MEMO

TO:	Kerry Wynne	**DATE:**	22nd March 2023
FROM:	Justin Courtier/Phil Read	**PROJECT NO.:**	J000502
COPY:	Harrison Hitchins		
SUBJECT:	Further Responses to s92 Further Information Request – Ropata Village		

The following is in response to Hutt City Council's request for additional information received on the 8th of March:

Stormwater

"The response from awa lacks clarity with regard to the details and calculations, such that the engineers cannot confirm the modelling. Please provide pre and post flows, model data including a 12 hour nested storm and accompanying calculations."

- A design 100yr, 12 hour storm was created as per the 'Reference Guide for Design. Storm Hydrology' document. Please see attached spreadsheet with the time series information. Weighted curve number values for the site were 83.36 pre-development and 83.81 post-development.

- Pre and Post flows are as follows:
    - Pre-development peak flow = 108.45 L/s.
    - Post-development peak flow = 109.86 L/s.
- The two images below show the discharge curves over the storm duration. The first image shows the whole storm, where most of the graph is overlapping. The second shows a close up at the storms peak (8h).

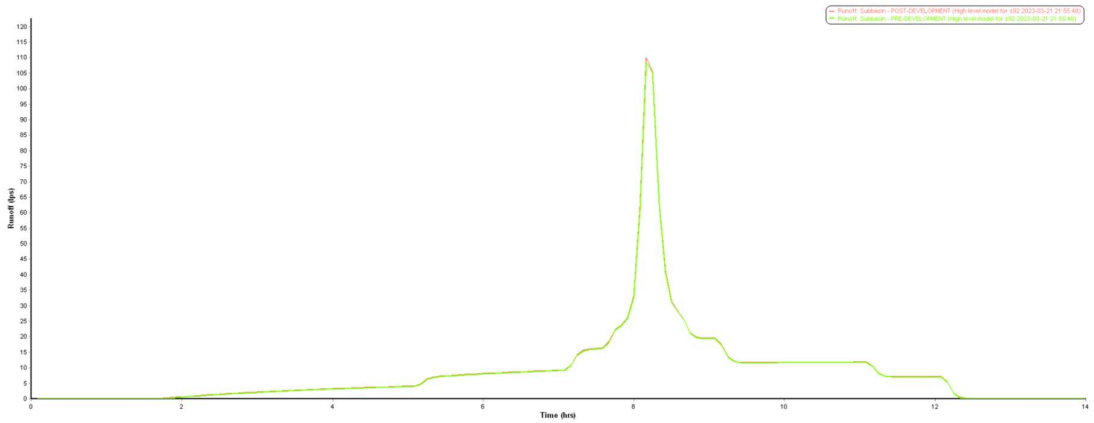

Figure 1: Time-series graph of full storm extent

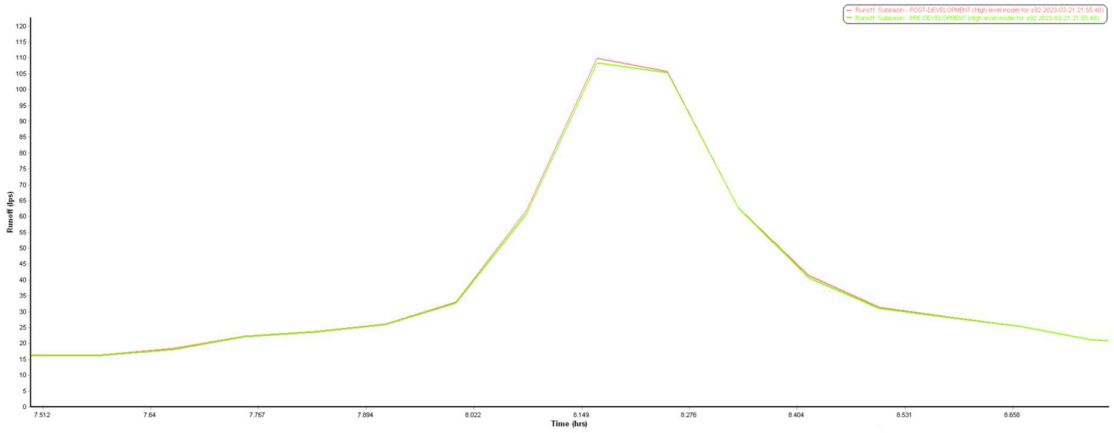

Figure 2: Time-series graph of storm event peak

"Please confirm the outlet invert level for the rain garden on the drainage plan. Please also confirm the level of the stormwater manhole to demonstrate the functionality of the rain garden"

- The level of proposed SWMH 05 (which the rain garden connects to) is at approximately RL 10.53m, with the required invert level of the rain garden inlet being RL 11.26m. This is based on the "Water Sensitive Design for Stormwater: Treatment Device Design Guideline – V1.1" document, a depth of at least 900mm is required, which based on the current design is not achievable at this location (730mm is available).
- Therefore, it has been decided that an appropriately sized Hynds Up-Flo filter will be located further downstream in the network to provide treatment, where more cover is available.
- Note that the Up-Flo filter has been sized such that it will also remove the need for the SPELBasin previously proposed to treat the carpark (refer below for further details).
- A bubble up system will be required in the upstream manhole (SWMH 02) to achieve the required inlet IL for the Up-Flo filter (10.6m). This means the lines upstream of SWMH02 will be charged, however the hydraulic grade line will remain below the minimum ground surface of RL 11.21m. This system is to be fully designed in the detailed design phase.

"Please provide further clarification with regard to the separate proprietary device which is required for the remaining road area stormwater treatment. The proposed device needs to be provided to council, including calculations of the functionality to confirm that the proposed method is fit for purpose."

- As stated above, the SPELBasin device has been deleted and replaced with the single Up-Flo device.
- The proposed Up-Flo filter has been sized based on The Up-Flo Filter Technical Guide (SW-11). Using Table 1 in this guide we have selected a 1.2m diameter chamber with 6 filters as this is sized for a 3600m^2 treatment area at a water quality flow rate of 10mm/hr. The required invert levels are shown on the attached Awa drawing (sheet No.6901).
- Please see the attached technical documentation for our proposed proprietary device (Hynds Up-Flo Filter). This includes a general arrangement drawing (T7511- GA) and a technical Guide (SW-11).

Wastewater

"Details regarding the proposed wastewater pump station replacement is needed to be submitted to council at this stage, to confirm that wastewater mitigation will be achieved. Please provide the appropriate details of the replacement station including plans where appropriate"

- Please see attached Awa Plan 6901, Awa sewer calculations and Aquate pump specification memo AQ1735.

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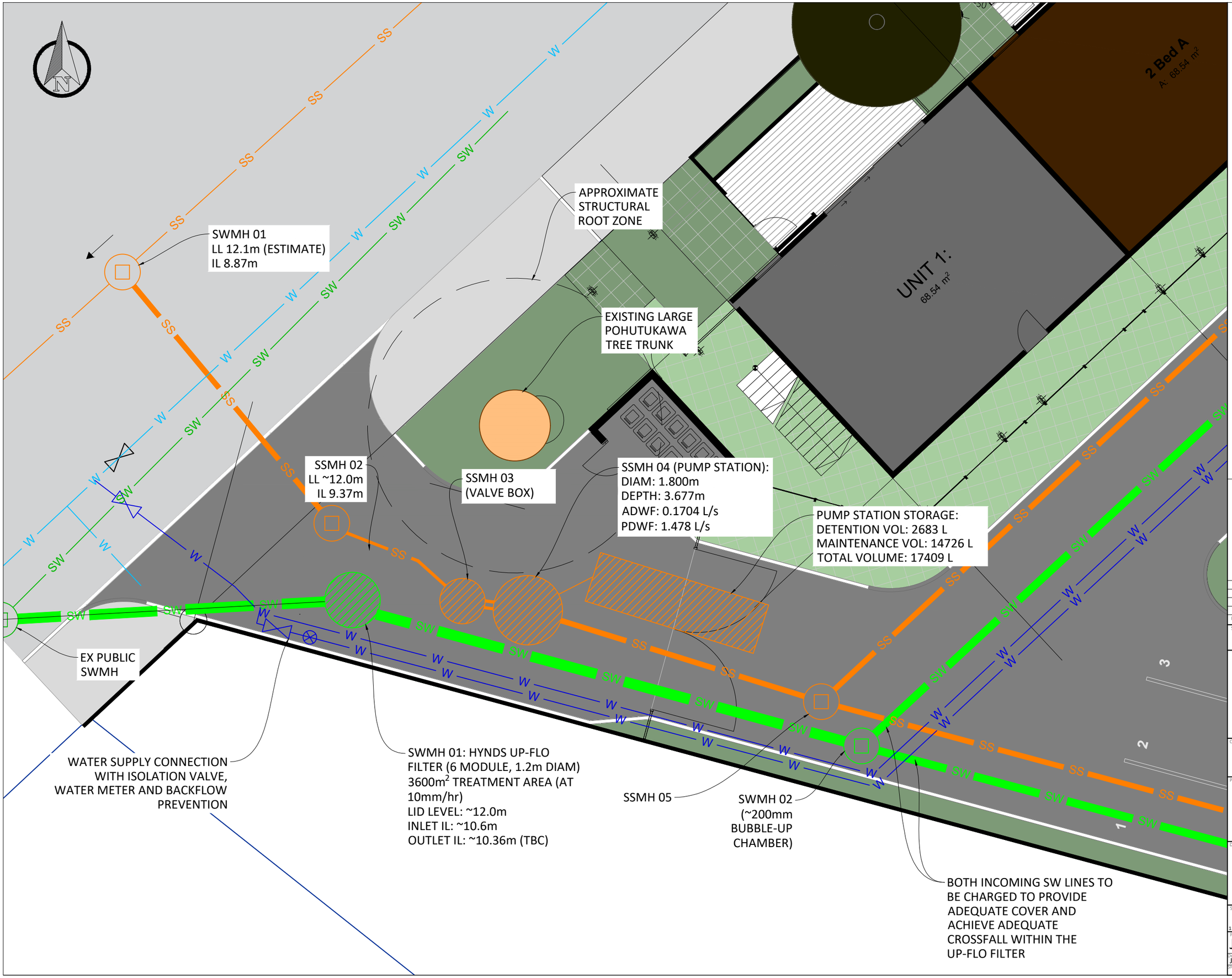

LEGEND:

PR. STORMWATER	SW
EX. STORMWATER	SW
PR. WASTEWATER	SS
EX. WASTEWATER	SS
PR. WATER SUPPLY	W
EX. WATER SUPPLY	W

NOTES:

1. REFER TO DRAWING SET AQ1735 FOR PUMP STATION, VALVE CHAMBER AND STORAGE TANK DETAILS

Rev.	Detail	App.	Date

Revisions

Status: RESOURCE CONSENT

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Client: WINDSOR MANAGEMENT

Project: ROPATA VILLAGE 758-764 HIGH STREET

Drawing Title: ENTRYWAY SERVICES LAYOUT PLAN

Scales: 0 1.5 3 Meters
1:50 @A1 1:100 @ A3

Project No.	Drawing No.
J000502	6901

Designed	Checked	Approved	Revision
JC SIGNED	PR SIGNED	PR SIGNED	-

Stormwater Hyetograph for Ropata Village - 23-02-08

ARI	100	
Duration (minutes)	Depth (mm)	
10	23.04	138.24
20	30.72	92.16
30	36.6	73.2
60	50.16	50.16
120	69.24	34.62
360	114.48	19.08
720	154.8	12.9

Start Time	End Time	Percentage of Rainfall Intersity		Rainfall depth (mm)	Cumulative Rainfall depth (mm)
0:00	0:05	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	0.56
0:05	0:10	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	1.12
0:10	0:15	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	1.68
0:15	0:20	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	2.24
0:20	0:25	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	2.80
0:25	0:30	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	3.36
0:30	0:35	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	3.92
0:35	0:40	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	4.48
0:40	0:45	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	5.04
0:45	0:50	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	5.60
0:50	0:55	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	6.16
0:55	1:00	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	6.72
1:00	1:05	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	7.28
1:05	1:10	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	7.84
1:10	1:15	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	8.40
1:15	1:20	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	8.96
1:20	1:25	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	9.52
1:25	1:30	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	10.08
1:30	1:35	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	10.64
1:35	1:40	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	11.20
1:40	1:45	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	11.76
1:45	1:50	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	12.32
1:50	1:55	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	12.88
1:55	2:00	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	13.44
2:00	2:05	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	14.00
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2:10	2:15	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	15.12
2:15	2:20	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	15.68
2:20	2:25	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	16.24
2:25	2:30	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	16.80
2:30	2:35	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	17.36
2:35	2:40	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	17.92
2:40	2:45	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	18.48
2:45	2:50	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	19.04
2:50	2:55	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	19.60
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3:00	3:05	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	20.72
3:05	3:10	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	21.28
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3:15	3:20	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	22.40
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3:35	3:40	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	24.64
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3:45	3:50	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	25.76
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3:55	4:00	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	26.88
4:00	4:05	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	27.44
4:05	4:10	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	28.00
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4:15	4:20	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	29.12
4:20	4:25	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	29.68
4:25	4:30	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	30.24
4:30	4:35	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	30.80
4:35	4:40	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	31.36
4:40	4:45	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	31.92
4:45	4:50	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	32.48
4:50	4:55	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	33.04
4:55	5:00	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	33.60
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7:00	7:05	1/12 of 2h Intensity less 1h Intensity (0.083)	0.083	1.5900	57.81
7:05	7:10	1/12 of 2h Intensity less 1h Intensity (0.083)	0.083	1.5900	59.40
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7:15	7:20	1/12 of 2h Intensity less 1h Intensity (0.083)	0.083	1.5900	62.58
7:20	7:25	1/12 of 2h Intensity less 1h Intensity (0.083)	0.083	1.5900	64.17
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7:35	7:40	1/6 of 1h Intensity less 30m Intensity (0.167)	0.167	2.2600	70.28
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8:10	8:15	1/2 of 30m Intensity less 20m Intensity (0.5)	0.5	2.9400	109.14
8:15	8:20	1/6 of 1h Intensity less 30m Intensity (0.167)	0.167	2.2600	111.40
8:20	8:25	1/6 of 1h Intensity less 30m Intensity (0.167)	0.167	2.2600	113.66
8:25	8:30	1/6 of 1h Intensity less 30m Intensity (0.167)	0.167	2.2600	115.92
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9:05	9:10	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	127.35
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9:15	9:20	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	129.23
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9:30	9:35	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	132.06
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10:10	10:15	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	139.60
10:15	10:20	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	140.54
10:20	10:25	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	141.48
10:25	10:30	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	142.43
10:30	10:35	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	143.37
10:35	10:40	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	144.31
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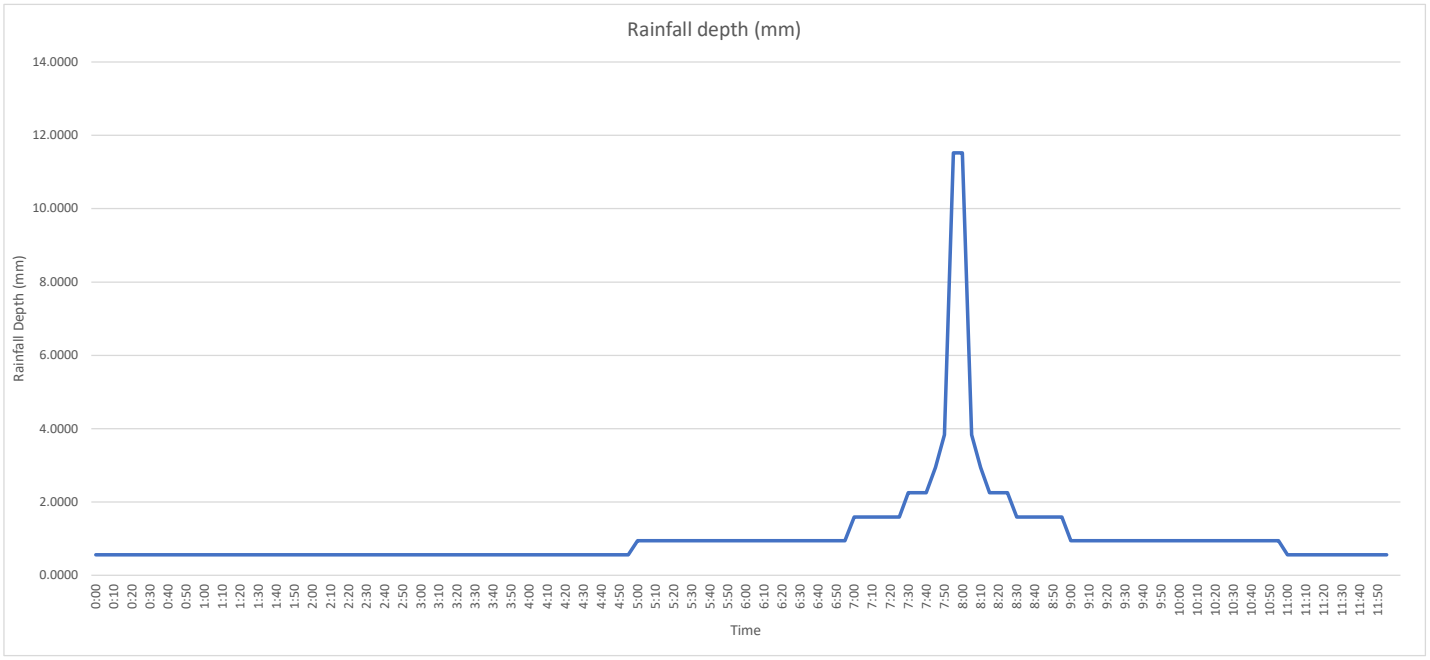
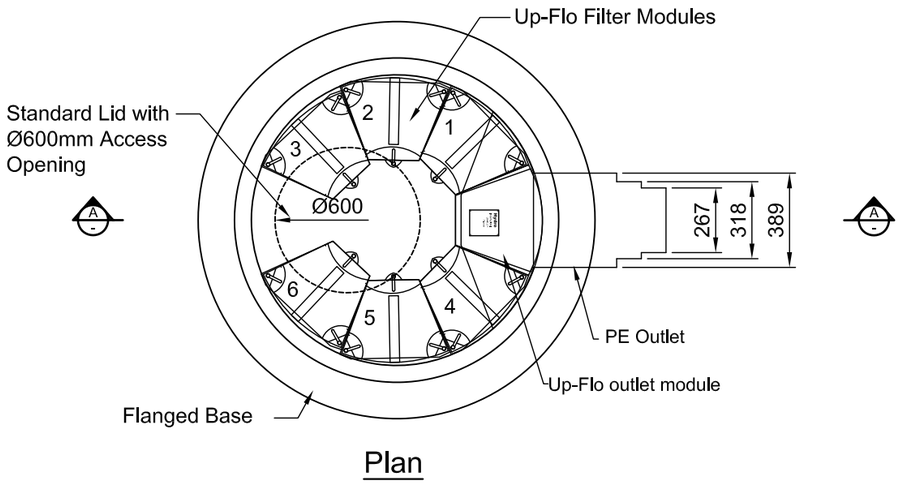
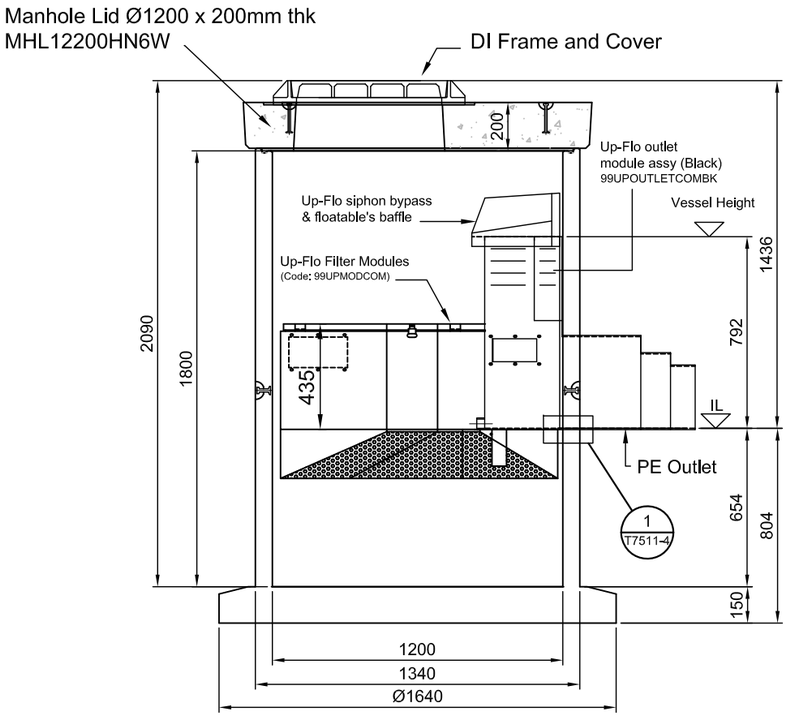
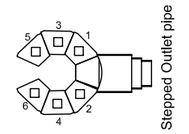
10:45	10:50	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	146.20
10:50	10:55	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	147.14
10:55	11:00	1/48 of 6h Intensity less 2h Intensity (0.021)	0.021	0.9425	148.08
11:00	11:05	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	148.64
11:05	11:10	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	149.20
11:10	11:15	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	149.76
11:15	11:20	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	150.32
11:20	11:25	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	150.88
11:25	11:30	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	151.44
11:30	11:35	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	152.00
11:35	11:40	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	152.56
11:40	11:45	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	153.12
11:45	11:50	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	153.68
11:50	11:55	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	154.24
11:55	12:00	1/72 of 12h Intensity less 6h Intensity (0.014)	0.014	0.5600	154.80


Rainfall depth (mm)
Rainfall Depth (mm)
14.0000
12.0000
10.0000
8.0000
6.0000
4.0000
2.0000
0.0000
Time



Plan



ITEM	DESCRIPTION - MATERIAL	CODE	UNIT WEIGHT (T)	
1	Ø1200mm FB Up-Flo Filter			
☐	with 1 module	UP-FLO.1KIT	2.040	
☐	with 2 modules	UP-FLO.2KIT	2.052	
☐	with 3 modules	UP-FLO.3KIT	2.065	
☐	with 4 modules	UP-FLO.4KIT	2.076	
☐	with 5 modules	UP-FLO.5KIT	2.088	
☐	with 6 modules	UP-FLO.6KIT	2.100	LOCATION INDICATOR
	Stepped (BK) OUTLET (O/D's 267mm, 318mm & 389mm)			
2	MH Lid Ø1200 200Hmm Ø605 Hole	MHL12200HN6W	0.509	☑
3	Ductile Iron Cover & Frame Ø600mm	DIMIMCFHS	0.058	☑

* PLEASE TICK THE NUMBER OF MODULES REQUIRED.

* STANDARD MODULE LOCATIONS ARE INDICTED ABOVE IF THE LOCATION OF THE MODULES IS IMPORTANT, PLEASE USE THE ABOVE LOCATION INDICATOR TO SELECT YOUR PREFERENCE.

NOTE:

1. The Up-Flo Filter can contain 1 to 6 modules. The invert level of optional inlet/s can be a minimum of 240mm above the invert level of the outlet pipe. Inlet pipework is installed by the contractor on site.
2. The standard PE outlet pipe provides the following optional outside diameters: 389mm / 318mm / 267mm. The contractor simply trims the outlet back to the size required.
3. Some dimensions could change to accommodate a site constraint situation. Please contact Hynds for technical assistance.
4. The orientation and elevation of the inlet pipe can be adjusted to suit site requirements. Refer to the site plan for orientation.
5. If the outlet invert depth to the ground level is >1436mm, the contractor will need to provide an appropriate riser to suit the on-site requirements.
6. The unit includes an 1200Ø x 1800mmH flanged based manhole chamber, Concrete Lid and a 600Ø ductile iron cover & frame.
7. If the Up-Flo is installed in an offline configuration and is connecting to a weir chamber - please note that the weir panel height within the weir chamber must match the height of the UpFlo outlet "Vessel Height" as shown on drawing. Height between invert of outlet stub to Vessel Height is 792mm

I AUTHORISE **HYNDS PIPES SYSTEMS LTD** TO PROCEED WITH THE MANUFACTURING OF THIS PRODUCT SPECIAL AS DETAILED ABOVE.
I ACKNOWLEDGE THAT ANY SPECIALS, ONCE MANUFACTURED, ARE DEEMED TO BE MY (CUSTOMERS) PROPERTY & ARE NON REFUNDABLE. PLEASE NOTE COSTS ARISING FROM CHANGES REQUESTED AFTER SIGNING THIS DRAWING WILL BE BORNE BY THE CUSTOMER.

NAME :- ..... SIGNATURE :- .....

DATE :- .....

NOTES:

1. HD60 Traffic loading
2. Consult Engineer where exposure classification C or U is required (Saltwater Tidal/Splash Zone or other aggressive environment).

MATERIALS	
VOL (m^3/unit) =	
WT (ton/unit) =	Refer Table
CODE =	Refer Table

REVISIONS

REV #:	REVISION DESCRIPTION:	DATE:	DRAWN:
1	Issued For Construction	16 Dec 2019	GH
2	Lid Notes updated	10 Feb 2023	GH
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----	----	----	----
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PO Box 58142, Botany, Auckland, 2163
Tel: 09-274 0316
Fax: 09-272 7485
email: technicalservices@hynds.co.nz

ISO 9001 CERTIFIED MANAGEMENT SYSTEM

PROJECT DESCRIPTION:
Hynds Stormwater
-
Up-Flo 1-6 Moudule
Standard Drawing

SERVICE DETAIL:
Up-Flo Filter Ø1200x1800 (PDEP)
1 to 6 Modules
FB1200x1800mm
General Arrangement

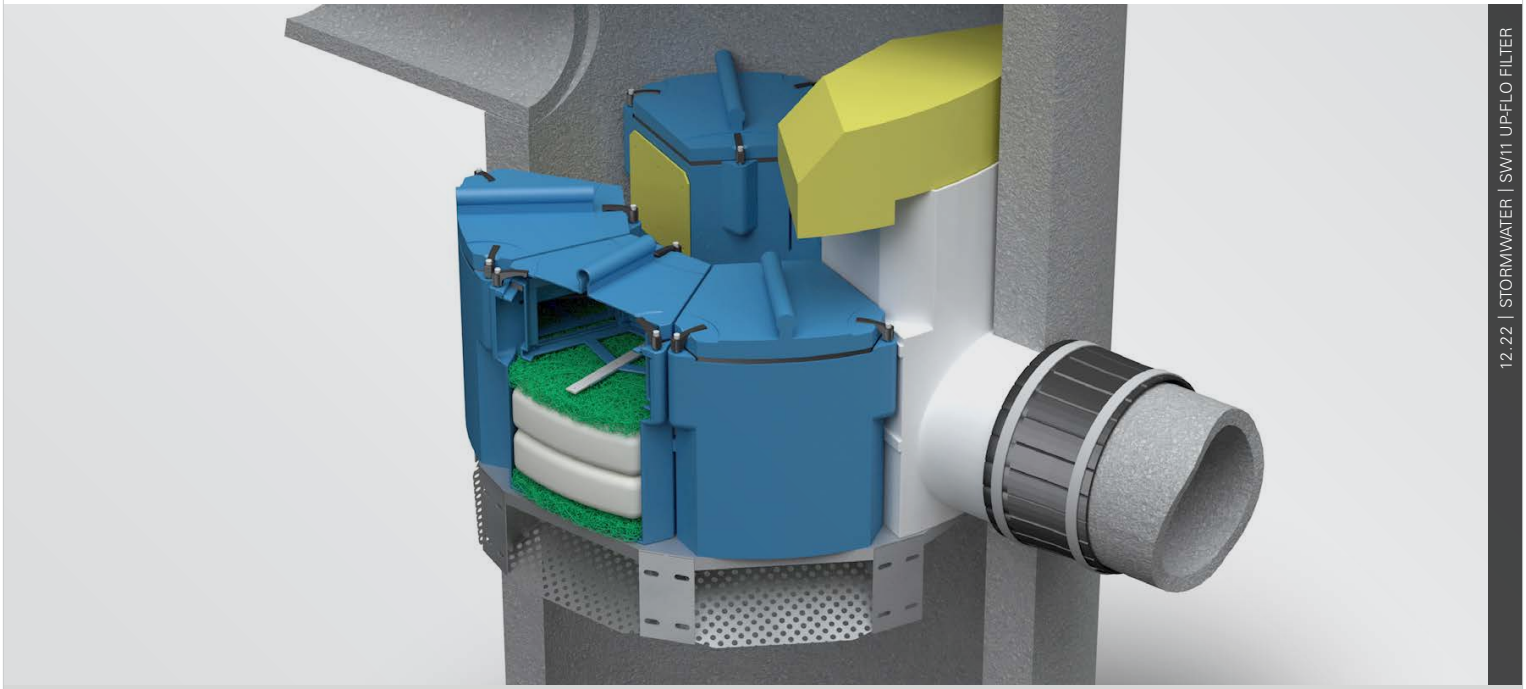
REFERENCE/QUOTE NUMBER:	25948	
DRAWN: GH SIGNATURE:	DESIGN: GH SIGNATURE:	CHECKED: ZS SIGNATURE:
SCALE: N.T.S PAPER SIZE: A3	Note: Do not scale drawing if in doubt **ASK!!!**	DATE: 2-Mar-21
DRAWING NUMBER: T7511 GA	SHEET NUMBER: GA of --	REVISION NUMBER: 2

The Up-Flo® Filter

(Stormwater Treatment)

Technical Guide SW 11

This technical guide is designed for Land Developers, Civil Engineering Consultants, Councils and Installers to assist in the understanding of the Up-Flo® stormwater filter. This includes key design attributes, indicative sizing, hydraulic requirements, and FAQ's



Applications

- Small commercial carparks
- Large industrial hardstand areas
- Residential sub-divisions
- Municipal roadways
- Retrofit into existing urban catchments
- Upstream of wetland or river discharge

Product Attributes

- Designed to remove 90% TSS with a mean particle size of 20 microns
- Small footprint to maximise land use
- Simple and cost-effective maintenance
- In-line or off-line configurations
- Internally bypasses storms

Approvals/Standards

- Auckland Council Approval for Private & Public sites (PDEP)
- Christchurch City Council Approved Private & Public treatment device
- New Jersey Department of Environmental Protection, NJCAT Program
- ARC TP10 approval for removal of greater than 75 percent TSS

We are the supply partner of choice for New Zealand's stormwater management and treatment solutions.

HYNDS STORMWATER

The Up-Flo® Filter is a stormwater remedial device that incorporates gravitational separation and absorption of fine sediment, nutrients, heavy metals, oils & organics. It offers pre-screening and upward flow path filtration of polluted stormwater to achieve treatment train capabilities in a standalone small footprint device. Each Up-Flo® device consists of a highly configurable array of modules that are supplied as a complete system generally encased in a concrete manhole.

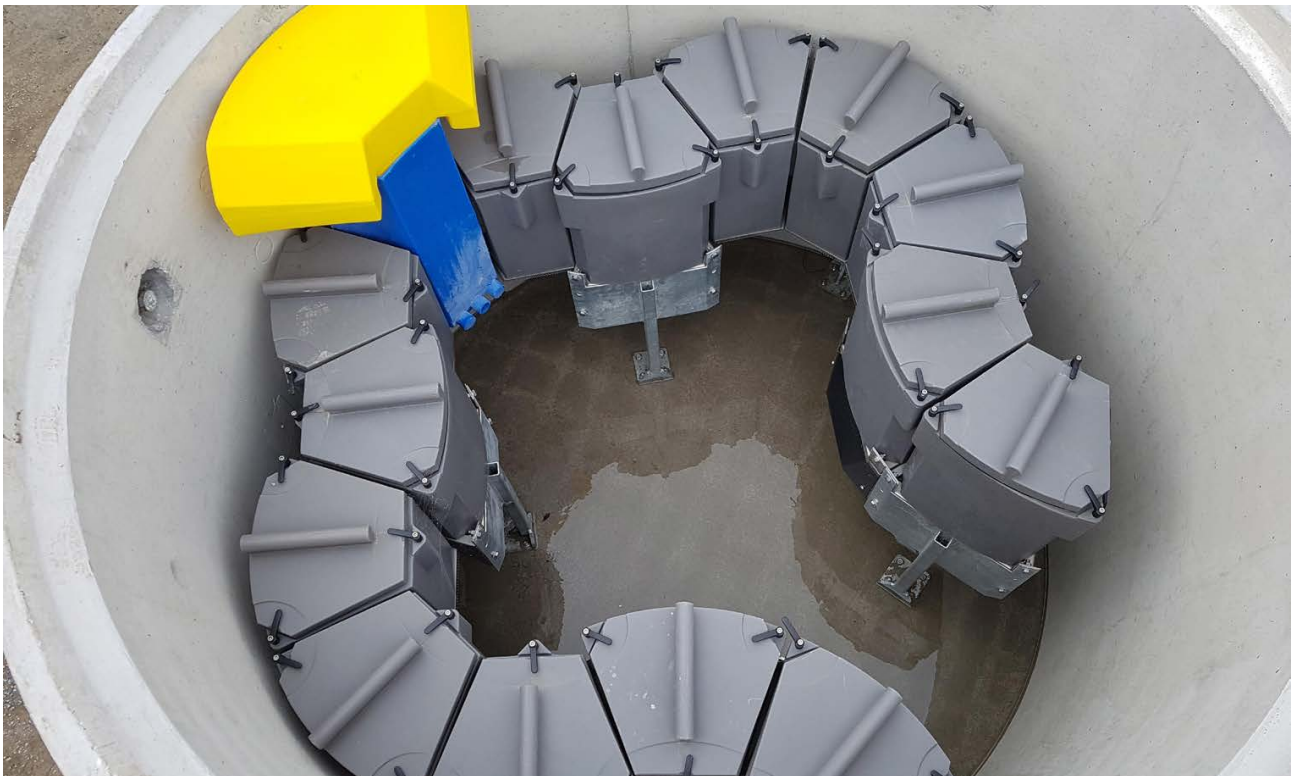


FIG. 1 14 module Up-Flo inside 2.3m dia manhole delivered to site and ready to operate. No assembly required.

Up-Flo Filter Components

- The Up-Flo® Filter has no moving parts and requires no external power.
- The internal components consist of the following:
  - Angled stainless steel screens
  - Filter modules
  - Bypass Siphon with a floatables baffle
  - Outlet module with a drain down port
- The filter module houses the media pack which consists of two filter media bags and two layers of flow distributing media comprising:
  - **C** arbon (granular activated) for filtration
  - **P** eat (organic, loose, not palletised) for absorption)
  - **Z** eolite (aluminosilicate mineral) for dissolved metals & some Nutrients

Design and Sizing

The Up-Flo® Filter is sized for either a specified catchment area, or a design flow rate to meet a water quality flow (WQF). Each individual filter module has a WQF of up to 1.58 L/s to meet the manufacturer's performance and design requirements (ref: NJCAT, US 2015).

Multiple versions of the Up-Flo Filter can be supplied depending on the available driving head and outlet Depth to Invert (DTI). Please email our nationwide Hynds stormwater Engineering team at ***hswsupport@hynds.co.nz*** and they will complete this task for you.

Due to the reduced head of the shallow outlet design (and subsequently lower flow rate); more filter modules are required to treat the equivalent area. The following tables are for indicative use only to represent approximate catchment areas that can be treated based on number of Up-Flo modules.

TABLE 1 **Auckland Council PDEP Approved Standard Design**
1-6 modules (drawing T7511) 7-10 modules (drawing T7495)

Hynds Sales Code	Manhole dia (m)	Outlet DTI (m)	Total Headloss (mm)	Max WQF (L/s)	Max carpark area based on 10mm/hr rainfall intensity (m2)
UP-FLO.1CKIT	Ø1.2	1.44	792	1.58	599
UP-FLO.2CKIT	Ø1.2	1.44	792	3.16	1197
UP-FLO.3CKIT	Ø1.2	1.44	792	4.74	1796
UP-FLO.4CKIT	Ø1.2	1.44	792	6.32	2395
UP-FLO.5CKIT	Ø1.2	1.44	792	7.9	2994
UP-FLO.6CKIT	Ø1.2	1.44	792	9.48	3592
UP-FLO.7CKIT	Ø1.8	1.59	842	11.06	4191
UP-FLO.8CKIT	Ø1.8	1.59	842	12.64	4790
UP-FLO.9CKIT	Ø2.0	1.59	842	14.22	5389
UP-FLO.10CKIT	Ø2.0	1.59	842	15.8	5987

TABLE 2 **Christchurch City Council Approved Standard Design**
1-6 modules (drawing E1000) 7-10 modules (drawing E1001)

Hynds Sales Code	Manhole dia (m)	Outlet DTI (m)	Total Headloss (mm)	Max WQF (L/s)	Max carpark area based on 5mm/hr rainfall intensity (m^2)
UP-FLO.1KIT	Ø1.2	1.44	792	1.58	1197
UP-FLO.2KIT	Ø1.2	1.44	792	3.16	2395
UP-FLO.3KIT	Ø1.2	1.44	792	4.74	3592
UP-FLO.4KIT	Ø1.2	1.44	792	6.32	4790
UP-FLO.5KIT	Ø1.2	1.44	792	7.9	5987
UP-FLO.6KIT	Ø1.2	1.44	792	9.48	7185
UP-FLO.7KIT	Ø1.8	1.59	842	11.06	8382
UP-FLO.8KIT	Ø1.8	1.59	842	12.64	9580
UP-FLO.9KIT	Ø1.8	1.59	842	14.22	10777
UP-FLO.10KIT	Ø1.8	1.59	842	15.8	11975

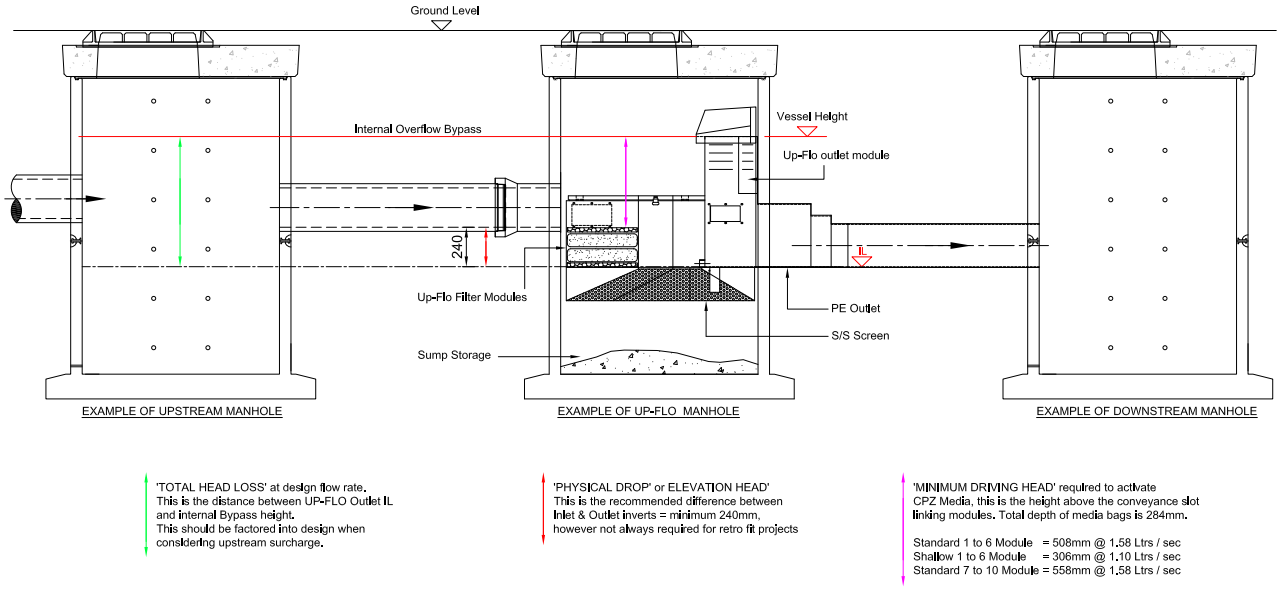
TABLE 3 **Low Driving Head Shallow Outlet Design (Drawing E1122)**

Hynds Sales Code	Manhole dia (m)	Outlet DTI (m)	Total Headloss (mm)	Max WQF (L/s)	Max carpark area based on 10mm/hr rainfall intensity (m2)	Max carpark area based on 5mm/hr rainfall intensity (m2)
UP-FLO.1SKIT	Ø1.2	1.0	500	0.55	209	417
UP-FLO.2SKIT	Ø1.2	1.0	500	1.20	455	910
UP-FLO.3SKIT	Ø1.2	1.0	500	2.10	796	1592
UP-FLO.4SKIT	Ø1.2	1.0	500	2.65	1005	2009
UP-FLO.5SKIT	Ø1.2	1.0	500	3.30	1251	2502
UP-FLO.6SKIT	Ø1.2	1.0	500	4.20	1592	3185

NOTES:

- *Rainfall intensities of 5mm/hr and 10mm/hr as provided by Auckland, Wellington and Christchurch City Councils*
- *Carpark area based only on runoff coefficient value (c value) of asphalt = 0.95*
- *Calculations above based on accepted rational method equation as an indication of stormwater runoff*
- *These carpark areas are indicative only, Hynds is not liable for any sizing without supplying a formal Hynds calc sheet*
- *To size Up-Flo's for areas outside of Auckland and Christchurch please email* ***hswsupport@hynds.co.nz***
- *Larger Up-Flo standard designs for 10 modules + are available upon request*
- *North Island Up-Flo's supplied in Pinnacle Cast Manholes ex Pokeno*
- *South Island Up-Flo's supplied in Hyspec Spun Manholes ex Hornby*

Example of typical Up-Flo Filter Long Section Whilst Operating



Hydraulic Parameters

- Total head loss = upstream surcharge height above outlet invert during max WQF
- Internal bypass height = Total head loss
- Multiple inlet pipes = Yes
- Maximum online bypass flow rate = 115.0L/s
- Recommended 'hydraulic drop' between inlet and outlet = 240mm*

Please contact Hynds stormwater Engineering team to discuss alternative arrangements as this is not always required.

Engineered for Performance

- Longer filter runs
- Higher flow capacities
- Resistant to clogging
- 'Self-cleans' during drain-down period
- Media is not submerged between events
- Media does not re-release captured materials

Maintenance & Safety-led Design

- The ONLY filter with lightweight media bags for easy removal and maintenance
- The Up-Flo takes less time to replace the media when compared with floor mounted cartridge filters
- Removal of filter bags does not require any lifting apparatus
- Refer to quick reference maintenance guide

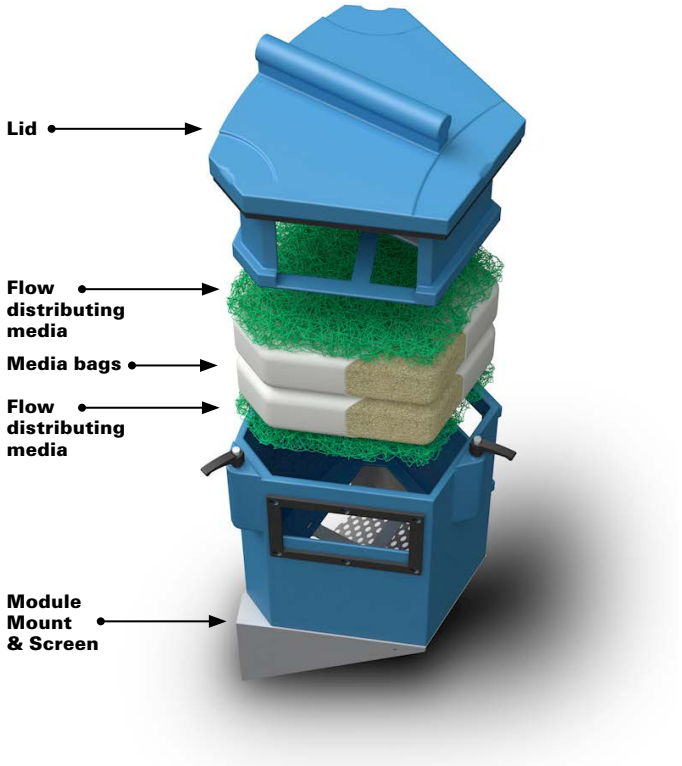


FIG. 2 Up-Flo® Filter Media Filter Module

How it Works

The Up-Flo® Filter comprises a three stage treatment train designed to achieve a high level of stormwater treatment. Coarse sediments are removed through settling. Gross pollutants are captured through screening, and fine particles are trapped through filtration. The function of the Up-Flo® Filter through each stage of a typical storm event is explained below.

- Treatment

During a rain event, stormwater runoff enters the chamber via an inlet pipe or overhead grate. Gross pollutants and sediment settle out in the sump. As water fills the chamber, flow is directed upwards through the angled screen into the filter module. Flow is evenly distributed across the media for maximum contact and treatment. Treated flow exits the filter module via a conveyance channel to a common outlet module.

- Siphonic Bypass

Flows in excess of the designed filtration capacity are discharged directly to the outlet using a siphonic bypass. The siphonic bypass also acts as a baffle, which prevents the escape of oils, grease, and buoyant pollutants.

- Drain-down

In traditional stormwater filters, the treatment media is often continuously submerged in water which may cause the media conditions to change resulting in anaerobic bacterial growth, degradation of the filter media, and the release of harmful leachates. The Up-Flo® Filter has a patented drain-down system to ensure the filter media is not submerged between storm events. As a storm subsides, filtered water drains out of the chamber through the drain-down port at the base of the outlet module. The reverse gravity flow backwashes filter media, ensuring continued high flow rate and removal efficiencies over the duty life of the filter module (between maintenance cycles).

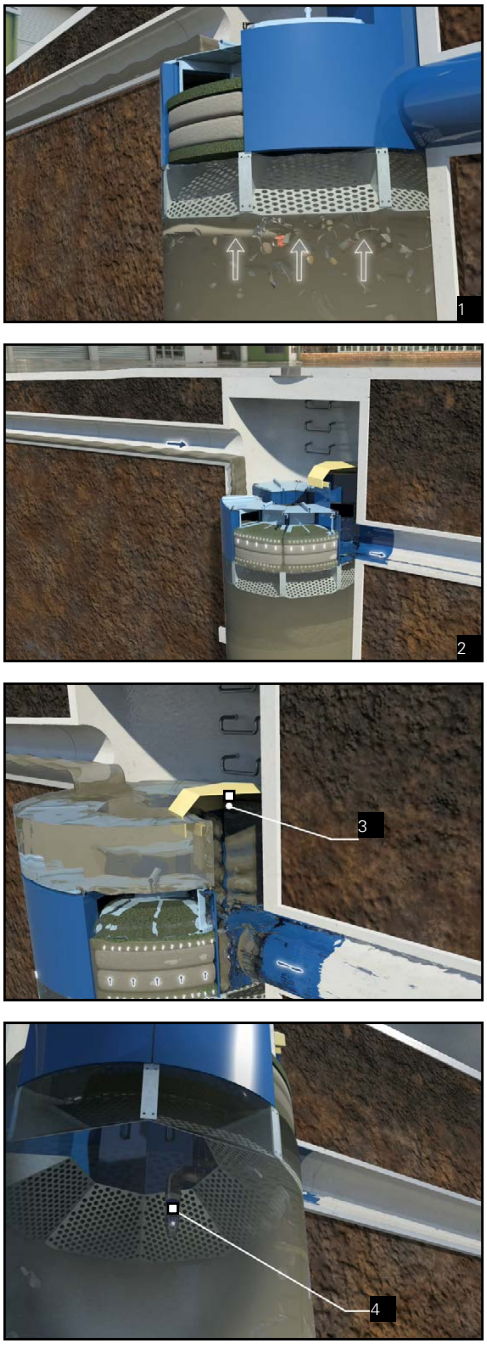


FIG. 3 Key functional stages of an Up-Flo® Filter in operation

Indicative Pollutant Removal Guide

The graph on the right indicates removal ranges based on ***Hydro International Up-Flo® Filter with CPZ™ Media Verification Statement***.

Verification is based on existing performance test data from two different locations with different rainfall characteristics, catchment areas and pollutant loadings. Supporting data were obtained from three independent performance monitoring studies.

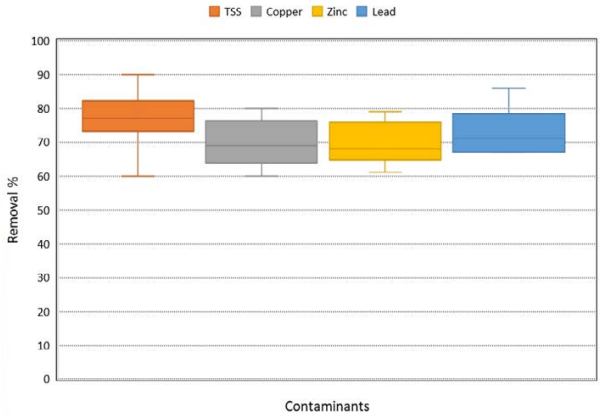


FIG. 4 Box and whisker graph depicting pollutant removal efficiency of the Up-Flo® Filter

Lifting and Handling

All Up-Flo® Filters incorporate Swiftlift lifting anchors for safe lifting and must be used with the correct lifting clutch.

Hynds Pipe Systems has designed and manufactured the Up-Flo® Filter with a minimum dynamic factor of 1.2. This dynamic factor requires that all the following conditions are observed when lifting, moving or placing the units:

1. Lifting with mobile plant *(such as an excavator or similar)* where equipment is specifically exempt from the requirements of the PECPR Regulations 1999, subject to the conditions outlined in the New Zealand Gazette, No. 104, September 2015 and
2. Lifting, travelling and placing over rough or uneven ground where anchor failure is not anticipated to cause harm or injury, by adopting procedures such as:
   a. Transporting the element as close as practical to ground level (300mm recommended)
   b. Establishing and maintaining exclusion zones
   c. Transporting only precast concrete elements that are unlikely to topple if they were to hit the ground
   d. Inspecting lifting anchors both after transportation and before final lifting into place

Refer to "Safe work with precast concrete - Handling, transportation and erection of precast concrete elements" published by Worksafe New Zealand (October 2018)

Shock loads resulting from travelling with suspended Up-Flo® over rough terrain and uneven ground may exceed design, dynamic and safety factors of the lifting systems. It is essential that care is taken during lifting and transporting as additional stresses could result in anchor failure.

FIG. 5 18 module Up-Flo inside a 3.0m dia manhole treating a 6,500m2 carpark at Featherston Railway station. Credit SDCL for image.

Frequently Asked Questions

How will the Up-Flo manhole arrive to site?

The Up-Flo manhole should be treated like any other manhole. Manhole installation depth is governed by outlet DTI. The Up-Flo will arrive ready to operate with the filter bags pre-installed. The concrete lid and cast iron cover will be placed on the truck separately.

If excessive fine sediment/clay is present in runoff during construction, or if the site is expected to be unsealed for a prolonged period of time; it is advised to avoid filtering through the Up-Flo. Alternatively, the CPZ filter bags can easily be removed from the modules by the Installer and kept clean and secure until the surface is sealed.

How is the outlet connection achieved?

The Up-Flo's has a stepped PE outlet with three possible diameters (267mm, 318mm and 389mm). It is designed to be cut back to the closest pipe diameter. Recommended connection options include ***Flexseal Shear Band Pipe Couplers (Hynds Technical Guide D10.4)*** for concrete & PE pipes, and/or level invert reducers for PVC pipes. Please discuss with your closest Hynds branch.

Can the Up-Flo accept multiple inlet pipes?

Yes, please follow ***CPAA guidelines*** in relation to manhole spacing requirements of inlet pipe penetrations. For Up-Flo's with 2-6 modules and multiple inlets it is recommended to ensure pipes enter above the grey filter modules (435mm above outlet IL) to prevent obstruction to flow path. Alternatively, ensure the Up-Flo is manufactured with modules positioned accordingly to suit pipe orientations during order process by Contractor.

What is the total head loss of the Up-Flo?

Depends on the number of filter modules. The total head loss is the height from the outlet invert to the underside of the bypass baffle, please refer to relevant drawing.

Does the inlet have to be 240mm higher than the outlet?

No, it is not compulsory. The inlet pipe can match the same invert with the outlet pipe if available head allows. The preference is for the inlet pipe to be installed above 240mm to reduce the volume of stormwater untreated during the drain down process after the rain event.

Does the Up-Flo filter need to be commissioned?

No. Because the CPZ filter bags, matala screens and drain down valve is pre-installed there is no need for commissioning by any agent. The Up-Flo filter is designed to treat hardstand runoff only, post construction phase. If the Up-Flo is subject to prolonged construction phase sediment runoff (fine clays etc) filter performance is likely to be compromised. It is the Installers responsibility to ensure this does not happen, not Hynds.

How often do the filter bags need to be replaced?

The acceptable industry standard is every 12-18 months with a 3-6 monthly visual inspection. For heavily trafficked commercial & industrial sites 6 monthly filter bag replacement should be considered as best practice.

What is the maximum online flow rate?

The yellow internal bypass hood is designed to convey up to 115.0L/s. For any storm flows approaching this figure it is recommended the Up-Flo is positioned offline with an upstream weir diversion.

Branches Nationwide *Support Office & Technical Services 0800 93 7473*

Aquate Pump Stations

Technical Specifications

Ropata Village, Lower Hutt - Pump Station

www.aquate.co.nz

Foreward

This installation manual is a guide only. All relevent Health and Safety laws and codes of construction must be adhered too and take precedence over any information in this manual. Installers must practice good professional practice and are required to understand all National and Local regulations in respect to the installation of drainage materials.

Contents

1 Technical Specifications 3
1.1 Storage Chamber 3
1.2 Pumps/Pump Performance 4
2 Design Information 4
3 Venting 5
4 Pipework, Valves and Fittings 6
5 Pump Operational Design 6
5.1 Timed Pump Operation ..... **Error! Bookmark not defined.**
5.2 Pump Operating Levels 6
5.3 System Alarms 6
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6 Electrical & Controls 7
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10.1 Six monthly 11
10.2 Annually 12
10.3 Maintenance requirements 12
10.4 Maintenance Replacement Work 12

APPENDICES

General Arrangement Drawing – Plan

General Arrangement Drawing – Section

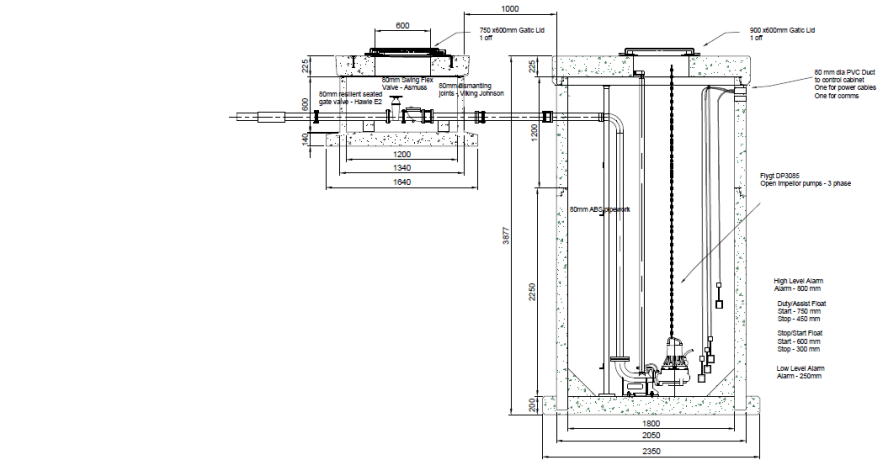
Flygt DP3085 Specifications

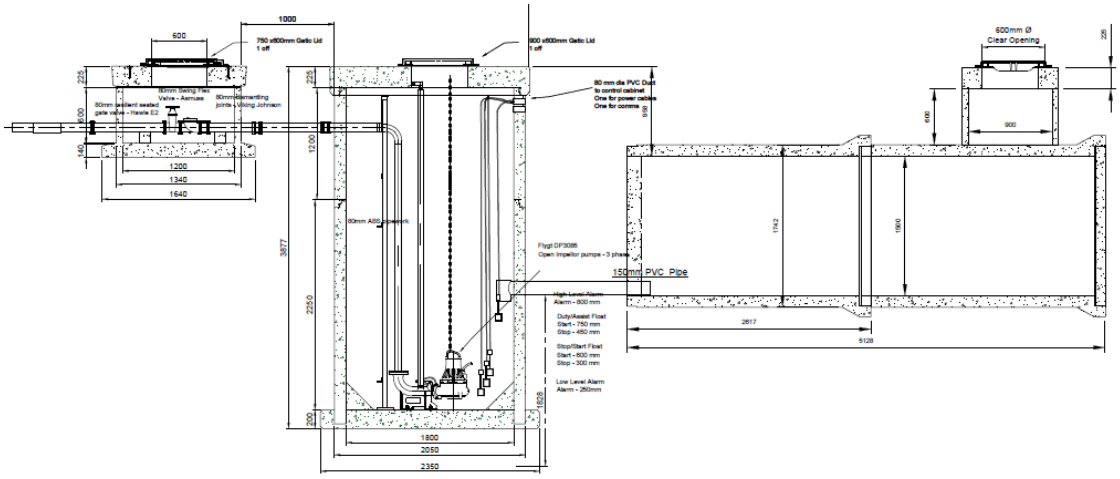
GATIC lid specifications

1 Technical Specifications

1.1 Storage Chamber

Tank Volume:	8.8 m^3
Storage tank vol:	12.3 m^3
Tank material:	Concrete
Manufacturing Std:	AS/NZS 4058:2007 and NZS 3101
Loading:	The standard lid is suitable for traffic loading up to Class B.
Inlet Connections:	the inlet pipe to be installed on site and sealed by the drainage contractor.
Outlet connection:	A threaded BSP socket is installed for connection to the outlet pressure pipe
Venting:	External venting required
Dimensions:	see drawing below





1.2 Pumps/Pump Performance

See full specifications in the Appendices

Manufacturer: Flygt Pumps

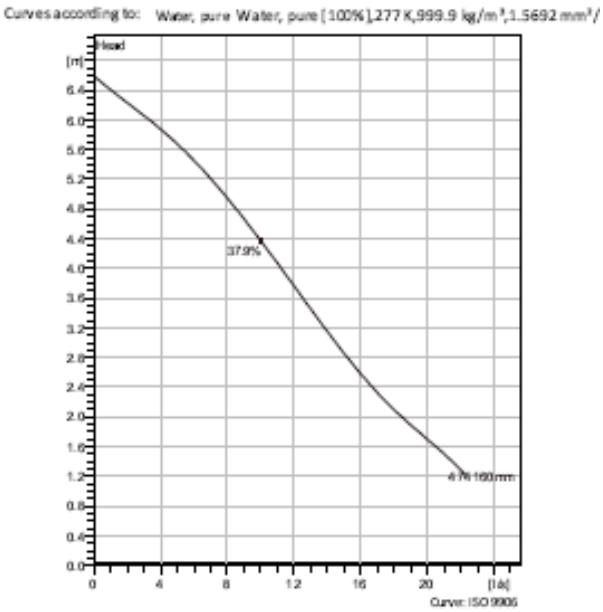
Type: Flygt DP3085 MT3 – 474

Connection: 415 V, 50 Hz

Power: 2.0 kW

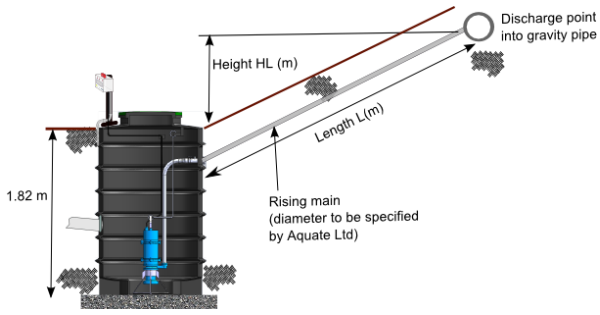
Phases: Three

Technical specification



2 Design Information

The system above has been designed based on the information provided below.



Length L : max 8 m

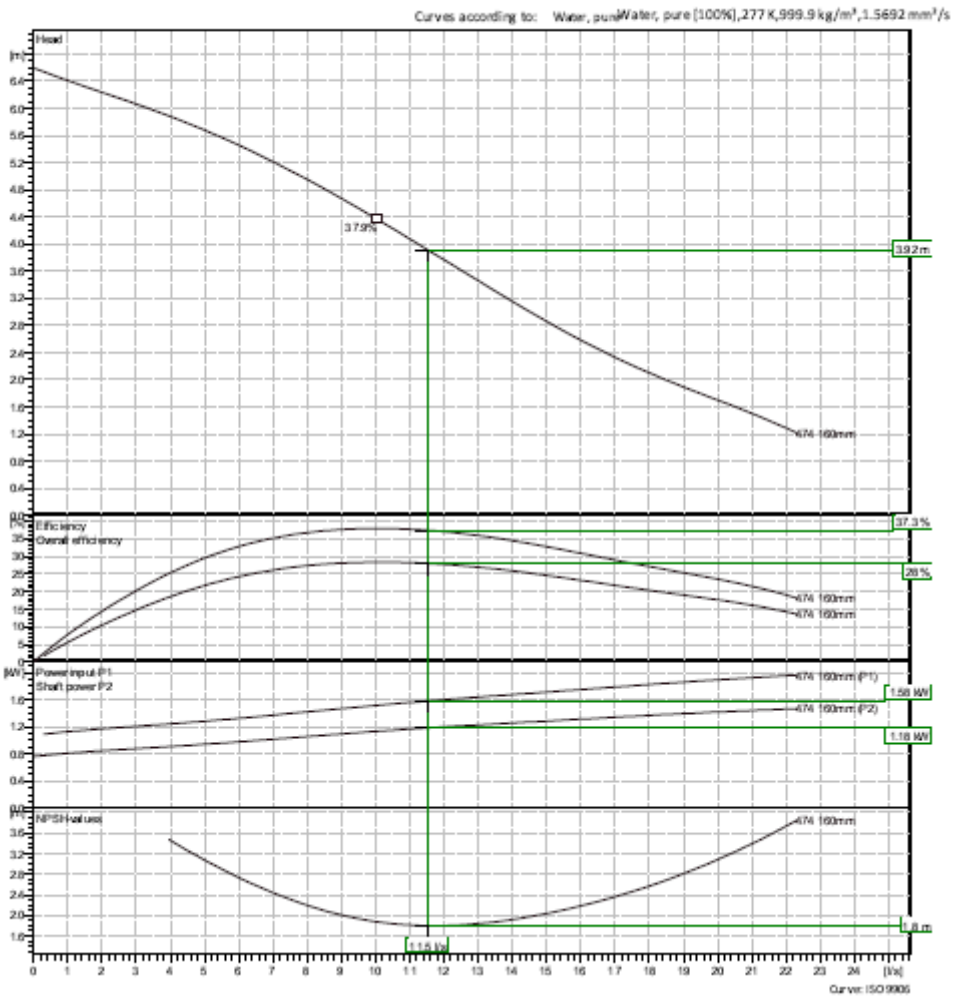
Height Hl : max 2.4m (inc depth of tank)

Rising main to be 90mm (OD) pipe for the vortex pump (PE100 (HDPE) PE 4710 SDR 17 (PN 10) / DN 80 (90x5,4 mm) – see friction loss sheet in Appendices

Type of wastewater : Sewer

Discharge to: sewer manhole

Flygt DP3085 Flow rate =11.1 l/s with a total head loss of 3.92 m (max 6.5 m)



3 Venting

A 100mm duct should be installed from the top of the wet-well to vent to an appropriate location.

This could be adjacent to the control cabinet if this location is suitable or at the top of a nearby building.

If odours are a concern, a McBerns VF150 odour filter can be installed at the top of the vent pipe. To be installed by contractor. See specifications in Appendices.

4 Pipework, Valves and Fittings

Discharge connection:	80 mm diameter flange coupler
Inlet and outlets:	the inlet pipe to be installed on site and sealed by the drainage contractor. The outlet pipe is pre-installed in the factory.
Discharge pipework:	Includes a non-return valve and an isolation valve.
Lifting chains:	a stainless steel chain is connected from the pump to the underside of the chamber for ease of pump removal if required.
Materials:	All pipework will be ABS 80mm and will be manufactured to the relevant AUS/ NZ Standards
Guide rails:	Stainless steel
Floats :	Low Level Float, Stop-Start, Duty-Assist and High level alarm

5 Pump Operational Design

5.1 Pump Operating Levels

The operational levels will be set as follows (dimensions taken from floor of wet-well) :

- High level alarm - 8500mm
- Assist Pump Start/Stop – 750-400mm
- Duty Pump Start/Stop – 650-300 mm
- Low Level Alarm : 200mm

5.2 System Alarms

The following alarm are included in this pump station :

- High level alarm – activates both pumps
- Low level alarm - stops both pumps
- High level float alarm - activates if the high-level float has been ON for more than 24 hours
- Stop/Start Float Alarm - activates if the stop-start float has been ON for more than 24 hours
- Low Voltage Alarm
- High Current Alarm

5.3 Pump Run times

1. ***Normal operating conditions***

Volume wastewater: 900 litres

Discharge rate: 11.1l/s

Running time: 1.5 minutes

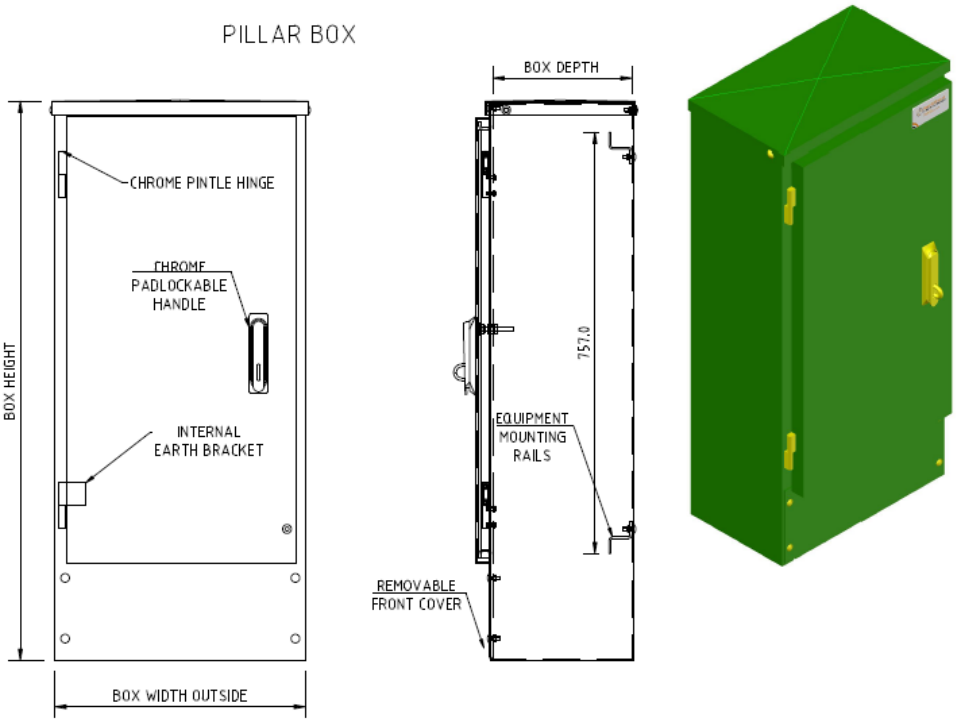
6 Electrical & Controls

Manufacturer:	N2P Controls
Type:	AQP-02
Number:	1 unit
Material:	UV Stabilised plastic construction for external locations.
Features	The duty/standby controller has a custom designed mounted printed circuit board designed for duty/standby applications. This allows both pumps to run when the high level alarm occurs and swaps duty after each pump start or after a set time.

The controller comes with:

- Jazz PLC System
- Outlook Web based monitoring system
- Duty/Standby control with alternating Duty after 24 hours (every day Duty pump changes) or pump start
- High level alarm activation that overrides Duty pump and starts both pumps
- Switchgear and starters
- Moulded Circuit Breaker protection for each pump with alarm notification of pump failure
- A flashing alarm light mounted on top of cabinet
- A buzzer that activates on alarm condition and associated mute button. Muting of alarm resets after alarm condition has passed.

Manufacturing Std:	AS/NZS 3000:2007
Control cabinet	The control cabinet will be installed in a 850mm wide x 250mm deep x 1000mm high steel pillar box. This is lockable.



7 Construction

The pump station has been design using reinforced precast concrete components. The system will be fabricated off site and delivered to site ready for installation. The tank will have a 8800litre capacity and a total depth of 3.75 m.

The pump stations will be delivered to site in a kit-set format and will need to be installed in the ground by the drainage contractor.

The construction and commissioning of the Aquate pump station will then be completed by a trained Hynds Environmental Construction Technician.

8 Safety in Design

This pump station has been designed to minimise any risk to operators and service personnel.

Access into the pump station should not be required for ongoing maintenance as almost all servicing work can be completed from ground level. The main components can be accessed as follows:

- Pumps – these can be removed from the pump station by lifting them up out of the wet-well and inspecting above ground. Note : the pumps weight 72 kg each.
- Floats – can be lifted from the connection points in the access hole in the lid.
- Non-return valves/Isolation valves –can be access from ground level without the need to enter the chamber
- Venting will be required and will need to be installed on site. The access lids are air-tight.

Risk register

The risk register is a live document which requires continuous monitoring updating. This will need to be completed by the maintenance company for the pump station. The items below are a guide only.

The safety and design and Hazops workshops have encompassed risks for normal operation of the vacuum wastewater pump station. Specific risks for the maintenance process are outlined below.

Risk matrix			Consequence / potential severity				
			Minimal Non-injury or First Aid injury (FAI)	**Minor** Medical treatment injury	**Moderate** Medical treatment injury, with lost time (LTI)	**Major** Injury requiring hospital-isation/notifiable event	**Catastrophic** Fatality or multiple fatalities
Likelihood	Very high	**Almost certain:** Commonly occurs	3: Medium	4: High	4: High	5: Very high	5: Very high
	High	**Likely:** Could easily happen	2: Low	3: Medium	4: High	4: High	5: Very high
	Medium	**Possible:** Could happen or has been known to happen	2: Low	2: Low	3: Medium	4: High	4: High
	Low	**Unlikely:** Hasn't happened yet but could happen	1: Very Low	2: Low	3: Medium	3: Medium	4: High
	Very low	**Rare:** Very unlikely but could hap- pen in exceptional circumstances	1: Very Low	2: Low	2: Low	3: Medium	4: High

	Hazards *(one per line)*		Hazard controls – what do we need to do to make it safe?	
What are we doing? *(step by step)*	**What could cause harm?**	**Existing risk level** (*use risk matrix)*	**Eliminate/ Controls**	Residual risk level
Wet-well inspection	The wet-well is classified as a confined space, an inspection is required prior to wet commissioning.	3	**Elimination:** The vessel will be isolated from the system at all exit points and inspected from the access hole in the lid . **Isolate/Engineering Controls/PPE:** Entry will only be required if debris is identified and cannot be removed by any other means. Entry to the vessel should follow confined space protocols, including ensuring all persons involved have the required training, admin and PPE controls.	1 1
Sewage Pump Testing	The wet well will be filled up for wet testing. This is a potential drowning hazard.	3	**Elimination** Barriers around the access hatch to be erected so no one can enter the wet-well. **Engineering Controls/PPE:** All essential persons to wear appropriate protection. Sewage pump shall only operate when required for wet testing..	1 1
Removing lids for access	Traffic moving through area Back strain	3 2	**Isolate/Engineering Controls/PPE:** Place cones around service area so vehicles cannot enter site **Engineering Controls/PPE –** use appropriate lifting equipment if lifting pumps / lids on site	
Removing pumps	This is a falling hazard	4	**Elimination** Barriers around the access hatch to be erected so no one can enter the wet-well.	
Electrical checks	Electrical shock	3	**Engineering Controls/PPE:** Only fully certified electricians to complete electrical work	

9 Warrantees

Aquate guarantees the performance and quality of its pump stations provided:

- The product is only used for the intended purposes as stated in the quote
- The control panel and pump station is correctly installed and commissioned by a suitable installer
- The fault is due to a defect in design, materials or workmanship
- The fault is reported to an Aquate agent or representative during the guarantee period
- No pump station components have been replaced by alternative products

This guarantee does not cover faults resulting from misuse of the system, blockages or breakdowns caused by the introduction of inappropriate materials into the system, incorrect electrical installation of the control unit, deficient maintenance or normal wear and tear.

Aquate assumes no liability for bodily harm, property damage or economic losses as a result of its pump stations.

9.1 Pumps

The pumps come with a 12 month year warranty against faulty components and/or workmanship. If prohibited substances are introduced to the system causing the pump to block and burn out, the warranty is null and void.

Flygt undertakes to remedy faults in products sold by Flygt provided that:

- The fault is due to defects in design, materials or workmanship;
- The fault is reported to a Flygt representative during the guarantee period;
- The product is used only under conditions described in the care and maintenance instructions and in applications for which it is intended;
- The monitoring equipment incorporated in the product is correctly connected;
    - All service and repair work is done by a workshop authorized by Flygt or the original manufacturer;
- Genuine manufacturer's parts are used
- Storage should be in accordance with the care and maintenance manual.
- The equipment is operated and maintained in accordance with the Operation and Care and Maintenance Manual.

Failure to comply with these requirements will render warranty void unless, due to the nature of the warranty claim, such voiding of warranty is prevented by law, regulation, act and/or ordinance.

Hence, the guarantee does not cover faults caused by deficient maintenance, abuse, incorrectly executed repair work or normal wear and tear.

10 Maintenance schedule

A certain amount of system maintenance is required on an ongoing basis to ensure that the system is working correctly. This is the responsibility of the homeowner

10.1 Six monthly

The following procedures should be completed every six months:

- The pumping station should be inspected to check the build-up of grease and fat particularly on the float switches and pumps. They may need to be withdrawn for cleaning.
- Visually inspect the pump station walls and hose down if necessary
- Ensure the pump station access lid is securely fastened and bolted down.
- Lift the pumps and inspect for any damage or blockages around the impellors
- Lift the floats and test the alarm system/pump operation
- Consult with the electrical control supplier for additional checks

10.2 Annually

The following procedures should be completed at least once every 12 months:

- The pumping station should be inspected to check the build-up of grease and fat particularly on the float switches and pumps. They may need to be withdrawn for cleaning.
- Visually inspect the pump station walls and hose down if necessary
- Lift the floats and test the alarm system/pump operation
- Press the mute button (audio alarms only) to check the audio alarm turns off.
- Visually check the pump station for any structural damage to the tank and pipework
- Ensure the pump station access lid is securely fastened and bolted down.
- Lift the pumps and inspect for any damage or blockages around the impellors
- Have the pump station sucked out to remove any debris/stones if necessary

10.3 Maintenance requirements

The pump maintenance and repair operations must be carried out by workers authorised by the manufacturer; Failure to comply with these instructions will result in forfeiture of the warranty and jeopardise the unit's safety.

Before any cleaning and/ or maintenance operations are carried out on the electric pump, the power supply must be switched off.

To disconnect the submersible electric pump from the electricity mains, first disconnect the phase conductors, then the yellow –green earth wires.

Use the special handle to remove the submersible electric pump from the tank.

ATTENTION: Before carrying out any operations, check the pump temperature. Only work on the pump when it is at room temperature.

Clean the electric pump thoroughly, using a jet of water or specific products to clean all its parts. When disposing of the waste material, follow the antipollution rules in force.

Replace any broken or worn parts with original spare parts only.

Given the likelihood that work on the electric pump will be carried out in confined spaces such as vats, wells, cesspools, tanks or cisterns, do not underestimate the risks caused by potentially poisonous exhalations.

10.4 Maintenance Replacement Work

The table below is a list of the main components of the pump station and a typical life expectancy for these components.

The costs shown include the labour costs to install the components

Maintenance Replacement Works	Frequency (yrs)	Quantity	Unit Rate	Value
Flygt Sewage Pumps	15	2	$10,000.00	$20,000.00
Float switches	8	4	$250.00	$1,000.00
PLC Board in Controller	10	1	$1,000.00	$1,000.00
Valves in Valve chamber	20	4	$500.00	$2,000.00

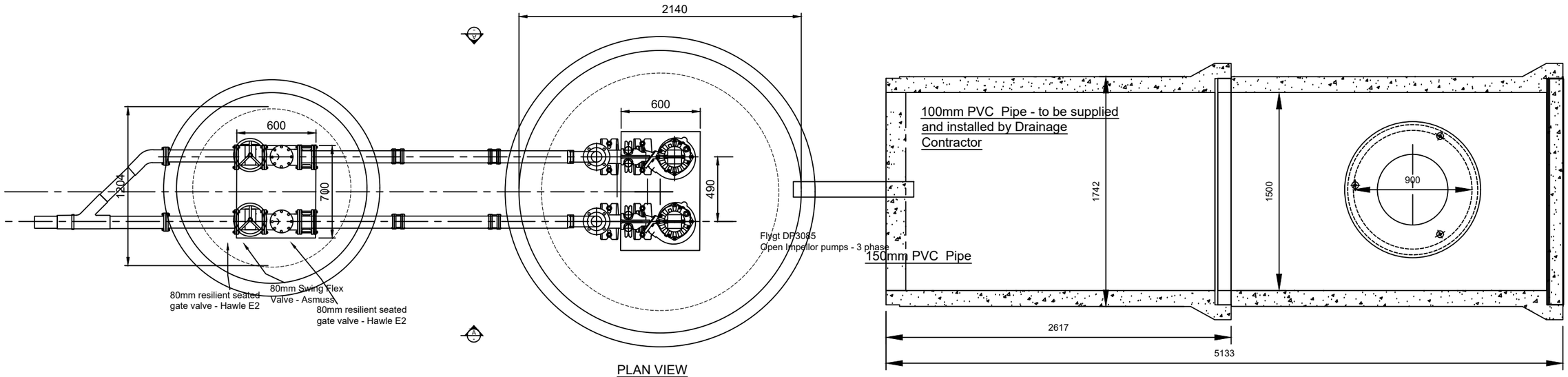
APPENDICES

General Arrangement Drawing – Plan

General Arrangement Drawing – Section

Flygt DP3085 Specifications

GATIC lid specifications



PLAN VIEW

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PO Box 58142, Botany, Auckland, 2316
Tel: 09-274 0316
Fax: 09-272 7485
email: hwwsupport@hynds.co.nz

ISO 9001 CERTIFIED MANAGEMENT SYSTEM

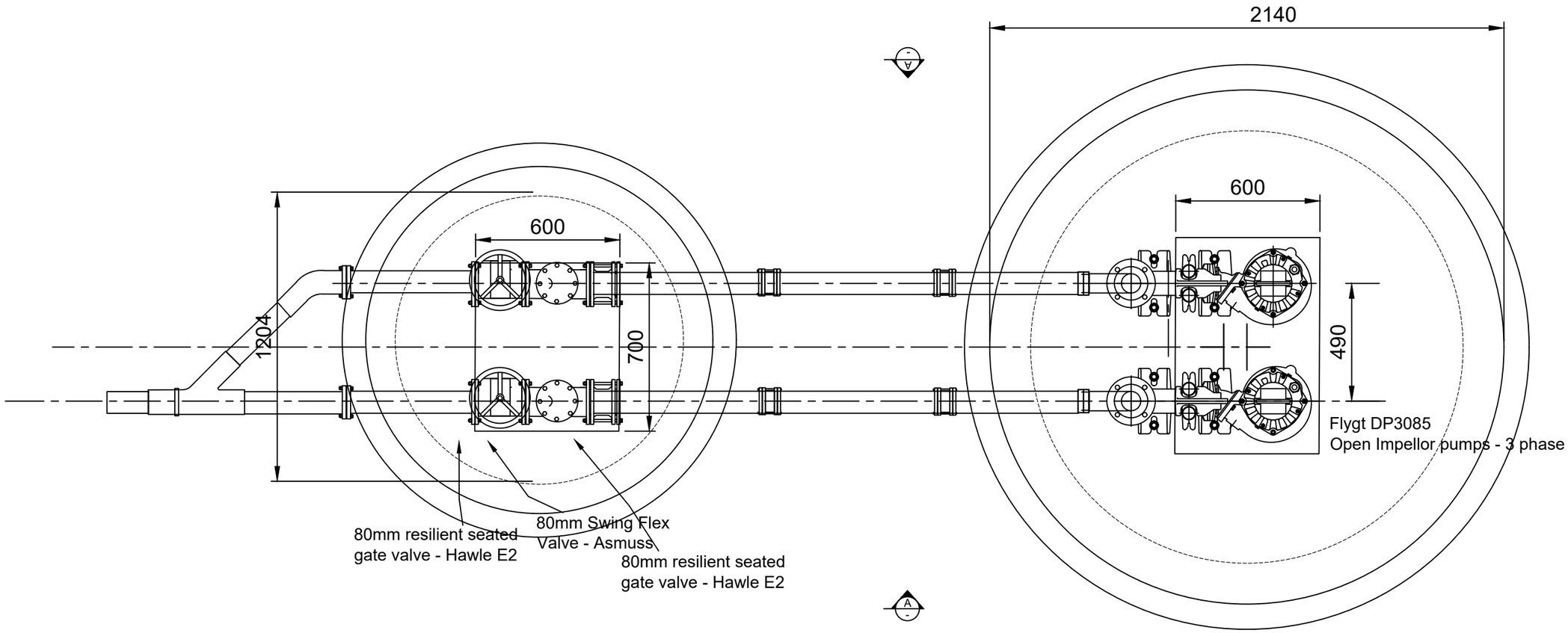
PROJECT:

Ropata Retirement Village
Lower Hutt
Wastewater Pump Station
Preliminary Design only

DRAWING TITLE:

Plan View with tank

REFERENCE/QUOTE NUMBER:	AQ1735		
DRAWN: PC SIGNATURE:	DESIGN: PC SIGNATURE:	CHECKED: JB SIGNATURE:	
SCALE: As Shown PAPER SIZE: A3	Note: Do not scale drawing if in doubt **ASK!!!**	DATE: 20/3/23	
DRAWING NUMBER: AQ1735 1	SHEET NUMBER: of 4	REVISION NUMBER: A	



PLAN VIEW

NOTES:

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REVISIONS

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ISO 9001 CERTIFIED MANAGEMENT SYSTEM

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Lower Hutt
Wastewater Pump Station
Preliminary Design only

DRAWING TITLE:
Plan View

REFERENCE/QUOTE NUMBER:	AQ1735		
DRAWN: PC SIGNATURE:	DESIGN: PC SIGNATURE:	CHECKED: JB SIGNATURE:	
SCALE: As Shown PAPER SIZE: A3	Note: Do not scale drawing if in doubt **ASK!!!**	DATE: 20/3/23	
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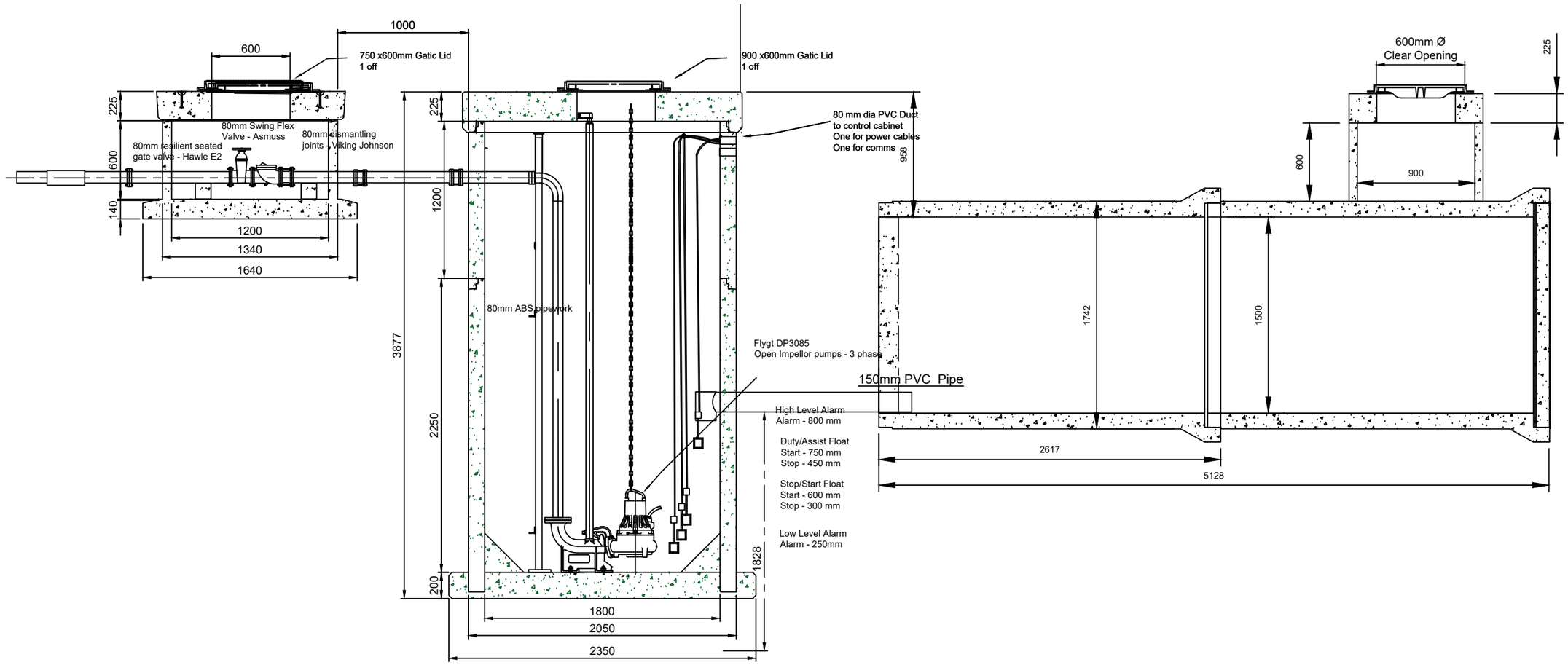

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ISO 9001 CERTIFIED MANAGEMENT SYSTEM

PROJECT:

Ropata Retirement Village
Lower Hutt
Wastewater Pump Station
Preliminary Design only

DRAWING TITLE:

Section View with tank

REFERENCE/QUOTE NUMBER:	AQ1735		
DRAWN: PC SIGNATURE:	DESIGN: PC SIGNATURE:	CHECKED: JB SIGNATURE:	
SCALE: As Shown PAPER SIZE: A3	Note: Do not scale drawing if in doubt **ASK!!!**	DATE: 20/3/23	
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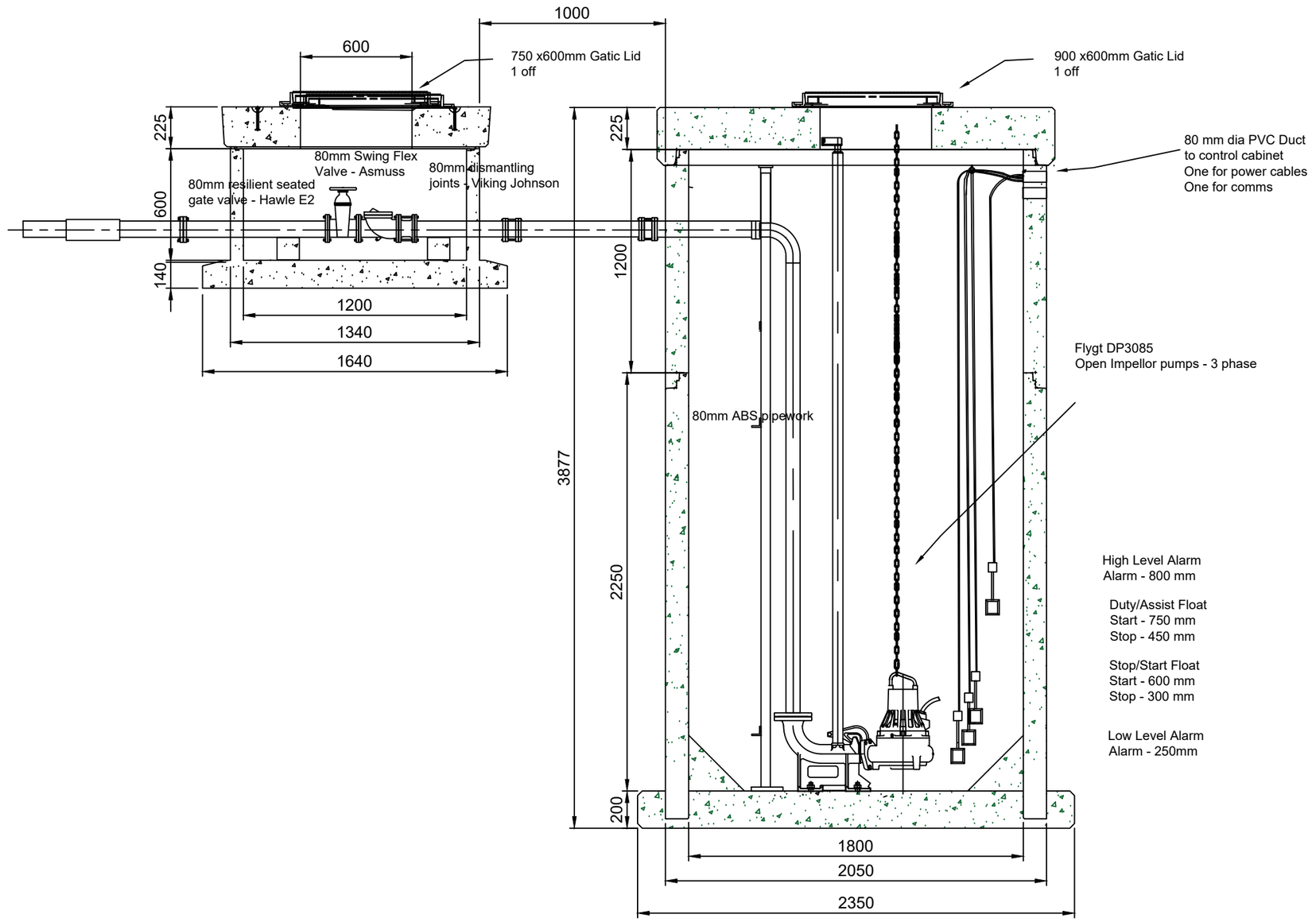

High Level Alarm
Alarm - 800 mm

Duty/Assist Float
Start - 750 mm
Stop - 450 mm

Stop/Start Float
Start - 600 mm
Stop - 300 mm

Low Level Alarm
Alarm - 250mm

NOTES:

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REVISIONS

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ISO 9001 CERTIFIED MANAGEMENT SYSTEM

PROJECT:

Ropata Retirement Village
Lower Hutt
Wastewater Pump Station
Preliminary Design only

DRAWING TITLE:
Section View

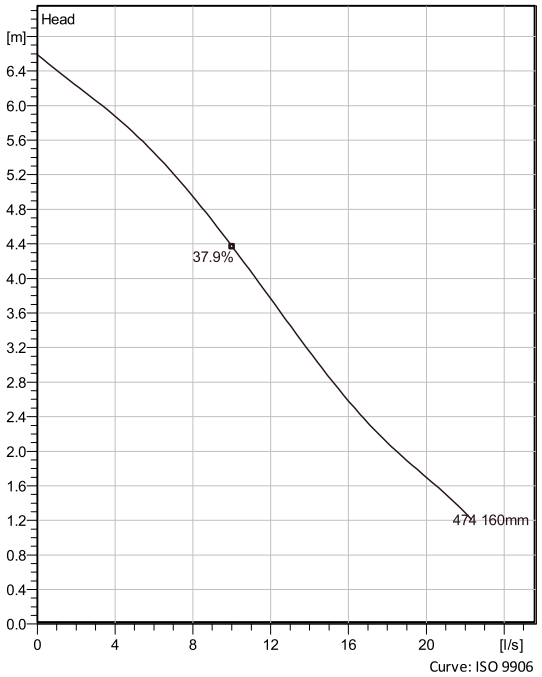
REFERENCE/QUOTE NUMBER:	AQ1735		
DRAWN: PC SIGNATURE:	DESIGN: PC SIGNATURE:	CHECKED: JB SIGNATURE:	
SCALE: As Shown PAPER SIZE: A3	Note: Do not scale drawing if in doubt **ASK!!!**	DATE: 20/3/23	
DRAWING NUMBER: AQ1735 4	SHEET NUMBER: of 4	REVISION NUMBER: A	

DP 3085 MT 3~ 474

Portable pumps with vortex impellers ideal for applications in which the water or liquid contains concentrations of abrasives when clogging problems can occur.

Technical specification

Curves according to: Water, pure Water, pure [100%],277 K,999.9 kg/m³,1.5692 mm²/s



Curve: ISO 9906

Configuration

Motor number
D3085.183 15-10-4AL-W 2KW

Installation type
P - Semi permanent, Wet

Impeller diameter
160 mm

Discharge diameter
80 mm

Pump information

Impeller diameter
160 mm

Discharge diameter
80 mm

Inlet diameter
80 mm

Maximum operating speed
1390 1/min

Number of blades
6

Throughlet diameter
76 mm

Max. fluid temperature
40 °C

Configuration

Material

Impeller
Grey cast iron

Stator housing material
Grey cast iron

Project	Xylect-20308391	**Created by**	Peter Carroll		
Block		**Created on**	3/19/2023	**Last update**	3/19/2023

DP 3085 MT 3~ 474

Technical specification

Motor - General

Motor number D3085.183 15-10-4AL-W 2KW	**Phases** 3~	**Rated speed** 1390 1/min	**Rated power** 2 kW
Approval No	**Number of poles** 4	**Rated current** 4.4 A	**Stator variant** 67
Frequency 50 Hz	**Rated voltage** 415 V	**Insulation class** H	**Type of Duty** S1
Version code 183			

Motor - Technical

Power factor - 1/1 Load 0.84	**Motor efficiency - 1/1 Load** 75.0 %	**Total moment of inertia** 0.004 kg m²	**Starts per hour max.** 30
Power factor - 3/4 Load 0.78	**Motor efficiency - 3/4 Load** 77.5 %	**Starting current, direct starting** 20 A	
Power factor - 1/2 Load 0.66	**Motor efficiency - 1/2 Load** 77.5 %	**Starting current, star-delta** 6.67 A	

Project	Xylect-20308391	**Created by**	Peter Carroll		
Block		**Created on**	3/19/2023	**Last update**	3/19/2023

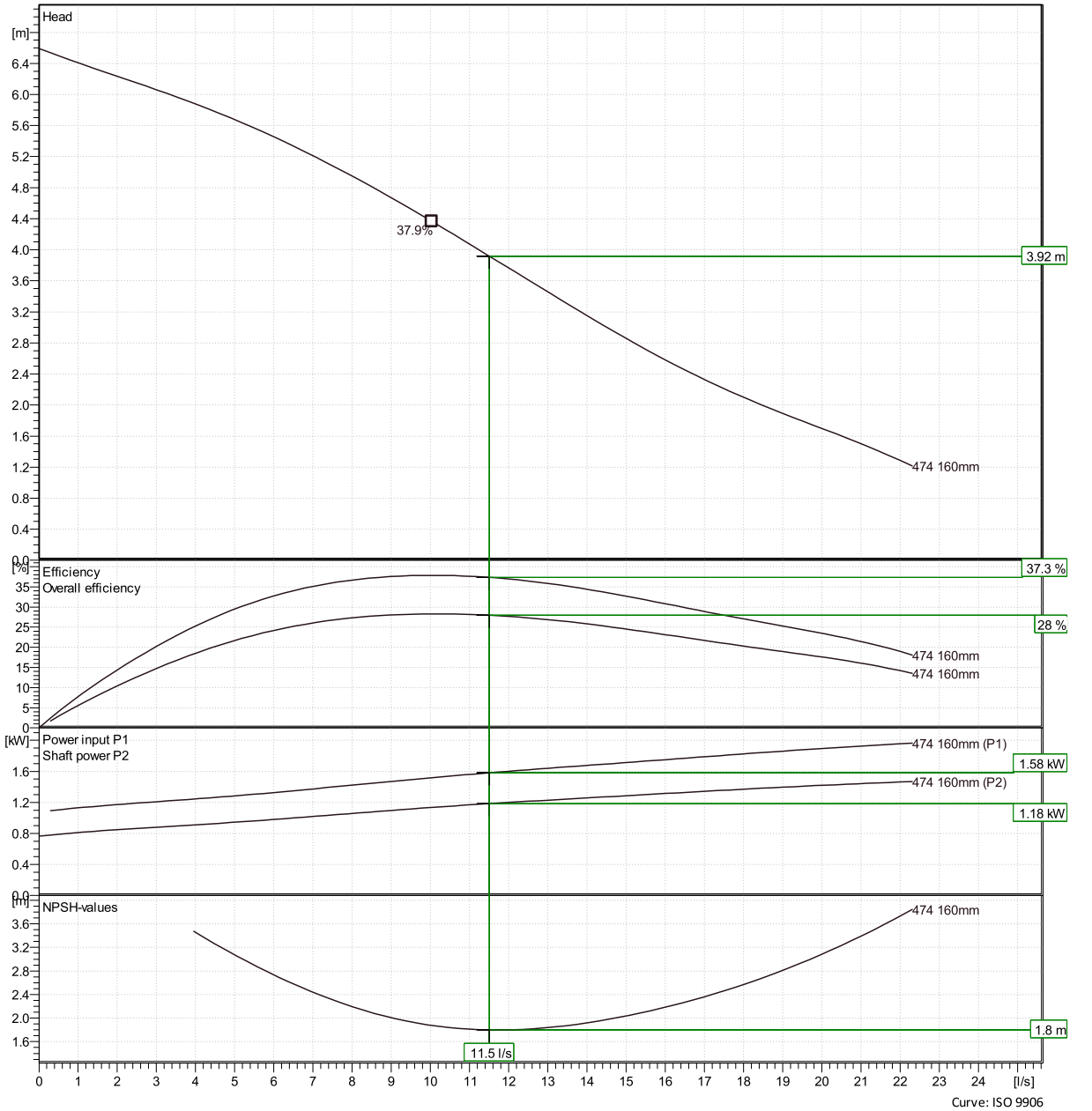
DP 3085 MT 3~ 474

Performance curve

Duty point

Flow	Head
11.5 l/s	3.92 m

Curves according to: Water, pure Water, pure [100%],277 K,999.9 kg/m³,1.5692 mm²/s



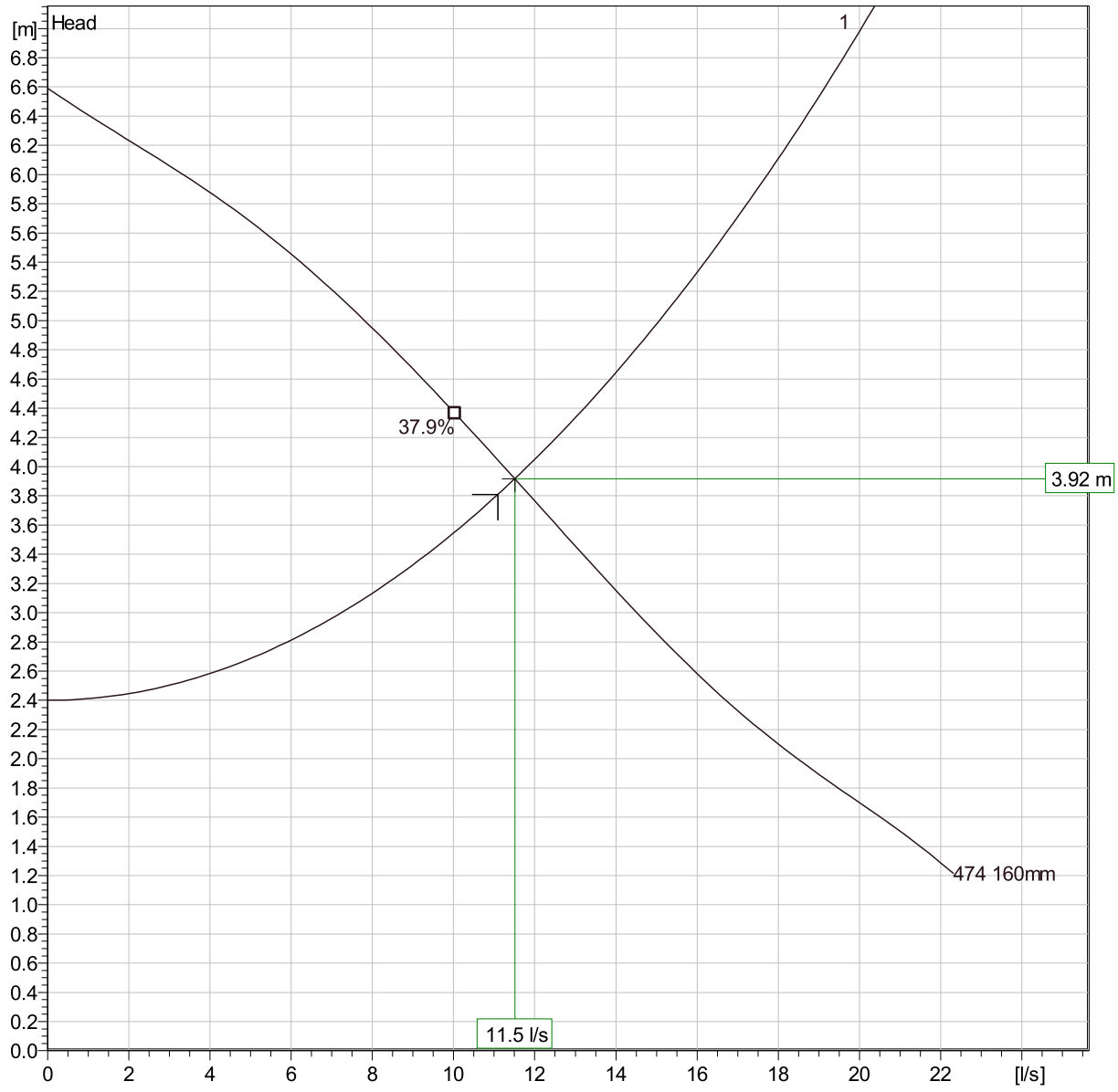
Curve: ISO 9906

Xylect-20308391	Peter Carroll		
	Created on 3/19/2023	**Last update**	3/19/2023

DP 3085 MT 3~ 474

Duty Analysis

Curves according to: Water, pure [100%] ; 277K; 999.9kg/m³; 1.5692mm²/s



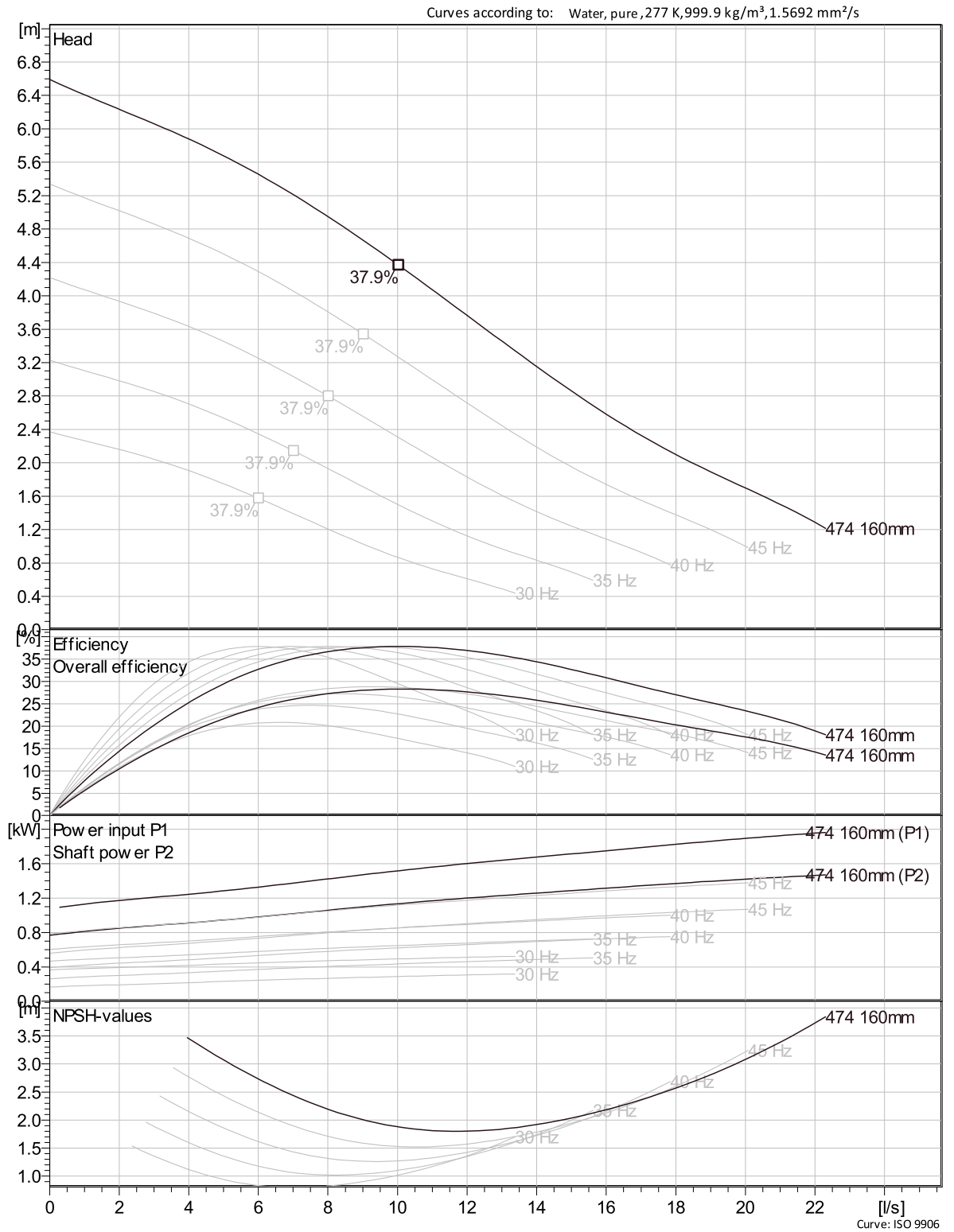
Operating characteristics

Pumps / Systems	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Spec. Energy	NPSHre
	l/s	m	kW	l/s	m	kW		kWh/m³	m
1	11.5	3.92	1.18	11.5	3.92	1.18	37.3 %	0.0382	1.8

Project		**Created by**	Peter Carroll		
Block	Xylect-20308391	**Created on**	3/19/2023	**Last update**	3/19/2023

DP 3085 MT 3~ 474

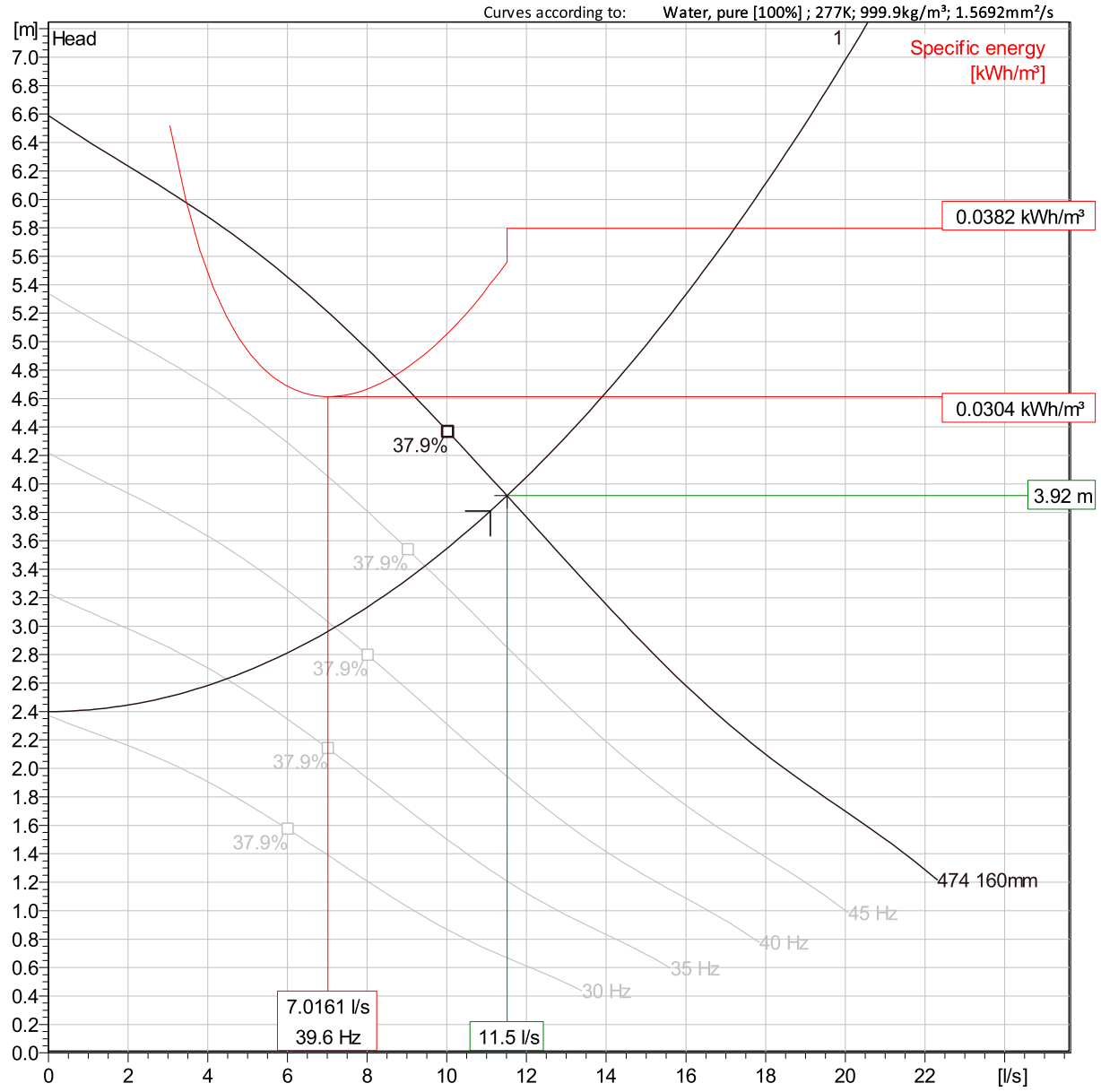
VFD Curve



Project	Xylect-20308391	**Created by**	Peter Carroll		
Block		**Created on**	3/19/2023	**Last update**	3/19/2023

DP 3085 MT 3~ 474

VFD Analysis



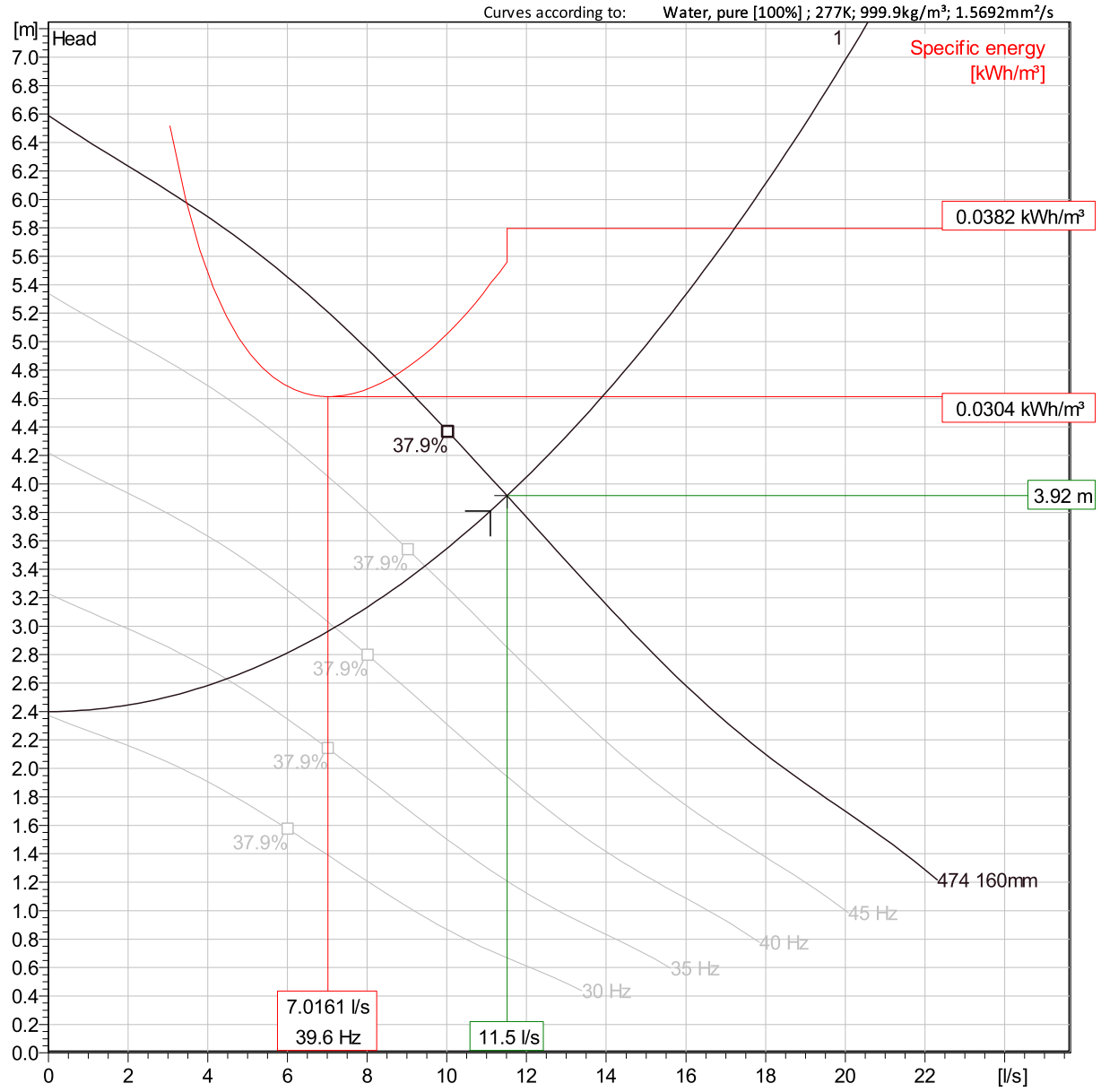
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		l/s	m	kW	l/s	m	kW		kWh/m³	m
1	50 Hz	11.5	3.92	1.18	11.5	3.92	1.18	37.3 %	0.0382	1.8
1	45 Hz	9.45	3.42	0.839	9.45	3.42	0.839	37.8 %	0.0323	1.55
1	40 Hz	7.19	2.99	0.562	7.19	2.99	0.562	37.6 %	0.0304	1.41
1	35 Hz	4.47	2.63	0.341	4.47	2.63	0.341	33.8 %	0.0341	1.48

Project	Xylect-20308391	**Created by**	Peter Carroll		
Block		**Created on**	3/19/2023	**Last update**	3/19/2023

DP 3085 MT 3~ 474

VFD Analysis



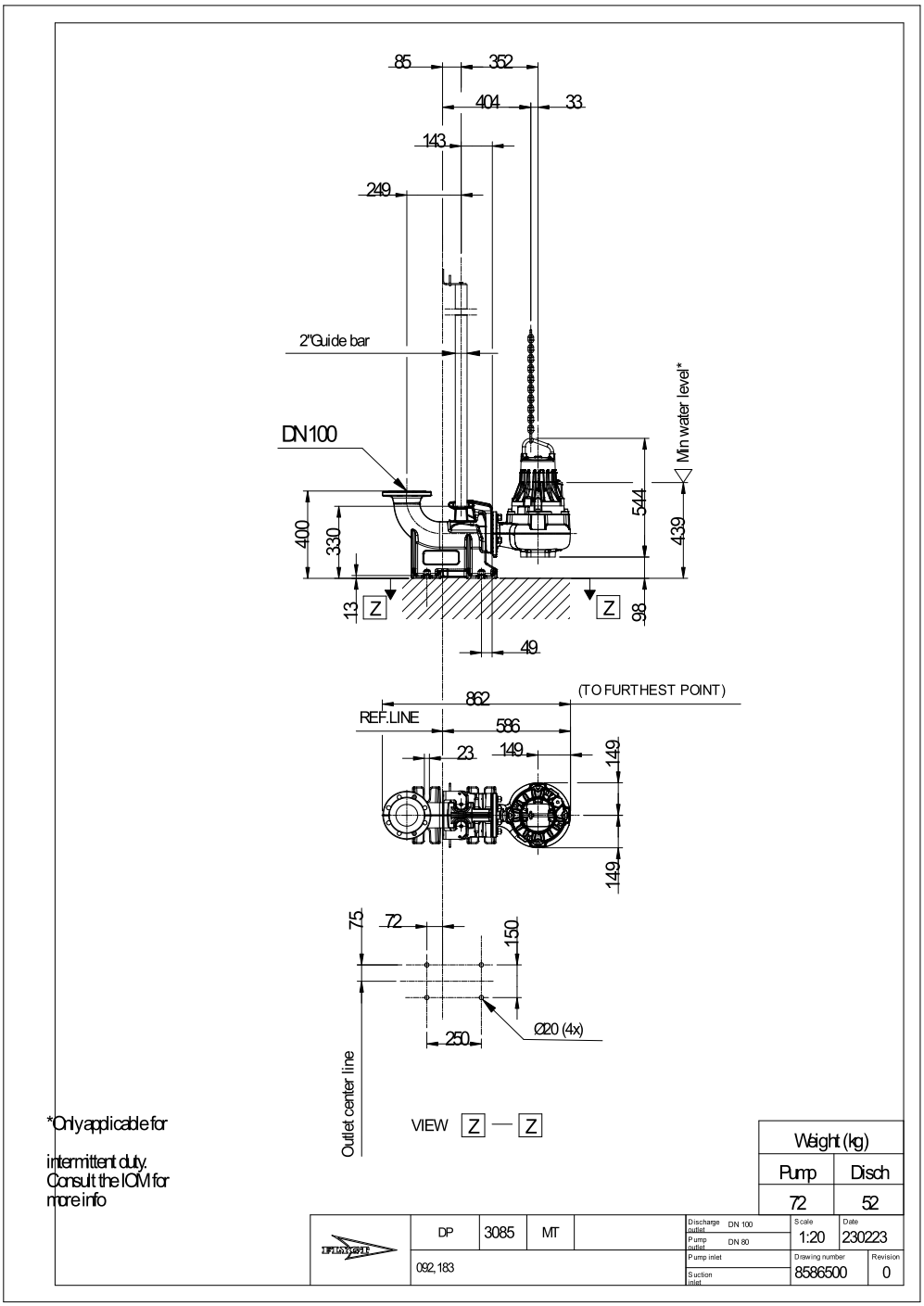
Operating Characteristics

Pumps / Systems	Frequency	Flow	Head	Shaft power	Flow	Head	Shaft power	Hydr.eff.	Specific energy	NPSHre
		l/s	m	kW	l/s	m	kW		kWh/m³	m
1	30 Hz									

Project	Xylect-20308391	**Created by**	Peter Carroll		
Block		**Created on**	3/19/2023	**Last update**	3/19/2023

DP 3085 MT 3~ 474

Dimensional drawing



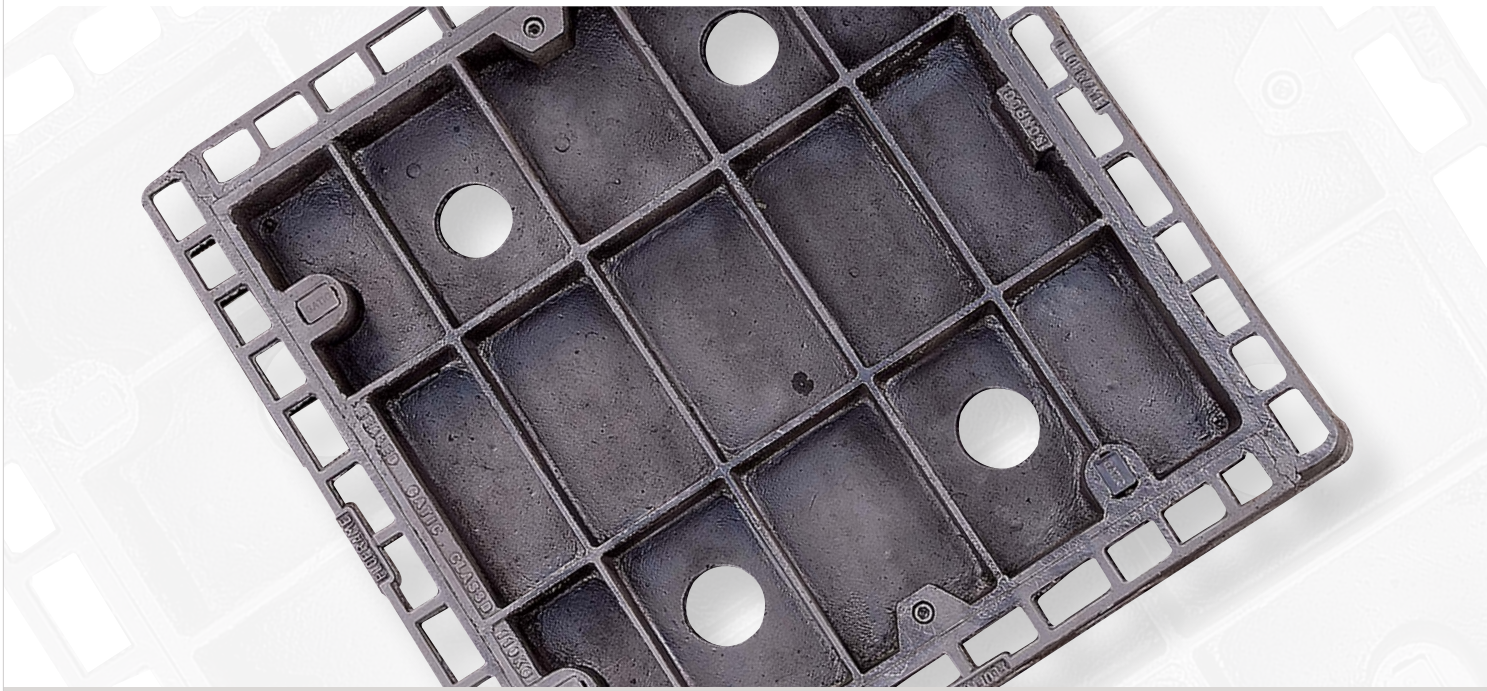
Project	Xylect-20308391	**Created by**	Peter Carroll
Block		**Created on**	3/19/2023 **Last update** 3/19/2023

Gas & Air Tight Access Covers and Grates

Scan for more information

Technical Guide SP2.4

Hynds supply a range of Gas and Air Tight Access Covers and Grates to New Zealand recognised standards AS3996:2006 and EN124.



Applications

When access is required for under ground services with a gas and airtight seal or grates are required to perform to specific design conditions.

Product Attributes

- Load rated from Class B through to Class G
- Gas and Air Tight
- Bolt Down Security
- Recessed infil or solid top versions

Approvals/Standards

- AS / NZS 3996:2006
- EN124

Quality

- ISO 9001:2008 Quality Management

Hynds supply a range of Gas & Air Tight Access Covers and Grates to Australian and New Zealand recognised standard AS3996:2006 and European Standard EN-124

Installation

When an improved seal is required to reduce surface water infiltration or trap odour release, Hynds recommend the use of manhole sealing grease. This lubricates the surface between cover and grate making future inspections easier when removal of the cover is required.

Features

- All castings are marked in accordance with AS3996:2006 or EN124 to enable identification of manufacturer and supplier.
- All castings are marked with the load rating A to G. The correct class of casting can be supplied to comply with all applications.
  N.B. product with load ratings A to D ARE readily available.
  Heavier classes E, F and G are available to order.
- AS3996:2006 is a recognised quality standard for manufacture and application in Australia and New Zealand accepted by territory authorities and specifiers.
- Gas air tight streetware castings provided by Hygrade have third party accreditation by Qual Mark 5 Ticks, an independent international body. They certify that the product is manufactured to and continues to comply with specifications and standards.
- Qual Mark operate under an approved quality system based on the ISO 9000 series of standards.

Design Specifications

- Design Service
  Unique design service available to specifiers and engineers. 24 hour turn around to provide technical drawings for specified applications.
- Custom Features
  Brass and stainless steel edged covers and frames on request. (only applies to square or rectangular covers)
- Special Lifting Keys
  Complete range of lifting keys and accessories are available. Refer to Technical Guide D10.1 Lifting Equipment.

Testing

- Batch Testing
  One unit in every 150 manufactured is tested to confirm that product complies with AS3996:2006 and EN124.

Durability

- Machining
  All castings are machined to ensure gas and air tightness. This also ensures that all seating is even to maintain uniform wear and stability.
- Material
  All castings are manufactured from ductile iron to ensure maximum strength.
- Coating
  All gas and airtight castings are bitumen coated to the AS3996:2006 standard. This helps maintain the castings appearance prior to installation.

Available on request

- Circular solid top and infill access covers and frames.
- Square and rectangular solid top and infill access covers and frames.
- Multi-part configurations to suit all applications.
- Trench runs in all load classes
- Brass & Stainless Steel edged decorative covers for retail and commercial high profile applications

Casting Examples

FIG. 1 Stock code GATIC-02301122
600 x 1270 mm - 2 Part Class D

FIG. 5 Stock code GATIC-300C6DB
600 mm Infilled & Bolt down Class D

FIG. 2 Stock code GATIC-02302195
600 x 2000 mm - 3 Part Class F/G

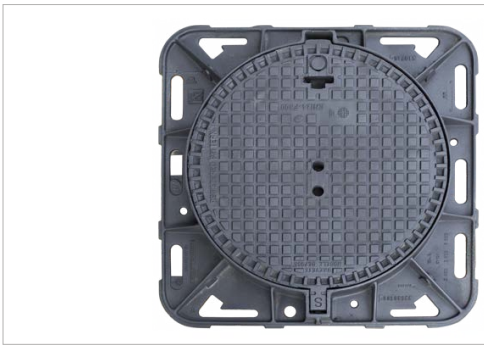


FIG. 6 Stock code GATIC-300S5G
600 mm Solid Top Hinged Class F/G

FIG. 3 Stock code GATIC-321S66D
600 x 600 mm Sump Grate Class D

FIG. 7 Stock code GATIC-301C66D
600 x 600 mm Infilled Class D

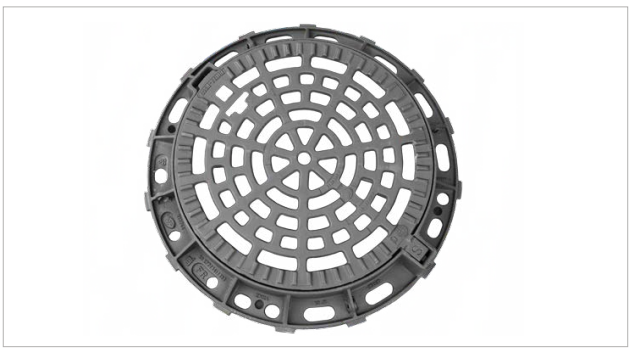


FIG. 4 Stock code GATIC-320G6G
600 mm Sump Grate Hinged Class F/G

FIG. 8 Stock code GATIC-02301093
600 x 600 mm Solid Top Class D

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VF150 - Specifications

Process Overview

The air filtration system is designed to treat wastewater odour emissions entering the unit by the two McBerns Proprietary Combined Media Cartridge, which is emitted to atmosphere.

Filtration Properties	H_2S Treatment Capacity	0.16 kg
	Total Media Volume	1 x 10^{-3} m^3
	Media Mass	
	McBerns Combined Media (Cartridges)	1 x F150MC
	Total Media Mass	0.8 kg
Flow Properties	Design Flow Rate	5 L/s
	Differential Pressure (refer to figure at back)	11 Pa
Unit Properties	**Dimensions**	
	Unit Housing	260 x 175 mm
	Inlet Duct	DN150 UPVC
	Material Properties	
	Fabrication Material	UPVC
	Specific Gravity	1.42g/cm^3
	Max Continuous Operating Temperature	50°C
	Max Short Term Operating Temperature	60°C
	Tensile Strength	51MPa
	Brinell Hardness	15kg/mm^2
	Mass	
	Unit Housing	1.35 kg
	Overall (Including Media)	2.15 kg