REF No: B181137 **PROJECT NAME: ETON ROAD**

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.
- Irrigation– refer NBS section S__.
- Slab / brick / sett / cobble paving – refer NBS section Q25.

Q37 GREEN ROOFS

To be read with Preliminaries / General Conditions.

GENERAL

130 EXTENSIVE GREEN ROOF: Garden Studio & Side Extension

- **Landscaping finish:** Extensive Soft Landscaping
- **Substrate:** New Plywood Deck
- **Slope:** 18°
- **Waterproofing system:** BAUDERFLEX GREEN ROOF SYSTEM – as per J41-110A.
- **Slip Layer:** N/A
- **Protection layer:** Bauder Eco-Mat - 6mm thick protection fleece. Installation as clause 750A.
- **Drainage layer:** Bauder Reservoir Board – 75mm thick, water storage panel. Installation as clause 770H.
- **Filter membrane:** Bauder Filter Fleece (upstands and details only). Installation as clause 780C.
- **Growing Medium:** Bauder Extensive Substrate (FLL compliant), first infilling the board cells and then achieving a depth of 100mm. Installation as clause 790B.
- **Landscaping depth:** TBC
- **Vegetation:** Bauder sedum or sedum/herb plug plants (species selection as per the client's requirements). Installation as clause 801A.
- **Surfacing: N/A**

- **Accessories:**
  - Project specific irrigation system (designed, supplied and installed by others), as clause 463A.
  - Purpose designed aluminium or stainless steel perimeter retention angles, used as landscaping retention, supplied and fabricated by others to the landscape architects requirements and incorporating drainage perforations where required. Refer clause 820M.
  - Concrete paving slabs (min 500mm) supplied by others, to landscape designers requirements, as clause 465. Paving to be installed to all ridge and eaves perimeters, but excluding the gutter areas (which are to incorporate 20 - 40mm round washed pebbles for drainage, as clause 460). Installation as clause 840C.
  - Bauder Organic Fertiliser (slow release), applied as clause 850A.
- **Additional requirements:** As clauses 210, 710, 715A, 720, 910, 915C, 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

463A IRRIGATION SYSTEM

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

460 PEBBLE BALLAST

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

465 PRECAST CONCRETE PAVING SLABS

- **Standard:** To BS 7263-1, hydraulically pressed.
- **Manufacturer:** _____ .
- **Product reference:** _____ .
- **Colour/ Finish:** _____ .
- **Size:** _____ .
- **Recycled content:** _____ .

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

750A PROTECTION LAYER INSTALLATION

- **Installation:** 6mm thick Protection Fleece, rolled out and laid loose.
- **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 5º), the protection layer should be cut away from the openings/ gaps to avoid impeding drainage.

770H WATER STORAGE / DRAINAGE LAYER INSTALLATION (SLOPES OVER 5º)

- **Extent:** Continuous over designated roof area.
- **Fitting:** Loose laid over the protection layer, open cells uppermost, ensuring that the rebated boards are properly interlocked to provide adequate anchorage prior to the substrate being laid.
- A parapet wall or restraint kerb must be provided to support the water storage / drainage board at the base of the slope. This should be included within the deck construction and reference made within the waterproofing specification also. This in turn will restrain and stabilise the landscaping against imposed shear load forces.
  Upstands: Fit closely around support battens, penetrations and outlets.
- **Temporary wind loading:** The board cells can be filled with substrate growing medium to provide temporary loading against wind uplift prior to installing the remaining landscaping elements in accordance with the specification. In the event of any confusion concerning this item, Bauder Ltd should be contacted so that advice may be given.

780C FILTER MEMBRANE INSTALLATION

- A filter layer is not used over reservoir board on slopes 5 degrees or above, where the reservoir board is directly filled with substrate growing medium. However, a separate strip of Bauder filter fleece must still be used to separate the growing medium from the vegetation barrier at perimeter abutments and around pipe protrusions, outlet inspection chambers etc. dressed up all upstands and around all protrusions to at least flush with the finished surface level. At abutments the filter fleece must be used to separate the vegetation/drainage barrier and substrate growing medium by extending it 500mm beneath the reservoir board and then bringing it up between these two items.

790B 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 extensive substrate growing medium directly into the cell profile of the reservoir board and then build up to the depth specified. Allowance should be made for any settlement that may occur. The Contractor must make provision to separate the vegetation/drainage barrier and substrate growing medium by bringing up the filter fleece between these two items – see clause 780C.

- 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.
- **Trellis Substrate restraint (inc. for all slopes above 16º):** Provision must be made by the installing contractor for supplying and fabricating 25mm x 50mm untreated timber formed into a trellis frame that is supported at the base of the slope (resting against the protection layer). The trellis is to form a series of retaining grids 400mm square and used on all slopes between 16º - 25º. This trellis will provide initial retention until plant establishment and help prevent soil erosion. It will eventually rot away naturally.
- **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:*** Bauder cannot take any responsibility for the performance or quality of alternative soils / growing medium materials supplied by others. 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 product and should be the subject to a structural engineer's approval.

801A PLUG PLANTS

- **General:** The ideal time for planting 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.
- **Installation:** Supply and plant a mixture of Bauder supplied sedum and herbs plug plants in accordance with the landscape designers or ecologists planting schedule and drawings (where provided). All operatives carrying out the vegetation installation should refer to the Bauder installation and establishment guidelines for vegetation plugs, which is available from Bauder Ltd.
- **Plant coverage:** Planted into the growing medium at a rate of 20plants/m². The plant coverage rate should be increased to 25 plants/m² in areas subject to wind erosion i.e. corner zones, ridges, perimeters etc. Bauder recommends planting 15 different species at a ratio of two number sedum plants to each of herb.
- **Plant suitability:** In accordance with good practice, the plants should have a mature root system within a root ball and that have been grown in the open air in a substrate similar into which they are to be transplanted.
- **Fertiliser:** Bauder Organic Fertiliser slow release, should be evenly spread over the substrate at a rate of 80g/m²
- **Watering:** It is essential that both the growing medium and the plugs are thoroughly watered both prior to and immediately after installation. Plug plants will need to be kept moist for 10 weeks after installation.
- **Planting generally:** Plant trays should be lifted to roof level and unpacked immediately, or alternatively may be kept for a maximum of two days in cool covered storage prior to lifting to roof level. Spring and autumn are the most suitable times of year to plant the plugs.

820M EDGE RETAINING PROFILE INSTALLATION

- **Cutting:** Neat, accurate and without spalling.
- **Junctions:** Cut with a hack saw to form 90º corners – mitre cut fixing arm.
- **Position:** True to line and level. Smooth continuous lines.
- **Fabrication:** The pre-fabricated trim is to be obtained from a specialist metal fabricating

company. The metal should be regularly perforated on the vertical face to allow drainage, using 5mm dia. Holes. The top leading edge should be folded fully or at a right angle by a minimum of 20mm to eliminate the sharp edge.

- **Height:** designed and manufactured to accommodate the total depth of the landscaping build-up.
- **Fixing arm:** this should be at least twice the length of the height when used as a base retention angle supporting landscaping on a slope over 5 degrees. Only the vertical section needs to be perforated with this fabrication and it is also possible to only provide perforations where the trim runs in front of drainage gaps in the kerb. The angle should be installed loose over the specified protection layer.
- **Precautionary note:** when cutting metal, please ensure that appropriate tools and personal protection equipment are used.

840C LAYING PRECAST CONCRETE PAVING SLABS

- **Extent:** To all ridge and eaves perimeters excluding the gutter areas, which are to be a pebble vegetation barrier – See landscape designers plan.
- **Support:** Slabs to be laid on Bauder FSM600 protection fleece, using additional pieces of material where required pack the levels to ensure a flush, level finished surface.
- **Setting out:** Minimize cutting.
- **Joints:** ca. 4mm.
- **Completion:** Slabs must be level and stable.

850A FERTILISER

- Bauder Organic Fertiliser slow release must be applied at a rate of 80g/m² 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.

915C ESTABLISHMENT WATERING REQUIREMENTS

- Surface watering for the first 10 weeks following installation (to ensure the substrate remains moist to the touch) It is the responsibility of the roofing contractor to liaise with the main contractor/ building owner to provide water and ensure that the planted and fertilised growing medium is thoroughly irrigated immediately after 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.
- See the Bauder Watering Guide document for detailed information on watering requirements.
- 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.