10. Permahaus

Permaculture meets passivhaus:

A *Sunday Times* British Homes Award Competition Entry

background

In March 2014 I was invited by a local architecture practice to join a team to submit an entry in the Sunday Times British Homes Award.

The brief called for a passivhaus, and the architects wanted to integrate permaculture ideas into their response.

Eric Parks was the principle architect, with Jonathan Lindh and Jim Wild from Leeds Environmental Design Associates providing graphics/narrative and Mechanical & Electrical engineering input.

I provided the permaculture & landscape design and the 3d artwork.

This was the first time I had entered a design competition of this type, and was an opportunity to gain experience of working with experienced design professionals, as well as a chance to promote permaculture to a wider audience – the judges and potentially (if the design was shortlisted) the Sunday Times' readership.

Landscape axonometric view, JA 01/05/2014

approach

Broadly speaking the approach taken by the team was Survey, Analyse, Design. Only the competition winners would be required to develop their design to implementation stage, so this design really only includes Survey, Analysis and Design.

However, I found the project instructive due to using a range of new design methods and tools for designing & collaborating with a professional design team. This project also suggests to me that there's almost justification for another stage after SAD: Presentation.

Survey

The survey phase of this project involved reading the competition brief then reviewing the competition brief FAQs (see below and Appendix A).

Much of the existing site survey information had been compiled by the client and was available in document form. Also, time was tight, the site was a long distance away and would be undergoing very significant ground works before any other work could start, so it was difficult to justfy a site visit to gather any additional details. (see below and appendix B).

Analysis

Due to the nature of the design, the analysis was virtual, and mainly performed using software tools.

Design

The Design stage was iterative to an extent. Ideas for all aspects of the design (landscaping, permaculture, building form, fabric, materials, services/energy strategy) were proposed at meetings, through shared online documents, sketches, 3D models etc. These proposals would then be explored and interrogated by all of the team and gradually the final design emerged.

Presentation

An interesting aspect of this project was the amount of time invested in presentation. All of the team spent a great deal of time producing building drawings, diagrams, 3d artwork and even creating a narrative with photgraphs to convey a sense of the possible lived experience of the imagined future occupants.

For many permaculture designs, with their strong focus on practical outcomes, it seems hard to justify this investment. However, when entering a competition, or if selling ideas to a client, community or planning authority, being able to present design work professionally can make the difference between gaining acceptance and support, and failing to. This insight and the new skills I developed were key outcomes of this project for me.

brief: 1

"Invitation

The Sunday Times British Homes Awards... invite submissions for a single stage open design competition from an architectural practice for "EcoHaus" – an aspirationally designed waterside home designed to Passivhaus standards.

Architects are encouraged to embrace innovative products and concepts while ensuring their submission is an inspirational home where people would love to live, buildable and replicable and compliant with building regulations to conform to NHBC/Premier Guarantee standards. It is planned that the winning design will be developed at one of Habitat First Group's UK sites.

Objective

In partnership with the Passivhaus Trust, Kingspan Insulation, the AJ and Habitat First Group, who champion design excellence and the preservation and encouragement of the natural habitat, this year's Awards' competition for "EcoHaus" challenges UK architects to design an aspirational home to Passivhaus standards for a waterside site at one of Habitat First Group's UK sites (Lower Mill Estate, Somerford Keynes (www.lowermillestate.com) or Silverlake in Dorset (www.silverlakedorset.com).

Designed with the Passivhaus methodology, the winning design will be of stunning architectural merit, visually arresting, environmentally smart and offer a healthy environment for the occupants: a home that everyone loves to live in. Designs are invited for both the individual home and group of homes, demonstrating how private and public space at a waterfront site can be combined to enhance the community living environment and deliver an aspirational lifestyle. The space between the home and the water will be private: the land in front will be communal.

Pioneered and developed in Germany Passivhaus is the world's leading low energy building standard, focusing on the building fabric combined with high levels of insulation and optimal solar gain. Excellent indoor air quality together with high levels of heat recovery are achieved with advanced heat recovery ventilation systems that transfer heat from outgoing stale air to fresh air coming into the house." – British Homes Awards 2014

brief: 2

*"**Type of House***

- *An architecturally distinguished detached house for an aspirational lifestyle, that people would love to live in*
- *Between 3 and 5 bedrooms*
- *Maximum Height: 3 storeys*
- *Maximum Size: no greater than 204 m2.*
- *Footprint: 24m. width/up to 30m. depth*

Design

The building will demonstrate, where relevant, best practice in:

- *Use of space (open, adaptable, flexible, movement, access, circulation)*
- *Internal environment (daylight, acoustics, heating, ventilation, finishes, furniture)*
- *Smart Home: intelligent infrastructure, network installations, wireless technology, cabling*
- *Security – secure by design and crime prevention measures*
- *Intelligent docking ports for electric vehicles, with the capability for two-way interaction between the car's batteries and the home energy systems*
- *The specification and performance of energy efficient products*

Method of Construction

- *All forms considered, such as brick and block, steel frame, timber frame, concrete frame.*
- *It is recommended that the designs submitted should include the specification of products already certified to Passivhaus standard. For example energy efficient insulation products manufactured by Kingspan (www.kingspantek.co.uk/EcoHaus). However other products that enable the scheme to meet both the Passivhaus standard and Building Regulations can also be specified.*
- *All schemes submitted for the competition should be eligible for compliance for a building warranty through a recognised warranty provider to enable development."* – British Homes Awards 2014

brief: 3

"The submission should include:

– an assessment of the quality of health and wellbeing for people living in the house, embracing issues such as daylight and integration of the natural environment

– a consumption calculation, based on the Passivhaus Planning Package (PHPP) to illustrate how the house will efficiently use energy and comply with the Passivhaus standard

– sufficient details to demonstrate the insulation and air tightness strategy with consideration given to ease of construction plus a ventilation strategy for summer and winter operation.

– evidence that the summer comfort requirements of the Passivhaus standard will be achieved with details of the shading and night cooling strategy.

– a consumption calculation or diagram to illustrate how the house will efficiently use other resources e.g. water, food or where waste from one process becomes a resource for another

– an indication of construction cost (the projected build cost should be between £200,000 and £350,000)

– a demonstration of how the dwelling would work as a volume development of multiple units

– a demonstration of how the front and back garden spaces provide flexibility, privacy and seamless integration with the interior

– an occupant guide about how the occupants will operate the house

– inclusion of a car bay plus provision for boat storage

– Why you think people would love to live there " – British Homes Awards 2014

brief FAQs

The competition organisaers published a list of FAQs.. I've selected the ones that are most relevant to my remit as landscape & permaculture designer...

Q. The Brief implies it is a regular permanent home. The documents from the Developer state that it is a holiday chalet/lodge where there will be planning conditions to prevent permanent occupation as a main residence.

A. To clarify the brief is for a permanent home…albeit that it will be used as a holiday /second home. The site has restrictions on full year round habitation but that does not impact upon the design of the building.

Q. Please clarify for me the exact site locations and site boundaries for both sites? Any chance you will be publishing site plans that we could use?

A. Specific sites have not been determined as the winning design could be built at any one of the three Habitat First Group sites. However as the brief stipulates the plot(s) will be fronting water with communal space at the back. We will not be publishing site plans but please assume the plot will be cleared and level.

Q. Passivhaus design is extremely site specific and design criteria is based on orientation and regional climatic data. Are we meant to select any one site and propose a design?

A. Design to maximise orientation. If required and if voted the winner the architect will work with the developer to address orientation to maximise solar gain on any specific site.

Q. The brief states: "The space between the home and the water will be private: the land in front will be communal." What is a definition of "land in front"? Is it the entrance side? Does it mean the building site will be closed, with no public access to water?

A. There will be no public access to the water down the side of the house as this will border with another house type. The land behind will lead down to the water edge. The land in front will be for a small area for parking etc. and road access.

brief FAQs

Q. Are there any restrictions for the distance from a building to the water?

A. No. Providing the max area of the plot specified in the brief is not exceeded.

Q.There is also mention of footprint 24 x 36m. is this the actual building plot size? If not then what is the plot size.

A. The building plot size is 24 x 36 m

Q. We are looking at Silver Lake and there are 5 different sites:

1) Lakeside

2) Beeches

3) Terraces

4) Islands

5) Waterside house

Which one of these can we choose?

A. The design is non site specific as Habitat First Group have yet to confirm which plots will be developed in the initial phase. But in terms of orientation the design will be sited accordingly to maximise solar gain.

survey

The team reviewed the client's documentation to better understand their vision, approach and details of the proposed sites. We decided to focus on the Silverlake site as we felt it allowed greater scope to meet the brief.

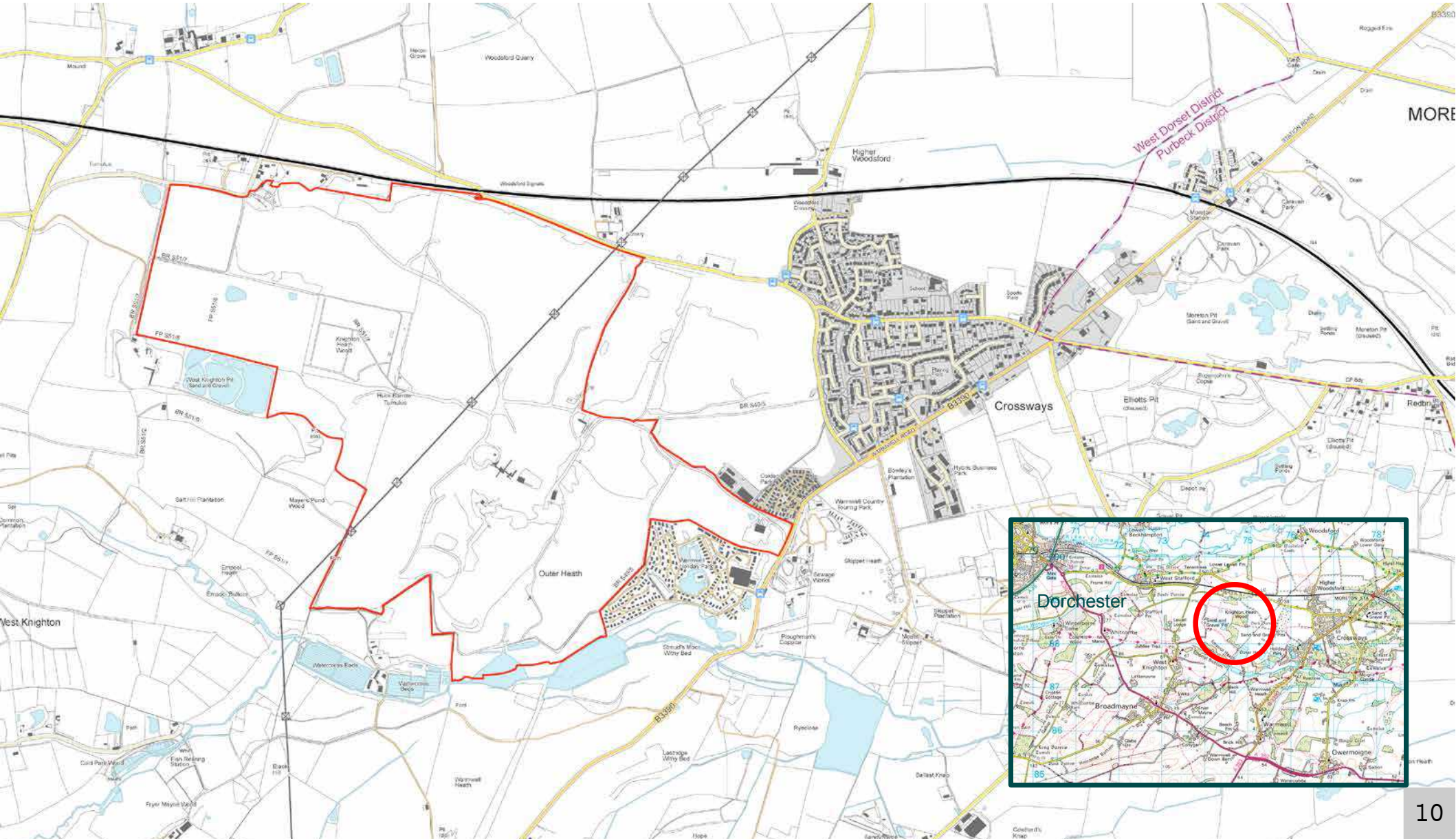
"The Vision for Silverlake is to create a sustainable and inclusive community of holiday chalets and lodges where visitors feel comfortable and relaxed in a natural environment, with opportunities to enjoy nature, open space, landscape and recreation. A creative contemporary design approach will combine influences from the waterside character and Dorset vernacular with the use of local materials, sustainability principles, energy efficiency and biodiversity.

This will be achieved within a carefully managed nature conservation framework, combining people and community with wildlife, habitat, landscape and leisure in a managed setting. There are opportunities for improved access, increased recreational use, and the project will generate inward investment, local jobs and facilities, all of which will benefit Crossways and other local communities."

Client vision: images from client's website. Habitat First Group 2014

survey

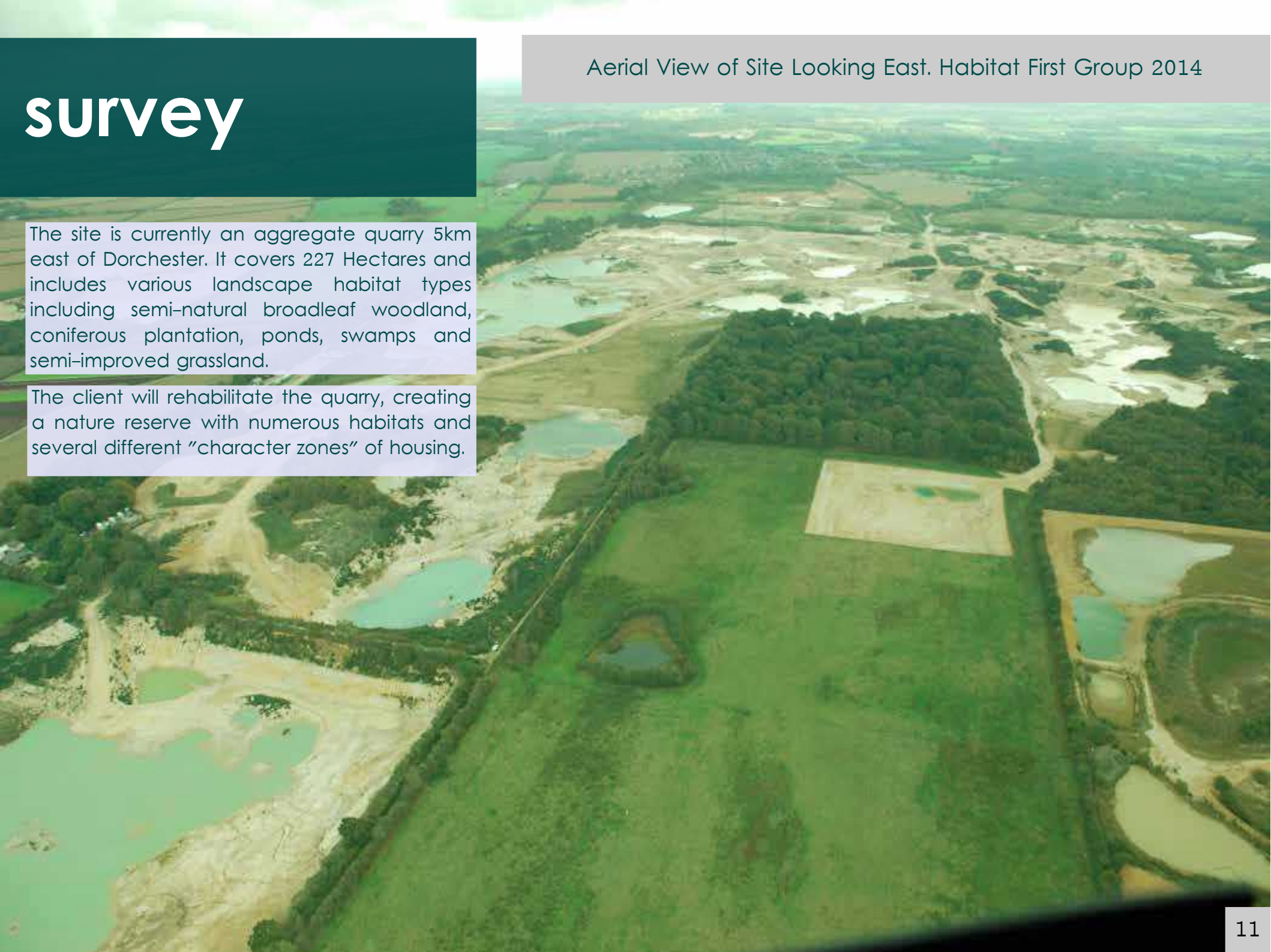
Site Location Plan. Habitat First Group 2013



survey

The site is currently an aggregate quarry 5km east of Dorchester. It covers 227 Hectares and includes various landscape habitat types including semi-natural broadleaf woodland, coniferous plantation, ponds, swamps and semi-improved grassland.

The client will rehabilitate the quarry, creating a nature reserve with numerous habitats and several different "character zones" of housing.



Aerial View of Site Looking East. Habitat First Group 2014

survey

Ecology–habitat survey. Habitat First Group 2012

A diverse range of habitats and landscape types already exist across the site. Notably the Outer Heath Site of Nature Conservation Importance and Knighton Heath Wood, which contains hazel, oak, beech and sweet chestnut, as well as a scheduled bronze age monument.

See appendix B for more details.

survey

"The ecology survey and other relevant information have demonstrated that the southern part of the site, where a significant range of habitats are currently present, should not be developed. This area is being retained for nature conservation and bio-diversity enhancement, with some access for recreational and bird watching /nature watching purposes.

Similarly Knighton Heath Wood is not being developed but instead retained and managed, including management of the archaeological assets. A major new bio-diverse habitat area, the "Biodiverse Heart" is being created on an area of over 31 hectares (78 acres) in the north eastern quadrant of the site, including large areas of public access land.

The areas with identified scope for holiday accommodation and facilities are the north west portion of the site which is currently being deep quarried, and the central section of the site occupied by the sand and gravel processing plant, offices and quarry workings. The eastern portion of the site occupied by the blister hangar and the Warmwell Road site entrance will be the location for the country club."

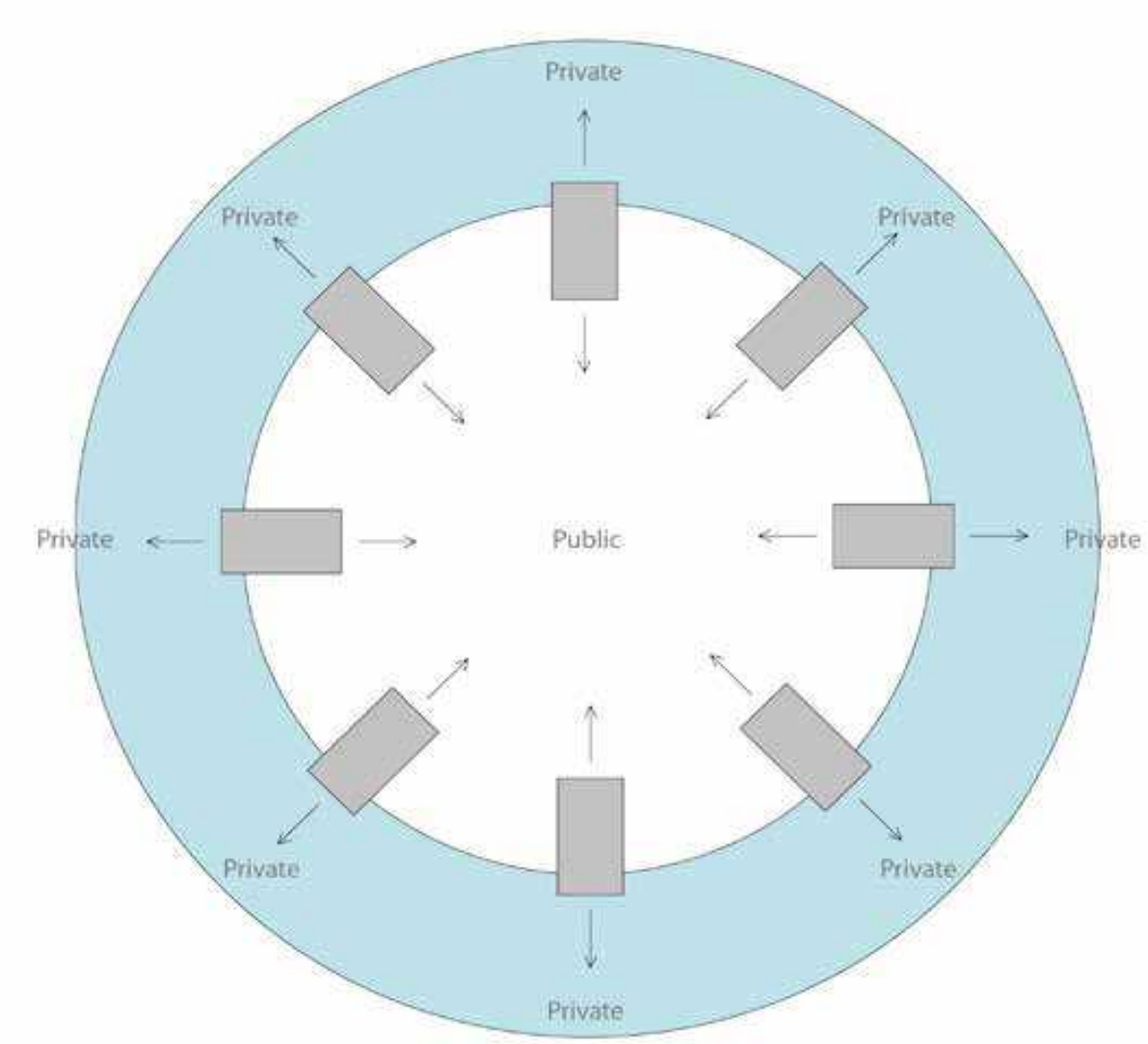
"In terms of detailed design, use will be made of local materials throughout the development; Portland and Purbeck stone, other local stone, brick, render, flint and cob, timber (both structural and timber cladding). For roofs, use will be made of locally produced materials including stone and clay tiles, local reed thatch where appropriate (particularly for some of the smaller buildings such as bird hides, canoe storage) and potentially for some of the holiday accommodation. Contemporary materials will be integrated with the use of more traditional materials"

survey

"The diagram shows how one important concept has influenced some of the character areas proposed at Silverlake. The application of this concept will be apparent in relation to the islands character areas in particular, but also in a number of the other areas of water frontage development.

Instead of the communal areas being at the front of the holiday units, with private space at the rear, the shared communal areas are located at the rear, the holiday units and their private spaces fronting the water."

Silverlake: design & layout concept. Habitat First Group 2014



Inverted public/ private space

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"Silverlake design principles

Amount

The proposed Silverlake development includes up to 1,000 holiday lodges and chalets. The units comprise 2 and 3 storey buildings up to the heights indicated and with the built footprints indicated in the character areas section which follows. The amount of holiday lodge and chalet development in those character areas with built development comprises;

Islands – 550

Terraces – 300

Lakeside – 56

Beach – 46

Mayers Pond Wood – 48

Many of the units will be detached, with some linked, grouped and small terraces of lodges and chalets.

Massing

Footprints and heights are provided for each character area in the following sections. The massing will be relieved considerably by the landscape framework within which all of the lodges and chalets will be located. Within each plot, landscape measures will reflect the character area and the biodiversity objectives adopted for that particular part of the Silverlake site. It will also reflect the topography and relationship with the water bodies. A number of areas involve plots broken up by woodland and tree planting, further reducing the impact and built impression.

Building heights and building footprints are provided for each of the character areas.

The Country Club and Hotel

The country club will comprise a number of linked pavilions, totalling 6153sqm of floor space, maximum building heights being three storeys, 14m including the roof. The hotel is a small 30 room facility enabling potential purchasers to try the Silverlake experience. It will have a floor space of up to 992sqm and a height of 2–3 storeys, 14m including the roof."

survey

"Density

Throughout the Silverlake development, the aspiration is for low density in a highly landscaped setting. Very low density is proposed in the more sensitive areas, such as Lakeside and Mayers Pond Wood. Providing a comfortable space between buildings will add to the feeling of open space and help develop a relaxed atmosphere. Average plot dimensions are 20m x 35m.

Some smaller terraced units will provide a mix of holiday accommodation for Silverlake. Whilst maintaining the high quality of design which runs throughout Silverlake, the smaller units will provide an efficient and slightly higher density concept which will appeal to a wider variety of holiday users. The provision of communal spaces for each group of about 30 units, will encourage social interaction, with each communal area to be shaped by the communities that form around it.

Sustainability

Throughout the Silverlake development, sustainability principles will include the following provisions for building design, construction, choice of materials and mode of future operation;

Low impact construction including:

ƒ sustainable materials

ƒ off–site construction / sectional timber buildings

ƒ green roofs

ƒ locally sourced materials

ƒ local labour force

ƒ construction waste minimisation and management

ƒ resilient and flexible design

ƒ natural ventilation

ƒ healthy buildings."

survey

"Sustainable energy sources including

f high levels of insulation and energy efficiency

f solar and other renewable energy technologies on-site

f biomass for powering communal buildings and some groups of lodges

f wood burning stoves for individual holiday units

f mini CHP for communal buildings

Water efficiency and management

f adequate water supply available

f water metering and monitoring

f grey water recycling

f rainwater harvesting

Infrastructure

f no major investment is needed in new infrastructure

f electricity infrastructure is already in place on site (no need for a new supply)

f water supply is readily available, with some upgrading of local pipework

f access roads are satisfactory

f rail services are available locally

f shuttle vehicles will be provided on site and for station links/coastal trips/journeys to Dorchester/Weymouth"

survey

"The Indicative Masterplan

The indicative Masterplan for Silverlake opposite shows how the arc of nature conservation and landscape interest in the south has been retained, with all lodges set over 400m from the Special Protection Area (the dashed line on the plan). Most are over 500m from the SPA.

Knighton Heath Wood is retained for its landscape and archaeology interest, buffered from new development, with footpaths and bridleways through the woodland.

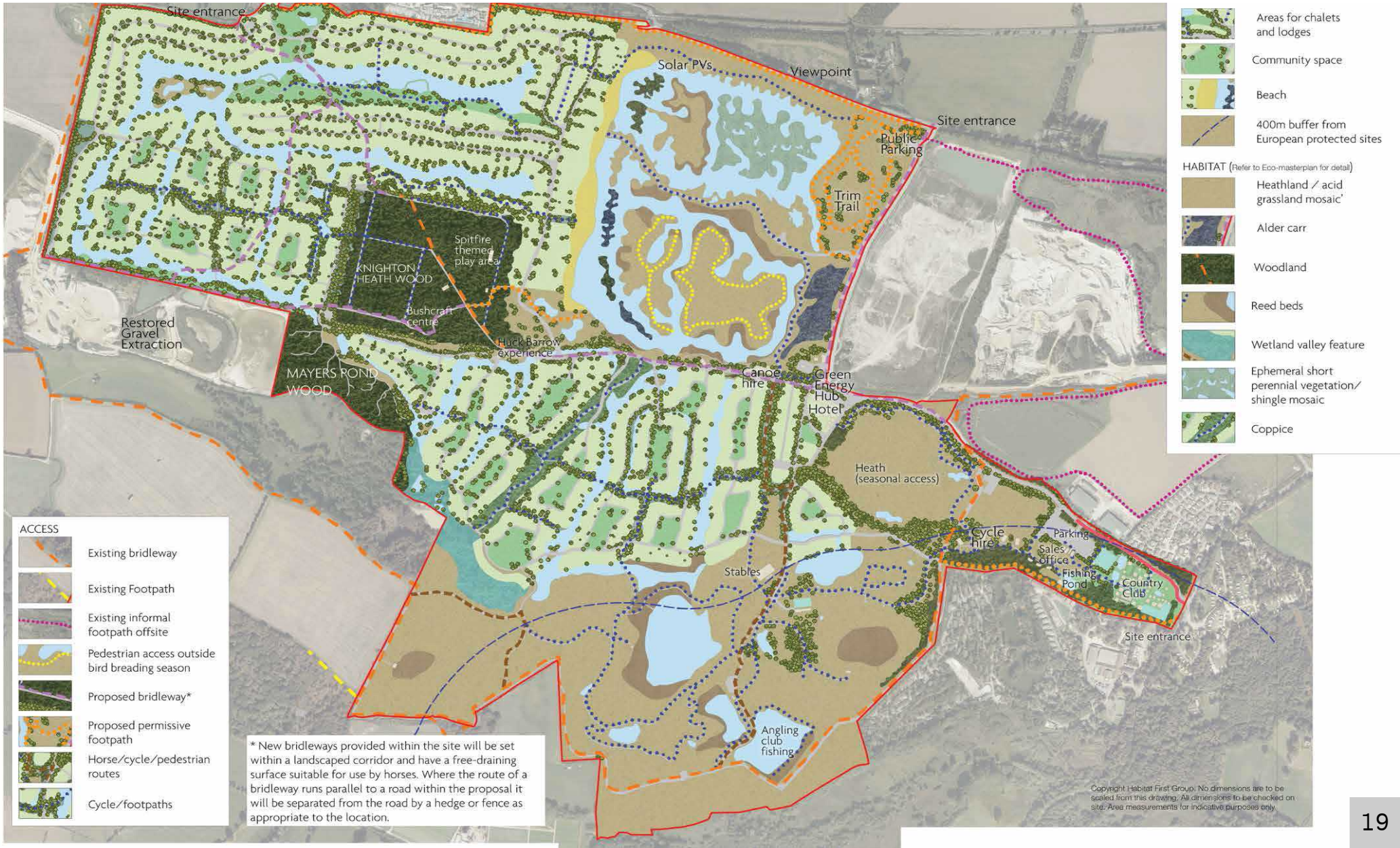
A large area in the north of the site, the Biodiverse Heart extending to 31 hectares (78 acres), is proposed for nature conservation and recreation, including over 11 hectares (27 acres) of publicly accessible SANG with public parking using the existing northern quarry access for Crossways residents and other visitors.

The holiday lodges are proposed in two main areas; in the north west of the site and in the central area, south of Knighton Heath Wood and the Biodiverse Heart, set around a system of interconnected lakes and water bodies. The 'Eastern Gateway' area with its access from Warmwell Road will accommodate a country club, sales office and hotel.

The three existing accesses to the quarry are shown as site entrances for the Silverlake development on the Masterplan. The site has been divided into several Character Areas, as explained on the next pages."

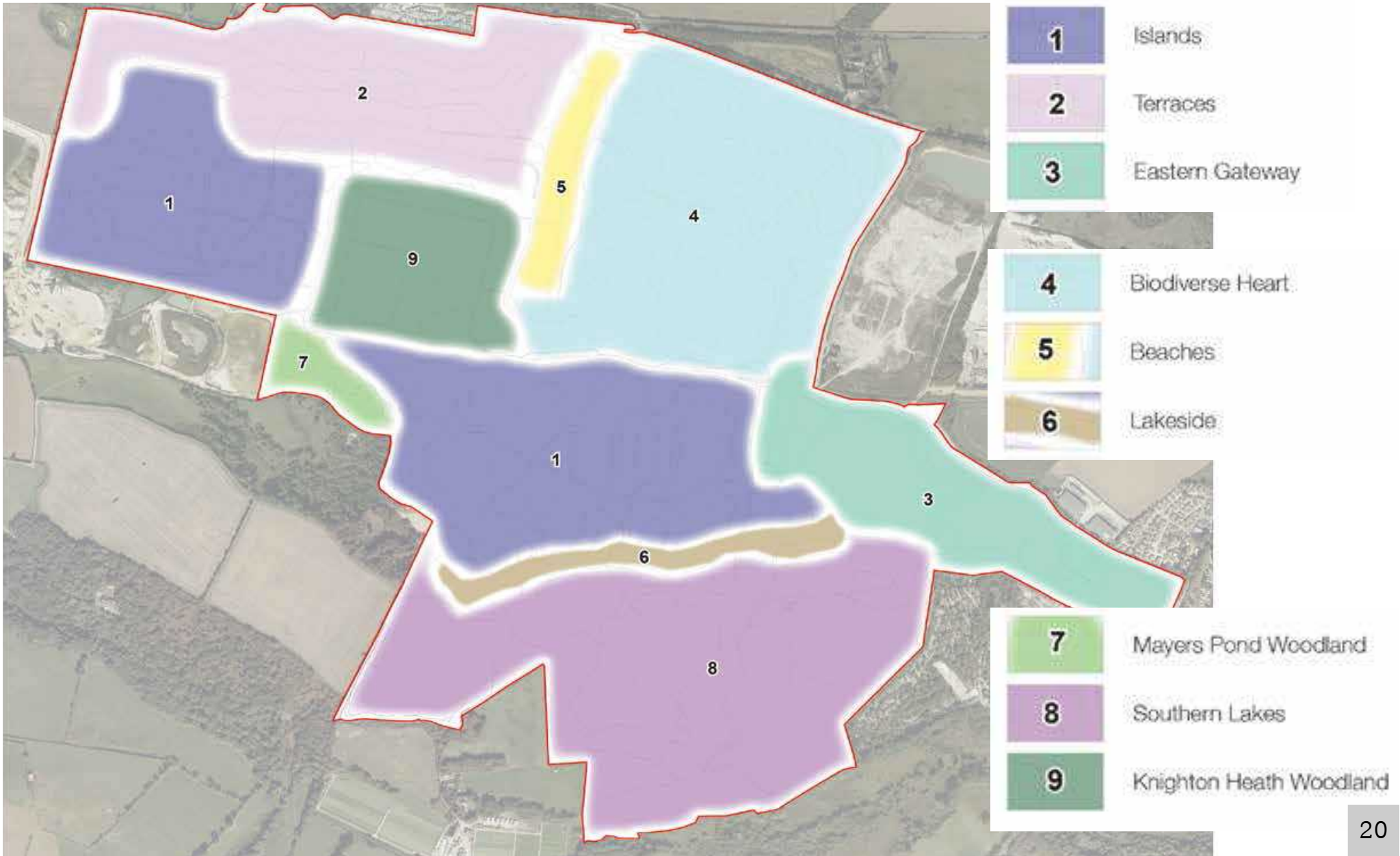
survey

Silverlake: Indicative Masterplan. Habitat First Group 2014



survey

Silverlake: Character Area Locations. Habitat First Group 2014



survey

Islands: indicative cross section. Habitat First Group 2014

"Character Area 1: Islands

Location and Access

The island communities are the most common of the built character areas at Silverlake. The character is created by a series of new 'islands' separated by water bodies and linked by bridges. A proposed footpath and bridleway network will provide public access across some of the islands.

Architecture and Landscape

The island communities are set amongst meandering waterways and corridors of nature which run throughout the Silverlake development. The buildings will be placed comfortably within a semi-wooded setting. A high proportion will have a waterfront location.

Within the centre of each island, a narrow shared vehicular/pedestrian route will provide access to each chalet, as well as access to a central communal space, similar to a 'village green', or community areas, where groups of around 30 chalet users will choose their community approach (a green, community allotments, tennis court, bowls etc.).

The spaces will have the capacity to accommodate a storage barn for the use of surrounding chalets as well as their choice of community facility. Communities will share each island's bespoke facilities.

Holiday units will be of high quality design. Materials used will reflect the Dorset vernacular, whereas form will respond to the layout of the islands, with their central communal green spaces and the private space on the outer edge."

survey

"Character Area 1: Islands

Biodiversity

At the water's edge, this character area provides opportunities for a wide range of aquatic and marginal planting, to include:

- *deep and shallow aquatic planting in open water*
- *emergent, lower bank and mid-upper bank marginal vegetation*

The open spaces and boundaries of holiday properties can also be rich wildlife habitats, including:

- *flower-rich amenity grassland*
- *species-rich native shrub and hedgerows*
- *native trees*

Greenways through the larger islands will have tree and shrub planting each side of the paths providing a series of wildlife corridors."

Islands: indicative site layout. Habitat First Group 2014

analysis

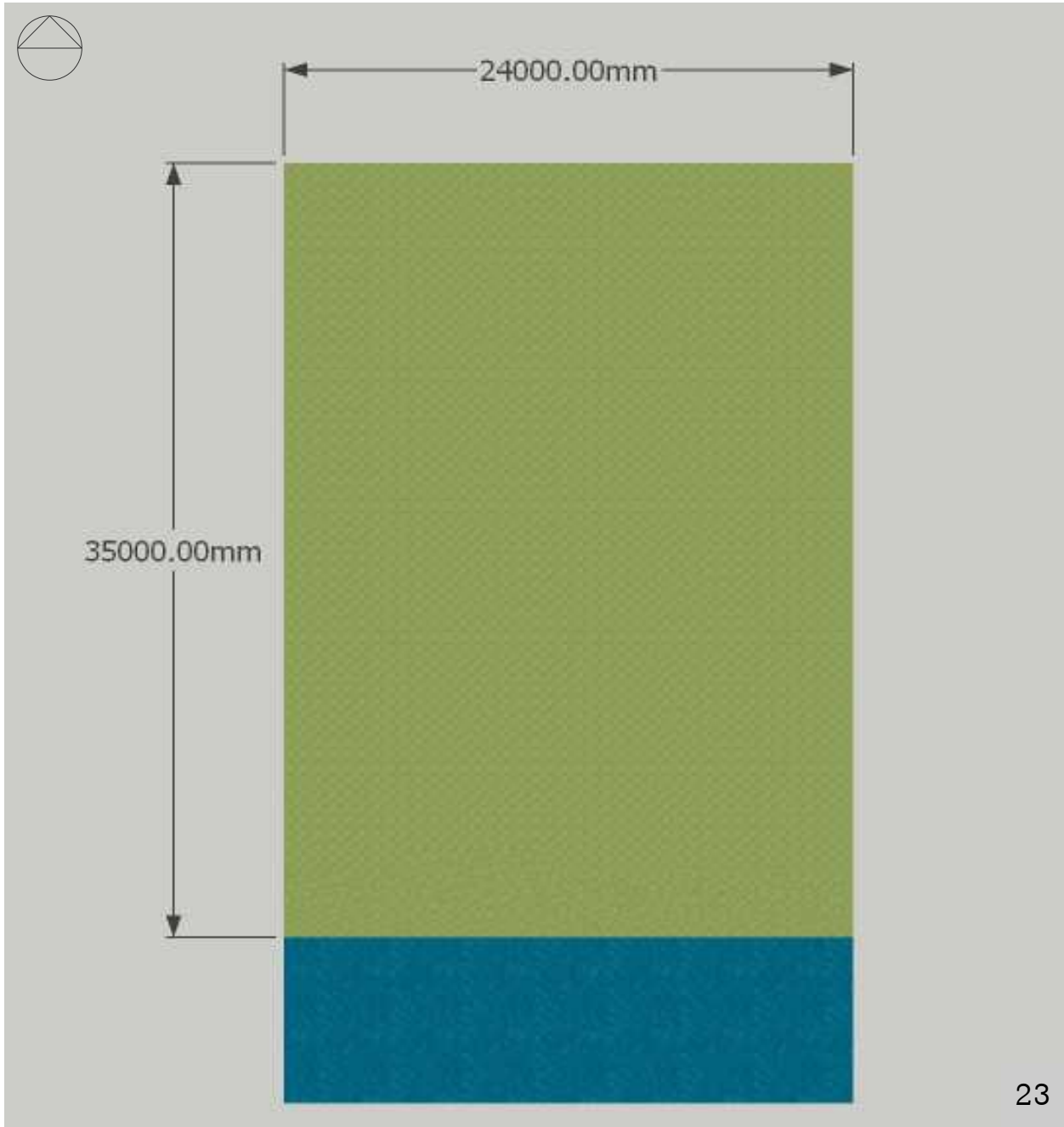
Designing for a non-specific site meant that the team had to make some decisions and assumptions.

We decided to base our design on the "Islands" character type at the client's Silverlake site, as it seemed to most closely match the description of the plot in the brief.

Also it was the character type with the highest number of planned houses (550), so the use of a passivhaus in this character type would have the greatest effect of lowering energy usage across the whole site.

Various points in the brief and FAQs led us to understand that we could design for an ideal plot – the public area to the North of the plot and the private garden running down to the waterside to the South.

Indicative plot. JA 04/2014



analysis

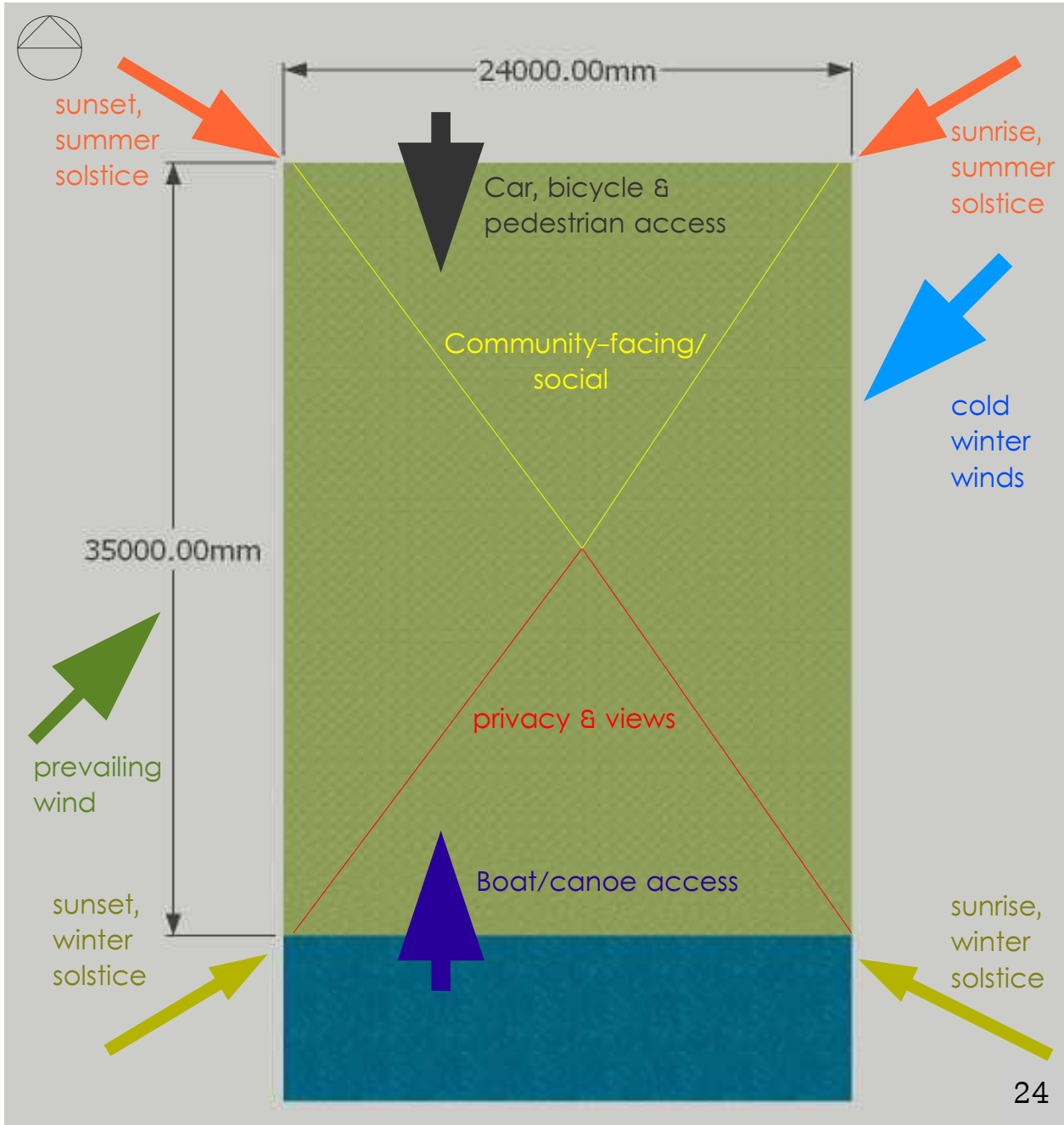
Sector analsysis.

I performed a virtual sector analysis on the plot. Prevailing and cold winter winds have been added from "perfect" directions as there is no information about nearby buildings that may cause wind canyoning effects etc.

I have added "community-facing/social" and "privacy and views" as additional sectors. While they aren't necessarily "energy entering the site form outside" in the strict sense, they do have an influence on the site design, as will be seen when patterning is used later.

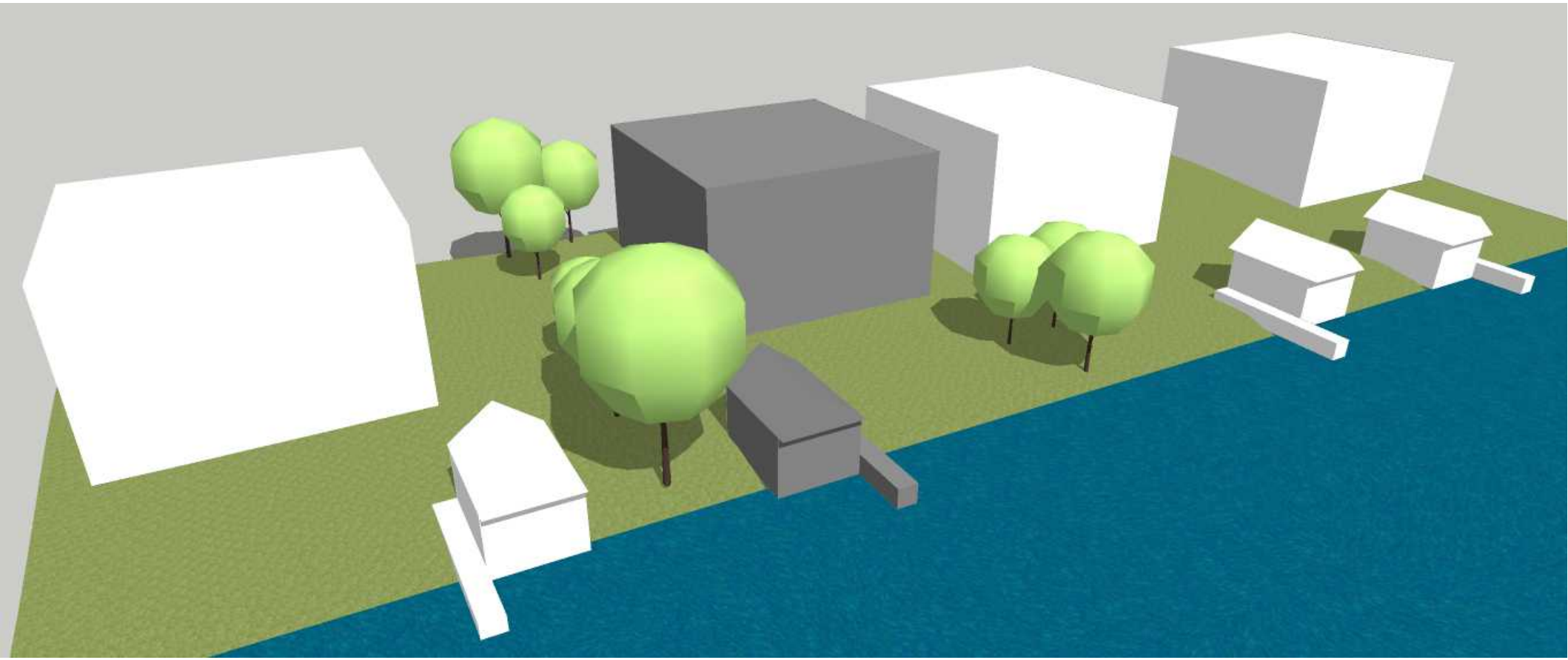
Also, I have added access routes both form land and water.

Water is obviously available from the watercourse at the southern boundary of the site, although the client documentation makes no mention of abstraction rights. Mains water is assumed to be generally available as the site will be fully serviced.



analysis

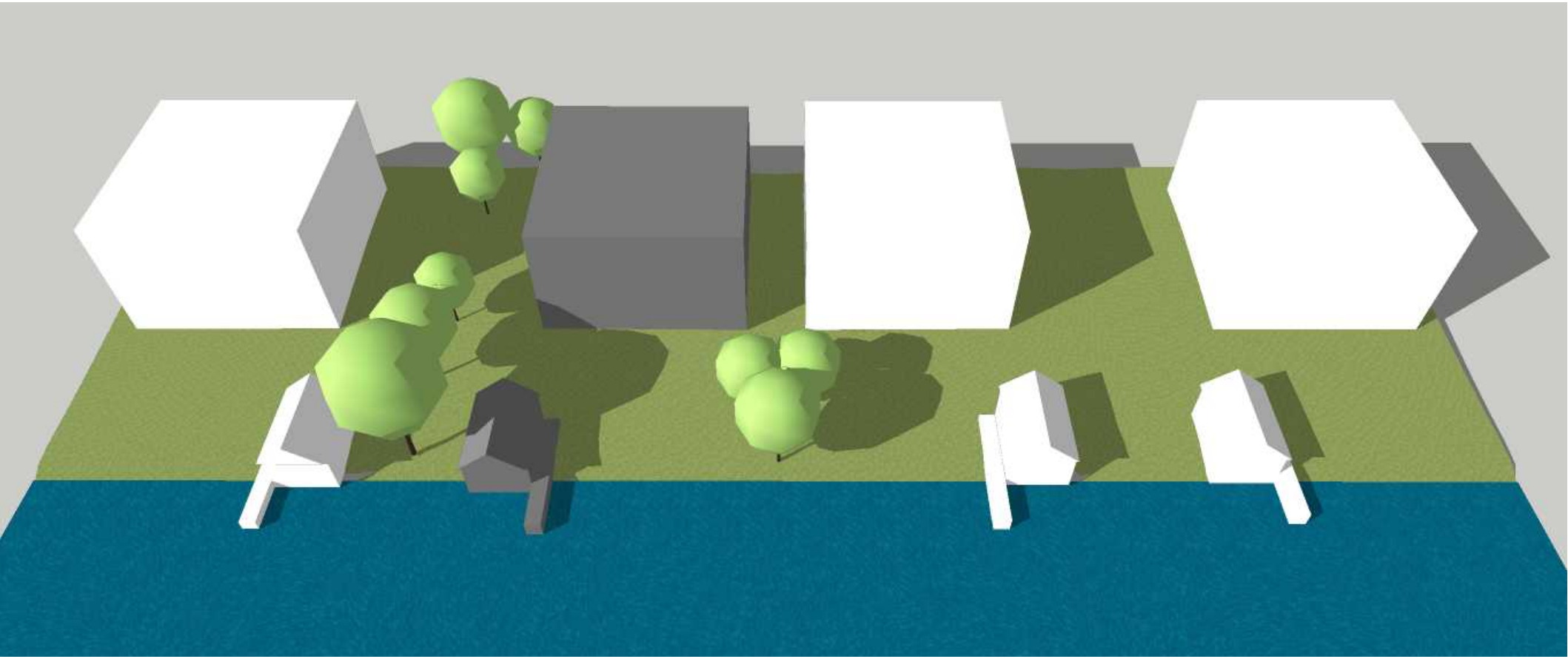
Initial Landscape massing model – JA 03/2014



Massing Model

I prepared a simple massing model to get an idea of how the space on the site would look and feel, to understand for example, the impact of placing additional structures on site, how many of what size (and therefore species) of trees would be feasible and so on. This informed later decisions and also acted as a visual tool to communicate ideas with the rest of the team before determining details. At this time Eric hadn't settled on the house form, so the large grey and white cubes indicate likely maximum dimensions to keep it within the 204m2 footprint limit set by the rules of the competition, while achieving an efficient envelope to volume ratio required to achieve passivhaus.. In reality the house was likely to be much smaller..

analysis



Shading analysis

The massing model also allowed me to perform a shading analysis on this early iteration of the model. This allowed me to understand where trees could be placed so that they wouldn't create excessive shade, thereby inhibiting solar gain in the house. As the trees are a key element of the design, their correct placement is very important. And as they are higher up the scale of permanence than most other elements, their placement needs to be determined before most other elements can be decided. Working in this way allowed me to determine the main framework – or pattern – of the plot. Using a model with multiple plots allowed me to see how the trees might impact other houses and/or act as edges between them.

design

Initial response to brief: JA 04/14

I took elements of the brief (bold italics below) relevent to my remit and recorded my initial ideas to share with the team...

"– an assessment of the quality of health and wellbeing for people living in the house, embracing issues such as daylight and integration of the natural environment."

- Natural materials for minimal offgassing (promoting health through high indoor air quality)
- Dual & triple aspect indoor spaces with vistas into woodland & wetland habitats: (wellbeing through nature connection)
- Use of transitional indoor/outdoor spaces – covered porches, verandas etc. (integration of natural environment)
- Where possible, high thermal mass materials used in sunny terraces to attenuate overheating on hot days and to re-radiate the heat in the evening; extending the usefulness of these spaces and enabling residents to spend more time outdoors. Where possible, could be combined with pergola/brise soleil idea, below, creating a suitable microclimate for more exotic species of fruit. (extending functionality of outdoor space & maximising integration of the outdoor environment

"– evidence that the summer comfort requirements of the Passivhaus standard will be achieved with details of the shading and night cooling strategy."

- Deciduous trees to the south/south west elevation to provide seasonal shading? Choose species with open canopy to create dappled shade to enable optimum daylighting.
- Pergola/brise soleil – vine fruits in summer provide additional shade and evaporative cooling (and fresh fruit for occupants, contributing to health & wellbeing).
- Deciduous trees close to the MVHR intake duct: evaporative cooling to pre-cool air when MVHR is on summer bypass? Choose species with short season in leaf.

"– a demonstration of how the front and back garden spaces provide flexibility, privacy and seamless integration with the interior"

- Flexibility achieved by a series of connected multifunctional spaces becoming progressively more wild away from the house. E.g. patio/decking; small lawn; woodland edge/clearing/meadow; woodland/lake…
- Privacy is achieved with the use of edible (for humans and/or wildlife) hedges for privacy & shelter to attenuate cool breezes.
- Integration with the interior is achieved through consistency of materials/textures/colours between indoor, transitional & outdoor spaces (garden furniture of similar style/materials as interior furniture/finishes etc). A summer house (or boat house?) in the garden could reflect material & furniture used in main house.

design

"– a consumption calculation or diagram to illustrate how the house will efficiently use other resources e.g. water, food or where waste from one process becomes a resource for another"

- Composting toilets to provide fertility for use around estate.
- Edible landscaping using mainly low maintenance perennial plants; where possible, early ripening varieties chosen so that harvest coincides with peak holiday season. Where fruits are not harvested, they will support wildlife.
- Charcoal for BBQs can be made on the estate
- Coppice on the estate (Silverlake – check Lower Mill) to provide fuel wood for log burners while creating unique habitat niches (Construction of bird hides in the coppice – from coppice products – provides additional facility/activity for residents/guests)
- Wood ash from wood burners separated, collected and used as fertilizer in (edible) landscaped areas/in the coppice.
- Coppice products used for garden fencing, furniture etc.
- Rainwater harvesting for e.g. garden use, washing car, boat etc.
- Residents & guests could take craft/land-based courses & activities (using coppice products to make furniture, bowls, spoons, charcoal-making etc.) to provide an additional USP & revenue stream for Habitat First Group.

Mood Board

I compiled the above ideas and shared them with the rest of the team using Basecamp (the collaborative working platform that LEDA were using on this project). I then prepred a mood board (see next page) to help communicate my thoughts and give examples. This was also shared via basecamp, and we also talked though it at a team meeting.

Pattern Application

After meeting, discussing the team's ideas & mood boards (Eric had prepared one as well), we ascertained the likely size & shape of the plot and roughly where the house would be placed on it. I then began to experiment with patterns taken from Christopher Alexander's *"A Pattern Language".* See page 30.

Integration of natural environment: materials

Above left & right: materials continue 'through' window. Edinburgh Botanical Gardens Visitors' Centre.

Right: materials, form & colour mirror landscape. Scottish Widows HQ, Edinburgh

Boat house as rustic cabin hideaway

Top row: traditional Norwegian Naust re-imagined as contemporary rustic holiday space; Jetty for water access & sitting. **Far left:** cabin in the woods atmosphere; large windows for views and to admit shimmering light reflected off lake surface. **Middle left:** modest scale; mezzanine for storage/teenager's bed. **Left:** Dorset vernacular

Outdoor kitchens

Top row: integrated cob barbecue, hot plate and bread oven. Slangerup, Denmark.

Bottom row: kitchen in small loggia with sink, benches, kitchen dresser & pizza oven by Valoriani, Slovenia.

Integration of natural environment: edges & transitional spaces

Top row: traditional Japanese domestic architecture: ambiguous boundaries between indoors & outdoors: transition achieved in stages; spaces afford shade & sun simultaneously.

Bottom left: the porch: a place to sit & cool off on a hot day or watch the rain on a wet one.

Bottom right: lean-to greenhouse or conservatory: unique atmosphere; an 'outdoor' space in winter; practical. A room of one's own for gardeners.

design

Possible patterns (from Alexander et al: *A Pattern Language*) JA 04/14

111 Half-hidden garden
•Casual social interaction
•Safe children's play
•Possible vegetable plot
•Circulation/access

170 Fruit Trees
•Attractive blossom
•Fruit
•Shelter
•Privacy
•Wildlife habitat

162 North Face
Car parking
Bike & dog wash

166 Gallery surround
•Wet coat/muddy boots

145 Bulk Storage
•Bins
•Bicycles
•Garden furniture
•Garden tools
•Firewood

161 Sunny Place
•Basking/Sun bathing
•Outdoor dining
•Entertaining
•Barbecue
•pizza oven

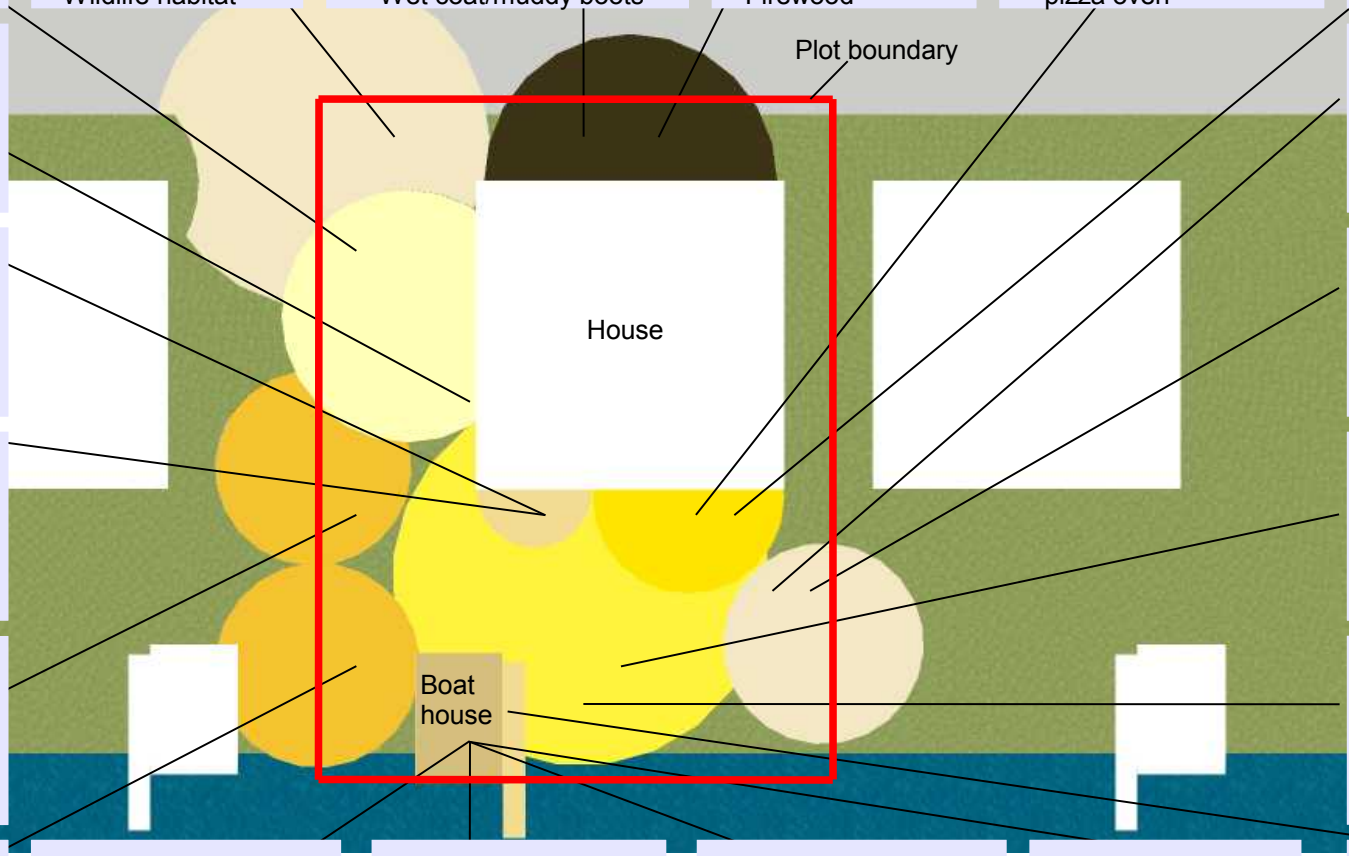
163 Outdoor Room
•Private outdoor space
•More formal than garden
•Enclosure/protection
•Sun, breeze, birdsong

166 Gallery surround
•Indoor/outdoor space
•Shady seating
•Outdoor room
•Porch/Six-foot balcony

175 Greenhouse/ conservatory?
•Protected cropping
•Unique character space
•Transitional space
•Solar gain

160 Building edge?
•A space to stop, sit and rest; to nestle against the building

172 Garden growing wild
•Modest forest garden
•Shelter belt/wind break
•Privacy
•Foraging/harvesting
•Wildlife habitat



170 Fruit Trees
•Attractive blossom
•Fruit
•Shelter
•Privacy
•Wildlife habitat

176 Garden Seat
•Secluded
•Shady seating area
•Views across lake
•Nature connection
•Late afternoon sun

105 South-facing outdoors
•Sun bathing
•Children's play
•Garden parties etc
•Circulation/access

106 Positive Outdoor Space
•Defined space
•Some degree of enclosure
•Entity in own right; not "left over" after house built

171 Tree Place
•Hidden/secret place
•"Umbrella" outdoor room
•A tree to lean against
•Widlife habitat
•N-fixing species (Alnus)

141 A room of one's own
•Solitude/privacy
•Contemplation
•Intimate entertaining

154 Teenager's Cottage
•Solitude
•Independence
•Self-expression
•Entertaining

181 The fire
•Contemplation
•Intimate entertaining

178 Compost?
•Compost toilet

145 Bulk storage
•Boat(s)
•Outdoor toys
•Garden tools
•Firewood

Jetty
•Access to/from water
•Diving
•Launching boats
•Sitting reading/ contemplating

design

Landscape Design Statement: Overall Concept

The garden serves as an edge that integrates the house & landscape in a gradual continuum from luxurious, controlled indoor spaces to wild natural space. It connects the two visually, functionally and through various energy transactions (such as the production of food, use of local firewood).

The potential for the building fabric to dominate as the defining design element is tempered by the interconnection of interior and exterior Spaces. This is achieved through the use of transitional spaces, outdoor rooms, views into the garden with its wild spaces, and the conscious invitation to wildlife to share the outdoor spaces. This creates opportunities for experiences that transcend the boundary of the building envelope, such as birdwatching from the house.

Deciduous trees to the south provide shelter and some shade to the house in the summer and admit the sun in the winter. Numerous fruit trees and bushes in the garden support wildlife while allowing residents to enjoy the abundance of the garden.

The estate coppice provides fuel for a wood-burning stove in the boat house and charcoal for barbecues, integrating the house into it's locality, providing carbon neutral fuel, providing local employment opportunities for coppice workers, enhancing the habitat value of the coppice, and offering unique experiences for residents through educational activities such as coppice management, green wood working crafts, charcoal burning etc. "Charcoal burn, wine & pizza" nights run by the estate coppice manager could form a unique activity for residents who are interested in land-based activities.

design

Car port & entrance: The entrance to the shady northern side of the house contains the car port and bulk storage for items such as garden tools, bicycles etc.

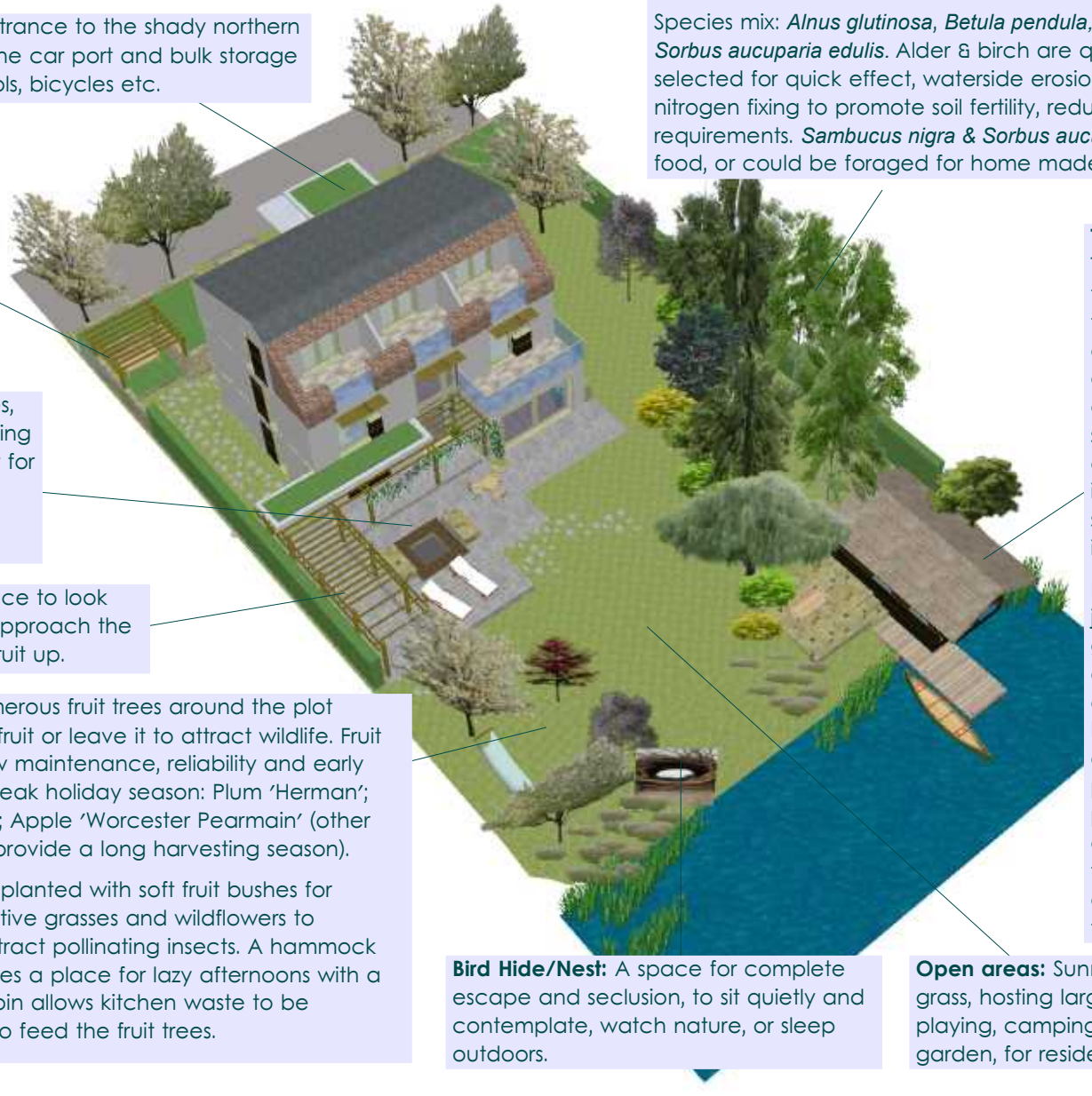
Arbour: A shady place to sit and enjoy views past the house to the waterway beyond, while being public enough to allow casual interaction with neighbours and passers–by.

Patio: A place for barbecues, outdoor dining and sunbathing in the summer, with a fire pit for use on cooler nights and in winter.

Pergola walk: A shaded space to look onto the sunny garden, to approach the orchard, and to grow vine fruit up.

Orchard/forest garden: Numerous fruit trees around the plot enable residents to use the fruit or leave it to attract wildlife. Fruit varieties are selected for low maintenance, reliability and early cropping to coincide with peak holiday season: Plum 'Herman'; Cherry 'Celeste'; Pear 'Beth'; Apple 'Worcester Pearmain' (other apple varieties selected to provide a long harvesting season).

Orchard understory can be planted with soft fruit bushes for maximum productivity or native grasses and wildflowers to promote biodiversity and attract pollinating insects. A hammock strung between trees provides a place for lazy afternoons with a favourite book. A compost bin allows kitchen waste to be recycled back into the soil to feed the fruit trees.



Woodland edge: A wilder space planted with native broadleaf species: This creates habitat, shelter belt for the house, a visual screen and seclusion for the boat house. Wildlife further encouraged through installation of bat boxes and hibernacula for amphibians and riparian mammals such as water vole *Arvicola terrestris amphibius*.

Species mix: *Alnus glutinosa*, *Betula pendula, Salix pentandra, Sambucus nigra & Sorbus aucuparia edulis*. Alder & birch are quick–growing riparian specialists selected for quick effect, waterside erosion control and in the case of alder, nitrogen fixing to promote soil fertility, reducing maintenance effort and fertilizer requirements. *Sambucus nigra & Sorbus aucuparia edulis* provide abundant bird food, or could be foraged for home made country wines.

The Boathouse: Getaway & Gateway
The secluded boat house is shielded from the main house by the native trees, and provides a different quality of rustic simplicity, allowing the occupants to really get away from it all. It contains a small woodburning stove and mezzanine platform for occasional additional guests, teenagers in need of privacy, or simply bulk storage. The boat house may optionally include a wood–fired sauna.

Housing boats, and incorporating a jetty, the boat house also becomes the gateway to water–borne transport around the network of channels that criss–cross the estate. A patio with a bench provides a place for quiet contemplation, or unobtrusive vantage point from which to watch children playing in the water. The boat house is constructed from locally–sourced timber and thatch, creating local employment opportunities & supporting traditional skills.

Bird Hide/Nest: A space for complete escape and seclusion, to sit quietly and contemplate, watch nature, or sleep outdoors.

Open areas: Sunny lawn for sunbathing on the grass, hosting larger garden parties, children playing, camping out, or to convert into a kitchen garden, for residents who are keen gardeners.

design

Permaculture Design Statement: Ethics

People care: The home, gardens and wider landscape are a place for escape, rest & regeneration, nature connection, play, learning, pampering/indulgence, socialising/community connection, contemplation & reflection.

Earth care: Low energy building, regenerative landscape (creating rich & diverse wildlife habitats)

Setting limits to consumption & redistributing surplus: Passivhaus standard explicitly sets limits to energy use in the building & reduces energy usage dramatically. Promotes holidaying in the UK, rather than abroad, reducing flights. Creating wild spaces in the garden invites wildlife to share the surplus of food.

design

View of entrance to north elevation – JA 04/2014

Permaculture Design Statement: Principles

I used Mollison's Principles for this design, as I had previously been using Holmgren's & wanted to compare them Also, I used them in the final design presentation and feel that they convey key concepts more simply.

Work with nature, not against

- Passive solar design
- Deciduous trees to south: provide shade when it's needed (and don't when it isn't).
- Provide food and habitat to invite wildlife in, rather than going to look for it.
- Where possible use renewable, local resources (e.g. timber & thatch) & labour.

Relative location & energy efficient planning:

- Trees placed carefully across the plot to minimise shading when/where not wanted
- Areas of most intensive activity & with most regular maintenance needs placed closed to the home
- Compost bin placed in orchard, where compost will be used
- Functions that don't require sunlight placed to the north elevation (car parking, bulk storage etc)

Use of edges to create niches and promote beneficial relationships & interactions

- Transitional spaces between interior & exterior provides gradation of privacy, shelter, nature connection. This is in turn creates a lot of niches
- Semi-public arbour: safe & private, but with opportunities for casual social connection & community building
- Views into the garden from the house for nature observation
- Water's edge for amphibian & riparian wildlife habitat
- Woodland edge
- Boat house/jetty occupies edge between land & water, private space and public waterway

design

View towards woodland edge, orchard & lake – JA 04/2014

Stacking (make use of 3rd & 4th dimensions)

The framework of native broad leaf high canopy trees with fruit trees as a secondary storey provides numerous beneficial functions as it is. However, it is designed so that it could be easily developed into a productive, low maintenance forest garden by infilling the shrub, herbaceous, ground-cover, root and climbing layers over time, should residents wish to do so.

Cycling of energy, nutrients & resources

Composting, use of wood ash on garden; supporting local economy helps to cycle financial resources locally

Encouraging Diversity

Range of spaces to provide richer diversity of experiences for residents;

Multiple habitat types encourages biodiversity

design

Important functions supported by multipe elements

Function	Element
Escape	The home, garden, entire estate.
Rest	Bedrooms; lounge; sun loungers; garden seating; hammock; bird hide/nest
Nature Connection	Woodland edge; water's edge; bird hide/nest
Play	Lounge; garden; boat house; jetty; water's edge
Learning	Through direct observation of nature: Bird hide/nest, Woodland edge & water's edge
Pampering/Indulgence	Luxurious interiors; optional sauna in boat house; sun loungers; on–site spa; barbecue spaces/outdoor kitchen
Socialising/Community	Arbour to the public side of the house; kitchen window overlooking public space
Contemplation/Reflection	Garden seats; fire pit; wood–burner; hammock; waterside seat/jetty
Recycling of Wastes	Compost bin; ash from wood–burner & barbecue returned to soil as mulch for fruit trees; Rainwater capture for use on garden and e.g. car washing.
Food Growing	Orchard; fruit trees around plot; open area (if converted to kitchen garden); pergola; arbour; woodland edge (forage).

design

Each element performs multiple functions

Element	Functions
House	Escape; rest & regeneration; nature connection (observation through windows); play; learning; pampering; socialising/community connection (hosting parties); contemplation & reflection; microclimates for tender plants
Balconies	Private outdoor space; views across landscape
Patio	Outdoor cooking; eating; drinking; reading; sunbathing (sun loungers); fire pit (contemplation; socialising/community connection)
Arbour	Socialising/community connection; support for climbing fruit
Pergola	Private shaded seating area; climbing plant support; framing views; support for climbing fruit
Open areas	Play; Socialising/community connection (garden parties); possible conversion into kitchen garden
Orchard	Food production; wildlife habitat; Wildlife food; shade; hammock support; partial shelter belt
Woodland Edge	Nature connection; food (foraging); play; learning
Bouthouse	Escape; nature connection (e.g. pond–dipping from the jetty); pampering (sauna); socialising/community connection (saying hello to passing boaters from the jetty)
Bird hide/nest	Nature connection; play; learning; outdoor sleeping

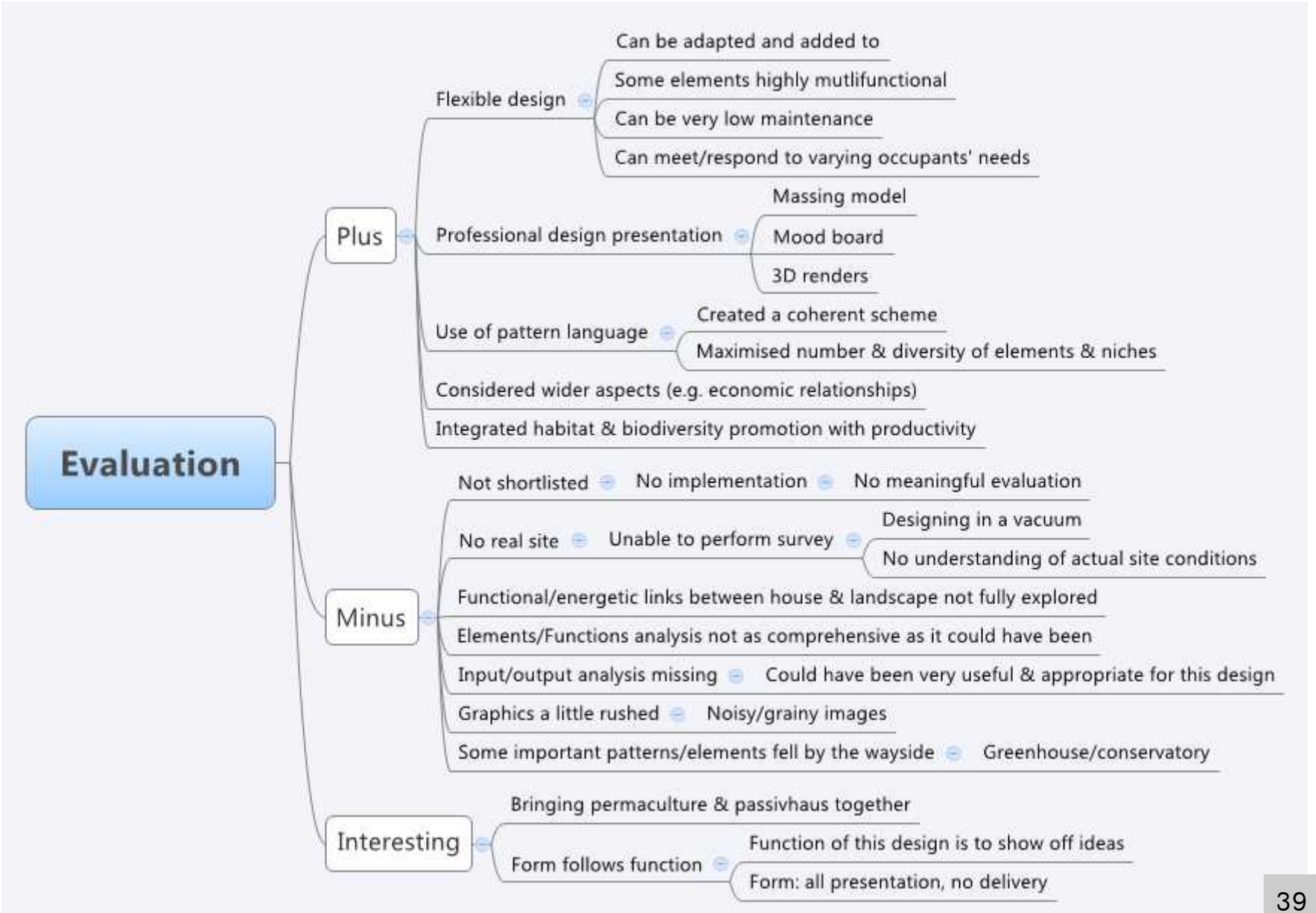
presentation

View from lake: JA 04/2014

3D Renders

All the renders used in the final design presentation were produced by using Google sketchup (free) and the basic Maxwell rendering plugin ($75). An online "warehouse" allows users to contribute & share their 3D models, so elements in the above image such as the trees, bench and canoe are all simply downloaded and dropped into the model. While the range of quality trees and plants is limited, a fairly realistic result can be achieved with a little work and trial and error. The house model was created by Eric, dropped into my landscape model and then I applied materials such as external render & roof tiles to it. Finally I sourced a HDRI image to provide a background and lighting data.

evaluation


Evaluation
Plus
Flexible design
Can be adapted and added to
Some elements highly mutlifunctional
Can be very low maintenance
Can meet/respond to varying occupants' needs
Professional design presentation
Massing model
Mood board
3D renders
Use of pattern language
Created a coherent scheme
Maximised number & diversity of elements & niches
Considered wider aspects (e.g. economic relationships)
Integrated habitat & biodiversity promotion with productivity
Minus
Not shortlisted
No implementation
No meaningful evaluation
No real site
Unable to perform survey
Designing in a vacuum
No understanding of actual site conditions
Functional/energetic links between house & landscape not fully explored
Elements/Functions analysis not as comprehensive as it could have been
Input/output analysis missing
Could have been very useful & appropriate for this design
Graphics a little rushed
Noisy/grainy images
Some important patterns/elements fell by the wayside
Greenhouse/conservatory
Interesting
Bringing permaculture & passivhaus together
Form follows function
Function of this design is to show off ideas
Form: all presentation, no delivery

reflection

What went well?

- Working in a team of professional designers
- Use of massing model to enable me to work simultaneously with the architect, rather than wait for the building design before starting the landscape
- Use of mood boards to communicate & share ideas
- Using base camp as a collaborative tool
- Using *A Pattern Language*: this is an incredibly powerful tool for informing design and communicating ideas
- Creating 3D images in short time frames: generally they all turned out well (some noise / grainy appearance in some images)

What was challenging?

- Working with massive time constraints, exacerbated by having to wait for architect's model before being able to start work on 3D renders. This resulted in a big last minute rush to meet the submission deadline, working all night etc.
- Working without having visited the site
- Working on a virtual/undecided site
- Working with a more organic process (I..e the architects didn't seem to use any kind of step–by–step process such as SADIM), but moved intuitively (and sometimes inefficiently in my view!) between tasks.

Long term visions & goals

- Develop architectural visualization skills further: include animation
- Leverage the design as an asset/vehicle to talk about permaculture design's role in architecture
- Promote professional presentation skills (3d modelling and rendering) within permaculture community

Next achievable steps

- Work through "blender" (open source 3D design, rendering and animation software) tutorials
- Write a blog post about the design & experience
- Use social media to publicise this design
- Run 3D modelling workshops at National Diploma Gathering(s)