SuDS Operation and Maintenance Technical Note

Project: New Warehouse at The Flarepath, Brigg

Client: Havercroft Construction Ltd

Date: 01st August 2018

Reference: 40614-SuDS OM

By: Jacob Padley

Checked: James Gibson

Alan Wood & Partners
Consulting Civil and Structural Engineers

Hull Office
(Registered Office)
341 Beverley Road
Hull HU5 1LD
Telephone
01482.442138
Facsimile
01482.448086

1.0 Introduction

The proposals are for the erection of a steel framed warehouse unit with office accommodation sited within the already industrial area on Elsham Wold Industrial Estate.

Alan Wood & Partners were commisioned to undertake the drainage design for the scheme and this Technical Note and its appendices stipulate the operation and maintenance requirements for the proposed drainage systems.

2.0 Proposed Drainage Components

The proposed drainage design consists of silt traps, trapped gullies, traditional manholes and pipes, and a soakaway.

3.0 Operation and Maintenance of Drainage Components

Operation and maintenance requirements of the drainage components, as listed above, should be undertaken in accordance with Chapter 32 of the CIRIA C753 SuDS Manual, along with the relevant tables 1 and 2 as included below. See also: BS 8582:2013 Code of Practice for Surface Water Management for Development Sites Section 11, and Susdrain Fact Sheet on SuDS Maintenance and Adoption Options (England) dated September 2015.

The responsibility for the operation and maintenance of the drainage and SuDS will lie with the operator of the new warehouse. An initial pre-handover inspection should be undertaken once construction is complete to ensure that it has been constructed as designed.

The staff undertaking the maintenance should have appropriate experience of SuDS and drainage maintenance and should be capable of keeping sufficiently detailed records of any inspections. If staff do not have appropriate experience, then specific inspection visits may be necessary. During the first year of operations of SuDS, inspections should usually be carried out at least monthly (and after significant storm events)

Table 1: Operation and Maintenance Requirements for Soakaways (Based on CIRIA C753 Table 13.1)

Maintenance schedule	Required action	Typical frequency*
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

*During the first year of operation, inspections should be carried out at least monthly (and after significant storm events) to ensure that the system is functioning as designed and that no damage is evident.

Table 2: Operation and Maintenance Requirements for Silt Traps/Trapped Gullies (Based on CIRIA C753 Table 14.2)

Maintenance schedule	Required action	Typical frequency*
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Change the filter media	As recommended by manufacturer
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect filter media and establish appropriate replacement frequencies	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

*During the first year of operation, inspections should be carried out at least monthly (and after significant storm events) to ensure that the system is functioning as designed and that no damage is evident.

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 2 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	8.476	0.676	133.3	24.0	O K
30 min Summer	8.446	0.646	133.3	22.9	O K
60 min Summer	8.100	0.300	133.3	10.5	O K
120 min Summer	7.844	0.044	116.7	1.3	O K
180 min Summer	7.834	0.034	91.3	0.8	O K
240 min Summer	7.828	0.028	74.0	0.6	O K
360 min Summer	7.821	0.021	55.3	0.4	O K
480 min Summer	7.818	0.018	44.4	0.3	O K
600 min Summer	7.817	0.017	37.4	0.3	O K
720 min Summer	7.816	0.016	33.1	0.3	O K
960 min Summer	7.814	0.014	27.1	0.2	O K
1440 min Summer	7.812	0.012	20.0	0.2	O K
2160 min Summer	7.810	0.010	14.0	0.2	O K
2880 min Summer	7.809	0.009	11.4	0.1	O K
4320 min Summer	7.808	0.008	9.1	0.1	O K
5760 min Summer	7.806	0.006	5.2	0.1	O K
7200 min Summer	7.806	0.006	5.2	0.1	O K
8640 min Summer	7.806	0.006	4.4	0.1	O K
10080 min Summer	7.805	0.005	3.7	0.1	O K
15 min Winter	8.480	0.680	133.3	24.1	O K
30 min Winter	8.632	0.832	133.3	29.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	111.940	0.0	12
30 min Summer	73.565	0.0	20
60 min Summer	46.096	0.0	36
120 min Summer	27.939	0.0	64
180 min Summer	20.582	0.0	92
240 min Summer	16.478	0.0	122
360 min Summer	11.961	0.0	186
480 min Summer	9.535	0.0	246
600 min Summer	7.993	0.0	308
720 min Summer	6.916	0.0	364
960 min Summer	5.501	0.0	482
1440 min Summer	3.977	0.0	720
2160 min Summer	2.871	0.0	1072
2880 min Summer	2.276	0.0	1496
4320 min Summer	1.639	0.0	2220
5760 min Summer	1.296	0.0	2728
7200 min Summer	1.081	0.0	3440
8640 min Summer	0.931	0.0	4256
10080 min Summer	0.820	0.0	5128
15 min Winter	111.940	0.0	12
30 min Winter	73.565	0.0	21

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Winter	7.891	0.091	133.3	2.9	O K
120 min Winter	7.834	0.034	90.0	0.9	O K
180 min Winter	7.825	0.025	67.3	0.5	O K
240 min Winter	7.821	0.021	55.3	0.4	O K
360 min Winter	7.817	0.017	39.7	0.3	O K
480 min Winter	7.816	0.016	33.1	0.3	O K
600 min Winter	7.815	0.015	29.0	0.2	O K
720 min Winter	7.814	0.014	27.1	0.2	O K
960 min Winter	7.812	0.012	20.0	0.2	O K
1440 min Winter	7.811	0.011	15.4	0.1	O K
2160 min Winter	7.809	0.009	11.4	0.1	O K
2880 min Winter	7.808	0.008	9.1	0.1	O K
4320 min Winter	7.807	0.007	7.0	0.1	O K
5760 min Winter	7.806	0.006	4.4	0.1	O K
7200 min Winter	7.805	0.005	3.7	0.1	O K
8640 min Winter	7.805	0.005	3.0	0.1	O K
10080 min Winter	7.805	0.005	3.0	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Winter	46.096	0.0	32
120 min Winter	27.939	0.0	64
180 min Winter	20.582	0.0	92
240 min Winter	16.478	0.0	122
360 min Winter	11.961	0.0	170
480 min Winter	9.535	0.0	234
600 min Winter	7.993	0.0	304
720 min Winter	6.916	0.0	340
960 min Winter	5.501	0.0	468
1440 min Winter	3.977	0.0	750
2160 min Winter	2.871	0.0	1084
2880 min Winter	2.276	0.0	1312
4320 min Winter	1.639	0.0	2020
5760 min Winter	1.296	0.0	2784
7200 min Winter	1.081	0.0	3784
8640 min Winter	0.931	0.0	3952
10080 min Winter	0.820	0.0	4584

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Pipe Network

Volume in Pipe Network (m^3)	6	Dia of Outfall Pipe (m)	0.3
Slope of Outfall Pipe (1:X)	100	Roughness of Outfall Pipe (mm)	0.600

Time Area Diagram

Total Area (ha) 0.550

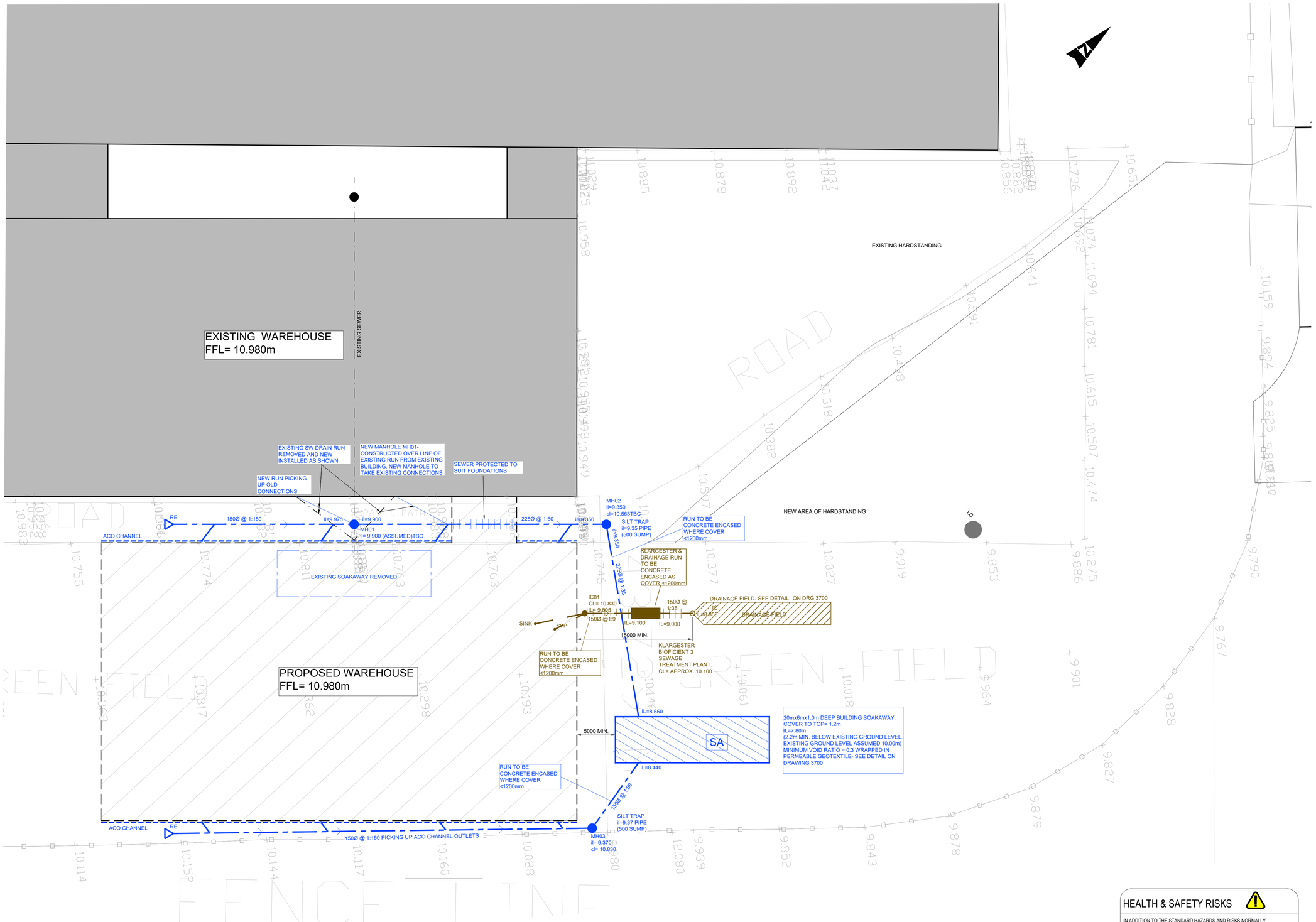
Time From:	(mins) To:	Area (ha)
0	4	0.550

Model Details

Storage is Online Cover Level (m) 10.000

Infiltration Trench Structure

Infiltration Coefficient Base (m/hr)	20.00000
Infiltration Coefficient Side (m/hr)	0.00000
Safety Factor	5.0
Porosity	0.30
Invert Level (m)	7.800
Trench Width (m)	6.0
Trench Length (m)	20.0
Slope (1:X)	1000.0
Cap Volume Depth (m)	1.000
Cap Infiltration Depth (m)	1.000



100mm at A1

NOTES:

1. THESE NOTES ARE INTENDED TO AUGMENT DRAWINGS AND SPECIFICATIONS. WHERE CONFLICT OF REQUIREMENTS EXIST THE ORDER OF PRECEDENCE SHALL BE AS SHOWN IN THE SPECIFICATION. OTHERWISE THE STRICTEST PROVISION SHALL GOVERN.
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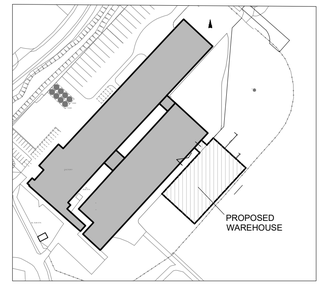
KEY PLAN 1:2500



= EXISTING SURFACE WATER DRAINAGE
= SURFACE WATER DRAINAGE
= ACO CHANNEL DRAIN
MH = SURFACE WATER MANHOLE
= FOUL WATER DRAINAGE
IC = FOUL WATER INSPECTION CHAMBER
SA = SOAKAWAY

READ IN CONJUNCTION WITH AWP DRAWING REFERENCE HAV - AWP - ZZ - XX - DR - C - 3700

Rev	Description	Date	By	Chk	App
C2	Soakaway and foul drainage moved	22.05.18	S	GO	NR
C1	FIRST ISSUE	15.05.18	DD	JAG	JAG

HEALTH & SAFETY RISKS

IN ADDITION TO THE STANDARD HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING RESIDUAL HEALTH AND SAFETY RISKS

CONSTRUCTION RISKS

CR 01 SITE IS UNDERSTOOD TO BE VIRGIN GROUND & NO CONTAMINATION IS ANTICIPATED. HOWEVER, CONTRACTOR TO BE VIGILANT & REPORT ANY UNEXPECTED FILL MATERIALS OR SUSPECT SOILS TO AWP

CR 02 THE WORKS INVOLVE DEEP EXCAVATIONS FOR DRAINAGE RUNS, DRAINAGE FIELDS & SOAKAWAY. CONTRACTOR TO DEVELOP SUITABLE SAFE METHODS OF WORKING TO INCORPORATE TRENCH BOXES, SHORING OR BATTERING.

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING IN ACCORDANCE WITH THE REQUIREMENTS DEFINED IN THE CDM REGULATIONS.

Alan Wood & Partners

Hull Office
341 Beverley Road
Hull
HU5 1LD

T. 01482 442138
www.alanwood.co.uk

Consulting Civil & Structural Engineers
Project Managers
Building Surveyors

Lincoln T. 01522 300210
London T. 02071 860761
Scarborough T. 01723 865484
Sheffield T. 01142 440077
York T. 01904 611594

Project: Proposed Warehouse
I G Industries, Elsham Wold Ind Est

Client: Havercroft Construction

Drawing: Proposed Drainage Layout

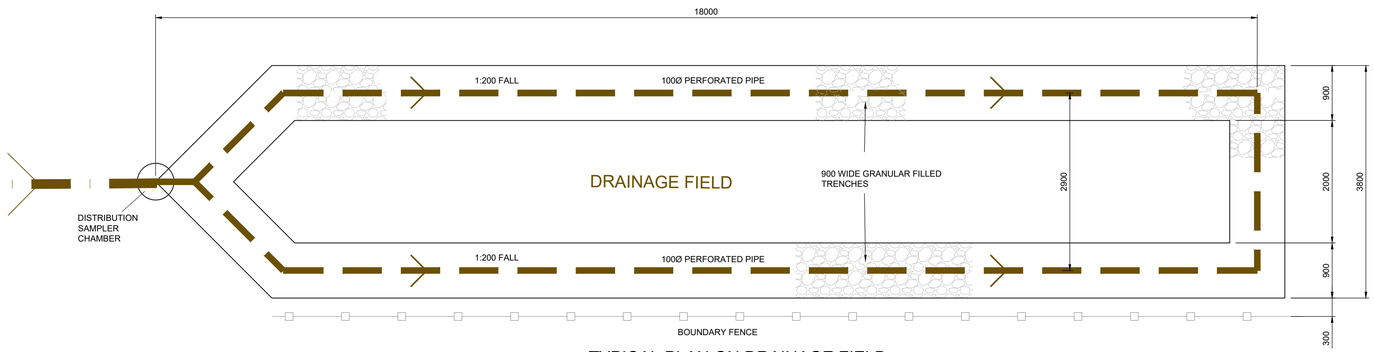
Role: Civil Engineer

Drawing Status: Construction

Job. no. 40614 | Scale@ A1: 1:250 | Rev. C2

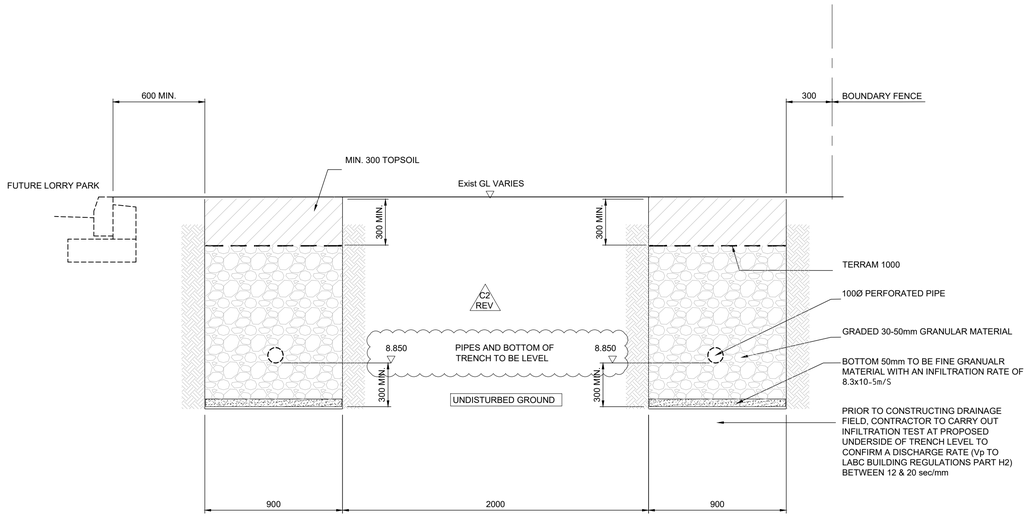
Project Originator Volume Level Type Role Number
HAV - AWP - ZZ - XX - DR - C - 3300

READ IN CONJUNCTION WITH AWP DRAWING REFERENCE
HAV - AWP - ZZ - XX - DR - C - 3300



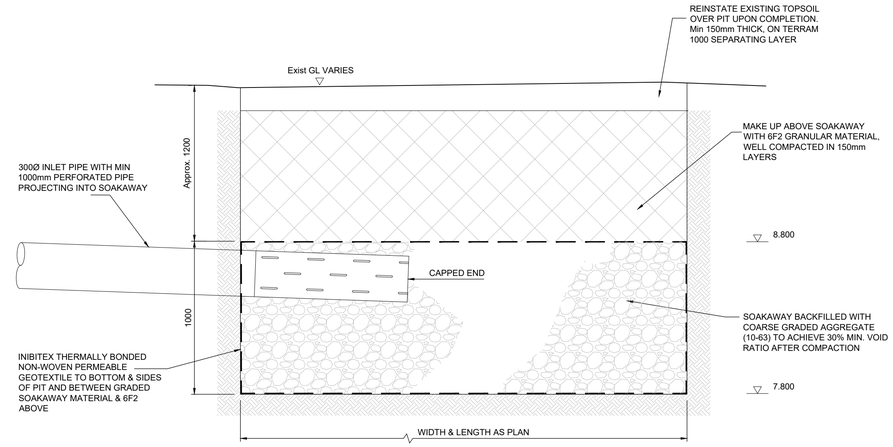
TYPICAL PLAN ON DRAINAGE FIELD

SCALE 1:50



TYPICAL SECTION THROUGH DRAINAGE FIELD

SCALE 1:20



TYPICAL SECTION THROUGH SOAKWAY

SCALE 1:20

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100mm at A1

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C2	NOTE AND LEVELS ADDED	22.05.18	SW	GO	NR
C1	FIRST ISSUE	16.05.18	DD	JAG	JAG

Alan Wood & Partners

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Drawing: Proposed Drainage Details

Role: Civil Engineer

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Project	Originator	Volume	Level	Type	Role	Number
HAV	AWP	ZZ	XX	DR	C	3700