PERCOLATION TEST REPORT & SOAKAWAY SIZING

J. STANBERRY

PROPOSED REPLACEMENT DWELLING,

WESTLYN, FENGATE, MOULTON CHAPEL,

SPALDING, LINCOLNSHIRE, PE12 0XL

PROJECT No: SW 22-362

DOCUMENT REF: SW 22-362-REP-01



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1. INTRODUCTION

Acting upon the instruction of Jenny Stanberry, we attended site on 3rd March 2023, the purpose being to observe the underlying ground conditions and determine the percolation characteristics and infiltration rates of the soil strata.

Percolation tests were undertaken in accordance with the method described within BRE digest 365 (2007 edition)

The opinions and comments expressed within this report are based upon ground conditions encountered in the trial pits excavated at the time of our visit.

This report has been prepared for the named client above and should not be relied upon by any other parties, with the exception of the client's professional advisors, for any use without the express written permission of Shields Wilson Limited.

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2. LOCATION & DESCRIPTION OF SITE

2.1. Site Location

The site is situated to the East of Fen Gate Road, Moulton Chapel, where the existing dwelling stands. Appropriate national grid reference TF299199.

A Location plan is contained with Appendix A.

2.2. Site Description

The site currently contains an existing dwelling which is to be demolished once construction begins.

The North of the site will be bound by the road, Daws Gate.

The Eastern Boundary is boarded by the existing property of which the proposed site belongs to.

The Western boundaries of the will be bound by the road Fen Gate.

The South boundary is bound by an existing property which is owned by the client.

At the time of our visit the weather was dry, however there was a slight drizzle in days leading up to the testing.

2.3. Geological Description

Desktop study of the area has been undertaken using the British Geological Society Maps.

The maps indicate the site to be underlain by tidal flat deposits of clay & silt.

This information is based upon publicly available records. An extract is contained with Appendix B.

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3. BOREHOLE EXCAVATIONS

Two No. boreholes were dug to test the ground soil conditions. The excavations show a layer of topsoil followed by silt down to 2m at both locations.

The strata is in-line with the desktop study, being silty makes ground infiltration a possible method for draining surface water.

Bore Hole logs and a location plan can be found in Appendix C.

4. PERCOLATION TESTS

One No. percolation test was undertaken on the proposed site.

Logs of the test and subsequent result calculations are contained within Appendix D. Appendix E contains a photographic record.

5. INFILTRATION TEST RESULTS

Results are summarised and tabulated below.

Test Pit	Test 1	Test 2	Test 3
SA01	1.43×10^{-5} m/s	1.19×10^{-5} m/s	1.13×10^{-5} m/s

The results are average for infiltration in the South Holland area and demonstrate that the underlying geology on the site is suitable for infiltration.

6. SOAKAWAY SIZING

Using the worst calculated infiltration rate of 1.13×10^{-5} m/s, two sets of Soakaways each taking approximately half the roof area have been sized to be able to withstand a 10-year storm of 240 Minute Duration.

For the front roof area A, a soakaway of 6 crates wide, 2 crates long and 1 crate deep is required to catch the 78m² of roof area.

For the back roof area B, a soakaway of 7 crates wide, 2 crated long and 1 crate deep is required to capture the 92m².

Soakaways have been deliberately sized at 1 crate deep to minimise their depth and maximise the distance from underside to the ground water table.

Soakaway sizing calculations, as well as a site plan showing the roof areas to be drained and approximate soakaway locations can be found in Appendix F.

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7. FOUL WATER

The existing dwelling discharges to a treatment plant with an outfall to infiltration.

The proposed replacement dwelling has the same number of bedrooms at the existing and therefore in terms of Foul water design the occupancy and usage have not increased.

As such the existing FW treatment plant will remain suitable and the new Foul water drainage will be directed towards the treatment plant and its infiltration outfall.

8. DISCUSSIONS

The ground conditions encountered on site, and percolation test results indicate that the site is suitable for the use of infiltration drainage techniques for disposal of run-off water.

The calculated infiltration rates are typical of South Lincolnshire sands and silts, and it is common for garden soakaways to have been successful utilised for residential roof water drainage in this area.

Designs of infiltration features and soakaways are based upon the worst-case calculated infiltration rate of 1.13×10^{-5} m/s.

The method of surface water discharge, infiltration on site, is at the top of the SUDs hierarchy to current Building Regulations Approved Document Part H. Findings and calculations contained withing this report are therefore considered to demonstrate suitable methods of surface water and foul water will be utilised for the proposed replacement dwelling.

For and on behalf of **SHIELDS WILSON LIMITED**

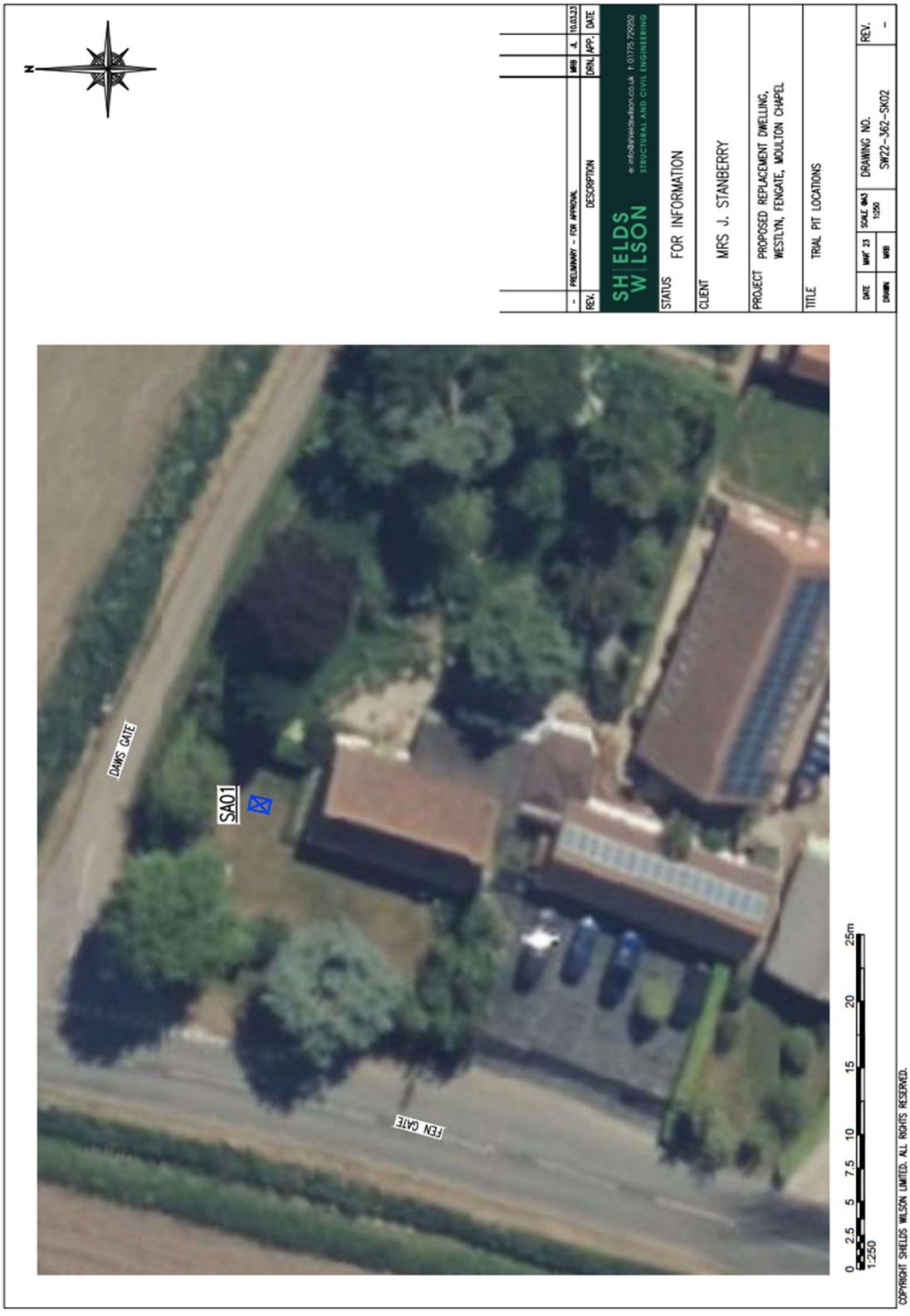
Max Barlow, Engineering Technician **10th March 2023**.

Checked by A.P.Wilson CEng MIStructE

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APPENDIX A

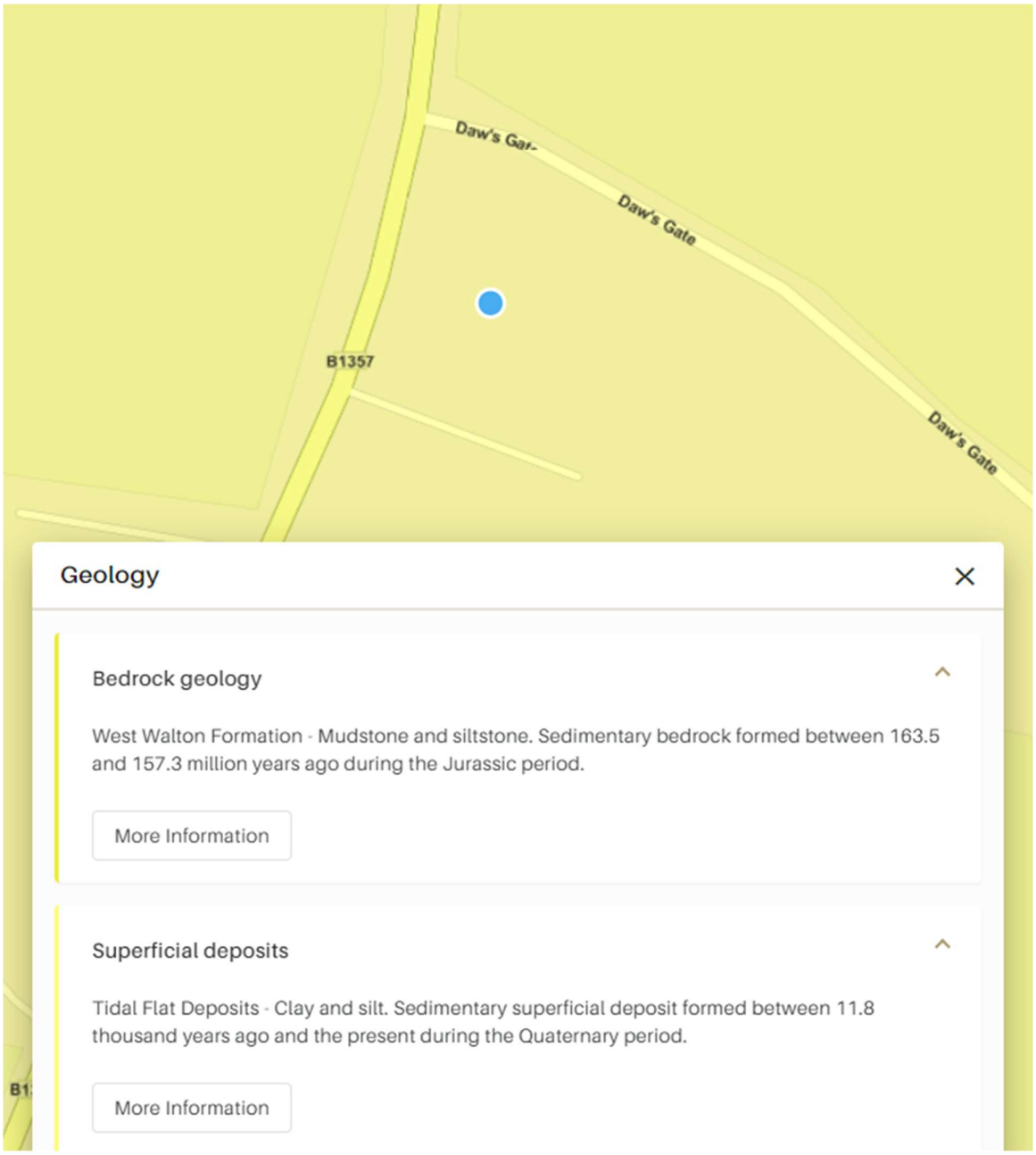
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APPENDIX B

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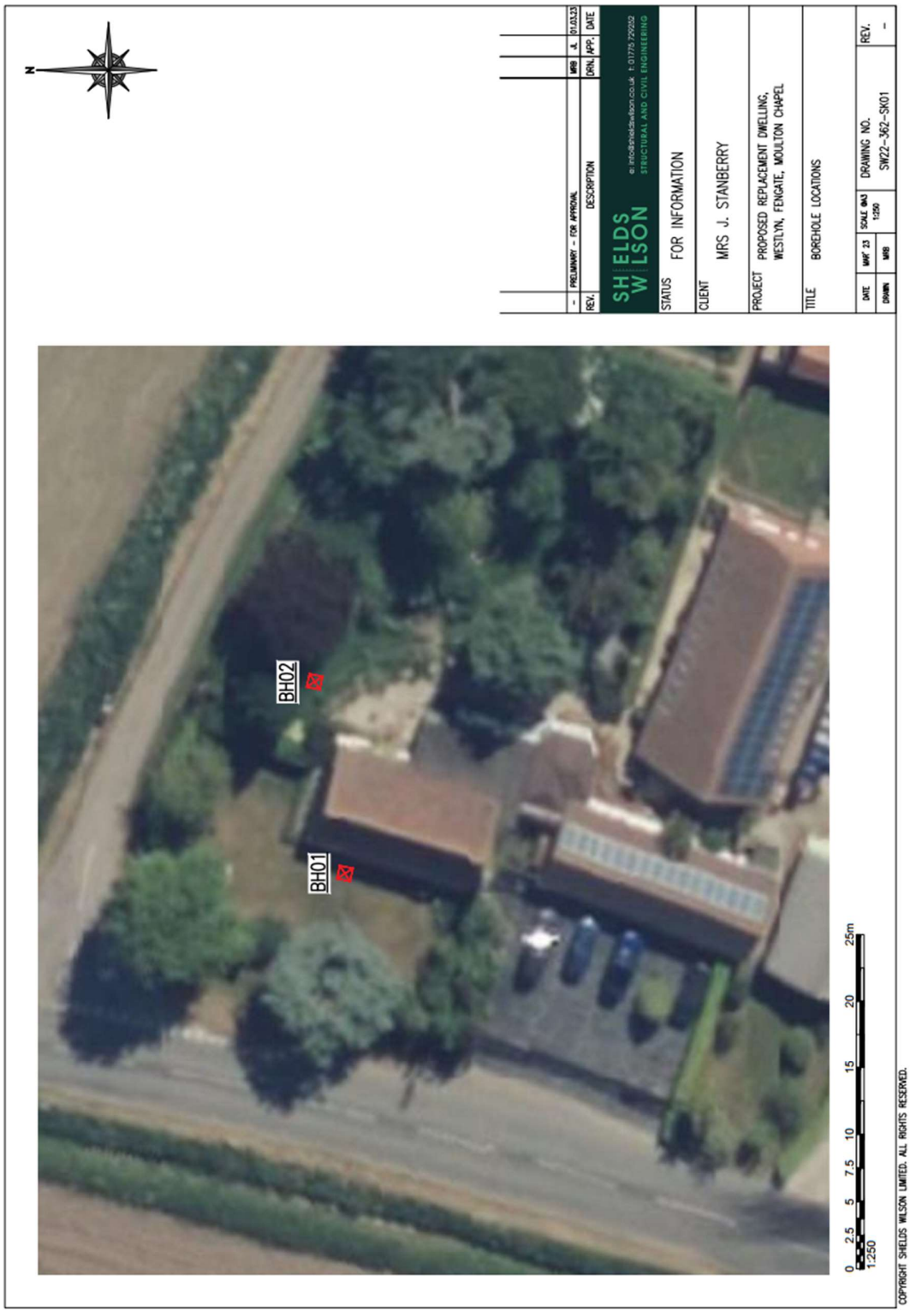


Extract British Geological Society Maps – Bedrock Geology & Superficial deposits

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APPENDIX C

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STRUCTURAL AND CIVIL ENGINEERING

LOGGED BY	JL	JOB NO.	SW22-362	BH01
DRAWN BY	MRB	DATE OF TESTING	08/02/23	

PROJECT: PROPOSED REPLACEMENT DWELLING, WESTLYN, FENGATE, MOULTON CHAPEL

SITE COORDINATES: TF298199

GROUND LEVEL: 4.000

CLIENT: MRS J. STANBERRY

EXCAVATION METHOD: HAND AUGER

DESCRIPTION	REDUCED LEVEL	LEGEND	DEPTH (THICK)	SAMPLE REF.	TEST REQUIRED	MACKINTOSH PROBE	HAND SHEAR VANE
DARK BROWN TOP SOIL			(0.6m) 0.6m				
LIGHT BROWN SILT			(0.6m) 1.2m				
ORANGEY BROWN SILT			(0.8m) 2.0m				

REMARKS: TRIAL PIT BECOMING WETTER WITH DEPTH, TERMINATED AT 2.0m DUE TO EXCESSIVE WATER SEEPING IN & AUGER HEAD NOT RETRIEVING MATERIAL.

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LOGGED BY	JL	JOB NO.	SW22-362	BH02
DRAWN BY	MRB	DATE OF TESTING	08/02/23	

PROJECT: PROPOSED REPLACEMENT DWELLING, WESTLYN, FENGATE, MOULTON CHAPEL

SITE COORDINATES: TF298199

GROUND LEVEL: 4.000

CLIENT: MRS J. STANBERRY

EXCAVATION METHOD: HAND AUGER

DESCRIPTION	REDUCED LEVEL	LEGEND	DEPTH (THICK)	SAMPLE REF.	TEST REQUIRED	MACKINTOSH PROBE	HAND SHEAR VANE
DARK BROWN TOP SOIL			(0.6m) 0.6m				
LIGHT BROWN SILT			(0.7m) 1.3m				
ORANGEY BROWN SILT			(0.6m) 1.9m				

REMARKS: TRIAL PIT BECOMING WETTER WITH DEPTH, TERMINATED AT 1.9m DUE TO EXCESSIVE WATER SEEPING IN & AUGER HEAD NOT RETRIEVING MATERIAL.

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APPENDIX D

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PROPOSED DWELLING, MOULTON CHAPEL - J. STANBERRY

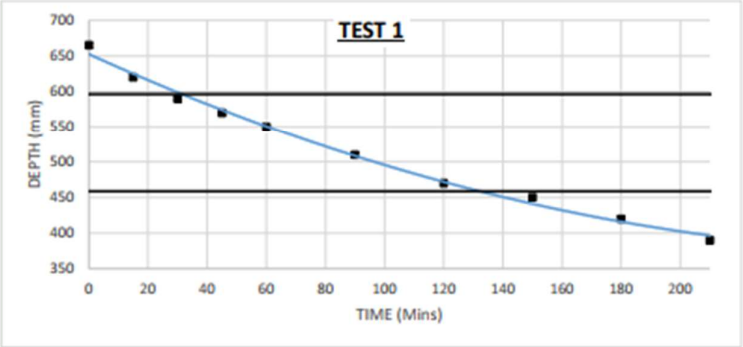
SA01	TEST 1	TEST 2	TEST 3
TIME (Mins)	DEPTH mm (d)	DEPTH mm (d)	DEPTH mm (d)
0	665	700	680
15	620	680	660
30	590	660	650
45	570	640	630
60	550	620	610
90	510	580	580
120	470	540	550
150	450	520	510
180	420	490	480
210	390	460	460

INFILTRATION TEST - HOLE SA01

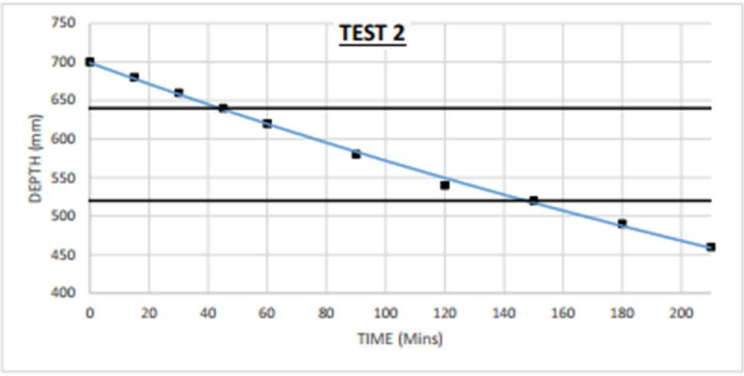
PROJECT NO. 22-362

SITE VISIT: 03/03/2023

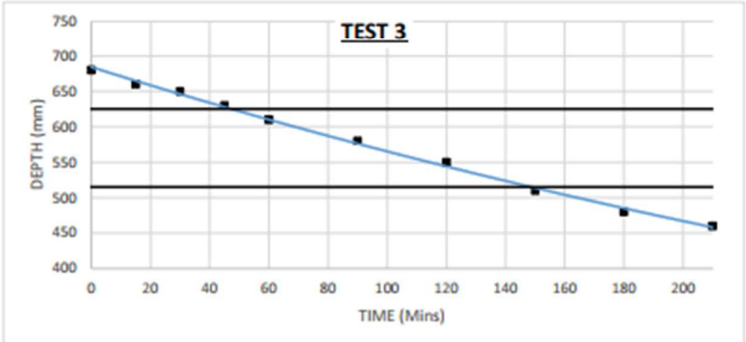
TRIAL PIT DIMENSIONS (m)	
A [L]	1.20
B [W]	0.60
C [D]	1.00



SOIL INFILTRATION RATE, f
TEST 1
1.4295E-05 m/s
0.051461988 m/h



SOIL INFILTRATION RATE, f
TEST 2
1.19048E-05 m/s
0.042857143 m/h



SOIL INFILTRATION RATE, f
TEST 3
1.12647E-05 m/s
0.040552995 m/h

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APPENDIX E

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Job Details SW 22-362 - Proposed Dwelling, Moulton Chapel, J. Stanberry

Title Soakaway sizing calculation - Area A

Calculated Infiltration Rate (m/s)
1.12647E-05

Design Rainfall - R	
M5-240	Z1
0.02	1.48
M10-D	Z2
0.0296	1.24

R = 0.036704 m

Inflow To Soakaway

Area (m^2)	x R
78	0.036704

Inflow = 2.862912 m^3

Soakaway Dimensions

Polystorm crates		Number	Total Lengths	Half Effective
Width	0.5	6	3	
Length	1	2	2	
Depth	0.4	1	0.4	0.2

Internal Surface Area Not Including Base (50% depth)
8 m^2

Storage Volume
2.28 m^3 (95% void ratio)

Outflow From Soakaway

Internal SA (50%)	Infiltration Rate	Storm Duration (s)		
8	1.12647E-05	240	60	14400

Outflow = 1.29769344 m^3

Storage Required

Inflow -	Outflow	
2.862912	1.297693	1.56521856

Storage Volume With 30% Free (Required)
2.034784128

Actual Storage Volume
2.28

Soakaway Has Been Designed For A
10 Year Storm Of 240 Minute Duration

Half drain time = 4.4 OK

NB. Actual Storage Volume Needs To Be
Greater Than Storage Volume + 30%

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Job Details SW 22-362 - Proposed Dwelling, Moulton Chapel, J. Stanberry

Title Soakaway sizing calculation - Area B

Calculated Infiltration Rate (m/s)
1.12647E-05

Design Rainfall - R	
M5-240	Z1
0.02	1.48
M10-D	Z2
0.0296	1.24

R = 0.036704 m

Soakaway Dimensions

Polystorm crates		Number	Total Lengths	Half Effective
Width	0.5	7	3.5	
Length	1	2	2	
Depth	0.4	1	0.4	0.2

Internal Surface Area Not Including Base (50% depth)
9.2 m^2

Storage Volume
2.66 m^3 (95% void ratio)

Inflow To Soakaway

Area (m^2)	x R
92	0.036704

Inflow = 3.376768 m^3

Outflow From Soakaway

Internal SA (50%)	Infiltration Rate	Storm Duration (s)		
9.2	1.12647E-05	240	60	14400

Outflow = 1.492347456 m^3

Storage Required

Inflow -	Outflow	
3.376768	1.492347	1.884420544

Soakaway Has Been Designed For A
10 Year Storm Of 240 Minute Duration

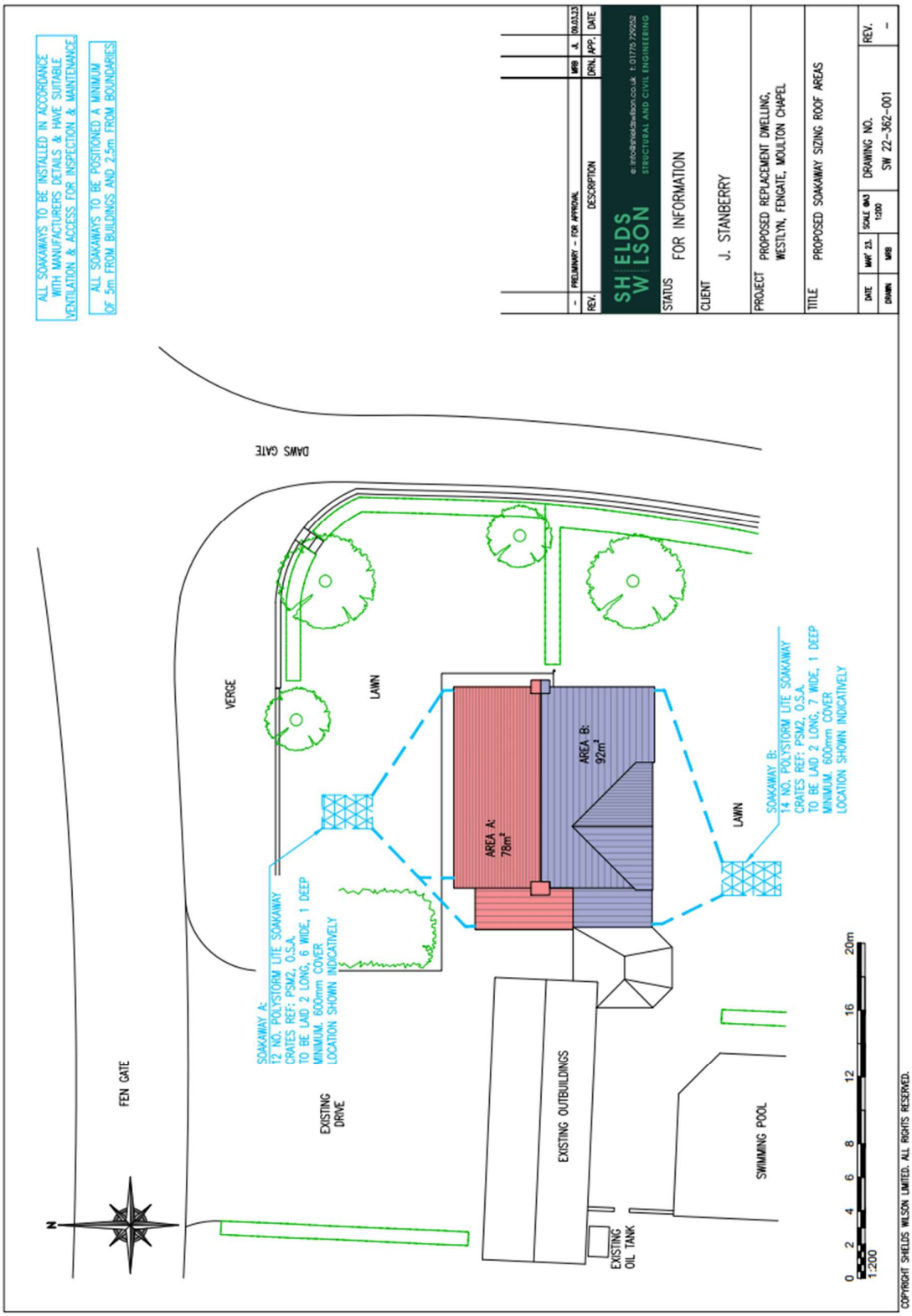
Storage Volume With 30% Free (Required)
2.449746707

Half drain time = 4.5 OK

NB. Actual Storage Volume Needs To Be
Greater Than Storage Volume + 30%

Actual Storage Volume
2.66

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