

West Riverside and Woodbank House

Environmental Statement: Volume 1 – Main Report

On behalf of **Flamingo Land Ltd and Scottish Enterprise**



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This report has been prepared by Peter Brett Associates LLP ('PBA') on behalf of its client to whom this report is addressed ('Client') in connection with the project described in this report and takes into account the Client's particular instructions and requirements. This report was prepared in accordance with the professional services appointment under which PBA was appointed by its Client. This report is not intended for and should not be relied on by any third party (i.e. parties other than the Client). PBA accepts no duty or responsibility (including in negligence) to any party other than the Client and disclaims all liability of any nature whatsoever to any such party in respect of this report.

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1 Introduction

1.1 Introduction

- 1.1.1 This Environmental Statement (ES) has been prepared by Peter Brett Associates LLP (PBA) to accompany an application for planning permission in principle (PPiP) for the erection and operation of a proposed tourism and leisure-led mixed use development ('the proposed development') on land at West Riverside and Woodbank House, Balloch ('the site'). The PPiP application and this ES are submitted on behalf of Flamingo Land Ltd and Scottish Enterprise ('the Applicants') to the Loch Lomond and the Trossachs National Park Authority (LLTNPA) as the relevant local planning authority.
- 1.1.2 The ES has been co-ordinated by Peter Brett Associates LLP ('PBA') on behalf of the applicant, with input from technical assessment specialists as detailed in **Section 1.7**.

1.2 Purpose of this Environmental Statement

- 1.2.1 The purpose of this ES is to report the findings of an Environmental Impact Assessment (EIA) carried out for the proposed development. In doing so, this ES identifies the likely significant environmental effects of the proposed development during construction and operation. The ES has been prepared in accordance with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 as amended ('the EIA Regulations') which are applicable to the determination of the PPiP application for the proposed development.

1.3 The Site

- 1.3.1 The site of the proposed development comprises approximately 35.5ha of land, situated to the north of Balloch at the southern tip of Loch Lomond. The site contains two distinct but contiguous areas, known for the purposes of this ES and the PPiP application as West Riverside and Woodbank House. The West Riverside area encompasses the south western bank of the River Leven at its confluence with Loch Lomond and extends eastwards across Drumkinnon Wood, whereas the Woodbank House area comprises the remains of the Grade A listed Woodbank House hotel, associated structures and attendant grounds.
- 1.3.2 A detailed description of the site and surrounding area is provided in **Chapter 2** of this ES, with a Site Location Plan provided as **Figure 2.1** in **Appendix 2** of **Volume 2 – Appendices**.

1.4 The Proposed Development

- 1.4.1 The proposed development comprises the erection and operation of a tourism and leisure-led mixed use development, including:
- Refurbished tourist information building;
 - 60-bedroom Apart-hotel;
 - 32-bedspace budget accommodation;
 - Up to 105 self-catering lodges;
 - 20 houses;
 - 900m² brewery;
 - Leisure / pool / water park area up to approximately 2,500m²;
 - Restaurants / Cafe & Retail areas up to 1,100m² in total;
 - Visitor reception areas & hub building up to approximately 2,000m²;
 - External activity areas including tree top walk, events/ performance areas, children's play areas, monorail, forest adventure rides, picnic / play areas;
 - Staff and service area of up to approximately 900m²;

- Associated parking (up to 320 additional spaces), landscaping and infrastructure development works; and
 - Access to be taken from the surrounding road network including Ben Lomond Way and Pier Road.
- 1.4.2 The proposed development also includes the retention of the Grade A Woodbank House listed building façade. Of note, the conservation and redevelopment of other listed structures within the site will be subject to future applications for planning and listed building consent.
- 1.4.3 As the Applicants are seeking PPIp rather than full planning permission, at this stage the proposed development comprises a suite of key parameters, within which the detailed design of the proposed development will be confirmed later. This EIA has therefore adopted a Rochdale Envelope approach to assess likely significant effects on the environment from the key parameters of the proposed development. Providing that the final design remains within these key parameters, this approach ensures that the likely ‘worse case’ effects can be considered when determining the PPIp application for the proposed development.
- 1.4.4 A detailed description of the key parameters of the proposed development is provided in Chapter 3 of this ES. This is supported by a Parameters Plan, provided as **Figure 3.1** in **Volume 2 – Appendices**, which is the key plan for which PPIp is being sought by the Applicants. All other plans submitted within this ES and the wider PPIp application are indicative and are provided for illustrative purposes only.

1.5 Terms and Definitions

- 1.5.1 For ease of reference, the following terms have been used in the ES:
- The site – the area within the PPIp application boundary which this ES relates to, as outlined in red on the Site Location Plan (Figure 2.1) within Volume 2 – Technical Appendices;
 - West Riverside and Woodbank House – the two distinct areas of land which together comprise the site;
 - The proposed development – the erection and operation of a tourism and leisure-led mixed use development as summarised in Section 1.4 above and detailed within Chapter 3 of this ES;
 - The Applicants – Flamingo Land Ltd and Scottish Enterprise;
 - The PPIp application - the application for planning permission in principle being submitted on behalf of the Applicants for the proposed development; and
 - The EIA Regulations – the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 as amended.

1.6 The EIA, ES and Related Documents

- 1.6.1 This ES presents the findings of an EIA undertaken for the proposed development in accordance with the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 as amended, referred to as ‘the EIA Regulations’. The transitional arrangements within the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, which came into force in May 2017, confirm that EIAs for development proposals which were the subject of an EIA scoping request prior to 16th May 2017 should proceed in accordance with the 2011 EIA Regulations. As a combined EIA screening and scoping request was submitted by PBA on behalf of the Applicants to the LLTNPA in April 2017, the 2011 EIA Regulations remain applicable to the EIA being undertaken for the proposed development.
- 1.6.2 Running concurrently with the design process (which remains ongoing), the EIA has sought to:
- Identify the likely environmental effects of the proposed development;
 - Define appropriate design and construction measures and good practice to mitigate likely significant adverse environmental effects and maximise opportunities for environmental

enhancements resulting from the construction and operation of the proposed development; and

- Determine the significance of the likely residual environmental effects from the proposed development remaining identified mitigation and enhancement measures have been taken into account.

1.6.3 The ES comprises the following volumes:

- **Volume 1** – Main report;
- **Volume 2** – Appendices; and
- **Non-Technical Summary**.

1.6.4 The other principal documents submitted with the planning application include:

- Drawings (to be approved and illustrative);
- Design Statement;
- Pre-Application Consultation Report;
- Transport Assessment;
- Flood Risk Assessment;
- Enabling works report;
- Drainage Assessment;
- Planning Statement.

1.7 Stakeholder Consultation

1.7.1 A programme of consultation has been undertaken to inform the design of the proposed development and the EIA reported in this ES:

- Following a request submitted by PBA on behalf of the Applicants, a formal EIA scoping exercise was co-ordinated by LLTNPA in Spring 2018 seeking the views of consultees (statutory and non-statutory) regarding the required scope of the EIA for the proposed development. The resulting EIA Scoping Opinion, issued by the LLTNPA on 11th May 2017, has guided the preparation of this ES and is provided in full as **Appendix 4.1** in **Volume 2 – Appendices**;
- Post scoping consultation has been undertaken with individual consultees to clarify points noted within LLTNPA's EIA Scoping Opinion, inform the emerging design of the proposed development (e.g. with respect to parking provision) and agree the detailed scope of the assessment presented in this ES. Details of these consultations are provided where relevant in Subsection **3 – Methodology** of each assessment presented in **Chapters 6 – 16** of this ES; and
- A programme of public consultation has been undertaken, pursuant to the pre-application consultation requirements prescribed within Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 for all proposed 'major' developments, of which the proposed development is one. Full details of this pre-application consultation and how it has informed the design of the proposed development are provided within a separate **Pre-Application Consultation (PAC) Report** prepared by PBA on behalf of the Applicants. Relevant environmental issues raised through pre-application consultation activities are however addressed within the assessments presented in Chapters 6 – 16 of this ES.

1.8 Project Team

1.8.1 The organisations involved in the preparation of this ES are listed below:

- **Peter Brett Associates (PBA)** – EIA Co-ordination, Planning, Traffic & Transport, Ground Conditions & Geology, Socio Economics, Tourism, Recreation & Public Access;

- **EnviroCentre** – Ecology, Trees & Woodland, Water Hydrology & Flood Risk, Air Quality, Noise & Vibration;
- **Gillespies** – Landscape and Visual Impact; and
- **Headland Archaeology** – Archaeology.

1.8.2 The wider project team involved in the preparation of the PPIP application for the proposed development also includes:

- **Anderson Bell + Christie Architects** – Project Architect;
- **PBA** – Planning Agent, Civil Engineering, Site Investigation (SI) Co-ordination, Pre-Application Consultation;
- **Brown + Wallace** – Cost Consultant; and
- **Tourism Resources Limited** – Commercial Strategist.

1.8.3 The full project team is listed in **Appendix 1.1**.

1.9 Structure of the Environmental Statement

1.9.1 The remainder of this ES is structured as follows:

- **Volume 1** – Main Report:
 - **Chapter 2:** description of the site and the surrounding area;
 - **Chapter 3:** summarises the proposed development, including utilities and the consideration of alternatives;
 - **Chapter 4:** provides the methodology and assessment methods adopted to undertake the EIA;
 - **Chapter 5:** summarises the planning and policy context to the proposed development;
 - **Chapters 6 to 14:** comprise the technical assessment chapters which document the aspects of the environment likely to be significantly affected by the proposed development and describes the likely significant effects of the proposed development (Ecology and Woodland; Traffic and Transport; Noise and Vibration; Air Quality; Water, Hydrology and Flood Risk; Ground Conditions and Geology; Landscape and Visual;; Archeology and Cultural Heritage; Socio-economics, Tourism, Recreation and Public Access);
 - **Chapter 15:** provides an assessment of impact interactions;
 - **Chapter 16:** provides a consolidated schedule of all identified mitigation measures and monitoring requirements; and
 - **Chapter 17:** provides a glossary of terms.
- **Volume 2** – Technical Appendices (**1.1 to 14.3**); and
- **Non-Technical Summary**.

2 Site and Surrounding Area

2.1 Overview

- 2.1.1 This chapter outlines the key environmental characteristics of the site and the surrounding area which have informed the EIA being undertaken for the proposed development. Details of the characteristics and sensitivities of the individual receptors which have been identified within relevant Study Areas and used to assess likely environmental effects from the proposed development are then provided in subsection 4 of **Chapters 6 – 14**.

2.2 The Site

Site Location and Context

- 2.2.1 The PPiP application site ('the site') is located to the north of Balloch and it contains two distinct areas, known respectively as West Riverside and Woodbank House. The site is therefore referred to in full as 'West Riverside and Woodbank House'. This site comprises approximately 35.5ha of land north of Balloch, at the southern tip of Loch Lomond. A Site Location Plan, showing the PPiP application red line boundary delineated in red and other land under the control of the Applicants in blue, is provided as **Figure 2.1** within **Appendix 2.1**.

Site Overview

- 2.2.2 A high level description of the West Riverside and Woodbank House areas of the site is provided below. Further details regarding individual potential receptors and sensitive areas within the site are identified within subsection 4 – **Baseline** of each technical assessment presented in **Chapters 6 – 15**.

West Riverside

- 2.2.3 The West Riverside site is bounded generally by the River Leven to the East, Loch Lomond Shores and Loch Lomond to the North, Old Luss Road and Ben Lomond Way to the west and Balloch Road and the houses in Clairinsh to the South.
- 2.2.4 The West Riverside area is heavily influenced by Drumkinnon Woods and other pockets of landscaped woodland, amenity areas and car parks are in the north of the site and to the east of the Loch Lomond Shores complex.
- 2.2.5 An oil pipeline operated by Ineos runs east-west through the northern portion of the West Riverside area of the site, approximately parallel with Ben Lomond Way. The exact location is visible via pipeline markers and two fenced off areas in the north east near the junction of Ben Lomond Way and Pier Road – these are understood to be valve gear / headworks associated with the pipeline. The pipeline does not intrude into the Woodbank House area.
- 2.2.6 As the site is located close to the waterfront, it is considered to be constrained to the north and east by the River Leven and by Loch Lomond itself. There a number of existing minor roads running through the site including Pier Road and Ben Lomond Way. These connect to Balloch Road and a number of roundabouts linking motorists from the A811 Stirling Road and the A82 trunk road network.
- 2.2.7 The A82 provides the principal access route to the west of Loch Lomond, other parts of the Trossachs, Argyll & Bute and the North West Highlands.
- 2.2.8 The application site is a very short walking distance to Balloch Train Station – which currently provides a half hourly service to Glasgow and Lanarkshire on the North Clyde line. The station is limited in terms of size/scale and has a limited covered waiting area and passenger facilities, with only one platform.
- 2.2.9 The John Muir Way runs through the site. This established route will be secured and enhanced by the development. The site is also situated very close to National Cycle Route 7.

Woodbank House

- 2.2.10 The area known as Woodbank House comprises the remains of the Woodbank House hotel, outbuildings and gardens including estate walls. The area is situated immediately to the west of Old Luss Road and approximately 500m east of the A82.
- 2.2.11 At the centre of the Woodbank area of the site lies the remains of Woodbank House, a Grade-A listed property. The buildings which comprised this hotel are in a state of advanced disrepair as a result of a fire (at the main hotel building) and subsequent dereliction. The land surrounding the house are wooded and slope steeply upwards from the Old Luss Road towards the A82. To the front of the ruined Woodbank House building, between it and the Old Luss Road, is an area of open grassland that is currently used for grazing.

Access

- 2.2.12 Access into the site is influenced by the location of the River Leven to east, Loch Lomond to the north and the existing urban form of Balloch to the south.
- 2.2.13 There a number of existing minor roads running through the site including Pier Road and Ben Lomond Way. These connect to Balloch Road and a number of roundabouts linking motorists from the A811 Stirling Road and the A82 trunk road network.
- 2.2.14 The A82 provides the principal access route to the west of Loch Lomond, other parts of the Loch Lomond and the Trossachs National Park, Argyll & Bute and the North West Highlands. This trunk route is strategic in nature and is therefore maintained by Transport Scotland.
- 2.2.15 The site is a very short walking distance to Balloch Train Station, which at present provides a half hourly service to Glasgow and Lanarkshire on the North Clyde line. The station is limited in terms of size/scale and has a limited covered waiting area and passenger facilities, with only one platform.
- 2.2.16 The site is situated very close to National Cycle Network Route 7 and the John Muir Way. These established routes would be secured and enhanced by the development to ensure that the potential connections from these routes are utilised and enhanced.

Site History

West Riverside

- 2.2.17 Available historical maps from 1864 show that the West Riverside area of the site was primarily occupied by fields and woodland (labelled as Drumkinnon Wood). Balloch Rail Station was situated in the south east of the site and a railway line ran up the eastern site boundary connecting Balloch Pier to the wider rail network. Throughout the history of the site, various branches, sidings and associated infrastructure were present associated with the rail line. The north western most strip of land was shown to comprise mixed woodland, bounded by a track to the west. The south eastern portion (connecting the north western strip of land to the land in the east) was grassland (presumed to be agricultural).
- 2.2.18 Historic mapping indicates that an excavation labelled as a Sand Pit was present in the north western area of the site, within Drumkinnon Wood in 1899 and a curling pond was present in the north eastern corner. The excavation in the west appears to have been enlarged on the mapping from 1958.
- 2.2.19 In the 1960s, excavations labelled as Gravel Pits were present at the north western extent of the site. The excavations encroached onto the site, but were present more extensively offsite to the north west. The excavations continued to extend throughout the sequence of maps, until recent mapping which showed this area as part of Loch Lomond – indicating that the former excavations have been flooded – with a new shoreline created that is currently occupied by the Lomond Shores retail and leisure destination.
- 2.2.20 The Loch Lomond silk drying and finishing factory with associated tanks was constructed in the 1930s and was located immediately offsite to the south along with several associated outbuildings and a railway line. The factory (subsequently labelled as Works) was present on mapping until around 1992. The works and infrastructure have since been demolished and the housing estate on Clarinish Road has been constructed in its place.

Woodbank House

- 2.2.21 Historical mapping shows the Woodbank House area to have remained largely unchanged since the first mapping (1864) when it comprised fields and woodland. The only significant infrastructure that appears to have been present on the site is associated with the (now derelict) hotel and outbuildings. The buildings were labelled on maps as Woodbank, and as a hotel from around 1958.

Environmental Characteristics

West Riverside

- 2.2.22 The West Riverside area of the site includes Drumkinnon Woods. This semi-natural woodland is located south east of the Loch Lomond Shores complex, across an undulating landform and is dissected by footpaths. The woodland is bounded to the west and north by roads accessing Loch Lomond Shores and the pier. Part of the woodland is designated as Ancient Woodland (long-established of plantation origin). Although subject to a level of disturbance, the woodland has the potential to support a range of wildlife.
- 2.2.23 SEPA's Indicative Flood Maps indicate that the northern part of the site surrounding Balloch Pier and the western banks of the River Leven running through the site are located within the 1 in 200 year return period flooding envelope (medium likelihood of flooding). However, a flood study of the river undertaken by Jacobs¹ which provides a more detailed outline of the modelled flood extents along the river highlights that the northern part of the site from the existing roundabout on Pier Road and above, would in fact be inundated in the 1 in 200 year return period event, and more substantially in the 1 in 500 year return period event. Only a small strip of land along the banks of the River Leven through the site would be affected by this flooding.

Woodbank House

- 2.2.24 The Woodbank House area of the site is not indicated as susceptible to river flooding on SEPA's indicative flood maps, however there are areas shown as being at potential risk of surface water flooding that coincide with the two small watercourses running through this area from the hills to the west towards Loch Lomond.

Existing Land Uses and Activities

- 2.2.25 Table 2.1 below identifies all existing land uses and activities known to be present either within the site or along its boundaries. In accordance with the embedded mitigation set out in **Section 3.4**, continuity of access to these receptors will be maintained throughout the construction and operational phases of the proposed development.

Table 2.1 Existing Land Uses and Activities within the Site

Receptor Type	Existing Uses and Activities
Recreational routes	Loch Lomond Shores Walk, John Muir Way, Three Lochs Way, National Cycle Route 7, West Loch Lomond Cycle Path, Regional Cycle Route 40
Tourism, Recreation and Leisure	Maid of the Loch, Sweeney's Cruises, Tourist Information Centre (Balloch VisitScotland iCentre), Tour Boats, Sealife Centre, Loch Lomond Bird of Prey Centre, Treezone aerial adventure course, Pier head users (swimming, fishing, canoeing, rowing, water-skiing, bike & boat hire etc.)

¹ Jacobs 2009, River Leven Flood Study Review & Update of Original Work

Receptor Type	Existing Uses and Activities
Other	Loch Lomond Shores including all operators currently within complex, National Park ranger's office at Pierhead

2.3 The Surrounding Area

2.3.1 As would be expected given the site's location within a National Park, it is proximate to various tourism and recreation resources/receptors, including: Loch Lomond, Ben Lomond, Luss, the River Leven and Balloch itself (with particular reference to visitor-related business activity and the accommodation sector). The closest visitor attractions to the site are:

- Loch Lomond Shores, a retail and leisure development situated immediately to the north west;
- The Loch Lomond Steamship, berthed at Balloch Pier within the northern extent of the development site;
- Loch Lomond Birds of Prey Centre, located within the Loch Lomond Shores complex;
- Balloch Castle and Country Park are situated east of the development site across the River Leven; and
- Other visitor attractions and tourism developments are located at greater distance within Balloch and along the shores of Loch Lomond.

2.3.2 Relevant environmental characteristics and sensitivities within the surrounding area are identified as potential receptors within the technical assessments presented in **Chapters 6 – 15**.

2.4 Cumulative Development

2.4.1 The EIA Regulations require likely significant cumulative effects from a development proposal in combination with other existing or proposed developments to be described within an ES. Details of relevant existing, approved and proposed developments which have been considered in this ES are provided below.

2.4.2 Consultation was undertaken with LLTNP in December 2017 to confirm the cumulative/committed developments which would be considered in this EIA. All of the selected cumulative developments are located within the immediate vicinity of the site, as shown on **Figure 2.2 – Cumulative Developments Plan**. These cumulative developments have been included within cumulative impact assessments provided in subsection **10** of each technical assessment presented in **Chapters 6 – 14**.

Existing Development

2.4.3 Existing development is considered as a receptor and/or impact source where relevant within each technical assessment through **Chapter 6 – 14**.

Approved Development

2.4.4 Table 2.2 below identifies the approved developments which have been considered in this EIA.

Table 2.2 Relevant Approved Developments

Planning Application Reference	OS grid reference	Overview
Drumkinnon Bay Dredging 2017/0326/DET	NS 38531 82178	Dredging operation to extend existing dredged channel

Planning Application Reference	OS grid reference	Overview
Woodbank Inn Extension 2017/0223/DET	NS 38938 81921	Demolition of kitchen extension. Erection of 3 storey extension comprising of 18 hotel rooms and kitchen

Other Proposed Development

2.4.5 Table 2.3 below identifies the approved developments which have been considered in this EIA.

Table 2.3: Relevant Proposed Developments

Planning Application Reference	OS Grid Reference	Overview
Sweeney Cruises Replacement Infrastructure 2017/0373/DET	NS 38938 81921	Demolition of existing buildings and erection of: office building; slipway enclosure/workshop building; boathouse and installation of 2 pontoons
Balloch Street Design Project	NS 39299 80180	The Balloch Village Plans (Street Design) Project builds on the extensive engagement undertaken through the 'Live in Balloch' Charrette process that took place in February and March 2016.

3 The Proposed Development

3.1 Introduction

3.1.1 This chapter provides an overview of the key construction and operational characteristics of the proposed development.

3.2 Overview

3.2.1 The proposed development comprises the erection and operation of a tourism and leisure-led mixed use development at the site, including:

- Refurbished tourist information building;
- 60-bedroom Apart-hotel;
- 32-bedspace budget accommodation;
- Up to 105 self-catering lodges;
- 20 houses;
- 900m² brewery;
- Leisure / pool /water park area up to approximately 2,500m²;
- Restaurants/Cafe & Retail areas up to 1,100m² in total;
- Visitor reception areas & hub building up to approximately 2,000m²;
- External activity areas including tree top walk, events/ performance areas, children’s play areas, monorail, forest adventure rides, picnic / play areas;
- Staff and service area of up to approximately 900m²;
- Associated parking (up to 320 additional spaces), landscaping and infrastructure development works; and
- Access to be taken from the surrounding road network including Ben Lomond Way and Pier Road.

3.2.2 The proposed development also includes the remains of the Grade A listed Woodbank House and attendant structures. The conservation and redevelopment of the Woodbank House façade and other listed structures within the site will be subject to future applications for planning and listed building consent.

3.2.3 As the Applicants are seeking PPIp rather than full planning permission, at this stage the proposed development comprises a suite of key parameters, within which the detailed design of the proposed development will be confirmed at a later date. This EIA has therefore been undertaken using a ‘Rochdale Envelope’ approach, with each technical assessment assessing the likely worst case effects from the construction and operation of the proposed development according to the defined key parameters. These key parameters include land use blocks and maximum building dimensions, as shown on **Figure 3.1 – Parameters Plan**.

3.3 Key Physical Characteristics

Demolition

3.3.1 For the avoidance of doubt, no demolition is proposed as part of the current PPIp. Demolition has therefore not been assessed in this EIA.

Tree-Felling

- 3.3.2 Targeted tree removal is proposed in order to create small development clusters within established woodland setting. No clear cut felling is proposed and the forestry EIA regulations are not considered to be engaged.
- 3.3.3 The approach to targeted tree removal and associated compensatory planting is assessed and detailed fully within the technical assessment presented in **Chapter 6 – Ecology and Woodland**.

Buildings

- 3.3.4 The Parameters Plan (**Figure 3.1**, contained in **Appendix 3** within **ES Volume 2**) separates the site into five 'Development Zones' (Zones A, B, C, D and E) as well as overarching components. For each zone, a set of parameters for development has been defined within which there is flexibility in the final design and layout of buildings. The developments zones are broken down into details as below:
- **Zone A: Station Square**
 - Area 1: Mixed Use: Food & Drink, Entertainment and Budget Accommodation; and
 - Area 2: Tourist Information Services and Public Realm.
 - **Zone B: Riverfront**
 - Area 3a: Woodland with Forest Lodges and Recreational Facilities; and
 - Area 4a: Managed Woodland with SUDs.
 - **Zone C: Pierhead**
 - Area 5: Pierhead Visitor Destination;
 - Area 6: Future Iconic Visitor Attraction; and
 - Area 7: Multi-User Public Realm.
 - **Zone D: Drumkinnon Wood & Bay**
 - Area 8: Woodland Visitor Attractions;
 - Area 3b: Woodland with Forest Lodges;
 - Area 9: Site Entrance Building(s);
 - Area 4b: Managed Woodland;
 - Area 10: Staff & Service Area;
 - Area 3c: Boathouse Accommodation; and
 - Area 11: Buffer Zone.
 - **Zone E: Woodbank**
 - Area 12: Residential;
 - Area 13: Heritage Landscaping; and
 - Area 3d: Visitor Accommodation largely within woodland.
- 3.3.5 These zones and land use blocks, and their associated key parameters as defined on **Figure 3.1 – Parameters Plan**, represent the proposed development for the purposes of this PPIp and EIA. The siting and detailed design of individual development components within each zone and land use block will be subject to further consideration through the submission of applications for approval of matters specified in condition (AMC applications) after any PPIp is granted for the proposed development. As such, at this stage the EIA is not concerned with assessing likely effects arising from the detailed siting and design of individual development components within individual land use blocks.

Other Structures

- 3.3.6 In addition to each proposed zone and land use block, the following overarching components are also proposed across the site:
- Area 14: New car parking;
 - Site Vehicular/Boat Access Points;
 - Pedestrian/cycle linkages; and
 - Monorail.
- 3.3.7 The key parameters of these components are detailed on **Figure 3.1 – Parameters Plan**.

Landscaping

- 3.3.8 A number of general landscape design principles have been developed as part of the landscape strategy that is described within the Design Statement accompanying the PPiP application. These principles seek to guide the implementation of a suitable landscape scheme for the proposed development.
- 3.3.9 As a result, the proposed development incorporates landscape buffers and planting to help set the development in its locality. Landscape buffers have been set at depths that respond to the adjacent current and proposed future land uses, with larger buffers close to sensitive receptors. For example, as shown on **Figure 3.1 – Parameters Plan** a 12m landscape buffer is proposed between the proposed development and the existing Drumkinnon Gate residential area to the south.

Ecology

- 3.3.10 A range of industry standard measures describing key working methods and timings to avoid/minimise ecological effects during construction will be delivered through a Construction Environmental Management Plan (CEMP) and protected species licences where required, overseen by an Ecological Clerk of Works. These licences would be obtained in advance of construction, and detailed mitigation measures would be agreed during the licensing process.

Existing Pipeline Infrastructure

- 3.3.11 The proposed development allows for the retention of existing INEOS pipeline infrastructure (2 main pipes and fenced valve areas) within the site. 3m stand-off zones each side of the infrastructure have been proposed to allow continuity of access for maintenance.

Access and Parking

Vehicular Access Points

- 3.3.12 The main access points to the site will be via Ben Lomond Way (the existing main access point to Loch Lomond Shores) and Pier Road, an existing, albeit secondary access point to Pierhead, Maid of the Loch and slipway activities. Woodbank House, as a standalone site, will be accessed via Old Luss Road and the reformation of an existing priority access junction.
- 3.3.13 Pier Road will be used for access to the newly proposed car park to the west of Pier Road, which is intended to cater for the land uses included within the Zone A Station Square proposals. Ben Lomond Way will be promoted as the main access point to the wider site to ensure strategic and site-bound traffic is removed from the local road network as soon as practicable.
- 3.3.14 A signage and wayfinding strategy will be developed for the wider site at the detailed design stage. It is expected that a combination of enhanced signage and Variable Message Signing (VMS) will need to be installed at key approaches to the site, as well as internally within the site, to ensure effective vehicular movement for internal destinations and appropriate directions to the relevant car parking areas.

- 3.3.15 For accommodation land uses, except for the Woodbank House site, the arrivals and parking for this element can be managed from the point of booking, whereby visitors can be advised of the intended arrival and check-in arrangements. It is intended that parking for the visitor accommodation will be segregated from the parking for other land-uses and will be remote from the accommodation. Small buggies will be used to transport visitors and baggage to their holiday accommodation as to reduce unnecessary vehicular trips.
- 3.3.16 There are no new internal access roads to be provided as part of the proposed development.
- 3.3.17 It is intended that the proposed development will be fully accessible by sustainable modes of transport ETC

Pedestrian and Cycle Path Networks

- 3.3.18 The existing pedestrian and cycle network as it exists through the West Riverside site will be retained and enhanced as necessary to provide full connectivity to the wider network as well as all new internal elements of the site. Further to this, bike hire is proposed as part of the Station Square and enhanced Tourist Information Office offering, which will further support internal movements by bike.
- 3.3.19 Whilst the internal layout requires to be developed further as part of subsequent detailed design stages, it is intended that the existing cycle and walking routes will be widened to SUSTRANS standards for shared walking and cycling routes, where this is practicable to do so.
- 3.3.20 Throughout the Station Square, Riverfront and Drumkinnon areas, the existing path network including the John Muir Way will be retained and enhanced as appropriate. The existing north-south foot and cycle paths through the Riverfront Zone, will be enhanced with a series of east-west paths increasing access opportunities between Pier Road and the Riverfront area.
- 3.3.21 The existing foot and cycle way from Loch Lomond Shores to Old Luss Road will be extended to provide a shared foot and cycle way, compliant with technical standards, on the north (development) side of the road, providing a direct walking and cycling link between the two sites.
- 3.3.22 From the Woodbank House site, which is intended to be configured in accordance with Designing Streets Principles and will provide a continuous internal path network, a direct foot and cycle link will be provided to the Upper Stoney-mollan Road/ John Muir Way.

Rail

- 3.3.23 The proposed development includes a mono-rail between Zone A (Station Square) and Zone C (Pierhead). This will provide better connectivity between Balloch Village and Loch Lomond Shores, through provision of a safe, direct and convenient means of transport.
- 3.3.24 Proposed WDC plans for the Station Square enhancements on Balloch Road between the proposed new Station Square development (Zone A) and Balloch Railway Station, will help deliver enhanced access between the station and the proposed development site as well as the wider village of Balloch. It understood that revised parking arrangements are being considered for Balloch Rail Station as part of the wider “Balloch Village Parking Proposals” which are hoped to alleviate parking issues in the locality as well as encourage an uptake in rail usage.

Bus

- 3.3.25 The existing bus service that operates through Loch Lomond Shores via Ben Lomond Way is presently intended to remain in operation with the proposed development, albeit discussions will be held with the operator once internal layout designs are progressed further.

Car Parking

- 3.3.26 As part of the PPiP application, parking arrangements have been outlined as described below. The development will seek to accord to the adopted parking standards at the time of reserved matters application(s).
- 3.3.27 The parking provision for the site is summarised below in **Table 3.1**.

Table 3.1 Parking provision

Development Zone	Land Use	Parking Provision
Zone A	Brewery incl. pub	30 spaces
	Restaurant	30 spaces
	Youth hostel	8 spaces
Zone A Sub-Total		68 spaces
Zone B	Woodland Lodges (Riverfront)	65 spaces
Zone B Sub-Total		65 spaces
Zone C	Apart Hotel & Rest.	24
	Water Park	60
	Iconic Visitor Attraction	-
Zone C Sub- Total		84 spaces
Zone D	Woodland lodges (Drumkinnon)	48 spaces
	Boathouse accommodation	1 space
	Staff & Service area	45 spaces
Zone D Sub- Total		94 spaces
Zone E	Residential Units	60 spaces
	Woodland Lodges (Woodbank)	42 spaces
Zone E Sub- Total		82 spaces
Total Incl. Woodbank Site		413 spaces
Total at West Riverside only		311 spaces

- 3.3.28 For the purposes of the PPIp application, it has been assumed that the development proposals demonstrate self-sufficiency with respect to vehicle parking. That is, presently, no reliance is placed on the existing spare capacity at the Loch Lomond Shores (main or overspill car parks).
- 3.3.29 The parameters plan indicates total parking provision of 256 new parking spaces plus 74 relocated/ reconfigured at Pierhead: this results in a total parking provision of 330 spaces across the site (excluding the Woodbank House site). This is disaggregated as follows:
- 109 spaces at the newly configured car park on Pier Road; and
 - 221 new parking spaces at the Pierhead.
- 3.3.30 As the detail of the proposals progress, and dialogue with the other Loch Lomond Shores proprietors continues, it is anticipated that parking locations will be reconfigured to allow effective, efficient and sustainable vehicle and access operations across the shared-sites.

- 3.3.31 As a result of the Zone A Station Square proposals replacing the existing West Riverside Car Park, WDC has requested that as a result of displaced parking, 44 Park & Ride (for rail) spaces should be provided within the newly proposed car park on Pier Road. These should be sited at the southern extents of the new Pier Road car park to provide convenient proximity to the rail station, and reduce the need for on-street parking around the station and on Tullichewan Road. This level of provision is considered both achievable and compatible, given the nature of the proposed Station Square development uses (pub/ restaurant), which are largely expected to have a development/ parking demand peak outwith the commuting/ P&R demand period.
- 3.3.32 Consultation has been undertaken with WDC with respect to the Balloch Village Parking Proposals and, the streetscape improvements proposed as part of the Station Square Proposals for Balloch Road.

3.4 Key Operational Characteristics

- 3.4.1 Once constructed, the proposed development will operate as a tourism and leisure business centred around a range of on-site visitor accommodation facilities. As shown on **Figure 3.1 – Parameters Plan**, proposed food and drink, retail, leisure and entertainment uses will be clustered within Zone A – Station Square and Zone C – Pierhead, with visitor accommodation located across all zones. Additionally, a suite of management and entrance buildings are proposed to be located in Zone D – Drumkinnon Wood & Bay, adjacent to Loch Lomond Shores' existing overspill carpark (which itself lies outwith the site and would not be subject to development through this PPIP application). Zone D will also include sensitively designed and sited forest adventure activities, as well as a dedicated area for site deliveries and operational staff parking.
- 3.4.2 With the exception of 20 low density houses which are proposed for permanent residents within the Woodbank area of the site, all proposed accommodation will be used for short term visitor/holiday purposes only. This visitor accommodation will therefore not give rise to any additional pressure on social or community infrastructure including education infrastructure.

3.5 Materials and Natural Resource Usage

- 3.5.1 The construction of the proposed development will utilise land and construction materials including bricks, roofing tiles, cement, concrete, timber, asphalt, piping, etc). Soil (reused from onsite resources wherever practicable) and seeded grass or turf will also be used for landscaping purposes. Once occupied the proposed development will use domestic energy and utilities infrastructure. Soil movement will be undertaken with reference to best practice guidelines available in the Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Defra, 2009).
- 3.5.2 Where possible, excavated material will (depending on type) be used to backfill excavations and for site re-profiling purposes where appropriate. It is not expected that any material would be unsuitable for re-use in this way, though in the unlikely event that such material arises it will be disposed off-site in line with relevant waste disposal regulations.

3.6 Expected Residues, Emissions and Waste

- 3.6.1 Construction waste is expected to be restricted to normal non-hazardous materials such as off-cuts of timber, bricks, wire, fibreglass, cleaning cloths, paper, materials packaging and similar materials. These will be sorted and recycled if possible, or disposed of to an appropriately licensed landfill by the relevant contractor appointed (whether directly by the applicant or a sub-contractor).
- 3.6.2 Once completed and operational, the proposed development will be serviced by a commercial waste management and recycling contractor which will be appointed by the Applicants. The proposed development has been designed to accommodate heavy goods vehicles in areas where access would be required for uplifting waste and delivering supplies. The quantity and type(s) of waste during the operational phase of the proposed development cannot be predicted at this stage, as this would depend on operational factors, visitor numbers and the implementation of waste management legislation unrelated to the proposed development.

3.7 Proposed Construction Works, Programme and Management Arrangements

Construction Works and Programme

- 3.7.1 At this pre-consent stage it is anticipated that construction will take approximately two years and that the key construction activities are likely to include:
- Vegetation clearance, earthworks and soil preparation to prepare areas of the site for construction activities;
 - Construction of infrastructure including internal access routes, drainage pipes and SUDS attenuation basin(s);
 - Formation of public open space, with associated landscaping;
 - Targeted tree removal and installation of forest lodges and path networks;
 - Construction of building foundations (where required), structure, cladding and glazing and internal walls and partitions;
 - Installation of fixtures, fitting and building services;
 - Utility diversions, upgrades and connections as required; and
 - External landscaping, highway and drainage works.
- 3.7.2 A Construction Environmental Management Plan (CEMP) will be implemented to reduce the risk of any likely significant adverse effects on environmental receptors as a result of construction activities, and to minimise disturbance to the local residents.
- 3.7.3 Given that the applicant includes Scottish Enterprise, a designated Scottish public authority, relevant contracts may include applicable community benefit clauses in accordance with the Procurement Reform (Scotland) Act 2014 and associated guidance. Such clauses could include guaranteed employment opportunities for participants of construction related apprenticeship schemes and local education facilities. This is considered further within **Chapter 14 - Socio-economics, Tourism, Recreation and Public Access**.

3.8 Proposed Mitigation and Enhancement

Embedded Mitigation

- 3.8.1 In line with EIA best practice, the iterative EIA, planning and design processes for the proposed development have been undertaken in tandem, with close dialogue maintained between the Applicant, EIA project team, project architect and other advisers. This has allowed an overarching suite of mitigation measures and commitments to be incorporated into the proposed development from the outset, in order to both address potentially adverse effects and enhance its environmental performance. These are termed embedded mitigation measures.
- 3.8.2 The embedded mitigation measures incorporated within the proposed development are as follows:

Construction Phase

- **CEMP:**
 - Development and implementation of measures relating to: construction traffic routing, site access/deliveries, parking, contractor management, parking, fuels and materials storage, standard dust and noise suppression techniques and standard pollution presentation and control techniques. These measures will be set out within a Construction Environmental Management Plan (CEMP). Any other measures to be included in the CEMP would be identified as 'further mitigation' (not embedded) through the EIA.
 - Any construction activities within a 5m strip along waterfronts will be subject to specific consideration within a CEMP to be agreed with the NPA prior to commencement.

- An Environmental Clerk of Works (ECoW) will ensure that the CEMP and associated mitigation measures are implemented effectively;
 - A pollution prevention and response plan will be set out in the CEMP. This will provide site spill response procedures, emergency contact details and equipment inventories and their location. All staff will be made aware of this document and its content during site induction. A copy will be available in the site office at all times.
 - Adoption of standard construction industry working hours for noise generating activities
 - A contaminated hotspots plan and procedure for managing unexpected contamination.
 - Settlement tanks/beds should be utilised to prevent increased suspended solids entering Loch Lomond via surface water run-off during rainfall;
 - A 3 m exclusion zone will be adopted around either side of INEOS gas pipelines within the site;
 - Risk Assessments and Method Statements (RAMS) will be prepared. Construction/ground workers should take cognisance of the contamination reported and will be required to work in accordance with the RAMS. The provision of appropriate personal protective equipment (PPE) to be worn by site workers (as specified in RAMS);
 - Informing site workers of the contamination on the site (i.e. the conclusions of the site investigation) and the potential health effects from exposure through site induction and toolbox talks;
 - Dust suppression to minimise the effects on offsite users;
 - If piled foundations are required, a site specific risk assessment designed specifically to assess the risks posed by piling should be carried out. Ultimately, if piled foundations are required, the technique used will be selected on the basis of protecting groundwater from contamination. Safe piling techniques should be adopted to minimise the risks posed by piling activities.
 - All construction work will be undertaken in general accordance with SEPA's Guidance for Pollution Prevention (GPPs).
- **Landscape:**
- 12m buffer (i.e. no construction) around the site boundary with Drumkinnon Gate;
 - Any construction activities within a 5m strip along waterfronts will be subject to specific consideration within a Construction Environmental Management Plan (CEMP) to be agreed with LLTNPA prior to commencement;
 - Adherence to relevant (Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) and Historic Environment Scotland (HES) regulatory and good practice guidance in construction methods;
 - Adoption of standard construction industry working hours for noise generating activities;
 - Safeguarding of identified important trees from disturbance or loss;
 - Work with existing topography to minimise ground level regrading where possible;
 - Proposed utilities to be located underneath existing path network to minimise disturbance to existing tree roots;
 - Access to all key nodes and routes through the site are to be maintained during the construction phase. Localised diversions to facilitate construction may occur on land within the applicant's control. Any impacts on walking/cycle routes during the construction phase will be short term and localised diversions will be put in place;
 - Continued provision of access through the site to existing receptors and land uses as identified in Chapter 2 Site and Surrounding Area.
- **Heritage:**
- Commitment to undertake a programme of archaeological works, as requested by WoSAS, prior to the construction of the proposed development;

- Adherence to relevant HES regulatory and good practice guidance in construction methods;
- Retention of Woodbank House listed building façade as a landmark feature; and,
- Conversion of other listed buildings within the Woodbank area of the site where practicable and viable.
- **Socio-economics, Tourism, Recreation and Access:**
 - Access to all key nodes and routes through the site are to be maintained during the construction phase. Localised diversions to facilitate construction may occur on land within the applicant's control. Any impacts on walking/cycle routes during the construction phase will be short term and localised diversions will be put in place; and
 - Continued provision of access through the site to existing receptors and land uses as identified in Table 2.1 in Chapter 2 (Site & Surrounding Area).
 - Access to tourist information facility will be maintained whilst building refurbishment takes place.
- **Pipeline:**
 - No ground development within 3m stand-off zone each side of INEOS pipelines, unless agreed with INEOS;
 - Minimisation of any piling (if required) within 25m zone each side of INEOS pipelines, with construction techniques to be agreed through consultation with INEOS if required; and
 - On-site supervision by/on behalf of INEOS of construction work within 25m zone each side of INEOS pipelines.
- **Ground Conditions**
 - Additional intrusive investigation to delineate contamination and for a remediation strategy;
 - Further intrusive investigation will be undertaken as required prior to construction within and around the derelict buildings in the Woodbank House site to determine the potential for contaminants of concern including asbestos and PAHs. If elevated concentration is identified, remediation will be undertaken to remove the contaminated material or lower the concentration of contaminants to a suitable level (i.e. below GAC).
 - Remediation strategy which may include localised excavation of contaminated material and replacement with clean fill/capping material or hardstanding.
 - Gas protection measures (if required) will be incorporated into the design of the proposed development to protect the building structures and human health (future end users).
 - Risk Assessments and Method Statements (RAMS) will be prepared. Construction/ground workers should take cognisance of the contamination reported and will be required to work in accordance with the RAMS.
- **Noise**
 - The design mitigation features incorporated into the final masterplan design is of one stretch of 2m high close boarded timber garden fencing at the garden /terrace boundary of NSR 19.
- **Ecology:**
 - Safeguarding of identified important trees, including their root systems, from disturbance or loss.
 - Erection of forest lodges on elevated support structures where required to minimise the need for the development of building foundations within woodland areas;
 - Siting and design of forest lodges to be informed by detailed tree surveys of the site, to be undertaken in accordance with relevant British Standards. This siting and design process should:

- Maintain the integrity of the existing forest habitat network;
- Target existing open areas where possible by using the completed survey to locate existing glades;
- Ensure the retention of desirable, native species trees is achieved by maximising the use of glades for lodge positions and by targeting specific survey of trees which surround the chosen areas (to be identified through aforementioned surveys);
- Use baseline habitat and future targeted tree survey to mitigate any predicted tree loss and disturbance impacts; and,
- Target opportunities to remove invasive species through construction activities;
- Commitment to the provision of appropriate compensatory planting to offset the loss of trees in building footprint and working areas within existing woodland (the details of which are considered below and treated as further mitigation and enhancement).
- Manage extents of invasive species such as rosebay willowherb, Japanese knotweed and bamboo in particular on the Woodbank site.
- Development of path and minor route networks using low impact technology to protect tree roots, soils and surrounding vegetation.
- Manage existing woodland to improve its age profile, encourage continued biodiversity and preserve its presence in the landscape;
- Boost ecology and ground flora within woodland by thinning out trees, consequently allowing more sunlight to reach the woodland floor. Management of none native species;
- A speed limit of 10mph would be applied to all construction traffic to reduce the risk and frequency of potential collisions
- Boundary features and fences would be designed to allow roe deer and badgers to move freely where appropriate;
- **Hydrology:**
 - No buildings within the functional floodplain and finished floor levels of buildings adjacent to the water bodies to be above the 1 in 200yr + climate change peak flood level;
 - Avoid crossings of existing watercourse to prevent pollution;
 - Development within a 5m strip along waterfronts will be subject to specific consideration with a CEMP;
 - The surface water drainage scheme for the proposed development will be designed in accordance with Sustainable Drainage Systems (SuDS) principles and such that the maximum discharge rate will be equivalent to the greenfield (i.e. pre-development) runoff rate.

Operational Phase

- **Landscape:**
 - 12m buffer (i.e. no operational activities) around the site boundary with Drumkinnon Gate;
 - Screening increased around the boundary between woodland and residential area where existing screening is limited, using evergreen native shrubs which are in-keeping with the surroundings, ensuring a decrease impact for the residents;
 - Lower density of lodges to be located within the 'Plantation origin' of Drumkinnon woodland;
 - Existing fenced substations and unsightly utilities to be screened and incorporated within the woodland setting;

- Proposed car parking to be sensitively incorporated into the woodland. Surface materials to be in keeping with the location and context. Additional mitigation measures such as buffer planting to provide natural screening to new car parking;
 - Retain and upgrade existing pathways, enhance with new porous surfacing. Widen and locally regrade to allow for buggies, cycles and emergency access;
 - New woodland planting to be created on the Woodbank plot, immersing proposed residential plots in order to reduce and mitigate any visual impact. Whilst acknowledging the need to retain the open views towards the facade of Woodbank House;
 - Retention of Woodbank House listed building facade as a landmark feature;
 - Continued public access to Drumkinnon Bay waterfront;
 - Continued provision of access through the site to existing receptors and land uses as identified in Chapter 2: Site and Surrounding Area;
 - Safeguarding of identified important trees within existing woodland areas, as identified on the Figure 3.1 - Parameters Plan in Appendix 3.1;
 - No structures or buildings within woodland areas to exceed the height of the tree canopy;
 - Integration of Station Square zone with Balloch Street Design Project proposals and Sweeney Cruises;
 - Elevated sections of monorail to have sufficient clearance above roads and paths to allow for passage underneath; and
 - Access to all key nodes and routes will be maintained during operation with the quality of some routes enhanced. Some permanent localised diversions may be required; however, this will be limited to using other land within the applicants control in order to avoid lengthy or circuitous alterations.
- **Heritage:**
 - Retention of Woodbank House listed building facade as landmark feature.
 - **Monorail:**
 - Elevated sections of monorail to have sufficient clearance above roads and paths to allow for passage underneath.
 - **Socio-economics, Tourism, Recreation and Access:**
 - Employment of locally resident workers and delivery of training (e.g. apprenticeships) where possible.
 - Access to all key nodes and routes will be maintained during operation with the quality of some routes enhanced. Some permanent localised diversion may be required however this will again be limited to using other land within the applicant control in order to avoid lengthy or circuitous alterations;
 - Continued public access to Drumkinnon Bay waterfront and public beach areas at Balloch Pierhead;
 - Development and implementation of Travel Plan (to encourage sustainable travel to/from site by visitors and workers); and
 - Continued provision of access through the site to existing receptors and land uses as identified in Table 2.1 in Chapter 2 (Site & Surrounding Area).
 - Elevated sections of monorail to have sufficient clearance above roads and paths to allow for passage underneath.
 - **Pipeline:**
 - No ground development within 3m stand-off zone each side of INEOS pipelines, unless agreed with INEOS.

■ **Ecology**

- Commitment to implement a woodland management plan to enhance the quality and composition of existing woodland within the site, particularly of the ancient woodland and those presenting semi-natural characteristics. The details of this plan will be informed by the EIA and relevant design considerations.
- Ongoing management of existing and newly created woodland to improve its age profile, encourage continued biodiversity and preserve its presence in the landscape;
- Ongoing management and survey of invasive species such as Rosebay Willow herb, Japanese Knotweed and Bamboo in particular on the Woodbank site;

■ **Hydrology:**

- The proposed surface water and SuDS scheme (see Section 11.6) will require regular maintenance during its operational life. This maintenance will include the regular debris clearing and cutting of grass of surface SuDS features, and the inspection and repairs to underground features if necessary. The responsibility for the maintenance of the drainage network will lie with the organisation that adopts the network

■ **Traffic & Transport**

- It is intended that the proposed development will be fully accessible by sustainable modes of transport. The existing pedestrian and cycle network as it exists through the West Riverside site will be retained and enhanced as necessary to provide full connectivity to the wider network as well as all new internal elements of the site. The site will benefit from increased uptake of sustainable modes over the use of the private car, and it is anticipated that walking and cycling will be the go-to-mode of choice for those visitors using the woodland lodges and overnight accommodation: by leaving their cars remote from the lodges, it is hoped this will reduce any unnecessary internal car trips;
- Bike hire is proposed as part of the Station Square and enhanced Tourist Information Office offering, which will further support internal movements by bike;
- Whilst the internal layout requires to be developed further as part of subsequent detailed design stages, it is intended that the existing cycle and walking routes will be widened to Sustrans standards for shared walking and cycling routes, where this is practicable to do so;
- Throughout the Station Square, Riverfront and Drumkinnon areas, the existing path network including the John Muir Way will be retained and enhanced as appropriate, albeit some relocating of certain sections may be required. It is expected that discussions will be held with Sustrans when the detail of these routes is considered. The existing north-south foot and cycle paths through the Riverfront Zone, will be enhanced with a series of east-west paths increasing access opportunities between Pier Road and the Riverfront area;
- The existing foot and cycle way from Loch Lomond Shores to Old Luss Road will be extended to provide a shared foot and cycle way, compliant with technical standards, on the north (development) side of the road, providing a direct walking and cycling link between the two sites;
- From the Woodbank House site, which is intended to be configured in accordance with Designing Streets Principles and will provide a continuous internal path network, a direct foot and cycle link will be provided to the Upper Stoney-mollan Road/ John Muir Way; and
- A signage and wayfinding strategy will be developed for the wider site, once clarification on the preferred parking locations for site-based activities and land uses are confirmed. It is expected that a combination of enhanced signage and Variable Message Signing (VMS) will need to be installed at key approaches to the site from both the strategic and local road network, as well as internally within the site, to ensure effective vehicular movement for internal destinations and appropriate directions to the relevant car parking areas.

■ **Cumulative Development:**

- Integration of the proposed development, in particular the proposed Station Square zone, with Balloch Street Design Project proposals (this is identified as a cumulative development per **Section 2.4**).
- 3.8.3 The embedded mitigation measures of relevance to each technical assessment are listed in **Subsection 6 – Embedded Mitigation** and have been taken account of within the assessments presented in **subsection 7 – Potential Effects** of chapters 6 - 15.

Further Mitigation and Enhancement

- 3.8.4 Further specific mitigation has also been identified where necessary through the EIA process to prevent, avoid, minimise or offset significant adverse effects and to further enhance the environmental performance or wider benefits of the proposed development. This 'further mitigation and enhancement' is identified in **Subsection 8 – Further Mitigation and Enhancement of Chapters 6 – 14**.
- 3.8.5 Embedded mitigation described above and the further mitigation measures proposed in connection with the proposed development summarised in **Chapter 14 – Schedule of Mitigation and Monitoring**. This will enable LLTNP to easily secure this mitigation in any PPIP granted for the proposed development.

3.9 Consideration of Alternatives

- 3.9.1 Paragraph 4 of Part II of Schedule 4 of the EIA Regulations requires an ES to include an outline of the main alternatives considered by the applicant, indicating the main reasons for the choice made, taking into account the environmental effects.
- 3.9.2 Although the EIA Regulations do not expressly require the applicant to study alternatives, the nature of certain developments and their location may make the consideration of alternative sites a material consideration. In such cases, the ES must record this consideration of alternative sites. More generally, consideration of alternatives (including alternative sites, choice of process, and the phasing of construction) is widely regarded as good practice, and resulting in a more robust application for planning permission. Ideally, EIA should start at the stage of site and process selection, so that the environmental merits of practicable alternatives can be properly considered. Where this is undertaken, the main alternatives considered must be outlined in the ES.
- 3.9.3 For the purposes of this EIA, the only alternatives considered in relation to the proposed development were:
- Different possible formulations of proposed land use zones across the site. The proposed configuration of land use zones has been arrived at following detailed analysis of multiple on-site constraints, including the need to safeguard INEOS pipeline infrastructure and to minimise disturbance to woodland. As reported in **Chapter 6 – Ecology and Woodland** a glade survey has been undertaken to determine the feasibility of installing lodges within pockets of Drumkinnon Woodland without resulting in significant disturbance to or the substantial loss of trees. The proposed configuration of land use zones is considered to be optimal in terms of safeguarding environmental and infrastructure constraints whilst enabling the development of a commercially viable tourism and leisure development; and
 - The potential inclusion of a 100m viewing tower. This was dropped from the proposed development in order to take account of feedback received from local communities through statutory pre-application consultation (PAC) activities, as detailed within the **West Riverside and Woodbank House PAC Report**.

4 Assessment Methods

4.1 Introduction

- 4.1.1 This chapter describes the process by which the EIA was carried out. It includes a discussion of the relevant EIA Regulations, the EIA process, consultations, and the assessment method adopted.

4.2 Overview of EIA

- 4.2.1 EIA is a systematic procedure that must be followed when determining applications seeking consent for certain categories of project (see **Section 4.3**). It aims to identify a project's likely significant environmental effects, identify mitigation measures to reduce the level of or avoid those effects, and assess the residual significance of predicted environmental effects taking account of all proposed mitigation and enhancement measures. This process helps to ensure that predicted significance effects, and the scope for reducing them, are properly understood by the public and the relevant authority (Loch Lomond & The Trossachs National Park Authority) before determining an application for a development proposal.
- 4.2.2 Within Scotland, the requirements of the European Council Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, as amended by the European Council Directive 97/11/EEC, are transposed in law by The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (the EIA Regulations).
- 4.2.3 An important tenet of EIA is that it is a process culminating in the submission and examination of an ES, rather than merely a single output in the form of the ES. EIA therefore has a number of key characteristics; it is:
- **Systematic**, comprising a sequence of tasks defined both by regulation and best practice;
 - **Analytical**, requiring the application of specialist knowledge and skills from environmental sciences and policy;
 - **Impartial**, its objectives being to inform decision making and improve the environmental performance of projects rather than being to promote them;
 - **Consultative**, with provision being made for obtaining information and feedback from interested stakeholders and relevant consultees; and
 - **Iterative**, allowing opportunities for environmental concerns to be addressed during the planning and design of a project.
- 4.2.4 Typically, an iterative design process occurs in response to environmental constraints (identified during the EIA process) and other design objectives, taking account of project viability considerations and feedback from relevant consultees. This often results in a development proposal incorporating mitigation measures or design features to avoid, reduce or compensate for potential adverse effects, referred to as embedded mitigation. Additional mitigation is then identified where necessary to reduce or avoid residual significant environmental effects.

4.3 Statutory Provisions

- 4.3.1 The planning application submitted for the proposed development stands to be determined under the provisions of the Town and Country Planning (Scotland) Act 1997 as amended. Statutory EIA requirements for certain planning applications are set out within the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 as amended, which remain applicable in cases where an EIA scoping request was submitted in respect of a development proposal prior to 16th May 2017. This is the case for this PPI application for the proposed development, meaning that the Town and Country Planning (Scotland) Environmental Impact Assessment (Scotland) Regulations 2011 as amended (hereafter 'the EIA Regulations') are applicable to this EIA.

4.4 EIA Screening and Scoping

- 4.4.1 The site extends to some 33.5ha, and therefore exceeds the thresholds identified for EIA screening under Classes 10 or 12 of Schedule 2 of the EIA Regulations. Furthermore, the site is located within the boundaries of Loch Lomond and the Trossachs National Park (LLTNP). Within the meaning assigned to it by the EIA Regulations, it is a ‘Sensitive Area’:

“sensitive area” means any of the following: —

(g) an area designated as a National Park by a designation order made by the Scottish Ministers under section 6(1) of the National Parks (Scotland) Act 2000(f).

- 4.4.2 In recognition of the environmental sensitivities affecting the site and surrounding area, the Applicant considered from the outset that a formal EIA would be likely to be required to support any planning application submitted for the proposed development. To confirm this and to obtain clarity on the required scope of the EIA, a formal EIA screening and scoping report (PBA, March 2017) was submitted to the Loch Lomond and the Trossachs National Park Authority (LLTNPA) in their role as the relevant local planning authority.
- 4.4.3 Subsequently, LLTNPA provided a positive EIA Screening Opinion in April 2017 which confirmed that a formal EIA would be required on account of likely significant effects from the proposed development. After consulting relevant stakeholders an EIA Scoping Opinion was then issued by LLTNPA on 11th May 2017 to define the required scope of this EIA; this is provided in full within **Appendix 4.1**.

4.5 Information Requirements and Guidance

Information Requirements

- 4.5.1 Schedule 4 of the EIA Regulations prescribe the information which must be included within an ES. The information requirements specified in Part 2 of Schedule 4 must be addressed in all ES, whilst the requirements specified in Part 1 must also be addressed to the extent “reasonably required to assess the environmental effects of the development and which the applicant can, having regard in particular to current knowledge and methods of assessment, reasonably be required to compile”.
- 4.5.2 Schedule 4 of the EIA Regulations therefore require this ES to include descriptions of:
- Relevant environmental baseline characteristics. Each of the technical assessments presented in **chapters 6 – 14** include Baseline sections to meet this requirement;
 - Physical characteristics of the whole development, which in this case means identifying the key characteristics of the construction and operational phases of the proposed development (refer to **Chapter 3 – The Proposed Development**);
 - Consideration of the reasonable alternatives studied by the developer (refer to **Chapter 3 – The Proposed Development**);
 - The main characteristics of the production or operational phase, including natural resource usage (refer to **Chapter 3 – The Proposed Development**);
 - An estimate of expected residues and emissions (refer to **Chapter 3 – The Proposed Development**);
 - The assessment methodologies deployed in undertaking this EIA (refer to the technical assessment methodologies provided in **Subsection 3** within **chapters 6 – 14**);
 - Likely significant effects from the proposed development (refer to the assessments presented in **Subsection 7 – Potential Effects**, **Subsection 9 – Residual Effects** and **Subsection 10 – Cumulative Assessment** within the technical assessments presented in **chapters 6 – 14**);
 - Mitigation measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment (refer to **Section 3.8 – Proposed Mitigation and Enhancement**, **Subsection 6 – Embedded Mitigation** and **Subsection 8 – Further**

Mitigation and Enhancement within the technical assessments presented in **chapters 6 – 14**, and **Chapter 16 – Schedule of Mitigation and Monitoring**);

- Any proposed monitoring arrangements in relation to any predicted significant adverse effects (refer to **Chapter 16 – Schedule of Mitigation and Monitoring**);
- A non-technical summary of all of the above elements (refer to the standalone **West Riverside and Woodbank House Environmental Statement Non-Technical Summary**); and
- A reference list detailing the sources used in the assessments (refer to the reference lists provided at the end of each technical assessment presented in **chapters 6 – 14**).

EIA Guidance

4.5.3 A range of reference material and guidance has been drawn upon in developing the EIA methodology adopted for the proposed development. Over and above the EIA Regulations, this guidance includes:

- IEMA. (2015) IEMA Environmental Impact Assessment Guide to Shaping Quality Development;
- IEMA. (2016) IEMA Environmental Impact Assessment Guide to Delivering Quality Development;
- Morris, P and Therivel, R. (2009) Methods of Environmental Impact Assessment; and
- Institute of Environmental Management and Assessment. (2004) Guidelines for Environmental Impact Assessment (IEMA).

4.5.4 Topic specific guidance used in the preparation of the individual technical assessments presented in this ES is noted where relevant in **Subsection 2 of chapters 6 – 14**.

4.6 The EIA Process

4.6.1 The EIA Regulations emphasise that EIA is a process rather than output and involves the following stages:

- **Assessment work** culminating in the preparation of an ES in accordance with information requirements prescribed by the EIA Regulations;
- **Public consultation on the application for planning permission, the ES and any other relevant information**. Consultation may be iterative rather than only occurring once in the EIA process;
- **Examination** by the relevant authority of the information presented in the ES and other relevant information including that received through the consultation; and
- The authority coming to a **reasoned conclusion** on the residual significant effects of the proposed development on the environment, prior to the determination of any related consenting application.

4.6.2 The EIA process therefore encompasses all stages of considering environmental issues associated with projects, from initial identification of relevant issues through to assessing the residual significance of **predicted** environmental effects and securing required mitigation. This ensures that all required mitigation is subsequently carried out in the implementation of projects. EIA therefore directly influences the design, construction, operation and, where relevant, decommissioning, of proposed projects, as well as providing information to decision makers.

4.7 EIA Methodology

Overview

- 4.7.1 Following the identification of the scope of the EIA in accordance with **Appendix 4.1 – West Riverside and Woodbank House EIA Scoping Opinion**, each environmental topic has been subject to investigation and assessment to identify and evaluate likely significant environmental effects. The survey and assessment methodologies deployed were based on recognised best practice and guidance relevant to each topic area, details of which are provided within relevant technical assessment ES chapters (**Chapters 6 – 14**). In general terms, the technical assessments undertaken for each topic area and ES chapter include:
- Collation of existing baseline information regarding relevant aspects of the environment, together with surveys and fieldwork, as required, to fill any knowledge gaps or update historical information;
 - Use of the collated baseline to identify relevant trends, describe the baseline scenario and predict the evolution of this baseline scenario in the absence of the proposed development;
 - Consultation with relevant consultees in relation to the EIA scope and emerging findings;
 - Consideration of the potential effects of the proposed development on the baseline scenario (and its predicted evolution), followed by the identification of design changes, mitigation measures to avoid or reduce predicted significant adverse effects, and possible enhancement measures to improve environmental outcomes;
 - Assessment of the significance of predicted residual effects from the proposed development and consideration of any monitoring required in relation to predicted residual significant adverse effects;
 - Production of ES chapter; and
 - Input into a consolidated schedule of required mitigation measures and proposed monitoring arrangements for the proposed development.
- 4.7.2 The detailed methodology adopted to undertake each individual technical assessment is presented in **Subsection 3 – Methodology** within **chapters 6 – 14**.

Key Methodological Assumptions

- 4.7.3 The following key assumptions have been used to ensure that the EIA reported in this ES has undertaken a proportionate assessment of the level and significance of likely effects from the proposed development:
- The EIA including the preparation of this ES has been undertaken in full accordance with the EIA Regulations;
 - The proposed development will be built out in accordance with **Figure 3.1 – Parameters Plan**. All other drawings submitted as part of this ES or the wider PPIp are for illustrative purposes only, as the detailed siting and design of the proposed development required to be confirmed after PPIp is granted;
 - Construction will be completed by 2020, with visitor accommodation and attractions scheduled to open in that year;
 - Baseline conditions are generally considered to be current conditions at the site and surrounding area, unless materially affected by the approved developments noted in **Section 2.4**. The potential for cumulative effects as a result of the construction and operation of the approved developments has been considered;
 - In accordance with the EIA Regulations, an assessment of likely effects (including cumulative effects) from the proposed development has been carried out in order to identify, describe and assess any significant effects. As such, the assessment only considers possible effects which have some potential to be significant within the context of the EIA Regulations. Other possible effects which have no potential to be significant in EIA terms have necessarily been scoped out of this EIA;

- The assessment of likely significant cumulative effects has assumed that the cumulative developments identified in **Section 2.4** will be built out as set out in the planning applications, planning permissions and associated documents available in the public domain for these developments; and
- Suitable planning conditions and planning obligations will be attached to any planning permission granted for the proposed development to secure relevant mitigation measures proposed in this ES (refer to **Chapter 16 – Schedule of Mitigation and Monitoring**).

Consultation

- 4.7.4 In addition to formally requesting LLTNPA to adopt an EIA Scoping Opinion in respect of the proposed development, additional consultation has been undertaken to provide information, discuss assessment methods and findings, and to agree mitigation measures and design responses. Consultation has been undertaken with stakeholders including (NB this is not an exhaustive list):
- LLTNPA Access Officer;
 - West Dunbartonshire Council Roads Department;
 - Transport Scotland;
 - Abellio Scotrail;
 - Historic Environment Scotland;
 - Scottish Water; and
 - Scottish Environment Protection Agency.
- 4.7.5 A programme of community engagement has also been undertaken, as detailed within the statutory **Pre-Application Consultation Report** which is submitted in support of the PPIp application for the proposed development.

Establishing Baseline Conditions

- 4.7.6 A range of site surveys and data collection exercises have been used to identify environmental conditions at the site and the surrounding area. The surveys undertaken are reported in each of the topic chapters. Data has also been collated regarding relevant approved cumulative developments which need to be considered in this EIA (see **Section 2.4**).
- 4.7.7 The EIA has been based on technical surveys and assessments, the reporting of which is frequently too detailed and lengthy for incorporation into **Volume 1** of this ES (e.g. ecology surveys). In such instances the technical survey and assessment reports are provided in full as an appendix to this ES (**Volume 2**), with a relevant summary and the reference for the full survey or assessment provided in the ES. The geographical scope of these appended surveys and assessments has been based on the likelihood for significant effects in accordance with the EIA scope summarised above.

Types of Effect

- 4.7.8 Schedule 4 to the EIA Regulations requires consideration of a variety of types of effect, namely direct / indirect, secondary, cumulative, positive / negative, short / medium / long-term, and permanent / temporary. All identified effects need to be considered in terms of how they are predicted to arise, whether they are positive (beneficial) or negative (adverse), their temporal occurrence (i.e. when they are predicted to occur) and their duration once the effect does occur. This includes consideration of effects during both the construction and operational phases of the proposed development.
- 4.7.9 The ES must also consider the potential for effects identified through one topic specific technical assessment to generate secondary or otherwise related effects of relevance to other environmental topics. At the outset of this EIA it was recognised that predicted traffic movements (from the proposed development, existing development and approved cumulative developments) would need to be taken account of in the Noise and Air Quality technical

assessments as well as the Transport ES Chapter. Traffic data calculated to inform **the West Riverside and Woodbank House Transport Assessment** submitted separately in support of the PPIP application for the proposed development has therefore been used to inform the transport and access, noise and air quality assessments presented in relevant chapters of this ES.

- 4.7.10 The spatial scope for the identification of likely significant environmental effects varies between environmental topic areas and a relevant Study Area is therefore defined within each technical assessment ES chapter (**chapters 6 – 14**). In general terms, this spatial scope depends on the location of relevant receptors and the existence of known pathways for effects from the proposed development to the identified receptors. Where it was considered necessary, a Study Area map is included within the Appendix to the relevant technical assessment chapter.

Uncertainty

- 4.7.11 The prediction of future effects inevitably involves a degree of uncertainty. Where necessary, the technical assessments presented in **chapters 6 - 14** describe the principal factors giving rise to uncertainty in the prediction of effects and the degree of the uncertainty.
- 4.7.12 Confidence in the assessments presented in this ES can be derived from the application of robust topic specific assessment methodologies, which have been developed and implemented in accordance with relevant technical guidance and standards (e.g. those detailed within Design Manual for Roads and Bridges, the Guidelines for Ecological Impact Assessment in the UK and British Standard Institute publications). Where the success of a mitigation measure is uncertain, the extent of the uncertainty has been identified in the ES and a suitable response identified.

Mitigation and Enhancement Measures

- 4.7.13 The technical assessments presented in **chapters 6 – 14** of this ES firstly identify predicted effects from the proposed development taking into account embedded mitigation measures, before identifying any required further mitigation and then reporting predicted residual effects.
- 4.7.14 The EIA Regulations require ES to include a description of “measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment”. **Subsection 8** within each technical assessment presented in **chapters 6 - 14** therefore consider the need for additional mitigation measures (beyond embedded mitigation features) to avoid significant adverse effects which are otherwise predicted to occur. Consideration is also given to potential measures in order to reduce predicted ‘not significant’ adverse effects and to enhance predicted beneficial effects from the proposed development where appropriate.
- 4.7.15 A schedule of all proposed mitigation measures is provided in **Chapter 16 – Schedule of Mitigation and Monitoring**. This schedule is provided to assist the planning authority in securing all required mitigation measures and any proposed monitoring within the decision notice of any PPIP granted for the proposed development.

The Significance of Likely Residual Effects

- 4.7.16 Residual effects are the environmental effects that will remain after the incorporation of both embedded and additional mitigation measures. It is these residual effects which should be considered when assessing the significance of the proposed development, rather than the unmitigated effects as unmitigated effects will not occur. For example, whilst the proposed development may affect protected species, appropriate mitigation has been identified to ensure that significant effects on such species do not occur.
- 4.7.17 To provide an objective assessment of residual effects, their significance has been determined and is identified in the ES, as detailed below. This allows for comparison of effects between topics, strengthens the assessment of impact interactions and allows decision makers to more easily examine and make a reasoned conclusion on the significant environmental effects of a project.
- 4.7.18 The two principal criteria for determining significance of an environmental effect are the magnitude of change and the sensitivity of an identified receptor to this change. The likelihood

of the change occurring is also considered, as a constituent factor affecting the predicted magnitude of change.

- 4.7.19 The approach to assigning significance to predicted environmental effects is not itself detailed within the EIA Regulations, meaning that it is necessary to develop effect significance thresholds to underpin the assessments reported in this ES. These thresholds are defined on a topic specific basis within **chapters 6 – 14**, taking account of relevant regulations, guidance, standards, the advice and views of consultees, and expert judgement. **Subsection 3 – Methodology** within each of these chapters explains the topic specific methodology adopted to identify the level and associated significance of predicted effects with reference to relevant thresholds. Where relevant, this is based on the factors identified above and the generic criteria set out in Table 4.1 below.

Table 4.1 Generic Significance Criteria

	Level of Effect	Criteria
Significant	Substantial	These effects are assigned this level of significance as they represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites and features of national or regional importance. A change at a district scale site or feature may also enter this category.
	Major	These effects are likely to be important considerations at a local or district scale and may become key factors in the decision-making process.
	Moderate	These effects, while important at a local scale, are not anticipated to be key decision-making issues.
Not significant	Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
	Negligible or No Effect	Either no effect or effect which is beneath the level of perception, within normal bounds of variation or within the margin of forecasting error. Such effects should not be considered by the decision-maker.

- 4.7.20 Effects that are described as ‘substantial’, ‘major’ or ‘moderate’ are determined to be significant, whereas effects that are described as ‘minor’ or ‘negligible’ are determined to be not significant.

4.8 Impact Interactions

- 4.8.1 **Chapter 15 – Impact Interactions** provides the assessment of impact interactions, i.e. receptors being affected by more than one environmental effect and therefore potentially being subject to a more significant combined effect than reported within the individual technical, assessment ES chapters (i.e. **chapters 6 – 14**). Details of the approach to identifying and assessing impact interactions is provided within **Chapter 15**.

4.9 Approach to Cumulative Impact Assessment

- 4.9.1 The EIA Regulations require likely significant cumulative effects from a development proposal in combination with existing and approved development to be described within an ES.
- 4.9.2 Existing developments are considered as part of the baseline scenario within the technical assessments provided in **chapters 6 – 14** of this ES, whilst approved developments are considered separately within the cumulative impact assessment section of each technical assessment ES chapter. Approved developments of relevance to this ES are listed in Section 2, 4 and shown on **Figure 2.2 - Cumulative Development Location Plan** provided in **Appendix 2.1**.

5 Legislative and Planning Policy Context

5.1 Introduction

- 5.1.1 This chapter sets out the key planning legislation, policies and other material considerations applicable to the proposed development which have informed the siting, design and environmental assessment processes. Consideration is given to the following matters in turn:
- Relevant Statutory Provisions;
 - The statutory Development Plan applicable to the site; and
 - Other material considerations, including the National Park Plan, local planning guidance and relevant national policies, advice and guidance.
- 5.1.2 The purpose of this chapter is to identify all legislative and policy requirements and considerations relevant to the technical assessments provided in **Chapters 6 – 15** of this ES. Appropriate cross-references are provided within **Subsection 2** of each technical assessment chapter to confirm which legislation and policies are applicable to the assessment.
- 5.1.3 This chapter is factual in nature and does not assess the proposed development's accordance with relevant planning policies. A separate Planning Statement explains the rationale for the proposed development and assess in detail how it accords with relevant Development Plan policies and other material considerations.

5.2 Relevant Statutory Provisions

- 5.2.1 The key planning legislation of relevance to this ES and the overall EIA process is:
- The Town and Country Planning (Scotland) Act 1997 as amended ('the Principal Act');
 - The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 as amended;
 - The National Parks (Scotland) Act 2000 as amended;
 - The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 as amended ('the EIA Regulations');
 - The Climate Change (Scotland) Act 2009; and
 - The Town and Country Planning (Development Management Procedure) (Scotland) Regulations 2013 as amended.
- 5.2.2 Under section 25 of the Principal Act, the determination of all planning applications must be made in accordance with the statutory Development Plan applicable to the site of a proposed development, unless material considerations indicate otherwise. Section 264A of the Principal Act also requires special attention to be paid to the applicable National Park Plan. Section 59 of the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 as amended requires planning authorities to have "*special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses*".
- 5.2.3 Section 1 of the National Parks (Scotland) Act 2000 as amended identifies the four aims of Scotland's National Parks including Loch Lomond and the Trossachs National Park (LLTNP), namely:
- "*(a) to conserve and enhance the natural and cultural heritage of the area;*
 - "*(b) to promote sustainable use of the natural resources of the area;*
 - "*(c) to promote understanding and enjoyment (including enjoyment in the form of recreation) of the special qualities of the area by the public; and*
 - "*(d) to promote sustainable economic and social development of the area's communities*".
- 5.2.4 These National Park aims are material planning considerations. Section 9 of the same Act states that the aims should be achieved collectively. However, in relation to any matter it appears to the National Park Authority that there is a conflict between the first aim, and the other National

Park aims, greater weight must be given to the conservation and enhancement of the natural and cultural heritage of the area.

- 5.2.5 Section 44 of the Climate Change (Scotland) Act 2009 requires all Scottish public bodies to “*act in the way best calculated to*” contribute to the delivery of Scotland’s greenhouse gas (GHG) emissions reduction targets and climate change adaptation programmes, as well as “*in a way that it considers most sustainable*”. These public body duties are relevant insofar as the Applicant (which includes Scottish Enterprise), a major landowner within the site (Scottish Enterprise) and Planning Authority (LLTNP) are Scottish public authorities.
- 5.2.6 The relevance and implications of the EIA Regulations for this ES are detailed separately in **Chapter 3 – Assessment Methods**.
- 5.2.7 It should be noted that the technical assessments presented in chapters 6 – 14 have also been prepared in accordance with a wide range of topic specific legislation, non-planning policies, technical guidance and standards, as detailed within a dedicated section of each chapter (**Subsection 2**).

5.3 Development Plan

Overview

- 5.3.1 The current statutory Development Plan applicable to the site of the proposed development comprises the Loch Lomond and the Trossachs Local Development Plan 2017 – 2021 (‘the LDP’), which was adopted by LLTNP in December 2016, and associated adopted Supplementary Guidance.

Loch Lomond and the Trossachs Local Development Plan 2017 – 2021

- 5.3.2 The LDP is split into four distinct sections (and appendices), of which Sections 2 – Vision, Section 3 – Place and Section 4 - Policies are of relevance.

Section 2 – Vision

- 5.3.3 The LDP’s vision is focused around conservation, visitor experience and rural development. Of relevance to the proposed development, it calls for “*a high quality, authentic experience for visitors, with many opportunities to appreciate and enjoy the natural and cultural heritage within an internationally renowned landscape that compares to the best on offer around the world*”. The LDP’s Development Strategy Map (page 17) identifies Balloch as one of eight locations for “*Strategic Tourism Opportunities*”, reflecting its role as a visitor destination and gateway to the National Park.

Section 3 – Place

- 5.3.4 This section sets out a spatial strategy for the LLTNP area, including land use allocations for each defined settlement. The following land use allocations in Balloch are of relevance:
- Balloch VE1: West Riverside – allocated for visitor experience related uses (as defined in approved Visitor Experience Planning Guidance – see Section 5.4 below). This allocation covers the eastern part of the site;
 - Balloch VE4: Woodbank House – allocated for visitor experience related uses. This allocation covers Woodbank House and attendant grounds within the site; and
 - Balloch MU1: The Old Station – allocated for mixed use (visitor experience and transport) uses. This allocation is located immediately south east of the site.
- 5.3.5 No details are provided in Section 3 regarding development requirements or design principles for these LDP site allocations.

Section 4 - Policies

- 5.3.6 This section of the LDP sets out three overarching policies which apply to all development proposals, followed by a suite of subject specific policies. The LDP policy of most relevance is Visitor Experience Policy 1, which at criterion (a) provides support for proposals forming a

strategic tourism opportunity within Balloch. The other criterion within this policy relate to small-scale proposals and are not relevant to the proposed development.

- 5.3.7 Other policies within the adopted LDP of relevance to the proposed development are outlined in Table 5.1. Particular attention is given to Overarching Policies 1 – Strategic Principles and 2 – Development Requirements as these set the framework within which all environmental and wider planning issues will be assessed through individual subject policies.

Table 5.1 Other Relevant Policies within the Loch Lomond and the Trossachs LDP (2016)

LDP Policy Title	Summary
Overarching Policy 1 - Strategic Principles	<p>Sets out principles linking the LDP with the Scottish Planning Policy (SPP, 2014 – see Section 5.4 below). All proposals should demonstrate their accordence with relevant principles, including:</p> <ul style="list-style-type: none"> • Collective achievement of the four statutory National Park aims (see Section 5.2 above) and implementation of the National Park Partnership Plan; • Contributing to sustainable development and climate change mitigation, including through sustainable design; • Prioritising the reuse of brownfield and vacant land; • Prioritising place making, including in street design; • Increasing connectivity, especially to public transport and key destinations, and providing safe access; • Open space provision that is <i>“high quality, appropriate to the needs of the local community, integrated to the development and provide links to the wider green network”</i>; • <i>“Minimising adverse impacts on water, air and soil quality”</i>; • <i>“Addressing climate change impacts”</i>; • <i>“Avoiding significant flood risk”</i>; • <i>“Relating well to the landscape context and setting”</i>, including in terms of cultural heritage and local built form”; and • <i>“Incorporating appropriate soft and hard landscaping, a planting scheme, and measures to protect existing trees and other landscape features”</i>.
Overarching Policy 2 - Development Requirements	<p>Provides high level design and environmental assessment criteria to assess all proposals, including the following of relevance to the PPIP application for the proposed development:</p> <ul style="list-style-type: none"> • <i>“Safeguard visual amenity and important views, protect and/or enhance rich landscape character, and features and areas specifically designated for their landscape values at any level;</i> • <i>avoid any significant adverse impacts of: flooding, noise/vibration, air emissions/ odour/fumes/dust, light pollution, loss of privacy/sunlight/daylight;</i>

LDP Policy Title	Summary
	<ul style="list-style-type: none"> • <i>protect and/or enhance the character, appearance and setting of the historic environment;</i> • <i>protect and/or enhance the biodiversity, geodiversity, water environment, sites and species designated at any level...including ancient and semi-natural woodland, green infrastructure and habitat networks;</i> • <i>support Active Travel choices where possible...and transport infrastructure;</i> • <i>provide safe road access and appropriate parking provision;</i> • <i>promote understanding and enjoyment (including recreation) of the special qualities of the area by the public including safeguarding access rights;</i> • <i>achieve a high quality design and layout, provide a positive sense of place, and compliment local distinctiveness; and</i> • <i>adaptable for the changing needs of future users, designing for extreme weather, fulfil disabled requirements, support new businesses, training/jobs for local people and a mix of uses/tenures...".</i>
Overarching Policy 3 - Developer Contributions	Sets out the circumstances in which development contributions will be sought in respect of proposals, including for infrastructure upgrades required to make the proposal acceptable in planning terms.
Visitor Experience Policy 2 - Delivering a World Class Visitor Experience	Requires tourism development proposals to enhance the visitor experience of the National Park.
Transport Policy 2 - Promoting Sustainable Travel and Improved Active Travel Options	Sets out criteria requiring proposals to contribute positively to “ <i>encouraging safe, sustainable travel and improving active travel options</i> ” throughout the National Park.
Transport Policy 3 - Impact Assessment and Design Standards of New Development	Requires large-scale proposals to be supported by a Transport Statement and Travel Plan, and to implement any identified appropriate mitigation, in order to minimise adverse traffic effects. The policy also sets out design related assessment criteria to ensure that proposals satisfy relevant technical standards and contribute to place making in the National Park.

LDP Policy Title	Summary
Natural Environment Policy 1 - National Park Landscapes, seascape and Visual Impact	Requires proposals to protect the defined Special Qualities (SQ) of the LLTNP. In this regard proposals must <i>“be sympathetic to their setting and minimise visual impact”</i> .
Natural Environment Policy 2 - European Sites - Special Areas of Conservation (SAC) and Special Protection Areas (SPA)	In line with European legislative requirements, this policy sets out criteria to protect SPAs and SACs from significant adverse effects relating to the integrity and conservation objectives of each designated site.
Natural Environment Policy 3 - Sites of Special Scientific Interest, National Nature Reserves and RAMSAR Sites	Requires development affecting these nationally designated sites to either result in an overall <i>“enhancement”</i> to the designation, not have an adverse effect on its conservation objectives or integrity, or otherwise demonstrate that <i>“adverse effects on the qualities for which the area has been designated are clearly outweighed by social or economic benefits of national importance”</i> .
Natural Environment Policy 4 - Legally Protected Species	Affords protection to all legally protected species from adverse effects, unless criteria protecting the conservation status of the species, the absence of alternatives and the demonstration of <i>“public health, public safety or other imperative reasons of overriding public interest, including those of a social or economic nature”</i> are satisfied.
Natural Environment Policy 5 - Species and Habitats	Sets out criteria to protect habitats and species identified in the National Park Biodiversity Action Plan from unacceptable adverse impacts. Also requires consideration of effects on ecological functions and the continuity and integrity of species and habitats. Compensatory and management measures are required where adverse effects are predicted.
Natural Environment Policy 6 - Enhancing Biodiversity	Requires proposals to enhance biodiversity by protecting, managing and enhancing natural landscape, wildlife, wildlife habitat, habitat networks and green corridors. The policy also encourages the planting of native species.
Natural Environment Policy 8 - Development Impacts on Trees and Woodlands	Sets out criteria to protect against the loss or deterioration of loss of ancient or long-established plantation or semi-natural woodland. Development proposals resulting in the loss of woodland which contributes to local amenity, character and/or are of nature conservation value or historic significance will not be

LDP Policy Title	Summary
	supported. The policy refers to the Scottish Government’s Control of Woodland Removal Policy in relation to woodland removal and compensatory planting requirements.
Natural Environment Policy 9 - Woodlands on or Adjacent to Development Sites	Requires proposals which may affect trees or woodland to comply with British Standard 5837:2012.
Natural Environment Policy 11 - Protecting the Water Environment	Requires proposals not to have a significant adverse effect on the water environment.
Natural Environment Policy 12 - Surface Water and Waste Water Management	Requires proposals to connect to public sewers where available.
Natural Environment Policy 13 - Flood Risk	Requires compliance with the SPP (2014) Flood Risk Framework.
Natural Environment Policy 16 - Land Contamination	Requires proposals on or close to known or suspected contamination to be supported by an appropriate risk assessment.
Historic Environment Policy 1 - Listed Buildings	Criterion (b) restricts the demolition of listed buildings. Criterion (c) seeks to limit enabling development to the minimum level required and ensure it is sensitively designed.
Historic Environment Policy 3 - Wider Built Environment and Cultural Heritage	Sets out criteria to protect buildings or feature of architectural and/or historical merit or of cultural significance.
Historic Environment Policy 4 - Gardens and Designed Landscapes (GDL)	Requires proposals not to adversely impact on GDL character, important views or wider landscape setting.

LDP Policy Title	Summary
Historic Environment Policy 5 – Conversion and Re-Use of Redundant Buildings	Requires proposals for the conversion and reuse of “ <i>buildings of vernacular quality and local historic and/or architectural interest</i> ” to demonstrate the building is structurally sound and that conversion would not involve significant “ <i>rebuilding or new building elements</i> ”.
Historic Environment Policy 6 - Scheduled Monuments and Other Nationally Important Archaeological Sites	Sets out criteria to protect these national heritage assets and their setting.
Historic Environment Policy 7 – Other Archaeological Resources	Requires development proposals to retain, protect and preserve in-situ and in an appropriate setting any archaeological resources affected by the proposal.
Historic Environment Policy 8 – Sites with Unknown Archaeological Potential	Requires development proposals on sites considered to have significant archaeological potential to be supported by an archaeological evaluation of the site, with appropriate archaeological mitigation then implemented.
Open Space Policy 2 - Protecting Other Important Open Space	Sets out criteria to protect formal and informal open spaces in public or private ownership. Proposals need to demonstrate that any affected open space “ <i>is not of community value and has no other multifunctional purposes such as cultural, historical, biodiversity or local amenity value</i> ”. Where open space is affected, alternative provision and alignment with nature conservation management objectives is also required.
Waste Management Policy 1 - Waste Management Requirement for new Developments	Requires suitable waste management provision to be incorporated into proposals.

Adopted Supplementary Guidance

- 5.3.8 A number of draft Supplementary Guidance and Planning Guidance documents were published by LLTNPA in 2015 for consultation alongside the LLTNP LDP Proposed Plan (2015). None of the Supplementary Guidance documents which have to date been adopted (as at January 2018) are of relevance to the proposed development.

5.4 Other Material Considerations

Overview

- 5.4.1 Other material considerations of relevance to the proposed development are:

- LDP Supplementary Guidance;
- LDP Planning Guidance;
- Draft LLTNP Partnership Plan (2018 – 2023);
- National Planning Policies; and,
- Other National Policies, Advice and Guidance.

- 5.4.2 Each of these material considerations is outlined in turn below.

LDP Supplementary Guidance

- 5.4.3 The only Supplementary Guidance relevant to the proposed development is the Design and Place making Supplementary Guidance. This document providing siting and design guidance to ensure that all development proposals, including specifically “*holiday park developments*” are of high quality. In doing so the document identifies a range of detailed urban and environmental considerations for proposals in the National Park.

LDP Planning Guidance

- 5.4.4 In addition to statutory Supplementary Guidance, the adopted LDP is also supported by a suite of non-statutory Planning Guidance documents. The following approved Planning Guidance documents are relevant to the proposed development:

- Listed Buildings and Conservation Areas Planning Guidance - sets out assessment criteria for proposals in the grounds of listed buildings, including the protection of key views and landscape setting; and
- Visitor Experience Planning Guidance - defines different types of tourism accommodation and infrastructure. This Planning Guidance does not set out criteria to assess tourism development proposals beyond repeating those within relevant LDP policies.

- 5.4.5 In addition, the Draft Development Contributions Planning Guidance identifies where developer contributions are likely to be sought by the LLTNPA in respect of proposals, depending on their scale, location, predicted impacted and particular circumstances.

National Park Partnership Plan

- 5.4.6 All planning decisions within the LLTNP area require to be guided by the policies of the National Park Partnership Plan where relevant to ensure that decisions are consistent with the National Park’s statutory aims (identified in **Section 5.2** above).

- 5.4.7 The National Park Partnership Plan 2018-2023 is an important material consideration in the determination of this application. It is framed around three thematic vision statements, 13 outcomes and numerous related priorities for the LLTNPA. All three identified themes, Conservation and Land Management, Visitor Experience and Rural Development, are relevant to the proposed development. Many of the identified outcomes are also relevant, specifically:

- Outcomes 1, 2 and 3 seek to conserve and enhance the National Park’s natural resources, special qualities and sense of place, whilst better mitigating and adapting to climate change;
 - Outcomes 5 – 9 seek to enhance recreational opportunities of all kinds and enjoyment within the National Park, deliver a thriving visitor economy, and protect and enhance environmental quality, community life, health and wellbeing; and
 - Outcomes 10 – 12 seek to enhance the National Park’s towns and villages through investment, strengthen and diversify the rural economy, realise sustainable business growth, and retain a larger skilled young and working age population.
- 5.4.8 To monitor its implementation, the National Park Partnership Plan (2018-2023) lists 14 targets for the LLTNP area over the period to 2023, of which the following are relevant to the proposed development:
- Increase the value of the visitor economy from 2016 STEAM baseline of £340m;
 - Increase the proportion of people reporting a good quality experience of the National Park’s settlements and landscapes;
 - Reduce the proportions of people arriving in or exploring within the National Park by car and increase the proportion exploring by foot, water and bike, all from 2015/16 Visitor Survey baseline levels; and
 - Increase from 2016 baseline of 44% to 59% of water bodies achieving at least good ecological condition.

National Planning Policies

- 5.4.9 National planning policy is contained within both the National Planning Framework 3 (NPF3) and the SPP, both of which were published in June 2014. Given that the statutory Development Plan applicable to the site post-dates this and has undergone a formal Examination through which its soundness has been tested, and since section 25 of the Principal Act requires planning applications to be determined in accordance with the Development Plan unless material considerations indicate otherwise, national planning policy is considered to play a secondary role in this EIA for the proposed development. Correspondingly, this section only briefly identifies relevant national planning policy provisions.

National Planning Framework

- 5.4.10 The NPF3 provides a statutory framework around which to orientate Scotland’s long-term spatial development. The Framework highlights the spatial planning implications of multiple national policy documents and commitments. In overall terms the NPF3 emphasises the Scottish Government’s commitment to increasing sustainable economic growth across all areas of Scotland and orientates the efforts of Scotland’s planning system towards this purpose.
- 5.4.11 The introduction to the NPF3 notes the importance of maintaining economically active and vibrant rural areas whilst “*safeguarding our natural and cultural assets and making innovative and sustainable use of our resources*”. Related to this, the document identifies tourism as a key economic growth sector and includes a strategy for Scotland’s two National Parks. This notes that the National Parks are “*sustainable, successful places*” where the Scottish Government wishes to see “*planning and innovation continue to strengthen communities, encourage investment, support tourism, deliver affordable rural housing, and encourage high quality place making and visitor experiences*”. At the same time the NPF3 expects Development Plans to safeguard their “*exceptional environmental quality*”.
- 5.4.12 The national spatial strategy of the NPF3 is structured around four key themes, namely: a successful, sustainable place; a low carbon place; a natural, resilient place; and a connected place. These themes are presented as ‘planning outcomes’ within the SPP (2014).
- 5.4.13 With respect to the Glasgow and Clyde Valley City Region (which includes West Dunbartonshire and therefore in local authority terms, Balloch), the NPF3 focuses on efforts to regenerate post-industrial areas and provides support for proposals which increase employment and economic development. It also identifies the Central Scotland Green Network (CSGN) as a National

Development, encourages the remediation of derelict land, promotes active and sustainable travel and supports the protection and enhancement of green infrastructure.

Scottish Planning Policy

- 5.4.14 The SPP (2014) is a material consideration that carries significant weight. It sets out the Scottish Government's expectations regarding the treatment of specific planning issues within development planning and development management. The document aims to contribute to the achievement of the Scottish Government's overarching purpose of achieving sustainable economic growth.
- 5.4.15 The SPP's Principal Policy on Sustainability (paragraphs 24-35) includes a presumption in favour of development that contributes to sustainable development, which relates to the identification of the need for and acceptability of the development. To implement this policy presumption, the SPP (paragraph 29) identifies 13 sustainable development principles which should guide planning policies and decisions, of which 12 are relevant to the proposed development:
- *“giving due weight to net economic benefit;*
 - *responding to economic issues, challenges and opportunities, as outlined in local economic strategies;*
 - *supporting good design and the six qualities of successful places;*
 - *making efficient use of existing capacities of land, buildings and infrastructure including supporting town centre and regeneration priorities;*
 - *supporting delivery of accessible housing, business, retailing and leisure development*
 - *supporting climate change mitigation and adaptation including taking account of flood risk;*
 - *improving health and well-being by offering opportunities for social interaction and physical activity, including sport and recreation;*
 - *having regard to the principles for sustainable land use set out in the Land Use Strategy;*
 - *protecting, enhancing and promoting access to cultural heritage, including the historic environment;*
 - *protecting, enhancing and promoting access to natural heritage, including green infrastructure, landscape and the wider environment;*
 - *avoiding over-development, protecting the amenity of new and existing development and*
 - *considering the implications of development for water, air and soil quality”.*
- 5.4.16 The SPP's other Principal Policy, on Place making (paragraphs 36-57), seeks to direct new development to the right location and to encourage a design-led approach to development in order to create high quality places. The SPP (under paragraph 40) states that high quality development which demonstrates the following six qualities of successful places should be supported: *“Distinctive, Safe and Pleasant, Welcoming, Adaptable, Resource efficient, and Easy to move around and beyond”*. As noted in **Section 5.3** above, these six qualities are referenced in Overarching Policy 1 – Strategic Principles within the adopted Loch Lomond and the Trossachs LDP (2016).
- 5.4.17 Subject specific provisions within the SPP of relevance to the proposed development are outlined in Table 5.2 below.

Table 5.2 Relevant Subject Policies within the Scottish Planning Policy (2014)

Subject Policy	Relevance
Promoting Rural Development (Paragraphs 74 – 91)	This section identifies planning principles related to sustainable rural development including “...encourage rural development that supports prosperous and sustainable communities and businesses whilst protecting and enhancing environmental quality...”. The section includes a sub-section regarding planning within Scotland’s National Parks (paragraphs 84 – 86), which lists the statutory aims of National Parks (see Section 5.2 above) and notes the need for LDP’s covering National Parks to be consistent with National Park Partnership Plans (see below).
Supporting Business and Employment (Paragraphs 92 – 108)	This section highlights the need to “give due weight to net economic benefit of Proposed Development” (paragraph 93). The SPP identifies tourism as one of several key growth sectors which should be appropriately supported through development plans.
Valuing the Historic Environment (Paragraphs 135 – 151)	This section states that planning should promote the care and protection of the designated and non-designated historic environment and should take account of all aspects of the historic environment. Detailed policy provisions are set out in order to protect and enhance different types of historical assets.
Listed Buildings (Paragraph 141)	This paragraph states that “where planning permission and listed building consent are sought for development to, or affecting, a listed building, special regard must be given to the importance of preserving and enhancing the building, its setting and any features of special architectural or historic interest...”.
Gardens and Designed Landscapes (Paragraph 148)	This paragraph states that” planning authorities should protect and, where appropriate, seek to enhance gardens and designed landscapes included in the Inventory of Gardens and Designed Landscapes and designed landscapes of regional and local importance”.
Archaeology (Paragraph 150)	This paragraph states that “planning authorities should protect archaeological sites and monuments as an important, finite and non-renewable resource and preserve them in situ wherever possible”. In-situ preservation is encouraged, but in cases where this is not possible conditions or legal obligations should be used to ensure archaeological assets are recorded and analysed before development proceeds.
Valuing the Natural Environment (Paragraphs 193 - 233)	This section identifies a number of planning principles related to natural heritage protection and ecological resilience. Principles (paragraph 194) of relevance to the Proposed Development include that planning should: “facilitate positive change while maintaining and enhancing distinctive landscape character; conserve and enhance protected sites and species... promote protection and improvement of the water environment...in a sustainable and co-ordinated way; protect and enhance ancient semi-natural woodland as an important and irreplaceable resource, together with other native or long-established woods, hedgerows and individual trees with high nature conservation or landscape value;

Subject Policy	Relevance
	seek benefits for biodiversity from new development where possible..."
Protecting Designated Sites (Paragraph 196)	This paragraph requires designated areas and sites to be identified and appropriately protected through development plans, without the use of buffer zones. It also states that <i>"the level of protection given to local designations should not be as high as that given to international or national designations"</i> .
Development Management Decisions (Paragraphs 202 - 203)	This section states that planning decisions <i>"should take account of potential effects on landscapes and the natural and water environment, including cumulative effects"</i> (paragraph 202). It further states that <i>"planning permission should be refused where the nature or scale of proposed development would have an unacceptable impact on the natural environment"</i> (paragraph 203). The same paragraph notes that whilst effects on statutorily protected sites will be an important consideration, this <i>"does not impose an automatic prohibition on development"</i> .
Non-Native Species (Paragraph 210)	This paragraph states that <i>"where non-native species are present on site, or where planting is planned as part of a development, developers should take into account the provisions of the Wildlife and Countryside Act 1981 relating to non-native species"</i> .
National Designations and Protected Species (Paragraphs 212 - 214)	Reflecting legislative requirements, these paragraphs identify criteria to safeguard nationally designated sites (including National Parks) and protected species from adverse effects. In relation to the protection of designated sites and protected species, these criteria have effectively been transposed into Natural Environment Policies 2-4 of the adopted Loch Lomond and the Trossachs LDP (2016).
Woodland (Paragraph 218)	This paragraph refers to and aligns directly with provisions set out in the Scottish Government's Control of Woodland Removal Policy 2009 (see below).
Maximising the Benefits of Green Infrastructure (Paragraphs 219 - 233)	This section identifies a number of planning principles related to the protection, enhancement and promotion of green infrastructure including core paths and other important routes.
Managing Flood Risk & Drainage (Paragraphs 254-268)	This section promotes a precautionary approach to flood risk management. Where relevant, flood risk assessments and the deployment of SUDs are required (paragraph 255).

Subject Policy	Relevance
Promoting Sustainable Transport and Active Travel (Paragraphs 269-291)	This section includes a requirement for development proposals to consider traffic impacts including cumulative effects (paragraph 286).

Other National Policies, Advice and Guidance

Scottish Historic Environment Policy Statement

- 5.4.18 This document takes account of the Historic Environment (Scotland) Act 2014 and explains how provisions within the SPP (2014) relating to the management of the historic environment should be interpreted. The document does not set out any new or different planning policies or development management assessment criteria, however it does retain the “*presumption in favour of preservation of individual historic assets and also the pattern of the wider historic environment*” previously set out in the now superseded Scottish Historic Environment Policy (2011).

Government Economic Strategy 2015

- 5.4.19 The overall purpose of the Scottish Government’s Economic Strategy is to deliver increased sustainable growth. In order to deliver this, one of the key priorities is securing sustainable investment. This includes investment in business and infrastructure. The Strategy highlights that it is important to foster an environment that supports business growth. Investment in sectors in which Scotland has an advantage, including tourism, is encouraged. In addition, the Strategy calls for businesses to be resource efficient and low carbon in order to improve efficiency and productivity.

Tourism Scotland 2020 and Tourism Development Framework for Scotland Refresh 2016

- 5.4.20 The SPP (2014) requires Development Plans to be informed by the Tourism Development Framework for Scotland, which is also identified as a key document for planning decisions more widely. The Framework was first published in 2013 and refreshed in 2016 to align with a mid-term review of the national tourism strategy, Tourism Scotland 2020.
- 5.4.21 The Framework sets out actions to assist and promote growth in Scotland’s visitor economy to 2020. It supports the implementation of Tourism Scotland 2020 and the achievement of its central target to secure annual visitor spend of between £5.5bn and £6.5bn to 2020 for overnight visitors. The Framework does this by providing guidance to development planning authorities to help secure growth in the visitor economy.
- 5.4.22 The Framework identifies the importance of the tourism economy within the LLTNP and states that “*further opportunities remain around the south of the Loch at the gateway to the National Park*” for hotel and other accommodation (paragraph 2.48). At paragraphs 2.54 – 2.58 the Framework defines ‘resort development’ as “*destinations where a collection of activities, such as eating, sleeping and recreation, can be undertaken in one defined location*” and confirms that such development can be situated in urban or rural locations, including within National Parks as existing key visitor destinations. The “*significant economic opportunities*” provided by resort development in terms of onsite rural employment, off-site supply chain benefits and the type of visitors they attract is noted within paragraph 2.55 of the Framework.

Scottish Government Control of Woodland Removal Policy (2009)

- 5.4.23 This policy provides a national position to inform decisions on all woodland removal across Scotland. The policy includes a presumption in favour of protecting woodland, stating that removal should only be permitted where it would achieve significant and clearly defined additional public benefits. The concept of additionality is therefore central to the application of the Policy.
- 5.4.24 The Policy identifies situations where:
- There is a strong presumption against removal of woodland;
 - Woodland removal is acceptable without compensatory planting (CP); and
 - Woodland removal is acceptable with CP.
- 5.4.25 The Policy requires consideration of any need for CP as part of a judgement regarding the acceptability of woodland removal, rather than as a separate issue or automatic presumption. Consequently, if significant net additional public benefit can be demonstrated from a development proposal involving woodland removal without compensatory planting, there is no

policy requirement for compensatory planting to then be provided (whether on a like-for-like or other basis).

- 5.4.26 Annex C of the Policy specifies acceptability criteria for demonstrating significant net additional public benefit either in the absence of, or with, CP. The criteria regarding acceptability in the absence of CP include benefits derived from land use change (whether or not the intended direct result of a development proposal) as well as other environmental and public safety factors.
- 5.4.27 The policy is supported by implementation guidance (March 2015) for Forestry Commission Scotland staff. This document notes that the need for any compensatory planting should be minimised and that compensatory planting “*should be seen as the final option once all other solutions have been exhausted*”.

Creating Places - A policy statement on architecture and place for Scotland (2013)

- 5.4.28 This document sets out the Scottish Government’s overall policy statement on architecture and place. The document defines ‘good design’ as “*an innovative and creative process that delivers value*” and provides a detailed explanation of the six qualities of successful places which are now embedded within the SPP (2014).

National Planning Advice and Circulars

- 5.4.29 National planning policy is supported by numerous Scottish Government Planning Circulars, Planning Advice Notes (PANs), Advice Sheets, Ministerial/Chief Planner Letters to Planning Authorities, as well as guidance documents prepared by Key Agencies of the Scottish Government. Annexe A to Scottish Government Planning Circular 3/2013: Development Management Procedures (Revision 1.0) confirms that amongst other considerations, the types of documents listed above are all potential material considerations in the determination of a planning application depending on the individual context of the case.
- 5.4.30 The following guidance and advice documents are considered to be of relevance to the proposed development and have been considered where appropriate in undertaking this EIA:
- SEPA’s Development Management Guidance: Flood Risk (July 2017);
 - Online Planning Advice regarding Flood Risk (June 2015);
 - PAN 1/2013: Environmental Impact Assessment (August 2013);
 - PAN 2/2011 Planning and Archaeology (July 2011);
 - Planning Circular 3/2011: The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011;
 - PAN 1/2011 Planning and Noise (March 2011);
 - PAN 60 Planning for Natural Heritage (2000, revised January 2008);
 - PAN 81 Community Engagement (March 2007);
 - PAN 51 Planning, Environmental Protection and Regulation (Revised October 2006);
 - PAN 79 Water and Drainage (September 2006);
 - PAN 75 Planning for Transport (August 2005);
 - PAN 68 Design Statements (August 2003);
 - PAN 61 Planning and Sustainable Urban Drainage Systems (July 2001); and
 - PAN 33 Development of Contaminated Land.

5.5 References

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- Scottish Government. (2013) Creating Places - A policy statement on architecture and place for Scotland: ([accessed January 2018](#)).
- Loch Lomond and the Trossachs National Park Authority (LLTNPA). (2016) Loch Lomond and the Trossachs Local Development Plan 2017 – 2021: ([accessed January 2018](#)).
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6 Ecology and Woodland

6.1 Introduction

6.1.1 This chapter provides an assessment of the likely significant effects on ecology and woodland. It details the ecological studies undertaken and presents the results of an Ecological Impact Assessment (EclA) undertaken for the proposed development in accordance with the latest guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM) (CIEEM, 2016). The assessment is based on the characteristics of the site and the surrounding area detailed in **Chapter 2 – Site and Surrounding Area**, and the key parameters of the proposed development detailed in **Chapter 3 – The Proposed Development**.

6.1.2 The aims of this chapter are to:

- Outline the methodology used in the assessment;
- Establish a robust and accurate ecological baseline for the site;
- Identify and evaluate the nature conservation/biodiversity interest present;
- Identify any likely impacts arising from the proposed development (construction and operational stages);
- Establish the magnitude of identified impacts;
- Identify further mitigation and enhancement measures where required to address identified impacts;
- Assess residual predicted impacts; and,
- Assess cumulative impacts from the proposed development in combination with other relevant cumulative developments.

6.1.3 This chapter is supported by the EclA provided in **Technical Appendix 6.5 - EclA**.

6.2 Scoping

6.2.1 An EIA Scoping Report was produced by PBA in April 2017. Consultation responses in reference to the initial development description as described in the Scoping Report were received in mid-May 2017 and these were reviewed in order to finalise and agree the scope of the EclA. Based on the Ecological Constraints and Opportunities Plan (ECOP) undertaken to inform the Scoping Report and the preliminary consultation responses, the scope of the ecology survey work is summarised below:

- Vegetation, comprising a Phase 1 Habitat Survey, including potential Groundwater Dependent Terrestrial Ecosystems (GWTDE's) and Invasive Non-native Species (INNS);
- Trees and woodland;
- Otter (*Lutra lutra*);
- Water vole (*Arvicola amphibius*);
- Badger (*Meles meles*);
- Red squirrel (*Sciurus vulgaris*);
- Pine marten (*Martes martes*);
- Roe deer (*Capreolus capreolus*); and
- Bats (all species) (automated and activity).

6.2.2 Following the ECOP findings and the preliminary consultation responses the following elements were scoped out of the EclA:

- The direct impacts to designated sites ecologically linked to the proposed development site have been scoped out as it is considered that no direct impacts as a result of the proposed development are likely. Aside from Loch Lomond, indirect impacts to ecologically connected

sites have also been scoped out as they are not considered to be tourist destinations and therefore impacts such as increased public pressure are not anticipated.

- Breeding and wintering bird surveys were scoped out due to the habitats on and directly adjacent to the site being considered suitable to support bird populations of only local importance. It was considered that any impacts on these local populations could be mitigated by enacting good practice mitigation during and post construction.

6.2.3 The scoping exercise narrowed down the Important Ecological Features (IEFs) within the study area and the Zone of Influence (Zoi) was set for each one according to the CIEEM guidance.

6.3 Methodology

6.3.1 In order to anticipate the potential ecological sensitivities at the site and inform the impact assessment a desk study was conducted in advance of the survey work. Where field surveys were not undertaken, desk study information was used to carry out the impact assessment. The IEFs were assigned a level of geographical importance based on the CIEEM guidance.

6.3.2 The assessment of impacts describes how the baseline conditions would change as a result of the project and its associated activities and from other developments. The term 'impact' is defined as a change experienced by a receptor (this can be positive, neutral or negative). The term 'effect' is defined as the consequences for the receptor of an impact after embedded and further mitigation and enhancement measures have been taken into account, as per the CIEEM guidance. The EIA Regulations specifically require all likely significant effects to be considered, therefore, impacts and effects are described separately and the effects on the IEFs are assessed as being either significant at a relevant geographic scale or not significant.

6.3.3 A cumulative impact assessment is included as cumulative effects in the construction and/or operational phase are likely. The cumulative impact assessment considers if the combined actions of adjacent developments is likely to have a negative impact on the IEFs.

6.4 Baseline Conditions

The Site

6.4.1 The site can be considered in two separate areas: the land at West Riverside and the area associated with Woodbank House. The area surrounding West Riverside includes Drumkinnon Woods. This semi-natural woodland is located south east of the Loch Lomond Shores complex, across an undulating landform and is dissected by footpaths. The woodland is bounded to the west and north by roads accessing Loch Lomond Shores and the pier. Part of the woodland is designated as ancient woodland. Although subject to a level of disturbance, the woodland has the potential to support a range of wildlife. A corridor of woodland is also present alongside the River Leven on the eastern boundary of the site, whilst pockets of landscaped woodland, amenity areas and car parks are present in the north of the site and to the east of the existing Loch Lomond Shores complex.

6.4.2 The area associated with Woodbank House is situated to the west of Old Luss Road and approximately 500m east of the A82. At the centre of the site are the remains of Woodbank House, a Grade-A listed property, which is now largely derelict. The remains of the house are accessed from Old Luss Road by a driveway through an area of paddock, used for grazing horses and surrounded by the remains of the former gardens. Ancient woodland surrounds the site of the building with mature specimens of broadleaved species such as oak and yew. The woodland and small watercourses present to the north and south of the site boundary at Woodbank House have the potential to support a range of faunal species.

Designated Sites and Ancient Woodland Sites

6.4.3 The site is situated within the Loch Lomond and the Trossachs National Park (LLTNP) near the southern park boundary. Twenty-four statutory designated sites are present within 10km of the site. Five of these sites are considered to be hydrologically and/or ecologically connected to the site. Six Local Nature Conservation Sites (LNCS) are present within 2km of the site. Only the River Leven LNCS has direct hydrological and ecological connectivity to the site.

- 6.4.4 Long-established woodland of plantation origin (LEPO) is present in the north and west of the site. The woodland present in the north and west offers connectivity to similar habitat in the wider area.

Evaluation of Important Ecological Features

- 6.4.5 The evaluations have been applied only to those habitats and species that have been scoped in to the assessment and those where there is the potential for impacts that could result in significant adverse ecological effects as a result of the proposed development.

6.5 Baseline Evolution

- 6.5.1 In the absence of the proposed development, increased public pressure and climate change are likely to contribute to the evolution of the baseline. Further details are provided in **Technical Appendix 6.5 - EclA**.

6.6 Embedded Mitigation

- 6.6.1 The proposed development seeks to construct small woodland lodges on elevated support structures (if required) to avoid the creation of foundations within the woodland areas. These woodland areas form part of the Forest Habitat Network. The proposed development intends to maintain and enhance this network during construction and post development.

- 6.6.2 The embedded mitigation measures incorporated within the proposed development that are relevant to this chapter and that are considered in the impact assessment are as follows:

- A Construction Environmental Management Plan (CEMP);
- Siting and design of forest lodges to be informed by detailed tree surveys of the site, to be undertaken in accordance with the relevant British Standards;
- Safeguarding of identified important trees, including their root systems, from disturbance or loss;
- Commitment to the provision of appropriate compensatory planting to offset the loss of trees to the building footprints and working areas within the existing woodland;
- Manage extents of invasive species such as rosebay willowherb, Japanese knotweed and bamboo, in particular on the Woodbank site;
- Development of path and minor route networks using low impact technology to protect tree roots, soils and surrounding vegetation;
- Existing woodland managed to improve age range and biodiversity;
- Boost ecology and diversify species mix further by replanting lost species with native hardwood trees such as beech and oak;
- Boost ecology and ground flora within woodland by thinning out trees, consequently allowing more sunlight to reach the woodland floor. Management of non-native species;
- A speed limit of 10mph would be applied to all construction traffic to reduce the risk and frequency of potential faunal collisions;
- Boundary features and fences would be designed to allow roe deer and badgers to move freely where appropriate.

6.7 Further Mitigation and Enhancement

- 6.7.1 As set out in **Appendix 6.5**, further mitigation and enhancement is proposed. The measures include the following:

- Appointment of an Environmental/Ecological Clerk of Works (ECoW) team to monitor compliance, produce auditable records and provide onsite advice;
- Pre-construction and regular protected species surveys;

- Provision of information regarding ecological sensitivities as part of site induction;
- Seasonal working checks and restrictions;
- Safeguarding of protected faunal species;
- Commitment to site and design working areas and building footprints (at detailed design stage) with the objectives of minimising habitat disturbance/loss and safeguarding IEFs;
- Undertaking an early flowering plants survey prior to detailed design;
- Use of geoweb to protect adjacent tree rooting systems from development within woodland;
- Porous gravel or similar for proposed parking;
- Turf translocation if required; and
- Tree survey to be undertaken of focused areas of the development to provide information on individual trees in relation to design and construction.

6.8 Residual Effects

6.8.1 Taking account of the proposed mitigation and enhancement measures, the significant residual effects from the construction and operation of the proposed development are identified in Table 6.1 below.

Table 6.1 Significant Residual Effects

IEF	Importance of IEF	Nature of Impact	Duration of Impact	Magnitude of Impact	Significance of Effect
Construction Phase					
Ancient woodland (LEPO)	County	Partial loss of habitat and damage.	Permanent and temporary	Moderate	Significant at a local level
Broadleaved semi-natural woodland	National (UK)	Partial loss of habitat and damage.	Permanent and temporary	Moderate	Significant at a local level
Standing water	International	Pollution	Temporary	Minor	Significant at a local level
Running water	National (UK)	Pollution	Temporary	Minor	Significant at a local level
Intact hedgerow	National (UK)	Partial loss of habitat	Permanent	Minor	Significant at a local level
Red Squirrel	National (UK)	Habitat loss, disturbance, displacement, injury and fatality.	Permanent and temporary	Minor	Significant at a local level
Operation Phase					
Ancient woodland (LEPO)	County	Recreational use	Permanent	Minor	Significant at a local level

IEF	Importance of IEF	Nature of Impact	Duration of Impact	Magnitude of Impact	Significance of Effect
Broadleaved semi-natural woodland	National (UK)	Recreational use	Permanent	Minor	Significant at a local level
Inundation vegetation	Local	Pollution and recreational activities	Permanent	Moderate	Significant at a local level
Otter	International	Injury and fatality, disturbance and displacement	Permanent	Minor	Significant at a local level
Red squirrel	National (UK)	Injury and fatality, disturbance and displacement	Permanent	Minor	Significant at a local level
Ancient woodland (LEPO)	County	Compensatory planting and future management	Permanent	Minor	Significant at a local level
Broadleaved semi-natural woodland	National (UK)	Compensatory planting and future management	Permanent	Minor	Significant at a local level
Intact hedgerow	National (UK)	Compensatory planting and future management	Permanent	Minor	Significant at a local level
Standing water	International	Shoreline habitat management	Permanent	Minor	Significant at a local level
Running water	National (UK)	Riparian habitat management	Permanent	Minor	Significant at a local level
Otter	International	Shoreline and riparian habitat management	Permanent	Minor	Significant at a local level
Red squirrel	National (UK)	Purpose built resting and feeding provisions	Permanent	Moderate	Significant at a local level
Pine marten	National (UK)	Purpose built resting and feeding provisions	Permanent	Moderate	Significant at a local level

IEF	Importance of IEF	Nature of Impact	Duration of Impact	Magnitude of Impact	Significance of Effect
Bats	International	Increased roosting and foraging resources	Permanent	Moderate	Significant at a local level

6.9 Assessment of Cumulative Effects

- 6.9.1 Cumulative impacts could occur if pollutants or sediments are released into the River Leven and/or Loch Lomond during the construction phase of the proposed development if simultaneous with the construction of the replacement building and infrastructure for Sweeney's Cruises. Without mitigation, the impacts may increase in magnitude and significance at a local level. If construction occurs consecutively impacts could increase in duration and significance at a local level. There may also be cumulative impacts once both developments are in operation, if increased visitor numbers lead to an increased frequency and/or duration of boat tours. If not properly managed this could lead to increased disturbance of species within the Loch Lomond Woods SAC and Loch Lomond SPA.
- 6.9.2 Once the Woodbank Inn Hotel Extension is operational, cumulative impacts could occur with the proposed development and the Sweeney's Cruises development in terms of increases in visitor numbers as above.

6.10 Summary

- 6.10.1 The ecology and woodland assessment has considered the likely effects of the proposed development on the Important Ecological Features (IEFs) within the Zone of Influence (Zoi). A suite of embedded and further mitigation measures is proposed to avoid, prevent and minimise the likely negative significant effects on ecology and woodland IEFs.
- 6.10.2 Taking account of the proposed mitigation and enhancement measures, **the significant residual effects from the construction and operation of the proposed development are limited to:**
- Negative impacts of partial loss of habitat and damage to ancient woodland (LEPO), broadleaved semi-natural woodland and intact hedgerow, resulting in significant effects at a local level;
 - Negative impacts of pollution to standing water and running water, resulting in significant effects at a local level;
 - Negative impacts of habitat loss, disturbance, displacement, injury and fatality to red squirrel, resulting in significant effects at a local level;
 - Negative impacts of recreational use and pollution to ancient woodland (LEPO), broadleaved semi-natural woodland and inundation vegetation, resulting in significant effects at a local level;
 - Negative impacts of injury and fatality, disturbance and displacement to otter and red squirrel, resulting in significant effects at a local level;
 - Positive impacts of compensatory planting and future management to ancient woodland (LEPO), broadleaved semi-natural woodland and intact hedgerow, resulting in significant effects at a local level;
 - Positive impacts of shoreline and riparian habitat management to standing water and running water and otter, resulting in significant effects at a local level;
 - Positive impacts of purpose built resting and feeding provisions to red squirrel and pine marten, resulting in significant effects at a local level; and
 - Positive impacts of increased roosting and foraging resources to bats, resulting in significant effects at a local level.

- 6.10.3 With reference to the Generic Significance Criteria the negative and positive effects on all the IEFs apart from ancient woodland (LEPO) and inundation vegetation are categorised as substantial, as they affect IEFs of national and international importance. The positive and negative effects on ancient woodland (LEPO) are categorised as major, as they affect an IEF of county importance. The negative effects on inundation vegetation are categorised as moderate, as they affect an IEF of local importance.
- 6.10.4 Cumulative impacts could occur during the construction phase if it is simultaneous with the construction of the replacement building and infrastructure for Sweeney's Cruises. There may also be cumulative impacts once both developments, and the Woodbank Inn Hotel Extension, are in operation. If not properly managed this could lead to increased disturbance of species within the Loch Lomond Woods SAC and Loch Lomond SPA.

7 Traffic and Transport

7.1 Introduction

- 7.1.1 This ES chapter provides an assessment of the likely significant effects on the traffic, transport and access, arising from the West Riverside & Woodbank House Planning Permission in Principle (PPiP) development proposals. It incorporates the findings of the Transport Assessment (TA) and the Outline Travel Plan.
- 7.1.2 The aims of this chapter are to:
- Identify the relevant context in which the TA has been undertaken;
 - Describe the methods used to undertake the assessment;
 - Outline the relevant baseline conditions currently existing at the site and surroundings;
 - Identify the potential direct and indirect traffic and transport effects of the proposed development;
 - Identify mitigation and enhancement measures where required to address identified effects;
 - Assess residual predicted effects; and
 - Assess cumulative effects on the local and trunk road network from the proposed development in combination with other relevant cumulative developments.

7.2 Legislative and Policy Context

Legislation

- 7.2.1 The overarching legislative framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**.

Policy

- 7.2.2 The planning policy framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Planning policy considerations of specific relevance to this assessment are:
- Scottish Planning Policy (SPP);
 - A Catalyst for Change - The Regional Transport Strategy for the West of Scotland 2008-2021, Strathclyde Partnership for Transport (SPT);
 - Loch Lomond & the Trossachs National Park (LLTNP) – Local Development Plan, 2017-2021; and
 - West Dunbartonshire Local Transport Strategy, 2013 – 2018.
- 7.2.3 Other policy considerations of relevance to this assessment are:
- Designing Streets, Scottish Government, 2010; and
 - Cycling by Design, Transport Scotland, 2010.

Guidance and Relevant Technical Standards

- 7.2.4 The following guidance and technical standards have informed this assessment:
- Transport Assessment Guidance 2012 – produced by Transport Scotland to guide the preparation of Transport Assessments for development proposal in Scotland, for which the planning and transport policy are contained within Scottish Planning Policy (SPP). The guidance provides an outline of the framework for delivering integration of transport and land use planning, including the requirements for a Transport Assessment, of development involved significant travel generating uses; and

- SCOTS National Roads Development Guide 2014 – produced by the Society for Chief Officers of Transport in Scotland, supported by Transport Scotland and Scottish Government Planning and Architecture Division. This document supports Designing Streets and expands on its principles to clarify the circumstances in which it can be used.

7.3 Study Methodology

Scope of Assessment

- 7.3.1 This ES chapter presents an assessment of likely significant effects on the local and trunk road network from the proposed development. The assessment presented in this ES chapter has been prepared in accordance with the 2011 EIA Regulations.
- 7.3.2 The principal aspects considered within this assessment include:
- *Changes in vehicle flows and usage patterns within the road network;*
 - *Associated amenity and environmental effects, including:*
 - *Severance;*
 - *Driver delay;*
 - *Pedestrian and Cyclist Delay;*
 - *Pedestrian and Cyclist Amenity;*
 - *Fear and intimidation;*
 - *Driver delay; and*
 - *Accidents and safety.*

Overall Approach

- 7.3.3 In undertaking the assessment presented in this ES Chapter, the following activities have been carried out:
- EIA screening and scoping (see below);
 - Scoping discussions and correspondence with West Dunbartonshire Council (WDC Roads Officers and Transport Scotland (TS);
 - Desk-based review of available information including previous studies;
 - A site-visit, walkover and cycle of the site and surrounding pedestrian, cycle and local road network;
 - Traffic data collection;
 - Evaluation of the baseline and baseline + development scenario traffic conditions;
 - Production of a Transport Assessment (TA) for the proposed development; and
 - Identification and assessment of likely significant effects, taking into account proposed mitigation and enhancement measures and including consideration of likely cumulative effects.
- 7.3.4 The assessment has been informed by an EIA Screening and Scoping Report (PBA, April 2017) and subsequent EIA Screening and Scoping Opinion issued by LLTNPA (11th May 2017) in respect of the EIA for the proposed development.
- 7.3.5 The EIA Scoping Opinion indicated that WDC had requested that “*Parking for the development should conform to the appropriate standards set out in WDC Parking Standards*”. Later scoping discussions in October 2017 requested a revision to this to accord with SCOTS National Roads Development Guideline (NRDG) parking standards. These guidelines suggest that maximum standards should be used with respect to providing car parking in new developments and have been used to identify an initial level of parking provision commensurate with the development proposals.

- 7.3.6 Consultation was undertaken with ScotRail Abellio to agree in principle the mutual benefits of promoting access to the development site by rail. Whilst any interventions are still in early developmental stages, options for shared-ticketing, marketing and the need for future studies is being explored further.
- 7.3.7 Consultation was undertaken with respect to the Balloch Village Parking Proposals and, more specifically, the streetscape improvements proposed as part of the Station Square Proposals for Balloch Road. WDC has indicated that any future refinement of the streetscape proposals will be informed through collaborative working with the proposed developer, to develop a scheme which will meet the needs of WDC and the design requirements of the Zone A Station Square area of the development proposals. It is expected that this scheme will progress collaboratively between WDC, Sustrans and the developer.

Study Area

- 7.3.8 The study area in the TA is consistent with that set out in ‘the EIA Screening and Scoping Report’ and ‘the EIA Scoping Opinion’, with key junctions between the Drymen Road/ A811 Stirling Road Priority junction to the east and the A82/ A11 Stoneymollan Roundabout to the west, being identified and agreed for assessment with WDC and TS. These junctions, as listed below under “Extent of Assessment”, are those junctions expected to experience an uplift in through traffic volumes as a result of the development.

Information Sources

Desk Top Study

- 7.3.9 The following sources were used within the Transport Assessment:
- Scottish Planning Policy (SPP);
 - A Catalyst for Change - The Regional Transport Strategy for the West of Scotland 2008-2021, Strathclyde Partnership for Transport (SPT);
 - Loch Lomond & the Trossachs National Park (LLTNP) – Local Development Plan, 2017-2021;
 - West Dunbartonshire Local Transport Strategy, 2013 – 2018;
 - Designing Streets, Scottish Government, 2010;
 - Cycling by Design, Transport Scotland, 2010;
 - Transport Assessment Guidance 2012;
 - SCOTS National Roads Development Guide 2014 – produced by the Society for Chief Officers of Transport in Scotland, supported by Transport Scotland and Scottish Government Planning and Architecture Division. This document supports Designing Streets and expands on its principles to clarify the circumstances in which it can be used;
 - www.crashmap.co.uk;
 - TRICS V7.4.4 trip generation database;
 - ARCADY Roundabout junction analysis software;
 - PICADY Priority junction analysis software; and
 - STEP Scottish Trip End User Programme software application.
- 7.3.10 A desk top study was undertaken to inform the policy review of the TA, as well as gathering supporting information on existing public transport services and timetables for bus and rail services adjacent to the development site.

Fieldwork

- 7.3.11 Fieldwork was undertaken in the form of site visits by walking, cycling and private vehicles of the development site and surrounding local area. Traffic data was also collected to inform baseline traffic flows.

- 7.3.12 To determine the existing traffic conditions on the study network a series of Junction Turning Counts (JTCs) were undertaken over Thursday 6 September 2017 and Saturday 9 September 2017 at all junctions noted above. Traffic surveys were undertaken in accordance with an agreed survey specification.
- 7.3.13 To inform the TA and the noise and air quality assessment to support the Environmental Assessment, a seven-day Automatic Traffic Count (ATC) survey was undertaken from Thursday 6 September 2017 to Wednesday 12 September 2017, inclusive to record existing traffic link flows, vehicle composition and traffic speeds.

Approach to Assessment

Identification of Relevant Receptors

- 7.3.14 Scoping was undertaken with West Dunbartonshire Council (WDC) Road Officers and Transport Scotland (TS). Preliminary scoping was undertaken with WDC and TS during the preparatory stages of the Planning Application Notice (PAN), submitted in October 2017. As the development proposals have evolved to reflect land use constraints, more detailed Scoping was undertaken with both TS and WDC to confirm the assessment parameters of the TA.
- 7.3.15 The TA was prepared in accordance with the Scoping agreed with WDC Road Officers in October 2017 and TS in March 2018. As such, the following assessment parameters were established:

Extent of Assessment

- 7.3.16 The extent of the TA is defined by the following junctions:
- Ben Lomond Way/ Loch Lomond Shores Roundabout (internal);
 - Ben Lomond Way, Old Luss Road, Balloch Road Roundabout;
 - A811, Ben Lomond Way Roundabout;
 - A82/ A811 Stonymollan Roundabout;
 - A811/ Carrochan Cres Roundabout;
 - Pier Road/ Balloch Road Priority;
 - Balloch Road/ Drymen Road/ Carrochan Road Priority; and
 - Drymen Road/ A811 Stirling Road Priority.

Year of Assessment

- 7.3.17 A year of opening assessment of 2020 was based on all development being operational in accordance with Transport Assessment Guidance 2012. Given the short lead in time between the surveyed flows to the baseline and year of assessment, it was agreed that growth would not need to be applied to the surveyed flows.

Assessment Period

- 7.3.18 The assessment periods for the proposed development are:
- Weekday AM Network Peak (08:00-09:00);
 - Weekday PM Network Peak (16:30-17:30); and
 - Weekend/ Saturday Network Peak (15:15-16:15).

Trip Generation

- 7.3.19 Trip generation has been based on the use of the TRICS V7.4.4 database for all proposed development land uses, with exception of the Iconic Visitor Attraction (IVA) and Woodland

Visitor Attractions, for which a bespoke trip arrivals and departures profile was produced for both the weekday and weekend.

Trip Distribution

- 7.3.20 Development trips have been assigned to the network on the basis of the existing turning proportions of vehicles on the network. This was considered to be the most robust approach given the nature of trips associated with the existing activities at: Old Luss Road; Loch Lomond Shores; Pierhead; and the West Riverside car park (to become Zone A Station Square) and adjacent to WDC/ Sustrans planned Station Square Proposals.

Junction Analysis

- 7.3.21 Junction capacity assessments have been undertaken using industry standard software PICADY, for priority junctions and ARCADY, for roundabouts junctions.
- 7.3.22 Each junction included in the extent of assessment has been assessed during the Weekday AM and PM peak and Weekend (Saturday) peak under the following conditions: 2020 Baseline Traffic Flows; and 2020 Baseline + West Riverside & Woodbank House Development Traffic Flows.
- 7.3.23 The ARCADY and PICADY computer models can split the peak period under consideration into a series of 15-minute time segments in order to simulate the likely arrival pattern of traffic more effectively. Research indicates that the peak Ratio to Flow Capacity (RFC) values returned in any individual peak (i.e. the peak capacity and corresponding queue results) are likely to be observed over the central 15-30 minute period for the hour.
- 7.3.24 RFC values between 0.00 and 0.85 are generally accepted as representing stable operating conditions, values between 0.85 and unity represent variable operation (i.e. possible queues building up at the junction during the period under consideration and increases in vehicle delay moving through the junction). RFC values in excess of unity represent possible congested conditions.

7.4 Assessment Methodology

Guidance

- 7.4.1 The assessment of the likely significant transport effects has been undertaken using established methodologies and has concentrated on examining the capacity of relevant local transport infrastructure to accommodate the proposed development. It has been undertaken in accordance with the guidance set out within the Institute of Environmental Assessment (IEA) document 'Guidelines on the Environmental Assessment of Road Traffic (Guidance Note 1)', 1993.
- 7.4.2 In line with IEA guidelines, further assessment will be undertaken on:
- Road links where traffic flows will increase by more than 30% (or the number of HGVs will increase by more than 30%);
 - Any specifically sensitive areas where the traffic flows have increased by 10% or more; and
- 7.4.3 Any non-road based transport infrastructure (e.g. national cycle roads) where likely effects from the proposed development have the potential to be significant.

Effect on Pedestrians

Severance

- 7.4.4 Severance is defined as the perceived division that can occur within a community when it becomes separated by a major traffic artery and describes a complex series of factors that separate people from places and other people. Such division may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself.

Pedestrian & Cyclist Delay

- 7.4.5 The IEMA guideline note that changes in the volume, composition and or speed of traffic may affect the ability of pedestrians and cyclists to cross the roads. Typically, this increase in traffic levels result in increased pedestrian and/ or cyclist delay, although increased pedestrian and cycle activity also contributes. The guidelines do not set any thresholds, recommending instead that assessors use their judgement to determine the significance of effect.

Pedestrian & Cyclist Amenity

- 7.4.6 Pedestrian and cyclist amenity is defined as the relative pleasantness of a journey which, as with pedestrian and cyclist delay, is affected by traffic volumes and composition along with foot and cycle way width and pedestrian and cyclist activity. The guidelines suggest tentative thresholds of significance would be where the traffic flows are doubled or halved.

Fear and Intimidation

- 7.4.7 The IEMA guidelines note that a further effect of traffic may have on pedestrians is fear and intimidation, the impact of which is dependent on volumes of heavy vehicular traffic, its proximity to people or a lack of protection caused by such factors as narrow pavements.

Effect on Road Users

Driver Delay

- 7.4.8 The IEMA guidelines note that driver delay to non-development traffic can occur at several points on the network, although the effects are only likely to be significant when the traffic on the road network is predicted to be at or close to the capacity of the system: typically during commuter periods. Values for delay are determined through ARCADY, PICADY and LINSIG junction modelling software to obtain detailed output on a range of traffic parameters including flows and average delay.

Accidents and Safety

7.4.9 IEMA guidelines do not include any definition in relation to accidents and safety, suggesting that professional judgement would be needed to assess the implications of local circumstances, or factors which may increase or decrease the risk of accidents.

Assumptions and Limitations

7.4.10 The limitations of the TA methodology are:

- Trip generation rates have been taken for proposed development land uses operating as individual entities, and do not account for shared trips either between the existing and proposed land uses or the newly proposed land uses. Trip-sharing will occur and so the TA is robust in traffic impact terms, but may overestimate the effects on receptors;
- The full extent of development traffic trips has been assessed in a 2020 scenario and, as such, represents a worst-case assessment scenario. A future operational year of assessment could be anticipated to have higher baseline flows, against which the % impact of development traffic trips would be lessened. As above, this adds to the robustness of the TA in traffic impact terms, but may overestimate on receptors; and
- The TA assumes a routing strategy for all development traffic trips which is based on the principles of making best use of the road hierarchy and seeking to minimise through-traffic trips in the village of Balloch. Whilst the external network routing is likely to be applicable in the future, the internal network and routing strategy may change in the future to account for refinement of the proposed parking locations and an associated internal access strategy. As such, this assessment may over or under-estimate the effects on receptors on internal/ access routes to the site.

Establishment of Effect Significance

7.4.11 Potential and residual effects will be defined in accordance with **Table 7.1**.

Table 7.1 Nature of effects

Nature	Description
Beneficial	Meaning that they are expected to produce environmental benefits in transportation terms, i.e. where overall traffic flows or percentage HGV movements decrease, or there are improved facilities for pedestrians, cyclists or public transport users;
Negligible	Meaning that expected changes are too small to meaningfully measure, i.e. where changes in flows are typically less than 10%; and
Adverse	Meaning that they are expected to produce environmental disbenefits in transportation terms, e.g. where overall traffic flows or percentage HGV movements increase, or there are reductions in facilities for pedestrians, cyclists or public transport users.

7.4.12 Beneficial and adverse effects will be further characterised in accordance with **Table 7.2**

Table 7.2 Magnitude of effects

Magnitude	Description
Minor	Slight very short or highly localised changes of no significance and/or where changes in traffic flows/patterns are between 10% and 30%;
Moderate	Limited change by extent, duration or magnitude which may be considered significant and/or where changes in traffic flows/patterns are between 30% and 60%; and

Magnitude	Description
Major	Considerable change by extent, duration or magnitude of more than local significance or in breach of recognised acceptability, legislation, policy or standards, and/or where changes in traffic flows/patterns are greater than 60%.

7.4.13 Where predicted increases in traffic flows are lower than the percentage based thresholds, the IEMA guidelines suggest that the significance of effects can be stated to be low or insignificant and further detailed assessments are not required.

Approach to Cumulative Impact Assessment

7.4.14 A separate cumulative assessment is not being provided for traffic, transport and access due to agreement with WDC Road Officers that committed development flows were not required for the TA.

7.5 Baseline Conditions

Pedestrian Facilities

7.5.1 The proposed development site is accessible by foot along the existing main vehicular access routes to the site, as well as the NCN 7 towpath along the western side of the River Leven and west bank of the site, dedicated pedestrian routes through Lomond Shores and the footways and links to the John Muir Way. This section considers the following routes:

- Pier Road;
- Ben Lomond Way;
- Lomond Shores Internal Routes;
- Old Luss Road; and
- John Muir Way.

Pier Road

7.5.2 Pier Road is an un-adopted private road providing primarily vehicle access to the Pierhead area (northern extents) of the proposed development site, where there is an operational slipway into Loch Lomond. As such, this route provides for functional access to the slipway and associated activities and, whilst a relatively direct route from Balloch into the site, the lack of footways on the route combined with dense brush and tree cover, is such that it has limited function as a walking route due to perceived safety and security issues. There is no lighting provided on this route, with the exception of the southerly extents adjacent to a handful of residential properties and the interface with Balloch Road.

Ben Lomond Way

7.5.3 Ben Lomond Way is the main vehicular access route into the Lomond Shores site from the western extents of the West Riverside component of the site. It provides an “Avenue-esque” connection from Balloch Road into Lomond Shores, as a function of strong landscaping defined by Beech hedges and a tree-lined, remote pedestrian route into Drumkinnon Woods and further north into the immediate Lomond Shores site. This is a well-lit, circa 2m wide pedestrian route and is favoured by many local people accessing the site and/ or the network of informal woodland trails through Drumkinnon Woods. This route links continuously with footways on Balloch Road and, whilst there are no controlled pedestrian crossing points, there is a dedicated, dropped-kerb with tactile paving to the east of Ben Lomond Roundabout. Further, there is a dedicated crossing location on Ben Lomond Way itself, just north of Ben Lomond Roundabout, providing continuous pedestrian access to Old Luss Road (north and south).

Loch Lomond Shores Internal Routes

7.5.4 Much of the Lomond Shores site is pedestrianised and facilitates movements on foot for all nature of users through large areas of the site. The main pedestrianised areas, remote from vehicular routes, include: around the “bay” and beached area to the west of the Pierhead area; to the rear and frontage of the commercial units; the route which skirts the north-western boundary of the car park and connects to Old Luss Road to the west; and a network of raised board-walk paths through woodland to the north of the Lomond Shores main area.

7.5.5 Notwithstanding the board-walk paths, the main pedestrianised areas are generally wide and well surfaced and capable of accommodating a reasonable volume of two-way pedestrian flow. These are also well lit. At a minimum, for example to the rear of the retail units, the footway is circa 2m wide.

7.5.6 The board-walk paths through the woodlands to the north of the site are raised walk way of circa 2m wide and textured to avoid slipping hazards. Some of the routing is tight and angular, but provide reasonable opportunity for passing.

7.5.7 Ben Lomond Way – internal to the Lomond Shores area – provides a continuous 2m footway along the southern side of the road, connecting the Ben Lomond Way/ Lomond Shores access roundabout with the Pierhead area of the site, and Pier Road. The route is lit on the northern side, where there is no continuous footway, albeit sections of the route are paved on the north side to facilitate access into the main pedestrianised area from a coach drop off area and a

layby for disabled-users drop-off. CCTV security cameras are located on the route and orientated on the link into the main pedestrianised area of Lomond Shores and the service access area.

- 7.5.8 A dedicated, pedestrian crossing with barriers on the approach to the carriageway, is located to the south west of the commercial units, to allow onward connection to Drumkinnon Woods and the main entrance footway in to the site, on Ben Lomond Way.

Old Luss Road

- 7.5.9 Old Luss Road is located to the east of the Woodbank House site and to the south of the Lomond Shores area. Access from Lomond Shores to Old Luss Road is provided by the internal remote pedestrian footway to the north of the Lomond Shores car park: wooden bollards prevent vehicle access from Old Luss Road. Old Luss Road provides for onward pedestrian connections to the west towards the more rural Upper Stonemollan and John Muir Way and, to the east, the suggested cycling section for the John Muir way.
- 7.5.10 The low volumes of traffic on the route, as a result of a “no-through-route” to vehicles to the north, gives rise to the route being used as a pedestrian link between Balloch and Cameron House and Duck Bay Marina to the north. A continuous footway is provided on the eastern side of the road, albeit foliage growth and lack of maintenance, is such that this largely overgrown and rough underfoot. This is not noted to be a deterrent to pedestrians who continue to make use of the relatively wide and reasonably surfaced carriageway, for walking (and cycling). There is no street lighting along the section of route between the Lomond Shores site and where the carriageway terminates to the north.
- 7.5.11 The southern extents of Old Luss Road provide reasonable quality, circa 2m wide and lit footways connecting to Ben Lomond Road Roundabout and Ben Lomond Way on the east. Lighting is more extensive on the east side of Old Luss Road, but with some lighting provision on the west side at the more southerly extents of the road.

John Muir Way

- 7.5.12 The John Muir Way is a coast to coast predominantly rural route for walkers (and cyclists) which stretches 134 miles between Helensburgh in the west, through to Dunbar on the east coast of Scotland. The route is divided into 10 sections, with the Helensburgh to Balloch and Balloch to Strathblane sections, being of relevance to the proposed development site.
- 7.5.13 The John Muir Way comes into the proposed development site’s area of influence, via Upper Stonemollan, over the A82 footbridge and linking to a single-track access road which skirts the southern boundary of the Woodbank House site. At the interface of this route with Old Luss Road, walkers are signed north towards the pedestrian link from Old Luss Road in to the Lomond Shores site. Thereafter, the route follows the internal pedestrian routes of Lomond Shores towards the west bank of the River Leven and follows this route south to Balloch Bridge. From here the route enters Balloch Castle Country Park on the east bank of the River Leven and meanders north and eastwards through Boturich, intercepts the A811 Stirling Road, and on towards Auchencarroch Road (providing connections to Gartocharn, Croftamie and Drymen).

Cycling Facilities

NCN Route 7

- 7.5.14 National Cycle Network (NCN) Route 7 links Sunderland in England to Inverness in the north. The 601 mile route in its entirety forms part of the wider Lochs & Glens (north) cycle route which passes through two national parks - Loch Lomond & The Trossachs and Cairngorms. The route leaves Glasgow by following the River Clyde to Dumbarton and then heads to Inverness via Aberfoyle, Callander, Killin, Pitlochry, Kingussie, Aviemore and Carrbridge.
- 7.5.15 In relation to the proposed development side, NCN Route 7 follows the west bank of the River Leven and approaches the proposed development site from the south, via Sweeney’s Cruises adjacent to Balloch Bridge. There is a main dedicated path – shared with walkers – but an alternative meandering unsurfaced route, which takes cyclists adjacent to the west river bank, through trees and scrub. This links directly to the Pierhead area and onwards to Loch Lomond Shores main.

West Loch Lomond Cycle Way

7.5.16 The West Loch Lomond Cycle Way starts at the Visit Scotland Visitor Centre in Balloch, adjacent to Balloch Bridge and Sweeney’s Loch Cruises. It’s an “easy” waymarked route suitable for most abilities of cyclist and follows part of the John Muir Way, along the west river bank of the proposed development site area. From the Pierhead area, cyclists are directed through the off-road shared pedestrian routes through Lomond Shores and west wards to Old Luss Road via the wide remote foot and cycleway to the north of the car park. From Old Luss Road, cyclists are directed along a route which skirts Loch Lomond side and, from Arden roundabout can continue adjacent to the A82 (off-road) or through an alternative route through the Carrick Golf Course. A short on-road section through the former Luss access road, takes cyclists through to Luss, thereafter, the route remains off-road as far north as Tarbet.

General Cycle Network

- 7.5.17 There are no other dedicated off-road cycle routes within the local urban area. Given the nature of the location and relatively low number of pedestrians, most routes highlighted above for the pedestrian environment will be used by both walkers and cyclists, with mutual acceptance of users on both parts. On-road cycle routes are limited, noting that the approach to the pedestrian crossing facility on Ben Lomond Way, appears to dedicate both lanes of the carriageway, to cycle priority. This is not noted elsewhere in the area and is therefore assumed to have been provided on the basis of this section of route being provided primarily for service vehicle access (and, potentially, relatively lower levels of vehicles). There is no continuum of this route noted elsewhere on the local network.
- 7.5.18 In the wider locality, including John Muir Way to the west and off-road routes through Whinny Hill Woods and Boturich to the east, routes are generally used by both walkers and cyclists – particularly, local mountain bikers and leisure cyclists.
- 7.5.19 Cyclists are able to use the recommended walking route for the John Muir Way as described above, however, an alternative cycling section is suggested on the Section 1 route maps which follows the NCN Route 7 trail. This remains an off-road section and directs cyclists towards the Cross Keys roundabout on the B832, and then east to Arden Roundabout (A82). Here the route links with a shared foot and cycle way, which skirts the A82, the west bank of Loch Lomond and continues south to link with Old Luss Road. From here, cyclists and walkers, can tie back into the dedicated route at Lomond Shores and continue west and south.

Public Transport

Balloch Railway Station

- 7.5.20 Balloch railway station is located approximately 100 metres to the south of the proposed development on Tullichewan Road. The station can be accessed via the established footpaths in the surrounding area. Sheltered cycle storage is available with 22 bicycle parking spaces. On-street parking is available from Tullichewan Road.
- 7.5.21 Train services run half hourly on Monday to Saturday from Balloch to Airdrie via Glasgow Queen Street and Singer. Sunday services run via Yoker and Glasgow Central and then alternately to Motherwell via Whifflet and to Larkhall on an hourly basis.
- 7.5.22 Table 7.3 provides a summary of existing train services at Balloch Rail Station.

Table 7.3 Train Services Summary

Service	Destination	Journey Time (minutes)	Frequency (Services per hour)
Monday to Saturday	Glasgow Queen Street	47	2
Monday to Saturday	Airdrie via Glasgow Queen Street	74	2
Sunday	Glasgow Central	48	2

Service	Destination	Journey Time (minutes)	Frequency (Services per hour)
Sunday	Larkhall	82	1
Sunday	Motherwell via Glasgow Central	83	1

Bus Services

7.5.23 Bus stops are located on both sides of Balloch Road adjacent to the proposed southern site boundary. Bus stops are serviced by the number 207 bus (McColl's), 305 (Garelochhead Minibuses and Coaches) and the number 309 (McGill's). The number 207 provides an hourly service between Balloch and Bonhill via Rosshead. The 305 bus service provides a regular service between Alexandria and Luss and the number 309 runs between Balmaha to Alexandria or Bonhill every 90 minutes.

Table 7.4 Bus Services Summary

Service	Operator	Route	Nearest Bus Stop	Journey Time (minutes)	Frequency (Services per hour midweek)
1 (The One)	First Greater Glasgow	Balloch Glasgow Centre – City	Balloch Bus Terminus	105	2
206	First Glasgow	Balloch - Westcliff	Balloch Bus Terminus	48	4
207	McColl's	Balloch - Bonhill	Loch Lomond Shores	27	1
305	Garelochhead Minibuses and Coaches	Alexandria - Luss	Loch Lomond Shores	16	1
		Luss - Alexandria	Loch Lomond Shores	11	1
309	McGill's	Old Bonhill - Balmaha	Balloch	21	<1
		Balmaha - Bonhill	Loch Lomond Shores	13	<1
316A*	Garelochhead Coaches	Coulport Alexandria -	Loch Lomond Shores		1 morning service Monday - Saturday

Service	Operator	Route	Nearest Bus Stop	Journey Time (minutes)	Frequency (Services per hour midweek)
863**	First Greater Glasgow	Balloch – Dumbarton	Haldane, Balloch	1	5 evening services Monday - Friday
874***	First Greater Glasgow	Balloch – Dumbarton	Balloch Bus Terminus	11	6 evening services Monday - Saturday

* Service from Coulport – Loch Lomond Shores (LLS) arrives at 0755 Monday – Friday and service from Garelochhead – Loch Lomond Shores arrives at 0855 on Saturday.

** Four morning services from Dumbarton – Balloch (Monday – Friday) and four evening services from Balloch – Dumbarton (Monday – Friday).

***Morning services only run from Dumbarton – Balloch (Monday – Sunday) whilst evening services only run from Balloch – Dumbarton (Monday – Saturday).

Vehicular Access

7.5.24 This section outlines the strategic and local vehicular access routes to the site. They include:

A82 Trunk Road

7.5.25 The A82 runs north – south and is one of two trunk roads through the National Park which is managed by Transport Scotland and therefore is one of the main access routes to the site. It provides access from the centre of Glasgow to Inverness via Fort William. For the most part, this route has a 60 mph speed limit. In addition, there are proposals in place to upgrade the section between Tarbet and Inverarnan which aims to reduce congestion and improve traffic flows. The National Park states that travel from central Glasgow would take approximately 40 minutes using the A82.

A811 Stirling Road

7.5.26 In addition to the A82, this trunk road provides key access through the National Park. It links Stirling in the east to the A82 in the west at Balloch, via Drymen. As a result, it provides a connection north to Perth, Dundee and Aberdeen. Generally, the speed limit is 60 mph. The National Park notes that car journeys from Stirling are approximately 50 minutes using this route.

B857 (Renton Road / Bank Street / North Main Street / Luss Road)

7.5.27 The B857 connects the A82 in the south to the A811 Stirling Road in the north, running through Renton, Alexandria and Balloch parallel to the A82 and A813. As a result of its built-up surroundings, the B857 has a speed limit of 30 mph with 20mph speed limits in place adjacent to main school routes.

Carrochan Road (A813)

7.5.28 The A813 links the A82, north of Dumbarton at Bellsmyre, to Drymen Road in Balloch crossing the A811. It runs north – south on the east side of the River Leven, parallel to the A82 and B857. The speed limit on this route is predominantly 40 mph speed limit, with sections of 30 mph in built-up areas.

Balloch Road / Drymen Road

7.5.29 This road runs east – west, parallel to the A811 Stirling Road, through Balloch from A811 Stirling Road in the east to the roundabout with Old Luss Road / Ben Lomond Way in the west, crossing River Leven. It has a speed limit of 30 mph.

Ben Lomond Way

7.5.30 This route provides access to the Loch Lomond Shores site from the northern arm of the roundabout with Old Luss Road / Ben Lomond Way and has a speed limit of 30 mph. It runs north west from the roundabout to an internal roundabout at Loch Lomond Shores which provides access to the main car parks, before running north east towards Balloch Pier.

Pier Road

7.5.31 This is a private adopted road which runs northwards from Balloch Road to Ben Lomond Way. Signage at the Balloch Road junction states that, due to its private status, “Vehicles using this road do so at their own risk”.

Existing Traffic Flows

7.5.32 Table 7.5 below provides a summary of the observed 2017 and estimated 2020 Base Flows for the local and strategic road network. The flows are the same across both scenarios as background traffic growth was not applied, nor committed development flows given the negligible flows associated with any minor local developmental changes.

Table 7.5 2017/ 2020 AADT Base Flows

Location	Two-Way Flows (All Vehicles)	HGV's
A811 (East of Stonymollan Roundabout)	16,542	9%
Old Luss Road (South)	9,375	7%
Ben Lomond Way	2,661	10%
Balloch Road (South)	4,958	8%
Pier Road	292	10%
Balloch Road (Balloch Bridge)	4,070	23%
Stirling Road (A811)	6,009	19%
A813 Carrochan Road (South)	8,079	7%
A811 (Lomond Bridge)	12,777	9%
Luss Road	12,427	9%
A82 (North of Stonymollan Roundabout)	20,090	12%
Old Luss Road (North)	242	13%

7.5.33 The development site and its proposed access routes are integral to the existing commercial, retail and leisure development at Loch Lomond Shores, as well as access to the Loch Lomond (Pierhead) slipway and Maid of the Loch.

Existing Accident Data

7.5.34 Crashmap data was interrogated to provide a 5 year summary of the accident history on the local and strategic road network, within the scope of the proposed development site.

Figure 7.1 Crashmap Data



7.5.35 Figure 7.1 above, indicates that five year accident data demonstrates a spread of slight accidents on the local road network, which can be disaggregated to the following receptors as:

- Old Luss Road (South) – one reported slight incident on the approach to the A811/ Lomond Road roundabout (Lomond Roundabout);
- Ben Lomond Way – no reported incidents;
- Balloch Road (South) – no reported incidents;
- Pier Road – no reported incidents;
- Balloch Road (Balloch Bridge) – three slight incidents are within close-proximity of the pedestrian crossing, railway station and tourist information on Balloch Road (South) and this area is heavily conflicted as a result of competing pedestrian and vehicular demands, as well as a nearby taxi rank, local leisure and retail amenities;
- Stirling Road (A811) – two slight incidents including one on approach to the Lomond Road Roundabout;
- A813 Carrochan Road (South) – two slight incidents are within close proximity to existing residential access points and the A813 Carrochan Road/ A811 Stirling Road;
- A811 (Lomond Bridge) - three slight accidents are dispersed over this link, which suggest driver behaviour/ error as opposed to locational characteristics and constraints are an issue;
- Luss Road - three slight incidents are clustered around an area of Old Luss Road (South) where there are a number of conflict points adjacent to a pedestrian crossing, bus laybys in proximity and two large residential estates;
- A82 (North of Stonymollan) – three serious incidents reported on the approach from the north to the Stonymollan Roundabout, albeit more remotely. This section of route is notorious for queuing and delay as a result of exceptionally heavy traffic volumes, which may have contributed to the incidents and propensity for occurrence in this location; and
- Old Luss Road (North) – no reported incidents.

7.5.36 Notwithstanding the noted incidents for the links above, the A82 Stonymollan Roundabout – all approaches and circulatory, and Lomond Road Roundabout (A811/ Old Luss Road (South)) particularly on the A811 and Old Luss Road (South) approaches/ exits, all have a higher

incidence of slight accidents. These are likely attributed to higher circulatory speeds, driver error and the higher volume of traffic on these links and junctions generally. The area is also expected to experience a higher prevalence of visitors to the area, who are less familiar with the network and routing/ destination points which may be a contributory factor.

Water-Based Transport

- 7.5.37 The Waterbus service operates on Loch Lomond and Loch Katrine, offering ten services which are used by cyclists and walkers. The Park offers this as a sustainable alternative to the car which can enhance the visitor experience. There is potential to develop upon the success of the Waterbus with the opportunity to enhance integration as part of a wider tourism and/ or access strategy.
- 7.5.38 Loch Lomond services offer alternative connections between Balloch, Luss, Balmaha and Tarbet amongst others. Generally, these run between April and October, although seasonality varies between services.

Summary of Receptor Sensitivity

- 7.5.39 The sensitivity of receptors has been defined as follows:
- Low – receptors which are lightly used (by all users or particularly by vulnerable road users) relative to other receptors within the study area;
 - Medium – receptors which are used (by all users or particularly by vulnerable road users) to a roughly average level relative to other receptors within the study area; and
 - High – receptors which are heavily used (by all users or particularly by vulnerable road users) relative to other receptors within the study area.
- 7.5.40 Significance criteria are determined through referencing magnitude of change with sensitivity of receptors. The significance of traffic change varies depending upon the environmental impact criteria being considered.
- 7.5.41 The receptors considered in this assessment include those people making journeys within the relevant study area (or links) for each mode, and include those travelling by that mode, or travelling by other modes affected by the mode in question, on the following links:
- Old Luss Road (South) – medium sensitivity for all users;
 - Ben Lomond Way – low sensitivity for all users;
 - Balloch Road (South) – low sensitivity for all users;
 - Pier Road – low sensitivity for all users;
 - Balloch Road (Balloch Bridge) – low sensitivity for all users;
 - Stirling Road (A811) – low sensitivity for all users;
 - A813 Carrochan Road (South) – low sensitivity for all users;
 - A811 (Lomond Bridge) – low sensitivity for all users;
 - Luss Road – medium sensitivity for all users;
 - A82 (North of Stonymollan) – low sensitivity for all users; and
 - Old Luss Road (North) – low sensitivity for all users.

7.6 Baseline Evolution

- 7.6.1 Baseline traffic, transport and access conditions at the development site are expected to remain as per the existing situation, without the development proposals. The development site is integral to a wider existing commercial, retail and leisure development, which is anticipated to operate as per the status quo, without development intervention.

7.7 Embedded Mitigation

7.7.1 As detailed in **Chapter 3 – The Proposed Development**, a number of design features and embedded mitigation measures have been incorporated into the design and construction of the proposed development to avoid, prevent or minimise significant adverse environmental effects and to enhance beneficial effects. Embedded mitigation measures of relevance to this assessment are:

Construction Phase

7.7.2 The embedded mitigation measures incorporated within the proposed development are as follows:

Construction Environmental Management Plan (CEMP):

- Development and implementation of measures relating to: construction traffic routing, site access/deliveries, parking, contractor management, parking, fuels and materials storage, standard dust and noise suppression techniques and standard pollution presentation and control techniques. These measures will be set out within a Construction Environmental Management Plan (CEMP). Any other measures to be included in the CEMP would be identified as 'further mitigation' (not embedded) through the EIA;
- Any construction activities within a 5m strip along waterfronts will be subject to specific consideration within a CEMP to be agreed with the NPA prior to commencement; and
- Adoption of standard construction industry working hours for noise generating activities.

Operational Phase

7.7.3 The embedded mitigation measures incorporated within the proposed development are as follows:

Design & Form-Based Mitigation

- It is intended that the proposed development will be fully accessible by sustainable modes of transport. The existing pedestrian and cycle network as it exists through the West Riverside site will be retained and enhanced as necessary to provide full connectivity to the wider network as well as all new internal elements of the site. The site will benefit from increased uptake of sustainable modes over the use of the private car, and it is anticipated that walking and cycling will be the go-to-mode of choice for those visitors using the woodland lodges and overnight accommodation: by leaving their cars remote from the lodges, it is hoped this will reduce any unnecessary internal car trips;
- Bike hire is proposed as part of the Station Square and enhanced Tourist Information Office offering, which will further support internal movements by bike;
- Whilst the internal layout requires to be developed further as part of subsequent detailed design stages, it is intended that the existing cycle and walking routes will be widened to Sustrans standards for shared walking and cycling routes, where this is practicable to do so;
- Throughout the Station Square, Riverfront and Drumkinnon areas, the existing path network including the John Muir Way will be retained and enhanced as appropriate, albeit some relocating of certain sections may be required. It is expected that discussions will be held with Sustrans when the detail of these routes is considered. The existing north-south foot and cycle paths through the Riverfront Zone, will be enhanced with a series of east-west paths increasing access opportunities between Pier Road and the Riverfront area;
- The existing foot and cycle way from Loch Lomond Shores to Old Luss Road will be extended to provide a shared foot and cycle way, compliant with technical standards, on the north (development) side of the road, providing a direct walking and cycling link between the two sites;

- From the Woodbank House site, which is intended to be configured in accordance with Designing Streets Principles and will provide a continuous internal path network, a direct foot and cycle link will be provided to the Upper Stonymollan Road/ John Muir Way; and
- A signage and wayfinding strategy will be developed for the wider site, once clarification on the preferred parking locations for site-based activities and land uses are confirmed. It is expected that a combination of enhanced signage and Variable Message Signing (VMS) will need to be installed at key approaches to the site from both the strategic and local road network, as well as internally within the site, to ensure effective vehicular movement for internal destinations and appropriate directions to the relevant car parking areas.

7.8 Potential Effects

7.8.1 This section describes the potential effects associated with the development proposals in relation to construction and operational traffic.

Construction Phase

7.8.2 The transport, traffic and access impacts arising as a result of the proposed development are considered to be negligible as a result of incorporating the CEMP embedded mitigation. Moreover, the development will be built-out in discrete phases such that individual sections of the site will be subject to the effects of construction traffic at any one time. The scale of the effect of the development is minor negligible.

Operational Phase

7.8.3 Table 7.6 below includes a summary of the potential number of vehicular trips associated with the completed development proposals based on the trip rates described in detail in the Transport Assessment.

7.8.4 The flows represent the number of external trips generated by the site and do not include any reductions for internal trips i.e. trips shared between different land uses and working and living within the site.

Table 7.6 Estimated Number of Two-Way External Development Daily Trips

Development	Two-Way Daily Vehicular Flows	
	Weekday	Weekend
West Riverside & Woodbank House	12,954	15,495

7.8.5 Table 7.7 below provides a summary of the potential changes in traffic on the local road network once the proposed development is fully operational.

Table 7.7 2020 AADT With Development Flows

Location	Two-Way Flows (All Vehicles)	HGVs	% Change Over Base 2020
A811 (East of Stonymollan Roundabout)	18,072	9%	9%
Old Luss Road (South)	11,679	7%	25%
Ben Lomond Way	4,783	10%	80%
Balloch Road (South)	7,128	8%	44%
Pier Road	2,403	10%	723%

Location	Two-Way Flows (All Vehicles)	HGVs	% Change Over Base 2020
Balloch Road (Balloch Bridge)	4,342	23%	7%
Stirling Road (A811)	6,267	19%	4%
A813 Carrochan Road (South)	8,368	7%	4%
A811 (Lomond Bridge)	13,025	9%	2%
Luss Road	12,900	9%	4%
A82 (North of Stoneymollan Roundabout)	20,803	12%	4%
Old Luss Road (North)	366	13%	51%

7.8.6 Noting the % change in traffic from the baseline 2020 to the baseline with development flows and in accordance with the IEA guidelines, the following links will not be subject to further assessment:

- A811 (East of Stoneymollan Roundabout);
- Balloch Road (Balloch Bridge);
- Stirling Road (A811);
- A813 Carrochan Road (South);
- A811 (Lomond Bridge);
- Luss Road; and
- A82 (North of Stoneymollan Roundabout).

7.8.7 The impacts on the roads listed above are less than 10% and, as such, traffic flow impacts are considered negligible. The scale of the effect of the development on the above links is minor negligible.

7.8.8 Old Luss Road (South) will experience an uplift in AADT flows by 25% as a result of the development traffic, but this remains less than the IEA guidelines requirement of a 30% increase in traffic warranting further assessment. As such, this route will not be considered further. The scale of the effect of the development is minor adverse.

7.8.9 Noting the % change in traffic from the baseline 2020 to the baseline with development flows and in accordance with the IEA guidelines, the following links will be subject to further assessment:

- Ben Lomond Way;
- Balloch Road (South);
- Pier Road; and
- Old Luss Road (North).

Effect on Pedestrians and Cyclists

7.8.10 With the exception of Balloch Road (South) which experiences a 44% uplift in traffic flow as a result of the development, Ben Lomond Way, Pier Road and Old Luss Road (North) constitute the three main access routes into the site.

7.8.11 Balloch Road (South) is a link between the Pier Road and Ben Lomond Way access points, within which there is anticipated to be a 44% increase in the traffic flow as a result of the development proposals. The uplift should be tempered against the negligible uplift of 7% increase in traffic flow over Balloch Road (Balloch Bridge) which is sited just east of Balloch

Road (South), and demonstrates that the proposed access arrangements and routing strategy are “achieving” what was originally intended: that traffic would be directed onto the appropriate road hierarchy as far as reasonably practicable and avoid additional traffic through the main Balloch Village. In effect, the traffic impacts have been “directed” to Balloch Road (South) to optimise ease of access to the trunk road network, and reduce impacts across the wider Balloch village. This is considered to be a moderate adverse effect with respect to traffic volume, although given WDC’s longer term ambitions to reconfigure this area of road, and noting that other “exit” links from the development site exist in the form of Tullichewan Road, the actual and perceived issues for pedestrians and cyclists are not considered to be notably impacted upon by the increase in flows. The scale of the effect of the development is minor adverse.

- 7.8.12 Old Luss Road (North) experiences a 51% uplift in traffic flow as a result of the development, but the existing nature of the road as a quiet, predominantly residential/ rural no-through-route, is such that the increase in flows are noted as a moderate adverse effect. The % impact is considered moderate, despite the modest levels of development that will be accessed from Old Luss Road. At present, whilst the section of Old Luss Road (north beyond the existing Loch Lomond Shores pedestrian access) is used for walking to Cameron House, Duck Bay and beyond, the area fronting the development site is not particularly conducive to walking and cycling as a result of poor lighting and lack of appropriate footways on either side of the carriageway. The development includes for provision of enhanced lighting, a connection will be provided between Loch Lomond Shores to Old Luss Road to provide a shared foot and cycle way, compliant with technical standards, on the north (development) side of the road, providing a direct walking and cycling link between the two sites and onwards to Balloch. Further, a connection will be provided within the Woodbank House site to the Upper Stonemollan Road/ John Muir Way, thereby enhancing the environment overall for pedestrians and cyclists. Increased ambient surveillance in the area as a result of additional residential properties, lends itself to improving actual and perceived personal security for walkers and cyclists. The scale of the effect of the development is moderate beneficial.
- 7.8.13 Pier Road experiences a 723% uplift in traffic flow as a result of the development proposals, however, this constitutes a new access road into the site and the very minimal existing AADT flows of 292 represent the very limited uses and operational function on the road at present. The road also has private status (is not adopted by the local authority) and as such, does not provide lighting and/ or a dedicated footway. Pier Road is not presently conducive to walking and cycling and an overgrown and dense foliage environment and associated dark and damp conditions, do not contribute to personal safety and security nor encourage travel by sustainable modes. As such, general improvements to Pier Road combined with alternative and enhanced walking and cycling routes through the site and the new monorail, are such that even with the anticipated increases in traffic, there will not be a notable adverse effect on severance, pedestrian and cyclist delay or amenity. More so, the development proposals will enhance Pier Road in terms of access for vehicles, and pedestrians and cyclists will be able to make use of alternative optimal routes. On this basis, the potential effects can be considered as moderate beneficial in environmental, placemaking and movement terms. The scale of the effect of the development is moderate beneficial.
- 7.8.14 Ben Lomond Way is the existing main access to the existing Loch Lomond Shores and provides the most appropriate direct access route into the proposed development site, both in terms of its proximity and ready access to the wider local and strategic road network, as well as its current form with a remote pedestrian and cycle path to the east. Ben Lomond Way experiences an 80% uplift in traffic flow as a result of the development proposals which will see the AADT traffic flow rise from 2,661 to 4,783 on the road. This is considered to pose a major adverse effect in terms of traffic flow, albeit this is a preferential position to potentially higher vehicle flows on Balloch Road (South) which has frontage residential properties and is a gateway route into Balloch main village from the west.
- 7.8.15 The existing pedestrian environment immediately adjacent to Ben Lomond Way is considered to be of a reasonable standard and, in terms of pedestrian amenity, the existing foot and cycle way is remote from the carriageway with a tree-lined avenue-type environment. As such, other road users are largely removed from the immediate road network and the environment is likely to remain relatively pleasant for walkers and cyclists. In addition, there are a number of pedestrian crossing routes approaching Ben Lomond Way, for which a number of access options or routing variations is possible. Given the limited need to cross Ben Lomond Way, largely as a function of no attractors on the west side of the carriageway, the existing pedestrian

environment is expected to prevail with limited effects on severance, fear and intimidation and pedestrian amenity. A crossing point exists on the southern end of Ben Lomond Way and the Queen of the Loch pub/ restaurant, for which it is expected some severance and fear and intimidation impacts could be felt. Vehicle speeds are generally low in this area and will remain the case, if not lessened, by increased traffic volumes. It is suggested that pedestrian movements will require to be monitored incrementally as the development builds out in phases, to ascertain the trigger point for enhanced pedestrian crossing infrastructure. The scale of the effect of the development is minor adverse.

Effect on Road Users

- 7.8.16 Delay to drivers can be predicted through capacity assessments at key points on the local road network. The TA (Appendix E) includes detailed junction capacity assessment results for the access routes and network junctions within the scope of the TA and influence of the proposed development site. The detailed junction capacity assessments suggest that remedial junction measures are not required on the local or strategic road network as a result of the development proposals.
- 7.8.17 As discrete phases of development come forward for detailed development in conjunction with refinement of the parking management, access and routing strategy, then monitoring should be implemented to gauge the quantum of “actual” development traffic levels (over the assessments ‘theoretical’ basis) on key routes. This will allow any locational and route-specific interventions and mitigation to be more accurately tailored. The scale of the effect of the development is minor negligible.

7.9 Further Mitigation and Enhancement

Construction Phase

- 7.9.1 The further mitigation and enhancement measures incorporated within the proposed development are as follows:

Construction Environmental Management Plan (CEMP):

- Development and implementation of measures relating to: construction traffic routing, site access/deliveries, parking, contractor management, parking, fuels and materials storage, standard dust and noise suppression techniques and standard pollution presentation and control techniques. These measures will be set out within a Construction Environmental Management Plan (CEMP). Any other measures to be included in the CEMP would be identified as ‘further mitigation’ (not embedded) through the EIA;
- Any construction activities within a 5m strip along waterfronts will be subject to specific consideration within a CEMP to be agreed with the NPA prior to commencement; and
- Adoption of standard construction industry working hours for noise generating activities.

Operational Phase

- 7.9.2 The mitigation measures incorporated within the proposed development are as follows:

An Outline Travel Plan

- Contained within the Transport Assessment an Outline Travel Plan incorporates actions and incentives and an ongoing programme of delivering sustainable travel options for the proposed development site. This includes several potential measures which could be implemented to support sustainable travel choices for future employees, through both induction processes and provision of a travel information pack for new starts. This would also include the provision of a Residential Travel Information Pack for the residential component of the site, which will be issued at point of occupation.

Monorail

- A monorail is incorporated in to the development proposals to provide better connectivity between Zone A (Station Square) and Zone C (Pierhead). This will provide better connectivity between Balloch Village and Loch Lomond Shores, through provision of a safe, direct and convenient means of transport. During the winter months/ dark nights the existing Pier Road and walking routes adjacent to the River Leven (Riverfront area) are not

conducive to walking as function of reduced personal security, and the overall distance. As such, the monorail will help support an evening economy at the existing and with-development scenarios.

Public Transport

- The proposed WDC plans for the Station Square enhancements on Balloch Road between the proposed new Station Square development (Zone A) and Balloch Railway Station, will help deliver enhanced access between the station and the proposed development site as well as the wider village of Balloch. It is also understood that revised parking arrangements are being considered for Balloch Rail Station as part of the wider “Balloch Village Parking Proposals” which are hoped to alleviate parking issues in the locality as well as encourage an uptake in rail usage;
- Discussions have been undertaken with ScotRail Abellio to seek to agree in principle the mutual benefits of promoting access to the development site by rail. Whilst any interventions are still in early developmental stages, these are presently anticipated to include:
 - Shared-ticketing: whereby rail and attraction-tickets can be purchased simultaneously, incorporating some form of discount for the passenger/ visitor;
 - The opportunity to promote the new West Riverside development as a destination, where branding/ wrapping the trains can be used as a marketing/ promotional incentive; and
 - The potential for further studies into the need for enhanced rail services either by frequency and/ or selective station stopping to improve journey times.

Remote Lodge Accommodation Parking

- For accommodation land uses, except for the Woodbank House site, the arrivals and parking for this element can be managed from the point of booking, whereby visitors can be advised of the intended arrival and check-in arrangements. The intention is that accommodation-based-visitors and associated parking will be segregated from other land-uses and that parking will be provided remotely from the accommodation. Small buggies will be used to transport visitors and baggage to their holiday accommodation. This will reduce both unnecessary vehicular circulation at arrival and departure times but is also expected to reduce the use of cars for short-trips by guests throughout their stay: it will be more convenient to walk, cycle or use the mono-rail for shorter local and site-internal trips.

7.10 Residual Effects

- 7.10.1 The residual effects arising from the development proposals following the implementation of the mitigation measures are described below:

Construction Effects

- 7.10.2 Appointed contractors would be required to implement strategies and work plans to minimise the potential effects of construction works on pedestrians, cyclists and drivers. Notwithstanding this, there would be **negligible to short-term slight adverse residual effects (not significant)** on pedestrians and drivers in terms of severance, amenity and delay due to construction activity.

Operational Effects

- 7.10.3 The embedded design and operational mitigation measures proposed would ensure that the potential traffic impact associated with the development proposals can be satisfactorily accommodated. Junction capacity assessments suggest that there would be some slight delay and congestion on some junctions within proximity to the site, due to development traffic, albeit not so much as to warrant remedial action to the junctions to increase capacity. The ongoing management of the eventual operational Travel Plan for the site, as well as the careful monitoring of usage of walking, cycling and vehicular access routes, will help ensure that any ongoing interventions for access and parking management are evaluated. Where measures are gauged to be less effective, then ongoing targets for improvement will help ensure appropriate

initiatives and interventions are undertaken. The scale of the effect of the development is concluded to be **moderate beneficial (significant)**.

- 7.10.4 The increases in the AADT traffic flow as a result of the development proposals are initially considered to be moderate adverse at Balloch Road (South) and Old Luss Road (North), albeit the operational mitigation, in conjunction with WDC streetscape improvements schemes (Balloch Road) will assist in an enhanced walking and cycling environment generally and are therefore considered beneficial within the wider context of the development proposals. The scale of the effect of the development is concluded to be **moderate beneficial (significant)**.
- 7.10.5 The increases in the AADT traffic flow as a result of the development proposals are initially perceived to be substantial adverse at both Pier Road and Ben Lomond Way, the two main access points into the main West Riverside site. Given the existing status of Pier Road as private, the uplift in traffic flows are initially perceived as being substantial, however, in the wider context of improvements to the existing function of Pier Road and the wider “movement” environment, the development proposals are considered to deliver a moderate benefit to the locality overall. The traffic impacts at Ben Lomond Way in terms of pedestrians and cyclists amenity are focused in an area of less sensitivity (limited residential area) as opposed to wider dispersal of more significant impacts on more sensitive residential and village centre areas. Further, monitoring of pedestrian and cycle movements on the key access routes will help identify trigger points for mitigation and/ or intervention as detailed stages of the development are progressed. The scale of the effect of the development is concluded to be **moderate beneficial (significant)** at Pier Road, and **minor beneficial (not significant)** at Ben Lomond Way.

7.11 Monitoring of Residual Effects

- 7.11.1 Ongoing monitoring of traffic flows, and walking and cycling on the key access routes into the development should be undertaken during build-out and completion stages to ascertain the appropriate trigger level for additional interventions. These are likely to include provision of designated pedestrian and cycle crossings, albeit their requirement and preferred location, would be based on actual operational data as opposed to the current theoretical data. It is expected that internal parking and routing operations will evolve as the application progresses to the detailed stage, and as such it would currently be abortive to include additional and, potentially surplus, infrastructure at the present time.

7.12 Summary

- 7.12.1 As a result of the proposed development and design measures, the effects of the development on the surrounding local and strategic road network, are not anticipated to result in substantial adverse effects. The embedded and operational mitigation is anticipated to greatly expand and enhance the walking, cycling and public transport environment within the immediate site and within the wider Balloch village. This is anticipated to materially change the local “road focussed culture in the area, in conjunction with the WDC Balloch Village, Station Square and Road/ streetscape proposals, which will see an uptake in the use of sustainable modes of travel within the local area more generally.
- 7.12.2 All construction traffic to and from the site will be controlled by a routing agreement which will ensure the correct road hierarchy is used and will prevent the use of residential roads by such vehicles, therefore resulting in a temporary slight adverse impact on road users, pedestrians and cyclists during this phase.
- 7.12.3 There would be increases in traffic flows within the Loch Lomond Shores/ development site as a result of the development proposals, more noticeably on roads Old Luss Road (North), Ben Lomond Way, Balloch Road (South) and Pier Road, which constitute the main access roads and links into the site. The % increase in AADT flows as a result of development require to be put in context to the existing status quo, which lessens the overall impact to moderate on Balloch Road (South), Old Luss Road (North) and Pier Road. Ben Lomond Way requires to be subject to monitoring during the construction and operational phases, to determine any future requirement for associated intervention or mitigation to reduce pedestrian and cyclist delay and fear and intimidation. Increases elsewhere will be less noticeable and generally confined to peak periods.

- 7.12.4 Junction capacity impact assessments undertaken in the TA indicate that remediation and mitigation are not required to improve the capacity at local or strategic road junctions. Moreover, increasing capacity is understood to lead to an eventual increase in vehicles, which should be avoided wherever practicable.
- 7.12.5 The provision of the improved public transport, pedestrian and cycle routes through the site and to the surrounding areas of Balloch will, in conjunction with site-specific initiatives as well as the implementation of a Travel Plan and other ongoing Parking and Access Management strategies, potentially lead to an **overall increase in the uptake and propensity of use for sustainable modes to the moderate benefit of all road users.**

7.13 References

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- Scottish Government (2010). *Designing Streets*. Scottish Government.
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- Transport Scotland (2012). *Transport Assessment Guidance*. Transport Scotland.
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8 Noise and Vibration

8.1 Introduction

8.1.1 This ES chapter provides an assessment of the likely significant effects on sensitive receptors as a result of road traffic noise.

8.1.2 The aims of this chapter are to:

- Identify the relevant context in which the noise assessment has been undertaken;
- Describe the methods used to undertake the assessment;
- Outline the relevant baseline conditions currently existing at the site and surroundings;
- Identify the potential direct and indirect noise effects of the proposed development;
- Identify mitigation and enhancement measures where required to address identified effects;
- Assess residual predicted effects; and
- Assess cumulative effects on sensitive receptors as a result of road traffic noise from the proposed development in combination with other relevant cumulative developments.

8.2 Technical Context

8.2.1 The purpose of the assessment is to identify and describe any likely significant effects arising from the proposed development. This chapter details the noise monitoring, modelling and the results of the impact assessment, which has been carried out for the proposed development.

8.2.2 This ES chapter is supported by the information provided in Appendices 5.1 (Drawings) and 5.2 (Technical Report).

8.3 Legislative and Policy Context

Legislation

8.3.1 Chapter 5 Planning Policy Context states the planning policy relevant to this EIA with regards to the proposed development. Full details of legislation and guidance relevant to the noise impact assessment is detailed in Technical Appendix 8.2: Noise Assessment. A summary of the relevant legislation, guidance and noise definitions used in this report is provided in this section.

Guidance and Relevant Technical Standards

8.3.2 The following definitions relating to noise are used in this report:

- **L_{Aeq, T}**: Equivalent continuous A-weighted sound pressure level. This is the single number that represents the average sound energy over that time period. It is the sound level of a notionally steady sound that has the same energy as a sound that fluctuates over a specified measurement period;
- **L_{A10, T}**: The noise level exceeded for 10% of the measurement period;
- **Free-field**: As sound propagates from the source it may do so freely, or it may be obstructed in some way by a wall, a fence, building, earth bund, etc. The former is known as free-field propagation;
- **Façade Effect**: When sound is reflected back towards its source, off a surface, such a wall, the reflected and incident sound waves interfere constructively, causing what is known as façade effect, or pressure doubling. This increases the noise, compared to that which exists in free-field, by approximately 3dB(A) for other sources;
- **Octave**: A range of frequencies whose upper frequency limit is twice that of its lower frequency limit; and

- **Octave Band:** Sound pressure level is often measured in octave bands, the centre frequencies of the bands are defined by ISO 266:1975, the audio spectrum is divided into 10 equal parts; 31.5Hz, 63Hz, 125Hz, 250Hz, 500Hz, 1kHz, 2kHz, 4kHz, 8kHz, 16kHz. The sound pressure level of sound that has been passed through an octave band pass filter is termed the octave band sound pressure level.
- 8.3.3 PAN 1/2011 Planning and Noise
- Advice on the role of the planning system in helping to prevent and limit the adverse effects of noise is provided in Planning Advice Note (PAN) 1/2011 'Planning and Noise' (The Scottish Government, 2011a). The associated Technical Advice Note (TAN) 1/2011 'Assessment of Noise' (The Scottish Government, 2011b) provides guidance on Noise Impact Assessment methods; and
 - The methodology provided in Technical Advice Note (TAN) 1/2011 'Assessment of Noise' (The Scottish Government, 2011b) is used to assess the suitability of the local noise environment for a residential development.
- 8.3.4 Calculation of Road Traffic Noise (CRTN)
- CRTN is the standard UK procedure which defines measurement and calculation methods for assessing road traffic noise;
 - The standard contains a shortened measurement procedure by which daytime $L_{A10,(18\text{hour})}$ noise levels can be calculated from the arithmetic average of three consecutive hourly $L_{A10,(1\text{hour})}$ measurements. Daytime $L_{Aeq,(16\text{hour})}$ are then calculated by subtracting a further 2dB(A) from the $L_{A10,(18\text{hour})}$ value; and
 - Night-time $L_{Aeq,(8\text{hour})}$ values can be extrapolated from daytime $L_{Aeq,(16\text{hour})}$ levels following guidance provided in the Highway Agencies publication, Design Manual for Roads and Bridges.
- 8.3.5 World Health Organisation (WHO) Guidelines for Community Noise 1999
- In Guidelines for Community Noise, (World Health Organisation, 1999), 55dB(A) was indicated as a criteria threshold below which few people are seriously annoyed (for an outdoor living area), during daytime and evening and other circumstances. To avoid sleep disturbance night time noise events exceeding 45dB (A) at the outside facades of living spaces should be avoided. In addition the guidance identifies that negative sleep impacts are avoided at 30dB for continuous noise sources. It also provides guidance on the attenuation provided to internal living areas when windows are partially opened i.e. up to 15dB reduction in external noise levels.
- 8.3.6 BS EN 12758:2011 'Glass in Building, Glazing and Sound Insulation; Product Descriptions and Determination of Properties'.

8.4 Methodology

Scope of Assessment

- 8.4.1 This ES chapter presents an assessment of likely significant effects on sensitive receptors as a result of road traffic noise from the proposed development (West Riverside and Woodbank House). The assessment presented in this ES chapter has been prepared in accordance with the 2011 EIA Regulations.
- 8.4.2 The noise assessment was undertaken to establish the existing and predicted future noise climate and to determine the suitability of the site for development.
- 8.4.3 As this is a Planning Permission in Principle (PPiP) application, detailed design is unknown at this stage and it is not possible to assess, for example, commercial/ entertainment etc. noise. This will be undertaken for the detailed planning application.
- 8.4.4 Vibration was scoped out of the assessment because it is considered not to be an issue.

Overall Approach

- 8.4.5 In undertaking the assessment presented in this ES Chapter, the following activities have been carried out:
- An EIA Screening and Scoping Report was submitted to West Dunbartonshire Council in April 2017 with a formal Scoping Opinion received in May 2017;
 - Consultation with West Dunbartonshire Council's Environmental Health Department to agree the noise assessment methodology and criteria;
 - Measurement of daytime and evening existing baseline noise levels for a period of 1 hour at each location, repeated at varying times over two separate dates. Baseline data to be used at the detailed planning stage to carry out any potential commercial/ entertainment noise assessment as required;
 - Measurement of existing road traffic noise at one position (close to the A82); in accordance with the shortened measurement procedure of The Calculation of Road Traffic Noise (CRTN). The results of the measurements were used to calibrate the CadnaA road traffic noise model;
 - 3D computer noise modelling of the proposed development site and surrounding area using CadnaA software. The noise model takes into account site topography, proposed development layouts, and current/predicted future traffic data in the form of annual weekly traffic flows (AAWT) to produce noise contours showing the impact in the surrounding areas. The following scenarios have been modelled;
 - 2017; Baseline road traffic, for noise model validation purposes against measured road traffic data;
 - 2020; Baseline + future committed developments;
 - 2020; Baseline + future committed developments + proposed development generated traffic;
 - Validation of CadnaA noise model outputs for the 2017 scenario against measured noise monitoring data;
 - Calculation of increase in road traffic noise at existing sensitive receptors with and without development for the future year of opening scenario (2020); the significance of the impact has been assessed in accordance with guidance provided in TAN 1/2011 (refer to Section 5.4.10 – 5.4.21 for TAN 1/2011 assessment methodology). Existing noise sensitive receptors used within the assessment are shown in Figure 168659 - 042 within Appendix 8.1 of this ES. The noise sensitive receptors are considered as representative of the most exposed properties within the study areas considered;
 - TAN 1/2011 assessment of day and night-time noise levels at location of new proposed sensitive receptors within the development; assessed against WHO Guidelines for Community Noise external noise criteria of 55dB(A) during the day (in gardens/terraces), and 45dB(A) at night (refer to Section 5.4.10 – 5.4.21 for TAN 1/2011 assessment methodology). The noise sensitive receptors are considered as representative of the most exposed properties within the study areas considered;
 - If the TAN 1/2011 magnitude of impact at night exceeds 'slight', undertake calculations of internal noise levels and compare to guidance provided in WHO Guidelines for Community Noise of 30dB(A) within bedrooms at night (assuming closed windows). Similarly, if daytime exceedance exceeds 'slight', calculate external garden noise levels (refer to Section 5.4.10 – 5.4.21 for TAN 1/2011 assessment methodology). A daytime TAN 1/2011 exceedance of 'moderate' or above within gardens is considered as significant; and
 - Advise on potential mitigation measures necessary to reduce the noise to within assessment Study Area.

EIA Screening and Scoping

- 8.4.6 This assessment has been informed by an EIA Screening and Scoping Report (PBA, April 2017) and subsequent EIA Screening and Scoping Opinions issued by LLTNPA (11th May 2017) in respect of the EIA for the proposed development.

- 8.4.7 The EIA Scoping Opinion, which is provided in full in **Appendix 4.1**, included a list of standard requirements for noise assessments in respect of development proposals.

Post Scoping Consultation

- 8.4.8 Consultation was carried out in June 2017 with West Dunbartonshire council in order to confirm assessment methodology, noise monitoring locations and noise criteria to be applied to the site. The approach within section 5.4.3 was agreed upon.

Study Area

- 8.4.9 The study area for the assessment of potential noise impacts focusses on existing sensitive receptors located adjacent to the local road network within the vicinity of the development most likely to be subjected to traffic increases as a result of the development. Future sensitive receptors were also assessed within the proposed development boundary.

Information Sources

Desk Top Study

- 8.4.10 The following data sources were used within this assessment:

- Aerial photography of the site;
- Traffic flow data for the roads surrounding the site;
- Weather data from Glasgow Bishopton weather station; and
- CadnaA noise modelling.

Fieldwork

Fieldwork included noise monitoring at locations agreed with the West Dunbartonshire Council Environmental Health Officer.

Approach to Assessment

Identification of Relevant Receptors

- 8.4.11 The noise assessment considered the most exposed residential resort accommodation within the development site to road noise as shown in Drawing Nos. 168659-043, in Appendix A. In addition, a sample of eleven existing noise sensitive receptors within the surrounding areas (refer to Drawing No. 168659-042, (refer to Appendix 8.1 for locations) were also considered in the noise assessment. All existing noise sensitive receptors were agreed with West Dunbartonshire Council Environmental Health Department through consultation.

Impact Assessment Methodology

- 8.4.12 The methodology provided in Technical Advice Note (TAN) 1/2011 'Assessment of Noise' (The Scottish Government, 2011b) is used to assess the suitability of the local noise environment for a residential development. This is a five stage process as follows:

Stage 1: Initial Process

- 8.4.13 The development is categorised according to whether it has the potential to generate noise i.e. a Noise Generating Development (NGD) or be affected by the existing noise i.e. a Noise Sensitive Development (NSD).
- 8.4.14 All Noise Sensitive Receptors (NSRs) that have the potential to be impacted by the proposed development are identified and prioritised according to their level of sensitivity. The residential receptors assessed within this ES chapter are categorised as having a high sensitivity to noise.

Stage 2: Quantitative Assessment

- 8.4.15 The quantitative assessment method depends on the type of development proposed i.e. Noise Sensitive Development (NSD) or Noise Generating Development (NGD) as follows:
- NSD – a quantitative assessment will be based on comparing an absolute noise level with an appropriate noise target, e.g. WHO guidelines etc.; and

- NGD – a quantitative assessment will be based on the change in noise climate before and after the new noise is introduced. This requires predictive calculations to be used to define post development noise.

8.4.16 In relation to the proposed development at West Riverside and Woodbank House, this is considered to be both a noise sensitive and noise generating development as proposed sensitive receptors are susceptible to noise from the existing road network, whilst existing residential receptors are susceptible to any increase in noise level that may be result from the increase in traffic flows generated by the development.

Noise Sensitive Development

8.4.17 The magnitude of the impact is defined by assessing the amount the road traffic noise level exceeds the assessment criteria for either day or night time periods. The magnitude of impact classifications used in this assessment and shown in Table 8.1 are based on the consultation response from West Dunbartonshire Council and classifications provided in the Technical Advice Note of PAN 01/2011 (The Scottish Government, 2011a).

Table 8.1 Classification of Magnitude of Noise Impacts; Noise Sensitive Development

Night Noise Level ¹ , x = (Existing – 45) L _{Aeq,8h}	Day Noise Level ¹ , X = (Existing – 55) L _{Aeq,16h}	Magnitude of Impact
> 15	> 10	Major
10 ≤ x ≤ 15	5 ≤ x ≤ 10	Moderate
5 ≤ x ≤ 10	3 ≤ x ≤ 5	Minor
0 ≤ x ≤ 5	0 ≤ x ≤ 3	Negligible
x < 0	x < 0	No change

⁽¹⁾ Corresponding façade levels are 2.5 dB(A) higher

Stage 3: Qualitative Assessment

8.4.18 The qualitative assessment allows the magnitude of the impact established in Stage 2 to be adjusted accordingly to take into account additional factors. It is based on perception and how noticeable the noise impact is in affecting the amenity value of the NSR. As noise becomes more noticeable, the level of disruption increases leading to significant changes in behaviour with a subsequent loss in the amenities associated with the NSR as follows:-

- Where a new noise source is planned, the assessment will be based on the effect the new noise climate may have on the amenity value of the existing NSR; and
- Where a new NSD is planned the assessment will be based on the effect the existing noise climate may have on the amenity value of the proposed property.

Establishment of Effect Significance

Stage 4: Level of Significance

8.4.19 The level of significance of the noise impact at the NSR is obtained through the relationship of the receptor's sensitivity to noise and the magnitude of the noise impact. Table 8.2 provides a framework for determining the level of significance in relation to the magnitude of the impact and the sensitivity of the receptor.

Table 8.2 Significance of Effects

Magnitude of Impact	Level of Significance Relative to Sensitivity of Receptor		
	Low	Medium	High
Major	Slight / Moderate	Moderate / Large	Large / Very Large

Magnitude of Impact	Level of Significance Relative to Sensitivity of Receptor		
	Low	Medium	High
Moderate	Slight	Moderate	Moderate / Large
Minor	Neutral / Slight	Slight	Slight / Moderate
Negligible	Neutral / Slight	Neutral / Slight	Slight
No change	Neutral	Neutral	Neutral

8.4.20 A daytime TAN 1/2011 exceedance of ‘moderate’ or above within gardens is considered as significant.

8.4.21 The definitions of the levels of significance are described as below:

- **Slight:** These effects may be raised but are unlikely to be of importance in the decision making process;
- **Moderate:** These effects, if adverse, while important, are not likely to be key decision making issues;
- **Large:** These effects are likely to be important considerations but where mitigation may be effectively employed such that resultant adverse effects are likely to have a Moderate or Slight significance; and
- **Very large:** These effects represent key factors in the decision making process. They are generally, but not exclusively associated with impacts where mitigation is not practical or would be ineffective.

Stage 5: The Decision Process

8.4.22 Stages 2 to 4 are repeated for all identified NSRs and a Summary Table of Significance is completed which provides an overview of the level of significance of the noise impact on all NSRs.

Noise Generating Development

8.4.23 The magnitude of impact is defined by assessing the change in road traffic noise with vs without development during the day and night-time periods at existing noise sensitive receptors. The classification of the magnitude of impacts used in this assessment is shown in Table 8.3.

Table 8.3 Classification of Magnitude of Noise Impacts; Noise Generating Development

Change in Noise Level, x $L_{Aeq,T}$ dB	Magnitude of Impact
$x \geq 5$	Major adverse
$3 \leq x < 5$	Moderate adverse
$1 \leq x < 3$	Minor adverse
$0 < x < 1$	Negligible adverse
$x = 0$	No change
$-1 < x < 0$	Negligible beneficial
$-3 < x \leq -1$	Minor beneficial
$-5 < x \leq -3$	Moderate beneficial
$x \leq -5$	Major beneficial

Approach to Cumulative Impact Assessment

- 8.4.24 Cumulative effects can occur when other proposed developments would also add to the noise environment that are relevant to the setting of a proposed development. There are no other proposed developments to which these criteria apply, and therefore cumulative effects have been scoped out of this assessment.

8.5 Baseline Conditions

The Site

- 8.5.1 The site is located immediately to the north of Balloch, West Dunbartonshire on the southern shores of Loch Lomond at OS grid reference 238500 682000.

The Surrounding Area

- 8.5.2 Notes of significant noise sources affecting the monitoring location were recorded and are summarised below in order of dominance (greatest first) (Refer to Technical Appendix 8.2);
- Road traffic on A82;
 - Light wind in trees; and
 - Birdsong.

Summary of Receptor Sensitivity

- 8.5.3 The receptor sensitivity as defined in TAN/2011 is High i.e. residential receptors.

8.6 Baseline Evolution

- 8.6.1 In the absence of the proposed development, future baseline conditions would likely remain consistent with existing conditions on site.

Baseline Noise Monitoring

- 8.6.2 Several noise surveys were carried out within and around the site of the proposed development at Riverside West during the daytime and evening of the 1st, 2nd, 20th, 21st February and 13th March 2018. The purpose of the survey was to determine the existing baseline noise environment in the area. The monitoring was carried out at each measurement location at varying times over two separate dates (Refer to Technical Appendix 8.2).

Noise Monitoring Locations and Periods

- 8.6.3 Seven measurement locations were chosen to represent the residual background noise levels within and surrounding the proposed development site. The monitoring locations, periods and durations were agreed through consultation with West Dunbartonshire Council. The location of the noise monitoring locations, and periods monitored for each is summarised in and shown in Drawing No 168659-048 (Refer to Appendix 8.1)

Table 8.4 Noise Monitoring Locations

NML ID	Description	Period Monitored	Grid Reference
02	Off Lower Stoney-mollan Rd	Daytime	E: 238167 N: 681643
03	Off Old Russ Road-Behind two Residential Properties	Evening	E: 238303 N: 681833
04	Land between Ben Lomond Shores Car Park and Clairinsh	Daytime	E: 238616 N: 681920
05	Off Ben Lomond Way, adjacent to Loch Lomond Shores	Daytime & Evening	E: 238587 N: 682190
06	On land between Pier Road and River Leven	Daytime & Evening	E: 238787 N: 682295
07	Land behind Anchorage Guest House and adjacent to Pier Road	Daytime & Evening	E: 238940 N: 681960
08	Off Old Luss Road	Evening	E: 238082 N: 682085

8.6.4 The weather conditions during the monitoring events were recorded and are summarised in Table 8.5

Table 8.5 Monitoring Periods and Weather Conditions

Monitoring Period/ Event	Weather Conditions
01/02/2018; Afternoon	Partially cloudy, between 4 and 7°C, wind speed between 0.0 m/s and 4.5 m/s
01/02/2018; Evening	Partially cloudy, between 3 and 4°C, wind speed between 2 m/s and 3.0 m/s.
02/02/2018: Morning & Afternoon	Partially cloudy, between 4 and 10°C, wind speed between 0.0 m/s and 1.0 m/s.
20/02/2018: Daytime	Partially cloudy, between 8 and 13°C, wind speed < 1.0 m/s.
20/02/2018: Evening	Partially cloudy, between 1 and 3°C, wind speed < 1.0 m/s.
21/02/2018: Evening	Partially cloudy, between 4 and 8°C, wind speed < 1.0 m/s.
13/03/2018: Evening	Overcast, between 4 and 7°C, wind speed < 1.0 m/s.

8.6.5 During the monitoring periods, notes of the general noise climate at each of the monitoring locations were recorded. It was noted that background noises were observed at each location as follows:

Table 8.6 Observations

Period	Monitoring Location	ID	Date	Observations
Weekday - Daytime	Off Lower Stonymollan Rd	02	01/02/2018	<ul style="list-style-type: none"> • Road traffic on A82 • Dogs barking at local kennels • Birds chirping • Trees rustling
			02/02/2018	<ul style="list-style-type: none"> • Road traffic on A82 • Distant music within Loch Lomond Shores
	Land between Ben Lomond Shores Car Park and Clairinsh	04	01/02/2018	<ul style="list-style-type: none"> • Traffic on local road network • Leaves rustling • Birds chirping
			02/02/2018	<ul style="list-style-type: none"> • Traffic on local road network • Leaves rustling • Birds chirping • Intermittent distant sawing activity
	Off Ben Lomond Way, adjacent to Loch Lomond Shores	05	01/02/2018	<ul style="list-style-type: none"> • Traffic on local road network • Kids playing in playground • Mechanical services noise from Loch Lomond Shores • Infrequent dog barks
			20/02/2018	<ul style="list-style-type: none"> • Traffic on local road network • Kids playing in playground • Mechanical services noise from Loch Lomond Shores
	Land between Pier Road and River Leven	06	01/02/2018	<ul style="list-style-type: none"> • Traffic on local road network • Birds chirping • Infrequent shouting in distance
			02/02/2018	<ul style="list-style-type: none"> • Traffic on local road network • Boating activity on River Leven • Paddle Steamer starting up
	Land behind Anchorage Guest House and adjacent to Pier Road	07	02/02/2018	<ul style="list-style-type: none"> • Traffic on local road network • Boating activity on River Leven • Overhead light aircraft
			20/02/2018	<ul style="list-style-type: none"> • Traffic on local road network • Infrequent distant indistinct industrial/commercial noise • Birds chirping
Week Day – Night-Time	Off Old Russ Road- Behind two Residential Properties	03	01/02/2018	<ul style="list-style-type: none"> • Road traffic on A82 • Water in stream nearby • Very Infrequent passing cars on Old Luss Road

Period	Monitoring Location	ID	Date	Observations
			13/03/2018	<ul style="list-style-type: none"> Road traffic on A82 Water in stream nearby Very Infrequent cars accelerating loudly in surrounding area
	Off Ben Lomond Way, adjacent to Loch Lomond Shores	05	01/02/2018	<ul style="list-style-type: none"> Traffic on local road network Leaves and trees rustling Mechanical services noise from Loch Lomond Shores
			21/02/2018	<ul style="list-style-type: none"> Traffic on local road network Mechanical services noise from Loch Lomond Shores Van in Loch Lomond Shores delivery area idling for less than 10 mins
	Land between Pier Road and River Leven	06	20/02/2018	<ul style="list-style-type: none"> Traffic on local road network Distant intermittent dog bark Lorry pulling up on Pier Road and idling for less than 10 mins Low to mid frequency drone suspected to be from mechanical services at Drumkinnon Tower
			21/02/2018	<ul style="list-style-type: none"> Traffic on local road network Low to mid frequency drone suspected to be from mechanical services at Drumkinnon Tower Single HGV passing on Pier Road
	Land behind Anchorage Guest House and adjacent to Pier Road	07	20/02/2018	<ul style="list-style-type: none"> Traffic on local road network Music from property on Pier Road Diesel car idling in adjacent car park
			13/03/2018	<ul style="list-style-type: none"> Traffic on local road network Music from property on Pier Road Infrequent lorry movements and doors closing in adjacent car park
	Off Old Luss Road	08	20/02/2018	<ul style="list-style-type: none"> Road traffic on A82 and local road network Water in nearby stream Infrequent, distant cars revving engines

Period	Monitoring Location	ID	Date	Observations
			21/02/2018	<ul style="list-style-type: none"> Road traffic on A82 and local road network Water in nearby stream Very infrequent bird calls

Results

8.6.6 A summary of the baseline noise monitoring results can be found below in Table 8.7.

Table 8.7 Noise Monitoring Results

Period	Date	Monitoring Location	Start Time – End Time (hrs:mins)	Noise Levels (dB(A))		
				L _{Aeq}	L _{A90}	L _{AFMax}
Position 2						
Daytime	01/02/2018	02	14:50 – 15:50	52.6	50.2	67.4
Daytime	02/02/2018	02	14:28 – 15:28	51.5	48.7	70.0
Position 3						
Evening	01/02/2018	03	20:49 – 21:49	45.7	42.3	58.3
Evening	01/02/2018	03	20:47 – 21:47	47.7	43.7	67.5
Position 4						
Daytime	01/02/2018	04	13:27 – 14:27	49.1	44.9	62.2
Daytime	02/02/2018	04	09:48 – 10:48	49.3	44.4	72.1
Position 5						
Daytime	01/02/2018	05	16:03 – 17:03	59.0	45.3	79.7
	20/02/2018	05	15:23 – 16:23	57.0	41.7	84.5
Evening	01/02/2018	05	19:39 – 20:39	53.3	40.3	80.7
	21/02/2018	05	20:41 – 21:41	53.2	37.2	81.1
Position 6						
Daytime	01/02/2018	06	17:13 – 18:13	45.2	42.1	71.1
	02/02/2018	06	12:28 – 13:28	44.0	36.6	66.5
Evening	20/02/2018	06	19:00 – 20:00	42.7	39.5	67.8
	21/02/2018	06	19:33 – 20:33	42.0	36.3	68.8
Position 7						
Daytime	02/02/2018	07	11:06 – 12:06	46.6	41.4	67.5
	20/02/2018	07	16:31 – 17:31	47.3	42.3	66.4
Evening	20/02/2018	07	20:11 – 21:11	44.4	40.3	64.5
	13/03/2018	07	19:30 – 20:30	45.0	41.7	69.4
Position 8						

Period	Date	Monitoring Location	Start Time – End Time (hrs:mins)	Noise Levels (dB(A))		
				L _{Aeq}	L _{A90}	L _{AFMax}
Evening	20/02/2018	08	21:22 – 22:22	41.8	37.8	61.9
	21/02/2018	08	21:45 – 22:45	41.0	37.0	64.7

Road Traffic Noise

- 8.6.7 A noise survey was carried out at the site of the proposed development at West Riverside between 10:23hrs and 13:23hrs on Friday 22nd June 2017. The purpose of the survey was to establish the noise from road traffic on the A82 without development traffic, the results of which are used to validate outputs from the CadnaA noise modelling exercise. The monitoring was carried out in accordance with the shortened measurement procedure of The Calculation of Road Traffic Noise (CRTN).
- 8.6.8 Details of the CRTN noise monitoring location is provided in Table 8.8 and shown in Drawing No 168659-048 (refer to Appendix 8.1).

Table 8.8 Noise Monitoring Location

NML ID	Grid Reference	Location
01	NS 237950 681930	Adjacent to A82, 6m back from carriageway edge.

- 8.6.9 The weather conditions during the monitoring events were recorded and are summarised in Table 8.9

Table 8.9 Monitoring Periods and Weather Conditions

Monitoring Period/Event	Weather Conditions
12/06/2017; 12:00	Partially cloudy, 16°C, wind speed between 0.0 m/s and 3.6 m/s in a westerly direction.

- 8.6.10 A summary of the results can be found in Table 8.10.

Table 8.10 Noise Monitoring Results

Measurement Position	Start Time/ Duration (hrs:mins:secs)	L _{Aeq} (dB _A)	L _{AF10} (dB _A)	L _{AFMax} (dB _A)
01	10:23/ 01:00:00	71.5	74.9	83.9
	11:24/ 01:00:00	71.8	74.9	90.4
	12:24/ 01:00:00	71.5	74.8	86.8

- 8.6.11 Following guidance provided in the Calculation of Road Traffic Noise (CRTN), 1dB(A) is subtracted from the average of the three hour LA10 levels at each position to provide the LA10 (18 hour), as shown in Table 8.11.

Table 8.11: LA10 Noise Monitoring Levels

Measurement Position	L _{A10, 1hr} (dB)			L _{A10 3 hour}	L _{A10 18hr}
	1 st hr	2 nd hr	3 rd hr		
01	74.9	74.9	74.8	74.9	73.9 ¹

8.7 Embedded Mitigation

8.7.1 As detailed in **Chapter 3 – The Proposed Development**, a number of design features and embedded mitigation measures have been incorporated into the design and construction of the proposed development to avoid, prevent or minimise significant adverse environmental effects and to enhance beneficial effects. Embedded mitigation measures of relevance to this assessment are:

- Development, approval and implementation of noise suppression techniques as part of a Construction Environmental Management Plan (CEMP); and
- The design mitigation features incorporated into the final masterplan design is of one stretch of 2m high close boarded timber garden fencing at the garden /terrace boundary of NSR 19.

8.8 Potential Effects

Construction Phase

8.8.1 At the time of writing, the development is at the Planning Permission in Principle (PPiP) stage and detailed design and construction methods have not yet been determined, as such, noise assessment is not possible at this stage.

8.8.2 Noise suppression techniques will be developed, approved and implemented as part of a Construction Environmental Management Plan (CEMP).

Operational Phase

8.8.3 There is the potential for commercial/entertainment noise from the proposed development to impact on future residents within resort accommodation, and on existing residents in the area surrounding the development. At the time of writing the development is at the PPiP/ masterplan stage, therefore detailed design information on proposed commercial/ entertainment noise sources is not available. If required, an assessment of commercial/ entertainment noise sources can be carried out at a later date when sufficient design information is available.

Impact Assessment

Noise Input Parameters

8.8.4 A 3D computer noise modelling exercise using CadnaA software has been carried out in order to predict future levels of road traffic noise across the proposed development site and surrounding areas.

8.8.5 CadnaA uses the principle methodologies as set out in the Calculation of Road Traffic Noise 1988 (CRTN), for determining the L_{A10} basic road noise level. In order to consider the noise data in a comparable form to PAN 01/2011, the output from CadnaA is converted into a $L_{Aeq,T}$ within the program.

Noise Sources

8.8.6 The dominant sources of noise affecting the proposed development site have been identified as being the A82, A811, Old Luss Road and Balloch Road.

8.8.7 Eighteen hour Annual Average Weekly Traffic (AAWT) flows for the above roads have been provided by Peter Brett Associates LLP and input to the CadnaA noise model.

Noise Sensitive Receptors

8.8.8 The noise assessment considered the proposed residential resort properties most exposed to road noise as shown in Drawing Nos. 168659-043. In addition a sample of eleven existing noise sensitive receptors within the surrounding areas (refer to Drawing No. 168659-042 for locations) were also considered in the noise assessment. All existing noise sensitive receptors were agreed with West Dunbartonshire Council Environmental Health Department through consultation.

8.8.9 Three different scenarios have been considered within the CadnaA model, as shown in Table 8.12.

Table 8.12: Modelled Scenarios

Scenario	Year	Description
1	2017	Baseline road traffic, for noise model validation purposes against measured road traffic data.
2	2020	Baseline + future committed developments
3	2020	Baseline + future committed developments + proposed development generated traffic.

Other Input Parameters

8.8.10 A number of assumptions have been established during the CadnaA modelling exercise, as detailed below:

- The noise model includes the effect of site design mitigation features (i.e. a 2m high close boarded timber fence along part of the boundary of the garden/terrace of NSR19);
- The 2017 and 2020 models use a combination of existing site topography, sourced from Lidar 1m resolution terrain height data and site topography supplied by the client;
- One storey buildings have been taken to be 6m high, two storey as 8m high;
- Receptor heights at garden and ground floor level have been taken as being 1.5m above ground level;
- Receptors at first floor level i.e. bedrooms have been taken to be 4m above ground level;
- Ground absorption has been set to 1 for soft ground for the 2017 and 2020 models, which comprises the majority of land, apart from areas;
 - Drumkinnon Gate housing – Modelled as 0.5 (mixed hard and soft ground);
 - Loch Lomond and River Leven – Modelled as 0 (reflective surface);
 - Ben Lomond car and coach park – Modelled as 0 (reflective surface);
 - Car park west of Drumkinnon Gate housing and adjacent to Ben Lomond Way– Modelled as 0 (reflective surface);
 - Housing between Balloch Road and the A811– Modelled as 0.5 (mixed hard and soft ground);
 - Housing south of the A811– Modelled as 0.5 (mixed hard and soft ground); and
 - Lomond Woods Holiday Park– Modelled as 0.5 (mixed hard and soft ground).

Calibration and Validation of CadnaA Noise Model

8.8.11 A CadnaA noise model was run for 2017 at a receptor height of 1.5m, with the results being compared to the noise monitoring results recorded at the site for validation purposes, as summarised in Table 8.13.

Table 8.13: CandaA Results and Model Validation

Monitoring position ID	Modelled period	L _{A10,18hrs} Noise Level (dBA) in accordance with CRTN	CadnaA results	Variance
01	Daytime	73.9	74.9	1.0

8.8.12 The analysis of the CadnaA validation results (as shown in Drawing No 168659-044) shows a good agreement between modelled results and monitoring data. The model is therefore considered to reflect the current situation at the site.

Impact Assessment: Existing Residential Receptors

8.8.13 The proposed residential development is predicted to increase traffic flows on the local road network surrounding the site. In order to assess how the noise levels will increase in these areas, noise models with and without development generated traffic have been compared.

8.8.14 The relevant heights for each of the existing noise sensitive receptors, have been based on daytime garden free field heights of 1.5 metres and 4 metres for façade level night-time receptors.

Existing Noise Sensitive Receptor Heights

8.8.15 The receptor heights for the existing noise sensitive receptors have been set to 1.5m during the daytime (i.e. gardens), and 4m at night (i.e. 1st floor bedrooms).

Comparison of Daytime Predicted Noise Levels

8.8.16 Daytime noise levels in the gardens of the noise sensitive receptors with vs without development generated traffic are compared in Table 8.14.

Table 8.14 Comparison of Daytime Noise Levels With vs Without Development; 1.5m Receptor Height

Noise Sensitive Receptor ID	2017 Without Development L _{Aeq, T} dB(A)	2020 With Development L _{Aeq, T} dB(A)	Differences dB(A)	TAN 2011 Magnitude of Impact	TAN 2011 Level of Significance
01	53.7	53.9	0.2	Negligible	Slight
02	49.1	49.6	0.5	Negligible	Slight
03	52.2	53.6	1.4	Minor	Slight
04	59.2	59.5	0.3	Negligible	Slight
05	57.2	59.2	2.0	Minor	Slight
06	49.2	50.6	1.4	Minor	Slight
07	41.3	42.2	0.9	Negligible	Slight
08	42.8	43.4	0.6	Negligible	Slight
09	66.8	67.1	0.3	Negligible	Slight
10	55.5	56.6	1.1	Minor	Slight
11	66.6	66.7	0.1	Negligible	Slight

8.8.17 The results show that the increase in daytime noise levels when comparing between the with vs without development scenarios for the year of development completion (2020) varies between 0.1dB(A) and 2.0dB(A), the TAN 2011 significance of which is *slight*. The existing properties at which the greatest increase in noise levels are predicted are located on, or close to Old Luss Road, Ben Lomond Way and Balloch Road (NSR 03, 05 & 06, refer to Drawing No. 168659-042, (refer to Appendix 8.1). This is due to the current traffic flows increasing due to development generated traffic. An increase in noise levels of around 2dB(A) shall be barely perceptible to the listener, and is therefore considered as insignificant.

Comparison of Night-time Predicted Noise Levels

8.8.18 Night time noise levels have been calculated to be 10dB(A) lower than daytime levels following guidance provided in the Design Manual for Roads and Bridges.

8.8.19 Night time noise levels at the facades of the noise sensitive receptors with vs without development generated traffic are compared in Table 8.15.

Table 8.15 Comparison of Night-time Noise Levels With vs Without Development; 4m Receptor Height

Noise Sensitive Receptor ID	2017 Without Development L _{Aeq, T} dB(A)	2020 With Development L _{Aeq, T} dB(A)	Differences dB(A)	TAN 2011 Magnitude of Impact	TAN 2011 Level of Significance
01	55.7	55.8	0.1	Negligible	Slight
02	40.3	41.4	1.1	Minor	Slight
03	42.3	43.7	1.4	Minor	Slight
04	53.9	54.3	0.4	Negligible	Slight
05	49.1	51.3	2.2	Minor	Slight
06	54.7	56.2	1.5	Minor	Slight
07	49.7	51.1	1.4	Minor	Slight
08	53.7	55.3	1.6	Minor	Slight
09	55.9	56.2	0.3	Negligible	Slight
10	52.1	52.2	0.1	Negligible	Slight
11	56.8	56.9	0.1	Negligible	Slight

8.8.20 The results show that the increase in night-time noise levels when comparing between the with vs without development scenarios for the year of development completion (2020) varies between 0.1dB(A) and 2.2dB(A), the TAN 2011 significance of which is *slight*. The existing properties at which the greatest increase in noise levels are predicted are located on, or close to Old Luss Road, Ben Lomond Way and Balloch Road (NSR 03, 05, 06, 07 & 08, refer to Drawing No. 168659-042 within Appendix 8.1. This is due to the current traffic flows increasing due to development generated traffic. An increase in noise levels of around 2dB(A) shall be barely perceptible to the listener, and is therefore considered as insignificant.

Proposed Resort Accommodation

Year of Development Completion Predicted Noise Levels

8.8.21 In order to assess the impact of road traffic noise on proposed sensitive receptors within the development, the CadnaA noise model considering the 2020 base + committed + development scenario has been used for assessment purposes. Site design mitigation features as outlined in Section 5.9.2 have been incorporated into the noise model.

Daytime Predicted Noise Levels

8.8.22 The noise model results for the 1.5m receptor height are summarised in Table 8.16, the free-field noise contours are shown in Drawing No. 168659-046 (refer to Appendix 8.1).

Table 8.16 CadnaA daytime model results. Receptor height: 1.5 metres; Gardens/Terraces

Noise Sensitive Receptor ID	Modelled Garden L _{Aeq, T} dB(A)	Meet External Noise Criteria? Target = 55 dB(A)	Excess dB(A)	TAN 2011 Magnitude of Impact	TAN 2011 Level of Significance
12	53.9	YES	-1.1	No Change	Neutral
13	54.1	YES	-0.9	No Change	Neutral
14	54.2	YES	-0.8	No Change	Neutral
15	53.5	YES	-1.5	No Change	Neutral

Noise Sensitive Receptor ID	Modelled Garden $L_{Aeq, T}$ dB(A)	Meet External Noise Criteria? Target = 55 dB(A)	Excess dB(A)	TAN 2011 Magnitude of Impact	TAN 2011 Level of Significance
16	53.9	YES	-1.1	No Change	Neutral
17	52.8	YES	-2.2	No Change	Neutral
18	56.0	NO	1.0	Minor	Slight
19	57.2	NO	2.2	Minor	Slight
20	57.7	NO	2.7	Minor	Slight
21	55.0	NO	0.0	Negligible	Slight
22	55.5	NO	0.5	Negligible	Slight
23	53.4	YES	-1.6	No Change	Neutral
24	52.6	YES	-2.4	No Change	Neutral
25	52.3	YES	-2.7	No Change	Neutral
26	53.2	YES	-1.8	No Change	Neutral
27	50.4	YES	-4.6	No Change	Neutral
28	56.3	NO	1.3	Minor	Slight
29	57.9	NO	2.9	Minor	Slight
30	52.1	YES	-2.9	No Change	Neutral
31	50.6	YES	-4.4	No Change	Neutral
32	51.8	YES	-3.2	No Change	Neutral
33	54.3	YES	-0.7	No Change	Neutral
34	54.2	YES	-0.8	No Change	Neutral
35	54.0	YES	-1	No Change	Neutral
36	53.3	YES	-1.7	No Change	Neutral
37	54.3	YES	-0.7	No Change	Neutral

8.8.23 The above noise receptors were chosen as they are considered to be the most exposed to noise from road traffic on the A82 and the local road network. The results show that the external noise levels at the majority of these properties, are predicted to be within the target external noise criteria of 55dB(A). Noise levels at the most exposed proposed properties exceed the noise target between 0.0dB(A) at NSR 21 to 2.9dB(A) at NSR 29. An exceedance of less than 3dB(A) is considered as barely perceptible to a listener. When assessed to TAN 2011, the significance of the daytime noise varies between *Neutral* and *Slight*, which are defined as;

Neutral: No effect, not significant, noise need to be considered as a determining factor in the decision making process.

Slight: These effects may be raised but are unlikely to be of importance in the decision making process.

8.8.24 As the greatest TAN 2011 level of significance at the most exposed properties is *Slight*, the noise is considered as acceptable in line with the consultation response received from West Dunbartonshire Council.

8.8.25 As the noise is acceptable at these, the most exposed properties; it shall also be at other, less exposed parts of the development. The external daytime noise is therefore considered acceptable at the proposed development site and does not need to be reduced further.

Night Time Predicted Noise Levels

8.8.26 Night time noise levels have been calculated to be 10dB(A) lower than daytime levels following guidance provided in the Design Manual for Roads and Bridges.

8.8.27 As part of the consultation carried out with West Dunbartonshire Council (refer to Section 1.6) it was agreed that if the TAN 2011 significance of the external night-time noise within some parts of the development exceeds *Slight*, internal noise calculations shall be carried out to confirm that the target internal noise criteria of 30dB(A) shall be met within bedrooms with closed windows.

8.8.28 External free-field noise levels at one of the most exposed properties of the development (NSR19) is predicted to exceed 49.9dB(A), (as shown in Table 8.17), and Drawing No. 168659-047, in Appendix A), the TAN 2011 significance of which is slight/moderate. In order to confirm if noise levels shall be met at the most exposed properties throughout the development, levels within ground floor bedrooms with windows facing towards the roads have been predicted using closed windows. At the time of writing the glazing configuration has not been specified, therefore the minimum standard of double glazing required for thermal insulation by the Building Standards (Scotland) Regulations of 6/16/6mm glazing, with a sound reduction index of 31dB, as described in Section 8.8.30, has been used. A façade correction of +2.5dB(A) in accordance with CRTN has been used for the calculation of internal noise levels.

8.8.29 A summary of the CadnaA night-time noise model results, TAN 2011 assessment and predicted internal noise levels are shown in Table 8.17. Night-time free-field noise contours for the 4m receptor height are shown in Drawing No. 168659- 047 (refer to Appendix 8.1).

Table 8.17: CadnaA Night-Time Model Results and Assessment. Receptor height: 1.5 metres

Noise Sensitive Receptor ID	Modelled Free-field External $L_{Aeq, T}$ dB(A)	Meet External Noise Criteria? Target = 45 dB(A)	Excess dB(A)	TAN 2011 Magnitude of Impact	TAN 2011 Level of Significance	Predicted Internal Bedrooms $L_{Aeq, T}$ dB	Meet noise criteria? Internal 30dB(A) night time
12	41.7	YES	-3.3	No change	Neutral	13.2	YES
13	41.8	YES	-3.2	No change	Neutral	13.3	YES
14	42.2	YES	-2.8	No change	Neutral	13.7	YES
15	42.0	YES	-3.0	No change	Neutral	13.5	YES
16	43.1	YES	-1.9	No change	Neutral	14.6	YES
17	42.4	YES	-2.6	No change	Neutral	13.9	YES
18	45.4	NO	0.4	Negligible	Slight	16.9	YES
19	50.0	NO	5.0	Minor	Slight/Moderate	21.5	YES
20	47.0	NO	2.0	Negligible	Slight	18.5	YES
21	47.4	NO	2.4	Negligible	Slight	18.9	YES
22	45.0	NO	0.0	Negligible	Slight	16.5	YES
23	41.1	YES	-3.9	No change	Neutral	12.6	YES
24	41.2	YES	-3.8	No change	Neutral	12.7	YES

Noise Sensitive Receptor ID	Modelled Free-field External $L_{Aeq, T}$ dB(A)	Meet External Noise Criteria? Target = 45 dB(A)	Excess dB(A)	TAN 2011 Magnitude of Impact	TAN 2011 Level of Significance	Predicted Internal Bedrooms $L_{Aeq, T}$ dB	Meet noise criteria? Internal 30dB(A) night time
25	39.6	YES	-5.4	No change	Neutral	11.1	YES
26	40.9	YES	-4.1	No change	Neutral	12.4	YES
27	41.0	YES	-4.0	No change	Neutral	12.5	YES
28	45.2	NO	0.2	Negligible	Slight	16.7	YES
29	45.5	NO	0.5	Negligible	Slight	17.0	YES
30	44.6	YES	-0.4	No change	Neutral	16.1	YES
31	46.0	NO	1.0	Negligible	Slight	17.5	YES
32	43.7	YES	-1.3	No change	Neutral	15.2	YES
33	44.5	YES	-0.5	No change	Neutral	16.0	YES
34	44.8	YES	-0.2	No change	Neutral	16.3	YES
35	45.6	NO	0.6	Negligible	Slight	17.1	YES
36	41.7	YES	-3.3	No change	Neutral	13.2	YES
37	44.8	YES	-0.2	No change	Neutral	16.3	YES

8.8.30 According to these results, night time internal noise levels at the properties around the periphery of proposed development; those most exposed to the main noise sources (i.e.A82, Old Luss Road, Ben Lomond Way, Pier Road and Balloch Road) are predicted to meet the agreed noise criteria of 30dB(A) within bedrooms during the night-time periods with closed windows. The minimum standard of double glazing required in the *Building Standards (Scotland) Regulations* for thermal insulation, of 2 panes of 6mm thick glass separated by a 16mm wide cavity shall provide the sound reduction required.

8.9 Further Mitigation and Enhancement

Construction Phase

8.9.1 As stated in Paragraph 8.8.1 construction phase impacts have been scoped out of this assessment.

Design Mitigation

8.9.2 As part of the masterplan design process EnviroCentre used CadnaA noise modelling software to inform the design of any mitigation measures if necessary for the year of development opening scenario (2020). The results were assessed in accordance with TAN 2011. Exceedances of the Council's noise criteria were identified in one of the garden/terraces of the most exposed properties.

8.9.3 The level of significance of any TAN 2011 exceedance within the current masterplan is now *slight*. The design mitigation features incorporated into the final masterplan design is of one stretch of 2m high close boarded timber garden fencing at the garden /terrace boundary of NSR 19.

Operational Phase

8.9.4 Daytime external noise levels are predicted to meet West Dunbartonshire Council's noise target of 55dB(A) in the majority of properties. Noise exceeds the target noise criteria in some locations by up to 2.9dB(A). The TAN 2011 level of significance of the exceedances is *Slight*. In line with consultation carried out with West Dunbartonshire Council, the daytime external noise, when

incorporating the site design mitigation features, has been found to be within acceptable limits and does not need to be reduced further.

8.10 Residual Effects

Construction Phase

8.10.1 As stated in Paragraph 8.8.1 construction phase impacts have been scoped out of this assessment.

Operational Phase

8.10.2 Taking account of proposed mitigation and enhancement measures, the residual potential effects from the construction and operation of the proposed development are identified in Table 8.18.

Table 8.18: Residual Effects

Noise Sensitive Receptor	Impact	Mitigation	Residual Effect	Significance (EIA Terms)
19	<i>Moderate (Daytime)</i>	2m high close boarded timber fencing at the garden/terrace boundary	Slight	Not significant/ Minor

8.11 Monitoring of Residual Effects

8.11.1 No monitoring of residual effects is proposed.

8.12 Assessment of Cumulative Effects

8.12.1 Cumulative effects can occur when other proposed developments would also be relevant to the setting of a sensitive receptors. There are no other proposed developments to which these criteria apply, and therefore cumulative effects have been scoped out of this assessment.

8.13 Summary

8.13.1 A noise assessment has been carried out to assess the impact of the increase in traffic noise as a result of a proposed development at Riverside West in Balloch. The impact of road traffic noise on both existing and proposed residential receptors has been assessed against noise criteria agreed with West Dunbartonshire council.

8.13.2 3D computer noise modelling using CadnaA software has been carried out and validated against measured on-site road traffic noise data. The modelling considered current year (2017), and year of development completion (2020) scenarios.

8.13.3 Vibration was scoped out of the assessment because it is considered not to be an issue.

Existing Noise Sensitive Receptors

8.13.4 A TAN 2011 assessment of the day and night-time noise impact from future (2020) development generated road traffic at existing noise sensitive receptors within the surrounding areas has been carried out, through comparison between with vs without development scenarios.

8.13.5 The amount by which day and night-time road traffic noise levels are predicted to increase varies between 0.1dB(A) and 2.2dB(A), the TAN 2011 level of significance of which is Slight. The greatest increase in road traffic noise is predicted to occur at properties located at Old Luss Road, Ben Lomond Way and Balloch Road. This is due to the largest percentage increase in road traffic as a result of the proposed development occurring around these areas.

Proposed Noise Sensitive Receptors

- 8.13.6 A TAN 2011 assessment of the day and night-time noise impact from road traffic at proposed future noise sensitive receptors, for the year of development completion scenario (2020) has been carried out. The assessment includes the use of design mitigation.
- 8.13.7 Daytime external noise levels are predicted to meet the agreed noise target of 55dB(A) at all but seven properties. Noise exceeds the target noise criteria at these properties by up to 2.9dB(A). The TAN 2011 level of significance of the exceedances is Slight. The daytime external garden/terrace noise, when incorporating the site design mitigation features, has been found to be within acceptable limits and does not need to be reduced further.
- 8.13.8 Similarly, A TAN 2011 assessment of night-time external noise at proposed future noise sensitive receptors has been carried out, for the year of development completion scenario. At one of the most exposed properties, the TAN 2011 level of significance of the night-time noise is predicted to exceed *Slight*, therefore internal noise levels have been calculated. At all locations throughout the proposed development internal noise levels are predicted to meet the target noise criteria of 30dB(A) with closed windows. The minimum standard of double glazing required in the *Building Standards (Scotland) Regulations* for thermal insulation, of 2 panes of 6mm thick glass separated by a 16mm wide cavity shall provide the sound reduction required.
- 8.13.9 **The Noise Assessment has determined that the significance of the proposed development is not significant/ minor i.e. the effects may be raised as local issues but are unlikely to be of importance in the decision-making process.**

8.14 References

- The Scottish Government (2011a). *PAN 1/2011 Planning and Noise*. The Scottish Government.
- The Scottish Government (2011b). *Technical Advice Note (TAN) 1/2011 - Assessment of Noise*. The Scottish Government.
- Department of Transport. *Calculation of Road Traffic Noise*, HMSO, London, 1988, ISBN 0-11-550847-3.
- World Health Organisation (1999). *Guidelines For Community Noise*. Geneva: WHO.
- British Standards Publication (2011). *Glass in Building. Glazing and Airborne Sound Insulation. Product Descriptions and Determination of Properties*. BS EN 12758:2011.
- Highways Agency, *Design Manual for Roads and Bridges: Volume 11 Environmental Assessment, Section 3, Paragraph A5.8*, The Stationery Office, London 2011.

9 Air Quality

9.1 Introduction

- 9.1.1 This ES chapter considers the suitability of the site in terms of local air quality for the proposed development and the potential for the proposed development to adversely affect local air quality. The assessment is based on the characteristics of the site and surrounding area and the key parameters of the proposed development detailed in **Chapter 2 – Site and Surrounding Area** and **Chapter 3 – The Proposed Development** respectively. This chapter has been prepared by EnviroCentre Ltd.
- 9.1.2 The aims of this chapter are to:
- Identify the relevant context in which the air quality assessment has been undertaken;
 - Describe the methods used to undertake the assessment;
 - Outline the relevant baseline conditions currently existing at the site and surroundings;
 - Identify the potential direct and indirect air quality impacts of the proposed development; and,
 - Identify mitigation and enhancement measures where required to address identified effects;
- 9.1.3 This ES chapter is supported by the following technical reports provided in **Appendices 9.1 (Drawings)** and **9.2 (Technical Report)**.

9.2 Legislative and Policy Context

Legislation

- 9.2.1 The overarching legislative framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Subject specific legislation of relevance to this assessment is outlined below.
- 9.2.2 Air Quality is protected by national and regional legislation. In the UK, Part IV of the Environment Act 1995 places a statutory duty on local authorities to periodically review and assess the air quality within their area. This involves consideration of present and likely future air quality against air quality standards and objectives. Under section 83(1) of this Act, local authorities have a duty to designate any relevant areas where the air quality objectives are not (or are unlikely to be) being met as Air Quality Management Areas (AQMAs). West Dunbartonshire Council have not currently declared any AQMA's within their administrative area, which includes the site of the proposed development.
- 9.2.3 Associated with Part IV of the Environment Act 1996, guidelines of the “Review and Assessment” process of local air quality were published in the 1997 National Air Quality Strategy (NAQS) and associated guidance and technical guidance. In 2000, the government reviewed the 1997 Strategy and produced a revised Air Quality Strategy for England, Scotland, Wales and Northern Ireland, which resulted in the production of air quality standards and objectives. The most current revision of the strategy available is dated March 2011 (DEFRA, 2011).
- 9.2.4 The objectives adopted in Scotland are contained within the Air Quality (Scotland) Regulations 2000 and Air Quality (Scotland) Amendment Regulations 2002 for the purpose of Local Air Quality Management and consolidate the provisions of the previous Air Quality Regulations. The Air Quality Standards (Scotland) Amendment Regulations 2010 introduce objectives for Particles (PM₁₀), Polycyclic Aromatic Hydrocarbons and Lead with the Air Quality (Scotland) Amendment Regulations 2016 amending the Air Quality (Scotland) Regulations 2000 to bring into statute an objective for PM_{2.5}.

Policy

- 9.2.5 The planning policy framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Planning policy considerations (including policies and guidance) of specific relevance to this assessment are:
- Adopted **Loch Lomond and the Trossachs National Park (LLTNP) Local Development Plan (LDP) (2016)** including relevant policies outlined in Table 5.1, in particular:
 - Overarching Policy 1 – Strategic Principles;
 - Overarching Policy 2 - Development Requirements; and
 - Transport Policy 2 - Promoting Sustainable Travel and Improved Active Travel Options.
 - **Draft LLTP Partnership Plan 2018 – 2023**, in particular outcomes 1-3 and 5-9;
 - **National Planning Framework 3 (NPF3) (2014)**;
 - **Scottish Planning Policy (SPP) (2014)** including relevant provisions outlined in Table 9.2, in particular:
 - Principal Policy on Sustainability (paragraphs 24-35); and
 - Valuing the Natural Environment Subject Policy (Paragraphs 193 - 233).
 - PAN 51 Planning Environmental Protection and Regulation (Revised October 2006).
- 9.2.6 Other policy considerations of relevance to this assessment are:
- Policy Guidance Local Air Quality Management. Policy Guidance (LAQM. PG(S) 16 was released by the Scottish Government in March 2016 as means of providing a source of guidance for local authorities to comply with their local air quality management duties as set out in Part IV of the Environment Act 1995 (see above).

Guidance and Relevant Technical Standards

Air Quality Definitions

- 9.2.7 Standards for air pollution are concentrations over a given time period that are considered to be acceptable in light of what is known about the effects of each pollutant on health and on the environment. They can also be used as a benchmark to see if air pollution is getting better or worse.
- 9.2.8 Objectives for pollutants have been derived from these standards and represent a compromise between what is desirable in terms of human health impacts and what is deemed to be achievable in terms of practicality and cost.

National Air Quality Objectives

- 9.2.9 Table 9.1 provides a summary of the air quality objectives from the Air Quality (Scotland) Regulations 2010, as amended 2016. An objective is the target date on which exceedances of a standard must not exceed a specified number. The results of air quality modelling will be compared against these objectives.

Table 9.1 Summary of Objectives of the UK Air Quality Strategy

Pollutant	Objective	Measured as	To be Achieved by
Benzene (All Authorities)	16.25 µg/m ³	Running Annual Mean	31 December 2003
Benzene (Scotland and Northern Ireland Only)	3.25 µg/m ³	Running Annual Mean	31 December 2010
1,3 Butadiene	2.25 µg/m ³	Running Annual Mean	31 December 2003
Carbon Monoxide (Authorities in Scotland Only)	10.0 µg/m ³	Running 8-Hour Mean	31 December 2003
Lead	0.5 µg/m ³	Annual Mean	31 December 2004
	0.25 µg/m ³	Annual Mean	31 December 2008
Nitrogen Dioxide	200 µg/m ³ Not to be exceeded more than 18 times per year	1 Hour Mean	31 December 2005
	40 µg/m ³	Annual Mean	31 December 2005
Particles (PM ₁₀) (gravimetric) All authorities	50 µg/m ³ Not to be exceeded more than 35 times per year	24 Hour Mean	31 December 2004
	40 µg/m ³	Annual Mean	31 December 2004
Particles (PM ₁₀) (gravimetric) Scotland Only	50 µg/m ³ Not to be exceeded more than 7 times per year	24 Hour Mean	31 December 2010
	18 µg/m ³	Annual Mean	31 December 2010
Particles (PM _{2.5}) (gravimetric)* All authorities	25 µg/m ³ (target)	Annual Mean	2020
	15% cut in urban background exposure	Annual Mean	2010 – 2020
Particles (PM _{2.5}) (gravimetric) Scotland Only	10 µg/m ³ (Limit)	Annual Mean	2020
Sulphur Dioxide	350 µg/m ³ not to be exceeded more than 24 times a year	1-Hour Mean	31 December 2004

Pollutant	Objective	Measured as	To be Achieved by
	125 µg/m ³ not to be exceeded more than 3 times a year	24 Hour Mean	31 December 2004
	266 µg/m ³ not to be exceeded more than 35 times a year	15-Minute Mean	31 December 2005
PAH *	0.25 ng/m ³	Annual Mean	31 December 2010
Ozone *	100 µg/m ³	8 hourly running or hourly mean *	31 December 2005
* not currently assessed by Scottish Local Authorities			

Air Quality Guidance

- 9.2.10 Technical guidance Local Air Quality Management. Technical Guidance (LAQM.TG) 09 was issued on behalf of the Department of Environment, Food and Rural Affairs (DEFRA) in February 2009 (DEFRA, 2009a). A Policy Guidance (LAQM.PG09) was also issued at the same time (DEFRA, 2009a_b). This guidance is designed to guide local authorities through the Review & Assessment process and will also be adhered to for the purposes of the air quality assessment.
- 9.2.11 DEFRA and the Scottish Government updated LAQM Technical Guidance in 2016 Local Air Quality Management. Technical Guidance (LAQM.TG) 16 (The Scottish Government, 2016). The main change is in the approach with a greater emphasis on action planning to bring forward improvements in air quality and to include local measures as part of the EU reporting requirements. The reporting requirements for Local Authorities also changed with the adoption of an Annual Progress Report. Local Authorities continue to appraise pollutant concentrations of Nitrogen Dioxide (NO₂), Particulate Matter (PM₁₀) and Sulphur Dioxide (SO₂). Local authorities are also required to work towards reducing levels of PM_{2.5}.
- 9.2.12 The document “Land-Use Planning & Development Control: Planning for Air Quality” produced by Environmental Protection UK and the Institute of Air Quality Management (EPUK & IAQM, 2017) provides guidance on dealing with air quality issues within the development control process. The guidance provides an assessment approach to defining whether the impact on air quality associated with the proposed development should be of material concern. This methodology uses a predicted change in pollutant concentrations, taking into account the relevant air quality objectives, to assess the impacts of development proposals on air quality. It further states that the effects on the residents of a proposed development need to be assessed as significant if the air quality objectives at the façade are not met. Assessed effects can be reduced if provision is made to reduce the exposure to the pollutant being considered.

9.3 Methodology

Scope of Assessment

- 9.3.1 This ES chapter presents an assessment of likely significant effects on air quality from the proposed development (West Riverside and Woodbank House). The assessment presented in this ES chapter has been prepared in accordance with the 2011 EIA Regulations.
- 9.3.2 The primary long-term concern in relation to air quality is the emissions generated by traffic and the subsequent impact on the local ambient air quality at residential areas located within the vicinity of the main road network. The main pollutant concentrations of concern from this source are Nitrogen Dioxide (NO₂) and Particulate Matter (PM₁₀ and PM_{2.5}).

Overall Approach

- 9.3.3 In undertaking the assessment presented in this ES chapter, the following activities have been carried out:
- EIA screening and scoping (see below);
 - Desktop review of current and predicted future baseline environmental conditions at the site and surrounding area (**Section 9.4**);
 - Assessment of potential changes in air quality using dispersion modelling, as detailed in **Appendix 9.2 – Air Quality Assessment**; and
 - Identification and assessment of likely significant effects, taking into account proposed mitigation and enhancement measures and including consideration of likely cumulative effects (**Sections 9.6 – 9.10**).
- 9.3.4 The assessment has been informed by an EIA Screening and Scoping Report (PBA, April 2017) and subsequent EIA Screening and Scoping Opinions issued by LLTNPA (11th May 2017) in respect of the EIA for the proposed development. The EIA Scoping Opinion is provided in full in **Appendix 4.1**.

Study Area

- 9.3.5 The Study Area adopted for the assessment of potential air quality impacts focusses on the roads within the vicinity of the site that are most likely to be subjected to traffic increases as a result of the proposed development. Minor roads have been excluded from consideration due to the relatively low pollutant concentrations that they generally produce.

Information Sources

Desk Top Study

Data Sources

- 9.3.6 The following data sources were used within this assessment;
- 2017 Air Quality Annual Progress Report (APR) for West Dunbartonshire Council;
 - DEFRA background mapping data for local authorities;
 - Aerial photography of the site;
 - Traffic flow data for the roads surrounding the site; and
 - Weather data from Glasgow Bishopton weather station for the year 2016.

ADMS Dispersion Modelling

- 9.3.7 An ADMS-Roads dispersion model was built to underpin this assessment. This model is approved for use in detailed assessment dispersion modelling studies through technical guidance LAQM.TG16 (DEFRA, 2016). The model has been subject to extensive validation and inter-model comparison studies. The ADMS-Roads model provides a means of predicting pollutant emissions attributed to road traffic and can be used to assess the impact of road traffic increases and resultant pollution as a consequence of a development.
- 9.3.8 The location of sensitive receptors, as identified in **Section 9.4 – Baseline**, and details of the local road network system were inputted to the ADMS model using the GIS software ArcMap 10.5 on a digital OS tile of the surrounding area.
- 9.3.9 For local impact assessments, all roads which are expected to make a significant contribution to pollution at identified sensitive receptor locations should be included within the ADMS model. These road links are identified in **Section 9.4 – Baseline**. Traffic flow data for these road links was provided by Peter Brett Associates LLP (PBA) for input to the ADMS model, whilst PBA also undertook wider modelling and analysis to underpin the **West Riverside and Woodbank House Transport Assessment** and **Chapter 7 – Traffic and Transport** of this ES. For full details of the traffic data utilised in the model refer to **Appendix 9.2 - Air Quality Assessment**.

As no industrial sources are located within the Study Area, none were included within the ADMS model.

- 9.3.10 Additional input data to the ADMS model was confirmed through a validation process designed to result in a model which most closely represented conditions at the existing monitoring locations and therefore gave a conservative prediction of pollutant concentrations the assessed receptors would be exposed to. The following additional input data were therefore utilised in the model.
- 9.3.11 The chemical reaction scheme option within the ADMS model was utilised in the assessment so that the model took into account the photochemical reactions between NO, NO₂ and O₃.
- 9.3.12 As no background concentration for West Dunbartonshire could be obtained the model was run using the 2016 annual average O₃ concentration for Glasgow Waulkmillglen Reservoir (classed as rural). The respective value is 49µg/m³. A surface roughness length is used in the dispersion modelling study to characterise the land use of the surrounding area in terms of frictional effect that will occur due to the interaction of wind with the surface; this is a key component in the generation of atmospheric turbulence, which influences dispersion. A surface roughness length of 0.5 was used to characterise the proposed development site which is representative of Parkland, open suburbia. A surface roughness of 0.3 was used to characterise the meteorological site. This is representative of agricultural areas (max).
- 9.3.13 A minimum Monin-Obukhov length is used in the dispersion model to represent the effects of buoyancy on turbulent flows as a result of the surface temperature and mechanical mixing in the lower atmosphere. The minimum Monin-Obukhov length used for both the proposed development and dispersion sites was 10m which is considered representative of small towns <50,000 residents.
- 9.3.14 No improvement in emission factors was assumed for the 'future year' scenarios in order to provide a 'worst case' assessment scenario.
- 9.3.15 Both gridded and specified points output were selected in the model so that emissions could be displayed as both contour plots and as values at particular sensitive receptors in the surrounding area.
- 9.3.16 The annual average concentrations of NO₂, PM₁₀ and PM_{2.5} were modelled in this assessment.

Fieldwork

- 9.3.17 No fieldwork was undertaken as part of this assessment.

Approach to Assessment

Identification of Relevant Receptors

- 9.3.18 Receptors considered in this assessment comprise human receptors, that is locations where a person or property may experience adverse impacts of airborne dust or exposure to ambient pollution (i.e. residential, leisure use, amenity and sensitive commercial use) and ecological receptors where this refers to any sensitive habitat that may be affected by dust soiling or increased ambient pollution (e.g. locations with an international, national or local designation and sensitive habitat features).
- 9.3.19 The proposed development is likely to alter traffic movements on the road network in the vicinity of the site. Therefore, the sensitive receptor locations examined in this assessment were selected due to their proximity to the roads most likely to be subject to traffic increases as a result of the development. The roads included in the assessment are those expected to make a significant contribution to pollution at identified receptor locations. In practise, roads more than 200m away from any sensitive receptor can be excluded. Minor roads can also be excluded even when they are closer than 200m to sensitive receptors due to their relatively small pollutant contributions. As no industrial sources are present within the Study Area, no such sources were modelled.

Construction Phase Assessment Methodology

- 9.3.20 At the outset it was recognised that certain construction activities have potential to generate dust emissions, which could adversely affect amenity and the environment. This will be managed through the preparation of a dust management plan as part of a Construction

Environmental Management Plan (CEMP) which will be developed prior to the commencement of construction and thereafter implemented. The CEMP, including a dust management plan, will be submitted to and approved by Loch Lomond and the Trossachs National Park under a condition attached to any PPIP granted for the proposed development. The inclusion of a dust management plan detailing relevant dust suppression techniques within the CEMP is therefore treated as an embedded mitigation measure within this ES.

9.3.21 Construction impacts are considered to be temporary, with any dust emissions being managed through embedded mitigation and dust levels returning to baseline post construction. Impacts from the construction phase of the proposed development are therefore not considered further in this assessment.

Operational Phase Assessment Methodology

9.3.22 The ADMS modelling exercise outlined above considered the impact of the operational phase of the proposed development on existing and future residents in areas where traffic movements are predicted to alter. Therefore, the sensitive receptors considered in the ADMS model were selected due to their proximity to the roads most likely to be subject to traffic increases as a result of the proposed development.

9.3.23 The following scenarios were considered:

- 2016 Baseline;
- 2019 Baseline; and
- 2019 Baseline + Proposed Development.

9.3.24 In accordance with the impact assessment methodology advised within Land-Use Planning & Development Control: Planning for Air Quality (EPUK & IAQM, 2017), the magnitude of likely operational impacts on air quality under the above scenarios was determined by assessing the predicted change in a pollutant concentration at a sensitive receptor between a 'without development' scenario against the 'with development' scenario. The criteria shown in Table 9.2 will be used for assessment purposes.

Table 9.2 Impact Descriptors for Individual Sensitive Receptors

Long term average Concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	≤ 1	2 – 5	6 – 10	> 10
≤ 75% of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
102 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
≥ 110% of AQAL	Moderate	Substantial	Substantial	Substantial

Explanation

AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'.

The Table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as Negligible.

The Table is only designed to be used with annual mean concentrations.

Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.

When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme;' concentration for an increase.

The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

Assumptions and Limitations

- 9.3.25 This assessment is based on modelled air quality figures, validated against monitored data. It is considered to be a good representation of the likely impact of the development on air quality.

Establishment of Effect Significance

- 9.3.26 In line with the approach and criteria set out in **Chapter 4 – Assessment Methods** for establishing the significance of likely effects, likely impacts on air quality at Moderate or higher levels (as per Table 9.2) are deemed to be significant in the context of the EIA Regulations. Any likely impacts at Slight or Negligible levels are deemed to be not significant.

Approach to Cumulative Impact Assessment

- 9.3.27 The traffic data provided by PBA assumed no interim growth in traffic flows between the 2016 and 2019 scenarios, as agreed with Transport Scotland and West Dunbartonshire Council. Furthermore, the traffic data future year scenarios provided by PBA also include no flows attributed to identified cumulative developments. As these cumulative developments are not predicted to affect traffic flows, no consideration of associated cumulative impacts on air quality is considered to be required as there is no potential for likely significant cumulative effects to occur. Cumulative air quality effects have therefore been scoped out of this assessment.

9.4 Baseline Conditions

Sensitive Receptors

- 9.4.1 The sensitive receptors considered in this assessment and included in the ADMS model are listed in Table 9.3.

Table 9.3 Air Quality Sensitive Receptors

Sensitive Receptor I.D	Sensitive Receptor Description	Rationale for Inclusion in Assessment
1.	Site of proposed boutique hotel within the proposed development	Proposed visitor accommodation
2.	Site of proposed budget accommodation within the proposed development	Proposed visitor accommodation
3.	South Eastern corner of the Woodbank area of the proposed development	Proposed visitor accommodation
4.	Anchorage B&B	Existing residential in close proximity to road network

Sensitive Receptor I.D	Sensitive Receptor Description	Rationale for Inclusion in Assessment
5.	2 Clairinsh	Existing residential in close proximity to road network
6.	8 Drumkinnon Road	Existing residential in close proximity to road network
7.	Arbor Travel Lodge	Existing residential in close proximity to road network
8.	27 Laudervale Gardens	Existing residential in close proximity to road network
9.	28 Lomond Road	Existing residential in close proximity to road network
10.	Cameron Drive	Existing residential in close proximity to road network
11.	North Western corner of the Woodbank area of the proposed development	Proposed visitor accommodation

9.4.2 The location of each sensitive receptor relative to the site is shown in Figure 9.1 (Drawing No. 168655-007) provided in Appendix 9.1. These locations, along with details of the local road network system, were inputted to the air dispersion model using the GIS software ArcMap 10.5 on a digital OS tile of the surrounding area.

9.4.3 These sensitive receptors were selected for inclusion within the ADMS model due to their proximity to the roads most likely to be subject to traffic increases as a result of the proposed development. These road links are:

- A811;
- Old Luss Road;
- Ben Lomond Way;
- Balloch Road;
- Pier Road;
- A813 Carrochan Road;
- B857; and
- A82.

Background Air Quality

9.4.4 For NOX, PM10 and PM2.5 these background pollutant concentrations are split into contributions from various sectors and therefore background levels can be obtained and the risk of “double counting” concentrations can be avoided. Only minor roads were removed during the adjustment process. In order to assume a worst-case assessment scenario no improvement in background concentrations was assumed for the ‘future year’ scenarios.

9.4.5 The proposed development is located in OS 1 kilometre grid square 238500 681500. The background pollutant concentrations for this square are outlined in Table 9.4 below:

Table 9.4 Site Background Air Quality Concentrations

Year	Pollutant Concentration ($\mu\text{g}/\text{m}^3$)							
	NO ₂		NO _x		PM ₁₀		PM _{2.5}	
	Total	Adjusted	Total	Adjusted	Total	Adjusted	Total	Adjusted
2016	7.23	5.30	9.36	6.82	7.60	7.54	4.90	4.85

Monitored Pollutant Concentrations

- 9.4.6 The ADMS-Roads model is verified for the year 2016 against the diffusion tube detailed in Table 9.5 below.

Table 9.5 Air Quality Monitoring Location

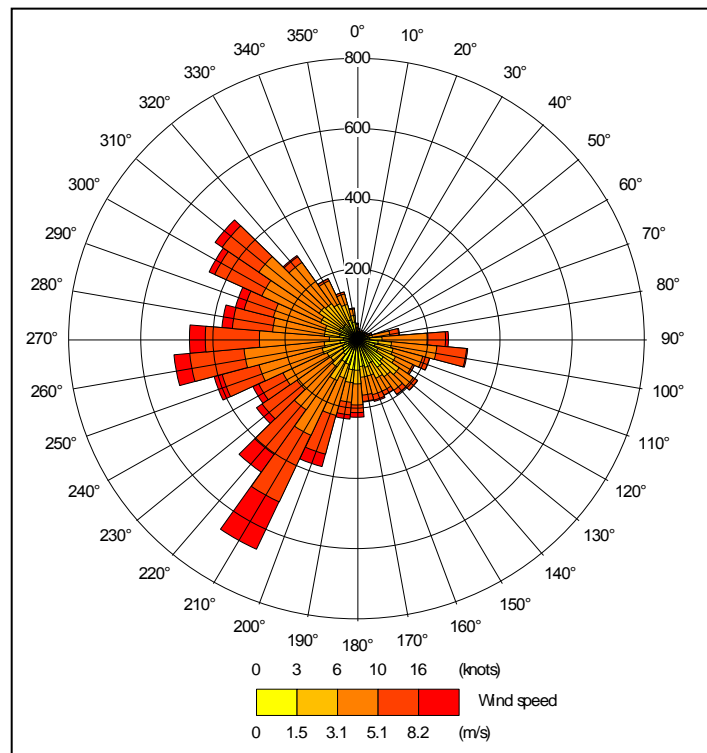
Site Name	Site Type	OS Grid Reference	Orientation to Site	NO ₂ 2016 Annual Mean Concentration ($\mu\text{g}/\text{m}^3$)
DT21 (Balloch 1)	Urban Traffic	238584 681562	South West	19.6

- 9.4.7 The annual average NO₂ concentration recorded at this location for 2016 was well within the objective level of 40 $\mu\text{g}/\text{m}^3$ for this parameter.

Weather Conditions

- 9.4.8 Meteorology data purchased from ADM Ltd specifically for use in ADMS-Roads was utilised in this assessment. The data was for the year 2016 and was obtained from the nearest meteorological weather station to the site recording a full suite of meteorological parameters, which is located at Glasgow Bishopton.
- 9.4.9 This weather station has an altitude of 59m and is located in a rural area approximately 11km south-east of the proposed development site. The data provided by the meteorological station was fully ratified and validated for the year 2016 and included all the meteorological parameters required by the model comprising hourly sequential recordings of:
- Surface Temperature;
 - Precipitation;
 - Wind speed;
 - Wind direction;
 - Relative humidity; and
 - Cloud cover.
- 9.4.10 The corresponding wind rose for this year is provided in Diagram 9.2. It indicates 3 prominent wind directions: 200-220°, 250-270°, and 300-310°. It also indicates the greatest percentage wind speed lies between 10-16 knots.

Diagram 9-2 Windrose for 2016 from Bishopton Weather Station



Summary of Receptor Sensitivity

- 9.4.11 The receptors included within the assessment are representative of current or future residential and therefore are considered to have high sensitivity to potential air quality impacts.

9.5 Baseline Evolution

- 9.5.1 In the absence of the proposed development the baseline conditions would likely be consistent with existing conditions.

9.6 Embedded Mitigation

- 9.6.1 As detailed in **Chapter 3 – The Proposed Development**, a number of design features and embedded mitigation measures have been incorporated into the design and construction of the proposed development to avoid, prevent or minimise significant adverse environmental effects and to enhance beneficial effects. Embedded mitigation measures of relevance to this assessment are:

Construction Phase

- Development, approval and implementation of a dust management plan as part of a Construction Environmental Management Plan.

Operational Phase

- Development, approval and implementation of a Travel Plan.

9.7 Potential Effects

Construction Phase

- 9.7.1 Construction phase dust effects will be managed through a dust management plan to be approved as part of a CEMP for the proposed development. This would prevent likely significant construction dust effects from arising. No further assessment of construction phase effects is therefore required.

Operational Phase

- 9.7.2 The proposed development is likely to alter traffic movements on the road network in the surrounding area. The primary long-term concern in relation to air quality is the emissions generated by traffic and the subsequent impact on the local ambient air quality at residential areas located within the vicinity of the main road network. The main pollutant concentrations of concern from this source are Nitrogen Dioxide (NO₂) and Particulate Matter (PM₁₀ and PM_{2.5}).

Impact Assessment

- 9.7.3 The predicted pollutant concentrations of the 2019 scenarios were assessed against the criteria provided in Table 9.2 of this document. Full model output results can be found in the **Appendix 9.2 - AQA Technical Report**.

NO₂ Assessment

- 9.7.4 The percentage of the objective level and the impact descriptors for the predicted NO₂ concentrations as a result of the proposed development for each sensitive receptor are provided in Table 9.6 below. The resulting level of impact at each sensitive receptor has been calculated using the methodology detailed in Table 9.2.

Table 9.6 NO₂ Percentage of Objective Level & Impact Magnitude

ID	Receptor Description	2019 Baseline (% of objective)	2019 Baseline + Development (% of objective)	Difference (% of objective)	Impact Magnitude
SR1	Site of proposed boutique hotel	15	15	0	Negligible
SR2	Site of proposed budget accommodation	18	19	1	Negligible
SR3	South Eastern corner of Woodbank site	17	18	1	Negligible
SR4	Anchorage B&B	26	27	1	Negligible
SR5	2 Clairinsh	22	23	1	Negligible
SR6	8 Drumkinnon Road	27	29	2	Negligible
SR7	Arbor Travel Lodge	24	26	2	Negligible
SR8	27 Laudervale Gardens	40	41	1	Negligible
SR9	28 Lomond Road	26	27	1	Negligible
SR10	Cameron Drive	30	31	1	Negligible
SR11	North Western corner of Woodbank site	25	25	0	Negligible
DT21	Diffusion Tube – Balloch 1	53	55	2	Negligible

9.7.5 The assessment concludes that in relation to NO₂ the impact of the development is considered to be **Negligible** for all of the assessed sensitive receptors.

PM₁₀ Assessment

9.7.6 The percentage of the objective level and the impact descriptors for the predicted PM₁₀ concentrations as a result of the development for each sensitive receptor are provided in Table 9.7 below.

Table 9.7 PM₁₀ Percentage Objective Level & Impact Magnitude

ID	Receptor Description	2019 Baseline (% of objective)	2019 Baseline +Development (% of objective)	Difference (% of objective)	Impact Magnitude
SR1	Site of proposed boutique hotel	42	42	0	Negligible
SR2	Site of proposed budget accommodation	44	44	0	Negligible
SR3	South Eastern corner of Woodbank site	43	43	0	Negligible
SR4	Anchorage B&B	46	46	0	Negligible
SR5	2 Clairinsh	45	45	0	Negligible
SR6	8 Drumkinnon Road	47	47	0	Negligible
SR7	Arbor Travel Lodge	46	46	0	Negligible
SR8	27 Laudervale Gardens	51	52	1	Negligible
SR9	28 Lomond Road	46	47	1	Negligible
SR10	Cameron Drive	48	48	0	Negligible
SR11	North Western corner of Woodbank site	46	47	1	Negligible
DT21	Diffusion Tube – Balloch 1	56	58	2	Negligible

9.7.7 The assessment concludes that in relation to PM₁₀ the impact of the proposed development is considered to be **Negligible** for all of the assessed sensitive receptors.

PM_{2.5} Assessment

9.7.8 The percentage of the objective level and the impact descriptors for the predicted PM_{2.5} concentrations as a result of the development for each sensitive receptor are provided in Table 9.8 below. The resulting level of impact at each sensitive receptor has been calculated using the methodology detailed in Table 9.2.

Table 9.8 PM_{2.5} Percentage of Objective Level & Impact Magnitude

ID	Receptor Description	2019 Baseline (% of Objective)	2019 Baseline + Development (% of Objective)	Difference (% of Objective)	Impact Magnitude
SR1	Site of proposed boutique hotel	49	49	0	Negligible
SR2	Site of proposed budget accommodation	50	51	1	Negligible
SR3	South Eastern corner of Woodbank site	50	50	0	Negligible
SR4	Anchorage B&B	53	53	0	Negligible
SR5	2 Clairinsh	52	52	0	Negligible
SR6	8 Drumkinnon Road	54	54	0	Negligible
SR7	Arbor Travel Lodge	53	53	0	Negligible
SR8	27 Laudervale Gardens	59	59	0	Negligible
SR9	28 Lomond Road	53	54	1	Negligible
SR10	Cameron Drive	55	55	0	Negligible
SR11	North Western corner of Woodbank site	53	54	1	Negligible
DT21	Diffusion Tube – Balloch 1	64	65	1	Negligible

9.7.9 The assessment concludes that in relation to PM_{2.5}, the impact of the proposed development is considered to be **Negligible** for all of the assessed sensitive receptors.

9.8 Further Mitigation and Enhancement

9.8.1 Taking account of proposed embedded mitigation measures, the assessment provided in **Section 9.7** predicts that no significant effects on air quality are considered likely. No further mitigation, compensation or enhancement measures are therefore required or proposed.

9.9 Residual Effects

9.9.1 The assessment provided in this chapter has concluded that:

- Significant construction phase dust effects are not likely owing to the proposed development, approval and implementation of a dust management plan within a CEMP for the proposed development; and
- No significant changes in NO₂, PM₁₀ or PM_{2.5} levels at all assessed sensitive receptors are likely, with the impact magnitude for all sensitive receptors categorised as Negligible.

9.9.2 The overall impact of the proposed development on air quality in the study area can therefore be concluded as not significant.

9.10 Monitoring of Residual Effects

9.10.1 As no residual significant adverse effects on air quality are predicted, no monitoring of residual effects is proposed or considered to be required.

9.11 Summary

9.11.1 An air quality assessment was undertaken using an ADMS-Roads air quality model to investigate if there was potential for traffic emissions to impact future residents on site as well as existing residents in the vicinity of the site.

9.11.2 The model predicts no significant change in NO₂, PM₁₀ or PM_{2.5} at all receptors on comparison of the 'with and without' development scenarios, with the impact magnitude for all sensitive receptors categorised as Negligible.

9.11.3 The overall impact of the proposed development on air quality in the study area can therefore be concluded as not significant.

9.11.4 With reference to the Generic Significance Criteria the level of **effect of the proposed development in terms of air quality can therefore be categorised as 'Negligible or No Effect'**.

9.12 References

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- DEFRA (2011). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 2). Norwich: Department for Environment, Food and Rural Affairs.
- DEFRA (2016). Local Air Quality Management - Technical Guidance (TG16). London: DEFRA.
- Department For Transport (2017, May). Traffic distribution on all roads by time of day in Great Britain, annual from 2006. Department For Transport. Retrieved from <https://www.gov.uk/government/collections/road-traffic-statistics>
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10 Water, Hydrology and Flood Risk

10.1 Introduction

10.1.1 This ES chapter provides an assessment of the likely significant effects on water, hydrology and flood risk. This assessment covers a range of components including, surface water and fluvial hydrology, water quality, drainage, groundwater, water supplies and wetlands. The assessment is based on the characteristics of the site and surrounding area and the key parameters of the proposed development detailed in **Chapter 2 – Site and Surrounding Area** and **Chapter 3 – The Proposed Development** respectively. This chapter has been prepared by EnviroCentre Ltd.

10.1.2 The aims of this chapter are to:

- Identify the relevant context in which the hydrological and flood risk assessment has been undertaken;
- Describe the methods used to undertake the assessment;
- Outline the relevant baseline conditions currently existing at the site and surroundings;
- Identify the potential direct and indirect effects of the proposed development on the water environment;
- Identify mitigation and enhancement measures where required to address identified effects;
- Assess residual predicted effects; and
- Assess cumulative effects on the water environment from the proposed development in combination with other relevant cumulative developments.

10.1.3 This ES chapter is supported by the following technical reports provided in **Appendices 10.1 - 10.3**:

- Appendix 10.1 – Figures;
- Appendix 10.2 – Flood Risk Assessment; and
- Appendix 10.3 – Drainage Strategy.

10.2 Legislative and Policy Context

Legislation

10.2.1 The overarching legislative framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Subject specific legislation of relevance to this assessment is:

- Water Environment and Water Services (Scotland) Act 2003 (WEWS Act);
- Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR);
- Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2013;
- Flood Risk Management (Scotland) Act 2009;
- Water Environment (Oil Storage) (Scotland) Regulations 2006;
- Water Environment (Groundwater and Priority Substances) (Scotland) Regulations 2009; and
- The Private Water Supplies (Scotland) Regulations 2006.

10.2.2 All activities with potential to impact on the water environment require to be authorised under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR). The level of authorisation required is dependent on the anticipated environmental risk posed by the activity to be carried out. Liaison with SEPA operations team will be undertaken at an early stage to

further confirm this. These activities could include construction drainage, dewatering, storage of oil and the three watercourse crossings.

- 10.2.3 Revised levels of authorisation, including amendments to the General Binding Rules (GBR), came into effect on January 1st 2018. These include the need for CAR authorisation for drainage of construction sites over four hectares in size, as well as a change to the size of development that will require authorisation for the permanent surface water drainage. The below summarises the requirements of these regulations.
- 10.2.4 For the construction SuDS associated with a site of this size, a complex CAR licence will be required, as detailed in the CAR Practical Guide (SEPA, 2018).

Policy

- 10.2.5 The planning policy framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Planning policy considerations (including policies and guidance) of specific relevance to this assessment are:
- Adopted **Loch Lomond and the Trossachs National Park (LLTNP) Local Development Plan (LDP) (2016)** including relevant policies outlined in Table 5.1, in particular:
 - Overarching Policy 1 – Strategic Principles;
 - Overarching Policy 2 - Development Requirements;
 - Natural Environment Policy 11 – Protecting the Water Environment; and
 - Natural Environment Policy 12 - Surface Water and Waste Water Management.
 - Natural Environment Policy 13 – Flood Risk. **Draft LLTP Partnership Plan 2018 – 2023**, in particular outcomes 1-3 and 5-9;
 - **National Planning Framework 3 (NPF3) (2014)**;
 - **Scottish Planning Policy (SPP) (2014)** including relevant provisions outlined in Table 5.2, in particular:
 - Principal Policy on Sustainability (paragraphs 24-35);
 - Valuing the Natural Environment Subject Policy (Paragraphs 193 - 233); and
 - Managing Flood Risk & Drainage Subject Policy (Paragraphs 254-268).
 - SEPA's Development Management Guidance: Flood Risk (2017);
 - Scottish Government Online Planning Advice regarding Flood Risk (2015);
 - PAN 61 Planning and Sustainable Urban Drainage Systems (July 2001); and
 - PAN 79 Water and Drainage (September 2006).
- 10.2.6 Other policy considerations of relevance to this assessment are:
- The River Basin Management Plan for the Scotland River Basin District: 2015–2027 (Scottish Government, 2014).

Guidance and Relevant Technical Standards

- 10.2.7 The following subject specific guidance and technical standards have informed this assessment:
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended): A Practical Guide (SEPA);
 - Masters-Williams, H., Heap, A., Kitts, H., Greenshaw, L., Davis, S., Fisher, P., Owens, D. (2001). Control of water pollution from construction sites. Guidance for consultants and contractors (C532). London: CIRIA;
 - SEPA (2006) Guidelines for Water Pollution Prevention from Civil Engineering Contracts;
 - SEPA (Various). Guidance for Pollution Prevention including PPG 1, 3, and 6 and GPP2, 5 and 21;

- SEPA (2009). Engineering in the water environment good practice guide; Temporary construction methods;
- SEPA (2014). Land Use Planning System SEPA Guidance Note 31; Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems;
- SEPA (2015). Technical flood risk guidance for stakeholders;
- SEPA (2016). Supporting Guidance; General binding rules for surface water drainage systems (No. WAT-SG-12);
- SEPA (2016). Regulatory method; Sustainable Urban Drainage Systems (SuDS or SuD Systems) (No.WAT-RM-08);
- SEPA (2010). Good Practice Guide – River Crossings (No. WAT-SG-25);
- SNH (2013). Environmental Assessment Handbook; and
- Woods Ballard, B. (2015). The SUDS Manual: CIRIA.

10.3 Methodology

Scope of Assessment

- 10.3.1 This ES chapter presents an assessment of likely significant effects on the water environment from the proposed development. The assessment presented in this ES chapter has been prepared in accordance with the 2011 EIA Regulations.
- 10.3.2 The principal aspects considered within this assessment include flood risk, surface water drainage, pollution prevention and environmental management, engineering activities in the water environment, existing groundwater abstractions, water abstractions and disruption to wetlands.

Overall Approach

- 10.3.3 In undertaking the assessment presented in this ES Chapter, the following activities have been carried out:
- EIA screening and scoping (see below);
 - Desk based review of available information, including previous studies, topographic, flood and geological maps, identification of local water receptors, surface water drainage and wetlands including potential groundwater dependent terrestrial ecosystems (GWDTEs);
 - A walkover survey of the site;
 - Evaluation of baseline water environment conditions (Section 10.4);
 - Development of a drainage strategy for the proposed development, which is presented as Appendix 10.3; and
 - Identification and assessment of likely significant effects, taking into account proposed mitigation and enhancement measures and including consideration of likely cumulative effects (Sections 10.6 – 10.10).
- 10.3.4 The assessment has been informed by an EIA Screening and Scoping Report (PBA, April 2017) and subsequent EIA Screening and Scoping Opinions issued by LLTNPA (11th May 2017) in respect of the EIA for the proposed development. The EIA Scoping Opinion is provided in full in **Appendix 4.1**. Subsequent meetings and discussions with SEPA and West Dunbartonshire Council have taken place to inform the design of the proposed development and the scope of this assessment. Table 10.1 below provides a summary of relevant consultee responses from the EIA Scoping Opinion and other discussions.

Table 10.1 Summary of Consultation Responses

Consultee	Comment	How and where addressed
SEPA	<p>SEPA stated within the formal Scoping Opinion that the assessment should cover the following:</p> <ul style="list-style-type: none"> • Flood risk; • Waste water drainage; • Surface water drainage; • Pollution prevention and environmental management; • Engineering activities in the water environment; • Existing groundwater abstractions; • Water abstractions; and • Disruption to wetlands. 	<p>These are addressed within of this chapter. Further detail is provided within Appendix 10.2: Flood Risk Assessment and surface and waste water drainage covered under Appendix 10.3: Drainage Assessment.</p>
SEPA	<p>SEPA advised that they have no record of CAR authorisations for any abstractions within the site, and no records of private water supplies were held.</p>	<p>Noted under Section 10.4 - Baseline Conditions.</p>
SEPA	<p>Between July 2017 and January 2018 a number of meetings have been held with SEPA, along with email correspondence, with respect to the potential flood risk on site. SEPA hydrometry experts had flagged concerns with the flow data used within the flood study and Flood Risk Assessment due to poor recording at the gauging station on the River Leven. This raised questions as to the accuracy of the peak flood levels identified in the Flood Risk Assessment.</p>	<p>In order to provide more confidence in the flow data used within the study, and the subsequent design flood levels, additional hydrological analysis was undertaken. This additional work calculated flow rates using a number of methods to verify the existing available data and indicated that the outputs from the Flood Risk Assessments would be representative of the extreme flooding scenarios. This was issued to SEPA for review and initial consultation indicated that this was acceptable to them. The additional hydrological analysis and subsequent correspondence is appended to Appendix 10.2: Flood Risk Assessment.</p>
West Dunbartonshire Council	<p>Environmental health department advised that they have no private water supplies within the development site.</p>	<p>Noted under Section 10.4 - Baseline Conditions.</p>

Study Area

- 10.3.5 The study area for the assessment of potential effects on the water environment is generally consistent with the site boundary, as shown in **Figure 2.1 – Site Location Plan**. The wider catchment area have also been considered where appropriate, for example the potential effect of the proposed development on downstream flood risk has been assessed.
- 10.3.6 The wider hydrological catchments include the upstream catchment of the River Leven, which encompasses Loch Lomond, as well as downstream along the River Leven through Balloch and Alexandria.

Information Sources

Desk Top Study

- 10.3.7 The following data sources were used within the assessment:
- Ordnance Survey (OS) 1:10,000 & 1:25,000 digital mapping;
 - Topographical survey of the Proposed Development site;
 - British Geological Survey (BGS) 1:50,000 digital map data;
 - British Geological Survey (BGS) User Guide: Aquifer Productivity (Scotland) GIS datasets, Version 2;
 - Digital soil maps published by the Scottish Government and James Hutton Institute;
 - Aerial photography of the site;
 - Catchment extents and characteristics from the Flood Estimation Handbook (FEH) website (CEH, 2017);
 - The online SEPA River Basin Management Plan Interactive Map and Flood Map;
 - River Leven Flood Study undertaken by Jacobs in 2001, along with the updates to the study in 2003 and 2009; and
 - Annual Maximum (AMax) flow data from SEPA for the Linnbrane gauging station on the River Leven, covering the period 1963-2015.

Fieldwork

- 10.3.8 A site walkover for the flood risk assessment was undertaken on 3rd March 2017. The weather on the day was sunny and fine, and there had been little precipitation in the days prior to the site visit. A photographic record of this site walkover is presented in **Appendix 10.2: Flood Risk Assessment**.
- 10.3.9 This walkover covered the whole of the development site, and included inspection of existing watercourses and water features on site, detailing their condition and any likely flood mechanisms.

Approach to Assessment

Identification of Relevant Receptors

- 10.3.10 Based on the information sources outlined above, the current baseline characteristics of the water environment at site and the surrounding area was characterised. This led to the identification of relevant sensitive receptors to consider within the assessment. Receptor sensitivity is defined based on the capacity of the receptor to accommodate change without fundamentally altering its character. The definitions provided in Table 10.2 take into account the quality of the receptor, its purpose and the potential for substitution or replacement.

Impact Assessment Methodology

- 10.3.11 Table 10.3 sets out the criteria for assessing the likely magnitude of the change due to the proposed development upon identified sensitive receptors.

Table 10.2 Criteria for Assessing Receptor Sensitivity

Receptor Sensitivity	Description
Low	<p>Receptors with a high capacity to accommodate change, low value or poor condition and no significant uses, for example:</p> <ul style="list-style-type: none"> • Receptor is not an internationally, nationally or locally designated site; • Not classified as a surface water body for the River Basin Management Plan; • No sensitive flood risk receptors downstream; • Surface water body not significant in terms of fish spawning and no other sensitive aquatic ecological receptors e.g. freshwater pearl mussels; • Surface water body not used for abstraction; • Surface water body not used for recreation directly related to water quality e.g. angling, swimming, and watersports; • Aquifer with no identified abstractions; and • GWDTEs with low to moderate dependency on groundwater (as defined by the site-specific conceptual model).
Medium	<p>Receptors with a moderate capacity to accommodate change, medium value or condition and limited use, for example:</p> <ul style="list-style-type: none"> • Receptor is not an internationally or nationally designated site. May be a locally designated site; • Salmonid species may be present and surface water body may be locally important for spawning. No other sensitive aquatic ecological receptors e.g. freshwater pearl mussels; • Surface water body used for private water supply or medium scale industrial/ agricultural abstractions; • Surface water body used for occasional or local recreation e.g. local angling clubs; • Groundwater body supports identified private water supplies or medium scale industrial/ agricultural abstractions; • GWDTEs with moderate to high dependency on groundwater (as defined by the site-specific conceptual model); and • Carbon-rich soils which have been affected by historic or current land management practices.
High	<p>Receptors with a low capacity to accommodate change, high value or condition and significant use, for example:</p> <ul style="list-style-type: none"> • Receptor is an internationally or nationally designated site. • Surface water body supports sensitive aquatic ecological receptors e.g. freshwater pearl mussels; • Surface water body used for public water supply or large scale industrial/ agricultural abstractions; • Surface water body important for recreation directly related to water quality e.g. swimming, watersports, angling; • Groundwater body supports public water supply or large scale industrial/ agricultural abstractions; • GWDTEs which form a qualifying feature, or part thereof, for an internationally or nationally designated site; and • Carbon-rich soils which form part of intact, active blanket bog in good condition.

Table 10.3 Criteria for Assessing Magnitude of Change

Magnitude of Change	Definition
Negligible	Very light changes from baseline (pre-development) conditions. Change barely distinguishable, approximating to the “no change” situation.
Low	Minor shift away from baseline (pre-development) conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of the baseline condition will be similar to pre-development circumstances/patterns.
Medium	Loss or alteration to one or more key elements/features of the Baseline (pre-development) conditions such that post-development character/composition/attributes of baseline will be partially changed.
High	Total loss or major alteration to key elements/features of the baseline (pre-development) conditions such that post-development character/composition/attributes will be fundamentally changed.

Establishment of Effect Level and Significance

- 10.3.12 The criteria set out in Table 10.2 and Table 10.3 have been used to develop a simple table to assess the significance of likely effects of the proposed development on the water environment, as shown in Table 10.4 below.
- 10.3.13 This methodology is derived from the SNH Environmental Assessment Handbook (SNH, 2013). The assessment of likely effects also takes into consideration the probability of the effect occurring (certain, likely, possible or unlikely) and the duration of the effect (short (less than 2 years), medium (2 – 5 years) or long term) (more than 5 years). Residual effects (direct and indirect) at levels of Moderate to Major as identified in Table 10.4 are considered to be significant in terms of the EIA Regulations.

Table 10.4 Criteria for Assessing Significance of Effects

Sensitivity of Receptor	Magnitude of Change	Predicted Significance of Effect
High	High	Major
High	Medium	
Medium	High	
High	Low	Moderate
Low	High	
Medium	Medium	
Medium	Low	Minor
Low	Medium	

Sensitivity of Receptor	Magnitude of Change	Predicted Significance of Effect
Low	Low	
High, Medium or Low	Negligible	Negligible

Approach to Cumulative Impact Assessment

10.3.14 Cumulative effects on the water environment could occur where more than one development is proposed within a catchment, and **Chapter 3 – The Proposed Development** identified the relevant cumulative developments within the area. This included:

- Replacement building and infrastructure for Sweeney’s Cruises;
- Drumkinnon Bay dredging;
- Woodbank Inn Hotel Extension; and
- Balloch Street Design Project.

10.3.15 A cumulative impact assessment for effects impacting the water environment has been undertaken and is included in Section 10.10.

10.3.16 This assesses whether any of the above developments will have an impact upon the proposed development in terms of the water environment, both independently and cumulatively.

10.4 Baseline Conditions

The Site

10.4.1 The site comprises two distinct but contiguous areas of land at West Riverside, adjacent to the River Leven, and Woodbank House, located between Old Luss Road and the A82.

10.4.2 The West Riverside area of the site is bounded to the north by the Loch Lomond Shores complex and Loch Lomond itself, to the west by a minor unnamed road and a landowner boundary, to the east by the River Leven and to the south by Balloch Road, the Balloch Road housing estate and Old Luss Road. The site is an irregular shape and effectively surrounds the Balloch Road housing estate on three sides. The site mainly comprises wooded areas (including Drumkinnon Wood) with recreational parkland and footpaths. Pier Road runs from south to north through the site. A beach area (Loch Lomond shore) is present in the north-west. The shoreline is used for mooring boats and pontoons are present in the water for this purpose.

10.4.3 The Woodbank House area of the site currently comprises two relatively flat grassy fields in its eastern area which are bisected by an access track running from east to west. The track leads to an area of mixed woodland in the western area which has a more varied topography with levels generally rising to the west and becoming particularly steep in the north-west. Within the woodland are the remnants of Woodbank House, outbuildings and a walled garden. The buildings are in a state of advanced disrepair as a result of a fire (at the main hotel building) and subsequent dereliction.

Topography and Land Use

10.4.4 The general topography of the site falls from the west down to the east towards Loch Lomond and the River Leven. In the west of the site surrounding Woodbank House and adjacent to the A82, the ground is at a maximum elevation of approximately 45m AOD. From here the ground slopes down relatively steeply towards Old Luss Road, beyond which the ground levels off and undulates at 15-19m AOD. Adjacent to the shores of the Loch, the ground level is approximately 7.5m AOD.

10.4.5 Within Drumkinnon Wood the ground levels undulate significantly, but in general slope from the west to the east towards Pier Road, from a level of approximately 16 mAOD down to approximately 12 mAOD.

- 10.4.6 The site currently consists of a range of different uses including leisure and recreation (water sports) along the shores of the loch, several areas of car parking which serve the public slipways as well as the neighbouring Loch Lomond Shores development, areas of woodland through Drumkinnon Woods and open parkland along the banks of the River Leven.
- 10.4.7 A tourist information and visitor centre is located at the south eastern point of the site, opposite Balloch train station and Sweeney's Cruises.

Surface Water Hydrology

- 10.4.8 There are four watercourses which have been identified as flowing through the site. The major watercourse is the River Leven which flows to the east of the site. To the west of the site there are two smaller unnamed watercourses which are described in more detail below. A fourth smaller watercourse is marked upon the Ordnance Survey mapping within the wooded area at Woodbank House. A plan showing the location of these watercourses is presented as **Figure 10.1** in **Appendix 10.1 – Figures**. Additional details including photographs from the site walkover are included in **Appendix 10.2 - Flood Risk Assessment**.

River Leven

- 10.4.9 The River Leven flows to the east of the site in a southerly direction. It rises at the outflow from Loch Lomond to the north of the development site, and routes south through the towns of Balloch and Alexandria to outfall into the River Clyde at Dumbarton. The river is approximately 11.5km long and has tidal influence for approximately 5km upstream from its confluence with the River Clyde.
- 10.4.10 Adjacent to the site, the river is approximately 85-90m wide and contains a number of floating pontoons for mooring boats. Approximately 550m downstream of the Balloch Station area of the site, the River Leven Barrage is located. This is operated by Scottish Water and controls the outflow from the loch limiting the discharge and maintains water levels within Loch Lomond between 7 and 7.6m Above Ordnance Datum (AOD). However, it is not formally operated as a flood prevention structure.
- 10.4.11 Scotland's River Basin Management Plan (RBMP)(Scottish Government, 2014) classified the River Leven in 2016 as a heavily modified water body on account of physical alterations that cannot be addressed without a significant impact from an increased risk of subsidence or flooding. As such this has been classified as having Moderate ecological potential.

Loch Lomond

- 10.4.12 Loch Lomond is located to the north of the site and has a surface area of approximately 71 km². Areas within and adjacent to the water body are designated Special Protection Areas (SPA), Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Ramsar Sites and National Nature Reserves. The loch is located wholly within the Loch Lomond and The Trossachs National Park and is used extensively for recreational use.
- 10.4.13 The RBMP classified Loch Lomond (south, ID:100257) as having a Moderate overall status in 2016.

Unnamed Watercourse 1

- 10.4.14 The Unnamed Watercourse 1 rises in the hills to the west of the A82. The burn flows in an easterly direction along the north-western boundary and passes beneath Old Luss Road before routing north of the existing car park and Loch Lomond Shores development. It outfalls into Loch Lomond at the end of a small headland in the bay north of the site.

Unnamed Watercourse 2

- 10.4.15 Unnamed Watercourse 2 also rises in the hills to the west of the site and the A82, and routes in an easterly direction towards Drumkinnon Farm. The burn flows through a small caravan park to the south of the site and below Lower Stonemollan Road before routing along the boundary of the Woodbank House area of the site. The burn then passes below Old Luss Road and routes north towards the car park of the Loch Lomond Shores complex. The burn routes through a number of culverts as it passes beneath access roads and flows through an open channel through the car park area.
- 10.4.16 Downstream of the car park the burn routes to the east and flows parallel with unnamed watercourse 1 towards Loch Lomond where it outfalls adjacent to the aerial adventure course.

Unnamed Watercourse 3

10.4.17 Within the Woodbank House area of the site a small watercourse is shown on plan routing in an easterly direction before it sinks, with no downstream route marked on the maps. During the site walkover there was water present within the channel however there was very little flow. The channel appeared to route into a culvert structure, but it is not known where this routes to or if it discharges into the unnamed watercourse 1. There were no visible signs of a culvert downstream across this area of the site. During the site walkover for ecological surveys, as noted in **Chapter 6 - Ecology**, it was noted that there were no flows within this channel, indicating that flows within this channel may be intermittent and dependent upon runoff.

Geology & Hydrogeology

Bedrock Geology

10.4.18 The British Geological Survey's (BGS) geological data (BGS, n.d.-a) (1:50,000 scale) indicates that the site is underlain by Teith Sandstone Formation. No fault lines are present within the site.

Drift Deposits

10.4.19 The BGS (BGS, n.d.-b) data indicates that the superficial deposits are predominantly formed of Glaciofluvial Deposits - Gravel, Sand and Silt, which cover the southern and western parts of the site. To the north and surrounding the shore of Loch Lomond the superficial deposits consist of Raised Marine Deposits of Holocene Age - Clay, Silt, Sand and Gravel.

Soils

10.4.20 Soil survey of Scotland 1:25,000 scale mapping (Soil Survey of Scotland Staff, n.d.) shows the site to be underlain by brown soils which have been stated to have parent materials of fluvioglacial sands and gravels derived from acid schists and Lower Old Red Sandstone sediments and lavas.

Hydrogeology

10.4.21 The Hydrogeological Map of Scotland (BGS, n.d.-c) shows that the site is underlain by the Strathmore Group, a moderate to highly productive aquifer with intergranular/fracture flow.

10.4.22 The Hydrogeological Maps highlight that superficial deposits classified as glaciofluvial are associated with high productivity intergranular flow, and raised marine deposits would be classified under low to moderate productivity with intergranular flow in the region of 0.1-10l/s.

10.4.23 The aquifer vulnerability is classed as 4a in the Groundwater Vulnerability dataset (Ó Dochartaigh, Doce, Rutter & MacDonald, 2011). Class 4a is groundwater which is described as being 'vulnerable to those pollutants not readily absorbed or transformed, and may have low permeability soil and less likely to have clay present in superficial deposits.'

10.4.24 Under the RBMP the development site is located within the *Loch Lomond and Leven Sand and Gravel (ID:150766)* and *Balloch (ID:150651)* groundwater bodies, both of which have overall classifications of Good.

Flood Risk

10.4.25 In line with the SPP (2014) at paragraphs 254-268 and the recommendations of SEPA and West Dunbartonshire Council in relation to the proposed development, a comprehensive site-specific flood risk assessment (FRA) was undertaken to assess the risks associated with all potential flood sources. The FRA is included as **Appendix 10.2** and the key findings in relation to flood risk under existing site conditions are described here.

10.4.26 A flood study of the River Leven was first undertaken in 2001 and then updated in 2003. This assessed the flood risk along the length of the River Leven, from Loch Lomond through to Dumbarton in the south. In 2009 the hydraulic model was updated to include more recent hydrological analysis as well as calibration of the model using the December 2006 flood event. The FRA undertaken for this proposed development included additional hydrological analyses to verify the flow rates and flood levels output from the original flood study, and to provide a level of confidence in the results. This is presented in **Appendix 10.2 - Flood Risk Assessment**.

10.4.27 The FRA concluded that the areas in the northeast of the site adjacent to the head of the River Leven and Loch Lomond would be at risk of fluvial flooding during the 0.5% Annual Exceedance Probability (AEP) event, and the area surrounding the existing tourist information centre is located immediately adjacent to the 0.5% AEP flood extents. The flood extents plans showing the maximum flood levels for the 0.5% AEP + climate change and the 0.2% AEP events is presented in Figure 10.2.

Water Supplies

10.4.28 Information supplied by SEPA and West Dunbartonshire Council confirmed that there are no private water supplies or CAR licensed abstractions within the site.

10.4.29 SEPA confirmed that there are no abstractions from the River Leven, and no groundwater abstractions within 1km.

Wetlands

10.4.30 Wetlands which are potential GWDTEs have been identified based on the ecological surveys covered in **Chapter 6 - Ecology**.

10.4.31 A small area of marshy grassland in the south of the Woodbank House area of the site has been listed as a wetland type classed under the Functional Wetland Typology for Scotland as 2A Marshy Grassland. This habitat is also a potential GWDTE and is identified as likely to be NVC type MG10 - *Holcus lanatus*–*Juncus effusus* rush pasture. This is listed under SEPA guidance (SEPA, 2014) as moderately groundwater dependent depending on the hydrogeological setting. Whilst a National Vegetation Classification (NVC) survey has yet to be undertaken for the site, for the purposes of this assessment it is assumed that this area of marshy grassland is a GWDTE habitat.

10.4.32 This area is located at the top of a slope and it is not located at a low spot or depression within the ground where ponding or standing water may occur. Based upon the topographic setting and hydrogeological information presented in paragraph 10.4.18124, it is considered that this area would have Moderate dependency on groundwater.

Summary of Receptor Sensitivity

10.4.33 The sensitivity of identified water environment receptors to be considered in this assessment is detailed in Table 10.5 below.

Table 10.5 Receptor Sensitivity

Receptor	Sensitivity	Rationale
Loch Lomond	High	International and national designations within and adjacent to the Loch. Used extensively for recreation.
Watercourses: River Leven and three unnamed watercourses	Medium	River Leven used for boating recreation and classified as Moderate Ecological Potential. Smaller watercourses not identified on RBMP.
Groundwater - Bedrock	Low	Bedrock: Moderate productivity aquifer with no identified abstractions within 1km proximity to site. Drift: Low productivity and very localised nature of present glaciofluvial deposits.
GWDTEs: Marshy grassland	Medium	Small area of MG10 GWDTE habitat located within the site, within 250m of proposed development, and considered to have moderate groundwater dependency.

10.5 Baseline Evolution

- 10.5.1 In the absence of the proposed development, future baseline conditions would likely remain consistent with existing conditions on site.
- 10.5.2 Increasing climate change may however affect the hydrological cycles within the catchments surrounding the site, resulting in marginally higher flows and more extreme intense rainfall events, which may result in higher water levels with Loch Lomond and the River Leven, as described above. This however is a change which would be relatively consistent across Scotland and would not be limited to this site.

10.6 Embedded Mitigation

- 10.6.1 As detailed in **Chapter 3 – The Proposed Development**, a number of design features and embedded mitigation measures have been incorporated into the design and construction of the proposed development to avoid, prevent or minimise significant adverse environmental effects and to enhance beneficial effects. Embedded mitigation measures of relevance to this assessment are:
- No buildings within the functional floodplain and finished floor levels of buildings adjacent to the water bodies to be above the 1 in 200yr + climate change peak flood level;
 - Avoid crossings of existing watercourse to prevent pollution; and
 - Development within a 5m strip along waterfronts will be subject to specific consideration within a CEMP to be agreed with the NPA prior to commencement.
- 10.6.2 The surface water drainage scheme for the proposed development will be designed in accordance with Sustainable Drainage Systems (SuDS) principles and such that the maximum discharge rate will be equivalent to the greenfield (i.e. pre-development) runoff rate.
- 10.6.3 Additional mitigation measures identified through the EIA process are detailed in **Section 10.8** below before likely residual effects from the proposed development are then stated in **Section 10.9**.

10.7 Potential Effects

- 10.7.1 Potential effects on the water environment that could arise during the construction and post-completion phases of the proposed development are summarised in Table 10.6 and are discussed further in the following sections.

Overview

- 10.7.2 The construction phase is the most important in terms of potential impacts on the water environment, with key activities including:
- Earthworks, including alteration of site ground levels;
 - Excavation for foundations of properties and site infrastructure;
 - Stockpiling of excavated materials;
 - Creation of impermeable surfaces;
 - Construction of new stormwater drainage system; and
 - Use and storage of oils and fuels.
- 10.7.3 During the operational phase, the most important potential impact is the potential change in surface water quality and volume of runoff, arising from increased impermeable surfaces, and associated downstream flood risk.
- 10.7.4 Watercourse crossings have the potential to impact upon the water environment in terms of flows within channels and sediment release during construction. There are however no watercourse crossings identified on the proposed masterplan, and so this has not been considered further.

Table 10.6 Summary of Potential Effects

Receptor	Potential Effect
Loch Lomond and watercourses	Flow alterations (increased runoff/ alteration of flow paths, and associated flood risk)
	Increased pollution from sediments – within watercourses and locally within Loch Lomond.
	Pollution from chemicals
Groundwater/ GWDTEs	Flow and level alterations (groundwater draw-down/ alteration of flow paths)
	Pollution from chemicals

Construction Phase

Surface Water Flow Alterations and Flood Risk

- 10.7.5 During construction, existing drainage patterns and flow pathways would be altered by the introduction of impermeable surfaces, change in site ground levels and presence of stockpiles or foundation voids. Impermeable surfaces arising from the compaction of soils and construction of infrastructure would reduce infiltration and may lead to an increase in surface water runoff. The potential environmental impacts of this include increase in flow rates within the on-site or adjacent watercourses, potentially leading to increases in channel erosion, sediment transport and both on-site and downstream flood risk.
- 10.7.6 Potential surface water flow alterations are assessed as having a possible, short-term, medium magnitude adverse impact on the identified watercourses and Loch Lomond (medium and high sensitivity receptors respectively).

Pollution from Sediments

- 10.7.7 There is the potential for increased release of fine sediment into watercourses and Loch Lomond arising from sediment-laden runoff from areas of soil stripping, earthworks and stockpiles.
- 10.7.8 Increased sediment loading to watercourses can degrade water quality and change substrate characteristics, which may affect the quality of the aquatic habitat. Sedimentation of watercourses can also have a detrimental effect on flow conveyance of the channel and downstream culverts, affecting flood risk.
- 10.7.9 Potential increased pollution from sediments would be short to medium term in duration and are assessed as having a likely, medium magnitude adverse impact on Loch Lomond and the identified watercourses (high and medium sensitivity receptors respectively).

Pollution from Chemicals

- 10.7.10 During construction there is a risk of accidental pollution incidences affecting the water environment (watercourses, loch, groundwater and GWDTEs) from the following sources:
- Spillage or leakage of oils and fuels:
 - Stored on site;
 - From construction machinery or site vehicles; and
 - From refuelling machinery on site.
 - Spillage or leakage from on-site toilet facilities;
 - Cement, concrete or grout getting polluting surface water or groundwater; and
 - Spillage or leakage from use or storage of other chemicals and hazardous substances.
- 10.7.11 Oil spillages to the water environment would be detrimental to water quality and could affect fauna and flora. Oils and fuels are hazardous (List 1) substances under the Groundwater and Priority Substances (Scotland) Regulations 2009 and their ingress to groundwater must be prevented. Groundwater vulnerability to pollutants may increase in areas where drift deposits

are excavated, for example for foundations or alteration of site ground levels. Potential contaminants could leak through fractures and cavities in the bedrock and affect groundwater quality.

- 10.7.12 Cement, concrete and grouts used for construction are highly alkaline and corrosive and can cause serious pollution to the ground and water environment. Water wildlife, such as invertebrates and fish, are very sensitive to changes in pH (acid/alkaline) levels.
- 10.7.13 Other chemicals and hazardous substances used and stored on site (e.g. cleaning products, solvents, and pesticides) could cause pollution if they enter surface waters or groundwater.
- 10.7.14 The potential impact of contaminant discharges on the identified receptors is likely to be short-term in nature. Potential contaminant discharges are assessed as having a possible, medium magnitude adverse impact on Loch Lomond and identified watercourses (high and medium sensitivity receptors respectively), and GWDTEs and groundwater (medium and low sensitivity receptors respectively).

Groundwater Flow and Level Alterations

- 10.7.15 Groundwater is expected to be at shallow depth in areas of lower ground. Excavations below groundwater level, for example for foundation construction, could lead to localised groundwater drawdown. Open excavations that cannot be drained by gravity may require dewatering. Groundwater pathways could also be altered by construction of foundations and road infrastructure.
- 10.7.16 The potential effect would be localised in extent and short-term in nature (duration of open excavation or dewatering). Groundwater flow and level alterations are assessed as having a likely, low magnitude adverse impact on the underlying moderate productivity aquifers (low sensitivity receptor).
- 10.7.17 Changes in groundwater flow and levels can also affect GWDTE. A small area of MG10 GWDTE habitat was identified in the southeast of the site within the Woodbank House area. Development is proposed to be undertaken within 250m of this location and so a site-specific risk assessment is provided in **Table 10.7** below in accordance with SEPA’s LUPS-GU31 guidance (SEPA, 2014), with reference to the baseline conceptual site model (CSM) presented in **Section 10.4.32**. The risk on GWDTE would be low. The proposed development is therefore assessed as having a possible, long term, low magnitude adverse impact on GWDTEs (medium sensitivity receptor).

Table 10.7 GDWTE Risk Assessment

GWDTE	Location	Risk Assessment	Risk Magnitude
MG10	South-east of site, in the southern boundary of Woodbank House area.	<p>Marshy grassland presenting moderate groundwater dependency located at the top of the slope within Woodbank House area of the site. Contributing catchment to this area would be to the west, upslope of the site.</p> <p>Woodland lodges proposed to be located adjacent to this, however no roads or linear features proposed which may have intercepted contributing groundwater flows. Main proposed development in the area which may have deeper excavations will be located downgradient of the GWDTE, approximately 60m to the east and at an elevation approximately 4-5m lower.</p> <p>The typology is common throughout Scotland and is not of high botanical interest. The size of the marshy grassland has been measured as only 0.007ha (70m²).</p>	Low

Operational Phase

Surface Water Flow Alterations and Flood Risk

- 10.7.18 Once the proposed development is completed and operational, in the absence of further mitigation, surface water runoff volumes would be increased due to the increase in impermeable area across the site, and surface water flow pathways would be altered by the drainage scheme. However as identified in **Section 10.6 - Embedded Mitigation**, the drainage scheme for the proposed development has been designed to attenuate runoff from impermeable areas within the development site to Greenfield (i.e. pre-development) rates. The discharge of flows from the site into the River Leven will be restricted so that is no increase in flood risk downstream.
- 10.7.19 Potential surface water flow alterations post-completion are assessed as having a likely, positive, long-term, negligible magnitude impact on Loch Lomond and the identified watercourses (high and medium sensitivity receptors respectively) and a negligible impact upon downstream flood risk.

Pollution from Sediment

- 10.7.20 Pollution from sediment may be reduced compared to baseline conditions due to the site SuDS scheme attenuating the sediment content in runoff from the development. Potential increased pollution from sediments are assessed as having an unlikely, long term, low magnitude adverse impact on Loch Lomond (high sensitivity receptor) and identified watercourses and GWDTE (medium sensitivity receptors).

Pollution from Chemicals

- 10.7.21 During the operational phase of the proposed development, oils and fuels within surface runoff from roads will be the main potential source of contaminant discharges. The SuDS scheme for the proposed development will include treatment of runoff in accordance with published standards and guidance. Increased contaminant discharges are therefore assessed as having an unlikely, short-term, low magnitude impact on Loch Lomond (high sensitivity), watercourses and GWDTE (medium sensitivity receptors) and groundwater (low sensitivity).

Groundwater Flow and Level Alterations

- 10.7.22 During the operational phase, the on-going impact of the proposed development on groundwater flow and levels would be negligible due to the nature of the development and no anticipated disturbance of the ground.
- 10.7.23 The potential effect on the hydrological supporting conditions for the GWDTE post-completion is as per Table 10.7 above, with the proposed development having a possible, long term, negligible magnitude impact on groundwater levels and GWDTEs (low and medium sensitivity receptors respectively).

10.8 Further Mitigation and Enhancement

- 10.8.1 The assessment of potential effects from the proposed development in Section 10.7 indicates that in the absence of further mitigation, a number of significant adverse effects on the water environment would be likely. To address this and minimise the likelihood of significant adverse effects arising, as well as to maximise environmental opportunities from the proposed development, further mitigation and enhancement measures are proposed below. These are then taken into account in the assessment of residual effects provided in Section 10.9.
- 10.8.2 The proposed further mitigation and enhancement is grouped into the following areas:

Construction Phase

Further Mitigation to be included within CEMP

- 10.8.3 As noted in **Section 11.6**, the commitment to develop and implement a CEMP for the construction phase of the proposed development is treated as an embedded mitigation measure, as are the provision of certain standard information and environmental management measures within the CEMP (refer to Section 11.6). Over and above this, the assessment in this ES chapter

has identified the need for the following further mitigation measures to also be detailed within and implemented through the CEMP:

- Any construction activities within a 5m strip along waterfronts will be subject to specific consideration within the CEMP to be agreed with the National Park Authority (NPA) prior to commencement;
- An Environmental Clerk of Works (ECoW) will ensure that the CEMP and associated mitigation measures are implemented effectively; and
- A pollution prevention and response plan will be set out in the CEMP. This will provide site spill response procedures, emergency contact details and equipment inventories and their location. All staff will be made aware of this document and its content during site induction. A copy will be available in the site office at all times.

Surface Water Management

- 10.8.4 Surface water drainage arrangements for the construction phase will be in line with SuDS principles, incorporating appropriate treatment and attenuation prior to discharge to the water environment in accordance with the required CAR authorisation and relevant GBR. It is proposed to replicate natural drainage around construction areas and to use source control to deal with rainwater in proximity to where it hits the ground.
- 10.8.5 The implementation of a given SuDS measure will be dependent upon detailed site and hydrological investigations. Detailed surface water drainage proposals and methodology for the construction phase will be detailed within a Pollution Prevention Plan (PPP) which will be included within the CEMP as noted above. The SuDS features will be installed prior to the main construction activities (including removal of vegetation and any earthworks). Suitable measures will be in place at all times for treatment of runoff from construction areas, to prevent the release of pollutants including sediment to adjacent surface water features and GWDTEs.
- 10.8.6 Clean runoff from vegetated areas or offsite will be kept clean and diverted around works to prevent mixing with silt-laden water.
- 10.8.7 Surface water management measures employed during the construction phase should be regularly inspected and maintained to check that they are working effectively and that there are no blockages or unexpected discharges.
- 10.8.8 The risk of oil contamination will be minimised by good site working practice (further described below) but should a higher risk of oil contamination be identified then an oil separator will be considered.
- 10.8.9 A minimum buffer zone of 5m will be maintained along the waterfronts. No construction activities will take place within this buffer zone, including movement of construction machinery, stockpiling and construction of SuDS features unless they have been specifically considered and allowed within the CEMP.
- 10.8.10 Routing of construction discharges should ideally be through at least three levels of SuDS to ensure that water quality of high sensitivity receptors is not adversely affected.

Earthworks

- 10.8.11 Areas stripped of earth and vegetation will be kept to a minimum at any one time. Soil loss and erosion will be minimised through careful storage, reinstatement and re-vegetation. Stockpiles will be placed in areas of minimal risk of slippage or erosion from drainage and will not be located within 20m of any watercourses or ditches.
- 10.8.12 Any runoff from earthworks and stockpiles will be passed through appropriate construction SuDS measures prior to discharge to the water environment.
- 10.8.13 The time excavations are kept open for will be kept to a minimum to avoid ingress of water, minimise erosion and the need for dewatering. Drainage or pumping from excavations will be minimised through appropriate design. Temporary cut-off drains will be installed if required to prevent surface water runoff entering excavations.
- 10.8.14 Any dewatering will comply with GBR2 and GBR5. If abstraction exceeds 10m³ per day a CAR registration or licence will be required, which will be obtained prior to the commencement of the

abstraction. Any water pumped out of excavations will be treated by passing through a SuDS feature prior to discharge to the water environment.

Construction tracks

10.8.15 Access tracks used during construction (i.e. not the final road layout) will incorporate appropriate drainage measures including ditches, camber to shed water to the edges, frequent cross drains and trackside grips/offlets to prevent the tracks acting as a preferential drainage route and to protect the water environment. Any trackside discharge will be passed through appropriate construction SuDS measures prior to discharge to the water environment. Water will not be allowed or encouraged to pond in the track where possible.

Oils, Fuels, Site Vehicles and Welfare facilities

10.8.16 The mitigation measures to minimise risk of contaminant release will be in line with the updated Controlled Activities (Scotland) Regulations which will come into force on 1st January 2018. These new General Binding Rules (GBRs) consolidate the provisions of the Water Environment (Oil Storage)(Scotland) Regulations 2006 into CAR, and extend the application of those provisions. Mitigation measures will follow these GBRs. The relevant PPGs will also be used to guide the embedded mitigation. This includes the following:

- Storage of oil and fuels on site will be designed to be compliant with GBRs 26-28 and any bunds will provide storage of at least 110% of the largest tank's maximum capacity;
- The storage of oil in a portable container with a capacity of greater than 200 litres on site will not be permitted;
- Multiple spill kits will be kept on site;
- Drip trays will be used while refuelling; and
- Regular inspection and maintenance of vehicles, tanks and bunds will be undertaken.

10.8.17 Welfare facilities will include closed-system toilets, with disposal of foul drainage at a suitable off-site facility.

10.8.18 Concrete and cement mixing will be sited on an impermeable designated area and at least 10m away from a watercourse or surface water drain, to reduce the risk of run-off entering a watercourse. Equipment will be washed out in a designated area, specifically designed to contain wet concrete and wash water. Wash waters will be discharged to the foul sewer with prior permission from Scottish Water or disposed off-site at an authorised facility.

10.8.19 All chemicals and hazardous substances will be stored safely, away from watercourses and drains in line with current best practice. They will be disposed of in line with duty of care requirements.

Operational Phase

10.8.20 The proposed surface water and SuDS scheme (see Section 10.6) will require regular maintenance during its operational life. This maintenance will include the regular debris clearing and cutting of grass of surface SuDS features, and the inspection and repairs to underground features if necessary. The responsibility for the maintenance of the drainage network will lie with the organisation that adopts the network. Details of the proposed drainage strategy for the site are covered in Appendix 10.3.

10.8.21 During the operational phase there should be no requirement for groundworks. However, should groundworks be required mitigation highlighted in the construction sections above will be adopted as appropriate.

10.9 Residual Effects

As shown in Table 10.8, the influence of the further mitigation identified in **Section 10.8** means that with one exception (effects on groundwater flow) the level of predicted effects would reduce such that the residual effect would become Negligible and not significant in the context of the EIA Regulations. The rationale for the predicted level (and thus significance) of effects on groundwater flow is provided in **Section 10.7**.

Table 10.8 Summary of Likely Residual Effects

Potential Impact	Receptor, Sensitivity	Source of Impact	Type of Effect	Duration	Probability of Effect Occurring on Receptor	Pre-Mitigation Magnitude of Change	Pre-Mitigation Level of Effect	Post Mitigation Magnitude of Impact	Residual Significance of Effect	Residual Effect Significance
Construction Phase										
Surface water flow alterations and flood risk	Loch Lomond, High	Impermeable surfaces, change in site levels, stockpiles, voids	Negative	Short	Possible	Medium	Major	Negligible	Negligible	Not Significant
	Watercourses, Medium		Negative	Short	Possible	Medium	Moderate	Negligible	Negligible	Not Significant
Pollution from sediments	Loch Lomond, High	Soil stripping, earthworks, stockpiles	Negative	Short – medium	Likely	Medium	Major	Negligible	Negligible	Not Significant
	Watercourses, Medium		Negative	Short – medium	Likely	Medium	Moderate	Negligible	Negligible	Not Significant
Pollution from chemicals	Loch Lomond, High	Oils, fuels, machinery, welfare facilities	Negative	Short	Possible	Medium	Major	Negligible	Negligible	Not Significant
	Watercourses, Medium		Negative	Short	Possible	Medium	Moderate	Negligible	Negligible	Not Significant
	Groundwater, Low		Negative	Short	Possible	Medium	Minor	Negligible	Negligible	Not Significant
	GWDTEs, Medium		Negative	Short	Unlikely	Medium	Moderate	Negligible	Negligible	Not Significant
Groundwater flow and level alterations	Groundwater, Low	Excavations and dewatering	Negative	Short	Likely	Low	Minor	Low	Minor	Not Significant
	GWDTEs, Medium		Negative	Long	Possible	Low	Minor	Minor	Minor	Not Significant

Potential Impact	Receptor, Sensitivity	Source of Impact	Type of Effect	Duration	Probability of Effect Occurring on Receptor	Pre-Mitigation Magnitude of Change	Pre-Mitigation Level of Effect	Post Mitigation Magnitude of Impact	Residual Significance of Effect	Residual Effect Significance
Operational Phase										
Downstream & on-site flood risk	Loch Lomond, Medium	Impermeable surfaces, drainage system	Positive	Long	Likely	Negligible	Negligible	Negligible	Negligible	Not Significant
	Watercourses, Medium		Positive	Long	Likely	Negligible	Negligible	Negligible	Negligible	Not Significant
Pollution from sediments	Loch Lomond, High	Increased runoff from impermeable surfaces, roads	Negative	Long	Unlikely	Low	Moderate	Negligible	Negligible	Not Significant
	Watercourses, Medium		Negative	Long	Unlikely	Low	Minor	Negligible	Negligible	Not Significant
Pollution from chemicals	Loch Lomond, High	Vehicle use	Negative	Short	Unlikely	Low	Moderate	Negligible	Negligible	Not Significant
	Watercourses, Medium		Negative	Short	Unlikely	Low	Minor	Negligible	Negligible	Not Significant
	Groundwater, Low		Negative	Short	Unlikely	Low	Minor	Negligible	Negligible	Not Significant
	GWDTes, Medium		Negative	Short	Unlikely	Low	Minor	Negligible	Negligible	Not Significant
Groundwater flow and level alterations	Groundwater, Low	Built infrastructure	Negative	Long	Possible	Negligible	Negligible	Negligible	Negligible	Not Significant
	GWDTes, Medium		Negative	Long	Possible	Negligible	Negligible	Negligible	Negligible	Not Significant

10.10 Assessment of Cumulative Effects

10.10.1 Cumulative effects on the water environment could occur where more than one development is proposed within a catchment, and **Chapter 3 – The Proposed Development** identified the relevant cumulative developments within the area.

10.10.2 The relevant cumulative developments are:

- Replacement building and infrastructure for Sweeney's Cruises;
- Drumkinnon Bay dredging;
- Woodbank Inn Hotel Extension; and
- Balloch Street Design Project.

10.10.3 With reference to impact upon the water environment, the only cumulative development which may have an impact would be the dredging of Drunkinnon Bay to the north of the site.

10.10.4 The proposed dredging is to take place to the west of the Pierhead area of the site, and it is to be undertaken to provide a greater area for open water swimming for the Glasgow 2018 European Championships. Approximately 1000m³ of material is to be excavated to provide a minimum depth of 1.4m within the bay.

10.10.5 The dredging activities are estimated to be undertaken with 3 weeks, with another 3 weeks drying and disposal time for the material. This will all have to be undertaken prior to the swimming events which will be held in August 2018.

10.10.6 The dredging activities will have a short term negative impact upon the water quality and may introduce sediment pollution to the Loch shore, which as noted is a highly sensitive receptor. However due to the duration of the activity and the fact that it will be undertaken early in 2018, it is not considered that it will coincide with any construction activities relating to the proposed development.

10.10.7 As such there would be negligible/no cumulative effects on the water environment.

10.11 Summary

10.11.1 This chapter of the ES has assessed the impact of the proposed development upon the water environment which includes surface water and fluvial hydrology (including flooding), water quality, drainage, groundwater, water supplies and wetlands.

10.11.2 A suite of embedded and further mitigation has been proposed to avoid, prevent and minimise likely significant effects on the water environment. This includes:

- A buffer for construction activities within a 5m strip along waterfronts;
- Adherence to relevant national guidance, legislation and good practice in construction methods;
- Development and adhering to a Construction Environmental Management Plan (CEMP) containing a Pollution Prevention Plan (PPP), which will include monitoring of the site activities to ensure compliance;
- The use of construction phase Sustainable Drainage Systems (SuDS);
- An Environmental Clerk of Works (ECoW) will supervise the construction works to ensure compliance with the above;
- Permanent surface water drainage network incorporating SuDS to ensure sufficient levels of treatment and attenuation of surface water discharges from site;
- All proposed development is to be located outwith the functional floodplain as identified in the Flood Risk Assessment, and the minimum finished floor levels of buildings on site are to be above the maximum flood level estimated for the 1 in 200 year + climate change event; and

- Routing of construction discharges through at least three levels of SuDS to ensure that water quality of high sensitivity receptors is not adversely affected.

10.11.3 With the above mitigation measures in place, the assessment has concluded that **the proposed development would not generate any significant effects upon the water environment.**

10.12 References

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11 Ground Conditions and Geology

11.1 Introduction

11.1.1 This chapter identifies the likely environmental effects from the construction and operation of the proposed development in relation to the ground conditions, including land stability and geological hazards. The assessment is based on the characteristics of the site and surrounding area and the key parameters of the proposed development detailed in **Chapter 2 – Site and Surrounding Area** and **Chapter 3 – The Proposed Development** respectively. This chapter has been prepared by Peter Brett Associates LLP (PBA).

11.1.2 This ES chapter is supported by the following technical reports provided in **Appendices 11.1 - 11.2**:

- **Appendix 11.1 – Figures**; and,
- **Appendix 11.2 – Preliminary Phase 2 Ground Conditions Assessment, PBA, 2017**

11.2 Legislative and Policy Context

Legislation

11.2.1 The overarching legislative framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Subject specific legislation of relevance to this assessment is:

- Environmental Protection Act 1990 (Part 2A) (as amended 2012);
- The Environment Act 1995 (Section 57);
- The Contaminated Land (Scotland) Regulations 2002 (as amended 2005);
- The Private and Public Water Supplies (Miscellaneous Amendments) (Scotland) Regulations 2015;
- Water Framework Directive 2000/60/EC; and
- Private Water Supplies (Scotland) Regulations 2006 (as amended 2015).

Policy

11.2.2 The planning policy framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Planning policy considerations (including policies and guidance) of specific relevance to this assessment are:

- Adopted **Loch Lomond and the Trossachs National Park (LLTNP) Local Development Plan (LDP) (2016)** including relevant policies outlined in **Table 5.1**, in particular:
 - Overarching Policy 1 – Strategic Principles;
 - Overarching Policy 2 - Development Requirements;
 - Natural Environment Policy 11 – Protecting the Water Environment; and
 - Natural Environment Policy 16 - Land Contamination.
- **Draft LLTP Partnership Plan 2018 – 2023**, in particular outcomes 1-3 and 5-9;
- **National Planning Framework 3 (NPF3) (2014)**;
- **Scottish Planning Policy (SPP) (2014)** including relevant provisions outlined in **Table 5.2**, in particular the Principal Policy on Sustainability (paragraphs 24-35); and
- PAN 33 Development of Contaminated Land.

Guidance

- 11.2.3 The following subject specific guidance and technical standards have informed this assessment:
- Model Procedures for the Management of Contaminated Land (CLR11), Environment Agency, 2004; and
 - CLR11 is the UK industry technical framework used for applying a risk management process when dealing with land impacted by contamination. This sets out a procedure for carrying out an environmental risk assessment based on a source-pathway-receptor relationship, referred to as a pollutant linkage. This allows an assessment of potential environmental risk to be determined, based on the nature of the contaminant, the degree of exposure of a receptor to a contaminant and the sensitivity of the receptor.

11.3 Methodology and Significance Criteria

Scope of Assessment

- 11.3.1 This ES chapter presents an assessment of likely significant effects on ground conditions and geology from the proposed development. The assessment presented in this ES chapter has been prepared in accordance with the 2011 EIA Regulations.
- 11.3.2 The principal aspects considered within this assessment are:
- The likely effects of the proposed development on the environment, human health and the proposed structures in relation to ground conditions, contamination and stability; and
 - The likely effects of the environment on the proposed development itself.
- 11.3.3 Likely environmental effects are considered during construction and operational phases and before and after mitigation measures have been applied.

Overall Approach

Contamination

- 11.3.4 The assessment of the ground conditions at the site has been undertaken by following a tiered approach as recommended within the industry guidance (namely the Model Procedures for the Management of Contaminated Land, CLR11):
- Tier 1 – a qualitative assessment of historical and published information, together with a site reconnaissance, undertaken in order to develop a preliminary conceptual site model and inform a preliminary risk assessment;
 - Tier 2 – an assessment of ground condition data using published GAC (generic assessment criteria) to screen the site and establish whether there are actual, or potential, unacceptable risks; and
 - Tier 3 - detailed - a quantitative assessment involving the generation of site specific assessment criteria (SSAC).
- 11.3.5 In the event that unacceptable risks are identified following a Tier 3 assessment, a remediation strategy may be required to mitigate the risks.
- 11.3.6 In order to evaluate whether the presence of a source of contamination could potentially lead to harmful consequences, a source-pathway-receptor methodology is adopted, with the underlying principle the identification of pollutant linkages. A pollutant linkage consists of the following three elements:
- A source/hazard (a substance or situation that has the potential to cause harm or pollution);
 - A pathway (a means by which the hazard moves along / generates exposure); and
 - A receptor/target (an entity that is vulnerable to the potential adverse effects of the hazard).

11.3.7 Without a pollutant linkage the contamination may be a hazard but does not constitute a risk unless all three elements are present. Therefore, in assessing the potential for contamination to cause a significant effect, the extent and nature of the potential source or sources of contamination must be assessed, pathways identified, and sensitive receptors or resources identified and appraised, to determine their value and sensitivity to contamination related impacts.

11.3.8 The methodology adopted in this chapter is qualitative with a progression from factual information (stated with reasonable certainty) regarding the baseline conditions, to appraisal informed by professional judgement and expression of opinions on the relative significance.

Ground Stability

11.3.9 An assessment of potential ground stability issues was undertaken by PBA as part of the preliminary site investigation. Available published geological information was obtained and reviewed, together with data acquired from public databases. This report presents a review of the acquired information and gives comments with respect to potential constraints on foundation and general site infrastructure design and construction. Ground stability assessment utilises the guidance given in NHBC Standards Chapter 4.1 Land Quality – Managing Ground Conditions (NHBC, 2014).

Study Area

11.3.10 The Study Area adopted in this assessment comprises the site of the proposed development (“onsite”), as shown in **Figure 2.1**, together with the surrounding area up to a maximum radius of 1000m from the site boundary (“offsite”).

Information Sources

Desk Top Study

11.3.11 The following sources of information have been reviewed and used to inform the geology and ground conditions assessment:

- Riverside & Woodbank Estate, Balloch, Preliminary Phase 2 Ground Conditions Assessment, Peter Brett Associates, 2017 or the “preliminary ground investigation”;
- Engineering Review, West Riverside, Balloch, AECOM, 2015 or “2015 Engineering Review”;
- West Riverside, Loch Lomond Shores, Phase 1 Geoenvironmental Desk Study, AECOM 2015 or “2015 Phase 1 Desk Study”; and
- Lomond Shores, Stage 2 Site Investigation Report, URS Report Fer 44762681/GLRP0533 Issue 2 or “URS Report”.

Fieldwork

11.3.12 A preliminary site investigation has been undertaken, comprising a programme of shallow boreholes across the site. All locations were logged and soil samples recovered for geotechnical and geoenvironmental analysis. Boreholes were installed at representative locations. Groundwater and gas monitoring was undertaken on six occasions. The results of this fieldwork are summarised in the Baseline **Section 11.4** below.

Approach to Assessment

Identification of Relevant Receptors

11.3.13 Receptors considered in this assessment are users or locations where a person, property or the environment may experience adverse impacts due to ground condition effects as a result of the proposed development. The sensitivity of a receptor is based upon the relative importance of the receptor. The approach towards determining the sensitivity is specified in Table 11.1 below.

Table 11.1 Criteria used in geology and ground conditions for classifying receptor sensitivity

Classification	Definition
<p>High Receptor of national or international importance</p>	<p>Groundwater: Source Protection Zone</p> <p>Surface water: Scottish Environment Protection Agency (SEPA) overall status of High</p> <p>Ecology: Special Areas of Conservation (SAC and candidates), Special Protection Areas (SPA and potentials) or wetlands of international importance (RAMSAR)</p> <p>Buildings: World Heritage Site or Conservation Area</p> <p>Human health: Residential and uses where children are present</p>
<p>Moderate Receptor of county or regional importance</p>	<p>Groundwater: Principal aquifer & Secondary A aquifer</p> <p>Surface water: SEPA overall status of Good or Moderate</p> <p>Ecology: SSSI, National or Marine Nature Reserve (NNR or MNR) County Wildlife Sites (CWS)</p> <p>Buildings: Area of Historic Character</p> <p>Human health: Employment</p>
<p>Low Receptor of local importance</p>	<p>Groundwater: Secondary B aquifer or Unproductive</p> <p>Surface water: SEPA overall status of Poor or Bad</p> <p>Ecology: local habitat resources or no designation</p> <p>Buildings: Replaceable/Local value</p> <p>Human health: Transient or Limited Access.</p> <p>Unoccupied/Industrial land use and construction workers**</p>

**assuming that construction workers will adopt appropriate health and safety and personal protective equipment procedures (PPE)

Impact Assessment Methodology

11.3.14 The level of likely ground condition effects from the construction and operation of the proposed development is determined by assessing the likely magnitude of impacts, using the criteria set out in Table 11.2.

Table 11.2 Magnitude of Impact on Ground Conditions

Magnitude		Example
Major	Adverse	A marked impact that causes a key attribute of the receptor to be lost/degraded.
	Beneficial	A marked improvement in relation to a key attribute of the receptor.
Moderate	Adverse	A noticeable impact that exceeds a standard (for example generic assessment criteria) but that does not cause a key attribute of the receptor to be lost/degraded.
	Beneficial	Benefit to, or addition of, key characteristics, features, or elements or improvement of attribute quality.
Minor	Adverse	A discernible impact that is below a standard (for example generic assessment criteria) and does not cause a key attribute of the receptor to be lost/degraded.
	Beneficial	A discernible improvement in relation to a key attribute of the receptor.
Negligible	Adverse	No discernible impact.
	Beneficial	No discernible impact.
No Change		No change would be perceptible, either positive or negative.

Assumptions and Limitations

11.3.15 The preliminary site investigation obtained site wide coverage, however, it was undertaken without a definitive proposed layout. As such, it is acknowledged that there may be a requirement for more detailed investigations in specific areas of the site once the layout has been finalised.

11.3.16 No intrusive investigation was undertaken within the footprint of the ruined buildings within the Woodbank House site and therefore the ground conditions within this area are unknown and have not been assessed.

11.3.17 The eastern area of the site is known to have had extensive rail lines running north / south. The extent to which these rail lines have been removed or simply buried is not known.

11.3.18 A belowground void was encountered during the preliminary ground investigation. It was later suggested that this void relates to a redundant 18" culvert at approximately 2m depth. This culvert may require further investigation.

Establishment of Effect Significance

11.3.19 The significance of an environmental effect is determined with reference to the sensitivity of identified receptors (Table 11.1) and the predicted magnitude of the impact (Table 11.2). To determine the significance of an effect, reference should be drawn to the impact significance matrix as set out in Table 11.3 below.

11.3.20 In line with the general approach set out in **Chapter 4 – Assessment Methods**, effects at Moderate or above levels are considered significant in EIA terms.

Table 11.3 Significance of Effects for Assessing Ground Conditions

Sensitivity/ Value of Receptor	Magnitude of Impact			
	Major	Moderate	Minor	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Minor
Low	Moderate	Minor	Minor	Negligible

Approach to Cumulative Impact Assessment

11.3.21 In accordance with the EIA Regulations, the cumulative assessment needs to consider all approved developments which have the potential to result in cumulative significant environmental effects alongside the proposed development. As outlined in **Section 2.4**, for the purposes of this assessment, the four developments in the table below have been identified:

- Sweeney Cruises Replacement Infrastructure - Demolition of existing buildings and erection of office building; slipway enclosure/workshop building; boathouse and installation of 2 pontoons;
- Drumkinnon Bay Dredging - Dredging operation to extend existing dredged channel;
- Woodbank Inn Extension - Demolition of kitchen extension. Erection of 3 storey extension comprising of 18 hotel rooms and kitchen; and
- Balloch Street Design Project - The Balloch Village Plans (Street Design) Project builds on the extensive engagement undertaken through the 'Live in Balloch' Charrette process that took place in February and March 2016.

11.3.22 Based on information available at this time, it is anticipated that the planning applications for the above developments will not have an impact on geology and hydrogeology such that a cumulative impact would occur alongside the proposed developments impacts.

11.3.23 However, cumulative impacts may occur if pollutants or sediments are released into the River Leven and/or Loch Lomond concurrently during the construction phase of the proposed development and this proposal. If construction occurs simultaneously and without mitigation, the impacts may increase in magnitude and significance at a local level. If construction occurs consecutively impacts could increase in duration and significance at a local level.

11.4 Baseline Conditions and Receptors

11.4.1 Baseline conditions for the proposed development have been identified using the recent 2017 preliminary ground investigation, together with the historical desk-based studies by AECOM and URS.

The Site

11.4.2 The site is located at the northern extent of the town of Balloch, at the southern end of Loch Lomond approximately centred at Ordnance Survey Grid Reference 238666, 682128. The boundary of the site is shown on **Figure 2.1 – Site Location Plan (Appendix 2.1)**. The site

measures approximately 35.5 hectares and can be split into two distinct areas known as West Riverside in the east and Woodbank House in the west.

- 11.4.3 A detailed description of the site and surrounding area is provided in **Chapter 2 – Site and Surrounding Area**.

Current Land Use

- 11.4.4 The larger eastern area of the site (West Riverside) is an irregular shape and is bounded to the north by the Lomond Shores centre and the bank of the Loch itself. To the east is the River Leven (the Maid of the Loch Slipway, including pontoons) and to the south is primarily housing. The majority of the West Riverside area is occupied by woodland and walking paths. Two INEOS oil pipelines run through the site from west to east and two fenced valve compounds are present.
- 11.4.5 The smaller western area (Woodbank House) is accessed via a track from Old Luss Road. The majority of the site area comprises two relatively flat lying open fields, however, in the west is an area dominated by woodland and the ruins of an old hotel and outbuildings.
- 11.4.6 The site in general is relatively flat lying. However, in the eastern area, ground levels fall away towards the River Leven. The INEOS oil pipelines run from west to east through the northern part of the site and for the most part are situated within a cutting. Woodland areas are hummocky, with level variations in the region of 2 – 3m. Other mounds and hollows at the site may be related to the superficial quarrying of sands and gravels. The western part of the Woodbank House site includes some steeply sloping ground which is thought to be a natural feature, possibly due to the effects of glacial movement. The above features (with the exception of the Woodbank House site) are shown on a topographical survey undertaken in 2017 (see **Figure 11.2**).

Historical Land Use

- 11.4.7 This summary is based on information from historical Ordnance Survey (OS) maps, which were included within the 2015 Phase 1 Desk Study.
- 11.4.8 The West Riverside area of the site has a varied history. There is no record of heavy industrial land uses within the West Riverside site, however, multiple small quarries were active, particularly in the northern and western areas. The eastern area (beside the slipway) was dominated by railway infrastructure from Balloch Station in the south to Balloch Pier in the north. A dye works was located immediately offsite to the south, however, this area is currently occupied by housing.
- 11.4.9 The majority of the Woodbank House area of the site remained undeveloped from 1864 until present. The exception to this being the hotel and outbuildings present within the sloping woodland area in the west of the Woodbank house area. On later mapping the hotel was labelled as Hamilton House. The hotel building was destroyed in a fire in 1995. The majority of the building was ruined, however, the façade remains standing. The various outbuildings are in a state of severe disrepair.

Summary of Receptor Sensitivity

Published Superficial Geology

11.4.10 The 1:50 000 scale geological map of the area, Sheet 30W and part of 29E (Scotland) - Drift "Greenock" (British Geological Survey, 1989) indicates the presence of some superficial deposits overlying the solid geology within the site. The superficial deposits comprise three main types:

- Raised Marine Deposits – Clay, silt, sand and gravel. Formed in shallow seas with mainly siliciclastic sediments. This is indicated to be present adjacent to and following the southern shoreline of the loch;
- Glaciofluvial Sand and Gravel – gravel, sand and silt formed in cold periods with Ice Age glaciers scouring the landscape and depositing moraines of till with outwash sand and gravel deposits. These deposits are indicated to be present across the greater part of the Woodbank House and West Riverside areas; and
- Till (Diamicton) – these deposits were formed in cold periods with Ice Age glaciers scouring the landscape and depositing moraines of till with outwash sand and gravel deposits. These deposits are indicated to be potentially present along the western part of the Woodbank House site.

11.4.11 In addition, the British Geological Survey (BGS) mapping also shows areas of man-made deposits (Made Ground) being present and these are annotated by the BGS as being "deposited on original ground surface". These occur in two locations, being; in a narrow strip along the banks of the River Leven (Slipway) to the east of Pier Road (along the alignment of the former railway line); and in an area of ground to the North of Balloch Road and extending beneath Clairnish. Furthermore, infilled ground (annotated as being manmade deposits - filling former opencast excavation) is marked as a parcel of land to the east of Old Luss Road and northwest of Ben Lomond Way, however this is believed to be outside of the site boundary.

11.4.12 The Geology of Britain viewer on the BGS website indicates that there are also deposits of Alluvium present at the site, described as clay, silt, sand and gravel, and shown as a ribbon extending from the shore of Loch Lomond, adjacent to the River Leven and along the alignment of the former railway line, predominantly to the east of Piers Road. These deposits may be present beneath any made ground.

Published Solid Geology

11.4.13 The 1:50 000 scale geological map of the area, Sheet 30W and part of 29E (Scotland) - Solid "Greenock" (BGS, 1990) indicates that the site is entirely underlain by the Teith Sandstone Formation of the Devonian Period.

BGS Boreholes and Historical Investigations

11.4.14 There are a number of BGS Borehole records available within the boundary of the West Riverside site, and the deepest of these undertaken in 1998 for Balloch Footbridge (adjacent to the northern boundary of the site) indicates that depth to bedrock is in excess of 35m at that location.

11.4.15 The 2015 Phase 1 Desk Study summarises the ground conditions indicated by previous ground investigations carried out at the West Riverside site and identifies the presence of Made Ground and 'Organic Soils' overlying 'Fluvio/Upper Glacial Deposits', 'Glacial Till' with Bedrock (sandstone) encountered at depths of between 51m below ground level (m bgl) and 69m bgl. It is considered that the descriptor 'Organic Soils' could represent Alluvium.

11.4.16 There are no BGS borehole records from within the Woodbank House site area. The closest BGS records relate to a string of shallow (generally <5m) boreholes drilled along the A82, to the west of the Woodbank House boundary. The boreholes typically reached depths of around 4.0mbgl and described 'Soft, friable or dense clayey SAND with cobbles' to around 1.5mbgl followed by 'Hard or Stiff sandy clay with boulders'

- 11.4.17 Two of the boreholes to the north / west of Woodbank House (close to Stoney-mollan Road / Roundabout) encountered sandstone bedrock at 5m – 6.5mbgl.
- 11.4.18 The historical boreholes indicate that the depth to bedrock may be highly variable within the area of the West Riverside / Woodbank House sites. Sandstone was encountered at a depth of 52.65m at Balloch Station (southern end of West Riverside), whilst in close proximity to the roundabout at the southern tip of Woodbank House site sandstone was recorded at 5.0m.

Findings of the Preliminary Ground Investigation

- 11.4.19 The 2017 ground investigation comprised 57 window sample boreholes to depths of up to 5m below ground level (mbgl). However, as a result of frequent obstructions which prevented drilling progress, several attempts were made at achieving depth at many of the boreholes and as a result, the total number of boreholes attempted was 73. Borehole locations are shown in Figure 1 of **Appendix 11.2**. The following section summarises the ground conditions encountered in the boreholes.

Geology

Made Ground

- 11.4.20 Made Ground was encountered in forty-six out of seventy-three window sample boreholes, either from the ground surface or below a relatively thin layer of topsoil, to depths of between 0.15m bgl and 3.5m bgl. With the exception of WS07 on the Woodbank House site, Made Ground thicknesses in excess of 1m were encountered predominantly to the east of Pier Road (as shown on Figures 2, 3 and 4 of **Appendix 11.2**), where a former railway line used to cross the site on embankment (as shown on the historical maps presented in the 2015 Phase 1 Desk Study). The borehole descriptions of the Made Ground indicate that it varies in composition from being a predominantly cohesive deposit comprising very soft gravelly sandy clay, to more typically a granular deposit, being a very loose to loose sand and gravel or organic silty gravelly sand. Each deposit contains varying quantities of cobbles, ash, glass fragments, pottery and brick fragments.

- 11.4.21 A programme of geochemical laboratory testing was carried out on selected soil and groundwater samples to determine the concentrations of a range of commonly occurring potential contaminants as part of the investigation. In addition, monitoring wells installed in selected boreholes were monitored on a single occasion to provide a preliminary determination of concentrations of potentially hazardous ground gases.

Alluvium

- 11.4.22 Material considered to represent Alluvium was encountered in fourteen of the seventy-three window sample boreholes, at depths between 0.2m bgl and 5.0m bgl. The Alluvium was only encountered in the eastern part of the site, between Pier Road and the River Leven. The Alluvium was typically described as very soft and soft peaty sandy Clay, but it is noted that beds (full thickness not proven but up to at least 2.85m) of very soft and soft sandy clayey Peat were encountered, as shown on Figures 2 and 3 of **Appendix 11.2** within the middle part of the site area east of Pier Road. The Alluvium is also occasionally encountered as a very loose and loose silty Sand. An additional window sample borehole containing 2.5m thickness of peaty Sand overlying sandy Peat was encountered at WS16 located offsite between West Riverside and Woodbank House.

Till (Diamicton)

- 11.4.23 Material considered to represent Till was encountered in five of the seventy-three window sample boreholes, all located in the western part of the Woodbank House site (see Figure 3 of **Appendix 11.2**). The Till was encountered at depths of between 0.1m bgl and 1.7m bgl, and was typically described as a firm to stiff gravelly sandy Clay. The gravel was recorded as being flat to elongated subangular to rounded igneous rock and other lithologies. Some high value SPTs were recorded in the deposit which are considered to represent larger gravel /boulder elements present.

Glaciofluvial Deposits

11.4.24 Material considered to represent Glaciofluvial deposits was encountered in fifty-one out of seventy-three window sample boreholes, at depths from existing ground surface to 4.8m bgl. These deposits were typically encountered in the western part of the West Riverside site and the eastern part of the Woodbank House site (as shown on Figure 3 of **Appendix 11.2**). These deposits were typically described as medium dense Sand and Gravel, silty gravelly Sand and silty Sand, but also occasionally as gravelly sandy Clay. The gravel inclusions are described generally as elongated, sub angular to sub rounded, fine to coarse of quartz, sandstone, igneous rock and other lithologies.

Hydrogeological Setting

11.4.25 The 2015 Phase 1 Desk Study indicated that earlier ground investigations at the site identified groundwater strikes in the 'majority of exploratory locations' and that 'groundwater at the site was in general hydraulic continuity with the River Leven at the level between 7.54m Above Ordnance Datum (AOD) and 8.89m AOD.

11.4.26 During 2017 phase of investigation, groundwater was only encountered during drilling in fourteen of the seventy-three window sample boreholes, at variable depths of between 0.8mbgl and 3.7mbgl, predominantly located in the Made Ground, Alluvium and glaciofluvial deposits in the east of the site. It is noted that the surface datum level of each of the boreholes was not recorded and as such the relative level of groundwater during this phase of investigation cannot be determined. In subsequent monitoring visits, around 13 of the 36 installed boreholes remained dry.

11.4.27 The groundwater encountered is considered to be perched water, existing in pockets of more permeable strata (such as sands and gravels), restricted by lower permeability deposits (such as clays), rather than a continuous shallow groundwater body.

11.4.28 The 2015 Phase 1 Desk Study states that groundwater in superficial deposits beneath the site is likely to be of moderate to high potential productivity. Furthermore, the Lower Devonian (Strathmore) bedrock aquifer is of High Productivity and has an overall classification of 'Good'.

11.4.29 The 2015 Phase 1 Desk Study states that there are no known abstraction boreholes within 1km of the site.

Hydrological Setting

11.4.30 The nearest surface water features to the site are Loch Lomond which is situated immediately to the north and the River Leven which is situated immediately to the east and enters the Loch adjacent to the north eastern point of the site.

11.4.31 The Phase 1 Desk Study states that the River Leven has a SEPA status of Poor for ecology and Pass for chemistry. The pressures on the river resulting in these classifications include morphological modifications (water collection, dams, weird etc.) and point source pollutants.

11.4.32 Likewise, the Phase 1 Desk Study states that Loch Lomond has a SEPA status of Poor for ecology and Pass for chemistry. The status is a result of both diffuse and point sources of pollution, morphological alterations and recreational activities.

11.4.33 Information on discharge consents is summarised in the Phase 1 Desk Study which includes a Landmark Envirocheck report.

11.4.34 A flood risk assessment has been undertaken and is reported in this ES under a separate chapter (see **Chapter 10**).

Other Potential Geological Hazards

11.4.35 Radon is a naturally occurring radioactive gas and emanates from geological formations to varying degrees, depending on the type, porosity and permeability. An assessment of potential for radon gas to be present is given in the 2015 Phase 1 Desk Study and indicates that the site is in the lowest category for potential radon risk.

11.4.36 Mining based on the conclusions of the 2015 Phase 1 Desk Study and the Coal Authority website, the site is not considered to be in an area where coal mining has occurred.

Geoenvironmental Conditions – Soil

11.4.37 The majority of the site has remained undeveloped. The main exceptions to this are the area of railway land in the east, the small superficial quarries (potentially backfilled with material of unknown origin) and the buildings associated with the hotel at the Woodbank House site. These areas are considered the main potential sources of onsite contamination.

11.4.38 Table 11.4 below summarises the potential sources of contamination.

Table 11.4 Summary of Potential Sources of Contamination

Source	Comment
Onsite	
Railway land	Railway land is often a source of contamination from the material used as ballast (including clinker and ashy material) as well as operational leaks and spills.
Made Ground	Made Ground or fill material of unknown origin can be a source of a range of contaminants including organic and inorganic compounds. Asbestos may be present within demolition rubble. If organic material is present, microbial decay can generate ground gases.
Peat / Organic Soils	Microbial decay can generate ground gases
Offsite	
Dye-works	Potential for waste material from the adjacent historical dye works being deposited onsite. The dye works may have affected groundwater, subsequently migrating below the site.

Woodbank House Area

11.4.39 Despite the presence of Made Ground near the existing / ruined buildings, no potentially significant contamination has been encountered in soil samples recovered from the Woodbank site.

11.4.40 It should be noted that no investigations have been undertaken from within the building footprints.

11.4.41 Given that the main hotel building was destroyed by fire, the potential exists for limited contamination to exist in soils within the building footprint. In particular, polycyclic aromatic hydrocarbons (PAHs) are often associated with combustion. If asbestos containing materials were present in any of the structures onsite, the potential exists for asbestos to be present in structures or rubble that currently remain onsite.

11.4.42 At the time of writing, it is unknown whether an attempt will be made to retain some or all of the existing buildings / remnants of buildings for inclusion within the proposed development. Depending on the outcome of these proposals, additional ground investigation locations are likely to be required within the existing / ruined building footprints.

West Riverside Area

11.4.43 No significant contamination was encountered within soil samples recovered from the natural soils to the west of Pier Road or South of Ben Lomond Way.

11.4.44 Elevated concentrations of heavy metals (lead and less frequently, arsenic and hexavalent chromium) were encountered within Made Ground soils to the east of Pier Road and North of Ben Lomond Way. These are likely to be associated with the former railway land and activities and potentially linked to the offsite dye works.

11.4.45 Concentrations of lead ranged from a maximum of 5,100mg/kg (in WS47) to a minimum of 5.1mg/kg. The average concentration of lead was 268mg/kg. The most conservative

assessment criteria for lead is 200mg/kg which is the Category 4 Screening Value (C4SL) for soils in a residential garden scenario. Fourteen soil samples contained concentrations of lead above the C4SL of 200mg/kg. The 14 locations, together with the lead concentrations are included on Figure 4 of **Appendix 11.2**.

11.4.46 With the exception of WS46 (which is in close proximity to Pier Road), all of the potentially elevated concentrations of lead were located in Made Ground to the East of Pier Road and north of Ben Lomond Way.

11.4.47 A single soil sample contained a concentration of arsenic that was above the threshold for residential garden soil (65mg/kg arsenic in WS38). This location is indicated on Figure 4 of **Appendix 11.2**. A single soil sample contained a concentration of hexavalent chromium that was above the threshold for C4SL for soils in a residential garden scenario (8mg/kg hexavalent chromium in WS49). This location is indicated on Figure 4 of **Appendix 11.2**. The elevated chromium concentrations correspond approximately with an area that driller noted some green colouration in soils during the site investigation.

11.4.48 No asbestos was encountered in any of the 63 samples analysed from the site.

Geoenvironmental Conditions – Groundwater

11.4.49 Samples from 15 boreholes across the site recorded concentrations of heavy metals that were, in some cases, elevated by comparison to the most conservative assessment criteria typically Annual Average (AA) EQS. However, with the exception of zinc and copper (which do not have a Maximum Allowable Concentration EQS), none of the samples were elevated by comparison to the less conservative Maximum Allowable Concentration (MAC) EQS.

11.4.50 The EQS for both copper and zinc are based on bioavailable concentrations, whereas the laboratory results are for the dissolved metals regardless of bioavailability. The actual bioavailable proportion would inevitably be lower than the total amount measured.

11.4.51 EQS thresholds are designed to be protective of the freshwater environment and are therefore intended to be applied at a compliance point within the surface water, after dilution has occurred, or to direct discharges. Therefore, it is highly conservative to compare these thresholds to samples of ground water recovered from boreholes within made ground or natural soils.

11.4.52 Both the River Leven and Loch Lomond are categorised as 'Poor' for ecology and 'Pass' for quality by SEPA due to physical modification and heavy recreational use. As such, despite their proximity, these receptors are considered to be of only moderate sensitivity.

11.4.53 It is considered highly unlikely that groundwater from the site is causing significant pollution of Loch Lomond or the River Leven as a result of the marginal concentrations of contamination encountered here. Contaminants have been recorded at relatively low concentrations and are likely to exhibit relatively low mobility through soil pores. The rate of flux of shallow perched groundwater from below the site into Loch Lomond is likely to be low. Furthermore, if contaminated groundwater from the site did reach the river or loch, the effect of dilution from such a large body of water would be highly effective.

Geoenvironmental Conditions – Ground Gas

11.4.54 Ground gasses were measured in 36 boreholes across the site on six occasions. The results are included in **Appendix 11.2**.

11.4.55 Using the approach recommended in CL:AIRE (2012) and endorsed in BS 8485 (2015), the Woodbank Site and the area of the West Riverside site to the west of Pier Road and south of Ben Lomond Way may be classified as Characteristic Situation 1 as defined in BS 8485 (2015). This situation is representative of ground with a very low potential for gas generation. For Characteristic Situation 1, BS 8485 (2015) advises that no special gas protection measures are required.

11.4.56 Within the areas to the east of Pier Road and the north of Ben Lomond Way the site is classified as 'category situation 2' (CS2) for gas. This is due to the carbon dioxide (CO₂) and methane (CH₄) being recorded at concentrations above the trigger values of 5% and 1% respectively during the monitoring even though flow rates remained low.

11.4.57 As expected, the elevated concentrations of ground gases correspond with Made Ground and Peaty soils.

11.4.58 Depending on the nature of the structures proposed for this area, there may be a requirement to incorporate gas protection measures. The appropriate gas protection measures are dependent on the proposed building design and end use, however, typically gas protection measures comprise a combination of barrier (e.g. concrete slab, gas resistant membrane) and a ventilation layer (e.g. a void space).

Ground Stability Hazards

11.4.59 Construction on areas where peat has been identified can however suffer from significant settlement and any structures proposed that cross areas underlain by peat may need to consider either excavation of the peat and replacement with engineered fill or the formation of a piled load transfer blanket with the road construction layers formed on top of the load transfer blanket. Where peat is present consideration will need to be given to all buried services that are sensitive to settlement and movement such as surface water drains or foul sewers.

11.4.60 It is unlikely that traditional shallow spread foundations will be suitable in the areas of the site where deeper Made Ground (>1.5m – 2.0m thick) and Alluvium are present due to their variability, typically very low strength, and loose relative density resulting in unacceptably high magnitudes of total and differential settlements. Where the Made Ground and Alluvium deposits are typically less than about 1.5m to 2.0m thick, and very lightly loaded structures that are relatively insensitive to settlement are proposed, deep strip or trench fill foundations could be taken through these deposits to found on more competent strata below (assuming competent strata is present). Alternatively, the Made Ground or Alluvium deposits could be excavated and replaced with engineered fill and a ground bearing raft used.

11.4.61 Where the Made Ground or Alluvium is greater than 1.5m to 2.0m thick, it may be uneconomical to adopt a traditional pad or deep strip foundation solution, and therefore consideration should be given to Vibrated Concrete Columns (VCC's) or a piled foundation solution.

11.4.62 Across the majority of the site, where Till deposits and Glaciofluvial deposits are present, it may be possible to adopt shallow spread foundations for relatively lightly loaded structures where the underlying material is proved to be at least medium dense or medium strength, otherwise ground improvement may be required (e.g. piled foundations or VCCs).

11.4.63 Careful consideration will need to be given to potential differential settlement developing between parts of the same building founded on different types of soil such as cohesive Till, peat or granular Glaciofluvial deposits.

Piled Foundations

11.4.64 Piled foundations are likely to be required where strip or pad foundation depth becomes excessively deep, where the size of the foundation becomes excessively large, or where the magnitude of predicted settlements for pad or strip footings is unacceptable. It is therefore anticipated that medium and heavily loaded structures or structures that are sensitive to total and/or differential settlements such as the pool and leisure facility, budget accommodation and hotel will require piled foundations. Lighter structures including the forest lodges are unlikely to require piling.

Belowground Structures

11.4.65 Utilities including the INEOS High Pressure Oil Pipeline and other gas apparatus are known to be present below the surface of the site. Known utilities (and where available, standoff zones) are included on Figures 1 – 4 of **Appendix 11.2**.

11.4.66 A belowground void was encountered during hand digging at borehole WS 40. It was later suggested that this void relates to a redundant 18" culvert at approximately 2m depth. The direction and extent of this feature is not known and may require further investigation with an excavator. This feature is not included on service plans which have been reviewed (and are included on Figures 1 to 4, **Appendix 11.2**) which suggests that it is not Scottish Water plant.

11.4.67 The eastern area of the site is known to have had extensive rail lines running north / south. The extent to which these rail lines have been removed or simply buried is not known.

Summary of Identified Sensitive Receptors

11.4.68 Sensitive receptors will include development and maintenance workers, future users, surface and groundwater and proposed buildings and structures, as shown in Table 11.5 below.

Table 11.5 Summary of Sensitivity of Potential Receptors

Receptor	Sensitivity	Comment
Site Workers	High	Ground workers and construction workers are likely to come into direct contact with soils, albeit for a short period of time. As the potential risk is to human health, the sensitivity is considered to be high.
Future Site Users	High	Future users include employees, day visitors and residential tourists who will have variable exposure scenarios to the potential contaminants. However, since the potential risks are to human health, the sensitivity is considered to be high.
Offsite Users	High	Off-site workers, visitors and residents including potential groundwater users.
Groundwater Resources	Moderate	Groundwater is currently considered to be of poor quality, albeit with a target of continuous improvement.
Surface Water Resources	Moderate	The site is immediately adjacent to the River Leven and Loch Lomond. The River Leven is considered to be of poor quality, albeit with a target of continuous improvement.
Built Environment	Moderate	Proposed buildings are potentially at risk from aggressive ground conditions caused by low pH or high sulphate and from the build-up of gases in confined spaces.

11.4.69 Table 11.6 below summarises the classification of potential receptors assuming no mitigation measures are in place.

Table 11.6 Receptor Sensitivity

Receptor	Risk Classification
Human Health - Future Users	High
Human Health - Construction and Ground Workers	High
Human Health - Offsite	High
Groundwater	Moderate
Surface Water	Moderate
Buildings	Moderate

11.5 Baseline Evolution

- 11.5.1 In the absence of the proposed development, the future baseline conditions would likely remain consisted with the existing conditions onsite.
- 11.5.2 However, as described in **Chapter 10**, climate change may cause higher water flows and more frequent and intense rainfall events which would likely result in higher water levels in the adjacent Loch Lomond and River Leven. Higher groundwater levels could form a pathway (linkage) through the mobilisation of ground contamination present onsite which could have an adverse effect on the nearby waterbodies.

11.6 Embedded Mitigation

- 11.6.1 As detailed in **Chapter 3 – The Proposed Development**, a number of design features and embedded mitigation measures have been incorporated into the design and construction of the proposed development to avoid, prevent, or minimise significant adverse environmental effects and to enhance the beneficial effects.
- 11.6.2 The embedded mitigation measures of relevance to this assessment are set out below.

Construction Phase

Construction Environmental Management Plan

- 11.6.3 A Construction Environmental Management Plan (CEMP) will be prepared and implemented during the construction phase of the proposed development. The purpose of the CEMP is to mitigate any adverse environmental effects and will specifically include the following:
- Surface water and groundwater protection measures, including an emergency spillage response procedure;
 - Procedures for the storage of fuel and chemicals;
 - A contaminated hotspots plan and procedure for managing unexpected contamination. Specifically, a watching brief for the visual and olfactory assessment of the soil and groundwater (if encountered) will be maintained with sampling and testing for verification and assessment purposes where necessary;
 - Settlement tanks/beds should be utilised to prevent increased suspended solids entering Loch Lomond via surface water run-off during rainfall;
 - A 3 m exclusion zone will be adopted around either side of INEOS gas pipelines within the site and no groundworks will take place within this zone unless agreed with INEOS;
 - Risk Assessments and Method Statements (RAMS) will be prepared. Construction/ground workers should take cognisance of the contamination reported and will be required to work in accordance with the RAMS. The provision of appropriate personal protective equipment (PPE) to be worn by site workers (as specified in RAMS);
 - Informing site workers of the contamination on the site (i.e. the conclusions of the site investigation) and the potential health effects from exposure through site induction and toolbox talks;
 - Dust suppression to minimise the effects on offsite users;
 - If piled foundations are required, a site specific risk assessment designed specifically to assess the risks posed by piling should be carried out. Ultimately, if piled foundations are required, the technique used will be selected on the basis of protecting groundwater from contamination. Safe piling techniques should be adopted to minimise the risks posed by piling activities; and
 - All construction work will be undertaken in general accordance with SEPA's Guidance for Pollution Prevention (GPPs).

Further Ground Investigation

- 11.6.4 Additional intrusive investigation will be required to delineate contamination and to inform the remediation strategy. Further intrusive investigation will be undertaken as required prior to construction within and around the derelict buildings in the Woodbank House site to determine contaminants of potential concern including asbestos and PAHs. If elevated concentration is identified, remediation will be undertaken to remove the contaminated material or lower the concentration of contaminants to a suitable level.

Remediation

- 11.6.5 Remediation measures will be established in a Remediation Strategy document and will depend on the risk associated with any potential contaminants specific to the proposed uses planned.
- 11.6.6 The remediation measures will be designed to reduce the impact of any contaminants on human health or environmental receptors to low or negligible levels.
- 11.6.7 Depending on the nature of the structures proposed for the West Riverside area, there may be a requirement to incorporate gas protection measures. The appropriate gas protection measures are dependent on the proposed building design and end use, however, typically gas protection measures comprise a combination of barrier (e.g. concrete slab, gas resistant membrane) and a ventilation layer (e.g. a void space).
- 11.6.8 The potential for ground instability has been identified within the proposed development associated with localised Made Ground deposits and naturally occurring weaker soils and peat. This hazard is considered to be Moderate and the risk associated with it will be quantified further through additional site specific intrusive ground investigation, the findings of which will inform the mitigation measures to be implemented. Once the risks have been quantified, suitable mitigation will be designed which may include ground improvement measures, none standard foundations (piling etc.) and the treatment of weaker soils or removal of peat. Planning conditions can be attached to any PPIP granted for the proposed development in order to secure the implementation of this mitigation.

Operational Phase

- 11.6.9 In relation to geology and ground conditions, it is not anticipated that specific embedded mitigation will be required at the operational phase of the proposed development.

11.7 Potential Effects

Construction Phase

- 11.7.1 A summary of the potentially sensitive receptors is provided in Table 11.5 above.

Human Health (Construction/Ground Workers)

- 11.7.2 Based on ground investigations to date, it has been established that there are some contaminants in soils at the site associated with the former neighbouring works, infilled made ground and naturally occurring peat which can produce ground gasses. However, the likelihood of severe and mobile contaminations is considered low.
- 11.7.3 Without prior knowledge of the site or appropriate planning and mitigation measures, construction worker's health could be adversely affected by contamination. The Woodbank House area of the site, whilst free of contaminants in the areas investigated, may have issues associated within the footprint of the former Hotel which was destroyed by fire and in some areas has therefore not been fully investigated at this stage.
- 11.7.4 Localised, elevated contaminants were identified during the preliminary ground investigation, including hotspots of heavy metals (lead and less frequently, arsenic and hexavalent chromium) in the Made Ground.
- 11.7.5 Embedded mitigation includes proposed further intrusive investigation to determine the potential for contaminants of concern (including asbestos and PAHs) within and around the derelict buildings in the Woodbank House site.

11.7.6 Taking account of this and the implementation of any remediation action which may subsequently be required, the construction phase of the proposed development is likely to have a localised, **Minor Adverse** effect on construction and ground workers.

Human Health (Future End Users)

11.7.7 The future end users are operational phase receptors, therefore are not considered in assessing construction effects.

Water Environment (Groundwater and Surface Resources)

11.7.8 It is considered highly unlikely that groundwater from the site is presently causing significant pollution of Loch Lomond or the River Leven as a result of the marginal concentrations of contamination encountered. Contaminants have been recorded at relatively low concentrations and are likely to exhibit relatively low mobility through soil pores. The rate of flux of shallow perched groundwater from below the site into Loch Lomond is likely to be low. Furthermore, if contaminated groundwater from the site did reach the river or loch, the effect of dilution from such a large body of water would be highly effective.

11.7.9 Without prior knowledge of the site or appropriate planning and mitigation measures, it is possible that construction techniques (notably piling, deep excavations and ground improvement) could mobilise contaminants and / or introduce pathways via which contaminants could migrate to the groundwater. Safe piling techniques will be utilised and controlled through specific risk assessments and methods statements, to prevent the mobilisation of any contamination during these construction activities.

11.7.10 In the absence of good construction site management there is potential for the accidental release of stored fuels and chemicals directly affecting localised areas of the surface water and groundwater quality during the construction of the proposed development. These pollution incidents could occur due to incorrect storage / transport / use of materials such as fuels, oils and chemicals. With containment in place, any accidents may result in the containment system being affected and a greater risk of measures being defeated. The presence of hardstanding / buildings and surface planting should reduce the infiltration (and therefore migration) of contamination into groundwater and surface resources. The construction phase will be undertaken in general accordance with SEPA's Guidance for Pollution Prevention (GPPs).

11.7.11 During the construction phase, there is potential for increased run-off of suspended soils entering Loch Lomond and other nearby water bodies. To reduce the impact, settlement tanks/beds can be utilised.

11.7.12 Embedded mitigation includes the development, approval and implementation of a CEMP, which will include procedures for the storage of fuel and chemicals and for managing unexpected contamination.

11.7.13 Taking account of this, potential release of contaminants or pollutants is likely to have a **Minor Adverse** effect on the water environment.

Built Environment

11.7.14 The built environment onsite is an operational phase receptor and therefore is not considered in assessing construction impacts.

Ecological Designations

11.7.15 Ecological receptors are not likely to be affected by ground contamination and instability. Ecology is considered in **Chapter 6 – Ecology and Woodland**.

Operational Phase

Human Health (Construction/Ground Workers)

11.7.16 Construction and ground workers are construction phase receptors and therefore are not considered in assessing operational effects.

Human Health (Future End Users)

11.7.17 There are no potential human health pollutant linkages anticipated to remain during the operational phase (completed development) or during maintenance as it is assumed that the design of the proposed development will embed suitable mitigation for the protection of human health.

11.7.18 Overall, once the embedded mitigation has been implemented, the operational phase of the proposed development is likely to have a **Negligible Beneficial** effect on the future end users.

Water Environment (Groundwater and Surface Resources)

11.7.19 There are no potential water environment pollutant linkages anticipated to remain during the operational phase (completed development) or during maintenance as it is assumed that the design of the proposed development will embed suitable mitigation for the protection of groundwater and surface water resources.

11.7.20 Overall, once the embedded mitigation has been implemented, the operational phase of the proposed development is likely to have a localised, **Negligible Beneficial** effect on the water environment.

Built Environment

11.7.21 Methane and carbon dioxide were detected at concentrations slightly above the trigger concentrations (refer to **Section 11.4**) to the east of Pier Road and north of Ben Lomond Way, which will be designated as CS2. Depending on the nature of structures and / or buildings proposed in these areas, it will be necessary to consider the need to incorporate ground gas protection measures.

11.7.22 Overall, once the embedded mitigation has been implemented, the operational phase of the proposed development is likely to have a **Negligible Adverse** effect on the building environment.

Ecological Designations

11.7.23 The likely disturbance effects on ecological receptors are considered within **Chapter 6 – Ecology and Woodland**.

11.8 Further Mitigation and Enhancement

11.8.1 As a general rule, further mitigation measures are proposed where a significant effect is predicted to occur. As no significant effects are predicated, no additional mitigation is expected. Embedded mitigation measures, which have been incorporated within the design of the proposed development or are standard practice measures, are summarised in **Section 11.6** above, and in **Chapter 3 – The Proposed Development**.

11.9 Residual Effects

11.9.1 Taking account of all proposed mitigation and enhancement measures, the likely residual effects from the construction and operation of the proposed development on ground conditions are identified in Table 11.7 and Table 11.8 below.

Table 11.7 Summary of likely residual effects related to ground conditions (Construction Phase)

Receptor	Residual Effect Significance	Justification
Human Health (site workers)	Minor Adverse	<p>The risks to human health will become more quantifiable following further advancement of the site layout and designed uses, plus additional phases of investigation and assessment.</p> <p>The Contractor will take cognisance of the investigation works undertaken and prepare Risk Assessment Method Statements (RAMS) as appropriate.</p> <p>The CEMP will document the procedures to minimise and manage spillages from chemical storage, dust generation, dewatering discharges and run-off.</p> <p>The possibility exists for unexpected conditions to be encountered during groundworks, therefore a watching brief should be maintained. Work should be halted in the event of unexpected, potentially detrimental conditions pending further assessment.</p>
Human Health (future site users, workers, guests, customers and maintenance workers)	Not Applicable	Not a construction phase receptor.
Water Environment	Minor Adverse	<p>Construction phase will occur following some further site investigation and, if necessary, site remediation. As such, contaminants in the subsurface will have been quantified and deemed to pose an acceptably low risk or remediated.</p> <p>Piling and / or other ground improvements / deep excavations will only take place following a specific risk assessment and method statement. Techniques to minimise the creation of pathways / mobilisation of contaminants will be employed.</p> <p>The CEMP will document the procedures to minimise and manage spillages from chemical storage, dust generation, dewatering discharges and run-off.</p>
Built Environment	Not Applicable	Not a construction phase receptor.
Ecological Systems	Not Applicable	No designated ecological sites have been identified in the vicinity, mitigation measures for the site Ecology are addressed in other Chapters of this EIA.

Table 11.8 Summary of likely residual effects related to ground conditions (Operational Phase)

Receptor	Residual Effect Significance	Justification
Human Health (site workers)	Not Applicable	Not an operational phase receptor.
Human Health (future site users, workers, guests, customers and maintenance workers)	Negligible Beneficial	<p>The risks to human health have been quantified and are considered moderate to low. However, through avoiding developing some of these areas and following further phases of investigation and assessment, the site will be remediated. This should aim to render it suitable for the proposed end use without entailing unacceptable risks to human health of future users.</p> <p>The remedial measures will be validated prior to construction.</p> <p>Based on the above, the risks to future site users will have been reduced.</p>
Water Environment	Negligible Beneficial	<p>The risks to controlled water have been quantified by detailed site investigation and are considered to be very low. The development will incorporate hard standing across the majority of the site, with run off and precipitation managed. As such, the potential for migration of mobile contamination through the subsurface will be reduced.</p>
Built Environment	Negligible Adverse	<p>Buildings and infrastructure will be constructed following further site investigation and, if necessary, remediation. Buildings will be constructed with mitigation measures to reduce the potential impact of adverse ground conditions (for example appropriate ground treatment / foundation design, gas protection measures, sulphate resistant cement etc.).</p>

11.10 Summary

- 11.10.1 The proposed development comprises two separate areas known as Woodbank House and West Riverside. In terms of baseline conditions, Woodbank House is currently occupied by fields used for grazing, vegetated with woodland and various ruined buildings formerly associated with a hotel and West Riverside is occupied by woodland and walking paths and two INEOS oil pipelines run through the site from west to east.
- 11.10.2 A recent preliminary ground investigation has identified ground conditions across the undeveloped areas site which comprise natural drift deposits with alluvium (soft, sandy, clayey peat) primarily to the east of Pier Road, glaciofluvial deposits (sands and gravels with silt and clay) and till (gravelly sandy clay), and Made ground of > 1m thick, almost entirely restricted to the eastern part of the site where former railway lines ran. Soils containing elevated contaminants were primarily restricted to the area to the east of Pier Road and to the North of Ben Lomond Way. The primary contaminant of concern was lead, however, elevated arsenic and hexavalent chromium were also encountered.
- 11.10.3 More detailed assessment of the potential risks posed by contaminants will be undertaken after any PPIP is granted for the proposed development, in order to inform its detailed design. In particular, additional area specific site investigation will be designed and undertaken to quantify the potential sources of contamination and to inform the design of specific mitigation measures to be adopted. This investigation will also be required to target areas of potential instability associated with former Made Ground deposits and in areas of Peat.
- 11.10.4 Specific mitigation measures will then be devised, secured through the approval of matters specified in conditions (AMC) applications to the local planning authority and thereafter implemented. In particular, it is likely that some remediation measures will be required in the West Riverbank area. Ground gas monitoring indicates that the area east of Pier Road and north of Ben Lomond Way will be classified as CS2 as a result of concentrations of carbon dioxide and methane in exceedance of trigger values. The design of buildings in these areas may therefore require the inclusion of gas protection measures. The results for the remainder of the site indicate that it would be classified as CS1 and no gas protection measures will be required. The results of the analysis of groundwater samples have confirmed the presence of slightly elevated concentrations of heavy metals in some of the boreholes. The concentrations encountered are considered unlikely to have significant negative impact on the sensitive receptors (Loch Lomond and River Leven), however, a further round of borehole sampling and the collection of surface water samples with testing is recommended to strengthen this conclusion.
- 11.10.5 The conclusions of this assessment are that the construction and operation of the proposed development would result in a likely significant effects in respect of site workers (human health) during the construction phase of the development. However, this effect is localised, and will be mitigated through site specific Risk Assessment and Method Statements together with a 'procedure and watching brief' for any unexpected conditions that should be encountered during groundworks. In this case, work should be halted in the event of unexpected, potentially detrimental conditions pending further assessment.
- 11.10.6 Taking account of all proposed embedded and further mitigation measures, **no likely significant residual effects are predicted on ground conditions from the proposed development.**

11.11 Glossary and reference

References

- Defra and EA (2004) Model Procedures for the Management of Contaminated Land (CLR11) Bristol, Defra and EA.
- National House-Building Council (2014) Standards Chapter 4.1 Land Quality – Managing Ground Conditions.
- Scottish Environment Protection Agency (2006-2018) Guidance for Pollution Prevention and Publications.
- British Geological Survey (2018) Geology of Britain viewer, available at: www.bgs.ac.uk/data/boreholescans/home.html [last accessed 04/04/18].

Glossary

11.11.1 A summary of terms and abbreviations used in this ES chapter is provided below.

Aquifer	Underground body of permeable rock which can contain or transmit groundwater.
Asbestos containing materials	Materials which have the potential to contain asbestos.
Phase I Ground Condition Assessment Report	Report assessing ground conditions based on publicly available information, current and historical mapping, previously undertaken reports and a site visit. Includes an assessment of potential contamination sources, a Conceptual Site Model which sets out the relationships between Sources, Pathways and Receptors and a preliminary risk assessment.
Phase II Ground Investigation Report	Report which provides factual records from ground investigations and includes the ground conditions encountered during ground investigation works.
Contamination	Anthropogenic or naturally occurring chemicals in soils or water that have the potential to cause harm to sensitive receptors.
Construction Environmental Management Plan	Outlines how a construction project will avoid, minimise or mitigate effects on the environment of the construction activities and operations.
Land instability	Ground conditions that could cause damage to proposed buildings and infrastructure due to compressibility, cavity collapse or slope instability.
Conceptual model	Representation of a site and the surrounding area. Typically comprises a mixture of pictures, diagrams and text and it is used to provide a vision of the site. It is important that your conceptual model is updated regularly during your site investigation.
Contaminated land	Environmental Protection Act Part IIA: Any land which appears to the local authority in whose area it is situated to be in such condition, by reason of substances in, on or under land that: (i) Significant harm is being caused or there is significant possibility of such harm being caused; or (ii) Pollution of controlled waters is being, or is likely to be, caused.
Groundwater	Water held underground in the soil or in pores and crevices in rock.
Groundwater abstraction	The process of taking groundwater from any source, either temporarily or permanently and using it for industrial or domestic.

Hazard/source	Substance or situation that has the potential to cause harm or pollution.
High Sulphate (or Sulfate)	High concentrations of sulphate can react with concrete and adversely affect its form (expansion, extensive cracking, loss of bond between cement paste and aggregate).
Hydrology	Study and practical implications of the movement, distribution and quality of freshwater in the environment.
Hydrogeology	Branch of geology concerned with water occurring underground or on the surface of the earth.
Made Ground	Land or ground created by filling in a low area with waste or other fill material.
Pathway	A means by which the hazard moves along / generates exposure.
Potential sources of contamination	Sources which have the potential to cause ground and/or water contamination.
Potential geological hazards	Geological features related to ground stability (i.e. unstable slopes, ground compression and cavities (natural and anthropogenic) which have the potential to become a hazard.
Remediation	Action taken to reverse or stop environmental damage.
Receptor	An entity that is vulnerable to the potential adverse effects of the hazard).
Risk assessment	A systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking.
River Basin Management Plan	Establish the current status of waters within the catchments across Scotland.
Source Protection Zones	Are defined around large and public potable groundwater abstraction sites. The purpose of SPZs is to provide additional protection to safeguard drinking water quality through constraining the proximity of an activity that may impact upon a drinking water abstraction.
Surface water	Water that collects on the surface of the ground (e.g. rivers or lakes).
Water Framework Directive	European legislation in place to protect groundwater.

List of Abbreviations

Asbestos Containing Materials	ACMs
British Geological Survey	BGS
Construction Environmental Management Plan	CEMP
Contaminated Land Report	CLR
Contaminants of Concern	CoC
Department for Environment, Food and Rural Affairs	Defra
Environment Agency	EA
Multi-Agency Geographic Information for the Countryside	MAGIC
National Planning Policy Framework	NPPF
Peter Brett Associates LLP	PBA
Potential Geological Hazard	PGHs
Potential Sources of Contamination	PSC
Risk Assessments and Method Statements	RAMS
River Basin Management Plan	RBMP
Site Specific Assessment Criteria	SSAC
Site of Special Scientific Interest	SSSI
Scottish Environment Protection Agency	SEPA
Source Protection Zones	SPZs
Water Framework Directive	WFD

12 Landscape and Visual

12.1 Introduction

12.1.1 This ES chapter provides an assessment of the likely significant effects from the proposed development on landscape, views and visual amenity. The assessment is based on the characteristics of the site and surrounding area and the key parameters of the proposed development detailed in **Chapter 2 – Site and Surrounding Area** and **Chapter 3 – The Proposed Development** respectively. This chapter has been prepared by Gillespies LLP.

12.1.2 The aims of this chapter are to:

- Identify the relevant context in which the landscape and visual assessment (LVIA) has been undertaken;
- Describe the methods used to undertake the assessment;
- Outline the relevant baseline conditions currently existing at the site and surroundings;
- Identify the potential direct and indirect landscape and visual effects of the proposed development;
- Identify mitigation and enhancement measures where required to address identified effects;
- Assess residual predicted effects; and
- Assess cumulative landscape and visual effects from the proposed development in combination with other relevant cumulative developments.

12.1.3 This ES chapter is supported by the following technical reports provided in **Appendices 12.1 - 12.6**:

- **Appendix 12.1 Figures;**
 - Figure 12.1 Site Location and Study Area;
 - Figure 12.2 Topography;
 - Figure 12.3a ZTV Apart-Hotel and Waterpark;
 - Figure 12.3b ZTV Station Square;
 - Figure 12.3c ZTV Woodbank House;
 - Figure 12.4 Loch Lomond and The Trossachs Landscape Character Areas; and
 - Figure 12.5 Landscape Designations.
- **Appendix 12.2 Methodology;**
- **Appendix 12.3 Landscape Character Assessment;**
- **Appendix 12.4 Viewpoint Assessment;**
- **Appendix 12.5 Viewpoint Massing Studies; and**
- **Appendix 12.6 Additional Viewpoint Plates.**

12.2 Legislative and Policy Context

Legislation

12.2.1 The overarching legislative framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**.

12.2.2 Of particular relevance to this assessment is the National Parks (Scotland) Act 2000 as amended, Section 1 of which identifies the four aims of Scotland's National Parks including Loch

Lomond and the Trossachs National Park (LLTTNP). These are directly or indirectly applicable to this assessment, namely:

“(a) to conserve and enhance the natural and cultural heritage of the area;

(b) to promote sustainable use of the natural resources of the area;

(c) to promote understanding and enjoyment (including enjoyment in the form of recreation) of the special qualities of the area by the public; and

(d) to promote sustainable economic and social development of the area's communities”.

Policy

12.2.3 The planning policy framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Planning policy considerations of specific relevance to this assessment are:

- Adopted Loch Lomond and the Trossachs National Park (LLTNP) Local Development Plan (LDP) (2016) including relevant policies outlined in Table 5.1, in particular:
 - The LDP Development Strategy Map (page 17) identifies Balloch as one of eight locations for ‘Strategic Tourism Opportunities’, reflecting its role as a visitor destination and gateway to the National Park;
 - Overarching Policy 1 – Strategic Principles;
 - Overarching Policy 2 – Development Requirements;
 - Visitor Experience Policy 2 – Delivering a World Class Visitor Experience;
 - Natural Environment Policy 1 – National Park Landscapes, Seascape and Visual Impact;
 - Natural Environment Policy 8 – Development Impacts on Trees and Woodlands;
 - Historic Environment Policy 1 – Listed Buildings;
 - Historic Environment Policy 3 – Wider Built Environment and Cultural Heritage;
 - Historic Environment Policy 4 – Gardens and Designed Landscapes (GDL);
 - Historic Environment Policy 6 – Scheduled Monuments and Other Nationally Important Archaeological Sites; and
 - Open Space Policy 2 – Protecting Other Important Open Space.
- Draft LLTP Partnership Plan 2018 – 20232, in particular outcomes 1-3 and 5-9;
- National Planning Framework 3 (NPF3) (2014);
- **Scottish Planning Policy (2014)** including relevant provisions outlined in Table 5.2 in **Chapter 5**, in particular:
 - Principal Policy on Sustainability (paragraphs 24-35);
 - Principal Policy on Placemaking (paragraphs 36-57);
 - Promoting Rural Development Subject Policy (Paragraphs 74 – 91);
 - Valuing the Historic Environment Subject Policy (Paragraphs 135 – 151); and
 - Valuing the Natural Environment Subject Policy (Paragraphs 193 - 233).
- **Creating Places - A policy statement on architecture and place for Scotland (2013)**

² Loch Lomond and The Trossachs National Park Authority Loch Lomond and The Trossachs National Park, Partnership Plan 2018 - 2023

Guidance and Relevant Technical Standards

- 12.2.4 The following guidance and technical standards have informed this assessment:
- Guidelines for Landscape and Visual Impact Assessment Third Edition³ (GLVIA3);
 - Landscape Character Assessment: Guidance for England and Scotland⁴;
 - Advice Note 01/11 'Photography and Photomontage in Landscape and Visual Assessment'⁵; and
 - The State of Environmental Impact Assessment Practice in the UK⁶.

12.3 Methodology

Scope of Assessment

- 12.3.1 This ES chapter presents an assessment of likely significant effects on the landscape, views and visual amenity arising from the proposed development. The assessment presented in this ES chapter has been prepared in accordance with the 2011 EIA Regulations.
- 12.3.2 The principal aspects considered within this assessment are landscape effects and visual effects, which are related but different concepts:
- **Landscape effects** are the effects on the landscape as a resource, including the constituent physical elements of the landscape as well as its specific aesthetic or perceptual qualities, the character of the landscape in different areas and any special interests such as designations or special qualities; and
 - **Visual effects** are the effects on specific views and on the general visual amenity⁷ experienced by people at different places.
- 12.3.3 At the request of the Landscape Officer of the LLTTNP a key consideration of this assessment was the need to understand how the Special Landscape Qualities (SLQ)⁸ of the LLTTNP ('the Park'), are experienced and how they may be affected by the proposed development. SLQ are linked to the type, range and composition of the physical components of the landscape, as well as to the less tangible experiential aspects of landscape as recognised and valued by people. SLQ do not necessarily have to be rare qualities, but simply what makes an area important and valued.
- 12.3.4 Within the Scoping Opinion it was detailed that the SLQ of the LLTTNP likely to be affected by the proposals are the Park's general qualities and the area based qualities of Loch Lomond. Therefore these are the qualities that have been considered within this assessment. Greater detail on the SLQ is provided below in paragraphs 12.4.28 to 12.4.32 and on pages 4 and 5 of **Appendix 12.3 Landscape Character Assessment**.

Overall Approach

- 12.3.5 This ES chapter presents an assessment of the likely significant effects of the proposed development on the landscape, views and visual amenity.

³ Landscape Institute and Institute of Environmental Management and Assessment (2013), Guidelines for Landscape and Visual Impact Assessment

⁴ Scottish Natural Heritage (2002), Landscape Character Assessment: Guidance for England and Scotland

⁵ Landscape Institute Advice Note 01/11 Photography and Photomontage in Landscape and Visual Impact Assessment

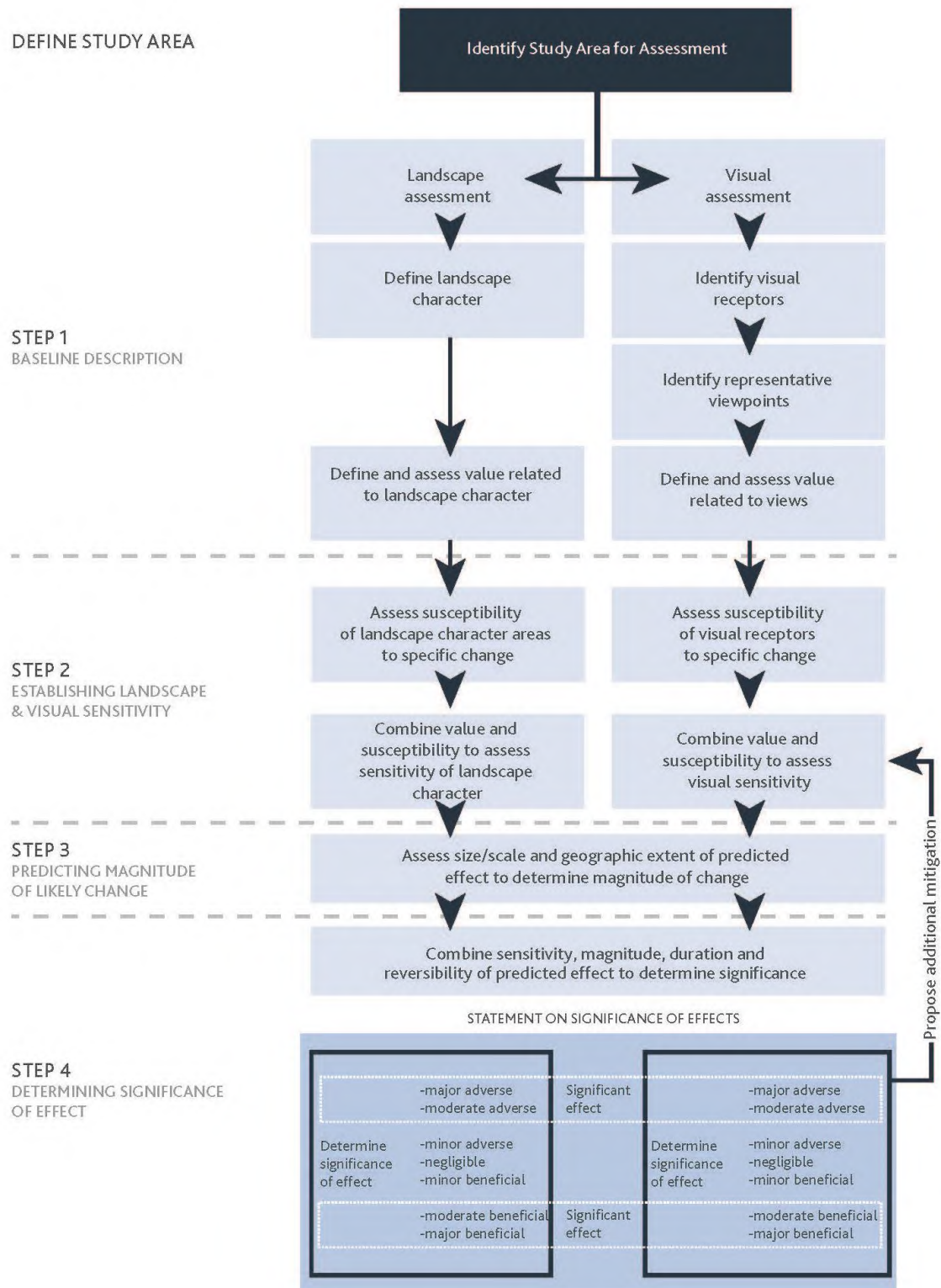
⁶ Institute of Environmental Management and Assessment, The State of Environmental Impact Assessment Practice in the UK (2011)

⁷ Visual amenity is the overall pleasantness of the views people enjoy of their surroundings.

⁸ As identified in Scottish National Heritage and Loch Lomond and The Trossachs National Park Authority (2010). The special landscape qualities of the Loch Lomond and The Trossachs National Park. Scottish Natural Heritage Commissioned Report No. 376

- 12.3.6 This assessment has been informed by an EIA Screening and Scoping Report (PBA, April 2017) and subsequent EIA Screening and Scoping Opinions issued by LLTNPA (11th May 2017) in respect of the EIA for the proposed development. The EIA Scoping Opinion, which is provided in full in **Appendix 4.1**, included a list of standard requirements for LVIA work. However, the following should also be noted:
- It was stated that reference should be made to the Landscape Character Assessment SNH Review (2015) and in particular the landscape character type (LCT) rationalisation, which would reclassify the southern end of Loch Lomond as Loch Lomond Basin LCT. This review was scheduled to be published at the end of 2017. At the time of writing (January 2018) this review is not yet available and therefore cannot be referenced. Requests were made to the National Park Authority for a copy of the review on 10 and 23 January 2018. On 24 January 2018 the Landscape Office at the Park confirmed that the 2015 review was not yet available and the previous document and classifications should be used;
 - Likely visual amenity effects on tourist and recreational receptors are covered within this chapter. Other likely effects on recreational experience and visitor management are covered within **Chapter 14 - Socio-Economics, Tourism, Recreation and Public Access**; and
 - Whilst heritage assets are referenced within this chapter as part of the baseline, the assessment of likely effects on heritage assets is provided in **Chapter 13 – Archaeology and Heritage**.
- 12.3.7 Since submitting the EIA Screening and Scoping Report for the proposed development, desk top research, field studies and further consultations with stakeholders including the National Park Authority has been undertaken. As a result, the methodology presented in this chapter is more detailed in its scope than that presented in the EIA Screening and Scoping Report (PBA, April 2017), particularly in respect of providing criteria for assessing value, susceptibility and sensitivity.
- 12.3.8 It is important to note that at the time of undertaking EIA screening and scoping, the key concern with respect to potential landscape and visual impacts was the proposed erection of a tall viewing tower at the south end of Loch Lomond. This proposal is no longer being carried forward and further consultation with the landscape officer at LLTNPA confirmed that, as a result of this proposal being removed, the Study Area for the LVIA of the proposed development could be reduced to 5km and that many of the previously identified potential receptors were no longer relevant to consider within the LVIA.
- 12.3.9 The process for the LVIA is illustrated in **Diagram 12.1** and summarised below. Each stage is described in more detail at **Appendix 12.2**. A key principle is for the landscape and visual baseline to be identified and understood before the assessment, which is based on a combination of the receptors value, sensitivity and the predicted magnitude of change, takes place.

Diagram 12.1 LVIA Process



Source: Gillespies LLP

Study Area

- 12.3.10 The site location and Study Area adopted for this assessment are shown in **Figure 12.1** at **Appendix 12.1**.
- 12.3.11 A 20km radius Study Area from the site was proposed in the EIA Scoping Report. As noted above, following the decision to remove the viewing tower from the proposed development, and with agreement from LLTNPA, this was reduced to a 5km radius from the site boundary, for the LVIA. The 5km Study Area which has been adopted in this assessment is larger than would normally be used for projects of this type, however due to the site's location within a National Park and the local topography it was decided that 5km would be an appropriate distance to ensure any noticeable landscape and visual effects were identified.
- 12.3.12 Due to the scale of the proposed development and the lack of perceptibility of the site from the wider area, it is unlikely that any prominent effects would be identified from further afield than 5km. However, it was agreed with the National Park Authority that one viewpoint would be included from high ground outside of the Study Area (approximately 7km from the site boundary) to demonstrate that the effect on views from distant high ground would not be significant .

Information Sources

Desk Top Study

- 12.3.13 The assessment was informed by an initial desktop study, including a review of relevant documents, Ordnance Survey (OS) data, aerial photography and Google Earth Pro.
- 12.3.14 Documents which helped define the landscape across the Study Area include:
- Loch Lomond and The Trossachs National Park Landscape Character Assessment⁹;
 - Glasgow and Clyde Valley Landscape Character Assessment¹⁰;
 - Argyll and the Firth of Clyde Landscape Character Assessment¹¹;
 - Special Landscape Qualities of the Loch Lomond and The Trossachs National Park¹²; and
 - Kilpatrick Hills Local Landscape Area Statement of Importance¹³.

Fieldwork

- 12.3.15 A site survey was undertaken on the 29th and 30th November 2017. Its purpose was to gain further understanding and appreciation of the landscape, the special qualities of the National Park and the landscape character areas within the Study Area, to undertake the viewpoint survey, and to understand the likely effects of the proposed development. A further site survey was undertaken on 30th January 2018 to complete this work.

Approach to Assessment

Identification of Relevant Receptors

- 12.3.16 Predicting the likely effects of the proposed development requires identification of the receptors who are likely to be affected. This includes both:
- Landscape receptors made up of designated landscapes, such as the National Park itself and the Landscape Character Areas (LCA) which cover the Study Area, including their

⁹ Scottish Natural Heritage (2011), Loch Lomond and The Trossachs National Park Landscape Character Assessment

¹⁰ Scottish Natural Heritage (1998), Glasgow and Clyde Valley Landscape Character Assessment

¹¹ Scottish Natural Heritage (1996), Argyll and the Firth of Clyde Landscape Character Assessment

¹² Scottish National Heritage (2010), Special Landscape Qualities of the Loch Lomond and The Trossachs National Park

¹³ West Dunbartonshire Council (2015), Kilpatrick Hills Local Landscape Area Statement of Importance

- constituent elements, key characteristics, physical, aesthetic and/or perceptual qualities and overall landscape character; and
- Visual receptors – that is the people, whether individuals or defined groups, who will be affected by changes in views or visual amenity at different places.
- 12.3.17 In identifying visual receptors, three Zones of Theoretical Visibility (ZTV) (**Figure 12.3a, b and c** in **Appendix 12.1 - Figures**) have been prepared for the proposed development:
- **Figure 12.3a** – ZTV based on apart-hotel, waterpark and visitor centre at the loch shore (this relates to Zone C: Pierhead of Figure 3.1 – Parameters Plan);
 - **Figure 12.3b** – ZTV based on the ‘Station Square’ development (this relates to Zone A: Station Square of Figure 3.1 – Parameters Plan); and
 - **Figure 12.3c** – ZTV based on the proposed residential development at Woodbank House (this relates to Zone E: Woodbank of Figure 3.1 – Parameters Plan).
- 12.3.18 A ZTV has not been produced for the proposed woodland lodges and other structures within Drumkinnon Woods (relating to Zone B: Riverfront and Zone D: Drumkinnon Wood and Bay of **Figure 3.1 – Parameters Plan**). By definition these developments will be substantially screened from visual receptors in the wider Study Area and would therefore not give rise to significant visual effects. A ZTV for development within the woodland would not be a useful assessment tool.

Impact Assessment Methodology

- 12.3.19 The same overall methodology has been adopted to assess likely effects during the construction and operational phases of the proposed development, as described below.

Step 1 – Baseline Description

Landscape Baseline

- 12.3.20 The LCAs defined within the existing published landscape character assessments listed in paragraph 12.4.21 formed the starting point for the description of the landscape baseline. For each identified LCA, a detailed information and assessment sheet is provided within **Appendix 12.3 – Landscape Character Assessment**, which also includes a detailed information and assessment sheet for the Park as a whole.
- 12.3.21 The Park and each LCA was described in terms of:
- The existing situation, including a factual description of the existing landscape - its constituent elements, its character and the way this varies spatially, its geographic extent, its history, its condition and the way the landscape is experienced;
 - The existing landscape character – the distinct recognisable and consistent pattern of elements in the landscape that makes one landscape different from another; and
 - The value of the existing landscape – this informs later judgments about significance of effect.
- 12.3.22 Landscape value¹⁴ is defined as the relative value that is attached to different landscapes by society, bearing in mind that a landscape may be valued by different stakeholders for a variety of reasons. Value can apply to areas of landscape as a whole, or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the character of the landscape. The quality of a valued landscape is often explained in a citation for a designation, but where this isn't available, value can be assessed through the application of a criteria based comparative landscape approach supported by published documentation such as tourist

¹⁴ Value in this instance means demonstrable features that elevate it above the ordinary.

leaflets, art and literature. This is in line with the European Landscape Convention¹⁵ which promotes an ‘all-landscapes approach’, founded on the recognition of value in all landscapes.

- 12.3.23 To ensure a systematic and consistent approach, the landscape value of each LCA was described with reference to seven criteria. These criteria are based on the key landscape characteristics identified within the Loch Lomond and The Trossachs National Park Landscape Character Assessment and consideration of GLVIA3 and the range of factors listed in Box 5.1 of GLVIA3 as helping the identification of valued landscapes. The seven criteria are: landscape features (i.e. landform, land use and land cover); settlement, development and leisure; access and recreation; biodiversity; cultural heritage and associations; aesthetic qualities and perceptual qualities (e.g. tranquillity or wildness).
- 12.3.24 For each criteria, the value of the landscape within each LCA was determined using a four-point scale from low to very high using professional judgement with reference to the site visits, consultation feedback, review of background documentation and consultation with other disciplines such as ecology and cultural heritage.
- 12.3.25 An overall level of value for each LCA was determined using a four-point scale from low to very high using professional judgement to assimilate the individual assessments and reference to the indicators of value provided in **Table 12.2.1** in **Appendix 12.2**. In making judgements on landscape value, additional weight was given to the factors which were considered to be making the most contribution to the value of the landscape.

Visual Baseline

- 12.3.26 The assessment of the visual baseline within the Study Area considered the following:
- The area within which the proposed development may be visible – by use of the ZTV prepared for the proposed development. In this instance three separate ZTVs were produced because the proposed development has three separate zones of potential visibility, as detailed below in the Baseline Conditions section of this chapter;
 - The different groups of people who may experience views of the proposed development;
 - The identification of representative viewpoints from which to conduct the viewpoint survey, as agreed with the landscape officer at the National Park Authority;
 - The final selection of representative viewpoints following three days of field work including visiting the initially selected representative viewpoints; and
 - The nature of the views and visual amenity at the selected viewpoints.
- 12.3.27 All the viewpoints used for the assessment of visual effects were in publicly accessible locations and were chosen to represent the range of visual receptors and types of view likely to be experienced within the surrounding area. The area around each broad viewpoint location was explored to find the most suitable (i.e. unscreened and representative) and safe location for the view to be recorded and photographed.
- 12.3.28 Judgements about the value attached to the view at each viewpoint took account of:
- Views which are important in relation to the special qualities of a designated landscape (in this case the LLTTNP);
 - Views recorded as important in relation to heritage assets (as recorded in the relevant citations accompanying the designation and taking account of Historic Scotland’s guidance¹⁶ on the setting of heritage assets);
 - Advertised viewpoints which appear in a guidebook or on tourist maps;
 - Location with provision of facilities for enjoyment e.g. parking, picnic and interpretation facilities; and

¹⁵ The European Landscape Convention (ELC) was the first international convention to focus specifically on landscape, and is dedicated exclusively to the protection, management and planning of all landscapes in Europe. The ELC became binding from 1 March 2007.

¹⁶ Historic Environment Scotland (2016), Managing Change in the Historic Environment: Setting

- Professional judgements about the quality and condition of the view.

12.3.29 Each viewpoint was visited and an overall level of the value of the view experienced was determined using a four-point scale from low to very high using professional judgement to assimilate the individual assessments and reference to the indicators of value provided in **Table 12.2.2** in **Appendix 12.2**. In making judgements on value, additional weight was given to the factors which were considered to be making the most contribution to value.

Step 2 – Establishing Landscape and Visual Sensitivity

12.3.30 The sensitivity of landscape and visual receptors is made up of judgements about the susceptibility of the receptor to the type of change arising from the proposed development and the value attached to the landscape or view under consideration (as defined by the baseline study).

12.3.31 Susceptibility is defined as the ability of a defined landscape or visual receptor to accommodate the proposed development without undue negative consequences.

Landscape Sensitivity

12.3.32 In determining landscape sensitivity, judgements were first made about the susceptibility of the landscape to the type of change arising from the proposed development - that is the extent to which the attributes of the receiving landscape are considered able to accommodate the proposed development without undue negative consequences.

12.3.33 The most susceptible i.e. vulnerable or fragile landscape is one which has little scope to accommodate the changes from the proposed development without its key characteristics being fundamentally altered, potentially leading to a different landscape character and conflicting with planning policies and strategies. Conversely a robust landscape is one which is resilient to the changes arising from the proposed development. In such cases only individual elements and/or features, or a particular aesthetic and perceptual aspect may be affected and the proposed development accords with planning policies and strategies.

12.3.34 The susceptibility of the landscape to the development was considered using the same criteria outlined above for assessing the landscape value and again each criteria was judged on a four-point scale from low to very-high using professional judgement with reference to site visits, consultation feedback, review of background documentation and consultation with other disciplines such as ecology and cultural heritage.

12.3.35 These judgements on the individual criteria were then considered together to inform an overall evaluation of the susceptibility of the landscape using professional judgement to assimilate the assessments made for each of the criteria and draw out the criteria most important to susceptibility in each case.

12.3.36 Finally, the judgements on value (as defined in the baseline study) and susceptibility of the landscape within each LCA were combined into an overall judgement on sensitivity using a four-point scale from low to very high using professional judgement to assimilate the individual assessments and reference to the indicators of landscape sensitivity provided in **Table 12.2.3** in **Appendix 12.2**. In making judgements on landscape sensitivity, appropriate weight was given according to the factors which were considered to be making the most contribution.

Visual Sensitivity

12.3.37 In determining visual sensitivity, judgements were first made about the susceptibility of each visual receptor to the type of change arising from the proposed development. The susceptibility of visual receptors is typically a function of the occupation or activity of people experiencing the view at a particular location and the extent to which their attention or interest may therefore be focused on the view and the visual amenity they experience. For example residents have prolonged viewing opportunities and are more likely to be interested in their surroundings than people using sports pitches or working indoors, whose attention is likely to be focussed on their activity rather than on the view.

12.3.38 For each viewpoint the judgements on the value of the view and susceptibility of the visual receptors were combined into an overall judgement on visual sensitivity using a four-point scale from low to very high using professional judgement to assimilate the individual assessments

and reference to the indicators of visual sensitivity provided in **Table 12.2.4** in **Appendix 12.2**. In making judgements on sensitivity, appropriate weight was given according to the factors which were considered to be making the most contribution.

12.3.39 As explained in more detail in Appendix 12.2, depending on the individual circumstance of each receptor, the assessment of sensitivity of the visual receptors at each viewpoint was adjusted up or down to fully reflect the viewer's expectations at a particular viewpoint and the nature of the development proposed in that location. For example people visiting the National Park are likely to be more sensitive to a large scale commercial development than they would to a new property built in the local vernacular.

12.3.40 Most of the selected viewpoints are representative of more than one type of receptor, for example, Viewpoint 6 represents the view experienced by both drivers and residents along Old Luss Road. In this situation residents have prolonged viewing opportunities and are considered to have a higher sensitivity to changes in visual amenity than road users. Where this arises, the highest sensitivity receptor is used in the assessment.

Step 3 – Predicting the Magnitude of Likely Change

12.3.41 Prediction of the likely magnitude of landscape and visual change combines judgements about the size and scale of the likely effect and the geographical extent of the area over which it occurs. When predicting magnitude of likely change the embedded mitigation listed in **Section 12.6 – Embedded Mitigation**, was taken into account.

Magnitude of Landscape Change

12.3.42 The scale/size and geographical extent of the change within an LCA depends on the degree to which the character of the landscape would be altered through the removal of existing landscape components or the addition of new components.

12.3.43 For each LCA the judgements on size/scale of effects and geographical extent were combined and an overall prediction of the likely magnitude of change made using a five-point scale of negligible to very-high based on professional judgement and the indicators set out in **Table 12.2.5** in **Appendix 12.2**.

12.3.44 Magnitude of landscape change was also assessed as being either beneficial or adverse where for:

- Beneficial change - the development, or part of it, would appear in keeping with existing landscape character and would make a positive visual and/or physical contribution to the key characteristics; and
- Adverse change - the development, or part of it, would be perceived as an uncharacteristic or intrusive component in the context of existing landscape character and would have a negative visual and/or physical effect on key characteristics.

Magnitude of Visual Change

12.3.45 The size/scale of the change in the view depends on the degree to which the view would be altered and is influenced by the factors listed in **Section 12.3.71** of **Appendix 12.2**.

12.3.46 For each viewpoint the judgements on the size/scale of effect and geographical extent were combined and an overall prediction of the likely magnitude of change made using a five-point scale of negligible to very-high based on professional judgement and the indicators set out in **Table 12.2.6** at **Appendix 12.2**.

12.3.47 As requested within the EIA Scoping Opinion and discussed in subsequent consultation with LLTNPA, visualisations of the proposed development have been prepared for selected viewpoints where significant visual effects are considered likely. They are presented in **Appendix 12.5 Viewpoint Massing Studies**. As this is currently only a Planning Permission in Principle the visualisations produced focus on the likely mass of the buildings within the Proposed Development and are not intended to be photo-realistic interpretations. These visualisations helped inform the assessment of the likely magnitude of visual change.

12.3.48 Magnitude of visual change was also assessed as being either beneficial or adverse, as follows:

- Beneficial change - the development, or part of it, would be perceived as a positive addition in the context of the existing view; and
- Adverse change - the development, or part of it, would be perceived as an uncharacteristic or intrusive component in the context of the existing view.

Assumptions and Limitations

- 12.3.49 All construction effects are assumed to be adverse.
- 12.3.50 It was not possible to enter the curtilage of private residential properties therefore the assessment of potential effects on the visual amenity of residents has been carried out from nearby roads and footpaths.
- 12.3.51 Due to the field work being undertaken during the winter months, visitor access (via the public ferry services for example) to Inchmurrin Island, in order to undertake a field survey and viewpoint photography, has not been possible. A panoramic photograph was provided by the LLTNPA for use within this report and the impact assessment completed via desk-top research.

Establishment of Effect Level and Significance

- 12.3.52 To draw final conclusions about the likely level and significance of landscape and visual effects, the separate judgements about the value and sensitivity of the individual landscape and visual receptors and the magnitude of each effect were combined. The likely level of effect was first identified when assessing potential effects in the absence of further (i.e. not embedded) mitigation (see **Section 12.7**), with the residual significance of likely effects then confirmed in **Section 12.9**.

Step 4 – Determining the Significance of Effects

- 12.3.53 Assessment of the likely level and significance of landscape or visual effects required the application of professional judgement to weigh the sensitivity of the landscape or visual receptors with the magnitude of predicted change. The broad criteria that influenced the level and significance of landscape and visual effects are set out in Table 12.1 below. Because different factors may be relatively more or less important depending on the particular location, the presence of any combination of factors which contribute to sensitivity or magnitude was considered when assessing the level (and thus significance) of effect.
- 12.3.54 A further consideration at this stage was the duration of the predicted change and whether it could be reversed if the proposed development were removed.
- 12.3.55 The final judgment on whether each effect should be considered significant in the context of the EIA Regulations took account of relevant proposed further mitigation and enhancement measures (**Section 12.8**). It also relied on informed professional judgement, supported by narrative text to draw out the key issues, describe the effects and explain the underlying rationale.

Table 12.1 Definitions of Effect Level and Significance

Effect Level and Significance	Definition
Major Beneficial (significant)	<p>Would considerably improve and enhance the existing landscape character/landscape setting or view.</p> <p>Would restore or reinstate valued characteristic elements/features entirely or substantially lost through other land uses.</p> <p>Would make a substantial positive contribution to local environmental policies for the protection and enhancement of the landscape.</p>
Moderate Beneficial	<p>Would markedly improve and enhance the existing landscape character/ landscape setting or view.</p>

Effect Level and Significance	Definition
(significant)	Would restore or enhance valued characteristic elements/features largely lost through other land uses. Would make a positive contribution to local environmental policies for the protection and enhancement of the landscape.
Minor Beneficial	Would slightly enhance the existing character/landscape setting or view.
Negligible	Would be compatible with the existing character/landscape setting or view.
Minor Adverse	Would be slightly at variance with the existing character/landscape setting or view. Would damage or partially remove some locally valued characteristic elements/features. Would cause a perceptible deterioration in the view.
Moderate Adverse (significant)	Would be at variance with the existing character and/or setting of the landscape and diminish its integrity. Would destroy, degrade or diminish valued characteristic elements/features (including aesthetic or perceptual qualities). Would cause a noticeable deterioration in the view. Would potentially be compatible with local environmental policies for the protection and enhancement of the landscape.
Major Adverse (significant)	Would be at considerable variance with the existing character and/or setting of the landscape, degrading its integrity. Would permanently destroy, degrade or diminish valued characteristic elements/features (including aesthetic or perceptual qualities), particularly rare or distinctive landscapes. Would cause a substantial deterioration in the view. Would conflict with international, national, regional or local environmental policies for the protection and enhancement of the landscape.

12.3.56 Each of these four categories (Negligible, Minor, Moderate or Major) covers a broad range of effects and represents a continuum or sliding scale as illustrated in **Diagram 12.2** below, which is adapted from the 'EIA Significance Evaluation Matrix' Figure 6.3 in The State of Environmental Impact Assessment Practice in the UK¹⁷. Any residual effect judged to be Major or Moderate is deemed to be significant in the context of the EIA Regulations.

12.3.57 As noted in GLVIA3 (para. 6.44), the relationship between receptors and effects is not generally a linear one and there are no hard or fast rules about what makes an effect significant. In terms of landscape effects, paragraph 5.56 of GLVIA3 notes that at opposite ends of the spectrum:

- 'Major loss or irreversible negative effects, over an extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes are likely to be of the greatest significance; and

¹⁷ Institute of Environmental Management and Assessment, The State of Environmental Impact Assessment Practice in the UK (2011)

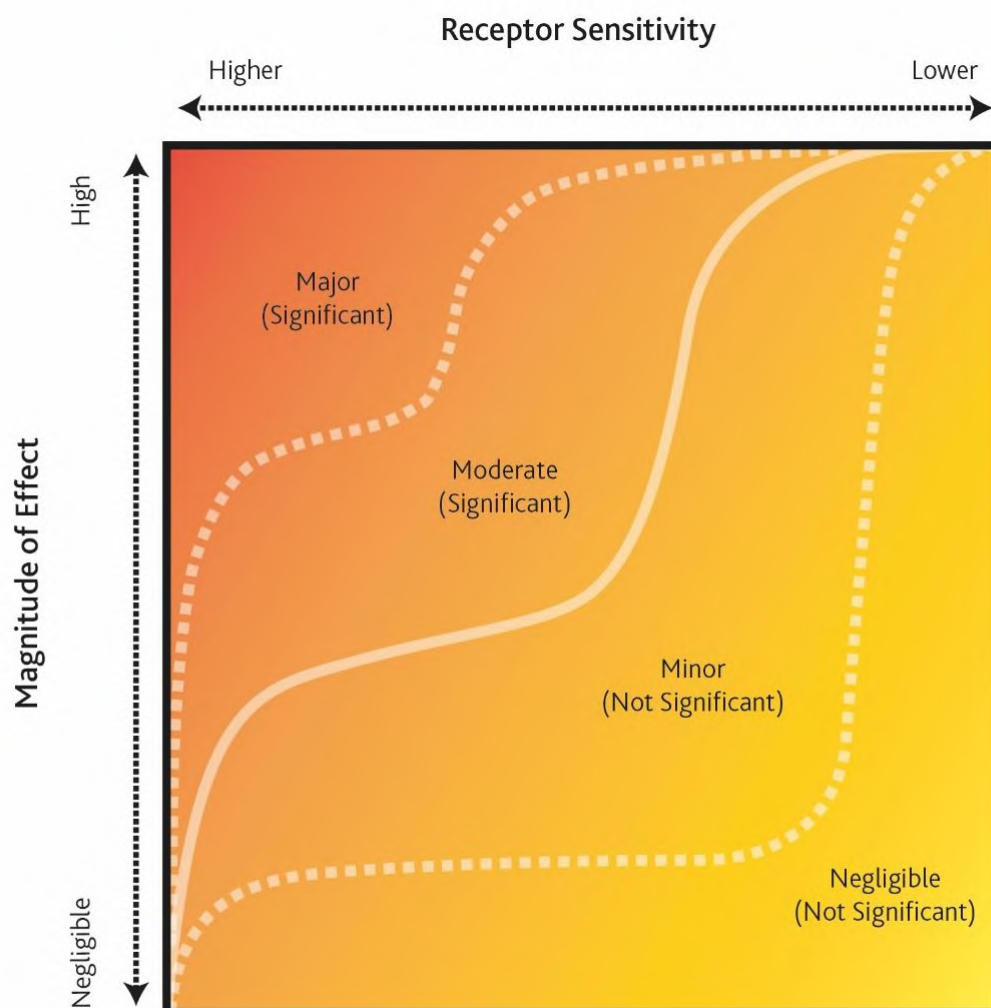
- Reversible negative effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of landscapes of community value, are likely to be of the least significance and may, depending on the circumstances, be judged as not significant’.

12.3.58 In terms of visual effects, paragraph 6.44 of GLVIA3 notes the following:

- ‘Effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant;
- Effects on people at recognised and important viewpoints or from recognised scenic routes are more likely to be significant; and
- Large-scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view are more likely to be significant than small changes or changes involving features which are already present within the view’.

12.3.59 The final judgment on whether each effect should be considered significant relies on informed professional judgement and is supported by descriptive text to draw out the key issues, describe the effects and explain the underlying rationale.

Diagram 12.2: EIA Significance Evaluation Matrix



Adapted from Figure 6.3 EIA Significance Evaluation Matrix from IEMA’s Report - The State of EIA Practice In The UK, (2011)

- 12.3.60 Where landscape or visual effects were judged to be adverse (see Table 12.1 above), proposals for preventing/avoiding, reducing or offsetting or compensating for such effects (referred to as further mitigation) have been identified where possible. The likely level and significance of residual effects remaining after taking account of further mitigation have been summarised as the final step in the assessment process (**Section 12.9**).
- 12.3.61 Effects associated with construction will typically be temporary, lasting the duration of the construction phase. For operation, the assessment takes accounts of the effects at operation year 1, i.e. the point at which the proposed development would first be visible in its entirety and at operation year 15, i.e. when the long-term residual effects are considered following the establishment of any planting within the design and mitigation proposals and further growth of existing vegetation.

Approach to Cumulative Impact Assessment

- 12.3.62 Cumulative landscape and visual effects are the likely additional landscape and visual effects to arise from the proposed development when considered in conjunction with other relevant development proposals, as defined in **Chapter 2 – Site and Surrounding Area** and shown on **Figure 2.2 in Appendix 2.1**.
- 12.3.63 The proposed and consented developments to be considered, as identified by the LLTNPA, are:
- Replacement building and infrastructure for Sweeney's Cruises (planning application 2017/0373/DET);
 - Drumkinnon Bay dredging (planning permission 2017/0326/DET). Consented January 2018;
 - Woodbank Inn Hotel Extension (planning permission 2017/0223/DET). Consented November 2017; and
 - Balloch Street Design Project (see <https://www.sustrans.org.uk/balloch>).
- 12.3.64 It is not considered, due the scale and type of development, that any of the above identified proposals would likely cause noticeable cumulative landscape or visual effects. However, where applicable the cumulative impact assessment has adopted the same methodology as for the assessment of likely landscape and visual effects from the proposed development itself.

12.4 Baseline Conditions

- 12.4.1 This section provides a description of the landscape and visual characteristics of the site and the Study Area adopted in this assessment, before reviewing the published landscape character studies relevant to this Study Area. The baseline analysis has been informed by desk top research and site survey work.
- 12.4.2 Details are provided of the various landscape and visual amenity receptors to be found within the Study Area and area covered by the ZTV before the baseline visibility of the site is explained. Judgements on the sensitivity of the different landscape and visual receptors are also provided in this section.
- 12.4.3 In summary, the site is positioned within a nationally important designated landscape, The Loch Lomond and The Trossachs National Park (i.e. a landscape generally considered to be of a very high value) in a lowland area at the southern end of Loch Lomond, with rising ground on all sides of the site except directly to the north (Loch Lomond) and directly to the south (the urban settlements along the River Leven valley). Part of the northern section of the 5km Study Area also falls within the Loch Lomond National Scenic Area (NSA) which, like the LLTTNP, is a nationally designated landscape. It is noticeable that this NSA does not cover the southern end of Loch Lomond or the site, which suggests that the quality of the landscape around the site fell short of that required for NSA designation.
- 12.4.4 The ZTV (**Figure 12.2** in **Appendix 12.1**) illustrates the potential north-south corridor of visibility. It is primarily the landform that controls the potential visual impact of the development proposals, although the areas of woodland within and to the south of the site, together with the built form of Balloch, also have a large screening effect.

Overview

The Site

- 12.4.5 As detailed in **Chapter 2 - Site and Surrounding Area**, the site comprises two distinct but contiguous areas, referred to as 'West Riverside' and 'Woodbank House'.
- 12.4.6 The West Riverside area mostly comprises Drumkinnon Woods to the south of Ben Lomond Way, but also includes the beach and shore area adjacent to and opposite the waterside commercial development known as Loch Lomond Shores and the west bank and jetties of the River Leven where it flows out from Loch Lomond.
- 12.4.7 Drumkinnon Woods is a small area of woodland with walks and picnic areas which is located just to the south of Loch Lomond Shores on gently undulating landform, most likely as a result of former man-made activities. Running east-west through the woodland is a major gas pipeline with associated infrastructure. The woodland contains a variety of native tree species, including a number of semi-mature oak. The woodland currently provides a setting for an area of housing to the south and helps screen views of Loch Lomond Shores from this housing.
- 12.4.8 The eastern part of Drumkinnon Woods includes a corridor of open grassland within the woods, which contain mixed pioneer woodland species that would benefit from woodland management such as thinning. This area of woodland lies alongside the River Leven, which flows south into the River Clyde. Views out are limited due to the woodland and views of the river and the loch are only experienced at the edge of the woodland.
- 12.4.9 Drumkinnon Woods is bounded to the west and north by roads accessing Loch Lomond Shores and pier, and to the south by housing.
- 12.4.10 West Riverside also includes a small pebbled beach opposite Loch Lomond Shores which gradually rises to a small wooded area, which is the proposed location of the apart-hotel and waterpark.
- 12.4.11 The south-east corner of the West Riverside site comprises an area of open grassland and existing car-parking located between the River Leven, Balloch Road and Drumkinnon Woods. It is also the location of the existing 'Visit Scotland' information centre. This corner of the site is the proposed location for the 'Station Square' development comprising budget accommodation, a micro-brewery, performance area and restaurant.

- 12.4.12 The Woodbank House area comprises the remains of the Woodbank House hotel (also known as Hamilton House) associated structures and attendant grounds. It is located between the A82 and the Old Luss Road and lies to the west of the West Riverside area.
- 12.4.13 The area is situated to the west of Old Luss Road at the north-western edge of housing in Balloch. The A82 is situated approximately 90m to the west of the sites western boundary. To the east, Old Luss Road provides access to residential areas and leads to Cameron House and marina.
- 12.4.14 At the centre of the Woodbank House area lies the remains of Woodbank House, a Category-A listed property, which is now largely derelict with only part of the south elevation still remaining. The remains of the house are accessed from the Old Luss Road by a drive which runs through an area of paddock used for grazing horses which is surrounded by the remains of the former terraced gardens, including remnants of the original garden walls.

The Study Area

- 12.4.15 The Study Area extends from the Clyde valley in the south to the Highland Boundary Fault within the LLTTNP in the north. The northern half of the Study Area, including the site, lies within the LLTTNP. **Figure 12.5** in **Appendix 12.1** shows other designated sites within the Study Area, including the NSA and the Kilpatrick Hills Local Landscape Area (LLA) which covers the south-eastern section of the Study Area.

Landform and Drainage

- 12.4.16 As shown on **Figure 12.2** in **Appendix 12.1**, the site is located in a lowland area at the southern end of Loch Lomond, with rising ground on all sides except directly to the north (Loch Lomond) and directly to the south (the urban settlements along the River Leven valley). Whilst on site the landform of the site appears to be generally level, however, the site does gradually drop in height from west to east. The loch shore development area is level at approximately 12m AOD, with the landform dropping to 8m AOD at the pebbled beach area. Similarly, whilst the 'Station Square' area is level at around 12m AOD, Drumkinnon Woods gradually rises from 11m AOD at the banks of the River Leven to 17m AOD at its western boundary at Old Luss Road. There are also small localised areas of undulating landform within Drumkinnon Woods. This rise in the landform is gradual and happens over an approximate distance of 680m. The Woodbank House site is located on landform which rises from 17m AOD at Old Luss Road to approximately 27m AOD at the house itself and 41m AOD on its western boundary. The landform to the west then carries on rising to 304m AOD (Bromley Muir) 1.8km south-west of Woodbank House and 313m AOD (Ben Bowie) 4.3km west-north-west of Woodbank House. From these highpoints west of the site the landform drops again to the Firth of Clyde. The landform rises to the east of the site to approximately 212m AOD at Auchincarroch Hill, before entering the landscape of the Kilpatrick Hills east-south-east of the site.
- 12.4.17 Immediately north of the site is Loch Lomond ('the loch'), which extends north for nearly 40km. The landscape at the southern end of the loch around the site is lowland in character. Broad and shallow with gently shelving banks the southern end of the loch is surrounded by rolling farmland and designed landscapes associated with large properties including Cameron House and Balloch Castle. These farmed hill slopes rise gently from the loch shores forming a series of foothills which merge with the moorlands and pastoral lowlands of the southern loch shores.
- 12.4.18 By contrast the central and northern sections of the loch have a narrow lochside margin and are surrounded by mountains and high hill ranges, including Ben Lomond (974m AOD) which is prominent on the skyline to the north, and the Arrochar Alps to the north-west reaching 1011 m AOD on the summit of Ben Ime. Uninhabited side glens with fast flowing burns and waterfalls and a rugged terrain of crags, screes and boulders are a distinctive feature of the highland loch. These are used for grazing and often contain ancient shielings.
- 12.4.19 The visible difference between the topography around the loch is caused by the Highland Boundary Fault, which separates the highlands and lowlands of Scotland. The fault cuts through the loch in a north-east to south-west direction and is approximately 4.5km north of the site boundary at its nearest point, as it runs through Inchmurrin Island.

- 12.4.20 Ben Bowie, at 313m AOD, is the highest peak within the 5km Study Area. To the west of the mid-to-southern end of the loch the highest peak is Doune Hill (734m AOD) 18km north-west of Balloch and to the east it is Ben Uird (596m AOD) 16km north of the site.
- 12.4.21 The loch flows out at the River Leven immediately adjacent to the eastern boundary of the site. The river flows south for 8.3km before joining the River Clyde at Dumbarton. The valley around the River Leven is generally around 1.2km wide and is on low lying ground approximately 6m AOD at the river banks and rising gradually to approximately 20m AOD 600m either side of the river, before quickly rising to around 300m AOD either side of the valley. As the River Leven approaches the River Clyde the low lying riverside margins become wider.

Landcover, Land Use and Settlement

- 12.4.22 Landcover throughout the Study Area is predominantly grassland and moorland with occasional large areas of woodland. In addition, there are smaller woodland belts, particularly around the loch shores and along the valley of the River Leven. Urban settlement within the Study Area is almost entirely confined to the River Leven valley extending from Balloch to Dumbarton some 7km to the south on the banks of the River Clyde.
- 12.4.23 The five broad types of landcover and land uses within the Study Area are:
- Loch Lomond;
 - The tourist industry along the loch shores, comprising holiday accommodation, Loch Lomond Shores and golf courses. Much of the land cover within this area consists of woodland belts which screen views of the loch and hills beyond, except for where areas of high ground are visible above the vegetation;
 - Urban settlement along the river valley from Balloch to Dumbarton;
 - Moorland, which is generally open and only occasionally forested, located on the hill sides and higher ground either side of the loch and urban settlements; and
 - Large areas of agricultural land, both arable and pasture, on the lower ground beyond the moorland and generally located towards the edge of the Study Area.
- 12.4.24 More detailed information on the value, susceptibility and sensitivity of the National Park is provided within **Appendix 12.3 - Landscape Character Assessment**. In summary, the value of the landscape within the Study Area as a whole is deemed to be very high, but this is locally reduced to high around the southern end of Loch Lomond where the built development, infrastructure and proximity to Balloch means that the landscape does not have the highly scenic, rugged and wild quality of the Park experienced further north. Similarly, whilst the susceptibility of the whole Park to the proposed development is considered very high, the susceptibility of the landscape around the southern end of Loch Lomond is considered medium as the landscape is already affected by a similar development (Loch Lomond Shores), by road infrastructure and by housing at Balloch. Drumkinnon Woods is classed as ancient woodland, however photography of the site from the 1920s, '40s and '60s shows there to be only pockets of woodland on the site. Drumkinnon Woods appear to be well used by local residents, however from a visual perspective it appears to be in relatively poor condition.
- 12.4.25 The very high value combined with the very high susceptibility means that the overall sensitivity of the LLTTNP as a whole is considered to be very high. However, for the reasons explained above, the sensitivity of the site and its immediate setting is reduced to high.

Published Landscape Character Studies

- 12.4.26 The site lies just within the southern boundary of the LLTTNP and is covered by the strategic landscape character assessment for this area, a review of which was published in 2011 by SNH. The LLTTNP Landscape Character Assessment areas, published by SNH, cover the northern half of the Study Area as shown on **Figure 12.4** in **Appendix 12.1 – Figures** and provides a strategic assessment of the LLTTNP's landscape. The south-east of the Study Area is covered by the Glasgow and Clyde Valley Landscape Character Assessment (1998), whilst the Argyll and the Firth of Clyde Landscape Character Assessment (1996), covers almost the entire Study

Area. All three assessments have been produced for and published by SNH. Because the boundaries of each of these assessments overlap one another, where the assessments cover the same landscape, the LLTTNP Landscape Character Assessment has been given prominence as the most recent of the assessments. Reference is made to the older assessments to help inform the description of the existing baseline.

Loch Lomond and The Trossachs Landscape Character Assessment (2011)

12.4.27 As shown in in **Figure 12.4** in **Appendix 12.1 – Figures** most of the West Riverside site is located within the River Valley Farmland with Estates Landscape Character Type (LCT), whilst the eastern part of the site, along the west bank of the River Leven, is located in the Loch Shore Fringe (LCT). The Woodbank House site is located within the Rolling Farmlands with Estates LCT, based on the LLTTNP Landscape Character Assessment.

12.4.28 In **Appendix 12.3 - Landscape Character Assessment** a detailed information and assessment sheet has been prepared for each of these four LCTs (as well as for LLTTNP as a whole). Each sheet details the landscape’s key characteristics, sensitivities and opportunities, using information from the LLTTNP Landscape Character Assessment. A judgement is also made about the value of the landscape and the susceptibility and sensitivity of the LCT to the proposed development. This is then summarised in Table 12.2 below:

Table 12.2 Summary Judgements of Baseline Landscape Value, Susceptibility and Sensitivity (refer to Appendix 12.3)

Landscape Character Type	Value	Susceptibility	Sensitivity
River Valley Farmland with Estates	High	High	High
Loch Shore Fringe	High	High	High
Rolling Farmlands with Estates	High	Medium	High
Lowland Lochs	High	High	High

12.4.29 Other LCT’s within the Study Area and ZTV, which may be affected by the proposed development include Loch Lomond Islands (specifically the island of Inchmurrin) and the various types of Moorland (Open, Forested or Farmed) LCT. Site survey has deemed that due to the distance from the site and intervening visual screening, any landscape or visual effects experienced by these LCTs would be no more than negligible and further detail and impact assessment on these LCTs is not provided.

Glasgow and Clyde Valley Landscape Character Assessment (1998) and Argyll and the Firth of Clyde Landscape Character Assessment (1996)

12.4.30 The Glasgow and Clyde Valley Landscape Character Assessment (1998) covers the south-eastern part of the Study Area. The identified character areas within the Study Area and ZTV are:

- Loch Lomond: Rolling Farmlands Gartochan (LCA 4a);
- Loch Lomond: Moorland Hills and Ridges Bromley Muir – Carman Muir (LCA 19);
- Kilpatrick and Campsie Fells: Rugged Moorland Hills – Kilpatrick Hills (LCA 20b); and
- Kilpatrick and Campsie Fells: Green Corridors River Leven (LCA 9b).

12.4.31 With the Argyll and Firth of Clyde Landscape Character Assessment, a single landscape character area, the ‘Firth of Clyde Lowlands’ is within the 5km Study Area and it covers almost the entire Study Area overlapping both the LLTTNP and Glasgow and Clyde Valley character areas. Within the Study Area the ‘Firth of Clyde Lowlands’ is further categorised into different landscape types:

- Open Ridgeland (LCA 5);
- Moorland Plateau (LCA 8); and
- Rolling Farmland with Estates (LCA 13).

12.4.32 The identified landscape character areas within the Glasgow and Clyde Valley Landscape Character Assessment (1998) and Argyll and the Firth of Clyde Landscape Character Assessment (1996) are not considered further in this LVIA. This is due to:

- The pre-eminence given to the more up to date Loch Lomond and The Trossachs Landscape Character Assessment;
- Outside of the area covered by the LLTTNP there will be no direct landscape effects; and/or; and
- The lack of perceptibility of the site from the south as a whole and the distance of these LCAs from the site, which means that any effects on the landscape would not be significant.

Special Landscape Qualities of Loch Lomond and The Trossachs National Park (2010)

12.4.33 This report was published by SNH to detail the special qualities of the LLTTNP¹⁸.

12.4.34 The SLQ are listed as a series of general qualities, which are applicable to the whole of LLTTNP, and a series of qualities relating to the different sub-areas. The sub-area relevant to this report is 'Loch Lomond'. By identifying a series of special qualities, the LLTTNPA hopes to direct landscape change in order to pass on the appeal and value of the LLTTNP for future generations; and to help promote the area to residents, businesses and visitors.

12.4.35 From the report, the summary list of the general special qualities of the park is as follows:

- A world-renowned landscape famed for its rural beauty;
- Wild and rugged highlands contrasting with pastoral lowlands;
- Water in its many forms;
- The rich variety of woodlands;
- Settlements nestled within a vast natural backdrop;
- Famous through-routes;
- Tranquillity; and
- The easily accessible landscape splendour.

12.4.36 The summary list of the Loch Lomond area special qualities is:

- Immensity of loch and landscape;
- Two lochs in one;
- A multitude of beautiful islands;
- Distinctive mountain groups;
- Ben Lomond, widely known, popularly frequented;
- Banks of broadleaved woodland; and
- Peaceful side glens.

12.4.37 These qualities, if relevant, have been considered within the detailed information and assessment sheet for the LLTTNP as a whole in **Appendix 12.3 - Landscape Character**

¹⁸ 'In 2007/8 Scottish Natural Heritage used a standard method to determine the special qualities of Scotland's National Scenic Areas. In 2009, in partnership with the National Park Authorities, this work was extended to determine the special qualities of the two National Parks, including the National Scenic Areas within them. The result of the work for the Loch Lomond and the Trossachs National Park is reported here.'

Opening paragraph from Scottish National Heritage and Loch Lomond and The Trossachs National Park Authority (2010). The special landscape qualities of the Loch Lomond and The Trossachs National Park. Scottish Natural Heritage Commissioned Report No. 376.

Assessment and have also been used to inform the judgements of landscape sensitivity for the individual LCTs.

12.4.38 At the request of the Landscape Officer of the National Park Authority a table detailing the relevant SLQs, their relevance within the Study Area and description of the potential effects of the Proposed Development on the SLQs has been completed. This table is shown on pages 4 and 5 of **Appendix 12.3 - Landscape Character Assessment**. In addition for each SLQ, again at the request of the Landscape Officer of the National Park Authority, an assessment of the potential risk of loss or damage to the SLQ has been provided based upon the following six point scale: no risk, negligible risk, low risk, moderate risk, high risk and very high risk. None of the SLQs were assessed as having a moderate risk of loss or damage.

Valued Areas and Sensitive Receptors

12.4.39 GLVIA 3 (paragraph 5.47) states that:

'Landscapes that are nationally designated will be accorded the highest value in the assessment. If the area affected by the proposal is on the margin of [as this development is] or adjacent to such a designated area, thought may be given to the extent to which it demonstrates the characteristics and qualities that led to the designation of the area. Boundaries are very important in defining the extent of designated areas, but they often follow convenient physical features and as a result there may be land outside the boundary that meets the designation criteria and land inside that does not.'

12.4.40 Under 'International and national designations' GLVIA 3 (paragraphs 5.23 and 5.24) explains that:

'...it is important that the baseline study should seek to understand the basis for the designation and why the landscape is considered to be of value. Great care should be taken to understand what landscape designations mean in today's context. This means determining to what degree the criteria and factors used to support the case for designation are represented in the specific Study Area.

...sometimes, at the more local scale of an LVIA Study Area, it is possible that the landscape value of that specific area may be different from that suggested by the formal designation... At the same time it should be recognised that every part of a designated area contributes to the whole in some way and care must be taken if considering areas in isolation.'

12.4.41 The positions from GLVIA 3 outlined above are supported by the Loch Lomond and Trossachs National Park State of the Park (2005) under the title 'Landscape Designations' which states that it is recognised that some parts of the Park are of higher scenic quality than others.

Designated Landscapes (in addition to the LLTTNP)

12.4.42 Valued areas reflected in designations often cross character type boundaries; therefore, to assess the overall effects, the total area of the designation needs to be considered as a whole. Relevant designations are mapped on **Figure 12.5** in **Appendix 12.1 – Figures** are described in the following text.

12.4.43 Landscape and landscape related designations, excluding the LLTTNP, which fall within the ZTV and 5km Study Area and are considered to be of high value are:

- Loch Lomond National Scenic Area (NSA);
- Kilpatrick Hills Local Landscape Area (LLA);
- Balloch Castle earthworks Scheduled Monument;
- Cameron House cairns Scheduled Monument;
- Inchmurrin Castle, castle and kiln-barn (on Inchmurrin Island) Scheduled Monument; and
- Boturich Woodlands SSSI.

- 12.4.44 There are several Ancient Woodlands located within the Study Area, including Drumkinnon Woods which would be directly affected by the proposed development. Other woodlands are found scattered throughout the Study Area. The assessment of the effects on ancient woodland from an ecological perspective is provided in **Chapter 6: Ecology and Woodland**. The effects of the proposed development on Woodbank House as a landscape feature forms part of the LVIA for the site.
- 12.4.45 The landscape value of the Ancient Woodland within the site is deemed to be medium. Its susceptibility to the proposed development is considered high and its overall sensitivity is also considered to be high. Impacts on the woodland are considered within the LVIA for the site.
- 12.4.46 No areas of panoramic quality are in the ZTV and Study Area (note that only the data for Argyll and Bute was accessible) and there are no Conservation Areas within the ZTV and 5km Study Area.
- 12.4.47 The site is not within a Conservation Area and neither does it directly affect a statutorily listed building or building of local interest. Woodbank House is a Grade A listed building which lies within the site. The assessment of the effects on Woodbank House from a heritage perspective is provided in **Chapter 13: Archaeology and Heritage**. The effects of the proposed development on Woodbank House as a landscape feature forms part of the LVIA for the site.

Designated Landscapes – Loch Lomond National Scenic Area

- 12.4.48 The southern boundary of the Loch Lomond NSA is approximately 1km north of the site's northern boundary and is the only NSA within the Study Area. There is a strong overlap between the Loch Lomond landscape area and the boundaries of the Loch Lomond NSA and the special qualities of the Loch Lomond NSA are considered by SNH to equate to the qualities of the Loch Lomond landscape area which have been listed previously in this chapter. These include the important and valued views of the Arrochar Alps, Ben Lomond and the Highlands.
- 12.4.49 The value of the landscape within the NSA is considered very high. Its susceptibility to the proposed development is also considered to be very high. Overall therefore the sensitivity of the Loch Lomond NSA to the proposed development is very high.

Designated Landscapes – Kilpatrick Hills Local Landscape Area

- 12.4.50 As noted in the Kilpatrick Hills Local Landscape Area: Statement of Importance¹⁹ The Kilpatrick Hills form a *'distinctive rugged upland landscape, inextricably linked with their surroundings: 'borrowed' views, unique and relatively accessible panoramas and a plethora of high quality vistas, both to and from the Kilpatrick Hills, make the area key to defining the identity of nearby settlements and in providing a setting for nationally important landscapes'*.
- 12.4.51 In addition to their importance in landscape terms, the Kilpatrick Hills are an important natural heritage and recreational resource, with a range of habitats, geodiversity sites and formalised access routes. The Kilpatrick Hills feature a network of nationally and locally important nature conservation sites of both biological and geological interest. Five Sites of Special Scientific Interest (SSSI) are found within the Kilpatrick Hills and much of the rest of the area has been designated as Local Nature Conservation Sites. These provide the SSSIs with a robust framework of buffers and habitat connectivity which contribute to safeguarding their viability and recognise the wildlife value of the Kilpatrick Hill's open mosaic of habitats.
- 12.4.52 As a locally designated landscape, the value of the Kilpatrick Hills LLA is considered high. Its special qualities and overall character means that its susceptibility to the proposed development is also considered to be high. Overall therefore the sensitivity of the Kilpatrick Hills LLA to the proposed development is high.

Designated Landscapes – Scheduled Monuments Balloch Castle earthworks, Cameron House Cairns and Inchmurrin Castle, castle and kiln-barn

- 12.4.53 The scheduled monuments at Cameron House cairns, located 850m and 1.2km west of the site, and Inchmurrin Castle, castle and kiln-barn, located 4km north of the site on Inchmurrin Island,

¹⁹ West Dunbartonshire Council, East Dunbartonshire Council and Scottish Natural Heritage (2015), Local Development Plan - Kilpatrick Hills Local Landscape Area: Statement of Importance

are on the very edge of the potential ZTV for the tallest proposed building in the development. There is substantial tree cover around all of these scheduled monuments.

- 12.4.54 The Balloch Castle earthworks scheduled monument is approximately 250m east of the proposed loch-shore site at its nearest point. The western half of the earthworks (i.e. closest to the development) are heavily wooded and provide screening towards the site.
- 12.4.55 The assessment of the effects on the scheduled monuments from an historic perspective is provided in **Chapter 13 Archaeology and Heritage**. Given the distance from the site and the fact that there is little inter-visibility between the site and the scheduled monuments any potential landscape effects would not be significant. They are therefore not considered further in this LVIA.

Designated Landscapes – Boturich Woodlands SSSI

- 12.4.56 There is one SSSI in both the 5km Study Area and the ZTV, Boturich Woodlands SSSI on the east bank of Loch Lomond, the southern end of which is 1.3km north of the site.
- 12.4.57 The SSSI is a 2.7km long woodland on the banks of Loch Lomond the southernmost 600m of which is within the ZTV. The value of the SSSI is deemed to be medium, its susceptibility to the development low and its overall sensitivity is assessed as low. Due to the lack of direct impacts and distance from the site the likely LVIA impacts on the SSSI are likely to be negligible. Potential effects on the SSSI from an ecological perspective are to be considered within **Chapter 6: Ecology and Woodland** of this ES. In these circumstances, with the likely landscape and visual effects on the SSSI being negligible, there will be no further reference to the SSSI within the LVIA.

Gardens and Designed Landscapes

- 12.4.58 **Figure 12.5** in **Appendix 12.1 - Figures** shows that there are two gardens and designed landscapes (GDL) of relevance to the LVIA. These are gardens which are set out in the Inventory of Gardens and Designed Landscapes managed by Historic Environment Scotland.
- 12.4.59 Balloch Castle GDL is situated with the eastern side of the Study Area on the opposite side of the River Leven from the site, close to where the river flows out of the loch. Balloch Castle is a 19th century gothic style castle, which was erected on the site of a much earlier structure. The building is on the Buildings at Risk Register and is a Category A listed building. The wider estate which includes pleasure gardens, a walled garden, and an area of grassed parkland with mature trees, all of which are framed by ornamental and semi-natural woodlands, is designated a country park with nature trails and guided walks. Leased to West Dunbartonshire Council, the castle is now derelict, but the park is a popular local visitor attraction. The western boundary of the Balloch Castle GDL is approximately 55m from the eastern boundary of the site on the opposite side the River Leven at the point where the river flows out of the loch. However, this is a wooded area and the paths around the GDL are generally located between 400-800m from the proposed apart-hotel and waterpark development. It is further noted that the key views from the GDL are all orientated west to north and not south towards the development.
- 12.4.60 As a designated landscape on the shores of Loch Lomond and within LLTTNP, the value of the Balloch Castle GDL is considered high. Its special qualities and overall character means that its susceptibility to the proposed development is also considered to be high. Overall therefore the sensitivity of Balloch Castle GDL to the proposed development is high.
- 12.4.61 Rossdhu House and its surrounding parkland is situated on the west shore of Loch Lomond, some 3km north of Balloch. The surrounding landscape of loch and islands, with its backdrop of hills, is important to the designed landscape. Views into the park from the landward side are limited by the high walls and vegetation but Rossdhu is an attractive landscape feature from the loch.
- 12.4.62 Rossdhu House, a three-storey classical mansion built in 1773, was home to the chief of the clan Colquhoun, and replaced a castle they had occupied since the 15th century. It is now listed Category B. In 1994, Rossdhu was opened as Loch Lomond Golf Club and is now also a popular wedding venue. Rossdhu House GDL is located 5.4km north-north-west of the site at its closest point. This GDL lies just outside the Study Area, but most of the designated area falls within the ZTV for the proposed development. Due to the distance of Rossdhu House GDL and the presence of intervening screening vegetation the proposed development would not

have a significant effect on Rosdhu House GDL. It is therefore not considered further in this LVIA.

Settlements and Groups of Properties

12.4.63 The closest settlement to the site is the town of Balloch, the northern end of which encloses the southern boundary of the site. To the south, the settlement of Balloch merges with Alexandria and the continuous urban settlement along the River Leven to Dumbarton 7km south of the site. This belt of settlement and associated woodland and trees, would largely screen the development from potential receptors. There are no other settlements within the Study Area or within the ZTV.

12.4.64 For assessment purposes, within the town of Balloch the settlement has been divided into the following groupings of properties:

- Old Luss Road (near and adjacent to the Woodbank House site);
- Upper Stoneyrollan (high ground to the west of Balloch);
- Inchcruin and Clairinsh (settlement enclosed by Drumkinnon Woods and the proposals);
- Properties on or near Pier Road, Balloch Road and Balloch Bridge;
- Mill of Haldane (high ground to the east of Balloch); and
- Remainder of Balloch.

12.4.65 Although there are other small groups of properties within the 5km Study Area, particularly around the A82 along the western side of Loch Lomond, none are within or close to the edge of the ZTV. Any potential views from these properties are likely to be highly filtered and potentially only available from the upper floors. Given the distance involved, any effects would not be significant therefore these properties are not considered further in the LVIA.

12.4.66 All the identified settlements and residential properties are deemed to be high sensitivity receptors. However, this sensitivity is reduced if the development is potentially only visible from the upper floor of properties i.e. where the residents will likely spend less time; and it is reduced where other visible built form occupies the landscape between the proposed development and the receptor.

Recreation, Leisure, Tourist Attractions and Business

12.4.67 The main recreation, leisure and tourist attraction within the Study Area is the National Park and the opportunities for both active and passive recreation that it offers such as the loch cruises; mountain climbing (e.g. although outside the ZTV Ben Lomond is 20km north of the site and has wide panoramic views; Shantron Hill, 7.5km north-west of the site, has been included as a viewpoint to ascertain the potential impact of the development on the higher ground north of the site); the loch islands; and holiday accommodation, particularly around the edge of the loch.

12.4.68 Golf courses are an important recreational resource and include Cameron House Golf Course (and associated development including holiday lodges, restaurant and hotel), The Carrick Golf Club and Spa, and, just outside the Study Area, Loch Lomond Golf Club (at Rosdhu House). Although the courses are within the ZTV the woodland belts around and within the courses, and along the banks of the loch, mean there is only limited, heavily screened, visibility of the site.

12.4.69 Lomond Woods Holiday Park is located on rising ground adjacent to the southern boundary of the Woodbank House site and approximately 650m south-west of the proposed location for the apart-hotel and waterpark development.

- 12.4.70 Adjacent to the loch shores development site is Loch Lomond Shores, which includes Drumkinnon Tower and is a mixed-use retail complex which includes visitor attractions such as a Sea Life Centre, cinema, shopping and restaurants.
- 12.4.71 An important visitor attraction are the walks and cycle paths within the LLTTNP. The main walks close to the site are the John Muir Way coast-to-coast trail which crosses through the site from west to east; and the Three Lochs Way which commences within the site boundary and runs through the site eventually heading west adjacent to the Woodbank House site. The main cycle routes are National Cycle Route No. 7 (Loch and Glens North) to the south and east of the site, and Regional Route No. 40 from the west of the site along the western banks of the loch. Further details and assessments of likely effects on recreational routes both within the site and the 5km Study Area are provided in **Chapter 14 - Socio-Economics, Tourism, Recreation and Public Access**.
- 12.4.72 Due to the importance of the southern end of Loch Lomond as a visitor and tourist attraction and the importance of the visual amenity of the loch and views to the loch and from the loch shore, the susceptibility of visitors to the recreation, leisure and tourist attractions is deemed to be high. However, susceptibility of visitors to the Lomond Shores Complex is deemed to be medium as much of the activity is indoors and not focused on the visual amenity of the location.
- 12.4.73 The value of the view experienced by these recreational receptors varies depending on the particular viewpoint, as recorded in **Appendix 12.4 - Viewpoint Assessment** and referenced in Table 12.4 - Table 12.7 below. The susceptibility of recreational receptors is generally considered high, but does vary as outlined in **Appendix 12.4 - Viewpoint Assessment**. The sensitivity therefore varies depending on the value of the view and is recorded in **Appendix 12.4 - Viewpoint Assessment** and referenced in Table 12.4 - Table 12.7.
- 12.4.74 Other businesses to be considered within the LVIA and not identified elsewhere within the baseline have been identified as follows:
- Hotels, Restaurants and Bars on Balloch Road near Balloch Bridge; and,
 - Hotels, Restaurants and Bars near Balloch Road / Old Luss Road roundabout.
- 12.4.75 Although the visual amenity of Loch Lomond brings tourists to the area, the majority of users of the hotels, restaurants and bars around Balloch will, by definition, be indoors and generally in locations where views of the loch and the wider landscape are not possible as none of the premises identified have direct and open views of the loch.
- 12.4.76 The value of the view experienced by these recreational receptors varies depending on the particular viewpoint, as recorded in Appendix 12.4 'Viewpoint Assessment' and referenced in Table 12.4 - Table 12.7 below. The susceptibility of these business receptors is considered medium. The sensitivity therefore varies depending on the value of the view and is recorded in **Appendix 12.4 - Viewpoint Assessment** and referenced in Table 12.4 - Table 12.7

Transport Corridors

- 12.4.77 The A82 is a key tourist route along the west of Scotland to the LLTTNP and the Highlands to the north. It passes approximately 200m west of Woodbank House and approximately 725m west of the proposed location of the apart-hotel and waterpark. The other main route within the Study Area and ZTV is the A811 (Sterling Road), which leaves the A82 approximately 200m south of the Woodbank House site and runs east through the town of Balloch to the south of the site, before turning north-east. Minor local roads to be assessed include Old Luss Road and Ben Lomond Way.
- 12.4.78 Other roads identified within the Scoping Opinion, such as the A81, B837 and West Highland Way are now outside the ZTV and/or the revised 5km Study Area.
- 12.4.79 With the exception of users of the A82 tourist route, the sensitivity of all road users is considered low as views would be fleeting and in the context of driving on busy roads with views of the development within the wider built form of Balloch. Tourists using the A82 are considered to be medium sensitivity receptors. Details of the sequential travel along these roads is provided in the 'Visual Effects on Transport Users' section of this chapter found in paragraphs 12.7.58 to 12.7.66.

12.4.80 The North Clyde Rail Line terminates at Balloch Train Station approximately 40m south of the southern boundary at the proposed Station Square site. No views of the development will be possible for rail users and therefore they are not considered further within this LVIA.

Baseline Visibility

12.4.81 The topography of the Study Area (**Figure 12.2 in Appendix 12.1**) and the ZTV (**Figure 12.3 in Appendix 12.1**) broadly explain the inter-visibility of the site area with its surroundings. The local topography, large areas of woodland and the settlements of Balloch and Alexandria to the immediate south of the site, are fundamental controlling factors for inter-visibility.

12.4.82 Excluding receptors directly adjacent to the site, the site is almost entirely screened from receptors to the south. An exception is a small pocket of land, on slightly higher ground than the majority of the site, within the western boundary at the Woodbank House location. However, even visibility of this area is heavily screened by woodland both on and outside the site. Although the site is generally not visible from the south, the proposed height of the apart-hotel and waterpark buildings mean that from a limited number of locations these buildings may be visible, however the existing Drumkinnon Tower provides a very good indication of the lack of perceptibility of the site from the wider Study Area.

12.4.83 Existing woodland belts on the western and eastern banks of the loch screen and filter views towards the site from much of the low-lying ground around the loch. Where there are occasional areas of open shoreline then there is a degree of inter-visibility between the site and the loch shore. As the landform rises to the east and west of the loch, the extensive swathes of woodland around the loch contain many views and limit the visibility of the site from much of its surroundings.

12.4.84 Inter-visibility with the site would be possible from the southern end of the loch (e.g. from boats on the loch) and at the loch shore immediately adjacent to the proposed site for the apart-hotel and waterpark.

Site Inter-Visibility Zones

12.4.85 Within the overall site there are four distinctive areas with different potential levels of visibility:

- The main loch-shore development comprising the apart-hotel, waterpark and visitor centre. This area will primarily be visible from the loch and loch shore adjacent to the site. The height of the proposed buildings will result in occasional visibility from further afield. This area relates to Zone C: Pierhead of **Figure 3.1 – Parameters Plan**;
- The ‘Station Square’ development comprising the micro-brewery, restaurant, monorail station, performance area and budget accommodation. This area is located adjacent to Balloch Road and the development will potentially be visible from areas of Balloch in the immediate vicinity of the site. This area relates to Zone A: Station Square of **Figure 3.1 – Parameters Plan**;
- The woodland development comprising the holiday lodges and associated structures within the existing Drumkinnon Woods. Despite some proposed thinning works the woods will still provide a high level of visual screening. Visual impacts from the proposed woodland lodges within this location are anticipated to be minimal. This area relates to Zone B: Riverfront and Zone D: Drumkinnon Wood and Bay of **Figure 3.1 – Parameters Plan**; and
- The Woodbank House site is located on rising ground at the west of Balloch, this location is potentially more visible than the remainder of the site. However it too is heavily screened by intervening vegetation, both on and outside the site. This area relates to Zone E: Woodbank of **Figure 3.1 – Parameters Plan**.

12.4.86 Within the site and its surrounding area, inter-visibility of the site and its different components (as listed in the previous paragraph) is unlikely due to the presence of intervening woodland and buildings. For instance, where views of ‘Station Square’ are feasible it is unlikely that views of the Woodbank House site are possible and vice versa. Therefore, a decision has been made to differentiate between these four zones within the visual amenity assessment provided in this chapter of the ES.

Summary of Receptor Sensitivity

12.4.87 The sensitivity of the different receptors, identified in **Section 12.4 – Baseline Conditions**, to the proposed development is listed below in Table 12.3. As explained above the sensitivity of landscape and visual receptors is made up of judgements about the susceptibility of the receptor to the type of change arising from the proposed development and the value attached to the landscape or view under consideration (as defined by the baseline study).

Table 12.3 Summary of Receptor Sensitivity

Landscape & Visual Receptors Within the 5km Study Area and ZTV	Sensitivity to the Proposed Development
The Site (including Drumkinnon Woods)	High
Loch Lomond and The Trossachs National Park	Very High
River Valley Farmland with Estates LCT	High
Loch Shore Fringe LCT	High
Rolling Farmland with Estates LCT	High
Lowland Lochs LCT	High
Loch Lomond National Scenic Area	Very High
Kilpatrick Hills Local Landscape Area	High
Gardens and Designed Landscapes – Balloch Castle	High
Settlement – Old Luss Road (Balloch)	High
Settlement – Upper Stoney-mollan (Balloch)	High
Settlement – Inchcruin and Clairinsh (Balloch)	High
Settlement – Pier Road, Balloch Road and Bridge (Balloch)	High
Settlement – Mill of Haldane (Balloch)	High
Settlement – Balloch (remainder of settlement)	High
Cameron House and associated development (including grounds, golf course and holiday lodges)	High
The Carrick Golf Club and Spa	High
Lomond Woods Holiday Park	High
Loch Lomond Shores	Medium
Hotels, Restaurants and Bars on Balloch Road near Balloch Bridge	Low

Landscape & Visual Receptors Within the 5km Study Area and ZTV	Sensitivity to the Proposed Development
Hotels, Restaurants and Bars near Balloch Road / Old Luss Road roundabout	Low
John Muir Way Coast to Coast Trail	High
The Three Lochs Way	High
National Cycle Route No. 7	High
Regional Cycle Route No. 40	High
A82 (key tourist route)	Medium
A811	Low
Old Luss Road	Low
Balloch Road	Low
Ben Lomond Way	Low

12.5 Baseline Evolution

- 12.5.1 In the absence of the proposed development it is likely that the woodland areas would continue maturing and evolving as they have done over recent years. It is also likely that the Woodbank House area of site, including the remains of the Grade A listed Woodbank House hotel, would become more overgrown and dilapidated in appearance.
- 12.5.2 Notwithstanding the above, as detailed in **Chapter 5 – Legislative and Policy Context**, the site is allocated within the adopted LLTNP LDP (2016) under Balloch proposals VE1 and VE4 for visitor experience related uses. It can therefore reasonably be assumed that in the absence of the proposed development then another development proposal involving built form and changes to land use and land cover may be proposed.

12.6 Embedded Mitigation

- 12.6.1 As detailed in **Chapter 3 – The Proposed Development**, a number of design features and embedded mitigation measures have been incorporated into the design and construction of the proposed development to avoid, prevent or minimise significant adverse environmental effects and to enhance beneficial effects. Embedded mitigation measures of relevance to this assessment are:

Construction Phase

- 12m buffer (i.e. no construction) around the site boundary with Drumkinnon Gate;
- Any construction activities within a 5m strip along waterfronts will be subject to specific consideration within a Construction Environmental Management Plan (CEMP) to be agreed with LLTTNPA prior to commencement;
- Adherence to relevant (Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH) and Historic Environment Scotland (HES) regulatory and good practice guidance in construction methods;
- Adoption of standard construction industry working hours for noise generating activities;

- Safeguarding of identified important trees from disturbance or loss;
- Work with existing topography to minimise ground level regrading where possible;
- Proposed utilities to be located underneath existing path network to minimise disturbance to existing tree roots;
- Access to all key nodes and routes through the site are to be maintained during the construction phase. Localised diversions to facilitate construction may occur on land within the applicant's control. Any impacts on walking/cycle routes during the construction phase will be short term and localised diversions will be put in place;
- Continued provision of access through the site to existing receptors and land uses as identified in **Chapter 2 Site and Surrounding Area**; and
- Development and implementation of a CEMP, to include as a minimum, measures relating to: construction traffic routing, site access/deliveries, parking, contractor management, parking, fuels and materials storage, standard dust and noise suppression techniques and standard pollution presentation and control techniques. Any other measures to be included in the CEMP would be identified as 'further mitigation' (not embedded) through this ES (see **Subsection 8 of Chapters 6 – 15**).

Operational Phase

- 12m buffer (i.e. no operational activities) around the site boundary with Drumkinnon Gate;
- Screening increased around the boundary between woodland and residential area using evergreen native shrubs which are in-keeping with the surroundings, ensuring a decrease impact for the residents;
- Lower density of lodges to be located within the 'Plantation origin' of Drumkinnon woodland;
- Existing fenced substations and unsightly utilities to be screened and incorporated within the woodland setting;
- Proposed car parking to be sensitively incorporated into the woodland. Surface materials to be in keeping with the location and context. Additional mitigation measures such as buffer planting to provide natural screening to new car parking;
- Retain and upgrade existing pathways, enhance with new porous surfacing. Widen and locally regrade to allow for buggies, cycles and emergency access;
- New woodland planting to be created on the Woodbank plot, immersing proposed residential plots in order to reduce and mitigate any visual impact. Whilst acknowledging the need to retain the open views towards the facade of Woodbank House;
- Retention of Woodbank House listed building facade as a landmark feature;
- Continued public access to Drumkinnon Bay waterfront;
- Continued provision of access through the site to existing receptors and land uses as identified in **Chapter 2: Site and Surrounding Area**;
- Safeguarding of identified important trees within existing woodland areas, as identified on the **Figure 3.1 - Parameters Plan in Appendix 3.1**;
- No structures or buildings within woodland areas to exceed the height of the tree canopy;
- Integration of Station Square zone with Balloch Street Design Project proposals and Sweeney Cruises;
- Elevated sections of monorail to have sufficient clearance above roads and paths to allow for passage underneath; and
- Access to all key nodes and routes will be maintained during operation with the quality of some routes enhanced. Some permanent localised diversions may be required; however, this will be limited to using other land within the applicants control in order to avoid lengthy or circuitous alterations.

12.6.2 Further mitigation and enhancement measures identified through the EIA process and of relevance to this assessment are detailed in **Section 12.8** below before likely residual effects from the proposed development are detailed in **Section 12.9**. A cumulative impact assessment is then provided in **Section 12.10**.

12.7 Potential Effects

Overview

12.7.1 The sources of potential landscape and visual effects are as follows:

Construction Phase

12.7.2 The sources of potential landscape effects during construction are assumed to include site offices, storage and parking areas, temporary hoardings/ security fencing and signage and a range of fixed and mobile plant, which will include cranes. Other effects would arising from the construction process, namely:

- Site clearance and vegetation removal, particularly any ‘thinning’ works within Drumkinnon Woods, the Woodbank House area and the removal of the woodland area at the proposed location of the apart-hotel and waterpark;
- Topsoil stripping and earthworks; and
- Construction activities.

12.7.3 The Transport Assessment (which forms part of the application submission) will refer to construction traffic effects.

Operational Phase

12.7.4 The sources of potential landscape effects during operation are:

- Introduction of new large structures on the loch shore and elsewhere into the landscape;
- The permanent removal of some trees and vegetation within existing woodland;
- The change of existing land cover and land use within the development area;
- An increase to the amount of existing lighting; and
- An increase in visitor numbers and traffic movements.

12.7.5 The operation effects on visual amenity will be long-term and permanent. However, as with the construction impacts the lack of perceptibility of the site from the wider area mean that these effects will typically only be experienced by receptors in close proximity to the development.

Assessment of Landscape Effects

12.7.6 The following section sets out a summary of the assessment of the effects of the proposed development on the landscape receptors identified above. It first considers the effects during construction and then those experienced during operation. Detailed assessment sheets for each of the key landscape receptor groups is provided in **Appendix 12.3 - Landscape Character Assessment**.

Construction Phase

12.7.7 As explained in paragraph 12.3.50 all construction effects are assumed to be adverse.

12.7.8 The construction of the proposed development would substantially change the character of the site and its immediate setting. The large scale of the construction works would change its current character, which would become more urban and substantially less tranquil due to the construction activity and additional traffic movements. Although there would be some vegetation removal, most of the trees within Drumkinnon Woods and within the Woodbank House area, which are a key landscape feature of the site, would remain. There would be a high magnitude of change, which when combined with the high sensitivity would result in a Major effect, which would be short term and temporary.

12.7.9 Beyond the site and its immediate setting, the construction would be visible from various locations. The types of views would range from glimpsed views of the cranes to more immediate views comprising the site hoardings and construction works. However, with the exception of mature tree removal these features will be short term and temporary. They will be strictly controlled and monitored through the construction process. The only LCTs or designated landscapes which would experience a noticeable construction effect are the Loch Shore Fringe, Rolling Farmland with Estates and River Valley Farmland with Estates. This is because these LCTs cover a part of the site and therefore would be directly and indirectly affected by construction activity. A Moderate landscape effect is predicted during construction for these LCTs, however this would be very localised, short term and temporary with most of the landscape within the LCTs experiencing Negligible or Minor effects. Due to the scale of the LLTTNP it is not considered that the proposed construction works would create more than a Minor effect on the landscape of the LLTTNP. Indirect effects on the adjacent Lowland Lochs LCT are considered to be Minor. Further details are provided in **Appendix 12.3**.

Operational Phase

The Site and its Immediate Setting

12.7.10 The proposed development would appear similar in scale to the existing Lomond Shores complex. Its presence would not fundamentally change the key characteristics of the site or its immediate setting and would generally fit well with the scale and character of the landscape. There would be some permanent tree losses particularly near the loch side (on the proposed site for the apart-hotel) but this would be balanced by a new landscape scheme which could provide an overall enhanced setting to the existing development. The presence of timber lodges and woodland walkway within Drumkinnon Wood would change its character but the associated vegetation management would improve the appearance of the woodland in the longer term. The monorail would appear as a new type of feature which would be less in keeping with the character and would introduce additional elevated movement.

12.7.11 There would be a medium magnitude of change, which when combined with the high sensitivity would result in a Moderate Adverse effect. Whilst aspects of the proposed development would have a neutral or even positive effect on the landscape, the monorail would be out of keeping and have an adverse effect on character.

Loch Lomond and the Trossachs National Park

12.7.12 Part of the site lies within the southern extent of LLTTNP which would therefore be directly and indirectly affected by the proposed development. The presence of the proposed development would add to the man-made development at the southern end of the Park but would not affect the wider rural character or change its special qualities. The low magnitude of change when combined with the very high sensitivity would result in a Moderate Adverse effect on the landscape within the immediate vicinity of the proposed development. However, for the majority of the LLTTNP any effects would be imperceptible. Therefore, when considered as a whole, the LLTTNP would experience a Minor Adverse effect. None of the special qualities of the LLTTNP would be affected by the proposed development, as detailed in **Appendix 12.3 – Landscape Character Assessment**.

Landscape Character Types

12.7.13 Three LCTs (Loch Shore Fringe, Rolling Farmland with Estates and River Valley Farmland with Estates) would experience a Moderate operational effect, in the vicinity of the development site. This is because these LCTs all cover a part of the site and therefore would be directly and indirectly affected by the proposed development. The presence of the proposed development would add to the man-made development within these LCTs but would not affect the wider rural character. The low magnitude of change when combined with the high sensitivity would result in a localised Moderate effect on the landscape. This effect would be localised within the immediate vicinity of the proposed development, with most of the landscape within the LCTs experiencing a Negligible effect or remaining unaffected. Overall therefore the operational landscape effects on the LCTs are assessed as Minor Adverse.

12.7.14 Elsewhere within the Study Area the presence of Lomond Shores, which is a similar type of development, would mean that the proposed development appears as an extension of the existing development rather than a completely new landscape feature. Additional tourism and leisure-led mixed-use development would not fundamentally change the key characteristics of the different landscapes or landscape designations and would generally integrate well into its surroundings. The magnitude of change would be low and the overall effect Minor Adverse or Negligible Adverse as explained in the relevant assessment sheets provided in **Appendix 12.3**.

Loch Lomond NSA

12.7.15 This NSA covers most of Loch Lomond and the high ground immediately adjacent to the loch. Only the southern end of the loch is excluded from the NSA, possibly due to the more developed character of this area.

12.7.16 The only parts of the NSA, which are inter-visible with the site are a very small area of land north of Balloch Castle GDL, Inchmurrin Island (over 4km north of the site) and receptors on the loch itself (although the NSA boundary is 1km north of the loch shore).

12.7.17 From the NSA the proposed development would appear as an extension of the existing Loch Lomond Shores development rather than a completely new landscape feature. The presence of additional tourism and leisure-led mixed use development would not fundamentally change the key characteristics of the landscape within the NSA. The magnitude of change would be low which, despite the very high sensitivity of the NSA, would give rise to a Negligible Adverse effect.

Kilpatrick Hills LLA

12.7.18 The only parts of the Kilpatrick Hills LLA, which are inter-visible with the site is the north-western edge of the LLA, which lies some 1.8km from the site.

12.7.19 From the Kilpatrick Hills LLA the proposed development would appear as an extension of the existing Loch Lomond Shores development rather than a completely new landscape feature. The presence of additional tourism and leisure-led mixed use development would not fundamentally change the key characteristics of the landscape within the LLA. The magnitude of change would be low which when combined with the high sensitivity of the LLA would give rise to a Negligible Adverse effect.

Balloch Castle Garden and Designed Landscape

12.7.20 Balloch Castle GDL would be relatively close to the proposed apart-hotel and waterpark which may give rise to some landscape effects. Viewpoints 14 (Proposal Beach) and 17 (Balloch Castle) both illustrate that the apart-hotel and waterpark (and potentially the monorail) would be visible from within the GDL. However, it is noted that they would be visible in the context of the existing Drumkinnon Tower and would be substantially screened by intervening woodland.

12.7.21 From the Balloch Castle GDL the proposed development would appear as an extension of the existing Loch Lomond Shores development rather than a completely new landscape feature. The presence of additional tourism and leisure-led mixed-use development would not fundamentally change the key characteristics of the landscape within the GDL. The magnitude of change would be low which when combined with the high sensitivity of the GDL would give rise to a Minor Adverse effect.

Assessment of Visual Effects

Viewpoint Analysis

12.7.22 The viewpoint assessment includes 21 representative viewpoint locations, each of which is fully described in **Appendix 12.4 – Viewpoint Assessment**. A description of the baseline and the predicted changes to the view as a result of the proposed development is provided together with a baseline photograph.

12.7.23 For eight viewpoints, visualisations have been provided. These are based on outline designs for the proposed development and are therefore only approximations of the proposed location

and likely outline/mass of the buildings. These are shown in **Appendix 12.5 – Viewpoint Massing Studies**.

- 12.7.24 **Appendix 12.6 – Additional Viewpoint Plates** includes a further 19 panoramic photographs taken from around the site and Study Area. It is important to emphasise that these viewpoints have not been assessed and no text is provided. They are provided to help the reader understand the perceptibility of the site from these locations and within the descriptions of travel around the site via local roads and the John Muir Way and Three Lochs Way trails.
- 12.7.25 **Appendix 12.4** includes a detailed assessment of the specific effects on the viewpoints in accordance with the landscape and visual methodology outlined in **Appendix 12.2 – Methodology**. For the purpose of the visual assessment, the proposed development is subdivided into four distinct zones, each of which is likely to give rise to different degrees of visual effect and will not always be simultaneously visible from every viewpoint. The proposed monorail links Station Square and the loch shore and is predominantly situated within Drumkinnon Woods. As explained above under ‘Baseline Visibility’ there are four distinct zones within the development with respect to the perceptibility of the site and potential visual impacts. These four zones are:
- Loch Shore Development (relating to Zone C: Pierhead of **Figure 3.1 – Parameters Plan**);
 - Drumkinnon Woods (relating to Zone B: Riverfront and Zone D: Drumkinnon Wood and Bay of **Figure 3.1 – Parameters Plan**);
 - Woodbank House (relating to Zone E: Woodbank of **Figure 3.1 – Parameters Plan**); and
 - Station Square (relating to Zone A: Station Square of **Figure 3.1 – Parameters Plan**).
- 12.7.26 Table 12.4 - Table 12.7 provide a summary of the viewpoint assessment sheets completed within **Appendix 12.4 – Viewpoint Assessment**.
- 12.7.27 The visual effects of introducing the proposed development within the woodland and on the loch shore of a designated national park are generally considered to be adverse. However, it is recognised that the introduction of well-designed development on the Station Square location could be viewed as beneficial to the visual amenity of that area. Furthermore, the introduction of well-designed residential properties and accompanying landscape on the Woodbank House site could be viewed as improving the current run down appearance of this location.
- 12.7.28 All 21 viewpoints are located within LLTNPA area, although viewpoints 12 and 18 are on the very southern boundary of the Park. Most of the viewpoints are representative of more than one type of receptor e.g. road users and residents. In these circumstances the sensitivity of the receptor with the highest sensitivity has been used within the assessment. Due to most of the receptors being either residents or tourists visiting the National Park, the sensitivity of most viewpoints has been assessed as high.

Table 12.4 Summary of Visual Effects, at the Selected Viewpoints, arising from the Loch Shore Development

Loch Shore Development							
VP	Location	Approx. Distance to Apart-Hotel	Sensitivity to the Proposed Development	Construction		Operation – Year 1	
				Magnitude of change	Visual Effect	Magnitude of change	Visual Effect
1	Ben Lomond Way	165m	High	High	Major	High	Major
2	Loch Lomond Shores	192m	High	Very High	Major	Very High	Major
3	Maid of the Loch Slipway	142m	High	High	Major	Medium	Moderate
4	Woodbank House	640m	Medium	Low	Minor	Negligible	Negligible
5	Cameron House Lodge, Old Luss Road	566m	Medium	Negligible	Negligible	Negligible	Negligible
6	Old Luss Road	560m	Medium	Low	Minor	Negligible	Negligible
7	Inchcruin Housing Estate	430m	Medium	Negligible	Negligible	Negligible	Negligible
8	John Muir Way, East Bank of River Leven	521m	High	Negligible	Negligible	Negligible	Negligible
9	Pier Road South	359m	Medium	Negligible	Negligible	Negligible	Negligible
10	Balloch Road (Bridge over river)	660m	High	Negligible	Negligible	Negligible	Negligible
11	A811, Balloch (Bridge over river)	834m	High	Negligible	Negligible	Negligible	Negligible

Loch Shore Development							
VP	Location	Approx. Distance to Apart-Hotel	Sensitivity to the Proposed Development	Construction		Operation – Year 1	
				Magnitude of change	Visual Effect	Magnitude of change	Visual Effect
12	Upper Stoneyrollan	1.1km	High	Medium	Moderate	Medium	Moderate
13	Roundabout near Laudervale Gardens (Old Luss Road / Balloch Road)	636m	Medium	Negligible	Negligible	Negligible	Negligible
14	The Boathouse Marina, near Cameron House Golf Course	768m	High	Medium	Moderate	Medium	Moderate
15	Proposal Beach, Balloch Country Park	610m	High	Medium	Moderate	Medium	Moderate
16	A82, North-West of Balloch	750m	Medium	Low	Minor	Negligible	Negligible
17	Balloch Castle, Balloch Country Park	778m	High	Low	Minor	Low	Minor
18	Drumbain Road (Mill of Haldane)	1.7km	Medium	Negligible	Negligible	Negligible	Negligible
19	The Cruin Restaurant Jetty (near Arden House)	2.8km	High	Negligible	Negligible	Negligible	Negligible
20	Inchmurrin Island	4.1km	High	Negligible	Negligible	Negligible	Negligible
21	Shantron Hill	7.5km	High	Negligible	Negligible	Negligible	Negligible

Table 12.5 Summary of visual effects, at the selected viewpoints, arising from the Drumkinnon Woods Development

Drumkinnon Woods Development							
VP	Location	Distance to Woods	Sensitivity to the Development	Construction		Operation – Year 1	
				Magnitude of change	Visual Effect	Magnitude of change	Visual Effect
1	Ben Lomond Way	Boundary	High	Medium	Moderate	Low	Minor
2	Loch Lomond Shores	192m	High	Negligible	Negligible	Negligible	Negligible
3	Maid of the Loch Slipway	283m	High	Negligible	Negligible	Negligible	Negligible
4	Woodbank House	308m	Medium	Low	Minor	Negligible	Negligible
5	Cameron House Lodge, Old Luss Road	362m	Medium	Negligible	Negligible	Negligible	Negligible
6	Old Luss Road	161m	Medium	Low	Minor	Low	Minor
7	Inchcruin Housing Estate	130m	Medium	Low	Minor	Negligible	Negligible
8	John Muir Way, East Bank of River Leven	90m	High	Low	Minor	Low	Minor
9	Pier Road South	Within	Medium	Medium	Moderate	Low	Minor
10	Balloch Road (Bridge over river)	152m	High	Medium	Moderate	Low	Minor
11	A811, Balloch (Bridge over river)	347m	High	Negligible	Negligible	Negligible	Negligible

Drumkinnon Woods Development							
VP	Location	Distance to Woods	Sensitivity to the Development	Construction		Operation – Year 1	
				Magnitude of change	Visual Effect	Magnitude of change	Visual Effect
12	Upper Stoneyrollan	732m	High	Low	Minor	Low	Minor
13	Roundabout near Laudervale Gardens (Old Luss Road / Balloch Road)	251m	Medium	Negligible	Negligible	Negligible	Negligible
14	The Boathouse Marina, near Cameron House Golf Course	925m	2High	Negligible	Negligible	Negligible	Negligible
15	Proposal Beach, Balloch Country Park	700m	High	Negligible	Negligible	Negligible	Negligible
16	A82, North-West of Balloch	715m	Medium	Negligible	Negligible	Negligible	Negligible
17	Balloch Castle, Balloch Country Park	810m	High	Low	Minor	Negligible	Negligible
18	Drumbain Road (Mill of Haldane)	1.3km	Medium	Negligible	Negligible	Negligible	Negligible
19	The Cruin Restaurant Jetty (near Arden House)	3km	High	Negligible	Negligible	Negligible	Negligible
20	Inchmurrin Island	4.2km	High	Negligible	Negligible	Negligible	Negligible
21	Shantron Hill	7.5km	High	Negligible	Negligible	Negligible	Negligible

Table 12.6 Summary of Visual Effects, at the Selected Viewpoints, arising from the Woodbank House Development

Woodbank House Development							
VP	Location	Distance to Woodbank House facade	Sensitivity to the Development	Construction		Operation – Year 1	
				Magnitude of change	Visual Effect	Magnitude of change	Visual Effect
1	Ben Lomond Way	593m	High	Negligible	Negligible	Negligible	Negligible
2	Loch Lomond Shores	498m.	High	Negligible	Negligible	Negligible	Negligible
3	Maid of the Loch Slipway	835m	High	Negligible	Negligible	Negligible	Negligible
4	Woodbank House	Within	Medium	High	Moderate	High	Moderate
5	Cameron House Lodge, Old Luss Road	322m	Medium	High	Moderate	Medium	Moderate
6	Old Luss Road	146m	Medium	Very High	Major	High	Moderate
7	Inchcruin Housing Estate	491m	Medium	Negligible	Negligible	Negligible	Negligible
8	John Muir Way, East Bank of River Leven	931m	High	Negligible	Negligible	Negligible	Negligible
9	Pier Road South	708m	Medium	Negligible	Negligible	Negligible	Negligible
10	Balloch Road (Bridge over river)	904m	High	Negligible	Negligible	Negligible	Negligible
11	A811, Balloch (Bridge over river)	945m	High	Negligible	Negligible	Negligible	Negligible

Woodbank House Development							
VP	Location	Distance to Woodbank House facade	Sensitivity to the Development	Construction		Operation – Year 1	
				Magnitude of change	Visual Effect	Magnitude of change	Visual Effect
12	Upper Stoneyrollan	436m	High	Low	Minor	Low	Minor
13	Roundabout near Laudervale Gardens (Old Luss Road / Balloch Road)	375m	Medium	Low	Minor	Negligible	Negligible
14	The Boathouse Marina, near Cameron House Golf Course	1km	High	Negligible	Negligible	Negligible	Negligible
15	Proposal Beach, Balloch Country Park	1.3km	High	Negligible	Negligible	Negligible	Negligible
16	A82, North-West of Balloch	660m	Medium	Negligible	Negligible	Negligible	Negligible
17	Balloch Castle, Balloch Country Park	1.5km	High	Low	Minor	Negligible	Negligible
18	Drumbain Road (Mill of Haldane)	2km	Medium	Negligible	Negligible	Negligible	Negligible
19	The Cruin Restaurant Jetty (near Arden House)	3.1km	High	Negligible	Negligible	Negligible	Negligible
20	Inchmurrin Island	4.5km	High	Negligible	Negligible	Negligible	Negligible
21	Shantron Hill	7.5km	High	Negligible	Negligible	Negligible	Negligible

Table 12.7 Summary of Visual Effects, at the Selected Viewpoints, arising from the Station Square Development

Station Square Development							
VP	Location	Distance to Proposed Site of Brewery	Sensitivity to the Development	Construction		Operation – Year 1	
				Magnitude of Change	Visual Effect	Magnitude of Change	Visual Effect
1	Ben Lomond Way	356m	High	Negligible	Negligible	Negligible	Negligible
2	Loch Lomond Shores	524m	High	Negligible	Negligible	Negligible	Negligible
3	Maid of the Loch Slipway	645m	High	Negligible	Negligible	Negligible	Negligible
4	Woodbank House	725m	Medium	Negligible	Negligible	Negligible	Negligible
5	Cameron House Lodge, Old Luss Road	834m	Medium	Negligible	Negligible	Negligible	Negligible
6	Old Luss Road	575m	Medium	Negligible	Negligible	Negligible	Negligible
7	Inchcruin Housing Estate	225m	Medium	Negligible	Negligible	Negligible	Negligible
8	John Muir Way, East Bank of River Leven	221m	High	Medium	Moderate	Medium	Moderate
9	Pier Road South	151m	Medium	Negligible	Negligible	Negligible	Negligible
10	Balloch Road (Bridge over river)	206m	High	Very High	Major	High	Moderate
11	A811, Balloch (Bridge over river)	348m	High	Low	Minor	Low	Minor

Station Square Development							
VP	Location	Distance to Proposed Site of Brewery	Sensitivity to the Development	Construction		Operation – Year 1	
				Magnitude of Change	Visual Effect	Magnitude of Change	Visual Effect
12	Upper Stoneyrollan	1.2km	High	Low	Minor	Low	Minor
13	Roundabout near Laudervale Gardens (Old Luss Road / Balloch Road)	428m	Medium	Negligible	Negligible	Negligible	Negligible
14	The Boathouse Marina, near Cameron House Golf Course	1.3km	High	Negligible	Negligible	Negligible	Negligible
15	Proposal Beach, Balloch Country Park	1km	High	Negligible	Negligible	Negligible	Negligible
16	A82, North-West of Balloch	1.1km	Medium	Negligible	Negligible	Negligible	Negligible
17	Balloch Castle, Balloch Country Park	1km	High	Low	Minor	Negligible	Negligible
18	Drumbain Road (Mill of Haldane)	1.3km	Medium	Negligible	Negligible	Negligible	Negligible
19	The Cruin Restaurant Jetty (near Arden House)	3.3km	High	Negligible	Negligible	Negligible	Negligible
20	Inchmurrin Island	4.4km	High	Negligible	Negligible	Negligible	Negligible
21	Shantron Hill	7.5km	High	Negligible	Negligible	Negligible	Negligible

Summary of Viewpoint Analysis

- 12.7.29 No viewpoint was identified as experiencing Moderate or greater, medium to long term visual effects from more than one development zone. For the loch shore development, six of the 21 representative viewpoints are predicted to experience Moderate or Major Adverse construction and operation phase visual effects (viewpoints 1, 2, 3, 12, 14 and 15). For the Drumkinnon Woods development, the number is zero, for the Woodbank House development it is three (viewpoints 4, 5, and 6), with two for the Station Square development (viewpoints 8 and 10).
- 12.7.30 Due to its location the proposed development would generally be substantially screened from the surrounding area by woodland belts, buildings and landform, which would limit visual effects.
- 12.7.31 Typically, significant visual effects have only been identified where the proposed development would be seen at close range. In middle and long distance views, the appreciable screening afforded by intervening landform, woodland and occasional buildings would generally be effective in limiting visibility. In these instances, the proposed development would not be a very noticeable component of the view and would therefore be unlikely to give rise to effects at levels which would be significant. The exception to this is where the apart-hotel and waterpark development on the loch shore is visible from further afield, namely Balloch Castle GDL, the boathouse marina near Cameron House and the rising ground at Upper Stoneymollan.

Visual Effects on Recreational Receptors

- 12.7.32 **Loch Lomond and The Trossachs National Park** is a large area (1,865 km²) of rugged landscape, incorporating several lochs and mountains (including 21 Munros). The site is located within the very southern boundary of the Park. All the 21 representative viewpoints have been taken from within the Park. From almost the full entirety of the Park the proposed development would not be visible. There would be limited, heavily screened views of the construction activity and proposed development from a localised area directly adjacent to the proposed development. There may be occasional glimpsed views from boats at the southern end of the loch, Inchmurrin Island (4km to the north) and high ground further afield. The proposed development would not be a prominent feature within the view and the magnitude of change on views and the general visual amenity of the Park is considered to be negligible resulting in an overall Negligible Adverse effect during both construction and operation.
- 12.7.33 **Loch Lomond National Scenic Area** is a large area focused around Loch Lomond, but excluding the southern tip of the loch. Its southern boundary is 1km north of the site at its closest point. Viewpoints 20 and 21 are located within the NSA. The construction activity and operation of the proposed development would not be a prominent feature within the NSA and the magnitude of change on views and the general visual amenity of the NSA is considered to be negligible, resulting in an overall Negligible Adverse effect during construction and operation.
- 12.7.34 **Kilpatrick Hills Local Landscape Area** is located to the south-east of the site. At its closest point it is approximately 1.9km east of the Station Square site and 2.4km east-south-east of the Loch Shore site. From the north-western boundary of the LLA there would potentially be glimpsed views of the construction activity and the taller elements of the proposed development. However, for the remainder of the LLA the construction activity and operation of the proposed development would be imperceptible. Overall the magnitude of change on views and the general visual amenity of the LLA is considered to be negligible resulting in an overall Negligible Adverse effect during construction and operation.
- 12.7.35 **Balloch Castle Garden and Designed Landscape** is located on rising land on the eastern loch shore to the east and north-east of the site. Within the GDL there are substantial areas of woodland which would screen views of the development, particularly from the loch shore. An exception along the loch shore in the GDL is the area around Proposal Beach (location of viewpoint 15) approximately 630m from the loch shore development. From here there would be direct but filtered views of the construction activity and the proposed development. The rising landform between Proposal Beach and Balloch Castle is less wooded and there would be views of the construction activity and the completed proposed development. From the higher ground around the castle (see viewpoint 17) there would be screened views of the loch shore development as well as the wider development, including the Station Square development and Woodbank House development. Overall the magnitude of change on views and the general

visual amenity of the GDL is considered to be medium resulting in an overall Moderate Adverse effect which would be higher (but still within the Moderate category) for construction than operation.

Visual Effects on Groups of Residential Receptors

- 12.7.36 **Old Luss Road** is a group of approximately 12 properties at the north-western edge of Balloch on the old road leading to Cameron House. The properties are located next to the proposed Woodbank House development. For those properties closest to Woodbank House (see viewpoint 6) there would be direct and generally open foreground and middle distance views of the construction activity and proposed development. The other areas of the proposed development (loch shore, Station Square and Drumkinnon Woods) would be screened from view by intervening vegetation and buildings. Overall the magnitude of change on views and the general visual amenity of the Old Luss Road residents is considered to be medium resulting in an overall Moderate Adverse effect during operation, which would be higher i.e. Major Adverse for construction.
- 12.7.37 **Upper Stonemollan** comprises two properties located on higher ground to the west of the site at approximately 990m and 1.3km distance from the proposed Loch Shore development. Viewpoint 12 is located in between these two properties (also see Plate J). Due to the elevation of these properties, occupiers would have open views towards the loch shore development, which would be a new and prominent feature alongside Drumkinnon Tower. Most of the remainder of the proposed development would be screened by intervening woodland on and adjacent to the site. Overall the magnitude of change on views and the general visual amenity of the Upper Stonemollan residents is considered to be medium resulting in an overall Moderate Adverse effect which would be higher (but still Moderate) for construction than operation.
- 12.7.38 **Inchcruin and Clairinsh** is a small housing area at the northern end of Balloch (see viewpoint 7). Drumkinnon Wood physically and visually separates the housing from Loch Lomond and Loch Lomond Shores. Only properties on the edge of the housing area closest to the proposed development are likely to be affected. Views from properties within the housing area would be screened by the intervening properties. Management works to Drumkinnon Woods would make the construction activity and the Drumkinnon Woods development more visible and residents may have views of timber lodges, the woodland walk and more movement of people than is currently experienced. However, the forest lodges and walkway should integrate well into the surrounding woodland and would not be a prominent feature. Most of the remainder of the proposed development (Station Square, Woodbank House and the loch shore) would be screened by intervening woodland on and adjacent to the site. Overall the magnitude of change on views and the general visual amenity of the Inchcruin and Clairinsh residents is considered to be low resulting in an overall Minor Adverse effect which would be higher (but still Minor) for construction than operation.
- 12.7.39 **Properties on or near Pier Road, Balloch Road and Balloch Bridge** are located at the northern end of Balloch close to the River Leven. Due to intervening vegetation and buildings, these properties would not have views of the loch shore development or the Woodbank House development. However, they would have close range and direct views of the Station Square development (see viewpoint 10 and Plates E and Q). In addition, properties on Pier Road (see viewpoint 9) would have filtered views of the Drumkinnon Woods development. Overall the magnitude of change on views and the general visual amenity of the Pier Road, Balloch Road and Balloch Bridge residents is considered to be medium resulting in an overall Moderate Adverse effect. Due to the proximity, the magnitude of effect arising from the construction activity would be high giving rise to a Major Adverse construction effect, although this would be short term and temporary.
- 12.7.40 **Mill of Haldane** is located on the high ground to the east of Balloch around Drumbain Crescent and Cook Road, between 1.5km and 2km east of the site. Views of the proposed development would be mostly screened (see viewpoint 18) by other built form, local landform and vegetation. However, there may be occasional glimpsed views, particularly from upper storeys, of the top of the loch shore development (i.e. the apart-hotel and waterpark). Overall the magnitude of change on views and the general visual amenity of the Mill of Haldane residents is considered to be negligible resulting in an overall Negligible Adverse effect during construction and operation.

12.7.41 **Balloch** – due to intervening landform, built form and vegetation the remainder of Balloch would not have views of the proposed development, except for occasional glimpsed views of the top of the loch shore development (i.e. the apart-hotel and waterpark). Overall the magnitude of change on views and the general visual amenity of Balloch residents is considered to be negligible resulting in an overall Negligible Adverse effect during construction and operation.

Visual Effects on users of Recreation, Leisure and Tourist Attractions, and Businesses

12.7.42 **Loch Lomond** is situated directly north of the site and hosts various leisure and tourist activities based around boating and the loch. From the southern end of the loch there would be close range and open views of the loch shore development. Although a viewpoint from the loch itself is not included, viewpoints 2, 3, 14, 15, 19 and 20 (and Plate O) are all located on the loch shore. For people using the southern end of the loch, the proposed development would appear similar to the existing Loch Lomond Shores complex. Its presence would not fundamentally change the view and the development would generally fit well with the scale and character of the landscape. There would be some permanent tree losses particularly near the loch side but this would be balanced by a new landscape scheme which could provide an overall enhanced setting to the existing development.

12.7.43 Users of the loch up to approximately 500m from the loch shore would experience a medium magnitude of effect arising from the construction activity giving rise to a Moderate Adverse construction effect, although this would be short term and temporary. During operation, the overall magnitude of change on views and the general visual amenity of recreational users at the southern end of Loch Lomond is considered to be low resulting in an overall Minor Adverse effect. For both construction and operation, with increasing distance the proposed development would become increasingly less perceptible and begin to appear as an extension to Loch Lomond Shores development. Therefore with increasing distance from the proposed development the magnitude of change and level of effect, for construction and operation, would eventually reduce, with receptors over 1km from the development only likely to experience Negligible Adverse effects.

12.7.44 **The River Leven** is adjacent to the east of the site and currently affords recreational users of the river views of Drumkinnon Woods and views along the river to the point it meets the loch (see viewpoints 8, 10 and 11 and Plate D). Due to intervening vegetation views of the loch shore development and Woodbank House development would be substantially screened. There may however be some direct, although partially screened, views of the Station Square development and glimpsed views of the Drumkinnon Woods development. Overall the magnitude of change on views experienced by users of the river is considered to be low resulting in an overall Minor Adverse effect for operation, the magnitude of change during construction would be medium with an overall Moderate Adverse effect.

12.7.45 **Cameron House and associated development (including grounds, golf course and holiday lodges)** is a busy visitor attraction to the north and north-west of the site. Views of the proposed development would be almost entirely screened by intervening landform and vegetation, in particular the woodland belt along the western banks of the loch. Viewpoints 5 and 14 (and Plate K) are from the Cameron House estate, and viewpoint 5 is one of the only locations within the estate where the proposed development would be visible. Overall the magnitude of change on views and the general visual amenity of the Cameron House visitors is considered to be low resulting in an overall Minor Adverse effect during construction and operation.

12.7.46 **The Carrick Golf Club and Spa** is located over an area between 3.2km and 5.2km north of the site along the western banks of Loch Lomond. Most views of the proposed development would be screened by intervening landform and vegetation. Due to the distance and intervening vegetation the proposed development would be almost imperceptible. Overall the magnitude of change on views and the general visual amenity of users of the Carrick Golf Club and Spa is considered to be negligible resulting in an overall Negligible Adverse effect during construction and operation.

12.7.47 **Lomond Woods Holiday Park** is adjacent to the southern boundary of the Woodbank House development. It is bounded on all sides by mature vegetation which screens views into and out of the park. Planting within the holiday park adds a further layer of screening and any potential views of the proposed development (excluding the Woodbank House development) would be

glimpsed and at a distance of over 700m (to the loch shore development). The existing northern boundary vegetation is relatively sparse and would afford some views of the Woodbank House development (see Plate I), particularly during winter months. Overall the magnitude of change on views and the general visual amenity of users of the Lomond Woods Holiday Park is considered to be low resulting in an overall Minor Adverse effect which would be higher (but still Minor) for construction than operation.

- 12.7.48 **Loch Lomond Shores** is located directly opposite the loch shore development, across 180m of open water. Visitors using the outside areas and boardwalk/promenade of Loch Lomond Shores would have direct and unobstructed views (see viewpoint 2) of the loch shore development. The remainder of the proposed development would not be visible. The current view of woodland on the shore area would be replaced by views of the proposed apart-hotel and waterpark set within a new, more formal landscape. The proposed development would be seen in the context of the existing view of Drumkinnon Tower and Loch Lomond Shores complex. Overall the magnitude of change on views and the general visual amenity of users of Loch Lomond Shores is considered to be medium resulting in an overall Moderate Adverse effect during operation. Due to the proximity, the magnitude of effect arising from the construction activity would be high giving rise to a Major Adverse construction effect, although this would be short term and temporary.
- 12.7.49 **Hotels, Restaurants and Bars** on and near Balloch Road and Balloch Bridge. Due to intervening vegetation and buildings, these properties would not have views of the Loch Shore development or the Woodbank House development. They would however have close range, direct views of the Station Square development (see viewpoint 10 and Plates E and Q). However most visitors would be indoors whilst at these locations and not focussing on the view, therefore their sensitivity is reduced to medium. Overall the magnitude of change on views and the general visual amenity of people visiting the hotels, restaurants and bars on Balloch Road is considered to be medium resulting in an overall Minor Adverse effect. The magnitude of effect arising from the construction activity would also be medium and give rise to a Minor Adverse construction effect which would be short term and temporary.
- 12.7.50 **Hotels, Restaurants and Bars** near Balloch Road / Old Luss Road roundabout (see viewpoint 13 and Plates G and H). Due to the intervening distance, vegetation and buildings, there are unlikely to be views from these locations other than occasional glimpses particularly from upper storeys, of the top of the loch shore development. Overall the magnitude of change on views and the general visual amenity of the people visiting these businesses is considered to be negligible resulting in an overall Negligible adverse effect during construction and operation.
- 12.7.51 **John Muir Way Coast to Coast Trail** runs from west to east through the Study Area entering the ZTV on the high ground at Bannachra Muir before heading along the old road along the western shores of the loch (see Plates M, R, L and K and Viewpoint 5). For this section of the trail the development would generally not be visible. However it then runs through the site passing the southern shore of the loch (see Viewpoints 1 and 2) and around the River Leven (see Plates B, D and C, and Viewpoints 10 and 8). The trail then follows the loch shore (see Viewpoint 15) and heads away from the loch through the grounds of Balloch Castle (see Viewpoint 17), before rising up in an easterly direction and crossing the higher ground where it skirts the northern boundary of the Kilpatrick Hills and leaves the Study Area and ZTV. Only a 3.5km section of this 215km trail would potentially afford views of the proposed development. The magnitude of change on views and the impact on general visual amenity of people using this 3.5km section of the John Muir Trail would vary and in many places would not be prominent due to intervening local landform or vegetation. Elsewhere it would be medium, resulting in an overall Moderate Adverse effect during operation. The magnitude of change would rise to high during construction giving rise to a Major Adverse construction effect, although this would be short term and temporary and would not be experienced along all of the 3.5km section of the trail.
- 12.7.52 **Three Lochs Way** commences within the site boundary and heads along the western banks of the River Leven and around the southern shore of Loch Lomond. For 1.5km it follows the same path as the John Muir Way (see Plates C, D and B and Viewpoints 1, 2 and 5). At Cameron House Lodge the trails head in separate directions and the Three Lochs Way heads along Old Luss Road (see Viewpoint 6) before turning west and on to higher ground along Lower Stoney-mollan Road (see Plates I and J) adjacent to the southern boundary of the Woodbank

House site and Upper Stoneyhill Road (see Viewpoint 12). The magnitude of change on views and the general visual amenity of people using the initial 3km section of the 55km long Three Lochs Way would vary and in many places would not be prominent due to intervening local landform or vegetation. Elsewhere it would be medium, resulting in an overall Moderate Adverse effect during operation. The magnitude of change would rise to high during construction giving rise to a Major Adverse construction effect, although this would be short term and temporary and would not be experienced along all of the 3km section of the trail.

12.7.53 **National Cycle Route 7** follows the path of the River Leven as it heads north towards Loch Lomond and skirts the south-eastern edge of site (see Viewpoint 10) close to the proposed Station Square development, before passing through the wooded area of the grounds of Balloch Castle and heading eastwards on Auchincarroch Road. The proposed development would be imperceptible for almost the entire route with the exception of approximately 300m of the route around Balloch Bridge where cyclists would have transient views of the Station Square development. Overall the magnitude of change on views and the general visual amenity of people using this 300m section of National Cycle Route 7 is considered to be low resulting in an overall Minor Adverse effect which would be higher (but still Minor) for construction than operation.

12.7.54 **Regional Cycle Route 40** begins at Loch Lomond Shores and follows the same route as the John Muir Way (see above) for almost 4km to Arden. It then continues northwards along the western banks of Loch Lomond. For users of Regional Cycle Route 40 the only part of the proposed development which would be visible (and then only transiently) is the Drumkinnon Woods development and Woodbank House development as the route leaves Drumkinnon Woods and heads north on Old Luss Road for approximately 110m. Overall the magnitude of change on views and the general visual amenity of cyclists using this section of Regional Cycle Route 40 is considered to be low resulting in an overall Minor adverse effect which would be higher (but still Minor) for construction than operation.

Visual Effects on Transport Users

12.7.55 **The A82** is a key tourist route and major road connecting Glasgow with the LLTTNP and the Highlands to the north. As a result, road users are considered to be of medium sensitivity to any changes in the visual amenity along the route. The road leaves Dumbarton approximately 6km south of the site and then runs along the western edge of the River Leven valley towards Balloch. Due to the screening afforded by the buildings in Balloch and mature roadside vegetation along this section of the road the proposed development would be imperceptible to road users. The A82 then passes approximately 180m west of Woodbank House (see Plate J) and 760m west of the proposed loch shores development. For almost this entire stretch of road, the proposed development would not be visible due to intervening vegetation, landform and buildings. The exception is a 340m stretch (approximate) adjacent to the Woodbank House development where there would be glimpsed and transient views of the proposed development. Overall the magnitude of change on views and the general visual amenity of road users in this location, during construction and operation, is considered to be negligible resulting in an overall Negligible Adverse effect.

12.7.56 Travelling north along the remainder of this road within the Study Area, there would be no views of the proposed development.

12.7.57 For road users heading southwards there would be occasional, glimpsed views of the proposed development and only during the winter months (see Plate M and Viewpoint 16). Overall the magnitude of change on views and the general visual amenity of road users in this location during construction and operation, is considered to be negligible resulting in an overall Negligible Adverse effect.

12.7.58 **The A818 and A817** (see Plate N) connect the A82, over high ground, with the A814 along the eastern shores of Gare Loch. For travellers heading west-to-east on these connecting roads views towards the southern end of Loch Lomond are typically screened by intervening vegetation and/or landform. The exception is a 500m stretch of the A817, 6.5km north-west of the site, where road users would have glimpsed and transient views of the loch shore development. Overall the magnitude of change on views and the general visual amenity of road users of the A818 in this location during construction and operation, is considered to be negligible resulting in an overall Negligible Adverse effect.

- 12.7.59 **The A811** leaves the A82 west of Balloch and 300m south-west of Woodbank House and runs directly through the town of Balloch (see Plate F) along the southern boundary of the LLTTNP, passing 200m south of Drumkinnon Woods at its closest point. Users of this road are of low sensitivity to the proposed development. With the exception of glimpsed and transient views of the Station Square development (see Viewpoint 11) the remainder of the proposed development would be almost imperceptible to users of the A811. Overall the magnitude of change on views and the general visual amenity of road users of the A811 in this location during construction and operation, is considered to be negligible resulting in an overall Negligible Adverse effect.
- 12.7.60 **Old Luss Road** is a minor local road which connects Balloch with Cameron House and other long established properties along the western banks of Loch Lomond. Users of this road are of low sensitivity to the proposed development. Close to the site it follows the same route as the John Muir Way (see above). The road is almost entirely tree lined and the only views of the proposed development would be for a 320m section where the road runs alongside the boundary of the Woodbank House site (see Viewpoints 5 and 6). Overall the magnitude of change on views and the general visual amenity of road users of Old Luss Road in this location is considered to be low resulting in an overall Minor Adverse effect during construction, during operation the transient nature of the views of completed residential properties on the existing site would also be low resulting in an overall Minor Adverse effect during operation.
- 12.7.61 **Balloch Road** is a local road which connects Old Luss Road (see Viewpoint 13) with the restaurants, pubs (See Plate E) and train station at the River Leven (see Viewpoint 10). Users of this road are of low sensitivity to the proposed development. The road is approximately 800m long and along its eastern section there would be close range and open (but transient) views of the Station Square development. The proposed development would however be viewed within the overall context of the road passing through the built up area. For this reason, the magnitude of change on views and the general visual amenity experienced by users of Balloch Road would be low resulting in an overall Minor adverse effect during operation. During construction the magnitude of change would rise to medium, resulting in a Moderate Adverse effect although this would be short term and temporary.
- 12.7.62 **Ben Lomond Way** is a local road at the south of Loch Lomond whose primary use appears to be to connect the large car park at Loch Lomond Shores to the smaller carpark at the Maid of the Loch and Duncan Mills slipways. Users of this road are of low sensitivity to the proposed development. The road is approximately 430m long. Views south are entirely screened by the adjacent Drumkinnon Woods and view to the north by mature planting within the Loch Lomond Shores car park and Loch Lomond Shores building complex. Views of the beach area are partially screened by intervening vegetation and there is only a small 40m section of road, adjacent to Drumkinnon Tower, where views towards the loch are possible (see Viewpoint 1). Road users would experience glimpsed and transient views of the Drumkinnon Woods development and of the loch shores development due to the proposed removal of existing vegetation between the road and beach area. Longer views across the loch would also be opened up as a result of the vegetation removal. At the eastern end of Ben Lomond Way the proposed monorail would pass over the road.
- 12.7.63 Overall the magnitude of change on views and the general visual amenity of road users of Ben Lomond Way in this location is considered to be medium resulting in an overall Minor Beneficial effect during operation (due to the opening of views towards the loch and general increased level of visual interest for the short time it takes to drive by the development). During construction the magnitude of change would also be medium (due to the very short term experience of travelling along the road) and in this instance the effect would be Moderate Adverse, although this would be short term and temporary.

12.8 Further Mitigation and Enhancement

Construction Phase

- 12.8.1 Beyond the relevant embedded mitigation listed in **Section 12.7**, no further mitigation of relevance to this assessment is proposed for the construction phase of the proposed development.

Operational Phase

- 12.8.2 The site is already heavily screened from the majority of the Study Area surrounding the site and standard mitigation measures to screen developments would not reduce any potential impacts further. For instance, it would not be possible to screen the apart-hotel and waterpark from other loch shore locations or recreational users of the loch, due to the intervening landscape. However, the use of darker building materials could reduce the visual impact on those receptors and has been suggested by the landscape officer at the LLTNPA. This is highlighted by the light cladding on Drumkinnon Tower which has the effect of highlighting the tower against the darker backdrop of the local woodland.
- 12.8.3 It is noted that this is not a full planning application and as yet full details are not available on the materials proposed for use in the development or facades of the buildings. However, from an LVIA perspective, in addition to using darker materials for the proposed apart-hotel and waterpark buildings, the following mitigation measures are being considered:
- Commitment to the use of sensitive materials, to be specified at detailed design stage;
 - Commitment to the implementation of a landscape scheme, to be specified at detailed design stage; and
 - Commitment to the retention where possible of a woodland strip to separate properties on Old Luss Road with the proposed site of the service area. To be confirmed at detailed design stage.

12.9 Residual Effects

- 12.9.1 Taking account of all proposed mitigation and enhancement measures, the likely residual effects from the construction and operation of the proposed development are identified in **Table 12.8 - Table 12.9** below.

Table 12.8 Summary of Residual Landscape Effects

Receptor	Construction			Operation – Year 15		
	Landscape Effect (All adverse)	Significance	Rationale	Landscape Effect (All adverse)	Significance	Rationale
Site	Major	Significant (very localised)	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Moderate	Significant (very localised)	As per the reasons stated in Section 12.7 for the predicted level of this effect.
LLTNP	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
River Valley Farmland with Estates LCT	Moderate	Significant (localised)	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Loch Shore Fringe LCT	Moderate	Significant (localised)	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Rolling Farmlands with Estates LCT	Moderate	Significant (localised)	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Lowland Lochs LCT	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.

Receptor	Construction			Operation – Year 15		
	Landscape Effect (All adverse)	Significance	Rationale	Landscape Effect (All adverse)	Significance	Rationale
Loch Lomond NSA	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Kilpatrick Hills LLA	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Balloch Castle GDL	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.

Table 12.9 Summary of Residual Visual Effects

Receptor	Construction			Operation – Year 15		
	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale
LLTNP	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Loch Lomond NSA	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Kilpatrick Hills LLA	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Balloch Castle GDL	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Settlement – Old Luss Road (Balloch)	Major	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Settlement – Upper Stoneydollan (Balloch)	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.

Receptor	Construction			Operation – Year 15		
	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale
Settlement – Inchrain and Clairinsh (Balloch)	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Settlement – Pier Road, Balloch Road and Bridge (Balloch)	Major	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Settlement – Mill of Haldane (Balloch)	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Settlement – Balloch (remainder of settlement)	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Loch Lomond	Moderate (up to 500m from the loch shore development and then decreasing the further in distance from the development you travel)	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor (up to 500m from the loch shore development and then decreasing the further in distance from the development you travel)	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.

Receptor	Construction			Operation – Year 15		
	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale
River Leven	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Cameron House and associated development (including the grounds, golf course and holiday lodges)	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
The Carrick Golf Club and Spa	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Lomond Woods Holiday Park	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Loch Lomond Shores	Major	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Hotels, Restaurants and Bars on Balloch Road near Balloch Bridge	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.

Receptor	Construction			Operation – Year 15		
	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale
Hotels, Restaurants and Bars near Balloch Road / Old Luss Road roundabout	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
John Muir Way Coast to Coast Trail	Major	Significant (localised for sections adjacent to the development)	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Moderate	Significant (localised for sections adjacent to the development)	As per the reasons stated in Section 12.7 for the predicted level of this effect.
The Three Lochs Way	Major	Significant (localised for sections adjacent to the development)	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Moderate	Significant (localised for sections adjacent to the development)	As per the reasons stated in Section 12.7 for the predicted level of this effect.
National Cycle Route No. 7	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Regional Cycle Route No. 40	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.

Receptor	Construction			Operation – Year 15		
	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale	Visual Effect (Adverse unless otherwise stated)	Significance	Rationale
A82 (key tourist route)	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
A811	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Negligible	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Old Luss Road	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Balloch Road	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.
Ben Lomond Way	Moderate	Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.	Minor Beneficial	Not Significant	As per the reasons stated in Section 12.7 for the predicted level of this effect.

12.10 Monitoring of Residual Effects

12.10.1 No monitoring is considered to be proportionate or required in relation to the predicted residual significant adverse effects of the proposed development.

12.11 Assessment of Cumulative Effects

12.11.1 A substantive cumulative assessment only needs to be included where cumulative effects (construction or operational phase) are likely and have not already been factored into the assessment provided above. Existing developments form part of the baseline scenario; therefore, they are of relevance to the assessment of individual effects rather than cumulative effects.

12.11.2 The proposed and consented developments to be considered, as identified by the LLTNPA, are:

- Replacement building and infrastructure for Sweeney's Cruises (planning application 2017/0373/DET);
- Drumkinnon Bay dredging (planning permission 2017/0326/DET). Consented January 2018;
- Woodbank Inn Hotel Extension (planning permission 2017/0223/DET). Consented November 2017; and
- Balloch Street Design Project (see <https://www.sustrans.org.uk/balloch>).

12.11.3 **Replacement building for Sweeney's Cruises** – this proposal is limited to the replacement of an existing small buildings and infrastructure on the existing site of the Sweeney's Cruises business at Balloch Road, adjacent to the River Leven and Station Square. In these circumstances it is not considered that there would be any cumulative landscape or visual impacts as a result of these developments, with the possible exception of short-term temporary visual impacts should construction work be undertaken concurrently with the proposed construction work at Station Square.

12.11.4 **Drumkinnon Bay dredging** – potential cumulative effects with this proposal are dependent on the timing and machinery used to perform the dredging operation. If a vessel with an inbuilt crane performs the dredging concurrently with construction work at the loch shore development site, there is the potential for very short-term visual effects. These effects would however impact those receptors where construction work at the loch shore site would already be visible.

12.11.5 **Woodbank Inn Hotel extension** – the proposed extension at the rear and partly on the footprint of an existing building, approximately 75m west of the boundary of the Station Square site. It is considered that these proposals are minimal, of a domestic scale and would not have any cumulative landscape or visual impact with the proposed development assessed within this ES, either during construction or operation.

12.11.6 **Balloch Street Design Project** – this project has involved a community consultation programme with respect to improving the appearance and quality of Balloch around the train station and town centre. These proposals have been submitted to West Dunbartonshire Council and LLTNPA with the intention of submitting a detailed design at a later date. Therefore as it currently stands it is not possible to accurately consider these proposals within the cumulative effects assessment. However, all the proposals focus around improving the streetscape of Balloch e.g. improving the street furniture, removing clutter and improving the initial impression of the town for visitors arriving at the train station. In these circumstances the only potential for cumulative landscape and visual effects would be very short-term and temporary visual effects if construction work near the train station occurred concurrently with the proposed construction work at Station Square. There would be no cumulative operational landscape or visual effects.

12.11.7 Overall none of the identified cumulative developments identified would result in significant cumulative landscape or visual effects, when considered in conjunction with the proposed development.

12.11.8 None of the identified cumulative developments would alter the predicted residual effects from the proposed development detailed in **Section 12.9** of this chapter.

12.12 Summary

12.12.1 This ES chapter has provided an assessment of the likely significant effects from the proposed development on landscape, views and visual amenity. The assessment has therefore assessed likely landscape and visual effects of identified receptors within a defined Study Area, extending to 5km from the site boundary.

12.12.2 In summary the value of the landscape within the Study Area as a whole is deemed to be very high but this is locally reduced to high, around the southern end of Loch Lomond where the built development, infrastructure and proximity to Balloch means that the landscape does not have the highly scenic, rugged and wild qualities of the park experienced further north. Similarly, whilst the sensitivity of the whole LLTTNP to the proposed development is considered very high, the sensitivity of the landscape around the southern end of Loch Lomond is considered medium as the landscape is already affected by a similar scale development (Loch Lomond Shores), by road infrastructure and by housing at Balloch. In relation to this it is noted that the Loch Lomond NSA actually excludes the southern end of Loch Lomond around the development site. Drumkinnon Woods appears well used by local residents and although classed as ancient woodland it visually appears to be in relatively poor condition. It is noted that the site is allocated for development for visitor experience related uses within the adopted Loch Lomond and the Trossachs LDP (2016).

12.12.3 As detailed in the baseline visibility section (**Paragraph 12.4.81**) the potential visual impacts of the proposed development were considered based on four different areas as follows:

- Loch Shore Development (relating to Zone C: Pierhead of **Figure 3.1 – Parameters Plan**);
- Drumkinnon Woods (relating to Zone B: Riverfront and Zone D: Drumkinnon Wood and Bay of **Figure 3.1 – Parameters Plan**);
- Woodbank House (relating to Zone E: Woodbank of **Figure 3.1 – Parameters Plan**); and
- Station Square (relating to Zone A: Station Square of **Figure 3.1 – Parameters Plan**).

12.12.4 As outlined in the section on baseline visibility (**Paragraphs 12.4.77– 12.4.82**) and the viewpoint analysis (**Paragraphs 12.7.22– 12.7.31**) there is a general lack of perceptibility of the site from the surrounding area. The proposed development as a whole would be visually well contained except for receptors immediately adjacent to the proposed development, with few exceptions as follows.

12.12.5 The loch shore development would potentially be visible from:

- Two isolated locations on the loch shore (Proposal Beach, within the grounds of Balloch Castle and the boathouse marina within the grounds of Cameron House estate);
- Areas of open high ground immediately to the east (Balloch Castle) and west (Upper Stonemollan) of Balloch;
- Boat users at the southern end of the loch; and
- Very occasional long distance views of the development from Inchmurrin Island (4km from the site) and areas of high ground further afield – the visual impact of which would be Negligible.

12.12.6 In addition, the loch shore development would visually impact viewers from the beach area, within the site itself, looking northwards across the loch.

12.12.7 The Station Square development would be a noticeable new feature to receptors immediately adjacent to the square including users of the River Leven and residents on Pier Road and Balloch Road.

12.12.8 The development at Woodbank House would be visible for existing residents on Old Luss Road and potentially visitors to the Lomond Woods Holiday Park.

Significant Landscape Effects

12.12.9 In summary, the LVIA has identified the following **adverse significant landscape effects that would be likely to arise from the proposed development:**

12.12.10 The site itself (i.e. within the red line boundary) would experience localised Major effects during construction work and localised Moderate effects (from the removal of woodland and change of land use) during operation; and

12.12.11 The Loch Shore Fringe, River Valley Farmland with Estates and Rolling Farmlands with Estates Landscape Character Types would experience localised Moderate effects during construction work.

Significant Visual Effects

12.12.12 In summary the LVIA has identified the following adverse significant visual effects that would be likely to arise from the proposed development:

- Balloch Castle Garden and Designed Landscape would experience Moderate effects during construction work at the loch shore and Moderate effects during operation, with little opportunity to mitigate the changes in view;
- A small number of properties on Old Luss Road would experience Major effects during construction work at Woodbank House and Moderate effects during operation;
- Properties and walkers at Upper Stoneydollan would experience Moderate effects during construction work at the loch shore and Moderate effects during operation, with little opportunity to mitigate the changes in view;
- A small number of properties on Pier Road and Balloch Road would experience Major effects during construction work at Station Square and Moderate effects during operation;
- Receptors, within 500m of the loch shore development, on Loch Lomond would experience Moderate effects during construction work at the loch shore development;
- Receptors on the River Leven would experience Moderate effects during construction work at Station Square;
- Receptors at Loch Lomond Shores would experience Major effects during construction work at the loch shore development and Moderate effects during operation, with little opportunity to mitigate the changes in view;
- Users of the John Muir Way and The Three Lochs Way would experience localised Major effects during construction and localised Moderate effects during operation, as they approached and walked through the development area, with little opportunity to mitigate the changes in view; and
- Road users of Ben Lomond Way would experience transient Moderate effects during construction work of the loch shore development.

Loch Lomond and The Trossachs National Park

12.12.13 In summary it is considered that due to the site's location on the boundary of the park and in an area already impacted by development, coupled with its lack of perceptibility, the proposed development would only cause **Negligible long term landscape and visual effects on the assessed Study Area and the LLTTNP, its Special Landscape Qualities and users.**

13 Archaeology and Heritage

13.1 Introduction

13.1.1 This ES chapter provides an assessment of the likely significant effects on the historic environment. The assessment is based on the characteristics of the site and surrounding area and the key parameters of the proposed development detailed in **Chapter 2 – Site and Surrounding Area** and **Chapter 3 – The Proposed Development** respectively. This chapter has been prepared by Headland Archaeology Ltd.

13.1.2 The aims of this chapter are to:

- Identify the relevant context in which the Cultural Heritage assessment has been undertaken;
- Describe the methods used to undertake the assessment;
- Outline the relevant baseline conditions currently existing at the site and surroundings;
- Identify the potential direct and indirect effects on the historic environment of the proposed development;
- Identify mitigation and enhancement measures where required to address identified effects;
- Assess residual predicted effects; and
- Assess cumulative effects on the historic environment from the proposed development in combination with other relevant cumulative developments.

13.1.3 A heritage asset (or historic asset) is defined as any element of the historic environment which has cultural significance. Both discrete features, and extensive landscapes defined by a specific historic event, process or theme, can be defined as heritage assets; and assets may overlap or be nested within one another.

13.1.4 Designated assets include Scheduled Monuments, Listed Buildings, World Heritage Sites, Conservation Areas, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields and Historic Marine Protected Areas. Other assets may also be locally designated through policies in the Local Plan.

13.1.5 The majority of heritage assets are not designated. Some undesignated assets are recorded in Historic Environment Records or Sites and Monuments Records (HERs/SMRs) maintained by local authorities and other agencies. However, many heritage assets are currently unrecorded, and the information contained in HERs and SMRs is not definitive, since they may include features which, for instance, have been entirely removed, or are of uncertain location, dubious identification, or negligible importance. The identification of undesignated heritage assets is therefore to some extent a matter of professional judgement.

13.1.6 Some heritage assets may coincide with visual receptors or landscape character areas, which are assessed in **Chapter 12 - Landscape and Visual Impact Assessment**, and in such cases, it is important to recognise the difference in approach between these two topics. Cultural heritage assessment addresses effects on the cultural heritage significance of heritage assets, which may result from, but are not equivalent to, visual impacts. Similarly, an effect on a landscape character area does not equate to an effect on the cultural heritage significance of heritage assets within it.

13.1.7 This ES chapter is supported by the following technical reports provided in **Appendices 13.1 - 13.2**:

- Appendix 13.1 Figures; and
- Appendix 13.2: Archaeological Desk Based Assessment.

13.2 Legislative and Policy Context

Legislation

13.2.1 The overarching legislative framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Subject-specific legislation of relevance to this assessment are:

- The Ancient Monuments and Archaeological Areas Act 1979 as amended - provides statutory protection for Scheduled Monuments though makes no reference to setting;
- The Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 as amended - provides statutory protection for Listed Buildings. This Act place a duty on the planning authority with respect to Listed Buildings and Conservation Areas, and their settings; and
 - Section 59 of the 1997 Act states (in part):
“In considering whether to grant planning permission for development which affects a listed building or its setting, a planning authority or the Secretary of State, as the case may be, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.”
 - Section 64 states:
“In the exercise, with respect to any buildings or other land in a conservation area, of any powers under any of the provisions in subsection (2), special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area.”
- The Historic Environment (Scotland) Act 2014 - defines the role of the new public body, Historic Environment Scotland (HES), and the processes for the designation of heritage assets, consents and rights of appeal.

Policy

13.2.2 The planning policy framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Planning policy considerations of specific relevance to this assessment are:

- Adopted Loch Lomond and the Trossachs National Park (LLTNP) Local Development Plan (LDP) (2016) including relevant policies outlined in Table 5.1, in particular:
 - Overarching Policy 1 – Strategic Principles;
 - Overarching Policy 2 – Development Requirements;
 - Visitor Experience Policy 2 – Delivering a World Class Visitor Experience;
 - Natural Environment Policy 1 – National Park Landscapes, Seascape and Visual Impact;
 - Historic Environment Policy 1 – Listed Buildings;
 - Historic Environment Policy 3 – Wider Built Environment and Cultural Heritage;
 - Historic Environment Policy 4 – Gardens and Designed Landscapes (GDL);
 - Historic Environment Policy 5 – Conversion and Re-Use of Redundant Buildings;
 - Historic Environment Policy 6 – Scheduled Monuments and Other Nationally Important Archaeological Sites;
 - Historic Environment Policy 7 – Other Archaeological Resources; and
 - Historic Environment Policy 8 – Sites with Unknown Archaeological Potential.

- Draft LLTP Partnership Plan 2018 – 202320, in particular outcomes 1-3 and 5-9;
- **National Planning Framework 3 (NPF3) (2014)**;
- **Scottish Planning Policy (2014)** including relevant provisions outlined in Table 5.2 in **Chapter 5**, in particular:
 - Principal Policy on Sustainability (paragraphs 24-35);
 - Principal Policy on Placemaking (paragraphs 36-57);
 - Valuing the Historic Environment Subject Policy (Paragraphs 135 – 151); and
 - Valuing the Natural Environment Subject Policy (Paragraphs 193 - 233).
- The **Historic Environment Scotland Policy Statement** (HESPS) (HES, 2016).

13.2.3 National and local planning policies regarding the preservation, conservation, protection and enhancement of the historic environment are supported by the following national planning guidance:

- **The Historic Environment Circular 1** (HES, 2016) supports the implementation of the HESPS (HES, 2016) and new consenting and listing procedures established under the Historic Environment (Scotland) Act 2014. The circular covers the requirements of the secondary legislation ('the Regulations') relating to the Historic Environment Scotland Act 2014 ('the 2014 Act'). The 2014 Act establishes Historic Environment Scotland as a Non-Departmental Public Body which will take over the functions of Historic Scotland and the Royal Commission on Ancient and Historical Monuments of Scotland;
- **Planning Advice Note 2/2011: Planning and Archaeology** provides technical advice to planning authorities and developers on dealing with archaeological remains. Among other issues it covers the balance in planning decisions between the preservation of archaeological remains and the benefits of development; the circumstances under which developers can be required to provide further information, in the form of a field evaluation, to allow planning authorities to reach a decision; and measures that can be taken to mitigate adverse impacts; and
- **'Setting'** (Historic Scotland, 2016) is part of the 'Managing Change in the Historic Environment' (MCHE) guidance provided by HES regarding the application of the historic environment policies set out in the SPP (2014).

Guidance and Relevant Technical Standards

13.2.4 The following guidance and technical standards have informed this assessment:

- Standards and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment (Chartered Institute for Archaeologists (CIfA), 2014); and
- Standards and guidance for historic environment desk-based assessment (CIfA, 2014).

13.3 Methodology

Scope of Assessment

13.3.1 This ES chapter presents an assessment of likely significant setting effects on the historic environment from the proposed development. The assessment presented in this ES chapter has been prepared in accordance with the 2011 EIA Regulations.

13.3.2 The principal issue considered within this assessment is the potential for the operational phase of the proposed development to result in impacts on the setting of designated heritage assets, on account of likely changes to views from and towards such assets. As detailed below,

²⁰ Loch Lomond and The Trossachs National Park Authority Loch Lomond and The Trossachs National Park, Partnership Plan 2018 - 2023

construction phase impacts on archaeological resources have been scoped out of this assessment on the basis that an archaeological programme of works prior to ground breaking will be required by condition attached to any PPIP granted for the proposed development.

Overall Approach

Overview

13.3.3 In undertaking the assessment presented in this ES Chapter, the following activities have been carried out:

- Desk-based study leading to the identification of heritage assets potentially affected by the development (**Technical Appendix 13.2**);
- Definition of baseline conditions, based on results of the desk-based study and visits to assets (**Technical Appendix 13.2**);
- Assessment of the importance of heritage assets potentially affected by the development;
- Identification of potential impacts on heritage assets, informed by baseline information, site visits, and photomontages;
- Proposal of mitigation measures, to eliminate, reduce or offset adverse effects;
- Assessment of the magnitude of residual effects;
- Assessment of the significance of residual effects, broadly a product of the asset's importance and the magnitude of the impact; and
- Assessment of cumulative effects.

13.3.4 The DBA identified the potential for setting impacts upon designated heritage assets within the proposed development area (PDA) and the wider Study Area. The DBA also identified the PDA as being of medium archaeological potential. The DBA baseline informs this ES Chapter, and the full DBA is included as **Appendix 13.2**

EIA Screening and Scoping

13.3.5 This assessment has been informed by an EIA Screening and Scoping Report (PBA, April 2017) and subsequent EIA Screening and Scoping Opinions issued by LLTNPA (11th May 2017) in respect of the EIA for the proposed development. The EIA Scoping Opinion, which is provided in full in **Appendix 4.1**, included a list of standard requirements for cultural heritage assessments in respect of development proposals. However, the following should also be noted:

- The scoping consultation response provided by the West of Scotland Archaeological Service (WoSAS) advised that a post-determination planning condition would be applied to any consent granted by the Council. WoSAS indicated that the condition should state;

“No development shall take place within the development site as outlined in red on the approved plan until the developer has secured the implementation of a programme of archaeological works in accordance with a written scheme of investigation which has been submitted by the applicant, agreed by the West of Scotland Archaeology Service, and approved by the Planning Authority. Thereafter the developer shall ensure that the programme of archaeological works is fully implemented and that all recording and recovery of archaeological resources within the development site is undertaken to the satisfaction of the Planning Authority in agreement with the West of Scotland Archaeology Service.”

13.3.6 WoSAS went on to state:

“this condition would be implemented by carrying out any proposed ground disturbance associated with the development as a staged process the first stage of which will be archaeological evaluation several weeks ahead of the construction phase followed by building recording.”

- 13.3.7 This condition covers any construction effects on known or previously unrecorded cultural heritage assets. Construction effects, including on unknown archaeological resources, have therefore been scoped out of this assessment.
- 13.3.8 The EIA Scoping Consultation Response issued by HES (letter dated 4th May 2017) deferred to WoSAS in the case of potential effects upon undesignated heritage assets and archaeology, and Category B and C-listed buildings. HES did request that four designated heritage assets be assessed for potential setting effects upon them. These assets are:
- Woodbank House with Garden Building (Category A, LB1125);
 - Balloch Castle Inventory Designed Landscape (GDL42);
 - Balloch Castle earthwork, Loch Lomond Park (Scheduled Monument, SM3385); and
 - Loch Lomond, Drumkinnon Bay, Winch House including Slipway (Category A, LB46721).
- 13.3.9 HES requested that certain views from and towards Woodbank House and Balloch Castle be illustrated with visualisations, and also that the proposed development be designed with a full appreciation of the heritage assets and their settings, and that the design should seek to retain key views towards and from Woodbank House, Balloch Castle and the Winch House.
- 13.3.10 The likelihood that undiscovered heritage assets may be present within the site is referred to as archaeological potential. Overall levels of potential can be assigned to different landscape zones while recognising that the archaeological potential of any zone will relate to particular historical periods and types of evidence.
- 13.3.11 The DBA (Technical Appendix 13.1, p8) identified the site as being of medium archaeological potential. This means that undiscovered heritage assets of low importance are likely to be present; and it is possible, though unlikely, that assets of high or medium importance may also be present.
- 13.3.12 As stated in paragraph 13.3.5 WoSAS has recommended that a post-determination planning condition will be placed on any development on this land. This condition would cover any direct physical impacts on the historic environment including building recording of Woodburn House and an archaeological evaluation. As the Applicant has accepted this recommendation, the assessment of construction phase impacts on cultural heritage assets and discussion of the mitigation of those impacts has been scoped out of this assessment.

Post Scoping Consultations

- 13.3.13 In January 2018, HES were provided with a list of proposed viewpoints from around the Study Area, as well as sample photography of the views towards and from Woodbank House. They responded in early February 2018 (email, 2nd February 2018). HES stated they were broadly content with the viewpoints as proposed, but also suggested three new viewpoints, illustrating two views towards Woodbank House (Category A-listed Building), and a view towards the Site from the Balloch Castle earthwork Scheduled Monument.
- 13.3.14 Draft visualisations were provided to HES in February 2018 (email, 9th February 2018) illustrating views from and towards Woodbank House listed building, Balloch Castle IGDL, and the Drumkinnon Bay winch house and slipway. The Balloch Castle earthwork Scheduled Monument was illustrated with photography undertaken on the archaeological site visit, but it will not be included as a formal visualisation. HES (email 28th February 2018) considered that the visualisations and site photographs would be sufficient for HES to make a judgement on potential impacts. HES also sought further clarification on the format of the visualisations.
- 13.3.15 In March 2018 (email, 6th March 2018), HES were supplied with draft versions of the visualisations illustrating the views from VP3, VP6, VP15 and VP17, as well as a copy of the Parameters Plan. It was clarified that only VP6 would be a detailed visualisation, and would include an artist's impression of the development around Woodbank House and its grounds. The views from VP3, VP15 and VP17 would constitute massing studies, intended to provide an idea of the mass of proposed buildings. HES responded in April 2018 (email, 4th April 2018) stating that although they *"would welcome further detailed visualisations from the massing study when they are produced.... Overall, we are content that these visualisations are sufficient in order for us to reach a decision when the application is submitted."*

13.3.16 These visualisations are included in **Appendices 12.4 and 12.6**.

Study Area

13.3.17 As this EIA chapter focuses on potential operational effects upon only four specific designated assets requested by consultees, a single Study Area has been used. The Study Area extends 1km from the site boundary. Within this area background data has been collated to identify any heritage assets which may be affected as they continue into the site and to identify assets which may be subject to setting effects.

Information Sources

Desk Top Study

13.3.18 A DBA produced in 2017 (Headland Archaeology, 2017) collated a detailed historic environment baseline for the site and the Study Area. This baseline information has been used to inform this EIA and the DBA is therefore included as **Appendix 13.2**.

Fieldwork

13.3.19 A targeted walkover survey of the Site and Study Area was carried out on 20th December 2016 to inform the DBA (Headland Archaeology, 2017). The intention of this walkover was to assess the presence/absence, character, extent and condition of known assets and to identify any previously unrecorded assets.

13.3.20 A second visit to the Study Area was made on 30th January 2018 to establish the potential for and assess the magnitude of any setting impacts upon the four designated heritage assets being considered as receptors in this assessment, namely Woodbank House, Balloch Castle IGDL, Balloch Castle earthwork Scheduled Monument and the Drumkinnon Bay Winch House and Slipway.

Approach to Assessment

Identification of Relevant Heritage Assets

13.3.21 Designated assets within the Study Area are shown on **Figure 13.1**. These assets are labelled with the reference number assigned to them by HES (prefixed SM for Scheduled Monuments, and LB for Listed Buildings).

13.3.22 In accordance with the EIA Scoping Opinion and the associated EIA scoping consultation response provided by HES (2017), this assessment therefore presents an assessment of likely effects on the following designated assets:

- Woodbank House with Garden Building (Category A, LB1125);
- Balloch Castle Inventory Designed Landscape (GDL42);
- Balloch Castle earthwork, Loch Lomond Park (Scheduled Monument, SM3385); and
- Loch Lomond, Drumkinnon Bay, Winch House including Slipway (Category A, LB46721).

Impact Assessment Methodology

13.3.23 An impact on the setting of a heritage asset occurs when the presence of a development changes the surroundings of a heritage asset in such a way that it affects (positively or negatively) the cultural significance of that asset. Visual impacts are most commonly encountered but other environmental factors such as noise, light or air quality can be relevant in some cases. Impacts may be encountered at all stages in the life cycle of a development from construction to decommissioning but they are only likely to lead to significant effects during the prolonged operational life of the development.

13.3.24 Indirect impacts describe secondary processes, triggered by the development, that lead to the degradation or preservation of heritage assets. For example, changes to hydrology may affect

archaeological preservation; or changes to the setting of a building may affect the viability of its current use and thus lead to dereliction.

13.3.25 Potential impacts on the settings of heritage assets are identified from an initial desk-based appraisal of data from HES and the HER, and consideration of current maps and aerial images available on the internet. Where this initial appraisal has identified the potential for a significant effect, the asset has been visited to define baseline conditions and identify key viewpoints.

Impact Assessment Criteria: Heritage Importance, Cultural Significance and Sensitivity

13.3.26 Cultural heritage impact assessment is concerned with effects on *cultural significance*, which is a quality that applies to all heritage assets, and as defined in ‘Historic Environment Scotland Policy Statement 2016’ (Annex 1, paragraph 3), may be artistic, archaeological, architectural, historic, traditional, aesthetic, scientific or social, and may be ‘inherent in the monument itself, its fabric, setting, use, associations, meanings, records, related monuments and related objects’. This use of the word ‘significance’, referring to the sum of the values we attach to an asset because of its heritage interest, should not be confused with the unrelated usage in EIA where the significance of an effect reflects the weight that should be attached to it in a planning decision.

13.3.27 The *importance* of a heritage asset is the overall value assigned to it based on its cultural significance, reflecting its statutory designation or, in the case of undesignated assets, the professional judgement of the assessor (Table 13.1). Assets of national importance and international importance are assigned a high and very high level respectively. Scheduled Monuments, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields and Historic Marine Protected Areas are, by definition, of national importance. The criterion for Listing is that a building is of ‘special architectural or historic interest’; following HESPS Note 2.17, Category A refers to ‘buildings of national or international importance’, Category B to ‘buildings of regional or more than local importance’, and Category C to ‘buildings of local importance’. Conservation Areas are not defined as being of national importance, and are therefore assigned to a medium level. Any feature which does not merit consideration in planning decisions due to its cultural significance may be said to have negligible heritage importance; in general, such features are not considered as heritage assets and are excluded from the assessment.

Table 13.1: Criteria for Assessing the Importance of Heritage Assets

Importance of the asset	Criteria
Very high	World Heritage Sites and other assets of equal international importance
High	Category A Listed Buildings, Scheduled Monuments, Inventory Gardens and Designed Landscapes, Inventory Historic Battlefields, Historic Marine Protected Areas and undesignated assets of national importance
Medium	Category B Listed Buildings, Conservation Areas, and undesignated assets of regional importance
Low	Category C Listed Buildings and undesignated assets of lesser importance

13.3.28 Cultural significance is assessed in relation to the criteria in HESPS Annexes 1-6, which are intended primarily to inform decisions regarding heritage designations but may also be applied more generally in identifying the ‘special characteristics’ of a heritage asset, which contribute to its cultural significance and should be protected, conserved and enhanced according to SPP paragraph 137. Annex 1 is widely applicable in assessing the cultural significance of archaeological sites and monuments, for instance, while the criteria in Annex 2 can be used in defining the architectural or historic interest of buildings, whether listed or not.

13.3.29 The special characteristics which contribute to an asset’s cultural significance may include elements of its setting. Setting is defined in ‘Managing Change in the Historic Environment:

Setting’ (HES 2016, Section 1) as ‘the way the surroundings of a historic asset or place contribute to how it is understood, appreciated and experienced’. The setting of an asset is defined and analysed according to Stage 2 of the three-stage approach promoted in ‘MCHE: Setting’, with reference to factors listed on pages 9-10. The relevance of these factors to the understanding, appreciation and experience of the asset determines how, and to what extent, an asset’s cultural significance derives from its setting. All heritage assets have settings; however, not all assets are equally sensitive to impacts on their settings. In some cases, setting may contribute very little to the asset’s cultural significance, or only certain elements of the setting may be relevant.

Impact Assessment Criteria: Magnitude of Effects on Cultural Significance

13.3.30 The magnitude of an effect is a measure of the degree to which the cultural significance of a heritage asset will be increased or diminished by impacts resulting from the development. This definition of magnitude applies to impacts on the setting, as well as impacts on the physical fabric, of an asset. Impacts on the settings of heritage assets are assessed with reference to the factors listed in ‘MCHE: Setting’ Stage 3 (evaluate the potential impact of the proposed changes, pages 10-11). It is important to note that the magnitude of an effect resulting from an impact on setting is not a direct measure of the visual prominence, scale, proximity or other attributes of the development itself, or of the extent to which the setting itself is changed; therefore, Landscape and Visual Impact Assessment criteria for scale/magnitude cannot be applied directly in determining the magnitude of effect on the setting of a heritage asset. It is also necessary to consider whether, and to what extent, the characteristics of the setting which would be affected contribute to the asset’s cultural significance.

13.3.31 Magnitude is assessed as high/medium/low, and adverse/beneficial, or negligible, using the criteria in Table 13.2 as a guide. In assessing the effects of a development, it is often necessary to take into account various impacts which affect an asset’s significance in different ways, and balance adverse effects against beneficial effects. For instance, there may be adverse effects on an asset’s fabric *and* on its setting, offset by a beneficial effect resulting from archaeological investigation.

Table 13.2: Criteria for Assessing the Magnitude of Effects on Heritage Assets

Magnitude of Effect	Guideline Criteria
High beneficial	Elements of the asset’s physical fabric which would otherwise be lost, severely compromising its cultural significance, are preserved in situ; or Elements of the asset’s setting, which were previously lost or unintelligible, are restored, greatly enhancing its cultural significance.
Medium beneficial	Elements of the asset’s physical fabric which would otherwise be lost, leading to an appreciable but partial loss of cultural significance, are preserved in situ; or Elements of the asset’s setting are considerably improved, appreciably enhancing its cultural significance; or Research and recording leads to a considerable enhancement to the archaeological or historical interest of the asset.
Low beneficial	Elements of the asset’s physical fabric which would otherwise be lost, leading to a slight loss of cultural significance, are preserved in situ; or Elements of the asset’s setting are improved, slightly enhancing its cultural significance; or Research and recording leads to a slight enhancement to the archaeological or historical interest of the asset.

Magnitude of Effect	Guideline Criteria
Negligible	The asset's fabric and/or setting is changed in ways which do not beneficially or adversely affect its cultural significance.
Low adverse	Elements of the asset's fabric and/or setting which are of very limited relevance to its significance are lost or changed, resulting in a very slight loss of cultural significance; or Elements of the asset's fabric and/or setting which contribute to its cultural significance are minimally affected, resulting in a very slight loss of cultural significance.
Medium adverse	Elements of the asset's fabric and/or setting which contribute to its significance are affected, but to a limited extent, resulting in an appreciable but partial loss of the asset's cultural significance.
High adverse	Key elements of the asset's fabric and/or setting are lost or fundamentally altered, such that the asset's cultural significance is lost or severely compromised.

Assumptions and Limitations

13.3.32 No issues or difficulties were encountered when compiling the baseline data, or when visiting the heritage assets included in this assessment.

Establishment of Effect Significance

13.3.33 The significance of an effect (EIA 'significance') on the cultural significance of a heritage asset, resulting from a direct or indirect physical impact, or an impact on its setting, is assessed by combining the magnitude of the effect and the importance of the heritage asset. The matrix in Table 13.3 provides a guide to decision-making but is not a substitute for professional judgement and interpretation, particularly where the importance or effect magnitude levels are not clear or are borderline between categories. The level of likely effects may be described on a continuous scale from negligible to major; it is also common practice to identify effects as significant or not significant, and in this sense major and moderate effects are regarded as significant in EIA terms, whilst minor effects are 'not significant' in the context of the EIA Regulations.

Table 13.3: Criteria for Assessing the Significance of Effects on Heritage Assets

Asset Importance	Magnitude of Effect			
	High	Medium	Low	Negligible
Very high	Major	Major	Major or moderate	Negligible
High	Major	Major or moderate	Moderate or minor	Negligible
Medium	Major or moderate	Moderate or minor	Minor	Negligible
Low	Moderate or minor	Minor	Negligible	Negligible

Approach to Cumulative Impact Assessment

13.3.34 Cumulative effects can occur when other proposed developments would also be visible in views that are relevant to the setting of a heritage asset. A proportionate assessment of likely

cumulative effects has been undertaken by considering the spatial relationship between each of the four identified cumulative developments (as detailed in **Chapter 2 – Site and Surrounding Area**), the proposed development and the four designated heritage assets located within the Study Area (see **Section 0** and **Appendix 13.2** for further details).

13.4 Baseline Conditions

- 13.4.1 A full review of current historic environment baseline conditions at the site and within the Study Area is contained within the DBA which is provided as **Appendix 13.2**. Further detail on certain heritage assets is included here as required.

Woodbank House and garden buildings, LB1125

- 13.4.2 Woodbank House and garden buildings (LB1125) comprise a Category A-listed building consisting of a modest eighteenth-century mansion, and an associated gazebo. Built on the site of an earlier 1670's house, the present building dates to the 1770s with a nineteenth-century extension added to the south. Occupied until the 1980s, Woodbank was most recently in use as a hotel, and minor alterations relating to this use are apparent in the building's fabric. Following the hotel's closure, the building has gradually fallen into disrepair, and is currently in a ruinous and unsafe state as a result of vandalism and exposure to the elements. The roof has fallen in, causing the collapse of the upper floors and staircases, and the ground floors and cellars are dilapidated, rubble-strewn and overgrown. Included in the listing is a small octagonal wooden gazebo near the house. The stable block and garages to the north are not listed, but are included on the HER and are also considered to be assets of high importance (**Technical Appendix 13.2, Section 4.2**).
- 13.4.3 Woodbank House is in the south-western corner of the Site, and stands at the top of a low ridge on the western edge of pasture on the Old Luss Road. Mature woodland surrounds the house, and the historic mapping indicates that the borders and footprint of this woodland, and the surrounding fields, appear largely unchanged since the mid-eighteenth century (**Appendix 13.2 Plates 13.2 to 13.9**). West of the house, the trees form a shelter belt, and define to edge of the modest grounds of the house. East and north of the house, the land slopes away and is currently under rough pasture, although the eastern field was moderately waterlogged at the time of the site visit.
- 13.4.4 The house is approached from the Old Luss Road along the original straight driveway, now a rough track, gravelled in places; the avenue of trees depicted in Roy's map (**Appendix 13.2 Plate 13.2**) does not survive. The original 1775 eastern façade of the house can be glimpsed through the trees, but the full extent of the house is not visible (**Appendix 12.4 Viewpoint 6**). As the drive enters the woodland, it begins to curve to the south whilst climbing the low ridge, and winds along the eastern edge of the woodland, giving the impression of a long approach to the house through the trees. From the curving drive, there are views across the lower fields east towards houses on the Old Luss Road, and the low hills south-east of Balloch and Jamestown. The existing developments on the shore of Loch Lomond are not visible in these views. Although now in an overgrown state, it is clear the tree planting has allowed for the house to be partially concealed yet still visible; with the house glimpsed from the road on the south-easterly approach, but hidden from view as you approach along the driveway from the north-east.
- 13.4.5 The driveway curves round to the southern front of the house, a nineteenth-century addition which now constitutes the main entrance. Again, partially hidden by woodland (depicted on the historic OS mapping), the house can only be glimpsed from the Lower Stonymollan Road approximately 100m to the south across an area of open pasture (**Appendix 12.6 Plate I**). This careful screen planting appears designed to ensure privacy for the house at the centre of what is a very small estate. From the southern elevation of the house, outward views are largely limited by the trees, and the overall impression is of a house designed to be relatively secluded within a small woodland setting. The drive continues southward to a gate onto Lower Stonymollan Road – historic mapping indicates this drive and entrance were added in the nineteenth century when the extension was built.
- 13.4.6 Woodbank House is Category A-listed for its architectural and historical interest built by a wealthy Glasgow merchant as a modest country house. It appears to have been originally designed to provide views to the east, over the grounds and fields to the hills beyond Balloch – at the time, a small village. However, the nineteenth-century extension appears to have made

the southern façade the main entrance to the house, with a new driveway from the Lower Stoney-mollan Road.

Loch Lomond, Drumkinnon Bay, Winch House including Slipway, LB46721

- 13.4.7 Drumkinnon Bay Winch House and Slipway is a Category A-listed Building (LB46721) Built in 1900-01 by the Dumbarton & Balloch Joint Line Committee, it is first depicted on Bartholomew's Map of 1902. It consisted of a 2-track 'patent slip', with a wooden cradle and iron outriggers supported on a double central rail, with ratchet in the centre, and single side rails. At the head of the slipway was a single-storey harled winding-engine house, containing a large steam winch (Hume 1976). The slipway was built to assist in servicing and maintaining the steam packets which ferried tourists and travellers along Loch Lomond in the late nineteenth and early twentieth century. Balloch Pier, approximately 80m to the north-east was a terminus for trains from Glasgow via Dumbarton Junction, and passengers could easily alight from the train to embark on the steamers. This traffic gradually declined and by the 1920s the Balloch to Dumbarton was very limited and passenger traffic ceased entirely in 1934 (<http://www.west-dunbarton.gov.uk/leisure-parks-events/museums-and-galleries/collections/transport/rail/>). The winch house fell into disuse and disrepair, and remained abandoned for the remainder of the twentieth century. In 2006 the winch house was restored with Heritage Lottery funding, and opened as a visitor attraction to complement the ongoing restoration of the paddle steamer 'Maid of the Loch'. The winch house machinery has been restored to working order, and the 'Maid' is currently berthed at Balloch Pier where she is undergoing restoration.
- 13.4.8 The Winch House and Slipway is on the southern shore of Loch Lomond, adjacent to but outside the north-eastern corner of the Site boundary. Historic mapping depicts it as being one of a number boat houses and jetties when it was first built, and a small jetty is still in use immediately adjacent to the slipway. The 1919 OS map depicts a footpath leading to the winch house from the centre of Balloch, which also gave access to the railway line. On shore and inland, the area around the winch house has been developed and now houses a number of car parks serving Loch Lomond Shores visitor centre and the jetty. There are areas of woodland planting which border the car parks and act as a natural screen between the developed shore and the northern suburbs of Balloch. The car parks have largely obscured the historic landward approach to the winch house, although the course of the railway line is still preserved as a footpath along the riverbank.

Balloch Castle, Inventory Garden and Designed Landscape, GDL42

- 13.4.9 Balloch Castle IGDL includes four Listed Buildings within its boundaries (**Figure 13.1**). The South (LB43221) and North (LB43220) Gate Lodges are Category B and C respectively, the Walled Garden (LB43222) is Category B-listed, and Balloch Castle (LB123) itself is a Category A-listed estate house. As the IGDL is considered to be the setting of the buildings, and operational effects on the IGDL as a whole are assessed, these Listed Buildings will not be assessed separately.
- 13.4.10 The Inventory entry for Balloch Castle IGDL deems it of 'High' or 'Outstanding' value for its scenic, architectural, artistic, horticultural and nature conservation aspects. Designed in the early 1800s, the park was commissioned by John Buchanan to complement the Gothic-style castle he was building on a low rise overlooking Loch Lomond. Planted with a variety of specimen trees, rhododendrons and areas of ornamental planting, the park is typical of early nineteenth century landscape parks, and has remained largely unaltered since its establishment. The estate was in various private hands until 1915 when Glasgow City Corporation bought it, and the estate is currently a Country Park open to the public and maintained by West Dunbartonshire Council.
- 13.4.11 Although the original Balloch estate covered approximately 330Ha, the IGDL only encompasses the 88Ha around the castle. As the Inventory entry describes; '[the IGDL] is situated on the south-east shore of Loch Lomond on the edge of the designated National Scenic Area, half a mile north of the town of Balloch and within easy walking distance of it. The Park is bounded to the west by Loch Lomond and the River Leven, to the north by the Burn of

Balloch, and to the east by its woodland belts. The Park slopes gently westwards down to Loch Lomond, and the Castle is set on a high point taking full advantage of the spectacular views over the south end of Loch Lomond.’

- 13.4.12 Currently the IGDL is most commonly approached from the southern car parks in Moss O’Balloch alongside the River Leven. A second, smaller car park beside the castle can be accessed from the eastern side of the IGDL. From the south, paths wind through woodland planted across the southern third of the IGDL. One path follows the bank of the river, and allows glimpses of the far bank (which constitutes the eastern Site boundary) through the trees. These glimpsed views gradually open up as one approaches the mouth of the river, and the southern end of Loch Lomond becomes more visible (**Appendix 12.4 Viewpoint 15**). The riverside path continues along the loch side, following the perimeter of the IGDL. The 1864 OS mapping clearly depicts these woodland paths and the managed views across the loch (**Appendix 13.2 Plate 13.10**). Other paths from the south take a more direct route towards the castle, passing the walled garden before leaving the ornamental woodland to cross an area of undulating landscaped parkland, planted with ornamental trees. From these paths the castle is a feature on the slopes to the east, but views west and north across the loch are still restricted by the loch side woodland. The mountains behind Luss and Auchentullich on the western shore of the loch are the principal topographic features in views from the parkland.
- 13.4.13 Upon reaching the castle, in its position overlooking the parkland, views across the loch open up. The ornamental trees and parkland form the foreground of these views, which sweep away west and north, across the loch side woodland. In views to the south-west, the 36m high Drumkinnon Tower of the Loch Lomond Aquarium is just visible above the trees beyond the estate boundaries, with low hills rising to the south-west behind it (**Appendix 12.4 Viewpoint 17**). To the west and north, across the sloping parkland, Loch Lomond can be seen curving away to the north, with mountains rising behind it.

Balloch Castle, Earthwork, Loch Lomond Park, SM3385

- 13.4.14 Balloch Castle, earthwork is a Scheduled Monument. It comprises a natural mound, surrounded by a ditch and traces of a bank, and represents the remnants of the original Balloch Castle. This was the first seat of the Lennox family, and was abandoned in 1390 when they built a new castle on Inchmurrin Island, the southernmost of Loch Lomond’s islands.
- 13.4.15 Exploiting a natural mound on the eastern bank of the River Leven, Balloch Castle is ideally located to monitor the river mouth, and the southern end of Loch Lomond, as well as overland routes along the eastern shore of the loch.
- 13.4.16 The Scheduled Monument is currently partially overgrown, and the western half of the mound is within an area of trees know as ‘Moat Wood’. The 1864 OS map (**Appendix 13.2 Plate 13.10**) depicts the earthworks, with woodland paths on two sides indicating that the castle was incorporated as a landscape feature on the Balloch Castle estate. Views out across the river mouth and loch are mostly restricted by the loch-side woodland of the Balloch estate, but it remains possible to appreciate and understand the reasons behind the Lennoxes’ choice of location. Views westward are restricted by the trees, and the existing buildings around Loch Lomond Shores are not visible.

Summary of Heritage Assets

- 13.4.17 In accordance with the EIA scoping consultation responses received from both HES and WoSAS, this assessment is concerned with potential operational effects upon particular designated heritage assets (**Table 13.4**, below). Potential construction and operational impacts, and mitigation of those impacts, upon other designated and undesignated heritage assets within the Site and Study Area are discussed in the DBA (**Appendix 13.2**, Section 5).

Table 13.4: Heritage Assets included in the Assessment

Asset no.	Asset Name	Status	Importance
LB1125	Woodbank House and garden buildings	Category A-listed Building	High
LB46721	Balloch Pier, Slipway and Engine House	Category A-listed Building	High
SM3385	Balloch Castle, earthwork, Loch Lomond Park	Scheduled Monument	High
GDL42	Balloch Castle	Inventory Garden & Designed Landscape	High

13.5 Baseline Evolution

13.5.1 Conditions affecting the survival of archaeological remains within the site and Study Area are likely to remain unchanged in the absence of the proposed development. With the exception of the likely continued and gradual decline and decay of the remains of Woodbank House, no ongoing processes of change have been identified.

13.6 Embedded Mitigation

13.6.1 As detailed in **Chapter 3 – The Proposed Development**, a number of design features and embedded mitigation measures have been incorporated into the design and construction of the proposed development to avoid, prevent or minimise significant adverse environmental effects and to enhance beneficial effects. Embedded mitigation measures of relevance to this assessment are:

- Commitment to undertake a programme of archaeological works, as requested by WoSAS, prior to the construction of the proposed development;
- Adherence to relevant HES regulatory and good practice guidance in construction methods;
- Retention of Woodbank House listed building façade as a landmark feature; and
- Conversion of other listed buildings within the Woodbank area of the site where practicable and viable.

13.7 Potential Effects

Construction Phase

13.7.1 As stated in **Paragraph 13.3.5** construction phase impacts on cultural heritage assets have been scoped out of this assessment.

Operational Phase

Woodbank House and garden buildings, LB1125

13.7.2 The elements of the proposed development within the vicinity of Woodbank House (**ES Figure 3.1**) comprise up to 20 low-density dwellings built in two groups, and up to 28 woodland lodges. The first group of dwellings will be along the Lower Stoneymollan Road, curving round along the Old Luss Road and will be built on the low-lying pasture to the south-east of the house. The second group of dwellings will be to the north-east, again on low-lying pasture along the Old Luss Road north of the original driveway. The woodland lodges will be dispersed throughout

the shelter belt of trees to the west of Woodbank House. Existing woodland north-east of and alongside the Old Luss Road will be retained.

- 13.7.3 The north-eastern group of dwellings would not be visible in views from the southern elevation, and will only appear on the periphery of views from the eastern elevation. The location of Woodbank, on a ridge of higher ground, means that eastward views would remain substantively unaffected by the presence of dwellings north-east of the house. The proposed development around Loch Lomond Shores would also not constitute a change to these eastward views, as it will be screened by existing woodland. The second group of low-density dwellings will appear in views to the south and south-east from both the southern and eastern elevations. However, views in these directions are considered to be of only limited relevance.
- 13.7.4 Despite the presence of elements of the proposed development in the vicinity, it would remain possible to appreciate and understand the contribution that setting makes to Woodbank House's cultural significance. This represents a negative change of low magnitude to the setting of a high sensitivity heritage asset (a Grade A listed building), resulting in a moderate adverse effect.

Loch Lomond, Drumkinnon Bay, Winch House including Slipway, LB46721

- 13.7.5 According to the HES listing entry the Winch House and Slipway are A-listed as 'a good example of a rare building type, particularly notable for the retention of its original machinery for the Dumbarton and Balloch Joint Line Committee.' The buildings' cultural significance derives almost entirely from its rarity and historic interest as a piece of industrial heritage with historical associations with Loch Lomond and Balloch. The buildings' immediate setting, on the shore of the loch, is relevant to cultural significance as is the relationship with Balloch Pier and the loch, as they relate to the buildings' function. Views to the south-west and south, inland, are less relevant to cultural significance, and with the existing carparks and Loch Lomond Shores development, these views are currently of limited sensitivity anyway.
- 13.7.6 Elements of the proposed development in the north-eastern corner of the site entail the reconfiguration of existing car parking to increase capacity, retention of most of the existing woodland, and the construction of a hotel, water park and restaurants to the south-west of the winch house.
- 13.7.7 Although the hotel and water park would appear in views to the south-west from the winch house (**Appendix 12.4 Viewpoint 3**), the redesign of the carparks would not substantively alter inland views. Views in these directions are of limited relevance to the cultural significance of the winch house and slipway. It would remain possible to appreciate and understand the Winch House and Slipway's cultural significance. This represents a negative change of negligible magnitude to the setting of high sensitivity heritage assets (a Grade A listed buildings), resulting in a negligible adverse effect.

Balloch Castle Inventory Garden & Designed Landscape, GDL42

- 13.7.8 It is clear that setting contributes to Balloch Castle IGDL's cultural significance. The use of natural topography to create a sweeping, undulating ornamental landscape, the enhancement and framing of views to the loch and mountains, and the creation of secluded woodland paths that open up into surprise views all combine to create a typical nineteenth century ornamental landscaped estate. The IGDL in its current form preserves many of the designed views and landscape features of the original estate, as can be seen from the 1864 OS map (Plate 13.10). Careful woodland planting has created framed views from the castle, as well as screening less desirable features such as Balloch Pier. The key outward view from the IGDL is from the castle, west across the parkland through a gap in the loch side woodland, out across the loch to the Cameron estate on the far shore, and the mountains rising behind it. Elsewhere on the estate, outward views are largely restricted to glimpses of the loch through trees and from woodland paths, and it is the internal views of ornamental trees and sculpted parkland that draw the eye.
- 13.7.9 The tallest structures in the proposed development are the hotel and water park on the shore of Loch Lomond, beside the Drumkinnon Tower; both will be a maximum of 24m high, whilst the existing tower is 36m. At the time of the setting visit in January 2018, the upper three floors of the Drumkinnon Tower were visible above the trees 900m south-west of Balloch Castle. It is therefore unlikely that either the hotel or the water park would be easily visible from the castle.

The remainder of the proposed development would not be visible from the IGDL as it would be either screened by existing woodland or located in areas of the site which are not visible from the IGDL.

- 13.7.10 Views to the south-west from Balloch Castle are not considered to be key contributors to the cultural significance of the IGDL. As detailed in paragraph 0, the key outward views are considered to be those to the west and north across the loch. The proposed development will not appear in these views. It would remain possible to appreciate and understand the contribution that setting makes to Balloch Castle IGDL's cultural significance. This represents a negative change of negligible magnitude to the setting of a high sensitivity heritage asset (an IGDL), resulting in a negligible adverse effect.

Balloch Castle, Earthwork, Loch Lomond Park, SM3385

- 13.7.11 The Scheduled Monument is on the eastern bank of the Leven approximately 75m from the site. Currently, the western bank is forested and crossed by footpaths and woodland walks.
- 13.7.12 Elements of the proposed development in this area will comprise the retention of the existing woodland at the mouth of the Leven, directly opposite the Scheduled Monument. Further upstream, south-west of the Scheduled Monument, it is proposed to build up to 43 single-storey lodges within the existing woodland, with footpaths providing access to existing pontoons. The proposed lodges are intended to be screened by the existing woodland, which will be largely retained.
- 13.7.13 The proposed development would not be an obvious or obtrusive presence in the key views from the Scheduled Monument. It is the strategic views of the river mouth, the southern end of the loch and the northern approaches that are of most relevance to understanding the contribution made by setting to the earthwork's location and function. It would remain possible to understand and appreciate their contribution to the cultural significance of the Scheduled Monument. This represents a negative change of negligible magnitude to the setting of a high sensitivity heritage asset (a Scheduled Monument), resulting in a negligible adverse effect.

13.8 Further Mitigation and Enhancement

Woodbank House and Garden Buildings (LB1125)

- 13.8.1 The proposed development would have an adverse operational impact of low magnitude upon Woodbank House which would, in the absence of mitigation, result in a moderate adverse effect on this heritage asset. However, it is proposed to implement a series of enhancement measures in order to offset and thus reduce the magnitude of potential impacts.
- 13.8.2 The detailed scope and timing of these measures will be developed and designed according to advice and guidance received from HES, but broad proposals are outlined below:
- A programme of historic building recording (HBR) will be undertaken in connection with Woodbank House and its associated structures and estate grounds;
 - The results of the HBR work will be used to inform the design of a flexible approach to the preservation of remaining facades of Woodbank House and the restoration where viable of associated listed structures;
 - Conservation work will pay particular attention to the east and south facades of Woodbank House, and their presentation as a landmark feature within the proposed development; and
 - The results of the EIA, HBR and conservation work will also be used to inform the production of interpretive materials for public dissemination. Such materials could take the form of information panels and/or a heritage trail around the grounds of Woodbank House describing and illustrating the history of the house and estate, whilst also providing information on the preservation and renovation process.
- 13.8.3 It is considered that these enhancement measures would conserve the fabric of Woodbank House, preserving its key intrinsic characteristics, whilst also enhancing the setting of the buildings by presenting them as a landscape feature. The public dissemination of information

gathered during HBR and conservation work will also serve to enhance the historical and associative characteristics of the buildings.

- 13.8.4 Following the criteria in Table 13.3, it is considered that this would constitute a beneficial effect of medium magnitude. When the beneficial effects of HBR, conservation and dissemination are balanced against the adverse effects of the proposed development upon the setting of Woodbank House, it is considered that the overall effect would constitute a beneficial effect of low magnitude.

Drumkinnon Bay Winch House and Slipway (LB46721), Balloch Castle IGDL (GDL42) and Balloch Castle, earthwork (SM3385)

- 13.8.5 No further mitigation is proposed in respect of the other designated heritage assets considered in this assessment.

13.9 Residual Effects

Construction Phase

- 13.9.1 As stated in paragraph 13.3.5 construction phase impacts on cultural heritage assets have been scoped out of this assessment

Operational Phase

- 13.9.2 Taking account of proposed mitigation and enhancement measures, the residual potential effects from the construction and operation of the proposed development are identified in Table 13.5.

Table 13.5: Residual Effects

Asset	Change due to Proposed Development	Mitigation and Enhancement	Residual Effect	Significance (EIA Terms)
Woodbank House and garden buildings (LB1125)	Negative Change - Low magnitude	Programme of historic building recording, followed by preservation/restoration of building fabric and presentation of facades as a landscape feature	Beneficial, low magnitude, minor significance	Not significant
Loch Lomond, Drumkinnon Bay, Winch House including Slipway, LB46721	Negative Change - Negligible magnitude	None	Negligible Adverse	Not significant
Balloch Castle Inventory Garden & Designed Landscape, GDL42	Negative Change - Negligible magnitude	None	Negligible Adverse	Not significant

Asset	Change due to Proposed Development	Mitigation and Enhancement	Residual Effect	Significance (EIA Terms)
Balloch Castle, earthwork, Loch Lomond Park, SM3385	Negative Change - Negligible magnitude	None	Negligible Adverse	Not significant

13.10 Monitoring of Residual Effects

13.10.1 Owing to the absence of predicted residual significant adverse effects, no monitoring of likely effects is proposed.

13.11 Assessment of Cumulative Effects

13.11.1 Cumulative effects can occur when other proposed developments would also be visible in views that are relevant to the setting of a heritage asset.

13.11.2 Owing to separation distances and screening provided by built form and vegetation, no likely significant cumulative effects are predicted to affect Woodbank House and garden buildings, Drumkinnon Bay Winch House and Slipway or Balloch Castle earthwork Scheduled Monument. With respect to the Balloch Castle IGDL. Views to the south-west from Balloch Castle are not considered to be key contributors to the cultural significance of the IGDL. The addition of the proposed Sweeney Cruises replacement infrastructure on the south western bank of the River Leven would therefore not alter the conclusion reached above that the proposed development would generate only a negligible adverse effect on the setting of the Balloch Castle IGDL. No likely significant cumulative

13.12 Summary

13.12.1 The cultural heritage assessment has considered likely effects of the proposed development upon the setting and physical fabric of cultural heritage assets within the site boundary and likely effects on the settings of certain assets within the wider landscape.

13.12.2 Within the site, the Category A-listed building Woodbank House and garden buildings was assessed for potential effects. Beyond the Site boundary, three designated heritage assets were assessed for setting effects. These were Drumkinnon Pier, winch house and slipway (Category A-listed building), Balloch Castle (Inventory Garden and Designed Landscape), and Balloch Castle, earthwork (Scheduled Monument).

13.12.3 Potential changes to views from and towards the identified designated heritage assets have been considered and illustrated with visualisations. Setting effects were also assessed following visits to each heritage asset. Mitigation and enhancement measures have been proposed to minimise the potential impacts of the proposed development upon each heritage asset.

13.12.4 The site is considered to be of medium archaeological potential. Potential impacts upon unknown archaeological deposits will be addressed through a staged programme of archaeological works, recommended by WoSAS and to be undertaken as a post-determination planning condition. On this basis, potential impacts upon archaeological deposits were not assessed.

13.12.5 Taking the account of the implementation of mitigation and enhancement measures, **no likely setting effects on the historic environment would result from the proposed development which would be considered significant in the context of the EIA Regulations.**

13.13 References

Bibliographic References

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Historic Maps

- The following pre-Ordnance Survey maps held by the National Library of Scotland were examined:
 - Blaeu, J 1654, *Levinia Vicecomitatus, [or] The Province of Lennox called the Shyre of Dun-Britton*;
 - Roy, W 1747-55, *Military Survey of Scotland – Highlands*;
 - Ross, C 1777, *A map of the Shire of Dumbarton*;
 - Ainslie, J 1821, *Map of the Southern Part of Scotland*;
 - Thomson, J 1832, *Dumbartonshire*; and
 - Bartholomew, JG 1902, *Trossachs, Loch Lomond*.
- The following Ordnance Survey maps held by the National Library of Scotland were examined:
 - 1864 (surveyed 1860) *Dumbartonshire*, Sheet XVIII, 1: 2,500;
 - 1898 (surveyed 1897) *Dumbartonshire*, Sheet 18.01, 1: 25,000;
 - 1898 (surveyed 1897) *Dumbartonshire*, Sheet 18.05, 1: 25,000;
 - 1918 (surveyed 1914) *Dumbartonshire*, Sheet 14.14, 1: 25,000;
 - 1918 (surveyed 1914) *Dumbartonshire*, Sheet 18.02, 1: 25,000; and
 - 1938 (surveyed 1936) *Dumbartonshire*, Sheet 18.02, 1: 25,000.

Aerial Photographs

- The following aerial photographs held by the NCAP were examined:

Sortie	Date	Frame nos.
AFL2132	10.09.49	SAW026582
ASS/51388	10.06.88	0195
AFL2014	07.10.27	SPW019589
n/a	01.01.39	SPW062643

14 Socio-economics, Tourism, Recreation and Public Access

14.1 Introduction

14.1.1 This ES chapter provides an assessment of the likely significant effects on socio-economics, tourism, recreation and access receptors.

14.1.2 The aims of this chapter are to:

- Identify the relevant context in which the socio-economic, tourism, recreation & access and assessment has been undertaken;
- Describe the methods used to undertake the assessment;
- Outline the relevant baseline conditions currently existing at the site and surroundings;
- Identify the potential direct and indirect economic effects of the proposed development;
- Identify the potential tourism, recreation and access effects of the proposed development;
- Identify mitigation and enhancement measures where required to address identified effects;
- Assess residual predicted effects; and
- Assess cumulative effects on socio-economics from the proposed development in combination with other relevant cumulative developments.

14.1.3 This ES Chapter is supported by the following supporting information provided in **Appendices 14.1 – 14.3**.

- **Appendix 14.1**
 - Figure 14.1: Socio-economic Study Area;
 - Figure 14.2: Tourism, Recreation and Access Study Area;
 - Figure 14.3: Promoted Paths;
 - Figure 14.4: Rights of Way and Heritage Path;
 - Figure 14.5: Core Paths;
 - Figure 14.6: Cycle Routes;
 - Figure 14.7: Recreational Activities;
 - Figure 14.8: Visitor Attractions; and
 - Figure 14.9: Events.
- **Appendix 14.2:** Socio-economic Baseline tables; and
- **Appendix 14.3:** Tourism Volume and Value tables.

14.2 Legislative and Policy Context

Legislation

14.2.1 The overarching legislative framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**.

14.2.2 The National Parks (Scotland) Act 2000 identifies the aims of Scotland's National Parks. The aim of relevance to this assessment is "to promote sustainable economic and social development of the area's communities".

Policy

14.2.3 The planning policy framework applicable to this EIA for the proposed development is outlined in **Chapter 5 – Legislative and Policy Context**. Planning policy considerations of specific relevance to this assessment are:

- Loch Lomond and the Trossachs Local Development Plan 2017 – 2021;
- Non-Statutory Planning Guidance: Visitor experience planning guidance;
- Draft National Park Partnership Plan (2018-23): Outcomes 5-9, Outcomes 10-12;
- National Planning Framework 3: provides support for proposals which increase employment and economic development; and
- Scottish Planning Policy 2014: Supporting Business and Employment (paragraph 92-108).

14.2.4 Other policy considerations of relevance to this assessment are:

- Government Economic Strategy 2015: Investment in tourism is encouraged;
- Tourism Scotland 2020 and Tourism Development Framework for Scotland Refresh 2016: identifies the importance of the tourism economy within LLTNP and states that “*further opportunities remain around the south of the Loch at the gateway to the National Park*” for hotel and other accommodation (paragraph 2.48);
- Loch Lomond and the Trossachs National Park Tourism Strategy 2012-2017; and
- Loch Lomond and the Trossachs National Park Outdoor Recreation Plan 2013-2017.

Guidance and Relevant Technical Standards

Socio-economics

14.2.5 There is no formal guidance on the assessment of socio-economic or tourism effects. The methodology for the socio-economic impact assessment follows guidance in Her Majesty's Treasury's 'Green Book for Economic Appraisal and Evaluation', and good practice guidance for economic assessment used by the Scottish Government and Scottish Enterprise. It is also similar to the approach employed in other development projects elsewhere in Scotland.

Tourism, Recreation and access

14.2.6 The methodology employed for the tourism and recreation assessment has been used in a number of other development projects across Scotland. The approach has been robustly tested and accepted as valid throughout the development process and at public inquiry.

14.3 Methodology

Scope of Assessment

14.3.1 This ES chapter presents an assessment of likely significant effects on socio economics, tourism, recreation and access receptors as a result of the proposed development. The assessment presented in this ES chapter has been prepared in accordance with the 2011 EIA Regulations.

14.3.2 The principal aspects considered within this assessment are:

- An overview of socio-economic baseline conditions in the study area;
- Identification and assessment of likely significant socio-economic effects arising from the Proposed Development;
- An overview of tourism, recreation and access baseline conditions in the study area;
- Identification and assessment of likely significant tourism, recreation and access effects arising from the Proposed Development;

- Mitigation and enhancement measures to minimise any predicted adverse socio-economic and/or tourism, recreation and access effects and maximise benefits from the Proposed Development; and
- A summary of residual effects, taking into account proposed mitigation and enhancement measures

Overall Approach

14.3.3 In undertaking the assessment presented in this ES Chapter, the following activities have been carried out:

- Preparation of EIA 'Screening and Scoping Report' and review of 'the EIA Scoping Opinion'. The Scoping Opinion confirmed that the EIA should include all potential socio-economic impacts (both direct and indirect) on Balloch and the surrounding area. It also identified that consideration needs to be given to the impacts of the proposals on recreation, including existing as well as proposed recreational uses, and on access;
- Consultation was undertaken with LLTNP to agree the revised tourism, recreation and access study area;
- Consultation with local businesses and organisations (carried out as part of Pre-application consultation – see PAC Report);
- Baseline review (socio-economic, tourism, recreation and access); and
- Assessment of likely significant effects (socio-economic, tourism, recreation and access).

Study Area

Socio-economic

14.3.4 The study areas for the socio-economic assessment will be based on those settlements closest to the proposed development, limited by a 15-minute drive time catchment. The 'wider area' will be defined within a 30-minute drive time, and 'wider region' within a 45-minute drive time (**Figure 14.1**);

Tourism, Recreation and Access

14.3.5 The study area for the tourism, recreation and access assessment is defined by a 5km radius from the Site (**Figure 14.2**). Facilities or notable points of focus for visitor attraction and recreation within this area will be reviewed.

14.3.6 At scoping stage, it was proposed that a study area of 7.5km radius would be used however as a result of the tower no longer being included in the proposed development, the study area for tourism, recreation and access was reduced to a 5km radius from the proposed development. This was agreed with the recreation and access officer at LLTNPA. The tourism officer was contacted but no response received. The 5km study area is consistent with that used in the Landscape and Visual Chapter (**Chapter 12**).

Information Sources

Socio-economic

14.3.7 An extensive desk based review of publicly available information sources has been undertaken to establish baseline conditions of the Local Study Area and the Wider Study Area. The following socio-economic indicators have been considered:

- Current and Future demographic characteristics including population and age structure; and
- Labour market indicators including economic activity, employment and qualifications.

Tourism, Recreation and Access

- 14.3.8 A desk-based analysis has been carried out to determine key factors which impact upon tourism trends and the key drivers influencing the market. Factors such as domestic and overseas visitor patterns and trends, occupancy rates and popular visitor attractions are analysed.
- 14.3.9 A desk-based audit has been prepared to determine the scale of tourism and recreational activity and related facilities in the study area. The assessment covers key aspects including: tourism and recreation facilities; and those facilities and features which act as a focus or attraction for visitors, and lead to expenditure by visitors.
- 14.3.10 The following facilities and attractions have been identified in the study area:
- Visitor attractions – including cultural facilities, recreation and leisure facilities;
 - Visitor activities – including walking, fishing, country pursuits, wildlife interests and sports; and
 - Visitor and tourist routes – including cycling, walking and rights of way.

Approach to Socio-economic Assessment

- 14.3.11 The study area for the socio-economic assessment is based on drive-time catchment areas from the development as defined in **Figure 14.1**.
- 14.3.12 The principal socio-economic assessment criteria relate to employment effects within the study area. These are defined in terms of Full-Time Equivalent (FTE) jobs and the Gross Value Added (GVA) generated by those jobs. The assessment has therefore focussed on the following categories:
- Direct economic effects: jobs and GVA that are wholly or largely related to construction, decommissioning, and operation and maintenance of the development;
 - Indirect economic effects (positive and negative): jobs and GVA generated in the economy of the study area in the chain of suppliers of goods and services to the direct activities;
 - Induced economic effects: jobs and GVA created by direct and indirect employees' spending in the study area or in the wider economy; and
 - Wider economic (catalytic) effects (positive and negative): employment and income generated in the economy related to the wider role of the development in influencing economic activities (including wider socio-economic effects below). This will include the effects on inward investment, elsewhere within the construction sector (e.g. as a result of worker supply), and on other sectors of the economy.
- 14.3.13 Best practice principles²¹ have been applied to assess the employment impact of the proposed development. An economic impact model, consistent with appraisal guidance, has been used to measure net additional employment and GVA.²² Appropriate economic appraisal guidance²³ and professional judgment based on economic impact assessment elsewhere has been used to estimate values for:
- Deadweight - what would happen in the absence of the proposed development;
 - Leakage - the proportion of employment opportunities accessed by people living outside the study area;
 - Displacement – the proportion of proposed development benefit accounted for by a reduction in benefit elsewhere;

²¹ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/220541/green_book_complete.pdf

²² The economic impact model allows the guidance to be applied to the quantitative elements of the employment impact assessment

²³ HM Treasury Green Book Economic Appraisal Guidance (see Reference section).

- Substitution - when a firm substitutes one activity for another to take advantage of public sector assistances; and
- Multipliers – to estimate further economic activity associated with additional income and supplier purchases.

Socio-economic Sensitivity

14.3.14 Adequate labour and/or skills capacity results in a low sensitivity, while limited labour and/or skills capacity results in a high sensitivity. Sensitivity criteria relating to employment are shown in Table 14.1 below.

Table 14.1 Socio-economic Sensitivity

Sensitivity	Definition
High	There is low/limited availability of labour and skills in the area's workforce (this is dependent on specific project requirements and the degree to which they can be met in the area under consideration). The Proposed development would lead to labour market pressure and distortions (i.e. wage inflation, skills and capacity shortages, import of labour).
Medium	The receptor has a constrained supply of labour and skills. The Proposed development may lead to labour market pressure and distortions (i.e. wage inflation, skills and capacity shortages, import of labour).
Low	The receptor has a readily available labour force: some skill deficits. The Proposed development is unlikely to lead to labour market pressure and distortions (i.e. wage inflation, skills and capacity shortages, import of labour).

Socio-economic Magnitude of Change

14.3.15 The magnitude of change associated with predicted socio-economic impacts has been defined in accordance with the criteria in Table 14.2 below.

Table 14.2 Socio economic Magnitude of Change

Magnitude	Definition
High	Effects would be observed on an international, national or regional scale; and/or where the number of jobs created or lost in the Study Area would be greater than 250 (based upon EU definition of small and medium enterprises). and/or Effects would be of long-term duration (i.e. greater than 5 years). Frequency is not a relevant consideration.
Medium	Noticeable effects would arise that may be judged to be important at a local scale, either because there are large effects on few receptors or smaller effects on a larger proportion of receptors; and/or where the number of jobs created or lost in the Study Area would be greater than 50, but fewer than 250. and/or Effects would be medium-term (i.e. 3-5 years). Frequency is not a relevant consideration.

Magnitude	Definition
Low	Small scale effects would arise, with a limited number of affected receptors; and/or where the number of jobs created or lost in the Study Area would be greater than 10, but fewer than 50. and/or Effects would be short-term (i.e. 1-2 years). Frequency is not a relevant consideration.
Very Low	Where an effect would not be discernible; and/or where fewer than 10 jobs would be created or lost within the Study Area. and/or Effects would be temporary (i.e. experienced for less than one year).

Approach to Tourism, Recreation and Access Assessment

- 14.3.16 The tourism and recreation study area is defined by a 5km radius from the Proposed Development. The catchment is taken to include all facilities, notable points of focus, or attractions located in this catchment which is either tourism, recreation or access related. Key facilities located just outside the boundary of the study area have also been included.
- 14.3.17 Tourism and recreational behaviour will only be detrimentally affected where the effect of the development either changes the visitor / user pattern – in terms of numbers, and /or where patterns of expenditure may change. In this, opportunities for tourist and visitor expenditure and any potential variation in expenditure or visitor numbers and its consequent effect upon turnover or employment are of key importance. This assessment highlights such effects and their likelihood of occurrence.
- 14.3.18 Facilities or notable points of focus in the study area have been identified. Based on the proposed developments anticipated visibility, comment is provided on the likelihood of the it influencing visitor and tourist attitudes and behaviour towards these visitor facilities and locations.
- 14.3.19 Recreational behaviour will be affected where a development potentially leads to a change in recreational habits or activities. Factors which might lead to change in recreational behaviour include loss, closure, or diversion of routes; obstructing access routes; enhancing access; reduction in amenity or intrusion; enhancement in amenity; and changes in setting and context of the recreational resource.
- 14.3.20 The scale of potential effect on recreational users is likely to be a factor of the proximity of the proposed development, significance of the resource in terms of usage, and the type of resource e.g. a town centre indoor recreational facility compared to a hill top view point, visibility of the proposed development from the resource at all points, and diversion due to the presence of the proposed development.

Tourism, Recreation and Access Sensitivity

- 14.3.21 In determining the level of tourism and recreation sensitivity, the status of the receptor or resource is the defining factor. The main factors considered relevant when defining the sensitivity of receptors are outlined in Table 14.3.
- 14.3.22 When assessing the tourism sensitivity of individual tourism/recreation receptors, establishing the availability of related visitor numbers or other data is the first step. Sources such as VisitScotland and relevant local authority information are employed. If this data is not available, a web based search is conducted to determine the status and popularity of a receptor.
- 14.3.23 Key indicators for a high sensitivity receptor would include its identification on national and international websites such as VisitScotland, VisitBritain and top attractions on Trip Advisor. If there are numerous references on such websites, then it is possible that the receptor has an

international/national draw i.e. people come specifically to an area to use or visit it. A high sensitivity receptor may receive high visitor numbers. International/National status can also relate to specific designations given to a receptor e.g. a national cycle route or one of Scotland's Great Trails (as defined by VisitScotland). If the receptor is a transport link i.e. a road or a rail line its international/national status is based on whether it operates across numerous regions and/or its ability to bring significant numbers of visitors/tourists to an area.

14.3.24 Regional receptors are generally less likely to appear frequently on searches of international/national websites and instead are more likely to be noted on regional websites such as the relevant local authority or regional tourism body. A regional receptor may have a specific draw to people visiting the local authority area but is unlikely to draw significant numbers of people beyond that area. Transport links will have a regional status if they only serve the region.

14.3.25 Local status receptors may draw relatively low volumes of visitors and are unlikely to be mentioned frequently on international/national or regional tourism sites. Such receptors are most likely to be promoted through their own website and/or local tourism bodies such as local community websites. Local receptors are unlikely to have significant draw as a singular receptor i.e. it is unlikely that people from the wider region and beyond would specifically come to an area to use/visit it. Instead these types of visitor may visit/use the receptor as part of a wider trip.

14.3.26 The assessment of receptor sensitivity is based on a detailed understanding of the factors listed above in combination with professional judgement.

Table 14.3 Tourism, Recreation and Access Sensitivity

Sensitivity	Definition
High	Where the receptor or resource (visitors to activities, resources, attractions or businesses) is defined as being of International or National status and generates high visitor numbers
Medium	Where the receptor or resource is defined as being of regional status and generates medium visitor numbers
Low	Where the receptor or resource is defined as being of local status and generates low visitor numbers

Tourism, Recreation and Access Magnitude of Change

14.3.27 Magnitude of change will be gauged by estimating the amount of change on the receptor arising from the scheme. This level of visual effect will be determined through assessment of the Zones of Theoretical Visibility Maps (ZTV) produced for **Chapter 12: Landscape and Visual Impact Assessment** and physical disturbance through map analysis. The magnitude of change will be evaluated in line with the criteria set out below in **Table 14.4**.

Table 14.4 Tourism and Recreation Magnitude of Change

Magnitude	Definition
High	The extent of change experienced by receptors (visitors to activities, resources, attractions or businesses) is large scale and a large number of people or activities will be affected; or The majority of the development is visible, at close proximity, from the receptor's location
Medium	The extent of change experienced by receptors is small in scale, but a large number of people or activities will be affected; or The extent of impacts on activities, resources and/or businesses is large in scale but only a small number of people or activities will be affected; or

Magnitude	Definition
	The development is partially visible from limited viewpoints in the receptor's location
Low	The extent of change experienced by receptors is small in scale and will only affect a small number of people or activities; or where the proposed development would be unlikely to be visible (as it would be obscured by hills or woodland, etc.) or would be visible at a distance or where the receptor is not susceptible to impacts from development visibility.
Very Low	Where impacts on receptors would be negligible

Establishment of Effect Significance

14.3.28 In line with standard EIA practice, the sensitivity of receptors, as defined in Table 14.1 Receptor Sensitivity (Socio-economic) and **Table 14.3** Receptor Sensitivity (Tourism, Recreation and access) are considered against the Magnitude of Change (**Table 14.2 and Table 14.4**) to determine the significance of effects (**Table 14.5**). Effects which are 'moderate' or 'major' are considered to be significant in EIA terms (highlighted in pink shading below).

Table 14.5 Significance of Effects

Sensitivity	Magnitude of Change			
	High	Medium	Low	Very Low
High	Major	Moderate/Major	Moderate	Negligible
Medium	Moderate/Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Minor	Negligible

Approach to Cumulative Impact Assessment

14.3.29 Cumulative socio-economic effects are the likely construction impacts from the proposed development when considered alongside other development proposals, as identified by LLTNPA. The cumulative developments are identified in **Chapter 2 – Site and Surrounding Area**.

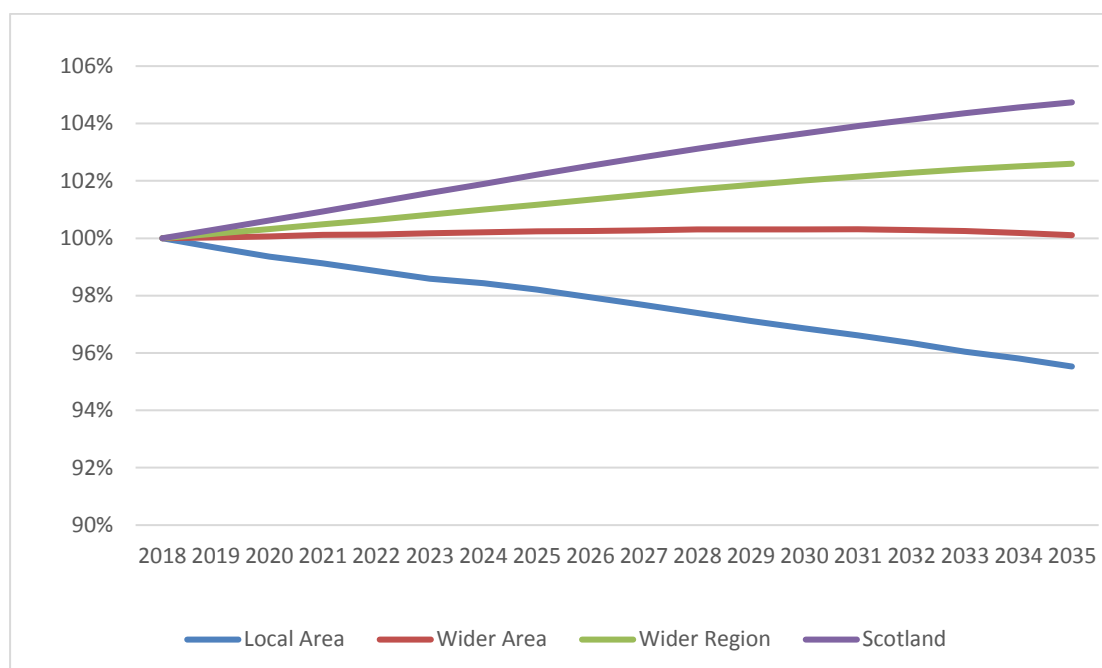
14.4 Baseline Conditions

Socio-economic Profile

Population

14.4.1 The local area has experienced a significant population decrease between 2001 and 2018 (7.2%). This wider area's population has fallen slightly (-0.2%) while the wider region has increased (2.8%). This increase is below that experienced in Scotland (4.7%). To 2035, a declining population will continue in the local area (falling 4.5%) while the wider area, wider region and Scotland will increase (0.1%, 2.6%, and 1.9% respectively). Tables are provided in **Appendix 14.2**.

Chart 14.1 Population Index. 2017=100%

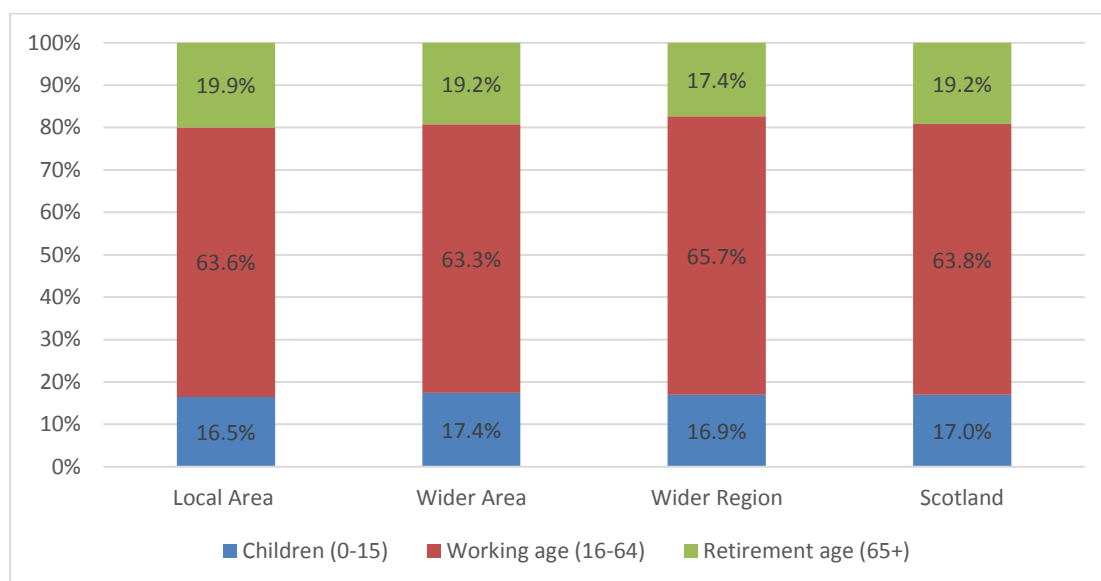


Source: PBA calculations; Experian Data

Age Structure

14.4.2 The age structure in the local area reflects an aging population relative to the wider area, wider region and Scotland. There is a lower proportion of children compared to the wider study area and Scotland. Inversely, there is a higher proportion of over 65s in the local area compared to the wider geographies.

Chart 14.2 Age Structure



Source: PBA Calculations; Experian 2018

14.4.3 The proportion of working age people is declining across the study area and in Scotland. In the local area, the working age population decreased 25% from 2001 to 2018 and will decrease a further 18% to 2035. Contraction in the working age population is also expected in the wider area and wider region (falling 15% in each to 2018, and a further 11% and 7% to 2035, respectively). The local area has a declining proportion of working age people and an increasing dependency ratio²⁴ which is likely to put additional pressure on services in the area. Indeed, to 2035, the retirement age population in the local area will increase by 58% from 2018. This is above the wider area and wider region (48% and 49% respectively) and slightly above expected growth in Scotland (57%).

Economic Activity

14.4.4 The economic activity rate is a measure of the labour market opportunities available in the area²⁵. The local area's level of economic activity (68.8%) is higher than the wider area, wider region and Scotland (68.3%, 67.2% and 68.3% respectively).

14.4.5 Unemployment in the local area is comparable to the wider area, wider region and Scotland (5.6%). Of economically active people, the employment profile is similar across the study area and in Scotland, with around 10% being self-employed. This is slightly lower in Scotland, where 9% of people are self-employed.

14.4.6 Of economically inactive people, a higher proportion of people in the local area are retired (50%) compared to the wider area (46%), wider region (41%) and Scotland (44%).

Employment Structure

14.4.7 Human health & social work, public administration, defence & compulsory social security and wholesale & retail are the main industries of employment in the local area (making up 40% of resident employment). This is slightly higher than the wider area and region (39% and 38%, respectively) and in Scotland (38%). However, a smaller proportion of residents in the study area are employed in wholesale & retail compared to Scotland.

²⁴ The dependency ratio (or proportion of working age people) is significant as it measures the relationship between the productive element of a population and the economically dependent

²⁵ The economic activity rate measures the percentage of the population, both in employment and unemployed that represent the labour supply regardless of their labour status. The figure represents the degree of success of the area in engaging people in productive activity.

Social Grade/Skills

14.4.8 National Readership Survey (NRS) social grades are a system of demographic classification widely used in market research²⁶. Compared to the wider area, wider region and Scotland, the local area has a lower proportion of people in the highest social grades (AB). The study area generally has an equal proportion of people in lowest social grades (DE) compared to the national average (30%).

Qualifications

14.4.9 The local area's educational attainment rate is generally comparable to the wider study area (i.e. the wider area and wider region) and Scotland levels, though a lower proportion of people have no qualifications compared to Scotland. However, a greater proportion of residents in the wider region have Level 4 qualifications or above (30%) compared to the local area, wider area and Scotland (27%, 28% and 27%, respectively).

Summary

14.4.1 The socio-economic study area²⁷ surrounding the Project is characterised by:

- An increasing population between 2001 and 2018 and to 2035 in the wider region;
- A greater proportion of working age residents compared to the local area, wider area and Scotland;
- A lower economic activity rate compared to Scotland;
- Comparable levels of unemployment to Scotland;
- Comparable employment profile compared to Scotland, a lower proportion of people working in manufacturing and wholesale and retail;
- A higher proportion of people in highly skilled jobs locally compared to the local study area and Scotland and lower proportion of people in semi-skilled and unskilled jobs compared to the local area and Scotland;
- A highly skilled population, with a higher proportion of residents achieving Level 4 qualifications or above compared to the local area, wider area, and Scotland; and
- A lower proportion of residents have no qualifications compared to Scotland.

Socio Economic and Labour Market Sensitivity

14.4.2 This socio-economic profile outlined above indicates the labour market has a readily available supply of appropriate labour. It is unlikely the development would lead to labour market pressure and distortions (i.e. wage inflation, skills and capacity shortages).

14.4.3 The overall sensitivity of the labour market receptor is considered to be low.

Tourism, Recreation and Access Baseline

14.4.4 The following section uses Visit Scotland statistics to provide a tourism profile of the region²⁸ relative to Scotland. Tables are provided in **Appendix 14.3**. Two-thirds of visitors to Loch Lomond and the Trossachs National Park participated in sightseeing by car, coach or on foot whilst in the area.

14.4.5 The Scotland Visitor Survey carried out by Jump Research in 2015 and 2016 revealed that the main motivation to visit Loch Lomond and the Trossachs National park was the scenery and the landscape.

²⁶ Originally developed by the National Readership Survey (NRS). Now used by many other organisations for wider applications and a standard for market research.

²⁷ Defined as the area with a 45-minute drive time

²⁸ The region varies between different tourism surveys which are used by Visit Scotland.

Top Visitor Attractions

14.4.6 The following attractions are rated as the top five most visited attractions in Argyll, Loch Lomond & Forth Valley in 2016:

- Loch Lomond Shores – 1,316,650 visitors;
- The Helix – 584,914 visitors;
- Falkirk Wheel – 538,373 visitors;
- Stirling Castle – 481,970 visitors; and
- Queen Elizabeth Forest – 278,844.

14.4.7 The top attraction in this area, Loch Lomond Shores, is situated immediately adjacent to the site. The Queen Elizabeth Forest is situated in Loch Lomond National Park although it is near Aberfoyle, over 20km away from the site.

Domestic Trips

14.4.8 Domestic trips to Argyll, the Isles, Loch Lomond, Stirling & Trossachs are made predominantly by visitors from Scotland (60%) which is higher than the national average (47%), whereas visitors from England make up 39% in comparison to the national average of 50%.

Overseas Trips and Expenditure

14.4.9 Half of overseas tourist trips to Argyll, Loch Lomond, Stirling & Trossachs are made from the USA, Germany and France, all higher than the national averages.

14.4.10 These visitors contribute just over half (51%) of overseas spend in Argyll, Loch Lomond, Stirling & Trossachs.

Duration of Trip

14.4.11 Over two thirds of domestic visitors (69%) visit Argyll, Loch Lomond, Stirling & Trossachs for 1-3 nights, indicating the popularity of short breaks. Average trip duration for domestic visitors is 3.3 nights and this is similar for overseas visitors with average of 3.5 nights.

Purpose of Trip

14.4.12 The main purpose of both domestic and overseas trips to Argyll, Loch Lomond, Stirling & Trossachs is for holiday, 65% and 78% respectively.

Transport Used

14.4.13 Over three quarters (77%) of domestic visitors to Argyll, The Isles, Loch Lomond, Stirling & Trossachs use a car to access the area, which is higher than the national average (62%). Only 3% use the train which compares to 17% for the national average.

Accommodation Used and Average Occupancy

14.4.14 Over a third (35%) of domestic visitors to Argyll, The Isles, Loch Lomond, Stirling & Trossachs stay in their own home/friend's home or relative's home which is slightly higher than the national average (33%). Nearly a quarter (24%) of domestic visitors use hotel/motel accommodation which is lower than the national average (30%).

14.4.15 Average occupancy for hotels in Argyll, Loch Lomond and Forth Valley is 68% which is slightly higher than the national average (63%). Occupancy for guest houses & B&Bs is higher in this area than the national average.

14.4.16 According to the Loch Lomond & The Trossachs National Park Tourism Strategy 2012-2017 there are around 19,000 bed spaces in total within the National Park. This capacity is split nearly equally between serviced, self-catering and holiday parks. There are 5,796 full serviced, 6,000 self-catering and 7,520 holiday park bed spaces.

Tourism, Recreation and Access Receptors

- 14.4.17 In assessing the tourist, recreational and access facilities within the study area, it is those which appear most frequently within tourist or visitor websites, brochures, guidebooks, and other media that are taken to represent the principal resources in the area. This is a standard approach taken as a proxy for tourists or other visitors assessing the potential attraction of an area as a holiday destination.
- 14.4.18 This section identifies the various forms of tourism and recreation activities and facilities within the tourism study area. This includes settlements, tourist routes, walking routes, rights of way, core paths, cycle routes, golf and fishing (i.e. lochs and rivers), nature reserves, events, visitor attractions, and activity centres present. Popular activities in the area include walking, cycling and fishing among many others.
- 14.4.19 A series of Figures (**Appendix 14.1 - Figures 14.3 to 14.9**) detail the various tourist, recreational and access receptors in the study area.
- 14.4.20 The proposed development site is situated in Balloch. Balloch is a village on the southern shores of Loch Lomond and has a number of tourist attractions and accommodation providers which draw tourists to the area.
- 14.4.21 Other settlements in the study area include Jamestown, Alexandria, Renton and Arden.

Principal Walking Routes

- 14.4.22 There are a number of promoted paths in the study area including the John Muir Way and the Three Lochs Way, both of which are Scotland's Great Trails. Both of these routes enter the site. Other promoted walking routes adjacent to the site include Loch Lomond Shores Walk and Balloch Castle Country Park.
- 14.4.23 The principal walking routes are shown in **Figure 14.3**.

Rights of Way

- 14.4.24 **Figure 14.4** shows the locations of the rights of way within the study area. These are rights of way registered in The National Catalogue of Rights of Way produced by Scotways. Rights of way play an important role in outdoor access in Scotland.

Heritage Path

- 14.4.25 There is one heritage path in the study area, Stonymollan Road, which runs from the A82 to Cardross. It is an old coffin road that people would have used to carry their dead to be buried at the church in Cardross. The route is shown in **Figure 14.4**.

Core Paths

- 14.4.26 There are a number of core paths in the study area, some of which enter the site. Core paths are shown in **Figure 14.5**.

Cycle Routes

- 14.4.27 There are several cycle routes in the study area including National Cycle Route 7, West Loch Lomond Cycle Path (Regional Route 40) and the Arden to Helensburgh cycle route. These are shown in **Figure 14.6**.

Recreational Activities

- 14.4.28 Balloch Castle Country Park is in the study area. The castle is not open to members of the public.
- 14.4.29 There are a number of golf courses in the study area including Vale of Leven Golf Course, Carrick Golf Course, "The Wee Demon" Golf Course and Cardross Golf Course.
- 14.4.30 There is one pony riding centre, Loch Lomond Pony Trekking, situated in the study area.
- 14.4.31 Fishing takes place on Loch Lomond and the River Leven.
- 14.4.32 A bike and boat hire company, "In your Element", is situated at Loch Lomond Shores. Between Easter and the end of October the company has a presence in Drumkinnon Bay.

14.4.33 Various water sport activities take place on Loch Lomond including swimming, water skiing, kayaking as well as three cruising clubs with jetties on the River Leven. The locations of these activities are shown on **Figure 14.7**.

Visitor Attractions

14.4.34 Visitor attractions in the tourism study area include:

- **Loch Lomond Shores:** Visitor destination, situated adjacent to the site, that is home to restaurants, shops and activities;
- **Sea Life Loch Lomond:** Aquarium situated in Drumkinnon Tower;
- **Loch Lomond Bird of Prey Centre:** Visitor attraction with over thirty-five Birds of Prey and Owls;
- **Sweeney’s Cruises:** Cruise operator on Loch Lomond. Premises are located adjacent to the site;
- **Maid of the Loch:** located at the pier head, the Maid of the Loch can be explored by visitors;
- **Steam Slipway:** 1902 heritage attraction. Rebuilt in 2006 and houses interactive displays and audio visuals; and
- **Treezone Aerial Adventure Course:** Forest obstacles and zip wire located at Loch Lomond Shores.

14.4.35 The location of these attractions is shown in **Figure 14.8**.

Events

14.4.36 The following events take place within the study area (**Figure 14.9**)

- Loch Lomond Highland Games²⁹: highland games held every summer in Balloch;
- Farmers and Artisan Craft Market: market held on a regular basis at Loch Lomond Shores; and
- Great Scottish Swim³⁰: swimming event in Loch Lomond with options for a 250m, half mile, 1 mile, 2 mile, 5k and 10k swim. The swim starts from the pierhead at the southern end of Loch Lomond.

Summary of Receptor Sensitivity

14.4.37 The sensitivity (as defined in **Table 14.3**) of each of the tourism, recreation and access receptors is set out in **Table 14.6**.

Table 14.6 Tourism, Recreation and Access Receptor Sensitivity

Receptor	Sensitivity
Principal Walking Routes	
John Muir Way	High
Three Lochs Way	High
Loch Lomond Shores Walk	Low
Balloch Castle Country Park	Low

²⁹ <http://www.lhgb.com/>

³⁰ <http://www.greatrun.org/great-swim/great-scottish-swim>

Receptor	Sensitivity
Rights of Way	
Various (see Figure 14.4)	Low
Heritage Path	
Stoneymollan Road	Low
Core Path	
Various (see Figure 14.5)	Low
Cycle Paths	
National Cycle Route 7	High
West Loch Lomond Cycle Route (Regional Cycle Route 40)	Medium
Arden to Helensburgh	Low
Recreational Activities/Facilities	
Balloch Castle and Country Park	Medium
Vale of Leven Golf Club	Low
Carrick Golf Course	Medium
Cardross Golf Club	Low
"The wee Demon" golf course	Low
Loch Lomond Pony Trekking	Low
River Leven	High
Loch Lomond	High
Swimming	Medium
"In your element" bike and boat hire	Medium
Loch Lomond Water Ski Club	Low
Drumchapel & Clydebank Kayak Club	Low
Balloch Cruising Club	Low
Sandbar Cruising Club	Low
Slipway Cruising Club	Low
Visitor Attractions	

Receptor	Sensitivity
Loch Lomond Shores	High
Sea Life Loch Lomond	Medium
Loch Lomond Bird of Prey Centre	Low
Sweeney's Cruises	Medium
Maid of the Loch	Low
Steam Slipway	Low
Treezone Aerial Adventure Course	Low
Events	
Loch Lomond Highland Games	Medium
Farmers and Artisan Craft Market	Low
Great Scottish Swim	High

14.5 Baseline Evolution

14.5.1 It is reasonable to assume that in the absence of this development proposal another tourism and leisure development proposal would come forward on this site with a similar scale of development. This is because much of the site is allocated for “Visitor Experience” within the LDP and much of the site has been marketed for these purposes for a number of years.

14.6 Embedded Mitigation

14.6.1 As detailed in **Chapter 3 – The Proposed Development**, a number of design features and embedded mitigation measures have been incorporated into the design and construction of the proposed development to avoid, prevent or minimise significant adverse environmental effects and to enhance beneficial effects. Embedded mitigation measures of relevance to this assessment are:

Construction Phase

- Access to all key nodes and routes through the site are to be maintained during the construction phase. Localised diversions to facilitate construction may occur on land within the applicant’s control. Any impacts on walking/cycle routes during the construction phase will be short term and localised diversions will be put in place; and
- Continued provision of access through the site to existing receptors and land uses as identified in Table 2.1 in Chapter 2 (Site & Surrounding Area);
- Access to tourist information facility will be maintained whilst building refurbishment takes place; and
- Employment of locally resident workers and delivery of training (e.g. apprenticeships) where possible.

Operational Phase

- Access to all key nodes and routes will be maintained during operation with the quality of some routes enhanced. Some permanent localised diversion may be required however

this will again be limited to using other land within the applicant control in order to avoid lengthy or circuitous alterations;

- Continued public access to Drumkinnon Bay waterfront;
- Development and implementation of Travel Plan (to encourage sustainable travel to/from site by visitors and workers);
- Continued provision of access through the site to existing receptors and land uses as identified in Table 2.1 in Chapter 2 (Site & Surrounding Area);
- Elevated sections of monorail to have sufficient clearance above roads and paths to allow for passage underneath; and
- Employment of locally resident workers and delivery of training (e.g. apprenticeships) where possible.

14.7 Socio-economic Effects

14.7.1 This section sets out the potential socio-economic effects of the Proposed Development during the construction and operation phases. The assessment of the potential effects is based upon the following key indicators:

- Construction
 - Gross Employment Impacts; and
 - Net Additional Employment Impacts on the Wider Region and national economy.
- Operation
 - Gross Employment and GVA Impacts; and
 - Net Additional Employment Impacts on the Wider Region and national economy.

14.7.2 The figures quoted below are based on the information available at the time of this study.

Construction Phase

Gross Impact

14.7.3 A standard method has been used to estimate the number of direct construction jobs supported by the construction phase. Flamingo Land Limited, has provided an estimated total development and construction expenditure for the proposed development of £35m³¹.

14.7.4 According to the Scottish Annual Business Survey (ABS) for West Dunbartonshire, the expenditure required to support one construction worker is £106,545.³² On this basis, the construction phase of the proposed development is estimated to create 328 person years of gross construction employment³³.

14.7.5 It is generally accepted in economic appraisal of development schemes, that 10 person years of full-time continuous employment is equivalent to one permanent job. In light of this, the construction phase of the proposed development would support 328 gross temporary construction jobs, equivalent to 33 full time equivalent (FTE) jobs.

Net Additional impact³⁴

14.7.6 Only a proportion of the total construction employment will occur within the Wider Region. This is because construction workers may live and spend wages outside these areas.

³¹ Figure provided by Flamingo Land Limited

³² This includes gross wages & salaries and employers' National Insurance contributions and contributions to other pension and welfare schemes.

³³ i.e. Construction cost divided by the total labour costs per head (£117,200 per year, per employee) which equals the estimated person years of gross construction employment.

³⁴ i.e. factoring deadweight, leakage, displacement

- 14.7.7 The construction of the proposed development itself could also reduce activity elsewhere in the economy, resulting in displacement effects. As such, allowances have been made for factors when assessing potential leakage effects.
- 14.7.8 The Applicant shall encourage local Contractors to tender for construction work associated with the proposed development where possible, to ensure that the local business community gain the maximum benefits. The Applicant is committed to holding 'Meet the Developer' sessions to brief local businesses on the types of contracts being let during the construction phase and assist local business to take advantage of potential contracting opportunities. Opportunities for local businesses for construction of the development will include a variety of construction requirements from concrete production to safety, environmental legal and professional consultancy services.³⁵ This is likely to have a positive effect on the number of construction personnel coming from within the Wider Region, though high levels of connectivity to the Central Belt will likely lead to contracts being awarded to firms out with the Wider Region.
- 14.7.9 Data and assumptions used to convert gross impact to net additional impact (i.e. factoring in deadweight, leakage, displacement and multipliers) are detailed in Table 14.7 below.

Table 14.7 Construction Additionality Assumptions

Data	Wider Region	National	Comments
Deadweight	33%	90%	This project is the largest proposed construction project in the study area, though there are a number of regeneration and housing projects in the Clydeplan area with short to medium term development potential (including significant brownfield sites such as the former Esso Terminal at Bowling, and several sites along the Clyde in Clydebank) which will create additional jobs in the absence of this development. It is therefore assumed that 1 in 3 (33%) jobs would be created in absence of the proposed development.
Leakage	25%	5%	97% of construction workers in Scotland live and work in the same region, meaning that leakage out with Scotland will be negligible. Construction labour in the study area makes up 38% of Scotland's construction labour. Given that committed projects will take up only a small proportion of available labour in the study area, leakage outside the study area is expected to be low (25%).
Displacement	25%	10%	Displacement is assumed to be relatively low (25%) within the study area. There is sufficient supply of labour within the study area to complete planned and committed development.
Substitution	0%	0%	Assumed no incentives to influence substitution behaviour.

³⁵ Including: concrete production; Stone / aggregate for roads and foundations; Electrical skills - metering, connection, switchgear; Haulage and storage of long/heavy components; Cranes and lorries; Safety, environmental, legal and professional consultants; Project management; Operations and maintenance; and Miscellaneous services - fencing, landscaping, planting, accommodation, security etc.

Data	Wider Region	National	Comments
Multiplier	1.43	1.90	Type II construction employment multipliers. Around 75% of the goods and services and household expenditure are assumed to occur in the Wider Region.

14.7.10 On the basis of the above, additionality assumptions, the construction phase of the proposed development is anticipated to support:

- 176 net additional construction related jobs in the Wider Region; and
- 53 net additional construction-related jobs in in Scotland.

Gross Value Added – Construction

14.7.11 Gross Value Added (GVA) is a measure of the value of goods and services produced in an area.³⁶ GVA per head in the construction industry in Dunbartonshire³⁷ is £61,750 compared to £59,710 in Scotland.³⁸ It is estimated the proposed development will have the following net additional GVA impact on the local and national economy:

- £10.9m net additional Gross Value Added impact in the Wider Region; and
- £3.2m net additional Gross Value Added impact in Scotland.

Operational Phase

Gross Employment

14.7.12 The Proposed Development will lead to significant employment in the ‘Recreation’ industry. The Applicant notes that a total of 76 full time staff and 165 part-time or seasonal staff would be required annually to support the operation of the Proposed Development. Based on assumed ratio of part-time/seasonal staff to FTEs of 0.5, a total of 159 gross FTEs would be required annually to support the operation of the Proposed Development.

Net Additional Employment

14.7.13 Table 14.8 below summarises the additionality assumptions used to estimate net additional employment for different types of land uses across the proposed development.

Table 14.8 Operation Additionality Assumptions

Data	Wider Region	Nationally	Comments
Deadweight	75%	90%	Continued development of the leisure sector in Glasgow and the expansion of hospitality industry suggests that a significant proportion of the jobs (75%) would be created in any case.
Leakage	10%	0%	Travel to work data from the 2011 Census shows that the majority of workers in West Dunbartonshire live in Glasgow City, East Dunbartonshire, Argyll and Bute and West Dunbartonshire. These are within the Wider Region, though a small proportion of workers also

³⁶ According to Experian Economics (2018) this can be expressed as either “the output of [an] industry less inputs of the industry” or “the sum of the compensation of employees in the industry [and] gross operation surplus (i.e. profit) earned by capital in the industry”.

³⁷ Combining Argyll & Bute, East Dunbartonshire, West Dunbartonshire to capture a wider labour market area.

³⁸ PBA working using Experian 2018 GVA per sector and number of FTEs

Data	Wider Region	Nationally	Comments
			travel from South Lanarkshire and elsewhere, making up about 10% of the workforce. Given that the majority of operational jobs will earn lower wages, investment in longer distance travel (i.e. out with the Wider Region) is expected to be limited.
Displacement	25%	5%	Displacement is assumed to be relatively low (25%) within the study area.
Substitution	0%	0%	Assumed no incentives to influence substitution behaviour.
Multiplier	1.06	1.42	Type II construction employment multipliers. Around 75% of the goods and services and household expenditure are assumed to occur in the study area.

14.7.14 The operational phase of the proposed development is predicted to support:

- 28 net additional operational FTEs in the Wider Region; and
- 21 net additional operational FTEs in Scotland.

14.7.15 Gross Value Added (GVA) is a measure of the value of goods and services produced in an area.³⁹ To capture the GVA per head in the ‘Recreation’ industry in Dunbartonshire⁴⁰ is £45,148 compared to £41,025 in Scotland.⁴¹ It is estimated the proposed development will have the following net additional GVA impact on the local and national economy:

- £1.2m net additional Gross Value Added impact in the Wider Region; and
- £0.85m net additional Gross Value Added impact in Scotland.

Impact on Demand for Housing and Social Infrastructure

14.7.16 This section examines the extent to which the development will influence demand for housing and social infrastructure.

Construction Phase

14.7.17 The baseline profile and workforce mobility research suggests the majority of the construction workforce are likely to come from within the Wider Region with the remainder likely to commute given high levels of connectivity to areas out with the Wider Region (e.g. via the motorway network in the Central Belt). These factors combined with the temporary nature of the construction phase mean it is unlikely any construction workers will choose to permanently locate in the Local Area as a result of the Project.

14.7.18 The project’s construction phase will therefore deliver a **negligible effect** on demand for housing and social infrastructure services and is therefore not significant.

Operational Phase

14.7.19 Travel to work data suggests there is a high level of mobility between West Dunbartonshire and neighbouring local authority areas (including Stirling, East Dunbartonshire, Glasgow, and Argyle & Bute). Many of these local authority areas are within the Wider Region. It is anticipated

³⁹ According to Experian Economics (2018) this can be expressed as either “the output of [an] industry less inputs of the industry” or “the sum of the compensation of employees in the industry [and] gross operation surplus (i.e. profit) earned by capital in the industry”.

⁴⁰ Combining Argyll & Bute, East Dunbartonshire, West Dunbartonshire to capture a wider labour market area.

⁴¹ PBA working using Experian 2018 GVA per sector and number of FTEs

that the majority of new jobs will be absorbed by existing residents. Housing and social infrastructure is considered to be adequate within these local authority areas.

14.7.20 The project's operational phase will therefore deliver a **negligible effect** on demand for housing and social infrastructure services and is therefore not significant.

14.8 Assessment of Tourism, Recreation and Access Potential Effects

14.8.1 This section reviews the potential impact of the proposed development on tourism, recreational and access resources in the local area. Resources include visitor attractions, walking routes, rights of way, cycle routes, golf courses and fishing (i.e. lochs and rivers) present within the study area.

14.8.2 The magnitude of impact (as defined in **Table 14.4**) of the proposed development is considered in respect of factors such as visibility, proximity and level of physical disturbance in relation to the receptor/activity. The sensitivity of the identified tourism, recreation and access receptors (as set out in **Table 14.6**) is combined with the magnitude of impact to give the potential effect (as defined in **Table 14.9**).

Table 14.9 Tourism, Recreation and Access Magnitude of Impact and Potential Effect

Receptor	Magnitude of Impact	Potential Effect
Principal Walking Routes		
John Muir Way	Medium	Moderate
Three Lochs Way	Medium	Moderate
Loch Lomond Shores Walk	Medium	Minor
Balloch Castle Country Park	Medium	Minor
Rights of Way		
SD28	Very low	Negligible
SD29	Very low	Negligible
SD30	Very low	Negligible
SD31	Very low	Negligible
SD 44	Very low	Negligible
SD45	Very low	Negligible
SD46	Very low	Negligible
SD47	Low	Minor
SD 53	Low	Minor
SD55	Very low	Negligible
SD56	Very low	Negligible

Receptor	Magnitude of Impact	Potential Effect
SD57	Very low	Negligible
SD58	Medium	Minor
SD60	Very low	Negligible
SD61	Medium	Minor
SD62	Medium	Minor
SD81	Very low	Negligible
SD82	Very low	Negligible
SD83	Very low	Negligible
SD84	Very low	Negligible
SD 95 (vindicated vehicular right of way)	Low	Minor
SD 97	Very low	Negligible
SD 99	Low	Minor
SD 102	Very low	Negligible
SD103	Very low	Negligible
SD109	Very low	Negligible
SD59 (Other route)	Medium	Minor
Heritage Path		
Stoneymollan Road	Low	Minor
Core Path		
Within site boundary	Medium	Minor
Outwith site boundary	Low	Minor
Cycle Paths		
National Cycle Route 7	Low	Moderate
West Loch Lomond Cycle Route (Regional Cycle Route 40)	Medium	Moderate
Arden to Helensburgh	Very Low	Negligible
Recreational Activities/Facilities		

Receptor	Magnitude of Impact	Potential Effect
Balloch Castle and Country Park	High	Moderate
Vale of Leven Golf Club	Medium	Minor
Carrick Golf Course	Low	Minor
Cardross Golf Club	Very Low	Negligible
"The wee Demon" golf course	Medium	Minor
Loch Lomond Pony Trekking	Low	Minor
River Leven	Low	Moderate
Loch Lomond	Medium	Moderate
Swimming	Medium	Moderate
"In your element" bike and boat hire	Low	Minor
Loch Lomond Water Ski Club	Medium	Minor
Drumchapel & Clydebank Kayak Club	Medium	Minor
Balloch Cruising Club	Low	Minor
Sandbar Cruising Club	Low	Minor
Slipway Cruising Club	Low	Minor
Visitor Attractions		
Loch Lomond Shores	Medium	Moderate
Sea Life Loch Lomond	Low	Minor
Loch Lomond Bird of Prey Centre	Medium	Minor
Sweeney's Cruises	Medium	Moderate
Maid of the Loch	Medium	Minor
Steam Slipway	Medium	Minor
Treezone Aerial Adventure Course	Medium	Minor
Events		
Loch Lomond Highland Games	Very Low	Negligible
Farmers and Artisan Craft Market	Very Low	Negligible
Great Scottish Swim	Very Low	Negligible

14.9 Further Mitigation and Enhancement

Construction Phase

14.9.1 No additional mitigation for the construction phase is proposed to that covered in the embedded mitigation section.

Operational Phase

14.9.2 No additional mitigation for the operational phase is proposed to that covered in the embedded mitigation section however mitigation of relevance to the tourism, recreation and access assessment is identified in **Chapter 12**.

14.10 Residual Effects

Socio-economic

14.10.1 The residual effects have been assessed based on the assessment of potential effects and the identified mitigation and enhancement measures (as discussed above in **Section 14.9**).

14.10.2 The significance of the residual effects has been estimated drawing on the significance criteria set out in Table 14.5.

14.10.3 Table 14.10 provides a summary of the predicted residual socio-economic effects for the construction and operational phase along with explanatory comments for their significance level. Net employment additionality is reported at West Dunbartonshire levels.

Table 14.10 Summary of Residual Effects (Socio-economics)

Receptor	Potential Effects	Residual Effect and Significance	Comments
Construction Phase			
Construction Jobs	Minor (beneficial) effect Creation of jobs during the construction phase: <ul style="list-style-type: none"> • 328 short term construction jobs • 176 net additional short term jobs in the Wider Region. 	Minor (beneficial) effect – not significant The effects are important at a local scale.	Positive effects could be maximised through enhanced engagement with local construction firms and other supply chain companies.
Training and apprenticeships	Minor (beneficial) effect The development will support approximately: <ul style="list-style-type: none"> • 23 Construction Apprenticeships 	Minor (beneficial) effect – not significant	Potential development of local skills which in turn will benefit the local economy.
Housing	n/a	Negligible – not significant	-

Receptor	Potential Effects	Residual Effect and Significance	Comments
Social Infrastructure	n/a	Negligible – not significant	-
Operational Phase			
Operational Jobs	Minor (beneficial) effect Creation of jobs during the operational phase: <ul style="list-style-type: none"> • 159 gross operational FTEs • 28 net additional operational FTEs in the Wider Region. 	Minor (beneficial) effect – not significant	Positive effects could be maximised through local career, employability and recruitment services.
Housing	n/a	Negligible – not significant	The workforce required for the operational phases of the project will be predominantly sourced from residents within the Wider Region.
Social Infrastructure	n/a	Negligible – not significant	There will be limited demand for housing and social infrastructure. The development of the housing element of the site will create additional demand for community services. The number of units is small, however.

Tourism, Recreation and Access

14.10.4 Taking account of proposed mitigation and enhancement measures⁴², the likely residual effects from the construction and operation of the proposed development are identified in **Table 14.11**. The overall significance of the effect is then presented in the final column with reference to **Table 14.5**. The effects described here which are ‘moderate’ or ‘major’ are, in all cases adverse effects, and are considered to be significant in EIA terms. Only those effects that were identified as potentially ‘significant’ in Table 14.9 are reported here.

Table 14.11 Significant Tourism, Recreation and Access Residual Effects (Construction and Operation)

Receptor	Potential Effect	Description & Mitigation	Residual Effect	Significance
John Muir Way	Moderate (localised)	Limited Visual Impact (only occurs for 3.5km of the overall 215km route and in some cases screening in the form of	Moderate	Significant (localised)

⁴² Identified in Chapter 12 – Landscape and Visual Impact

Receptor	Potential Effect	Description & Mitigation	Residual Effect	Significance
		<p>intervening landform and vegetation will reduce this.</p> <p>Physical Disturbance during construction. Any impacts during the construction phase will be short term and localised diversions will be put in place.</p> <p>Parts of the route which enter the site will be upgraded and enhanced as part of the proposed development, so in the long term this will provide beneficial impacts to users.</p>		
Three Lochs Way	Moderate (localised)	<p>Visual Impact</p> <p>Physical Disturbance during construction. Any impacts during the construction phase will be short term and localised diversions will be put in place.</p> <p>Parts of the route which enters the site will be upgraded and enhanced as part of the proposed development so in the long term this will provide beneficial impacts to users.</p>	Moderate	Significant (localised)
National Cycle Route 7	Moderate (localised)	<p>Limited Visual Impact: only occurs for very small proportion of overall 601-mile route.</p> <p>As noted in Chapter 12 there is a commitment to the implementation of a landscape scheme, to be specified at detailed design stage.</p> <p>No Physical Disturbance.</p>	Minor	Not significant
West Loch Lomond Cycle Route (Regional Cycle Route 40)	Moderate (localised)	<p>Visual Impact: only occurs for small proportion of overall 17-mile route</p> <p>As noted in Chapter 12 there is a commitment to the implementation of a landscape scheme, to be specified at detailed design stage.</p> <p>No Physical Disturbance</p>	Minor	Not Significant
Balloch Castle and Country Park	Moderate	<p>Visual Impact: particularly from proposed development at Loch shore. Existing Development (i.e. Drumkinnon Tower and Loch Lomond Shores) is already visible. The additional presence of this proposed development is unlikely to make visitors stay away from the park.</p> <p>As noted in Chapter 12 there is a commitment to the implementation of a landscape scheme, to be specified at detailed design stage.</p> <p>No Physical Disturbance.</p>	Minor	Not Significant

Receptor	Potential Effect	Description & Mitigation	Residual Effect	Significance
Fishing - River Leven	Moderate	<p>Visual Impact: During construction, particularly at Station Square however this will be short term.</p> <p>As noted in Chapter 12 there is a commitment to the use of sensitive materials, to be specified at detailed design stage. In addition, there will be a landscape scheme will be implemented.</p> <p>No Physical Disturbance: access will be maintained during construction and operation.</p>	Minor	Not Significant
Fishing - Loch Lomond	Moderate	<p>Visual Impact: During construction and operation, particularly as a result of the proposed development at pier head. As noted in Chapter 12 the use of sensitive materials particularly for apart-hotel and waterpark buildings could reduce this further⁴³.</p> <p>No Physical Disturbance: access will be maintained during construction and operation.</p>	Minor	Not Significant
Swimming	Moderate	<p>Visual Impact: During construction and operation, particularly at the area around the pier head. As noted in Chapter 12 the use of sensitive materials particularly for apart-hotel and waterpark buildings could reduce this further⁴⁴.</p> <p>No Physical Disturbance: access will be maintained during construction and operation.</p>	Minor	Not Significant
Loch Lomond Shores	Moderate (for visitors using outdoor areas)	<p>Visual Impact: During Construction and Operation, due to close proximity to development. As noted in Chapter 12 there will be little opportunity to mitigate the changes in view.</p> <p>The presence of the apart hotel and waterpark is unlikely to make visitors stay away from Loch Lomond Shores.</p> <p>No Physical Disturbance.</p>	Moderate	Significant
Sweeney's Cruises	Moderate	<p>Visual Impact: During Construction and Operation due to close proximity to Station Square part of the development. The presence of the proposed development is</p>	Minor	Not Significant

⁴³ To be confirmed at detailed design stage

⁴⁴ To be confirmed at detailed design stage

Receptor	Potential Effect	Description & Mitigation	Residual Effect	Significance
		unlikely to make visitors stay away from Sweeney's Cruises. As noted in Chapter 12 there is a commitment to the use of sensitive materials, to be specified at detailed design stage. In addition, there will be a landscape scheme will be implemented. No Physical Disturbance		

14.11 Monitoring of Residual Effects

14.11.1 It is considered that there is no need to carry out monitoring of residual effects.

14.12 Assessment of Cumulative Effects

14.12.1 A substantive cumulative assessment only needs to be included where cumulative effects (construction or operational phase) are likely and have not already been factored into the assessment provided above. Existing developments form part of the baseline scenario; therefore, they are of relevance to the assessment of individual effects rather than cumulative effects.

14.12.2 Relevant cumulative developments (which are identified in **Chapter 3** – The Proposed Development) are:

- Replacement building and infrastructure for Sweeney's Cruises (planning application 2017/0373/DET);
- Drumkinnon Bay dredging (planning application 2017/0326/DET);
- Woodbank Inn Hotel Extension (planning permission 2017/0223/DET). Consented November 2017; and
- Balloch Street Design Project (see <https://www.sustrans.org.uk/balloch>).

14.12.3 **Table 14.12** shows the construction job requirement for each project included in the cumulative assessment. Estimates have been based on construction costs using Building Cost Information Service data (2018)⁴⁵.

Table 14.12 Cumulative Effects

Planning	Location*	Total Construction Cost (£m)	Construction Employment (person years)	% of Total Construction Workforce
N/A	West Riverside & Woodbank House	£35m	328	0.78%
Scoped in				
2017/0373/DET	Replacement building and infrastructure for Sweeney's Cruises	£1.24	12	0.03%

⁴⁵ Commercial database subscription held by PBA

Planning	Location*	Total Construction Cost (£m)	Construction Employment (person years)	% of Total Construction Workforce
2017/0326/DET	Drumkinnon Bay dredging	£0.09	1	0.002%
2017/0223/DET	Woodbank Inn Hotel Extension	£1.42	13	0.03%
	Balloch Street Design Project ⁴⁶	N/A	N/A	N/A
Total		£37.75	354	0.84%

Absorption Capacity

14.12.4 **Table 14.13** demonstrates sufficient labour in a 60-minute drive time of the proposed development to build all the committed developments.

14.12.5 The labour market requirement to build each of the projects in Table 14.13 accounts for less than 5% of each of the labour market category including the construction workforce. This demonstrates that should cumulative projects be built at the same time, there would still be sufficient labour market capacity without creating any labour market distortions.

Table 14.13 Absorption Capacity

Absorption Capacity	Local Area	Wider Area	Wider Region	Scotland
Construction Workers as a % of:				
Economically Active	2.25%	0.32%	0.11%	0.06%
Economically active: Unemployed	40.35%	5.75%	1.86%	1.10%
Highly Skilled	6.81%	0.88%	0.29%	0.18%
Skilled	7.02%	1.08%	0.38%	0.22%
Semi-skilled & Unskilled	8.99%	1.34%	0.43%	0.24%
Construction	33.75%	4.83%	1.61%	0.85%
Construction FTE Jobs as % of:				
Economically Active	0.23%	0.03%	0.01%	0.01%
Economically active: Unemployed	4.04%	0.57%	0.19%	0.11%
Highly Skilled	0.68%	0.09%	0.03%	0.02%
Skilled	0.70%	0.11%	0.04%	0.02%

⁴⁶ At this stage it is not clear what construction work will be required as a result of this project

Absorption Capacity	Local Area	Wider Area	Wider Region	Scotland
Semi-skilled & Unskilled	0.90%	0.13%	0.04%	0.02%
Construction	3.38%	0.48%	0.16%	0.09%

14.13 Summary

Socio Economic

14.13.1 The socio-economic assessment shows that the proposed development will have a minor beneficial socio-economic impact through temporary construction employment and indirect employment supported through supply chain linkages in the wider economy and also job creation during the operation of the development.

14.13.2 **The proposed development would not result in any significant socio-economic effects.**

Tourism, Recreation and Access

14.13.3 The tourism, recreation and access assessment shows that the vast majority of receptors will experience no significant effects. The John Muir Way, The Three Lochs Way and Loch Lomond Shores have the potential to experience localised significant adverse effects. This is due to the proximity of these receptors to the proposed development and limited opportunities to mitigate the changes in view. **It is unlikely that the presence of the proposed development would result in a change in visitor numbers to these receptors to such an extent that would result in an adverse effect in the long term.**

14.14 References

- Loch Lomond and the Trossachs National Park Authority (LLTNPA) (2012) *Loch Lomond and the Trossachs National Park Tourism Strategy 2012-2017*. ([accessed February 2018](#)).
- LLTNPA (2013) *Loch Lomond and the Trossachs National Park Outdoor Recreation Plan 2013-2017*: ([accessed February 2018](#)).
- LLTNPA (2017). *Draft Loch Lomond and the Trossachs National Park Partnership Plan 2018 – 2027*: ([accessed January 2018](#)).
- Scottish Government (2014) *Scottish Planning Policy*. ([accessed February 2018](#)).
- Scottish Government. (2015) *Scotland's Economic Strategy (2015)*: ([accessed January 2018](#)).
- Visit Scotland. (2016). *Tourism Scotland 2020 and Tourism Development Framework for Scotland Refresh (2016)*: ([accessed January 2018](#)).
- Visit Scotland (2016). *Scotland Visitor Survey 2015 & 2016 Regional Results Loch Lomond and the Trossachs National Park*. Available at: ([accessed January 2018](#)).
- Visit Scotland (2017). *Tourism in Scotland's Regions 2016*. Available at: ([accessed January 2018](#)).

15 Impact Interactions

15.1 Introduction

15.1.1 The direct and indirect effects of the proposed development have been assessed within the relevant topic chapters of the ES (**Chapters 6 – 14**) prepared by competent experts for the purposes of this EIA, as defined within the Town and Country Planning (EIA) (Scotland) Regulations 2011 as amended ('the EIA Regulations'). Environmental effects are assessed relative to the topic under consideration. This approach can lead to the interaction of effects being reported in separate chapters but combined effects on the same environmental receptor(s) not being considered. This chapter therefore considers the principal findings of each topic chapter of the ES to enable assessment of the potential for impact interactions. In doing so, the chapter also provides a summary of the likely significant environmental effects identified throughout the ES.

15.2 Methodology

15.2.1 The assessment methodology for combined effects involves the identification of impact interactions associated with both the construction and operational phases of the proposed development upon one or more environmental resources. This is undertaken using a qualitative appraisal process which has been used by PBA for numerous EIAs and draws upon best practice guidance, as detailed in **Section 4.7**.

15.2.2 The assessment of the significance of individual and cumulative effects has been based on the generic significance criteria provided in **Table 4.1**, although as detailed in Subsection 3 of each technical assessment ES chapter, topic-specific significance threshold criteria have been developed in accordance with relevant legislation, policy, technical guidance and standards. These significance criteria are also relevant when assessing likely interactions between individual predicted environmental effects.

15.3 Environmental Interactions and Combined Effects

15.3.1 Taking account of proposed mitigation and enhancement measures identified through the ES and in the Summary sections in Chapter 3 and Chapter 16, including the development and implementation of a CEMP, a Landscape Management Plan and a Travel Plan, no residual significant adverse environmental effects are predicted to arise from the proposed development.

15.3.2 The technical assessments presented in **Chapters 6 - 14** conclude that proposed construction activities and the subsequent operation of the proposed development could result in a number of adverse, albeit not significant, environmental effects (both individually from the proposed development and cumulatively with effects from cumulative developments). The interaction of these effects could generate overarching health and amenity effects, which are considered in turn below.

Health Risks and Effects

15.3.3 In the context of the proposed development, health risks and effects on human health have the potential to arise from:

- Direct effects relating to pollution and the quality of the environment (e.g. from noise and air quality emissions, including dust effects). These types of effects are primarily predicted to occur during the construction phase, although operational effects are also predicted from road traffic impacts; and,
- Indirect effects relating to the quality of the built environment and the provision, accessibility and green infrastructure.

- 15.3.4 The technical assessments conclude that no residual significant adverse environmental effects will occur from the proposed development with only localised effects occurring. In addition, predicted emissions (noise and air pollutants) will remain within legally accepted limits.
- 15.3.5 Taking account of proposed mitigation and enhancement measures, the proposed development will result in residual minor and not significant beneficial effects on health risks and effects.

Amenity and Visual Effects

- 15.3.6 It is considered that due to the site's location on the boundary of the LLTTNP and by being in an area already impacted by development, coupled with its lack of perceptibility, the proposed development would only cause Negligible long term landscape and visual effects on the assessed Study Area and the LLTTNP, its Special Landscape Qualities and users.
- 15.3.7 The John Muir Way, The Three Lochs Way and Loch Lomond Shores have the potential to experience localised significant adverse effects. This is due to the proximity of these receptors to the proposed development and limited opportunities to mitigate the changes in view. It is unlikely that the presence of the proposed development would result in a change in visitor numbers to these receptors to such an extent that would result in an adverse effect in the long term.
- 15.3.8 the construction and operational phases of the proposed development are predicted to result in a number of effects on the physical environment. These have the potential to affect the same receptors (such as dwellings adjacent to the site) and, depending on the phasing of construction activities, could occur simultaneously. This has the potential to generate combined effects on quality of life and residential amenity.
- 15.3.9 However, a key role of the proposed CEMP will be to co-ordinate construction activities and mitigation measures to minimise all potential effects on both environmental and amenity receptors.
- 15.3.10 Taking account of proposed mitigation and enhancement measures, the proposed development will result in residual minor and not significant beneficial effects on amenity and visual effects.

16 Schedule of Proposed Further Mitigation and Enhancement Measures

16.1.1 The table below lists the further mitigation and enhancement measures which have been proposed in the technical assessment chapters.

Table 16.1 – Schedule of Proposed Further Mitigation and Enhancement Measures

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
Chapter 6 – Ecology and Woodland	Construction Phase
	<ul style="list-style-type: none"> • Appointment of Environmental/Ecological Clerk of Works (ECoW) team to monitor compliance, produce auditable records and provide onsite advice (different environmental constraints may require ECoWs of differing specialisms).
	<ul style="list-style-type: none"> • Pre-construction and regular protected species surveys.
	<ul style="list-style-type: none"> • Provision of information regarding ecological sensitivities as part of site induction.
	<ul style="list-style-type: none"> • Seasonal working checks and restrictions: where vegetation (including woodland, grassland, hedgerow, scrub and trees) clearance is to be undertaken in March to August inclusive, a pre-works nesting bird check would be carried out by a suitably qualified ecologist. If nesting birds are found an appropriate works exclusion area would be put in place to protect the nest until the young have fledged.
	<ul style="list-style-type: none"> • Implementation of 10mph speed limit for all site traffic.
	<ul style="list-style-type: none"> • Safeguarding of protected species: In the event that a protected species is discovered on site, the contractor will be expected to comply with relevant legislation and guidance. Where necessary all work in that area would stop immediately and the site ECoW contacted.
	<ul style="list-style-type: none"> • Site compounds/material and plant storage areas to be located as far as possible from watercourses.
	<ul style="list-style-type: none"> • Commitment to site and design working areas and building footprints (at detailed design stage) with the objectives of minimizing habitat disturbance/loss and safeguarding important ecological features (IEF).
	<ul style="list-style-type: none"> • Undertaking an early flowering plants survey prior to the detailed design of the proposed development.

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
	<ul style="list-style-type: none"> Any trenches or pits made during construction (for example that may be present to lay infrastructure) to be covered at the end of each working day or a wooden plank placed inside to allow any mammal species to escape, should it fall in. Any temporarily exposed open pipe system to be capped in such a way as to prevent wildlife gaining access.
	<ul style="list-style-type: none"> Use of geoweb to protect adjacent tree rooting systems from development within woodland.
	<ul style="list-style-type: none"> Porous gravel or similar for proposed parking.
	<ul style="list-style-type: none"> Turf translocation if required.
	<ul style="list-style-type: none"> Tree survey to be undertaken of focused areas of the development to provide information on individual trees in relation to design and construction. This would inform the production of method statements for particular construction activities within woodland habitats.
	<ul style="list-style-type: none"> New planting to compensate for any tree loss within the development footprint shall comprise native species trees reflecting the desired semi-natural oak woodland of Drumkinnon and Woodbank woodland features; and the alder dominated riparian woodland of the River Leven. New planting shall also include a mix of appropriate understory trees and shrub species particular to these woodland types such as birch, hazel, rowan, holly and willow species.
	<p>Operational Phase</p>
	<ul style="list-style-type: none"> Commitment for street lighting and other lighting associated with the development to be designed (at detailed design stage) in consideration with habitat use by nocturnal species. Where possible lighting to be positioned upon or around the completed development so it would not illuminate surrounding woodland and watercourses.
	<ul style="list-style-type: none"> An appropriate speed limit (20mph or less) to be applied to all traffic.
	<ul style="list-style-type: none"> Visitor management facilities/entrance area to incorporate suitably sized and located waste and recycling receptacles, to be combined with appropriate collection and transportation regimes.
<ul style="list-style-type: none"> Management of the riparian and shoreline habitats, including the removal of invasive plant species and encouraging appropriately vegetated banks comprising native woodland species, to enhance the composition of vegetated connectivity between woodland and watercourses. 	
<ul style="list-style-type: none"> A selection of bat and bird boxes to be installed throughout woodland habitats at the site. 	

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
	<ul style="list-style-type: none"> An infusion of native, berry producing, shrub species to be planted within existing woodlands and along connective linear vegetated features to enhance the foraging and sheltering resource for a variety of mammal and bird species which may frequent the site in the future. Integrated bat roost and bird nesting provisions to be installed into new structures on site to increase roosting provisions for these species. Annual vegetation and protected species surveys
Chapter 7 – Traffic and Transport	Construction Phase
	<ul style="list-style-type: none"> None required
	Operational Phase
	An Outline Travel Plan <ul style="list-style-type: none"> Contained within the Transport Assessment an Outline Travel Plan incorporates actions and incentives and an ongoing programme of delivering sustainable travel options for the proposed development site. This includes several potential measures which could be implemented to support sustainable travel choices for future employees, through both induction processes and provision of a travel information pack for new starts. This would also include the provision of a Residential Travel Information Pack for the residential component of the site, which will be issued at point of occupation.
	Monorail <ul style="list-style-type: none"> A monorail is incorporated in to the development proposals to provide better connectivity between Zone A (Station Square) and Zone C (Pierhead). This will provide better connectivity between Balloch Village and Loch Lomond Shores, through provision of a safe, direct and convenient means of transport. During the winter months/ dark nights the existing Pier Road and walking routes adjacent to the River Leven (Riverfront area) are not conducive to walking as function of reduced personal security, and the overall distance. As such, the monorail will help support an evening economy at the existing and with-development scenarios;
Public Transport <ul style="list-style-type: none"> The proposed WDC plans for the Station Square enhancements on Balloch Road between the proposed new Station Square development (Zone A) and Balloch Railway Station, will help deliver enhanced access between the station and the proposed development site as well as the wider village of Balloch. It is also understood that revised 	

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
	<p>parking arrangements are being considered for Balloch Rail Station as part of the wider “Balloch Village Parking Proposals” which are hoped to alleviate parking issues in the locality as well as encourage an uptake in rail usage;</p> <ul style="list-style-type: none"> • Discussions have been undertaken with ScotRail Abellio to seek to agree in principle the mutual benefits of promoting access to the development site by rail. Whilst any interventions are still in early developmental stages, these are presently anticipated to include: • Shared-ticketing: whereby rail and attraction-tickets can be purchased simultaneously, incorporating some form of discount for the passenger/ visitor; • The opportunity to promote the new West Riverside development as a destination, where branding/ wrapping the trains can be used as a marketing/ promotional incentive; and • The potential for further studies into the need for enhanced rail services either by frequency and/ or selective station stopping to improve journey times. <hr/> <p>Remote Lodge Accommodation Parking</p> <ul style="list-style-type: none"> • For accommodation land uses, except for the Woodbank House site, the arrivals and parking for this element can be managed from the point of booking, whereby visitors can be advised of the intended arrival and check-in arrangements. The intention is that accommodation-based-visitors and associated parking will be segregated from other land-uses and that parking will be provided remotely from the accommodation. Small buggies will be used to transport visitors and baggage to their holiday accommodation. This will reduce both unnecessary vehicular circulation at arrival and departure times but is also expected to reduce the use of cars for short-trips by guests throughout their stay: it will be more convenient to walk, cycle or use the mono-rail for shorter local and site-internal trips.
<p>Chapter 8 – Noise and Vibration</p>	<p>Construction Phase</p>
	<ul style="list-style-type: none"> • As part of the masterplan design process EnviroCentre used CadnaA noise modelling software to inform the design of any mitigation measures if necessary for the year of development opening scenario (2020). The results were assessed in accordance with TAN 2011. Exceedances of the Council’s noise criteria were identified in one of the garden/terraces of the most exposed properties. • The level of significance of any TAN 2011 exceedance within the current masterplan is now slight. The design mitigation features incorporated into the final masterplan design is of one stretch of 2m high close boarded timber garden fencing at the garden /terrace boundary of NSR 19.
	<p>Operational Phase</p>

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
	<ul style="list-style-type: none"> Daytime external noise levels are predicted to meet West Dunbartonshire Council's noise target of 55dB(A) in the majority of properties. Noise exceeds the target noise criteria in some locations by up to 2.9dB(A). The TAN 2011 level of significance of the exceedances is Slight. In line with consultation carried out with West Dunbartonshire Council, the daytime external noise, when incorporating the site design mitigation features, has been found to be within acceptable limits and does not need to be reduced further.
Chapter 9 – Air Quality	Construction Phase
	<ul style="list-style-type: none"> Taking account of proposed embedded mitigation measures, the assessment provided in Section 9.7 predicts that no significant effects on air quality are considered likely. No further mitigation, compensation or enhancement measures are therefore required or proposed.
	Operational Phase
	<ul style="list-style-type: none"> Not Required
Chapter 10 – Water, Hydrology and Flood Risk	Construction Phase
	<p>General Mitigation measures</p>
	<ul style="list-style-type: none"> A CEMP will be in place during the construction phase and will detail surface water management, pollution prevention measures, and construction method statements. The CEMP will remain a live document throughout the construction phase and will be continually updated as work progresses. All mitigation measures will be incorporated into the CEMP. The CEMP will be submitted to the Council for approval prior to commencement of the construction works, in consultation with SEPA and other agencies such as SNH.
	<ul style="list-style-type: none"> The CEMP will include as a minimum measures relating to: construction traffic routing, site access/deliveries, parking, contractor management, parking, fuels and materials storage, standard dust and noise suppression techniques and standard pollution presentation and control techniques.
	<ul style="list-style-type: none"> Any construction activities within a 5m strip along waterfronts will be subject to specific consideration within the CEMP to be agreed with the National Park Authority (NPA) prior to commencement.
	<ul style="list-style-type: none"> An Environmental Clerk of Works (ECoW) will ensure that the CEMP and associated mitigation measures are implemented effectively. Best practice will be adopted throughout the construction phase following current guidance listed in section 10.2.

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
	<ul style="list-style-type: none"> • A pollution prevention and response plan will be set out in the CEMP. This will provide site spill response procedures, emergency contact details and equipment inventories and their location. All staff will be made aware of this document and its content during site induction. A copy will be available in the site office at all times. • All activities with potential to impact on the water environment require to be authorised under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR). The level of authorisation required is dependent on the anticipated environmental risk posed by the activity to be carried out. Liaison with SEPA operations team will be undertaken at an early stage to further confirm this. These activities could include construction drainage, dewatering, storage of oil and the three watercourse crossings. • Revised levels of authorisation, including amendments to the General Binding Rules (GBR), came into effect on January 1st 2018. These include the need for CAR authorisation for drainage of construction sites over four hectares in size, as well as a change to the size of development that will require authorisation for the permanent surface water drainage. The below summarises the requirements of these regulations. • For the construction SuDS associated with a site of this size, a complex CAR licence will be required, as detailed in the CAR Practical Guide (SEPA, 2018).
	<p>Surface Water Management</p>
	<ul style="list-style-type: none"> • Surface water drainage arrangements for the construction phase will be in line with SuDS principles, incorporating appropriate treatment and attenuation prior to discharge to the water environment in accordance with the required CAR authorisation and relevant GBR. It is proposed to replicate natural drainage around construction areas and to use source control to deal with rainwater in proximity to where it hits the ground.
	<ul style="list-style-type: none"> • The implementation of a given SuDS measure will be dependent upon detailed site and hydrological investigations. Detailed surface water drainage proposals and methodology for the construction phase will be detailed within a Pollution Prevention Plan (PPP) which will be included within the CEMP. The SuDS features will be installed prior to the main construction activities (including removal of vegetation and any earthworks). Suitable measures will be in place at all times for treatment of runoff from construction areas, to prevent the release of pollutants including sediment to adjacent surface water features and GWDTEs.
	<ul style="list-style-type: none"> • Clean runoff from vegetated areas or offsite will be kept clean and diverted around works to prevent mixing with silt-laden water.
	<ul style="list-style-type: none"> • Surface water management measures employed during the construction phase should be regularly inspected and maintained to check that they are working effectively and that there are no blockages or unexpected discharges.

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
	<ul style="list-style-type: none"> The risk of oil contamination will be minimised by good site working practice (further described below) but should a higher risk of oil contamination be identified then an oil separator will be considered.
	<ul style="list-style-type: none"> A minimum buffer zone of 5m will be maintained along the waterfronts. No construction activities will take place within this buffer zone, including movement of construction machinery, stockpiling and construction of SuDS features, unless they have been specifically considered and permitted within a CEMP
	<p>Earthworks</p>
	<ul style="list-style-type: none"> Areas stripped of earth and vegetation will be kept to a minimum at any one time. Soil loss and erosion will be minimised through careful storage, reinstatement and re-vegetation. Stockpiles will be placed in areas of minimal risk of slippage or erosion from drainage and will not be located within 20m of any watercourses or ditches.
	<ul style="list-style-type: none"> Any runoff from earthworks and stockpiles will be passed through appropriate construction SuDS measures prior to discharge to the water environment.
	<ul style="list-style-type: none"> The time excavations are kept open for will be kept to a minimum to avoid ingress of water, minimise erosion and the need for dewatering. Drainage or pumping from excavations will be minimised through appropriate design. Temporary cut-off drains will be installed if required to prevent surface water runoff entering excavations.
	<ul style="list-style-type: none"> Any dewatering will comply with GBR2 and GBR5. If abstraction exceeds 10m³ per day a CAR registration or licence will be required, which will be obtained prior to the commencement of the abstraction. Any water pumped out of excavations will be treated by passing through a SuDS feature prior to discharge to the water environment.
	<p>Construction tracks</p>
	<ul style="list-style-type: none"> Access tracks used during construction (i.e. not the final road layout) will incorporate appropriate drainage measures including ditches, camber to shed water to the edges, frequent cross drains and trackside grips/offlets to prevent the tracks acting as a preferential drainage route and to protect the water environment. Any trackside discharge will be passed through appropriate construction SuDS measures prior to discharge to the water environment. Water will not be allowed or encouraged to pond in the track where possible.
	<p>Oils, Fuels, Site Vehicles and Welfare facilities</p>
<ul style="list-style-type: none"> The mitigation measures to minimise risk of contaminant release will be in line with the updated Controlled Activities (Scotland) Regulations which will come into force on 1st January 2018. These new General Binding Rules (GBRs) consolidate the provisions of the Water Environment (Oil Storage)(Scotland) Regulations 2006 into CAR, and extend 	

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
	<p>the application of those provisions. The relevant PPGs will also be used to guide the embedded mitigation. This includes the following:</p> <ul style="list-style-type: none"> ○ Storage of oil and fuels on site will be designed to be compliant with GBRs 26-28 and any bunds will provide storage of at least 110% of the largest tank's maximum capacity; ○ The storage of oil in a portable container with a capacity of greater than 200 litres on site will not be permitted; ○ Multiple spill kits will be kept on site; ○ Drip trays will be used while refuelling; and <ul style="list-style-type: none"> ● Regular inspection and maintenance of vehicles, tanks and bunds will be undertaken.
	<ul style="list-style-type: none"> ● Welfare facilities will include closed-system toilets, with disposal of foul drainage at a suitable off-site facility.
	<ul style="list-style-type: none"> ● Concrete and cement mixing should be sited on an impermeable designated area and at least 10m away from a watercourse or surface water drain, to reduce the risk of run-off entering a watercourse. Equipment will be washed out in a designated area, specifically designed to contain wet concrete and wash water. Wash waters should be discharged to the foul sewer with prior permission from Scottish Water or disposed off-site at an authorised facility.
	<ul style="list-style-type: none"> ● All chemicals and hazardous substances will be stored safely, away from watercourses and drains in line with current best practice. They should be disposed of in line with duty of care requirements.
	<p>Operational Phase</p>
	<ul style="list-style-type: none"> ● The proposed surface water and SuDS scheme (see Section 11.6) will require regular maintenance. This maintenance will include the regular debris clearing and cutting of grass of surface SuDS features, and the inspection and repairs to underground features if necessary. The responsibility for the maintenance of the drainage network will lie with the organisation that adopts the network. Details of the proposed drainage strategy for the site are covered in Appendix 11.3.
	<ul style="list-style-type: none"> ● During the operational phase there should be no requirement for groundworks. However, should groundworks be required mitigation highlighted in the construction sections above will be adopted as appropriate.
<ul style="list-style-type: none"> ● All development is proposed be located outwith the functional floodplain as identified in the Flood Risk Assessment, and the minimum finished floor levels of buildings on site are to be above the maximum flood level estimated for the 1 in 200 year + climate change event. A safe access/egress route will be maintained to properties in times of extreme flood events. 	
<p>Chapter 11 – Ground Conditions and Geology</p>	<p>Construction Phase</p>
	<ul style="list-style-type: none"> ● None required

ES Chapter and Topic	Proposed Further Mitigation and Enhancement Measures
	<p style="text-align: center;">Operational Phase</p> <ul style="list-style-type: none"> • None Required
Chapter 12 - LVIA	<p style="text-align: center;">Construction Phase</p>
	<ul style="list-style-type: none"> • No further construction stage mitigation proposed
	<p style="text-align: center;">Operational Phase</p>
	<ul style="list-style-type: none"> • Commitment to the use of sensitive materials, to be specified at detailed design stage.
	<ul style="list-style-type: none"> • Commitment to the implementation of a landscape scheme, to be confirmed at detailed design stage. • Commitment to the retention where possible of woodland strip to separate properties on Old Luss Road with the proposed site of the service area. To be confirmed at detailed design stage.
Chapter 13 – Historic Environment	<p style="text-align: center;">Construction Phase</p>
	<ul style="list-style-type: none"> • A programme of historic building recording (HBR) will be undertaken in connection with Woodbank House and its associated structures and estate grounds.
	<ul style="list-style-type: none"> • The results of the HBR work will be used to inform the design of a flexible approach to the preservation of remaining facades of Woodbank House and restoration where viable of associated listed structures.
	<ul style="list-style-type: none"> • Conservation work will pay particular attention to the east and south facades of Woodbank House, and their presentation as a landmark feature within the proposed development
	<p style="text-align: center;">Operational Phase</p> <ul style="list-style-type: none"> • The results of the EIA, HBR and conservation work will also be used to inform the production of interpretive materials for public dissemination. Such materials could take the form of information panels and/or a heritage trail around the grounds of Woodbank House describing and illustrating the history of the house and estate, whilst also providing information on the preservation and renovation process.
Chapter 14 - Socio-Economics, Tourism, Recreation and Public Access	<p style="text-align: center;">Construction Phase</p>
	<ul style="list-style-type: none"> • None required
	<p style="text-align: center;">Operational Phase</p> <ul style="list-style-type: none"> • None Required