



TECHNICAL SERVICES DEPARTMENT

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CHECK OF EXISTING SERVICES FOR SITE TRAFFIC SURCHARGE

Client VCUK

Contract Radcliffe Civic Hub

Section Check of Existing Services for Site Traffic Surcharge

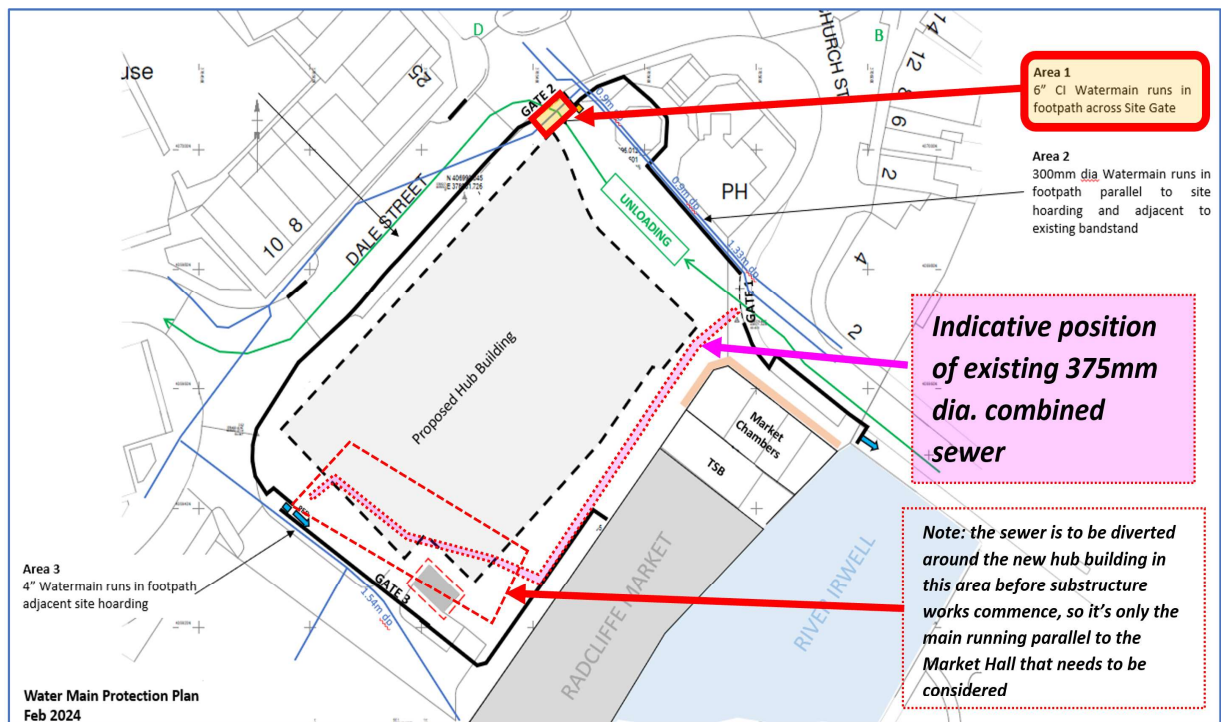
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Revision	Date	Calculated by	Checked by	Approved by
0	27 February 2024	SB	JGC	JR

CALCULATIONS	Client VCUK					
	Contract Radcliffe Civic Hub					
	Section Check of Existing Services for Site Traffic Surcharge					
Date	Calculated by	Checked by	Page	Ref.	Rev.	
27 February 2024	SB	JGC	2 of 6	BH0045-VCUK-XX-XX-CA-Y-001901	0	

1.0 Introduction

This report covers the check of existing vitrified clay pipe located at Radcliffe Civic Hub project at circa 2.8m depth. Pipe is 375mm diameter and is located between Market Hall & New Hub Building. Pile location is shown in **Figure 1**.



2.0 Standards and References

Standards

1. BS 5975:2008+A1:2011: Code of practice for temporary works procedures and the permissible stress design of falsework
2. BS EN 1925-1: Structural design of buried pipelines under various conditions of loading
3. BS 9295:2010 - Guide to the structural design of buried pipelines

Industry Guidance

1. Clay Pipe Development Association Ltd - The specification, design and construction of drainage and sewerage systems using vitrified clay pipes

Clients Information

1. RADHUB-IDG-XX-XX-SU-G-0001 - Geoenvironmental Appraisal of Land at Radcliffe Hub, Radcliffe

CALCULATIONS	Client VCUK					
	Contract Radcliffe Civic Hub					
	Section Check of Existing Services for Site Traffic Surcharge					
Date	Calculated by	Checked by	Page	Ref.	Rev.	
27 February 2024	SB	JGC	3 of 6	BH0045-VCUK-XX-XX-CA-Y-001901	0	

4.0
Design Loads

Design loads & schematics for a standard 12t axle are as shown in **Figure 3**.

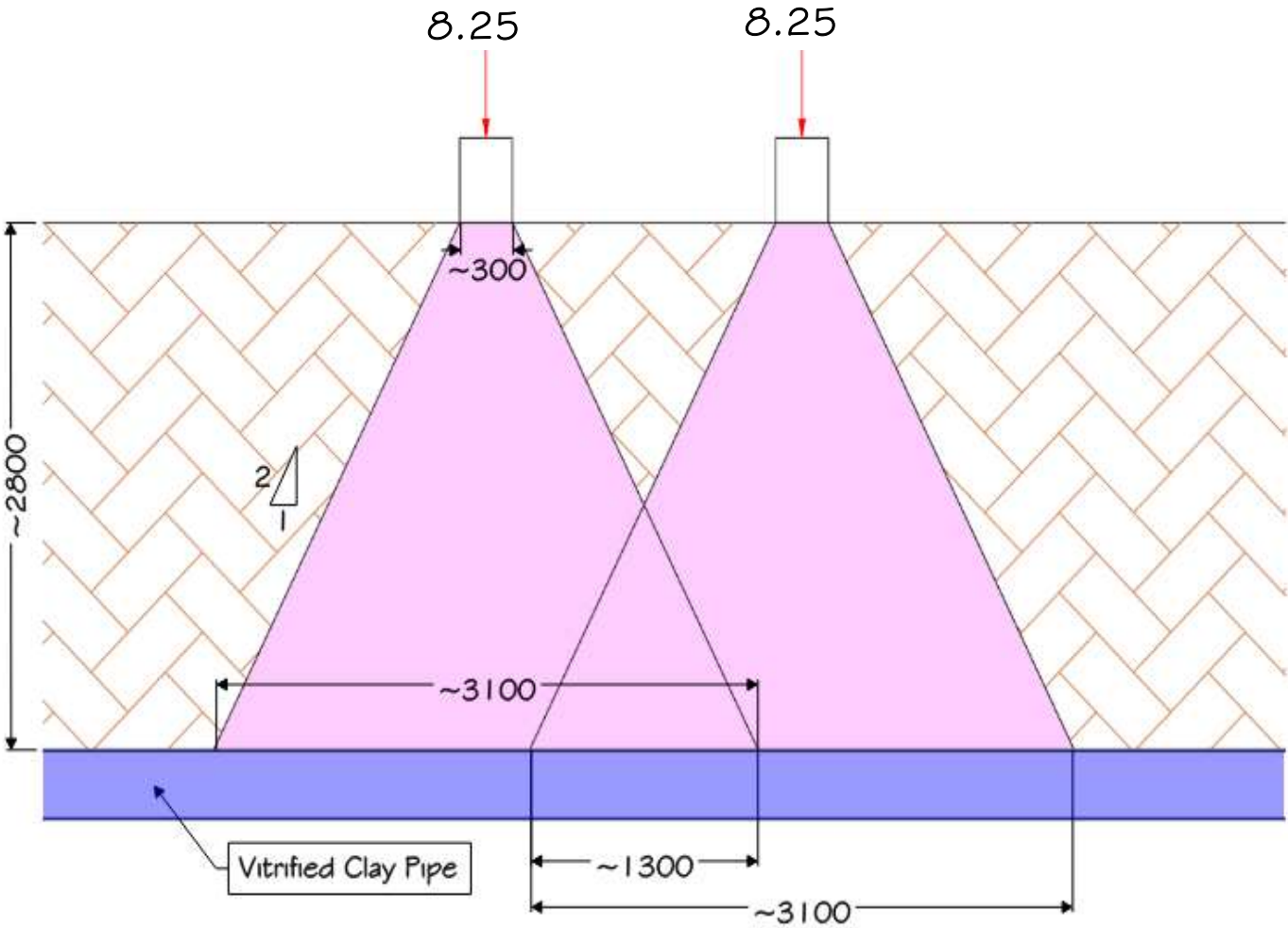


Figure 3: Loads and Spread Scheme Illustration

As per BS 9295:2010 - Table B1 - With conservative - worst case - assumptions:

Pipe Diameter: 375mm

Bedding Construction: D or N

Strength Class: 120

The minimum Crushing Strength of Vitrified Clay Pipe is derived to be **36.0 kN/m**

CALCULATIONS	Client VCUK					
	Contract Radcliffe Civic Hub					
	Section Check of Existing Services for Site Traffic Surcharge					
Date 27 February 2024	Calculated by SB	Checked by JGC	Page 4 of 6	Ref. BH0045-VCUK-XX-XX-CA-Y-001901	Rev. 0	

3.0 Geotechnical

Referring to Borehole WS04 log as recorded in Geotechnical Report RADHUB-IDG-XX-XX-SU-G-0001 upper soil strata at pipe location is formed of granular Made Ground following with granular Gravel strata below. N SPT is measured to be 6 and 15 respectively.

Considering the information available on soil an approx. 2:1 (30) spread shall be assumed

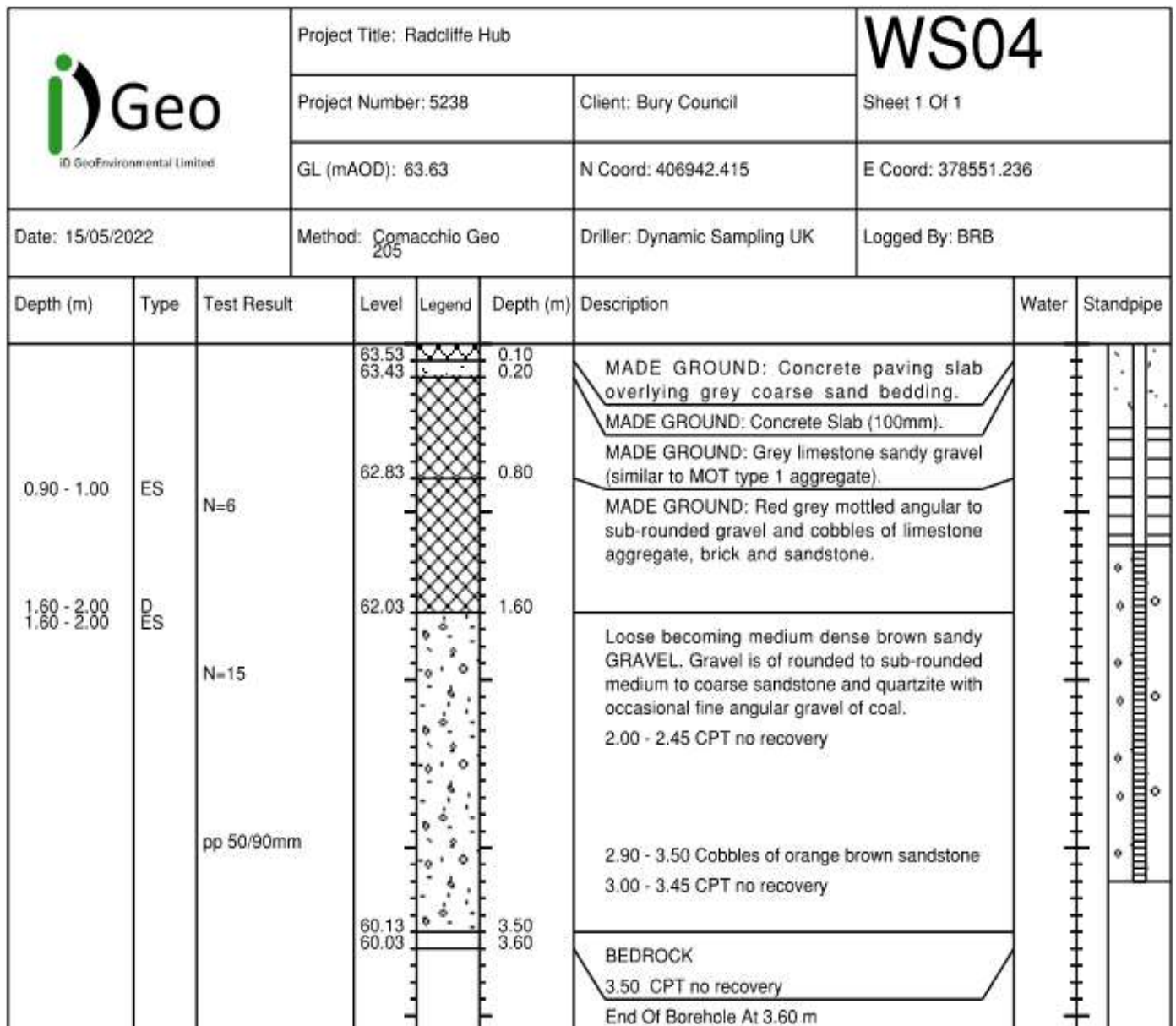


Figure 2: WS04 Borehole Log

CALCULATIONS	Client VCUK					
	Contract Radcliffe Civic Hub					
	Section Check of Existing Services for Site Traffic Surcharge					
Date 27 February 2024	Calculated by SB	Checked by JGC	Page 5 of 6	Ref. BH0045-VCUK-XX-XX-CA-Y-001901	Rev. 0	

5.0 Analysis

The additional pressure to vitrified clay pipe shall be calculated below:

z (Depth of Cover) **2.8** m

α (Spread Angle) **30** °

b (Tyre Contact) **300** mm

F,tyre (Load per Tyre) **8.25** t

A,spread (Spread Area at Pipe Level) 9.61 m²
Radcliffe Civic Hub

S,pipe (Pressure at Pipe Level) 8.4 kPa
Check of Existing Services for Site Traffic Surcharge

As demonstrated in Figure 3, the pressure from same axel tyres overlap at pipe level at a 1.3m segment thus:
BH0045-VCUK-XX-XX-CA-Y-001901

S,pipe,axel 16.84 kPa

D (Pipe Diameter) 375 mm

P,pipe,axel 6.32 kN/m

γ ,soil **18** kN/m³ Assumed for soil strata as shown in Figure 2)

S,pipe,soil 50.4 kPa

P,pipe,soil 18.9 kN/m Assuming no soil arching above - conservative

P,pipe,TOT **25.22** kN/m < **36** kN/m (Refer to Chapter 4)

CALCULATIONS	Client VCUK					
	Contract Radcliffe Civic Hub					
	Section Check of Existing Services for Site Traffic Surcharge					
Date 27 February 2024	Calculated by SB	Checked by JGC	Page 6 of 6	Ref. BH0045-VCUK-XX-XX-CA-Y-001901	Rev. 0	

6.0 Conclusion

Based on Chapter 5 analysis, it is concluded that the vitrified clay pipe is OK for additional surcharge due to site traffic with axle load up to 16.5t. This axle load complies with vehicles used on British roads as regulated by the Road Vehicles (Construction & Use Regulations 1986 (C&U) Regs and the Road Vehicles (Authorised Weight) regulations 1998 (AW) Regs.