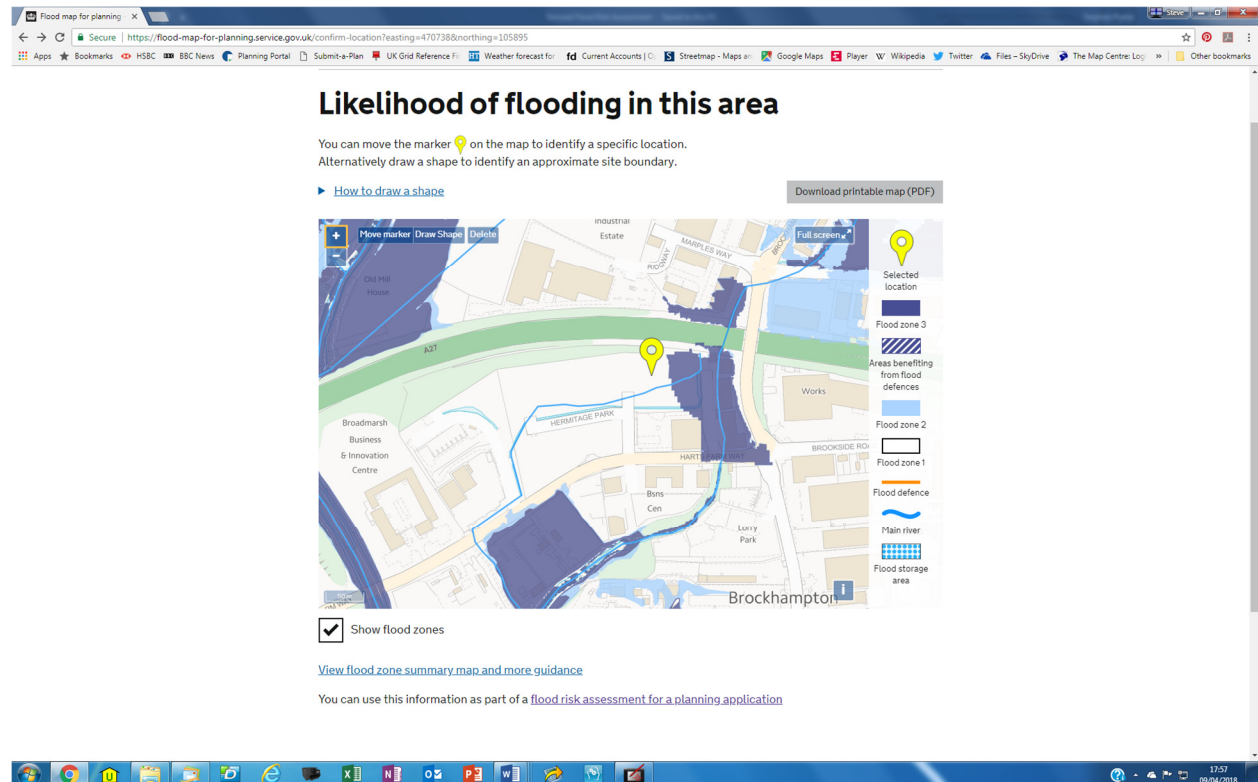


Revised Flood Risk Assessment For Plot 2, Harts Farm Way, Havant.

Environment Agency Flood Map

From the Environment Agency 'flood map for planning', the application site is shown to have a proportion of flood zone three area on its eastern side.



The map also shows the original stream which is no longer there. Therefore, the map is inaccurate, out of date and misleading.

The remodeled pond shown faintly under the dark flood zone 3 area and the running ditch to the south of the site is accurate.

There is a watercourse shown running through the adjacent industrial units east of plot 3 and Brockhampton Road which, after investigation, we believe is culverted from the northern side of the M27 all the way to Harts Farm Way.

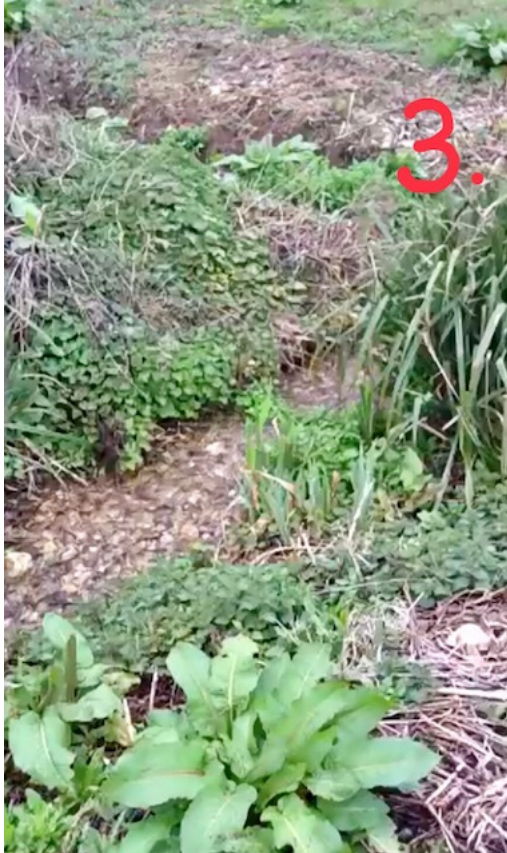
The pond and running ditch, having been remodeled are fed only by a spring from the underground aquifer. **There are no other watercourses feeding this pond.**



1. The pond (from southern end looking north)



2. Undisturbed vegetation at edge of weir (hidden).



3. Water running 'gin' clear

(All photos taken 03/04/2018)

The pond is approximately 1m deep and this depth has been monitored since the start of the 2015 winter and has remained constant. This has been monitored by both the owner of P & I Generators (Plot 3) and ourselves as developers of Plot 3.

The running ditch from the pond (that runs in a westerly direction) is fed via a weir from the ponds southern end. It runs to the estuary approximately 300m west of the Harts Farm site.

There are no other watercourses that feed the pond or adjoin the ditch apart from the overflow pipe from the Plot 3 storm drainage system, which to-date, has not yet expelled any water in a flash flood or prolonged rain event.

The ditch water level remains constant at an average depth of 50 mm.

During the winter periods of 2015/2016, 2016 /2017 and 2017 /2018 the pond level has remained constant and has not been surcharged by any external waters.



7. Culvert under service road



4. Running ditch from pond from service road culvert looking east towards pond.



8. This is the overflow from plot 3 to the ditch which has to-date has not expelled any water during a flash flood or prolonged period of rain.

Evidence that the water level in the ditch has remained the same can be seen by the amount of undamaged green vegetation in it, which has not been knocked over by high or fast running water.

The water also runs gin clear, constantly, confirming that there are no other feeds other than the spring.

Conclusion

- 1.** We don't believe that this site has flooded in the area shown on the flood map since the pond and ditch was remodeled.
- 2.** As the Plot 2 site levels are very similar to the M27 road level any flooding event would have affected the road and, if this is the case, there would be a record of it.
- 3.** We must assume therefore that any site flooding event in the past (if recorded) would have arisen from the culverted watercourse that runs under the adjacent industrial buildings and M27 east of plot 2.
- 4.** The ditch has a massive attenuation volume which is not used. If a 1 in 100-year flood event happened, this would be used. The estimated volume is shown in this document later.

5. The given Environment Agency design floor level for P & I Generators (Plot 3) was **3.35 m AOD**. The floor level was built at 3.85 m AOD, 50mm higher.

From drawing no. 1802.03A you will see the existing site levels and the proposed floor levels for the buildings.

Without building up the site we can achieve a floor level of 4.05 m AOD for the main building which would make that 700mm above the design level and a floor level of 4.40 m AOD for the woodchip store building which would make that 1.05 m above the design level.

6. Returning to the EA flood map and the flood zone 3 area shown, surely, from the site levels shown on drawing no. 1802.03A, the further west you go, the lower the site gets therefore the zone 3 area should cover the whole site and service road and maybe the M27?

Flood Risk Mitigation

The development will be accessed off the recently completed site service road which links with Harts Farm Way. This will provide a safe access and egress to and from the development. The service road level is approximately 700mm above the local design level therefore there is little risk of flooding

The finished floor level of the new building will be set at 4.05 m AOD which is 700mm above the local design level. The woodchip building will have a finished floor level of 4.40 m AOD, 1.05 m above the local design level.

The existing site ground levels will not need to be raised to achieve these levels as can be seen from the information shown on drawing no. 1802.03A attached.

All electrical power sockets, meters, fuse boards etc. will be fixed at a minimum height of 4.5 m AOD (1.15 m above design level).

Storm Water Accommodation / Attenuation

Please read in conjunction with drawing No's. 1802.03A and 1802.20.

Storm Water Handling, Design, Approach & Considerations

1. Low environmental impact.
2. Eco friendly approach.
3. Reduced excavation and disposal to landfill.
4. Proposal.
5. Design Drawing.
6. Overflow swale as added attenuation.
7. Natural gravels filtration.
8. Existing installation success.
9. Sustainability.
- 10.Reduced Plastic Reliability.
- 11.Avoidance of plastic ground contamination.
- 12.Water table and available freeboard.
- 13.Level issues for underground attenuation
- 14.Attenuation capacity of storm drainage system
- 15.Attenuation capacity of swale/ditch.

1.Low Environmental Impact.

In today's modern world we are asked to consider the environment and the impact our developments and buildings will make to our surroundings and infrastructure.

We are responsible to now consider the least and most natural way to deal with building infrastructure issues.

The following design approach will prove why we think our solution has considered all the options and is the only way forward.

2.Eco Friendly Approach.

Our solution is considered to cause the least disruption to the site and the nearby road infrastructure.

The products we are using are more environmentally friendly and reduce the plastic in the ground to a minimum.

The use of concrete in limited amounts as opposed to production of large amounts of P.V.C crates has got to be better alternative.

Producing and using concrete will reduce the amount of oil dependent products.

The concrete product will be produced locally and not require materials from around the world.

3.Reduced Excavation & Landfill.

The system we are proposing will require less excavation.

The soil excavated would have to be removed from site and would have to go to landfill and again, it is our responsibility to reduce landfill.

4.Proposal.

(A) Our proposal is to sink concrete rings down to the natural "loose" gravel strata. Connect all the storm water drainage to them and let the water dissipate through the natural gravel filtration system.

(B) Some water will be diverted with perforated pipes laid in a gravel backfill to the landscape areas and trees to be planted.

(C) Car parking areas to be uncapped and laid to gravel. These areas will be subject to the grounds natural drainage.

(D) The concrete rings will have a high-level overflow pipe outlet that will be diverted to the onsite running ditch. This ditch can be counted as a swale as it has a limiting outfall and headwall thus creating a flash flood attenuation area with a measured and controlled outfall. The size, depth, headwall, pipe diameter and outfall are indicated in the photographs that follow.

(E) The storm water drains have been deliberately oversized for attenuation in a flash flood situation.

5.Design Drawings.

Please read the following drawings in conjunction with the above.

Drg. No. 1802.03A

Drg. No. 1802.20

6.Overflow Swale Attenuation.

Please note that this attenuation is only considered as a safety approach to the system we are using and under normal or extreme conditions it is unlikely to be used.

7.Natural Gravels Filtration.

There have been many bore holes carried out over the site and they all confirm a "loose" gravel strata. The subterranean water is considered to flow to the nearby harbour.

This can be observed as fresh water outfall within the gravel layers as visible on the foreshore at low tide confirming water migration from this site to nearby the harbor approximately 300 metres.

The total site is under laid by the largest natural soakaway you could wish for.

This natural filtration medium is confirmed by the borehole log from approximately 1 metre below ground level to depths more than 10 metres whereby it sits on chalk aquifers.

We are tapping into the natural existing ecological drainage strata.

8.Existing Installation Success.

In the previous application on the adjoining site (plot 3 P & I Generators) our proposal was accepted and approved.

We have also used the same system on another development in Herefordshire.

In both cases these systems have been monitored in extreme flash flooding events and we can confirm that the high-level outfall pipes have never been breached.

The Herefordshire project is on a flood plain and the system has never failed.

We can arrange access to Plot 3 for the Environment Agency to monitor the system themselves if they wish to.

9.Sustainability.

Our proposal is using the gift of a natural soakaway with the advantage of migrating through-water. The natural phenomenon reduces the risk of "silting up" thereby providing a sustainable solution. This cannot be guaranteed for a plastic crate system with a singular outfall pipe at a restricted flow. Ingress of silted water with poor flow can result in silting up of this system.

10.Reduced Plastic Reliability.

Plastic production and use is at the forefront of our minds today. We are asked to reduce its use and dependency.

We are offering a tried and tested solution using a natural and sustainable alternative.

11.Plastic Ground Contamination.

We are avoiding placing “tonnes” of plastic crates in the ground including the plastic membranes to encase such a system. Our holistic design avoids this.

12.Water Table & Available Freeboard.

We have site investigation reports confirming the water tables to be as high as 1m below ground level during or just after flash flood or sustained rainfall periods therefore we challenge the effectiveness of a suds crates system on this site.

We suspect that this system of attenuation could be compromised on a regular basis, could be reduced in capacity due to the natural water table or worse, underlying water pressure could cause heave and push the crates above ground level.

13.Level Issues for Underground Attenuation

Working on a 1 metre freeboard with required storm drainage pipe falls and the depth of the crates (even slim ones) we don't consider that a crate suds system can work.

We consider that we know the site and its ground conditions as well or better than anyone, having completed the works to Plot 3 with a good working storm water disposal system and we ask you to accept our proposal in this situation.

14.Attenuation Capacity of Storm Drainage System

We would expect the same water to aquifer flow rates on Plot 2 as we did on Plot 3 as the ground strata is generally the same over Plot 2.

The trial pit log TP21 (nearest to our concrete SUDS chambers) attached illustrates the ground conditions.

If we do achieve similar flow rates, then the attenuation volume of the concrete chambers and the oversized drains will not be used but we are airing on the side of caution.

Attenuation volumes.

Storm drains (roof water only)	37,800 litres
Northern Boundary soakaway capacity	11,100
Storm drains (yard water)	25,300
Concrete Chambers	13,300
Overflow drain (chambers to swale)	760
Total attenuation	88260 litres
Additional ditch/swale attenuation	391,500 litres

Drain and chamber sizes are noted on drawing no. 1802.03A

15. Attenuation Capacity of Swale/Ditch



Ditch/swale looking east from service road culvert.



Ditch/swale looking west from southern end of pond.



Culvert under service road indicating constant depth of water and water brake.

The estimated attenuation capacity of the ditch/swale is **391,500 litres**.

Revised Flood Risk Assessment

Ref 1802.21