

Drainage Strategy Report

Subject: Llangatwg School

Reference: 26CC07-CUR-10-XX-T-C-0020-P04

Date: 03/07/2025

Site Background

The site sits within the grounds of the existing Ysgol Gyfun Cymunedol Llangatwg Community Comprehensive School in Aberdulais, Neath. The proposals comprise demolition of the existing comprehensive school and loss of existing sports fields, construction of a new comprehensive school, modified car parking arrangement, inclusion of sports pitches and multi-use games area, lighting, landscaping and associated infrastructure works. The works will take place in phases to allow the new build construction to conclude prior to demolition of the existing school building, to reduce impact on students during term time.

Existing Site Drainage

Watercourses and Culverts

The site is crossed by an ordinary watercourse which passes through the site, flowing from a 900mm diameter culvert, into an open hard-engineered concrete channel through the school's building complex before re-entering a culvert downstream in the south-western corner of the site and discharging off site into a watercourse.

There is also a secondary culvert originating from the vegetation to the north of the playing fields. The function of this culvert is anticipated to serve a cut-off drain along the northern boundary of the school between the current playing fields and forested hillside. No changes are proposed to this culvert, with levels to be retained above and a maintenance strip introduced to manage vegetation.

Public Drainage

Dŵr Cymru Welsh Water (DCWW) asset maps suggest that there is a 300mm diameter combined sewer running through the site, which is confirmed via CCTV survey. As the confirmed route of this sewer is directly beneath the proposed school buildings, the combined sewer will require a diversion. The diversion will rejoin the existing combined sewer upstream of the combined sewer overflow (CSO) located within the site boundary near the westernmost entrance. No alteration is proposed to the CSO assets.

Private Drainage

The school site currently contains several private foul and surface water drains. A CCTV survey shows the site's surface water (arising from roofs and hardstanding) to drain into the watercourse and culvert that passes through the site unrestricted. Existing foul drainage connects into the combined sewer that passes through the site. Most of this system will be abandoned once the existing school is demolished.

Proposed Surface Water Drainage Strategy

The proposed site is to be designed in alignment with the SuDS standards, with discharge locations considered in accordance with the SuDS hierarchy and following the four pillars of SuDS design (CIRIA C753).

S1 - Surface Water Runoff Destination

Per Table 1 below, each priority level has been assessed against the practicalities of the site, and each priority level given justification prior to considering the next discharge location.

Discharge Location (In Order of Priority)	Feasibility
Reuse	The realistic utilisation of non-potable water is minimal, and therefore the infrastructure required for rainwater harvesting is not economically justifiable.
To Ground	Infiltration testing undertaken by Tetrattech as part of Ground Investigation works, confirms that surface water discharge to ground is not feasible for this scheme. Of the 6 BRE365 test locations across the site, 5 locations failed to yield a valid result, and the remaining location yielded infiltration rates in the magnitude of 10^{-6} m/s. Providing there are no concerns over structural stability or contamination, SuDS features shall be left unlined to allow limited infiltration and volume loss.
To a Surface Water Body	The current school site discharges surface water to the watercourse/culvert that passes through the site. It is proposed to continue this strategy for the new school, albeit with flows restricted to minimise the flood risk from the development. The degree of flow restriction is to be agreed with the SAB authority, however initial proposals are discussed in section S2.
To a Surface Water Sewer	There are no surface water sewers in the immediate vicinity of the site.
To a Combined Sewer	Although there is a combined sewer passing through the site, a connection to the culvert/watercourse is higher in the discharge hierarchy and therefore a surface water connection to the combined sewer is not being sought.

Table 1 – Surface Water Discharge Destination Hierarchy

S2 - Surface Water Hydraulic Control

The proposed development will result in an increase in positively-drained surface water catchment when compared to the existing site. The proposed positively-drained catchment area measures 3.450ha; an increase of 0.263ha or 58% on the existing 2.187ha. The proposed area includes a 100% runoff coefficient for the all-weather pitches due to the synthetic surface.

As the site is currently developed, surface water runoff from the new development is to be limited to the existing 2-year brownfield rate, with a 30% betterment applied. This limited discharge rate shall apply to all storms up to the critical 100yr return period (+40% climate change) design storm.

Table 2 below shows the brownfield rates for the development using a dummy network in the Causeway Flow software and FEH 22 rainfall data. Summer and winter CV values of 1.0 have been used, with MADD factor set to 0.

With a proposed overall drained catchment of 3.450ha, the restricted flow rate is 230 l/s for the entire development site.

The existing and proposed discharge rates are summarised below.

Return Period	Existing Peak Runoff (2.187ha)	Betterment	Proposed Peak Runoff Rate for New Development (3.450ha)
2yr	335.2 l/s	30%	230 l/s
10yr	598.3 l/s	62%	230 l/s
30yr	751.1 l/s	69%	230 l/s
100yr	911.3 l/s	75%	230 l/s

Table 2 – Existing and Proposed Runoff Rates

Flow restriction shall be provided using flow control devices, such as vortex flow controls (Hydrobrakes), orifices, and small-diameter pipework. These shall be designed to minimise the risk of blockage by considering suitable minimum outlet sizes.

Due to the phased approach of the development, the flow rate for the temporary case at the end of phase 1 has also been calculated at approximately 150l/s from the new build site.

In order to achieve the flow rates above for all return periods, surface water attenuation will be required to temporarily store the volume of runoff generated on site. Where possible, any water to be stored is to be above ground to permit any volume losses possible. The estimated storage requirement for the site to achieve the required 230l/s will be 1810m³ to be distributed throughout the site between development phases.

S3 – Water Quality

The drainage design shall aim to direct runoff to a green SuDS feature where possible, to maximise interception (volume loss of small rainfall events) and treatment through natural biological processes.

The drainage design incorporates runoff from roofs, roads, parking and delivery areas, captured where possible in bioretention areas and swales which, subject to detailed design, will provide sufficient treatment for the catchments. The runoff treatment trains are evidenced in a Simple Index Approach alongside a detailed catchment plan which are to be included within the full SAB application.

S4 and S5 - Surface Water Amenity and Biodiversity

SuDS amenity and biodiversity benefits shall be provided by distributing green SuDS features across the site. Vegetation within SuDS features such as bioretention areas provide visual interest and habitat for wildlife.

An attenuation basin is proposed as part of the development with a boardwalk providing raised access to the densely planted area. An educational sign is proposed, to explain the roles of SuDS features around the site.

Proposed Foul Water Drainage Strategy

The development will result in foul drainage flows which shall be conveyed via gravity to the combined sewer which crosses the site. All foul drainage should be designed and constructed in accordance with Part H of the Building Regulations.

A response to a pre-development enquiry with Welsh Water has confirmed that the combined sewer and the downstream Wastewater Treatment Works (WwTW) both have capacity for the anticipated foul flows from the development.

Any connection of new foul flows to the sewer shall be subject to a S106 agreement with Welsh Water. No additional sewers are proposed as part of the development, and therefore no S104 agreement is currently required.

Due to the existing combined sewer passing through the proposed site, a diversion agreement (S185) is proposed to divert the sewer from the southeast of the site, through the proposed car park heading west and rejoining the existing sewer in the southwest corner of the site before continuing downstream.