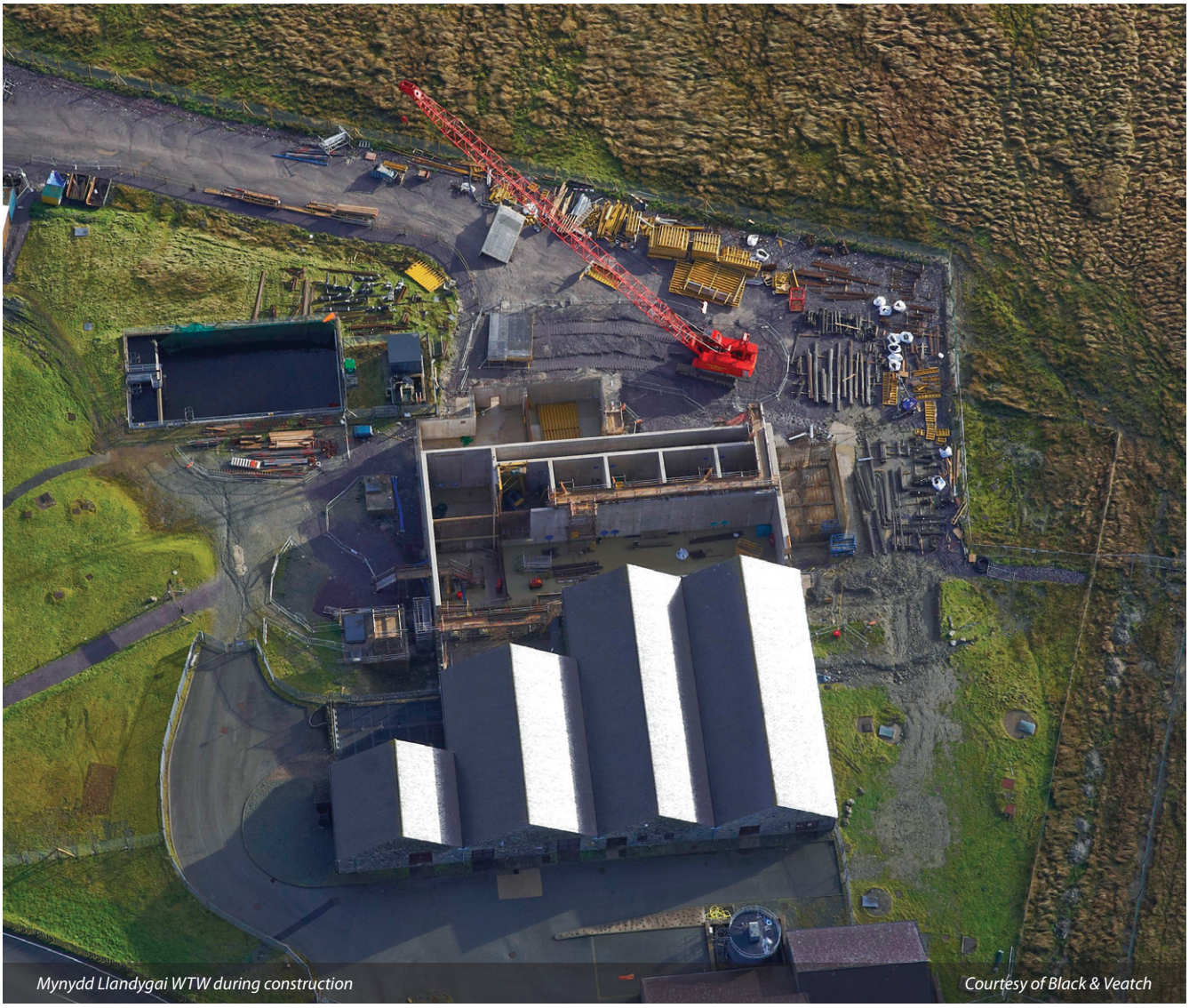
Mynydd Llandygai WTW

enhancement by the integration of a new counter current dissolved floatation and filtration (CoCoDaff) process into an existing works

by Huw Roblin M.Sc. B.Sc(Hons)

Mynydd Llandygai WTW is situated near the town of Bangor, and supplies drinking water to a network supporting a large area of North West Wales. Dwr Cymru Welsh Water (Welsh Water), as part of its Early Start AMP5 Investment Plan, has enhanced the existing works to meet requirements of the Drinking Water Inspectorate (DWI) undertaking, addressing a deterioration in the quality of the raw water supply, leading to risk of increasing trihalomethane (THM) concentrations in the treated water. The new process was sized to maintain the existing works output of 12MLD, using robust industry standard treatment processes that will secure treated water quality for years to come.



Mynydd Llandygai WTW during construction *Courtesy of Black & Veatch*

Existing works

Prior to the recent investment, the existing process, which was built in 1995, used rapid gravity filtration (RGF) with chemical dosing and disinfection to treat the water. Welsh Water undertook to improve the treatment process by 30th September 2010.

The preferred option

The site boundary of Mynydd Llandygai WTW is surrounded by a Special Area of Conservation (SAC), and a Site of Special Scientific Interest (SSSI). This restriction had a significant impact on the choice of process, as it was not possible to extend the works permanently outside of its existing boundary fence. This meant that the CoCoDaff process, with its smaller footprint than conventional separate DAF and filtration stages, was selected. A study of the existing infrastructure was undertaken to maximise the use of existing assets and minimise the capital spend.

With the site being surrounded by a SAC and an SSSI, as well as being close to the Snowdonia National Park, early consultation with local planning authorities and the local council was essential

to ensure the proposed process, to be housed in an extension that doubled the size of the existing works, successfully passed through the planning process. The Countryside Council for Wales (CCW) was consulted to ensure any impact on the SAC and SSSI was managed and minimised.

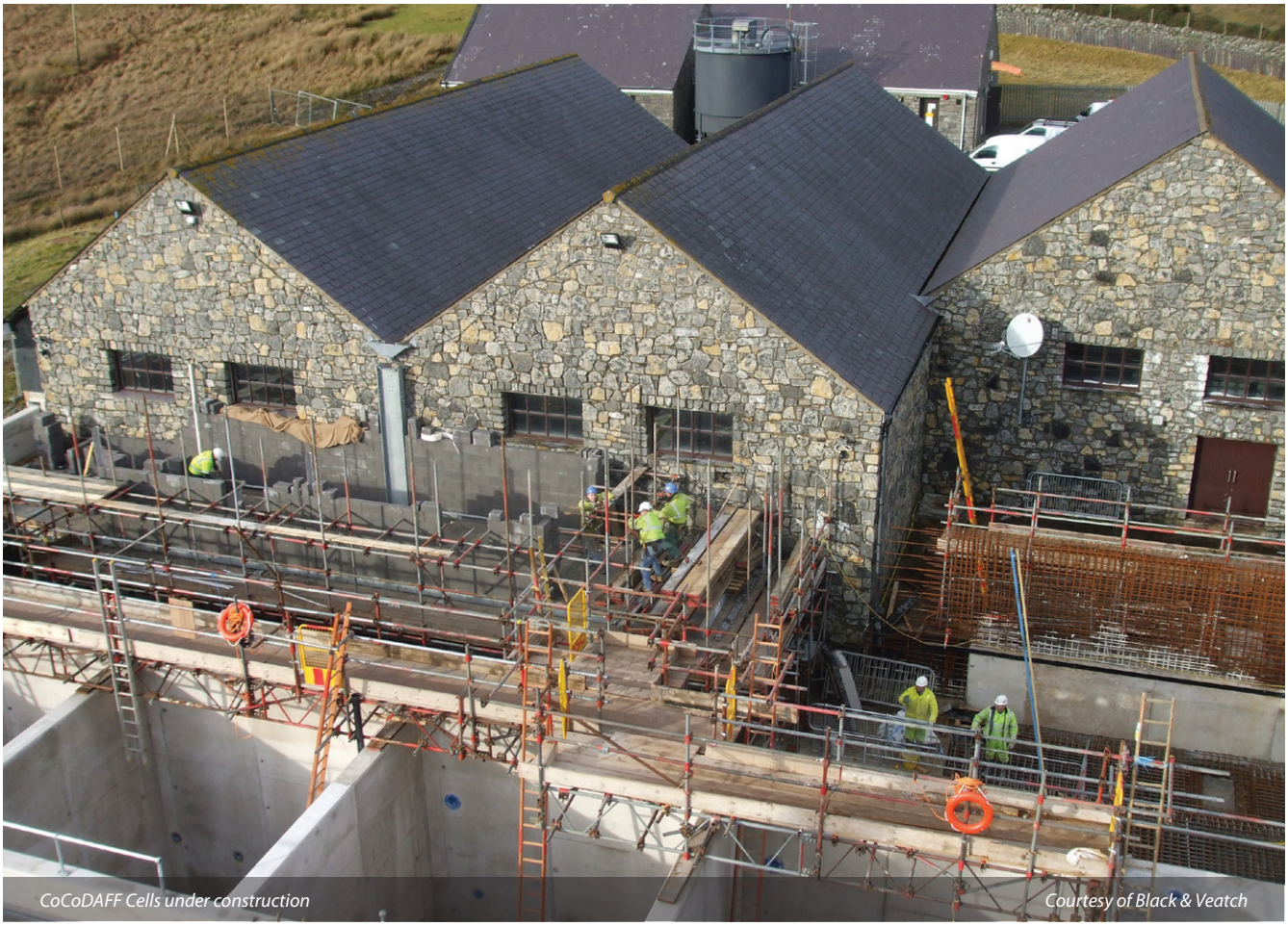
Construction

Work started on site in early 2009 with a DWI 'water-into-supply' date of September 2010. The first nine months were mainly civil activities undertaken by Costain, along with Welsh Water's Tier 1 civils partner William Hughes Civil Engineering of Anglesey.

The weather had a significant influence on progress. Due to the site's elevation of 310m, wind significantly affected progress, and the heavy snows of the 2009/10 winter had an impact on both access to, and productivity on site. Traffic control and management was very important, as access to the site from the east was via the village of Mynydd Llandygai, passing a local school and on very narrow lanes. Communication with suppliers and signposting off the A55, 8 miles away, were critical to ensure no site-bound traffic took the quickest, SatNav, route off the main A55 expressway across North Wales.

To ensure the DWI 'water-into-supply' date was met, detailed planning of all activities was absolutely necessary, especially once the mechanical subcontractor, W Walters Engineers Ltd of Swansea, and electrical installation subcontractor, Lloyd Morris Electrical of Wrexham started work on site.

As already stated, the size of the site had a significant impact on the process selection of CoCoDaff, and it also impacted on the constructability of the new works. The space available to undertake the construction of the new works was too small. The project had to obtain agreements to use local land adjacent to the site to allow



CoCoDAFF Cells under construction *Courtesy of Black & Veatch*

for the construction process of building the new extension to the works. This was done via consultation and agreement with land owners, the Countryside Council for Wales, and the local authority, as the land is a SSSI. Various ecological surveys and agreement of construction methods had to be in place before planning permission was granted, let alone site access.

Teamwork

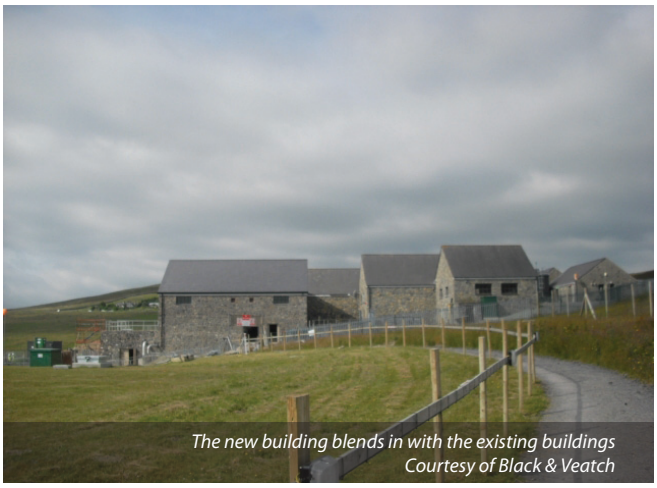
The construction team shared open plan offices and this greatly improved cooperation between parties. The design team attended weekly site meetings during the construction process, to ensure regular and clear communication with the construction team, and to make sure any technical queries that had arisen were answered quickly. This proved of huge benefit to all.

One main objective through the construction process was to maintain operation of the works so as not to disrupt output and customer supply. To ensure customer disruption was avoided, any works shutdowns had to be planned in advance and in great detail to minimise their duration. Part of this mitigation strategy was to undertake any shutdown activities on a night shift. This required close liaison with Welsh Water Operations both at the works and in the networks.

The site was independently audited by the Considerate Constructors Scheme and was noted as being an *"exceptional site"*; an endorsement to the way in which the project was managed.

Commissioning

Main process commissioning started in August 2010, with a keen eye on the 30th September deadline. As through the construction process, detailed planning and liaison went on with Welsh Water Operations to ensure risks to the existing process was minimised. The process was effectively commissioned on line with close support of the operators.



The new building blends in with the existing buildings
Courtesy of Black & Veatch

Software integration

A staged approach was taken with the software integration, undertaken by Oasis Software Services. IT and communications for the new plant were set up in the existing control room. Again, all the preparation and planning paid dividends as the software worked immediately, with very little disruption to the existing process.

The plant was fully into service on 1 September 2010, meeting the DWI output date. An opening ceremony was held in May 2011 during which local residents were invited to a tour of the works and a ribbon cutting ceremony. Local councillors and residents were impressed with what they saw, particularly how the new building blended in with the surrounding environment and existing works.

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