

Engineers Comments Regarding Surface Water Drainage

Application Reference:	BE/40/22/PL	Reviewer Reference:	ADC/SB
Planning Officer:	Maria Tomalova	Date of Review:	15 June 2023
Site Name:	Former Bartons Infant School Romney Broadwalk Bersted PO22 9BH		
Application Description:	Demolition of former school building and erection of 20 No. new dwellings and associated car parking, cycle parking and landscaping. This site is in CIL Zone 4 (Zero Rated).		
Assessment Number:	3 of 1		

Policy and Guidance Information

Arun District Council Surface Water Drainage Guidance - <https://www.arun.gov.uk/surfacewater>

WSCC Policy for the Management of Surface Water-

https://www.westsussex.gov.uk/media/12230/ws_llfa_policy_for_management_of_surface_water.pdf

Land Drainage Consent - <https://www.arun.gov.uk/land-drainage-consent/>

Arun District Council surface water pre-commencement conditions -

<https://www.arun.gov.uk/planning-pre-commencement-conditions>

Response

No objection – requesting conditions (PCENG2, PCENG3, PCENG4, ENGD1)

Comments

Following the submission of additional and substitute documents we now have **no objection** to this application. It is not expected that surface water drainage design for the site will impinge on the proposed number of properties or layout – although the design may change.

It is noted that all the latest plans – provided via WeTransfer links - are not currently viewable on the public portal.

It is important to note that this consultation is based upon the site layout shown in the Drainage Layout 11653_1601_P7 and the Landscaping plans, including the **Illustrative Landscape Masterplan 1444-HED-DR-02-001- Rev P05** as shared with me on 28 June by Daniel Vick. Please ensure that the final approved site plan corresponds with the landscaping shown on these drawings. **I request that these proposed landscaping plans are approved – or, if landscaping is to be further handled via condition that the engineers are consulted on any application to discharge those conditions.**

Whilst the applicant has supplied a drainage documentation, it does not meet our detailed design requirements to avoid conditions being applied to the permission. Therefore, if you are minded to approve the application, **please do not list any drainage plans as approved and apply standard conditions PCENG2, PCENG3, PCENG4 and ENGD1** (listed at the end of this consultation) to ensure that the development is adequately drained and does not increase flood risk elsewhere.

Comments not affecting determination – no action required at this stage

Please see an attached comment tracker covering the progression of comments up to this point and detailing areas for further detail and review when an application is made to discharge conditions.

Suggested conditions

PCENG2 – Surface Water Drainage Design

“Development shall not commence, other than works of site survey and investigation, until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the Local Planning Authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in ‘Approved Document H’ of the Building Regulations, and guidance provided by the ‘SuDS Manual’ produced by CIRIA. Design considerations must take full account of the ‘Supplementary Requirements for Surface Water Drainage Proposals’ produced by Arun District Council, and are an overriding factor in terms of requirements. Winter groundwater monitoring to establish highest annual ground water levels and winter percolation testing to BRE 365, or similar approved, will be required to support the design of any infiltration drainage. No building / No part of the extended building shall be occupied until the complete surface water drainage system serving the property has been implemented in accordance with the agreed details and the details so agreed shall be maintained in good working order in perpetuity.”

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W SP1, W DM1, W DM2 and W DM3 of the Arun Local Plan. This is required to be a pre-commencement condition because it is necessary to implement the surface water drainage system prior to commencing any building works.

And the accompanying informative:

INFORMD

“Infiltration rates for soakage structures are to be based on percolation tests undertaken in the winter period and at the location and depth of the proposed structures. The infiltration tests must be carried out in accordance with BRE365, CIRIA R156 or a similar approved method. All design storms must include a climate change allowance, as per <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances> on stored volumes or rainfall intensity. Infiltration structures must cater for the critical 1 in 10 year storm event, (plus 40%) between the invert of the entry pipe to the soakaway and the base of the structure. All surface water drainage designs must also have provision to ensure there is capacity in the system to contain the critical 1 in 100 year storm event (plus 45%).

Freeboard is to be provided between the base of the infiltration structure and the highest recorded groundwater level identified in that location. Ideally this should be 1 metre where possible, as stated in the CIRIA Suds Manual guidance. However, on the coastal plain in particular, where geology dictates and where shallow perched/tidally influenced water tables are often present, this is unlikely to be achievable. Irrespective of this, infiltration must still be fully considered. Therefore, to maximise this potential and avoid utilising other less favourable methods of surface water disposal, the bases of infiltration structures are permitted to be immediately above the peak recorded groundwater levels where it is deemed necessary.

In areas where an aquifer is to be protected (subject to guidance from the Environment Agency) then a minimum 1 metre freeboard must be provided.

Suitable water treatment is required upstream to the point of discharge in all circumstances to minimise any groundwater pollution risk or detriment to the drainage network.

Any SuDS or soakaway design must include adequate groundwater monitoring data to determine the highest groundwater table in support of the design. The applicant is advised to discuss the extend of ground water monitoring with the council's engineers.

Supplementary guidance notes regarding surface water drainage are located at <https://www.arun.gov.uk/drainage-planning-consultations> on Arun District Council's website. A surface water drainage checklist is available on Arun District Council's website, this should be submitted with a Discharge of Conditions Application. Reference should also be made to the 'West Sussex LLFA Policy for the Management of Surface Water'.

PCENG3 – Watercourses

"The development shall not proceed until details have been submitted to and approved in writing by the Local Planning Authority for any proposals: to discharge flows to watercourses; or for the culverting, diversion, infilling or obstruction of any watercourse on or adjacent to the site. Any discharge to a watercourse must be at a rate no greater than the pre-development run-off values and in accordance with current policies. No construction is permitted, which will restrict current and future landowners from undertaking their riparian maintenance responsibilities in respect to any watercourse or culvert on or adjacent to the site."

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W DM1, W DM2 and W DM3 of the Arun Local Plan. And to ensure that the duties and responsibilities, as required under the Land Drainage Act 1991, and amended by the Flood and Water Management Act 2010, can be fulfilled without additional impediment following the development completion. It is considered necessary for this to be a pre-commencement condition to protect existing watercourses prior to the construction commencing.

And the accompanying informative:

INFORMD2

"Under Section 23 of the Land Drainage Act 1991 Land Drainage Consent must be sought from the Lead Local Flood Authority (West Sussex County Council), or its agent (Arun District Council land.drainage@arun.gov.uk), prior to starting any works (temporary or permanent) that affect the flow of water in an ordinary watercourse. Such works may include culverting, channel diversion, discharge of flows, connections, headwalls and the installation of trash screens.

The development layout must take account of any existing watercourses (open or culverted) to ensure that future access for maintenance is not restricted. No development is permitted within 3m of the bank of an ordinary watercourse, or 3m of a culverted ordinary watercourse."

PCENG4 – Maintenance Manual

"Development shall not commence until full details of the maintenance and management of the surface water drainage system is set out in a site-specific maintenance manual and submitted to, and approved in writing, by the Local Planning Authority. The manual is to include details of financial management and arrangements for the replacement of major components at the end of the manufacturer's recommended design life. Upon completed construction of the surface water drainage system, the owner or management company shall strictly adhere to and implement the recommendations contained within the manual."

Reason: To ensure that the proposed development is satisfactorily drained in accordance with policies W DM1, W DM2 and W DM3 of the Arun Local Plan. It is considered necessary for this to be

a pre-commencement condition to ensure that the future maintenance and funding arrangements for the surface water disposal scheme are agreed before construction commences.

ENGD1 – Verification

“Immediately following implementation of the approved surface water drainage system and prior to occupation of any part of the development, the developer/applicant shall provide the local planning authority with as-built drawings of the implemented scheme together with a completion report prepared by an independent engineer that confirms that the scheme was built in accordance with the approved drawing/s and is fit for purpose. The scheme shall thereafter be maintained in perpetuity.”

Reason : To ensure that the proposed development is satisfactorily drained in accordance with policies W SP1, W DM1, W DM2 and W DM3 of the Arun Local Plan.

Application Reference: BE/40/22/PL Site Name: Former Bartons Infant School Romney Broadwalk Bersted PO22 9BH			Initial Issue Date: 15 June 2023 Issue Date: 12/07/2023		
	ADC Drainage Comments	Applicants Response	ADC – 21/04/2023	Designer – 24/05/2023	ADC - 12/07/2023
Summary and Recommendation: No objection – request conditions (PCENG2, PCENG3, PCENG4 and ENG1)					
	Condition Number:				
1.			This application is classified as a major development, therefore it must meet all of the stipulations of the local plan policy W DM3. The current site plan and landscaping plans include no open features, this contrasts with the updated drainage layout [11642/1601 Rev P5] which shows a swale bordering the communal area in the centre of the site and a second swale south of plot 11 (shown as a native mix hedge on the landscaping plans). Multiple policy documents and guidance refer to the need for SUDS to deliver multifunctional benefits which are generally achieved through open features.	The landscape architect and architect have revised their plans to include these open features. Please see the attached plans from the Landscape Architect, included within the WeTransfer Link.	Ok – thank you point closed.
2.			If open features are required to meet policy requirements then these must be accounted for within the proposed layout and must not conflict with the POS or landscaping requirements of the site. There is currently no provision for this. All plans should be consistent to ensure that local plan policy is being met. If the proposed swales are included within the rest of the plans then the ecology officer must be consulted to determine whether these swales actually provide the biodiversity and amenity benefits that are required through local plan policy.	The swales are shown on the updated illustrative landscape masterplan, included within the WeTransfer link, for completeness, but are not part of the biodiversity or amenity plan.	The planning officer should consider whether the proposed SUDS strategy meets local plan policy W DM3 with regards to clauses c and d.
3.			The current landscaping design proposes one Red Oak tree and 8 Himalayan Birches planted directed over the area where the attenuation tank and storage blanket are proposed. This is inappropriate – drainage infrastructure and trees must not conflict. Tree roots have the potential to damage pipes, the tank and blanket liners which can cause groundwater ingress, loss of capacity and connectivity. Furthermore, the location of substantial drainage apparatus within 0.3m of ground level is likely to inhibit the growth of the proposed trees – please	We have coordinated with the landscape architect and the trees are now away from the tank. The tree pits eat into the storage blanket and we have taken this into account within the storage calculations. Please refer to the updated landscape architect's information (attached in the WeTransfer link) for details of the tree pits showing root barriers which will prevent ingress of roots into the adjacent drainage infrastructure.	I am satisfied that the proposed trees (in tree pits as detailed) will not impact the surface water drainage. Landscaping must be in accordance with the latest plans as listed in my consultation.

			consult the landscaping officer in this regard.		
4.			There also appears to be a proposed Quercus Rubra (Red Oak) located directly over the proposed outfall pipe east of plot 11. It is likely that this tree will need to be removed or relocated in the landscaping proposals.	This is now shown moved away from the outfall on the updated Soft Landscape Plan included within the WeTransfer link.	OK, updated plans now show this tree moved and all trees removed from the watercourse easement. Landscaping must be in accordance with the latest plans as listed in my consultation.
5.			The removal or reduction in number of proposed trees will likely impact the ecological assessment, please consult the ecology officer if there any alterations to the proposed landscaping strategy.	No trees have been removed, although some have been relocated. Please see the updated Landscape Plans attached in the WeTransfer link. To be clear, the changes made will have no impact on the conclusions made within the Ecology related documents submitted.	OK – point closed, although see point 4 above.
6.			I have not undertaken an accurate assessment of the calculations that have been provided as they are not supported by an impermeable area plan. However, it is clear that there is an error in the calculation of volume for the storage blanket which is proposed over the attenuation tank to provide extra capacity. The volume falsely assumes that the storage blanket will be a depth of 0.5m over it's full area, however on the basis of the levels provided, there will only be a depth of 0.1m available over the tank area once a 100mm sand surround is allowed for. Therefore an optimistic estimate (not allowing for the 0.1m sand surround to the sides of the tank) is that the storage blanket will only provide 20.4m3 – instead of the 36m2 allowed for in the design. This volume will need to be provided elsewhere.	Please refer to the attached revised Drainage Layout rev P6 and Micro Drainage Calculations. The system has been modelled with 0.2m of cover (minimum) over the blanket. The tank will not have a 100mm sand layer on its top side – the blanket will lie directly over it. Please note: To compensate for the loss of storage caused by the tree pits and the climate change increase of 40 to 45%, we have a) increased the area of the tank, b) increased the area of the storage blanket by extending it under the adjacent 2No parking bays, and c) around the sides of the tank have deepened the blanket down to bottom of tank level.	OK – whilst a detailed analysis has not been completed, I am satisfied that if further storage is required this can be accommodated by increasing the depth of the storage. Due to the complexity of the storage arrangement the designer will need to consider how to translate this clearly into the calculations. Site-specific construction details will also be required to ensure that it will be constructed as designed. This can be handled via condition.
7.	Please can you provide calculations to confirm the proposed geo-cellular storage will not become buoyant if the groundwater was to become elevated. The groundwater monitoring results suggest high groundwater across the entire site. The base of the geo-cellular storage system is ~1.5m below ground level (BGL) in the centre of the site, and all 3 of the groundwater monitoring results provided suggest groundwater levels will become elevated above this level.	Groundwater monitoring was carried out from 24th November 2021 to 30th March 2022 by Risk Management Ltd. The results are contained in the appendix to this note. The peak GW level was recorded as 1.84m AOD on 24th November 2021 within BH3 and 2nd February 2021 in BH1. The tank invert is 1.835m AOD therefore, this figure has been used in the floatation calculations appended. These show that the tank is not in danger of floatation.	The referenced groundwater monitoring data does not appear to be included within the appendices of the technical note. In any case, evidence of groundwater levels at approximately 1-1.1mbgl has already been presented in the FRA, this monitoring being from three separate points on the site. Comparison with the later data will be necessary before we will consider the use of a lower peak groundwater level than that already evidenced.	Please find attached the entire suite of groundwater monitoring results. The highest groundwater level reading is circa 1m below ground level and the attached calculations show that with this reading the tank does not float with the inclusion of the required safety factor. The ground level used as a datum is existing which is slightly lower than proposed in the area of the island.	Ok – thank you point closed.

	Consequently, we would request that calculations are submitted to confirm that the proposed SuDS will not need to be altered in order to accommodate the expected high groundwater levels. At this stage in the planning process, we anticipate a worst case groundwater level will be encountered, based on the testing provided. At present the FRA suggests in section 2.6 that this will be around 1.0m BGL.				
8.	Additional information should be provided on the proposed SuDS to show how the treatment provided to the runoff will impact the water quality. We are concerned that there may be insufficient space if additional SuDS are required to ensure a suitable quality of water is discharged offsite. We request that calculations are provided which follow the Basic Index Method, to confirm that the proposed SuDS will treat runoff sufficiently.	See attached calculator sheets taken from the Susdrain web site which show treatment for water falling on residential roads and car parking is sufficiently treated by the permeable paving and swale provided.	This is not an accurate representation of the design. The roof water on the site is not diverted through permeable paving as the Susdrain calculators imply. In reality permeable paved driveways are linked separately to the positive network and roof water is piped directly to catchpit inspection chambers with no treatment. Furthermore, whilst some sections of the road may drain to the swales in the communal garden area (if these are indeed proposed – see above) there are at least five road gullies that appear to discharge to the network with limited treatment.	We have adjusted the design to provide permeable paved areas at the end of the roads on the east part of the site. This removes the need for road gullies, except at the entrance by plot 9 where a smart sponge is shown in the gully on the bellmouth to treat runoff. The CIRIA SUDS guide shows roof water does not need treatment other than a catchpit.	Ok – thank you point closed.
9.	A 10% allowance for urban creep should be applied to the design. A 10% allowance does not appear to have been applied. Given the limited available space to expand the crate system, it is important to consider urban creep at this stage in the planning process, as additional storage may be required.	10% has been added to the calculations for all the plots and drainage layout updated accordingly. See attached revised microdrainage calculations and drawing 11642/1601 rev P5.	Unfortunately the previous calculations have not been uploaded to the public portal and therefore I am unable to compare them to the latest revision. No impermeable area plan has been provided.	Please see attached an Impermeable Area Plan which can be cross-referenced with the calculations to see that 10% urban creep has been applied.	Ok – thank you point closed.
10.	We require the fences to be at least 3m from top of bank, between the development and ancient watercourse, to ensure that the proposals are in accordance with our land drainage byelaws. This easement should be delineated and confirmed on the drainage layout plan. From the information provided it appears that a 2m easement (approximately) has been provided for access and maintenance of the watercourse at present. It is recognised that no buildings are located within 5m (as is also required).	We have clarified the location of the top of the bank of the watercourse and shown a 3.5m easement to a relocated fence line location on amended drawing 11642/1601 rev P5 appended.	OK thank you. The same easement will need to be shown on all proposed site layouts and landscaping plans going forward.	Please see Landscape Architects drawings attached in WeTransfer link.	OK – thank you point closed.

11.	We are unsure how the ditch / small watercourse adjacent to the site connects to the nearby main river and we have concerns regarding how onward connection from the development site to this watercourse, or the main river will be achieved. The drainage layout shows the proposed onward connection to the main river crossing the smaller ditch channel. There is likely to be works required to facilitate the connection as shown, or to ensure the ditch / small channel is fit for purpose and has onward connectivity to the main river if a connection to this feature is proposed at the detailed design stage. We require additional details of the proposed connection, including whether an existing connection between the main river and smaller channel is present. We require details of how any pipework can be accommodated / will pass through the area where the existing ditch / channel is. This pipework should remain above the water level within the main river.	We have searched the area and we cannot find connectivity between the small watercourse and main river due to dense undergrowth. The proposed connection is mimicking the existing school outfall location which is shown on the survey plan appended. The only reason this existing outfall was not used was that it is not in a convenient location for future maintenance, as the manhole falls in the garden of plot 13. The level of the existing outfall is likely to be somewhere in the region of 1.4m AOD (as upstream chamber is 1.54m) which is what we are proposing, so the new outfall will have no more impact than the existing, especially taking into account this used to have no flow restriction from the school site. The main river ditch bed level has been surveyed at approximately 1.020m AOD in the vicinity of the connection with no water level in the river present. So the connection is 380mm above the bed level which we feel is more than sufficient.	The viability of the blind ditch crossing is critical to the proposed surface water drainage strategy and the layout of the site. The designer needs to be able to evidence that a gravity connection can cross beneath the hard bed of the blind ditch with sufficient freeboard between the hard bed and the top of the pipe bedding, whilst also achieving an acceptable outlet invert level into the main river.	Please find attached a drawing showing long and cross sections of the storm outfall as requested.	OK – point closed. It is considered that the 45mm freeboard between the top of the pipe surround and the blind ditch bed is less than we would like. At detailed design stage this may need to be increased and pipe protection in the form of a class 2 pipe bed and surround will be necessary at this location.
NOT AFFECTING DETERMINATION – NO ACTION REQUIRED AT THIS STAGE					
12.			Updated buoyancy calculations based on peak evidenced groundwater levels.		Ok – thank you point closed.
13.			A flood risk activity permit will be required for the proposed connection to the main river and removal of the existing outfall. This will need to be evidenced as part of an application to discharge conditions if the application is approved.	This is an application to the Environment Agency. By “evidenced” do they mean proof of application or consent for the permit? If the latter, this will take many weeks. One should allow for 2 months for a standard permit on top of a 2–3-week determination stage: On the other hand, we could register for an exemption as I believe we meet (or can arrange to meet) criterion 12 - “Outfall pipes less than 300mm diameter through a headwall (FRA12)” from the following link: https://www.gov.uk/government/publications/environmental-permitting-regulations-exempt-flood-risk-activities/exempt-flood-risk-activities-environmental-permits	The consent (or exemption) can be provided as part of an application to discharge conditions if planning permission is granted.
14.			Land drainage consent would normally be required for the proposed crossing of the blind ditch. However, Paul Cann has agreed that oversight of the crossing may be covered under the planning process and no LDC will be required. It is likely	See answer to previous point	As above.

			remediation and maintenance works that are required to the receiving watercourses to ensure they are capable of receiving proposed flow. At the DOC stage we will expect full details of this to be provided.		
15.			The existing connection to the main river will have to be properly abandoned. The piped network will ideally need to be grubbed out, otherwise it may be filled with concrete.	I have added a note next to the existing connection on the Site Drainage plan to cover for this.	Ok – thank you point closed.
16.			The infiltration testing that has been carried out does not show drain down times from 75-25% across all 3 tests, as in most cases a single test has been carried out. If the permeable surfacing / paving with infiltration is included in the detailed design, BRE 365 compliant infiltration tests will be necessary to support the calculations. This area cannot be excluded from the impermeable areas in the drainage model unless this additional testing is carried out.	We are not proposing to discharge surface water runoff to ground due to the high groundwater levels, so this comment doesn't apply. Where we are showing permeable surfacing/paving, it is a lined system with discharge to the piped system.	OK, groundwater levels are unlikely to inundate any permeable paving and therefore we would seek to leave the permeable paving lined with a permeable liner. The system should still be designed as attenuation with the design rate set to zero for the calculations. This will allow any minimal infiltration to occur when possible.
17.			A detailed maintenance and management plan has been made a condition of planning. For the DOC application full maintenance details will be required, including information on responsible parties, expected costs and funding for ongoing maintenance.	Noted. We already show a DMMP appended to the FRA which we can expand on and issue as a separate document.	OK – to be handled at a later stage.
18.			Detailed design / construction drawings will be required as part of the DOC application, these will need to be prepared in accordance with ADC's guidance and checklist (link below).	Noted.	OK – to be handled at a later stage.
19.			The applicant should confirm that the SuDS have been excluded from the landscaping / open space allowance calculations by providing a summary table of the developed and open space allowance areas.	Confirmed they are excluded. Please see Landscape Architect drawings in WeTransfer link – table requested shown on 'Open Space Areas Plan' drawing.	OK – planner to assess.