



Avie Consulting Ltd
6 Killingbeck Court
Killingbeck Office Village
Killingbeck Drive
Leeds, LS14 6FD

Proposed Surface Water Drainage Statement

David Brown

Phase 1, 3 and 4 Combined



DBS-AVE-00-XX-DR-C-RP01

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Registered in England and Wales No 8325892



Avie Consulting have been appointed to provide information to support the discharge of Planning Condition 10:-

Drainage Summary:

The hydraulic calculations indicate a 40m³ attenuation storage tank (50m² x 0.8m), however this is not indicated on the Drainage Layout drawing. It is assumed DBS 3 is MH S09, although the IL shown on the drawing is different to that in the calculations for the HydroBrake.

As stated in the LLFA's email dated 03/04/2023:

The LLFA will require a Drainage Statement and supporting Hydraulic Calculations for the combined

MA3 and MA4 developments. These documents must show the following:

- Drained areas for MA3 and MA4 separately identified and shown on an impermeability Area plan.*
- Proposed Drainage Plan for both MA3 and MA4 areas clearly indicating the drainage connectivity between the two areas.*
- The claimed final allowable discharge rate to public sewer based on a 30% betterment of the existing flows from the equivalent existing hard standing areas.*
- MicroDrainage Calculations showing that the attenuation storage for the surface water run-off from the MA3 and MA4 areas can contain the critical 1 in 100 year (plus 30%CC) without causing flooding off-site.*

The Hydraulic modelling was updated to incorporate the removal of the 40m³ storage attenuation featuring on the original drainage design. Subsequently a packaged pump station fitted with dual pumps now features in the surface water drainage scheme.

Due to the existing underground utility constraints discovered on site, once the construction works had commenced, the original gravity discharge of surface water flows serving the Marine Assembly 3 building was not achievable. Whilst underground utility mapping was carried out, the arrangement of the existing HV cable ducts located in the area the attenuation was proposed did not allow the construction of the attenuation feature. When exposed, the cable ducts were arranged in two banks of four spanning the area the attenuation crates were proposed.



Having assessed depth and route of the cable ducts once exposed, Avie provided an amended proposal for consideration.

An increased footprint of the tank whilst reducing the attenuation to one crate in depth would allow the same volume of water to be restricted and contained on site, however, following discussions with the contractor and client the proposals would not allow for a safe method of construction given the condition of the ducting/ cables.

The ducting would have to be propped extensively, as it is made up of old clay ducts, each section only about a metre in length and some of the ducting was cracked. This would make rolling out the membrane for the tank very difficult.

The subcontractor installing the tank also stated that they require 500mm minimum working space around the perimeter, which wouldn't be achievable with the 40m³ attenuation requirement due to the underground utilities in this area.

Due to the existing utility constraints on site, the limited available space to construct below ground attenuation and the construction progress of the Marine Assembly 3 building, Avie explored the option of pumping the surface water flows at a greater discharge rate (to allow for some onsite attenuation) to the Marine Assembly 4 area of the development to the south. The multi-phase drainage layout is included in Appendix A.

An existing brownfield runoff rate considering a 30% betterment of the existing flows from Marine Assembly 3, 4 and Phase 1 (existing attenuation tank to be relocated due to new building position) combined surface water flows has been calculated. The surface water flows will ultimately discharge to the public sewer at a reduced rate of 71.2 L/s to a manhole located in Nabcroft Lane. The existing, proposed impermeable areas and Rational Method for calculating peak runoff information is included in Appendix B.

The 1 in 1, 1 in 30 year and 1 in 100 year storm events considering 30% allowance for climate change MicroDrainage calculations are included in Appendix C. The calculations demonstrate the critical 1 in 100 year plus 30% storm event is contained within the system and will cause no offsite flooding.



APPENDIX A



Notes:
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 All dimensions are in millimetres unless noted otherwise.
 DO NOT SCALE THIS DRAWING - IF IN DOUBT ASK.
 1. All dimensions & levels to be checked by the contractor prior to commencement of work, any discrepancy shall be reported immediately to Avie Consulting Ltd.
 2. All work shall be carried out in accordance with Local Authority, statutory authority, health & safety requirements and regulations.
 3. The drawings shall be read in accordance with all other contract documents relevant at that time of issue and during the period of the contract.
 4. The contractor must ensure the overall stability of the works is adequate at all stages of the construction.
 5. No allowance has been made for cuttings, holes, notches, etc. for services. All of these are to be agreed prior to the start of the works.

KEY:
 - - - PROPOSED SURFACE WATER DRAIN
 - - - PROPOSED FOUL WATER DRAIN
 - - - EXISTING DRAIN TO BE ABANDONED
 - - - PROPOSED EXTERNAL LEVELS

SUBJECT TO APPROVAL FROM KIRKLEES PLANNING AND LLFA. DRAINAGE LEVELS TO BE INVESTIGATED AND CONFIRMED ON SITE PRIOR TO WORKS COMMENCING.

DRAWING TO BE READ IN CONJUNCTION WITH ALL PUMP SOLUTIONS DESIGN DRAWINGS AND SPECIFICATIONS.

IMPORTANT AS BUILT NOTE
 In preparing "As Built" record drawings, Avie has relied upon information provided by the Contractor to confirm that the works have been constructed as the construction drawings. Avie has not been appointed to supervise the works and accepts no responsibility for the accuracy of the record information.

AS BUILT

C17	Combined Phase 4 and Phase 1 extension drainage. Drawing size amended to A0.	J.C.	T.C.	03/07/2023
C18	Amended to reflect As-Built information provided by Triton and All Pump Solutions.	J.C.	T.C.	24/04/2023
C19	Borehole alteration incorporated within Phase 4 of the development.	J.C.	T.C.	24/04/2023
C14	Pump station levels amended in accordance with All Pump Solutions specification.	J.C.	S.T.P.	20/01/2023
C13	Amended to include final and surface water applications.	J.C.	S.T.P.	21/12/2022
C12	Combined diversion amended to avoid service clothes. S10 omitted.	J.C.	S.T.P.	21/12/2022
C11	Amended to reflect on site constraints. Attention tank omitted, combined sewer diversion amended, temporary drainage design added.	J.C.	S.T.P.	15/12/2022
C10	ACO drain added in accordance with Acumen drawing 20200000923.	J.C.	S.T.P.	07/12/2022
C09	Amended in accordance with Triton Construction's comments.	J.C.	S.T.P.	11/08/2022
C08	Amended in accordance with Triton Construction's email dated 08/07/22.	S.T.P.	S.A.B.	10/08/2022
C07	Amended in accordance with Triton Construction's email dated 23/06/22.	J.C.	T.C.	23/06/2021
C06	Amended in accordance with Triton Construction's email dated 21/06/22.	J.C.	T.C.	26/04/2021
C05	Amended to LLFA comments.	J.C.	T.C.	08/11/2021
C04	Amended to site conditions.	P.A.S./P.A.S.	P.A.S.	03/02/2021
C03	Attention tank revised to raise invert. MH types amended.	P.A.S./P.A.S.	P.A.S.	15/07/2021
C02	Attention tank relocated to avoid trench.	P.A.S./P.A.S.	P.A.S.	18/06/2021
C01	Construction issue.	P.A.S./P.A.S.	P.A.S.	09/06/2021
Rev	Inch issue.	P.A.S./P.A.S.	P.A.S.	25/09/2020

6 Killingbeck Court,
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Client: David Brown Santasalo
 Project: Marine Assembly 3
 Title: Drainage Layout

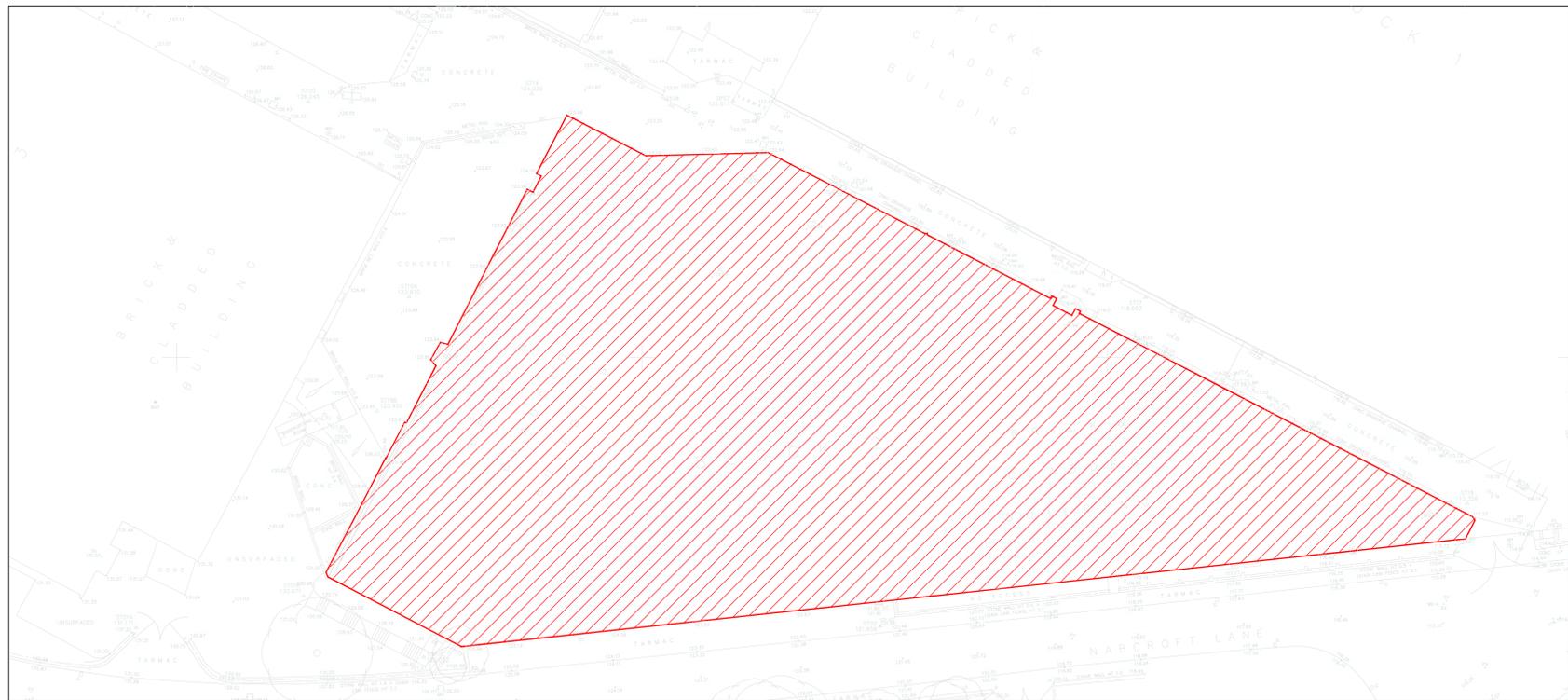
Drawn: P.A.S. Checked: S.A.B. Date: Aug 2020 Scale: 1:200 Original Issue No: AO
 Drawing Name: DBS-AVE-00-XX-DR-C-0001 No: C17



APPENDIX B



OS GRID REFERENCE
412970, 415394
LEVELS RELATED TO OS BY CONNECTION TO
THE OS ACTIVE NETWORK BY G.P.S.
ORIENTATION AT OS GRID NORTH.



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Existing Impermeable Area Marine Assembly 4

3847.777m² - 0.385ha

Total Area: 3847.777m² - 0.385ha

2918.016m² - 0.292ha Extent of existing building to be demolished.

Existing Impermeable Area Marine Assembly 1 (E1)

2305m² - 0.231ha

Existing Impermeable Area Marine Assembly 3

2056m² - 0.210ha

Existing discharge rate based on brownfield runoff rates.

$$Q = 2.78 \times C_i \times A$$

$$Q = 2.78 \times 1.0 \times 50 \times 0.385 = 53.5 \text{ L/s}$$

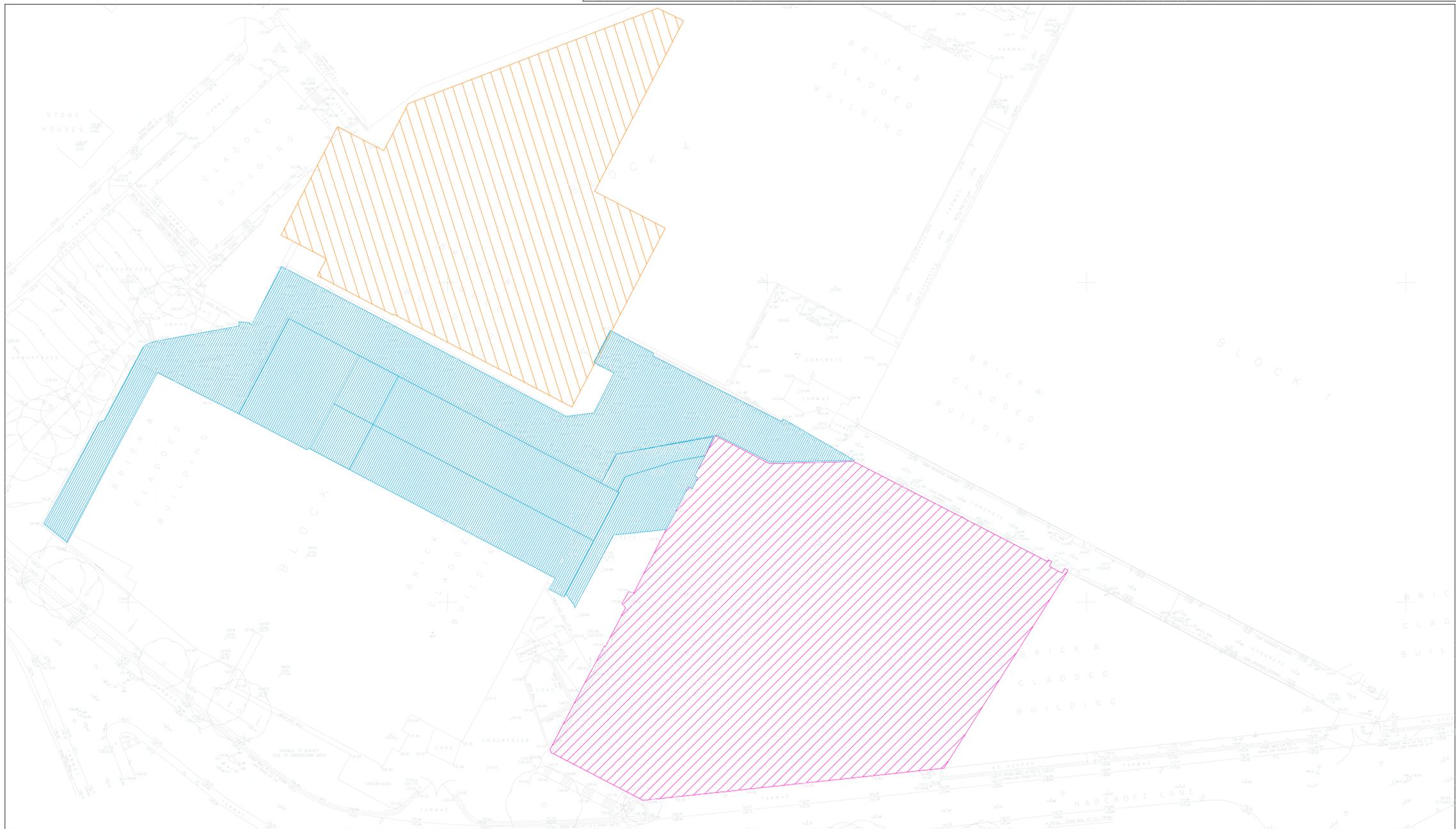
$$\text{Proposed Discharge rate} = 53.5 \text{ L/s minus 30\% reduction} = 37.46 \text{ L/s}$$

Therefore considering the following information:

$$\text{Marine Assembly 4 Phase 1 discharge rate} = 37.46 \text{ L/s total site area x extent of existing building to be demolished.}$$

$$Q = 37.46 / 0.385 \times 0.292 = 28.39 \text{ L/s}$$

$$Q = 28.39 \text{ L/s} + 22.4 \text{ L/s (Marine Assembly 1 discharge rate)} = 20.4 \text{ L/s (Marine Assembly 3 discharge rate)} = 71.2 \text{ L/s}$$



PO1	Additional impermeable areas added for Phases 1 and 3	T.C.	T.C.	12/07/2023
PO0	Initial issue	T.C.	DR	19/05/2023
Rev	Drawn	DR	CHK	DR
Client: David Brown Santasalo Project: Marine Assembly 4 Title: Existing Impermeable Areas Plan				
Drawn by:	Checked:	Issue:	Scale:	Original by:
T.C.	S.A.B.	Sept 2022	1:250	AO
Drawing No: DBS-AVE-00-XX-DR-C-0005				Rev: PO1



APPENDIX C

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD	David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC	
Date 30/12/2021 File P3748 - Phase 1_3_4 com...	Designed by TC Checked by TC	
Micro Drainage	Network 2020.1	

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.570	4-8	0.173

Total Area Contributing (ha) = 0.743

Total Pipe Volume (m³) = 11.082

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Micro Drainage		Network 2020.1



Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	32.375	0.890	36.4	0.007	5.00	0.0	0.600	o	100	Pipe/Conduit
2.000	11.869	0.177	67.1	0.032	5.00	0.0	0.600	o	150	Pipe/Conduit
2.001	20.866	0.313	66.7	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit
2.002	7.583	0.100	75.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
1.001	18.765	0.305	61.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
1.002	8.851	0.220	40.2	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
3.000	47.867	2.535	18.9	0.007	5.00	0.0	0.600	o	150	Pipe/Conduit
3.001	11.139	1.510	7.4	0.133	0.00	0.0	0.600	o	225	Pipe/Conduit
1.003	5.423	0.060	90.4	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.004	5.004	0.200	25.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.005	32.311	-0.838	-38.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.006	25.325	0.375	67.5	0.231	0.00	0.0	0.600	o	225	Pipe/Conduit
4.000	42.468	2.170	19.6	0.010	5.00	0.0	0.600	o	225	Pipe/Conduit
4.001	12.001	1.058	11.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
5.000	32.519	2.815	11.6	0.109	5.00	0.0	0.600	o	150	Pipe/Conduit
5.001	26.703	2.595	10.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	124.700	0.007	0.0	1.28	10.1
2.000	124.350	0.032	0.0	1.23	21.7
2.001	124.173	0.059	0.0	1.23	21.8
2.002	123.860	0.059	0.0	1.16	20.4
1.001	123.760	0.066	0.0	1.28	22.7
1.002	123.380	0.066	0.0	2.07	82.2
3.000	127.280	0.007	0.0	2.33	41.2
3.001	124.670	0.140	0.0	4.85	192.8
1.003	123.160	0.206	0.0	1.38	54.7
1.004	123.100	0.206	0.0	2.63	104.4
1.005	119.112	0.206	0.0	0.00	0.0
1.006	119.950	0.437	0.0	1.59	63.4
4.000	123.395	0.010	0.0	2.97	118.1
4.001	119.158	0.010	0.0	3.91	155.4
5.000	125.060	0.109	0.0	2.98	52.7
5.001	122.245	0.109	0.0	3.16	55.8

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Micro Drainage		Network 2020.1



Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.007	11.745	0.040	293.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
1.008	15.910	0.159	100.1	0.187	0.00	0.0	0.600	o	375	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.007	118.100	0.556	0.0	0.76	30.1
1.008	118.060	0.743	0.0	1.81	200.1



Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
RE	126.750	2.050	Junction		1.000	124.700	100				
RE	125.000	0.650	Junction		2.000	124.350	150				
JUNC	125.100	0.927	Junction		2.001	124.173	150	2.000	124.173	150	
MHS03	124.950	1.090	Open Manhole	750	2.002	123.860	150	2.001	123.860	150	
MHS04	125.100	1.340	Open Manhole	600	1.001	123.760	150	1.000	123.810	100	
								2.002	123.760	150	
MHS04A	125.100	1.720	Open Manhole	600	1.002	123.380	225	1.001	123.455	150	
MH S06	128.510	1.230	Open Manhole	1200	3.000	127.280	150				
MHS07	125.850	1.180	Open Manhole	1200	3.001	124.670	225	3.000	124.745	150	
MHS08	124.720	1.560	Open Manhole	1200	1.003	123.160	225	1.002	123.160	225	
								3.001	123.160	225	
MHS09	124.720	1.620	Open Manhole	1200	1.004	123.100	225	1.003	123.100	225	
MHS10	124.812	5.700	Open Manhole	1800	1.005	119.112	225	1.004	122.900	225	3788
12	122.650	2.700	Open Manhole	1800	1.006	119.950	225	1.005	119.950	225	
13	124.000	0.605	Open Manhole	1200	4.000	123.395	225				
13	122.650	3.492	Open Manhole	1200	4.001	119.158	225	4.000	121.225	225	2067
15	125.660	0.600	Open Manhole	1200	5.000	125.060	150				
15	122.845	0.600	Open Manhole	1200	5.001	122.245	150	5.000	122.245	150	
13	120.650	2.550	Open Manhole	1800	1.007	118.100	225	1.006	119.575	225	1475
								4.001	118.100	225	
								5.001	119.650	150	1475
14	120.350	2.290	Open Manhole	1800	1.008	118.060	375	1.007	118.060	225	
	119.100	1.199	Open Manhole	0		OUTFALL		1.008	117.901	375	

No coordinates have been specified, layout information cannot be produced.

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Micro Drainage		Network 2020.1



PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	o	100	RE	126.750	124.700	1.950	Junction		
2.000	o	150	RE	125.000	124.350	0.500	Junction		
2.001	o	150	JUNC	125.100	124.173	0.777	Junction		
2.002	o	150	MHS03	124.950	123.860	0.940	Open Manhole		750
1.001	o	150	MHS04	125.100	123.760	1.190	Open Manhole		600
1.002	o	225	MHS04A	125.100	123.380	1.495	Open Manhole		600
3.000	o	150	MH S06	128.510	127.280	1.080	Open Manhole		1200
3.001	o	225	MHS07	125.850	124.670	0.955	Open Manhole		1200
1.003	o	225	MHS08	124.720	123.160	1.335	Open Manhole		1200
1.004	o	225	MHS09	124.720	123.100	1.395	Open Manhole		1200
1.005	o	225	MHS10	124.812	119.112	5.475	Open Manhole		1800
1.006	o	225	12	122.650	119.950	2.475	Open Manhole		1800
4.000	o	225	13	124.000	123.395	0.380	Open Manhole		1200
4.001	o	225	13	122.650	119.158	3.267	Open Manhole		1200
5.000	o	150	15	125.660	125.060	0.450	Open Manhole		1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., (mm)	L*W
1.000	32.375	36.4	MHS04	125.100	123.810	1.190	Open Manhole		600
2.000	11.869	67.1	JUNC	125.100	124.173	0.777	Junction		
2.001	20.866	66.7	MHS03	124.950	123.860	0.940	Open Manhole		750
2.002	7.583	75.8	MHS04	125.100	123.760	1.190	Open Manhole		600
1.001	18.765	61.5	MHS04A	125.100	123.455	1.495	Open Manhole		600
1.002	8.851	40.2	MHS08	124.720	123.160	1.335	Open Manhole		1200
3.000	47.867	18.9	MHS07	125.850	124.745	0.955	Open Manhole		1200
3.001	11.139	7.4	MHS08	124.720	123.160	1.335	Open Manhole		1200
1.003	5.423	90.4	MHS09	124.720	123.100	1.395	Open Manhole		1200
1.004	5.004	25.0	MHS10	124.812	122.900	1.687	Open Manhole		1800
1.005	32.311	-38.6	12	122.650	119.950	2.475	Open Manhole		1800
1.006	25.325	67.5	13	120.650	119.575	0.850	Open Manhole		1800
4.000	42.468	19.6	13	122.650	121.225	1.200	Open Manhole		1200
4.001	12.001	11.3	13	120.650	118.100	2.325	Open Manhole		1800
5.000	32.519	11.6	15	122.845	122.245	0.450	Open Manhole		1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	o	150	15	122.845	122.245	0.450	Open Manhole	1200
1.007	o	225	13	120.650	118.100	2.325	Open Manhole	1800
1.008	o	375	14	120.350	118.060	1.915	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.001	26.703	10.3	13	120.650	119.650	0.850	Open Manhole	1800
1.007	11.745	293.6	14	120.350	118.060	2.065	Open Manhole	1800
1.008	15.910	100.1		119.100	117.901	0.824	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.008		119.100	117.901	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.312		

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Online Controls for Storm

Pump Manhole: MHS10, DS/PN: 1.005, Volume (m³): 14.6

Invert Level (m) 121.712

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.300	40.0000	2.600	80.0000

Hydro-Brake® Optimum Manhole: 14, DS/PN: 1.008, Volume (m³): 6.2

Unit Reference	MD-SHE-0327-7120-2185-7120
Design Head (m)	2.185
Design Flow (l/s)	71.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	327
Invert Level (m)	118.060
Minimum Outlet Pipe Diameter (mm)	375
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.185	71.2
Flush-Flo™	0.675	71.2
Kick-Flo®	1.471	58.8
Mean Flow over Head Range	-	61.1

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)						
0.100	9.7	1.200	67.1	3.000	83.0	7.000	125.4
0.200	33.4	1.400	62.0	3.500	89.5	7.500	129.7
0.300	59.3	1.600	61.2	4.000	95.5	8.000	133.8
0.400	68.0	1.800	64.8	4.500	101.1	8.500	137.9
0.500	70.1	2.000	68.2	5.000	106.4	9.000	141.8
0.600	71.0	2.200	71.4	5.500	111.5	9.500	145.6
0.800	70.9	2.400	74.5	6.000	116.3		
1.000	69.5	2.600	77.4	6.500	120.9		

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Micro Drainage	Network 2020.1	

Storage Structures for Storm

Cellular Storage Manhole: 13, DS/PN: 1.007

Invert Level (m) 118.100 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	114.0	0.0	1.201	0.0	0.0
1.200	114.0	0.0			

Volume Summary (Static)

Length Calculations based on Centre-Centre

Pipe Number	USMH Name	Manhole Volume (m ³)	Pipe Volume (m ³)	Storage	
				Structure Volume (m ³)	Total Volume (m ³)
1.000	RE	0.000	0.254	0.000	0.254
2.000	RE	0.000	0.210	0.000	0.210
2.001	JUNC	0.000	0.369	0.000	0.369
2.002	MHS03	0.482	0.134	0.000	0.616
1.001	MHS04	0.379	0.332	0.000	0.710
1.002	MHS04A	0.486	0.352	0.000	0.838
3.000	MH S06	1.391	0.846	0.000	2.237
3.001	MHS07	1.335	0.443	0.000	1.777
1.003	MHS08	1.764	0.216	0.000	1.980
1.004	MHS09	1.832	0.199	0.000	2.031
1.005	MHS10	14.505	1.285	0.000	15.789
1.006	12	6.871	1.007	0.000	7.878
4.000	13	0.684	1.689	0.000	2.373
4.001	13	3.949	0.477	0.000	4.427
5.000	15	0.679	0.575	0.000	1.253
5.001	15	0.679	0.472	0.000	1.150
1.007	13	6.489	0.467	129.996	136.952
1.008	14	5.827	1.757	0.000	7.585
Total		47.351	11.082	129.996	188.429

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 2 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.316
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	RE 15	Winter	1	+0%					124.720
2.000	RE 15	Winter	1	+0%					124.393
2.001	JUNC 15	Winter	1	+0%					124.230
2.002	MHS03 15	Winter	1	+0%	100/15 Summer				123.924
1.001	MHS04 15	Winter	1	+0%	100/15 Summer				123.822
1.002	MHS04A 15	Winter	1	+0%	100/15 Summer				123.430
3.000	MH S06 15	Winter	1	+0%					127.295
3.001	MHS07 15	Winter	1	+0%					124.715
1.003	MHS08 15	Winter	1	+0%	30/15 Summer				123.292
1.004	MHS09 15	Winter	1	+0%	30/15 Summer				123.192
1.005	MHS10 30	Winter	1	+0%	1/15 Summer				122.205
1.006	12 60	Summer	1	+0%	30/15 Summer				120.064
4.000	13 15	Winter	1	+0%					123.407
4.001	13 15	Winter	1	+0%	100/60 Winter				119.168
5.000	15 15	Winter	1	+0%	100/15 Winter				125.112
5.001	15 15	Winter	1	+0%					122.296
1.007	13 60	Winter	1	+0%	30/15 Summer				118.293
1.008	14 60	Winter	1	+0%	30/30 Winter				118.256

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Micro Drainage		Network 2020.1



1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	RE	-0.080	0.000	0.08		0.8	OK*	
2.000	RE	-0.107	0.000	0.18		3.9	OK*	
2.001	JUNC	-0.093	0.000	0.31		6.7	OK*	
2.002	MHS03	-0.086	0.000	0.38		6.7	OK	
1.001	MHS04	-0.088	0.000	0.36		7.6	OK	
1.002	MHS04A	-0.175	0.000	0.11		7.6	OK	
3.000	MH S06	-0.135	0.000	0.02		0.8	OK	
3.001	MHS07	-0.180	0.000	0.09		14.6	OK	
1.003	MHS08	-0.093	0.000	0.64		22.1	OK	
1.004	MHS09	-0.133	0.000	0.35		22.1	OK	
1.005	MHS10	2.868	0.000	1.21		14.7	SURCHARGED	
1.006	12	-0.111	0.000	0.48		28.1	OK	
4.000	13	-0.213	0.000	0.01		1.2	OK	
4.001	13	-0.215	0.000	0.01		1.2	OK	
5.000	15	-0.098	0.000	0.26		13.2	OK	
5.001	15	-0.099	0.000	0.25		13.1	OK	
1.007	13	-0.032	0.000	0.98	26	25.2	OK	
1.008	14	-0.179	0.000	0.21		32.1	OK	

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Micro Drainage	Network 2020.1	

Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 1.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 2.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD	David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC	
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Micro Drainage	Network 2020.1	

Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 2.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 2.002 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 1.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 1.002 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 3.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 3.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 1.003 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 1.004 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 30 minute 1 year Winter I+0%
for Pipe 1.005 (Storm)

Time (mins)	Rain (mm/hr)								
1	2.523	7	9.461	13	36.489	19	30.407	25	8.420
2	6.198	8	11.520	14	41.713	20	24.537	26	8.154
3	7.763	9	14.732	15	45.419	21	19.228	27	8.150
4	8.150	10	19.228	16	45.419	22	14.732	28	7.763
5	8.154	11	24.537	17	41.713	23	11.520	29	6.198
6	8.420	12	30.407	18	36.489	24	9.461	30	2.522

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 60 minute 1 year Summer I+0%
for Pipe 1.006 (Storm)

Time (mins)	Rain (mm/hr)								
2	3.964	14	5.800	26	23.274	38	16.229	50	5.293
4	4.169	16	6.429	28	31.757	40	11.576	52	4.894
6	4.374	18	7.311	30	42.705	42	8.918	54	4.568
8	4.568	20	8.918	32	42.705	44	7.311	56	4.374
10	4.894	22	11.576	34	31.757	46	6.429	58	4.169
12	5.293	24	16.229	36	23.274	48	5.800	60	3.964

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 4.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 4.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 5.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 1 year Winter I+0%
for Pipe 5.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.470	4	15.566	7	58.022	10	40.766	13	12.297
2	11.807	5	25.196	8	67.396	11	25.196	14	11.807
3	12.297	6	40.766	9	58.022	12	15.566	15	6.470

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 60 minute 1 year Winter I+0%
for Pipe 1.007 (Storm)

Time (mins)	Rain (mm/hr)								
2	1.664	14	6.242	26	24.076	38	20.063	50	5.556
4	4.089	16	7.601	28	27.523	40	16.190	52	5.380
6	5.122	18	9.721	30	29.968	42	12.687	54	5.378
8	5.378	20	12.687	32	29.968	44	9.721	56	5.122
10	5.380	22	16.190	34	27.523	46	7.601	58	4.089
12	5.556	24	20.063	36	24.076	48	6.242	60	1.664

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 60 minute 1 year Winter I+0%
for Pipe 1.008 (Storm)

Time (mins)	Rain (mm/hr)								
2	1.664	14	6.242	26	24.076	38	20.063	50	5.556
4	4.089	16	7.601	28	27.523	40	16.190	52	5.380
6	5.122	18	9.721	30	29.968	42	12.687	54	5.378
8	5.378	20	12.687	32	29.968	44	9.721	56	5.122
10	5.380	22	16.190	34	27.523	46	7.601	58	4.089
12	5.556	24	20.063	36	24.076	48	6.242	60	1.664

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Micro Drainage	Network 2020.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 2 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.316
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	RE	15 Winter	30	+0%					124.731
2.000	RE	15 Winter	30	+0%					124.420
2.001	JUNC	15 Winter	30	+0%					124.279
2.002	MHS03	15 Winter	30	+0%	100/15 Summer				123.999
1.001	MHS04	15 Winter	30	+0%	100/15 Summer				123.873
1.002	MHS04A	15 Winter	30	+0%	100/15 Summer				123.586
3.000	MH S06	15 Winter	30	+0%					127.302
3.001	MHS07	15 Winter	30	+0%					124.750
1.003	MHS08	15 Winter	30	+0%	30/15 Summer				123.564
1.004	MHS09	15 Winter	30	+0%	30/15 Summer				123.442
1.005	MHS10	15 Winter	30	+0%	1/15 Summer				123.327
1.006	12	30 Summer	30	+0%	30/15 Summer				120.752
4.000	13	15 Winter	30	+0%					123.419
4.001	13	15 Winter	30	+0%	100/60 Winter				119.181
5.000	15	15 Winter	30	+0%	100/15 Winter				125.148
5.001	15	15 Winter	30	+0%					122.331
1.007	13	30 Winter	30	+0%	30/15 Summer				118.655
1.008	14	60 Winter	30	+0%	30/30 Winter				118.485

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/MH Name	Surcharged Flooded		Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)					
1.000	RE	-0.069	0.000	0.20		2.0	OK*	
2.000	RE	-0.080	0.000	0.44		9.5	OK*	
2.001	JUNC	-0.044	0.000	0.83		18.0	OK*	
2.002	MHS03	-0.011	0.000	1.00		17.6	OK	
1.001	MHS04	-0.037	0.000	0.93		19.7	OK	
1.002	MHS04A	-0.019	0.000	0.29		19.3	OK	
3.000	MH S06	-0.128	0.000	0.05		2.1	OK	
3.001	MHS07	-0.145	0.000	0.27		44.6	OK	
1.003	MHS08	0.179	0.000	1.81		62.5	SURCHARGED	
1.004	MHS09	0.117	0.000	0.98		61.5	SURCHARGED	
1.005	MHS10	3.990	0.000	4.00		48.7	SURCHARGED	
1.006	12	0.577	0.000	1.58		92.4	SURCHARGED	
4.000	13	-0.201	0.000	0.03		3.0	OK	
4.001	13	-0.202	0.000	0.02		3.0	OK	
5.000	15	-0.062	0.000	0.64		32.4	OK	
5.001	15	-0.064	0.000	0.60		32.1	OK	
1.007	13	0.330	0.000	2.27	16	58.3	SURCHARGED	
1.008	14	0.050	0.000	0.44		68.5	SURCHARGED	

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 1.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 2.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 2.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 2.002 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 1.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 1.002 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 3.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		
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Micro Drainage	Network 2020.1	

Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 3.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 1.003 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 1.004 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 1.005 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Rainfall Hyetograph for 30 minute 30 year Summer I+0%
for Pipe 1.006 (Storm)

Time (mins)	Rain (mm/hr)								
1	14.766	7	21.608	13	86.704	19	60.458	25	19.718
2	15.531	8	23.949	14	118.306	20	43.127	26	18.232
3	16.296	9	27.236	15	159.092	21	33.223	27	17.016
4	17.017	10	33.223	16	159.092	22	27.236	28	16.296
5	18.232	11	43.127	17	118.306	23	23.949	29	15.531
6	19.718	12	60.458	18	86.704	24	21.608	30	14.766

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 4.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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Micro Drainage	Network 2020.1	

Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 4.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 5.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Rainfall Hyetograph for 15 minute 30 year Winter I+0%
for Pipe 5.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	15.832	4	38.090	7	141.976	10	99.753	13	30.090
2	28.890	5	61.654	8	164.916	11	61.654	14	28.890
3	30.090	6	99.753	9	141.976	12	38.090	15	15.831

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
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Rainfall Hyetograph for 30 minute 30 year Winter I+0%
for Pipe 1.007 (Storm)

Time (mins)	Rain (mm/hr)								
1	6.201	7	23.255	13	89.693	19	74.744	25	20.697
2	15.234	8	28.316	14	102.532	20	60.315	26	20.042
3	19.081	9	36.213	15	111.642	21	47.263	27	20.034
4	20.034	10	47.263	16	111.642	22	36.213	28	19.081
5	20.042	11	60.315	17	102.532	23	28.316	29	15.234
6	20.697	12	74.744	18	89.693	24	23.255	30	6.200

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Rainfall Hyetograph for 60 minute 30 year Winter I+0%
for Pipe 1.008 (Storm)

Time (mins)	Rain (mm/hr)								
2	4.027	14	15.103	26	58.253	38	48.544	50	13.442
4	9.894	16	18.391	28	66.592	40	39.173	52	13.017
6	12.392	18	23.519	30	72.508	42	30.696	54	13.012
8	13.012	20	30.696	32	72.508	44	23.519	56	12.392
10	13.017	22	39.173	34	66.592	46	18.391	58	9.894
12	13.442	24	48.544	36	58.253	48	15.103	60	4.027

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 2 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.316
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 30

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	RE 15	Winter	100	+30%					124.765
2.000	RE 15	Summer	100	+30%					124.500
2.001	JUNC 15	Summer	100	+30%					124.323
2.002	MHS03 15	Winter	100	+30%	100/15	Summer			124.787
1.001	MHS04 15	Winter	100	+30%	100/15	Summer			124.697
1.002	MHS04A 15	Winter	100	+30%	100/15	Summer			124.523
3.000	MH S06 15	Winter	100	+30%					127.310
3.001	MHS07 15	Winter	100	+30%					124.777
1.003	MHS08 15	Winter	100	+30%	30/15	Summer			124.506
1.004	MHS09 15	Winter	100	+30%	30/15	Summer			124.217
1.005	MHS10 15	Winter	100	+30%	1/15	Summer			123.995
1.006	12 15	Winter	100	+30%	30/15	Summer			122.138
4.000	13 15	Winter	100	+30%					123.426
4.001	13 60	Winter	100	+30%	100/60	Winter			120.272
5.000	15 15	Winter	100	+30%	100/15	Winter			125.256
5.001	15 15	Winter	100	+30%					122.361
1.007	13 60	Winter	100	+30%	30/15	Summer			120.271
1.008	14 60	Winter	100	+30%	30/30	Winter			120.092

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Flooded		Flow / Overflow Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)					
1.000	RE	-0.035	0.000	0.34		3.4	OK*	
2.000	RE	0.000	0.000	0.57		12.4	SURCHARGED*	
2.001	JUNC	0.000	0.000	0.98		21.4	SURCHARGED*	
2.002	MHS03	0.777	0.000	1.25		21.9	FLOOD RISK	
1.001	MHS04	0.787	0.000	1.13		24.1	SURCHARGED	
1.002	MHS04A	0.918	0.000	0.42		27.7	SURCHARGED	
3.000	MH S06	-0.120	0.000	0.09		3.5	OK	
3.001	MHS07	-0.118	0.000	0.46		74.9	OK	
1.003	MHS08	1.121	0.000	2.32		79.9	FLOOD RISK	
1.004	MHS09	0.892	0.000	1.19		74.9	SURCHARGED	
1.005	MHS10	4.658	0.000	5.68		69.2	SURCHARGED	
1.006	12	1.963	0.000	2.49		145.8	SURCHARGED	
4.000	13	-0.194	0.000	0.04		5.0	OK	
4.001	13	0.889	0.000	0.03		3.7	SURCHARGED	
5.000	15	0.046	0.000	1.01		51.1	SURCHARGED	
5.001	15	-0.034	0.000	0.96		51.0	OK	
1.007	13	1.946	0.000	2.66	32	68.4	SURCHARGED	
1.008	14	1.657	0.000	0.46		71.1	FLOOD RISK	

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Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 1.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Summer I+30%
for Pipe 2.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	37.574	4	56.501	7	254.255	10	128.467	13	47.066
2	41.315	5	74.981	8	394.614	11	74.981	14	41.315
3	47.066	6	128.467	9	254.255	12	56.501	15	37.574

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Summer I+30%
for Pipe 2.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	37.574	4	56.501	7	254.255	10	128.467	13	47.066
2	41.315	5	74.981	8	394.614	11	74.981	14	41.315
3	47.066	6	128.467	9	254.255	12	56.501	15	37.574

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 2.002 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

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Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 1.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

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6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 1.002 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 57
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 3.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 58
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 3.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 59
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 1.003 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 60
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 1.004 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 61
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 1.005 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 62
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 1.006 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 63
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 4.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 64
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 60 minute 100 year Winter I+30%
for Pipe 4.001 (Storm)

Time (mins)	Rain (mm/hr)								
2	6.878	14	25.796	26	99.496	38	82.912	50	22.959
4	16.899	16	31.411	28	113.737	40	66.906	52	22.233
6	21.166	18	40.170	30	123.843	42	52.428	54	22.224
8	22.224	20	52.428	32	123.843	44	40.170	56	21.166
10	22.232	22	66.906	34	113.737	46	31.411	58	16.899
12	22.959	24	82.912	36	99.496	48	25.796	60	6.878

Avie Consulting Ltd		Page 65
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 5.000 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 66
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 15 minute 100 year Winter I+30%
for Pipe 5.001 (Storm)

Time (mins)	Rain (mm/hr)								
1	26.584	4	63.959	7	238.400	10	167.501	13	50.525
2	48.511	5	103.527	8	276.920	11	103.527	14	48.511
3	50.525	6	167.501	9	238.400	12	63.959	15	26.584

Avie Consulting Ltd		Page 67
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 60 minute 100 year Winter I+30%
for Pipe 1.007 (Storm)

Time (mins)	Rain (mm/hr)								
2	6.878	14	25.796	26	99.496	38	82.912	50	22.959
4	16.899	16	31.411	28	113.737	40	66.906	52	22.233
6	21.166	18	40.170	30	123.843	42	52.428	54	22.224
8	22.224	20	52.428	32	123.843	44	40.170	56	21.166
10	22.232	22	66.906	34	113.737	46	31.411	58	16.899
12	22.959	24	82.912	36	99.496	48	25.796	60	6.878

Avie Consulting Ltd		Page 68
6 Killingbeck Court Killingbeck Drive Leeds LS14 6FD		David Brown P3129 Marine Assembly Combined 1 in 1, 30, 100 year Plus CC
Date 30/12/2021 File P3748 - Phase 1_3_4 com...		Designed by TC Checked by TC
Micro Drainage		Network 2020.1



Rainfall Hyetograph for 60 minute 100 year Winter I+30%
for Pipe 1.008 (Storm)

Time (mins)	Rain (mm/hr)								
2	6.878	14	25.796	26	99.496	38	82.912	50	22.959
4	16.899	16	31.411	28	113.737	40	66.906	52	22.233
6	21.166	18	40.170	30	123.843	42	52.428	54	22.224
8	22.224	20	52.428	32	123.843	44	40.170	56	21.166
10	22.232	22	66.906	34	113.737	46	31.411	58	16.899
12	22.959	24	82.912	36	99.496	48	25.796	60	6.878



all pump solutions

FLUID EXPERTISE

Tel: 01743465463
 Fax: 01743452050
 Email:
 sales@allpumpsolutions.com

Client: Not Specified	Contractor: AVIE Consulting Ltd
Consulting Engineer: Not Specified	Contract: Marine Assembly 3, Huddersfield
Title: APS Surface Water Package Pumping Station to be Install in an Existing Manhole.	Works Order Number: 8891
Drawing Number: EQ5386-152152-100	Quote Reference: APS5386-152152

Issue:	Reviewed by:	Comments:	Amendments:	Hours:	Cost Impact:	Lead-time Impact:	Date:	Auth:
A	APS	Drawing For Approval	-	-	-	-	19/01/23	ML
B	AVIE Consulting Ltd	Update Design to Suit Install	Orientation updated	1	-	-	22/05/23	

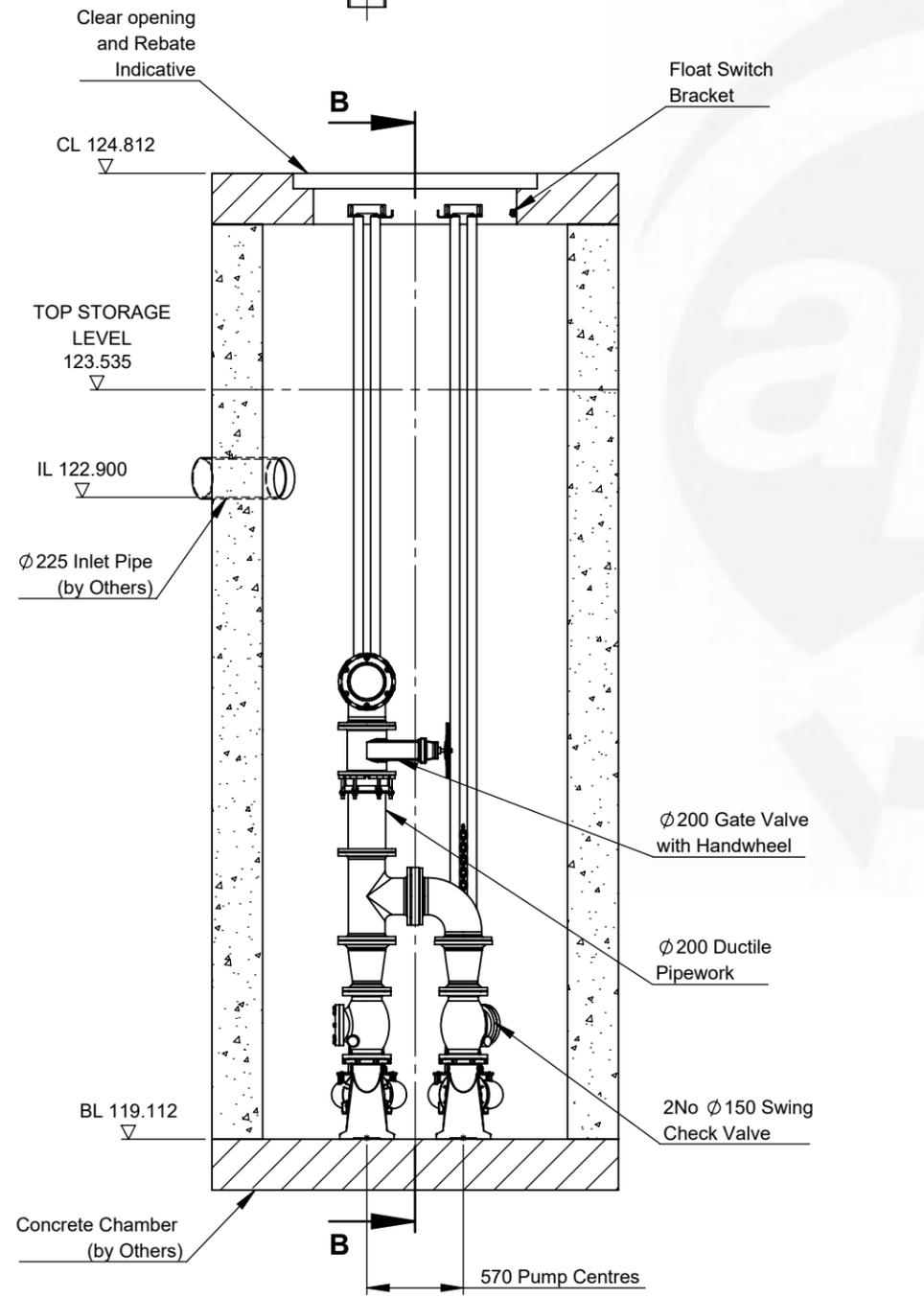
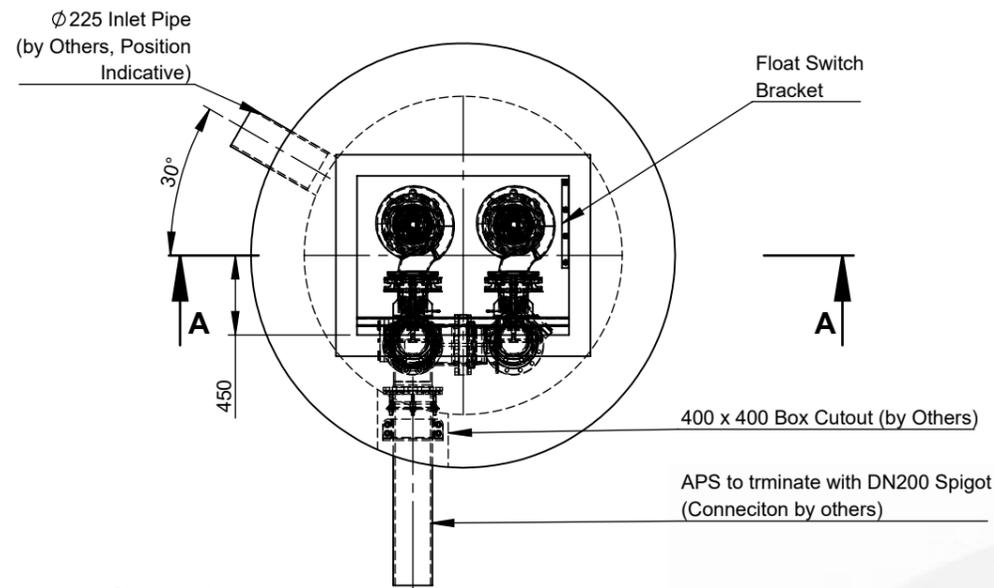
IMPORTANT NOTES:

Please check the drawing very carefully, and ensure any comments are clearly marked on the drawing or by reply to the approval e-mail. Once checked please **return signed & dated** in the top right hand corner on the drawing page.

Please note that the availability is from receipt of drawing approval/payment.

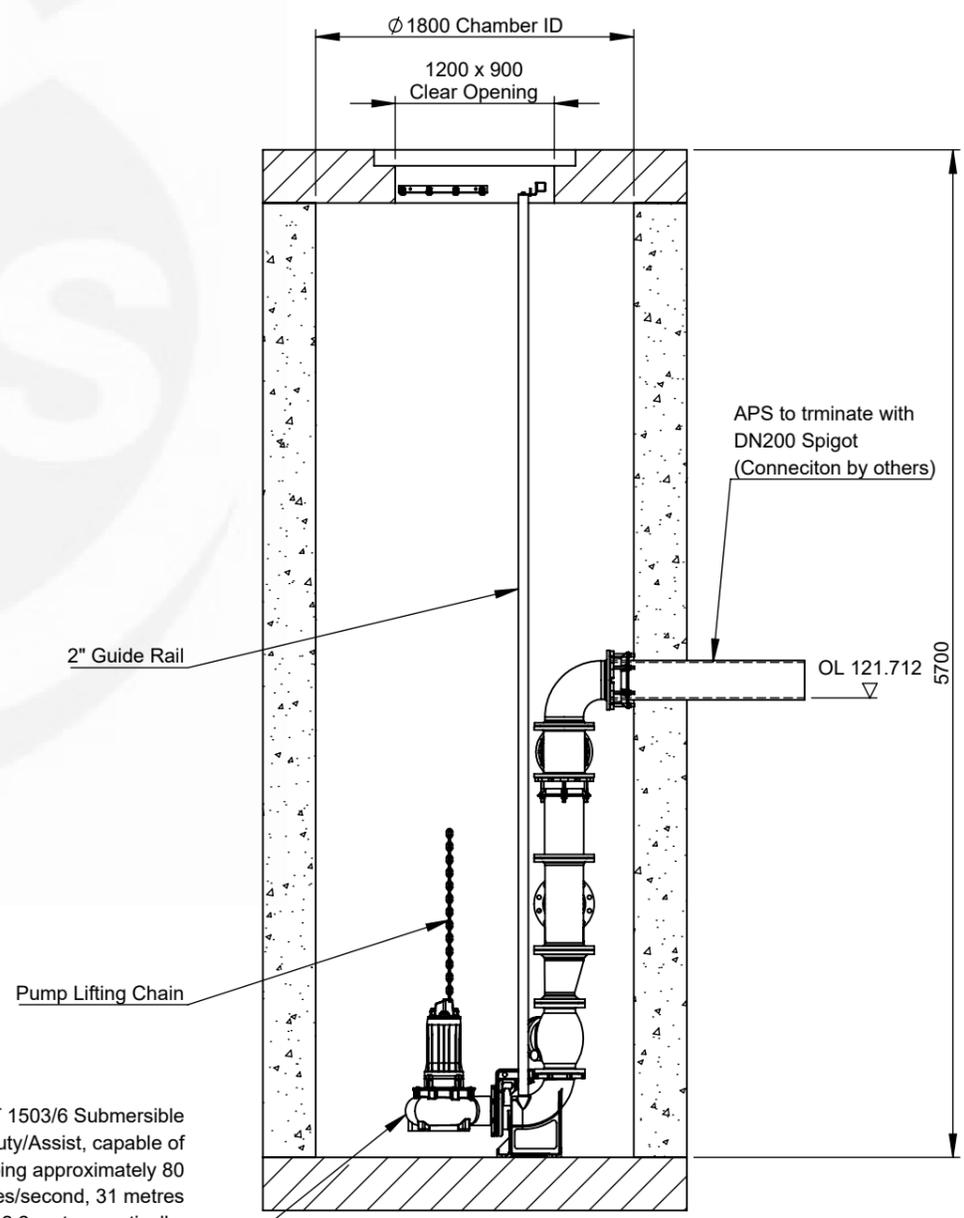
We have allowed for the provision of Site Specific Drawings for approval, in accordance with the information received to date.

All changes that have resulted in an impact on the project costs will be captured in a re-quote at the point of approval.



SECTION A-A

2No Javelin BT 1503/6 Submersible Pumps, Duty/Assist, capable of pumping approximately 80 litres/second, 31 metres horizontally, 2.2 metres vertically, 3.5kW, 400 volt, 3 phase, 20 metres cable per pump.



SECTION B-B

Approved by:

Date:	Signed:
-------	---------

Dimensions are subject to Dimensional Tolerances. If critical, check physically prior to installation. All Dimensions in mm unless stated otherwise.

The customer must check tank specification is compatible with ground water table level (in winter) and burial depth. Refer to burial depth graph. Pumpwell delivered with pumps not installed to avoid damage in transit. Read operating and installation guidelines before installing.

This drawing is confidential and must not be reproduced, copied or passed to a third party without the written permission from All Pump Solutions

Material Specification	
Bolts:	ZP
Pipework:	Ductile
Guide Rail:	GALV
Tank Specification:	Concrete
Laminate Specification:	N/A

Notes	
1.	Flow calculations based on 225mm OD MDPE SDR17 Rising Main
2.	Pump Chamber considered as zone 2 Non Hazardous Area

B	As-Built	22/05/23	ML
A	Drawing for Approval	19/01/23	ML
Issue:	Description:	Date:	Auth:



Tel: 01743465463
 Fax: 01743452050
 Email: sales@allpumpsolutions.com

all pump solutions
 FLUID EXPERTISE

Title: **APS Surface Water Package Pumping Station to be Install in an Existing Manhole.**

Contract: **Marine Assembly 3, Huddersfield**

Contractor: **AVIE Consulting Ltd**

Consulting Engineer: **Not Specified**

Works Order Number: **8891**

Size:	Scale:	Drawn:	Checked:	Approved:
A3	1:40	ML	CW	SM

Drawing Number: **EQ5386-152152-100** Date: **19/01/23**

Internal Reference: **EQ5386** Issue: **B**

Technical Specification

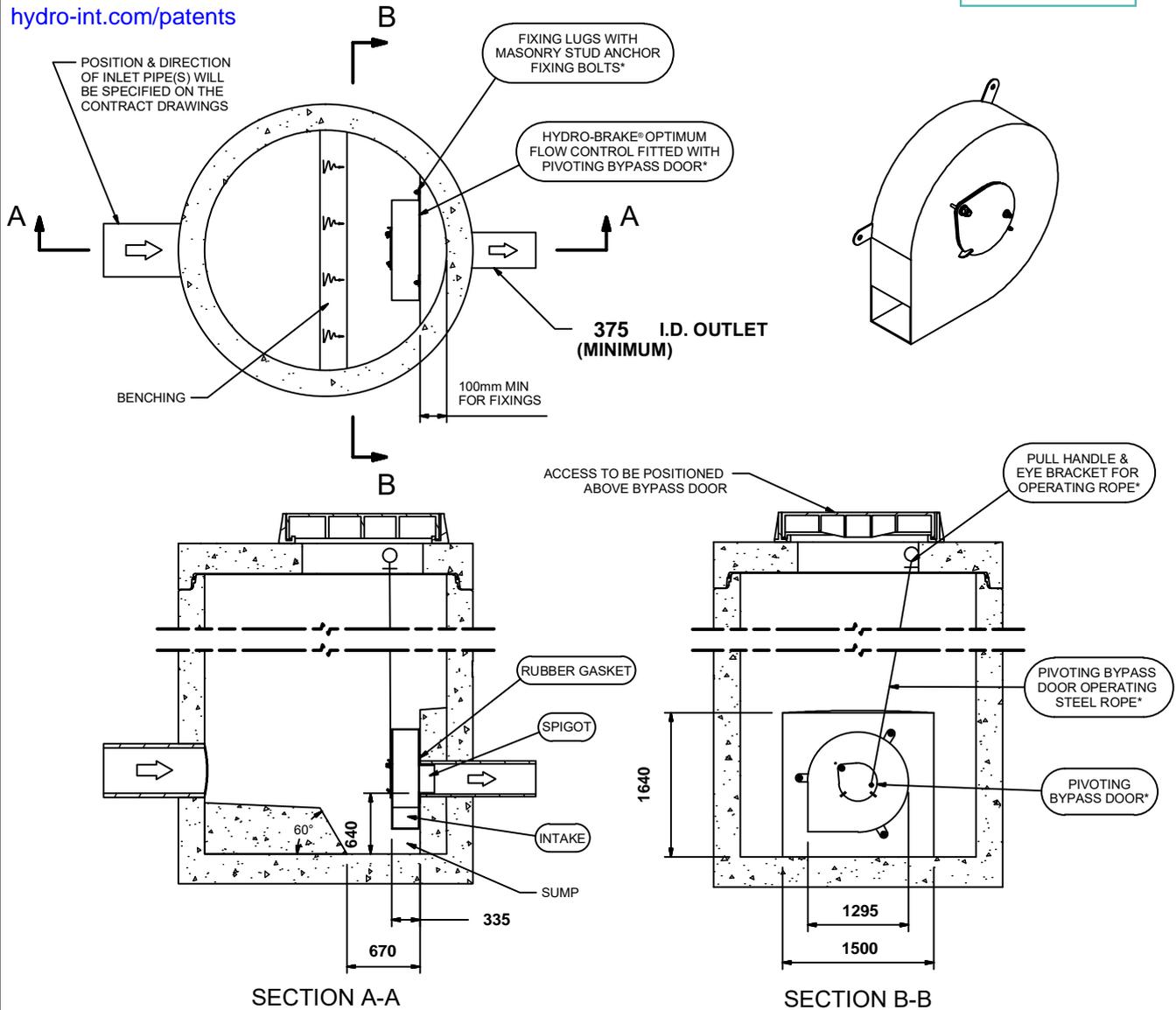
Control Point	Head (m)	Flow (l/s)
Primary Design	2.185	71.200
Flush-Flo™	0.675	71.200
Kick-Flo®	1.471	58.811
Mean Flow		61.142

Hydro-Brake® Optimum Flow Control including:

- 8 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 260 kg



hydro-int.com/patents



IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 * WHERE SUPPLIED
 HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0327-7120-2185-7120 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International

DATE 07/08/2023 08:55

SITE David Brown

DESIGNER jake curtis

REF P3748

SHE-0327-7120-2185-7120

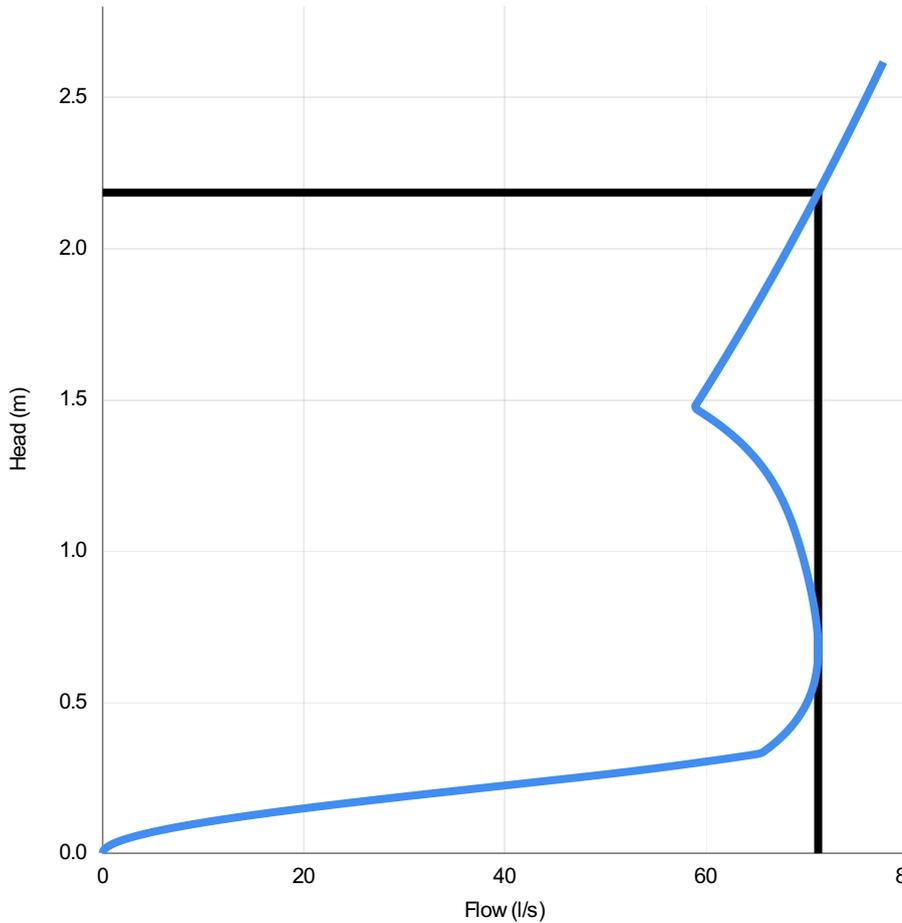
Hydro-Brake® Optimum

Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	2.185	71.200
Flush-Flo	0.675	71.200
Kick-Flo®	1.471	58.811
Mean Flow		61.142



hydro-int.com/patents



Head (m)	Flow (l/s)
0.000	0.000
0.075	5.678
0.151	20.556
0.226	40.532
0.301	59.617
0.377	67.295
0.452	69.285
0.527	70.463
0.603	71.045
0.678	71.200
0.753	71.057
0.829	70.716
0.904	70.245
0.979	69.675
1.055	68.995
1.130	68.154
1.206	67.057
1.281	65.572
1.356	63.533
1.432	60.757
1.507	59.494
1.582	60.911
1.658	62.294
1.733	63.645
1.808	64.967
1.884	66.261
1.959	67.529
2.034	68.772
2.110	69.993
2.185	71.191

DESIGN ADVICE

The head/flow characteristics of this SHE-0327-7120-2185-7120 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.



The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.



DATE	07/08/2023 08:55
Site	David Brown
DESIGNER	jake curtis
Ref	P3748

SHE-0327-7120-2185-7120
Hydro-Brake Optimum®