CALCULATIONS

Prepared by LL
Checked by AE

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Settlement Pond Sizing - Stage 2 (PONDS A & B)

Site Area:	6.32	ha
PP Unit Volume:	185	m3/ha
AS Unit Volume:	125	m3/ha

Depth Increment (m)	0.05
Permanent Pool Elevation (m)	259.25
Bottom of Pond (m)	256.50
Max. Pond Elevation (m)	260.05
Perm. Pool Vol. Req'd (m3)	1169
Permanent Pool Vol. (m3)	1343
Active Storage Req'd (m3)	790
Max Active Storage (m^3)	811

Elevation (m)	Depth (m)	Surface Area (m^2)	Incr. Area (m^2)	W (m) x L (m)
256.50	0	144	10.8	6 x 24
257.50	1.0	360	14.4	12 x 30
258.50	2.0	648	18.0	18 x 36
259.50	3.0	1008	26.4	24 x 42
260.50	4.0	1536	26.4	32 x 48

Elevation (m)	Depth (m)	Area (m^2)	Incr. Volume (m^3)	Cum. Volume (m^3)	Active Storage (m^3)
256.50	0.00	144		0	
256.55	0.05	155	7	7	0
256.60	0.10	166	8	15	0
256.65	0.15	176	9	24	0
256.70	0.20	187	9	33	0
256.75	0.25	198	10	43	0
256.80	0.30	209	10	53	0
256.85	0.35	220	11	64	0
256.90	0.40	230	11	75	0
256.95	0.45	241	12	87	0
257.00	0.50	252	12	99	0
257.05	0.55	263	13	112	0
257.10	0.60	274	13	125	0
257.15	0.65	284	14	139	0
257.20	0.70	295	14	154	0
257.25	0.75	306	15	169	0
257.30	0.80	317	16	184	0
257.35	0.85	328	16	200	0
257.40	0.90	338	17	217	0
257.45	0.95	349	17	234	0
257.50	1.00	360	18	252	0
257.55	1.05	374	18	270	0
257.60	1.10	389	19	289	0
257.65	1.15	403	20	309	0
257.70	1.20	418	21	330	0
257.75	1.25	432	21	351	0
257.80	1.30	446	22	373	0
257.85	1.35	461	23	396	0
257.90	1.40	475	23	419	0
257.95	1.45	490	24	443	0

258.00	1.50	504	25	468	0
258.05	1.55	518	26	494	0
258.10	1.60	533	26	520	0
258.15	1.65	547	27	547	0
258.20	1.70	562	28	575	0
258.25	1.75	576	28	603	0
258.30	1.80	590	29	632	0
258.35	1.85	605	30	662	0
258.40	1.90	619	31	693	0
258.45	1.95	634	31	724	0
258.50	2.00	648	32	756	0
258.55	2.05	666	33	789	0
258.60	2.10	684	34	823	0
258.65	2.15	702	35	857	0
258.70	2.20	720	36	893	0
258.75	2.25	738	36	929	0
258.80	2.30	756	37	967	0
258.85	2.35	774	38	1005	0
258.90	2.40	792	39	1044	0
258.95	2.45	810	40	1084	0
259.00	2.50	828	41	1125	0
259.05	2.55	846	42	1167	0
259.10	2.60	864	43	1210	0
259.15	2.65	882	44	1253	0
259.20	2.70	900	45	1298	0
259.25	2.75	918	45	1343	0
259.30	2.80	936	46	1390	46
259.35	2.85	954	47	1437	94
259.40	2.90	972	48	1485	142
259.45	2.95	990	49	1534	191
259.50	3.00	1008	50	1584	241
259.55	3.05	1034	51	1635	292
259.60	3.10	1061	52	1687	344
259.65	3.15	1087	54	1741	398
259.70	3.20	1114	55	1796	453
259.75	3.25	1140	56	1852	509
259.80	3.30	1166	58	1910	567
259.85	3.35	1193	59	1969	626
259.90	3.40	1219	60	2029	686
259.95	3.45	1246	62	2091	748
260.00	3.50	1272	63	2154	811

CALCULATIONS

Prepared by ?
Checked by ?

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Stage Storage (Ponds A & B)

Calculation of Outflow Rate Required for Minimum Detention Time

$$Q = \frac{Storage\ Volume}{Detention\ Time}$$

Storage Volume = 811 m^3
Detention Time = 48 hrs

Q_1 = 0.0047 m^3/s
Q_1 = 4.7 L/s

Calculation of Orifice Size to allow required release rate.

$$Q = C\,A\sqrt{2gh} \qquad A = \frac{\pi d^2}{4}$$

Flow Rate, Q_1 = 0.0047 m^3/s
Coefficient, C = 0.62
head, h = Full storage - orifice elevation = 260.05 - 259.25 = 0.80 m

A_1 = 0.00191 m^2

d_1 = 49.32 mm

Use 75mm diameter orifice

Calculation of Actual Release Rate.

d_1 = 75.00 mm
A_1 = 0.004 m^2
Coefficient, C = 0.62

head, h = Full storage - orifice elevation = 260.05 - 259.25 = 0.80 m

Flow Rate, Q_1 = 0.0109 m^3/s

Drawdown time = 20.75 hours

CALCULATIONS

Prepared by ?
Checked by ?

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Perforated Pipe Design

PERFORATED PIPE DESIGN

Orifice Diameter (d_o) = 75 mm
Percent Blockage = 50%
Orifice Area (A_o)= pi d_o^2/4
A_o = 0.004 m^2

The perforated pipe must provide an opening greater than the orifice area (A_o) assuming blockage.

Perforated Pipe Opening (A_p)> A_o x [100/(100-Percent Blockage)]
A_p > 0.009 m^2

Diameter of Perforated Pipe (d_p) = 200 mm
Length of Pipe (l) = 0.80 m
Circumference of Pipe (C) = pi d
C = 0.63 m
Diameter of Holes (d_h) = 25 mm
Spacing between Holes (S) = 75 mm

Holes per row (H/r) = C / S
H/r = 9 holes / row

Rows per length of pipe (R)= l / S rows
R = 11
Number of Holes = H/r x R
99 holes
Area per hole (A_h) = pi d_h^2/4
A_h = 0.0005 m^2 / hole
Perforated Pipe Opening (A_p) = A_h x No. Holes
A_p = 0.049 m^2

The perforated pipe opening is greater than the orifice opening, therefore the following perforated pipe

200 mm diameter perforated pipe with
25 mm diameter holes spaced
75 mm centre to centre
min. 99 holes.
11 rows,
9 holes per row,

CALCULATIONS

Prepared by LL
Checked by AE

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Settlement Pond Sizing - Stage 2 (PONDS A & B)

Site Area:	6.32	ha
PP Unit Volume:	185	m3/ha
AS Unit Volume:	125	m3/ha

Depth Increment (m)	0.05
Permanent Pool Elevation (m)	259.25
Bottom of Pond (m)	256.50
Max. Pond Elevation (m)	260.05
Perm. Pool Vol. Req'd (m3)	1169
Permanent Pool Vol. (m3)	1343
Active Storage Req'd (m3)	790
Max Active Storage (m^3)	811

Elevation (m)	Depth (m)	Surface Area (m^2)	Incr. Area (m^2)	W (m) x L (m)
256.50	0	144	10.8	6 x 24
257.50	1.0	360	14.4	12 x 30
258.50	2.0	648	18.0	18 x 36
259.50	3.0	1008	26.4	24 x 42
260.50	4.0	1536	26.4	32 x 48

Elevation (m)	Depth (m)	Area (m^2)	Incr. Volume (m^3)	Cum. Volume (m^3)	Active Storage (m^3)
256.50	0.00	144		0	
256.55	0.05	155	7	7	0
256.60	0.10	166	8	15	0
256.65	0.15	176	9	24	0
256.70	0.20	187	9	33	0
256.75	0.25	198	10	43	0
256.80	0.30	209	10	53	0
256.85	0.35	220	11	64	0
256.90	0.40	230	11	75	0
256.95	0.45	241	12	87	0
257.00	0.50	252	12	99	0
257.05	0.55	263	13	112	0
257.10	0.60	274	13	125	0
257.15	0.65	284	14	139	0
257.20	0.70	295	14	154	0
257.25	0.75	306	15	169	0
257.30	0.80	317	16	184	0
257.35	0.85	328	16	200	0
257.40	0.90	338	17	217	0
257.45	0.95	349	17	234	0
257.50	1.00	360	18	252	0
257.55	1.05	374	18	270	0
257.60	1.10	389	19	289	0
257.65	1.15	403	20	309	0
257.70	1.20	418	21	330	0
257.75	1.25	432	21	351	0
257.80	1.30	446	22	373	0
257.85	1.35	461	23	396	0
257.90	1.40	475	23	419	0
257.95	1.45	490	24	443	0

258.00	1.50	504	25	468	0
258.05	1.55	518	26	494	0
258.10	1.60	533	26	520	0
258.15	1.65	547	27	547	0
258.20	1.70	562	28	575	0
258.25	1.75	576	28	603	0
258.30	1.80	590	29	632	0
258.35	1.85	605	30	662	0
258.40	1.90	619	31	693	0
258.45	1.95	634	31	724	0
258.50	2.00	648	32	756	0
258.55	2.05	666	33	789	0
258.60	2.10	684	34	823	0
258.65	2.15	702	35	857	0
258.70	2.20	720	36	893	0
258.75	2.25	738	36	929	0
258.80	2.30	756	37	967	0
258.85	2.35	774	38	1005	0
258.90	2.40	792	39	1044	0
258.95	2.45	810	40	1084	0
259.00	2.50	828	41	1125	0
259.05	2.55	846	42	1167	0
259.10	2.60	864	43	1210	0
259.15	2.65	882	44	1253	0
259.20	2.70	900	45	1298	0
259.25	2.75	918	45	1343	0
259.30	2.80	936	46	1390	46
259.35	2.85	954	47	1437	94
259.40	2.90	972	48	1485	142
259.45	2.95	990	49	1534	191
259.50	3.00	1008	50	1584	241
259.55	3.05	1034	51	1635	292
259.60	3.10	1061	52	1687	344
259.65	3.15	1087	54	1741	398
259.70	3.20	1114	55	1796	453
259.75	3.25	1140	56	1852	509
259.80	3.30	1166	58	1910	567
259.85	3.35	1193	59	1969	626
259.90	3.40	1219	60	2029	686
259.95	3.45	1246	62	2091	748
260.00	3.50	1272	63	2154	811

CALCULATIONS

Prepared by ?
Checked by ?

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Stage Storage (Ponds A & B)

Calculation of Outflow Rate Required for Minimum Detention Time

$$Q = \frac{Storage\ Volume}{Detention\ Time}$$

Storage Volume = 811 m^3
Detention Time = 48 hrs

Q_1 = 0.0047 m^3/s
Q_1 = 4.7 L/s

Calculation of Orifice Size to allow required release rate.

$$Q = C\,A\sqrt{2gh} \qquad A = \frac{\pi d^2}{4}$$

Flow Rate, Q_1 = 0.0047 m^3/s
Coefficient, C = 0.62
head, h = Full storage - orifice elevation = 260.05 - 259.25 = 0.80 m

A_1 = 0.00191 m^2

d_1 = 49.32 mm

Use 75mm diameter orifice

Calculation of Actual Release Rate.

d_1 = 75.00 mm
A_1 = 0.004 m^2
Coefficient, C = 0.62

head, h = Full storage - orifice elevation = 260.05 - 259.25 = 0.80 m

Flow Rate, Q_1 = 0.0109 m^3/s

Drawdown time = 20.75 hours

CALCULATIONS

Prepared by ?
Checked by ?

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Perforated Pipe Design

PERFORATED PIPE DESIGN

Orifice Diameter (d_o) = 75 mm
Percent Blockage = 50%
Orifice Area (A_o)= pi d_o^2/4
A_o = 0.004 m^2

The perforated pipe must provide an opening greater than the orifice area (A_o) assuming blockage.

Perforated Pipe Opening (A_p)> A_o x [100/(100-Percent Blockage)]
A_p > 0.009 m^2

Diameter of Perforated Pipe (d_p) = 200 mm
Length of Pipe (l) = 0.80 m
Circumference of Pipe (C) = pi d
C = 0.63 m
Diameter of Holes (d_h) = 25 mm
Spacing between Holes (S) = 75 mm

Holes per row (H/r) = C / S
H/r = 9 holes / row

Rows per length of pipe (R)= l / S rows
R = 11
Number of Holes = H/r x R
99 holes
Area per hole (A_h) = pi d_h^2/4
A_h = 0.0005 m^2 / hole
Perforated Pipe Opening (A_p) = A_h x No. Holes
A_p = 0.049 m^2

The perforated pipe opening is greater than the orifice opening, therefore the following perforated pipe

200 mm diameter perforated pipe with
25 mm diameter holes spaced
75 mm centre to centre
min. 99 holes.
11 rows,
9 holes per row,

CALCULATIONS

Prepared by LL
Checked by AE

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Settlement Pond Sizing - Stage 3 (PONDS A & B)

Site Area:	7.30	ha
PP Unit Volume:	185	m3/ha
AS Unit Volume:	125	m3/ha

Depth Increment (m)	0.05
Permanent Pool Elevation (m)	259.25
Bottom of Pond (m)	256.50
Max. Pond Elevation (m)	260.15
Perm. Pool Vol. Req'd (m3)	1350
Permanent Pool Vol. (m3)	1343
Active Storage Req'd (m3)	912
Max Active Storage (m^3)	941

Elevation (m)	Depth (m)	Surface Area (m^2)	Incr. Area (m^2)	W (m) x L (m)
256.50	0	144	10.8	6 x 24
257.50	1.0	360	14.4	12 x 30
258.50	2.0	648	18.0	18 x 36
259.50	3.0	1008	26.4	24 x 42
260.50	4.0	1536	26.4	32 x 48

Elevation (m)	Depth (m)	Area (m^2)	Incr. Volume (m^3)	Cum. Volume (m^3)	Active Storage (m^3)
256.50	0.00	144		0	
256.55	0.05	155	7	7	0
256.60	0.10	166	8	15	0
256.65	0.15	176	9	24	0
256.70	0.20	187	9	33	0
256.75	0.25	198	10	43	0
256.80	0.30	209	10	53	0
256.85	0.35	220	11	64	0
256.90	0.40	230	11	75	0
256.95	0.45	241	12	87	0
257.00	0.50	252	12	99	0
257.05	0.55	263	13	112	0
257.10	0.60	274	13	125	0
257.15	0.65	284	14	139	0
257.20	0.70	295	14	154	0
257.25	0.75	306	15	169	0
257.30	0.80	317	16	184	0
257.35	0.85	328	16	200	0
257.40	0.90	338	17	217	0
257.45	0.95	349	17	234	0
257.50	1.00	360	18	252	0
257.55	1.05	374	18	270	0
257.60	1.10	389	19	289	0
257.65	1.15	403	20	309	0
257.70	1.20	418	21	330	0
257.75	1.25	432	21	351	0
257.80	1.30	446	22	373	0
257.85	1.35	461	23	396	0
257.90	1.40	475	23	419	0
257.95	1.45	490	24	443	0

258.00	1.50	504	25	468	0
258.05	1.55	518	26	494	0
258.10	1.60	533	26	520	0
258.15	1.65	547	27	547	0
258.20	1.70	562	28	575	0
258.25	1.75	576	28	603	0
258.30	1.80	590	29	632	0
258.35	1.85	605	30	662	0
258.40	1.90	619	31	693	0
258.45	1.95	634	31	724	0
258.50	2.00	648	32	756	0
258.55	2.05	666	33	789	0
258.60	2.10	684	34	823	0
258.65	2.15	702	35	857	0
258.70	2.20	720	36	893	0
258.75	2.25	738	36	929	0
258.80	2.30	756	37	967	0
258.85	2.35	774	38	1005	0
258.90	2.40	792	39	1044	0
258.95	2.45	810	40	1084	0
259.00	2.50	828	41	1125	0
259.05	2.55	846	42	1167	0
259.10	2.60	864	43	1210	0
259.15	2.65	882	44	1253	0
259.20	2.70	900	45	1298	0
259.25	2.75	918	45	1343	0
259.30	2.80	936	46	1390	46
259.35	2.85	954	47	1437	94
259.40	2.90	972	48	1485	142
259.45	2.95	990	49	1534	191
259.50	3.00	1008	50	1584	241
259.55	3.05	1034	51	1635	292
259.60	3.10	1061	52	1687	344
259.65	3.15	1087	54	1741	398
259.70	3.20	1114	55	1796	453
259.75	3.25	1140	56	1852	509
259.80	3.30	1166	58	1910	567
259.85	3.35	1193	59	1969	626
259.90	3.40	1219	60	2029	686
259.95	3.45	1246	62	2091	748
260.00	3.50	1272	63	2154	811
260.05	3.55	1298	64	2218	875
260.10	3.60	1325	66	2284	941
260.15	3.65	1351	67	2351	1007

CALCULATIONS

Prepared by ?
Checked by ?

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Stage Storage (Ponds A & B)

Calculation of Outflow Rate Required for Minimum Detention Time

$$Q = \frac{Storage\ Volume}{Detention\ Time}$$

Storage Volume = 941 m^3
Detention Time = 48 hrs

Q_1 = 0.0054 m^3/s
Q_1 = 5.4 L/s

Calculation of Orifice Size to allow required release rate.

$$Q = C\,A\sqrt{2gh} \qquad A = \frac{\pi d^2}{4}$$

Flow Rate, Q_1 = 0.0054 m^3/s
Coefficient, C = 0.62
head, h = Full storage - orifice elevation = 260.15 - 259.25 = 0.90 m

A_1 = 0.00209 m^2

d_1 = 51.58 mm

Use 75mm diameter orifice

Calculation of Actual Release Rate.

d_1 = 75.00 mm
A_1 = 0.004 m^2
Coefficient, C = 0.62

head, h = Full storage - orifice elevation = 260.15 - 259.25 = 0.90 m

Flow Rate, Q_1 = 0.0115 m^3/s

Drawdown time = 22.70 hours

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Perforated Pipe Design

PERFORATED PIPE DESIGN

Orifice Diameter (d_o) = 75 mm
Percent Blockage = 50%
Orifice Area (A_o)= pi d_o^2/4
A_o = 0.004 m^2

The perforated pipe must provide an opening greater than the orifice area (A_o) assuming blockage.

Perforated Pipe Opening (A_p)> A_o x [100/(100-Percent Blockage)]
A_p > 0.009 m^2

Diameter of Perforated Pipe (d_p) = 200 mm
Length of Pipe (l) = 0.90 m
Circumference of Pipe (C) = pi d
C = 0.63 m
Diameter of Holes (d_h) = 25 mm
Spacing between Holes (S) = 75 mm

Holes per row (H/r) = C / S
H/r = 9 holes / row

Rows per length of pipe (R)= l / S rows
R = 12
Number of Holes = H/r x R
108 holes
Area per hole (A_h) = pi d_h^2/4
A_h = 0.0005 m^2 / hole
Perforated Pipe Opening (A_p) = A_h x No. Holes
A_p = 0.053 m^2

The perforated pipe opening is greater than the orifice opening, therefore the following perforated pipe

200 mm diameter perforated pipe with
25 mm diameter holes spaced
75 mm centre to centre
min. 108 holes.
12 rows,
9 holes per row,

CALCULATIONS

Prepared by LL
Checked by AE

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Settlement Pond Sizing - Stage 3 (POND C)

Site Area:	4.86	ha
PP Unit Volume:	185	m3/ha
AS Unit Volume:	125	m3/ha

Depth Increment (m)	0.05
Permanent Pool Elevation (m)	259.20
Bottom of Pond (m)	257.00
Max. Pond Elevation (m)	260.00
Perm. Pool Vol. Req'd (m3)	900
Permanent Pool Vol. (m3)	893
Active Storage Req'd (m3)	608
Max Active Storage (m^3)	641

Elevation (m)	Depth (m)	Surface Area (m^2)	Incr. Area (m^2)	W (m) x L (m)
257.00	0	144	10.8	6 x 24
258.00	1.0	360	14.4	12 x 30
259.00	2.0	648	18.0	18 x 36
260.00	3.0	1008	18.0	24 x 42

Elevation (m)	Depth (m)	Area (m^2)	Incr. Volume (m^3)	Cum. Volume (m^3)	Active Storage (m^3)
257.00	0.00	144		0	
257.05	0.05	155	7	7	0
257.10	0.10	166	8	15	0
257.15	0.15	176	9	24	0
257.20	0.20	187	9	33	0
257.25	0.25	198	10	43	0
257.30	0.30	209	10	53	0
257.35	0.35	220	11	64	0
257.40	0.40	230	11	75	0
257.45	0.45	241	12	87	0
257.50	0.50	252	12	99	0
257.55	0.55	263	13	112	0
257.60	0.60	274	13	125	0
257.65	0.65	284	14	139	0
257.70	0.70	295	14	154	0
257.75	0.75	306	15	169	0
257.80	0.80	317	16	184	0
257.85	0.85	328	16	200	0
257.90	0.90	338	17	217	0
257.95	0.95	349	17	234	0
258.00	1.00	360	18	252	0
258.05	1.05	374	18	270	0
258.10	1.10	389	19	289	0
258.15	1.15	403	20	309	0
258.20	1.20	418	21	330	0
258.25	1.25	432	21	351	0
258.30	1.30	446	22	373	0
258.35	1.35	461	23	396	0
258.40	1.40	475	23	419	0
258.45	1.45	490	24	443	0

Date: 8/7/2019
File Location: C:\Users\lli\Documents\Sediment Pond Size and Hickenbottom Size-rice3.xlsx[StageStorage]

258.50	1.50	504	25	468	0
258.55	1.55	518	26	494	0
258.60	1.60	533	26	520	0
258.65	1.65	547	27	547	0
258.70	1.70	562	28	575	0
258.75	1.75	576	28	603	0
258.80	1.80	590	29	632	0
258.85	1.85	605	30	662	0
258.90	1.90	619	31	693	0
258.95	1.95	634	31	724	0
259.00	2.00	648	32	756	0
259.05	2.05	666	33	789	0
259.10	2.10	684	34	823	0
259.15	2.15	702	35	857	0
259.20	2.20	720	36	893	0
259.25	2.25	738	36	929	36
259.30	2.30	756	37	967	74
259.35	2.35	774	38	1005	112
259.40	2.40	792	39	1044	151
259.45	2.45	810	40	1084	191
259.50	2.50	828	41	1125	232
259.55	2.55	846	42	1167	274
259.60	2.60	864	43	1210	317
259.65	2.65	882	44	1253	360
259.70	2.70	900	45	1298	405
259.75	2.75	918	45	1343	450
259.80	2.80	936	46	1390	497
259.85	2.85	954	47	1437	544
259.90	2.90	972	48	1485	592
259.95	2.95	990	49	1534	641
260.00	3.00	1008	50	1584	691
260.05	3.05	1026	51	1635	0
260.10	3.10	1044	52	1687	0
260.15	3.15	1062	53	1739	0
260.20	3.20	1080	54	1793	0
260.25	3.25	1098	54	1847	0
260.30	3.30	1116	55	1903	0
260.35	3.35	1134	56	1959	0
260.40	3.40	1152	57	2016	0
260.45	3.45	1170	58	2074	0
260.50	3.50	1188	59	2133	0
260.55	3.55	1206	60	2193	0
260.60	3.60	1224	61	2254	0
260.65	3.65	1242	62	2315	0
260.70	3.70	1260	63	2378	0
260.75	3.75	1278	63	2441	0
260.80	3.80	1296	64	2506	0
260.85	3.85	1314	65	2571	0

CALCULATIONS

Prepared by ?
Checked by ?

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Stage Storage (Pond C)

Calculation of Outflow Rate Required for Minimum Detention Time

$$Q = \frac{Storage\ Volume}{Detention\ Time}$$

Storage Volume = 641 m^3
Detention Time = 48 hrs

Q_1 = 0.0037 m^3/s
Q_1 = 3.7 L/s

Calculation of Orifice Size to allow required release rate.

$$Q = C\,A\sqrt{2gh} \qquad A = \frac{\pi d^2}{4}$$

Flow Rate, Q_1 = 0.0037 m^3/s
Coefficient, C = 0.62
head, h = Full storage - orifice elevation = 260.00 - 259.20 = 0.80 m

A_1 = 0.00151 m^2

d_1 = 43.86 mm

Use 75mm diameter orifice

Calculation of Actual Release Rate.

d_1 = 75.00 mm
A_1 = 0.004 m^2
Coefficient, C = 0.62

head, h = Full storage - orifice elevation = 260.00 - 259.20 = 0.80 m

Flow Rate, Q_1 = 0.0109 m^3/s

Drawdown time = 16.41 hours

CALCULATIONS

Prepared by ?
Checked by ?

Project Name	Rice Group - Holt Pit
Project No.	11139891
Subject	Perforated Pipe Design

PERFORATED PIPE DESIGN

Orifice Diameter (d_o) = 75 mm
Percent Blockage = 50%
Orifice Area (A_o)= pi $d_o^2/4$
A_o = 0.004 m^2

The perforated pipe must provide an opening greater than the orifice area (A_o) assuming blockage.

Perforated Pipe Opening (A_p)> A_o x [100/(100-Percent Blockage)]
A_p > 0.009 m^2

Diameter of Perforated Pipe (d_p) = 200 mm
Length of Pipe (l) = 0.80 m
Circumference of Pipe (C) = pi d
C = 0.63 m
Diameter of Holes (d_h) = 25 mm
Spacing between Holes (S) = 75 mm

Holes per row (H/r) = C / S
H/r = 9 holes / row

Rows per length of pipe (R)= l / S rows
R = 11
Number of Holes = H/r x R
99 holes
Area per hole (A_h) = pi $d_h^2/4$
A_h = 0.0005 m^2 / hole
Perforated Pipe Opening (A_p) = A_h x No. Holes
A_p = 0.049 m^2

The perforated pipe opening is greater than the orifice opening, therefore the following perforated pipe

200 mm diameter perforated pipe with
25 mm diameter holes spaced
75 mm centre to centre
min. 99 holes.
11 rows,
9 holes per row,