THE PROJECT
FUCHS LUBRICANTS HEADQUARTERS

APPLICATION
MASS GRAVITY RETAINING WALLS • LANDSCAPING
DESIGN • SUPPLY • INSTALLATION

LOCATION
HANLEY, STOKE-ON-TRENT, UK

DATE
JULY 2016

CONTRACTOR
ARTHUR M. GRIFFITHS & SONS

CLIENT
FUCHS LUBRICANTS

ARCHITECT
SAMMONDS ARCHITECTURAL LTD
PROJECT BACKGROUND

The FUCHS Lubricants UK headquarters, based in Stoke-on-Trent is part of a larger global group, which was established in Germany in 1931. FUCHS have developed, produced and sold lubricants for more than 85 years and currently have approximately 60 companies and almost 5,000 employees worldwide. They are the world’s largest independent manufacturer of lubricants.

FUCHS’ UK site redevelopment

As part of a planned development of the FUCHS UK site in Hanley, Stoke-on-Trent, a factory extension and new office buildings would include the wider site (an area of approx. 2,300m²). This comprised the upper and lower level car parking areas, local site access roads, pedestrian access and connecting walkways to the buildings and car parks, together with the installation of architectural landscaping feature walls and planting schemes close to the main office buildings.

FUCHS were keen to explore a gabion retaining wall solution for the project, to not only facilitate an effective, practical solution to address the difference in levels throughout the site, but also to capitalise on the clean, precise and modern architectural look that can be achieved with the use of gabion mesh baskets when filled with naturally occurring stone.

Enviromesh were approached by the contractor Arthur M. Griffiths and Sons in November 2015, to design, supply and install the gabion walls. Enviromesh were selected for the contract following a referral and recommendation from Arthur M. Griffiths to the client, having worked with Enviromesh on a previous project.

In the early stages of the project planning phase, there were a number of meetings between the client, the architect and main contractor, both on-site and at the Enviromesh offices. These addressed the designs for the different walls, the specification of the gabion baskets and options for the types of stone / filling materials. Enviromesh were scheduled to start work in July 2016.
THE CHALLENGES

Gabion stone selection
One of the client’s key objectives for this project would present Enviromesh with one of their main challenges. The choice of stone for any gabion wall is critical to the visual appearance of the finished structure. In this case, the client specified a dark blue/grey Welsh slate, with a pillared face, a sawn back and a riven top and bottom. FUCHS had selected this particular material to make the visual connection with the design of the cladding applied to the main headquarters, as well as giving the finished walls a natural ‘dry-stone wall’ effect.

Pillared Welsh slate
Welsh slate is supplied in cubic metres and is nonuniform in size so it would need to be machine-cut prior to installation. This requires the use of specialist equipment and would mean introducing an additional ‘stage’ to the construction schedule.

The health and safety of the workforce is a key consideration for every project we undertake. In this instance the masonry-cutting saw would involve training an operator and providing the correct personal protective equipment in accordance with the risk assessment.

Finding a solution to meet the budget
Pillared Welsh slate is certainly at the more expensive end of the scale for stone fill materials, so filling the baskets completely with slate would be costly and perhaps unnecessary.

The challenge then, would be to provide a solution that is acceptable to the client in terms of the overall budget, but one that did not compromise the structural integrity of the wall or its visual appearance.

Above, left, a section of the finished surface of the pillared Welsh slate gabion wall which, when viewed from above (middle photo), was specially cut to enable a mitred corner joint to accommodate the change in wall direction.

Right, a portable table-top masonry saw was used to cut the slate on site and ensured that a less uniform, more natural appearance to the wall’s finished surface could be achieved. Its portability also meant that the machining of the materials would always be nearby the installation team, making the build process slightly more efficient. Behind the worker is a section of one of the finished walls.

For more information, visit us online www.enviromeshgabions.co.uk

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Prior to any work being undertaken, Enviromesh constructed a sample wall on site for approval using the selected materials. By providing an accurate representation of the wall’s materials and visual characteristics, Enviromesh were able to alleviate any potential concerns before the client committed to a much larger-scale investment.

There was a considerable amount of work carried out by hand, using more conventional tools, to ensure the gabions with a dual fill looked as natural as possible, particularly given their more prominent position.

To help further mitigate the costs of the project, only the gabion units facing the FUCHS building were faced with slate, whilst the others, out of view of the main building, were filled entirely with the 6G Granite.

Middle, the reverse view of the gabion units being constructed for one of the raised bed features. These were faced with the Welsh slate and then backfilled by hand with 6G Granite. Internal bracing ties were included to help maintain the structural integrity of each unit.

Above, a section of the raised bed areas prior to top soil being added. The addition of the non-woven, needle punched geotextile membrane (the white material) is important for preventing fine material ingress into the outer structure of the gabion wall.
THE SOLUTION

Pillared Welsh slate and Granite (dual fill)
The contrasting nature of the materials used in the gabion baskets filled using a combination of slate and granite, meant each basket would need filling by hand. Slate has a more linear characteristic than granite, however the nonuniform sizes of the Welsh slate, gave the finished walls a more natural feel.

Whilst hand-filling would undoubtedly slow the build process, the integrity of the gabion units would be vastly improved by reducing the potential for any settlement within the baskets. It also meant avoiding the possibility of introducing voids into the fill, which may otherwise have allowed the stone inside to move.
THE SOLUTION

Raised-bed gabion mesh planters
The area immediately adjacent the new FUCHS HQ was designed to incorporate an interconnecting arrangement of raised bed planters and low level feature walls.

These would serve a dual purpose by introducing an area of natural vegetation into the built environment and offer a more pleasing visual break between the new building, the access road and the larger gabion retaining wall beyond.

Min 150mm 6F5 sub-base

Gabion fill (Class 6G)

EMGEO-NW15 Geotextile membrane

Topsoil

There were a number of pedestrian access areas throughout the site, including this stairway leading to the new FUCHS headquarters building. These combined the use of the pillared Welsh slate-filled gabions, stainless steel hand rails and concrete paving slabs, each of which was designed and specified to complement the overall visual appearance of the new buildings and the wider site infrastructure and newly planted beds.
SERVICES PROVIDED BY ENVIROMESH

- Design engineer consultations and production of as-built drawings
- Manufacture and supply of the gabion mesh baskets in line with the design
- Supply and construction of sample walls on-site for client approval
- Material consultation meeting with FUCHS and lead architect at Enviromesh to view pillared slate, 6G granite and samples of mesh baskets
- Preliminary meetings with key parties to agree wall design, materials, specifications and the construction process
- Dedicated and experienced team of gabion wall construction personnel
- Risk assessments and method statements in advance of works commencing

PROJECT BUILD COMPONENTS, SUPPLIED BY ENVIROMESH

- Bi-axial welded mesh gabion baskets:
  75mm × 75mm welded mesh (4mm wire diameter, Galfan coated)
- Pillared Welsh slate (480m³)
- 6N granular engineered backfill, imported
- 6N Granite gabion stone
- Plate compactor, hand tools, compressor, pneumatic clipping tools, table saw, generator, mini excavator and all fixing accessories including CL50 ‘C’ rings
- Non-woven, needle-punched geotextile membrane
- Slate chippings (same colour and type as the Welsh slate, which formed part of the post-landscaping remedial works

Technical and material specifications:

- **Fabric type**
  Galfan coated bi-axial welded mesh
- **Tensile strength (wire)**
  540 to 770 N/mm²
- **Weld strength**
  75% of the minimum ultimate tensile strength of the wire
- **BS EN 10223-8:2013**
  Steel wire and wire products for fencing and netting (welded mesh gabion products)
- **BS EN 10244-2:2009**
  Steel wire and wire products (general wire dimensions and tolerances)
- **BS EN ISO 9223:2012**
  50 years design life
- **BS EN 10244-2:2009 (Class A)**
  Zinc or Galfan coated (95% Zn / 5% Al) steel wire
- **BS EN 10218-2:2012**
  Steel wire and wire products (general wire dimensions and tolerances)

The finished gabion wall retaining the upper level car park area. The angular change in direction that can be achieved with gabions is just one example of how these types of features can offer almost limitless combinations of structures and shapes.