Eastwood&Partners
CONSULTING ENGINEERS

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JMW/LEM/33275

November 2010
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FLOOD RISK ASSESSMENT

Client:	Barnsley Metropolitan Borough Council
Site:	Penistone Grammar School 106 Huddersfield Road, Penistone
Planning Authority:	Barnsley Metropolitan Borough Council

EXECUTIVE SUMMARY

The project comprises the proposed re-development of a 1.5 ha site. The site was formerly in use as educational premises. The future development use is not known.

The Environment Agency and Barnsley MBC Strategic Flood Risk Assessment flood maps show the site to lie outside of the flood zone. The site is at negligible risk of flooding from the nearest watercourse, Scout Dike, or from other sources. Thus, most development uses will be appropriate to this site. The principal concern of the Flood Risk Assessment is surface water disposal.

Surface water disposal is considered in accordance with the drainage hierarchy in Building Regulations Part H 2002, with disposal via SUDS methods the first option.

Infiltration SUDS such as soakaways are not likely to be viable on the site due to the presence of clay and/or rock at shallow depth. This should be confirmed by further intrusive site investigation and percolation testing.

A drainage survey is required to establish the outfall of the existing surface water system; assumed to be Scout Dam reservoir.

The permitted discharge rate is subject to agreement with the relevant statutory bodies. Surface water discharge is likely to require flow balancing and on-site storage.

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INTRODUCTION

This Flood Risk Assessment (FRA) has been prepared in accordance with Planning Policy Statement 25 – Development and Flood Risk (PPS25 – December 2006).on the instructions of Chris Carr Associates on behalf of Barnsley Metropolitan Borough Council. Any other parties using the information in this report do so at their own risk and any duty of care is excluded.

The project comprises the proposed re-development of a 1.5 ha educational site.

This report is written on the assumption that the site will be sold on for development. Potential uses include commercial, care-home and private residential.

THE DEVELOPMENT

Site Location & Description

The site is to the east of Huddersfield Road, Penistone, at OS grid reference SE 242 042, in an area of mixed agricultural and residential development.

The site was formerly in use as educational premises, comprising principally school buildings and hardstanding. The site includes a sloping, wooded area to the east.

The site is bounded by housing to the north and west, by the new Penistone Grammar School to the south and by a reservoir known as Scout Dam to the east.

The nearest watercourse is Scout Dike which feeds Scout Dam.

Site Levels

The site falls to the east. The central area of the site, currently car-parking, falls from Huddersfield Road by up to 3 m. Beyond the school buildings the site is terraced and drops 1m to the wooded area. Land slopes some 3 m to the edge of the wood before falling steeply some 6 m to Scout Dam reservoir.

Scout Dam is estimated to be around 10 m below the main area of the site.

It is assumed that the sloping, wooded area will not be developed. It is anticipated that although there will be some re-levelling required where the site is terraced, generally site levels will remain broadly unchanged.

Site Layout

A site plan showing existing features and surrounding road levels is appended.

Environment Agency Flood Map

The Environment Agency (EA) flood zone map shows the site to lie within Zone 1 (Low Risk).

Barnsley Metropolitan Borough Council Flood Map

The Level 1 Strategic Flood Risk Assessment (SFRA) commissioned by Barnsley MBC shows the site to lie outside of the flood zone.

Planning Policy Statement 25 (PPS25)

PPS25 - "Development and Flood Risk" - sets out the principles for assessing the suitability of sites for development, in relation to flood risk, as part of the planning process. A risk-based approach is adopted through a strategic approach with regard to site selection and a methodology for managing flood "pathways" and reducing the adverse consequences of flooding.

Initially the "Sequential Test" is applied to the allocation of land suitable for development. Following this, if appropriate, the "Exception Test" is applied where it must be demonstrated that the development provides wider sustainability benefits to the community outweighing flood risk.

Sequential Test

Tables D.1 and D.2 of PPS25 provide details of vulnerability classifications for particular types of development in relation to flood risk zones. Care homes and private housing is classed as "More Vulnerable" in Table D.2; offices "Less Vulnerable".

Table D.3 indicates that "More Vulnerable" development is compatible with Flood Zones 1 and 2, compatible with Zone 3a if the Exception Test can be satisfied and incompatible with Zone 3b (functional floodplain).

Any proposed development that may be classed as "More Vulnerable" or "Less Vulnerable" would be appropriate to this site. It is envisaged that application of the Sequential Test can be adequately demonstrated.

Exception Test

Application of the Exception Test under PPS25 is not required in this case.

Climate Change

An issue emphasised in PPS25 is the requirement to take account of potential climate change effects. Housing, for example, is generally taken to be designed for a sixty year lifespan. PPS25 recommends that a 20% increase in peak rainfall intensity is taken into account for design horizons up to and including 2055-2085.

FLOOD RISK

Potential Sources of Flooding

The EA and SFRA maps are intended for general guidance on flood risk and it is also necessary to consider other, more detailed, sources in relation to local factors.

Scout Dike & Scout Dam

The site lies in an elevated position relative to Scout Dike and Scout Dam. There is potential for Scout Dike to flood as it crosses Huddersfield Road to the north of the site. However, the road is some 10 m lower than the site at this point. Thus, flood risk from these sources is considered to be negligible.

Other watercourses

To the south of the site, there is potential for the River Don to flood as it passes through Penistone. Again, the site is elevated above the watercourse and flood risk from this source is considered to be negligible.

Overland Flow

Huddersfield Road falls to the north as it passes the site. There is the potential for surface water run-off, during heavy rainfall, to enter the site. However, the road reaches a high point just south of the site adjacent to the new school. Thus, the drained area is small and the volume of run-off will not be substantial.

The site itself falls to lower-lying, ground to the east. As such, any surface water that does reach the site is unlikely to collect to any significant depth.

Sewerage

The site may be at risk of flooding resulting from surcharging of the local drainage system. However, the surrounding sewers are owned and maintained by Yorkshire Water. We are unaware of any capacity issues or flood risk associated with these systems.

Residual Flood Risk

The site is not deemed to be at risk of flooding from external sources. Hence, the principal flood

risk for consideration is to others. Flood risk should not be increased (reduced if possible) as a result of developing the site and is discussed in more detail in the Drainage Strategy section of this report.

General Flood Mitigation Measures

Buildings

- Levels across the site should be laid out to provide an opportunity for any flood water to flow away from buildings.
- The minimum level for peripheral roads, paths and escape routes should be at or above current site levels.

Access and Egress

Provided that site roads, paths and walkways are not constructed significantly below current site levels, with a consequential risk of localised flooding, it is anticipated that there will be no difficulty in maintaining safe access and egress to and from the buildings, or the site in general, even during extreme weather conditions.

DRAINAGE STRATEGY

Yorkshire Water Consultation

A sewer record map, appended, has been received from Yorkshire Water. The map shows there is a 150 mm public combined sewer crossing the northern and eastern edges of the site.

A pre-planning enquiry has been sent to Yorkshire Water. Their letter, reference L006924 dated 26 October 2010, is summarised below.

- There is a 150 mm public combined sewer crossing the site. No buildings are to be erected within 4 m of the sewer, nor must ground levels be raised or lowered over the sewer. Alternatively, a Section 185 diversion of the sewer may be made.
- Foul water should discharge to the 150 mm public foul (combined) sewer recorded crossing the site.
- The disposal of surface water by means of soakaways should be considered as the primary method.
- The local public sewer network does not have the capacity to accept any additional discharge of surface water from the site.
- Surface water discharge to the sewer will be restricted to the same rate as existing less 30% as an allowance for climate change.
- It will be necessary to demonstrate that there is positive drainage to the public sewer at present.

Environment Agency Consultation

If the site currently drains to the watercourse and it is intended that the proposed development also drain to the watercourse the EA generally require the discharge rate to be no greater than existing and, ideally, for it to be reduced by 30%.

If the site currently drains to the public sewer and it is intended that the proposed development drain to the watercourse then the EA generally require discharge to be restricted to the greenfield rate of 5 l/s/ha.

Existing Sewerage

The site is mainly covered by buildings and hardstanding. Hardstanding areas generally drain to gullies. A site walkover indicates that surface water drains to the east. The discharge route could not be determined but may be to the watercourse or reservoir below the site. It is assumed that this discharge route will cross third party land as the site boundary is not thought to include the bank of the reservoir

Anecdotal evidence from site staff indicates the site has no incident of flooding from run-off or from problems with the site sewers. The site is thought to drain to separate surface and foul systems with interceptors on surface water systems.

A full drainage survey should be carried out to confirm drainage capacity and condition, and also to prove connection to the public sewer network and/or watercourse.

Ground Conditions

A Phase 1 site investigation, comprising desk-top study, has been carried out by Eastwood & Partners. It relevant points are summarised below.

Geological maps show the solid geology beneath the site to comprise Penistone Flags sandstone of the Lower Coal Measures.

The Envirocheck Report identifies the site to overlie a Secondary A aquifer comprising permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

It is expected that clay or sand soils are present, with flaggy sandstone bedrock at shallow depth below. Past experience suggests that these strata do not lend themselves well to soakaway drainage.

Drainage Hierarchy

Surface water disposal should be in accordance with the drainage hierarchy in Building Regulations Part H 2002. Disposal via SUDS methods should be considered as the first option. Disposal to the public sewer should be considered only when SUDS methods and disposal to the watercourse are shown to be unsuitable.

Sustainable Drainage Systems (SUDS)

It is recognised that the use of sustainable drainage systems, or SUDS, is desirable on new development sites.

SUDS methods include water infiltration systems such as soakaways, basins and filter strips, together with swales, pervious pavements, detention basins, ponds and other wetland solutions. Source control methods such as green roofs, water butts and rainwater harvesting on individual properties or groups of properties may also be considered part of a SUDS package of measures. The various methods are considered in detail in The SUDS Manual (CIRIA C697).

Infiltration SUDS such as soakaways are not expected to viable on the site due to the presence of clay and/or bedrock at shallow depth. Detention type SUDS such as ponds are not expected to be viable due to the small size of the developable area of the site and by the steep slope of the remaining site areas. However, it is a recommendation of this report that due consideration is given to the use of other SUDS as may be appropriate.

Watercourse

The nearest watercourse that may accept surface water discharge from the site is Scout Dike or Scout Dam reservoir. As noted, this route is thought to cross third party land and an agreement will be needed, otherwise a Sewer Requisition is required.

Proposals for Surface Water Disposal

The final disposal strategy for surface water run-off from the site requires detailed consideration and approval during the design phase of the project.

Current planning policy guidance, as contained in PPS25, is for the disposal of surface water to be dealt with in a sustainable way, such that volumes and peak flows are not increased. The aim should be to reduce as far as possible peak flows below those existing prior to development.

The disposal strategy will follow the principles listed below, subject to further intrusive site investigation and percolation testing.

If infiltration type SUDS are viable:-

- Surface water from private areas will drain to individual soakaways in garden areas. Highways will drain to an infiltration basin or to a system of soakaways. These will be

located in public open spaces.

- On-site containment will be required for the 1 in 100 year storm event plus allowance for climate change.
- If the use of infiltration basins is desirable then consideration should be given within the site layout to the accommodation of such features, ideally in a low-lying part of the site.

If infiltration type SUDS are not viable:-

- Surface water will discharge via existing connections.
- The discharge rate will be subject to further discussion and agreement with Yorkshire Water, the EA and Barnsley MBC. Attenuation is likely to be required.
- Notwithstanding discussion with the statutory bodies, the minimum practical discharge rate for a site of this size is 5 l/s.
- Storage will be required for the 1 in 100 year storm event plus allowance for climate change. If the site drainage system is adopted Yorkshire Water will require storage for the 1 in 30 year event to be stored below-ground.
- Ideally, the additional storage up to the 1 in 100 plus climate change event should be contained above-ground, if layout and site levels permit.
- Within the site layout consideration should be given to the provision of storage in a low-lying part of the site, either above-ground or, if this is not feasible, below-ground in oversized sewer pipes, tanks or box culverts.
- A preliminary estimate of storage volumes is:-

1 in 30 year below-ground storage	240 m^3
1 in 100 year + 20% containment on site	170 m^3
Total	430 m^3

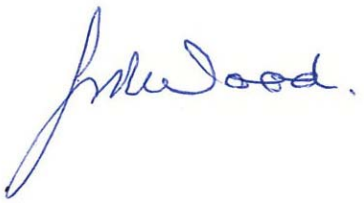
The estimate assumes 50 % impermeable site area and a “worst-case” permitted discharge of 5 l/s.

Proposals for Foul Disposal

- Foul effluent will drain to the public combined sewer crossing the site.

CONCLUSIONS

1. The site is not in an area at risk of flooding.
2. Further intrusive site investigation and percolation testing are required.
3. If infiltration type SUDS are viable surface water disposal will be via soakaways and/or detention basins. However, it is doubtful that such disposal methods will be viable.
4. If infiltration type SUDS are not viable surface water disposal will be to Scout Dike/Scout Dam reservoir or to the public sewer.
5. A full drainage survey is recommended, prior to any demolition, to establish existing connections.
6. The permitted discharge rate to the watercourse or the public sewer is subject to agreement with the relevant statutory bodies.
7. For surface water discharge to the watercourse or public sewer, flow balancing and on-site storage are likely to be required. Storage will be in the form of oversize sewer pipes, tanks or box culverts.
8. The level of risk and safeguards available are considered appropriate to this class of development.



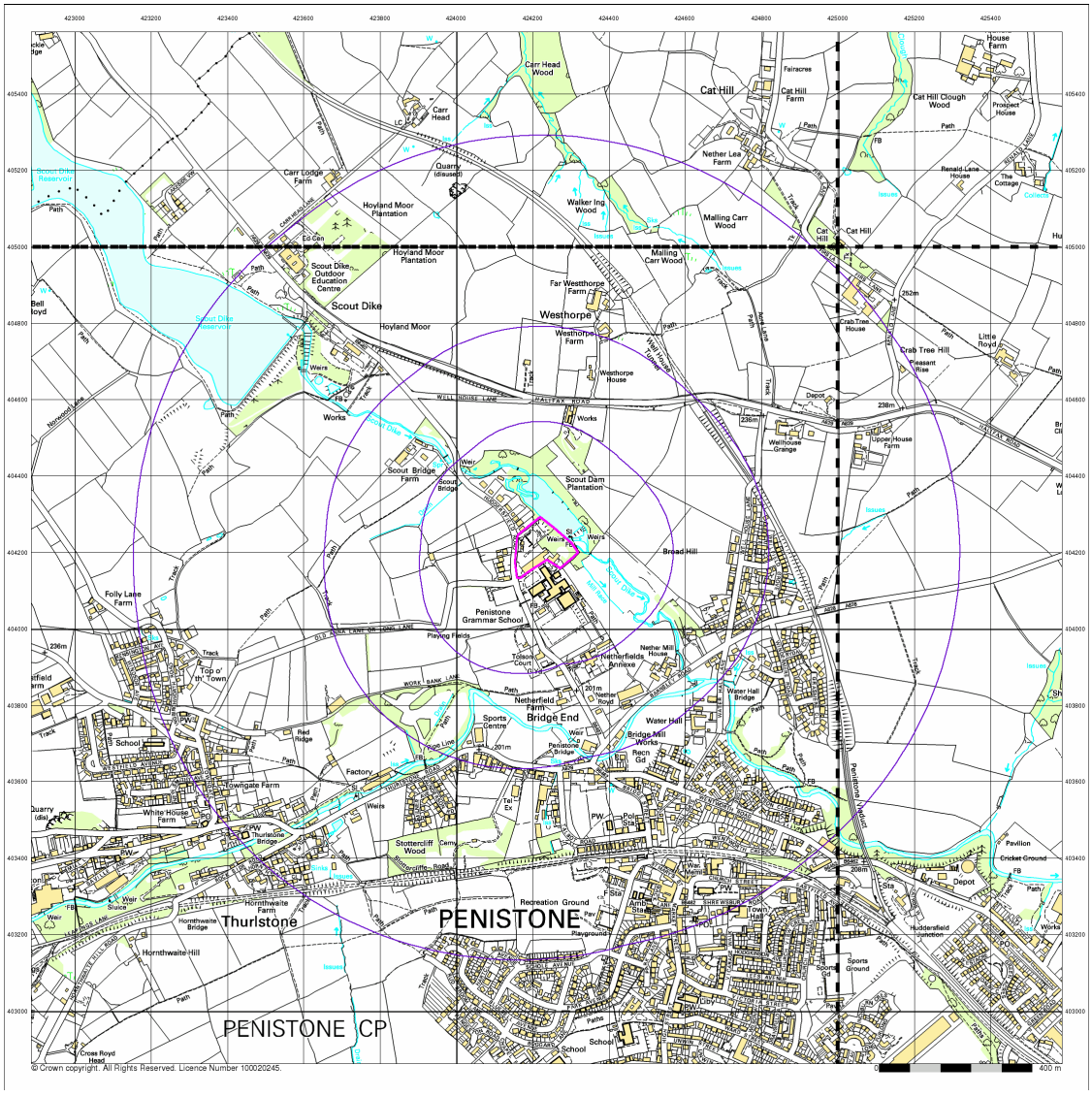
J M Wood
Director

APPENDICES

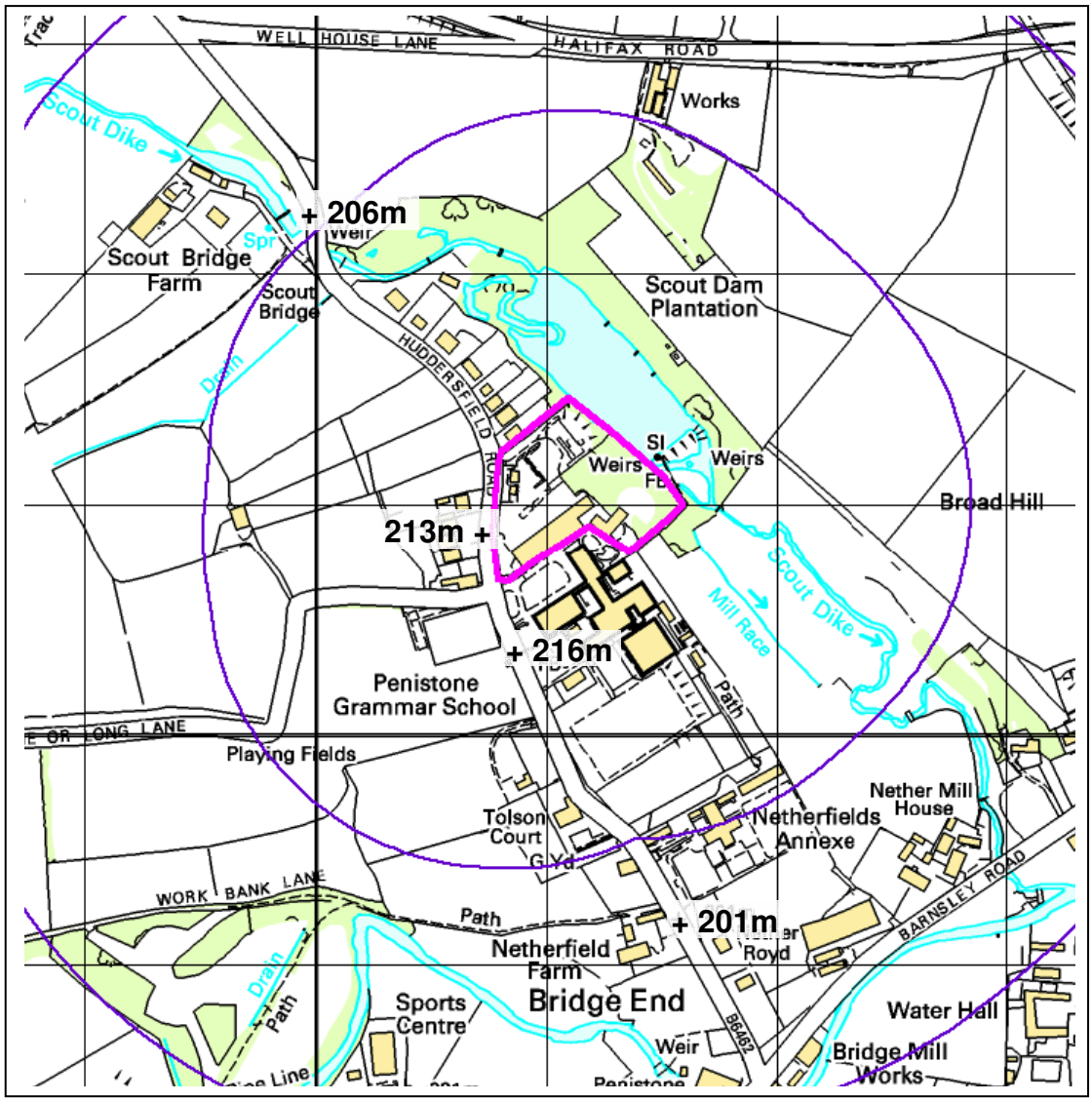
- Location plan
- Existing site plan
- Environment Agency
  Flood zone map
- Yorkshire Water
  Sewer record map
  Correspondence dated 26 October 2010

Location Plan

Penistone Grammar School, Penistone

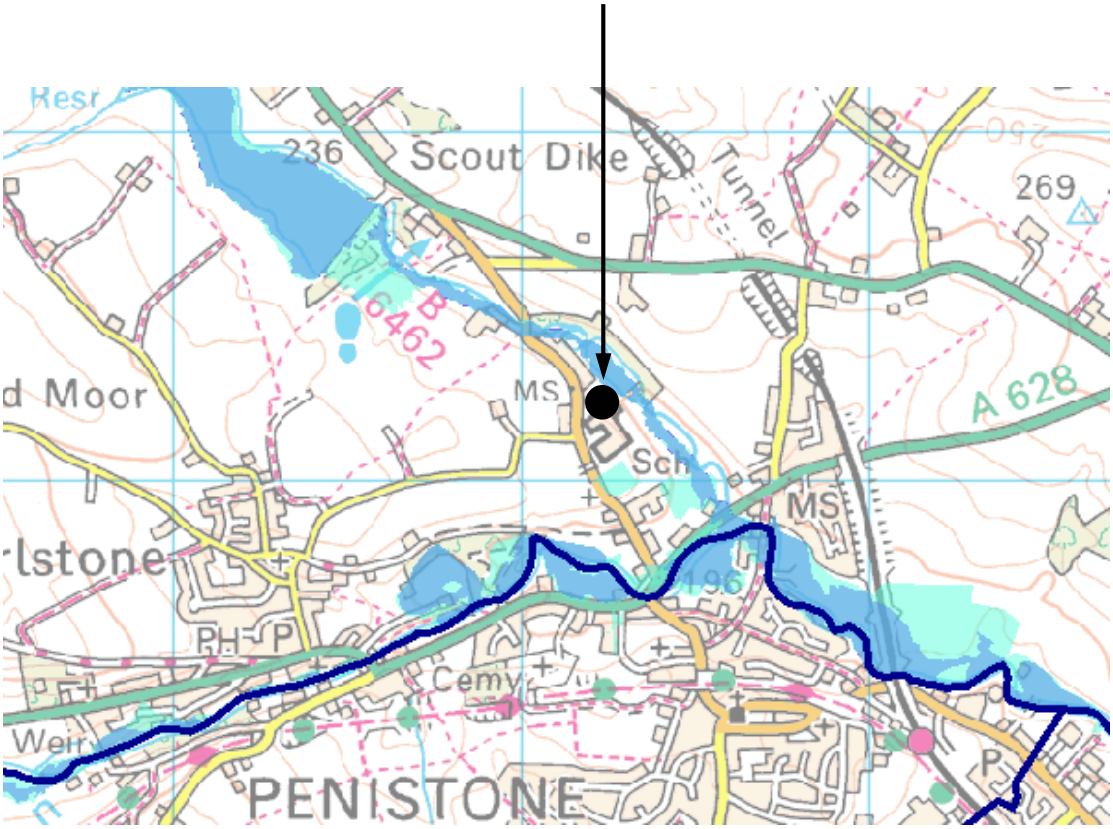


Site plan showing spot levels to Ordnance Datum



Environment Agency Flood Map

Penistone Grammar School, Penistone



	Flooding from rivers or sea without defences
	Extent of extreme flood
	Flood defences
	Areas benefiting from flood defences

YorkshireWater

Yorkshire Water Services
Developer Services
Sewerage Technical Team
PO BOX 52
Bradford
BD3 7AY

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

Email:
Planning.Sewerage@yorkshirewater.co.uk

For telephone enquiries ring:

Kashif Khan on (0845)120 8482

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FAO Ms Linda Mee

Eastwood & Partners
29 OCT 2010
Rec'd

Your Ref:
Our Ref: L006924

26th October 2010

Dear Madam,

Penistone Grammar School, 106 Huddersfield Road, Penistone - Pre-Planning Sewerage Enquiry - Educational

Thank you for your enquiry received 11th October 2010. Our charge of £60.00 (plus VAT) will be added to your account with us, reference EPL039. 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 is a 150 mm diameter public combined sewer recorded crossing the site. No buildings are to be erected within 3 (three) metres, nor trees planted within 5 (five) metres of this public sewer. It may not be acceptable to raise or lower ground levels over the sewer, nor to restrict access to the manholes on the sewer. If you wish to have this sewer diverted under Section 185 of the Water Industry Act 1991 an application should be made in writing. To discuss this matter, please telephone 0845 120 84 82.

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

Foul water domestic waste should discharge to the 150 mm diameter public foul sewer recorded crossing/within the site.

Foul water from kitchens and/or food preparation areas of any restaurants and/or canteens etc. must pass through a fat and grease trap of adequate design before any discharge to the public sewer network.

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.

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 for discharge.

It is understood that watercourses are located to the east/north-east of the site. These appear to be the obvious place for surface water disposal.

Failing the above, curtilage 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. Discharges to the public sewer must take into account a 30% reduction in existing discharge and climate change.

To do this, Yorkshire Water requires to see existing and proposed drainage layouts with pipe sizes, gradients and connection points, measured impermeable areas of the present and proposed use of the site, along with the calculations that show the existing and 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/Internal Drainage Board, with regard to surface water disposal from the site.

Surface water run-off from communal parking (greater than 800 sq metres or more than 50 car parking spaces) and hardstanding must pass through an oil, petrol and grit interceptor/separator of adequate design before any discharge to the public sewer network. Roof water should not pass through the traditional 'stage' or full retention type of interceptor/separator. It is good drainage practice for any interceptor/separator to be located upstream of any on-site balancing, storage or other means of flow attenuation that may be required.

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.

The site is within an area that may be affected by river flooding. We would advise you to contact the Environment Agency for details.

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.

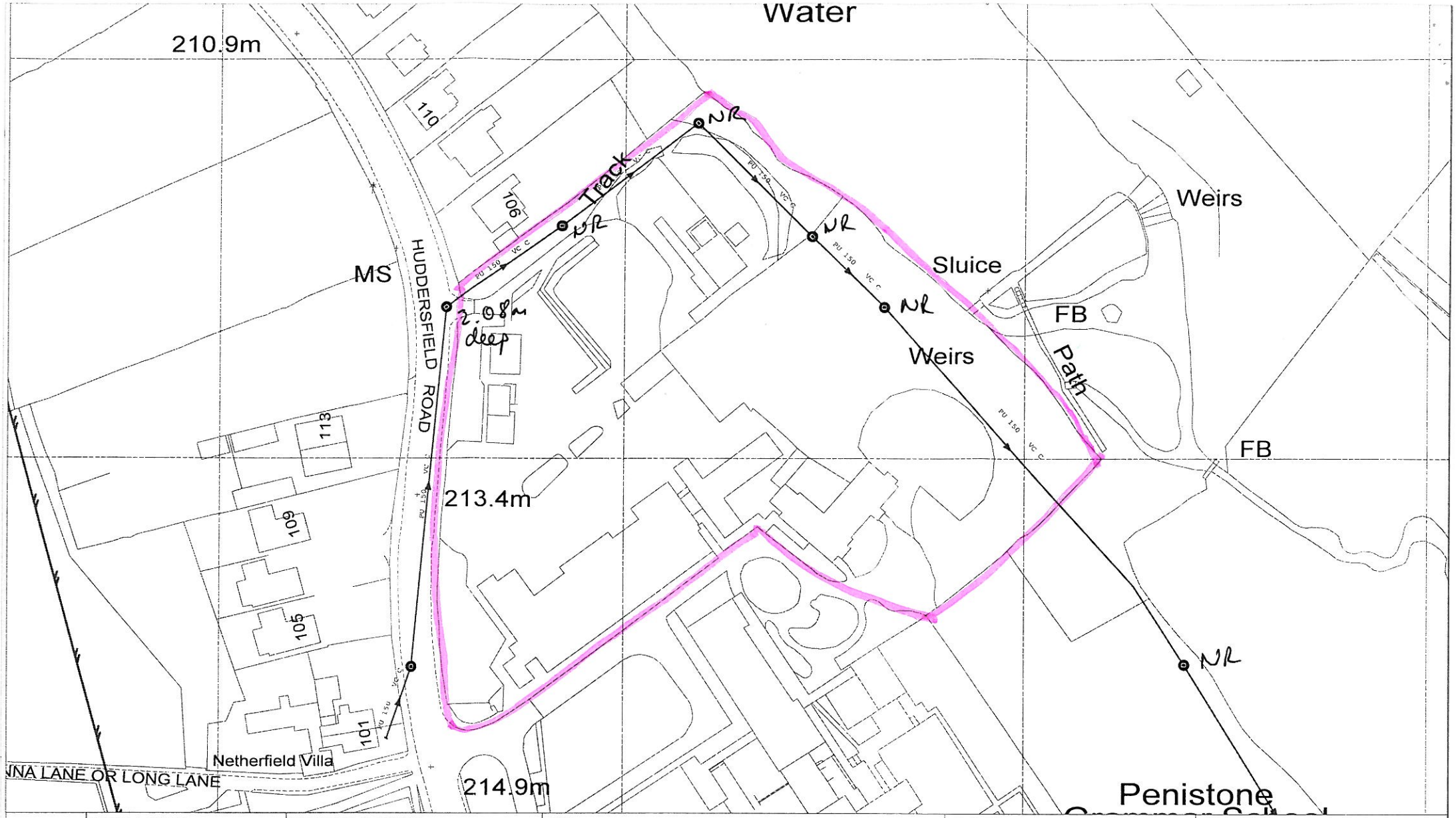
All the above comments are based upon the information and records available at the present time.

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



424040 : 404106	Map Name : SE2404SW	Title	Partial Key Foul Sewer = F Combined Sewer = C Surface Water Sewer = SW Trade Sewer = TD Partially Separate = PS
YorkshireWater	Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : K KHAN Contact Tel .	Notes NR = No Recorded depth.	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
		(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 : 26/10/2010, 14:20:42 Date Gen : 26/10/2010, 14:20:44 Source : Sewer Network Enquiry

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