

Lynne Baldwin

From: Yarnton Flood Defence <yarntonflooddefence@gmail.com>
Sent: 30 January 2023 20:29
To: Planning
Cc: Dave Woolley; Amy Evans; Phoebe Ryding; Yarnton Parish Council; David Thompson; Cllr Ian Middleton; Councillor Dorothy Walker; Will Savage; john.gloag@merton.ox.ac.uk; Vidovic, Andrew - Oxfordshire County Council; Bawar, Nagina - Oxfordshire County Council; Tony Brummell; Dave Stickland; Karen Nelson; Ana Pereira; David Stamateris; James Hern; keith.johnston@yarnton-pc.org.uk; Yarnton Parish council; Jackie Hoyle
Subject: Re: Planning application 21/03522/OUT OBJECTION to FINAL FLOOD STRATEGY

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Re: Planning application 21/03522/OUT

OBJECTION to FINAL FLOOD STRATEGY submitted by PJA.CO.UK dated December 2022 on behalf of Merton College

Following the 2020 flooding in Yarnton, YFD have had face to face meetings with PJA to discuss the impact and how the application site could be used to reduce existing flood risk. We have submitted a number of written statements to LLFA, CDC and PJA voicing our ongoing concerns about the existing flood risk to the village of Yarnton, which still remain largely unanswered. CDC have now posted the final version of PJA's FRA and Drainage Strategy, which appears to be unchanged from the draft posted in July 2022.

Having scrutinised the final report **it remains our firm view that the application should be deferred** until such time as a site investigation, a flood risk assessment and flood mitigation strategy is prepared for the village of Yarnton to lay alongside the PJA site specific strategy. Should Merton decline to facilitate an investigation, then it is our opinion that the LLFA should undertake the investigation using its own resources before planning consent is granted by CDC.

It is unfortunate that CDC did not take the advice we submitted during site development brief consultation. Following the approval of the brief, the developers have developed their strategy on CDC's stated requirement which is for a simple on-site SUDS based solution, meaning that they could ignore the existing village flood risk which is clearly identified in the Cherwell Level 1 SFRA.

PJA are still asserting that their Strategy complies with Nation Guidelines and Merton College abrogate any duty to the existing village to which PR9 abuts. We have to remind CDC that guidelines are just that, and does not automatically confer a right that the developer can expect to be granted. If they are eventually granted permission to pursue the current strategy (which seems very likely at this point) then by virtue of that decision it is entirely plausible that CDC will be taking on a liability in perpetuity for flood damage downstream of the site, as similarly could the LLFA be liable as the flooding would most likely be the result of water freely flowing onto the highway, now with their consent unless perhaps they have formally objected. This, having been brought to their attention during the consultation period.

It remains our view that the National Guidelines alone do not take into account the local conditions. The Cherwell Level 1 SFRA identifies flooding in Yarnton on five occasions between 2007 and 2014 where intervention with sandbags, flood boards and road closures were necessary. The SFRA was published in 2017 so does not include the most recent events between 2017 and 2020. Because these flooding events took place outside the application site PJA have chosen to largely ignore them. What they fail to recognise is the application site already plays a significant part in those flood events and along the northern exceedance routes in particular. In their report, PJA have again been careful to distance themselves from liability for their own work, stating that they have used third party data which they have had to assume is correct. To their credit they have now attempted to encompass part of the existing village into a rudimentary flood model. However, their conclusions are not reassuring to the villagers. They simply state that the development may be undertaken “without increasing flood risk” on or off site. But they also say their recommendations are limited by the “availability of data”.

PJA have used the publicly available one meter LIDAR data and produced a smoothed model of the terrain. (Figure 6.3 attached) They have used Manning's N factors for rural and urban land to calculate runoff figures to argue that there is a benefit in a change from a rural to urban catchment. They go on to argue that due to its rudimentary nature, the model does not account for finer grain undulations that could retain and further attenuate the surface water flows. And similarly, with the masked features such as ditches and culverts. All this may, they argue, provide a reduction in the level of flood risk in the village. However, as far as we can tell from the information they have released the surface model also relies on the rate of surface water extraction at the existing southern and central culvert inlet nodes. The extraction rate is calculated using the well established Colebrook equation to determine a maximum pipe discharge rate based simply on an unobstructed pipe diameter and material roughness. They have not stated what confounder values they have used for head losses throughout the culvert length for changes in pipe direction, the connection of other joining pipe flows in manholes, intrusions into the culvert by badly made gully connections, utility-crossings through the culvert, intruding roots and groundwater infiltration. In short, the rate of pipe-flow is likely to be much less than that calculated using the Colebrook equation. To date they have not ventured to explain the discrepancies between their theoretical outputs and the photographic flooding evidence YFD has provided. However, they have acknowledged that the existing surface water systems does surcharge, which to us is a clear indication of insufficient capacity to serve the existing village and the proposed site.

Flows from both the site's central and the southern inlet headwalls join in the village at manhole S105 as indicated on the attached drawing. During the last flood event water was seen to be emerging from the ground near to the old Post Office. Thames Water investigated what they considered might be a water-mains leak only to find that it was the highway culvert that was surcharged above ground level. Water continued to emerge from the ground for several days. It is also of interest that PJA's report has recorded what is described as a 600mm diameter storage pipe between Manholes S110 and S111. No explanation as to why it was necessary or its operation is given. It is our view that, given the empirical evidence there is a long standing issue with surface water drainage in Yarnton which deserves to be properly investigated prior to CDC giving outline consent.

The PJA flood risk assessment also misrepresents our view with regards to the impact of the Thames floodplain south of the village. When full, the Oxford functional floodplain is a very large body of water and the Yarnton sub-catchment discharge doesn't on its own have a significant impact of the floodplain water level. Our point was that when the floodplain is in spate, water is back-flowing into ditches and culverts around Yarnton, which are on the very edge of the floodplain and rendering them partially full when they are most needed. This would have an impact on the culverts and statutory “Main Rivers” and their capacity to convey flash flood runoff through the village. As far as we can tell, no work has been done by the developer or the LLFA to determine the possible impact of back-flows on the capacity of the local drainage infrastructure or the application site. It is vital that this is addressed.

As SuDS came out of the Government's desire to address more frequent and what was becoming more severe fluvial flood events along the developed fringes of the main rivers in the UK, previous central

Government growth policies have lead to more flashy catchments and flooding downstream due to the accumulation of development upstream. For example, Oxford is now faced with a £120 million bill to protect built-up areas that are increasingly under threat from the Thames. Finding open land to retrofit SUDS to the older pre-SUDS crop of dense developments is becoming a growing problem that is not being properly recognised in planning policy. The Yarnton catchment alone may not contribute significantly to water levels on the Thames floodplain, but the accumulative effect that the hundreds of similar developments upstream of Oxford certainly do – hence the need to retrofit SuDS to older developments.

Extract taken from a report on a roundtable meeting held in June 2022 following flash flooding in London:

“Looking at SuDS on a catchment scale is important, as sometimes SuDS are needed in areas that do not flood in order to reduce the flood risk elsewhere”

We remain very concerned that CDC and the LLFA are about to forgo a valuable opportunity to investigate and address flooding along the north flood-route currently terminating on Aysgarth Road. It is our firm view that using Aysgarth Road highway and footways as an attenuation pond for the exceedance flow off the development site should not be allowed to continue as it relies entirely on roadside gullies to drain back into a surcharged highway culvert leading out to the A44, where it then joins the flow from the development site’s central culvert inlet point – headwall B and the A44 highway drainage. At this junction about 70% of the site drains along the eastern fringe of the village and down to the floodplain.

PJA argued that a new cutoff drain will intercept the groundwater emerging from the spring-line. They have not given any details of the drain construction, its attenuation or final offsite outfall location. However, from their drawings it seem likely it will discharge to the southern inlet in the village – headwall C. An exceedance route is still shown from the spring-line down through the development site into the grounds of the medical centre and terminating on Aysgarth Road. PJA have argued that the spring-line flow cannot be diverted to the watershed on the south side of Spring Hill and away from the village as suggested by YFD. This is made on the grounds that the transfer of water from its natural watershed to a different one is not environmentally desirable and an incompatibility of relative ground-levels between the lower points on the site and the outfall on the south side of Spring Hill which they have tried to demonstrate in their report (figure 6.3). However, the groundwater emerging from the spring-line on the application site boundary will have the same mineral profile as that emerging on the south face of Spring Hill. Its origin is the same Hanborough gravel geological member. There are substantial disused gavel-pit workings south of the village that could be used for attenuation which could entirely remove the spring-line flow from the new development site and the village. As can be seen on their figure 6.3 the spring-line is perched at 100m AOD – well above the YFD suggested area for the outfall at 70.366m AOD.

PJA may have provided detailed argument for managing surface water flows on the site by SUDS attenuation measures and the protection of property by raising floor levels and damp courses at least 150mm above predicted exceedance water levels. But there is still no data or information about the maximum likely yield from the spring-line as their strategy for the outflow from the spring-line still seems to be based on confounders.

The PJA argument is that a change from an open field to an urban development will increase the gross friction coefficient (Manning’s friction factors) to a value that would be beneficial to the existing village. However, we believe the coefficient would remain unchanged for the undeveloped exceedance route through the site which is being kept clear to protect the new houses. The un-modelled benefits of ditches and culverts are already being fully exploited in the current flood events.

PJA have gone to great efforts to show that the development should have minor impact on the existing flooding in the village. They have used a number of confounders to argue that there could be some benefit

to the village. Our argument is that they have used presumptions and PJA have not produced numerical data to support their presumptions or given the +/- confidence limits for their modelling. It seems to us that should the confounders not be realised (which seems likely) and the real world flow volumes fall into the positive range of the confidence limits there is a very good possibility that actual flood depths in Aysgarth will increase and not decrease at all. Aysgarth is a residential area and is considered to be a "more vulnerable" area under the National Guidelines.

Setting PJA predicted outcome aside, at times there is already a lack of capacity in the water courses downstream of the site. Of greater concern to us, is the LLFA have not explored fully the potential for the application site to address the existing flooding at the north end of the village. As we have previously said, the application site is the only remaining land of the fringe of the village. It is our belief that the LLFA have a duty to, at the very least, investigate the current flooding mechanisms and determine if the site can play a positive role in the mitigation of the existing flooding.

The application site seems to be a once in a generation opportunity to, at least, look for a solution to part of a long standing flooding problem in Yarnton. If this opportunity is not taken, the LLFA will have a much more challenging task in delivering a solution for Yarnton's flooding problems in the years ahead, as there is no other open space available on the west side of the A44 and the highways and verges are already crowded with other utility services. The prospect of providing off-site remedial attenuation ponds or closed tankage seem unlikely from the perspective of space and cost. If not the application site, what is the LLFA and CDC proposals for remedying their previous planning shortcomings? We look forward to seeing your proposals for Yarnton.

An independent body should be established to overhaul London's "confusing" flood management strategy, according to conclusions made in The London Flood Review.

The review, commissioned by Thames Water, found that there is currently a disconnect between local authorities' management of surface water and storm water management and sewage companies.

The review concludes that "both events occurred around the peak of high tide which exacerbated the flooding." It adds heavy rain caused some sewer systems to become overwhelmed, while in other cases, drains on the road could not cope with the volume of water.

"Opposition to new housing developments could be curbed if there was more focus on the "heart and soul" of areas, Michael Gove has suggested."

"Much of the opposition to new housing developments is often grounded in a fear that the quality of the new buildings [inadequate infrastructure] and places created will be deficient and therefore detrimental to existing neighbourhoods and properties"

"If a general improvement in the standard of design reassures the general public that this will in fact not be the case, then they may be less likely to oppose it."

Re: DRAFT FLOOD STRATEGY – PJA.CO.UK – July 2022

The revised Surface Water Management Strategy most recently issued by PJA Civil Engineering has not materially changed from that first proposed by WSP Ltd. The report still proposes to mitigate runoff from the site to a greenfield rate no lower than the minimum requirement in the National Planning Guidelines.

The surface water digital modelling may now better recognise that the SUB-soil conditions on the lower slopes are not suitable for infiltration and presumably the retention ponds have been increased in volume to reflect this. However, the proposed rate of runoff at the site boundary remains the same. As we have previously stated, the current greenfield runoff rate is already causing flooding in the north of the village. The revised strategy doesn't appear to offer any significant improvement. Our questions previously raised remain unanswered and most significantly why the runoff rate cannot be mitigated to the capacity of the existing infrastructure downstream of the site, particularly as there are no plans to improve the infrastructure running through the village.

The PJA report executive summary refers to surface-water, groundwater and sewer flooding to all be low risk. We would accept that might be the case within the development site. PJA have presumably been commissioned to engineer the site-work to ensure the new housing is protected to guarantee its sale and resale value. The strategy proposes the direction of exceedance flows (those above the 1 in 100 year return period) away from the proposed new housing but the existing "more vulnerable" dwellings in the existing village will remain at risk. Protecting the existing village seems to still be very much outside their brief and will be detrimental to the successful integration of the new community. If the new housing were to remain dry, while the existing community were to continue to be flooded, we feel this will cause a strong resentment that will not easily be reconciled and become a long term rift lasting long after the sale of the last house. The community is likely to consider they have been sacrificed for the sole benefit of Merton College and the newcomers.

The PJA report references "betterment" to flood risk for existing communities but doesn't make clear as to how much betterment there might be or with whom the residual risk will remain. They have meticulously calculated the volume of rainwater runoff from the new roofing and paving. From those figures they have subtracted a greenfield runoff figure to determine the volume of storage they will be required to provide under the planning guidance. Our argument is with the use of greenfield runoff as set out in planning guidance which is carried through to the CDC site brief. Guidance is just that – for guidance and does not grant a statutory right. The current greenfield state of the site is already causing flooding in the village. Residential houses are categorised as "more vulnerable" in national planning guidance and that is equally true of existing houses as the proposed houses.

PJA are proposing to install a cutoff drain along the west boundary of the site to take water around the proposed housing areas that emerges at the spring-line. This may protect the new housing but it is by no means clear as to how much benefit that will have for the at-risk areas in the village. There seems to be little field data offered with regards to the physical nature of the perched water-table sitting outside the site's west boundary – seepage rate, strike of the aquitard (towards the site or away from it) or maximum volume of water it could retain. These might offer a clearer picture of the discharge pattern from the spring-line and the time period over which the discharge might extend. From which, the volume required to attenuate the Spring-line runoff can then be established and provided within the site area. A cutoff drain may intercept the water but it still all seems to be directed to the same discharge point at the surgery - there being no redistribution to other discharge points shown.

The report principally aims to establish that there will be no significant change to the off-site status-quo and possibly a betterment but to an undefinable amount. The argument used to support their position seems to be derived from a coarse grained digital catchment model constructed using freely available digital data but have relatively low confidence limits. The final outcome is just as likely to see a detrimental increase in the exceedance flows in Aysgarth as it is a betterment. The betterment argument seems to rely on a general assumption that there are improvements and features not captured in the coarse model. We reiterate; our argument about flooding in Yarnton is based on observation of flood events and not simply based on a digital hydraulic model which may not fully capture the real world.

The sets of drawings included in the report show similar predicted outlines for change in off-site water depths in Aysgarth Rd for all flood events – from a green field up to the 1 in 1000 return period. The

similarity suggests there is limited real data available outside the site limits on which to base reliable risk estimates. Certainly the drawings all show, what could be seen, as an attenuation pond sitting in the highway in Aysgarth Rd and having no overground exceedance route onto the A44, Woodstock Rd. The pond only being drained by a third party pipe of uncertain ownership. If the pipe were to become blocked what would be the maximum extent of the pond outline and who would be at risk?

The survey reports for the off-site piped drainage would suggest it is currently functional. But there are already indications that it will require substantial work to keep it that way within the next 10 to 20 years. That again raises the question as to who are the maintainers? It now seems that responsibility is spread between a number of private landowners and the Country Council. However, it is not clear that there are agreements to discharge to a third party drain, nor have any statutory powers been sighted that the University is relying on to discharge to a none public drain.

The previous flooding events have now been included, as stated in the Local Planning Policy Strategic Level flood risk documents. These refer to reports of flooding in Yarnton but there is little information about the details of those reports or more importantly their impact on the community. It's a pity that PJA choose to use the term "anecdotal" stories of flooding in their report. Unlike fluvial flooding the local flood authorities are unable to respond in time to observe and record flash flooding first hand. They rely to a great extent on *eye witness* reports. Where as individual accounts of events might vary, as a conglomerate they very often provide a reliable overview and much of which, in Yarnton, is backed up by photographic evidence.

The report dismisses the idea of redirecting surface water runoff away from the east boundary of the site, towards the south west and the Worcester railway over-bridge as not feasible due to differences in ground levels. A gravity drain may not be feasible but a pumped solution is, which appears in the hierarchy of water management methods reproduced in the report. Should the Planning Authority and the LLFA fail to agree an adequate package of mitigation measures to include and address the current off-site risks in the village, they may only be left with a pumped solution.

Re: DRAFT DRAINAGE STRATEGY – PJA.CO.UK

The PJA drawings now shows a foul sewer connection within the village at the Aysgarth Road, Rutten Lane junction. That concerns us greatly. As we have previously said, new foul connections in the village will bring more sewage to an inundated foul system that already plays a significant part in surface flooding. The drawings also identify some public sewers as **combined** Thames Water sewers. This is new information to us. Previous discussions with Thames Water, they have declared that there are no surface water sewers in Yarnton village, only foul sewers and as such they don't have a statutory duty for any surface water runoff. They have also previously said their estimate of spare capacity in the foul network is 20% – presumably a metric derived by equating current pumping rates to pumping capacity. Part of that spare capacity is currently taken up by groundwater infiltration for which they don't have a figure but they are working to reduce it. They say, that the function the foul sewer system currently plays in flood relief is concessionary only. However, with the emergence of the presence of combined sewers in Yarnton at least part of the surface flow into the foul system is there by right and not by concession or trespass. It would be interesting to know how much of the surface area in Yarnton is drained to the foul system via combined sewers and how much of the 20% is thus taken? We would repeat what we have previously said, bringing sewage from up to 540 extra homes into the village can only exacerbate the current problem and it should be all pumped clear of the village. Foul sewerage flows have a daily cycle and will almost certainly intersect with flash flood events. The report states that Thames Water have 25 foul flood events recorded on their DG5 register. It therefore seems likely that all of these events are due to sewer blockages and will not include events where the foul/combined system is simply overwhelmed by surface water.

It's a pity that PJA have chosen to dismiss our concern about the proximity of the Thames floodplain on the southern edge of Yarnton and its potential impact upon groundwater levels on the alluvial silts in the village. The Agency had issued a RED alert for the area during the most recent flash flood event. Much of the village expansion in the last 60 years has been over ancient marshland, for which there are historic accounts of the regular movement of cattle to and from it in winter. It seems far from implausible that the high groundwater could not have intersected with the flash flood runoff. Much of the land in the north part of the village is only dry by virtue of post war agricultural policies. With the absence of public surface water sewers a lot of the current housing stock rely on soakaways and the Main River ditches to convey water out to the River Thames floodplain. Climate change will bring rising flood levels on the floodplain and with it higher groundwater levels along its peripheries. There is a risk that we could see areas in Yarnton returning to it's previous marshland state over the next 100 years, however without undertaking some form of investigation as the proposed development is being designed with the next 100 years in mind, we feel strongly that one cannot simply dismiss the threat that rising levels on the Thames floodplain will not impact the village water environment.

We hope the above information proves to be helpful.

With our best regards,

Dave, Steve and Colin



Yarnton Flood Defence
yarntonflooddefence@gmail.com

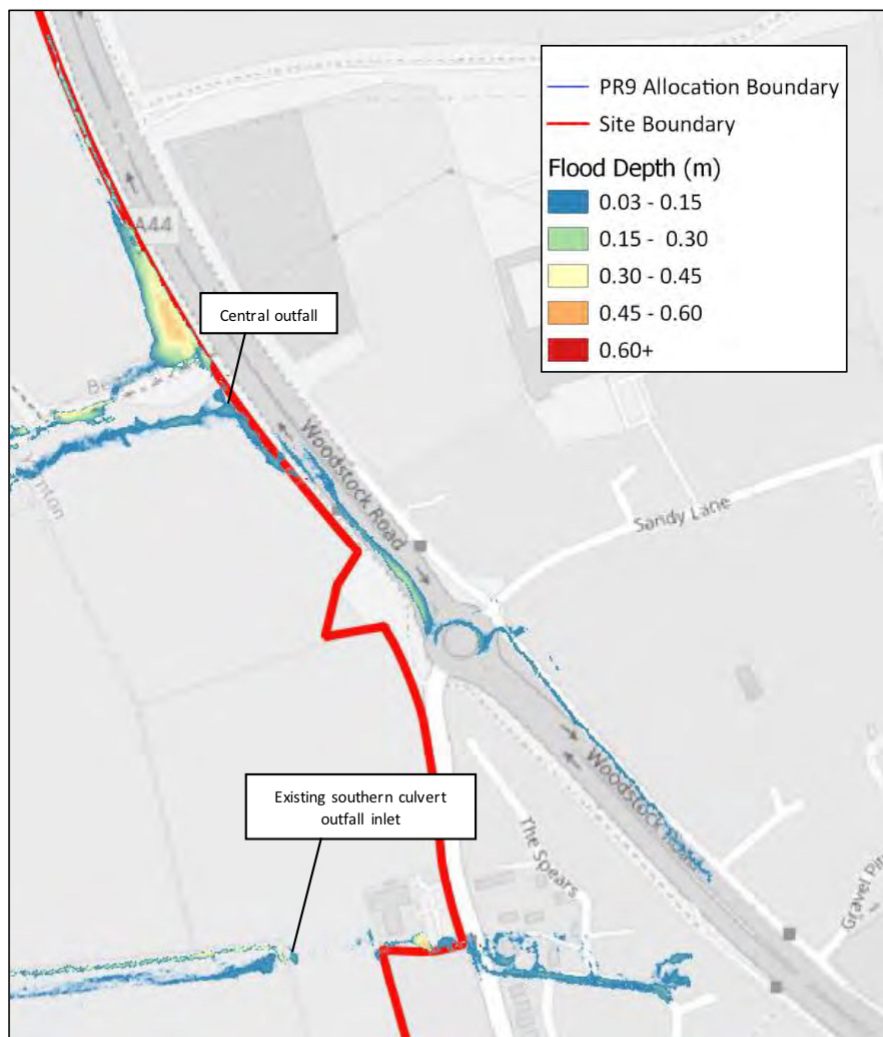


Figure 5-5: Modelled 1 in 20-year Baseline Flood Depths – Woodstock Road

Note that the mapped flood extents represent flows from the Site only and do not include surface water flows generated to the east of the Site.

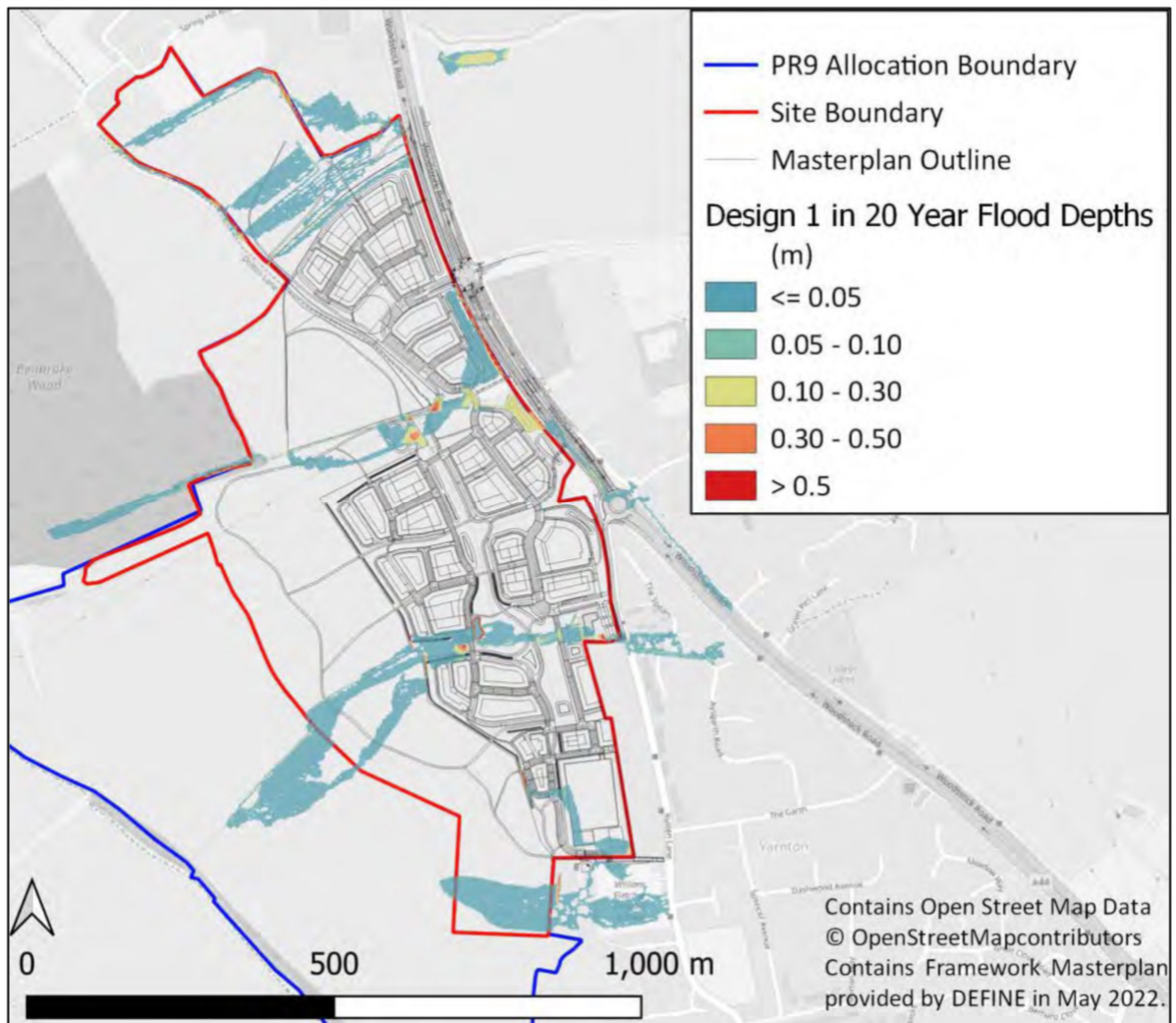


Figure 5-12: Modelled 1 in 20-year post-developed Flood Depths

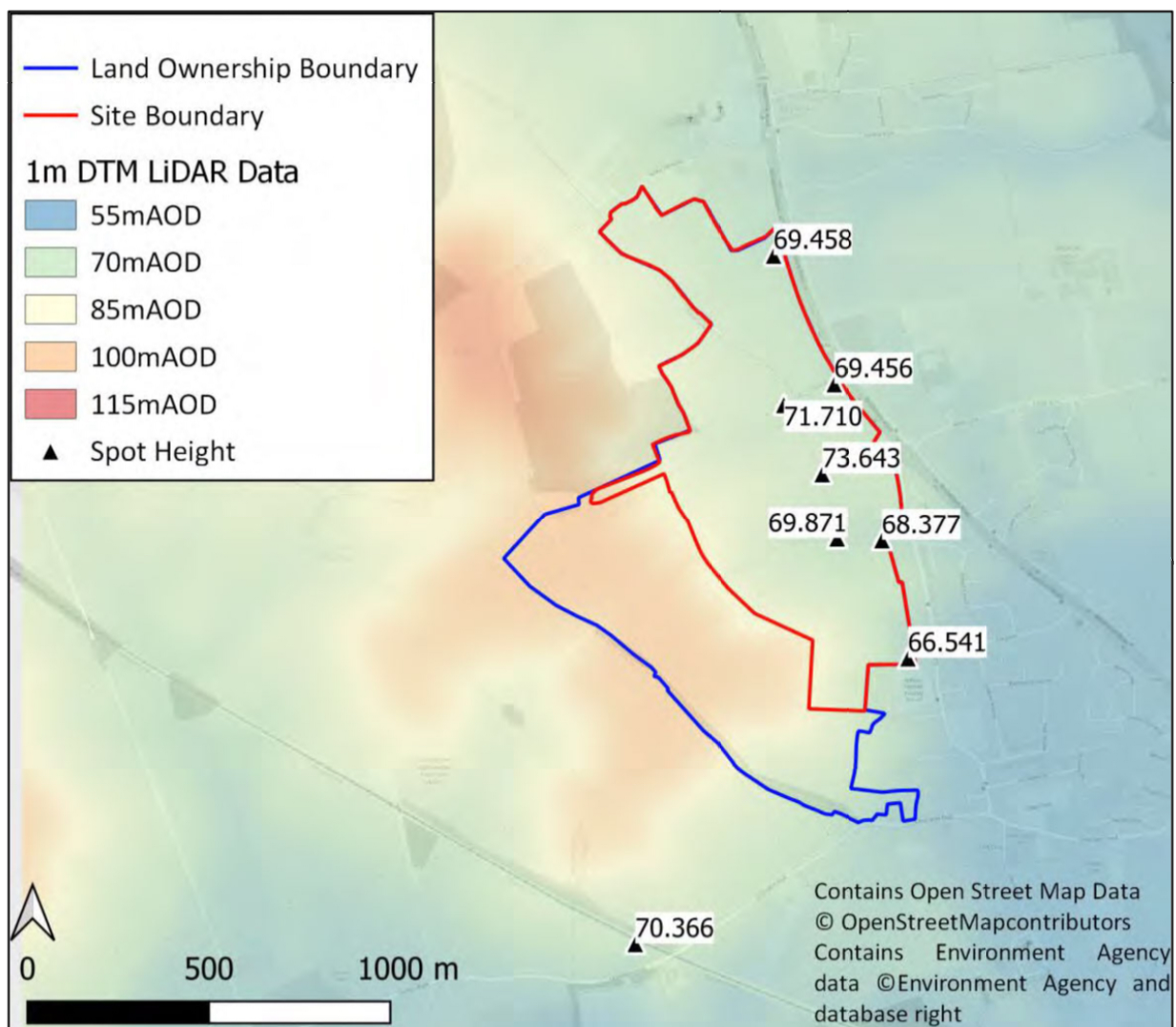


Figure 6-3 – Spot Height Data (1m DTM LiDAR)

