

Technical Note

Project:	P21-184 Littlestone, Kent		
Subject:	Technical Note – LLFA Response to Overland Flow Routing (Received 6 May 2022)		
Prepared by:	Lance Hammond – Project Engineer	Date:	24 May 2022
Authorised by:	Nick Fenton – Associate	Status:	S2 - Information
Document Ref:	0058-RLL-00-XX-TN-C-003	Revision:	P02

1 Introduction

This Technical Note has been prepared by Rodgers Leask in response to the LLFA consultation response received on 6th May 2022 reference: FHDC/2021/085984.

The response relates to the reserved matters planning application relating to the scale, layout, appearance and landscaping for 80 dwellings pursuant to outline planning permission Y18/0768/FH at Land adjoining 39 Victoria Road West, Littlestone, TN28 8ND.

2 Lead Local Flood Authority Key Observations

2.1 Proposed land drain to rear of properties along Queens Road

Rodgers Leask proposed a land drain to the rear of the properties along Queens Road in response to comments received by the LLFA in a previous consultation response. This land drain was included to address concerns regarding existing overland flows from the rear of the properties along Queens Road and any potential overland flows as a result of the land raising on the proposed development. The land drain ensures connectivity of the aforementioned overland flows to Ditch A.

LLFA Comment:

In addition to the ditch on the western side of the site, a further proposal is made regarding the possible runoff from the rear of the properties along Victoria Road and the draining of the land at this location. A 175mm perforated land drain would be installed along the northern boundary within the rear gardens of the new properties. This drain would convey any surface water into Ditch A and then be conveyed southwards.

Whilst an approach such as this is welcomed, it would be our preference for a larger gravel filled trench (minimum 300mm and inclusion of a perforated pipe) to be utilised instead. This is to improve upon overall interception and capacity of the feature. Consideration should also be applied to undertaking a catchment assessment to determine the relative contributions that would occur (overland flows), and the actual size of the trench/ drain required.

The LLFA view that any future feature positioned within these rear gardens should be managed in perpetuity. This is to protect both the existing properties along the southern side of Victoria Road and the new dwellings, to ensure appropriate land drainage. The creation of this feature also develops concern around access, infill/ removal and maintenance of the feature long term. One option for future consideration is the implementation of a restrictive covenant.

Rodgers Leask Comment:

Overland Flow Routing drawing 0058-RLL-00-XX-DR-C-1015 has been updated to refine the position of the proposed land drain. The proposed land drain has been detailed to show a 225mm diameter perforated pipe within a 600mm width gravel filled trench to improve interception and capacity as requested. Modelling of overland flow from existing gardens to the rear of properties in Queens Road and rear gardens from the proposed development has been undertaken to size the land drain.

The fencing to the rear of the proposed gardens has been offset 1m to provide an access for maintenance of the feature in perpetuity. Maintenance will be undertaken by a private management company.

Appendix A – Overland Flow Routing Drawing

GENERAL NOTES

- Do not scale this drawing. If in doubt, ask.
- This drawing is to be read in conjunction with all other relevant Engineers, Architects and specialist design drawings and details.
- All dimensions are in metres unless noted otherwise. All levels are in metres unless noted otherwise.
- Any discrepancies noted on site are to be reported to the Engineer immediately.
- Sewers shall be constructed to the satisfaction of Southern Water and in accordance with Appendix C of the UK Water Sewerage Sector Guidance "Design and Construction Guidance" 2020, unless noted otherwise.
- All clauses referenced relate to Appendix C of the UK Water Sewerage Sector Guidance "Design and Construction Guidance" 2020, unless noted otherwise.
- The Contractor shall check all the site for line and level with existing at least 3 weeks prior to the commencement of any works. The Engineer shall be notified immediately in writing, should any errors be found.
- It is the responsibility of the Contractor to locate any service apparatus in the vicinity of the works.
- It is the responsibility of the Contractor to execute the works at all times in strict accordance with the requirements of the Health And Safety At Work Act 1974, and the C.O.M. Regulations 2015. The Contractor will be deemed to have allowed for full compliance, including full liaison with the Principal Designer, within his rates.
- The Contractor is responsible for ensuring that all works are to the satisfaction of the site Engineer, and shall be deemed to have included within his rates for any necessary testing.
- The Contractor will be responsible for providing all necessary de-watering and trench support to execute the works in a satisfactory manner, and shall be deemed to have allowed for the same within his rates.
- All buried concrete products and mortar shall be made using sulphate resisting cement.
- All pipes 225mm dia or less shall be Extra Strength Verified Clay. Pipe joints shall be spigot and socket joints. Sleeve joint joints will not be permitted. 300mm and above to be class 120 concrete.
- All pipes shall be laid with soffit level unless stated otherwise.
- Design subject to approval by KCC and SW.
- Where FW crosses above SW the pipe trench to be lined with 1200 gauge impermeable membrane to eliminate any chances of cross contamination.
- Infill covers and frames within block paved areas are not to be used.
- Excavations at any change of width should be 3.0m either side of pipes up to Ø375mm, and 3.5m either side of pipes greater than Ø375mm.
- All manhole covers to be in accordance with the BS EN 124, Class D400 and endorsed FW or SW as appropriate.
- All manhole covers and frames to be kitemarked.
- Protective concrete cover slabs to be used on pipes in non-turfed areas which don't achieve 900mm cover and in trafficked areas that don't achieve 1200mm cover.
- Precast concrete manhole rings are not to be cut under any circumstances.
- All proposed landscaping and tree planting adjacent to sewers shall be in accordance with clauses BS 1:10 and BS 6.

KEY

- Development Boundary
- Proposed IBS Culvert
- Existing Drainage
- Perforated Land Drain
- Ø100 / Ø150mm Storm Water Drain (Ø100mm pipework unless otherwise shown)
- Ø600mm Storm Water Inspection Chamber (Maximum Depth 3.0m & Non-man entry required for depths > 1.2m)
- Sealed Rodding Eye
- Overland Flow Route
- 1m Easement for maintenance of Land Drain
- Proposed Overflow & Alternate Ditch Route
- Proposed ditch lined to specified ditch to accommodate overflow route through development in the event of surcharging to specified ditch to the north
- Flood Compensation Zone
- Levels lowered locally to provide a minimum of 1.144m additional flood storage. This volume has been based on Herrington Consulting Limited Flood Risk Assessment.
- Non-Return Valve
- At least 150C Headwall or similar approved to be fitted with Non-return flap valve
- Land Drain
- Proposed Ø225mm perforated pipe to be installed in 600mm wide gravel filled trench. Plot fencing to be set back from development boundary to provide 1m access for maintenance of land drain.
- Western Ditch Culvert
- At least 150C Headwall or similar approved to 4500 culverted section of western ditch

Health and safety symbols refer to reference numbers indicated on Designers Risk Assessment number: 21184-RL-22-X0485-C-001

Health & Safety Information Key

- Used to provide design specific safety information that may not be obvious to a competent contractor but may be useful
- Used to restrict/prevent a possible action, e.g. stop construction traffic from entering an area
- Used to warn of significant design hazards, adding recommendations
- Used to encourage a positive action, e.g. use of robust protection for inspection chambers

G	24.05.22	Land drain amended adjacent Plot 54. Western ditch amended	LH	NMF
F	20.05.22	Land drain amended	LH	NMF
E	19.05.22	Land drain added adjacent Plot 1	LH	NMF
D	19.05.22	Land drain amended & detail added. IBS Culvert updated.	LH	NMF
C	13.04.22	Footpaths through POS adjacent to Ditch A updated to reflect amended Architects layout.	BRM	MJA
B	07.04.22	Footprint of attenuation updated as requested by the Architect.	BRM	MJA
A	06.04.22	FFL added and attenuation storage shaping updated as requested by L&C 04.04.22	BRM	MJA
Rev	Date	Amendments	By	CHK

Client: **RLRE** Consulting Engineers

LEGAL AND GENERAL MODULAR HOMES

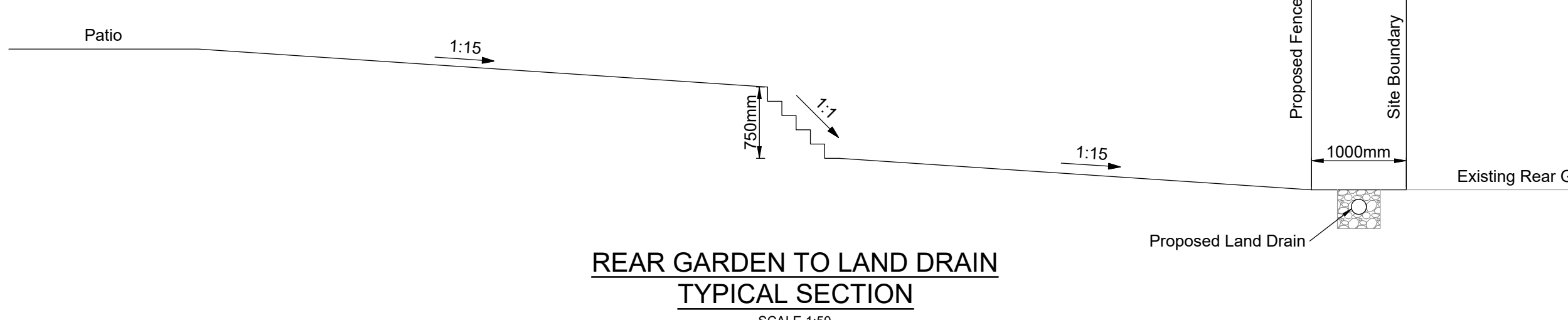
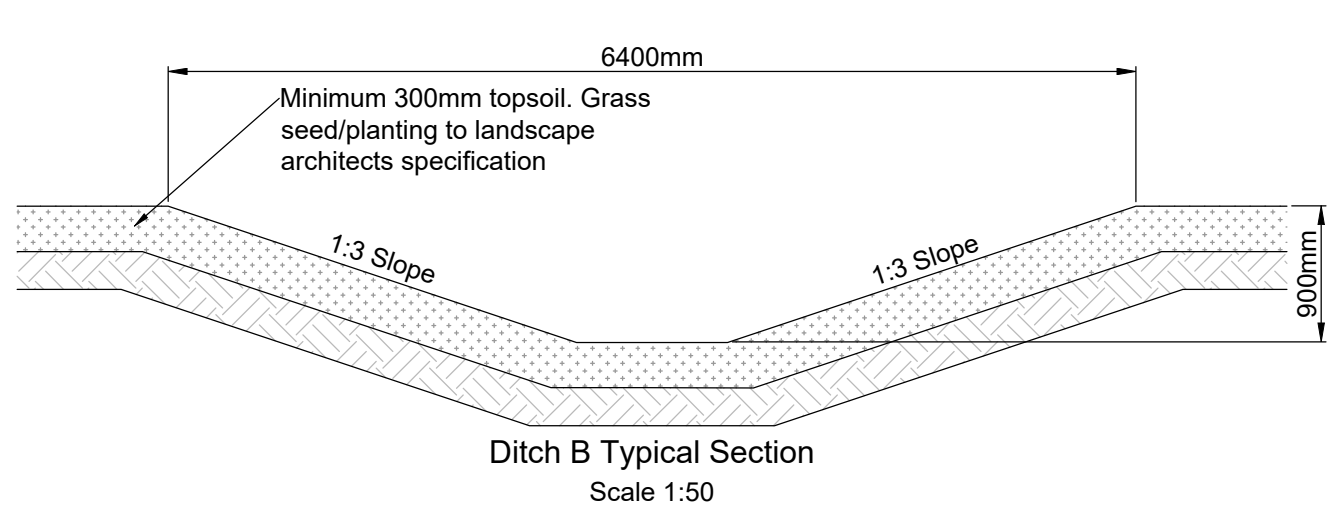
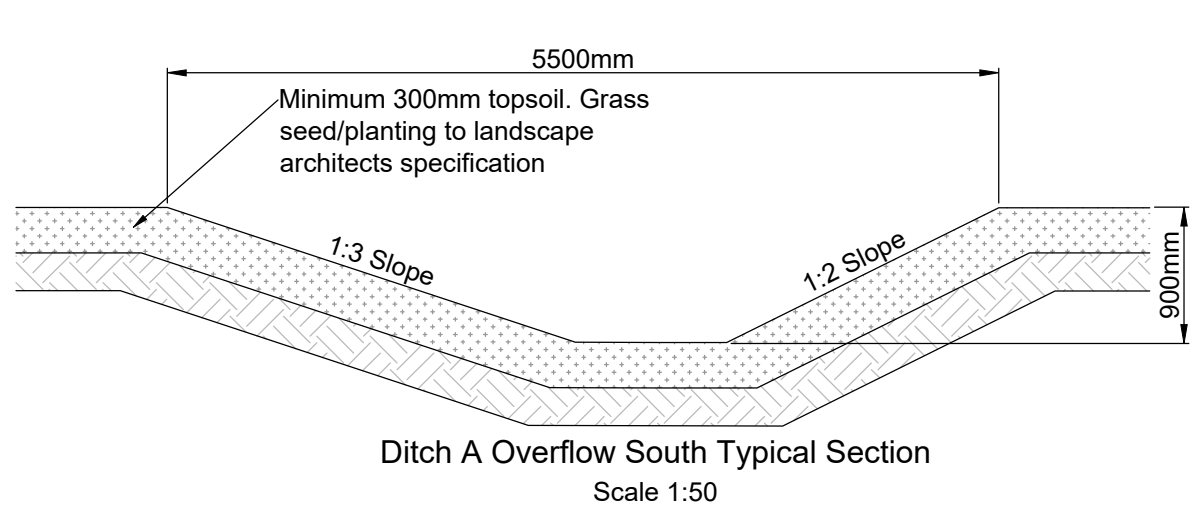
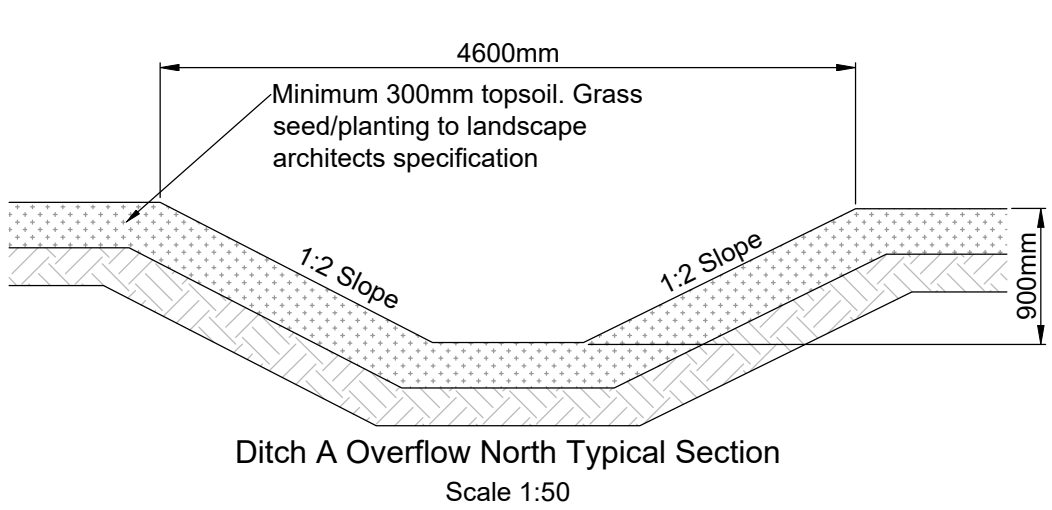
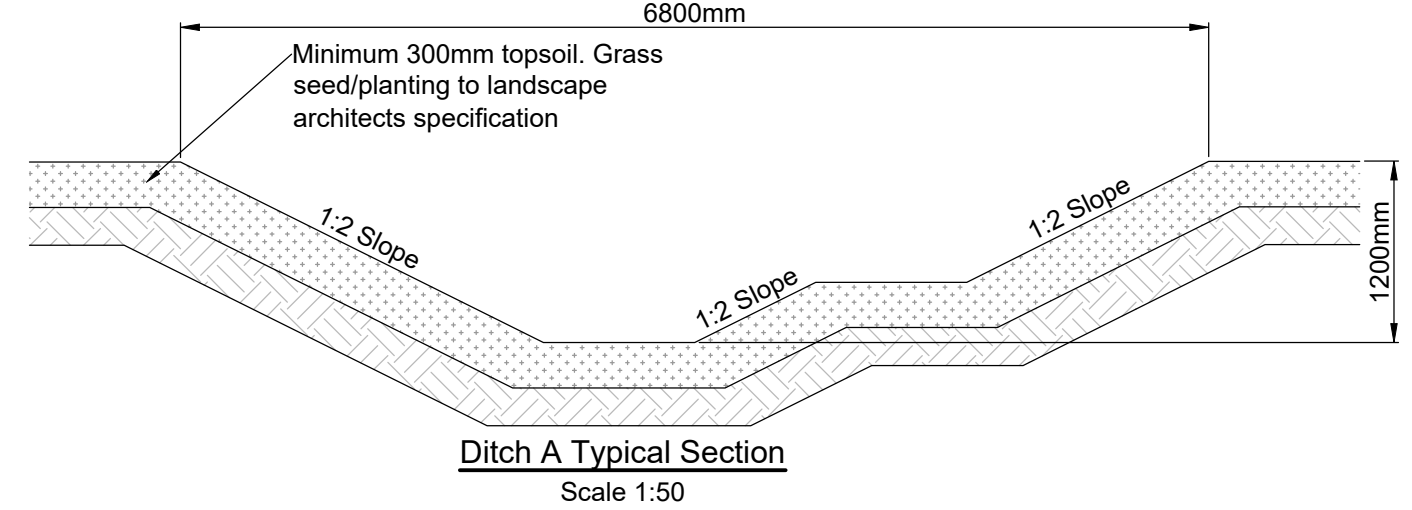
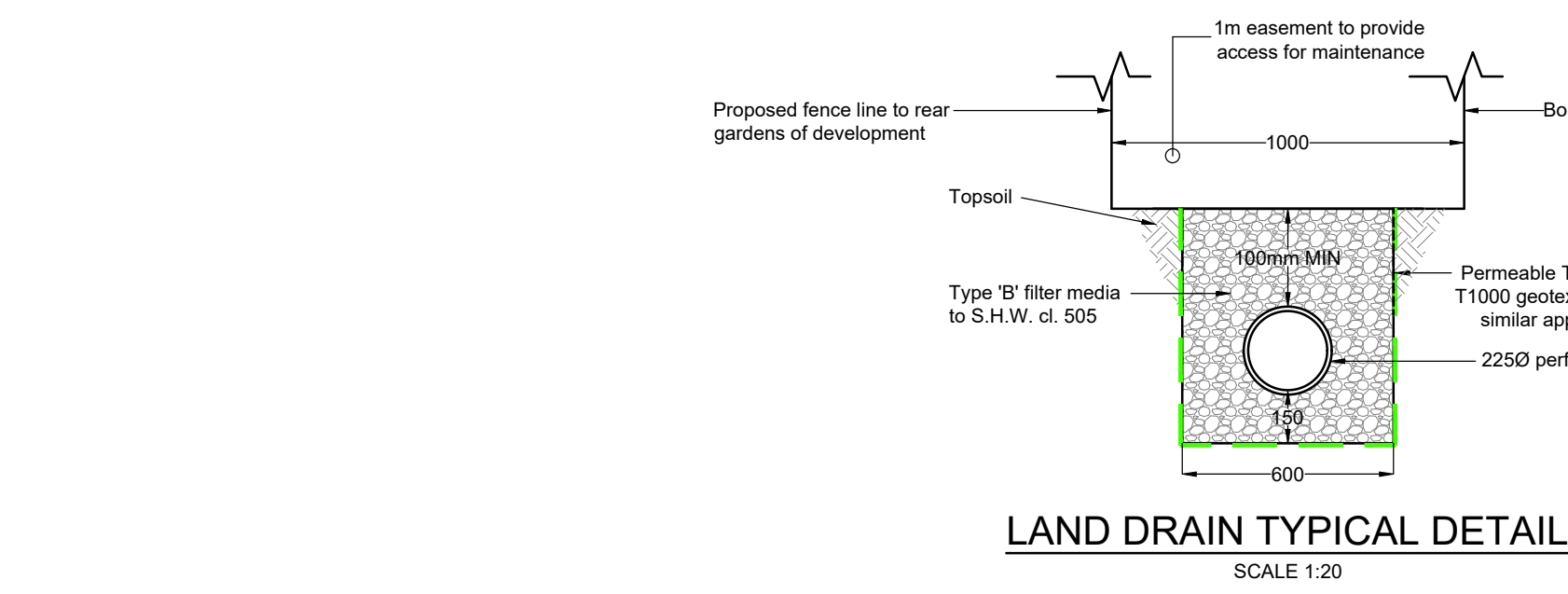
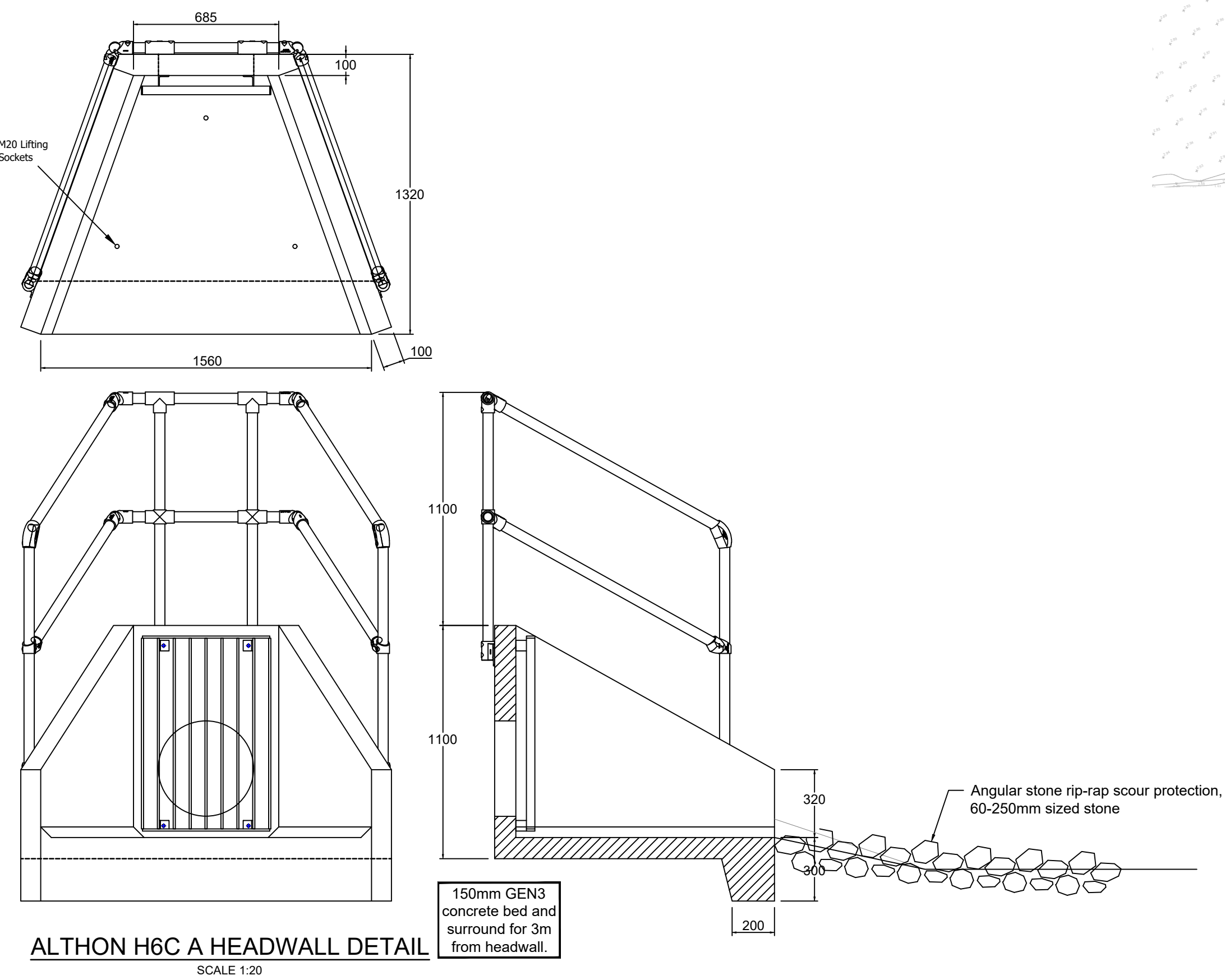
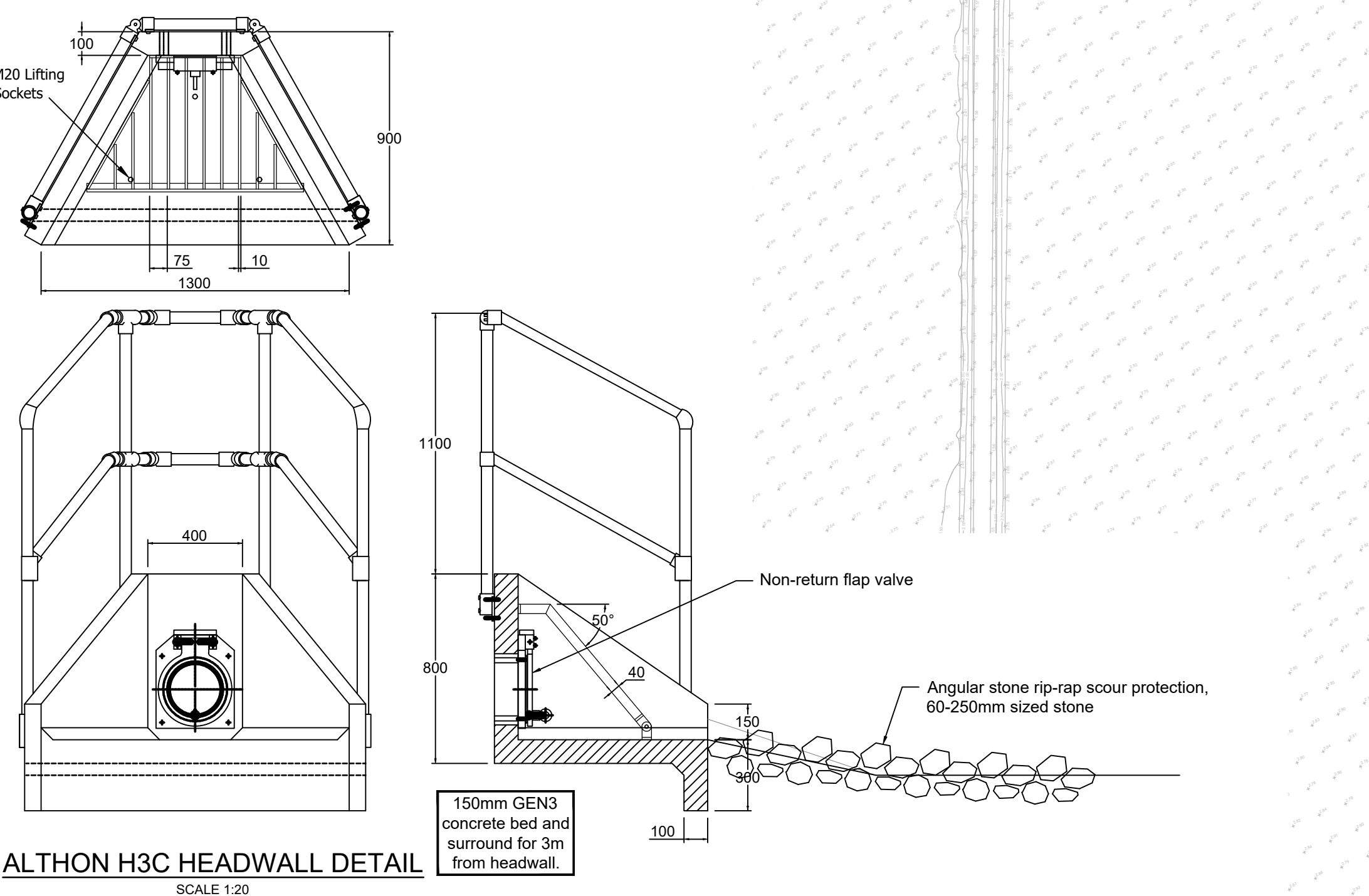
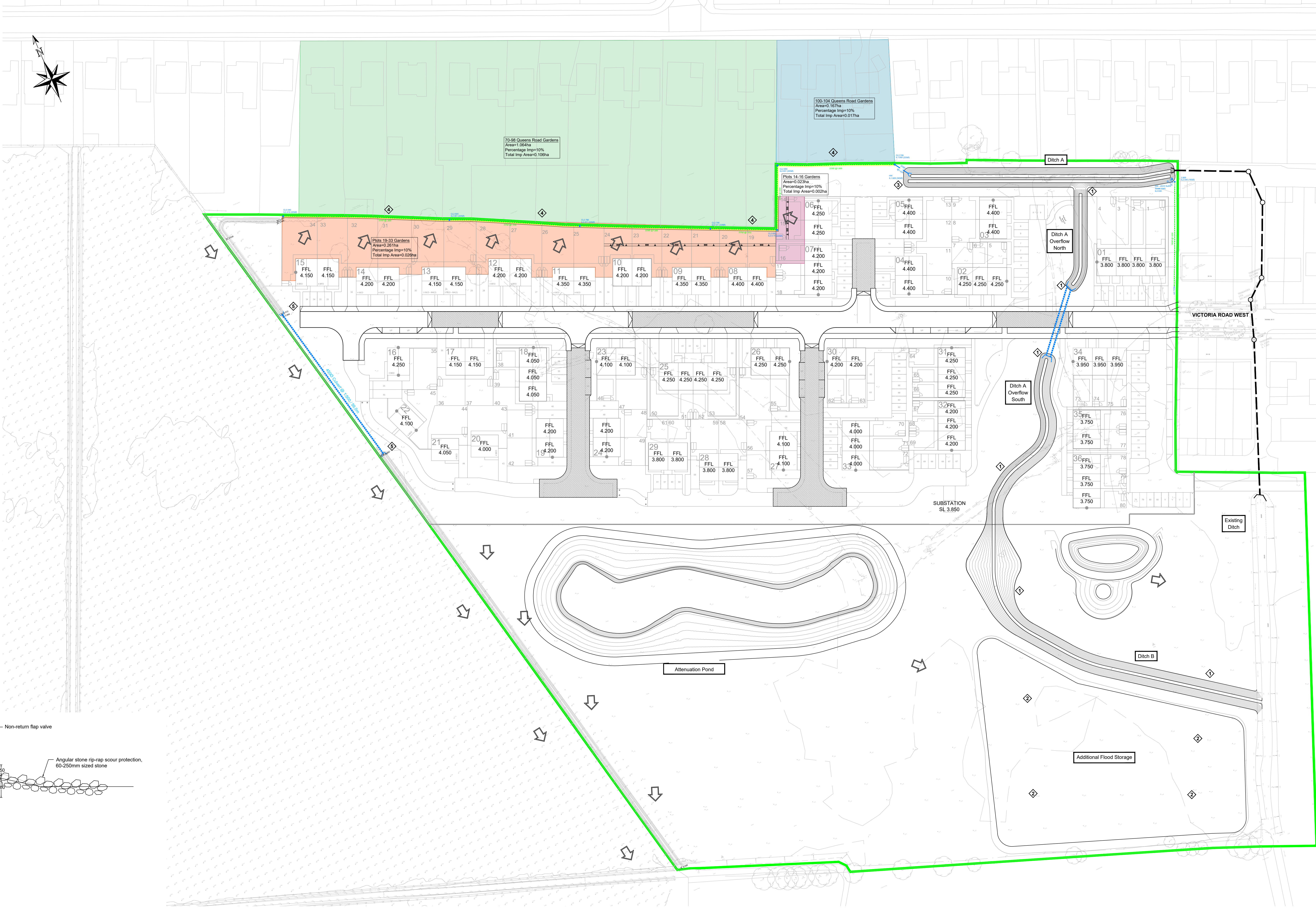
Project: **VICTORIA ROAD WEST, LITTLESTONE, KENT**

OVERLAND FLOW ROUTING

Status: **PLANNING**

Scale	Drawn	Checked	Date
1:500 @ A0	BRM	NMF	31.03.22
Drawing Number	Revision		
0058-RL-00-XX-DR-C-1015	G		

Scale Bar: 1:500
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Appendix B – InfoDrainage Calculations

Project: P21-184 Littlestone Land Drain Capacity Check Rev A	Date: 24/05/2022			
Report Details: Type: Stormwater Controls Storm Phase: Phase	Designed by: LH		Checked by:	Approved By:
Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ				



Land Drain 1

Type : Infiltration Trench

Dimensions

Exceedence Level (m)	2.850
Depth (m)	0.925
Base Level (m)	1.925
Freeboard (mm)	0
Porosity (%)	33
Length (m)	170.134
Long. Slope (1:x)	500.00
Width (m)	0.600
Total Volume (m³)	35.692

Under Drain

Height Above Base (m)	0.150
Diameter (mm)	225
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Lateral Inflow
Incoming Item(s)	70-98 Queens Road Gardens
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	Plots 19-33 Gardens
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	No Delay
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	100.0
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Project: P21-184 Littlestone Land Drain Capacity Check Rev A	Date: 24/05/2022		
	Designed by: LH	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ		



Land Drain 2

Type : Infiltration Trench

Dimensions

Exceedence Level (m)	2.850
Depth (m)	0.969
Base Level (m)	1.881
Freeboard (mm)	0
Porosity (%)	33
Length (m)	21.947
Long. Slope (1:x)	500.00
Width (m)	0.600
Total Volume (m³)	4.796

Under Drain

Height Above Base (m)	0.150
Diameter (mm)	225
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	No Delay
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	Plots 14-16 Gardens
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	No Delay (1)
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	100.0
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Project: P21-184 Littlestone Land Drain Capacity Check Rev A	Date: 24/05/2022		
Report Details: Type: Stormwater Controls Storm Phase: Phase	Designed by: LH	Checked by:	Approved By:
Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ			



Land Drain 3

Type : Infiltration Trench

Dimensions

Exceedence Level (m)	2.900
Depth (m)	1.100
Base Level (m)	1.800
Freeboard (mm)	0
Porosity (%)	33
Length (m)	40.436
Long. Slope (1:x)	500.00
Width (m)	0.600
Total Volume (m³)	9.884

Under Drain

Height Above Base (m)	0.150
Diameter (mm)	225
No. of Barrels	1
Release Height (m)	0.000
Friction Scheme	Manning's n
n	0.015

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	No Delay (1)
Bypass Destination	(None)
Capacity Type	No Restriction

Inlet (1)

Inlet Type	Lateral Inflow
Incoming Item(s)	100-104 Queens Road Gardens
Bypass Destination	(None)
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	1.000
Outlet Type	Under Drain

Advanced

Conductivity (m/hr)	100.0
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Project: P21-184 Littlestone Land Drain Capacity Check Rev A		Date: 24/05/2022			
Report Details: Type: Connections Storm Phase: Phase		Designed by: LH	Checked by:		Approved By:
		Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ			

Name	Length (m)	Connection Type	Slope (1:x)	Manning's n	Colebrook-White Roughness (mm)	Diameter / Base Width (mm)	Upstream Cover Level (m)	Upstream Invert Level (m)
No Delay	1.089	No Delay						
No Delay (1)	1.112	No Delay						
1.000	5.625	Pipe	224.988		0.6	225	2.981	1.950

Name	Downstream Cover Level (m)	Downstream Invert Level (m)	Min. Downstream Invert Level (m)	Flow Restriction (L/s)	Auto Size
No Delay					
No Delay (1)					
1.000	0.000	1.925	1.925	0.0	<input checked="" type="checkbox"/>

Project: P21-184 Littlestone Land Drain Capacity Check Rev A		Date: 24/05/2022			
Report Details: Type: Inflow Summary Storm Phase: Phase		Designed by: LH	Checked by:		Approved By:
		Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ			

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
70-98 Queens Road Gardens	Land Drain 1		Time of Concentration	1.064	10	0	10	0.106
100-104 Queens Road Gardens	Land Drain 3		Time of Concentration	0.167	10	0	10	0.017
Plots 14-16 Gardens	Land Drain 2		Time of Concentration	0.023	10	0	10	0.002
Plots 19-33 Gardens	Land Drain 1		Time of Concentration	0.261	10	0	10	0.026
TOTAL		0.0		1.516				0.152

Project: P21-184 Littlestone Land Drain Capacity Check Rev A	Date: 24/05/2022			
	Designed by: LH	Checked by:	Approved By:	
Report Details: Type: Outfall Details Storm Phase: Phase	Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Simple Junction	Free Discharge		

Project: P21-184 Littlestone Land Drain Capacity Check Rev A	Date: 24/05/2022			
Report Title: Rainfall Analysis Criteria	Designed by: LH <table border="1"> <tr> <td>Checked by:</td> <td>Approved By:</td> </tr> </table>		Checked by:	Approved By:
Checked by:	Approved By:			
	Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ			

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Shortest
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	<input type="checkbox"/>

Rainfall

FSR 1 in 100 +40% Type: FSR

Region	England and Wales
M5-60 (mm)	20.0
Ratio R	0.400
Summer	<input checked="" type="checkbox"/>
Winter	<input checked="" type="checkbox"/>

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	40

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880

Project: P21-184 Littlestone Land Drain Capacity Check Rev A	Date: 24/05/2022		
	Designed by: LH	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ		



Critical Storm

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow (m³)
70-98 Queens Road Gardens	FSR 1 in 100 +40%: 100 years: +40 %: 15 mins: Summer	1.06	14.4	6.249
100-104 Queens Road Gardens	FSR 1 in 100 +40%: 100 years: +40 %: 15 mins: Summer	0.17	2.3	0.978
Plots 19-33 Gardens	FSR 1 in 100 +40%: 100 years: +40 %: 15 mins: Summer	0.26	4.6	1.986
Plots 14-16 Gardens	FSR 1 in 100 +40%: 100 years: +40 %: 15 mins: Summer	0.02	0.4	0.177

Project: P21-184 Littlestone Land Drain Capacity Check Rev A		Date: 24/05/2022			
Report Details: Type: Junctions Summary Storm Phase: Phase		Designed by: LH	Checked by:		Approved By:
		Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ			



Critical Storm

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
Simple Junction	FSR 1 in 100 +40%: 100 years: +40 %: 60 mins: Summer		0.000	2.002	0.077	8.8			8.8	8.028	OK

Project: P21-184 Littlestone Land Drain Capacity Check Rev A		Date: 24/05/2022			
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase		Designed by: LH	Checked by:		Approved By:
		Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ			



Critical Storm

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Residual Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Land Drain 1	FSR 1 in 100 +40%: 100 years: +40 %: 60 mins: Summer	2.466	2.201	0.201	0.276	10.8	7.722	0.000	0.000	7.6	8.286	78	OK
Land Drain 2	FSR 1 in 100 +40%: 100 years: +40 %: 60 mins: Summer	2.185	2.157	0.260	0.276	7.7	1.164	0.000	0.000	8.0	7.883	76	OK
Land Drain 3	FSR 1 in 100 +40%: 100 years: +40 %: 60 mins: Summer	2.140	2.064	0.259	0.264	8.6	2.096	0.000	0.000	8.8	8.212	79	OK

Project: P21-184 Littlestone Land Drain Capacity Check Rev A		Date: 24/05/2022			
Report Details: Type: Connections Summary Storm Phase: Phase		Designed by: LH	Checked by:		Approved By:
		Company Address: Rodgers Leask Ltd St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ			



Critical Storm

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
No Delay	FSR 1 in 100 +40%: 100 years: +40 %: 60 mins: Summer	No Delay	Land Drain 1	Land Drain 2		2.154	0.083	8.286	0.0		7.6	
No Delay (1)	FSR 1 in 100 +40%: 100 years: +40 %: 60 mins: Summer	No Delay	Land Drain 2	Land Drain 3		2.149	0.085	7.883	0.0		8.0	
1.000	FSR 1 in 100 +40%: 100 years: +40 %: 60 mins: Summer	Pipe	Land Drain 3	Simple Junction	3.0	2.062	0.080	8.028	0.7	0.25	8.8	OK