

23. Summary of Significant Residual Effects

23.1 Introduction

- 23.1.1 This chapter summarises the significant residual effects (Tables 23.1 to 23.11) that have been identified due to construction and operation of the proposed scheme. These residual effects comprise those which remain significant after incorporating the mitigation measures as provided in Chapters 8 to 21 and as set out in Chapter 22 (Schedule of Environmental Commitments).
- 23.1.2 Within this EIAR, significant effects are identified according to the methodology provided for each environmental topic within Chapters 8 to 21. Effects are generally defined as significant in the context of the EIA Regulations where they are assessed as Moderate or of greater significance. Residual effects that have been assessed as not significant are also provided within Chapters 8 to 21, but are not considered within this chapter.
- 23.1.3 The assessment of environmental parameters has found that there are no significant residual effects for the following topics as a result of the proposed scheme:
- Air Quality (Chapter 8);
 - Geology, Soils, Groundwater and Land Contamination (Chapter 13); and
 - Climate (Chapter 20).
- 23.1.4 All residual effects in Tables 23.1 to 23.11 are adverse unless stated otherwise.

Table 23.1: Summary of significant residual effects – Cultural Heritage (Chapter 9)

Residual Effect	Significance of Residual Effect
Construction	
Significant residual effects on historic buildings have been assessed for three receptors: Dunkeld and Birnam Station Signal Box (Asset 16) (Moderate); Dunkeld and Birnam Station, including Footbridge (Asset 26) (Very Large); and Birnam Conservation Area (Asset 44) (Moderate).	Moderate and Very Large
Significant residual effects on historic landscapes have been assessed for one receptor: Murthly Castle Garden and Designed Landscape (GDL) (HLT 14).	Moderate
Operation	
Significant residual effects on historic buildings have been assessed for three receptors: Dunkeld and Birnam Station Signal Box (Asset 16) (Moderate); Dunkeld and Birnam Station, including Footbridge (Asset 26) (Moderate); and Birnam Conservation Area (Asset 44) (Moderate).	Moderate
Significant residual effects on historic landscapes have been assessed for one receptor: Murthly Castle Garden and Designed Landscape (GDL) (HLT 14).	Moderate

Table 23.2: Summary of significant residual effects – Landscape (Chapter 10)

Residual Effect	Significance of Residual Effect	
	Winter Year of Opening	Summer (+ 15 years)
Operation		
Landscape/Townscape Character: Significant residual effects (Large) on the Strath Tay: Lower Glen Local Landscape Character Area (LLCA) during the winter of the year of opening. However, in the summer 15 years after opening, following establishment of the mitigation planting, residual effects would reduce, but remain significant (Moderate) due largely to the effects of the Birnam and Dalguise grade separated junctions and cumulative losses of established woodland along the route corridor. Beyond 15 years, the level of effect is likely to continue to reduce further as woodland planting matures, particularly in areas such as the Birnam Junction and Dalguise Junction.	Large	Moderate

Residual Effect	Significance of Residual Effect	
	Winter Year of Opening	Summer (+ 15 years)
Landscape/Townscape Character: Significant residual effects (Moderate) on the Lowland River Corridor: Strath Tay LLCA and Strath Tay: Dunkeld and Birnam LLCA (Settlement) (including Townscape Character Areas (TCAs) D1, LD1, B1 and B2) during the winter of the year of opening. However, in the summer 15 years after opening, following establishment of the mitigation planting, residual effects on these LLCAs and TCAs would reduce to not significant (Slight).	Moderate	Not significant (Slight)
Landscape/Townscape Character: During the winter of the year of opening, Slight beneficial direct residual effects are predicted on the Lowland Hills -Tayside LCT due to the introduction of areas of mixed and broadleaved compensatory woodland planting at Muir of Thorn. However, in the summer 15 years after opening, following the establishment of these areas of compensatory woodland planting, Moderate beneficial residual effects are predicted on the Lowland Hills -Tayside LCT.	Not significant (Slight beneficial)	Moderate beneficial
Landscape and Landscape Related Designations: There would be no significant risk to the integrity of the River Tay (Dunkeld) NSA. However, there would be significant residual effects (Moderate) during the winter of the year of opening on Special Landscape Qualities (SLQs) of the NSA for SLQs 1, 2, 3, 4, 5, 7 and 8. However, in the summer 15 years after opening, following establishment of the mitigation planting, residual effects on these SLQs reduce to not significant (Slight).	Moderate	Not significant (Slight)

Table 23.3: Summary of significant residual effects – Visual (Chapter 11)

Residual Effect	Significance of Residual Effect
Construction	
Significant residual effects on people's views at 73 visual receptor locations (buildings) of which 42 are a Large significant residual effect and 31 are a Moderate significant residual effect. These effects are temporary (ranging in duration from under one month to approximately 43 months) and may not be significant for the full duration of construction works.	Moderate to Large
Significant residual effects on people's views at 35 visual receptor locations (outdoors) of which 26 are a Large significant residual effect and nine are a Moderate significant residual effect. These effects are temporary (ranging in duration from under one	Moderate to Large

Residual Effect	Significance of Residual Effect
month to approximately 43 months) and may not be significant for the full duration of construction works.	
Operation	
Significant residual effects on people's views at 43 visual receptor locations (buildings) during the winter of the year of opening of the proposed scheme, of which eight are a Large significant residual effect and 35 are a Moderate significant residual effect. Significant residual effects on people's view at 28 visual receptor locations (outdoors) during the winter of the year of opening of the proposed scheme, of which six are a Large significant effect and 22 are a Moderate significant residual effect.	Moderate to Large
Significant residual effects on people's views at three visual receptor locations (buildings) and five visual receptor locations (outdoors) in the summer 15 years after opening.	Moderate
Significant residual effects on the view from the road during the winter of the year of opening at Strath Tay: Lower Glen LLCA (ch850 to ch8280). By the summer 15 years after opening, following the establishment of mitigation planting, these residual effects would reduce to non-significant.	Moderate

Table 23.4: Summary of significant residual effects – Biodiversity (Chapter 12)

Residual Effect	Significance of Residual Effect
Operation	
Significant residual effect to woodland listed on the Ancient Woodland Inventory (AWI).	Moderate
Permanent loss of woodland used by protected species (including breeding birds, pine marten and red squirrel) will be mitigated through habitat creation. However, during the establishment phase of the mitigation planting, a significant residual adverse effect is predicted whilst the canopy is not fully established and whilst the immature woodland does not exhibit features important for biodiversity that are only achieved through woodland maturation. This impact will be temporary, albeit long-term in nature and, once cover is established, no significant residual effects are predicted.	Moderate (temporary)
Significant residual beneficial effect on a variety of protected species, including bats, badger, pine marten, red squirrel due to the new Murthly Estate Bridge structure reducing habitat fragmentation between Dalpowie Plantation and Birnam Wood.	Moderate (beneficial)

Table 23.5: Summary of significant residual effects – Material Assets and Waste (Chapter 14)

Residual Effect	Significance of Residual Effect
Construction	
Significant residual effects have been recorded for waste in relation to the occupation of non-hazardous landfill capacity within the second study area (Tayside, Central and Fife Local Authority Region) and occupation of non-hazardous landfill capacity outwith the second study area. Although the second study area is expected to have sufficient inert landfill capacity to handle most of the surplus materials and wastes generated during the anticipated construction programme (2028 to 2032), all non-hazardous landfills in the second study area are currently scheduled to have ceased infilling by the start of construction in 2028.	Moderate

Table 23.6: Summary of significant residual effects – Noise and Vibration (Chapter 15)

Residual Effect	Significance of Residual Effect
Construction	
Significant residual effects due to construction noise at three individual or groups of noise sensitive receptors, (The Old Bakehouse (and nearby Tirohia, 1 and 2 Station Cottages), Lagmhor (and nearby Caileagan, Braan Cottage, Craigvinean Flat and Craigvinean Surgery) and Dunkeld and Birnam Station).	Significant
Operation	
A significant residual operational noise effect (adverse) at one noise sensitive receptor (Dundonachie Coach House).	Significant
Significant residual operational noise effects (beneficial) at 65 noise sensitive receptors (56 dwellings and nine other sensitive receptors). These include Ballincrief House, Barbed Wire and Poppies, Oakwood and Tomcroy House; dwellings north of Perth Road between A9 and south end of St. Mary's Road (33 dwellings and three other noise sensitive receptors); Hollybank, Carse Na Tay, Shian, Wychwood and Rowanlea; Dowiestone and 6 Perth Road; Dunkeld and Birnam Railway Station; 12 and 13 Birnam Terrace; Merryburn, Tigh Lois, The Merryburn, 8 Station Road, 2 Station Cottages and Tigh Dughlas; 1 Station Cottages and Tirohia; Craigvinean, Craigvinean Surgery and Dunkeld and Birnam Recreation Club; Rose Cottage, Neil Gow Cottage and Sunnybank Cottage.	Significant (beneficial)

Table 23.7 Summary of significant residual effects for Population – Land Use (Chapter 16)

Residual Effect	Significance of Residual Effect
Construction/Operation	
Private Property and Housing	
Access to private property and housing at Birnam Glen (construction only) (Moderate). Access to private property and housing at Birnam, Little Dunkeld and Dunkeld (operation only) (Moderate (beneficial)). Significant residual effects on three private property and housing receptors (Ballincreiff House, Rowanlea, and Tirohia, (all Birnam) (Moderate)).	Moderate Moderate (beneficial)
Community Land and Assets	
Access to community assets located in or near to Ringwood, Birnam, Little Dunkeld, Dunkeld and Inver (operation only) (Moderate (beneficial)). Significant residual effects on two community land and community asset receptors, ranging from Moderate to Large and Very Large (beneficial): Dunkeld & Birnam Railway Station (Station Building) <i>Accessibility WCH (to/from Birnam Glen)</i> (Large). The Hermitage, Dunkeld & Birnam Railway Station (Station Building) <i>Accessibility Vehicles</i> (Moderate). Dunkeld & Birnam Railway Station (Station Building) <i>Accessibility WCH (to/from replacement car park)</i> (Very Large (beneficial)).	Moderate to Large Moderate (beneficial) and Very Large (beneficial)
Development Land	
Significant residual effects on one development land receptor (PA01 (Birnam Industrial Park – T&M Developments))	Large
Businesses	
Access to businesses located in or near to Byres of Murthly, Ringwood, Birnam, Little Dunkeld, Dunkeld and Inver (operation only) (Moderate (beneficial)). Significant residual effects on eight business receptors, ranging from Moderate to Very Large and Very Large (beneficial). Dunkeld and Birnam Railway Station (Interchange) - Network Rail Infrastructure Ltd (Moderate to Very Large and Very Large (beneficial)). Foster Contracting (North) Ltd (including Dunkeld Builders) (Large); Birnam Industrial Park - Lonely Mountain Skis (Large); Birnam Industrial Park – Vacant Unit (Large); Birnam Industrial Park – Colin	Moderate to Very Large Moderate (beneficial) and Very Large (beneficial)

Residual Effect	Significance of Residual Effect
Bell Yard (Large); Aran Bakery (Large); T & M Developments (Large); and SSE PLC Electricity Sub Station, Station Road (Large).	
Agricultural Land Holdings	
Significant residual effects on seven agricultural land holding receptors of Moderate and Very Large significance. Ladywell Farm (Drummond Fencing); Ladywell Farm (Ladywell Fencing); Invermill Farm; Inchmagrannachan Farm and Dalmarnock Fishings and Woodlands Cottage (Very Large) Murthly Estate, Atholl Estates (Moderate)	Moderate and Very Large

Table 23.8: Summary of significant residual impacts for Population – Accessibility (Chapter 17)

Residual Effect	Significance of Residual Effect
Construction	
Significant residual effects for WCH using: Paths 19, 24, 25, 26a and 36 due to impacts on amenity value; and NCR77 (south) and Paths 7, 7a, 22/NCR77, 23, 33, 35, 39 and 48/NCR77 due to impacts on amenity value and potential diversion lengths during construction.	Moderate to Substantial
Significant residual effects due to temporary reduction of local amenity and journey disruption to outdoor areas, affecting WCH in accessing Birnam Hill via Path 23, River Tay via Path 35, and River Braan via Paths 35 and 39.	Moderate to Substantial
Operation	
Significant residual effects for WCH on eight paths, including National Cycle Route (NCR)77, ranging from Moderate to Large. Paths 7a (including crossing point CP01), 19 and 47 (all non-designated Local Paths) (Moderate) Path 22/Core Path DUNK/142 and NCR77 (Moderate) Path 48/Core Path DUNK/100 and NCR77 (Moderate) Path 33/Core Path DUNK/59 (Moderate) Path 23/Core Path DUNK/57/Right of Way 32/10 (including crossing point CP02) (Large) Path 35/Core Path DUNK/23 (including crossing points CP07, CP08 and CP09) (Large)	Moderate and Large
Significant residual effects for WCH accessing outdoor areas of woodland at Ring Wood using Path 19 (due to the reduction in path length) and for WCH accessing the River Braan using Paths 33 and 35 (due to the journey length increases from realignment of paths).	Moderate

Table 23.9: Summary of significant residual effects – Human Health (Chapter 18)

Residual Effect	Significance of Residual Effect
Construction	
Significant residual effects on health and wellbeing of vulnerable groups related to construction noise (Health Determinant (HD) HD7 – noise and the ambient noise environment). Significant residual effects on health and wellbeing of vulnerable groups related to safety risks (HD9 – safety associated with the affected road network). However, these effects will be short-term and reversible on completion of the works.	Moderate
Operation	
Significant residual positive effects on health and wellbeing of vulnerable groups in relation to healthcare facilities (HD3 - healthcare facilities) and in transport-related health determinant HD5 - spatial characteristics of the transport network and usage. Significant residual positive effects on health and wellbeing for vulnerable groups and the general population related to transport (HD9 – safety associated with the road network).	Moderate (positive)

Table 23.10: Summary of significant residual effects – Road Drainage and the Water Environment (Chapter 19)

Residual Effect	Significance of Residual Effect
Operation	
Significant residual effects relating to hydromorphology of WF11 (River Braan).	Moderate
Significant residual effects relating to hydromorphology of WF13.	Moderate

Table 23.11: Summary of significant residual effects – Cumulative Effects (Chapter 21)

Residual Effect	Significance of Residual Effect
Construction	
Significant Type 2 cumulative effects (of the proposed scheme with other reasonably foreseeable developments) are expected during construction as follows: - Five visual receptor building locations due to construction activities. - Seven visual receptor outdoor locations due to construction activities.	Significant

Residual Effect	Significance of Residual Effect
Material assets and waste (waste element) due to the proposed scheme's potential use of the available non-hazardous landfill capacity within the second study area (Tayside, Central and Fife Local Authority Region) as well as the use of non-hazardous landfill capacity outside the second study area.	
Operation Significant Type 1 cumulative effects (of the proposed scheme) are expected during operation for the following receptors: - Ballincrieff: Visual effects at winter year of opening and in the summer 15 years after opening combined with effects arising from land-take and change in access; and beneficial noise effects. - Oakwood, Tomcroy House, Barbed Wire and Poppies: Visual effects at winter year of opening and in the summer 15 years after opening combined with beneficial noise effects. - Rowanlea: Visual effects at winter year of opening combined with effects arising from land-take and change in access; and beneficial noise effects. - Dowiestone, 6 Perth Road, Carse-na-Tay, Shian, Wychwood and Hollybank: Visual effects at winter year of opening combined with beneficial noise effects. 1 Station Cottages: Visual effects at winter year of opening combined with beneficial noise effects. 8 Station Road: Visual effects at winter year of opening combined with beneficial noise effects. 10 Station Road (Tirohia): Visual effects at winter year of opening combined with effects arising from land-take and change in access; and beneficial noise effects. - Dunkeld & Birnam Station: Visual effects at winter year of opening and in the summer 15 years of opening combined with effects arising from land-take and change in access, and effects on historic buildings; and beneficial noise effects. 12 and 13 Birnam Terrace: Visual effects at winter year of opening combined with beneficial noise effects. - The Merryburn Hotel: Visual effects at winter year of opening combined with beneficial noise effects. - Craigvinean Surgery: Visual effects at winter year of opening combined with beneficial noise effects. - Dunkeld & Birnam Recreation Club: Visual effects at winter year of opening combined with beneficial noise effects. - Sunnybank Cottage and Niel Gow Cottage: Visual effects at winter year of opening combined with beneficial noise effects.	Significant

Residual Effect	Significance of Residual Effect
Significant Type 2 cumulative effects (of the proposed scheme with other reasonably foreseeable developments) are expected during operation as follows: ▪ Strath Tay: Lower Glen LLCA during the winter of the year of opening and in the summer 15 years after opening due to the combined effects of the proposed scheme and the A9 Dualling: Tay Crossing to Ballinluig project road infrastructure and loss of vegetation. ▪ Strath Tay: Mid Glen LLCA during the winter of the year of opening and in the summer 15 years after opening due to the combined effects of the proposed scheme and the A9 Dualling: Tay Crossing to Ballinluig project road infrastructure and loss of vegetation. ▪ River Tay (Dunkeld) NSA during the winter of the year of opening on SLQs 1, 2, 3, 4, 5, 7 and 8 due to the combined effects of the proposed scheme and the A9 Dualling: Tay Crossing to Ballinluig project road infrastructure and loss of vegetation. ▪ Five visual receptor building locations during the winter of the year of opening due to the combined effects of the proposed scheme and the A9 Dualling: Tay Crossing to Ballinluig project road infrastructure and loss of vegetation. ▪ Six visual receptor outdoor locations during the winter of the year of opening and two in the summer 15 years after opening due to the combined effects of the proposed scheme and the A9 Dualling: Tay Crossing to Ballinluig project road infrastructure and loss of vegetation. ▪ AWI habitat due to loss of irreplaceable woodland across the A9 Dualling programme projects.	