Appendix 4 d): Strategic Flood Risk Assessment; background paper for Topic Paper 4

National Park Authority Board Meeting

Monday 10 November 2025

1. Introduction

1.1. The Scottish Government's Local Development Planning Guidance identifies a Strategic Flood Risk Assessment (SFRA) as being a relevant source of information for the Evidence Report. The SFRA Map is an ESRI Web map resource that sits alongside this short summary report.

1.2. The inclusion of evidence relating to flood risk is needed to successfully deliver the policy intent and outcomes of National Planning Framework 4 (NPF4) Policy 22, Flood risk and water management, to strengthen resilience to flood risk by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding. The SFRA will also provide evidence for the implementation of other NPF4 policies where they address the climate and nature crises and the delivery of infrastructure, including blue and green infrastructure.

1.3. This SFRA has been prepared in accordance with Scottish Environment Protection Agency (SEPA) SFRA Guidance V1 October 2023 as updated by Version 2, Guidance for planning authorities on Strategic Flood Risk Assessment Version 2 (May 2025) and Planning Advice Note LDP Evidence Gathering: Achieving sufficiency of evidence relating to flood risk and the water environment December 2024, in consultation with SEPA and flood risk specialists within the four Local Authorities that cover the Loch Lomond and The Trossachs National Park. The National Park Authority does not have its own separate Flood Authority, so we work with the Flood Authorities that cover the National Park (Argyll and Bute, Stirling, Perth and Kinross and West Dunbartonshire. The methodology consists of four key steps:

Step 1: Gathering available information.

Step 2: Gap analysis, in which gaps in the evidence are identified.

Step 3: Prepare the outputs, in which all the collated information is presented and a report drafted.

Step 4: Discuss with Scottish Environment Protection Agency, in which the assessment material is reviewed prior to publishing the final draft of the report.

1.4. The SFRA is intended to be straightforward to interpret, present a high-level strategic view and be primarily map-based. The maps within this report use the same data as the SFRA web-based GIS.

Aims and Objectives

1.5. The primary aim of the strategic flood risk assessment is to strengthen resilience to flood risk by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding and to ensure that new development does not increase flood risk elsewhere (for example by affecting the storage or conveyance capacity of flood plains). The SFRA can be used during local development plan (LDP) preparation to inform choices about appropriate locations for development. SFRAs are prepared by the planning authority in consultation with SEPA. The main objectives are to:

1.5.1 Identify where flood risk and coastal erosion exist in the plan area at the Evidence Report stage, and therefore areas where new development should be located or avoided at the Proposed Plan stage, in accordance with Policy 10 Costal development, and Policy 22 Flood risk and water management of National Planning Framework 4.

1.5.2. Identify areas where climate change is resulting in unmanageable flood exposure, and so where alternative land use is needed, in accordance with National Planning Framework 4.

1.5.3. Identify where and how actions contained in the local Flood Risk Management Plans (including future flood protection schemes) and Coastal Change Adaptation Plans affect the location of new development.

2. Legislative and Policy Context

2.1. This section sets out the key legislation, policy and guidance for the Strategic Flood Risk Assessment (SFRA).

The Flood Risk Management (Scotland) Act 2009

2.2. The Flood Risk Management (Scotland) Act 2009 promotes a risk based, plan-led approach to managing flood risk. It requires Scottish Environment Protection Agency and other designated responsible authorities to develop and implement Flood Risk Management Plans and Local Flood Risk Management Plans. These contain a significant amount of information on potential flood hazards and risks which can be drawn upon to inform the Strategic Flood Consequences Assessment.

Flood Risk Management Plans

2.3. Flooding in Scotland is being managed through 14 Local Plan Districts (LPD) which are based on river catchments and cross various administrative and institutional boundaries. Flood Risk Management Plans (FRMPs) are published by SEPA for the areas noted below and shown in Figure 1 and intersect the National Park Authority's administrative area. The most recent set of plans were adopted in 2022 and will be pertinent until 2028.

- LPD1 Highland & Argyll
- LPD8 Tay
- LDP9 Forth
- LDP11 Clyde and Loch Lomond

2.4. Loch Lomond and the Trossachs National Park Authority is not responsible for coordinating and publishing a Local Plan District Flood Risk Management Plan, as this is the responsibility of the four Local Authorities, noted below, intersecting the National Park. These plans supplement the Flood Risk Management Plan (the 'SEPA Plan' developed and published by SEPA), which sets out Objectives and Actions to reduce flood risk from rivers, the sea and surface water:

- Argyll and Bute
- Stirling
- Perth and Kinross
- West Dunbartonshire

2.5. The River Catchments are shown in Figure 2.

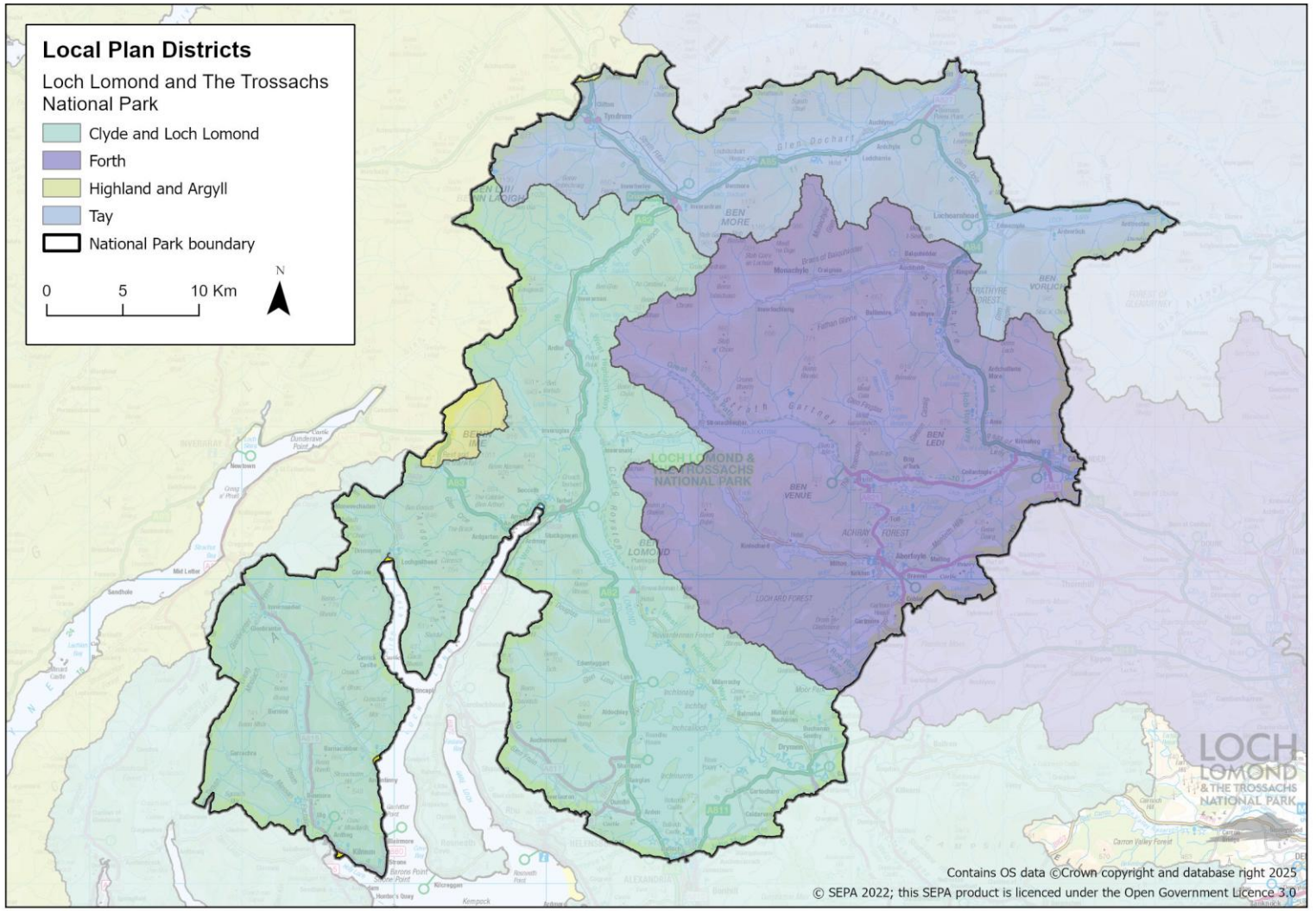
Local Plan Districts
Loch Lomond and The Trossachs National Park
Clyde and Loch Lomond
Forth
Highland and Argyll
Tay
National Park boundary
0
5
10 Km
N
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
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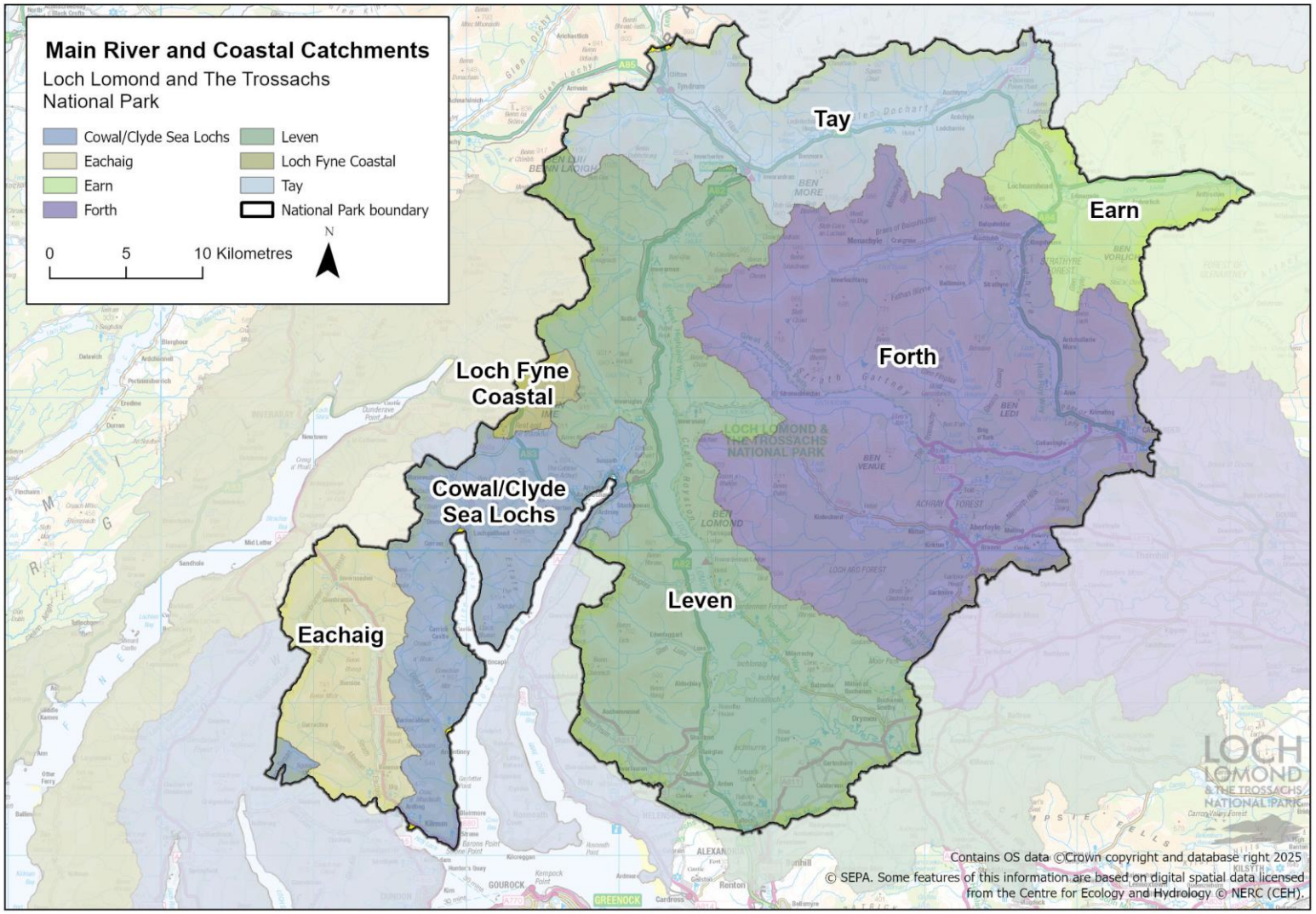
Figure 1


Main River and Coastal Catchments
Loch Lomond and The Trossachs National Park
Cowal/Clyde Sea Lochs
Eachaig
Earn
Forth
Leven
Loch Fyne Coastal
Tay
National Park boundary
0
5
10 Kilometres
N
Tay
Earn
Forth
Loch Fyne Coastal
Cowal/Clyde Sea Lochs
Leven
Eachaig
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
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© SEPA. Some features of this information are based on digital spatial data licensed from the Centre for Ecology and Hydrology © NERC (CEH).

Figure 2

2.6. In the current cycle of flood risk management planning (2022-2028) there are catchment based Potentially Vulnerable Areas and community-based areas at risk known as target areas. Potentially Vulnerable Areas are specifically defined areas where the risks to property from flooding, and the estimated average annual damages occurring as a result of flooding, are greatest. Potentially Vulnerable Areas data was updated in December 2024.

2.7. Potentially Vulnerable Areas (2022-2028) are shown on Figure 3 and comprise:

- Aberfoyle,
- Comrie,
- Callander
- Helensburgh to Loch Lomond, and
- Loch Lomond and Vale of Leven

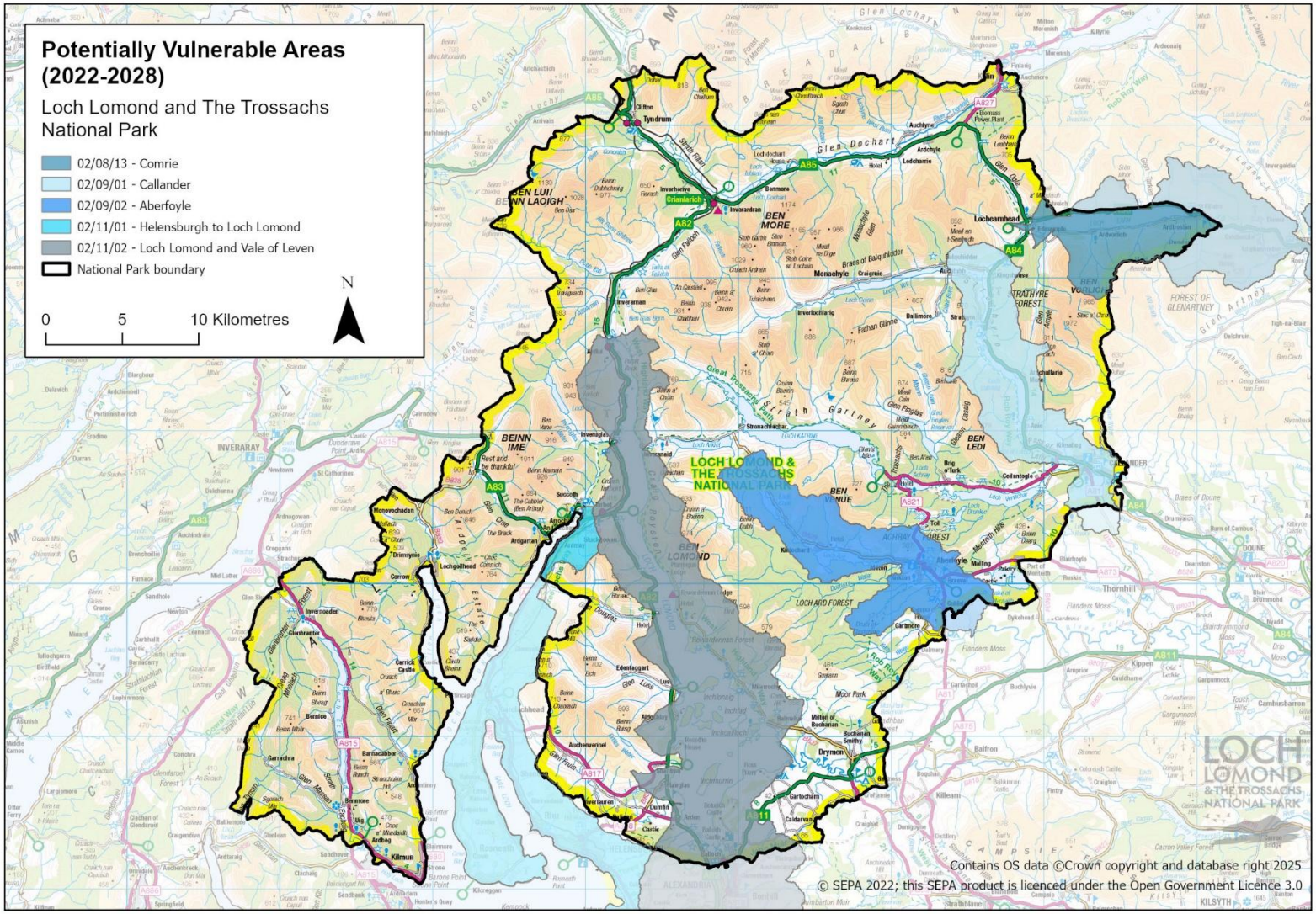
Potentially Vulnerable Areas (2022-2028)
Loch Lomond and The Trossachs National Park
02/08/13 - Comrie
02/09/01 - Callander
02/09/02 - Aberfoyle
02/11/01 - Helensburgh to Loch Lomond
02/11/02 - Loch Lomond and Vale of Leven
National Park boundary
N
0
5
10 Kilometres
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
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Figure 3

2.8. The next flood risk management planning cycle (2028-2034) will use community based Potentially Vulnerable Areas (PVA). This change from catchment to community based Potentially Vulnerable Areas has been the result of a consultation process involving the public, local authorities, and Scottish Government. Potentially Vulnerable Areas (PVA) 2028-2034 are areas identified by Scottish Environment Protection Agency (SEPA) using information from the National Flood Risk Assessment and in consultation with others. Development of the new Local Development Plan will be undertaken using this new dataset. Potentially Vulnerable Areas (PVA) 2028-2034 are shown in overview on Figure 4 and a settlement level on Figures 5, 6, 7, 8 in the following communities.

- Aberfoyle (PVA 163),
- Callander (PVA 187),
- Strathyre (PVA154), and
- Vale of Leven (PVA 2) (Balloch)

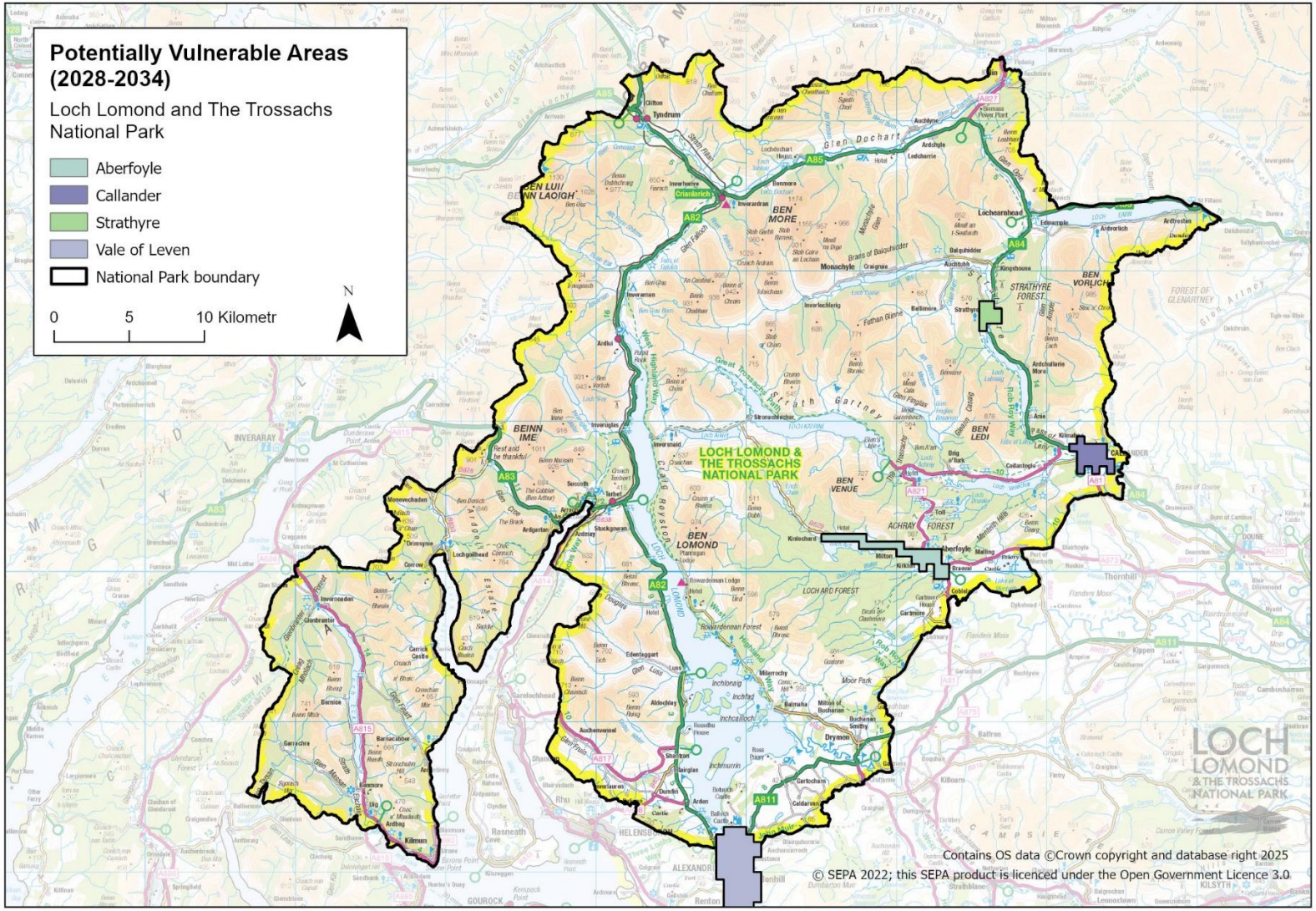
Potentially Vulnerable Areas (2028-2034)
Loch Lomond and The Trossachs National Park
Aberfoyle
Callander
Strathyre
Vale of Leven
National Park boundary
0
5
10 Kilometr
N
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
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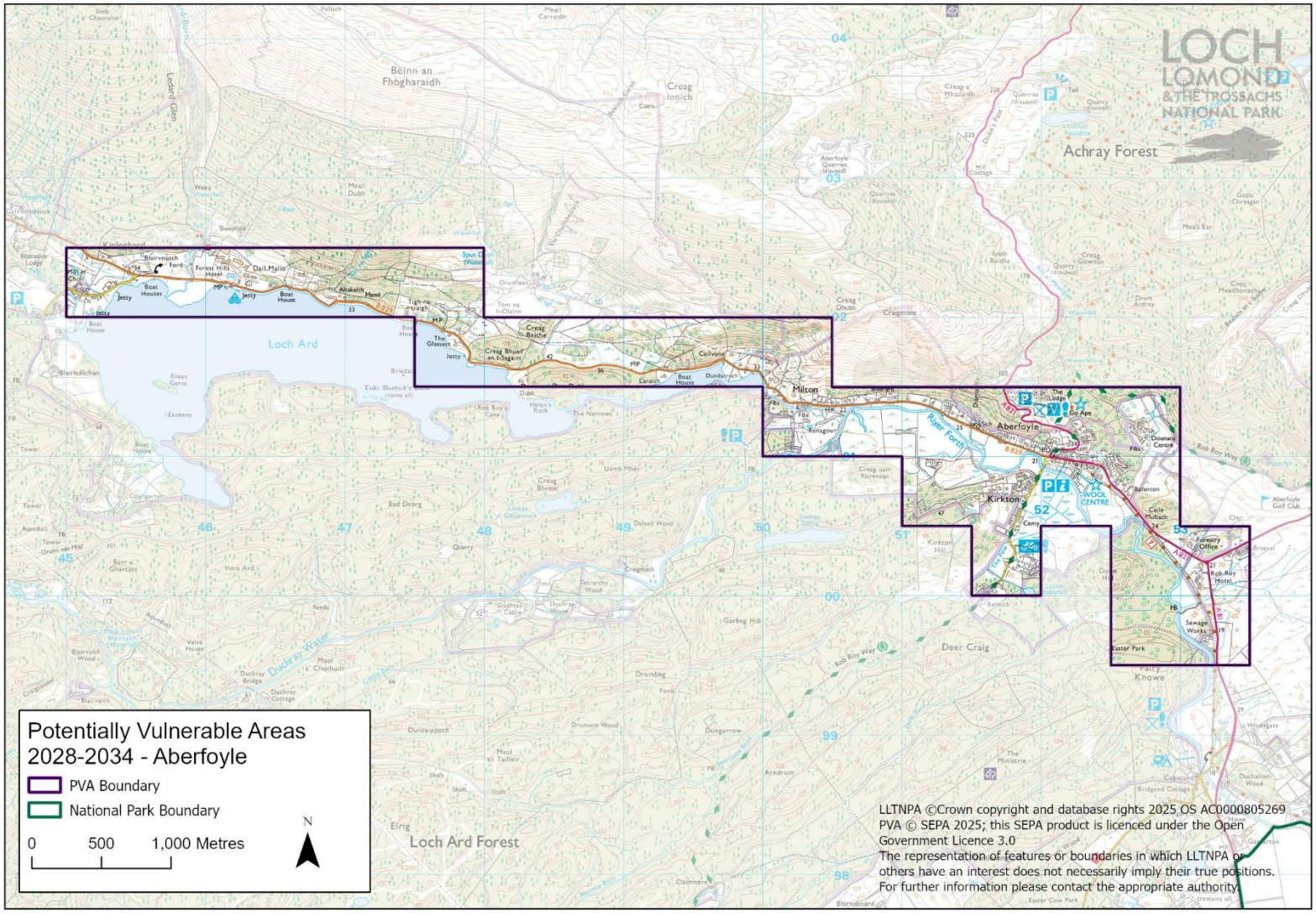
Figure 4


Potentially Vulnerable Areas
2028-2034 - Aberfoyle
PVA Boundary
National Park Boundary
0
500
1,000 Metres
N
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
Achray Forest
Loch Ard
Loch Ard Forest
Aberfoyle
Milton
Kirkton
Deer Craig
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PVA © SEPA 2025; this SEPA product is licenced under the Open Government Licence 3.0
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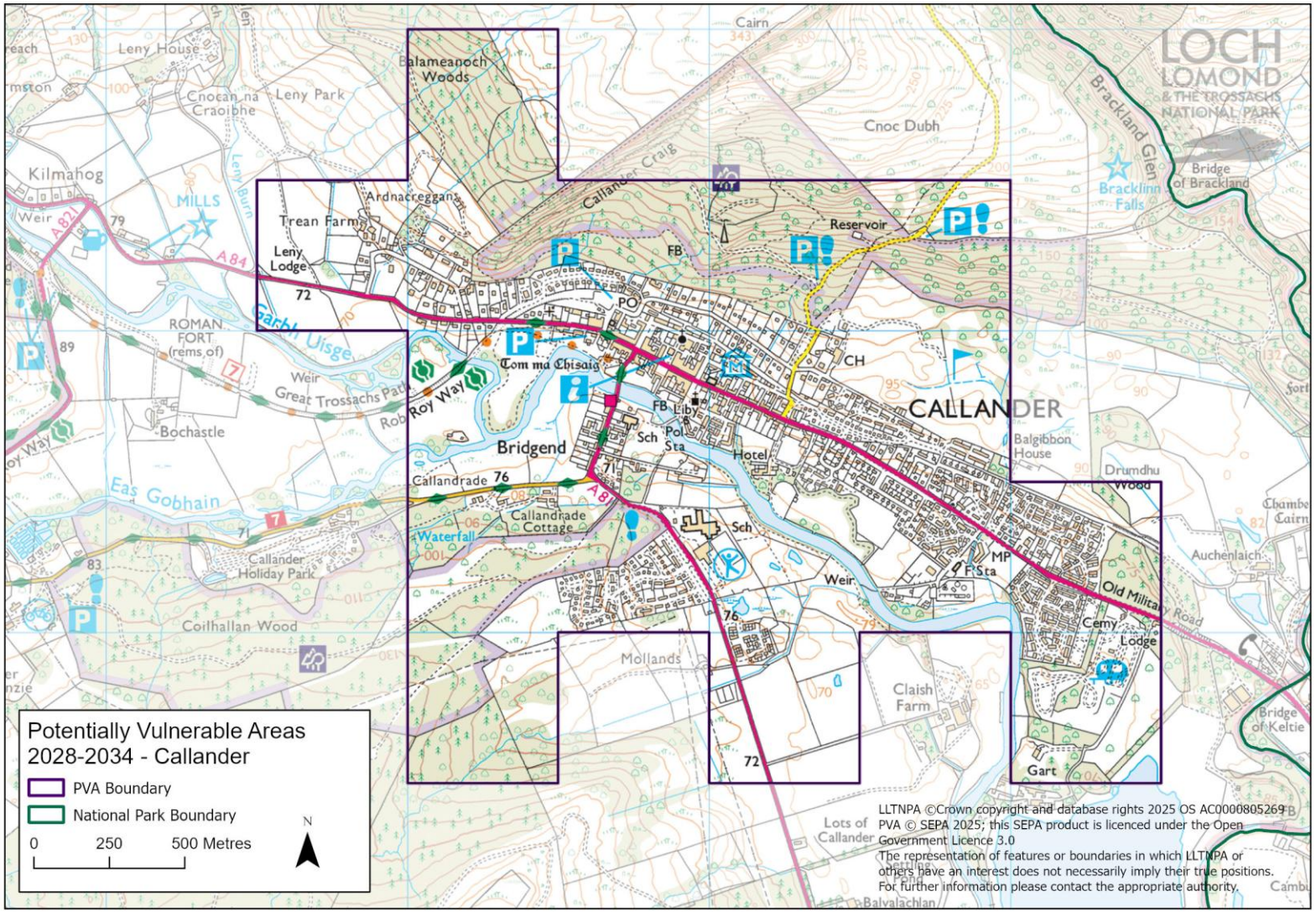
Figure 5


Potentially Vulnerable Areas
2028-2034 - Callander
PVA Boundary
National Park Boundary
0 250 500 Metres
N
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CALLANDER
Bridgend
Callandrade
Callandrade Cottage
Waterfall
Tom na Chisaig
Leny House
Leny Park
Cnocan na Craoibhe
Balameanoch Woods
Ardnacreggans
Trean Farm
Leny Lodge
Kilmahog
MILLS
ROMAN FORT (rems of)
Bochastle
Great Trossachs Path
Rob Roy Way
Eas Gobhain
Callander Holiday Park
Coilhallan Wood
Callander Craig
Cnoc Dubh
Reservoir
Brackland Glen
Bracklinn Falls
Bridge of Brackland
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
Balgibbon House
Drumdhu Wood
Auchenlaich
Old Military Road
Cemy Lodge
Gart
Bridge of Keltie
Claish Farm
Mollands
Lots of Callander
Balvalachlan
Hotel
Sch
Pol Sta
Liby
FB
PO
CH
MP
F Sta
Weir
A84
A821
A81

Figure 6

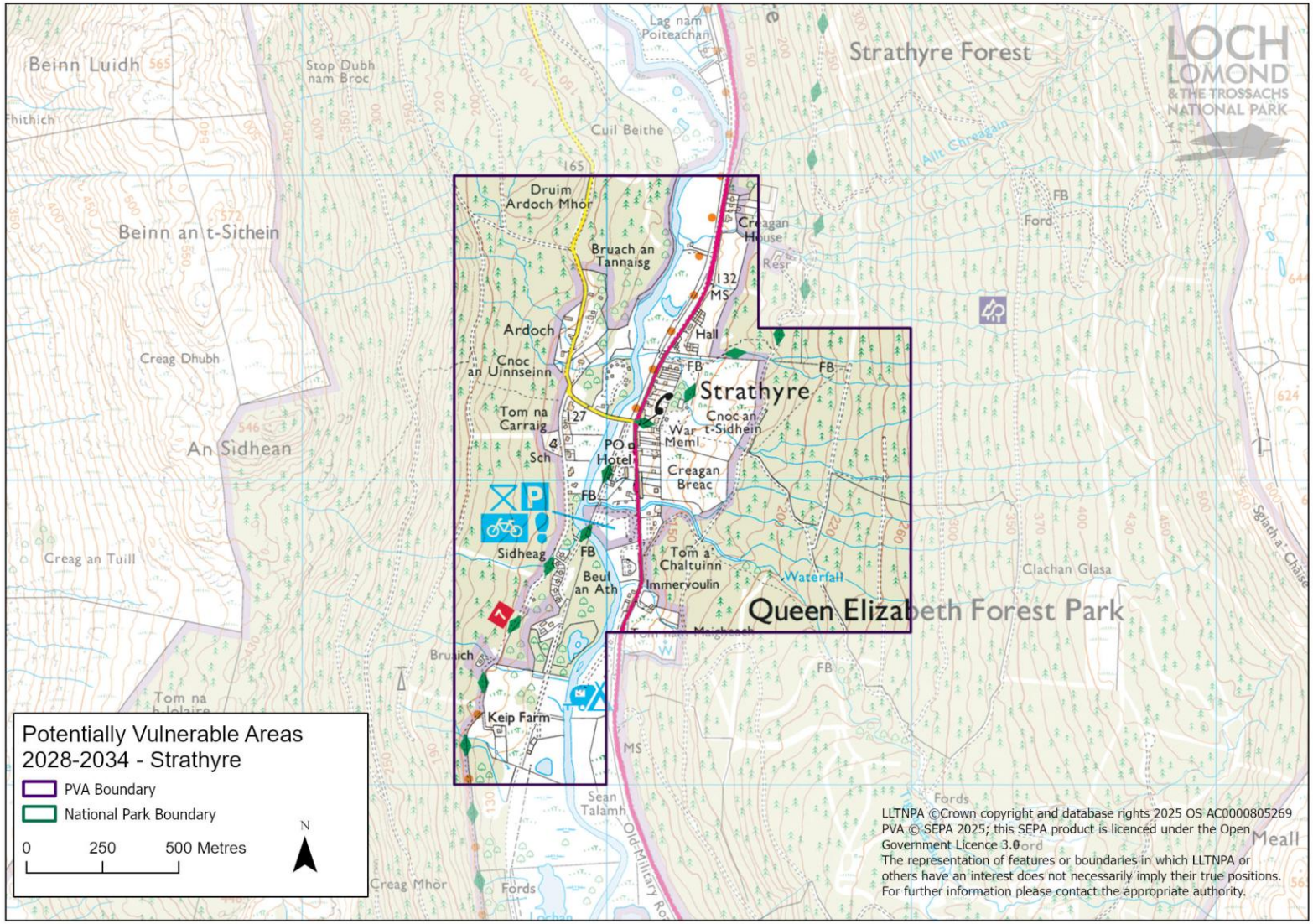
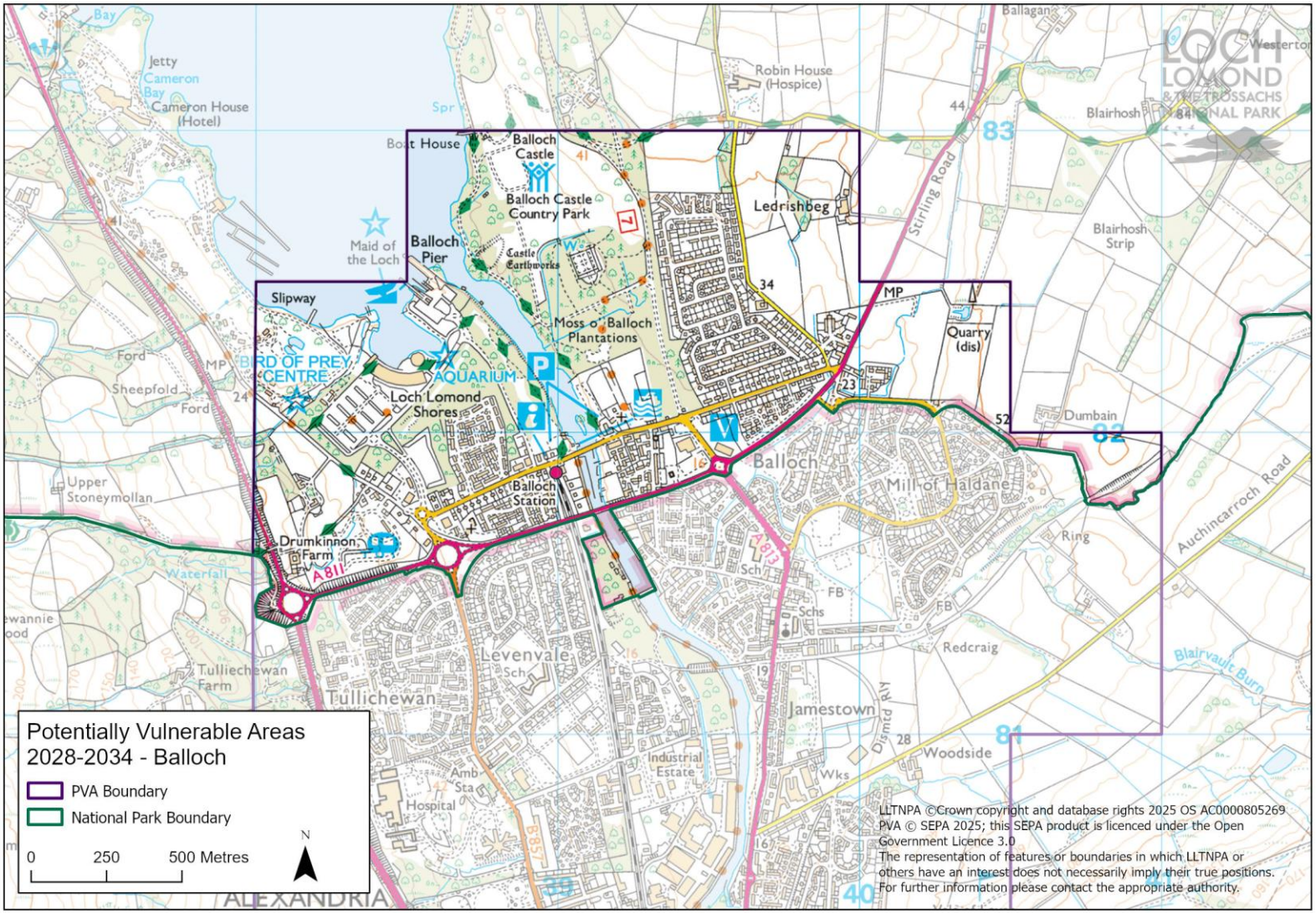


Figure 7

Appendix 4 d): Associated Evidence Report Appendices: Strategic Flood Risk Assessment; background paper for Topic Paper 4 National Park Authority Board Meeting
10 November 2025


Potentially Vulnerable Areas
2028-2034 - Balloch
PVA Boundary
National Park Boundary
0 250 500 Metres
N
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The representation of features or boundaries in which LLTNPA or others have an interest does not necessarily imply their true positions.
For further information please contact the appropriate authority.
Balloch Castle
Balloch Castle Country Park
Balloch Pier
Maid of the Loch
Slipway
Moss o' Balloch Plantations
BIRD OF PREY CENTRE
AQUARIUM
Loch Lomond Shores
Balloch Station
Drumkinnon Farm
Ledrishbeg
Quarry (dis)
Balloch
Mill of Haldane
Dumbain
Auchincarroch Road
Levenvale
Tullichewan
Jamestown
Woodside
Redcraig
Blairvault Burn
Industrial Estate
Hospital
Robin House (Hospice)
Cameron House (Hotel)
Jetty
Cameron Bay
Stirling Road
Blairhosh
Blairhosh Strip
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
Upper Stoneymollan
Sheepfold
Waterfall
Tullichewan Farm
Ring
A811

Figure 8

National Flood Resilience Strategy

2.9. The National Flood Resilience Strategy was published on 18 December 2024. Sea levels, peak rainfall and peak river flows are all set to increase significantly in the years to come resulting in greater flood exposure and more flood impacts. The Strategy, part of the Scottish National Adaptation Plan 2024-2029 (SNAP3), sets out to help meet this challenge. The Strategy supports a flood resilient places approach, recognising that reducing the impacts of flooding is as much about the design of our places as it is about the design of specific flood actions.

2.10 The SFRA is a tool within the Evidence Report, that will help us contribute to achieving the actions below, extracted from the National Flood Resilience Strategy, in relation to land use planning in the National Park when preparing the new Local Development Plan.

Outcome One - People, Creating flood resilient places involves our people and communities. People actions will be achieved by **involving and supporting communities** and include:

- Improving community involvement and input to decisions relating to their flood resilience. In particular, improving involvement at the options and design stage of flood protection schemes but also having input to decisions like where new homes could be built so they were not exposed to flooding, or how surface water may be managed through blue and green infrastructure in their community.

- Exploring how existing mechanisms can be used to support this, such as existing community engagement and consultation processes of the planning system, Local Place Plans, and tools and resources such as the Place Standard with a Climate Lens and the National Standards for Community Engagement.

Outcome Two - Places, Land management and placemaking decisions follow good practice for flood resilience, will be achieved by improving land use for flood mitigation and supporting long-term transition planning for our most exposed communities:

Improving land use for flood mitigation

- Developing our understanding of how our urban and rural landscapes can be adapted to increase our flood resilience. For example: how we can make more use of our natural capital such as peatland and forestry to help mitigate flooding impacts and how space can be made in urban areas for more blue and green infrastructure to manage rainfall.
- Avoiding development and redevelopment in areas at flood risk as a first principle.
- Supporting new development and redevelopment where it contributes to the flood resilience of our places.
- Seeking new delivery partners whose activities can contribute to our flood resilience.
- Seeking urban and rural land-use opportunities to improve our flood resilience.
- Developing policy for rainwater drainage networks. Scottish Government is developing policy to improve the management of rainwater in urban areas through strategic drainage networks designed for our current and our future climate.
- Investigating how mechanisms such as the Agricultural Reform Programme could contribute to Scotland's flood resilience and coastal change adaptation. For example, by supporting farmers and land managers to optimise the natural hydrological and hydraulic services provided by land, river networks and coastal zones.

Supporting long-term transition planning for our most exposed communities:

- Supporting those communities where it may not be possible to maintain a level of flood resilience indefinitely with long-term transition planning.
- Exploring how coastal storm damage could be better forecast and warned for.

- Identifying the most efficient and effective way to establish a national coastal monitoring programme to ensure that up to date information on coastal change is collected, analysed and made available.

National Planning Framework 4 and the Local Development Plan

2.11. National Planning Framework Spatial Planning Priority Central Region notes that Loch Lomond and The Trossachs National Park has landscape-scale opportunities to restore and enhance nature and respond to climate change, including through woodland creation and peatland restoration, as well as natural flood risk management.

2.12. In Scotland, the planning system operates on a plan-led approach, with development plans playing an important role in setting out how land should be used and developed for long-term public interest. For the National Park, the statutory development plan comprises both National Planning Framework 4 (NPF4) and the Local Development Plan, forming the basis for determining planning applications.

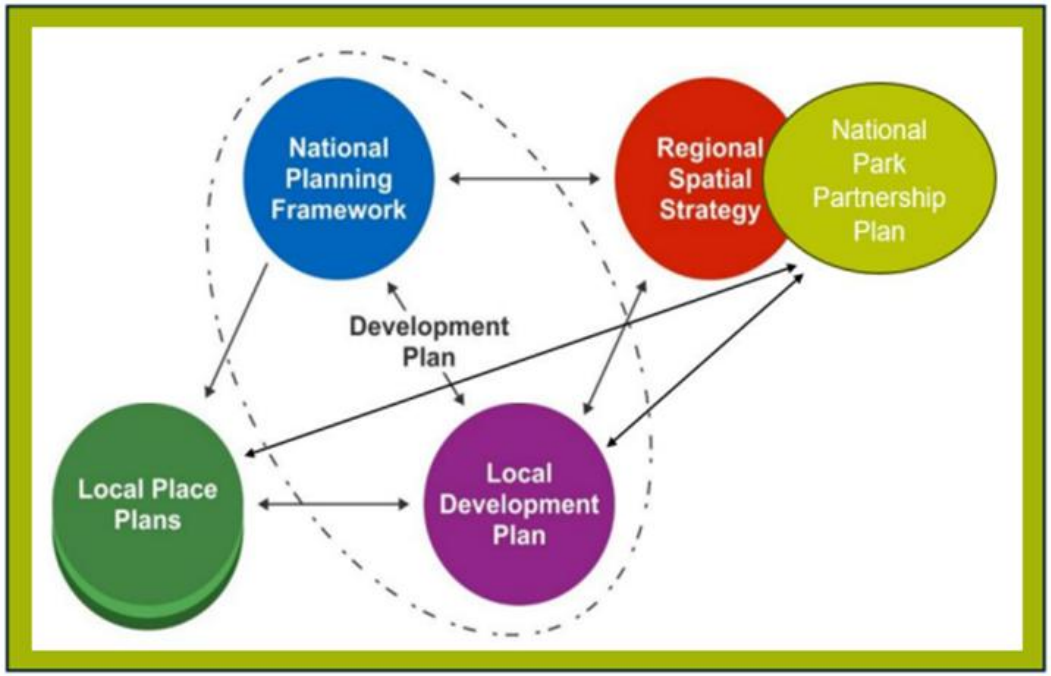

Figure 9 National Park Statutory Development Plan and Related Plans

2.13. National Planning Framework 4 Policy 22: Flood risk and water management, aims to strengthen resilience to flood risk by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding. The policy states that Local Development Plans should strengthen community resilience to the current and future impacts of climate change, by avoiding development in areas at flood risk as a first principle. Resilience should also be supported by managing the need to bring previously used sites in built up areas into positive use; planning for adaptation measures; and identifying opportunities to implement improvements to the water environment through natural flood risk management and blue and green infrastructure.

2.14. Local Development Plans should also consider the probability of flooding from all sources and make use of relevant flood risk and river basin management plans for the area. A precautionary approach should be taken, regarding the calculated probability of flooding as a best estimate, not a precise forecast. For areas where climate change is likely to result in increased flood exposure that becomes unmanageable, consideration should be given to alternative sustainable land use.

2.15. The Strategic Flood Risk Assessment will primarily support the Local Development Plan in responding to the spatial implications of Policy 22 by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding. In doing so the Strategic Flood Risk Assessment will also provide evidence to help take other National Planning Framework 4 policies into account, including:

- Policy 1 Tackling the climate and nature crises
- Policy 2 Climate mitigation and adaptation
- Policy 3 Biodiversity
- Policy 4 Natural places
- Policy 6 Forestry, woodland and trees
- Policy 10 Coastal Development
- Policy 11 Energy
- Policy 13 Sustainable transport
- Policy 18 Infrastructure first
- Policy 20 Blue and green infrastructure

- Policy 21 Play, recreation and sport

National Park Partnership Plan NPPP

2.16. Strategic direction within the National Park is provided by the Loch Lomond and The Trossachs National Park Partnership Plan 2024-2029. The National Park Partnership Plan 2024-2029 sets out a long-term vision for the future of the National Park and the steps we will take together over the next five years to achieve it. The Plan guides the work of not just the National Park Authority but of all the organisations and other partners involved in managing the area and making the overarching vision a reality.

2.17. Scottish Government guidance states that Local Development Plans for National Parks should be consistent with the Partnership Plan and Regional Spatial Strategy. The Partnership Plan therefore provides the strategic context for the Local Development Plan, and the Local Development Plan will help to deliver a number of the Partnership Plan's policies and priorities.

2.18. The Partnership Plan was developed following extensive dialogue with a wide range of partners and stakeholders and a public consultation. It involved facing up to some uncomfortable truths and looking at these from a variety of perspectives to find answers together. The plan recognises that residents, workers and visitors in the National Park are facing substantial challenges due to climate change, including more frequent floods and landslides that damage buildings, infrastructure and isolate entire communities. The National Park promotes natural flood management strategies such as woody debris dams, with land managers receiving public and private funding to implement regenerative practices. However, with projected increases in rainfall and storms in the next few decades, the National Park Partnership plan aims to engage all stakeholders in enhancing community resilience to these changes.

2.19. The Partnership Plan therefore provides direction for the strategic flood risk assessment by setting out spatially strategic development and investment in the National Park, as shown on Figure 10, extracted from the NPPP.

2.20. National strategic development and infrastructure improvements associated with A82 and A83 trunk road improvements, electricity transmission or hydro-electric power generation will be supported whilst ensuring opportunities to safeguard the

environmental and landscape qualities are maximised in the design and delivery, as well as creating enhanced opportunities for people to experience the National Park's special qualities and maximise benefits to local communities, businesses and visitors.

2.21. Strategic scale development that is likely to have an impact on National Park and neighbouring planning authorities will be supported at Callander, Arrochar, Tarbet and Balloch through:

- *Delivery of the southern expansion of Callander, needed to facilitate sustainable expansion of the town and to provide mixed uses in support of the development needs of both Callander and surrounding rural communities for which it acts as a service hub. The new Local Development Plan will re-consider the requirement for longer term land release beyond the currently identified mixed used development site for which a masterplan has been prepared to guide and support development.*

- *The delivery of tourism investment in Balloch as a core strategic tourism gateway location, with opportunities for improved transport interchange as well as job creation and wider economic regeneration with adjoining areas to the National Park.*

- *The prioritisation of development and infrastructure within Arrochar and Tarbet that helps unlock constrained, vacant and derelict sites, bringing them back into use in ways that support identified community needs, low-carbon local living and improves infrastructure for visitors to the area and travelling through it to Argyll.*

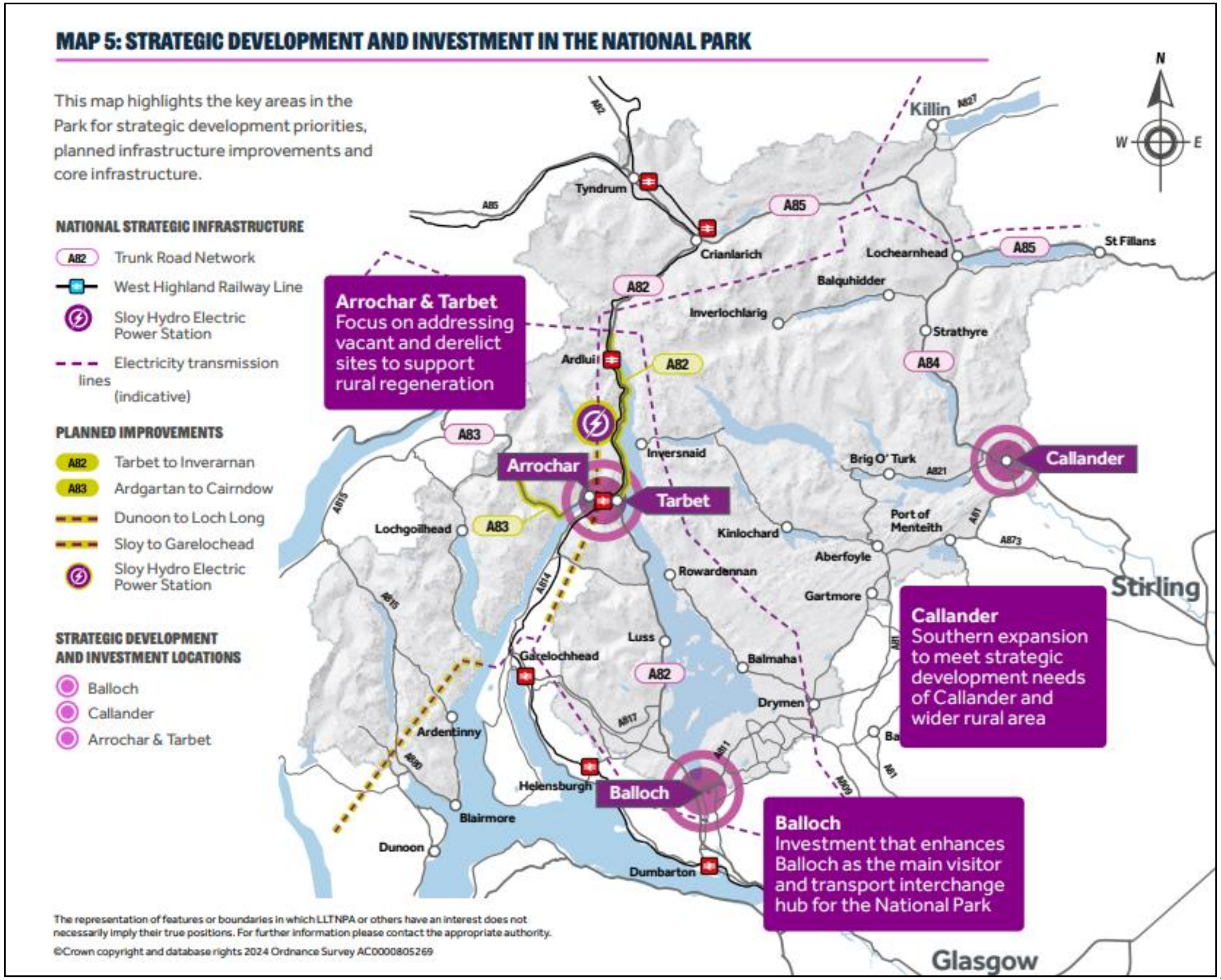

Figure 10

Appendix 4 d): Associated Evidence Report Appendices: Strategic Flood Risk Assessment; background paper for Topic Paper 4
National Park Authority Board Meeting
10 November 2025

Regional Spatial Strategy

2.22. The Planning (Scotland) Act 2019 introduces a new type of plan called a Regional Spatial Strategy which is a long-term spatial strategy for an area for strategic development. The part of the Planning (Scotland) Act 2019 that requires Regional Spatial Strategies to be prepared and adopted is not yet in force; however, it is intended that this National Park Partnership Plan will also become the draft Regional Spatial Strategy for the purposes of public consultation and further procedure.

Development Hierarchy and Place Based Approach for the new Local Development Plan

2.23. The new Local Development Plan will follow the National Park Partnership Plan for strategic development, as noted above, along with the settlement hierarchy of the current Development Plan. The new Local Development Plan is envisaged to take a localities-based approach to spatial planning in the National Park and the new Local Development Plan areas. The main settlements are shown on Figure 1.

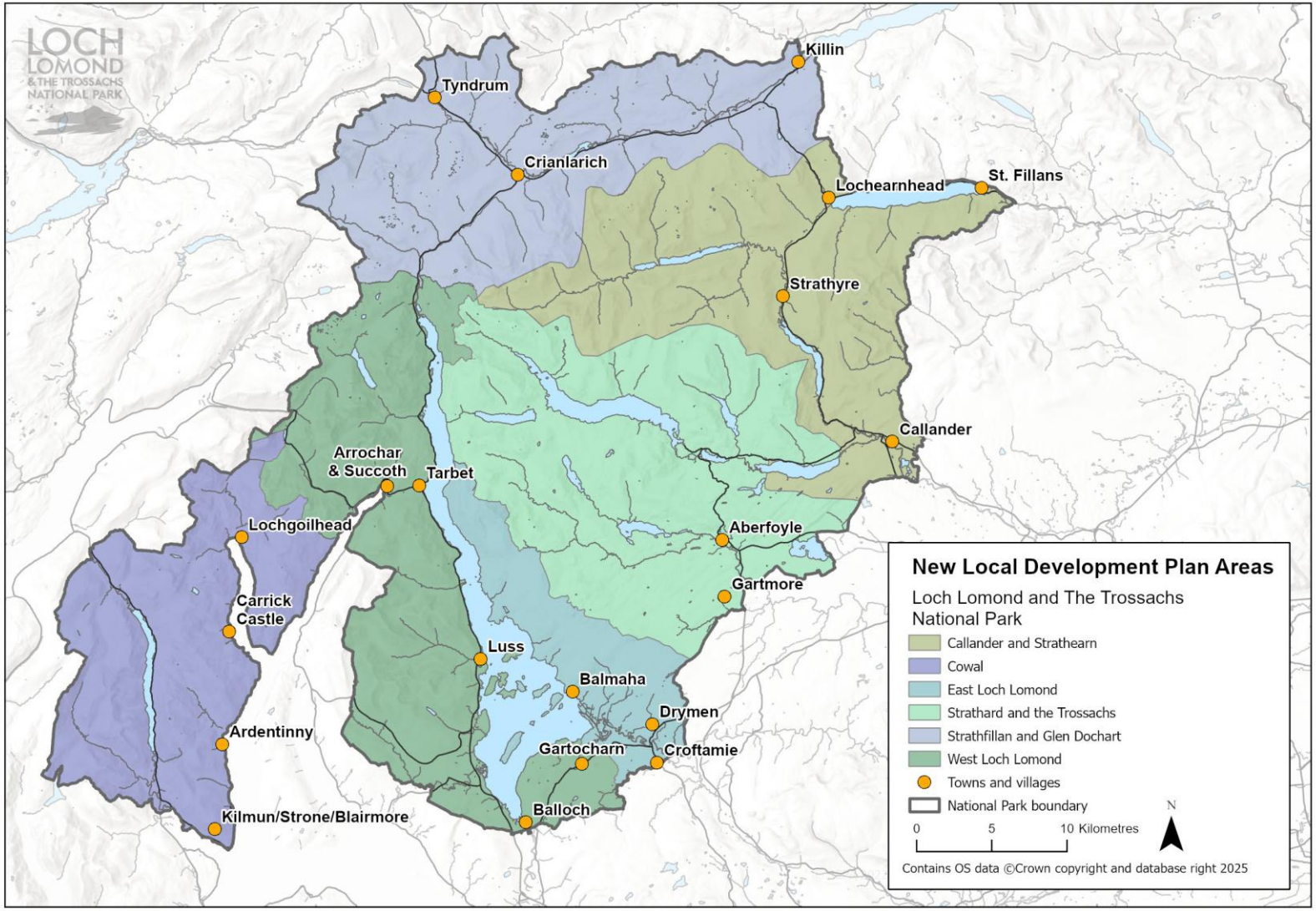
LOCH LOMOND & THE TROSSACHS NATIONAL PARK
Killin
Tyndrum
Crianlarich
Lochearnhead
St. Fillans
Strathyre
Callander
Arrochar & Succoth
Tarbet
Lochgoilhead
Aberfoyle
Gartmore
Carrick Castle
Luss
Balmaha
Drymen
Ardentinny
Gartocharn
Croftamie
Balloch
Kilmun/Strone/Blairmore
New Local Development Plan Areas
Loch Lomond and The Trossachs National Park
Callander and Strathearn
Cowal
East Loch Lomond
Strathard and the Trossachs
Strathfillan and Glen Dochart
West Loch Lomond
Towns and villages
National Park boundary
N
0
5
10 Kilometres
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Figure 11

3. Strategic Flood Risk Assessment (SFRA) Map

3.1. The SFRA Map is an ESRI Web map resource that sits alongside this short summary report. It is an interactive high-level overview, where layers can be switched on and off and areas can be zoomed into. The SFRA will be used as a screening tool as part of the Site Assessment Methodology to help understand whether a candidate site may need more detailed information, for example a site-specific flood risk assessment, to fully assess flood risk.

3.2. The SFRA map has been prepared in line with SEPA Guidance for planning authorities on Strategic Flood Risk Assessment Version as noted in section 1. Datasets on the public viewer include:

Reference layers

- SEPA Main River and coastal catchments
- National Park (Planning Authority) Boundary
- Local Authority boundaries
- Settlement Boundaries

Flood Protection Schemes and Past flood events.

- Existing flood protection schemes (location, point data)
- Proposed flood protection schemes (location, point data)
- Flood studies (location, point data)
    - Callander Hydraulic Modelling (200-year storm event)
    - Callander Surface Water Management Plan (30-year storm event)

- Aberfoyle Hydraulic Modelling (200-year storm event)

- Perth and Kinross Local Authority Historic Flood events 1997 – 2021
- West Dunbartonshire Local Authority Historic Flood events 1872 – 2020

Flood Risk Management

- Flood Warning Areas
- Local Plan Districts
- Target Areas 2021
- SEPA Potentially Vulnerable Areas (PVAs) 2022 – 2028
- SEPA Potentially Vulnerable Areas (PVAs) 2028 - 2034

Scottish Government Dynamic Coast

- Mean High Water Springs MHWS (Spring tides when the tidal range is at its highest) modern
- Artificial coastal defences
- Artificial coastal defences buffer
- Future erosion 2050 high emissions scenario
- Future MHWS for high emissions scenario

SEPA Flood Hazard Maps displaying the land affected by river, coastal, and surface water and small watercourses flooding

- High likelihood flooding

- Medium likelihood plus climate change (the Future Flood Map)
- Medium likelihood
- Low likelihood.

The following data will be used within the Planning Authority, however not included on the public map:

- Reservoir inundation Reservoirs Map
- SEPA's Observed Flood Events (OFE) and Historic River Flood Extents data
- SEPA Natural Flood Management
- Loch Lomond and The Trossachs National Park climate adaptation study high risk areas
- Local Authority Flood Study outputs – Balloch Area (West Dunbartonshire)

3.4. The reservoir inundation data, information on past flooding events, SEPA's Observed Flood Events (OFE), and historic river flood extents cannot be published by the National Park Authority, as they remain the property of SEPA and can only be released by them. Due to licensing restrictions, the National Park Authority is also unable to publish SEPA's Natural Flood Management data. Additionally, the High-Risk areas identified in the National Park Authority's Climate Adaptation Study should be interpreted within the full context of that report.

3.5. Local Authority Flood Study outputs – Balloch Area (West Dunbartonshire), Callander and Aberfoyle (Stirling) are available to the public through Flood Authority websites where referenced in the report

3.6. The SFRA map is a snapshot in time and will be regularly reviewed and updated as appropriate, as new or updated flood risk information becomes available.

4. River, surface water and coastal flooding and coastal erosion risk summary by towns and villages

4.1. The table below sets out a summary of the most significant flooding and coastal erosion risks and hazards on a settlement hierarchy basis, covering those settlements (towns and villages) identified in the current Local Development Plan.

Settlement	Catchment	Local Plan District	PVA (2018)[1]	PVA (2024)[2]	Future Flood Map (ML)[3]			Future Coastal Erosion[4]
					River	*Surface*	*Coastal*	
Aberfoyle	Forth	Forth	Yes	Aberfoyle	Yes	Yes	No	No
Ardentinny	Cowal/Clyde Sea Lochs	Clyde and Loch Lomond	No	No	No	Yes	Yes	Yes
Arrochar and Succoth	Cowal/Clyde Sea Lochs	Clyde and Loch Lomond	Yes	No	Yes	Yes	Yes	No
Balloch	Leven	Clyde and Loch Lomond	Yes	Leven	Yes	Yes	No	No
Balmaha	Leven	Clyde and Loch Lomond	Yes	No	Yes	Yes	No	No
Callander	Forth	Forth	Yes	Callander	Yes	Yes	No	No
Carrick Castle	NS	Clyde and Loch Lomond	No	No	Yes	Yes	Yes	Yes
Crianlarich	Tay	Tay	No	No	Yes	Yes	No	No
Croftamie	Leven	Clyde and Loch Lomond	No	No	Yes	Yes	No	No
Drymen	Leven	Clyde and Loch Lomond	No	No	No	Yes	No	No
Gartmore	Forth	Forth	No	No	Yes	Yes	No	No
Gartocharn	Leven	Clyde and Loch Lomond	No	No	Yes	Yes	No	No
Killin	Tay	Tay	No	No	Yes	Yes	No	No
Kilmun/Strone/Blairmore	Cowal/Clyde Sea Lochs	Clyde and Loch Lomond	No	No	No	Yes	Yes	Yes
Lochearnhead	Earn	Tay	Yes	No	Yes	Yes	No	No
Lochgoilhead	Cowal/Clyde Sea Lochs	Clyde and Loch Lomond	No	No	Yes	Yes	Yes	Yes
Luss	Leven	Clyde and Loch Lomond	Yes	No	Yes	Yes	No	No
St Fillans	Earn	Tay	Yes	No	Yes	Yes	No	No
Strathyre	Forth	Forth	Yes	Strathyre	Yes	Yes	No	No
Tarbet	Leven	Clyde and Loch Lomond	Yes	No	Yes	Yes	No	No
Tyndrum	Tay	Tay	No	No	Yes	Yes	No	No

[1] In the current cycle of flood risk management planning (2022-2028) there are catchment based PVAs and community-based areas at risk known as target areas.

[2] The next flood risk management planning cycle (2028-2034) will use community based PVAs. We will Inform our new Local Development Plan using this new dataset

[3] SEPA Flood Maps V3.0 the latest published river, coastal and surface water flood extents, Future Flood Map (Medium Likelihood).

[4] Dynamic Coast dataset

5. Flood Warning Areas

5.1. There are seven Flood Warning Areas in the National Park, and these are shown on the SFRA interactive map and listed by Flood Authority below:

Argyll and Bute Council Flood Authority

- Loch Lomond and River Leven – West Lomond Shores

Stirling Council Flood Authority

- Loch Lomond and River Leven – East Lomond Shores
- Teith – Callander
- Aberfoyle
- Lower Endrick

West Dunbartonshire Council Flood Authority

- Balloch
- Loch Lomond and River Leven – South Lomond Shores

6. Climate change

Flood hazard maps and climate change allowances

6.1. The river and surface water extent data used in this report comes from Flood Map Version 3.0 of the Scottish Environment Protection Agency's flood hazard maps. National Planning Framework 4 states that: 'For planning purposes, at risk of

flooding or in a flood risk area means land or built form with an annual probability of being flooded of greater than 0.5% which must include an appropriate allowance for future climate change' (page 149).

6.2. Within this assessment Scottish Environment Protection Agency's Future Flood Maps Version 3.0 have been used to inform the assessment. As per the SEPA Surface Water and Small Watercourse Flood Maps – new national update 2025, the Flood Map Version 3.0 design rainfall event of interest is the 0.5% annual probability event including climate change (or 200 year + climate change) which is referred to as the future flood map. A future flood map is now available for surface water and small watercourses for the first time.

6.3. Reference should be made to SEPA's Climate change allowances for flood risk assessment in land use planning Version 6, and the allowances therein, for use in site specific flood risk assessment. The revised expected uplifts, as shown in the extract of the guidance in the table below, highlight the change from the previous 20% uplift figure, noting that the appropriate figure to use in a detailed flood risk assessment is dependent on catchment location and size:

Table 1: Peak river flow and peak rainfall intensity allowances by River Basin Region

River Basin Region	Peak river flow allowances Total change to the year 2100 (%)	Peak rainfall intensity allowances Total change to the year 2080 (%)
Argyll	59	46
Clyde	49	41
Forth	56	39
Tay	53	39

Climate Change Adaptation Risks and Opportunities Assessment Loch Lomond & the Trossachs National Park March 2024

6.4. The Climate Change Adaptation Risks and Opportunities Assessment study forms the first step in the production of an adaptation plan for the National Park. The adaptation plan will be a standalone plan with elements potentially embedded into the new Local Development Plan. The information from this study will be used to drive discussion and develop a strategic approach to adaptation by bringing people together, by outlining what climate change could mean for different

areas of the National Park including infrastructure, residents, visitors, habitats and the local economy. The results of this study emphasise the need for adaptation and can be used to make the case to partners and funders.

6.5. The SFRA includes the dataset Climate Adaption High Risk Areas, developed within the above study and this includes climate change risks for flooding. As previously noted, these are only shown on internal SFRA map not the external SFRA map, and it is important to note that this does not necessarily mean that every risk in the high-risk areas is applicable to every receptor and the risk assessment tables in the report should be referred to for further detail. The areas provide an indication of the location of high-risk areas, the extent of which would need to be identified through a ground truthing exercise, with areas potentially removed completely if mitigation measures are already in place.

Climate Action: Local Authority Reports

6.6. The report Argyll and Bute Climate Strategy Draft November 2024 is a strategy and action plan for Argyll & Bute, the strategy identifies the key climate risks and impacts impacting on Argyll & Bute and the areas in which action can be taken. The impacts relevant to the SFRA include increased landslides, flooded water courses and more surface water, and coastal infrastructure damage and loss, coastal retreat or protection cost.

6.7. Listed below are further relevant reports for the National Park, updates will be referred to as they are published.

- Stirling Council's Climate and Nature Emergency Plan 2021-2045
- West Dunbartonshire Council's Climate Change Strategy (2021)
- Perth and Kinross Council Climate Change Strategy

7. Natural Flood Management

7.1. NPF4 Spatial Planning Priorities Central Region notes that Loch Lomond and The Trossachs National Park has landscape-scale opportunities to restore and enhance nature and respond to climate change, including through woodland creation and peatland restoration, as well as natural flood risk management. Natural flood management sits alongside hard

infrastructure, better flood warning and policies to avoid building in the flood plain in and integrated approach to Flood Risk management. Invasive Non-native Species (INNS) have an impact on flood resilience. For example, Japanese Knotweed and Giant Hogweed, which weaken riverbanks, increase flood-related erosion and sedimentation. They can also complicate maintenance due to health and safety concerns.

7.2. The SEPA Natural Flood Management Maps Flood Risk Management Maps identify areas where nature-based solutions could be most effective for sustainable flood risk management and these are to be further investigated in conjunction with the broad scale habitat recovery priority areas in our National Park Partnership Plan (Figure 12) to support FRM planning, and sustainable land use at Proposed Plan stage. The maps show areas where implementing natural flood management techniques could be most effective. This information will help to make flood risk management decisions and should not be viewed in isolation. SEPA note that the maps should be considered alongside Identifying Opportunities for Natural Flood Management December 2013 guidance on how areas were identified and how to interpret the information.

7.3. The accompanying, SEPA Natural Flood Management Handbook 2015, sepa-natural-flood-management-handbook1.pdf is a practical guide to the delivery of natural flood management to benefit flooding, with multiple benefits and outcomes. The handbook is primarily aimed at local authorities tasked with delivery of actions set out in the Flood Risk Management Strategies, it is also intended to be of use to all those seeking to deliver natural flood management.

7.3.1. At a strategic scale, Natural Flood Management Map opportunity areas for ***run-off reduction*** broadly correlate with the mapped National Park Partnership Plan Habitat Recovery Priority Areas, particularly woodland and peatland. More detailed mapping will be undertaken through our developing Nature Networks and Blue Green Infrastructure studies.

7.3.2. At a strategic scale, Natural Flood Management Map shows some opportunity areas for ***flood plain storage*** that broadly correlates with the mapped National Park Partnership Plan Habitat Recovery Priority Areas, for wetland. Opportunities are highest in Drymen, Aberfoyle, Callander, and Strathfillan.

7.3.3. At a strategic scale, Natural Flood Management Map ***Sediment management*** opportunity areas are shown on many watercourses throughout the National Park with the exception of Cowal.

7.3.4. At a strategic scale, there is no data within the National Park itself regarding Natural Flood Management Map ***estuarine surge attenuation***, however the coastlines of Cowal are within opportunity areas.

7.3.5. At a strategic scale, Natural Flood Management Map shows some opportunity areas for ***wave energy dissipation*** in Cowal in the National Park, focussed along the coast between Kilmun and Ardentinny, and on towards Lochgoilhead, and at Carrick Castle and at Ardgartan.

7.4. As part of the National Park Authority's Future Nature programme, we are working alongside the River and Fisheries Trusts, to develop an initial shared vision for the water network.

7.5. The Clyde and Loch Lomond Flood Risk Management Plan notes that a Natural Flood Management (NFM) study was ongoing for the Vale of Leven (page 44). This study is not currently being progressed by either Loch Lomond and The Trossachs National Park Authority, or West Dunbartonshire Council, however when this study is progressed any potential outputs will be considered.

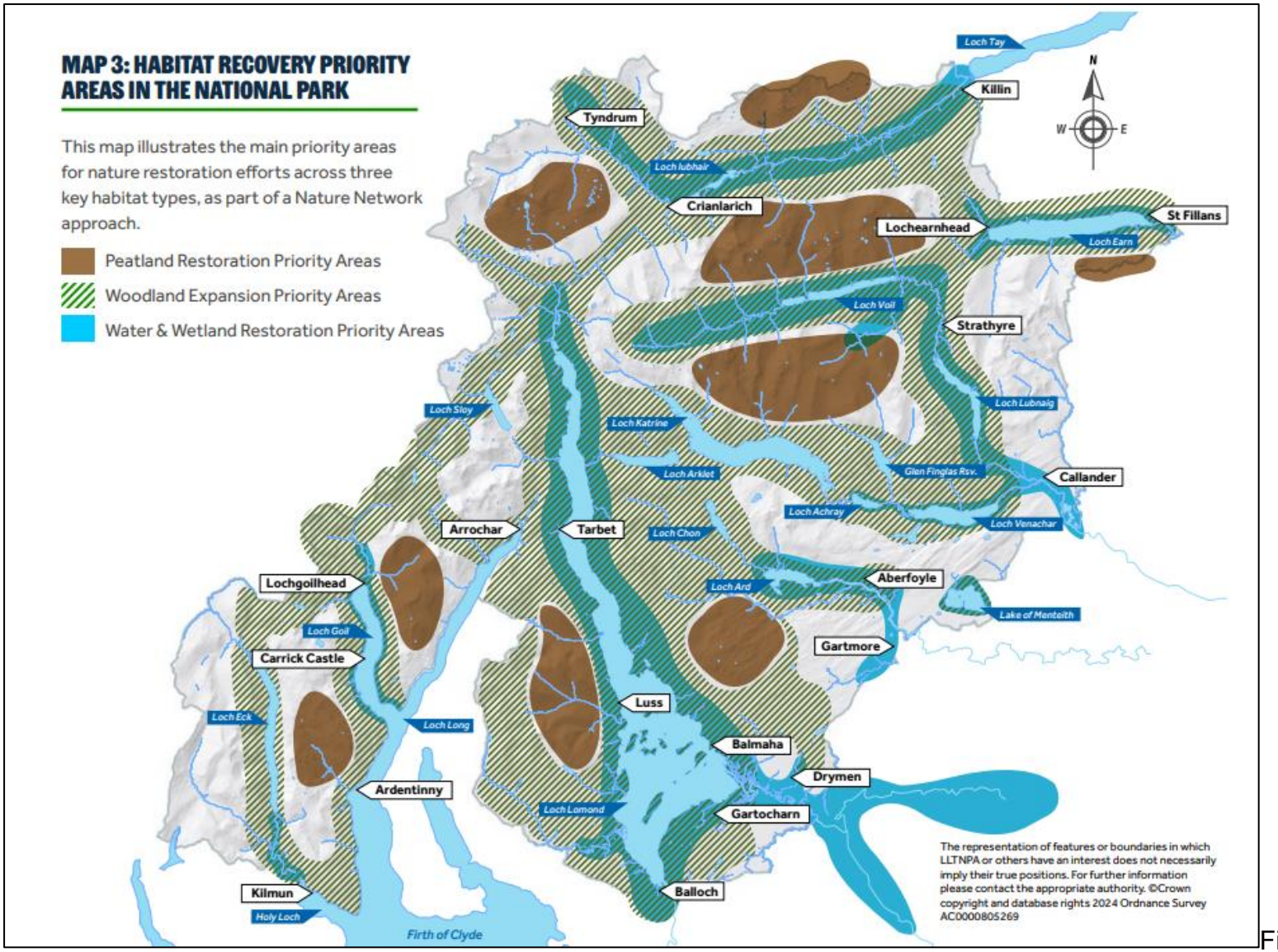
MAP 3: HABITAT RECOVERY PRIORITY AREAS IN THE NATIONAL PARK
This map illustrates the main priority areas for nature restoration efforts across three key habitat types, as part of a Nature Network approach.
Peatland Restoration Priority Areas
Woodland Expansion Priority Areas
Water & Wetland Restoration Priority Areas
N
W
E
Loch Tay
Killin
Tyndrum
Loch Iubhair
Crianlarich
Lochearnhead
St Fillans
Loch Earn
Loch Voil
Strathyre
Loch Lubnaig
Loch Sloy
Loch Katrine
Loch Arklet
Glen Finglas Rsv.
Callander
Loch Achray
Loch Venachar
Arrochar
Tarbet
Loch Chon
Lochgoilhead
Aberfoyle
Loch Ard
Lake of Menteith
Loch Goil
Gartmore
Carrick Castle
Luss
Loch Eck
Loch Long
Balmaha
Drymen
Ardentinny
Loch Lomond
Gartocharn
Kilmun
Holy Loch
Balloch
Firth of Clyde
The representation of features or boundaries in which LLTNPA or others have an interest does not necessarily imply their true positions. For further information please contact the appropriate authority. ©Crown copyright and database rights 2024 Ordnance Survey AC0000805269

Figure 12

8. Historic Flood events

8.1. Historic Flood event data is available for both Perth and Kinross and West Dunbartonshire Council Areas. In Perth and Kinross there is data for 1997-2019 only (excludes any events in the last 5 years), and there is a record of surface water flooding in St Fillans. In West Dunbartonshire there is data for 1823-2023 and flood events in the National Park are concentrated in Balloch in the Potentially Vulnerable Area (2022-2028) and eastward towards Gartocharn.

8.2. At this stage, data from SEPA's river, coastal and surface water and small watercourse flooding datasets are being drawn on for Argyll and Bute Council and Stirling Council as we have been unable to obtain historic flood event data. We have been unable to obtain historic flood event data for Argyll and Bute Council and Stirling Council. However, we are satisfied that the available evidence at this stage is sufficient to inform the Strategic Flood Risk Assessment and the preparation of the Evidence Report. We will continue to engage closely with the relevant Flood Authorities as we progress towards the Proposed Plan stage. It is also important to note that the SFRA interactive map is an evolving data inventory, and any additional data that becomes available will be incorporated into our GIS interactive mapping in due course.

9. Dynamic Coast

9.1. The Dynamic Coast project aims to provide the strategic evidence base on the extent of coastal erosion in Scotland. Improving the evidence on coastal change, improving the awareness of coastal change, and supporting decision-makers to ensure Scotland's coast and assets can adapt to our future climate.

9.2. Further information on Dynamic Coast is on the website, Dynamic Coast. A summary of the project is below, extracted from the website:

9.3. 'About the project' extract:

The Dynamic Coast project aims to provide the strategic evidence base on the extent of coastal erosion in Scotland by:

- *Improving the evidence on coastal change*
- *Improving the awareness of coastal change*
- *Supporting decision-makers to ensure Scotland's coast and assets can adapt to our future climate.*

9.4. 'Project Results' extract:

To reduce the impact of the coastal erosion already under way due to sea level rise, our coast and its assets and communities need to be safeguarded by building resilience and adaptation planning. Dynamic Coast delivers the mapping and data to allow us to quickly adapt to the challenges that climate change presents and to become more "sea level wise ".

10. Reservoir Inundation

10.1. There are thirteen controlled reservoirs where a potential breach could result in flooding inside the National Park. Ten of these are within the National Park with a further three located outside the boundary. The risk designation of all but one of the thirteen reservoirs is High as shown in the SEPA Controlled Reservoirs Register Reservoirs Map.

11. Flood studies and Flood defences

11.1. The National Park Authority is not a Flood Authority. Four Flood Authorities cover the National Park, this section sets out the evidence base for flood studies and flood defences for the council areas of Stirling, West Dunbartonshire and Argyll and Bute. There are no studies or defences applicable to the National Park area in Perth and Kinross.

Stirling Council

11.2. On their dedicated website, Stirling Council Flood Protection Schemes, Stirling Council note that they have undertaken extensive exploratory work in our most at risk communities including Aberfoyle and Callander. Much of this work involves flood modelling which aims to measure flood risk and identify possible solutions for flood risk reduction. Callander and Aberfoyle are currently undergoing updates to the hydraulic models which include the 'flood zone' event relevant to NPF (1 in 200 + 56% climate change). Callander is complete and considered in the SFRA, Aberfoyle is underway and so for now we are using the 2019 iteration with 40% climate uplift as it was at that time, we will replace this with the new 2025 update as soon as it becomes available.

11.3. There is a long history of flooding in Callander ranging from travel access routes being cut off, to flooding of homes and businesses. Stirling Council have invested in several reports to gain a better understanding of the causes and potential solutions to flooding in Callander. Stirling Council are working on identifying a preferred option for Callander flood protection scheme. This seeks to reduce flood risk from river flooding. More detailed information regarding the flood protection scheme can be found on the Council's website - Callander Flood Protection | Stirling Council Flood Protection Schemes. Additional information can also be found at - Callander flood protection scheme webpage, which is a platform to share information about the ongoing projects to mitigate impacts of river flooding to Callander and any engagement events with the community of Callander.

11.4. Aberfoyle, particularly the areas of Main Street and Lochard Road, often experiences flooding from the River Forth. Notable floods include two major events in December 2015 caused by Storm Desmond and Storm Frank. Storm Frank, on December 30, 2015, was the largest recorded flood in Aberfoyle's history. More recently, Aberfoyle experienced extensive flooding in October 2023 resulting in widespread flooding to properties on the Main Street, impacting both local businesses and residences. Aberfoyle and the wider Strathard area are particularly sensitive to flooding due to the solitary access route beyond the A821, the B829, being regularly cut off due to flood water. The subpage on Aberfoyle is Aberfoyle Flood Protection | Stirling Council Flood Protection Schemes. Aberfoyle flood protection scheme was originally prioritised under the Scottish Government's Cycle 2 Programme 2022-2028 for Flood Protection Schemes, which provided 80% grant funding. However, due to national over commitment in funding and subsequent review of funding process, the scheme was graded as low and therefore removed cycle 2 funding. Following the removal of Aberfoyle from Cycle 2 flood scheme

funding, Stirling Council are in the process of identifying other suitable measures to reduce flood risk and enhance flood resilience in Aberfoyle.

West Dunbartonshire Council

11.5. Within West Dunbartonshire a flood study in relation to Balloch within the National Park has been developed. This is the Loch Lomond and Vale of Leven Flood Risk Management Study Feasibility Report December 2019, that West Dunbartonshire Council commissioned to identify the flood risk associated with Loch Lomond and the River Leven including its main tributaries, then assess options (including economic viability) for the alleviation of future flooding. Due to the format in which the data was provided by West Dunbartonshire Council, we were unable to upload the information to the GIS interactive map. However, both the Vale of Leven Surface Water Management Plan (SWMP) Report and the Leven Feasibility Study Report have been included in the appendix of this SFRA report for reference. If shapefiles for the Vale of Leven Surface Water Management Plan become available, they will be added to our internal GIS mapping.

11.6. Within the study Flood Cell 4 – River Leven, Flood Cell 7 - Carrochan Burn and Flood Cell 8 - Ballagan Burn relate to the National Park affecting the areas of Balloch and west of Balloch towards Gartocharn. This study notes receptors and risk and sets out both grey and green potential control measures for flooding with preferred options and recommendations.

11.7. Within Balloch, just outside the National Park boundary there is an existing barrage, the Lomond Barrage, which forms part of the Loch Lomond Water Scheme. The barrage controls the outflow from Loch Lomond when the loch level is between approximately 7.0m AOD and 7.9m AOD. If loch levels are above or below this range the gates of the barrage stay in their lowered position and river flows are unrestricted.

Argyll and Bute

11.8. Within the National Park in Argyll and Bute there are no flood studies relating to Cowal (planned, in progress or completed). Coastal Change Adaptation Plans are currently being developed for locations identified in Cycle 2 of the Local Flood Risk Management Plan.

12. Surface Water Management Plans

12.1. This section sets out the evidence base for surface water management in Stirling and West Dunbartonshire. There is no evidence applicable to the National Park area in Perth and Kinross and Argyll and Bute. The flooding section above includes information on surface water management for Stirling.

Stirling

12.2. Callander is also subject to a surface water management plan - this is currently entering stage 2 and will likely be complete at some point in early 2026. The data from the Surface Water Management Plan can be found on our interactive SFRA map viewer.

12.3. The Forth Flood Risk Management Plan includes an action for Stirling Council to progress a surface water management plan for Aberfoyle (Action Ref: 18405), when progressed and available this will be included.

Balloch – West Dunbartonshire

12.4. Vale Of Leven Surface Water Management Plan 21 October 2022 notes within its approach that “Land use planning policy - Ensure that new development is not at risk of surface water flooding and does not increase flooding elsewhere. To achieve this, surface water (drainage and flooding) should be managed sustainably above ground and should integrate with and enhance the urban landscape (i.e. should form part of the ‘green and blue’ infrastructure of the development).” The study highlights area VL01 – Old Luss Road as a small cluster, located in the west of Balloch, where there is a significant risk of surface water flooding linked to exceedances of the sewer network according to observed evidence. The main risk of flooding is from water flowing down slopes to the west of the cluster and via the small burn that flows through the cluster, ponding in low-lying areas. There is also a risk of backing-up and surcharging of the combined sewer network near Ben Lomond Way. The study notes an action OBJ_VL01/1: Improve understanding of surface water flooding at Cluster VL01 (Old Luss Road) within the current FRM planning cycle (West Dunbartonshire Council and Scottish Water). Vale Of Leven Surface Water Management Plan, if available shapefiles will be included on the internal GIS system.

13. Coastal change impacts

13.1. Coastal change impacts within the National Park are in Cowal where we have 39 miles of coastline around three sea lochs all within the Argyll and Bute Council area In terms of the extent of the park authority's role in intertidal and marine areas, the relationship between the land use planning system and the marine planning system is set out in The Marine (Scotland) Act 2010. Terrestrial planning authorities are responsible for all terrestrial planning matters down to Mean Low Water Springs and for marine fish farming out to 12 nautical miles. In the intertidal zone (between low and high water springs) there is an overlap between terrestrial planning and Marine Licensing. This is the same for all Local Authorities as well as the National Park. We only have a small marine area in the National Park (Holy Loch, Loch Long, Loch Goil), the entirety of Loch Goil is in the National Park whereas Loch Long and Holy Loch are split between the National Park and Argyll and Bute Council.

Coastal Erosion and Artificial Coastal Defences

13.2. Drawing on the analysis carried out for the SFRA, it is important to highlight the areas at risk of coastal erosion and subsequent flooding along the coastal regions of the National Park, particularly the Cowal Peninsula. As shown in the table in Section 4, based on the Dynamic Coast Future Erosion data the settlements at risk of coastal erosion by 2050 under a high emissions scenario are Ardentinny, Lochgoilhead, Carrick Castle, Kilmun, Strone, and Blairmore.

13.3. Further to the areas at risk of coastal erosion within the National Park, there are areas along the Cowal Peninsula where artificial coastal defences are already in place. These defences are located at the head of Loch Long and Loch Goil, Gairletter Point, as well as in the settlements of Ardentinny, Kilmun, Blairmore, and Strone.

13.4. Coastal Change Adaptation Plans play a crucial role in improving the understanding of the risks of coastal erosion and flooding in Scotland, both today and in the future. Currently, the status of Argyll and Bute Council's Coastal Change Adaptation Plan is to be confirmed, but CCAP's are currently being developed for locations identified in Cycle 2 of the Local flood Risk Management Plan. Through ongoing engagement, we aim to gather further information to better inform our approach to coastal risk management.

Argyll and Bute Climate Action A climate change strategy for Argyll and Bute 2024

13.5. The above draft report, Argyll and Bute Climate Action, notes “Sea level rise, both absolute and from storm surges, is a major concern for Argyll and Bute. 80% of the region’s population lives within 1km of the coast (97% within 10km), and we have over 200km of road within 25m of the sea (at high tide), especially in Cowal and Bute. Replacement costs of sea defences for this stretch were estimated at £300m in 2015 prices. This would be equivalent to approximately £420m today due to inflation alone, with the actual figure likely significantly greater due to increased materials costs and more severe climatic conditions predicted”. Further Evidence is required for Cowal Coastal change impacts within the National Park.

14. Gap analysis

14.1. The information on flood risk and incidents across the National Park is limited and includes restricted information of flood incidents as they are only recorded if they enter a property. The National Park has experienced flood incidents at critical infrastructure such as the A83 Rest and be Thankful, leading to multiple landslips, and although we hold details of extreme weather events through our Climate Adaption Study of March 2024, we do not hold corresponding flood event data. The data owners for flood events are the Flood Authorities and SEPA and where we have been able to access data then we have added it to the SFRA internal resource, and where publication allows, the public viewer. Outputs from any work undertaken by Stirling, Perth & Kinross, Argyll & Bute or West Dunbartonshire councils should be used as an additional data source when assessing flood risk.

14.2. Summary of data gaps to be addressed as we compile the Evidence Report for our new Local Development Plan is noted below. We will aim to add the following datasets to the internal map resource as they become available.

- Local Authority Historic flood events, Argyll and Bute data not available as a standalone resource, Argyll & Bute Council are currently developing a Flood Risk Management system. A historic flood event layer will be included in this detailing coastal, fluvial and surface water events in Argyll & Bute Council area.

- Local Authority Historic flood events, Stirling Council data is not available as a standalone resource. We have referred to SEPA's river, coastal and surface water and small watercourse datasets and any additional data that becomes available will be incorporated into our GIS interactive mapping in due course.

- Mapped point information on flood protection schemes - Argyll and Bute are still developing the Flood defence layer and when this is available, we will include this in our GIS system.

- Local Authority Flood studies: Aberfoyle, nearing completion.

- Vale Of Leven Surface Water Management Plan, shapefiles not yet available. We recognise that the SFRA interactive map is an evolving data inventory, and any additional data that becomes available will be incorporated into our GIS interactive mapping in due course.

- Further Evidence is required for Cowal Coastal change impacts within the National Park, however, is not available at this time.

14.3. Limitations of the SFRA are that is a snapshot time, and it will be regularly reviewed and updated as appropriate, as new or updated flood risk information becomes available.

14.4. A site-specific flood risk assessment may be required for sites in locations known to be at risk of flooding and coastal erosion. SEPA Climate change allowances for flood risk assessment in land use planning, Version 6 Issued date: 25 February 2025 and the allowances therein should be used in site specific flood risk assessment.

15. Bibliography

Scottish Government's Local Development Planning Guidance

Scottish Environment Protection Agency (SEPA) SFRA Guidance V1 October 2023, updated by V2 Guidance for planning authorities on Strategic Flood Risk Assessment Version 2 (May 2025)

Planning Advice Note LDP Evidence Gathering: Achieving sufficiency of evidence relating to flood risk and the water environment December 2024

The Flood Risk Management (Scotland) Act 2009

Flood Risk Management Plans 2022 - 2028, published by SEPA (home)

- Highland and Argyll
- Tay
- Forth
- Clyde and Loch Lomond

Forth Local Plan District Flood Risk Management Plan 2022 – 2028 Stirling Council

Tay Local Plan District Flood Risk Management Plan 2022 - 2028

Highland and Argyll Local Plan District Flood Risk Management Plan 2022 – 2028

Clyde and Loch Lomond Local Flood Risk Management Plan 2022 -2028

Statement of consultation arrangements for Flood Risk Management Plan 2028 FRM (Scotland) Act 2009 Section 30

Statement of Consultation Measures for Flood Risk Management Plan 2028

National Flood Resilience Strategy December 2024

Scottish National Adaptation Plan 2024-2029 (SNAP3)

National Planning Framework 4

Loch Lomond and The Trossachs National Park Local Development Plan 1

Loch Lomond and The Trossachs National Park Partnership Plan 2024-2029

SEPA Surface Water and Small Watercourse Flood Maps – new national update 2025 Briefing note to assist planning users.

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Loch Lomond And Vale of Leven Flood Risk Management Study Feasibility Report December 2019

Vale Of Leven Surface Water Management Plan 21 October 2022

Stirling Council Flood Protection Schemes