

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 J41-110

Q37 GREEN ROOFS

To be read with Preliminaries / General Conditions.

GENERAL**130 EXTENSIVE GREEN ROOF: 3rd Floor Green Roof**

- **Landscaping finish:** Pre-cultivated UK Native species wildflower blanket
- **Substrate:** New Concrete Deck
- **Slope:** Level
- **Waterproofing system:** BAUDER TOTAL GREEN ROOF SYSTEM – as per J41-110
- **Irrigation:** Project specific drip line irrigation system (designed and supplied by others), as clause 463C. Installation of irrigation pipe work to the waterproofing as clause 825A.
- **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.
- **Filter membrane:** Bauder Filter Fleece. Installation as clause 780A.
- **Growing Medium:** Bauder Extensive Substrate, depth 100 mm above the filter fleece. Installation as clause 790A.
- **Landscaping depth:** TBC
- **Vegetation:** Bauder XF118 UK Native Species Wildflower Blanket. Installation as clause 800A.
- **Accessories: -**
 - Bauder AL150 drainage and retention trim, fitted to all open perimeters to contain a pebble vegetation barrier. Installation as clause 820I
 - 20 - 40mm round washed pebble vegetation barrier provided at all perimeters and protrusions, as clause 460. Installation as clause 840.
- **Additional requirements:** As clauses 210, 710, 715A, 720, 910, 915F, 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.

PRODUCTS

460 PEBBLE BALLAST

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

463C IRRIGATION

- **Supplier:** Access Irrigation Ltd. Crick, Northampton NN6 7XS
Tel: 01788 823811 Fax: 01788 824256 E-mail: sales@access-irrigation.co.uk
- **Product reference:** Permadrip Pro - drip line irrigation system with anti-syphon design to resist clogging and pressure regulation.
- **Material:** Perforated UV resistant plastic - Colour: Dark Brown
- **Height:** 10mm
- **Operating range:** 0.8 -4.3bar.
- **Wall thickness:** 1.2mm
- **Nozzle output:** 1.6L/h
- **Spacing:** 150mm.
- **Pipe connection:** For Bauder Extensive Green Roofs, all irrigation systems using Permadrip Pro must use PoziLock compression fittings for both the drip line and water feed pipework. Barbed connectors are not permitted.
- **Location:** Irrigation system to be installed flush with the surface of the growing medium and tested to ensure that it is fully operational prior to installation of the vegetation blanket.
- **Design:** The design, water pressure, positioning and spacing of the drip line is critical to the performance and effectiveness of the system. Therefore, the irrigation scheme for each project should be designed accordingly to ensure it is fit for purpose. Irrigation is a specialist subjects and Access Irrigation Ltd provide a design service and can assist with information pertaining to any individual project upon request.

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: -**
- **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.
- **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.

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.

780A FILTER MEMBRANE INSTALLATION

- **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.

800A WILDFLOWER VEGETATION BLANKET INSTALLATION

- **Planting mix:** Non-invasive selected wildflowers (see manufacturer's literature)
- **Thickness:** 25mm.
- **Roll size:** 2m x 1m
- **Handling blankets and timing:** Lay within 24 hours of delivery. Watering and installation over large areas should be carried out in sections that could be completed within 4 hour time frame.
- **Laying blankets:** Dry, damaged, frosty or waterlogged blankets: Do not lay.
- **Excessive stacking:** Not permitted.
- **Method:** Laid manually / two-man operation
Pre-grown wildflower blankets should be supplied and installed in strict accordance with the manufacturer's recommendations.
- **Material loss (maximum):** 3% of total surface area.
- **Growing medium condition:** Immediately prior to planting, the whole system should be thoroughly watered to ensure that the water storage/drainage board is filled and the substrate growing medium saturated
- **Layers:** Pre-grown wildflower blankets should be typically applied directly over a minimum of 100mm of prepared level or gently undulating substrate.
- **Orientation:** Perpendicular to slope of roof.
- **Joints:** Staggered/tight abut together to minimize any gaps. Do not stretch blankets. All excess vegetation should be removed from the overlap and the opposite leading edge of the blanket to ensure that the joints abut together tightly (as per the manufacturer's installation guideline).
- **Edges:** Finish with whole blankets.
- **Consolidation:** N/A
- **Dressing:** Bauder Xero Terr 3 substrate.
- **Application:** Brush in to fill joints.
- **Watering:** Thoroughly water using surface sprinklers immediately after installation and substrate dressing, ensuring that the blankets and substrate are fully saturated before moving on to the next area.
- **Slopes:** When applying the system on roof slopes above 10°, on large or exposed areas, the vegetation blankets should be secured in place by suitable bio-degradable landscaping pegs. Great care should be taken to prevent any damage to the waterproofing.
- **Please note** - Bauder Ltd does not take any responsibility for the design, performance or maintenance of any planting schemes.

820I EDGE RETAINING PROFILE INSTALLATION

- **Cutting:** Neat, accurate and without spalling.
- **Junctions:** Use the supplied connection pieces to reinforce and support the abutment of trim sections.
- **Corners:** The trim is cut to the length required. The supplied aluminium connection pieces

have a perforated vertical line in the centre of the component to enable folding the unit through 90° to form the corner reinforcement.

- **Position:** True to line and level. Smooth continuous lines.
- **Fixing:** The AL150 retaining trim is to be secured in place by separate pieces of torch applied Bauder Plant-E capping sheet cut into strips 500mm x 200mm, these retention flashings should be torched through the holes in the trim to the waterproofing surface and set at intervals of 400mm between each flashing piece, bonding onto the main capping sheet by a minimum 100mm.
- **Location:** To contain soft landscaping at abutments and open perimeters, used in conjunction with the vegetation barrier.
- **Precautionary note:** When cutting metal, please ensure that appropriate tools and personal protection equipment are used.

825A INSTALLATION OF IRRIGATION PIPEWORK

- Pipe work should be installed and connected in accordance with the irrigation supplier's installation guidelines and set as per the plan provided. Pipework should be secured at intervals to the substrate as required using plastic pegs (available from irrigation supplier), but these must not exceed the depth of the substrate itself. Pegs are best installed off-set at an angle if they are over long or otherwise trimmed down to ensure that later foot traffic during maintenance does not push the peg beyond the substrate depth into the underlying drainage board. Once the vegetation blanket is installed, the pipes will become retained in position.

840 VEGETATION BARRIER / DRAINAGE BARRIER

- A minimum 500mm pebble vegetation barrier must be provided to all perimeters and roof penetrations and protrusions i.e. surrounds to roof light or plant upstand kerbs, rainwater outlets, soil vent pipes, man-safe posts etc. as specified.
- 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.
- We recommend 20/40mm rounded river washed pebbles. Stones or aggregates with sharp edges must not be used i.e. flint. Other materials may be used, but only after consultation and agreement with Bauder Ltd.
- 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 width of 500mm is set by the GRO codes of practice and FLL industry guidelines, which 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/ FLL guidelines.

COMPLETION

910 INSPECTION

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

915F ESTABLISHMENT WATERING REQUIREMENTS

- For wildflower blankets, it will be necessary to keep the blanket substrate damp for a period of at least 10 weeks during the period of vegetation establishment. It should be established at tender stage, whom should carry out this task and that they have all relevant information available regarding watering requirements.
- It is the responsibility of the roofing contractor to liaise with the main contractor/ building owner to provide water and ensure that the planted growing medium is thoroughly irrigated immediately after installation.
- An adequate mains water supply of sufficient pressure must be available and operational prior to the planting being delivered and installed. Initial watering must be by surface mounted sprinklers. For larger roofs this will likely entail more than one watering point at roof level.

916 POST INSTALLATION MAINTENANCE

- Wildflower blanket maintenance comprises of two visits a year. The spring visit will consist of an application of fertiliser and during the Autumn visit the removal of weeds, accumulated litter and any unwanted vegetation by strimming. On completion of the maintenance a Photographic Condition Report can be provided for the client.
- 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.