

3.0 DESIGN DEVELOPMENT

3.1 Introduction

The proposed development has been through a process of site selection and iterative design feedback as part of the Environmental Impact Assessment (EIA) process. This is described in Volume 2, Chapter 3 of the EIA Report (EIAR) accompanying the planning application.

A number of concept layouts and factors such as maximum building or structure heights (with respect to the site topography), location of noise-generating equipment, location of the hydrogen flare and access points have been considered through the EIA process. This has also identified environmental sensitivities such as a standing stone Scheduled Monument, areas of higher-value habitat north of Dewsford Burn, and badger setts to be incorporated sensitively in the proposed development design.

A Planning Permission in Principle application occurs prior to detailed development design and provides permission on a parameters basis, retaining flexibility for approval of detailed design matters subsequently. Where there is such flexibility, it is a requirement of the EIA process to assess maximum- or worst-case impacts, which is done by defining a 'Rochdale envelope' of maximum design parameters. The proposed development design assessed in the EIA uses development zones and building/structure envelope parameters to represent the electrolysis plant. By their nature, these parameters are a maximum case and do not necessarily represent a more realistic architectural and landscaping design for the development.

The EIA has recommended mitigation of landscape and visual effects of the proposed development through sensitive architectural treatment and a fully developed scheme of landscape planting, incorporating retained habitats, new habitat creation or enhancement, and incorporating heritage assets where these are to be preserved. This must remain within the planning parameters and Rochdale envelope defined in the Planning Permission in Principle application and the accompanying EIAR.

This Design Principles Statement is therefore intended to set out how the high quality architectural design and landscaping will be achieved, with specific principles to be adhered to which arise from both the early engineering design and EIA work. As such, it represents a further mitigation and enhancement commitment that can be secured by planning condition should the Planning Permission in Principle application be approved.

3.2 Concept Layout

The initial concept layout (see [Fig 5](#)) responds to the site constraints as noted earlier in Section 2.

The evolving site masterplan is informed by an appreciation of site constraints and opportunities, in particular geographical limitations, topography, landscape character, ecological sensitivities, cultural heritage features, views of the site and existing and proposed OHL routes. Given the constraints, sensitivities of the site and potential for adverse effects, it is important that the landscape and architectural design of the site ought to be carefully considered and sensitively designed.

The scale of the overall scheme is such that the 3GW scheme, with all of its associated infrastructure, will be split either side of the transverse shoulder of the hill from The Knock on the west boundary sloping down to the east side of the site (see [Fig 6](#)).

The split of the site into developable areas are defined by the crossing of multiple high-voltage OHLs from the adjacent Kintore Substation across the highest point of the landscape. Exclusion zones beneath the OHLs can only accommodate limited infrastructure (e.g. accesses, fencing, low level planting) and subject to engagement with the transmission owner.

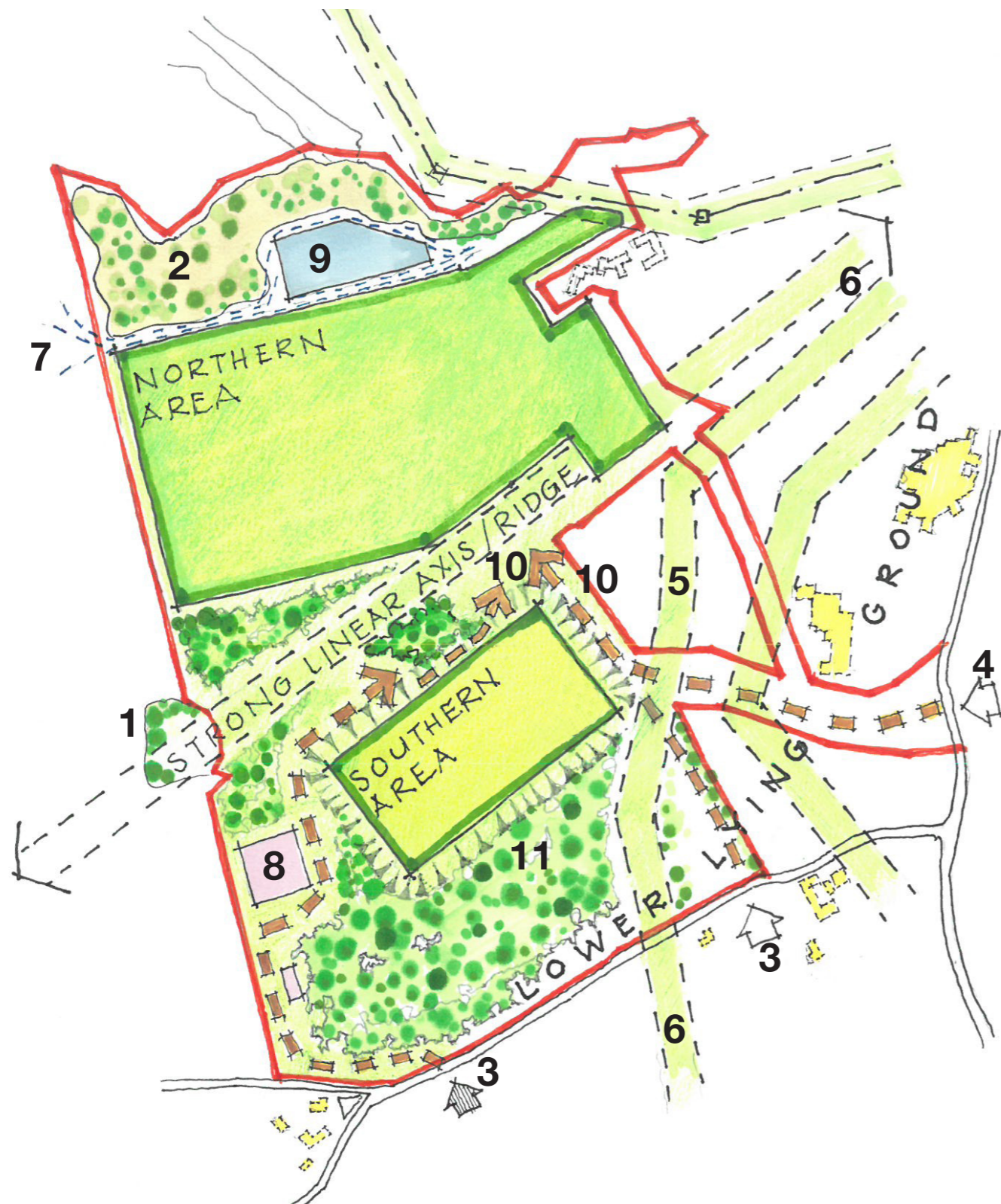
It is logical to split the electrolysis buildings/structures, associated electrical transformer containers, and switch yards, so that the majority and tallest of these buildings are located to the north of The Knock, and therefore less visible to visual receptors. The initial phase or phases of the development will therefore be located to this northern portion of the site.

Electrical infrastructure, compressor modules, cooling towers, dryers and warehouses would also be situated to the north side of the site. Proximity to the sub-station to minimise electrical losses forms part of this placement strategy.

To the northern end of the site is the enclosed ground flare, next to the attenuation pond. The adjacent existing watercourse Dewsford Burn may or may not be re-meandered, depending on optimum plant design for the relevant nearby infrastructure, hydrology and ecological considerations.

The area furthest north within the site is defined as an area of ecological sensitivity and is intended to be left undeveloped.

Access and egress to and from the site during the construction Phase 1 would be from the B977 where a new temporary junction and construction access track are proposed from a point north of Leylodge Farmhouse. This would be for the construction phase only as this allows easier access for construction traffic and movement / delivery of components to the whole of the site. This access route will be reinstated upon completion of construction but may remain in place (unused) between construction phases. The bellmouth for this access may remain in place during operation in case it is needed for replacement of plant (for which, if so, track mats would be used to create a temporary route from the B977 to



LEGEND/KEY

- 1 Local high point
- 2 Ecological area
- 3 Existing or proposed access
- 4 Temporary construction access
- 5 400 KV OHL possibly rerouted
- 6 Wayleave maintained
- 7 Burn possibly diverted
- 8 Control point
- 9 Attenuation pond
- 10 Possible routes- Construction access & controlled access
- 11 Sunken topography

FIG 5 - CONCEPT LAYOUT

the site). The occupied field will be reinstated/made good after removal of the temporary construction track, whether that be during construction or for replacement of plant.

One junction to the site will be provided for both phases along the minor road at the south of the site, with the existing access to be for emergencies only (along with an additional emergency access where there is an existing access off the B977. See [Figs 2](#) and [5](#).

The internal private access road would be gated and have a control gatehouse. Workshop, office / control buildings and parking will also be located within the southern portion of the site, and these would also be constructed as part of the initial phase.

Development to the south of The Knock (buildings, plant, equipment and infrastructure) will involve ground modification to integrate the site more fully within the landscape setting and minimise adverse landscape and visual effects.

Overall site planning disposition is determined by process requirements: site constraints as noted (including part re-routing of OHLs by the transmission and distribution network operators); and careful definition and development of landscape mitigation measures including areas of tree planting, as well as retention of existing ecological features, and areas of earthworks.

3.3 Design Evolution

Zoning / Phasing

It is the intention to develop the site as a minimum of two phases with the possibility of enabling works preceding the main facility development.

Concurrently with the first construction phase commencing, screening earthworks and Phase 1 planting may commence particularly on the southern, eastern and western sides of the site. This would establish areas of screening in advance of future phases of development and would mitigate adverse landscape and visual effects, particularly for nearby receptors.

Site access would be created including parking, construction operations base, materials laydown and site security, offices, stores, etc.

The first phase construction works would relate to areas located at the furthest northern end of the site. This would include formation of bases for buildings and equipment, internal roads, SUDs and associated landforms.

Later phases will be developed according to a variety of factors but in general terms would

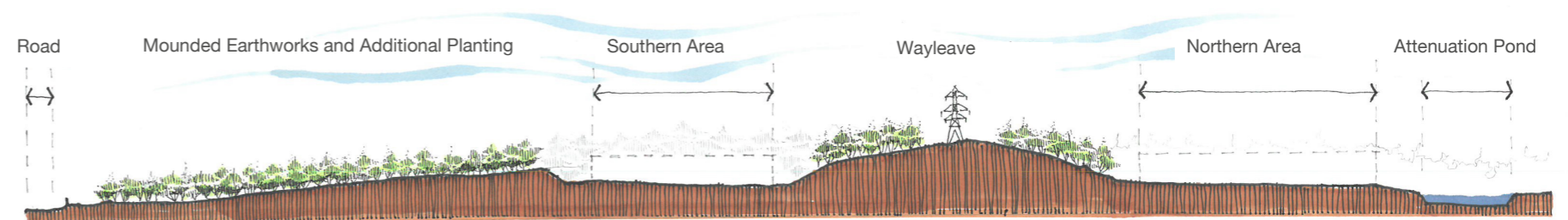


FIG 6 - CONCEPT CROSS SECTION

move from the north to the south side of the site (save for control buildings which would be developed in the southern part of the site as part of the first phase). By the time that prominent infrastructure development reached the southern part of the site, the Phase 1 landscape mitigation would be establishing and would provide a level of screening for these stages of construction and development. Phase 2 planting and earthworks would then be implemented to further mitigate effects.

Zoning the site would also reduce potential adverse landscape and visual effects, such that specific areas would have different height parameter and functions, and some areas (such as the elevated area nearest the Knock) would only be used for certain types and heights of built development. It is recommended that this elevated area be kept relatively free of built development to maintain the distinctive feature of this local high point, relative to the wider landscape. Please see the EIA Report for further detail on this.

Building Response

Designing large infrastructure developments presents specific requirements, challenges and opportunities:

- Addressing and meeting the technical requirements of the hydrogen plant process in terms of building numbers, dimensions and planning
- Developing an environmental response through careful site planning, process and building placement and landscape modelling to integrate the development as carefully and effectively as possible within the wider landscape
- Respecting the key landscape qualities in order to minimise adverse impact on the landscape and visual amenity.

Furthermore, the architectural language should be responsive to the whole notion of hydrogen production as a pioneering process and represents an important feature of our clean energy future. It is therefore considered important that the built response is effectively expressed and celebrated in a modern idiom in terms of massing, finishes, colour, quality and detailing.

That said, the site is within a primarily rural location although close to the Kintore settlement and adjoining extensive SSE substation works and OHL infrastructure. The key features, characteristics of the landscape, and architectural features within the landscape, are noted elsewhere. A design approach for the built elements of the project must relate to and be designed with due sensitivity to both the existing character of the Aberdeenshire landscape and the local vernacular in terms of mass, form, colour and materials.

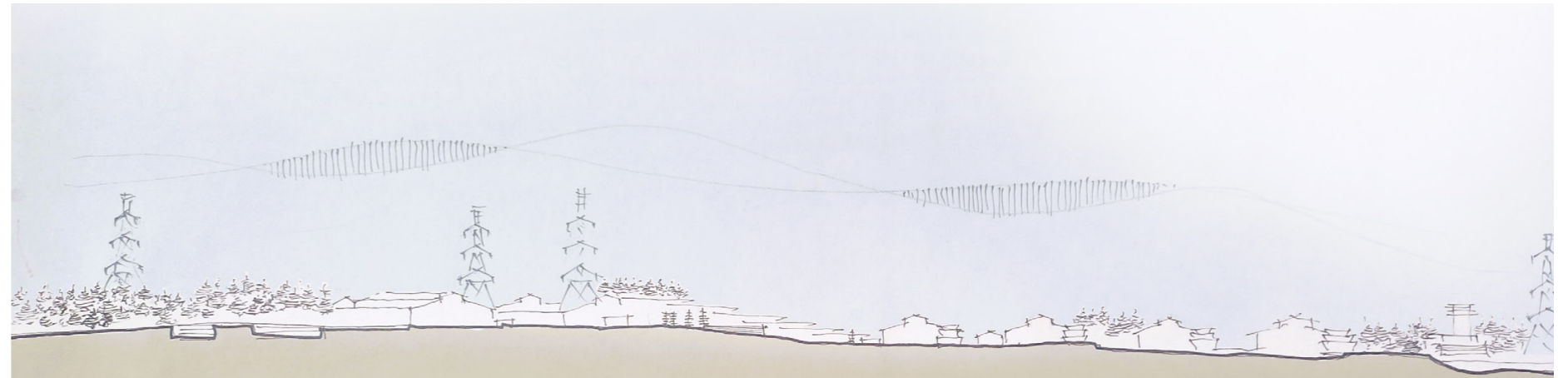


FIG 7 - EARLY INDICATIVE SITE ELEVATIONS

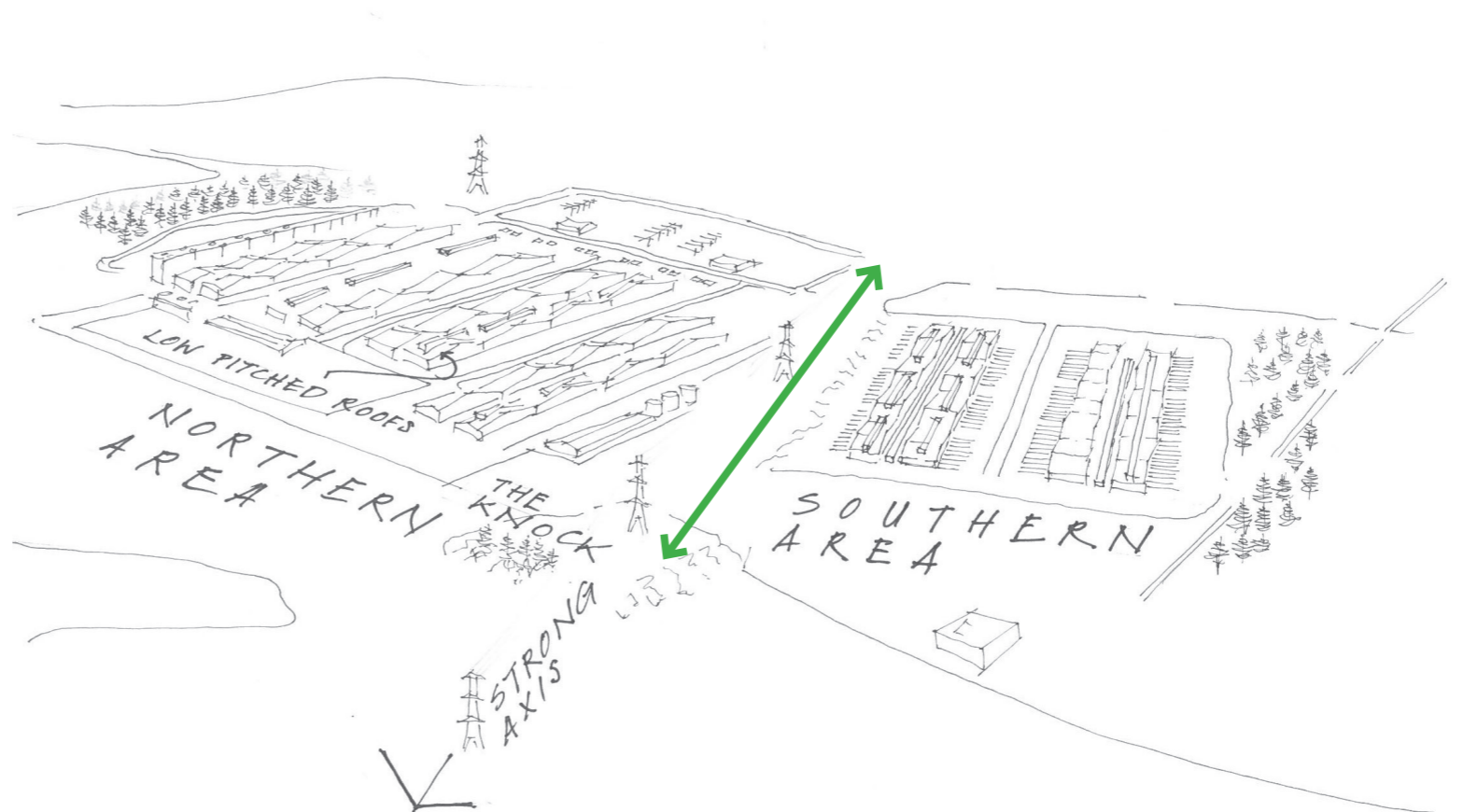


FIG 8 - EARLY INDICATIVE MASSING CONCEPT SKETCH

Mass and Form

To the extent that infrastructure is to be housed in buildings, these would be of considerable area, mass and volume. Therefore, different massing strategies will be executed to respond to each zone resulting in a variation of ridge heights i.e. lower heights in the southern zones and taller in the northern zones are included (see illustrative plans and the proposed parameters in the EIAR).

Building forms are proposed to be simple, rectilinear and grouped as clusters with minimum pitched roofs where practicable and carefully considered façade treatments (see **Figs 7, 8 & 9**)

Building forms would be evocative of the agricultural settlements typically seen in Aberdeenshire and Moray in terms of geometry and volume, and the nature of the relationship of the buildings to each other is directly comparable to bonded warehouse developments, with widespread examples across the North-East region. Relevant examples include: Malcolmburn Bond, Dufftown (Chivas Bros.).

There is potential for there to be fewer buildings with electrolyser plant and associated gas and water treatment facilities located outside and set at a lower level than they would otherwise be accommodated indoors, meaning a substantial decrease in terms of mass and form compared to a building solution.

Scale and Height

It is anticipated that the infrastructure will be limited to the dimensional parameters as set out in the adjacent table.

The built features would be limited by the following parameters:

- within the **southern** part of the site (including an area east of The Knock hilltop), buildings, structures and equipment would not exceed a maximum upper height of 134 m AOD (based on max. 18 m height above an indicative ground level of 116 m AOD);
- within the **northern** part of the site, buildings, structures and equipment would not exceed a maximum upper height of 127 m AOD (based on max. 20 m height above an indicative ground level of 107 m AOD);
- Within the **western** part of the site (most elevated part of the site, around The Knock hilltop), buildings, structures and equipment would not exceed a maximum upper height of 128 m AOD (based on max. 8 m height above an indicative ground level of 120 m AOD).
- The ground flaring stack will have an outer diameter of up to 17m and would not exceed a maximum upper height of 132 m AOD (based on a maximum of 30m height above an indicative ground level of 102 m AOD).

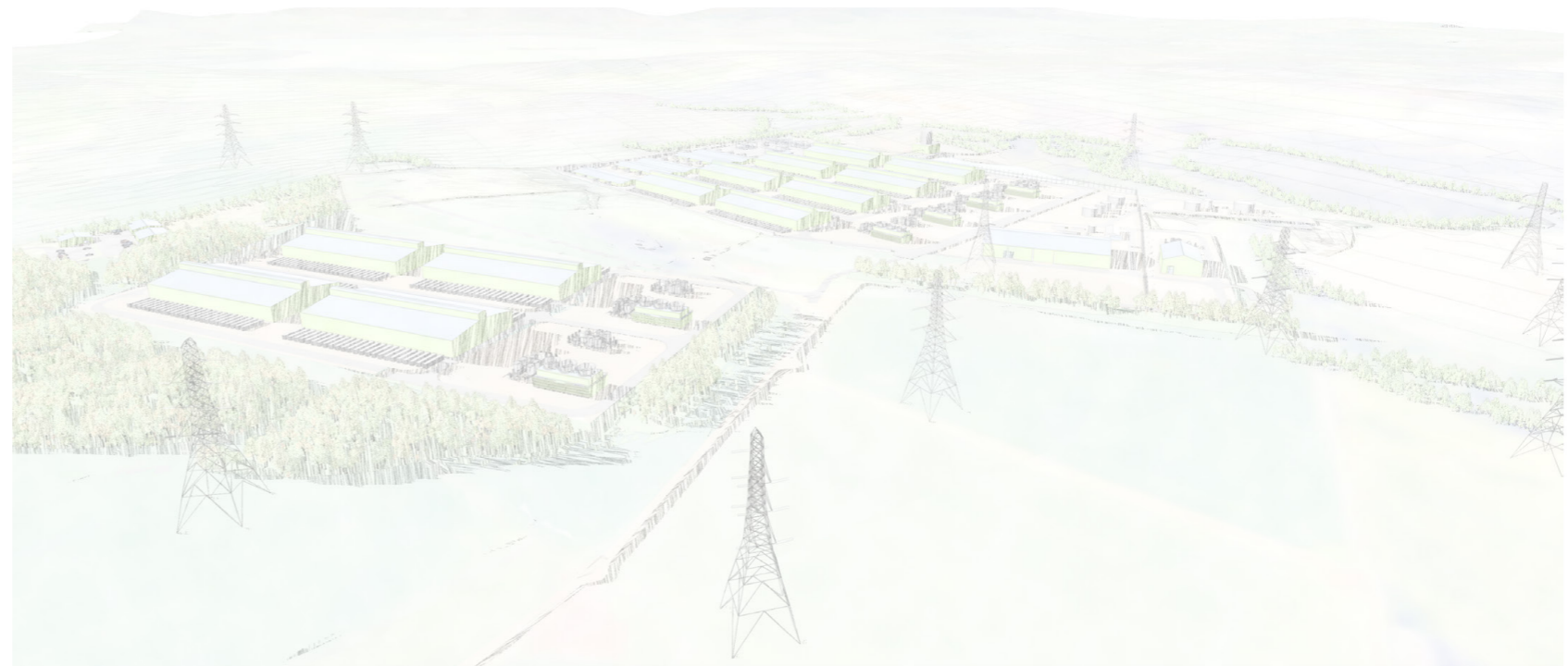


FIG 9 - INDICATIVE FORM CONCEPT

Structure	Length (m)	Width (m)	Max Height (m)
Electrolyser buildings:	50	120	16 to ridge with oxygen vent stacks up to 4m higher than the buildings. The buildings situated to the south of The Knock can have a reduced height of maximum 14m plus 4m high vent stacks to assist in minimising visual impact. Where the solution is to have the electrolyser infrastructure not housed in buildings, the maximum height of the infrastructure that would otherwise have been in buildings would be up to 12m high .
Compressor Buildings	30	45	20
AIS Equipment	115	125	12
GIS Equipment (if used)	45	105	8
Cooling Tower Units	40	35	15
Other Buildings / Infrastructure			10

Rather than focusing on the buildings in isolation, the scale and coherency of the development will be carefully controlled by unifying the built and landscaped environment harmoniously.

This will require a careful response to the topography, acknowledgement of the scale and height of existing features and the adoption of creative cut and fill techniques. For example, the building clusters will defer to The Knock in relative height terms with a ridge height that is less than its 134m (AOD).

Elevation Treatment: Colour and Materials

The palette of colours intended at this stage will be selected to reflect tones and hues that are prevalent in the landscape but will also contribute to a sensitive yet contemporary design statement. Elevational treatments may evolve as a mix of colour banding using panelised and profile cladding systems to minimise apparent volume from visual receptors (see Fig 10).

- Materials will be selected to provide a simple, understated textural quality that will accord rather than compete with those found in the existing vernacular.
- Reflectivity of materials will be chosen to eliminate undesirable specular reflection and finishes will be appropriate for the zone in which they are applied.
- Whilst the architectural massing will be relatively muted, detail on the other hand will be finely articulated.
- This use of architectural vocabulary is an important influencing factor on the perception of the building as having an inherent quality.

The landscape is made up of a palette of natural earth and fauna colours and tones moving subtly across the vista as indicated in Fig 11.

Taken in isolation the colours become distinct as a series of shades that change with the light conditions and it is apparent that duller tones and hues play their part in this richness.

The colours could possibly take on a matt/low reflectance. darker colours of the forestry plantations have less clarity than the lighter farmland. The colours of the various elements of the proposed buildings take direct reference to the naturally occurring colours seen in this landscape.



FIG 10 - COLOUR BANDING SKETCH



FIG 11 - COLOUR PALETTE ANALYSIS

LEGEND/KEY

- 1 Lighter tones considered to avoid collision with the sky or tree canopies
- 2 Darker tones utilised in lower bands or low rise infrastructure to break up massing. Shadows or subtle recesses can also serve to reduce mass.
- 3 Rectilinear elements that pick up light and shade introduce layering and help to accentuate variation in tone/colour.

Landscape Response

As described throughout section 3.4, the zoning/phasing, building response and landscape response are all interrelated aspects of the design evolution. This section describes the recommendations for the landscape design response.

In response to the immediate and surrounding landscape context and potential for adverse environmental effects, the site layout and design should respond sensitively to the existing landscape and to mitigate potential significant environmental effects (reported in the EIAR).

Within the EIAR, the assessment of the proposed development taken into account mitigation measures embedded in the design of Kintore Hydrogen Plant. There are also opportunities for further mitigation or enhancement which would help ensure that landscape and visual effects would be minimised as far as possible. These are described briefly in the EIAR, and are further detailed in this document. It is proposed that these measures could be incorporated within the detailed design for the proposed development, as this is developed.

Landscape design should be designed and implemented with reference to best practice and policy, Aberdeenshire Council (2023).¹

Landscape Mitigation Zoning

A number of areas within the site have been identified for further mitigation or enhancement. Within these areas, landscape mitigation is recommended to consist of mixed woodland planting and earthworks to provide screening from sensitive receptor locations and tie the development in with the surrounding landscapes.

These areas are identified broadly on the Planning Parameters Plan submitted with the planning application and also referenced within the EIA Report.

A more detailed illustrative landscape design is shown in [Fig 12](#) of this document, and shows a more detailed plan of the landscaping and ecology areas, based on the Indicative Master Plan developed by Statera and HRI Munro. This is recommended as the basis for further design stages, to be evolved through the planning process.

Levels and Earthworks

It is recommended that the proposed ground levels, heights of features and general masterplan of the site is designed to respond to the site topography. For example, the design should site the tallest part of the development in the northern part of the site, since it is lower and can be more screened by the existing ridgeline and existing planting. The design should also retain the topography and character of The Knock, a locally distinctive high point within the landscape.

In designing new levels and earthworks, there should be sensitivity to existing topography

in the formation of new earthworks, which tie in with existing contours and appear as naturalistic in form as possible. Gentle gradients are likely to be suitable and formed to tie in harmoniously with adjacent topography. Structural integrity should be confirmed by a qualified Civil Engineer. Excavated material from the levelling of the ground around buildings should be used to form the earthworks, where possible.

Planting

It is recommended that proposed planting would comprise:

- areas of mixed woodland (broadleaf and coniferous), areas of broadleaf woodland, areas of Scots Pine, and areas of scrub and a hedgerow;
- to include native species identified on the list of appropriate trees and shrubs native to north-east Scotland linked to in Aberdeenshire Council (2023) advice, see ². Where suitable, these may include *Pinus sylvestris* (Scots Pine), *Quercus Petraea* (Sessile Oak), *Sorbus aucuparia* (Rowan), *Fagus sylvatica* (Common Beech), *Betula pubescens* (Downy Birch), (*Betula pendula*) Silver Birch, *Alnus glutinosa* (Common Alder), *Salix purpurea* (Purple Willow), *Salix cinerea* (Grey Willow), *Salix caprea* (Goat Willow), *Sambucus nigra* (Elder), *Corylus avellana* (Hazel), *Ilex aquifolium* (Common Holly) and *Rosa canina* (Dog Rose) (see [Fig 13](#));
- of local provenance, as determined in accordance with Forestry Commission Practice Note 8: Using Local Stock for Planting Native Trees and Shrubs;
- to exclude invasive non-native species (INNS), in line with Aberdeenshire Council (2023) advice, and NatureScot Code of Practice ³;
- to exclude species in Appendix 1 of Aberdeenshire Council (2023) advice, which lists non-native species that may spread to adjacent land and which should not be planted in schemes close to water courses and semi-natural habitats, and to follow Plantlife guidance⁴
- to be planted at suitable sizes (e.g. smaller planting stock) to ensure establishment;
- to be planted at densities that would meet screening requirements and provide long term plant cover, whereby some areas may be planted with closer spacing where its primary role is immediate screening and other areas may be planted with larger spacing, where its role may be to supplement screening as infill planting or for biodiversity benefits. Generally dense planting is recommended initially, and thinned when crown closure occurs, to establish a strong landscape structure;
- to be planted in an irregular pattern, to avoid an unnatural grid pattern;
- to be protected by suitable plant protection (such as tree guards, and/or deer/rabbit/stock proof fencing, depending on site requirements);
- to be laid out to avoid constraints (to be determined on site by contractors);



FIG 12 - ILLUSTRATIVE LANDSCAPE MASTERPLAN

Legend

- | | | | |
|----------------------------------|--|--|--|
| Site boundary | Hydrogen pipeline | Existing trees, scrub and hedgerows | Proposed Scots Pine Planting (labeled C on the plan) |
| Extension to existing substation | Potential diversion of overhead electricity line | Existing Cultural Heritage Asset to be Retained | Proposed Native Scrub Planting (labeled D on the plan) |
| Stone access track | Overhead electricity clearance zone | Proposed Earthworks | Proposed Mixed Species Native Hedgerow (labeled E on the plan) |
| Loose permeable gravel | Attenuation pond | Proposed Native Grassland Mix | Proposed Mixed Native Woodland Planting (Coniferous and Deciduous) (labeled A on the plan) |
| 2.5m high steel weld mesh fence | Existing stone wall retained | Proposed Mixed Native Woodland Planting (Deciduous and Coniferous) (labeled B on the plan) | |
| Retaining wall | New stone wall | Proposed Deciduous Native Woodland Planting (labeled B on the plan) | |

Stockproof fence to be fully designed and installed to protect proposed planting.

Planting has been designed to take account of relocated underground water pipe (indicative route). Location of existing and relocated utilities and infrastructure to be confirmed.

All landscaping to be carried out in accordance with an approved 5 year management and maintenance programme, and fully detailed hard and soft landscape plan

- to be planted by suitably qualified professional, and subject to inspection and maintenance, as per maintenance contract.

Existing planting within the site is to be retained, as far as possible, per **Fig 12**. Certain planting will need to avoid to be adapted to existing utility infrastructure, depending on the preferences of the relevant equipment owner.

Groundcover

Groundcover is to consist of a suitable low-maintenance native grassland seeding mix. In areas that may become waterlogged, riparian mixes may be suitable.

Drainage

Drainage, including a SUDs design, should be designed in detail, taking on board the findings and recommendations reported in the EIAR and informed by detailed survey work. An indicative SUDs design for drainage, to be developed in further detail, is set out in the Drainage Impact Assessment in Volume 3, Appendix 13.3 of the EIA Report.

Perimeter Treatment

Perimeter treatment, such as fencing and walls, to be designed to meet security requirements of the site, and to meet plant protection requirements.

Sensitivity to Other Constraints

Design of all landscape mitigation to take account and minimise disturbance of constraints, as far as possible.

Implementation and Management

It is recommended that plants and seeded areas be subject to a 5-year maintenance period, and that a Management Plan is drawn up upon further development of the masterplan and landscape plan. As per guidance from Aberdeenshire Council (2023), this would include:

- *“Part 1 – A short term implementation and establishment plan for 3-5 years to be presented primarily as a programme relating to monthly maintenance tasks for establishing all aspects of a new landscape, including grassed areas, shrub planting and woodland planting. A commitment to watering young stock in drought conditions should be included in this section.”*
- *“Part 2 – A long term maintenance plan (5 years +). To address all aspects of management and maintenance for the long-term development and retention of the landscape created, including the programme for grass cutting, weed control, pruning, long term maintenance inspections and replacement planting.”*

Ecological Management

The landscape design has been developed in parallel with the Outline Biodiversity Enhancement and Management Plan (OBEMP) for the proposed development.

Integration of Buildings and Landscape

This development is of a scale that is likely to be visible within the landscape to varying degrees from the surrounding landscape and could potentially be perceived as a large scale development from some locations if not sensitively designed.

Therefore, the design approach must embrace an appreciation of the development in the wider landscape which can only be realised through careful site preparation, resolution of levels and landscape modelling, to integrate it as effectively as possible within the landscape and visual context. For example, there are opportunities to align the buildings with naturally occurring axes in the landscape or to partially burrow some areas so that they read as low lying elements and partially screened in the rolling landscape.

Designed-in mitigation measures (assessed in the EIAR) and further mitigation or enhancement (as recommended in this document) are therefore recommended to ameliorate landscape and visual effects.

Accordingly, the layout, location, ground preparation and landscaping approach is equally as important as the design and appearance of the buildings themselves. A series of modelling exercises and evolving design decisions on formation levels, bunding, ground modelling, landscape design and specifications, have been and will be integral to project development through the consents process.

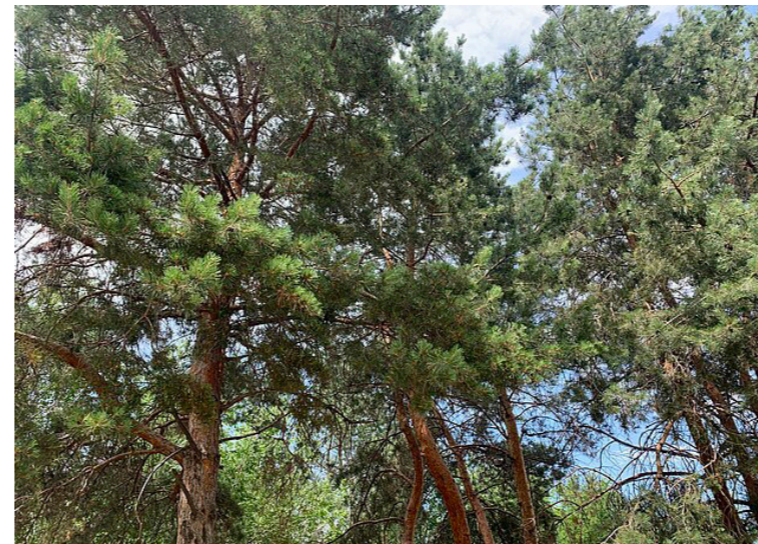


FIG 13 - ILLUSTRATIVE PLANTING SPECIES

4.0 DESIGN PRINCIPLES

4.1 Summary of Key Design Principles

Based on the information within this document, it is proposed that the following principles that have informed the illustrative designs submitted with the application will be considered and prioritised for incorporation into the scheme proposals, in close consultation with Aberdeenshire Council in the final detailed design.

Zoning – The development will be split so that the majority of the buildings/structures, plant and associated equipment can be contained to the north of The Knock, to reduce visual impact on neighbouring receptors. The development will likely be constructed in two or more phases, with the first phase to the northern end of the site and the remaining phase or phases built out from north to south.

Mass and form of the buildings – Where plant is housed in buildings, these will be ordered in neat development clusters, and read as agricultural forms, echoing examples of farm buildings and bonded warehouses of the North East.

Elevation treatment – Cladding colours will be contemporary, but muted, natural and perhaps with the use of banding to integrate better visually with the surrounding countryside.

Levels - The ground levels, heights of proposed features and general masterplan of the site will be designed to respond to the site topography, such as retaining important features such as The Knock and ridgeline through the site, and working with existing and proposed levels to enhance opportunities for screening and embed the proposal within the landscape, as far as practical.

Landscape - Mitigation measures comprising earthworks and planting are proposed to help integrate the proposed development in the surrounding landscape and provide screening for views from receptors closest to the proposed development site, as well as those further from the site.

Existing features – The site will be designed to avoid and minimise disturbance to existing built and natural features (including existing OHLs, trees, cultural heritage assets), developed alongside habitat enhancement and ecological management measures

Biodiversity and ecology – The site will be designed with sensitivity to ecological habitats and will maximise opportunities for habitat enhancement.

Mitigation of adverse effects – The site will be designed to take on board recommended mitigation measures as set out in the EIA.

References

- 1 Aberdeenshire Council (September 2023) Landscaping Design- Planning Advice PA2023-08V, (document focuses on soft landscaping, Siting and Design, Policy P2 Open Space and Access in New development, and Appendices 8 and 9 of the Aberdeenshire Local Development Plan 2023).
- 2 <https://www.aberdeenshire.gov.uk/media/19015/2012-01-09-native-tree-species.pdf>
- 3 <https://www.nature.scot/professional-7> PA2023-08 Planning Advice Landscaping Design
- 4 <https://www.aberdeenshire.gov.uk/media/19037/2014-plantlife-landscaping-without-harmful-plants.pdf>