



**THE PROJECT**

PROJECT MERLIN

**LOCATION**

BUXTON, DERBYSHIRE

**APPLICATION**

GABION CLADDING

**DATE**

MARCH 2012

**CLIENT**

NESTLÉ WATERS

**ARCHITECT**

FLETCHER-RAE UK

**CONTRACTOR**

POCHIN'S

### SERVICES PROVIDED BY ENVIROMESH

- Preliminary outline project consultation
- Full detailed designs incorporating supporting steelwork and gabion layouts
- Manufacture and material supply
- On-site technical support throughout construction

### PROJECT BUILD COMPONENTS, SUPPLIED BY ENVIROMESH

- Gabion 27 System, bi-axial welded mesh cladding gabions
- 75mm x 75mm x 4mm wire diameter, galvanized
- Supporting steelwork and fixings, sited within the gabion cladding

### PROJECT BACKGROUND

Nestlé has recently unveiled a new £35 million state of the art manufacturing and distribution facility in Buxton and is one of Europe's most innovative and efficient bottling facilities. Key to the projects development was reduction to its total energy output as well as the packaging used in its bottles by an average of 25 per cent across the range.

Following construction, the project has since achieved a BREEAM excellent sustainability rating.



“ *Enviromesh quickly established an effective working relationship with our design team. Offering unrestricted access to their vast reservoir of technical knowledge and expertise – we wouldn't hesitate in working alongside Enviromesh in the future.* ”

Lead Design Consultant, FLETCHER-RAE LTD

### THE CHALLENGE

As the lead design consultant for the entire project, Fletcher-Rae Ltd were challenged by the location concerns and planning requirements by introducing natural local materials and a dramatic rolling curved roof line, which was reflective of Nestlé Waters corporate branding and surrounding hills.

To give the rustic and yet natural local stone finish to the building, Fletcher Rae chose to use welded mesh cladding gabions that were the preferred containment option for the rock fill. To meet the challenges ahead in the exacting time frame, Enviromesh were invited to Fletcher-Rae's offices in January 2011 to discuss, detail and then design not only the complicated setting out procedures for the gabion cages but also the structural tie back methods to the steel framed building.



## THE SOLUTION

There were four deciding elements that were the keys factor in the use of Enviromesh gabions:

### 1. DURABILITY

To satisfy durability, the cladding gabions were all Galvan Coated (95% Zn / 5% Al) and had BBA (British Board of Agreement) Certification for a design life of 70+ years in a mild environment.

### 2. AESTHETICS

The aesthetic look was paramount and dimensionally stable bi-axial welded mesh gabions manufactured from a 75mm x 75mm x 4mm wire diameter were specified.

Working at heights up to seven metres meant that the gabions had to be fabricated with practicality in mind specifically as specialist sub-contractors worked from Scissor Lifts during installation.

All of the units were purpose made to fit the openings and eaves and in generally maximum lifts of 675mm to ensure placement of the stone in line with the architects' visual expectations.

In addition, internal support diaphragms were centred laterally at 675mm centres to ensure the face alignment, giving a 675mm x 675mm grid appearance.

- **Fabric type**  
Bi-axial welded mesh
- **BS EN 10218-2**  
Steel wire and wire products  
(general wire dimensions and tolerances)
- **Tensile strength (wire)**  
540 to 770 N/mm<sup>2</sup>
- **Weld strength**  
75% of the minimum ultimate tensile strength of the wire
- **BS EN 10244-2 (Class A)**  
Zinc and zinc alloy coatings on steel wire
- **BBA certification**  
Design lifespan up to 70 years in a mild environment



### 3. STRUCTURAL CONSIDERATIONS

For structural stability, the cladding gabions were supplied in depths of 225mm and 300mm widths, and were tied back to the main structure utilising two differing systems dependant upon wall height.

For the low height cladding up to 975mm, the units were tied back to the concrete wall by clamp bars, the major concern here being the bridging of the insulation panels. This was overcome by setting tie back bolts within polymer tubes extending from the concrete and through the insulation into the rear face of the gabion where it terminated to a clamp bar. The tubes surrounding the tie back bolts were grouted to provide a vapour barrier.

For the larger heights of cladding this method of fixing required a different approach. Vertical bars were introduced instead into the gabions at 2.025m centres such that clamp bars could be fixed to the vertical bars with bolts to encompass the end panels of adjacent gabions. The fixings were buried within the units to ensure all of the aesthetic requirements were taken account of. As the gabion cladding was to a maximum of 300mm only, concern further rested with potential deformation for the full height of structure.

*continued overleaf*

### 3. STRUCTURAL CONSIDERATIONS

To counter and take effective measures against potential crushing of the gabions, horizontal steel beams were incorporated at approximately 3 to 3.5m heights such that the loads were taken back to the main structure generally at floor levels. Vertical steel support bars were fixed to the concrete foundation at the base and the underside of the first horizontal beam support by angle brackets, then above the first level of the beam the vertical support bars were bracketed to the underside / top flanges of the beams.

Where openings were required and the gabions spanned openings, horizontal beam supports were incorporated. To ensure the beams were not visible, they were positioned above the soffit of the openings so that rock fill could be inserted below the beam to carry the aesthetic look throughout. In doing this and to prevent potential sag to the underside of the mesh, hangers were provided to hook over the beam and the mesh underside.

### 4. EXPERIENCE

Finally and for a project of this nature, experience was essential. Utilising all of the Enviromesh design teams prior knowledge of gabion cladding and to ensure that all structural requirements were met and that no errors occurred during manufacture to the 100+ different size of gabions supplied at their Stoke-on-Trent factory, Enviromesh assisted in delivering the scheme to the programme and visual requirements.



*As these photos illustrate, the exterior and interior walls of the Nestlé Waters building show the success with which architectural features can be emphasised—using a combination of gabion mesh systems supplied by Enviromesh—and carefully specified aggregate/filling material*

