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15a Parliament Hill
Sustainable Design Summary
04.05.2019

The Site

- The new house at 15a Parliament Hill has an unusual site which is both wedge and hour-glass shaped. It is made up of the left-over space between the end of two terraces and has a large back garden. The site is on the inside of an oblique turn in the road of Parliament Hill.
- The previous house on the site was a garage which had been converted into a house in the 1970's. The building was small and made inefficient use of the site. It had solid wall construction and no insulation or double glazing.
- The site is within the South Hill Park Conservation Area and a range of historic and contextual planning issues were critical considerations to the design. Proximate neighbouring houses and flats also raised important and complex planning issues regarding overlooking, loss of privacy, and loss of light.
- Although no protected species were identified on the site, a number of trees required protection and the broader ecological setting and proximity to Hampstead Heath were important considerations.
- The new house attempts to respond sensitively to the immediate setting to create an appropriate & broadly sustainable house & pattern of life in a building with a long design life.

Management of the Construction Site

Construction Site Waste Management Plan
- A Site Waste Management Plan was maintained by the builder.
- The SWMP included procedures and commitments for reducing waste generated on site in accordance with the best practice, and to sort and divert waste from landfill (reuse, recycle, compost or otherwise recover).
- On and off site procedures diverted and sorted 50% of waste.

Construction Site Impacts
- On site the builder undertook best practice policies in respect of water (ground & surface) pollution..
- The builder undertook best practice policies in respect of air (dust) pollution arisings from the works.

Considerate Constructors Scheme
- The builder has achieved an average score of 34 under the Considerate Contractors Scheme (See attached).

Pre-Development Site Photo

14 Parliament Hill 15a Parliament Hill 15 Parliament Hill

Pre-Development Site Plan

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Summary of Sustainable Design Principles & Details

The following is based on the original Code for Sustainable Homes pre-assessment prepared for the original planning permission. Other sustainable features and characteristics of the building are also detailed. Related documents are attached.

Environmental Impact of Materials

- The materials used in the building fabric construction provide the following Green Guide Ratings:
- Windows: A, painted timber
- Roof: A, timber rafters with plywood deck and zinc roof
- External Walls: A, plaster on lightweight thermal block, insulation between timber studs, battens and clay hanging tile
- External Party Wall: A, lightweight thermal block & insulation
- Ground Floor: A, reinforced concrete beam and block
- Upper Floors: A, timber joist with plywood deck

Responsibly Sourced Materials: Basic Building Elements

- 80% of the materials used in the following key basic building elements was responsibly sourced: frame, ground floor, upper floors (including separating floors), roof, external walls, internal walls, foundations and substructures (excluding sub-base), staircase
- 100% of the timber used in the in these elements was legally sourced.

Responsibly Sourced Materials: Finishing Elements

- 80% of the materials used in the following finishing elements was responsibly sourced: stair, window, upper floors (including separating floors), external and internal doors, skirting, panelling, furniture, facias
- 100% of the timber used in the in these elements was legally sourced.

Global Warming Potential of Insulants

- All insulating materials to roofs, floors, walls, and doors (internal and external, including acoustic insulation), and hot and cold water cylinders and tanks, and pipes have a GWP of less than 5.

Sound Insulation

- For the purposes of the Building Regulations the house is ‘detached’. Its walls are independent of the adjacent properties, and this provides very good levels of sound insulation and separation.
- Note that one room within the new house (a portion of the kitchen) sits within the volume of the adjacent house at 15 Parliament Hill. This unusual arrangement is an historical anomaly in the demise of the previous house on the site. The Building Regulations considers this room in the new house separately. Work to it is deemed an ‘alteration’. All the original separating wall construction to the neighbouring housed has been retained, and a new physically separate wall, floor and ceiling has been added. This has substantially improved the sound separation with the adjacent house, but a small portion of shared structure (ie. steel a column and beam) was circumstantially necessary. It is therefore not possible to describe the house as fully ‘detached.’

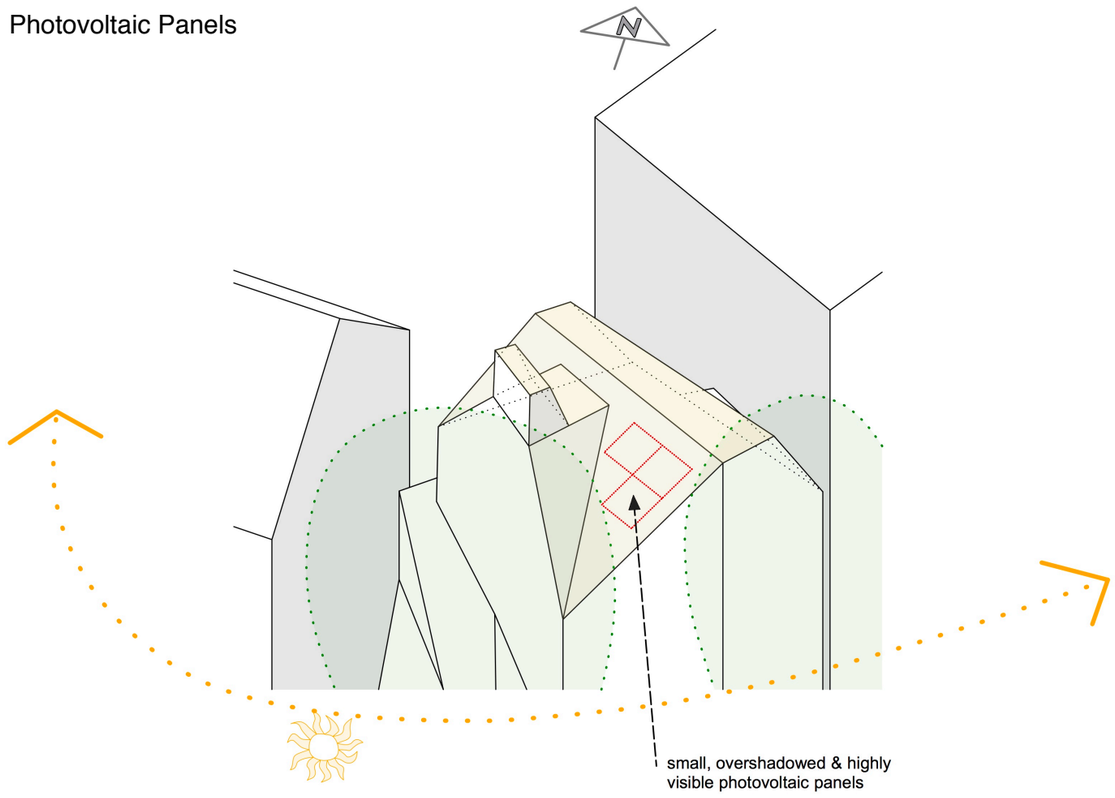
NO x Emissions

- Atag Q Series Solo System Boiler (SEDBUK A rated) is NOx Class 5 (to EN483) under 70 mg/kWh.

Photovoltaic Panels

- PV suppliers were contacted and the size, form, exposure, and orientation of the roof was reviewed.
- The pitched and gabled profile of the new roof is complex. The shape relates directly to the historic roof form found on surrounding semi-detached houses to the north and east of the new house. A simpler roof form would not have been as contextually appropriate and this was critical to the planning permission.
- The fitting of PV panels to the new house is compromised by the complexity and orientation of the roof. Very few panels can be accommodated and their angle and orientation would be inefficient. The system would be small and its relative performance poor. This significantly reduces the sustainable environmental benefits of a PV system for the house.

Photovoltaic Panels



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- The preferred south and west facing roofs of the house are also the most visually conspicuous. PV panels would be prominent and visible from the street below. The visual impact of the panels on the Conservation Area would be considerable.
- It was concluded that PV panels would have a relatively high visual impact in an historically sensitive area. The sustainable environmental benefits would be relatively small. PV panels were therefore not incorporated and greater investment was allocated to other sustainable strategies.

Air & Ground Source Heat Pumps

- High levels of insulation and air tightness, and an underfloor heating system in the new house suggested that an air or ground source heat pump would be ideal.
- A passive cooling and ventilation system was proposed for the new house and at some considerable cost. The ability to cool the house with an air or ground source system was therefore not considered relevant, and this lessened the advantages of a heat pump system.
- A ground source borehole was considered, but no practical location could be found for the borehole. The front area is small and compromised by both existing trees and the tree sensitive, micro-pile foundations to the new house. Access is not possible to the back garden for a large drilling rig. Smaller drilling rigs would add to the cost of a relatively expensive system. Existing trees and a flood relief tunnel under the rear garden (although at some depth) presented further complexities.
- Air source heat pumps were considered in detail and suppliers where consulted. Space for the unit at the front of the house was inadequate and at the back a lengthy insulated pipe would be required to distance the unit from the house given the narrowness of the curtilage. The length of the pipe made the system more costly and less efficient.
- Noise from an air source heat pump system was an important consideration. The pump produces significant noise and in winter runs almost continuously. Surrounding development is relatively dense and existing ambient noise levels are relatively low. Acoustic housing and baffling could be formed, but this would increase the size and cost of the unit. Given the proximities of adjacent houses and other circumstances it is likely that even with acoustic tempering the sound of the pumps would cause disturbance. The risk would be particularly significant at night when ambient noise levels are especially low and sensitivity to noise is high. Consultation with neighbours confirmed these concerns. One neighbour noted that many bedrooms face onto the back garden.
- It was concluded that given the site circumstances a ground source heat pump was not practically possible and an air source heat pump would create significant noise disturbance to neighbours. A heat pump was therefore not incorporated and greater investment was allocated to other sustainable strategies.

Heat Recovery Ventilation

- The bathrooms generally, and all the habitable rooms of the basement are fitted with high efficiency, through-wall heat recovery ventilation systems.

Heat Gain Risk, Passive Ventilation & Cooling

- The risk of the house overheating in summer due to solar gains generally, and in particular due to the large southeast facing front elevation, was considered early in the development of the design. A number of precautions and strategies to use passive means to control the risk were developed.
- The following design stratagems were adopted for the southeast facing elevation:

– The total overall glazing area was carefully considered to balance natural daylight levels, and winter solar gains against the risk of possible summer overheating. In simple colloquial terms, the total window area on the large southeast facing elevation is neither too small nor too large.

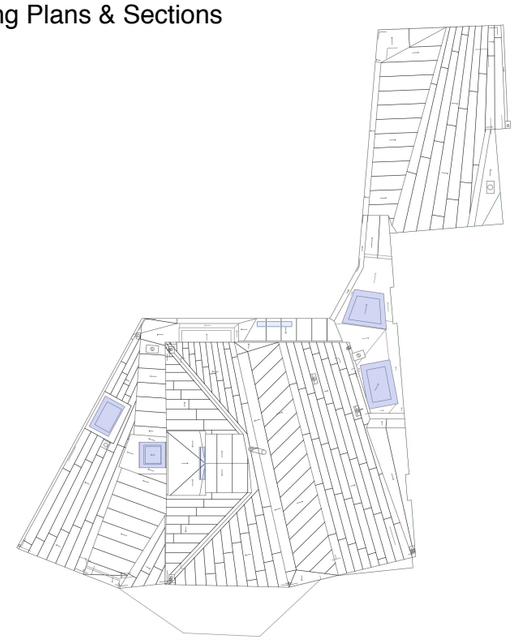
–'Window walls', horizontal-strip windows, and floor-to-ceiling windows were considered inappropriate as these are 'blanket' solutions which provide a lot of light which would increase the risk of overheating.

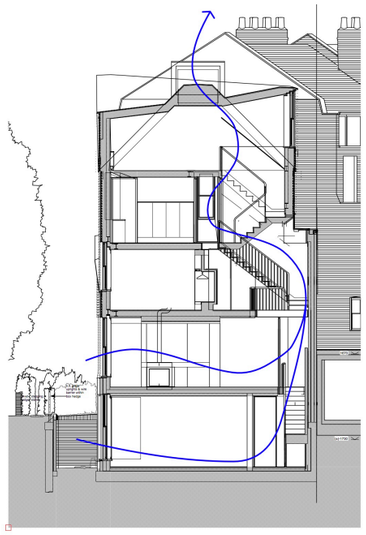
– It was determined that a good distribution of conventionally sized, 'hole-in-the-wall' windows would help to lessen the risk of overheating while providing good light levels across the full depth of multiple rooms.

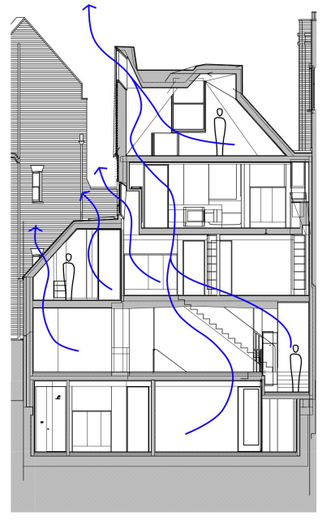
- A passive ventilation strategy was developed to serve all the habitable rooms of the house with a range of approaches including passive fabric (thermal wall), active occupant (ie. blinds & windows), and automatic controls (thermal sensor driven).

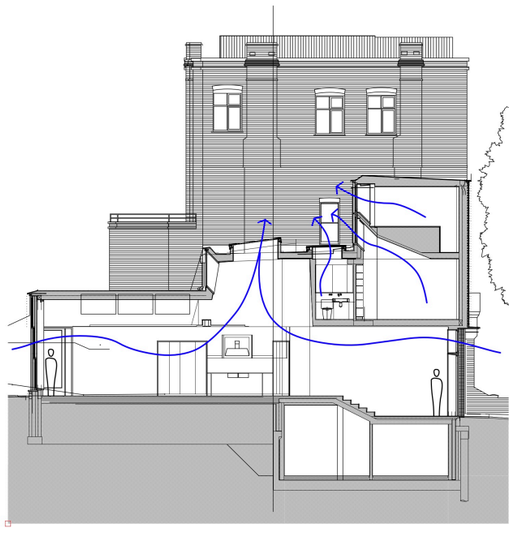
The contextually appropriate and environmentally effective and simple vertically sliding sash window was chosen for a number of reasons:

Passive Ventilation & Cooling Plans & Sections









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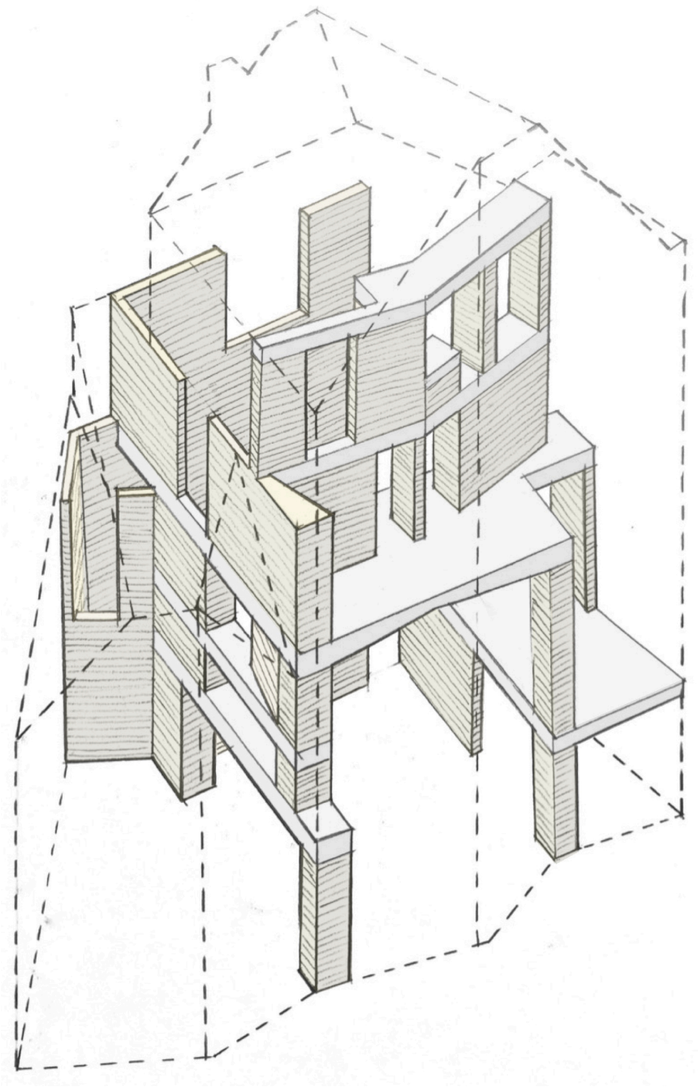
– Vertically sliding sash windows allow a choice between high-level ventilation alone or in combination with low level ventilation for increased stack effect (ie cool air enters at the bottom of an open window, and hot air leaves through the top).
– Vertically sliding sash windows do not intrude into the room and can be used in combination with internal solar reflective blinds.
– Used in combination with sash locks a vertically sliding window can be left slightly open for ventilation without compromising security. They will also not let in rain in case of the typical unexpected hot weather, solar driven summer downpour.

- Two carefully placed high level windows drive the passive stack effect ventilation of all the habitable rooms of the house with air rising through the main staircase. The windows open automatically via easily adjustable thermostatically controlled sensors (with manual over-ride).
- A similar, but separate system in the kitchen uses a single automatically opening high level roof light which is also controlled via easily adjustable thermostatic sensors (with manual over-ride).
- In both cases 'make-up-air' is provided through adjustable trickle vents and by raising the bottom sashes of the windows to the relevant rooms.
- All the habitable rooms of the house except those in the basement (see note below) also have cross ventilation. This was a primary ambition from the outset of the design. It was achieved through very careful design despite the very awkward site plan which prevents the formation of any ground floor windows along both sides and most of the back elevation.
- Two of the first floor bedrooms have high level clerestory windows which reach up into the space of the second floor. Ventilation to these bedroom is passively driven by stack effect and the high level windows have automatic opening and closing controls with manual override.
- In the basement bedroom and family room cross-ventilation can be achieved via the main staircase by leaving open the main internal doors to the relevant rooms. The doors have been undercut by 20 mm to allow some cross ventilation when closed.

Thermal Stability and Embodied Energy

- Early in the design development a wall and floor construction was sought which would provide good thermal mass and thermal stability to compliment the passive ventilation and cooling design.
- It was also understood that the embodied energy in a high thermal mass structure might contradict its other environmental advantages.
- The most efficient and effective environmental use of thermal mass would derive from a construction which was configured as follows:
- – As much as possible of the thermal mass is placed on the inside of the insulated envelope where it works to dampen temperature changes and stabilise the internal temperature.
- – The surface of the thermal mass (ie. masonry) is directly exposed to the interior of the house for the most direct and immediate heat transfer.
- With this criteria cavity wall construction is a less ideal form of construction because half of the thermal mass is placed outside of the insulated envelope. The chosen wall construction uses a primary internal structural wall construction of 140 mm of lightweight block with plaster. This block work is clad external with full-fill insulation between timber stud-work and battens and hanging tiles.
- This buildup uses less masonry than a typical brick and block cavity wall (±200 mm minimum) and therefore has less embodied energy. It also places almost all of the masonry thermal mass inside of the insulation where it is best placed to stabilise the internal temperature of the house.
- To add further thermal stability a white brick and reinforced concrete structural core or 'chimney' rises through the house. In many cases this is only one brick thick, but at least one internal wall of white brick features in all the habitable rooms of the house except the attic. The mass of the exposed internal brick wall & reinforced concrete core contributes further to the thermal stability of the house.
- The masonry core also reduces the overall structural floor spans generally and the extent and size of structural steelwork required in the construction. The use of timber joists generally helps to lower the overall embodied energy of the building fabric.
- It is noteworthy that the CSH criteria is piecemeal in its recognition of these important contributions to the sustainability of the house.

Brick & Concrete Core



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Dwelling Emission Rate (Details attached)
- SAP Environmental Efficiency Rating: 'Very energy efficient- lower running costs' 89 B
- Environmental Impact (CO2) Rating: 'Very environmentally friendly- lower CO2 emissions' 87 B
- Dwelling Fabric Energy Efficiency (DFEE) 12.12 kgCO2/m2 (This is 22% better than building regulations)
- Dwelling Carbon Dioxide Emission Rate (DER) 11.69 kgCO2/m2 (This is 3.5% better than building regulations)

Fabric Energy Efficiency (Details attached)
- Target Fabric Energy Efficiency (TFEE): 49.98 kWh/m2/yr
- Dwelling Fabric Energy Efficiency (DFEE): 38.98 kWh/m2/yr

Energy Display Devices
- Electric and primary fuel monitors are provided.

Energy Labelled White Goods
- Fridge/Freezer: Bosch KGN49AI30G, rated A++
- Dishwasher: Miele G 6060SCVi Jubilee, rated A+++
- Washing Machine: Samsung WF0804X8E E, rated A+++
- Tumble Dryer: Miele TDB230WP Active, A++

Low Energy Electric Lighting
- More than 75% of the light fittings are low energy and use energy efficient lamps that achieve greater than 40 lumens per circuit watt.

Daylighting
- Despite the complex and compromised site circumstances good daylighting (daylight factor greater than 2%) is achieved in all habitable rooms of the house including the Kitchen, Living Room, and Home Office.
- 80% of all the working plane in the Kitchen, Living, and Dining Rooms achieves direct light from the sky.

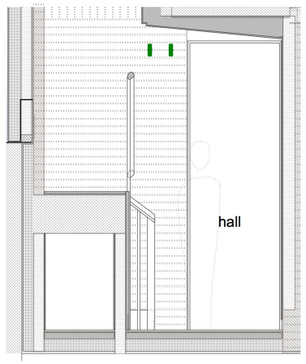
External Lighting
- All external space lighting is provided by energy efficient fittings
- Security Lighting: All security light fittings are designed for energy efficiency and are adequately controlled. No burglar security lights are fitted.
- All movement detecting control devices (PIR's) have daylight cut off sensors.
- All external lighting is bat sensitive. It is low wattage, at a low level, and it is directed downward.
- All PIR's are on short timers and are only sensitive to large moving objects.

Indoor Water Use
- Water Calculator: A very efficient total consumption (Part G) of 100.96 l/p/day is calculated (Details attached).

Outdoor Water Use
- A water butt on a base, connected to a down pipe with overflow (removable for cleaning) is provided.

Permanent Drying Space
- Internal, Basement Clothes Line: 10 metres (with controllable background ventilation)
- Externally, Back Garden Clothes Line: 15 metres

Basement Clothes Line



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Flood Risk
- The site is in Zone 1 and is at low risk of flooding.

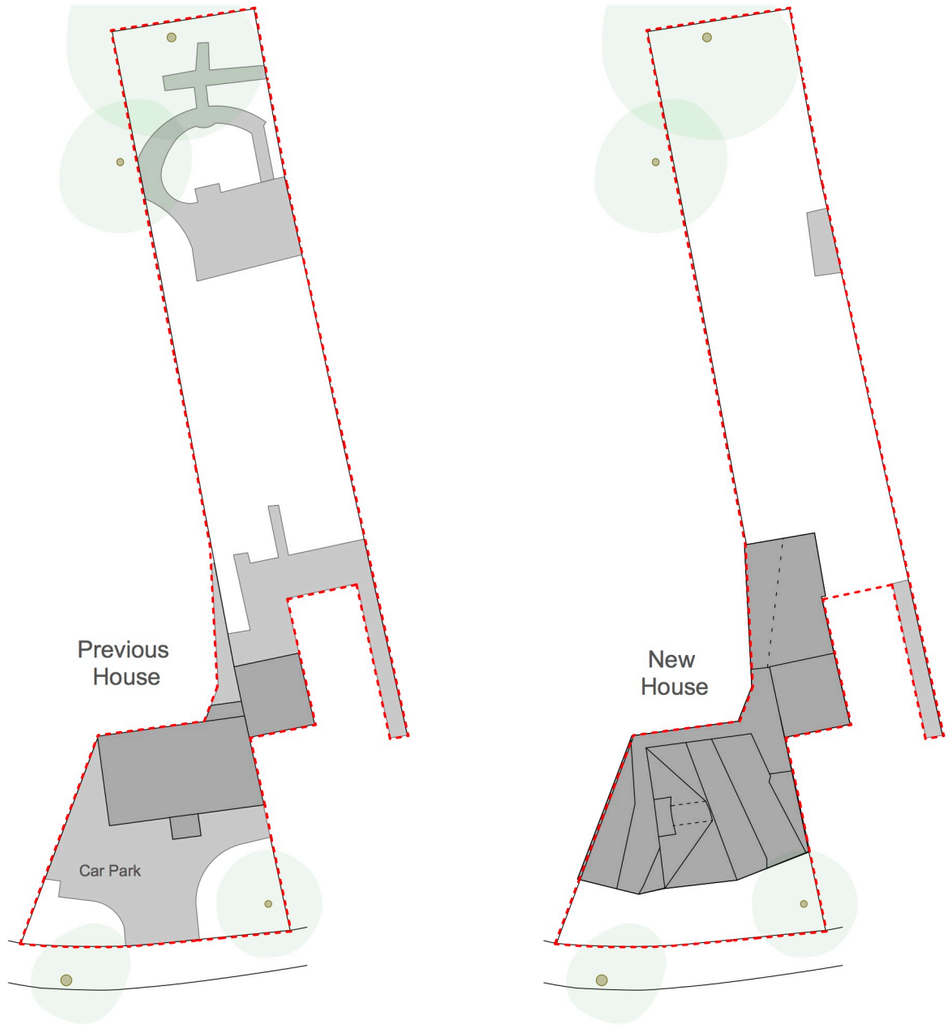
On Site Car Parking
- Prior to development the site provide off street parking for two cars in the front garden area on a large impervious paved area with mains drainage.

Building Footprint
- The creation of a small building footprint was contradicted by the unusual hour-glass shaped site.
- Planning constraints also set strict limitations on the depth of the basement and the overall building height.
- A good building footprint to internal area ratio has nonetheless been achieved. The ration of the Net Internal Floor Area to the Net Ground Floor Area is 2.9 to 1.

Management of Surface Water Run-Off from Development
- Comparison of pre- and post-construction impervious area shows a reduction of almost 20%:
– Total Site Area: 470.163 sq m
– Pre-Development Impervious Area: 212.333 sq m.
– Post-Development Impervious Area: 171.742 sq m.
- The reduction was achieved through the removal of a large impervious paved car parking area and terrace to the front and by the removal of impervious paved terraces to the back garden. The site no longer provides off street parking and new paved areas use SUDS construction.
- All drainage pipes are a minimum of 100 mm diameter.
- To dampen storm surge flows the rear elevation rainwater down pipe is fed into an oversized underground rainwater pipe which holds over 5000 litres prior to discharging into the drains. This dampens rainwater surges to the mains drain from over 40% of the roof area.
- A 200 litre rainwater butt also dampens flow from the roof to the drains.
- A 150 - 250 mm granular sub-base to the external SUDS paving acts as a reservoir for storm water.

Ecological Value of the Site
- The construction zone (area used for buildings, hardstanding, landscaping, & site access) is of low ecological value (ie. It has either already been built upon or is covered in hardstandings or paved terraces). A comparison of the pre and post construction zone areas shows that the total area was reduced.
- The advice of an arboriculturalist was sought and reports and recommendations were made and followed.
- Tree protection procedures in accordance with BS5837 “Trees in Relation to Construction” were undertaken. This included root protection zones and enclosures, etc.
- The following mature trees of ecological value on the site were protected:
– Silver Birch (Betula), front garden
– Apple (Malus), rear garden
– Sycamore (Acer Pseudoplatanus) rear garden boundary
- A Lime Tree (Tilia) within the front pavement adjacent to the house was protected.
- Procedures to ensure the protection of a Sycamore (Acer Pseudoplatanus) and an Ash (Fraxinus) in adjacent rear gardens were undertaken. These trees were outside of the construction zone.
- No known protected species are present on the site, but owls and bats are known to visit the area.
- The following bat and owl friendly external lighting parameters were followed:
– Lighting is of low wattage, and level, and is downward pointed.
– Security lighting is on short timers and is only sensitive to large moving objects.
- Two bat boxes were installed in the rear garden.
- A stag beetle log pile has been formed in the rear garden with 10 cm diameter bark covered logs from native broad leaved trees.
- The floral species present on the site prior to development were not very diverse nor did they contain many native species. Primary habitat on the site is provided by the existing mature trees and these have been retained.

Impervious Area



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- The overall impervious ground across the site will be reduced by about 20% as a result of the development. This is ecologically beneficial.
- A planting plan has been developed using a wide range of native species including trees, hedges, shrubs, climbers, wildflowers, and a meadow grass margin. The overall floral diversity of the site is increased with additional and improved habitats an an improved overall ecological value.

Cycle Storage
- Adequate, weatherproof and secure storage for 4 bicycles is provided in a fully enclosed solid structure with convenient access and a permanent lock to BS3621:2004.
- More than 1 m2 of garden tool storage is provided.

Composting
- Accessible composting is available on and off the site.
- 2 no. concrete plank lined enclosures (560 w x 1200 d x 1500 h) in the rear garden provide a volume of over 2 cubic metres for composting.

Internal Storage of Non-Recyclable Waste and Recyclable Waste
- A 40 litre storage bin is provide with adequate internal space.
- Mixed Recycling: 1 no. x 42 litre bin
- Non-Recyclable Household Rubbish: 1 no. x 28 litre bin
- Food Waste: 1 no. x 10 litre bin

External Waste Storage
- Sited on a hard level surface and accessible to disabled people.
- Mixed Recycling: 1 no. x 240 litre Euro bin
- Non-Recyclable Household Rubbish: 1 no. x 140 litre Euro bin
- Food Waste: 2 no. x 23 litre food waste caddy

Home Office
- The attic level is a home office with more than 1.8 m wall length, 2 double sockets, 2 telephone lines, windows (with daylight factor greater than 1.5%), and with adequate ventilation (greater than 0.5 m2 opening).

Private Space
- Ample, accessible, outdoor private space is provided.

Security
- The recommendations for Crime Prevention in Design were followed.
- Security locks, bolts, & glazing beyond the requirements of the building regulations were undertaken.

Lifetime Homes Standards
- The house complies with all 16 Design Criteria of the Lifetime Homes Standards (from 5 July 2010).
- More details are given in the ‘Llifetime Homes Standards Summary’ included with this application.

Adaptability & Occupancy
- The importance of adaptability and overall occupancy to the sustainability of the house was carefully considered in the design.
- Several alternative living configurations have been developed for the house and the relevant services and plumbing runs have been installed.
- More details are given in the ‘Flexibility / Adaptability Summary included with this application.

Home User Guide
- A Home User Guide is provided in accessible alternative formats. It includes details on environmental strategy/design features, energy, water use, recycling and waste, sustainable DIY, emergency information, links, references, and further information, sustainable urban drainage systems, public transport, local amenities, and responsible purchasing.

Back Garden Section & Plan