Onn Point
CIVIL ENGINEERING

FLOOD RISK ASSESSMENT

Pagefield Hotel, 168 Gidlow Lane, Wigan, WN6 7AW

Prepared by

Andy Bannister

Senior Civil Engineer

October 2024

Revision Schedule

Version no.	Date	Checked by	Description
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Contents

1. Introduction

1.1. Background

1.1.1. Onn Point Engineering has been commissioned on behalf of the client to prepare a Flood Risk Assessment for the planning application for the proposed conversion of the existing basement at the Pagefield Hotel, 168 Gidlow Lane, Wigan, WN6 7AW to create one new apartment and one new office.

1.1.2. This Flood Risk Assessment (FRA) report has been prepared by Andrew Bannister, a Member of the Institute of Highway Engineers with over 22 years' experience working in environmental and engineering consultancy.

1.1.3. This report has been written to comply with chapter 14 of the National Planning Policy Framework (NPPF) and Wigan Council's Preliminary Flood Risk Assessment (PFRA), Strategic Flood Risk Assessment (SFRA) and Local Flood Risk Management Strategy.

1.1.4. The Flood Risk Assessment will be part of a Planning Application to be made to Wigan Council.

2. Local Policy & Consultation

2.1. Lead Local Flood Authority (LLFA)

2.1.1. The Lead Local Flood Authority (LLFA) for the site locality is Wigan Council. Wigan Council has a Preliminary Flood Risk Assessment (PFRA), Strategic Flood Risk Assessment (SFRA) and Local Flood Risk Management Strategy which define flooding and drainage requirements.

2.1.2. Key items within the LLFA's SuDS drainage guidance are:

a) An allowance needs to be made for the climate change over the life of the development for the 1 in 100-year event with an allowance for climate change as per the latest EA's guidance.

b) Use of SuDS (where possible use of strategic SuDS should be made)

c) Discharge rates should be restricted to Greenfield rates as a maximum.

d) Brownfield sites should seek to discharge surface water from the redeveloped site at Greenfield rates wherever possible. As a minimum, betterment should be offered (in terms of reduced runoff) for all redeveloped sites.

e) 1 in 100-year attenuation of surface water, taking into account climate change.

2.2. Application of Flood Risk Policy

2.2.1. Based on the EA's flood maps it is possible to undertake an initial site flood risk compatibility assessment to ascertain whether the proposed development site is presently suitable for development by referring to the flood zone compatibility matrix Table 1.

		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood Zones	**Zone 1**	√	√	√	√	√
	Zone 2	√	√	Exception Test required	√	√
	Zone 3a	Exception Test required	√	x	Exception Test required	√
	Zone 3b Functional Floodplain	Exception Test required	√	x	x	x

Table 1. Flood Risk Vulnerability and Flood Zone Compatibility

Key: *√ - Development is appropriate*
x - Development should not be permitted

3. Site Overview

3.1. Location

3.1.1. The site is located within an urban location in the northern part of the town of Wigan, off Gidlow Lane, WN6 7AW and comprises an existing abandoned public house. The development area is approximately 0.05 hectares in total, with approximate O.S. Land Ranger Grid Reference of SD574063 (approximate site coordinates of X: 357469 Y: 406394) with What3Words reference dash.seat.fees. The site location is displayed within Figure 1 and location plan is included within Appendix A.

Figure 1. Site location indicated by the red pin (© 2022 Ordnance Survey)

3.1.2. The location of the proposed site in relation to the surrounding area can be seen in Figure 2 below. The site area bounded in red is located off Gidlow Lane to the east and Park Road (B5375) to the south and is currently accessed via an existing asphalt private access junction off Gidlow Lane. The site is bounded on two sides by main roads (Park Road (B5375) to the south and Gidlow Lane to the east) with and existing bowling green/undeveloped green area to the west and existing private dwellings to the north. The surrounding area is urban in nature with the site laying within the northern part of the town of Wigan.

Figure 2. Site Location indicated by the red boundary (Source: www.google.com/maps)

3.2. Topography

3.2.1. The site is generally flat with slight falls across the site.

3.3. Watercourses

3.3.1. The closest waterbodies to the site are the Leeds and Liverpool Canal and the River Douglas which are located approximately 480m & 620m to the southwest respectively, and a culverted section of the Barley Brook approximately 80m southeast of the site.

3.4. Existing Drainage

3.4.1. The site has an existing abandoned public house located within the site area, and as such there is likely to be existing private drainage located on site.

3.5. Proposed Development

3.5.1. The proposed whole development comprises of the refurbishment of the existing 3 storey building into 10 No. residential apartments. However, this report mainly concerns the application for the proposed conversion of the existing basement to create one new apartment and one new office. A copy of the proposed site layout plan is contained in Appendix A.

3.6. Ground Conditions

3.6.1. At the time of writing, no site investigation has been undertaken. Therefore, a site desktop study has been undertaken to ascertain the nature of the existing underlying ground at the site. Publicly available data from the British Geological Survey (BGS) mapping services has been used to obtain details of the underlying bedrock and superficial deposits. The BGS service also includes information logged from boreholes and trial pits, these have been referenced below. The LandIS Soilscapes map has been consulted to gather information regarding the upper soil layers.

3.6.2. The BGS mapping indicates that the site is underlain by Pennine Lower Coal Measures Formation – Mudstone which is identified as being typically composed of Interbedded grey mudstone, siltstone and pale grey sandstone, commonly with mudstones containing marine fossils in the lower part, and more numerous and thicker coal seams in the upper part (source: BGS Lexicon of Named Rock Units) and is recorded as a Secondary A aquifer.

Figure 3. BGS Mapping Services – Bedrock Geology

3.6.3. The upper superficial deposit layers are identified as Till, Devensian – diamicton, which are varied unsorted glacial deposits of clay, sand, gravel, and boulders which vary widely in size and shape (source: BGS Lexicon of Named Rock Units) and is classed as a Secondary (undifferentiated) aquifer. Figure 4 shows an overview of the BGS map of the 1:50,000 scale records.

Figure 4. BGS Mapping Services – Superficial Deposits

3.6.4. Although there are no borehole records available within the site area itself, borehole records referenced SD50NE35, SD50NE82, SD50NE979 & SD50NE980 are available 148m southeast, 377m northwest and 449m west of the site area respectively. They show that the ground is underlain by varying layers of clay and sand overlaying mudstone/siltstone & coal measures. Water was encountered in two of the boreholes at 3.1m below ground level (SD50NE979) and 3.75m below ground level (SD50NE82) with resting water level of between 2.8m – 3.45m below ground level, recorded in the boreholes respectively. This is therefore a good indication of the local groundwater level being sufficiently below the surface. Refer to Appendix B for a copy of the borehole record summary page.

3.6.5. The Soilscapes map indicates that the nature of the upper soil layers throughout the site are likely to be slowly permeable seasonally wet acid loamy and clayey soils. Therefore, it is likely that runoff from the undeveloped areas in the locality discharge principally to the stream network or existing drainage network features.

3.6.6. The DEFRA Magic map indicates that the site does not lay within a groundwater source protection zone.

3.6.7. No Infiltration tests have been carried out on site at the time this report was being written.

3.6.8. From our review of the ground geology data, it is likely that the site ground will be unsuitable for infiltration drainage. However, infiltration tests in accordance with BRE digest 365 should be undertaken on the proposed development site, to confirm whether the infiltration rates within the site area are sufficient/insufficient to support the use of soakaways.

4. Site Flood Risk

4.1. Analysis

4.1.1. Flood risk comes from several sources including coastal, fluvial (rivers and watercourses), reservoirs (breaches or capacity related), pluvial (surface water 'overland' flows), groundwater and from drains and sewers. Table 1 below provides a summary of flood sources and their anticipated risk to the site. A qualitative approach has been taken in assessing the site flood risk, and the following sections provide greater detail and justification for the selected risk level.

Flood Consideration	Potential Risk				Description
	High	Medium	Low	None	
Tidal (Sea)				X	The site location is not within the vicinity of a tidal body of water.
Fluvial (Rivers)			X		The site falls within Flood Zone 1
Pluvial (Surface Water)			X		No areas of surface water flood risk identified on the EA long term flood risk map. No deep water or significant surface flows are evident
Artificial (Reservoirs)				X	The EA's flood risk map displays no local flooding risk from reservoirs
Groundwater		X			Wigan Council's PFRA indicates a medium risk of groundwater flooding.
Sewers			X		Wigan Council's PFRA & SFRA make no reference to any incidents of sewer flooding at the locality
Culverts			X		No flood risk issues from culverts have been identified
Highway Drainage			X		Small potential of highway flooding issues for the site access route have been identified. No risk to development directly
Access/Egress		X			The EA's flood risk map displays areas of low to medium risk of local flooding to Park Road (B5375)
Climate change			X		The site has been planned and designed to be resilient to climate change, therefore low risk
Effect of development on wider catchment			X		No increase of impermeable areas. Any new positive discharges & infrastructure captured and limited to existing runoff rates. The proposed development will comply with the LLFA SuDS requirements.

4.2. Flood Zone

4.2.1. The Environment Agency (EA) is responsible for the provision of information pertaining to flood risk from tidal and main watercourses throughout England and Wales. The EA provides an online information service through its flood map data.

4.2.2. Figure 5 displays an extract of the Environment Agency Flood Map for planning. This extract shows that the site is located within Flood Zone 1 and is therefore considered to be at low risk of flooding from rivers or the sea, which is defined as an area considered to have a low probability (less than 0.1 %) of fluvial flooding in any year.

Figure 5. EA Flood map for planning

4.3. Tidal & Fluvial Flooding

4.3.1. Tidal/Fluvial flooding occurs when sea levels rise and flow into a water course causing the water table levels to rise or water levels rise as a result of high or intense rainfall flowing into a watercourse, resulting in water courses overflowing their banks.

4.3.2. Reference has been made to the Environment Agency's 'Flood map for planning' to identify the site's flood risk category. As indicated in Figure 6, the site is located within Flood Zone 1 and therefore considered very low risk with a less than 1-in-1000 (0.1%) of flooding from tidal or fluvial flows.

4.3.3. Sea (Tidal) Flooding – The site is not located in the vicinity of the coast and is therefore not at risk of flooding due to tidal flows.

4.3.4. River (Fluvial) Flooding – The site is not located adjacent to any river or watercourse. As shown in Figure 6, the site does not fall within any areas designated as being at risk of fluvial flooding.

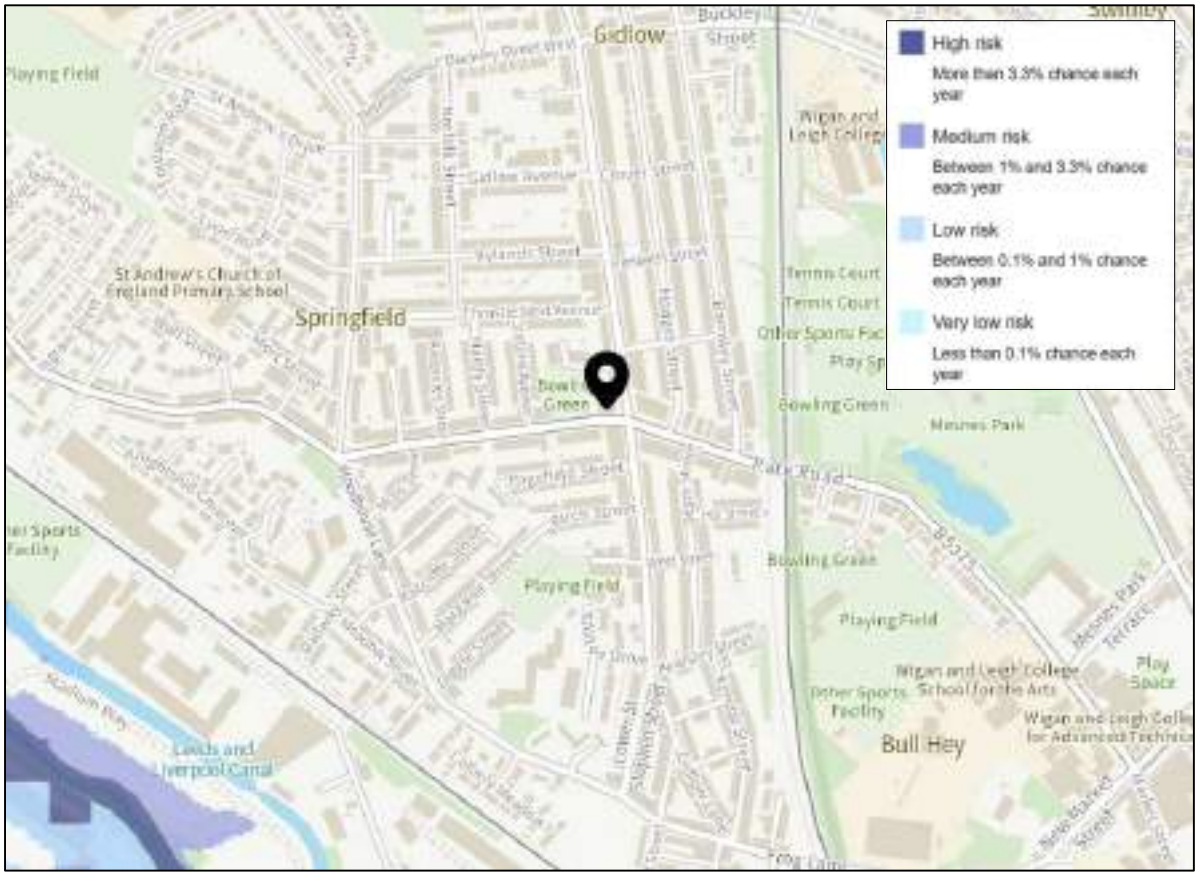


Figure 6. Tidal & Fluvial Flood risk map

4.4. Pluvial (Surface Water) Flooding

4.4.1. Surface water flooding can occur when heavy rainfall overwhelms the local drainage network and also depends on existing ground levels, rainfall, and the local drainage network. The EA website contains mapping of areas believed vulnerable to surface water flooding.

4.4.2. The Environment Agency surface water (SW) flooding maps shows no areas of the actual site as being at risk of surface water flooding as shown in Figure 7. However, Park Road (B5375) within the vicinity of the proposed site entrance and and Gidlow Lane to the east of the site are indicated as being at low to medium risk of flooding from surface water.

4.4.3. The flooding is shown as mainly being at low risk with water levels being very shallow at less than 300mm deep. Surface water flood risk needs to be considered further at the detailed design stage to ensure that the site levels do not lead to any surface water flood risk issues.

4.4.4. No significant flow routes crossing the proposed site area have been identified. We consider that due to the site layout, topography and ground conditions, that the development is at an overall low risk of surface water flooding.

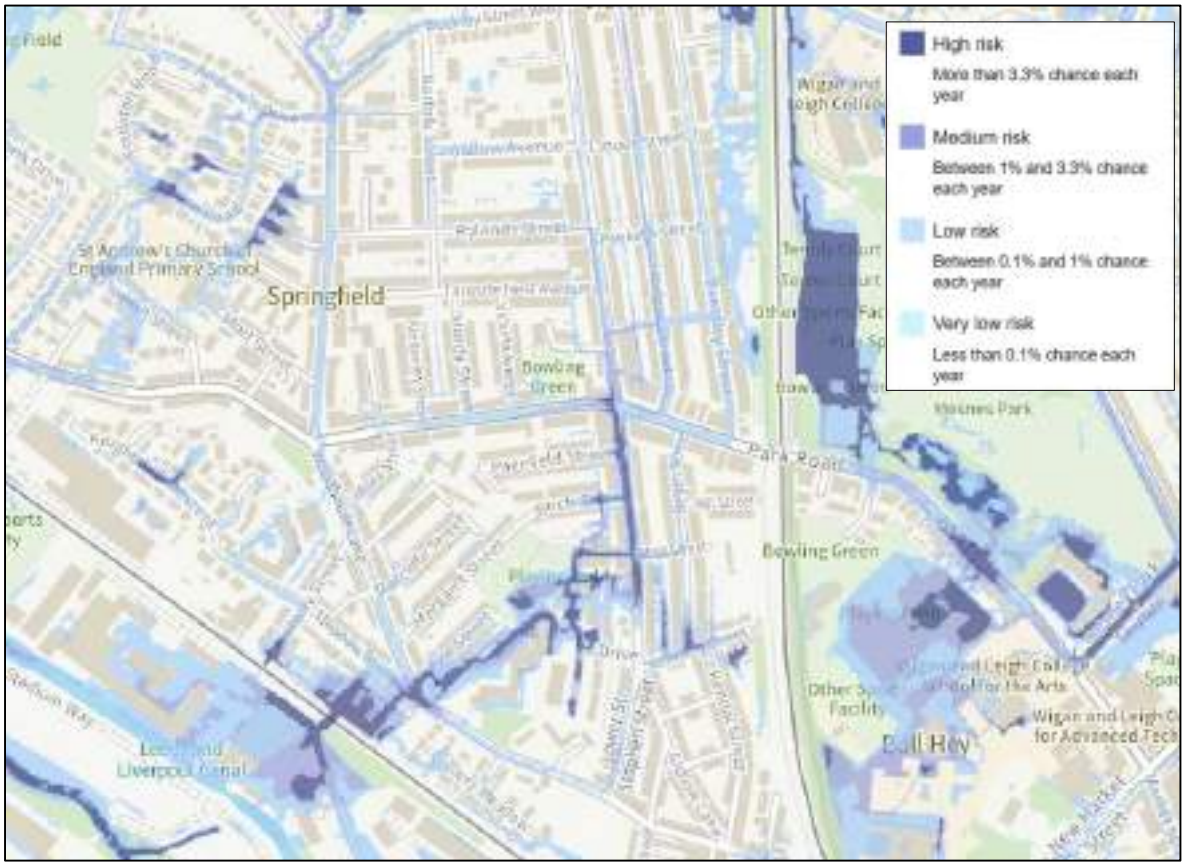


Figure 7. Surface Water Flood Risk

4.5. Artificial Flooding

4.5.1. Artificial sources include any water bodies not covered under other categories and typically include canals, lakes, and reservoirs.

4.5.2. The Environment Agency flooding maps (reservoirs) show no risk of flooding from this source as shown in Figure 8. No sources of flood risk from other artificial sources have been identified.

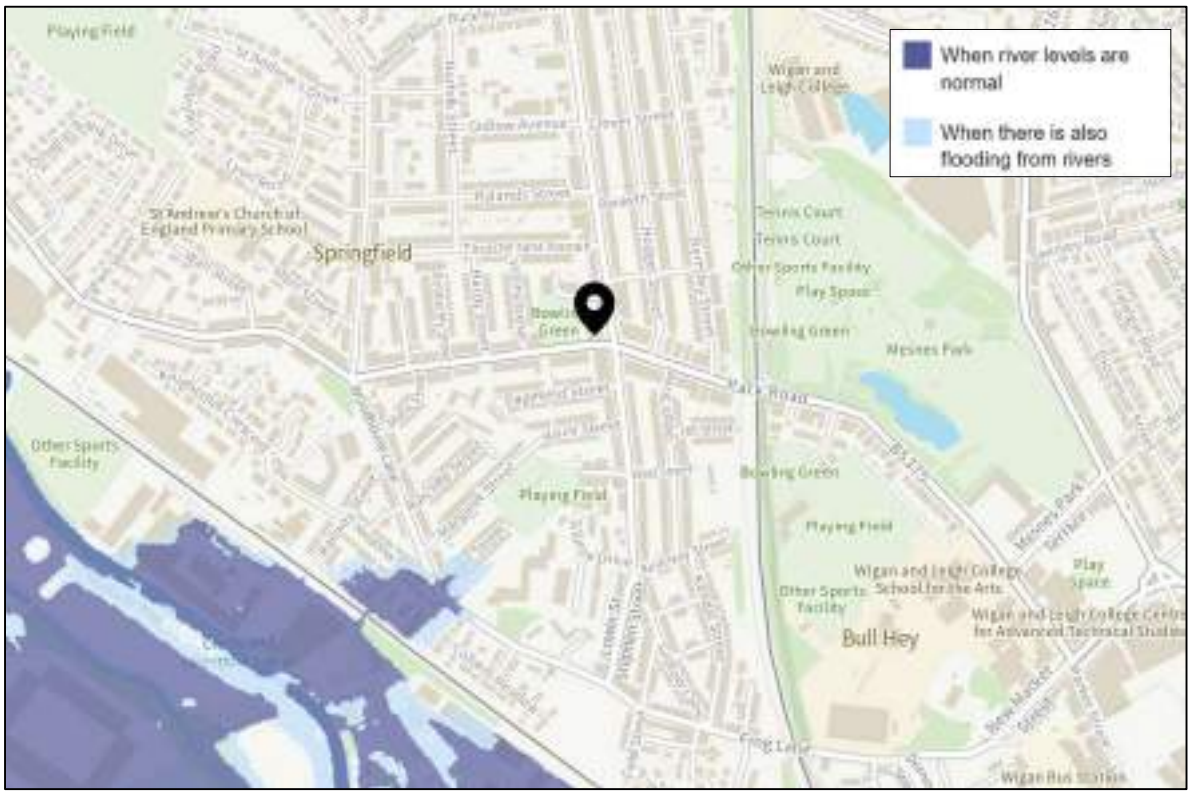


Figure 8. Flood risk from Reservoirs

4.6. Groundwater Flooding

4.6.1. Groundwater flooding is considered to be medium risk, Wigan Councils Preliminary Flood Risk Assessment (PFRA) Flood Risk Mapping Index indicates that the area of the site falls within an area designated as being within the >50% but <75% susceptibility classification of groundwater flooding. Borehole records in nearby locations indicate that groundwater is unlikely to be within 2m of the ground level and therefore it is unlikely to be high enough to impact the proposed development infrastructure.

4.7. Sewer Flooding

4.7.1. The Wigan Council Preliminary Flood Risk Assessment (PFRA) and Strategic Flood Risk Assessment (SFRA) Level 2, make no reference to incidents of sewer flooding within the vicinity of the site.

4.7.2. Therefore, we consider that sewer flooding is unlikely to impact the proposed development.

4.8. Culverts

4.8.1. Although the Wigan Council Preliminary Flood Risk Assessment (PFRA) and Strategic Flood Risk Assessment (SFRA) Level 2, make no reference to culvert flooding within the vicinity of the site, the Environment Agency Flood Map for planning show a culverted section of the Barley Brook running from approximately 800m north of the site into the River Douglas approximately 751m southwest of the site as being approximately 80m southeast of the site. However, no details of size or depth are available. We consider that there is no risk to the proposed development site from this culverted watercourse.

4.9. Highway Drainage

4.9.1. The Environment Agency surface water (SW) flooding maps show areas of Park Road (B5375) and Gidlow Lane to the south and east of the proposed development site respectively as being at low to medium risk of surface water flooding as shown in Figure 7. No sources of flood risk to the site directly from highway drainage have been identified.

4.10. Access/Egress

4.10.1. The main site access route is proposed to be taken from Park Road (B5375), with the site accessed directly from the private access junction off this road. During extreme rainfall flood events some localised flooding could occur along the site access routes and there may be times when the access routes to the site are restricted due to surface water flooding. However, this is likely to be very shallow at less than 300mm deep (as shown by the EA long term flood risk map), and due to the short-term nature of surface water flooding we anticipate that this will not restrict access for long periods of time.

4.11. Historical Flooding

4.11.1. Wigan Council Preliminary Flood Risk Assessment (PFRA) and Strategic Flood Risk Assessment (SFRA) Level 2, make no reference to historic flooding within the vicinity of the site.

4.11.2. The DEFRA website also indicates that there are no recorded flood outlines within the vicinity of the proposed development site.

4.12. Climate Change

4.12.1. The site is located within the Douglas Management Catchment. The EA 'higher central' prediction for Douglas catchment specifies 26% climate change factor for the 2050s and a 47% increase to the 2080s. Considering the design life for the site, the rate of increase in river flows for the later years of the development lifecycle is likely to be between 26% and 47%. Given the nature of the proposed development, we consider that climate change will not have a significant impact on the operation of the proposed development. The proposed development will not produce intensified run-off as discussed in 4.13 below, and therefore the effects of climate change are not anticipated to increase downstream flood risk.

4.13. Effect of Development on Wider Catchment

4.13.1. The proposed development will not create any increase in the amount of impermeable areas within the property boundary. We consider that the redevelopment of the property will not influence the total volumes of surface water runoff.

4.13.2. Runoff from the site once the proposed development has been constructed should be dealt with by incorporating appropriate sustainable drainage systems (SuDS) components where possible within the drainage strategy for the proposed development.

5. Mitigation

5.1. Flood Risk Management

5.1.1. The following flood risk management measures have been considered for the mitigation of any flood risks highlighted in the above:

1. External levels to be designed such as the surface water is directed away from any buildings/vulnerable areas.
2. The proposed development will incorporate a new surface water drainage system to capture the proposed development catchment and ensure no flooding during the 1 & 30Y event (including climate change), and any flooding during the 100Y event (including climate change) will be minimal and maintained within the development.
3. Wherever possible, Finished Floor Levels will be set at 150mm above the proposed/existing surroundings levels.
4. The drainage system/network for the proposed development should incorporate appropriate mechanisms such as non-return valves to prevent the surcharging of the developments drainage network should an overload of the external public sewer network occur due to an extreme rainfall event or blockage occur.

5.2. Residual Risks

5.2.1. Residual risks are the risks that remain once the flood risk management measures described above have been implemented. These are typically associated with extreme events that overwhelm drainage systems exceeding the flood levels used to design any mitigation measures. The primary residual risks that will affect this development are:

1. An extreme rainfall event which exceeds the capacity of the existing surface water drainage system to both intercept and convey the flows. During such an event, water that is unable to enter the formal drainage system will flow over the ground through the development. The risk can be reduced by designing site levels to direct any runoff towards an appropriate area.

6. Conclusion

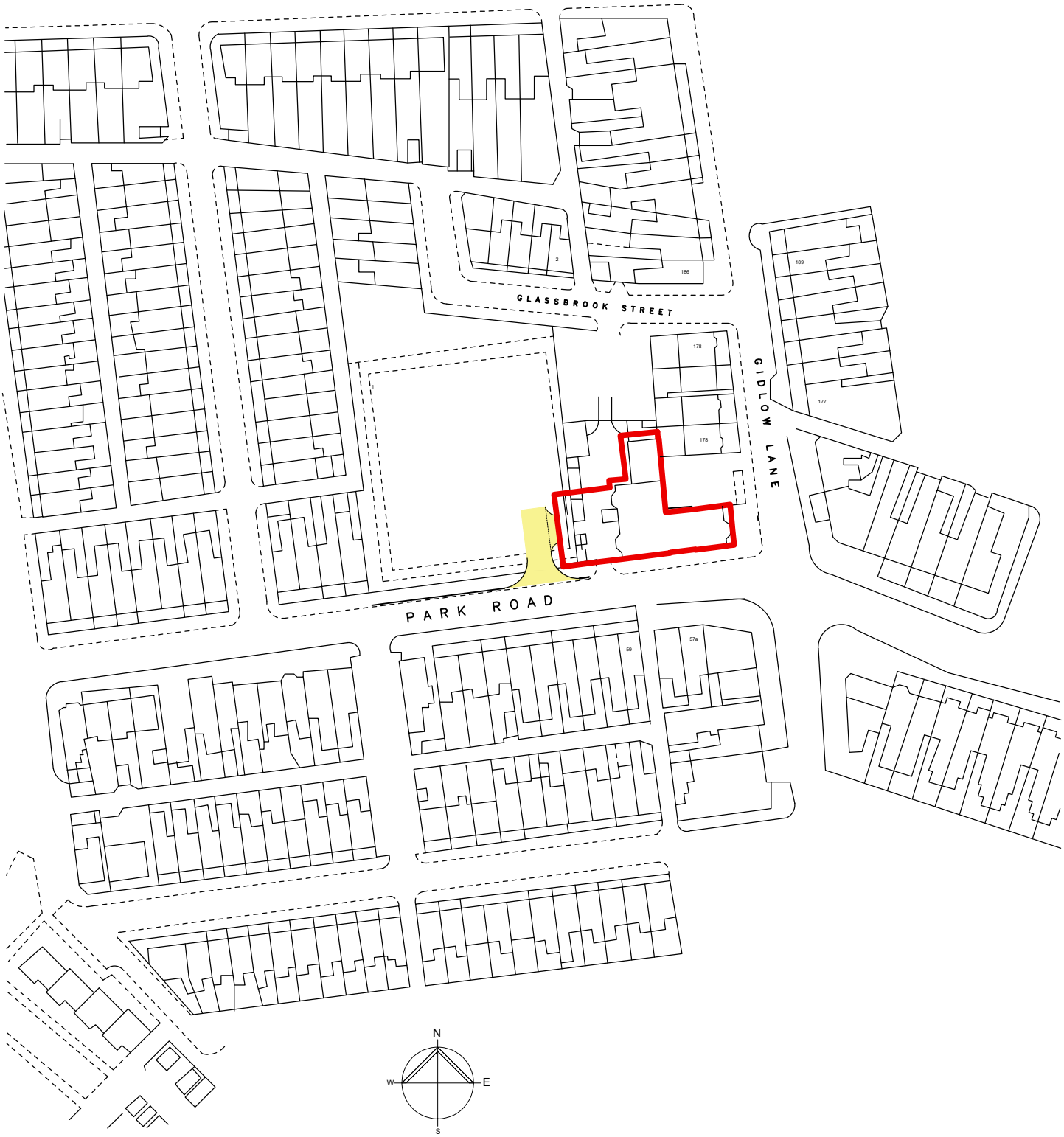
6.1.1. This site-specific Flood Risk Assessment has been prepared in accordance with NPPF guidance and local policy on Flood Risk. The government approved flood mapping shows the site to be located within Flood Zone 1, with the risk of flooding deemed to be very low risk with a low probability of 1 in 1000 (0.1%) of fluvial flooding in a year.

6.1.2. The proposed development will not have a material impact on the hydrology of the existing land. Any runoff from impermeable areas will be managed by appropriate SuDS components. This will ensure that the proposals do not increase the risk or intensity of downstream flooding.

6.1.3. The proposed development has been designed to ensure that the proposed infrastructure is resilient to local flood risk. Whilst there is some surface water flood risk posed on the access routes; this is generally not considered to impact upon the development. We consider therefore that the proposals do not increase the risk or intensity of downstream flooding.

6.1.4. Further to the above assessment, we are of the view that all foreseeable sources and receptors of flood risk as a result of the development have been considered.

Appendix A – Drawings



SCALE BAR 0 5 10 25M 50M 75M

PROPOSED LOCATION PLAN

CLIENT:	JAMIE HALL - MCG
DWG NO:	PL K1102/L
SCALE:	1/1250 @ A4
DRAWN BY:	R.P.
DATE:	17/01/24
REV:	

MICHIGAN HOUSE,17-19 CHORLEY NEW ROAD, BOLTON, BL1 4QR
TEL: 01204 392233 FAX: 01204 528505
WWW.NEILPIKEARCHITECTS.CO.UK EMAIL: INFO@NEILPIKEARCHITECTURE.CO.UK

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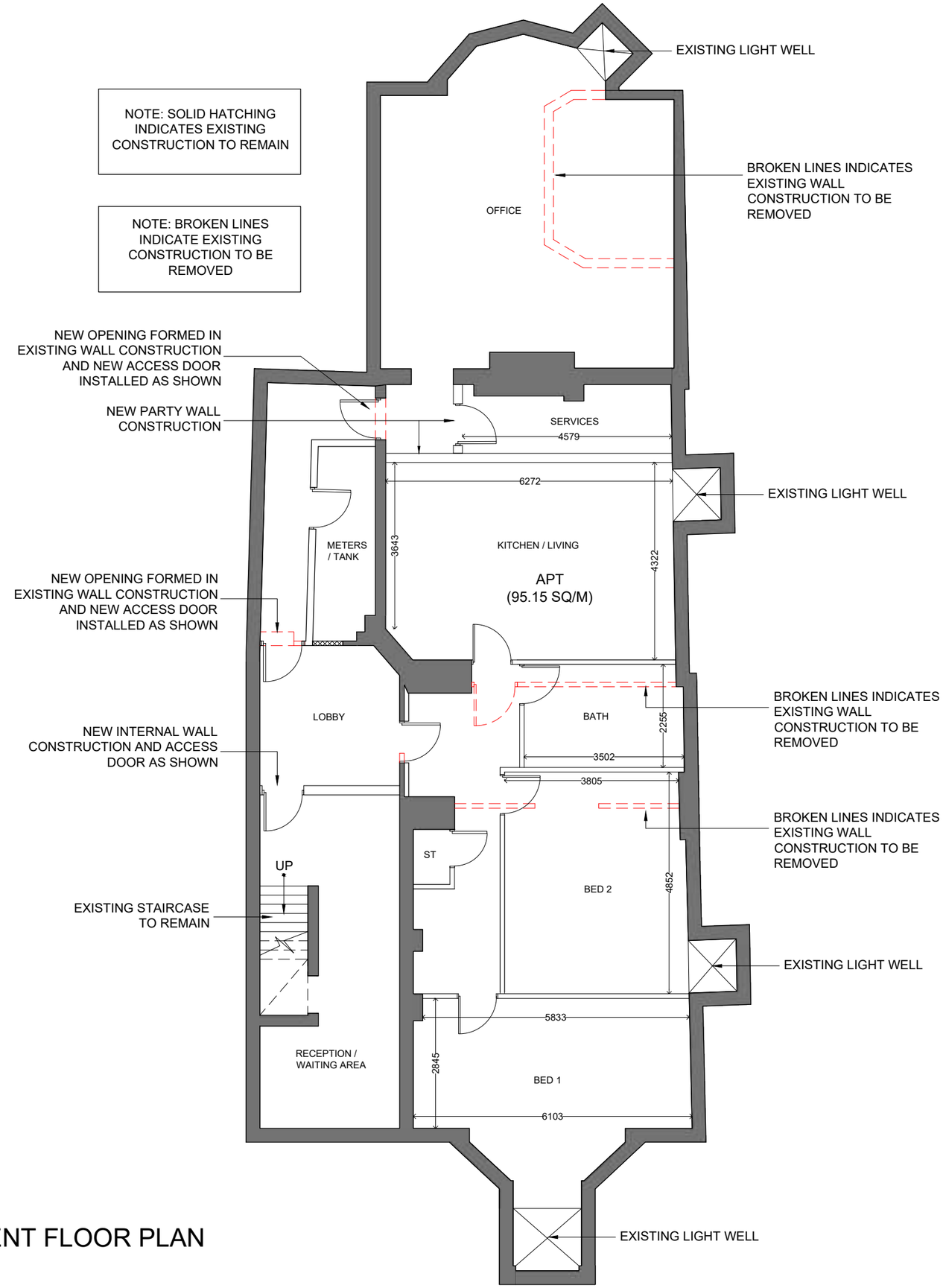

PROPOSED BASEMENT FLOOR PLAN

REV	DESCRIPTION
A	AMENDMENT TO LAYOUT TO FORM METER ROOM 21.06.24
B	AMMENDMENT TO FLOOR LAYOUT 24.06.24

PROPOSED BASEMENT FLOOR PLAN

PROPOSED CONVERSION OF BASEMENT TO 2-BED APARTMENT AND OFFICE
PAGEFIELD HOTEL, 168 GIDLOW LANE, WIGAN, WN6 7AW

CLIENT:	MCG N/W LTD
DWG NO:	BR K1102/25
SCALE:	1/100 @ A3
DRAWN BY:	R.P.
DATE:	07/06/24
REV:	B

NEIL PIKE ARCHITECTS
MICHIGAN HOUSE,17-19 CHORLEY NEW ROAD, BOLTON, BL1 4QR
TEL: 01204 392233 FAX: 01204 528505
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Appendix B – Borehole Information

SD 50 NE 35

SECTION OF Shaft at Bardsey Brook Colliery 19

5760 0637

Maps: One-inch 84 Six-inch 93NE County Lancs

Height above O.D. Latitude Longitude

Communicated by Date of sinking

Made by

BGS REGISTRATION NO.
SD 50 NE / 35
PAGE NO. 1

	Thickness (m)	Thickness (ft in)	Depth from surface (m)	Depth from surface (ft in)
Soil and clay	1.57	5 2	1.57	5 2
Black rock	[illegible]	22 2	8.33	27 4
Blue metal	[illegible]	23 10	[illegible]	51 2
Black rock	[illegible]	3	[illegible]	54 2
Blue metal	[illegible]	10	[illegible]	55 0
Black rock	[illegible]	9	[illegible]	55 9
Blue metal	[illegible]	12 3	[illegible]	68
Dark metal	[illegible]	7 10	[illegible]	76 10
Black bass	[illegible]	4	[illegible]	77 2
Coal [illegible]	[illegible]	10	[illegible]	78
Black rock	[illegible]	10	[illegible]	78 10
Blue metal	[illegible]	6 10	[illegible]	85 8
Black rock	[illegible]	1 8	[illegible]	87 4
Blue metal	[illegible]	3 2	[illegible]	89 6
Black rock	[illegible]	1	[illegible]	90 6
Blue metal	[illegible]	2	[illegible]	92 6
Black rock	[illegible]	1	[illegible]	93 6
Blue metal	[illegible]	10 2	[illegible]	103 8
Dark metal	[illegible]	6	[illegible]	109 8
Blue metal	[illegible]	5 4	[illegible]	115
Coal	[illegible]	6	[illegible]	115 6
Ironstone with streaks of Coal	[illegible]	9 3	[illegible]	124 9
Coal	[illegible]	1 6	[illegible]	126 3
Dark metal	[illegible]	5 6	[illegible]	131 9
Black rock	[illegible]	1	[illegible]	132 9
Blue metal	[illegible]	3	[illegible]	135 9
Ironstone	[illegible]	2	[illegible]	137 9
Dark metal with [illegible]	2.74	9	44.75	146 9

British Geological Survey

SD [illegible] 19

SECTION OF ..... at .....

Maps: One inch ..... Sheet ..... County .....

Height above O.D. ..... Latitude ..... Longitude .....

Communicated by ..... Date received .....

Made by ..... Dip & Strata .....

BGS REGISTRATION NO
SD 50 NE / 35

PAGE NO. 1

	Thickness		Depth from Surface	
	ft	in	ft	in
CARBONIFEROUS				
[illegible]	2	6	149	3
[illegible]	10	6	159	9
[illegible] CONGL		10	160	7
[illegible]	4	6	165	1
[illegible]	2	8	167	10
COAL — KING COAL	1	2	169	
[illegible]	2	4	171	4
COAL — KING COAL BOTTOMS	1	5	172	9
[illegible]	9		181	9
[illegible]	12	9	194	6
[illegible]	3		197	6
[illegible]	20	9	218	3
[illegible]	11		229	5
[illegible]	11		233	3
[illegible]	3	6	237	9
[illegible]	9		246	9
COAL		2	249	11
[illegible]	3		280	2
COAL	2	3	282	5
[illegible]	3		292	8
COAL — RAVEN MINE	1	2	283	10
[illegible]	3		286	10
COAL		10	287	8
[illegible]	4	5	292	1
COAL	2	4	294	5
[illegible]	6		300	5
[illegible]	30		330	5
[illegible]	2	2	332	7

d c5

British Geological Survey

SD 50 NE 19

SECTION OF ... at ...

Maps: One inch ... Six-inch ... County ...

Height above O.D. ... Latitude ... Longitude ...

Communicated by ... BGS REGISTRATION NO. ... Date of sinking ...

Made by ... SD 50 NE 19 ... Dip of strata ...

PAGE NO. 3

	Thickness		Depth from Surface	
	ft	in	ft	in
Blue metal		6	338	[illegible]
Coal		6	339	1
[illegible]	7	6	346	7
[illegible]	66		412	[illegible]
Blue metal	1	9	414	4
Coal	1		415	4
Black shale	2		417	4
Coal		3	417	7
[illegible]	1	7	419	2
Coal		6	419	8
[illegible]		3	419	11
Coal — YARD MINE	3	6	423	5
[illegible]	8	3	431	8
White rock	9		440	8
Blue stone	2		442	8
[illegible]	2		444	8
[illegible]	2	6	447	2
White rock	4		451	2
Blue metal	27	9	478	11
[illegible]	15		493	11
Blue metal	12		505	11
[illegible]	25	6	531	5
Coal		4	531	9
[illegible]	3		534	9
White rock	7	6	542	3
[illegible]	18		560	3
Coal		9	561	[illegible]
[illegible]		1	561	[illegible]

SD 50 NE 19

SECTION OF

Maps One-inch ... Six-inch ... County ...

Height above O.D. ... Latitude ... Longitude ...

Communicated by ... Date of sinking ...

Made by ... Depth of Shaft ...

BGS REGISTRATION NO. SD 50 NE / 35

PAGE NO. 4

	Thickness (metric)	Thickness ft	Thickness in	Depth from surface (metric)	Depth ft	Depth in
Coal	[illegible]	[illegible]	7	[illegible]	562	4
White rock	[illegible]	9		[illegible]	571	4
Coal	[illegible]		7	[illegible]	571	11
[illegible]	[illegible]	3		[illegible]	574	11
White rock	[illegible]	16	4	[illegible]	591	3
Grey do	[illegible]	15	7	[illegible]	606	10
Brown stone	[illegible]	3	6	[illegible]	610	4
White rock	[illegible]	15		[illegible]	625	4
Blue metal	[illegible]	3	4	[illegible]	628	8
Coal } SMITH'S COAL	[illegible]	1	4	[illegible]	630	
Light coloured shale } SMITH'S COAL	[illegible]	2	2	[illegible]	632	2
Coal } SMITH'S COAL	[illegible]		6	[illegible]	632	8
[illegible] } SMITH'S COAL	[illegible]	2	4	[illegible]	635	
Coal	[illegible]	2	2	[illegible]	637	2
White rock	[illegible]	30		[illegible]	667	2
Blue metal	[illegible]	4		[illegible]	671	2
COCKLE SHELL BED	[illegible]	2	7	[illegible]	673	9
White rock	[illegible]	8		[illegible]	681	9
Coal	[illegible]		2	[illegible]	681	11
Brown stone	[illegible]	4	2	[illegible]	686	1
White rock	[illegible]	9	4	[illegible]	695	5
Blue metal	[illegible]	7	4	[illegible]	702	9
White rock	[illegible]	13	7	[illegible]	716	4
Brown stone	[illegible]	6		[illegible]	722	4
White rock	[illegible]	19	7	[illegible]	741	11
Blue metal	[illegible]	7	6	[illegible]	749	5
Ironstone band	[illegible]		9	[illegible]	750	2
Blue metal	[illegible]	15		[illegible]	765	2

British Geological Survey

SD 50 NE 79

SECTION OF

BGS REGISTRATION NO.
SD 50 NE / 357
PAGE NO. 5

	Thickness ft	in	Depth from Surface ft	in
Ironstone band		4	765	6
Blue metal	5	3	770	9
Black bass	5	3	776	
Ironstone band		9	776	9
Black bass	6		782	9
Light metal	36		818	9
Hard light metal	12		830	9
Blue metal	6		836	9
Dark do	2	6	839	3
Black bass		9	840	
Bass Coal		2	840	2
Coal — ARLEY MINE	4	0	844	2

STRATA SURVEYS LIMITED	Location: **Central Wigan Sewer King Street**			Borehole No. **BH4**
	Client: BeWT		Project Ref: [illegible]	
	Equipment and methods: **Light cable percussion**			
Job No. 9069-41	Start Date: 14.11.97	End Date: 14.11.97	Final Depth: 5.50m	Casing: Diameter 150mm, Depth [illegible]

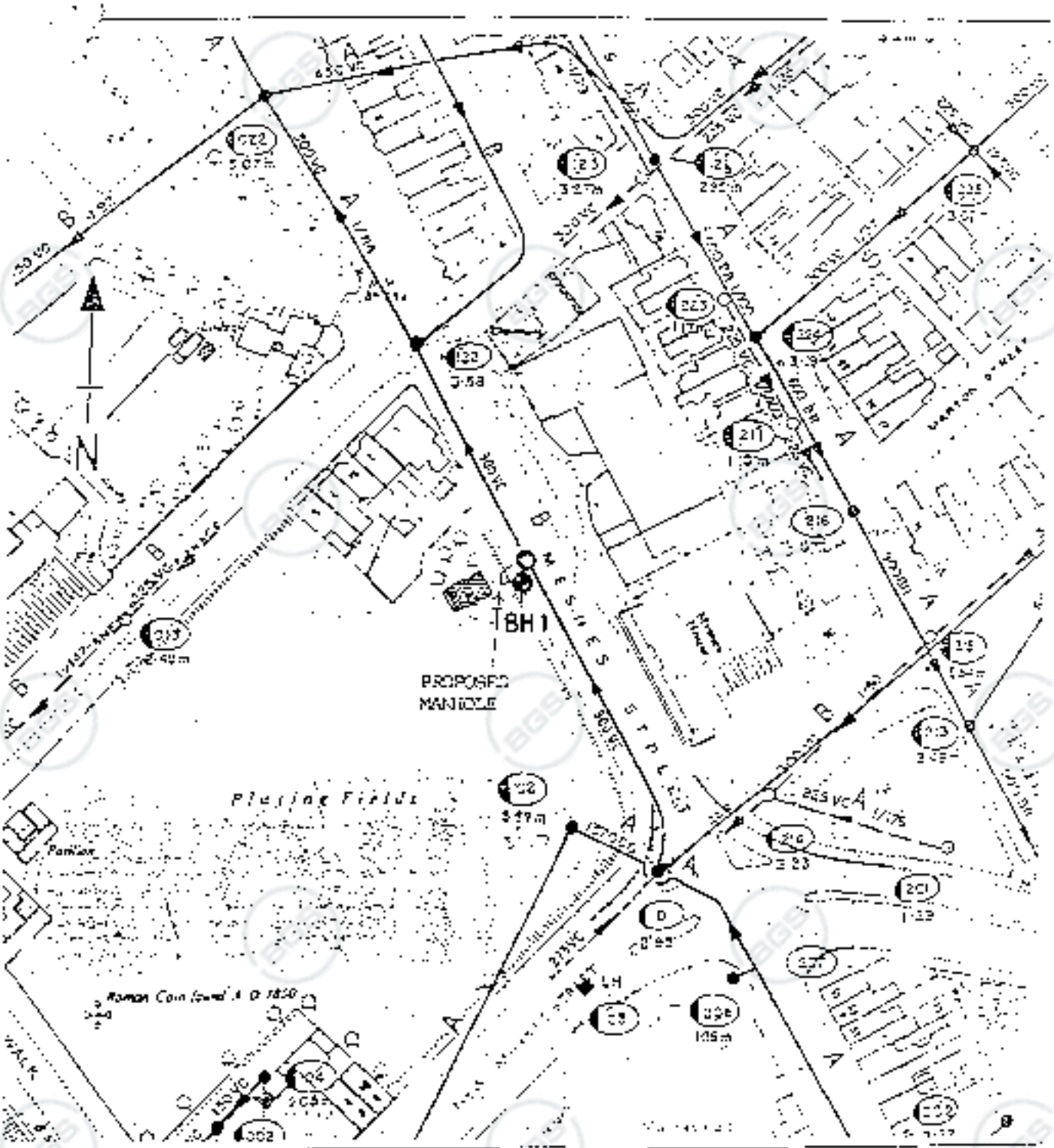
FIELD RECORDS	Water	Depth from	Depth to	Samples/Tests Type & No.	Tests	Description	Depth (m)	Level	Legend
		0.10		D1		MADE GROUND 0.15m asphalt over sandstone setts	[illegible]		
		0.50		D2		MADE GROUND [illegible] over grey mottled clay with occasional brick fragments	[illegible]	[illegible]	
		0.70		D3			[illegible]	[illegible]	
						Soft grey mottled sandy CLAY	[illegible]	[illegible]	
/6097		1.20	1.65	U1	[illegible]	Firm to stiff brown sandy CLAY with grey veins occasional fine to medium gravel and some organic material			
		1.65		D4					
/6097		2.20	2.65	U2	[illegible]		[illegible]		
		2.90		D5					
/6097		3.20	3.65	U3	[illegible]	[illegible]			
[illegible]	[illegible]	3.65	4.25	D6	[illegible]	[illegible]	3.70	[illegible]	
		3.75		B1		Medium dense brown clayey silty fine to medium SAND			
		3.75		S1					
							[illegible]		
/6097		4.80	5.25	U4					
		5.40		D7		Borehole Completed	5.50	[illegible]	

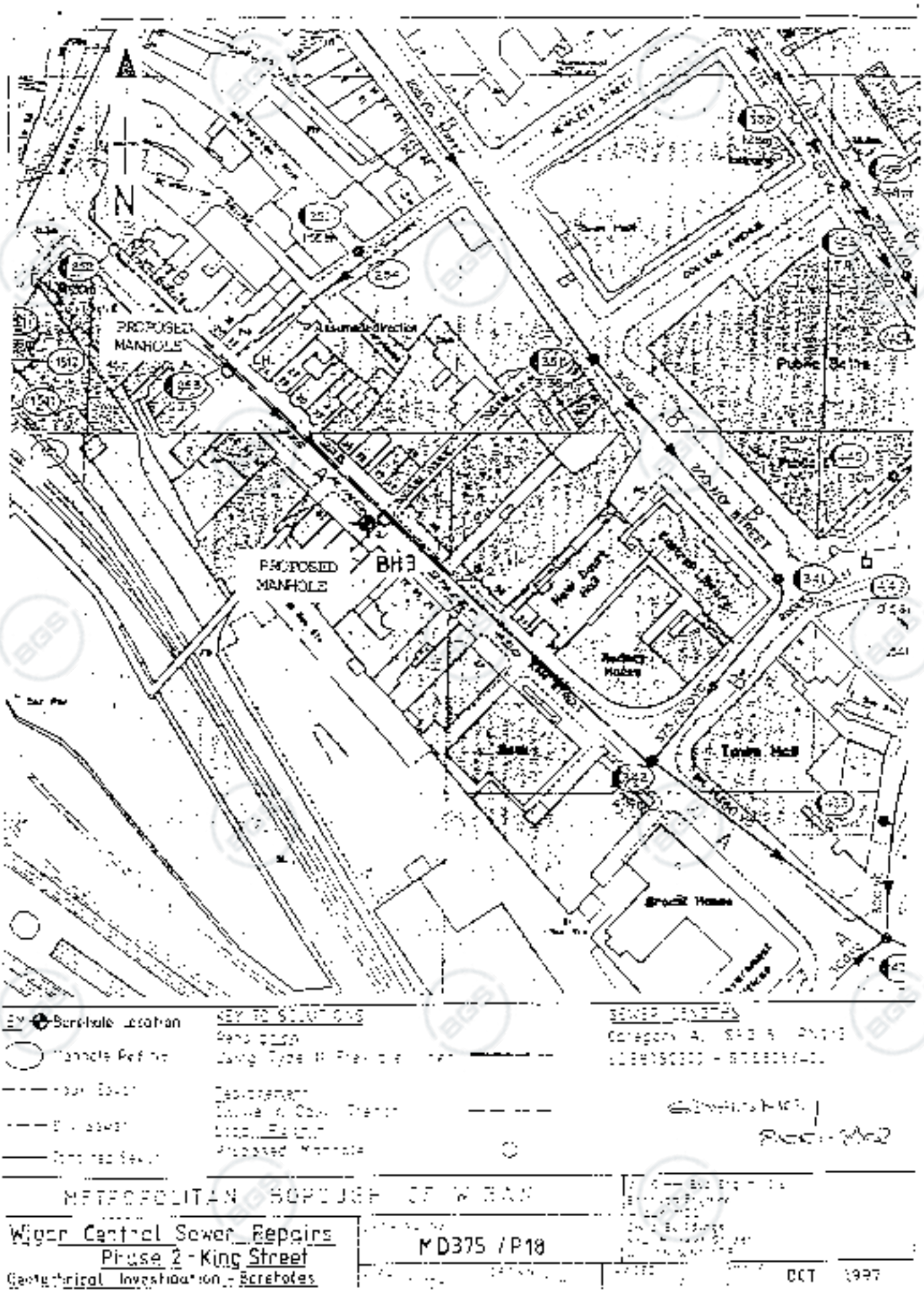
Remarks 1) Seepage [illegible]
2) Water met at 3.75m rising to 3.45m after 20 mins
3) Borehole dry [illegible]
4) Piezometer installed with [illegible]
5) [illegible] water level [illegible] after [illegible]

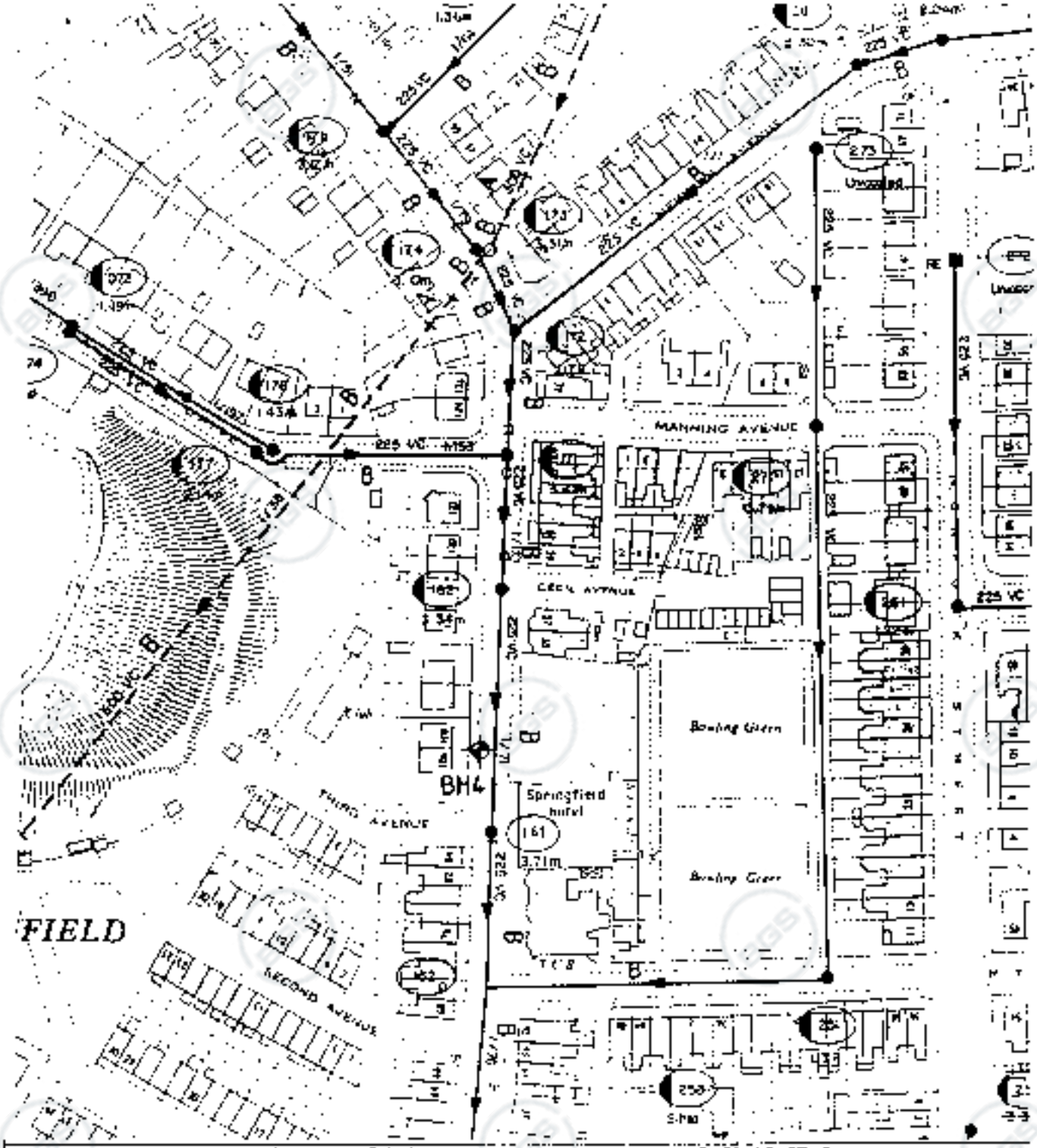
Logged by: [illegible] Drilled by: [illegible]

Ground level: [illegible] mAD

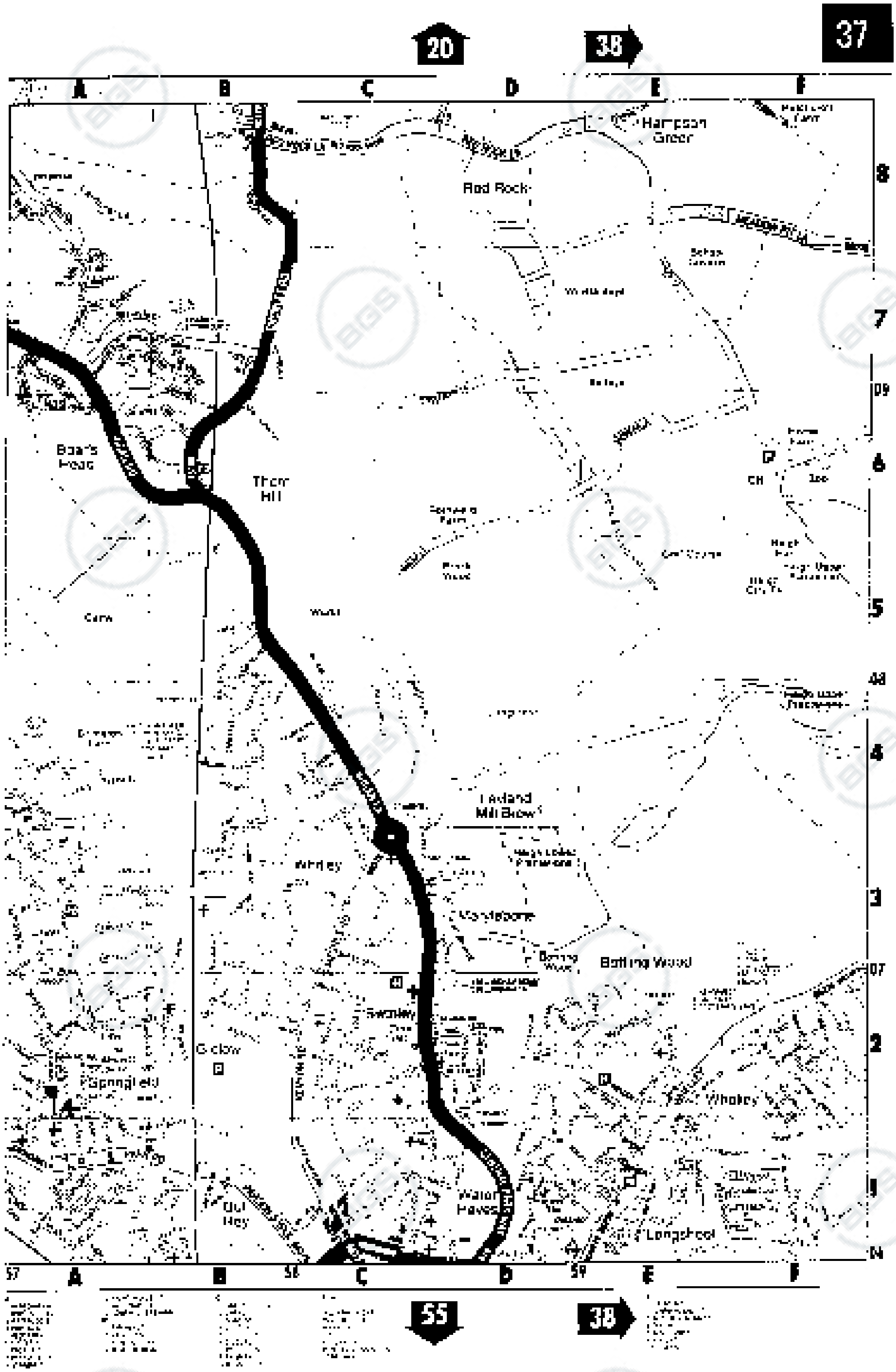
Co-ordinates:


BH1
PROPOSED MANHOLE
Playing Fields
Pavilion
Roman Coin found A.D. 1850
Borehole Location
KEY TO SOUTIONS
Proposed manhole
Dig down repair
METROPOLITAN BOROUGH OF WIGAN
Wigan Central Sewer Repairs
Phase 2 - Mesnes Street
MD375 / P17


N
PROPOSED MANHOLE
Assumed direction
PROPOSED MANHOLE
BH3
Public Baths
Town Hall
KEY TO SCHEDULE
Borehole location
Manhole Reference
Proposed Manhole
SEWER LENGTHS
METROPOLITAN BOROUGH OF WIGAN
Wigan Central Sewer Repairs
Phase 2 - King Street
Geotechnical Investigation - Boreholes
MD375 / P10
OCT 1997


MANNING AVENUE
GREEN AVENUE
THIRD AVENUE
SECOND AVENUE
FIELD
Bowling Green
Bowling Green
Springfield hotel
BH4
KEY Borehole Location
Manhole Ref No
Foul Sewer
S.W. Sewer
Combined Sewer
KEY TO SOLUTIONS
Renovation
Long Type II Flexible Liner
Replacement
Online in Open Trench
Local Repair
Dig Down
SEWER LENGTHS
Category B, SPG 5.
SD57061602 - SD57061501
METROPOLITAN BOROUGH OF WIGAN
Wigan Central Sewer Repairs
Phase 2 - Springfield Road
DRAWING No
MD 375 / P19
J.G Smith Bsc Eng M.I.C.E
Borough Engineer
Wigan MBC
Civic Buildings
New Market Street
WIGAN WN1 1RP

37


20
38
A
B
C
D
E
F
Hampson Green
Red Rock
Boar's Head
Thorn Hill
Leyland Mill Brow
Whitley
Worthington
Botting Wood
Swanley
Springfield
Standish
Whaley
Water Hayes
Longshoot
Old Hey
8
7
6
5
4
3
2
1
55
38

British Geological Survey

BeWT

STRATA SURVEYS LIMITED

CABLE PERCUSSION RECORD SHEET

Location [illegible] Wigan

Job No. [illegible]

Project Ref:

Borehole No. [illegible]

Sheet [illegible] of [illegible]

Equipment and methods [illegible]

Casing Diameter (mm) [illegible]

Casing Depth (m) [illegible]

Drilled by [illegible]

Ground level [illegible] m AOD

Co-ordinates E [illegible] N [illegible]

Date [illegible]

3701 Ows2

Casing Depth (m)	Water Depth (m)	Field Records	Samples / Tests Depth (m) From	To	Sample Type & No.	SPT N Value	Description	Depth & Thickness (m)	Reduced Level (m AOD)	Strata Legend
							MADE GROUND [illegible]			
								0.35	[illegible]	
			[illegible]		[illegible]		MADE GROUND [illegible] clay [illegible] gravel and [illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	
		[illegible]	[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	
							[illegible]			

Remarks

[illegible]

Logged by [illegible]

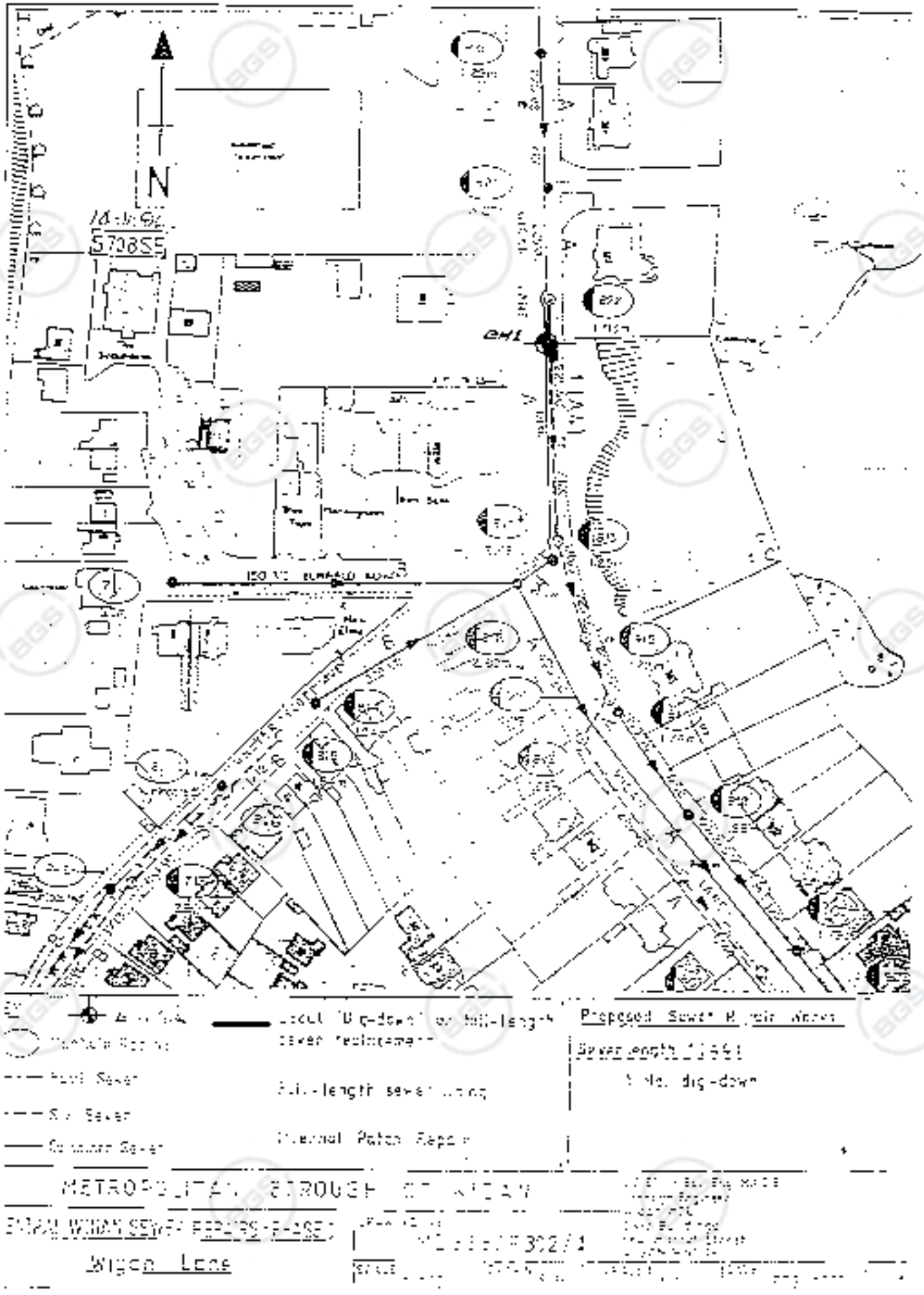
Date

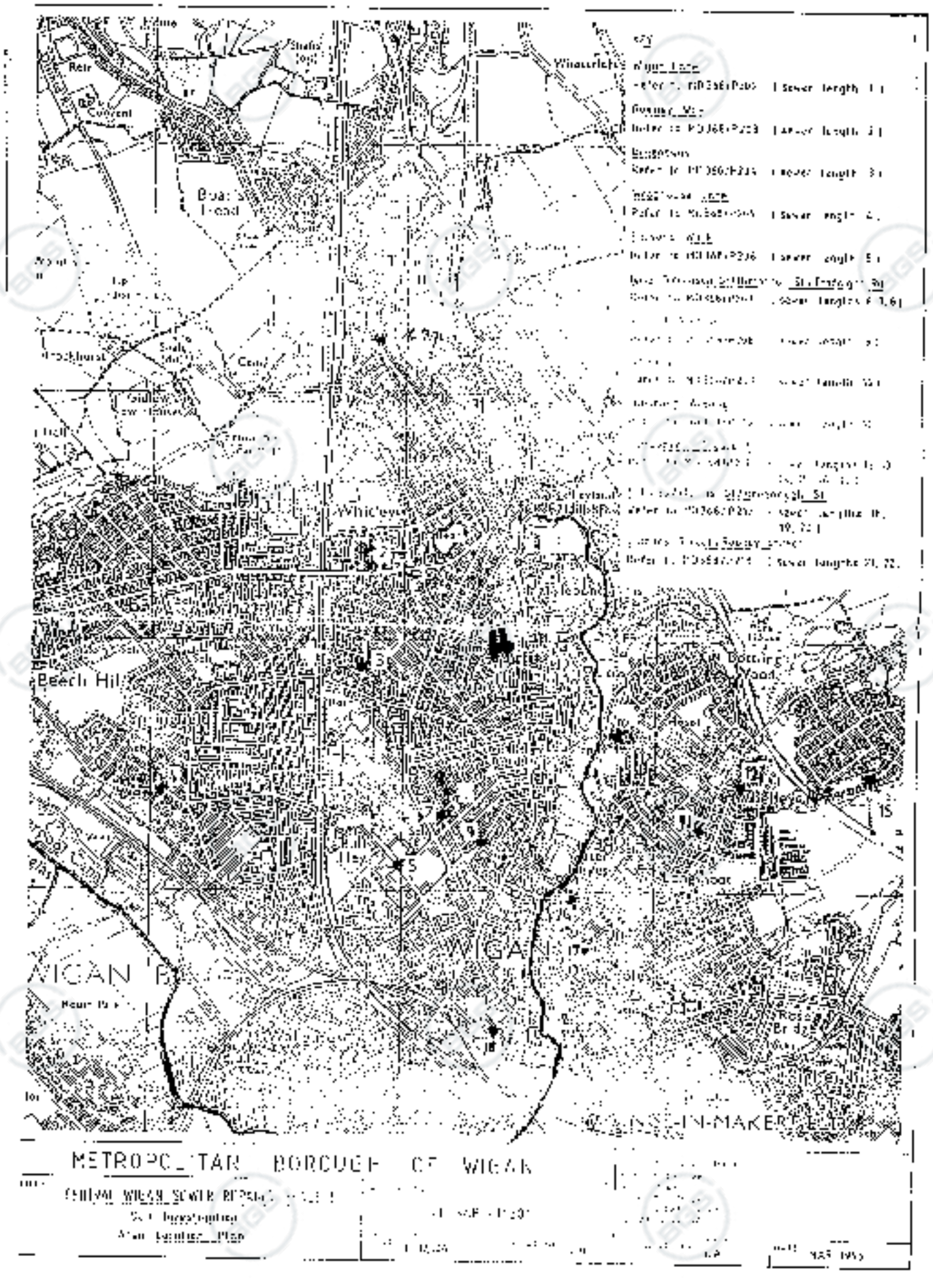
Checked by

Approved by

Fig No.

Scale 1:50


N
570855
150 YC DUNKIRK ROAD
Proposed Sewer Repair Works
Sewer length 11661
No. dig-down
Wigan Lane


METROPOLITAN BOROUGH OF WIGAN
Beech Hill
Whitley
Leyland
Standish
Wrightington
Coppull
Chorley
Haigh
Aspull
Hindley
Abram
Ashton-in-Makerfield
Golborne
Lowton
Newton-le-Willows
Winwick
Culcheth
Croft
Glazebury
Leigh
Astley
Tyldesley
Mosley Common
Boothstown
Ellenbrook
Worsley
Eccles
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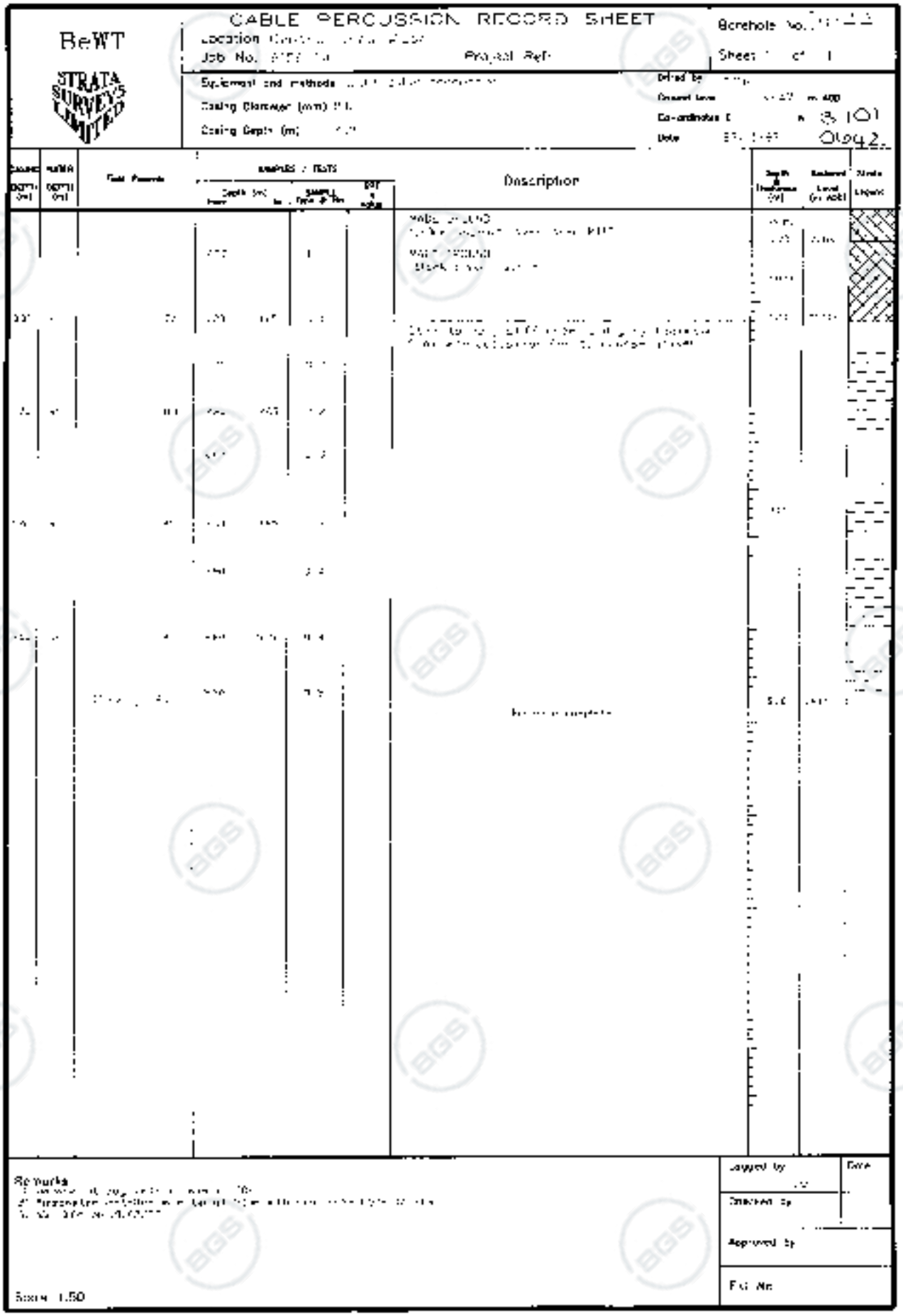


CABLE PERCUSSION RECORD SHEET

BeWT

STRATA SURVEYS LIMITED

Borehole No.

Location

Job No.

Project Ref.

Sheet

Equipment and methods

Casing Diameter (mm)

Casing Depth (m)

Co-ordinates E

N

Date

0942

Samples / Tests

Description

Depth (m)

Level (m AOD)

Remarks

Logged by

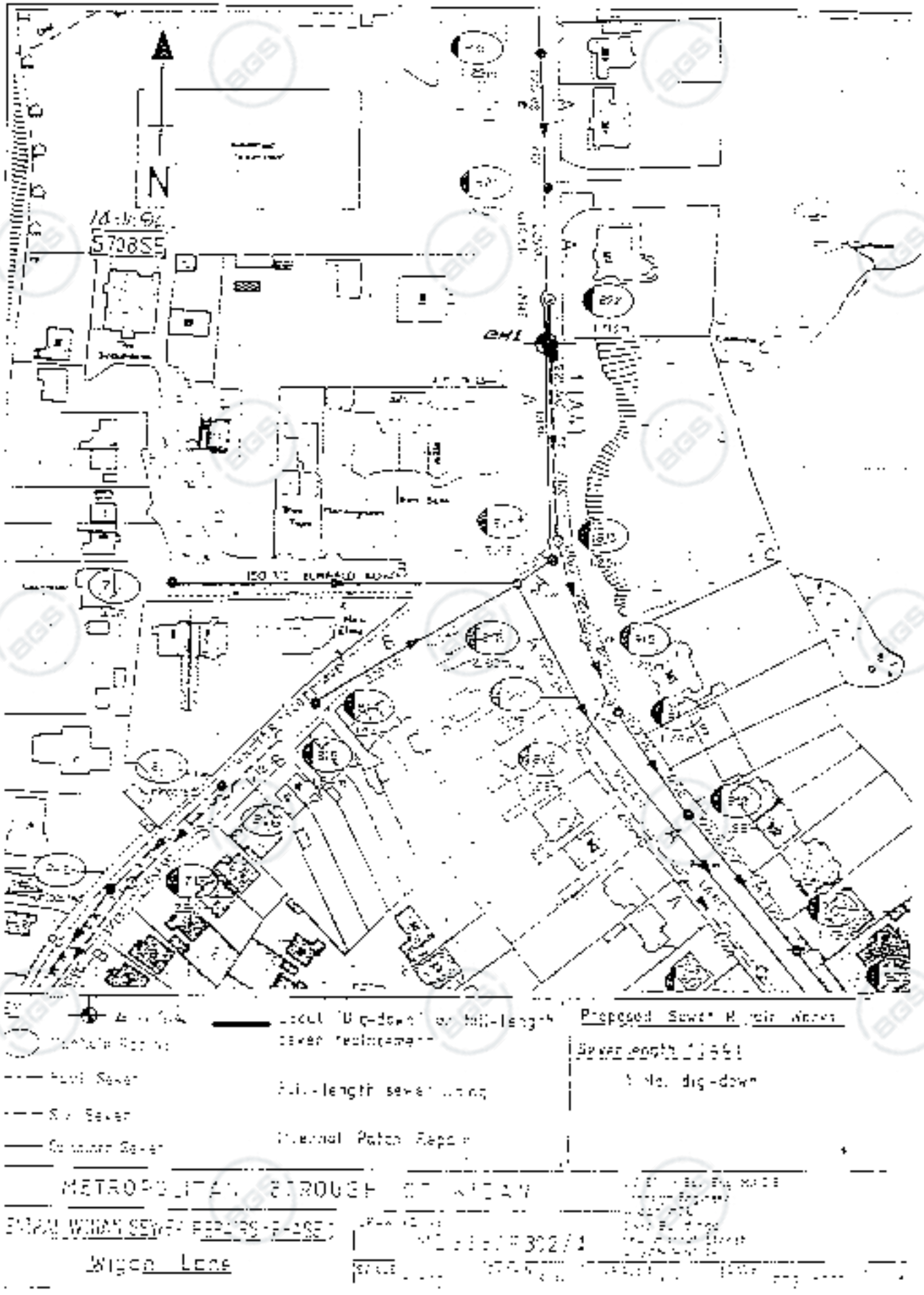
Checked by

Approved by

Date

Scale 1:50

d c5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Proposed Sewer Repair Works
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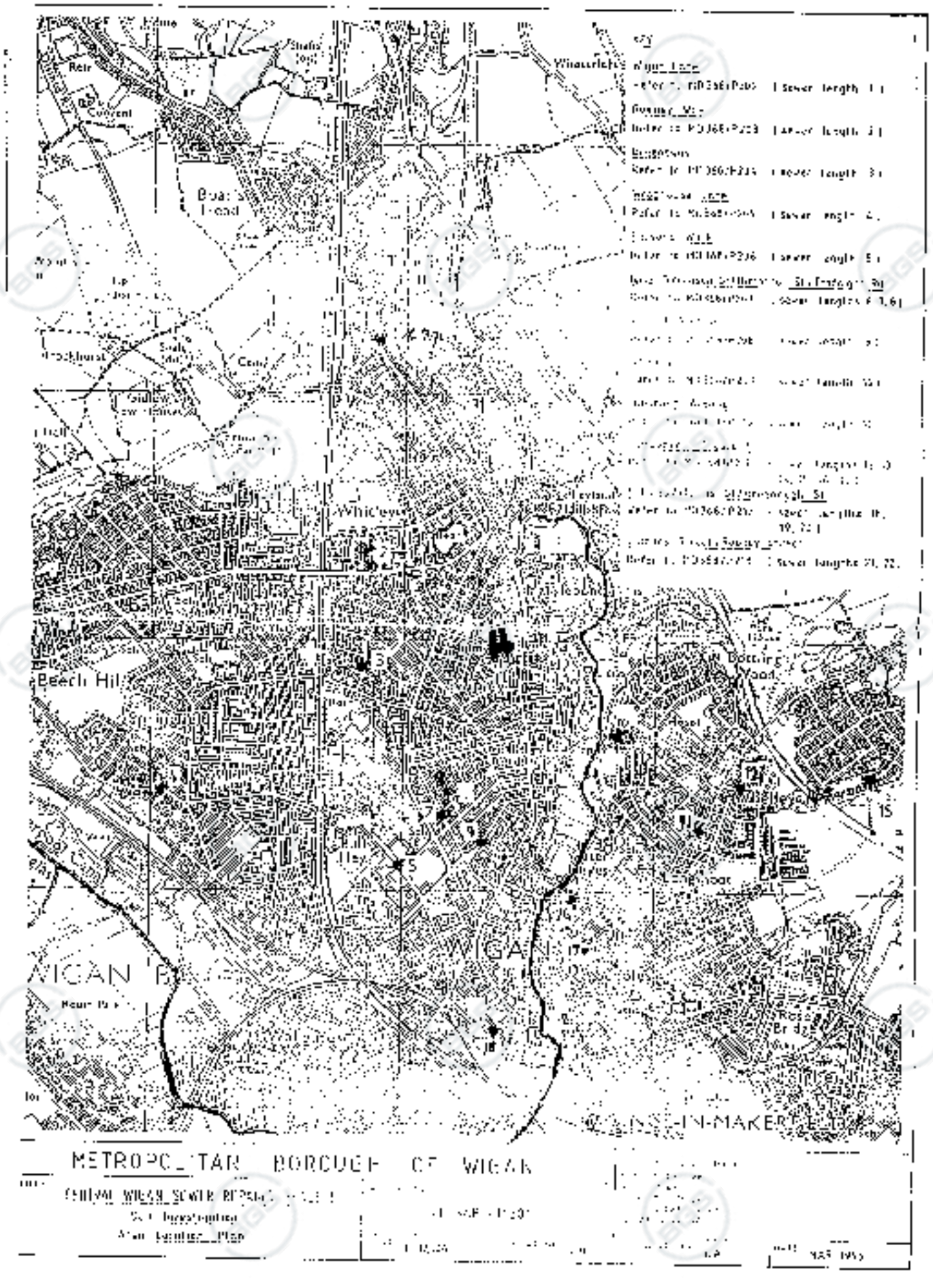
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Amble
Warkworth
Rothbury
Otterburn
Bellingham
Hexham
Haydon Bridge
Allendale
Alston
Nenthead
Garrigill
Melmerby
Kirkoswald
Lazonby
Langwathby
Appleby-in-Westmorland
Brough
Kirkby Stephen
Tebay
Shap
Penrith
Keswick
Cockermouth
Workington
Whitehaven
Egremont
Millom
Broughton-in-Furness
Coniston
Hawkshead
Ambleside
Grasmere
Rydal
Windermere
Bowness-on-Windermere
Kendal
Sedbergh
Dent
Ingleton
Clapham
Settle
Giggleswick
Long Preston
Gargrave
Skipton
Ilkley
Otley
Pool-in-Wharfedale
Harrogate
Knaresborough
Boroughbridge
Ripon
Masham
Thirsk
Northallerton
Stokesley
Guisborough
Saltburn-by-the-Sea
Redcar
Marske-by-the-Sea
Loftus
Whitby
Scarborough
Filey
Bridlington
Driffield
Beverley
Hornsea
Withernsea
Hedon
Patrington
Spurn Head
Easington
Seaham
Peterlee
Hartlepool
Billingham
Stockton-on-Tees
Yarm
Eaglescliffe
Darlington
Richmond
Catterick
Scotch Corner
Leyburn
Middleham
Wensleydale
Hawes
Reeth
Swaledale
Muker
Keld
Kirkby Stephen
Brough
Appleby-in-Westmorland
Penrith
Alston
Haltwhistle
Brampton
Carlisle
Gretna
Annan
Dumfries
Castle Douglas
Kirkcudbright
Dalbeattie
Gatehouse of Fleet
Newton Stewart
Wigtown
Whithorn
Isle of Whithorn
Portpatrick
Stranraer
Ballantrae
Girvan
Ayr
Prestwick
Troon
Irvine
Kilmarnock
Cumnock
New Cumnock
Sanquhar
Thornhill
Moniaive