying features of the site would not be affected by construction or operation of the scheme.

- Two LBAP habitats have been identified within the route corridor, coniferous woodland and lowland heath. Some 7ha of wet heath/acid grassland mosaic and some 5ha (3ha outwith the site boundary) of coniferous woodland would be lost to the proposals however the areas lost are small in the context of the wider area and the loss is not considered to be significant.
- Construction of the bypass would be in an area of extensive peat and existing hydrological patterns would change which could affect the character of remaining habitat in the corridor. This is not considered to be significant.
- There would be new planting of some 1.5ha at the edge of the new road following the works. New planting would also be undertaken in the felled area outwith site boundary (some 0.5ha). Maintenance of this are would be the responsibility of the Forestry Commission.
- Casual otter activity has been identified along the route corridor. Otter ledges and fencing would be incorporated into the detailed design of the scheme to reduce the potential for severance effects from the new road.
- A variety of birds have been identified as breeding in the scheme corridor or in proximity to it but no significant effects to any have been identified.
- Deer patterns could change in the area as a result of the construction of the new road which could result in additional grazing pressures in other areas.
- The new landscape proposals have been designed to provide a range of habitats for birds and other animals and have potential to enhance local biodiversity in the longer term.

17.3.2 Landscape and Visual

17.4 SUMMARY

Findings of the Assessment

- The proposed road runs through the woodland fringe and narrow open landscape along the south-western edge of Crianlarich. At the larger scale the line of the road respects the topography, curving round the toe of the hillside, although it smoothes out the small-scale irregularities, introduces a smooth line in a generally irregular scene and reinforces the artificial nature of the current forestry edge.
- Visual effects occur particularly at either end of the village, where the road runs close to houses. There are lesser effects around the station area but none from the centre of village.
- More widely, there are slight, almost negligible visual effects in views from surrounding hill slopes and tops, including five Munros and three Corbetts.

Significant Effects

- At the scale of the landscape character areas as a whole, the new road would have a moderate adverse effect on the landscape during the construction period.
- At a more local scale, there would be a major adverse effect on the landscape of the narrow strip open glen side traversed by the road.
- These effects would all reduce over time as the mitigation matures, such that the eventual overall landscape effect would be minor, although locally they would remain moderate.
- The road and traffic together would have a major adverse visual effect at the time of opening on the group of houses at Tyndrum Terrace, on Willow Brae and Willow Square and Gleann Fiadh Lodge. They would also have a major adverse effect on parts of the Community Woodland and on part of the West Highland Way spur to the village.

- Over time these effects would be reduced by the development of the mitigation planting and the general roadside landscape. The effects on Tyndrum Terrace would remain major because of the views of traffic from the upstairs rear, and at Gleann Fiadh Lodge the effect would remain major because of views of the road and traffic to the south of the house. They would also remain major at the West Highland Way spur where this crosses under the new road. Elsewhere major adverse visual effects would fall to moderate averse or, for Willow Square, from moderate adverse to minor adverse.
- There would be moderate adverse visual effects at the time of road opening from The Shieling and Ardlea, from Carna Cottage, from Station House and from the two groups of houses on Glenfalloch Road. Mitigation planting would generally reduce this effect over time to minor adverse and, at the southern group of houses on Glenfalloch Road to minor beneficial.

17.4.1 Cultural Heritage

- There are 53 sites, of archaeological or historic interest in vicinity of Crianlarich, of which four have statutory protection.
- These include one Scheduled Ancient Monument and three Listed Buildings.
- A review of the historical background of the area shows that the area has undergone substantial pre-historic and historic development. This would indicate that there is the possibility for further unidentified archaeology in the area around Crianlarich.
- The bypass would have a direct physical impact on five sites of local importance (sites 44, 47-50).
- Where a physical impact on a site is predicted, the site would be revealed/excavated to determine whether there would actually be an impact by the route. If the archaeology was unavoidable then it would be excavated and recorded to a suitable standard prior to construction. Where the site is upstanding, rather than buried archaeology, it would be recorded to a suitable standard.
- The sites that would be physically impacted on are a Royal Observer Corps underground monitoring post (site 44), a section of old field bank (site 47), a rectangular building or enclosure (site 48) a levelled area (site 49) and a possible World War 2 lookout post (site 50). The sites would be recorded prior to and during demolition.
- Sites 52 and 53 are very close to the west side of the road cutting. Although only a negligible physical impact is predicted at most they would be recorded to a suitable standard should the practicalities of construction require their removal.
- The setting impacts of those sites with statutory protection have been considered. There would be no significant effect on the setting of these sites.

17.4.2 Disruption due to Construction

- Temporary construction activities would affect the Crianlarich community and the surrounding area and this could be significant over short periods, however, with careful planning, including effective communications with the local community and the travelling public, the effects would be reduced.

17.4.3 Traffic Noise and Vibration

- A detailed baseline noise survey of the study area identified that the key noise source is local road traffic with additional contributions from natural sources such as rustling vegetation and bird song.

- Noise mitigation design was undertaken as part of the iterative design process for the scheme, resulting in a number of noise mitigation measures being incorporated in the proposals.
- The significance of noise effects resulting from noise level changes associated with general traffic growth in the Do Minimum scenario are predicted to be minor adverse at all dwellings.
- During the construction phase, temporary noise effects are predicted ranging in significance from minor to moderate adverse. Minor adverse effects are predicted to arise as a result of average case construction operations. Adverse effects of moderate significance are expected for short duration worst case construction activities where work is to be undertaken at the closest point of the relevant site areas to Northumbria B&B, Sharneil Bungalow, 3 Glenfalloch Road, 1 – 11 Tyndrum Terrace and Ardlea Bungalow. (Receptor Locations 2 and 7).
- During the construction works, temporary groundborne vibration impacts of moderate adverse significance are predicted to arise where heavy construction activities including the use of vibratory rollers are undertaken within distances of less than approximately 23m from vibration sensitive receptors. Where there is potential for moderate adverse effects to arise, vibration monitoring would be undertaken to allow impacts to be appropriately determined and controlled to within acceptable levels.
- The effect of general traffic growth up to the design year (2026DM versus 2011DM) across the study area is predicted to give rise to noise level changes of less than 1dB barely perceptible).
- More receptors are predicted to be subject to noise level decreases than increases. Furthermore,, the magnitude of noise level decreases is predicted to be greater than the magnitude of increases.
- Within the study area (defined within Figures 13.1 A and B), including for the effect of general traffic growth and the effect of the scheme, noise effects at dwellings are predicted to range from major beneficial decreases of greater than 5dB to moderate adverse increases of 3 to 5dB, with the majority of receptors subject to minor noise level changes or less.
- Within the study area, including for the effect of general traffic growth and the effect of the scheme, noise effects at 'other receptors' are predicted to range from moderate beneficial decreases of 3 to 5dB to moderate adverse increases of 3 to 5dB.
- Within the study area, including for general traffic growth and the effect of the scheme, no dwellings are predicted to be subject to adverse effects of major significance, and four are subject to adverse effects of moderate significance, (7, 5 and 11 Tyndrum Terrace and 10 Willow Square). There are six dwellings (1-6 Strathfillan Terrace) subject to beneficial effects of moderate significance and nine (The Shieling, Station House, Northumbria B&B, Dunvegan Block and 5 bungalows east of A82) would be subject to beneficial effects of major significance.
- Effects at Scheduled Ancient Monuments and Listed Buildings are predicted to range from none to minor beneficial.
- For the study area and Do Something scenario, a large proportion of dwellings are predicted to be subject to a change in noise nuisance of between 0% and +40%. Ten receptors are predicted to be subject to an increase in noise nuisance of greater than 20%, eight are predicted to be subject to an increase of between 10 and 20%, with twenty three predicted to be subject to increases of between 0 and 10% and twenty three predicted to be subject to decreases of between 0 and 20%.

- For the Do Minimum scenario, it was identified that all 64 residential receptors were predicted to be subject to an increase in noise nuisance of between 0 and 10%.
- For the study area, no significant adverse airborne vibration effects are expected to arise as a result of the proposed development, whilst some local properties may be subject to a decrease in airborne vibration due to traffic flow decreases on the existing A82, and the proposed route being located at greater distance from properties than the existing route.
- It is not expected that the proposals would result in increasing ground-borne vibration levels on existing routes, furthermore for the existing A82, decreases in road traffic flows are predicted as a result of the scheme, thus resulting in potential reductions in road traffic induced groundborne vibration.

17.4.4 Air Quality

- Air quality within the study corridor is good. Concentrations of all the pollutants which have been considered were found to be well within the statutory objectives.
- The main impacts during construction would result from emissions of dust and PM_{10}. These impacts would be minimised by implementing best management practices on site and overall the residual effects are not considered to be significant.
- During operation, the proposed bypass would lead to a small reduction in NO_2 and PM_{10} concentrations at the majority of receptors which have been assessed. An increase in pollution concentrations is predicted to occur at two receptors for NO_2 and one receptor for PM_{10} as they would be located closer to the route of the proposed bypass than they currently are to the existing route. However the increases predicted at these receptors would be small and probably indistinguishable using available monitoring techniques.
- Approximately 85 properties would experience an improvement in local air quality and two properties would experience a deterioration in local air quality as a result of the proposed bypass. The increase at these properties would be very small and is not considered to be significant Approximately, three properties are likely to experience no change in local air quality.
- Total emissions of both CO_2 and NO_x with the scheme operational would be less than the 2011 baseline. This decrease is primarily due to a reduction in the distance that vehicles would travel using the proposed bypass compared to the current road layout.
- Overall, the scheme would have positive effects on air quality for the local population.

17.4.5 Pedestrians, Cyclists, Equestrians and Community Effects

- Access to and from all properties near the scheme and for users of local roads accessing community facilities would be maintained for all modes during construction and operation of the scheme.
- An underpass and realignment of the West Highland Way spur would be provided to maintain permanent access. Access with appropriate signage would be maintained during construction.
- Reduced traffic within Crianlarich would provide a quieter and less congested environment for pedestrians and cyclists once the bypass was constructed.

17.4.6 Vehicle Travellers

View from the Road

- The view from the existing road is of the village, and provides an interesting variation in the experience of a mainly rural route. The views from the new road would be very restricted, mainly of cutting (and false cutting) slopes (required to give noise protection to nearby properties) with planting. The new road would remove contrast from the visual experience of those using the A82 and replace it with mainly poor quality views. Overall this would be a moderately adverse effect on the road users' visual experience.

Driver Stress

- Driver stress on the existing A82 is assessed as moderate.
- Driver stress on the new route is assessed as low with the existing route remaining moderate through the village because traffic on the road would still be passing through a built up area. The traffic flows on the existing route would be significantly reduced.

17.5 EFFECTS ON THE RIVER FILLAN

The proposed scheme lies approximately 0.2km south west of the River Fillan part of the River Tay Special Area of Conservation. The site would not be directly affected by the proposals. Seven small unnamed watercourses (some ephemeral) run across the route of the scheme and all drain into or into other watercourses which eventually drain into the River Fillan. Implementation of best management practices during construction and design and implementation of effective drainage features including detention basins and other SUDS measures would ensure that sediment rich or polluted run-off was attenuated and there were no significant indirect effects on the river (see Section 9.10.2). The qualifying features of the site would not be affected by construction or operation of the scheme.

17.6 CUMULATIVE EFFECTS

The potential for combined and cumulative environmental effects from the proposed project has been considered at two levels:

- the combined and interactive effects of the different aspects of the project on the various environmental resources and receptors which have been assessed; and
- the cumulative effects of the project with any other approved projects which have been identified in the vicinity of the proposals.

17.6.1 Cumulative Effects of the Scheme

The construction of 1.3km of single carriageway and associated infrastructure would inevitably have cumulative effects in terms of the Loch Lomond and Trossachs National Park, changes in land use, landscape and habitats etc, particularly in a sensitive area where there has not previously been a road. The effects would reduce as mitigation planting matures and the scheme becomes an accepted part of the landscape.

The proposed bypass would remove through traffic using the current A82 route through the village as it would provide a quicker and more direct route. This would benefit properties on the Glenfalloch Road in terms of noise and air quality. Properties which would be sandwiched between the Tyndrum Road and the new A82(T) would experience an adverse effect in terms of noise. The effect on air quality would not be significant. Overall the appraisals have indicated that more properties benefit in terms of noise and air quality than are disadvantaged.

17.6.2 Cumulative Effects of Parallel Projects

No significant applications for development proposals have been submitted or have planning consent in the locality of the scheme. There are several small planning permissions consented at local properties however the effects on this properties have been considered in the EIA and it is anticipated that there would be no significant effects on or from the proposals.

An application has been submitted for the construction of an extension to the Glen Dochart Cycle Route. The off-road section of the route to the north of the village is consented and programmed for construction and so would not be impacted on by the scheme. The proposed section would run on-road through the village. Provision for cyclists to connect into the off-road section has been included in the scheme thus no significant impacts on the proposals are predicted.