Project Number: PM2400-24

WEPA

Project Vesta-
Flood Risk Assessment

QPM-R-C-500

Revision - | 3 December 2024

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CONTENTS

1. Introduction

This Flood Risk Assessment (FRA) has been prepared by Quorum Consulting Engineers to support a planning application for the new proposed paper machine, warehouse, dispatch area and ancillary infrastructure to be constructed at the existing WEPA UK Ltd site.

The Flood Risk Assessment is in accordance with current planning policy and complies with the requirements of Technical Advice Note 15: Development and Flood Risk (TAN 15). An assessment has been made of the risks posed to the new development from a range of sources such as fluvial, groundwater, surface water and sewers. All available information at the time of writing the report has been reviewed such as geology, topography and hydrology.

This scheme will need to comply with the Statutory Standards for Sustainable Drainage Systems produced by Welsh Government and the CIRIA SuDS Manual (C753) and be approved by Bridgend County Borough Council acting as SAB Authority.

1.1 Location

The WEPA UK Ltd site is located off the A4063 in Llangynwyd, Bridgend. A national grid reference for the site is SS 87755 87128 (287755mE ,187128mN). The A4063 runs along the Southern and Western boundaries with existing fields to the North and the River Llynfi to the East.

A site location plan is included within Appendix A.

1.2 Current Land Use

The site is currently occupied by WEPA UK Ltd. The company produce hygiene paper products such as toilet paper and kitchen roll for the UK retail sector.

1.3 Site Topography

A topographical survey has been completed by Total Survey Solutions Ltd and is appended in Appendix B.

Access and Egress to the site is via gated access to the east and west of the site joining the A0463.

Overall, the site sits in a valley with levels falling into the site from the North, West and South. Levels range from approx. 105mAOD to 72.50mAOD at the Railway line. The levels continue to fall away to the East into the Llynfi River.

To the West of the site near the entrance there is a large area of parking, three bungalows and a security hut. The main building / series of buildings and plant sits in the centre of the site. The loading bays and storage yards are located along the South of the site. There is a wastewater treatment facility located over the rail line next to the river however this is not being considered as part of this report as no works are located further than the railway line.

1.4 Site Geology

The site has had an array of ground investigation carried out both recently and historically with further information to be published shortly. Works have been carried out by Golder Associates, Ove Arup and Integral Geotechnique to name a few. A plan showing where boreholes and trial pits have been carried out can be seen in Appendix C along with samples of boreholes taken across the site to give an overall idea of the ground conditions.

The British Geology Survey maps indicate the bedrock across the site to be a sequence of sandstones, siltstones and mudstones. The superficial deposits comprise of alluvium where the valley was historically located (now culverted watercourse) and glacial till surrounding this to the North and South.

The culverted section of watercourse will need to be relocated towards its western outfall to accommodate the proposed paper machine building. An ordinary watercourse consent application has been made to the local authority and this permitting process will serve to ensure riparian flood risk is not materially increased through the relocation of the culvert. The culvert diversion is proposed to be implemented in advance of the construction of the proposals.

Groundwater has been recorded at varying depths across the site along with seepages at shallow depth. To the West Golder Associates recorded ground water at depths of 7-9m Bgl, Ove Arup recorded ground water at 4m Bgl in the same area. To the East Ove Arup have recorded ground water from approx. 3m Bgl which did rise in two of the boreholes. It is noted by that ground water is expected at a shallow horizon in the proposed development area.

Localised groundwater monitoring is understood to be in progress as part of the geotechnical investigation being undertaken in connection with the proposed development.

The bedrock is classified as a Secondary A aquifer and the overlying superficial soils are classified as either a Secondary A or a Secondary – undifferentiated aquifer.

The site is not underlain by a principle aquifer and is not located within a source protection zone.

1.5 Existing Drainage

Dwr Cymru Welsh Water (DCWW) plans are presented in Appendix D and confirm none of the onsite systems are adopted.

The site has an extensive network of existing foul and surface water drainage. Surface water flows are discharged into the culverted (1200dia) Nant Gwyn watercourse which is culverted throughout the site until it discharges into the Llynfi River. Many areas are not attenuated however the “Neptune development” constructed c. 2020 features two large capacity cellular attenuation tanks.
Foul flows are directed to the onsite treatment works before being discharged into the Llynfi River.

The existing 1200dia culverted watercourse also has a second inlet near the site entrance from an unnamed watercourse to the North West.

The site is expansive and the development proposals are limited only to the area the east of the site. An existing on-site drainage plan, localised to the project area can be seen in Appendix E

2. Flood Risk Assessment Requirements

2.1 Requirements for a Flood Risk Assessment

Flood Risk Assessments are required depending on the location of developments relative to Natural Resources Wales (NRW) flood mapping zones or where the development is more than 1 hectare.

The flood risk zones are normally classified as follows:

- Zone 1 – areas that have a low probability of flooding i.e. less than 1 in 1000 annual probability of river or sea flooding.

- Zone 2 – areas that have a medium probability of flooding i.e. between a 1 in 100 and 1 in 1000 annual probability of river flooding; or between a 1 in 200 and 1 in 1000 annual probability of sea flooding.

- Zone 3a – areas that have a high probability of flooding i.e. 1 in 100 or greater annual probability of river flooding or 1 in 200 or greater annual probability of sea flooding.

- Zone 3b – areas classed as functional flood plains where water has to flow or be stored in times of flood.

Although the NRW flood maps show the above flood zones for planning purposes TAN 15 which is still relevant in Wales classifies these zones slightly different to this with zones from A to C. These are explained below:

- Zone A – Considered to be at little or no risk of fluvial or tidal/coastal flooding.

- Zone B – Areas known to have been flooded in the past evidenced by sedimentary deposits.

- Zone C – Based on the extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal).

    - Zone C1 – Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.

    - Zone C2 – Areas of the floodplain without significant flood defence infrastructure.

3. Flood Risk Assessment

This section explores the potential flood risk from a range of sources.

3.1 Fluvial Flooding

The nearest main river to the application site is the Llynfi river located along the Eastern boundary of the site on the opposite side of the railway line.

The NRW flood map for planning below shows that the proposed development site is located mainly in Zone A but with a section through the centre of the site falling under Zone B. Ordinarily this zone would be assessed based on levels compared to flood level data for the river however as this zone is based on the underlying geology it is believed to no longer be relevant as the existing site has been developed, levels have been raised and the watercourse has been culverted, please refer to British Geology Survey Map in Appendix E which shows exactly the same shape for the superficial alluvium deposits as the NRW flood Zone B.
This principle has been previously agreed with the local drainage officer at detailed design stage (SAB).

The site is therefore considered at this stage to be at little or no risk of fluvial flooding.

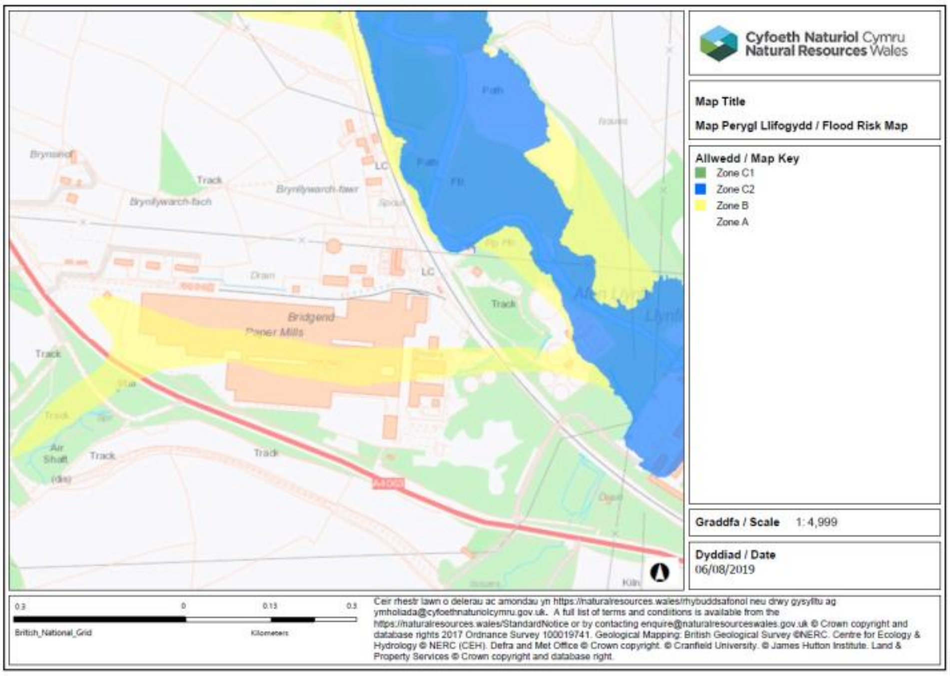


Figure 1 - NRW Flood map for planning

3.2 Tidal Flooding

The site is not influenced by Tidal flooding.

3.3 Surface Water (Overland) Flooding

Intense periods of rainfall over a short duration can often lead to overland flow and flooding as rainwater is unable to infiltrate into the ground or enter drainage systems. It is made worse when soils are saturated so that they cannot accept any more water.

The NRW surface water flood map below has been generated by simulating rainfall events over the site to determine where surface flows and collects based on Lidar survey information.

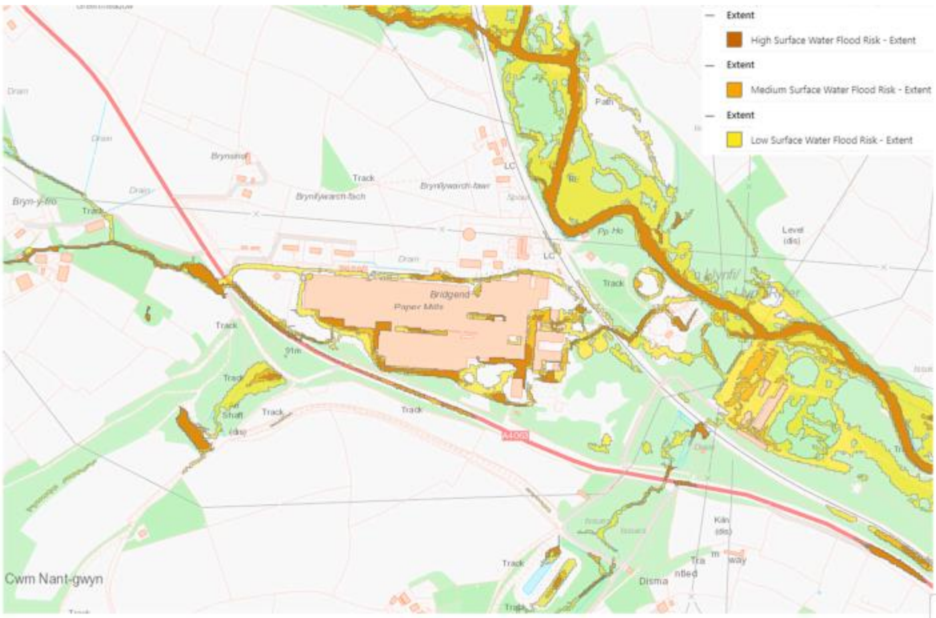


Figure 2 - NRW Surface water flood map

The map shows that the hardstanding areas surrounding the main buildings are at low to high risk from surface water flooding.

As mentioned much of this is based on rainfall simulation and lidar data which does not take into account the existing on-site drainage systems.

For the existing scenario there is a large system of gullies and drainage channels which intercept the surface water flows and therefore prevents surface water flooding to the buildings.

In the proposed scenario some of the areas of risk highlighted will now be replaced with additional buildings or external hardstanding and under Schedule 3 of the Flood and Water Management Act 2010 these will be subject to having a sustainable drainage scheme designed and approved by the local Sustainable Drainage Approval Body (SAB).

It is considered that the existing site drainage, which includes new attenuation tanks installed during the 2020 development in addition to the new sustainable drainage systems will mitigate the risks posed by surface water runoff.

3.4 Flooding from Sewers

There is no evidence to suggest there are any capacity issues with the onsite drainage systems. No CCTV reports of the condition of the on-site sewers were available at the time of writing the report, however they appear to be performing adequately, even under recent heavy rainfall events..

The culverted watercourse has been noted as causing flooding on two occasions in the past. The most recent event which was approximately 6 years ago was caused by a partial collapse near the site entrance. The second event was approximately 10 years ago and was caused by a blockage of the culvert. In both scenarios remedial works were carried out. The smaller un-named branch has also been recently renewed as a pro-active measure by WEPA Uk Ltd.

There are no known issues with capacity in the culvert at the time of writing the report.

It is therefore considered at this time that there is little to no risk of flooding from sewer systems.

3.5 Flooding from Groundwater

There are no known springs within the site. As mentioned earlier in the report ground water has been encountered in boreholes across the site at varying depths but has not been recorded as rising to the surface or above, therefore it is considered that there is a low risk of flooding from groundwater which will need to be considered with any foundation design or design of the new sustainable drainage systems.

3.6 Flooding from Artificial Sources

There are no artificial bodies of water located within or near the proposed application area and as a result is not considered that flooding from artificial sources is a risk to the development.

3.7 Flooding from Construction Activities

Construction activity is known to increase flow rates into drainage systems and off site usually through the stripping of surface vegetation. It is also known for clogging up existing systems through siltation and washing away of rubble etc.

As part of the SAB and/or planning approval process a detailed construction surface water management plan will be required to be submitted and approved highlighting how run off will be restricted and how contaminants will be prevented from entering the river. As it will be the SAB that approves these proposals the risk does not need to be considered as part of this report.

3.8 Flooding from Operation of the site

Operation and maintenance of the existing drainage systems will remain the responsibility of the site owners and regular maintenance, and inspection regimes should be followed. In regard to the new proposed systems these will be approved by the council SAB team before construction can commence and then maintenance will again fall to the site owner. The risk from the future operation of the site is therefore considered to be low so long as maintenance and inspection regimes are followed.

Suitable flow restriction into the culverted watercourse will be required for any of the proposed systems so as not to increase flood risk on site or downstream, this will either follow greenfield rates for each rainfall event or be restricted to Qbar in line with the current Welsh Government guidance.

4. Schedule 3 – SAB Application

Under Schedule 3 all developments in Wales over 100m² now require surface water drainage to be designed in accordance with the statutory standards for sustainable drainage systems produced by Welsh Government. It is the job of each councils SAB team to assess and approve the design proposals which are reviewed against these standards.

The standards aim to mimic the natural drainage characteristics of a site to help control the volume and rate of run off from the proposed development. This is achieved by managing the runoff at or close to the surface and as close to the sources as possible while also providing additional benefits such as biodiversity and amenity.

There are six standards that need to be met as follows:

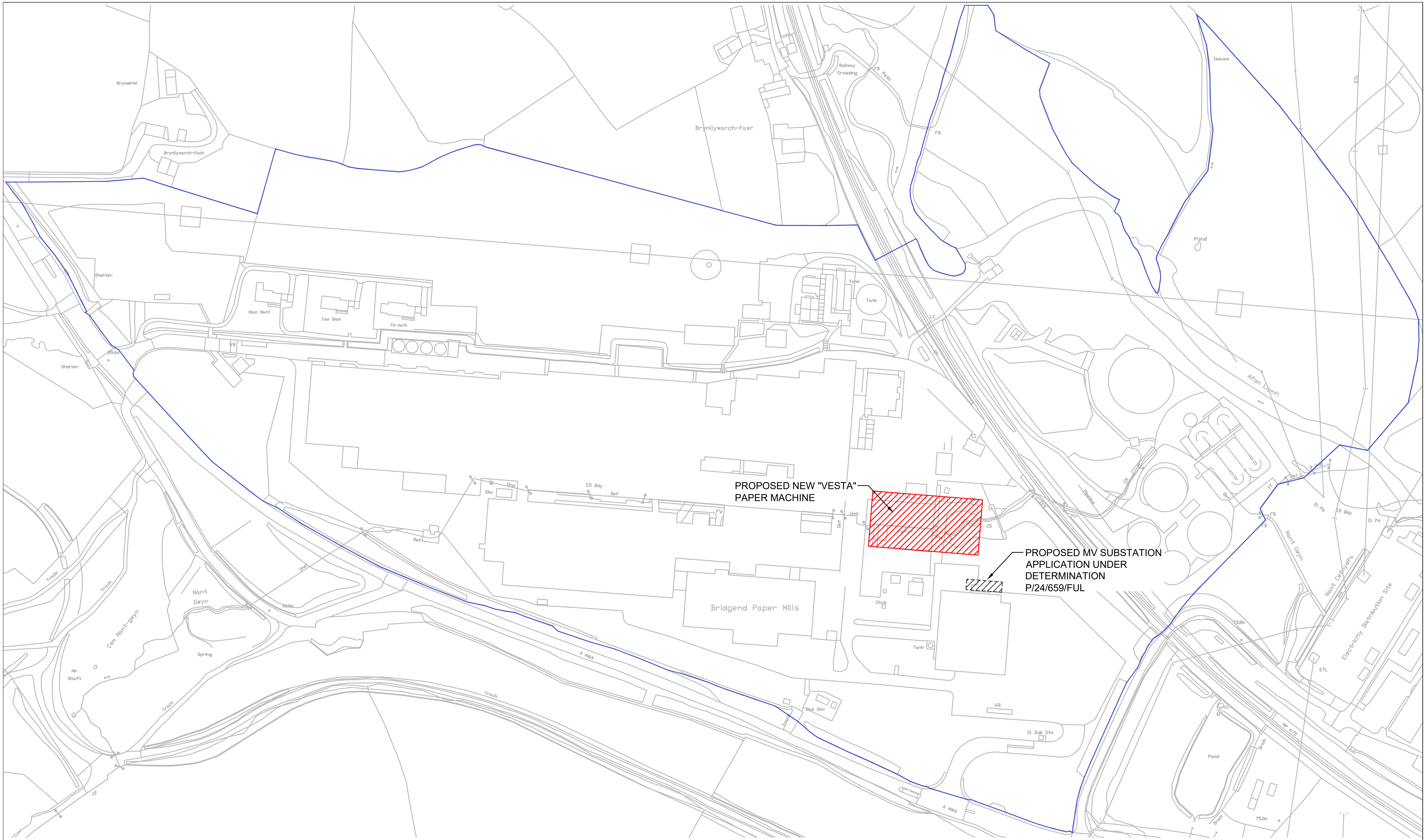
- S1 – Surface Water runoff destination
- S2 – Surface Water runoff hydraulic control
- S3 – Water Quality
- S4 – Amenity
- S5 – Biodiversity
- S6 – Design of drainage for construction, operation and maintenance

5. Conclusions/Summary

- Majority of the site is located in Flood Zone A, and partially within Flood Zone B. Flood Zone B extent is likely in relation to the underlying geology as shown on the British Geology Survey Maps.
- Site lies in a valley with levels falling into the site from the West, North and South.
- The river Llynfi lies to the East of the site and the Nant Gwyn watercourse is culverted through the site before discharging into the river Llynfi. The Nant Gwyn watercourse will be re-routed to the east of the site.
- The site bedrock geology consists of sandstones, siltstones and mudstones. The superficial deposits comprise of alluvium and made ground.
- Groundwater has been encountered at a range of depths from 1mBgl.
- No Dwr Cymru Welsh Water assets are located with the site, all existing drainage is considered to be private.
- The development can be considered to be at low to no risk from the majority of sources. Surface water flooding mitigation will be provided by existing and proposed drainage systems.
- Under Schedule 3 of the Flood and Water Management Act 2010 the surface water proposals will need to be reviewed and approved by Bridgend County Borough Council SAB team.
- All systems need be designed for the 1 in 100 year + 40% climate change event.
- On the basis of the findings of this report there are no grounds for objecting to the proposed development due to flood risk.

Appendices

Appendix A - Location Plan



0 100m 200m 300m 400m

Scale 1:2500 @ A3

Rev.	Date	Description
-	--.--.--	-

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General Notes

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All site works must be to the current drawing revision. Drawing is copyright of Quorum Project Management Ltd.
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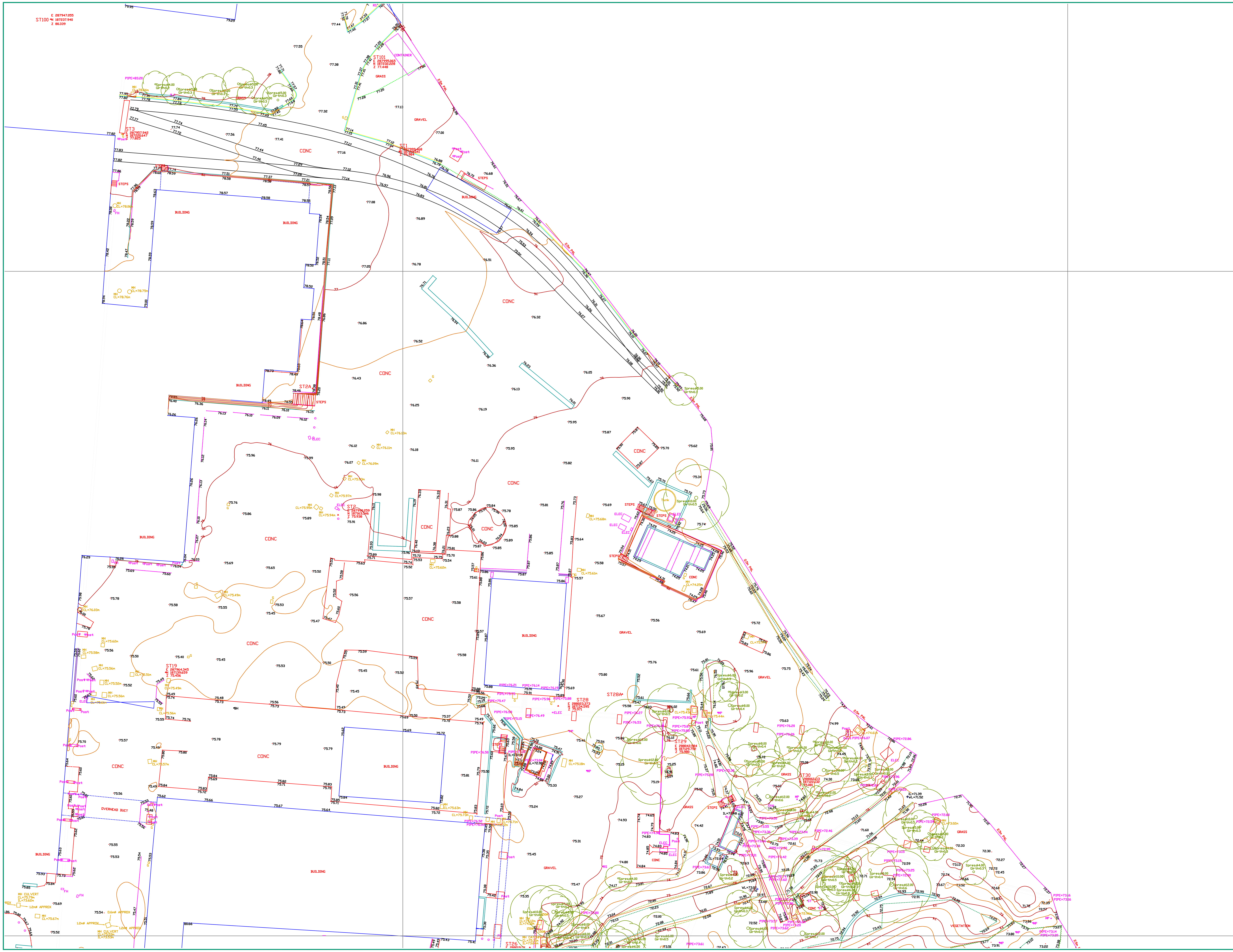
The drawing information must be read in conjunction with all relevant scheme drawings, specification and/or schedules referred to or not.
The contractor is responsible to insure that all work is in compliance with current Building Regulations and or other relevant legislation
Dimensions on this drawing are not to be used for construction purposes.

Drawing	PROPOSED NEW "VESTA" PAPER MACHINE SITE LOCATION PLAN
Project	PROJECT VESTA - WEPA
Project No.	PM2400-24
Drawing No.	QPM-DR-P-011
Rev.	-
Scale	1:2500 @ A3
Drawn by	JM
Status	PLANNING
Date	DEC 2024
Chkd by	JS

Appendix B - Topographical Survey



Rev	Amendments	Date	By

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NOTES:

1. SITE GRID AND LEVELS ARE BASED UPON ORDNANCE SURVEY VIA THE ACTIVE GPS NETWORK.

KEY

	BOTTOM OF BANK		VERGE
	TOP OF BANK	ST1	SURVEY STATION
	CONTOURS	TH=50.09	TREE HEIGHT
CAB	CABINET	PB	POST BOX SQUARE
	TREE	PB	POST BOX ROUND
FH	FIRE HYDRANT	GRILL	GRILL SQUARE
BT	BRITISH TELECOM	GRILL	GRILL ROUND
CATV	CABLE TV	BL	BOLLARD ROUND
	OVERHEAD LINE	BL	BOLLARD SQUARE
GV	GAS VALVE	BIN	BIN SQUARE
1.0BR	BRICK WALL	BIN	BIN ROUND
1.0BL	BLOCK WALL	38.32	SPOT LEVEL
1.0ST	STONE WALL	ASP	ASPHALT
	VEGETATION	GR	GRASS
2.0 CB	CLOSE BOARD	GRAV	GRAVEL
1.6 PR	POST RAIL FENCE	H/S	HARDSTANDING
1.8 H	HERAS FENCE	BB	BELISHA BEACON
2.0 PW	POST WIRE FENCE	RS	ROAD SIGN
	DROPPED KERB	TS	TRAFFIC SIGNAL
	KERB CHANNEL	IC	INSPECTION COVER
	TOP OF KERB	MH	MANHOLE SQUARE
RL=46.12	RIDGE LEVEL	MH	MANHOLE ROUND
EL=43.88	EAVE LEVEL	MP	MARKER POST
FFL=40.55	FINISHED FLOOR LEVEL	TP	TELEGRAPH POLE
FR=42.99	FLAT ROOF LEVEL	LC	LIGHTING COLUMN
		G	GULLY
		WM	WATER METER
		SV	SLUICE VALVE
		ST	STOP TAP

APPROX N

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PROJECT
WEPA PAPERMILL CULVERT,
BRIDGEND.

Surveyed by	MH	Date	18/09/2024
Drawn	MH	Date	27/09/2024
Scales	1:250@A1	Checked:	PCH
Project Reference No.	TTS/0219		
Drawing Number	WEP/01		

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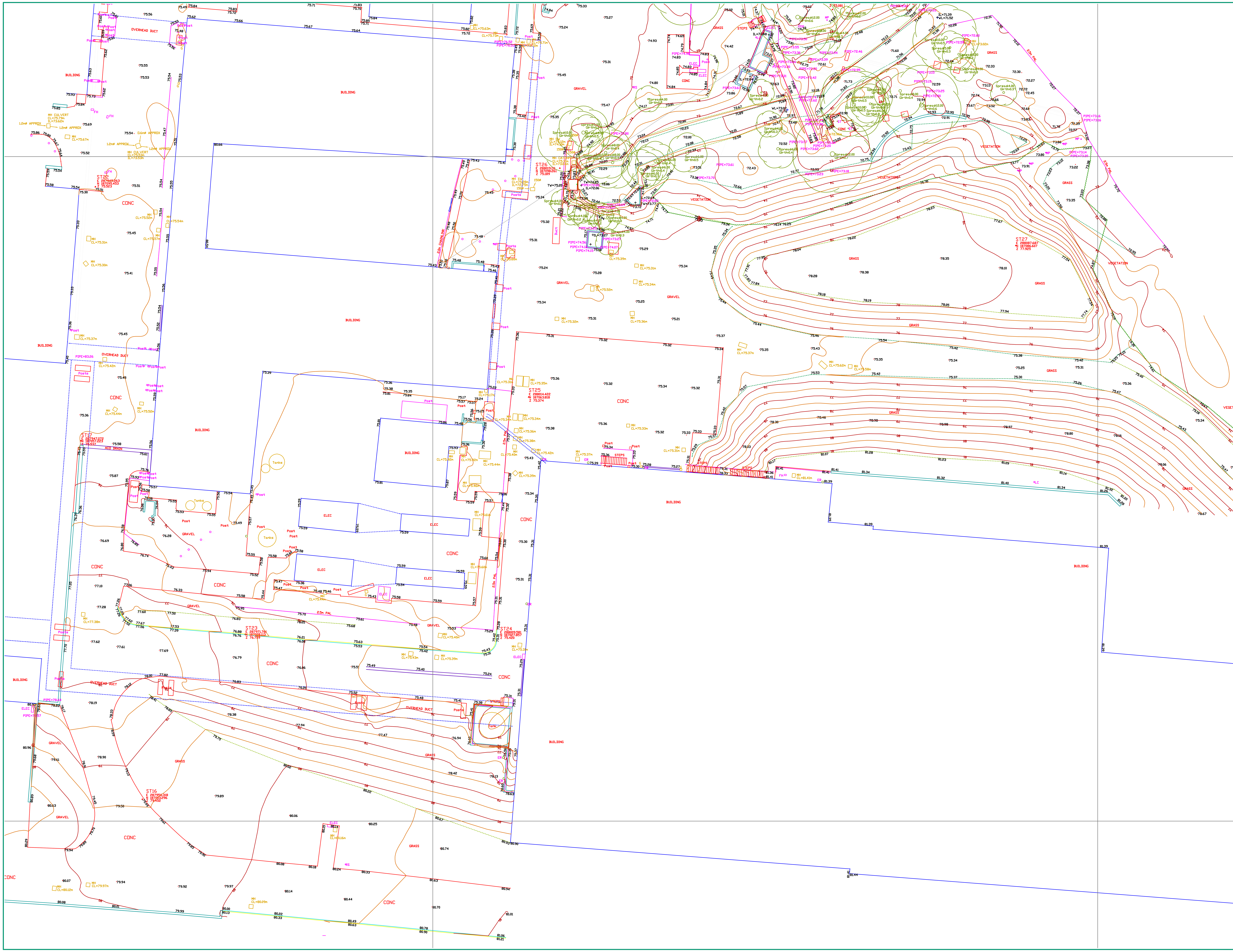

Rev	Amendments	Date	By

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KEY

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	TOP OF BANK
	CONTOURS
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	TREE
FH	FIRE HYDRANT
BT	BRITISH TELECOM
CATV	CABLE TV
	OVERHEAD LINE
GV	GAS VALVE
1.0BR	BRICK WALL
1.0BL	BLOCK WALL
1.0ST	STONE WALL
	VEGETATION
2.0 CB	CLOSE BOARD
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2.0 PW	POST WIRE FENCE
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	KERB CHANNEL
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	VERGE
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LC	LIGHTING COLUMN
G	GULLY
WM	WATER METER
SV	SLUICE VALVE
ST	STOP TAP

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Project Reference No.	TTS/0219		
Drawing Number	WEP/02		

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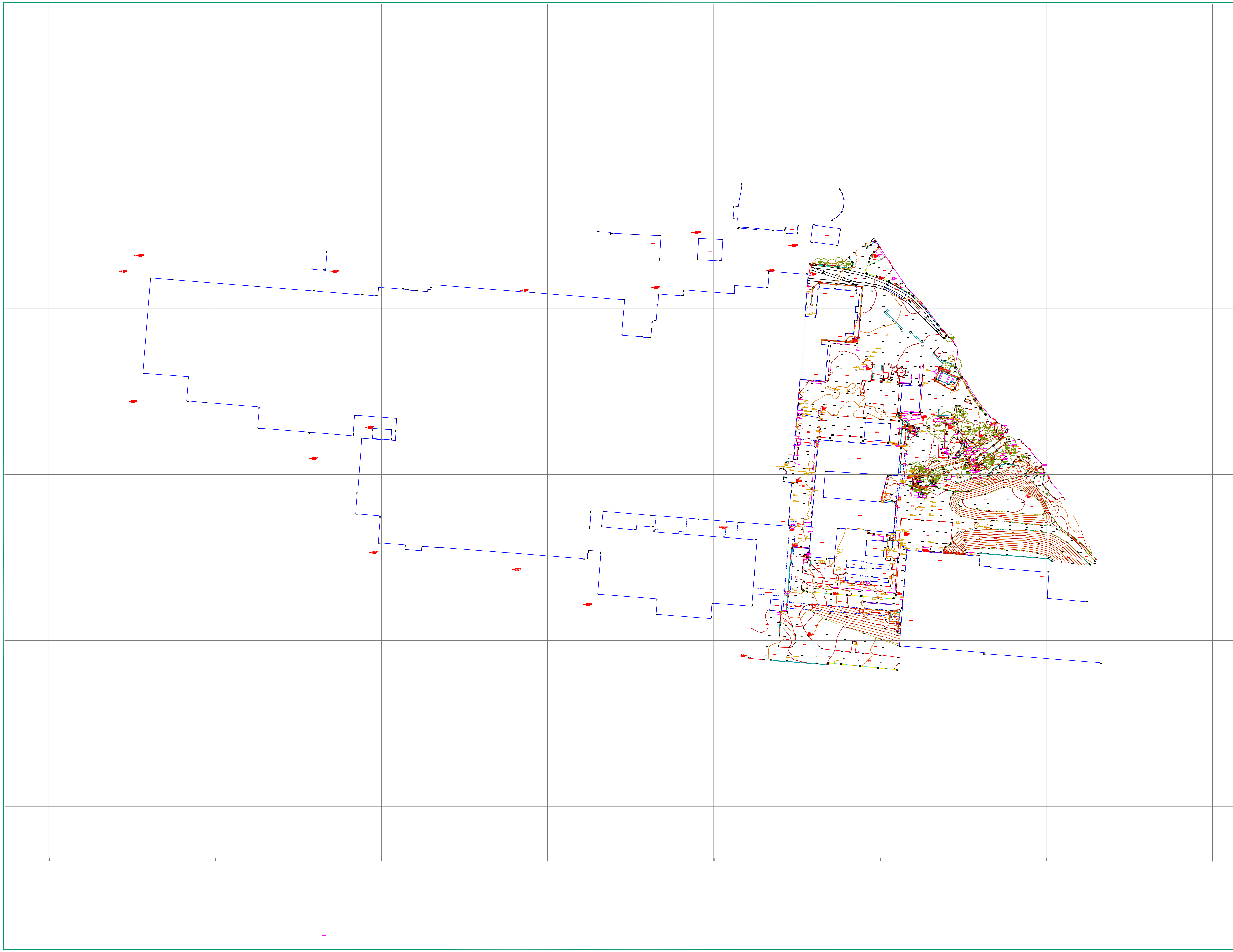

Rev	Amendments	Date	By

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		G	GULLY
		WM	WATER METER
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		ST	STOP TAP

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WEPA PAPERMILL CULVERT,
BRIDGEND.

Surveyed by	MH	Date	18/09/2024
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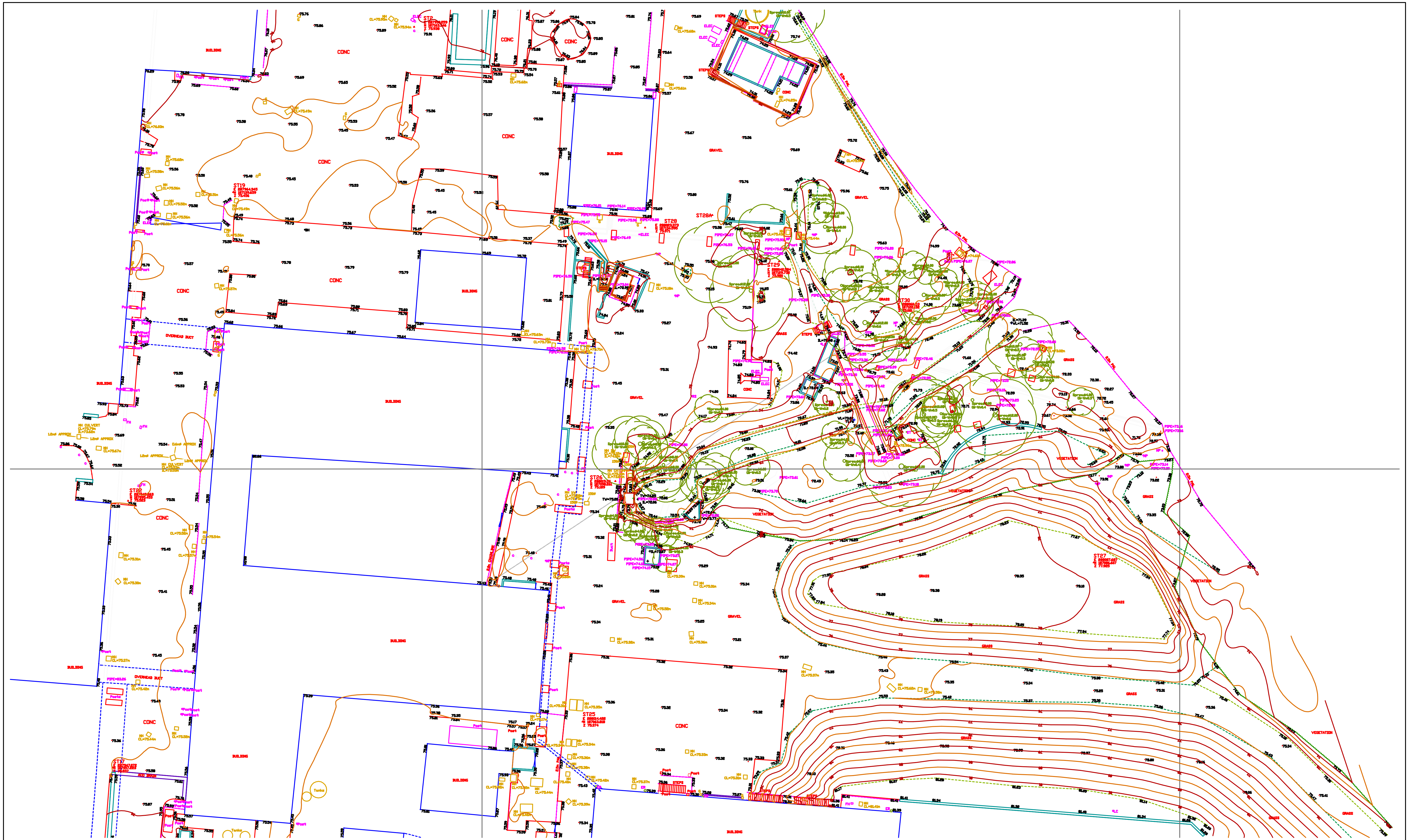
Drawing Number	WEP/03		

A1



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		TSS Ref: TTS/0219			

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Rev	Amendments	Date	By

Client	QUORUM
Project	WEPA PAPER MILL CULVERT
Drawing No.	WEP/04

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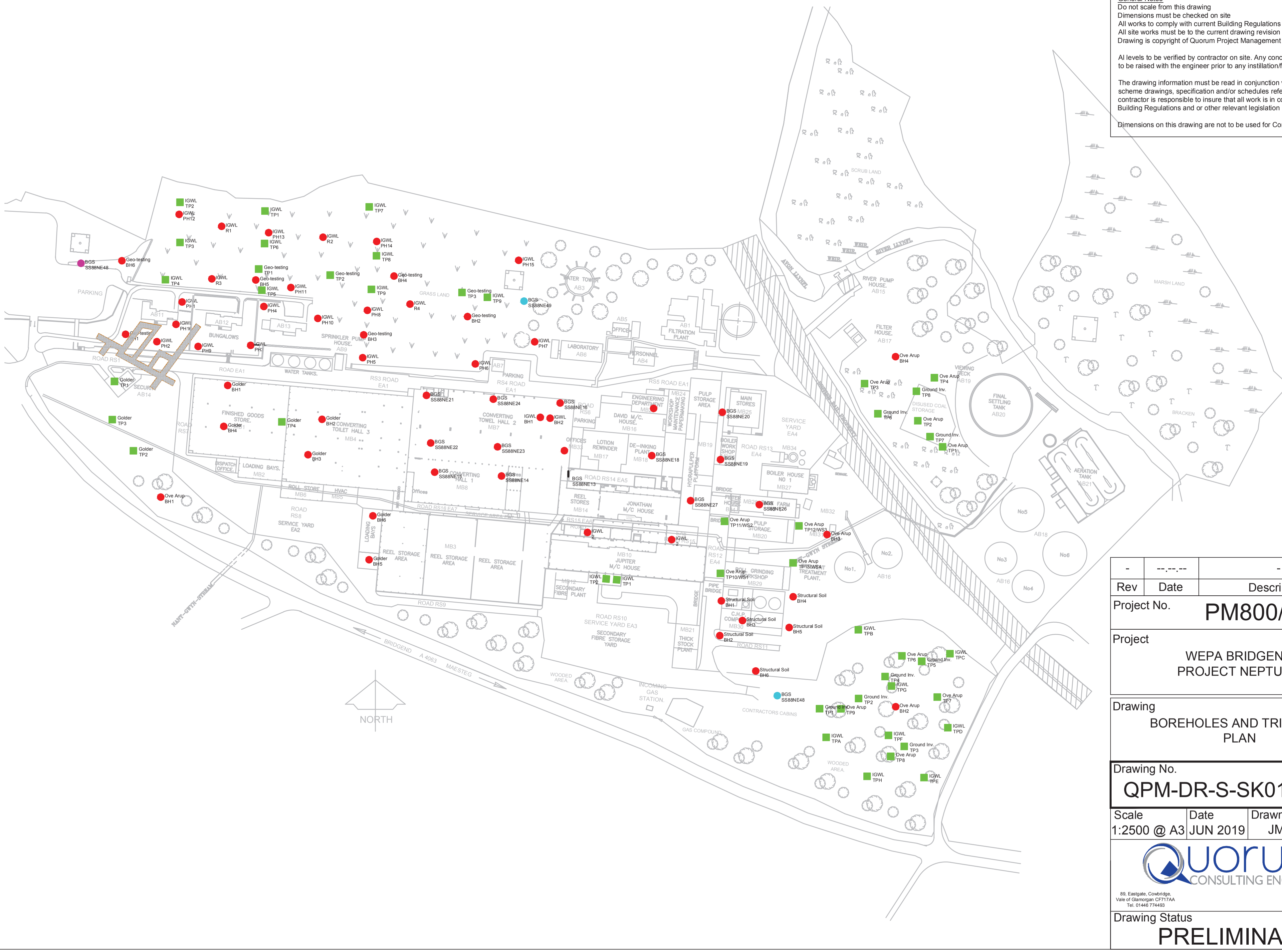
Appendix C – Available Geotechnical Information



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Rev	Date	Description
-	--.--.--	-

Project No. PM800/19

Project
WEPA BRIDGEND
PROJECT NEPTUNE

Drawing
BOREHOLES AND TRIAL PITS
PLAN

Drawing No.			Revision
QPM-DR-S-SK01			-
Scale	Date	Drawn by	Chkd by
1:2500 @ A3	JUN 2019	JM	

Quorum CONSULTING ENGINEERS

89, Eastgate, Cowbridge, Vale of Glamorgan CF717AA Tel. 01446 774493

2 Crown Road, St. Margaret's Middlesex, TW1 3EE Tel. 0208 892 9293

Drawing Status
PRELIMINARY

STRUCTURAL SOILS

BOREHOLE LOG

Contract	Client	Borehole No
Bridgend	National Power	4

Job No	Date	Ground Level (m AOD)	Co-Ordinates	Sheet
30604	22/04/93	26.32		1 of 2

Samples and In-situ Tests: Depth	No	Type	Blows	Water	Instrumentation	Description of Strata	Depth (Thickness)	Legend
0.00-1.00	1	D				MADE GROUND: Loose to medium dense red brown sand and gravel of moderately strong laminated siltstone		
1.00-1.45	2	SPT	7	2, 1			(2.00)	
1.45-2.00	3	D						
2.00-2.45	4	SPT	23			Medium dense grey and yellow brown very silty clayey fine SAND with some gravel and clay pockets (Glacial Sand and Gravel)	2.00	
2.45-3.00	5	B				Dense yellow brown zoned grey silty SAND and GRAVEL with some gravel, clay pockets and fine coal fragments (Glacial Sand and Gravel)	(0.45) 2.45	
3.00-3.45	6	SPT	38					
3.45-4.50	7	B						
4.00	19	W						
4.60-5.05	8	SPT	32				(4.00)	
5.05-5.80	9	B						
6.00-6.45	10	SPT	31					
6.45-7.60	11	D				Stiff grey/brown very silty sandy CLAY with occasional to some subrounded sandstone, coal, and shale gravel and cobbles with depth (Boulder Clay)	6.45	
7.60-8.05	12	SPT	30					
8.05-9.00	13	D					(3.45)	

Boring Progress and Water Observations / Chiselling

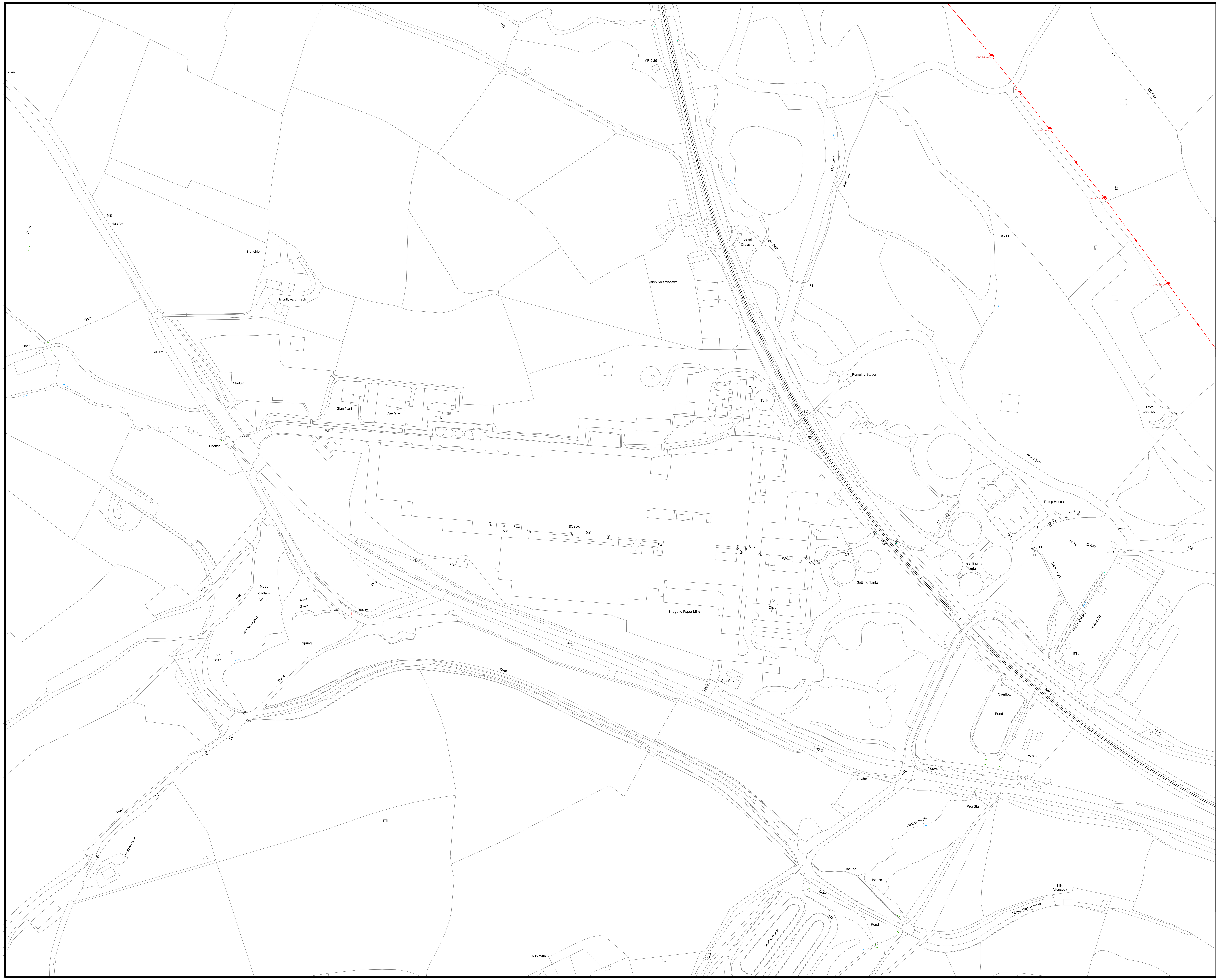
Date	Time	Borehole Depth	Casing Depth	Casing Diameter	Water Depth	Chiselling From	To	Hours
21.4.93		3.45	3.00	150	0.90	6.50	10.0	0.5
22.4.93		11.95	0.0	150	0.70			

General Remarks

Hand dig service pit to 1.0m depth (1 hr). Methane monitoring standpipe installed to 7.5m depth. Water sample no. 19 collected above boulder clay. Water sample no. 20 collected from below boulder clay.

All dimensions in metres Scale 1:50	Method Cable Percussion	Logged By SJM	Checked By

Appendix D – DCWW Records



Dŵr Cymru
Welsh Water

Bridgend Paper Mill

N
W E
S

LEGEND(Representative of most common features)

Waste network:

	Foul chamber		Outfall
	Surface water chamber	LH	Lamphole
	Combined chamber		Storm Overflow
C O	Combined sewer overflow		Rising main
SPC	Special purpose chamber		Gravity sewer
	Treatment works	P	Private sewer
	Pumping station	S 104 P	Private sewer subject to Sect. 104 adoption agreement
		T	Private Sewer Transfer
		L	Lateral Drain
			Inspection Chamber

NB: Sewer symbol colour indicates the type.

RED - Combined
GREEN - Surface Water
BROWN - Foul
Purple - Former S24 sewers (for indicative purposes only)

Notes:

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases, pipe material (other than Asbestos Cement or Pitch Fibre) may be found to be asbestos cement (AC) or Pitch Fibre (PF) . It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation

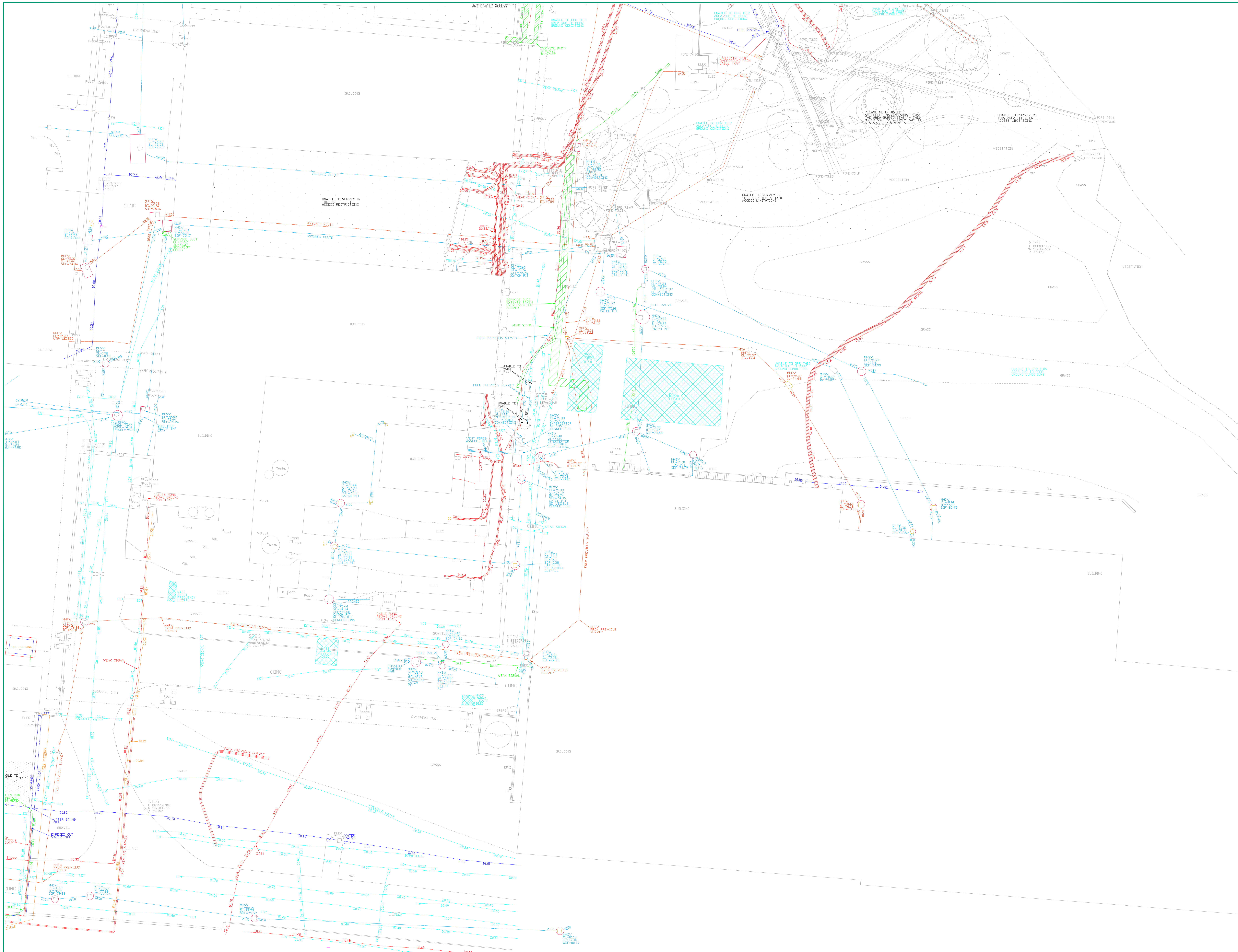
Dŵr Cymru Cyfyngedig ('the Company') gives this information as to the position of its underground apparatus by way of general guidance only and on the strict understanding that it is based on the best information available and no warranty as to its correctness is relied upon in the event of excavations or other works made in the vicinity of the company's apparatus. The onus of locating apparatus before carrying out any excavations rests entirely on you. The information which is supplied by the Company, is done so in accordance with statutory requirements of sections 198 and 199 of the Water Industry Act 1991 which is based upon the best Information available and, in particular, but without prejudice to the generality of the foregoing, it should be noted that the records that are available to the Company may not disclose the existence of a water main, service pipe, sewer, lateral drain or disposal main and any associated apparatus laid before 1 September 1989, or, if they do, the particulars thereof including their position underground may not be accurate. It must be understood that the furnishing of this information is entirely without prejudice to the provision of the New Roads and Street Works Act 1991 and the Company's right to be compensated for any damage to its apparatus.

Service pipes are not generally shown but their presence should be anticipated.

EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.

Map Ref:	287803,187170
Map scale:	1:1250
Printed by:	John Emma
Printed on:	10 Dec 2019

Appendix E – Site Drainage Plan



Rev	Amendments	Date	By

Do not scale this drawing
This drawing is copyright.

NOTES:

1. SITE GRID AND LEVELS ARE BASED UPON ORDNANCE SURVEY VIA THE ACTIVE GPS NETWORK.

KEY

TOTAL SURVEYING SOLUTIONS Ltd.

CLIENT
QUORUM

PROJECT
WEPA PAPERMILL CULVERT,
BRIDGEND.

Surveyed by	MH	Date	18/09/2024
Drawn	MH	Date	27/09/2024
Scales	1:250@A1	Checked	PCH
Project Reference No.	TTS/0219		
Drawing Number	WEP/02		

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