Kintore Hydrogen
A STATERA COMPANY

HYDROGEN PLANT
Kintore

Design Principles Statement

August 2024

Revision Details						
REVISION	STATUS	DATE	AUTHOR	DESCRIPTION	CHECKED	APPROVED
01	DRAFT	30.08.24	VH	Submitted to Client Team for review	JG	AB
02	DRAFT	02.09.24	VH	Landscaping Plan added. Minor amendments.	JG	AB
03	DRAFT	06.09.24	VH	Amendments, including updated masterplan.	JG	AB

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Contents

List of Figures

1.0 INTRODUCTION

1.1 Purpose of this Document

This Design Principles Statement has been prepared as part of the application by Kintore Hydrogen Limited (the applicant) for Planning in Principle (PIP) to develop the Kintore Hydrogen Plant.

The applicant is developing a 3GW hydrogen production facility, to be built in phases, in order to produce green hydrogen from abundant Scottish wind power. It will supply both power generating facilities and the UK's most carbon intensive industrial clusters through existing gas transmission pipelines.

The land within the application boundary can be divided into five parts – the main electrolysis plant site for hydrogen production, and associated infrastructure connections serving it, as follows:

- the main electrolysis plant site for hydrogen production, including temporary construction access and permanent access road;
- the electrical connection from Kintore Substation to the electrolysis plant;
- the underground hydrogen pipeline to a connection and blending point for export into National Gas's existing National Transmission System (NTS);
- the water abstraction and discharge point, pumping and treatment station, and underground water pipelines to and from the River Don; and
- the riparian and other habitat creation and enhancement area on the east bank of the River Don.

This Design Principles Statement focuses on the electrolysis plant, which is the main development site comprising buildings, structures and external equipment for hydrogen production. It is intended to serve two purposes.

First, it provides an overview of the design evolution and site constraints, and demonstrates that the indicative design makes the best use of available space while avoiding unnecessary additional land-take.

Second, it describes the principles of design that have informed the indicative layout and elevation drawings.

The indicative drawings will be subject to further design and approval by Aberdeenshire Council prior to construction.

It is proposed that the final design will have regard to the general principles described in this document and to any further specific design points that may be agreed with Aberdeenshire Council.

1.2 Kintore Hydrogen Limited

The applicant is a subsidiary of Statera Energy Ltd, a private British company that develops, builds and operates flexible electricity generating energy generation and storage technologies to help balance the grid.

Statera Energy was established with the aim of delivering increased flexibility for the UK electricity system to assist in the transition to a low carbon economy in the future.

The applicant will be a fully integrated developer, owner and operator of the proposed hydrogen production facility.

1.3 Site Description

The electrolysis plant site is located on land west of the town of Kintore in Aberdeenshire, and west of the SSEN Kintore sub-station. The British National Grid coordinates are 376298 813644 (approximately site centre) and the nearest existing postcode is AB51 0XY. It is within the administrative area of Aberdeenshire Council.

The application boundary and location of the application site (referred to hereafter as the 'site' in this document) is shown on the Location and Boundary Plans.

Fig 1 indicates the location of the application site within the wider context.

The below indicative masterplan (**Fig 2**) is an indication of the infrastructure that could be developed within main hydrogen production facility at the west of the site.

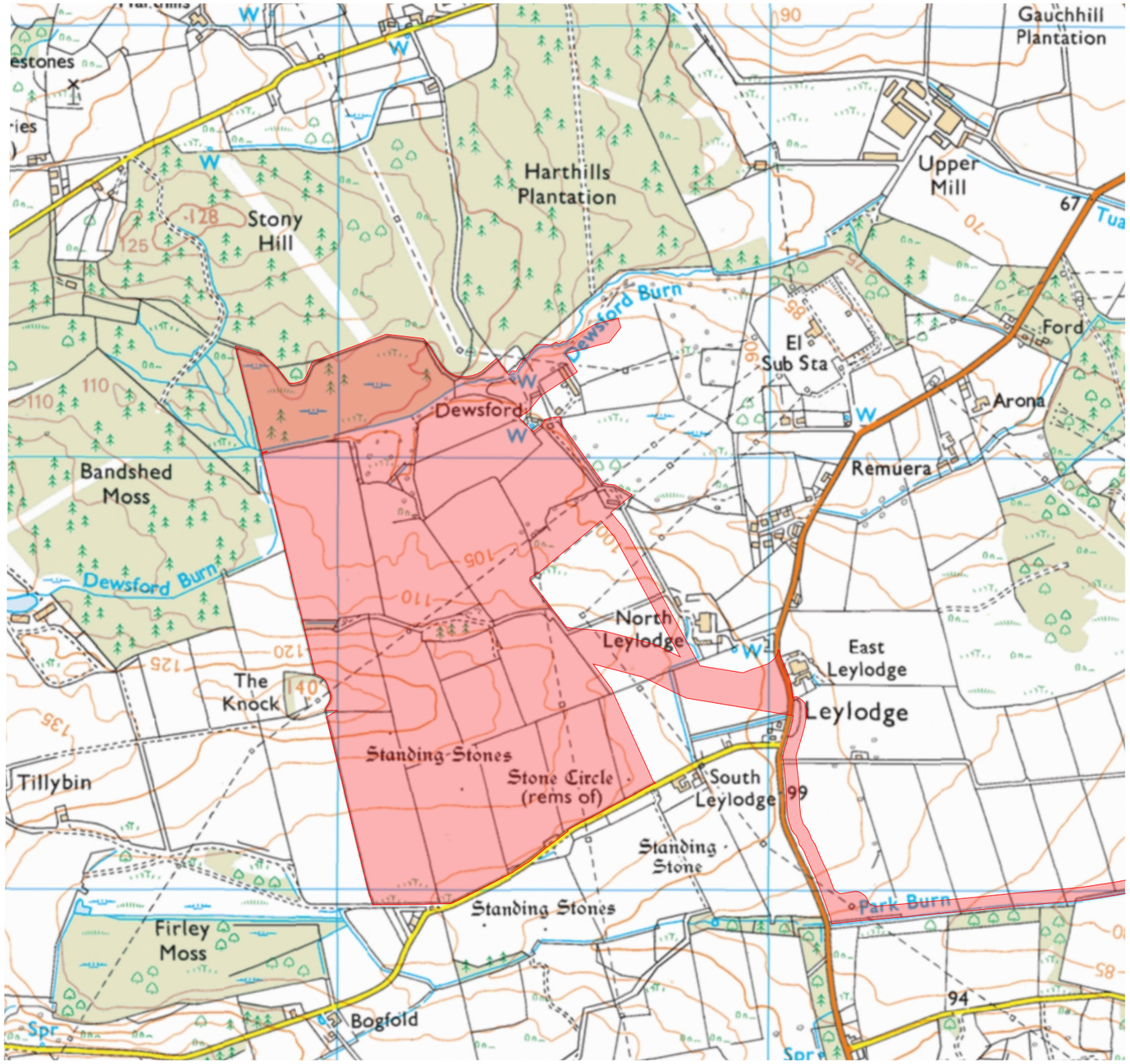

FIG 1 - LOCATION PLAN
NTS

1.4 The Proposed Development

In overview, the buildings, structures and equipment of the electrolysis plant would include:

- structures housing the electrolyser cells, with gas and water treatment equipment inside or adjacent to the buildings, and oxygen vent stacks adjacent or on the roofs;
- electrical switchyard with high voltage transformers
- hydrogen scrubber (only applicable for the alkaline technology);
- hydrogen compressors and auxiliaries for export;
- an enclosed ground flare for hydrogen;
- nitrogen generation and storage;
- compressed air generation and storage;
- external cooling system with cooling towers and pumps;
- water treatment building and tanks;
- firewater tanks;
- control room, workshop and stores buildings;
- gatehouse, internal access and circulation roads and parking;
- site drainage, runoff attenuation ponds and underground services;
- perimeter security fencing, lighting and CCTV; and
- further ancillary infrastructure

The Design Principles Statement concerns the main development site on which the electrolyser infrastructure and associated plant and equipment will be constructed.

FIG 2 - INDICATIVE MASTERPLAN
NTS

FIG 3 - EXTRACT OF ILLUSTRATIVE LANDSCPING MASTERPLAN (FIG 12)

2.0 SITE ANALYSIS

2.1 Introduction

Site survey and analysis of the site and its surroundings has highlighted the key constraints and opportunities of the site that will inform the evolution of the concept design.

Detailed information relating the environmental baseline can be found in the Environmental Impact Assessment Report (EIAR), which relates to the site as well as the other areas encompassed by proposed development application boundary, and wider study areas relevant to each environmental topic.

This section describes the site analysis and is accompanied by **Fig 4** - Site Analysis Plan.

2.2 Description of Site Survey and Observations

This section describes key topics that could affect the design and appearance of the proposed scheme.

Topography
The site is situated within an undulating landscape. Topography within the site itself ranges between around 100m AOD in the northernmost and north-easternmost parts of the site and around 110m AOD in the south of the site; rising up to 136m AOD on its western periphery (which nears The Knock at a high point of 140m AOD just outside the site). A ridgeline runs west to east, through the middle of the site.

The site has an easterly aspect, sloping down towards the B977 and properties along this road. The southern part of the site is more exposed, while the northern part is somewhat more sheltered by nearby forestry to the north and north-west. Prevailing wind in the area is southerly but with a north westerly component.

Watercourses
The site is located crossed in its northern part by Dewsford Burn, a tributary of Tuach Burn which ultimately connects to the River Don. There are drainage channels in the eastern part of the site just north of The Knock. The south of the site drains to Park Burn, which also flows to the River Don via Tuach Burn.

Ecology and Biodiversity
The electrolysis plant site is currently agricultural land with an area of lowland fen habitat at the northern edge (around where it is crossed by Dewsford Burn), with purple moor-grass and rush pasture, gorse and mixed scrub and fringe of bog woodland. There are farm tracks, field boundaries and smaller stands of coniferous trees and scrub in the central part of the site. To the immediate north of the site (outside its boundary) are the Stony Hill, Harthills and Bandshed Moss coniferous plantations on gently rising ground from the burn. The northern edge of the site contains habitats which are considered particularly sensitive, including priority Scottish Biodiversity List (SBL) habitats. Evidence has also been found of species including bats, red squirrel and pine marten and barn owl within the east and north of the site.

Archaeology and Cultural Heritage
There are several features of cultural heritage value recorded within the site. These comprise:

- one scheduled monument:
    - ‘South Leylodge Steading, stone circle 110m W of’ (Scheduled Monument SM12350) in the south-eastern corner of the site around 14 m north of the public highway; and
- four HER non-designated heritage assets:
    - a post-medieval cattle rubbing stone (HER non-designated site, listed as regionally significant but considered to be of local heritage value only in the EIAR) in the south-western part of the site at approx. 376288, 813238
    - a second cattle rubbing stone (HER non-designated site, regionally significant) in the south-western part of the site; however, site survey has identified this as more characteristic of a glacial erratic, hence a natural feature and considered to have little or no heritage value;
    - Dewsford Farmstead, the remains of a derelict lime and stone built building and many low stone walls outlining the possible foundations of other buildings or enclosures, as well as demarcating trackways and field boundaries (HER non-designated site, standard) on the north-eastern periphery of the site, near the Dewsford properties; and
    - ‘Backstyles, remains of cottages’ (HER non-designated site, standard) comprising only stone foundations on the north-eastern periphery of the site, to the south-east of the Dewsford properties; and
- one non-designated prehistoric heritage asset identified during survey:
    - Bandshed Moss’, a possible burial cairn (a small mound of rounded boulders and stones, measuring approximately 3 m by 5 m and 0.4 m in height, atop which a tree was growing) in the north-western part of the site north of Dewsford Burn.

Landscape and Architectural Character
Landscape character within the site and its surroundings is predominantly agricultural, consisting of a patchwork of fields separated by drystone dykes and fences, as well as patches of coniferous forestry, with a mixture of more open and enclosed areas. Built features within the immediate landscape include large-scale agricultural sheds, small-scale wind turbines, farmsteads and other residential properties, substation (including under-construction substation extensions), industrial parks, a knackery (featuring a visible plume) at Cottown and electrical transmission infrastructure.

In the future, there may be further built developments introduced within the local area (described as cumulative developments in the EIAR). The closest of these developments to this site are a proposed Battery Energy Storage System (BESS) (APP/2022/2022) near South Leylodge, immediately adjacent to the site; and a proposed BESS on the eastern side of Kintore Substation (ENQ/2023/0382). Other more distant cumulative sites are described in the EIAR.

Overhead and Underground features
Several overhead transmission lines (OHLs) are situated within the vicinity of the site. Four OHLs cross the site. SSEN has also consulted on proposals for a new 400 kV OHL from Kintore Substation to Tealing via Fiddes, currently at an early development stage, which is expected to cross or be adjacent to the site in its southern half.

Underground features, such as water pipes, gas pipes, cables, drainage routes, may also be present within the site and would verified through existing plans and investigations by the contractor, during the construction stage.

Views
Views of the site from the surrounding area vary, given the undulating topography and pattern of tree cover. Some views are close-range, from nearby properties and routes; while other views of the site are longer range, but are more broken up or filtered by intervening trees, landform and settlement. Most views within the surround area include agricultural land, distant settlements and/or nearby dispersed properties and farm buildings, wooded areas, OHLs and substations, all to varying degrees.

In views from the south and south-west of the site, there are some close-range views of the site from nearby properties, as well as some elevated views from properties and routes, occasionally filtered or screened by patches of woodland. More distant views of the site are screened by landform.

In views from the north of the site, the site is largely screened by forestry immediately north of the site (Harthills Plantation, Stony Moss and Bandshed Moss).

From the east of the site, there are some close-range views of the site from nearby properties at Dewsford and along the B977, although several views are filtered or screened by properties and/or vegetation along the valley floor and lining the B977 which runs immediately to the east of the site. More distant views of the site from the east and south-east also include wider views across the settled agricultural landscape.

From the west of the site, there are some close-range views from nearby properties, but more distant views are generally screened by landform.

From the site itself, views are relatively open to the south, south-west and east, with some relatively expansive, elevated views across the farmed and wooded valley floor, featuring residential properties, farm buildings, small scale wind turbines and OHLs crossing the landscape.

2.3 Analysis of Opportunities and Constraints

Following this site analysis, the following opportunities and constraints are summarised in the adjacent table, and have been taken forward in the design development.

	Opportunities	Constraints
Topography	The ridgeline through the site, rising to 'The Knock' on the western periphery, offers opportunities for screening the development in some directions. Lower lying areas to the north may be able to accommodate taller features within the development.	'The Knock' is a local high point within the landscape that is relatively distinctive within the local area. To maintain this is a feature in the landscape, the development may be constrained by height, to sit lower in the landscape than this high point and relate to the existing topography of the site.
Cultural Heritage		Features of cultural heritage value within the site which may constrain areas for development and planting, subject to pre-construction surveys. Most importantly the standing stone Scheduled Monument SM12350 is legally protected and requires retention in situ and buffers applied to avoid direct disturbance and limit disturbance to their setting.
Ecology and Existing Planting	Areas of existing planting within and around the site offer opportunities for enhancing green corridors and biodiversity through additional landscape planting and other ecological enhancement. Areas of existing tree planting within and around the site offer opportunities for screening the development.	Areas of ecological sensitivity, particularly to the north of the site, and small areas within the site, which may constraint development and require protection.
Built Features	Other large-scale built features are present within the local area, including immediately adjacent to the site, such as large agricultural and industrial buildings associated with farms and Kintore Substation. This may offer opportunities for new development to be introduced in this area of a relative scale and architectural style that is sensitive to other built features currently present in the landscape. Furthermore, diversions of existing OHL assets within the site by SSE could loosen constraints in the southern half of the site.	Route of existing and proposed OHLs, as well as other known and unknown utilities and underground features (to be verified on site), may constrain areas available for development and for planting. Proposed developments near the site may require consideration in future proofing of the development.
Views	Tree cover and topography largely screen views of the site from the north and in longer range views from south and west; as well as fragmenting or filtering views of the site from various directions and distances. There are opportunities to utilise this screening and add to it. Most views of the site also include views of OHLs and other built features, potentially reducing sensitivity. In elevated and distant views, the site is seen as a small part of a somewhat settled landscape, so there are opportunities for the design of the site to relate to other features in views.	Close-range views from nearby properties and routes to the east, south and west may constrain development and following assessment, require sensitive design, which also involves introducing landscape mitigation to screen the development. Longer range views may also be sensitive to development and require careful assessment and design.

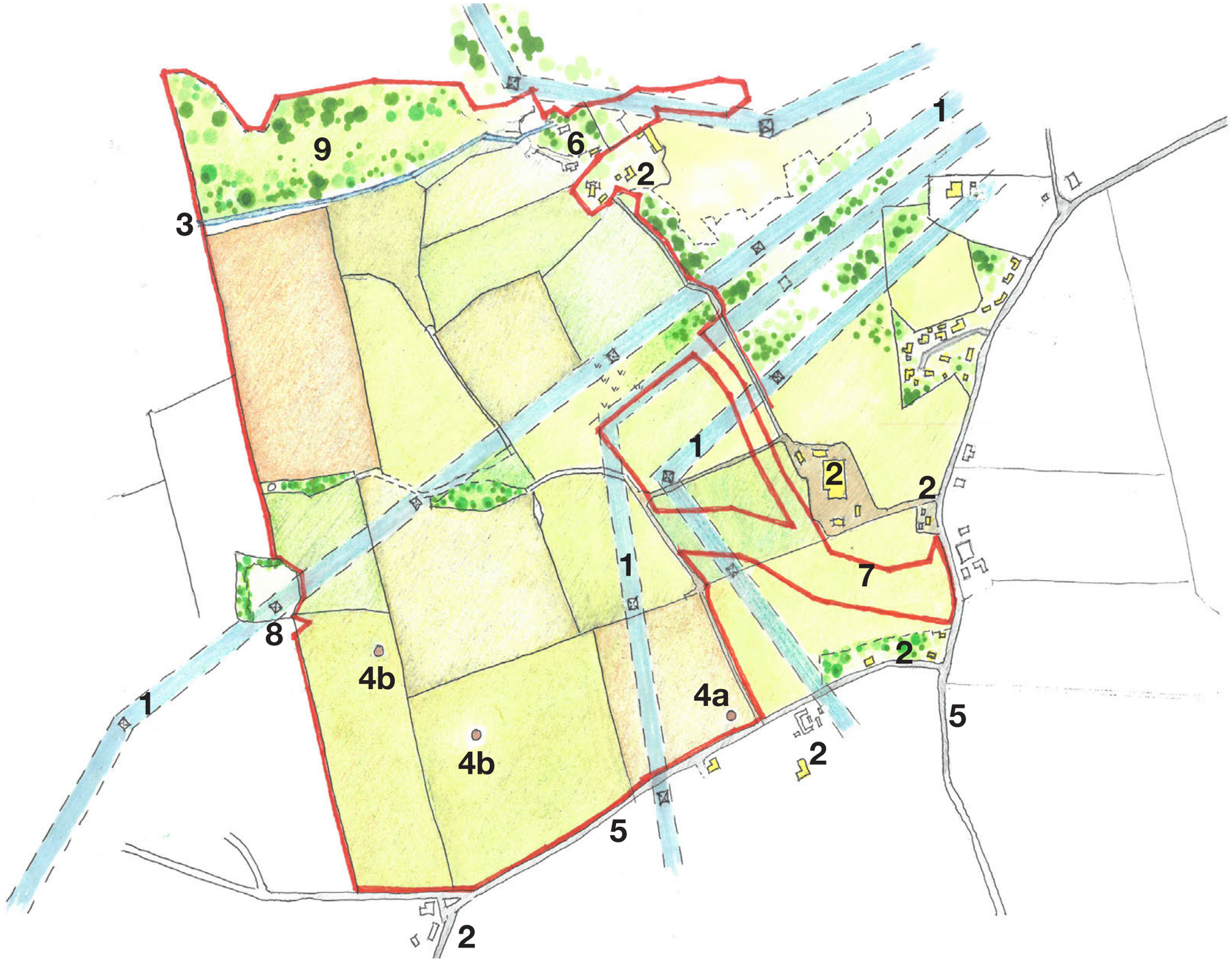

FIG 4 - SITE ANALYSIS PLAN

LEGEND/KEY

1	400KV OHL & wayleave
2	Local properties
3	Dewsford Burn
4a	Cultural Heritage Asset- scheduled monument
4b	Cultural Heritage Asset- “scratching post”
5	Public road
6	Derelict building
7	Land ownership/access agreements
8	Local high point “The Knock”
9	Ecological sensitivity

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