Clayton Starkey

Proposed Residential Development
Occupation Lane
Dewsbury

Drainage Assessment

Prepared by EWE Associates Ltd
Draft Rev0 July 2023

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CLIENT DETAILS

Mr Clayton Starkey

CONTRACT

This report describes work commissioned by Clayton Starkey during June 2023. Lea Favill of EWE Associates Ltd carried out the work.

Date: 20th July 2023

Prepared by: …… …… Lea Favill
Director

REVISION HISTORY

Draft Report Rev0 issued 20th July 2023
- 1No copy issued to Mr Clayton Starkey

CONTENTS

1. INTRODUCTION ---- 4

Terms of Reference 4
Approach to the Assessment 4
Design Constraints 4

2. DESIGN OF PROPOSED SURFACE WATER DRAINAGE SYSTEM ---- 6

Proposed Drainage Strategy 6
Adoption & Maintenance 6
Crate Tank Maintenance 6

3. DESIGN OF PROPOSED FOUL WATER DRAINAGE SYSTEM ---- 7

APPENDICES:

APPENDIX A: - SEWER PLAN

APPENDIX B: - 1 IN 100 YEAR+CC WINDES CALCULATION SHEETS

APPENDIX C: - DRAINAGE DRAWINGS

1. INTRODUCTION

Terms of Reference

This report was commissioned by Mr Clayton Starkey to consider the surface water and foul water drainage for the proposed residential development off Occupation Lane in Dewsbury.

The proposal involves the construction of residential units, parking areas and access drive. The drainage issues are being considered as part of the current planning application.

Approach to the Assessment

For the purposes of this study, the following have been considered: -

- Site level information and proposed finished levels of the buildings and external works.
- Onsite constriction.
- Options available to developer.
- NPPF guidelines with regards to the control of runoff.
- PPG3 pollution prevention guidelines.
- Future adoption and management of drainage system.
- Discharge rates into sewer.
- Flood risk to adjacent land users.

Design Constraints

For the purposes of this study, the following constraints have been applied: -

- The design is based on the proposed layout provided by the client's representative. At this stage no modifications to the layout are proposed.
- Any drainage features or attenuation structures will be maintained by the individual owner/maintenance company.
- SUDs features are to be recommended where practically possible.
- The client has confirmed that the subsoils have a low permeability. Subsequently, infiltration drainage is not a viable option for this site.
- There is a Yorkshire Water public sewer located within the adjacent property (No.46). The client has agreement with Yorkshire Water to discharge into this sewer via gravity at a rate of 3.5l/s. It was considered that pumping upto the sewer adjacent No.38 wasn't sustainable.
- It is assumed that the minimum design standard is 1 in 100 years plus climate change (40%) as the site is less vulnerable.

- No on site above ground flooding will be acceptable up to and including 1 in 100 years plus climate change (40%) storm.

2. DESIGN OF PROPOSED SURFACE WATER DRAINAGE SYSTEM

Proposed Drainage Strategy

A peak discharge rate from the site of 3.5 l/s is proposed. The site includes 566m² of roofed and paved areas. It is proposed that 15m² by 1.2m deep crate tank is provided at the low point within the site.

An assessment of the required balance volume has been made using the estimated post development impermeable area of 566m².

Using WinDes Source Control software developed by Microdrainage the required attenuation has been calculated for the 1 in 100 year plus climate change (40%) event.

Reference should be made to Appendix B where the calculation sheets are provided. The attenuation size has been tabulated below in Table 1. It is estimated that during the 1 in 100 year plus climate change (40%) event that 19.5m³ of storage will be required. This will be provided within the crate tank.

The drainage strategy drawing provided at Appendix C shows the drainage strategy for the site which includes the crate tank.

Table 1: WinDes 1 in 100 year+CC Storage Volume

Return Period	Required Attenuation	Approx Volume (m³)
1 in 100 year + CC	Crate Tank 15m2 by 1.2m deep	19.5

Adoption & Maintenance

It is considered that the piped drainage systems and crate tank will be maintained by onsite management company.

Crate Tank Maintenance

Following construction regular inspection is recommended. The main concern is to reduce the level of siltation entering the crate tank and as such a catchpit manhole should be located directly upstream of the tank to intercept any silt being washed down the surface water system. It is recommended that this manhole is lifted and inspected on a monthly basis and any silt located in the bottom removed. Furthermore the location of the tank within the site should be clearly marked on a plan. This area should also be inspected for any deformation of the topsoil/pavement which could indicate settlement or failure. A log book should be completed which will show the inspection and maintenance history of the system. The log book, site plan and construction check list should form maintenance manual for the system.

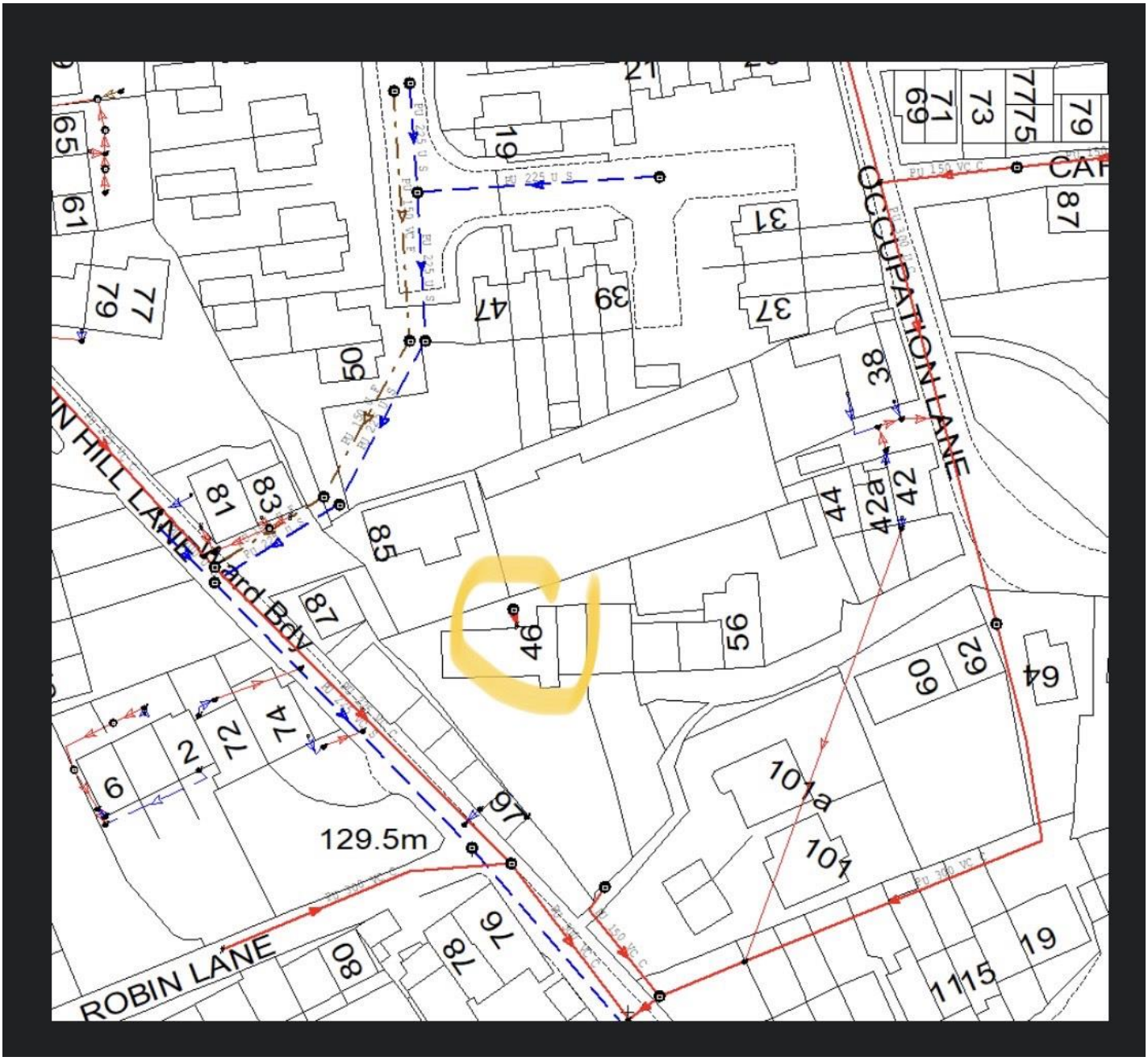
The maintenance plan has been tabulated below and will be the responsibility of the appointed management company.

Maintenance Schedule	Required action	Frequency
Monitoring	Inspect catchpit manhole for silt and debris	Monthly
	Inspect crate tank locations for ground deformation	3 monthly
	Inspect crate tank for silt buildup	6 monthly
Regular Maintenance	Litter and debris removal from road gullies	Monthly
	Remove silt and debris from catchpit manholes	Monthly
Occasional Maintenance	Remove silt from crate tank	6 monthly
Remedial actions	Repair deformation of topsoil once settlement stopped	As required
	Repair deformation of paved areas once settlement stopped	As required

3. DESIGN OF PROPOSED FOUL WATER DRAINAGE SYSTEM

There is a foul sewer located within the adjacent property which can be accessed by gravity.

Appendix A: - Sewer Plan



Appendix B: - 1 in 100 year+CC WinDes Calculation Sheets

EWE Associates Ltd		Page 1
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		Micro Drainage
Date 20/07/2023 09:53	Designed By Lea	
File 100yr+CC40% tank ...	Checked By	
Micro Drainage	Source Control W.12.4	

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	135.551	1.051	3.1	15.8	O K
30 min Summer	135.630	1.130	3.2	17.0	O K
60 min Summer	135.635	1.135	3.2	17.0	O K
120 min Summer	135.579	1.079	3.1	16.2	O K
180 min Summer	135.510	1.010	3.0	15.2	O K
240 min Summer	135.445	0.945	2.9	14.2	O K
360 min Summer	135.329	0.829	2.7	12.4	O K
480 min Summer	135.228	0.728	2.6	10.9	O K
600 min Summer	135.142	0.642	2.4	9.6	O K
720 min Summer	135.067	0.567	2.3	8.5	O K
960 min Summer	134.967	0.467	2.0	7.0	O K
1440 min Summer	134.809	0.309	1.9	4.6	O K
2160 min Summer	134.612	0.112	1.8	1.7	O K
2880 min Summer	134.590	0.090	1.6	1.3	O K
4320 min Summer	134.570	0.070	1.1	1.1	O K
5760 min Summer	134.561	0.061	0.9	0.9	O K
7200 min Summer	134.555	0.055	0.7	0.8	O K
8640 min Summer	134.551	0.051	0.6	0.8	O K
10080 min Summer	134.547	0.047	0.6	0.7	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	167.093	17
30 min Summer	98.095	31
60 min Summer	57.588	50
120 min Summer	33.808	84
180 min Summer	24.758	118
240 min Summer	19.848	152
360 min Summer	14.534	218
480 min Summer	11.652	284
600 min Summer	9.816	348
720 min Summer	8.533	412
960 min Summer	7.018	538
1440 min Summer	5.328	794
2160 min Summer	4.045	1100
2880 min Summer	3.327	1468
4320 min Summer	2.384	2152
5760 min Summer	1.881	2936
7200 min Summer	1.566	3672
8640 min Summer	1.348	4400
10080 min Summer	1.187	5136

EWE Associates Ltd		Page 2
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		Micro Drainage
Date 20/07/2023 09:53 File 100yr+CC40% tank ...	Designed By Lea Checked By	
Micro Drainage	Source Control W.12.4	

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	135.688	1.188	3.3	17.8	O K
30 min Winter	135.832	1.332	3.5	19.3	O K
60 min Winter	135.868	1.368	3.5	19.5	O K
120 min Winter	135.727	1.227	3.3	18.4	O K
180 min Winter	135.622	1.122	3.2	16.8	O K
240 min Winter	135.523	1.023	3.0	15.4	O K
360 min Winter	135.351	0.851	2.8	12.8	O K
480 min Winter	135.211	0.711	2.5	10.7	O K
600 min Winter	135.095	0.595	2.3	8.9	O K
720 min Winter	134.999	0.499	2.1	7.5	O K
960 min Winter	134.863	0.363	1.9	5.4	O K
1440 min Winter	134.605	0.105	1.8	1.6	O K
2160 min Winter	134.581	0.081	1.4	1.2	O K
2880 min Winter	134.571	0.071	1.1	1.1	O K
4320 min Winter	134.558	0.058	0.8	0.9	O K
5760 min Winter	134.551	0.051	0.6	0.8	O K
7200 min Winter	134.546	0.046	0.5	0.7	O K
8640 min Winter	134.543	0.043	0.5	0.6	O K
10080 min Winter	134.540	0.040	0.4	0.6	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Winter	167.093	17
30 min Winter	98.095	31
60 min Winter	57.588	52
120 min Winter	33.808	90
180 min Winter	24.758	126
240 min Winter	19.848	164
360 min Winter	14.534	232
480 min Winter	11.652	300
600 min Winter	9.816	366
720 min Winter	8.533	432
960 min Winter	7.018	568
1440 min Winter	5.328	738
2160 min Winter	4.045	1092
2880 min Winter	3.327	1464
4320 min Winter	2.384	2200
5760 min Winter	1.881	2832
7200 min Winter	1.566	3568
8640 min Winter	1.348	4312
10080 min Winter	1.187	4968

EWE Associates Ltd		Page 3
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		
Date 20/07/2023 09:53 File 100yr+CC40% tank ...	Designed By Lea Checked By	
Micro Drainage	Source Control W.12.4	

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
Site Location	421850 423600 SE 21850 23600
C (1km)	-0.024
D1 (1km)	0.342
D2 (1km)	0.431
D3 (1km)	0.288
E (1km)	0.298
F (1km)	2.346
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time / Area Diagram

Total Area (ha) 0.057

Time (mins)	Area (ha)
0-4	0.057

EWE Associates Ltd		Page 4
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		
Date 20/07/2023 09:53 File 100yr+CC40% tank ...	Designed By Lea Checked By	
Micro Drainage	Source Control W.12.4	

Model Details

Storage is Online Cover Level (m) 136.300

Tank or Pond Structure

Invert Level (m) 134.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	15.0	1.400	0.0	2.800	0.0	4.200	0.0
0.200	15.0	1.600	0.0	3.000	0.0	4.400	0.0
0.400	15.0	1.800	0.0	3.200	0.0	4.600	0.0
0.600	15.0	2.000	0.0	3.400	0.0	4.800	0.0
0.800	15.0	2.200	0.0	3.600	0.0	5.000	0.0
1.000	15.0	2.400	0.0	3.800	0.0		
1.200	15.0	2.600	0.0	4.000	0.0		

Hydro-Brake® Outflow Control

Design Head (m) 1.400 Hydro-Brake® Type Md4 Invert Level (m) 134.500
Design Flow (l/s) 3.5 Diameter (mm) 62

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	1.200	3.3	3.000	5.2	7.000	8.0
0.200	1.6	1.400	3.6	3.500	5.6	7.500	8.2
0.300	1.7	1.600	3.8	4.000	6.0	8.000	8.5
0.400	1.9	1.800	4.0	4.500	6.4	8.500	8.8
0.500	2.1	2.000	4.3	5.000	6.7	9.000	9.0
0.600	2.3	2.200	4.5	5.500	7.1	9.500	9.3
0.800	2.7	2.400	4.7	6.000	7.4		
1.000	3.0	2.600	4.8	6.500	7.7		

Appendix C: - Drainage Drawings