Cato Data Centre

Design & Access Statement

A report to Fife Council

CATO

The STOICS

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Introduction

This document supports an application by ILI Cato Limited (the "Applicant") to Fife Council for Planning Permission in Principle under the Town and Country Planning (Scotland) Act 1997 (the "Application"), for a data centre facility at Land north-west of Auchtertool, Fife, nearby postcode KY2 5XW. The proposal is known as Cato Data Centre (the "Development").

The Application seeks Planning Permission in Principle for the provision of a data centre campus comprising a complex of data hall buildings, plant, electricity substations, security fencing, gatehouses, internal access roads, parking, pathways, associated ancillary infrastructure, and landscaping including ponds, landscape bunds, new woodland, wetland, hedgerow, scrub, and wildflower meadow habitats.

This report demonstrates how the Applicant has employed an iterative design-lead approach in full compliance with planning policy, particularly National Planning Framework 4 polices 8, 12, 14 & 29, and Fife Council's Local Development Plan polices 1,7,13 &14. The various iteration stages are presented alongside explanatory figures. The appendices include technical drawings, and commentary on relevant planning guidance provided by the Local Authority.

Iterative Process

The objective was to produce an outline design and illustrative layout for planning submission, which could be further refined in future iterations to produce a final technical design at Approval of Matters Specified by Conditions ("AMSC") stage. The iterative process is summarised below. At each iteration stage the design was refined to:

- Establish design brief
- Consider site constraints
- Validate desk-based assessment via site visits
- Develop concept design
- Present to public and incorporate consultation feedback (Proposal of Application Notice)
- Incorporate Pre-Application Consultation advice and planning policy
- Undertake preliminary assessments, incorporate findings
- Develop building concept
- Refine design to inform final assessments , incorporate findings
- Produce final illustrative layout to inform the submission document set

Design Brief

The brief was to produce an outline design for a hyperscale data centre facility, on the land available. The capacity was defined by an associated grid connection, to be made from either of two local substations. The technical specification of the equipment, final function of the facility, and end user are yet to be established. The outline design aimed to produce a set of parameters around which a final technical design could be developed in due course by any end user at AMSC stage.

Potential end users may include single operators, colocation providers (wholesale or retail), and cloud service providers, each with specific technical requirements. The relative mix of IT equipment depends on the data services offered. More traditional data storage systems tend to require more IT space, whereas modern high power density systems such as those used for AI services usually require a smaller footprint, but more complex electrical arrangements. Depending on the IT equipment and local environmental conditions, facilities may employ a mix of traditional air cooling and modern liquid cooling systems. Variations also exist in the uptime reliability, redundancy and security, commonly graded in tiers. Each of these factors has certain implications for the overall site design, which were all considered throughout the process. Increasing demand for data processing capacity and the rapid progress of innovation in computing technology have led to a common preference for a phased approach to construction.

The design brief for Cato Data Centre was further developed by the Applicant in consideration of three linked proposals known as 'The Stoics', with the objective of delivering essential AI-ready data services across the Central Belt of Scotland, supporting the Just Transition to Net Zero by employing the highest standards of sustainability and driven by an abundance of renewable energy supply.

Several core design principles were developed to satisfy the brief:

- A complex of large multiple story Data Centre buildings of a practically buildable size. Each as a standalone facility, preferably of identical footprint and repeatable design. Each building to include:
  - Multiple secure data halls maximising available IT space
  - Electrical and mechanical rooms for associated equipment
  - Ample flat roof space for high efficiency free-cooling equipment, service access and redundancy
  - Ground level external plant compound for additional cooling, electrical and mechanical equipment, service access and redundancy
  - Office space for technical services, campus research and administrative staff
  - Staff facilities, stairs, goods lifts and emergency escape routes
  - HGV loading and staging areas
  - All around vehicle access for servicing and emergencies

- Additional area for associated infrastructure, including:
    - Substations for electrical connection at both transmission and distribution voltage
    - Ancillary buildings and equipment , including security, storage and fencing
    - Access routes for staff travel, including accessible and cycle parking
    - Buried service routes including power, data, water, and drainage
    - Surface water drainage management
    - Free space for landscaping measures and design contingency
- Remaining area for inbuilt mitigation, including:
    - Separation from local receptors and visual screening
    - Habitat mosaic maximising biodiversity gains

A set of key metrics were developed to define the parameters, including typical ratios of footprint, provision for redundancy, assumed power density and Power Usage Efficiency. These parameters were then applied to the design, in consideration of the location setting; existing site constraints; design principles; various construction, technical and safety standards; as well as local and national planning policy.

Design Evolution

In each iteration of the design process technical drawings were produced in consideration of site constraints, to provide information on which specialist assessments could be adequately made, to inform the public about the Development and incorporate feedback, and in respect of the submission requirements stated in Fife Council's formal pre-application report. The aim of the iterative process was to produce a set of drawings presenting the outline design of the Development and complementing various supporting statements on which Planning Permission in Principle could be deemed to be granted.

An illustrative layout of a buildable facility comprising typical buildings and equipment was produced, based on the design parameters. The parameters were developed in consideration of the brief, various technical standards and policies, and in-depth research of similar facilities both built and proposed. Reasonable margins were applied to provide contingency for fair assessment and for a final technical design to be produced in due course, without unnecessarily restricting the choice of equipment or other requirements of any potential end user.

The approach of defining an area in which the majority of the built development could be located, subsequently referred to as the Development Area, was undertaken to allow all elements of the site design to be properly considered, whilst satisfying the design brief and providing adequate mitigation against impacts. Designing an illustrative layout within a clearly defined area enabled assessments to be undertaken without a full technical design being defined.

The Development Area is not the area on which consent is to be determined, but an indication of the area required to accommodate a viable facility. This area was continually refined, from over 30ha to under 25ha in the final iteration, ensuring the brief could be fulfilled whilst minimising land take and maximising mitigation.

Figure 1 shows the final iteration of design used to inform the document set for Planning Permission in Principle. The design process undertaken is set out in the sections below in chronological order, to demonstrate the key stages of iteration and how the design has continually evolved in respect of all pertinent matters.

Fig.1

Existing Site Constraints

The design initially considered any existing constraints within the site and surrounding area. Constraints may naturally restrict the extents of the built development but can also present opportunities for mitigation and enhancement. By closely considering these factors a design concept could be developed , and key areas of mitigation could be defined to ensure a viable project.

Topography & Landform

Several escarpments exist within the site boundary. This indicated that the built development should generally be located between these features, to minimise any associated impacts, particularly given the proximity to the town of Auchtertool. As a key component of the local landscape character identified by the local community during the pre-application consultations it was decided that no built development should be sited in front of these features. The topography of the area between these natural features is more suited to platforming large areas of hardstanding for appropriately sized buildings and infrastructure.

The landform of the South side of the site provided a natural route back to a suitable road for access, following a disused track in an existing cutting between the escarpments. A second access point was identified, joining another local road at an existing field entrance. The access points were subsequently defined as 'Main Access' and 'Secondary (emergency) Access' in consideration of various factors including gradient, sightlines and estimated local traffic impact.

Local Employment Zone

The majority of the site lies within an area allocated as a local Employment Zone in Fife's Local Development Plan. The southern boundary roughly follows the landform described above. An initial core area for built development was defined within this boundary, seeking to maximise the employment potential of the Development in respect of this allocation.

Core Path

Core Path 496 runs roughly through the centre of the Development site area , a potential (enhanced) diversion has been identified and has been proposed to enable a viable project. The proposed new route would follow an existing railway cutting, and route viability was assessed during initial site visits. The new route presents an opportunity for positive amenity impact, improving access to a local Wildlife Site utilising an existing cultural heritage asset, that would contribute towards Fife's Active Travel Plan by enhancing the existing condition and accessibility, which is generally poor and indistinct in its current form.

Railway Cutting

An existing railway cutting, part of the dismantled Kirkcaldy & District railway line, presented a natural barrier to development in this area. Further West the route of the railway has been infilled to create farm pasture and becomes indistinct. The cutting, informally used by some local residents but hard to access, overgown and wet in places, presented a good route for redirection of the core path. The depth of the cutting and mature surrounding woodland would act as a natural barrier to any adverse impacts in this section. As a natural direct route to local service connections the cutting is also considered a suitable route for wastewater and potential heat network pipework, subject to viability. An alternative route for these services was subsequently considered within the design.

Wildlife Site

The existing Auchtertool Linn Wildlife Site presented an additional constraint to be considered in the area around the railway cutting. This includes the linn itself, a disused header pond for a defunct local distillery, which remains on land outside of the Applicant's control. The benefits of this constraint were evident however, and the early ecological strategy prioritised preservation, enhancement and extension of this area of native woodland. An arboreal specialist was consulted throughout the design process to ensure minimal impact on existing trees and to inform the landscaping proposals.

Dronachy Burn

An existing watercourse runs through the site, found to be in relatively good condition and with high potential for supporting local ecology. The general approach was to avoid any development in the area around the Dronachy Burn, other than to provide outflow points for surface water drainage. A separation distance of 20m was subsequently developed as a suitable buffer to the Development. The buffered area presented an opportunity for new planting to extend the habitats found in the wildlife site and enhance the area around the route of the proposed new path which follows the burn after leaving the railway cutting.

The preferred main access route would need to cross the burn. Several crossing points exist but none were found to be of a standard appropriate for vehicular access. An outline area for a new bridge was subsequently considered in the area least likely to impact the burn and any existing trees.

Flood Risk

An area of flood risk associated with the Dronachy Burn was identified in reviewing SEPA flood maps, covering a large portion of the site. This indicated that this constraint should be prioritised at an early stage to ensure a viable project in full compliance with environmental and planning policies. A specialist flood consultant was employed at the earliest possible stage. An area was subsequently reserved for a new flood storage area, including additional biodiversity wetland.

Amenity Impact

Local receptors were identified and then buffered equally to determine the optimal centre of the Development. This was to ensure that any potential amenity impacts could be mitigated equally for all local receptors. Potential impacts considered included noise, light pollution and visual obtrusiveness.

Hallyards House Remains

An existing cultural heritage asset was identified on a part of the site critical to delivering a viable project. Despite the asset's non-designated status and a modest amount of remains in evidence, a specialist heritage consultant was employed at an early stage to fully assess the asset and define a suitable mitigation strategy in consultation with Fife Archaeology Unit.

Existing overhead power lines

Several local 33kV distribution lines run through the site on overhead wooden poles. To deliver a viable project it was necessary to find suitable diversion routes which could accommodate these lines, with sufficient offset to the Development . Corridors within new planting for the expected servitudes were considered. Final routes will be made by buried cable, in agreement with the Energy System Operator.

The constraints identified, and the initial area which could accommodate the majority of the built development are summarised in figure 2. Allowance was made for inbuilt mitigation in the remaining area, with that area prioritised for the creation and enhancement of biodiversity habitat, in the form of various landscaping measures.

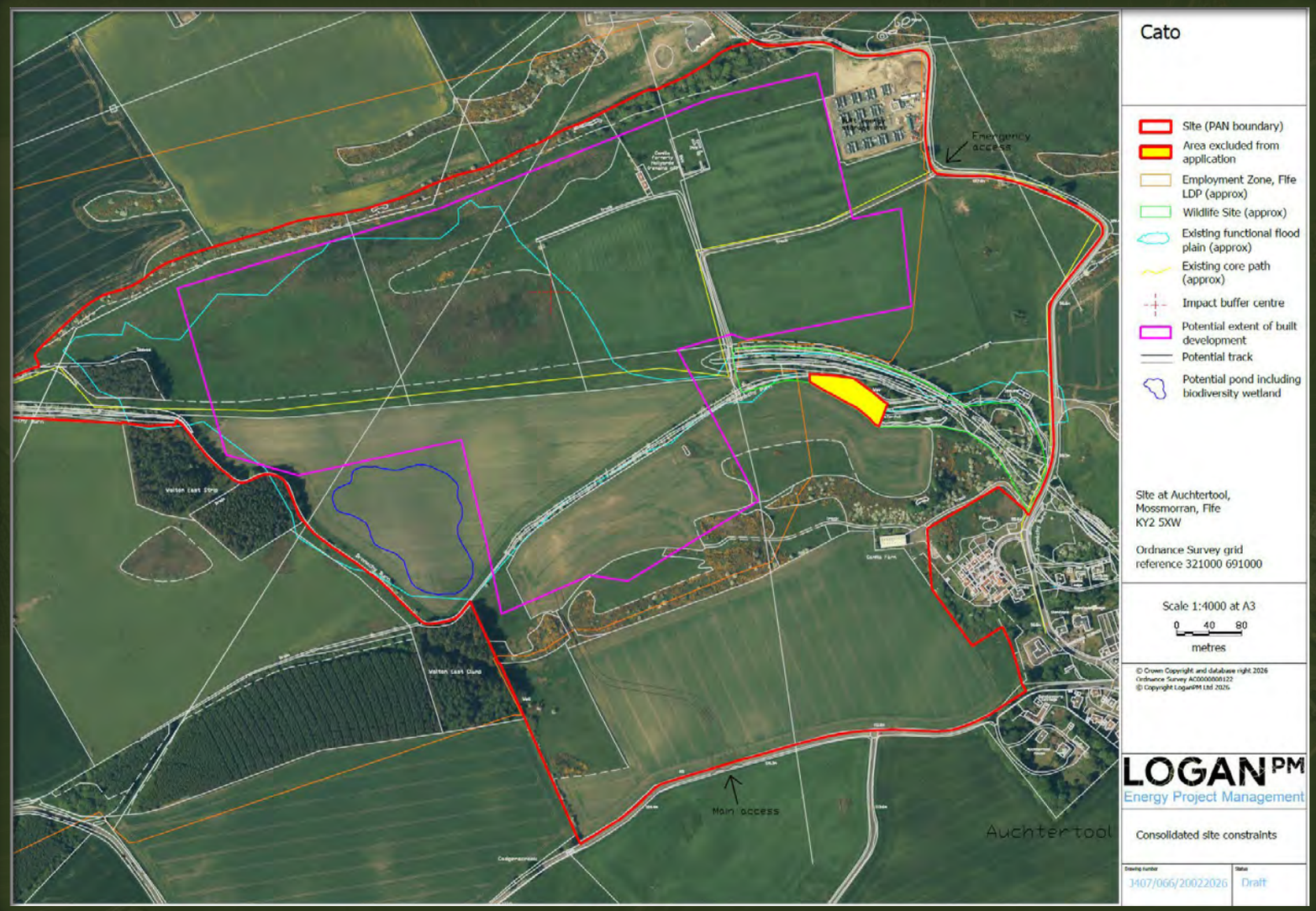

Fig.2

Iteration stage 1: Initial Concept Layout

The site constraints were carefully considered to develop a viable concept design for the project. Where the viability of the project was likely to be affected, mitigation against existing constraints was considered. Feasibility of any mitigation was informed by planning policy and specialist assessments.

- The initial design sought to avoid all site constraints. The resulting concept layout was not considered viable, due to:
  - Insufficient area for buildings and electrical infrastructure to fulfill the brief, including mitigating landscape measures
  - Potential surface water impact on existing flood area (maximised approximation shown)
  - Adverse impact on existing core path
  - Unavoidable impact on features associated with the former railway
  - Poor use of local landscape topography / potential prominence at local receptors
  - Proximity to preferred point of electrical connection and main access
- To ensure viability a potential modification of the existing flood plain was prioritised. A specialist consultant was engaged at an early stage to assess feasibility against planning policy in accordance with SEPA guidance
- A specialist heritage consultant was engaged to assess impacts any assets and options for appropriate mitigation. All subsequent revisions of layout isolated Hallyards House remains to a single building plot to allow for the investigation and mitigation proposed to occur in isolation

Fig.3

- A core area of built development was defined, to enable priority assessments to consider worst-case impacts. This area was subsequently referred to as the Development Area
- Estimated flood storage basin included. Large area reserved for contingency and additional surface water drainage management
- Concept layout of building footprint to fulfill brief, sited to better suit topography and landscape setting. Reaming space assumed to include internal roadways, electrical and ancillary infrastructure
- Two potential access points assessed, considering optimal sightlines at entrances, routes following existing tracks where possible. Potential re-use of existing bridge for internal access to cross the burn
- Key areas of new planting identified to aid visual screening around entrances. Mix of landscape measures indicated to create a mosaic of habitats, subject to ecological assessment
- Route of existing core path unobstructed, pending review of alternative routes to limit predicted impacts

Fig.4

Incorporating Consultation Feedback

The illustrative initial layout was shared with the public and Planning Authority during the consultation period (shown in Figure 3). Information at public events was presented in a simple schematic form showing the proposed scale and nature of the project and its setting within the surrounding landscape, to aid understanding and discussion.

The potential building footprint shown was maximised, whilst a main area of development was highlighted to show the offset from the site boundary and local receptors, in keeping with the local landscape and potential for extensive landscaping measures in the remaining area. Other aspects including potential redirection of the core path were discussed.

Feedback gathered from the consultation events indicated that site access and any associated traffic impact should be prioritised. Most local road users agreed that the main access should be from the B925, rather than the K11 Auchtertool-Lochgelly road. The associated road layout and main entrance design were subsequently developed in consultation with the roads department of Fife Council.

Another key concern was avoiding visually obtrusive electrical infrastructure such as pylons and impacts such as light and noise pollution. These issues are prevalent in the area due to the nearby Mossmorran gas works and other renewable energy developments. Subsequent revisions to the site layout and development of the building concept design and massing were carefully considered in respect of this feedback.

The public were encouraged by the large buffer between the main area for development and local receptors, and it was noted that the remaining area should seek to minimise amenity impacts and enhance ecology where possible. The proposal to redirect and improve access to the core path found a high level of support, as it was widely reported to be underused, or even unknown at present.

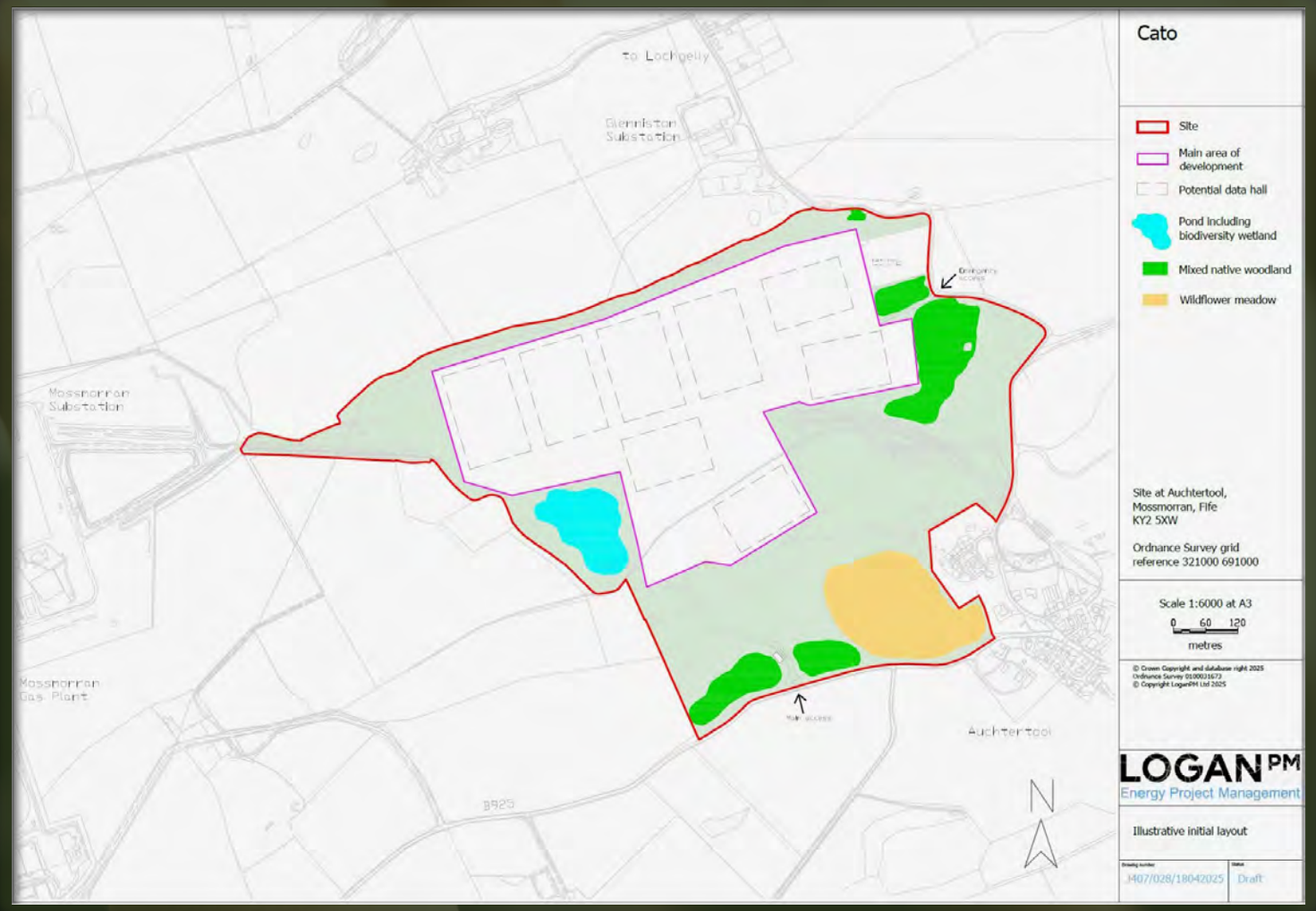

Fig.5

Incorporating Planning Guidance

Fife Council's pre-application response report advised an approach that would ensure compliance with national and local planning policy, particularly National Planning Framework (NPF4), and Fife Council's Local Development Plan (LDP). A full description of the Development is provided in the Supporting Document to fully establish the principle of consent, whilst various specialist assessments were undertaken in consideration of specific planning policies.

Key design principles of NPF4 were kept at the heart of the strategy, including those in The Scottish Governments' Creating Places guidance, and the related supplementary guidance Making Fife's Places. The 6 qualities of Making Fife's Places are:

1. Distinctive
2. Easy to Move Around and Beyond
3. Safe and Pleasant
4. Welcoming
5. Adaptable
6. Resource Efficient

A summary of how the Development will accord with the LDP supplementary guidance is included as an Appendix to this report.

Design Principles

Sustainability is a key guiding principle of both NPF4 and Fife planning policy and is not limited to considering natural heritage impacts. The aim is to facilitate development that is useable, resource efficient, and inclusive, supporting longer term policy objectives such as the Just Transition to Net Zero. A set of core design principles were developed to prioritise sustainability at all stages of design, construction and operation of the proposed facility:

- Ecologically Beneficial - Inbuilt mitigation. Habitat mosaic, biodiversity enhancement, green infrastructure
- Minimal Construction Impact - Land take, earthworks and retaining structures
- Minimal Environmental Impact - Amenity impact. Low carbon materials and transport
- Zero Waste - Reuse of materials, local and sustainable sourcing
- Inclusive - Accessible site, buildings, parking , and public spaces
- Successful – Economically beneficial. Cost effective. Secure, safe and pleasant places
- Distinctive – Architecture suited to place and purpose
- Net Zero – Low emission, carbon free and local transport travel

Though certain measures cannot be fully quantified before a final technical design is produced, the outline design included margins to enable principles to be preserved in any future iterations of the design. A similar approach was undertaken with specialist assessments, which were generally made on a worst-case basis providing a baseline condition for the determination of consent to be further optimised in a final design in accordance with planning guidance.

Incorporating Assessments

The findings of specialist assessments undertaken in support of the Application were fed back into the design. Examples include:

- Appropriate scale and massing of the main buildings, with a layout to minimise amenity impact
- Maximising the new flood storage area, providing appropriate separation to exiting water courses, and adjusting made ground levels to achieve minimum Finished Floor Levels
- Increasing separation from the Development Area to watercourse and walking route
- Adjusting access routes to avoid unnecessary tree felling and impact on roots structures
- Native species planting, habitats to support local wildlife and food web, extensive enhancement measures
- Allowing for drainage and flood basins to incorporate new wetland habitat

Considering a worst-case scenario at the outset allowed for inbuilt contingency. The Development Area was initially maximised to inform assessments, and then continually refined in light of the findings. The remaining area was similarly revised to maximise landscape mitigation and habitat enhancement. Multiple iterations of building layout and massing were considered and continually refined to minimise impacts, whilst satisfying the brief.

The specialist assessments submitted in support of the Application, guided both by the formal pre-application process and best practice, include landscape, ecology, arboreal, drainage, flood, geoenvironmental, air quality, noise and heritage. A series of technical drawings and design files were provided alongside the project brief and any desk study findings, as the basis for each assessment. Drawings were also provided to inform the Planning Authority and other key consultees for aspects such as heritage, electrical and water connection, road design and transport impact. Additional assessments were undertaken to establish viability of certain proposed elements which are not included with the Application. The design was continually refined in consideration of the findings of any assessments commissioned by the Applicant.

Iteration Stage 2: Concept Layout Development

A concept layout of the site was developed to inform key assessments including flood, drainage, and ecology. The layout was revised in consideration of assessment findings providing a sound basis to undertake further assessments including landscape, noise and cultural heritage impact, before the building design and massing concept was developed. Example figures are provided.

- Layout condensed to fewer buildings of uniform footprint, moved away from eastern boundary where estimated ground levels would lead to higher visual impact
- Construction area / auxiliary building plot included south of burn
- On-site access considered. Initial track layout including large and emergency vehicle access, turning and parking areas. S-bend in tracks to avoid direct views into the site. Potential new bridge location considered
- Substation area added, closest to most likely point of connection
- Access including security points considered
- Viable route for redirected core path identified. Route following disused railway cutting, including wastewater and potential heat network

Fig.6

- Early indications suggested the flood storage area may need increase. Storage ponds for surface water drainage would also be considerable due to large areas of impermeable surface, and to provide sufficient wetland habitat to mitigate for loss of marshy grassland
- Development Area drafted within the original core area to accommodate all built development, associated security and ancillary equipment, assumed to be mostly impermeable. All flood and drainage measures now to be accommodated outside of the Development Area. Final Development Area to be revised towards a minimal footprint following this principle
- Bridge area refined and offset further from the burn and new walking route to provide separation, reduce engineering impact and allow for additional habitat creation
- Auxiliary plot reshaped to improve access avoid unnecessary cutting into north side of escarpment

Fig.7

Iteration Stage 3: Layout Assessment

The layout was developed further in consideration of the findings of the Flood Risk Assessment, Preliminary Ecological Appraisal and Arboreal Assessment. A worst-case approach was assumed for subsequent assessments to ensure a viable project and allow margins for a final technical design. In general, assessments were based on an area wider than the actual Development Area to provide fair assessment of the principle of development within the local setting. Example figures are provided

- Planning boundary defined within original red line boundary used for the Proposal of Application Notice. "Excluded area" mapped around millpond, within wildlife site
- New flood storage area, indicative channel and basin added from Flood Risk Assessment including separation strip to the Development Area
- Overly dense building layout to provide worst case impermeability, and all potential locations for SuDS ponds included to inform initial drainage assessment. Potential additional attenuation measures within the Development Area indicated
- Development buffer / root protection fencing from Arboreal Assessment included. Development Area, bridge location and new path route refined accordingly
- Main entrance reshaped, including improved pedestrian and cycle access into site and continuing along boundary to connect with existing routes near Auchtertool. Revisions to junction layout made subsequently in consultation with Planning Authority
- Planting scheme extended, including enhancement of local wildlife site, and new riparian barrier between flood area and existing burn. Large areas reserved to assess maximum biodiversity impact
- Alternative substation location considered at East, potentially of lesser visual impact here (subsequently found to be impractical)

Fig.8

- Height parameters defined to assess visual impact. Two areas of maximum height in consideration of local topography, existing built environment, approximate site levels, and minimum finished floor levels advised in the Flood Risk Assessment:
  - A northern area: Accommodating the main data centre buildings, substation, and associated infrastructure– up to a maximum 35m height
  - A southern area: Accommodating an auxiliary data centre building, entrance area including security lodge, parking areas, and ancillary equipment – up to 12m height
- The Zone of Theoretical Visibility used in the Heritage Impact Assessment was based on the whole area, for worst case impact. The subsequent Landscape and Visual Assessment considered specific buildings in more detail after the building design and massing was developed
- The final height parameter areas were revised in respect of the Development Area, following this principle

Fig.9

Iteration Stage 4: Layout Development

An outline master plan was produced to inform the second stage assessments and final round of layout revisions. The layout is composed of six data centre buildings, each with an identical footprint to deliver the design brief and allow for a phased approach to construction. Substation, parking, roadways and security buildings were considered more closely, and remaining free space allocated to ancillary buildings and equipment.

- Substation area moved back to West due to proximity to point of electrical connection, improved large vehicle and operator access
- Main building footprint refined considering largest viable buildings and a repeatable design
- Main car park resized and relocated to suit new road layout
- Development Area further reduced near bridge route to provide more separation to walking route
- Site levels considered from initial cut and fill exercise, potential landscape bund included on flood separation strip
- Entrance and security reconsidered, including vehicle rejection route
- Potential SuDS locations reduced after initial drainage assessment findings, replaced with alternative habitats including additional wetland areas in case retention ponds were not viable
- New planting and habitat areas extended, including meadow and scrub areas

Fig.10

- Though no technical specification was made the illustrative layout was informed by consideration of typical equipment. Each building footprint included:
  - Internal IT space as separate data halls, approximate server racks and associated electrical plant, cooling conduits and emergency escape routes
  - External plant compound for electrical and cooling equipment
  - Loading bay and lift access
  - Office space including service and technical rooms
  - Service and emergency vehicle access to all parts of the building
  - Dedicated close-proximity parking areas including accessible spaces
  - Separation to roadways for access, buried services, and green verges
- A seventh data centre building was included for fair assessment, subsequently reassigned as a campus lab / office building following architectural development

Fig.11

Iteration Stage 5: Building Layout Development

The building and massing concept was developed in conjunction with a team of award-winning architects at Graeme Nicholls Architects to achieve the optimal design to satisfy the brief in consideration of the parameters defined in earlier stages.

- Areas were provided for revision to building location, footprint and massing. Remaining space was allocated for substation design, access, ancillary buildings and equipment
- Approximate site levels, and viewpoint locations from the Landscape and Visual Assessment were provided to inform the building position, aspect and massing
- The character of the wider area was considered for context, including landscape setting and topography, existing large industrial buildings, built and consented local energy projects and associated infrastructure
- Assessment from visual receptors indicated buildings should be realigned with entrance and office space facing South, in consideration of impact mitigation and a pleasant working environment in operation
- Exiting cultural heritage asset location identified to ensure the isolation to a single building plot was maintained

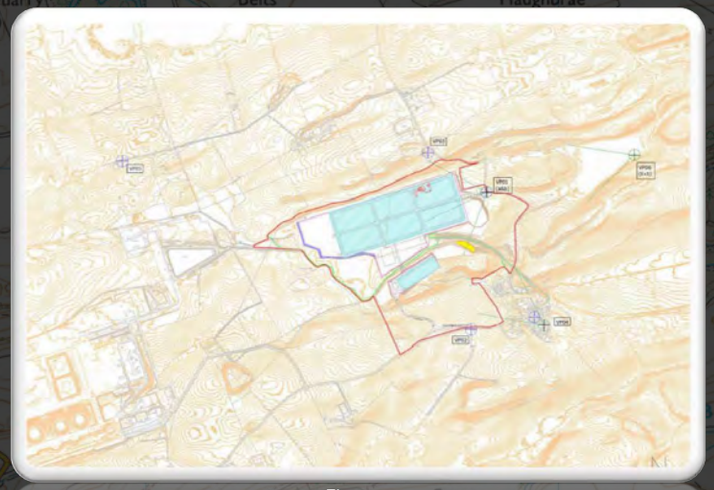

Fig.12

- Indicative substation design produced including fenced transmission compound for safety and dedicated operator access. Additional substation area for conversion to site voltage, including potential buildings
- Site roadways and parking layout refined. Localized accessible parking and HGV access to buildings improved. Road bridge relocated to simplify access, including potential oversized vehicles. The final route avoids an existing stone bridge which was identified as having good bat roost potential
- Development Area refined further, to accommodate reshaping of entrance. Entrance to include more practical security and rejection route, deliveries, potential public transport access and refuse collection
- Ancillary Area developed further, including potential above-ground water and/or fuel storage equipment
- Various building layout options assessed during initial massing discussions to inform the final architectural concept design

Fig.13

Iteration Stage 6: Building Design & Massing

Overview

Graeme Nicholls Architects were appointed by ILI Cato Ltd to develop the concept design for a new data centre campus near Auchtertool, Fife. Cato Data Centre is the first in a proposed hyperscale network across Scotland's Central Belt, known as 'The Stoics', and forms part of a significant investment in Scotland's digital and economic infrastructure. The name reflects the Applicant's interest in the ancient Greek philosophy of Stoicism, with its associations of strength, resilience and endurance.

The design draws on the ancient Greek stoa, a covered colonnaded walkway where Stoic philosophers gathered to exchange ideas, and on the related classical tradition in which proportion, order and harmony were understood as expressions of a wider philosophical worldview. This is reflected particularly in the work of the sculptor Polykleitos, whose Canon set out a system of idealised ratios for the human form, linking geometry, balance and proportion.

Design Brief

The brief focused on the data centre buildings within the wider site and was developed in close collaboration with the wider team, including our clients ILI Group, who steered the overall philosophical and ethical direction of the project.

The assignment called for a series of six data centre buildings, each containing a data hall, office space and associated plant and service areas. A seventh standalone office / lab building to the south formed part of the design remit.

Design approach

In response to the operational and spatial requirements of each building, and with the aim of creating a coherent development within its landscape setting, a bespoke proportional system was developed for the project based on the ratios found in Polykleitos' Canon. This establishes a related series of dimensions, applied consistently across the buildings, and rooted in a 450mm 'cubit' to give the proposals a clear human-scale reference at their core.

The proportional system informs a series of six stepped blocks, clad in profiled anodised aluminium. South-facing office accommodation for each data centre is defined by a stoa that draws on these principles, while providing solar shading in summer and sheltered external space within the exposed landscape setting in inclement weather.

The result is a robust and disciplined architectural expression that mediates between human-scale and hyper-scale.

Fig.14

Development

The building design was developed through an iterative process balancing aesthetics, operational needs and visual impact. Logan PM led on the functional, organisational and spatial requirements of the buildings.

- Concept building footprint optimised, considering typical equipment and target parameters provided:
    - 10,000m2 data hall floor space
    - External plant compound of 20m width
    - Office space of 12m height
    - Loading bay for 2 HGVs
    - Access including lifts, stairs and emergency exits
- Proportional framework informed by Polykleitos' Canon
- Harmonic ratios including 2:3, 3:4 and 3:5 used to organise form. Structural bay of 7200mm derived from this system

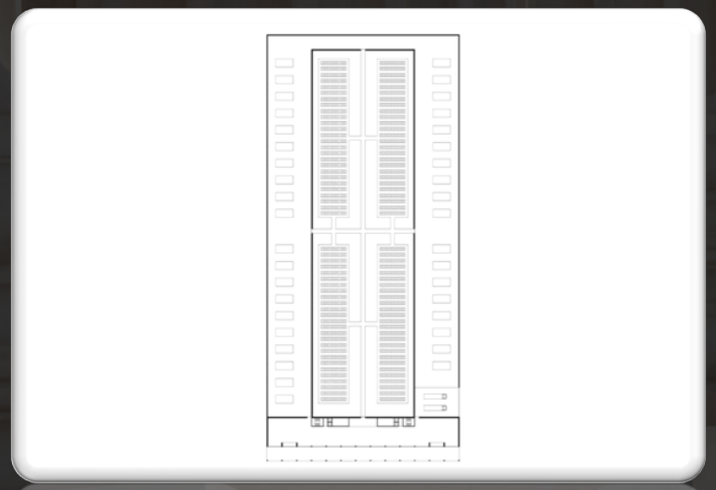

Fig.15

- Consistent dimensional logic applied from detail to overall building scale
- Several massing options assessed with the wider team including landscape architects to optimise the layout
- Final massing concept using a mixture of building forms in consideration of visual impact within the wider landscape

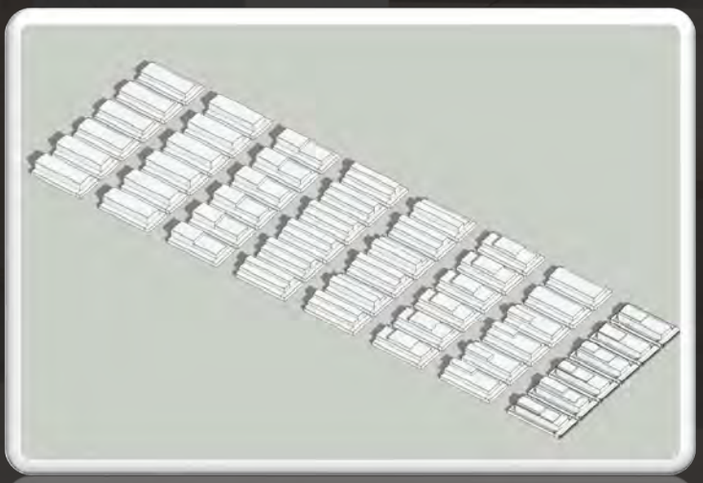

Fig.16

Massing Concept

A series of six data centre buildings within the Development Area in a linear side-by-side arrangement with all around road access. Each block incorporates office accommodation to the southern edge, creating an active facade and taking advantage of views for occupied areas.

The overall heights and stepping of the buildings have been developed through an iterative process informed by both the proportional system and the Landscape and Visual Appraisal, resulting in a massing strategy that is higher to the west and lower to the east in response to wider views of the development.

- Stepped massing used to break down scale and improve landscape integration
- Data hall space and rooftop plant compounds in upper steps. Building volumes above 12m height remain unlit
- South-facing stoa elements provide solar shading and sheltered external space

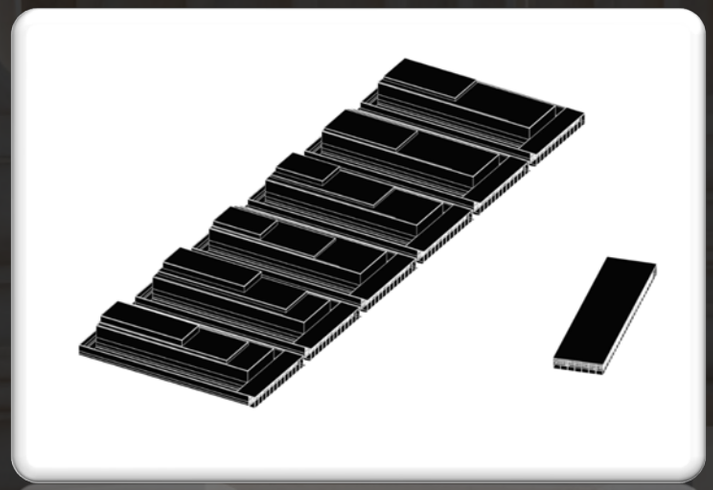

Fig.17

Local Landscape Setting

- Site located within an open agricultural landscape, with large industrial infrastructure present. Long sections produced to assess massing against landscape character and features
- Linear arrangement of data centre buildings responds to the wider landscape grain
- Buildings designed to recede within the skyline. Stepped forms reduce perceived scale of hyperscale buildings
- South-facing office elements introduce activity and human scale to the elevation
- Illumination limited to south-facing office areas at lower levels to reduce light spill within the wider landscape

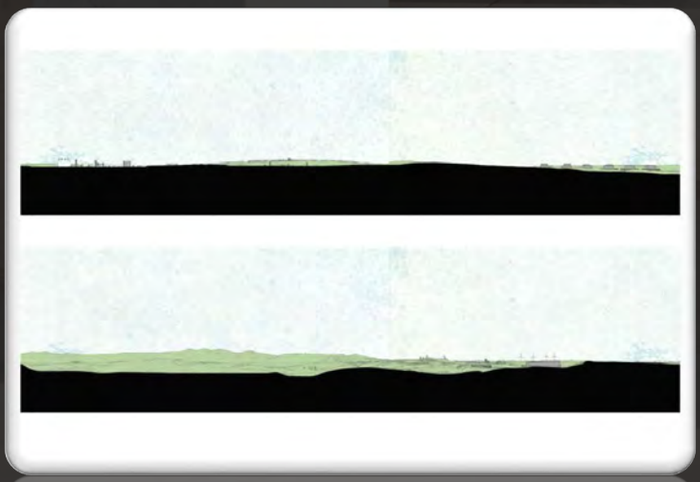

Fig.18

Building Finish & Materiality

A consistent material palette is proposed to minimise visual impact giving an overall restrained composition, aligning with the aesthetic principles of Stoicism.

- Concept draws on the ancient Greek stoa and classical proportional systems, based on a 450mm cubit establishing a human-scale reference
- Complementary monochromatic palette includes curtain walling, block paving and smooth aluminium to stoa columns

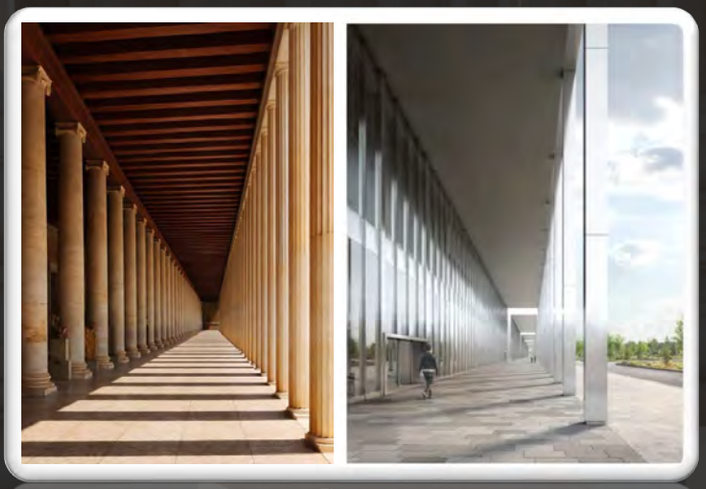

Fig.19

- Consistent material palette of profiled anodised aluminium cladding across all buildings reference the surrounding agricultural landscape. Matt finish assumed in line with the Landscape and Visual Appraisal
- Colour and tone of Buildings designed to minimise visual impact and recede within the skyline. Final finish to be agreed with Fife Council
- Building materials to be fully defined in a final technical design in consideration of specialist assessments and planning policy, such as:
    - Sustainably soured, recyclable and low carbon impact primary materials e.g. anodised aluminium and green concrete
    - Windows in office / entrance only, materials to minimise light pollution e.g. electro-chromic glass
    - External equipment compounds of permeable aggregates base, locally sourced
    - Additional green infrastructure such as green roof and wall elements

Fig.20

Iteration Stage 7: Final Assessments

The building and massing concept was fed back into the design allowing specialist assessments to be completed and ensure consistency across the reports submitted in support of the Application. The Development Area was divided into several subsections to aid description of the Development. Reports updated included heritage, arboreal, ecology, landscape, flood and drainage. Example figures are provided.

- Due to the scale of the Development and the requirement for flood management the Surface Water Drainage Assessment included a second stage detailed design. The design confirmed a viable strategy, without the use of pumping systems
- Several catchments were created to account for the relative permeability of built surfaces, each with independent attenuation and outflow. Outflow routes provided where direct routes would conflict with landscape measures
- Several buried storage tanks specified within the Development Area to allow for a viable site design and limit excessive excavation of open ponds.
- SuDS pond area and depths revised, inclusion of water retention for wetland habitat confirmed. The original larger area (+45% pond surface area) remains free of built elements and landscaping as contingency for a final site design
- Route of new public path including wastewater finalised. Alternative route identified for path, wastewater and district heating, should the route through the railway cutting prove unviable

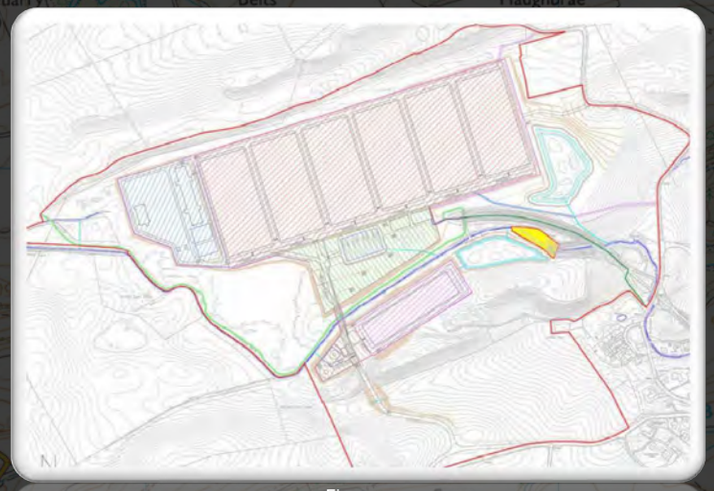

Fig.21

- Development Area subsections approximate to drainage catchments. Each area serves a distinct purpose in terms of built form
- The indicative extents of each area and height parameters of potential buildings and equipment were used in the final Landscape and Visual Assessment:
  - Main Building Area: 16.1ha, buildings up to 35m
  - Substation Area: 3.1ha, buildings up to 15m
  - Ancillary Area: 2.9ha, buildings up to 12m
  - Construction / Auxiliary Building Area: 1.9ha, buildings up to 12m
  - Entrance Area: 0.8ha, buildings up to 12m

Fig.22

Iteration Stage 8: Final Illustrative Layout

Revised drawings were updated to finalise all assessments for submission. The plans below outline two key areas of the design on which Planning Permission in Principle could be deemed to be granted – The Development Area, and proposed landscaping in the remaining area. Of the 68.7ha of available land, 24.8ha is proposed as Development Area and 40.9ha for landscaping including water storage. The remaining area of 3ha reserved for access including new road junction and public path, expected servitudes for buried services, and margins to assess impacts on a worst-case basis.

- The illustrative Development Area layout includes:
  - Perimeter security fencing, gates and vehicle traps
  - 6 main Data Centre buildings of identical footprint and 1 axillary building, each with: data halls office space, loading bay and external plant compounds
  - Transmission and site distribution substation equipment and buildings, secure fenced transmission compound
  - Entrance area including vehicle rejection route, turning areas including public transport, enclosed by perimeter stock fencing
  - Single carriageway industrial type roads of 7.3m width. Shared-use pedestrian / cycle tracks at 2m width, road crossing points. Single span bridge area of 14m width
  - Main car park and local additional spaces including accessible, EV charging and cycle storage
  - Ancillary buildings and equipment including security lodge, potential heat network terminus, water and fuel storage tanks
  - SuDS ponds with side slopes of 3:1, including water retention basins for wetland habitat
  - Approximate site levels, 2:1 cut slopes and landscape bund. Made ground levels to achieve recommended FFL of 117.15m
  - Proposed new walking and cycling path at 2m width on site, widening to 3m along public road

Fig.23

- The landscaping layout includes a mosaic of habitats. Area breakdown:
  - New trees, native broadleaf: 6.7ha;
  - New trees, broadleaf / pine mix: 1.1ha
  - New trees Scots Pine: 0.17ha;
  - New trees, mixed pine: 0.4ha
  - New semi-mature mixed trees, riparian barrier: 120 approx.
  - New scrub planting: 2.5ha
  - New wildflower / grass meadow: 9.8ha
  - New hedgerow:3.4ha (1.6km)
  - Flood area and wetland: 4.7ha
  - SuDS ponds and wetland: 2.2ha
  - Existing planting to be enhanced: 10.1ha
- Corridors within tree planting for buried services and servitudes, including alternative wastewater route, at angles minimising direct views into site
- The Landscaping Plan submitted with the Application includes habitat creation, enhancement and management measures and an outline Planting Plan

Fig.24

Final Technical Design

The final technical design will accommodate the specific technical requirements of the end user, based on the outline design and illustrative layout submitted for Planning Permission in Principle, and prioritising sustainability and inclusive design principles. The final design will be agreed with the Planning Authority at the AMSC stage.

Though the design of the Development is likely to be optimised in due course it is not anticipated that the main facility should require more than the 25ha footprint of Development Area plus associated access routes, representing around 40% of the overall site area. Due to specific site constraints around 10% of the site is allocated to flood and surface water storage which would generally remain outside of the Development Area. The remaining 50% of the site reserved for the extensive landscaping proposed includes around 5% of free space for contingency. Following optimisation, any remaining free space within or outside of the final Development Area should be allocated for additional landscaping and green infrastructure, positioning biodiversity impact.

The final technical design will not alter the main parameters of the Development as proposed, including:

- Overall heights of buildings and equipment stated
- Main access via the B925 and emergency access via the K11 roads
- Access routes of appropriate construction and specification, including roads, pathways and new bridge
- Provision of a new public path, as a viable diversion to the route of Core Path R496
- Provision of routes for buried services and associated servitudes including power, data, water, wastewater and waste heat
- Equivalent area for substation infrastructure, including secure compound and two points of access
- Equivalent scheme of site levels, prioritising re-use of any excavated site materials
- Extensive landscaping including habitat mosaic of equivalent or better mitigation performance
- Any key recommendations from the specialist assessments undertaken, including:
    - Overall flood and surface water storage capacity, and additional use of rainwater harvesting
    - Flat roof plant compounds using EPDM or similar reflective membrane to minimise metal leaching
    - Minimum recommended Finished Floor Levels of 117.15m
    - Temporary root protection fencing for existing trees
    - Cautionary measures for local protected species

The final technical design will optimise the facility, including potential changes to the following:

- The extents and position of the Development Area, subject to existing constraints
- The number, position, massing and material finish of buildings
- The internal layout of buildings, associated floor plans and elevations
- The size and position of external plant compounds for cooling and electrical equipment
- The layout and position of associated infrastructure, including substation and storage equipment
- The design and layout of new road entrance from the B925
- The exact route of proposed new public path, wastewater and heat network connections
- Final parking arrangements subject to actual staff and visitor levels
- Site levels including potential landscape bunds, subject to final cut and fill exercise

The final technical design will incorporate the most advanced equipment and systems to create a cutting-edge facility driven by renewable power, with optimal power and water usage efficiency ratings, as defined by industry bodies such as Open Compute Networks Ready for AI, and the Climate Neutral Data Centre Pact.

Conclusion

The Applicant has undertaken a design lead approach throughout the pre-planning process, incorporating assessment findings, planning guidance, and public feedback in order to produce an outline design for Planning Permission in Principle. Technical drawings have been produced at each stage, allowing the design to be refined in an iterative process to make the most efficient use of available land, and deliver a viable project in accordance with the brief. Embedded mitigation against potential impacts has been considered at the heart of the design strategy. The outline design enables a high-quality technical design to be produced in due course without limiting the scope of the brief, or increasing any of the impacts as assessed.

The outline design is compliant with both national policy under National Planning Framework 4 for development proposals of this type, and local planning policy under Fife Councils' Local Development Plan.

Appendix A: Technical Drawings

The below technical drawings are referenced in the appendices of assessments and used to produce a final drawing set submitted in support of the Application. The final drawing set is compliant with Scottish Planning Circular 3/2022 and related guidance: 2.3.2 for applications for Planning Permission in Principle. The set includes: Block Plan; Location Plan; Site Plan; Contextual Sections; and Landscaping Plan.

Location

Figure A1 shows the Location plan submitted at the outset of the Proposal of Application Notice.

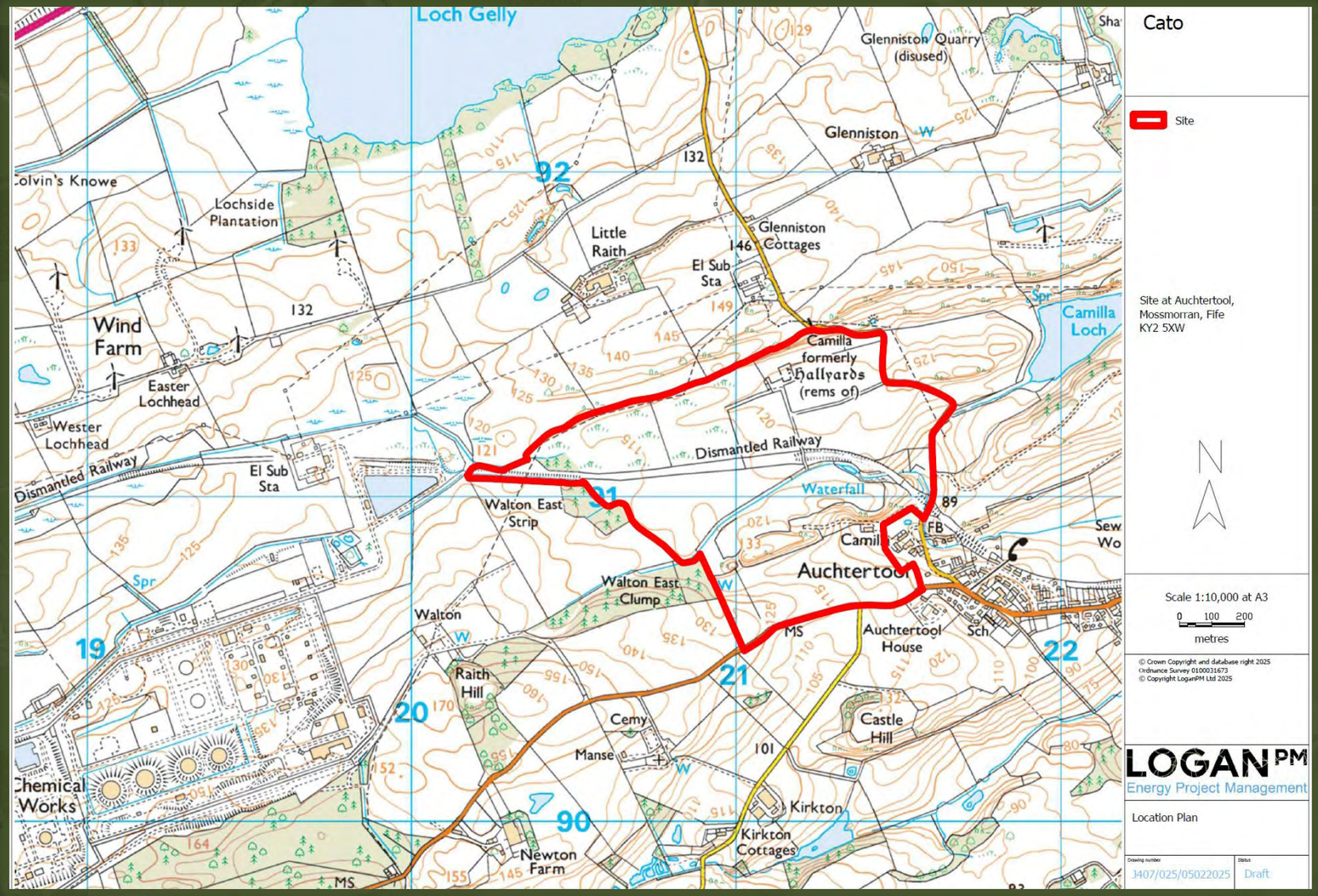

Fig.A1

Topography – Levels Existing

Figure A2 shows the existing ground levels, at 05m interval (OS LiDAR data).

Fig.A2

Topography – Levels Proposed

Figure A3 shows the ground levels proposed and retained, at 1m interval.

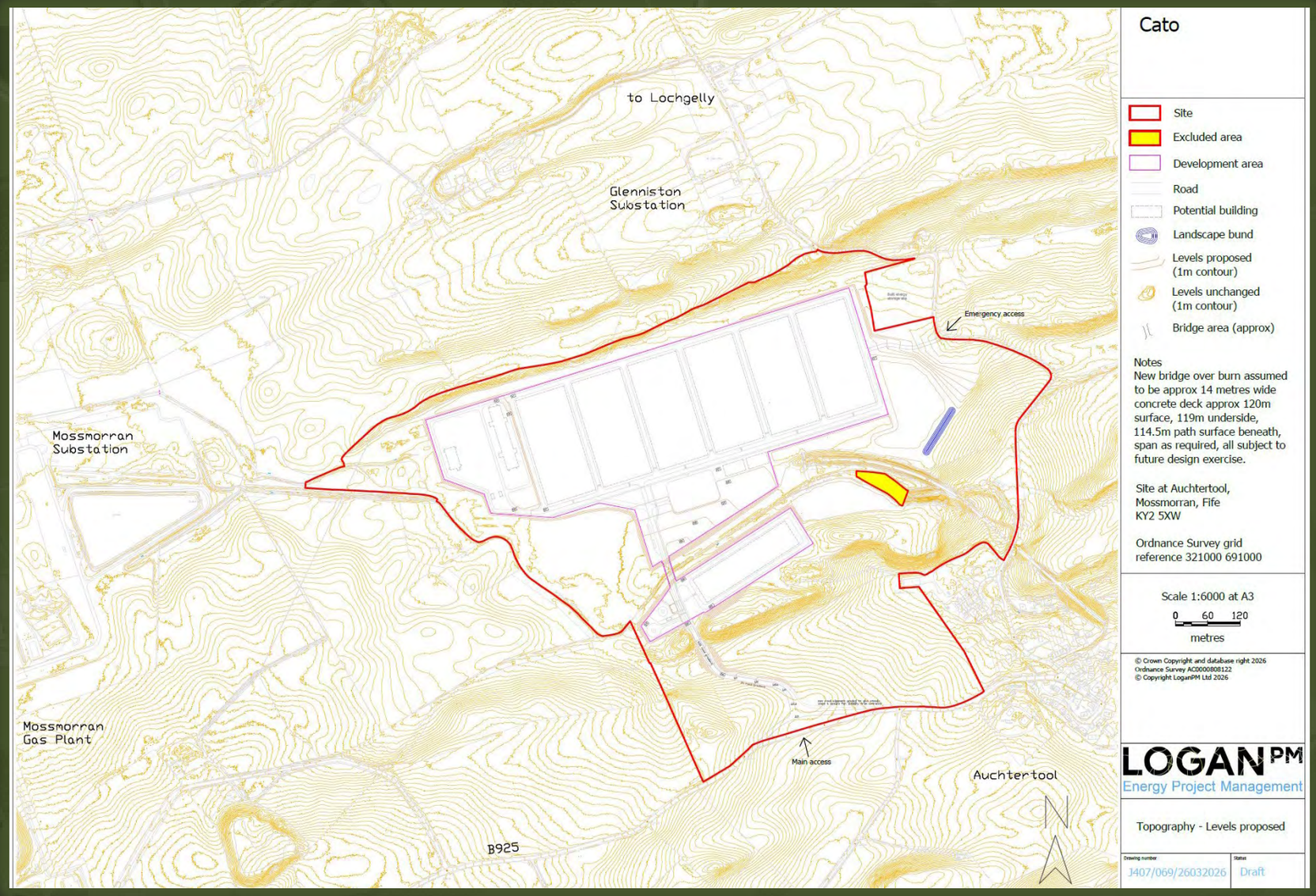

Fig.A3

Development Area Parameters

Figure A4 shows the master parameters of the Development Area .

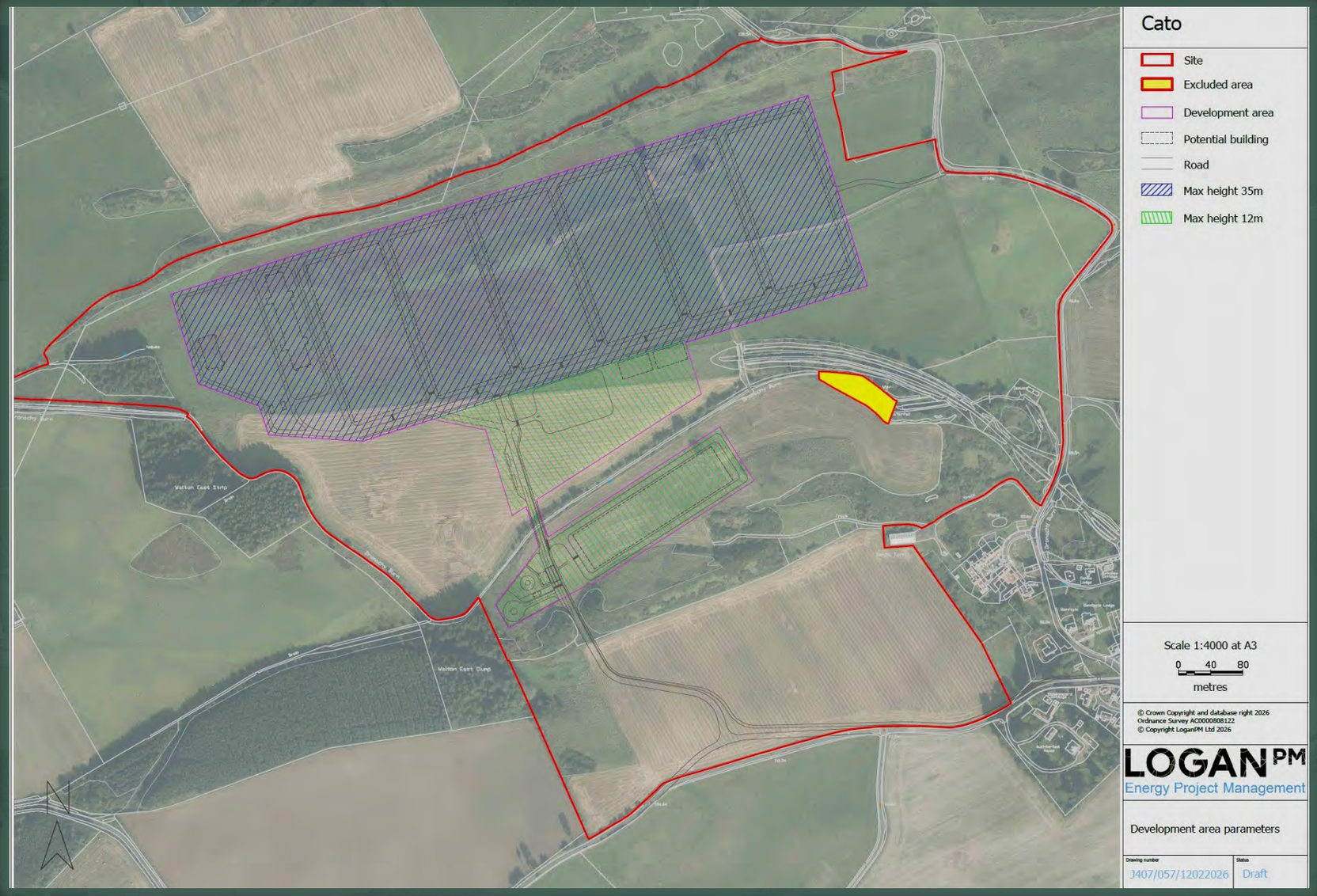

Fig.A4

Development Area – Final Illustrative Layout

Figure A5 shows the final illustrative layout of the Development Area.

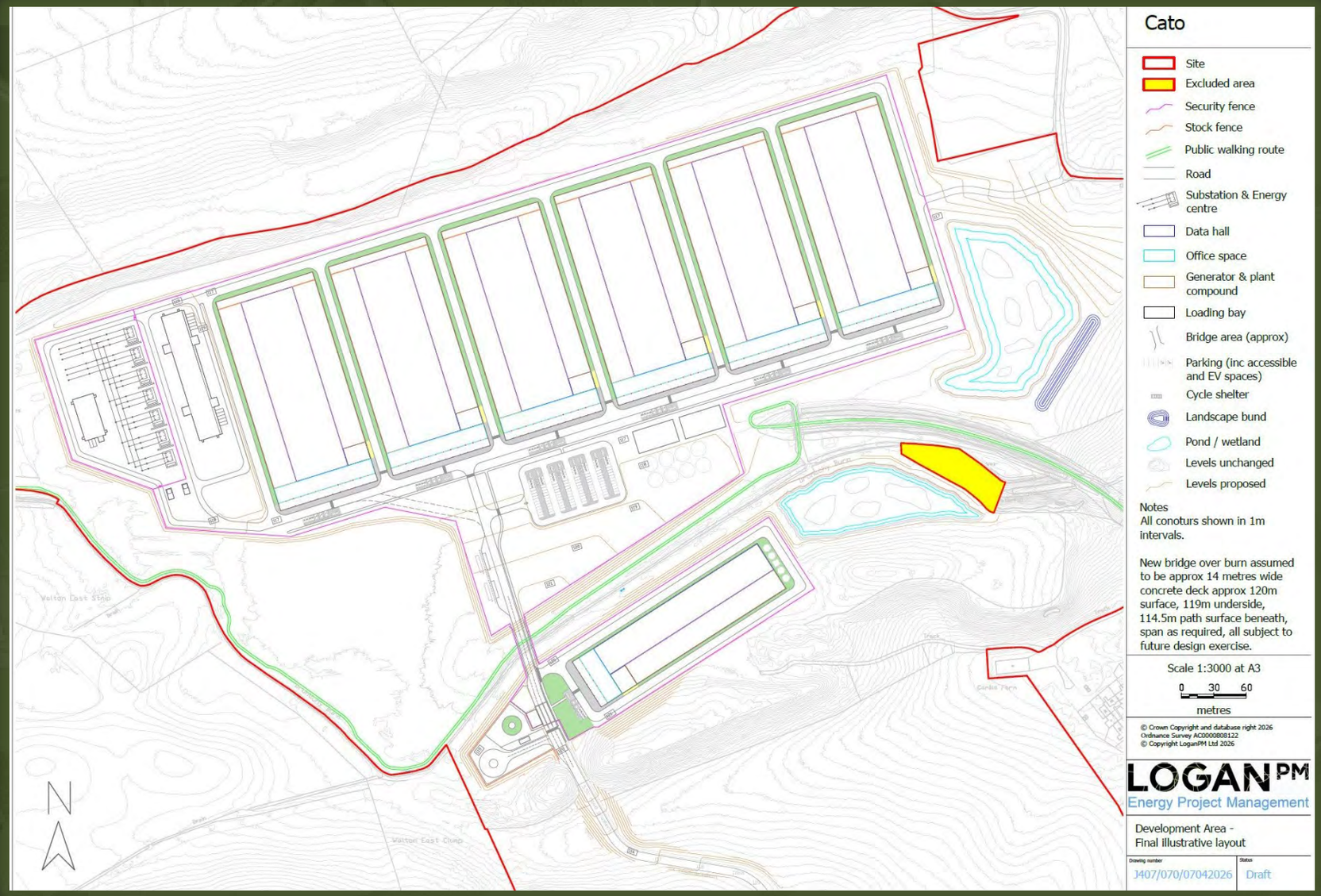

Fig.A5

Appendix B: Making Fifes Places Evaluation Framework

Commentary on how the outline design has considered Fife Council's LDP supplementary guidance is provided in the tables below. 'N/A' indicates criteria considered to be outwith the scope of the Application for Planning Permission in Principle. 'TBC' indicates aspects that should be reappraised in due course, as they cannot be fully defined until a final technical design has been produced. The final technical design will remain in compliance with the supplementary guidance and as amended prior to the determination of full planning consent.

Distinctive

Key Issues	Commentary
Essential	
Is the proposal an appropriate design response to the remaining context in terms of townscape & landscape character and habitats (in particular the quality of detailing and materials in historic or sensitive landscape locations)?	The design has responded to local topography and landform, locating the main area of built development appropriately to minimise impacts on landscape character. The landscaping proposed will extend and enhance all local habitats post-development
Does the proposal make the most of existing buildings, landscape, and habitats including trees?	The design makes use of an existing stone bridge and avoids another with bat roost potential. No other buildings of appropriate construction exist on the site. Minimal tree felling is limited to a few specimens of low quality. Root protection buffers have been defined to preserve existing trees, using temporary fencing
Where applicable - Does the proposal comply with any design briefs, development frameworks, conservation area appraisals or the following Fife Council Guidance: Windows in Listed buildings and Conservation Areas; Shop front Design Guidelines; Painting the exterior of listed buildings and unlisted buildings in Conservation Areas?	N/A – The site is not within a Conservation Area. The adjacent Wildlife Site is to be extended and enhanced. Impacts on any nearby designated sites have been assessed as negligible
Has built form been designed to minimise visual impact in sensitive locations?	Yes. For full details please see the Landscape and Visual Impact Appraisal
Important	
Does the use of natural features, buildings, street patterns, spaces, skylines, building forms, landscape and use of materials create a place with a distinctive character?	TBC – The building massing concept considered the local landscape to create a distinctive place suited to the and purpose of the proposed facility. Final material choices will reflect this
Have opportunities been taken to incorporate green infrastructure into the fabric of the buildings and the spaces between them?	TBC – The outline design shows indicative green space to be maximised following final design. Features such as green roof / walls and potential solar arrays for operational power should be considered in any remaining space
Best Practice	
Does the proposal preserve cultural or historical associations for the community?	The industrial rail heritage assets on the site have been preserved where possible and incorporated into the design. Popular wooded areas are to be enhanced and protected and the Core Path re-routed with improved accessibility

Easy to Move Around and Beyond

Key Issues	Commentary
Essential	
Has a network of continuous routes been created? Are public spaces, streets and footpaths connected into routes within and remaining the development? Is it well integrated with the existing settlement?	A network of continuous routes has been created for site access including vehicles, pedestrians and cycles, to be connected to Auchtertool via the existing local road network . The new public path will connect with Fife's Core Path network
Has the proposal considered green networks in and around the development area, and made provisions to connect to these and/or enhance their value as part of the green infrastructure provision?	Site access routes encourage use of carbon free travel and public transport. The new public path will enhance green infrastructure providing cycle access to a part of the core path currently inaccessible
Important	
Are routes safe and direct, pedestrian and cycle friendly, and offering a range of options to get to local facilities and public transport?	Safety of all routes has been considered including crossings and separation buffers to SCOTS guidance. On site speed restrictions and signage would be employed in a final design. A potential new public transport stop has been accounted for.
Are the streets and public spaces designed to be accessible for all users (including service vehicles, public transport, wheelchair users, pushchairs, the elderly and the visually impaired)?	All routes sized and graded with accessibility in mind. Final surfaces, signage etc TBC - to be appropriate for all users
Are the streets designed as places that respond to the site rather than based on standard details?	N/A – There would be no new streets. Site routes would generally be private industrial type roadways and tracks.
Best Practice	
Does the development use landmarks, vistas and gateways to make it easy to find ways through the development? Does this work for all modes of transport?	TBC - The new public path would be well signposted. Additional public information signage detailing cultural heritage, local history and nature would enhance amenity impact

Safe and Pleasant

Key Issues	Commentary
Essential	
Is the overall scale of development appropriate for the site?	The scale of development is sufficient to fulfil the design brief, and maximise employment potential of the site whilst minimising land take and maximising landscaping measures
Are the open spaces, streets and paths overlooked by windows and doors? Are there any undesirable blank facades or gables facing onto public spaces?	There are no streets as such, and no blank facades facing onto public spaces
Are the streets designed primarily as safe places for people incorporating natural traffic calming measures and avoiding rat-runs?	N/A – There will be no streets
Does the layout accommodate car parking so that the development does not appear dominated by cars?	The car parking areas have been calculated from estimated staff and visitor numbers (TBC), covering only a modest proportion of the site area. Car parks are not likely to be viewable from any local receptors including new public path
Important	
Do the main entrances face onto the street?	The main entrance to buildings will face the main roadways
Do the street blocks and buildings have a built form (layout, density, scale and massing) appropriate to their location in the settlement?	N/A - There will be no streets. The layout, density, scale and massing are all appropriate to the site
Are there clear boundaries between public and private spaces?	A separation of around 20m is proposed from the new public path to the site compound, filled with new tree planting. Security fencing will act as a physical barrier to public access
Are the public spaces well designed and useable (visually attractive, adequately sheltered, uncluttered and well lit), with suitable management arrangements put in place?	The new public path will be visually attractive and enhanced with new planting. Lighting is generally not considered necessary for a rural Core Path, to limit light pollution. No other public spaces are proposed
Is new or existing planting of appropriate species and at an appropriate distance from new/existing buildings, accounting for growth over a number of years?	The planting layout has been carefully considered alongside in term of visual impact, and visuals have been produced in maturity (at year 10) – see Landscape and Visual Assessment
Best Practice	
Does the proposal encourage activity for all ages and abilities at different times of day, and in different seasons and weathers?	The new public path would be accessible at all times and in all weathers
For housing developments – does the development accommodate a range of car parking options?	N/A – Not housing. Though, a range of options has been duly considered
Is there suitable storage provision for cyclists?	There is ample storage for cycles to SCOTS guidance, based on estimated staff and visitor levels

Welcoming

Key Issues	Commentary
Essential	
Where it is on the edge of a settlement is the relationship between new development and the countryside sensitively handled?	N/A – Not on the edge of settlement. Though, a large set back between the Development Area and the neighbouring settlement has been duly considered to minimise impacts
Does the proposal meet the requirements of Table 1 for open space provision?	Open space subject to final design at AMSC stage, in accordance with provision requirements.
Important	
Are entrances and the front of buildings clearly defined?	Entrances to all buildings are clearly defined
Can people find a good mix of shops, sitting out and play-space, places of employment, local services and transport links within easy walking distance of their homes?	N/A – Though local transport and facilities have been duly considered.
Is there a clear network of public spaces and streets that are well-shaped and proportioned by buildings? Are they attractive as well as functional?	NA – Though remaining green / open spaces would balance attractiveness with positive biodiversity impact (TBC)
Is there a strategy for the public realm and landmark sites / public art? Is public art fully integrated into the design of landmark buildings & spaces?	N/A – Though there is potential for public art spaces along the new walking route
Best Practice	
Does development encourage people of all ages and abilities to meet and mix with each other?	N/A
Does the layout make good use of views?	The reorientation of the building entrances and office space has ensured good use of views

	Key Issues	Commentary
Adaptable	**Essential**	
	Are opportunities provided to make connections to possible future development sites?	Opportunities for future connection include potential district heating network, or other uses of waste heat such as grow houses. Increased data services and power connections to renewable energy projects have been provided for
	Important	
	Does the development provide a mix of tenures, building densities, forms and sizes that can accommodate the needs of a diverse range of users (by age, gender and degree of mobility)?	N/A – No mixed tenure. Though, all buildings and associated services and access will be fully accessible and inclusive
	Best Practice	
	Could the buildings or spaces be easily adapted to change in the future?	TBC – The outline design is adaptable to multiple variations in the final technical design depending on the end user. The final building design would ensure a building core and shell which could be adapted to accommodate technical changes in IT infrastructure.
	Have opportunities been provided for growing food as individuals or a community?	TBC – The provision of a potential heat network could serve local grow houses. The remaining landscape areas could accommodate community growing spaces, subject to relative biodiversity gains

	Key Issues	Commentary
Resource Efficient	**Essential**	
	Does the proposal provide adequate protection and avoid encroachment on natural features and biodiversity including trees and woodland? Does it provide adequate buffers?	The approach has been to enhance biodiversity as opposed to avoiding encroachment. The Development will provide adequate buffers to existing trees, waterways and any protected species where required. Associated measures during construction will be managed though a robust Construction and Environmental Management Plan agreed at AMSC stage
	Have sustainable drainage systems [SUDS] been considered from the earliest stage as part of the landscape framework?	The drainage assessment has considered SuDS by gravity from the outset and ensures the illustrative layout would conform to relevant policies by creating a drainage design. A similar approach has been undertaken for flood storage
	Have opportunities been taken to refurbish existing buildings rather than demolish them, or incorporate part[s] of them, or re-use materials in the new development, including soil/rubble?	N/A – Though in the case of the existing cultural heritage remains any material would be repurposed within site, subject to the final mitigation approach to be agreed with the Planning Authority. All excavated materials to be reused on site.
	Has waste collection and storage been addressed?	Final arrangements to be agreed at AMSC stage – Though the outline design has accounted for collection routes and storage areas
	Are materials and detailing of suitable appearance and proven performance for the site location (context and level of exposure)?	Material performance will ensure a viable facility whilst minimising ecological impact. Final material finish and detailing to be agreed with the Planning Authority at AMSC stage
	Important	
	Are there areas of development at a density that can support community facilities and public transport in appropriate locations?	Provision of a potential new public transport terminus, connecting with local routes has been considered. Route viability to be agreed with the Planning Authority.
	Can building and landscaping works be easily and cost-effectively managed and maintained into the future?	The high levels of capital investment would ensure cost-effective management of buildings and landscaping, likely through dedicated grounds and maintenance staff or local contractors. Should the facility reach end of life reinstatement and ongoing habitat management would be managed through bonds held by the Local Authority.
	Does the proposal include measures to enhance biodiversity (including the water environment where appropriate) and landscape character both on the fabric of buildings and in the spaces in between?	A core aim of the proposal has been to greatly enhance biodiversity post development, helping to address the current climate and nature crisis. The final building design and remaining space would prioritise biodiversity gains, with measure including green roofs and walls, invertebrate homes and pollinator friendly planting.
	Does block layout and detailed design of building or spaces take advantage of the site's orientation, landform and existing features to maximise shelter, daylight, sunlight etc?	Yes - The illustrative building layout maximises shelter from prevailing weather, and south facing office windows can utilise natural light.
	Best Practice	
	Does the proposal minimise the need for earthworks or retaining structures?	Though significant earthworks would be required to form the site, indicative site level design has considered balance. All excavated materials would be reused on site, subject to final cut and fill calculation (TBC). All cut slopes are at 2:1 gradient and would not require reinforcement. A minimal amount of reinforcement may be required through the escarpment on the main access route, subject to full geological survey
	Are the materials locally sourced /sustainably produced?	Sustainable and recyclable building materials such as green concrete and EPDM, and materials with the lowest environmental impact should be prioritised. Other materials such as aggregates to be sourced as locally as possible
	Does the design use new technologies, detailing or materials with a lower carbon footprint than conventional measures?	The final design will employ the latest and most efficient technologies. All materials will be appraised in terms of carbon impact when and balanced with relative environmental impact in any cost benefit analyses.

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