

156 West End Lane Hampstead

- Green roof report and specification



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1. INTRODUCTION

The Green infrastructure consultancy (GIC) for the Ecology Consultancy Ltd and on behalf of Astir Living have been commissioned to prepare a green roof report and specification to meet the relevant planning condition (see below).

The purpose of this report is to ensure that the green roofs are designed, specified and implemented in line with Condition 13 of planning permission 2019/4140/P by the London Borough of Camden.

The report provides a specification for the green roofs that is inline both the Camden Biodiversity Action Plan (CBAP) 'Living roofs and walls guidance note and with the Buglife - the Invertebrate Charity's green roof guidance and in line with the approach as outlined in the GLA's 'Living roofs and walls: Technical report to support the London Plan (2008). The roof specified is a biodiverse extensive green roofs as outlined in the CBAP guidance note.

2. PLANNING CONDITION

The report and specification addresses the planning condition 13:

Condition 13 - Prior to the commencement of works on site, other than demolition site clearance and preparation full details of biodiverse, substrate-based extensive living roofs in the areas indicated on the approved roof plans shall be submitted to and approved in writing by the local planning authority. The design and planting scheme should seek to maximise potential to enhance the strategic wildlife corridor and should reflect the local conditions and species of interest. The development shall not be carried out otherwise than in accordance with the details thus approved and shall be fully implemented before the development is first occupied.

Reason: in order to ensure the development undertake reasonable measures to take account of biodiversity and the water environment in accordance with policies A3 (Biodiversity) and CC3 (Water and flooding) of the London Borough of Camden Local Plan 2017.

3.ECOLOGICAL MITIGATION

The provision of green roofs (biodiverse) at 156 West End Lane will have a number of positive impacts on ecology in the immediate and wider area. It also meets the 'built structures' priority habitat in the London BAP and the details within 'Action Plan 2: Built Environment' within Camden's BAP (2013-2018).

The design aims specifically to target invertebrates species associated with open-mosaic habitat and brownfield land. In addition, the planting and seeding of the green roof will have a positive impact on a range of pollinator species.

The green roof will have a positive impact on a number of species present in the general area:

- Presence of logs will provide nesting habitat for a number of solitary bees that are likely to be present in the immediate and wider area.
- Clay sand piles will potentially support a number of other solitary wasp and bee species that are present in the general area and benefit a range of invertebrates associated with dry grassland habitat in the immediate area.

In accordance with the requirements of Condition 19, the scheme includes **1,500m²** of biodiverse roofs (see appendix 2).

4. STRUCTURAL CAPACITY OF THE ROOF

It is imperative that to meet the planning condition, that the roof (s) in question have a structural capacity to allow the required green roof to be installed. The maximum depth of the substrate is 150mm which will require a structural capacity to take 250kg/m² saturated. Whilst there are many systems that are lighter than this, there would not be in keeping with the condition.

5. GREEN ROOF (BIODIVERSE) SPECIFICATION

5.1

Root protection

It is imperative that the waterproofing layer is suitably root protected in order for it to be used beneath a green roof

5.2

Protection layer (warm roof)

A non-woven geotextile layer should be installed above the waterproofing on a warm roof build-up. This is not required on an inverted roof system. The geotextile should also be puncture resistant.

5.3

Drainage layer

The drainage layer is installed onto the protection layer (warm roof) or the insulation)inverted roof. This element should be at least a 20-25mm bicuspate or similar equivalent product in terms of performance. This layer provides moisture to the plants and soils above whilst also allowing excess water to laterally drain.

5.4

Filter sheet

Most drainage layers (5.3) come with the filter sheet attached. Where this is not the case an appropriate filter sheet should be laid across the drainage layer. This sheet allows free movement of water and restricts the movement of substrate fines from the substrate layer.

5.5

Solar mounts

Solar biodiverse green roofs are best installed using an integrated 'biosolar' system as opposed a non-integrated system.

5.6

Substrate layer

A green roof substrate that supports wildflowers will be installed at a varied depth of 80mm - 150mm across the whole green roof area. At least two thirds of the roof will be at a depth of 150mm. It is recommended that substrate at 150mm is created directly behind the solar panels. The varied topography is important as this will allow wildflower species variation across the roof. Low growing vegetation will take root in the lower areas whilst the deeper depths will allow species to dominate that require more substrate. In turn shallower depths will allow invertebrates associated with barer soils to benefit from the green roofs.

5.7

Vegetation layer

The vegetation layer will be created through seeding and planting. The total species density per m² will be between 15 - 20 species. No blankets or mats will be used.

5.7.1

Wildflowers

Wildflower plugs from the list on page 9 will be planted at 12 plugs per square metre. Planting should be undertaken in the autumn or early spring (mid-winter months should be avoided). If planted in summer time irrigation will be required to ensure that the wildflower plugs root in and become established.

5.7.2

Wildflower seeds

Wildflowers will be sown onto the green roof substrate. There are two mixes to be sown - living roofs mix (LRM) and special cornfield annual (SCA) mix. LRM should be sown at 4gm/m² and SCA at 2gm/m².

5.7.3

Sedum cuttings

In addition to the wildflower plugs and seeds, sedum cuttings will be spread across the roof at rate of 10 cuttings per square metre.

5.8.1

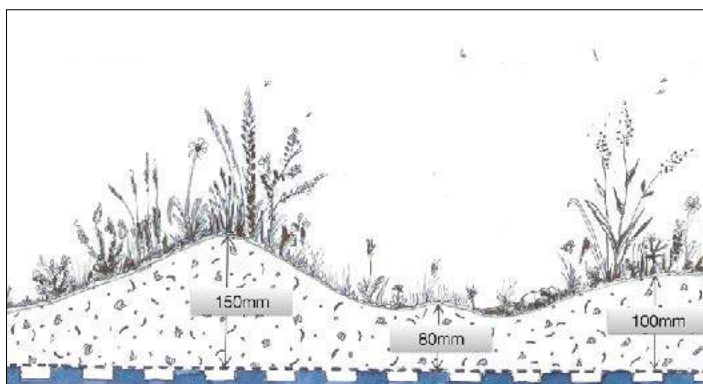
Additional features - logs

A number of logs and log piles will be added to the surface of the green roof to provide additional habitat for invertebrate species to shelter and nest within.

5.8.2

Additional features - sand piles

A number small **clay sand** will be installed onto the green roof. Due to weight consideration, these will need to be installed around the perimeter of the green roof (not on the shingle boundary. They should be at least 250mm deep and with a diameter of approximately 500mm. There should be at least 10 per 100m². It is imperative that the sand used is not sand ballast or fine sand but **clay sand** (type used to create mortar for brick work.



Cross section of green roof showing topography of the green roof substrate



Logs and clay sand mound on a green roof

6. PLANT SPECIES

Living roofs mix (LRM)	English name	Special Cornflower Annual (SCA)	English Name
Agrimonia eupatoria	Agrimony	Adonis annua	Pheasant's-eye
Hippocrepis comosa	Horseshoe Vetch	Anagallis arvensis	Scarlet Pimpernel
Anthyllis vulneraria	Kidney Vetch	Anthemis arvensis	Corn Chamomile
Centaurea nigra	Common Knapweed	Centaurea cyanus	Cornflower
Galium verum	Lady's Bedstraw	Chrysanthemum segetum	Corn Marigold
Hypericum perforatum	Perforate St John's-wort	Matricaria recutita	Scented Mayweed
Knautia arvensis	Field Scabious	Myosotis arvensis	Common Forget-me-not
Leucanthemum vulgare	Oxeye Daisy	Papaver rhoeas	Common Poppy
Lotus corniculatus	Bird's-foot-trefoil	Ranunculus arvensis	Corn Buttercup
Origanum vulgare	Wild Marjoram		
Ranunculus bulbosus	Bulbous Buttercup		
Sanguisorba minor	Salad Burnet		
Leontodon autumnalis	Autumn Hawkbit		
Echium vulgare	Viper's-bugloss		
Leontodon hispidus	Rough Hawkbit		
Linaria vulgaris	Common Toadflax		
Malva moschata	Musk-mallow		
Plantago media	Hoary Plantain		
Primula veris	Cowslip		
Prunella vulgaris	Selfheal		
Ranunculus acris	Meadow Buttercup		
Reseda lutea	Wild Mignonette		
Silene vulgaris	Bladder Campion		
Verbascum thapsus	Greater Mullein		

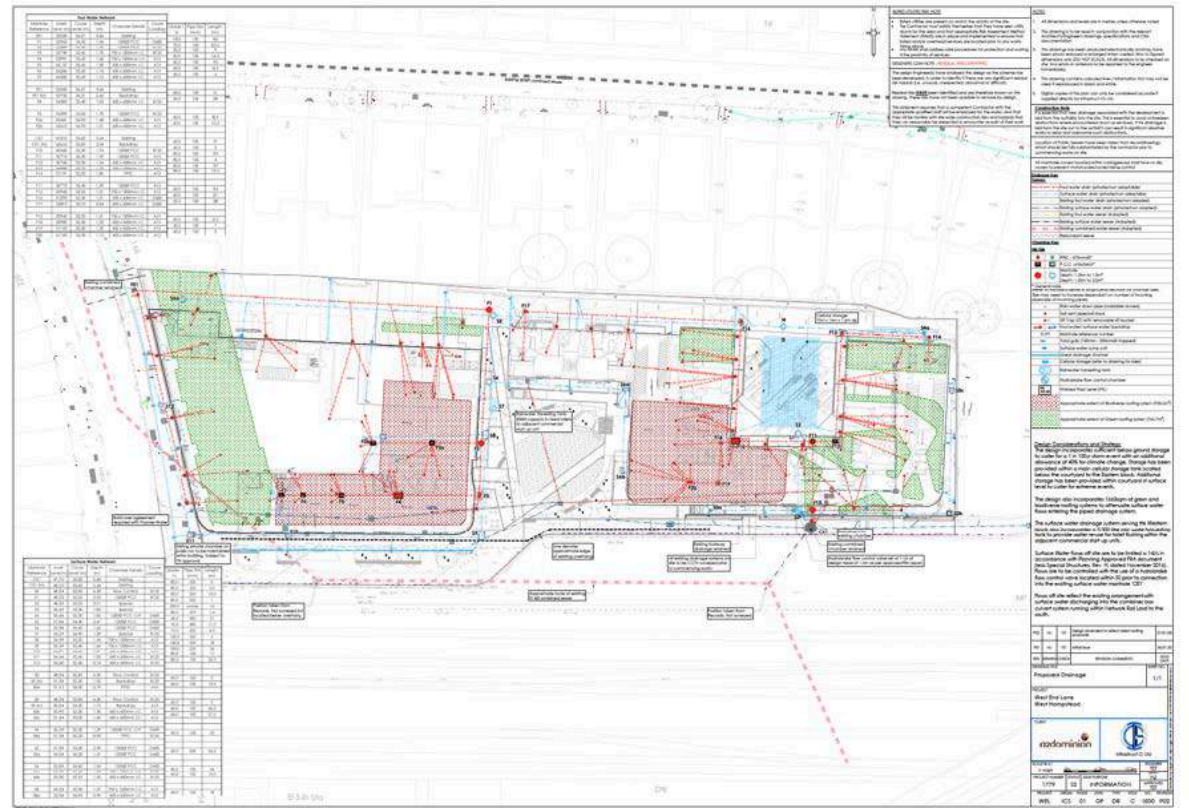
7. MAINTENANCE

9.1

Maintenance of all extensive green roof elements should be in line with recommendations as outlined in the [Green Roof GRO Code \(2014\)](#) under extensive and biodiverse green roofs.

- Irrigation: Post-establishment, irrigation should not be required for most extensive green roofs, although the water storage capacity of the system and the plants' water demands should be appropriately assessed.
Will need irrigation post-installation if implemented during late spring and summer.
- Fertilisation (annual) will not be required as the green roofs to be installed will not be established using sedum blankets.
- Plant management: Removal of undesirable plant species and fallen leaves should take place once a year in the autumn
- General: Drainage outlets (including inspection chambers) and shingle/gravel perimeters to be cleared of vegetation, twice yearly

Roof Plan - showing area of green roofs and solar panels



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APPENDIX 2 - INTEGRATED BIOSOLAR SYSTEM

Cross - section of an integrated biosolar system (one of three such systems supplied in the UK.

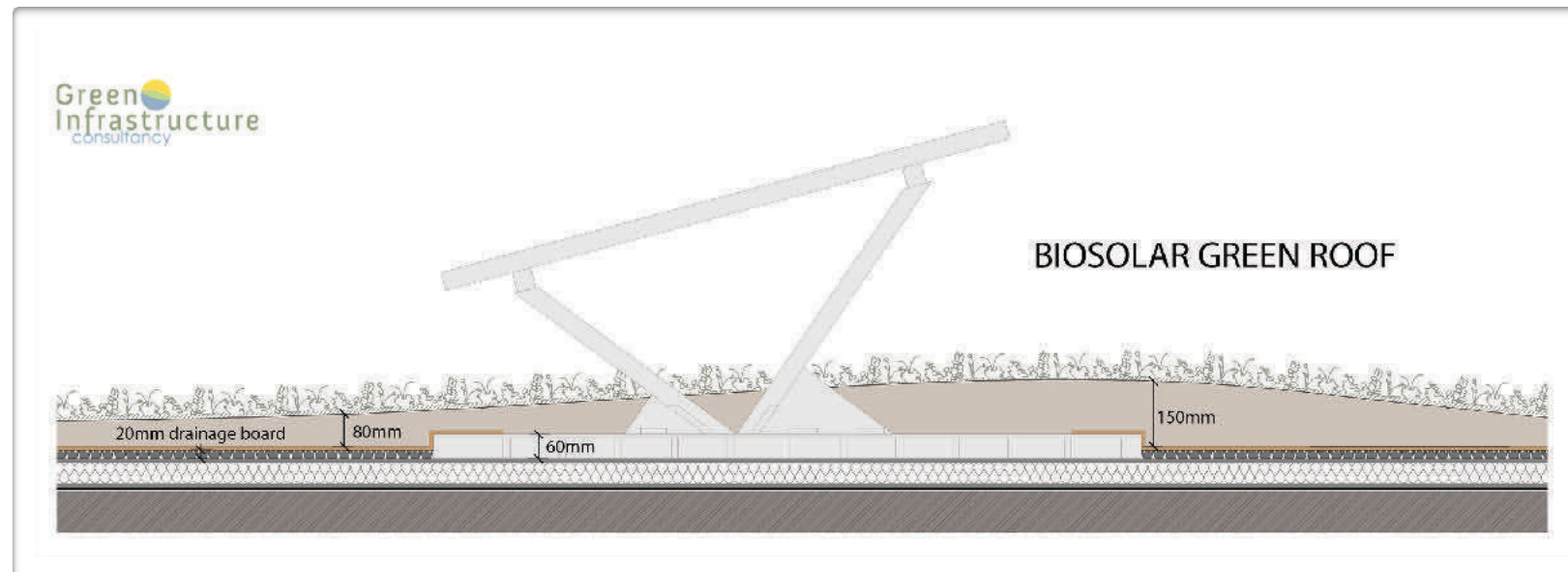


Photo - integrated biosolar system (Barnet North London)

