



**GRAINGER PLC
WOODCROFT FARM PHASES 1 AND 2
WATERLOOVILLE**

DRAINAGE STRATEGY

APRIL 2018



the journey is the reward

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WOODCROFT FARM PHASES 1 AND 2
WATERLOOVILLE**

DRAINAGE STRATEGY

APRIL 2018

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Grainger PLC
Woodcroft Farm phases 1 and 2
Waterlooville
Drainage Strategy

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1 Introduction

- 1.1 Mayer Brown Ltd has been appointed by Grainger PLC to develop the off-site drainage strategy to support a proposed residential development at Woodcroft Farm, Waterloooville. The long-term development will comprise of 288 new properties to be developed over three phases. Phases 1 and 2 will be constructed by Linden Homes Ltd and will provide 168 properties. The remainder will be provided by others under a future phase (Phase 3).
- 1.2 On site drainage for Phases 1 and 2 will be provided by Linden Homes Ltd (LHL). The drainage directly associated with the development (within the residential development boundary) is still under development. However, Odyssey Consulting Engineers, who are the designers appointed by LHL, has confirmed that their drainage design will accord with the design parameters set out in this report.
- 1.3 The overall drainage infrastructure includes an off-site element located along the western boundary of the site. This is being designed by Mayer Brown Ltd on behalf of Grainger PLC.
- 1.4 The public sewer connections and watercourse discharge consent is being provided by Grainger PLC through a New Appointment and Variations Agreement (NAV) arranged with Severn Trent (ST). The intention is for ST to arrange the installation and subsequently adopt the development's foul and storm water networks, including the proposed attenuation storage ponds and associated flow control units. Severn Trent will also adopt the proposed foul sewer pumping station and arrange connection to the public foul sewer with Southern Water.
- 1.5 Linden Homes Ltd (LHL) proposes to construct Phases 1 and 2 under three sub-phases (Phases 1, 2A and 2B).
- 1.6 The off-site drainage will be designed to accommodate the above Phases and a future phase, Phase 3.
- 1.7 This report covers the provision of the off-site drainage and in particular how foul water and storm water is routed and discharged outside the residential development.

2 Proposed Drainage Strategy

General

- 2.1 The development's storm water drainage will comprise of underground pipe networks discharging to three proposed attenuation ponds. Each pond will be constructed and fitted with a flow control device at the appropriate time to comply with the strategic design parameters.
- 2.2 Dwg No.GTWCFFARM/SK/38 and 39, in Appendix A, shows the proposed development phasing and associated catchment areas. A breakdown of the development areas for each Phase is provided in Table 1.1 below.

<i>Phase</i>	<i>Developer</i>	<i>Drainage Design Consultant</i>	<i>Development Area (Ha)</i>	<i>Effective Impermeable Area (Ha)</i>
1A	LHL	OCE	0.92	0.66
2A and 2B	LHL	OCE	3.12	2.23
3	TBC	TBC	5.15	3.68

Table 1.1: Catchment Areas

- 2.3 The above areas are based on the strategy, which was submitted by Peter Brett Associates as part of the Planning Application. OCE has confirmed that the proposed housing layout being prepared for LHL will not vary significantly from the areas referred above.

Phase 1 Foul Water

- 2.4 Phase 1 is located at the eastern end of the site and comprises of 32 properties. Discharge from the foul sewer network will be routed via a 150mm pipe to the public sewer in James Copse Road.

Phase 1 Storm Water

- 2.5 The offsite attenuation pond (Pond 3) will be constructed in time to receive discharge from Phase 1.
- 2.6 Initially the stormwater drainage network for Phase 1 will drain south westwards via a temporary pipe/shallow ditch to Pond 3. Pond 3 will be fitted with a flow control device to restrict discharge to less than the QBAR greenfield run-off rate of 44.7l/s. As the

pond is situated in the valley and greenfield overland flows are routed into this pond it will not be necessary to phase the controlled outflow rate.

Phase 2 Foul Water

- 2.7 The foul sewer network for Phase 2 will drain to the western boundary, to connect to the off-site drainage. An underground foul sewer pumping station will be provided as part of the off-site drainage works and will be commissioned prior to the commencement of Phase 2 construction.
- 2.8 A more detailed description of the pump station is provided in Sections 2.12 to 2.24.

Phase 2 Storm Water

- 2.9 Phase 2 will include the construction of Ponds 1 and 2. Ponds 1 and 2 will provide supplementary storage and treatment prior to discharge to Pond 3.
- 2.10 The Phase 2 drainage network will divert also allow connection of Phase 1 drainage network and will replace the temporary ditch installed during phase 1. Phase 1 run-off and part of Phase 2A run-off to Pond 2. A small proportion of Phase 2B run-off will be routed through Pond 2. The remainder of the catchment would drain directly to Pond 3.
- 2.11 Flow control devices would be fitted downstream of each pond to restrict flow rates to 8l/s (Pond 1) and 5l/s (Pond 2) respectively.

Off-Site Foul Water Drainage

- 2.12 The proposed off-site foul water infrastructure for Phase 1 is shown on Dwg. GTWCFARM/SK/11. A gravity sewer will be routed from the site and connected to the existing public sewer in James Copse Road.
- 2.13 Off-site foul water infrastructure for the remaining phases is shown on Dwg. GTWCFARM/SK/40 in Appendix A. It will comprise and an underground foul sewer pump station and rising main connecting to the public sewer in the vicinity of Linnet Close. Dwg No. GTWCFARM/SK13 shows an indicative network for Phases 2A and 2b and how it interfaces with the proposed off-site works.
- 2.14 Storage capacity within the pumping station and within the network upstream will be sufficient to comply with Sewers for Adoption 7th requirements and any additional requirements applied by ST.
- 2.15 The location of the pumping station will be west of the residential development boundary and lies at the site's lowest topographic point.

- 2.16 Discharge from the pumping station will be via a 150mm diameter rising main, which will be routed south along the western boundary to connect to the public sewer in Linnet Close. However, ST are currently consulting with Southern Water with regards the most appropriate location for connection to the public sewer as Southern Water have several potentially suitable points of connection within this area.
- 2.17 Discharge from the pumping station will be at the rate agreed by ST with Southern Water.
- 2.18 The pumping station will be a bespoke Type 3 pumping station designed to comply with Section D6 and Part F of Sewers for Adoption, with the intention it is adopted by Severn Trent on completion.
- 2.19 The pumping station will be designed to ensure additional storage is already available or can be retrofitted in time to receive discharge from Phase 3.
- 2.20 Access to the pump station will be via a 5.5m nominal width road connected to the housing road network at the western boundary. The road will be provided with a turning head and will be wide enough to accommodate a 32T Heavy Good Vehicle to facilitate pumping out of the pump station in the event of maintenance or pump station failure.
- 2.21 The compound for the pump station will be approximately 100sq.m and will comprise a pumping wet well and storage chamber, vehicle standing, control cabinet and lighting for use during maintenance activities. The compound will be bounded by a 1.8m chainlink fence and lockable gate. Wet well and storage chamber depths will need to be about 4.5 and 3.5m respectively but will be dependent on the available storage within the network upstream.
- 2.22 Power will be provided via an electricity sub-station located immediately to the north of the pump station compound.
- 2.23 A 150mm diameter rising main will be routed from the pumping station along the western boundary of the site and will terminate at a new chamber located between the site boundary and the connection with the public sewer in Linnet Close. The pipe between the rising main and the public sewer will be 150mm diameter with a nominal depth of 1.4m. The pumping station and rising main will be designed and constructed in order that Severn Trent can adopt them under a NAV agreement.

Off-Site Storm Water Drainage

- 2.24 The layout of the off-site stormwater drainage is shown on Dwg. GTWCFARM/SK/40 in Appendix A and will comprise a storage pond (Pond 3), a silt separator, a flow control

- device, a pollution control valve; a shallow ditch with culverts at bridleway/track crossings and a headwall outfall into the Soake Farm Ditch.
- 2.25 The pond will have sufficient storage (3740cu.m) for all phases of the development including Phase 3. Discharge from the pond will be controlled using a vortex flow control.
- 2.26 The ponds will incorporate a bentonite liner set 300mm below the pond bed level and protected with a 300mm thick layer of sub-soil. The purpose of the liner is to prevent infiltration into the underlying Aquifer (classified as a Major Aquifer by the Environment Agency).
- 2.27 A Vortex Silt Separator will be provided immediately upstream of the pond inlets in order to intercept silt and other debris.
- 2.28 All gullies and other surface water receptors will include sumps to intercept silt and hydrocarbons as close to source as possible.
- 2.29 Pollution control valves will be located at the downstream end of each of the three ponds to intercept polluted effluent in the event of a spillage/accident and to prevent silted effluent running downstream during pond cleaning/maintenance activities.
- 2.30 Discharge from Pond 3 will be routed along a new shallow ditch, which will follow the existing topography down to the Soake Farm ditch. The ditch will be located in the upper clay layer and therefore will not need to be lined. The principal of discharging to the Soake farm ditch forms part of the detailed planning consent of 2013.
- 2.31 A new headwall will be constructed at the Soake Farm ditch connection. The proposed construction will be covered by a Flood Risk Activity Permit issued by the Environment Agency in October 2017.
- 2.32 Planting within the ponds will be selected to prevent erosion; provide some tertiary water treatment and encourage indigenous wildlife.

3 Stormwater Design Parameters

Storm water

- 3.1 Stormwater attenuation storage will be sufficient to ensure the development greenfield run-off rate is not exceeded for storm events up to 1 in 100 years. An additional run-off allowance of 40% has been included to represent climate change as per current best practice guidelines.
- 3.2 Approximate pond sizing has been calculated assuming the proportion of impermeable area is 65%. An additional 10% has been included to represent 'urban creep'.
- 3.3 The design discharge rate from the site has been set to represent the equivalent QBAR greenfield run-off rate referred to in the Flood Risk Assessment of 5.74l/s/Ha. For a developed site area of 7.8Ha, this is a rate of 44.7l/s.
- 3.4 No allowance has been made for infiltration, to reflect the ponds being lined.
- 3.5 The contributing catchment areas have been calculated using the original layout submitted for planning. It is understood the layout being developed by OCE on behalf of Linden Homes Ltd will not significantly change the original proposed catchments.

4 Stormwater Design Calculations

4.1 The required storage volume for the proposed Ponds has been calculated using the current version of Windes Microdrainage Source Control software. Output data is contained in Appendix B.

4.2

Phase	Maximum Discharge (l/s)		
	Pond 1	Pond 2	Pond 3
1			44.7
2A and 2B	8	5	44.7
3	8	5	44.7

Table 5.1: Proposed Discharge Rates

4.3 Calculations to support the Microdrainage data is also included in Appendix B.

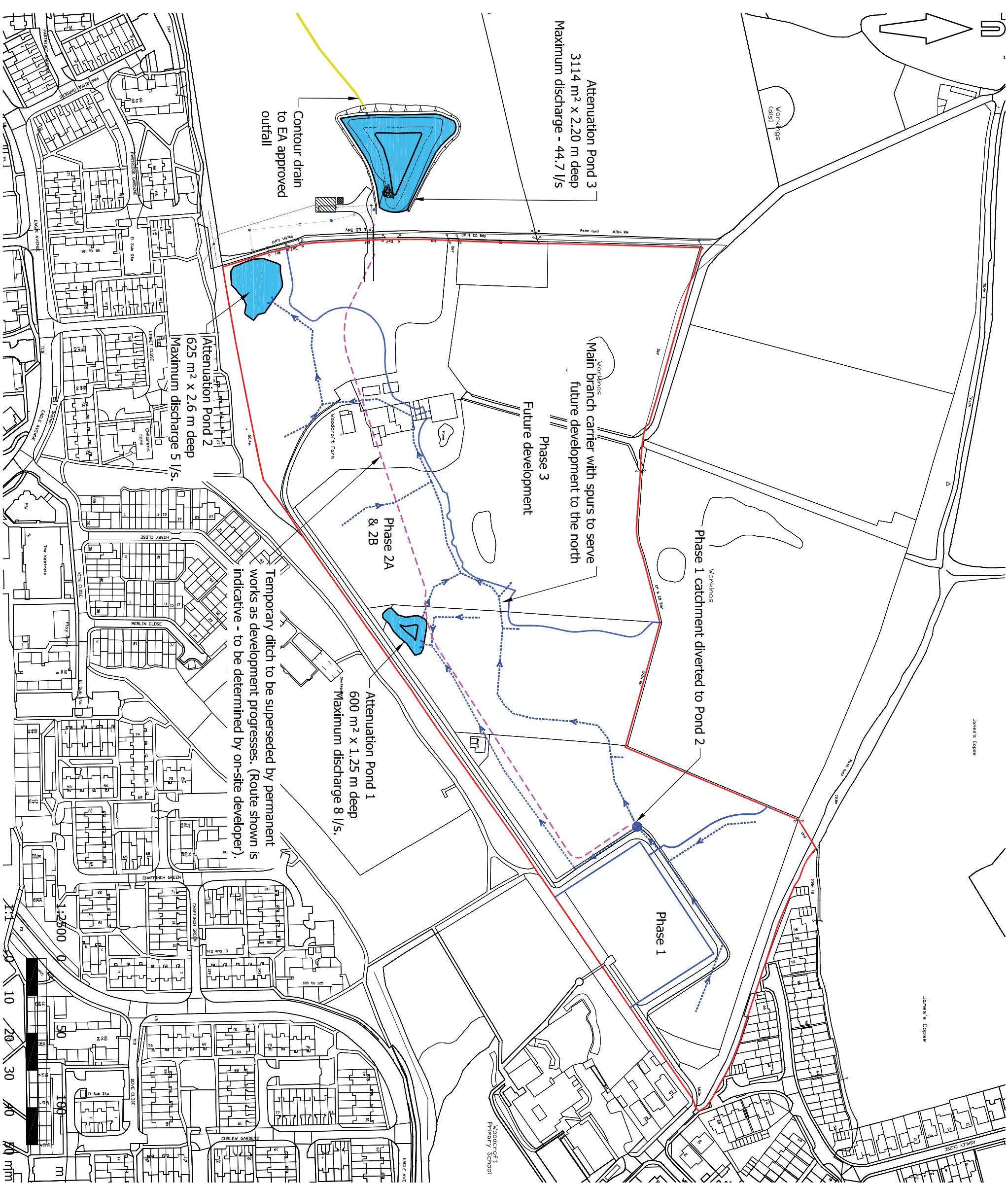
5 Stormwater Management and Maintenance

- 5.1 As part of the NAV Agreement Severn Trent will adopt the foul water and stormwater drainage networks including the foul sewer pump station and the SuDs features.
- 5.2 ST will have a statutory responsibility for managing and maintaining the storage ponds and associated equipment to ensure the proposed drainage continues to function as designed. This will include maintenance of any proposed planting within the ponds.
- 5.3 ST will also be responsible for the upkeep and maintenance of the foul sewer pump station to prevent, in particular, pollution to the underlying Aquifer.

6 Conclusion

- 6.1 The proposed attenuation storage and flow control measures will ensure run-off from the site adheres as closely as possible to the respective QBAR greenfield run-off rate for each Phase of the development.
- 6.2 Overland flow routes will avoid development and neighbouring property.
- 6.3 Long term maintenance of the stormwater and foul water drainage infrastructure including SuDs features will be secure with Severn Trent under the statutory S104 adoption process.

APPENDIX A: Drawings



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A	General revision (KOB)	RHA	17/04/2018
rev.	amendment	checked	date

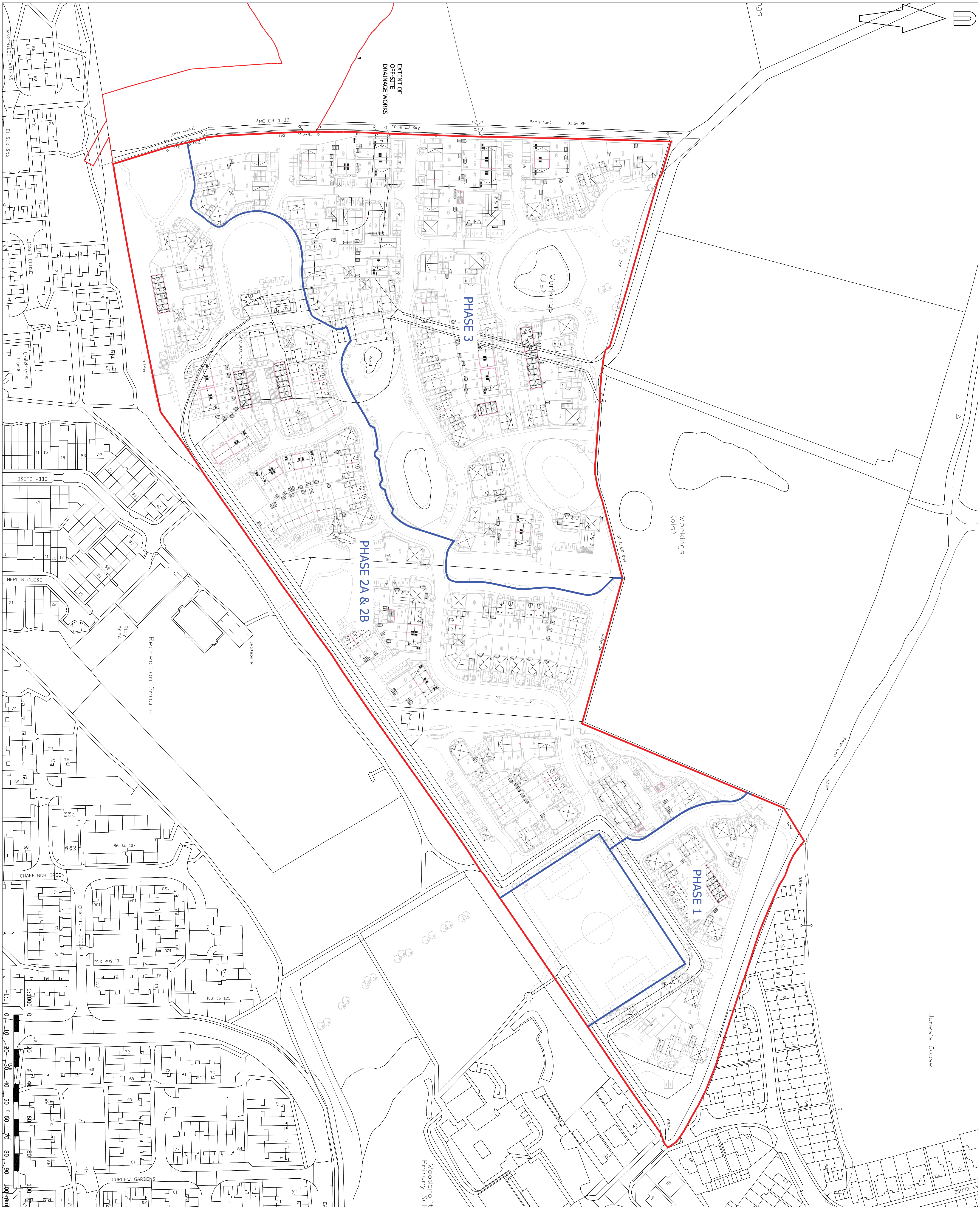


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project	WOODCROFT FARM HAMPSHIRE
scale	1:2500
date	MARCH 2017
title	INDICATIVE PROPOSED SURFACE WATER FOR PHASES 1 & 2

drawing number GTWCFARM/SK/13



James's Copse

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Key

Development Boundary

Phase Boundary

Notes

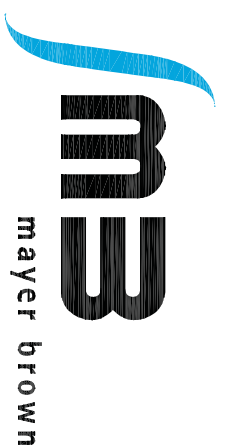
- Off-site drainage works to be completed September 2018.
- Housing layout indicative only. Phase 1 and 2 currently being designed by Odyssey Consulting Engineers Ltd. on behalf of Linden Homes.

PHASE	IMPERMEABLE AREA
1	0.66 (ha)
2A & 2B	2.23 (ha)
3	3.68 (ha)

* Assumes 65% of total area plus 10% for Urban Creep.

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rev	amendment	checked	date
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WOODCROFT FARM
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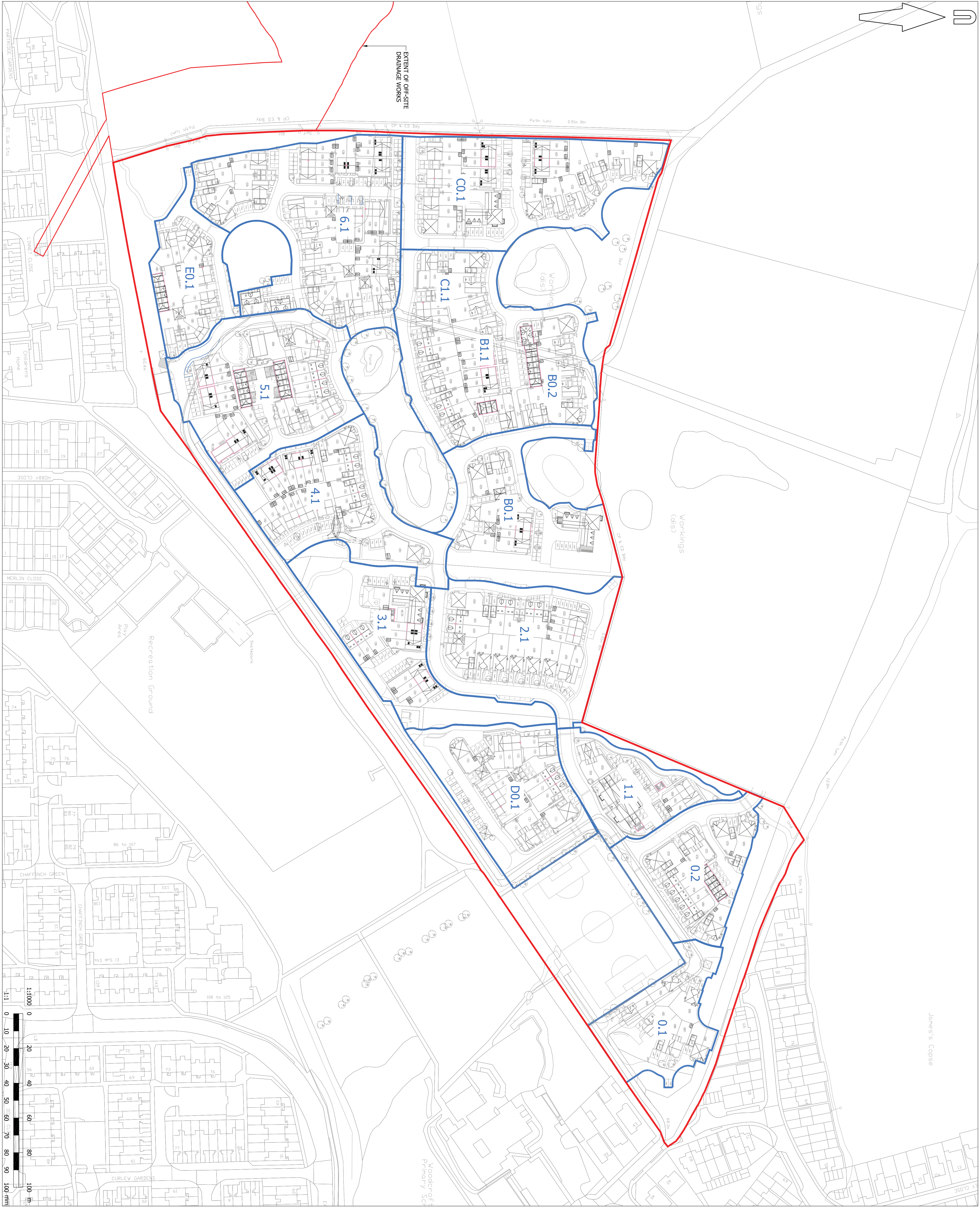
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date	APRIL 2018	cad file	SK_38.dwg
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title
PUMP STATION AND POND
RESIDENTIAL PHASE BOUNDARIES

drawing number
GTWCFAFM/SK/38

rev.



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Key

Development Boundary

Catchment Area

Notes

- Off-site drainage works to be completed September 2018.
- Housing layout initiative only, Phase 1A and 1B currently being designed by Odyssey Consulting Engineers Ltd on behalf of Linden Homes.

CATCHMENT	AREA
0.1	3381m ²
0.2	4534m ²
1.1	3396m ²
D0.1	5809m ²
2.1	5931m ²
3.1	5930m ²
B0.1	6435m ²
B0.2/B1.1 & C1.1	9690m ²
4.1	5988m ²
5.1	7351m ²
C0.1	7862m ²
E0.1	7470m ²
6.1	6531m ²
C0.1	7862m ²

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rev	amendment	checked	date
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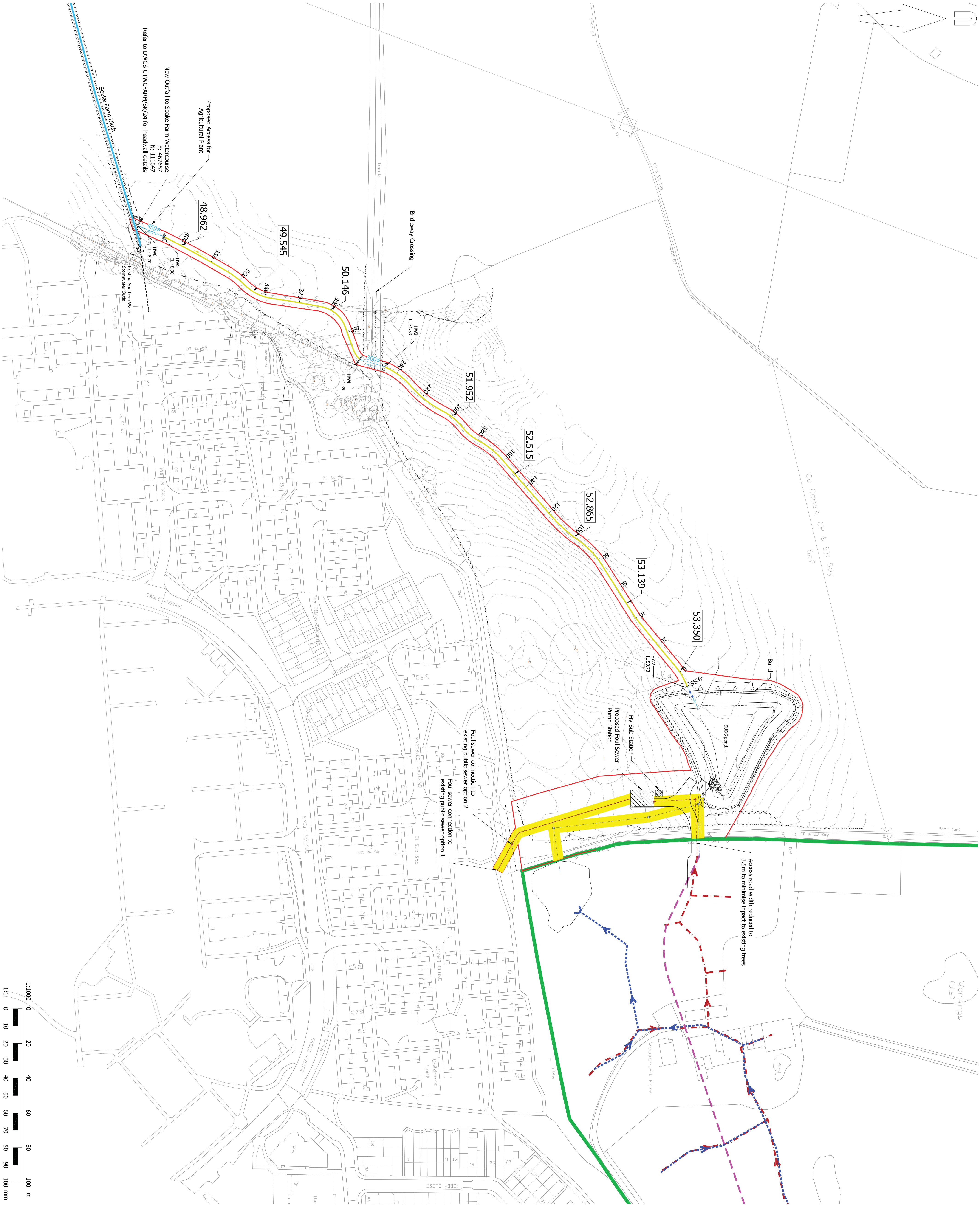
project
WOODCROFT FARM
HAMPSHIRE

scale	1:1000	drawn by	KDB	checked by	RHA
date	APRIL 2018	cdl file	SK_39.dwg		

title
PUMP STATION AND POND
STORM WATER CATCHMENT AREAS

drawing number
GTWCFAFM/SK/39

rev.



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Notes:

1. Location of public sewer connection to be confirmed by Southern Water.

Key	
	Proposed Surface Water
	Proposed Land Drainage Culvert
	Proposed Land Drainage Ditch
	Existing Watercourse
	Proposed Drainage Works Boundary
	Woodcroft Farm Development Boundary
	Proposed Foul Sewer Network
	Proposed Rising Main
	6m Proposed Easement
	Proposed Ditch Invert

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rev.	amendment	checked	date

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scale	1:1000	drawn by	KDB
date	APRIL 2018	checked by	RHA
title	SURFACE AND FOUL WATER PROVISION GENERAL LAYOUT		
drawing number	GTWC/FARM/SK/40		

APPENDIX B: "Calculations and Model Output"

Woodcroft Farm, Waterloooville
Drainage Strategy Design Calculations

Stormwater

Catchment Areas (Based on Housing Footprints)

				U/S of Pond:-				
Ref.	Permeability Factor	Urban Creep		Adjusted Area sq.m	Effective Area	Ph 1	Ph 2A+2B	Ph 3
0.1	0.65	1.1		3919	2802	3	3	3
0.2	0.65	1.1		5256	3758	3	3	3
1.1	0.65	1.1		3937	2815	3	3	3
2.1	0.65	1.1		6875	4916		3	3
3.1	0.65	1.1		6874	4915		1	1
4.1	0.65	1.1		6942	4963		3	3
5.1	0.65	1.1		8522	6093		2	2
6.1	0.65	1.1		11074	7918			3
B0.1	0.65	1.1		7460	5334			3
B0.2	0.65	1.1		3721	2661			3
B1.1	0.65	1.1		6135	4386			3
C0.1	0.65	1.1		9114	6516			3
C1.1	0.65	1.1		1377	985			3
D0.1	0.65	1.1		5467	3909		3	3
E0.1	0.65	1.1		3689	2637		2	2
Total			77949	90361.4053	64608.40479			
						9175	36809	90361
Catchment Areas (Based on Development Footprint)							27633	53553

Pond Catchments	Area (sq.m)	Effective Area (sq.m)
-----------------	-------------	--------------------------

Pond 1 cascades to Pond 2 when Phase 2 comes onstream.

Phase 1

Pond 1 Catchment		
Pond 2 Catchment		
Pond 3 Catchment	13112	9375

Phase 2A and 2B

Pond 1 Catchment	6874	4915
Pond 2 Catchment	12210	8730
Pond 3 Catchment	32396	23163
	51481	36809

Phase 3

Pond 1 Catchment	6874	4915
Pond 2 Catchment	12210	8730
Pond 3 Catchment	58868	50963
Total	77953	64608

Ponds tested for 1 in 1yr, 1in 30yr and 1 in 100yr storm events.
20% added to 1 in 30yr event and 40% added to 1 in 100yr event to reflect climate change.
Effective catchment based on 65% of development area.
Additonal 10% added for urban creep
Overall discharge restricted to greenfield run-off rate for equivalent catchment.

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Lion House Oriental Road Woking GU22 8AP		Woodcroft Farm Phase 3 - Pond 3 1 in 100yrs			
Date 06/02/2018 File Ph 3 Ponds 1, 2 and 3 ...		Designed by RHA Checked by			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for 180413 Ph 3 Pond 3 1 in 100yrs.srcx</u>					
Upstream Structures			Outflow To Overflow To		
180413 Ph 2 Pond 1 1 in 100yrs.srcx			(None)	(None)	
180413 Ph 2 Pond 2 1 in 100yrs.srcx					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	54.584	1.084	49.9	1301.5	O K
30 min Summer	54.748	1.248	49.9	1619.0	O K
60 min Summer	54.928	1.428	49.9	1997.8	O K
120 min Summer	55.115	1.615	49.9	2430.4	O K
180 min Summer	55.222	1.722	49.9	2694.1	O K
240 min Summer	55.293	1.793	49.9	2877.6	O K
360 min Summer	55.382	1.882	49.9	3114.3	O K
480 min Summer	55.432	1.932	49.9	3251.3	Flood Risk
600 min Summer	55.460	1.960	49.9	3329.3	Flood Risk
720 min Summer	55.474	1.974	49.9	3369.0	Flood Risk
960 min Summer	55.419	1.919	49.9	3214.9	Flood Risk
1440 min Summer	55.332	1.832	49.9	2980.3	O K
2160 min Summer	55.223	1.723	49.9	2697.4	O K
2880 min Summer	55.115	1.615	49.9	2429.4	O K
4320 min Summer	54.927	1.427	49.9	1995.0	O K
5760 min Summer	54.685	1.185	49.9	1494.6	O K
7200 min Summer	54.476	0.976	49.9	1107.1	O K
8640 min Summer	54.291	0.791	49.9	811.1	O K
10080 min Summer	54.132	0.632	49.9	591.6	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Summer	139.438	0.0	1652.3	31	
30 min Summer	87.625	0.0	2050.8	45	
60 min Summer	55.065	0.0	2660.4	76	
120 min Summer	34.604	0.0	3340.4	134	
180 min Summer	26.370	0.0	3810.2	194	
240 min Summer	21.746	0.0	4169.8	254	
360 min Summer	16.571	0.0	4730.9	372	
480 min Summer	13.665	0.0	5171.0	492	
600 min Summer	11.767	0.0	5537.6	610	
720 min Summer	10.414	0.0	5854.6	724	
960 min Summer	8.213	0.0	6125.4	824	
1440 min Summer	5.878	0.0	6517.3	1080	
2160 min Summer	4.206	0.0	7329.3	1496	
2880 min Summer	3.317	0.0	7701.8	1912	
4320 min Summer	2.459	0.0	8470.9	2692	
5760 min Summer	1.989	0.0	9249.5	3408	
7200 min Summer	1.687	0.0	9805.5	4112	
8640 min Summer	1.474	0.0	10284.1	4760	
10080 min Summer	1.316	0.0	10705.3	5392	
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Lion House Oriental Road Woking GU22 8AP		Woodcroft Farm Phase 3 - Pond 3 1 in 100yrs			
Date 06/02/2018 File Ph 3 Ponds 1, 2 and 3 ...		Designed by RHA Checked by			
Micro Drainage		Source Control 2017.1.2			
<u>Cascade Summary of Results for 180413 Ph 3 Pond 3 1 in 100yrs.srcx</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	54.668	1.168	49.9	1461.0	O K
30 min Winter	54.846	1.346	49.9	1820.8	O K
60 min Winter	55.040	1.540	49.9	2251.6	O K
120 min Winter	55.243	1.743	49.9	2746.6	O K
180 min Winter	55.360	1.860	49.9	3055.8	O K
240 min Winter	55.441	1.941	49.9	3275.9	Flood Risk
360 min Winter	55.544	2.044	49.9	3571.5	Flood Risk
480 min Winter	55.607	2.107	49.9	3755.7	Flood Risk
600 min Winter	55.646	2.146	49.9	3873.3	Flood Risk
720 min Winter	55.670	2.170	49.9	3946.8	Flood Risk
960 min Winter	55.615	2.115	49.9	3780.3	Flood Risk
1440 min Winter	55.508	2.008	49.9	3465.9	Flood Risk
2160 min Winter	55.371	1.871	49.9	3084.5	O K
2880 min Winter	55.213	1.713	49.9	2671.0	O K
4320 min Winter	54.887	1.387	49.9	1909.1	O K
5760 min Winter	54.500	1.000	49.9	1149.7	O K
7200 min Winter	54.178	0.678	49.9	651.2	O K
8640 min Winter	53.950	0.450	48.7	377.2	O K
10080 min Winter	53.820	0.320	45.9	247.4	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	
15 min Winter	139.438	0.0	1837.3	31	
30 min Winter	87.625	0.0	2285.0	45	
60 min Winter	55.065	0.0	2978.8	74	
120 min Winter	34.604	0.0	3735.9	132	
180 min Winter	26.370	0.0	4244.8	190	
240 min Winter	21.746	0.0	4644.0	250	
360 min Winter	16.571	0.0	5267.0	364	
480 min Winter	13.665	0.0	5754.8	480	
600 min Winter	11.767	0.0	6161.7	592	
720 min Winter	10.414	0.0	6513.9	704	
960 min Winter	8.213	0.0	6814.4	914	
1440 min Winter	5.878	0.0	7233.5	1138	
2160 min Winter	4.206	0.0	8204.2	1612	
2880 min Winter	3.317	0.0	8604.9	2032	
4320 min Winter	2.459	0.0	9437.1	2908	
5760 min Winter	1.989	0.0	10359.4	3528	
7200 min Winter	1.687	0.0	10982.2	4120	
8640 min Winter	1.474	0.0	11518.1	4680	
10080 min Winter	1.316	0.0	11990.0	5256	
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Lion House Oriental Road Woking GU22 8AP	Woodcroft Farm Phase 3 - Pond 3 1 in 100yrs																																																													
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File Ph 3 Ponds 1, 2 and 3 ...		Checked by					
Micro Drainage			Source Control 2017.1.2				
<u>Cascade Model Details for 180413 Ph 3 Pond 3 1 in 100yrs.srcx</u>							
Storage is Online Cover Level (m) 55.700							
<u>Tank or Pond Structure</u>							
Invert Level (m) 53.500							
Depth (m) Area (m²)		Depth (m) Area (m²)		Depth (m) Area (m²)			
0.000 628.0		1.000 1768.0		2.200 3113.0			
<u>Hydro-Brake® Optimum Outflow Control</u>							
Unit Reference MD-SHE-0278-5000-2200-5000							
Design Head (m) 2.200							
Design Flow (l/s) 50.0							
Flush-Flo™ Calculated							
Objective Minimise upstream storage							
Application Surface							
Sump Available Yes							
Diameter (mm) 278							
Invert Level (m) 53.500							
Minimum Outlet Pipe Diameter (mm) 300							
Suggested Manhole Diameter (mm) 2100							
Control Points		Head (m) Flow (l/s)		Control Points Head (m) Flow (l/s)			
Design Point (Calculated)		2.200 50.0		Kick-Flo® 1.428 40.6			
Flush-Flo™		0.658 49.9		Mean Flow over Head Range - 43.2			
The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated							
Depth (m) Flow (l/s)		Depth (m) Flow (l/s)		Depth (m) Flow (l/s)		Depth (m) Flow (l/s)	
0.100 8.7		1.200 46.4		3.000 58.1		7.000 87.6	
0.200 28.7		1.400 41.7		3.500 62.6		7.500 90.6	
0.300 45.2		1.600 42.9		4.000 66.7		8.000 93.5	
0.400 47.9		1.800 45.4		4.500 70.7		8.500 96.3	
0.500 49.3		2.000 47.7		5.000 74.4		9.000 99.0	
0.600 49.9		2.200 50.0		5.500 77.9		9.500 101.6	
0.800 49.6		2.400 52.1		6.000 81.3			
1.000 48.5		2.600 54.2		6.500 84.5			
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