Public Document Pack

WEST OXFORDSHIRE DISTRICT COUNCIL

Supplement for

LOWLANDS AREA PLANNING SUB-COMMITTEE - MONDAY, 8TH JANUARY, 2024

Agenda No **Item**

4. **Applications for Development** **(Pages 3 - 56)**

Purpose:
To consider applications for development, details of which are set out in the attached schedule.

Recommendation:
That the applications be determined in accordance with the recommendations of the Business Manager – Development Management.

Application No.	Address	Planning Officer
23/00539/FUL	The Crawley Inn, Foxburrow Lane	Clare Anscombe
23/02731/FUL	The Coffee Shed, The Leys	Elloise Street
23/02849/FUL	Land South West Of Chapel Lane	Esther Hill

This page is intentionally left blank

WEST OXFORDSHIRE DISTRICT COUNCIL

LOWLANDS AREA PLANNING SUB-COMMITTEE

Date: 8th January 2024

Report of Additional Representations

Agenda Index

Please note that if you are viewing this document electronically, the agenda items below have been set up as links to the relevant application for your convenience.

23/00539/FUL	The Crawley Inn, Foxborough Lane, Crawley, Witney	3
23/02731/FUL	The Coffee Shed, The Leys, Witney	4
23/02849/FUL	Land South West Of Chapel Lane	5

Report of Additional Representations

Application Number	23/00539/FUL
Site Address	The Crawley Inn, Foxburrow Lane, Crawley, Witney
Date	5th January 2024
Officer	Clare Anscombe
Officer Recommendations	Approve subject to Legal Agreement
Parish	Crawley Parish Council
Grid Reference	434322 E 212094 N
Committee Date	8th January 2024

Additional Public Comments
3 additional objection comments have been submitted from members of the public. These are available to view in the online case file: https://publicaccess.westoxon.gov.uk/online-applications/applicationDetails.do?activeTab=documents&keyVal=RQFTVCRKIXI00 and are summarised below:

- Concerns relating to the impact on local ecology, highways, the proposed design and layout including the proximity of houses to Foxburrow Lane, increased flood risk and landscape impact.

Report of Additional Representations

Application Number	23/02731/FUL
Site Address	The Coffee Shed, The Leys, Witney
Date	5th January 2024
Officer	Elloise Street
Officer Recommendations	Approve
Parish	Witney Parish Council
Grid Reference	435485 E 209036 N
Committee Date	Committee Date 8th January 2024

Application Details:
Demolition of existing hub and erection of replacement hub and community facilities, installation of court lighting, creation of new pedestrian access, extension to existing car park, creation of changing and shower facilities from former depot facility and resurfacing of tennis courts to provide new tennis courts, MUGA and Padel courts and installation of canopies above Padel courts together with associated works (amended parking plans)

Applicant Details:
Mr Jeff Hunter
Courtside Hubs CIC
20 Wheatley Business Centre
Old London Road Oxford OX33 1YW

Additional Representations:
1 additional comment from Witney Town Council as detailed below:

"Witney Town Council welcome the amended plans and thank the applicant for addressing the concerns relating to parking and vehicular access. The Town Council have no objection to this revised proposal."

<u>Third Party Representations</u>

One additional third-party comment of support has been received following the consultation period which can be viewed in full on the website. The comment as summarised states "I fully support the new facilities being proposed by Courtside and thank the developer for being willing to meet with and listen to residents"

Report of Additional Representations

Application Number	23/02849/FUL
Site Address	Land South West Of Chapel Lane Standlake Oxfordshire
Date	5th January 2024
Officer	Esther Hill
Officer Recommendations	Refuse
Parish	Standlake Parish Council
Grid Reference	439750 E 203347 N
Committee Date	8th January 2024

Application Details:
Erection of a dwelling with double garage, adapted vehicular entrance point and related landscaping

Applicant Details:
NPES Developments Ltd C/o Agent

Additional Representations:

Third Party Representations

One additional support comment has been received. In summary, the comment states that as a landowner in Chapel Lane for some years, that they do not recall any incidence of flooding within the development site.

Additional Drainage Information

In an attempt to overcome the concerns raised by the WODC Drainage Officer, a series of emails and updated documents have been submitted. The amended documents include an updated Drainage Strategy, Ground Water Monitoring and SuDS Assessment. These documents can be found within Appendix 1 of this document.

Whilst your Drainage Officers have been re consulted, the additional information was received over the Christmas period and therefore has not yet been fully assessed. The Drainage Officer has however asked for further points of clarification. Your officers would therefore suggest that members choose to either:

1. Determine the application as it and not accept the amended details.
2. Defer consideration to enable consultation and bring the application back once that has occurred.
3. Delegate the decision to officers to determine the application, approving if the amended details satisfy the drainage engineer, or refusing if they don't.

This page is intentionally left blank

From: Richard White [redacted]
Sent: 04 January 2024 16:40
To: Kevin Jack <Kevin.Jack@publicagroup.uk>
[redacted]
Subject: RE: Chapel Lane Soakage

You don't often get email fr[redacted] Learn why this is important

Good afternoon Kevin,
Thank you so much for coming back to us. It is appreciated, we know how much you have on at the moment!

The current design achieves 304mm clearance of the base of the infiltration feature and the highest recorded groundwater level (this week). The latest reading has been taken into account with the current design.

We have already raised the finished floor level. Whether or not the building can be raised again is not our area of expertise, but it is already higher than the original application. Technically, there could be some scope to raise the floor levels on-site further, as the ridge heights are higher for the houses along Woodlands. But there will be other factors at play, too and equally, we do not believe this would be necessary. We are also concerned that raising the ground more than we already have could make the site look odd compared to the surroundings. It is already higher than most of the existing properties locally.

C753 indicates that 300mm should provide sufficient depth for treatment between permeable paving and a high groundwater table, we are providing 304mm. An extract from C753 is below, see below and note 3:

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates[1]	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.6[4]	0.5	0.6
A soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.4[4]	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.8[4]	0.8	0.8
Proprietary treatment systems[5, 6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

Notes

1 All designs must include a minimum of 1 m unsaturated depth of aquifer material between the infiltration surface and the maximum likely groundwater level (as required in infiltration design – Chapter 25).

2 For example as recommended in Sniffer (2008a and 2008b), Scott Wilson (2010) or other appropriate guidance.

3 Alternative depths may be considered where it can be demonstrated that the combination of the proposed depth and soil characteristics will provide equivalent protection to the underlying groundwater – see note 1.

4 If significant volumes of sediment are allowed to enter an infiltration system, there will be a high risk of rapid clogging and subsequent system failure.

5 See Chapter 14 for approaches to demonstrate product performance. Note: a British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: **www.britishwater.co.uk/Publications/codes-of-practise.aspx**

6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution, where there is a requirement to retrofit treatment. WAT-RM-08 (SEPA, 2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

The parking is already 420mm higher than the existing ground level at the location of the paving (it was 66.08, it will be 66.50).
To the rear of the dwelling is 550mm higher, the existing levels are currently 65.95, and the FFL is proposed to be 66.50.
We feel the current design meets the standard needed, and whilst raising the dwelling may help with drainage, it will impact other areas of the design.

We are hopeful that, at this stage, the plans and measurements provided show that the design is achievable and that the drainage can be conditioned. If the offset to the groundwater needs to be increased further, the paving depth could be reduced to provide a larger offset; these displaced waters would then be guided to the floodable area to the rear, which is many times oversized. Or the sub-base could be replaced with permavoid (or similar) to provide the same storage in a shallower depth. But we cannot see that this could be a reason to maintain the objection, as there is a solution and clarity is only required on the finer points.

Please do feel free to give me a call if you or Laurence would like to discuss this. As you are probably aware, this site goes to the Lowlands committee on the 8th, and we need to have the drainage agreed upon before this date.

All the best,

Richard White
B.Sc (Hons) C.Env C.WEM I.Eng F.IHE MCIWEM
Managing Director

Infrastruct CS Ltd
Consulting Civil Engineers
The Stables, High Cogges Farm, High Cogges, Witney, Oxon, OX29 6UN.
[redacted]
Web: www.infrastructcs.co.uk

From: Kevin Jack <Kevin.Jack@publicagroup.uk>
Sent: Thursday, January 4, 2024 3:54 PM
To: Richard White [redacted]
Cc: [redacted]
Subject: RE: Chapel Lane Soakage

Happy new year Richard

I can acknowledge that no photographic evidence has been supplied of the application site having flooded previously, and that the depth to groundwater on the allotment site cannot be taken into consideration otherwise there would be evidence of flooding on the application site. I also note that the latest recorded depth to groundwater of 330mm on the application site is significantly less than previously measured.

As you have stated it is proposed to raise levels of the lower site, can you please confirm by how much it is currently proposed to raise them by and whether the latest groundwater reading has been taken into consideration with regards to the base level of the permeable paving, i.e. is there any scope for raising the ground levels further?

Regards

From: Richard White [redacted]
Sent: 02 January 202[redacted]
To: Kevin Jack <Kevin.Jack@publicagroup.uk>
Cc: [redacted]

[redacted]
Subject: RE: Chapel Lane Soakage

You don't often get email from [redacted] earn why this is important

Good afternoon Kevin/Laurence,
Happy New Year! I hope you guys managed to have a good Christmas break despite the rain.
To follow up on my discussion with Laurence on the 22nd of December, I am attaching an updated SuDS report and stand-alone Groundwater monitoring report for your review.
There is now an updated Groundwater monitoring section to the SuDS report, the bund is keyed into the sub-soil and the 2nd soakage test has now been added too. A measurement today, following three days of significant rainfall, is as high as ever recorded, putting it at 304mm below the base of the infiltration structure. This complies with the treatment requirements of C753, which requires 300mm (see footnotes to table 26.4 in C753). In addition to this, because it is close to the line, we recommend a SuDS geotextile to help capture any oils that may make it though, before they reach the underlying soils.

We would also note that Batt's field again had standing water this morning, showing there is no correlation between standing water on the surface of the neighbouring land and the groundwater level on our client's land. Photos can be provided of this surface ponding if it would help.

All the best,

Richard White
B.Sc (Hons) C.Env C.WEM I.Eng F.IHE MCIWEM
Managing Director

Infrastruct CS Ltd
Consulting Civil Engineers
The Stables, High Cogges Farm, High Cogges, Witney, Oxon, OX29 6UN.
[redacted]
Web: www.infrastructcs.co.uk

From: Richard White
Sent: Friday, December 22, 2023 1:44 PM
To: Kevin Jack <Kevin.Jack@publicagroup.uk>
Cc: L[redacted]
Subject: RE: Chapel Lane Soakage

Thank you Kevin,
Whilst we appreciate the concerns, the number of objections does not necessarily correlate with the validity of those objections. The main drainage concern voiced for this application seems to be the Thames Water system, which is not a planning issue. Whilst we do understand the emotive reaction to drainage, we also believe the flood risk in the area will be marginally reduced as a result of the works due to the bunded area. Ultimately, the same amount of rain will fall with or without this scheme, and the connectivity of the gravels below means said rainfall will spread quickly to the places it has always gone; the keyed bund may help reduce the risk of this leaving site.
The capacity of the Thames Water pumping station, as noted above, is not a planning issue, as they are a statutory body, and it is not being made an issue elsewhere in WODC, where Thames Water is

also using tankers. If this were a planning issue, the majority of the Low-lands would be undevelopable, and the number of houses being built indicates that this is not the case.

We do not believe the groundwater can be an issue for this site; there has been no substantiated evidence of the site ever flooding (so the groundwater must be below ground level), and the SuDS system is above the general ground level, so it follows that if groundwater stays at the current typical levels, the SuDS system will not be below the groundwater level.
If the site had ever flooded, given the level of objection, we expect that at least one person in the village would have taken a photo of the site flooded by now. On the basis of there having been no flooding historically, the permeable paving is highly unlikely to be inundated by groundwater.

Further to the above, the SuDS Manual C753 (the standard for SuDS design) discusses the use of SuDS in areas of high groundwater. Please find an extract below, for ease of reference. Interestingly, the manual specifically mentions a WODC scheme with groundwater within 400mm. With the use of permeable paving, we are providing better treatment than was provided on the Henry Box site, and the parking will be at a much lower risk of a pollution event than the road.

8.3 HIGH GROUNDWATER LEVELS BELOW THE SITE

8.3.1 The challenges

When designing a surface water management system for a site that overlies high groundwater levels (ie maximum likely groundwater levels are within 1 m of the base of the SuDS component – see Section 25.2.2), the following challenges should be considered within the design process:

- The use of infiltration may not be suitable due to reduced hydraulic and treatment capacity.
- If SuDS are constructed below the maximum likely groundwater level, then groundwater can potentially enter the SuDS component and reduce the storage capacity.

- Flotation and structural design risks to storage structures or impermeable liners can occur because of the extra loads imposed by the groundwater and the buoyancy of the tanks or liner.

One example of SuDS on a site with high groundwater levels is the Henry Box site in Witney, Oxfordshire. On this site, shallow source control methods using a combination of swales and kerb drains was used to manage surface water (Figure 8.5). Groundwater was 400 mm to 700 mm below the surface of the site, and ground levels could not be raised as part of the development.

Figure 8.5 Shallow swale on a site with shallow groundwater, Witney, Oxfordshire (courtesy EPG Limited)

The next section 8.3.2 discusses permeable paving and the design considerations, these are discussed below:

8.3.2 The use of infiltration where groundwater levels are high

Infiltration may not be suitable where there is not an adequate depth of unsaturated soils (ie greater than 1 m) between the infiltration surface and the groundwater. Any assumption of pollution protection within the unsaturated soil layer will also be invalidated. Contaminated surface water runoff can potentially directly pollute groundwater if the groundwater is hydraulically linked to water within the SuDS.

Depending on the depth of groundwater below the site it may be possible to use shallow infiltration basins or permeable pavements. On some sites careful use of land raising with suitable fill materials may also be an option, although this will require advice from a ground engineering specialist, to ensure that the infiltration capacity and risk of settlement or instability is acceptable.

Where infiltration into sites with shallow groundwater tables is proposed, the impact of recharge in thin aquifers leading to groundwater mounding (even under average conditions) should be considered. This risk is minimised by using planar infiltration systems such as discharges from below a pervious surface.

The impact of fluvial flood events on groundwater levels should also be considered, as there may be impacts even if the site is outside the fluvial flood plain.

Contamination of the groundwater - We believe, and the guidance in C753 states, that permeable paving provides suitable treatment for residential parking areas
Stability of the sub-soils – Gravels are amongst the more stable soil types
Groundwater recharge – The hydraulic conductivity will mean the water spreads fast across the site, as it does with no building or parking there. There will be no material difference to groundwater recharge in this area as a result of these works.
As noted in C753, "This risk is minimised by using planar infiltration systems such as discharges from below a pervious surface." Ie the use of permeable paving, so we are following the recommendation of C753
Fluvial flood risk – The site is in flood zone 1.

On the basis that the site complies with the recommendations of the C753 - SuDS manual, we cannot see a justifiable reason to hold the objection. If groundwater had been as high as ground level, we believe it would have been reported/recorded, and as such, we do not believe groundwater will be an insurmountable issue.
If more information is required, please confirm exactly what it is that you need to see. But we would expect that with the above and the updated drawing (attached), a condition could now cover any items.

We hope you have a wonderful Christmas break and look forward to working with you all again in the new year!

All the best,

Richard White
B.Sc (Hons) C.Env C.WEM I.Eng F.IHE MCIWEM
Managing Director

Infrastruct CS Ltd
Consulting Civil Engineers
The Stables, High Cogges Farm, High Cogges, Witney, Oxon, OX29 6UN.
[redacted]
Web: www.infrastructcs.co.uk

From: Kevin Jack <Kevin.Jack@publicagroup.uk>
Sent: Friday, December 22, 2023 11:49 AM
To: Richard White [redacted]

Subject: FW: Chapel Lane Soakage

Hello Richard

Unfortunately, with the very large number of flooding-related objections received for this latest application, a handwritten note of groundwater depths without corroborating borehole logs is not going to be sufficient to satisfy the concerns, especially as the same figure (590mm) keeps cropping up. Although a further soakage test has been carried out which indicates similar infiltration to before, formal evidence that groundwater will not be an insurmountable issue is required to be submitted before I can remove my objection.

I have taken on board your response to the concerns raised about the meadow/storage area and bund. While the nature of the gravel sub-soil will not be altered by your proposals, it may be helpful if the bund is keyed further into the sub-soil if this helps to placate the objectors, as you have suggested.

In response to your previous comment about 23/02695/FUL, the s/w strategy is still under discussion and has not yet been approved.

Regards

Kevin Jack
Land Drainage Consenting and Enforcement Officer

CHELTENHAM BOROUGH COUNCIL
COTSWOLD DISTRICT COUNCIL
Forest of Dean DISTRICT COUNCIL
WEST OXFORDSHIRE DISTRICT COUNCIL

PUBLICA
disability confident EMPLOYER
INVESTORS IN PEOPLE
We are a Living Wage Employer

ENHANCED LEVEL AWARD

From: Richard White [redacted]
Sent: 21 December 202[redacted]

Subject: Chapel Lane Soakage

You don't often get email from [redacted] Learn why this is important

Hi Kevin,
Please can you let us know if you have had a chance to review this one? The planning officer, Esther Hill is very keen to get this one closed out ASAP.
The owners have carried out an additional soakage test; admittedly, it is not to BRE365, but on the basis that this matches the previous, we cannot see why this would be needed. The rate is fractionally faster/better than the previous, at 1.387E-05 m/s, so it will require the same volume of storage.

With regards to rainfall, Standlake (presumed to be similar to Brize Norton) has had approx:
71.2mm in November compared to the average of 60.88mm and
106.1mm in October compared to 62.71mm.
So, the rainfall has been well above the average this winter, which would be expected to elevate the groundwater level.

Please feel free to give me a call if you would like to discuss this.

All the best,

Richard White
B.Sc (Hons) C.Env C.WEM I.Eng F.IHE MCIWEM
Managing Director

Infrastruct CS Ltd
Consulting Civil Engineers
The Stables, High Cogges Farm, High Cogges, Witney, Oxon, OX29 6UN.
[redacted]
Web: www.infrastructcs.co.uk

Publica is a company wholly owned by Cotswold District Council, Forest of Dean District Council, West Oxfordshire District Council and Cheltenham Borough Council to deliver local services on their behalf.

The content of this email and any related emails do not constitute a legally binding agreement and we do not accept service of court proceedings or any other formal notices by email unless specifically agreed by us in writing.

Recipients should be aware that all e-mails and attachments sent and received by Publica on behalf of West Oxfordshire, Cotswold and/or Forest of Dean District Council may be accessible to others in the Council for business or litigation purposes, and/or disclosed to a third party under the Freedom of Information or Data Protection Legislation.

DRAINAGE STRATEGY

CHAPEL LANE, STANDLAKE
MR PATRICK STEEPE
MARCH 2021
4212-CHAP-ICS-XX-RP-C-07.001-P07

DRAINAGE STRATEGY

4212-CHAP-ICS-XX-RP-C-07.001-P07

REPORT ISSUE

Revision	Date	Notes
P01	16/03/2021	First Issue.
P02	22/07/2022	Second Issue.
P03	29/07/2022	Site layout/entrance updated.
P04	18/04/2023	Groundwater monitoring added.
P05	08/06/2023	Updated in line with the comments from Drainage Officer
P06	16/10/2023	Exceedance pathway routed to private land
P07	02/01/2023	Additional GW monitoring added

PREPARED BY

I. Tuton June 2023

REVIEWED BY

A. J. GRIFFITHS June 2023

DISCLAIMER

This document has been prepared solely as a drainage strategy for the Client, Mr Patrick Steepe. No responsibility or liability will be accepted for any use that is made of this document other than by the Client for the purpose it was written. The conclusions resulting from this study and contained within this report are not necessarily indicative of future conditions or operating practices at or adjacent to the site.
No person other than the client may copy use or rely on the contents of this document without prior permission.

Some of the information presented within this report is based on third-party information which is believed to be correct; no liability will be accepted for any discrepancies in accuracy, mistakes or omissions in such information.

TABLE OF CONTENTS

1 DRAINAGE STRATEGY 1
APPENDIX A - INFILTRATION TESTING AND GROUNDWATER 4
INFILTRATION TESTING 5
GROUNDWATER MONITORING 6
APPENDIX B - MAINTENANCE SCHEDULE 7
APPENDIX C - ARCHITECTS LAYOUT 10
APPENDIX D - DRAINAGE LAYOUT 11
APPENDIX E - MICRO DRAINAGE CALCULATIONS 12
DRIVEWAY CALCULATIONS 13
PATIO CALCULATIONS 14

1 DRAINAGE STRATEGY

Item	Details	Refence /Comment
Method of Foul Water Discharge	Foul water flows are to drain to the existing an adopted sewer in the Chapel Lane via gravity. The on-site system will be privately maintained by the owners of the freehold or their representatives. Should, for any reason a sewered connection proved not to be viable, there is sufficient space within the client's ownership for a treatment plant and associated drainage mound.	The new connection will be subject to S106 consent from Thames Water
Method of Surface Water Discharge	The surface water drainage design proposed for the new dwellings is to follow the drainage hierarchy to ensure the site reflects the natural flows from the site as closely as possible: 1. Rainwater reuse **2. Infiltration** 3. Discharge to Surface Water or a Watercourse 4. Discharge to a Surface Water sewer or a Highway Drain 5. Discharge to a Foul Sewer Surface water falling onto the roof and hardstanding areas is to be drained via infiltration, using permeable paving. Surface water falling onto the roof and hardstanding areas is to be drained to the sub-base of the permeable paving where it will infiltrate a source.	Due to the low-lying nature of the site and the potential for high-ground waters, an x5 factor of safety has been used when sizing the soakaway.
Local Ground Conditions	Trial holes indicate that the site is underlain by freely draining gravel.	
Infiltration Rate	Soakage testing to BRE365 has been undertaken on-site by T Biswell and found the site to have an infiltration rate of 1.348×10^{-5} m/s	The Infiltration Rate used for the design is 1.348×10^{-5} m/s
Surface Water Calculations	The surface water drainage system has been designed for a 1 in 100-year event, plus an allowance of 40% for climate change. Impermeable areas have had an additional 10% added for urban creep in line with Ciria C753. Contributing Areas Roof Areas = 200 m^2 Patio Area = 60 m^2 Parking Area = 130 m^2 **Total Area = 390 m^2**	The total impermeable area for the site is 390 m^2

Ground Water

The site investigation report confirmed that the natural water table was not encountered during the soakage testing to 0.5m depth. Further testing between November 2022 and January 2024 indicated peak ground water encountered 330 mm below ground level of 65.67. To ensure the greatest practical offset between the base of the lowest infiltration feature and the highest recorded groundwater, permeable surfacing is to be used for the hardstanding providing a freeboard of more than 300mm. The proposed base of the permeable paving is above the current ground level. As no surface/groundwater flooding has been recorded to date, the risk of inundation of the on-site storage is considered low. Tanked sides will ensure no lateral movement of water.

Anecdotal evidence of a higher groundwater table has been supplied to the planners, the measurement point is approximately 50m northwest of the site and included measurements within 10mm of ground level. This is believed to be a localised, perched water table, which is at a higher elevation than the proposed site. If this were representative of the proposed site groundwater level, there would have been visible ponding on-site at that time.

Groundwater has not been recorded at a surface level on the site. So, it is taken that groundwater on site has historically been lower than 65.80 (the lowest point on site). Lower than the base of either the patio or driveway.

Water Quality

Permeable paving will be required for water purification qualities in order to avoid the need for petrol interceptors.

Based upon table 26.4 in C753, Permeable paving provides treatment levels of 0.7,0.6,0.7

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates[1]	TSS	Metals	Hydrocarbons
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential[2] of at least 300 mm in depth[3]	0.7	0.6	0.7

A betterment over the required treatment of 0.5,0.4,0.4

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4

The 300mm depth of sub-soil between the highest recorded groundwater depth and base of the lowest infiltration feature achieves this. However it is recommended a SuDS geotextile such as the Polypipe Permafilter Geotextile is used, which can ve shown to retain a range of oil contamination types, allowing decomposition prior to the ground water table and sub-soils.

Exceedance Flows	It is proposed that finished floor levels be raised 600mm above the existing average ground level to mitigate against the risk of any surface water flooding. Exceedance flows will be intercepted and directed to the lower garden area to the northwest. To ensure that this water does not leave the site, a bund will be constructed to a level of 66.30, tying into the new retaining walls. This will provide 140m3 of additional storage above any known groundwater level. Providing five times the anticipated volume of water from the 1 in 100-year event. Whilst not included in the calculations it is recommended that rainwater harvesting is installed to minimize the volume of the water draining to the paving sub-base. The proposed surface water drainage measures will be designed to contain the peak storm event that can be expected for a 1-in-100-year situation. A 40% allowance has already been applied to the site to account for future climate change, and a further 10% has been added to the impermeable areas to allow for urban creep.	
Other	The site is located within Flood Zone 1 and is not at risk of fluvial flooding. The finished floor level should be set at 600mm or greater above the existing ground level to account for climate change.	

Table 1 Drainage Strategy

Appendix A - Infiltration Testing and Groundwater

Infiltration Testing

Soakaway Design Calculations to BRE365 (DG 365 Revised 2016)

Test Reference:	TP1
Site:	Chapel Lane
Client:	Steepe Builders
Test Date:	12/03/2021
Results logged by:	T Biswell

Calculations By:	RJW
Calculation Date:	15/03/2021
Length (m) =	1.00
Width (m) =	0.30
Depth (m) =	0.50

Infrastruct CS Ltd

File ref:	4212-CHAP-13-001-BRE365.xlsx

First Fill	
Time [Mins]	Test 1 Depth [m]
7.00	0.08
13.00	0.13
34.00	0.23
54.00	0.30
74.00	0.34
94.00	0.37
114.00	0.40
134.00	0.45
154.00	0.50

Second Fill	
Time [Mins]	Test 2 Depth [m]
10.00	0.10
20.00	0.15
30.00	0.19
40.00	0.23
50.00	0.28
60.00	0.30
70.00	0.33
80.00	0.36
90.00	0.38
100.00	0.40
120.00	0.42
130.00	0.44
145.00	0.50

Third Fill	
Time [Mins]	Test 3 Depth [m]
10.00	0.09
20.00	0.14
30.00	0.17
40.00	0.20
50.00	0.24
60.00	0.27
70.00	0.29
80.00	0.32
90.00	0.34
100.00	0.36
120.00	0.38
130.00	0.40
140.00	0.42

RESULTS

Volume Vp75 - 25 [m³]	0.06300
Area A_{p50} [m^2]=	0.8460
Time t_{p75-25} [s] =	5167
Surface Water Soil infiltration rate [m/s]	1.441E-05
Treated Effluent Soil infiltration rate ($V_{p)}$ [s/mm]	24.60
Surface Water Soil infiltration rate [m/hr]	0.052

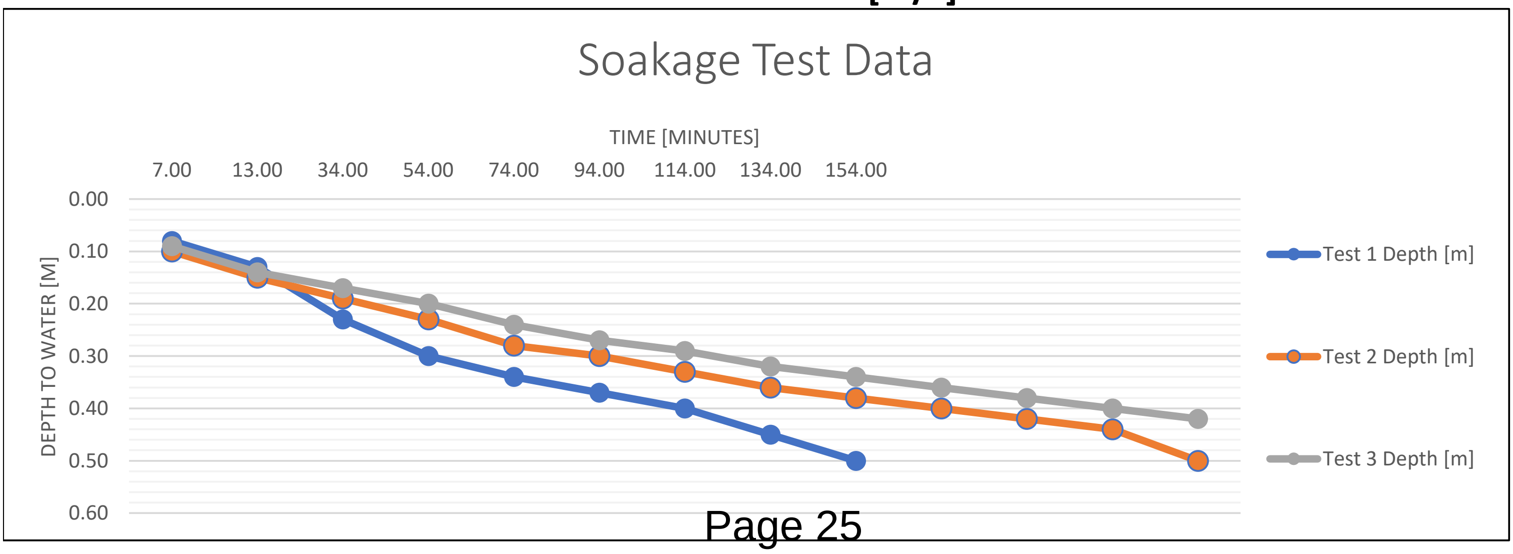
RESULTS

Volume Vp75 - 25 [m³]	0.06000
Area A_{p50} [m^2]=	0.8200
Time t_{p75-25} [s] =	4350
Surface Water Soil infiltration rate [m/s]	1.682E-05
Treated Effluent Soil infiltration rate ($V_{p)}$ [s/mm]	21.75
Surface Water Soil infiltration rate [m/hr]	0.061

RESULTS

Volume Vp75 - 25 [m³]	0.06150
Area A_{p50} [m^2]=	0.8330
Time t_{p75-25} [s] =	5475
Surface Water Soil infiltration rate [m/s]	1.348E-05
Treated Effluent Soil infiltration rate ($V_{p)}$ [s/mm]	26.71
Surface Water Soil infiltration rate [m/hr]	0.049

Slowest Soil Infiltration Rate [m/s] = 1.348E-05



Soakaway Design Calculations to BRE365 (DG 365 Revised 2016)

Test Reference:	TP1 - Test 2
Site:	Chapel Lane
Client:	Steepe Builders
Test Date:	16/12/2023
Results logged by:	T Biswell

Calculations By:	RJW
Calculation Date:	21/12/2023
Length (m) =	1.00
Width (m) =	0.30
Depth (m) =	0.50

Infrastruct CS Ltd

File ref:	4212-CHAP-13-002-BRE365.xlsx

First Fill	
Time [Mins]	Test 1 Depth [m]
8.00	0.08
12.00	0.15
30.00	0.23
60.00	0.32
75.00	0.35
95.00	0.37
120.00	0.42
160.00	0.44
165.00	0.50

Second Fill	
Time [Mins]	Test 2 Depth [m]
0.00	0.00

Third Fill	
Time [Mins]	Test 3 Depth [m]
0.00	0.00

RESULTS

Volume Vp75 - 25 [m³]	0.06375
Area A_{p50} [m²]=	0.8525
Time t_{p75-25} [s] =	5393
Surface Water Soil infiltration rate [m/s]	1.387E-05
Treated Effluent Soil infiltration rate (V_p) [s/mm]	25.38
Surface Water Soil infiltration rate [m/hr]	0.050

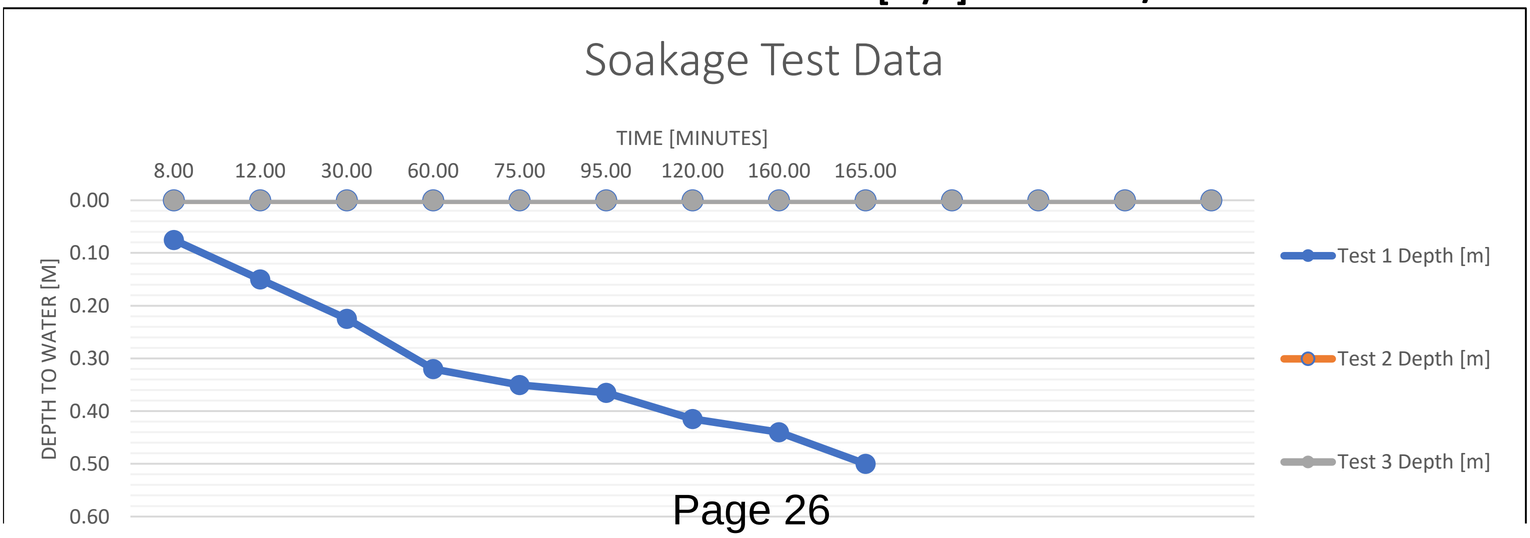
RESULTS

Volume Vp75 - 25 [m³]	0.00000
Area A_{p50} [m²]=	1.6000
Time t_{p75-25} [s] =	#DIV/0!
Surface Water Soil infiltration rate [m/s]	#DIV/0!
Treated Effluent Soil infiltration rate (V_p) [s/mm]	#DIV/0!
Surface Water Soil infiltration rate [m/hr]	#DIV/0!

RESULTS

Volume Vp75 - 25 [m³]	0.00000
Area A_{p50} [m²]=	1.6000
Time t_{p75-25} [s] =	#DIV/0!
Surface Water Soil infiltration rate [m/s]	#DIV/0!
Treated Effluent Soil infiltration rate (V_p) [s/mm]	#DIV/0!
Surface Water Soil infiltration rate [m/hr]	#DIV/0!

Slowest Soil Infiltration Rate [m/s] = #DIV/0!



Groundwater Monitoring

Infrastuct CS LTD

Site Name	Chapel Lane, Standlake
Document Title	4212-CHAP-13-003-T1-Groundwater Monitoring
Document Revision	Revision T1
Client	P Steepe
Calculations By	Fergus Mckirdy

1 Introduction

This is a report showing the ground water levels relative to ground level
for the proposed Chapel Lane, Standlake Development
All information has been provided by the client P Steepe

GROUNDWATER MONITORING - PAGE 1

Site:	Chapel Lane, Standlake
Client:	P Steepe

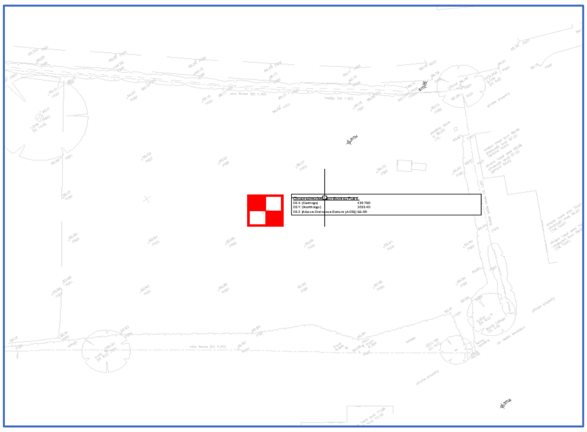
Calculations By:	Fergus Mckirdy
Calculation Date:	02 January 2024

Infrastruct CS Ltd

File ref:	4212-CHAP-13-003-T1-Groundwater Monitoring.xlsx

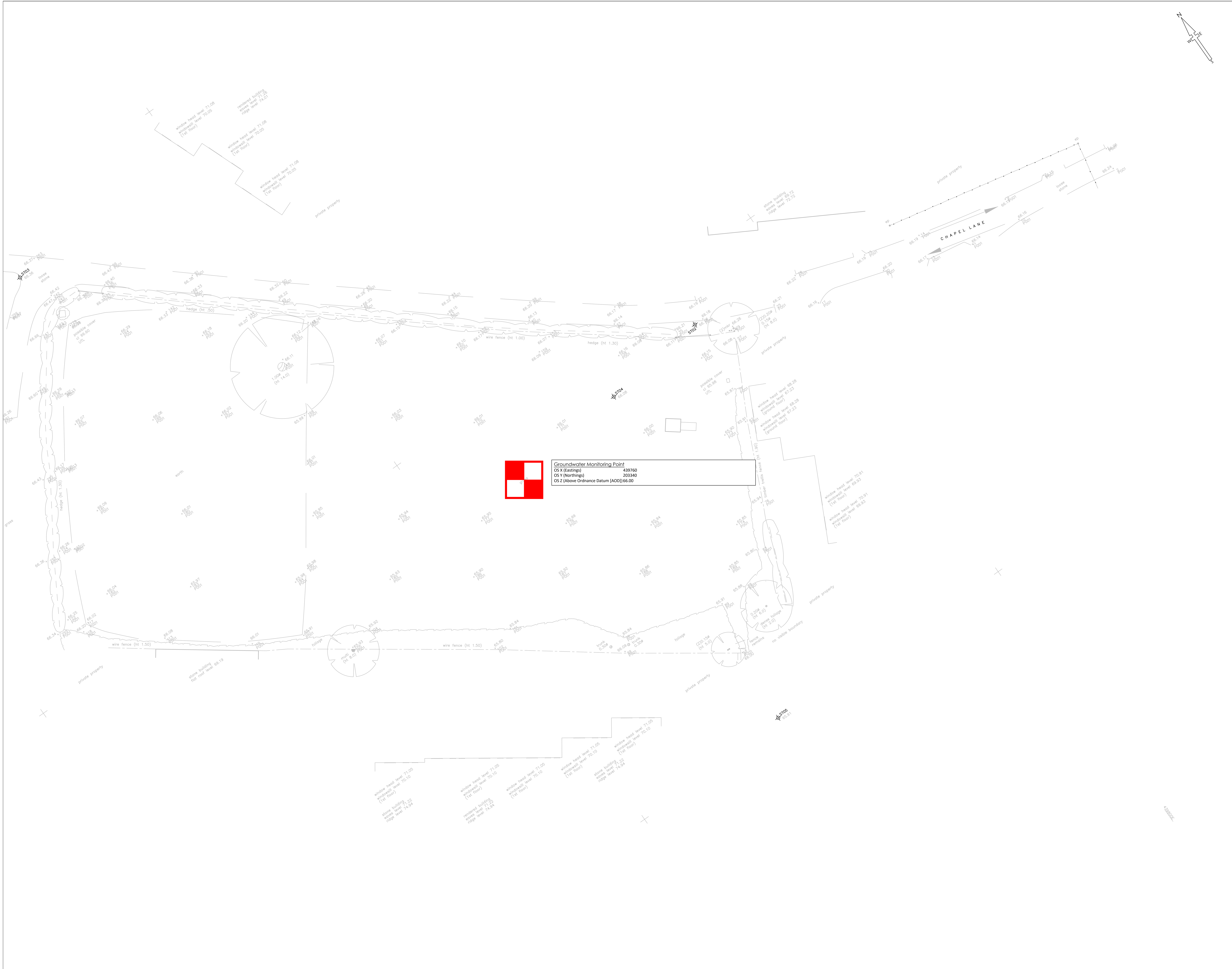
Trial Hole Location

Unit	Measurement
OS X (Eastings)	439760
OS Y (Northings)	203340
OS Z (Above Ordnance Datum [AOD])	66.00
Nearest Post Code	OX29 7RA



Measurements

Date	Measurement from ground level to water/mm	Approximite level (Above Ordnance Datum [AOD])/m
26 November 2022	590	65.41
10 December 2022	590	65.41
24 December 2022	590	65.41
07 January 2023	590	65.41
21 January 2023	590	65.41
04 February 2023	735	65.27
18 February 2023	800	65.20
28 February 2023	800	65.20
06 October 2023	1020	64.98
13 October 2023	900	65.10
24 October 2023	880	65.12
27 October 2023	740	65.26
03 November 2023	670	65.33
10 November 2023	590	65.41
17 November 2023	590	65.41
24 November 2023	670	65.33
01 December 2023	670	65.33
08 December 2023	590	65.41
20 December 2023	595	65.41
26 December 2023	670	65.33
02 January 2024	330	65.67



Survey: 37391/1 - Midland Survey Ltd — Rec'd: 15.03.2021
Site Plan: 20072 - PP0012 - Anderson Orr — Rec'd: 15.03.2021

NOTES

1. All dimensions and levels are in metres unless otherwise noted
2. This drawing is to be read in conjunction with the relevant Architect's/Engineer's drawings, specifications and CDM documentation
3. This drawings has been produced electronically and may have been photo reduced or enlarged when copied. Work to figured dimensions only (DO NOT SCALE). All dimensions to be checked on site. Any errors or omissions to be reported to the engineer immediately.
4. This drawing contains coloured lines / information that may not be clear if reproduced in black and white.
5. Digital copies of this plan can only be considered accurate if supplied directly by Infrastruct CS Ltd.

Construction Note
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions where encountered (such as services). If the drainage is laid from the site out to the outfall it can result in significant abortive works to relay and overcome such obstructions.

Location of Public Sewers have been taken from record drawings which should be fully substantiated by the contractor prior to commencing works on site

All manholes covers located within carriageways shall have no slip covers to prevent motorcycles/cycles losing control

Manhole schedules - Invert level shown related to the deepest pipe within the chamber

REV	DRAWN	CHECK	REVISION COMMENTS	ISSUE DATE
P01	AC	RJW	Initial issue	02/01/24

DRAWING TITLE: Groundwater Monitoring Point
SHEET NO.: 1/1

PROJECT: Chapel Lane, Standlake

CLIENT: Anderson Orr Architects

Infrastruct CS Ltd

The Stables, High Cogges Farm, High Cogges, Witney, OX29 6UN - Tel: 01993 709709: info@infrastructcs.co.uk

SCALE @ A1: 1:200 (0m 5m 10.0m)

ENGINEER: RJW
DRAFT: AC
APPROVED: DJ

PROJECT NUMBER	STATUS	ISSUE PURPOSE
4212	S2	INFORMATION

PROJECT	ORIGIN	PHASE	LEVEL	TYPE	ROLE	NO.	REVISION
CHAP	ICS	01	XX	DR	C	0700	P01

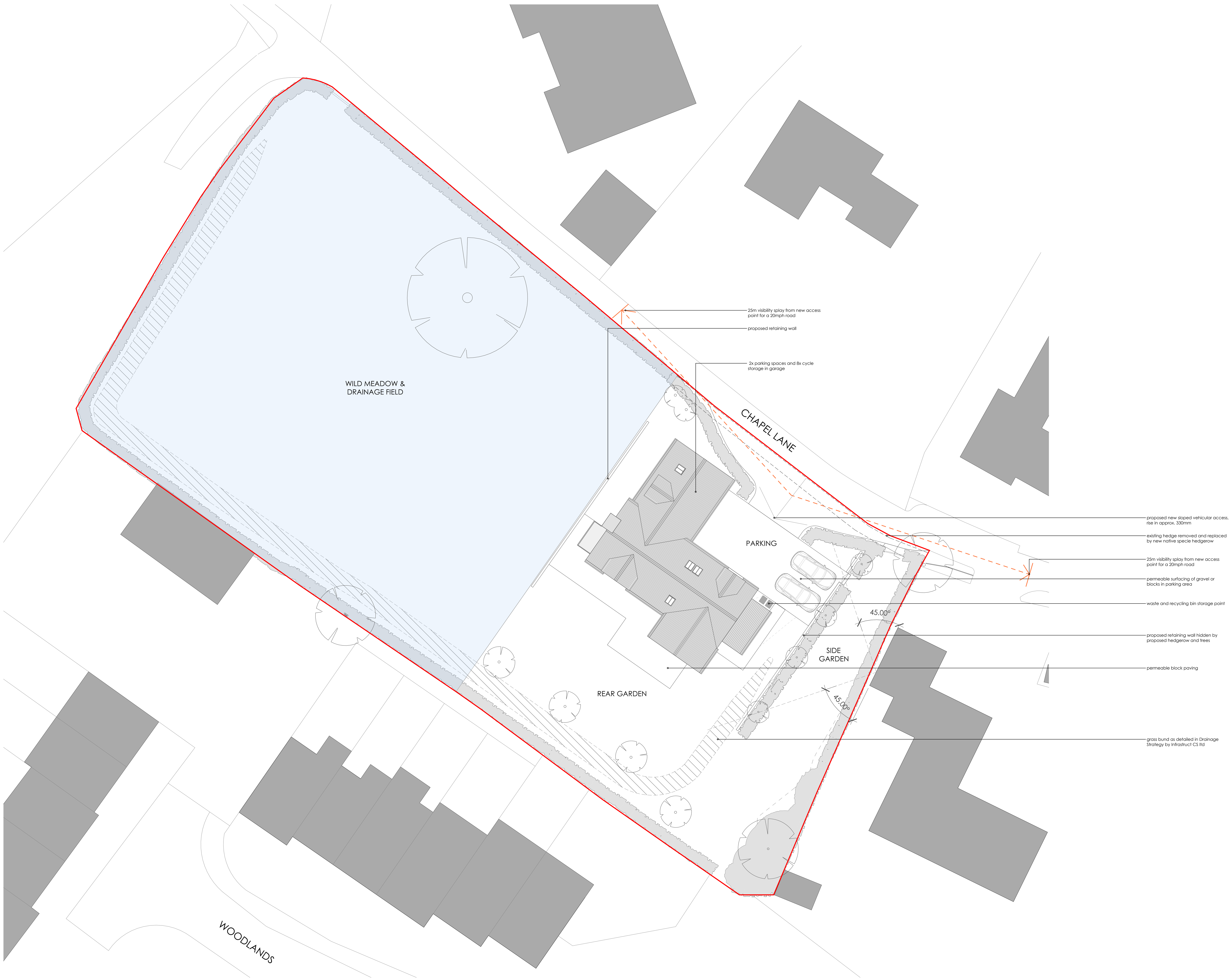
Appendix B - Maintenance Schedule

Item	Required Maintenance	Frequency
Pipe and chambers	CCTV camera survey, flush, descale, repair as necessary	5 Years or upon poor performance
Pervious Pavements (Gravels)	Inspect gravel for siltation and weed growth.	As required or upon poor performance
	Remove Weeds and rake.	As required or upon poor performance
	For heavy siltation or petrochemical spills lift surface gravel, wash and replace	As required or upon poor performance
	Stabilise and mow contributing and adjacent areas.	As required.
	Initial inspection.	Monthly for 3 months after installation
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action.	3-monthly, 48 h after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.
Pervious pavements (Block Paving)	Brushing and vacuuming.	Three times/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations.
	Stabilise and mow contributing and adjacent areas.	As required.
	Removal of weed.	As required.
	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving.	As required.
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users.	As required.
	Rehabilitation of surface and upper sub-structure.	As required (if infiltration performance is reduced as a result of significant clogging).
	Initial inspection.	Monthly for 3 months after installation
	Inspect for evidence of poor operation and/or weed growth. If required, take remedial action.	3-monthly, 48 h after large storms.
	Inspect silt accumulation rates and establish appropriate brushing frequencies.	Annually.
	Monitor inspection chambers.	Annually.
Rainwater Harvesting	Inspection of the tank for debris and sediment buildup, inlets/outlets/withdrawal devices, overflow areas, pumps, filters	Annually (and following poor performance)
	Cleaning of tank., inlets, outlets, gutters, withdrawal dev ices and roof drain filters of silts and other debris	Annually (and following poor performance)

	Cleaning and/or replacement of any filters	Three monthly (or as required)
	Repair of overflow erosion damage or damage to tank.	As required
	Pump repairs	As required
Silt traps and catchpits	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then six monthly
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Inspection of silt traps and catch pits to assess silt accumulation	Monthly (and after large storms)
	Removal of accumulated silt from silt trap and catch pit sumps	Annually, or as required
	Repair/rehabilitation of inlets, outlet, overflows and vents	As required
	Inspect/check all inlets, outlets, and overflows to ensure that they are in good condition and operating as designed	Annually and after large storms

Table 2 SuDS Maintenance

Appendix C - Architects Layout



SCALE

0 2 4 6 8 10

VISUAL SCALE (M) 1:200

GENERAL NOTE
ALL DIMENSIONS MUST BE CHECKED ON SITE AND NOT SCALED FROM THIS DRAWING

FOR USE IN PRECISE NAMED LOCATION ONLY

REVISIONS

DRAWING GRAPHIC KEY

- Domestic area to be meadow grass with an area to be used as part of the drainage strategy
- Proposed and existing trees
- Proposed and existing hedges
- Proposed grass bund as detailed in Drainage Strategy by Infrastruct CS ltd

REVISION	DESCRIPTION	DATE
I	Revised garage wing	06/10/23
H	Amendments to graphic and landscaping plan	11/09/23
G	Amendments to levels according to drainage consultant	26/04/23
F	Front entrance design update	02/09/22
E	Front entrance design update	31/08/22
D	Front entrance design update	18/08/22
C	Graphical amendment	05/08/22
B	Graphical amendment	02/08/22
A	Revised access point	06/06/22

STATUS

PLANNING

PROJECT TITLE
Land Adj. Chapel Lane, Standlake

DRAWING TITLE
PROPOSED SITE PLAN

FIRST ISSUED	DRAWN	SCALE (A1)
/	GH	1:200

PROJECT – DRAWING NO – REVISION

20072-PP1012-I

The Big Barn: Units 8-10, Oddington Grange,
Weston-on-the-Green, Oxfordshire, OX25 3QW

+44 (0) 1865 873936 | info@andersonorr.com | andersonorr.com

AndersonOrr

Appendix D - Drainage Layout

DESIGN RISK ITEM
Surface Water system designed for a 1 in 100 year event plus an allowance of 40% for climate change.
Impermeable areas have had an additional 10% added for urban creep. CV of 0.85 used with a safety factor of x5.
A site specific soakage rate of **1.348×10^{-05}** / m/s has been utilised for the soakaway.
Soakage rate based on the worst result encountered during on-site testing by T Biswell.

CDM RESIDUAL RISK ITEM
Overhead cables within site area.

CDM RESIDUAL RISK ITEM
Works within public Highway.
Danger to site personnel and general public

CDM RESIDUAL RISK ITEM
Existing services likely within working area.
Danger to site personnel and general public

CDM RESIDUAL RISK ITEM
Drainage pipes, manhole rings covers and fittings.
Risk of Manual handling injury.

CDM RESIDUAL RISK ITEM
Contact with waste water when making drainage connections.
Risk of infection from Weils disease etc.

CDM RESIDUAL RISK ITEM
Above Ground activities.
Possibility of objects falling from operations at high level onto persons working or passing below.

CDM RESIDUAL RISK ITEM
Works within confined spaces.

BURIED UTILITIES RISK NOTE

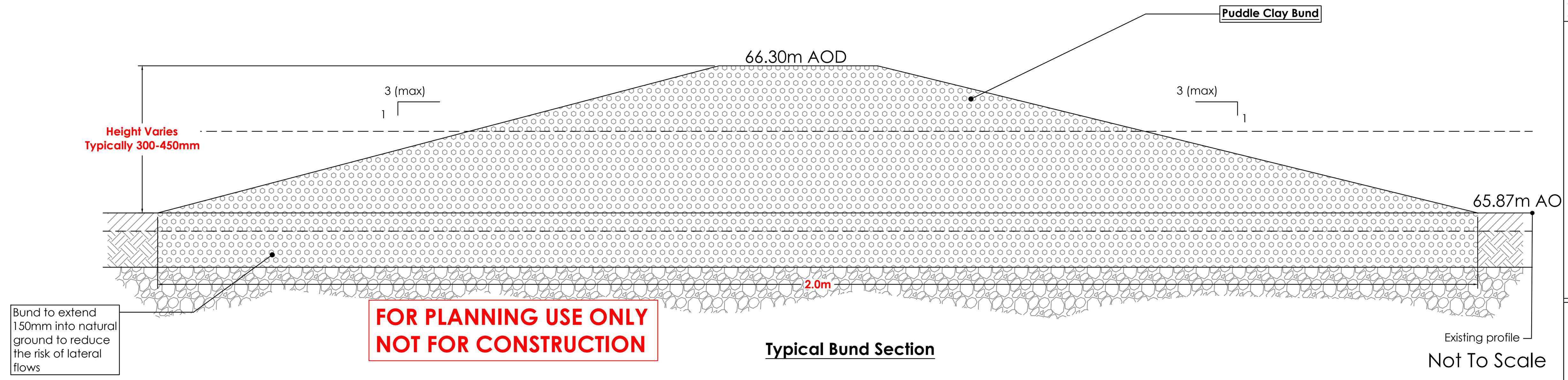
- Buried utilities are present on and in the vicinity of the site.
- The Contractor must satisfy themselves that they have seen utility returns for the area and that appropriate Risk Assessment Method Statement (RAMS) are in place and implemented to ensure that buried and/or overhead services are located prior to any works taking place.
- Any RAMS shall address safe procedures for protection and working in the proximity of services.

DESIGNERS CDM NOTE - RESIDUAL RISKS IDENTIFIED

The design Engineer(s) have analysed this design as the scheme has been developed, in order to identify if there are any significant residual risk hazards (i.e. unusual, unexpected, abnormal or difficult).

Residual risks **HAVE** been identified and are therefore shown on this drawing. These risks have not been possible to remove by design.

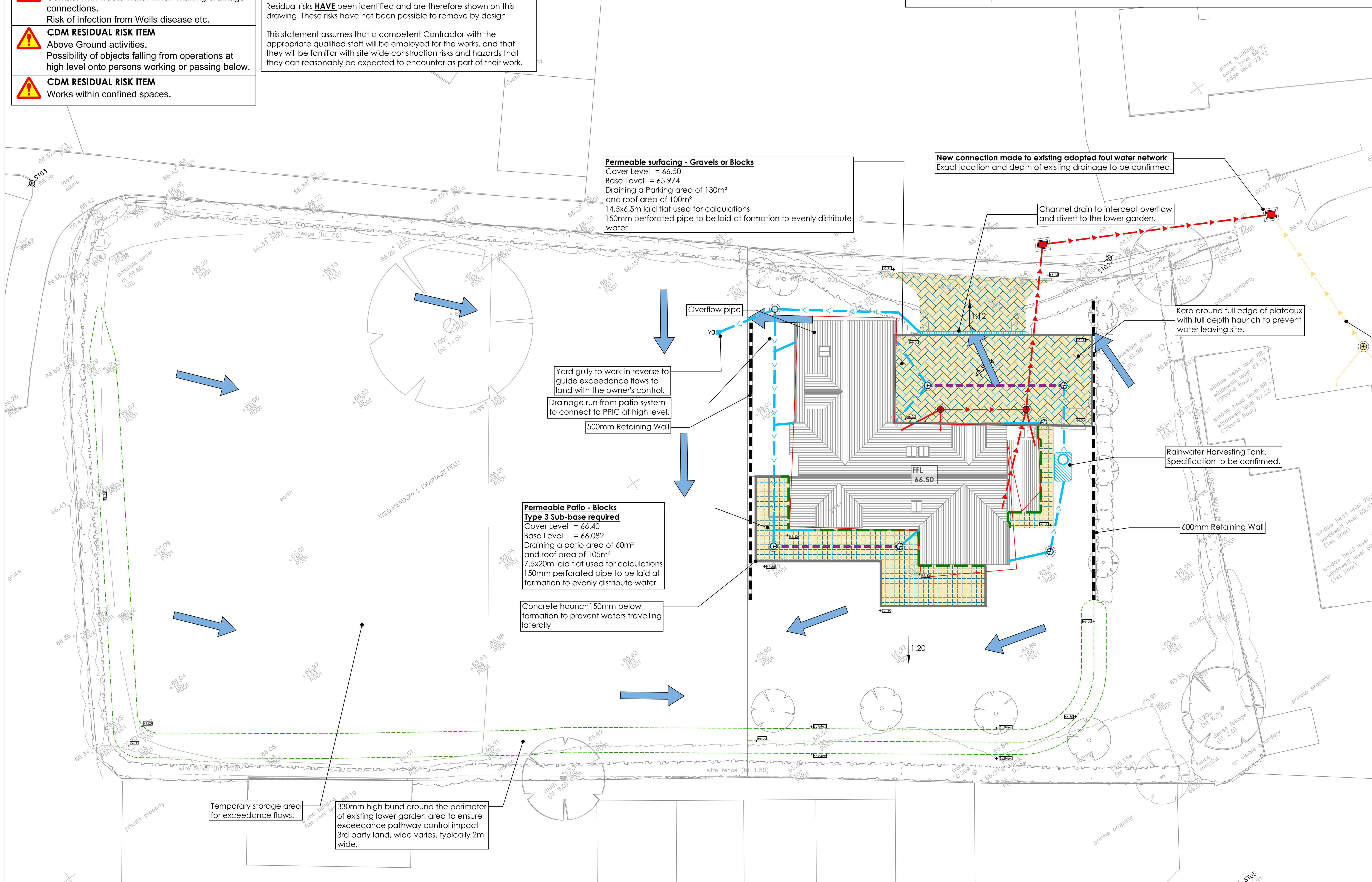
This statement assumes that a competent Contractor with the appropriate qualified staff will be employed for the works, and that they will be familiar with site wide construction risks and hazards that they can reasonably be expected to encounter as part of their work.



FOR PLANNING USE ONLY
NOT FOR CONSTRUCTION

Typical Bund Section

Not To Scale



Drainage Strategy

Foul Drainage

Gravity system discharging into to the existing adopted foul water chamber in the road (under Section 106), should a new connection to the adopted network be unfeasible a private treatment plant with pumped outflow and drainage mound could be utilised to address the potential for high ground waters.

Surface Water Drainage

Consists of permeable surfacing for the new driveway and parking area and roof runoff discharging into the paving sub-base to keep surface waters as high as possible above the groundwater table.

Surface Water drainage based on a site specific infiltration rate of 1.3×10^{-5} m/s.

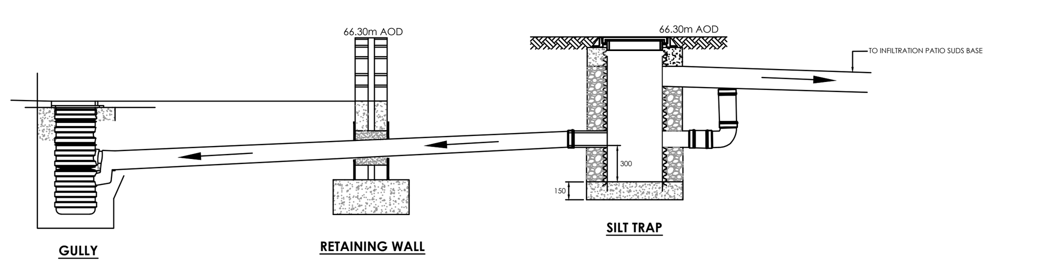
Soakaways designed to accommodate 1 in 100yr plus 40% storm event.

DESIGN NOTE
Peak groundwater encountered 330mm below ground level from a surface level of 66.00m. Indicating a peak groundwater level between November 2022 and January 2024 of 65.67

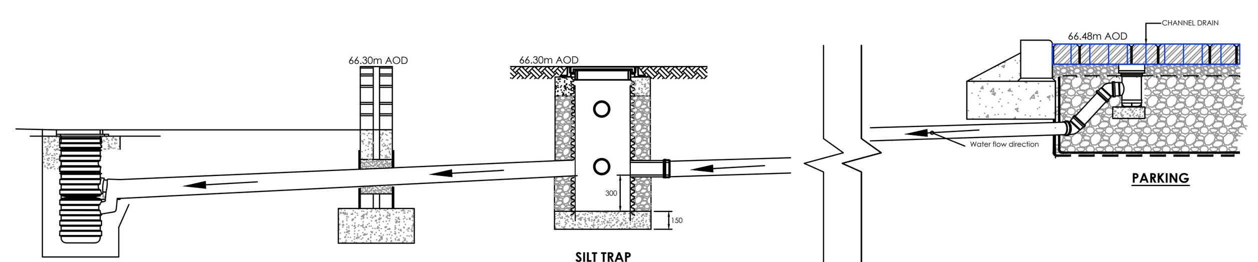
DESIGN NOTE
A paving level of 66.50 gives an 304mm freeboard between base of infiltration feature and highest recorded ground water level

DESIGN NOTE
Raised DPC Required

FOR PLANNING USE ONLY
NOT FOR CONSTRUCTION

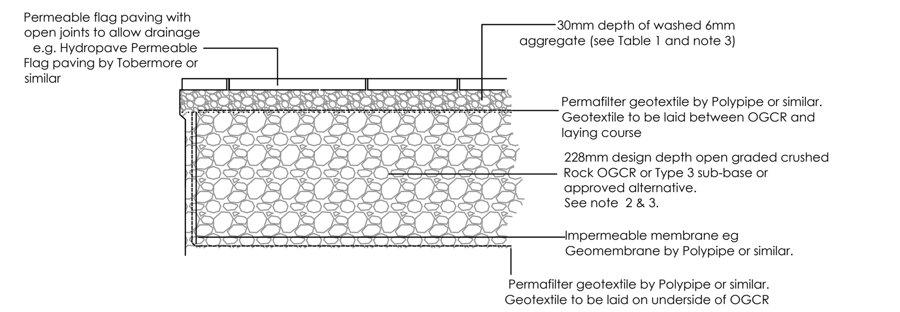


SECTION FOR INCOMING BACK DROP FROM PATIO SYSTEM



SECTION FOR CHANNEL DRAIN TO OVERFLOW GULLY. SHOWING EXCEEDANCE PATHWAY TO LOWER GARDEN

1:50 0m 1.5m 3.0m



PATIO INFILTRATION PERMEABLE PAVING

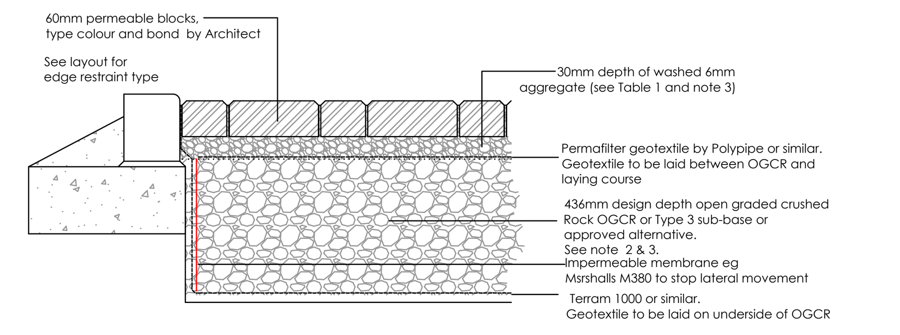
NOTE - WHERE LOWER CBR VALUES ARE ENCOUNTERED IT WILL BE NECESSARY TO UNDERTAKE FORMATION IMPROVEMENT BY REMOVAL OF SOFT MATERIAL, PROOF ROLLING, AND ROLLING IN CAPPING LAYER MATERIAL.

Notes:

1. For CBR's of <5% incorporation of subgrade improvement layers are required.
2. Sound clean non friable sub-base material, free from clay or any other deleterious material. Sub-base grading to BS EN 13242:2002 as shown in table 1 - must have a minimum 10% fines value of 150kN when tested in accordance with BS 812:Part: 111:1990.
3. Should an alternative material be proposed it is the responsibility of the originator of the alternative material to prove its suitability.
4. The pavement must be protected at all times during and after construction from any activity or material to prove its suitability.

Recommended BS EN 13242 aggregate mm	Sub Base Grading 10/20	Laying Course Grading 2/6.3
Recommended BS EN 13242 grading/tolerance category	Gc80/20 GTc20/15	Gc80/20 GTc20/15
Sieve size mm	Percentage by mass passing ISO 565 sieve	
31.5	98 to 100	100
20	80 to 99	100
14	20 to 70 (+/-15)	100
10	0 to 20	100
6.3		80 to 99
4	0 to 5	20 to 70 (+/-15)
2	0	0 to 20
3.15		
2.8		0 to 5

Table 1
(Figures from BS EN13242:2002)



NOTE - WHERE LOWER CBR VALUES ARE ENCOUNTERED IT WILL BE NECESSARY TO UNDERTAKE FORMATION IMPROVEMENT BY REMOVAL OF SOFT MATERIAL, PROOF ROLLING, AND ROLLING IN CAPPING LAYER MATERIAL.

DRIVEWAY INFILTRATION PERMEABLE PAVING
eg Driveway up to 5 dwellings

FOR PLANNING USE ONLY
NOT FOR CONSTRUCTION

Notes:

1. For CBR's of <5% incorporation of subgrade improvement layers are required.
2. Sound clean non friable sub-base material, free from clay or any other deleterious material. Sub-base grading to BS EN 13242:2002 as shown in table 1 - must have a minimum 10% fines value of 150kN when tested in accordance with BS 812:Part: 111:1990.
3. Should an alternative material be proposed it is the responsibility of the originator of the alternative material to prove its suitability.
4. The pavement must be protected at all times during and after construction from any activity or material to prove its suitability.

Recommended BS EN 13242 aggregate mm	Sub Base Grading 10/20	Laying Course Grading 2/6.3
Recommended BS EN 13242 grading/tolerance category	Gc80/20 GTc20/15	Gc80/20 GTc20/15
Sieve size mm	Percentage by mass passing ISO 565 sieve	
31.5	98 to 100	100
20	80 to 99	100
14	20 to 70 (+/-15)	100
10	0 to 20	100
6.3		80 to 99
4	0 to 5	20 to 70 (+/-15)
2	0	0 to 20
3.15		
2.8		0 to 5

Table 1
(Figures from BS EN13242:2002)

Survey: 37391/1 - Midland Survey Ltd — Rec'd: 15.03.2021
Site Plan: 20072 - PP0012 - Anderson Orr — Rec'd: 15.03.2021

NOTES

1. All dimensions and levels are in metres unless otherwise noted
2. This drawing is to be read in conjunction with the relevant Architect's/Engineer's drawings, specifications and CDM documentation
3. This drawings has been produced electronically and may have been photo reduced or enlarged when copied. Work to figured dimensions only (DO NOT SCALE). All dimensions to be checked on site. Any errors or omissions to be reported to the engineer immediately.
4. This drawing contains coloured lines / information that may not be clear if reproduced in black and white.
5. Digital copies of this plan can only be considered accurate if supplied directly by Infrastruct CS Ltd.

Construction Note
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions where encountered (such as services). If the drainage is laid from the site out to the outfall it can result in significant abortive works to relay and overcome such obstructions.

Location of Public Sewers have been taken from record drawings which should be fully substantiated by the contractor prior to commencing works on site

All manholes covers located within carriageways shall have no slip covers to prevent motorcycles/cycles losing control

Manhole schedules - Invert level shown related to the deepest pipe within the chamber

Drainage Key

Sewers

- Foul water drain (private/non adoptable)
- Surface water drain (private/non adoptable)
- Surface water perforated pipe (private/non adoptable)
- Existing foul water drain (private/non adopted)

Chamber Key

FW/SW

- Mini access chamber (mac) - 300mmØ
- PPIC - 475mmØ*
- P.C.C. units/brick*

* General note
(Refer to standard details & longitudinal sections for chamber sizes. Size may need to increase dependant on number of incoming pipes/size of incoming pipes)

- Surface water rodding eye
- Rain water down pipe (roddable access)
- Soil vent pipe/soil stack
- Silt Trap (ST) with removable silt bucket
- Linear drainage channel
- Yard gully (150mm - 200mmØ trapped)
- Impermeable barrier to stop lateral movement of water
- Retaining wall (design by others)
- FFL XX.XX — Finished Floor Level (FFL)
- Permeable driveway - 436mm open graded sub-base required for surface water storage
- Permeable patio - 228mm open graded sub-base required for surface water storage
- Flood exceedance routing
- Baffle to prevent rapid through flow of water through permeable paving
- Clay bund to stop flood movement

REV	DRAWN	CHECK	REVISION COMMENTS	ISSUE DATE
P08	NJ	RJW	Amended in line with revised site layout	22/12/23
P07	NJ	RJW	Amended in line with revised site layout	16/10/23
P06	AA	RJW	Overflow added to surface water system to ensure exceedance flows are retained within private land.	03/10/23
P05	RSI	RJW	Updated in line with the comments from drainage officer	08/06/23
P04	NJ	RJW	Existing levels to rear of gardens corrected	26/04/23
P03	NJ	RJW	Driveway layout updated in line with proposed site plan	18/04/23
P02	BMK	RJW	Drainage design amended in accordance with redesigned site layout	22/07/22
P01	AC	RJW	Initial issue	16/03/21

DRAWING TITLE: Drainage Strategy — SHEET NO. 1/1

PROJECT: Chapel Lane, Standlake

CLIENT: Anderson Orr Architects — Infrastruct CS Ltd

SCALE @ A1		ENGINEER
1:200	0m 5m 10.0m	RJW
		DRAFT AC
PROJECT NUMBER 4212	STATUS S2 / ISSUE PURPOSE INFORMATION	APPROVED DJ

PROJECT	ORIGIN	PHASE	LEVEL	TYPE	ROLE	NO.	REVISION
CHAP	ICS	01	XX	DR	C	0200	P08

4212-CHAP-ICS-01-XX-M2-C-0200_Drainage Strategy

Appendix E - Micro Drainage Calculations

Driveway Calculations

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 413 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	66.188	0.214	0.3	6.1	O K
30 min Summer	66.257	0.283	0.3	8.0	Flood Risk
60 min Summer	66.323	0.349	0.3	9.9	Flood Risk
120 min Summer	66.379	0.405	0.3	11.5	Flood Risk
180 min Summer	66.401	0.427	0.3	12.1	Flood Risk
240 min Summer	66.409	0.435	0.3	12.3	Flood Risk
360 min Summer	66.406	0.432	0.3	12.2	Flood Risk
480 min Summer	66.397	0.423	0.3	12.0	Flood Risk
600 min Summer	66.387	0.413	0.3	11.7	Flood Risk
720 min Summer	66.376	0.402	0.3	11.4	Flood Risk
960 min Summer	66.354	0.380	0.3	10.8	Flood Risk
1440 min Summer	66.311	0.337	0.3	9.5	Flood Risk
2160 min Summer	66.251	0.277	0.3	7.8	Flood Risk
2880 min Summer	66.198	0.224	0.3	6.3	O K
4320 min Summer	66.113	0.139	0.3	3.9	O K
5760 min Summer	66.057	0.083	0.3	2.3	O K
7200 min Summer	66.028	0.054	0.3	1.5	O K
8640 min Summer	66.020	0.046	0.2	1.3	O K
10080 min Summer	66.014	0.040	0.2	1.1	O K
15 min Winter	66.188	0.214	0.3	6.1	O K
30 min Winter	66.257	0.283	0.3	8.0	Flood Risk
60 min Winter	66.323	0.349	0.3	9.9	Flood Risk
120 min Winter	66.380	0.406	0.3	11.5	Flood Risk
180 min Winter	66.402	0.428	0.3	12.1	Flood Risk
240 min Winter	66.410	0.436	0.3	12.3	Flood Risk
360 min Winter	66.409	0.435	0.3	12.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	22
30 min Summer	90.705	0.0	37
60 min Summer	56.713	0.0	66
120 min Summer	34.246	0.0	124
180 min Summer	25.149	0.0	182
240 min Summer	20.078	0.0	242
360 min Summer	14.585	0.0	360
480 min Summer	11.622	0.0	410
600 min Summer	9.738	0.0	470
720 min Summer	8.424	0.0	532
960 min Summer	6.697	0.0	664
1440 min Summer	4.839	0.0	936
2160 min Summer	3.490	0.0	1336
2880 min Summer	2.766	0.0	1708
4320 min Summer	1.989	0.0	2424
5760 min Summer	1.573	0.0	3064
7200 min Summer	1.311	0.0	3680
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.994	0.0	5144
15 min Winter	138.153	0.0	22
30 min Winter	90.705	0.0	36
60 min Winter	56.713	0.0	64
120 min Winter	34.246	0.0	122
180 min Winter	25.149	0.0	180
240 min Winter	20.078	0.0	236
360 min Winter	14.585	0.0	348

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
480 min Winter	66.398	0.424	0.3	12.0	Flood Risk
600 min Winter	66.384	0.410	0.3	11.6	Flood Risk
720 min Winter	66.371	0.397	0.3	11.2	Flood Risk
960 min Winter	66.341	0.367	0.3	10.4	Flood Risk
1440 min Winter	66.279	0.305	0.3	8.6	Flood Risk
2160 min Winter	66.192	0.218	0.3	6.2	O K
2880 min Winter	66.119	0.145	0.3	4.1	O K
4320 min Winter	66.029	0.055	0.3	1.6	O K
5760 min Winter	66.015	0.041	0.2	1.2	O K
7200 min Winter	66.009	0.035	0.2	1.0	O K
8640 min Winter	66.004	0.030	0.2	0.8	O K
10080 min Winter	66.000	0.026	0.1	0.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
480 min Winter	11.622	0.0	448
600 min Winter	9.738	0.0	482
720 min Winter	8.424	0.0	556
960 min Winter	6.697	0.0	708
1440 min Winter	4.839	0.0	998
2160 min Winter	3.490	0.0	1408
2880 min Winter	2.766	0.0	1760
4320 min Winter	1.989	0.0	2332
5760 min Winter	1.573	0.0	2992
7200 min Winter	1.311	0.0	3672
8640 min Winter	1.129	0.0	4408
10080 min Winter	0.994	0.0	5056

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.850
Region	England and Wales	Cv (Winter)	0.850
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.023

Time From:	**(mins) To:**	**Area (ha)**	**Time From:**	**(mins) To:**	**Area (ha)**
0	4	0.013	4	8	0.010

Model Details

Storage is Online Cover Level (m) 66.500

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.04853	Width (m)	14.5
Membrane Percolation (mm/hr)	1000	Length (m)	6.5
Max Percolation (l/s)	26.2	Slope (1:X)	0.0
Safety Factor	5.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	65.974	Membrane Depth (m)	0

Patio Calculations

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 158 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	66.236	0.154	0.4	4.0	Flood Risk
30 min Summer	66.266	0.184	0.4	5.3	Flood Risk
60 min Summer	66.292	0.210	0.4	6.5	Flood Risk
120 min Summer	66.308	0.226	0.4	7.2	Flood Risk
180 min Summer	66.310	0.228	0.4	7.3	Flood Risk
240 min Summer	66.308	0.226	0.4	7.2	Flood Risk
360 min Summer	66.302	0.220	0.4	6.9	Flood Risk
480 min Summer	66.295	0.213	0.4	6.6	Flood Risk
600 min Summer	66.286	0.204	0.4	6.2	Flood Risk
720 min Summer	66.278	0.196	0.4	5.8	Flood Risk
960 min Summer	66.261	0.179	0.4	5.1	Flood Risk
1440 min Summer	66.234	0.152	0.4	3.8	Flood Risk
2160 min Summer	66.209	0.127	0.4	2.7	Flood Risk
2880 min Summer	66.193	0.111	0.3	2.1	Flood Risk
4320 min Summer	66.171	0.089	0.3	1.3	Flood Risk
5760 min Summer	66.156	0.074	0.2	0.9	Flood Risk
7200 min Summer	66.145	0.063	0.2	0.7	Flood Risk
8640 min Summer	66.138	0.056	0.2	0.5	Flood Risk
10080 min Summer	66.132	0.050	0.2	0.4	Flood Risk
15 min Winter	66.237	0.155	0.4	4.0	Flood Risk
30 min Winter	66.266	0.184	0.4	5.3	Flood Risk
60 min Winter	66.292	0.210	0.4	6.5	Flood Risk
120 min Winter	66.308	0.226	0.4	7.2	Flood Risk
180 min Winter	66.309	0.227	0.4	7.2	Flood Risk
240 min Winter	66.306	0.224	0.4	7.1	Flood Risk
360 min Winter	66.297	0.215	0.4	6.7	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	138.153	0.0	22
30 min Summer	90.705	0.0	36
60 min Summer	56.713	0.0	64
120 min Summer	34.246	0.0	122
180 min Summer	25.149	0.0	158
240 min Summer	20.078	0.0	188
360 min Summer	14.585	0.0	254
480 min Summer	11.622	0.0	322
600 min Summer	9.738	0.0	388
720 min Summer	8.424	0.0	456
960 min Summer	6.697	0.0	584
1440 min Summer	4.839	0.0	828
2160 min Summer	3.490	0.0	1176
2880 min Summer	2.766	0.0	1532
4320 min Summer	1.989	0.0	2252
5760 min Summer	1.573	0.0	2944
7200 min Summer	1.311	0.0	3680
8640 min Summer	1.129	0.0	4408
10080 min Summer	0.994	0.0	5136
15 min Winter	138.153	0.0	21
30 min Winter	90.705	0.0	35
60 min Winter	56.713	0.0	64
120 min Winter	34.246	0.0	120
180 min Winter	25.149	0.0	172
240 min Winter	20.078	0.0	194
360 min Winter	14.585	0.0	270

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
480 min Winter	66.286	0.204	0.4	6.2	Flood Risk
600 min Winter	66.273	0.191	0.4	5.6	Flood Risk
720 min Winter	66.261	0.179	0.4	5.1	Flood Risk
960 min Winter	66.239	0.157	0.4	4.1	Flood Risk
1440 min Winter	66.209	0.127	0.4	2.7	Flood Risk
2160 min Winter	66.184	0.102	0.3	1.8	Flood Risk
2880 min Winter	66.167	0.085	0.3	1.2	Flood Risk
4320 min Winter	66.145	0.063	0.2	0.7	Flood Risk
5760 min Winter	66.133	0.051	0.2	0.4	Flood Risk
7200 min Winter	66.128	0.046	0.1	0.4	Flood Risk
8640 min Winter	66.125	0.043	0.1	0.3	Flood Risk
10080 min Winter	66.122	0.040	0.1	0.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
480 min Winter	11.622	0.0	344
600 min Winter	9.738	0.0	414
720 min Winter	8.424	0.0	482
960 min Winter	6.697	0.0	610
1440 min Winter	4.839	0.0	840
2160 min Winter	3.490	0.0	1196
2880 min Winter	2.766	0.0	1560
4320 min Winter	1.989	0.0	2252
5760 min Winter	1.573	0.0	2936
7200 min Winter	1.311	0.0	3672
8640 min Winter	1.129	0.0	4352
10080 min Winter	0.994	0.0	5016

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.850
Region	England and Wales	Cv (Winter)	0.850
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.017

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.006	4	8	0.011

Model Details

Storage is Online Cover Level (m) 66.400

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.04853	Width (m)	7.5
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	41.7	Slope (1:X)	150.0
Safety Factor	5.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	66.082	Membrane Depth (m)	0

Infrastuct CS LTD

Site Name	Chapel Lane, Standlake
Document Title	4212-CHAP-13-003-T1-Groundwater Monitoring
Document Revision	Revision T1
Client	P Steepe
Calculations By	Fergus Mckirdy

1 Introduction

This is a report showing the ground water levels relative to ground level
for the proposed Chapel Lane, Standlake Development
All information has been provided by the client P Steepe

Infrastruct CS Ltd

GROUNDWATER MONITORING - PAGE 1

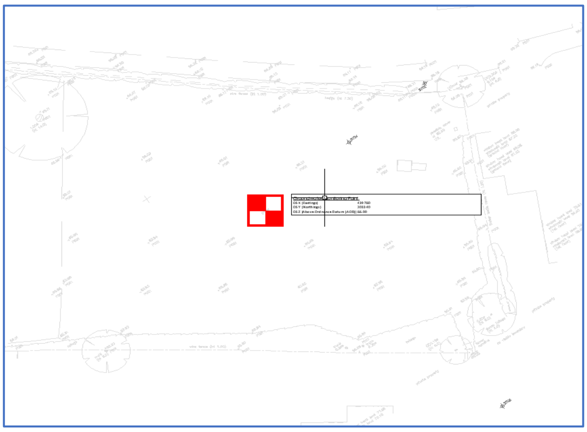
Infrastruct CS Ltd

Site:	Chapel Lane, Standlake		Calculations By:	Fergus Mckirdy
Client:	P Steepe		Calculation Date:	02 January 2024

File ref:	4212-CHAP-13-003-T1-Groundwater Monitoring.xlsx

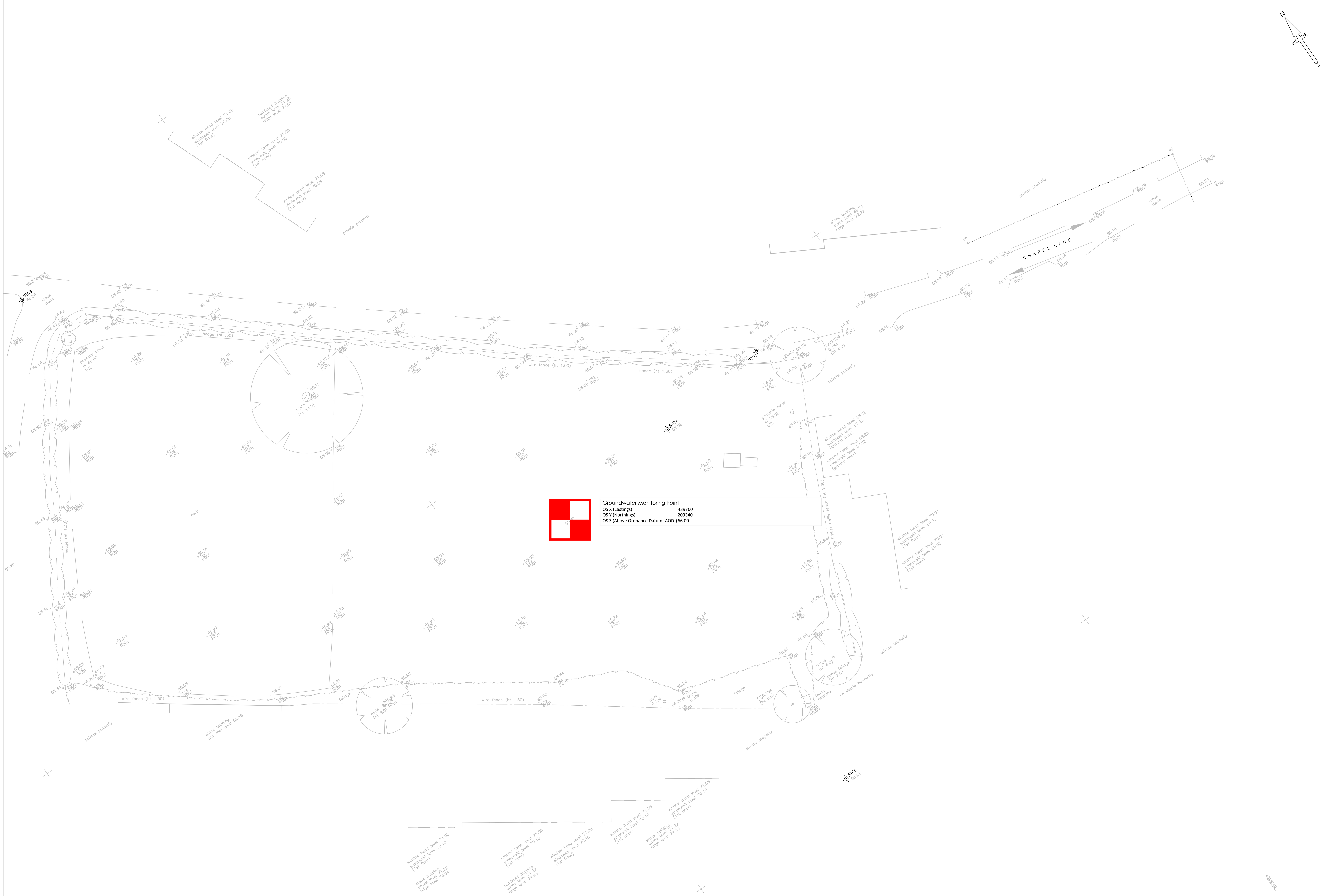
Trial Hole Location

Unit	Measurement
OS X (Eastings)	439760
OS Y (Northings)	203340
OS Z (Above Ordnance Datum [AOD])	66.00
Nearest Post Code	OX29 7RA



Measurements

Date	Measurement from ground level to water/mm	Approximite level (Above Ordnance Datum [AOD])/m
26 November 2022	590	65.41
10 December 2022	590	65.41
24 December 2022	590	65.41
07 January 2023	590	65.41
21 January 2023	590	65.41
04 February 2023	735	65.27
18 February 2023	800	65.20
28 February 2023	800	65.20
06 October 2023	1020	64.98
13 October 2023	900	65.10
24 October 2023	880	65.12
27 October 2023	740	65.26
03 November 2023	670	65.33
10 November 2023	590	65.41
17 November 2023	590	65.41
24 November 2023	670	65.33
01 December 2023	670	65.33
08 December 2023	590	65.41
20 December 2023	595	65.41
26 December 2023	670	65.33
02 January 2024	330	65.67



Survey: 37391/1 - Midland Survey Ltd Rec'd: 15.03.2021
Site Plan: 20072 - PP0012 - Anderson Orr Rec'd: 15.03.2021

NOTES

1. All dimensions and levels are in metres unless otherwise noted
2. This drawing is to be read in conjunction with the relevant Architect's/Engineer's drawings, specifications and CDM documentation
3. This drawings has been produced electronically and may have been photo reduced or enlarged when copied. Work to figured dimensions only (DO NOT SCALE). All dimensions to be checked on site. Any errors or omissions to be reported to the engineer immediately.
4. This drawing contains coloured lines / information that may not be clear if reproduced in black and white.
5. Digital copies of this plan can only be considered accurate if supplied directly by Infrastruct CS Ltd.

Construction Note
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions where encountered (such as services). If the drainage is laid from the site out to the outfall it can result in significant abortive works to relay and overcome such obstructions.

Location of Public Sewers have been taken from record drawings which should be fully substantiated by the contractor prior to commencing works on site

All manholes covers located within carriageways shall have no slip covers to prevent motorcycles/cycles losing control

Manhole schedules - Invert level shown related to the deepest pipe within the chamber

REV	DRAWN	CHECK	REVISION COMMENTS	ISSUE DATE
P01	AC	RJW	Initial issue	02/01/24

DRAWING TITLE
Groundwater Monitoring Point

SHEET NO.
1/1

PROJECT
Chapel Lane, Standlake

CLIENT
Anderson Orr Architects

Infrastruct CS Ltd

SCALE @ A1
1:200
0m 5m 10.0m

PROJECT NUMBER	STATUS	ISSUE PURPOSE
4212	S2	INFORMATION

ENGINEER RJW
DRAFT AC
APPROVED DJ

The Stables, High Cogges Farm, High Cogges, Witney, OX29 6UN - Tel: 01993 709709: info@infrastructcs.co.uk

PROJECT	ORIGIN	PHASE	LEVEL	TYPE	ROLE	NO.	REVISION
CHAP	ICS	01	XX	DR	C	0700	P01

DESIGN RISK ITEM

Surface Water system designed for a 1 in 100 year event plus an allowance of 40% for climate change.
Impermeable areas have had an additional 10% added for urban creep. CV of 0.85 used with a safety factor of x5.
A site specific soakage rate of **1.348×10^{-05}**/ m/s has been utilised for the soakaway.
Soakage rate based on the worst result encountered during on-site testing by T Biswell.

CDM RESIDUAL RISK ITEM
Overhead cables within site area.

CDM RESIDUAL RISK ITEM
Works within public Highway.
Danger to site personnel and general public

CDM RESIDUAL RISK ITEM
Existing services likely within working area.
Danger to site personnel and general public

CDM RESIDUAL RISK ITEM
Drainage pipes, manhole rings covers and fittings.
Risk of Manual handling injury.

CDM RESIDUAL RISK ITEM
Contact with waste water when making drainage connections.
Risk of infection from Weils disease etc.

CDM RESIDUAL RISK ITEM
Above Ground activities.
Possibility of objects falling from operations at high level onto persons working or passing below.

CDM RESIDUAL RISK ITEM
Works within confined spaces.

BURIED UTILITIES RISK NOTE

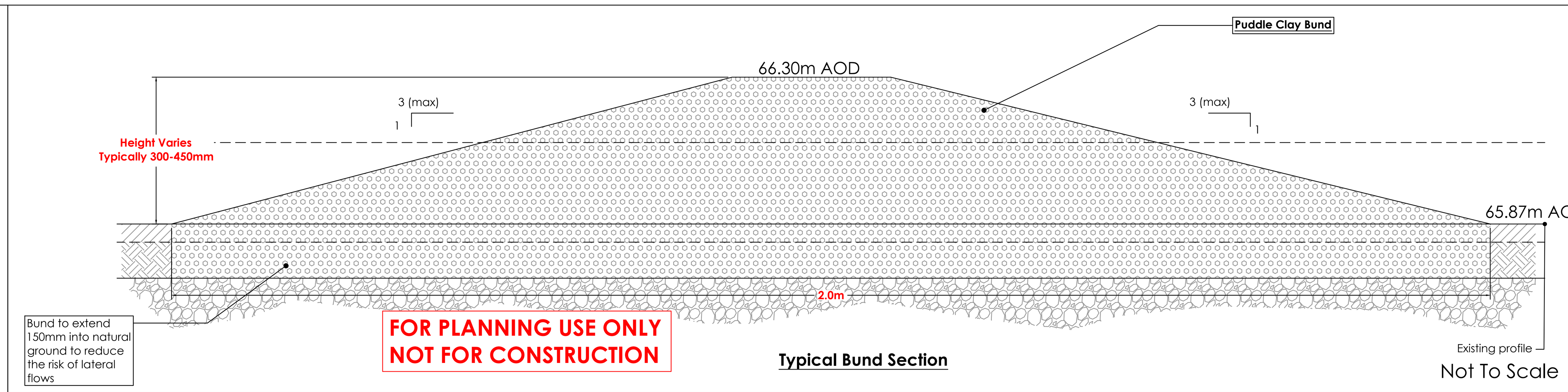
- Buried utilities are present on and in the vicinity of the site.
- The Contractor must satisfy themselves that they have seen utility returns for the area and that appropriate Risk Assessment Method Statement (RAMS) are in place and implemented to ensure that buried and/or overhead services are located prior to any works taking place.
- Any RAMS shall address safe procedures for protection and working in the proximity of services.

DESIGNERS CDM NOTE - RESIDUAL RISKS IDENTIFIED

The design Engineer(s) have analysed this design as the scheme has been developed, in order to identify if there are any significant residual risk hazards (i.e. unusual, unexpected, abnormal or difficult).

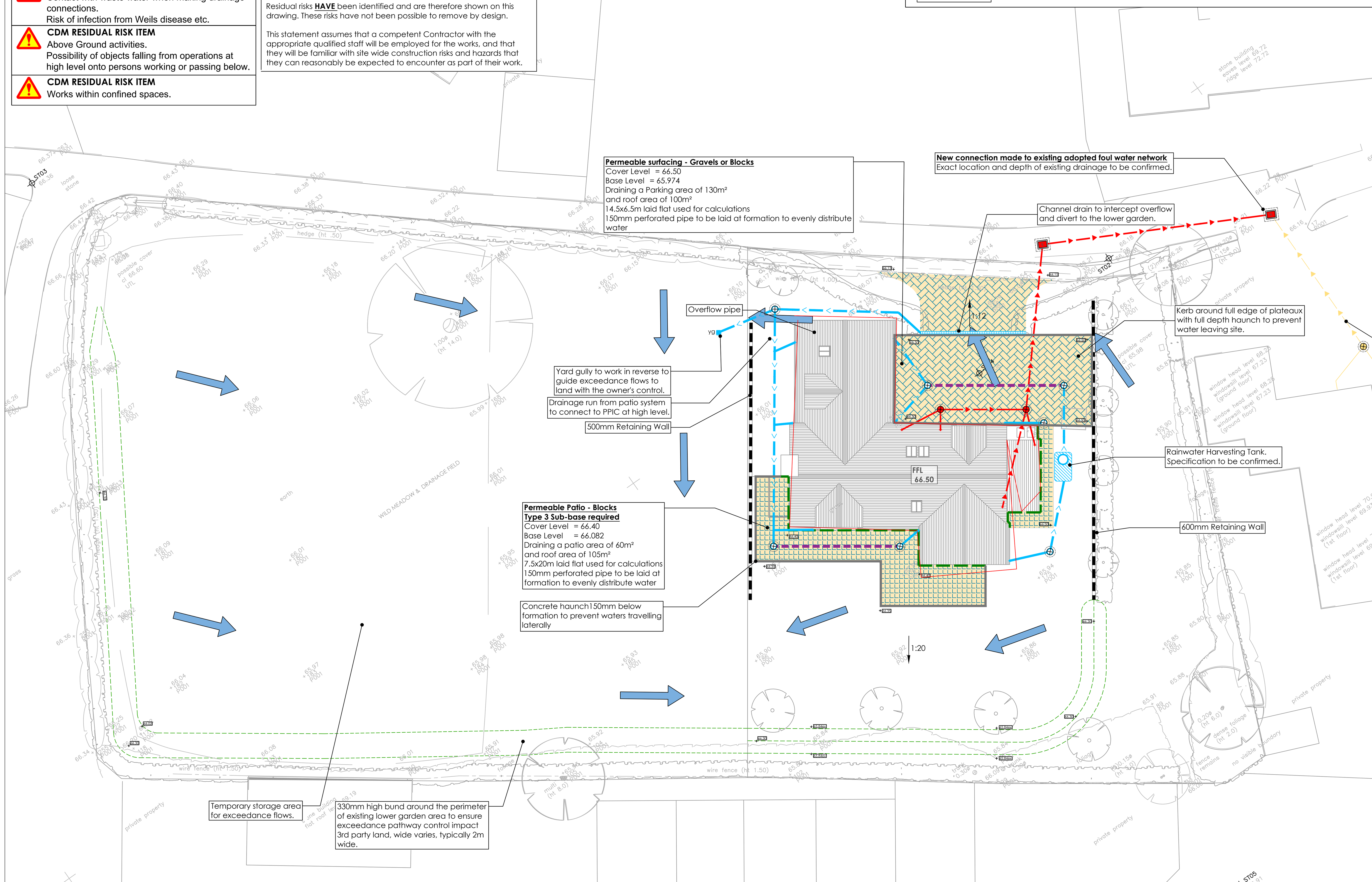
Residual risks **HAVE** been identified and are therefore shown on this drawing. These risks have not been possible to remove by design.

This statement assumes that a competent Contractor with the appropriate qualified staff will be employed for the works, and that they will be familiar with site wide construction risks and hazards that they can reasonably be expected to encounter as part of their work.



FOR PLANNING USE ONLY
NOT FOR CONSTRUCTION

Typical Bund Section
Not To Scale



Drainage Strategy

Foul Drainage

Gravity system discharging into to the existing adopted foul water chamber in the road (under Section 106), should a new connection to the adopted network be unfeasible a private treatment plant with pumped outflow and drainage mound could be utilised to address the potential for high ground waters.

Surface Water Drainage

Consists of permeable surfacing for the new driveway and parking area and roof runoff discharging into the paving sub-base to keep surface waters as high as possible above the groundwater table.

Surface Water drainage based on a site specific infiltration rate of 1.3×10^{-5} m/s.

Soakaways designed to accommodate 1 in 100yr plus 40% storm event.

DESIGN NOTE
Peak groundwater encountered 330mm below ground level from a surface level of 66.00m. Indicating a peak groundwater level between November 2022 and January 2024 of 65.67

DESIGN NOTE
A paving level of 66.50 gives an 304mm freeboard between base of infiltration feature and highest recorded ground water level

DESIGN NOTE
Raised DPC Required

Survey: 37391/1 - Midland Survey Ltd — Rec'd: 15.03.2021
Site Plan: 20072 - PP0012 - Anderson Orr — Rec'd: 15.03.2021

NOTES

1. All dimensions and levels are in metres unless otherwise noted
2. This drawing is to be read in conjunction with the relevant Architect's/Engineer's drawings, specifications and CDM documentation
3. This drawings has been produced electronically and may have been photo reduced or enlarged when copied. Work to figured dimensions only (DO NOT SCALE). All dimensions to be checked on site. Any errors or omissions to be reported to the engineer immediately.
4. This drawing contains coloured lines / information that may not be clear if reproduced in black and white.
5. Digital copies of this plan can only be considered accurate if supplied directly by Infrastruct CS Ltd.

Construction Note
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions where encountered (such as services). If the drainage is laid from the site out to the outfall it can result in significant abortive works to relay and overcome such obstructions.

Location of Public Sewers have been taken from record drawings which should be fully substantiated by the contractor prior to commencing works on site

All manholes covers located within carriageways shall have no slip covers to prevent motorcycles/cycles losing control

Manhole schedules - Invert level shown related to the deepest pipe within the chamber

Drainage Key

Sewers

Foul water drain (private/non adoptable)
Surface water drain (private/non adoptable)
Surface water perforated pipe (private/non adoptable)
Existing foul water drain (private/non adopted)

Chamber Key

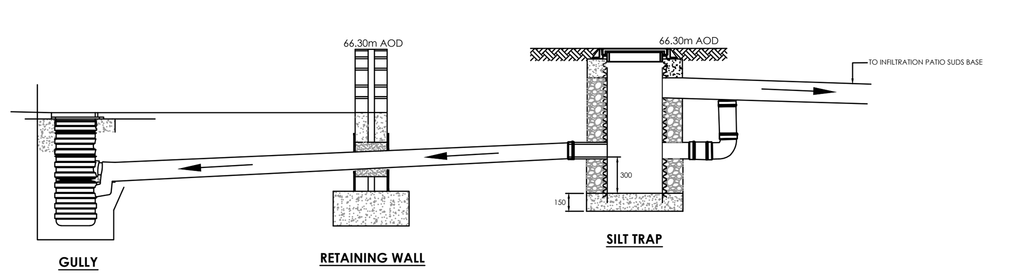
FW/SW

Mini access chamber (mac) - 300mmØ
PPIC - 475mmØ*
P.C.C. units/brick*

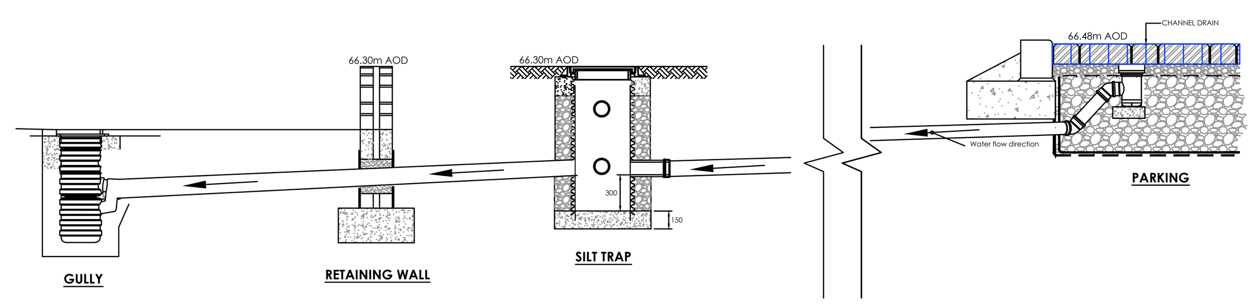
* General note
(Refer to standard details & longitudinal sections for chamber sizes. Size may need to increase dependant on number of incoming pipes/size of incoming pipes)

Surface water rodding eye
Rain water down pipe (roddable access)
Soil vent pipe/soil stack
Silt Trap (ST) with removable silt bucket
Linear drainage channel
Yard gully (150mm - 200mmØ trapped)
Impermeable barrier to stop lateral movement of water
Retaining wall (design by others)
FFL XX.XX — Finished Floor Level (FFL)
Permeable driveway - 436mm open graded sub-base required for surface water storage
Permeable patio - 228mm open graded sub-base required for surface water storage
Flood exceedance routing
Baffle to prevent rapid through flow of water through permeable paving
Clay bund to stop flood movement

FOR PLANNING USE ONLY
NOT FOR CONSTRUCTION

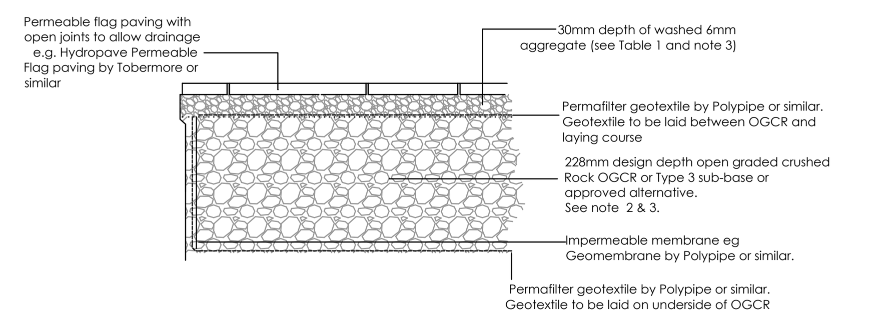


SECTION FOR INCOMING BACK DROP FROM PATIO SYSTEM



SECTION FOR CHANNEL DRAIN TO OVERFLOW GULLY.
SHOWING EXCEEDANCE PATHWAY TO LOWER GARDEN

1:50 0m 1.5m 3.0m



Notes:

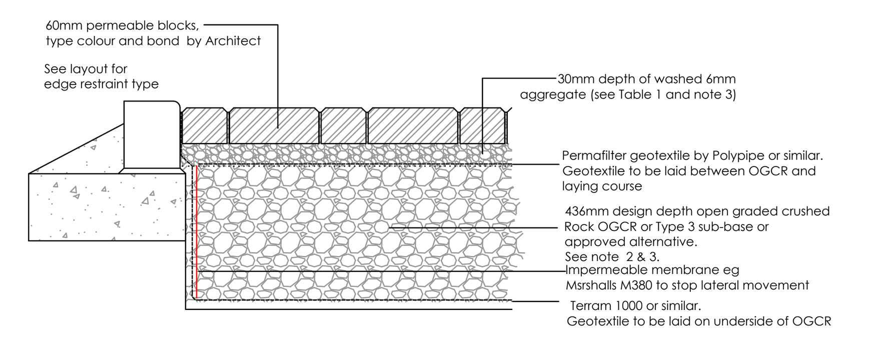
1. For CBR's of <5% incorporation of subgrade improvement layers are required.
2. Sound clean non friable sub-base material, free from clay or any other deleterious material. Sub-base grading to BS EN 13242:2002 as shown in table 1 - must have a minimum 10% fines value of 150kN when tested in accordance with BS 812:Part: 111:1990.
3. Should an alternative material be proposed it is the responsibility of the originator of the alternative material to prove its suitability.
4. The pavement must be protected at all times during and after construction from any activity or material to prove its suitability.

PATIO INFILTRATION PERMEABLE PAVING

NOTE - WHERE LOWER CBR VALUES ARE ENCOUNTERED IT WILL BE NECESSARY TO UNDERTAKE FORMATION IMPROVEMENT BY REMOVAL OF SOFT MATERIAL, PROOF ROLLING, AND ROLLING IN CAPPING LAYER MATERIAL.

Recommended BS EN 13242 aggregate mm	Sub Base Grading 10/20	Laying Course Grading 2/6.3
Recommended BS EN 13242 grading/tolerance category	Gc80/20 GTc20/15	Gc80/20 GTc20/15
Sieve size mm	Percentage by mass passing ISO 565 sieve	
31.5	98 to 100	100
20	80 to 99	100
14	20 to 70 (+/-15)	100
10	0 to 20	100
6.3		80 to 99
4	0 to 5	20 to 70 (+/-15)
2	0	0 to 20
3.15		
2.8		0 to 5

Table 1
(Figures from BS EN13242:2002)



Notes:

1. For CBR's of <5% incorporation of subgrade improvement layers are required.
2. Sound clean non friable sub-base material, free from clay or any other deleterious material. Sub-base grading to BS EN 13242:2002 as shown in table 1 - must have a minimum 10% fines value of 150kN when tested in accordance with BS 812:Part: 111:1990.
3. Should an alternative material be proposed it is the responsibility of the originator of the alternative material to prove its suitability.
4. The pavement must be protected at all times during and after construction from any activity or material to prove its suitability.

DRIVEWAY INFILTRATION PERMEABLE PAVING
eg Driveway up to 5 dwellings

NOTE - WHERE LOWER CBR VALUES ARE ENCOUNTERED IT WILL BE NECESSARY TO UNDERTAKE FORMATION IMPROVEMENT BY REMOVAL OF SOFT MATERIAL, PROOF ROLLING, AND ROLLING IN CAPPING LAYER MATERIAL.

Recommended BS EN 13242 aggregate mm	Sub Base Grading 10/20	Laying Course Grading 2/6.3
Recommended BS EN 13242 grading/tolerance category	Gc80/20 GTc20/15	Gc80/20 GTc20/15
Sieve size mm	Percentage by mass passing ISO 565 sieve	
31.5	98 to 100	100
20	80 to 99	100
14	20 to 70 (+/-15)	100
10	0 to 20	100
6.3		80 to 99
4	0 to 5	20 to 70 (+/-15)
2	0	0 to 20
3.15		
2.8		0 to 5

Table 1
(Figures from BS EN13242:2002)

FOR PLANNING USE ONLY
NOT FOR CONSTRUCTION

REV	DRAWN	CHECK	REVISION COMMENTS	ISSUE DATE
P08	NJ	RJW	Amended in line with revised site layout	22/12/23
P07	NJ	RJW	Amended in line with revised site layout	16/10/23
P06	AA	RJW	Overflow added to surface water system to ensure exceedance flows are retained within private land.	03/10/23
P05	RSI	RJW	Updated in line with the comments from drainage officer	08/06/23
P04	NJ	RJW	Existing levels to rear of gardens corrected	26/04/23
P03	NJ	RJW	Driveway layout updated in line with proposed site plan	18/04/23
P02	BMK	RJW	Drainage design amended in accordance with redesigned site layout	22/07/22
P01	AC	RJW	Initial issue	16/03/21

DRAWING TITLE: Drainage Strategy — SHEET NO. 1/1

PROJECT: Chapel Lane, Standlake

CLIENT: Anderson Orr Architects

Infrastruct CS Ltd

The Stables, High Cogges Farm, High Cogges, Witney, OX29 6UN - Tel: 01993 709709: info@infrastructcs.co.uk

SCALE @ A1: 1:200 (0m 5m 10.0m)

ENGINEER: RJW
DRAFT: AC
APPROVED: DJ

PROJECT NUMBER	STATUS	ISSUE PURPOSE
4212	S2	INFORMATION

PROJECT	ORIGIN	PHASE	LEVEL	TYPE	ROLE	NO.	REVISION
CHAP	ICS	01	XX	DR	C	0200	P08

From: Richard White
To: Kevin Jack
Cc: [redacted]
Subject: 23/02849/FUL, Chapel Lane, Standlake_20072
Date: 15 December 2023 15:49:09
Attachments: image001.png

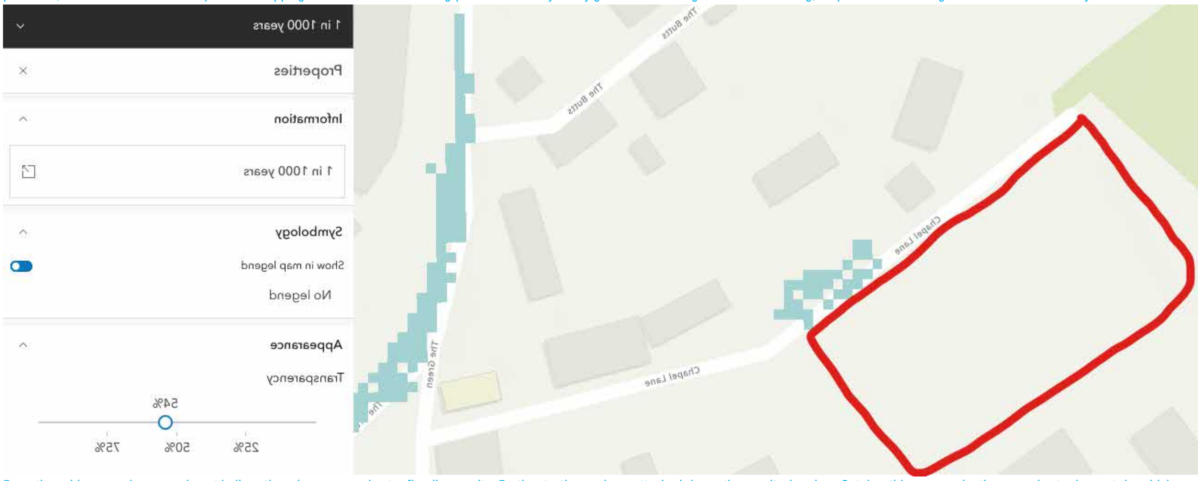
Good afternoon Kevin,

As discussed earlier, we believed we had reached an agreement about the way forward for this in the summer, in that we would continue to utilise a shallow infiltration method on a raised site, to spread the water as much as possible, and keep infiltration above groundwater level (and for the most part the existing ground level) with an overflow to a vastly oversized basin area to the north-west, to serve the site should the design storm be exceeded. However, we note there are some new comments on the portal:

I see there a great number of objections to this development on flooding grounds. My comments are -

I objected to the previous application, 22/01908/FUL (subsequently withdrawn), on the basis that a viable drainage strategy had not been submitted. Infiltration had not been proved to be feasible as groundwater monitoring had not taken place in March and April 2023, when rainfall was much higher than when readings were taken - groundwater flooding had been experienced adjacent to the site in April 2023. I note that the drainage strategy still only refers to the groundwater monitoring from November 2022 to February 2023, indicating an identical depth of 590mm to the water table from November to January, which I have questioned previously. Further groundwater measurements are required to be taken, with borehole logs submitted as evidence of the actual depth to the water table/there will be adequate clearance for the permeable paving. It is being disputed that the high water table on the nearby allotment site is due to perched water, but this has not been proven.

The on-site groundwater level cannot possibly reflect the level recorded at the well on the allotment or in the adjacent field; if it did, the site would be underwater. If the site were underwater (regularly or otherwise), it can be expected that the same person/people who walked past the site to take the well measurement would have stopped to take a photo of the site underwater (and in doing so, better proved their point and, walked a shorter distance). The EA mapping for surface water flooding (which is normally a very good indicator of groundwater flooding, too) shows no flooding on site for the 1 in 1000-year event:



From the evidence we have, we do not believe there is any groundwater flooding on site. Further testing we have attached shows the monitoring since October this year; again, the groundwater has not risen higher than 590mm bgl.

It is noted that soakage testing to BRE 365 has not been undertaken since November 2022, so further testing would be required to re-calculate the infiltration rate during wetter conditions.

We have not been asked to retest for any other site in West Oxfordshire. Please can you confirm why it is needed here? Gravels underlie the site, the rate achieved by on-site testing is representative of gravels, and the soakage rate for gravel is unlikely to change. The previous testing was carried out at a time when groundwater levels were high, and in any case, our infiltration will be well above the groundwater level. Please can you confirm the reason for more testing?

I also asked for a Groundwater Management Plan, to ensure that adjacent properties are not affected by s/w runoff during the construction phase. A request was made for it to subject to a pre-commencement condition, as it would be prepared by the groundworker who has not yet been appointed - although this could be agreed in principle, a viable drainage strategy would be required for me to remove my objection.

We understand you can allow this as a condition once you are happy with the wider strategy.

The method for this will need to be confirmed by the eventual contractor. But informally, we would expect the contractor to build the bunded area to the north first, then install well points around the foundations and pump to the bunded area, in order to locally lower the groundwater level at the foundations (if this is needed)

A bund is now proposed around the north-western and south-western site boundaries, but there are concerns about this. It is noted the meadow (at the north-western end) is at a higher elevation than the proposed building. If a large water storage area is created by the bund (and I note an adjoining retaining wall at the south-eastern end), there will be no slow release of water from the site should it flood (it has been reported that the existing field does regularly flood), so water will either infiltrate in the ground and raise the groundwater level, flowing underground to Chapel Lane, or the bund would overtop and cause flooding to adjacent properties.

Given the local opposition to the site, if it regularly flooded, there would be photos. The water is currently infiltrated into the ground here. We are intending to match this. The amount of rain falling on the site will not change if there is a dwelling on it; the plan area used for infiltration will be essentially unchanged, and given the good hydraulic conductivity of gravels, we cannot see how the proposal will impact the wider area and groundwater flows.

The meadow is at typical levels of between 66.10 and 65.90 (yes, it rises to 66.66 at one point on the northwest boundary, where the bund tapers out, but this is not typical). The Bund is set at 66.30 (this is above the surrounding land, except for where the bund tapers out), and the FFL for the proposed property is at 66.50.

A 3D model of the existing meadow gives an exceedance storage of 357m3 within the bunded/walled area. The total site area is 2,700m2, so this accounts for 130mm of rainfall over the full site (assuming zero infiltration into sub-surface gravel). This storage is over and above the 1 in 100-year storm, plus 40% already catered for; while we cannot say overtopping will never happen, we do not believe that it can, as the rainfall even would have to be many, many times that experienced in July 2007.

With regard to the water leaving the site via infiltration into the sub-soil, The risks of this are realistically unchanged from an undeveloped site; the sub-soil is and has always been gravel. The area of the site is the same, and the rain falling on this area will be the same regardless of whether or not there is a dwelling on it. Would it help if we extended the bund to key further into the sub-soils? We cannot see the benefit of doing this, due to the connectivity of the underlying gravels, but it might help address the concerns of the local villagers?

Arguably, the rainwater harvesting we are now proposing will mean that less water will be infiltrating, as the recycled water will discharge to the foul. Thames Water have confirmed they have the capacity for the foul. Whilst we acknowledge the village has issues, Thames Water manages the foul water drainage and has a statutory duty to provide this capacity. Planning cannot be refused on the basis that a government-regulated service provider is not believed to be fulfilling their duties, as to do so would set a very dangerous precedent indeed, as it could then be used to prevent development across the full WODC Lowlands Area, a significant proportion of which suffers from similar issues with Thames Water.

We would also note that the capacity and risk of groundwater flows have not been contested for other sites in the village, such as the current 23/02695/FUL on the Abingdon Road, with 2 houses draining to the same adopted foul pumping station and draining via infiltration. Please can you confirm how the Chapel Lane site differs or is worse, as the foul flows will be less from Chapel Lane?

Due to the above concerns, I maintain my objection to development on this site.

Hopefully, the above and our earlier conversation address your concerns and will allow you to remove your objection. Our current design arguably provides a reduction in the risk of flooding to 3rd parties rather than an increase due to the rainwater harvesting and attenuation.

If you can accept the above, please let us know, and we will update our report to reflect this and add the additional testing currently being carried out.

All the best,

Richard White
B.Sc (Hons) C.Env C.WEM I.Eng F.IHE MCIWEM
Managing Director

Infrastruct CS Ltd
Consulting Civil Engineers
The Stables, High Cogges Farm, High Cogges, Witney, Oxon, OX29 6UN.
[redacted]
Web: www.infrastructcs.co.uk

This page is intentionally left blank