

## ***Land adjoining 14 Highland Road, Bromley, BR1 4AD***

*Construction of a highly sustainable, self-build dwelling with sensitivity to its woodland site*

**Design & Access Statement**

Revision E

22.10.24

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# 01/ Introduction

## 1.1 Project Aims

The aim of this project is to deliver a high-quality, self-build dwelling on a underused backland site, employing the highest standards of design to sensitively integrate the home into its wooded setting and the surrounding townscape. The proposal demonstrates that a much-needed home can be provided at the same time as increasing the health and biodiversity of the wooded area and improving the setting of 14 Highland Road.

## 1.2 Project Introduction

This Design & Access Statement has been prepared in support of a full planning application in regards to one proposed new self-build dwelling on land adjoining 14 Highland Road, Bromley, BR1 4AD. The site is located in the London Borough of Bromley and is not within a conservation area. The site is the subject of a Tree Protection Order (TPO): “land behind 14 Highland Road – trees of all species: 31.05.23”.

This statement describes the site and its context, and how the proposal has been sensitively designed to take into consideration the character of the local area, public amenity and the amenity of neighbours, the setting of 14 Highland Road and the protection of trees and wildlife.



Aerial view of the site (red line) and its immediate surroundings. Blue line indicates land over which the owner has a right of access.

# 01/ Introduction

## 1.3 Design Team

The design process has been led by Arboreal Architecture, an award-winning architecture practice specialising in principles of ecological design. Having identified the ecological value of the site and its protected trees in particular, a team of professionals was assembled to address the design challenge of building a house on the site. The aim from the outset was to accommodate habitation for a single family on the site whilst protecting and enhancing the habitat for the trees and other species and improving the setting of 14 Highland Road. The design team includes:

- Arboreal Architecture (architect)  
<http://arborealarchitecture.com>  
*Arboreal led the design team and developed the architectural design in careful response to information provided by consultants.*
- Bartlett Consulting (arboricultural consultant)  
[www.bartlett.com](http://www.bartlett.com)  
*Bartlett surveyed the trees on site and fed into the design process key information on tree species, value, canopy size and root protection area. They supported the design development to bring the needs of the dwelling and those of the trees into alignment.*
- Arborweald (landscape, arboriculture and ecology consultants)  
[www.arborweald.co.uk](http://www.arborweald.co.uk)  
*Arborweald surveyed the site and fed into the design process key information on wildlife needs, rare and common species, habitat enhancement and biodiversity. They supported the design to deliver a Biodiversity Net Gain and benefits to wildlife more generally.*
- Palmer Heritage Limited (heritage consultants)  
*Palmer Heritage surveyed the site and fed into the design process advice on the heritage asset of 14 Highland Road. They supported the design to enhance the setting of this building and meet or exceed Bromley and London Plan policies.*
- Transport Planning Associates (transport consultants)  
[www.tpa.uk.com](http://www.tpa.uk.com)  
*TPA surveyed the site and fed into the design process key information on car access, pedestrian access and car parking, enabling the backland development to fit within the access needs of the front property.*
- Jan Monvid MIFireE (fire safety consultant)  
*Jan supported the design development to ensure compliance with fire safety regulations in regards to relevant policies in The London Plan and building regulations Approved Documents.*

arboreal  
ARCHITECTURE | DESIGN | ECOLOGY



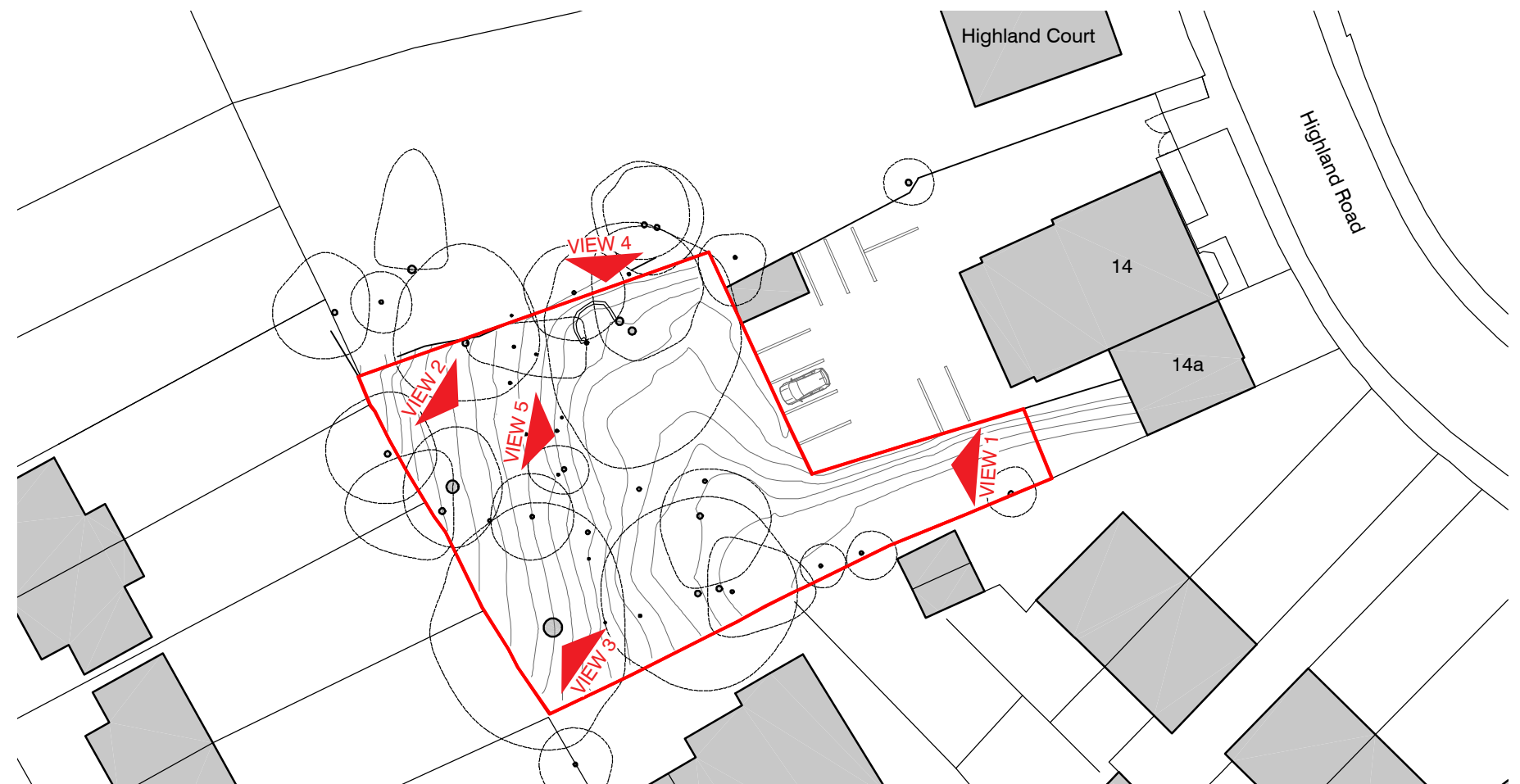
## 02/ Site & Context

### 2.1 Character of Site

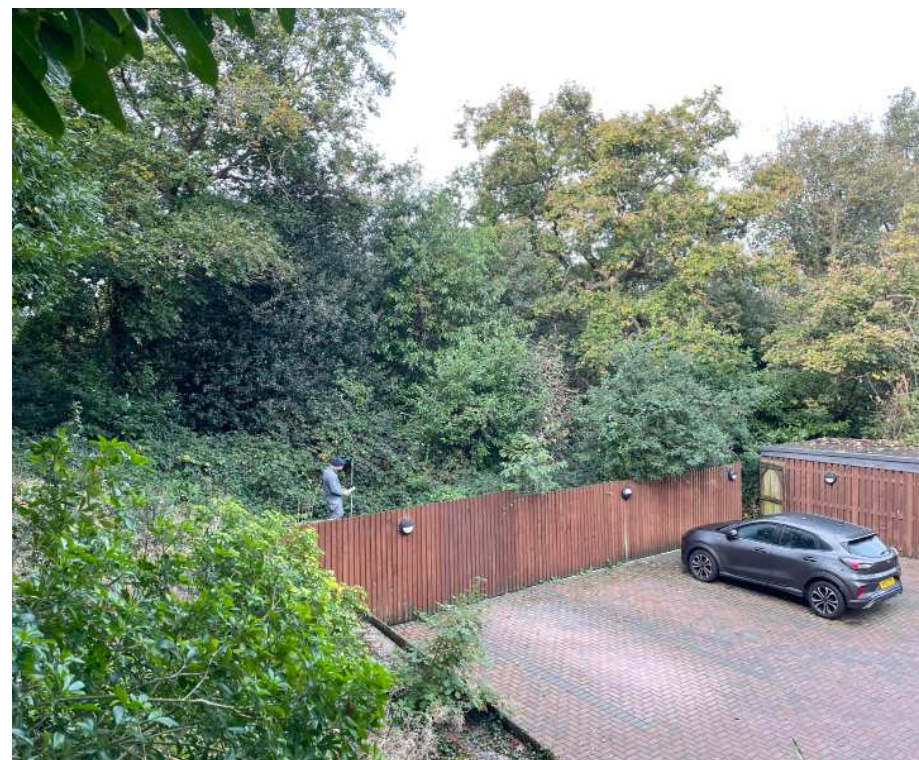
The site is a backland property behind 14 Highland Road and its car park characterised by derelict and overgrown trees, bramble, scrub and non-native, invasive species such as laurel. It has fairly flat areas on the east side but slopes away steeply (up to 30 degrees) toward the west corner. It has a projecting portion of the site to the east which forms a bank that slopes down to a retaining wall on the south side of the 14 Highland Road carpark.

The site has not been used for a number of years and the lack of any management or oversight has meant that the landscape quality has been reduced by,

- Invasion of non-native species that out-compete more beneficial and biodiverse forms of wildlife.
- Extensive deadwood in the mature trees and compromise of tree health from ivy growth.
- Fly tipping of rubbish across the site.



Site plan showing sloping topography (down to the west by up to 9m), tree locations and their canopies. Scale = 1:500



View 1. View from east corner of site showing overgrown woodland.



View 2. View showing non-native laurel and fly tipping within overgrown woodland.

## 02/ Site & Context

Historically, the site was the extended garden of the house at 14 Highland Road, which dates from the 1890's, and included the areas of what is now 14a and Highland Court. In the 1960's Highland Court was built and the north portion of the property separated off to accommodate it. In 2008 planning permission was granted for a single-storey side and four-storey rear extension to 14 Highland Road, splitting the house into eight flats. Since at least this point in time, it appears the rear of the property fell into disuse.

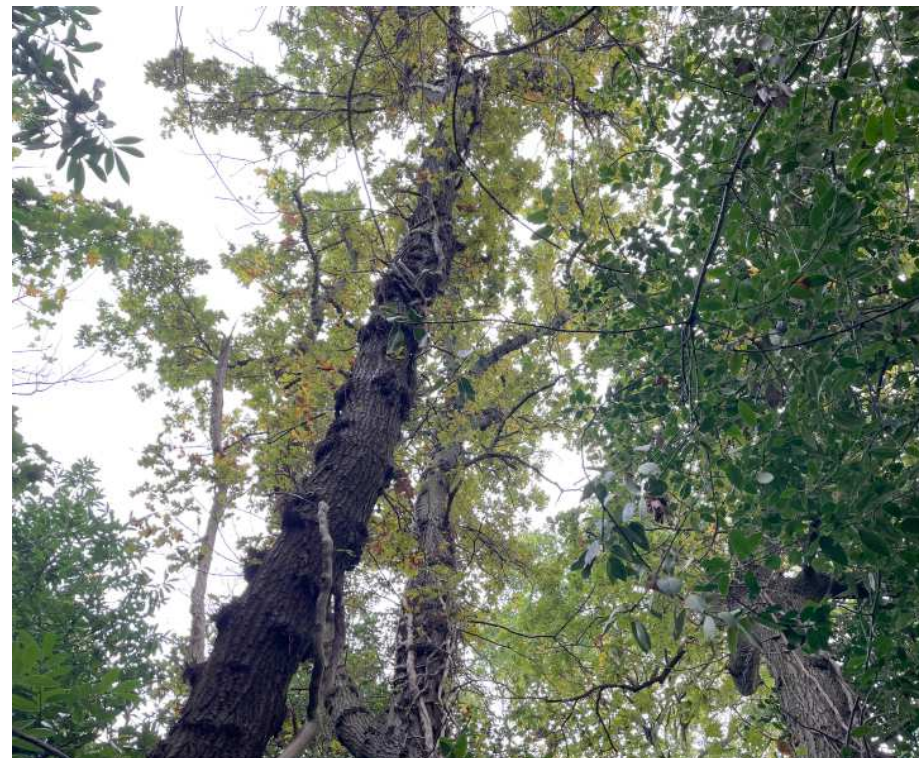
See also [Tree, Ecology and Heritage Reports](#) submitted with this application.



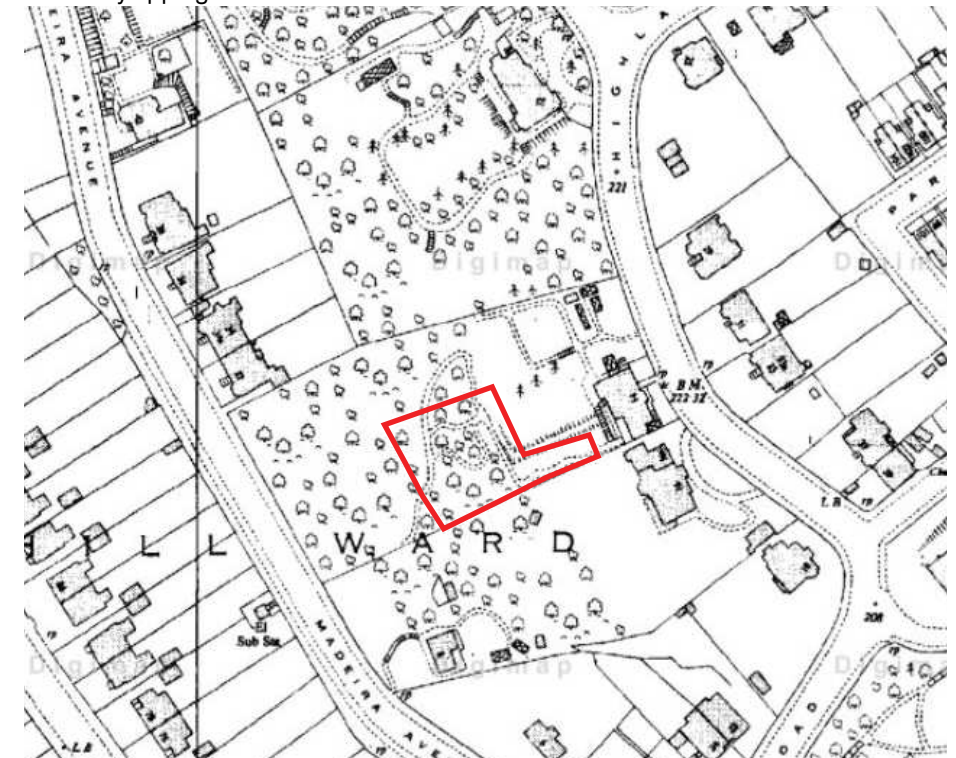
View 3. View showing mature oak tree, non-native laurel and fly tipping.



View 4. View showing remnants of previous inhabitation: water tap and brick walls, as well as fly tipping.



View 5. View looking up showing gaps in tree canopy and oak tree (T18) that is in decline with extensive dieback and dead ivy (category C3).



1950's map showing garden of 14 Highland Road. Site overlaid in red.

## 02/ Site & Context

### 2.2 Local Area

The local area is a diverse mix of housing types that includes detached homes, semi-detached pairs and small and medium-sized blocks of flats. Property ages also vary widely from late 19th century to the present day. Streets such as Madeira Avenue have a fairly clear building line defining a consistent set back of buildings from the street whilst others, such as Highland Road, are much more varied with set backs from 5m to 25m.

The proposed building fits discreetly and harmoniously within this varied urban pattern. Furthermore, it is located behind and down hill from 14 Highland Road (ground level is 6m lower) making it especially well concealed from public areas.

#### Image Key

1. Project site.
2. 14 Highland Road.
3. Highland Court.
4. Branxholme Court.
5. 10 Madeira Avenue backland development.
6. Madeira Avenue.



Aerial view looking south over Highland Road.



Aerial view looking north across the site.

## 02/ Site & Context

Adjacent to the site are the buildings 14 and 14a Highland Road, Highland Court and 10 Madeira Avenue. 20-26 Madeira Avenue also neighbour the site but are located more than 20m away and down hill so are much less visible to each another. 14 Highland Road and Highland Court are large buildings of three storeys at the front and four at the rear. They significantly obscure views of the site from Highland Road except for the narrow slot of space between them.

The front of 14 Highland Road is original late 19th century brick at ground level with Tudor-revival, half-timbered walls above. The rear is an early 20th century pastiche of these styles of a low design quality. Highland Court is a 1960's modern style with panels of brickwork and white render. The variety of visual languages suggests that the proposed building can fit harmoniously into this heterogenous mix.

See also the [Heritage Statement](#) included with this application.



View from Highland Road showing the limited views of the site between the buildings of 14 Highland (left) and Highland Court (right).



View showing the access route down the side of 14 Highland Road.



View showing the back of 14 Highland Road and Highland Court, including the car park and driveway.



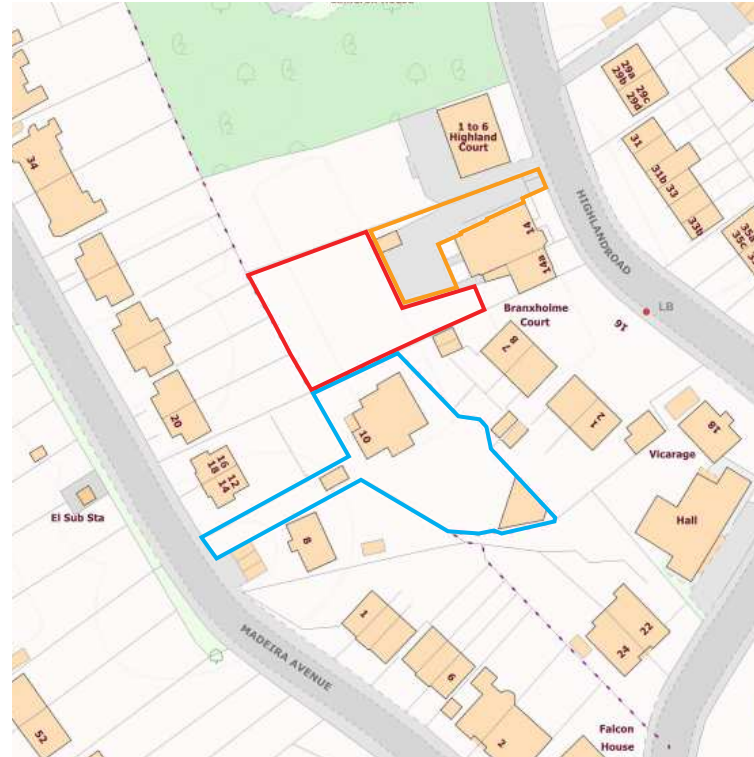
View showing the back of 14 Highland Road and the significant rear extension that converted the buildings to flats (permitted 2008).



## 02/ Site & Context

### 2.3 Example of 10 Madeira Avenue

10 Madeira Avenue borders the proposal site to the south and itself contains a discreet backland development of high design quality. Similarly to the proposal, it fits carefully into the wooded area and demonstrates the harmonious coexistence of trees and people where the trees are cared for and the views onto and through them are enjoyed. The project makes extensive use of outdoor decks as amenity areas and demonstrates that these can be just as, if not more, valuable than typical garden areas.



Location plan showing proposal site (red), land over which the owner has right of way (orange) and 10 Madeira Avenue (blue).



View of the south side showing the house nestled into the trees.



View of the southwest corner.



Outdoor deck adjacent to main living area.

## 02/ Site & Context

The scheme also includes outbuildings which create a natural need to traverse the wooded landscape. The building forms respond directly to the context of the site



The house demonstrates the value of living amongst the trees with deck spaces, rather than gardens, immediately accessible from rooms providing a high quality of amenity.



Beautiful views onto the adjacent trees are enjoyed from many rooms.

## 03/ Design Proposal

### 3.1 Description of Proposal

The project proposes to construct a two-storey, three-bedroom house of less than 180m<sup>2</sup> gross internal floor area (GIA) within the plot of land behind 14 Highland Road. The site has an area of 986m<sup>2</sup> and a sloping topography that drops by about 9m from its east corner to the west. The site is wooded and has a mix of semi-mature and early-mature trees, predominantly sycamore and oak.

The project takes great care to locate, shape and detail the construction of the dwelling so as to minimise its impact on existing trees as well as to protect the amenity of neighbours and the setting of 14 Highland Road. In particular, the proposed building is elevated on stilts so as not to cover over the ground (with its ecological value) nor to interrupt the natural topography. In this, and other ways detailed below, the proposal increases the wildlife and amenity value of the wooded site. The landscape is retained as woods (not converted to garden) and one parking space is located just inside the boundary so as to minimise the impact of cars on the natural character of the site. With 14 Highland Road already converted into 14a and 8 individual flats, the proposal is simply an extension of the existing estate.



View from the south showing building raised up on stilts and sitting within a natural gap in the trees.



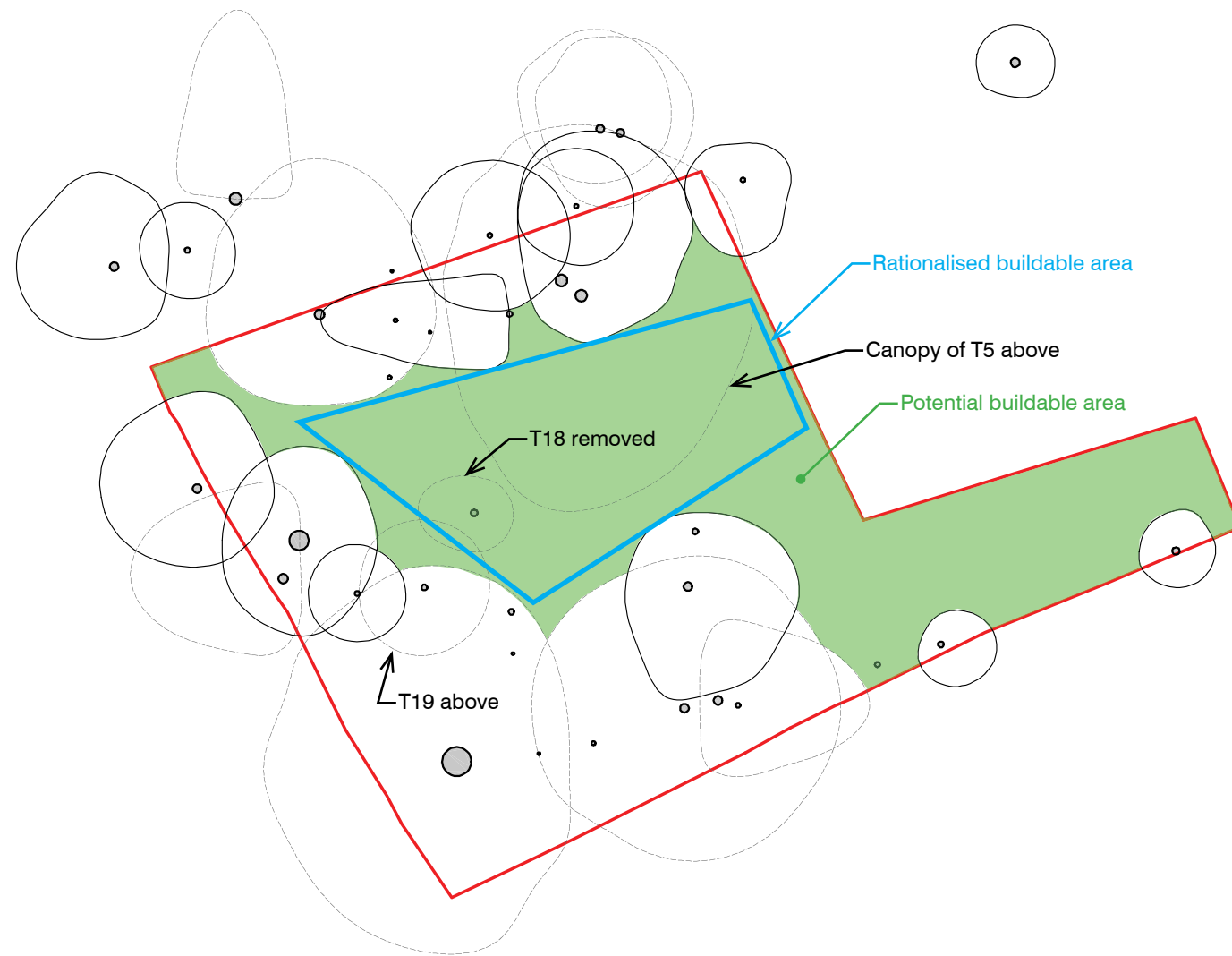
View from the north showing the planted roofs of the house and car port as well as the trellis wall on the north facade.

# 03/ Design Proposal

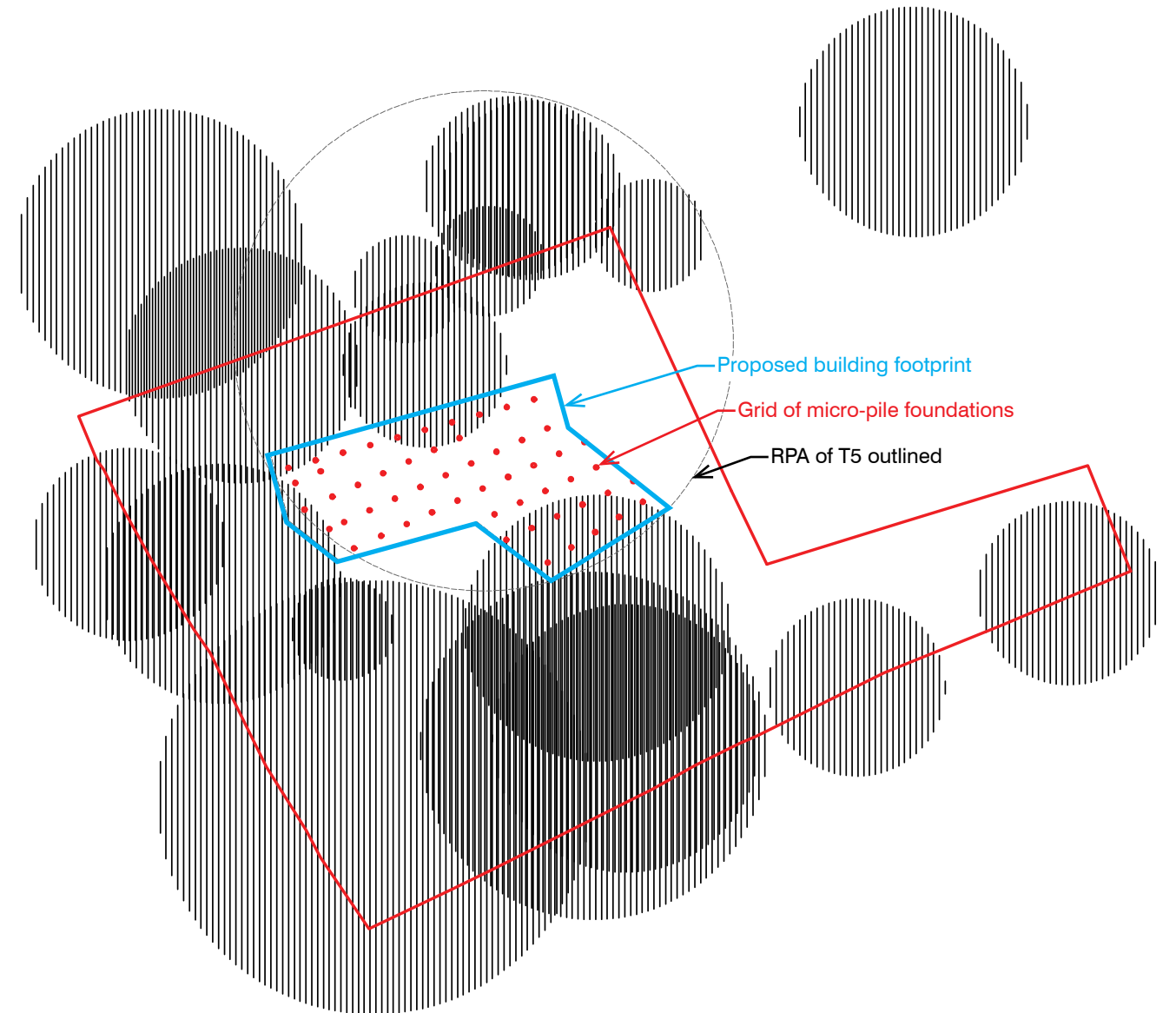
## 3.2 Design Process

The design process was led by the need to precisely coordinate the proposed building with the constraints of the trees, their canopies and likely root locations. The trees were surveyed twice to ensure accuracy and the resulting data enabled the definition of a feasible building zone - see diagrams below. Within the feasible zone a rationalised, broadly orthogonal building area was defined that had a minimum impact on the trees. The conclusion of the process was that just one semi-mature Category C three (T18) needed to be removed as well as two groups of small Category C trees (TG7 and TG27). This minimal loss could easily be compensated for with additional planting.

The building form was developed into an L-shape with an outdoor deck in between the two arms of the building. This form could be oriented south maximising solar gains to the deck and the south, southeast and southwest facades. The L-shape footprint largely avoids the root protection areas of the trees and a micro-pile foundation system and stilt structure has been developed to limit excavation to a minimum. Furthermore, installation methods have been designed to locate tree roots during construction and alter the structure accordingly - see Section 4 below.



Site diagram showing tree canopies and optimised construction zone to minimise impact on trees.



Site diagram showing root protection areas and locations of micro-piles.

## 03/ Design Proposal

The building form and fenestration has been optimised for access to daylight and sunlight as well as passive solar gains to reduce space heating demand in winter. The open L-shape arrangement creates four facades that face south, southeast or southwest and just two that face north or northeast. Principal living spaces enjoy these aspects and capture daylight, sunlight and solar gain. In the angle of the L-shape an external deck enjoys the southerly aspect and protection from the building behind - see diagram 1 right. North and northeast walls are largely without windows that would have poor access to sunlight and solar gain and larger thermal losses than the highly insulated walls. The north wall has a projection that creates small east and west facing windows for moderate solar gains. The east facade is also deliberately angled so as not to be parallel with the back wall of 14 Highland Road, thereby appearing more recessive and having less visual impact on the locally listed building - see diagram 2 right.

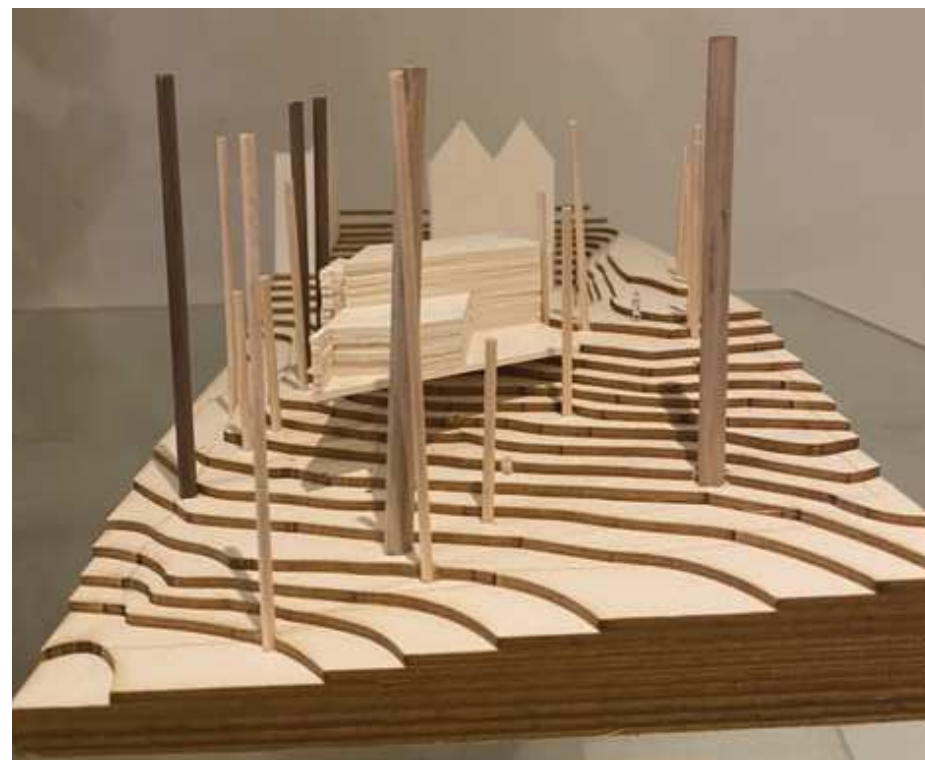
The L-shaped arrangement creates an outdoor deck that is the primary amenity space of the dwelling. It is a high quality space, immediately accessible from the living area and enjoying elevated views through the trees, access to southerly daylight and sunlight, and protection from the building behind. It connects to two other amenity spaces (shown yellow at right) which are small zones within the wider wooded area. These are patches of bare ground that allow the family to enjoy the trees up close as well as the proposed pond (light blue). The remaining area around the building (excluding the driveway) is given over to biodiverse woodland with the result that around 79% is for wildlife and 21% used for residents' amenity.



Diagram 1 showing optimised sun-orientation and amenity spaces (yellow).



Diagram 2 showing recessive and opaque north and northeast facades.



Example of physical models used in design development.



## 03/ Design Proposal

### 3.3 Amount, Layout and Scale

1. Only one dwelling is proposed rather than the two which were proposed in a previous planning application (22/03878/FULL1).
2. The site will be lightly used with a density of just 10 dwellings per hectare (DPH) which compares with 27-36 DPH for nearby properties.
3. The dwelling will be located centrally in the site which allows for existing trees to remain around the building.
4. There are significant distances between the proposed building and neighbouring buildings, see dimensions on plan right.
5. The distances between buildings, together with the large number of trees and other vegetation around the proposed dwelling mean that there will be no significant loss of privacy to any properties.
6. The arrangement of living spaces in the proposed dwelling locates primary rooms away from the northeast side meaning only two windows face 14 Highland Road. These are bathrooms and could be obscure glazed if needed.
7. The building has been angled so that its rear façade is not parallel with that of 14 Highland Road.
8. The dwelling is relatively modest at less than 180m<sup>2</sup> GIA. The adjacent property to the south, 10 Madeira Avenue, has a GIA of 272m<sup>2</sup> (according to Energy Performance Certificate data).
9. The height is in keeping with the context with proposed roofs at least 5m lower than the ridge height of 14 Highland Road.



## 03/ Design Proposal

### 3.4 Setting of 14 Highland Road

1. The setting of the 14 Highland Road will be maintained by:
  - The proposed dwelling being located at least 20m away.
  - The proposed dwelling being subservient to, and at least 5m lower in overall height and than 14 Highland Road.
  - No construction on the projecting portion of the site to the east, rather this will be landscaped to enhance the setting of the building.
  - Existing trees retained and new trees planted to provide a screen between the new dwelling and 14 Highland Road.
  - Selecting colours and tones of external finish materials that fit those of the woodland setting, thereby reducing the visibility of the new building.
2. NPPF paragraph 212 actively encourages councils to seek opportunities for development in the setting of heritage assets. Juxtaposition through a modern build brings architectural interest to the site as outlined in the Bromley Urban Design Guide July 23, 5.62 – Junctions.
3. The proposal will implement an attractive landscaping plan and improve the site boundary fence which will both improve the current setting and add to the house in front.
4. We also note that the value of 14 Highland Road is its original front façades that contribute to the character of the public realm. There are side and rear extensions, built around 2010, that already obscure the heritage value of the building from the rear and therefore less weight should be given to any consideration of further impacts from these directions.

See also the [Heritage Statement](#) included with this application.



## 03/ Design Proposal

### 3.5 External Appearance and Materials

The external appearance of the building has been designed to blend into the wooded setting through the use of six key materials, all with tones and textures that echo the natural world:

1. Charred wood cladding with a deep brown to black tone, vertical orientation and expression of knots and variation in the natural material.
2. Textured, warm-grey lime render that resembles the lighter brown tones in the wooded area.
3. Silver grey wood decking, again with the natural variation of wood.
4. Green roofs planted with woodland species from the site or similar native ecosystems.
5. Wood trellis with climbing plants that will grow over the facade.
6. Dark metal railings and stilts under the building.



View from the southwest showing charred vertical timber cladding, textured lime render, wood decking and black stilts below.



Example of dark wood cladding, elevated outdoor decks and stilt structures.



Example of charred, vertical wood cladding combined with a textured concrete, similar to lime render.



Example of an outdoor deck a few steps up from the ground in a wooded area.



## 03/ Design Proposal

The southwest corner of the building continues the palette of charred wood cladding and textured render. Black metal railings and stilts match the wood colour and recede into the shadows. The southwest corner is the highest portion of the ground floor above the sloping ground creating a dramatic balcony.



View from the southwest showing charred vertical timber cladding, textured lime render, black stilts below and black metal railings to outdoor decks.



Example of an elevated house on stilts within a woodland.



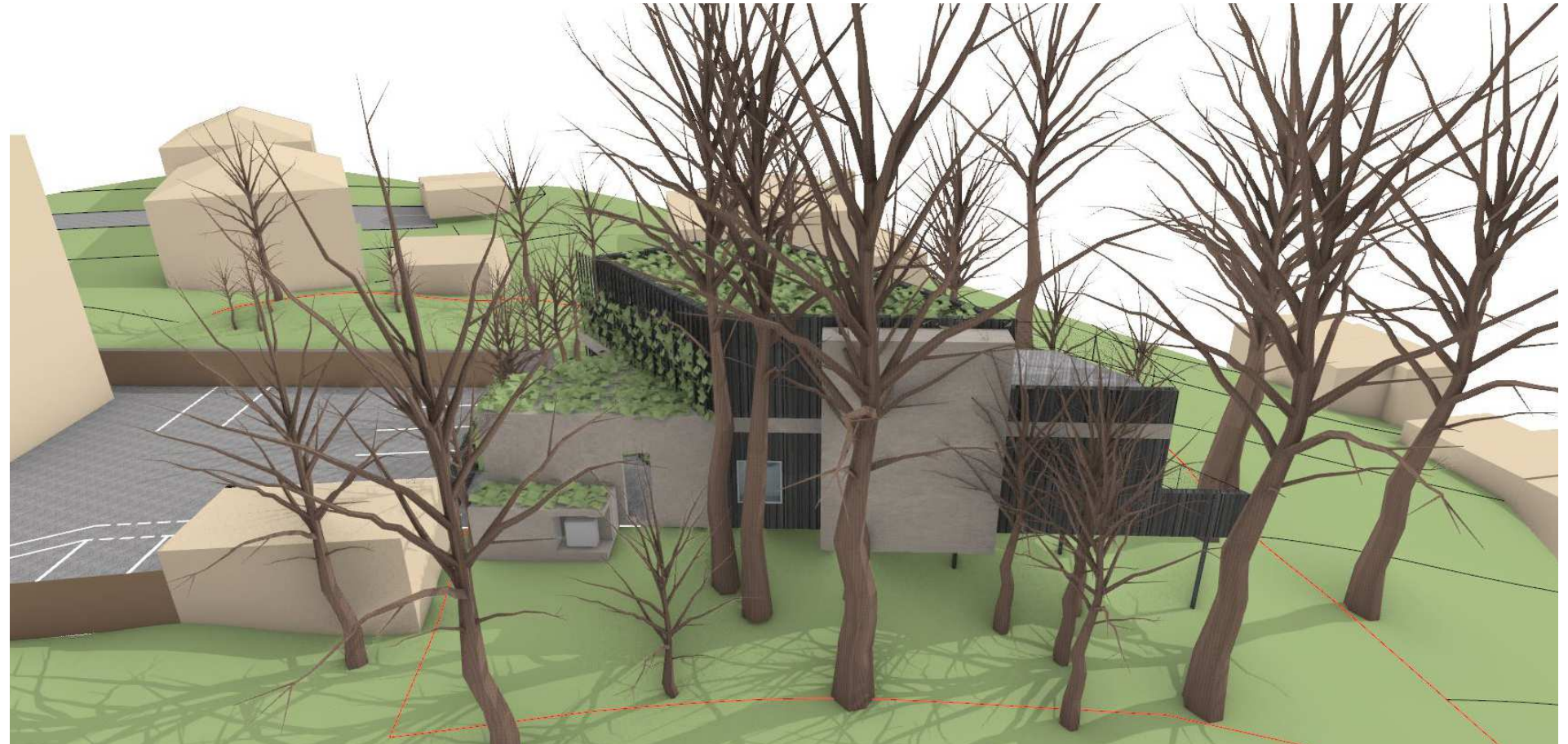
Example of a wood deck and black metal railings, elevated and overlooking the trees.



Example of charred, vertical wood cladding in a wooded setting.

## 03/ Design Proposal

The north side of the building is broken down into portions of charred wood cladding and portions of render, reducing its apparent mass. The green roofs, planted with native woodland species are visible as well as the trellis with climbing plants on the northeast facade. The bike and bin store (front, left) is finished in charred, vertical timber cladding.



View from the north showing charred vertical timber cladding, textured lime render, planted roofs and climbing plants on a vertical trellis.



Example of a roof planted with diverse species native to the wooded area.



Example of climbing plants (ivy) on vertical trellis.



Example of charred, vertical wood cladding and the pattern of shadow cast by the trees.

## 03/ Design Proposal

The northeast side of the building is particularly designed to recede into the wooded setting and to enhance the setting of 14 Highland Road. The building facade is fully covered with vertical wood trellis allowing climbing plants to grow up from the ground and from the carport roof. The carport roof is itself planted with native woodland species. The existing low-quality brown wood fence will be replaced by black vertical fencing and matching gate with native hedge behind.



View from the northeast showing the planted carport roof, climbing plants on the vertical trellis and the fence and gate at the boundary with hedge behind.



Example of a black metal, vertical fence and gate.



Example of a planted roof in a woodland setting.



Example of climbing plants on vertical trellis.

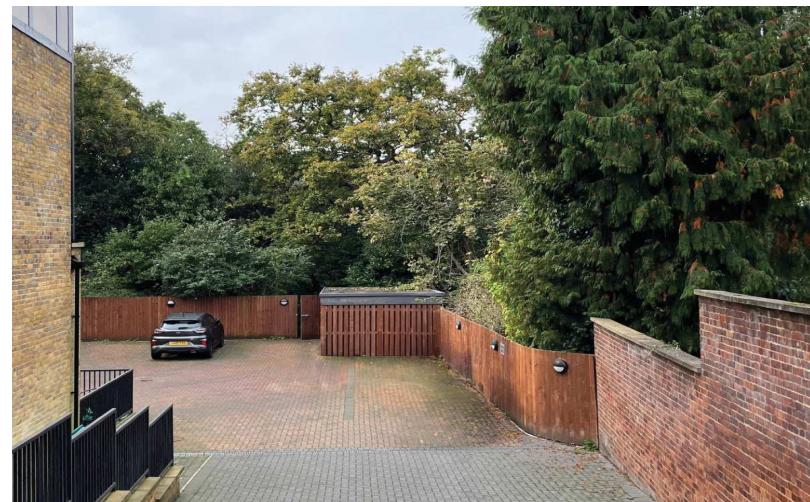
## 03/ Design Proposal

The experience of the carpark and the setting of 14 Highland Road will be enhanced by the external appearance of the proposed building and significant improvements to the boundary treatments and lighting. The brown wooden fence will be removed along the full border with the proposal site and replaced with black metal, vertical fencing and matching gate. Behind the fence will be native hedgerow and a new line of trees, see landscape plan in Section 4.

Existing lighting will be replaced with high quality black metal downlighters, mounted closer to ground level. These will be more discreet, provide better illumination of the ground surface and less light pollution for wildlife.



View from 14 Highland Road carpark showing the proposed building and new boundary treatments of vertical fencing and gate with hedge behind as well as new lighting.



Existing view.



Example of metal railing in front of hedge.



Example of discreet, low-level downlighters.

## 03/ Design Proposal

### 3.6 Arrival Experience

The arrival experience for both residents of the proposal and those of the eight flats in 14 Highland Road will be improved. A new gate will be installed to replace the existing one which serves car access only. The new gate will have both a pedestrian portion and a car portion, with both parts opening when a car enters or leaves. The gate will be accessed as currently by a fob and via an intercom connected to the proposed dwelling. The intercom, postbox and sign (14b) located on the pedestrian gate will give clear indication of the property behind. The concept of multiple properties at one address is commonplace and there is already a 14a on the other side of number 14.

Stripe markings and lighting will be installed to increase the ease and safety of the entrance route, clarifying the relationship between cars and pedestrians that may occasionally be using it at the same time.

Please see the [Transport Report](#) by Transport Planning Associates submitted with this application for more detail.



View from Highland Road showing new gate, intercom, post box, house number sign and lighting. Bin store is extended to the rear. Pedestrian striping added for wayfinding.



Elevated view showing pedestrian wayfinding and lighting of the entry and route to the property.

## 04/ Landscape, Trees & Ecology

### 4.1 Landscape Design

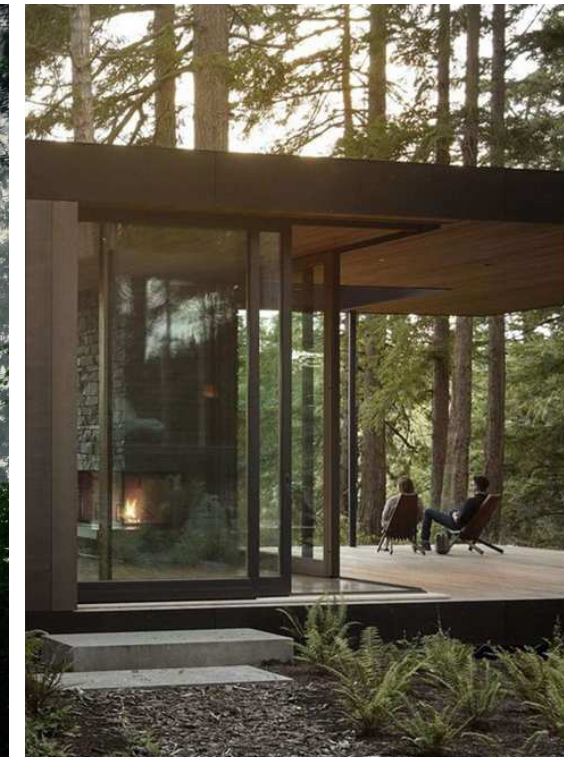
The purpose of the landscape design for the proposal has been to bring the needs of the family who will live in the dwelling into a harmonious and mutually beneficial relationship with the trees and wildlife with which they will cohabitate. There is a powerful win-win opportunity for the pleasure of living close to nature to fit with the care and sensitive management of the landscape for biodiversity gains.

A key principle of the landscape design has been to use just enough, to give the majority of space over to the trees and wildlife and use minimal areas for residents' amenity. Two small outdoor areas are proposed, connected by a meandering path, whilst the main amenity space is a raised deck adjacent to the principal living areas, hovering over the ground below. The proposal has shown that an outdoor deck has potentially greater amenity value (certainly to the site owner) than a typical garden. These include:

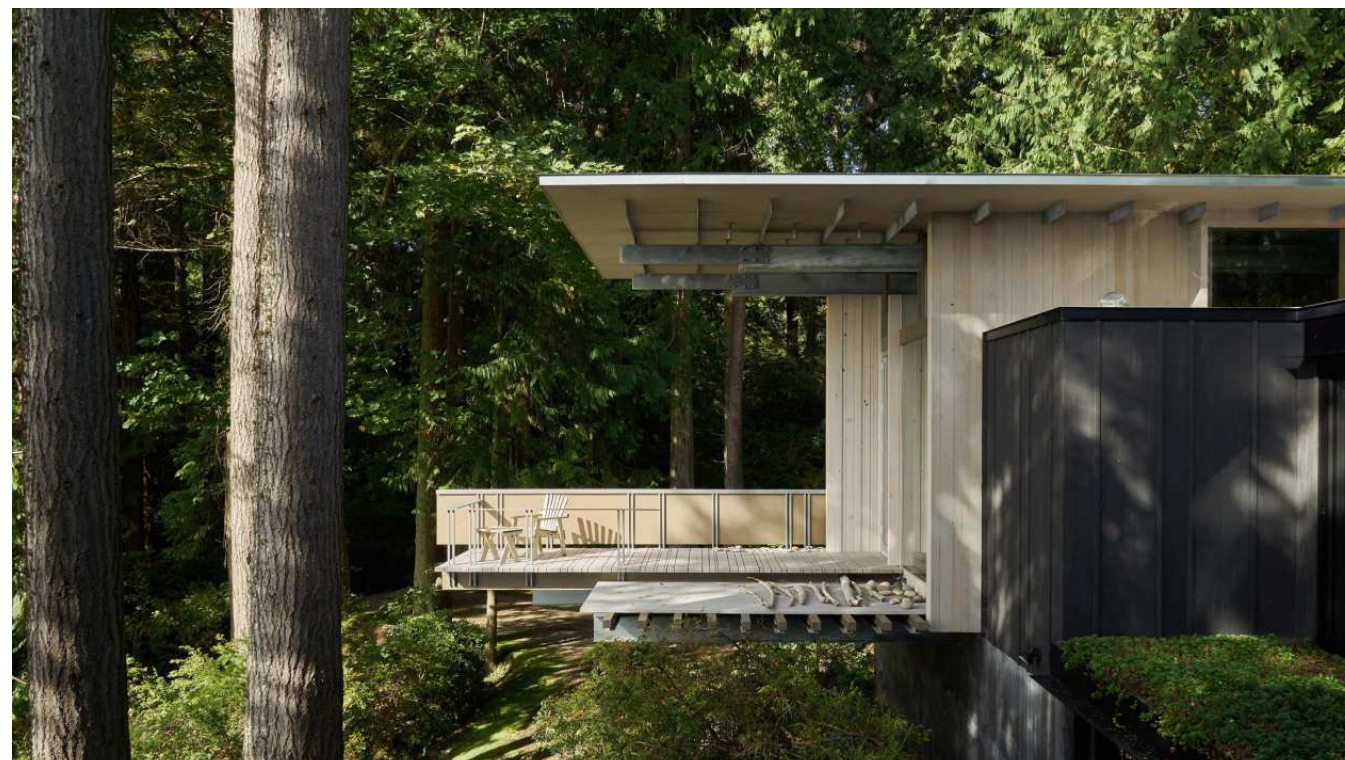
- Direct access from the living area onto a clean walking surface.
- Great light and views from an elevated vantage point.
- Proximity to the trees and immersion in the natural setting.



Example of the potential for buildings and trees to be brought into a beneficial and ecologically sensitive relationship.



Slightly elevated deck in a wooded setting.



Example of the amenity value of a raised deck in a natural setting.



Elevated views with immersion in nature.



A clean, durable outdoor space surrounded by trees and plants to form an outdoor room.

# 04/ Landscape, Trees & Ecology

## 4.2 Ecology and Biodiversity Gains

The landscape plan as shown below and submitted with the architectural drawings describes how the recommendations of the Ecology and Tree Reports are put into practice. The Ecology and Biodiversity Net Gain Report makes recommendations in three categories: red - essential to achieve biodiversity gains; amber - good practice for achieving further biodiversity value; and green - additional enhancements. The proposal adopts and implements them all, going further in quantity than recommended minimums. For example, 10m of native hedgerow is required but 37.5m is proposed.

In general, the plan below shows the site split into dark green for wooded areas and ground cover, light green as meadow and yellow for amenity uses. Red is used to highlight new tree and hedge planting. The living surface area is comprised of:

- Ground around the building = 725m<sup>2</sup>
- Ground under the building = 108m<sup>2</sup>
- Planted roofs = 91m<sup>2</sup>
- Planted trellis wall = 67m<sup>2</sup>

**TOTAL = 1,041m<sup>2</sup>**

The total plot area is 988m<sup>2</sup> so the proposal has succeeded in proposing a dwelling as well as increasing the total live biotic surface area. Furthermore, the proposal significantly diversifies the habitat niches on the site with greater variation in areas of light and shade, dry and sheltered areas under the building, meadow and wooded areas and crucially water in a small pond.

### KEY

- = Existing tree.
- = New trees, minimum 2m tall of hornbeam, field maple, lime (*Tilia cordata*), or fruiting species such as pear (*Pyrus spp.*), apple (*Malus spp.*), or mountain ash (*Sorbus aucuparia*).
- = New trees, minimum 1m tall of hornbeam, field maple or lime (*Tilia cordata*).
- = New hedge planting in two rows (30cm apart) of 5 plants per meter of hazel, hawthorn, blackthorn, crab apple, hornbeam, dog rose and field maple and honeysuckle.
- = Climbing plants on trellis of clematis, honeysuckle, hops, climbing roses and ivy.
- = Bird or bat boxes, species as labeled.
- = Wildflower meadow of native species from seed mix including borage, ox-eye daisy, meadow cranesbill, wild clary, red clover, wild foxglove, musk mallow, field scabious etc.
- = Woodland ground cover with existing native plants retained and enhanced with native plug-planting at 5 per square meter of wild garlic, woodruff, wood spurge, sanicle, dog violet, snowdrops etc.
- = Bare woodland ground.
- = Timber decking.
- = Pond with depths varying from 15-60cm and planted with minimum 30 plug-plants of yellow iris, meadow sweet, watermint, bogbean, marsh marigold, water violet, water crowfoot, willow moss and sedges.



## 04/ Landscape, Trees & Ecology

### 4.3 Cohabitation of People and Trees

One of the primary aims of the proposal is to demonstrate that the residents of the dwelling and the dwelling itself can be brought into a harmonious coexistence with the trees and the wooded habitat. A broad range of design measures have been developed to achieve this during both the construction phase and occupation of the building:

1. Screw pile foundations are proposed rather than more conventional concrete strips, pads or rafts which require broad and deep excavations that damage tree root systems. Screw pile also avoid putting concrete into the ground which can have detrimental chemical effects on soil biology.
2. Screw piles carry load at a point resulting in far fewer potential root clashes than typical foundations. Furthermore, when installing them, the first meter of ground can be hand dug to check for roots and, if encountered, the pile can be relocated with pre-planned modifications to structures above, e.g. the point at which the pile meets a beam.
3. Screw piles can be installed without heavy machinery that would risk ground compaction - see images right. This construction model has been adopted for all superstructure, utilising small, lightweight, usually timber components that can be delivered, manoeuvred and installed by hand. This protects the ground, reduces risk to branches and allows for a compact site with minimal working areas around the building.
4. Service runs are another building element that interrupt the ground and risk clashes with tree roots. The services have been designed to enter the site via a single route before branching out above ground, under the elevated building, thereby minimising intrusion. Again they will be hand dug and redirected as needed to avoid tree roots.
5. Trees are sometimes considered a "nuisance" in relation to buildings due to the branches, twigs, leaves and sap that can fall from them. They do not have to be a nuisance if the building is designed to accommodate them and the owners and their maintenance regimes informed and expecting them. Roofs and drainage have been designed to accept falling debris without hampering their function. Roofs are either green, planted with local and native woodland species that mimic the forest floor, or wooden decks. The former can accept and compost debris whilst the latter is accessible and easily maintained.
6. In contrast to typical guttering, green roofs naturally filter out debris through the soil, gravel and membranes they are composed of. Decked roofs catch debris on the deck and have secondary leaf traps where the rainwater exits the deck. These can be accessed, periodically cleaned out and maintained.

7. The building is raised up on stilts which allows a larger area of the ground to remain undisturbed and biologically active. Such undercroft areas can typically be devoid of life because they are too dark and too dry. In this case, however, light levels will be improved by painting the underside of the building white. Rainwater will also be redirected to the undercroft by drip-pipes connected to the rainwater drainage system see diagram right. Around 20% of the undercroft will not receive this water, creating sheltered dry areas suitable for small mammals.
8. Artificial lighting can be detrimental to wildlife, in particular, disturbing roosting birds. This problem is widespread across London and cities generally so could not reasonably be expected to be completely addressed in this project. None-the-less the proposal has avoided the use of skylights that (without blinds) would be likely to transmit artificial light up into the tree branches. Furthermore, no artificial light is proposed outside of the building except for low brightness lighting at the main entrance to the building which is anyway screened by the carport roof above. Residents of the dwelling will also keep in mind to close blinds and curtains in the evening rather than allow light to spill outside.

See also [Tree Report](#) by Bartlett Consulting, included with this application.

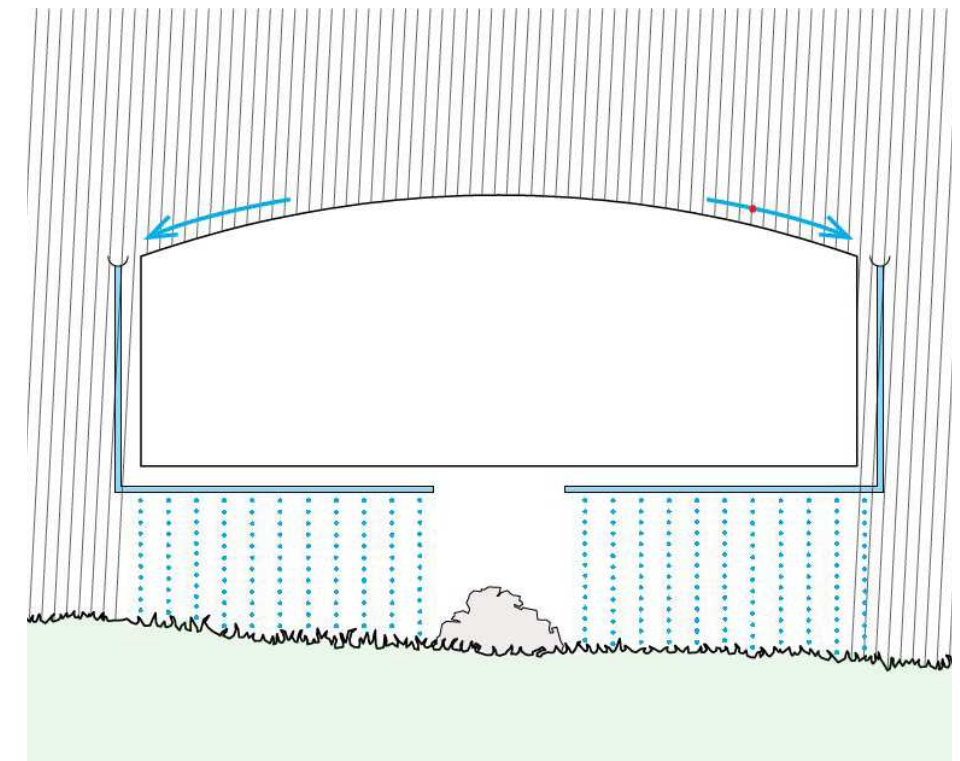
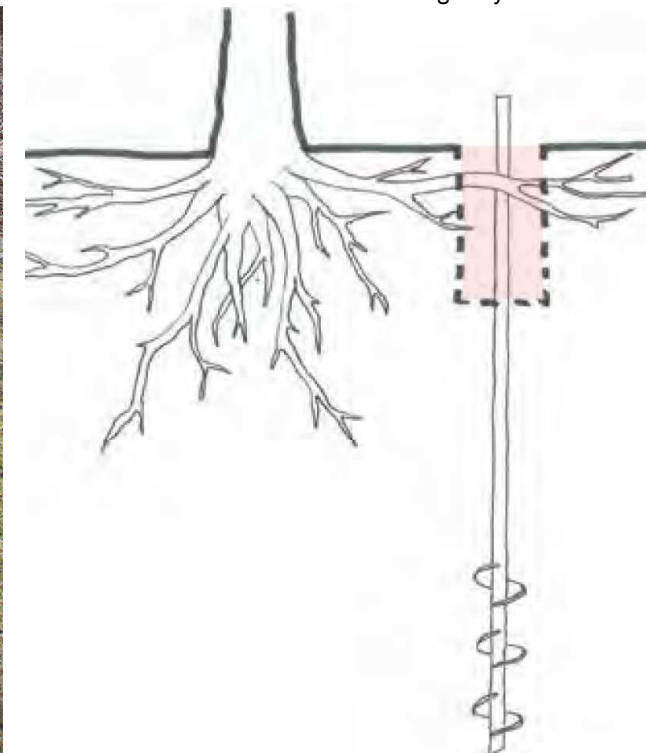


Diagram showing rainwater collected and redistributed to the undercroft, keeping it biologically alive. Some areas with log and branch piles can be left dry for habitat.



Composite image of a screw-pile being installed.



Section through a screw pile showing how hand-digging the first meter allows roots to be located and avoided.



Green roof with native woodland ground cover species.



## 05/ Sustainable Design

### 5.1 Embodied and Operational Carbon

The proposed building is designed to achieve the highest standards of sustainability, focussing in particular on the impact that buildings have on the climate crisis through their embodied and operational carbon. The embodied carbon of a building is a measurement of the emissions caused in the extraction, processing, manufacturing and construction of the materials and products used in the building. Some materials, such as concrete, steel and glass, require large amounts of energy to manufacture and have consequently high emissions, whilst others, such as timber and plant-based products, are very much lower. Wood also has the benefit of sequestering carbon from the atmosphere as it grows, offsetting the energy and emissions from its manufacturing and transport to site. This project sets two embodied carbon aims:

- To achieve the [RIBA 2030 Climate Challenge](#) criteria of <625 kgCO<sub>2</sub>e per square meter of floor area.
- The building will be built primarily from wood and plant-based construction products (e.g. insulation) so that, when sequestration of carbon is taken into account, the building has net-zero embodied carbon.

The proposed building is designed to achieve very low levels of operational carbon through the efficient use of energy, especially for space heating and hot water. Space heating requirements are reduced by the use of a compact, two-storey form, orientation of glazing to the south for passive solar gain, generous wall thicknesses for high levels of insulation, highly-insulated doors and windows, and careful detailing to avoid air leaks. Operational carbon is reduced by using only electric systems (no gas) and generating heat through an air-source heat pump. The project aims to:

- Achieve the [RIBA 2030 Climate Challenge](#) operational energy criteria of <35 kWh/m<sup>2</sup> per year.
- Collecting energy data for the first 18 months of building use to track performance.

### 5.2 Water and Drainage

The proposed building is designed to achieve the highest standards of sustainability in regards to water usage and this will be achieved through the specification of low-volume fixtures. Rainwater will also be collected so that no potable water is needed for irrigation of interior or exterior plants.

The project aims to:

- Achieve the [RIBA 2030 Climate Challenge](#) potable water use criteria of <75l per person, per day.

The project employs several innovative approaches to sustainable urban drainage systems (SUDS).

- Two-thirds of the roof area is given over to planted roofs which have the effect of absorbing and slowly releasing the rainwater, thereby reducing stormwater runoff and flood risk, and stabilising groundwater levels.
- Rainwater will be collected in a 2,000l rainwater harvesting container stored underneath the building, providing plenty of water for plant irrigation.
- In order to maintain plant growth and biodiversity of the area under the building (as the building is raised up on stilts), rainwater will be piped underneath and released through drip-pipes. The amount of water will be equivalent to the amount it would have received had it not been under the building.
- Rainwater that exceeds the amounts absorbed by the green roof, harvested for irrigation, or piped under the building will be piped to a soakaway in the west corner of the site and allowed to percolate back into the ground. Foundations near to this location will be designed to accommodate fluctuating water saturation.

### 5.3 Reduction of Waste

More than 50% of waste generated in the UK is estimated to come from the construction industry and this project aims to address this issue by:

- Design for disassembly, maintenance and recycling by employing construction systems and assembly methods that facilitate taking the building apart again at a later date. This can be achieved, for example, by using bolt and screw connections rather than glue.
- Specifying long-life, durable materials that last and weather well, reducing the need to maintain and replace them during the lifespan of the building.
- Avoiding the need to remove earth from the site by limiting groundworks and raising the building up on stilts.

### 5.4 Health and Wellbeing

The project aims to deliver a high standard of health and wellbeing to its occupants and this will be achieved by:

- Enjoying the unique opportunity to live in a wooded area with generous views onto and through the trees.
- Creating outdoor decks and balcony spaces immediately adjacent to the living and bedroom areas so that it is easy to step outside frequently and to use these spaces as outdoor rooms.
- Employing generous amounts of southerly oriented glazing so that occupants have access to natural light.
- Carefully specifying natural building materials to avoid off-gassing of formaldehyde or other volatile organic chemicals (VOCs).

## 06/ Access & Parking

### 6.1 Vehicle Access and Parking

The dwelling will be accessed via the driveway and parking area of 14 Highland Road, over which the owner has a right of access. A remotely operated, electric gate will give access to the driveway and vehicles will drive down to the site boundary where a second gate will give access to a parking space under a covered car port. This single parking space complies with the Bromley Local Plan requirement for a minimum of one space for three-bedroom houses on sites with a PTAL of 2-6a.

In order to achieve this arrangement, the parking layout of 14 Highland Road will be reorganised and marking repainted to create the access to the site in place of what is currently parking space F, see diagram right. One parking space will be removed but overall eight will remain, one for each of the flats in 14 Highland Road. The 9th space is currently for visitor parking and, once removed, visitors will now park on the street.

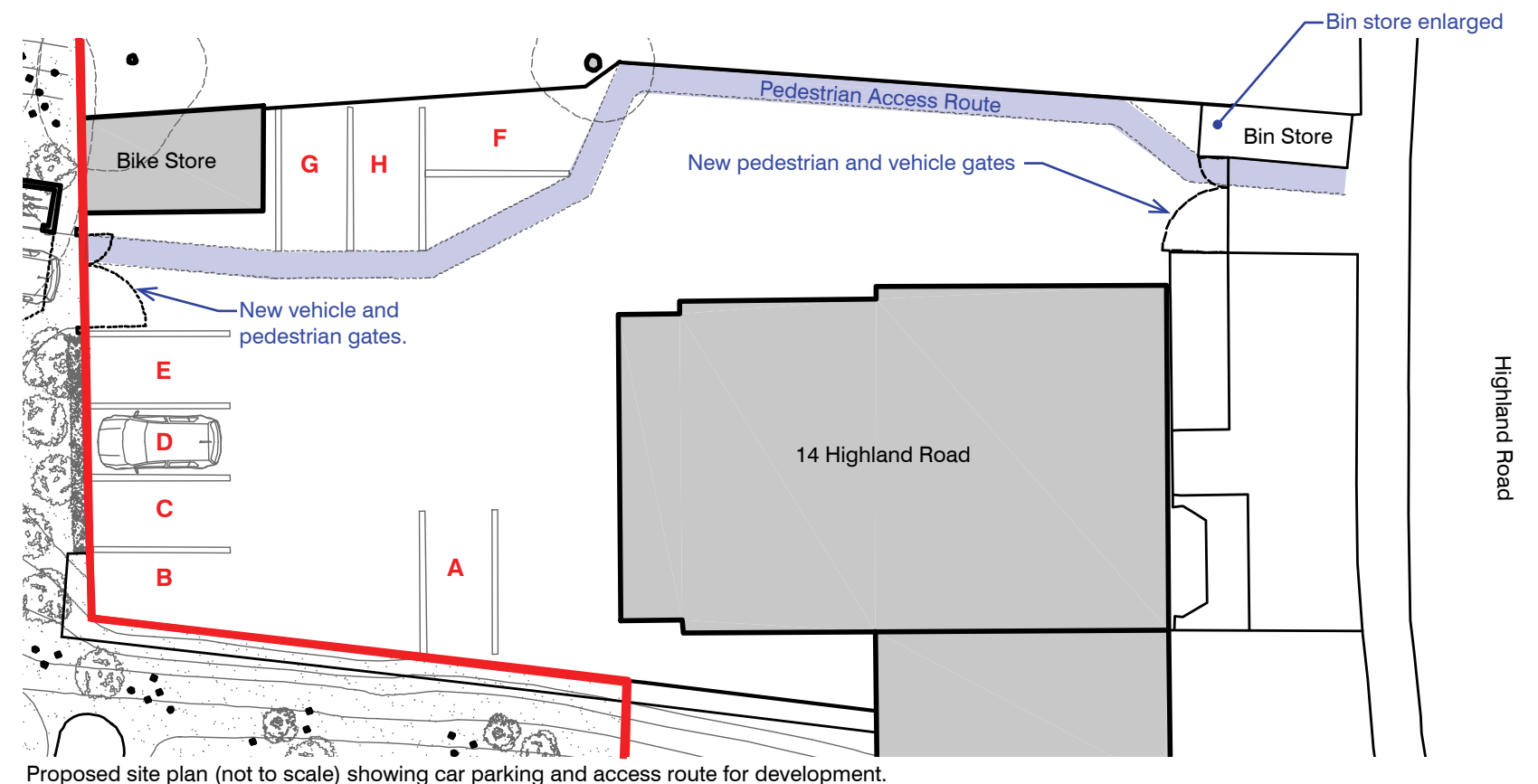
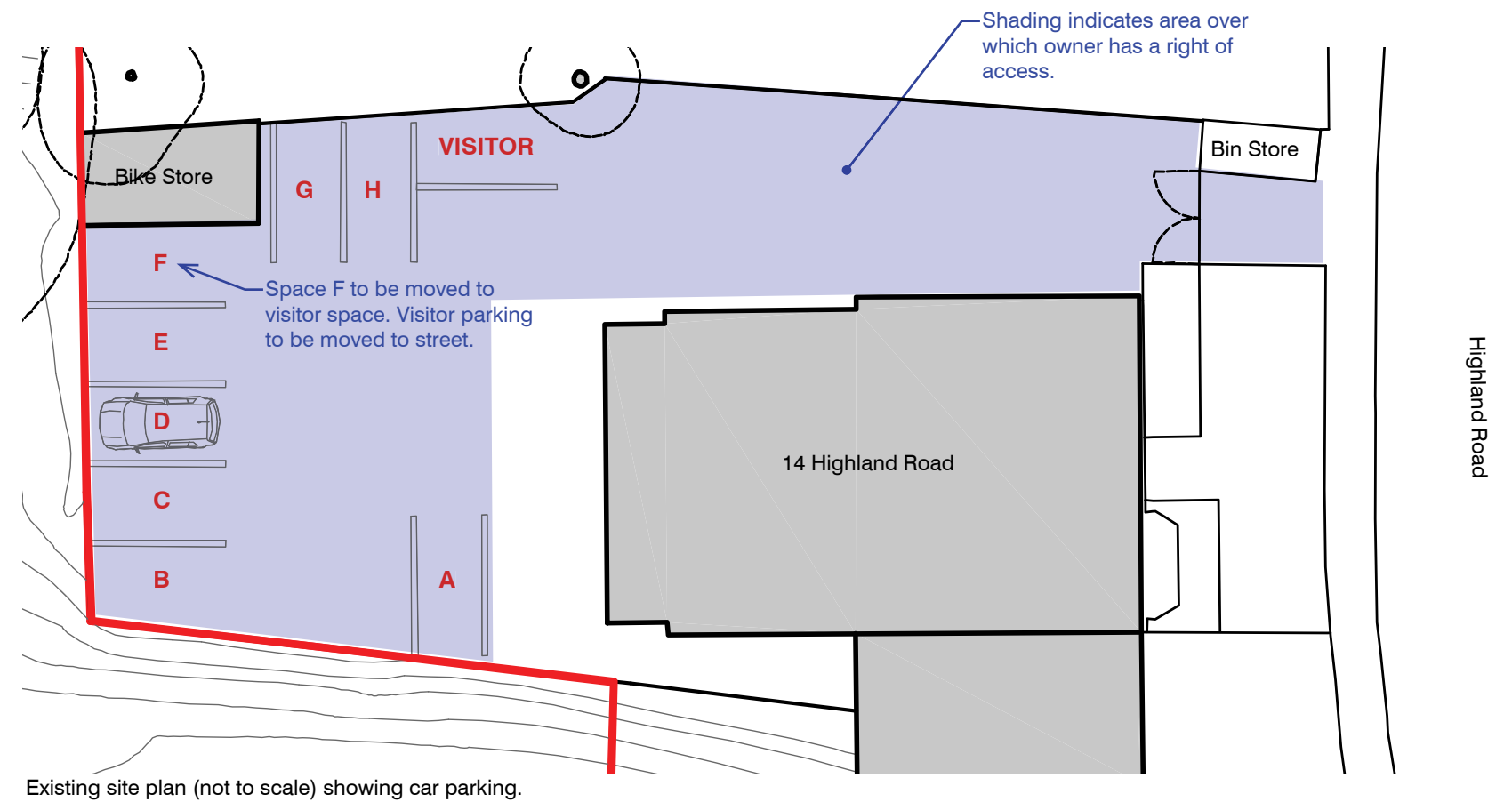
### 6.2 Pedestrian Access

Pedestrian access to the property will be provided from Highland Road via a new pedestrian gate, intercom and signage at the existing gate location - see also Section 3.6 above. To clarify the relationship between cars and pedestrians as well as between the residents of the dwelling and those of 14 Highland road, a pedestrian path will be indicated on the ground and illuminated at night. Minimal amounts of light will be used to clarify the route and provide safe access without excess light pollution for people or wildlife. Once inside the parking area, pedestrians will walk to a pedestrian gate at the site boundary. Discreet and low-level lighting will be provided at this area.

### 6.3 Emergency Vehicle Access

In an emergency, vehicles may gain access to the 14 Highland Road parking area but there is insufficient space for a fire appliance to turn around. It is therefore proposed that as compensation the dwelling will be fitted throughout with a sprinkler system to BS 9251 standard. The fire appliance would be located at 14 Highland Road and no part of the dwelling would be more than 70m away.

Please see the [Fire Strategy Report](#) by Jan Monvid submitted with this application for more detail.



## 06/ Access & Parking

### 6.4 Refuse Access and Collection

The dwelling will comply with all Bromley Council waste and recycling collection policies. Wheelie bins or recycling boxes will be used for waste, paper recycling, plastic/glass/metal, food and garden waste. Waste and recyclable material will be taken from the dwelling to the bin store on the property near the east boundary. Here it will be stored in wheelie bins or recycling boxes for waste, paper recycling, plastic/glass/metal, food and garden waste. Prior to collection day, these containers will be moved up to the existing (but enlarged for the additional dwelling) bin store that is within reach of the kerb.

### 6.5 Sustainable Transport

The plot is located in a relatively high Public Transport Accessibility Level, PTAL 3, and is less than 800m from Shortlands Railway Station. It is also 500m from Bromley Town Centre, a London Plan designated Opportunity Area. The site is served by bus routes on London Road with the closest stop being Farwig Lane at around 320m away. From here bus routes 208, 320 and N199 may be used.

A bicycle store is provided on the site with space for three bicycles.

Please see the [Transport Report](#) by Transport Planning Associates submitted with this application for more detail.

### 6.6 Inclusive Access

The proposed development has been designed to achieve compliance with the optional building regulations M4(2): Category 2 - Accessible and Adaptable Dwellings in accordance with the London Plan Policy 3.8. Compliance is achieved with each regulation as follows:

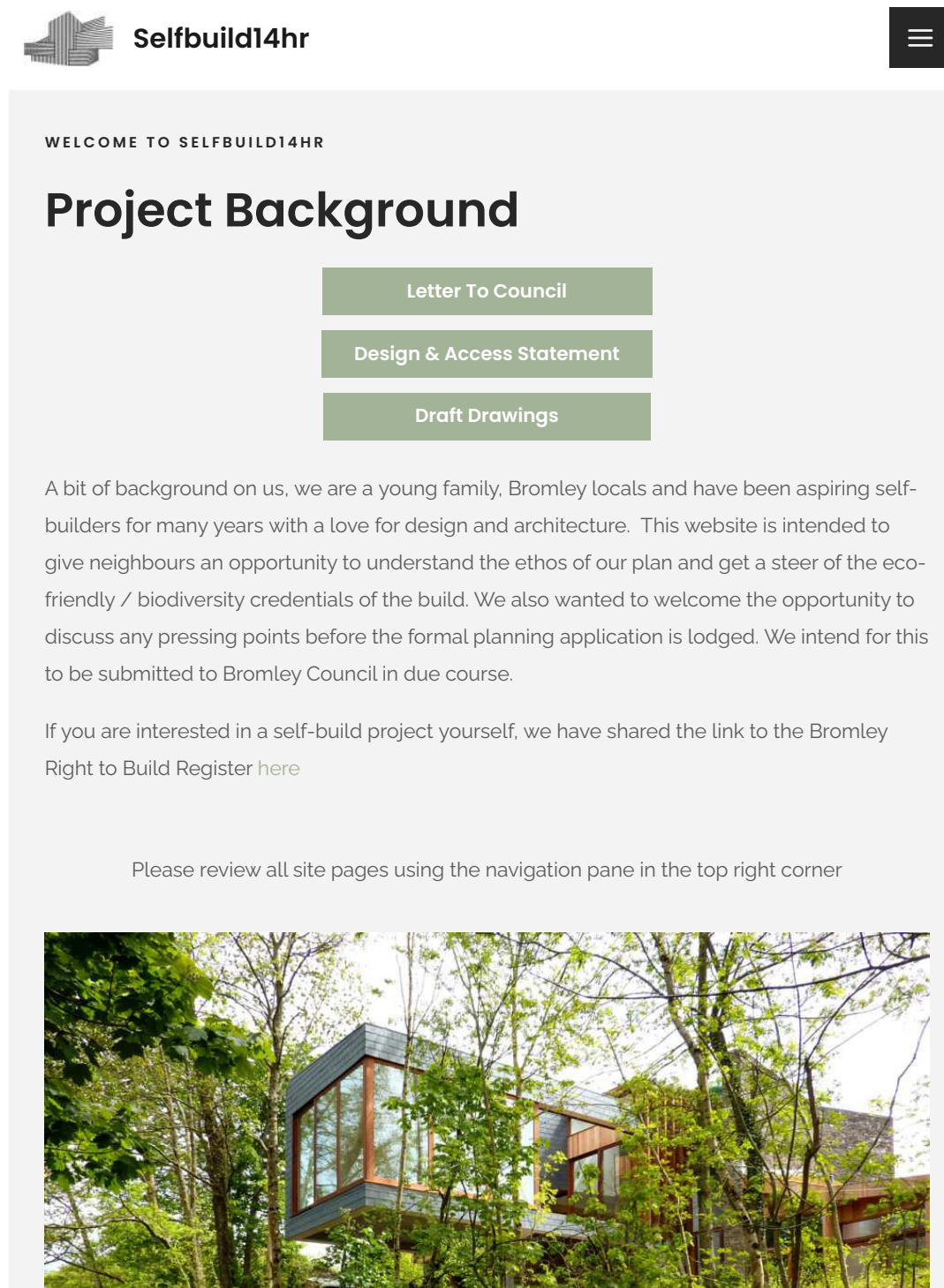
- 2.1-2.5 Information only.
- 2.6 The approach route is safe and convenient, step free and following the minimum gradient allowed by the topography.
- 2.7-2.8 Not applicable.
- 2.9 The approach route is gently sloping with minimum clear widths of 900mm and suitable ground surfaces of tarmac, brick paving and permeable paving. Gates have clear opening greater than 850mm as well as 300mm nibs on the leading edge.
- 2.10 Within the plot there is a short ramped area from the boundary to the house that is 7m long and 1:17 gradient complying with diagram 2.1.
- 2.11 Not applicable.
- 2.12 The parking space is gently sloping and has step free access to the main entrance of the dwelling.
- 2.13-2.17 Not applicable.
- 2.18-2.19 Information only.
- 2.20 The principal private entrance has a level landing with a depth and width of 1200mm, diffuse lighting, a clear opening of 850mm, a 300mm nib to the leading edge and an accessible threshold.
- 2.21 All other external doors have a clear opening of at least 850mm, 300mm nibs to the leading edge and an accessible threshold.
- 2.22 Hallways within the dwelling are 1050mm (greater than 900mm) and comply with the relevant door requirements in table 2.1 as well as having 300mm nibs to the leading edge on the entrance storey.
- 2.23 Access to all rooms on the entrance storey is step free and the minimum clear width of the stairs to the first floor is 850mm.
- 2.24 There is a living area within the entrance storey and 1200mm clear between kitchen cabinets/appliances. Principal glazing starts at floor level (i.e. less than 850mm).
- 2.25 Every bedroom can provide a clear access route with a minimum of 750mm wide from the doorway to the window. The principal bedroom can provide a clear access zone with a minimum of 750mm wide to both sides and the foot of the bed whilst other bedrooms provide clear access to one side and the foot.
- 2.26 All wall constructions to WC, bathroom and en-suite shower room will allow for imposed loads of 1.5kN/m<sup>2</sup>.
- 2.27 There is a WC on the entrance level with a potential level access shower and the door opens outwards. The arrangement of the room complies with diagrams 2.5 and 2.6.

- 2.28 The WC complies with diagram 1.3.
- 2.29 There is a compliant bathroom on the same floor as the double bedroom. The arrangement complies with diagram 2.7.
- 2.30 Switches, sockets, stop cocks and handles will be installed within the required height ranges and distances from inside corners.

# 07/ Community Engagement

## 7.1 Proposal Website and Residents' Meeting

A website - [www.selfbuild14hr.com](http://www.selfbuild14hr.com) - has been created to brief local residents about the proposal prior to submission. The website includes details on design process, sustainability, and rationale for the scheme. A local residents' meeting has also been offered by the design team to the extent required.



<https://selfbuild14hr.com/>

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