

TECHNICAL NOTE

JBA Project Code
Contract

2022s1056
Review of Drainage and Groundwater
Proposals for Wyevale Garden Centre
Development
Thames Farm Action Group
V2.0 15/09/2022
Brendon McFadden
Paul Eccleston
Review of Drainage and Groundwater
Proposals

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1 Introduction

A reserved matters planning application (P21/S4271/RM) has been submitted to South Oxfordshire District Council (SODC) for 40 dwellings and a minimum of 250m² of employment space at Wyevale Country Gardens, Reading Road near Harpsden, RG9 4AE.

JBA Consulting were appointed by Thames Farm Action Group (TFAG) to undertake a technical review of the submitted documents relating to drainage and groundwater. The site is immediately north of the Thames Farm site, where ground investigations identified significant voids or solution features in the underlying chalk strata. The drainage, groundwater and geotechnical proposals for the Thames Farm site were previously reviewed by JBA Consulting for Shiplake Parish Council, and hence we are familiar with issues on that neighbouring site and have drawn upon that knowledge in this review.

TFAG commissioned this review to consider whether ground investigations and drainage proposals at the Wyevale site have taken proper consideration of the potential for similar voids. The Wyevale site is also entirely within the Environment Agency's Source Protection Zone 1, the inner zone designated to manage activities in order to reduce the risk of contamination of the aquifer, in this case due to the proximity of Thames Water's Harpenden borehole located off Bolney Lane, just across the A4155 from the Wyevale site. This borehole is the primary source of water for the Henley Water Resource Zone, and hence groundwater contamination could have severe consequences for the population of Henley and neighbouring villages.

2 Documents reviewed

The following documents, downloaded from the SODC planning portal on 02/09/2022 were reviewed:

Drainage Layout-Sheet 1 drwgn 8210674-1001 - _A4.pdf.

- Foul and surface water drainage, west side of site

Drainage Layout-Sheet 2 drwgn 8210674-1002 Rev A5.pdf.

- Foul and surface water drainage, east side of site

Exceedance Flow Plan drwgn 8210674-1901 Rev A4.pdf.

- Surface water flow pathways in the event of exceedance

Flood Risk Assessment Part 1.pdf.

- Main FRA report

Flood Risk Assessment Part 2.pdf.

Appendix G Extracts from site investigation report including:

- ST Consult Due Diligence – Site Investigation Report (Ref: JT0447, April 2022)
This is not referenced in any of the geotechnical, geoenvironmental or ground investigation reports, but is referenced in the FRA.
- ST Consult Ground Conditions Letter Report (Ref: JT0447, November 2021)

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- Cundall Phase 1 Geotechnical and Geoenvironmental Assessment (Ref: 1016459.RPT.GL.001, February 2018)

Flood Risk Assessment Part 3.pdf

- Cundall Geoenvironmental Due Diligence (Ref: 016459.RPT.GL.002, October 2019)
- Cundall Summary Report on Additional Ground Investigation (Ref: 1016459.RPT.GL.004, December 2020)
- Dunelm Site Investigation Report (Ref: D9677/01, October 2019)
- Dunelm Site Investigation Report (Ref: D10256/00, December 2020)

Flood Risk Assessment Part 4.pdf

- Proposed site plan

Flood Risk Assessment Part 5.pdf

- Flood risk maps
- Drainage Strategy Plan
- Drainage Calculations
- Exceedance Flow Plan

Summary Report on Additional Ground Investigation.pdf

- Cundall's 2020 report

3 Review

3.1 Groundwater characterisation

Our review has focussed on the Summary Report on Additional Ground Investigation, prepared by Cundall in 2020. This draws upon the 2018 Phase I Geotechnical & Geoenvironmental Assessment, 2019 Geoenvironmental due diligence report and Dunelm's 2020 Factual Report on Ground Investigation, which are provided in Appendix G of the Flood Risk Assessment (FRA).

The report states in Limitations (section 1.5) that the investigation has been carried out to provide characteristics of groundwater at the site, however there is no discussion within the report regarding groundwater for the site at all. The report does not make reference to the site being in Source Protection Zone 1, although this is referenced in the Phase I Geotechnical & Geoenvironmental Assessment, which states that "the water environment in generally is in general considered a highly sensitive receptor."

Reviewing the factual report borehole records (Appendix A) it appears that only the three cable percussive (CP) boreholes reached a sufficient depth to allow measurement of groundwater levels, and no groundwater monitoring installations were included as part of the investigation.

The limited groundwater data is based on groundwater strikes during drilling, which are not a clear indication of the local stable groundwater table. The report does not refer to the sampling undertaken in August, September and October 2019 (reported in the

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2019 Geoenvironmental due diligence report). Groundwater monitoring at the EA borehole at Stonor Park showed water levels dropping during this period in line with the mean seasonal trend¹. To make any reasonable assessment of groundwater characteristics, a sufficient array of groundwater monitoring boreholes should be established, which would allow on-going monitoring of variable groundwater levels and quality across the site. Ideally a minimum of 12-months of baseline monitoring would be carried out to assess the varying seasonal groundwater table, and to get a reasonable understanding of the minimum and maximum levels that can be expected. The location and number of monitoring boreholes required should be informed by a hydrogeologist and presented in a Hydrogeology Impact Assessment (HIA).

3.2 Assessment of dissolution features

The assessment of Chalk dissolution features (voids) appears to be limited, with approximately half of the exploratory holes deep enough to encounter the upper boundary of the Chalk.

Based on assessments of dissolution voids in the Chalk to the south (Thames Farm) only the three CP boreholes undertaken during the Cundall investigation were deep enough to have the potential to encounter potential voids, which were found down to 16m below ground level (mbgl) at Thames Farm.

All other window sampling boreholes terminated at 1-5mbgl. Therefore this ground investigation alone would have limited data to map out any potential voids below the site.

Please note that, for reasons of time limitations, this review does not include the opinion of a geotechnical engineer, therefore we are unable to provide advice upon an appropriate scheme of ground investigations given the potential for dissolution features at this site.

3.3 Contamination assessment

The ground investigation factual report (Dunelm, Appendix A) states that an objective of the investigation is to determine the nature and extent of potential contamination within the site, however there is no further reporting of any soil or water quality analysis data or discussion. A robust geo-environmental assessment is included with Appendix G of the FRA. However, this assessment now needs to be extended, for example in the form of an HIA, to take account of the proposed piling (if required) and of the infiltration drainage proposed.

3.4 Drainage Layout drawings

The current proposal shows soakaway SUDs over the Chalk aquifer to be located in the eastern portion of the site, which is in close proximity to the Thames Water public water supply (Harpsden PWS), in the most sensitive source protection zone (Zone 1). The policies associated with SPZs are set out in 'The Environment Agency's approach to

¹ https://nora.nerc.ac.uk/id/eprint/531387/1/HS_202110.pdf

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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 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."

3.5 Flood Risk Assessment

3.6 Surface water

The site's drainage strategy proposes to drain all surface water to shallow soakaways in the Taplow gravels which overlay the chalk. This is a pragmatic approach given the greater pollution and dissolution risks of draining to deeper soakaways directly to the chalk.

Roof drainage from houses is considered to be of the lowest risk of contamination and can be drained to soakaway in a Source Protection Zone 1. Estate roads and driveways pose a low risk. The strategy proposes permeable paving and swales to mitigate pollution risks from runoff from driveways and site roads. Following the SuDS Manual Simple Index approach, these, properly designed, would provide adequate pollution mitigation. However, as previously discussed, it would be advisable to consider the risks of groundwater contamination in an HIA to confirm the approach. The SuDS Manual does advise considering the need for a more precautionary approach in SPZs.

Site roads are not intended to be put up for adoption and would be privately managed. Given the location within a Source Protection Zone 1, it would be preferable that site roads were adopted by Oxfordshire County Council, in order to ensure that they are built to adoptable standards and maintained in perpetuity. However, the FRA does provide an appropriate maintenance plan for the SuDS drainage which includes the site roads. Information should be provided to the LPA on how the private maintenance will be funded.

3.7 Foul drainage

Foul drainage of the site is proposed to drain to the south east of the site, from where it will pump into the Thames Water public sewer. It is proposed that the foul drainage, including the pumping station, is operated as a private system, not adopted by Thames Water. Given the close proximity of the pumping station to the public water supply

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borehole, it would be advisable to have the foul sewerage adopted. This would ensure that the drainage was designed and constructed to adoptable standards, and maintained in perpetuity by Thames Water, who are likely to be better equipped to, for example, respond to a pumping station failure than a private maintenance company. If this is not the case, an appropriate maintenance plan should be provided to demonstrate how the system will be maintained. An outline plan is included with the FRA, but does not cover how pumping station alarms would be responded to. This is considered a significant source and pathway for contamination to groundwater in the event that foul sewage surcharges out of the pumping station wet-well during a prolonged pumping station failure. Information should be also provided to the LPA on how the private maintenance will be funded.

4 Summary

The proposed development includes soakaway SUDs and piling works in a SPZ1 for the nearby Thames Water PWS, which require a Hydrogeological Impact Assessment to ensure that they do not pose an unacceptable risk to the source of supply. The planning documents currently do not appear to include any form of HIA. If piling is required this may also be in the form of a Piling Risk Assessment. With the recommendations of the HIA and assistance of a hydrogeologist a more robust groundwater monitoring and assessment scheme can be carried out.

It is currently unknown as to what extent voids may be present within the Chalk underlying the site. Should additional construction methods be required, such as grouting works, this should also be included within any Hydrogeology Impact Assessment, to ensure that the grouting does not adversely affect the physical or chemical quality of the aquifer/PWS.

The proposal for site roads and foul sewers to be privately managed raises concerns within a Source Protection Zone 1, given the risk of groundwater contamination if maintenance is not carried out and systems fail. It would be preferable that these are adopted by Oxfordshire County Council and Thames Water to ensure maintenance in perpetuity. If this is not possible, assurances should be provided on how the maintenance will be funded, including a suitable financial bond or guarantee. Further information should also be provided on how pumping station high alarms will be dealt with to prevent the risk of sewer flooding and contamination of the aquifer.