

From: [Joann Meneaud](#)
To: [Paul Roberts](#); [Christien Lee](#); [Peter Dutton](#)
Subject: FW: Hill Farm, Hempsted appeal 20/00315/OUT drainage
Date: 20 July 2022 08:42:23
Attachments: [image010.png](#)

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Hello,
Sorry if this is a bit confusing but here are the comments in relation to surface water drainage.

Latest comments in green and the immediate text below relates to the basin design.

If you could let me know in the next couple of days, whether you would be intending to submit the modified basin design and sections, that would be helpful.

As we discussed with the affordable housing proposals, it would be very helpful if we could have all the new/revised/updated information in one document that we can refer to and condition as necessary, and so it is clear to all of us what the proposals are, and to make it easier for the Inspector to read/understand.

Thanks
Joann

Hi Jo,

Very slightly modified comments below – the only slight change from yesterday being that the extra length and width
My preference would be to get modified basin layout and sections from them prior to determination, otherwise this unsuitable basin layout may re-appear at detailed design and slip through if no-one is checking.

If that is not possible then a carefully worded condition would suffice.

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Hi Jo,

I have commented on this one by means reference to my earlier comments which are shown below.

Latest comments are shown in green font.

In summary, all my comments have been addressed apart from the issue of demonstrating acceptable / safe basin design.

In order to make the design acceptable, the basin will need to occupy a larger footprint than currently shown
If there is confidence that there is space to accommodate this increase in basin size, and still deliver the number of units proposed, then the modifications can be dealt with at detailed design stage. Otherwise, revised proposals should be submitted prior to determination.

The reasons a larger basin footprint is required is because:

- It needs to incorporate a wider (industry standard) minimum 3.5 m wide dry safety/maintenance bench; it currently has a 1 metre dry safety bench.
- Furthermore, due to the deep water proposed (up to 1.5 metres I believe), it needs a further (min 1.5 metre wide) safety bench 0.6 metres below top water level.

The key points are:

- An intercept ditch / swale is required along the top of the development to protect it from overland runoff from the north.
Partly addressed – see below. Additional length of intercept swale added. Now ok
- A review of QBar (permissible discharge rate) and the attenuation volume is needed. These could have an impact on the space required for the basin.
Partly addressed – see below. Addressed. ok
- More commitment to SuDS provision is needed.
Mostly addressed – see below. Addressed. ok
- Basin too rectilinear (man-made) looking.
The shape has been improved
- Sections through the basin are required so we can see if it can be accommodated, in an acceptable manner, into the space allocated.

Sections have been provided, but additional information is sought. Revised sections have been provided. I am not satisfied that the basin is safe.

- The basin may need reconfiguring to produce an acceptable design (no large bund).

Additional section information is required to provide clarity here. As set out above, I am not satisfied that the basin design is safe

- The culverted watercourses should be opened up.

This now forms part of the proposal - ok

The EA is a statutory consultee and should provide bespoke comments on this application.

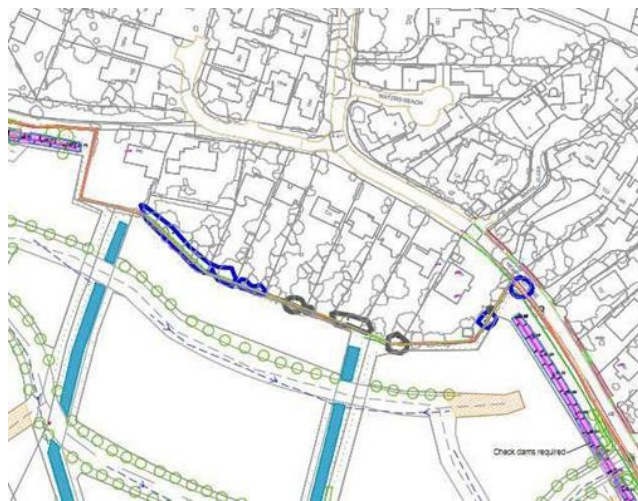
Flood Risk At The Site

Flood maps show that the application site includes flood zone 2 and flood zone 3 areas.

However, no built development is proposed in the flood zone 2 and 3 areas, and so I don't have any concerns about fluvial flood risk at the site.

My only comment on flood risk from other sources is that due consideration will need to be given to surface runoff arriving at the development site from the uphill areas to the north. Due to the sloping site and the clay soils this could be significant. We would expect to see an intercept ditch/swale at detailed design stage.

An intercept swale (with check dams) has been provided along part of the northern boundary – in purple below (where a gravity connection around the east / west of the site is possible). This leaves a section in the centre (shown below in red) which remains unprotected. Can an intercept swale / ditch please be added here. It could be connected into the proposed swales (blue lines), with an appropriate allowance for the attenuation provision. I appreciate that the highway will intercept overland flows from north of the highway, but we have had similar (sloping, clay) sites before where problematic runoff has been generated over a relatively small area. Additional length of intercept swale added. Now ok



The sequential test can be considered as passed by virtue of the fact a sequential approach has been taken to site layout and all development is within flood zone 1. The exception test does not need to be addressed ('more vulnerable' development in flood zone 1).

Please note that the EA will make their own evaluation over flood risk at the site, which may differ from my comments.

Impact Of The Development On Flood Risk Elsewhere

- Surface Water Runoff Rates

It is accepted that infiltration is not viable.

In line with GCC/LLFA guidance, surface water runoff is to be attenuated to QBar.

I have some questions over the discharge rate / attenuation volume calculations.

A QBar value for the site of 17.3 l/s has been calculated based on a developable area of 6.3 ha.

However, the attenuation volume calculations seem to have been calculated based on the smaller (impermeable) area of 3.52 ha, with no allowance for the permeable areas.

The runoff from the permeable areas has to go somewhere. It will either:

1. Be captured by the on-site drainage - in which case that area can be included in the QBar calculations, but the attenuation volume calculations will need to make allowance for the runoff.

or

2. Not be captured by the on-site drainage – in which case that area should not be included in the QBar calculations.

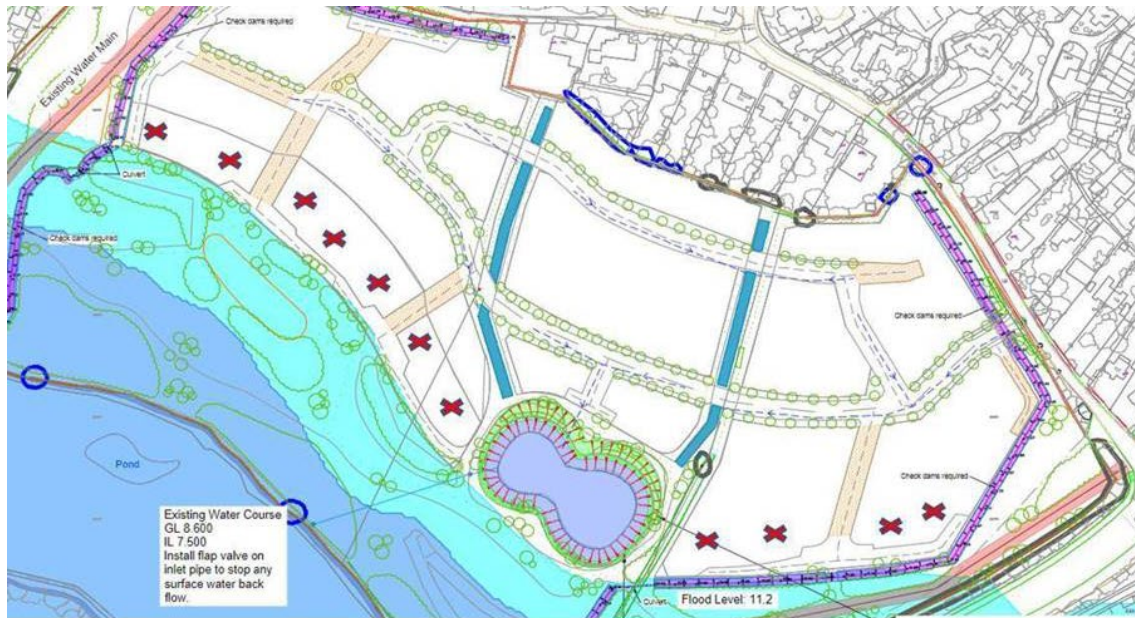
Where runoff volumes are being calculated for a defined area of impermeable surfacing (as they are here), we would normally expect the cv value to be 0.95. Here, Cv values of 0.75 / 0.84 (summer / winter) have been used. Clarification is sought.

N.B. There are some small discrepancies between (developable / impermeable) areas quoted in the different sections / plans but these can be ironed at detailed design.

The permissible site discharge has been re-calculated at 10.3 l/s which seems like an appropriate rate.

The attenuation volume calculations don't make any allowance for the capture of runoff from permeable area. Presumably some permeable area (that uphill of new drainage provision) will contribute surface water runoff to the new drainage network. An allowance is needed here. Sometimes we see 20% of contributing permeable added at 100% runoff. **This has now been done. ok**

The drainage strategy presented is fairly basic. I am concerned that the new dwellings located closest to the bottom of the site ('X's below) will not be able to discharge by gravity to the surface water drainage pipework shown which in places is a long way up hill from new dwellings. Clarity is sought here. **The applicant has checked and assures us that the levels work. We will take their word for this.**



SuDS

On a large Greenfield site such as this we expect to see a very good level of above ground SuDS provision. As well as source control and attenuation, we would expect to see SuDS included for conveyance (for example, swales instead of pipes). Please see the attached SuDS layout for another development site which demonstrates the inclusion of SuDs for surface water conveyance. The FRA does say that swales and filter strips are options applicable to the development however, we require to see more commitment that these will actually be incorporated. For example, the FRA should include text along the lines of, 'swales, filter strips, water butts and permeable paving will be incorporated into the development', and where possible, some commitment to the extents of these SuDS. For example, 'where practicable, every dwelling shall be fitted with a water butt'. Also, where possible, indicative positions/extents should be shown on the drainage layout plan (swales for example).

Two swales have been added through the centre of the site (existing drains de-culverted) which is a welcome addition.

The (tanked) permeable paving is a useful addition, helping with water quality and reducing attenuation volumes for the main basin.

Clarity is sought on water butt provision. **Clarification provided. ok**

It is particularly important that SuDS attenuation basins are well designed and well integrated. Basins should be as naturalistic as possible with varying side slopes (max 1 in 4). If they are to form part of public open space / play space they should have good access. Low flows should be channelled within a shallow swale within the basin so the basin is kept as accessible (dry) as possible for as much of the time as possible, unless the basin is designed as a wet pond. The photo below shows the style of basin preferred. A permanently wet area is good for wildlife.



Further notes on attenuation basins:

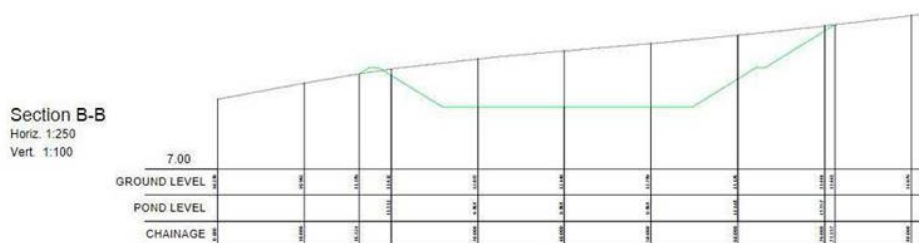
- Basins to incorporate a 3.5 m wide safety / maintenance bench around the perimeter.
- Basin sides to have varying gradients (max 1 in 4)
- Inlets and outlets to be finished in pitched stone rather than RC concrete
- Key clamp railings to be avoided
- Basin topography to be as naturalistic as possible. In particular, unnatural looking bunds and 'perched' basins are to be avoided

Whilst we do not need to see the full detailed design of the basin as part of outline planning application it needs to be demonstrated that the attenuation volume required can be comfortably, and safely, accommodated within the space allocated. With this in mind, an outline planning application should include a few indicative sections. I would like to request that these are submitted.

Sections have been provided but modifications are required so that we can evaluate the basin design fundamentals (extent of bunding / safety & maintenance benches etc).

Please:

- Provide chainage/level information at changes in slope so that we can evaluate the changes in level / heights of bunds / positions and widths of maintenance & safety benches etc
- Add slope gradients to section
- Add proposed max water levels / outfall levels (so we can review water depths / freeboard etc)



I am not satisfied that acceptable / safe basin design has been demonstrated.

In order to make the design acceptable, the basin will need to occupy a larger footprint than currently shown – possibly a circa 10 metre increase in both length and width.

If there is confidence that there is space to accommodate this increase in basin size, and still deliver the number of units proposed, then the modifications can be dealt with at detailed design stage. Otherwise, revised proposals should be submitted prior to determination.

The reasons a larger basin footprint is required is because:

- It needs to incorporate a wider (industry standard) minimum 3.5 m wide dry safety/maintenance bench; it currently has a 1 metre dry safety bench.
- Furthermore, due to the deep water proposed (up to 1.5 metres I believe), it needs a further (min 1.5 metre wide) safety bench 0.6 metres below top water level.

Looking at the drainage layout plan, and with reference to the guidance above, a few comments spring to mind:

The basin has rather man-made rectilinear layout; this should be softened.

The basin outline has been softened

I suspect that the layout shown involves a tall bund on the downslope side, although until we see sections it is hard to tell. As set out above, perched basins and large bunds are to be avoided. They look unnatural and also pose a risk in the sense of presenting a potential breach (bank failure) opportunity.

A more linear basin, working with contours, would sit better.

The applicant should indicate how the SuDS features will be maintained. Subject to acceptable design, and an agreed committed sum, the City Council may agree to take on the responsibility for the maintenance of certain above ground SuDS features in public open space. Where an application does not include a SuDS maintenance schedule, a condition to this effect will be required.

Please note that the LPA no longer tends to adopt basins on new developments.
The applicant should indicate how the SuDS features will be maintained

From a water quality perspective, the water quality objectives set out in the publication CIRIA C753 should be met. Please note that traditional gullies/slot drains and interceptors alone, will not meet the objectives. All vehicular areas need to meet the required standards. Here, the basin in conjunction with the swales and permeable paving should deliver adequate water quality provision.

The combination of permeable paving, swales, basins should meet water quality requirements

All SuDS proposals will need to be reviewed by the archaeologist.

Watercourses

Gloucester City Council requires that an 8 m corridor be kept free of development to each side of watercourses (measured from top of bank). This is achieved for Hempsted Brook (Black Ditch) as there is no development in this area. The 4 m corridor (4 m to each side) proposed for the smaller on-site watercourses is considered acceptable here.

These on-site drains are being converted into swales. ok

These on-site watercourses currently have culverted sections due to previous infilling by the landowner. We require that these culverted sections are removed and the watercourses / ditches reinstated. This is in line with sections 3.5.39 and 3.5.40 of the City Plan. Currently, if the culverted sections block, the repercussions are minimal as flood would simply flow across the fields to the Hempsted Brook. However, in event that the site is developed, blockages could have more serious consequences.

These on-site drains / ditches are being converted into swales. ok

Kind regards

Nick

