1 Assessment of Related Infrastructure – Raigbeg Rail Bridge Replacement

1.3 Introduction

The Consenting Context

1.3.1 The replacement or major modification of a rail bridge underpass on the Highland Main Line (such as at Raigbeg/Lynebeg near Tomatin) forms an integral enabling element of major regional transport enhancements. Depending on the scope of the project, consent for rail and highway infrastructure works is typically sought under the Town and Country Planning (Scotland) Act 1997 or through specific statutory orders (such as Road Orders and Compulsory Purchase Orders under the Roads (Scotland) Act 1984) alongside Network Rail's permitted development powers.

1.3.2 The applicant's interpretation of assessment requirements is that the Environmental Impact Assessment (EIA) process for the main infrastructure scheme must additionally assess secondary and indirect environmental effects associated with key related works, such as rail bridge replacements and associated watercourse/culvert diversions—insofar as is reasonably possible.

1.3.3 The Electricity Works and Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations state that the EIA Report should provide an indication of any technical difficulties encountered in compiling required information. A key technical challenge in predicting likely environmental effects is that final detailed engineering methods (e.g., precise track possession windows, offline construction areas, and heavy transport movements) are dependent on Network Rail operational constraints, contractor logistics, and severe weather contingencies.

1.3.4 As such, an assessment of predicted environmental effects has been made based upon the best current understanding of a pre-cast offline build and SPMT (Self-Propelled Modular Transporter) installation methodology.

1.4 Scope

1.4.1 Given the above qualifications and context, the purpose of this section is:

- To describe the existing local rail and road infrastructure;
- To describe the bridge replacement working corridor and its environmental sensitivities; and

1.4.2 Based upon the identified construction corridor, demonstrate that a replacement solution is achievable without significant long-term environmental impacts.

1.5 Proposed Works Corridor & Construction

Network Context

1.5.1 The targeted crossing carries the Highland Main Line railway over local access routes (such as the B1954/U2829) and minor watercourses adjacent to the main A9 corridor south-east of Inverness, near Tomatin.

Construction Methodology

1.5.2 The bridge will be constructed to the East of the existing bridge. Western options were ruled out due to a ~5 m elevation difference between the cutting crests, which would require excessive earthworks or steep grades.

1.5.3 To avoid transported turbine blades oversailing Network Rail (NR) boundaries, the bridge will follow Route A. This requires a skewed alignment across the railway cutting.

1.5.4 The superstructure will maintain a minimum rail-to-soffit clearance height of 6.650 m to accommodate future railway electrification (up from the existing 4.5 m clearance).

Key Construction Steps

Site Earthworks & Surface Drainage

1.5.5 Excavation and earthworks will take place to line up with the proposed highway alignment.

1.5.6 Drainage management features (such as soakaways and swales) will be constructed to control surface run-off without overloading the rail cutting slopes.

Substructure & Integral Abutment Placement

1.5.7 Substructure Location: Abutments will be built directly on the cutting slopes inside the Network Rail boundary fence.

1.5.8 Geotechnical Considerations: Construction on the cutting slopes requires careful integration with historical slope interventions (such as rock blankets, counterforts, crest ditches, and 6G granular replacement) to avoid destabilising the slopes.

1.5.9 Integral Detailing: The deck and abutments are constructed to form a single rigid structure, eliminating the need for bearings or expansion joints.

Superstructure Erection

1.5.10 Due to the span length and a required lifting radius of approximately 60–70 m, a single-crane lift is impracticable.

1.5.11 Erection Method: The superstructure will be placed using either longitudinal launching or a tandem crane lift.

1.5.12 If launched, temporary launching equipment and a launching nose will be set up in the fields south of the site, with the bridge launched northwards into its final position.

Network Rail Interface & Safety Protocols

1.5.13 Because construction occurs inside the NR fenceline and directly over operational tracks, work will be governed by Network Rail Standard NR/L3/CIV/020.

1.5.14 Construction activities over or near the tracks will be scheduled during pre-agreed line possessions.

1.5.15 Continuous supervision will be provided by a dedicated Network Rail Construction Manager, with formal site handbacks to Network Rail required after every shift.

Finishing & Asset Integration

1.5.16 Non-climbable vehicle restraint systems (parapets) will be installed at the required safety height to protect rail traffic and road users.

1.5.17 Carriageway surfacing will be laid, incorporating space for traffic as well as integration with National Cycle Route 7capacity.

1.6 Potential Impact

1.6.1 A preliminary assessment of the precited environmental effects of the potential Reigbeg Bridge has been undertaken to verify that there are unlikely to be any unacceptable environmental effects.

1.6.2 The main receptors considered to have the potential for likely significant effects are:

- Landscape and Visual;
- Non-Avian Ecology;
- Ornithology;
- Archaeology and Cultural Heritage;
- Hydrology
- Traffic and Transport; and
- Noise.

1.7 Landscape and Visual

1.7.1 Currently there is no detailed design for the proposed Reigbeg bridge replacement, therefore only a high-level assessment of landscape and visual impacts of likely significant effects has been carried out to support Abnormal Indivisible Load (AIL) vehicle movements into the Clune Wind Farm. However, for the purpose of this assessment it has been assumed that construction locations and temporary laydown areas would be restored to their existing condition, and any landscape elements, such as drystone dykes, traditional masonry, or estate fencing, would be reinstated to their original specification.

Baseline Characteristics

Landscape Fabric / Topography and Landuse

1.7.2 The bridge replacement site and immediate access route are located within a landscape that comprises:

- a settled strath valley environment associated with the River Findhorn and local watercourses;
- a combination of agricultural land, modified grassland, and riparian vegetation;
- commercial coniferous forestry plantations and patches of native broadleaf woodland/scrub along the valley slopes;
- the local U2856 road network, existing bridge crossing, and small estate tracks;
- scattered residential properties, farmsteads, and cottages in the Reigbeg, Strathdearn, and Tomatin areas; and
- established infrastructure including the A9 transport corridor, local utility lines, and existing wind farm access routes.

Landscape Character

1.7.3 The proposed bridge replacement is located within the transition between the Rolling Uplands – Inverness Landscape Character Type (LCT), the Forested Upland

Fringe LCT, and the Upland Strath LCT (Strathdearn). This landscape is characterised by the enclosed and wooded slopes of the valley which give way to higher rolling moorland. Given the localised nature of the works in the strath, there is a settled character defined by field boundaries, roadside vegetation, and existing transport infrastructure associated with rural access and nearby operational wind farms (such as Farr and Glen Kyllachy).

Visual Amenity

1.7.4 The bridge replacement site and adjoining transport corridor contain a number of key visual receptors, including:

- users of the local U-class road network (e.g., U2856) and the nearby A9 trunk road;
- residential receptors in scattered properties around Reigbeg, Strathdearn, and Tomatin; and
- local walkers, cyclists, and recreational users on Core Paths and in the nearby Cairngorms National Park (CNP) fringe.

1.7.5 The local road network acts as a key rural access route in the immediate vicinity of the bridge, and the works sit in proximity to the sensitive recreational landscapes of the CNP fringes and local scenic valleys.

Construction Impacts

Effects on Landscape Receptors

1.7.6 Construction activities associated with the bridge replacement are likely to result in temporary impacts on the landcover, landscape elements, and localised disturbance to the riparian environment at the crossing point. The principal impacts on landscape fabric would arise from site preparations (including clearance of roadside/riverbank vegetation, ground stripping, and excavation for abutments/foundations), temporary crane pads or laydown areas, and the dismantling of the existing structure. Impacts would, however, be of short duration, geographically localised, and reversible, and are therefore not considered likely to be significant.

1.7.7 Construction operations would introduce temporary disturbance, additional heavy vehicle movements, and construction plant to the settled landscape of the Upland Strath LCT. However, the surrounding area already contains operational wind farm infrastructure and modified access routes, and so the works would not represent a wholly novel element in the landscape. Construction activities would be of short duration and localised extent, and are therefore considered unlikely to constitute a significant effect on the baseline character of the site and adjoining landscape.

1.7.8 Whilst there is potential for indirect effects on nearby landscape designations such as the Cairngorms National Park (CNP) and the Drynachan, Lochindorb and Dava Moors SLA, the temporary and localised nature of construction impacts, coupled with the natural screening provided by woodland and topography on the lower strath slopes, confirm that these highly valued landscapes would not be subject to significant construction effects.

Effects on Visual Receptors

1.7.9 While the works are limited to the immediate bridge crossing, the site is situated within a settled valley where residential properties are located (in and around Reigbeg, Strathdearn, and Tomatin) and where local roads and recreational paths are present. Construction works would have potential effects on the amenity of visual receptors nearby, principally in respect of temporary visual disturbance from plant and earthworks. However, such effects would be geographically localised, short term, and reversible, and are therefore not considered significant..

Operational Impacts

Effects on Landscape and Visual Receptors

1.7.10 Following the completion of the replacement bridge and the implementation of site restoration measures, long-term effects on landscape fabric, landscape character, or visual amenity would be minimal. The replacement structure would be integrated into the existing road alignment and viewed as a modernised rural infrastructure asset replacing an existing crossing. Provided that appropriate finishes and boundary treatments are adopted, the operational bridge would not contribute to significant individual or cumulative landscape and visual effects within the strath context.Mitigation

Mitigation

1.7.11 On the basis of the preceding assessment of potential construction and operational effects, the focus of mitigation would comprise:

- the careful layout of temporary working areas, crane pads, and material storage to avoid sensitive riparian habitats, mature trees, and direct visual intrusion;
- the adoption of a phased construction approach that minimises the duration of ground exposure and enables rapid reinstatement of disturbed banks and verges;

- the selection of sympathetic materials and finishes for the bridge parapets and retaining walls to respect the local valley character;
- retention of existing riverbank tree cover and woodland where practicable to maintain natural visual screening; and
- early restoration of all disturbed ground to a condition consistent with the current baseline, alongside the reinstatement of any stone walls, fencing, or landscape elements damaged during the works.

Residual Impacts

1.7.12 Taking account of the embedded and additional mitigation measures outlined previously, no significant effects are anticipated during either the construction or operational phase of the Reigbeg bridge replacement.

1.7.13 Effects on landscape fabric would be confined to the construction phase during earthworks and foundation construction, entailing localised loss of ground cover and bank vegetation. However, this would be reinstated in the short term.

1.7.14 Similarly, whilst construction would introduce temporary plant movements and structural works to the immediate setting, these would be highly localised and short term, with the character of the local strath returning to its baseline condition upon completion.

1.7.15 The visual amenity of nearby receptors would only be subject to small scale and temporary impacts associated with construction activity. The permanent replacement structure would integrate into the local road network, ensuring long-term views are not significantly affected.

1.8 Archaeology and Cultural Heritage

Baseline Characteristics

1.8.1 There are no heritage assets with statutory or non-statutory designations known to be directly impacted within the immediate footprint of the proposed Reigbeg bridge replacement. The closest scheduled monuments and listed buildings are generally concentrated within the wider strath and around the settlement of Tomatin, located at a distance from the bridge crossing site. Historic Environment Scotland (HES) raised no objections to the main wind farm application, indicating a general lack of highly sensitive statutory assets in the immediate vicinity.

1.8.2 There are a number of non-designated heritage assets recorded in the Historic Environment Record (HER) within the broader study area of the bridge site and local transport network. As the access route passes through Strathdearn toward Reigbeg, these typically include assets of post-medieval and agricultural or infrastructure origin.

1.8.3 While the presence of prehistoric assets (such as burnt mounds or cists) cannot be ruled out along the river valley terraces, the recorded assets in this immediate landscape are predominantly later historical features.

1.8.4 The post-medieval assets likely to be present in this transitional valley landscape include: former bridge abutments, farmsteads, stone boundary walls, enclosures, sheepfolds, small stone borrow pits, and historic trackways associated with the historical settlement and crossing points of Strathdearn.

1.8.5 The majority of these identified non-designated agricultural and infrastructure assets are assessed as being of no more than low sensitivity, while any undiscovered prehistoric remains would hold a higher sensitivity.

Construction Impacts

1.8.6 Replacement of the Reigbeg bridge and associated approach works would have potential to directly affect any identified heritage asset or traditional masonry structure that lies within its immediate construction boundary. Structural design and working footprints can usually be microsited or carefully managed to avoid identified assets along the riverbank and road verge.

1.8.7 In addition to potential impacts from bridge demolition and civil engineering activities, the establishment of construction compounds for materials and plant storage, crane pads, and workers' welfare accommodation could also have direct impacts on identified heritage assets.

1.8.8 It is also possible that buried archaeological remains that have not been identified by the desk-based baseline study could be directly affected either as a result of riverbank excavations, abutment groundworks, or the establishment of working compounds.

1.8.9 Where works are proposed within existing road carriageways and the current bridge footprint (such as the U2856), the potential for direct impact on unrecorded archaeology and cultural heritage assets is normally low or negligible, as previous bridge and road construction work is likely to have had a detrimental impact on any buried remains that may have been present. Where abutment widening, crane pads,

or working areas extend into roadside verges or undisturbed riverbank ground, the potential for direct impacts on archaeology and cultural heritage is likely to be low; although the possibility of buried archaeological remains surviving in undisturbed ground cannot be ruled out.

1.8.10 Depending on the final construction footprint, a small number of non-designated assets adjacent to the crossing could be directly affected, such as remnants of post-medieval stone walling, trackways, or earlier bridge footings. Excavation for bridge abutments and foundations could reveal buried, unrecorded archaeological remains that may survive either along the verge or below the undisturbed bank surface.

Operational Impacts

1.8.11 Following the completion of construction works and site reinstatement, the replacement bridge would form part of the established rural road network, resulting in a negligible potential for long-term adverse impact on the settings of cultural heritage assets in the area.

1.8.12 The operational bridge structure would be viewed within the context of the existing local road network, local crossing points, and rural transport infrastructure. It would have an impact on the setting of nearby heritage assets of only negligible magnitude; an effect that would be minor and not significant.

Mitigation

1.8.13 Most of the identified heritage assets within the vicinity of the bridge replacement site can be avoided by design of the working footprint, bridge alignment, and the selection of the sites for construction compounds; thereby ensuring their preservation in situ.

1.8.14 Where the bridge replacement works pass in close proximity to any known HER assets or involve ground disturbance in previously undisturbed riparian ground, an archaeological watching brief would be carried out to ensure that any buried remains or historic masonry are identified and recorded to an appropriate standard.

1.8.15 If required under the terms of a planning condition, the scope of any required archaeological watching brief(s) would be agreed through consultation with The Highland Council's Historic Environment Team (HET) in advance of development works commencing and would be set out in a Written Scheme of Investigation (WSI).

1.8.16 If significant discoveries are made during any archaeological monitoring works that are carried out, and it is not possible to preserve the discovered remains in situ, provision would be made for the excavation, where necessary, of any archaeological deposits encountered. The provision would include the consequent production of written reports on the findings, with post-excavation analysis and publication of the results of the works, where appropriate.

1.8.17 Written guidelines would be issued for use by all construction contractors, outlining the need to avoid causing unnecessary damage to known heritage assets or historic stone structures. The guidelines would set out arrangements for calling upon retained professional support in the event that buried archaeological remains of potential archaeological interest (such as building remains, historic masonry, human remains, artefacts, etc.) should be discovered in areas not subject to archaeological monitoring. The guidelines would make clear the legal responsibilities placed upon those who disturb artefacts or human remains.

1.9 Ecology

Baseline Characteristics

1.9.1 Baseline surveys undertaken for the Proposed Development did not fully extend to cover the entirety of the bridge replacement footprint at Reigbeg. However, a summary of the likely ecological sensitivities of the bridge replacement site and immediate access route, based on the findings of baseline environmental data and surveys for the Proposed Development and its immediate surroundings, is provided below:

1.9.2 Habitats/Botany: The bridge crossing sits within a settled strath environment characterised by riparian woodland, scattered broadleaf trees, wet meadow, modified neutral grassland, and riverbank vegetation. Modified blanket bog and wet heath are absent from the immediate crossing footprint, though localised upland acid grassland and patches of scrub may be present along the bank approaches.

1.9.3 Avifauna: The wider area lies in proximity to sensitive designated sites, including the Kinveachy Forest Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), and Special Area of Conservation (SAC), which support nationally important breeding woodland bird assemblages (notably capercaillie). Local watercourses and woodland corridors near Reigbeg also provide foraging and nesting habitat for breeding riverine and woodland bird species, as well as range habitat for white-tailed eagle.

1.9.4 Protected Mammalian Species: The ranges of otter, badger, water vole, bats, pine marten, and red squirrel encompass the bridge replacement area. The presence of otters and water voles is of high sensitivity given the direct interaction of the works with the River Findhorn watercourse system and its feeding tributaries. Mature trees along the riverbank may also provide roosting potential for bats.

1.9.5 Fish and Freshwater Invertebrates: The watercourse at the bridge crossing falls within or feeds directly into key river catchments (including the River Findhorn and connections toward the River Spey SAC network), supporting sensitive aquatic species such as Atlantic salmon, sea trout, brown trout, freshwater pearl mussel, European eel, and lamprey species where suitable instream gravels and water quality exist.

1.9.6 Protected Reptilian Species: The ranges of adder, common lizard, and slow worm encompass the wider strath landscape, and these species may be present along vegetated bank slopes, drystone structures, and sunny road verges adjacent to the bridge works.

Potential Effects

1.9.7 The potential effects during both construction and operation of the bridge replacement on ecological sensitivities relate primarily to localised civil engineering, structural removal, and riverbank works required to facilitate Abnormal Indivisible Load (AIL) vehicle movements. Below is a summary of potential effects that the bridge replacement may have on ecological receptors:

- Direct and indirect habitat loss (e.g., clearance of riverbank vegetation, localised tree felling, and temporary laydown disturbance);
- Disturbance to / loss of breeding sites and resting places for protected mammals (e.g., otter holts/couches, water vole burrows, or bat roosts in mature trees/bridge masonry);
- Disturbance to nesting riverine birds and woodland bird assemblages during construction activities;
- Direct / indirect loss of localised foraging resource;
- Displacement / disruption to the movement of species along the river corridor during works;
- Environmental effects, specifically silt runoff, sediment release, or fuel/chemical spillages entering the watercourse, which could adversely affect Atlantic salmon, trout, freshwater pearl mussel, and otters; and
- Changes to bank morphology or instream hydraulics during foundation, abutment, or temporary bridging works.

Approach to Mitigation

1.9.8 Proposed mitigation will vary depending on the detailed ecological constraints identified during pre-construction baseline surveys at the bridge site. The following points are provided as standard measures and site-specific embedded mitigations to address construction and operational impacts:

- Avoidance by Design: Structural design and working footprints will be minimised to avoid sensitive riverbank habitats and mature trees where practicable, while maintaining appropriate set-backs from known ecological constraints.
- Pre-construction Surveys: Target pre-construction surveys for otter, water vole, roosting bats, and breeding birds prior to any vegetation clearance or structural demolition.
- Hydrological Buffers & Working Limits: Demarcation of strict working zones to prevent unnecessary encroachment into the river channel and riparian zone outside the immediate construction footprint.
- Pollution Prevention: Standard pollution prevention mitigation (complying with GPP/PPG guidelines) will be employed throughout the construction phase. Surface runoff, concrete washings, and excavation water will pass through settlement tanks, silt traps, and oil interceptors prior to discharge to protect downstream aquatic habitats.
- Clerk of Works Oversight: An Environmental/Ecological Clerk of Works (ECoW) will be appointed to continuously monitor bridge replacement works, oversee instream/bankside activities, and ensure compliance with environmental protections.
- Timing of Works: In-river and bankside construction activities will be timed to avoid sensitive periods for migratory fish spawning, otter breeding, and the main bird nesting season (March to August inclusive).

Residual Impacts

1.9.9 On the assumption that the final bridge design, construction methodology, and timing are strictly informed by site-specific ecological surveys, and that standard embedded mitigation measures, pollution controls, and Construction Environmental

Management Plan (CEMP) protocols are enforced by an ECoW, no significant residual ecological impacts are anticipated to occur.

1.10 Ornithilolgy

Existing Conditions

1.10.1 As detailed in Chapter 8 (Ornithology) and the Additional Information Report, the Kinveachy Forest Special Protection Area (SPA), Special Area of Conservation (SAC), and Site of Special Scientific Interest (SSSI) are in close proximity to the Proposed Development and the access route via Reigbeg. Consequently, as identified in updated bird surveys, there is potential for connectivity between the wider area surrounding the Reigbeg bridge replacement site and the Kinveachy Forest SPA and SSSI, whose qualifying features include capercaillie and a nationally important breeding woodland bird assemblage.

1.10.2 Baseline surveys undertaken for the Proposed Development did not fully extend to include the entirety of the bridge replacement footprint at Reigbeg. (Bespoke baseline surveys and pre-construction checks would be carried out as part of the detailed engineering and environmental assessment process prior to commencement). A summary of the likely ornithological sensitivities of the bridge replacement site and immediate access route (based on the findings of baseline surveys for the Proposed Development) is provided below.

1.10.3 Breeding Woodland Birds and Capercaillie: The Kinveachy Forest SSSI and SPA support nationally important breeding woodland bird assemblages, specifically including capercaillie. As the access route passes through the wooded strath near Reigbeg and Tomatin, there is potential for woodland species to be present or moving through adjacent riparian and forest habitats.

1.10.4 Raptors (including White-tailed Eagle): White-tailed eagles have been identified as a key sensitive species in the area, and their flight paths and range expansion encompass the Proposed Development and the wider valley. Other raptor species typical of upland moorland edges and river straths may also forage or breed in the vicinity of the bridge crossing.

1.10.5 Breeding Waders, Riverine Birds, and Moorland Birds: The immediate valley context includes riverbank, wet meadow, and nearby moorland edge habitats where riverine species, breeding waders, and red grouse may be present depending on prevailing habitat conditions. Should any section of the bridge replacement works (and associated laydown or crane setup areas) fall within established buffer distances for Schedule 1 species, checks will be undertaken by a suitably licensed ornithologist and an appropriate protection buffer applied.

Species Scoped Out of Assessment

1.10.6 On the basis of experience from other relevant projects and policy guidance or standards (e.g. NatureScot guidance), the following species are likely to be 'scoped out' since significant effects are unlikely:

- Common and/or low conservation species not recognised in statute as requiring special conservation measures, i.e. bird species not listed on Annex 1 of the EU Birds Directive or Schedule 1 to the Wildlife & Countryside Act 1981 (as amended);
- Common and/or species of low nature conservation importance not included in non-statutory lists that indicate birds whose populations are at some risk either generally or in parts of their range (e.g. the Birds of Conservation Concern (BoCC) Red list); and
- Passerine species (not generally considered to be at risk from short-term civil engineering or bridge construction works), unless being particularly rare or vulnerable at a national level.

Potential Construction/Decommissioning Effects

1.10.7 Based on the available information to date from baseline surveys for the adjacent Proposed Development (Chapter 8) and preliminary desk-based review for the Reigbeg bridge replacement site, the following construction/decommissioning effects are likely to require consideration:

- Disturbance/displacement to target species (breeding woodland birds, riverine species, raptors, owls, and waders) associated with heavy civil engineering, piling/foundation works, structural removal, and heavy plant movements during the bridge replacement.

Potential Operational Effects

1.10.8 Based on the available information to date from baseline surveys for the adjacent Proposed Development and the preliminary results from the desk-based study for the bridge crossing, the following operational effects are likely to require consideration:

1.10.9 Following completion of the bridge works, operational traffic (including AIL deliveries for Clune Wind Farm) will pass over the new structure. Operational traffic will be periodic and of low frequency, and the replacement bridge structure itself

presents no collision risk to avifauna. Operational impacts on target species are therefore anticipated to be negligible.

Approach to Mitigation

1.10.10 Significant effects upon birds will be avoided/minimised where possible within the design and construction management process. Good practice during construction and removal of the existing structure will also be implemented, including strict working footprints around sensitive riverbank and woodland vegetation.

1.10.11 Where potential likely significant effects on Important Ornithological Features (IOFs) are identified, measures to prevent, reduce and where possible to offset these adverse effects will be proposed.

1.10.12 Standard good practice measures will be applied to minimise any potential effects on any wintering foraging/roosting wildfowl and breeding waders within up to 500 m and/or breeding Schedule 1/Annex 1 raptors and owls within up to 800 m of the bridge works.

1.10.13 If required, a Breeding Bird Protection Plan (BBPP) will be produced for the construction phase to ensure that pre-construction nest clearance checks are executed and that all reasonable precautions are taken to ensure relevant wildlife legislation is adhered to (e.g. avoiding vegetation clearance during the main breeding season from March to August).

Residual Impacts

1.10.14 On the assumption that the final bridge replacement design and construction schedule are strictly informed by ornithological sensitivities identified (particularly regarding the Kinveachy Forest designations, riparian nesting species, and raptor flight paths), and that mitigation measures and good practice methods are adopted, no significant residual impacts are anticipated to occur.

1.11 Geology, Peay & Hydrogeology

Baseline Characteristics

1.11.1 As noted previously, the proposed Reigbeg bridge replacement is required to facilitate Abnormal Indivisible Load (AIL) vehicle movements into the Clune Wind Farm. The bridge replacement site and immediate access route along the local road network (e.g. U2856) sit within a settled strath valley environment associated with the River Findhorn catchment and connections toward the wider River Spey Special Area of Conservation (SAC) catchment.

1.11.2 Where civil engineering works and bridge replacement occur, the potential for localised direct hydrological, hydrogeological, and superficial geological impacts requires careful control. Ground disturbance would be required for bridge abutment foundations, crane pads, and temporary laydown areas, though the working footprint is localised assuming appropriate site boundaries are maintained.

1.11.3 The site falls within or feeds directly into sensitive watercourse catchments, including the River Findhorn. The bridge replacement involves direct civil engineering works over and adjacent to the main river channel and its minor tributaries. Construction activities and temporary watercourse crossing arrangements would be carefully managed to maintain flow capacity and prevent pollution.

1.11.4 The immediate river crossing and valley slopes comprise alluvial deposits, river terrace gravels, and localised modified soils rather than deep upland blanket peat. Baseline peat conditions along the immediate bridge footprint are minimal, though localised pockets of organic soils or peaty deposits may occur in adjacent low-lying bank verges.

1.11.5 Baseline conditions with regards to wider localised hydrological sensitivities including Groundwater Dependent Terrestrial Ecosystems (GWDTE) and public or private water supplies (PWS) in the immediate Reigbeg and Tomatin area are to be verified following specific site-specific baseline surveys. The following section outlines the wider hydrological sensitivities that would be considered when bringing forward the bridge replacement submission.

Potential Hydrological Effects

1.11.6 The Reigbeg bridge replacement works would be assessed for the following potential effects:

- construction runoff, sediment and silt release, and potential fuel/chemical pollution events during in-river and bankside works (of particular sensitivity given the downstream aquatic designations and connectivity to the River Findhorn and River Spey SAC catchments);
- potential disturbance to riverbank stability, superficial geology, and localised organic or alluvial soils;

- potential localised effects on GWDTE where bankside excavations interact with shallow groundwater groundwater-seepages; and
- potential effects on nearby public or private water supplies (PWS) serving properties in Reigbeg, Strathdearn, or Tomatin.

1.11.7 The potential effects from construction runoff and potential pollution events would be controlled through adherence to best practice guidance (including SEPA Guidance for Pollution Prevention / GPPs) as detailed in a project-specific Construction Environmental Management Plan (CEMP).

1.11.8 Works within or adjacent to the watercourse, including engineering operations, temporary abstractions, or bridge structure replacement, will require authorisation under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) from SEPA (e.g. a Simple Licence or Complex Licence depending on the scale of engineering and CAR Practical Guide thresholds). This would include details of surface water management and drainage plans proposed for the construction phase.

1.11.9 The potential effects of the bridge replacement works on GWDTE and any public and private water supplies would be fully assessed once detailed baseline data and abstraction locations have been verified against the final engineering design.

Approach to Mitigation

1.11.10 The following section identifies potential mitigation measures that would need to be considered to reduce the likely significant effects.

1.11.11 Sediment and Erosion Control: To protect the River Findhorn watercourse and downstream aquatic habitats, strict sediment control measures will be required. A 10m to 50m buffer from the watercourse will be maintained for stockpiled materials and refuelling areas where technically feasible. Runoff entering excavations or temporary compounds will be directed through settlement tanks, silt fences, and sediment traps before any indirect discharge.

1.11.12 If high or moderate GWDTE are identified within the immediate survey zone around the bridge abutments, a 100 m buffer (or site-specific hydrological mitigation) would need to be considered in accordance with SEPA Land Use Planning System Guidance Note 31, in order to ensure no significant adverse effect on GWDTE.

1.11.13 If the bridge foundations or temporary laydown areas intersect habitat comprising high or moderate GWDTE, further hydrogeological assessment would be conducted to ascertain whether the works interrupt preferential groundwater flow paths and to implement suitable cross-drainage measures.

1.11.14 The design of the bridge replacement and associated earthworks would aim to result in minimal long-term disturbance to natural ground and river hydraulics. Backfilling around abutments and retaining structures with appropriate permeable fill will allow natural shallow groundwater movement to reoccur once construction has been completed.

1.11.15 A 100m buffer would be required around groundwater abstractions for private water supplies (or 250m for excavations deeper than 1.5m). Where a supply may be influenced by surface water or shallow groundwater interactions, the wider hydrological connectivity of the working area to the supply source would be evaluated. Should the assessment identify a potential risk, mitigation measures would be submitted to SEPA and The Highland Council (THC), including water quality monitoring regimes or alternative temporary supply provisions during the works.

Residual Impacts

1.11.16 On the assumption that the final bridge replacement design and construction methodology are strictly informed by identified geological, hydrological, and water supply sensitivities, and that robust mitigation measures including CAR authorisation, CEMP protocols, and Environmental/Ecological Clerk of Works (ECoW) oversight are adopted, no significant residual impacts are anticipated to occur.

1.12 Traffic and Transport

Baseline Characteristics

1.12.1 Baseline surveys undertaken for the Proposed Development's Transport and Access chapter (Chapter 10) focused extensively on the access routes surrounding the wind farm, including the U2856 and the A9. The review of the proposed Reigbeg bridge replacement in terms of traffic and transport has been informed by these comprehensive baseline traffic surveys, desk study, and professional judgement regarding Abnormal Indivisible Load (AIL) access requirements for the Clune Wind Farm.

1.12.2 The local road network outwith the site boundary, specifically the U2856 and local access roads near Reigbeg, is predominantly made up of narrow, single-track rural roads with passing places and structural weight or geometry constraints at existing

watercourse crossings. In contrast, the A9 is a major, high-capacity trunk road that acts as the primary transport gateway for the region.

1.12.3 Traffic counts undertaken for the EIA confirm that the local road network, particularly the U2856, is currently very lightly trafficked, especially regarding existing baseline Heavy Goods Vehicle (HGV) and Abnormal Indivisible Load (AIL) movements.

Construction Impacts

1.12.4 It is anticipated that construction vehicles for the Reigbeg bridge replacement will travel to the site utilising the A9 trunk road and access the local corridor via the U2856. As such, there would be a localised, temporary increase in traffic on these roads during the bridge replacement phase.

1.12.5 Construction traffic associated with the bridge replacement would involve HGV movements to deliver structural elements, concrete, aggregate, piling/foundation plant, and cranes, as well as movements to carry away excavated material from the existing bridge structure. Staff are anticipated to travel to the site via the A9 and would be of a limited number each day. Whilst no specific quantitative traffic appraisal has been undertaken exclusively for the bridge replacement works, the EIA demonstrates that the local road network has massive spare capacity. Specifically, a theoretical road capacity review confirmed that even during the peak construction of the main wind farm, the U2856 retains 98.36% of its spare capacity. Therefore, there is ample capacity to comfortably accommodate the construction traffic required for the bridge replacement.

1.12.6 It is inevitable that temporary traffic management, single-lane working, or short road closures will be required during the bridge replacement works; for example, when cranes or construction vehicles require occupation of the road, or during the dismantling of the existing bridge and lifting of the new structure. Where required, temporary diversionary routes, convoy systems, or traffic signal controls will be implemented in coordination with The Highland Council and local residents.

Operational Impacts

1.12.7 Operational impacts in terms of traffic and transport following completion of the bridge replacement will be positive, as the new structure will safely accommodate AIL vehicle movements associated with turbine component deliveries for Clune Wind Farm, as well as general operational traffic and local rural road users. Operational traffic associated with routine maintenance of the bridge structure itself will be limited to occasional Light Goods Vehicle (LGV) trips, rendering operational traffic impacts negligible.

Mitigation

1.12.8 A Construction Traffic Management Plan (CTMP) and an AIL Route Access Strategy will be required as part of the submission for the bridge replacement, aligning with the robust commitments already made for the main wind farm. This would include mitigation measures such as:

- detailed temporary traffic management plans, local diversion routes, and clear public notification prior to any required road closures;
- restricted hours of construction deliveries (e.g., 0700 to 1900, Monday to Saturday) to avoid peak local travel times;
- swept path analysis and trial runs for AIL vehicle deliveries to verify swept paths; and
- good practice measures such as wheel washing facilities and routine road sweeping prior to vehicles leaving the work area to join the public road network.

Residual Impacts

1.12.9 It is considered that with the adoption of the proposed mitigation (principally the CTMP and AIL Route Access Strategy), no significant residual impacts in respect of traffic and transport are anticipated to occur during either the construction or operational phases.

1.13 Noise and Vibration

Baseline Characteristics

1.13.1 The noise character of the area transitions from an exposed, remote upland moorland environment at the wind farm site (where the acoustic environment is dominated by wind and natural sounds) to a more settled rural environment as the valley descends towards Reigbeg, Tomatin, and Strathdearn. In these lower-lying areas around the bridge crossing, the acoustic baseline is heavily influenced by traffic noise from the A9 trunk road, local vehicle movements on the U2856, the flow of the river, and general agricultural activities.

Construction Impacts

1.13.2 Noise and vibration would arise during the construction of the Reigbeg bridge replacement due to the operation of heavy plant machinery (e.g., excavators, piling equipment, cranes, and concrete delivery vehicles) and associated construction traffic utilising the local road network. Construction noise levels at nearby sensitive residential properties, particularly scattered dwellings in the strath near Reigbeg or along the U2856 approach, would depend on their exact distance from the bridge site and temporary laydown areas. However, these impacts would be highly localised, temporary in nature, and could be effectively managed and mitigated.

Operational Impacts

1.13.3 Operational noise associated with the replacement bridge structure will be negligible. Vehicle movements over the newly engineered bridge surface will result in smooth traffic flow without the clatter or vibration often associated with deteriorating or temporary bridge structures. No significant operational noise or vibration impacts are expected as a result of the bridge replacement.

Mitigation

1.13.4 Any noise or vibration emitted during the construction period would be temporary. 'Best practicable means' would be used to reduce noise levels with due regard to practicality and cost in line with the Control of Pollution Act (CoPA) 1974[1].

1.13.5 To protect the amenity of nearby residents, construction working hours for the bridge replacement would be restricted to align with standard practice and the main development (e.g., 0700 to 1900, Monday to Saturday, with no noisy works on Sundays or Bank Holidays except by prior agreement).

1.13.6 The guidance provided by BS 5228-1:2009+A1:2014 (Noise) and BS 5228-2:2009+A1:2014 (Vibration) would be utilised to identify appropriate mitigation, such as switching off plant when not in use, fitting effective silencers, and maintaining well-fitted acoustic enclosures on equipment. The final mitigation measures to be adopted would be agreed with The Highland Council as part of the Construction Environmental Management Plan (CEMP).

1.13.7 As the bridge structure contains no mechanical or electrical generation components, no ongoing operational noise mitigation is required.

Residual Impacts

1.13.8 With the implementation of restricted working hours and standard best-practice acoustic and vibration mitigations outlined in the CEMP, no significant residual noise or vibration impacts are anticipated due to either the construction or operation of the Reigbeg bridge replacement.

1.14 Summary

Table 1.1 Likely Secondary and Indirect Impacts of the Proposed Development resulting from the Potential Reigbeg Bridge replacement

	Construction Impacts	Operational Impacts	Mitigation	Residual Effects	Means by which Mitigation would be delivered
Landscape and Visual	Localised, temporary visual intrusion from heavy plant, cranes, welfare compounds, soil stockpiles, traffic management, and bridge demolition activities within Strathdearn.	Low to negligible long-term visual change. The replacement bridge replaces an existing structural transport element within an established rural road setting.	Context-sensitive structural design and material selection; consolidation of working footprints; full post-construction site reinstatement and native re-vegetation	Not significant / Minor.	• Approved Landscape and Site Reinstatement Plan. • Detailed Structural Design Approval. • Planning Conditions.
Archaeology and Cultural Heritage	Potential direct physical impacts on identified post-medieval non-designated heritage assets (e.g., walls, tracks, bridge footings) and unrecorded buried archaeological remains from riverbank excavations, abutment groundworks, and compound setup.	Negligible potential for long-term adverse impacts on the settings of nearby cultural heritage assets. The replacement structure fits into the established rural transport context.	Micro-siting and design optimization to avoid known HER assets in situ; archaeological watching briefs during ground disturbance in undisturbed areas; controlled excavation/recording if preservation in situ is unfeasible; contractor guidelines for chance finds.	Not significant / Minor.	• Written Scheme of Investigation (WSI) agreed with The Highland Council's Historic Environment Team (HET). • Planning Conditions. • Construction Environmental Management Plan (CEMP).
Ecology	Localised vegetation clearance and habitat loss; potential disturbance, displacement, or direct harm to protected species (e.g., otter, water vole, bats, badger) and aquatic fauna (salmonids) during groundworks, in-river works, and bridge demolition.	Negligible. Reinstated riverbanks maintain habitat continuity and wildlife movement along the river corridor.	Pre-construction protected species surveys; implementation of species exclusion buffers; NatureScot licensing (if required); adherence to SEPA CAR conditions; continuous silt/sediment pollution controls.	Not significant / Minor.	• Construction Environmental Management Plan (CEMP). • Ecological Clerk of Works (ECoW) oversight. • NatureScot Species Protection Licences (if required).
Ornithology	Temporary disturbance, acoustic displacement, and potential nest abandonment for breeding or foraging birds due to construction noise, machinery, and footprint works; minor, localized loss of nesting/foraging vegetation.	Negligible. The low-level bridge structure presents no operational collision risk or long-term displacement to bird species.	Schedule ground clearance and vegetation removal outside the bird breeding season (1 March – 31 August); pre-construction ECoW nest checks and protection buffers if clearance occurs during breeding season.	Not significant.	• Construction Environmental Management Plan (CEMP). • Pre-construction ECoW surveys/checks. • Planning Conditions.
Geology, Peat & Hydrology	Potential for construction runoff, silt/sediment release, and fuel/chemical pollution into watercourses (River Findhorn / Spey SAC catchment); potential localized ground/bank disturbance; potential disruption to GWDTE or Private Water Supplies (PWS).	Negligible long-term impact on natural ground and river hydraulics. Permeable backfilling around abutments restores natural shallow groundwater movement.	Strict sediment and erosion control (settlement tanks, silt fences); maintenance of 10m–50m watercourse buffers for stockpiles/refuelling; 100m–250m buffers around GWDTE and PWS; hydrogeological cross-drainage measures where needed.	Not significant.	• SEPA Controlled Activities (Scotland) Regulations (CAR) Licence (Simple or Complex). • Construction Environmental Management Plan (CEMP). • Environmental / Ecological Clerk of Works (ECoW) oversight.

	Construction Impacts	Operational Impacts	Mitigation	Residual Effects	Means by which Mitigation would be delivered
Traffic and Transport	Localised, temporary increase in HGV and construction vehicle traffic on the A9 and U2856 for material/plant delivery and bridge removal; temporary traffic management, single-lane working, or short road closures during lifting operations.	Positive long-term impact by providing a safe, upgraded route capable of accommodating Abnormal Indivisible Load (AIL) movements for wind farm turbine component deliveries; negligible operational traffic from maintenance trips.	Implementation of temporary traffic signals, convoy systems, and clear public notification of road closures; restricted delivery hours (0700–1900, Mon–Sat); swept path analysis and AIL trial runs; wheel-washing facilities and routine road sweeping	Not significant	• Construction Traffic Management Plan (CTMP). • AIL Route Access Strategy. • Agreements/consents with The Highland Council Roads Authority and Police Scotland.
Noise	Localised, temporary increase in noise and vibration from heavy plant operation (piling, excavators, cranes) and construction traffic affecting nearby sensitive residential receptors along the U2856/Reigbeg area.	Negligible. Vehicle movements across the new engineered bridge surface will result in smooth traffic flow without structural clatter or excessive vibration.	Utilisation of Best Practicable Means (BPM); restricted working hours (0700–1900, Mon–Sat); compliance with BS 5228 guidelines (plant shut-down when idle, silencers, acoustic enclosures on equipment).	Not significant.	• Construction Environmental Management Plan (CEMP). • Section 61 consent under the Control of Pollution Act (CoPA) 1974 (if required). • Planning Conditions.