APPENDIX C

A13/2

PROPOSED DRAINAGE STRATEGY

Greenfield Runoff Calculation

Basin 1 Catchment Simulation Calculations

Basin 2 Catchment Simulation Calculations

Basin 3 Catchment Simulation Calculations

Q100 – 6 Hour Rainfall

Drainage Strategy Plan

Existing Rhyne System & Related Works

Exceedance Flow Routes

Drainage Strategy Plan

Drawing No. 23257-HYD-XX-XX-DR-D-2001-P05

OS NORTH

Proposed 450mm dia, foul sewer diversion route

New manhole on existing public foul sewer at downstream end of proposed diversion

Proposed Pipe Culvert 1.2m diameter

Existing surface water sewer discharge to ditch to be connected to new culvert via manhole

WW Ref: 5603 CL: ???? IL: ????

New manhole on existing public foul sewer at upstream end of proposed diversion

Proposed Pipe Culvert 1.2m diameter

Existing highway drain discharge to ditch to be maintained

WW Ref: 6602 CL: ???? IL: ????

New manhole on existing public foul sewer at downstream end of proposed diversion

Proposed Box Culvert 3.0m wide x 2.5m high

Proposed 225mm dia, foul sewer diversion route

Proposed 225mm dia, foul sewer diversion route

Existing surface water discharge to piped ditch to be maintained

WW Ref: 6503 CL: ???? IL: ????

New manhole on existing public foul sewer at upstream end of proposed diversion

WW Ref: 6504 CL: ???? IL: ????

Existing surface water discharge to rhyne to be maintained

Proposed Box Culvert 3.0m wide x 2.4m high

WW Ref: 6403 CL: 6.873 IL: 5.633

Existing surface water discharge to rhyne to be maintained

Proposed Foul Pumping Station

Proposed Foul Pumping Station

Basin 1

Basin 2

Basin 3

Proposed flow control manhole

Proposed surface water discharge to rhyne

Proposed flow control manhole

Proposed surface water discharge to rhyne

Proposed flow control manhole

Proposed surface water discharge to rhyne

Existing surface water discharge to rhyne to be maintained

Proposed Pipe Culvert 1.2m diameter

SHINERS ELMS

GRACE CLOSE

LODGE CLOSE

STRAWB

Railway Walk (Path)

Key

- Existing public foul water sewer
- Existing public surface water sewer
- Proposed surface water sewer
- Proposed foul water sewer
- Proposed foul rising main
- Proposed rhyne crossing culvert
- Proposed attenuation basin
- Proposed rhyne easement strips
- Proposed foul pumping station with 15m standoff zone
- Existing public foul water sewer to be abandoned and diverted

REVISIONS

Rev	Date	Description	By	Ckd	App
P05	15/03/23	Redrawn.	RJH	JAC	JAC
P04	23/02/23	Redrawn.	RJH	JAC	JAC
P03	25/01/23	Redrawn.	RJH	JAC	JAC
P02	27/04/22	Catchment 1 basin relocated. Foul diversion added.	RJH	JAC	JAC
P01	22/04/22	First Issue.	RJH	JAC	JAC

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CLIENT

PERSIMMON HOMES SEVERN VALLEY

PROJECT

LAND AT RECTORY FARM (NORTH)
YATTON, NORTH SOMERSET

TITLE

PROPOSED FOUL & SURFACE WATER DRAINAGE STRATEGY PLAN

HYDROCK PROJECT NO.	SCALE @ A0
23257-IOCB	1 : 500

STATUS DESCRIPTION	STATUS
FOR APPROVAL	S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)	REVISION
23257-HYD-XX-XX-DR-D-2001	P05

Existing Rhyne System & Related Works

Drawing No. 23257-HYD-XX_DR-D-2002-P01

OS NORTH

Basin 1

Basin 2

Basin 3

Proposed Pipe Culvert
1.2m diameter

Existing surface water sewer discharge to ditch to be connected to new culvert via manhole

SHINERS ELMS

GRACE CLOSE

LODGE CLOSE

Proposed Pipe Culvert
1.2m diameter

Existing highway drain discharge to ditch to be maintained

Proposed surface water discharge to rhyne

Proposed flow control manhole

Proposed Pipe Culvert
1.2m diameter

Proposed Box Culvert
3.0m wide x 2.5m high

Existing surface water discharge to piped ditch to be maintained

Proposed surface water discharge to rhyne

Proposed flow control manhole

Proposed Box Culvert
3.0m wide x 2.4m high

Existing surface water discharge to rhyne to be maintained

Existing surface water discharge to rhyne to be maintained

Proposed surface water discharge to rhyne

Proposed flow control manhole

Existing surface water discharge to rhyne to be maintained

Proposed Pipe Culvert
1.2m diameter

Railway Walk (Path)

Key

- Existing piped ditch/rhyne
- Existing public surface water sewer
- Proposed surface water sewer
- Proposed rhyne crossing culvert
- Proposed attenuation basin
- Proposed rhyne easement strips
- IDB Viewed Rhyne
- Ordinary Watercourse

REVISIONS

Rev	Date	Description	By	Ckd	App
P01	16/03/23	First Issue.	RJH		

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PERSIMMON HOMES SEVERN VALLEY

PROJECT
LAND AT RECTORY FARM (NORTH)
YATTON, NORTH SOMERSET

TITLE
EXISTING RHYNE SYSTEM AND RELATED WORKS

HYDROCK PROJECT NO.
23257-IOCB

SCALE @ A0
1 : 500

STATUS DESCRIPTION
FOR APPROVAL

STATUS
S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)
23257-HYD-XX-XX-DR-D-2002

REVISION
P01

Exceedance Flow Routes

Drawing No. 23257-HYD-XX_DR-D-2004-P01

OS NORTH

SHINERS ELMS

GRACE CLOSE

LODGE CLOSE

Railway Walk (Path)

Key

- Exceedance flow route
- Proposed surface water sewer
- Proposed rhyne crossing culvert
- Proposed attenuation basin
- Proposed rhyne easement strips

REVISIONS

Rev	Date	Description	By	Ckd	App
P01	16/03/23	First Issue.	RJH		

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PROJECT

LAND AT RECTORY FARM (NORTH)
YATTON, NORTH SOMERSET

TITLE

POST-DEVELOPMENT SURFACE WATER EXCEEDANCE FLOW ROUTES

HYDROCK PROJECT NO.	SCALE @ A0
23257-IOCB	1 : 500

STATUS DESCRIPTION	STATUS
FOR APPROVAL	S2

DRAWING NO. (PROJECT CODE-ORIGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)

23257-HYD-XX-XX-DR-D-2004

REVISION P01

APPENDIX D

WESSEX WATER PRE-DEVELOPMENT ENQUIRY

Wessex Water Response

Richard Hughes

From: Teddy Takyi-Amuah <Teddy.Takyi-Amuah@wessexwater.co.uk>
Sent: 01 December 2022 15:28
To: Richard Hughes
Subject: WWRESP : ST46NW/ 47 - Rectory Farm, Chescombe Road, Yatton

Follow Up Flag: Follow up
Flag Status: Flagged

Categories: Scanned by Gekko

Good afternoon Richard,

Re: 280 units at Rectory Farm, Chescombe Road, Yatton

Many thanks for your email on the subject site, Please note the requested comments below.

Foul drainage

Easements

Firstly, please note the attached maps, ensuing links and table below indicating the minimum stand-off distances for the public sewers crossing the site. Statutory easements must be maintained and are essential to accommodate the size of the excavation and the equipment required to repair, maintain and mitigate the risk of structural damage to buildings and property. Obstructions and restrictions such as front access wall structures with flights of steps, private enclosed gardens and plot boundary structures will not be acceptable within the statutory easement.

Depth to invert of sewer (m)	Sewer diameter/size						
	Not exceeding 225mm	226mm to 475mm	476mm to 724mm	725mm to 924mm	925mm to 1124mm	1125mm to 1399mm	1400 or greater
Less than 3m	3m	3m	3.5m	4m	5m	5m	5m
3 to 4	3m	3m	4m	5m	5m	5m	5m
4 to 5	4m	4m	5m	5m	6m	6.5m	6.5m
5 to 6	5m	5m	6m	6.5m	6.5m	6.5m	6.5m
6 to 7.5	6m	6m	6m	6.5m	6.5m	6.5m	6.5m
7.5 or greater	4m	4m	4m	5m	5m	5m	6m

- *Section 104 /185 process link*
- *Wessex Water easements & Guidance*

Foul point of connection

The proposed 280 units will warrant a connection to the nearest public foul 225 mm dia or bigger under our size-for-size policy. We note as part of our preliminary revision that Yatton is benchmarked for a broad distribution of 391 units in accordance with the spatial strategy and requirements for neighbourhood plan considerations. It is understood that Land at North End, Yatton Rugby Club/Moor Road, and Land north of Egret Drive are earmarked to provide the additional units which total up to 322 of the anticipated 391 aforementioned (*154 units, 160 units and 8 units respectively*).

A point of connection will be considered to an adequate point within the 450 mm dia public foul sewers crossing the north-eastern fringes of the site subject to planning consent (*which will dictate the final number of units, layout and method of conveyance*) and depending on when the site comes forward in relation to the aforementioned allocations. Capacity is generally limited within the catchment and capacity improvements will likely be required to support growth and upcoming developments; The developer/applicant is recommended to reengage with Wessex Water as the site progresses and details come forward.

For the existing and new development to operate sustainably, it is important that we meet the capacity requirements, ensuring that negative effects on residents, local communities, and the environment are avoided while still satisfying requirements for the approved/upcoming developments. Wessex Water will manage capacity improvements for upcoming sites through careful planning and programming for the best possible outcome in terms of risk, disruption, and cost, based on the phasing of upcoming sites. Some options we will consider may involve oversizing/ storage arrangements at the on-site pumping station should this be deemed more cost-effective /less disruptive from a catchment-wide approach.

We note future processes on site could result in the need for a Trade Effluent Consent. It is important to stress the importance of understanding the full details of any proposed commercial elements of the proposal as well as any establishments likely to generate trade effluent flows. Capacity Improvements to be managed by Wessex Water will include the predicted foul flows from any approved non-residential uses being of domestic type only. The applicant must contact Wessex Water with information should discharge of a non-domestic nature be approved.

Wessex Water recommends the installation of a properly maintained fat trap on all systems for catering establishments; We further recommend, in line with best practice for the disposal of Fats, Oils, and Grease, the collection of waste oil by a contractor, particularly to recycle. Failure to implement these recommendations may result in this and other properties suffering blocked drains, sewage flooding, and pollution of local watercourses nearby.

Pumping station requirements

Site topography and the proposal to pump via two pumping stations are noted at this stage; In addition to being built to adoptable standards, Wessex Water anticipates that matters on septicity, pump rates and times of operation, and easement of the onsite pumping station to the nearest residential dwelling (*15 m*) will be addressed as details come forward. Please note the further guidance links below.

- *Pumping station septicity control*
- *Wessex Water Pumping Station addendum*
- *Other sewerage connections - Wessex Water*

Manhole levels

To verify the actual levels and gradients of sewers and manholes, further on-site surveys should be conducted as the project progresses.

1. MH Reference ST4265 4705
   a. Cover Level 5.297
   b. Location IN FIELD 4067 REAR OF SHINERS ELMS
   c. Lowest Invert 3.637
   d. Depth 1.660

2. MH Reference ST4265 3702
   a. Cover Level 5.294
   b. Location IN FIELD 4178 OPP BARN
   c. Lowest Invert 3.474
   d. Depth 1.820

I hope the above is enough to proceed with the design. A review of the contents of this email will be required where 18 months or more have elapsed. In light of significant changes, any variations that are likely to impact the response (e.g. changes in drainage strategy, development numbers, or phasing) will need to be discussed with Wessex Water.

Kind regards

Teddy Takyi-Amuah

Planning Liaison / Wessex Water
Claverton Down Bath BA2 7WW

From: Richard Hughes <RichardHughes@hydrock.com>
Sent: 10 November 2022 11:35
To: Planning Liaison <planning.liaison@wessexwater.co.uk>
Subject: [Hydrock: 23257-IOCB] 23257-IOCB - Proposed Development at Yatton - Pre-Development Enquiry

Dear Sirs,

Please find attached an application for a Pre-Development capacity check for a proposed residential development at the above site on behalf of our Client, Persimmon Homes. A pre-application submission is also with the planning authority at this time.

For your information, it is intended that surface water will be disposed of to adjacent watercourses and therefore this application is purely for foul water. Due to topography we believe that most of the site will need to be pumped to the nearest Wessex Water foul sewer on the eastern boundary of the site.

Attached is a completed application form, site location details, and a copy of the indicative Land Budget Plan.

Should you require any further information or have any queries then please do not hesitate to contact us.

Richard Hughes Eng Tech MICE
Principal Engineer - Infrastructure

Make flexibility work: Hydrock promotes flexible working; if you get an email from me outside normal hours it is because I am sending it at a time convenient to me. I do not expect you to read or reply until normal office hours.

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Eight consecutive years in the '100 Best Large Companies to Work For' listing.

Richard Hughes

From: Teddy Takyi-Amuah <Teddy.Takyi-Amuah@wessexwater.co.uk>
Sent: 13 March 2023 09:00
To: Richard Hughes
Subject: RE: [Hydrock: 23257-IOCB] RE: WWRESP : ST46NW/ 47 - Rectory Farm, Chescombe Road, Yatton

Categories: Scanned by Gekko

Good morning Richard,

Re: ST46NW/ 47 - Rectory Farm, Chescombe Road, Yatton
Based on the reduction in numbers alone; I will inform that the comments from December remain the same. I hope this answers the questions raised.

Kind regards,

Teddy Amuah

From: Richard Hughes <RichardHughes@hydrock.com>
Sent: 09 March 2023 11:47
To: Teddy Takyi-Amuah <Teddy.Takyi-Amuah@wessexwater.co.uk>
Subject: [Hydrock: 23257-IOCB] RE: WWRESP : ST46NW/ 47 - Rectory Farm, Chescombe Road, Yatton

Good Morning Teddy,

We are hoping to be in a position to be able to submit the planning application for the above project in the next few weeks. Since your last email of the 1st December 2022, copy below, the layout has been significantly amended and we are now looking at a development of up to 190 residential dwellings, as opposed to the original 280 units, and approximately 0.3 ha of Class E building use.

As this is a significant reduction on the previous proposals I would be grateful if you advise me of any changes that this will have to your previous comments.

Many Thanks,

Richard

Richard Hughes Eng Tech MICE
Principal Engineer - Infrastructure

APPENDIX E

GEOTECHNCIAL INFORMATION

Extracts from Preliminary Land Contamination and Geotechnical Risk Assessment (Hamson Barron Smith, report reference 23-12-113547/DSR, dated December 2022),

Hamson Barron Smith

HBS

Land at Yatton, Yatton
Preliminary Land Contamination and Geotechnical Risk Assessment

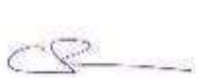
On behalf of Persimmon Homes Severn Valley

Report 23-12-113547/DSR1

December 2022

Report Issue Record

Project No.:	23-12-113547
Project Title:	Land at Yatton
Site Location:	Land north of Rectory Farm, Chescombe Road, Yatton
Client:	Persimmon Homes Severn Valley
Report Title:	Preliminary Land Contamination and Geotechnical Risk Assessment
Issue Date:	13 December 2022
Report No.:	23-12-113547/DSR1
Revision:	-

Prepared by	Written	Reviewed & Approved
Name	**Catherine Riley**	**Craig Roberts**
Signature		
Position	Senior Geo-Environmental Engineer	Technical Director

Contents

Appendices

Executive Summary

SITE INFORMATION	
Client	Persimmon Homes Severn Valley.
Site	Land at Yatton.
Location	Land north of Rectory Farm, Chescombe Road, Yatton, BS49 4EU (nearest). NGR 342478, 165551.
Approximate area	13.5Ha.
Topography	Elevation circa 5m OD.
Current land use	Farmland.
Proposed development	Low rise residential.

SITE SETTING	
Geology	Superficial deposits of Raised Tidal Flat Deposits (clay and silt) over Mercia Mudstone Group.
Radon	No radon protective measures are required.
Hydrogeology	Unproductive Strata over Secondary B Aquifer. The site does not lie in a Source Protection Zone.
Hydrology	Series of unnamed field drains running through and around the immediate vicinity of the site. Branch Rhyne lies c.150m north west and Biddle Street Rhyne lies c.150m south west. The closest main river is the Yeo which lies c.845m south west.
Landfill sites	No landfills located within 250m of the site.
History	Ordnance Survey plans show the site to have remained undeveloped to present day.
Previous site investigations	Hamson Barron Smith has not been made aware of any previous investigations which may have been undertaken at this site.
Anticipated ground conditions	Potentially soft clays. Shallow groundwater is anticipated.

GEOTECHNICAL	
Foundations	Shallow spread foundations may not be suitable depending on the depth and strength of the Tidal Flat deposits. Bearing capacity to be determined from site investigation.
Shrinkable soils	Soils are likely to be shrinkable.
Buried concrete	Significant concrete protection measures may be required.
Floor slabs	Suspended floor slab likely to be required.
Slope stability	Site and adjacent area are level and therefore no risks.
Pavement	CBR values likely to be adequate for road and car park construction.
Soakaways	Underlying geology unlikely to be suitable for soakaway drainage, subject to full scale testing to confirm and calculate infiltration rates.
Natural cavities	None expected.
Mining	None expected.
UXO	The preliminary UXO report was unable to rule out the risk of UXO and therefore it is therefore recommended that in advance of any intrusive works that further research in the form of a detail UXO Risk assessment be undertaken in accordance with CIRICA guidelines.

CONTAMINATION	
Human health	No significant risks identified.
Controlled waters	No significant risks identified.
Gas protection	Medium risk identified, depending on the presence of organic soils within the Tidal Flat deposits. No radon protective measures are required.
Water supply pipes	No significant risks identified, standard pipework may be suitable.

4 Environmental Setting

4.1 Geology

The 1:50,000 scale British Geological Survey (BGS) geological mapping indicates the site to be underlain by superficial deposits comprising Raised Tidal Flat Deposits (clay and silt) overlying the bedrock geology of Mercia Mudstone Group.

Tidal Flat Deposits, are deposited on extensive nearly horizontal marshy land in the intertidal zone that is alternately covered and uncovered by the rise and fall of the tide. They consist of unconsolidated sediment, mainly mud and/or sand. Normally a consolidated soft silty clay, with layers of sand, gravel and peat.

The Mercia Mudstone Group is described by the BGS as "*dominantly red, less commonly green-grey, mudstones and subordinate siltstones with thick halite-bearing units in some basinal areas. Thin beds of gypsum/anhydrite are widespread; thin sandstones are also present*".

There are no BGS records in the immediate vicinity of the site.

4.2 Soil Geochemistry

The BGS "Normal Background Concentrations of Contaminants in English Soils" included as part of the Groundsure report indicates the typical estimated concentrations of each determinant in topsoil in the locality of the site, as summarised in Table 1.

Table 1: Summary of BGS Estimated Soil Geochemistry

Determinant	Concentration Range (mg/kg)
Arsenic	15 – 25
Cadmium	<1.8
Chromium	60 – 90
Lead	<100
Nickel	15 – 30

4.3 Hydrogeology

The Environment Agency classifies the Tidal Flat Deposits to be Unproductive Strata. The underlying Mercia Mudstone Group at the site is a Secondary B Aquifer. The site

does not lie within a Source Protection Zone. The nearest commercial groundwater abstraction (for general farming use) lies circa 905m north west of the site.

The depth to groundwater is unknown. However, the site comprises low lying land on the Somerset Levels and on site field drains have surface water at a depth of 1.0m to 1.5m bgl. Therefore, shallow groundwater is anticipated at the site.

Despite the shallow depth to groundwater, the likely low permeability of the superficial deposits would suggest that groundwater would be of low sensitivity to any potential on site sources of contamination.

4.4 Hydrology

A series of unnamed field drains run through and around the immediate vicinity of the site. Branch Rhyne lies c.150m north west and Biddle Street Rhyne lies c.150m south west. The closest main river is the Yeo which lies c.845m south west.

The proximity of the site to the surface water features would suggest that surface water is considered to be of high sensitivity to any potential on site sources of contamination.

4.5 Landfill Sites

No current or historical landfills are known to exist within 250m of the site. No evidence of buried biodegradable materials or other potential sources of ground gas were identified on the site. However, the site is underlain by Tidal Flat Deposits, which may contain organic rich soils. Consequently, the risks to end users from explosive or asphyxiating gases is considered medium.

4.6 Radon

The Groundsure report states that the site is in an area where the estimated probability of homes being above the action level of 200Bqm^{-3} is less than 1%. Therefore, no radon protective measures are required in the construction of new buildings. The Groundsure report is presented in Appendix D.

Confirmation of any protection measures should be agreed with the local authority building control and / or warranty provider.

4.7 Statutory Authority Records

A review of public registers contained within the Groundsure report has been undertaken. These entries relate to trade directories, pollution control registers, hazardous sites, enforcement notices etc. A summary of those that might be of relevance to the site is presented below, for full details of all entries, reference should be made to the Groundsure report in Appendix D.

- A former petrol filling station is listed at High Street, Yatton, approximately 400m to the north of the site boundary.
- There is a Pollution Incident recorded located circa 20m south of the site from August 2008; the incident involved waste materials including vehicle parts, tyres, metal waste, commercial waste, demolition waste and biodegradable materials, and is listed as having a Category 2 Significant Impact on land.

4.8 Sensitive Land Uses and Designated Areas

There are three Site of Special Scientific Interest (SSSI) located within 2km of the site including Biddle Street which is located on site / immediately west, Tickenham, Nailsea and Kenn Moors which are located circa 665m north east and Puxton Moor which is located circa 1.85km south west.

Cheddar Valley Railway Walk which is located on the western site boundary is listed as a Local Nature reserve (LNR).

4.9 Land Use History

The historical land uses of the site and its surrounding area have been established from superseded editions of Ordnance Survey maps and are detailed in Table 2.

Copies of the maps are included in Appendix C.

Table 2: Summary of Historical Maps

Date	On Site	Offsite
1883-1885	The site comprises a series of undeveloped agricultural fields.	The Great Western Railway forms the western boundary of the site. The generally surrounding land use is agriculture, with residential dwellings in the village of Yatton c.250m north east. A gas works lies 260m north west.

Date	On Site	Offsite
1902-1903	No significant changes are evident.	No significant changes are evident.
1931-1932	No significant changes are evident.	The gas works is no longer marked.
1960-1961-	No significant changes are evident.	No significant changes are evident.
1975-1979	No significant changes are evident.	By 1977 Rectory Farm has been constructed to the south with residential housing and a works present to the east.
1980-1988-	No significant changes are evident.	The former gas site is marked as a works and a gasholder is present on the site.
1991-1995	No significant changes are evident.	The works and gas holder to the north are no longer marked. The works to the east has been extended. A storage tank is marked in the farm.
2001-2003	No significant changes are evident.	No significant changes are evident.
2010	No significant changes are evident.	No significant changes are evident.
2022	No significant changes are evident.	No significant changes are evident.

4.9.1 Summary of Development History

On site

The site has remained as undeveloped agricultural land until the present date.

Off Site

The surrounding land use was typically undeveloped farmland becoming a mixture of agricultural land and residential properties. A gas works was present circa 260m north west from the 1800s until the 1930s. A works was present immediately east from the later 1970s; the site has recently been redeveloped by Woodstock Homes for residential apartments.

5 Geotechnical Assessment

The 1:50,000 scale British Geological Survey (BGS) geological mapping indicates the site to be underlain by superficial deposits comprising Tidal Flat Deposits (clay and silt) overlying the bedrock geology of Mercia Mudstone Group.

An assessment of potential geotechnical risks based on the information from the Groundsure Report and available geological information is presented in the following sections. The risks are summarised in Table 4. The Groundsure Report is reproduced in Appendix D.

5.1 Deep Made Ground

It is possible that some localised Made Ground will be present, resulting from the current use of the site e.g. demolition rubble place in the farm access. Deep Made Ground resulting from infilling or significant raising of levels is considered unlikely however.

5.2 Buried Structures

None are anticipated.

5.3 Compressible Soils

The Groundsure report states that the Compressible Ground risk at the site is “moderate”. Based on the expected superficial geology, compressible soils may be present.

5.4 Shrinking / Swelling Clay

The Groundsure report states that the Shrinking or Swelling Clay risk at the site is “low”. The near surface soils are anticipated to be clay and therefore are likely to be shrinkable.

5.5 Collapsible soils

The Groundsure report states that the Collapsible Ground risk at the site is “negligible” to “very low”. Based on the anticipated ground conditions, collapsible soils are not expected.

5.6 Aggressive Ground Conditions for Concrete

Based on the published geology, the anticipated soils are expected to contain significantly elevated concentrations of soluble sulphates or pyritic materials which may oxidise to form soluble sulphates.

5.7 Running Sands / Excavation Instability

The Groundsure report states that the Running Sand risk at the site is “moderate”. Based on the anticipated ground conditions, running sands may be present.

5.8 Groundwater

The site comprises low lying land on the Somerset Levels. On site field drains have surface water at a depth of 1.0m to 1.5m bgl and ponding of surface waters were noted across the site during the walkover. We therefore envisage that shallow groundwater will be present in the near surface superficial deposits.

5.9 Slope Stability

The Groundsure report states that the Landslide risk at the site is “very low”.

The site is topographically flat. Provided no significant alterations to the site’s topography are made no issues with stability are anticipated. Any proposed slopes or temporary cutting for retaining systems should be carefully assessed however.

5.10 Solution Features / Natural Cavities

The site is expected to be underlain by Tidal Flat Deposits (clay and silt) over mudstone of the Mercia Mudstone Group which are not prone to dissolution.

The Groundsure report states that the Ground Dissolution risk at the site is “negligible” and no solution features are recorded within 1km.

5.11 Underground Mining

A review of the Groundsure report and the historical maps indicates that there are no records of underground mining within 1km of the site. Consequently, the risks from underground mining within the site itself are considered to be negligible.

5.12 UXO Risk

An online check of freely available UXO risk maps https://zeticauxo.com/downloads-and-resources/risk-maps/) from Zetica indicated there is a Moderate risk of unknown UXO at the site. Therefore, a preliminary UXO risk assessment was obtained from 1st Line Defence, the report is presented in Appendix E.

The preliminary UXO confirmed the following.

- The site has not had a former military use. It is noted that the site was located approx. 6.2km from the closest Heavy Anti-Aircraft battery.
- The site is located within the Long Ashton Rural District which sustained an overall low density of bombing, with an average of 22.2 items dropped per 1,000 acres. In total 1,034 items of ordnance including 1004 high explosive (HE) bombs, 8 parachute mines, 16 oil bombs and 6 phosphorous bombs were recorded over an area of 45,515 acres.
- The report identified a refence to a bombing incident at Yatton Junction in October 1940. This lies circa 250m north of the site. The source spoke of a "stick" of eight bombs but refence to the location of the other 7 incidents were vague and could not be ascertained at the preliminary stage.
- There are no structures within the site boundary with which to attribute damage when comparing pre and post WWII OS mapping.

The report concluded that the location of the remaining seven incidents was vague and could not be ascertained at this preliminary stage. As the site is large and was undeveloped it is noted that had any of these incidents landed within the boundary, it is considered unlikely they would have been noted and subsequently investigated.

Given both this and the site's relative proximity to the aforementioned Yatton Junction, it is considered necessary to conduct further research in regards to this incident, and whether it had an effect on the site.

The report therefore recommends that a detailed UXO report is commission ed to examine in detail the probability of encountering explosive ordnance during any proposed works at the site.

APPENDIX F

NORTH SOMERSET DEVELOPER CHECKLIST

North Somerset Council Lead Local Flood Authority Checklist for Developers

Outline Planning Permission

What information should be included at outline planning submission?

The LLFA are statutory consultees for major development and expect the following to be considered within outline planning applications they review to demonstrate that flood risk and surface water drainage is appropriately managed by the proposals. Minor planning applications should also take into account the below, when submitting a planning application.

The proposals will be checked to ensure they comply with:

- National Planning Policy Framework and associated guidance
- Non-statutory technical standards for sustainable drainage systems
- West of England SuDS Developer Guidance
- North Somerset Council Planning Policies and supplementary planning documents:
    - CS2 Delivering sustainable design and construction
    - CS3: Environmental impacts and flood risk assessment
    - CS4: Nature conservation
    - CS9: Green infrastructure
    - Creating sustainable buildings and places Supplementary Planning Document
    - Biodiversity and trees Supplementary Planning Document (watercourse buffers)

Check	Information Required	Reason for Requirement
☒	Site Location Plan	Identify the site location, extents and location of any offsite works
☒	Topographic Information	Site topographic survey or LiDAR information to understand drainage and surface water flood risk implications of site levels both before and post development
☒	Baseline Geological Assessments and Infiltration Testing	To understand the underlying ground conditions and infiltration potential. If infiltration is proposed, testing should be carried out in accordance with BRE digest 365 Soakaway Guidance.

Check	Information Required	Reason for Requirement
☒	Evaluation of Flood Risk	Assessment of flood risk from all sources including surface water commensurate with the scale and nature of the development to identify: • Existing flood risk to the site from within the site; • Existing flood risk to the site from outside of the site; • Flood risk to the site generated by the proposed development; • Flood risk outside the site generated by the proposed development; • Details of any appropriate mitigation measure that may be required.
☒	Proposed Layout Plan(s) including: • Masterplan or Parameters Plan (where available), • Drainage Areas Catchment Plan, • Proposed Drainage Layout, and • Preliminary Exceedance and Overland Flow Route Management Design	Outline the overarching development proposals / parameter plans and plans which identify flood risk and drainage elements of the proposed development.
☒	Site-specific Approach to Surface Water Drainage including: • Consideration of SuDS • Evidence that the drainage hierarchy has been applied. • A simple index approach (CIRIA C753) calculation • Clearly marked discharge location (s) and discharge rates • An explanation of how the volume of discharge will be managed i.e. the approach taken, long term storage or (2 l/s/ha or Qbar) • Spatial arrangement of the required attenuation • Surface water drainage calculations which demonstrate that the proposed development will not be at risk from flooding and will not exacerbate flood risk elsewhere.	To provide evidence that the proposed development has been designed in accordance with National and Local planning policy, with particular regard to the implementation of sustainable drainage (SuDS). Demonstrate consideration of various types of SuDS within the site appraisal and that water quality, amenity and biodiversity considerations have been incorporated into the SuDS proposals.

Check	Information Required	Reason for Requirement
☒	Consideration of Operation & Maintenance	Demonstrate a consideration of operation and maintenance for the surface water drainage strategy including the proposed SuDS features along with any existing drainage features within the site. At outline stage this would entail allowing enough space for access to the surface water drainage and existing watercourses.
☒	Written evidence of agreements in principle from third parties such as Wessex Water, Internal Drainage Boards and owners of other assets or owners of land that maybe needed to be crossed.	To demonstrate that the proposed discharge location is viable and achievable.

The following table should be filled in and submitted with the application:

Site Characteristics		Where referenced (Document page no/drawing no etc)
Total Site Area (m^2):	136,540	Section 2.1.2
Significant public open space (m^2):	46,080	Not specifically referenced
Existing Impermeable Area (m^2):	0	Section 3.1.1
Proposed Impermeable Area (m^2):	25,690	Table 2, Page 8
Area drained by infiltration (m^2):	0	Sections 3.2.3 to 3.2.5, Page 6
Topographic Information		
Maximum pre and post development site elevation (mAOD):	7.25m 8.68m	Appendix B – Topographic Survey Appendix C – Drg. No. 23257-HYD-XX-XX-DR-D-2001
Minimum pre and post development site elevation (mAOD):	5.10m 8.00m	Appendix B – Topographic Survey Appendix C - Drg. No. 23257-HYD-XX-XX-DR-D-2001
General slope of the site pre and post development (1 in X):	1 in 550 1 in 100	Appendix B – Topographic Survey Appendix C - Drg. No. 23257-HYD-XX-XX-DR-D-2001
Geological information		
Soil type (from FSR, HOST Class from FEH or WRAP map from Wallingford Procedure – specify where from):	0.400	Micro Drainage – Appendix C (Greenfield Runoff)
Superficial geology classification:	Tidal Flats deposits	Appendix E
Bedrock geology classification:	Mudstone	Appendix E
Depth to groundwater level (m):	TBC	Sections 3.2.3 & 3.2.4, Page 6
Groundwater source protection zone:	No	Appendix E
Drinking water protected area:	No	Not referenced.
Lowest non-extrapolated infiltration rate from three tests per test hole (BRE 365):	N/A	Sections 3.2.3 & 3.2.5, Page 6

Ground contamination present:	Low/Med Risk	Refer to separate Land Contamination & Geotechnical Risk Assessment by Hamson Barron Smith, Section 6, Table 3.
Flood risk information		
EA fluvial flood zone:	No	
EA tidal flood zone:	Yes	FRA – section 3
Surface water flood risk (h/m/l):	Very Low	FRA – section 3.2
Percentage of site area at risk of flooding:	100%	FRA – section 3
Risk of groundwater flooding (y/n):	Yes	FRA – section 3.3
Risk of sewer flooding (y/n):		
Risk of flooding from artificial sources (y/n):	No	FRA – section 3.4
Surface water drainage proposals		
Discharge location and hierarchy justification:	To rhynes	Sections 3.2.2 to 3.2.7
Hydraulics		
Existing Qbar (l/s)	10.5 l/s	Section 3.2.20, Table 4
Existing 1 in 1 (l/s)	8.2 l/s	Section 3.2.20, Table 4
Existing 1 in 30 (l/s)	19.8 l/s	Section 3.2.20, Table 4
Existing 1 in 100 (l/s)	25.2 l/s	Section 3.2.20, Table 4
Urban creep percentage:	10%	Section 3.2.13
Climate change amount applied:	+40%	Section 3.2.12
Long term storage volume (if applicable):	N/A	Discharge at QBAR rate – section 3.2.10
Attenuation storage volume:	4,495m^3 2,038m^3	Submerged Outfall – Appendix C calculations Free Outfall – Appendix C calculations
CIRIA SuDS Manual C753 Simple index approach undertaken (y/n)	Y	Section 3.1.9
Proposed 1 in 1 (l/s):	8.7 l/s	Section 3.2.19, Table 3
Proposed 1 in 30 (l/s):	9.2 l/s	Section 3.2.19, Table 3
Proposed 1 in 100 (l/s):	9.6 l/s	Section 3.2.19, Table 3
Volume control approach (LTS) or (2 l/s/ha or Qbar)	QBAR	Sections 3.2.8 to 3.2.10
Submerged outlet?	Yes	Section 3.2.11
Maintenance		
Sufficient space for maintenance of surface water drainage and watercourses?	Yes	Drawing no. 23257-HYD-XX-XX-DR-D-2001 Appendix C.

Limitations

This document has been developed by North Somerset Council for the purpose of providing advice to all persons involved in all matters relating to surface water drainage and associated flood risk with regard to the submission of planning applications and all other planning matters within North Somerset

North Somerset Council accepts no liability for any costs, liabilities or losses arising as a result of the use of or reliance upon the contents of this guidance.