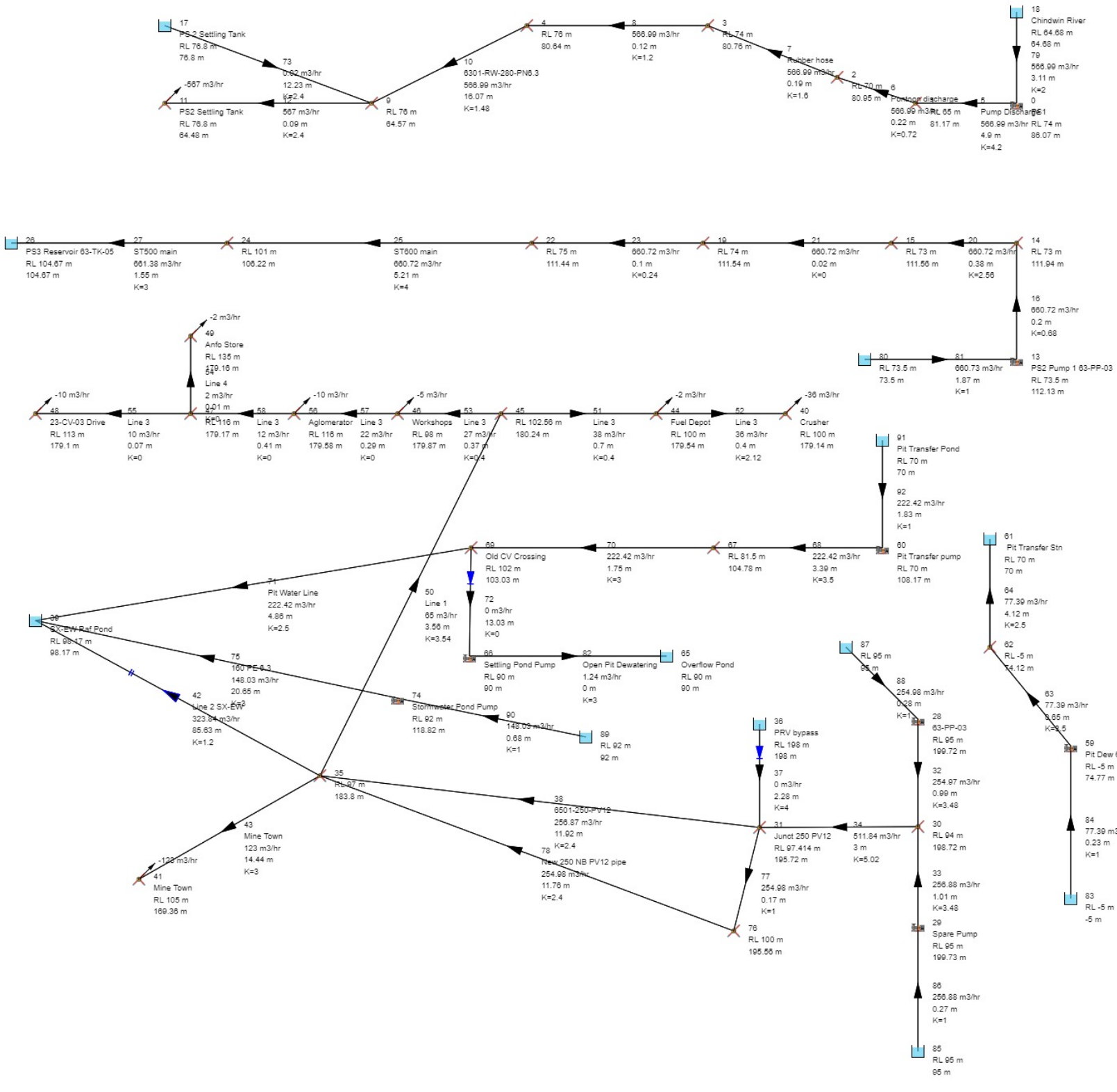
Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Network Type	Liquid	Calc. Method	Darcy
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Copper Mine and Solvent Solution Process Plant Water Supply system.
This is an existing mine and township water supply system including a river extraction pump, open pit dewatering system, process plant feed, township resevoir and overhead tank supply system.

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		



Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	5	From node to node	0 - 1
Description	Pump Discharge	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 020
Nominal Diameter	200 mm	Inside Diameter	206.4 mm
Outside Diameter	219.1 mm	Pipe Length	1.9 m
Pipe Roughness	0.045 mm	Allowable Press.	2500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	4.2	Total Fittings kf	0
Flow Rate	566.99 m3/hr	Velocity	4.71 m/s
Friction Loss	0.16 m	Fitting Losses	4.74 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	4.9 m	Total Pressure Drop	48.06 kPa
Entry Total Head	86.07 m	Exit Total Head	81.17 m
Entry Gauge Head	12.07 m	Exit Gauge Head	16.17 m
Reynolds No.	961947.62	Friction Factor	0.01491 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	6	From node to node	1 - 2
Description	Pontoon discharge	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 020
Nominal Diameter	300 mm	Inside Diameter	311.2 mm
Outside Diameter	323.9 mm	Pipe Length	6 m
Pipe Roughness	0.045 mm	Allowable Press.	4500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0.72	Total Fittings kf	0
Flow Rate	566.99 m3/hr	Velocity	2.07 m/s
Friction Loss	0.06 m	Fitting Losses	0.16 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.22 m	Total Pressure Drop	2.15 kPa
Entry Total Head	81.17 m	Exit Total Head	80.95 m
Entry Gauge Head	16.17 m	Exit Gauge Head	10.95 m
Reynolds No.	638001.25	Friction Factor	0.01455 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	7	From node to node	2 - 3
Description	Rubber hose	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Rubber Hose	Pipe Class	
Nominal Diameter	500 mm	Inside Diameter	440 mm
Outside Diameter	500 mm	Pipe Length	40 m
Pipe Roughness	0.5 mm	Allowable Press.	100 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1.6	Total Fittings kf	0
Flow Rate	566.99 m3/hr	Velocity	1.04 m/s
Friction Loss	0.1 m	Fitting Losses	0.09 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.19 m	Total Pressure Drop	1.88 kPa
Entry Total Head	80.95 m	Exit Total Head	80.76 m
Entry Gauge Head	10.95 m	Exit Gauge Head	6.76 m
Reynolds No.	451240.89	Friction Factor	0.02087 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	8	From node to node	3 - 4
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 020
Nominal Diameter	500 mm	Inside Diameter	489 mm
Outside Diameter	508 mm	Pipe Length	75 m
Pipe Roughness	0.045 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1.2	Total Fittings kf	0
Flow Rate	566.99 m3/hr	Velocity	0.84 m/s
Friction Loss	0.08 m	Fitting Losses	0.04 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.12 m	Total Pressure Drop	1.22 kPa
Entry Total Head	80.76 m	Exit Total Head	80.64 m
Entry Gauge Head	6.76 m	Exit Gauge Head	4.64 m
Reynolds No.	406024.52	Friction Factor	0.01473 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	10	From node to node	4 - 9
Description	6301-RW-280-PN6.3	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN6.3
Nominal Diameter	280 mm	Inside Diameter	252 mm
Outside Diameter	280 mm	Pipe Length	600 m
Pipe Roughness	0.007 mm	Allowable Press.	630 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1.48	Total Fittings kf	0
Flow Rate	566.99 m3/hr	Velocity	3.16 m/s
Friction Loss	15.31 m	Fitting Losses	0.75 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	16.07 m	Total Pressure Drop	157.56 kPa
Entry Total Head	80.64 m	Exit Total Head	64.57 m
Entry Gauge Head	4.64 m	Exit Gauge Head	-11.43 m
Reynolds No.	787880.91	Friction Factor	0.01265 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	12	From node to node	9 - 11
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 020
Nominal Diameter	500 mm	Inside Diameter	489 mm
Outside Diameter	508 mm	Pipe Length	6 m
Pipe Roughness	0.045 mm	Allowable Press.	1500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2.4	Total Fittings kf	0
Flow Rate	567 m3/hr	Velocity	0.84 m/s
Friction Loss	0.01 m	Fitting Losses	0.09 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.09 m	Total Pressure Drop	0.91 kPa
Entry Total Head	64.57 m	Exit Total Head	64.48 m
Entry Gauge Head	-11.43 m	Exit Gauge Head	-12.32 m
Reynolds No.	406032.17	Friction Factor	0.01473 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	16	From node to node	13 - 14
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 020
Nominal Diameter	350 mm	Inside Diameter	339.8 mm
Outside Diameter	355.6 mm	Pipe Length	4 m
Pipe Roughness	0.5 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0.68	Total Fittings kf	0
Flow Rate	660.72 m3/hr	Velocity	2.02 m/s
Friction Loss	0.05 m	Fitting Losses	0.14 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.2 m	Total Pressure Drop	1.92 kPa
Entry Total Head	112.13 m	Exit Total Head	111.94 m
Entry Gauge Head	38.63 m	Exit Gauge Head	38.94 m
Reynolds No.	680896.79	Friction Factor	0.02196 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	20	From node to node	14 - 15
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	400 mm	Inside Diameter	381 mm
Outside Diameter	406.4 mm	Pipe Length	5 m
Pipe Roughness	0.5 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2.56	Total Fittings kf	0
Flow Rate	660.72 m3/hr	Velocity	1.61 m/s
Friction Loss	0.04 m	Fitting Losses	0.34 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.38 m	Total Pressure Drop	3.68 kPa
Entry Total Head	111.94 m	Exit Total Head	111.56 m
Entry Gauge Head	38.94 m	Exit Gauge Head	38.56 m
Reynolds No.	607266.64	Friction Factor	0.02141 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	21	From node to node	15 - 19
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 020
Nominal Diameter	300 mm	Inside Diameter	311.2 mm
Outside Diameter	323.9 mm	Pipe Length	1 m
Pipe Roughness	0.5 mm	Allowable Press.	4500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0	Total Fittings kf	0
Flow Rate	660.72 m3/hr	Velocity	2.41 m/s
Friction Loss	0.02 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.02 m	Total Pressure Drop	0.21 kPa
Entry Total Head	111.56 m	Exit Total Head	111.54 m
Entry Gauge Head	38.56 m	Exit Gauge Head	37.54 m
Reynolds No.	743473.78	Friction Factor	0.02241 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	23	From node to node	19 - 22
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	500 mm	Inside Diameter	477.8 mm
Outside Diameter	508 mm	Pipe Length	30 m
Pipe Roughness	1.5 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0.24	Total Fittings kf	0
Flow Rate	660.72 m3/hr	Velocity	1.02 m/s
Friction Loss	0.09 m	Fitting Losses	0.01 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.1 m	Total Pressure Drop	1.01 kPa
Entry Total Head	111.54 m	Exit Total Head	111.44 m
Entry Gauge Head	37.54 m	Exit Gauge Head	36.44 m
Reynolds No.	484238.1	Friction Factor	0.02678 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	25	From node to node	22 - 24
Description	ST600 main	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	600 mm	Inside Diameter	574.6 mm
Outside Diameter	609.6 mm	Pipe Length	4500 m
Pipe Roughness	1.5 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	4	Total Fittings kf	0
Flow Rate	660.72 m3/hr	Velocity	0.71 m/s
Friction Loss	5.11 m	Fitting Losses	0.1 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	5.21 m	Total Pressure Drop	51.13 kPa
Entry Total Head	111.44 m	Exit Total Head	106.22 m
Entry Gauge Head	36.44 m	Exit Gauge Head	5.22 m
Reynolds No.	402661	Friction Factor	0.02555 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	27	From node to node	24 - 26
Description	ST500 main	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	500 mm	Inside Diameter	477.8 mm
Outside Diameter	508 mm	Pipe Length	464.75 m
Pipe Roughness	1.5 mm	Allowable Press.	4500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3	Total Fittings kf	0
Flow Rate	661.38 m3/hr	Velocity	1.02 m/s
Friction Loss	1.39 m	Fitting Losses	0.16 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.55 m	Total Pressure Drop	15.22 kPa
Entry Total Head	106.22 m	Exit Total Head	104.67 m
Entry Gauge Head	5.22 m	Exit Gauge Head	0 m
Reynolds No.	484720.59	Friction Factor	0.02678 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	32	From node to node	28 - 30
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	200 mm	Inside Diameter	202.7 mm
Outside Diameter	219.1 mm	Pipe Length	4.6 m
Pipe Roughness	0.5 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3.48	Total Fittings kf	0
Flow Rate	254.97 m3/hr	Velocity	2.19 m/s
Friction Loss	0.14 m	Fitting Losses	0.85 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.99 m	Total Pressure Drop	9.76 kPa
Entry Total Head	199.72 m	Exit Total Head	198.72 m
Entry Gauge Head	104.72 m	Exit Gauge Head	104.72 m
Reynolds No.	440467.96	Friction Factor	0.02514 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	33	From node to node	29 - 30
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	200 mm	Inside Diameter	202.7 mm
Outside Diameter	219.1 mm	Pipe Length	4.6 m
Pipe Roughness	0.5 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3.48	Total Fittings kf	0
Flow Rate	256.88 m3/hr	Velocity	2.21 m/s
Friction Loss	0.14 m	Fitting Losses	0.87 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.01 m	Total Pressure Drop	9.9 kPa
Entry Total Head	199.73 m	Exit Total Head	198.72 m
Entry Gauge Head	104.73 m	Exit Gauge Head	104.72 m
Reynolds No.	443771.94	Friction Factor	0.02514 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	34	From node to node	30 - 31
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	250 mm	Inside Diameter	254.5 mm
Outside Diameter	273 mm	Pipe Length	20 m
Pipe Roughness	1.5 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	5.02	Total Fittings kf	0
Flow Rate	511.84 m3/hr	Velocity	2.79 m/s
Friction Loss	1 m	Fitting Losses	2 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	3 m	Total Pressure Drop	29.45 kPa
Entry Total Head	198.72 m	Exit Total Head	195.72 m
Entry Gauge Head	104.72 m	Exit Gauge Head	98.31 m
Reynolds No.	704265.67	Friction Factor	0.03206 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	37	From node to node	31 - 36
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	150 mm	Inside Diameter	154.1 mm
Outside Diameter	168.3 mm	Pipe Length	20 m
Pipe Roughness	0.045 mm	Allowable Press.	1 kPa
Orifice Plate Dia	-	Non Return Valve	Yes
Total Fittings k	4	Total Fittings kf	0
Flow Rate	0 m3/hr	Velocity	0 m/s
Friction Loss	2.28 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	2.28 m	Total Pressure Drop	22.34 kPa
Entry Total Head	198 m	Exit Total Head	195.72 m
Entry Gauge Head	98.31 m	Exit Gauge Head	-4.56 m
Reynolds No.	0	Friction Factor	1870120.27839 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	38	From node to node	31 - 35
Description	6501-250-PV12	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	250 mm	Inside Diameter	253 mm
Outside Diameter	280.4 mm	Pipe Length	1770 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2.4	Total Fittings kf	0
Flow Rate	256.87 m3/hr	Velocity	1.42 m/s
Friction Loss	11.68 m	Fitting Losses	0.25 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	11.92 m	Total Pressure Drop	116.93 kPa
Entry Total Head	195.72 m	Exit Total Head	183.8 m
Entry Gauge Head	98.31 m	Exit Gauge Head	86.8 m
Reynolds No.	355526.81	Friction Factor	0.01625 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	42	From node to node	35 - 39
Description	Line 2 SX-EW	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	200 mm	Inside Diameter	203.1 mm
Outside Diameter	225.3 mm	Pipe Length	880 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	75	Non Return Valve	No
Total Fittings k	1.2	Total Fittings kf	0
Flow Rate	323.84 m3/hr	Velocity	2.78 m/s
Friction Loss	27.47 m	Fitting Losses	0.47 m
Slurry Losses	0 m	Orifice Losses	57.68 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	85.63 m	Total Pressure Drop	839.72 kPa
Entry Total Head	183.8 m	Exit Total Head	98.17 m
Entry Gauge Head	86.8 m	Exit Gauge Head	0 m
Reynolds No.	558358.18	Friction Factor	0.01612 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	43	From node to node	35 - 41
Description	Mine Town	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	150 mm	Inside Diameter	142.7 mm
Outside Diameter	160.3 mm	Pipe Length	475 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3	Total Fittings kf	0
Flow Rate	123 m3/hr	Velocity	2.14 m/s
Friction Loss	13.74 m	Fitting Losses	0.7 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	14.44 m	Total Pressure Drop	141.61 kPa
Entry Total Head	183.8 m	Exit Total Head	169.36 m
Entry Gauge Head	86.8 m	Exit Gauge Head	64.36 m
Reynolds No.	301833.46	Friction Factor	0.01774 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	50	From node to node	35 - 45
Description	Line 1	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	200 mm	Inside Diameter	203.1 mm
Outside Diameter	225.3 mm	Pipe Length	2350 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3.54	Total Fittings kf	0
Flow Rate	65 m3/hr	Velocity	0.56 m/s
Friction Loss	3.5 m	Fitting Losses	0.06 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	3.56 m	Total Pressure Drop	34.91 kPa
Entry Total Head	183.8 m	Exit Total Head	180.24 m
Entry Gauge Head	86.8 m	Exit Gauge Head	77.68 m
Reynolds No.	112070.08	Friction Factor	0.01911 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	51	From node to node	45 - 44
Description	Line 3	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	150 mm	Inside Diameter	142.7 mm
Outside Diameter	160.3 mm	Pipe Length	220 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0.4	Total Fittings kf	0
Flow Rate	38 m3/hr	Velocity	0.66 m/s
Friction Loss	0.69 m	Fitting Losses	0.01 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.7 m	Total Pressure Drop	6.87 kPa
Entry Total Head	180.24 m	Exit Total Head	179.54 m
Entry Gauge Head	77.68 m	Exit Gauge Head	79.54 m
Reynolds No.	93249.36	Friction Factor	0.02019 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	52	From node to node	44 - 40
Description	Line 3	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	150 mm	Inside Diameter	142.7 mm
Outside Diameter	160.3 mm	Pipe Length	125 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2.12	Total Fittings kf	0
Flow Rate	36 m3/hr	Velocity	0.63 m/s
Friction Loss	0.36 m	Fitting Losses	0.04 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.4 m	Total Pressure Drop	3.9 kPa
Entry Total Head	179.54 m	Exit Total Head	179.14 m
Entry Gauge Head	79.54 m	Exit Gauge Head	79.14 m
Reynolds No.	88341.5	Friction Factor	0.02035 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	53	From node to node	45 - 46
Description	Line 3	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	150 mm	Inside Diameter	142.7 mm
Outside Diameter	160.3 mm	Pipe Length	220 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0.4	Total Fittings kf	0
Flow Rate	27 m3/hr	Velocity	0.47 m/s
Friction Loss	0.37 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.37 m	Total Pressure Drop	3.65 kPa
Entry Total Head	180.24 m	Exit Total Head	179.87 m
Entry Gauge Head	77.68 m	Exit Gauge Head	81.87 m
Reynolds No.	66256.13	Friction Factor	0.02128 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	54	From node to node	47 - 49
Description	Line 4	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	150 mm	Inside Diameter	142.7 mm
Outside Diameter	160.3 mm	Pipe Length	535 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0	Total Fittings kf	0
Flow Rate	2 m3/hr	Velocity	0.03 m/s
Friction Loss	0.01 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.01 m	Total Pressure Drop	0.09 kPa
Entry Total Head	179.17 m	Exit Total Head	179.16 m
Entry Gauge Head	63.17 m	Exit Gauge Head	44.16 m
Reynolds No.	4907.86	Friction Factor	0.03806 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	55	From node to node	47 - 48
Description	Line 3	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	150 mm	Inside Diameter	142.7 mm
Outside Diameter	160.3 mm	Pipe Length	250 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0	Total Fittings kf	0
Flow Rate	10 m3/hr	Velocity	0.17 m/s
Friction Loss	0.07 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.07 m	Total Pressure Drop	0.68 kPa
Entry Total Head	179.17 m	Exit Total Head	179.1 m
Entry Gauge Head	63.17 m	Exit Gauge Head	66.1 m
Reynolds No.	24539.31	Friction Factor	0.02563 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	57	From node to node	46 - 56
Description	Line 3	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	150 mm	Inside Diameter	142.7 mm
Outside Diameter	160.3 mm	Pipe Length	250 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0	Total Fittings kf	0
Flow Rate	22 m3/hr	Velocity	0.38 m/s
Friction Loss	0.29 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.29 m	Total Pressure Drop	2.82 kPa
Entry Total Head	179.87 m	Exit Total Head	179.58 m
Entry Gauge Head	81.87 m	Exit Gauge Head	63.58 m
Reynolds No.	53986.47	Friction Factor	0.02202 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	58	From node to node	56 - 47
Description	Line 3	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	150 mm	Inside Diameter	142.7 mm
Outside Diameter	160.3 mm	Pipe Length	1070 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	0	Total Fittings kf	0
Flow Rate	12 m3/hr	Velocity	0.21 m/s
Friction Loss	0.41 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.41 m	Total Pressure Drop	4.02 kPa
Entry Total Head	179.58 m	Exit Total Head	179.17 m
Entry Gauge Head	63.58 m	Exit Gauge Head	63.17 m
Reynolds No.	29447.17	Friction Factor	0.02468 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	63	From node to node	59 - 62
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN16
Nominal Diameter	160 mm	Inside Diameter	123 mm
Outside Diameter	160 mm	Pipe Length	3 m
Pipe Roughness	0.003 mm	Allowable Press.	1600 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3.5	Total Fittings kf	0
Flow Rate	77.39 m3/hr	Velocity	1.81 m/s
Friction Loss	0.06 m	Fitting Losses	0.58 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.65 m	Total Pressure Drop	6.35 kPa
Entry Total Head	74.77 m	Exit Total Head	74.12 m
Entry Gauge Head	79.77 m	Exit Gauge Head	79.12 m
Reynolds No.	220327.83	Friction Factor	0.01555 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	64	From node to node	62 - 61
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN16
Nominal Diameter	160 mm	Inside Diameter	123 mm
Outside Diameter	160 mm	Pipe Length	172.5 m
Pipe Roughness	0.007 mm	Allowable Press.	1600 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2.5	Total Fittings kf	0
Flow Rate	77.39 m3/hr	Velocity	1.81 m/s
Friction Loss	3.7 m	Fitting Losses	0.42 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	4.12 m	Total Pressure Drop	40.41 kPa
Entry Total Head	74.12 m	Exit Total Head	70 m
Entry Gauge Head	79.12 m	Exit Gauge Head	0 m
Reynolds No.	220327.83	Friction Factor	0.01582 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	68	From node to node	60 - 67
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN6.3
Nominal Diameter	200 mm	Inside Diameter	180 mm
Outside Diameter	200 mm	Pipe Length	100 m
Pipe Roughness	0.007 mm	Allowable Press.	630 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3.5	Total Fittings kf	0
Flow Rate	222.42 m3/hr	Velocity	2.43 m/s
Friction Loss	2.34 m	Fitting Losses	1.05 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	3.39 m	Total Pressure Drop	33.25 kPa
Entry Total Head	108.17 m	Exit Total Head	104.78 m
Entry Gauge Head	38.17 m	Exit Gauge Head	23.28 m
Reynolds No.	432704.73	Friction Factor	0.014 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	70	From node to node	67 - 69
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN6.3
Nominal Diameter	315 mm	Inside Diameter	283 mm
Outside Diameter	315 mm	Pipe Length	615 m
Pipe Roughness	0.007 mm	Allowable Press.	500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3	Total Fittings kf	0
Flow Rate	222.42 m3/hr	Velocity	0.98 m/s
Friction Loss	1.6 m	Fitting Losses	0.15 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.75 m	Total Pressure Drop	17.12 kPa
Entry Total Head	104.78 m	Exit Total Head	103.03 m
Entry Gauge Head	23.28 m	Exit Gauge Head	1.03 m
Reynolds No.	275218.55	Friction Factor	0.01494 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	71	From node to node	69 - 39
Description	Pit Water Line	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN12.5
Nominal Diameter	355 mm	Inside Diameter	289 mm
Outside Diameter	355 mm	Pipe Length	2023 m
Pipe Roughness	0.007 mm	Allowable Press.	100 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2.5	Total Fittings kf	0
Flow Rate	222.42 m3/hr	Velocity	0.94 m/s
Friction Loss	4.75 m	Fitting Losses	0.11 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	4.86 m	Total Pressure Drop	47.68 kPa
Entry Total Head	103.03 m	Exit Total Head	98.17 m
Entry Gauge Head	1.03 m	Exit Gauge Head	0 m
Reynolds No.	269504.67	Friction Factor	0.015 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	72	From node to node	66 - 69
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN6.3
Nominal Diameter	200 mm	Inside Diameter	180 mm
Outside Diameter	200 mm	Pipe Length	55 m
Pipe Roughness	0.007 mm	Allowable Press.	630 kPa
Orifice Plate Dia	-	Non Return Valve	Yes
Total Fittings k	0	Total Fittings kf	0
Flow Rate	0 m3/hr	Velocity	0 m/s
Friction Loss	13.03 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	13.03 m	Total Pressure Drop	127.8 kPa
Entry Total Head	103.03 m	Exit Total Head	90 m
Entry Gauge Head	0 m	Exit Gauge Head	-25.03 m
Reynolds No.	0	Friction Factor	899123.09654 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	73	From node to node	9 - 17
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel ANSI BS36.10	Pipe Class	Sch 020
Nominal Diameter	500 mm	Inside Diameter	2 mm
Outside Diameter	508 mm	Pipe Length	6 m
Pipe Roughness	1.5 mm	Allowable Press.	1500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2.4	Total Fittings kf	0
Flow Rate	0.02 m3/hr	Velocity	1.68 m/s
Friction Loss	11.88 m	Fitting Losses	0.35 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	12.23 m	Total Pressure Drop	119.91 kPa
Entry Total Head	76.8 m	Exit Total Head	64.57 m
Entry Gauge Head	-11.43 m	Exit Gauge Head	-24.46 m
Reynolds No.	3335.7	Friction Factor	0.5237 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	75	From node to node	74 - 39
Description	160 PE 6.3	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN6.3
Nominal Diameter	160 mm	Inside Diameter	144 mm
Outside Diameter	160 mm	Pipe Length	600 m
Pipe Roughness	0.007 mm	Allowable Press.	630 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3	Total Fittings kf	0
Flow Rate	148.03 m3/hr	Velocity	2.52 m/s
Friction Loss	19.67 m	Fitting Losses	0.98 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	20.65 m	Total Pressure Drop	202.49 kPa
Entry Total Head	118.82 m	Exit Total Head	98.17 m
Entry Gauge Head	26.82 m	Exit Gauge Head	0 m
Reynolds No.	359975.11	Friction Factor	0.01452 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	77	From node to node	31 - 76
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	250 mm	Inside Diameter	253 mm
Outside Diameter	280.4 mm	Pipe Length	10 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1	Total Fittings kf	0
Flow Rate	254.98 m3/hr	Velocity	1.41 m/s
Friction Loss	0.07 m	Fitting Losses	0.1 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.17 m	Total Pressure Drop	1.63 kPa
Entry Total Head	195.72 m	Exit Total Head	195.56 m
Entry Gauge Head	98.31 m	Exit Gauge Head	95.56 m
Reynolds No.	352914.35	Friction Factor	0.01626 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	78	From node to node	76 - 35
Description	New 250 NB PV12 pipe	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	uPVC RRJ Pipe AS1477	Pipe Class	12
Nominal Diameter	250 mm	Inside Diameter	253 mm
Outside Diameter	280.4 mm	Pipe Length	1770 m
Pipe Roughness	0.06 mm	Allowable Press.	1200 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2.4	Total Fittings kf	0
Flow Rate	254.98 m3/hr	Velocity	1.41 m/s
Friction Loss	11.51 m	Fitting Losses	0.24 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	11.76 m	Total Pressure Drop	115.3 kPa
Entry Total Head	195.56 m	Exit Total Head	183.8 m
Entry Gauge Head	95.56 m	Exit Gauge Head	86.8 m
Reynolds No.	352914.35	Friction Factor	0.01626 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	79	From node to node	18 - 0
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	200 mm	Inside Diameter	203.3 mm
Outside Diameter	219.1 mm	Pipe Length	8 m
Pipe Roughness	0.045 mm	Allowable Press.	1500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	2	Total Fittings kf	0
Flow Rate	566.99 m3/hr	Velocity	4.85 m/s
Friction Loss	0.71 m	Fitting Losses	2.4 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	3.11 m	Total Pressure Drop	30.46 kPa
Entry Total Head	64.68 m	Exit Total Head	61.57 m
Entry Gauge Head	0 m	Exit Gauge Head	-12.43 m
Reynolds No.	976615.79	Friction Factor	0.01493 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	81	From node to node	80 - 13
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	200 mm	Inside Diameter	203.3 mm
Outside Diameter	219.1 mm	Pipe Length	2 m
Pipe Roughness	0.045 mm	Allowable Press.	1500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1	Total Fittings kf	0
Flow Rate	660.73 m3/hr	Velocity	5.65 m/s
Friction Loss	0.24 m	Fitting Losses	1.63 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.87 m	Total Pressure Drop	18.32 kPa
Entry Total Head	73.5 m	Exit Total Head	71.63 m
Entry Gauge Head	0 m	Exit Gauge Head	-1.87 m
Reynolds No.	1138084.41	Friction Factor	0.01481 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	82	From node to node	65 - 66
Description	Open Pit Dewatering	Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	200 mm	Inside Diameter	203.3 mm
Outside Diameter	219.1 mm	Pipe Length	3 m
Pipe Roughness	0.045 mm	Allowable Press.	1500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	3	Total Fittings kf	0
Flow Rate	1.24 m3/hr	Velocity	0.01 m/s
Friction Loss	0 m	Fitting Losses	0 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0 m	Total Pressure Drop	0 kPa
Entry Total Head	90 m	Exit Total Head	90 m
Entry Gauge Head	0 m	Exit Gauge Head	0 m
Reynolds No.	2143.14	Friction Factor	0.04854 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	84	From node to node	83 - 59
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN16
Nominal Diameter	160 mm	Inside Diameter	123 mm
Outside Diameter	160 mm	Pipe Length	3 m
Pipe Roughness	0.007 mm	Allowable Press.	1600 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1	Total Fittings kf	0
Flow Rate	77.39 m3/hr	Velocity	1.81 m/s
Friction Loss	0.06 m	Fitting Losses	0.17 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.23 m	Total Pressure Drop	2.27 kPa
Entry Total Head	-5 m	Exit Total Head	-5.23 m
Entry Gauge Head	0 m	Exit Gauge Head	-0.23 m
Reynolds No.	220327.83	Friction Factor	0.01582 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	86	From node to node	85 - 29
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	200 mm	Inside Diameter	203.3 mm
Outside Diameter	219.1 mm	Pipe Length	1 m
Pipe Roughness	0.045 mm	Allowable Press.	1500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1	Total Fittings kf	0
Flow Rate	256.88 m3/hr	Velocity	2.2 m/s
Friction Loss	0.02 m	Fitting Losses	0.25 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.27 m	Total Pressure Drop	2.6 kPa
Entry Total Head	95 m	Exit Total Head	94.73 m
Entry Gauge Head	0 m	Exit Gauge Head	-0.27 m
Reynolds No.	442462.38	Friction Factor	0.01579 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	88	From node to node	87 - 28
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Steel B36.10	Pipe Class	Sch 040
Nominal Diameter	200 mm	Inside Diameter	203.3 mm
Outside Diameter	219.1 mm	Pipe Length	2 m
Pipe Roughness	0.045 mm	Allowable Press.	1500 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1	Total Fittings kf	0
Flow Rate	254.98 m3/hr	Velocity	2.18 m/s
Friction Loss	0.04 m	Fitting Losses	0.24 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.28 m	Total Pressure Drop	2.75 kPa
Entry Total Head	95 m	Exit Total Head	94.72 m
Entry Gauge Head	0 m	Exit Gauge Head	-0.28 m
Reynolds No.	439184.29	Friction Factor	0.0158 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	90	From node to node	89 - 74
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN16
Nominal Diameter	160 mm	Inside Diameter	123 mm
Outside Diameter	160 mm	Pipe Length	1 m
Pipe Roughness	0.007 mm	Allowable Press.	1600 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1	Total Fittings kf	0
Flow Rate	148.03 m3/hr	Velocity	3.46 m/s
Friction Loss	0.07 m	Fitting Losses	0.61 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	0.68 m	Total Pressure Drop	6.68 kPa
Entry Total Head	92 m	Exit Total Head	91.32 m
Entry Gauge Head	0 m	Exit Gauge Head	-0.68 m
Reynolds No.	421434.27	Friction Factor	0.01427 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Pipe No	92	From node to node	91 - 60
Description		Equipment No	
Liquid	WATER	Viscosity	1.01 cp
Temperature	20 C	Density	1000 kg/m3
Vapour Pressure	1.6 kPa		
Pipe Description	Polyethylene PE80 AS4130	Pipe Class	PN16
Nominal Diameter	160 mm	Inside Diameter	123 mm
Outside Diameter	160 mm	Pipe Length	3 m
Pipe Roughness	0.007 mm	Allowable Press.	1600 kPa
Orifice Plate Dia	-	Non Return Valve	No
Total Fittings k	1	Total Fittings kf	0
Flow Rate	222.42 m3/hr	Velocity	5.2 m/s
Friction Loss	0.45 m	Fitting Losses	1.38 m
Slurry Losses	0 m	Orifice Losses	0 m
Fixed Head Loss	0 m	Booster Pump Head	0 m
Total Head Loss	1.83 m	Total Pressure Drop	17.97 kPa
Entry Total Head	70 m	Exit Total Head	68.17 m
Entry Gauge Head	0 m	Exit Gauge Head	-1.83 m
Reynolds No.	633226.43	Friction Factor	0.01349 (Darcy f)

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	0	Node Type	Pump
Description	PS1	Equipment No	Galligher 8 inch
Rel. Level (RL)	74 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	86.07 m		
Pump Head	24.5 m	Pump Flow Rate	566.99 m3/hr
Pump / Fan Efficiency	70 %	Pump Absorbed Power	54.06 kW
Casing Pressure	118.4 kPa		
Pump NPSH required	0 m	Pump NPSH available	-2.37 m

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	1	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	65 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	16.17 m	Int.(Gauge) Pressure	158.6 kPa
Total Node Head	81.17 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	2	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	70 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	10.95 m	Int.(Gauge) Pressure	107.42 kPa
Total Node Head	80.95 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	3	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	74 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	6.76 m	Int.(Gauge) Pressure	66.32 kPa
Total Node Head	80.76 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	4	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	76 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	4.64 m	Int.(Gauge) Pressure	45.49 kPa
Total Node Head	80.64 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	9	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	76 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	-11.43 m	Int.(Gauge) Pressure	-112.07 kPa
Total Node Head	64.57 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	11	Node Type	Junction
Description	PS2 Settling Tank	Equipment No	
Rel. Level (RL)	76.8 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-567 m3/hr
Int.(Gauge) Head	-12.32 m	Int.(Gauge) Pressure	-120.82 kPa
Total Node Head	64.48 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	13	Node Type	Pump
Description	PS2 Pump 1 63-PP-03	Equipment No	63-PP-03
Rel. Level (RL)	73.5 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	112.13 m		
Pump Head	40.5 m	Pump Flow Rate	660.68 m3/hr
Pump / Fan Efficiency	70 %	Pump Absorbed Power	104.13 kW
Casing Pressure	378.85 kPa		
Pump NPSH required	0 m	Pump NPSH available	8.19 m

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	14	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	73 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	38.94 m	Int.(Gauge) Pressure	381.83 kPa
Total Node Head	111.94 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	15	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	73 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	38.56 m	Int.(Gauge) Pressure	378.15 kPa
Total Node Head	111.56 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	17	Node Type	Tank
Description	PS 2 Settling Tank	Equipment No	
Rel. Level (RL)	76.8 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	76.8 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	18	Node Type	Tank
Description	Chindwin River	Equipment No	RL 64.68 to 74.18
Rel. Level (RL)	64.68 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	64.68 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	19	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	74 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	37.54 m	Int.(Gauge) Pressure	368.13 kPa
Total Node Head	111.54 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	22	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	75 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	36.44 m	Int.(Gauge) Pressure	357.32 kPa
Total Node Head	111.44 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	24	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	101 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	5.22 m	Int.(Gauge) Pressure	51.21 kPa
Total Node Head	106.22 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	26	Node Type	Tank
Description	PS3 Reservoir 63-TK-05	Equipment No	63-TK-05
Rel. Level (RL)	104.67 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	104.67 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	28	Node Type	Pump
Description	63-PP-03	Equipment No	
Rel. Level (RL)	95 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	199.72 m		
Pump Head	105 m	Pump Flow Rate	254.98 m3/hr
Pump / Fan Efficiency	70 %	Pump Absorbed Power	104.19 kW
Casing Pressure	1026.95 kPa		
Pump NPSH required	0 m	Pump NPSH available	9.77 m

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	29	Node Type	Pump
Description	Spare Pump	Equipment No	
Rel. Level (RL)	95 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	199.73 m		
Pump Head	105 m	Pump Flow Rate	256.88 m3/hr
Pump / Fan Efficiency	70 %	Pump Absorbed Power	104.96 kW
Casing Pressure	1027.09 kPa		
Pump NPSH required	0 m	Pump NPSH available	9.79 m

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	30	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	94 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	104.72 m	Int.(Gauge) Pressure	1027 kPa
Total Node Head	198.72 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	31	Node Type	Junction
Description	Junct 250 PV12	Equipment No	
Rel. Level (RL)	97.414 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	98.31 m	Int.(Gauge) Pressure	964.07 kPa
Total Node Head	195.72 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	35	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	97 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	86.8 m	Int.(Gauge) Pressure	851.2 kPa
Total Node Head	183.8 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	36	Node Type	Tank
Description	PRV bypass	Equipment No	
Rel. Level (RL)	198 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	198 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	39	Node Type	Tank
Description	SX-EW Raf Pond	Equipment No	
Rel. Level (RL)	98.17 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	98.17 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	40	Node Type	Junction
Description	Crusher	Equipment No	
Rel. Level (RL)	100 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-36 m3/hr
Int.(Gauge) Head	79.14 m	Int.(Gauge) Pressure	776.1 kPa
Total Node Head	179.14 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	41	Node Type	Junction
Description	Mine Town	Equipment No	
Rel. Level (RL)	105 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-123 m3/hr
Int.(Gauge) Head	64.36 m	Int.(Gauge) Pressure	631.14 kPa
Total Node Head	169.36 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	44	Node Type	Junction
Description	Fuel Depot	Equipment No	
Rel. Level (RL)	100 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-2 m3/hr
Int.(Gauge) Head	79.54 m	Int.(Gauge) Pressure	780 kPa
Total Node Head	179.54 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	45	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	102.56 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	77.68 m	Int.(Gauge) Pressure	761.77 kPa
Total Node Head	180.24 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	46	Node Type	Junction
Description	Workshops	Equipment No	
Rel. Level (RL)	98 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-5 m3/hr
Int.(Gauge) Head	81.87 m	Int.(Gauge) Pressure	802.83 kPa
Total Node Head	179.87 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	47	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	116 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	63.17 m	Int.(Gauge) Pressure	619.48 kPa
Total Node Head	179.17 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	48	Node Type	Junction
Description	23-CV-03 Drive	Equipment No	
Rel. Level (RL)	113 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-10 m3/hr
Int.(Gauge) Head	66.1 m	Int.(Gauge) Pressure	648.22 kPa
Total Node Head	179.1 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	49	Node Type	Junction
Description	Anfo Store	Equipment No	
Rel. Level (RL)	135 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-2 m3/hr
Int.(Gauge) Head	44.16 m	Int.(Gauge) Pressure	433.07 kPa
Total Node Head	179.16 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	56	Node Type	Junction
Description	Aglomerator	Equipment No	
Rel. Level (RL)	116 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-10 m3/hr
Int.(Gauge) Head	63.58 m	Int.(Gauge) Pressure	623.5 kPa
Total Node Head	179.58 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	59	Node Type	Pump
Description	Pit Dew 61-PP-02	Equipment No	RL495
Rel. Level (RL)	-5 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	74.77 m		
Pump Head	80 m	Pump Flow Rate	77.39 m3/hr
Pump / Fan Efficiency	70 %	Pump Absorbed Power	24.09 kW
Casing Pressure	782.26 kPa		
Pump NPSH required	0 m	Pump NPSH available	9.82 m

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	60	Node Type	Pump
Description	Pit Transfer pump	Equipment No	62-PP-02C/D
Rel. Level (RL)	70 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	108.17 m		
Pump Head	40 m	Pump Flow Rate	222.42 m3/hr
Pump / Fan Efficiency	70 %	Pump Absorbed Power	34.62 kW
Casing Pressure	374.3 kPa		
Pump NPSH required	0 m	Pump NPSH available	8.22 m

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	61	Node Type	Tank
Description	Pit Transfer Stn	Equipment No	RL570
Rel. Level (RL)	70 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	70 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	62	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	-5 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	79.12 m	Int.(Gauge) Pressure	775.91 kPa
Total Node Head	74.12 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	65	Node Type	Tank
Description	Overflow Pond	Equipment No	
Rel. Level (RL)	90 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	90 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	66	Node Type	Pump
Description	Settling Pond Pump	Equipment No	
Rel. Level (RL)	90 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	90 m		
Pump Head	0 m	Pump Flow Rate	1.24 m3/hr
Pump / Fan Efficiency	70 %	Pump Absorbed Power	0 kW
Casing Pressure	0 kPa		
Pump NPSH required	0 m	Pump NPSH available	10.06 m

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	67	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	81.5 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	23.28 m	Int.(Gauge) Pressure	228.27 kPa
Total Node Head	104.78 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	69	Node Type	Junction
Description	Old CV Crossing	Equipment No	
Rel. Level (RL)	102 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	1.03 m	Int.(Gauge) Pressure	10.12 kPa
Total Node Head	103.03 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	74	Node Type	Pump
Description	Stormwater Pond Pump	Equipment No	Grundfoss SP160-2N
Rel. Level (RL)	92 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	118.82 m		
Pump Head	27.5 m	Pump Flow Rate	148.03 m3/hr
Pump / Fan Efficiency	70 %	Pump Absorbed Power	15.84 kW
Casing Pressure	263 kPa		
Pump NPSH required	0 m	Pump NPSH available	9.37 m

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	76	Node Type	Junction
Description		Equipment No	
Rel. Level (RL)	100 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	0 m3/hr
Int.(Gauge) Head	95.56 m	Int.(Gauge) Pressure	937.08 kPa
Total Node Head	195.56 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	80	Node Type	Tank
Description		Equipment No	
Rel. Level (RL)	73.5 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	73.5 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	83	Node Type	Tank
Description		Equipment No	
Rel. Level (RL)	-5 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	-5 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	85	Node Type	Tank
Description		Equipment No	
Rel. Level (RL)	95 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	95 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	87	Node Type	Tank
Description		Equipment No	
Rel. Level (RL)	95 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	95 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	89	Node Type	Tank
Description		Equipment No	
Rel. Level (RL)	92 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	92 m		

Bateman Engineering

Project	Water Supply Review	Client	MMICCL Ltd
Project No.		Design Date	23/01/2016
Category	Demo Liquid Mine Water System	Atmos. Press	100.21 kPa
Description	MICCL Water Supply PS1-PS3 Upgrade 2		

Node No	91	Node Type	Tank
Description	Pit Transfer Pond	Equipment No	
Rel. Level (RL)	70 m	Pressure Input	0 kPa
Nozzle K value	-	Ext Flow (+In/-Out)	-
Int.(Gauge) Head	-	Int.(Gauge) Pressure	-
Total Node Head	70 m		