Flood Risk Assessment

SR Gent Site, Dodworth Road, Barnsley

Residential Development on Former SR Gent Site

Flood Risk Assessment

S W Mann

February 2009

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Flood Risk Assessment

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Flood Risk Assessment

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Flood Risk Assessment

EXECUTIVE SUMMARY

PwC is seeking outline planning consent for a new development on land off Dodworth Road, in Barnsley. The proposed development seeks consent for a maximum of 200 residential units to be built on the site of the previous 4.25ha factory site. WYG has been commissioned to produce this Flood Risk Assessment (FRA) to accompany an outline planning application for the proposed development.

This FRA has identified the following:

- The development site is shown on the EA flood risk map as lying in Flood Zone 1; outside the extent of 0.1% (1 in 1000) risk of flooding from major watercourse.
- No other significant sources of flood risk were identified.
- The site is therefore considered to be at low risk of flooding.
- The approximate 4.25ha development site will be mostly impermeable surfaces areas. If not managed properly, this could lead to increases in flood risk to the development itself and to other areas.

Based on the above, the following recommendations are made:

- It is recommended that a ground investigation, including soakaway testing, should be completed before finalizing the surface water strategy for the proposed site. Should the ground investigation demonstrate that soakaways are viable, and also it is concluded that they can be implemented without increasing risk elsewhere, surface water from site should be disposed of via infiltration techniques in accordance with CIRIA Guidance C697 "The SUDs Manual."
- If infiltration techniques prove not to be a feasible option, then surface water discharges from site should discharge to sewer. Surface water discharge from the site should be limited to 70% of the existing runoff rate and discharged into the 525mm diameter surface water sewer to the north of the site. Given that the existing site is 100% impermeable, the permissible post-development runoff rate has been estimated at 417 l/s; however, survey of the existing site drainage systems will be required in order to gain YW's formal agreement to this discharge rate.
- Surface water sewers will be required to control surface water runoff within the site. It is envisaged that the sewers will be designed to a 1 in 30 standard, in line with Sewers for Adoption requirements. Based on the above discharge rate of 417 l/s, an estimated 435 m^3 of formal storage will be required to limit flows to the permissible runoff rate during a 1 in 30 event.

- Flows in exceedance of the 1 in 30 standard, up to the 1 in 100 event will be retained on site and attenuated to the required rate. An estimated further 165 m^3 will be required to store this additional runoff. Following design guidance such as the CIRIA report C635 this additional storage, for example, could be provided by setting levels such that local and temporary flooding of the roads, parking areas and landscaping occurs.
- The above estimates include increasing rainfall intensities by 30%, as recommended by PPS25, to take into account current projected impacts of climate change.
- It is recommended that foul water should be discharged into the 225mm diameter combined sewer to the north of the site. YW has noted that there may be limited spare capacity at the local Waste Water Treatment Works at Lundwood; further discussions are therefore recommended with YW in order to confirm the foul effluent disposal strategy.
- A drainage and connectivity survey should be undertaken to confirm the current point of surface water and foul discharge from the site, and the existing condition of the public sewer.
- To minimise the risk of flooding from overland flow, it is recommended that finished floor levels be set a minimum 300mm above adjacent ground levels. It is recommended that external levels are set such that overland flows are conveyed away from buildings to prevent the internal flooding of buildings.

1 INTRODUCTION

1.1 PROPOSED DEVELOPMENT

PricewaterhouseCoopers (PwC) is seeking outline planning permission for the development of a maximum of 200 residential properties on the former 4.25ha SR Gent site located just off Dodworth Road in Barnsley.

WYG has been commissioned to produce a Flood Risk Assessment (FRA) to accompany a planning application for the proposed development.

1.2 PURPOSE OF THE REPORT

According to flood mapping produced by the Environment Agency (EA), the site is located in Flood Zone 1; outside the extent of the 0.1% (1 in 1000) risk of flooding from major watercourse. This site is therefore considered to be at low risk of flooding from fluvial sources.

However, the size of the application boundary is over 1 ha (4.25ha in total). Therefore, based on current EA Standing Advice[1], a FRA is required in order to assess surface water runoff generated by the site, and to establish a management regime for that runoff. If not managed properly, surface water runoff from the site could potentially lead to increases in flood risk to other areas or the development itself. The FRA should therefore primarily consider the management of surface water runoff.

In line with PPS25, the FRA will also consider other potential sources of flood risk, such as sewers, overland flow routes, groundwater flooding, and minor watercourses not shown on EA flood mapping.

1.3 REPORT COMPLIANCE WITH PPPS25

To demonstrate that this report is in compliance with the requirements of PPS25, it was checked against the PPS25 Practice Guide pro-forma, which is included as Appendix A.

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[1] http://www.pipernetworking.com/floodrisk/

2 SITE DESCRIPTION

2.1 EXISTING SITE

The development site is located off Dodworth Road (A628), to the west side of Barnsley town centre. The site is shown below in Figure 1.

Figure 1 – Site location[2]



[2] [2] Crown Copyright 2009. All rights reserved. OS mapping generated using Promap (www.promap.co.uk), Licence Number 100020449. OS mapping reproduced under WYG Engineering Ltd Paper Map Reproduction Licence Number 100017603.

The site itself is brownfield, and was previously the site of a clothing factory. It was noted from a recent site visit that all buildings on the site have now been demolished. The development site itself is surrounded by residential properties to the north, east, west and part of the southern boundary. Playing fields are located to the south-east boundary of the site.

Examination of the topographic survey and observations from a site visit show that the site is relatively level at around 136m AOD, although the levels gradually increase slightly to around 138m AOD in the northern side of the site, towards Dodworth Road.

Detailed plans of the existing site are included in Appendix B, and photographs of the site in Appendix C.

2.2 EXISTING SITE DRAINAGE

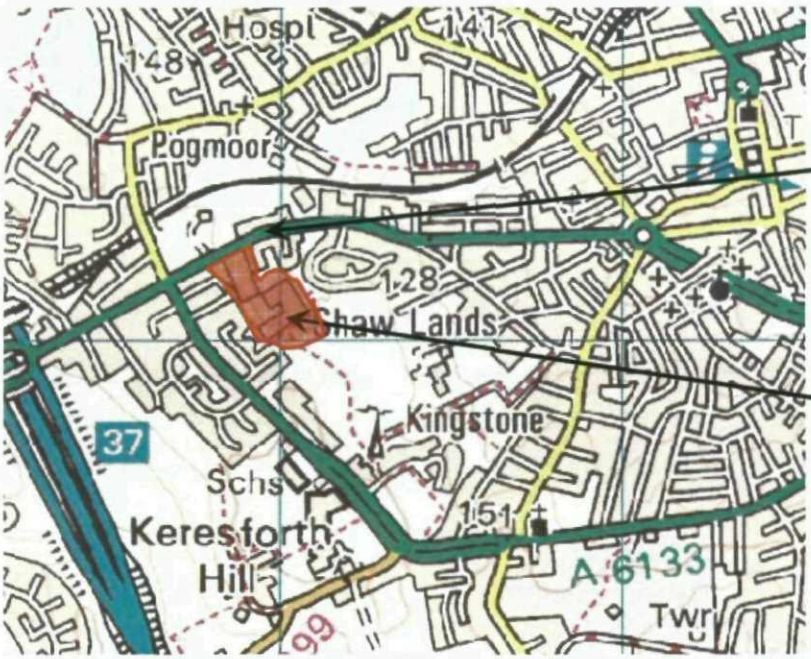
Yorkshire Water (YW) sewer records show that the area is served by a network of public sewers. To the north-west edge of the site a 525mm surface water sewer crosses the site, which connects into a 675mm diameter public sewer to the north east. It is assumed that surface water from the site currently drains into this public sewer. However, no survey of the existing site drainage systems was available at the time this report was written, and so the existing site discharge point has not been confirmed.

2.3 FLOOD RISK

2.3.1 Fluvial flood risk

According to flood risk mapping provided by the EA, the site is located within Flood Zone 1; outside the *extent of the 0.1% (1 in 1000) risk of flooding from major watercourse. An extract of the EA flood risk map* is shown in Figure 2, below. As the site is located in Flood Zone 1, it is considered to be at low risk of flooding from fluvial sources.

Figure 2 – Extract of EA flood risk map (downloaded 22/12/2008)



At the time this report was written, the EA and Barnsley Metropolitan Borough Council (BMBC) had not responded in writing regarding the flood zone classification and other risks of flooding to the proposed site; however, as discussed in Section 1.2 (and shown above in Figure 2) the site is shown to be located in Flood Zone 1 and therefore at low risk from fluvial flooding.

Correspondence with YW has reported no history of flooding at this location from other sources such as sewers and overland flow routes. Copies of correspondence are included in Appendix D.

2.3.2 Other sources of flood risk

WYG has not identified any other significant sources of flood risk to the site.

In addition to consultations with third parties, a site visit was undertaken as part of the FRA. No other sources of flood risk were identified.

2.3.3 Summary of flood risk

Overall, the site itself is considered to be at low risk of flooding from major watercourse and other sources such as sewers, overland flow routes, groundwater flooding, and minor watercourses not shown on EA flood mapping.

3 DEVELOPMENT PROPOSALS

3.1 PROPOSED DEVELOPMENT

3.1.1 Description of proposed development; Links to local Development Documents

PwC wishes to gain planning permission for the development of a maximum of 200 residential properties on the former 4.25ha SR Gent site located just off Dodworth Road in Barnsley.

A layout of the development and proposed drainage system is included in Appendix B.

One of the aims of PPS25 is to steer development away from zones of high flood risk towards this flood zone. The development site falls within Flood Zone 1, and therefore the proposed development is considered to be suitable for this site[3]. The development is therefore considered to pass the PPS25 Sequential Test.

3.2 DEVELOPMENT AND FLOOD RISK

3.2.1 Flood risk to the site

As discussed in Section 2.2, the development site is considered to be at low risk of flooding from watercourse and also at low risk of flooding from other sources, such as sewer flooding and overland flow.

3.2.2 Flood risk from the site

Following development, it is considered that most of the site will be impermeable. Considerations must therefore be made for ensuring surface water runoff from this development is managed without increasing flood risk elsewhere. Therefore, there is a need to consider mitigation against any flood risk from surface water runoff as well as accounting for future potential increases in rainfall intensity and frequency due to climate change.

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[3] Refer to Table D3 of PPS25 (Flood Risk Vulnerability and Flood Zone 'Compatibility')

3.3 PROPOSED MITIGATION

3.3.1 Flood risk due to surface water runoff from the site

In order to ensure that surface water runoff from the site does not cause an increase in flood risk the management of runoff has been considered via a sequential approach, in line with Building Regulations. The following options for the disposal of surface water runoff were considered, in order of preference[4]:

1. A soakaway or some other infiltration system,
2. A watercourse
3. A sewer

Discharge to soakaway

A full ground investigation of the site was not available at the time this report was written and so a quantitative assessment of the viability of infiltration at the site has not yet been carried out. However, it is recommended that testing is undertaken to confirm whether soakaways will be viable on this site. If the testing proves positive, the final site drainage strategy may be able to accommodate some infiltration of surface water.

Discharge to watercourse

There are no watercourses within the vicinity of the development site that could feasibly be used to discharge to from SUDS designs. Therefore, it is suggested that surface water should be discharged to sewer.

Discharge to sewer

Surface water sewers will be required to control surface water runoff from the 1ha site, up to a 1 in 30 standard, in line with Sewers for Adoption requirements. Discharge to sewer should be limited to 70% of the existing brownfield discharge rate, which has been assessed at 416 l/s.

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[4] Building Regulations H3(3), Rainwater drainage.

Surface water sewers will be required to control surface water runoff. It is envisaged that the sewers will be designed to a 1 in 30 standard, in line with Sewers for Adoption requirements. An estimated 435 m^3 of formal storage will be required to limit flows to the existing runoff rate during a 1 in 30 event, using the above estimated post-development runoff rate of 417 l/s This estimate includes upsizing rainfall intensities by 30%, as recommended by PPS 25, to take into account the projected impacts of climate change.

Flows in exceedance of the 1 in 30 standard, up to the 1 in 100 event will be retained on site and attenuated to the existing runoff rate. An estimated further 165 m^3 will be required to store this additional runoff. Calculations are included in Appendix E.

It should be noted that the above values of attenuation storage are estimates only. The required storage volumes will be confirmed through detailed design. Further, it is anticipated that YW will require a detailed survey of the existing drainage system on the site in order to formally agree the post-development discharge rate.

Guidance on designing for exceedance is available from such documents as CIRIA report C635[5]. It is envisaged that this element of storage could be achieved by setting levels such that local and temporary flooding of the access roads, parking areas and landscaping occurs.

Discharge of foul sewerage

Consultation with YW has confirmed that there is a 225mm diameter public combined sewer shown to be crossing the northern boundary of the site. Foul flows should therefore be discharged into this.

YW also noted in its consultation response that there may be limited spare capacity at the local sewage treatment works at Lundwood, and therefore it is recommended that at detailed design stage the YW Area Asset Manager should be consulted.

[5] CIRIA C635, Designing for exceedance in urban drainage – good practice, published 2006.

3.4 RESIDUAL FLOOD RISK

If the above mitigation measures are provided as part of the development, it is considered that the primary residual risk of flooding would be as a result of some type of failure of the site drainage system during the life of the development. Regular, ongoing maintenance will be required to ensure that the capacity of the system is maintained as it has been designed.

In addition, as discussed above, there remains a residual risk of a storm event that exceeds the capacity of the drainage system, as storm events beyond the 1 in 100 event will not be catered for explicitly. Whilst the risk of such an event is low, its potential impact should be considered in design. The detailed design of the site should incorporate design guidance such as the CIRIA report C635 and aim, for example, to provide additional storage by setting levels such that local and temporary flooding of the roads, parking area and landscaping occurs.

4 CONCLUSIONS AND RECOMMENDATIONS

This report has identified the following.

- PwC is seeking outline planning consent for residential development on land off Dodworth Road, in Barnsley. The proposed development is for a maximum of 200 residential properties to be built on the site of the previous 4.25ha factory site.
- The development site is shown on the EA flood risk map as lying in Flood Zone 1; outside the extent of 0.1% (1 in 1000) risk of flooding from major watercourse.
- No other significant sources of flood risk were identified.
- The site is therefore considered to be at low risk of flooding.
- The approximate 4.25ha development site will be largely impermeable surfaces areas. If not managed properly, this could lead to increases in flood risk to the development itself and to other areas.

Based on the above, the following recommendations are made:

- It is recommended that a ground investigation, including soakaway testing, should be completed before finalizing the surface water strategy for the proposed site. Should the ground investigation demonstrate that soakaways are viable, and also it is concluded that they can be implemented without increasing risk elsewhere, surface water from site should be disposed of via infiltration techniques in accordance with CIRIA Guidance C697 "The SUDs Manual."
- If infiltration techniques prove not to be a feasible option, then surface water discharges from site should discharge to sewer. Surface water discharge from the site should be limited to 70% of the existing runoff rate at 417 l/s and discharged into the 525mm diameter surface water sewer to the north of the site.
- Surface water sewers will be required to control surface water runoff within the site. It is envisaged that the sewers will be designed to a 1 in 30 standard, in line with Sewers for Adoption requirements. An estimated 435 m^3 of formal storage will be required to limit flows to the permissible runoff rate during a 1 in 30 event.
- Flows in exceedance of the 1 in 30 standard, up to the 1 in 100 event will be retained on site and attenuated to the required rate. An estimated further 165 m^3 will be required to store this additional runoff. Following design guidance such as the CIRIA report C635 this additional storage, for example,

could be provided by setting levels such that local and temporary flooding of the roads, parking areas and landscaping occurs.

- The above estimates include increasing rainfall intensities by 30%, as recommended by PPS25, to take into account current projected impacts of climate change.
- It is recommended that foul water should be discharged into the 225mm diameter combined sewer to the north of the site and YW consulted regarding the capacity of the Waste Water Treatment Works at Lundwood.
- A drainage and connectivity survey should be undertaken to confirm the current point of surface water and foul discharge from the site, and the existing condition of the public sewer.
- To minimise the risk of flooding from overland flow, it is recommended that finished floor levels be set a minimum 300mm above adjacent ground levels. It is recommended that external levels are set such that overland flows are conveyed away from buildings to prevent the internal flooding of buildings.

APPENDIX A

PPS25 PRACTICE GUIDE PROFORMA

PPS25 PRACTICE GUIDE PRO-FORMA

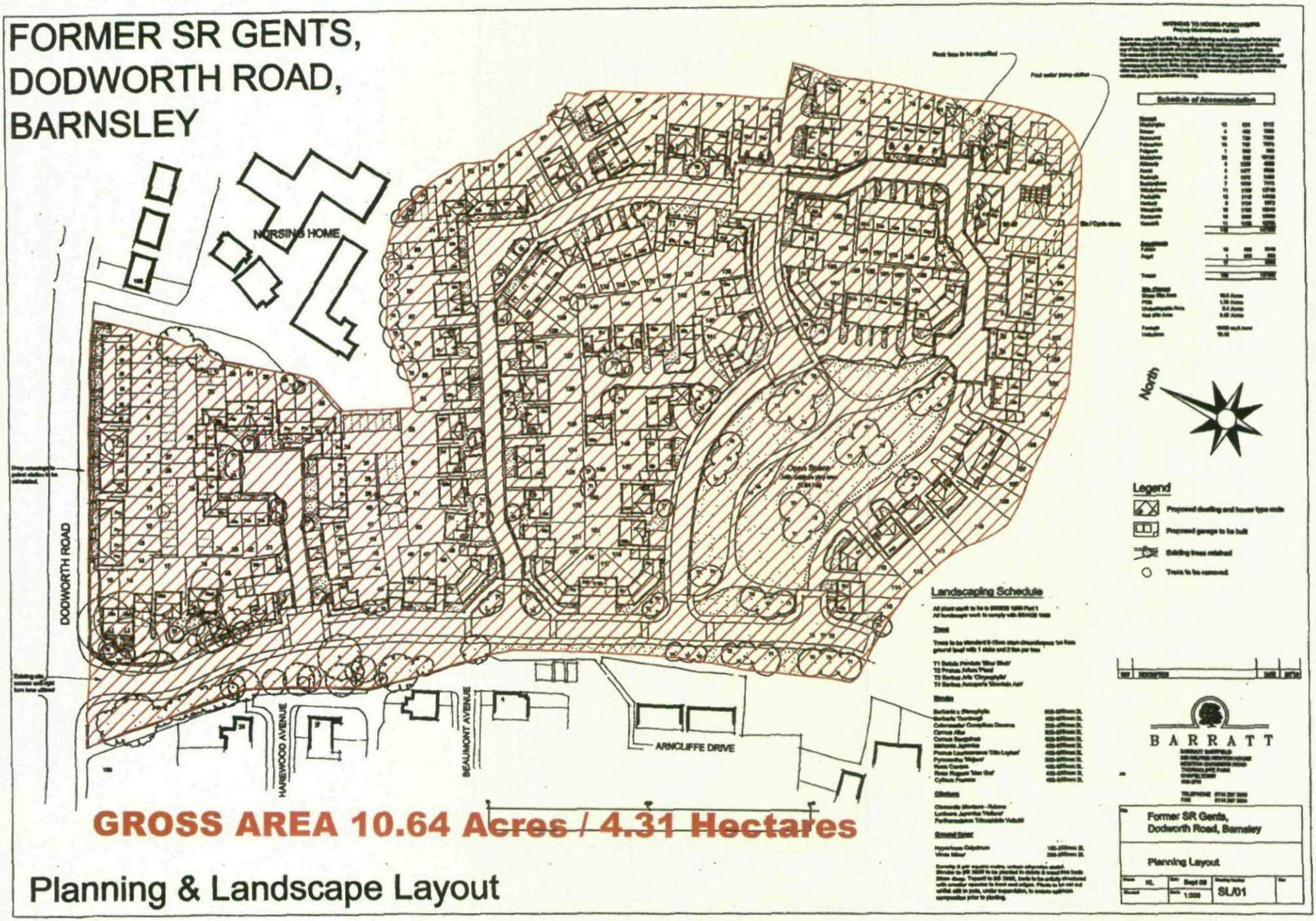
The table below provides an easy cross-reference between the PPS25 Practice Guide Pro-form (ref. Appendix C of PPS25 Practice Guide) and this WYG Flood Risk Assessment.

PPS25 Practice Guide section		WYG Report ref.	
1	**Description and location**	**Para.**	**Page**
1a	Development description and location?	3.1	7
1b	EA vulnerability classification?	2.2	5
1c	Consistency with Local Development Documents?	3.1	7
1d	Evidence that the sequential test or exception test (PPS25) has been applied in the selection of this site for this development type.	3.1	7
2	**Definition of the flood hazard**		
2a	What are the sources of flooding that could affect the site?	2.1.1	4
2b	Description of flood mechanics for all sources and any historical flooding.	2.1	4
2c	Existing surface water drainage arrangements for the site?	2.1.1	4
3	**Probability**		
3a	EA Flood Zone classification?	2.2	5
3b	Reference to any Strategic Flood Risk Assessment covering this site?	3.1	7
3c	Probability of the site flooding taking account of the contents of the SFRA and of any further site-specific assessment?	3.1	7
3d	Existing rates and volumes of run-off generated by the site?	3.2.2	7 - 8
4	**Climate change**		
4a	Influence of climate change on the site?	3.2.2	7 - 8
5	**Detailed development proposals**		
5a	Details of the development layout, referring to the relevant drawings.	1.1	3
5b	Where appropriate, demonstrate how land-uses most sensitive to flood damage have been placed in areas within the site that are at least risk of flooding.	N/A	
6	**Flood risk management measures**		
6a	How will the site be protected from flooding, including the potential impacts of climate change, over the development's lifetime?	3.3	8 - 9
7	**Off site impacts**		
7a	How will you ensure that the measures to protect your site from flooding will not increase flood risk elsewhere?	3.3	8 - 9
7b	How will you prevent run-off from the completed development causing an impact elsewhere?	3.3	8 – 9
8	**Residual risks**		
8a	What flood-related risks will remain after you have implemented the measures to protect the site from flooding?	3.3	8 – 9
8b	How, and by whom, will these risks be managed over the lifetime of the development	3.3	8 - 9

APPENDIX B

SITE PLANS (EXISTING AND PROPOSED)

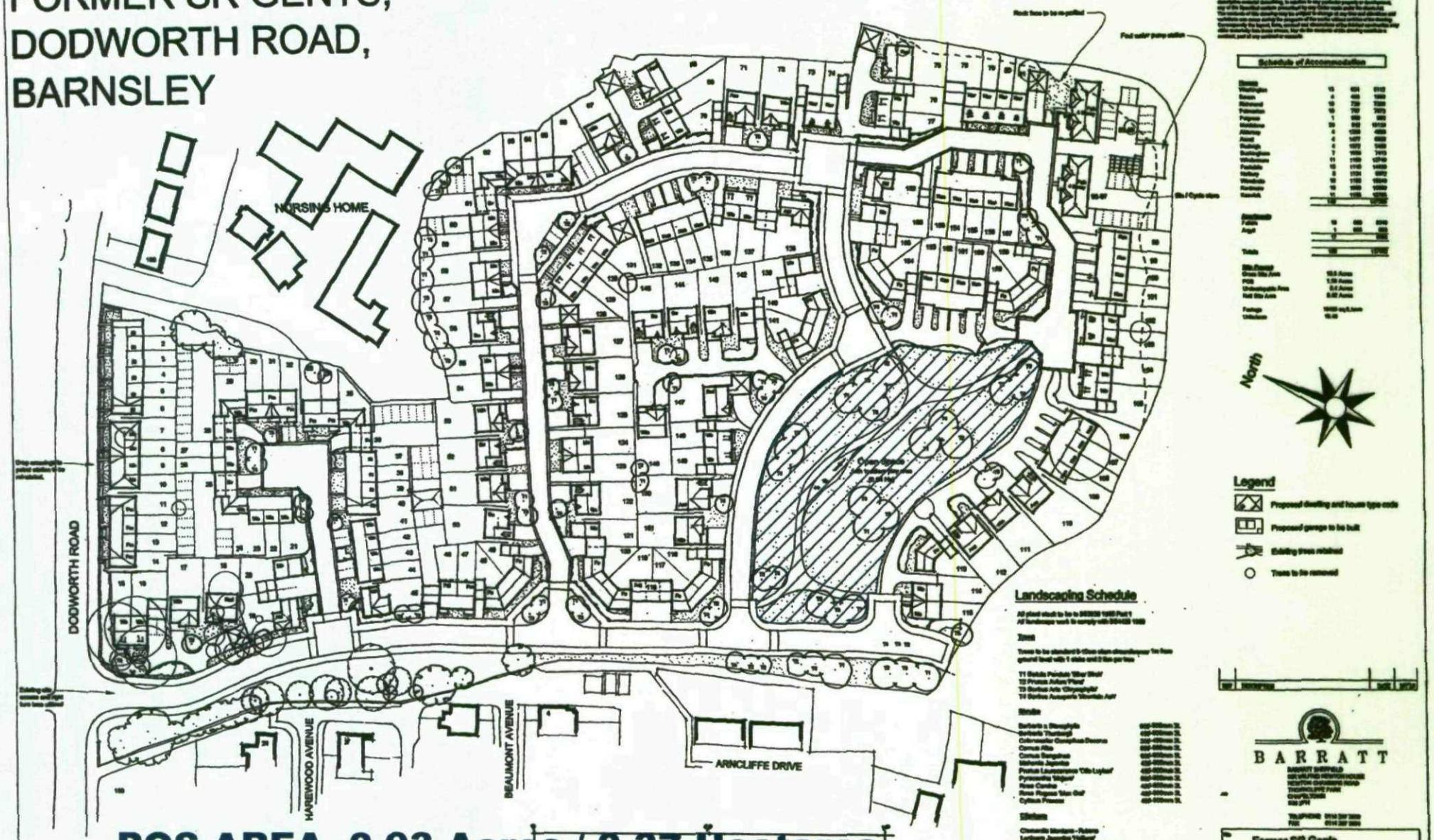
FORMER SR GENTS, DODWORTH ROAD, BARNSLEY



GROSS AREA 10.64 Acres / 4.31 Hectares

Planning & Landscape Layout

FORMER SR GENTS, DODWORTH ROAD, BARNSLEY

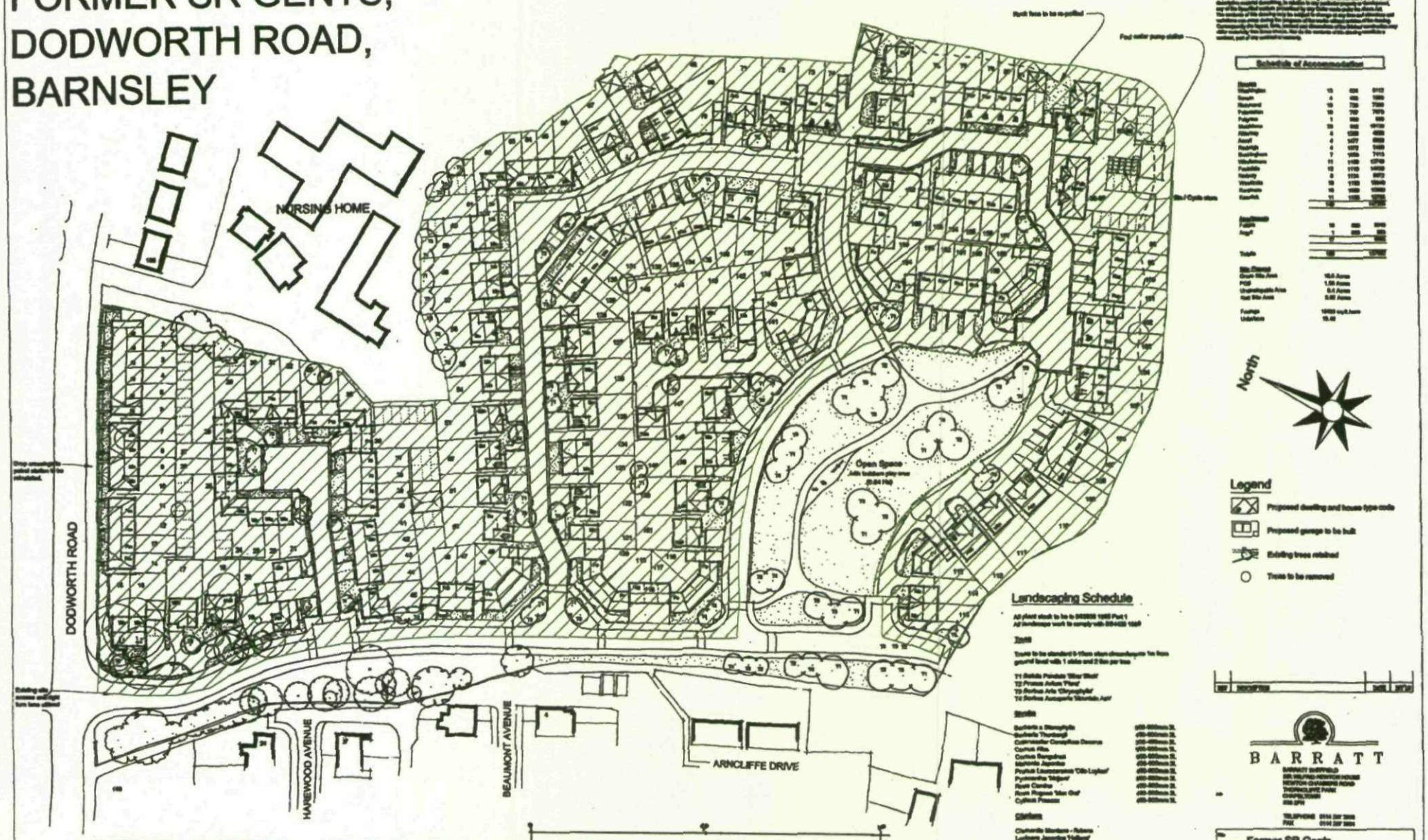


POS AREA 0.93 Acres / 0.37 Hectares

Approx 8.6 % of the Gross Site Area / 10.3% of Net Area

Planning & Landscape Layout

FORMER SR GENTS, DODWORTH ROAD, BARNSLEY



NET AREA 8.84 Acres / 3.58 Hectares

Planning & Landscape Layout



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0 20 40 60 80 100m

SCALE 1:1250

LOROC ARCHITECTS

N

APPENDIX C – SITE PHOTOGRAPHS



View looking west across the site.



View looking to the south-east off the site.



View looking north-east.



View of the site entrance.



View looking north-east.



View looking from site north – west onto Dodworth Road.

APPENDIX D

CORRESPONDENCE

YorkshireWater

Yorkshire Water
New Development Team Sewerage
Western House
Halifax Road
PO Box 500
Bradford
BD6 2LZ

Tel: (0845)1242424
Fax: (01274) 372 834

Email:
Planning.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:
Kashif Khan on (0845)1242424

12th January 2009

White Young Green
Arndale Court
Otley Road
Headingley
LEEDS
LS6 2UJ

For the attention of Mr G Davies



Your Ref:
Our Ref: K000022

Dear Sirs,

S R Gent, Dodworth Road, Barnsley - Pre-Planning Sewerage Enquiry

Thank you for your enquiry of 24th December 2008. Our charge of £150.00 (plus VAT) will be added to your account with us, reference WYG074. 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:

There are 225 mm diameter public combined and 525 mm diameter public surface water sewers recorded crossing the site. No buildings are to be erected within 4 (four) metres, nor trees planted within 5 (five) metres of these public sewers. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewers. If you wish to have these sewers diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0845 124 24 24.

The local Waste Water Treatment Works (WWTW) is Lundwood. It is understood that this WWTW may only have limited spare capacity, if any, available. We have contacted the Area Asset Manager for more information regarding the impact of proposed development and will contact you when an assessment has been made.

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 225 mm diameter public combined sewer recorded crossing/within the northern boundary of the site.

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 he should contact our New Development Team at Sheffield on 0845 124 24 24.

The local public sewer network does not have capacity to accept any additional discharge of surface water from the proposal site. The developer is advised to contact the Environment Agency/local Land Drainage Authority with a view to establishing a suitable watercourse (if any nearby) for discharge.

Surface water discharges to the public sewer will be restricted to the level of run-off - i.e. same rate of discharge - to that from the existing use of the site. To maintain the "status quo" in the public sewer network, any discharge of surface water from the site should take place with similar rates of flow and/or measured areas discharging to similar points of connection to that of the existing use of the site. You will need to demonstrate positive drainage to the public sewer to Yorkshire Water by means of investigation and calculation carried out at your expense.

To do this, Yorkshire Water requires to see previous drainage layouts with pipe sizes, gradients and connection points, proposed drainage layouts with pipe sizes, gradients and connection points, measured impermeable areas of the present use of site and the proposed use of site, along with the calculations that show the previous discharge rate from the site to the public sewer and the proposed discharge rate from the site to the public sewer.

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, with regard to surface water disposal from the site.

You may wish to assume that all the impermeable area has a free discharge to the public sewer network at this stage. A site survey indicating what impermeable areas positively drain to the public sewers and any existing restrictions on the existing network will be needed in the future to agree any discharge rate to the public sewer.

Prospectively adoptable sewers 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 New Development Team at Sheffield (telephone 0845 124 24 24) 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. Land drainage will not be allowed into a public sewer. 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.

There are several properties within 500 metres downstream of the site on the DG 5 (sewer flooding) Register, and there are no reported incidents of sewer flooding in the area on the YW operations database.

Any new connection to an existing public sewer will require the approval of Yorkshire Water. You may obtain an application form by telephoning 0845 124 24 24.

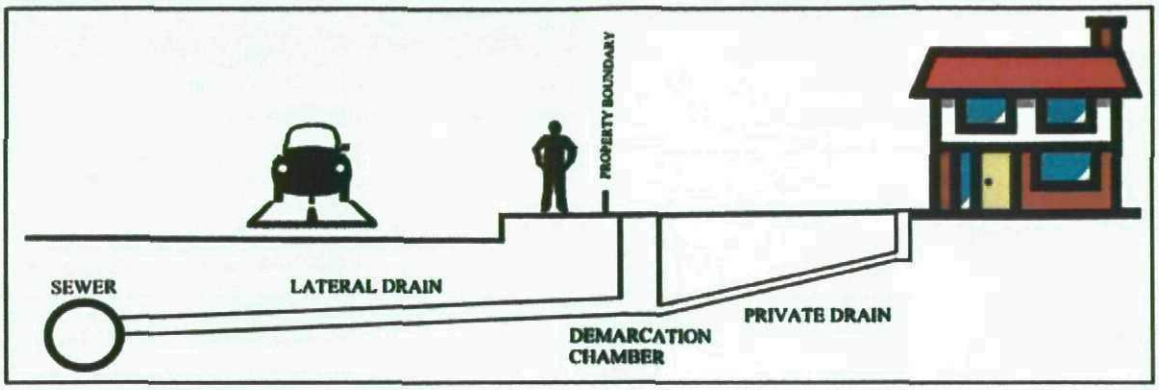
All the above comments are based upon the information and records available at the present time. The information contained in this letter together with that shown on any extract from the Statutory Sewer Map that may be enclosed is believed to be correct and is supplied in good faith. Please note that 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

New Development Team

Criteria for laying adoptable lateral drains/sewers in highway



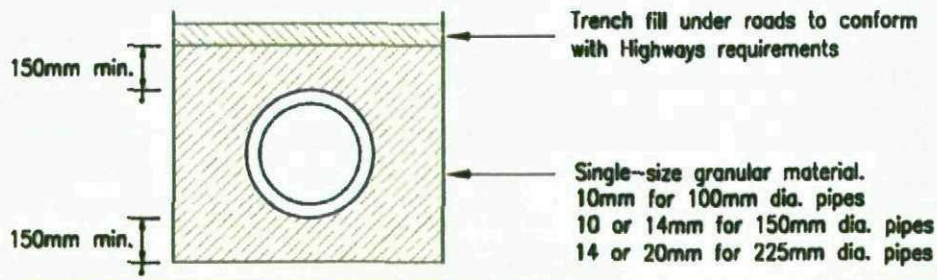
Pipes

The pipes detailed in the table below can be used when laying a lateral drain/sewer under public highway subject to acceptable minimum gradients, also detailed below.

Product Name	Diameter (mm)	Manufacturer	Material
SuperSleve	100 & 150 (I.D.)	Hepworth	Vitrified Clay
SuperSeal	150 & 225 (I.D.)	Hepworth	Vitrified Clay
Densleeve	100, 150 & 225 (I.D.)	Naylor	Vitrified Clay
Denseal	100, 150 & 225 (I.D.)	Naylor	Vitrified Clay
Ultra-Drain	110 & 160 (O.D.)	Uponor	uPVC (solid wall)
Plastidrain	110 & 160 (O.D.)	Hepworth	uPVC (solid wall)

Diameter (mm)	Gradient	
	Foul	S.W
100	1:40	1:100
150	1:80	1:150
225	1:125	1:225

Bedding (typical section)



Class S Bedding
To be used when pipe is more than 1200mm from highway surface
Concrete bed and surround required when less than 1200mm from highway surface

NOT TO SCALE

Demarcation Chamber

A chamber must be located just within the property boundary at the end of the public section of the lateral drain/sewer. The table below lists some acceptable chamber types.

Manufacturer	Product Name / Ref	Material	Maximum Depth	Cover Type
Naylor	Plastic Inspection Chamber	Polypropylene	Up to 1200mm	Class B125
Hepworth	PPIC	Polypropylene	Up to 1200mm	Class B125
Uponor	Inspection chamber (450mm ∅)	Polypropylene	Up to 1200mm	Class B125
Marshalls	Inspection chamber	Precast concrete	Up to 1000mm	To BS5911 pt2

YorkshireWater

Supplementary Information: Adoption of Lateral Drains

With the implementation of the Water Act 2003 the Government's strategy on the ownership of new sewers is moving forward.

The intention is that all new sewers are to be built to adoptable standards. Further more, drains from the curtilage to the point of connection to the public sewer (to be known as Lateral Drains) can also be in public ownership.

Yorkshire Water's policy on these issues is in line with the Governments thinking and to facilitate this, the following protocol is required to be implemented.

All drains and sewers to be adopted are to be laid at the front of the curtilage, the termination of the lateral drain to be defined by a demarcation access point and to be constructed in accordance with documentation to be introduced in the autumn of 2004. As an interim solution demarcation chambers are to be constructed as per Yorkshire Water's guidelines for demarcation chambers.

All sewers to be adopted (and Yorkshire Water would look to have all sewers adopted) should be designed to either the WRc publication "Sewers for Adoption - a design and construction guide for developers" 6th Edition or if serving less than 9 properties on foul only systems to the protocol on design, construction and adoption of sewers in England and Wales produced by DEFRA. Please contact our Development Team - Technical (telephone 0114 251 8321, Fax 0114 251 8384) for further information.

YorkshireWater

General Conditions in relation to the adoption of Sustainable Drainage Systems (SUDS)

1. There should be no potential to cause pollution and a discharge consent from the EA should not be required – see Sections 4.1.2 and 4.1.3 of the SUDS Interim Code of Practice for further detail. (Yorkshire Water cannot readily control what is discharged into sewers and the risk of pollution to watercourses and groundwater must be avoided.)
2. Health and safety file must be provided to quantify and mitigate any associated risks
3. Yorkshire Water will not adopt SUDS features that are situated in private land. They should be sited in public open space; common shared areas held for general communal purposes or public highway and have unrestricted access. Access to these features is required on a 24 hour basis to ensure entry for routine maintenance and in the event of emergencies.
4. Drainage must be from roofs & yards with a proper outfall and should not have land drainage or groundwater inflow. This will enable adoption as part of the public sewerage system.
5. Any discharges into watercourses or other SUDS features must have the benefit of a right to discharge in perpetuity as Yorkshire Water have no statutory powers in respect of such discharges.
6. Ground conditions must be suitable to allow free drainage from the particular SUDS feature all year round (by having regard to groundwater levels).
7. Required technical considerations:

   (i) Clearly defined channel, conduit or structure for flows
   (ii) Extent of controlled storage of the particular SUDS feature to be defined
   (iii) Must meet relevant design guidance found in current versions of 'Sewers for Adoption or CIRIA documentation
   (iv) Sphere of influence not within 5m of the building
   (v) No tree planting within 5m of feature as this would prevent access for maintenance (approved shallow rooted shrubs may be permitted).
   (vi) Designed flood route as per 'Sewers for Adoption'
   (vii) No outlet to combined sewers or foul sewers
   (viii) Design for 1:30 year flooding if Yorkshire Water is to adopts
   (ix) The SUDS feature must incorporate an adoptable bypass pipe that can be used in the event that the SUDS feature fails and is designed to comply with the requirements of items (vi) and (viii) above.

Experience with 'Sewers for Adoption' has shown that compliance with the criteria detailed above provides a robust and cost effective solution to draining new developments whilst offering a high level of protection to occupiers of premises that are served by these SUDS features.

In addition to the above general conditions the following specific conditions apply in relation to SUDS features that may be adopted/operated by Yorkshire Water

Swales

- If a swale meets the general requirements detailed above then it could enable adoption by Yorkshire Water. However, swales would normally be expected to be owned and operated by either:

    - Local authority for public open space
    - Highway authority for public highway and verges
    - Private landowners and/or management companies (through maintenance agreements with owners) in respect of private land

Soakaways

- Must be constructed at least 5m from the curtilage of private land to ensure free drainage and no building over
- Properly engineered structure constructed to an agreed design having –
    - A defined chamber or structure
    - Outlet to underground strata
    - Drainage from more than one property
    - An outfall to S.W. sewer/highway drain/watercourse

Infiltration Trenches

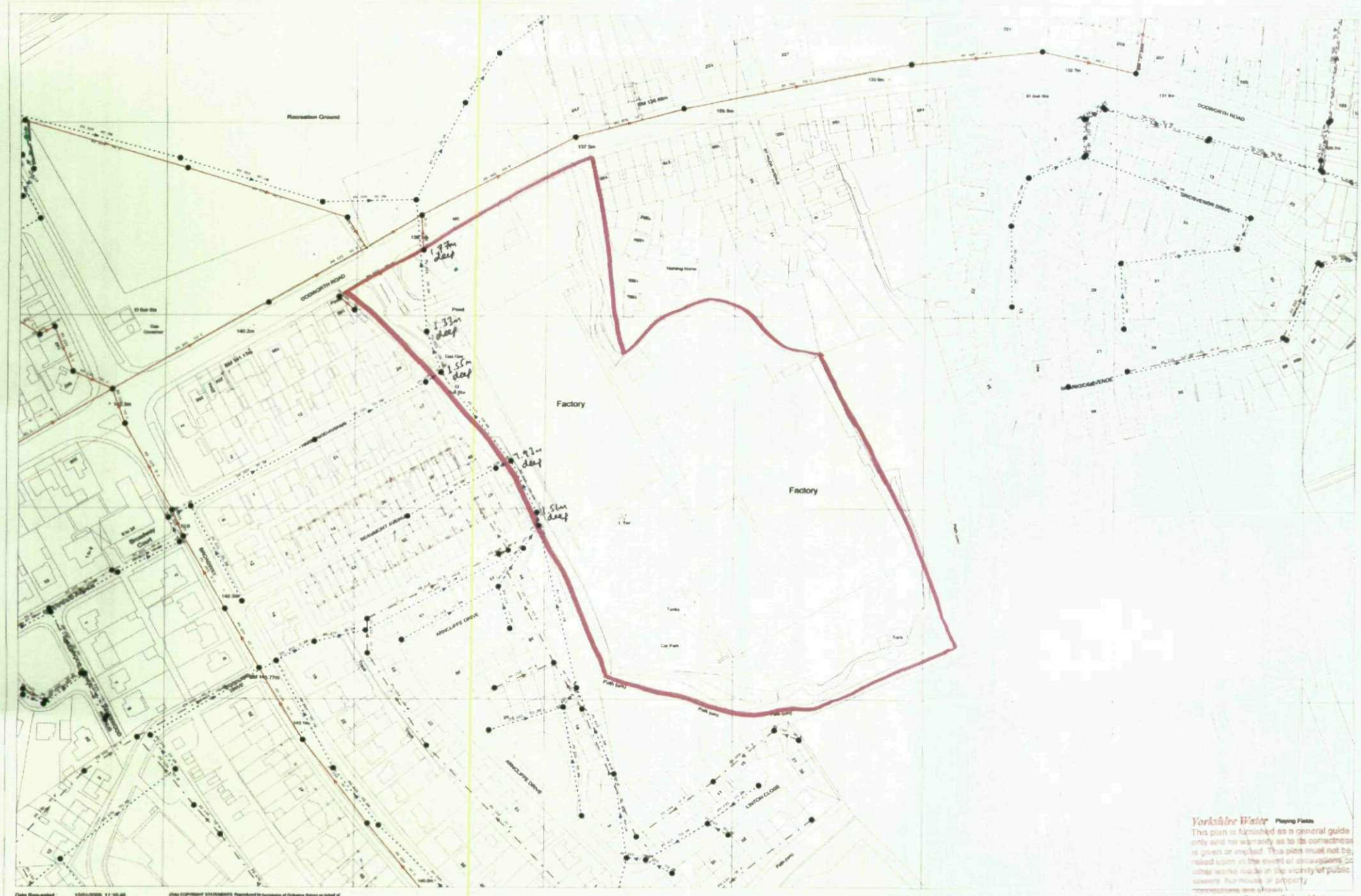
- If a infiltration trenches meet the general requirements detailed above then it could enable adoption by Yorkshire Water. However, infiltration trenches would normally be expected to be owned and operated by either:

    - Local authority for public open space
    - Highway authority for public highway and verges
    - Private landowners and/or management companies (through maintenance agreements with owners) in respect of private land

Filter drains

- As infiltration trenches

Pipes - Covered in 'Sewers for Adoption'



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Yorkshire Water Playing Fields

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 connections are shown.

Extract from Statutory Sewer Map
Location: BARNSLEY
Scale: ~~1/500~~ ~~1/1000~~ (1/1250) ~~1/2500~~
YWS Ref: K0000121
Sheet 1 of 1

APPENDIX E

CALCULATIONS

Arndale Court
Headingley
Leeds LS6 2UJ

Date 06 February 2009... | Designed By simon.mann
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Summary of Results for 30 year Return Period (+30%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m^3)	Status
30 Summer	383.7	383.7	0.9163	0.9163	398.6	FLOOD RISK
30 Winter	402.2	402.2	0.9943	0.9943	432.6	FLOOD RISK

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
30 Summer	59.75	22
30 Winter	59.75	23

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Summary of Results for 30 year Return Period (+30%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m^3)	Status

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)

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Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	30	Longest Storm (mins)	10080
M5-60 (mm)	19.000	Summer Storms	Yes
Ratio-R	0.356	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+30
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 3.000

Time (mins) from:	to:	Area (ha)
0	4	3.000

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Tank/Pond Details

Invert Level (m) 0.000 Ground Level (m) 1.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.00	435.0	0.30	435.0	0.60	435.0	0.90	435.0
0.10	435.0	0.40	435.0	0.70	435.0	1.00	435.0
0.20	435.0	0.50	435.0	0.80	435.0		

Hydro-Brake Outflow Control

Design Head (m) 1.200 Diameter (mm) 599
Design Flow (l/s) 417.0 Invert Level (m) 0.000
Hydro-Brake Type MD6

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.10	17.5	1.20	416.9	3.00	388.2	7.00	542.0
0.20	55.1	1.40	418.6	3.50	401.0	7.50	560.9
0.30	103.9	1.60	413.9	4.00	419.0	8.00	579.2
0.40	158.3	1.80	405.9	4.50	439.4	8.50	597.0
0.50	214.1	2.00	397.5	5.00	460.5	9.00	614.3
0.60	267.7	2.20	390.7	5.50	481.6	9.50	631.2
0.80	356.1	2.40	386.5	6.00	502.3		
1.00	403.6	2.60	384.8	6.50	522.4		

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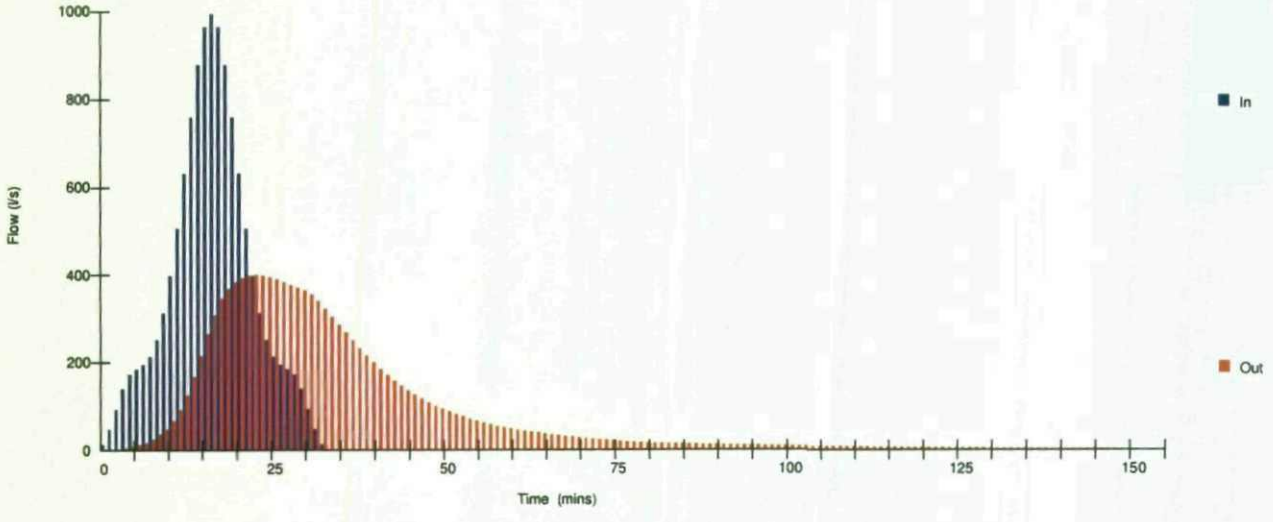
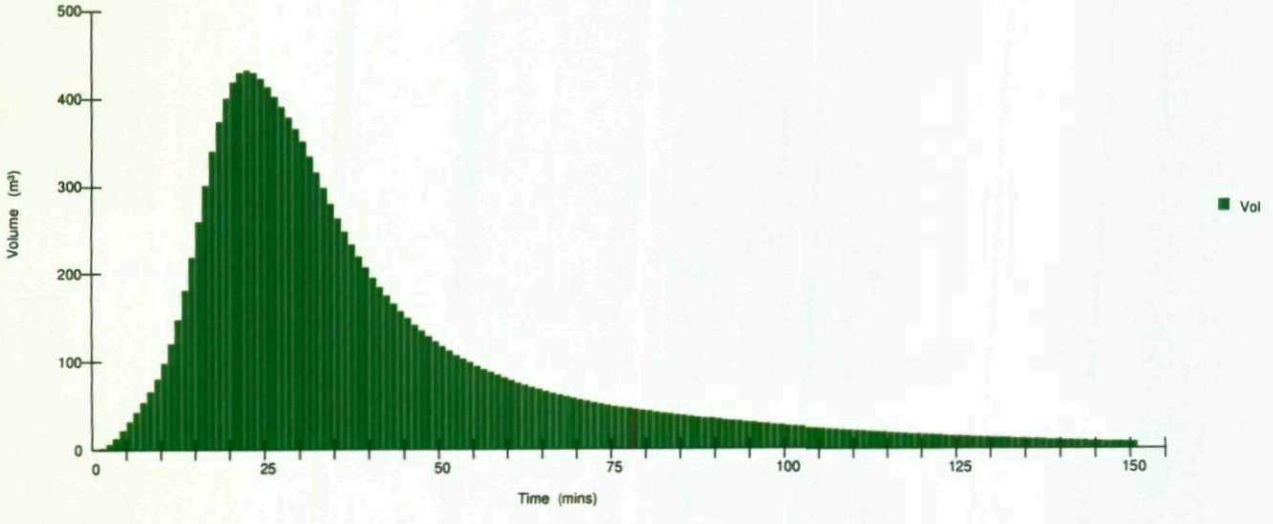
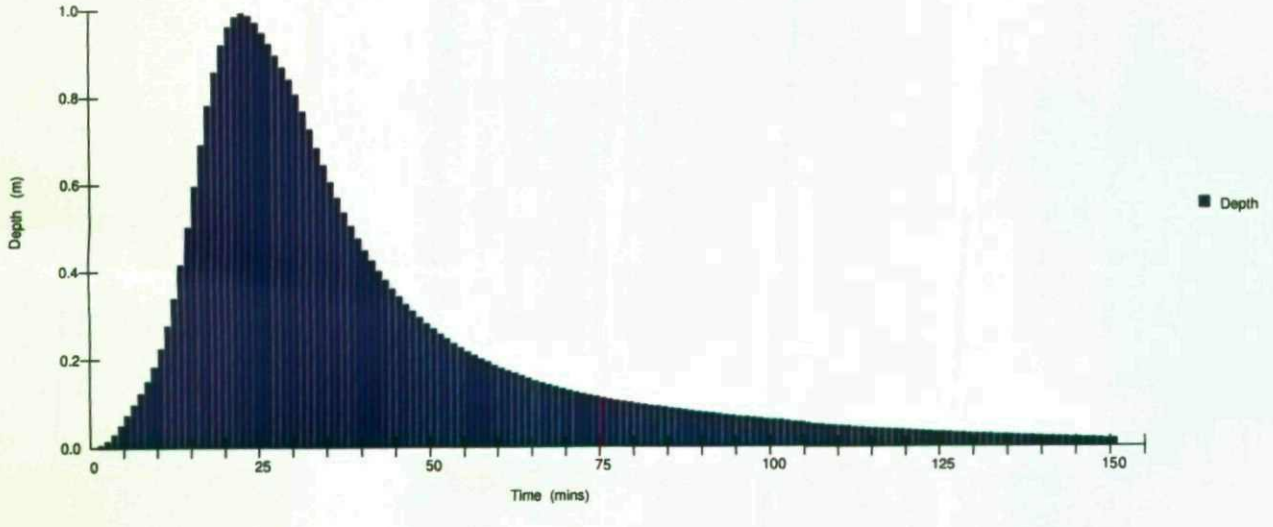
Storm Duration 30 Mins (Winter)







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Summary of Results for 100 year Return Period (+30%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m^3)	Status
30 Summer	411.7	411.7	1.1223	1.1223	535.6	FLOOD
30 Winter	415.6	415.6	1.1803	1.1803	593.6	FLOOD

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)
30 Summer	78.04	22
30 Winter	78.04	24

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Summary of Results for 100 year Return Period (+30%)

Storm Duration (mins)	Maximum Control (l/s)	Maximum Outflow (l/s)	Maximum Water Level (m OD)	Maximum Depth (m)	Maximum Volume (m^3)	Status

Storm Duration (mins)	Rain (mm/hr)	Time-Peak (mins)

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Rainfall Details

Region	ENG+WAL	Shortest Storm (mins)	15
Return Period (years)	100	Longest Storm (mins)	10080
M5-60 (mm)	19.000	Summer Storms	Yes
Ratio-R	0.356	Winter Storms	Yes
Cv (Summer)	0.750	Climate Change %	+30
Cv (Winter)	0.840		

Time / Area Diagram

Total Area (ha) = 3.000

Time (mins) from:	to:	Area (ha)
0	4	3.000

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Tank/Pond Details

Invert Level (m) 0.000 Ground Level (m) 1.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.00	435.0	0.30	435.0	0.60	435.0	0.90	435.0
0.10	435.0	0.40	435.0	0.70	435.0	1.00	435.0
0.20	435.0	0.50	435.0	0.80	435.0		

Hydro-Brake Outflow Control

Design Head (m) 1.200 Diameter (mm) 599
Design Flow (l/s) 417.0 Invert Level (m) 0.000
Hydro-Brake Type MD6

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.10	17.5	1.20	416.9	3.00	388.2	7.00	542.0
0.20	55.1	1.40	418.6	3.50	401.0	7.50	560.9
0.30	103.9	1.60	413.9	4.00	419.0	8.00	579.2
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0.60	267.7	2.20	390.7	5.50	481.6	9.50	631.2
0.80	356.1	2.40	386.5	6.00	502.3		
1.00	403.6	2.60	384.8	6.50	522.4		

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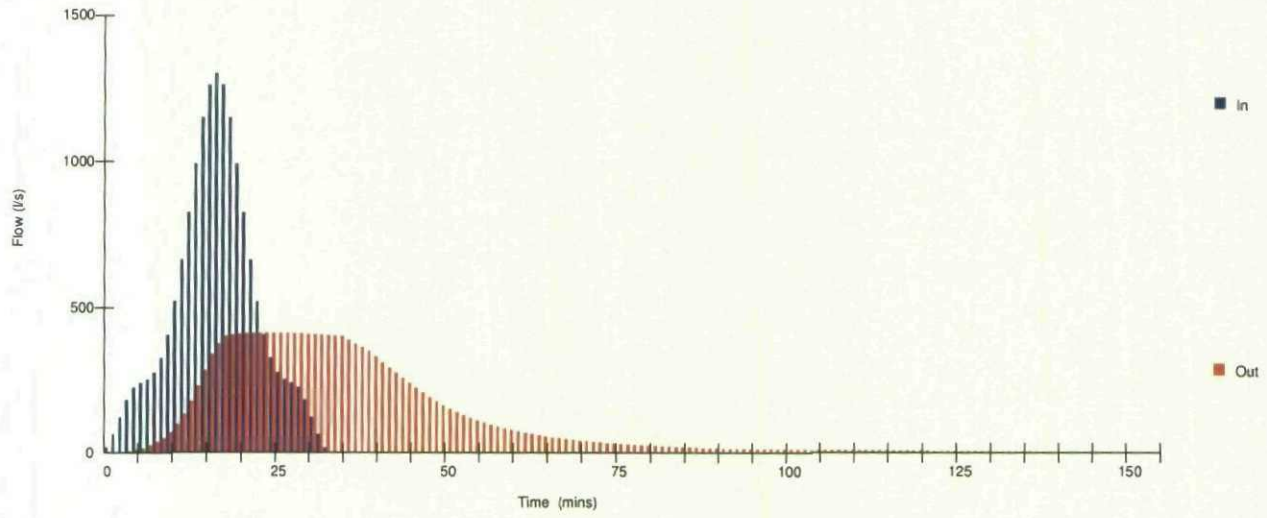
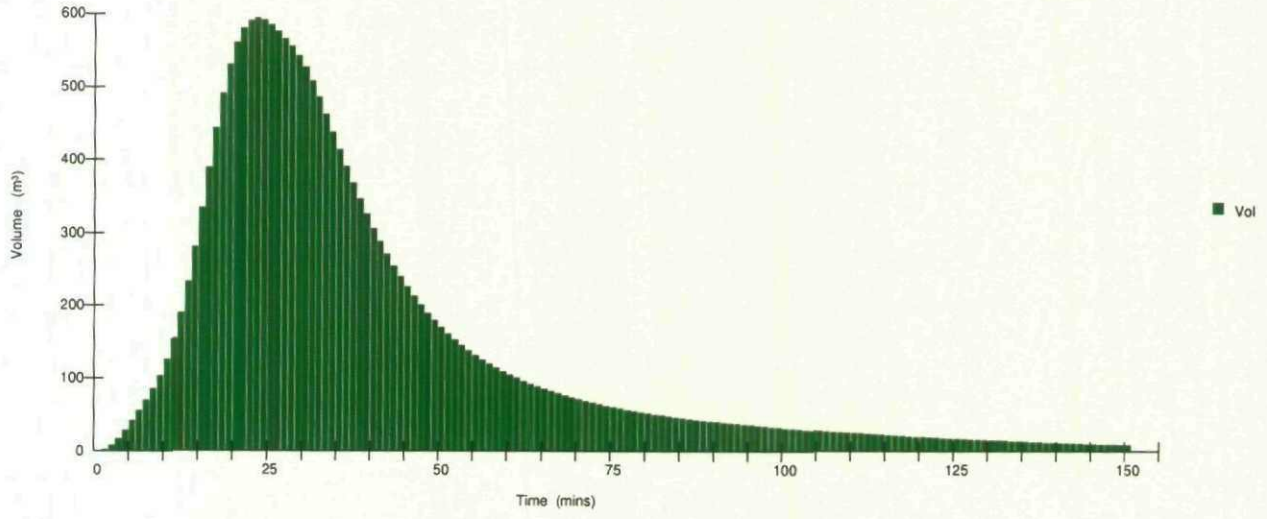
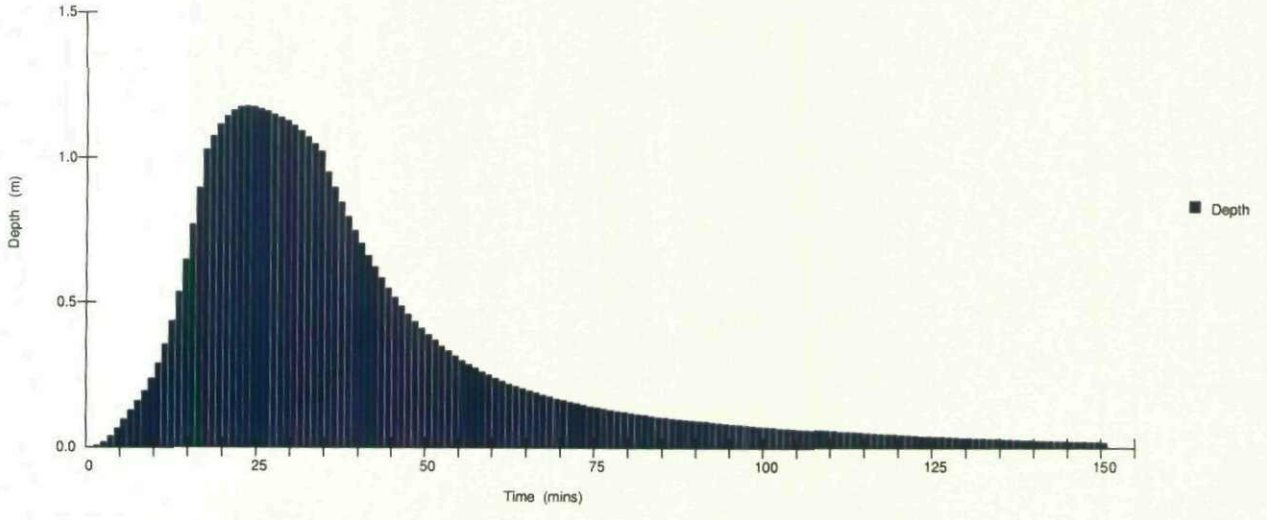
Storm Duration 30 Mins (Winter)







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