FLOOD RISK ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT
(substitution of types)
LAND TO THE NORTH OF LANE END MEWS, THURNSCOE

INTRODUCTION

This latest scheme is proposed for 5 detached bungalows inlieu of the approved scheme for 3 bungalows and 2 detached houses.

It is proposed to develop land to the north of Lane End Mews, Thurnscoe with five new dwellings. The land is currently an undeveloped space between existing dwellings and playing fields and is split by a watercourse running through it.

This report considers the implications of the development with respect to draining surface water and considers whether the site will be affected by flooding or causes others to flood.

This report should be read in conjunction with the site planning layout
drawing No 19-143-2

EXISTING TOPOGRAPHY

The site is around 0.40 hectares and flat at an average level of around 47.5m (local benchmark) undulating plus or minus 300mm. The site is overgrown and there is a spoil heap tipped in the middle, which will be removed.

There are surrounding properties to three sides and most of the eastern boundary fronts playing fields.

There is a watercourse crossing the site that is approximately one metre deep and which flows from east to west. On leaving the site the watercourse turns to flow south through residential areas and approximately 340 metres away, it joins a larger stream, Carr Dike, south of Rectory Lane.

There is a lane / access track crossing the site from north to south where it then meets High Street. The watercourse is culverted with twin 900mm diameter pipes where the track passes over.

EXISTING DRAINAGE

The site is currently undrained and rainwater is allowed to run off towards the watercourse or soak through the ground to the watercourse. However, there are obvious signs that rainwater does pond on site and does not effectively soak into the ground. Moreover, there are no obvious signs of land drains on the site unlike the adjacent playing field that does.

FLOOD ZONES AND FLOODING

Part of the site is shown to be in Flood Zones 2 and 3 on the Environment Agency's Indicative Flood Zone Map and thereby has a greater than 1% chance of annual flooding (1 in 100-years). Flooding is shown to be from overland, originating from a stream to the west of Rectory Lane and possibly flowing onto site through the garden of 11 Rectory Lane, a low point in the road, and then back towards the watercourse on site. The watercourse passing through the site is believed not to flood in this locality but there is flooding downstream along with Carr Dike, to the west of Rectory Lane, as more areas are drained to it.

In 2007 a series of severe storms caused extensive flooding in the Dearne Valley and surrounding area along with other regions in northern England. Data was collected from known sources along with Met Office reports resulting in a suggestion that the event had been in the order of a 1 in 100-year occurrence and at Toll Bar, near Doncaster, 1 in 150-years was suggested as more likely.

The site was inspected shortly after these storms to find that the site and Rectory Lane remained free from flood apart from localised puddles and this finding was used to support earlier development proposals. With hindsight the inspection may have been too soon, as it has since been confirmed by the Local Authority (email dated 7/2/14) that "all the properties on Lane End Mews were in fact inundated by flood water during the June 2007 floods".

DESIGN CONSIDERATIONS AND PROPOSALS

The new development will be drained with separate foul and surface water sewerage systems with foul water draining to public sewers in High Street. At this time, it is believed that foul sewage will drain by gravity but may need to be pumped if levels prove unsuitable at final design stage.

Requirement H3 of the Building Regulations 2000 specifies a hierarchy for the disposal of surface water. In brief, this states that consideration should first be given to soakaways, infiltration systems and other Sustainable Drainage Systems (SUDS).

The ground beneath the site is not free draining and consequently soakaways or other infiltration methods of draining surface water have been dismissed for this proposed development and it is therefore proposed to attenuate flows and drain surface water to the watercourse.

To satisfy current standards, the proposed surface water drainage system must accommodate a 1:30 year storm with no surface flooding and no surface water run-off from the site during a 1:100 year storm (1% chance of annual occurrence). Moreover, in accordance with PPS25 the design should accommodate climate change variations with greater intensity rainfalls - currently suggested as +30%.

It is suggested that by using a 75mm Hydro-brake flow control, which is considered to be the ideal minimum with regards to a maintenance free unit, flows could be reduced to around 2.4 litres per second for this development.
[*It is acknowledged that smaller units are used where additional measures are used to protect the unit from detritus and debris, which might get into the system and block the Hydro-brake; and in locations where they will be periodically inspected and maintained, which is thought not to be guaranteed on this development.*]

Final proposals are subject to detailed design but draft calculations, appended to this report show that by using a 75mm Md5 Hydro-brake in conjunction with twin 600mm storage pipes the maximum flow discharging to the watercourse would be 2.4 litres per second during the 1 in 30-year storm and 2.9 litres per second during the 100-year storm (1% chance of annual occurrence).

The calculations also show that all the rainwater from the larger storm is contained within the network [pipes surcharged] but to increase flood protection further, the existing undulating ground in the area of the proposed dwellings would be reshaped to create a gentle uniform slope draining towards the watercourse. This will provide a suitable 'Flood Routing Path' in the event of greater storms.

Provisionally, the lowest floor level of any of the proposed dwellings (Units 1 and 2) will be set to 47.70m, which is believed to be some 600mm above any known flood level but this is subject to clarification from the Environment Agency and approval by the local authority. Units 3 and 4 are shown at 47.75m and Unit 5 at 47.85m.
Gardens, driveways and parking areas

The five properties will be served from a 'Private Drive' that will be constructed using porous tarmac or block paving such as Marshalls' Priora

Individual house drives and paths will be either gravel or, if paved, rainwater will be allowed to run off onto garden areas. Gardens will be constructed using a good depth of imported topsoil and there will be no land drainage beneath.

SUMMARY

It is proposed to build five new dwellings on a piece of land off Lane End Mews, Thurnscoe. The area has been identified as being vulnerable to flooding but has previously been approved for development.

To safeguard the dwellings they will be constructed with floor levels 600mm above any known or predicted flood levels and surface water drainage will be attenuated so as not to exacerbate flooding in the area that might affect other properties.

SITE LOCATION



FLOOD ZONE MAP



APPENDIX 4 - DRAINAGE CALCULATIONS

Stevenson Associates		Page 1
PO Box 58 Monk Fryston Leeds LS25 5WZ	Lane End Mews Thurnscoe Barnsley	Micro Drainage
Date July 2014 File 30 year plus 25.SIM	Designed By Stevenson Checked By	
Micro Drainage	Simulation W.11.3	

Global Variables

Region	FSR - England & Wales
Return Period (yrs)	30
M5-60 (mm)	19.000
Ratio R	0.400
Volumetric Runoff Coef	0.840
Profile Type	Winter
PIMP (%)	100
Areal Reduction Factor	1.000
Storm Duration (mins)	60
Hot Start (mins)	0
Hot Start Level (mm)	0
Manhole Headloss Coefficient	0.500
MADD Factor * 10m³/ha Storage	2.000
Foul Sewage/Hectare (l/s)	0.00
Additional Flow - % of Total Flow	25
Number of Input Hydrographs	0
Number of Time/Area Diagrams	0
Number of Bifurcations	0
Number of Overflows	0
Number of Off-Line Controls	0
Number of On-Line Controls	1

Starting Storm file name

C:\Users\Stevenson\Documents\WINDES DATA\Lane End Mews Thurnscoe\4.SWS

Freely Discharging Outfalls

Outfall Pipe Number	Outfall MH/No	C.Level (m)	I.Level (m)	D,L (mm)	B (mm)
1.001		46.734	46.284	1200	0

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Date July 2014 File 30 year plus 25.SIM	Designed By Stevenson Checked By	
Micro Drainage	Simulation W.11.3	

On-Line Controls (Hydro-Brake®)

US/PN	Volume (m^3)	Ctrl MH Name	Invert (m)	Type	Dia (m)	D.Head (m)	D.Flow (l/s)	Headloss (m)	Flow (l/s)
1.000	30.793	2	46.304	Md5 SW Only	0.075	0.600	2.6	0.1	1.7
								0.2	1.9
								0.3	2.0
								0.4	2.2
								0.5	2.4
								0.6	2.6
								0.7	2.8
								0.8	3.0
								0.9	3.2

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Micro Drainage	Simulation W.11.3	

Network Details

PN	Length (m)	Fall (m)	Slope (1:x)	Area (ha)	T.E. (mins)	Rain Pro	k (mm)	Hyd Sect	Dia (mm)
1.000	56.00	0.112	500.0	0.032	4.00	1	0.600	oo	45
1.001	3.00	0.020	150.0	0.074	0.00	1	0.600	o	150

PN	USMH No.	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl No.	US/MH (mm)
1.000	1	47.700	46.400	0.700	47.100	46.288	0.212		1500
1.001	2	47.100	46.304	0.646	46.734	46.284	0.300	9	1500

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Date July 2014 File 30 year plus 25.SIM	Designed By Stevenson Checked By	
Micro Drainage	Simulation W.11.3	

Summary of Results

Return Period (years)	30	Analysis Time Step	Fine
Storm Duration (mins)	60	DTS Status	ON
Profile Type	Winter	DVD Status	OFF
Margin for Flood Risk warning (mm)	300	Inertia Status	OFF

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m^3)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	46.779	-0.221	0.000	0.01	0.0	5.9	O K
1.001	46.779	0.325	0.000	0.22	0.0	2.4	SURCH'ED

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Global Variables

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Return Period (yrs)	100
M5-60 (mm)	19.000
Ratio R	0.400
Volumetric Runoff Coef	0.840
Profile Type	Winter
PIMP (%)	100
Areal Reduction Factor	1.000
Storm Duration (mins)	60
Hot Start (mins)	0
Hot Start Level (mm)	0
Manhole Headloss Coefficient	0.500
MADD Factor * 10m³/ha Storage	2.000
Foul Sewage/Hectare (l/s)	0.00
Additional Flow - % of Total Flow	25
Number of Input Hydrographs	0
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Number of Off-Line Controls	0
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Starting Storm file name

C:\Users\Stevenson\Documents\WINDES DATA\Lane End Mews Thurnscoe\4.SWS

Freely Discharging Outfalls

Outfall Pipe Number	Outfall MH/No	C.Level (m)	I.Level (m)	D,L (mm)	B (mm)
1.001		46.734	46.284	1200	0

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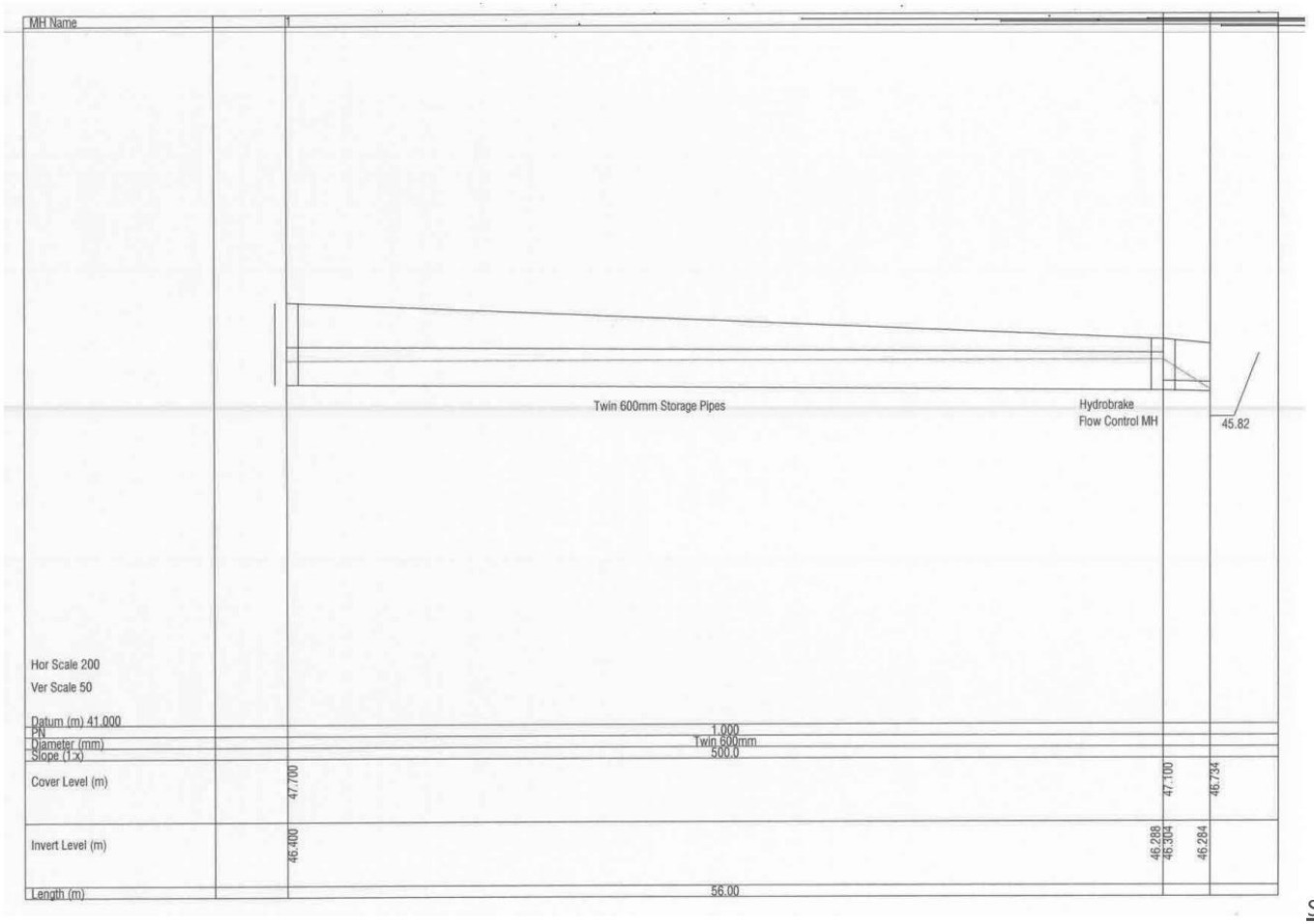
Summary of Results

Return Period (years)	100	Analysis Time Step	Fine
Storm Duration (mins)	60	DTS Status	ON
Profile Type	Winter	DVD Status	OFF
Margin for Flood Risk warning (mm)	300	Inertia Status	OFF

PN	Water Lev. (m)	Surcharged Depth (m)	Flooded Vol (m^3)	Flow/ Capacity	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	47.054	0.054	0.000	0.01	0.0	7.8	SURCH'ED
1.001	47.054	0.600	0.000	0.28	0.0	2.9	FLD RISK

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APPENDIX 5 – STORAGE PIPE SECTION



Showing High Water Level