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## Appendix 4d Otter Habitat Assessment Report

## A82 Pulpit Rock Road Improvement

# Report to inform screening for Appropriate Assessment for Scheme Construction: Otter Habitat Assessment of Upper Loch Lomond

Report  
March 2010



Prepared for :  
**Transport Scotland**

## **A82 Pulpit Rock Road Improvement**

Report to inform screening for Appropriate Assessment for Scheme Construction: Otter Habitat Assessment of Upper Loch Lomond

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### Revision Schedule

**A82 Pulpit Rock - Information to inform screening for Appropriate Assessment for Scheme Construction: Otter Habitat Assessment of Upper Loch Lomond**  
March 2010

Rev	Date	Details	Prepared by	Reviewed by	Approved by
01	March 2010	Otter Habitat Assessment	<b>Graeme Hull</b> Ecologist	<b>Simon Geary</b> Principal Ecologist	<b>Simon Geary</b> Principal Ecologist

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# 1 Introduction

## 1.1 Background

Scott Wilson Ltd was instructed by Transport Scotland to carry out an Appropriate Assessment screening of the potential effects of the ground investigation works and the construction of the proposed A82 Pulpit Rock improvements on Natura 2000 sites within the Loch Lomond area. The Appropriate Assessment screening must also assess in-combination effects of the Pulpit Rock scheme and other road improvement works along the A82.

As part of the Appropriate Assessment screening process an examination of potential effects upon the integrity of Loch Lomond Woods, Special Area of Conservation (SAC) and qualifying features was undertaken, including impacts from both temporary and permanent works.

Loch Lomond Woods SAC is designated for Annex 1 habitat: Western acidic oak woodland, a qualifying feature being Otter.

A primary concern is the potential effects on otter, a qualifying feature of the Loch Lomond Woods SAC. The boundaries of the SAC are complex due to the fragmentary nature of the site, with the closest section occurring on the eastern shore of the Loch, approximately 500m from the A82 trunk road at Pulpit Rock. Potential impacts to otter may occur due to disturbance and the likely loss of otter habitat including holt sites, which occur within the footprint of the Pulpit Rock scheme.

The habitats present at Pulpit Rock, include natural rock faces with associated boulder scree, a substantial cave system and broadleaf woodland. Together they provide otters with a multitude of locations for their holts and other refuges, a total of six confirmed holts and the same number of sprainting sites, were recorded during earlier field surveys.

Otters live a transitory lifestyle within their territories, which in fresh water systems can range from in excess of 30km for males and 18km for females (Kruuk, 2006)<sup>1</sup>, as such individual otters may frequent both the impacted habitats within the scheme, as well as areas within the SAC.

In order to assess the potential effects of the GI works and the construction of the proposed road improvement scheme upon otter populations occurring within SAC and other areas of the northern part of Loch Lomond, i.e. Tarbet to Ardlui, including both the east and west shorelines, the following survey and assessment work deemed necessary.

## 1.2 Conservation objectives for otter - Loch Lomond Woods SAC

Conservation objectives for otter within the context of the SAC are aimed at ensuring the following components are maintained in the long term:

- Population of otters as a viable component of the site;
- Distribution of the species within the site;
- Distribution and extent of habitats supporting the species;

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<sup>1</sup> Kruuk, H. (2006) Otters ecology, behaviour and conservation. Oxford University Press. Oxford.

- Structure, function and supporting processes of habitats supporting the species; and
- No significant disturbance of the species.

### 1.3 Survey Aim

The aim of the survey was to gather contextual information to enable the combined impacts of disturbance and habitat loss on otters at Pulpit Rock to be put into context i.e. in terms of habitats occurring around the north basin of the loch. Additionally the evaluation, would inform the Appropriate Assessment screening process, in relation to the potential effects of both the ground investigation works and the scheme construction.

In view of the extent of the survey area and access difficulties, it was proposed to undertake the otter habitat assessment survey by boat, followed by a targeted, ground-truthing walkover survey.

### 1.4 Survey Objectives

- To undertake a boat based survey as a means of identifying, classifying and recording loch side habitats occurring along the shoreline of Loch Lomond, commencing from Tarbet on the west shore, northwards to Ardlui and down to Rowchoish on the eastern side of the loch. Where possible all islands within the study area will be included within the survey.
- To identify and classify all recorded habitats in terms of their potential use by otters i.e. the provision of holts and other forms of refuge;
- Based upon the shoreline survey data and as a means of evaluating the habitat classifications, implement a targeted walkover survey [looking for field signs] of areas deemed to be of high conservation value to otters.
- Classified according to habitat type;
- Areas of high value otter habitat have been identified and quantified<sup>2</sup>;
- Assessment of the potential effects of the GI works and the scheme on the integrity of SAC, in particular the effects on otters as a key qualifying feature; and
- Information to inform the screening of the Appropriate Assessment for the GI works and the scheme.

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<sup>2</sup> Important otter habitat may include breeding sites with natal holts or areas associated with a high number of transitional holts or other forms of refuges

## 2 Methods

### 2.1 Desk study

The local biological records centre was consulted regarding existing records relating to otter within the Loch Lomond area and immediate catchment.

A search was made of the National Biodiversity Network (NBN) for all otter records within the Loch Lomond area and immediate catchment.

Scottish Natural Heritage was consulted and otter records relating to the study area were obtained from the National survey of otter distribution in Scotland 2003-04 (Strachan, 2007).

Reference was made to the research paper Ecology and Conservation of Otters in Loch Lomond and the Trossachs National Park (McCafferty, 2005).

### 2.2 Boat Survey

The field surveys consisted of two stages, stage one involved a boat based survey undertaken on 15th & 16th December 2009. The boat survey was undertaken by two Scott Wilson ecologists (J. Sneddon and G. Hull), during which the Phase 1 habitat methodology - Joint Nature Conservation Committee (JNCC), 2003 was employed as a means of recording habitat data occurring on the foreshore and adjoining areas.

Initially field data was outlined on 1:10, 000 scale field maps then transferred to a Geographic Information system utilising 1: 10,000 scale map tiles.

The following Phase 1 Habitat classifications were further defined to incorporate the following descriptions:

- Scree included medium to large size boulders occurring along the loch foreshore, hard engineering in the form of rock armour [west shore] adjacent to the A82 trunk road was included within this category;
- Inland cliff included all naturally occurring rock surfaces; and
- Phase 1 Habitat classifications were combined in situations where otter holts and other field signs were recorded in locations where two or more habitats occurred in close proximity.

Additionally, habitat features collated as part of the National survey of otter *Lutra lutra* distribution in Scotland 2003-04, were also recorded.

To facilitate the habitat recording process the boat passed [at low speed] within close proximity to the shoreline, photographs were also taken as a means of recording general habitat features.

As part of the boat survey and where safe to do so, a number of targeted landings were made particularly on islands as a means of further assessing potential otter terrestrial habitat.

## 2.3 Walkover Survey

Stage two of the assessment involved a targeted walk over survey of the eastern shoreline based upon an area of 2 kilometres north and south of the settlement of Inversnaid. Holts and other forms of refuges, spraint sites and other field signs were recorded. Walk over surveys were carried out in accordance with recommendations set out in the following publications, Monitoring the Otter - Conserving Natura 2000 Rivers, Monitoring Series No.10 (EN, CCW, EA, SEPA, SNH & Sniffer, 2003) and (Strachan, 2007) National survey of otter (*Lutra lutra*) distribution in Scotland 2003-04. Scottish Natural Heritage Commissioned Report No.211 (ROAME No. F03AC309).

## 2.4 Survey Terminology

**Otter Holt** – for the purpose of this report the term holt relates to an enclosed chamber or chambers used by otters as a refuge, which were located within embankments, under boulders, tree roots or a combination.

**Laying up area** – relates to a partially enclosed site used by otters as a transitory / short term refuge, such sites were commonly associated with rocky shorelines.

**Spraint sites** – spraint [otter droppings] sites occurred as two distinct features, firstly all confirmed holts and laying up areas had spraints present, a number of locations contained multiple spraints ranging in age from old to very recent, indicating that such sites are frequently used.

Stand alone spraint sites were recorded in a number of shoreline locations; again a number of sites contained multiple spraints of varying age. Such sites are often associated with the conservation of resources; sprainting is used as a means of preventing competition from other otters and relate to feeding areas rather than territory<sup>3</sup>.

## 2.5 Survey limitations

Due to the extent of the Loch Lomond foreshore, only selected accessible areas were included within the walk over surveys.

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<sup>3</sup> Kruuk, H. (2006) Otters ecology, behaviour and conservation. Oxford University Press. Oxford.

## 3 Results

### 3.1 Desk study

Information obtained from the desk top study revealed a number of existing records relating to previous otter activity around Loch Lomond and the adjacent catchment area, within the last five years, none of the records related to or were adjacent to the study site.

### 3.2 Boat Survey

Results pertaining to the Phase 1 Habitat survey are shown in Figures 1 to 6 and Table 8.

One confirmed otter holt (a number of spraints were observed in side the chamber) was recorded during a targeted walk over survey on the eastern foreshore.

### 3.3 Walkover Survey

**Holts** – A total of nine confirmed holts were recorded during the survey (ten including the holt recorded during the boat survey), all holts had otters spraints present within the entrance area or chamber of the holt. A further two potential holts were also recorded.

**Laying up areas** – a total of five laying up areas were also recorded during the survey all had otter spraints present, one other potential site was also recorded.

**Spraint sites** – six separate spraint sites in addition to those recorded within the holts / laying up areas were recorded, three sites contained multiply deposits.

Table 1 details additional information relating to the East Shore walk over survey findings, whilst holt locations etc. are shown on the Phase 1 habitat maps (Figures 1 to 6).

**Table [1] East Shore Recorded Otter Refuges & Spraint Sites**

Ref. No	Type	Notes	Survey Map ref	Grid ref
SS01	Spraint Site	Fresh spraint located on the saddle of a tree immediately adjacent to a burn	19	NN333 106
PH01	Potential Holt	Located within an undercut embankment, some indistinguishable tracks present, located approx 50m from a spraint	19	NN 33340 10635
LA01	Laying Up Area	Semi open chamber amongst shoreline boulders, two old spraints present	19	NN 33289 10549
H01	Holt	Set within an area of historical rock fall [Rob Roy's Cave area] consisting of a large chamber with both a landward and loch side entrances. Multiple spraints some fresh / recent within the chamber	19	NN 33173 10010
H02	Holt	Located on the edge of the loch under a large boulder, two number very fresh spraints, splashes were evident on nearby rocks caused by an otter emerging from the water	20	NN 334 094
LA02	Laying Up Area	Located amongst an area of boulders partially	20	NN 335 094

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Ref. No	Type	Notes	Survey Map ref	Grid ref
		covered by a large rock, three spraints present one recent & two old		
SS02	Spraint Site	Fresh single spraint located on a large rock on the foreshore	20	NN 335 094
SS03	Spraint Site	Two number old spraints located on a loch side rock	20	NN 336 091
SS04	Spraint Site	Four number spraints including one recent located on a loch side rock	21	NN 336 091
LA03	Laying Up Area	Located in amongst boulders and tree roots, one old spraint recorded 3m from site and a recent spraint 10m	21	NN 33719 08491
LA04	Laying Up Area	Located amongst boulders, two number recent spraints present	21	NN 33719 08491
H03	Holt	Located within an undercut embankment [1.5m in depth], two recent spraints present within the chamber	21	NN 33736 08447
LA05	Laying Up Area	Located immediately above H03, two recent spraints present	21	NN 33736 08447
SS05	Spraint Site	Multiple spraint site located on a lock side rock	21	NN 33749 08325
H04	Holt	Small holt within undercut wooded embankment, five number spraints present fresh, recent & old	21	NN 33774 08227
H05	Holt	Located within undercut wooded embankment adjacent to H04, otter guard hairs present	21	NN 33774 08227
H06	Holt	Located approx 3m from H05 under a large rock within the embankment, recent spraint present on a stone at the beginning of the chamber	21	NN 33774 08227
PH02	Potential Holt	Located under tree roots / embankment no spraints were recorded although clay had been carried via animals feet, a bowl has been formed inside the chamber were animals have settled	22	NN 33904 07692
H07	Holt	Located under tree roots / embankment / boulders, approx 15 – 20m from PH02, a recent spraint was recorded on a stone within the chamber	22	NN 33884 07685
H08	Holt	Located within a embankment & under a large boulder 2.-3m fro the shore. Three entrances present. One fresh spraint present, located on a stone under the boulder, another fresh spraint located approx 20m from the holt	22	NN 33921 07451
SS06	Spraint Site	Single fresh spraint located on rocky headland near the loch shoreline	22	NN339 074
PLA01	Potential Laying Up Area	Located within the root system of an oak tree, no spraints present although large muddy foot prints present, possible otter could not distinguish	22	NN 339 074
H09	Holt	Located within a wooded embankment / large boulders two old spraints present on a stone within the chamber	22	NN 33979 07387
H10	Holt	Located within a natural rock cavity above the loch in a wooded habitat. Three number spraints present at the entrance one recent, two old	23	NN 34058 06680

Table [2] details the Phase 1 Habitat classifications in which the holts, laying up areas and spraint sites were recorded within the East Shore study area.

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**Table [2] East Shore Recorded Otter Refuges & Spraint Sites by Phase 1 Habitat Classification**

Ref. No	Type	Phase 1 Habitat Classification	Habitat Code	Survey Map ref	Grid ref
SS01	Spraint Site	Semi Natural Broadleaved Woodland	A1.1.1	19	NN333 106
PH01	Potential Holt	Semi Natural Broadleaved Woodland	A1.1.1	19	NN 33340 10635
LA01	Laying Up Area	Scree	I1.2.1	19	NN 33289 10549
H01	Holt	Inland Cliff	I1.1.1	19	NN 33173 10010
H02	Holt	Inland Cliff	I1.1.1	20	NN 334 094
LA02	Laying Up Area	Scree	I1.2.1	20	NN 335 094
SS02	Spraint Site	Scree	I1.2.1	20	NN 335 094
SS03	Spraint Site	Scree	I1.2.1	20	NN 336 091
SS04	Spraint Site	Scree	I1.2.1	21	NN 336 091
LA03	Laying Up Area	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	21	NN 33719 08491
LA04	Laying Up Area	Scree	I1.2.1	21	NN 33719 08491
H03	Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	21	NN 33736 08447
LA05	Laying Up Area	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	21	NN 33736 08447
SS05	Spraint Site	Inland Cliff	I1.1.1	21	NN 33749 08325
H04	Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	21	NN 33774 08227
H05	Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	21	NN 33774 08227
H06	Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	21	NN 33774 08227
PH02	Potential Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	22	NN 33904 07692
H07	Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	22	NN 33884 07685
H08	Holt	Scree	I1.2.1	22	NN 33921 07451
SS06	Spraint Site	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	22	NN339 074
PLA01	Potential Laying Up Area	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	22	NN 339 074
H09	Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	22	NN 33979 07387
H10	Holt	Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	23	NN 34058 06680

A compilation of the east shore survey findings are summarised in Table [3] below.

**Table [3] Recorded Otter Refuges & Spraint Sites by Phase 1 Habitat Classification [Summary]**

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Observation & Phase 1 Habitat Classification	Habitat Code	Number Recorded	% Recorded
<b>Holts [including potential Holts]</b>			
Semi Natural Broadleaved Woodland	A1.1.1	1	8
Inland Cliff	I1.1.1	2	18
Scree	I1.2.1	1	8
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	1	8
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	7	58
	<b>Total</b>	<b>12</b>	<b>100</b>
<b>Laying up Areas [including potential Laying up Areas]</b>			
Semi Natural Broadleaved Woodland	A1.1.1	0	0
Inland Cliff	I1.1.1	0	0
Scree	I1.2.1	3	50
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	0	0
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	3	50
	<b>Total</b>	<b>6</b>	<b>100</b>
<b>Spraint Sites</b>			
Semi Natural Broadleaved Woodland	A1.1.1	1	17
Inland Cliff	I1.1.1	0	0
Scree	I1.2.1	3	50
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	1	17
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	1	16
	<b>Total</b>	<b>6</b>	<b>100</b>

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Table [4] shows all recorded otter refuges & spraint sites and the associated Phase 1 Habitat survey classification, occurring within the proposed scheme foot print at Pulpit Rock

**Table [4] A82 Pulpit Rock: Recorded Otter Refuges & Spraint Sites by Phase 1 Habitat Classification**

Ref. No	Type	Phase 1 Habitat Classification	Habitat Code	Survey Map ref	Grid ref
SS01A	Spraint Site	Semi Natural Broadleaved Woodland	A1.1.1	10	NN 32895 13315
R02A	Potential Laying Up Area	Semi Natural Broadleaved Woodland	A1.1.1	10	NN 32885 13324
SS02A	Spraint Site	Bare Ground [Gravel] / Semi Natural Broadleaved Woodland	J4 / A1.1.1	10	NN 32880 13332
R03A	Holt	Semi Natural Broadleaved Woodland	A1.1.1	10	NN 32870 13351
SS03A	Spraint Site	Scree	I1.1.1	10	NN 32862 13379
SS04A	Spraint Site	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	10	NN 32831 13431
R04A	Holt	Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	10	NN 32811 13460
R05A	Potential Laying Up Area	Scree	I1.2.1	10	NN 32775 13498
R06A	Potential Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	10	NN 32736 13532
R07A	Potential Holt	Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	10	NN 32720 13551
R08A	Holt	Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	10	NN 32715 13558
R09A	Holt	Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	10	NN 32704 13577
R10A	Holt	Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	10	NN 32701 13598
R11A	Holt	Semi Natural Broadleaved Woodland	A1.1.1	10	NN 32694 13657
R12A	Potential Laying Up Area	Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	10	NN 32688 13678
SS06A	Spraint Site	Scree	I1.2.1	10	NN 32652 13708
R13A	Potential Laying Up Area	Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	10	NN 32607 13700
SS07A	Spraint Site	Scree	I1.2.1	10	NN 32582 13709

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A compilation of the Pulpit Rock survey findings are summarised in Table [5] below.

**Table [5] A82 Pulpit Rock: Recorded Otter Refuges & Spraint Sites by Phase 1 Habitat Classification [Summary]**

Observation & Phase 1 Habitat Classification	Habitat Code	Number Recorded	% Recorded
<b>Holts [including potential Holts]</b>			
Semi Natural Broadleaved Woodland	A1.1.1	2	25
Inland Cliff	I1.1.1	0	0
Scree	I1.2.1	0	0
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	4	50
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	2	25
	<b>Total</b>	<b>8</b>	<b>100</b>
<b>Laying up Areas [including potential Laying up Areas]</b>			
Semi Natural Broadleaved Woodland	A1.1.1	2	50
Inland Cliff	I1.1.1	0	0
Scree	I1.2.1	1	25
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	1	25
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	0	0
	<b>Total</b>	<b>4</b>	<b>100</b>
<b>Spraint Sites</b>			
Semi Natural Broadleaved Woodland	A1.1.1	1	17
Inland Cliff	I1.1.1	0	0
Scree	I1.2.1	3	50
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	0	0
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	1	17
Bare Ground [Gravel] / Semi Natural Broadleaved Woodland	J4 / A1.1.1	1	16
	<b>Total</b>	<b>6</b>	<b>100</b>

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For the purpose of assessing and comparing habitat [Phase 1 Habitat Classifications] usage by otters within the two study sites, the two sets of survey data as outlined in Table [6] have been combined.

**Table [6] Comparison of recorded Otter Refuges & Spraint Sites by Phase 1 Habitat Classification [Summary] @ A82 Pulpit Rock Survey Area [West Shore] & Loch Lomond East Shore Walk Over Survey**

Observation & Phase 1 Habitat Classification	Habitat Code	A82 Pulpit Rock: Number Recorded	East Shore: Number Recorded
<b>Holts [including potential Holts]</b>			
Semi Natural Broadleaved Woodland	A1.1.1	2	1
Inland Cliff	I1.1.1	0	2
Scree	I1.2.1	0	1
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	4	1
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	2	7
	<b>Total</b>	<b>8</b>	<b>12</b>
<b>Laying up Areas [including potential Laying up Areas]</b>			
Semi Natural Broadleaved Woodland	A1.1.1	2	0
Inland Cliff	I1.1.1	0	0
Scree	I1.2.1	1	3
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	1	0
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	0	3
	<b>Total</b>	<b>4</b>	<b>6</b>
<b>Spraint Sites</b>			
Semi Natural Broadleaved Woodland	A1.1.1	1	1
Inland Cliff	I1.1.1	0	0
Scree	I1.2.1	3	3
Inland Cliff / Semi Natural Broadleaved Woodland	I1.1.1 / A1.1.1	0	1
Scree / Semi Natural Broadleaved Woodland	I1.2.1 / A1.1.1	1	1
Bare Ground [Gravel] / Semi Natural Broadleaved Woodland	J4 / A1.1.1	1	0
	<b>Total</b>	<b>6</b>	<b>6</b>

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For the purpose of assessing and comparing habitat [National Otter Survey Habitat Classifications] usage by otters within the two study sites, the two sets of survey data as outlined in Table [7] have been combined.

**Table [7] Comparison of recorded Otter Refuges & Spraint Sites by Phase 1 Habitat Classification [Summary] @ A82 Pulpit Rock Survey Area [West Shore] & Loch Lomond East Shore Walk Over Survey**

Map Reference	National Otter Survey Habitat Classifications	Recorded Holts	Recorded Laying up areas	Recorded Spraints
<b>10</b>	<b>A82 Pulpit Rock Survey Area</b>	<b>8</b>	<b>4</b>	<b>6</b>
	<b>Shore Type:</b> Bedrock, Boulders & Gravel			
	<b>Bank Profile:</b> Steep [>45 degrees] 55%, Gentle 45			
	<b>Land use within 50m of Bank Top</b>			
	Broad Leaf Woodland			
	<b>Extent:</b> Continuous			
<b>19</b>	<b>East Shore Walk Over Survey</b>	<b>2</b>	<b>1</b>	<b>1</b>
	<b>Shore Type:</b> Bedrock, Boulders & Gravel			
	<b>Bank Profile:</b> Steep [>45 degrees] 60%, Gentle 40			
	<b>Land use within 50m of Bank Top</b>			
	Broad Leaf Woodland, Rough Grassland & Scree			
	<b>Extent:</b> Continuous			
<b>20</b>	<b>East Shore Walk Over Survey</b>	<b>1</b>	<b>0</b>	<b>2</b>
	<b>Shore Type:</b> Bedrock, Boulders & Gravel			
	<b>Bank Profile:</b> Steep [>45 degrees] 80%, Gentle 20			
	<b>Land use within 50m of Bank Top</b>			
	Broad Leaf Woodland, Rough Grassland & Scree			
	<b>Extent:</b> Continuous			
<b>21</b>	<b>East Shore Walk Over Survey</b>	<b>4</b>	<b>3</b>	<b>2</b>
	<b>Shore Type:</b> Bedrock, Boulders & Earth / Clay			
	<b>Bank Profile:</b> Steep [>45 degrees] 90%, Gentle 10			
	<b>Land use within 50m of Bank Top</b>			
	Broad Leaf Woodland, Rough Grassland			

## A82 Pulpit Rock Road Improvement

Report to inform screening for Appropriate Assessment for Scheme Construction: Otter Habitat Assessment of Upper Loch Lomond

Map Reference	National Otter Survey Habitat Classifications	Recorded Holts	Recorded Laying up areas	Recorded Spraints
	<b>Extent:</b> Continuous & Exposed tree roots			
<b>22</b>	<b>East Shore Walk Over Survey</b>	<b>5</b>	<b>1</b>	<b>1</b>
	<b>Shore Type:</b> Bedrock & Boulders			
	<b>Bank Profile:</b> Steep [>45 degrees] 65%, Gentle 35			
	<b>Land use within 50m of Bank Top</b>			
	Broad Leaf Woodland, Rough Grassland & Rock & Scree			
	<b>Extent:</b> Continuous & Exposed tree roots			
<b>23</b>	<b>East Shore Walk Over Survey</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<b>Shore Type:</b> Bedrock, Boulders & Gravel			
	<b>Bank Profile:</b> Steep [>45 degrees] 60%, Gentle 40			
	<b>Land use within 50m of Bank Top</b>			
	Broad Leaf Woodland, Rough Grassland & Rock & Scree			
	<b>Extent:</b> Continuous & Exposed tree roots			

Estimated shore lengths [linear metres] based upon the recorded Phase 1 Habitat Classifications for the entire northern part of the loch, were calculated using the GIS and detailed in Table [8] below.

**A82 Pulpit Rock Road Improvement**

Report to inform screening for Appropriate Assessment for Scheme Construction: Otter Habitat Assessment of Upper Loch Lomond

**Table [8] Recorded Phase 1 Habitat Data [Boat Survey] Loch Lomond Foreshore [North Section]  
Note shore length measurements are an approximate assessment**

Habitat(s)	Total Shore length (m)	%
Woodland (Br-leaved semi-natural)	6582	23.49
Woodland (Br-leaved semi-natural) & Boulders	6481	23.13
Woodland (Br-leaved semi-natural), Boulders & Reinforcement	161	0.57
Woodland (Br-leaved semi-natural) & Cliff	3736	13.34
Woodland (Br-leaved semi-natural) & Gravel	1756	6.27
Woodland (Br-leaved semi-natural) & Reinforcement	814	2.91
Grassland	2522	9.00
Grassland, Boulders	634	2.26
Grassland, Gravel	161	0.57
Grassland, Bracken	196	0.70
Grassland, Bracken & Boulders	113	0.40
Grassland, Bracken & Cliff	23	0.08
Grassland, Bracken & Gravel	412	1.47
Swamp	921	3.29
Boulders & Cliff	72	0.26
Boulders & Reinforcement	167	0.60
Cliff	680	2.43
Gravel	345	1.23
Gravel & Reinforcement	73	0.26
Reinforcement	1213	4.33
Amenity etc	953	3.40
Approximate total shore length in linear metres	28015	100.00

**A82 Pulpit Rock Road Improvement**

Report to inform screening for Appropriate Assessment for Scheme Construction: Otter Habitat Assessment of Upper Loch Lomond

**Table [9] Recorded Phase 1 Habitat Data [Boat Survey] Loch Lomond: A82 West Foreshore [North Section] Note shore length measurements are an approximate assessment**

Habitat(s)	Total Shore length (m)	%
Woodland (Br-leaved semi-natural)	3542	23.74
Woodland (Br-leaved semi-natural) & Boulders	1407	9.43
Woodland (Br-leaved semi-natural), Boulders & Reinforcement	161	1.08
Woodland (Br-leaved semi-natural) & Cliff	1919	12.86
Woodland (Br-leaved semi-natural) & Gravel	1481	9.92
Woodland (Br-leaved semi-natural) & Reinforcement	814	5.45
Grassland	2216	14.85
Swamp	25	0.17
Amenity etc	953	6.39
Boulders & Cliff	72	0.48
Boulders & Reinforcement	167	1.12
Cliff	680	4.56
Gravel	200	1.34
Gravel & Reinforcement	73	0.49
Reinforcement	1213	8.13
Approximate total shore length in linear metres	14923	100.00

**Plate [A] Example of Otter laying up area**



**Plate [B] Example of an otter Holt within an undercut embankment, trees roots and scree**



**Plate [C] Example of a stand alone otter sprainting site**



**Plate [D] Example of an otter holt located amongst large boulders**



**Plate [E] Example of Primary Otter Habitat in terms of Holt / laying up areas locations**



## 4 Discussion

By recording the habitats present within the loch foreshore area [Phase 1 Habitat survey] in combination with the locations of recorded otter refuges [holts and laying up areas] as well as sprainting sites, it is possible to assess which habitat types are being used most frequently by otters .

The habitat data summary relating to the Eastern Shore walk over survey as detailed in Table [3] above, shows that the highest number of holts [58%] were recorded within a combination of scree [loch side boulders] and semi natural broadleaf woodland habitat types. Whilst 50% of the laying up sites were recorded within the same type of habitat combination, an equal number were also recorded with more open areas along the rocky shoreline [scree].

Habitat survey data relating the A82 trunk road survey site at Pulpit Rock, as detailed in Table [5] above, revealed that 50% of the holts and 25% of the laying up areas were recorded in inland cliff [natural rock formations] and semi natural broadleaf woodland habitat types. Additionally, 25% of the other recorded holts were recorded within a combination of scree [loch side boulders] and semi natural broadleaf woodland.

The highest number of laying up areas [50%] within the A82 survey area were recorded within areas of semi natural broadleaf woodland i.e. undercut embankments and tree root systems, 25% were found amongst loch side boulders [scree] and the remaining 25% occurred within a combination inland cliff and semi natural broadleaf woodland.

The selection by otters of more open areas for a significant number of laying up sites is more likely to relate to the transitory and short term nature of their use. Holts tend to be located in more secure locations with greater levels of cover, which maybe indicative of more frequent / prolonged usage. Natal holts [breeding sites] are normally located in only the most secure of areas, with a low risk of flooding and often located some distance from major water bodies and devoid of spraints. Thus avoiding the attention of none related adult male otters and the likelihood of cannibalism of the cubs occurring (Kruuk, 2006)<sup>4</sup>.

An analysis of the results from both the Pulpit Rock and East Shore surveys, revealed a number of important traits associated with otter activity occurring within both survey areas and relate too:

- Usage - Although the study areas were of a limited extent, the survey findings suggest a high level of specific habitat usage by otters in terms of refuge locations; additionally the age range of spraints observed at a number of sites [old, recent and fresh] indicates that usage is not infrequent; and
- Results indicate that there is a positive relationship between the presence of natural rock faces, boulders and broadleaf woodland habitat types and the number of holts and laying up areas present.

The habitat relationship is further reinforced when the locations of recorded otter refuges for both the west and east shore survey areas are compared.

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<sup>4</sup> Kruuk, H. (2006) Otters ecology, behaviour and conservation. Oxford University Press. Oxford.

## 4.1 Assessment of impacts on otter

### Otter habitat

As a means of quantifying the habitat types which occur around the loch in terms of linear metres of shoreline, the recorded Phase 1 Habitat Classifications for the entire northern part of the loch were calculated from map survey data using GIS computer software, refer to Tables [8 & 9] above.

One of the main outputs of the assessment, as highlighted within the introduction chapter of this report was to be able to indentify and quantify high value otter habitat, as a means of assessing the impacts associated with the proposed scheme. As stated in section 6.1.6 there is a positive association between habitat type and the presence of otter refuge sites, with the presence of natural rock faces, boulders and broadleaf woodland habitat types, showing the most significant correlation.

Results from the GIS calculations indicate that the combined total [linear metres] of foreshore where natural rock faces, boulders and broadleaf woodland habitats occur is approximately 12,111 lm or 43.23% of the recorded habitats which occur along both the foreshores within the study area.

Habitats lost to the scheme at Pulpit Rock, fall within the same categories as the above and equate to approximately 200 m of shoreline, when compared to the total for those habitat types within the combined foreshores, the habitats lost to the scheme equal approximately 4.95%.

### Otter population & distribution

Due to the number otter refuges present within the foot print of the proposed scheme at Pulpit Rock, the loss of such habitat and refuges can be regarded as being locally significant to otters whose territory occurs within that area. Although analysis of the GIS data reveals that the extent of the habitats contributes to less than 5% of the total extent occurring on both shorelines.

Such an estimate of habitat lost may in the first instance appear low; however, one important question that this study cannot answer is, do otters which frequent Pulpit Rock also occur on the east shore and in particular within the SAC boundaries? As this scenario will remain unanswered, we should also consider to what extent such important habitats occur only on the western shore adjacent to the A82 trunk road.

A re-examination of the GIS data showed that the lost habitats at Pulpit Rock contribute in the region of 12% of the total distribution on the western shoreline. However, as part of the impact assessment and in addition to habitat availability, there is also a requirement to consider the increased levels of disturbance [human & traffic] to otters frequenting the west shore, compared to the east shoreline as a consequence of the close proximity of the A82 and the proliferation of both formal and informal parking areas.

High levels of disturbance may preclude / influence otters in their choice or the availability of suitable habitat for both refuge and foraging sites.

## Constraints to otter movements

Although otters in fresh water systems are known to inhabit extensive linear territories, so in theory it is possible that a number of otters may frequent both the east and west shore. The expanse of deep water separating the shorelines may present not on a physical barrier but a biological one too, which may interact to influence otter distribution within the loch and catchment areas.

So unless resident otters utilise areas along the northern most extremities of the loch, it is unlikely that otter territories extend to include both shorelines, as a consequence of deep open water and low water temperatures, particularly during mid to late winter and early spring, when water temperatures are at their lowest.

Therefore, thermo-insulation constraints related to the otter's ability to maintain body temperature whilst swimming and foraging will influence their behaviour, choice of habitat and ultimately their distribution (Kruuk, Taylor & Mom, 1997)<sup>5</sup>.

Whilst it is not possible to completely rule out individual otters frequenting both shorelines by means of swimming across the loch, constraints imposed by thermo-insulation would make it unlikely.

Therefore the predicted impacts upon otter populations within the Loch Lomond Woods SAC can be considered to be negligible, whilst impacts to otters at Pulpit rock without mitigation is considered severe.

---

<sup>5</sup> Kruuk, H. Taylor, PT & Mom, G (1997). Body temperature and foraging behaviour of the Eurasian otter (*Lutra lutra*) in relation to water temperature. *Journal of Zoology*. London. 241, 689-697.

## 5 References

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Websites:

Scottish Natural Heritage – SiteLink

[http://gateway.snh.gov.uk/portal/page?\\_pageid=53,854538&\\_dad=portal&\\_schema=portal](http://gateway.snh.gov.uk/portal/page?_pageid=53,854538&_dad=portal&_schema=portal)

## **6 Appendix**

### **Figures 1 to 6– Phase 1 Habitat Maps & Recorded Otter Refuges and Spraint Sites**

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**Otter Evidence (from separate local surveys)**

- Holt + Spraint site
- Holt
- Lie-up + Spraint site
- Lie-up
- Spraint site

**Phase1**

- Broad-ldvd semi-nat wood
- Semi-improved grass
- Grass + bracken
- Dense bracken
- Swamp
- Gravel
- Inland acidic cliff

**Phase1 linear**

- Boulders
- Boulders
- Gravel
- Inland acidic cliff
- Reinforcement (cemented)

**Phase1 points**

- Scattered scrub
- Scattered broadleaves

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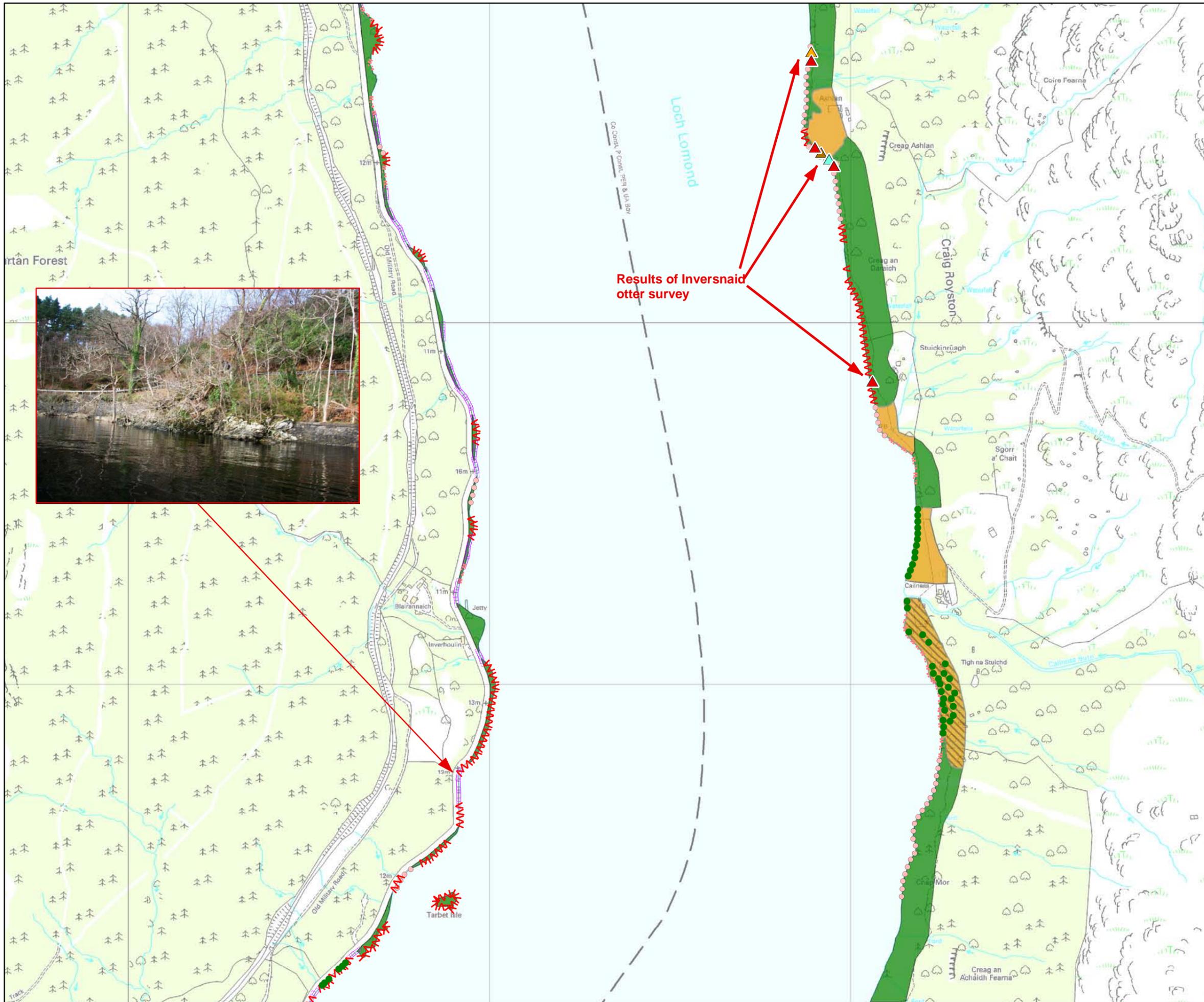
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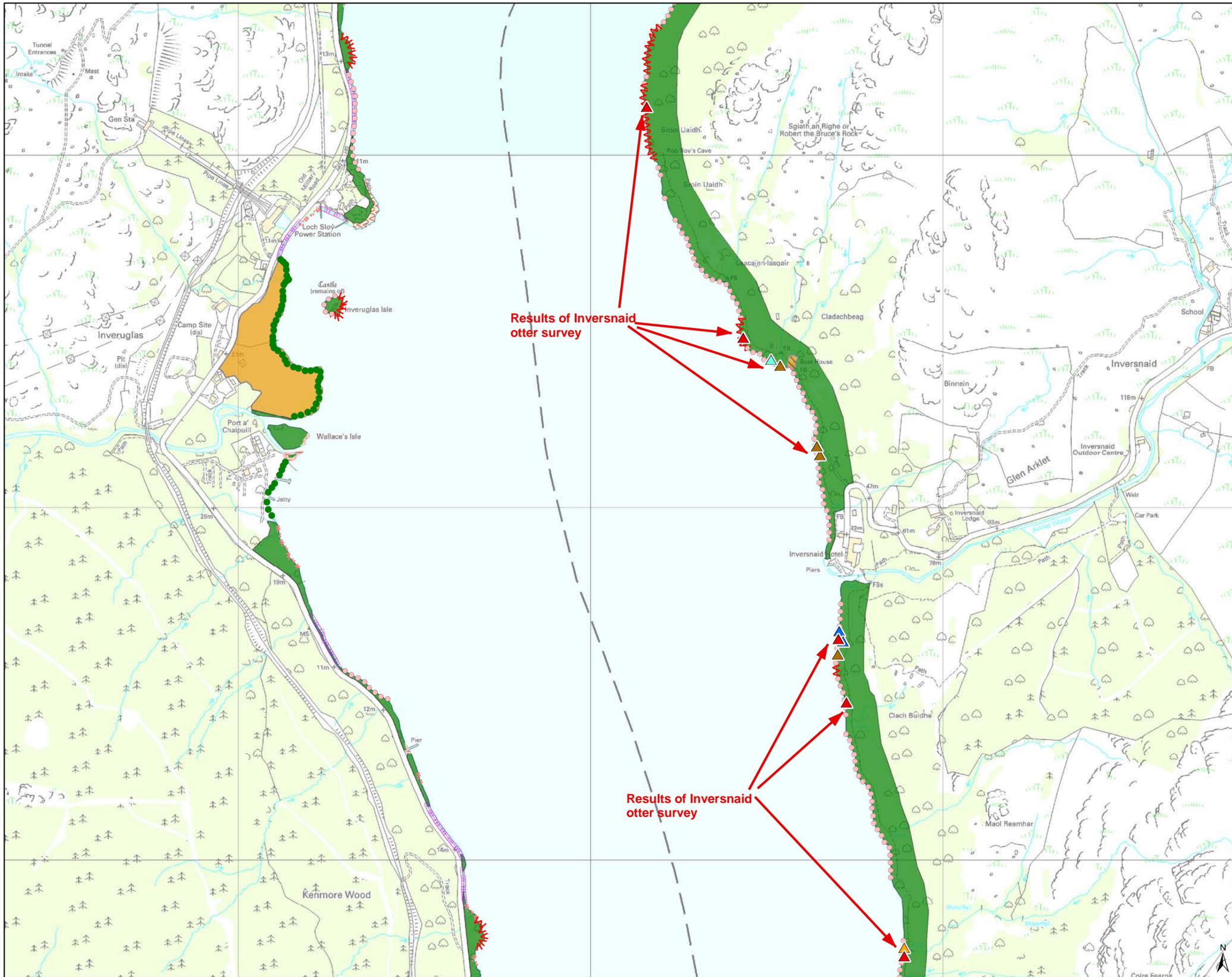


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Results of Inversnaid otter survey





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**Otter Evidence (from separate local surveys)**

- ▲ Holt + Spraint site
- ▲ Holt
- ▲ Lie-up + Spraint site
- ▲ Lie-up
- ▲ Spraint site

**Phase1**

- Broad-ldd semi-nat wood
- Semi-improved grass
- Grass + bracken
- Dense bracken
- Swamp
- Gravel
- Inland acidic cliff

**Phase1 linear**

- Boulders
- Boulders
- Gravel
- www Inland acidic cliff
- Reinforcement (cemented)

**Phase1 points**

- X Scattered scrub
- Scattered broadleaves

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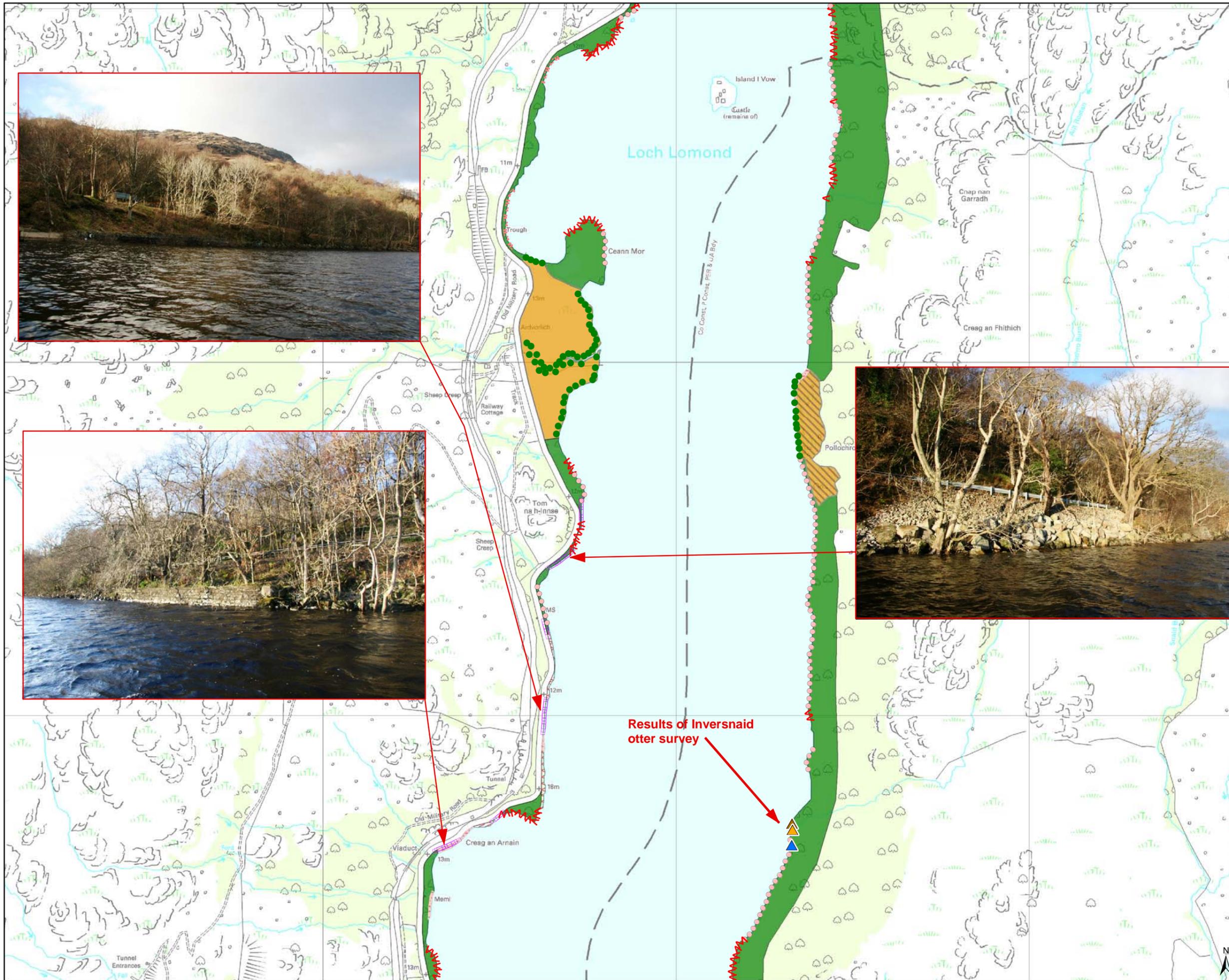
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**Otter Evidence (from separate local surveys)**

- ▲ Holt + Spraint site
- ▲ Holt
- ▲ Lie-up + Spraint site
- ▲ Lie-up
- ▲ Spraint site

- Phase1**
- Broad-ldvd semi-nat wood
  - Semi-improved grass
  - Grass + bracken
  - Dense bracken
  - Swamp
  - Gravel
  - Inland acidic cliff

- Phase1 linear**
- Boulders
  - Boulders
  - Gravel
  - WWW Inland acidic cliff
  - Reinforcement (cemented)

- Phase1 points**
- × Scattered scrub
  - Scattered broadleaves

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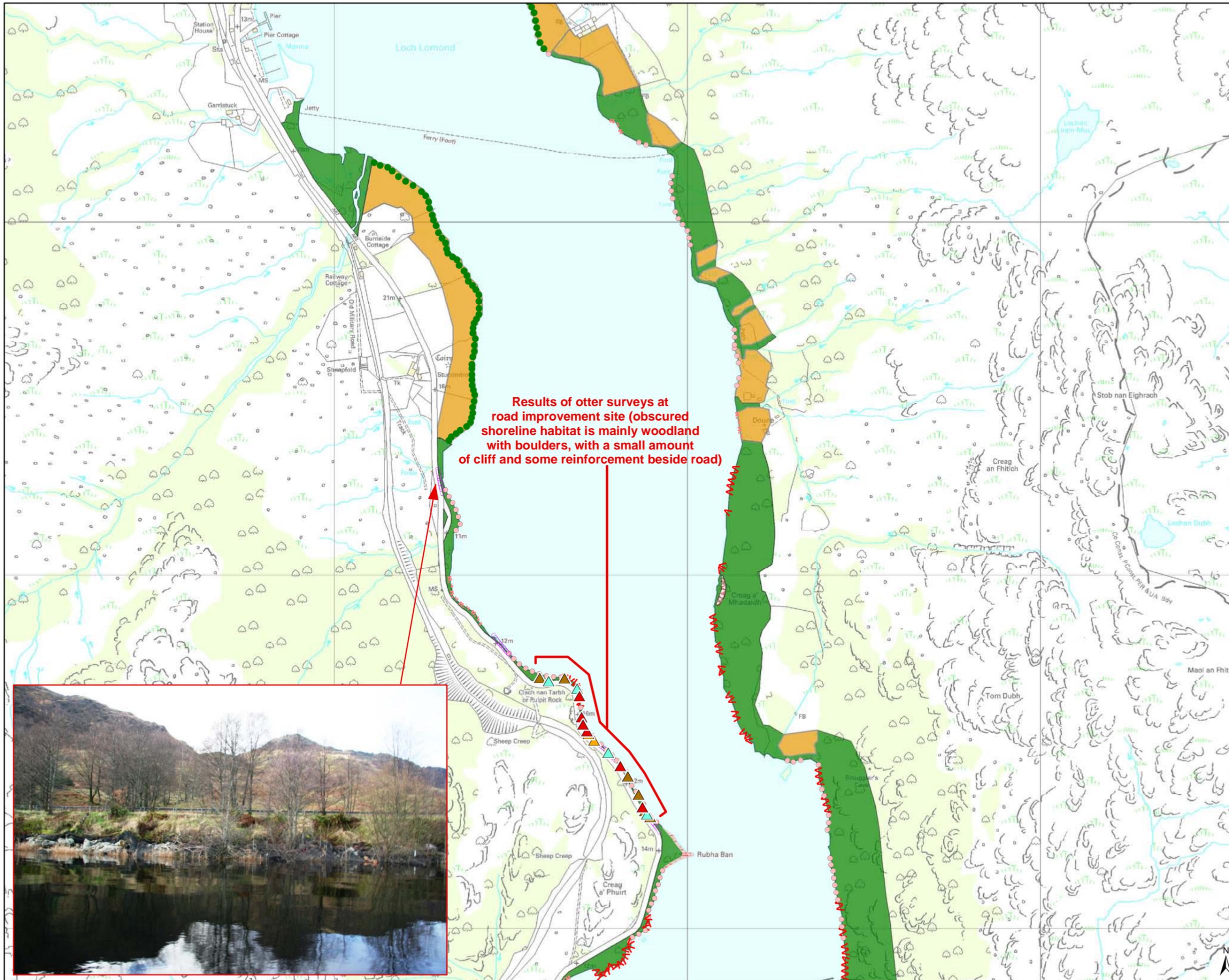
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**Results of otter surveys at road improvement site (obscured shoreline habitat is mainly woodland with boulders, with a small amount of cliff and some reinforcement beside road)**

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**Otter Evidence (from separate local surveys)**

- ▲ Holt + Spraint site
- ▲ Holt
- ▲ Lie-up + Spraint site
- ▲ Lie-up
- ▲ Spraint site

- Phase1**
- Broad-ldvd semi-nat wood
  - Semi-improved grass
  - Grass + bracken
  - Dense bracken
  - Swamp
  - Gravel
  - Inland acidic cliff
- Phase1 linear**
- Boulders
  - Boulders
  - Gravel
  - Inland acidic cliff
  - Reinforcement (cemented)
- Phase1 points**
- × Scattered scrub
  - Scattered broadleaves

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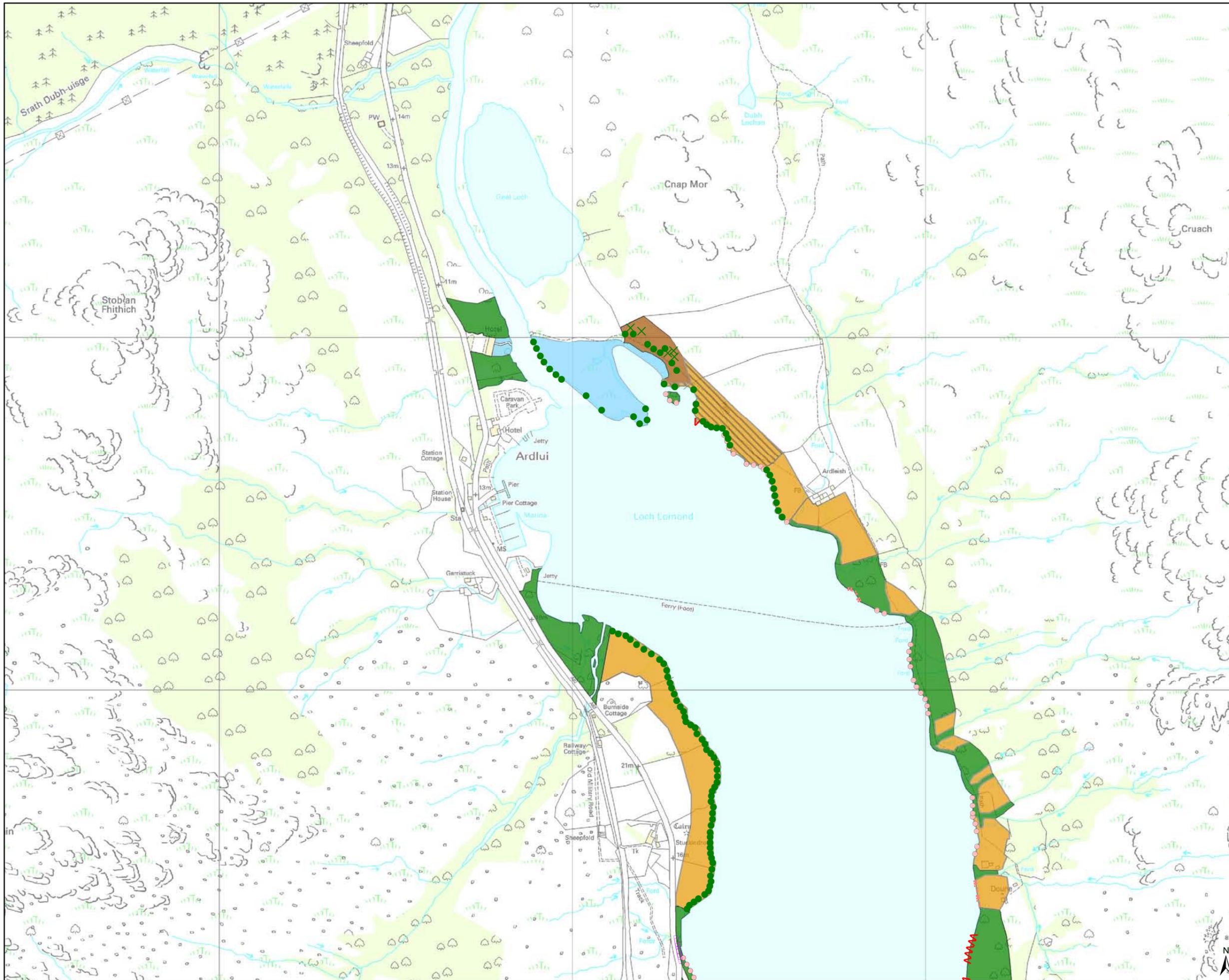
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**Otter Evidence (from separate local surveys)**

- ▲ Holt + Spraint site
- ▲ Holt
- ▲ Lie-up + Spraint site
- ▲ Lie-up
- ▲ Spraint site

**Phase1**

- Broad-ldvd semi-nat wood
- Semi-improved grass
- Grass + bracken
- Dense bracken
- Swamp
- Gravel
- Inland acidic cliff

**Phase1 linear**

- Boulders
- Boulders
- Gravel
- WWW Inland acidic cliff
- Reinforcement (cemented)

**Phase1 points**

- X Scattered scrub
- Scattered broadleaves

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**Otter Evidence (from separate local surveys)**

- ▲ Holt + Spraint site
- ▲ Holt
- ▲ Lie-up + Spraint site
- ▲ Lie-up
- ▲ Spraint site

**Phase1**

- Broad-lvd semi-nat wood
  - Semi-improved grass
  - Grass + bracken
  - Dense bracken
  - Swamp
  - Gravel
  - Inland acidic cliff
- Phase1 linear**
- Boulders
  - Boulders
  - Gravel
  - VVVV Inland acidic cliff
  - Reinforcement (cemented)
- Phase1 points**
- × Scattered scrub
  - Scattered broadleaves

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Drawing Title  
Upper Loch Lomond  
Shoreline Habitat Survey:  
close-up of improvement site  
with results of site otter surveys

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