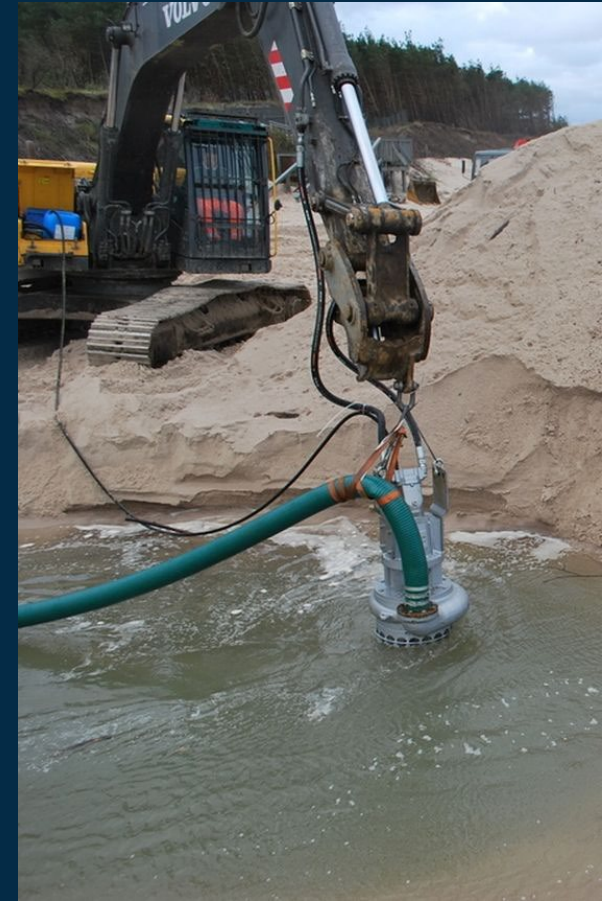




Quarry Waste

What can you do with it ?



PrimePump
United pumps of the world.

Two sites, two different methods

Blackhead Quarry – Dunedin



FlatTop Quarry – Auckland



Some of the challenges

- Environmentally sensitive areas
 - Extremely fine particle product with high concentrate of water
- High traffic areas – Limited access
- Limited time to set up and pack down
- Vertical height from slurry ponds to discharge point

Blackhead Quarry

What they had traditionally done?

- Diggers and trucks
- Vacuum trucks !
- Digging it out into drying ponds and then carting away after a few weeks
- Which is a very inefficient and an expensive way of shifting liquid
- Tipsite – dealing with it , sloppy messy product



Blackhead Quarry

Environmentally Sensitive

- Very public – Beach/surfer carpark right beside
- Any spillage would go straight into the sea
- Cutting main access off with pipeline
- All of sites rainfall runs through the ponds

What was required

- 4 ponds to clean out
- Some product had been there for 30-40 years
- Depth ranging from 0 – 1.8 metres (yeah right)

The lift

58
Meters





The Pipeline

Total distance 650 meters



PrimePump
United pumps of the world.

The Pump – Dragflow HY85

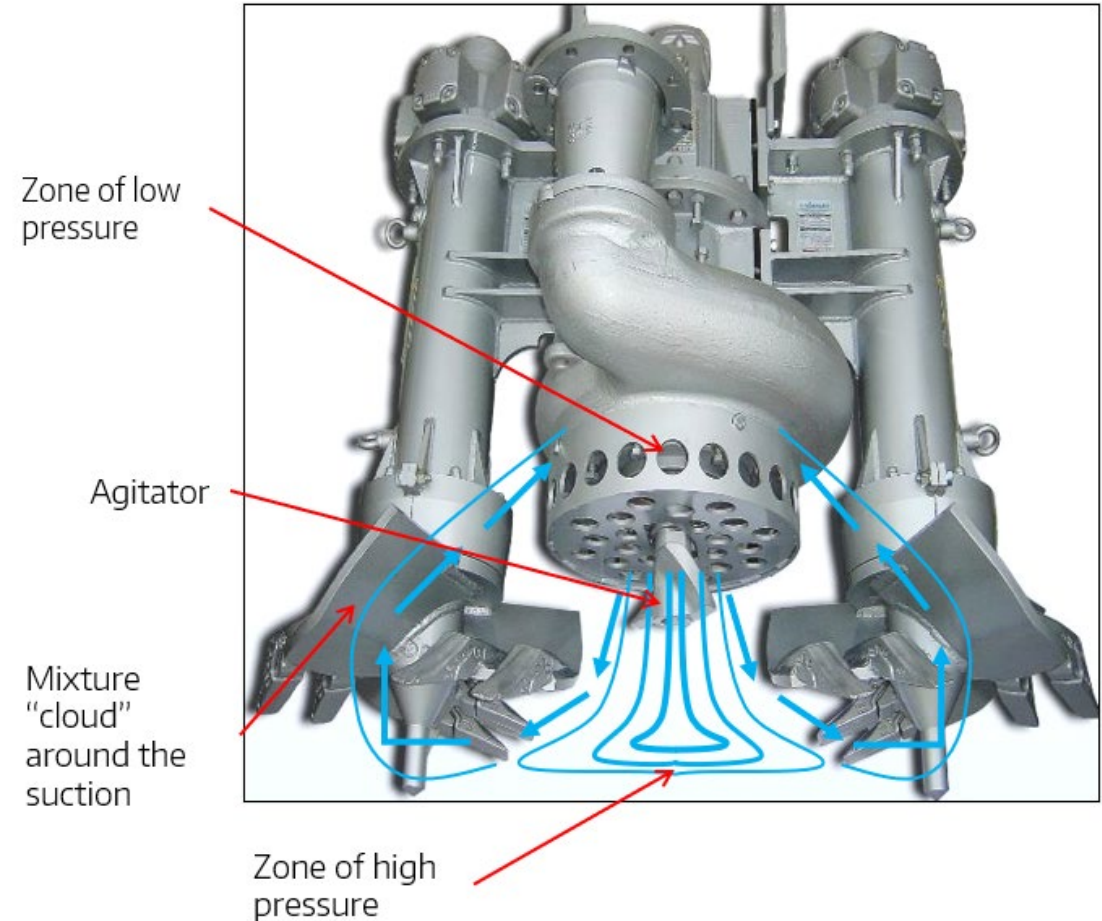


How it works

The agitator not only prevents solids from blocking the pump inlet by mixing them with the liquid, but with its rotation with pump shaft it creates a downward flow that generates a high-pressure area in front of the pump. That puts the settled material in suspension creating a cloud of slurry around the pump suction.

Above the agitator, inside the strainer, a low-pressure area is created. This, together with the action of the impeller, makes it possible to pump a high concentration of solids.

The side cutters run at low rpm. At every rotation they bring additional material to the suction.



Dragflow Jetring



Dredging equipment – types



Amphibious digger, boom mounted



Remotely operated dredge, cable mounted



Manned dredge, cable mounted



Manned dredge, boom mounted



The Workings

System Curve and Operating Point

Client Pipe System Input Data			
Pipe Section		UnderWater	AboveWater
Length	(m)	3	550
Static Head	(m)	3	45

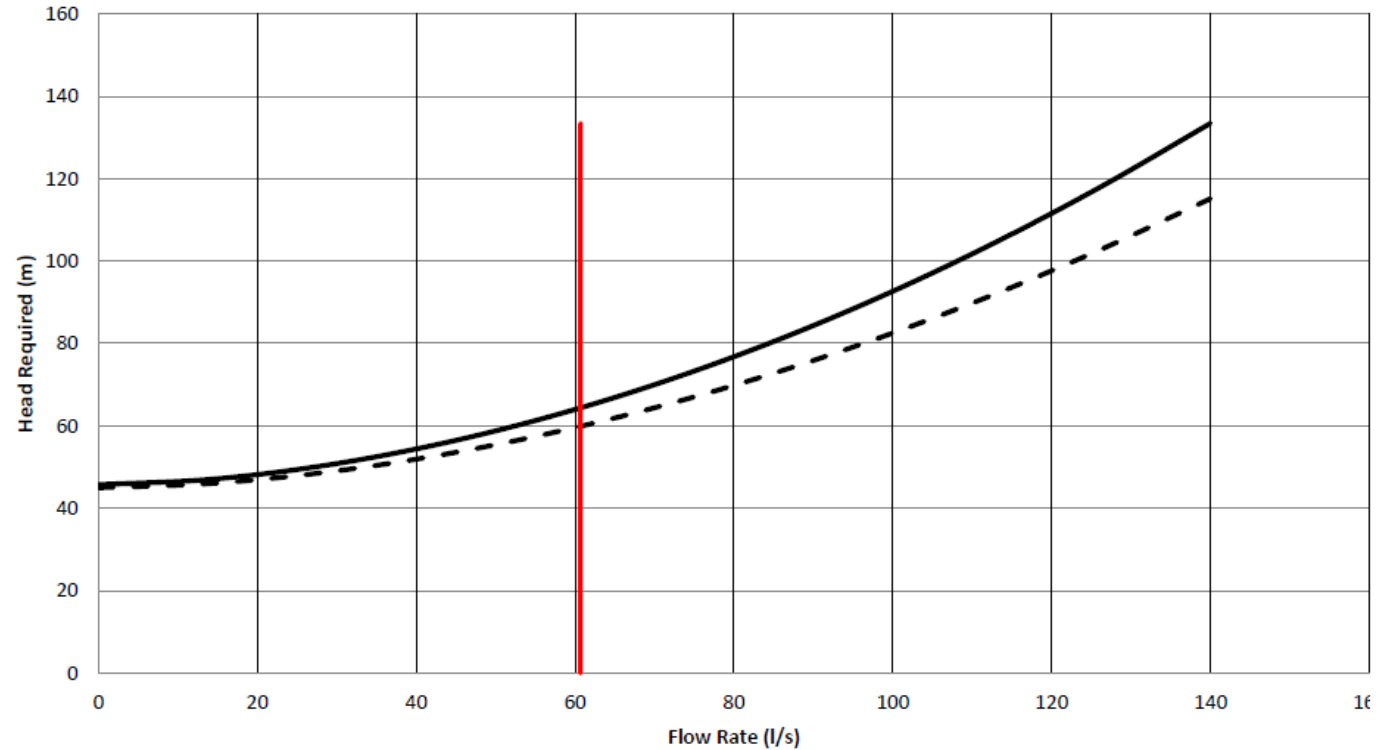
Pipe ID	(mm)	175.8
Pipe Roughness	(Constant, K)	0.0015
Friction Co-efficients		4.20
Water Temp	(°C)	20.0
Desired Flow Rate	(l/s)	70.0
Minimum Mean Fluid Velocity	(m/s)	2.50
S.G. (Sm) of Slurry		1.25
Dry S.G. of Solid		2.00
Head Ratio (HR)		1.25

Implies 60.7 L/s minimum through the designated pipe

Water Temp	(°C)	20
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Client Pipe System Output Data			
Flow Rate tested	Mean Fluid Velocity	Water (TDH)	Slurry (TDH)
(l/s)	(m/s)	(m)	(m)
0	0.00	45.0	45.8
14	0.58	46.0	47.0
28	1.15	48.6	50.3
42	1.73	52.6	55.2
56	2.31	57.9	61.8
70	2.88	64.4	70.0
84	3.46	72.2	79.7
98	4.04	81.2	90.9
112	4.61	91.3	103.6
126	5.19	102.6	117.8
140	5.77	115.1	133.4

Use this Point onwards.



- System Curve - Slurry
- - System Curve - Water
- Minimum Operating Point

Workings continued

Client Pipe System Input Data			
Pipe Section		UnderWater	AboveWater
Length	(m)	5	300
Static Head	(m)	5	15

Pipe ID	(mm)	175.8
Pipe Roughness	(Constant, K)	0.0015
Friction Co-efficients		4.20
Water Temp	(°C)	20.0
Desired Flow Rate	(l/s)	70.0
Minimum Mean Fluid Velocity	(m/s)	2.50
S.G. (Sm) of Slurry		1.25
Dry S.G. of Solid		2.00
Head Ratio (HR)		1.25

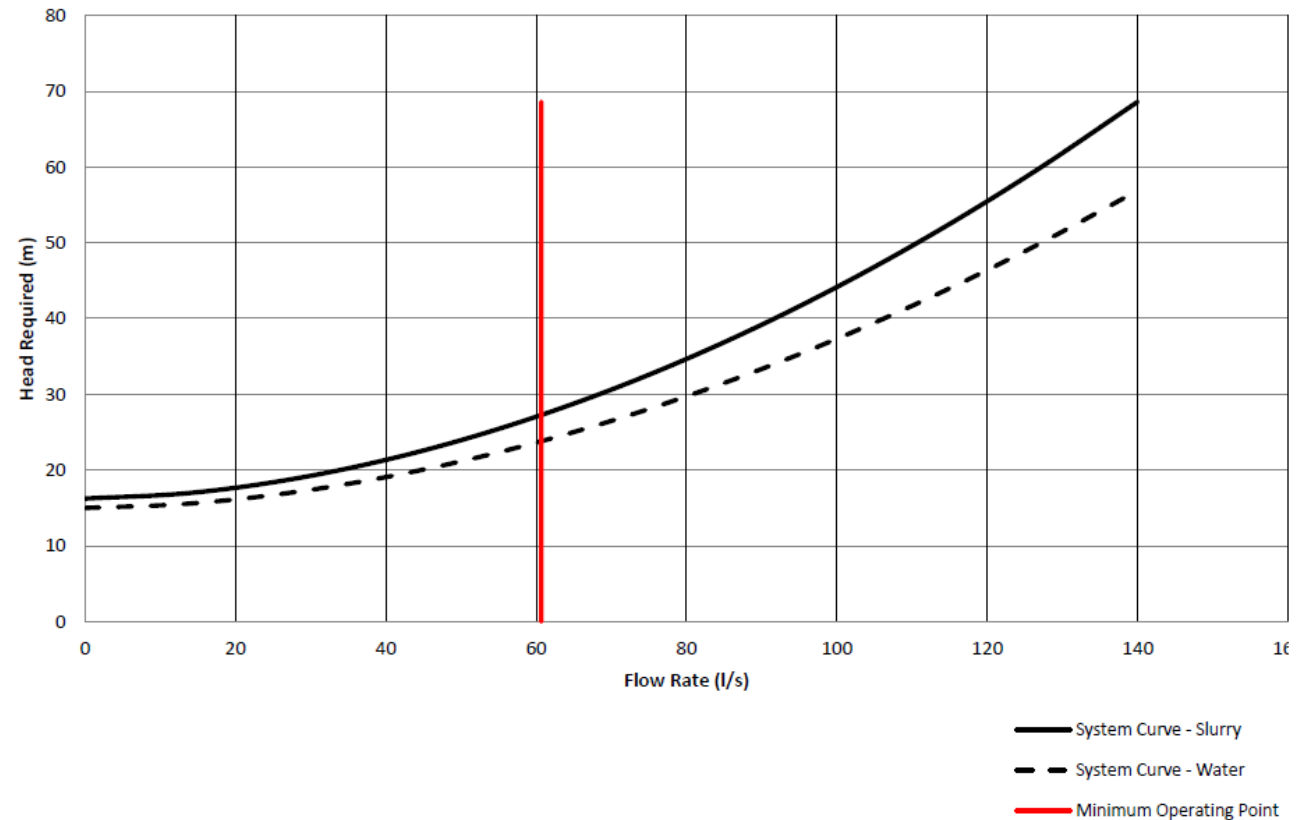
Implies 60.7 L/s minimum through the designated pipe

Water Temp	(°C)	20
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Client Pipe System Output Data			
Flow Rate tested	Mean Fluid Velocity	Water (TDH)	Slurry (TDH)
(l/s)	(m/s)	(m)	(m)
0	0.00	15.0	16.3
14	0.58	15.6	17.0
28	1.15	17.1	18.9
42	1.73	19.5	21.8
56	2.31	22.6	25.8
70	2.88	26.5	30.6
84	3.46	31.1	36.4
98	4.04	36.5	43.1
112	4.61	42.6	50.7
126	5.19	49.4	59.2
140	5.77	56.9	68.6

Use this Point onwards.

System Curve and Operating Point





The Pipeline

Clip together HDPE



Fast establishment / disestablishment – 1 day to set up, 1 day to pack down

The Discharge Point

Start



Finish



Booster Pump

BBA BA180





Finished Product

Winstones Flat Top



WINSTONE
AGGREGATES

The Issue

Silt pond completely full, with no settling capacity left – Winter was coming!



Winstones Flat Top

What they had tried to do?

- Diggers and trucks
- Large geo bags
- Lamella settling tanks plus smaller geo bags
- Lime/ Crystals



1st Option

Where it had to be pumped

70
Meters

- 70 metres vertical
- 380 metres distance



The Pump

Wangen KL50

Discharge Point – Murrays Pond

- Filter bed with clean stone
- An outlet pipe
- Filter cloth on top
- This enables quick drying times



Still work in progress

The
next
step!