

REF No: 20071/2

PROJECT NAME: 4 Oakhill Park Mews

## NBS SECTION Q37 - DESCRIPTION OF WORKS

Section Q37 deals with the design and installation of the Bauder Green Roof landscaping system, including the various related elements i.e. separation, protection, and drainage layers, substrates, Bauder supplied planting and accessories such as inspection chambers, trims etc. It invokes clauses from related sections for waterproofing, insulation, landscaping and maintenance as necessary for a complete system.

It is intended for use on projects where the detailed design is completed by the specifier (architect or landscape architect) with technical assistance from the manufacturer as required and should be read in conjunction with any project specific drawings provided.

### SCOPE OF WORKS

#### This section includes:

- Bauder Extensive green roof system components/ landscaping.
- Related Bauder system accessories

#### This section does not include:

- Construction of the structural deck
- Bauder waterproofing system – refer NBS Section J41-110A, J41-110C & J41-110D.

### Q37 GREEN ROOFS

To be read with Preliminaries / General Conditions.

### GENERAL

#### 130A EXTENSIVE GREEN ROOF:

- **Landscaping finish:** Extensive Green Roof Landscaping
- **Substrate:** New Concrete Deck
- **Slope:** Level
- **Waterproofing system:** BAUDER TOTAL GREEN ROOF SYSTEM – as per J41-110C.
- **Slip Layer:** Bauder PE Foil (loose laid) rolled out in single layer. Installation as clause 745.
- **Protection layer:** Bauder FSM600 - 4mm protection fleece. Installation as clause 750C.
- **Drainage layer:**
  - Bauder DSE40 - drainage / water storage panel. Installation as clause 770E.
  - Photovoltaic mounting system: **Bauder BioSOLAR** PV Mounting system, supplied by Bauder Ltd and ballasted using Bauder substrate. Installation as clause 770L.
- **Filter membrane:** Bauder Filter Fleece. Installation as clause 780A.
- **Growing Medium:**
  - Bauder Biodiverse Substrate (FLL compliant), depth 100mm above the filter fleece. Installation as clause 790A.
  - Bauder Biodiverse Substrate, FLL compliant (Photovoltaic mounting system areas only), first infilling the board cells and then achieving a depth of 130mm . Installation as clause 790L.
- **Landscaping depth:** TBC

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- **Vegetation:** Bauder Flora 3 seed mix. Installation as Clause 801D.
- **Accessories:**
  - Bauder ALU 250 Inspection chamber, to be installed over all internal rainwater outlets within soft landscaping areas. The lid of the chamber must be level with, or higher than the surrounding landscaping. For landscaping exceeding 100mm, additional height adapter units (available in 50mm or 100mm depths) must be used to achieve the required chamber depth, with the chamber lid being at least level with the surrounding landscaping or higher. Installation as clause 830.
  - 20 - 40mm round washed pebble vegetation barrier provided at all perimeters and protrusions, as clause 460. Installation as clause 840.
  - Project specific irrigation system (designed, supplied and installed by others), as clause 463A.
- **Additional requirements:** As clauses 210, 710, 715A, 720, 910, 915D, 916, 920, 930.

## **PERFORMANCE**

### **210 GENERAL DESIGN**

- **Green roof and associated features:** Complete the detailed design.
- **Proposals:** Submit drawings, technical information, calculations and manufacturers literature.

### **460 PEBBLE BALLAST**

- **Type:** Washed, round pebbles.
- **Size:** Graded 20-40mm and free from fines and sharps.

### **463A IRRIGATION SYSTEM**

- **Supplier:** Access Irrigation Ltd. Crick, Northampton. NN6 7XS  
Tel: 01788 823811, Fax: 01788 824256, E-mail: [sales@access-irrigation.co.uk](mailto:sales@access-irrigation.co.uk)  
Web: [www.access-irrigation.co.uk](http://www.access-irrigation.co.uk)
- **Type:** Project specific system designed by irrigation supplier.

## **EXECUTION**

### **710 INSTALLATION GENERALLY**

- **Preparation:** Clear all surfaces of debris.
- **Timing:** After certification of waterproof membrane integrity.
- **Surface condition:** Visually inspect waterproof membrane, report any damage.
- **Faults in waterproof membrane:** Report.
- **Contamination:** Do not use materials detrimental to healthy plant growth.
- **Storage:** Do not overload.
- **Point loads:** Avoid.
- **Outlets:** Do not block.
- **Outlet grilles:** Installed (these can be omitted where Bauder inspection chambers are used, if the grille cap height obstructs the closing of the chamber lid).

### **715A GREEN ROOF RELATED REQUIREMENTS**

- **The following are vital to the accurate pricing, correct installation, and ultimately the long-term life of a green roof, and must, therefore, be included within the specification and tender documents: -**

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- **Loadings:** It is assumed that the architect or his advisors have satisfied themselves that the roof structure and deck are suitable to receive the dead load of the proposed green roof system and landscape both during construction and on completion of the works.
- **Additional protection:** A planned or contractual delay between the installation of the waterproofing and landscape will almost certainly necessitate additional/increased protection to the waterproofing. This protection may be temporary or permanent. The responsibility and cost of this possible extra protection should be clearly included within the tender documents.
- **Detailed drawings:** Correct detailing design and construction is essential to the long-term life of the green roof. It is essential, therefore, that detail drawings illustrating for the construction are included with the tender documents, in order to enable the contractor to tender accurately.
- **Minimum upstand height requirements:** The waterproofing should be taken up all abutment upstands, pipes, detailing protrusions etc. a minimum of 150mm above finished landscape surface level to comply with British Standards and current code of practice BS8217:2005.
- **Provision for living products in hot weather conditions:** During hot weather conditions, living products such as plants, turf, sedum blankets etc. must be laid on the day of delivery to site. With regard to sedum blankets or turf, any rolls not installed should be laid out and kept watered prior to final installation.
- **Watering / Irrigation:** Adequate provision for watering the installed any form of planting must be in place on site before the product is installed. Irrigation systems if fitted should be operational. Initial watering should be by surface sprinklers to water in the fertiliser, where this is specified. All watering should be carried out in strict accordance with the Bauder watering requirements and guidance document.
- **Final Inspection:** No landscaping work should be installed until Bauder have carried out a final inspection to the waterproofing and have passed this as suitable for guarantee. It is the responsibility of the roofing contractor to advise and organise this inspection with Bauder. We cannot guarantee any waterproofing that has been landscaped without this inspection having been carried out and passed as acceptable.
- **Damage risk form other trades:** No landscaping should be installed while the roof area is subject to other site traffic. Bauder will carry out an inspection of the completed roof 4-6 weeks following installation and any site related damage by others will be reported to the client. Bauder accept no responsibility whatsoever for damage to the product or the installation caused by site work carried out by others after the landscaping has been installed.
- **First year maintenance:** The contractor must price into his tender the cost of post installation maintenance for a minimum period of 1 year to ensure the handover of a flourishing green roof.

## **720 ADVERSE WEATHER**

- **Unfinished work:** Secure from damage and wind uplift.
- **Conditions:** Do not install or work with frozen materials.

## **LANDSCAPING INSTALLATION**

### **745 SLIP LAYER INSTALLATION**

- **Installation:** to be rolled out loose over the root resistant layer as specified (one layer for Extensive landscaping and two layers for Intensive landscaping).
- This product is only required for roofs with a fall between 0-3° (A slip layer is not necessary or advisable for slopes above 3°).
- **Joints:** Minimize.
- **Overlaps (minimum):** All laps to be 150mm with care being taken to ensure that roll sides join between layers.

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- **Upstands:** Extend to top of growing medium. Sufficient foil must be allowed for to enable it to be taken up all upstand and edge details prior to installation of the protection layer.

**750C PROTECTION LAYER INSTALLATION**

- **Installation:** Protection fleece rolled out and laid loose. Laps to be sealed by lightly heating overlap area with a propane gas torch to melt the polypropylene fibres and then press seal the two fleece sheets together.
- **Joints:** Minimize.
- **Overlaps (minimum):** Laps to be 150mm
- **Upstands:** Sufficient protection fleece must be allowed for so that it may be installed to all abutment upstands and edge details, in accordance with the manufacturer's instructions. Extend to full height of the upstand and secure in place by using a lead or fabricated metal counter-flashing.
- **Openings in landscape restraint kerbs:** Where these kerbs are present (roof slopes above 5°), the protection layer should be cut away from the openings/ gaps to avoid impeding drainage.

**770B DRAINAGE LAYER INSTALLATION**

- **Extent:** Continuous over designated roof area
- **Fitting:** Loose laid over the waterproofing and butt jointed with 100mm fleece overlap
- **Upstands:** Carefully cut to fit closely around penetrations and outlets.

**770E DRAINAGE / WATER STORAGE LAYER INSTALLATION**

- **Extent:** Continuous over entire designated roof area.
- **Fitting:** Loose laid over the protection layer. Boards to overlap and interlock by one cup profile at sides and ends and each row be laid staggered. The 'X' stamped impression on the highpoint of the cup moulding indicates where boards overlap.
- **Upstands:** Carefully cut to fit closely around penetrations and outlets.
- **Construction of planter walls:** The drainage/water storage board provides a suitable base surface for building concrete or brick kerbs/walls. The specified infill haunching should be installed over the board to required depth of cover, poured directly into the cells of board. These should be constructed to provide an adequate support for the raised masonry planters. For the specification of the type of infill and all kerb/wall construction elements – please refer to the structural engineer's plans and the specification. An internal surface of the planter wall may be primed using bituminous primer and then lined with single layer of torch applied root resistant Bauder Plant-E. The bright green slate finish may be considered undesirable, but the slate is necessary for long-term UV protection of the bitumen. To disguise and blacken the slate colour, paint exposed areas above anticipated soil level with a light coat of bituminous primer.

**770L PHOTOVOLTAIC PANEL MOUNTING SYSTEM**

- **Bauder BioSOLAR** green-roof mounted photovoltaic solution to be loose laid and positioned directly on to a protection layer. BioSOLAR Anchor boards must be ballasted using Bauder substrate growing medium, applied directly into the cell profiles of the Anchor Boards and then built up to a depth of 130mm. Allowance should be made for any settlement that may occur. Please see the project specific BioSOLAR technical report for further information.
- **PV module specification** - please refer to NBS Engineering services Section V14, clauses 310 and 315 and the corresponding Bauder BioSOLAR technical report for further information on scheme design or BioSOLAR installation guidelines for further information on installation method.

**780A FILTER MEMBRANE INSTALLATION**

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- **Joints:** Minimize.
- **Overlaps (minimum):** 150mm
- **Fitting:** Loose laid over drainage layer in accordance with manufacturer's recommendation.
- **Upstands (soft landscaping):** Extend up, between vegetation barrier and growing medium and trim flush with finished surface level.
- **Upstands (Hard landscaping):** Extend to top of perimeter abutments and trim flush just below finished surface level.

#### 790A GROWING MEDIUM INSTALLATION

- **Handling:** Minimize.
- **Conditions:** Handle in the driest condition possible. Do not handle or install when wet or frozen.
- **Layers:** Start by applying two equal layers, building up to required maximum depth.
- **Sequence:** Gently firm each layer before spreading the next. Allowance should be made for any settlement that may occur. It is recommended that measuring stick markers of the required depth be used around the roof area to ensure that a minimum acceptable thickness of growing medium is achieved.
- **Supply:** Depending on size and access of the project the 'substrate' can be supplied by various methods i.e. Tipper, Silo lorry (pumping directly onto the roof area), Big bags, or sacks. Prior to costing this element of the installation the 'Approved Contractor' must contact Bauder Ltd so that they may advise on the best solution on any specific contract.
- **Important note regarding alternative substrates:** If alternative substrates are required (e.g. topsoil...etc.), Bauder does not take any responsibility for the performance of such substrates supplied from an alternative source. We recommend that alternative substrates should be covered by a technical data sheet and certified in writing as suitable to support the system and plants specified. Saturated weight loadings must be provided directly from the supplier of the substrate and should be the subject to a structural engineer's approval.

#### 790L GROWING MEDIUM INSTALLATION

- **Handling:** Minimize.
- **Conditions:** Handle in the driest condition possible. Do not handle or install when wet or frozen.
- **Layers:** Start by applying consecutive layers, building up to required maximum depth.
- **Sequence:** Apply the substrate growing medium directly into the cell profiles of the Anchor Boards and then built up to a depth of 130mm. Allowance should be made for any settlement that may occur. Please see the project specific BioSOLAR technical report for further information.
- Gently firm each layer before spreading the next. Allowance should be made for any settlement that may occur. It is recommended that wooden measuring sticks are used randomly around the roof to test and ensure that a minimum acceptable thickness is always maintained.
- **Supply:** Depending on size and access of the project the 'substrate' can be supplied by various methods i.e. Tipper, Silo lorry (pumping directly onto the roof area), Big bags, or sacks. Prior to costing this element of the installation the 'Approved Contractor' must contact Bauder Ltd so that they may advise on the best solution on any specific contract.
- **Alternative substrates:** Not permitted

#### 801D BAUDER FLORA 3 SEED MIX

- **General:** The ideal time for seeding is in the spring and autumn. Please note that increased post installation aftercare will be required for installations that take place during the summer and winter months.

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- A seed mixture of stonecrop and herb species, suitable for wildflower meadow or biodiversity areas.
- **Packaging:** 2Kg bag (20m<sup>2</sup> coverage), 5Kg bag (50m<sup>2</sup> coverage), 20 Kg bag (200m<sup>2</sup> coverage)
- **Sowing Rate:** 100g/m<sup>2</sup> of mix (mix includes blend of selected seeds, bulking aggregate, seed adhesive, organic nutrients & beneficial Mycorrhizal fungi)
- **Layers:** Sow directly onto Bauder substrate (without the need for a seed bed substrate layer), laid to a minimum depth of 80mm.
- **Application:** Avoid sowing in strong winds. Sow approximately 50% of the mix longitudinally down the roof, and then over-sow at 90° with the remainder of the mix. **Do not rake the seed mix into the substrate surface.** The seed mix needs light to germinate.
- **Watering:** The substrate is to be watered immediately prior to application of the seed mix. Please note that the seed mix is only to be lightly watered in during the summer or where activation of the adhesive element is required in exposed locations. Please avoid over-watering to prevent seed washout.
- **Post installation watering:** It is essential that the growing medium remains moist following germination for a further 10 weeks until established – Refer to ‘Establishment Watering’ below for further guidance

**830 INSPECTION CHAMBER INSTALLATION**

- **Location:** Install centrally over rainwater outlets.
- **Orientation:** Align parallel with adjacent features.
- **Surround:** Using 20/40mm grade washed pebbles; the inspection chamber must be surrounded by a 500mm vegetation barrier surround to prevent unwanted growth obstructing the drainage system.
- **Positioning:** Never place directly on the waterproofing membrane – see options below-  
**Intensive / extensive soft landscaping:** Placed directly on to the drainage / water storage layer.  
**Inverted roof with pebble ballast:** Placed directly on the vapour permeable membrane or filter layer.  
**Decorative aggregate finishes:** Placed directly on the protection layer or vapour permeable membrane / filter layer  
**Important Note:** Ensure that a suitably sized hole has been cut out of the underlying drainage board / protection layer to allow water to flow freely into the outlet.
- **Chamber Height:** The contractor should also allow for the installation of additional Bauder height adapter units as required, in order to bring the inspection chamber up to at least the height of the surrounding landscaping. These are available in either 50mm or 100mm units.
- **Box gutters and gullies:** Where a box gutter is to be constructed, provision should be made to accommodate the 250mm diameter of the inspection chamber. The front support leg of the chamber will need to be removed (see installation guide) for the unit to fit inside a box gutter /gully. We recommend that all box gutters are constructed to a minimum finished width of 500mm to ensure that the support feet of the inspection chamber sufficiently clears the angle fillets within the gutter sole and leaves space to dress the pebble vegetation barrier around the main body of the chamber.
- **Precautionary note:** When cutting metal, please ensure that appropriate tools and personal protection equipment are used.

**840 VEGETATION BARRIER / DRAINAGE BARRIER**

- A vegetation barrier must be provided to all perimeters, abutments penetrations including protrusions i.e. man-safe posts etc. We recommend 20/40mm rounded river washed pebbles. Stones/ aggregates with sharp edges must not be used i.e. flint. In accordance with current GRO guidelines, the specified barrier widths are as follows: -

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- Minimum 300mm, but increasing to 500mm at vertical walls with opening windows or doors or to abutments with opening rooflights.
- Every 40m, there is a 30mm high barrier constructed of non-flammable materials or a one metre wide strip of solid paving, gravel or pebbles.
- At all open drainage perimeters, drainage trim must be used to contain the vegetation barrier.
- For extensive green roofs where sedum blanket is specified, the vegetation barrier must cover the edges of the blanket by a minimum of 100mm in order to protect the exposed edge of the blanket against wind uplift and substrate erosion.
- **Vegetation barriers removal or reduction of the recommended width:** Pebble vegetation barriers function as a fire break between potentially flammable dry vegetation and abutting construction materials that are also potentially flammable, to prevent fire spreading. These can be seen as an aesthetic issue for smaller green roof areas and for this reason some clients/designers choose to reduce this width or otherwise remove the barrier altogether. The current barrier guidelines are set by the GRO codes of practice that Bauder follows and promotes. These are guidelines and not currently a legal requirement under British Standards or Building Regulations. However, not following these guidelines may affect an insurance claim in the unlikely event of a fire. Consequently, Bauder Ltd cannot accept liability for issues arising from non-compliance with the current GRO guidelines.

#### **850A FERTILISER**

- Bauder Organic Fertiliser slow release must be applied at a rate of 80g/m<sup>2</sup> onto the installed planting.
- This product is to be supplied by Bauder Ltd.
- Care must be taken to distribute the fertiliser evenly, through use of an approved applicator.
- The vegetation / vegetation blankets should then be thoroughly saturated by the use of sprinklers so as to promote rapid establishment. It is the responsibility of the roofing contractor to liaise with the main contractor/ building owner to provide water to ensure that the growing medium/ blanket does not dry out within the first month – refer document 'Watering Requirement Guidelines for Extensive and Bio-diverse green roof installations'.

#### **COMPLETION**

#### **910 INSPECTION**

- **Timing:** Before handover.
- **Give notice (minimum):** 3 days.

#### **915D ESTABLISHMENT WATERING REQUIREMENTS**

- The substrate will have been watered prior to application of the seed mix. Please note that the seed mix should only then be lightly watered in during the summer or where activation of the adhesive element is required in exposed locations. Please avoid over-watering to prevent seed washout.
- Once the seeds have germinated, it is essential that the growing medium is kept moist for a further 10 week period until planting is established. It is the responsibility of the roofing contractor to liaise with the main contractor/ building owner to provide water and ensure that the necessary watering programme (as indicated above) is instigated following installation.
- An adequate mains water supply of sufficient pressure must be available and operational prior to the plants being delivered and installed. Initial watering must be by surface mounted sprinklers.
- Refer to the Bauder Watering Guide document for further information on watering.
- Bauder Ltd accepts no responsibility whatsoever for the condition of installed planting that is not properly watered or irrigated following landscaping works.

**916 POST INSTALLATION MAINTENANCE**

- The installing contractor should price into the tender, the cost of carrying out post-installation maintenance for a contract period to be agreed with the client's representative. Following completion of the landscaping installation and handover, the responsibility for future on-going maintenance of the green roof planting becomes the responsibility of the building owner or the Main Contractor, where this element forms part of the contract.
- **Maintenance services:** Bauder Ltd offers a professional maintenance service using experienced green roof technicians and would be pleased to provide an estimate for carrying out on-going maintenance. Please contact our green roof maintenance team on Tel: 01473 257671. Alternatively, the work can be contracted to experienced landscape contractors of your choice.
- **Period of maintenance contract:** *Insert requirement i.e. one year, two years etc.*
- **Scope of maintenance procedure:** as per manufacturer's recommendations.

**920 COMPLETION**

- **General:** Leave the works in a clean, tidy condition.
- **Surfaces:** Clean immediately before handover.
- **Outlets:** Clean and clear of obstructions.
- **Completed green roof:** Protect from adjacent or high level working.

**930 DOCUMENTATION**

- **Timing:** Submit at handover.
- **Contents:**
  - Manufacturer's guarantees and warranties.
  - Procedures for maintenance of the green roof.
  - Record drawings showing the location of planting and associated features.
- **Number of copies:** as required by client.

*Bauder reserves the right to amend information and product specifications without prior notice. All reasonable care has been taken to ensure that the information is current and correct at the time of issue. Please note that any future regulation changes could result in this specification requiring an update. The specifier is responsible for ensuring that this specification information is still current prior to issue, as Bauder Ltd can accept no liability for any resulting errors or omissions.*