

Proposed Extension works at Borrás Park Schools, Wrexham **Outline Drainage Strategy Report**

Issue 1.1

29th May 2020

Introduction

Borrás Park Primary and Infant School is located on Borrás Park Road, approximately 0.3km to the south west of the A5156 link road to Wrexham Industrial estate, with the centre of the site at National Grid Reference SJ 351 519. The proposed development comprises a 2 storey steel framed extension to the rear of the existing junior school with associated hard play areas, a small single storey extension to the front of the junior school and an extension to the current car parks to the junior and infant schools. The scheme also includes landscape enhancements, the creation of an ecology/forest school area with pond and the construction of two mixed use games areas (MUGAs).

Investigation Works

Topographical Survey

A topographical survey was completed for both the junior and infant school in March 2020 and incorporates the full extents of both sites and Borrás Park Road.

CCTV Drainage Survey

A detailed CCTV survey was undertaken to identify the current drainage arrangements on the junior and infant school sites.

Geotechnical Site Investigation

An on-site geotechnical investigation was undertaken by Groundsolve in Feb 2020 and a detailed ground investigation report produced. The Geotechnical report identified that the ground conditions briefly comprise topsoil or made ground over alluvium comprising sands, gravels, silts and localised clay layers all overlying sands and gravels.

In 2017, Ground Investigations were carried out on the adjacent site to the east of Borrás Park Junior School. The following key information is as follows.

Initial tests were carried out and permeabilities between 6.12×10^{-6} and 7.14×10^{-7} m/sec were calculated. However, in one of the boreholes the casing was pulled back to 4.5m, with a full head of water inside the casing, i.e. a volume of 432 litres. This water drained away immediately, following which water was then added at a rate of 20 l/min by hose for a period of 12mins, giving a further total of 240 litres. Therefore, some 671 litres of water soaked into the BH with a surface area of $1.5m^2$, with no recorded rise in the water level.

Soakaway testing was carried out on site as part of the ground investigation and a summary of the information provided is included below.

Soakaway testing was carried out in two trial pits, TP01 and TP02, in accordance with BRE 365, Reference 3. However, due to water inflow into the pit and instability of the sides, no fall in water level was recorded, and it was not possible to complete the tests.

A soakaway test was intended to be carried out in TP03 however a service was encountered, and it was therefore replaced with WS04. A falling head permeability test was performed, and the permeability calculated in accordance with

Reference 5. The borehole was filled with water and the falling water levels monitored over a period of up to 2hrs. only 1 No test was possible and the calculated permeability is presented in the table below

TP Ref.	Test	Depth (m)	Fall in water level (m)	Time for test (Hrs: mins)	Permeability (m/sec)
TP01	1	1.6	0.30	1:25	N/A
TP02	1	1.3	0.21	2:52	N/A
WS04	1	3	1.51	2:02	2.151×10^{-06}

It should be noted that the date on which the Site investigation was undertaken corresponds with a prolonged period of heavy rainfall which saw many areas of Wrexham under record flood levels. Therefore, the test results relating to on-site infiltration were likely to be adversely affected so additional infiltration testing was commissioned to be undertaken later in the year.

Additional Infiltration testing

Since the original site investigation works identified variable infiltration rates despite the extremely inclement weather, additional testing was undertaken in May 2020 with 3 no additional trial pits dug in order to carry out infiltration testing to BRE Digest 365.

Results from this additional testing confirmed a worst case infiltration rate of 8.09×10^{-5} .

Foul Drainage

Existing Drainage Network

Public sewer records have been obtained from Dwr Cymru Welsh Water (DCWW) which confirm the public sewer network within the vicinity of the site. The CCTV survey confirmed that the existing foul drainage from the junior school connects to the DCWW public sewer located in Borras Park Road into manhole DCWW ref SJ35511901. The existing foul drainage from the infant school connects to the DCWW public sewer located in Borras Park Road into manhole DCWW ref SJ35510801.

Proposed Foul Drainage

It is proposed to connect the new foul drainage from new toilets, wash handbasins, cleaners sinks and the new kitchen via gravity, into the existing foul drainage system on site. A network of new foul drainage pipes and manholes will collect and connect the new foul flows into the existing on-site foul drainage system via connection to existing on-site manholes. No new adoptable drainage runs will be required, and the additional foul flow will ultimately discharge into the Dwr Cymru Welsh Water (DCWW) sewer located in Borras Park Road, via the existing foul sewer connection from the Junior School.

Grease traps will be incorporated into the new above ground foul drainage system which will serve the new kitchen.

A Section 106 agreement will be required to obtain consent from DCWW to accept the additional flows from the proposed extensions and will be submitted in due course.

Surface Water Drainage

The Welsh Government Planning Policy Wales guidance states that “flood risk is a material planning consideration” and the Technical Advice Note 15: Development and Flood Risk (TAN15, 2004) also states that “surface water is a material consideration and explains that development should not create additional runoff compared with the undeveloped situation and re-development schemes should also aim to reduce run-off where possible.”

The aim of a surface water drainage strategy is to focus on the capture and management of surface water within the site boundary and ensure compliance with the following publications and organisations:

- Technical Advice Note (TAN) 15: Development and Flood Risk dated October 2004 issued by Welsh Government
- Welsh Government Guidance - Statutory standards for sustainable drainage systems (designing, constructing, operating and maintaining surface water drainage systems) - 2018
- Wrexham County Borough Council
- Building Regulations 2010 (Part H3)
- Sewers for Adoption 7th Edition
- Planning Policy Wales (Edition 9, November 2016) issued by Welsh Government
- Welsh Ministers Standards for Foul Sewers and Lateral Drains
- Wrexham County Borough Council Local Flood Risk Management Strategy April 2013
- The new Sustainable Drainage Systems (SuDS) Manual C753, CIRIA
- RainScape – Dwr Cymru Welsh Water
- SuDS Wales

In accordance with the above, surface water drainage systems are required to consider quantity, quality, amenity and biodiversity whilst preventing any likelihood of flooding to the site or adjacent sites. SAB guidance recommends that surface water runoff shall discharge to one of the following, listed in order of priority:

1. Surface water runoff is collected for use (rainwater harvesting)
2. Discharge to the ground
3. Discharge to a surface water body
4. Discharge to a surface water sewer
5. To a combined sewer where there are absolutely no other options and only where agreed in advance with the relevant sewerage undertaker.

It is necessary to identify the most appropriate method of controlling and discharging surface water. The design will seek to improve the local run-off profile by using systems that can either attenuate run-off and reduce peak flow rates or positively impact on the existing flood profile.

Existing Surface Water Drainage

The majority of the existing surface water run-off from the school buildings and hardstanding's is currently collected via gulleys and discharges to a network of soakaways located in areas of soft landscaping around the site. Certain gulleys and rainwater pipes appear to connect to the on-site foul/combined system which ultimately connects to the public sewers located in Borras Park Road. Refer to existing drainage survey for details.

Proposed Surface Water Drainage

Given that the majority of the existing surface water from the school discharges to ground via on-site soakaways and the fact that the infiltration tests confirm that the ground conditions will allow for infiltration on site, it is proposed to drain all new areas of hardstanding and building to ground via infiltration.

The main car park extension will be formed in tarmac but will incorporate permeable block paving to parking bays to collect surface water run-off and infiltrate to ground via a geotextile wrapped single size aggregate sub-base under the block paving parking bays.

Run-off from the new extension flat roof and external hardstanding will be collected via a buried French drain to the southern perimeter of the hard play area and connected to a shallow attenuation crate soakaway located in the soft landscaped area to the east of the site. The French drain will be laid to falls and outfall to a new pond within the proposed ecology area. The pond will be lined to allow a consistent year-round water level with an overflow from the pond connecting to the buried soakaway crates. The French drain will allow some degree of infiltration direct to ground prior to outfalling to the pond. The pond will allow a certain degree of storage and evaporation prior to discharging to the soakaway located under the playing fields. At this stage, the beneficial effects of infiltration within the French drain and storage within the pond have been ignored and the soakaway has been sized based upon a 1 in 100 yr. storm with 30% increase for climate change.

The two new MUGAs will be constructed in permeable tarmac with a single size stone sub-base allowing direct infiltration to ground.

See Appendix A for the proposed surface water outline design.

Contact with the SAB has been made to discuss the drainage strategy and to ensure it meets all SAB requirements before the SAB application is made.