Haigh Huddleston & Associates
Civil Structural Engineering Consultants
Firth Buildings, 99 - 101 Leeds Rd, Dewsbury, WF12 7BU t 01924 464342 f 01924 450662
e trevor.haigh@haighhuddleston.co.uk

FLOOD RISK ASSESSMENT

ON

Proposed Extension at Goldthorpes Cornmillers Ltd, Lee Lane Mill, Lee lane, Millhouse Green, Sheffield S60 9NN

FOR

Goldthorpes Cornmillers Ltd, c/o Townsend Planning

E10/5225/FR001

August 2010

T. Haigh. BSc.,C.Eng.M.I.C.E.

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INTRODUCTION

This report is commissioned to investigate and report on the Flood Risk of this site in accordance with PPS25. The report is based on information supplied by the client and from relevant authorities in both written and verbal format. Due to the short timescales available some of this information is in verbal form only. No liability can be accepted for information supplied by third parties which is subsequently found to be inaccurate or incorrect.

THE SITE

The site is located off Lee Lane , Millhouse Green, South Yorkshire S60 9NN and is situated around Ordnance Survey grid reference SE 21023 03202. It lies approx 2 miles west of Penistone town centre. A site location plan is shown on Figure 1 in Appendix B.

The site is rectangular in nature and is currently covered by a series of steel portal framed industrial buildings, with the majority of the frontage along Lee Lane. The majority of the site is covered in concrete hard standings that are drained to the highway drainage system. The eastern most part of the site is still covered with derelict farm buildings and it is in this area that the proposed extension to the main buildings is to be made. The total site area is approximately 0.725ha.

The site is bound by Lee Lane to the South existing residential properties to the East and arable farm land to the north south and west of the site. There is an open all weather equestrian dressage paddock area to the north. Current site access is from the southern boundary to the site.

The nearest water course to the site is Flash House Dike which is located 200m to the north of the site. This flows from west to south east and passes beneath the main road approx 150m from the site. This then flows northwards into the River Don approximately 0.5km to the south of the site. The River Don then flows eastwards away from the site.

The site falls from west to east and very slightly from south to north. Beyond the site to the north the land falls very slowly towards Flash House Dike, beyond this the land rises steeply northwards. The land to the south on the far side of Lee Lane falls towards the site. The land to north and east falls away from the site.

On site levels varying from approximately 247m in the north west corner to 242m AOD in the south east corner. There are substantial areas of roofed buildings and hard paved or concrete yard areas on site and we understand these all drain to the south east corner and thence into a highway drain.

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PROPOSED DEVELOPMENT

We have a preliminary copy of the proposed development which shows an extension to the main industrial sheds. The proposals are therefore for limited industrial development on the eastern part of the site. A copy of the site proposals are attached to this report.

FLOOD RISK

PPS 25 – Development and Flood Risk 2007 requires that Flood Risk Assessments review whether the development of a site will not add to, and should, where practicable, reduce the flood risk for both on site and off site properties. The future users of the development must not be placed in danger from flooding and should remain so throughout the lifetime of the proposed development. It also requires that the effects of climate change are taken into account together with the impacts of extreme events and flood defence failures.

To this extent the Sequential Test outlined in PPS 25, must be applied to each development site.

Based on the published Environment Agency Flood Risk Maps the developed residential portion of the site does not fall within the 0.1% Flood Risk nor does it fall within the 1% Flood Risk area. The area of the site therefore falls within the low probability zone 1.

The development falls within the Less Vulnerable Classification in Table 02 of Annex D to PPS25. The site has previously been developed. Based on that simple criteria the sequential test is therefore met and development is considered appropriate.

There are a number of potential flooding mechanisms that PPS25 now requires are evaluated for each proposed development site. Each method of flooding requires an assessment to be made on its probability relative to the site development. The normal requirement of the document is for no flooding of properties for storms up to a 1% probability or a once in a 1000 years storm. The risk assessment also includes for flooding both on site and off site, and the effects of the development on the downstream catchment or the flow regime of the watercourse. PPS25 also requires that the effects of severe storms above the normal 1% probability are reviewed together with the effects of climatic change relating to the design life of the development. Access to and from the site during extreme storms also need to be evaluated.

Each Flood Risk mechanism will be discussed in turn. We consider there are three main risks of flooding to the site the alternative mechanisms are not applicable to this site.

1. Inundation from floodwaters leaving watercourses or rivers entering the site. This can include the effects on culverted watercourses and where the risk of blockage can occur and from breach scenarios.

2. Rainwater falling on the site and not being able to leave the site at sufficient rate to prevent flooding on the site.

3. Overland flows from adjacent land sites due to surcharging of sewerage systems or other watercourses.

The impact of the developed site on the existing drainage systems and off-site surface water systems must also be assessed as part of this flood risk assessment.

1. Flood Risk from Watercourses, River & Tidal

The proposed residential portion of the development site appears not to fall within the 1% probability Flood Risk Maps as published by the Environment Agency nor within the 0.1% Flood Risk Area.

The risk of flooding to buildings from river or tidal water is therefore considered acceptable for this development

2. Risk of Flooding from overland flows from adjacent land.

The site lies on a slightly sloping site with open fields on three sides falling from west to east and from south to north. The topographical levels are such that the risk from overland surface water run off from adjacent land entering the site would be quite low. Flows from these areas would only occur when the land becomes saturated and the land drainage system is overloaded. In the first instance the flows would follow the existing road pattern across the site and not enter the site. There is only a small catchment to develop flows and this is unlikely to pass through the site due to the highway and stone walls to the adjacent fields. This risk would be considered as substantially low and deemed acceptable for this development.

3. Risk of Flooding from Rainwater Falling on Site

The risk of flooding from water falling on site and not being able to leave can be managed by the use of underground storage systems. The site currently has extensive impermeable areas relating to the roof areas and hard paved areas around the existing buildings. We understand that there has previously been local drainage issues with adjacent land but this had been resolved by the connection of the site storm-water flows to the highway drain in Lee Lane.

Discussions with Yorkshire water and Barnsley MDC Land Drainage Department will be necessary to agree discharge rates but these should result in an allowable discharge of approx 42 lit/s. This is based on achieving a reduction of existing flows from the site to 70% of the current unrestricted discharge from the developed site for a 1 in 1 year storm. Onsite disposal should be investigated further but it is thought that the underlying strata would be un-suitable for this infiltration method on this site.

Accordingly attenuation of stormwater discharges to the proposed level would be required as part of the development.

Based on the proposed development and the increase in impermeable areas for a discharge of 42 lit/sec the approximate storage volume required would be 72 cu.m to cater for a 100 year storm which would rise to 118cu.m when the effects of climate change in accordance with PPG25 are considered against the design life of the project. Whilst this can be provided in a number of forms such as a small open swale or detention basin the site constraints require that the use of underground storage systems would be the most suitable option.

The cumulative effect of development has to be taken in to consideration. It would therefore be prudent to restrict flows from the site to agreed discharge rates and provide storage to cater for storms up to the 1% return probability and add an allowance for climatic change related to the design life of the propose development. This would currently suggest a 20% increase in flood water storage volume requirements.

The development of the site without storm-water attenuation would increase the risk of flooding downstream of the site. There are known problems with the River Don Catchment and any increase in discharges to it would accentuate these problems. It is therefore important that on site attenuation is implemented on this site

This method of storm-water disposal proposed would also reduce the flood risks to downstream properties due to the site development. If on-site balancing is utilised then the risk to downstream properties would be negligible in relation to flood water flows in the downstream watercourse.

Site Access and Extreme Storms

During extreme flood events above the 1% risk level the site access road fronting the site could become flooded from over land run-off. These flows are however likely to be very shallow due to the topography but access to the site would still be available for vehicles or pedestrians with care, and certainly for emergency vehicles. The building should afford a safe refuge for the duration of flooding which is likely to be .of short duration due to the size of the catchment. The risk to the site is

therefore considered to be acceptable but they may be isolated during extreme flooding conditions for short periods of time.

CONCLUSIONS

In our opinion the proposed development site is not at risk of flooding from river or tidal water up to a 0.1% return period.

There is a very low risk of flooding from overland flows during extreme events.

The site access may be affected during severe storms but this is unlikely to prevent access by vehicles or emergency services, and would be of a short duration.

The development of the site without any attenuation of storm-water discharges could create further problems on the downstream watercourse, so attenuation of storm-water flows to agreed rates will be required. We are proposing that existing flows are restricted to 70% of current annual storm discharge rates.

The use of infiltration systems to serve the development is thought to be unfeasible but further site investigations should be carried out to assess their suitability for this site.

If the measures outlined above are implemented we would consider that the requirements of PPS25 can be satisfied.



T.Haigh B.Sc. C.Eng M.I.C.E.

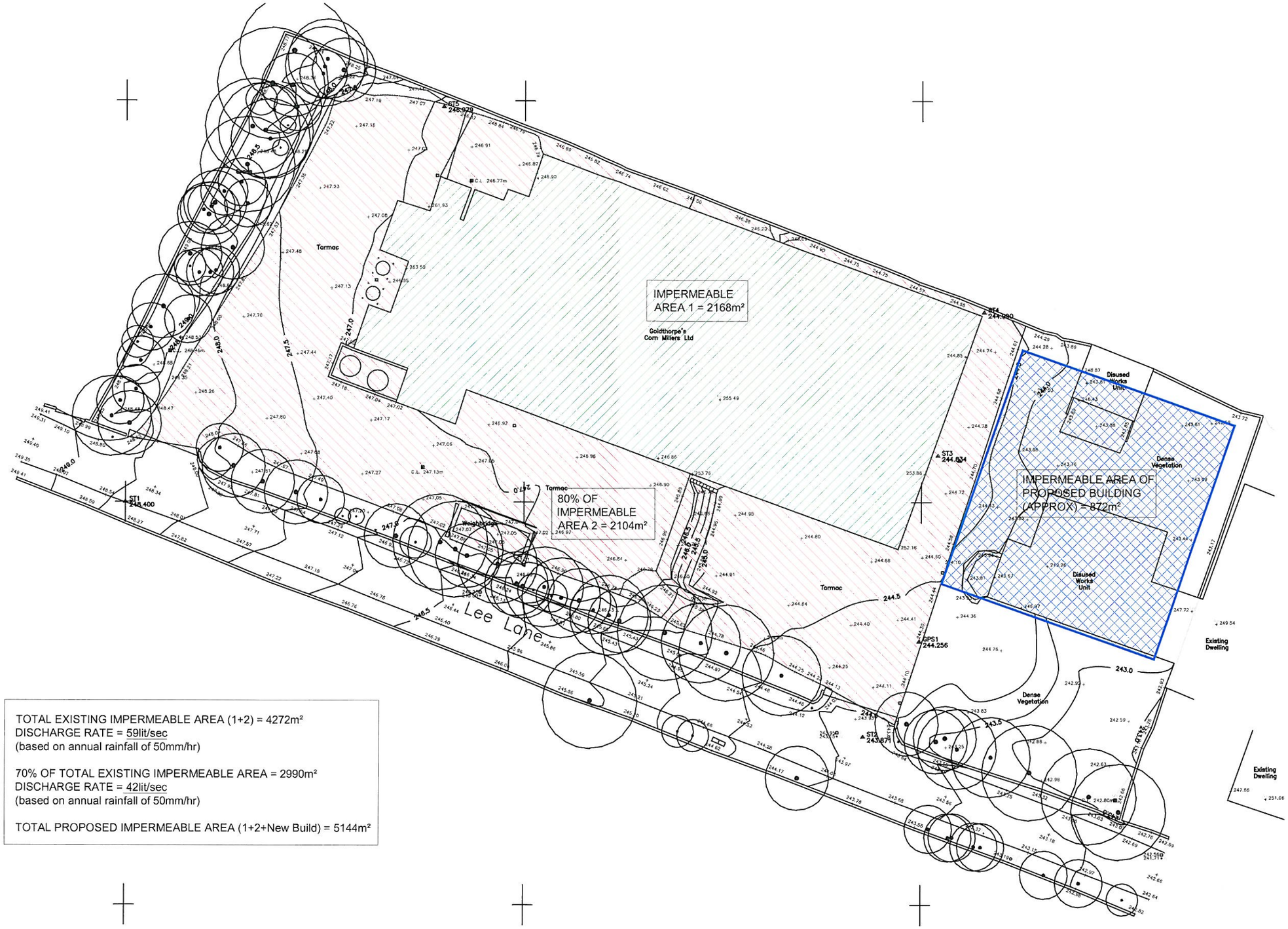
APPENDIX A

LOCATION PLAN

Issues
Sinks
Sinks
Issues
Flash House Dike
Small Shaw Dike
Catshaw Cross
(remains of)
Works
LEE LANE
Catshaw Cross
Farm
Catshaw
Green
Cottage
CATSHAW LANE
Path
237m
Sinks
Issues
Sks
Track
Iss
Path
Rough
Brow
Issues
Southways
Sks
Lee Lane Dike
Bullhouse
Mill
Sluice
Weir
Air Shaft
224m
Drain
Bullhou
Bridg
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APPENDIX B

PROPOSED IMPERMEABLE AREAS



TOTAL EXISTING IMPERMEABLE AREA (1+2) = 4272m²
DISCHARGE RATE = 59lit/sec
(based on annual rainfall of 50mm/hr)

70% OF TOTAL EXISTING IMPERMEABLE AREA = 2990m²
DISCHARGE RATE = 42lit/sec
(based on annual rainfall of 50mm/hr)

TOTAL PROPOSED IMPERMEABLE AREA (1+2+New Build) = 5144m²

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e trevor.haigh@haighhuddleston.co.uk

Project	Lee Lane Mill, Millhouse Green
Client	Townsend Planning
Detail	Proposed Impermeable Areas

Scale	Dwn	Chkd	Date	Dwg No.
1:500	HS		Aug-10	E10/5225/01

APPENDIX C

FLOOD RISK MAP



Risk of Flooding

Enter postcode or place name:

HX7 5AA

Search

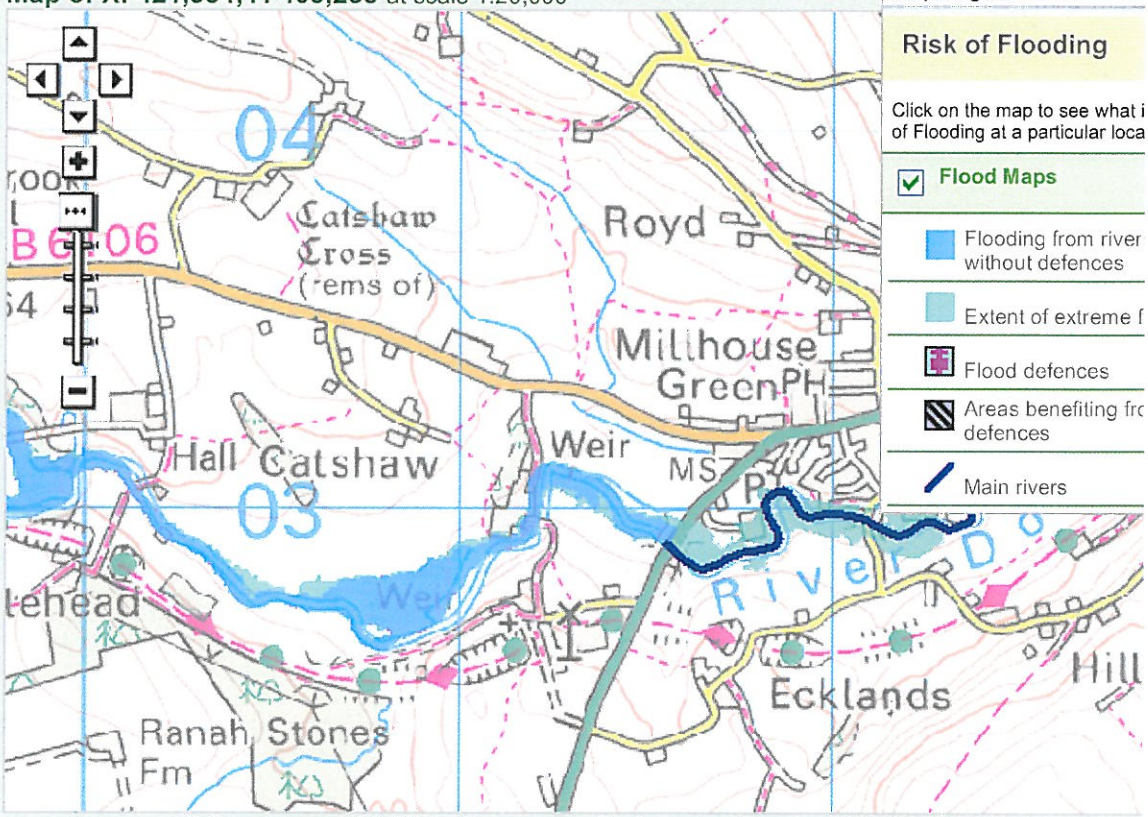
Overview map:



Other topics for this area...

- Risk of Flooding
- Flood Warning Areas
- Landfill
- Pollution
- Air Pollution
- Rivers
- Bathing Water Quality
- Groundwater
- Environment Agency Offices
- River Basin Management Plans - Rivers
- River Basin Management Plans - Lakes
- River Basin Management Plans - Coastal Waters
- River Basin Management Plans - Estuarine
- River Basin Management Plans - Groundwater

Map of X: 421,384;Y: 403,253 at scale 1:20,000



Map Legend

Risk of Flooding

Click on the map to see what i of Flooding at a particular loca

Flood Maps

Flooding from river without defences

Extent of extreme f

Flood defences

Areas benefiting fr defences

Main rivers

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» view text version of all results

Issues have been identified in Risingbrook, Stafford and on the Upper Don from Penistone to Oughtibridge, Sheffield:

These will be resolved during the next update in July 2010.
For further information regarding these areas please contact us directly.

More about flooding:

» Understanding the flood map
A more detailed explanation to help you understand the flood map shown above.

» Current flood warnings
We provide flood warnings online 24 hours a day. Find out the current flood warning status in your local area.

» Flood map - your questions answered
Answers to commonly asked questions about the flood map.

APPENDIX D

DRAINAGE RECORDS

YorkshireWater

RECEIVED
- 5 AUG 2010
MWA

Yorkshire Water
Developer Services Team
Western House
Halifax Road
PO Box 500
Bradford
BD6 2SZ

Tel: 0845 120 8482
Fax: (01274) 372 834

Email:
Planning.Sewerage@yorkshirewater.co.uk

Haigh Huddleston & Associates
Firth Buildings
99-101 Leeds Road
Dewsbury
WF12 7BU

For the attention of Helen Shaw.

Your Ref:
Our Ref: L004961

For telephone enquiries ring:

Kashif Khan on (0845)120 8482

3rd August 2010

Dear Madam,

Off Lee Lane Millhouse Green S86 9NN - Pre-Planning Sewerage Enquiry - Industrial

Thank you for your enquiry received 19th July 2010. Our charge of £60.00 (plus VAT) will be added to your account with us, reference MWA057. You will receive an invoice for your account in due course.

Please find enclosed a complimentary extract from the Statutory Sewer Map. This indicates the recorded position of the public sewers. The following comments reflect our view, with regard to the public sewer network only, based on a 'desk top' study of the site:

The site is remote from the public sewer network.

Development of the site should take place with separate systems for foul and surface water drainage. The separate system should extend to the public sewer.

Foul water should discharge to the 150 mm diameter public combined sewer recorded in Lee Lane, at a point approximately 770 metres from the site.

From the information supplied, it is not possible to determine if the whole site will drain by gravity to the public sewer network. If the site, or part of it, will not drain by gravity, then it is likely that a sewage pumping station will be required to facilitate connection to the public sewer network. If sewage pumping is required foul water discharge must not exceed 5 (five) litres per second.

The developer's attention is drawn to Requirement H3 of the Building Regulations 2000. This establishes a preferred hierarchy for surface water disposal. Consideration should firstly be given to discharge to soakaway, infiltration system and watercourse in that priority order.

Sustainable Drainage Systems (SUDS), for example the use of soakaways and/or permeable hardstanding etc., may be a suitable solution for surface water disposal appropriate in this situation. You are advised to seek comments on the suitability of SUDS in this instance from the appropriate authorities.

Where appropriate, soakaways, swales and infiltration trenches (SUDS) may be adopted as part of the public sewer network. For general conditions for the adoption of SUDS please see the attached sheet. Further information may be seen in the DEFRA publication 'Interim Code of Practice for Sustainable Drainage Systems' (ISBN 0-86017-904-4). If the developer is considering adoption of SUDS they should contact our Developer Services Team on 0845 120 84 82.

There are no public surface water sewers available in the vicinity to accept any surface water discharge from this site. Therefore, I would advise you to contact the Environment Agency/local Land Drainage Authority with a view to establishing a suitable watercourse for discharge.

It is understood that a watercourse (Flash House Dike) is located to the North and East of the site. This appears to be the obvious place for surface water disposal.

Please note further restrictions on surface water disposal from the site may be imposed by other parties. You are strongly advised to seek advice/comments from the Environment Agency/Land Drainage Authority/Internal Drainage Board, with regard to surface water disposal from the site.

Off-site drains may be required which may be provided by the developer and considered for adoption under Section 104 of the Water Industry Act 1991. Please telephone 0845 120 84 82 for advice on sewer adoptions. Alternatively, the developer may in certain circumstances be able to requisition off-site sewers under Section 98 of the Water Industry Act 1991 for which an application must be made in writing. For further information, please telephone 0845 120 84 82.

Prospectively adoptable sewers and pumping stations must be designed and constructed in accordance with the WRc publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition as supplemented by Yorkshire Water's requirements, pursuant to an agreement under Section 104 of the Water Industry Act 1991. An application to enter into a Section 104 agreement must be made in writing prior to any works commencing on site. Please contact our Developer Services Team (telephone 0845 120 84 82) for further information.

The public sewer network is for domestic sewage purposes. This generally means foul water for domestic purposes and, where a suitable surface water or combined sewer is available, surface water from the roofs of buildings together with surface water from paved areas of land appurtenant to those buildings. Land and highway drainage have no right of connection to the public sewer network. Highway drainage, however, may be accepted under certain circumstances; for instance, if SUDS are not a viable option and there is no highway drain available and if capacity is available within the public sewer network. In this event, the developer will be required to enter into a formal agreement with Yorkshire Water Services under Section 115 Water Industry Act 1991 to discharge non-domestic flows into the public sewer network.

No land drainage to be connected/discharged to public sewer.

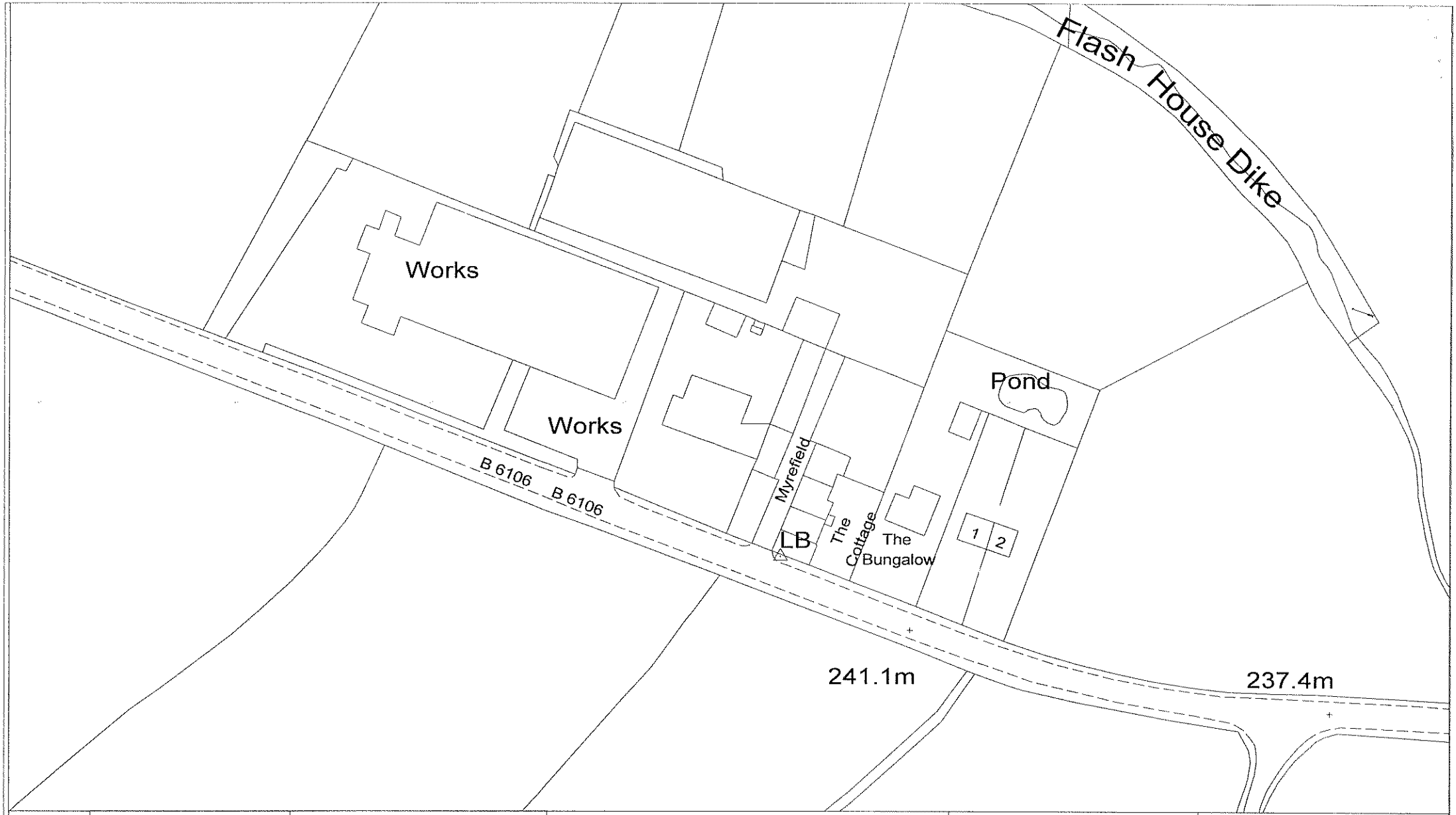
Any new connection to an existing public sewer will require the approval of Yorkshire Water. You may obtain an application form from our website (www.yorkshirewater.com) or by telephoning 0845 120 84 82.

Yorkshire Water's Industrial Waste Manager must be consulted in respect of any proposed trade effluent discharge to the public sewer.

All the above comments are based upon the information and records available at the present time. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that capacity in the public sewer network is not reserved for specific future development. It is used up on a 'first come, first served' basis. You should visit the site and establish the line and level of any public sewers affecting your proposals before the commencement of any design work.

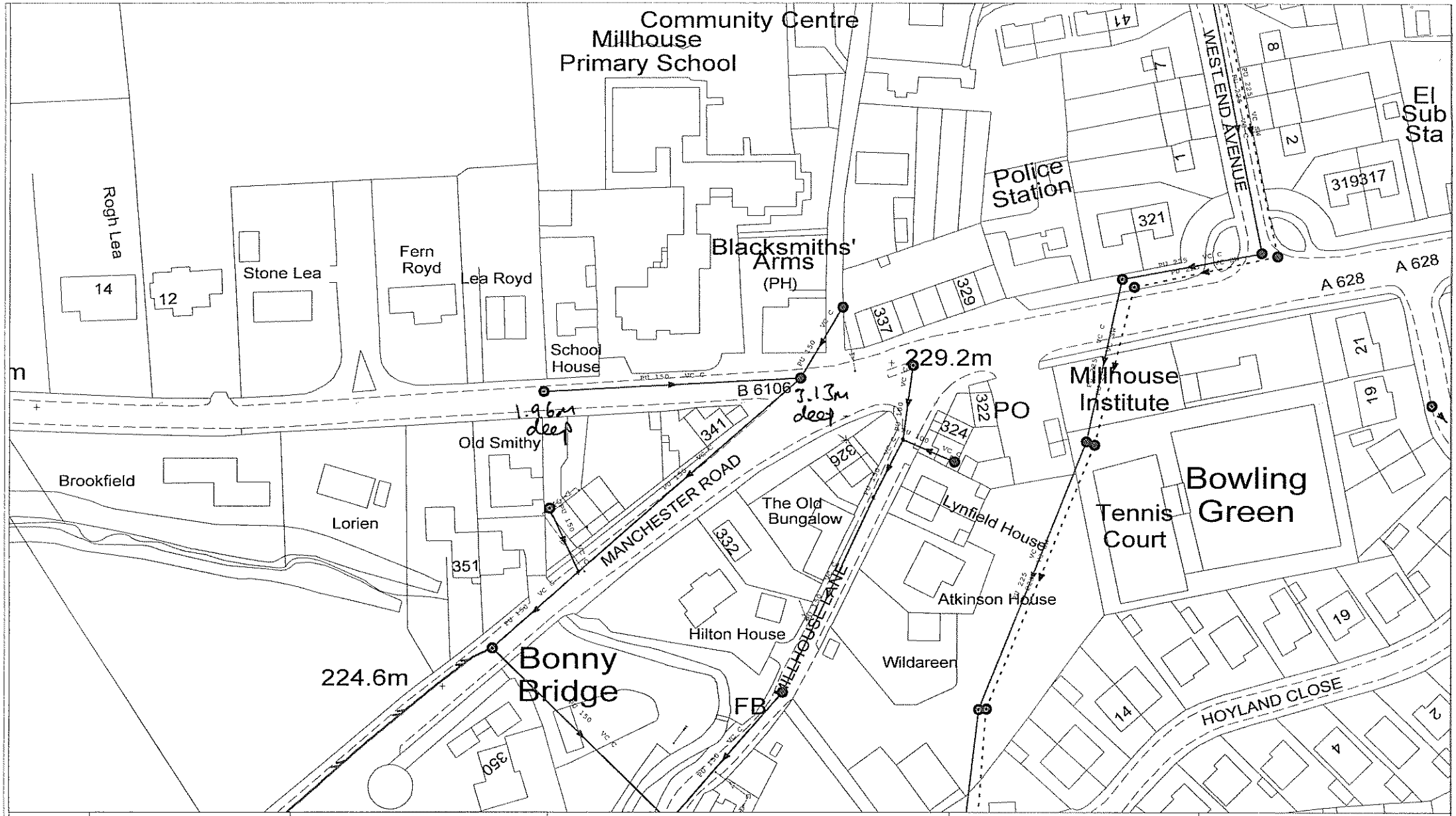
Yours faithfully

Developer Services Team



420852 : 403262	Map Name : SE2003SE	Title	Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connection
YorkshireWater	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : K KHAN Contact Tel :	Notes		
		(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2004. All rights reserved Ordnance Survey Licence number 100019559	Date Req : 03/08/2010, 12:00:16	Date Gen : 03/08/2010, 12:00:17
			Source : Sewer Network Enquiry	

UPN: Undefined Originator: K KHAN, New Development - Waste Water,



421641 : 403057	Map Name : SE2103SE	Title	Partial Key	This plan is furnished as a general guide only and no warranty as to its correctness is given or implied. This plan must not be relied upon in the event of excavations or other works made in the vicinity of public sewers. No house or property connection
YorkshireWater	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : K KHAN Contact Tel :	Notes	Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS	
		(Ody) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2004. All rights reserved Ordnance Survey Licence number 100019559	Date Req : 03/08/2010, 11:37:45	Date Gen : 03/08/2010, 11:37:46
			Source : Sewer Network Enquiry	

UPN: Undefined Originator: K KHAN, New Development - Waste Water,

APPENDIX E

STORMWATER STORAGE CALCULATIONS

HAIGH HUDDLESTON ASSOCIATES

Stormwater Storage Calculations

Client TOWNSEND PLANNING

Site LEE LANE MILL, MILLHOUSE GREEN E10/5225

Design storm 100 M5-60 19 mm
r 0.35

Site area sq m. 7250
Imp Area sq m. 5144
T of Conc min 4 Time to Flow
Allow Discharge 42 Lit / sec Imp Ratio 0.71

Storm Duration Mins	Intensity mm/hr	Depth mm	Vol In cu.m	Vol Out cu.m	Storage cu.m.	Q	t
10	81.8	13.63	70.13	31.66	38.47	116.98	1.4
20	59.8	19.93	102.54	55.53	47.01	85.52	2.0
30	47.6	23.80	122.43	79.46	42.97	68.07	2.5
50	34.4	28.67	147.46	127.47	19.99	49.19	3.4
60	30.3	30.30	155.86	151.51	4.35	43.33	3.9
120	18.7	37.40	192.39	296.65	-104.26	26.74	6.3
180	14.1	42.30	217.59	442.68	-225.09	20.16	8.3
240	11.5	46.00	236.62	589.14	-352.51	16.45	10.2
300	9.8	49.00	252.06	735.87	-483.81	14.01	12.0
360	8.7	52.20	268.52	883.25	-614.73	12.44	13.5
420	7.9	55.30	284.46	1031.01	-746.54	11.30	14.9
480	7.5	60.00	308.64	1180.21	-871.57	10.73	15.7
540	6.9	62.10	319.44	1327.97	-1008.53	9.87	17.0
600	6.38	63.80	328.19	1475.68	-1147.49	9.12	18.4

			Storage	47.01
Length of 1800	18.47			
Length of 1500	26.60	Culvert	2.4*1.5m	13.06
Length of 1200	41.56	culvert	3.6*1.8m	7.25
Length of 1050	54.28			
Length of 900	73.91			
Length of 750	106.35			
Length of 600	166.11			

100 year storm

Intensity mm/hr	Depth mm	Vol In cu.m	Vol Out cu.m	Storage cu.m.
101.27	16.88	86.82	31.66	55.16
74.03	24.68	126.94	55.53	71.41
58.93	29.46	151.56	79.46	72.10
42.59	35.49	182.56	127.47	55.08
37.51	37.51	192.96	151.51	41.45
23.15	46.30	238.17	296.65	-58.48
17.46	52.37	269.38	442.68	-173.31
14.24	56.95	292.94	589.14	-296.20
12.13	60.66	312.05	735.87	-423.83
10.77	64.62	332.42	883.25	-550.83
9.78	68.46	352.17	1031.01	-678.84
9.29	74.28	382.10	1180.21	-798.11
8.54	76.88	395.47	1327.97	-932.50
7.90	78.98	406.30	1475.68	-1069.38

		Storage	72.10
Length of 1800	28.3351		
Length of 1500	40.8061		
Length of 1200	63.7528		
Length of 1050	83.26		
Length of 900	113.37		
Length of 750	163.13		
Length of 600	254.79		

100year plus 30% climate

Intensity mm/hr	Depth mm	Vol In cu.m	Vol Out cu.m	Storage cu.m.
131.65	21.94	112.87	31.66	81.21
96.24	32.08	165.02	55.53	109.49
76.61	38.30	197.03	79.46	117.57
55.36	46.14	237.32	127.47	109.85
48.76	48.76	250.85	151.51	99.34
30.10	60.19	309.63	296.65	12.98
22.69	68.08	350.19	442.68	-92.49
18.51	74.03	380.82	589.14	-208.31
15.77	78.86	405.66	735.87	-330.21
14.00	84.01	432.15	883.25	-451.10
12.71	89.00	457.82	1031.01	-573.19
12.07	96.56	496.73	1180.21	-683.48
11.10	99.94	514.11	1327.97	-813.86
10.27	102.68	528.18	1475.68	-947.49

		Storage	117.57
Length of 1800	46.2034		
Length of 1500	66.5387		
Length of 1200	103.956		
Length of 1050	135.767		
Length of 900	184.865		
Length of 750	266.004		
Length of 600	415.455		

	Footprint Area (m)		
Aquacell Storage Crates (400mm deep)	123.705	30 year	
	189.748	100 year	
	309.405	100 year plus climatic	
Pond 900mm deep	52.2308	30 year	
	80.116	100 year	
	130.638	100 year plus climatic	