

**Thames Farm Proposed Development – Environmental Impact Assessment
(EIA) Screening Application
- P24/S1613/SCR**

**TFAQ comments on the completion of the proforma EIA Screening Matix &
Application Documents**

A. Introduction

We have always been somewhat mystified as to why a site that is as sensitive as this, was not required at the outset to be subjected to a full EIA when the development proposals first came forwards for consideration; and, given the proposals were supported by only 3 very historic ground investigation samples. Whilst the scale of development was perhaps small by comparison with the typical site subjected to such a requirement, there existed some very compelling reasons as to why this was not the right approach. Indeed what has since transpired with the site is proof of this fact if proof is needed.

The Inspector who finally approved the principle of residential development on the site, imposed stringent requirements and conditions precedent to ensure that detailed due diligence was indeed first undertaken and assessed before the site could be developed. Since that consent was issued however, the current owner has sought to trigger the commencement of the development on the site by undertaking a small proportion of the entrance area works as part of their project to undertake highway improvements to the Reading Road. This was done despite having insufficient and inadequate due diligence on the ground conditions generally, due to the absence of intrusive investigations. The net effect of that action has been that whilst the site may have a valid and implemented Planning Consent, it cannot be developed as currently proposed, without undertaking a very significant ground stabilisation programme to allow the subsequent building of so many houses on the site.

This course of action has resulted in a quite bizarre situation, and no doubt a certain level of embarrassment for the LPA, with the situation now reached. Indeed, both SODC and a Government appointed Inspector have rejected an LDC Application from the developer in January of this year, which is the clearest demonstration of the level of concern and also that in effect the consent needed to be reconsidered with the benefit of the new information.

There now remains outstanding 2 major issues which prevent this development from taking place. Firstly that of the proposed groundworks and their potential impact if approved, and secondly the consequential issue of the disposal of surface water runoff arising from these works which will make the site more impermeable. These two factors are inextricably linked, as one of the primary reasons for the developer failing to achieve an acceptable method of dealing with the run off, is the nature of the groundworks they now propose. Indeed if permission is eventually granted for the grouting and vibro-compaction works now envisaged, the permeability of the site will be very significantly compromised, resulting in a possible requirement to collect the run off and pump it off site. Such a move is certainly out with Governmental guidance and would need very careful consideration and evaluation bearing in mind the previous attempts by the developer to find a satisfactory methodology to deal with runoff..

To recap, the developer has previously put forward 3 different schemes to deal with the surface water issue. The first was deep underground infiltration proposals that might impact the groundwater/aquifer which was rejected by the EA. Latterly, it has been the collection of runoff on site and pumping the run off a very significant distance away, initially to be to the south and later on when that was proven unviable, to the north. Both proposals have been demonstrated to be unworkable and resulting in flooding elsewhere.

The methodology for dealing with surface water run-off, is one of the key environmental impacts that would result from the groundworks as proposed; and, as such, **must** be addressed at the outset in any submission involving the groundworks proposals for the site and their wider Environmental impact.

Appendix 1 to this document contains a marked up copy of the Applicants matrix of questions/responses submitted as part of its application with TFAG's comments in the right hand column.

Appendices 2 and 3 to this document contain 2 technical notes prepared for TFAG and the Local Councils in respect of the Applicant's Hydrogeological Assessments and were submitted to SODC in response to earlier Applications made

B. Relevant Legislation and Government Guidance

What is the purpose of a Environmental Impact Assessment? – (Per Governmental Guidance)

[Environmental Impact Assessment - GOV.UK \(www.gov.uk\)](http://www.gov.uk)

“The aim of Environmental Impact Assessment is to protect the environment by ensuring that a local planning authority when deciding whether to grant planning permission for a project, which is likely to have significant effects on the environment, does so in the full knowledge of the likely significant effects, and takes this into account in the decision making process. The regulations set out a procedure for identifying those projects which should be subject to an Environmental Impact Assessment, and for assessing, consulting and coming to a decision on those projects which are likely to have significant environmental effects.

The aim of Environmental Impact Assessment is also to ensure that the public are given early and effective opportunities to participate in the decision making procedures.....”

“What legislation covers Environmental Impact Assessment?

The process of Environmental Impact Assessment in the context of town and country planning in England is governed by the [Town and Country Planning \(Environmental Impact Assessment\) Regulations 2017 \(the ‘2017 Regulations’\)](#).

These regulations apply to development which is given planning permission under Part III of the Town and Country Planning Act 1990.”

The guidance continues:-

“What are the stages of Environmental Impact Assessment?”

There are 5 broad stages to the process:

Screening

Determining whether a proposed project falls within the remit of the Regulations, whether it is likely to have a significant effect on the environment and therefore requires an assessment.

Scoping

Determining the extent of issues to be considered in the assessment and reported in the Environmental Statement. The applicant can ask the local planning authority for its opinion on what information needs to be included (which is called a ‘scoping opinion’).

A request for a scoping opinion may be made at the same time as a request for a screening opinion. A local planning authority must request additional information if it considers that it has not been provided with sufficient information to adopt a scoping opinion (see [regulation 15\(3\)](#)).

In relation to the issue of SW runoff disposal, the guidance says:-

“Does an applicant need to consider alternatives?”

The 2017 Regulations do not require an applicant to consider alternatives. However, where alternatives **have been** considered, paragraph 2 of [Schedule 4](#) requires the applicant to include in their Environmental Statement a description of the reasonable alternatives studied (for example in terms of development design, technology, location, size and scale) and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

Paragraph: 041 Reference ID: 4-041-20170728

The developer has failed to make such a submission and or comparison

It is clear that the development does not fall within the scope of Schedule 1 of the legislation.

However, Schedule 3 includes criteria for considering screening under Schedule 2 and states:-

“Characteristics of development

1. The characteristics of development **must be** considered having regard, in particular, to—

- (a) the size of the development;
- (b) the cumulation with other development;
- (c) the use of natural resources;
- (d) the production of waste;
- (e) pollution and nuisances;
- (f) the risk of accidents, having regard in particular to substances or technologies used.

Location of development

2. The environmental sensitivity of geographical areas likely to be affected by development must be considered, having regard, in particular, to—

- (a) the existing land use;
- (b) the relative abundance, quality and regenerative capacity of natural resources in the area;
- (c) the absorption capacity of the natural environment, paying particular attention to the following areas—
 - (i) wetlands;
 - (ii) coastal zones;
 - (iii) mountain and forest areas;
 - (iv) nature reserves and parks;
 - (v) areas designated by Member States pursuant to Council Directive [2009/147/EC](#) on the conservation of wild birds⁽¹⁾ and Council

Directive [92/43/EEC](#) on the conservation of natural habitats and of wild fauna and flora(2);

(vi) areas in which the environmental quality standards laid down in EU legislation have already been exceeded;

(vii) densely populated areas;

(viii) landscapes of historical, cultural or archaeological significance.

Characteristics of the potential impact

3. The potential significant effects of development must be considered in relation to criteria set out under paragraphs 1 and 2 above, and having regard in particular to—

(a) the extent of the impact (geographical area and size of the affected population);

(b) the transfrontier nature of the impact;

(c) the magnitude and complexity of the impact;

(d) the probability of the impact;

(e) the duration, frequency and reversibility of the impact.”

The Applicants own hydrogeological report states there is a chance that turbidity will occur in the chalk strata and fissures will carry contaminative material towards the water supply boreholes. If this arises, what guarantees can be provided that the flows can be stopped once arising, and what indemnities are available from the developer to ensure the consequences of such an event are rectified by them and do not fall upon the public purse or private landowners impacted for remediation?

TFAG's Opinion

We consider that the proposed development **does** fall to be assessed under the following criteria taken from the above guidance:-

1. A, C, D & E.
2. B & C
3. A, C, D & E

We therefore propose to the LPA, that it requests a comprehensive EIA from the developer to address all of the primary impacts of this proposal. Only then can a decision be taken as to whether or not those impacts would be acceptable in the context of these proposals.

The remainder of this document addresses a number of errors, omissions and deficiencies in the screening assessment produced for the developer.

1. The developer states in the accompanying text at para 2.1.1, that the River Thames at this point flows from north to south. The River Thames at this point flows south to north.
2. The developer states at 2.2.9, that the site is not located within or near a drinking water Safeguard Protection Zone and Source Protection Zone for groundwater. Again, this is incorrect - the site is within a Source Protection Zone 1 (Inner Protection Area) which supplies potable water to the Henley area.

This is the only source of potable water for the area, which has no piped supply as a backup, and as such this fact is critical and requires extensive assessment.

This is further amplified by the fact that local designations which are not included in the definition of 'sensitive areas', but which are nonetheless environmentally sensitive, may also be relevant in determining whether an assessment is required. Furthermore, in considering the sensitivity of a particular location, regard should also be had to whether any national or internationally agreed environmental standards (e.g. air quality) are already being approached or exceeded.

It is TFAGs understanding that potable water from this aquifer is used in other Thames Water supply areas to blend with water abstractions to ensure that nitrate levels are within agreed environment standards.

3. The principal environmental effects from the development are centred on the effects upon the supply of potable water from the aquifer and the management and disposal of surface runoff from a site with increased impermeability. This latter point appears to be completely disregarded by the applicant notwithstanding that 3 earlier attempts to produce a solution to this issue have failed. It is for this reason that we consider it essential that this issue is addressed comprehensively as part of an EIA now as it is one of the most significant environmental factors flowing from this proposal.
4. The consultant for the developer is wrong in his reading of the screening criteria. (Para 3.5.3).

*Schedule 2 development - column 2**

"Applicable thresholds and criteria" should be read

(i) The development includes more than 1 hectare of urban development which is not dwellinghouse development; or

(ii) the development includes more than 150 dwellings; or

(iii) the overall area of the development exceeds 5 hectares."

**<https://www.legislation.gov.uk/uksi/2017/571/schedule/2/made>*

5. The consultants list of Key issues is highly selective and completely omits water and surface water runoff.
6. The consultants conclusions are not correct.
At 4.12. 'Low impact and non-invasive' could hardly be more wrong when considering grouting to a depth of perhaps 16m or more across a significant proportion of the site and the vibro-compaction of a very significant proportion of the surface area of the site. This statement is wholly incorrect and misleading.
7. At 4.1.3 the consultant argues that the site is not located within a sensitive area under the regulations. Once again this is factually incorrect and misleading.
8. At 4.1.4 the consultant again ignores both traffic and water, so the entire screening process is invalidated because of these erroneous assertions.
9. The applicants screening tabulation, TFAG's Comments are in the right hand column:-

Appendix 1 – Matrix of Developers Responses, with T FAG Comments in the right hand column

Part 1 - Question	Part 2 - Answer to the question and explanation of reasons (Yes/No or Not Known (?) or N/A)		Part 3 - Is a Significant Effect Likely? (Yes/No or Not Known (?) or N/A)	TFAQ Comments
1. Natural Resource				
1.1 Will construction, operation or decommissioning of the project involve actions which will cause physical changes in the topography of the area?	N	The proposals to stabilise the ground would not be expected to result in changes to ground levels.	N/A	Definition of Topography:- ‘the configuration of a surface including its relief and the position of its natural and man-made features’. We therefore conclude that the topography would be impacted
1.2 Will construction or operation of the project use natural resources above or below ground such as land, soil, water, materials/ minerals or energy which are non-renewable or in short supply?	N	The stabilisation works will comprise below ground stabilisation on a site that has planning permission for residential development. There would be no further use of resources.	N/A	This is not correct. The answer should be YES. Significant amounts of limestone (processed as Portland cement) will be used as part of the admixture for the grout. The grout will comprise sulphate resisting Portland Cement, pulverised fuel ash (PFA), sand, pea gravel, and a thixotropic admixture of either bentonite or other admixture of chemicals to stabilise the ground. The embodied carbon footprint of this material should be considered. In addition, the region has a scarce resource being the Aquifer supplying the region with its potable water supply. There is no backup piped system for this vital resource

1.3 Are there any areas on/around the location which contain important, high quality or scarce resources which could be affected by the project, e.g. forestry, agriculture, water/ coastal, fisheries, minerals?	N	The site is in the semi-rural area of Shiplake. There are no fisheries, tourism or minerals resources that could be affected by the development. The site overlies a groundwater SPZ. A Hydrogeological Assessment has been undertaken for the proposals and will be submitted with the planning application which confirm there would be no significant effects on the SPZ.	N/A	This is not correct, The answer should be Yes! High quality water resources for public water consumption will be impacted. TFAG's advisor JBA has identified a number of shortfalls in the hydrogeological assessment provided by the developer. The hydrogeological assessment shows that there will be an effect on scarce water resources. Whether this is a significant effect requires further investigation
2. Waste				TFAG Comments
2.1 Will the project produce solid wastes during construction, operation, or decommissioning?	N	The proposals are not expected to produce wastes.	N/A	No comment
3. Pollution and Nuisances				TFAG Comments
3.1 Will the project release pollutants or any hazardous, toxic or noxious substances to air?	N	The stabilisation works will introduce grout below the ground level. The proposed dense mortar grout will be inert (the grout will comprise sulphate resisting Portland Cement, pulverised fuel ash (PFA), sand, pea gravel, and a thixotropic admixture of either bentonite or other admixture of chemicals approved), will not react with the surrounding substrate and will not leach into groundwater. Construction machinery will be managed in accordance with best practice including a CEMP secured by condition.	N/A	The developer has not provided the 'safety profiles/certification' of the proposed grouting materials, and the comment is completely unsubstantiated Further investigation is required to support the developer's comments that grout will not react with the surrounding substrate and will not leach into groundwater. The methodology for monitoring potential leeching of the grouting material into the aquifer and preventing any such leak from any significant contamination of the potable water supply needs to be robustly demonstrated and the likelihood of such events quantified and factored into assessment. These materials are not ones that once they have escaped can be recovered or their impact negated very easily. Air quality is a local significant issue in Henley on Thames, and no data regarding emissions has been produced by the developer as to its local impacts from the works.

3.2 Will the project cause noise and vibration or release of light, heat, energy or electromagnetic radiation?	N	The works will result in noise which would be considered typical to standard construction practices. The works will be undertaken in accordance with best practice including a CEMP to be secured by condition. Lighting levels will be controlled to maintain safety to minimise spill. No heat, energy or electromagnetic radiation will be caused or released.	N/A	TFAG would not regard 'grouting and ground compaction' as a standard construction for house building. It is wrong to say that noise and vibration will be of a 'standard construction' type. Pumping mass concrete into the ground to a depth of 16 metres or more is a long way from a standard construction project, as is the use of vibro-compaction techniques across a significant proportion of the surface area of this very large site. At the very least these impacts need to be quantified / identified and measures taken to ensure that there is NO impact on any land or buildings outside of the ownership of the developer. Surveys of existing building in the vicinity should be taken before any works begin as a record of the situation before commencement. It is acknowledged that these actions would be time limited – however, the potential impacts of noise and vibration on local residents requires further investigation and safeguarding
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3.3 Will the project lead to risks of contamination of land or water from releases of pollutants onto the ground or into surface waters, groundwater, coastal waters or the sea?	N	The stabilisation works will introduce grout below the ground level. The grout will be inert, will not react with the surrounding substrate and will not leech into groundwater. Surface water run-off and foul water drainage will be managed on-site.	N/A	The developer has not provided the 'safety profiles/certification' of the proposed grouting materials. The comment is unsubstantiated. Further investigation is required to support the developer's comments that grout will not react with the surrounding substrate and will not leech into groundwater. Also as stated above a robust methodology that can be immediately actioned needs to be identified in the event that the developer is incorrect in their assertions. The local drinking water MUST be safeguarded

				at all times and be the first priority of both the developer, and the regulatory authorities. Despite at least 3 attempts, the developer has failed to provide a robust surface water runoff methodology/plan. Increasing the non-permeable area will only increase the volume of and need for attenuation of surface runoff. Deep infiltration has been rejected by the EA, a pumped solution to both the north and south have also been proven to be unworkable. The developer has now mentioned the possibility of onsite infiltration once again! This is a fundamental issue that speaks to the viability of the development of this site in the currently approved layout. It is not a matter that can be simply deferred yet again, and must be addressed once and for all (if at all feasible) as part and parcel of this current submission We are aware that there are already flooding difficulties at the entrance to the site following the developers access construction activities. These need to be corrected, and a workable solution identified to the discharge of run off for the scheme as a whole.	
3.4 Are there any areas on or around the location which are already subject to pollution or environmental damage, e.g. where existing legal environmental standards are exceeded, which could be affected by the project?	Y	The site is located within an AQMA. The site is located within a groundwater Source Protection Zone.	N	Air quality impacts with machinery and site operatives will be appropriately mitigated through the implementation of a CEMP, which will set out measures to mitigate air quality impacts from plant and traffic. The Hydrogeological Impact Assessment prepared to accompany the planning application and attached at Appendix B confirms there would be no effects on groundwater.	Further information/investigation is required to support the developer's comments that grout will not react with the surrounding substrate and will not leach into groundwater.

4. Population and Human Health				TFAG Comments
4.1 Will there be any risk of major accidents (including those caused by climate change, in accordance with scientific knowledge) during construction, operation or decommissioning?	N	The appointed contractor(s) will implement measures in accordance with Health and Safety legislation/requirements, and best practice to minimise the risks of accidents that could have adverse effects on people or the environment as a result of the stabilisation activities. All such measures will form part of the CEMP. There are no anticipated significant risks of accidents during operation as the development will not involve users dealing with hazardous substances.	N/A	The same comments about the safety profiles/certificates of the proposed grouting materials apply. Statements that there can be no significant risks require further evidence and verification. A large amount of machinery and equipment as well as fuel and other substances will be utilised by operatives and others on site, and so once again this is incorrect
4.2 Will the project present a risk to the population (having regard to population density) and their human health during construction, operation or decommissioning? (for example due to water contamination or air pollution)	N	During the works dust would be managed in accordance with standard best practice measures, enforced through the CEMP, and is not anticipated to generate adverse effects to human health.	N/A	The impact of the proposed grouting and its ability to leach into the aquifer which it will interface with have yet to be properly evaluated. Insufficient information (material hazard data sheets etc) has not been issued for the proposed grouting materials. No consideration of impact on the public drinking water supply has been considered in this EIA screening.
5. Water Resources				TFAG Comments
5.1 Are there any water resources including surface waters, e.g. rivers, lakes/ponds, coastal or underground waters on or around the location which could be affected by the project, particularly in terms of their volume and flood risk?	Y	The site is entirely located within Flood Zone 1. The bedrock under the site is identified as principal aquifer. The stabilisation works will use inert materials which will not leach into groundwater or result in contamination – see Appendix B.	N/A	Incorrect again, - Yes. The site is located within:- Drinking Water Safeguard Zones (Surface Water) Drinking Water Safeguard Zones (Groundwater) Source Protection Zones - Zone I - Inner Protection Zone from which the water supply for the Henley Water Supply Zone is taken. The depth of the proposed grouting means that it is below the high water table as recorded and therefore will interact with this aquifer. The grouting of a substantial area of the site will reduce the ground permeability and lead to an increase in surface water runoff.

				No mention has been made of how surface water generated within the site will be managed. Previous proposals for surface water management have not been viable and their remains an outstanding requirement to find a solution for surface water management for this development. This issue should be an integral component of the EIA as the proposed engineering solution for the ground stabilisation works will materially impact the ability to manage surface water generated and likely increase offsite surface water flood risk.
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Part 1 - Question	Part 2 - Answer to the question and explanation of reasons (Yes/No or Not Known (?) or N/A)		Part 3 - Is a Significant Effect Likely? (Yes/No or Not Known (?) or N/A)	TFAG Comments
6. Biodiversity (Species and Habitats)				
6.1 Are there any protected areas which are designated or classified for their terrestrial, avian and marine ecological value, or any non-designated / non-classified areas which are important or sensitive for reasons of their terrestrial, avian and marine ecological value, located on or around the location and which could be affected by the project? (e.g. wetlands, watercourses or other water-bodies, the coastal zone, mountains, forests or woodlands, undesignated nature reserves or parks. (Where designated indicate level of designation (international, national, regional or local)).	N	There are no ecological designations on or directly adjacent to the site. The ground stabilisation works will not result in direct or indirect effects on biodiversity.	N/A	The answer is not correct. The impact of the grouting on the hydrodynamics of nearby water courses (River Harp), River Thames and their tributaries such as Lashbrook, should be considered.
6.2 Could any protected, important or sensitive species of flora or fauna which use areas on or around the site, e.g. for breeding, nesting, foraging, resting, over-wintering, or migration, be affected by the project?	N	The site comprises semi improved grassland.	N/A	Incorrect response. The site has been left to re-wild for the past few years and as such it is likely that flora and fauna have established habitats over this period and as such a new base line ecology report should be undertaken.

7. Landscape and Visual				TFAG Comments
7.1 Are there any areas or features on or around the location which are protected for their landscape and scenic value, and/or any nondesignated / non-classified areas or features of high landscape or scenic value on or around the location which could be affected by the project? Where designated indicate level of designation (international, national, regional or local).	Y	The site is approximately 300m to the west of the Chilterns National Landscape.	N The proposals comprise below ground works which would not affect views or result in landscape changes. The works involved in stabilising the underlying geology will be temporary and construction managed through a CEMP.	Incorrect to the extent that, Natural England has approved formal consultation on the extension of the Chilterns AONB as requested by the 7 local parishes
7.2 Is the project in a location where it is likely to be highly visible to many people? (If so, from where, what direction, and what distance?)	N	The site is surrounded by trees but there is potential for local views of the works however these will be temporary and not significant.	N/A	Incorrect response. The site is surrounded by local dwellings on all sides and adjacent to the main route into Shiplake. It is highly visible to residents and public.
8. Cultural Heritage / Archaeology				TFAG Comments
8.1 Are there any areas or features which are protected for their cultural heritage or archaeological value, or any non-designated / classified areas and/or features of cultural heritage or archaeological importance on or around the location which could be affected by the project (including potential impacts on setting, and views to, from and within)? Where designated indicate level of designation (international, national, regional or local).	N	There are no statutory designations within or immediately adjacent to the site.	N/A	We are aware that the adjacent building site has had significant archaeological investigations undertaken. There must therefore be a high probability that there are areas beneath this site that will be of local regional or national interest

Part 1 - Question	Part 2 - Answer to the question and explanation of reasons (Yes/No or Not Known (?) or N/A)		Part 3 - Is a Significant Effect Likely? (Yes/No or Not Known (?) or N/A)	TFAG Comments
9. Transport and Access				
9.1 Are there any routes on or around the location which are used by the public for access to recreation or other facilities, which could be affected by the project?	N	There are PRoWs within proximity of the site and roads to the north and east however the stabilisation works will be temporary and will not result in significant effects on these features.	N/A	Incorrect, Yes – Taylor Wimpey themselves acknowledge that there are public rights of way adjacent to the site.
9.2 Are there any transport routes on or around the location which are susceptible to congestion, or which cause environmental problems, which could be affected by the project?	N	The works to install stabilisation materials be temporary and will not result in significant effects on local roads. A Traffic Technical Note has been prepared to accompany the planning application confirming there would be no significant transport effects.	N/A	Inaccurate and only an opinion. There will be huge numbers of vehicle movements as identified by the developer and highlighted in our representations to the Planning Application for the LDC. Whilst recognising that grouting and compaction will be a temporary activity, TFAG cannot accept that it will not have a significant effect on local roads, local businesses and local people, as well as the local environment both land based and air based. The large number of vehicle movements for a prolonged period of time will impact local residents and cause disruption and delay on local roads.
10. Land Use				TFAG Comments
10.1 Are there existing land uses or community facilities on or around the location which could be affected by the project? E.g. housing, densely populated areas, industry / commerce, farm/agricultural holdings, forestry, tourism, mining, quarrying, facilities relating to health, education, places of worship, leisure /sports / recreation.	N	The site comprises grassland in a semi-rural location. The nature, scale and extent of the proposed ground stabilisation works will not result in any significant effects on community facilities.	N/A	Incorrect, Yes – Adjacent houses will be impacted by the proposed works.

10.2 Are there any plans for future land uses on or around the location which could be affected by the project?	N	No.	N/A	Incorrect answer, Yes – The area within which the site is located is a Source Protection Zone 1 and as such land use activities are highly sensitive and regulated. Consideration of the proposed activities against the requirements of a SPZ1 should be made within a full EIA.
11. Land Stability and Climate				TFAG Comments
11.1 Is the location susceptible to earthquakes, subsidence, landslides, erosion, or extreme /adverse climatic conditions, e.g. temperature inversions, fogs, severe winds, which could cause the project to present environmental problems?	N	No.	N/A	The location is susceptible to subsidence due to karstic features and land condition, so much so that warning signs are in place around the site. It is exactly this that is driving the developer to ground stabilisation techniques. The developer should also consider what further erosion of the sub strata will occur once their groundworks are completed. The area will continue to suffer from ground erosion and in time further movement
12. Cumulative Effects				TFAG Comments
12.1 Could this project together with existing and/or approved development result in cumulation of impacts during the construction/operation phase?	N	There is no potential from cumulative developments which would give rise to potential effects.	N/A	
13. Transboundary Effects				TFAG Comments
13.1 Is the project likely to lead to transboundary effects?	N	No.	N/A	Unknown unless a full hydrogeological model of the aquifer is undertaken, and a solution to the run-off is identified

TFAG is by no means convinced that we have yet to receive the full story/information at Thames Farm. In our view this will only really come about once a full and comprehensive approach to due diligence, ground and site investigations and environmental impacts (including upon the regions sole potable water supply for which there is no piped backup; and for the surface water dispersal proposals) is undertaken to a high, comprehensive and transparent standard of current best practice and statutory requirements - to be specified in detail by the authorities and perhaps with some assistance from our own advisors, whom have on each occasion/review point identified defects and omissions in the information provided at each and every stage.

07 June 2024

Appendix 2 – Technical Note by JBA Consulting January 2021

TECHNICAL NOTE

JBA Project Code	2020s1712
Contract	Review of Drainage Strategy for Thames Farm, Shiplake
Client	Shiplake Parish Council
Date	January 2021
Author	Brendon McFadden
Reviewer / Sign-off	Susan Wagstaff
Subject	Hydrogeological review of drainage proposal



1 Introduction

1.1 Background

JBA consulting have been commissioned by Shiplake Parish Council to complete a hydrogeological review of the proposed planning application Ref P20/S2808/DIS under consultation for a housing development at Thames Farm, Shiplake (see Figure 1-1), focusing on elements of the scheme that could affect groundwater and groundwater dependent receptors.

The Thames Farm site at Reading Road, Lower Shiplake, obtained planning permission (P16/SO970/O) in 2017 for up to 95 homes on a 5.6Ha site. The developer had originally proposed to drain the site to soakaways, however subsequent ground investigations have identified that the site has a large number of sub-surface voids formed by dissolution of the underlying Chalk bedrock. Consequently, the developer is now proposing to grout and vibro-compact the site in order to stabilise it for construction. Concerned that shallow soakaways will wash material from the voids and increase the risk of collapse and prevented from using deep borehole soakaways as the site is in Source Protection Zone 1 (SPZ 1), the surface water strategy has been amended to exclude any infiltration methods.

Approval was given on planning ref P16/SO970/O with various conditions, including condition 11 which states; No development shall commence until a drainage strategy, detailing all on and off-site surface and foul drainage works, has been submitted to and approved in writing by the local planning authority. No discharge of foul or surface water from the site shall occur before the drainage strategy has been completed and brought into use.

As part of the discharge condition 11 (P20/S0715/DIS) which required a drainage strategy to be submitted, a Hydrogeological Impact Assessment was completed by H Fraser Consulting (April, 2020). This assessment refers to the use of deep soakaway boreholes from a previous drainage plan (ALP, April 2020), and no update to this HIA has been made available for the new drainage plan (ALP, Oct 2020). This report therefore considers the original HIA, and whether it is sufficient, detailing the site constraints, findings of the HIA and potential hydrogeological impacts to consider. The original discharge of condition 11 (P20/S0715/DIS) was withdrawn, due to objections from Thames Water and the Environment Agency regarding the use of deep soakaways within an SPZ 1 an unacceptable risk. This review therefore considers the current information on the site, including the existing HIA (HFC, 2020), in regard to the updated drainage scheme proposal, and any further considerations that should be made.

TECHNICAL NOTE

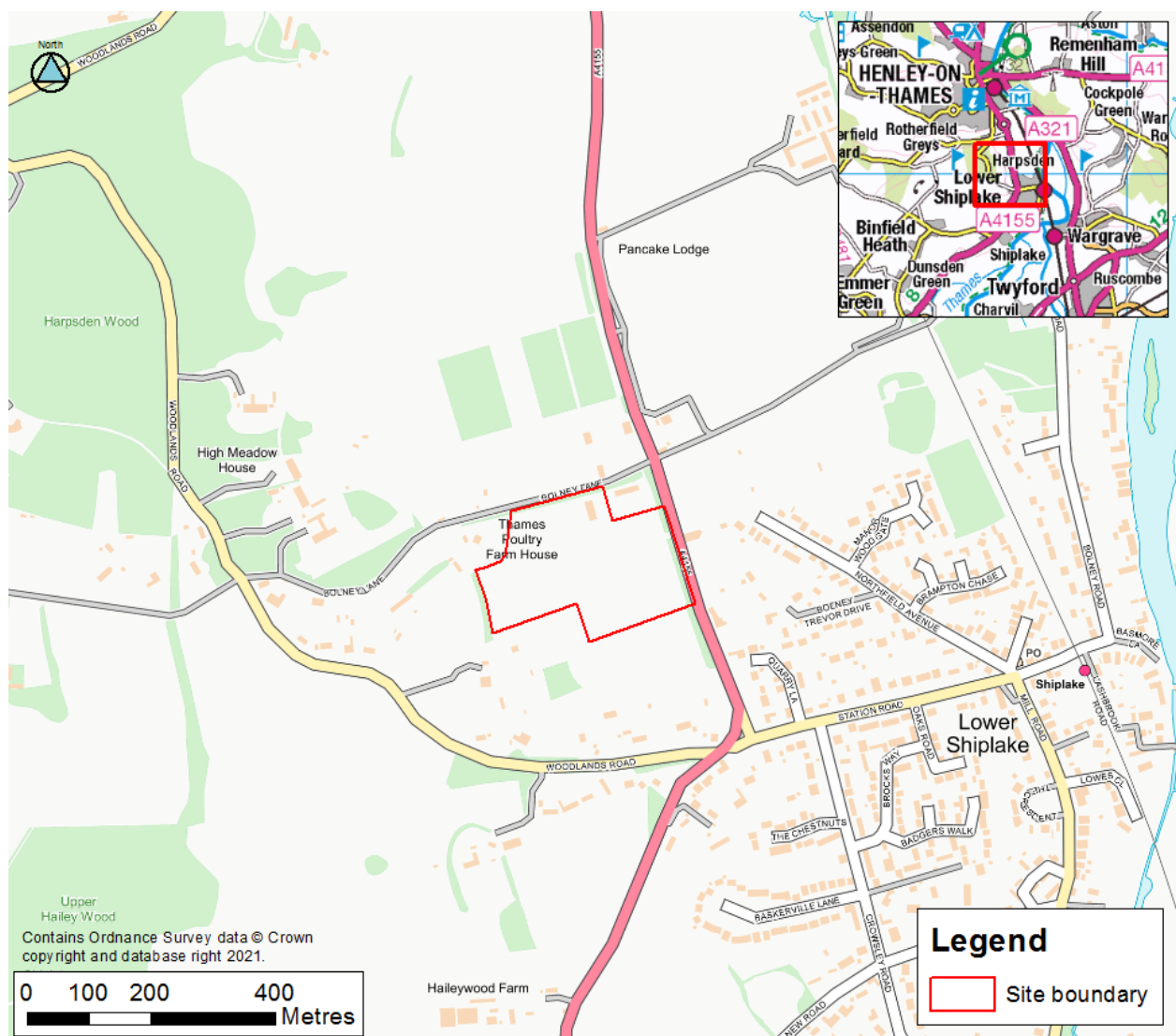
JBA Project Code	2020s1712
Contract	Review of Drainage Strategy for Thames Farm, Shiplake
Client	Shiplake Parish Council
Date	January 2021
Author	Brendon McFadden
Reviewer / Sign-off	Susan Wagstaff
Subject	Hydrogeological review of drainage proposal

1.1.1 Current drainage scheme proposal

The current drainage scheme proposal is detailed in Thames Farm, Shiplake Drainage Statement (ALP, Oct 2020) under consultation (P20/S2808/DIS). Due to the identified constraints relating to ground conditions and location within an SPZ 1 (discussed further in Section 1.2), shallow and deep soakaway drainage strategies are excluded, with no infiltration features proposed.

In summary it is proposed that surface water will be collected in on-site attenuation features, and directed through to an off-site main/sewer connection that will travel along approximately 2km of pipework to Lash Brook (a tributary of the River Thames) 1km south-east of the site. Further details and drawings are given in the Drainage Statement.

Figure 1-1 - Site location



TECHNICAL NOTE

JBA Project Code	2020s1712
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1.2 The Scheme and Constraints

The sections below outline the main elements of the scheme and constraints that are the subject of this review.

1.2.1 Ground condition constraints

A ground investigation and Ground Stability Assessment was carried out by Peter Brett Associates (Nov, 2019). They identified deep seated disturbed ground across the site associated with karstic solution voids within the underlying Chalk, and shallow weak/disturbed ground.

It was therefore recommended that ground stabilisation works are carried out across the site prior to the construction of foundations, using a technique such as compaction grouting to stabilise deep seated disturbance (Chalk voids) and a potential secondary phase of dynamic grouting or replacement of shallow disturbed ground. The grouting treatment process compacts the ground by injecting a viscous sand, cement, PFA and bentonite grout mixture under high pressure to locally consolidate the ground surrounding the point of injection.

1.2.2 Groundwater abstraction and Source Protection Zones (SPZs)

The proposed development site is located over a Chalk aquifer, within SPZ 1 of a Thames Water public water supply (Harpsden PWS). The abstraction is licenced for around 13 MI/d average and 18 MI/d peak, with peak daily output of 14.8MI/d in 2018/19.

The Environment Agency defines Source Protection Zones (SPZs) around groundwater sources - such as wells, boreholes and springs - that are used for public drinking water supply. Within these zones, potentially polluting activities are strictly controlled. Three zones are defined around each source (Environment Agency 2013; Environment Agency website):

- Zone 1: Inner protection zone: The area from which pollution could reach the source within 50 days (minimum 50 m radius).
- Zone 2: Outer protection zone: The area from which pollution could reach the source within 400 days. This zone now has a minimum radius of 250m or 500m around the source, depending upon the size of the abstraction.
- Zone 3: Total catchment: The total area from which groundwater flows to the well, borehole or spring.

Moving from Zone 3 (outermost) to Zone 1 (innermost), the degree of restriction placed on potentially polluting activities increases. The development site is located within SPZ1.

The policies associated with SPZs are set out in 'The Environment Agency's approach to groundwater protection' (EA, 2018). Within the context of the proposed development the following EA Position Statements are considered relevant:

- G4 - Inside SPZ1 we will object to any new trade effluent, storm overflow from sewer system or other significantly contaminated discharges to ground where the

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risk is high and cannot be adequately mitigated. If necessary, we will use a prohibition notice to stop any such existing discharge.

- G12 - The discharge of clean roof water to ground is acceptable both within and outside SPZ1 provided that all roof water down-pipes are sealed against pollutants entering the system from surface run-off, effluent disposal or other forms of discharge. The method of discharge must not create new pathways for pollutants to groundwater or mobilise contaminants already in the ground.
- G13 - Where infiltration SuDS are proposed for anything other than clean roof drainage (see G12) in a SPZ1, a hydrogeological impact assessment should be undertaken, to ensure that the system does not pose an unacceptable risk to the source of supply.
- N8 - Within SPZ1, the Environment Agency will normally object in principle to any planning application for a development that may physically disturb an aquifer.

Due to the site location within a Thames Water abstraction borehole SPZ1 area the use of deep bore soakaways was rejected by Thames Water and the Environment Agency, who stated that the close proximity to the nearby groundwater abstraction station and underlying aquifer introduced an unacceptable risk which could not be overcome within the constraints of the approved Site Layout or within the overall scheme viability.

1.2.3 Proposed drainage scheme

The latest proposed drainage scheme is detailed in Thames Farm, Shiplake Drainage Statement (ALP, Oct 2020). Due to the identified constraints relating to ground conditions and location within an SPZ1, shallow and deep soakaway drainage strategies have now been excluded, with no infiltration features proposed.

The current proposal is that surface water will be collected in on-site attenuation features and directed through to off-site main/sewer connection to Lash Brook (a tributary of the River Thames) 1km south-east of the site. Further details and drawings are given in the Drainage Statement.

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2 Site ground conditions

A summary of the ground conditions at the site is described below, based on the following investigation reports;

- Geotechnical Investigation - Terramech (2018-2019)
- Phase 1 Ground Stability Assessment - Peter Brett Associates LLP (2019)

2.1 Geology

With reference to online resources (www.bgs.ac.uk), and the British Geological Survey (2000) Reading, Solid and Drift, 1:50,000 (Sheet 268), the published geology suggests that much of the eastern section of the site comprises Quaternary age Taplow Gravel Member (sand and gravel), overlying Cretaceous Chalk Group strata of the Seaford and Newhaven Chalk Formations (undifferentiated). Towards the west of the site, the Taplow Gravels appear to feather out; exposing the chalk. Within the south western corner of the site, a wedge of Head Deposits (gravel, sand, silt and clay) are identified.

With reference to the previous ground investigations undertaken by Terramech, boreholes have confirmed a ground model comprising a thin mantle of topsoil across the site ranging from 0.2 to 0.35 m in thickness, above the Taplow Gravel Member and Head Deposits, all overlying the Chalk Group. The chalk surface was encountered at about 6.2 mbgl (metres below ground level) on the western side of the site, and 4.2 mbgl at the eastern side of the site. Made Ground was not encountered at any of the exploratory hole locations across the site.

2.1.1 Cavity assessment (PBA, 2019)

Approximately 550 dynamic probe locations were completed across the site, with 87 locations recording slightly disturbed/disturbed ground profiles. These profiles tend to display reduced levels of strength in the ground from surface level, with significant depths of weak ground and possible voiding to varying depths up to 16mbgl.

Where disturbed ground has been identified, many of the locations are peripherally surrounded by profiles that exhibit relaxed or slightly relaxed ground that has been affected by the karstic processes.

2.2 Hydrogeology

The Chalk bedrock underlying the site is a Principal Aquifer, in an area with medium to high groundwater vulnerability. The gravels underlying the site have a Secondary A or minor aquifer status. Groundwater flow in the Chalk aquifer is primarily by secondary permeability, such as fractures or fissures, rather than through primary matrix porosity.

Groundwater levels within the underlying Chalk aquifer were 12-22mbgl in two Terramech boreholes drilled on site (March, 2019). The groundwater level has implications for the hazards posed by natural and mining cavities (PBA, 2019).

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3 Review of Available Information

3.1 Hydrogeological impact assessment for proposed development works near Harpsden Water Treatment Works (H Fraser Consulting, April 2020)

A hydrogeological impact assessment was completed for the site in April 2020 under an application to discharge condition 11 (P20/S0715/DIS). This HIA is written for a previous drainage proposal (ALP, April 2020), which included deep soakaway boreholes.

In this HIA (HFC, 2020), the effects of the grouting operation on the PWS are thought to be low as:

- The grouting will be above the water table.
- The grout is a stiff grout that does not flow horizontally under its own weight.
- The depth of grouting is largely above the base of the solid casing of the PWS boreholes.
- There will be operational controls to monitor grout takes and pressure, hence unexpected loss of grout will result in cessation of operations and assessment.

The effects on the PWS due to changing recharge across the developed site are thought to be negligible because:

- Recharge across the site is less than 0.5% of the abstraction at the PWS.
- If recharge were to be removed from the site, the maximum impact on drawdown is thought to be 0.03 m. This is not considered to be a significant impact.
- Recharge is in fact thought likely to increase due to reduction in volumes lost to run-off, evapotranspiration and soil moisture deficit.
- Recharge under the developed scenario may be quicker, although it will be attenuated through the storm water collection and attenuation system, however the recharge volumes are not sufficiently large for a change in timing to have a deleterious effect on the PWS abstraction.
- Given the relatively low volumes of recharge, the effect of changing the spatial distribution of recharge over the site is not thought to be significant.
- The quality of the surface water collected is anticipated to be good. It is understood that there are proposals to further govern the quality of the injection water via reedbeds/attenuation infrastructure, and that water quality is not a concern. This aspect has not been further assessed.

It is noted that the report does not use the most up to date SPZ mapping (see latest SPZ outlines in Figure 4-1).

The hydrogeological considerations for an updated HIA are discussed in Section 4.

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3.2 Risk Assessment for Drilling & Grouting Works near Thames Water Main Supply (Vertase, March 2020)

Vertase produced a risk assessment for Drilling & Grouting Works near Thames Water Main Supply (submitted in March 2020 for P20/SO715/DIS) which state that "where groundwater conditions allow the ground treatment will be undertaken to a typical maximum depth of 15m below ground level. Where the water table is confirmed at a shallower depth, then treatment will be restricted to finish in the ground immediately above the water table".

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4 Hydrogeological impact considerations

The current application is not supported by a hydrogeological impact assessment that takes into consideration the updated drainage strategy. The section below provides an outline assessment of the potential impacts of proposed grouting and surface drainage schemes that should be considered, and any potential gaps in the current HIA. This is not a comprehensive assessment but outlines areas of concern that should be addressed in an updated HIA.

4.1 General considerations for the HIA

The HIA needs to include a good spatial and 3D understanding of the hydrogeological setting of the site and surrounding area, which would be improved with the following inclusions.

- Mapping:
 - Geology: BGS mapped geology (including any faults or structural features, fracture directions/bedding plane orientation) and also the geology encountered on site with the probing (and any differences).
 - Hydrogeology: including aquifers, depth to water, SPZs, surface water. Actual distance of the boreholes to the site (unless actual location of boreholes is confidential). It would be useful to know how close the grouting is to the actual borehole - is it clearly within fissure / fracture location. Could use observation borehole locations. Consideration of the typical fracture length in the Chalk and proximity to the PWS.
- A conceptual model of the site including:
 - PWS boreholes and key depths - base of casing, screen depths. Depths of known flow.
 - Depth of Chalk rock head, superficial horizons and any bedding plan horizons (may be level of preferential flow).
 - Depth of groundwater levels and degree of seasonality and uncertainty in this.
 - Level of nearby surface waters, e.g., pond, streams, river etc.
 - Depth of unstable/ground improvement ground - i.e., maximum depth of proposed grouting or areas where the grout may migrate to through voids.

This should pull together all the information spatially and demonstrate how this works to protect the PWS and to clearly demonstrate any level of risk to the PWS.

The original HIA (HFC, 2020) report includes location of observation boreholes - if long term data is available from the EA for any of these this should be included in any new HIA update if available (e.g., Shiplake OBH, Engbers OBH, Kilnpits OBH).

4.2 Loss of aquifer storage

The grouting of voids within the Chalk aquifer underlying the site will lead to a potential decrease in the overall potential storage of the aquifer. This is against EA Policy N8, where the EA will normally object in principle to any planning application for a development that may physically disturb an aquifer.

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Groundwater levels were taken at two boreholes drilled at the site, approximately 12 and 22 mbgl. As disturbed ground was found up to 16mbgl there is potential that grouting could be required below the water table, removing this potential storage. It was noted that groundwater levels could vary significantly from those observed during the ground investigation and the range of potential variation has not been defined by ongoing monitoring via installed observation wells (Terramech, 2019).

The current HIA states that the effect of grouting is low risk in part due to grouting being above the water table. However, the ground investigation data suggests that disturbed ground/voids may be located beneath the water table. If this is the case it would suggest that any grouting operation would result in grouting within the aquifer. More detailed monitoring of seasonal groundwater levels relative to the known disturbed ground depths should be established to demonstrate that grouting would not be required to go below the maximum water table depth. If grouting occurs below the water table, there may be additional impacts on water quality (for instance fly ash has a very high pH) and potential for additional migration of the grout.

4.3 Potential contamination of groundwater

The grouting mixture may contain a proportion of fly ash (power station ash) as a cheap filler to reduce the cost of the concrete. This may have a detrimental impact on the water environment due to very high pH. Some confirmation may be required by the Environment Agency to demonstrate that there will be no risk to groundwater (ALP Drainage Statement, Oct 2020).

The SODC emerging Local Plan¹ includes the following policies regarding new developments;

- Policy ENV11: Pollution - Impact from Existing and/ or Previous Land Uses on New Development (Potential Receptors of Pollution)
 - *Development proposals should be appropriate to their location and should be designed to ensure that the occupiers of a new development will not be subject to individual and/or cumulative adverse effect(s) of pollution. Proposals will need to avoid or provide details of proposed mitigation methods to protect occupiers of a new development from the adverse impact(s) of pollution.*
- Policy ENV12: Pollution - Impact of Development on Human Health, the Natural Environment and/or Local Amenity (Potential Sources of Pollution)
 - *Development proposals should be located in sustainable locations and should be designed to ensure that they will not result in significant adverse impacts on human health, the natural environment and/or the amenity of neighbouring uses.*

Due to the removal of any soakaway element within the new drainage strategy it is likely that there will be a reduced risk of groundwater pollution from surface run-off. The current HIA assumes that grouting is low risk due to only effecting the unsaturated zone above the aquifer, however, as discussed above it is not clear from ground investigation data that disturbed ground does not extend below the watertable.

1 <https://www.southoxon.gov.uk/wp-content/uploads/sites/2/2020/12/SODC-LP2035-Non-Track-Change-Version-November-2020.pdf>

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Therefore, an updated HIA should demonstrate that the grouting works will not pose a pollution risk to the Chalk aquifer, including additional monitoring and analysis of groundwater levels to demonstrate that grouting is not required below the water table.

The composition of any leachate from the grout material should be specified within the HIA and whether this could impact upon the aquifer water quality arriving at the PWS. The findings of this assessment should then be adopted into the Construction and Environmental Management Plan for the development.

4.4 Loss of aquifer recharge

The proposed drainage scheme is such that water that would have previously infiltrated to ground is diverted to surface water attenuation storage and then a surface water course (Lash Brook) a significant distance from the area of the site (1km south-east of the site). The site is currently estimated to be 98% permeable (ALP, Oct 2020), with the Chalk aquifer overlain by highly permeable sand and gravel. This permeability would be largely negated across the proposed site, with surface water infiltration reduced significantly with proposed impermeable surfacing, sub-surface grouting and surface water capture and export via mains/sewer.

The grouting of voids within the Chalk, and shallow disturbed ground underlying the site will lead to a decrease in the overall permeability of the ground above and including the aquifer. This will result in a significant decrease in infiltration of water directly from the ground surface (i.e. due to rainfall infiltration) to the underlying groundwater table.

The catchment required to support the borehole will increase due to this loss of infiltration across the site, which is sited in the SPZ 1 for the Thames Water PWS. This will mean a larger area would be within the 50-day travel time covered by the SPZ 1. The SPZ 1 would need to be redrawn, bringing new areas into SPZ 1. This would have two potential impacts:

- Increase the likelihood of the borehole being affected by pollution incidents,
- Put new SPZ 1 restrictions on the uses of parcels of land formally not subject to them, reducing their potential utility. This also relates to Policy ENV12 detailed above, which states that there should not be significant adverse impacts on the amenity of neighbouring uses. The SPZ 1 area is approximately 1,280,000 m² while the site footprint is 57,300 m² (see Figure 4-1), which is approximately 4.5% of the SPZ 1 area.

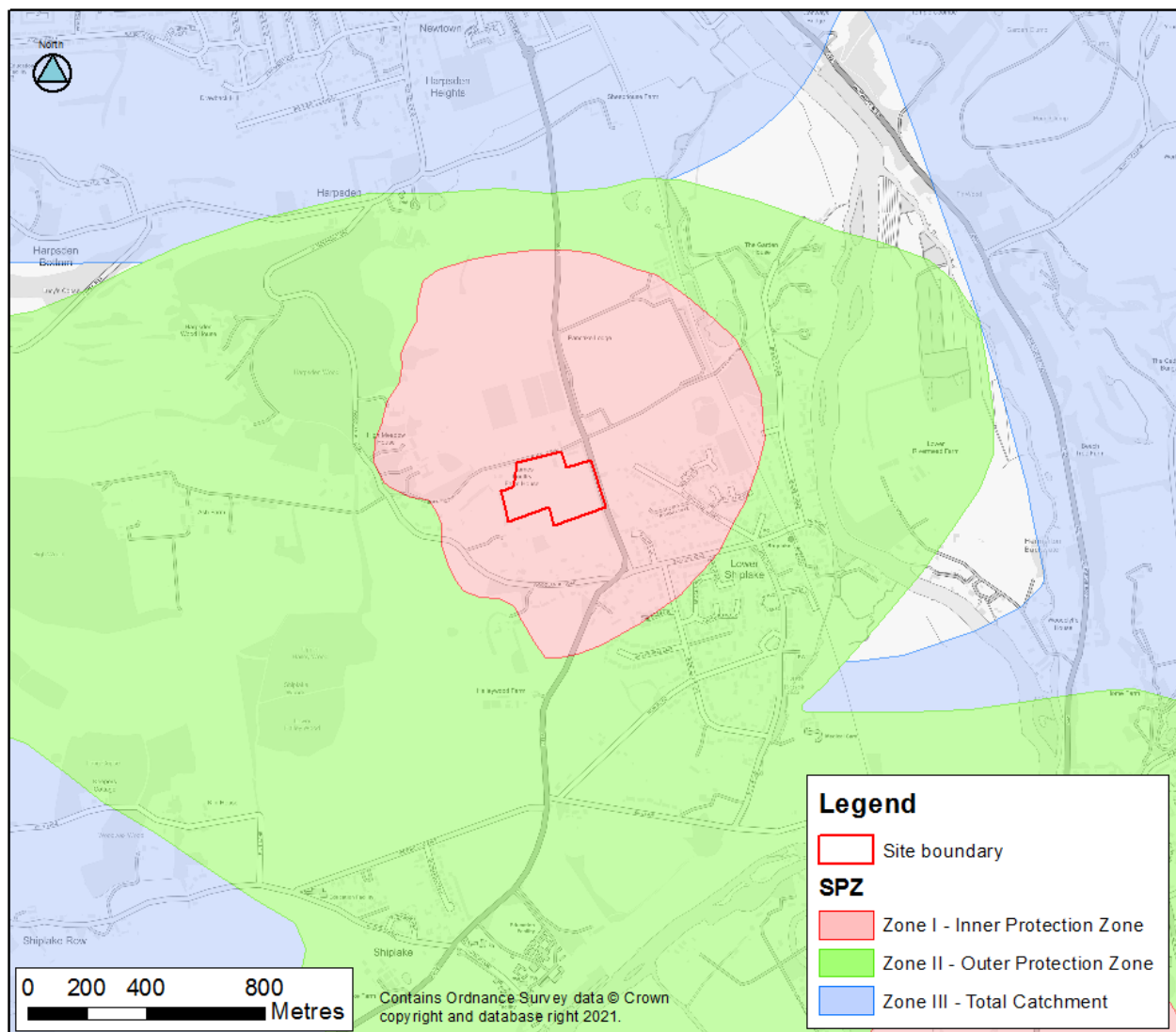
The current HIA (including deep borehole soakaways) assumes that recharge to the PWS would likely increase and be quicker with the proposed development. However, as the newly proposed drainage plan excludes all infiltration mechanisms it would be necessary to reassess the potential effect of removing nearly all recharge across the site, and alteration of the SPZ 1, in an updated HIA.

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Figure 4-1 - Site footprint in relation to groundwater abstraction borehole SPZ



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5 Conclusion

Based on this review of the current drainage proposal, existing site data and Hydrogeological Impact Assessment the following points are made;

- An updated Hydrogeological Impact Assessment would be needed for the proposed grouting and updated drainage scheme, with approval from EA and Thames Water. The impact assessment should show that there is no significant impact on the underlying aquifer and nearby abstraction borehole, both in terms of water levels, flows and water quality. The HIA should include a hydrogeological conceptual model of the site, which needs to confirm that the PWS borehole doesn't take its water from a part of the aquifer which may be grouted up (such as enhanced permeability of the near surface Chalk).
- It is recommended that borehole groundwater monitoring is carried out across the site for at least 12-months prior to development to assess the groundwater table variability across the area. Additionally, any long-term local observation borehole data available (e.g. from the Environment Agency) should also be included in the assessment and any surface water levels (such as the nearby pond). Current risk assessments assume that grouting will be entirely above the water table of the aquifer, however, it is unclear from current ground investigation data whether this is the case across the site. Detailed groundwater levels should then be compared to the existing extensive ground stability depth mapping across the site to establish relative depths to groundwater ranges. The data should be presented in a comprehensive hydrogeological conceptual model including maps and cross sections to demonstrate the spatial location and potential interaction (or reasons for no interaction) of the proposed grouting and the PWS boreholes.
- Groundwater monitoring should be carried out before, during and after construction to assess any on-going impacts to local groundwater following grouting works. Monitoring would include measurement of long-term groundwater levels and chemical quality. Chemical analysis suite would be appropriate to demonstrate that the grouting mixture has not had a detrimental impact on aquifer quality (water quality records may be available for the PWS).
- A Construction Environmental Management Plan (CEMP) should be developed detailing measures to avoid creation of potential migration pathways into the underlying aquifer or increasing pollution risk. This should include measures to prevent creation of new contamination pathways by piling or excavating through the full thickness of superficial deposits to the Chalk; a detailed grouting scheme that ensures grouting does not extend below the water table, and measures to prevent accidental fuel spillages during construction; and measures to control generation of silt laden run-off during site works. Proposals for wet working or not working during periods of high rainfall (and hence high infiltration to the ground) should be considered and the risk of associated contamination assessed.

Regardless of mitigations measure put in place, the scheme cannot mitigate against the increase in the catchment of the borehole due to loss of recharge to the aquifer across the site. This will increase the vulnerability to pollution of the aquifer/PWS and could put additional restrictions on nearby land that is then captured in the extended SPZ 1.

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The changes to the top of the Chalk and superficial aquifers in terms of reduction in voids and associated reduction in storage and permeability are also inherent in the grouting scheme. These cannot be mitigated. Although if the grouting scheme is never below the water table these impacts may be minimal. However, if the water table ever rises to the elevation of the grouted aquifer then the aquifer will respond in a very different manner to as at present. Once the water table is within the lower permeability, lower storage, grouted material then this ground may become saturated fairly rapidly and not allow rapid flow of groundwater as at present.

6 References

H Fraser Consulting (HFC, 2020) Hydrogeological impact assessment for proposed development works near Harpsden Water Treatment Works.

Abley Letchford Partnership (ALP, April 2020) Thames Farm, Shiplake - Drainage Statement.

Abley Letchford Partnership (ALP, Oct 2020) Thames Farm, Shiplake - Drainage Statement.

Appendix 3 – Technical Note by JBA Consulting September 2023

TECHNICAL NOTE

JBA Project Code	2022s1056
Contract	Thames Farm Application for a Certification of Lawfulness
Client	Thames Farm Action Group
Date	September 2023
Author	Benjamin Brière De L'Isle
Reviewer / Sign-off	Paul Eccleston
Subject	Review of supporting evidence documents in appeal (APP/Q31115/X/23/3325922)

1 Introduction

A development appeal form was submitted by Taylor Wimpey West London (TWWL) on 13 July 2023 with Appeal reference APP/Q3115/X/23/3325922 in relation to the planning application P21/S4749/LDP to South Oxfordshire District Council (SODC) decided on 13/01/2022. Thames Farm Action Group requested JBA (email dated 22/09/2023) to review the technical documents submitted as part of the appeal and related to the hydrogeological assessment of the site.

2 Documents reviewed

The applicant, TWWL, submitted the appeal form alongside reports and drawings in support of the appeal. The documents list below has been submitted as part of the appeal statement and, due to time constraints and relevance to hydrogeological matters, only those identified as reviewed have been assessed. No documents from the planning application has been reviewed as part of this work or is commented within this technical note. JBA technical note (January 2021) should be read in conjunction with this technical note for any previously submitted documents as part of the planning application.

Table 1: List of documents

Document name	Relevance to hydrogeology	Reviewed
Appeal Form		Yes
Grounds of Appeal.pdf		Yes
Location Plan drwgn C11748.16.001.pdf	Yes	Yes
Landscape Strategy drwgn C11748.16.701.pdf	Yes	Yes
Tree Woodland Planting Plandrwn C11748.16.705.pdf	Yes	Yes
Strategic Landscaping Plan drwgn C11748.16.801.pdf	Yes	Yes
Shiplake - Program Rev2.pdf		
A253-TN06 Rev C - Traffic Impact Assessment of Grouting Exercise.pdf		
Indicative Foundations.pdf		Yes
30438R3.2 Shiplake Grouting HIA-Non-technical summary.pdf		Yes
Approved Highway Plan.pdf		
30438R3.2 Shiplake Grouting HIA_Part1.pdf	Yes	Yes
30438R3.2 Shiplake Grouting HIA_Part2.pdf	Yes	Yes
30438R3.2 Shiplake Grouting HIA_Part3.pdf	Yes	Yes
30438R3.2 Shiplake Grouting HIA_Part4.pdf	Yes	Yes

The grounds of appeal discussed in this technical note relates only to the nature of the ground remediation works and the potential risk to the public water supply commenting in particular on Ground of appeal document Section 5. ix) paragraph (6) "The site lies approximately 130 m from the Harpsden Water Treatment Works, where

groundwater is abstracted from the Chalk aquifer from two boreholes for public water supply. A Hydrogeological Impact Assessment has been produced which considers whether it is possible that grouting the ground could have an effect on how rainfall infiltrates down to the water table and also how water flows through the ground towards the boreholes. It also investigates the possibility that grouting could create turbidity, or cloudiness, in the water supply, by creating a suspension of fine particles in the water.

The Hydrogeological Impact Assessment demonstrates that the ground stabilisation works will have no effect on the nearby groundwater abstraction borehole."

The key document related to the appeal is the Hydrogeological Impact Assessment (HIA) produced by H Fraser Consulting dated 10/07/2023.

3 Hydrogeological Impacts Considerations

The sections below provide a technical review of the HIA. The objectives stated by the HIA is to "assess the potential impacts of the grouting operation on groundwater abstraction at the PWS abstractions, and on the potential to increase flooding at the site."

3.1 Potential impact of the grouting operation on groundwater abstraction

A network of monitoring boreholes has been installed over several rounds ground investigation works and is considered sufficient to establish groundwater level over the proposed development. Piezometric levels have been monitored over winter 2022/2023 which have been used to establish groundwater levels although the HIA mainly relies on February 2022 to derive groundwater levels.

A hydrogeological conceptual site model (CSM) was developed and presented in Section 5 of the HIA. The CSM indicates that soft ground, potentially with relatively higher capacity to infiltration, are present on the proposed site linking drift deposits (gravels base at 49.4 to 38.6 mAOD, unstructured Chalk (base at 32.5 to 30.3mAOD) and structured Chalk.

The grouting plan specified by Stantec and submitted in Appendix 6 of the HIA indicates most of the grouting would take place to the South of the proposed development (Phase 1). The Ground Stabilisation by Compaction Grouting – Specification (Stantec, March 2020) provides no consideration of the environmental impacts from grouting and potential effect of the grouting on adjacent (80m distance) potable water supply.

The grouting mix described by Stantec (March 2020) and reproduced by H Fraser Consulting (July 2023) consist in a mix of Portland cement, pulverised fuel ash (PFA), sand, pea gravel and a thixotropic admixture or either bentonite or other admixture of chemicals approved by the Engineer. The composition that could be used for the grouting mix is described as "The Contractor will supply the Engineer with all relevant details and material data sheets of grout mix constituents to demonstrate their quality and compliance at the start of the works." in Section 5.2 of the HIA (Fraser Nash, 2023). In the absence of clear specification of the proposed grouting mix, it is difficult to establish the potential for release of chemicals into the principal aquifer, how they can be mobilised in the future and their fate potentially affecting the public water supply.

The HIA is assessing the risk of grouting reaching the public water supply by assessing movement of grouts through fractures identified during the site investigation (Section 6.2). The risk assessment uses 1mm and 10mm fractures to determine potential conservative travel distance of 3.4m and 33.4m respectively based on a number of justifications including that "there will be groundwater in the fractures". In assessing the turbidity caused by grouting (Section 6.3), the HIA states that "In the unlikely event that grout mixture interacts with a chalk fractures (potentially causing turbidity in the groundwater contained in those fractures)" turbid

water would be blocked within this fractures and seep through the Chalk matrix rather than following fractures. It is also stated that *"in the worst-case scenario the grout could flow 130 m to the abstraction point."* (Section 6.2 3rd paragraph).

As the purpose of grouting is to reduce fractures void, it is in fact rather probable that the grout will move to fractures up to a certain distance and not fill entirely fractures allowing the bleed water or the leachate from the grout to be mobilised from the end position within the fracture to other connected fractures and to the public water supply. No assessment is made within the HIA for this source – pathway – receptor linkage other than for turbidity.

With regards to Section 6.3.1 related to the potential reduction in permeability of the Chalk affecting groundwater flow to the public water supply or to Section 6.4 related to the reduction in recharge to the Chalk aquifer, the absence of a definitive drainage strategy for the site reduce significantly the validity of the arguments made. There is no justification why a reduction of 7cm or 3cm in the drawdown at the PWS is considered insignificant and this results as well as the uncertainty associated with the calculation should be considered by Thames Water. It is unclear whether cumulative impacts on the water supply has been considered in the significance of the effects.

3.2 Potential increase of flooding

The potential increase of flooding is dealt with in the HIA by Section 6.5 (total of 2 paragraphs). The HIA indicates that the proposed development works is expected to reduce permeability over the site. However, the assessment is dependent on the approval of SUDS plan taking *"account for areas of reduced permeability due to grouting"*.

4 Conclusion

Based on the above discussion, the applicant's environmental consultancies consideration of the grouting effects on the Harpsden Water Treatment Works concluded that no significant effects are expected.

However, in the absence of definitive drainage strategy by the applicant there is a significant gap in what has been assessed and should include a robust determination of contamination sources potentially affecting the Source Protection Zone from the grouting works and consideration of drainage to assess effects of the development during its operational phase. Due to the sensitive location of the proposed development, a more comprehensive assessment is expected to assess risks to the public abstraction.

The HIA focuses on risks associated with turbidity, grouting reaching the abstraction borehole and the reduction in permeability over the proposed development. It doesn't provide a chemical assessment of the substances that would be used to support the grouting. No Material Safety Datasheets have been provided for the grouting or for substances that could be added to the grouting mix.

Inconsistencies within the report have been noted, the most significant relating to the actual distance of the Harpsden Water Treatment Works to the site stated at 80m in Section 2.1 Background, or 130m in Section 7 Conclusions. With a worst case scenario of grouting moving 130m, the proposed grouting would reach the public water supply.