Engineers Comments Regarding Surface Water Drainage

Application Reference:	BN/167/24/HH	**Reviewer Reference:**	ADC/SB
Planning Officer:	Hebe Smith	**Date of Review:**	14/02/2025
Site Name:	8 Downview Road Barnham PO22 0EE		
Application Description:	Demolition of existing kitchen and bay windows and construction of single and two storey side and rear extensions. First floor added to existing footprint.		
Assessment Number:	1 of 1		

Policy and Guidance Information

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

Land Drainage Consent – https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent/
and
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

The SuDs Manual [C753] by CIRIA

Sustainable drainage systems: non-statutory technical standards'
https://assets.publishing.service.gov.uk/media/5a815646ed915d74e6231b43/sustainable-drainage-technical-standards.pdf

Response	**No objection subject to condition**

Critical Items for Surface Water Drainage Design Conditions

The failure to adequately address the following items will result in an objection to a surface water drainage design.

If any of these items are inadequately addressed by the submission, then their correction may result in a redesign of the surface water drainage scheme. A redesign is likely to have site wide implications such as the potential for storage structures to increase in volume or plan area.

Critical Item	Reason	Status
Winter groundwater monitoring data.	Adequate winter groundwater monitoring data must be supplied to evidence that infiltration designs have sufficient freeboard from the base of structures and the peak groundwater level. The same data is necessary to ensure that the potential for buoyancy has been adequately considered in attenuation designs.	**Compliant**

Winter infiltration testing data.	Adequate winter infiltration testing must be supplied to justify the proposed discharge method and design infiltration rates. Infiltration tests must be completed strictly in accordance with BRE DG 365, CIRIA R156 or a similar approved method. Testing depths must account for peak groundwater levels and correspond with the location and depth of proposed infiltration features. Designs must be based upon the slowest infiltration rate evidenced closest to a proposed infiltration feature. Average design rates will not be accepted. The results of incomplete tests should not be extrapolated to obtain design values for infiltration rates.	**Insufficient for detailed design**
The hierarchy for sustainable drainage.	The proposed discharge method must accord with the SuDS hierarchy as given below. Evidence must be supplied to justify the proposed discharge method. 1. Rainwater reuse where possible. 2. Complete discharge into the ground (infiltration). 3. Hybrid infiltration and restricted discharge to an appropriate water body or surface water sewer. 4. Restricted discharge to an appropriate water body. 5. Restricted discharge to a surface water sewer. 6. Restricted discharge to a combined sewer. A water body may be defined as a river, watercourse, ditch, culverted watercourse, reservoir, wetland or the sea. **Engineers cannot support any proposed connection of surface water to the foul sewer.**	**Compliant**
Calculations	Calculations for pre-development run off rates must be based upon the positively drained area only. Proposed discharge rates must not increase flood risk on site or elsewhere. Discharge	**Not supplied**

	rates must be restricted to QBAR or 2 l/s/ha, depending on whichever is higher.	
	Designs must be based on the most recently available rainfall data at the time of conditions being applied. **FSR rainfall data will not be accepted.** FEH rainfall data is based upon more recent records and continues to be updated.	**Not supplied**
	Designs must use the correct climate change allowances at the time of determination of the outline or full planning application. CV values for all events must be set to 1. This includes summer, winter, design, and simulation events. The correct allowance for urban creep must be applied. Additional storage must be set to zero unless it can be evidenced where this is provided. Infiltration half-drain times must be less than 24 hours. Infiltration design rates must be applied to the sides of soakaways, or to the base of infiltration blankets. Design rates must not be applied to both the base and sides of infiltration structures. A surcharged outfall must be modelled.	**Not supplied**
Natural catchments design.	The submission must define the natural drainage characteristics within, and hydraulically linked to, the site and demonstrate that the drainage proposals will integrate with and not compromise the function of the natural and existing drainage systems. The condition, performance (including capacity where appropriate) and ownership of any existing site surface water drainage infrastructure must be accurately reported. Appropriate easements to watercourses and other services must be shown on all plans. Where there are areas of flood risk from any source on the site, it must be shown how a sustainable surface water drainage design can	**Insufficient for detailed design.**

	be accommodated on the site without conflicting with those areas of flood risk. Designs must replicate the natural drainage catchments of the site. All surface water drainage designs must therefore drain via gravity to corresponding points of discharge. **The use of pumps for surface water drainage is not sustainable and will not be supported**. .	
Plans	Plan areas, depths and levels of drainage infrastructure must accurately correspond with the supporting calculations.	**Calculations not supplied**
Water quality benefits.	An assessment of water quality is necessary to evidence that the proposed design provides adequate treatment of surface water.	**Insufficient for detailed design– design options at present.**
Biodiversity and amenity benefits.	The surface water drainage design must provide biodiversity and amenity benefits.	**Insufficient for detailed design– design options at present.**
Trees and planting	There should be no conflict between surface water drainage infrastructure and existing or proposed trees or planting. The design must consider the potential growth of proposed trees and adequate mitigation must be provided to protect drainage infrastructure where conflict **cannot** be avoided.	**Compliant**

Drainage Impact on Other Planning Matters

This application has been assessed with regards to surface water drainage design only.

Other planning matters occasionally effect the surface water drainage design. If plans relating to other matters have been assessed for their impact on the proposed drainage, then it must not be assumed that they have been assessed for any other purpose. The planning officer is advised to check for conflicts with any existing approved plans and to consult any relevant consultees as appropriate.

It has been identified that the following consultees may have comments about the plans that have been submitted and reviewed for this application:

☐ Landscaping officer (proposed trees and landscaping)
☐ Tree officer (existing trees)
☐ Environment Agency (main rivers and fluvial/tidal flood risk, groundwater source protection zones)

☐ Southern Water (foul drainage and surface water disposal to public sewer network)
☐ Portsmouth Water (groundwater source protection zones)
☐ Lead local flood authority (all other sources of flooding and ordinary watercourses)
☐ Other:
☒ None

Additional comments to the planning officer

The NPPF states that when determining any planning application, local planning authorities should ensure that flood risk is not increased elsewhere (paragraph 181, 182 and 187e). The PPG guides local planning authorities to refer to 'Sustainable drainage systems: non-statutory technical standards' and detailed industry guidance like The SuDS Manual [C753] by CIRIA to guide decisions about the design, maintenance, and operation of sustainable drainage systems for non-major development.

This consultation has been primarily informed by The SuDS Manual.

The following documents have been submitted to support the application with reference to surface water drainage:

- Groundwater Investigation Report for 8 Downview Road, PO22 0EE
- Infiltration Testing Report – 8 Downview Road, Barnham
- Greenfield runoff rate estimation for sites – 8 Downview Road
- Drainage & Impermeable Area Plan
- Proposed Surface Water Disposal Strategy
- Surface Water Storage Requirements for Sites – 8 Downview Road
- Proposed Design Statement
- Surface Water Drainage Statement

The disposal strategy and other statement indicate that ultimately surface water will be drained via infiltration (to ground). We are supportive of this strategy. However, insufficient evidence has been submitted to confirm design infiltration rates at the depths of likely infiltration structures on the site.

The applicant has submitted groundwater monitoring and infiltration testing, these give the impression that infiltration should be possible. Groundwater has been evidenced to peak at 1.905m. This means that 1m of unsaturated ground between the groundwater and base of any infiltration structure can be achieved.

An infiltration test has been submitted which demonstrates an infiltration rate that would comfortably achieve our half drain requirements. However, the infiltration testing is not fully BRE DG 365 compliant, as only one test was completed – as opposed to the three consecutive tests stipulated by the guidance. Repeated testing is necessary to evidence how the ground drains when it is saturated, it is expected that the design rate will be slower once winter BRE DG 365 testing has been completed.

Whilst the site investigations are inadequate for detailed design purposes, they evidence that an infiltration design is likely to be achievable on the site. The high-level design is robust, includes consideration of biodiversity, water treatment and amenity. We support the overarching strategy,

however we will need to check the detail of the design – including the calculations before it is approved.

If the planning officer is minded to grant planning permission, then it is requested that the following condition is applied to the decision notice. The applicant has not provided enough evidence to demonstrate the detail of the surface water drainage design and that it will not increase flood risk, therefore it will need to be scrutinised further. It is accepted that it is unlikely that the surface water drainage design would affect the layout or scale of the proposed development.

Suggested condition

Prior to the commencement of development, full details of the proposed surface water drainage scheme must be submitted and approved in writing by the local planning authority. The full details submitted for approval shall include:

1. Winter groundwater monitoring,
2. Winter infiltration testing strictly in accordance with BRE DG 365 or similar approved,
3. Details of the proposed method and location of surface water disposal, in accordance with the SuDS hierarchy,
4. Impermeable area plan,
5. Calculations modelling the surface water drainage network for the following storm events:
   a) 100% Annual Exceedance Probability [AEP]
   b) 10% AEP + climate change allowance
   c) 3.3% AEP + climate change allowance
   d) 1% AEP + climate change allowance
   All storm events must include an allowance for urban creep and surcharged outfalls where appropriate,
6. Detailed drainage plans conforming to Local Planning Authority guidance,
7. Specifications for all surface water drainage components and associated infrastructure or flow control mechanisms,
8. Any relevant permissions relating to the discharge location, works to watercourses or adoption of the SuDS scheme.

The scheme shall then be constructed as per the approved plans. The surface water drainage scheme shall remain for the lifetime of the development unless agreed in writing by the local planning authority.

Reason: In order to comply with policies (insert) of the Arun Local Plan and the NPPF.

A reduced **site-specific** version of our full surface water drainage design checklist is provided below. This has been edited to remove elements that are not applicable to this site, either due to the scale of the proposal or the method of disposal. The checklist is provided to assist the applicant and designer in preparing a detailed design to meet our requirements. It is applicable to 8 Downview Road only.

- Items highlighted as ☐ must be provided prior to determination to overcome our objection.
- Additional comments or notes are provided by the reviewer **in bold**.
- If an item has been submitted this is checked: ☒
- For HH, OUT, RES and PL applications only: All other items are assumed to be handled via a condition applied to the permission if given.

Our requirements and comments are elaborated upon or condensed within a separate comment tracker where necessary. If a comment tracker is provided a designer is encouraged to refer to this and respond to comments to aid further review. Please request a .docx version of this document to by email to land.drainage@arun.gov.uk if needed.

The full unedited surface water design checklist is available on our website at https://www.arun.gov.uk/surfacewater/. **If the design is amended following receipt of our consultation the designer may need to refer to the full checklist to ensure that the revised design meets our requirements.**

Ground Investigation Results

Groundwater monitoring – Accepted, GW peak at 1.905m bgl or 9.945mAOD (Rear) and 1.961m bgl or 9.869mAOD (Front)

☒ Plan showing location of monitoring points provided.
☒ Depths of holes detailed.
☒ Dates of observations and depth to groundwater recorded.
☒ Evidence of the strata within borehole or monitoring pits provided.

Requested to aid speed of assessment
☐ Plan showing the peak groundwater levels at each monitoring point in mAOD.
☒ Peak groundwater levels recorded in metres below ground level and mAOD.

Infiltration testing – further testing required as it was not repeated three times in accordance with BRE DG 365.

☐ Completed strictly in accordance with BRE DG 365, CIRIA R156 or a similar approved method.
☒ Plan showing location of trial pits provided.
☒ Pit dimensions provided.
☒ Depths of testing provided.
☒ Dates, times and readings of each test recorded.
☒ Calculations for the infiltration rate for each test provided.
☒ Evidence of the strata within trial pits provided.
☒ Test locations, and depths correspond with the expected location and depths of proposed infiltration features.

Requested to aid speed of assessment
☐ Depths of testing provided in m below ground level and mAOD.

Surface Water Drainage Statement

Disposal method (Select as appropriate)

☒ Rainwater reuse is proposed where possible.
☒ Infiltration is proposed and maximised wherever possible.

Disposal method justification

☐ Infiltration has been adequately investigated, in winter, at appropriate and varying depths where appropriate, above peak recorded winter groundwater levels at the given location.

Requested to aid speed of assessment
☐ Any previous relevant correspondence or pre-application advice from the Local Planning Authority [LPA] or the Lead Local Flood Authority [LLFA] regarding the surface water drainage design is included with the statement. **– Assumed N/A**

Existing Site

Essential
☒ It is clear what the natural drainage characteristics of the site and hydraulically linked areas are.
☐ Natural flow paths are identified on a plan (where applicable).
☐ Existing site drainage features are investigated – condition, performance, and ownership.

☒ Existing and future flood risk from any source is detailed.

It is suggested that the above is achieved with the following, which may be combined where appropriate:
☒ An existing topographical plan.
☐ An existing site surface water drainage plan (where applicable).
☒ Flood maps (fluvial, tidal, pluvial, groundwater, sewer, and reservoir) are supplied (or Flood Risk Assessment referred to).
☐ Confirmation and surveys of any existing drainage infrastructure on the site.
☒ Full details of any known flooding on the site.

Proposed Design
Essential
☒ Statement confirming the proposed design criteria including fixed design calculation inputs for the SuDS system. Examples include:

- **Climate change allowances, incorrect**
- Urban creep allowance,
- **CV values, to be agreed**
- Rainfall data,
- **MADD factor or additional storage. – to be agreed**

☒ Natural catchments are followed.
☒ The design is gravity based with no use of pumps.
☐ Where there is existing drainage infrastructure on the site it is clearly explained or illustrated what is being retained, upgraded, or removed.
☐ If the surface water drainage is designed to flood in the 1% Annual Exceedance Probability [AEP] + Climate Change Allowance [CCA] event, then the flood volume is contained safely on site without flooding any part of a building or utility plant susceptible to water or affecting safe access or egress. **– Assumed N/A**

☒ The design provides and evidences interception drainage and is able to capture and retain on site the first 5mm of the majority of all rainfall events.
☒ Water quality and treatment is adequately assessed – with an assessment appropriate for the scale and proposed use of the site.
☐ There are no clashes with other infrastructure.
☐ Self-cleansing velocities are achieved where pipes are proposed.

☒ 1m freeboard is provided between peak groundwater levels and the base of any infiltration feature.

☒ Amenity benefits are provided by the drainage system (assessed by others).
☒ Biodiversity benefits are provided by the drainage system (assessed by others).
☒ Landscaping has been designed to ensure ease of maintenance of drainage assets.
☒ The justification and criteria for tree root avoidance and mitigation measures is clear, referencing adopting body standards where applicable. **N/A**
☒ Biodiversity and ecological enhancements do not impede the functionality, maintenance or capacity of the drainage system.

☐ A maintenance plan for the SuDS system, appropriate to the scale of the development, is submitted. [Please refer to our SuDS Maintenance Checklist where this is stipulated by condition.]

Preferred
☒ Ground raising is avoided where possible.

Impermeable Area/Catchment Plan

Essential
☒ An impermeable area plan is provided showing all positively drained areas including open surface water storage plan areas.

Preferred
☒ Impermeable areas are shown in m^2 on the impermeable areas plan(s).
☐ Demarcated impermeable areas correspond with the distribution of those areas in the supporting calculations.

Surface Water Drainage Calculations

General
☐ The most recently applicable, or previously agreed FEH rainfall data is used.
☐ CV values for all events are set to 1. This includes summer, winter, design, and simulation events.
☐ The correct climate change allowances, appropriate for the full lifetime of the development, have been applied to all calculations.
☐ A 10% allowance for urban creep is applied to all residential roof areas.
☐ 100% Annual Exceedance Probability [AEP] + Climate Change Allowance [CCA] (1 in 1 year) event calculations provided.
☐ 10% AEP + CCA (1 in 10 year) event calculations provided showing that the incoming pipe to any infiltration feature is above this level.
☐ 3.33% AEP + CCA (1 in 30 year) event calculations provided showing that the full surface water volume is contained within the designed system without flooding.
☐ 1% AEP + CCA (1 in 100 year) event calculations provided showing that the full surface water volume is contained safely on site, without flooding any part of a building or utility plant susceptible to water or affecting safe access or egress.

Infiltration
☐ Half drain times do not exceed 24 hours for the 10% AEP + CCA and 1% AEP + CCA events.
☐ If half drain times exceed 24 hours for the 1% AEP + CCA event, then advice and agreement from the LPA has been sought and submitted.
☐ The most precautionary design infiltration rate is used.
☐ Design infiltration rates are applied to the sides of soakaways only.
☐ Design infiltration rates are applied to the base of permeable paving, infiltration blankets or basins only.
☐ Where the design infiltration rate is applied to the base an appropriate factor of safety is applied.

Requested to aid assessment
☒ FEH22 point descriptors for the site are provided.

Drainage Plans and Specifications

Essential
Plans are provided showing:

☒ The proposed design within the proposed site layout. **Options and high level – will require refinement**
☒ Existing levels.
☐ Proposed levels.
☐ Exceedance flow management routes.

These plans must be of sufficient detail that a reviewer can be confident that the design can be constructed without flood risk being increased on site or elsewhere.

Specifications are required for all materials used in the design. We suggest that this is best achieved and illustrated with site specific construction detail drawings. The combination of construction details, with plans and sections, ensure that the proposed standard of construction will facilitate adoption and maintenance by an appropriate body and have structural integrity.

The following checklist is designed to demonstrate the level of detail required:

Easements
☐ Any appropriate easements as stipulated by any public or private utility provider shown on all plans. **Assumed N/A**
☒ Infiltration features (aside from permeable paving that does not take any extra impermeable catchment such as a roof) are shown at least 5m from buildings or structures.
☒ Existing and proposed trees and their **root protection zones** are shown on any drainage layout.

Detail
☐ It can be clearly determined what a pipe's diameter, pipe materials, gradients, flow directions and invert levels are from the plans.
☐ It can be clearly determined what an inspection chamber or manhole's cover level, invert level, cover loading grade and sump depth (where applicable) are from the plans.
☐ All infiltration features (including permeable paving) are clearly labelled with their dimensions, invert/base levels and cover levels.
☐ If the 1% AEP + CCA event floods, then the extent and depth of the flooding is shown on a site plan. This plan includes proposed external ground levels and finished floor levels of buildings.
☐ Potential flow routes off site are shown. The plan also includes proposed external ground levels, finished floor levels of buildings and designed slopes on all impermeable surfaces such as highways or car parks.
☐ Construction detail drawings are site specific.
☐ Construction detail drawings are provided for all components including but not limited to:

- ☐ Infiltration structures
- ☐ Manholes/inspection chambers
- ☐ Catchpits/silt traps
- ☐ Permeable paving
- ☐ Channel drains
- ☐ Pipe bed and surround
- ☐ Pipe to pipe connections
- ☐ Bio-retention systems
- ☐ Green roofs
- ☒ Water butts or alternative methods of water reuse – also to be shown on plans.

<u>The following items are requested to aid assessment or confidence in construction:</u>

☐ Where features have a non-uniform plan area, a plan showing the coordinates of the perimeter is provided.
☐ All drainage infrastructure is labelled to correspond with the supporting calculations.

Other
☐ Open feature planting specification is provided (to be assessed by others).

This checklist is designed to aid an applicant with their submission. The list is not exhaustive, and our engineers may request additional information to enable them to review a proposal to their satisfaction.

The checklist may also request information that an applicant does not feel is relevant to their submission. In this case the applicant can provide an explanation as to why they have omitted certain information in their drainage statement. However, the appraising engineer reserves the right to request this information if they believe it is necessary for their review.

[redacted]

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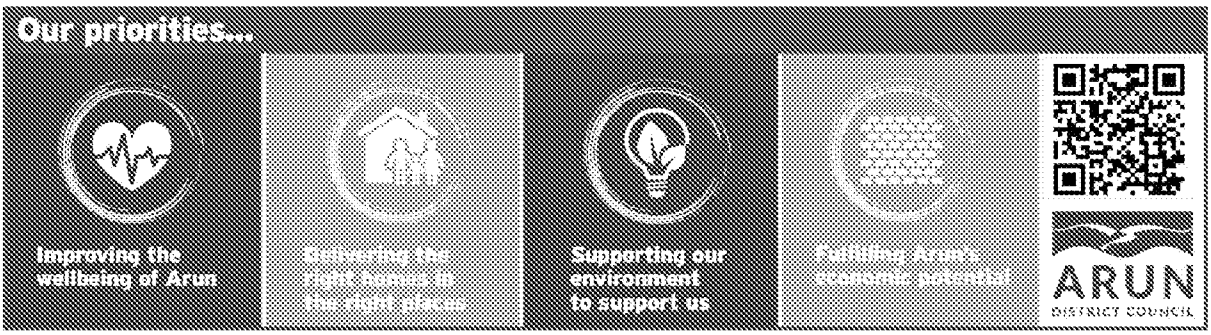

From: Sarah Burrow <Sarah.Burrow@arun.gov.uk>
Sent: 14 February 2025 11:58
To: Planning.Responses <Planning.Responses@arun.gov.uk>
Cc: Hebe Smith <Hebe.Smith@arun.gov.uk>; Paul Cann <Paul.Cann@arun.gov.uk>
Subject: RE: Planning Consultation on: BN/167/24/HH

Hi Hebe,

Find my consultation – no objection subject to condition – attached. Apologies for the delay in response.

Kind regards

Sarah Burrow
Flood Risk and Drainage Engineer, Coastal Engineers and Flood Prevention

[redacted]

Usual working pattern:
Monday – Flexible between 8am and 6pm
Tuesday and Wednesday – 9:15am to 2:45pm
Thursday – 9am to 6pm
Friday – Flexible between 8am and 6pm

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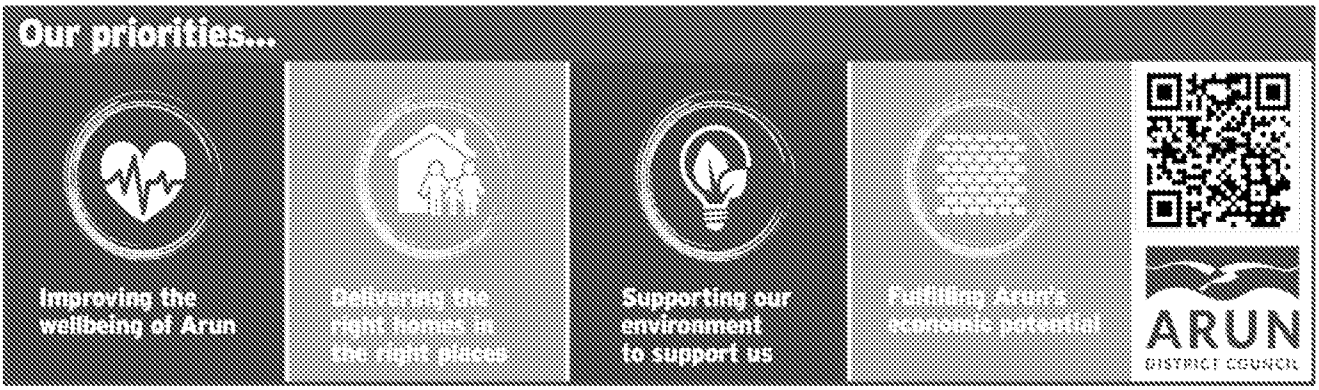

From: Planning.Responses <Planning.Responses@arun.gov.uk>
Sent: 30 December 2024 12:19
To: Land Drainage <Land.Drainage@arun.gov.uk>
Subject: Planning Consultation on: BN/167/24/HH

To: **Engineers (Drainage)**

NOTIFICATION FROM ARUN DISTRICT COUNCIL

Town & Country Planning Act 1990 (as amended)
Town & Country Planning (Development Management Procedure) (England) Order 2015

Planning Permission for Works or Extension to a Dwelling

Application No:	**BN/167/24/HH**
Registered:	23rd December 2024
Site Address:	8 Downview Road Barnham PO22 0EE
Grid Reference:	495356 105225

Description of Works: Demolition of existing kitchen and bay windows and construction of single and two storey side and rear extensions. First floor added to existing footprint.

The Council have received the above application.

Click here to view the application details

This application has been identified as CIL Liable. Therefore please be aware that, in accordance with Appendix 2 of the Arun CIL Charging Schedule, your consultation response should only include requests for Section 106 for onsite mitigation, Pagham Harbour Management Contributions (if applicable} or Affordable Housing. "Off" Site mitigation measures directly related to this development should be dealt with by condition if possible to ensure the scaling back of Section 106 if possible. CIL contributions will be used for "off" site infrastructure mitigation schemes. Therefore if this proposal triggers the need for "off" site mitigation, please ensure that you engage in the CIL Infrastructure List Consultation process upon receipt of a consultation letter.

Should you have any comments to make, these should be sent by replying to this email by 30th January 2025 . You can also monitor the progress of this application through the Council web site:

https://www.arun.gov.uk/planning-application-search

The application will be determined having regard to the development plan policies (if any are relevant) and other material considerations. The development plan can be accessed via the website https://www.arun.gov.uk/development-plan as can information on what comments we can consider https://www.arun.gov.uk/planning-application-comments

Please be aware that any comments you may make will be available on our website so please do not insert personal details or signatures on your reply.

Should the application go to appeal the Planning Inspectorate will publish any comments made to the Council on their website:https://acp.planninginspectorate.gov.uk/ but they will protect personal details.

When the appeal relates to a householder application there will be no opportunity to make further comments.

In the absence of a reply within the period stated, I shall assume that you have no observations to make.

Yours sincerely

Hebe Smith

Planning Officer- Arun District Council

Telephone: 01903 737626

Email: hebe.smith@arun.gov.uk

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