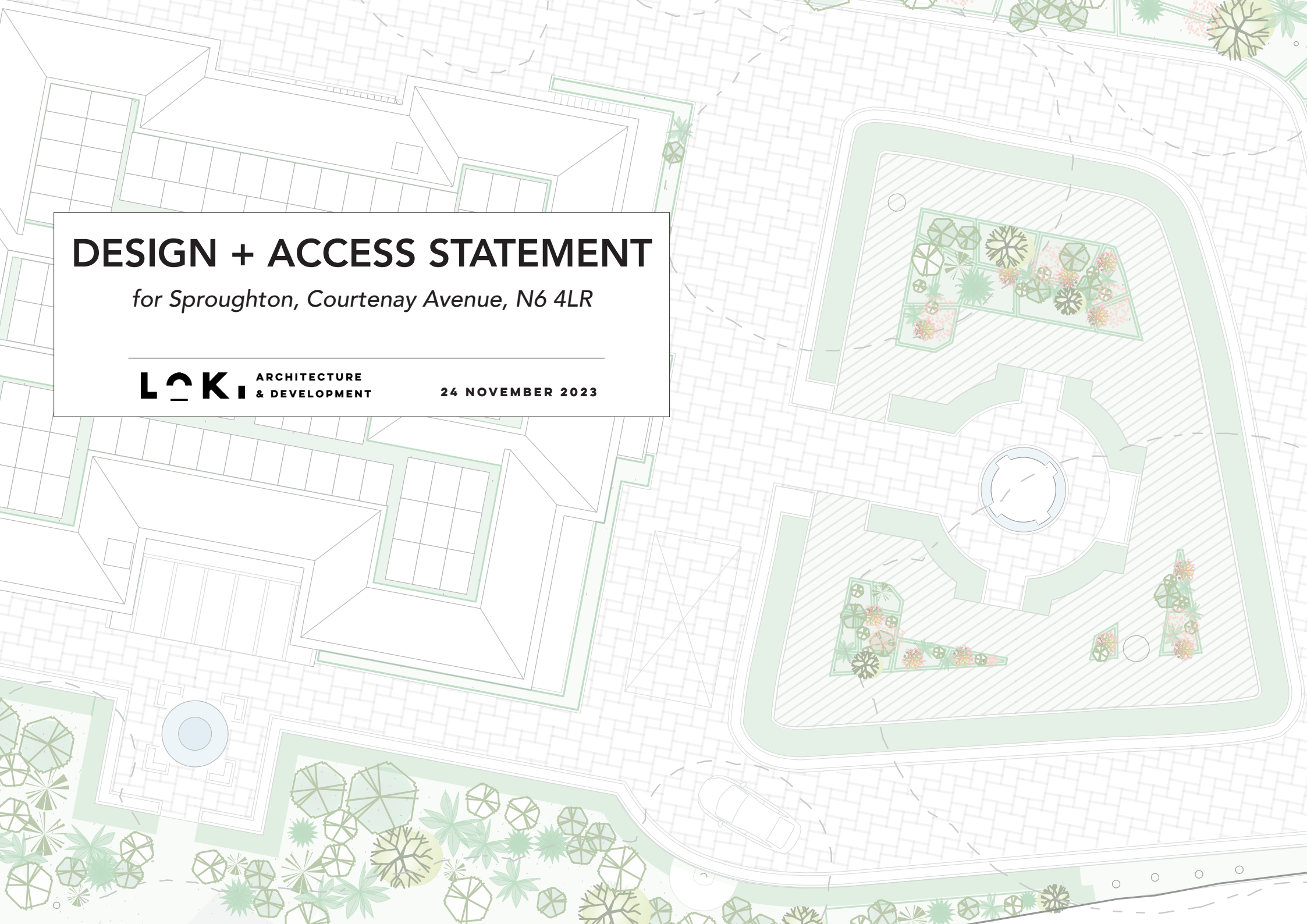
DESIGN + ACCESS STATEMENT

for Sproughton, Courtenay Avenue, N6 4LR

LOK ARCHITECTURE & DEVELOPMENT

24 NOVEMBER 2023



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DESIGN + ACCESS STATEMENT

I. Introduction

This proposal envisions the demolition of the existing detached house in poor condition to make way for a revolutionary net-zero house, a beacon of sustainability and architectural elegance. Our design philosophy revolves around a meticulous consideration of the site's context, character, and appearance. The proposed house aims not only to be aesthetically sympathetic to its surroundings but also to set a new standard for contemporary dwelling performance, aspiring to be Haringey's inaugural zero carbon high-end residence.

The grand and elegant structure planned for Sproughton will harmonize seamlessly with its exquisite mature gardens, emulating the grand estates that grace the landscape. Careful attention has been given to materiality and building function, where sustainability takes center stage. In response to the climate crisis, this project pioneers an innovative approach, considering optimal building performance, low embodied carbon, and regenerative principles.

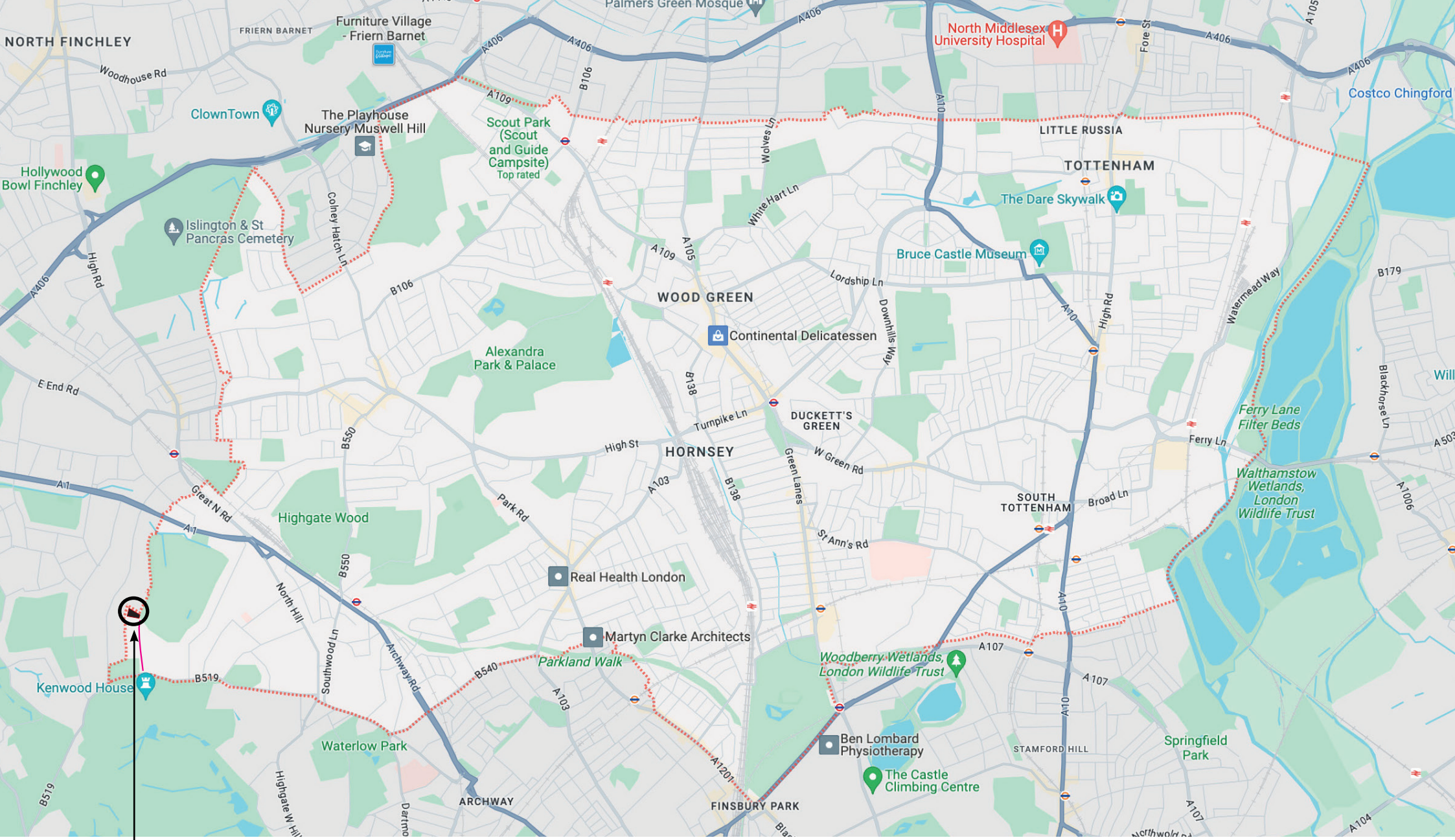
The architectural language draws inspiration from the beauty of Hampstead and Kenwood, embracing sustainability through responsible material sourcing. Unlike traditional builds in the area, this net-zero house will feature a superstructure of cross-laminated timber panels (CLT) and hempcrete, reducing embodied carbon and contributing to carbon capture. The fusion of old-world elegance and modern sustainability is evident in the design details. The facade, finished with a lime-based render, echoes regency aesthetics while allowing the building fabric to breathe. By embracing sustainable materials and methods, this project stands as a beacon, demonstrating that elegance and environmental responsibility can coexist.

Drawing inspiration from British neo-classical architecture, specifically Kenwood House, the design incorporates timeless elements such as a grand portico entrance and symmetrical facades adorned with ornate cornices. This synthesis of historical grandeur and modern efficiency defines the proposed net-zero house, creating a residence that is both visually stunning and environmentally responsible.

In conclusion, this planning application aspires to be a flagship project, showcasing how innovative design principles can seamlessly blend with beautiful architecture, setting a precedent for sustainable, high-end living in Haringey.



View of the proposed net-zero house



Plan of Haringey

Site: Sproughton, Courtenay Avenue, N4 6LR

Haringey Boundary

Sproughton

A. CONTEXT

i. Site Location

This application is for the site Sproughton, on Courtenay Avenue. The proposal is for demolition of the existing detached house and erection of a new build net-zero house.

The property is located within the Highgate Conservation Area. Courtenay Avenue is marked by large high-end single family dwellings in various styles, with predominantly Neoclassical and Neo-Georgian buildings within the immediate surroundings of the site, as well as some Arts and Crafts influences. There are a couple of properties on the street that are of a more contemporary style.

The new build proposal has been designed to be sympathetic to the context, character and appearance of its surroundings as outlined in the *Highgate Conservation Area Character Appraisal*. The design approach has focused on achieving a sympathetic redevelopment of the site with an architectural language that relates to the context, character and appearance of the area.

In addition, this proposal seeks to be not only aesthetically sympathetic, but is designed with the highest sustainability standards with the ambition to be a Net-Zero flagship project to set a new standard of contemporary dwelling performance.



Figure 1. Aerial view of area surrounding Courtenay Avenue

KEY

Haringey Boundary

Courtenay Avenue

Sproughton Site

ii. Surrounding Context

Courtenay Avenue, Compton Avenue, and Sheldon Avenue constitute a notable inter-war development from the 1920s and 30s, with Courtenay Avenue largely finished by the mid-1930s. Situated on the periphery of the expansive Highgate Conservation Area and adjacent to the Hampstead Garden Suburb Conservation Area in Barnet, the residential development along the northern section of Hampstead Lane, formerly part of Bishop's Wood, began with Stormont Road and The Bishop's Avenue.

Courtenay Avenue, located within the Bishop's sub-area of the Highgate Conservation Area in the London Borough of Haringey, is a gated private road featuring twenty-two detached houses exhibiting traditional styles such as Neo-Georgian, Neoclassical, and Arts and Crafts. The site, including Sproughton at the northern and western extremity of Courtenay Avenue, has a 6-degree downward slope. Constructed around 1930, Sproughton displays a curious blend of Arts and Crafts and Neo-classical architectural styles.

Courtenay Avenue is a self-contained, gated cul-de-sac, distinctly separate from other developments in the Conservation Area currently without any listed or locally listed buildings. Its appearance is independent of the rest of the Conservation Area and its historic link to the immediate Conservation Area is significantly reduced because the original broad consistency of Quennell and Cooper's vision has been significantly eroded, generally by the replacement of two thirds of the houses and the alteration of the rest and particularly by the recent large and prominent neo-classical houses that dominate the road. The Conservation Area is the only relevant designated Heritage Asset. The CAS makes the following relevant comments::

Courtenay Avenue is a gently sloping private cul–de-sac that falls from the junction with Hampstead Lane down to the boundary of the Highgate Golf Club, which provides a view over a rolling landscape and a semi-rural setting. The houses are spaced out in large plots, and set back behind mature gardens with mature trees and hedges; many of which are original mature oak trees which remain from the former Bishop's Wood. Both Courtenay Avenue and Compton Avenue, located immediately to its east, are similar in terms of layout and style of houses, the width of the road and the number of frontage trees. Both have large detached houses with views into Highgate Golf Club at their northern end. Courtenay Avenue has no formal pavements, just grass verges, which gives it a semi-rural feel. It has a slope of 6% from north to south, and there is also a slope across the road from west to east, with houses on the west side being above road level whilst those on the east side are below or level with the road. Courtenay Avenue is located within Highgate Conservation Area which includes a wide area of historic character with Highgate Village as its core. Courtenay Avenue lies within the Bishops Sub-Area of the Conservation Area which lies to the west of Highgate Village. On its western side the line of its rear gardens forms the borough boundary with the London Borough of Barnet.



Figure 2. Aerial View of Courtenay Avenue

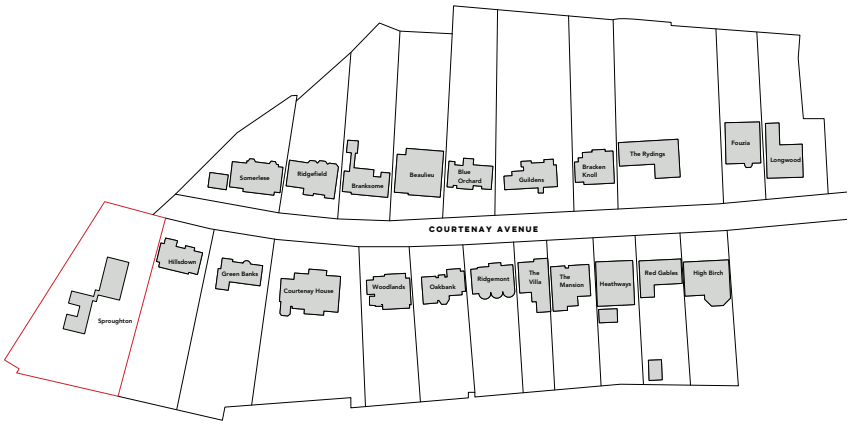


Figure 3. Location Plan. (Appendix II: C1_Courtenay Avenue)

iii. Architectural Character

The predominant form of development of the area shows large detached houses on wide fronted plots, each with substantial gardens along Courtenay Avenue and the neighbouring streets. Hipped and gabled roofs are finished in clay tile, some in slate, and frequently feature tall brickwork chimneys. The original style of architecture along Courtenay Avenue showed a mixture of designs by CHB Quennell and Christopher Cooper. Quennell is believed to have designed 4 of the original houses on the road: High Birch, Guildens, Blue Orchard and Courtenay House. Cooper, a draughtsman, designed many of the remaining houses.

On Courtenay Avenue there are grass verges and no formal pavements lining the street. The road was originally a relatively visually coherent Avenue of large detached Cooper and Quennell style houses. The houses on the street were situated on large plots and set back from the street featuring a front drive with mature gardens to the rear with mature trees and hedges. However, of the 22 houses on Courtenay Avenue, 15 have now been demolished and have replacement houses on them. The replacement houses fundamentally differ from the original character and appearance of Courtenay Avenue because they are of a larger scale and more visually prominent and assertive than the original 1920's Cooper and Quennell-style houses. In addition, the 'house on a mini-estate' feel has been all but eliminated, as the houses sit shoulder to shoulder with each other. There have also been a significant number of replacement houses in recent years along Courtenay Avenue, particularly on the western side of the road, such as, 'High Birch', 'Red Gables', 'Oak Bank', 'Woodlands' and 'Courtenay House', all of which replace original Cooper and Quennell style designs.

The conservation of Courtenay Avenue has changed as two-thirds of the properties have been replaced by neo-classical or modern houses, evolving from the original street's language. The area's Heritage Asset significance is diminished due to this intensive redevelopment, which has transformed the language and character of the street. Consequently, this Heritage Asset's weight in conservation decisions should be restricted.



























Figure 4. Street View (Heathways, The Mansion, The Villa)



Figure 5. Street View (Somerlese and Ridgefield)



Figure 6. Aerial View of Heathways, The Mansion, The Villa



Figure 7. Aerial View of Somerlese and Ridgefield

Spatial Presence: little space between houses



Figure 8. 1:500 Location Plan showing the transformation of Courtenay Avenue

* *Note that The Guildens has been demolished all but for the front facade. The new house is not built yet, although it has a consent for this footprint.*



Figure 9. Aerial View of Courtenay Avenue

B. COURTENAY AVENUE BUILT FORM

i. Demolished and Rebuilt Properties

As shown on the plan below, the replacement of, and significant changes to properties on Courtenay Avenue has been ongoing for in excess of 30 years with other houses also constructed or modified/extended prior to this time that did not reflect the original style established in the 1920s and 1930s.

The updated character of Courtenay Avenue has therefore been altered to a street of enlarged houses that almost fully fill their frontages with a prevalent style incorporating Neo-Classical, Neo-Georgian, and some Arts & Crafts features. These elements now characterise the street to a much greater extent than any other character that may have existed previously. Courtenay Avenue is also a completed self-contained element within the Conservation Area. As a gated cul-de-sac it does not contribute to general experiences of the Conservation Area and sits separate from even immediately neighbouring streets. Development in this area should therefore be considered in that limited context only.



Figure 10. Plan showing the changing character of Courtenay Avenue. The green plots are properties that have been demolished and rebuilt. See Appendix for full graphic.

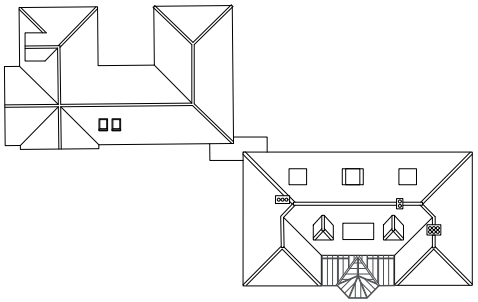
ii. Comparisons of Before and After Rebuilt Building Footprints

The table below compares the before and after footprints of all the rebuilt properties on Courtenay Avenue. In comparison to other new houses on the street, the proposal for Sproughton is only marginally bigger than the existing footprint, coming in at only 9% larger (with only 30m^2 added). The average increase of footprint on the street is 50% and half the houses on the street which have been rebuilt, mostly sitting on smaller plots that SpWroughton, have more than doubled their original footprint.

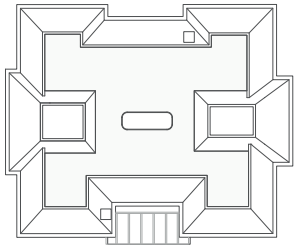
Property	Original Footprint (m^2)	New Footprint (m^2)	Area Added (m^2)	% Increase
Beaulieu	206	614	408	198%
Branksome	215	593	378	176%
High Birch	179	473	294	164%
Somerlese	217	525	309	142%
Three Oaks *	184	425	241	131%
Red Gables	204	432	228	112%
Heathways	215	437	222	103%
Oakbanks	171	342	171	100%
Courtenay House	338	653	315	93%
White Lodge *	183	334	151	83%
Ridgemount	247	392	145	59%
Ridgefield	276	413	138	50%
Bracken Knoll	264	371	107	41%
Woodlands	256	355	99	39%
Hilldown	218	276	58	27%
Sproughton	435	475	40	9%
Guildens	541		To be redeveloped	
Blue Orchard	351		Not Redeveloped	
Greenbanks	296		Not Redeveloped	
The Rydings	446		Not Redeveloped	
Fouzia	383		Not Redeveloped	
Longwood	387		Not Redeveloped	

Figure 11. The chart compares the before and after footprints of houses on Courtenay Avenue. The grey boxes are properties that have not been demolished and are thus not comparable. * Previously one plot of 367m^2 before becoming two plots: Three Oaks & White Lodge. For simplicity, the merged values of both the plot(s) and the new footprints have been calculated to give a total value for comparison.

The existing property at Sproughton is currently organised in two main volumes that are connected with a ground floor passage. This awkward internal articulation and building form has been replaced with a simpler, more symmetrical single volume that is more reflective of the built form of the rest of the street.

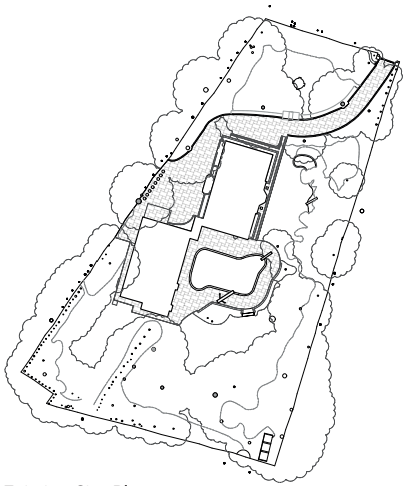


Existing Roof Plan

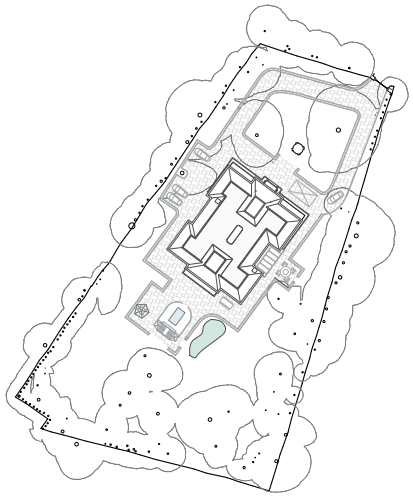


Proposed Roof Plan

Figure 12. The roof plan of the existing Sproughton (Left) is 435 m^2. The proposal merges the two volumes into a single building (Right) with a new footprint of 475 m^2.



Existing Site Plan



Proposed Site Plan

Figure 13. The generosity of the plot, along with its beautiful gardens, has been celebrated in the new proposal, with the new house similar in volume to the existing.

iii. Oversized? House Size in Comparison to Plot Size

The houses on Courtenay Avenue are characterised by grand houses set within generous gardens. Sproughton has the second largest plot on the street. The new 475m^2 footprint sits within 4,700m^2 of gardens, taking up just 10% of the plot. The new proposal will have the third lowest ratio of house size: plot size on the street and the lowest of any of the houses that have been demolished and rebuilt. The average ratio on on Courtenay Avenue is twice that value. Thus, although a generous and grand house, the new proposal is not oversized considering its setting.

Property	Plot Area (m^2)	Footprint (m^2)	Plot : Footprint Ratio
Somerlese	1864	525	28%
Heathways	1666	437	26%
White Lodge	1294	334	26%
High Birch	1946	473	24%
Red Gables	1838	432	24%
Branksome	2519	593	24%
Three Oaks	1837	425	23%
Beaulieu	2627	614	23%
Ridgefield	2004	413	21%
Fouzia	1891	383	20%
Ridgemount	2062	392	19%
Longwood	2216	387	17%
Oakbanks	2206	342	16%
Woodlands	2209	355	16%
Courtenay House	4184	653	16%
Bracken Knoll	2303	371	16%
Guildens	4007	541	14%
Blue Orchard	2689	351	13%
Hilldown	2489	276	11%
Sproughton	4700	475	10%
Greenbanks	3417	296	9%
The Rydings	5116	371	7%

Figure 14. The chart above compares the proposed footprint of Sproughton with other properties on Courtenay Avenue. Grey boxes are properties that have not been redeveloped. Of all the new build properties, Sproughtonhas the lowest house size : plot size ratio.

iv. House Situation: Proximity to Neighbours and the Street

A walk down Courtenay Avenue will show large impressive houses sitting shoulder to shoulder with one another. The grand facades face the streets with front drives before them.

Sproughton has the luxury of being located at the bottom of Courtenay Avenue, and with the house situated centrally on the plot, the house is not visible at all from the street. A gate leads down the private drive through the gardens to the house. The house is flanked on all sides by large trees and verdant gardens.

The Nolli Plan below shows how the buildings on the street are largely pushed up against each other. There is very little breathing space between most of the properties, so much so that it is only just possible to bring a wheelie bin along between them. Sproughton however has the fortune of having both an abundance of space around the house as well as not being visible from the street.

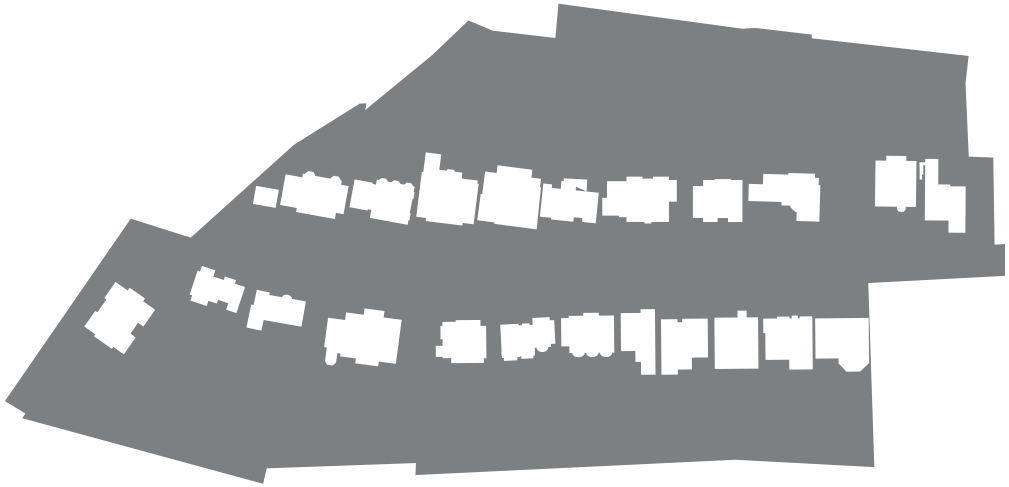


Figure 15. The above Nolli Plan shoes the various buildings related to the spaces around them. What the plan shows i the very close proximity of buildings to each other and their size relative to their plots.

To further demonstrate the minimal impact of the new proposal to the rest of the street, the chart below shows the distance of the houses with their left (north), right (south) and front boundaries. Although Sproughton isn't visible from the street, it is important to show that the new proposal will not have visual impact to the neighbours or street. The average distance to the side boundary of all houses to the north, except Sproughton, is 1.5m. Sproughton has 10.3 meters to the north boundary, 12.5 meters to the south boundary. At 35 meters from the entrance to the road, the distance from the front entrance of Sproughton is almost 3 times that of the average of the other houses.

Property	Distance of House to the North Boundary (m)	Distance of House to the South Boundary (m)	Distance of House to Courtenay Ave (Street) (m)
Longwood	2.0	12.2	6.0
Branksome	0.2	1.0	8.5
White Lodge	1.8	1.0	10.0
Somerlese	0.6	2.5	10.0
Hilldown	0.3	2.2	10.5
Ridgemount	1.7	1.0	11.0
Ridgefield	1.3	1.0	11.6
Beaulieu	1.2	0.0	12.8
Bracken Knoll	0.7	0.8	13.0
The Rydings	1.8	22.0	13.0
Oakbanks	3.2	1.0	13.2
Guildens	1.3	6.3	13.2
Courtenay House	1.5	13.5	13.9
Heathways	1.9	0.9	14.0
Greenbanks	3.0	9.5	14.0
Red Gables	1.4	0.6	14.3
Blue Orchard	1.0	0.6	14.3
Three Oaks	2.5	1.0	14.5
Woodlands	2.0	3.0	14.6
High Birch	0.6	0.4	15.0
Fouzia	2.0	1.5	16.0
Sproughton	10.3	12.5	35.0

Figure 16. The chart above compares the proximity of the side and front facades of the houses on the street with the neighbouring properties and the street.

PLANNING HISTORY

HILLSDOWN
Extension/Alterations - Approved
(OLD/1970/0219) 1970
Extension/Alterations - Approved
(OLD/1963/0133) 1963
Extension/Alterations - Approved
(OLD/1963/0132) 1963

COURTENAY HOUSE
Full Demolition - Approved
(HGY/2005/1771) GP 2005

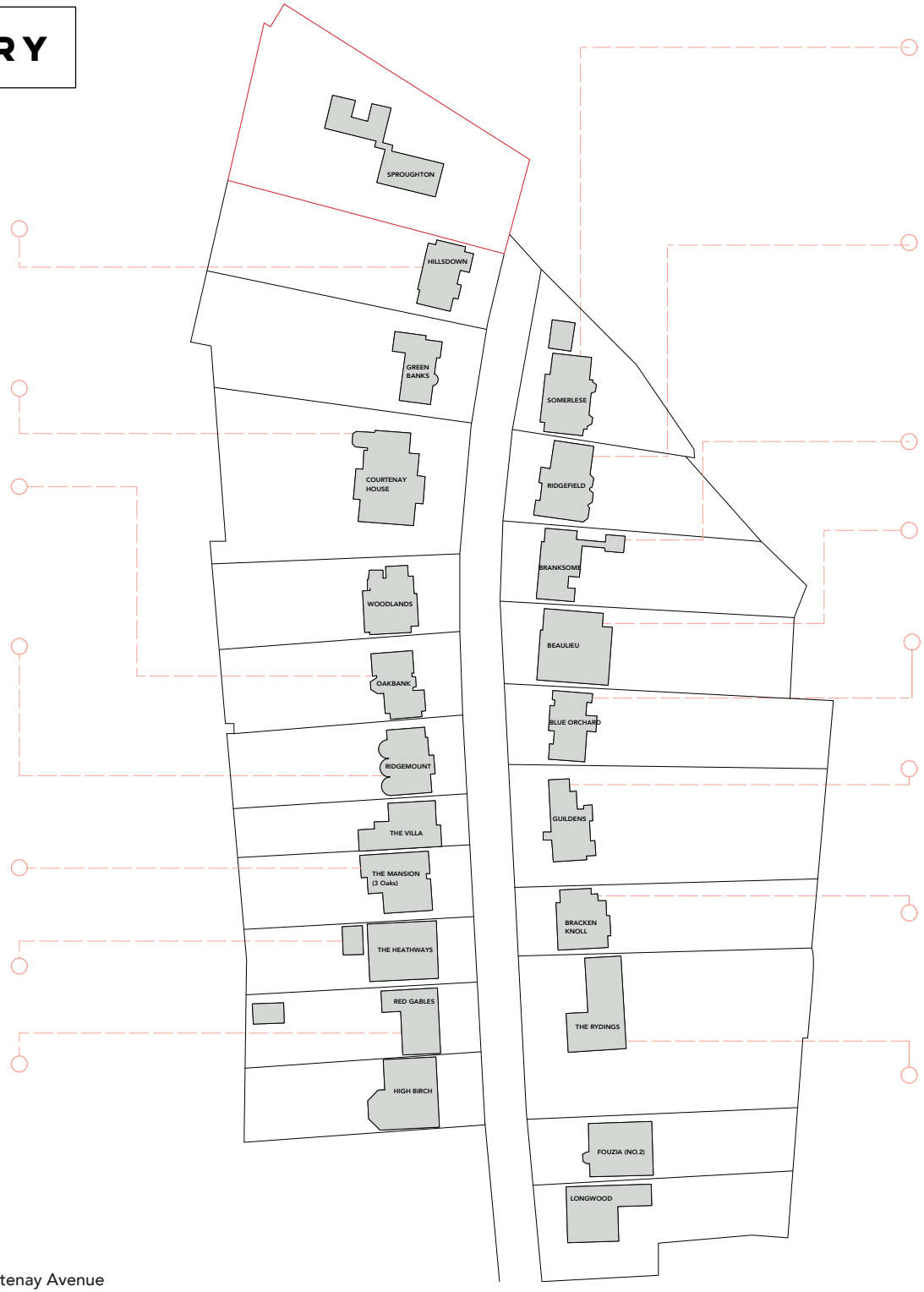
OAK BANK
Extension/Alterations - Approved
(HGY/2000/0273) GP 2000
Full Demolition - Approved
(HGY/1992/1042) GP 1992
Extension/Alterations - Approved
(OLD/1987/0301) GP 1987

RIDGEMOUNT
Full Demolition - Approved
(HGY/2007/1097) GP 2007
Extension/Alterations - Approved
(HGY/1990/0688) GP 1990
Extension/Alterations - Approved
(OLD/1989/0318) GP 1989
Extension/Alterations - Approved
(OLD/1970/0218) GP 1970
Extension/Alterations - Approved
(OLD/1960/0156) GP 1960

3 OAKS
Partial Demolition/Extension - Approved
(OLD/9999/1282

HEATHWAYS
Extension/Alterations - Approved
(HGY/2004/0182) GP 2004

GABLES
Extension/Alterations - Approved
(HGY/2013/1542) GP 2013
Extension/Alterations - Approved
(HGY/2013/0191) WD 2013
Full Demolition - Approved
(HGY/1994/0004) GP 1994



SOMERLESE
UNDER CONSTRUCTION
Full Demolition - Approved
(HGY/2019/1481) GP 2019
Full Demolition - Approved
(HGY/2016/3207) GP 2016
Full Demolition Appeal - Approved
(APP/Y5420/W/ 15/3134883)
Facade Retention- Approved
(HGY/2013/0491) GP 2013

RIDGEFIELD
Full Demolition - Approved
(HGY/2013/0131) GP 2013
Full Demolition - Approved
(HGY/2012/1936) GP 2012
Facade Retention- Approved
(HGY/2012/1533) GP 2012
Extension/Alterations - Approved
(HGY/1995/0457)GP 1996
Extension/Alterations - Approved
(HGY/1994/0440) GP 1994

BRANKSOME
Full Demolition - Approved
(HGY/2021/1190) 2021

BEAULIEU
Extension/Alterations - Approved
(HGY/2006/1910) GP 2007
Full Demolition - Approved

BLUE ORCHARD
Extension/Alterations - Approved
(HGY/2006/1910) GP 2007
Full Demolition - Approved
(OLD/1970/0194) GP 1970

GUILDENS
Appeal for Facade Retention - Approved
(planning appeal 3243272) 2022
Extension/Alterations - Approved
(HGY/1999/0762) GP 2000

BRACKEN KNOLL
Facade Retention- Approved
(HGY/2017/1560) GP 2017
Facade Retention- Approved
(HGY/2013/2486) GP 2014
Extension/Alterations - Approved
(HGY/1999/0656)GP 1998

THE RYDINGS
Extension/Alterations - Approved
(HGY/1999/0685) GP 1999
Extension/Alterations - Approved
(HGY/1997/0375) GP 1998
Full Demolition - Approved
(OLD/1981/0282) GP 1981
Full Demolition - Approved
(OLD/1981/0281) GP 1981
(Further applications listed overleaf)

Figure 17. Overview of all Planning applications on Courtenay Avenue

II. SPROUGHTON
A. The Property

i. The Site

The site's generous plot of about .48 ha / 1.11 acres is almost double the mean plot size on Courteney Road (0.25 ha / .61 acres). The house sits in the centre of generous gardens. It is located at the very end of Courtenay Avenue on the western side, directly overlooking Highgate golf course. It is below the level of the road and its immediate neighbour Hillsdown. Sproughton is the last property on Courtenay Avenue, tucked away in the back and not visible from the street. The property has its own private access, in addition to the one at the top of Courtenay Avenue, making it the most private property on Courtenay Avenue.



Figure 18. Ordinance Survey Map of Sproughton



Figure 19. Aerial View of Sproughton

ii. The House

The site is currently occupied by a 2.5 storey red brick and red/brown tiled detached dwelling with timber windows. The house consists of two volumes, with the living, recreation, accomodation and service areas spread between the two seemingly separated buildings that are connected by a small corridor. Whereas externally there appears to be a clear hierarchy between the buildings, with the south-east building (A) more prominent than the north-west building (B, built at a later date), though with a somewhat awkward single storey connecting section that seems to be stuck on to the rear corner, internally this is not translated. The current house lacks a cohesive style and language.

Although situated within a generous sized garden, internally there is very little relationship with the external spaces. The orientation of the rooms, the layout and the openings to the garden were not originally designed in such a way to celebrate the landscape or make the best use of light. The conservatory on the south side of building A is the brightest space of the house, but too hot in summer and cold in winter. The entrance of the property is tucked away on the north side. The awkward organisation of rooms gives little hierarchy for spaces; lifestyle trends have moved on considerably since the house was built.

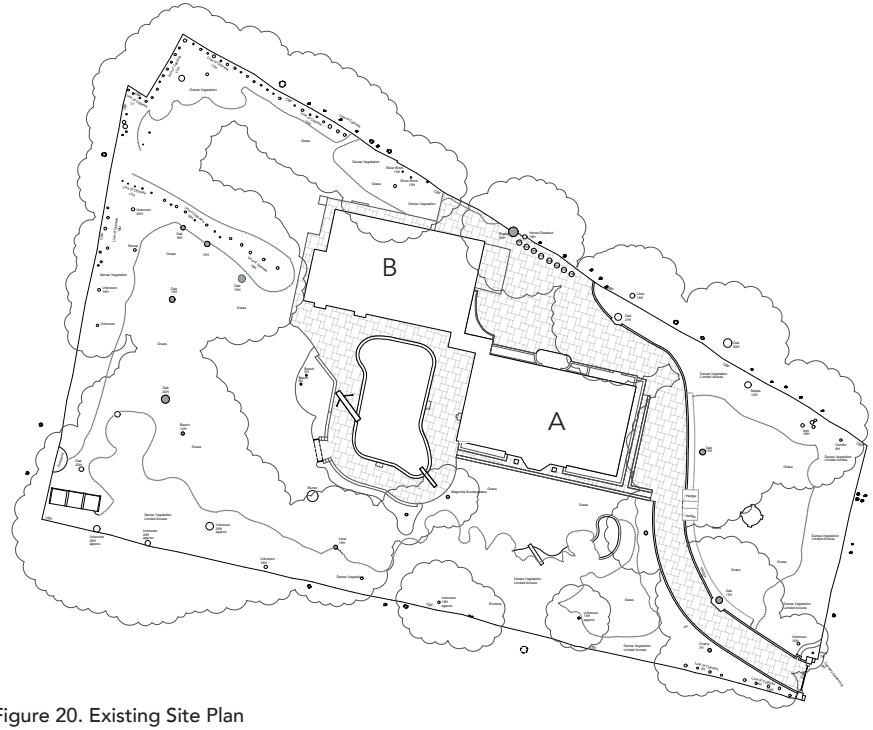
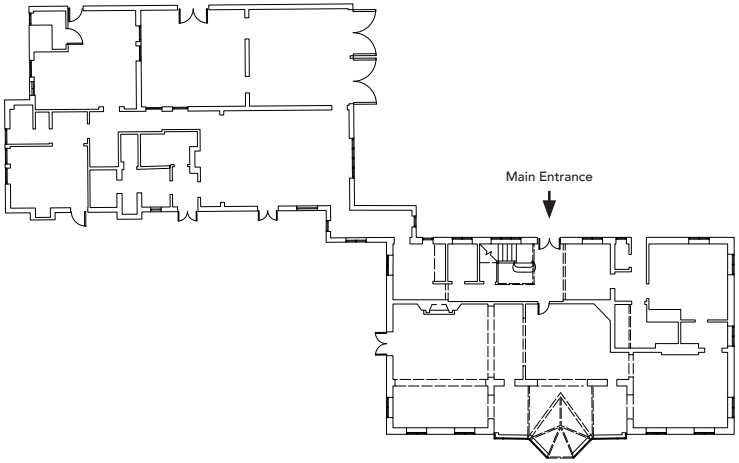
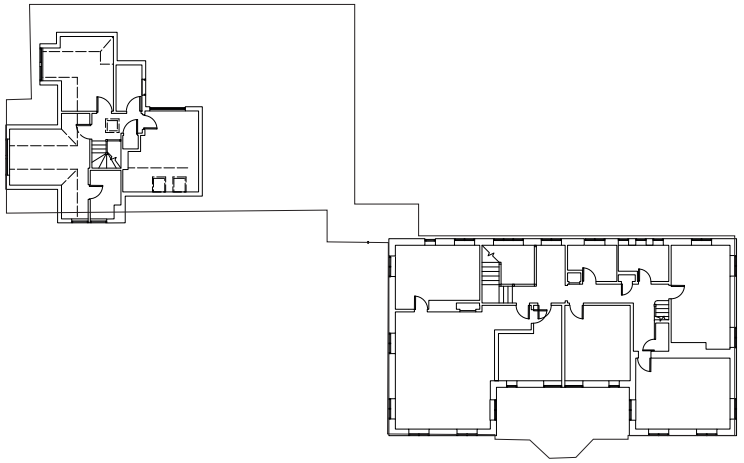


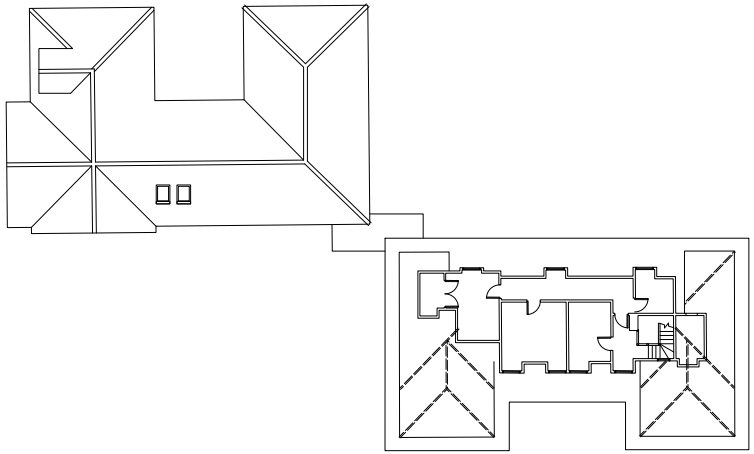
Figure 20. Existing Site Plan



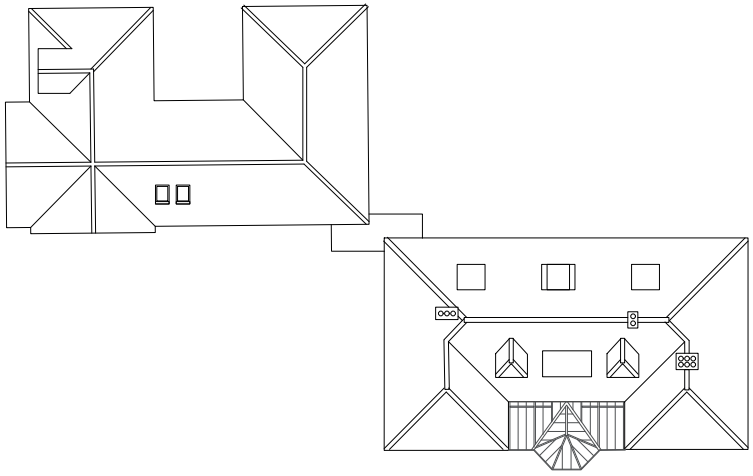
Existing Ground Floor Plan



Existing First Floor Plan



Existing Second Floor Plan



Existing Roof Plan

Figure 21. Exisitng Floor plans

iii. Current state of the house

Internal



Thermal Bridges + Leaky Interfaces



Rising Damp



Behind the surface



Moisture penetrating through ceiling



Unsuitable surface condition



Surface Condensation



Behind the Surface



Ceiling - more black mould



Black mould



Moisture penetrating through wall



Surface condensation; mould growth



Plant growth

External - Issues effecting structure + building performance



Cracking / Chipping



DPC level compromised



Rising Damp wet base + moss



Structural Cracking in wall

Safety Hazards



Condemned Heating System



Obsolete Tank



Security

iv. Landscaping

Sproughton is a very special property because of its setting within its beautiful gardens. The gardens are generally in very good condition, with mature trees thriving and the plant life well maintained. However, there are two things that need to be carefully considered: Drainage and Trees.

Drainage

There is a general fall from the front of the property to the rear. Courtenay Avenue slopes downwards to Sproughton and so the surface drainage is captured at the base of the street and brought through a drain that cuts into Garden I, where the fountain is, to a manhole at the base of the garden, and then further on to the pond on the neighbouring property to the rear. Note, this is surface water and grey water only, and not sewage (Refer to Figure 12. Plan F_Drainage). There has previously been significant works to the drains to the rear of the property. The collapsing pipes were replaced about two years ago to the rear of the property. The pipes were broken on the outside of the original manhole to the rear of the back house and the entire area was clogged. A new manhole was installed next to it (A). The pipes weathered over the years and turned soft but many of them had to be replaced. This was however not a perfect fix as the new pipes were connected to the old pipes, which are crumbling and in terrible condition.

The area to the south west of the property (raised area) has become waterlogged previously in heavy rains (B). The tree to the rear of the property died as a result. To deal with this challenge, as it is a topographical issue that has an impact on both Sproughton and the adjacent property, a pond was dug in the neighbouring garden to deal with the excess water (C). Water not directed to the neighbouring pond drains in to the Sproughton pond.

An obvious intervention would be to put a large drain along the perimeter of the property to the south (D). However, a more natural approach that supports local biodiversity could be resolved in the form of water features that complement the gardens.

Drainage from the entrance of the property down the slope needs to be seriously considered (E). As Sproughton is at the bottom of Courtenay Avenue, all water drains onto the property and this needs to be suitably considered and planned for. The pond plays a major role in managing drainage and runoff, on not just the property, but of the surrounding area (F). There is a gentle slope from Hampstead Lane / Bishops Avenue falling down towards Highgate Golf Course.

The last couple of years have seen a significant increase in erratic and heavy or extremely heavy rainfall patterns. Flooding in London has become a significant issue and will exacerbate in the coming years. Sustainable urban drainage strategies need to be considered when designing for Sproughton (refer to SUDs Strategy Report).

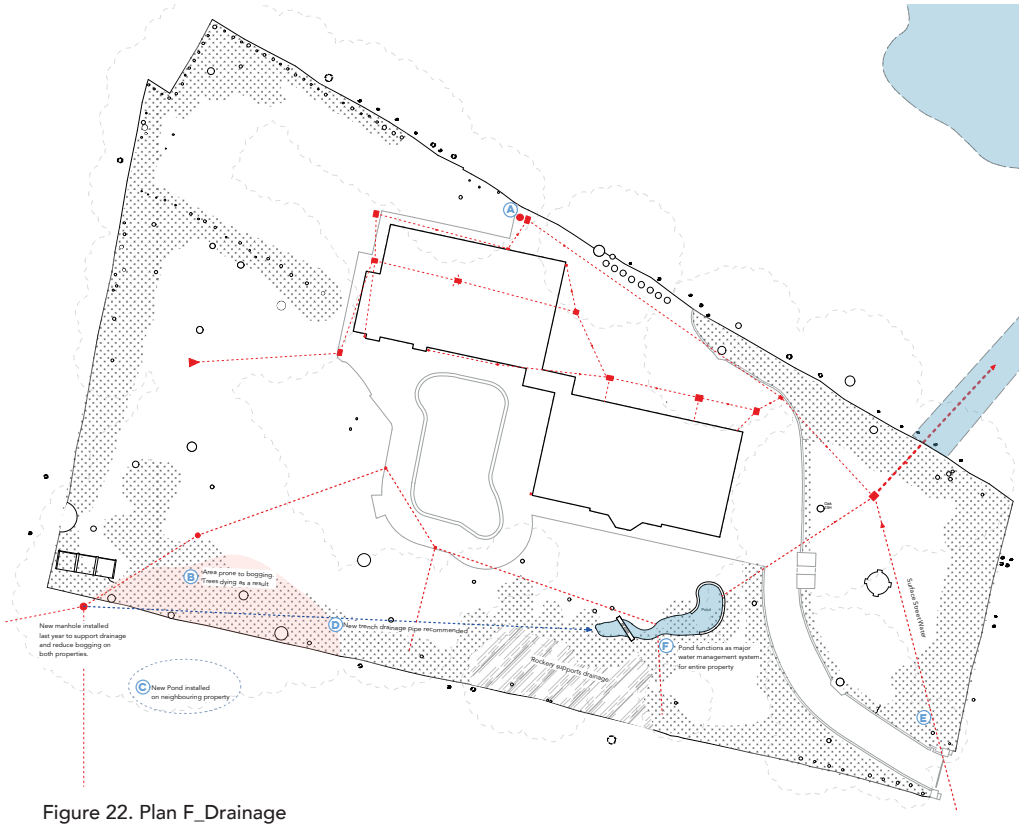


Figure 22. Plan F_Drainage

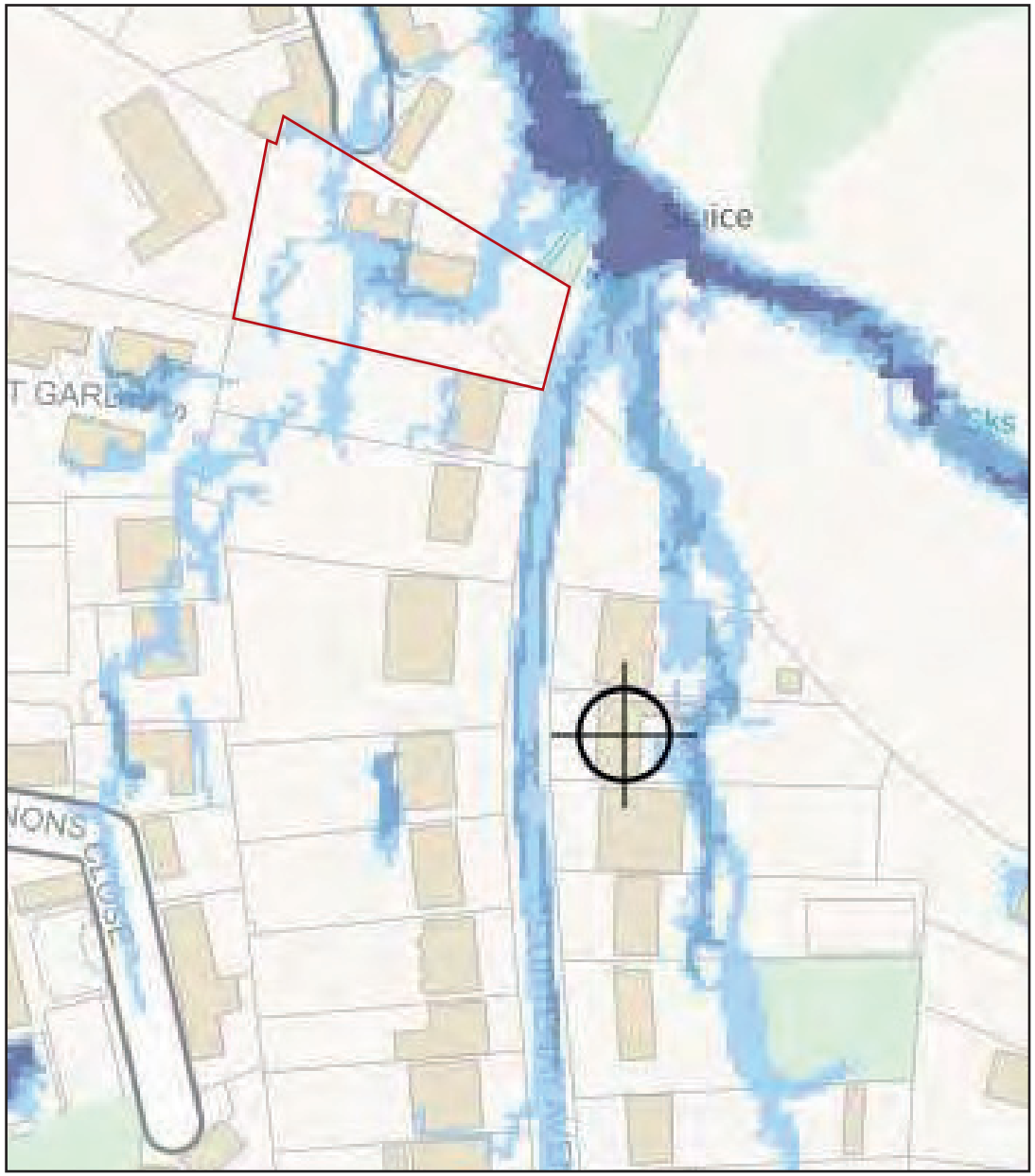


Figure 23. Extent of Surface Flooding from Surface Water.
Retrospectively adapting the current property to deal with climate change driven floods presents a challenge.

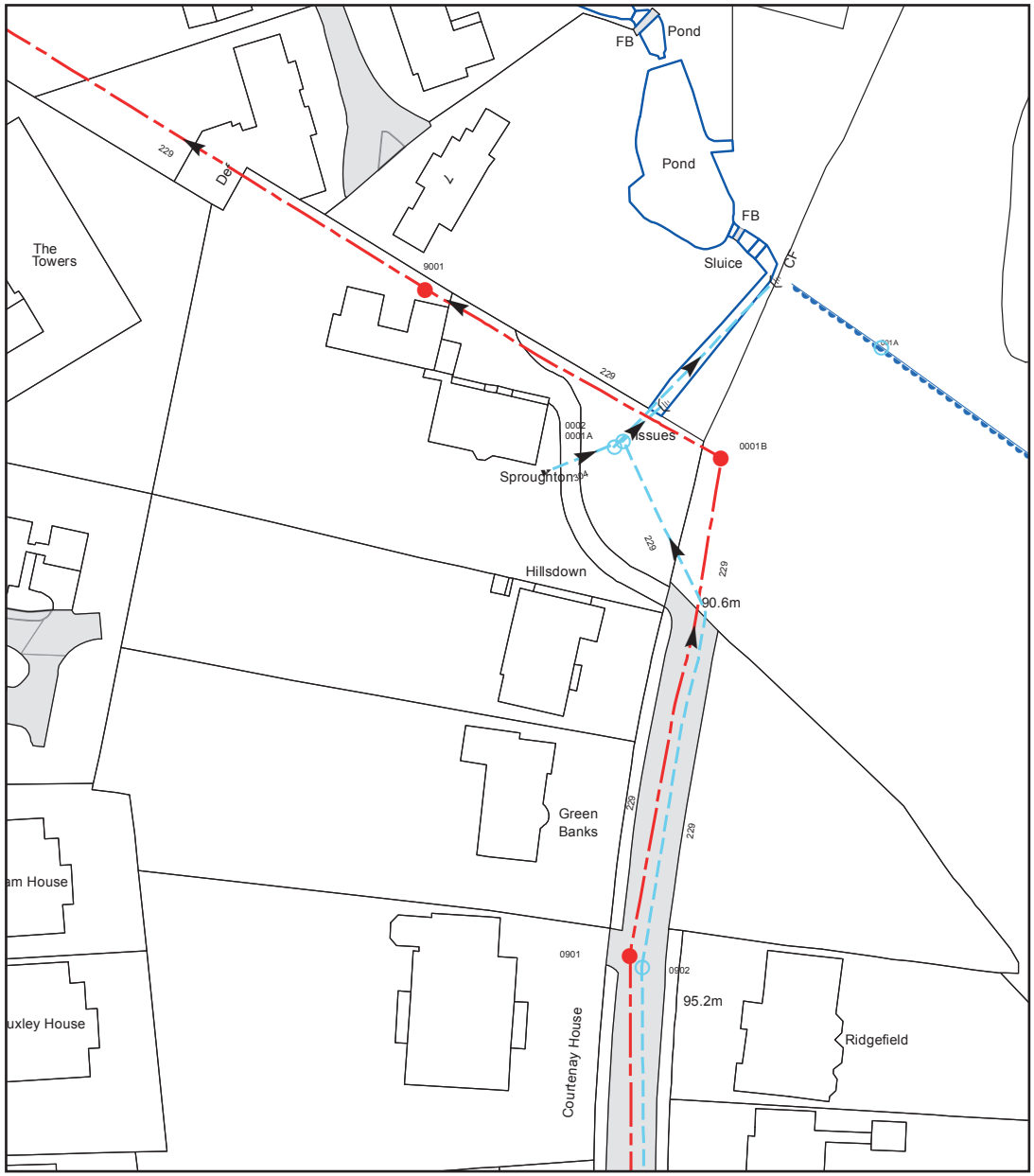


Figure 24. Asset Location Search Sewer Map - ALS/ALS.

Trees

Although the trees at Sproughton look to be in great condition, many have grown too large for their situation and need to be dealt with. As the gardens are such an essential part of the design strategy, it is important to understand the current health and situation of the existing gardens in order to suitably maintain and genuinely restore the landscape.

The first tree to the left of the entrance gate is grown on top of a dead stump (A)* (Refer to Figure 25. Tree Constraints Plan with Existing House). It is a danger because the root system is not secure enough and should be taken out. The coniferous trees to the left have also grown too large and are at risk of dying. They are not in good health (B). To the right of the entrance gate is a strawberry tree (Arbutus Unido), it is in bad condition and should be removed. This is because strawberry trees thrive in acidic rich soil and the soil quality has been neutralised, most likely as a result of the lime that is mixed with cement being washed down from the street and infiltrating the soil (C). The tree is not bearing much fruit and is unlikely to thrive. In the same area is the eucalyptus, which is leaning significantly and is not flourishing. It should at some point be removed due to its poor condition (D). The oak tree along the drive on the right side when entering (E) is thriving but as a result of dealing with the road is has developed structural buttresses at its base. This overgrown root system will continue to develop, which in turn is likely to impact the paving on the road. Site interventions should be wary of building too close or too deep near the roots.

The Poplar Tree (F) is the most troublesome tree on the property. The tree bridges the property line, with 60% on the neighbouring land and 40% on Sproughton. The Poplar tree, also known as the splitting tree, has grown far too large and is no longer entirely stable. In the last few years branches have split off the tree, once seriously damaging the roof. The tree is a significant danger to the property and house and is at risk of splitting and causing serious damage or injury.There is significant undulation in the pavement around the Poplar tree because of the root system, which is sucking water out of the ground. This is leading to cracks in the walls of the house and could lead to further structural damage to the property.

The conifer line to the rear of the property (G) have grown too high and the root system is at risk of damaging the foundations of the house. These trees were originally planted as shading feature for where the tennis courts used to be. However, the courts have not been there in decades, and the trees have outgrown their space and now function to split the rear garden in two. Excessive shading means that the rear garden (Garden 4) receives little sunshine at all throughout the year. The conifer line also segregates the north west garden, rendering it a largely unused space. The close proximity of the conifers to the magnificent mature Oak trees (H) compromise the ability for the Oak trees to thrive. Although not compromising the proposed scheme, the priority would be to secure the health of the grand mature oaks and to remove the majority of the conifer line. Note that other more suitable trees and planting that is more complementary to the garden habitat would replace these trees.

There is a stump in the garden (J), which will be removed when restoring the gardens. Because of excessive water collection and bogging on the south side of the plot, a tree was killed (K). It has since been cut down. As a result new drainage and a pond next door were installed.

The Grande Flore Magnolia (L) has grown too vigorously but because of the climate it does not blossom / fruit as it should and is not in the best condition. It will have to be removed to accomodate the proposal along with the Thuja and Dwarf Conifers. The root system of the Thuja plants is already causing problems to the drains. The Dwarf Conifers (M) adjacent to the conservatory are unstable and will not last much longer. They will destroy the structure of the pond and they are unsafe. One was previously removed and the other two have grown too large for their condition. As well as having the impact of making the garden look smaller, the real issue is that they are not in good condition and should be removed before they become a serious hazard. They will not last very much longer because they are a dwarf that has grown too large. The root system will also destroy the structure of the pond.

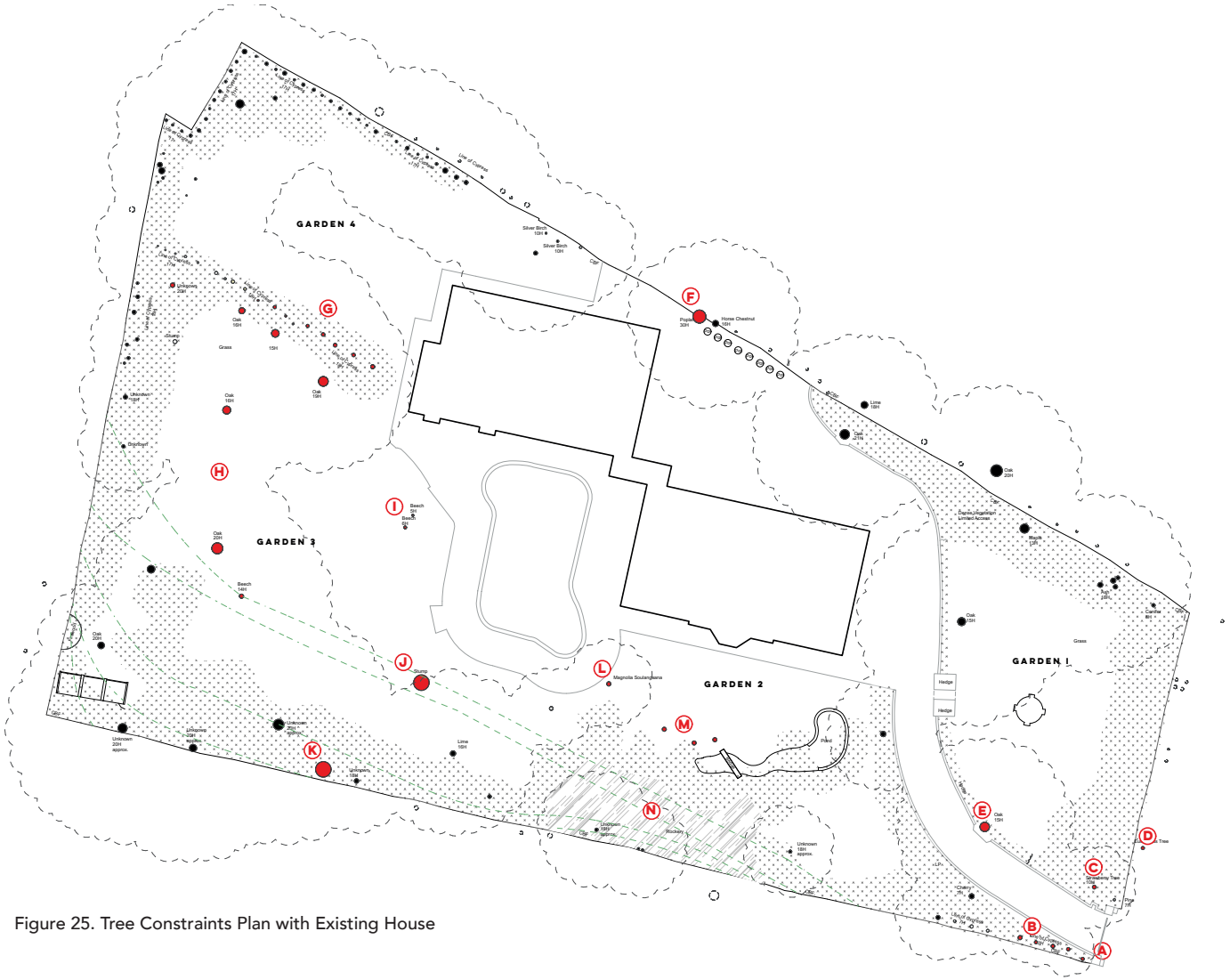


Figure 25. Tree Constraints Plan with Existing House

KEY

A Tree grown over stump is weak - to be removed.

B Coniferous trees grown too large and are at risk of dying

C Strawberry Tree deteriorating as a result of neutralised soil.

D Eucalyptus Tree deteriorating and leaning. Should be removed.

E Oak Tree root system lifting drive. Oak needs space to thrive.

F Poplar Tree a significant hazard

G Conifer line compromising structure & overshading Garden 4

H The Oak Trees needs space. No excavation to occur in this area.

I The beech trees are usually not considered of significant importance

J Stump to be removed

K Tree killed from water bogging as a result of bad drainage

L The Grande Flora Magnolia doesn't thrive & could be removed.

M The Drawf Conifers should be removed

N The Rockery plays an important role.

Rockery

The rockery (N) is currently overgrown. It is an old rockery, possibly older than the house. It is constructed of West Mulland rock, which can no longer be sourced. The area in Yorkshire where it was sourced is now protected. It is, however, a beautiful rock. Most rock for rockeries is not weathered, because the areas of weathered rock are protected, so most is mined in quarries. This is unique sculptured rock and is irreplaceable. This was probably once an Edwardian pleasure garden that possible extended over the next two gardens. There is a distinct possibility that there was a stream flowing down to the rockery ending in the Sproughton Estate. Before the properties were possibly / likely one garden. The rockery provides a vibrant habitat and the richness and contribution to the ecology of the gardens should not be underestimated. The rockery will be restored and moved to be nearer to the new pond and will be planted with ferns, azaleas, maples - sensitiverly restored to how it likely originally was. The rockery will also be used as part of a larger comprehensive sustainable drainage strategy for the site.



Pavement obstructs tree growth, damaging both tree and pavement



Drowned Oak - water bogging



Shrouded, dark and enclosed



Pine Line encroaches House



Room without a view. Overgrown tree branches cover windows



Pines planted in 1920s to provide wind sharding for the tennis court (removed +5 decades ago) have outgrown their purpose

Figure 26. Photographs showing the challenges and restoration opportunities of the landscape that would enhance both the home and the natural surroundings.

v. The Challenges + Summary

The current property has poor services, and insufficient building envelope which requires a substantial amount of fuel to run. The retrospective enhancements to this property to meet the standards to address the climate crisis would result in an obscure architectural property with small rooms and low ceilings. Even with sophisticated architectural consideration, low profile structural elements and an elegant service design, it will be very difficult to fully deliver the complete project brief that meets current building and living standards.

The house is fundamentally unsafe when considered against current fire safety regulations. Even with the addition of compartmentation such as fire doors and fire rated partitions, there are voids throughout the building which are unknown and could create fire routes risking the lives of the occupants, family and staff alike. The process of either surveying or stripping back the material to the base structure would be possible but would be financially prohibitive. Even with these parameters there would still be potential security and fire risks to this methodology. The plant area required to incorporate a full BMS operated HVAC and system service is insufficient. The usable space of the property would need to be reduced to incorporate this plant. The wide layout of the house poses an issue with this given the horizontal distances for services to travel.

The existing ceiling heights are far too low, as 3m to 3.5m is a minimum for today's requirements in a high status area such as this. The existing property lacks the ceiling voids to incorporate necessary services to deliver against the project brief. A conservative consideration of 500mm ceiling void (including plant such as fan coils, ventilation ducts, cable trays, sprinkler systems, SVP returns etc) would reduce the current ceiling heights below an acceptable level impacting the usability of the space and the original architects intentions. In addition there are insufficient risers to accommodate vertical services. These could be created but would eat into rooms which are already a 'small' size given the number of bedrooms and therefore the capacity of the house.

The lifestyle demands of a modern family purchasing in the Hampstead location have evolved significantly since the point Sproughton was designed. Aside from lifestyle trends of the type and size of rooms, the greatest enhancements are in the area of security (especially poignant considering the vandalism and criminality that has severely damaged the properties directly adjacent to the house). The homes of UHNW need advanced consideration and incorporation of high performance technical materials, plant and services to ensure the operation of the house and the safety of the occupants. These materials, plant and services are currently not present. A completely different scale of services i.e. electrical wiring, lighting, heating and ventilation, data wiring, and security wiring is required, which would not be possible whilst preserving the existing property.

Taking all this into account, it is highly questionable whether an effective refurbishment of the existing house is possible, let alone viable, and the risk is that this house would eventually take on a similar derelict appearance to the long term vacant houses in the adjacent The Bishops Avenue. This site would benefit by being considered for a sympathetic and sustainable new build which incorporates the requirements from the project brief, with special consideration for security and safety of the occupants, as well as being a positive contribution to the surrounding environment.

With careful detailing and design with sustainability at its core, this proposal for Sproughton will be an exemplar Net Zero home that aims to give more to the grid than it takes, whilst working in balance with the surrounding natural environment. The ambition with Sproughton is to achieve absolute Best in Practice in regards to its environmental sustainability performance. Aesthetically, the design will incorporate all the technical and living standard requirements of tomorrow and fuse it with a gentle architectural articulation that reflects the style of the surrounding area, whilst respecting its original estate-like character. This can not be achieved by adapting the existing property.

Haringey council declared a climate emergency on March 18, 2019.

We want to work with the council to support this pledge and set a precedent for best practice.

ii. Architectural Expression

The proposal draws its architectural inspiration from the timeless elegance of British neo-classical architecture, specifically reminiscent of the iconic Kenwood House. The design incorporates key elements of this style, such as the grand portico entrance, which is a hallmark of Kenwood House and a nod to the Greek Revival movement within neo-classical architecture. The use of a symmetrical facade, adorned with ornate cornices and friezes, mirrors the meticulous attention to detail seen in neo-classical designs. The incorporation of these elements not only pays homage to the historically important legacy of British culture but also ensures the new build house will exude a sense of timeless elegance, much like its neo-classical predecessors. This design approach serves to create a seamless blend of historical architectural grandeur with modern living requirements, ensuring the new build house is both aesthetically pleasing and functionally efficient.

Set in the conservation area, the proposed replacement dwelling has kept a traditional style so as to remain sympathetic to the locality. Despite not being visible from the street, the design of the house nevertheless celebrates the character and heritage of the area whilst employing smart design to ensure the building addresses contemporary issues. The new dwelling has grand, symmetrical facades, embellished with classical-inspired motifs and elegant detailing. The ground floor features arched windows with simple architraves; the keystone butting up against the stringer celebrates the height of the ground floor. This rhythm of curved elements adds a softness to an otherwise orthogonal volume. The scale of the windows reflects the internal layout of the building, bringing an abundance of light into the living spaces. Advances in highly insulating and efficient windows has allowed for generous fenestration design. The windows on the upper floors have external awnings, whilst the arched windows on the ground level have louvres recessed in the architraves that provides partial shading on sunny, hot days.

the effects of evaporative cooling within the cooling-towers. These chimney-esque elements will be closed off in colder seasons to avoid heat loss, and opened only on hot days to allow the house to naturally cool through passive cooling techniques.

The design concept for the proposal has been developed based on the requirements of the client for a new single family dwelling. Initial strategies to remodel and retrofit the exiting property in the feasibility phase were abandoned when the energy performance targets aimed at meeting the RIBA 2030 targets proved not possible spatially and architecturally. Instead the ambition shifted to designing a new family home that was centred around the absolute best-practice of sustainability at its core. By sustainability, we mean not only the embodied and operational carbon, but also enhancing biodiversity and the natural environment, designing for flexibility and considering the entire life cycle of the building.

Considerations towards the Highgate Conservation Area have been used to inform both the layout and architectural articulation of the dwelling. The building volume has been carefully considered to match that of the surrounding properties, with the ambition to ensure that the house retains its "house in an estate" feel.

The house has been designed around the landscaping, celebrating the mature trees and the lush gardens. The orientation has been changed to give the house a more beautiful frontage, whilst making use of the full arc of the sun. The rear garden has been designed to celebrate the breadth of the landscape; a sunken courtyard brings variation as well and blurring the boundary between inside/outside and bringing the outdoors to the subterranean level. The existing foliage to the boundaries will be supplemented with additional planting of trees, bushes, hedges and flower borders. A new pond will be a beautiful natural space in the garden whilst supporting the natural drainage system from the south west of the property, and being a supportive local habitat for fish, insects, bees and amphibians.

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iii. Design Intent: Inspiration





Figure 26. LEFT: Kenwood House

Figure 27. RIGHT: The Orangerie. Kenwood House





Figure 28. LEFT: Proposal for Sproughton

Figure 29. RIGHT: Classical form, elegant lines & detailing at Park Square. Architect John Nash.





Figure 30. LEFT: Whitestone House, Hampstead

Figure 31. RIGHT: Fine metalwork and detailing. Kenwood House. Similar structures are found throughout Hampstead, including the Keats house.

iv. Proposed Site Layout

The proposed building will maintain the estate-like feel of Sproughton, with the new house mirroring the size and volume of the current one, nestled amidst lush gardens and mature trees. Unlike other houses on Courtenay Avenue, Sproughton is uniquely situated at the street's end, hidden from public view and centered within a generous garden.

Currently Sproughton is split into two main volumes with a singular awkward ground floor corridor connection between the two. The new house will be a single volume, with an orientation adjusted for the sun path, in line with the low-density development pattern of the street. The house, spread over five storeys, will include a basement and a secondary basement for Net-Zero development equipment. The house will be encircled by the gardens, with a front drive designed with a blend of porous hard and soft landscaping.

v. Sun Path

The sun path was a key factor in the house design. The existing house is poorly orientated with little relationship to the external factors. The new design celebrates the landscaping, views, and considers the sun path and seasons. The morning room catches the early sun, followed by the garden room. The main living areas, the grand living room and family kitchen, catch the afternoon and evening sun. The formal dining room is on the north-western corner, used for evening meals and doesn't require daylighting. The family room and study are on the north side. The central atrium, a triple height space with a glass ceiling, brings natural light into the stairwell, library, and top floor playroom. The atrium also functions as part of the natural ventilation strategy, with a glass ceiling that opens in summer to pull up hot air, replaced by cool air from the cooling towers. The glass ceiling fuses tradition glazing craftsmanship (similar to the one found in the Keats House library), with modern technology, whereby louvres open in summer to pull up the hot air. The cooling towers help replace that hot air with cool air.

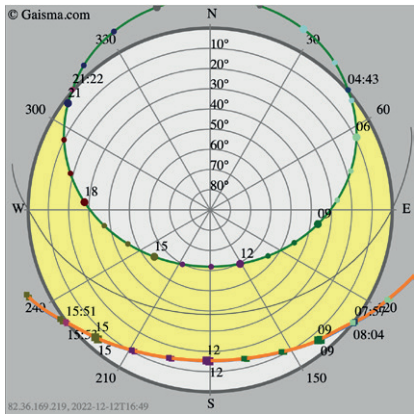


Figure 32. The Giasma Sun Path Diagram shows the winter and summer sun path of Hampstead, London (source: Giasma).

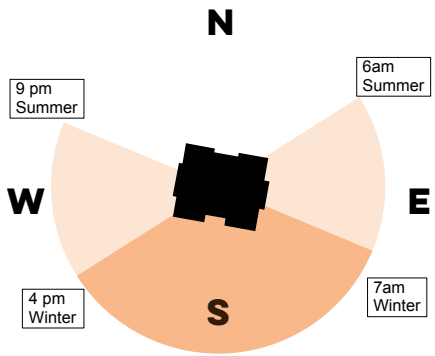


Figure 33. The diagram above shows the sun path on the new proposal of Sproughton.

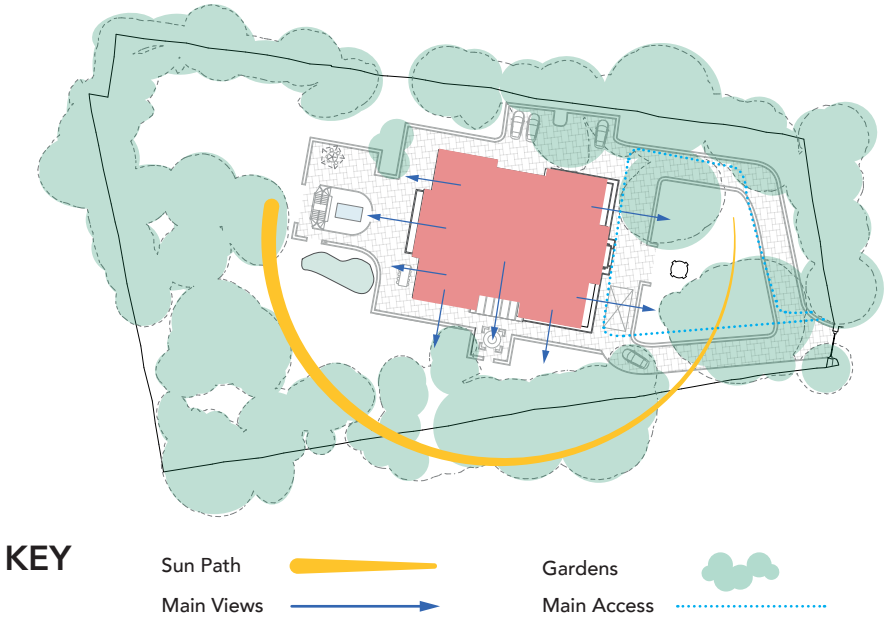


Figure 34. The orientation of the proposal sits in better harmony with the natural flow of the site

V. THE PRE-PLANNING JOURNEY

A. OVERVIEW OF PRE-PLANNING

The pre-application meeting was conducted on 2 February 2023. As the proposal centred around achieving the highest sustainability metrics, it was decided that an additional meeting would be arranged to include the sustainability officer, who was not at the intial meeting. The second meeting was conducted on 27 March 2023. Although the meetings were very positive, the council outlined a few key points they wanted us to address around the proportion of the volume of the proposal, with specific focus around the height between the first floor windows and the cornice, as well as the building feeling too erect as a result of the lack of heirarchy between floor heights.

The design team, including LOKI and the team at Stephen Levrant Heritage Architects, conducted design workshops to address and reiterate the design in line with the issues surrounding proportion, detailing and architectural articulation which were brought up by the conservation officer and the design officer. On 17 May we submitted the design alterations. The overall ambition in addressing the feedback from pre-planning has been to soften the feel of the house, and work with the proportions to give the proposal a more elegant and tasteful articulation.

To address this we extended the ground floor height to give it added presence, as well as reduced the roof height, allowing the ground floor to have more presence. The keystones of the first floor windows reach to the stringer course. The dormer windows have been reduced in size and now feature eyebrows to soften the form. To give the proposal a warmer and softer feel, more focus around the detailing has been given. The roof line has been shortened, the angle of the pitch reduced and sprockets soften the connection between the roof and the cornice; Flat tiles have been replaced with granny bonnets. The cornices are more prominent as dentals and more detail has been added. The stringer remains simple, functioning only to break up the elevation, whilst the new cornice functions as a sort of crown to the volume (right). The entrance situation has been given more focus, with a more traditional, yet grand front door featuring a more refined surround, with the moulding going up the sides and continuing over the arched fanlight. Integrated shutters have been designed to be concealed within the window surrounds in order to provide additional shading, especially in extreme heat seasons, without interrupting the rhythm of the pattern language of the elevation. On 2 August, 2023, We received the pre-application feedback notes from the council (Ref: PRE1003272). On the principle of development,

> *Para 3.8 accepts the lack of significant heritage or architectural interest associated with the existing building means that the demolition and re-build could be acceptable.*
>
> *Para 3.14 says given the specific circumstances of this site, hidden from the public domain, not only by being at the end of a private road, but by the large and secluded nature of this site with high perimeter screening, there is much more freedom in design approach as opposed to following a specific context. Para 3.15 goes on to say the amendments to the scheme are viewed to be successful and respectful of the chosen design approach, specifically addressing concerns about proportions. The siting, form and massing of the proposed building would also be respectful of landscape features important to the character of the site.*

In summary, the journey from the initial pre-application meeting on 2 February 2023 to the latest feedback received on 2 August 2023 has been marked by a collaborative effort to address sustainability and aesthetic aspects. The additional meeting with the sustainability officer in March and subsequent design workshops with LOKI and Stephen Levrant Heritage Architects addressed council concerns about proportion, detailing, and architectural articulation. Design alterations, including adjustments to ground and roof heights, and enhancements to elements like window keystones and shutters, collectively contribute to a more elegant and tasteful articulation, softening the overall feel of the house. The positive response from the council's feedback on 2 August 2023, acknowledging successful proportion addressing and accepting the demolition and re-build, emphasizes the project's design freedom within its unique context. In conclusion, the collaborative efforts and design refinements align the proposal with sustainability goals and aesthetic expectations, showcasing a commitment to delivering a project that positively integrates with its architectural and environmental context.

B. CHANGES FROM PRE-PLANNING

i. Proportion

Following the two pre-planning meetings, there were concerns about the proportion and architectural articulation. The original submission for pre-planning had minimal variation between floor heights. By gradually reducing the floor-to-ceiling heights as your eye moves up the building, the building becomes more refined and slender.

Elements like the widened and elevated stringer, and the relationship between the windows and the stingers also ties the building together more convincingly.

Both these drawings and the annoted elevation on the followingv page were submitted to the council following the second pre-planning meeting for their approval.



Figure 35. Final building levels



Figure 36. Previously proposed building levels

B. CHANGES FROM PRE-PLANNING

ii. Detailing



Figure 37. The annotations below outline the changes that were made to the original proposal. The two main ambitions were to:

1. articulate a more pleasing and clearer heirarchy in the proportions, and
2. to soften through more details and softer edges, such as the cornicing, dentils, sprockets and eyebrows over the dormers.

V. SUSTAINABILITY STRATEGY

A. Main Principles

i. Introduction

Sustainability has driven the design, dictated the selection of materiality and enabled the power strategy to be informed by modern technology. The sustainability strategy has two main objectives:

1. Build a highly insulated and air-tight building fabric from natural materials that are carbon neutral or carbon negative.

2. Powered entirely by renewable energy sources that supplement the passive cooling and heating strategies.

The principles of sustainability here are simple: construct the new building out of carbon neutral or carbon negative materials. Careful detailing ensures that the airtightness minimises fabric heat loss to passivhaus standards, greatly reducing the energy demand to heat and cool the property. The power strategy employs renewable technologies.

Seasonal thermal energy capture will be retained through thermal banks, which can store heat energy from one season to another by exploiting the thermal inertia of the ground, with supplementary vanadium/lithium and heat battery storage. The second level basement provides extensive provision for the technology and equipment needed to power this house entirely from renewable energy without the need to burn any fossil fuels. There is extra provision to allow for future flexibility when new technologies come on the market. With regards to thermal efficiency, due to the chosen materials and specifications (insulation, airtightness etc), the sustainability strategy developed for Sproughton will surpass all industry standard energy targets in the UK today.

ii. Carbon considered construction

The substructure will use carbon capture and storage (CCS) by mixing an 8-10% mix of Biochar in the concrete, which reduces the CO2 footprint of cement to zero (1kg of biochar captures 3kg of CO2).The aggregate will be used from on-site rubble from demolished building masonry that wasn't suitable for re-use. The superstructure will be constructed out of CLT and timber as the structural components, capturing 722kg of carbon per cubic meter. As mentioned previously, the external lime render on the facade is a natural, breathable material. The insulation will be made of 46cm thick hempcrete, which is carbon negative. 70% of the heat accumulation happens in the ceiling. The 36cm thick timber ceiling joists will be filled with air-dried clay plates, a hygroscopic material that ensures a comfortable indoor climate by controlling the humidity and tempering the temperature variations via absorption.

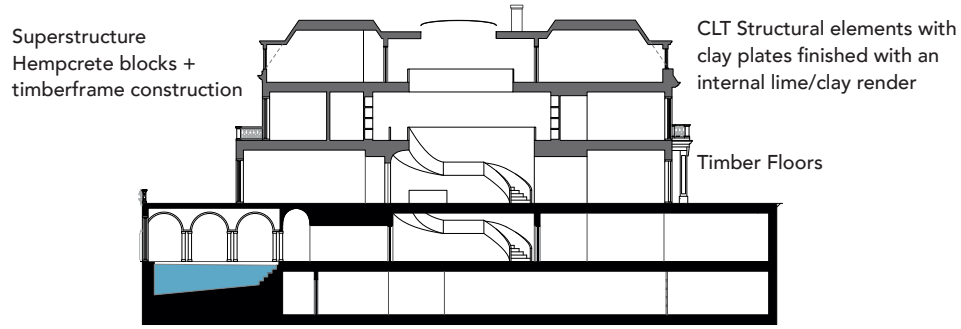


Figure 38: The fabric first approach forms the basis of the sustainability strategy, reducing the embodied cabon, considering end-of-life use and ensuring that operational carbon is minimised.



Figure 39: Hempcrete is a strong, lightweight and breathable building material made of hemp, lime and water. It is flame, water, mould and pest resistant and is known to last for hundreds of years. With excellent thermal properties, hempcrete has optimal moisture balance, and paired with the external lime render, allows the building to breathe and have a comfortable internal humidity level.

iii. Whole Life Carbon (Operational Carbon + Embodied Carbon)

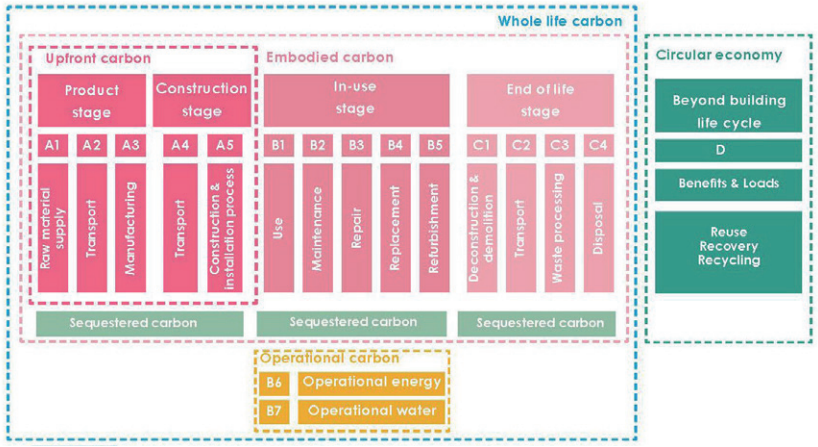


Figure 40: Diagram: Life cycle stages defined by BS EN 15978:2011

a. UPFRONT CARBON A1 A2 A3 A4 A5

CO^2 negative building blocks through carbon sequestration

UK raw material supply, Waste Material Use, High Sequestered Carbon Values

CCS Concrete (Carbon Capture & Storage)

- locally sourced biochar to reduce or compensate the carbon footprint of cement, which is requred for the substructure (1kg binds 3kg CO^2)

CCS through hemp and straw

- Use of carbon sink materieals like hemcrete and hemp bricks (UK sourced)
- Hemp achieved through its strong and dense fibers a high insulation value. 1m^3 captures 212kg CO^2
- 1t of hemp binds 1.8 kg of CO^2

CCS by wood

- Local, renewable and sustainable.
  CO2 capturing per 1m3 as structure: 723kg, as building material: 339 kg
- C2C (cradle-to-cradle) principle of building materials used, little to no waste when converted.

Sequestration and Carbonation

- biogenic CO^2 uptake during the biobased growth and to CO^2 uptake by carbonation ensure the construction materials have a negative carbon footprint and act therefore as effective carbon sinks.

b. EMBODIED CARBON + END OF LIFE B1 B2 B3 B4 B5

Response In-Use and Designed for Circularity

Use + Maintenance, Deconstruction, Recycling and Reuse

Adaptability in Use

- Allow for adaptation to new technologies (open systems for technology transfer)
- Accessibility, Monitoring (Smart Maintenance)
- Space provision for adaptability

Deconstruction

Whole Life Carbon

- Circular Economy of materials including future energy recovery, reuse +recycling
- Hempcrete longetivity +100 years (replacable panels)
- End-of-life material in building recyclable or absorbed into soil (No landfill)
- 70% of the energy storage happens in the clay ceiling plates (reuse)
- Easy to demolish - Heavy machinery unneccesary
- Low water requirement

C. OPERATIONAL CARBON B6 B7

Energy and Water in Use

Zero Carbon Balance

- Energy-plus house through renewables (≥120% annual energy requirement generated on site)
- Max. electricity demand 35 kWh per m^2 per year
- Intelligent home control use of energy (all electric house)
- Short-term storage with batteries (recycled car batteries if able to source)
- Large technical rooms (energy storage always has to do with mass)

Energy efficiency + Self Sufficiency through Architecture & Physics

- The warmth of summer heats up in winter and vice versa (seasonal heat exchange system (UTES System / ICAX Thermal Bank)
- Optimal Building fabric paired with good airtightness, & minimal thermal bridging allows for heavily reduced energy demand for heating (10 kWh/m^2
- Ventilation flaps on the windows controlled and regulated by sensors and wind tunnels allow for natural ventilation and advanced stack effect use.
- Plot likely to be more prone to flooding. Water retention, containment, cleaning and re-use designed in to scheme to take advantage of this resource.
- Water consumption meter readings + Grey water use

d. CIRCULAR ECONOMY D

Buildings as fuel for the planet

Whole Life Carbon. Zero Waste Approach

Reuse of the Existing

- Existing building fabric (eg. brick) to be offered for reclamation for reuse or aggragates. On-site requirement for hardcore to be sourced from demolition
- Inventory of materials (doors, fenestration,surface materials) to be given
- Cradle-to-Cradle approach to design (and deconstruction)
- Cradle-to-Grave EC of existing stock to be valued when evaulating the WLC of the new proposal (EC of new - EC of demolished = total EC value)

Future Low-Energy technology in materials

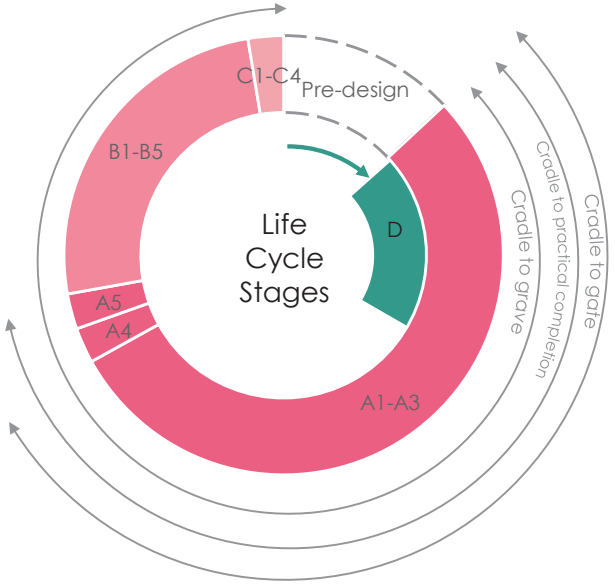
Currently, between 4-8% of total global CO^2 emissions come from concrete. In the future is will be zero. Compared to conventional concrete, more than 200 kilograms of CO^2 per cubic meter of concrete can be permanently neutralized when combined with biochar. Inkoh is a natural Swiss product that is made from untreated residual wood from regional forests using a specially developed pyrolysis process. It is manufactured according to the highest European Biochar Certification (EBC) standards. Thanks to the porous surface, Inkoh biochar can store five times its own weight in water. **At the end of its life cycle, the pollutant-free concrete is completely dismantled and can be easily recycled without releasing the trapped carbon dioxide. The patent for the climate concrete has already been registered**. klark.swiss mit Fachhochschule OST Rapperswil).

Keep it Simple

- Bio-based and natural construction means that whatever can not be directly re-used, will be returned to the natural earth cycle
- Component led design means that building elements, appliances and components can easily be switched out and replaced. (What does the floppy disc of construction look like in 2123?)
- Decoupling and deconstruction to be designed in at the beginning.
- Interactive Construction, data-log and Deconstruction Guide allows for owners in 150 years time to know how the building function.

Regenerative Design

- At the end of Sproughton 2.0's life, it will have acted as a energy provider, carbon sink, water balance. The landscaping will be restorative and enhance the natural environment and biodiversity.



Key

Pre-design period
Encompassing Embodied Carbon Reduction strategies nos. 1-6 to reduce upfront carbon emissions in Life Cycle Stages A1-A5.

A1-A5 – Upfront carbon emissions in product and construction
A1-A3 Raw material supply/ Transport/ Manufacturing
A4-A5 Transport/ Construction & installation processes

B1-B5 – In use carbon emissions
B1-B5 Use/ Maintenance/ Repair/ Replacement/ Refurbishment

C1-C4 – End of life carbon emissions
C1-C2 Deconstruction & demolition/ Transport
C3-C4 Waste processing/ Disposal

D – Beyond building life boundary
Reuse, Recovery, Recycling (reported separately but Circular Economy principles can be used to reduce upfront carbon).

Figure 50. The circular form and proposal to integrate a pre-design period at the start emphasisesthe opportunities available to reduce the upfront carbon emissions associated with Life Cycle StagesA1-A5. Source: LETI Embodied Carbon.

iv. Passive Strategies

a. Passive Cooling

The proposed design employs passive cooling and heating strategies. Modern wind towers used to cool and ventilate in summer will replace traditional chimneys, shifting the use of this familiar architectural element from a fossil fuel burning artefact to one fit for the purposes of tomorrow. This passive strategy has been cooling buildings in hot countries for centuries. The tower vents open in summer and pull air into the building. The air cools by evaporative cooling when passing the base pools and then is the pulled through the central atrium and released via the apertures in the central dome (See figure 20 below). All windows can be opened and the central atrium functions like a lung, drawing air in and expelling it.

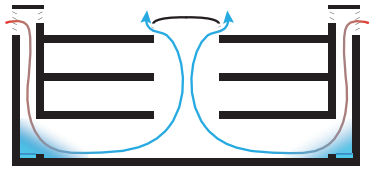


Figure 20: Passive Cooling Strategy in Summer

b. Passive Heating

In the winter, the wind chimneys and the central dome apertures are closed. All the building services and machinery are located in the -2 basement level, and this equipment expels heat. In summer, this radiant heat, along with excess heat collected from the GSHP and collected summer heat is stored in an interseasonal thermal store known as a Underground Thermal Energy Storage (UTES). However, in winter, this radiant heat is released and through the natural stack effect process, this heat rises through the building, heating it. The hempcrete is a fantastic absorber of heat and the hygroscopic surface materials will give a soft warm feeling in the building.

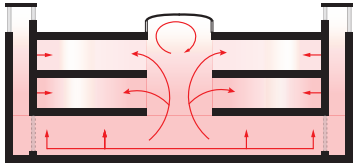


Figure 21: Passive Heating Strategy in Winter

v. Renewable Energy

a. Introduction

We require energy to heat, cool and power our homes. The fabric first approach means that the required energy collected is greatly reduced as a result of a super insulated property. Whilst this does not affect the lighting and appliance demand, the greatest energy requirement is space heating and cooling. The electricity generation will come predominantly from the substantial solar voltaic array on the roof.

b. Interseasonlal Underground Thermal Energy Storage “UTES”

The greatest source of heat and cold is from the seasonal external temperatures. The UTES system is essentially a thermal bank that stores heat between seasons using a bank of earth to hold solar heat energy collected in the summer for use in winter to heat buildings, and cool air and surface temperatures collected in winter for summer use.

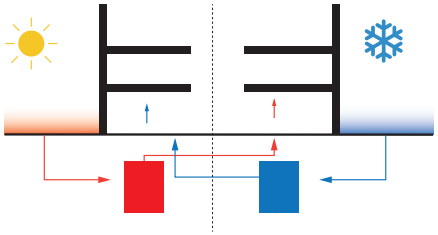


Figure 51: A thermal bank is essentially a temperature battery that stores cold and warm temperatures seasonally to supplement interseasonal heating and cooling demand.

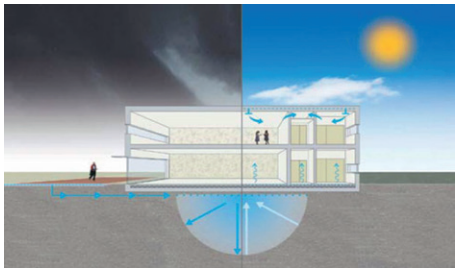


Figure 52: The renewable cooling system collects cold air and ground surface temperatures in winter and stores it to be used in summer.
Source: www.icax.co.uk

This building will in the first instance use the aforementioned passive ventilation strategies, supplemented with temperatures collected in the off season, and finally heated actively with a ground sourced heat pump. Because of the ultra-high insulation of the building, the source demand is greatly reduced.

c. Power management

The property will be powered by a ground sourced heat pump (GSHP), supplemented by an extensive 265 m2 PV array on the roof, which alone will generate around 52,800 KwH per annum (not visible from ground level). The ambition is to produce more power than is needed for the house. In the future this building will be able to contribute electricity to the national grid. In anticipation of Britain's changing climate, especially in regards to extreme heat waves, the ground sourced heat pump will be supplemented by ground sourced cooling, which will be used to cool the building. This house is designed so as not to require any electrically-powered air conditioning units.

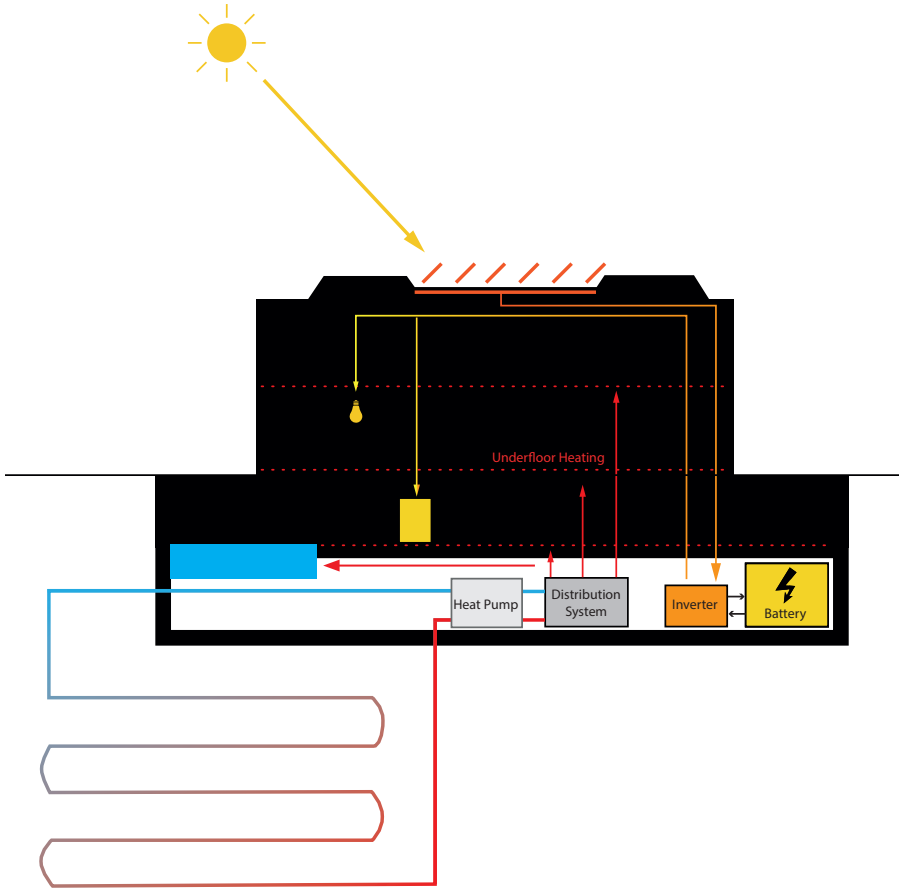


Figure 53. Diagram demonstrates how the house is powered by PV and the GSHP.

vi. Sustainable Urban Drainage Strategy

a. Current Situation

Until recently, water has not been a precious resource in Britain. Water scarcity, droughts and housepipe bans are now becoming a regular seasonal feature. Gardens are more than a part of our scenography, they are a fundamental part of a sustainable ecosystem - a diaspora of natural oases that provide a habitat for diversity as well as help balance local climate. Flooding and surface runoff in cities are exacerbated by a lack of absorbative surfaces; droughts can be minimised with considered planning and sustainable urban drainage strategies. The SUDs strategy employs natural elements that are complementary to supporting local biodiversity. The strategy is designed to work in periods of drought as well as periods of excess rain, functioning as a water barometer for the season.

b. Strategy I : Absorbative Landscape + Rain Gardens

We have a free source of water: rain. Climate change has led to more erratic rain patterns, often with excessively short and heavy rainfalls. Our urban infrastructure especially struggles to deal with this excess of water. Sproughton is located downhill from the rest of the houses on Courtenay Avenue. This presents an opportunity for Sproughton to work as a sponge and collect this rainwater through a drainage system, and passive landscaping strategies such as rain gardens. Rain gardens are designed with depressions in the topography to divert rainwater, and planted with hardy plants that will thrive both in situations when submerged under water and through drier periods. In addition, a more substantial "wild" reed pond designed to mimic a natural reservoir has been repositioned into the rear garden. Water runoff and excess rain will be funneled to the pond. This not only reduces surface flooding, but means that this water can be collected and reused to water the gardens in drier periods, or, if excessive amounts of water is collected, will overflow into the grey water filtration system.

This solution enhances the mixed diversity of vegetation already prominent in the garden, and provides not only a beautiful designed landscape, but a nutrient rich environment to support biodiversity.

Strategy II : Rainwater Collection

Rainwater will be collected from under the porous landscaping (under the drive and along the pathways on either side of the house), as well as from the downpipes from the roof and hard surfaces. The collected rainwater will be used almost entirely for watering the gardens, reducing the need of any mains water for the external green spaces. The rain garden and pond will collect most of the water runoff, though downpipes will feed into a subterranean tank and pumped into the pond. In the event of a significant rain event, overflow from the rainwater tank will be diverted to the grey water filtration system, where it will be cleaned and reused within the house.

Strategy III : Grey Water Filtration - Reusing what we have

Washing laundry, brushing our teeth, washing our hands, taking baths - most of our everyday water use can be collected, filtered and reused. This would substantially reduce the need to use mains water. Some water is not suitable for the grey water recycling system, such as toilets and the sink / dishwasher(because of grease), which will be connected to the mains sewer system. However, suitable grey water will be collected, filtered with UV and cleaned and pumped back up to be used for washing machines and secondary water needs. The water tank supplying the house will be topped-up with mains water. The collection, processing, storing and distribution for this system is located in the -2 Basement level (Figure 25).

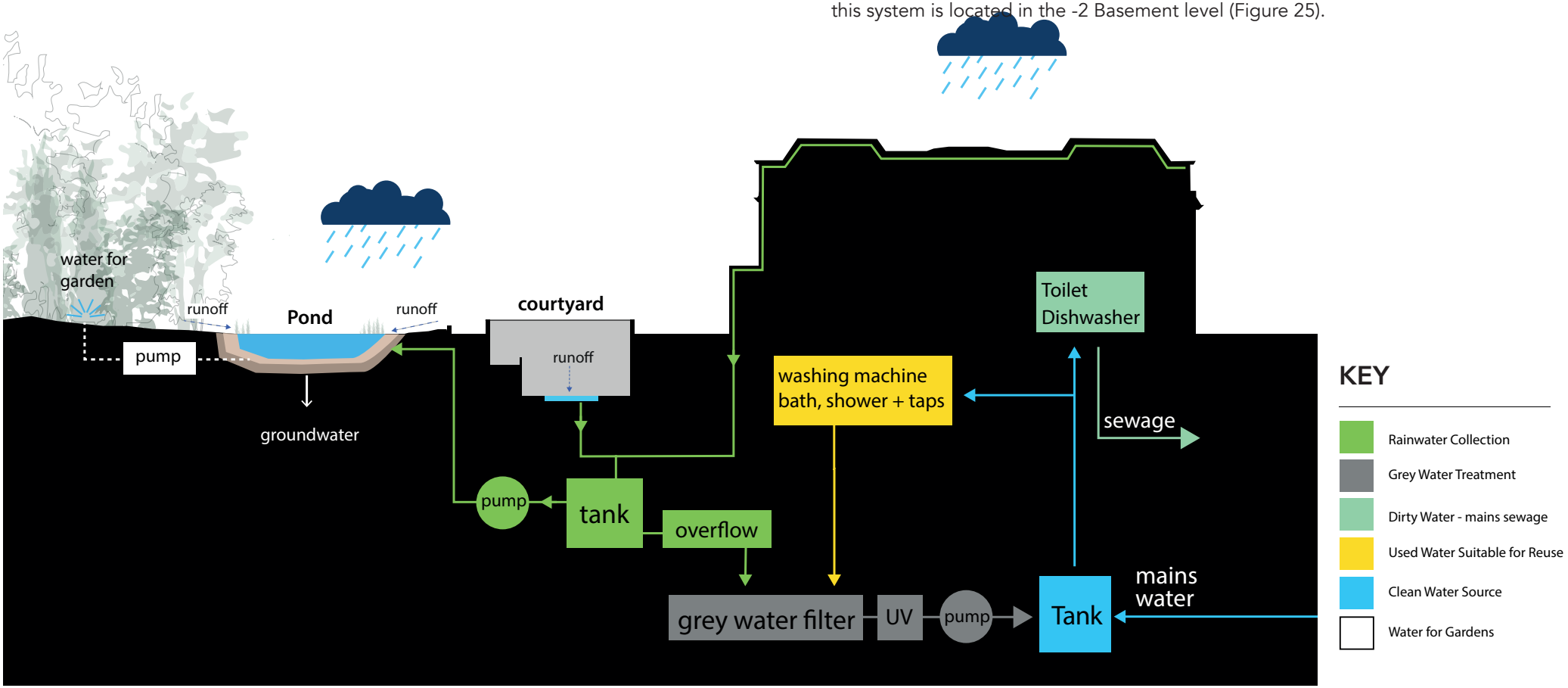


Figure 54. Sustainable Urban Drainage Strategy for Sproughton

vii : Landscaping and Biodiversity Strategy

a. Overview

In crafting our landscaping and biodiversity strategy, our approach has been meticulous, treating the natural habitat as not merely a backdrop but as the very essence that sets the stage for a stunning scenography. Recognizing that sustainability in architecture transcends the physical built environment, our focus is on ensuring that our buildings seamlessly coexist with and, ideally, enhance the natural surroundings they inhabit.

The landscaping strategy unfolded with a set of priorities aimed at nurturing and revitalizing high-value natural reserves. Our foremost initiative involves the meticulous restoration of areas surrounding mature oak trees, affording them the optimal conditions to flourish. Additionally, our attention extends to the rejuvenation of the rockery, a habitat that, while degraded, holds immense potential to support a vibrant ecosystem teeming with amphibians, insects, and various plant life.

Our second priority is rooted in leveraging the topography and a carefully considered drainage strategy to implement Sustainable Urban Drainage (SUD) designs. This not only results in the creation of visually striking spaces, such as ponds, but also serves as a catalyst for fostering a robust and interconnected biodiverse network. The rain garden is an example of a landscape feature that changes with the seasons and rain patterns, providing a natural flood buffer that is beautiful. The intent is to not only create aesthetically pleasing elements within the landscape but to actively contribute to the flourishing biodiversity of the site.

Lastly, our planting strategy, though rich in color and beauty, is exclusively curated with locally sourced plants and flowers. By selecting flora that harmonizes with the existing local ecosystem, we ensure not only a visually stunning landscape but also one that serves as a sanctuary for local bugs, bees, and birds. This conscientious approach underscores our commitment to creating a sustainable environment where architectural excellence seamlessly integrates with and enhances the natural beauty of the site.



Figure 55. These flowering plants will enhance + restore insect, bee, bird, and butterfly populations.

b. Biodiversity Net Gain



Figure 56. Landscape plan identifying plant species specifically selected for both their pollinating and beautiful qualities

viii. Conclusions

a. Sustainability Statement

In our committment to explore the optimal sustainability strategies, Eight Versa Sustainability Consultants were appointed to undertake a full comprehensive audit of the proposal. The team conducted ten reports, encompassing analyses of the existing building, the surrounding natural environment, the physical built proposal, building performance, and operational requirements. This ranged from understanding the existing property and opportunities for repurposing in the pre-demolition audit, to the following list of reports: *Biodiversity Net Gain, Circular Economy Statement, Dynamic Overheating, Ecological Impact Assessments, Operational Waste Management, Pre-Demolition Audit, Sustainable Urban Drainage Strategy, Sustainability Statement, Whole Life Carbon Report*

Key findings worth pointing out are:

- The total upfront embodied carbon (A1-A5) of the project is ***164 kgCO²e/m²***. **The project achieves a rating better than A+ (LETI target). The project also exceeds the extrapolated design targets for 2020-2030 and the aspirational targets set by the GLA** (A1-A5 = 500 kgCO2e/m² for residential buildings). A comparative study using a concrete structure for super structure and less efficient sub structure model has also been performed to show that the whole life carbon emission **of the same project with concrete would have been roughly** 184 kgCO2/m2 higher.

- An estimate of the total percentage of waste materials that can be repurposed or recycled is 58% by weight. **A total diversion from landfill target of 95%** (Reuse + Recycle) by weight is therefore achieved.

- The development has appropriately provisioned waste storage and will encourage occupants to minimize waste. The waste storage has been sized according to the local borough's standards, and the plan includes a provision for bulky waste. The development's waste collection service is expected **to achieve a minimum of zero biodegradable and recyclable waste to landfill by 2026**, in line with the London Plan Policy. The plan aligns with Haringey's Reduction and Recycling Plan's strategic aim of managing waste sustainably, reducing waste quantity, and applying a sustainable/circular approach to the management of waste.

- DSY 1 Overheating is comfortably addressed with passive strategies.

- The scheme **achieves a minimum on-site CO^2 reduction of 66.2% beyond 2021 Building Regulations**, surpassing Haringey's Local Plan Strategic Policies. The scheme would then meet and **exceed the 25% carbon reduction target** set in the Haringey's Local Plan Strategic Policies 2013-2026

b. Limitations of the Reporting + Opportunitites

Regarding the Energy Assessment, limitations of the SAP software that would potentially not illuminate the performance of the building and energy perfomance as accurately as with another meteric. These include, but are not limited to:

- not having the capability to run a computational fluid dynamic (CFD) of the passive ventilation strategy and stack effect. This would have an impact on cooling. But this function does not exist in this programme (which is required by the council)

- The UTES (InterSeasonal Thermal Capture) is a non-standard technology. It captures cold winter air and stores it underground to be used in winter, and hot summer air in winter for use for winter heating. This would be a supplementary system. This system already exists, and works, but is not able to be modelled in the SAP programme.

- Battery provision - the programme only allows for maximum 4 batteries. We intend to use 12 used batteries. Generating energy is less of an issue, storing it is. This is problematic in understanding the results.

The current performance comfortably meets the Natural Carbon Solutions (NCS) protocol requirements for design stage Net Zero Carbon in Construction and Operations.

The final feedback received from our sustainability consultant is:

> *"Your (LOKI's) design approach is exemplary and even with lots of assumptions (which are generally overestimated by software) the results are exceptional. The results are going to improve at the next stages with accurate structural and MEP information"*

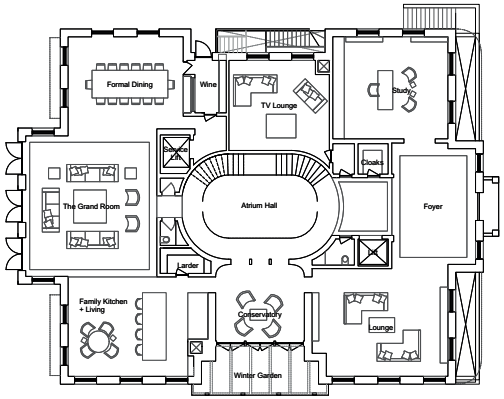
Hesham Ahmad, Eight Versa Ltd.
Senior Sustainability and Building LCA Consultant
27 September 2023

VI. DRAWINGS

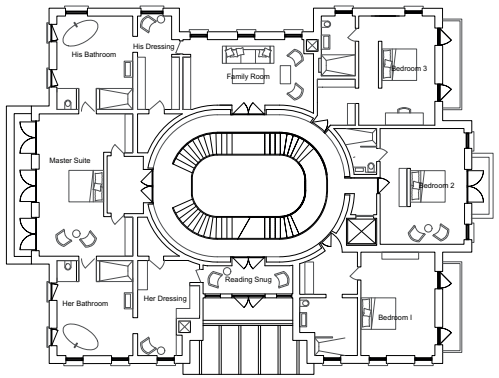
A. Proposed Plans

i. The Main House

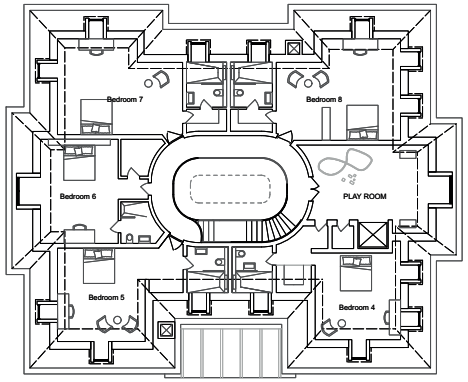
The layout was designed around the central atrium. The designated rooms follow the sunpath. The simplicity of the layout, along with its well proportioned rooms allow for future flexibility.



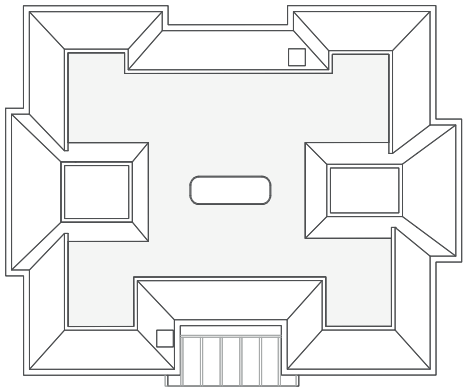
Proposed Ground Floor Plan



Proposed First Floor Plan



Proposed Second Floor Plan

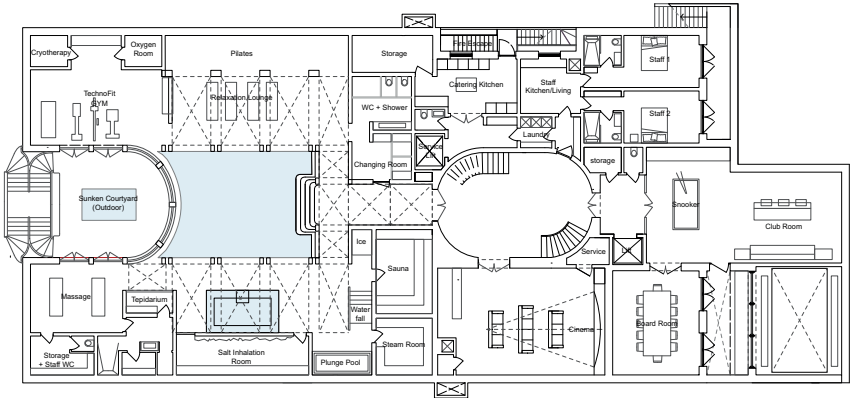


Proposed Roof Plan (shown without PV + green roof)

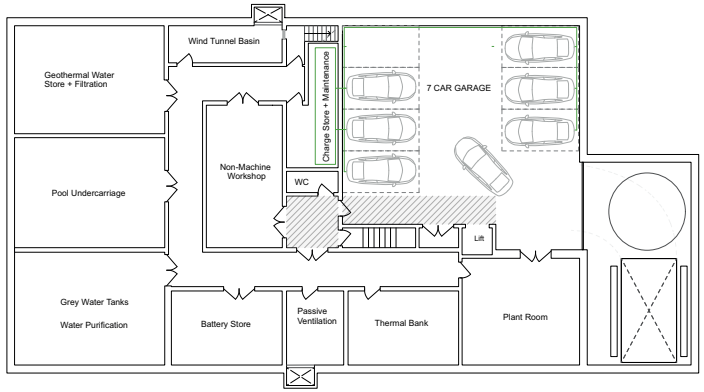
ii. Basement Levels

There are two basement levels; -1 Basement is an extension of the living space, with a spa, entertainment and leisure and staff provisions, whereas the -2 basement level is solely a service level and is essential to execute the net-zero sustainability strategy outlined previously.

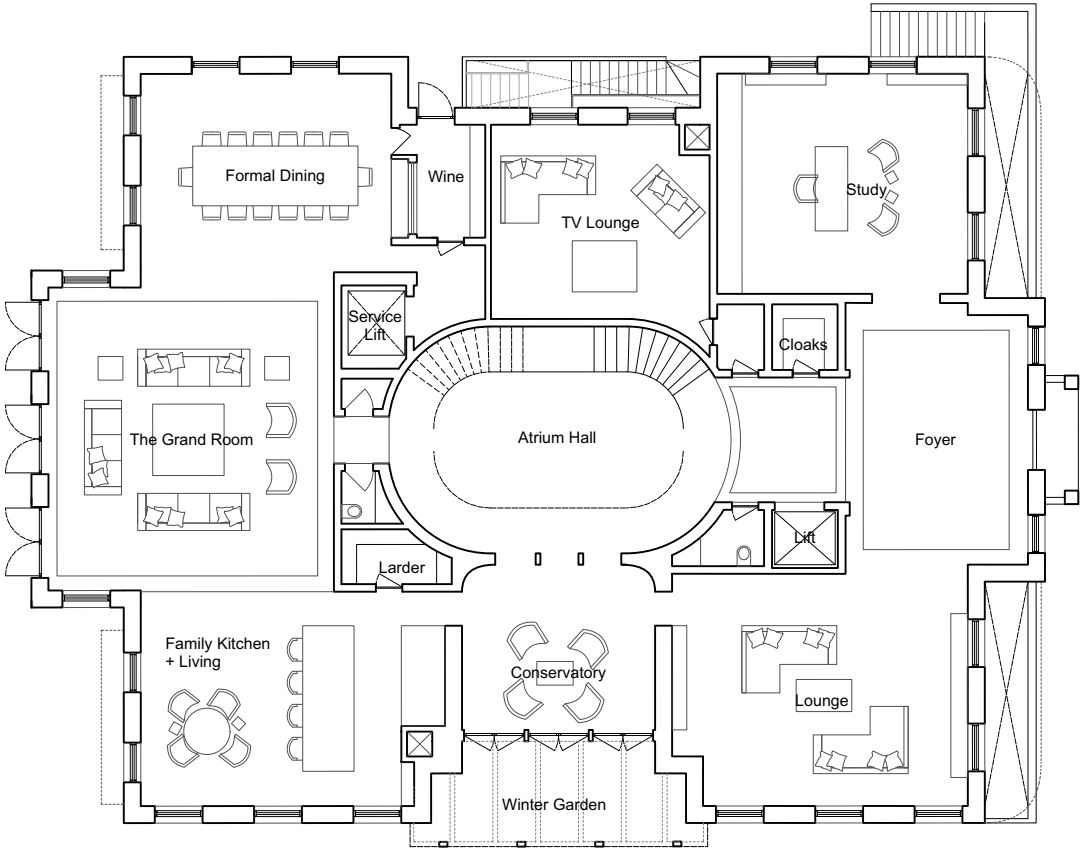
The follow pages have more detailed plans and descriptions of each floor.



Proposed Lower Ground Floor (-1) Plan



Proposed -2 Service Basement Plan



PROPOSED GROUND FLOOR

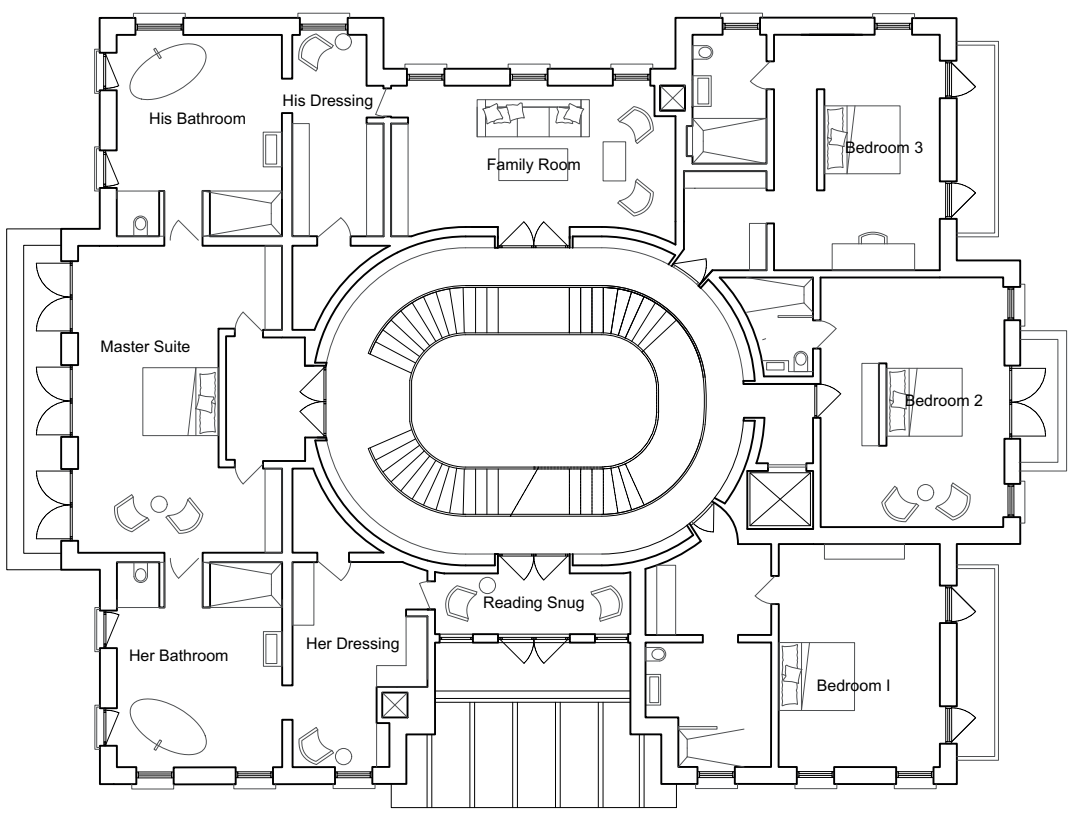
The entrance leads you in to the generous foyer, which then leads to the central atrium, a beautiful triple height space. An elegant curved staircase leads your eyes up, to the elliptical shaped library along the first floor landing, and then higher up to the feature transparent dome on the top, which pours natural light to the central space.

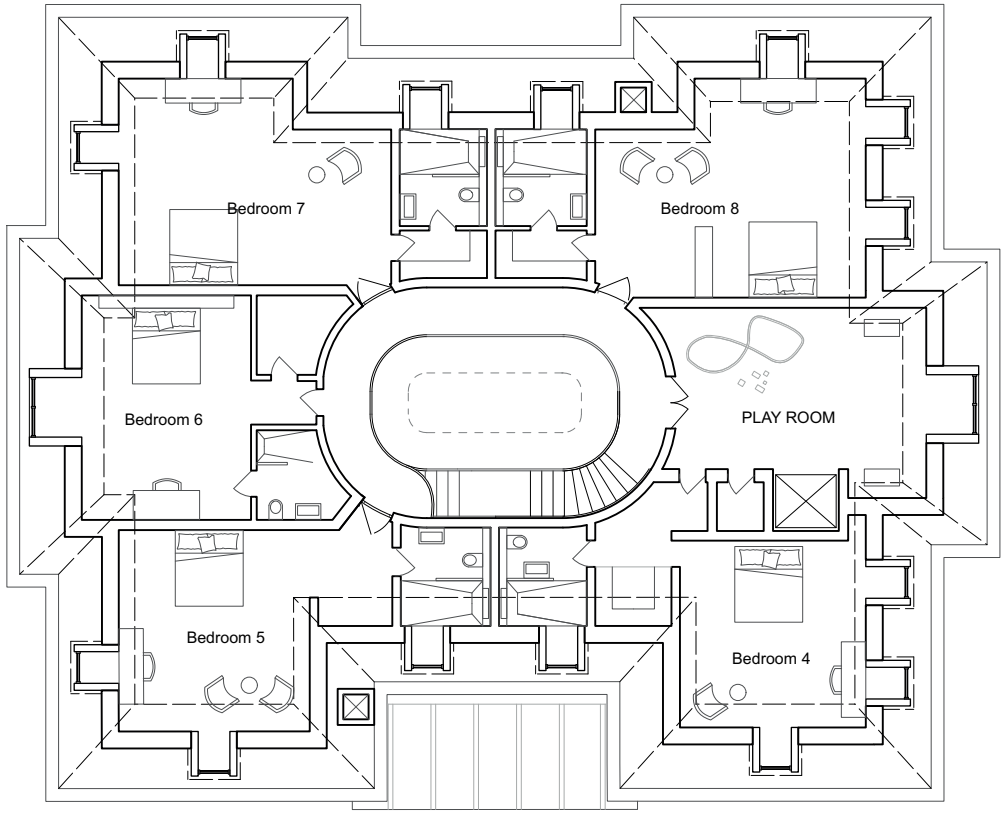
Aside from its sculptural qualities, the central atrium is designed as the thermal core of the building, using thermal stratification of the open space to support a comfortable living environment to the other living areas. In summer the apertures on the dome on the roof are opened, and with the west facing doors on the ground and lower ground floor open to pull fresh air through the house. In winter, this space is closed and the heat expelled and trapped into the atrium, creating a warm heart to the building.

Upon entering the atrium, a feature archway leads to a conservatory and winter garden atrium with views out to the garden to the south, and another door connecting to the rear of the house. Continuing through a doorway to the rear of the atrium leads to the Grand Room, the main feature room with the best views over the garden. The four corners of the house work with the movement of the sun: to the south east is the morning room and lounge, where the morning sun can most be enjoyed. Here one sits with coffee and the papers and enjoys the views over the front garden.

To the south west, connection to the conservatory and the grand room, is the family kitchen and living. This dual aspect space gets the most sunlight and will be the most popular space in the house. The formal dining space is situated on the west corner, where the sun sets.

The family tv room and the study are located in the north side where there is little sunlight. Situated between the formal dining room and the family room is a back of house service area with a connection to the catering pitch downstairs, and the side exit, which would be used for catering and deliveries.





PROPOSED FIRST FLOOR

The central staircase brings you up to the first floor oval landing. Along the corridor are floor to ceiling bookshelves, transforming the first floor elliptical landing into the family library.

The bedrooms, family room and reading snug can be accessed directly from this space. The main landing located at the top of the stairs leads directly to the master suite, with his and her separate bathrooms and wardrobes. There is a generous balcony overlooking the rear garden. To the south of the first floor atrium is a reading snug. The front of the house has three bedrooms with ensures. A family room is located on the north side.

PROPOSED SECOND FLOOR

The proposed second floor accommodates further bedrooms and a play room, which can be accessed from either the lift or of the staircases.

All rooms benefit from generous sized dormer windows, sufficient storage and amenity space. Wet spaces have been paired adjacently to one another where possible. The internal walls between bedroom 5 - 7 to the south, and the playroom and bedroom 8 are designed with flexibility as to be easily adapted for future use. The play area especially benefits from an abundance of natural light from the east faced windows and the glass dome above the atrium. All bedrooms have ensuites.

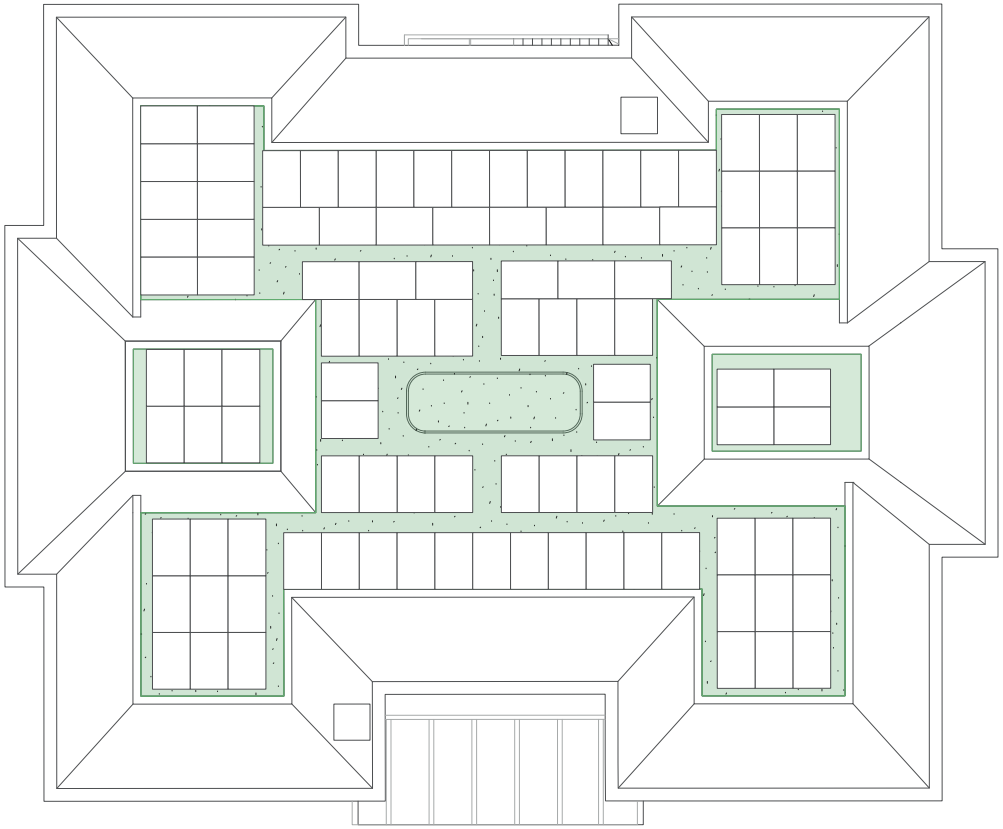




Figure 57: The large surgace are of the roof provides enought space for a PV array to supply about 52,800 KwH per annum, to be used predominantly for lighting and appliances.

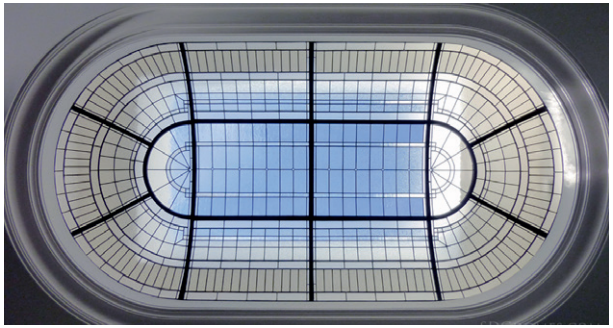


Figure 58: The barrel vault glass dome was inspired by the Keats House Hampstead. Fusing traditional elements with modern technology, this beautiful architectural element plays a key role in the ventilation system.

PROPOSED ROOF PLAN

Balancing proportion, aesthetics and function, the roof has two dominant features: an extensive PV array, and a central glass dome that sits directly above the central atrium.

In the initial conception design phase, it was clear that the house would require a generous surface area to provide substantial space for a comprehensive photovoltaic array. Although the heating and cooling of the building will be met with other strategies, the PV array will be the sole generation of electricity for the property.

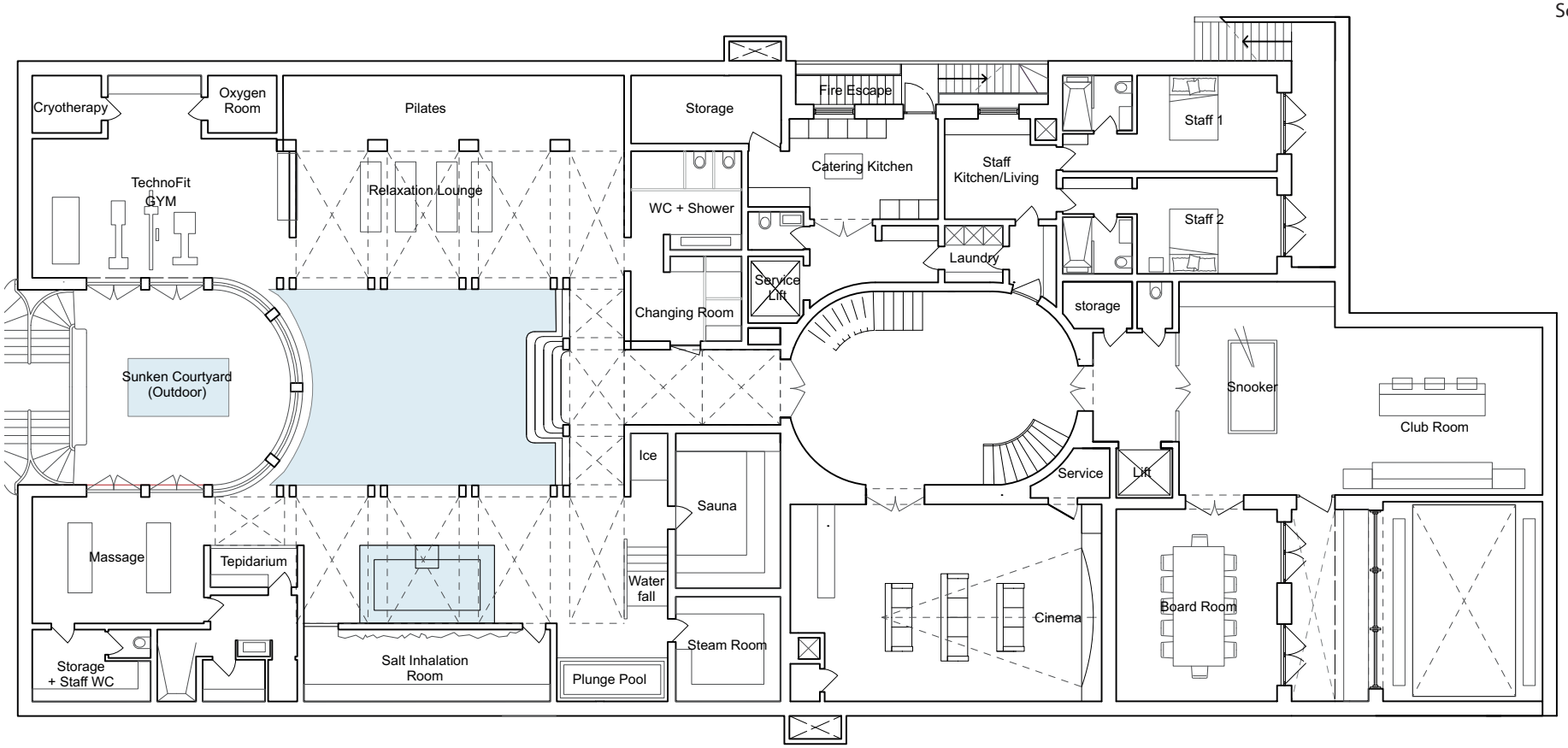
The roof has been designed to have maximal surface area for the vast solar panel array; it will not at all be visible from below. To avoid a heavy and overbearing feel to the house, there are height variations on the roof line to give hierarchy to the main spaces. Both the proportions of the roof, the form and the pitch has been carefully designed to suit the proportionality of the main volume below.

The glass dome is the centre of the roof is not only an architectural feature that lights up the central atrium, but its apertures that can be opened when required for ventilation. The glass dome was inspired by the Keats House in Hampstead and provides an elegant architectural feature that brings an abundance of light into the central atrium.

The clay tiles are made from recycled material that gives a more textured weathered feel that softens the overall appearance of the house.

BASEMENT PLANS

Scale 1:200



PROPOSED LOWER GROUND FLOOR (-1)

The central atrium staircase is the main circulation throughout the house and is the main accessway that brings you down to the basement level, where the space is organised into 3 major zones.

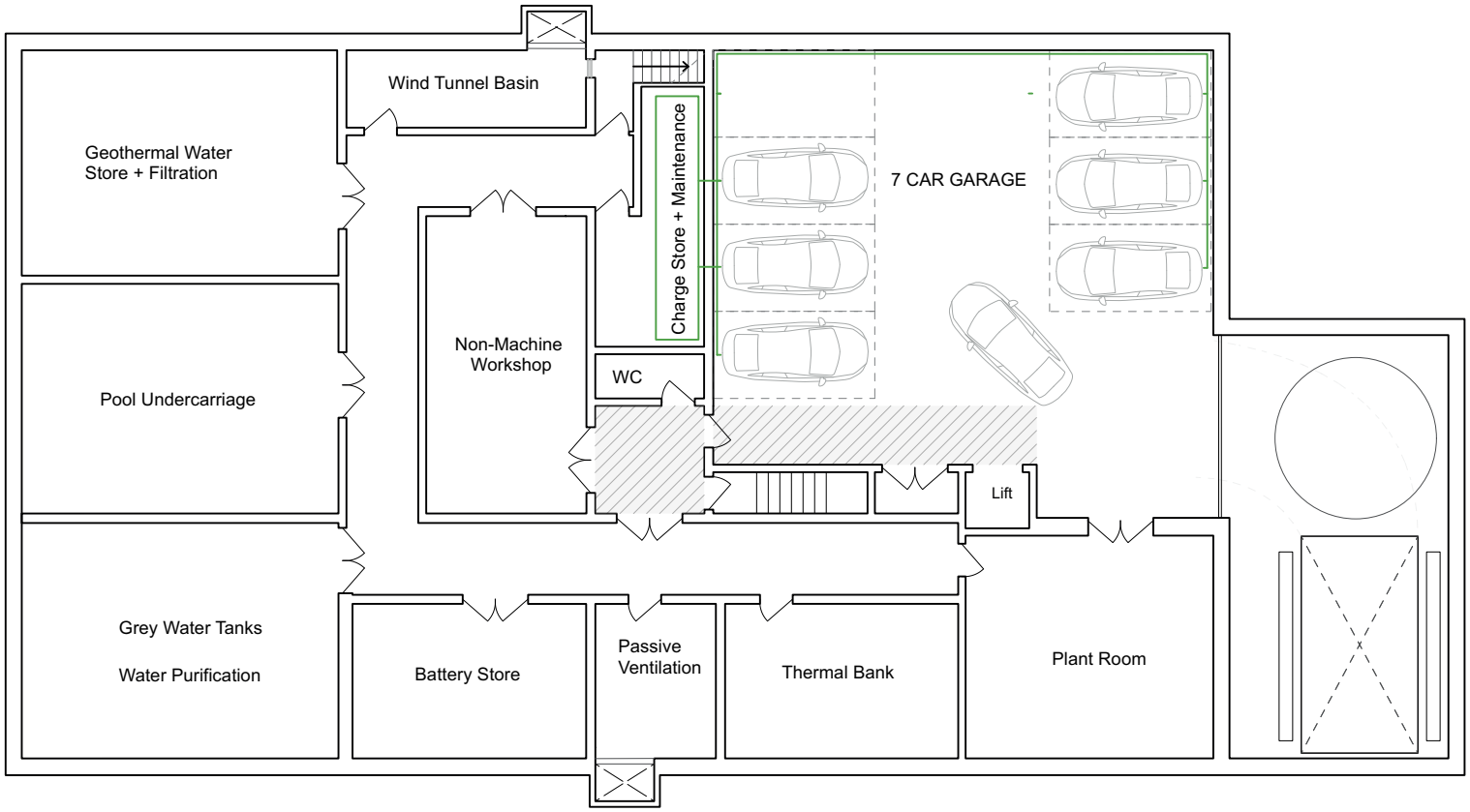
To the north and north east side of the basement are the staff areas. Here a catering kitchen and generous staff accommodation have generous light wells, ensuring that those working and living in the house have natural light and outside areas in all spaces. The catering kitchen has a service lift connection with the formal dining room upstairs.

To the south and south east are the recreational spaces including a snooker room + club room, business board room and a cinema. To the west is the spa area including a geothermal swimming pool, spa facilities, sports and massage area. This will be one of the most beautiful areas of the house, with the leisure area having direct access to a lower garden designed as a sunken courtyard that can be accessed directly from the spa area or the garden upstairs. This provides both a beautiful view onto a outdoor space landscaped with a small pond and plants as well as bringing a lot of sunlight into the spa area.

The large arched doors can be opened in warmer weather to allow cross ventilation. The lower pond not only features as a beautiful reflection point, but serves to collect rainwater that will funnel into the grey water filtration system one level below. In the summer, the pond and greenery will help with passive cooling through evapotranspiration, a natural strategy that has been used in hot countries for centuries. This systems is supplemented by the wind towers to the north and south sides of the building.

BASEMENT PLANS

Scale 1:200



PROPOSED SERVICE BASEMENT (-2)

The service basement area is accessed by a staircase leading from the central atrium to the service corridor. From here the garage, workshop or plant and service areas can be accessed. To the west of the basement area are the wet spaces; the pool undercarriage, located directly under the pool, is flanked on either side by geothermal water store, as well as the grey water collection and filtration system, which is fed in from the "wild" pond in the garden and the smaller reflection pond in the sunken courtyard.

The south side of the -2 basement houses the main service facilities. The battery store has a state-of-the art electricity storage capacity that holds energy collected from the photovoltaic array on the roof through to darker seasons. The thermal bank stores cold temperatures collected from the outside air in winter until it can be used in the summer, and hot temperatures collected from geothermal sources and as the residual heat from the service equipment, which can be employed to heat spaces in winter.

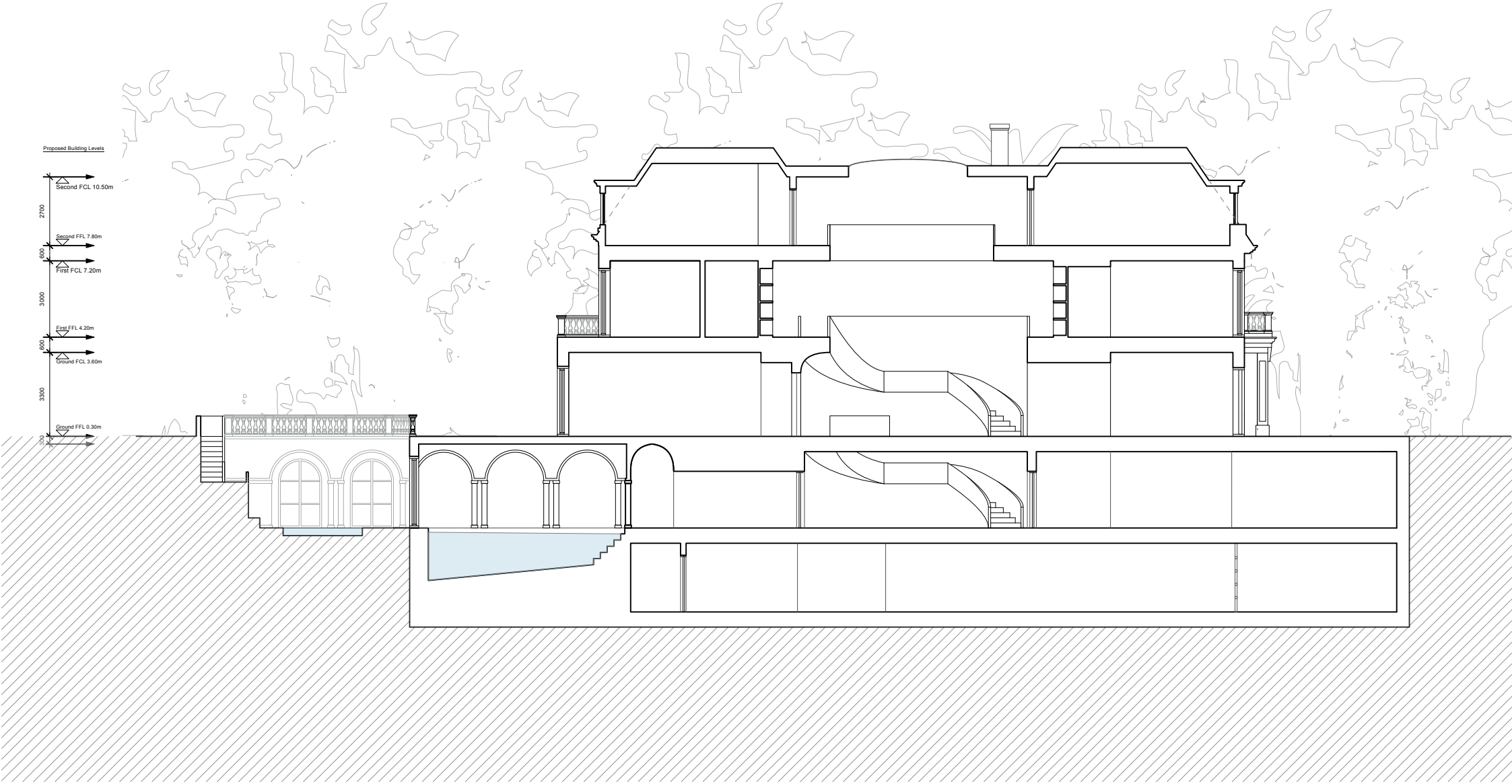
A thermal bank functions like a temperature battery. This means that unwanted residual excess energy in the form of heat and cold do not infiltrate in the internal spaces at the wrong times (heat in summer and cold in winter), which would require more extensive and energy intensive heating and air-conditioning systems. Instead this excess temperature would be captured and stored to avoid overheating/cooling, and then used as part of the heating and cooling system when needed.

The plant room can be accessed by both the service corridor or the garage. The passive ventilation strategy employs wind towers, inspired by the ones used in Yazd, Iran for centuries as a cooling measure. At the base, a water filled basin helps cool the air being pulled in from the vents connecting to the garden, bringing fresh, cool air through the wind tunnel "chimneys" and cooling the internal areas upstairs. In summer, these vents are closed at the base and at the top, making sure there is no fabric heat loss. This strategy reinterprets the chimney of today, and instead of burning fossil fuels, it celebrates the properties of thermodynamics as a source of cooling.

The seven car garage is accessed via a car lift. All cars will have 3-phase ultra fast e-charging points, and the car lift will be powered by renewable sources. The back wall of the parking will store the battery charging facilities and will be flanked by a workshop area. A fire escape is located on the north side of the building.

B. Proposed Section

SECTION
Scale 1:200



C. Proposed Elevations

i. Facade

Currently the entrance of Sproughton leads you between two gate posts and along a curved road that splits the garden, rendering one corner unused and forgotten. The road curves around to what is seemingly the back of the house, but where the front entrance is. At no point is there a good vantage point where one can view and admire the house. The current road has been damaged and lifted as the great oak trees have grown, and this road is now also damaging one of the great oak trees. For this proposal, the entrance of the house has been moved to the east face of the house so that upon entering the gates onto the estate, one is met with a fabulous aspect of the house. The road has been moved so as to curve along the periphery of the north east garden, returning the previously split and unused garden to the rest of the green space and giving the house a beautiful and verdant frontage. This also allows for the beautiful mature oaks to have space to grow and be healthy.

The building is two stories above ground with a roof space, plus a two level basement. The hipped form of the main roof is reflective of the predominant roof form found on Courtenay Avenue, with height variations and dormer windows to give variation to the volume.

The soft white rendered facade is detailed with simple ornamentation in the form of architraves around the windows, a string course to break up the volume and simple moulding of the cornice that creates a definitive line between the roof and the main volume. The external front door is hardwood timber-framed with a simple yet classical portico with orthogonal columns. Window frames, doors and the fine metalwork on the balconies and pagoda-inspired conservatory are all featured in black to give a fine yet striking contrast to the heavier, solid volume.

Stone balustrades are featured on the front, south side and rear balconies that sit only atop solid walls, whilst cantilevered balconies and Juliet balconies all have fine black metalwork. The differentiation of balustrades was designed to break up the rhythm of the façade, whilst ensuring that the building remains elegant and simple to read.

To the south side, the winter garden is protected by a fine pagoda style awning, inspired by the one found at Kenwood House. The glazed roof that extends over the conservatory bathes the internal spaces with light. This feature of the house was designed to celebrate movement through the interior, playing with views and light. In terms of internal sequencing of spaces, upon entering the house, you move through the entrance hall through an arched doorway and into the light-filled high central atrium space. From there, the light coming through the south face to the left of the atrium, and pulls you through the central space where you turn and look directly into the garden and curated water feature.

It is, however, the rear face of the house that responds most to the gardens. The grand room features three grandiose arched doorways that open onto the patio and onto the uninterrupted views of the beautiful, extensive gardens. The orientation of the house means that the social and dining spaces will enjoy the afternoon sun and sunset. The central space is designed to open up to the garden, blurring the interior and exterior boundary.

Beyond the patio is a sunken courtyard that is accessed from the garden side via a feature double flanked staircase. This variation of height and space not only serves the function of bringing natural light into the lower level swimming and fitness area, but also brings diversity and delight to the garden landscape and topography. The courtyard will be verdant and green, with a central pond. Arched doorways along the lower level semi-circular curved courtyard walls are a continuation of the ground floor fenestrative style, framing the views from the spa to the courtyard, whilst being an attractive facade when viewed from the garden.

COMPARATIVE SITE ELEVATIONS

Scale 1:350



PROPOSED SOUTH ELEVATION



EXISTING SOUTH ELEVATION

COMPARATIVE SITE ELEVATIONS

Scale 1:350



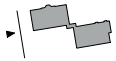
East Elevation



PROPOSED EAST ELEVATION



East Elevation



EXISTING EAST ELEVATION



Proposed Front Elevation



Proposed South Side Elevation



Proposed Rear Elevation



Proposed North Side Elevation



Figure 59. Rendered view of the front (south/east corner) when entering the site.



Figure 60. Rendered view from the back garden at night.