Appendix 9.2: Sloy Pumped Hydro Storage Scheme: National Vegetation Classification (NVC) Survey Report

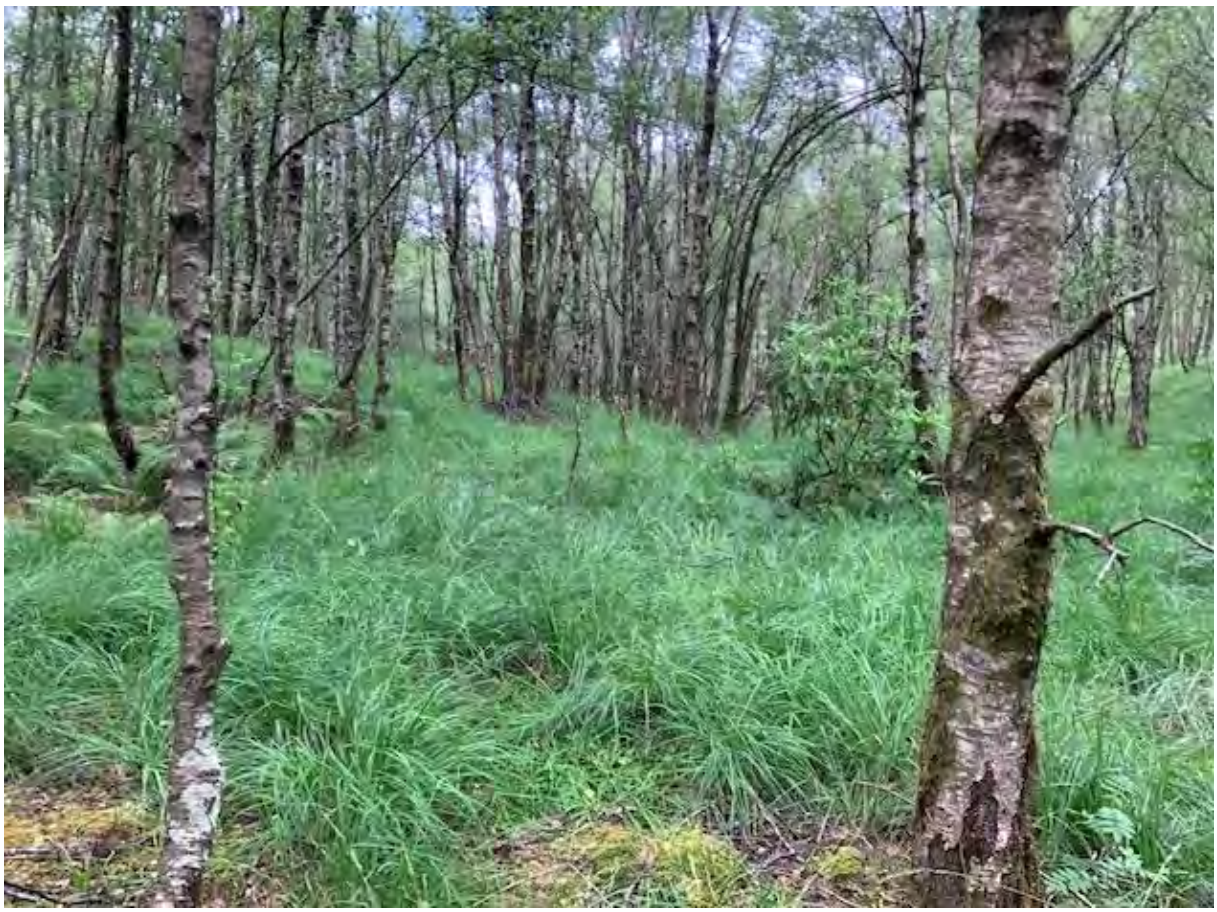
Appendix 9.2

Sloy Pumped Hydro Storage Scheme National Vegetation Classification Survey Report

Document Classification | **Public**

sse Renewables

Sloy Pumped Hydro Storage Scheme
National Vegetation Classification Survey



June 2024

CONTROL SHEET

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EXECUTIVE SUMMARY

EnviroCentre Ltd were commissioned by ASH Design + Assessment to undertake a National Vegetation Classification (NVC) survey of wetland vegetation, noted during a Phase 1 Habitat Survey as having potential to be a Ground Water Dependent Terrestrial Ecosystem (GWDTE). The wetland habitats were evaluated in terms of their GWDTE potential as per SEPA guidance, and for their inclusion as Scottish Biodiversity List Priority Habitats. The survey was extended to capture the range of NVC communities which could be classified within site boundary.

The following NVC communities are present on the site:

- M27 *Filipendula ulmaria – Angelica sylvestris* mire *Juncus effusus – Holcus lanatus* sub-community;
- Degraded W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland;
- W4 *Betula pubescens – Molinia caerulea* woodland; *and*
- W4 *Betula pubescens-Molinia caerulea* woodland: *Sphagnum* spp. sub-community.

The British Geological Society Hydrogeological Map indicates that the solid stratum underlying the site is a low-productivity aquifer. W4 woodland can be highly groundwater dependent, depending on the hydrogeological setting and M27 mire can be moderately groundwater dependent, depending on the hydrogeological setting.

M27 meets the criteria for SBL Priority Habitat: Lowland Fen. Drier examples of W4 *Betula pubescens – Molinia caerulea* woodland meet the criteria for SBL Priority Habitat: Upland Birchwoods, while wetter examples, including the W4c sub-community located on low gradient topography to the north of the site meet the criteria for SBL Priority Habitat: Wet Woodland.

It is considered that the W4 woodland and M27 mire are predominantly fed by surface-flow. Further hydrological investigation would likely confirm this hypothesis.

Based on the habitats categorised, suggested mitigation is detailed in section 4.3 of this report, and includes:

- The project design should assume that the M27 habitats are retained and avoided or protected during construction.
- The project design should further investigate the W4 habitats through hydrological assessment for their groundwater dependency.
- No vehicles or personnel should access retained wetland areas, to avoid poaching and soil compaction.
- Management of watercourses and surface water on site will be required including all spoil storage areas should be situated at least 10m from any watercourse or drainage ditches and outwith retained wetland areas.
- Stockpiled material/soil should be monitored for erosion to prevent pollution of the wetland areas and surrounding freshwater habitats from run-off.
- Emergency spill kits should be available in case of plant leaking oil or fuel to contain contaminants and avoid pollution of wetland areas, drainage ditches, Loch Lomond and other areas of standing water in the locale.
- Any planting or seed sowing to cover the permanent soil stockpiles or reinstatement of ground following temporary works should contain native species appropriate to the local and desired eventual habitats. Temporary and permanent soil bunds should be seeded as soon as possible after creation to reduce risk of weedy species establishing or competing.

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Tables

1 INTRODUCTION

1.1 Terms of Reference

EnviroCentre Ltd were commissioned by ASH Design + Assessment on behalf of Scottish and Southern Energy Renewables (SSER) to undertake a National Vegetation Classification (NVC) survey of woodland and wetland vegetation within the proposed Sloy Pumped Hydro Storage Scheme site, near Inveruglas, Loch Lomond, previously identified[1] as being a potential Ground Water Dependent Terrestrial Ecosystem (GWDTE).

1.2 Scope of Report

The aim of the survey was to classify the wetland vegetation communities present within the habitat identified in the Preliminary Ecological Appraisal[1] (PEA) and evaluate them in terms of their GWDTE potential as per SEPA guidance[2] and Scottish Biodiversity List (SBL) Priority Habitats. Secondary to this was to confirm any further NVC communities which could be determined within the site boundary.

1.3 Site and Project Description

The site is located at Sloy Hydroelectric Power Station (defined as the boundary displayed in Appendix A), centred at National Grid Reference (NGR) NN 32163 09872. The site is situated at the southeast base of Ben Vorlich, covers an area of over 4 hectares (ha), and is located within the Loch Lomond and The Trossachs National Park. The site is on undulating ground, which slopes downwards in the west, towards the shores of Loch Lomond, reaching a maximum elevation of 40 metres (m) above the sea level and a minimum of 6m. The site comprises the power station building with associated amenity grassland, hardstanding vehicle access/parking, a small site compound and woodland. The site also includes the Inveruglas Visitor Centre car park and associated habitats adjacent to Loch Lomond. The wider landscape is dominated by woodland to the north, west and south. Loch Lomond bounds the site to the east and a train line is present to the west of the site. The region comprises extensive woodland leading to mountainous grass and heathland.

Historic imagery of the area suggests that the site was devoid of woodland in the 1950s and that development of the habitats present today are the result of planting and woodland regeneration since this time.

1.4 Report Usage

The information and recommendations contained within this report have been prepared in the specific context stated above and should not be utilised in any other context without prior written permission from EnviroCentre Limited.

If this report is to be submitted for regulatory approval more than 12 months following the report date, it is recommended that it is referred to EnviroCentre Limited for review to ensure that any relevant

[1] EnviroCentre Limited (2022) Report No. 9172 *Sloy Power Station Preliminary Ecological Appraisal*

[2] https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf (Accessed September 2022)

changes in data, best practice, guidance or legislation in the intervening period are integrated into an updated version of the report.

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2 METHOD

2.1 NVC Survey

The NVC survey was conducted in line with the Joint Nature Conservation Committee (JNCC) handbook[3]. The field work was undertaken on the 25th July 2023 by Steven Duncan BSc (Hons) who is an associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM). The weather during the survey was dry and sunny with a light breeze.

The NVC survey aims to classify natural and semi-natural vegetation communities in a standardised fashion based on species composition and frequency. A site walkover was conducted to gain an overview of the vegetation present. Homogenous stands were then identified by eye and mapped by hand onto aerial imagery. Notes on the species composition and frequency, structure, and any apparent management were taken. Representative 2x2m quadrats were surveyed using the Domin Scale[4] within the wetland habitats. This data, alongside the keys and floristic tables presented in Volumes 1 to 5 of the British Plant Communities[5], were used to determine the NVC communities. The communities were identified to the sub-community level where sufficient data was available to do so. The naming convention follows Stace (2019)[6] for vascular plants and Smith (2004) for bryophytes[7].

The DAFOR scale[8] is used in text to describe the relative abundance of vegetive species recorded within each NVC community.

NVC Quadrat locations are displayed in the Quadrat Location Plan in Appendix A.

2.2 GWDTE Determination

GWDTEs are not in themselves necessarily of ecological value or rarity, although some GWDTEs may also comprise Annex I habitat, protected under the EU Habitats directive or UK Priority Habitats. GWDTEs are indicative of groundwater and so are protected under the Water Framework Directive (WFD), which is transposed into Scottish law through the Water Environment and Water Services (Scotland) Act, 2003 (WEWS Act). SEPA planning guidance[9] has been used to determine potential GWDTEs. To help assess ground water dependency, observations of local topography and features such as springs, diffuse ground water emergence and floristic indicators of base enrichment were made.

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[3]Rodwell, J.S. (2006) *National Vegetation Classification: Users' Handbook*. JNCC Peterborough.

[4] Cover of 91-100% - Domin 10; Cover of 76-90% - Domin 9; Cover of 51-75% - Domin 8; Cover of 34-50% - Domin 7: Cover of 26-33% is - Domin 6; Cover of 11-25% - Domin 5; Cover of 4-10% - Domin 4; Cover of <4% with many individuals is Domin; Cover of <4% with several individuals is Domin 2; and Cover of <4% with few individuals is Domin 1

[5]Rodwell, J.S. (1991) *British Plant Communities, Volume 1: Woodlands and Scrub*. Cambridge University Press, Cambridge.
Rodwell, J.S. (1991) *British Plant Communities, Volume 2: Mires and Heaths*. Cambridge University Press, Cambridge.
Rodwell, J.S. (1992) *British Plant Communities, Volume 3: Grasslands and Montane Communities*. Cambridge University Press, Cambridge.
Rodwell, J.S. (1995) *British Plant Communities, Volume 4: Aquatic Communities, Swamps and Tall-herb Fens*. Cambridge University Press, Cambridge.
Rodwell, J.S. (2000) *British Plant Communities, Volume 5: Maritime Communities and Vegetation of Open Habitats*. Cambridge University Press, Cambridge.

[6] Stace, C.A. (2019) New Flora of the British Isles. 4nd edition. C&M Floristics.

[7] Smith, A.J.E. (2004) The Moss Flora of Britain and Ireland. 2nd edition. Cambridge University Press.

[8] D - Dominant 50-100%, A - Abundant 30-50%, F - Frequent 15-30%, O - Occasional 5-15%, and R - Rare < 5%

[9] Scottish Environment Protection Agency (SEPA) Land Use Planning System Guidance Note 31: Guidance on Assessing the Impacts of Development on Ground Water Abstractions and Ground Water Dependent Terrestrial Ecosystems Accessed online at: https://www.sepa.org.uk/media/144266/lups-gu31-guidance-on-assessing-the-impacts-of-development-proposals-on-groundwater-abstractions-and-groundwater-dependent-terrestrial-ecosystems.pdf [Accessed August 2022]

2.3 Survey Constraints

The survey was conducted within the main growth season. However, the peak times for growth and flowering vary between species, so it is possible that some species were missed as their vegetative and/or flowering parts were not visible at the time of survey. It is considered unlikely that this would alter the NVC communities assigned or the evaluation of GWDTEs.

3 RESULTS

The following section should be read in conjunction with Appendix A: Quadrat Location Plan, Appendix B: NVC Survey Plan, Appendix C: GWDTE Plan, and Appendix D: Quadrat data.

3.1 NVC Communities

The following NVC communities were identified on the site:

- M27 *Filipendula ulmaria – Angelica sylvestris* mire *Juncus effusus – Holcus lanatus* sub-community;
- Degraded W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland;
- W4 *Betula pubescens – Molinia caerulea* woodland; *and*
- W4 *Betula pubescens-Molinia caerulea* woodland: *Sphagnum* spp. sub-community.

3.1.1 W4 *Betula pubescens-Molinia caerulea* woodland

This woodland community occurs to the north of the site. Here, drainage is impeded, and the soils are mesic to locally inundated. On low to moderate-sloping topography, this community is represented by a general vegetative composition not specific to its recognised sub-communities. The woodland on the low to level ground has a higher soil moisture level, and its species composition corresponds with the W4c *Sphagnum* spp. sub-community.

All examples of W4 on site are characterised by the dominance of downy birch (*Betula pubescens*) in the canopy, particularly in the W4c area. Other broadleaves occurred infrequently, including rowan (*Sorbus aucuparia*), grey willow (*Salix cinerea*), and sapling oak (*Quercus* sp.); Sitka spruce (*Picea sitchensis*) also occurred infrequently, a consequence of adjacent commercial forestry to the south. Rhododendron (*Rhododendron ponticum*) is frequent across the woodland and is the principal understory shrub.

Within the drier areas of W4 (Quadrats LS09 and 10), purple moor-grass (*Molinia caerulea*) formed a dominant component of the field layer. Other graminoids represented included occasional common bent (*Agrostis capillaris*), and rarely occurring wavy hair-grass (*Avenella flexuosa)*and tufted hair-grass (*Deschampsia cespitosa*). Forb diversity is species-poor within this community, and bramble (*Rubus fruticosus* agg.), wood sorrel (*Oxalis acetosella*), and tormentil (*Potentilla erecta*) are occasional to rarely occurring. Bracken is the main fern species present within the drier W4 woodland, while hard-fern (*Blechnum spicant*), and male fern (*Dryopteris filix-mas*) occur rarely. Bryophyte cover is up to 50% with species such as abundant *Thuidium tamariscinum* and *Polytrichum commune*, and occasional *Mnium hornum* and *Hookeria lucens* moss. *Sphagnum fallax* moss cover is sparser than in the W4c community, is often patchy, and does not form a continuous carpet.

The W4c sub-community on site (Quadrat LS04) has a slightly higher diversity of forb species, including frequent bog asphodel (*Narthecium ossifragum*), occasional bluebell (*Hyacinthoides non-scripta*), marsh violet (*Viola palustris*), marsh willowherb (*Epilobium palustre*), bog stichwort (*Stellaria alsine*), common dog-violet (*Viola riviniana*), and marsh hawk's-beard, alongside the previously mentioned forb species. Star sedge (*Carex echinata)* occurs frequently. *Sphagnum fallax* cover attains dominance and contributes to a dense, tussocky carpet alongside occasional *S. palustre* and *Polytrichum commune*. Bracken is uncommon, and beech fern (*Phegopteris connectilis*), male ferns, hard-fern, and broad-buckler fern (*Dryopteris dilatata*) are better represented. Bryophyte diversity

increases adjacent to minor watercourse channels which flow from the west (Quadrat LS05). Here, liverwort *Pellia epiphylla* occurs occasionally alongside the aforementioned moss species.

The W4 woodland is assessed as being of moderate condition. Mature and veteran broadleaf trees are absent from the woodland and age-class and vertical structure is limited. The canopy is composed of even-age birch with limited regrowth, comprising birch seeding and saplings. The ground flora displays a recognisable NVC plant community; however, it is not strongly characterised by ancient woodland specialists. The woodland is undisturbed and does not display signs of ground damage or enrichments; however, rhododendron does contribute >10% cover throughout and the vegetative condition suggests moderate browsing pressure via the lack of tree saplings, low diversity of tree species, and clumps of young bramble rather than old woody stalks.

3.1.2 W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland

A small patch of degraded W11 woodland (Quadrat LS08) is situated on the eastern boundary of the site and a further better quality example surrounds the Inveruglas Visitor Centre carpark. To the east, the patch of W11 woodland is bordered by Sitka spruce plantation to the east. The woodland is dry and its ground flora is very limited following recent removal of dense rhododendron. Downy birch and Sitka spruce are abundant within the canopy and accompanied by rarely occurring hawthorn (Crataegus monogyna), beech (*Fagus sylvatica*), and ash (*Fraxinus excelsior)*. The understorey comprises frequent rhododendron, and the ground layer includes occasional bracken and *Thuidium tamariscinum*.

This woodland is considered to be poor quality. Trees within this patch have a restricted variation in age-class and vertical structure due to the absence of understory tree regrowth as a result of recent rhododendron dominance. The ground layer does not support a recognisable NVC plant community, and the ground conditions/species composition indicates recent woodland disturbance.

3.1.3 M27 *Filipendula ulmaria – Angelica sylvestris* mire (Good Condition)

M27 mire is located on low lying ground to the south of the site (Quadrats LS06 and 07). This habitat is located within 10m of Loch Lomond and is likely to be influenced by flood events. The soil moisture conditions are seasonally wet and sometimes inundated, with no visible artificial drainage. The vegetation is lightly grazed by herbivores, including geese. Abundant components of the sward comprise meadowsweet (*Filipendula ulmaria*), soft rush (*Juncus effusus)*, and purple moor-grass. Water mint (*Mentha aquatica*), common spike rush (*Eleocharis palustris),* greater bird's foot trefoil (*Lotus pedunculatus*), marsh pennywort (*Hydrocotyle vulgaris*), pignut, sharp-flowered rush (*Juncus acutiflorus*), marsh bedstraw (*Galium palustre*), marsh-marigold (*Caltha palustris*), common sorrel (*Rumex acetosa*), and wavy hair-grass (occur frequently, while marsh cinquefoil (*Comarum palustre*), common valerian (*Valeriana officinalis*, tormentil (*Potentilla erecta*), wavy bitter-cress (*Cardamine flexuosa*), Yorkshire fog, sneezewort (*Achillea ptarmica*), and *Calliergonella cuspidata* moss occur occasionally.

The mire is considered to be in a good condition due to multiple factors, including the saturation of the soil during the summer survey period, absence of artificial drainage, sward composition is a recognisable NVC plant community; the water supply has no obvious signs of pollution, no cover of scrub and bare ground does not exceed 5%. Japanese knotweed (*Reynoutria japonica*) is present within the embankment scrub habitat west adjacent to the mire; however, is has not encroached.

3.1.4 Other Habitats not Corresponding with an NVC Community.

A pond (Quadrats LS01, 02, and 03) is present to the west side of a commercial plantation woodland, described in the PEA report[1] as a small example of Phase 1 habitat 'Valley Mire'. The feature comprises an emergent muddy bank along its western extent and an area of standing water. The pond is partial to fully shaded and is bordered by a high canopy of Sitka spruce. It is fed by a minor watercourse channel to the north which flows from rail network drainage. Emergent vegetation is established on exposed mud with forb species, including marsh-bedstraw (*Galium palustre*), starwort sp. (*Callitriche* sp.), and lesser spearwort (*Ranunculus flammula*). Carpets of *Sphagnum fallax* extend into the water to the north, where the pond borders the W4 woodland. Bog pondweed (*Potamogeton polygonifolius*) is dominant within the open water.

3.2 GWDTE Evaluation

There are two wetland habitats within the site representing GWDTE habitats. Table 3.1 below summarises the NVC communities along with corresponding Phase 1 habitat descriptions and GWDTE assessment. A map of the NVC habitats and their corresponding groundwater dependency category can be found in Appendix C. The NVC floristic tables are provided in Appendix D.

Table 3-1: Potential GWDTE NVC communities within the Site

NVC Community	Phase 1 Habitat	SEPA GWDTE Assessment
M27c *Filipendula ulmaria – Angelica sylvestris* mire *Juncus effusus – Holcus lanatus* sub-community	E2.1 Acid/ Neutral Flush/ Spring	Moderately Groundwater Dependent
W4 *Betula pubescens-Molinia caerulea* woodland	A1.1 Semi-Natural Broadleaved Woodland	Highly Groundwater Dependent

The British Geological Society Hydrogeological Map[10] indicates that the bedrock is composed of pelite, psammite and semipelite and trace metaconglomerate, mica schist, schist, siltstone and wacke which are low productive aquifers with small amounts of groundwater in near surface weathered zone and secondary fractures. Superficial stratum within the M27 community are river terrace deposits consisting of gravel, sand, clay and silt. Superficial stratum up slope in the wooded W4 area include unsorted glacial till, deposited, and reworked by melt water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape.

Scotland's soils interactive map[11] indicated that the soils within the site and wider area and mineral comprising humus-iron podzols, brown forest soils; some gleys and peat. No deep peat is present within the site.

During the site survey, no evidence of groundwater emergence or springs was noted, and the habitats are not considered to be indicative of base enrichment derived from a groundwater source.

[10] The British Geological Society Hydrogeological Map, available at https://www.bing.com/search?q=British%20Geological%20Society%20Hydrogeological%20Map&pc=0MON&ptag=C24N241A06F869CFCC&form=CONBNT&conlogo=CT3210127 (Accessed October 2023)

[11] National soil map of Scotland. Available at Scotland's Soils - soil maps (environment.gov.scot) (Accessed October 2023)

M27 mire communities can be moderately groundwater dependent, depending on the hydrogeological setting, as detailed in SEPA Land Use Planning System Guidance Note 31 (LUPS-GU31).

It is assessed that the on-site example of this community is also fed by surface-flow during winter flooding events.

The W4c woodland sub-community occurs within a damp depression, likely on thin acidic soils to the north of the site and perhaps influenced by the rail network installation and drainage. A slightly drier example of the W4 community occurs on lower gradient slopes towards the railway line embankments and leading towards the A82 to the east. W4 can be highly groundwater dependent, depending on the hydrogeological setting. It is hypothesised that the on-site example of these communities are fed by surface-flow emanating from drainage or flows from the hill ground and then below the rail network. Further hydrological investigation would be required to confirm this hypothesis.

3.3 Scottish Biodiversity List Priority Habitat Evaluation

M27 *Filipendula ulmaria – Angelica sylvestris* mire *Juncus effusus – Holcus lanatus* sub-community (LS06 and LS07) meets the criteria for SBL Priority Habitat Lowland Fen.

Drier examples of W4 *Betula pubescens – Molinia caerulea* woodland meet the criteria for SBL Priority Upland Birchwoods, while wetter examples, including the W4c sub-community located on low gradient topography to the north of the site meet the criteria for SBL Priority Habitat Wet Woodland.

4 POTENTIAL IMPACTS AND MITIGATION RECOMMENDATIONS

4.1 Further Survey

Further hydrological investigation could be conducted to confirm how the W4 woodland and M27 mire communities are influenced by groundwater and to predict impacts if the habitats are to be lost, modified and/or disturbed by the proposed works.

4.2 Potential Impacts

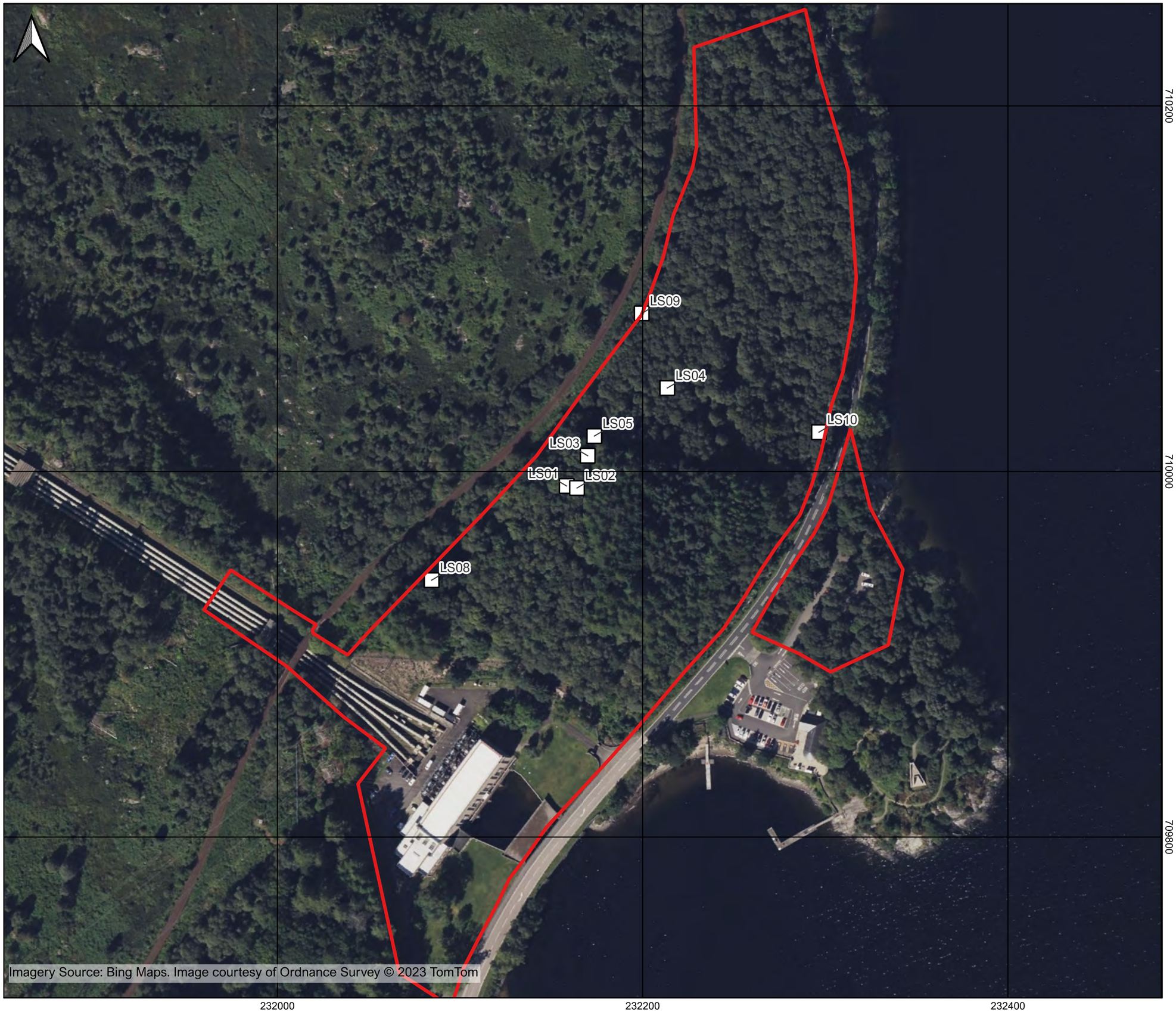
- Loss, modification and/or disturbance of the identified W4c habitats (SBL Priority Habitat Wet Woodland) and M27 (SBL Priority Habitat Lowland Fen) if no avoidance or mitigation is implemented.
- Pollution of wetlands and surrounding freshwater habitats via silted surface water run-off or a fuel or oil spill, if SEPA guidance/best practice is not followed.
- Loss, modification and/or disturbance of the surface water source of the wetland if these habitats are found not to be groundwater-dependent.
- Material storage in the land surrounding the wet woodland/wetland could result in the proliferation of undesirable weedy species within the priority habitats.

4.3 Mitigation Recommendations

- The project design should assume that the M27 habitats are retained and avoided or protected during construction.
- No vehicles or personnel should access retained wetland areas, to avoid poaching and soil compaction.
- Management of watercourses and surface water on site will be required including all spoil storage areas should be situated at least 10m from any watercourse or drainage ditches and outwith retained wetland areas.
- Stockpiled material/soil should be monitored for erosion to prevent pollution of the wetland areas and surrounding freshwater habitats from run-off.
- Emergency spill kits should be available in case of plant leaking oil or fuel to contain contaminants and avoid pollution of wetland areas, drainage ditches, Loch Lomond and other areas of standing water in the locale.
- Any planting or seed sowing to cover the permanent soil stockpiles or reinstatement of ground following temporary works should contain native species appropriate to the local and desired eventual habitats. Temporary and permanent soil bunds should be seeded as soon as possible after creation to reduce risk of weedy species establishing or competing.

APPENDICES

A NVC QUADRAT LOCATION PLAN



Legend

- Site Red Line Boundary
- NVC Quadrat Location

Do not scale this map

Client
ASH Design & Assessment

Project
Sloy Pumped Hydro Storage Scheme

Title
National Vegetation Classification Quadrat Location Plan

Status
FINAL

Drawing No.	Revision	Date
176783-QGIS010	R1	28 Nov 2023
Drawn: SD	Checked: JB	Approved: DB

Scale
1:2,000 @ A3

Rev	Date	Amendment	Initials
R1	13 AUG 2024	Project name change	SD

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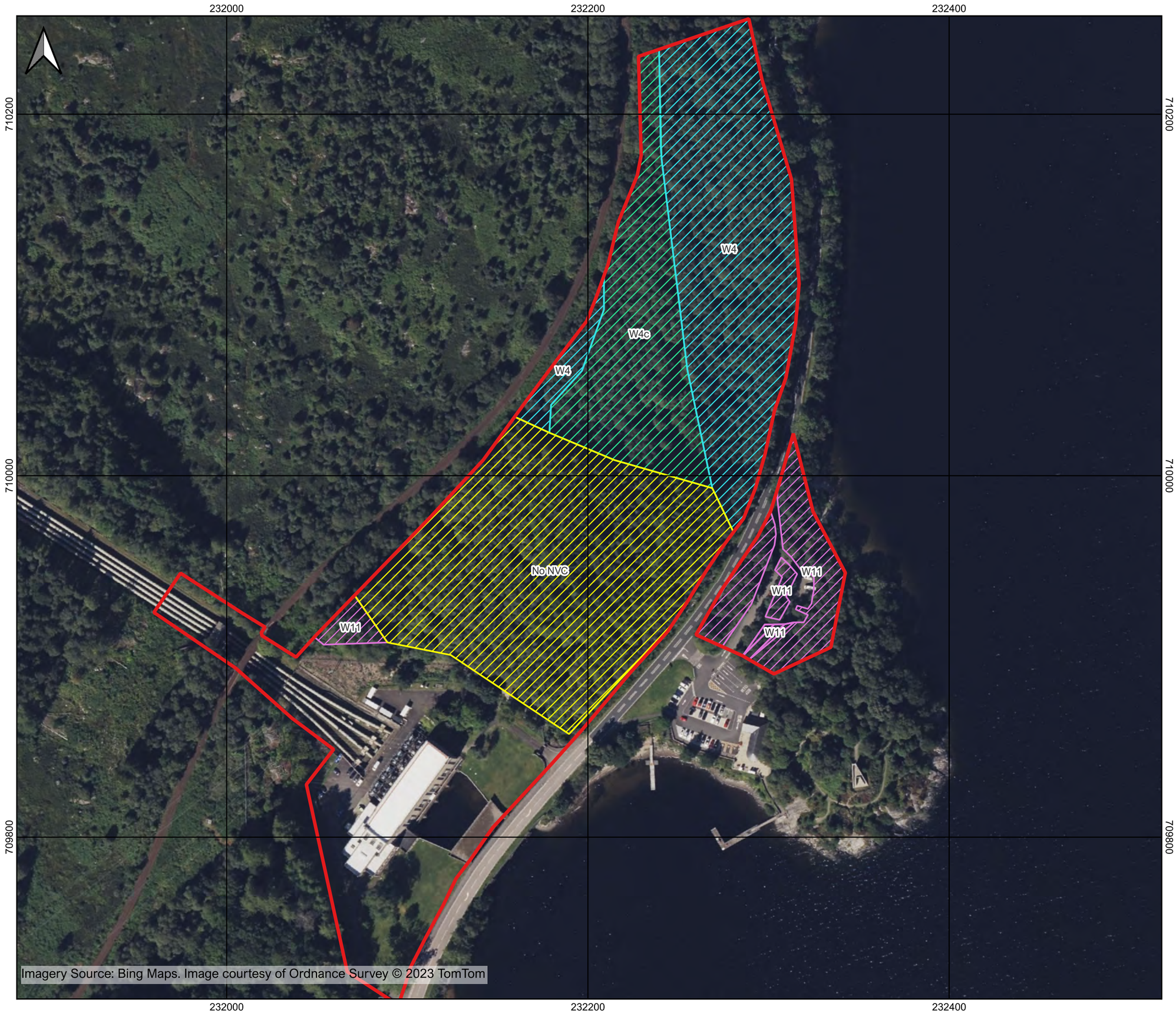
B NVC SURVEY PLAN



Legend

Site Boudnary

NVC Communities

- W4 Betula pubescens – Molinia caerulea woodland
- W4c Betula pubescens - Molinia caerulea woodland: Sphagnum spp. sub-community
- Degraded W11 Quercus petraea - Betula pubescens- Oxalis acetosella woodland
- M27c Filipendula ulmaria – Angelica sylvestris mire: Juncus effusus – Holcus lanatus sub-community
- No NVC type

Do not scale this map

Client
ASH Design & Assessment

Project
Sloy Pumped Hydro Storage Scheme

Title
National Vegetation Classification Plan

Status
FINAL

Drawing No.	Revision	Date
176783-QGIS009	R1	28 Nov 2023
Drawn	Checked	Approved
SD	JB	DB

Scale
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R1	13 AUG 2024	Project name change	SD

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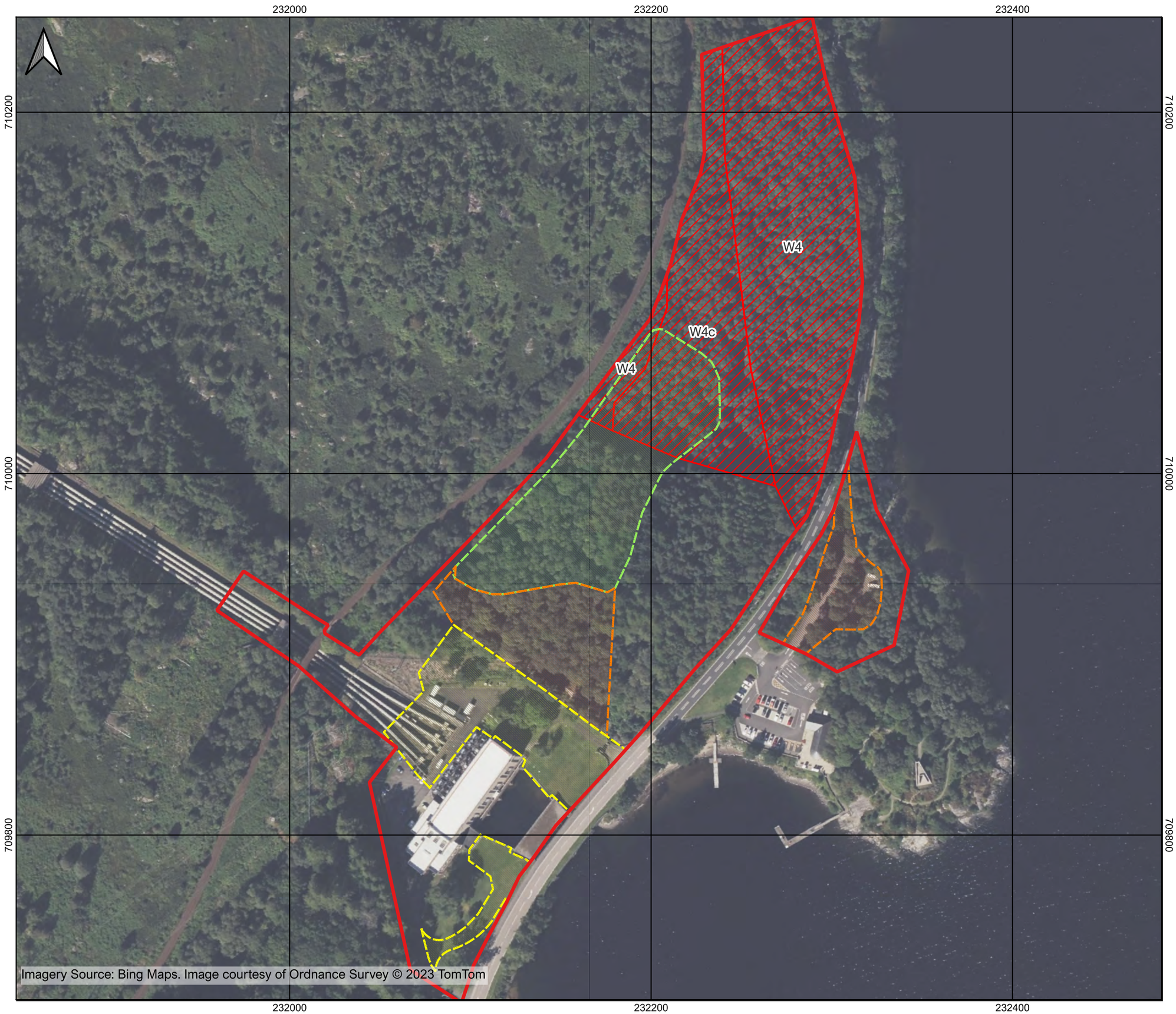
C POTENTIAL GWDTE PLAN



Legend

- Proposed Development Area
- Indicative Construction Area / Crane Pad
- Site Establishment / Construction Compound
- Indicative Spoil Management Area

GWDTE Status

- Potential High Groundwater Dependence

Do not scale this map

Client
ASH Design & Assessment

Project
Sloy Pumped Hydro Storage Scheme

Title
Potential Groundwater Dependant Terrestrial Ecosystem (GWDTE) Plan

Status
FINAL

Drawing No.	Revision	Date
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Drawn: SD	Checked: JB	Approved: DB

Scale
1:2,000 @ A3

Rev	Date	Amendment	Initials
R1	22 MAR 2024	Construction area and proposed buildings added	SD
R2	16 AUG 2024	Proposed development area and project name changed	SD

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D NVC QUADRAT FLORISTIC TABLES

Quadrat LS01		Grid Reference: NN 32158 09992			
Priority Habitat: N/A		**Altitude: 36m**		**Aspect: flat**	
Tree cover:	**>90 %**	**Graminoid and herb cover:**	**55%**	***Sphagnum* cover: <**	**<5%**
Bryophyte cover (- Sphagnum):	**0**	**Vegetation Height (cm):**	**<5cm**	**Microtopography profile:**	**Low**
NVC Community: N/A					
Ground Water Dependence: N/A					

Common Name	Latin Name	Abundance
Bare Ground (Mud)	-	7
Bog Pondweed	*Potamogeton polygonifolius*	7
Marsh-bedstraw	*Galium palustre*	4
Starwort sp.	*Callitriche* sp.	4
Lesser Spearwort	*Ranunculus flammula*	1

Quadrat LS02		Grid Reference: NN 32164 09991			
Priority Habitat: N/A		**Altitude: 36m**		**Aspect: flat**	
Tree cover:	**>90%**	**Graminoid and herb cover:**	**40%**	***Sphagnum* cover:**	**0**
Bryophyte cover (- Sphagnum):	**0**	**Vegetation Height (cm):**	**<5cm**	**Microtopography profile:**	**low**
NVC Community: N/A					
Ground Water Dependence: N/A					

Common Name	Latin Name	Abundance
Open Water	-	8
Bog Pondweed	*Potamogeton polygonifolius*	7
Starwort sp.	*Callitriche* sp.	4

Quadrat LS03		Grid Reference: NN 32170 10009			
Priority Habitat: N/A		**Altitude: 36m**		**Aspect: flat**	
Tree cover:	**>90 %**	**Graminoid and herb cover:**	**15%**	***Sphagnum* cover:**	**85%**
Bryophyte cover (- Sphagnum):	**0%**	**Vegetation Height (cm):**	**20cm**	**Microtopography profile:**	**low**
NVC Community: N/A					
Ground Water Dependence: N/A					

Common Name	Latin Name	Abundance
Flat-topped Bog-moss	*Sphagnum fallax*	9
Marsh-bedstraw	*Galium palustre*	3
Starwort sp.	*Callitriche* sp.	3
Lesser Spearwort	*Ranunculus flammula*	3

Quadrat LS04	**Grid Reference: NN 232170 10009**	
Priority Habitat: Wet Woodland	**Altitude: 40m**	**Aspect: flat**
Tree cover: 80%	**Graminoid and herb cover: 70%**	***Sphagnum* cover: 75%**
Bryophyte cover (- Sphagnum): 15 %	**Field Layer Vegetation Height (cm): 50cm**	**Microtopography profile: Mod**
NVC Community: W4 *Betula pubescens-Molinia caerulea* woodland: *Sphagnum* spp. sub-community		
Ground Water Dependence: Highly groundwater dependent depending on the hydrogeological setting		

Common Name	**Latin Name**	**Abundance**
Flat-topped Bog-moss	*Sphagnum fallax*	9
Downy Birch	*Betula pubescens*	9
Purple Moor-grass	*Molinia caerulea*	8
Common Haircap	*Polytrichum commune*	5
Bog Asphodel	*Narthecium ossifragum*	5
Rhododendron	*Rhododendron ponticum*	4
Bluebell	*Hyacinthoides non-scripta*	4
Common Bent	*Agrostis capillaris*	4
Marsh Violet	*Viola palustris*	3
Red-stemmed Feather-moss	*Pleurozium scheberi*	3
Glittering Wood-Moss	*Hylocomium splendens*	3
Wavy Hair-grass	*Deschampsia flexuosa*	3
Young Willow Shrub	*Salix sp.*	2
Rowan	*Sorbus aucuparia*	2
Oak Sapling	*Qercus Sp.*	2
Tormentil	*Potentilla erecta*	2
Common Pellia	*Pellia epiphylla*	2
Marsh Willowherb	*Epilobium palustre*	2
Broad Buckler-fern	*Dryopteris dilatata*	2
Bramble	*Rubus fruticosus* agg.	2
Bracken	*Pteridium aquilinum*	2
Sitka Spruce Sappling	*Picea stichensis*	1
Grey Willow	*Salix cinerea*	1

Quadrat LS05	**Grid Reference: NN 32174 10019**	
Priority Habitat: Upland Birch Woodland	**Altitude: 40m**	**Aspect: Flat**
Tree cover: >95%	**Graminoid and herb cover: 15%**	***Sphagnum* cover: 70%**
Bryophyte cover (- Sphagnum): 30%	**Field Layer Vegetation Height (cm): 15cm**	**Microtopography profile: Low**
NVC Community: Damp seepage area surrounding small watercourse in W4 *Betula pubescens – Molinia caerulea* woodland		
Ground Water Dependence: Highly groundwater dependent depending on the hydrogeological setting		

Common Name	**Latin Name**	**Abundance**
Flat-topped Bog-moss	*Sphagnum fallax*	8
Downy Birch	*Betula pubescens*	5
Swan's-neck Thyme-moss	*Mnium hornum*	4
Common Pellia	*Pellia epiphylla*	4
Common Haircap	*Polytricum commune*	3
Common Tamarisk-moss	*Thuidium tamariscinum*	3

Shining Hookeria	*Hookeria lucens*	3
Dotted Thyme-moss	*Rhizomnium punctatum*	3
Rhododendron	*Rhododendron ponticum*	3
Bog Stitchwort	*Stellaria alsine*	3
Rowan (Sapling)	*Sorbus aucuparia*	2
Common Dog-violet	*Viola riviniana*	2
Star Sedge	*Carex echinata*	2
Marsh Hawk's-beard	*Crepis paludosa*	1

Quadrat LS06	**Grid Reference: NN 32124 09697**	
Priority Habitat: Lowland Fen	**Altitude: 18m**	**Aspect: flat**
Tree cover: 0%	**Graminoid and herb cover: >95%**	***Sphagnum* cover: 0%**
Bryophyte cover (- Sphagnum): 10%	**Vegetation Height (cm): 40cm**	**Microtopography profile: Low**
NVC Community: M27 *Filipendula ulmaria – Angelica sylvestris* mire *Juncus effusus – Holcus lanatus* sub-community		
Ground Water Dependence: Moderately groundwater dependent depending on the hydrogeological setting		

Common Name	**Latin Name**	**Abundance**
Meadowsweet	*Filipendula ulmaria*	6
Purple Moor-grass	*Molinia caerulea*	6
Water mint	*Mentha aquatica*	5
Common spike rush	*Eleocharis palustria*	4
Greater bird's-foot-trefoil	*Lotus corniculatus*	4
Pennywort	*Hydrocotyle vulgaris*	4
Pignut	*Conopodium majus*	4
Pointed Spear-moss	*Calliergonella cuspidata*	4
Sharp-flowered Rush	*Juncus acutiflorus*	4
Marsh Cinquefoil	*Potentilla palustris*	3
Marsh-bedstraw	*Galium palustre*	3
Marsh-marigold	*Caltha palustris*	3
Marsh Willowherb	*Epilobium palustre*	2
Marsh Woundwort	*Stachys palustris*	2
Sneezewort	*Achillea ptarmica*	2
Wavy Bitter-cress	*Cardamine flexuosa*	2

Quadrat LS07		**Grid Reference: NN 32121 09678**			
Priority Habitat: Lowland Fen		**Altitude: 18m**		**Aspect: flat**	
Tree cover:	**0%**	**Graminoid and herb cover:**	**>95%**	***Sphagnum* cover:**	**0%**
Bryophyte cover (- Sphagnum):	**5%**	**Vegetation Height (cm):**	**55cm**	**Microtopography profile:**	**Low**
NVC Community: M27 *Filipendula ulmaria – Angelica sylvestris* mire *Juncus effusus – Holcus lanatus* sub-community					
Ground Water Dependence: Moderately groundwater dependent depending on the hydrogeological setting					

Common Name	**Latin Name**	**Abundance**
Meadowsweet	*Filipendula ulmaria*	6
Soft-rush	*Juncus effusus*	6
Purple Moor-grass	*Molinia caerulea*	5
Greater bird's-foot-trefoil	*Lotus corniculatus*	4
Pennywort	*Hydrocotyle vulgaris*	4
Sharp-flowered Rush	*Juncus acutiflorus*	4
Marsh-bedstraw	*Galium palustre*	4
Marsh-marigold	*Caltha palustris*	4
Marsh Woundwort	*Stachys palustris*	4
Sheep's Sorrel	*Rumex acetosella*	4
Wavy Hair-grass	*Deschampsia flexuosa*	4
Pointed Spear-moss	*Calliergonella cuspidata*	3
Valerian	*Valeriana offionalis*	3
Tormentil	*Potentilla erecta*	3
Yorkshire-fog	*Holcus lanatus*	3
Water Mint	*Mentha aquatica*	2

Quadrat LS08		**Grid Reference: NN 32084 09940**			
Priority Habitat: N/A		**Altitude: 39m**		**Aspect: Flat**	
Tree cover:	**95%**	**Graminoid and herb cover:**	**20%**	***Sphagnum* cover:**	**0%**
Bryophyte cover (- Sphagnum):	**40%**	**Field Layer Vegetation Height (cm):**	**60cm**	**Microtopography profile:**	**Mod**
NVC Community: Degraded W11 *Quercus petraea-Betula pubescens-Oxalis acetosella* woodland					
Ground Water Dependence: N/A					

Common Name	**Latin Name**	**Abundance**
Downy Birch	*Betula pubescens*	7
Sitka Spruce	*Picea stichensis*	7
Bare Ground	-	7
Common Tamarisk-moss	*Thuidium tamariscinum*	7
Rhododendron	*Rhododendron ponitcum*	6
Bracken	*Pteridium aquilinum*	6
Beech	*Fagus sylvatica*	2
Creeping buttercup	*Ranunculus repens*	2
Swan’s-neck Thyme-moss	*Mnium hornum*	2
Soft rushes	*Juncus effesus*	1
Oak	*Quercus* sp.	1
Hawthorn	*Crataegus monogyna*	1

Quadrat LS09		**Grid Reference: NN 32199 10086**			
Priority Habitat: Upland Birchwoods		**Altitude: 38m**		**Aspect: Flat**	
Tree cover:	**90%**	**Graminoid and herb cover:**	**65%**	***Sphagnum* cover:**	**10%**
Bryophyte cover (- Sphagnum):	**50%**	**Field Layer Vegetation Height (cm):):**	**65cm**	**Microtopography profile:**	**High**
NVC Community: W4 *Betula pubescens-Molinia caerulea* woodland					
Ground Water Dependence: Highly groundwater dependent depending on the hydrogeological setting					

Common Name	**Latin Name**	**Abundance**
Downy Birch	*Betula pubescens*	9
Purple Moor-grass	*Molinia caerulea*	8
Common Haircap	*Polytrichum commune*	6
Common Tamarisk-moss	*Thuidium tamariscinum*	5
Flat-topped Bog-moss	*Sphagnum fallax*	4
Grey Willow	*Salix cinerea*	2
Tormentil	*Potentilla erecta*	2
Wavy Hair-grass	*Avenella flexuosa*	2
Sitka Spruce	*Picea stichensis*	1
Tufted Hairgrass	*Deschampsia cespitosa*	1
Hard-fern	*Blechnum spicant*	1

Quadrat LS10		**Grid Reference: NN 32296 10021**			
Priority Habitat: Upland Birchwoods		**Altitude: 22m**		**Aspect: Flat**	
Tree cover:	**95%**	**Graminoid and herb cover:**	**75%**	***Sphagnum* cover:**	**30%**
Bryophyte cover (- Sphagnum):	**40%**	**Field Layer Vegetation Height (cm):):**	**65cm**	**Microtopography profile:**	**High**
NVC Community: W4 *Betula pubescens-Molinia caerulea* woodland					
Ground Water Dependence: Highly groundwater dependent depending on the hydrogeological setting					

Common Name	**Latin Name**	**Abundance**
Downy Birch	*Betula pubescens*	9
Purple Moor-grass	*Molinia caerulea*	8
Common Haircap	*Polytrichum commune*	6
Flat-topped Bog-moss	*Sphagnum fallax*	6
Rhododendron	*Rhododendron ponitcum*	5
Common Tamarisk-moss	*Thuidium tamariscinum*	4
Grey Willow	*Salix cinerea*	2
Rowan	*Sorbus aucuparia*	2
Male Fern	*Dryopteris filix-mas*	2
Wood Sorrel	*Oxalis acetosella*	2
Tormentil	*Potentilla erecta*	2
Wavy Hair-grass	*Avenella flexuosa*	2
Sitka Spruce	*Picea stichensis*	1
Oak	*Quercus* sp.	1
Bramble	Rubus fruticosus agg.	1
Tufted Hairgrass	*Deschampsia cespitosa*	1