Unit 12, Owenacurra Business Park, Midleton, Co. Cork
T +353 21 4631600 **F** +353 21 4638690 **E** geotechnical@priority.ie

HAULBOWLINE EAST TIP –

EXPLORATORY GROUND INVESTIGATION

FACTUAL REPORT

NO. P12030

VOL. 2

Employer:

Cork County Council

Environmental Directorate,
Cork County Council,
Inniscara,
Co. Cork.

Employer's Representative:

WYG EPT Ltd.

Arndale Court,
Headingley,
Leeds,
United Kingdom,
LS6 2UJ

06/02/2013

TABLE OF CONTENTS

APPENDICES

VOL. 1

APPENDIX A **EXPLORATORY HOLE RECORDS AND PHOTOGRAPHIC RECORDS**

VOL. 2

APPENDIX B ***In situ* PERMEABILITY TEST DATA**

APPENDIX C **GROUNDWATER AND GROUND GAS MONITORING DATA**

VOL. 3

APPENDIX D1 **LABORATORY RESULTS- SOIL**

VOL. 4

APPENDIX D2 **LABORATORY RESULTS- WATER**

VOL. 5

APPENDIX D3 **LABORATORY RESULTS- WATER, PAH and GEOTECHNICAL**

APPENDIX E **EXPLORATION LOCATION LAYOUT & PLANS**

APPENDIX F **AGREED METHOD STATEMENTS AND PROCEDURES**

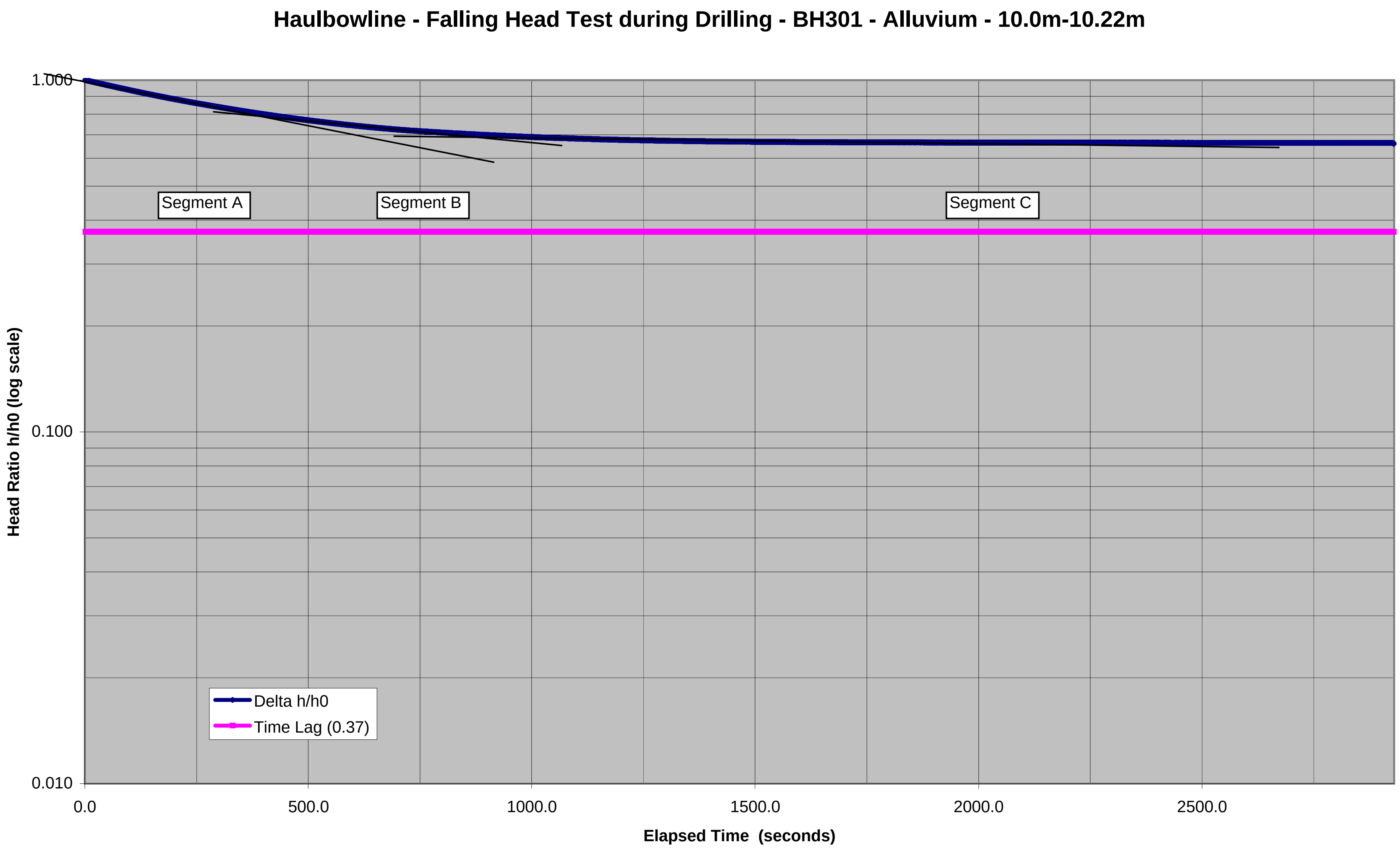
APPENDIX B

In situ PERMEABILITY TEST DATA

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	17/05/12; 10:33
Borehole ID:	BH301
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Rising tide (Low tide 10:21, High tide 16:12)
Static water level (m below top of casing):	9.16 @ 09:52
Initial water level (m below top of casing):	0.44 @ 10:33
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.23
Depth of casing (m below top of casing):	10.23
Depth of hole (m below top of casing):	10.45
Depth interval of material tested:	10.00 - 10.22 mbgl
Description of material in test interval:	Alluvium
Depth of hole at end of test (m below top of casing):	10.45

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.44	Started filling borehole @ 10:00; flow rate approx 0.2 l/s;
0.5	-	stopped filling @ 10:33
1.0	-	
1.5	-	
2.0	0.86	
2.5	-	
3.0	1.20	
3.5	-	
4.0	1.41	
4.5	-	
5	1.67	
6	1.89	
7	2.09	
8	-	
9	-	
10	2.25	
12	2.76	
14	2.97	
16	3.03	
~~18~~ 19	3.11	
~~20~~ 21	3.17	
~~25~~ 24	3.22	
~~30~~ 29	3.27	
35	3.28	
~~40~~ 41	3.29	
45	3.29	
~~50~~ 46	3.29	Logger taken out of borehole
55	-	
60	-	



Haulbowline - Falling Head Test during Drilling - BH301 - Alluvium - 10.0m-10.22m
Head Ratio h/h0 (log scale)
1.000
0.100
0.010
Segment A
Segment B
Segment C
Delta h/h0
Time Lag (0.37)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	17/05/2012
Tidal Conditions	Low Tide 10:21; High Tide 16:12
Borehole name	BH301 (Graph Segment A)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	10
Depth of hole (m below ground level)	10.22
Height of casing (m above ground level)	0.23
Test depth interval (m below ground level)	10.0 - 10.22
Test material description	Alluvium (Silt)
Static water level (m below top of casing)	9.094m btoc @ 09:59 (from logger data)
Initial water level (m below top of casing)	0.44 btoc @ 10:33:41 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation	
Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)					
Equation			***Application***		
Eq. 1: $F = 2.75D$			Soil flush with bottom in uniform soil		
Eq. 2: $F = [2\pi L] / [\log_e(L/D) + sqrt(1+(L/D)^2]$			Well point or hole extended in uniform soil		
Eq. 3: $F = [2\pi L] / [\log_e(2L/D) + sqrt(1+((2L)^2/D)]$			Well point or hole extended at impervious boundary		
where:					
Length	L (m) =	0.22	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.426	Eqn. 2
			F =	1.063	Eqn. 3
For this test, where open hole extends into uniform silt layer, Eqn. 2 is applied					

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:			
	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	250	Time 1 after commencement of test (sec)
	H_1 =	8.654	Head measured at Time 1 (m)
	H_2 =	7.442	Head measured at Time 2 (m)
	F =	1.426	Shape Factor
	K =	**1.E-05**	**Permeability (m/sec)**

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	17/05/2012
Tidal Conditions	Low Tide 10:21; High Tide 16:12
Borehole name	BH301 (Graph Segment B)
Casing internal diameter (mm)	195
Casing depth (m below top of casing)	10
Depth of hole (m below ground level)	10.22
Height of casing (m above ground level)	0.23
Test depth interval (m below ground level)	10.0 - 10.22
Test material description	Alluvium (Silt)
Static water level (m below top of casing)	9.094m btoc @ 09:59 (from logger data)
Initial water level (m below top of casing)	0.44 btoc @ 10:33:41 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	*Application*
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	*Application*
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.22	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.426	Eqn. 2
			F =	1.063	Eqn. 3

For this test, where open hole extends into uniform silt layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	500	Time 1 after commencement of test (sec)
	t_2 =	750	Time 1 after commencement of test (sec)
	H_1 =	6.656	Head measured at Time 1 (m)
	H_2 =	6.119	Head measured at Time 2 (m)
	F =	1.426	Shape Factor
	K =	**7.E-06**	**Permeability (m/sec)**

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	17/05/2012
Tidal Conditions	Low Tide 10:21; High Tide 16:12
Borehole name	BH301 (Graph Segment C)
Casing internal diameter (mm)	195
Casing depth (m below top of casing)	10
Depth of hole (m below ground level)	10.22
Height of casing (m above ground level)	0.23
Test depth interval (m below ground level)	10.0 - 10.22
Test material description	Alluvium (Silt)
Static water level (m below top of casing)	9.094m btoc @ 09:59 (from logger data)
Initial water level (m below top of casing)	0.44 btoc @ 10:33:41 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = Pr_c^2/T_0F}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + \mathrm{sqrt}(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + \mathrm{sqrt}(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.22	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.426	Eqn. 2
			F =	1.063	Eqn. 3

For this test, where open hole extends into uniform silt layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	1000	Time 1 after commencement of test (sec)
	t_2 =	2000	Time 1 after commencement of test (sec)
	H_1 =	5.965	Head measured at Time 1 (m)
	H_2 =	5.754	Head measured at Time 2 (m)
	F =	1.426	Shape Factor
	K =	**8.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

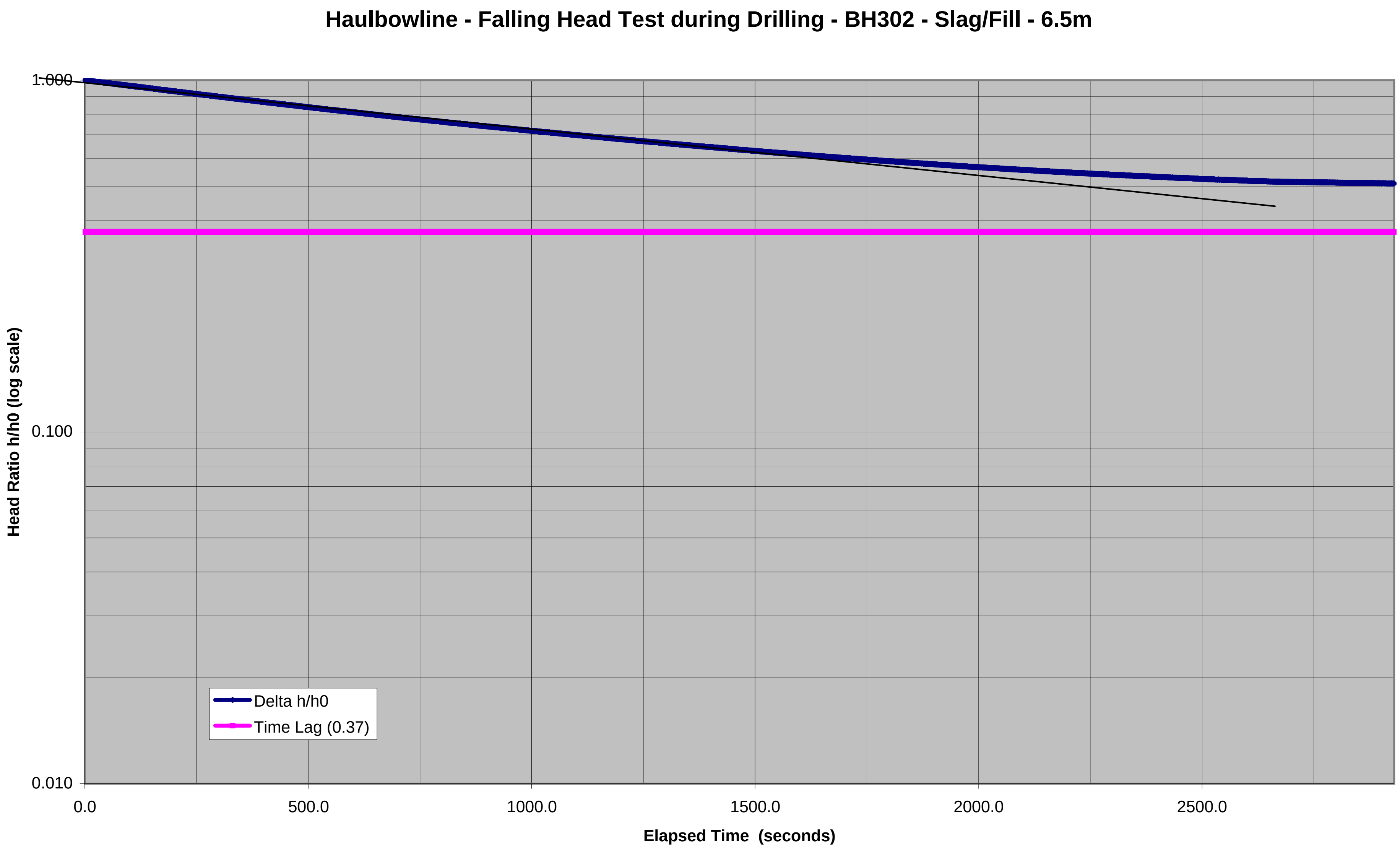
Site name:	Haulbowline Island
Date and Time:	24/05/12; 15:03
Borehole ID:	BH302
Weather/Site conditions:	Dry, sunny & warm
Tidal conditions/Time:	Falling tide (High tide 8:08, Low tide 14:32)
Static water level (m below top of casing):	4.04 @ 14:25
Initial water level (m below top of casing):	0.14 @ 13:03
Casing diameter (mm ID):	300
Height of casing (m above ground level):	0.50
Depth of casing (m below top of casing):	7.01
Depth of hole (m below top of casing):	7.00
Depth interval of material tested:	6.5 mbgl
Description of material in test interval:	Slag/Fill
Depth of hole at end of test (m below top of casing):	6.95

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.14	Started filling borehole @ 14:35; flow rate approx 0.2 l/s;
0.5	-	stopped filling @ 15:03
1.0	0.21	
1.5	0.25	
2.0	0.30	
2.5	0.35	
3.0	0.39	
3.5	-	
4.0	0.46	
4.5	-	
5	0.55	
6	0.63	
7	0.72	
8	-	
9	0.92	
10	0.92	
~~12~~ 13	1.10	
14	1.12	
16	-	
18	-	
~~20~~ 21	1.51	
~~25~~ 24	11.64	
~~30~~ 27	1.75 (32 mins - 1.90m)	
35	2.00	
40	2.09	
~~45~~ 47	2.16	
~~50~~ 52	2.20	
55	-	
60	2.25	continued overleaf

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	24/05/12 ; 15:03
Borehole ID:	BH302
Weather/Site conditions:	Dry, sunny & warm
Tidal conditions/Time:	Falling tide (High tide 8:08, Low tide 14:32)
Static water level (m below top of casing):	4.04 @ 14:25
Initial water level (m below top of casing):	0.14 @ 15:03
Casing diameter (mm ID):	300
Height of casing (m above ground level):	0.50
Depth of casing (m below top of casing):	7.00
Depth of hole (m below top of casing):	7.00
Depth interval of material tested:	6.5 mbgl
Description of material in test interval:	Slag/Fill
Depth of hole at end of test (m below top of casing):	6.95

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
~~0~~ 65	2.28	continued
~~0.5~~ 71	2.30	
~~1~~ 80	2.35	
~~1.5~~ 84	2.38	
~~2~~ 88	2.39	
~~2.5~~ 90	2.40	
~~3~~ 95	2.42	
~~3.5~~ 100	2.44	
~~4~~ 107	2.47	
~~4.5~~ 114	2.50	
~~5~~ 119	2.52	Logger taken out of borehole


Haulbowline - Falling Head Test during Drilling - BH302 - Slag/Fill - 6.5m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	24/05/2012
Tidal Conditions	Low Tide 14:32; High Tide 08:08
Borehole name	BH302
Casing internal diameter (mm)	300
Casing depth (m below ground level)	6.5
Depth of hole (m below ground level)	6.5
Height of casing (m above ground level)	0.5
Test depth interval (m below ground level)	6.5
Test material description	Slag/Fill
Static water level (m below top of casing)	4.305m btoc @ 14:32:00 (from logger data)
Initial water level (m below top of casing)	0.14m btoc @ 15:03:12 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.825	Eqn. 1
Diameter	D (m) =	0.3	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

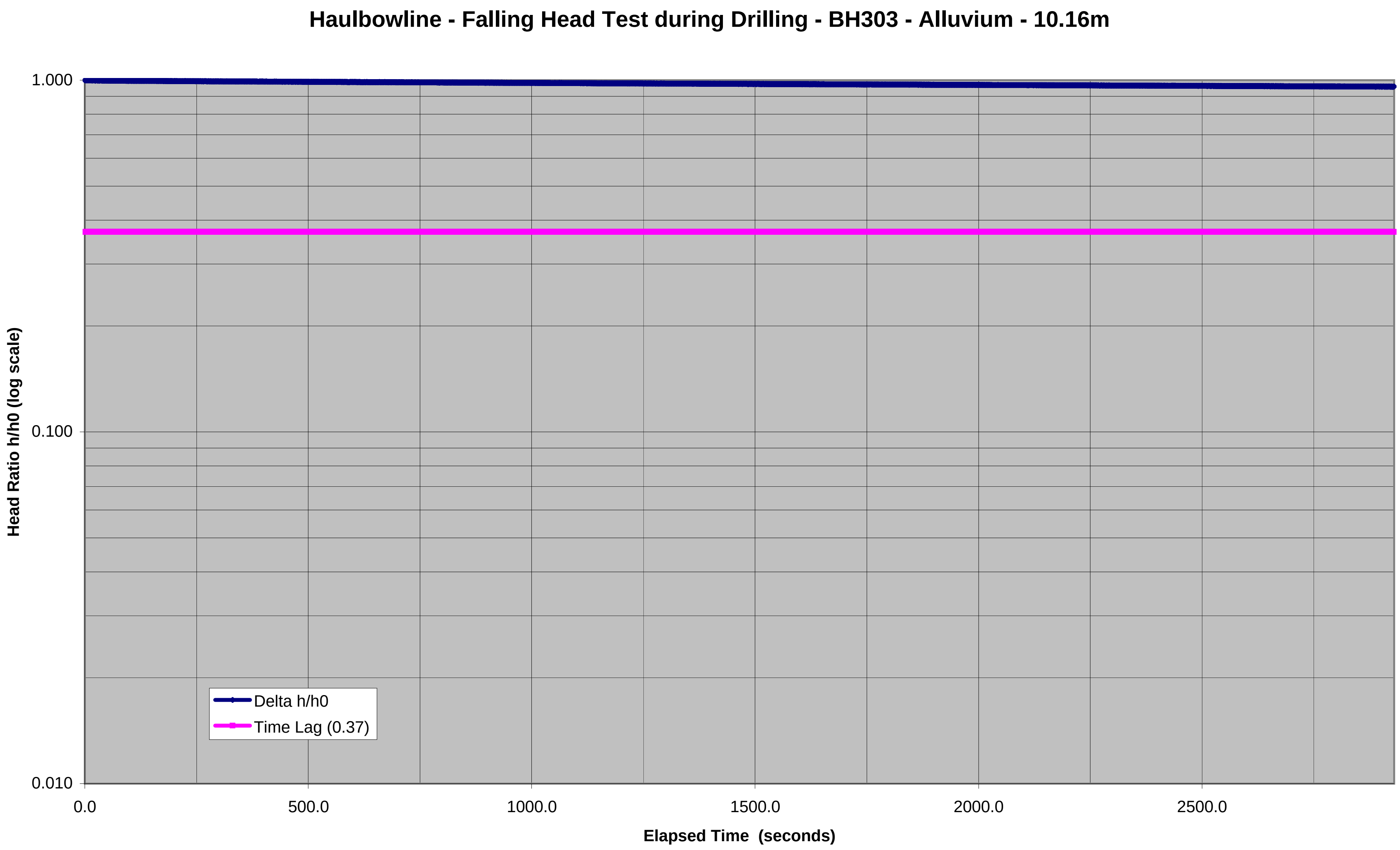
where:

	P =	3.14	Pi
	r_c =	0.15	Casing inner radius (m)
	t_1 =	250	Time 1 after commencement of test (sec)
	t_2 =	1500	Time 1 after commencement of test (sec)
	H_1 =	3.805	Head measured at Time 1 (m)
	H_2 =	2.622	Head measured at Time 2 (m)
	F =	0.825	Shape Factor
	K =	**3.E-05**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	15/05/12 ; 14:48
Borehole ID:	BH303
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Falling Tide (High tide 14:21, Low tide 21:00)
Static water level (m below top of casing):	3.76 @ 14:37
Initial water level (m below top of casing):	0.62 @ 14:48
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.23
Depth of casing (m below top of casing):	10.39
Depth of hole (m below top of casing):	10.39
Depth interval of material tested:	10.16 mbgl
Description of material in test interval:	Alluvium
Depth of hole at end of test (m below top of casing):	10.10

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.62	Started filling borehole @ 14:44; flow rate approx 0.4 l/s;
0.5	-	stopped filling @ 14:48
1.0	-	
1.5	0.64	
2.0	-	
2.5	0.66	
3.0	-	
3.5	0.66	
4.0	-	
4.5	0.66	
~~5~~ 5.5	0.66	
~~6~~ 6.5	0.66	
7	-	
8	-	
9	-	
10	-	
12	-	
14	0.66	
~~16~~ 15	0.66	
~~18~~ 16	0.66	
~~20~~ 22	0.68	
~~25~~ 23	0.68	
30	-	
~~35~~ 38	0.71	
40	-	
45	-	
50	-	
55	-	
60	0.75	Logger taken out of Borehole


Haulbowline - Falling Head Test during Drilling - BH303 - Alluvium - 10.16m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	15/05/2012
Tidal Conditions	Low Tide 21:00; High Tide 14:21
Borehole name	BH303
Casing internal diameter (mm)	195
Casing depth (m below ground level)	10.16
Depth of hole (m below ground level)	10.16
Height of casing (m above ground level)	0.23
Test depth interval (m below ground level)	10.16
Test material description	Alluvium
Static water level (m below top of casing)	3.756m btoc @ 14:43:00 (from logger data)
Initial water level (m below top of casing)	0.62m btoc @ 14:48:40 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

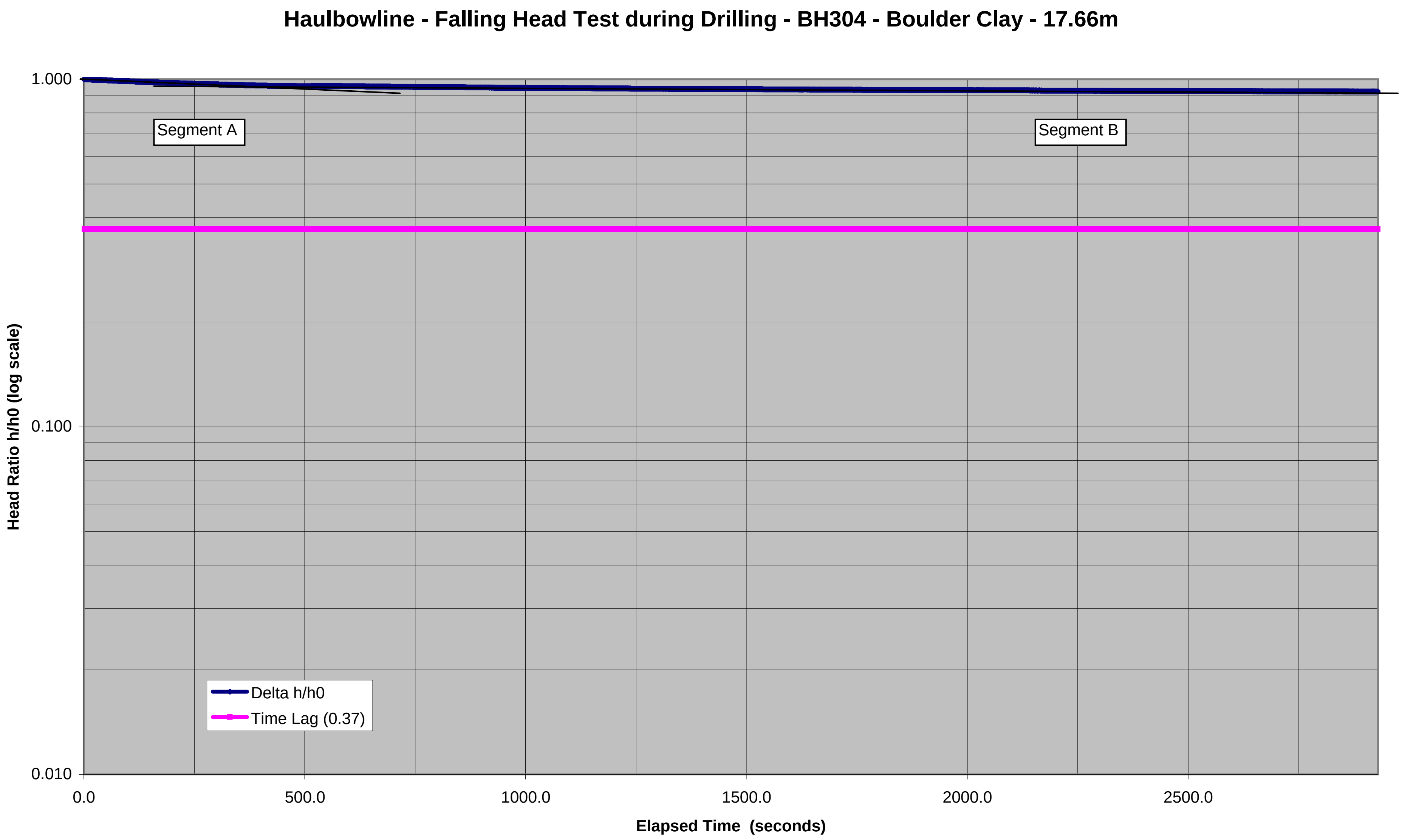
where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	3859.5	Time 1 after commencement of test (sec)
	H_1 =	3.136	Head measured at Time 1 (m)
	H_2 =	2.971	Head measured at Time 2 (m)
	F =	0.536	Shape Factor
	K =	**8.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	08/06/12 ; 09:52
Borehole ID:	BH304
Weather/Site conditions:	Dry, windy, overcast
Tidal conditions/Time:	Falling Tide (High tide 09:03, Low tide 15:39)
Static water level (m below top of casing):	14.95 @ 09:12
Initial water level (m below top of casing):	0.23 @ 09:52
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.64
Depth of casing (m below top of casing):	18.30 (BH v. silted up at bottom, difficult to get accurate measurement)
Depth of hole (m below top of casing):	18.30
Depth interval of material tested:	17.66 mbgl
Description of material in test interval:	"Boulder Clay"
Depth of hole at end of test (m below top of casing):	18.30

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.23	Started filling borehole @ 09:17; stopped filling @ 09:52
0.5	0.27	
1.0	0.33	
1.5	0.38	
2.0	0.42	
2.5	0.47	
3.0	0.52	
3.5	-	
4.0	0.59	
4.5	-	
5.0	0.65	
6.0	0.71	
7	0.77	
8	0.80	
9	0.8	
10	0.81	
12	0.85	
14	0.89	
16	0.93	
18	0.95	
20	1.00	
~~25~~ 27	1.06	
~~30~~ 32	1.14	
35	-	
41	1.20	
45	-	
~~50~~ 52	1.27	
55	-	
60	-	


Haulbowline - Falling Head Test during Drilling - BH304 - Boulder Clay - 17.66m
Head Ratio h/h0 (log scale)
1.000
0.100
0.010
Segment A
Segment B
Delta h/h0
Time Lag (0.37)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	08/06/2012
Tidal Conditions	Low Tide 15:39; High Tide 09:03
Borehole name	BH304 (Segment A)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	17.66
Depth of hole (m below ground level)	17.66
Height of casing (m above ground level)	0.64
Test depth interval (m below ground level)	17.66
Test material description	Boulder Clay
Static water level (m below top of casing)	13.487m btoc @ 09:17:42 (from logger data)
Initial water level (m below top of casing)	0.23m btoc @ 09:52:04 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	250	Time 1 after commencement of test (sec)
	H_1 =	13.257	Head measured at Time 1 (m)
	H_2 =	12.867	Head measured at Time 2 (m)
	F =	0.536	Shape Factor
	K =	**7.E-06**	**Permeability (m/sec)**

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	08/06/2012
Tidal Conditions	Low Tide 15:39; High Tide 09:03
Borehole name	BH304 (Segment B)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	17.66
Depth of hole (m below ground level)	17.66
Height of casing (m above ground level)	0.64
Test depth interval (m below ground level)	17.66
Test material description	Boulder Clay
Static water level (m below top of casing)	13.487m btoc @ 09:17:42 (from logger data)
Initial water level (m below top of casing)	0.23m btoc @ 09:52:04 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	*Application*
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	*Application*
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + \text{sqrt}(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + \text{sqrt}(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

P =		Pi
r_c =		Casing inner radius (m)
T_0 =		Time lag (sec)
F =		Shape Factor
K =	***#DIV/0!***	**Permeability (m/sec)**
K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

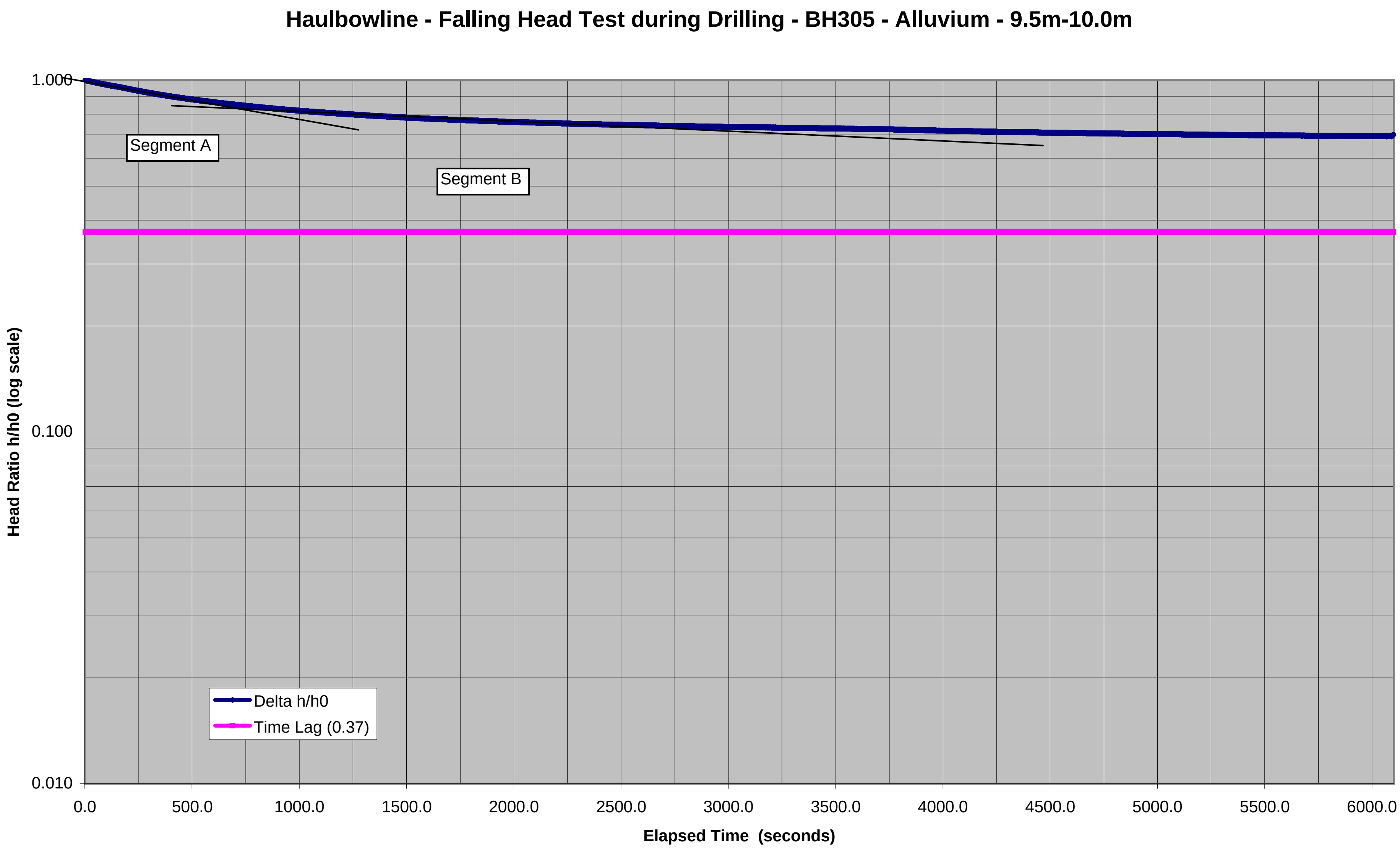
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

P =	3.14	Pi
r_c =	0.0975	Casing inner radius (m)
t_1 =	750	Time 1 after commencement of test (sec)
t_2 =	2750	Time 1 after commencement of test (sec)
H_1 =	12.605	Head measured at Time 1 (m)
H_2 =	12.238	Head measured at Time 2 (m)
F =	0.536	Shape Factor
K =	**8.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet	
Site name:	Haulbowline Island
Date and Time:	31/05/2012 ; 13:40
Borehole ID:	BH305
Weather/Site conditions:	Dry, clear, windy
Tidal conditions/Time:	Rising tide (Low tide 08:28, High tide 14:18)
Static water level (m below top of casing):	9.1
Initial water level (m below top of casing):	0.31
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.18
Depth of casing (m below top of casing):	9.5
Depth of hole (m below top of casing):	10
Depth interval of material tested:	9.5 - 10.0
Description of material in test interval:	Alluvium (silt)
Depth of hole at end of test (m below top of casing):	9.8

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.31	Logger set at 9.5m below top of casing
0.5	-	Started filling @ 13:27; flow rate approximately 0.13l/s;
1.0	-	Stopped filling @ 13:40
1.5	-	
2.0	0.61	
2.5	0.69	
3.0	0.735	
3.5	0.82	
4.0	0.90	
4.5	0.94	
5	1.01	
6	1.13	
7	1.21	
8	1.33	
9	1.41	
10	1.49	
12	1.63	
14	1.76	
16	1.86	
18	-	
~~20~~ 22	2.12	
25	2.20	
30	2.33	
35	-	
40	2.49	
45	-	
50	-	
55	-	
60	-	
70	2.80	
80	2.89	
90	2.94	
100	2.99	



Haulbowline - Falling Head Test during Drilling - BH305 - Alluvium - 9.5m-10.0m
Head Ratio h/h0 (log scale)
1.000
0.100
0.010
Segment A
Segment B
Delta h/h0
Time Lag (0.37)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
3000.0
3500.0
4000.0
4500.0
5000.0
5500.0
6000.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	31/05/2012
Tidal Conditions	Low Tide 08:28; High Tide 14:18
Borehole name	BH305 (Graph Segment A)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	9.5
Depth of hole (m below ground level)	10
Height of casing (m above ground level)	0.18
Test depth interval (m below ground level)	9.5 - 10.0
Test material description	Alluvium (Silt)
Static water level (m below top of casing)	9.123m btoc @ 13:27:01 (from logger data)
Initial water level (m below top of casing)	0.31m btoc @ 13:40:09 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.5	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.879	Eqn. 2
			F =	1.548	Eqn. 3

For this test, where open hole extends into uniform silt layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	500	Time 1 after commencement of test (sec)
	H_1 =	8.8091	Head measured at Time 1 (m)
	H_2 =	7.767	Head measured at Time 2 (m)
	F =	1.879	Shape Factor
	K =	**4.E-06**	**Permeability (m/sec)**

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	31/05/2012
Tidal Conditions	Low Tide 08:28; High Tide 14:18
Borehole name	BH305 (Graph Segment B)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	9.5
Depth of hole (m below ground level)	10
Height of casing (m above ground level)	0.18
Test depth interval (m below ground level)	9.5 - 10.0
Test material description	Alluvium (Silt)
Static water level (m below top of casing)	9.123m btoc @ 13:27:01 (from logger data)
Initial water level (m below top of casing)	0.31m btoc @ 13:40:09 (from manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	*Application*
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	*Application*
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e(L/D) + \mathrm{sqrt}(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e(2L/D) + \mathrm{sqrt}(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.5	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.879	Eqn. 2
			F =	1.548	Eqn. 3

For this test, where open hole extends into uniform silt layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

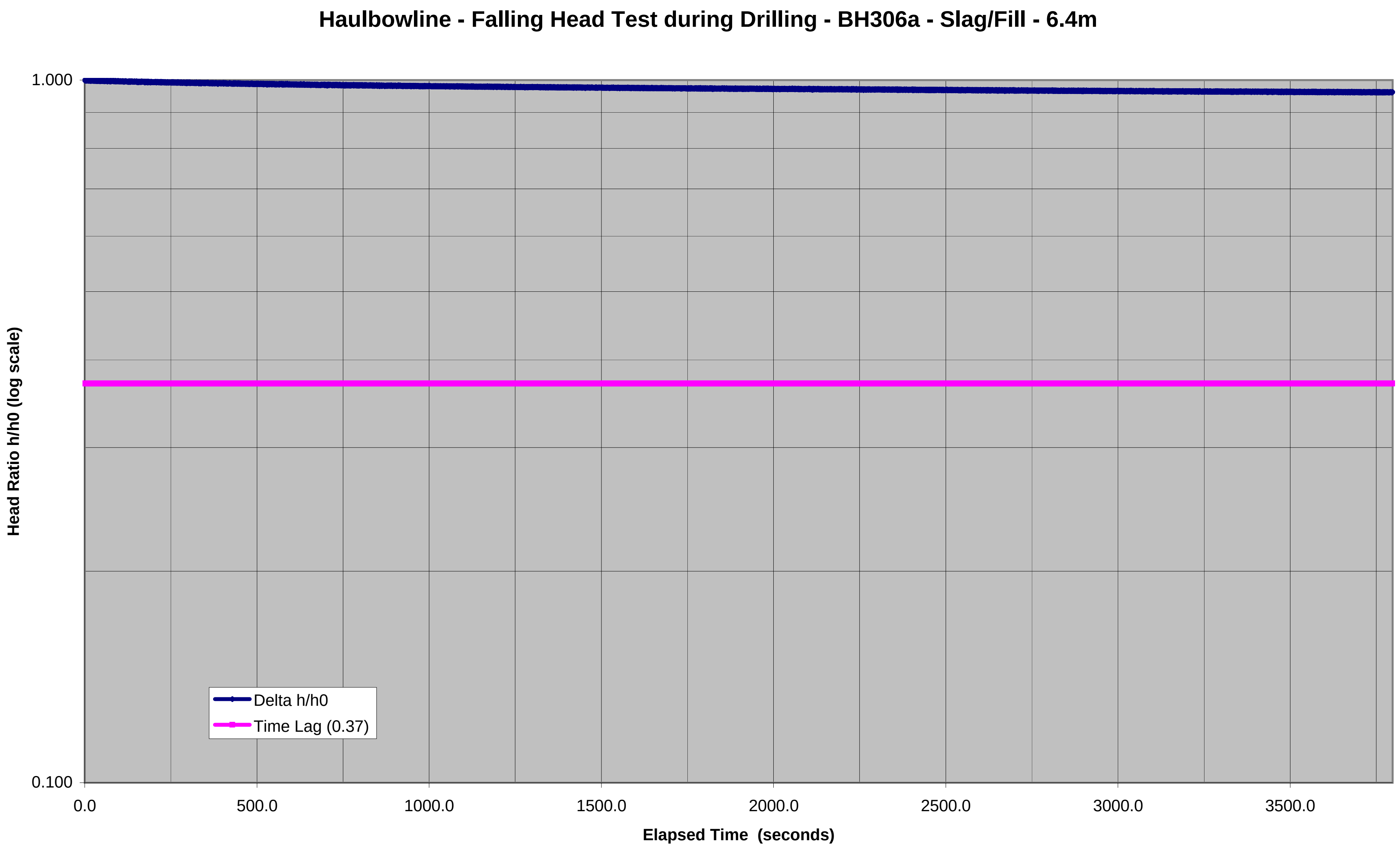
where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	1000	Time 1 after commencement of test (sec)
	t_2 =	2500	Time 1 after commencement of test (sec)
	H_1 =	7.215	Head measured at Time 1 (m)
	H_2 =	6.576	Head measured at Time 2 (m)
	F =	1.879	Shape Factor
	K =	**1.E-06**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	4/5/2012 ; 16:04
Borehole ID:	BH306A
Weather/Site conditions:	Light misty rain at beginning of test and for 20mins into test
Tidal conditions/Time:	Rising Tide and Falling (Low Tide 10:59; High Tide 16:51)
Static water level (m below top of casing):	1.97 @ 15:40
Initial water level (m below top of casing):	0.23 @ 16:04
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.65
Depth of casing (m below top of casing):	7.05
Depth of hole (m below top of casing):	7.05
Depth interval of material tested:	6.40 mbgl
Description of material in test interval:	Slag/fill material
Depth of hole at end of test (m below top of casing):	7.04

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.23	Started filling borehole @ 15:55; flow rate approx 0.5l/s;
0.5	0.23	stopped filling @ 16:04
1.0	0.23	
1.5	0.23	
2.0	0.23	
2.5	0.23	
3.0	0.23	
3.5	0.23	
4.0	0.23	
4.5	0.23	
5	0.24	
6	0.24	
7	0.24	
8	0.24	
9	0.24	
10	0.25	
12	0.25	
14	-	
16	-	
18	-	
20	-	
25	-	
30	-	
35	-	
40	-	
45	-	
50	-	
55	-	
60	0.28	Logger removed from borehole


Haulbowline - Falling Head Test during Drilling - BH306a - Slag/Fill - 6.4m
1.000
0.100
Head Ratio h/h0 (log scale)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
3000.0
3500.0
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	04/05/2012
Tidal Conditions	Low Tide 10:59; High Tide 16:51
Borehole name	BH306A
Casing internal diameter (mm)	195
Casing depth (m below ground level)	6.4
Depth of hole (m below ground level)	6.4
Height of casing (m above ground level)	0.65
Test depth interval (m below ground level)	6.4
Test material description	Slag/fill
Static water level (m below top of casing)	1.968m btoc @ 15:45:00 (from logger data)
Initial water level (m below top of casing)	0.23m btoc @ 16:03:43 (from manual dip
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + \mathrm{sqrt}(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + \mathrm{sqrt}(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.53625	Eqn. 1
Diameter	D (m) =	0.195	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

P =		Pi
r_c =		Casing inner radius (m)
T_0 =		Time lag (sec)
F =		Shape Factor
K =	***#DIV/0!***	**Permeability (m/sec)**
K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

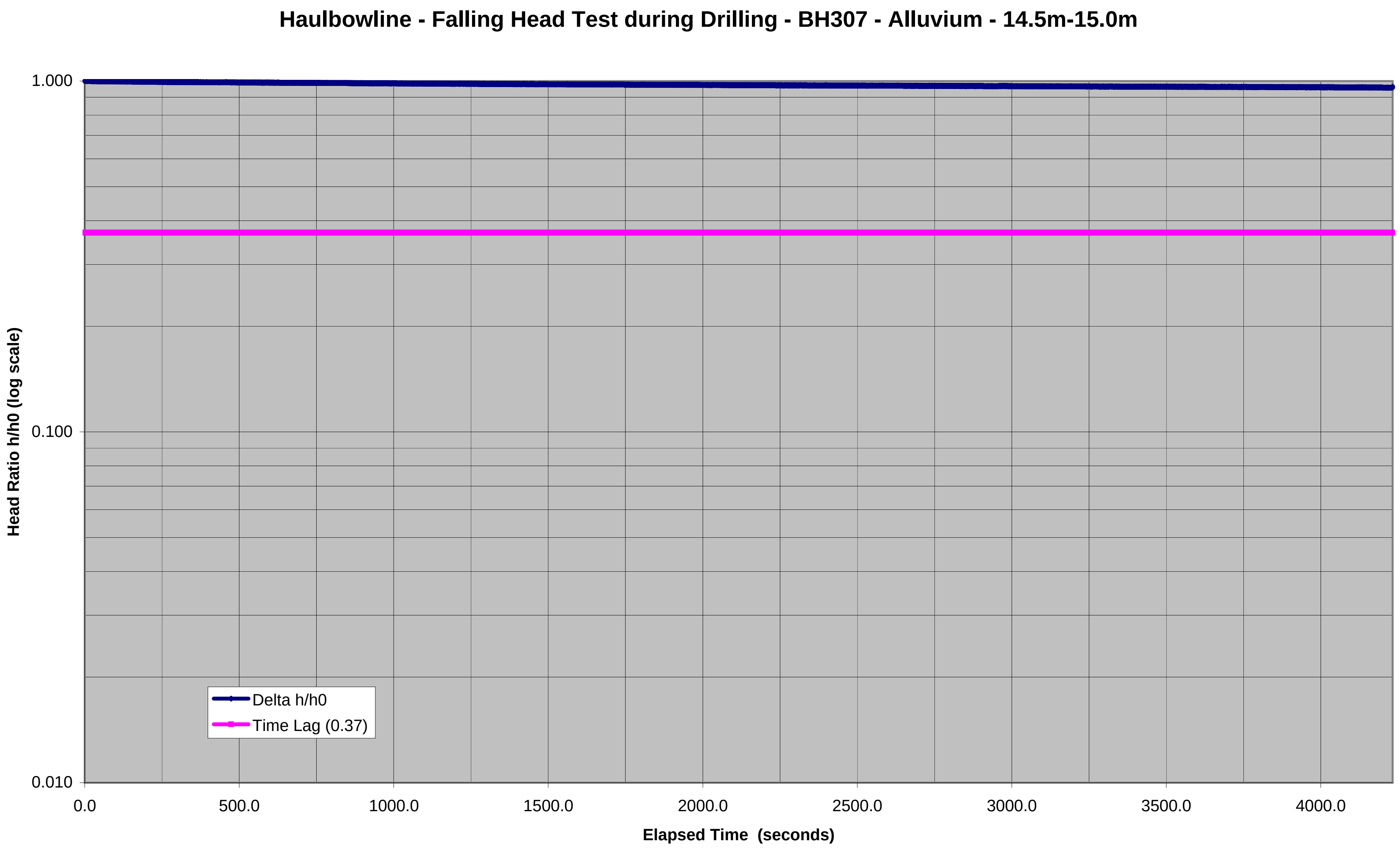
where:

P =	3.14	Pi
r_c =	0.0975	Casing inner radius (m)
t_1 =	0	Time 1 after commencement of test (sec)
t_2 =	3797	Time 1 after commencement of test (sec)
H_1 =	1.738	Head measured at Time 1 (m)
H_2 =	1.671	Head measured at Time 2 (m)
F =	0.53625	Shape Factor
K =	**6.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	30/05/2012 ; 15:53
Borehole ID:	BH307
Weather/Site conditions:	Dry
Tidal conditions/Time:	Rising tide (Low tide 19:50, High tide 13:12)
Static water level (m below top of casing):	3.7 @ 15:28
Initial water level (m below top of casing):	0.16
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.18
Depth of casing (m below top of casing):	14.68
Depth of hole (m below top of casing):	15.18
Depth interval of material tested:	14.5-15mbgl
Description of material in test interval:	Alluvium
Depth of hole at end of test (m below top of casing):	15

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.16	Start fill @ 15:47, flow rate approx. 0.2l/s; Stop fill at 15:53
0.5	0.16	
1.0	0.16	
1.5	0.16	
2.0	-	
2.5	0.16	
3.0	0.16	
3.5	0.16	
4.0	0.16	
4.5	0.16	
5	0.16	
6	0.16	
7	-	
8	0.17	
9	0.17	
10	0.17	
12	0.18	
14	0.18	
16	0.18	
18	0.18	
20	0.19	
25	-	
30	-	
35	0.20	
40	0.21	
45	0.21	
50	0.215	
55	0.215	
60	0.22	


Haulbowline - Falling Head Test during Drilling - BH307 - Alluvium - 14.5m-15.0m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
3000.0
3500.0
4000.0
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	30/05/2012
Tidal Conditions	Low Tide 19:50; High Tide 13:12
Borehole name	BH307
Casing internal diameter (mm)	195
Casing depth (m below ground level)	14.5
Depth of hole (m below ground level)	15
Height of casing (m above ground level)	0.18
Test depth interval (m below ground level)	14.5 - 15.0
Test material description	Alluvium (Silt)
Static water level (m below top of casing)	3.65m btoc @ 15:34 (manual dip reading)
Initial water level (m below top of casing)	0.208 btoc @ 15:53:27 (from logger data)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.5	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.879	Eqn. 2
			F =	1.548	Eqn. 3

For this test, where open hole extends into uniform silt layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

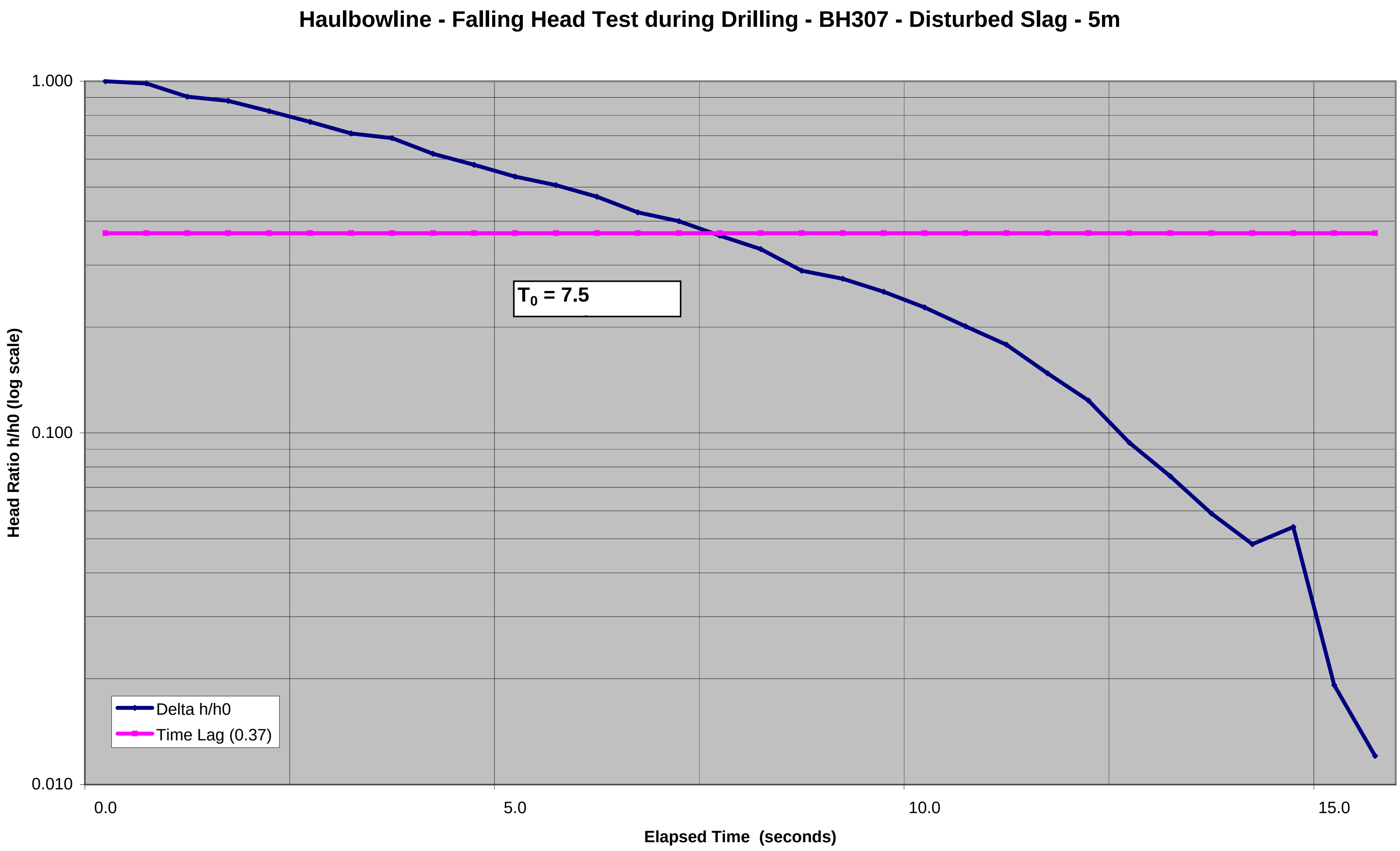
where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	4232	Time 1 after commencement of test (sec)
	H_1 =	3.442	Head measured at Time 1 (m)
	H_2 =	3.317	Head measured at Time 2 (m)
	F =	1.879	Shape Factor
	K =	**1.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	28/05/2012 ; 16:32
Borehole ID:	BH307
Weather/Site conditions:	Dry, windy
Tidal conditions/Time:	Falling tide (Low tide 17:41, High tide 11:07)
Static water level (m below top of casing):	3.77 @ 16:27 and 16:30
Initial water level (m below top of casing):	3.595
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.3
Depth of casing (m below top of casing):	5.3
Depth of hole (m below top of casing):	5.3
Depth interval of material tested:	5mbgl
Description of material in test interval:	Disturbed Slag
Depth of hole at end of test (m below top of casing):	5 (drilled to 7m but collapsed to 5m)

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	3.595	Start fill @ 16:32, flow rate approx. 0.2l/s
0.5	3.74	Water levels during fill as follows:
1.0	3.74	3.65 @ 16:35
1.5	3.74	3.62 @ 16:36
2.0	3.74	3.55 @ 16:37
2.5	3.74	3.59 @ 16:38: water level falling, stop fill @ 16:38
3.0	3.74	
3.5	-	
4.0	-	
4.5	-	
5	3.74	
6	-	
7	3.74	
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Falling Head Test during Drilling - BH307 - Disturbed Slag - 5m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
T0 = 7.5
Delta h/h0
Time Lag (0.37)
0.0
5.0
10.0
15.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	28/05/2012
Tidal Conditions	Low Tide 17:41; High Tide 11:07
Borehole name	BH307
Casing internal diameter (mm)	195
Casing depth (m below ground level)	5
Depth of hole (m below ground level)	5 (drilled to 7m but collapsed back to 5m)
Height of casing (m above ground level)	0.3
Test depth interval (m below ground level)	0
Test material description	Disturbed Slag
Static water level (m below top of casing)	3.77m btoc @ 16:30 (manual dip reading)
Initial water level (m below top of casing)	3.629 btoc @ 16:38:54 (from logger data)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the ground has collapsed to the base of the casing, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	T_0 =	7.5	Time lag (sec)
	F =	0.536	Shape Factor
	K =	***7.4E-03***	**Permeability (m/sec)**
	K =	***641***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

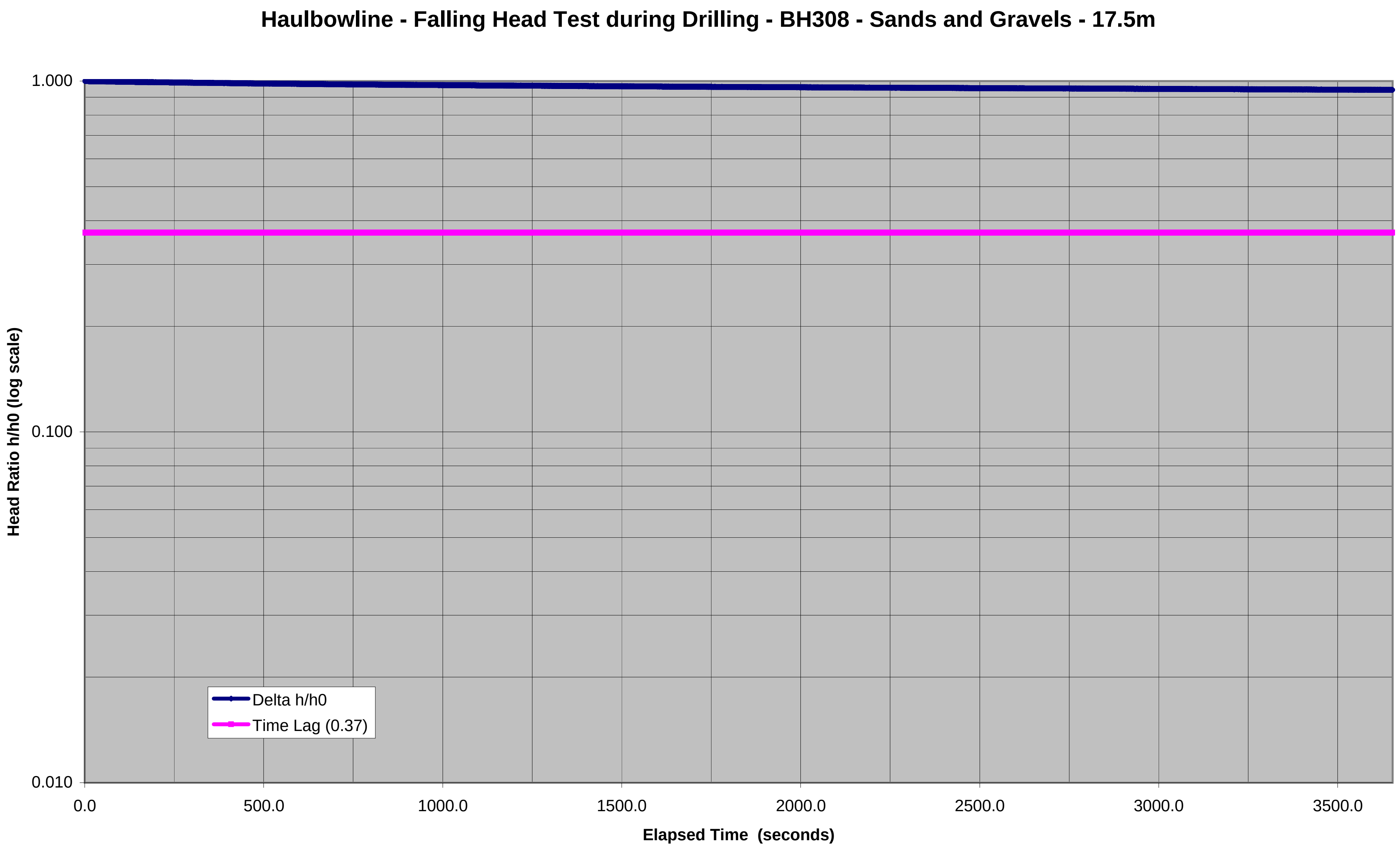
where:

	P =		Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =	#DIV/0!	Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	30/05/2012 ; 11:24
Borehole ID:	BH308
Weather/Site conditions:	Dry, calm
Tidal conditions/Time:	Rising tide (Low tide 07:22, High tide 13:12)
Static water level (m below top of casing):	5.6 @ 11:06
Initial water level (m below top of casing):	0.2
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.28
Depth of casing (m below top of casing):	17.78
Depth of hole (m below top of casing):	17.78
Depth interval of material tested:	17.5mbgl
Description of material in test interval:	Sand and Gravel
Depth of hole at end of test (m below top of casing):	17.5

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.20	Fill started @ 11:14; flow rate approximately 0.25l/s
0.5	0.20	Filll stopped @ 11:24
1.0	0.20	
1.5	0.20	
2.0	0.21	
2.5	0.21	
3.0	0.220	
3.5	0.23	
4.0	0.24	
4.5	-	
5	0.24	
6	0.24	
7	0.25	
8	0.25	
9	0.26	
10	0.26	
12	0.27	
14	0.28	
16	0.29	
18	0.30	
20	0.31	
25	0.32	
30	0.34	
35	0.355	
40	0.365	
45	0.38	
50	0.39	
55	-	
60	-	



Haulbowline - Falling Head Test during Drilling - BH308 - Sands and Gravels - 17.5m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
3000.0
3500.0
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	30/05/2012
Tidal Conditions	Low Tide 19:50; High Tide 13:12
Borehole name	BH308 (Graph Segment A)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	17.5
Depth of hole (m below ground level)	17.5
Height of casing (m above ground level)	0.28
Test depth interval (m below ground level)	0
Test material description	Sands and Gravels
Static water level (m below top of casing)	5.60m btoc @ 11:06 (manual dip reading)
Initial water level (m below top of casing)	0.195 btoc @ 11:24:07 (from logger data)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = Pr_c^2/T_0F}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_eH_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e(L/D) + \mathrm{sqrt}(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e(2L/D) + \mathrm{sqrt}(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the subsoil is flush with bottom in uniform layer, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

P =		Pi
r_c =		Casing inner radius (m)
T_0 =		Time lag (sec)
F =		Shape Factor
K =	***#DIV/0!***	**Permeability (m/sec)**
K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

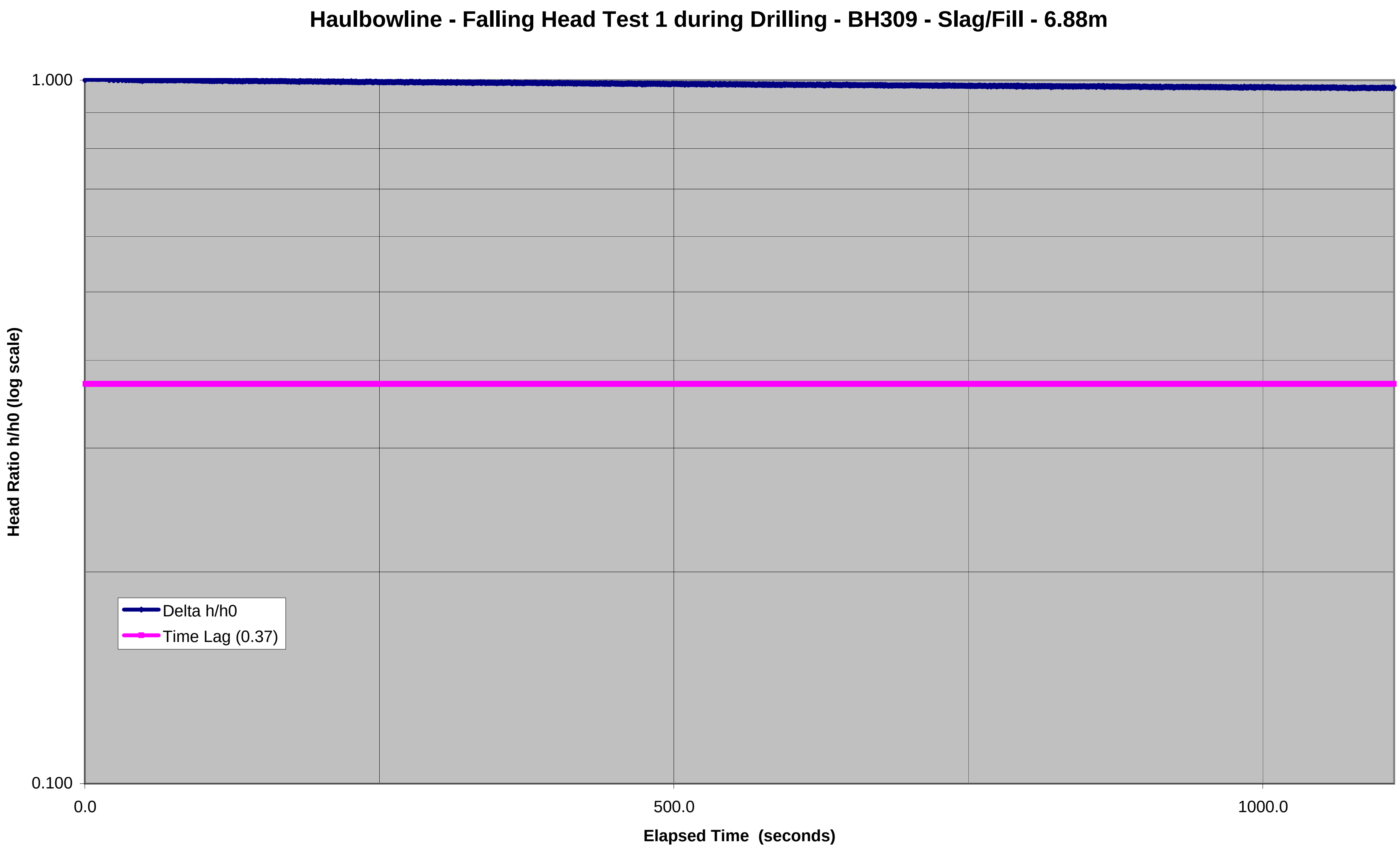
where:

P =	3.14	Pi
r_c =	0.0975	Casing inner radius (m)
t_1 =	0	Time 1 after commencement of test (sec)
t_2 =	3653	Time 1 after commencement of test (sec)
H_1 =	5.405	Head measured at Time 1 (m)
H_2 =	5.1	Head measured at Time 2 (m)
F =	0.536	Shape Factor
K =	**9.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	05/06/2012; 17:03
Borehole ID:	BH309
Weather/Site conditions:	Light rain
Tidal conditions/Time:	Falling tide (High tide 07:03, Low tide 13:24)
Static water level (m below top of casing):	2.73 @ 16:31
Initial water level (m below top of casing):	0.05 @ 17:03
Casing diameter (mm ID):	260
Height of casing (m above ground level):	0.72
Depth of casing (m below top of casing):	7.60
Depth of hole (m below top of casing):	7.60
Depth interval of material tested:	6.88 mbgl
Description of material in test interval:	Slag/Fill
Depth of hole at end of test (m below top of casing):	-

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.05	Started filling borehole @ 16:34; flow rate approx 0.1 l/s;
0.5	-	stopped filling @ 16:41, ran out of water, start filling
1.0	-	again @ 16:59, stopped filling @ 17:03
1.5	-	
2.0	-	
2.5	0.11	
3.0	-	
3.5	0.12	
4.0	-	
4.5	-	
5	-	
6	-	
7	-	
8	-	
9	-	
10	-	
12		
14	-	
16	-	
~~18~~ 19	0.14	
20	-	
25		
30		
35		
40		
45		
50		
55		
~~60~~		


Haulbowline - Falling Head Test 1 during Drilling - BH309 - Slag/Fill - 6.88m
1.000
0.100
0.0
500.0
1000.0
Elapsed Time (seconds)
Head Ratio h/h0 (log scale)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	05/06/2012
Tidal Conditions	Low Tide 13:24; High Tide 07:03
Borehole name	BH309 (Test 1)
Casing internal diameter (mm)	260
Casing depth (m below ground level)	6.88
Depth of hole (m below ground level)	6.88
Height of casing (m above ground level)	0.72
Test depth interval (m below ground level)	6.88
Test material description	Slag/Fill
Static water level (m below top of casing)	2.665m btoc @ 16:31:30 (from logger data)
Initial water level (m below top of casing)	1.254m btoc @ 16:41:07 (manual reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = Pr_c^2/T_0F}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_eH_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [log_e(L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [log_e(2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.715	Eqn. 1
Diameter	D (m) =	0.26	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

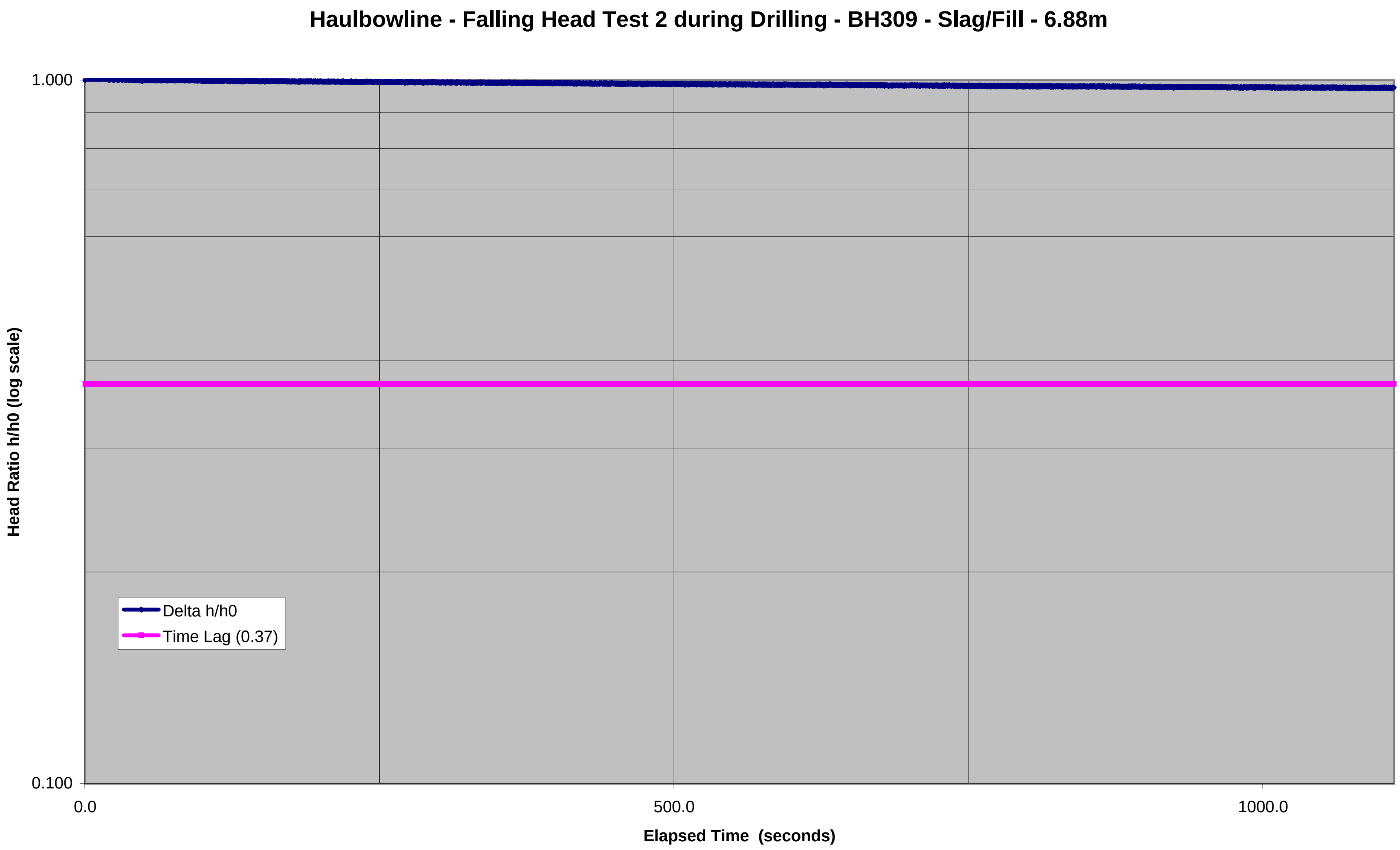
	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][log_eH_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =	0.13	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	1111	Time 1 after commencement of test (sec)
	H_1 =	1.411	Head measured at Time 1 (m)
	H_2 =	1.378	Head measured at Time 2 (m)
	F =	0.715	Shape Factor
	K =	**2.E-06**	**Permeability (m/sec)**


Haulbowline - Falling Head Test 2 during Drilling - BH309 - Slag/Fill - 6.88m
1.000
0.100
Head Ratio h/h0 (log scale)
Delta h/h0
Time Lag (0.37)
0.0
500.0
1000.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	05/06/2012
Tidal Conditions	Low Tide 13:24; High Tide 07:03
Borehole name	BH309 (Test 2)
Casing internal diameter (mm)	260
Casing depth (m below ground level)	6.88
Depth of hole (m below ground level)	6.88
Height of casing (m above ground level)	0.72
Test depth interval (m below ground level)	6.88
Test material description	Slag/Fill
Static water level (m below top of casing)	2.665m btoc @ 16:31:30 (from logger data)
Initial water level (m below top of casing)	0.05m btoc @ 17:03:36 (manual reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.715	Eqn. 1
Diameter	D (m) =	0.26	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

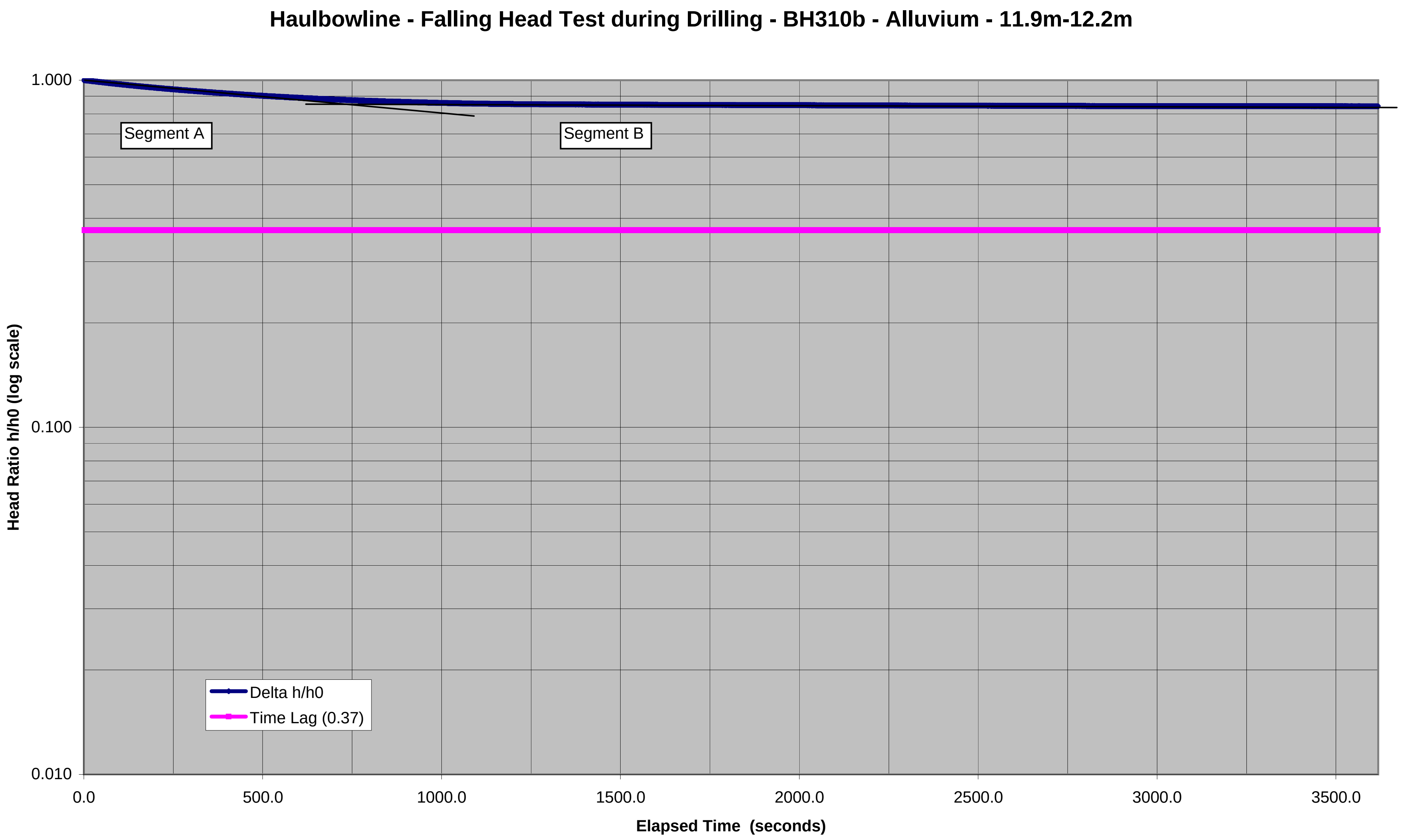
where:

	P =	3.14	Pi
	r_c =	0.13	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	17383	Time 1 after commencement of test (sec)
	H_1 =	2.615	Head measured at Time 1 (m)
	H_2 =	2.128	Head measured at Time 2 (m)
	F =	0.715	Shape Factor
	K =	**9.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	11/05/12; 10:40
Borehole ID:	BH310b
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Falling tide (High tide 10:07; Low tide 16:44)
Static water level (m below top of casing):	12.30 (silty water at bottom of borehole) @ 10:20
Initial water level (m below top of casing):	0.90 @ 10:40
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.60
Depth of casing (m below top of casing):	12.50
Depth of hole (m below top of casing):	12.80
Depth interval of material tested (m below ground level):	11.9 - 12.2 mbgl
Description of material in test interval:	Alluvium
Depth of hole at end of test (m below top of casing):	12.10

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.90	Started filling borehole @ 10:27; flow rate approx 0.4 l/s;
0.5	-	stopped filling @ 10:40
1.0	-	
1.5	-	Unable to get accurate water level readings for first
2.0	-	5 mins due to silty water affecting dipper
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5	1.72	
6	-	
7	1.89	
8	2.29	
9	-	
~~10~~ 11	2.52	
12	-	
14	-	
~~16~~ 17	2.56	
18	-	
20	-	
25	-	
30	-	
~~35~~ 33	2.58	
~~40~~ 41	2.61	
45	-	
50	2.64	
55	-	
60	2.65	Logger removed from borehole



Haulbowline - Falling Head Test during Drilling - BH310b - Alluvium - 11.9m-12.2m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
Segment A
Segment B
Delta h/h0
Time Lag (0.37)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
3000.0
3500.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	11/05/2012
Tidal Conditions	Low Tide 15:44; High Tide 10:07
Borehole name	BH310b (Segment A)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	11.9
Depth of hole (m below ground level)	12.2
Height of casing (m above ground level)	0.6
Test depth interval (m below ground level)	11.9 - 12.2
Test material description	Alluvium (Silt)
Static water level (m below top of casing)	11.919m btoc @ 10:28 (from logger data)
Initial water level (m below top of casing)	0.9 btoc @ 10:39:42 (from manual dip measurement)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = Pr_c^2/T_0F}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.3	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.549	Eqn. 2
			F =	1.207	Eqn. 3

For this test, where open hole extends into uniform layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	500	Time 1 after commencement of test (sec)
	H_1 =	11.019	Head measured at Time 1 (m)
	H_2 =	9.936	Head measured at Time 2 (m)
	F =	1.549	Shape Factor
	K =	**4.E-06**	**Permeability (m/sec)**

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	11/05/2012
Tidal Conditions	Low Tide 15:44; High Tide 10:07
Borehole name	BH310b (Segment B)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	11.9
Depth of hole (m below ground level)	12.2
Height of casing (m above ground level)	0.6
Test depth interval (m below ground level)	11.9 - 12.2
Test material description	Alluvium (Silt)
Static water level (m below top of casing)	11.919m btoc @ 10:28 (from logger data)
Initial water level (m below top of casing)	0.9 btoc @ 10:39:42 (from manual dip measurement)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = Pr_c^2/T_0F}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.3	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.549	Eqn. 2
			F =	1.207	Eqn. 3

For this test, where open hole extends into uniform layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

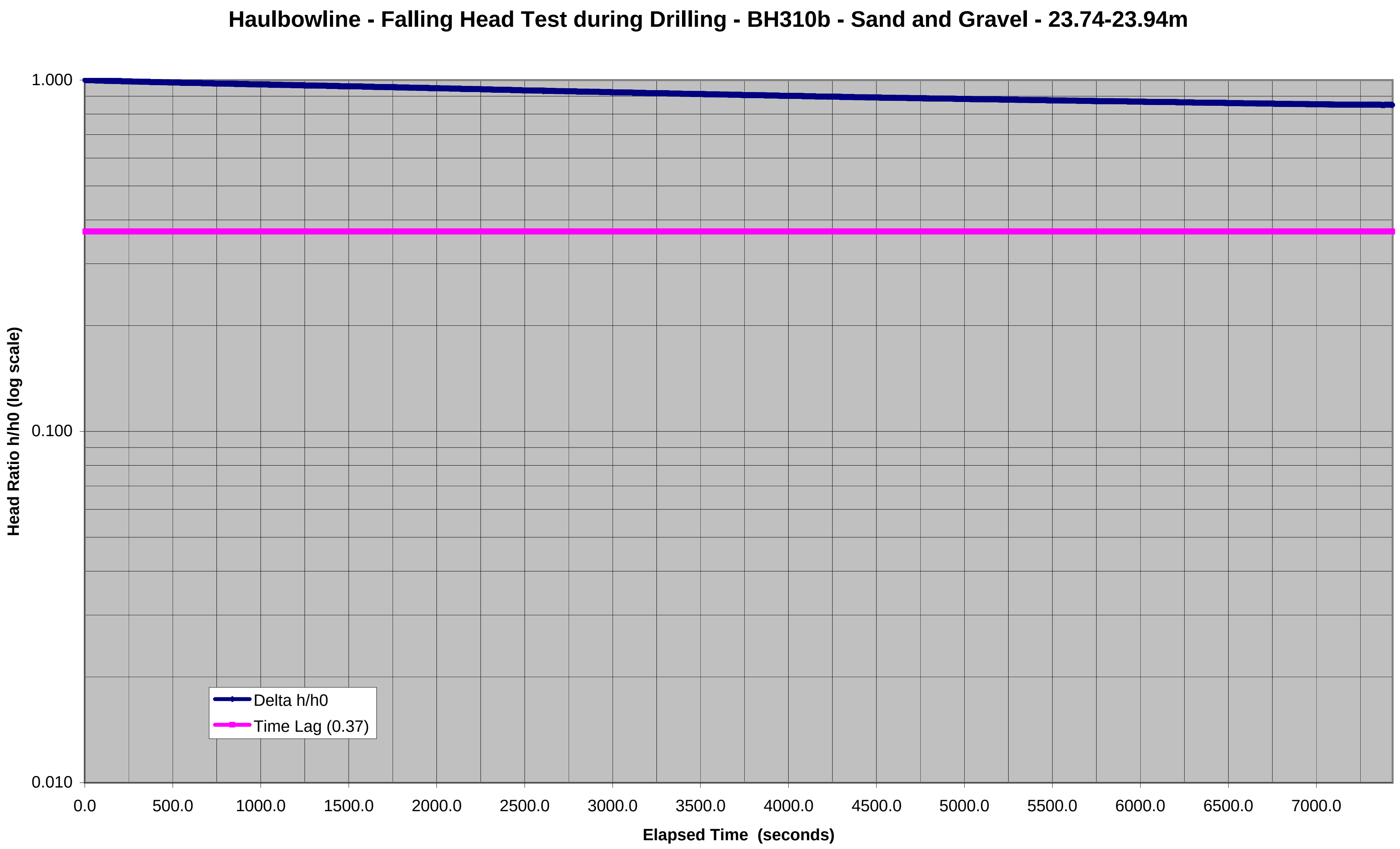
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	t_1 =	1250	Time 1 after commencement of test (sec)
	t_2 =	3500	Time 1 after commencement of test (sec)
	H_1 =	9.399	Head measured at Time 1 (m)
	H_2 =	9.273	Head measured at Time 2 (m)
	F =	1.549	Shape Factor
	K =	**1.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet	
Site name:	Haulbowline Island
Date and Time:	15/05/12 ; 10:52
Borehole ID:	310b
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Rising Tide (Low tide 8:27, High tide 14:21)
Static water level (m below top of casing):	6.41
Initial water level (m below top of casing):	0.80
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.36
Depth of casing (m below top of casing):	24.10
Depth of hole (m below top of casing):	24.30
Depth interval of material tested:	23.74 - 23.94 mbgl
Description of material in test interval:	Sand and Gravel
Depth of hole at end of test (m below top of casing):	24.00

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
~~0~~ 110	1.55	Continued
~~0.5~~ 116	1.59	
~~1~~ 118	1.59	
~~1.5~~ 121	1.60	Logger taken out of borehole



Haulbowline - Falling Head Test during Drilling - BH310b - Sand and Gravel - 23.74-23.94m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
3000.0
3500.0
4000.0
4500.0
5000.0
5500.0
6000.0
6500.0
7000.0
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	15/05/2012
Tidal Conditions	Low Tide 08:27; High Tide 14:21
Borehole name	BH310b
Casing internal diameter (mm)	195
Casing depth (m below ground level)	23.74
Depth of hole (m below ground level)	23.94
Height of casing (m above ground level)	0.36
Test depth interval (m below ground level)	23.74 - 23.94
Test material description	Sand and Gravel
Static water level (m below top of casing)	6.428m btoc @ 10:29:00 (from logger data)
Initial water level (m below top of casing)	0.8m btoc @ 10:52:07(manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.2	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	1.397	Eqn. 2
			F =	1.026	Eqn. 3

For this test, where open hole extends into uniform layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

P =		Pi
r_c =		Casing inner radius (m)
T_0 =		Time lag (sec)
F =		Shape Factor
K =	***#DIV/0!***	**Permeability (m/sec)**
K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

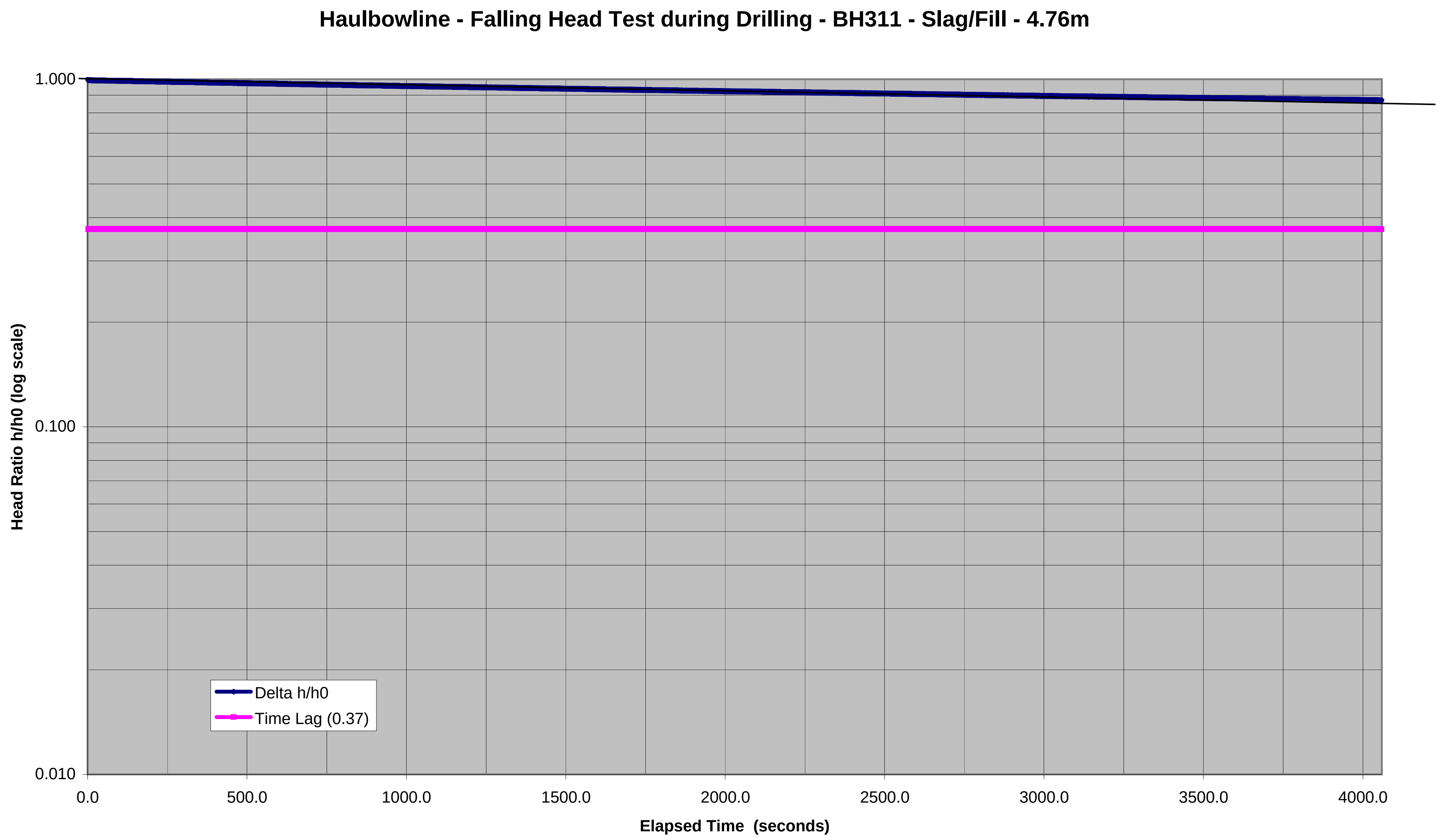
where:

P =	3.14	Pi
r_c =	0.0975	Casing inner radius (m)
t_1 =	0	Time 1 after commencement of test (sec)
t_2 =	7433	Time 1 after commencement of test (sec)
H_1 =	5.638	Head measured at Time 1 (m)
H_2 =	4.789	Head measured at Time 2 (m)
F =	1.397	Shape Factor
K =	**5.E-07**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	25/05/12 ; 13:28
Borehole ID:	BH311
Weather/Site conditions:	Dry, sunny & warm
Tidal conditions/Time:	Falling Tide (High tide 08:45 ; Low tide 15:12)
Static water level (m below top of casing):	3.73 @ 13:06
Initial water level (m below top of casing):	0.22 @ 13:28
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.68
Depth of casing (m below top of casing):	5.44
Depth of hole (m below top of casing):	5.44
Depth interval of material tested:	4.76 mbgl
Description of material in test interval:	Slag/Fill
Depth of hole at end of test (m below top of casing):	5.35

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.22	Started filling borehole @ 13:20; flow rate approx 0.2 l/s;
0.5	0.23	stopped filling @ 13:28
1.0	0.24	
1.5	0.24	
2.0	0.24	
2.5	-	
3.0	0.25	
3.5	-	
4.0	0.26	
4.5	-	
5	0.26	
6	0.27	
7	0.28	
8	-	
9	0.29	
10	0.30	
12	0.32	
14	0.33	
16	0.35	
18	0.36	
20	0.38	
~~25~~ 24	0.41	
~~30~~ 29	0.43	
~~35~~ 34	0.46	
~~40~~ 38	0.50	
~~45~~ 44	0.53	
~~50~~ 51	0.56	
55	-	
~~60~~ 66	0.65	Logger taken out of borehole



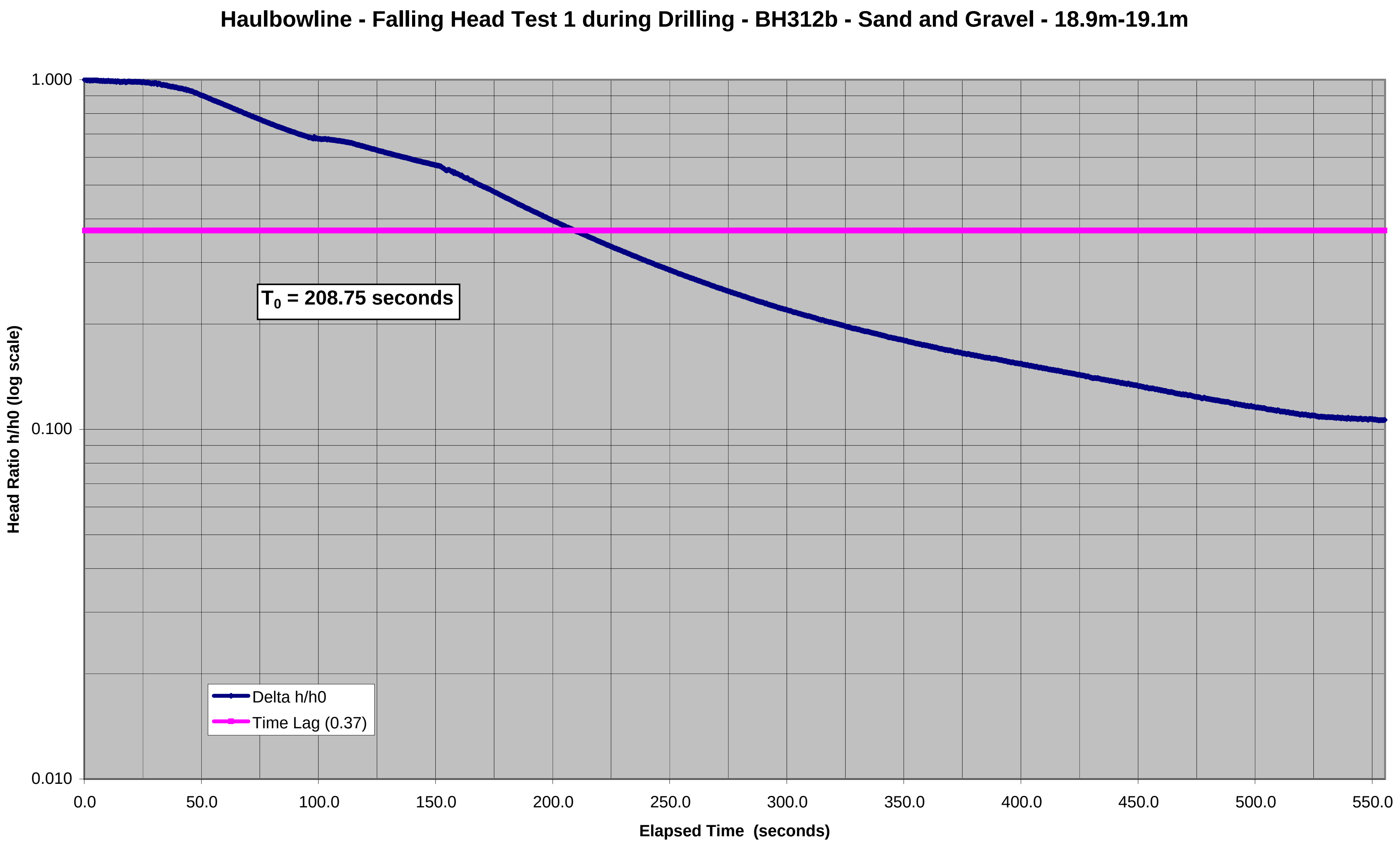
Haulbowline - Falling Head Test during Drilling - BH311 - Slag/Fill - 4.76m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
Delta h/h0
Time Lag (0.37)
0.0
500.0
1000.0
1500.0
2000.0
2500.0
3000.0
3500.0
4000.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA					
Client			Cork County Council/White Young Green		
Location			Haulbowline		
Project Number			IE718 (IE Consulting Reference)		
Date of Test			25/05/2012		
Tidal Conditions			Low Tide 15:12; High Tide 08:45		
Borehole name			BH311		
Casing internal diameter (mm)			195		
Casing depth (m below ground level)			4.76		
Depth of hole (m below ground level)			4.76		
Height of casing (m above ground level)			0.68		
Test depth interval (m below ground level)			4.76		
Test material description			Slag/Fill		
Static water level (m below top of casing)			3.73m btoc @ 13:06 (from manual dip reading)		
Initial water level (m below top of casing)			0.217 btoc @ 13:27:21 (from logger data)		
Permeability Test Type			Falling head test during drilling		
Analysis Method Reference			BS5930:1999 and Hvorslev (1951)		
Method Applied for Permeability Calculation					
Equation			***Application***		
$\mathbf{K = Pr_c^2/T_0F}$			Where T_0 can be determined from graph		
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_eH_1/H_2]}$			Where T_0 cannot be determined from graph		
Determination of T_0 from Graph					
$T_0 = (Pr_c^2)/(FK)$					
Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$					
Determination of F (Shape Factor)					
Equation			***Application***		
Eq. 1: F = 2.75D			Soil flush with bottom in uniform soil		
Eq. 2: $F = [2\pi L] / [log_e (L/D) + sqrt(1+(L/D)^2]$			Well point or hole extended in uniform soil		
Eq. 3: $F = [2\pi L] / [log_e (2L/D) + sqrt(1+((2L)^2/D)]$			Well point or hole extended at impervious boundary		
where:					
Length	L (m) =	0	*F =*	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3
For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied					
Permeability K (m/s) Equation (where T_0 can be determined from the graph)					
$K = Pr_c^2/T_0F$					
where:					
	P =		Pi		
	r_c =		Casing inner radius (m)		
	T_0 =		Time lag (sec)		
	F =		Shape Factor		
	K =	***#DIV/0!***	**Permeability (m/sec)**		
	K =	***#DIV/0!***	**Permeability (m/day)**		
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)					
$K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]$					
where:					
	P =	3.14	Pi		
	r_c =	0.0975	Casing inner radius (m)		
	t_1 =	0	Time 1 after commencement of test (sec)		
	t_2 =	4059	Time 1 after commencement of test (sec)		
	H_1 =	3.513	Head measured at Time 1 (m)		
	H_2 =	3.056	Head measured at Time 2 (m)		
	F =	0.536	Shape Factor		
	K =	**2.E-06**	**Permeability (m/sec)**		

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline
Date and Time:	4/5/12 ; 14:25
Borehole ID:	BH312b
Weather/Site conditions:	Dry, Overcast
Tidal conditions/Time:	Rising Tide, (Low tide 10:59, High tide 16:51)
Static water level (m below top of casing):	3.43 @ 13:12
Initial water level (m below top of casing):	0.72 @ 14:25
Casing diameter (mm ID):	195
Height of casing (m above ground level):	0.75
Depth of casing (m below top of casing):	19.65
Depth of hole (m below top of casing):	19.85
Depth interval of material tested:	18.9 - 19.1 mbgl
Description of material in test interval:	Sands/ Gravels
Depth of hole at end of test (m below top of casing):	19.85

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.72	Started filling borehole @ 13:20; flow rate approx 0.5 l/s;
0.5	0.95	Stopped filling @ 13:24 due to lack of water, aborted test.
1.0	1.36	Started Filling again @ 14:08 and stopped filling again
1.5	1.62	@14:25
2.0	1.83	
2.5	2.02	
3.0	2.19	
3.5	2.31	
4.0	2.41	
4.5	2.52	
5	2.71	
6	2.77	
7	2.91	
8	3.01	
9	3.12	
10	3.14	
12	3.21	
14	3.22	
16	3.22	
18	3.2	
20	3.19	
25	3.13	
30	-	
35	-	Logger Removed From Borehole
40	-	
45	-	
50	-	
55	-	
60	-	



Haulbowline - Falling Head Test 1 during Drilling - BH312b - Sand and Gravel - 18.9m-19.1m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
T_0 = 208.75 seconds
Delta h/h0
Time Lag (0.37)
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	04/05/2012
Tidal Conditions	Low Tide 10:59; High Tide 16:51
Borehole name	BH312b (Test 1)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	18.9
Depth of hole (m below ground level)	19.1
Height of casing (m above ground level)	0.75
Test depth interval (m below ground level)	18.9 - 19.1
Test material description	Sand and Gravel
Static water level (m below top of casing)	4.442 m btoc @ 13:15:00 (from logger data)
Initial water level (m below top of casing)	0.72 m btoc @ 14:24:55 (from manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = Pr_c^2/T_0F}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.2	*F* =	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F* =	1.397	Eqn. 2
			F =	1.026	Eqn. 3

For this test, where open hole extends into uniform layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

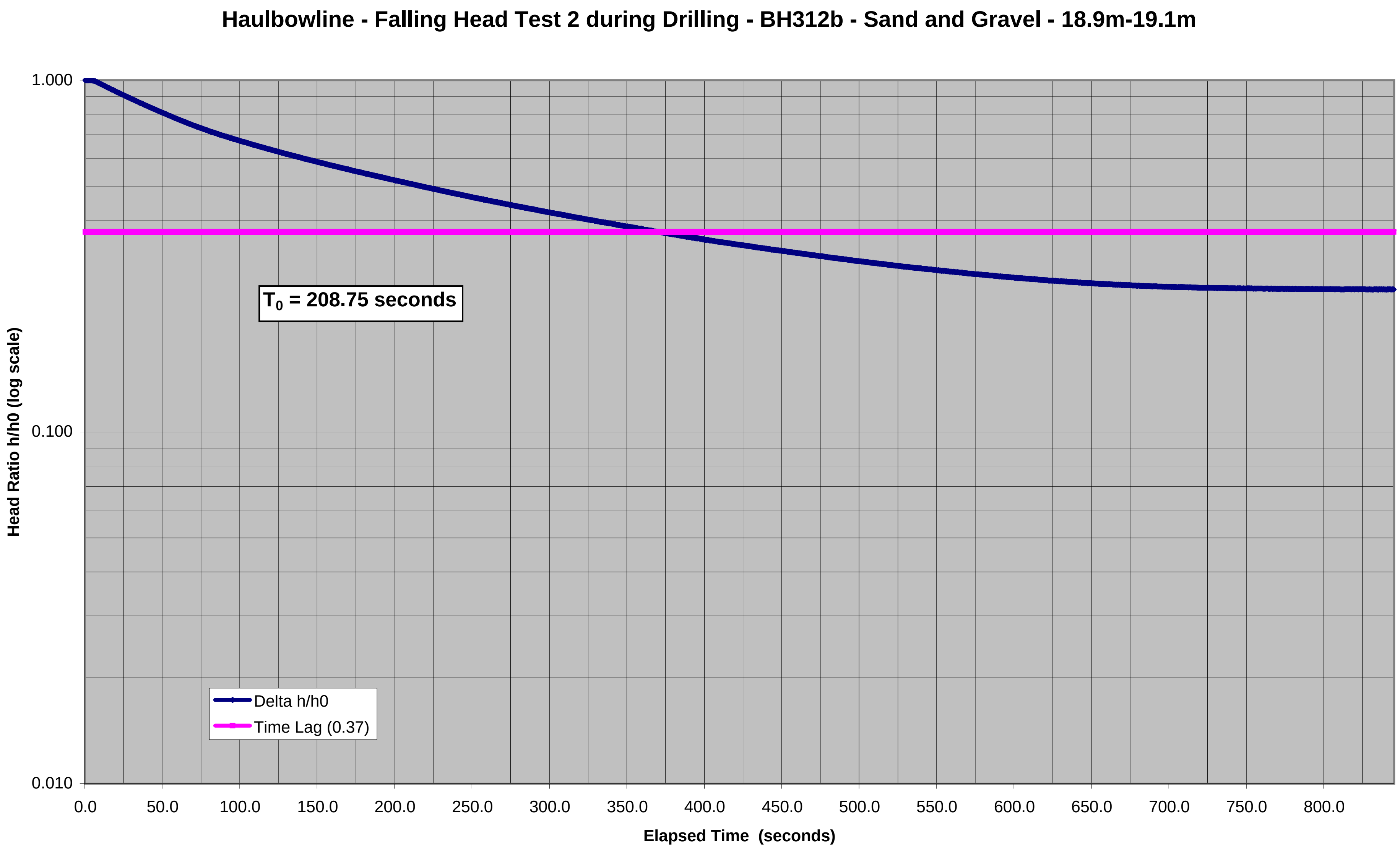
	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	T_0 =	208.75	Time lag (sec)
	F =	1.40	Shape Factor
	K =	***1.0E-04***	**Permeability (m/sec)**
	K =	***8.8***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**



Haulbowline - Falling Head Test 2 during Drilling - BH312b - Sand and Gravel - 18.9m-19.1m
T_0 = 208.75 seconds
Delta h/h0
Time Lag (0.37)
Head Ratio h/h0 (log scale)
1.000
0.100
0.010
0.0
50.0
100.0
150.0
200.0
250.0
300.0
350.0
400.0
450.0
500.0
550.0
600.0
650.0
700.0
750.0
800.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	04/05/2012
Tidal Conditions	Low Tide 10:59; High Tide 16:51
Borehole name	BH312b (Test 2)
Casing internal diameter (mm)	195
Casing depth (m below ground level)	18.9
Depth of hole (m below ground level)	19.1
Height of casing (m above ground level)	0.75
Test depth interval (m below ground level)	18.9 - 19.1
Test material description	Sand and Gravel
Static water level (m below top of casing)	4.442 m btoc @ 13:15:00 (from logger data)
Initial water level (m below top of casing)	0.72 m btoc @ 14:24:55 (from manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + \mathrm{sqrt}(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + \mathrm{sqrt}(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.2	*F* =	0.536	Eqn. 1
Diameter	D (m) =	0.195	*F* =	1.397	Eqn. 2
			F =	1.026	Eqn. 3

For this test, where open hole extends into uniform layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =	3.14	Pi
	r_c =	0.0975	Casing inner radius (m)
	T_0 =	370.5	Time lag (sec)
	F =	1.40	Shape Factor
	K =	***5.8E-05***	**Permeability (m/sec)**
	K =	***5.0***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

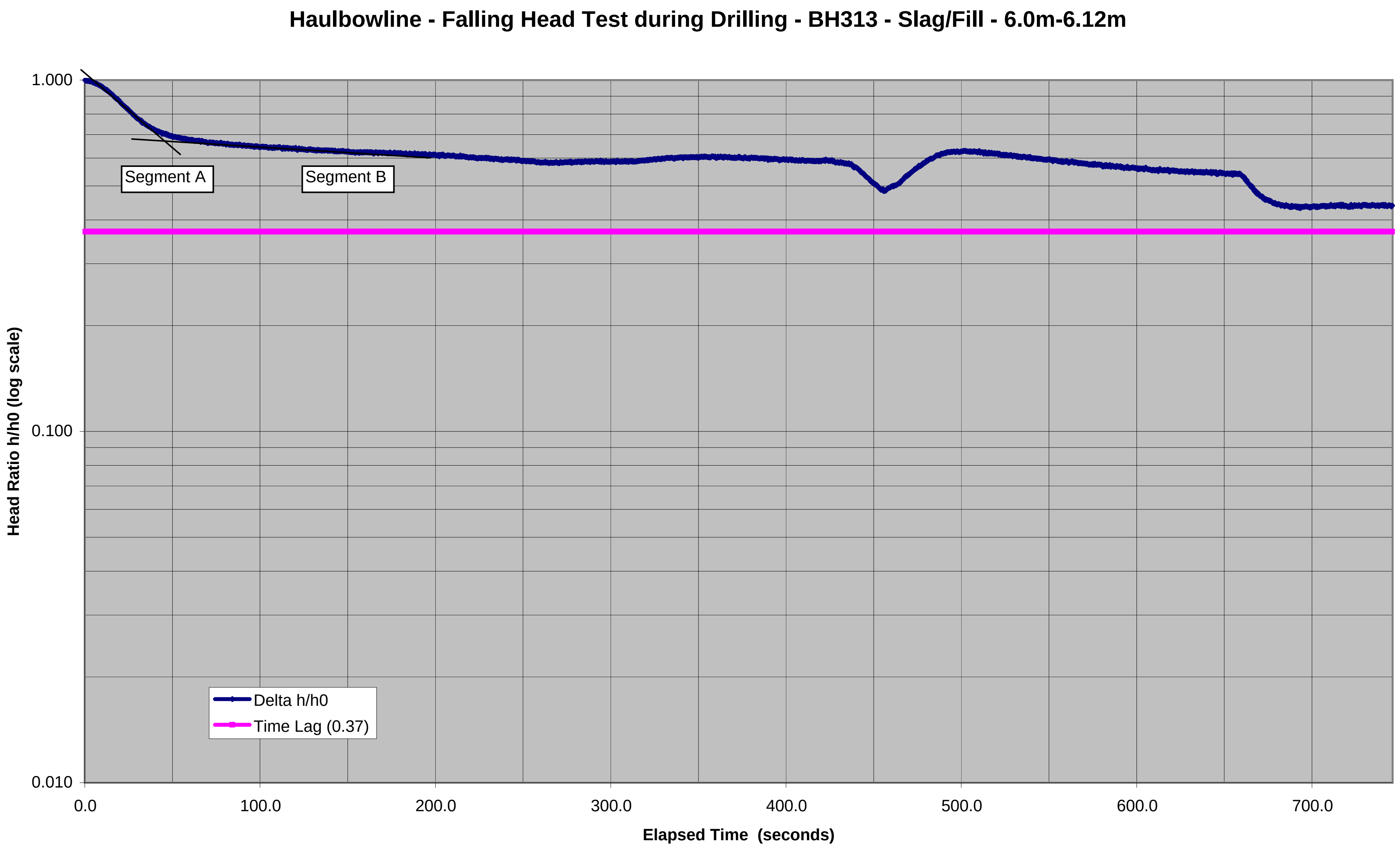
where:

	P =		Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	17/05/12 ; 15:47
Borehole ID:	BH313
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Rising Tide (Low tide 10:21, High tide 16:12)
Static water level (m below top of casing):	3.40 @ 15:23
Initial water level (m below top of casing):	2.25 @ 15:47
Casing diameter (mm ID):	260
Height of casing (m above ground level):	0.30
Depth of casing (m below top of casing):	6.30
Depth of hole (m below top of casing):	6.42
Depth interval of material tested:	6.00 - 6.12 mbgl
Description of material in test interval:	Slag/ Fill
Depth of hole at end of test (m below top of casing):	-

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	2.25	Started filling borehole @ 15:28; flow rate approx 0.1 l/s;
0.5	-	stopped filling @ 15:47
1.0	-	
1.5	-	Difficult to affect increase in head in this borehole
2.0	-	
2.5	-	Difficult to get water level readings with dipper due to
3.0	-	scum from slag on top of the water & rapid drop in
3.5	-	water levels
4.0	-	
4.5	-	Refer to Logger Data
5	-	
6	-	
7	-	
8	-	
9	-	
10	-	
12	-	
14	-	
16	-	
18	-	
20	-	
25	-	
30	-	
35	-	
40	-	
45	-	
50	-	
55	-	
60	-	



Haulbowline - Falling Head Test during Drilling - BH313 - Slag/Fill - 6.0m-6.12m
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
Segment A
Segment B
Delta h/h0
Time Lag (0.37)
0.0
100.0
200.0
300.0
400.0
500.0
600.0
700.0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	17/05/2012
Tidal Conditions	Low Tide 10:21; High Tide 16:12
Borehole name	BH313 (Graph Segment A)
Casing internal diameter (mm)	260
Casing depth (m below ground level)	6
Depth of hole (m below ground level)	6.12
Height of casing (m above ground level)	0.3
Test depth interval (m below ground level)	6.0 - 6.12
Test material description	Slag/Fill
Static water level (m below top of casing)	3.40m btoc @ 15:27:22 (manual dip reading)
Initial water level (m below top of casing)	2.774 btoc @ 15:47:34 (from logger data)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.12	*F =*	0.715	Eqn. 1
Diameter	D (m) =	0.26	*F =*	1.688	Eqn. 2
			F =	1.066	Eqn. 3

For this test, where open hole extends into slag/fill layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

P =		Pi
r_c =		Casing inner radius (m)
T_0 =		Time lag (sec)
F =		Shape Factor
K =	***#DIV/0!***	**Permeability (m/sec)**
K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

P =	3.14	Pi
r_c =	0.13	Casing inner radius (m)
t_1 =	11.5	Time 1 after commencement of test (sec)
t_2 =	33.5	Time 1 after commencement of test (sec)
H_1 =	0.59	Head measured at Time 1 (m)
H_2 =	0.471	Head measured at Time 2 (m)
F =	1.688	Shape Factor
K =	**3.E-04**	**Permeability (m/sec)**

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	17/05/2012
Tidal Conditions	Low Tide 10:21; High Tide 16:12
Borehole name	BH313 (Graph Segment B)
Casing internal diameter (mm)	260
Casing depth (m below ground level)	6
Depth of hole (m below ground level)	6.12
Height of casing (m above ground level)	0.3
Test depth interval (m below ground level)	6.0 - 6.12
Test material description	Slag/Fill
Static water level (m below top of casing)	3.40m btoc @ 15:27:22 (manual dip reading)
Initial water level (m below top of casing)	2.774 btoc @ 15:47:34 (from logger data)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = Pr_c^2/T_0F}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0.12	*F =*	0.715	Eqn. 1
Diameter	D (m) =	0.26	*F =*	1.688	Eqn. 2
			F =	1.066	Eqn. 3

For this test, where open hole extends into slag/fill layer, Eqn. 2 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

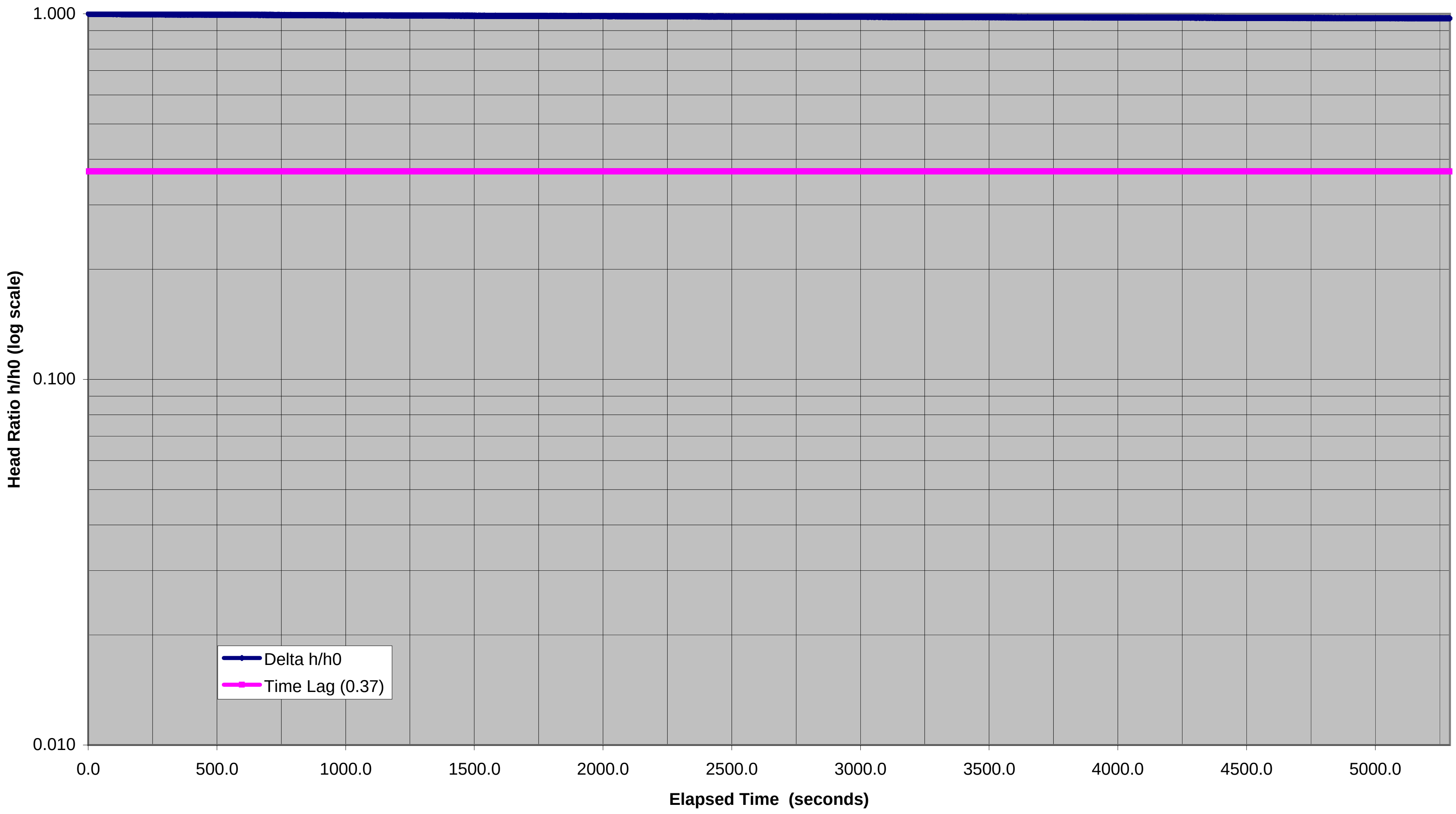
	P =	3.14	Pi
	r_c =	0.13	Casing inner radius (m)
	t_1 =	100	Time 1 after commencement of test (sec)
	t_2 =	200	Time 1 after commencement of test (sec)
	H_1 =	0.404	Head measured at Time 1 (m)
	H_2 =	0.383	Head measured at Time 2 (m)
	F =	1.688	Shape Factor
	K =	**2.E-05**	**Permeability (m/sec)**

In-situ Permeability (Falling Head) Test during Drilling - Field Datasheet

Site name:	Haulbowline Island
Date and Time:	22/05/12 ;12:22
Borehole ID:	BH315
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Falling tide (High tide 07:03, Low tide 13:24)
Static water level (m below top of casing):	4.37 @ 12:05
Initial water level (m below top of casing):	0.20 @ 12:22
Casing diameter (mm ID):	260
Height of casing (m above ground level):	0.70
Depth of casing (m below top of casing):	6.00
Depth of hole (m below top of casing):	6.00
Depth interval of material tested:	5.30 mbgl
Description of material in test interval:	Slag/Fill
Depth of hole at end of test (m below top of casing):	5.97

Time (minutes)	Water level (m below top of casing)	Other Notes/Observations
0.0	0.20	Started filling borehole @ 12:13; flow rate approx 0.1 l/s;
0.5	0.20	stopped filling @ 12:22
1.0	0.20	
1.5	-	
2.0	0.20	
2.5	-	
3.0	0.20	
3.5	-	
4.0	0.20	
4.5	-	
5	0.20	
6	0.21	
7	0.21	
8	0.22	
9	0.22	
10	0.22	
12	0.22	
14	0.22	
16	0.23	
18	0.23	
~~20~~ 23	0.23	
25	0.24	
30	0.25	
35	-	
40	-	
45	-	
50	-	
55	-	
~~60~~ 64	0.27	Logger removed from borehole

Haulbowline - Falling Head Test during Drilling - BH315 - Slag/Fill - 5.3m



ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/White Young Green
Location	Haulbowline
Project Number	IE718 (IE Consulting Reference)
Date of Test	22/05/2012
Tidal Conditions	Low Tide 13:24; High Tide 19:20
Borehole name	BH315
Casing internal diameter (mm)	260
Casing depth (m below ground level)	5.3
Depth of hole (m below ground level)	5.3
Height of casing (m above ground level)	0.7
Test depth interval (m below ground level)	5.3
Test material description	Slag/Fill
Static water level (m below top of casing)	4.347m btoc @ 12:11 (from logger data)
Initial water level (m below top of casing)	0.20 btoc @ 12:21:51 (manual dip reading)
Permeability Test Type	Falling head test during drilling
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = Pr_c^2/T_0F$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
Eq. 1: $F = 2.75D$	Soil flush with bottom in uniform soil
Eq. 2: $F = [2\pi L] / [\log_e (L/D) + sqrt(1+(L/D)^2]$	Well point or hole extended in uniform soil
Eq. 3: $F = [2\pi L] / [\log_e (2L/D) + sqrt(1+((2L)^2/D)]$	Well point or hole extended at impervious boundary

where:

Length	L (m) =	0	*F =*	0.715	Eqn. 1
Diameter	D (m) =	0.26	*F =*	#DIV/0!	Eqn. 2
			F =	#DIV/0!	Eqn. 3

For this test, where the soil is flush with bottom in uniform soil, Eqn. 1 is applied

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = Pr_c^2/T_0F$$

where:

	P =		Pi
	r_c =		Casing inner radius (m)
	T_0 =		Time lag (sec)
	F =		Shape Factor
	K =	***#DIV/0!***	**Permeability (m/sec)**
	K =	***#DIV/0!***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

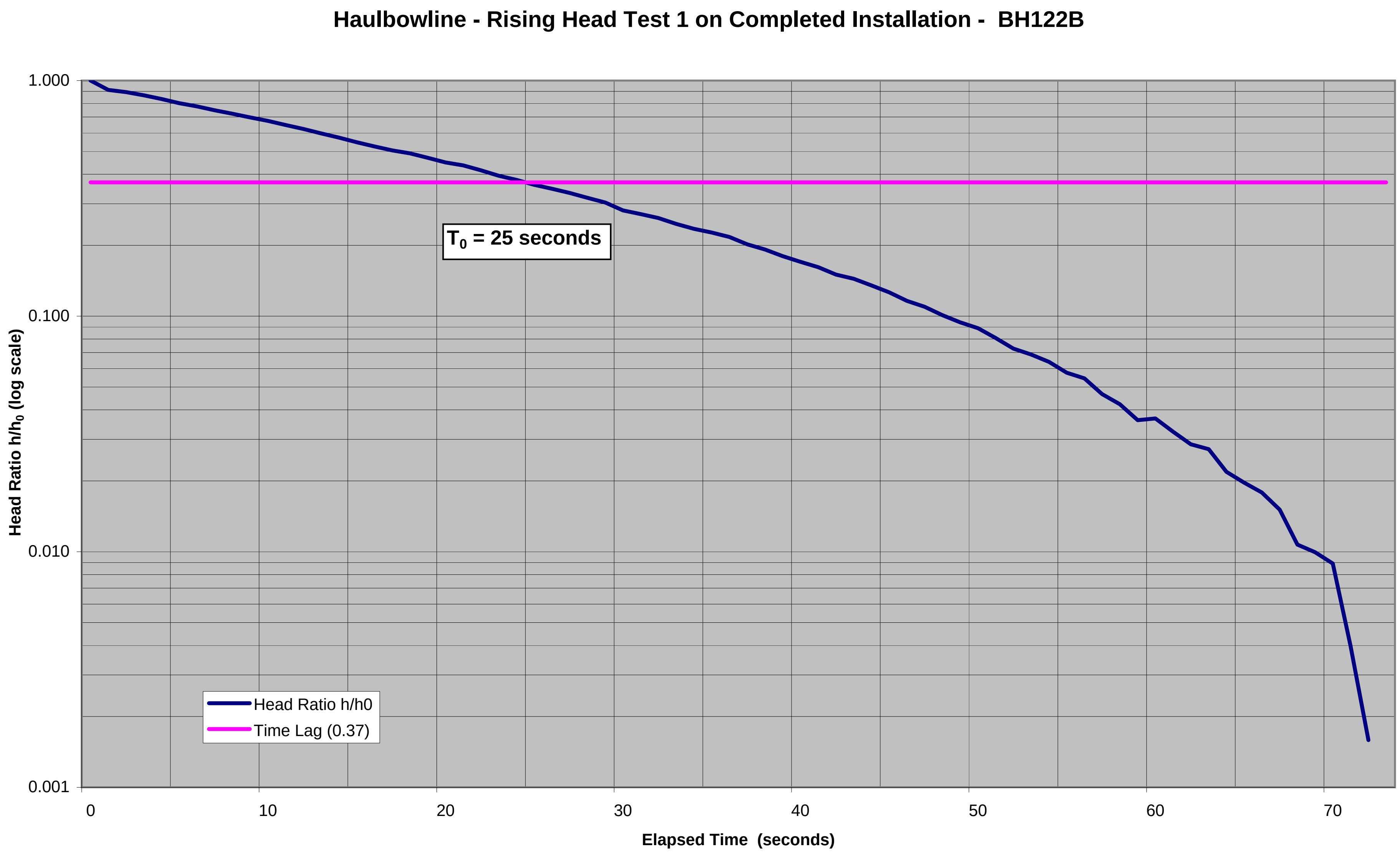
where:

	P =	3.14	Pi
	r_c =	0.13	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	5289.5	Time 1 after commencement of test (sec)
	H_1 =	4.147	Head measured at Time 1 (m)
	H_2 =	4.031	Head measured at Time 2 (m)
	F =	0.715	Shape Factor
	K =	**4.E-07**	**Permeability (m/sec)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	15/06/2012 @ 13:36 (Test 1)
Borehole ID:	BH122B
Weather/Site conditions:	Heavy rain, very windy
Tidal conditions/Time:	Low tide @ 09:31, High Tide @ 15:27
Static water level (m below top of PVC casing):	2.03 @ 13:32
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	23.9 - 29.9
Description of material in test interval:	Bedrock
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.014

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Data logger started at 13:20
0.5	-	Pump started @ 13:34
1.0	2.08	Pump stopped at @ 13:36
1.5		
2 mins 20 sec	1.99	
2.5	-	
3.0	1.98	
3.5	-	
4.0	-	
4.5	-	
5	1.97	
6	-	
7	-	
8	-	
9	-	
10	-	
12	-	
14	-	
16	-	
18	-	
20	-	
25	-	
30	-	
35	-	
40	-	
45	-	
50	-	
55	-	
60	-	



Haulbowline - Rising Head Test 1 on Completed Installation - BH122B
1.000
0.100
0.010
0.001
Head Ratio h/h_0 (log scale)
T_0 = 25 seconds
Head Ratio h/h0
Time Lag (0.37)
0
10
20
30
40
50
60
70
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork Counnty Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH122B (Test 1)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	23.9 - 29.9
Length of screened filter section (m)	6
Material description	Bedrock
Static water level (m below top of PVC casing)	2.03 @ 13:32:00 (manual dop measurement)
Initial water level (m below top of PVC casing)	3.858 @ 13:35:57 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 ln(L_i/r_{wf})/2LiT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	9.203
Intake Length (m)	L_i =	6		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 ln(L_i/r_{wf})/2L_i T_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	6	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	25	Time lag (sec)
	K =	***8.5E-06***	**Permeability (m/sec)**
	K =	***0.74***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

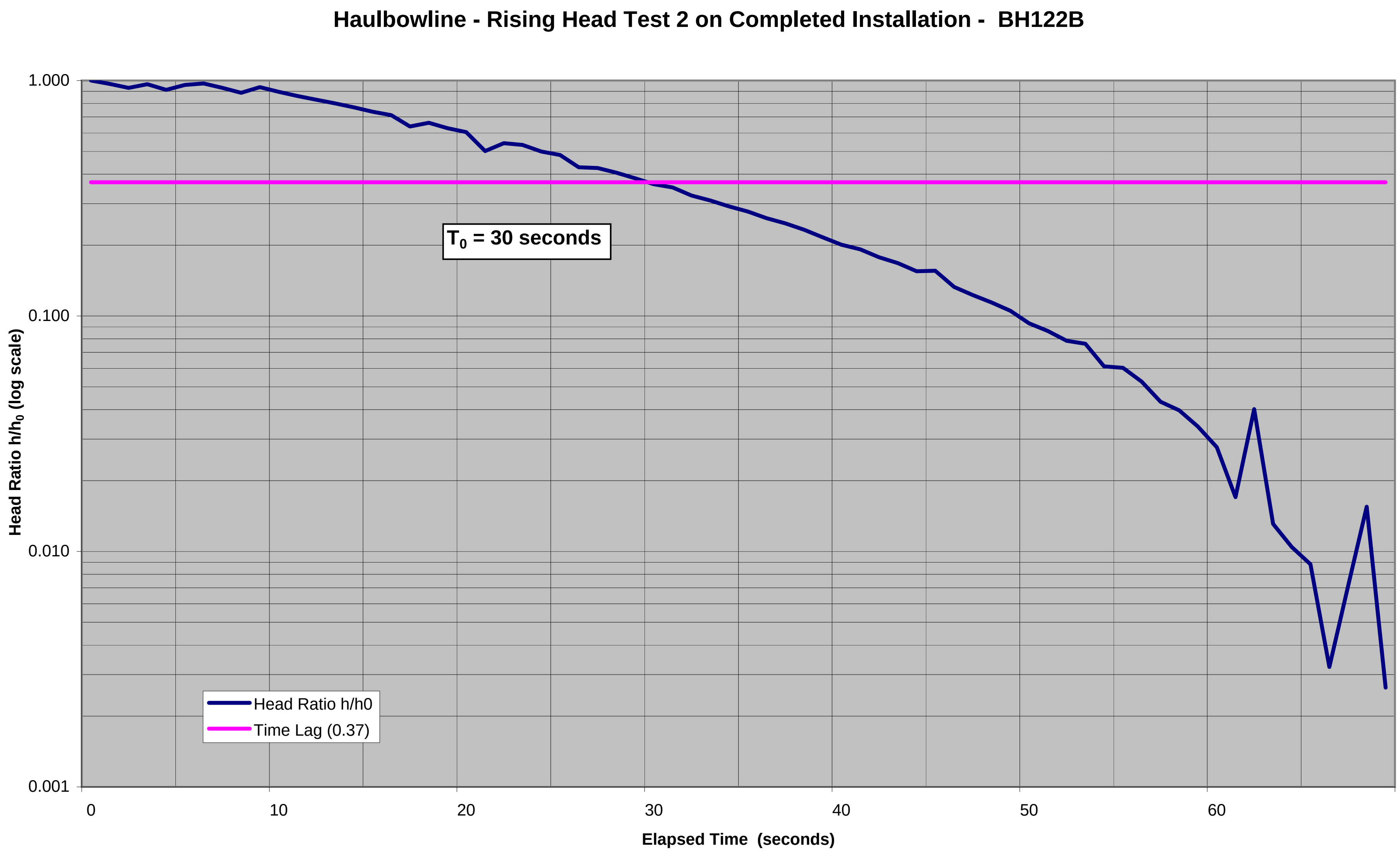
$$K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	15/06/2012 @ 13:48:05 (Test 2)
Borehole ID:	BH122B
Weather/Site conditions:	Heavy rain, very windy
Tidal conditions/Time:	Low tide @ 09:31, High Tide @ 15:27
Static water level (m below top of PVC casing):	1.97 @ 13:42
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	23.9 - 29.9
Description of material in test interval:	Bedrock
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.014

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Data logger started at 13:20
0.5	-	Pump started @ 13:46
1.0	-	Pump stopped at @ 13:48
1.5	1.925	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	-	
5	-	
6	-	
7	-	
8	-	
9	-	
10	-	
12	-	
14	-	
16	-	
18	-	
20	-	
25	-	
30	-	
35	-	
40	-	
45	-	
50	-	
55	-	
60	-	


Haulbowline - Rising Head Test 2 on Completed Installation - BH122B
1.000
0.100
0.010
0.001
Head Ratio h/h_0 (log scale)
T_0 = 30 seconds
Head Ratio h/h0
Time Lag (0.37)
0
10
20
30
40
50
60
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH122B (Test 2)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	23.9 - 29.9
Length of screened filter section (m)	6
Material description	Bedrock
Static water level (m below top of PVC casing)	1.97 @ 13:42:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	3.828 @ 13:48:05 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	9.203
Intake Length (m)	L_i =	6		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	6	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	30	Time lag (sec)
	K =	***7.1E-06***	**Permeability (m/sec)**
	K =	***0.61***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	19/06/2012
Tidal Conditions	Low Tide 12:30; High Tide 18:28
Borehole name	BH117R - Test 2
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	131
Screened interval (m)	14.4 - 21.4
Length of screened filter section (m)	7
Material description	Sand & Gravel
Static water level (m below top of PVC casing)	3.623 @ 15:17:11 (from logger data)
Initial water level (m below top of PVC casing)	3.659 @ 15:19:19 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
$F = 2PL_i/\ln(L_i/r_{wf})$	Where L_i/r_{wf} >8

where:

Pi	P =	3.14	*F* =	9.410
Intake Length (m)	L_i =	7		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:

	r_c =	0.025	Casing inner radius (m)
	L_i =	7	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	2.8	Time lag (sec)
	K =	***7.4E-05***	**Permeability (m/sec)**
	K =	***6.44***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	18/06/2012; 11:53
Borehole ID:	BH128
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	5.09 @ 11:50
Initial water level (m below top of PVC casing):	5.09
Casing diameter (mm ID):	50
Screened interval of material tested:	2.0 - 11.5 mbgl
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.015

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	5.09	
0.5	5.09	
1.0	-	
1.5	-	
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA				
Client			Cork County Council/WYG	
Location			Haulbowline	
Project Number			IE718	
Date of Test			18/06/2012	
Tidal Conditions			Low Tide 11:53; High Tide 17:50	
Borehole name			BH128	
Installed PVC casing internal diameter (mm)			50	
Drilled diameter (mm)			200	
Screened interval (m)			2.0 - 11.5	
Length of screened filter section (m)			9.5	
Material description			Slag	
Static water level (m below top of PVC casing)			5.09 @ 11:50:00 (manual dip measurement)	
Initial water level (m below top of PVC casing)			-	
Permeability Test Type			Rising head test on completed installation	
Borehole Geometry Criteria			Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.	
Analysis Method Reference			BS5930:1999 and Hvorslev (1951)	
Method Applied for Permeability Calculation				
Equation			***Application***	
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$			Where T_0 can be determined from graph	
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$			Where T_0 cannot be determined from graph	
Determination of T_0 from Graph				
$T_0 = (Pr_c^2)/(FK)$				
Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$				
Determination of F (Shape Factor)				
Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where $L_i/r_{wf} > 8$	
where:				
Pi	P =	3.14	*F =*	13.101
Intake Length (m)	L_i =	9.5		
Effective Radius (m)	r_{wf} =	0.1		
Permeability K (m/s) Equation (where T_0 can be determined from the graph)				
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$				
where:				
	r_c =	0.025	Casing inner radius (m)	
	L_i =	9.5	Intake length (m)	
	r_{wf} =	0.1	Effective radius (m)	
	T_0 =	1	Time lag (sec)	
	K =	***1.5E-04***	**Permeability (m/sec)**	
	K =	***12.94***	**Permeability (m/day)**	
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)				
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$				
where:				
	P =	3.14	Pi	
	r_c =		Casing inner radius (m)	
	t_1 =		Time 1 after commencement of test (sec)	
	t_2 =		Time 1 after commencement of test (sec)	
	H_1 =		Head measured at Time 1 (m)	
	H_2 =		Head measured at Time 2 (m)	
	F =		Shape Factor	
	K =	**#DIV/0!**	**Permeability (m/sec)**	
	K =	**#DIV/0!**	**Permeability (m/day)**	

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

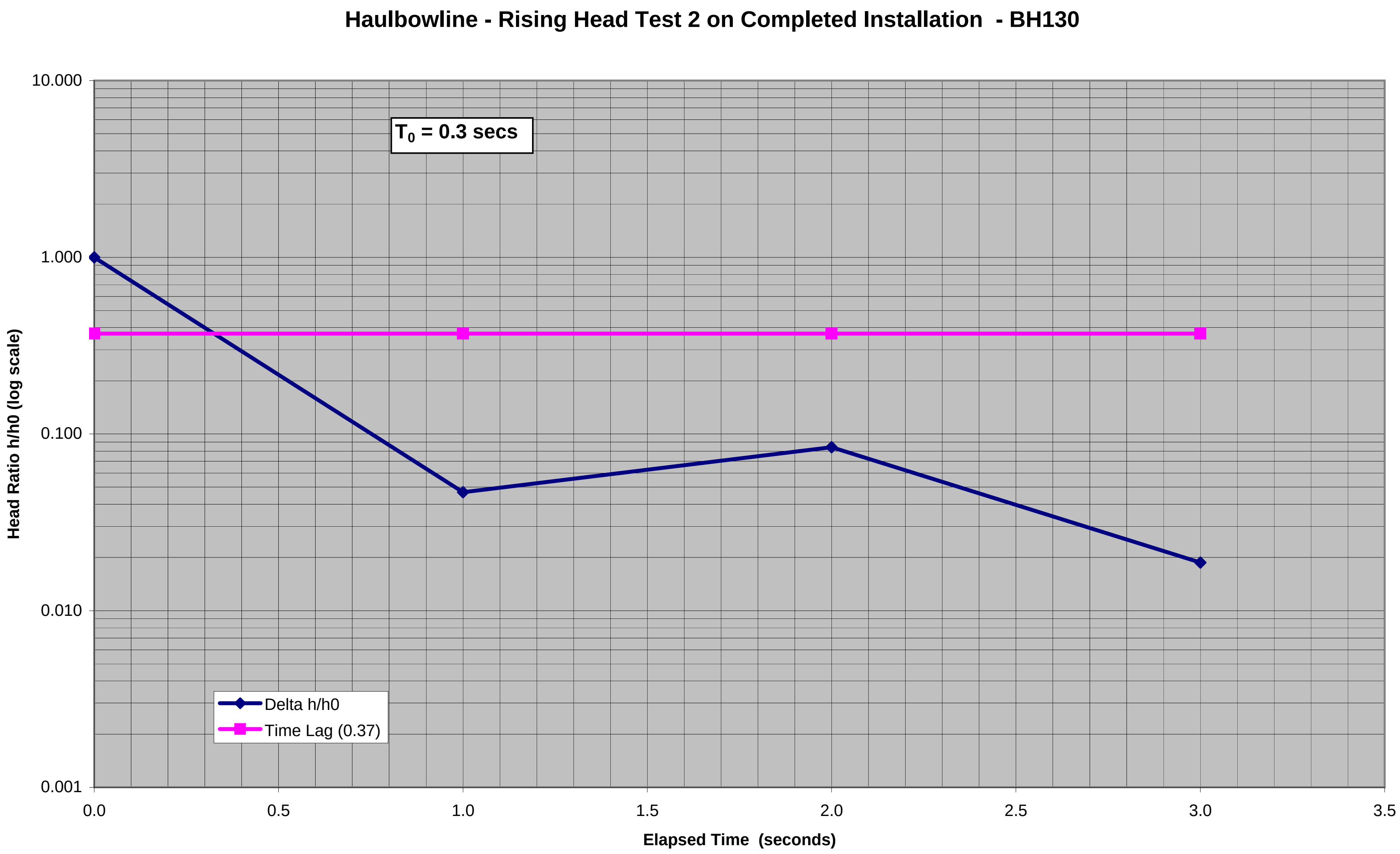
Site name:	Haulbowline
Date and Time:	19/06/2012; 16:48
Borehole ID:	BH130 (Test 1)
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @ 12:30; High tide @ 18:28
Static water level (m below top of PVC casing):	4.37 @ 16:47
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	2.0 - 6.5 mbgl
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.0295

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0		-
~~0.5~~ 0.25	4.34	
1.0	4.34	
1.5	4.34	
2.0	4.34	
2.5	-	
3.0	4.34	
3.5	-	
4.0	-	
4.5	-	
5	4.33	
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	19/06/2012; 16:56
Borehole ID:	BH130 (Test 2)
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @ 12:30; High tide @ 18:28
Static water level (m below top of PVC casing):	4.33 @ 16:55
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	2.0 - 6.5 mbgl
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	1.5 (pump ran out of petrol)
Volume removed (m^3):	0.025

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	-
~~0.5~~ 0.25	4.32	
1.0	4.32	
1.5	-	
2.0	-	
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test 2 on Completed Installation - BH130
T0 = 0.3 secs
10.000
1.000
0.100
0.010
0.001
Head Ratio h/h0 (log scale)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	19/06/2012
Tidal Conditions	Low Tide 12:30; High Tide 18:28
Borehole name	BH130 - Test 2
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	2.0 - 6.5
Length of screened filter section (m)	4.5
Material description	Slag
Static water level (m below top of PVC casing)	4.37 @ 16:47:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	4.411 @ 16:57:35 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	7.424
Intake Length (m)	L_i =	4.5		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	4.5	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	0.3	Time lag (sec)
	K =	***8.8E-04***	**Permeability (m/sec)**
	K =	***76.13***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

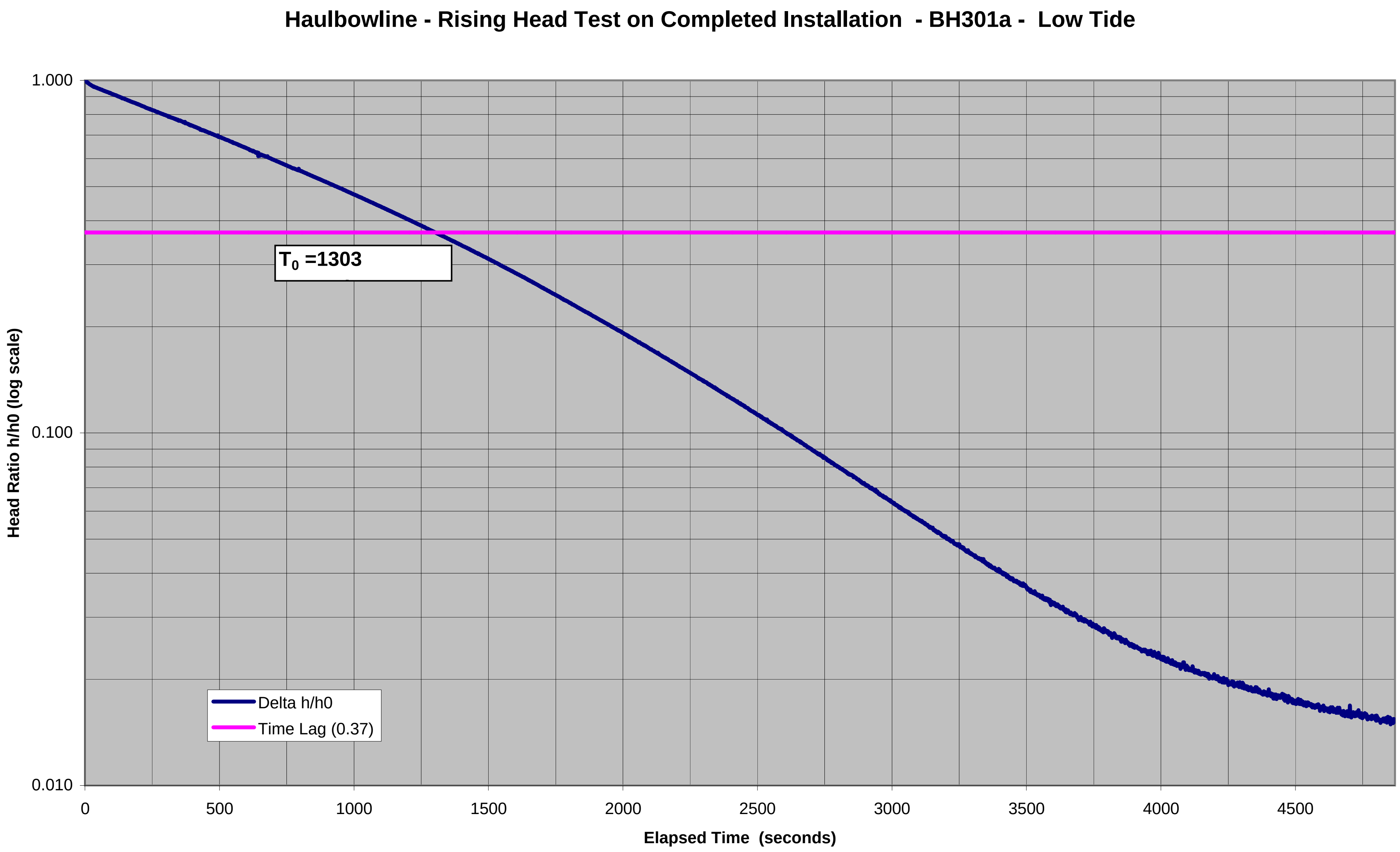
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =	0.025	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	3	Time 2 after commencement of test (sec)
	H_1 =	0.0107	Head measured at Time 1 (m)
	H_2 =	0.0002	Head measured at Time 2 (m)
	F =	7.424	Shape Factor
	K =	**4.E-04**	**Permeability (m/sec)**
	K =	**30.30**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	15/06/2012 @ 09:19
Borehole ID:	BH301a (Low Tide Test)
Weather/Site conditions:	Heavy rain, very windy
Tidal conditions/Time:	Low tide @ 09:31, High tide @ 15:27
Static water level (m below top of PVC casing):	2.845 @ 09:13
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	16.3m - 17.8m
Description of material in test interval:	Boulder clay
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	1 minute 50 seconds
Volume removed (m^3):	0.012

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Purged to fill dedicated tubing @ 09:15
0.5	-	Pump started @ 09:17:00
1.0	-	Pump stopped @ 09:18:50 (water level dropped below pump intake)
1.5	-	Requirement to purge dedicated tubing purged at start of test to assist in
2.0	-	pumping of water
2.5	-	
3.0	-	
3.5	-	
4.0	7.845	
4.5	-	
5	7.625	
6	-	
7	7.245	
8	7.04	
9	6.88	
~~10~~ 11	6.545	
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test on Completed Installation - BH301a - Low Tide
Head Ratio h/h0 (log scale)
1.000
0.100
0.010
T_0 =1303
Delta h/h0
Time Lag (0.37)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH301a - Low Tide
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	16.3 - 17.8
Length of screened filter section (m)	1.5
Material description	Boulder clay
Static water level (m below top of PVC casing)	2.845 @ 09:13:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	9.027 @ 09:18:50 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	3.479
Intake Length (m)	L_i =	1.5		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	1.5	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	1303	Time lag (sec)
	K =	***4.3E-07***	**Permeability (m/sec)**
	K =	***0.04***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

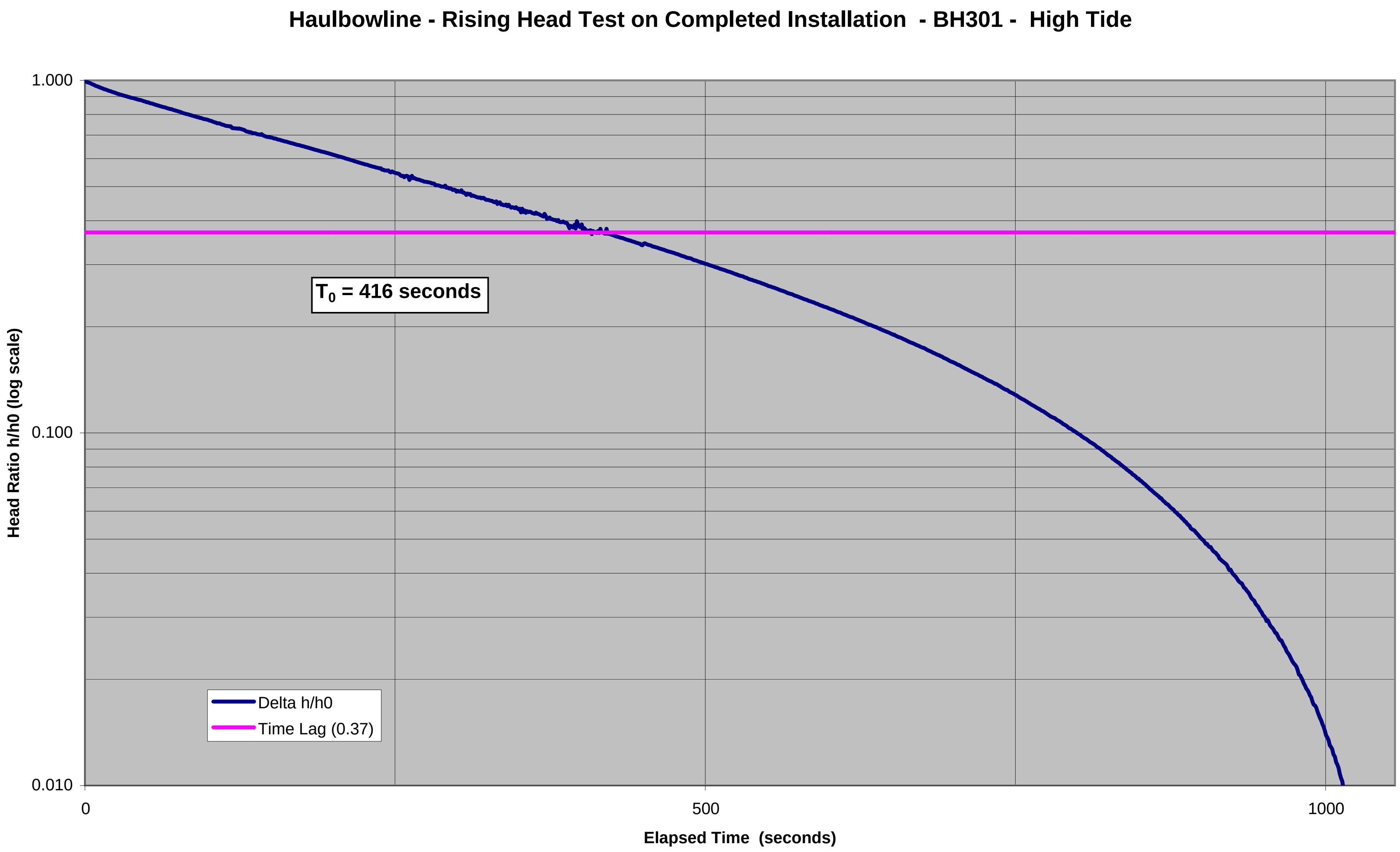
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	15/06/2012 @ 15:33
Borehole ID:	BH301a (High Tide Test)
Weather/Site conditions:	Heavy rain, very windy
Tidal conditions/Time:	Low tide @ 09:31, High tide @ 15:27
Static water level (m below top of PVC casing):	2.80 @ 15:29
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	16.3m - 17.8m
Description of material in test interval:	Boulder clay
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	1 minute 52 seconds
Volume removed (m^3):	0.014

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Start pump at 15:31:40
0.5	-	Stop pump at 15:33:32
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	7.15	
5	-	
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
~~60~~ 59	2.78	Logger removal at 16:32



Haulbowline - Rising Head Test on Completed Installation - BH301 - High Tide
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
T_0 = 416 seconds
Delta h/h0
Time Lag (0.37)
0
500
1000
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH301a - High Tide
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	16.3 - 17.8
Length of screened filter section (m)	1.5
Material description	Boulder clay
Static water level (m below top of PVC casing)	2.80 @ 15:29:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	9.048 @ 15:33:33 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F* =	3.479
Intake Length (m)	L_i =	1.5		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	1.5	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	416	Time lag (sec)
	***K* =**	***1.4E-06***	**Permeability (m/sec)**
	***K* =**	***0.12***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

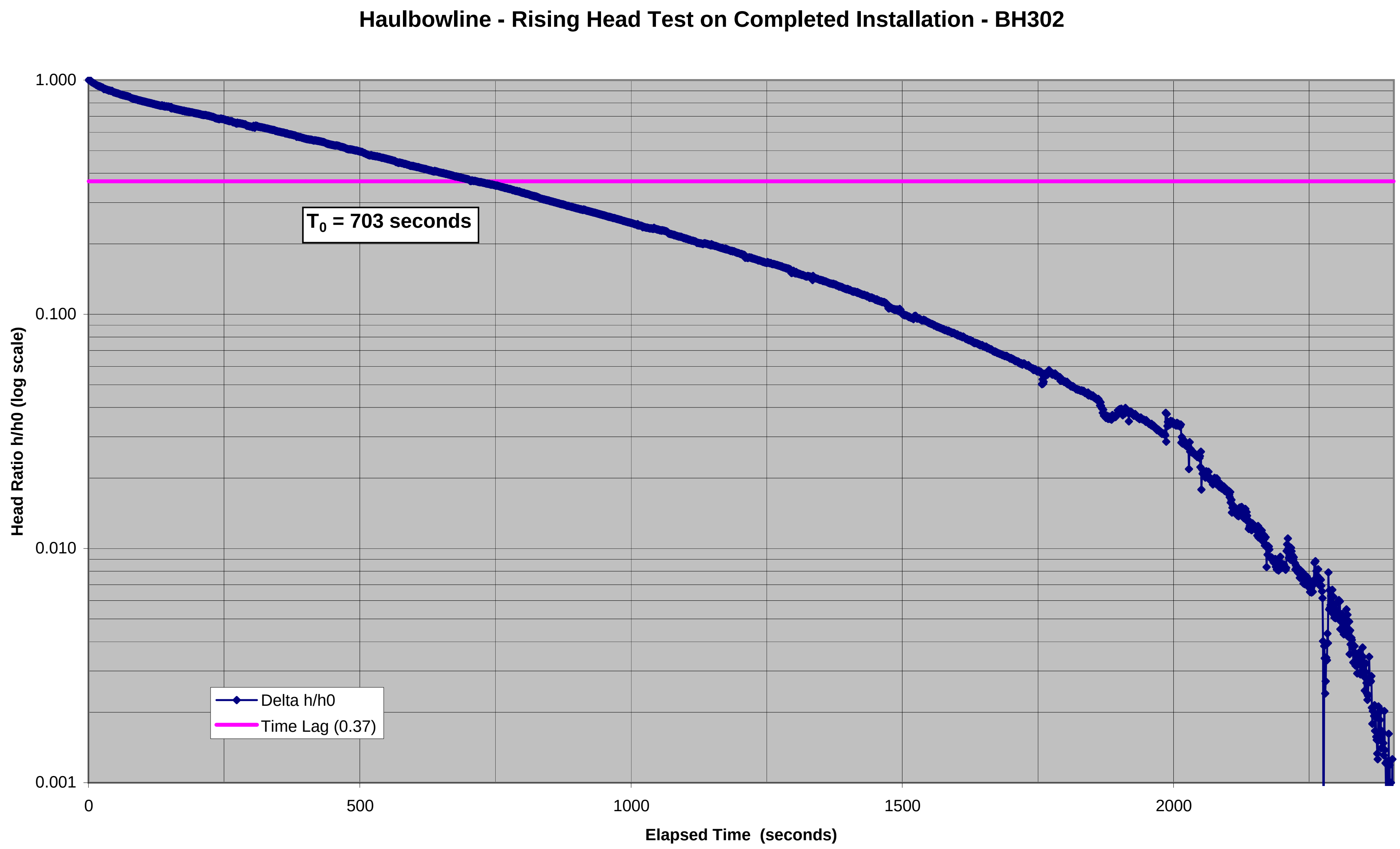
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	***K* =**	**#DIV/0!**	**Permeability (m/sec)**
	***K* =**	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	14/06/2012; 13:15
Borehole ID:	BH302
Weather/Site conditions:	Heavy rain, windy
Tidal conditions/Time:	Low tide @ 08:35; High tide @ 14:29
Static water level (m below top of PVC casing):	3.98 @13:09
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	12.0 - 20.5 mbgl
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	1.66
Volume removed (m^3):	0.009

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Pump started at 13:14
0.5	-	Pump stopped @ 13:15 (water level dropped below pump intake)
1.0	7.56	
1.5	-	
2.0	7.19	
2.5	6.89	
3.0	6.65	
3.5	-	
4.0	6.48	
4.5	-	
5	-	
6	6.25	
7	6.05	
8	5.99	
9	-	
10	-	
~~12~~ 11.5	5.5	
14	-	
16 17	4.93	
~~18~~ 18.5	4.80	
20	4.67	
~~25~~ 24	4.41	
~~30~~ 29	4.23	
~~35~~ 37	4.03	
~~40~~ 42	3.98	
~~45~~ 46	3.95	
50	3.93	
55	3.95	
~~60~~ 58	3.92	


Haulbowline - Rising Head Test on Completed Installation - BH302
1.000
0.100
0.010
0.001
Head Ratio h/h0 (log scale)
T_0 = 703 seconds
Delta h/h0
Time Lag (0.37)
0
500
1000
1500
2000
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	14/06/2012
Tidal Conditions	Low Tide 08:35; High Tide 14:29
Borehole name	BH302
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened Interval (m)	12.0 - 20.5
Length of screened filter section (m)	8.5
Material description	Silt
Static water level (m below top of PVC casing)	3.98 @ 13:15:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	8.184 @ 13:16:19 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	12.015
Intake Length (m)	L_i =	8.5		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	8.5	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	703	Time lag (sec)
	K =	***2.3E-07***	**Permeability (m/sec)**
	K =	***0.02***	**Permeability (m/day)**

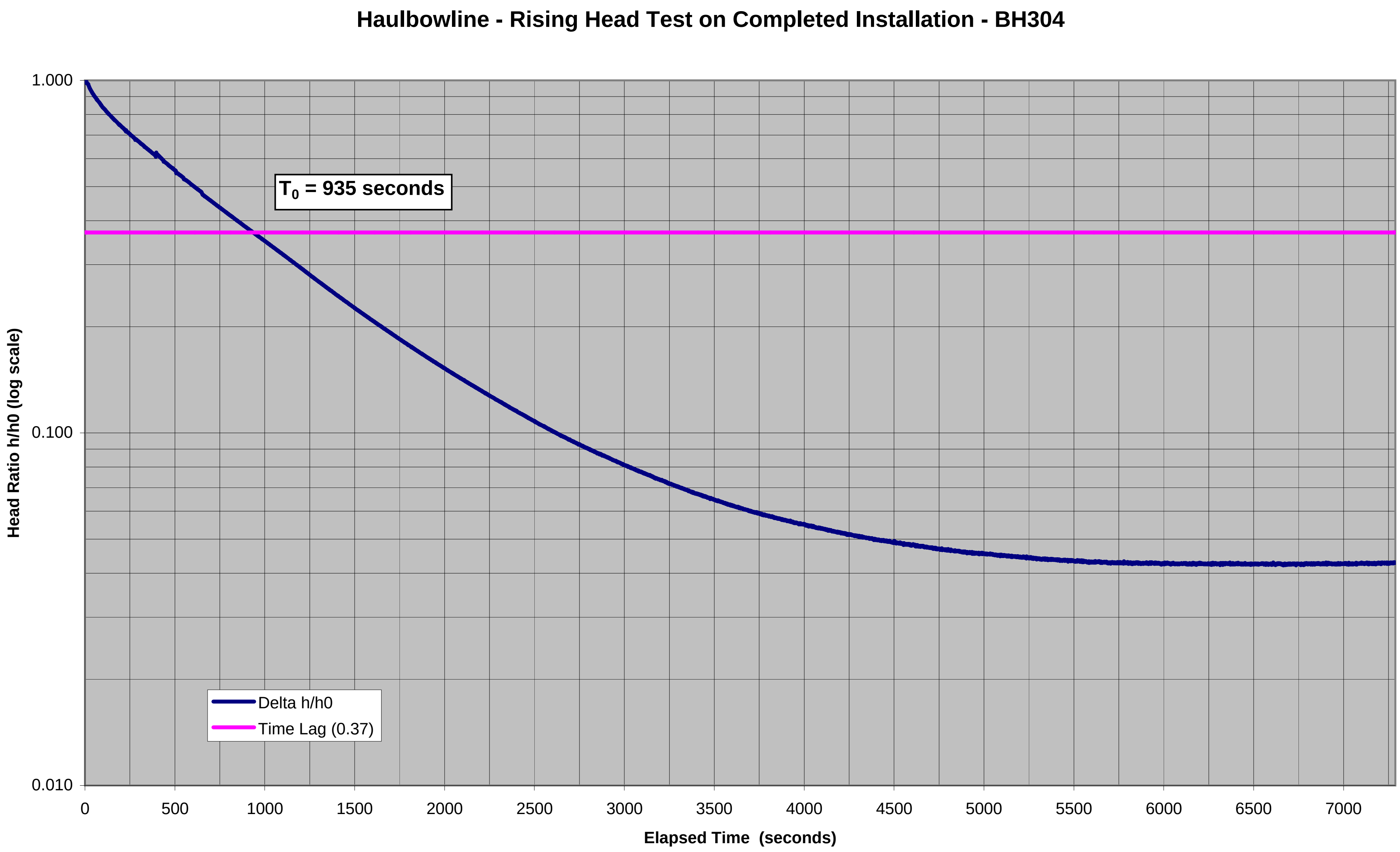
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =		Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	19/06/2012; 10:34
Borehole ID:	BH304
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @ 12:30; High tide @ 18:28
Static water level (m below top of PVC casing):	3.21 @10:33
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	7.2 - 12.7 mbgl
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	1.5 (Pump cut out as water level had dropped beyond reach of pump)
Volume removed (m^3):	0.01

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	
0.5	-	
1.0	7.11	
1.5	6.90	
2.0	6.75	
2.5	6.61	
3.0	6.51	
3.5	6	
4.0	6.28	
4.5	6.21	
5	6.12	
6	-	
7	-	
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

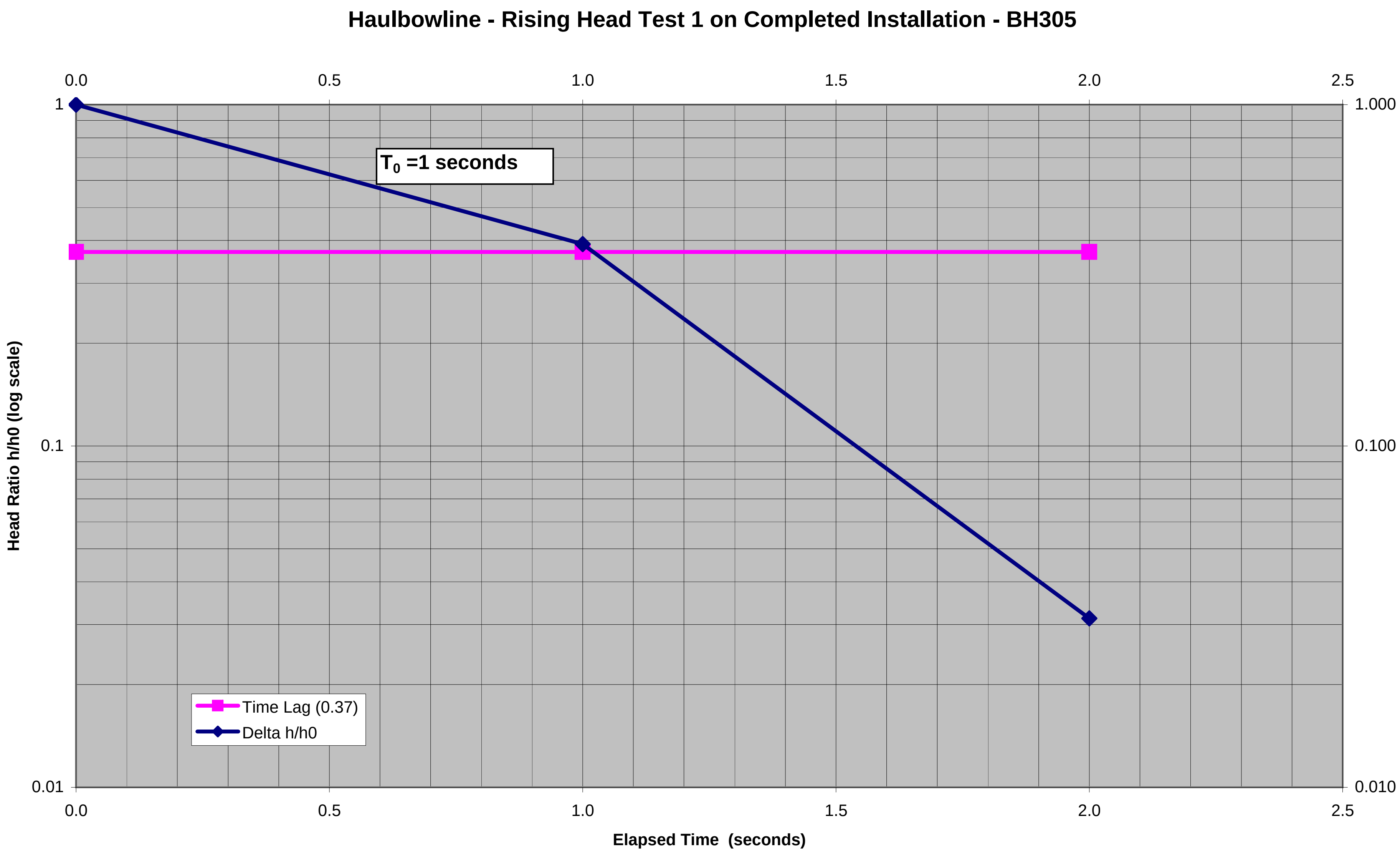

Haulbowline - Rising Head Test on Completed Installation - BH304
T0 = 935 seconds
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
6000
6500
7000
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA				
Client			Cork County Council/WYG	
Location			Haulbowline	
Project Number			IE718	
Date of Test			19/06/2012	
Tidal Conditions			Low Tide 12:30; High Tide 18:28	
Borehole name			BH304	
Installed PVC casing internal diameter (mm)			50	
Drilled diameter (mm)			200	
Screened interval (m)			7.2 - 12.7	
Length of screened filter section (m)			5.5	
Material description			Silt	
Static water level (m below top of PVC casing)			3.21 @ 10:33:00 (manual dip measurement)	
Initial water level (m below top of PVC casing)			7.571 @ 10:35:33 (from logger data)	
Permeability Test Type			Rising head test on completed installation	
Borehole Geometry Criteria			Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.	
Analysis Method Reference			BS5930:1999 and Hvorslev (1951)	
Method Applied for Permeability Calculation				
Equation			***Application***	
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$			Where T_0 can be determined from graph	
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$			Where T_0 cannot be determined from graph	
Determination of T_0 from Graph				
$T_0 = (Pr_c^2)/(FK)$				
Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$				
Determination of F (Shape Factor)				
Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	8.619
Intake Length (m)	L_i =	5.5		
Effective Radius (m)	r_{wf} =	0.1		
Permeability K (m/s) Equation (where T_0 can be determined from the graph)				
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$				
where:				
	r_c =	0.025	Casing inner radius (m)	
	L_i =	5.5	Intake length (m)	
	r_{wf} =	0.1	Effective radius (m)	
	T_0 =	935	Time lag (sec)	
	K =	***2.4E-07***	**Permeability (m/sec)**	
	K =	***0.02***	**Permeability (m/day)**	
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)				
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$				
where:				
	P =	3.14	Pi	
	r_c =		Casing inner radius (m)	
	t_1 =		Time 1 after commencement of test (sec)	
	t_2 =		Time 1 after commencement of test (sec)	
	H_1 =		Head measured at Time 1 (m)	
	H_2 =		Head measured at Time 2 (m)	
	F =		Shape Factor	
	K =	**#DIV/0!**	**Permeability (m/sec)**	
	K =	**#DIV/0!**	**Permeability (m/day)**	

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	18/06/2012; 09:28
Borehole ID:	BH305 (Test 1)
Weather/Site conditions:	Light rain
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	3.07 @ 9:21
Initial water level (m below top of PVC casing):	3.07
Casing diameter (mm ID):	50
Screened interval of material tested:	5.2 - 6.2
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.032

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	3.07	-
0.5	-	
1.0	-	
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test 1 on Completed Installation - BH305
T0 =1 seconds
Time Lag (0.37)
Delta h/h0
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)
0.0
0.5
1.0
1.5
2.0
2.5
1
0.1
0.01
1.000
0.100
0.010

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH305 - Test 1
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	5.2 - 6.2
Length of screened filter section (m)	1.0
Material description	Slag
Static water level (m below top of PVC casing)	3.07 @ 09:21:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	3.077 @ 09:29:55 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	2.727
Intake Length (m)	L_i =	1		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:

	r_c =	0.025	Casing inner radius (m)
	L_i =	1	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	1	Time lag (sec)
	K =	***7.2E-04***	**Permeability (m/sec)**
	K =	***62.17***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

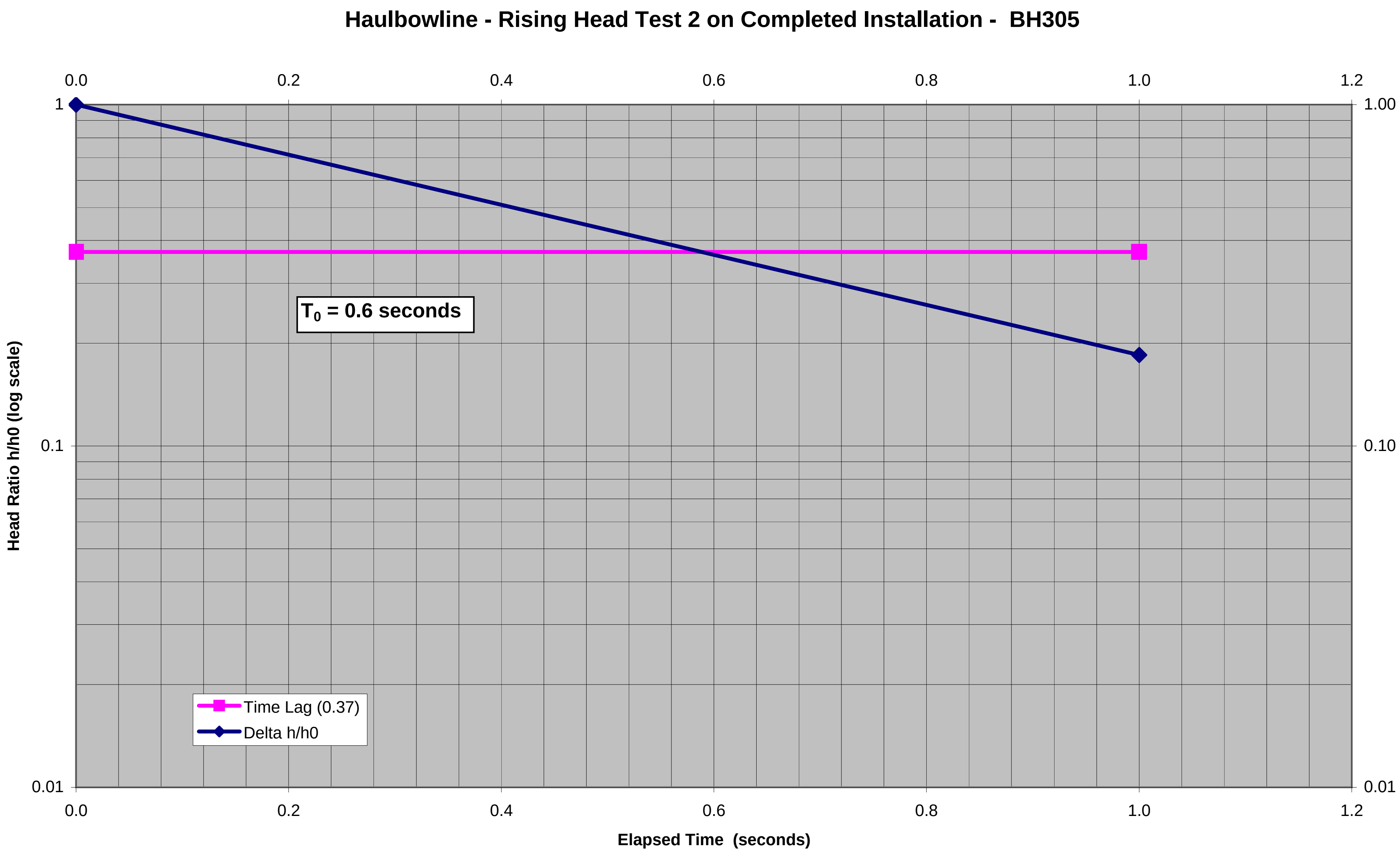
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

	P =	3.14	Pi
	r_c =	0.025	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	2	Time 2 after commencement of test (sec)
	H_1 =	0.0064	Head measured at Time 1 (m)
	H_2 =	0.0002	Head measured at Time 2 (m)
	F =	2.727	Shape Factor
	K =	**1.E-03**	**Permeability (m/sec)**
	K =	**107.73**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	18/06/2012; 09:40
Borehole ID:	BH305 (Test 2)
Weather/Site conditions:	Light rain
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	3.07 @ 9:38
Initial water level (m below top of PVC casing):	3.07
Casing diameter (mm ID):	50
Screened interval of material tested:	5.2 - 6.2
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.033

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	3.06	-
0.5	-	
1.0	-	
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test 2 on Completed Installation - BH305
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)
0.0
0.2
0.4
0.6
0.8
1.0
1.2
1
0.1
0.01
1.00
0.10
0.01
T0 = 0.6 seconds
Time Lag (0.37)
Delta h/h0

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH305 - Test 2
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	5.2 -6.2
Length of screened filter section (m)	1
Material description	Slag
Static water level (m below top of PVC casing)	3.07 @ 09:38:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	3.074 @ 09:42:43 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	2.727
Intake Length (m)	L_i =	1		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$\boldsymbol{K = r_c^2 \ln(L_i/r_{wf})/2L_i T_0}$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	1	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	0.6	Time lag (sec)
	K =	***1.2E-03***	**Permeability (m/sec)**
	K =	***103.62***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

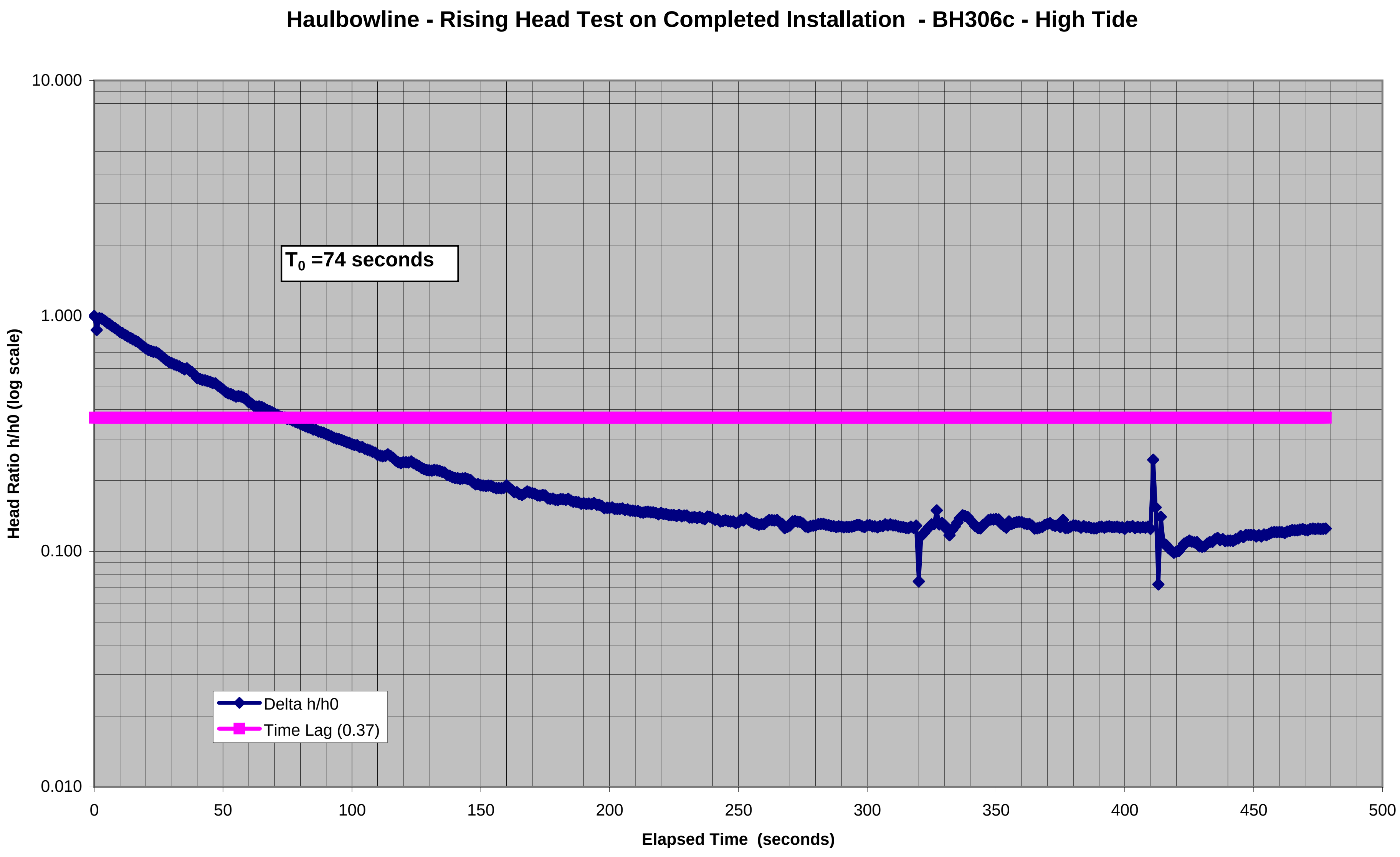
$$\boldsymbol{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$$

where:			
	P =	3.14	Pi
	r_c =	0.025	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	1	Time 2 after commencement of test (sec)
	H_1 =	0.0065	Head measured at Time 1 (m)
	H_2 =	0.0012	Head measured at Time 2 (m)
	F =	2.727	Shape Factor
	K =	**1.E-03**	**Permeability (m/sec)**
	K =	**105.03**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	22/06/2012; 09:32
Borehole ID:	BH306c (High Tide Test)
Weather/Site conditions:	Dry, slight breeze
Tidal conditions/Time:	Low tide @ 14:16; High tide @ 07:54
Static water level (m below top of PVC casing):	0.81 @ 09:32
Initial water level (m below top of PVC casing):	1.17
Casing diameter (mm ID):	50
Screened interval of material tested:	28.5 - 42.0
Description of material in test interval:	Bedrock
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.017

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	1.17	-
0.5	1.1	
1.0	-	
1.5	1.0	
2.0		
2.5	0.92	
3.0	0.89	
3.5	0.96	
4.0	-	
4.5	0.85	
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test on Completed Installation - BH306c - High Tide
T0 =74 seconds
10.000
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
0
50
100
150
200
250
300
350
400
450
500
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	22/06/2012
Tidal Conditions	High Tide 07:54; Low Tide 14:16
Borehole name	BH306c - High Tide
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	131
Screened interval (m)	28.5 - 42.0
Length of screened filter section (m)	13.5
Material description	Bedrock
Static water level (m below top of PVC casing)	0.81 @ 09:32:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	1.672 @ 09:36:02 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation	***Application***
$F = 2PL_i/\ln(L_i/r_{wf})$	Where L_i/r_{wf} >8

where:

Pi	P =	3.14	*F =*	15.911
Intake Length (m)	L_i =	13.5		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:

	r_c =	0.025	Casing inner radius (m)
	L_i =	13.5	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	74	Time lag (sec)
	K =	***1.7E-06***	**Permeability (m/sec)**
	K =	***0.14***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

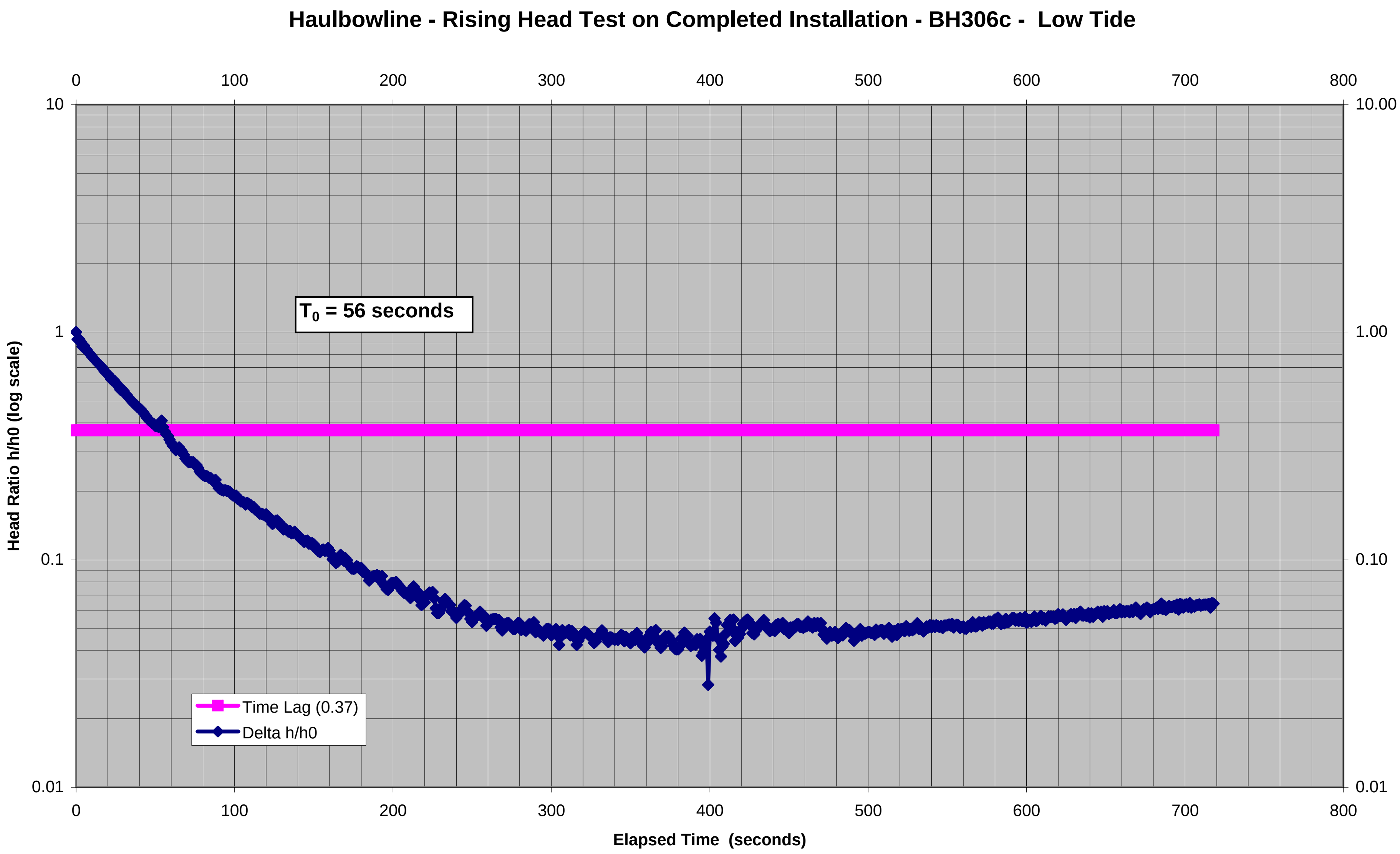
where:

	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	22/06/2012; 13:24
Borehole ID:	BH306c (Low Tide Test)
Weather/Site conditions:	Dry, slight breeze
Tidal conditions/Time:	Low tide @ 14:16; High tide @ 07:54
Static water level (m below top of PVC casing):	2.57 @ 13:23
Initial water level (m below top of PVC casing):	2.97 @ 13:26
Casing diameter (mm ID):	50
Screened interval of material tested:	28.5 - 42.0
Description of material in test interval:	Bedrock
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.013

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	2.97	Pump started at 13:24
0.5	-	Pump stopped at 13:26
1.0	2.81	
1.5	2.78	
2.0	2.7	
2.5	2.67	
3.0	2.66	
3.5	2.645	
4.0	2.635	
4.5	2.63	
5	2.62	
6	2.615	
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test on Completed Installation - BH306c - Low Tide
T0 = 56 seconds
Time Lag (0.37)
Delta h/h0
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)
0
100
200
300
400
500
600
700
800
10
1
0.1
0.01
10.00
1.00
0.10
0.01

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	22/06/2012
Tidal Conditions	High Tide 07:54; Low Tide 14:16
Borehole name	BH306C - Low Tide
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	131
Screened interval (m)	28.5 - 42.0
Length of screened filter section (m)	13.5
Material description	Bedrock
Static water level (m below top of PVC casing)	2.66 @ 13:24:00 (from logger data)
Initial water level (m below top of PVC casing)	3.511 @ 13:26:02 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where $L_i/r_{wf} > 8$	
where:				
Pi	P =	3.14	*F =*	15.911
Intake Length (m)	L_i =	13.5		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	13.5	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	56	Time lag (sec)
	K =	***2.2E-06***	**Permeability (m/sec)**
	K =	***0.19***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

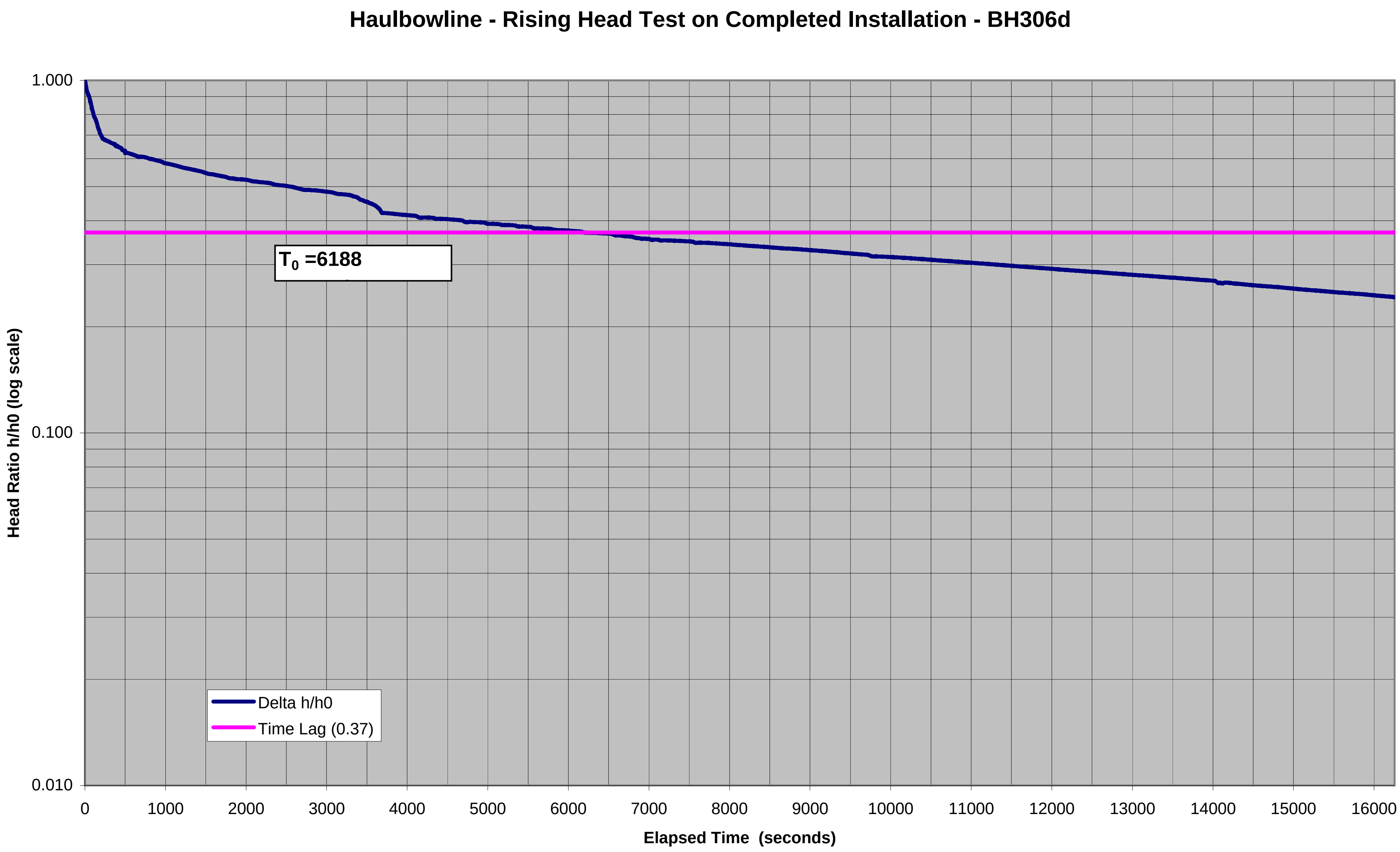
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	18/06/2012; 15:28
Borehole ID:	BH306d
Weather/Site conditions:	Rain, light wind
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	1.37 @15:26
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	12.0 - 20.0
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2.5
Volume removed (m^3):	0.018

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	
0.5	-	
1.0	6.33	
1.5	-	
2.0	5.7	
2.5	-	
3.0	5.25	
3.5	-	
4.0	5.11	
4.5	-	
5	-	
6	-	
7	-	
8	-	
9	-	
10	-	
12	-	
14	-	
~~16~~ 17	2.52	
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test on Completed Installation - BH306d
Head Ratio h/h0 (log scale)
1.000
0.100
0.010
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
11000
12000
13000
14000
15000
16000
Elapsed Time (seconds)
T_0 =6188
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH306d
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	150
Screened interval (m)	12.0 - 20.0
Length of screened filter section (m)	8
Material description	Silt
Static water level (m below top of PVC casing)	1.37 @ 15:26:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	7.223 @ 15:30:45 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	10.759
Intake Length (m)	L_i =	8		
Effective Radius (m)	r_{wf} =	0.075		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	8	Intake length (m)
	r_{wf} =	0.075	Effective radius (m)
	T_0 =	6188	Time lag (sec)
	K =	***2.9E-08***	**Permeability (m/sec)**
	K =	***0.003***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	15/06/2012
Borehole ID:	BH307 (Low Tide Test 1)
Weather/Site conditions:	Heavy rain, wind
Tidal conditions/Time:	Low Tide @ 09:31; High Tide @ 15:27
Static water level (m below top of PVC casing):	3.64 @ 10:24 and 10:28
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	5.5 - 9.5 mbgl
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.024

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Start pumping at 10:29
0.5	-	Stop pumping at 10:31
1.0	3.65	No discernible drop in water level
1.5	-	
2.0	3.65	
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH307 (Low Tide Test 1)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	5.5 - 9.5
Length of screened filter section (m)	4
Material description	Slag
Static water level (m below top of PVC casing)	3.64 @ 10:24:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	-
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2LiT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F* =	6.810
Intake Length (m)	L_i =	4		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	4	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	1	Time lag (sec)
	***K* =**	***2.9E-04***	**Permeability (m/sec)**
	***K* =**	***24.9***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	***K* =**	**#DIV/0!**	**Permeability (m/sec)**
	***K* =**	**#DIV/0!**	**Permeability (m/day)**

Note:

Using a base unit of 1 second, no discernible drawdown was noted during the tests.

Assuming a T_0 value is <1 second, then the estimated K for BH307 is >2.5 x 10^{-4}m/s or >21.8m/day

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	15/06/2012
Borehole ID:	BH307 (Low Tide Test 2)
Weather/Site conditions:	Heavy rain, wind
Tidal conditions/Time:	Low Tide @ 09:31; High Tide @ 15:27
Static water level (m below top of PVC casing):	3.64 @ 10:44
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	5.5 - 9.5 mbgl
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.024

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Start pumping at 10:45
0.5	-	Stop pumping at 10:47
1.0	3.65	No discernible drop in water level
1.5	-	
2.0	-	
2.5	-	
3.0	3.65	
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH307 (Low Tide Test 2)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	5.5 - 9.5
Length of screened filter section (m)	4
Material description	Slag
Static water level (m below top of PVC casing)	3.64 @ 10:44:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	-
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	6.810
Intake Length (m)	L_i =	4		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	4	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	1	Time lag (sec)
	K =	***2.9E-04***	**Permeability (m/sec)**
	K =	***24.9***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

<u>Note:</u>

Using a base unit of 1 second, no discennible drawdown was noted during the tests.

Assuming a T_0 value is <1 second, then the estimated K for BH307 is >2.5 x 10^{-4}m/s or >21.8m/day

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	15/06/2012
Borehole ID:	BH307 (High Tide Test 1)
Weather/Site conditions:	Heavy rain, wind
Tidal conditions/Time:	Low Tide @ 09:31; High Tide @ 15:27
Static water level (m below top of PVC casing):	3.11 @ 15:56
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	5.5 - 9.5 mbgl
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.026

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Start pumping at 15:57
0.5	3.11	Stop pumping at 15:59
1.0	-	No discernible drop in water level
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH307 (High Tide Test 1)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	5.5 - 9.5
Length of screened filter section (m)	4
Material description	Slag
Static water level (m below top of PVC casing)	3.11 @ 15:56 (manual dip measurement)
Initial water level (m below top of PVC casing)	-
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	6.810
Intake Length (m)	L_i =	4		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	4	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	1	Time lag (sec)
	K =	***2.9E-04***	**Permeability (m/sec)**
	K =	***24.9***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

Note:

Using a base unit of 1 second, no discennible drawdown was noted during the tests.

Assuming a T_0 value is <1 second, then the estimated K for BH307 is >2.5 x 10^{-4}m/s or >21.8m/day

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	15/06/2012
Borehole ID:	BH307 (High Tide Test 2)
Weather/Site conditions:	Heavy rain, wind
Tidal conditions/Time:	Low Tide @ 09:31; High Tide @ 15:27
Static water level (m below top of PVC casing):	3.11 @ 15:56
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	5.5 - 9.5 mbgl
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.026

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Start pumping at 16:03
0.5	-	Stop pumping at 16:05
1.0	3.085	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH307 (High Tide Test 2)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	5.5 - 9.5
Length of screened filter section (m)	4
Material description	Slag
Static water level (m below top of PVC casing)	3.11 @ 15:56 (manual dip measurement)
Initial water level (m below top of PVC casing)	-
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	6.810
Intake Length (m)	L_i =	4		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	4	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	1	Time lag (sec)
	K =	***2.9E-04***	**Permeability (m/sec)**
	K =	***24.9***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

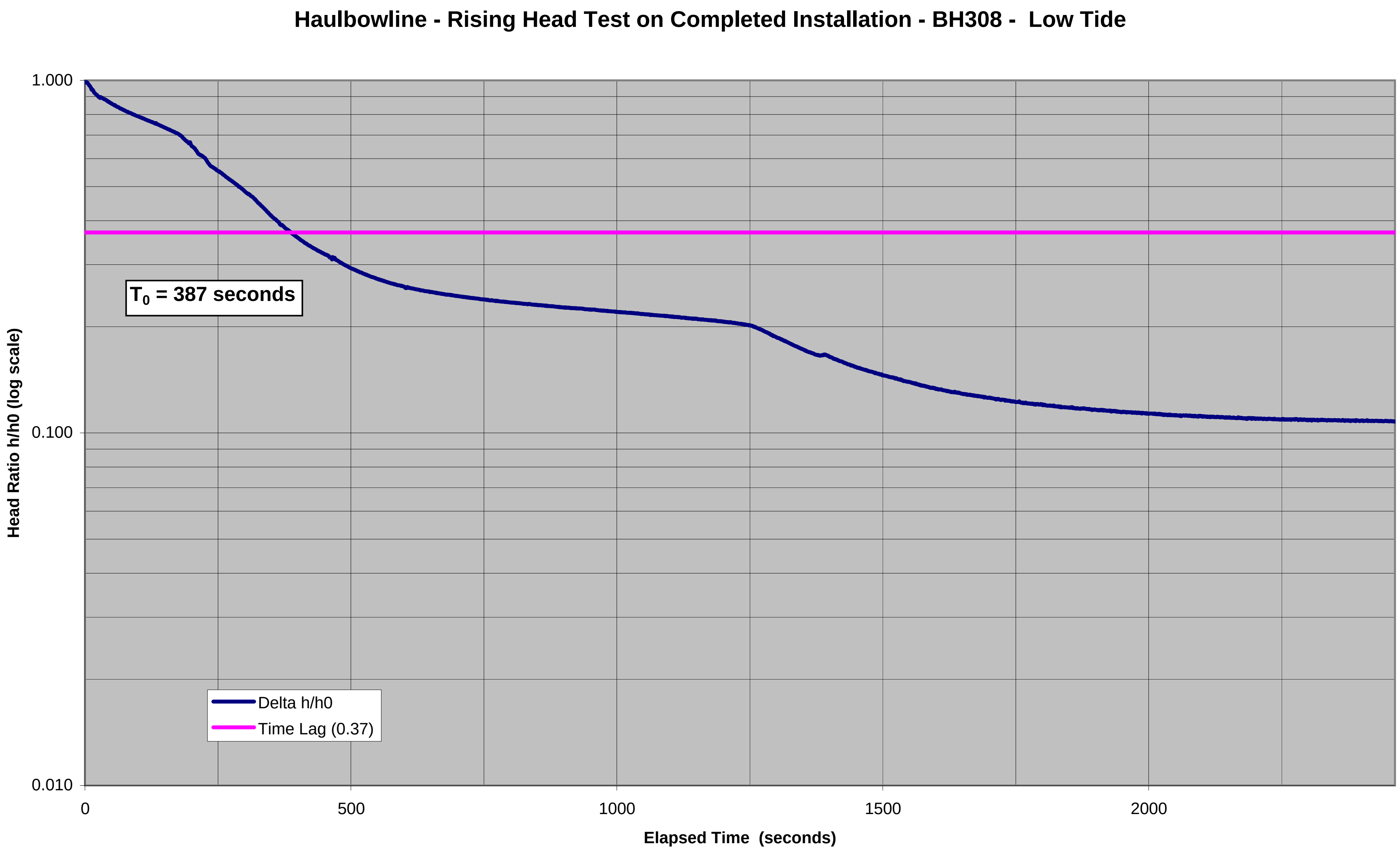
<u>Note:</u>

Using a base unit of 1 second, no discennible drawdown was noted during the tests.

Assuming a T_0 value is <1 second, then the estimated K for BH307 is >2.5 x 10^{-4}m/s or >21.8m/day

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	18/06/2012; 11:00
Borehole ID:	BH308 (Low Tide Test)
Weather/Site conditions:	Light rain, breezy
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	3.41 @ 10:56
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	4.0 - 13.2
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.021

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Started pumping @ 10:55 for approx 15 secs, pump ran out out petrol,
0.5	5.23	SWL - 3.23m @ 10:54
1.0	5.13	
1.5	5.03	
2.0	4.97	
2.5	4.9	
3.0	-	
3.5	4.68	
4.0	4.55	
4.5	-	
5	4.38	
6	4.21	
7	-	
8	-	
9	-	
10	3.94	
12	-	
14	-	
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test on Completed Installation - BH308 - Low Tide
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
T_0 = 387 seconds
Delta h/h0
Time Lag (0.37)
0
500
1000
1500
2000
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH308 - Low Tide
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	4.0 - 13.2
Length of screened filter section (m)	9.2
Material description	Silt
Static water level (m below top of PVC casing)	3.41 @ 10:56:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	5.441 @ 11:02:08 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 ln(L_i/r_{wf})/2L_iT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_eH_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation	***Application***
$F = 2PL_i/ln(L_i/r_{wf})$	Where L_i/r_{wf} >8

where:

Pi	P =	3.14	*F =*	12.777
Intake Length (m)	L_i =	9.2		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 ln(L_i/r_{wf})/2L_iT_0$$

where:

r_c =	0.025	Casing inner radius (m)
L_i =	9.2	Intake length (m)
r_{wf} =	0.1	Effective radius (m)
T_0 =	387	Time lag (sec)
K =	***4.0E-07***	**Permeability (m/sec)**
K =	***0.03***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

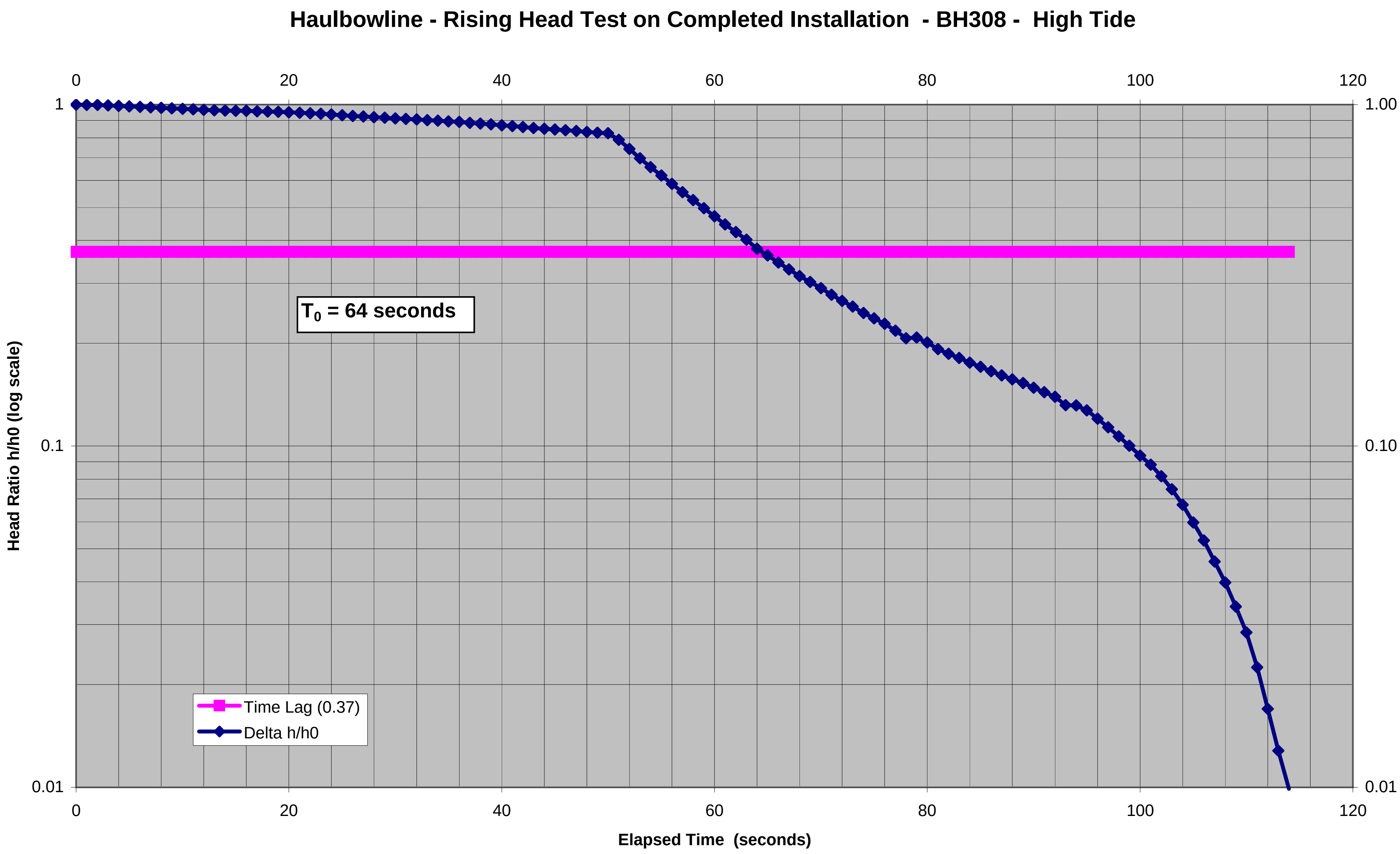
$$K = [Pr_c^2/F(t_2-t_1)][log_eH_1/H_2]$$

where:

P =	3.14	Pi
r_c =		Casing inner radius (m)
t_1 =		Time 1 after commencement of test (sec)
t_2 =		Time 1 after commencement of test (sec)
H_1 =		Head measured at Time 1 (m)
H_2 =		Head measured at Time 2 (m)
F =		Shape Factor
K =	**#DIV/0!**	**Permeability (m/sec)**
K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	18/06/2012; 17:12
Borehole ID:	BH308 (High Tide Test)
Weather/Site conditions:	Moderately heavy rain, breezy
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	3.24 @ 17:10
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	4.0 - 13.2
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	1.5
Volume removed (m^3):	-

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	-
~~0.5~~ 0.25	3.75	
1.0	3.24	
1.5	3.09	
2.0	3	
2.5	2.95	
3.0	2.91	
3.5	2.89	
4.0	2.86	
4.5	2.85	
5	2.83	
6	-	
7	-	
8	-	
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test on Completed Installation - BH308 - High Tide
0
20
40
60
80
100
120
1
0.1
0.01
1.00
0.10
0.01
T_0 = 64 seconds
Time Lag (0.37)
Delta h/h0
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH308 - High Tide
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	4.0 - 13.2
Length of screened filter section (m)	9.2
Material description	Silt
Static water level (m below top of PVC casing)	3.216 @ 17:12:46 (from logger data)
Initial water level (m below top of PVC casing)	4.802 @ 17:14:06 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 ln(L_i/r_{wf})/2L_iT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation	***Application***
$F = 2PL_i/ln(L_i/r_{wf})$	Where L_i/r_{wf} >8

where:

Pi	P =	3.14	*F =*	12.777
Intake Length (m)	L_i =	9.2		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 ln(L_i/r_{wf})/2L_iT_0$$

where:

r_c =	0.025	Casing inner radius (m)
L_i =	9.2	Intake length (m)
r_{wf} =	0.1	Effective radius (m)
T_0 =	64	Time lag (sec)
K =	***2.4E-06***	**Permeability (m/sec)**
K =	***0.21***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]$$

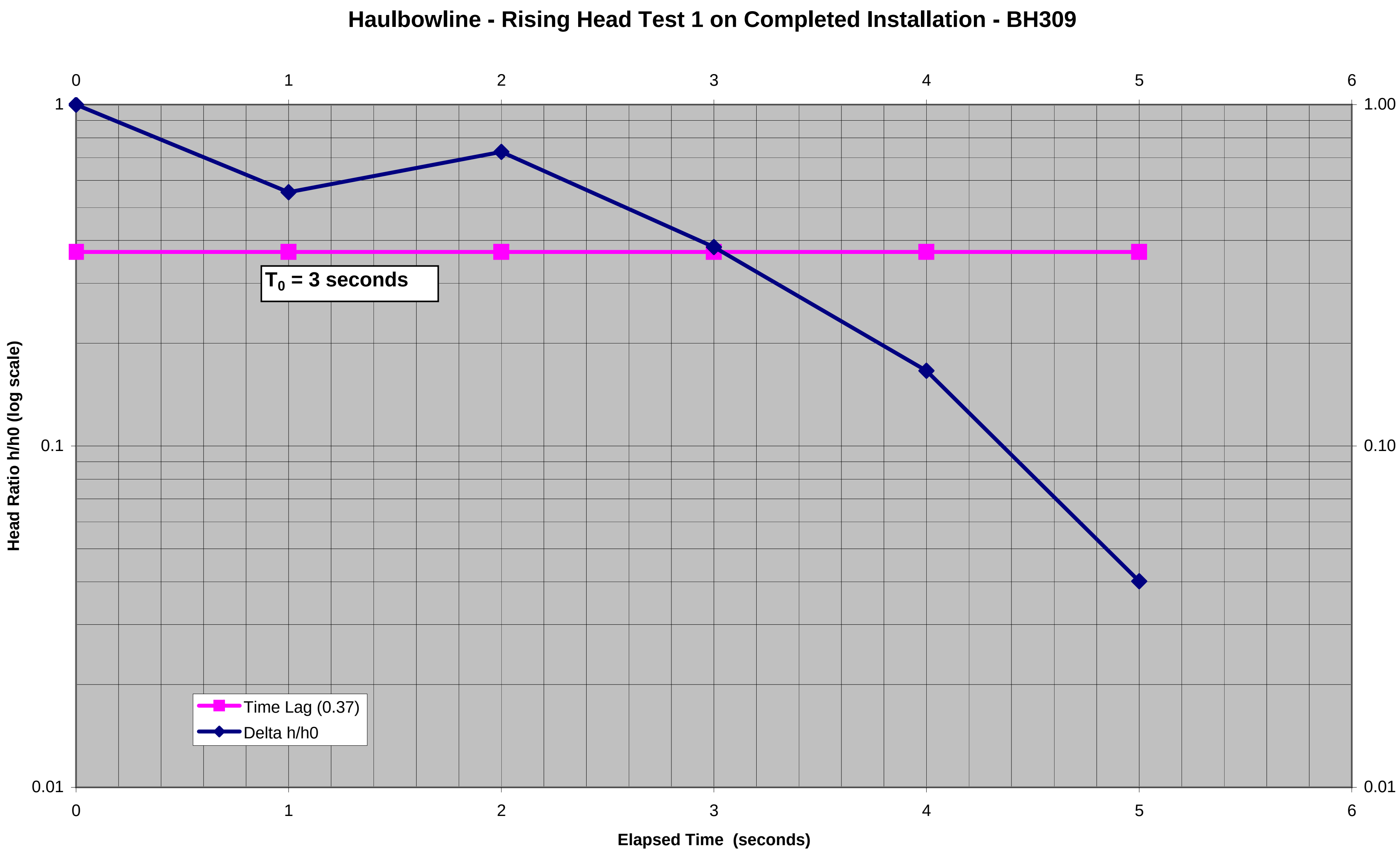
where:

P =	3.14	Pi
r_c =		Casing inner radius (m)
t_1 =		Time 1 after commencement of test (sec)
t_2 =		Time 1 after commencement of test (sec)
H_1 =		Head measured at Time 1 (m)
H_2 =		Head measured at Time 2 (m)
F =		Shape Factor
K =	**#DIV/0!**	**Permeability (m/sec)**
K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	18/06/2012; 16:15
Borehole ID:	BH309 (Test 1)
Weather/Site conditions:	Light rain, breezy
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	2.53m @ 16:13
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	8.2 - 16.7
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	
Volume removed (m^3):	

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	See logger data
0.5		
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test 1 on Completed Installation - BH309
0
1
2
3
4
5
6
1
0.1
0.01
1.00
0.10
0.01
T_0 = 3 seconds
Time Lag (0.37)
Delta h/h0
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH309 - Test 1
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	8.2 - 16.7
Length of screened filter section (m)	8.5
Material description	Silt
Static water level (m below top of PVC casing)	2.53 @ 16:13:16 (manual dip measurement)
Initial water level (m below top of PVC casing)	2.857 @ 16:17:04 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	12.015
Intake Length (m)	L_i =	8.5		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	8.5	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	3	Time lag (sec)
	K =	***5.4E-05***	**Permeability (m/sec)**
	K =	***4.70***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

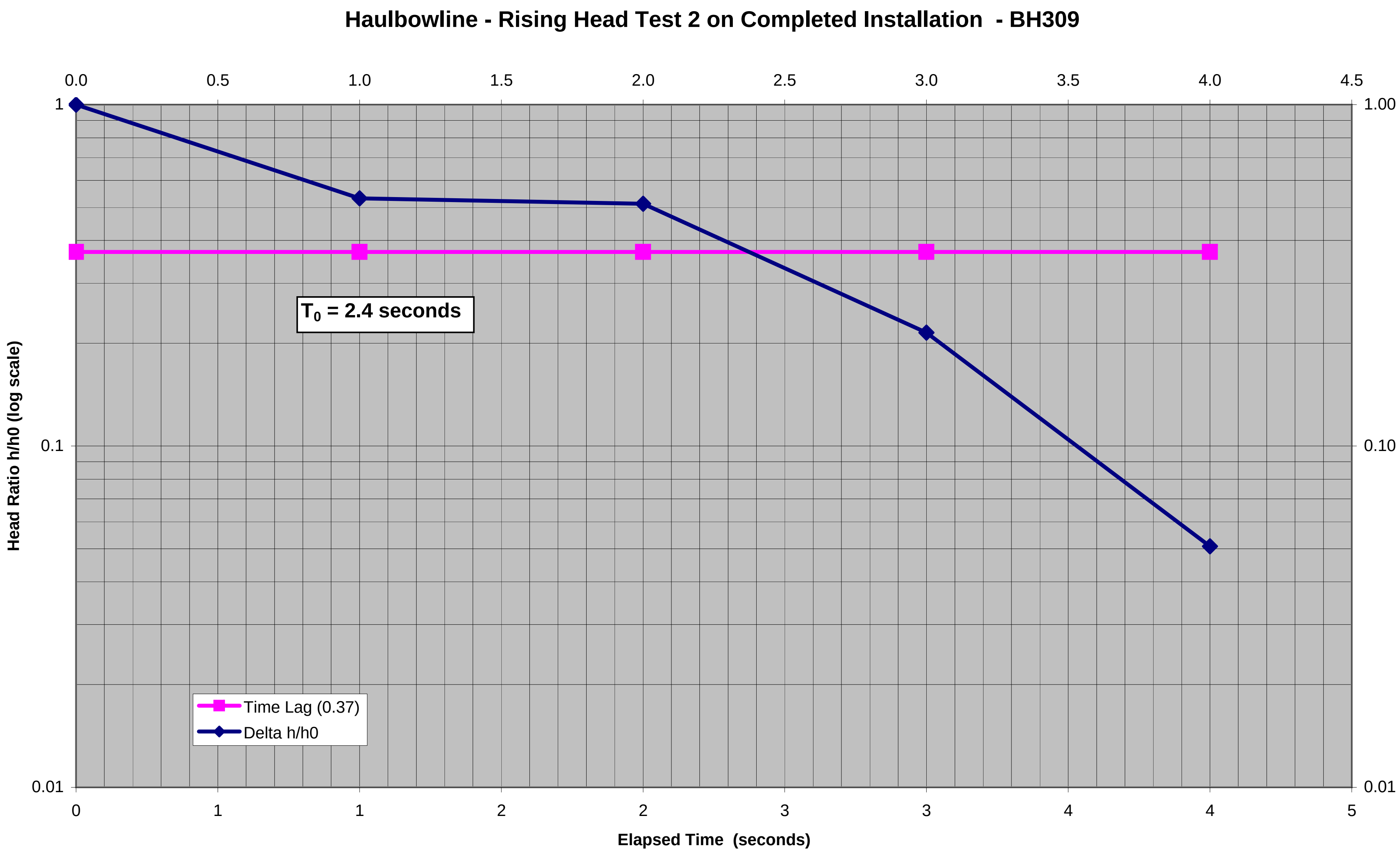
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	18/06/2012; 16:19
Borehole ID:	BH309 (Test 2)
Weather/Site conditions:	Light rain, breezy
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	2.52m @ 16:19
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	8.2 - 16.7
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	
Volume removed (m^3):	

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0		See logger data
0.5		
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test 2 on Completed Installation - BH309
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
1
0.1
0.01
1.00
0.10
0.01
T_0 = 2.4 seconds
Time Lag (0.37)
Delta h/h0
0
1
1
2
2
3
3
4
4
5
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH309 - Test 2
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	8.2 - 16.7
Length of screened filter section (m)	8.5
Material description	Silt
Static water level (m below top of PVC casing)	2.531 @ 16:19:41 (from logger data)
Initial water level (m below top of PVC casing)	2.817 @ 16:21:50 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	12.015
Intake Length (m)	L_i =	8.5		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	8.5	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	2.4	Time lag (sec)
	K =	***6.8E-05***	**Permeability (m/sec)**
	K =	***5.88***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

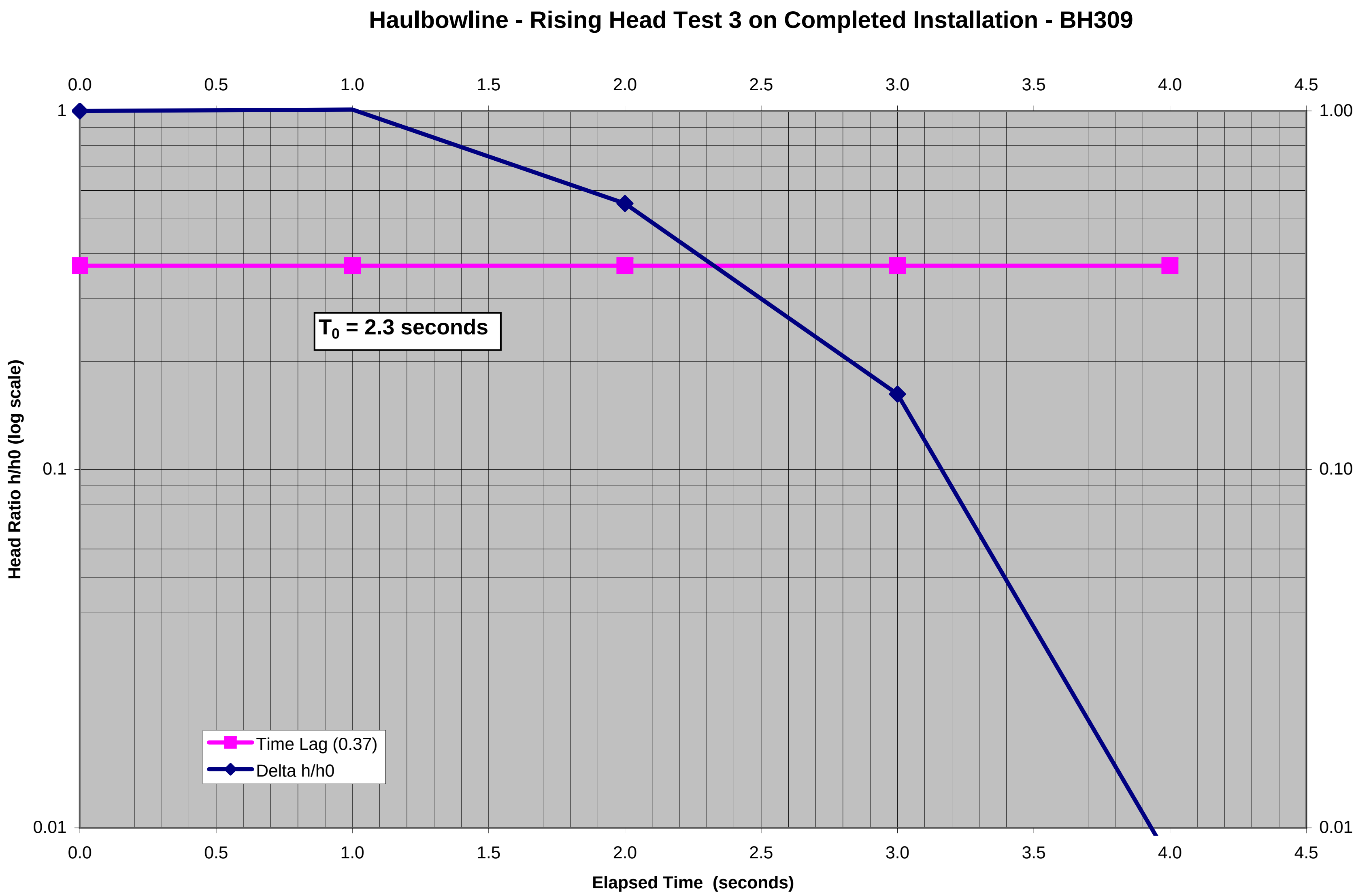
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	18/06/2012; 16:26
Borehole ID:	BH309 (Test 3)
Weather/Site conditions:	Light rain, breezy
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	2.52 @ 16:26
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	8.2 - 16.7
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	
Volume removed (m^3):	

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0		See logger data
0.5		
1.0		
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test 3 on Completed Installation - BH309
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
4.5
1
0.1
0.01
1.00
0.10
0.01
T_0 = 2.3 seconds
Time Lag (0.37)
Delta h/h0
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH309 - Test 3
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	8.2 - 16.7
Length of screened filter section (m)	8.5
Material description	Silt
Static water level (m below top of PVC casing)	2.523 @ 16:25:58 (from logger data)
Initial water level (m below top of PVC casing)	2.670 @ 16:28:01 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where $L_i/r_{wf}>8$	
where:				
Pi	P =	3.14	*F =*	12.015
Intake Length (m)	L_i =	8.5		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	8.5	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	2.3	Time lag (sec)
	K =	***7.1E-05***	**Permeability (m/sec)**
	K =	***6.14***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

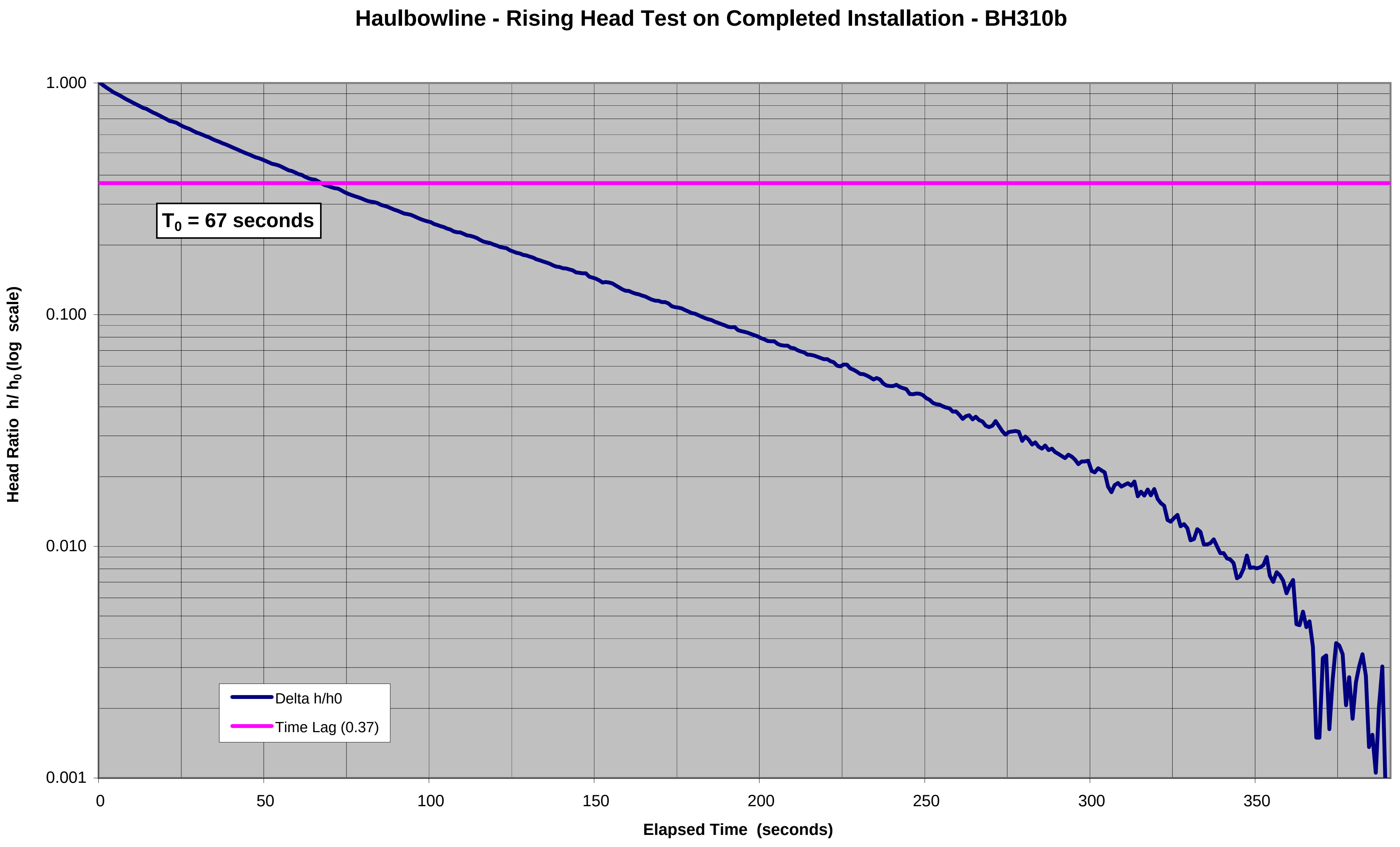
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)

	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	***K* =**	**#DIV/0!**	**Permeability (m/sec)**
	***K* =**	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	14/06/2012; 15:33
Borehole ID:	BH310B
Weather/Site conditions:	Heavy rain, windy
Tidal conditions/Time:	Low tide @ 08:35; High tide @ 14:29
Static water level (m below top of PVC casing):	4.22 @ 15:29
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Depth of hole (m below ground level):	22
Screened interval of material tested:	11.5 - 21.5mbgl
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.020

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	-
0.5	-	
1.0	5.22	
1.5	4.89	
2.0	4.70	
2.5	4.58	
3.0	4.47	
3.5	4.37	
4.0	-	
4.5	4.29	
5	4.25	
6	4.24	
7	4.21	
8	-	
9	-	
10	-	
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test on Completed Installation - BH310b
T_0 = 67 seconds
Delta h/h0
Time Lag (0.37)
1.000
0.100
0.010
0.001
0
50
100
150
200
250
300
350
Head Ratio h/ h_0 (log scale)
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork Counnty Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	14/06/2012
Tidal Conditions	Low Tide 08:35; High Tide 14:29
Borehole name	BH310b
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	11.5 - 21.5
Length of screened filter section (m)	10
Material description	Silt
Static water level (m below top of casing)	4.22 @ 15:29:00 (manual dip measurement)
Initial water level (m below top of casing)	6.498 @ 15:33:33 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F* =	13.6
Intake Length (m)	L_i =	10		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	10	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	67	Time lag (sec)
	***K* =**	***2.1E-06***	**Permeability (m/sec)**
	***K* =**	***0.19***	**Permeability (m/day)**

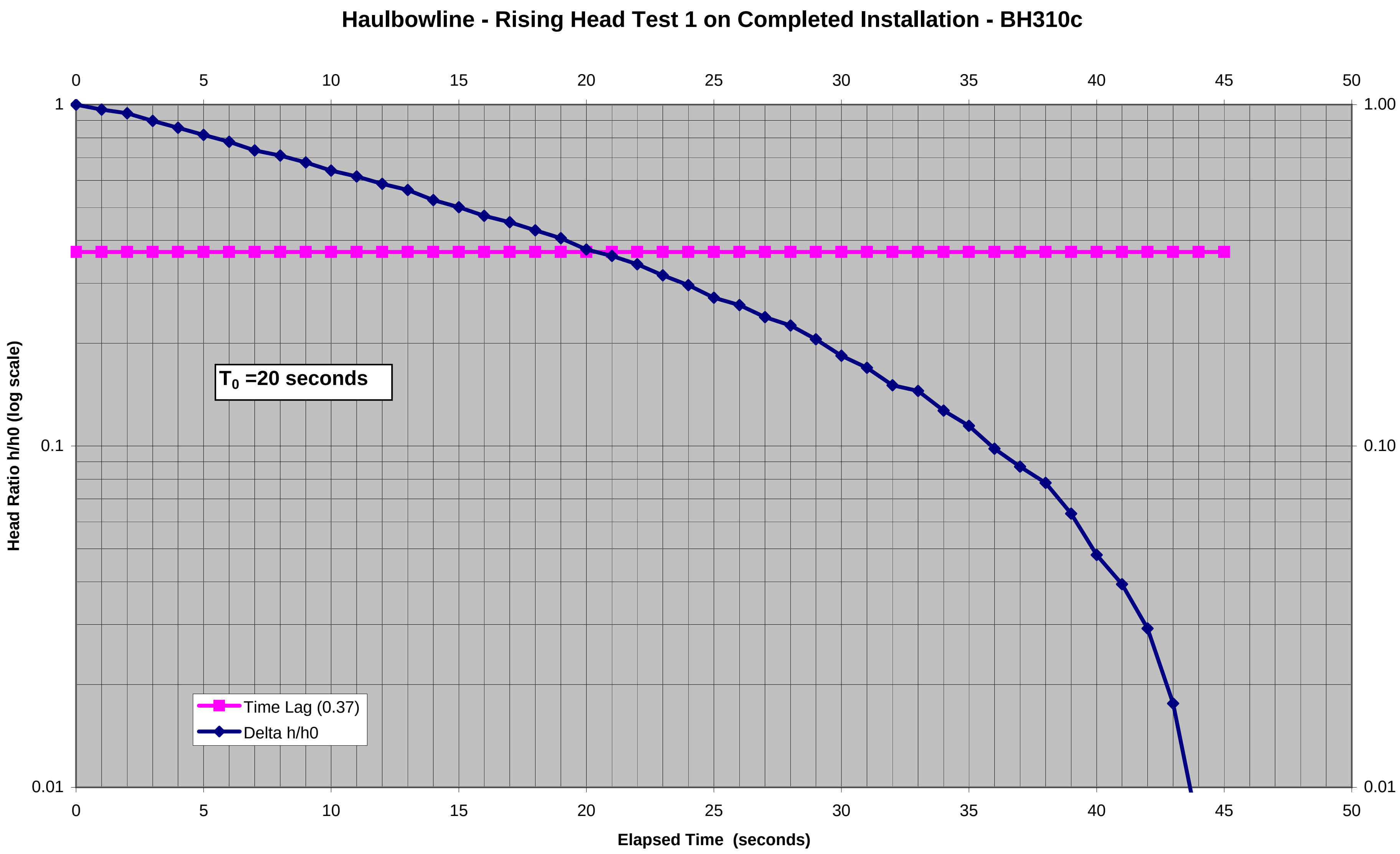
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =		Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	***K* =**	**#DIV/0!**	**Permeability (m/sec)**
	***K* =**	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	18/06/2012; 13:11
Borehole ID:	BH310c (Test 1)
Weather/Site conditions:	Light rain, breezy
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	6.23 @ 13:08
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	
Screened interval of material tested:	39.6 - 47.6 mbgl
Description of material in test interval:	Bedrock
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	3
Volume removed (m^3):	0.0125

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	V difficult to get pump to purge water, manually purged water through
~~0.5~~ 0.25	6.4	tubing initially to get pump purging
~~1~~ 0.75	6.23	
1.5	6.20	
2.0	6.20	
2.5	6.20	
3.0	6.20	
3.5	6.20	
4.0	-	
4.5	-	
5	6.20	
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test 1 on Completed Installation - BH310c
0
5
10
15
20
25
30
35
40
45
50
1
0.1
0.01
1.00
0.10
0.01
Head Ratio h/h0 (log scale)
T_0 =20 seconds
Time Lag (0.37)
Delta h/h0
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH310c - Test 1
Installed PVC casing internal diameter (mm)	-
Drilled diameter (mm)	131
Screened interval (m)	39.6 - 47.6
Length of screened filter section (m)	8
Material description	Bedrock
Static water level (m below top of PVC casing)	6.23 @ 13:08:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	6.497 @ 13:13:43 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 ln(L_i/r_{wf})/2L_iT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	10.455
Intake Length (m)	L_i =	8		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.0655	Casing inner radius (m)
	L_i =	8	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	20	Time lag (sec)
	K =	***6.4E-05***	**Permeability (m/sec)**
	K =	***5.57***	**Permeability (m/day)**

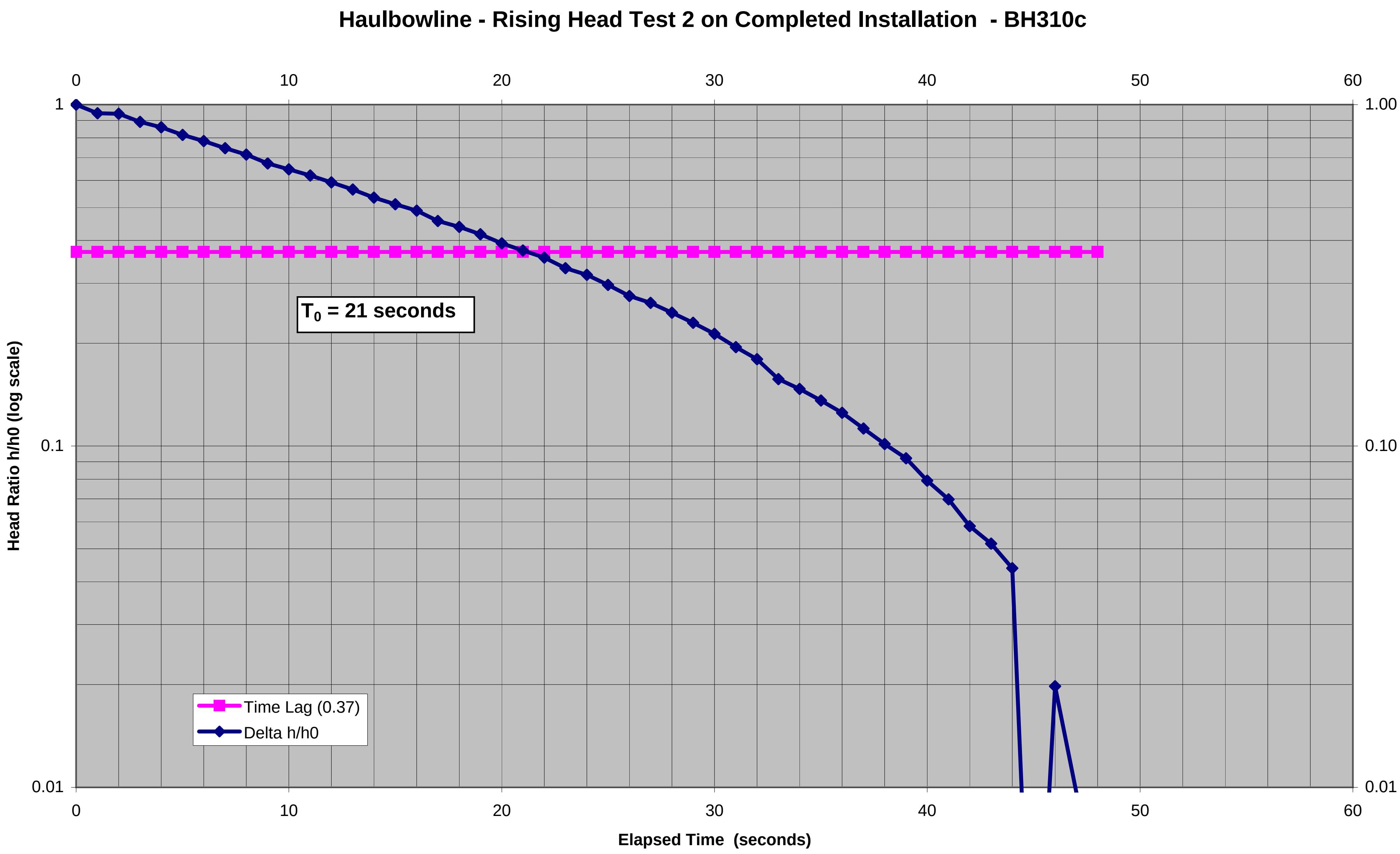
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	18/06/2012; 13:21
Borehole ID:	BH310c (Test 2)
Weather/Site conditions:	Light rain, breezy
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	6.20 @ 13:18
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	
Screened interval of material tested:	39.6 - 47.6 mbgl
Description of material in test interval:	Bedrock
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2.5
Volume removed (m^3):	-

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	V difficult to get pump to purge water, manually purged water through
~~0.5~~ 0.25	6.34	tubing initially to get pump purging
1.0	6.21	
1.5	-	
2.0	6.18	
2.5	6.18	
3.0	6.18	
3.5	6.18	
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test 2 on Completed Installation - BH310c
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)
T0 = 21 seconds
Time Lag (0.37)
Delta h/h0
0
10
20
30
40
50
60
1
0.1
0.01
1.00
0.10
0.01

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide 11:53; High Tide 17:50
Borehole name	BH310c - Test 2
Installed PVC casing internal diameter (mm)	-
Drilled diameter (mm)	131
Screened interval (m)	39.6 - 47.6
Length of screened filter section (m)	8
Material description	Bedrock
Static water level (m below top of PVC casing)	6.182 @ 13:19:19 (from logger data)
Initial water level (m below top of PVC casing)	6.460 @ 13:23:22 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation	***Application***
$F = 2PL_i/\ln(L_i/r_{wf})$	Where L_i/r_{wf} >8

where:

Pi	P =	3.14	*F =*	10.455
Intake Length (m)	L_i =	8		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:

	r_c =	0.0655	Casing inner radius (m)
	L_i =	8	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	21	Time lag (sec)
	K =	***6.1E-05***	**Permeability (m/sec)**
	K =	***5.30***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:

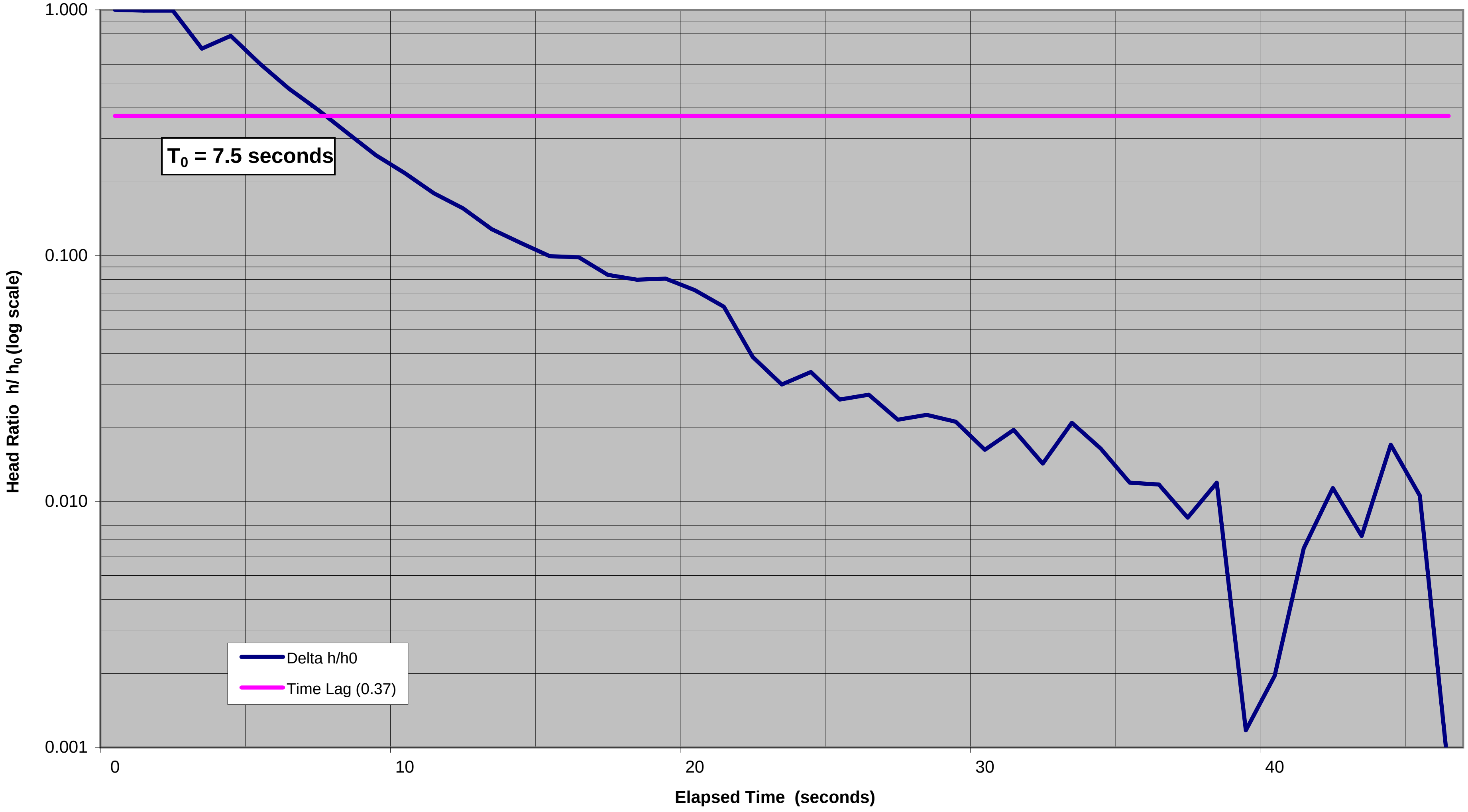
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	15/06/2012
Borehole ID:	BH312b (Test 1)
Weather/Site conditions:	Heavy rain, wind
Tidal conditions/Time:	Low Tide @ 09:31; High Tide @ 15:27
Static water level (m below top of PVC casing):	2.15 @ 14:58
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	7.2 - 13.2 mbgl
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.024

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Start pumping at 14:59
0.5	2.16	Stop pumping at 15:01
1.0	-	
1.5	2.15	
2.0	-	
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

Haulbowline - Rising Head Test 1 on Completed Installation - BH312b



ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork Counnty Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH312b (Test 2)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	7.2 - 13.2
Length of screened filter section (m)	6
Material description	Silt
Static water level (m below top of casing)	2.14 @ 15:06:00 (manual dip measurement)
Initial water level (m below top of casing)	2.638 @ 15:08:58 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 ln(L_i/r_{wf})/2LiT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	9.20
Intake Length (m)	L_i =	6		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 ln(L_i/r_{wf})/2L_i T_0$$

where:

	r_c =	0.025	Casing inner radius (m)
	L_i =	6	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	7.5	Time lag (sec)
	K =	***2.8E-05***	**Permeability (m/sec)**
	K =	***2.46***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]$$

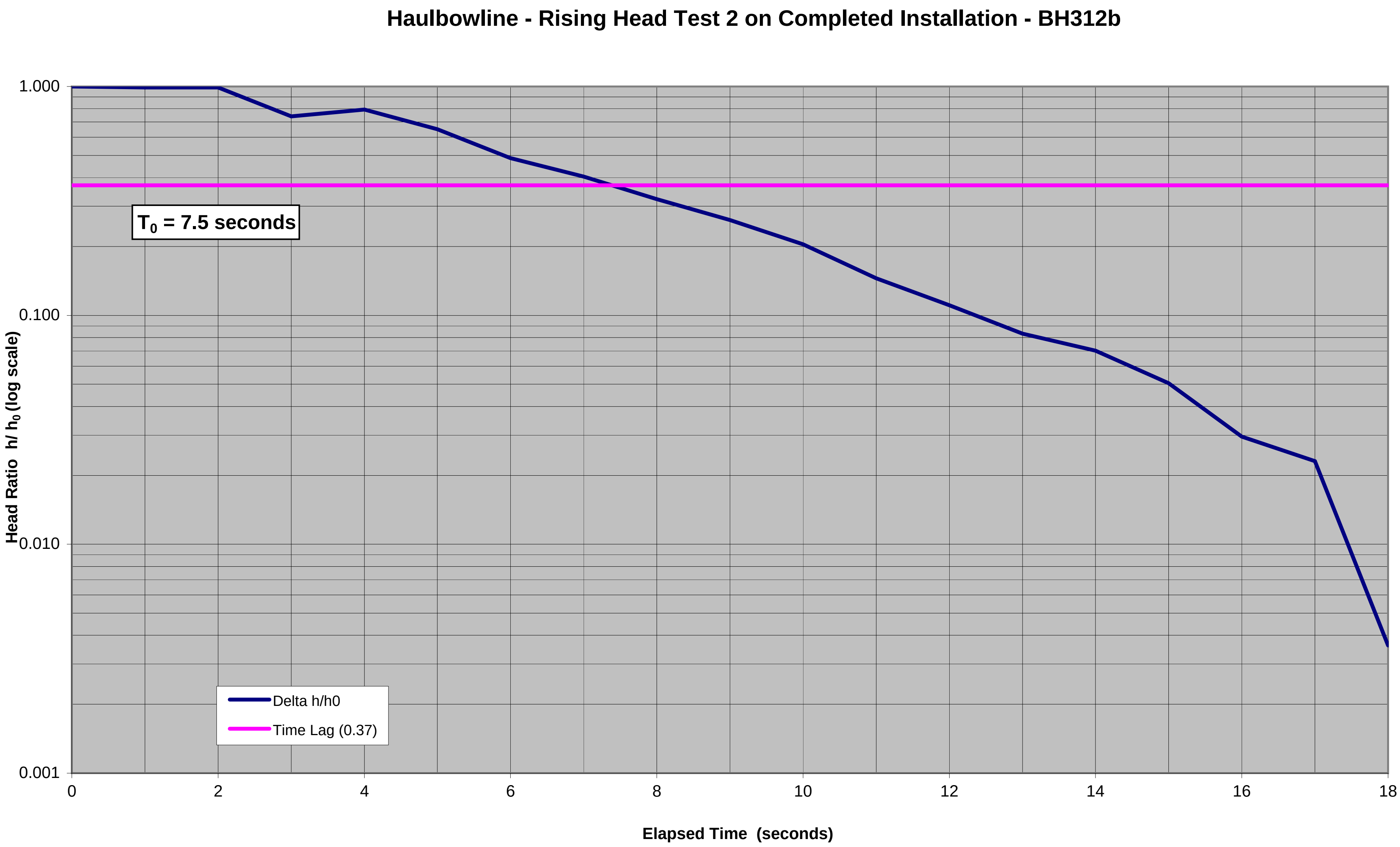
where:

	P =		Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	15/06/2012
Borehole ID:	BH312b (Test 2)
Weather/Site conditions:	Heavy rain, wind
Tidal conditions/Time:	Low Tide @ 09:31; High Tide @ 15:27
Static water level (m below top of PVC casing):	2.14 @ 15:06
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	7.2 - 13.2 mbgl
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.024

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Start pumping at 15:07
0.5	-	Stop pumping at 15:09
1.0	-	
1.5	2.135	
2.0	-	
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test 2 on Completed Installation - BH312b
1.000
0.100
0.010
0.001
Head Ratio h/ h0 (log scale)
T0 = 7.5 seconds
Delta h/h0
Time Lag (0.37)
0
2
4
6
8
10
12
14
16
18
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork Counnty Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	15/06/2012
Tidal Conditions	Low Tide 09:31; High Tide 15:27
Borehole name	BH312b (Test 2)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	7.2 - 13.2
Length of screened filter section (m)	6
Material description	Silt
Static water level (m below top of casing)	2.14 @ 15:06:00 (manual dip measurement)
Initial water level (m below top of casing)	2.638 @ 15:08:58 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation	***Application***
$F = 2PL_i/\ln(L_i/r_{wf})$	Where L_i/r_{wf} >8

where:

Pi	P =	3.14	*F =*	9.20
Intake Length (m)	L_i =	6		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:

	r_c =	0.025	Casing inner radius (m)
	L_i =	6	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	7.5	Time lag (sec)
	K =	***2.8E-05***	**Permeability (m/sec)**
	K =	***2.46***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

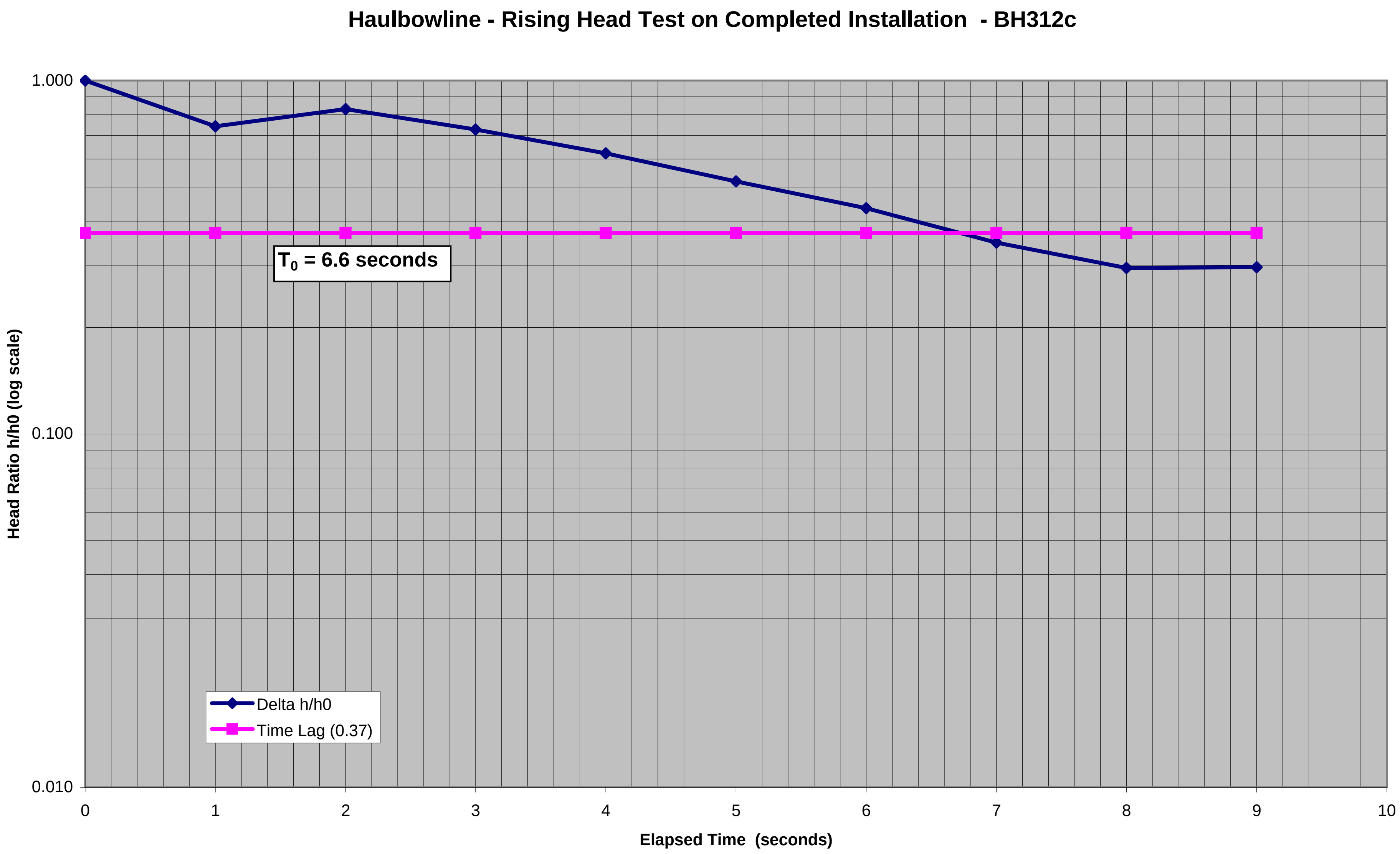
where:

	P =		Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	19/06/2012; 16:07
Borehole ID:	BH312c
Weather/Site conditions:	Light rain, breezy
Tidal conditions/Time:	Low tide @ 12:30; High tide @ 18:28
Static water level (m below top of PVC casing):	3.44 @ 16:07
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	
Screened interval of material tested:	25.5 - 32.5
Description of material in test interval:	Bedrock
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.015

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	-
0.5	3.37	
1.0	3.38	
1.5	-	
2.0	-	
2.5	3.35	
3.0	-	
3.5	3.3	
4.0	3.34	
4.5	-	
5	3.33	
6	3.32	
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test on Completed Installation - BH312c
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
T_0 = 6.6 seconds
Delta h/h0
Time Lag (0.37)
0
1
2
3
4
5
6
7
8
9
10
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	19/06/2012
Tidal Conditions	Low Tide 12:30; High Tide 18:28
Borehole name	BH312c
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	131
Screened interval (m)	25.5 - 32.5
Length of screened filter section (m)	7
Material description	Bedrock
Static water level (m below top of PVC casing)	3.44 @ 16:07:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	3.561 @ 16:10:11 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	9.410
Intake Length (m)	L_i =	7		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	7	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	6.6	Time lag (sec)
	K =	***3.2E-05***	**Permeability (m/sec)**
	K =	***2.73***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

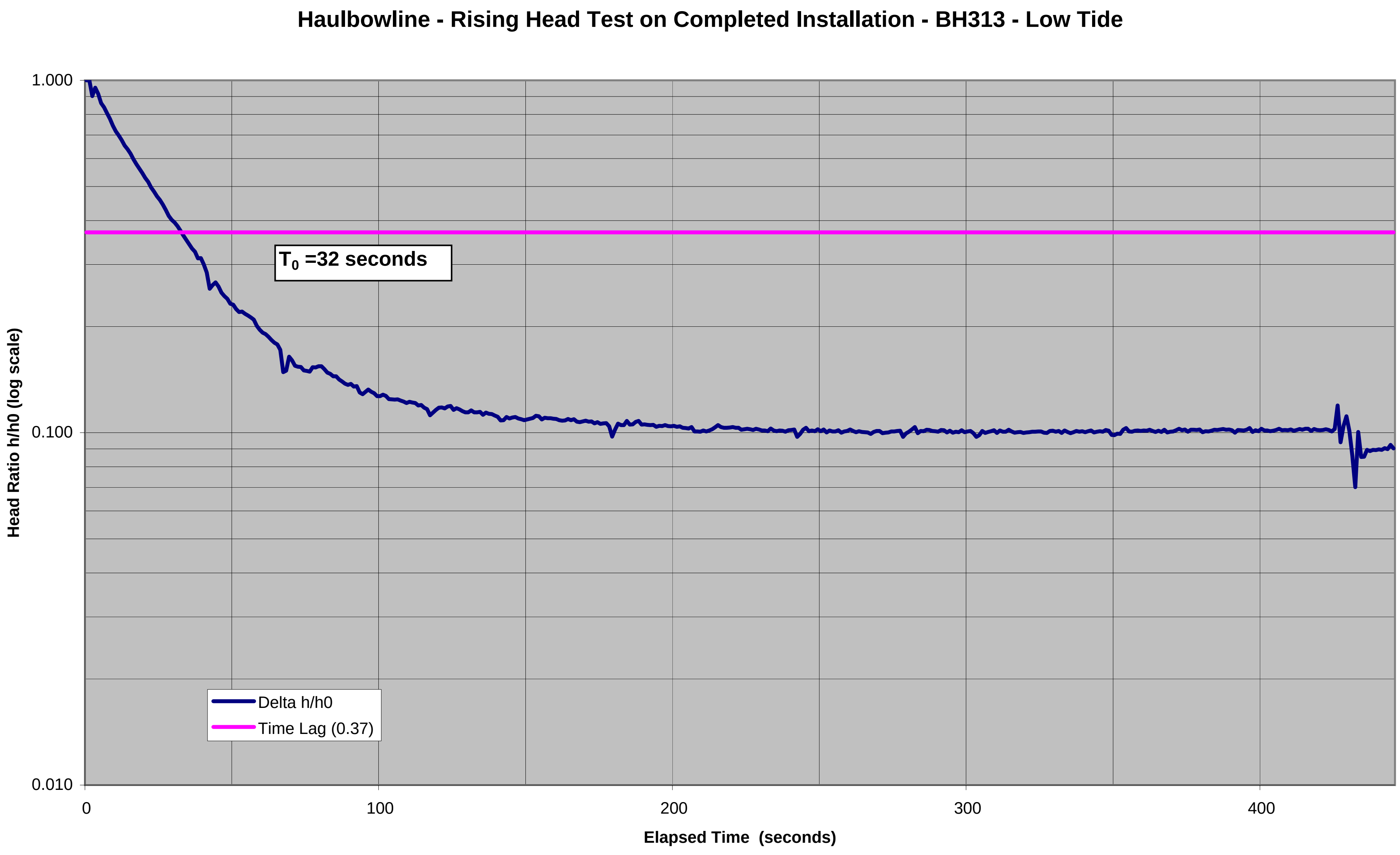
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	18/06/2012; 10:20
Borehole ID:	BH313 (Low Tide Test)
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	3.14 @ 10:18
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	21.1 - 25.3
Description of material in test interval:	Sand & gravel
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.018

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	-
0.5	3.85	
1.0	3.51	
1.5	3.36	
2.0	3.36	
2.5	3.35	
3.0	3.34	
3.5	3.34	
4.0	3.33	
4.5	3.32	
5	3.32	
6	-	
7	-	
~~8~~ 8.5	3.32	
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test on Completed Installation - BH313 - Low Tide
1.000
0.100
0.010
Head Ratio h/h0 (log scale)
T_0 =32 seconds
Delta h/h0
Time Lag (0.37)
0
100
200
300
400
Elapsed Time (seconds)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide @ 11:53; High Tide @ 17:50
Borehole name	BH313 (Low Tide Test)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	21.1 - 25.3
Length of screened filter section (m)	4.2
Material description	Sands and gravels
Static water level (m below top of PVC casing)	3.14 @ 10:18:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	5.032 @ 10:22:35 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	7.057
Intake Length (m)	L_i =	4.2		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	4.2	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	32	Time lag (sec)
	K =	***8.7E-06***	**Permeability (m/sec)**
	K =	***0.75***	**Permeability (m/day)**

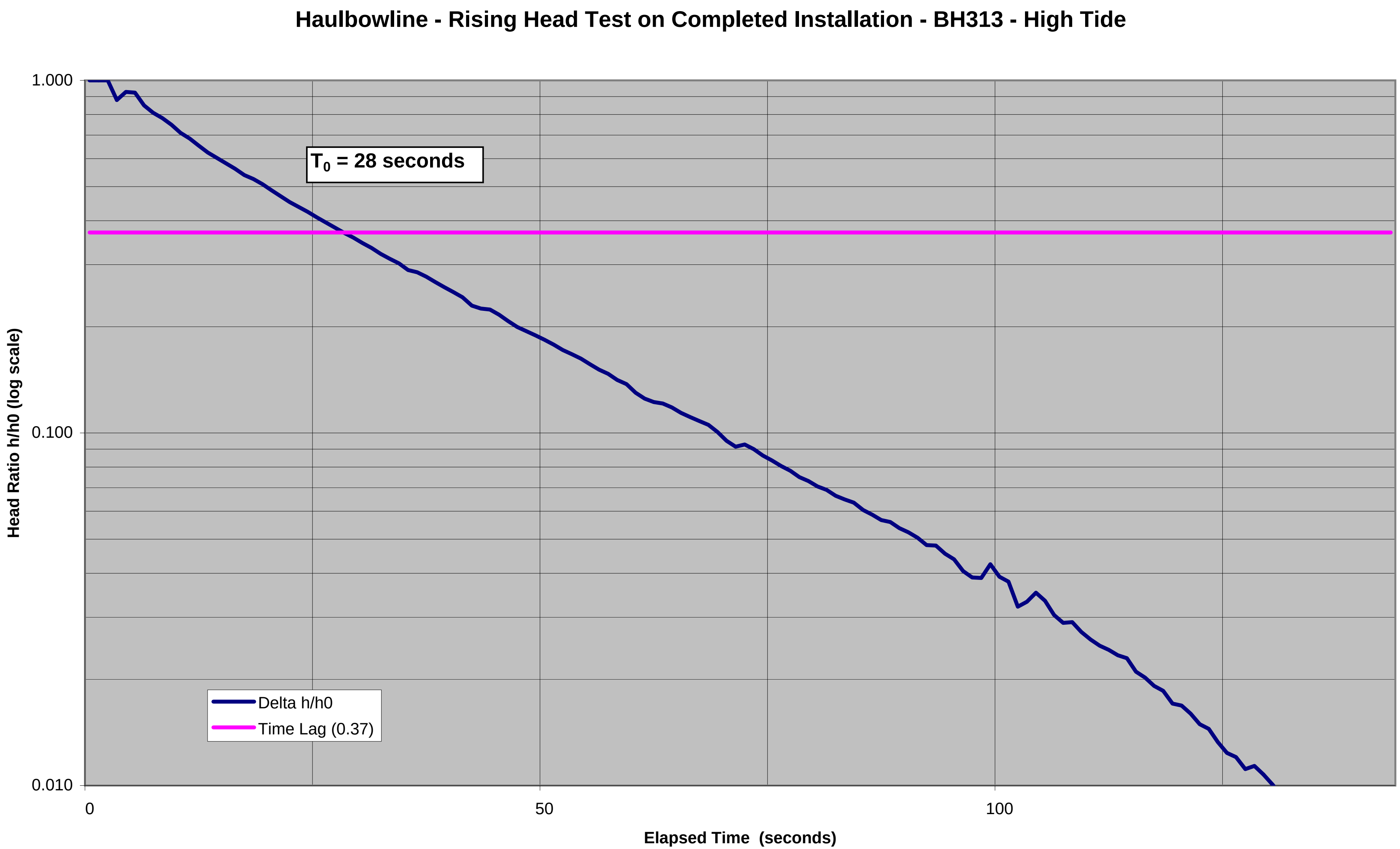
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	18/06/2012; 16:36
Borehole ID:	BH313 (High Tide Test)
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @ 11:53; High tide @ 17:50
Static water level (m below top of PVC casing):	2.22 @ 16:33
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	21.1 - 25.3
Description of material in test interval:	Sand & gravel
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.020

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	
0.5	2.77	
1.0	2.45	
1.5	2.32	
2.0	-	
2.5	2.25	
3.0	-	
3.5	2.22	
4.0	-	
~~4.5~~ 4.25	2.21	
5	2.21	
6	2.2	
7	-	
8	2.17	
9	-	
~~10~~ 11	2.16	
~~12~~ 13	2.15	
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test on Completed Installation - BH313 - High Tide
T_0 = 28 seconds
Head Ratio h/h0 (log scale)
1.000
0.100
0.010
0
50
100
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	18/06/2012
Tidal Conditions	Low Tide @ 11:53; High Tide @ 17:50
Borehole name	BH313 (High Tide Test)
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	21.1 - 25.3
Length of screened filter section (m)	4.2
Material description	Sands and Gravels
Static water level (m below top of PVC casing)	2.22 @ 16:33:00 (manual dip measurement)
Initial water level (m below top of PVC casing)	3.989 @ 10:38:31 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 ln(L_i/r_{wf})/2L_iT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	7.057
Intake Length (m)	L_i =	4.2		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	4.2	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	28	Time lag (sec)
	K =	***9.9E-06***	**Permeability (m/sec)**
	K =	***0.86***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]$$

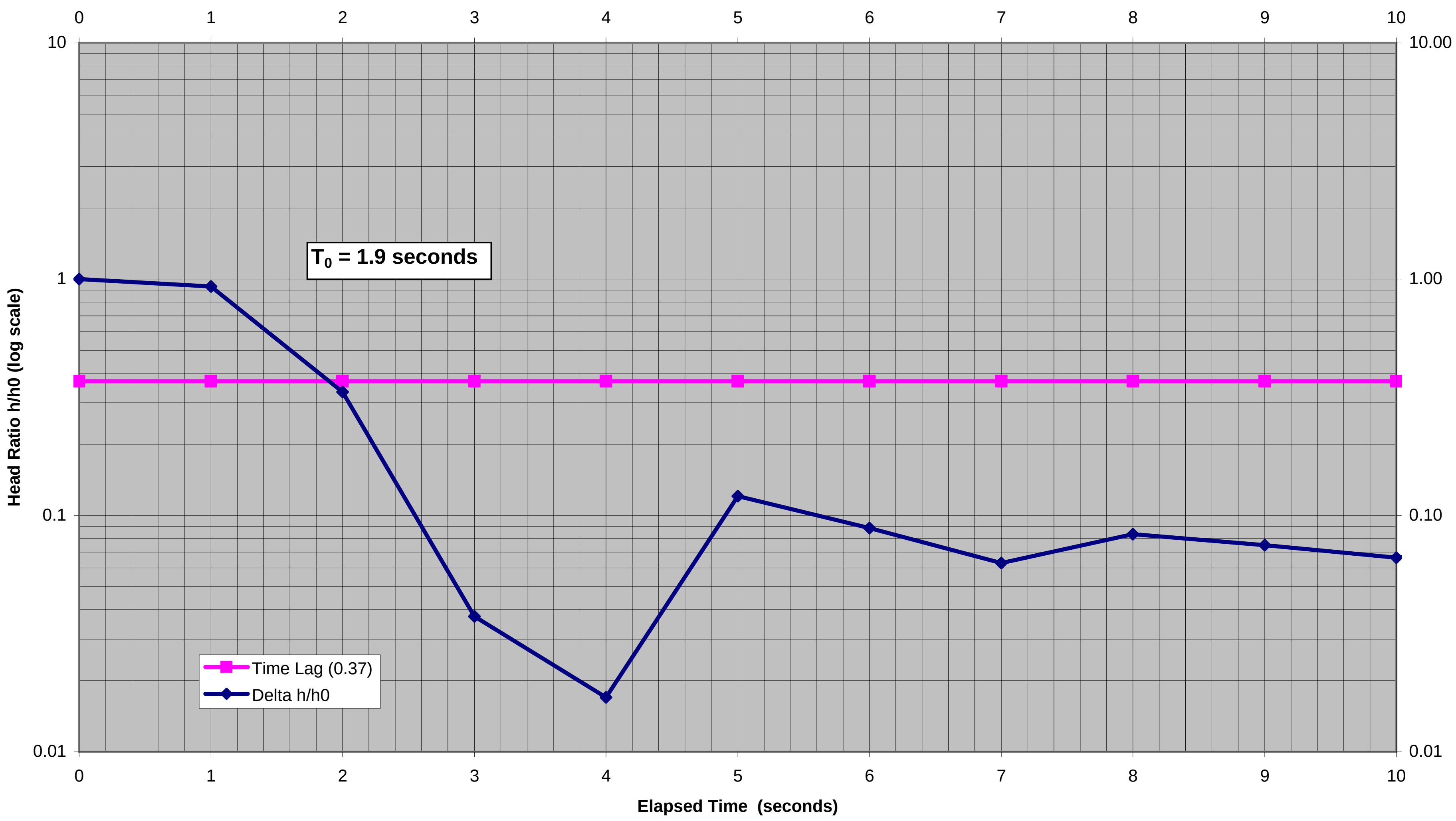
where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	22/06/2012; 13:46
Borehole ID:	BH315 (Low Tide Test)
Weather/Site conditions:	Dry, slight breeze
Tidal conditions/Time:	Low tide @ 14:16; High tide @ 07:54
Static water level (m below top of PVC casing):	3.55 @ 13:42
Initial water level (m below top of PVC casing):	3.56 @ 13:45
Casing diameter (mm ID):	50
Screened interval of material tested:	5.4 - 6.4
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.02

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	3.56	Pump started at 13:43
0.5	-	Pump stopped at 13:45
1.0	3.55	
1.5	-	
2.0	3.55	
2.5	3.55	
3.0	-	
3.5	3.55	
4.0	-	
4.5	3.55	
5	-	
6	3.55	
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		

Haulbowline - Rising Head Test on Completed Installation - BH306C - Low Tide



ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	22/06/2012
Tidal Conditions	High Tide 07:54; Low Tide 14:16
Borehole name	BH315 - Low Tide
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	5.4 - 6.4
Length of screened filter section (m)	1
Material description	Slag
Static water level (m below top of PVC casing)	3.572 @ 13:44:32 (from logger data)
Initial water level (m below top of PVC casing)	3.631 @ 13:46:07 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where $L_i/r_{wf} > 8$	
where:				
Pi	P =	3.14	*F =*	2.232
Intake Length (m)	L_i =	1		
Effective Radius (m)	r_{wf} =	0.06		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	1	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	1.9	Time lag (sec)
	K =	***3.8E-04***	**Permeability (m/sec)**
	K =	***32.72***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

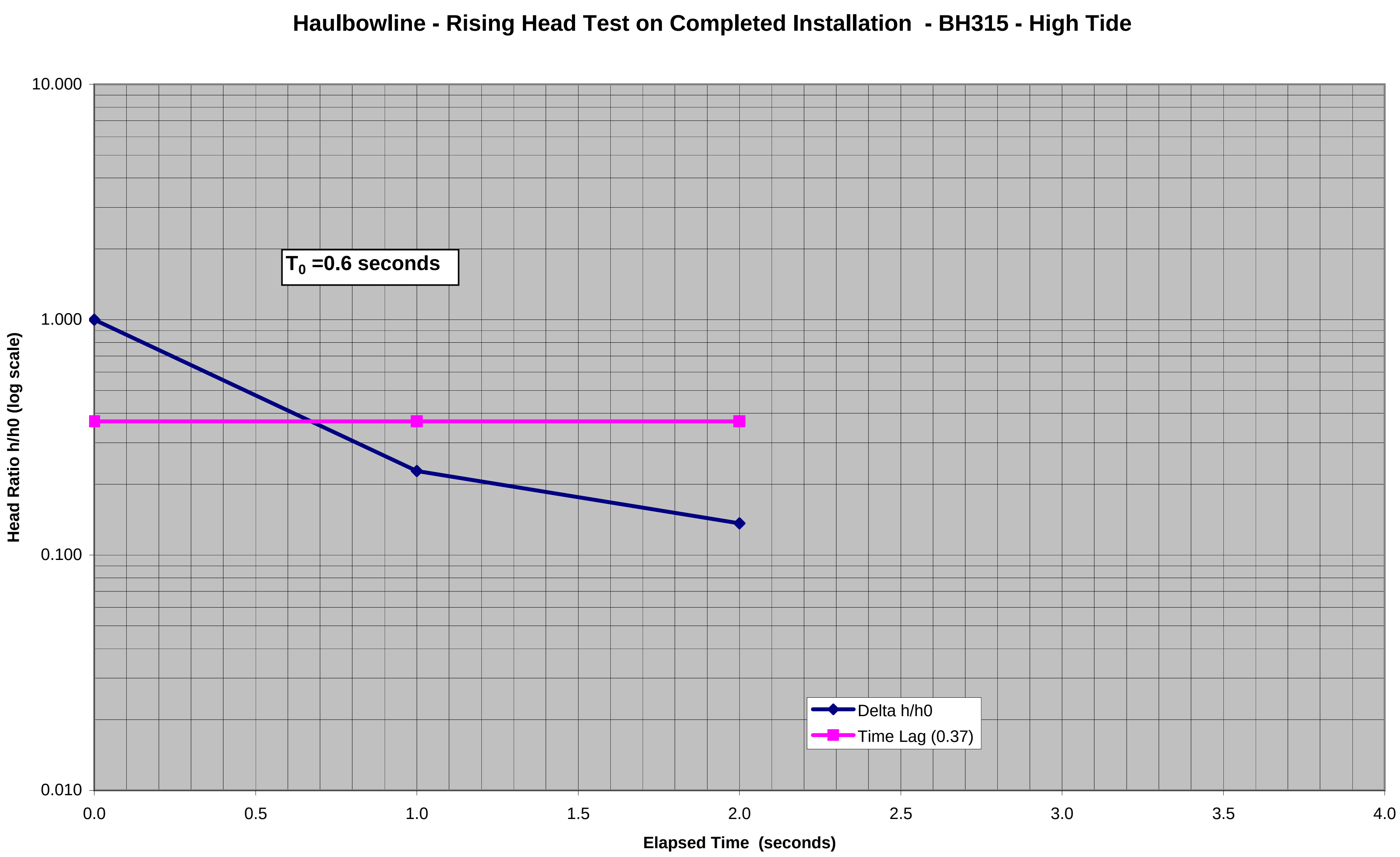
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =	0.025	Casing inner radius (m)
	t_1 =	0	Time 1 after commencement of test (sec)
	t_2 =	4	Time 2 after commencement of test (sec)
	H_1 =	0.059	Head measured at Time 1 (m)
	H_2 =	0.001	Head measured at Time 2 (m)
	F =	2.232	Shape Factor
	K =	**9.E-04**	**Permeability (m/sec)**
	K =	**77.43**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	22/06/2012; 09:10
Borehole ID:	BH315 (High Tide Test)
Weather/Site conditions:	Dry, slight breeze
Tidal conditions/Time:	Low tide @ 14:16; High tide @ 07:54
Static water level (m below top of PVC casing):	3.16 @ 09:02
Initial water level (m below top of PVC casing):	3.16 @ 09:10
Casing diameter (mm ID):	50
Screened interval of material tested:	5.4 - 6.4
Description of material in test interval:	Slag
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.02

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	3.16	Pump started at 09:08
0.5	3.16	Pump stopped at 09:10
1.0	3.16	
1.5		
2.0		
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



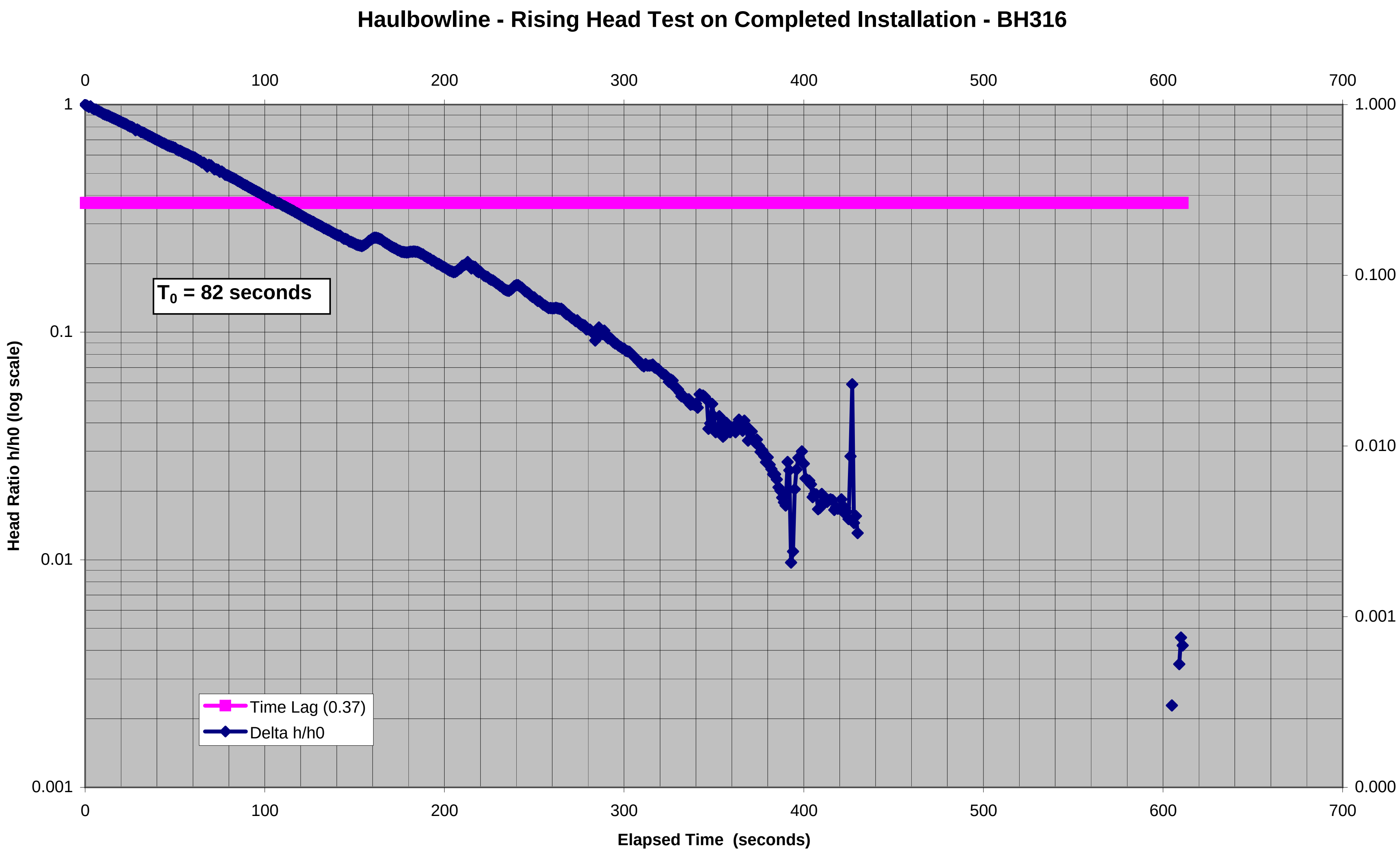
Haulbowline - Rising Head Test on Completed Installation - BH315 - High Tide
T_0 =0.6 seconds
Head Ratio h/h0 (log scale)
10.000
1.000
0.100
0.010
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
4.0
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA				
Client			Cork County Council/WYG	
Location			Haulbowline	
Project Number			IE718	
Date of Test			22/06/2012	
Tidal Conditions			High Tide 07:54; Low Tide 14:16	
Borehole name			BH315 - High Tide	
Installed PVC casing internal diameter (mm)			50	
Drilled diameter (mm)			200	
Screened interval (m)			5.4 - 6.4	
Length of screened filter section (m)			1	
Material description			Slag	
Static water level (m below top of PVC casing)			3.16 @ 09:02:00 (manual dip measurement)	
Initial water level (m below top of PVC casing)			3.236 @ 09:10:02 (from logger data)	
Permeability Test Type			Rising head test on completed installation	
Borehole Geometry Criteria			Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.	
Analysis Method Reference			BS5930:1999 and Hvorslev (1951)	
Method Applied for Permeability Calculation				
Equation			***Application***	
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$			Where T_0 can be determined from graph	
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$			Where T_0 cannot be determined from graph	
Determination of T_0 from Graph				
$T_0 = (Pr_c^2)/(FK)$				
Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$				
Determination of F (Shape Factor)				
Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	2.727
Intake Length (m)	L_i =	1		
Effective Radius (m)	r_{wf} =	0.1		
Permeability K (m/s) Equation (where T_0 can be determined from the graph)				
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$				
where:				
	r_c =	0.025	Casing inner radius (m)	
	L_i =	1	Intake length (m)	
	r_{wf} =	0.1	Effective radius (m)	
	T_0 =	0.6	Time lag (sec)	
	K =	***1.2E-03***	**Permeability (m/sec)**	
	K =	***103.62***	**Permeability (m/day)**	
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)				
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$				
where:				
	P =	3.14	Pi	
	r_c =	0.025	Casing inner radius (m)	
	t_1 =	0	Time 1 after commencement of test (sec)	
	t_2 =	2	Time 2 after commencement of test (sec)	
	H_1 =	0.0748	Head measured at Time 1 (m)	
	H_2 =	0.0102	Head measured at Time 2 (m)	
	F =	2.727	Shape Factor	
	K =	**7.E-04**	**Permeability (m/sec)**	
	K =	**61.93**	**Permeability (m/day)**	

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	27/06/2012; 15:58
Borehole ID:	BH316
Weather/Site conditions:	Moderately heavy rain, breezy
Tidal conditions/Time:	High tide @ 11:38; Low tide @ 18:09
Static water level (m below top of PVC casing):	2.72 @ 15:30
Initial water level (m below top of PVC casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	6.0 - 18.3 mbgl
Description of material in test interval:	Silt
Method of water removal:	Honda WX10 pump & dedicated Inertial Pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.017

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Tried to purge between 15:32 and 15:50, could not get pump to purge water
0.5	5.71	thought that borehole v. silted up at bottom & bottom of tubing & foot valve
1.0	3.97	in silt, raised tubing few meters & started purging at 15:58
~~1.5~~ 1.75	3.50	Depth measured at 14m btoc (PVC) on day of test
2.0	-	
2.5	-	
3.0	-	
3.5	-	
4.0	-	
4.5	2.86	
5	-	
~~6~~ 6.5	2.77	
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test on Completed Installation - BH316
T0 = 82 seconds
Time Lag (0.37)
Delta h/h0
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)
0
100
200
300
400
500
600
700
1
0.1
0.01
0.001
1.000
0.100
0.010
0.001
0.000

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	27/06/2012
Tidal Conditions	High Tide 11:38; Low Tide 18:09
Borehole name	BH316
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	200
Screened interval (m)	6.0 - 18.3
Length of screened filter section (m)	12.3
Material description	Silt
Static water level (m below top of PVC casing)	2.699 @ 15:55:40 (from logger data)
Initial water level (m below top of PVC casing)	5.352 @ 16:00:49 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	16.052
Intake Length (m)	L_i =	12.3		
Effective Radius (m)	r_{wf} =	0.1		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	12.3	Intake length (m)
	r_{wf} =	0.1	Effective radius (m)
	T_0 =	82	Time lag (sec)
	K =	***1.5E-06***	**Permeability (m/sec)**
	K =	***0.13***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

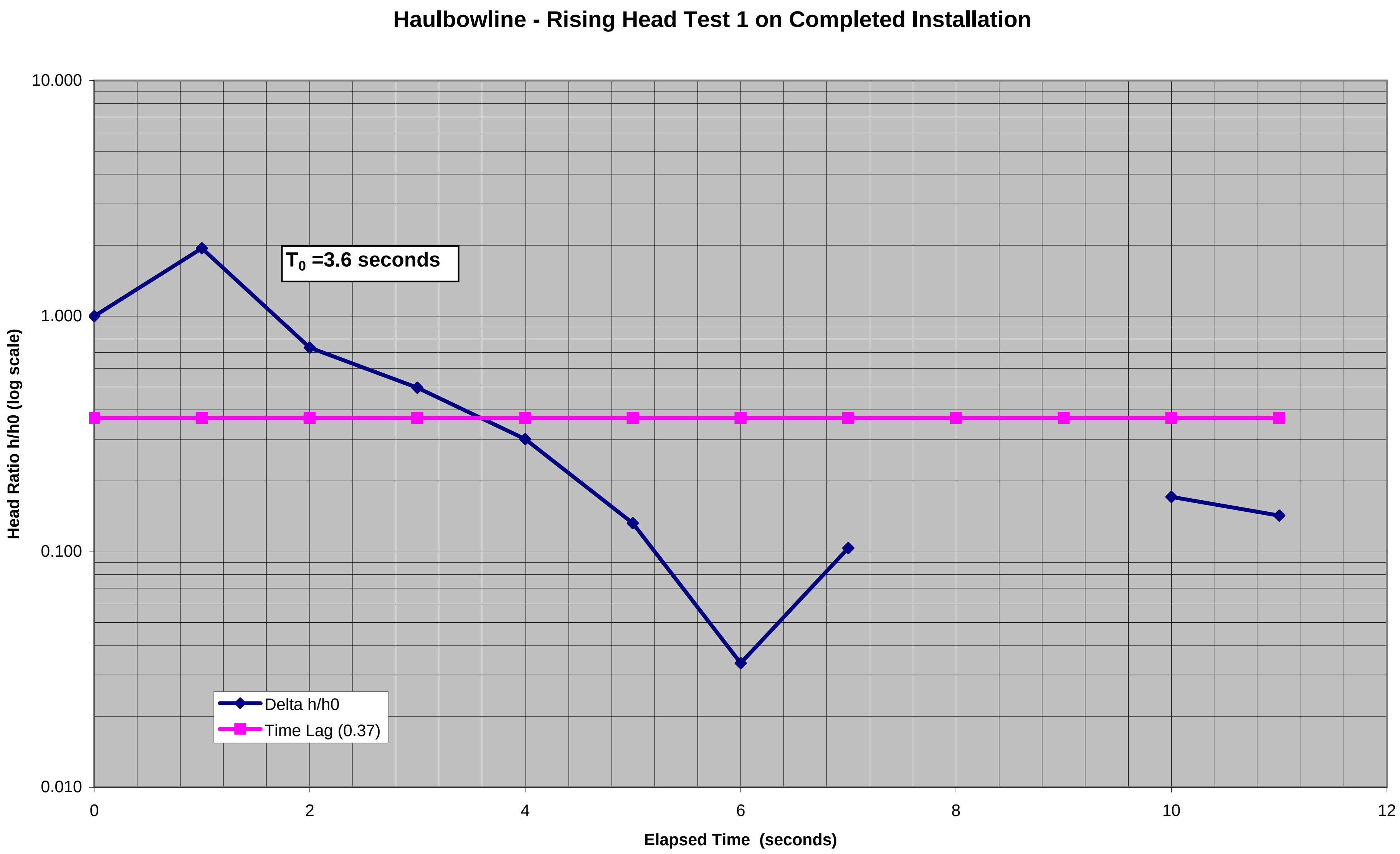
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	19/06/2012; 15:11
Borehole ID:	BH117R (Test 1)
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @12:30; High tide @ 18:28
Static water level (m below top of casing):	3.70 @ 15:08
Initial water level (m below top of casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	14.4 - 21.4 mbgl
Description of material in test interval:	Sand & Gravel
Method of water removal:	Honda WX10 pump & Waterra tubing & foot valve
Pumping duration (mins):	2
Volume removed (m^3):	0.019

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	
~~0.5~~ 0.25	3.68	
1.0	3.65	
1.5	3.65	
2.0	-	
2.5	3.63	
3.0	-	
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test 1 on Completed Installation
T0 =3.6 seconds
Head Ratio h/h0 (log scale)
10.000
1.000
0.100
0.010
0
2
4
6
8
10
12
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	19/06/2012
Tidal Conditions	Low Tide 12:30; High Tide 18:28
Borehole name	BH117R - Test 1
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	131
Screened interval (m)	14.4 - 21.4
Length of screened filter section (m)	7
Material description	Sand & Gravel
Static water level (m below top of PVC casing)	3.679 @ 15:10:59 (from logger data)
Initial water level (m below top of PVC casing)	3.718 @ 15:13:08 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	9.410
Intake Length (m)	L_i =	7		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	7	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	3.6	Time lag (sec)
	K =	***5.8E-05***	**Permeability (m/sec)**
	K =	***5.01***	**Permeability (m/day)**

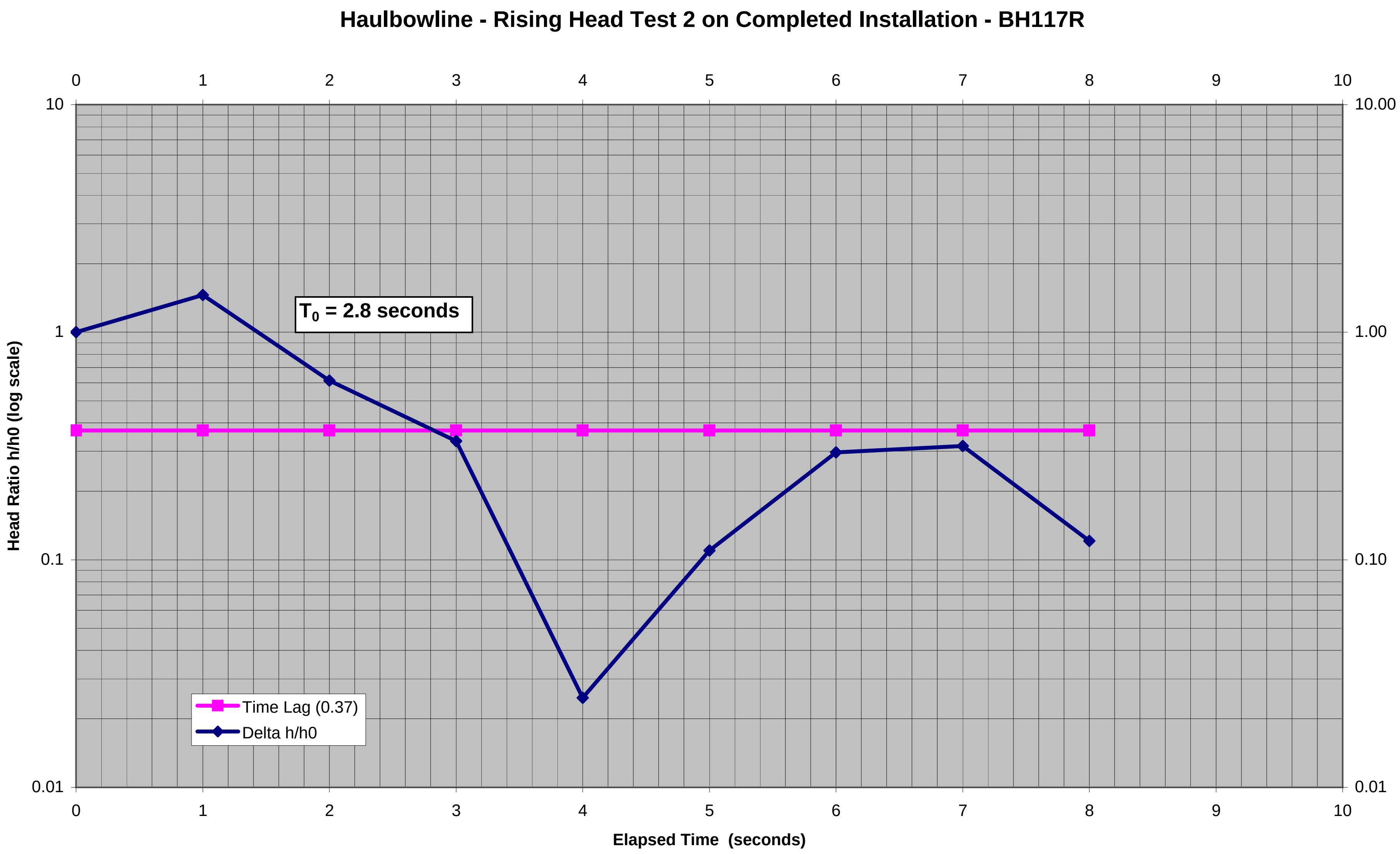
Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet	
Site name:	Haulbowline
Date and Time:	19/06/2012; 15:17
Borehole ID:	BH117R (Test 2)
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @12:30; High tide @ 18:28
Static water level (m below top of casing):	3.63 @ 15:15:30
Initial water level (m below top of casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	14.4 - 21.4 mbgl
Description of material in test interval:	Sand & Gravel
Method of water removal:	Honda WX10 pump & dedicated Inertial pump (Waterra tubing & foot valve)
Pumping duration (mins):	2
Volume removed (m^3):	0.020

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	
~~0.5~~ 0.1666	3.6	
1.0	-	
1.5	-	
2.0	-	
2.5	-	
3.0	-	
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		



Haulbowline - Rising Head Test 2 on Completed Installation - BH117R
T0 = 2.8 seconds
Time Lag (0.37)
Delta h/h0
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)
0
1
2
3
4
5
6
7
8
9
10
0.01
0.1
1
10.00
1.00
0.10

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA

Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	19/06/2012
Tidal Conditions	Low Tide 12:30; High Tide 18:28
Borehole name	BH117R - Test 2
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	131
Screened interval (m)	14.4 - 21.4
Length of screened filter section (m)	7
Material description	Sand & Gravel
Static water level (m below top of PVC casing)	3.623 @ 15:17:11 (from logger data)
Initial water level (m below top of PVC casing)	3.659 @ 15:19:19 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where L_i/r_{wf} >8	
where:				
Pi	P =	3.14	*F =*	9.410
Intake Length (m)	L_i =	7		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	7	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	2.8	Time lag (sec)
	K =	***7.4E-05***	**Permeability (m/sec)**
	K =	***6.44***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

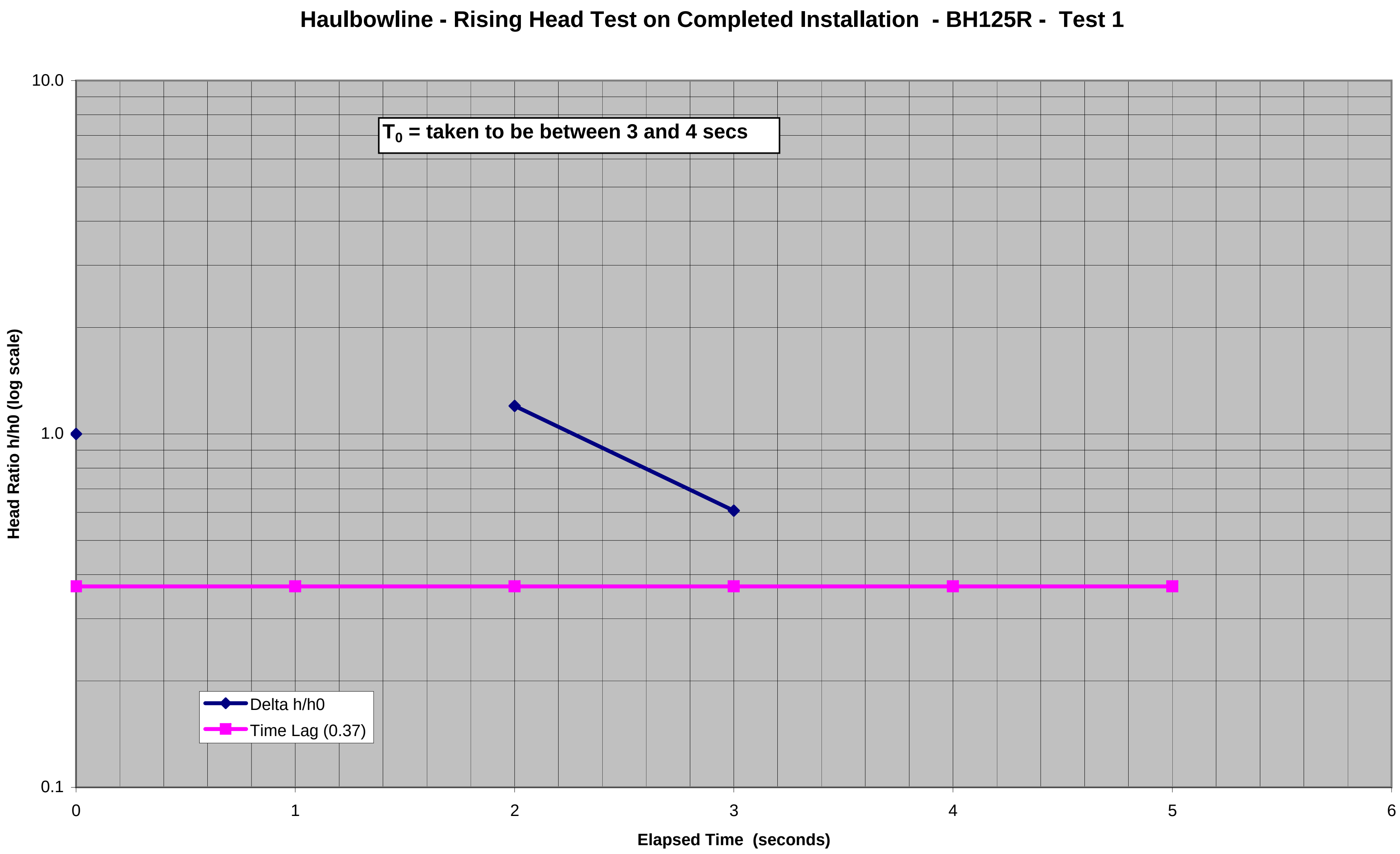
$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	19/06/2012; 11:05
Borehole ID:	BH125R (Test 1)
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @12:30; High tide @ 18:28
Static water level (m below top of casing):	4.31 @ 11:03
Initial water level (m below top of casing):	4.29
Casing diameter (mm ID):	50
Screened interval of material tested:	27.0 - 30.0 mbgl
Description of material in test interval:	Sand & gravel
Method of water removal:	Honda WX10 pump & dedicated Inertial pump (Waterra tubing & foot valve)
Pumping duration (mins):	3
Volume removed (m^3):	0.008

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	4.29	Very difficult to get pump to purge water, manually purged water through
0.5	4.31	tubing initially to get pump purging
1.0	4.31	
1.5	-	
2.0	4.31	
2.5	4.3	
3.0	-	
3.5	4.29	
4.0	4.29	
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test on Completed Installation - BH125R - Test 1
T_0 = taken to be between 3 and 4 secs
Head Ratio h/h0 (log scale)
10.0
1.0
0.1
0
1
2
3
4
5
6
Elapsed Time (seconds)
Delta h/h0
Time Lag (0.37)

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	19/06/2012
Tidal Conditions	Low Tide 12:30; High Tide 18:28
Borehole name	BH125R - Test 1
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	131
Screened interval (m)	27.0 - 30.0
Length of screened filter section (m)	3
Material description	Sand & Gravel
Static water level (m below top of PVC casing)	4.31 @ 11:03:00 (manual dip reading)
Initial water level (m below top of PVC casing)	4.575 @ 11:08:19 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$\mathbf{K = r_c^2 ln(L_i/r_{wf})/2L_iT_0}$	Where T_0 can be determined from graph
$\mathbf{K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]}$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which Dh/Dh_0 = 0.37

Determination of F (Shape Factor)

Equation	***Application***
$F = 2PL_i/ln(L_i/r_{wf})$	Where L_i/r_{wf} >8

where:

Pi	P =	3.14	*F =*	4.926
Intake Length (m)	L_i =	3		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \, ln(L_i/r_{wf})/2L_i T_0$$

where:

	r_c =	0.025	Casing inner radius (m)
	L_i =	3	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	3.5	Time lag (sec)
	K =	***1.1E-04***	**Permeability (m/sec)**
	K =	***9.83***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][log_e H_1/H_2]$$

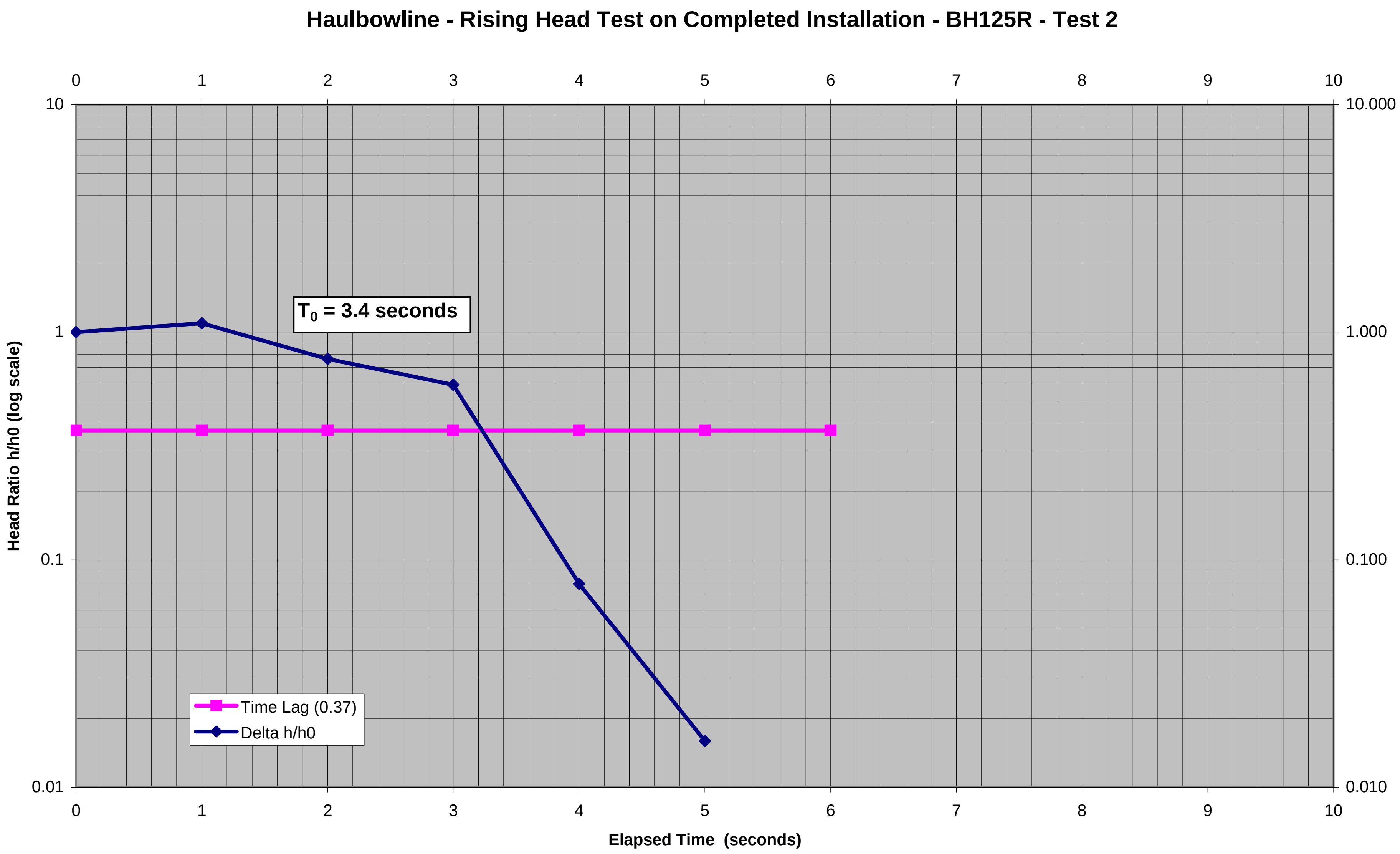
where:

	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	K =	**#DIV/0!**	**Permeability (m/sec)**
	K =	**#DIV/0!**	**Permeability (m/day)**

In-situ Permeability (Rising Head) Test on Completed Installation - Field Datasheet

Site name:	Haulbowline
Date and Time:	19/06/2012; 11:13
Borehole ID:	BH125R (Test 2)
Weather/Site conditions:	Dry, overcast
Tidal conditions/Time:	Low tide @12:30; High tide @ 18:28
Static water level (m below top of casing):	4.29 @ 11:13
Initial water level (m below top of casing):	-
Casing diameter (mm ID):	50
Screened interval of material tested:	27.0 - 30.0 mbgl
Description of material in test interval:	Sand & gravel
Method of water removal:	Honda WX10 pump & dedicated Inertial pump (Waterra tubing & foot valve)
Pumping duration (mins):	3
Volume removed (m^3):	-

Time (minutes)	Water level (m below top of PVC casing)	Other Notes/Observations
0.0	-	Very difficult to get pump to purge water, manually purged water through
0.5	4.28	tubing initially to get pump purging
1.0	4.28	
1.5	-	
2.0	-	
2.5		
3.0		
3.5		
4.0		
4.5		
5		
6		
7		
8		
9		
10		
12		
14		
16		
18		
20		
25		
30		
35		
40		
45		
50		
55		
60		


Haulbowline - Rising Head Test on Completed Installation - BH125R - Test 2
T0 = 3.4 seconds
Time Lag (0.37)
Delta h/h0
Head Ratio h/h0 (log scale)
Elapsed Time (seconds)
0
1
2
3
4
5
6
7
8
9
10
0.01
0.1
1
10
0.010
0.100
1.000
10.000

ANALYSIS SHEET OF IN-SITU PERMEABILTY TEST DATA	
Client	Cork County Council/WYG
Location	Haulbowline
Project Number	IE718
Date of Test	19/06/2012
Tidal Conditions	Low Tide 12:30; High Tide 18:28
Borehole name	BH125R - Test 2
Installed PVC casing internal diameter (mm)	50
Drilled diameter (mm)	131
Screened interval (m)	27.0 - 30.0
Length of screened filter section (m)	3
Material description	Sand & Gravel
Static water level (m below top of PVC casing)	4.378 @ 11:13:39 (from logger data)
Initial water level (m below top of PVC casing)	4.565 @ 11:16:18 (from logger data)
Permeability Test Type	Rising head test on completed installation
Borehole Geometry Criteria	Intake length of borehole/piezometer filter section (L_i) is >8 times its effective radius r_{wf}, including gravel pack, where present.
Analysis Method Reference	BS5930:1999 and Hvorslev (1951)

Method Applied for Permeability Calculation

Equation	***Application***
$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$	Where T_0 can be determined from graph
$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$	Where T_0 cannot be determined from graph

Determination of T_0 from Graph

$$T_0 = (Pr_c^2)/(FK)$$

Time lag T_0 = time taken for 63% of recovery i.e. time at which $Dh/Dh_0 = 0.37$

Determination of F (Shape Factor)

Equation			***Application***	
$F = 2PL_i/\ln(L_i/r_{wf})$			Where $L_i/r_{wf} > 8$	
where:				
Pi	P =	3.14	*F* =	4.926
Intake Length (m)	L_i =	3		
Effective Radius (m)	r_{wf} =	0.0655		

Permeability K (m/s) Equation (where T_0 can be determined from the graph)

$$K = r_c^2 \ln(L_i/r_{wf})/2L_iT_0$$

where:			
	r_c =	0.025	Casing inner radius (m)
	L_i =	3	Intake length (m)
	r_{wf} =	0.0655	Effective radius (m)
	T_0 =	3.4	Time lag (sec)
	***K* =**	***1.2E-04***	**Permeability (m/sec)**
	***K* =**	***10.12***	**Permeability (m/day)**

Permeability K (m/s) Equation (where T_0 cannot be determined from the graph)

$$K = [Pr_c^2/F(t_2-t_1)][\log_e H_1/H_2]$$

where:			
	P =	3.14	Pi
	r_c =		Casing inner radius (m)
	t_1 =		Time 1 after commencement of test (sec)
	t_2 =		Time 1 after commencement of test (sec)
	H_1 =		Head measured at Time 1 (m)
	H_2 =		Head measured at Time 2 (m)
	F =		Shape Factor
	***K* =**	**#DIV/0!**	**Permeability (m/sec)**
	***K* =**	**#DIV/0!**	**Permeability (m/day)**

APPENDIX C

GROUNDWATER AND GROUND GAS MONITORING DATA

BH116

Date	Time	Water Level (mbtoc)
26/04/2012	12:46	2.58
11/05/2012	13:22	2.61
15/05/2012	12:30	2.80
21/05/2012	12:43	2.82
28/05/2012	13:03	2.92
06/06/2012	15:51	2.51
11/06/2012	between 14:09 & 14:18	2.80
11/06/2012	14:29	2.81
19/06/2012	11:51	2.84

BH117

Date	Time	Water Level (mbtoc)	
26/04/2012	14:31	2.54	
11/05/2012	14:33	2.49	
15/05/2012	13:41	2.89	
21/05/2012	13:30	2.70	
28/05/2012	11:04	2.70	
28/05/2012	13:12	2.54	
05/06/2012	18:26	2.43	
06/06/2012	10:24	1.80	reading seems incorrect, not consistent with other readings or logger data
11/06/2012	14:00	2.39	

BH117R

Date	Time	Water Level (mbtoc)	
15/06/2012	18:22	2.78	
19/06/2012	14:47	3.89	
19/06/2012	15:08	3.70	took out in situ logger and changed setting by 2m approx
20/06/2012	16:18	3.35	
26/06/2012	08:46	3.03	
26/06/2012	18:06	4.33	
05/07/2012	15:33	4.33	

BH118

Date	Time	Water Level (mbtoc)
26/04/2012	12:08	2.85
11/05/2012	12:20	2.73
15/05/2012	09:00	4.04
17/05/2012	09:35	3.00
21/05/2012	09:35	3.00
28/05/2012	09:22	2.96
06/06/2012	12:32	3.51
11/06/2012	11:43	2.29
25/06/2012	08:21	2.97
25/06/2012	17:20	4.04

BH119

Date	Time	Water Level (mbtoc)
22/05/2012	16:05	3.62
28/05/2012	12:51	3.12
06/06/2012	15:23	3.31
11/06/2012	14:25	3.14
19/06/2012	12:25	3.47

BH120

Date	Time	Water Level (mbtoc)
26/04/2012	12:51	3.35
04/05/2012	16:46	3.60
11/05/2012	16:55	3.32
15/05/2012	12:35	3.74
17/05/2012	16:28	3.77
21/05/2012	10:38	3.56
28/05/2012	12:58	3.68
06/06/2012	15:41	3.16
11/06/2012	14:07	3.51
20/06/2012	13:44	3.54

BH122

Date	Time	Water Level (mbtoc)
26/04/2012	14:10	3.04
04/05/2012	17:23	1.82
11/05/2012	12:58	2.36
11/05/2012	14:27	2.64
15/05/2012	13:34	2.12
17/05/2012	14:43	2.01
21/05/2012	13:26	3.65
28/05/2012	13:18	2.01
06/06/2012	16:38	2.82
08/06/2012	14:12	3.33
11/06/2012	11:47	1.59
15/06/2012	13:32	2.03
20/06/2012	14:51	3.41

BH125

Date	Time	Water Level (mbtoc)	
26/04/2012	12:37	3.04	
04/05/2012	18:07	3.24	
15/05/2012	11:47	3.46	
17/05/2012	16:17	3.56	
21/05/2012	13:15	3.35	
28/05/2012	10:56	3.46	
05/06/2012	13:40	3.14	
05/06/2012	14:30	3.23	WL after purging and sampling i.e. probably not static level
06/06/2012	10:48	2.77	

BH125R

Date	Time	Water Level (mbtoc)
15/06/2012	18:59	4.02
19/06/2012	10:54	4.29
19/06/2012	11:03	4.31
19/06/2012	15:32	3.93
02/07/2012	09:51	4.19
05/07/2012	16:46	3.86

BH126

Date	Time	Water Level (mbtoc)
11/05/2012	13:59	0.86
11/05/2012	17:02	1.01
15/05/2012	09:32	1.30
17/05/2012	15:01	1.34
21/05/2012	10:16	0.94
28/05/2012	10:38	1.19
06/06/2012	13:18	0.70
11/06/2012	13:35	0.95
20/06/2012	14:17	1.12
05/07/2012	17:11	0.99

BH127

Date	Time	Water Level (mbtoc)	
26/04/2012	12:19	3.12	
01/05/2012	14:15	9.28	
11/05/2012	14:15	3.65	
15/05/2012	09:20	4.24	
17/05/2012	14:55	3.73	
21/05/2012	09:55	3.42	
28/05/2012	09:37	3.68	
06/06/2012	12:46	3.65	
11/06/2012	11:58	3.07	
19/06/2012	13:14	4.21	After purging
19/06/2012	17:11	3.65	

BH128

Date	Time	Water Level (mbtoc)	
11/05/2012	13:32	4.53	
11/05/2012	16:22	5.34	
15/05/2012	11:33	3.38	difficulty in getting consistent water reading
21/05/2012	13:04	5.08	
28/05/2012	10:52	3.85	
01/06/2012	10:00	5.12	
06/06/2012	13:42	4.86	
11/06/2012	13:45	4.07	
15/06/2012	18:54	4.24	
18/06/2012	11:43	5.06	
18/06/2012	11:50	5.09	
18/06/2012	14:20	5.05	
25/06/2012	11:10	3.63	
25/06/2012	16:29	5.10	
05/07/2012	16:42	4.83	

BH130

Date	Time	Water Level (mbtoc)
26/04/2012	13:40	4.10
11/05/2012	13:45	4.06
15/05/2012	09:25	4.58
21/05/2012	10:02	4.03
28/05/2012	09:41	4.31
06/06/2012	13:02	4.08
11/06/2012	13:29	3.81
15/06/2012	18:45	3.84
19/06/2012	16:32	4.41
19/06/2012	16:47	4.37
20/06/2012	15:42	4.52
25/06/2012	10:18	3.83
25/06/2012	15:58	4.40
25/06/2012	16:21	4.43
05/07/2012	16:31	4.38

BH301

Date	Time	Water Level (mbtoc)	
22/05/2012	16:26	3.09	
06/06/2012	15:34	2.75	
08/06/2012	13:11	2.51	
11/06/2012	14:09	2.80	
14/06/2012	09:03	3.10	
14/06/2012	09:31	3.09	
14/06/2012	09:34	3.14	existing logger moved slightly, - adjust logger
14/06/2012	11:07	3.90	
15/06/2012	09:13	2.85	
15/06/2012	15:20	2.82	
15/06/2012	15:29	2.80	
18/06/2012	13:36	3.140	
02/07/2012	10:55	1.950	
02/07/2012	16:22	2.970	

BH302

Date	Time	Water Level (mbtoc)
08/06/2012	12:47	3.37
08/06/2012	12:59	3.34
11/06/2012	14:44	3.67
14/06/2012	10:43	4.04
14/06/2012	15:53	3.80
18/06/2012	13:32	4.3
02/07/2012	10:11	3.49
04/07/2012	10:33	3.42
05/07/2012	10:55	3.33

BH303

Date	Time	Water Level (mbtoc)
17/05/2012	16:40	3.17
21/05/2012	12:31	5.56
28/05/2012	12:48	2.98
06/06/2012	15:17	2.70
08/06/2012	12:43	2.48
11/06/2012	14:23	2.82
15/06/2012	08:25	2.77
27/06/2012	11:26	4.77
28/06/2012	09:40	4.78
05/07/2012	10:53	2.45

BH304

Date	Time	Water Level (mbtoc)
11/06/2012	14:05	3.54
15/06/2012	19:29	3.12
19/06/2012	10:04	3.35
19/06/2012	10:33	3.21
19/06/2012	15:26	3.44
26/06/2012	12:28	3.38
28/06/2012	09:24	5.06
28/06/2012	13:15	9.44

BH305

Date	Time	Water Level (mbtoc)
06/06/2012	15:56	2.93
08/06/2012	13:34	2.81
11/06/2012	13:55	3.22
15/06/2012	11:46	3.12
15/06/2012	11:56	2.91
18/06/2012	09:13	3.00
18/06/2012	09:21	3.06
18/06/2012	10:06	3.06
18/06/2012	11:15	3.03
21/06/2012	10:40	2.99
21/06/2012	15:59	3.00
25/06/2012	11:50	3.08
25/06/2012	18:06	3.08
25/06/2012	18:06	3.08
25/06/2012	18:39	3.08
05/07/2012	17:02	2.70

BH306B

Date	Time	Water Level (mbtoc)
04/05/2012	17:53	0.57
15/05/2012	12:14	1.35??
21/05/2012	12:55	1.06
28/05/2012	12:41	0.72
06/06/2012	15:10	0.78
08/06/2012	12:36	0.49
11/06/2012	14:18	0.75
15/06/2012	16:26	0.56
02/07/2012	17:17	0.56

logger twine may have changed position

BH306C

Date	Time	Water Level (mbtoc)
08/06/2012	16:06	2.92
11/06/2012	14:19	1.32
19/06/2012	08:51	1.62
25/06/2012	12:50	1.41
03/07/2012	14:16	2.04
03/07/2012	16:40	0.65

BH306D

Date	Time	Water Level (mbtoc)
15/06/2012	19:13	1.04
18/06/2012	15:02	1.37
18/06/2012	15:26	1.31
03/07/2012	14:18	1.10
04/07/2012	09:04	0.39
04/07/2012	12:13	0.89
05/07/2012	11:00	1.89
05/07/2012	17:47	0.88
05/07/2012	18:37	1.98

BH307

Date	Time	Water Level (mbtoc)	
01/06/2012	16:39	3.16	
06/06/2012	13:35	3.40	
08/06/2012	12:26	3.15	
11/06/2012	13:43	3.20	
15/06/2012	09:43	3.59	
15/06/2012	10:15	3.63	
15/06/2012	10:24	3.64	
15/06/2012	10:44	3.64	
15/06/2012	15:56	3.11	
27/06/2012	13:22	4.88	Very difficult to get dipper reading, not sure if correct
27/06/2012	17:08	5.37	Very difficult to get dipper reading, not sure if correct
05/07/2012	16:37	3.64	

BH308

Date	Time	Water Level (mbtoc)
06/06/2012	16:00	3.22
08/06/2012	14:05	3.00
11/06/2012	13:58	3.14
18/06/2012	10:38	3.17
18/06/2012	10:54	3.23
19/06/2012	08:38	2.89
26/06/2012	09:41	3.03
26/06/2012	16:37	4.13
26/06/2012	17:58	4.25
05/07/2012	17:14	3.44

BH309

Date	Time	Water Level (mbtoc)
15/06/2012	19:35	2.22
18/06/2012	16:13	2.53
20/06/2012	15:50	2.49
26/06/2012	11:03	2.53
26/06/2012	15:32	2.47
26/06/2012	16:23	2.48
05/07/2012	16:55	1.85

BH310A

Date	Time	Water Level (mbtoc)	
04/05/2012	18:00	4.13	reading appears inconsistent with logger data
11/05/2012	17:12	4.49	
15/05/2012	09:37	4.73	
17/05/2012	16:11	4.62	
28/05/2012	10:43	4.57	
06/06/2012	13:23	4.14	
08/06/2012	12:04	4.85	
08/06/2012	12:17	3.96	
11/06/2012	13:40	4.59	
11/06/2012	13:42	4.20	
15/06/2012	16:16	4.16	
02/07/2012	09:46	4.21	
02/07/2012	15:06	4.62	

BH310B

Date	Time	Water Level (mbtoc)
21/05/2012	-	5.15
08/06/2012	12:04	4.85
11/06/2012	13:40	4.59
14/06/2012	15:25	4.21
14/06/2012	16:18	4.29
14/06/2012	16:21	3.25
14/06/2012	16:22	3.29
03/07/2012	12:07	6.17
03/07/2012	16:30	4.4

BH310C

Date	Time	Water Level (mbtoc)
08/06/2012	12:15	5.27
08/06/2012	15:36	6.60
11/06/2012	13:36	4.79
18/06/2012	13:07	6.23
18/06/2012	14:50	5.57
18/06/2012	15:56	5.01
03/07/2012	08:38	4.91
04/07/2012	09:44	5.11

BH311

Date	Time	Water Level (mbtoc)
06/06/2012	16:05	4.14
08/06/2012	11:42	2.68
08/06/2012	11:44	2.71
11/06/2012	11:38	2.61
18/06/2012	12:53	4.11
26/06/2012	13:17	2.85
26/06/2012	15:29	3.55
27/06/2012	16:22	5.19
05/07/2012	15:29	4.19

BH312A

Date	Time	Water Level (mbtoc)
04/05/2012	18:14	2.68
15/05/2012	13:24	3.15
17/05/2012	14:27	3.12
21/05/2012	13:22	2.92
28/05/2012	13:25	2.65
06/06/2012	16:33	2.79
08/06/2012	14:19	2.46
11/06/2012	11:46	2.74
04/07/2012	09:28	2.42
04/07/2012	10:12	2.44

BH312B

Date	Time	Water Level (mbtoc)
11/05/2012	16:15	3.28
15/05/2012	12:29	2.96
17/05/2012	14:37	3.91
21/05/2012	13:19	3.19
06/06/2012	16:24	3.01
08/06/2012	14:23	2.98
11/06/2012	11:50	2.27
15/06/2012	14:34	2.25
15/06/2012	14:58	2.15
15/06/2012	15:06	2.14
28/06/2012	13:43	3.82

BH312C

Date	Time	Water Level (mbtoc)
08/06/2012	14:25	4.38
08/06/2012	15:12	4.65
11/06/2012	11:49	2.59
19/06/2012	16:03	3.44
19/06/2012	16:07	3.44
04/07/2012	15:37	3.8
05/07/2012	11:40	3.86

BH313

Date	Time	Water Level (mbtoc)
17/05/2012	16:23	2.35
17/05/2012	17:06	2.34
30/05/2012	13:18	2.20
30/05/2012	13:30	2.17
06/06/2012	16:17	3.18
08/06/2012	15:21	3.44
11/06/2012	11:55	2.01
15/06/2012	12:13	2.74
15/06/2012	12:48	2.57
18/06/2012	09:53	3.02
18/06/2012	10:03	3.06
18/06/2012	10:18	3.14
18/06/2012	16:33	2.22
19/06/2012	08:42	2.35
03/07/2012	13:04	3.72
03/07/2012	18:56	1.43
05/07/2012	16:19	3.18

BH314

Date	Time	Water Level (mbtoc)
04/05/2012	18:18	3.020
11/05/2012	14:11	3.990
15/05/2012	09:10	4.520
17/05/2012	14:47	3.750
21/05/2012	09:50	3.770
28/05/2012	09:34	3.720
30/05/2012	15:05	2.730
30/05/2012	15:12	2.770
06/06/2012	12:38	4.030
08/06/2012	11:52	3.470
11/06/2012	11:53	3.200
15/06/2012	08:15	3.925

BH315

Date	Time	Water Level (mbtoc)
28/05/2012	10:30	3.50
30/05/2012	14:38	3.36
30/05/2012	14:51	3.36
06/06/2012	12:54	3.24
08/06/2012	11:58	3.03
11/06/2012	12:00	3.32
25/06/2012	09:14	3.50
25/06/2012	15:16	3.56
05/07/2012	16:25	3.54

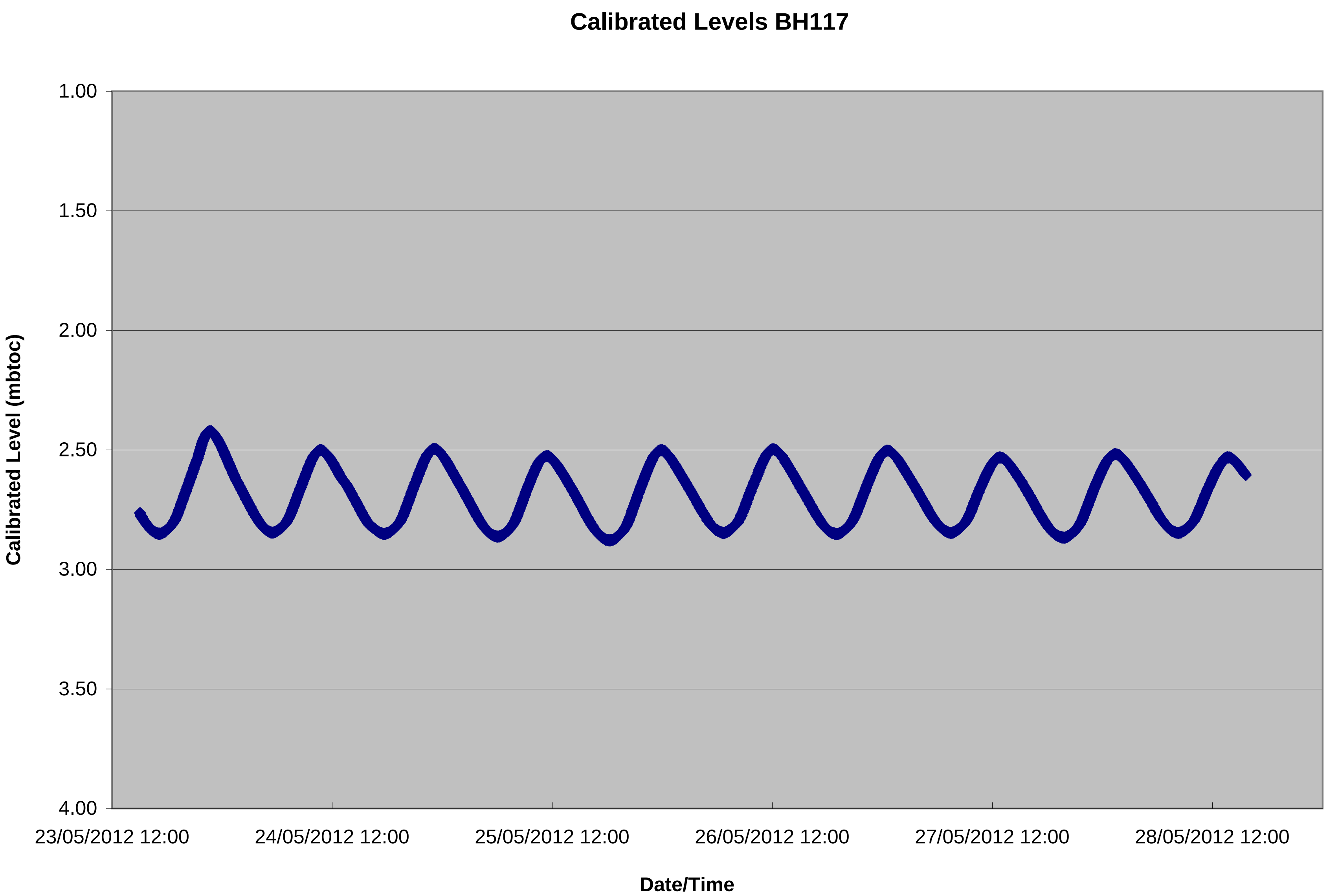
BH316

Date	Time	Water Level (mbtoc)
15/06/2012	19:06	0.80
03/07/2012	09:19	0.86
03/07/2012	17:55	0.91
05/07/2012	16:52	0.77

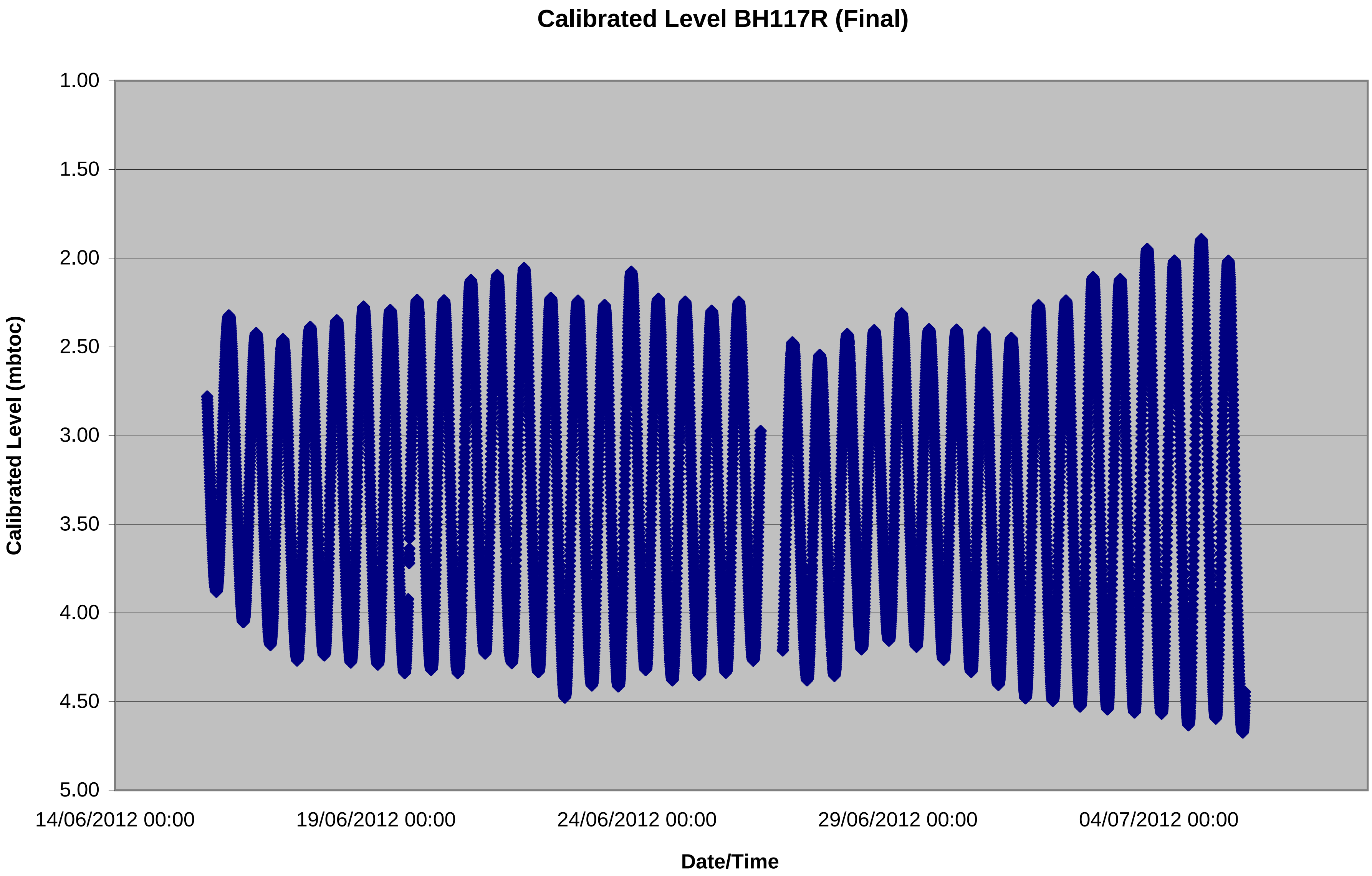
Date:	26/07/2012	
		Chart Level
High Tide	05:14	0.8
Low Tide	11:12	3.7
High Tide	17:41	0.8
Low Tide	23:44	3.6

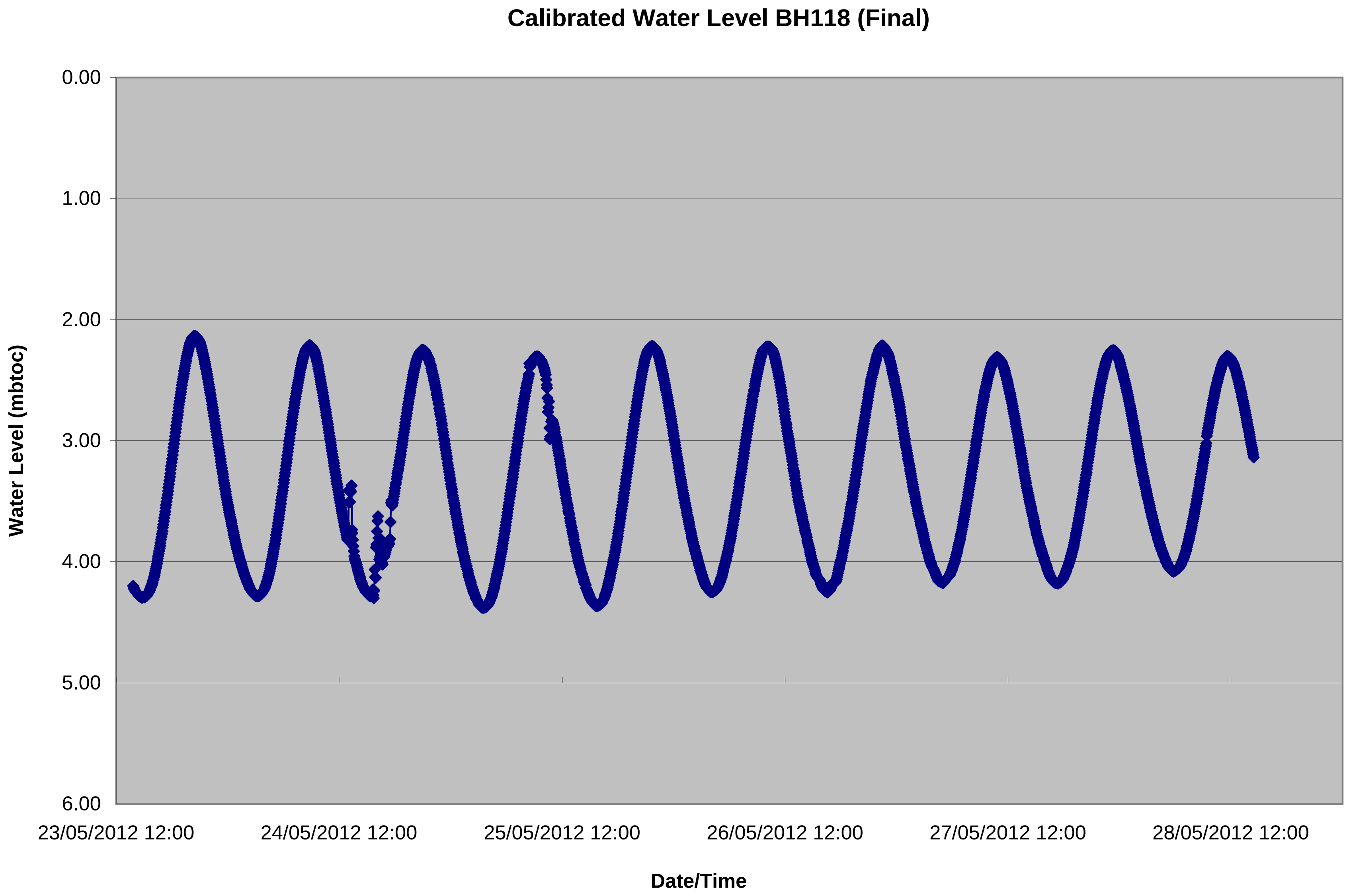
Borehole N	WL (m btoc)	Time
BH116	3.05	17:04
BH117R	4.26	17:40
BH118	3.26	14:35
BH119	3.75	16:40
BH120	3.65	16:54
BH122	--	14:40
BH125R	5.06	17:20
BH126	1.25	17:25
BH127	3.52	15:00
BH128	3.57	16:00
BH130	4.31	15:15
BH301	3.26	16:45
BH302	4.05	16:30
BH303	3.12	16:21
BH304	3.5	17:00
BH305	3.33	17:10
BH306b	1.31	16:15
BH306c	1.43	16:16
BH306d	1.15	16:17
BH307	3.88	15:50
BH308	3.99	17:35
BH309	2.64	17:28
BH310a	5.7	15:35
BH310b	4.74	15:40
BH310c	4.9	15:45
BH311	3.32	14:25
BH312a	2.93	14:42
BH312b	2.89	14:48
BH312c	3.77	14:46
BH313	--	14:51
BH314	4.12	14:55
BH315	3.57	15:05
BH316	1.17	17:15

Weather: Showers, Overcast, Temp 15deg

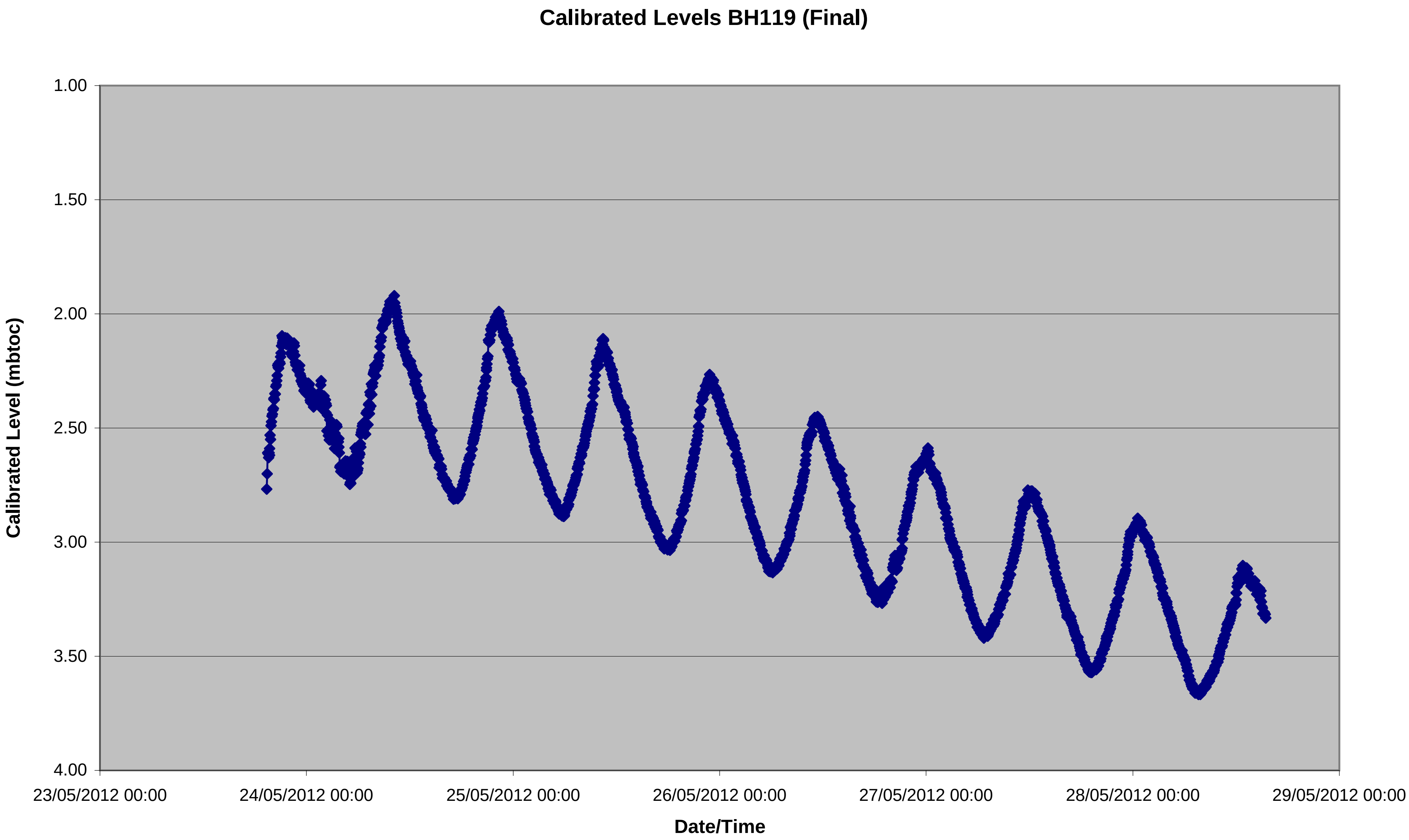


Calibrated Levels BH117
Calibrated Level (mbtoc)
1.00
1.50
2.00
2.50
3.00
3.50
4.00
23/05/2012 12:00
24/05/2012 12:00
25/05/2012 12:00
26/05/2012 12:00
27/05/2012 12:00
28/05/2012 12:00
Date/Time

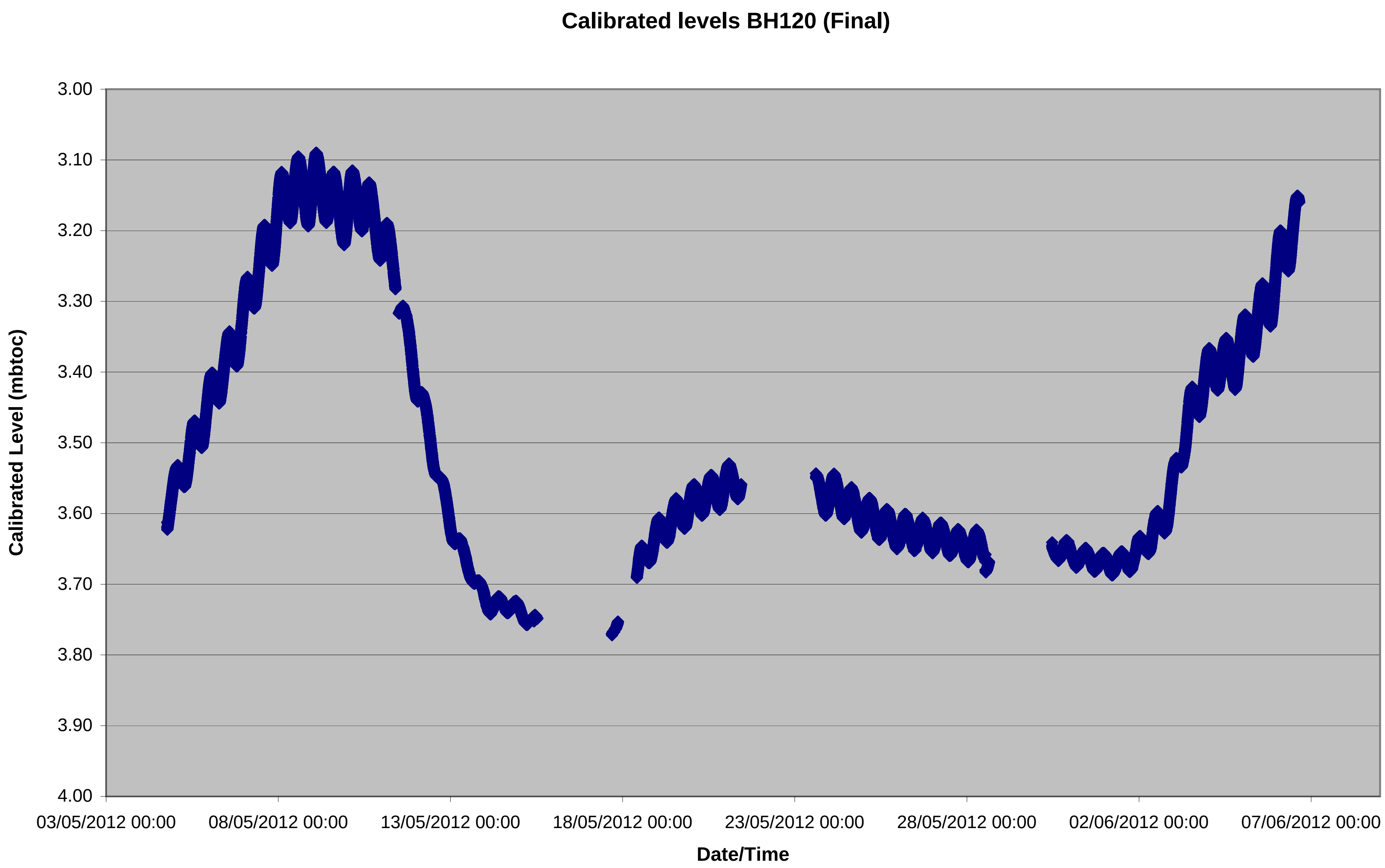

Calibrated Level BH117R (Final)
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
Calibrated Level (mbtoc)
14/06/2012 00:00
19/06/2012 00:00
24/06/2012 00:00
29/06/2012 00:00
04/07/2012 00:00
Date/Time



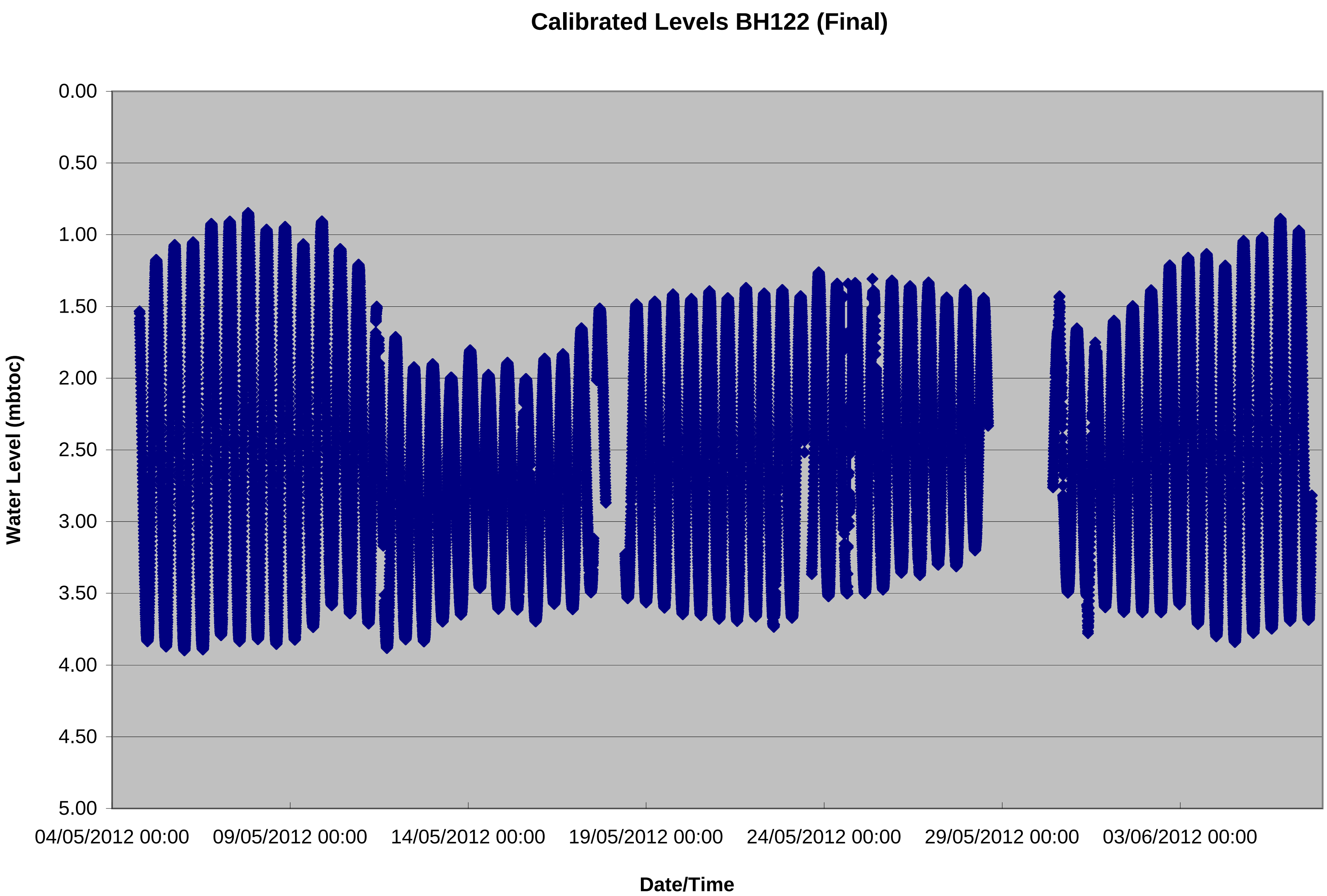
Calibrated Water Level BH118 (Final)
Water Level (mbtoc)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
23/05/2012 12:00
24/05/2012 12:00
25/05/2012 12:00
26/05/2012 12:00
27/05/2012 12:00
28/05/2012 12:00
Date/Time

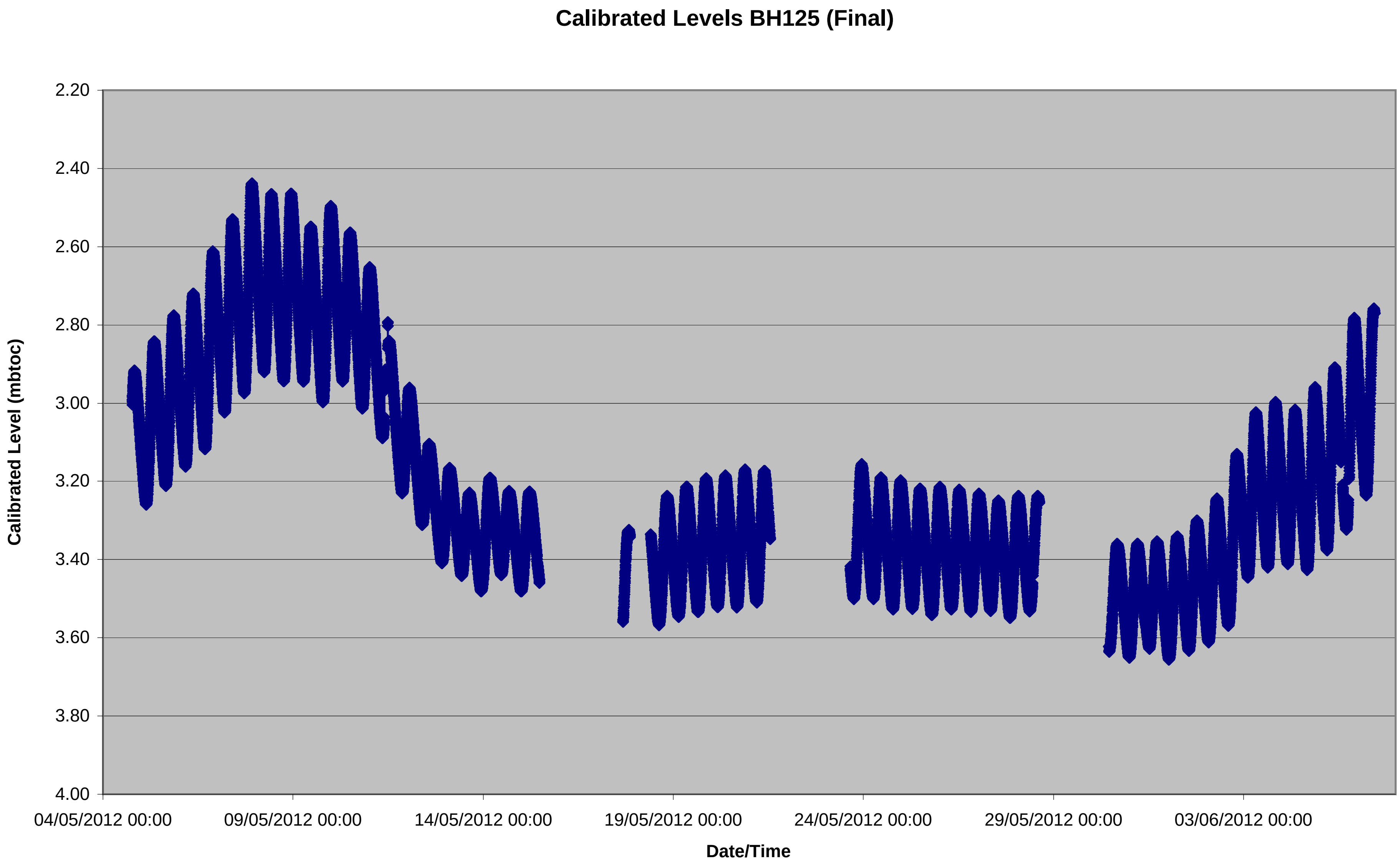


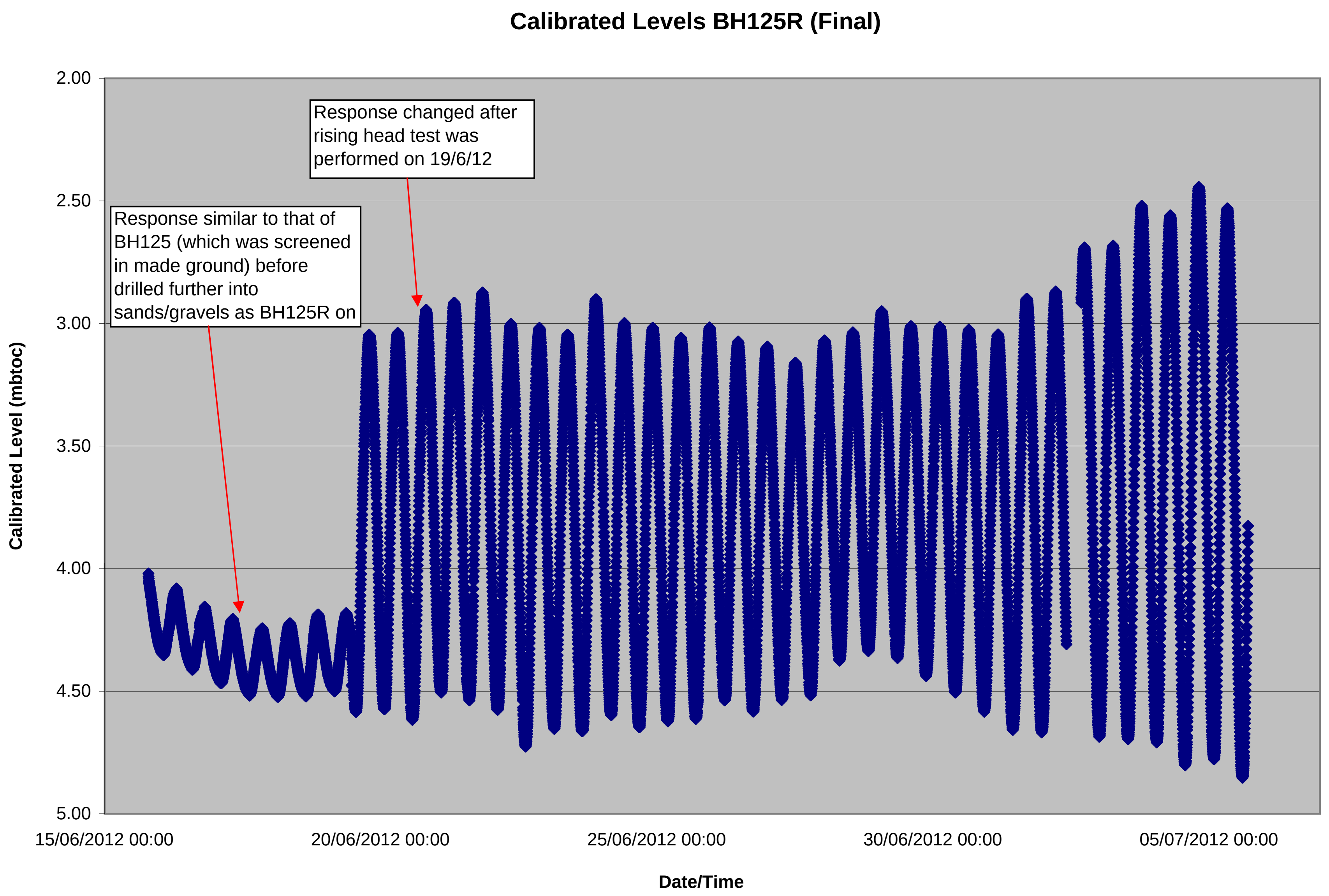
Calibrated Levels BH119 (Final)
1.00
1.50
2.00
2.50
3.00
3.50
4.00
Calibrated Level (mbtoc)
23/05/2012 00:00
24/05/2012 00:00
25/05/2012 00:00
26/05/2012 00:00
27/05/2012 00:00
28/05/2012 00:00
29/05/2012 00:00
Date/Time



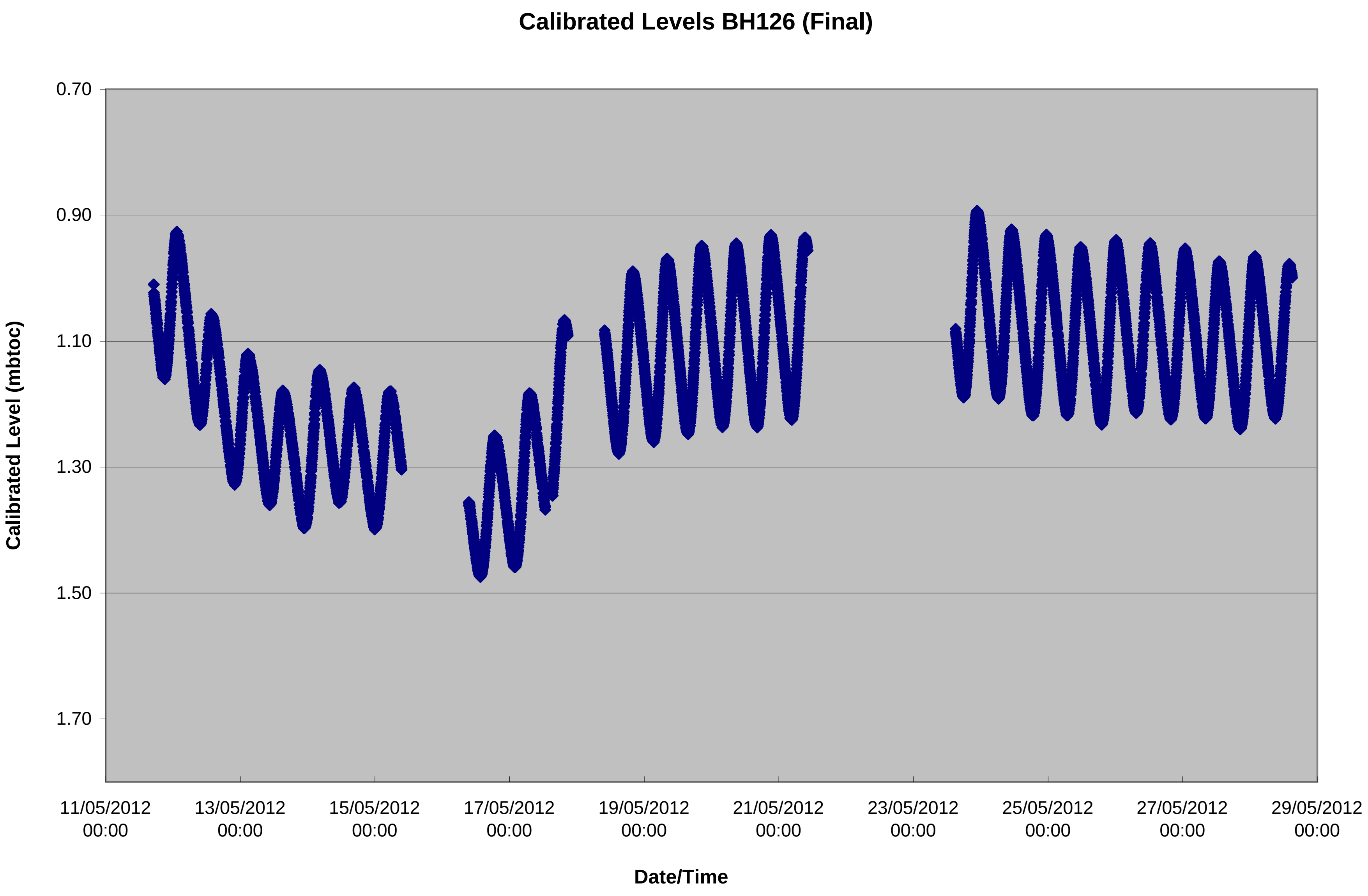
Calibrated levels BH120 (Final)
Calibrated Level (mbtoc)
3.00
3.10
3.20
3.30
3.40
3.50
3.60
3.70
3.80
3.90
4.00
03/05/2012 00:00
08/05/2012 00:00
13/05/2012 00:00
18/05/2012 00:00
23/05/2012 00:00
28/05/2012 00:00
02/06/2012 00:00
07/06/2012 00:00
Date/Time


Calibrated Levels BH122 (Final)
Water Level (mbtoc)
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
04/05/2012 00:00
09/05/2012 00:00
14/05/2012 00:00
19/05/2012 00:00
24/05/2012 00:00
29/05/2012 00:00
03/06/2012 00:00
Date/Time

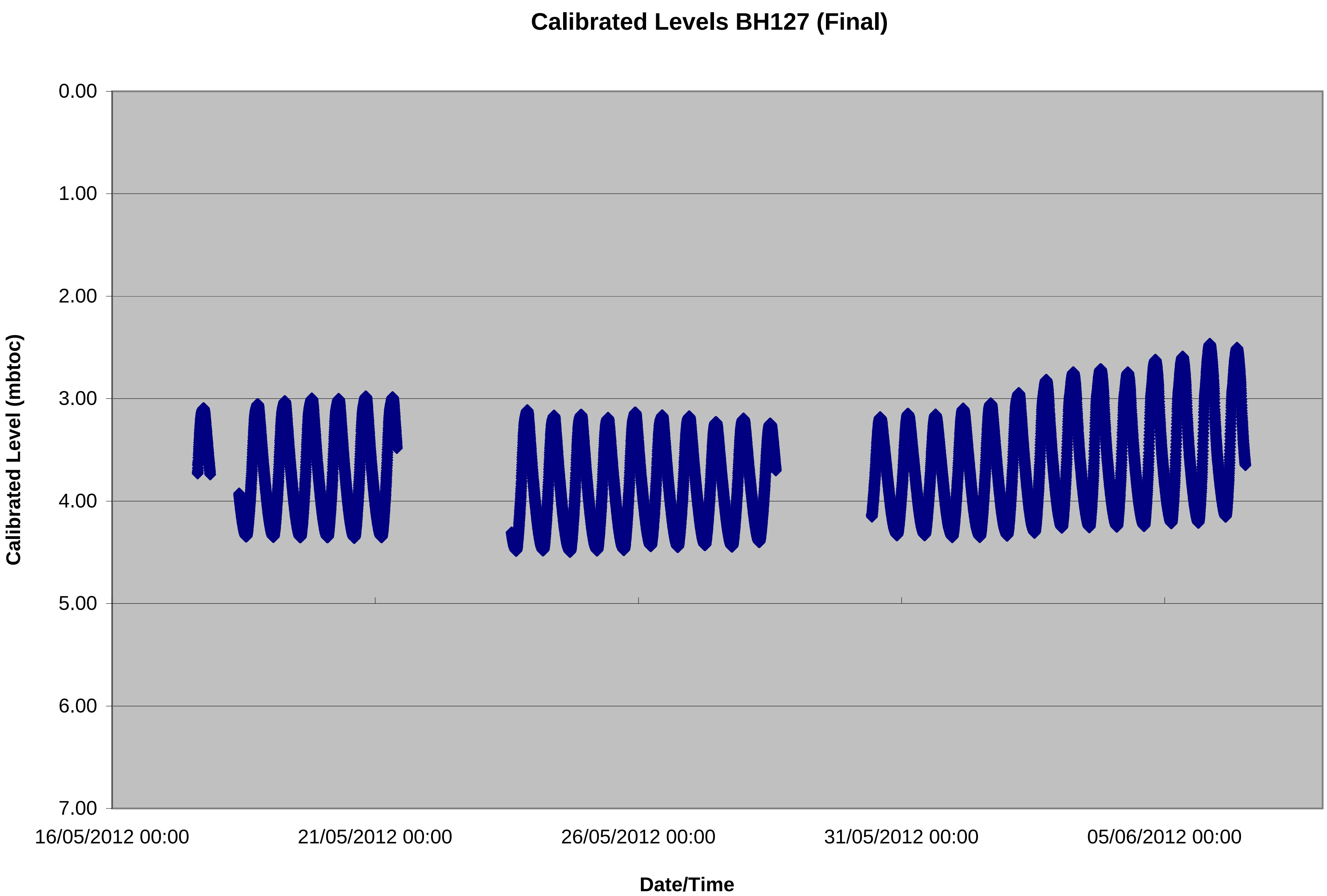

Calibrated Levels BH125 (Final)
Calibrated Level (mbtoc)
2.20
2.40
2.60
2.80
3.00
3.20
3.40
3.60
3.80
4.00
04/05/2012 00:00
09/05/2012 00:00
14/05/2012 00:00
19/05/2012 00:00
24/05/2012 00:00
29/05/2012 00:00
03/06/2012 00:00
Date/Time



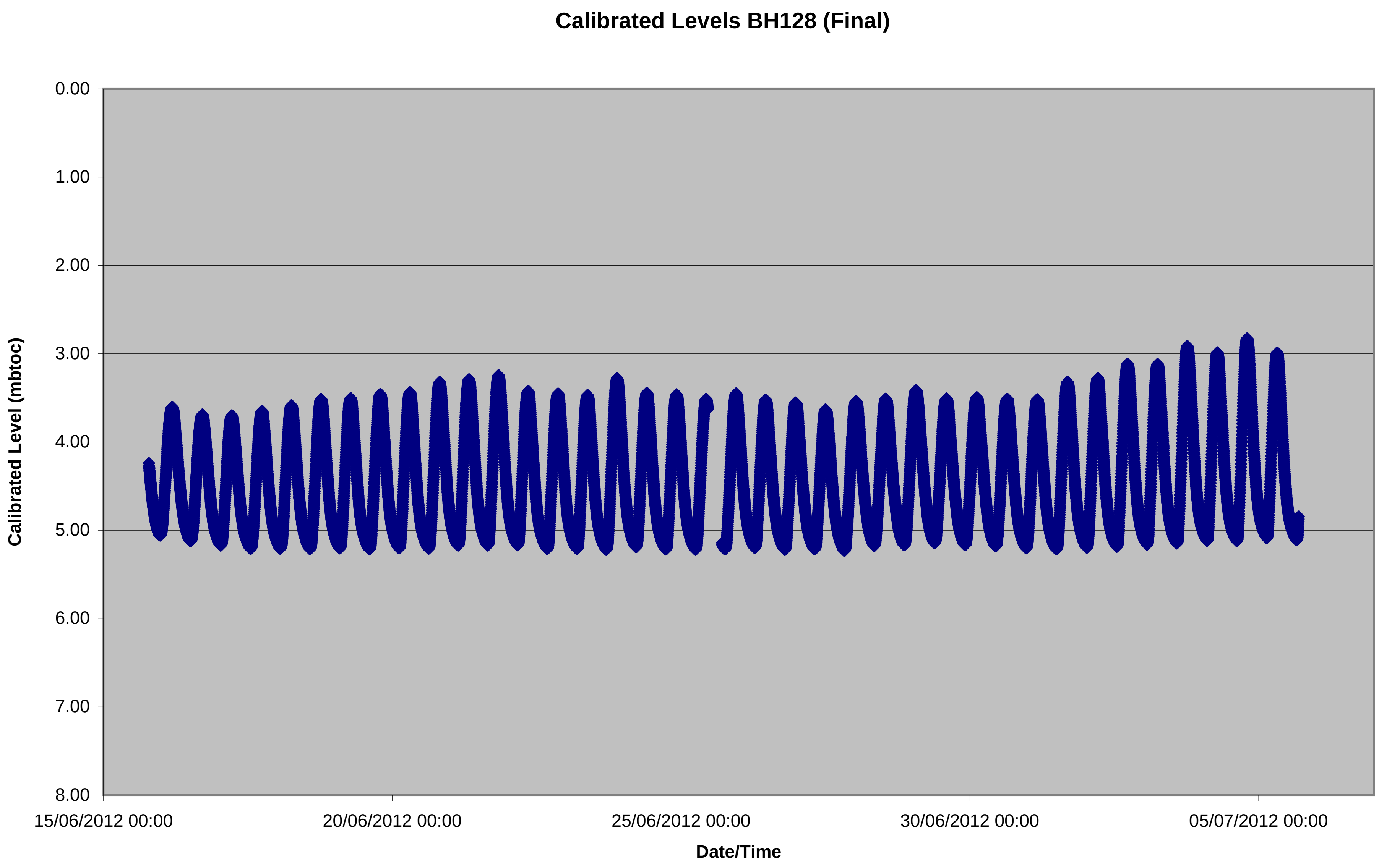
Calibrated Levels BH125R (Final)
Calibrated Level (mbtoc)
2.00
2.50
3.00
3.50
4.00
4.50
5.00
Response changed after rising head test was performed on 19/6/12
Response similar to that of BH125 (which was screened in made ground) before drilled further into sands/gravels as BH125R on
15/06/2012 00:00
20/06/2012 00:00
25/06/2012 00:00
30/06/2012 00:00
05/07/2012 00:00
Date/Time



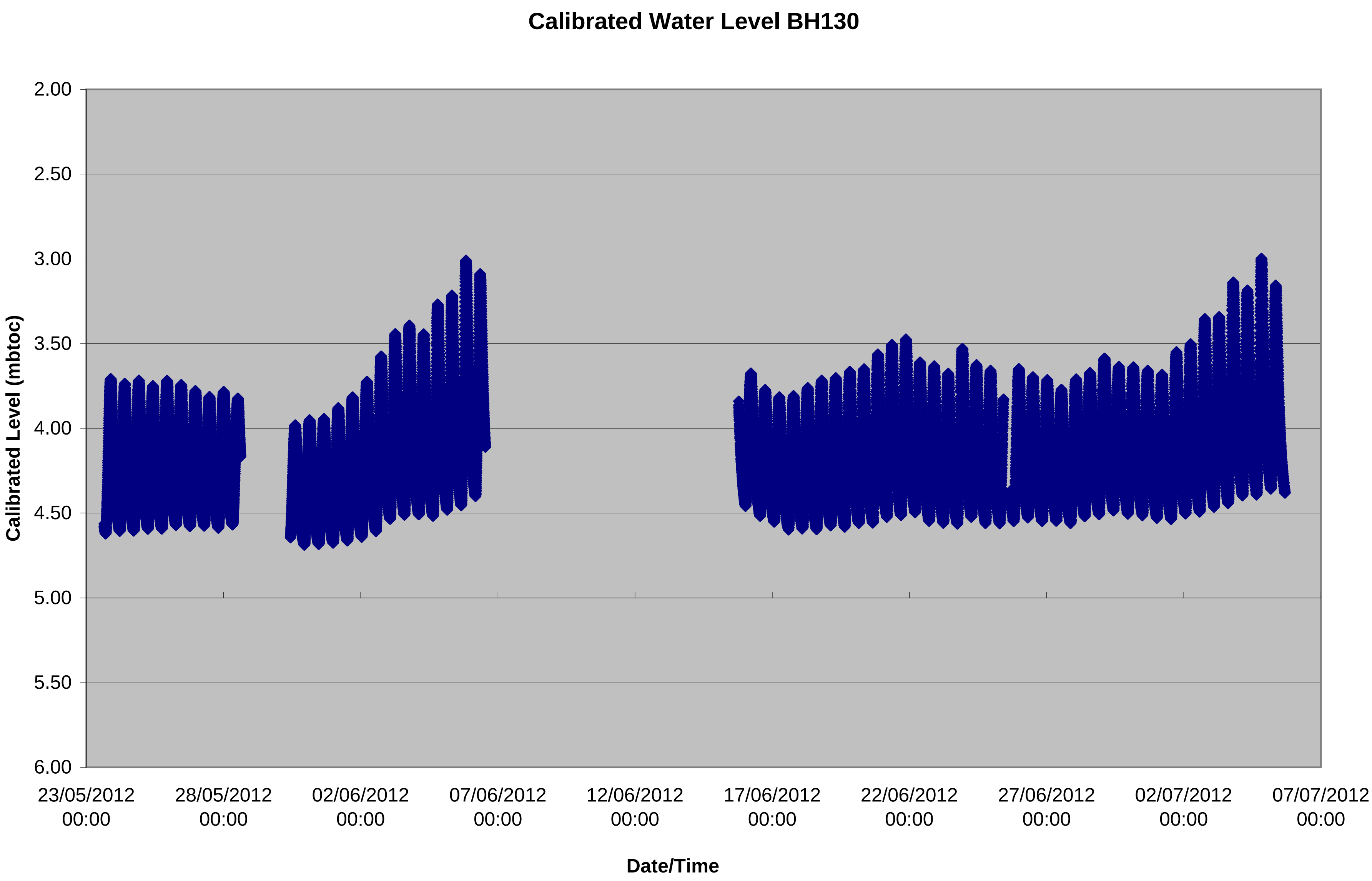
Calibrated Levels BH126 (Final)
Calibrated Level (mbtoc)
0.70
0.90
1.10
1.30
1.50
1.70
11/05/2012 00:00
13/05/2012 00:00
15/05/2012 00:00
17/05/2012 00:00
19/05/2012 00:00
21/05/2012 00:00
23/05/2012 00:00
25/05/2012 00:00
27/05/2012 00:00
29/05/2012 00:00
Date/Time

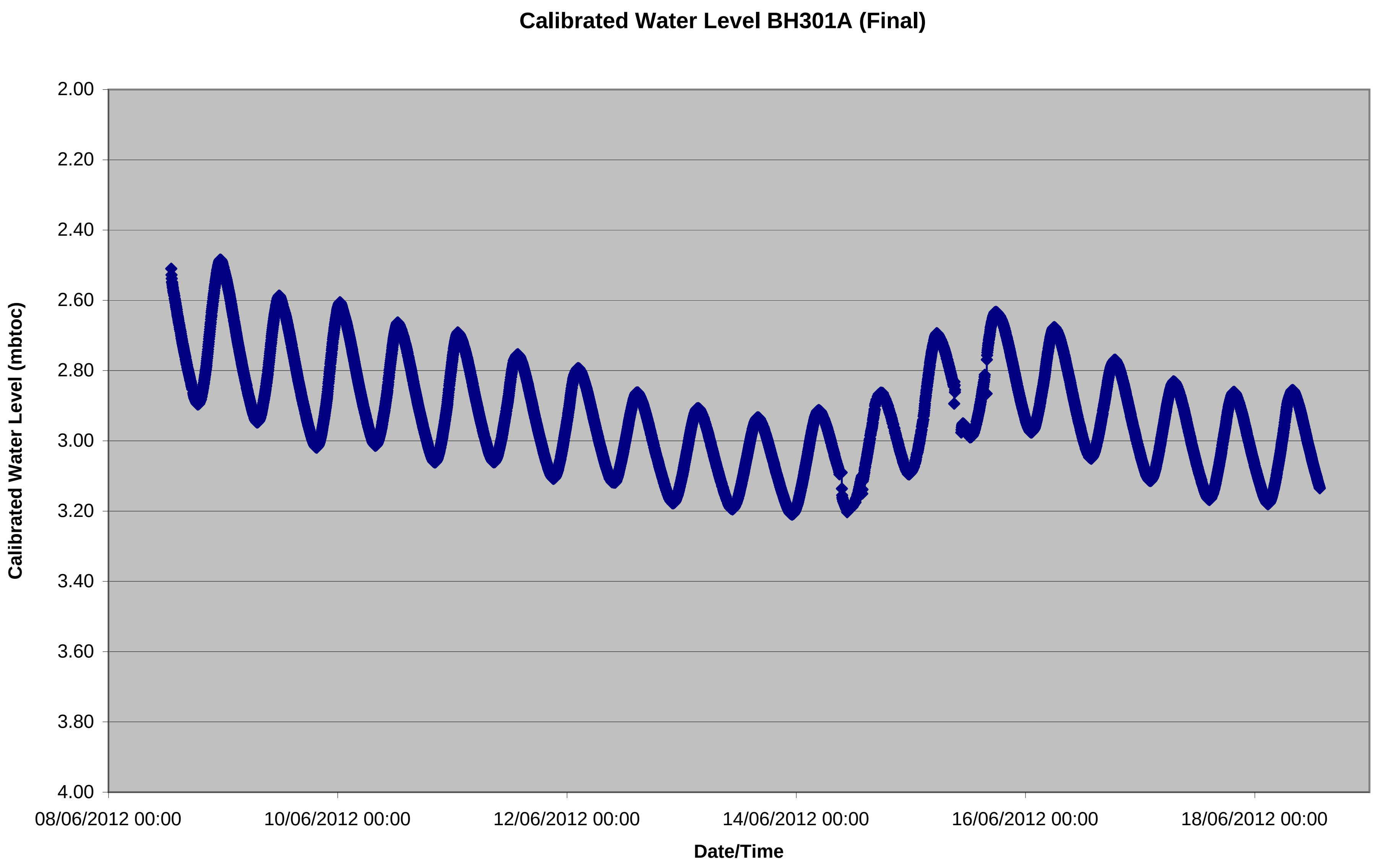


Calibrated Levels BH127 (Final)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
Calibrated Level (mbtoc)
16/05/2012 00:00
21/05/2012 00:00
26/05/2012 00:00
31/05/2012 00:00
05/06/2012 00:00
Date/Time

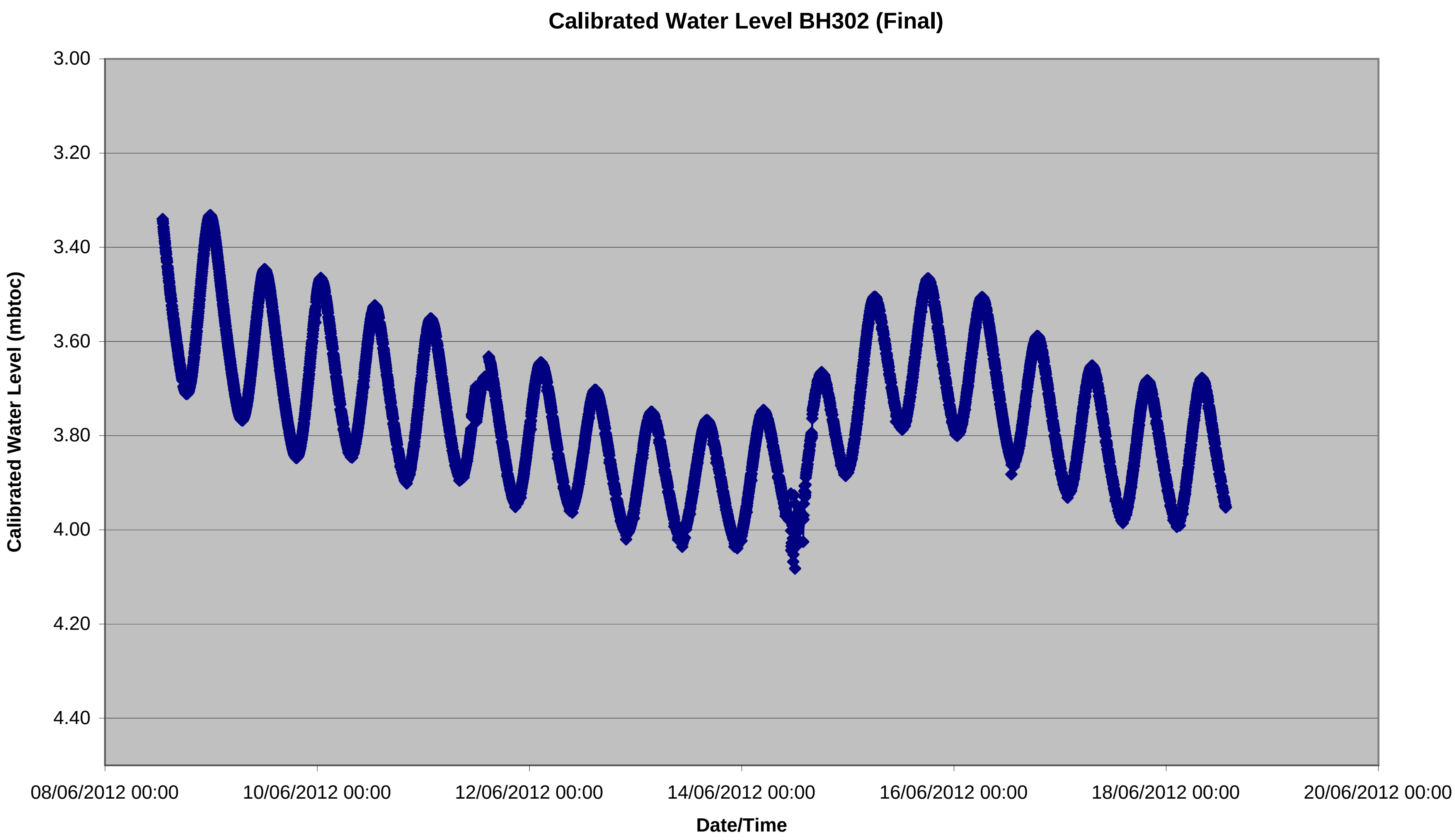


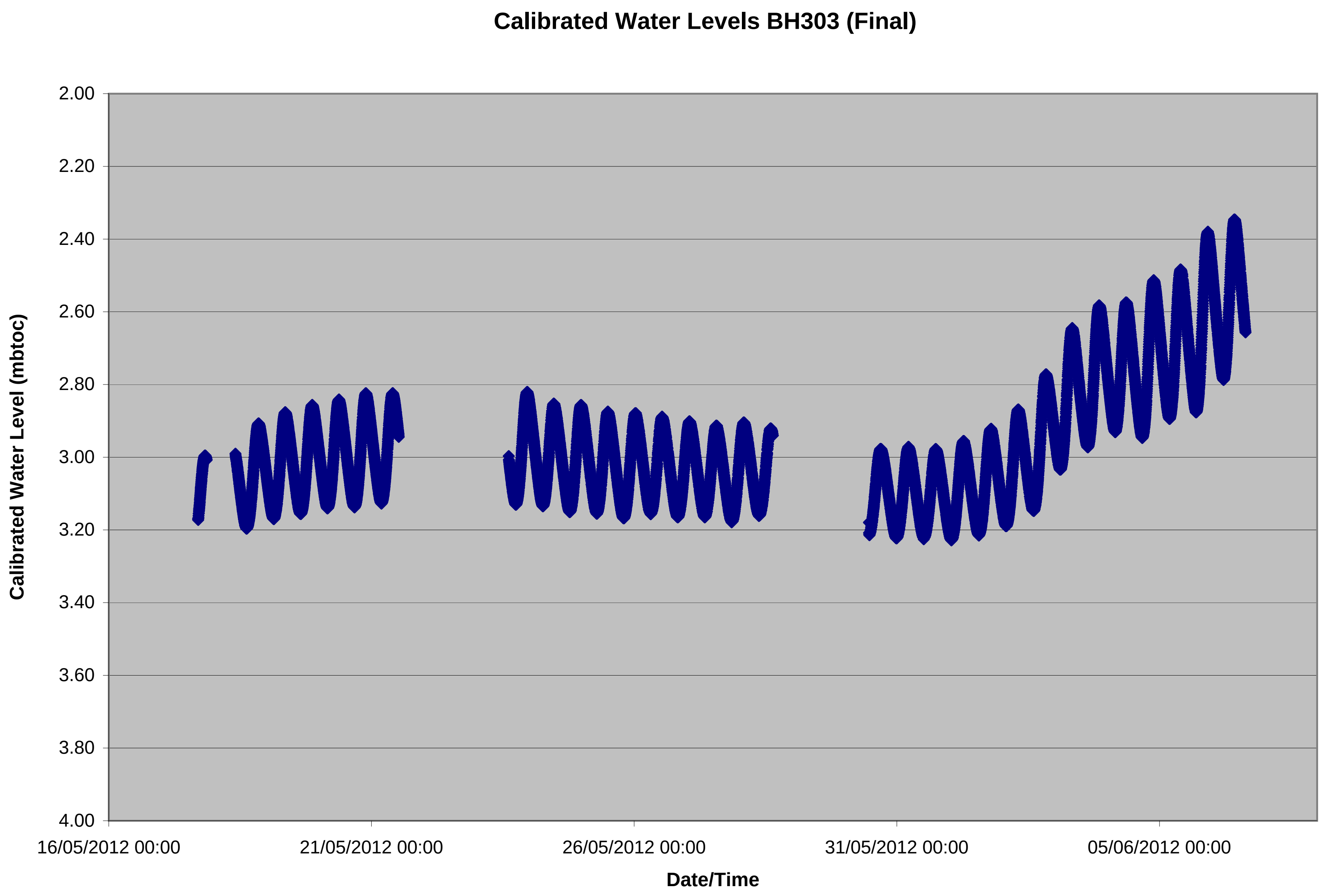
Calibrated Levels BH128 (Final)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
Calibrated Level (mbtoc)
15/06/2012 00:00
20/06/2012 00:00
25/06/2012 00:00
30/06/2012 00:00
05/07/2012 00:00
Date/Time


Calibrated Water Level BH130
Calibrated Level (mbtoc)
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00
23/05/2012 00:00
28/05/2012 00:00
02/06/2012 00:00
07/06/2012 00:00
12/06/2012 00:00
17/06/2012 00:00
22/06/2012 00:00
27/06/2012 00:00
02/07/2012 00:00
07/07/2012 00:00
Date/Time



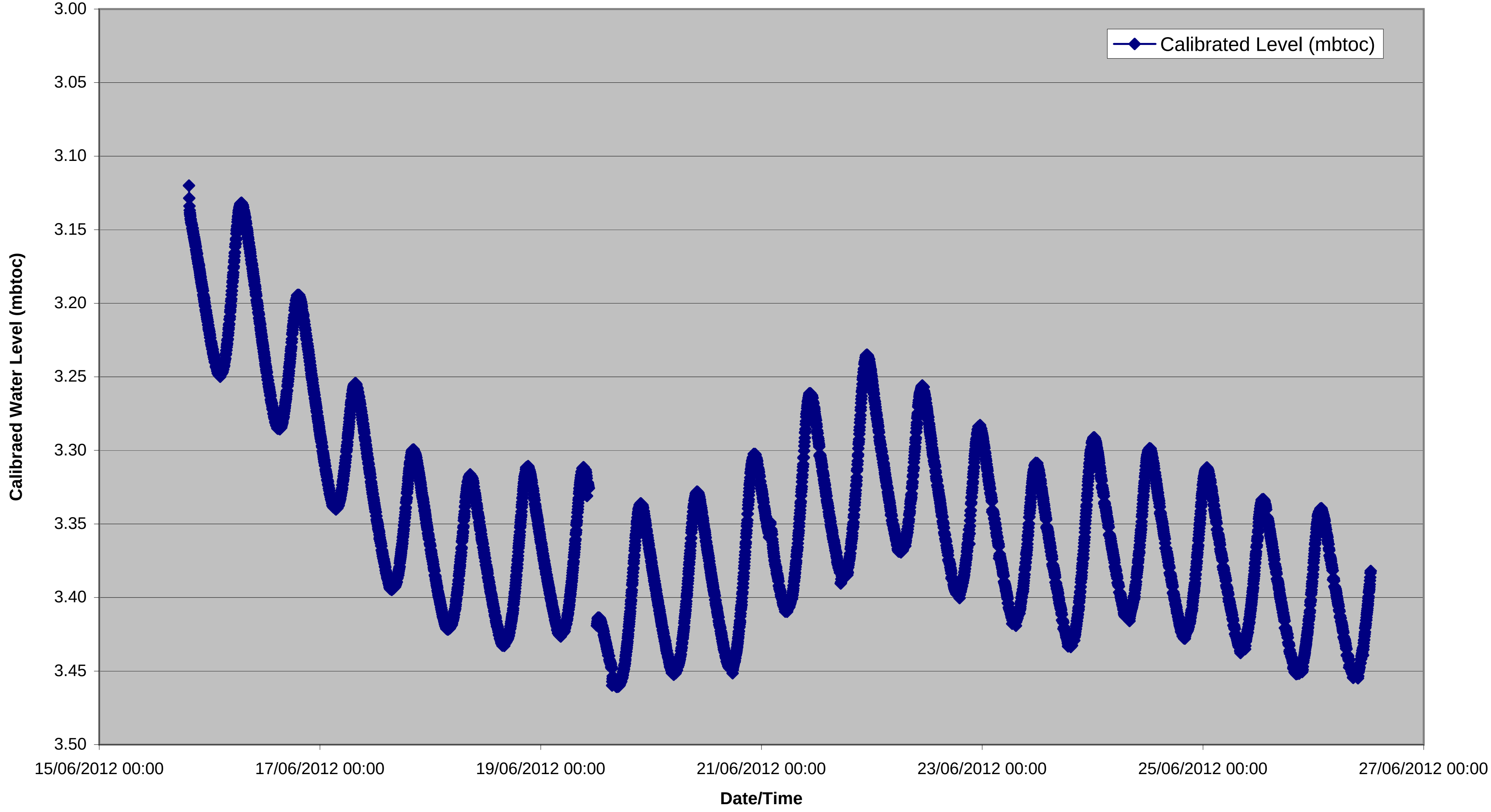
Calibrated Water Level BH301A (Final)
Calibrated Water Level (mbtoc)
2.00
2.20
2.40
2.60
2.80
3.00
3.20
3.40
3.60
3.80
4.00
08/06/2012 00:00
10/06/2012 00:00
12/06/2012 00:00
14/06/2012 00:00
16/06/2012 00:00
18/06/2012 00:00
Date/Time

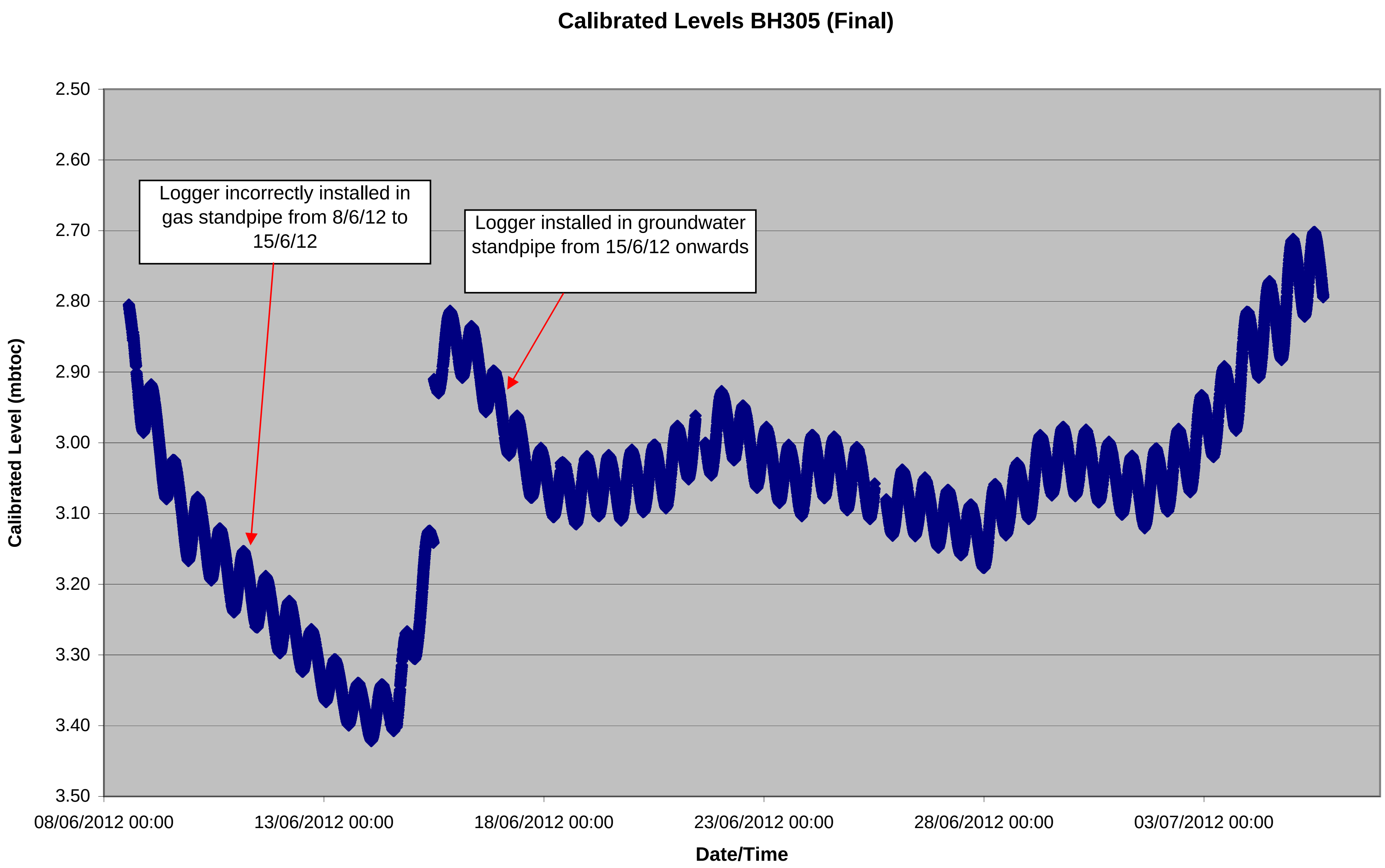

Calibrated Water Level BH302 (Final)
Calibrated Water Level (mbtoc)
3.00
3.20
3.40
3.60
3.80
4.00
4.20
4.40
08/06/2012 00:00
10/06/2012 00:00
12/06/2012 00:00
14/06/2012 00:00
16/06/2012 00:00
18/06/2012 00:00
20/06/2012 00:00
Date/Time

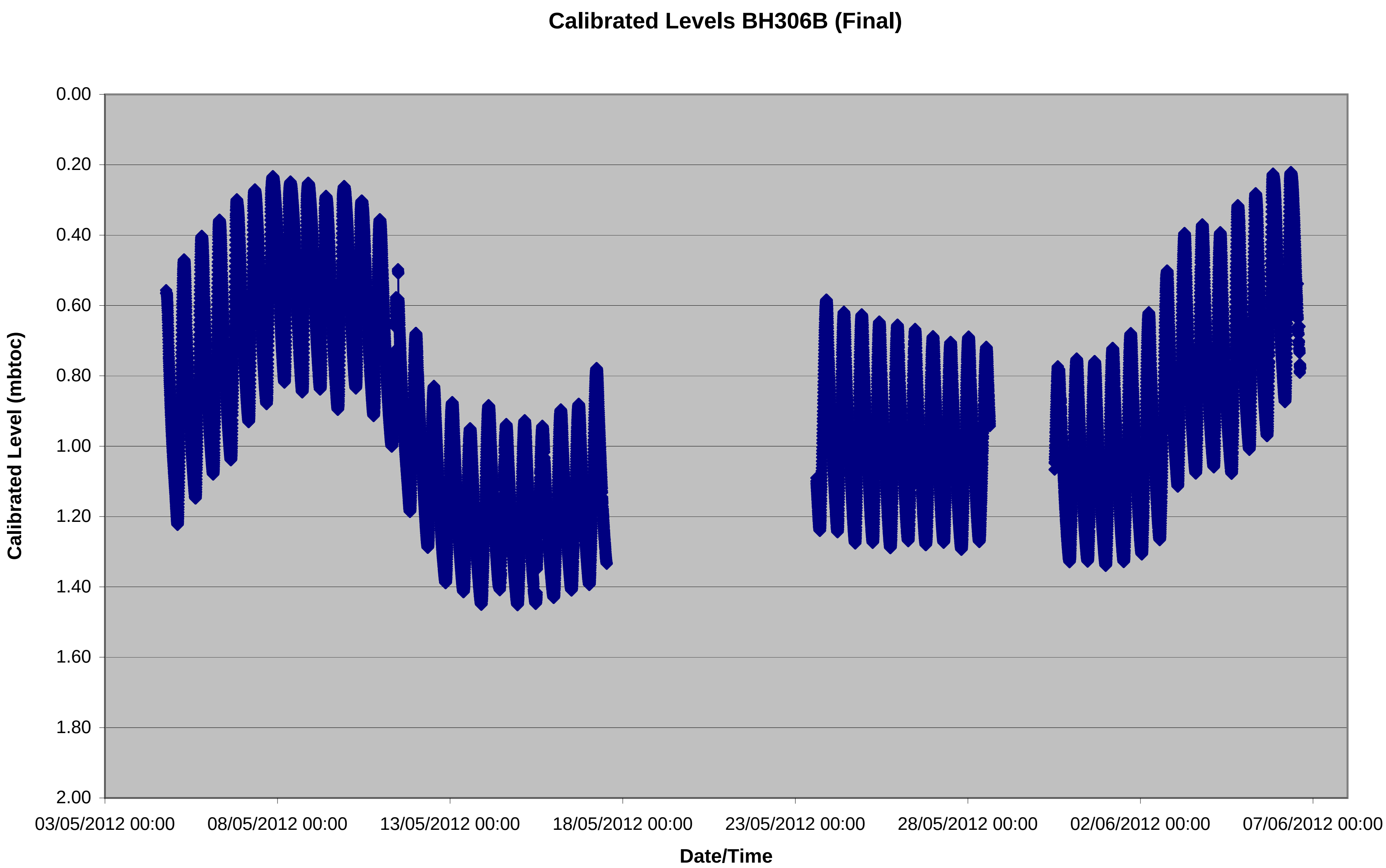


Calibrated Water Levels BH303 (Final)
Calibrated Water Level (mbtoc)
2.00
2.20
2.40
2.60
2.80
3.00
3.20
3.40
3.60
3.80
4.00
16/05/2012 00:00
21/05/2012 00:00
26/05/2012 00:00
31/05/2012 00:00
05/06/2012 00:00
Date/Time

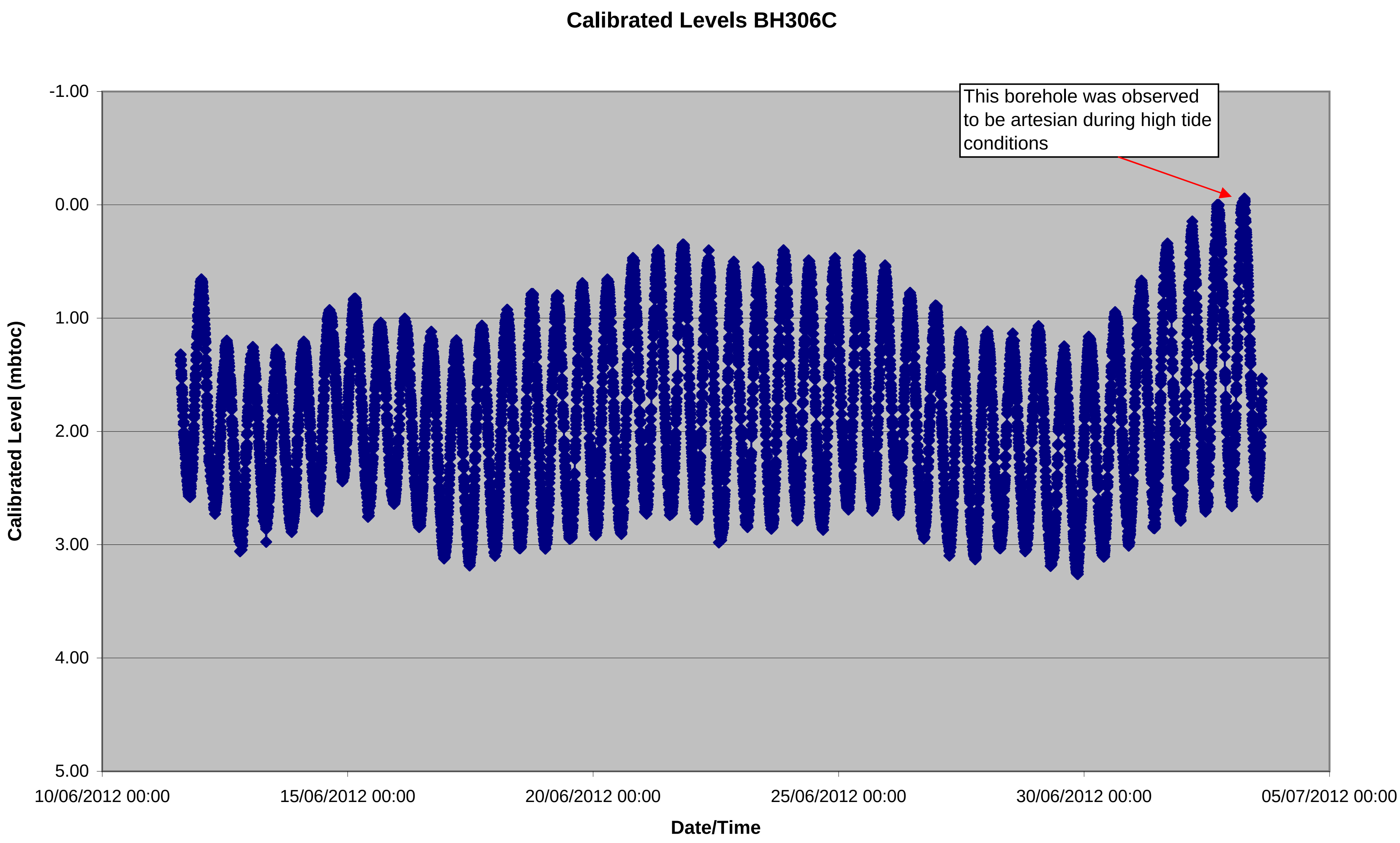
Calibrated Level BH304 (Final)



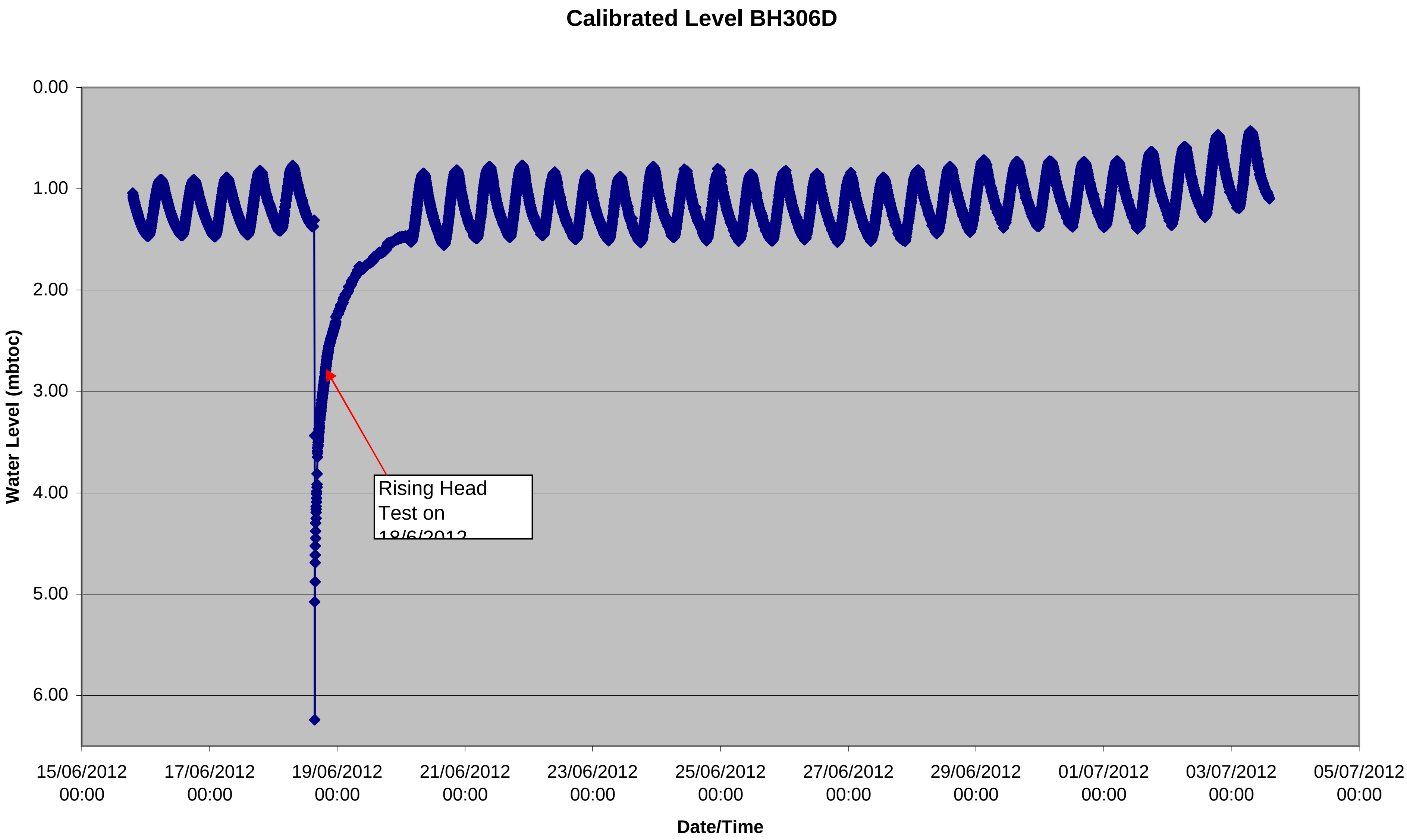

Calibrated Levels BH305 (Final)
Logger incorrectly installed in gas standpipe from 8/6/12 to 15/6/12
Logger installed in groundwater standpipe from 15/6/12 onwards
Calibrated Level (mbtoc)
2.50
2.60
2.70
2.80
2.90
3.00
3.10
3.20
3.30
3.40
3.50
08/06/2012 00:00
13/06/2012 00:00
18/06/2012 00:00
23/06/2012 00:00
28/06/2012 00:00
03/07/2012 00:00
Date/Time



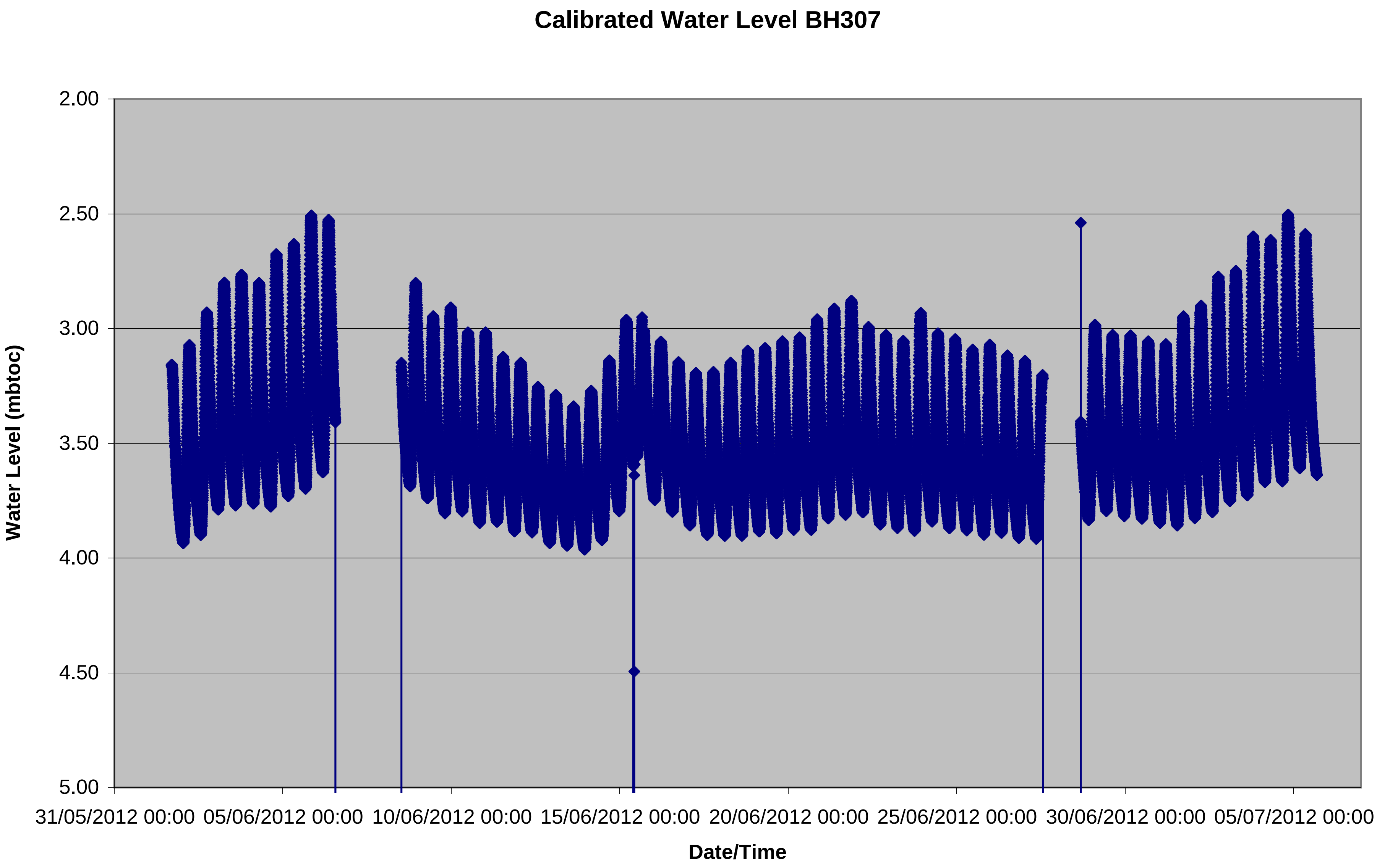
Calibrated Levels BH306B (Final)
Calibrated Level (mbtoc)
0.00
0.20
0.40
0.60
0.80
1.00
1.20
1.40
1.60
1.80
2.00
03/05/2012 00:00
08/05/2012 00:00
13/05/2012 00:00
18/05/2012 00:00
23/05/2012 00:00
28/05/2012 00:00
02/06/2012 00:00
07/06/2012 00:00
Date/Time



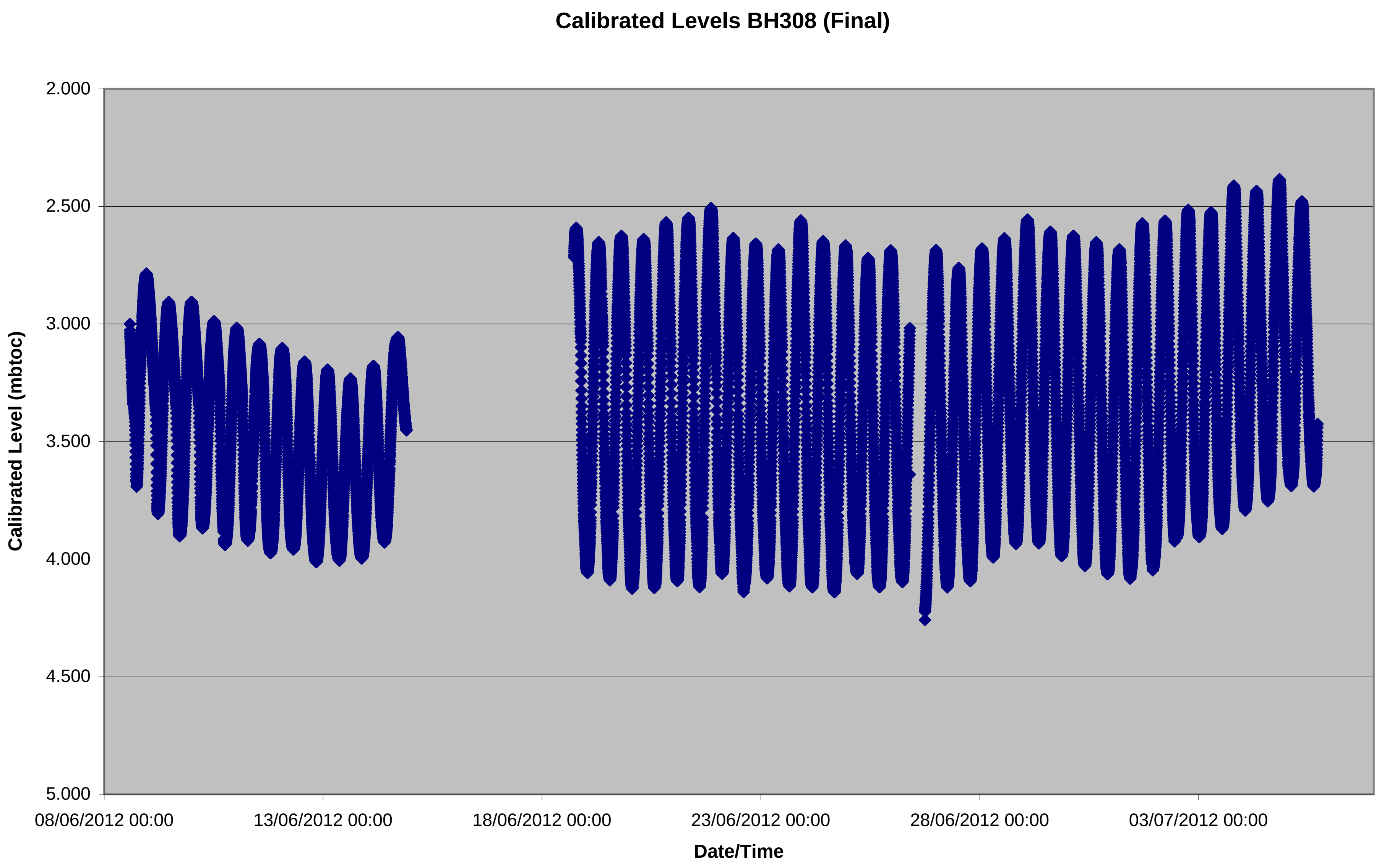
Calibrated Levels BH306C
This borehole was observed to be artesian during high tide conditions
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
Calibrated Level (mbtoc)
10/06/2012 00:00
15/06/2012 00:00
20/06/2012 00:00
25/06/2012 00:00
30/06/2012 00:00
05/07/2012 00:00
Date/Time

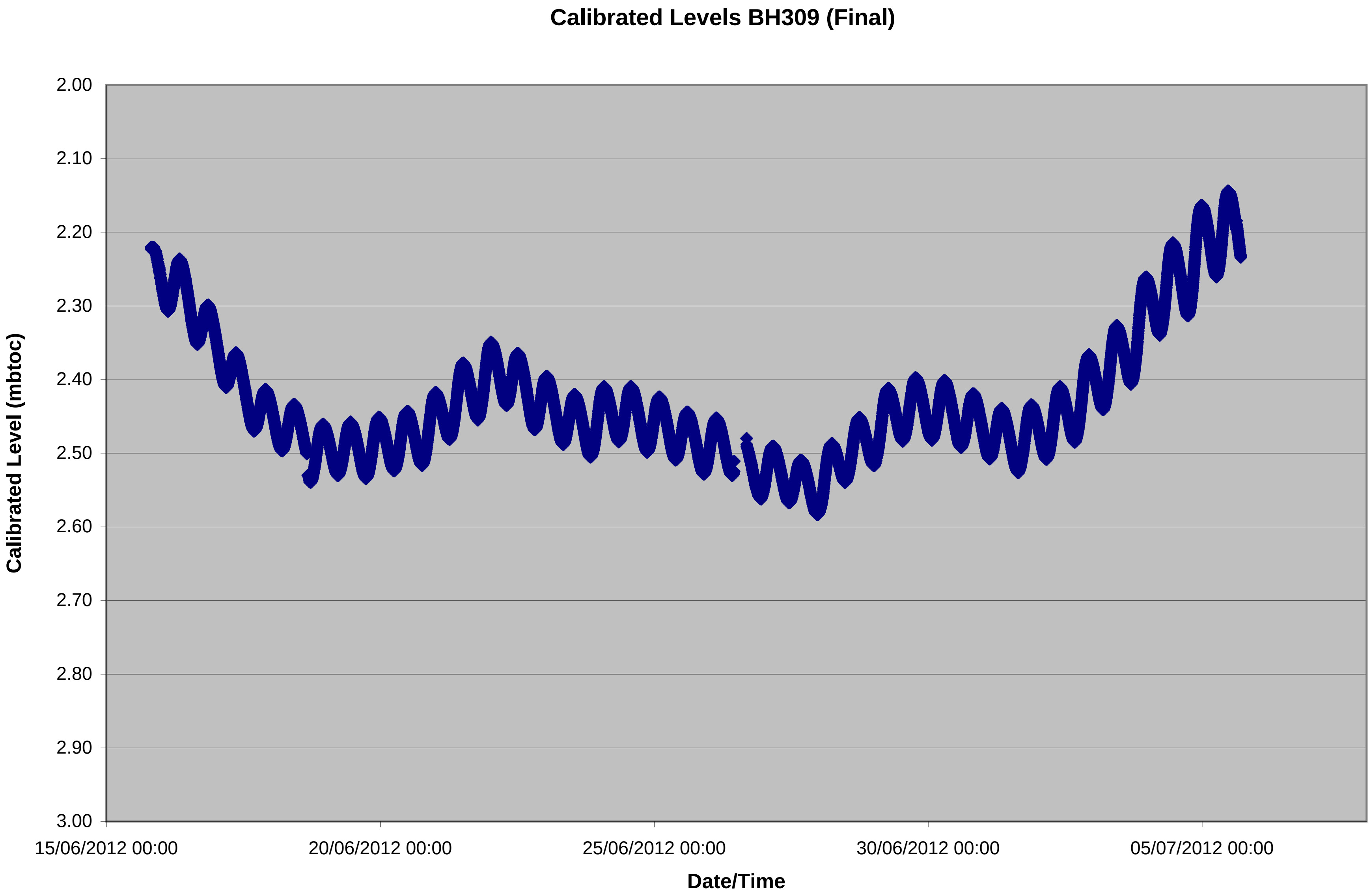


Calibrated Level BH306D
Water Level (mbtoc)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
Rising Head
Test on
18/6/2012
15/06/2012 00:00
17/06/2012 00:00
19/06/2012 00:00
21/06/2012 00:00
23/06/2012 00:00
25/06/2012 00:00
27/06/2012 00:00
29/06/2012 00:00
01/07/2012 00:00
03/07/2012 00:00
05/07/2012 00:00
Date/Time

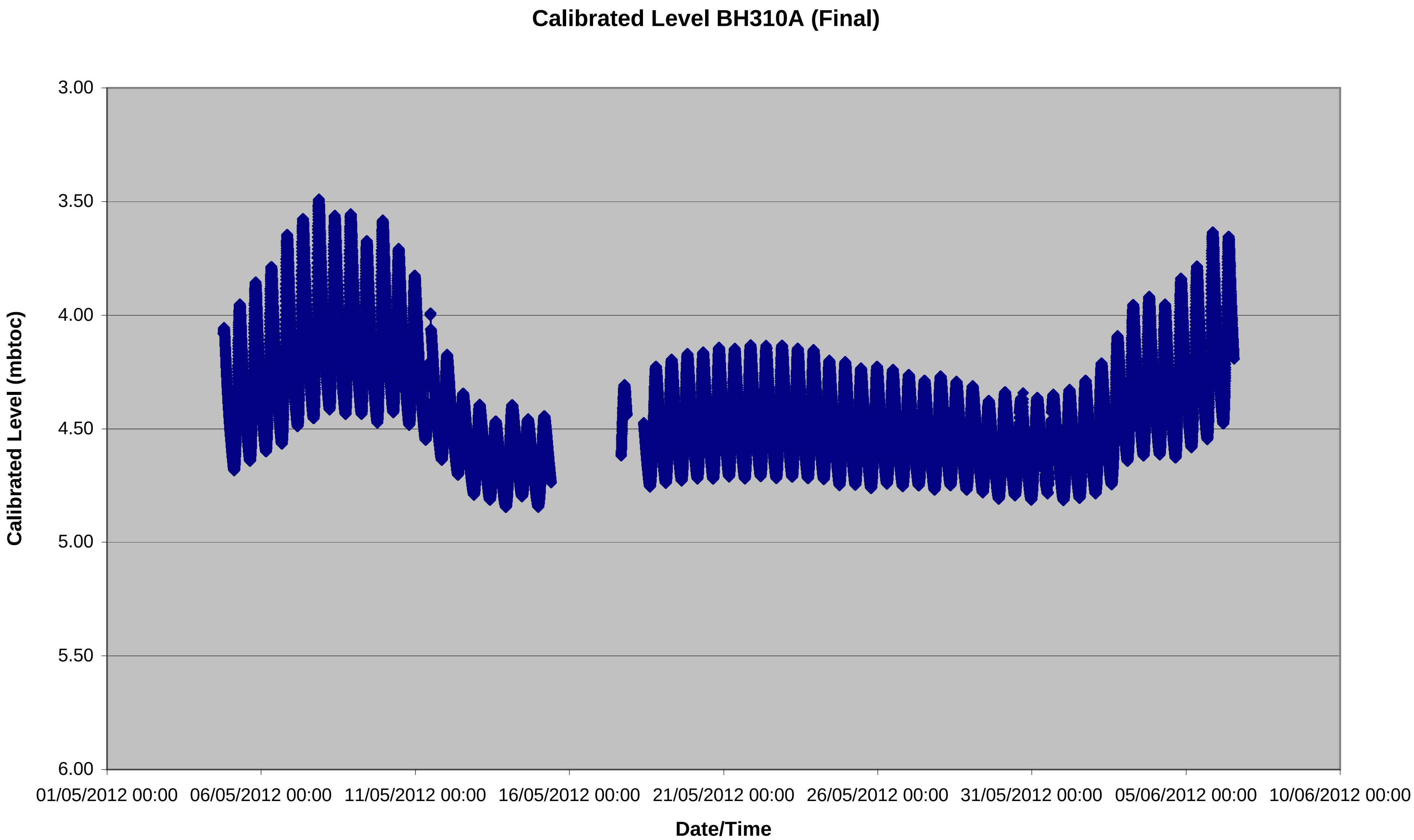


Calibrated Water Level BH307
Water Level (mbtoc)
2.00
2.50
3.00
3.50
4.00
4.50
5.00
31/05/2012 00:00
05/06/2012 00:00
10/06/2012 00:00
15/06/2012 00:00
20/06/2012 00:00
25/06/2012 00:00
30/06/2012 00:00
05/07/2012 00:00
Date/Time

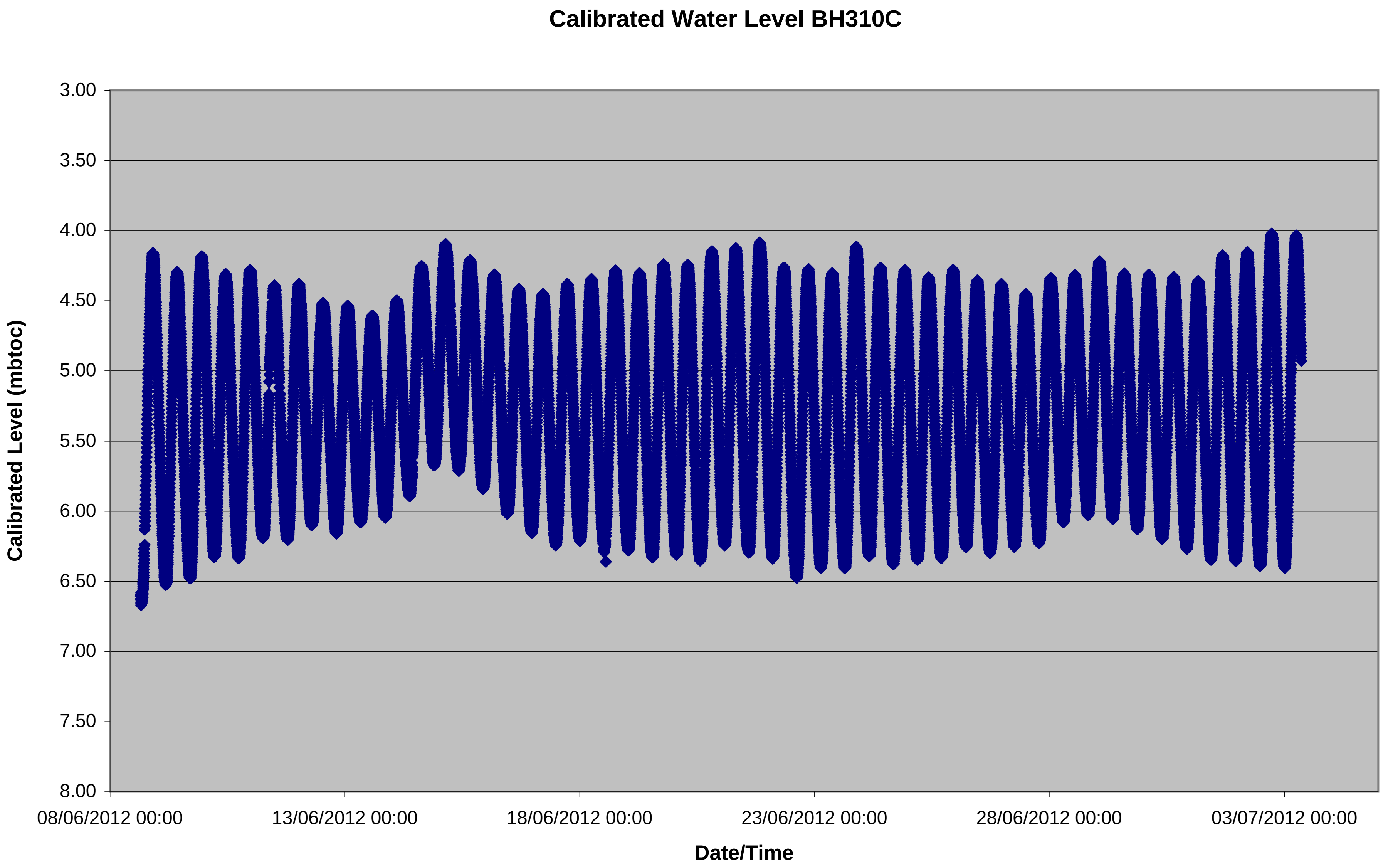

Calibrated Levels BH308 (Final)
Calibrated Level (mbtoc)
2.000
2.500
3.000
3.500
4.000
4.500
5.000
08/06/2012 00:00
13/06/2012 00:00
18/06/2012 00:00
23/06/2012 00:00
28/06/2012 00:00
03/07/2012 00:00
Date/Time



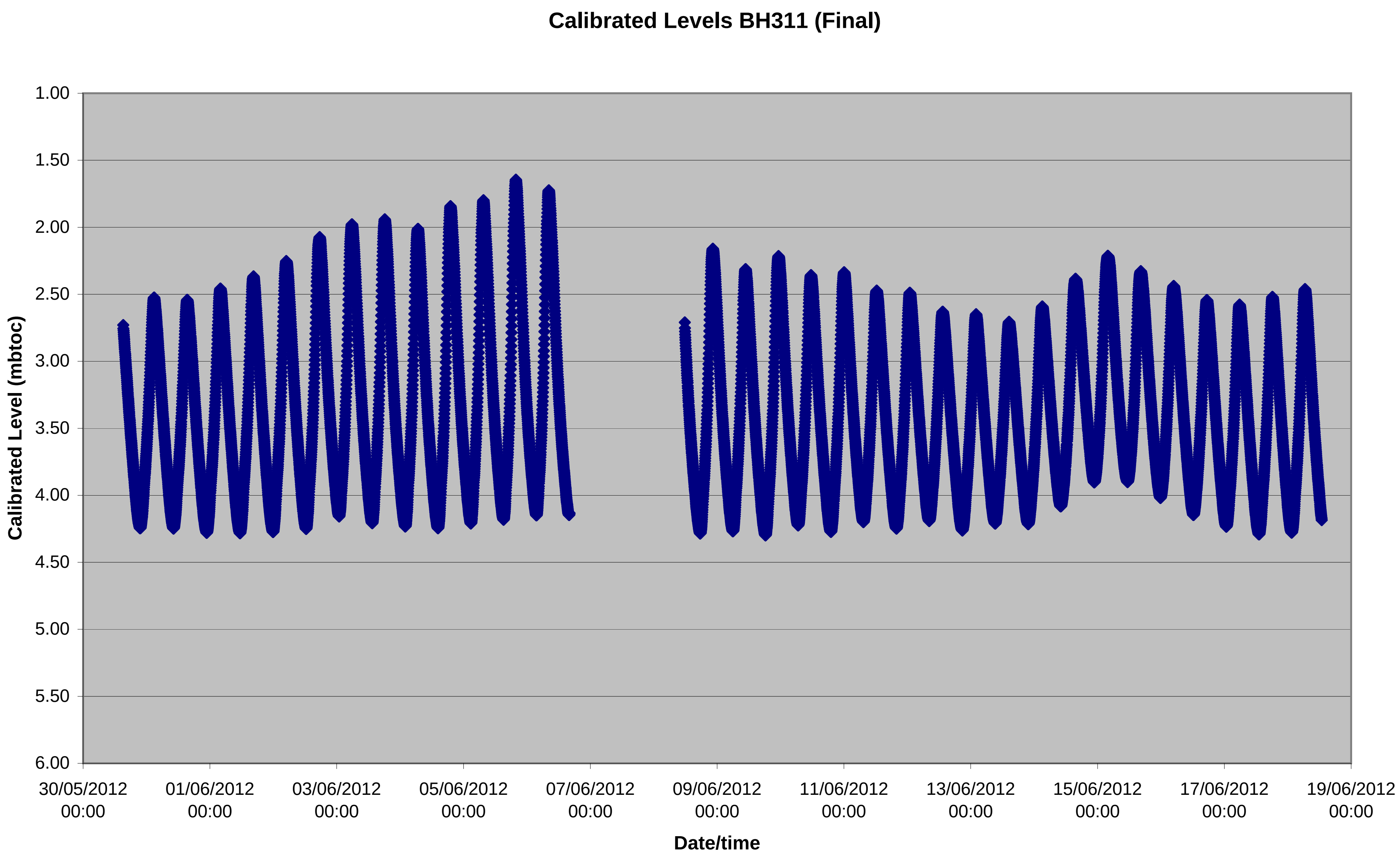
Calibrated Levels BH309 (Final)
2.00
2.10
2.20
2.30
2.40
2.50
2.60
2.70
2.80
2.90
3.00
Calibrated Level (mbtoc)
15/06/2012 00:00
20/06/2012 00:00
25/06/2012 00:00
30/06/2012 00:00
05/07/2012 00:00
Date/Time

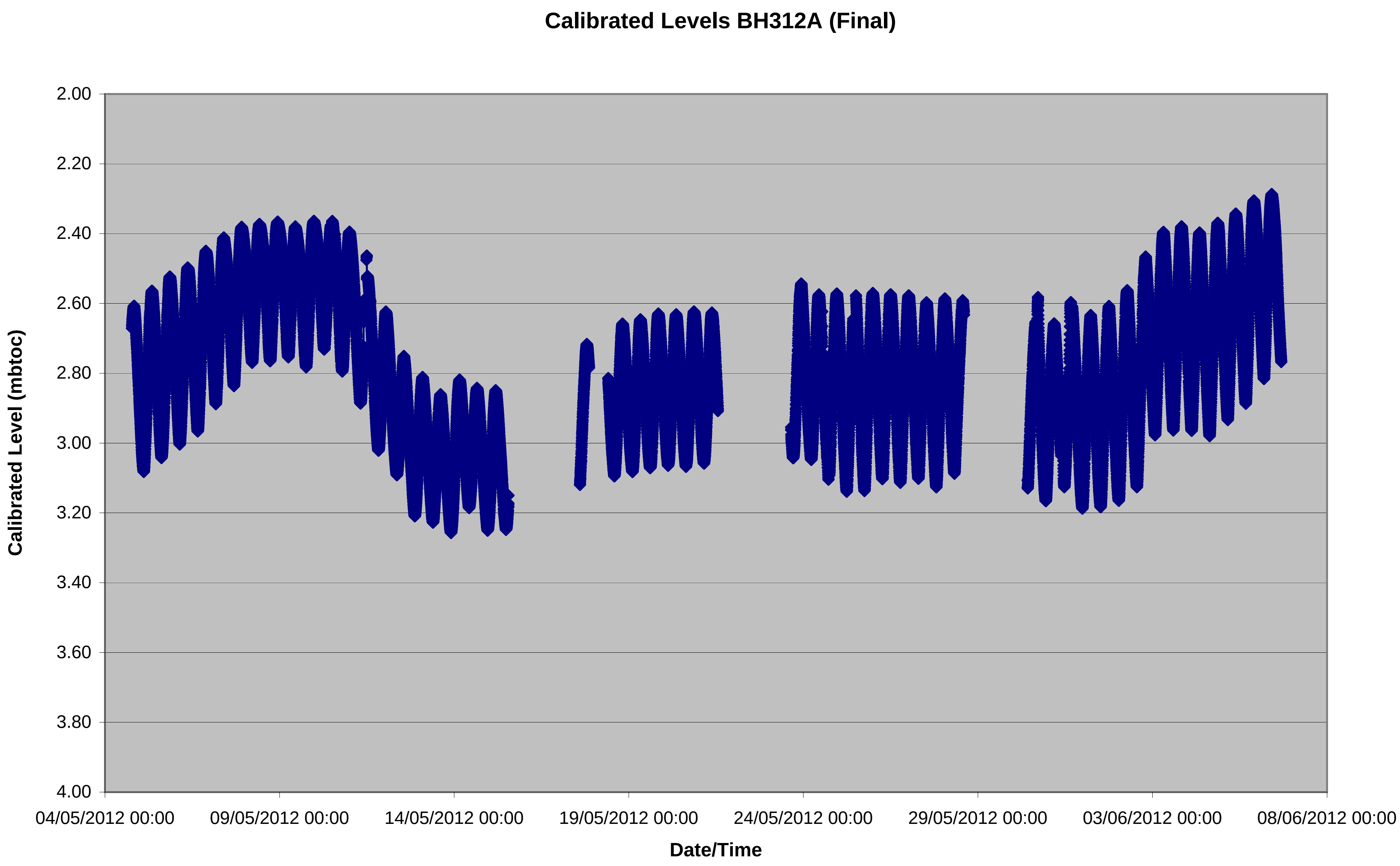


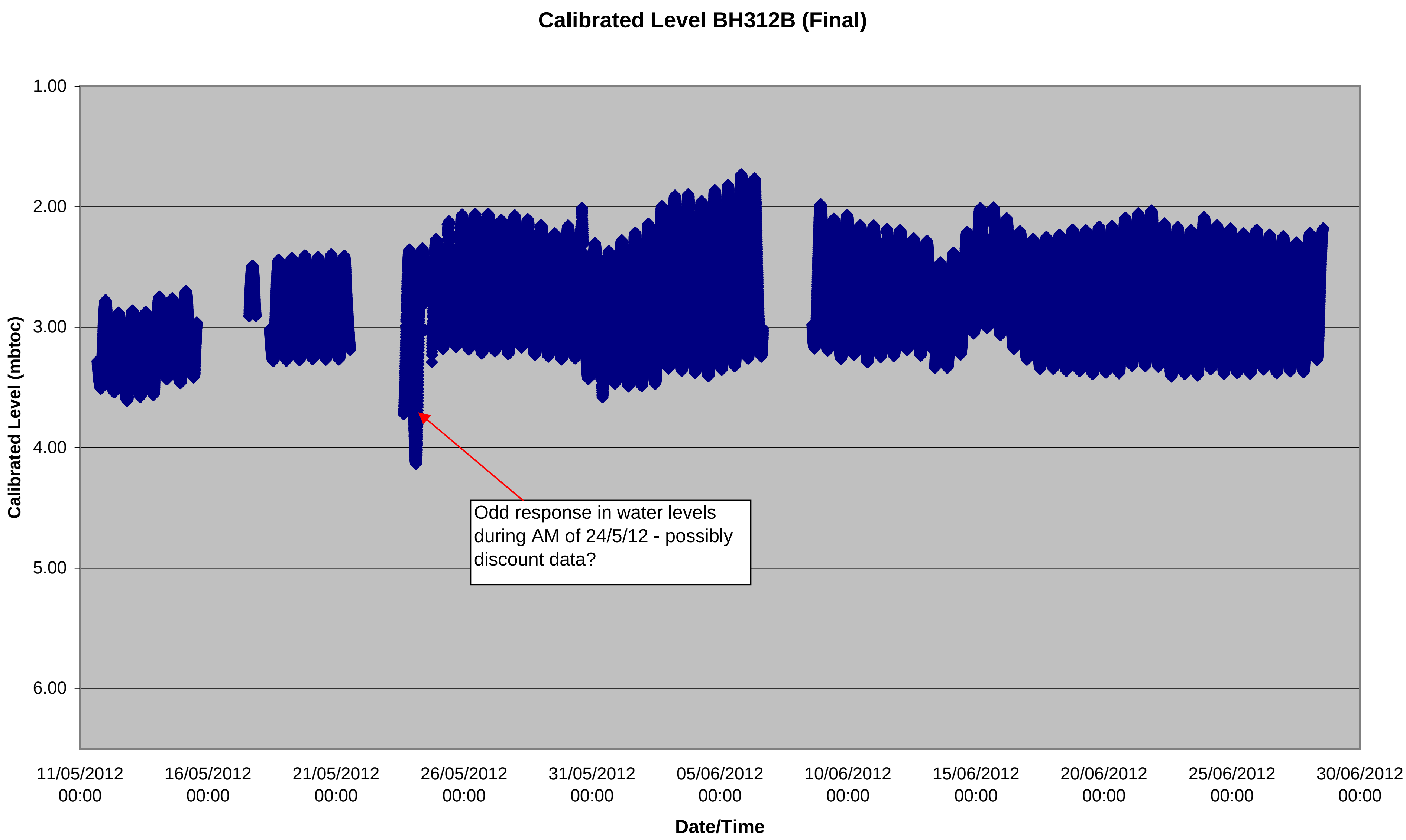
Calibrated Level BH310A (Final)
Calibrated Level (mbtoc)
3.00
3.50
4.00
4.50
5.00
5.50
6.00
01/05/2012 00:00
06/05/2012 00:00
11/05/2012 00:00
16/05/2012 00:00
21/05/2012 00:00
26/05/2012 00:00
31/05/2012 00:00
05/06/2012 00:00
10/06/2012 00:00
Date/Time

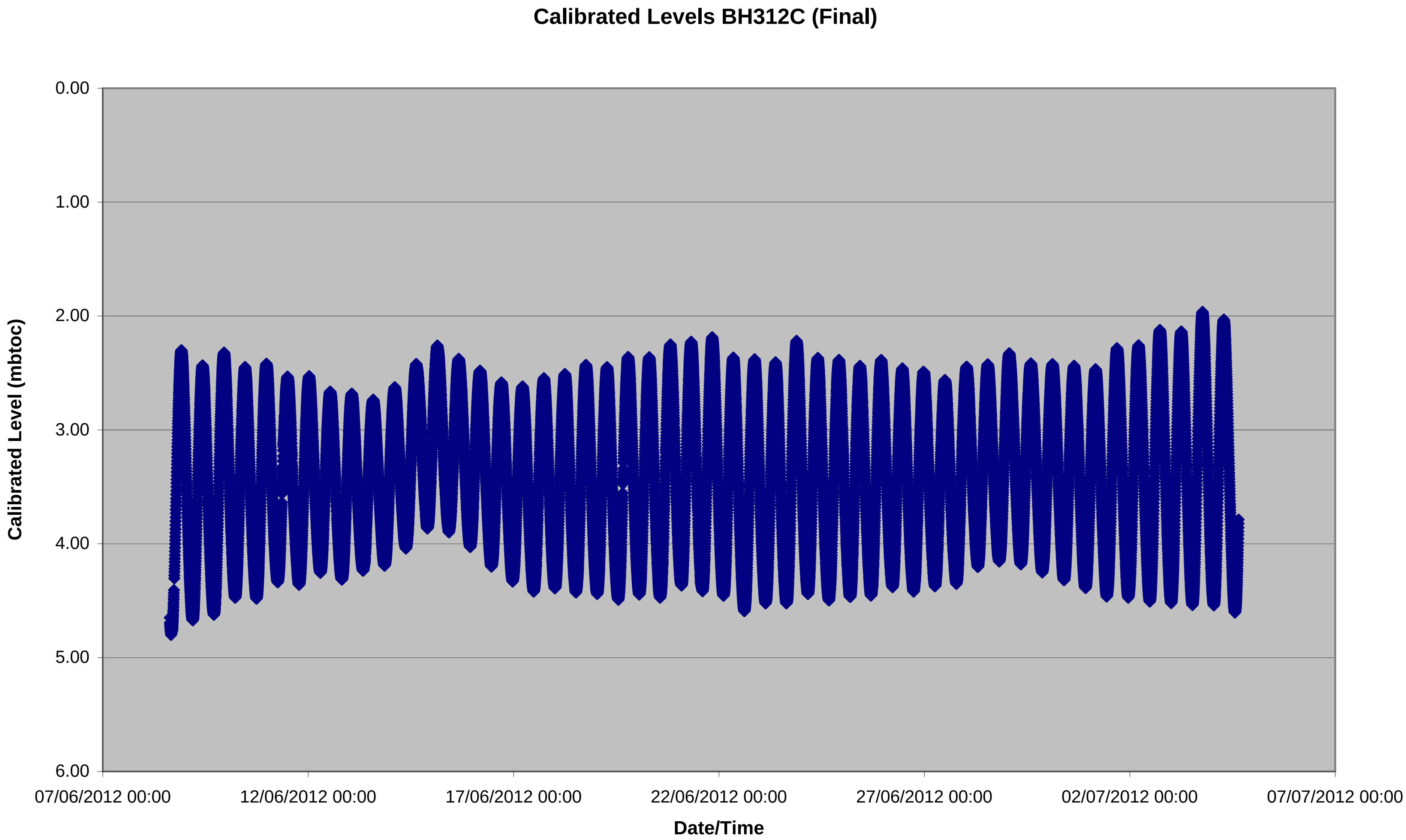


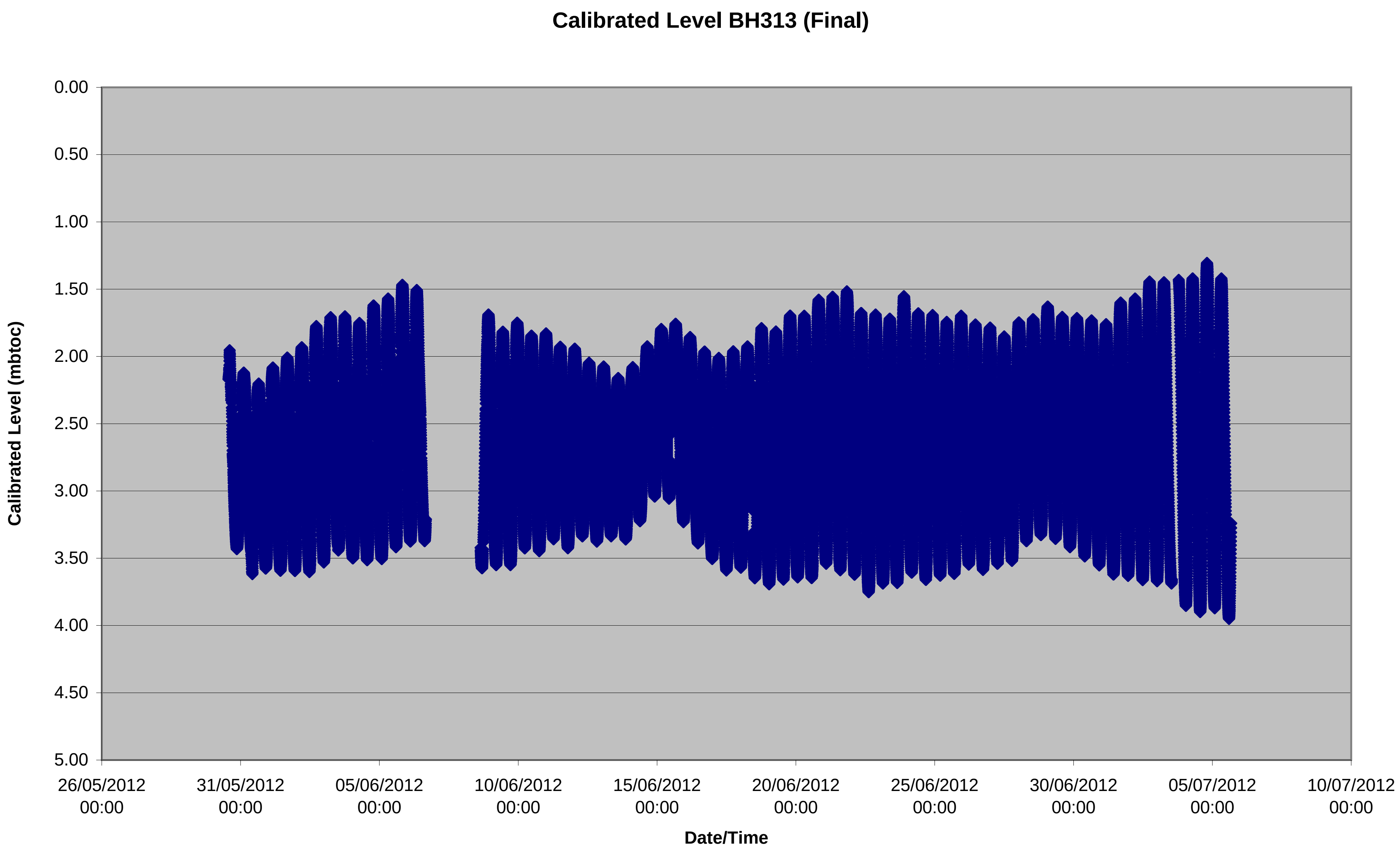
Calibrated Water Level BH310C
Calibrated Level (mbtoc)
3.00
3.50
4.00
4.50
5.00
5.50
6.00
6.50
7.00
7.50
8.00
08/06/2012 00:00
13/06/2012 00:00
18/06/2012 00:00
23/06/2012 00:00
28/06/2012 00:00
03/07/2012 00:00
Date/Time


Calibrated Levels BH311 (Final)
Calibrated Level (mbtoc)
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00
30/05/2012 00:00
01/06/2012 00:00
03/06/2012 00:00
05/06/2012 00:00
07/06/2012 00:00
09/06/2012 00:00
11/06/2012 00:00
13/06/2012 00:00
15/06/2012 00:00
17/06/2012 00:00
19/06/2012 00:00
Date/time

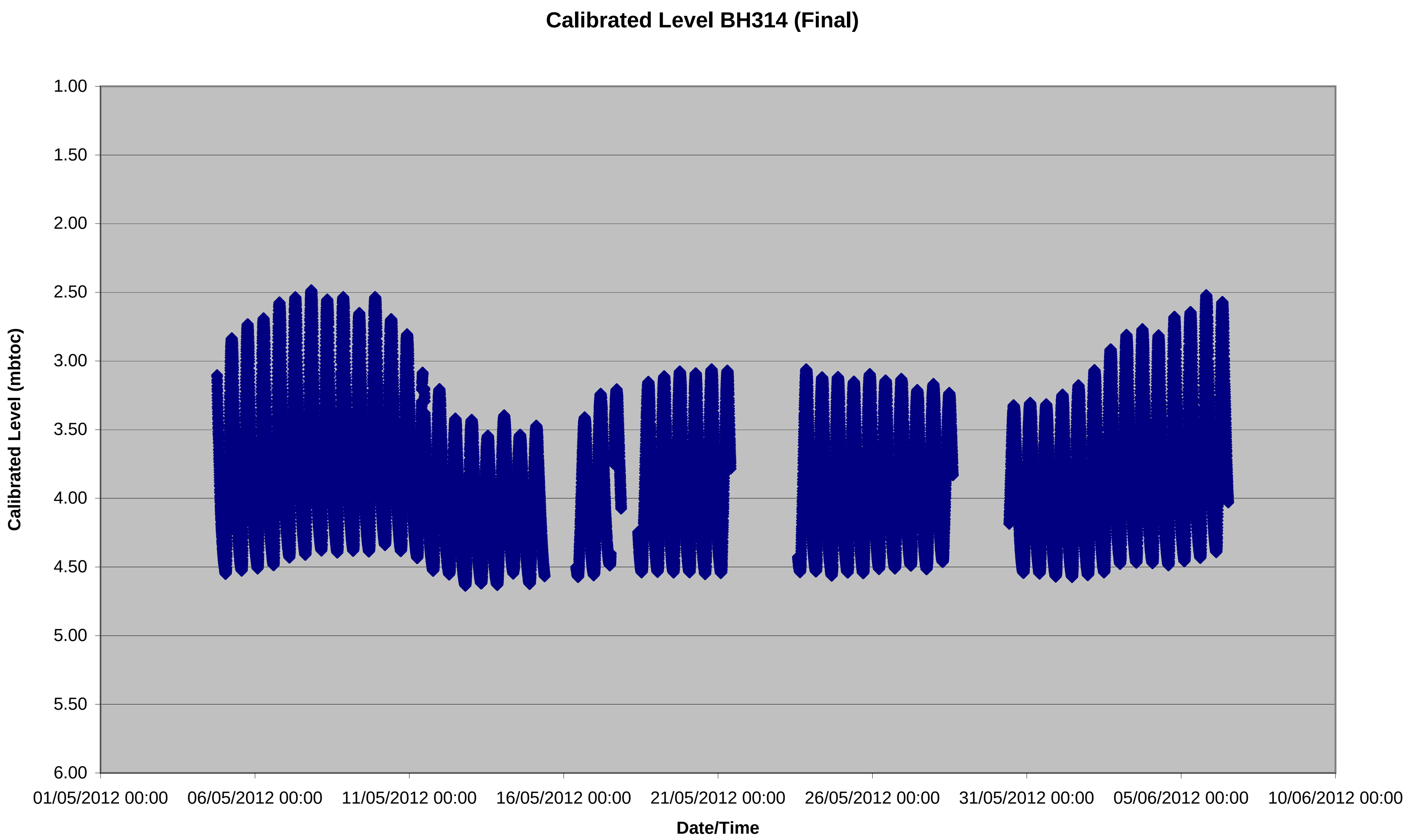

Calibrated Levels BH312A (Final)
Calibrated Level (mbtoc)
2.00
2.20
2.40
2.60
2.80
3.00
3.20
3.40
3.60
3.80
4.00
04/05/2012 00:00
09/05/2012 00:00
14/05/2012 00:00
19/05/2012 00:00
24/05/2012 00:00
29/05/2012 00:00
03/06/2012 00:00
08/06/2012 00:00
Date/Time


Calibrated Level BH312B (Final)
1.00
2.00
3.00
4.00
5.00
6.00
Calibrated Level (mbtoc)
Odd response in water levels during AM of 24/5/12 - possibly discount data?
11/05/2012 00:00
16/05/2012 00:00
21/05/2012 00:00
26/05/2012 00:00
31/05/2012 00:00
05/06/2012 00:00
10/06/2012 00:00
15/06/2012 00:00
20/06/2012 00:00
25/06/2012 00:00
30/06/2012 00:00
Date/Time


Calibrated Levels BH312C (Final)
Calibrated Level (mbtoc)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
07/06/2012 00:00
12/06/2012 00:00
17/06/2012 00:00
22/06/2012 00:00
27/06/2012 00:00
02/07/2012 00:00
07/07/2012 00:00
Date/Time



Calibrated Level BH313 (Final)
Calibrated Level (mbtoc)
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
26/05/2012 00:00
31/05/2012 00:00
05/06/2012 00:00
10/06/2012 00:00
15/06/2012 00:00
20/06/2012 00:00
25/06/2012 00:00
30/06/2012 00:00
05/07/2012 00:00
10/07/2012 00:00
Date/Time



Calibrated Level BH314 (Final)
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00
Calibrated Level (mbtoc)
01/05/2012 00:00
06/05/2012 00:00
11/05/2012 00:00
16/05/2012 00:00
21/05/2012 00:00
26/05/2012 00:00
31/05/2012 00:00
05/06/2012 00:00
10/06/2012 00:00
Date/Time

P12030
Haulbowline East Tip
Ground gas Analysis readings

Borehole	**Date**	**CH_4**	**$C0_2$**	**O_2**	**Bal**	**H_2S**	
BH118A	11/05/2012	0.0	0.0	19.8	80.2	0.0	
BH116	11/05/2012	0.0	0.0	20.5	79.4	0.0	
BH128	11/05/2012	0.0	0.0	20.2	79.8	0.0	
BH130	11/05/2012	0.0	0.0	20.4	79.6	0.0	
BH314	11/05/2012	0.0	0.0	20.6	79.4	0.0	
BH127	11/05/2012	0.0	0.0	20.1	79.9	0.0	
BH312A	11/05/2012	0.0	0.0	20.6	79.4	0.0	
BH117	11/05/2012	0.0	0.0	20.8	79.1	0.0	
BH126	11/05/2012	10.8	0.0	18	71.3	0.0	**Initial**
		46.6	0.0	8.8	47.6	0.0	**1 Minute**
		30.1	0.0	12.8	57.7	0.0	**2 Minutes**
		20.5	0.0	15.6	64.2	0.0	**3 Minutes**
		14.5	0.0	17.1	68.8	0.0	**4 Minutes**
		10.8	0.0	18	71.3	0.0	**5 Minutes**
Borehole	**Date**	**CH_4**	**$C0_2$**	**O_2**	**Bal**	**H_2S**	
BH118A	16/05/2012	0.0	0.0	20.6	79.1	0.0	
BH116	16/05/2012	0.5	0.0	20.1	79.3	0.0	
BH128	16/05/2012	0.0	0.0	20.8	79.1	0.0	
BH130	16/05/2012	0.0	0.0	20.9	79	0.0	
BH314	16/05/2012	0.0	0.0	20.8	79.2	0.0	
BH127	16/05/2012	0.0	0.0	20.8	79.1	0.0	
BH312A	16/05/2012	0.0	0.0	21.1	78.8	0.0	
BH117	16/05/2012	0.0	0.0	20.6	79.3	0.0	
BH126	16/05/2012	65.4	0.1	6.7	34.6	0.0	**Initial**
		65.4	0.1	6.7	34.6	0.0	**1 Minute**
		40.2	0.1	10.5	50.6	0.0	**2 Minutes**
		33.4	0.0	12.5	54.8	0.0	**3 Minutes**
		27.5	0.0	14.1	59.4	0.0	**4 Minutes**
		22.9	0.0	15.3	62	0.0	**5 Minutes**

Borehole	Date	CH_4	$C0_2$	O_2	Bal	H_2S	
BH118A	30/05/2012	0.0	0.0	19.4	80.6	0.0	
BH127	30/05/2012	0.0	0.0	19.6	80.4	0.0	
BH130	30/05/2012	0.0	0.0	20.5	79.5	0.0	
BH314	30/05/2012	0.0	0.0	19.7	80.3	0.0	
BH125	30/05/2012	0.0	0.0	20.6	79.4	0.0	
BH116	30/05/2012	0.1	0.0	20.6	79.3	0.0	
BH120	30/05/2012	0.1	0.0	12.8	87.1	0.0	
BH117	30/05/2012	0.1	0.0	19.3	80.6	0.0	
BH126	30/05/2012	51.4	0.0	9.5	39.1	0.0	
		46.9	0.0	9.2	47.8	0.0	**Initial**
		38.9	0.0	10.9	50	0.0	**1 Minute**
		37	0.0	11	51.8	0.0	**2 Minutes**
		27.3	0.0	14.1	58.8	0.0	**3 Minutes**
		23.1	0.0	15.2	61.9	0.0	**4 Minutes**
		17.3	0.0	16.6	66	0.0	**5 Minutes**
BH122B	30/05/2012	0.0	0.0	19.8	80.2	0.0	
BH128	30/05/2012	0.0	0.0	20.4	79.6	0.0	
BH310A	30/05/2012	0.0	0.0	20.1	79.3	0.0	
BH310B	30/05/2012	0.0	0.0	20.6	79.4	0.0	
BH303	30/05/2012	0.1	0.0	20.7	79.2	0.0	
BH306B	30/05/2012	0.1	0.0	20.7	79.2	0.0	
BH312A	30/05/2012	0.0	0.0	19.7	80.3	0.0	
BH312B	30/05/2012	0.0	0.0	20.3	79.7	0.0	
BH301	30/05/2012	0.1	0.0	17.5	82.4	0.0	
BH119	30/05/2012	0.1	0.0	20.1	79.8	0.0	
BH315	30/05/2012	0.0	0.0	20.3	79.7	0.0	
BH313	30/05/2012	0.1	0.0	20.1	79.8	0.0	
BH311	30/05/2012	0.0	0.0	20.3	79.7	0.0	

Borehole	Date	CH_4	$C0_2$	O_2	Bal	H_2S
BH118	08/06/2012	0.0	0.0	20.1	79.9	0.0
BH127	08/06/2012	0.0	0.0	20.2	79.8	0.0
BH130	08/06/2012	0.0	0.0	20.7	79.3	0.0
BH314	08/06/2012	0.0	0.0	29.8	80.2	0.0
BH125	08/06/2012					
BH116	08/06/2012	5.7	0.0	18.3	76.0	0.0
BH120	08/06/2012	0.1	0.0	8.8	91.2	0.0
BH117	08/06/2012					
BH126	08/06/2012	0.0	0.0	20.7	79.3	0.0
BH128	08/06/2012	0.0	0.0	20.3	79.7	0.0
BH310A	08/06/2012	0.0	0.0	20.7	79.4	0.0
BH310B	08/06/2012	0.1	0.0	20.7	79.3	0.0
BH303	08/06/2012	0.1	0.0	18.9	81.0	0.0
BH306B	08/06/2012	0.0	0.0	20.5	79.5	0.0
BH312A	08/06/2012	0.0	0.0	20.2	79.8	0.0
BH312B	08/06/2012	0.0	0.0	20.3	79.7	0.0
BH301A	08/06/2012	0.3	0.0	17.7	82.0	0.0
BH119	08/06/2012	0.1	0.0	20.8	79.1	0.0
BH308	08/06/2012	0.1	0.0	14.0	85.9	0.0
BH305	08/06/2012	0.1	0.0	19.5	80.4	0.0
BH302	08/06/2012	0.0	0.0	20.7	79.3	0.0
BH311	08/06/2012	0.0	0.0	20.2	79.8	0.0
BH122B	08/06/2012	0.0	0.0	20.3	79.7	0.0
BH315	08/06/2012	0.0	0.0	20.4	79.6	0.0
BH307	08/06/2012	0.0	0.0	20.5	79.5	0.0

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^{0} C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**C0$_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH311	30/07/2012	0.0	0.0	20.3	79.7	0.0	**30 Sec**	+0.8 l/hr	3.74
@0830		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**C0$_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH118	30/07/2012	0.0	0.0	19.9	80.1	0.0	**30 Sec**	+0.7 l/hr	3.89
@0845		0.0	0.0	19.9	80.1	0.0	**60 Sec**		
		0.0	0.0	19.8	80.2	0.0	**90 Sec**		
		0.0	0.0	19.8	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.2	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**C0$_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH122B	30/07/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	-3.4 l/hr	3.3
@0900		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^{0} C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH312A	30/07/2012	0.0	0.0	19.3	80.7	0.0	**30 Sec**	+0.7 l/hr	2.96
@0905		0.0	0.0	19.3	80.7	0.0	**60 Sec**		
		0.0	0.0	19.3	80.7	0.0	**90 Sec**		
		0.0	0.0	19.3	80.7	0.0	**2 Minutes**		
		0.0	0.0	19.3	80.7	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH312B	30/07/2012	0.0	0.0	18.9	81.1	0.0	**30 Sec**	+0.7 l/hr	3.38
@0910		0.0	0.0	19.4	80.6	0.0	**60 Sec**		
		0.0	0.0	19.6	80.4	0.0	**90 Sec**		
		0.0	0.0	19.7	80.3	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.1	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH314	30/07/2012	0.0	0.0	20.8	79.2	0.0	**30 Sec**	+1.0 l/hr	4.44
@0919		0.0	0.0	20.8	79.2	0.0	**60 Sec**		
		0.0	0.0	20.8	79.2	0.0	**90 Sec**		
		0.0	0.0	20.8	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH313	30/07/2012	0.0	0.0	20.3	79.7	0.0	**30 Sec**	+1.0 l/hr	2.91
Gas		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
@0935		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH313	30/07/2012	0.0	0.0	20.7	79.3	0.0	**30 Sec**	+0.8 l/hr	3.72
GW		0.0	0.0	20.7	79.3	0.0	**60 Sec**		
@0942		0.0	0.0	20.8	79.2	0.0	**90 Sec**		
		0.0	0.0	20.8	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH127	30/07/2012	0.0	0.0	20.3	79.7	0.0	**30 Sec**	+0.9 l/hr	4.18
@0950		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH315	30/07/2012	0.0	0.0	20.1	79.9	0.0	**30 Sec**	+0.7 l/hr	3.74
@1001		0.0	0.0	20.1	79.9	0.0	**60 Sec**		
		0.0	0.0	20.1	79.9	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH130	30/07/2012	0.0	0.0	20.7	79.3	0.0	**30 Sec**	+0.9 l/hr	4.56
@1012		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH310B	30/07/2012	0.1	0.0	20.7	79.2	0.0	**30 Sec**	+0.9 l/hr	6.14	1%
GW		0.1	0.0	20.7	79.2	0.0	**60 Sec**			
@1025		0.1	0.0	20.7	79.2	0.0	**90 Sec**			
		0.1	0.0	20.7	79.2	0.0	**2 Minutes**			
		0.1	0.0	20.7	79.2	0.0	**3 Minutes**			

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310B	30/07/2012	0.0	0.0	20.8	79.2	0.0	**30 Sec**	+1.0 l/hr	4.43
GAS		0.0	0.0	20.8	79.2	0.0	**60 Sec**		
@1030		0.0	0.0	20.8	79.2	0.0	**90 Sec**		
		0.0	0.0	20.8	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310C	30/07/2012	--	--	--	--	--	--	--	6.39
@1040									

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310A	30/07/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+0.9 l/hr	4.71
@1042		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^{0} C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH307	30/07/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+1.1 l/hr	3.95
GAS		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@1056		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH307	30/07/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+1.2 l/hr	3.94
GW		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
@1105		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH128	30/07/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+1.2 l/hr	5.26
@1110		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306C	30/07/2012	0.1	0.0	20.9	79	0.0	**30 Sec**	+1.5 l/hr	2.2
Bedrock		0.1	0.0	20.9	79	0.0	**60 Sec**		
@1124		0.1	0.0	20.9	79	0.0	**90 Sec**		
		0.0	0.0	20.9	79.1	0.0	**2 Minutes**		
		0.0	0.0	20.9	79.1	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306B	30/07/2012	0.1	0.0	20.8	79.2	0.0	**30 Sec**	+1.2 l/hr	1.05
@1140		0.1	0.0	20.8	79.1	0.0	**60 Sec**		
		0.1	0.0	20.8	79.1	0.0	**90 Sec**		
		0.1	0.0	20.8	79.1	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**4 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^{0} C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306D	30/07/2012	22.8	0.1	15.3	62.7	0.0	**30 Sec**	+1.2 l/hr	1.42
@1125		20.3	0.1	15.8	63.6	0.0	**60 Sec**		
		16.9	0.1	16.7	66.4	0.0	**90 Sec**		
		15.8	0.0	16.9	67.2	0.0	**2 Minutes**		
		13.1	0.0	17.8	69.2	0.0	**3 Minutes**		
		11.5	0.0	18.1	70.4	0.0	**4 Minutes**		
		9.2	0.0	18.7	72.1	0.0	**5 Minutes**		
		8.9	0.0	18.8	72.3	0.0	**6 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH303	30/07/2012	0.0	0.0	20.9	79.1	0.0	**30 Sec**	+1.2 l/hr	3.23
@1200		0.0	0.0	20.9	79.1	0.0	**60 Sec**		
		0.0	0.0	20.9	79.1	0.0	**90 Sec**		
		0.0	0.0	20.9	79.1	0.0	**2 Minutes**		
		0.0	0.0	20.9	79.1	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH302	30/07/2012	0.2	0.0	19.9	79.9	0.0	**30 Sec**	+1.1 l/hr	4.12
GW		0.1	0.0	19.8	80.1	0.0	**60 Sec**		
@1210		0.1	0.0	19.8	80.1	0.0	**90 Sec**		
		0.1	0.0	19.7	80.2	0.0	**2 Minutes**		
		0.1	0.0	19.6	80.3	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH302	30/07/2012	0.0	0.0	15.4	84.6	0.0	**30 Sec**	+1.2 l/hr	4.13
GAS		0.0	0.0	15.4	84.6	0.0	**60 Sec**		
@1215		0.0	0.0	15.4	84.6	0.0	**90 Sec**		
		0.0	0.0	15.4	84.6	0.0	**2 Minutes**		
		0.0	0.0	15.4	84.6	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH119	30/07/2012	0.1	0.0	18.7	81.2	0.0	**30 Sec**	+0.9 l/hr	3.78
@1225		0.0	0.0	18.7	81.3	0.0	**60 Sec**		
		0.0	0.0	18.7	81.3	0.0	**90 Sec**		
		0.0	0.0	18.8	81.2	0.0	**2 Minutes**		
		0.0	0.0	18.8	81.2	0.0	**3 Minutes**		

		Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)		1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH301	30/07/2012	0.1	0.0	21	78.9	0.0	**30 Sec**	+0.9 l/hr	3.23
GW		0.1	0.0	21	78.9	0.0	**60 Sec**		
@1235		0.0	0.0	21	78.9	0.0	**90 Sec**		
		0.0	0.0	21.1	78.9	0.0	**2 Minutes**		
		0.0	0.0	21.1	78.9	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH301	30/07/2012	0.3	0.0	16.8	82.9	0.0	**30 Sec**	+0.9 l/hr	2.88	6%
GAS		0.3	0.0	16.8	82.9	0.0	**60 Sec**			
@1245		0.2	0.0	16.8	83	0.0	**90 Sec**			4%
		0.2	0.0	16.8	83	0.0	**2 Minutes**			
		0.2	0.0	16.7	83.1	0.0	**3 Minutes**			

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH120	30/07/2012	0.0	0.0	10	90	0.0	**30 Sec**	+0.8 l/hr	3.72
@1400		0.0	0.0	9.4	90.6	0.0	**60 Sec**		
		0.0	0.0	9.3	90.7	0.0	**90 Sec**		
		0.0	0.0	9.2	90.8	0.0	**2 Minutes**		
		0.0	0.0	9.1	90.9	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^{0} C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH304	30/07/2012	3.2	0.0	17.4	79.4	0.0	**30 Sec**	+0.8 l/hr	3.56	40%
GW		1.8	0.3	18.6	79.4	0.0	**60 Sec**			
@1413		1.9	0.2	18.6	79.3	0.0	**90 Sec**			37%
		1.7	0.2	18.7	79.4	0.0	**2 Minutes**			
		1.5	0.2	19.1	79.4	0.0	**3 Minutes**			
		1.1	0.1	19.5	79.3	0.0	**4 Minutes**			21%
		1.2	0.1	19.4	79.3	0.0	**5 Minutes**			
		1.3	0.1	19.2	79.4	0.0	**6 Minutes**			

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH304	30/07/2012	0.0	0.3	9.9	89.9	0.0	**30 Sec**	+0.8 l/hr	3.49
GAS		0.0	0.3	9.8	89.9	0.0	**60 Sec**		
@1425		0.0	0.2	9.7	90.2	0.0	**90 Sec**		
		0.0	0.2	9.6	90.2	0.0	**2 Minutes**		
		0.0	0.2	9.3	90.5	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH116	30/07/2012	17.9	0.5	11.6	70	0.0	**30 Sec**	+0.9 l/hr	3.08
@1435		17.9	0.5	11.5	70	0.0	**60 Sec**		
		18	0.5	11.5	70	0.0	**90 Sec**		
		18	0.5	11.4	70.1	0.0	**2 Minutes**		
		18.1	0.5	11.3	70.1	0.0	**3 Minutes**		
		18.2	0.5	11.1	70.2	0.0	**4 Minutes**		
		18.2	0.5	11	70.3	0.0	**5 Minutes**		
		18.3	0.5	11	70.2	0.0	**6 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH305	30/07/2012	0.0	0.0	20.7	79.3	0.0	**30 Sec**	+0.9 l/hr	3.29
GW		0.0	0.0	20.7	79.3	0.0	**60 Sec**		
@1450		0.0	0.0	20.7	79.3	0.0	**90 Sec**		
		0.0	0.0	20.7	79.3	0.0	**2 Minutes**		
		0.0	0.0	20.7	79.3	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH305	30/07/2012	0.0	0.0	18.9	81.2	0.0	**30 Sec**	+0.9 l/hr	3.26
GAS		0.0	0.0	18.8	81.2	0.0	**60 Sec**		
@1455		0.0	0.0	18.7	81.3	0.0	**90 Sec**		
		0.0	0.0	18.7	81.3	0.0	**2 Minutes**		
		0.0	0.0	18.7	81.3	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH316	30/07/2012	79.4	0.2	2.3	18.5	0.0	**30 Sec**	+3 l/hr	1.17
GW		67.2	0.2	5.4	27.2	0.0	**60 Sec**		
@1500		60.9	0.2	6.8	32.1	0.0	**90 Sec**		
		48	0.1	9.1	42.8	0.0	**2 Minutes**		
		41.2	0.1	10.9	47.8	0.0	**3 Minutes**		
		34	0.1	12.7	53.2	0.0	**4 Minutes**		
		29.7	0.1	13.9	56.3	0.0	**5 Minutes**		
		24.1	0.1	15.3	60.5	0.0	**6 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH316	30/07/2012	10.4	0.0	17	72.6	0.0	**30 Sec**	+0.9 l/hr	1.28
GAS		10.1	0.0	17.1	72.8	0.0	**60 Sec**		
@1510		9.7	0.0	17.4	73.2	0.0	**90 Sec**		
		9	0.0	17.5	73.5	0.0	**2 Minutes**		
		8.5	0.0	17.7	73.9	0.0	**3 Minutes**		
		7.3	0.0	18.1	74.6	0.0	**4 Minutes**		
		6.9	0.0	18.3	74.9	0.0	**5 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH125R	30/07/2012	0.0	0.0	20.9	79.1	0.0	**30 Sec**	+0.9 l/hr	3.02
@1520		0.0	0.0	20.9	79.1	0.0	**60 Sec**		
		0.0	0.0	20.9	79.1	0.0	**90 Sec**		
		0.0	0.0	20.9	79.1	0.0	**2 Minutes**		
		0.0	0.0	20.9	79.1	0.0	**3 Minutes**		

		Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)		1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH126	30/07/2012	88.6	0.0	2.7	8.7	0.0	**30 Sec**	-11.2 l/hr	1.29
@1530		77.4	0.0	2.4	18.9	0.0	**60 Sec**		
		73.7	0.0	3.5	23.8	0.0	**90 Sec**		
		60.4	0.0	6	35.0	0.0	**2 Minutes**		
		54.8	0.0	6.9	38.3	0.0	**3 Minutes**		
		38.5	0.0	9.9	51.6	0.0	**4 Minutes**		
		33	0.0	12.8	54.8	0.0	**5 Minutes**		
		27	0.0	14.2	58.8	0.0	**6 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH309	30/07/2012	0.0	0.0	20.9	79.1	0.0	**30 Sec**	+0.8 l/hr	2.67
GAS		0.0	0.0	20.9	79.1	0.0	**60 Sec**		
@1545		0.0	0.0	20.9	79.1	0.0	**90 Sec**		
		0.0	0.0	20.9	79.1	0.0	**2 Minutes**		
		0.0	0.0	20.9	79.1	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^0 C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH309	30/07/2012	0.1	0.0	20.8	79.1	0.0	**30 Sec**	+0.8 l/hr	2.67
GW		0.0	0.0	20.8	79.2	0.0	**60 Sec**		
@1550		0.0	0.0	20.8	79.2	0.0	**90 Sec**		
		0.0	0.0	20.8	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH308	30/07/2012	0.0	0.0	4.5	95.5	0.0	**30 Sec**	+0.8 l/hr	Dry
GAS		0.0	0.0	4.3	95.7	0.0	**60 Sec**		
@1640		0.0	0.0	4.2	95.8	0.0	**90 Sec**		
		0.0	0.0	4	96	0.0	**2 Minutes**		
		0.0	0.0	3.8	96.2	0.0	**3 Minutes**		

	Day 1	Day 2	Day 3	Monitoring Day	Day 5
Atmospheric Pressure (3 days before and one day after monitoring)	1018	1010	1012	1016	1007

Weather Conditions: 13^{0} C. Generally overcast. Light rain at 1430 for remainder of the day. Little wind. Sea quite calm.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH308	30/07/2012	0.3	0.0	19.4	80.3	0.0	**30 Sec**	+0.8 l/hr	2.88
GW		0.2	0.0	19.5	80.3	0.0	**60 Sec**		
@1645		0.1	0.0	19.6	80.3	0.0	**90 Sec**		
		0.2	0.0	19.6	80.2	0.0	**2 Minutes**		
		0.2	0.0	19.5	80.3	0.0	**3 Minutes**		
		0.2	0.0	19.4	80.4	0.0	**4 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH117R	30/07/2012	0.0	0.0	20.8	79.2	0.0	**30 Sec**	+0.8 l/hr	2.37
@1655		0.0	0.0	20.9	79.1	0.0	**60 Sec**		
		0.0	0.0	20.9	79.1	0.0	**90 Sec**		
		0.0	0.0	20.9	79.1	0.0	**2 Minutes**		
		0.0	0.0	20.9	79.1	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH311	08/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	-0.1 l/hr	3.55
@0820		0.0	0.0	20.2	79.8	0.0	**60 Sec**		
		0.0	0.0	20.2	79.8	0.0	**90 Sec**		
		0.0	0.0	20.2	79.8	0.0	**2 Minutes**		
		0.0	0.0	20.2	79.8	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH118	08/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	-0.2 l/hr	2.98
@0830		0.0	0.0	20.2	79.8	0.0	**60 Sec**		
		0.0	0.0	20.1	79.9	0.0	**90 Sec**		
		0.0	0.0	20.2	79.8	0.0	**2 Minutes**		
		0.0	0.0	20.2	79.8	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH122B	08/08/2012	0.0	0.0	20.3	79.7	0.0	**30 Sec**	+8.5 l/hr	1.99
@0840		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH312A	08/08/2012	0.0	0.0	20.5	79.6	0.0	**30 Sec**	-0.4 l/hr	2.92
@0846		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH312B	08/08/2012	0.0	0.0	19.2	80.8	0.0	**30 Sec**	-0.4 l/hr	2.41
@0852		0.0	0.0	19.2	80.8	0.0	**60 Sec**		
		0.0	0.0	19.2	80.8	0.0	**90 Sec**		
		0.0	0.0	19.4	80.6	0.0	**2 Minutes**		
		0.0	0.0	19.5	80.5	0.0	**3 Minutes**		

Borehole	
BH312C	**Water level (m)**
@0857	2.88

Tide (Cobh)	04:11	0.9 m		10:06	3.6 m		16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH314	08/08/2012	0.0	0.0	19.4	80.6	0.0	**30 Sec**	-0.1 l/hr	3.45
@0902		0.0	0.0	19.3	80.7	0.0	**60 Sec**		
		0.0	0.0	19.3	80.7	0.0	**90 Sec**		
		0.0	0.0	19.3	80.7	0.0	**2 Minutes**		
		0.0	0.0	19.3	80.7	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH313	08/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-3.2 l/hr	2.39
Gas		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
@0912		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH313	08/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	-0.0 l/hr	2.03
GW		0.0	0.0	20.7	79.3	0.0	**60 Sec**		
@0918		0.0	0.0	20.8	79.2	0.0	**90 Sec**		
		0.0	0.0	20.8	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m		10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH127	08/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	-0.0 l/hr	3.23
@0934		0.0	0.0	20.2	79.8	0.0	**60 Sec**		
		0.0	0.0	20.2	79.8	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH315	08/08/2012	0.0	0.0	20.1	79.9	0.0	**30 Sec**	-0.2 l/hr	3.43
@0927		0.0	0.0	20.1	79.9	0.0	**60 Sec**		
		0.0	0.0	20.1	79.9	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH130	08/08/2012	0.0	0.0	20.3	79.7	0.0	**30 Sec**	-0.0 l/hr	3.97
@0946		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH310B	08/08/2012	0.1	0.0	20.3	79.6	0.0	**30 Sec**	-1.3 l/hr	4.34	1%
GW		0.1	0.0	20.3	79.6	0.0	**60 Sec**			
@0955		0.1	0.0	20.4	79.5	0.0	**90 Sec**			
		0.1	0.0	20.4	79.5	0.0	**2 Minutes**			
		0.1	0.0	20.4	79.5	0.0	**3 Minutes**			

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH310B	08/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+0.1 l/hr	4.59
GAS		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
@1006		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310C	08/08/2012	--	--	--	--	--	--	--	4.43
@1015									

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310A	08/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-0.5 l/hr	4.45
@1024		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH307	08/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-0.1 l/hr	3.1
GAS		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
@1030		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH307	08/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	-7.3 l/hr	3.21
GW		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@1036		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^{0} C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH128	08/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	+0.1 l/hr	3.54
@1042		0.0	0.0	20.2	79.8	0.0	**60 Sec**		
		0.0	0.0	20	80	0.0	**90 Sec**		
		0.0	0.0	20	80	0.0	**2 Minutes**		
		0.0	0.0	20	80	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306C	08/08/2012	0.1	0.0	20.5	79.5	0.0	**30 Sec**	-1.0 l/hr	0.63
Bedrock		0.1	0.0	20.5	79.5	0.0	**60 Sec**		
@1056		0.1	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306B	08/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	-0.0 l/hr	0.66
@1050		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**4 Minutes**		

Tide (Cobh)	04:11	0.9 m		10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306D	08/08/2012	20.0	0.3	15.9	63.8	0.0	**30 Sec**	-0.3 l/hr	0.62
@1105		18	0.1	16.3	66.7	0.0	**60 Sec**		
		13.5	0.1	17.5	69.3	0.0	**90 Sec**		
		9	0.0	18.5	72.4	0.0	**2 Minutes**		
		5.6	0.0	19.3	75.2	0.0	**3 Minutes**		
		3.1	0.0	19.9	77	0.0	**4 Minutes**		
		1.4	0.0	20.3	78.3	0.0	**5 Minutes**		
		0.8	0.0	20.4	78.8	0.0	**6 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH303	08/08/2012	0.0	0.0	19.8	80.2	0.0	**30 Sec**	+0.1 l/hr	2.89
@1115		0.0	0.0	19.8	80.2	0.0	**60 Sec**		
		0.0	0.0	19.8	80.2	0.0	**90 Sec**		
		0.0	0.0	19.8	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.2	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH302	08/08/2012	0.4	0.0	18.8	80.8	0.0	**30 Sec**	+0.2 l/hr	3.63
GW		0.3	0.0	18.6	81.1	0.0	**60 Sec**		
@1140		0.3	0.0	18.6	81.1	0.0	**90 Sec**		
		0.3	0.0	18.6	81.1	0.0	**2 Minutes**		
		0.3	0.0	18.6	81.1	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH302	08/08/2012	0.0	0.0	16.2	83.8	0.0	**30 Sec**	+0.1 l/hr	3.66
GAS		0.0	0.0	16.2	83.8	0.0	**60 Sec**		
@1130		0.0	0.0	16.2	83.8	0.0	**90 Sec**		
		0.0	0.0	16.2	83.8	0.0	**2 Minutes**		
		0.0	0.0	16.2	83.8	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH119	08/08/2012	0.0	0.0	18.4	81.6	0.0	**30 Sec**	+0.2 l/hr	2.95
@1146		0.0	0.0	18.4	81.6	0.0	**60 Sec**		
		0.0	0.0	18.4	81.6	0.0	**90 Sec**		
		0.0	0.0	18.4	81.6	0.0	**2 Minutes**		
		0.0	0.0	18.4	81.6	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH301	08/08/2012	0.1	0.0	20.4	79.5	0.0	**30 Sec**	+0.2 l/hr	2.8	1%
GW		0.1	0.0	20.4	79.5	0.0	**60 Sec**			
@1210		0.1	0.0	20.5	79.4	0.0	**90 Sec**			1%
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**			
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**			

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH301	08/08/2012	0.1	0.0	15.1	84.8	0.0	**30 Sec**	+0.2 l/hr	2.7	1%
GAS		0.1	0.0	15.1	84.8	0.0	**60 Sec**			
@1158		0.1	0.0	15.1	84.8	0.0	**90 Sec**			1%
		0.1	0.0	15.1	84.8	0.0	**2 Minutes**			
		0.1	0.0	15.1	84.8	0.0	**3 Minutes**			

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH120	08/08/2012	0.0	0.0	15.2	84.8	0.0	**30 Sec**	+0.0 l/hr	3.48
@1230		0.0	0.0	15.2	84.8	0.0	**60 Sec**		
		0.0	0.0	15.1	84.9	0.0	**90 Sec**		
		0.0	0.0	15	85	0.0	**2 Minutes**		
		0.0	0.0	15	85	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m		10:06	3.6 m		16:29	0.9 m		22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH304	08/08/2012	4.2	0.2	15.9	79.6	0.0	**30 Sec**	-0.0 l/hr	3.3
GW		3.3	0.2	16.7	79.8	0.0	**60 Sec**		
@1555		2.9	0.2	17	79.9	0.0	**90 Sec**		
		2.9	0.2	17	79.9	0.0	**2 Minutes**		
		2.8	0.2	17.1	79.8	0.0	**3 Minutes**		
		2.6	0.2	17.4	79.8	0.0	**4 Minutes**		
		2.6	0.2	17.4	79.9	0.0	**5 Minutes**		
		2.3	0.2	17.4	80.1	0.0	**6 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH304	08/08/2012	0.0	0.0	5.2	94.8	0.0	**30 Sec**	+0.0 l/hr	3.2
GAS		0.0	0.0	4.8	95.2	0.0	**60 Sec**		
@1600		0.0	0.1	4.7	95.2	0.0	**90 Sec**		
		0.0	0.0	4.6	95.3	0.0	**2 Minutes**		
		0.0	0.0	4.6	95.3	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH116	08/08/2012	16.3	0.6	10.7	72.5	0.0	**30 Sec**	+0.0 l/hr	2.77
@1250		16.2	0.6	10.6	72.5	0.0	**60 Sec**		
		16.2	0.6	10.5	72.7	0.0	**90 Sec**		
		16.2	0.6	10.5	72.9	0.0	**2 Minutes**		
		16.1	0.6	10.4	72.9	0.0	**3 Minutes**		
		16.1	0.6	10.3	73	0.0	**4 Minutes**		
		16.1	0.6	10.3	73	0.0	**5 Minutes**		
		16.2	0.6	10.2	73	0.0	**6 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH305	08/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	+0.0 l/hr	2.97
GW		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
@1545		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH305	08/08/2012	0.2	0.0	14.5	85.5	0.0	**30 Sec**	-0.0 l/hr	3.00
GAS		0.1	0.0	13.9	86	0.0	**60 Sec**		
@1540		0.0	0.0	13.8	86.2	0.0	**90 Sec**		
		0.0	0.0	13.8	86.2	0.0	**2 Minutes**		
		0.0	0.0	13.8	86.2	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m		10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH316	08/08/2012	89.3	0.0	0.7	10	0.0	**30 Sec**	+9.6 l/hr	1.17
GW		87.1	0.0	1.1	12.0	0.0	**60 Sec**		
@1520		84.3	0.0	1.6	14.6	0.0	**90 Sec**		
		78.3	0.0	2.7	19.1	0.0	**2 Minutes**		
		60	0.0	6.5	33.0	0.0	**3 Minutes**		
		39	0.0	10.7	49.6	0.0	**4 Minutes**		
		5.1	0.0	19.4	75.3	0.0	**8 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH316	08/08/2012	0.3	0.0	20	79.7	0.0	**30 Sec**	-0.2 l/hr	1.03
GAS		0.3	0.0	20	79.7	0.0	**60 Sec**		
@1510		0.3	0.0	20	79.7	0.0	**90 Sec**		
		0.2	0.0	20.2	79.6	0.0	**2 Minutes**		
		0.2	0.0	20.2	79.6	0.0	**3 Minutes**		
		0.2	0.0	20.2	79.6	0.0	**4 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH125R	08/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-2.3l/hr	3.00
@1020		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH126	08/08/2012	88.0	0.0	2.5	9.5	0.0	**30 Sec**	-0.1 l/hr	0.98
@1450		73.4	0.0	3	23.6	0.0	**60 Sec**		
		50.6	0.0	7.7	41.7	0.0	**90 Sec**		
		38.8	0.0	10	51.2	0.0	**2 Minutes**		
		25.8	0.0	14	60.2	0.0	**3 Minutes**		
		17.5	0.0	16.2	66.3	0.0	**4 Minutes**		
		12.9	0.0	17.4	69.7	0.0	**5 Minutes**		
		9.6	0.0	18.3	72.1	0.0	**6 Minutes**		
		4.2	0.0	19.5	76.3	0.0	**10 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH309	08/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	+0.0 l/hr	2.36
GAS		0.0	0.0	20.1	79.9	0.0	**60 Sec**		
@1430		0.0	0.0	20.1	79.9	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH309	08/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	+0.0 l/hr	2.38
GW		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
@1437		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Tide (Cobh)	04:11	0.9 m	10:06	3.6 m	16:29	0.9 m	22:28	3.5 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 5/8/12	Day 2 6/8/12	Day 3 7/8/12	Monitoring Day	Day 5 9/10/12
	1008	1006	1016	1023	1027

Weather Conditions: 20^0 C. Foggy and overcast. Light drizzle at 0800 to 1000. Calm very humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH308	08/08/2012	0.0	0.0	8.7	91.3	0.0	**30 Sec**	+0.1 l/hr	Dry
GAS		0.0	0.0	8.4	91.6	0.0	**60 Sec**		
@1410		0.0	0.0	7.8	92.2	0.0	**90 Sec**		
		0.0	0.0	7.7	92.3	0.0	**2 Minutes**		
		0.0	0.0	7.6	92.4	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH308	08/08/2012	0.0	0.0	19.8	80.2	0.0	**30 Sec**	+0.0 l/hr	3
GW		0.0	0.0	20.1	79.9	0.0	**60 Sec**		
@1415		0.0	0.0	20.5	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH117R	08/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	-0.2 l/hr	3.72
@1400		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH311	13/08/2012	0.0	0.0	20	80	0.0	**30 Sec**	-0.0 l/hr	3.69
@0830		0.0	0.0	19.8	80.2	0.0	**60 Sec**		
		0.0	0.0	19.8	80.2	0.0	**90 Sec**		
		0.0	0.0	19.8	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.2	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH118	13/08/2012	0.0	0.0	19.2	80.8	0.0	**30 Sec**	+0.0 l/hr	3.64
@0842		0.0	0.0	19.2	80.8	0.0	**60 Sec**		
		0.0	0.0	19.2	80.8	0.0	**90 Sec**		
		0.0	0.0	19.1	80.9	0.0	**2 Minutes**		
		0.0	0.0	19.1	80.9	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH122B	13/08/2012	0.0	0.0	20.1	79.9	0.0	**30 Sec**	-3.5 l/hr	3.18
@0850		0.0	0.0	20.1	79.9	0.0	**60 Sec**		
		0.0	0.0	20.1	79.9	0.0	**90 Sec**		
		0.0	0.0	20	80	0.0	**2 Minutes**		
		0.0	0.0	20	80	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH312A	13/08/2012	0.0	0.0	19.7	80.3	0.0	**30 Sec**	-0.0 l/hr	3.26
@0910		0.0	0.0	19.7	80.3	0.0	**60 Sec**		
		0.0	0.0	19.7	80.3	0.0	**90 Sec**		
		0.0	0.0	19.7	80.3	0.0	**2 Minutes**		
		0.0	0.0	19.7	80.3	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH312B	13/08/2012	0.0	0.0	19.5	80.5	0.0	**30 Sec**	-0.4 l/hr	3.23
@0920		0.0	0.0	19.5	80.5	0.0	**60 Sec**		
		0.0	0.0	19.5	80.5	0.0	**90 Sec**		
		0.0	0.0	19.5	80.5	0.0	**2 Minutes**		
		0.0	0.0	19.5	80.5	0.0	**3 Minutes**		

Borehole	
BH312C	**Water level (m)**
@0918	4.24

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH314	13/08/2012	0.0	0.0	20	80	0.0	**30 Sec**	-0.1 l/hr	4.32
@0932		0.0	0.0	20	80	0.0	**60 Sec**		
		0.0	0.0	20	80	0.0	**90 Sec**		
		0.0	0.0	20	80	0.0	**2 Minutes**		
		0.0	0.0	20	80	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH313	13/08/2012	0.0	0.0	20	80	0.0	**30 Sec**	-0.0 l/hr	2.92
Gas		0.0	0.0	20	80	0.0	**60 Sec**		
@0945		0.0	0.0	20	80	0.0	**90 Sec**		
		0.0	0.0	20	80	0.0	**2 Minutes**		
		0.0	0.0	20	80	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH313	13/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	+0.2 l/hr	4.32
GW		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@0950		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH127	13/08/2012	0.0	0.0	19.8	80.2	0.0	**30 Sec**	-0.1 l/hr	4.08
@1005		0.0	0.0	19.8	80.2	0.0	**60 Sec**		
		0.0	0.0	19.8	80.2	0.0	**90 Sec**		
		0.0	0.0	19.8	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.2	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH315	13/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-0.1 l/hr	3.77
@1012		0.0	0.0	19.7	80.3	0.0	**60 Sec**		
		0.0	0.0	19.7	80.3	0.0	**90 Sec**		
		0.0	0.0	19.7	80.3	0.0	**2 Minutes**		
		0.0	0.0	19.7	80.3	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH130	13/08/2012	0.0	0.0	20.3	79.7	0.0	**30 Sec**	-0.1 l/hr	5.07
@1020		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310B	13/08/2012	0.2	0.0	20.4	79.4	0.0	**30 Sec**	+1.2 l/hr	5.3
GW		0.2	0.0	20.4	79.4	0.0	**60 Sec**		
@		0.1	0.0	20.4	79.5	0.0	**90 Sec**		
		0.1	0.0	20.4	79.5	0.0	**2 Minutes**		
LEL		0.1	0.0	20.4	79.5	0.0	**3 Minutes**		
3% & 2%									

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310B	13/08/2012	0.1	0.0	20.4	79.5	0.0	**30 Sec**	-0.0 l/hr	4.88
GAS		0.1	0.0	20.3	79.6	0.0	**60 Sec**		
@1155		0.1	0.0	20.2	79.7	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
LEL		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		
1%									
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310C	13/08/2012	--	--	--	--	--	--	--	5.44
@1200									

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310A	13/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	+0.0 l/hr	3.87
@1212		0.1	0.0	20.4	79.5	0.0	**60 Sec**		
		0.1	0.0	20.4	79.5	0.0	**90 Sec**		
		0.1	0.0	20.4	79.5	0.0	**2 Minutes**		
		0.1	0.0	20.4	79.5	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH307	13/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	+0.0 l/hr	3.86
GAS		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@ 1205		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH307	13/08/2012	0.0	0.0	20.8	79.2	0.0	**30 Sec**	+0.1 l/hr	3.75
GW		0.0	0.0	20.8	79.2	0.0	**60 Sec**		
@1210		0.0	0.0	20.8	79.2	0.0	**90 Sec**		
		0.0	0.0	20.8	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH128	13/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+0.1 l/hr	4.6
@1240		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH306C	13/08/2012	0.1	0.0	20.8	79.1	0.0	**30 Sec**	+0.9 l/hr	1.06
Bedrock		0.1	0.0	20.8	79.1	0.0	**60 Sec**		
@1312		0.1	0.0	20.8	79.1	0.0	**90 Sec**		
		0.1	0.0	20.8	79.1	0.0	**2 Minutes**		
		0.1	0.0	20.8	79.1	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH306B	13/08/2012	0.0	0.0	20.7	79.2	0.0	**30 Sec**	+0.8 l/hr	1.15
@1250		0.0	0.0	20.7	79.2	0.0	**60 Sec**		
		0.0	0.0	20.7	79.2	0.0	**90 Sec**		
		0.0	0.0	20.7	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.7	79.2	0.0	**3 Minutes**		
		0.0	0.0	20.7	79.2	0.0	**4 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306D	13/08/2012	34.0	0.3	12.2	53.7	0.0	**30 Sec**	-0.2 l/hr	1.01
@1300		32.4	0.2	12.7	54.67	0.0	**60 Sec**		
		28.5	0.2	13.6	57.8	0.0	**90 Sec**		
		26.8	0.2	14.1	58.8	0.0	**2 Minutes**		
		21.2	0.1	16.5	63.4	0.0	**3 Minutes**		
		18.2	0.1	16.4	65.3	0.0	**4 Minutes**		
		15.3	0.1	17.2	67.4	0.0	**5 Minutes**		
		10	0.0	18.6	71.6	0.0	**6 Minutes**		
		7.1	0.0	19.2	73.7	0.0	**7 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH303	13/08/2012	0.0	0.0	17.8	82.2	0.0	**30 Sec**	-0.1 l/hr	3.11
@1340		0.0	0.0	17.8	82.2	0.0	**60 Sec**		
		0.0	0.0	17.8	82.2	0.0	**90 Sec**		
		0.0	0.0	17.8	82.2	0.0	**2 Minutes**		
		0.0	0.0	17.8	82.2	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH302	13/08/2012	1.0	0.0	18.6	80.4	0.0	**30 Sec**	+0.0 l/hr	3.88	18%
GW		0.9	0.0	18.6	80.6	0.0	**60 Sec**			
@1355		0.8	0.0	18.6	80.7	0.0	**90 Sec**			15%
		0.7	0.0	18.4	80.9	0.0	**2 Minutes**			14%
		0.7	0.0	18.4	80.9	0.0	**3 Minutes**			14%
		0.8	0	18.3	80.9	0	**4 Minutes**			15%

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH302	13/08/2012	0.0	0.0	17.4	82.6	0.0	**30 Sec**	-0.2 l/hr	4.16
GAS		0.0	0.0	17.4	82.6	0.0	**60 Sec**		
@1350		0.0	0.0	17.4	82.6	0.0	**90 Sec**		
		0.0	0.0	17.4	82.6	0.0	**2 Minutes**		
		0.0	0.0	17.4	82.6	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH119	13/08/2012	0.0	0.0	19.5	80.5	0.0	**30 Sec**	-0.2 l/hr	3.35
@1402		0.0	0.0	19.5	80.5	0.0	**60 Sec**		
		0.0	0.0	19.5	80.5	0.0	**90 Sec**		
		0.0	0.0	19.5	80.5	0.0	**2 Minutes**		
		0.0	0.0	19.5	80.5	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitorin g Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH301	13/08/2012	0.1	0.0	19.9	79.9	0.0	**30 Sec**	-0.1 l/hr	3.09
GW		0.1	0.0	19.9	80	0.0	**60 Sec**		
@1419		0.1	0.0	19.9	80	0.0	**90 Sec**		
		0.1	0.0	19.9	80	0.0	**2 Minutes**		
		0.1	0.0	20	79.9	0.0	**3 Minutes**		
LEL	1%								

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH301	13/08/2012	0.3	0.0	13.8	86	0.0	**30 Sec**	-0.2 l/hr	2.98	6%
GAS		0.4	0.0	13.5	86.1	0.0	**60 Sec**			7%
@1410		0.3	0.0	13.4	86.3	0.0	**90 Sec**			6%
		0.3	0.0	13.3	86.4	0.0	**2 Minutes**			6%
		0.3	0.0	13.2	86.5	0.0	**3 Minutes**			6%
		0.3		13.1	86.6	0.0	**4 Minutes**			6%

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH120	13/08/2012	0.1	0.0	9.9	90	0.0	**30 Sec**	+0.2 l/hr	3.48	1%
@1435		0.1	0.0	9.8	90.1	0.0	**60 Sec**			
		0.1	0.0	9.5	90.4	0.0	**90 Sec**			
		0.1	0.0	9.3	90.6	0.0	**2 Minutes**			
		0.1	0.0	8.6	91.3	0.0	**3 Minutes**			

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH304	13/08/2012	5.1	0.2	14	80.8	0.0	**30 Sec**	-0.0 l/hr	3.42	
GW		3.2	0.1	16.5	80.4	0.0	**60 Sec**			
@1445		2.8	0.1	16.9	80.2	0.0	**90 Sec**			
		3.3	0.1	16.5	80	0.0	**2 Minutes**			
		2.9	0.1	17	80	0.0	**3 Minutes**			52%
		2.3	0.1	17.6	80	0.0	**4 Minutes**			46%
		1.8	0.1	18.1	80	0.0	**5 Minutes**			35%
		1.8	0.1	18.2	80	0.0	**6 Minutes**			35%

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH304	13/08/2012	0.1	0.0	8.8	91.4	0.0	**30 Sec**	+0.0 l/hr	3.38	1%
GAS		0.1	0.0	7.9	92	0.0	**60 Sec**			
@1455		0.1	0.1	7.4	92.5	0.0	**90 Sec**			
		0.1	0.0	7	92.9	0.0	**2 Minutes**			
		0.1	0.0	6.8	93.1	0.0	**3 Minutes**			

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH116	13/08/2012	19.4	0.4	11.3	68.9	0.0	**30 Sec**	+0.1 l/hr	2.9
@1510		19.5	0.4	11.2	68.9	0.0	**60 Sec**		
		19.7	0.4	11.1	68.8	0.0	**90 Sec**		
		19.9	0.5	11	68.6	0.0	**2 Minutes**		
		20.1	0.4	10.9	68.6	0.0	**3 Minutes**		
		20.4	0.4	10.8	68.4	0.0	**4 Minutes**		
		20.6	0.5	10.7	68.2	0.0	**5 Minutes**		
		20.9	0.6	10.6	68	0.0	**6 Minutes**		
		20.5	0.5	10.6	68.4	0.0	**7 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH305	13/08/2012	0.1	0.0	20.2	79.7	0.0	**30 Sec**	+0.0 l/hr	3.17
GW		0.1	0.0	20.3	79.6	0.0	**60 Sec**		
@1520		0.1	0.0	20.3	79.6	0.0	**90 Sec**		
		0.1	0.0	20.3	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH305	13/08/2012	0.1	0.0	12.7	87.2	0.0	**30 Sec**	-0.0 l/hr	3.12
GAS		0.1	0.0	12.6	87.3	0.0	**60 Sec**		
@1525		0.1	0.0	12.4	87.5	0.0	**90 Sec**		
		0.1	0.0	12.3	87.6	0.0	**2 Minutes**		
		0.1	0.0	12.2	87.7	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH316	13/08/2012	93.3	0.0	0.5	6.2	0.0	**30 Sec**	+25 l/hr	1.07
GW		93.4	0.0	0.3	6.3	0.0	**60 Sec**		
@1118		93.4	0.0	0.3	6.3	0.0	**90 Sec**		
		93.2	0.0	0.3	6.5	0.0	**2 Minutes**		
		90.6	0.0	0.7	8.7	0.0	**3 Minutes**		
		88.3	0.0	1.2	10.5	0.0	**4 Minutes**		
		83.2	0.0	2.1	14.7	0.0	**5 Minutes**		
		62	0.0	5.3	32.7	0.0	**6 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH316	13/08/2012	0.6	0.0	19.7	79.7	0.0	**30 Sec**	-0.3 l/hr	1.15
GAS		0.6	0.0	19.8	79.6	0.0	**60 Sec**		
@1115		0.6	0.0	19.8	79.6	0.0	**90 Sec**		
		0.5	0.0	19.9	79.6	0.0	**2 Minutes**		
		0.5	0.0	19.9	79.6	0.0	**3 Minutes**		
		0.5	0.0	20	79.5	0.0	**4 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH125R	13/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+2.5l/hr	3.96
@1140		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH126	13/08/2012	87.9	0.0	0.9	11.2	0.0	**30 Sec**	-0.0 l/hr	1.14
@1030		80.7	0.0	1.6	17.7	0.0	**60 Sec**		
		76.2	0.0	2.8	21.0	0.0	**90 Sec**		
		58.3	0.0	5.5	36.2	0.0	**2 Minutes**		
		39.2	0.0	10.5	50.3	0.0	**3 Minutes**		
		26.5	0.0	13.8	59.7	0.0	**4 Minutes**		
		13	0.0	17.3	69.7	0.0	**5 Minutes**		
		7.4	0.0	18.7	73.9	0.0	**6 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH309	13/08/2012	0.0	0.0	19.9	80.1	0.0	**30 Sec**	+0.1 l/hr	2.56
GAS		0.0	0.0	19.9	80.1	0.0	**60 Sec**		
@1055		0.0	0.0	19.9	80.1	0.0	**90 Sec**		
		0.0	0.0	19.9	80.1	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.2	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitorin g Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH309	13/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	+0.0 l/hr	2.53
GW		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@1045		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH308	13/08/2012	0.1	0.0	7.6	92.3	0.0	**30 Sec**	+0.0 l/hr	Dry
GAS		0.1	0.0	7.5	92.4	0.0	**60 Sec**		
@1535		0.1	0.0	7.5	92.4	0.0	**90 Sec**		
		0.1	0.0	7.5	92.4	0.0	**2 Minutes**		
		0.1	0.0	7.3	92.6	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH308	13/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	+0.0 l/hr	3.02
GW		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
@1545		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Tide (Cobh)	02:29	3.0 m	08:54	1.4m	15:04	3.1 m	21:30	1.4m

Atmospheric Pressure (3 days before and one day after monitoring	Day 1 10/8/12	Day 2 11/8/12	Day 3 12/8/12	Monitoring Day	Day 5 14/10/12
	1024	1013	1007	1003	1006

Weather Conditions: 20^0 C. Overcast. Light drizzle at 0800 to 0830. Calm & humid.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH117R	13/08/2012	0.0	0.0	20.8	79.2	0.0	**30 Sec**	-0.1 l/hr	2.59
@1600		0.0	0.0	20.8	79.2	0.0	**60 Sec**		
		0.0	0.0	20.8	79.2	0.0	**90 Sec**		
		0.0	0.0	20.8	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH311	20/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	+7.0 l/hr	2.64
@0835		0.0	0.0	20.2	79.8	0.0	**60 Sec**		
		0.0	0.0	20.2	79.8	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH118	20/08/2012	0.0	0.0	19.9	80.1	0.0	**30 Sec**	+2.3 l/hr	2.46
@0845		0.0	0.0	19.9	80.1	0.0	**60 Sec**		
		0.0	0.0	19.9	80.1	0.0	**90 Sec**		
		0.0	0.0	19.9	80.1	0.0	**2 Minutes**		
		0.0	0.0	19.9	80.1	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH122B	20/08/2012	0.0	0.0	19.8	80.2	0.0	**30 Sec**	+19.7 l/hr	1.41
@0855		0.0	0.0	19.8	80.2	0.0	**60 Sec**		
		0.0	0.0	19.8	80.2	0.0	**90 Sec**		
		0.0	0.0	19.8	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.2	0.0	**3 Minutes**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH312A	20/08/2012	0.0	0.0	20.1	79.9	0.0	**30 Sec**	+0.2 l/hr	2.58
@0907		0.0	0.0	20.1	79.9	0.0	**60 Sec**		
		0.0	0.0	20.1	79.9	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH312B	20/08/2012	0.0	0.0	18.6	81.4	0.0	**30 Sec**	-0.1 l/hr	1.72
@0902		0.0	0.0	18.5	81.5	0.0	**60 Sec**		
		0.0	0.0	18.5	81.5	0.0	**90 Sec**		
		0.0	0.0	18.5	81.5	0.0	**2 Minutes**		
		0.0	0.0	18.5	81.5	0.0	**3 Minutes**		

Borehole	Water level (m)
BH312C	
@0910	2.26

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH314	20/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	+0.0 l/hr	2.92
@0914		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	19.9	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.9	80.2	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH313	20/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-0.2 l/hr	2.17
Gas		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
@0920		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH313	20/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-6.6 l/hr	1.73
GW		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
@0928		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitorin g Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH127	20/08/2012	0.1	0.0	19.9	80	0.0	**30 Sec**	-0.0 l/hr	3.72	1%
@940		0.1	0.0	19.9	80	0.0	**60 Sec**			1%
		0.1	0.0	19.9	80	0.0	**90 Sec**			1%
		0.1	0.0	19.9	80	0.0	**2 Minutes**			1%
		0.1	0.0	19.9	80	0.0	**3 Minutes**			1%

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH315	20/08/2012	0.0	0.0	20	80	0.0	**30 Sec**	-0.1 l/hr	2.87
@0950		0.0	0.0	19.9	80.1	0.0	**60 Sec**		
		0.0	0.0	20	80	0.0	**90 Sec**		
		0.0	0.0	20	80	0.0	**2 Minutes**		
		0.0	0.0	20	80	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH130	20/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	-0.0 l/hr	3.42

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m	

Atmospheric Pressure (3 days before and one day after monitoring)

Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

@1000		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310B	20/08/2012	0.1	0.0	20.4	79.5	0.0	**30 Sec**	-3.7 l/hr	5.02
GW		0.1	0.0	20.4	79.5	0.0	**60 Sec**		
@1115		0.2	0.0	20.3	79.5	0.0	**90 Sec**		
		0.3	0.0	20.3	79.5	0.0	**2 Minutes**		
LEL		0.3	0.0	20.3	79.5	0.0	**3 Minutes**		
3% & 2%									

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310B	20/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	-0.1 l/hr	3.65
GAS		0.0	0.0	20.5	79.4	0.0	**60 Sec**		
@1100		0.0	0.0	20.5	79.4	0.0	**90 Sec**		
		0.0	0.0	20.5	79.4	0.0	**2 Minutes**		
LEL		0.0	0.0	20.5	79.4	0.0	**3 Minutes**		
1%									
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m	

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

BH310C	20/08/2012	--	--	--	--	--	--	--	5.41
@1125									

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH310A	20/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	-0.1 l/hr	4.02
@1125		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH307	20/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	+0.1 l/hr	3.2
GAS		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
@1140		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH307	20/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-5.4 l/hr	3.29
GW		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
@1145		0.0	0.0	20.4	79.6	0.0	**90 Sec**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH128	20/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	+0.9 l/hr	4.58
@1155		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306C	20/08/2012	0.0	0.0	20.3	79.7	0.0	**30 Sec**	-0.4 l/hr	1.02
Bedrock		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
@1345		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306B	20/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	-0.1 l/hr	0.55
@1235		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**4 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306D	20/08/2012	13.0	0.1	17.2	69.7	0.0	**30 Sec**	-0.1 l/hr	0.78
@1330		10.2	0.0	17.7	72.1	0.0	**60 Sec**		
		10.4	0.0	17.9	71.7	0.0	**90 Sec**		
		9.1	0.0	18.2	72.8	0.0	**2 Minutes**		
		6.8	0.0	18.7	74.5	0.0	**3 Minutes**		
		3.5	0.0	19.4	77.1	0.0	**4 Minutes**		
		2.5	0.0	19.5	78	0.0	**5 Minutes**		
		1.6	0.0	19.8	78.6	0.0	**6 Minutes**		
		1.1	0.0	19.9	79	0.0	**7 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH303	20/08/2012	0.0	0.0	19.7	80.3	0.0	**30 Sec**	-0.2 l/hr	3.1
@1352		0.0	0.0	19.6	80.4	0.0	**60 Sec**		
		0.0	0.0	19.6	80.4	0.0	**90 Sec**		
		0.0	0.0	19.6	80.4	0.0	**2 Minutes**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

		0.0	0.0	19.6	80.4	0.0	**3 Minutes**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m	

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH302	20/08/2012	0.2	0.0	18.5	81.3	0.0	**30 Sec**	-0.1 l/hr	3.71	3%
GW		0.1	0.0	18	79.9	0.0	**60 Sec**			2%
@1355		0.1	0.0	17.8	82.2	0.0	**90 Sec**			2%
		0.1	0.0	17.3	82.6	0.0	**2 Minutes**			2%
		0.1	0.0	17.1	82.6	0.0	**3 Minutes**			2%
		0.1	0	16.9	83	0	**4 Minutes**			2%

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH302	20/08/2012	0.0	0.0	16.3	83.7	0.0	**30 Sec**	-0.2 l/hr	4.54
GAS		0.0	0.0	16.2	83.8	0.0	**60 Sec**		
@1400		0.0	0.0	15.8	84.2	0.0	**90 Sec**		
		0.0	0.0	15.6	84.4	0.0	**2 Minutes**		
		0.0	0.0	15.6	84.4	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH119	20/08/2012	0.0	0.0	18	82	0.0	**30 Sec**	-0.1 l/hr	3.34
@1430		0.0	0.0	18	82	0.0	**60 Sec**		
		0.0	0.0	18	82	0.0	**90 Sec**		
		0.0	0.0	18	82	0.0	**2 Minutes**		
		0.0	0.0	18	82	0.0	**3 Minutes**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitorin g Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH301	20/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	-0.1 l/hr	2.78
GW		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@1438		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		
LEL	1%								

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH301	20/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	-0.2 l/hr	2.7
GAS		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
@1445		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**4 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH120	20/08/2012	0.1	0.0	17.5	82.4	0.0	**30 Sec**	+0.0 l/hr	3.17	1%
@1455		0.1	0.0	16.4	83.6	0.0	**60 Sec**			
		0.1	0.0	15.2	84.7	0.0	**90 Sec**			
		0.1	0.0	13.5	86.4	0.0	**2 Minutes**			
		0.1	0.0	11.5	88.4	0.0	**3 Minutes**			

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH304	20/08/2012	4.3	0.1	16.2	79.6	0.0	**30 Sec**	-0.0 l/hr	3.08	81%
GW		3.6	0.1	16.7	79.6	0.0	**60 Sec**			70%
@1510		3.4	0.1	17	79.6	0.0	**90 Sec**			67%
		3.1	0.1	17.2	79.6	0.0	**2 Minutes**			60%
		3.2	0.1	17.1	79.6	0.0	**3 Minutes**			63%
		3	0.1	17.4	79.6	0.0	**4 Minutes**			59%
		2.9	0.1	17.5	79.6	0.0	**5 Minutes**			57%
		2.4	0.0	17.7	79.9	0.0	**6 Minutes**			48%

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH304	20/08/2012	0.0	0.0	12.8	87.2	0.0	**30 Sec**	+0.0 l/hr	3.07	0%
GAS		0.1	0.0	12.2	87.7	0.0	**60 Sec**			1%
@1507		0.1	0.1	11.8	88.1	0.0	**90 Sec**			1%
		0.1	0.0	11.4	88.5	0.0	**2 Minutes**			1%
		0.1	0.0	10.8	89.1	0.0	**3 Minutes**			1%

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH116	20/08/2012	30.5	0.2	11	58.3	15.0	**30 Sec**	-0.1 l/hr	2.51
@1520		27.3	0.1	11.9	60.7	14.0	**60 Sec**		
		27.1	0.1	12.2	60.6	14.0	**90 Sec**		
		23	0.1	12.9	64	13.0	**2 Minutes**		
		20.2	0.1	13.8	65.9	11.0	**3 Minutes**		
		20.9	0.1	14.1	64.9	11.0	**4 Minutes**		
		19.2	0.1	14.1	66.6	10.0	**5 Minutes**		
		16.3	0.1	15.1	68.5	8.0	**6 Minutes**		
		16	0.1	15.1	68.8	8.0	**7 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH305	20/08/2012	0.1	0.0	20.1	79.8	0.0	**30 Sec**	-0.0 l/hr	2.74
GW		0.1	0.0	20.2	79.7	0.0	**60 Sec**		
@1550		0.1	0.0	20.2	79.7	0.0	**90 Sec**		
		0.1	0.0	20.2	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.2	79.7	0.0	**3 Minutes**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH305	20/08/2012	0.1	0.0	16.4	83.5	0.0	**30 Sec**	+0.0 l/hr	2.72	0%
GAS		0.1	0.0	16.4	83.5	0.0	**60 Sec**			1%
@1540		0.1	0.0	16.3	83.6	0.0	**90 Sec**			1%
		0.1	0.0	16.3	83.6	0.0	**2 Minutes**			1%
		0.1	0.0	16.3	83.6	0.0	**3 Minutes**			1%

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH316	20/08/2012	84.8	0.0	0.6	14.6	0.0	**30 Sec**	+10 l/hr	0.76
GW		84.4	0.0	0.5	15.1	0.0	**60 Sec**		
@1600		84	0.0	0.6	15.3	0.0	**90 Sec**		
		80.1	0.0	1.7	19.2	0.0	**2 Minutes**		
		77.4	0.0	2.4	20.2	0.0	**3 Minutes**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH316	20/08/2012	0.3	0.0	20.6	79.1	0.0	**30 Sec**	-1.0 l/hr	0.85	
GAS		0.2	0.0	20.6	79.2	0.0	**60 Sec**			4%
@1610		0.2	0.0	20.6	79.2	0.0	**90 Sec**			4%
		0.2	0.0	20.6	79.2	0.0	**2 Minutes**			4%
		0.2	0.0	20.6	79.2	0.0	**3 Minutes**			4%
		0.2	0.0	20.6	79.2	0.0	**4 Minutes**			4%

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH125R	20/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+2.3l/hr	3.98
@1135		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH126	20/08/2012	78.0	0.0	2.2	19.8	0.0	**30 Sec**	+0.0 l/hr	0.59
@1030		67.4	0.0	4.3	28.3	0.0	**60 Sec**		
		52.5	0.0	6.8	40.7	0.0	**90 Sec**		

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

		36.8	0.0	10.6	52.6	0.0	**2 Minutes**		
		Water					**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH309	20/08/2012	0.1	0.0	20.3	79.6	0.0	**30 Sec**	-0.1 l/hr	2.23	1%
GAS		0.1	0.0	20.3	79.6	0.0	**60 Sec**			1%
@1620		0.1	0.0	20.3	79.6	0.0	**90 Sec**			1%
		0.1	0.0	20.3	79.6	0.0	**2 Minutes**			1%
		0.1	0.0	20.3	79.6	0.0	**3 Minutes**			1%

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH309	20/08/2012	0.1	0.0	20.6	79.3	0.0	**30 Sec**	-0.1l/hr	2.21	1%
GW		0.1	0.0	20.6	79.3	0.0	**60 Sec**			1%
@1625		0.1	0.0	20.6	79.3	0.0	**90 Sec**			1%
		0.1	0.0	20.6	79.3	0.0	**2 Minutes**			1%
		0.1	0.0	20.6	79.3	0.0	**3 Minutes**			1%

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH308	20/08/2012	0.0	0.0	19	81	0.0	**30 Sec**	-0.0 l/hr	Dry	1%
GAS		0.0	0.0	18.3	81.8	0.0	**60 Sec**			1%
@1634		0.0	0.0	17.7	82.3	0.0	**90 Sec**			1%
		0.1	0.0	17.2	82.7	0.0	**2 Minutes**			1%
		0.1	0.0	16.5	83.4	0.0	**3 Minutes**			1%
		0.1	0.0	15.3	84.8	0.0	**4 Minutes**			

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH308	20/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	+0.0 l/hr	3.83
GW		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@1645		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH117R	20/08/2012	0.1	0.0	20.5	79.4	0.0	**30 Sec**	+0.8 l/hr	3.84	1%
@1655		0.1	0.0	20.5	79.4	0.0	**60 Sec**			1%
		0.1	0.0	20.5	79.4	0.0	**90 Sec**			1%
		0.1	0.0	20.5	79.4	0.0	**2 Minutes**			1%

Tide (Cobh)	02:01	0.3 m	07:49	4.3 m	14:19	0.2 m	20:11	4.3 m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 17/8/12	Day 2 18/8/12	Day 3 19/8/12	Monitoring Day	Day 5 21/10/12
	1005	1012	1014	1018	1014

Weather Conditions: 20^0 C. Showers AM, warm and sunny in the afternoon.

		0.1	0.0	20.5	79.4	0.0	**3 Minutes**			1%

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH311	28/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	-0.1 l/hr	3.78
@0940		0.0	0.0	20.2	79.8	0.0	**60 Sec**		
		0.0	0.0	20.2	79.8	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH118	28/08/2012	0.0	0.0	19.8	80.2	0.0	**30 Sec**	-0.1 l/hr	3.99
@0945		0.0	0.0	19.8	80.2	0.0	**60 Sec**		
		0.0	0.0	19.8	80.2	0.0	**90 Sec**		
		0.0	0.0	19.8	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.2	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH122B	28/08/2012	0.0	0.0	20.4	79.7	0.0	**30 Sec**	-0.8 l/hr	3.48
@0950		0.0	0.0	20.4	79.7	0.0	**60 Sec**		
		0.0	0.0	20.4	79.7	0.0	**90 Sec**		
		0.0	0.0	20.4	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.7	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH312A	28/08/2012	0.0	0.0	20.3	79.7	0.0	**30 Sec**	-0.4 l/hr	2.87
@0955		0.0	0.0	20.3	79.7	0.0	**60 Sec**		
		0.0	0.0	20.3	79.7	0.0	**90 Sec**		
		0.0	0.0	20.3	79.7	0.0	**2 Minutes**		
		0.0	0.0	20.3	79.7	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH312B	28/08/2012	0.0	0.0	19.8	80.2	0.0	**30 Sec**	-0.1 l/hr	3.45
@1005		0.0	0.0	19.8	80.2	0.0	**60 Sec**		
		0.0	0.0	19.8	80.2	0.0	**90 Sec**		
		0.0	0.0	19.8	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.8	80.2	0.0	**3 Minutes**		

Borehole	**Water level (m)**
BH312C	
@1000	4.4

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH314	28/08/2012	0.0	0.0	20.2	79.8	0.0	**30 Sec**	+0.0 l/hr	4.05
@1010		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	19.9	80.2	0.0	**2 Minutes**		
		0.0	0.0	19.9	80.2	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH313	28/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	+0.0 l/hr	3.08
Gas		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@1020		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH313	28/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	+0.1 l/hr	3.64
GW		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@0928		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH127	28/08/2012	0.0	0.0	20.1	79.9	0.0	**30 Sec**	-0.0 l/hr	3.65
@1040		0.0	0.0	20.1	79.9	0.0	**60 Sec**		
		0.0	0.0	20.1	79.9	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH315	28/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	-0.1 l/hr	3.75
@1100		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH130	28/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-0.1 l/hr	4.52
@1115		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH310B	28/08/2012	0.2	0.0	20.4	79.4	0.0	**30 Sec**	-0.7 l/hr	5.94
GW		0.2	0.0	20.4	79.4	0.0	**60 Sec**		
@1120		0.2	0.0	20.4	79.4	0.0	**90 Sec**		
		0.2	0.0	20.5	79.3	0.0	**2 Minutes**		
LEL		0.2	0.0	20.5	79.3	0.0	**3 Minutes**		
2%									

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH310B	28/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+0.0 l/hr	4.66
GAS		0.0	0.0	20.5	79.4	0.0	**60 Sec**		
@1125		0.0	0.0	20.5	79.4	0.0	**90 Sec**		
		0.0	0.0	20.5	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.4	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH310C	28/08/2012	--	--	--	--	--	--	--	6.06
@1138									

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH310A	28/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	-0.1 l/hr	4.64
@1140		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH307	28/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	+0.2 l/hr	3.86
GAS		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
@1155		0.0	0.0	20.6	79.4	0.0	**90 Sec**		
		0.0	0.0	20.6	79.4	0.0	**2 Minutes**		
		0.0	0.0	20.6	79.4	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH307	28/08/2012	0.0	0.0	20.5	79.5	0.0	**30 Sec**	-4.1 l/hr	3.46
GW		0.0	0.0	20.5	79.5	0.0	**60 Sec**		
@1150		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH128	28/08/2012	0.0	0.0	20.4	79.6	0.0	**30 Sec**	+0.1 l/hr	5.19
@1200		0.0	0.0	20.4	79.6	0.0	**60 Sec**		
		0.0	0.0	20.4	79.6	0.0	**90 Sec**		
		0.0	0.0	20.4	79.6	0.0	**2 Minutes**		
		0.0	0.0	20.4	79.6	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	LEL
BH306C	28/08/2012	0.1	0.0	20.8	79.1	0.0	**30 Sec**	+0.4 l/hr	0.69	1%
Bedrock		0.1	0.0	20.8	79.1	0.0	**60 Sec**			1%
@1500		0.1	0.0	20.8	79.1	0.0	**90 Sec**			1%
		0.1	0.0	20.8	79.1	0.0	**2 Minutes**			1%
		0.1	0.0	20.8	79.1	0.0	**3 Minutes**			1%

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH306B	28/08/2012	0.1	0.0	20.9	79	0.0	**30 Sec**	+0.1 l/hr	0.84
@1525		0.1	0.0	20.9	79	0.0	**60 Sec**		
		0.1	0.0	20.9	79	0.0	**90 Sec**		
		0.1	0.0	20.9	79	0.0	**2 Minutes**		
		0.1	0.0	20.9	79	0.0	**3 Minutes**		
		0.1	0.0	20.9	79	0.0	**4 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH306D	28/08/2012	21.1	0.2	15.8	62.9	0.0	**30 Sec**	+0.4 l/hr	0.77
@1508		20.2	0.2	15.9	63.7	0.0	**60 Sec**		
		18.6	0.2	16.4	64.8	0.0	**90 Sec**		
		15.5	0.1	17.2	67.2	0.0	**2 Minutes**		
		10.5	0.1	18.4	71	0.0	**3 Minutes**		
		7.8	0.0	19.1	73.1	0.0	**4 Minutes**		
		4.9	0.0	19.8	75.3	0.0	**5 Minutes**		
		2.5	0.0	20.3	77.2	0.0	**6 Minutes**		
		1.6	0.0	19.8	78.6	0.0	**7 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH303	28/08/2012	0.0	0.0	20	80	0.0	**30 Sec**	+0.0 l/hr	3.09
@1230		0.0	0.0	19.9	80.1	0.0	**60 Sec**		
		0.0	0.0	19.9	80.1	0.0	**90 Sec**		
		0.0	0.0	19.9	80.1	0.0	**2 Minutes**		
		0.0	0.0	19.9	80.1	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH302	28/08/2012	0.3	0.0	19.5	80.3	0.0	**30 Sec**	-0.3 l/hr	3.89	6%
GW		0.3	0.0	19	80.7	0.0	**60 Sec**			5%
@1235		0.2	0.0	18.7	81.1	0.0	**90 Sec**			4%
		0.2	0.0	18.8	80.8	0.0	**2 Minutes**			4%
		0.2	0.0	19.4	80.4	0.0	**3 Minutes**			4%
		0.2	0	19.5	80.2	0	**4 Minutes**			4%

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH302	28/08/2012	0.0	0.0	16.4	83.5	0.0	**30 Sec**	-0.3 l/hr	3.96
GAS		0.0	0.0	16.5	83.5	0.0	**60 Sec**		
@1240		0.0	0.0	16.6	83.4	0.0	**90 Sec**		
		0.0	0.0	16.6	83.4	0.0	**2 Minutes**		
		0.0	0.0	16.6	83.4	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH119	28/08/2012	0.0	0.0	18.5	81.5	0.0	**30 Sec**	-0.4 l/hr	3.61
@1250		0.0	0.0	18.5	81.5	0.0	**60 Sec**		
		0.0	0.0	18.5	81.5	0.0	**90 Sec**		
		0.0	0.0	18.5	81.5	0.0	**2 Minutes**		
		0.0	0.0	18.5	81.5	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	CO_2 %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH301	28/08/2012	0.0	0.0	20.6	79.4	0.0	**30 Sec**	-0.1 l/hr	3.11
GW		0.0	0.0	20.6	79.4	0.0	**60 Sec**		
@1305		0.0	0.0	20.5	79.5	0.0	**90 Sec**		
		0.0	0.0	20.5	79.5	0.0	**2 Minutes**		
		0.0	0.0	20.5	79.5	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	CO_2 %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH301	28/08/2012	0.4	0.0	17.3	82.3	0.0	**30 Sec**	-0.0 l/hr	3.08	8%
GAS		0.4	0.0	17.2	82.4	0.0	**60 Sec**			7%
@1258		0.4	0.0	17.3	82.3	0.0	**90 Sec**			7%
		0.4	0.0	17.3	82.3	0.0	**2 Minutes**			7%
		0.4	0.0	17.3	82.3	0.0	**3 Minutes**			7%
		0.4	0.0	17.3	82.3	0.0	**4 Minutes**			7%

Borehole	Date	CH_4 %	CO_2 %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH120	28/08/2012	0.0	0.0	7	93	0.0	**30 Sec**	-0.5 l/hr	3.49
@1307		0.1	0.0	7	93	0.0	**60 Sec**		
		0.1	0.0	6.9	93.1	0.0	**90 Sec**		
		0.1	0.0	6.8	93.2	0.0	**2 Minutes**		
		0.1	0.0	6.7	93.3	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH304	28/08/2012	7.8	0.1	10.6	81.6	0.0	**30 Sec**	+0.2 l/hr	3.3
GW		7.6	0.1	10.7	81.6	0.0	**60 Sec**		
@1410		7.6	0.1	10.8	81.5	0.0	**90 Sec**		
		7.6	0.1	10.7	81.6	0.0	**2 Minutes**		
		7.7	0.1	10.6	81.6	0.0	**3 Minutes**		
		7.8	0.1	10.5	81.6	0.0	**4 Minutes**		
		7.9	0.1	10.5	81.5	0.0	**5 Minutes**		
		7.8	0.1	10.3	81.9	0.0	**6 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH304	28/08/2012	0.0	0.0	7.2	92.8	0.0	**30 Sec**	-0.2 l/hr	3.31	1%
GAS		0.1	0.0	7.1	92.8	0.0	**60 Sec**			1%
@1315		0.1	0.0	7	92.9	0.0	**90 Sec**			1%
		0.1	0.0	6.8	93.1	0.0	**2 Minutes**			1%
		0.1	0.0	6.5	93.4	0.0	**3 Minutes**			1%

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH116	28/08/2012	11.1	0.5	13.6	74.8	8.0	**30 Sec**	+0.1 l/hr	3.2
@1325		11.2	0.5	13.5	74.8	8.0	**60 Sec**		
		11.3	0.5	13.4	74.8	8.0	**90 Sec**		
		11.3	0.5	13.4	74.8	7.0	**2 Minutes**		
		11.2	0.5	13.5	74.8	6.0	**3 Minutes**		
		10.8	0.5	13.5	75.2	5.0	**4 Minutes**		
		10.4	0.5	13.6	75.5	5.0	**5 Minutes**		
		9.8	0.5	13.6	76.0	4.0	**6 Minutes**		
		6	0.5	14.4	79.1	3.0	**7 Minutes**		
Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH305	28/08/2012	0.0	0.0	18.2	81.8	0.0	**30 Sec**	-4.6 l/hr	3.73
GW		0.0	0.0	18.2	81.8	0.0	**60 Sec**		
@1352		0.0	0.0	18.2	81.8	0.0	**90 Sec**		
		0.0	0.0	18.2	81.8	0.0	**2 Minutes**		
		0.0	0.0	18.2	81.8	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH305	28/08/2012	0	0.0	15.5	84.5	0.0	**30 Sec**	-0.1 l/hr	3.11
GAS		0	0.0	15.5	84.5	0.0	**60 Sec**		
@1345		0	0.0	15.5	84.5	0.0	**90 Sec**		
		0	0.0	15.5	84.5	0.0	**2 Minutes**		
		0	0.0	15.5	84.5	0.0	**3 Minutes**		

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH316	28/08/2012	91.1	0.0	0.5	8.4	0.0	**30 Sec**	+27.7 l/hr	1.02
GW		91.3	0.0	0.3	8.4	0.0	**60 Sec**		
@1545		91.6	0.0	0.2	8.2	0.0	**90 Sec**		
		91.6	0.0	0.2	8.2	0.0	**2 Minutes**		
		91.5	0.0	0.2	8.3	0.0	**3 Minutes**		
		89.9	0.0	0.6	9.6	0.0	**4 Minutes**		
		86.8	0.0	1.1	12.1	0.0	**5 Minutes**		
		80	0.0	2.5	17.5	0.0	**6 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH316	28/08/2012	3.3	0.0	19.6	77.1	0.0	**30 Sec**	+0.2 l/hr	1.18	61%
GAS		3.1	0.0	19.7	77.2	0.0	**60 Sec**			57%
@1540		2.9	0.0	19.7	77.4	0.0	**90 Sec**			57%
		2.8	0.0	19.7	77.5	0.0	**2 Minutes**			54%
		2.3	0.0	20	77.7	0.0	**3 Minutes**			46%
		2.1	0.0	20.1	77.8	0.0	**4 Minutes**			41%
		1.8	0.0	20.2	78.0	0.0	**5 Minutes**			36%

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**
BH125R	28/08/2012	0.0	0.0	20.7	79.3	0.0	**30 Sec**	+1.9 l/hr	4.20
@1210		0.0	0.0	20.7	79.3	0.0	**60 Sec**		
		0.0	0.0	20.7	79.3	0.0	**90 Sec**		
		0.0	0.0	20.7	79.3	0.0	**2 Minutes**		
		0.0	0.0	20.7	79.3	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH126	28/08/2012	87.7	0.0	0.7	11.6	0.0	**30 Sec**	+0.1 l/hr	1.12
@1600		76.3	0.0	2.6	21.1	0.0	**60 Sec**		
		64.1	0.0	5.1	30.8	0.0	**90 Sec**		
		51.4	0.0	7.7	40.9	0.0	**2 Minutes**		
		31.7	0.0	12.7	55.6	0.0	**3 Minutes**		
		19.6	0.0	15.9	64.5	0.0	**4 Minutes**		
		11.7	0.0	18	70.3	0.0	**5 Minutes**		
		6.4	0.0	19.4	74.2	0.0	**6 Minutes**		
		2.9	0.0	20	77.1	0.0	**7 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH309	28/08/2012	0.0	0.0	20.1	79.9	0.0	**30 Sec**	+0.1 l/hr	2.45
GAS		0.0	0.0	20.1	79.9	0.0	**60 Sec**		
@1215		0.0	0.0	20.1	79.9	0.0	**90 Sec**		
		0.0	0.0	20.1	79.9	0.0	**2 Minutes**		
		0.0	0.0	20.1	79.9	0.0	**3 Minutes**		

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH309	28/08/2012	0.0	0.0	20.8	79.2	0.0	**30 Sec**	-0.3 l/hr	2.45
GW		0.0	0.0	20.8	79.2	0.0	**60 Sec**		
@1220		0.0	0.0	20.8	79.2	0.0	**90 Sec**		
		0.0	0.0	20.8	79.2	0.0	**2 Minutes**		
		0.0	0.0	20.8	79.2	0.0	**3 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)
BH308	28/08/2012	0.0	0.0	11.2	88.8	0.0	**30 Sec**	-0.0 l/hr	Dry
GAS		0.0	0.0	11.2	88.8	0.0	**60 Sec**		
@1430		0.0	0.0	10.8	89.2	0.0	**90 Sec**		
		0.1	0.0	10.4	89.5	0.0	**2 Minutes**		
		0.1	0.0	10.3	89.6	0.0	**3 Minutes**		
		0.1	0.0	9.8	90.1	0.0	**4 Minutes**		

Borehole	Date	CH_4 %	$C0_2$ %	O_2 %	Bal %	H_2S ppm	Time	Flow	Water level (m)	LEL
BH308	28/08/2012	0.1	0.0	20.4	79.5	0.0	**30 Sec**	+0.0 l/hr	3.95	1%
GW		0.1	0.0	20.3	79.6	0.0	**60 Sec**			1%
@1440		0.1	0.0	20.1	79.8	0.0	**90 Sec**			1%
		0.1	0.0	19.8	80.1	0.0	**2 Minutes**			1%
		0.1	0.0	19.6	80.3	0.0	**3 Minutes**			1%

Tide (Cobh)	03:13	3.4 m	09:41	1.0 m	15:48	3.6 m	22:18	0.9m

Atmospheric Pressure (3 days before and one day after monitoring)	Day 1 25/8/12	Day 2 26/8/12	Day 3 27/8/12	Monitoring Day	Day 5 29/10/12
	1007	1015	1001	1010	1002

Weather Conditions: 12-18^0 C. Overcast and Windy and partly sunny in the afternoon.

Borehole	**Date**	**CH_4 %**	**$C0_2$ %**	**O_2 %**	**Bal %**	**H_2S ppm**	**Time**	**Flow**	**Water level (m)**	**LEL**
BH117R	28/08/2012	0.1	0.0	20.7	79.2	0.0	**30 Sec**	+0.4 l/hr	3.31	1%
@1655		0.1	0.0	20.8	79.1	0.0	**60 Sec**			1%
		0.1	0.0	20.8	79.1	0.0	**90 Sec**			1%
		0.1	0.0	20.8	79.1	0.0	**2 Minutes**			1%
		0.1	0.0	20.8	79.1	0.0	**3 Minutes**			1%