

GOLCAR PHASE 2, HUDDERSFIELD



25/10/2019

FLOOD RISK ASSESSMENT

The Alan Johnston Partnership LLP

Job Ref: 219-238

Document Ref: GOL-AJP-ZZ-XX-RP-C-3000



Prepared By

Document Owner(s)	Project/Organization Role
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Project Closure Report Version Control

Version	Date	Author	Change Description
P01	30.10.2019	Thomas Clark	Initial Issue
P02	03.02.2020	Thomas Clark	Amended to suit LLFA comments, removal of crate storage and replaced with PCC manholes

Record of Approval

Originator	Approved	Date
Thomas Clark	John Marshall	30.10.2019
Thomas Clark	John Marshall	03.02.2020
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1.0 INTRODUCTION

This Flood Risk Assessment (FRA) has been prepared on behalf of Brierstone Ltd for the development south of Clay Well, Huddersfield. To develop thirteen new dwellings on a site that is currently Greenfield, in support of a planning application to Kirklees Council.

The purpose of this report is to present the surface water and foul water outline drainage strategies for the site which have been developed by the Alan Johnston Partnership (AJP). To demonstrate how the specific drainage planning requirements are to be met, the report should be read in conjunction with the relevant drawings and supporting information included within the appendices.

The drainage strategies outlined within this report, have been prepared in accordance with BS EN 752:2008 (Drain and sewer systems outside buildings), Sewers for Adoption 6th Edition, Building Regulations Approved Document H (Drainage and waste disposal) and the Technical Guidance to the National Planning Policy Framework document (Department for Communities and Local Government, March 2012).

The site is located within Flood Zone 1, with a total site area under 1.0ha. Therefore, in accordance with DEFRA guidance, a Flood Risk Assessment is not required, however, Kirklees Council have requested one as part of their planning comments.

2.0 SITE DESCRIPTION

The proposed development site is located south of Clay Well, National Grid Reference SE 096156. The location of the existing site is illustrated in Appendix A and the extent of the area to which the application relates is also shown on the aerial photo enclosed in Appendix B.

The proposed development site covers a total area of approximately 0.505ha and is currently a Greenfield site with the site currently heavily treed.

The site falls from north east to south west, with the levels falling from approximately 189.700 AOD along the northern border to 171.140 AOD at the southern border. The topographical survey, attached in Appendix C detailing this level information is to ordnance datum.

3.0 PROPOSED DEVELOPMENT

The proposed development consists of thirteen new dwellings accessed off a newly constructed road which is accessed off Clay Well. The total impermeable area from the proposed development is 0.241 Ha, encompassing the proposed houses, proposed highway and associated driveways/pathways.

To enable a viable scheme, the proposed site levels are constrained by the existing highway allowing access/exit to the site and the adjoining boundaries of the site which consist of existing buildings and associated gardens to the north, existing woodland to the west and south and a housing development to the east. A proposed site plan is attached in Appendix D.

4.0 ASSESSMENT OF FLOOD RISK

The Technical Guidance to the National Planning Policy Framework requires all forms of flooding to be considered.

4.1 Flooding from Rivers

The Flood Risk maps are included in Appendix E.

It can be seen from the map in Appendix E that the site is located in Flood Zone 1 with a chance of flooding of less than 0.1% (or 1 in 1000).

The nearest designated main river is River Colne which is located approximately 0.7km south east of the site, no flooding to the proposed site is shown on the map therefore the site has low risk of flooding from rivers.

4.2 Flooding from the Sea

The site is not at risk of flooding from the sea. The lowest level of the site is approximately 171.140 AOD, i.e. well above tidal flood levels. This level is based on the topographic survey in Appendix C.

4.3 Flooding from Land

Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can run quickly off land and result in local flooding.

The Surface Water Flooding map is included in Appendix E. It can be seen from the map that the site is classified as having a very low risk of surface water flooding.

4.4 Flooding from Groundwater

Identified in the Phase I desk study, document reference SMH/01r1, which was submitted as part of the development to the east of the site. The BGS suggests that the bedrock is classified as a 'Secondary A Aquifer'. As no below ground structures are proposed for the development the site is not considered to be at risk of flooding from groundwater.

A Phase II site investigation is yet to be undertaken, it is recommended that one is undertaken, including groundwater monitoring to fully understand the below ground strata and the potential impact groundwater may have or not have on the site.

4.5 Flooding from Sewers

A record of Public Sewers surrounding and serving the development site has been obtained from Yorkshire Water and is included in Appendix F. There is one manhole located within the site boundary constructed as part of the adjacent development, located along the eastern boundary is an existing combined water sewer, due to the topographical levels of the site in the unlikely event of the sewer flooding the water will be directed towards Brook Lane.

Therefore, as a result of the above, the site itself is considered to be at low risk of flooding from sewers.

4.6 Flooding from Reservoirs, Canals and Other Artificial Sources

Longwood Reservoir is located approximately 1.2km to the north of the site and the risk of flooding to the new development is considered to be very low.

5.0 DEVELOPMENT AND DRAINAGE STRATEGY

5.1 Effect of Proposed Development

As previously outlined in Section 2.0, the existing site covers a total area of 0.505ha, and is a Greenfield site. The developed area of the site has an impermeable area of 0.241ha in total.

A plan detailing the proposed impermeable areas is included in Appendix G, as can be seen it indicates that with the introduction of the new; roof area, proposed highway and private driveways, the development will lead to an increase in impermeable areas.

Drainage Networks	Site Area (ha)	Existing Impermeable Area (ha)	Proposed Impermeable Area (ha)
SW Network 1	0.505	0.000	0.241

Therefore, the changes to the existing site will increase the volume of impermeable area and as such, the proposed development will lead to an increase in the;

- Volume of surface water ponding on the site
- Volume of surface water runoff leaving the site or discharging into surrounding areas
- Peak discharge rate from the site.

Accordingly, site-wide drainage systems are required to drain the foul and surface water flows arising from the proposed development. Where possible, any existing drainage networks should be utilised. Appropriate design and construction of these systems as set out in Section 5.3 should ensure that there is no increase in offsite flood risk that would otherwise impact downstream areas.

5.2 Existing Drainage Systems

As shown in the Yorkshire Water map, attached in Appendix F, there is an existing 150mm diameter C.W sewer within Hale Road, Yorkshire Water have confirmed that they would accept the proposed flows from the development into this sewer, also attached in Appendix F.

5.3 Proposed Drainage Strategy

As outlined above in section 5.1, site-wide drainage systems are required to drain the foul and surface water flows arising from the proposed development. The proposed drainage systems must ensure that there is no increase in offsite flood risk that would otherwise impact downstream areas.

5.3.1 Surface Water Drainage

The Building Regulations - Approved Document H (2002) details a hierarchy of potential methods for disposing of surface water as shown below in order of preference:

- Discharge via infiltration
- Discharge to watercourse
- Discharge to sewer

Considering the hierarchy above, the surface water network for the proposed site should infiltrate where possible.

A Phase II SI has yet to be undertaken and one is recommended. Based on British Geological Survey online maps the site is underlain by strata of the Millstone Grit Group and Midgley Grit. The site isn't underlain by any superficial strata.

Based on the adjacent developments accepted surface water drainage design, infiltration on the site is unlikely to be possible due to the nature of the underlying bedrock strata. Infiltration testing should be undertaken to confirm that surface water discharge via infiltration isn't possible for the development.

Assuming that infiltration for the development is ruled out, discharge to a watercourse is next in the hierarchy.. The nearest watercourse is the River Colne, which is located 0.7km south of the site. Accessing this watercourse would mean constructing the proposed drainage network through third party land which is unfeasible, this rules discharge to watercourse out as the method of surface water discharge.

Therefore, in accordance with the discharge hierarchy, discharging to public sewer is acceptable. Located along the eastern boundary of the site is public combined water sewer which then discharges into the public combined water sewer in Brook Lane south of the site. The adjacent site have constructed a manhole on the existing combined water sewer along the eastern boundary, the proposal would be to discharge the surface water into this manhole. A pre development application has been submitted to Yorkshire Water, this can be found in Appendix F. Yorkshire Water have confirmed they would accept the surface water to discharge from the site at 5.0l/s for the proposed development.

While every effort to utilise any suitable existing systems should be made, the drainage systems should be designed to suit the proposed site layout and topography which aims to provide an efficient design.

For each design case described above, the design storm is the critical storm duration for the site conditions. In the case of the 1 in 100 year design storm, a 40% increase in the peak rainfall intensity is applied to allow for the estimated worst case impacts of climate change. This is in accordance with Table 5 of the Technical Guidance to the National Planning Policy Framework.

Suitable systems of below ground drainage will be required to contain as a minimum requirement, the 1 in 30 year event. Additionally, any surface water run-off from events that exceed the design capacity of the new drainage system, up to and including the 1 in 100 year (+40%) event, will be retained on-site in highways away from proposed/existing dwellings.

Due to the topography of the site the proposed surface water drainage network is to contain two number hydro-brake manholes enabling the site to drain and pose no flood risk for the 1 in 100yr + CC event. Plots 4-13 and an area of proposed highway are to drain into the 1200mm diameter concrete pipes and 2700mm diameter manholes at the top of the site. The proposed flows are restricted using a hydro-brake unit with an orifice plate size of 75mm restricting the proposed water entering the downstream system. Due to the 1 in 10 proposed carriageway plots 1-3 are to drain into the 150mm diameter carrier drains before discharging into the 2700mm diameter sewer which is being utilised as storage due the space constraints of the site. 2No. 3m diameter manholes

will form offline attenuation during the 1 in 100yr + CC event set above the 1 in 30yr water level as per Yorkshire Water/Sewers for adoption 6th edition requirements & shall be privately maintained.

The adjacent sites drainage infrastructure will most likely require diverting under a S185 agreement due it clashing with the proposed carriageway for this development.

A small area equating to approx. 100m² is proposed to freely discharge into the existing combined water system due to the proposed and existing topography, this is to be discussed with Yorkshire Water and the LLFA to confirm this arrangement..

Should they be required, measures to prevent oil and other contaminants being passed forward to the existing surface water sewer should also be incorporated into the design of the surface water system, through the use of appropriate oil separators or other appropriate pre-treatment methods.

In line with common practice, it is proposed the surface water discharge from the proposed development should mimic that from the existing site or the lowest practicable discharge rate which has also been agreed with Yorkshire Water.

The proposed surface water drainage system is designed to restrict the discharge to the required rate, up to, and including a 1 in 100 year return period plus 40% climate change design storm, a representation of this attenuation system can be seen in Appendix I.

The system has been designed to attenuate all surface water flows for up to and including the 1 in 100 year return period plus climate change. In the event of a catastrophic system failure, surface water flows will lie within the proposed highway, eventually discharging off the site away from all existing/proposed dwellings. The flow route plan demonstrating this pathway can be found in Appendix J.

The surface water drainage strategy and discharge rates are subject to approval from Yorkshire Water and the Lead Local Flood Authority prior to the commencement of any works.

5.3.2 Foul Water Drainage

Foul water drainage disposal is set out in Part H of the Building Regulations in order of priority the preferred methods are;

1. Public sewer
2. Septic tank
3. Cesspool.

The foul water system shall be designed in accordance with;

- BS EN 752:2008 (Drain and sewer systems outside buildings)
- Sewers for Adoption (7th Edition)
- Technical Guidance to the National Planning Policy Framework document (Department for Communities and Local Government, March 2012).
- BS EN 12056-2:2000 (Drainage systems inside buildings)
- Building Regulations Approved Document H, Drainage and waste disposal. (Office of the Deputy Prime Minister, December 2010).

As can be seen in the Outline Drainage Strategy Drawing, attached in Appendix I, it is anticipated that the foul water will be collected and conveyed to the Combined Sewer along the eastern boundary of the site into an existing manhole at an unrestricted rate, as confirmed by Yorkshire Water.

The foul water drainage strategy and should be confirmed via more detailed discussions with Yorkshire Water and the Lead Local Flood Authority prior to the commencement of any works.

5.4 Compliance with LASOO Non-Statutory Technical Standards for SUDS

In compliance with the runoff destinations guidance within the LASOO Non-Statutory Technical Standards for Sustainable Drainage: Best Practice Guidance, infiltration is not feasible; therefore the surface water runoff is designed to discharge to the public sewer.

S1. Where the drainage system discharges to a surface water body that can accommodate uncontrolled surface water discharges without any impact on flood risk from that surface water body (e.g. the sea or a large estuary) the peak flow control Standards (S2 and S3) and volume control Standards (S4 to S5) need not apply.

The site does not discharge to a surface water body that can accommodate uncontrolled surface water discharges and therefore Standards S2 – S5 shall apply.

5.4.1 Peak Flow Control

S2. For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1-year rainfall event and the 1 in 100-year rainfall event should never exceed the peak greenfield runoff rate for the same event.

The site is considered Greenfield and the discharge rate for the 1 in 100 year return period has been restricted to smallest practicable discharge rate of 5l/s for the development's drainage network, utilising a hydrobrake control unit with an orifice size of 75mm in diameter for SW Network 1.

S3. For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event should be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

The site is considered Greenfield therefore this standard does not apply.

5.4.2 Volume Control

S4. Where reasonably practicable, for Greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

S5. Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

S6. Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

Due to space considerations & site constraints SuDS systems such as ponds or green roofs are not viable. Infiltration may be viable subject to infiltration testing validating potential use, but for the purpose of this report has been discounted.

Due to the fact that the development is on a site that is currently Greenfield, there will be an increase in volume run-off from the development site. Utilising SuDS features such as detention basins or retention ponds are not viable due to space constraints within the site layout and while other SuDS components such as green roofs or rainwater harvesting may assist in constraining the volume of surface water runoff, this has not been feasible due to proposed construction methods and space considerations for the development. The run off volume shall be discharged at a maximum of 5l/s for the network serving the development, with only small amount of flooding within the attenuation system and house plot levels set at least 150mm above the flood water level, reducing the rate of run off to not adversely affect the flood risk, in accordance with standard S6.

5.5 Future Maintenance

The proposed drainage solution uses no SUDS techniques in accordance with the CIRIA SUDS Manual C753, due to considerations with regards to appropriate space and ground conditions for their viable use. The surface water run-off is restricted using a vortex flow control device and the attenuated run-off stored using oversized pipes/manholes with 2No 3m diameter P.C.C manholes acting as offline storage for the 100yr+CC event.

It is proposed that the surface and foul water drainage systems will be adopted by Yorkshire Water and the 2No offline manholes will remain private and therefore will be the responsibility of a responsible organisation In accordance with the CIRIA SUDS Manual C753.

The hard surfaces proposed for the development shall require regular annual sweep and suction brush following leaf fall in autumn. An annual inspection of control chamber, ACO channels and the inspection chambers shall be necessary to remove any silt build up and check the free flow use of the hydro-brake.

6.0 CONCLUSIONS

- The site is located within flood zone 1 and has a low risk of flooding from all potential sources.
- The initial desk study has anticipated geology of the site doesn't consist of any superficial deposits with the underlying strata consisting of a mixture of Midgley Grit and Millstone Grit Group (sandstone), discounting infiltration to ground.
- The surface water discharge from the proposed site should discharge to the existing Yorkshire Water 150mm C.W Sewer along the western boundary of the site at a rate not exceeding 5.0/s.
- Foul water discharge from the proposed site should discharge, at unrestricted rate to the Yorkshire Water 150mm C.W Sewer along the western boundary of the site

7.0 RECOMMENDATIONS

- Oversized pipes, large manholes a vortex flow control device and a geo-cellular attenuation tank should be utilised to restrict the surface water runoff and prevent any flooding for rainfall events up to and including the 1 in 100yr+40% climate change event.
- The external ground levels around the proposed building shall fall away from the proposed building with any new levels being designed to ensure any overland flood routes, for events in excess of the 1 in 100yr+40% climate change event are directed towards the highway for use in exceptional circumstances.
- A Phase II site investigation is recommended to fully understand the below ground strata and the impact groundwater may have, falling head tests should be undertaken to determine whether surface water discharge via infiltration is viable or not. Should falling head tests prove productive, full infiltration testing in accordance with BRE 365 should be carried out.

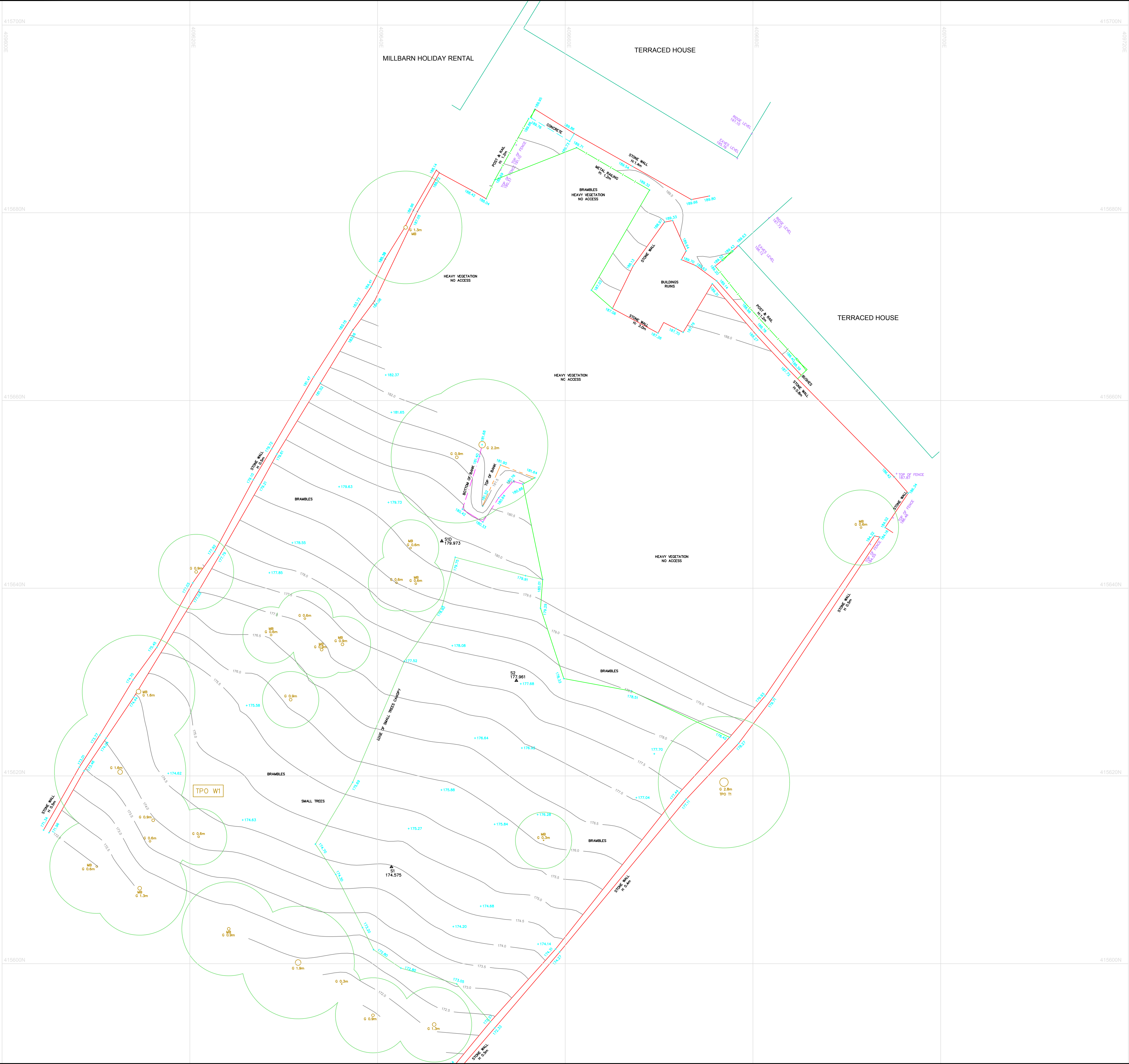
Appendix A Site Location Plan

Appendix B Aerial Photograph



REV	DATE	DESCRIPTION			BY	APP	SCALE @ A3:	DESIGNED:	DRAWN:	CHECKED:	APPROVED:	DATE:
							NTS	TC	TC	JCM	JCM	Aug 2019
PROJECT:							alan johnston partnership LLP CONSULTING STRUCTURAL & CIVIL ENGINEERS 1 Dale Street, Liverpool L2 2ET Tel: 0151 227 1462 Fax: 0151 225 1187 E-Mail: Mail@ajpstructeng.com ajp structural & civil engineers					
TITLE:												
Aerial Photograph												
STATUS:	PROJECT No:	DRAWING No:			REV:							
S2	219-238	App B			.							

Appendix C Topographic Survey



Notes

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Grid : OS National Grid.
Using the OS GPS Network and applying OSTN02 transformation and then removing the scale factor for true distances with a one-step transformation centred on S2

Datum : OS Level Datum.
Using the OS GPS Network and applying OSGM02 National Geoid Model to obtain local area corrections.

Station Listing

Station	Easting	Northing	Level
S1	409641.481	415610.306	174.575
S2	409654.790	415630.157	177.961
S1C	409629.445	415656.986	180.096
S1C1	409636.681	415668.764	183.178
S1D	409646.852	415645.014	179.973

KEY

AIR VALVE	AV	KERB OUTLET	KO
BENCH MARK	BM	LAMP POST	LP
BN	BN	MANHOLE (CIRCULAR)	MH
BOLLARD	BOL	MANHOLE (RECTANGULAR)	MH
BORE HOLE	BH	MANHOLE (TRIANGULAR)	MH
BRITISH TELECOM COVER	BT	MARKER POST	MKR
BUS STOP	BUS	GULLY	GU
CABLE TV COVER	CATV	RODDING EYE	RE
CABLE TV SUPPLY	CA	SIGN POST	SIG
COLUMN	COL	TELECOM COVER	TEL
DROPPED KERB	DK	TELEGRAPH POLE	TP
EARTHING POINT	ER	THRESHOLD LEVEL	THL
ELECTRICITY COVER	ELEC	TRAFFIC LIGHT	TL
ELECTRICITY POLE	EP	TRIAL PIT	PIT
FIRE HYDRANT	PH	WASH OUT	WM
GAS VALVE	GAS	WATER METER	WM
GATE	G	WATER STOP COCK	WSC
INSPECTION COVER (CIRCULAR)	IC	WATER STOP VALVE	WSV
INSPECTION COVER (RECTANGULAR)	IC		
COVER LEVEL	CL	CHAMBER BASE LEVEL	Ch.L
INVERT LEVEL	IL	WATER SURFACE LEVEL	WL
UNABLE TO RAISE	UTR	UNABLE TO MEASURE	UTM
GIRTH OF TREE TRUNK	G	DIAMETER OF TREE TRUNK	D
HEIGHT TO TOP OF TREE CANOPY	H	MULTI BOLE TREE	MB

Rev	Date	Drawn	Description	Check
-	--/--/----	--	--	--

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ACUMEN DESIGNERS & ARCHITECTS

Site

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Title

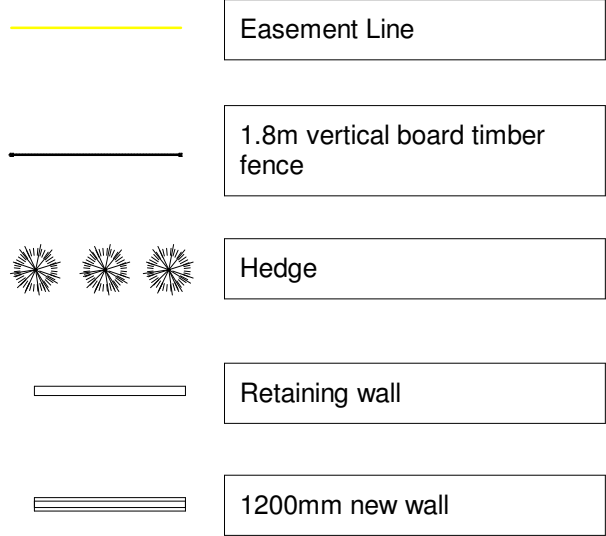
TOPOGRAPHICAL
SURVEY

Surveyed	GS, JA	Drawn	GS, JA
Chk.	DA	Date	01/09/17
Scale	Job No	Sheet Size	Issue
1:200	P17-00632	A1	01

DWG Ref

Year	Number	Originator	Zone	Level	Type	Role	Sheet
P17	00632	MET	XX	T	M2	G	001

Appendix D Proposed Site Plan



GENERAL NOTE: SCHEME UNDER
CONSTRUCTION AS PER PLANNING
APPROVAL REF:2017/61/91173/W

Client	BRIERSTONE		
Job	CARR TOP LANE		
Drawing title	Site Plan		
Project number	M4419	(PA) 01	Rev B
Scale	1 : 250	@ A1	
Date	05/30/19		
Drawn by	Author	Checked by	Checker

Rev	Date	Description
A	12.03.19	Gardens for plot 1 and 13 reduced to phase 1 boundary line
B	05.07.19	Site plan revised to planners comments

architects project managers construction cost consultants
Registered in England and Wales. Reg No. 2140639
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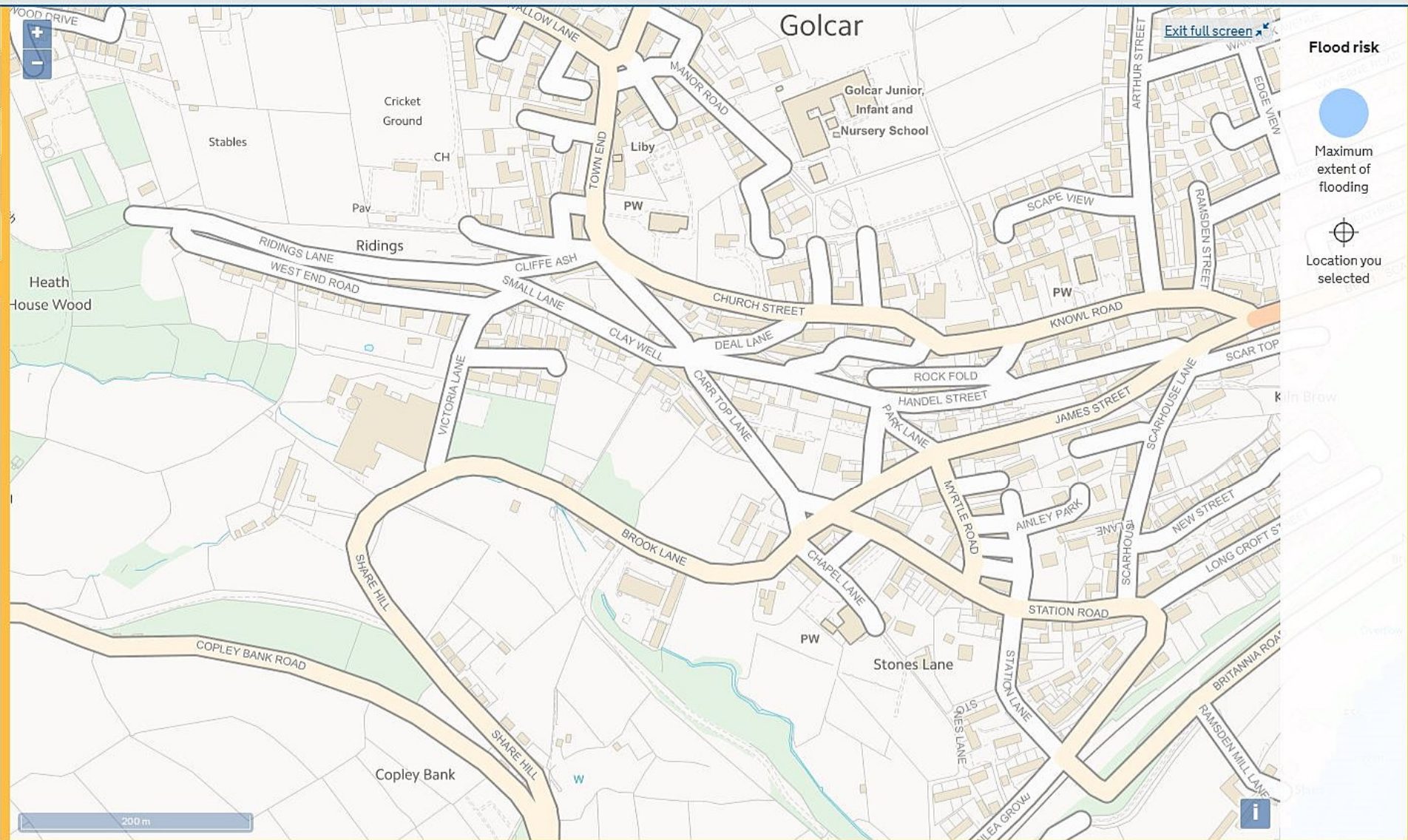
Heyside House, Blackshaw Lane, Heyside, Royton, Oldham OL2 6NS
t: 01706 290088 f: 01707 290099 e: oldham@nicolthomas.com

Also at Birmingham (Registered office)

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05.07.19

Appendix E Flood Risk Maps



 Flood risk from rivers or the sea

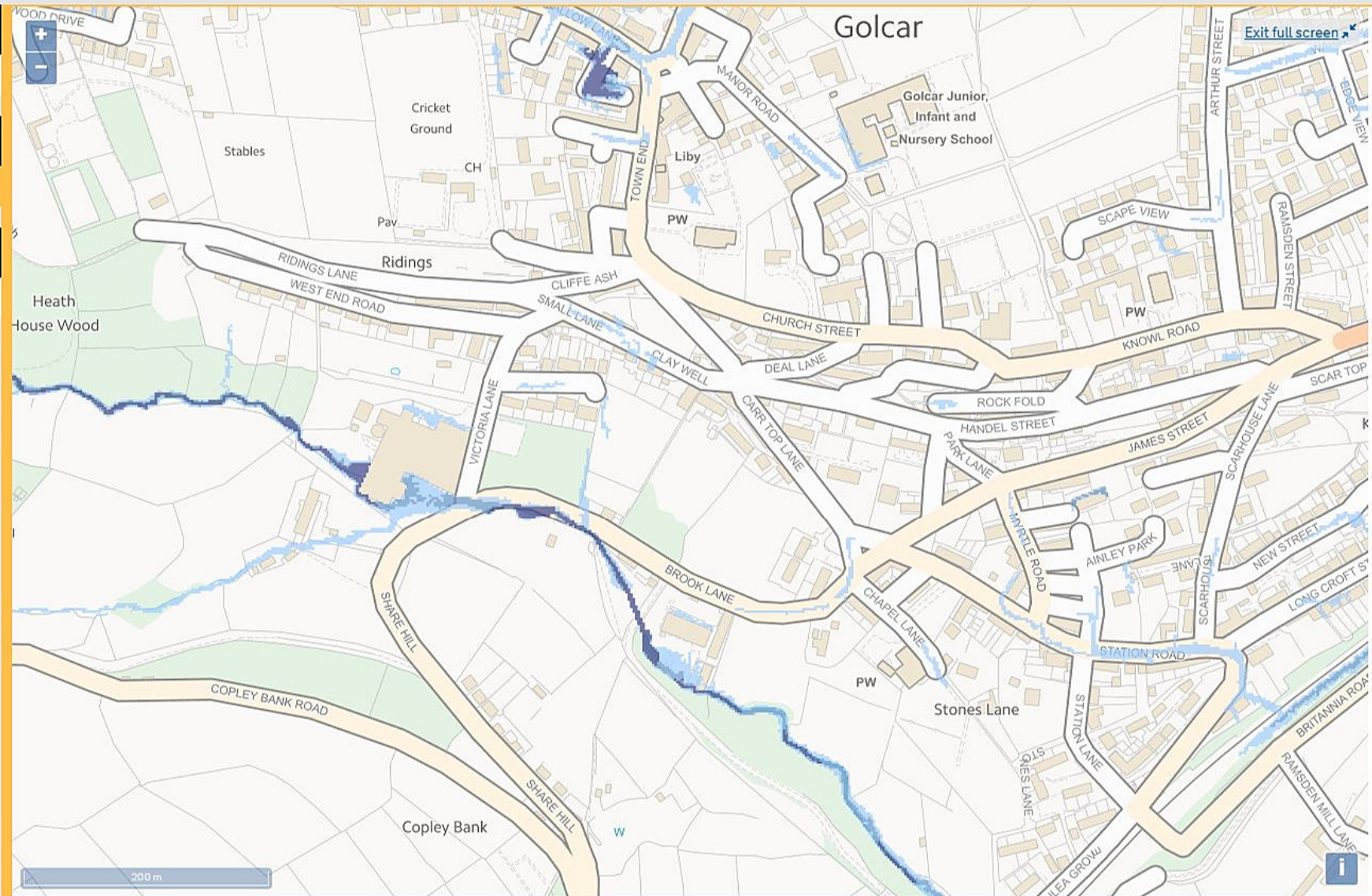
 Extent of flooding

 Flood risk from surface water

 Extent of flooding

 Flood risk from reservoirs

 Extent of flooding



Flood risk



High



Medium



Low



Very low



Location you selected

 Flood risk from rivers or the sea

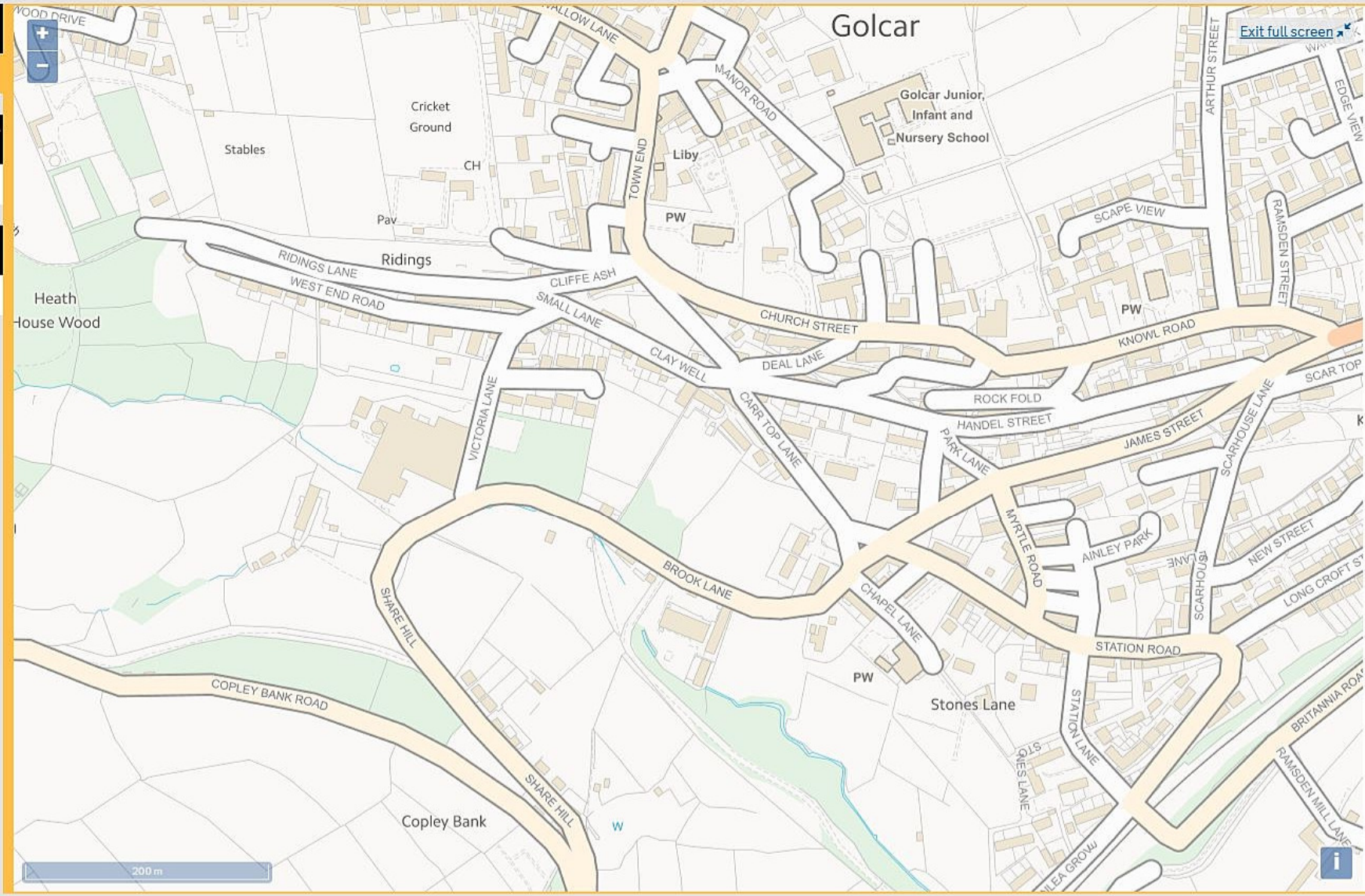
 Extent of flooding

 Flood risk from surface water

 Extent of flooding

 Flood risk from reservoirs

 Extent of flooding



Flood risk



High



Medium



Low



Very low



Location you selected

Appendix F Yorkshire Water Map



YorkshireWater

Mr T Clark
Alan Johnston Partnership
1 Dale Street
Liverpool
L2 2ET

Yorkshire Water Services
Developer Services
Sewerage Technical Team
PO BOX 52
Bradford
BD3 7AY

Your Ref:
Our Ref: V014891

Tel: 0345 120 8482
Fax: (01274) 372 834

Email:
technical.sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Chris Roberts on 0345 120 8482

23rd September 2019

Dear Mr Clark,

Clay Well, Golcar, Huddersfield, HD7 4JD - Pre-Planning Sewerage-Enquiry-Residential T540016

Thank you for your recent enquiry and remittance. Our official VAT receipt has been sent to you under separate cover. Please find enclosed a complimentary extract from the Statutory Sewer Map which indicates the recorded position of the public sewers. Please note that as of October 2011 and the private to public sewer transfer, there are many uncharted Yorkshire Water assets currently not shown on our records.

The following comments reflect our view, with regard to the public sewer network only, based on a desk top study of the site and are valid for a maximum period of twelve months.

Development of the site should take place with separate systems for foul and surface water drainage on site, with a combined sewer off site.

Existing Infrastructure

There is a combined sewer running through the western edge of the site. The sewer is unaffected by the building proposal.

Foul Water

Foul water domestic waste should discharge to the public combined sewer as proposed to the south west of the site.

Surface Water

Curtilage surface water may discharge to the public combined sewer as proposed to the south west of the site.

The surface water discharge from the site to be restricted to not greater than 5 five litres/second.

Please note further restrictions on surface water disposal from the site may be imposed by other parties.



YorkshireWater

You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Other Observations

Any new connection to an existing public sewer will require the prior approval of Yorkshire Water. You may apply on line or obtain an application form from our website www.yorkshirewater.com or by telephoning 0345 120 84 82.

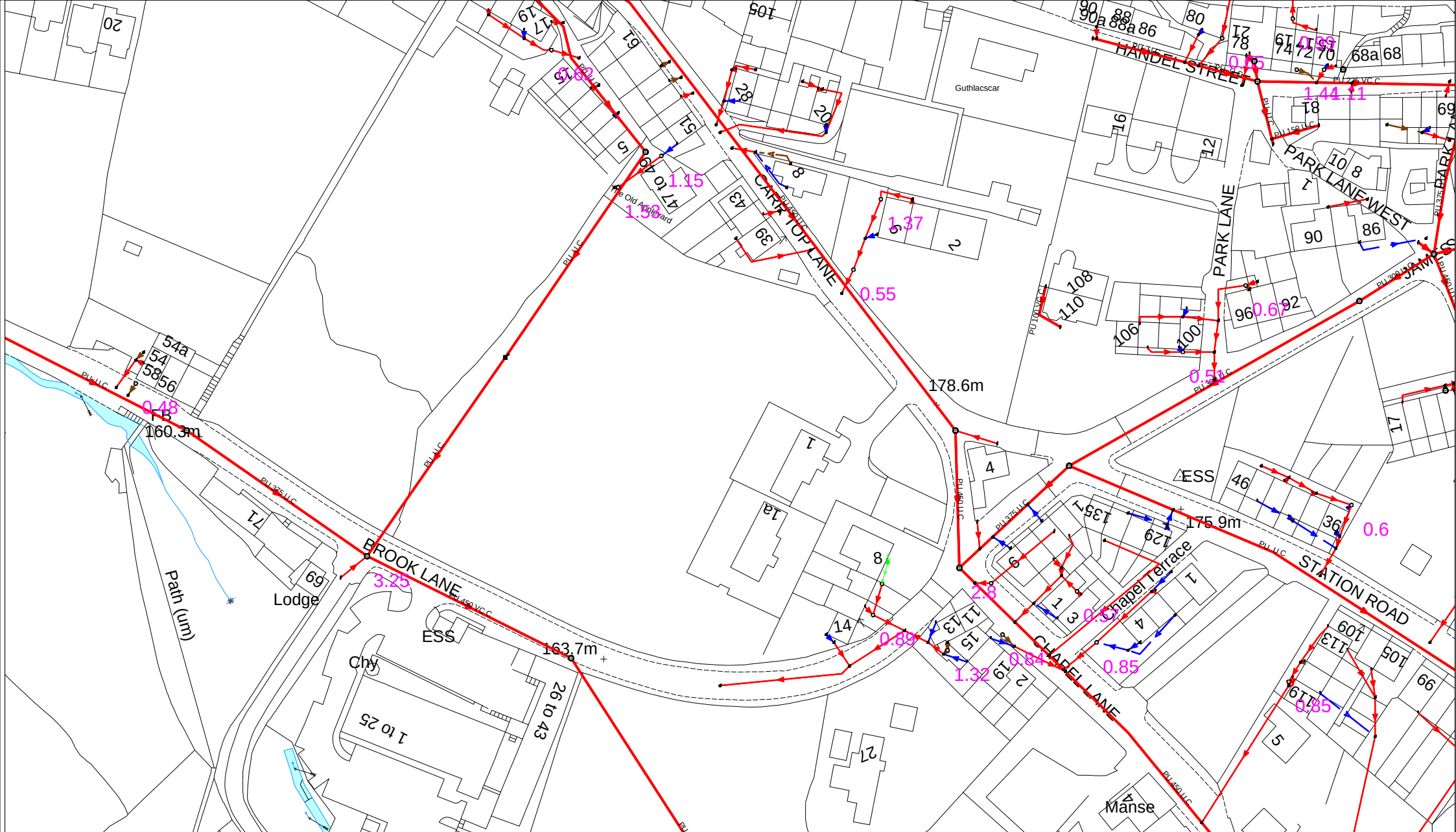
An off-site foul and surface water sewer may be required which may be provided by the developer and considered for adoption under Section 104 of the Water Industry Act 1991. Please telephone 0345 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0345 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the WRC publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Developer Services Team telephone 0345 120 84 82 for further information.

All the above comments are based upon the information and records available at the present time and is subject to formal planning approval agreement. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

Yours sincerely

Chris Roberts
Sewerage Technician
Developer Services



409556 : 415493		Map Name : SE0915SE	Title	Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connections are shown.
 Yorkshire Water Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : YorMap Advisor C ROBERTS Contact Tel : 87 2582			Notes (Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2014. All rights reserved Ordnance Survey Licence number 100022432		
				Date Req : 23/09/2019, 14:32:33	Date Gen : 23/09/2019, 14:32:47
				Source : Sewer Network Enquiry	

Appendix G Post Development Impermeable Areas



1. SETTING OUT SHALL BE UNDERTAKEN USING ONLY THE INFORMATION GIVEN. DISTANCES SHOULD NOT BE SCALED FROM THIS DRAWING.
2. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION 7TH EDITION AND UNITED UTILITIES DETAILS & GUIDELINES.
3. THE MINIMUM GRAVITY PIPE DIAMETER UNDER ADAPTABLE HIGHWAYS SHALL BE 150mm
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION GIVEN WITH REGARDS TO EXISTING SERVICES AND DRAINAGE CONNECTIONS ETC. PRIOR TO COMMENCING THE WORKS. THE RATES SHALL INCLUDE FOR HAND DIG AROUND SERVICES WHERE NECESSARY. THE CONTRACTOR SHALL ADHERE TO THE CDM REGULATIONS AT ALL TIMES
5. THE OUTSIDES OF ALL SEWERS SHALL BE A MINIMUM OF 1.0m FROM KERB LINES AND THE OUTSIDE OF MANHOLES SHALL BE A MINIMUM OF 0.5m FROM KERB LINES
6. EXISTING FLOWS IN WATERCOURSES, SEWERS AND LAND DRAINS SHALL BE MAINTAINED AT ALL TIMES
7. ONLY TRAINED PERSONNEL SHALL BE PERMITTED TO ENTER CONFINED SPACES
8. ALL MATERIALS TO BEAR THE RELEVANT B.S. KITEMARK AND COMPLY FULLY WITH THE SPECIFICATIONS. ALL CONCRETE & CONCRETE PRODUCTS MUST USE SULPHATE RESISTANT CEMENT UNLESS THE SITE INVESTIGATION REPORT PROVES THAT SULPHATE ATTACK FROM SOILS AND GROUNDWATER WILL NOT OCCUR TO WITHSTAND A CLASS
9. ALL OPENING NOTICES ETC. AS REQUIRED UNDER HIGHWAYS ACTS ETC. ARE TO BE OBTAINED PRIOR TO COMMENCEMENT OF WORKS. ALL WORKS ARE TO BE INSPECTED BY A L.A. NHC OR THE NETWORK OPERATOR AS APPLICABLE.
10. WHERE "ULTRA RIB" UPVC PIPES (OR SIMILAR APPROVED) ARE USED IN ADAPTABLE DRAINAGE THEY SHALL STILL BE HANDLED AND LAID IN ACCORDANCE WITH THE SPECIFICATION AND GUIDANCE ISSUED BY THE HIGH PERFORMANCE PIPE ASSOCIATION.
11. A CLASS 5 BED AND SURROUND MUST BE USED FOR SUCH PIPES. TRENCH BACKFILL IN HIGHWAYS TO WITHIN 1M OF HIGHWAY SHALL AS DIRECTED BY THE HIGHWAY AUTHORITY BE A SUTABLE GRANULAR MATERIAL ALL IN ACCORDANCE WITH SEWERS FOR ADOPTION CL. 4.3.4.
12. SLAB LEVELS SHALL NOT BE VARIED WITHOUT REFERENCE TO THE ENGINEER FOR GUIDANCE
13. DOMESTIC DRAINAGE SHALL BE TO BUILDING REGULATIONS APPROVED DOCUMENT H. 110mm U.P.V.C. PIPES LAID TO THE FOLLOWING MINIMUM FALLS UNLESS OTHERWISE SHOWN.

14. ALL GULLY CONNECTIONS TO BE 150mm VITRIFIED CLAY UNLESS NOTED OTHERWISE
15. ALL MANHOLE COVERS TO BE RECESSED TO ACCEPT FINISH AS DETAILED BY LANDSCAPE ARCHITECT
16. SLOW REST BENDS TO BE USED IN ALL LOCATIONS MADE UP FROM 2No. 45 DEG BENDS (600mm TO INVERT FROM FFL)
17. MANHOLE POSITIONS AND ACCESS COVERS TO BE ACCURATELY SET-OUT BY LANDSCAPE ARCHITECT TO SUIT EXTERNAL FINISHES
18. ALL DRAINS CAST THROUGH FOUNDATIONS TO HAVE ROCKER PIPES ON BOTH SIDES OF FOUNDATION
19. ALL POP UP POSITIONS TO BE CONFIRMED SET OUT DIMENSIONS TO BE AGREED & PROVIDED BY OTHERS
20. ALL DISCHARGE RATES TO BE CONFIRMED BY M&E DESIGNER
21. ALL SURFACE WATER COLLECTION FEATURES TO BE CONFIRMED BY THE LANDSCAPE ARCHITECT
22. STORAGE HAS BEEN PROVIDED IN A CELLULAR STORAGE TANK AND UP-SIZED MANHOLES AND PIPES.
23. EXISTING SEWER DEPTHS HAVE BEEN APPROXIMATED FROM LIMITED INFORMATION, NEW CONNECTIONS TO BE CONFIRMED PRIOR TO CONSTRUCTION OF ANY DRAINAGE WORKS.
24. LANDSCAPE ARCHITECT TO CONFIRM GULLY AND DRAINAGE CHANNEL LOCATIONS TO LANDSCAPED AREAS.
25. FOUL NETWORK TO BE CONFIRMED FOLLOWING CONFIRMATION OF BRANCH CONNECTION POINTS FROM BUILDING M&E DESIGNER
26. CCTV SURVEY OF EXISTING SITE DRAINAGE REQUIRED PRIOR TO THE COMMENCEMENT OF ANY WORKS STARTING ON SITE

	PROPOSED SURFACE WATER DRAIN MANHOLE
	PROPOSED COMBINED WATER DRAIN MANHOLE
	EXISTING COMBINED WATER DRAIN MANHOLE
	EXISTING COMBINED WATER SEWER
	PROPOSED FOUL WATER SEWER
	PROPOSED SURFACE WATER SEWER

REV	DATE	DESCRIPTION	BY	CHK
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ARCHITECT: NICOL THOMAS

TITLE: POST DEVELOPMENT IMPERMEABLE AREA

SCALE @ A1:	DESIGNED:	DRAWN:	CHECKED:	APPROVED:	DATE:
1:200	TC	TC	JCM	JCM	29.10.15

alan johnston partnership LLP
CONSULTING STRUCTURAL & CIVIL ENGINEERS

1 Dale Street, Tel: 0151 227 1462
Liverpool L2 2ET Fax: 0151 225 1187 E-Mail: Mail@ajpstructeng.com

The logo for Alan Johnston Partnership (ajp) is located in the bottom right corner. It features the letters 'ajp' in a small, lowercase, sans-serif font, followed by the word 'structural' in a larger, italicized, sans-serif font. Below this, there is a large, stylized, blue 'J' that incorporates the letters 'A' and 'P'. To the right of the 'J' is the word '& civil' in a smaller, italicized, sans-serif font. The entire logo is set against a white background.

Appendix H Greenfield Run Off Rate

The Alan Johnston Partnership		Page 1
1 Dale Street Liverpool L2 2ET	Golcar Phase 2 Ex. Greenfield Run Off	
Date 29/11/2019 File	Designed by TC Checked by	
XP Solutions Source Control 2016.1.1		
<u>ICP SUDS Mean Annual Flood</u> Input Return Period (years) 100 Soil 0.300 Area (ha) 0.505 Urban 0.000 SAAR (mm) 1217 Region Number Region 3 Results 1/s QBAR Rural 1.8 QBAR Urban 1.8 Q100 years 3.7 Q1 year 1.5 Q30 years 3.1 Q100 years 3.7		
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Appendix I Outline Drainage Strategy Drawing

The Alan Johnston Partnership		Page 1
1 Dale Street Liverpool L2 2ET	Golcar Phase 2 Clay Well Huddersfield	
Date 29/10/2019 11:59 File 219-238 SW NETWORK 1.MDX	Designed by TC Checked by	
XP Solutions	Network 2016.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.288	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.192	4-8	0.049

Total Area Contributing (ha) = 0.241

Total Pipe Volume (m³) = 44.227

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	21.653	0.054	401.0	0.081	5.00	0.0	0.600	o	1200	Pipe/Conduit	
2.000	16.483	0.041	402.0	0.081	5.00	0.0	0.600	o	1200	Pipe/Conduit	
1.001	9.735	0.974	10.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	7.491	0.749	10.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	19.888	1.989	10.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	43.44	5.19	176.219	0.081	0.0	0.0	0.0	1.86	2106.0	9.5
2.000	43.60	5.15	176.207	0.081	0.0	0.0	0.0	1.86	2103.2	9.6
1.001	43.28	5.24	176.165	0.162	0.0	0.0	0.0	3.21	56.7	19.0
1.002	43.15	5.28	175.191	0.162	0.0	0.0	0.0	3.20	56.6	19.0
1.003	42.82	5.39	174.442	0.162	0.0	0.0	0.0	3.21	56.6	19.0

Network Design Table for Storm

Network Results Table

Free Flowing Outfall Details for Storm

1.005	172.821	169.964	169.458	0	0
-------	---------	---------	---------	---	---

Simulation Criteria for Storm

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

The Alan Johnston Partnership		Page 3
1 Dale Street Liverpool L2 2ET	Golcar Phase 2 Clay Well Huddersfield	
Date 29/10/2019 11:59 File 219-238 SW NETWORK 1.MDX	Designed by TC Checked by	
XP Solutions Network 2016.1.1		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: 2, DS/PN: 1.001, Volume (m³): 54.4

Unit Reference	MD-SHE-0075-5000-4500-5000
Design Head (m)	4.500
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	176.165
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	4.500	5.0
Flush-Flo™	0.323	2.6
Kick-Flo®	0.674	2.1
Mean Flow over Head Range	-	3.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.1	1.200	2.7	3.000	4.1	7.000	6.1
0.200	2.5	1.400	2.9	3.500	4.4	7.500	6.3
0.300	2.6	1.600	3.1	4.000	4.7	8.000	6.5
0.400	2.6	1.800	3.3	4.500	5.0	8.500	6.7
0.500	2.5	2.000	3.4	5.000	5.2	9.000	6.9
0.600	2.3	2.200	3.6	5.500	5.5	9.500	7.1
0.800	2.2	2.400	3.7	6.000	5.7		
1.000	2.5	2.600	3.9	6.500	5.9		

Hydro-Brake® Optimum Manhole: 6, DS/PN: 1.005, Volume (m³): 17.8

Unit Reference	MD-SHE-0083-5000-3000-5000
Design Head (m)	3.000
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	83
Invert Level (m)	170.763
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

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The Alan Johnston Partnership		Page 4																																																																								
1 Dale Street Liverpool L2 2ET	Golcar Phase 2 Clay Well Huddersfield																																																																									
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The Alan Johnston Partnership		Page 5
1 Dale Street Liverpool L2 2ET	Golcar Phase 2 Clay Well Huddersfield	
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XP Solutions	Network 2016.1.1	

Storage Structures for Storm

Cellular Storage Manhole: 5, DS/PN: 1.004

Invert Level (m) 173.440 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	44.0	44.0	0.900	0.0	68.0
0.800	44.0	68.0			

The Alan Johnston Partnership		Page 7
1 Dale Street Liverpool L2 2ET	Golcar Phase 2 Clay Well Huddersfield	
Date 29/10/2019 11:59 File 219-238 SW NETWORK 1.MDX	Designed by TC Checked by	
XP Solutions	Network 2016.1.1	

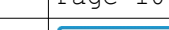
1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

			Surcharged	Flooded		Pipe		
	US/MH	Depth	Volume	Flow /	Overflow	Flow		Level
PN	Name	(m)	(m³)	Cap.	(l/s)	(l/s)	Status	Exceeded
1.005	6	0.962	0.000	0.07		3.3	SURCHARGED	

The Alan Johnston Partnership		Page 9
1 Dale Street Liverpool L2 2ET	Golcar Phase 2 Clay Well Huddersfield	
Date 29/10/2019 11:59 File 219-238 SW NETWORK 1.MDX	Designed by TC Checked by	
XP Solutions	Network 2016.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

			Surcharged	Flooded		Pipe		
	US/MH	Depth	Volume	Flow /	Overflow	Flow		Level
PN	Name	(m)	(m³)	Cap.	(l/s)	(l/s)	Status	Exceeded
1.005	6	2.247	0.000	0.09		4.5	SURCHARGED	

The Alan Johnston Partnership		Page 10
1 Dale Street Liverpool L2 2ET	Golcar Phase 2 Clay Well Huddersfield	
Date 29/10/2019 11:59 File 219-238 SW NETWORK 1.MDX	Designed by TC Checked by	
XP Solutions	Network 2016.1.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

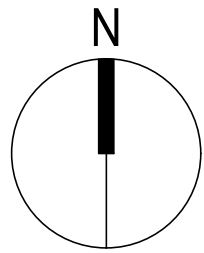
Simulation Criteria

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Rainfall Model	FSR	Ratio R	0.293
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	19.000	Cv (Winter)	0.840

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Surcharged	Flooded	Flow / Cap.	Overflow (l/s)	Pipe	Status	Level Exceeded
		Depth (m)	Volume (m³)			Flow		
1.000	1	1.300	0.000	0.00		6.1	SURCHARGED	
2.000	2	1.313	0.000	0.01		6.0	FLOOD RISK	
1.001	2	2.414	0.000	0.08		3.8	SURCHARGED	
1.002	3	-0.122	0.000	0.08		3.8	OK	
1.003	4	-0.124	0.000	0.07		3.8	OK	
1.004	5	1.222	0.000	0.09		4.8	SURCHARGED	



- IMPORTANT NOTES**
- SETTING OUT SHALL BE UNDERTAKEN USING ONLY THE INFORMATION GIVEN. DISTANCES SHOULD NOT BE SCALED FROM THIS DRAWING.
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 - DOMESTIC DRAINAGE SHALL BE TO BUILDING REGULATIONS APPROVED DOCUMENT H. 110mm U.P.V.C. PIPES LAID TO THE FOLLOWING MINIMUM FALLS UNLESS OTHERWISE SHOWN.

HEAD RUN	FOUL	S.W.
1 IN 40	1 IN 60	1 IN 80
ELSEWHERE	1 IN 80	1 IN 100

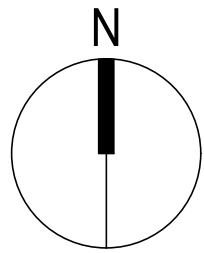
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- ALL MANHOLE COVERS TO BE RECESSED TO ACCEPT FINISH AS DETAILED BY LANDSCAPE ARCHITECT
- SLOW REST BENDS TO BE USED IN ALL LOCATIONS MADE UP FROM 2No. 45 DEG BENDS (600mm TO INVERT FROM FFL)
- MANHOLE POSITIONS AND ACCESS COVERS TO BE ACCURATELY SET-OUT BY LANDSCAPE ARCHITECT TO SUIT EXTERNAL FINISHES
- ALL DRAINS CAST THROUGH FOUNDATIONS TO HAVE ROCKER PIPES ON BOTH SIDES OF FOUNDATION
- ALL POP UP POSITIONS TO BE CONFIRMED SET OUT DIMENSIONS TO BE AGREED & PROVIDED BY OTHERS
- ALL DISCHARGE RATES TO BE CONFIRMED BY M&E DESIGNER
- ALL SURFACE WATER COLLECTION FEATURES TO BE CONFIRMED BY THE LANDSCAPE ARCHITECT
- STORAGE HAS BEEN PROVIDED IN A CELLULAR STORAGE TANK AND UP-SIZED MANHOLES AND PIPES.
- EXISTING SEWER DEPTHS HAVE BEEN APPROXIMATED FROM LIMITED INFORMATION, NEW CONNECTIONS TO BE CONFIRMED PRIOR TO CONSTRUCTION OF ANY DRAINAGE WORKS.
- LANDSCAPE ARCHITECT TO CONFIRM GULLY AND DRAINAGE CHANNEL LOCATIONS TO LANDSCAPED AREAS.
- FOUL NETWORK TO BE CONFIRMED FOLLOWING CONFIRMATION OF BRANCH CONNECTION POINTS FROM BUILDING M&E DESIGNER
- CCTV SURVEY OF EXISTING SITE DRAINAGE REQUIRED PRIOR TO THE COMMENCEMENT OF ANY WORKS STARTING ON SITE

LEGEND

- PROPOSED SURFACE WATER DRAIN MANHOLE
- PROPOSED COMBINED WATER DRAIN MANHOLE
- EXISTING COMBINED WATER DRAIN MANHOLE
- EXISTING COMBINED WATER SEWER
- PROPOSED FOUL WATER SEWER
- PROPOSED SURFACE WATER SEWER

REV	DATE	DESCRIPTION	BY	CHK	APP
DRAWING STATUS: PRELIMINARY					
CLIENT: BRIERSTONE					
ARCHITECT: NICOL THOMAS					
PROJECT: GOLCAR PHASE 2 CLAY WELL HUDDERSFIELD					
TITLE: OUTLINE DRAINAGE LAYOUT					
STATUS: S2	PROJECT NUMBER: 219-238	DRAWING No: GOL-AJP-ZZ-00-DR-C-0001	REV: P02		
SCALE @ A1: 1:200	DESIGNED: TC	DRAWN: TC	CHECKED: JCM	APPROVED: JCM	DATE: 29.10.19
alan johnston partnership LLP CONSULTING STRUCTURAL & CIVIL ENGINEERS 1 Dale Street, Liverpool L2 2ET Tel: 0151 227 1462 Fax: 0151 225 1187 E-Mail: Mail@ajpsructeng.com					

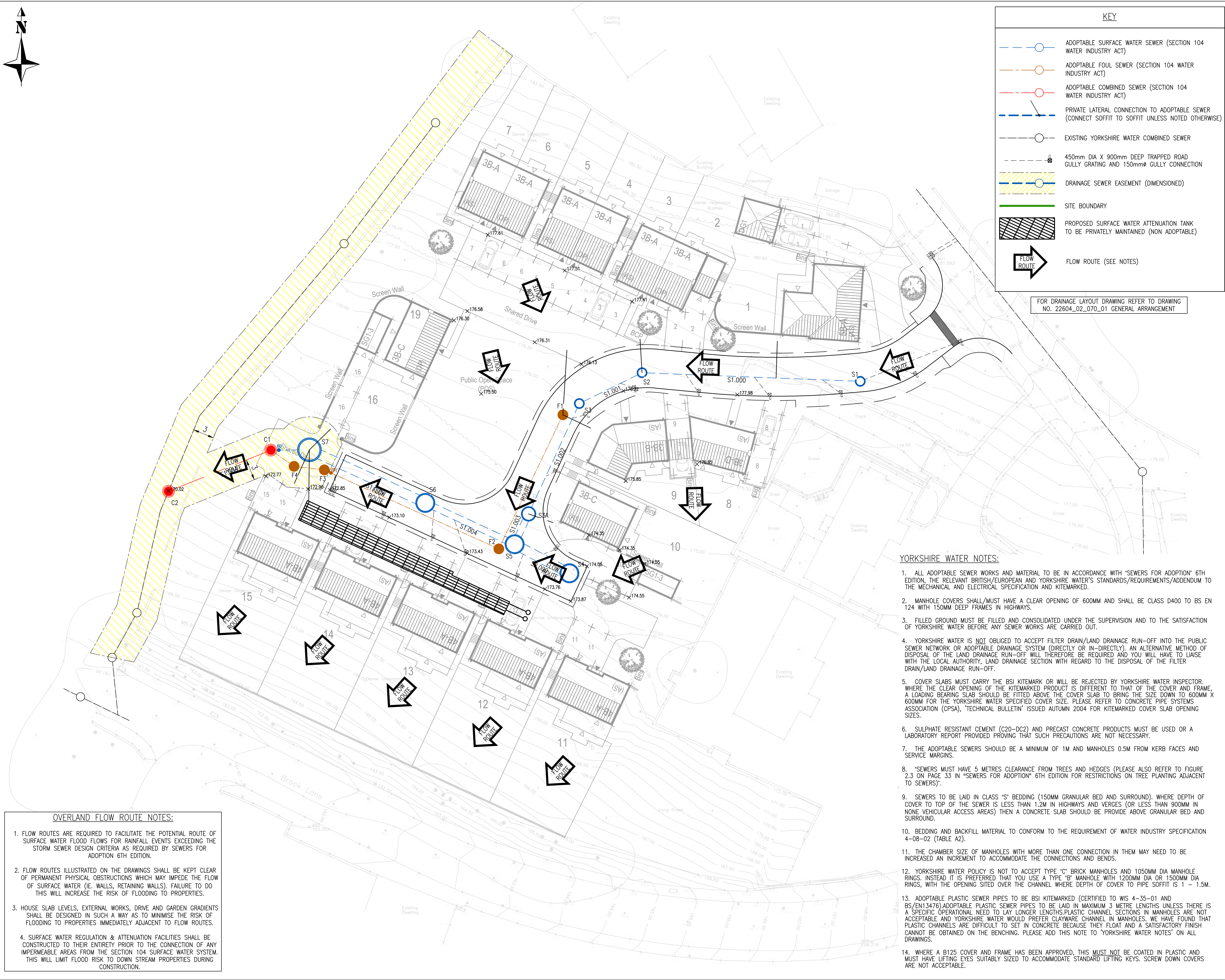
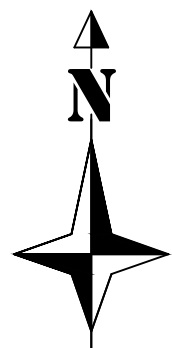
Appendix J Flow Routing Plan



- IMPORTANT NOTES**
- SETTING OUT SHALL BE UNDERTAKEN USING ONLY THE INFORMATION GIVEN. DISTANCES SHOULD NOT BE SCALED FROM THIS DRAWING.
 - ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH SEWERS FOR ADOPTION 7TH EDITION AND UNITED UTILITIES DETAILS & GUIDELINES.
 - THE MINIMUM GRAVITY PIPE DIAMETER UNDER ADOPTABLE HIGHWAYS SHALL BE 150mm
 - IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION GIVEN WITH REGARDS TO EXISTING SERVICES AND DRAINAGE CONNECTIONS ETC. PRIOR TO COMMENCING THE WORKS. THE RATES SHALL INCLUDE FOR HAND DIG AROUND SERVICES WHERE NECESSARY. THE CONTRACTOR SHALL ADHERE TO THE COM REGULATIONS AT ALL TIMES
 - THE OUTSIDES OF ALL SEWERS SHALL BE A MINIMUM OF 1.0m FROM KERB LINES AND THE OUTSIDE OF MANHOLES SHALL BE A MINIMUM OF 0.5m FROM KERB LINES
 - EXISTING FLOWS IN WATERCOURSES, SEWERS AND LAND DRAINS SHALL BE MAINTAINED AT ALL TIMES
 - ONLY TRAINED PERSONNEL SHALL BE PERMITTED TO ENTER CONFINED SPACES
 - ALL MATERIALS TO BEAR THE RELEVANT B.S. KITEMARK AND COMPLY FULLY WITH THE SPECIFICATIONS. ALL CONCRETE & CONCRETE PRODUCTS MUST USE SULPHATE RESISTANT CEMENT (UNLESS THE SITE INVESTIGATION REPORT PROVES THAT SULPHATE ATTACK FROM SOILS AND GROUNDWATER WILL NOT OCCUR TO WITHSTAND A CLASS
 - ALL OPENING NOTICES ETC. AS REQUIRED UNDER HIGHWAYS ACTS ETC. ARE TO BE OBTAINED PRIOR TO COMMENCEMENT OF WORKS. ALL WORKS ARE TO BE INSPECTED BY L.A., NHBC OR THE NETWORK OPERATOR AS APPLICABLE.
 - WHERE "ULTRA RIB" UPVC PIPES (OR SIMILAR APPROVED) ARE USED IN ADOPTABLE DRAINAGE THEY SHALL STILL BE HANDLED AND LAID IN ACCORDANCE WITH THE SPECIFICATION AND GUIDANCE ISSUED BY THE HIGH PERFORMANCE PIPE ASSOCIATION.
 - A CLASS 5 BED AND SURROUND MUST BE USED FOR SUCH PIPES. TRENCH BACKFILL IN HIGHWAYS TO WITHIN 1M OF HIGHWAY SHALL AS DIRECTED BY THE HIGHWAY AUTHORITY BE A SUITABLE GRANULAR MATERIAL ALL IN ACCORDANCE WITH SEWERS FOR ADOPTION CL 4.3.4
 - SLAB LEVELS SHALL NOT BE VARIED WITHOUT REFERENCE TO THE ENGINEER FOR GUIDANCE
 - DOMESTIC DRAINAGE SHALL BE TO BUILDING REGULATIONS APPROVED DOCUMENT H. 110mm U.P.V.C. PIPES LAID TO THE FOLLOWING MINIMUM FALLS UNLESS OTHERWISE SHOWN.

- LEGEND**
- PROPOSED SURFACE WATER DRAIN MANHOLE
 - PROPOSED COMBINED WATER DRAIN MANHOLE
 - EXISTING COMBINED WATER DRAIN MANHOLE
 - EXISTING COMBINED WATER SEWER
 - PROPOSED FOUL WATER SEWER
 - PROPOSED SURFACE WATER SEWER

REV	DATE	DESCRIPTION	BY	CHK	APP
DRAWING STATUS:					
PRELIMINARY					
CLIENT:					
BRIERSTONE					
ARCHITECT:					
NICOL THOMAS					
PROJECT:					
GOLCAR PHASE 2 CLAY WELL HUDDERSFIELD					
TITLE:					
OUTLINE DRAINAGE LAYOUT					
STATUS:	PROJECT NUMBER	DRAWING No:	REV:		
S2	219-238	GOL-AJP-ZZ-00-DR-C-0001	-		
SCALE @ A1:	DESIGNED:	DRAWN:	CHECKED:	APPROVED:	DATE:
1:200	TC	TC	JCM	JCM	29.10.19
alan johnston partnership LLP					
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KEY

ADOPTABLE SURFACE WATER SEWER (SECTION 104 WATER INDUSTRY ACT)

ADOPTABLE FOUL SEWER (SECTION 104 WATER INDUSTRY ACT)

ADOPTABLE COMBINED SEWER (SECTION 104 WATER INDUSTRY ACT)

PRIVATE LATERAL CONNECTION TO ADOPTABLE SEWER (CONNECT SOFFIT TO SOFFIT UNLESS NOTED OTHERWISE)

EXISTING YORKSHIRE WATER COMBINED SEWER

450mm DIA X 900mm DEEP TRAPPED ROAD GULLY GRATING AND 150mmØ GULLY CONNECTION

DRAINAGE SEWER EASEMENT (DIMENSIONED)

SITE BOUNDARY

PROPOSED SURFACE WATER ATTENUATION TANK TO BE PRIVATELY MAINTAINED (NON ADOPTABLE)

FLOW ROUTE (SEE NOTES)

FOR DRAINAGE LAYOUT DRAWING REFER TO DRAWING NO. 22604_02_070_01 GENERAL ARRANGEMENT

YORKSHIRE WATER NOTES:

- ALL ADOPTABLE SEWER WORKS AND MATERIAL TO BE IN ACCORDANCE WITH "SEWERS FOR ADOPTION" 6TH EDITION, THE RELEVANT BRITISH/EUROPEAN AND YORKSHIRE WATER'S STANDARDS/REQUIREMENTS/ADDENDUM TO THE MECHANICAL AND ELECTRICAL SPECIFICATION AND KITEMARKED.
- MANHOLE COVERS SHALL/MUST HAVE A CLEAR OPENING OF 600MM AND SHALL BE CLASS D400 TO BS EN 124 WITH 150MM DEEP FRAMES IN HIGHWAYS.
- FILLED GROUND MUST BE FILLED AND CONSOLIDATED UNDER THE SUPERVISION AND TO THE SATISFACTION OF YORKSHIRE WATER BEFORE ANY SEWER WORKS ARE CARRIED OUT.
- YORKSHIRE WATER IS NOT OBLIGED TO ACCEPT FILTER DRAIN/LAND DRAINAGE RUN-OFF INTO THE PUBLIC SEWER NETWORK OR ADOPTABLE DRAINAGE SYSTEM (DIRECTLY OR IN-DIRECTLY). AN ALTERNATIVE METHOD OF DISPOSAL OF THE LAND DRAINAGE RUN-OFF WILL THEREFORE BE REQUIRED AND YOU WILL HAVE TO LIAISE WITH THE LOCAL AUTHORITY, LAND DRAINAGE SECTION WITH REGARD TO THE DISPOSAL OF THE FILTER DRAIN/LAND DRAINAGE RUN-OFF.
- COVER SLABS MUST CARRY THE BSI KITEMARK OR WILL BE REJECTED BY YORKSHIRE WATER INSPECTOR. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOADING BEARING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO 600MM X 600MM FOR THE YORKSHIRE WATER SPECIFIED COVER SIZE. PLEASE REFER TO CONCRETE PIPE SYSTEMS ASSOCIATION (CPSA), "TECHNICAL BULLETIN" ISSUED AUTUMN 2004 FOR KITEMARKED COVER SLAB OPENING SIZES.
- SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
- THE ADOPTABLE SEWERS SHOULD BE A MINIMUM OF 1M AND MANHOLES 0.5M FROM KERB FACES AND SERVICE MARGINS.
- "SEWERS MUST HAVE 5 METRES CLEARANCE FROM TREES AND HEDGES (PLEASE ALSO REFER TO FIGURE 2.3 ON PAGE 33 IN "SEWERS FOR ADOPTION" 6TH EDITION FOR RESTRICTIONS ON TREE PLANTING ADJACENT TO SEWERS)".
- SEWERS TO BE LAID IN CLASS "S" BEDDING (150MM GRANULAR BED AND SURROUND). WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN 1.2M IN HIGHWAYS AND VERGES (OR LESS THAN 900MM IN NON VEHICULAR ACCESS AREAS) THEN A CONCRETE SLAB SHOULD BE PROVIDE ABOVE GRANULAR BED AND SURROUND.
- BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENT OF WATER INDUSTRY SPECIFICATION 4-08-02 (TABLE A2).
- THE CHAMBER SIZE OF MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
- YORKSHIRE WATER POLICY IS NOT TO ACCEPT TYPE "C" BRICK MANHOLES AND 1050MM DIA MANHOLE RINGS. INSTEAD IT IS PREFERRED THAT YOU USE A TYPE "B" MANHOLE WITH 1200MM DIA OR 1500MM DIA RINGS, WITH THE OPENING SITED OVER THE CHANNEL WHERE DEPTH OF COVER TO PIPE SOFFIT IS 1 - 1.5M.
- ADOPTABLE PLASTIC SEWER PIPES TO BE BSI KITEMARKED (CERTIFIED TO WIS 4-35-01 AND BS/EN13476).ADOPTABLE PLASTIC SEWER PIPES TO BE LAID IN MAXIMUM 3 METRE LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER LENGTHS.PLASTIC CHANNEL SECTIONS IN MANHOLES ARE NOT ACCEPTABLE AND YORKSHIRE WATER WOULD PREFER CLAYWARE CHANNEL IN MANHOLES. WE HAVE FOUND THAT PLASTIC CHANNELS ARE DIFFICULT TO SET IN CONCRETE BECAUSE THEY FLOAT AND A SATISFACTORY FINISH CANNOT BE OBTAINED ON THE BENCHING. PLEASE ADD THIS NOTE TO "YORKSHIRE WATER NOTES" ON ALL DRAWINGS.
- WHERE A B125 COVER AND FRAME HAS BEEN APPROVED, THIS MUST NOT BE COATED IN PLASTIC AND MUST HAVE LIFTING EYES SUITABLY SIZED TO ACCOMMODATE STANDARD LIFTING KEYS. SCREW DOWN COVERS ARE NOT ACCEPTABLE.

OVERLAND FLOW ROUTE NOTES:

- FLOW ROUTES ARE REQUIRED TO FACILITATE THE POTENTIAL ROUTE OF SURFACE WATER FLOOD FLOWS FOR RAINFALL EVENTS EXCEEDING THE STORM SEWER DESIGN CRITERIA AS REQUIRED BY SEWERS FOR ADOPTION 6TH EDITION.
- FLOW ROUTES ILLUSTRATED ON THE DRAWINGS SHALL BE KEPT CLEAR OF PERMANENT PHYSICAL OBSTRUCTIONS WHICH MAY IMPEDE THE FLOW OF SURFACE WATER (IE. WALLS, RETAINING WALLS). FAILURE TO DO THIS WILL INCREASE THE RISK OF FLOODING TO PROPERTIES.
- HOUSE SLAB LEVELS, EXTERNAL WORKS, DRIVE AND GARDEN GRADIENTS SHALL BE DESIGNED IN SUCH A WAY AS TO MINIMISE THE RISK OF FLOODING TO PROPERTIES IMMEDIATELY ADJACENT TO FLOW ROUTES.
- SURFACE WATER REGULATION & ATTENUATION FACILITIES SHALL BE CONSTRUCTED TO THEIR ENTIRETY PRIOR TO THE CONNECTION OF ANY IMPERMEABLE AREAS FROM THE SECTION 104 SURFACE WATER SYSTEM. THIS WILL LIMIT FLOOD RISK TO DOWN STREAM PROPERTIES DURING CONSTRUCTION.

NOTES:

- DO NOT SCALE THIS DRAWING.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SPECIALIST DESIGN DRAWINGS AND DETAILS.
- ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
- ANY DISCREPANCIES NOTED ON SITE ARE TO BE REPORTED TO THE ENGINEER IMMEDIATELY.
- THE CONTRACTOR SHALL CHECK ALL TIE-INS FOR LINE AND LEVEL WITH EXISTING BEFORE COMMENCING ANY WORKS. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY IN WRITING, SHOULD ANY ERRORS BE FOUND.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ANY SERVICE APPARATUS IN THE VICINITY OF THE WORKS. THE CLIENT WILL ACCEPT NO CLAIMS WHATSOEVER IN RESPECT OF ANY LOSSES OR DAMAGE CAUSED IN RESPECT OF SUCH APPARATUS, HOWEVER CAUSED.
- IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO EXECUTE THE WORKS AT ALL TIMES IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE HEALTH AND SAFETY AT WORK ACT 1974, AND THE C.D.M. REGULATIONS 2015. THE CONTRACTOR WILL BE DEEMED TO HAVE ALLOWED FOR FULL COMPLIANCE, INCLUDING FULL LIAISON WITHIN HIS RATES.
- THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ALL WORKS ARE TO THE SATISFACTION OF THE ENGINEER, AND SHALL BE DEEMED TO HAVE INCLUDED WITHIN HIS RATES FOR ANY NECESSARY TESTING.
- THE CONTRACTOR WILL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY DE-WATERING AND TRENCH SUPPORT TO EXECUTE THE WORKS IN A SATISFACTORY MANNER, AND SHALL BE DEEMED TO HAVE ALLOWED FOR THE SAME WITHIN HIS RATES.
- FOR HIGHWAY & DRAINAGE LONGITUDINAL SECTIONS REFER TO DRG NO. 22604_02_110_02.
- ALL BURIED CONCRETE PRODUCTS AND MORTAR SHALL BE MADE USING SULPHATE RESISTING CEMENT.
- ALL DRAINAGE WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH SEWERS FOR ADOPTION 6TH EDITION SPECIFICATION AND DRG NO. 22604_02_080_02.
- REFERENCES:
 - M1074-003 PLANNING LAYOUT BY NINETEEN47 ISSUED 16TH FEBRUARY 2018.
 - 1805/001 TOPOGRAPHICAL SURVEY BY STAMFORD GEOMATICS LTD. ISSUED 31ST OCTOBER 2017.
 - 13478/A18 TREE PROTECTION PLAN BY JCA LTD. ISSUED SEPTEMBER 2017.
 - SEWER ALIGNMENT ISSUED BY BRIERSTONE LTD. ON 31ST JANUARY 2018.

SITE REFERENCE NUMBER:
H-3-264-011

F	SECTION 38 APPROVAL	MF	JG	21.09.18
E	SIGN COMMENTS	JG	TR	07.07.18
D	SIGN COMMENTS, SPOT LEVELS ADDED	RS	TR	06.06.18
C	SITE LAYOUT AMENDED	ARD	JG	17.05.18
B	SITE REFERENCE NUMBER CHANGED	RP	JG	28.03.18
A	GULLY CONNECTION AMENDED ON ROAD 2	RP	JG	21.03.18
REV	AMENDMENTS	DRN	CHK	DATE:

PROJECT:

CARR TOP LANE
GOLCAR
HUDDERSFIELD

DRAWING TITLE:

FLOOD ROUTING
PLAN

CLIENT:

BRIERSTONE LTD.

DRAWING NUMBER:

22604_02_070_06

REVISION:

F

SHEET SIZE:

A1

SCALE:

1:250

DRAWN BY:

RP

CHECKED BY:

JG

DATE:

15.03.18

STATUS:

FOR CONSTRUCTION

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LICENCE NUMBER 100055845.

File Location: T:\M-EC Job Books\22604_MDrawings\02_sewer_infrastructure\22604_02_070_06_flood_routing_plan.dwg
Printed: 26.09.2018