DRAINAGE STRATEGY AND CALCULATIONS



CLIENT:	Voyage Care
ARCHITECT:	31 / 44
SITE ADDRESS:	Wilton Gardens South, Boldon Colliery, NE35 9HS
REFERENCE (REV):	24321-DCE-XX-XX-T-C-002-P02
DATE:	21/10/2024

AUTHOR:	Sebastian Reid	DATE:	21/10/2024
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REVISION	DATE	AUTHOR	CHECKER	COMMENTS
P01	17/10/24	S Reid	H Baglin	Initial Issue
P02	21/10/24	S Reid	H Baglin	NWL Comments

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EXISTING SITE

The existing site is a brownfield site located between Wilton Gardens South and Brockley Terrace in Boldon Colliery, South Tyneside.

The site topography is general flat with an average level of 30.1mAOD.

Residential properties are located to the north and a small industrial unit is to the south. To the west and east are Wilton Gardens South and Brockley Terrace respectively.

The existing site drains into a surface water drainage system via an existing gully located in a former access and this is routed into the NWL surface water sewer in Wilton Gardens South. Site levels generally fall towards this gully.

The site is remediated and has made ground and demolition waste on the surface with boulder clay forming the underlying natural strata below the site.

PROPOSED DEVELOPMENT

The proposed works on the site is shown on plan 44/2404/PL_1400 which is the Site and Landscaping Plan for the site. These plans show the 12 bed care two storey development with external gardens and paved areas. The site does not have specific car parking and utilises porous construction where possible. The Building is located right up to the boundaries on all sites where possible to utilise all of the land where possible.

The total site area is 788 m^2 of which 654 m^2 is impermeable or porous paved and the remaining is permeable falling towards landscaped areas.

Proposed levels direct water away from the building towards the courtyard and Wilton Gardens South and the existing gullies in the highway which are being retained.

SURFACE WATER DRAINAGE STRATEGY

DESIGN STANDARDS

Drainage systems on this site have been designed in accordance with the following standards as required:

- CIRIA C753 – The SuDS Manual (2015)
- British Standard 8582:2013 – Code of Practice for Surface Water Management for Development Sites
- British Standard 752:2017 – Drain and Sewer Systems Outside Building – Sewer System Management
- British Standard 8533:2017 - Assessing and managing flood risk in development - code of practice
- Building Regulations Part H

SURFACE WATER DRAINAGE HEIRARCHY

Re-use of Surface Water In-Situ

While re-use of water on site has been considered, the use of rainwater harvesting has been discounted due to a limited use of the water within the scheme. Irrigation is not being provided from the SW drainage system to the landscaped areas, and these areas will be naturally watered. Green roofs are not proposed as the roofs are all traditional pitched construction. There is limited space within the site for water butts and no gardening areas for residents are proposed which would use this water.

Reduction of Runoff

Green roofs are not proposed as the building is to be a traditional pitched roof construction.

The site is going to use planters within the development, but these are to be remote from any downpipe meaning that they will have limited utility as SUDS features to accept runoff from the roof.

Infiltration

The site is awaiting further SI which will include soakaway tests. The previous brownfield use means that there is made ground covering the site. The Phase 1 SI suggests that the site is overlaying boulder clay which has very limited infiltration capacity. On this basis, it is assumed that infiltration is not feasible.

Watercourse

No watercourses are located in the vicinity of the site nor accessible without substantial infrastructure.

Surface Water Drainage

There is an existing surface water drain by the site and this is connected to an existing gully which the site drains towards. It is proposed that a new surface water connection is made to the same sewer and this will be managed to ensure that runoff if managed as the eventual discharge point for this sewer is a combined sewer downstream.

NWL have confirmed that they will accept a connection into this sewer at 2l/s in all storm events, and that to support this they require infiltration testing to confirm that there is no other means of discharging surface water from their site. Their consultation response is to the rear of this document.

Preferred Methods of Water Discharge

The preferred method of runoff is to the surface water sewer.

PEAK FLOW CONTROL FROM SITE

The existing site is brownfield and falls towards an existing gully in the former access which is connected to the surface water sewer. Assuming 140l/s/ha and 700m2 impermeable area, the rate to this existing gully is 9.8l/s, which is well within the capacity for the existing pipework.

The existing QBAR for the site is 0.9l/s, however this is a very low rate and the small size of the site means that there is a limited capacity for storing water at this discharge rate as this would negatively impact areas of planting and landscaping which are required for residential amenity and biodiversity.

It is proposed that a minimum rate of 2l/s is used for the site and this is managed by a vortex flow control which has an orifice size which will be resistant to blockage. This is in accordance with NWL's requirements for accepting the connection.

A large tank taking most of the available space within the courtyard is proposed, and this will be kept away from areas of planting. This tank is designed to store water up to and including the 1:100 + 45% CC storm event.

FLOOD RISK AND FLOOD EXCEEDANCE

The site is in Flood Zone 1 and this is shown on the flood map for planning below.

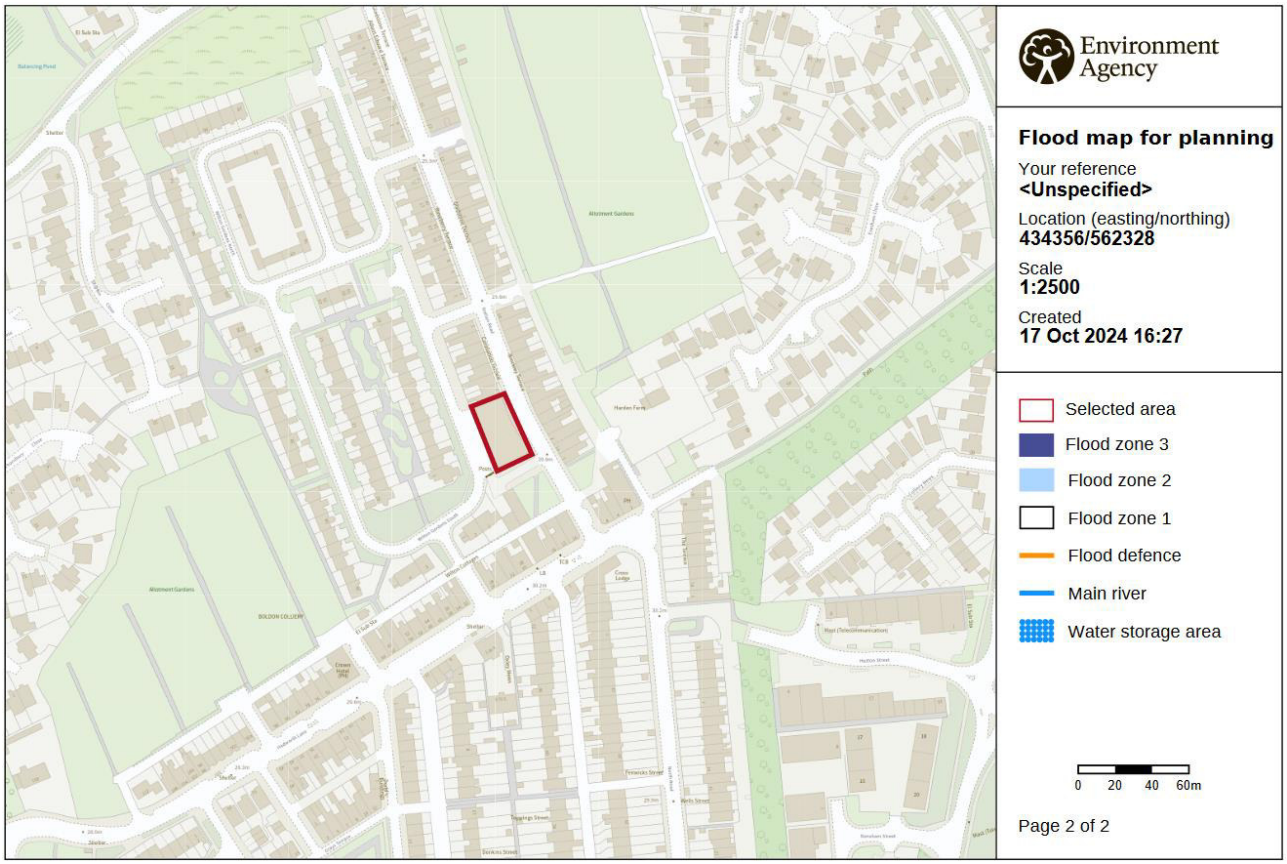


Figure 1 - Flood Map for Planning (EA)

Fluvial (River) Flooding

The map below shows that the site is remote from a watercourse and areas of Fluvial Flood risk.

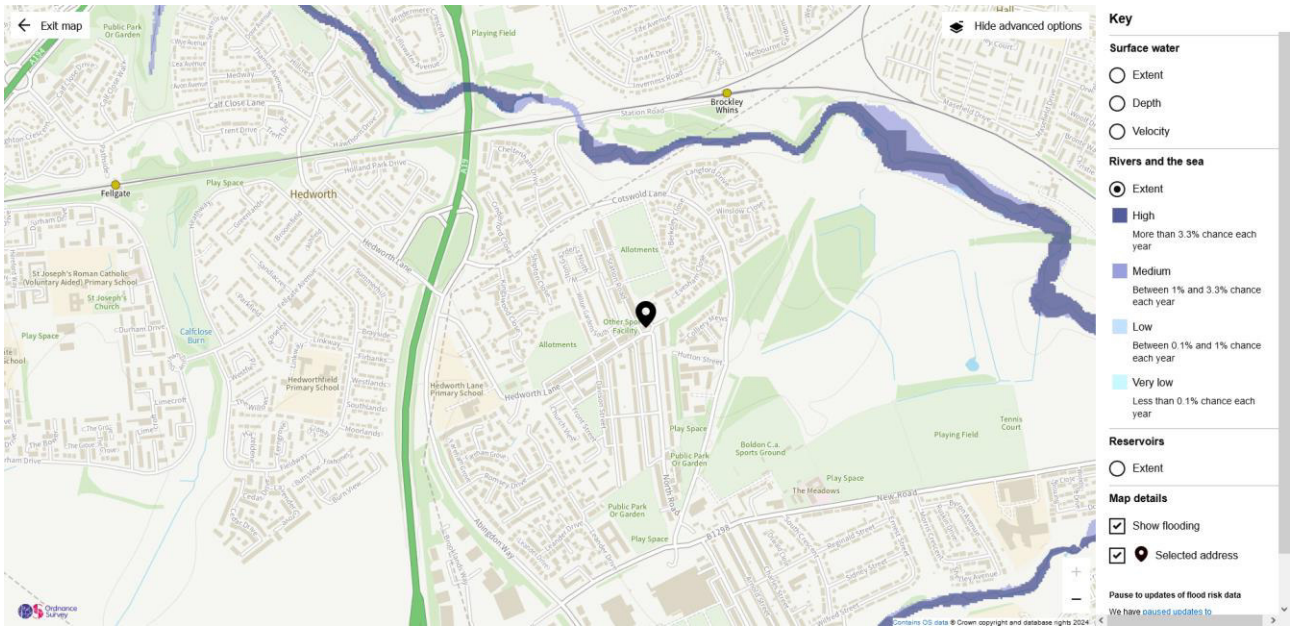


Figure 2 - Fluvial Flooding (EA)

Tidal Flooding

The site is not at risk from tidal flooding.

Pluvial (Surface Water) Flooding

The map below shows that there is negligible flood risk from surface water sources. Ground levels should be designed to direct any overland flows away from buildings where possible.

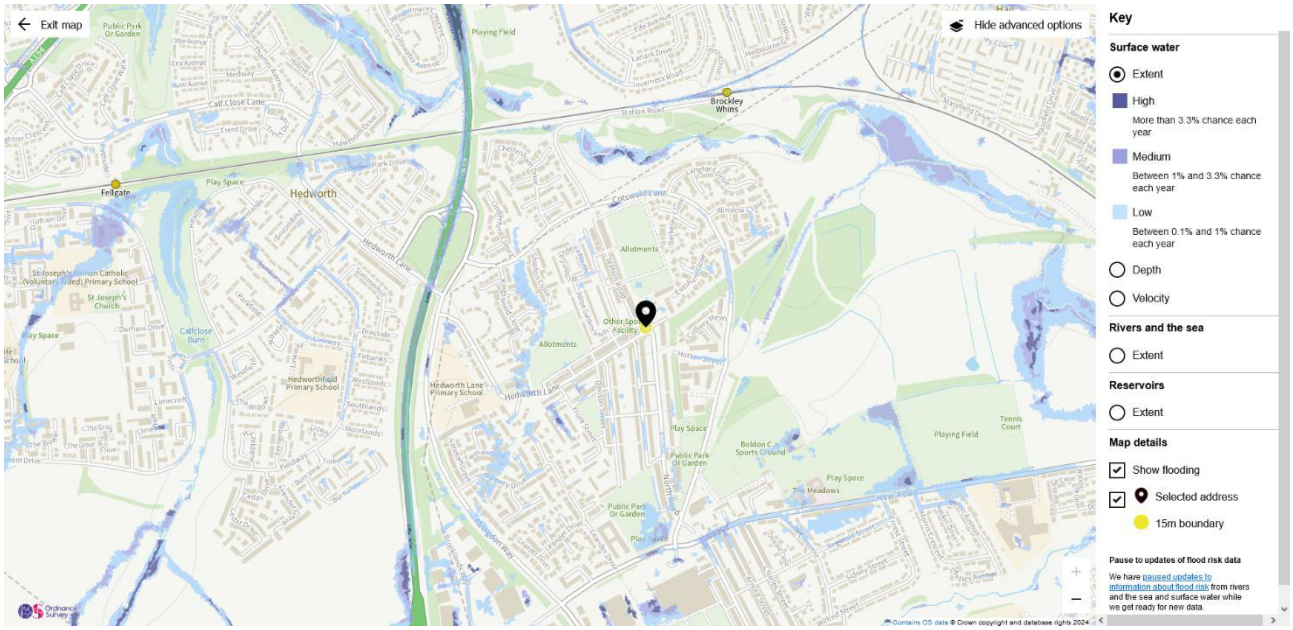


Figure 3 – Pluvial Flooding (EA)

Groundwater Flooding

Groundwater flooding is unlikely in this area according to the BGS.

Sewer Flooding

Existing sewers are 3 – 4m below the ground level in this area, and 2 -3m below the finished floor level. There is negligible risk of flooding from sewer sources.

Reservoir and Other Artificial Sources of Flooding

There is no risk of flooding from reservoir and other sources of flooding.

Flood Exceedance

While the system is designed to attenuate flows within the site and manage extreme events up to 1:100 + 45% climate change underground, it is envisaged that in a more extreme storm scenario water may exceed the capacity of this system and water will leave the drainage system causing flooding.

In the event of an event beyond the design, water would be directed around the building and towards the east.

SUSTAINABLE DRAINAGE SYSTEMS

The following SUDS Methods are used within this development:

- Porous pavements.

Open and Green SUDS have not been specified at this stage. Open features such as swales, ponds and basins are not desirable due to the risk of falling and the impact on external space for residents and the lack of available space.

The chosen systems provide a water quality and pollution prevention benefit which is required for a drainage system that drains to groundwater. It may be that as a part of the wider landscape and ecology design, by others, rain gardens

and planters which utilise water from rainwater pipes may be considered and these would be quite suitable to use for the site but they will need to be designed appropriately.

WATER QUALITY AND POLLUTION CONTROL

The site has no vehicular areas or areas where pollution could enter the system. The roof is traditional construction using slate or concrete paviors and on the external areas utilise porous pavements.

The site has a very low risk category, and on this basis there is negligible risk from pollution.

AMENITY AND BIODIVERSITY

The site has a landscaping scheme which includes planters and planted beds and these will be for the benefit of residents. Open water is not proposed on the site due to a lack of space and due to the sensitive nature of the residents.

DRAINAGE DESIGN

Using the above information, the drainage design has been developed and is shown on drawings: 24321-DCE-XX-XX-D-C-100 Drainage Strategy.

Hydraulic Modelling is provided in document: 24321-V1.1.

FOUL WATER DRAINAGE STRATEGY

The site will connect to the existing combined sewer on the periphery of the site via a new lateral connection.

TEMPORARY, CONSTRUCTION PHASE AND LAND DRAINAGE STRATEGY

The construction phase plan, developed by the Principal Contractor, will detail temporary management of water on the site. It is expected that water will be intercepted locally on the site, with silt and other runoff filtered and pumped from the site to the surface water sewer. This will be detailed within the Principal Contractor's Construction Phase Plan.

MAINTENANCE OF DRAINAGE SYSTEMS

The private systems will be managed by the landowner and the individual tenants for the site. The system has been designed so that the drainage system is fully accessible and maintainable with flooding easily visible if it occurs. The maintenance schedule for the individual elements of the scheme is as per manufacturer's recommendations and as follows.

Pipe Network	
Operation	**Frequency**
Inspect and identify any areas that are not operating correctly, if required, take remedial actions.	Monthly for 3 months as a part of normal post completion monitoring, then biannually. If flooding is identified, take immediate action.
Debris removal from manholes (where may cause risk performance)	As required, but at least twice a year
Where rainfall into network from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required, but at least twice a year
Remove sediment from pipework by jetting.	Annually or as required
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed	Annually, or as required and after large storms

Attenuation Tank	
Operation	**Frequency**
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	Monthly for 3 months, then six monthly
Debris removal from attenuation tank (where may cause risk performance)	As required, but at least twice a year
Where rainfall into attenuation tank from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required, but at least twice a year
Remove sediment from upstream surface water network by jetting.	Annually or as required

Attenuation Tank	
Operation	**Frequency**
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed.	Annually and after large storms with remedials as required.
Survey inside of tank for sediment build up and remove if necessary.	Every 5 years.

Permeable / Porous Paving	
Operation	**Frequency**
Brushing and Vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturers recommendations.
Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial work to any depressions or cracks in the tarmac / block paviors considered detrimental to the structural performance or a hazard to users and replace lost jointing material.	As required.
Rehabilitation of surface and upper substructure by remedial sweeping	As required
Inspect for evidence of poor operation	Three-monthly, 48 hours after large storms in first six months
Inspect filter media and establish appropriate replacement frequencies	Six monthly or as required by the Manufacturer.
Inspect sediment accumulation rates and establish appropriate removal frequencies.	Monthly for first half year of operation, then every six months, or as required by the Manufacturer.
Note – All Permeable / Porous Paving should be maintained and monitored under a Service Plan which is compatible with the Manufacturer's warranty.	

The maintenance of the drainage network and SuDS features are to be linked with the wider site maintenance.

A log of all maintenance activities is to be kept and made available to the local planning authority (LPA) and / or the Lead Local Flood Authority (LLFA) on request.

DRAINAGE DESIGN PARAMETERS

Drainage Outfalls	**Consultation with LLFA/IDB/EA/Water Co?**	NWL – Yes. In progress. LLFA – Through Planning, no Pre-app..
	Rainwater Reuse	Not viable.
	Soakaway Viable / Rate	Not viable
	Groundwater Level	Not known, but expected to be low.
	Watercourse	Not viable.
	Surface Water Sewer	Viable. Located in Wilton Avenue S
	Foul / Combined Sewer	Viable, but not acceptable to NWL.
	Agreed Discharge Outfall Points	SW: NWL Surface Water FW: NWL Combined Sewer
	Invert Level of Outfalls	SW: 28.335 FW: 27.620
Surface Water Drainage Assessment Constants	**Scenarios to be Tested**	1:2, 1:30 + 40%CC, 1:100 + 45% CC
	Agreed discharge rate	2l/s
	Proposed Impermeable Area	654m^2
	Attenuation Storage Method	Geocellular Crates
	Half Drain Down Time	250 mins
	Proposed Attenuation Volume	25.7m3 @ 95% Voids
Surface Water Hydraulic Modelling Parameters	**Rainfall Model Parameters (FEH/FSR)**	FEH22 Used
	Modelling Parameters assume MADD of 0, Default Time of Entry of 5 Mins and Summer and Winter Coefficients of 1.0. Default Rainfall of 50mm used with 720min drain down.	
Foul Water Drainage	**Assessment Method and Assumptions (DU, F&L4, BR Part H2, SFA)**	SFA – 12 Single Dwellings, 160l/dwelling storage, 1920l 24 Hr Storage
SUDS	**Water Quality – Primary Treatment**	Permeable Pavement
	Water Quality – Secondary Treatment	
	Pollution Control Risk Level	Very Low
	Outfall Risk Level	Low. Surface Water then Combined Sewer
	Vortex Separator Spec	
	Silt Capture Method Spec	Catchpits
	Permeable Pavement Spec	Porous Block Paving. TBC

Information Provided	Drainage Layout Ref: 24321-DCE-XX-XX-D-C-100 Drainage Strategy Topographical Survey Ref: By Developer Hydraulic Modelling Ref: 24321 V1.1 Site Layout Ref: 44/2404/PL_1400 Proposed Landscaping Plan NWL Information and Consultation Response Phase 1 Geotech Excerpts NE LLFA SUDS Checklist Specification Data: • SDS Geolight Geocellular Tank

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

IT IS ASSUMED THAT ALL WORKS WILL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT. IN ADDITION TO THE HAZARDS TYPICALLY ASSOCIATED WITH THE TYPES OF CONSTRUCTION DETAILED ON THIS DRAWING, ANY KNOWN ABNORMAL HAZARDS SPECIFIC TO THIS SCHEME HAVE BEEN IDENTIFIED.

ABNORMAL HAZARD REFERENCE

NOTES

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.
3. IF ANY DISCREPANCIES ARE FOUND IN THIS DRAWING, PLEASE REPORT TO DUDLEYS CONSULTING ENGINEERS.
4. THIS DRAWING HAS BEEN ORIENTATED TO OS BRITISH NATIONAL GRID (EPSG:27700 OSGB36). EXISTING SURVEY STATIONS ARE SHOWN ON THE TOPOGRAPHICAL SURVEY.
5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH RELEVANT ARCHITECTS' AND ENGINEERS' DRAWINGS AND THE FOLLOWING SPECIFICATIONS:
   5.1. ENGSPEC 06 - ROAD, PAVING AND CAR PARKING AREAS
   5.2. ENGSPEC 17 - DRAINAGE WORK
   5.3. ENGSPEC 24 - SPECIFICATION FOR HIGHWAY DRAINAGE
6. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
   6.1. T24673-DR-U-001 - TOPOGRAPHICAL SURVEY
   6.2. PL_1010-Proposed Ground Floor - SITE LAYOUT PLAN BY 31 / 44 ARCHITECTS DATED OCTOBER 2024
7. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT EDITION OF THE BUILDING REGULATIONS, SEWERAGE SECTOR CODES OF PRACTICE, AND THE RELEVANT LOCAL HIGHWAY AUTHORITY STANDARDS.
8. THE SITE IS AN INFILL BROWNFIELD DEVELOPMENT, HOWEVER IT HAS BEEN DERELICT FOR SOME TIME AND ALL EXISTING DRAINAGE CONNECTIONS ARE LIKELY NO LONGER SERVICEABLE. THE SITE HAS THEREFORE BEEN ASSESSED AS A GREENFIELD DEVELOPMENT.
9. THE SITE IS FOUNDED ON BOULDER CLAY AND IT IS EXPECTED THAT INFILTRATION WILL NOT BE SUCCESSFUL. DISCHARGE TO THE NEAREST SURFACE WATER SEWER (WHICH DISCHARGES TO COMBINED SEWER) IS PROPOSED. MINIMUM ACHIEVABLE FLOW RATE OF 2L/S IS PROPOSED TO MANAGE RUNOFF FROM THE SITE AND REDUCE FLOODING POTENTIAL.
10. IT IS EXPECTED THAT THE EXISTING 700m2 RUNOFF FROM THE SITE IS CIRCA 9.8L/S IN THE 1:1 YEAR EVENT AS THE SITE FALLS TOWARDS AN EXISTING GULLY.
11. 25.7m³ ATTENUATION IS PROVIDED WITHIN THE SITE FOR THE 1:30 + 40%CC AND 1:100 + 45%CC EVENTS. THIS IS STORED UNDER THE GARDEN AREA.

NORTH

EXSWMH01
CL: 29.670
IL: 28.335 150Ø
TO BE SURVEYED

S1.05
1.2Ø PPIC C250
CL: 30.000
HYDROBRAKE
1.35m HEAD, 2.0L/S
SHE-0063-2000-1350-2000
IL: 28.664 150Ø
IL: 28.589 225Ø
FCIL: 28.589 150Ø
CPIL: 28.000

POROUS BLOCK PAVING
DIRECT INFILTRATION INTO
ATTENUATION TANK

GEOCELLULAR STORAGE
SDS GEOLIGHT 400
3m X 12m X 0.75m 95% VOIDS
25.7m³ NET VOLUME
IL: 28.600
SL: 29.350
MINIMUM COVER = 600mm

ABOVE GROUND TREE PITS

150 / 225 JUNCTION IL:
27.620 225Ø

EXNWL CS 3301
CL: 29.80
IL: 27.740 150Ø
IL: 27.665 225Ø

S2.01
RODDING EYE
CL: 29.950
IL: 29.200 150Ø

F1.01
SEALED RECESSED MH
CL: 30.100
IL: 29.500 100Ø
IL: 29.450 150Ø

S1.04
0.6Ø PPIC C250
CL: 30.025
IL: 28.664 150Ø
IL: 28.589 225Ø

F1.02
SEALED RECESSED MH
CL: 30.100
IL: 29.400 100Ø
IL: 29.350 150Ø

S3.01
0.6Ø PPIC C250
CL: 30.025
IL: 29.275 150Ø

F1.03
SEALED RECESSED MH
CL: 30.100
IL: 29.310 100Ø
IL: 29.260 150Ø

F1.04
SEALED RECESSED MH
CL: 30.100
IL: 29.235 100Ø
IL: 29.185 150Ø

S1.03
0.6Ø PPIC C250
CL: 29.950
IL: 28.788 150Ø
IL: 28.713 225Ø

F1.05
SEALED RECESSED MH
CL: 30.100
IL: 29.175 100Ø
IL: 29.125 150Ø

S1.02
0.6Ø PPIC C250
CL: 29.950
IL: 29.035 150Ø

F1.06
0.9Ø PCC C250
CL: 29.850
IL: 29.100 100Ø
BDIL: 29.050 150Ø
IL: 27.920 150Ø

EXNWL CS 3307
CL: 30.03
IL: 23.550 525Ø

S1.01
RODDING EYE
CL: 30.000
IL: 29.250 150Ø

POROUS BLOCK PAVING
100mm PERFORATED PIPE
INTO RAINWATER OUTLET

FFL
30.025

FFL
30.100

KEY - PROPOSED PRIVATE DRAINAGE

- PROPOSED PRIVATE SURFACE WATER DRAIN
- PROPOSED PRIVATE FOUL WATER DRAIN
- PROPOSED PRIVATE SURFACE WATER MANHOLE
- PROPOSED PRIVATE SURFACE WATER PPIC
- PROPOSED PRIVATE FOUL WATER MANHOLE
- PROPOSED PRIVATE FOUL WATER PPIC
- PROPOSED PRIVATE SURFACE WATER RODDING EYE
- PROPOSED PRIVATE SURFACE WATER YARD GULLY
- PROPOSED PRIVATE SURFACE WATER ATTENUATION TANK
- PROPOSED POROUS SURFACING

KEY - EXISTING ADOPTED DRAINAGE

- EXISTING ADOPTED COMBINED WATER SEWER
- EXISTING ADOPTED SURFACE WATER SEWER
- EXISTING ADOPTED COMBINED WATER MANHOLE
- EXISTING ADOPTED SURFACE WATER MANHOLE

DRAINAGE LAYOUT
SCALE: 1:100



PROPOSED IMPERMEABLE AREAS
SCALE: 1:200

00.00.00	REVISION DESCRIPTION	XXX	XXX	XXX
DATE	REVISION DESCRIPTION	BY	CHK.	REV.

DUDLEYS CONSULTING ENGINEERS
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PROJECT
VOYAGE BOLDON COLLIERY
WILTON GARDENS SOUTH
BOLDON COLLIERY, NE35 9HS

TITLE
DRAINAGE STRATEGY

SCALE	PAPER	STAGE	STATUS
1:100	A1	PRELIMINARY	

DRAWING NO.	REV.
24321-DCE-XX-XX-D-C-100	P01



Planting

P01. Mixed native scrub (hawthorn, hazel, crab apple, field maple, dogwood)

P02. Low-level flower bed

P03. Green wall with native species

T01. Silver birch (Betula pendula)

T02. Rowan (Sorbus aucuparia)

S01. Shallow rooting hedgerows

Hard landscaping

H01. Paving

H02. Permeable brick pavers

H04. Bat box, placed high up close to the parapet/eaves

H05. Bird box, placed high up close to the parapet/eaves

H06. Raised planter for residents to grow fruit and vegetables

H07. Benches

H08. Seated group activities area

H09. Proposed birth bath feature

H10. Potting shed

N

0 2 5 10m

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Client
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Project
Boldon Colliery

Status
Planning

Date
22/10/2024

Drawn BH
Checked SD

Drawing name
Proposed Landscaping Plan

Scale / Format
1:200 / A3

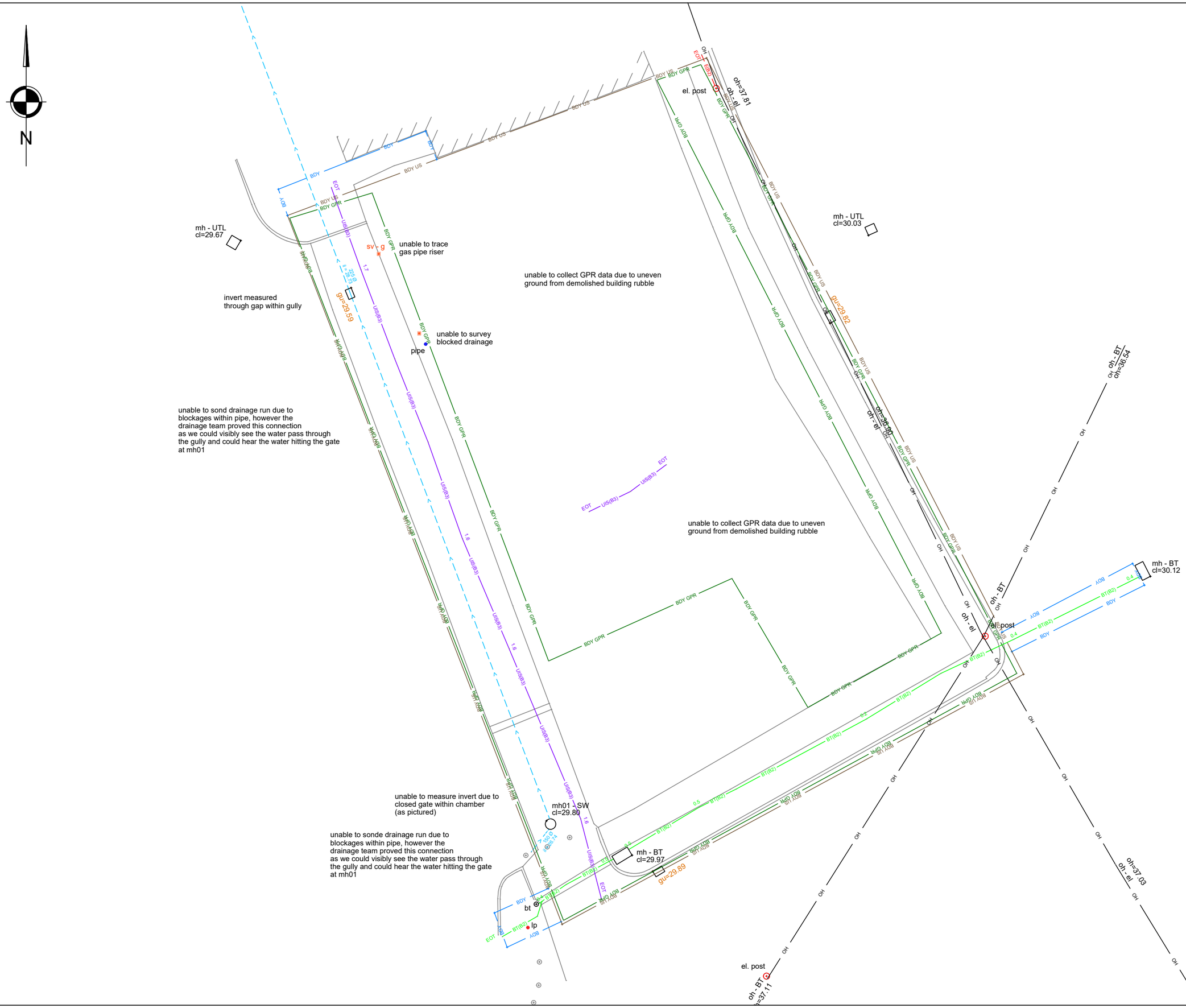
Drawing number
44/2404/PL_1400

Rev.	Date	Description	Drawn / Checked

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Do not scale from this drawing.
All dimensions to be verified on site.
This drawing is to be read in conjunction with allconsultants information.
Any discrepancies to be reported immediately to theArchitect.

Drawing may be scaled for planning purposes.



Disclaimer

Electromagnetic and/or Ground Penetrating Radar techniques have been used to locate/map underground utilities and features on this drawing. Variations in ground condition, depth and density of services, as well as signal interference can affect accuracy. Results from these types of surveys are not infallible and should the location or depth of services/features be of importance to your project, then it is strongly advised that trial excavations should be undertaken to confirm survey results.
Depths given are to the center of all services other than drainage where invert levels or crowns are displayed.
Depths and diameters of utilities measured at manholes and inspection chambers where access is prevented, are by tape from ground level. These are indicative only and may not always be accurate.
Drainage type i.e. surface / foul / combined may not always be clear and are therefore something assumed. Client to verify.
Gully outlet pipes will not be surveyed as standard and what is shown on the drawing is often the assumed route.
A service line may represent multiple cables and/or ducts.
GPR anomalies are undefined features and may represent services or utilities, voids, saturated ground, or buried concrete/foundations.
No liability will be accepted for inaccuracy of any surveys provided by to us by the client that have been overlaid or used within the deliverables. The same applies to the statutory information provided as part of any desktop study given to us.
We use skilled staff and modern calibrated equipment to perform our surveys. However, the completeness of any underground survey cannot be 100% guaranteed and we cannot be held responsible for any inaccuracies beyond those that could be reasonably expected by a competent surveyor.
Contractors utilising our drawings for intrusive work should take all reasonable measures to work safely in accordance with hsg47 guidelines "avoiding danger from underground services".

PAS128 Quality Level labeling of utility information by a classification code allows the user of this information to understand clearly how the information was collected and then place an appropriate amount of reliance on it, project risks related to underground utilities can then be properly managed.
QL A Information is obtained by exposing the underground utility using a non destructive excavation technique. the vertical information for this locating method is to the top of the shallowest part of the located service.the 3d location is recorded as an x,y,z coordinate. Tolerances for ql- a classification are +/- 50mm horizontally and +/- 25mm vertically.
QL B1 Information is collected by designating the horizontal and vertical location of underground utilities by using electromagnetic pipe and cable locators, sondes or flexi trace, ground penetrating radar and acoustic pulse equipment. to obtain a b1 quality level multiple techniques must agree on the geophysical position.
Tolerances for b1 classifications are +/- 150mm horizontally and +/- 15% of the detected depth vertically.
QL B2 Information is collected by designating the horizontal and vertical location of underground utilities by using electromagnetic pipe and cable locators, sondes or flexi trace, ground penetrating radar and acoustic pulse equipment. tolerances for b2 classifications are +/- 200mm horizontally and +/- 40% of the detected depth vertically.
QL B3 Information is collected by designating the horizontal location only of underground utilities by using electromagnetic pipe and cable locators, sondes or flexi trace, ground penetrating radar and acoustic pulse equipment. tolerances for b3 classifications are +/- 500mm horizontally with no depth given.
QL B4 Information is added as an assumed route, the underground utilities have been unable to be detected using electromagnetic pipe and cable locators, ground penetrating radar and acoustic pulse equipment however are suspected to exist, this data should be treated with caution.
QL C Information is collected by correlating the survey of visible utility surface features such as marker plates or manholes with existing drawing and record information to draw a string which shows the approximate position of services. this method does not usually show multiple banks of cables and does not always show three dimensional information.
QL D Information is the most basic level of utility locations using only information based on existing utility drawings and by measuring boundary offsets etc. this method of utility location should always be treated as an indication of the presence of a service only and should not be used for design.

Key and Linestyles

Quality Level (QL) is noted within the line type.
Quality Level B4 and lower is indicated with a dashed line.
Depths are indicated beside the surveyed points.

BT	BT
CATV	CATV QL-B2
CCTV	CCTV QL-B2
COMMS	Comms QL-B2
DCW	Drainage Combined Water
DFW	Drainage Foul Water
DSW	Drainage Surface Water
ECBLE	Earth Cable QL-B2
ELEC	Electric QL-B2
EDUCT	Empty Duct QL-B2
FOBO	Fiber Optic QL-B2
GAS	Gas QL-B2
PAGE	Pipe Above Ground QL-A
PBGB	Pipe Below Ground QL-B2
UNSER	Unidentified Service QL-B2
VF	Vodafone QL-B2
VIRGIN	Virgin Media QL-B2
WATER	Water QL-B2
DESKTOP	Desktop Study Boundary
BDY	EML Boundary
GPR	GPR Boundary
	Service Band

Symbol colour and abbreviation indicate service type.

Chamber / Manhole
Chamber / Manhole
Kiosk

Abbreviations

AR	ASSUMED ROUTE	NTA	NO TRANSMITTER ACCESS
BD	BACKDROP	OH	OVERHEAD
BTC	BRITISH TELECOM CHAMBER	OSA	OUTSIDE SURVEY AREA
C	CENTRE LINE	P	PIPE LINE
CL	COVER LEVEL	PR	PIPE RISER
CO	CONCRETE	PVC	POLYVINYL CHLORIDE
CP	CABLE PIT	RE	RODDING EYE
CR	CABLE RISER	RWP	RAINWATER PIPE
EM	EARTH MAT	SV	STOP VALVE
EP	ELECTRICITY POLE	SVP	SOIL VENT PIPE
EOT	END OF TRACE	TFR	TAKEN FROM RECORDS
FE	FENCE EARTH POINT	TP	TELEGRAPH POLE
FH	FIRE HYDRANT	TPI	TELEPHONE MARKER INFO?
G	GULLY	UTL	UNABLE TO LOCATE
GPR	PLACED BY G.P.R.	UTR	UNABLE TO RAISE
GV	GAS VALVE	UTS	UNABLE TO SONDE
GR	GAS RISER	UTT	UNABLE TO TRACE
IC	INSPECTION CHAMBER	WL	WATER LEVEL
IL	INVERT LEVEL	WR	WATER RISER
LP	LAMP POST	VP	VENT PIPE
MH	MANHOLE	VR	VAPOUR RECOVERY
MCW	MAINS COLD WATER	WM	WATER METER
ND	NO DEPTH (Unable to get depth)	WO	WASH OUT VALVE
NFI	NO FURTHER INFORMATION	WWP	WASTE WATER PIPE

Availability of Statutory Records		
Utility Type	Record Provided	Record Owner
BT	N	Openreach
Electric	N	UKPN
Gas	N	Cadent
Sewer	N	United Utilities
Telecom	N	Virgin Media
Telecom	N	Vodaphone
Telecom	N	SSE
Water	N	United Utilities
Other		

Sheet Layout

1. The survey has been accurately positioned on the Ordnance Survey National Grid system using GPS observations to the OS Active Network and the latest Ordnance Survey transformation (OSTN15/OSGM15)

2. All levels relate to Ordnance Survey Datum (Newlyn). Vertical control has been established using GPS observations to the OS Active Network and the latest Ordnance Survey transformation (OSTN15/OSGM15).

3. Local Scale Factor has been removed to transform the survey to a flat earth grid (scale factor 1.00000)
Local Grid Origin is Control Station TRI01
This is the only point where OS Grid coordinates are true.

Surveyed by	Initials - JS, JB			
D				
C				
B				
A	16/09/24	Original Issue	JB	TH
Rev	Rev. Date	Purpose of revision	Drawn	Checked

TRI-TECH engineering - surveying - mapping
Tri-Tech Ltd, Unit 20, Sycamore Business Park, Copt Hewick, Ripon, HG4 5DF
T: 01347 833261 W: www.tritechsurveys.com

Client: Blue Kite Projects

Project: Boldon Colliery

Drawing title: Utility Survey

Scale	1:200 @ A3	DO NOT SCALE
Tri-Tech Job No.	T24673	
Client Job No.		
Drawing number	T24673-DR-U-001	Rev A

This drawing is not to be used in whole or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	0.600
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	✓
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1.01	0.011	5.00	30.000	320	434352.981	562306.011	0.750
S1.02	0.018	5.00	29.950	600	434371.584	562317.006	0.915
S2.01	0.012	5.00	29.950	320	434356.976	562347.944	0.750
S1.03			29.950	600	434360.392	562339.204	1.237
S3.01	0.011	5.00	30.025	320	434352.848	562326.656	0.750
S1.04	0.014	5.00	30.025	600	434348.884	562334.706	1.436
S1.05			30.000	1200	434343.844	562332.795	1.465
EXSWMH			29.670	900	434332.149	562338.931	1.300

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1.01	S1.02	21.609	0.600	29.250	29.035	0.215	100.5	150	5.36	44.4
1.001	S1.02	S1.03	24.860	0.600	29.035	28.788	0.247	100.6	150	5.77	43.0
2.000	S2.01	S1.03	9.384	0.600	29.200	28.788	0.412	22.8	150	5.07	45.4
1.002	S1.03	S1.04	12.356	0.600	28.713	28.589	0.124	100.0	225	5.93	42.5
3.000	S3.01	S1.04	8.973	0.600	29.275	28.664	0.611	14.7	150	5.06	45.4
1.003	S1.04	S1.05	5.390	0.600	28.589	28.535	0.054	99.8	225	6.00	42.3
1.004	S1.05	EXSWMH	13.207	0.600	28.535	28.370	0.165	80.0	150	6.20	41.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.002	17.7	1.8	0.600	0.765	0.011	0.0	32	0.641
1.001	1.001	17.7	4.5	0.765	1.012	0.029	0.0	52	0.841
2.000	2.119	37.4	2.0	0.600	1.012	0.012	0.0	23	1.118
1.002	1.307	52.0	6.3	1.012	1.211	0.041	0.0	52	0.886
3.000	2.642	46.7	1.8	0.600	1.211	0.011	0.0	20	1.281
1.003	1.308	52.0	10.1	1.211	1.240	0.066	0.0	67	1.020
1.004	1.125	19.9	9.9	1.315	1.150	0.066	0.0	75	1.126

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	21.609	100.5	150	Circular	30.000	29.250	0.600	29.950	29.035	0.765
1.001	24.860	100.6	150	Circular	29.950	29.035	0.765	29.950	28.788	1.012
2.000	9.384	22.8	150	Circular	29.950	29.200	0.600	29.950	28.788	1.012
1.002	12.356	100.0	225	Circular	29.950	28.713	1.012	30.025	28.589	1.211
3.000	8.973	14.7	150	Circular	30.025	29.275	0.600	30.025	28.664	1.211
1.003	5.390	99.8	225	Circular	30.025	28.589	1.211	30.000	28.535	1.240
1.004	13.207	80.0	150	Circular	30.000	28.535	1.315	29.670	28.370	1.150

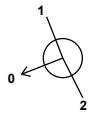
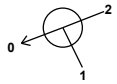
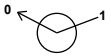
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	S1.01	320	Manhole	Adoptable	S1.02	600	Manhole	Adoptable
1.001	S1.02	600	Manhole	Adoptable	S1.03	600	Manhole	Adoptable
2.000	S2.01	320	Manhole	Adoptable	S1.03	600	Manhole	Adoptable
1.002	S1.03	600	Manhole	Adoptable	S1.04	600	Manhole	Adoptable
3.000	S3.01	320	Manhole	Adoptable	S1.04	600	Manhole	Adoptable
1.003	S1.04	600	Manhole	Adoptable	S1.05	1200	Manhole	Adoptable
1.004	S1.05	1200	Manhole	Adoptable	EXSWMH	900	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1.01	434352.981	562306.011	30.000	0.750	320	 0	1.000	29.250	150
S1.02	434371.584	562317.006	29.950	0.915	600	 1	1.000	29.035	150
						0	1.001	29.035	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S2.01	434356.976	562347.944	29.950	0.750	320				
						0	2.000	29.200	150
S1.03	434360.392	562339.204	29.950	1.237	600				
						1	2.000	28.788	150
						2	1.001	28.788	150
						0	1.002	28.713	225
S3.01	434352.848	562326.656	30.025	0.750	320				
						0	3.000	29.275	150
S1.04	434348.884	562334.706	30.025	1.436	600				
						1	3.000	28.664	150
						2	1.002	28.589	225
						0	1.003	28.589	225
S1.05	434343.844	562332.795	30.000	1.465	1200				
						1	1.003	28.535	225
						0	1.004	28.535	150
EXSWMH	434332.149	562338.931	29.670	1.300	900				
						1	1.004	28.370	150

Simulation Settings

Rainfall Methodology	FEH-22	Winter CV	1.000	Drain Down Time (mins)	960	Check Discharge Rate(s)	x
Rainfall Events	Singular	Analysis Speed	Normal	Additional Storage (m³/ha)	0.0	Check Discharge Volume	x
Summer CV	1.000	Skip Steady State	x	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	100	45	0	0
30	40	0	0				

Node S1.05 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	28.535	Product Number	CTL-SHE-0063-2000-1350-2000
Design Depth (m)	1.350	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node S1.05 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	28.535
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	250

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	36.0	0.0	0.750	36.0	0.0	0.751	0.0	0.0

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1.01	10	29.281	0.031	1.7	0.0025	0.0000	OK
15 minute summer	S1.02	11	29.086	0.051	4.4	0.0145	0.0000	OK
15 minute summer	S2.01	10	29.223	0.023	1.8	0.0018	0.0000	OK
15 minute summer	S1.03	11	28.765	0.052	6.0	0.0149	0.0000	OK
15 minute summer	S3.01	10	29.295	0.020	1.7	0.0016	0.0000	OK
240 minute summer	S1.04	144	28.685	0.096	3.6	0.0270	0.0000	OK
180 minute summer	S1.05	116	28.682	0.147	4.0	5.1963	0.0000	OK
15 minute summer	EXSWMH	1	28.370	0.000	1.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.01	1.000	S1.02	1.7	0.431	0.094	0.0851	
15 minute summer	S1.02	1.001	S1.03	4.3	0.819	0.241	0.1297	
15 minute summer	S2.01	2.000	S1.03	1.8	1.074	0.048	0.0155	
15 minute summer	S1.03	1.002	S1.04	6.0	0.679	0.116	0.1100	
15 minute summer	S3.01	3.000	S1.04	1.7	1.234	0.036	0.0122	
240 minute summer	S1.04	1.003	S1.05	3.3	0.676	0.063	0.1146	
180 minute summer	S1.05	Hydro-Brake®	EXSWMH	1.5				12.3

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Results for 30 year +40% CC Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1.01	10	29.311	0.061	6.3	0.0049	0.0000	OK
120 minute winter	S1.02	118	29.160	0.125	5.1	0.0354	0.0000	OK
15 minute summer	S2.01	10	29.246	0.046	6.9	0.0037	0.0000	OK
120 minute winter	S1.03	118	29.160	0.447	7.3	0.1265	0.0000	SURCHARGED
15 minute summer	S3.01	10	29.312	0.037	6.3	0.0030	0.0000	OK
120 minute winter	S1.04	118	29.160	0.571	10.8	0.1616	0.0000	SURCHARGED
120 minute winter	S1.05	118	29.160	0.625	10.4	22.0816	0.0000	SURCHARGED
15 minute summer	EXSWMH	1	28.370	0.000	1.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1.01	1.000	S1.02	6.2	0.581	0.352	0.2330	
120 minute winter	S1.02	1.001	S1.03	5.2	0.850	0.292	0.4139	
15 minute summer	S2.01	2.000	S1.03	6.9	1.564	0.183	0.0770	
120 minute winter	S1.03	1.002	S1.04	6.4	0.584	0.124	0.4914	
15 minute summer	S3.01	3.000	S1.04	6.3	1.429	0.134	0.0918	
120 minute winter	S1.04	1.003	S1.05	10.4	0.920	0.201	0.2144	
120 minute winter	S1.05	Hydro-Brake®	EXSWMH	1.7				33.5

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.36%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	S1.01	118	29.772	0.522	2.5	0.0417	0.0000	FLOOD RISK
120 minute winter	S1.02	118	29.772	0.737	6.6	0.2085	0.0000	FLOOD RISK
120 minute winter	S2.01	118	29.771	0.571	2.8	0.0457	0.0000	FLOOD RISK
120 minute winter	S1.03	118	29.771	1.058	9.4	0.2995	0.0000	FLOOD RISK
120 minute winter	S3.01	118	29.771	0.496	2.5	0.0397	0.0000	FLOOD RISK
120 minute winter	S1.04	118	29.770	1.181	14.4	0.3343	0.0000	FLOOD RISK
120 minute winter	S1.05	118	29.771	1.236	13.9	27.0656	0.0000	FLOOD RISK
15 minute summer	EXSWMH	1	28.370	0.000	1.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute winter	S1.01	1.000	S1.02	2.5	0.481	0.141	0.3804	
120 minute winter	S1.02	1.001	S1.03	6.6	0.868	0.373	0.4377	
120 minute winter	S2.01	2.000	S1.03	2.8	1.123	0.075	0.1652	
120 minute winter	S1.03	1.002	S1.04	8.7	0.579	0.167	0.4914	
120 minute winter	S3.01	3.000	S1.04	2.5	1.085	0.054	0.1580	
120 minute winter	S1.04	1.003	S1.05	13.9	0.994	0.267	0.2144	
120 minute winter	S1.05	Hydro-Brake®	EXSWMH	1.9				43.8

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Northumbrian Water
Developer Services
Leat House
Pattinson Road
Washington
NE38 8LB

Direct Line: 07596315994
Email: developmentenquiries@nwl.co.uk
Our Ref: 325308

Monday, 21 October 2024

Dudley's Consulting Engineers Ltd
Tithe House
Leeds
West Yorkshire
LS18 5LJ

Dear Sebastian,

Re: Pre-Planning Enquiry – East of Wilton Gardens South

Further to the Point of Connection Application for the above site, received September 30th 2024, we are now able to provide the following response.

We have based our response on the information in your application and accompanying correspondence. Therefore, should any of the information now be different, then you must ensure that you inform us of any changes as further Network Modelling may be required and our response may also change, leading to this response being invalid.

Northumbrian Water assesses the impact of the proposed development on our assets and assesses the capacity within our networks to accommodate and treat the anticipated flows arising from the development. We do not therefore offer comment on aspects of planning applications that are outside of our area of control.

Enclosed in this response is a scaled plan showing the **approximate** position of the water and sewerage networks within the vicinity of this site.

We have changed the way contractors and developers can access our assets.

Historically only our own staff and framework contractors could access our sewerage network. As of 1st January 2018, we are allowing third party contractors to access our sewer network on a site by site basis, subject to certain conditions.

Further information (including how to apply) is available from our web site - https://www.nwl.co.uk/services/developers/developer-sewerage-services/

Also enclosed is our extract showing locations within the approximate vicinity of this site that have, from our records, experienced flooding. This has been provided to demonstrate the known flood risks within the vicinity which have been considered as part of our assessment on this enquiry.

We have also carried out a review of your application and can confirm the following:

Sewerage and Sewage Treatment

Northumbrian Water would ask that you please separate the foul and surface water flows in accordance with Part H of the Building Regulations prior to the final connection to the public sewer.

All new connections to the public sewerage system must first be approved through the Section 106 of the Water Industry Act 1991 process prior to construction.

Should you decide to proceed with this development, a fully completed Sewer Connection application form will be required. These are available to download from the following link:

https://www.nwl.co.uk/services/developers/developer-sewerage-services/new-sewer-connections-s106/

- Foul Water Discharge

The foul flows can discharge without restriction into the **225mm** diameter **combined** public sewer to the south west of the site via manhole **3301.**

- Surface Water Discharge

No surface water flow from the proposed development will be allowed to connect into the existing public sewerage system unless it is proven that the alternative options which are listed within Part H of the Building Regulations 2003 are not available:

Rainwater from a system provided pursuant to sub-paragraphs (1) or (2) shall discharge to one of the following, listed in order of priority –

(a) an adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,

(b) a watercourse; or, where that is not reasonably practicable,

(c) a sewer.

If the more sustainable options prove to be unfeasible, a restricted surface water flow of **2 l/sec** would be permitted to discharge into the **225mm** diameter **surface water** sewer to the south east of the site via manhole **3211**. Any excess in flows must be attenuated on site.

- For Information

The Lead Local Flood Authority may require surface water flows to discharge at a different rate to that which has been agreed by Northumbrian Water. As the statutory consultee on flood risk and drainage matters, they have the authority to do so therefore, we suggest that you contact them to discuss this in further detail.

Written approval for all individual connections (direct or indirect) to the public sewerage system should be obtained through the Section 106 process, following completion of the detailed drainage design and before the commencement of any drainage works on site.

- Storm Overflows

We have identified that there are **3** storm overflows downstream of your proposed development.

Attached is a copy of the Drainage and Waste Water Management Plan (DWMP) for the drainage area your proposed development sits within. This plan shows the location of the storm overflows within the catchment and their current investment status as part of our storm overflow discharge reduction plan.

If you require further information regarding any potential impact your proposed development may have on spill frequencies, please contact us to discuss how this could be provided.

- Sewage Treatment Capacity

The Sewage Treatment Works to which this development finally discharges to is **Howdon** and these works are able to accept the additional flows.

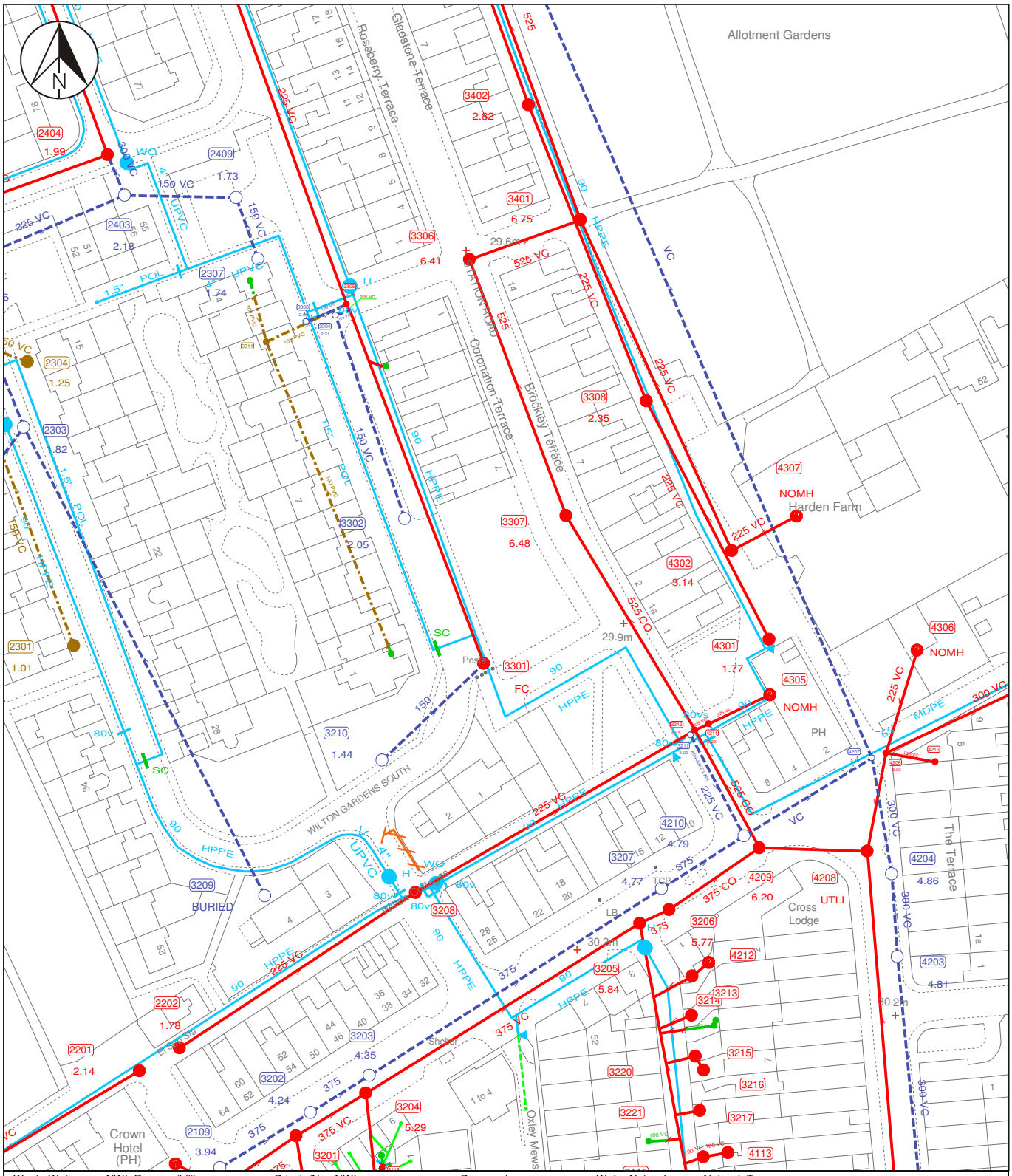
Please note that this response is valid for 1 year only and you should resubmit your proposals should this period lapse prior to your development beginning.

Should you require any further assistance or information, then please do not hesitate to contact me at developmentenquiries@nwl.co.uk or alternatively on 07596315994, please quote our reference number above in any future correspondence.

Yours sincerely,

L Roberts

Laura Roberts
Technical Support Advisor
Developer Services



Waste Water - NWL Responsibility	Private/Non NWL	Proposed	Water Network - Network Types	
Combined	Combined	Combined	Distribution	AB Asbestos
Foul	Foul	Foul	Treated	Abandoned
Surface	Surface	Surface	Raw	Out of Comm
Treated Eff	Treated Eff		Fire	Proposed
Untreated Eff	Trade Eff		Supply	
Overflow	Watercourse		Private	

NORTHUMBRIAN WATER *living water*

User : DAWSJ1

Date : 02/10/2024 14:13:27

Title :

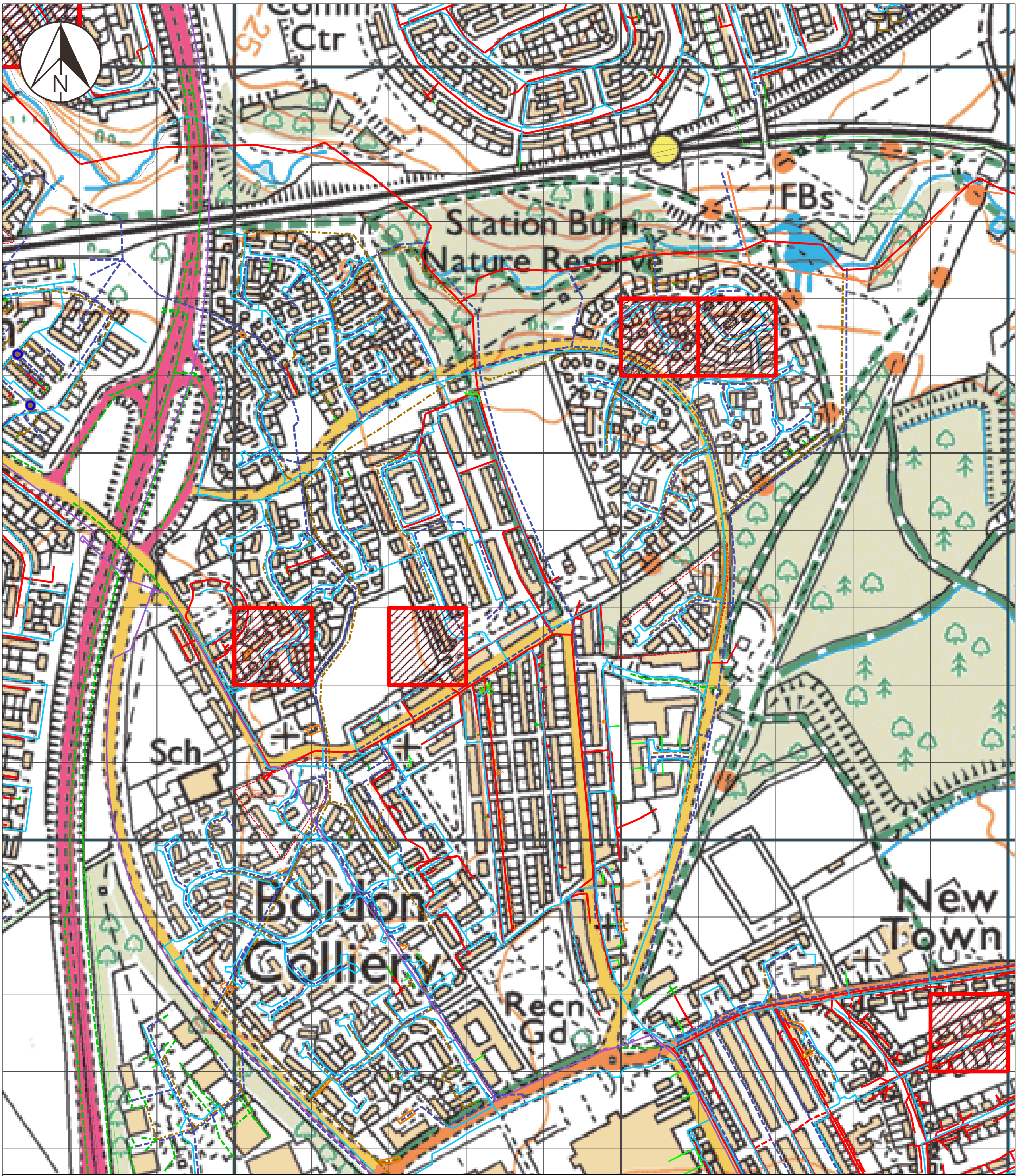
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Centre Point : 434355,562324

Paper / Scale : A4@1:1250

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10 m



Waste Water - NWL Responsibility

Combined	
Foul	
Surface	
Treated Eff	
Untreated Eff	
Overflow	

Private/Non NWL

Combined	
Foul	
Surface	
Treated Eff	
Trade Eff	
Watercourse	

Proposed

Combined	
Foul	
Surface	

Water Network - Network Types

Distribution	
Treated	
Raw	
Fire	
Supply	
Private	

AB Asbestos	
Abandoned	
Out of Comm	
Proposed	

NORTHUMBRIAN WATER living water

User : BOWMS

Title :

Centre Point : 434355,562324

Date : 03/10/2024 09:35:38

Map Sheet : NZ3462

Paper / Scale : A3@1:5015

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Emergency Telephone Number: 0345 717 1100

50 m

Jarrow,Hedworth (05-D53)

Drainage Area Options and Opportunities Overview Plan

Drainage and Wastewater Management Plan (DWMP)

November 2023

Legend

- Drainage Area Boundary
- NIDP Opportunity Area
- Stakeholder Opportunities
- WwTW (and septic tank) Locations
- WINEP Locations

Storm Overflow Assignment

- Storm Overflow Improvement (2025-2030)
- Storm Overflow Improvement (2030-2035)
- Storm Overflow Improvement (2035-2050)
- Storm Overflow does not require Improvement

Storm Overflow Discharge Reduction Plan Options

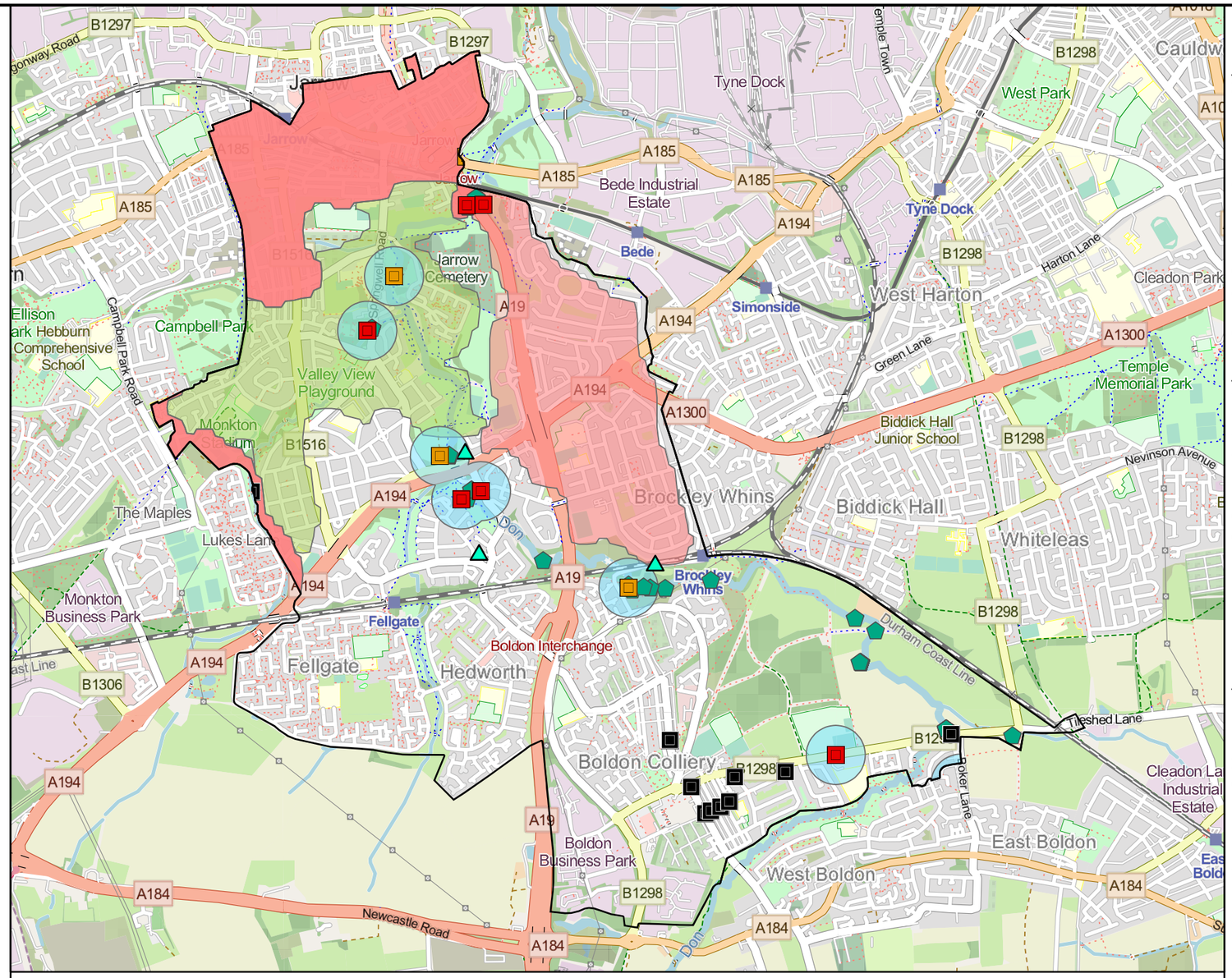
- Green Infrastructure
- Below Ground Storage only
- Green Infrastructure and Below Ground Storage
- Smart Networks and Storage
- Surface Water Management and Storage
- Surface Water Management and Smart Networks

Water Industry National Environment Programme (WINEP)

The Water Industry National Environment Programme (WINEP) is the programme of actions all water companies need to take to meet statutory and non-statutory environmental obligations or delivery against statutory functions. The Environment Agency and Natural England translate legislation and UK government priorities into WINEP Drivers.

For Jarrow,Hedworth, 51 WINEP schemes have been identified for delivery between 2025 and 2030.

Please refer to the Level 2 Report for further information regarding the WINEP scheme(s) in this area.



Jarrow,Hedworth has been identified as requiring interventions to achieve the performance targets outlined in the Storm Overflow Discharge Reduction Plan.

The Wastewater Treatment Works serving Jarrow,Hedworth does require an intervention to ensure that the dry weather flow and/or discharge effluent quality permit criteria are not exceeded within the planning period.

Drainage Area Overview

Jarrow,Hedworth is located within the Tyneside Strategic Planning Area.

The Storm Overflow Discharge Reduction Plan states that:

Water companies will only be permitted to discharge from a storm overflow where they can demonstrate there is no local adverse ecological impact. This target must be achieved for at least 75% of storm overflows discharging in or close to high priority sites by 2035; for all remaining storm overflows discharging in or close to high priority sites by 2045; and for all remaining storm overflows sites by 2050.

Jarrow,Hedworth includes:
- 20 High Priority Storm Overflows
- No Bathing Water Storm Overflows
- No Low Priority Storm Overflows
- No Coastal Storm Overflows

Northumbrian Water Group (NWG) have a duty to ensure that Wastewater Treatment Works (WwTW) operate in compliance within their dry weather flow and treated effluent discharge quality permits.

The WwTW serving this area is Howdon WwTW.

Stakeholder Opportunities

Jarrow,Hedworth in Tyneside is included in the Northumbria Integrated Drainage Partnership (NIDP) programme.

Stakeholder consultation has identified opportunities for collaborative working in the Drainage Area.

The following number of opportunities have been identified:
2 environmental related opportunities.
1 flooding opportunities.

Further detail on the opportunities can be found in the Tyneside Strategic Planning Area Technical Report.

NWG will continue to engage and work with stakeholders to identify opportunities for collaborative working in the delivery of options included within the DWMP.

Planning Objective Risk Scores

Planning Objective	2020		2025		2030		2045		2060	
Internal Flood Risk	0	0	0	0	0	0	0	0	0	0
External Flood Risk	0	0	0	0	0	0	0	0	1	1
50 Year Population at Risk	1	1	1	1	1	1	1	1	1	1
Bathing Water Storm Overflows	0	0	0	0	0	0	0	0	0	0
Inland Storm Overflows	2	2	2	2	2	2	2	0	2	0
Pollution Risk	1	1	1	1	1	1	1	1	1	1

0: Low level of risk, 1: Medium level of risk, 2: Higher level of risk

The left-hand risk score is for the Do Nothing scenario. The right-hand risk score is with the DWMP options delivered.

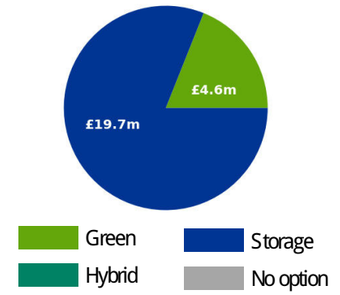
Storm Overflow Discharge Reduction Plan Option Identification

For Jarrow,Hedworth, a mix of Best Value options and Marginal Green options have been chosen. Marginal Green options provided significant reduction in below-ground storage without significantly increasing costs from the Best Value option.

The options for storm overflow spill frequency reduction for Jarrow,Hedworth includes:
- 1 area of Green Infrastructure interventions
- No Hybrid Green/below-ground storage interventions
- 5 areas of below-ground storage

The 30-year whole-life total cost expenditure on storm overflows between 2025 and 2050 for Jarrow,Hedworth is estimated to be ì 24.34m

Option Type Cost Split



Wastewater Treatment Works Options

Howdon WwTW is being investigated/upgraded currently for dry weather flow compliance.

Long-Term Delivery Strategy - Flooding

NWG's Long-Term Delivery Strategy sets out to reduce sewer flooding by 60% over the next 25 years. This drainage area may be targeted for surface water runoff management to contribute to that target.

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Seb Reid
Site name:	Voyage Boldon Colliery
Site location:	Boldon Colliery

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	54.95427° N
Longitude:	1.46505° W
Reference:	3077495880
Date:	Sep 24 2024 14:37

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 0.1

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	635	635
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 30 years:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	0.43	0.43
1 in 1 year (l/s):	0.37	0.37
1 in 30 years (l/s):	0.75	0.75
1 in 100 year (l/s):	0.9	0.9
1 in 200 years (l/s):	1.02	1.02

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

3.0 Environmental Setting (Cont'd)

3.1 Site Geology (Cont'd): -

- BGS NZ36SW, Solid and Drift, 1:10,560 scale map, 1973
- Coal Authority Online Interactive Map Viewer
- Coal Authority Consultants Coal Mining Report: 51003447927001
- Archive BGS Trial Pit and Boreholes (NZ36SW14476_TP2, 1075)
- Landmark Envirocheck Report (Ref. 357209385_1_1)

3.1.1 Made Ground: -

According to published BGS data, the site is not recorded to be underlain by significant thicknesses of made ground. Historic maps record a residential property and the former club on site resulting in made ground being present with potential deeper made ground associated with a potential cellar (if present).

3.1.2 Superficial Deposits: -

Published geological maps produced by BGS indicated that the underlying superficial deposits are comprised of the Pelaw Clay Member which comprise reddish-brown to dark brown silty clay containing well dispersed pebbles and cobbles. Which overlies Glacial Till which are likely to comprise firm and stiff sandy, gravelly clay deposits often containing cobbles and boulders, and lenses of sand.

According to the BGS 1:10,560 scale map (NZ36SW) and BGS historic borehole records surrounding the site, the thickness of the drift ranges between c.5m to c.30m surrounding the site comprising firm becoming stiff with depth brown sandy gravelly clay.

3.1.3 Solid Geology: -

According to BGS the underlying solid geology is shown to comprise the Middle Coal Measures which comprise interbedded grey mudstone, siltstone, pale grey sandstone, and productive coal seams.

3.2 Coal Mining Risk Assessment: -

The BGS 1:10,560 scale map Ref. NZ36SW records a fault in the Maudlin Coal Seam at depth below the site traversing from east to west down throwing 60m – 70m to the southeast.

Based on stratigraphic location, i.e., just below the Down Hill Marine Band, the shallowest seam of significance is calculated as the Bottom Hebburn Fell at c.130m below the site. The Bottom Hebburn Fell is anticipated to be present at depth below the site area of at least c.130m, with a maximum thickness of c.1.62m. Therefore at this stage it is felt that the mechanisms for future ground subsidence and crown hole failures occurring in the future as a direct result of shallow mining activities below the site is deemed to be negligible.

According to the Coal Authority (CA) Online Interactive Map Viewer, records the site lying within a Coal Mining Reporting Area. However, the site does not lie within a defined 'Development High Risk Area' (DHRA), or an 'Area of Past / Probable Shallow Coal Mine Workings'.

To assist with this risk assessment, a Coal Authority Consultants Coal Mining Report (Ref. 51003447927001) was obtained for this site, a copy of which is attached in Appendix II.

The shallowest recorded coal mine workings beneath the site are within the Mauldin Coal Seam at c.398m below the site with an extraction thickness of c.1.70m which was last worked in c.1930.

APPENDIX II

BGS Archive Borehole Records

Coal Authority Consultants Coal Mining Report

British Geological Survey

BGS ID: 841244 : BGS Reference: NZ36SW14476/TP2
British National Grid (27700) : 434460,562320

DUNELM DRILLING CO.

BOREHOLE RECORD

Contract No. C4737 Client BELLWAY HOMES LTD

Ground Level ..... Location HARDEN FARM – BOLDON COLLIERY

Date NOV '90 BOREHOLE No. TP1 & 2

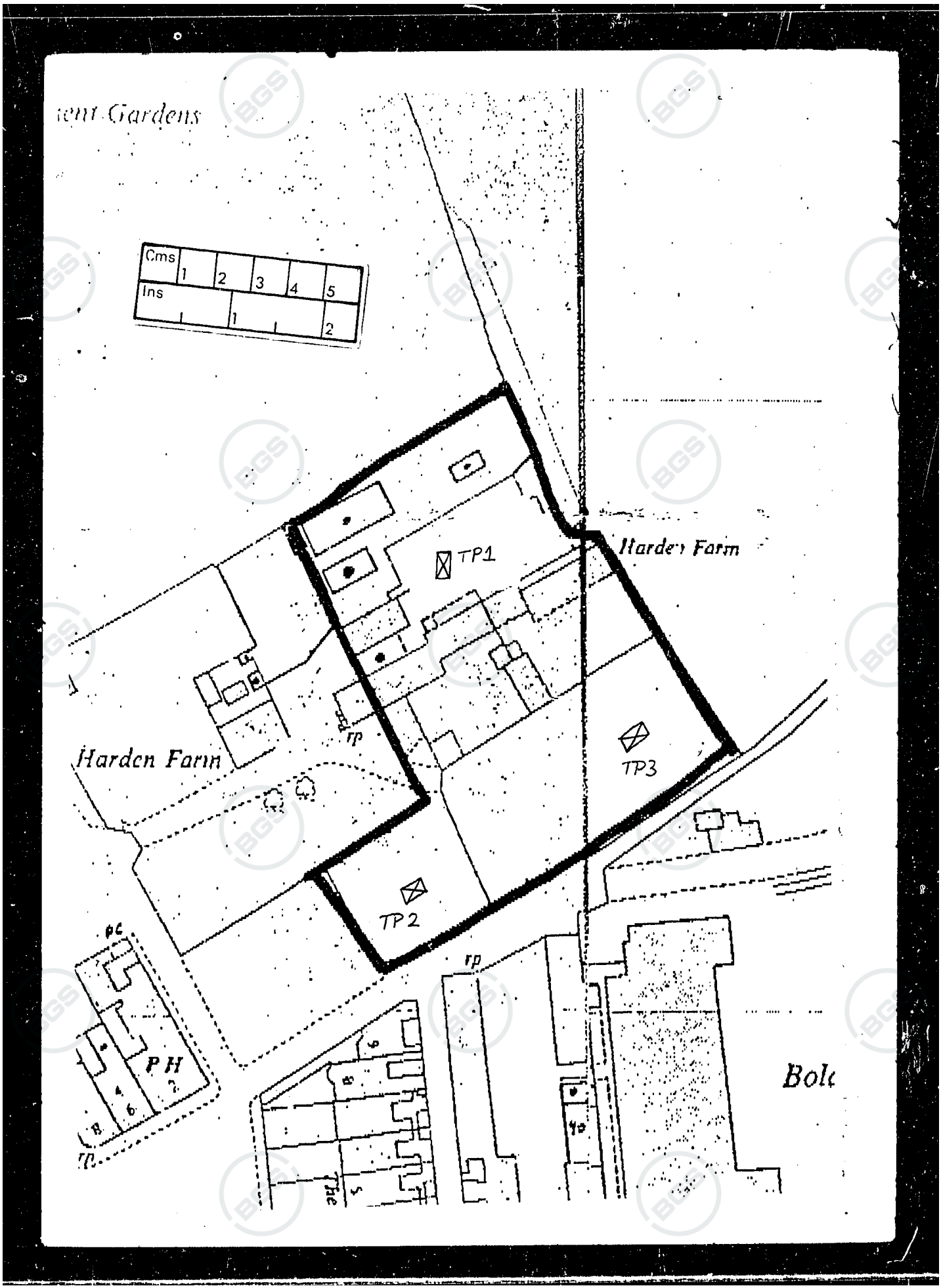
Depth	Thick-ness	Legend	Description of Strata	Type of Sample	C kN/m²	M %	Ø	Density Kg/m³	N
			TP1						
0.40	0.40		ASH STONE & SOIL FILL						
0.90	0.50		SOFT TO FIRM LT. BROWN & GREY MOTTLED SL. STONY PLASTIC CLAY	V 0.70	48.0				
	2.10		FIRM TO STIFF DK. BROWN & GREY MOTTLED STONY SL. SANDY BOULDER CLAY.	V 1.50	70.0				
3.00			OCCASIONAL SAND LENSES TOWARDS THE BASE.						
			TP2						
0.30	0.30		TOPSOIL						
0.80	0.50		FIRM LT. BROWN & GREY MOTTLED SL. STONY CLAY	V 0.70	62.0				
	2.20		FIRM TO STIFF DK. BROWN & GREY MOTTLED SL. STONY SANDY BOULDER CLAY. BECOMING DARKER & STIFFER TOWARDS BASE	V 1.50	105.5				
3.00			ROOTS PRESENT TO 0.80m	V 2.50	120.0	+			

Water Struck at ..... NONE ..... Standing Water Level .....

Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 841244 : BGS Reference: NZ36SW14476/TP2
British National Grid (27700) : 434460,562320



Contact BGS: ngdc@bgs.ac.uk

British Geological Survey

BGS ID: 20403787 : BGS Reference: NZ36SW1075
British National Grid (27700) : 434362,562210

Dunelm
GEOTECHNICAL • ENVIRONMENTAL

WINDOW SAMPLING RECORD

BH No. **WS4**
Sheet 1 of 1

Site: Hedworth Lane, Boldon Colliery
Contract No: Q1066

Client: Ravensworth Homes LLP
Dates: 19/03/2003

Method: Hand held breaker and window sampler.
Scale 1:25

Driller: ST & GD
Logged By: MJC

SAMPLE DETAILS			Groundwater	STRATA RECORD				
Type	Depth From - To(m)	Vane Results kN/m²		Description	Depth (m)	Level (mAOD)	Legend	Well
D	0.15m - 0.50			MADE GROUND: Concrete.				
				MADE GROUND: Light brown slightly sandy slightly gravelly SILT with occasional cobbles. Gravel is angular fine to coarse of sandstone, limestone and brick. 0.45-0.50m: dark grey with ash inclusions.	0.15			
D	0.60m - 0.90	58		PROBABLE MADE GROUND: Firm light brown slightly sandy slightly gravelly CLAY. Gravel is fine of chalk / limestone.	0.50			
D	1.10m - 1.40	120		Stiff brown slightly sandy slightly gravelly CLAY with occasional grey gleyed fissures. Gravel is angular to subrounded fine and medium of sandstone, silstone and mudstone.	1.00			
D	1.60m - 1.85	98						
D	2.10m - 2.40	129						
D	2.40m - 2.80	130						
		128		End of Window Sample at 2.80 m	2.80			

Remarks and Water Observations
1. No groundwater encountered during drilling.
2. Unable to advance beyond 2.80m.
3. Borehole backfilled on completion.

GL (mAOD) -
Easting: -
Northing: -

Fig. No. WS4

Contact BGS: ngdc@bgs.ac.uk

North-East Local Standards for Sustainable Drainage Checklist Proforma

This checklist should be completed by using guidance from the North-East Local Standards for Sustainable Drainage

1. Project & Site Details	Project / Site Name (including sub-catchment / stage / phase where appropriate)	VOYAGE CARE BOLDEN COLLIERY	
	Has a Pre-app consultation been undertaken? (Add any existing planning reference?)		
	Site address & post code	WILTON GARDENS SOUTH, BOLDON COLLIERY, NE35 9HS	
	OS Grid ref. (Easting, Northing)	E	434348
		N	562334
	Brief description of proposed work	Construction of a 12 Bed Care Development with Secure Outdoor Gardens	
	Total site area	788	m^2
	Total proposed impervious area	654	m^2
	Total proposed area of Public Open Space	194	m^2
	Total area used for GFRO		m^2
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	NO	
	Existing drainage connection type and location	GULLY TO COMBINED SEWER	
	Designer Position/Company	Associate, Dudleys Consulting Engineers Ltd	
	Designer email address/contact	Sebastian Reid CEng MICE, seb.reid@dudleys.co.uk	

2a. Discharge Rates & Required Storage

	Greenfield runoff rate (l/s)	*Required storage (m^3)*	*Proposed discharge rate (l/s)*
Qbar	0.43		2
1 in 1	0.37	5	2
1 in 30	0.75	22	2
1 in 100	0.9		2
1 in 100 + CC		27	2
Climate change allowance used	45%		

2b. Principal Method of Flow Control	Vortex Flow Control

2c. Proposed SuDS Measures

	Catchment area (m^2)	*Plan area (m^2)*	*Storage vol. (m^3)*
Rainwater harvesting	0		0
Infiltration systems	0	0	0
Green roofs	0	0	0
Blue roofs	0	0	0
Filter strips	0	0	0
Bioretention / tree pits	0	0	0
Swales	0	0	0
Basins/ponds	0	0	0
Filter drains	0	0	0
Pervious pavements	16	16	4
Other storage types	0		0
Total	**16**	**16**	**4**

North-East Local Standards for Sustainable Drainage Checklist Proforma

This checklist should be completed by using guidance from the North-East Local Standards for Sustainable Drainage

3. Proposed Discharge Arrangements	**3a. Infiltration Feasibility**	*Report/Page/Section*	
	Superficial geology classification / Bedrock geology classification	Phase 1 Sections 3.1.2, 3.1.3	
	Is land contamination present? / Is there any coal mining, subsidence risk or SPZ	Coal Authority Consultants Coal Mining Report (Ref. 51003447927001)	
	Site infiltration rate	0	m/s
	Depth to groundwater level	5	m below ground level
	Is infiltration feasible? (full or partial)	N	
	3b. Drainage Hierarchy		
		Feasible (Y/N)	*Proposed (Y/N)*
	1 store rainwater for later use	N	N
	2 use infiltration techniques, such as porous surfaces	N	N
	3 discharge rainwater direct to a watercourse	N	N
	4 discharge rainwater to a surface water sewer/drain	Y	Y
	5 discharge rainwater to the combined sewer.	Y	N
	3c. Proposed Discharge Details		
	Proposed discharge location (s)	EXISTING NWL SURFACE WATER MANHOLE	
	Has the owner/regulator of the discharge location been consulted? (have you included copies of NW pre-app enquiries)	Yes, But Awaiting response.	

4. Waterquality, amenity, biodiversity and construction	**4a. Source control/interception and water quality**	*Comment/Report /Page/Section*
	How have you provided source control SuDS for all of the impermeable surfaces of the development? (if full source control is not possible detail how you have provided as much as possible i.e. permeable paving on all drives etc)	Standard Pitched Roof has limited opportunity for Source Control. Paved Footpaths into landscaped areas or gullies Porous Block Paving into Tank / Pipe Network
	How have you provided source control interception for the first 5mm of rainfall? (see CIRIA c753 , chapter 24)	Unlikely
	What is the pollutant loading of the development?(see CIRIA c753 chapter 26)	Very Low (Residential, no car parking)
	What is the pollutant removal efficiency of the SuDS provided? (see CIRIA c753 chapter 26)	No pollution removal for water from RWP and limited removal externally.
	Have you shown the SuDS provide residence time, depths and flow velocities as required in C753?	Within the Hydraulic Calculations. Porous Block Paving not specifically modelled.
	4b. Other Supporting details	*Comment/Report /Page/Section*
	Is evidence provided that the SuDS have been integrated with landscape design and ecology?	Yes. Landscape architect has specified SUDS.
	Is a landscape plan or drawing included?	Yes.
	Is a SuDS health and safety risk assessment considered	No.
	Have you considered overland flow routes on your site?	Yes. Flows directed away from the building to the highway.
	Have you provided detailed design drawings , including sections and landscape drawings and if applicable mdx or other hydraulic modelling files?	Yes. Causeway Flow information available on request.
	Have you identified any risk and mitigation to water receptors during precommencement of construction?	To be detailed by the contractor.
	Have you provided a maintenance strategy?	Yes.
	4c Demonstration of how the proposed SuDS measures improve:	
	a) water quantity	Reduction of runoff from the site. (Existing Brownfield)
	b) water quality	Some water quality improvement.
	c) biodiversity	Extensive landscaping provided.
	d) amenity	Garden provided for residents.

Water Infrastructure Systems

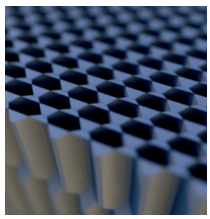
SDS GEOlight®

Stormwater Management System

Product Profile

SDS GEOlight® is an ultra lightweight honeycombed modular structure made from recycled PVC. The ready to install units are preformed to provide an underground stormwater storage facility, for the application of stormwater attenuation or infiltration.

The high void rate (>95%), high compressive strength (to 1000KN/m^2) and low resistance to water flow makes SDS GEOlight® an ideal material for cost efficient and maintainable underground water storage during storm conditions.





SDS GEOlight® Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m^3 reservoir, completed in one week.
- Light and easy to handle.
- Excellent hydraulic characteristics.
- The honeycomb structure is highly permeable, offering low resistance to water flow.
- SDS GEOlight®'s unique lateral and vertical filling arrangement requires a minimum amount of pipework and stone.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Modular format offers design flexibility to overcome topographical contraints and architectural requirements.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist separation and filtration technology such as SDS Aqua-Swirl™ and SDS Aqua-Filter™.
- Design service available, including calculations.

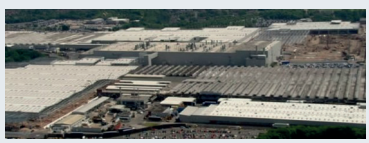
APPLICATIONS



RETAIL



INFRASTRUCTURE



INDUSTRIAL



RESIDENTIAL



COMMERCIAL



PUBLIC SECTOR

SDS Ltd, Clearwater House, Castlemills, Biddisham, Somerset, BS26 2RE

T: +44 (0)1934 751303
E: info@sdslimited.com





SDS GEOlight® 400	SDS GEOlight® 600	SDS GEOlight® 800
APPLICATIONS		
Stormwater Management		
Attenuation / Infiltration		
Bacterial filter-bed for biological treatment		
Hydrocarbon Separation		
Filtration and Separation Units		
SPECIFICATIONS		
Material	Recycled Rigid PVC	
Colour	Dark grey to black	
Standard length of a block	2000 mm	2000 mm	2000 mm
Standard width of a block	500 mm	500 mm	500 mm
Standard height of a block*	750 mm	750 mm	750 mm
	*Other block sizes available on request		
Void Ratio	> 95%	> 95%	> 95%
Compressive Strength	420 kN/m²	610 kN/m²	800 kN/m²
ADVANTAGES		
Highly cost effective		
Reduced excavation costs		
High void capacity		
Good UV resistance		
Good hydrocarbon resistance		



GEO DS/1021

SDS Ltd, Clearwater House, Castlemills,
Biddisham, Somerset, BS26 2RE

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E: info@sdslimited.com