
9 SUMMARY OF EFFECTS AND MITIGATION

This chapter provides a summary of the environmental effects associated with the Scheme, along with the mitigation commitments that have been described in each environmental topic chapter, which will need to be part of the Scheme implementation.

9.1 Summary of Effects and Mitigation

Table 9.1 below reports the environmental effects associated with the Scheme, proposed mitigation where appropriate, and the identification of residual effects.

Table 9.1 - Summary of Effects and Mitigation

Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
Cultural Heritage				
Site 2 (Category B Listed AA Sentry Box)	Neutral direct effect	Relocation approximately 1km to the east.	Relocation of AA Sentry Box will place it in an appropriate roadside setting, similar to its current setting.	Not significant.
Hitherto undiscovered archaeological remains	The archaeological potential is considered to be moderate. Any hitherto undiscovered archaeological remains that lie within the landtake for the scheme would be removed during construction.	Trial trenching evaluation followed by an appropriate scheme of full excavation, post-excavation analyses and publication. Scale of work to be agreed with Council Archaeology Advisor.	Recovery of archaeological information and presentation of results in appropriate forum.	Not significant.
Disruption Due to Construction				
Residential properties	Increased noise and vibration, possible dust from earthworks, litter and disruption caused by construction traffic	Appropriate location for site construction compound and best construction site practice e.g. to limit noise and vibration, dust, mud on roads, site EMP	Would reduce level of noise experienced at residential receptors, but still limited exposure to dust, noise, litter and mud on roads.	Minor adverse

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Commercial properties	Increased noise and vibration, possible dust from earthworks, litter and disruption caused by construction traffic. Disturbance to access and property frontage	Appropriate location for site construction compound and best construction site practice e.g. to limit noise and vibration, dust, mud on roads, site EMP. Access maintained at all times	Would reduce level of noise and disturbance experienced at Garden Centre, and opening hours to remain as per normal conditions	Minor adverse.
Vehicle travellers	Additional construction traffic, delays on main A96 carriageway, and temporary diversion to property accesses	Access to remain open to all properties at all times, minimise disruption to A96 e.g. one lane to remain open at all times, detailed Traffic Management Plan	Would alleviate and reduce traffic congestion, although there would inevitably be small periods of delay for some vehicle travellers.	Minor adverse
Pedestrians, cyclists and equestrians	Temporary journey disruption for cyclists using the A96 and side roads	Prevent temporary severance of cycling on the A96 and Loch Oire road	Limited delays, but A96 and side roads to remain open at all times	Negligible

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Ecology and Nature Conservation				
Loch Oire SSSI	No direct landtake, but potential for release of soils, sediment and construction chemicals into the Loch. Non-significant impact at national level and unlikely to happen though the impacts may be significant at the local level.	Ecological Clerk of Works, implementation of SEPA PPG's and CIRIA Report SP156, sensitive habitats clearly marked, detailed Construction Environmental Management Plan, attenuation pond etc.	Lowered risk of the impacts occurring, now extremely unlikely to occur.	Any construction impacts upon Loch Oire SSSI are extremely unlikely to occur, and will be non-significant if mitigation measures are implemented.
Long-established woodland of plantation origin	Direct landtake from small proportion of Sleepieshill Wood (1.33ha). Non-significant impact at the regional level and certain to occur though the impacts may be significant at the site level.	Minimise landtake as far as possible, landscape planting to be undertaken as part of the Scheme, and mitigation also as above for Loch Oire SSSI.	Minimal landtake, resulting in less than 0.2% loss of Sleepieshill Wood (681ha in total at current time).	The construction impacts upon the long-established woodland of plantation origin are certain to occur, though the residual impact is considered non-significant
Habitats	Direct landtake from dense scrub, woodland and semi-improved grassland, and indirect impact from dust. Non-significant impact at the local level and certain to happen.	Minimise landtake as far as possible, landscape planting to be undertaken as part of the Scheme, and mitigation also as above for Loch Oire SSSI.	Some habitats will still be lost due to the Scheme, but over time the landscape design will compensate for this loss, and such habitats are common in the wider area.	Direct impacts upon terrestrial habitats are certain to occur, but the impacts are considered to be non-significant.

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Otter	No direct impacts, though potential for some indirect construction disturbance. Non-significant at the local level and extremely unlikely to happen.	Pre-construction surveys, continuing throughout the construction period. Licence may be required if otter shelters found to be in use, within 100m of construction activity.	Risk of disturbance to otter shelters greatly reduced. Less traffic on the Loch Oire road in close proximity to the Loch, which will reduce possible disturbance and potential road kill incidents.	Direct construction impacts are extremely unlikely to happen, and indirect impacts unlikely. With mitigation in place neither of these impacts is considered significant.
Water vole	No impacts predicted. Non-significant at the local level and extremely unlikely to occur.	Pre-construction checks required on watercourses.	No impacts are expected, but if signs of activity were found, then further detailed mitigation measures would be agreed with SNH.	Any construction impacts upon water voles are extremely unlikely and residual impacts are non-significant.
Bats	Possible bat roosts in trees to be removed. Significant negative at the local level and probable to happen.	Trees with bat roost potential should be checked immediately prior to, and during felling, by a bat specialist.	Impacts upon potential bat roosts will be minimised, and felling can be halted if a roost is found.	The construction impacts upon potential bat roosts will only be non-significant if mitigation measures are enforced.
Red squirrel	Disturbance from construction activity. Non-significant at the local level and extremely unlikely to happen.	Pre-construction surveys for squirrel dreys in trees to be felled. Felling avoided between February and July if at all possible.	No direct or indirect impacts upon red squirrel dreys and activity are expected.	The construction impacts upon red squirrels are considered extremely unlikely, and are non-significant

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Breeding birds	Removal of breeding bird habitat during breeding bird season. Significant negative impact at local and site level and probable.	All tree and scrub removal should be undertaken outwith the breeding bird season, which is regarded as being between March and August.	Although breeding bird habitat would be lost to the scheme, the birds and nests would not be disturbed during the breeding bird season, partial mitigation of anticipated impacts.	The residual impacts will only be non-significant if the prescribed mitigation measures are implemented.
Landscape Effects				
Landscape character	There will be a slight adverse effect on the landscape character resulting from the introduction of the new embankments and access road and loss of vegetation.	Replacement planting	Negligible adverse	Negligible adverse
Visual effects	A small number of residential receptors located adjacent to the scheme will experience substantial effects during construction but moderate changes to their views when the scheme is completed. The remaining receptors will experience less significant effects.	Replacement planting	Moderate adverse	Minor adverse

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Land Use				
Agricultural Land	Permanent loss of land (low grade arable and grazing), temporary landtake during construction and diversion of accesses (2.17ha)	Keep land take to minimum, creation of new accesses, and compensation	The mitigation measures would lessen the impact of any agricultural land take	Minor adverse
Forest / Woodland	Permanent loss of land at Sleepieshill Wood, felling of mature trees (1.33ha)	Planting of new trees as part of landscaping, and minimising landtake	The planting of new trees will partially offset the felling of existing trees	Minor adverse
Residential Properties	Permanent landtake of small area of one residential garden (79m ² at Tilhill)	Compensation, landscaping, and minimise land take	Residential land will be permanently removed from private garden use.	Minor adverse
Commercial property	Permanent loss of land from area of Threapland Garden Centre hardstanding (194m ²)	Compensation, landscaping, and minimise land take	Permanent loss of land from area of hardstanding	Minor adverse

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Water Quality and Drainage				
Loch Oire & Loch Oire Outfall Drain	Sediment mobilisation and spillage or discharge of other pollutants in watercourses (Construction Phase)	The Contractor should implement best practice guidance as detailed in PPG's published by SEPA and CIRIA Report C532. The Contractor should produce a site management plan, and this should include control of surface water run off to existing road drains. Consideration should be given to creating the retention pond infrastructure at the outset of construction work, and this could then be used to treat construction stage site run off prior to discharge.	Potential effects will be minimised	Minor Adverse

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Infrastructure surrounding watercourse crossings	Flood risk to surrounding land from development (Construction Phase)	The Contractor should ensure that provisions are made to keep a flow passing from the Loch to the downstream portions of the Outfall Drain during the works to replace the existing culvert.	Potential effects will be minimised	Negligible Adverse
Loch Oire Outfall Drain	Alteration of watercourse crossing (Construction Phase)	Set up working areas around the Outfall Drain to control the amount of disturbance caused. Complete a survey to record the pre construction condition and inform reinstatement design. It is also recommended that as the new formalised surface water drainage system is installed the retention pond should be available to enable the flows into the Outfall Drain to be controlled.	Potential effects will be minimised	Minor Adverse
Groundwater under the proposed scheme	Potential disturbance of groundwater movement (Construction Phase)	None required at this stage.	None	Neutral

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Receptor / Source Of Impact	Summary Of Effects Before Mitigation	Mitigation	Summary Of Effects After Mitigation	Significance Of Residual Effects
Groundwater under the proposed scheme	Potential contamination to shallow groundwater (Construction Phase)	The Contractor should manage the works in accordance with the best practice guidance provided in the SEPA Pollution Prevention Guidelines, CIRIA Report C532 "Control of water pollution from construction sites", and CIRIA Report C638 "Control of water pollution from linear construction projects".	Potential effects will be minimised	Negligible adverse
Loch Oire Outfall Drain	Discharge of road run off to watercourses (Operational Phase)	The new sections of road are to incorporate SUDS principles, by providing filter drains and an attenuation pond for the road run off. The proposed road alignment and profile has been designed to improve safety and hence reduce the risk of serious accidents and attendant spillages.	Potential effects will be minimised	Minor adverse

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Loch Oire Outfall Drain	Discharge of pollutants from other road and infrastructure maintenance (Operational Phase)	Works to road infrastructure should be completed under an approved method statement and should include best practice measures (including the SEPA Pollution Prevention Guidelines) to reduce the risk of significant or major spillages to the surrounding water resources features.	Potential effects will be minimised	Negligible Adverse
Infrastructure surrounding watercourse crossings	Flood Risk to surrounding land from development (Operational Phase)	The replacement culvert should be sized to accept a defined return period storm, based on storm flows calculated for the Outfall Drain using FEH or similar accepted methods. The designers should ensure that the rates of release of the surface water run off from the retention pond is in accordance with the guidance provided in CIRIA Report C697 for acceptable rates of run off.	Potential effects will be minimised	Negligible to Minor Adverse

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Loch Oire Outfall Drain	Alteration / addition of watercourse crossings (Operation Phase)	The design of the replacement culvert shall be such as to avoid changing the alignment of the channel. Design of the culvert works for the scheme should be in accordance with the Scottish Executive's "River Crossings and Migratory Fish: Design Guidance (April 2002)".	Potential effects will be minimised	Minor Adverse
Loch Oire Outfall Drain	Run off from the scheme into watercourses (Operation Phase)	The designers should ensure that the rates of release of the surface water run off from the retention pond is in accordance with the guidance provided in CIRIA Report C697 for allowable rates of run off.	Potential effects will be minimised	Negligible Adverse
Loch Oire & Loch Oire Outfall Drain	Alteration to land drainage patterns (Construction and Operation Phase)	None included at this stage.	Potential effects will be minimised	Negligible Adverse
Groundwater under the proposed scheme	Potential disturbance of groundwater movement from the new road construction (Operational Phase)	None included at this stage.	Potential effects will be minimised	Neutral

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Groundwater under the proposed scheme	Potential contamination to shallow groundwater (Operational Phase)	The scheme already includes for filter drains and an attenuation pond to provide treatment and storage of the road run off, and therefore primary mitigation is already built into the proposed scheme. No further mitigation has been considered at this stage.	Potential effects will be minimised	Minor Adverse