Design Note

Buro Happold

to Lorna Murray, Richard Barlow – Atkins

from Nicole Cooper – Buro Happold

date 23 December 2008

job no 022413 \ F08

copied to Rob Moyser, Dave Leversha – Buro Happold

attachments CSK010 and CSK011

subject **Penistone Drainage Strategy**

Lorna, Richard

Introduction

This design note serves to outline the proposed foul and surface water drainage strategy for the new Penistone School. As this development is a replacement school, the construction will be phased to allow the decant of students and staff from the existing building into the new building.

This drainage strategy will aim to describe:

- the existing site drainage
- the proposed site drainage strategy
- consultation with Yorkshire Water & the Environment Agency
- and the planning conditions to be satisfied.

The Site

The existing Penistone School site covers approximately 4.4 hectares east of Huddersfield Road which comprises buildings, a car park and school pitches, and 7.9 hectares west of Huddersfield which comprises further pitches. The existing topography of the site grades from 214.90m at the site access in the north-west corner to 200.00m in the south of the site (1:25 average grade). Since the proposed finished floor level is set at 212.50m, it is anticipated that all connections into the public sewer system will be gravity connections and that no pumping will be required.

Existing Site Drainage

There are 2no. public sewers adjacent to the site: 1no. 150mm dia. combined sewer in Huddersfield Road and 1no. 150mm dia. combined sewer to the east of the site running in between the school and the Cawthorne Dike (Refer to sketch CSK 011). It is assumed that the existing school utilises both sewers for the disposal of foul and surface water drainage.

CCTV drainage inspection has been commissioned to confirm the extent, location and size of the existing school's private drainage system. Connections from the private drainage into the public sewer system will also be confirmed in the CCTV survey.

<u>Existing Foul Water</u>

In the absence of a CCTV drainage survey to verify the existing, private network, it is assumed that the foul water drainage gravitates to both 150mm dia. sewers. This shall be verified against the CCTV inspection records when completed.

The existing foul flow rate	=	No. of pupils & staff x Average flow rate x Peak flow factor
	=	1796 x 90 L/per/day / (24x60x60) x 6
	=	**11.2 L/s**

These foul water calculations are based on:

- a 90L/per/day water consumption figure provided in the British Water's Code of Practice - Flow and Loads 2 report and
- occupancy figures provided in the Barnsley Output Specification and Penistone School's website:
  - current number on roll 1600 pupils
  - teaching staff 90 full-time & 13 part-time
  - support staff 20 full-time & 73 part-time

Existing Surface Water

For the purposes of establishing the existing peak surface water run-off, it has been assumed that the roof area, car parking, hardstanding and games areas have an unrestricted discharge into both existing 150mm dia. combined water sewer systems that drain north to south adjacent to the site.

Preliminary calculations, based on Wallingford's procedure and a rainfall intensity of 50mm/hr (as suggested in BSEN752-4:1998 and the Building Regulation Document H) result in an:

Existing surface water peak flow rate = 2.78 x 50mm/hr x 3.11 hectare impermeable area
= **432 L/s**

Proposed Drainage Strategy

Proposed Foul Water Discharge

The drainage system shall be designed to have separate foul and surface water systems.

The peak foul flow rate has been calculated based on the following:

- a 90L/per/day water consumption figure provided in the British Water's Code of Practice - Flow and Loads 2 report and
- occupancy figures provided in the Barnsley Output Specification:
  - assumed designed capacity 1800 pupils
  - teaching staff 90 full-time & 13 part-time
  - support staff 20 full-time & 73 part-time

The proposed foul flow rate = No. of pupils & staff x Average flow rate x Peak flow factor
= 1996 x 90 L/per/day / (24x60x60) x 6
= **12.5 L/s**

Upon receipt of the CCTV drainage survey:

- the existing discharge locations into the public sewer/s will be assessed for re-use or
- new connections will be proposed if the existing connections are not viable, in terms of invert and location to suit the new school.

Proposed Surface Water Discharge

In accordance with Sewers for Adoption 6th edition, the underground drainage system shall be sized to accommodate the 30 year storm event. For those storm events in excess of the 1 in 30 year return period and up to the 1:100 year event, surface water will be accommodated/stored aboveground, within the site. To ensure that there is no risk of flooding to the building from that rainfall being stored aboveground during severe storm events, external hardstanding areas will be designed to fall away from thresholds and overland flow routes will be established which guide the surface water away from the buildings to soft landscaped or pitch areas within the site boundary.

In accordance with Planning Policy Statement 25 (PPS25), the surface water calculations will also take into account climate change. Based on a design life of 60 years, a 20% increase in rainfall intensity will be considered. (Refer to table B.2 Annex B of PPS 25)

The underground surface water drainage system will be designed to collect rainwater run-off from building roof areas, the car park, access and service roads and hardstanding areas. Run-off from hardstandings will be collected by a series of gullies and/or drainage channels, while run-off from car parking areas will also drain via a petrol interceptor, prior to discharging into the public sewer system, or be treated by means of a permeable pavement system (Refer to sketch CSK 010).

To ensure that the requirements of the Environment Agency and Yorkshire Water are met with regards to restricted flows, all surface water run-off from the site will be attenuated to an agreed rate. This will be achieved by introducing a flow control device within the private drainage system ie. a vortex flow control, an orifice control or throttle pipe.

The Environment Agency have advised that the watercourse to the east of the site, known as the Scout or Cawthorne Dike, can also accommodate a surface water discharge at a Greenfield rate of 5 L/s/ha. As the public sewer network adjacent to the school is small ie. 150mm dia, this option will be explored further, in conjunction with the CCTV survey inspection upon its receipt.

In line with PPS 25, Sustainable Urban Drainage Systems (SUDs) will be considered as a means of attenuating, treating and disposing of surface water.

Sustainable Drainage Systems

Sustainable drainage systems (SUDS) control volume and rate of runoff from the development, remove pollution and provide an amenity benefit such as wildlife habitat. These systems aim to control surface water at the source and mimic the natural catchment processes. The following SUDs will be considered on the Penistone site:

Permeable Pavements

Permeable pavements reduce the requirement for conventional drainage and ancillaries such as pipes, gully pots, manholes and interceptors. They can be utilised for both infiltration and attenuation of surface water collected from paved areas and roof catchments. If complete infiltration is not viable on this site (based on soakage information still to be received), there is therefore still an opportunity to use lined permeable pavements as attenuation in this scheme.

It is the current intention to provide permeable paving within the parking bays of the car park ie. the aisles will remain a traditional blacktop construction, while the bay area will incorporate a permeable block paving system.

Rainwater Harvesting

Rainwater harvesting shall be considered on this site. Not only will this serve to reduce the demand of potable water from the mains, it will reduce the volume of surface water being discharged into the public sewer system for everyday rainfall events.

This system will be designed by the Services Engineer and will include an off-line storage tank plus overflow into the surface water drainage system. The permanent storage volume required for re-use is provided in addition to the volume required to attenuate stormwater flows from major storm events.

It is the intention to use rainwater harvesting for the new school's roof area.

Infiltration trenches and soakaways

Where there is no risk of contamination, infiltration can be used to recharge underlying groundwater sources and feed the base-flows of local watercourses. Soakaways provide both surface water storage and allow for its infiltration into the ground. Soakage testing, which is due to be carried out shortly, will indicate whether the ground conditions are suitable for SUDs that employ infiltration as a primary means of surface water disposal.

Swales

To ensure that abnormal storm events (greater than a 1:30 year), are controlled within the site, swales are to be proposed along boundaries. These shallow, grass-lined channels/ditches will be used to intercept storm flows from the school site so that it does not cause flooding on adjacent properties.

Temporary Works

Since the existing school is to be retained while the new school is constructed, temporary works by the Contractor will be required to ensure that the drainage runs are kept live. This may involve temporary diversions and approvals from Yorkshire Water. The CCTV drainage inspections will clarify the affected pipework.

Planning Conditions

The following planning conditions relate to underground drainage. Once the detailed design has progressed, and prior to construction, a submission to the local authority will be made to obtain sign off of these conditions.

9. All surface water run-off shall be collected and disposed of within the site and shall not be allowed to discharge onto the public highway.	Road gullies and/or drainage channels will be located at the site entrances to ensure that surface water run-off is collected and disposed of in the school's drainage system and does not discharge onto the public highway.
19. No development shall commence until it has been shown that the foul and surface water flows entering the public sewerage system will be restricted to those of the existing/previous use of the site. Details of any necessary flow attenuation shall be submitted to and approved by BMBC Planning Authority.	Refer to above paragraphs 'Proposed Foul Water Discharge' and 'Proposed Surface Water Discharge'
20. The site shall be developed with separate systems for foul and surface water on and off-site.	Refer to above paragraph 'Proposed Foul Water Discharge'.
21. No development shall commence until details of the proposed means of disposal of foul and surface water drainage, including details of any balancing works and off-site works, have been submitted to and approved in writing by BMBC Planning Authority.	Refer to above paragraphs 'Proposed Foul Water Discharge' and 'Proposed Surface Water Discharge'
22. There shall be no piped discharge of surface water from the development prior to the completion of approved surface water drainage works and no buildings shall be occupied or brought into use prior to the completion of the approved foul water drainage works, unless otherwise agreed in writing with BMBC Planning Authority.	Refer to above paragraphs 'Proposed Foul Water Discharge' and 'Proposed Surface Water Discharge'
23. Surface water from vehicle parking and hardstanding areas shall be passed through an interceptor of adequate capacity prior to discharge to the public sewer. Roof drainage should not be passed through any interceptor.	Refer to above 'Proposed Surface Water Discharge'.

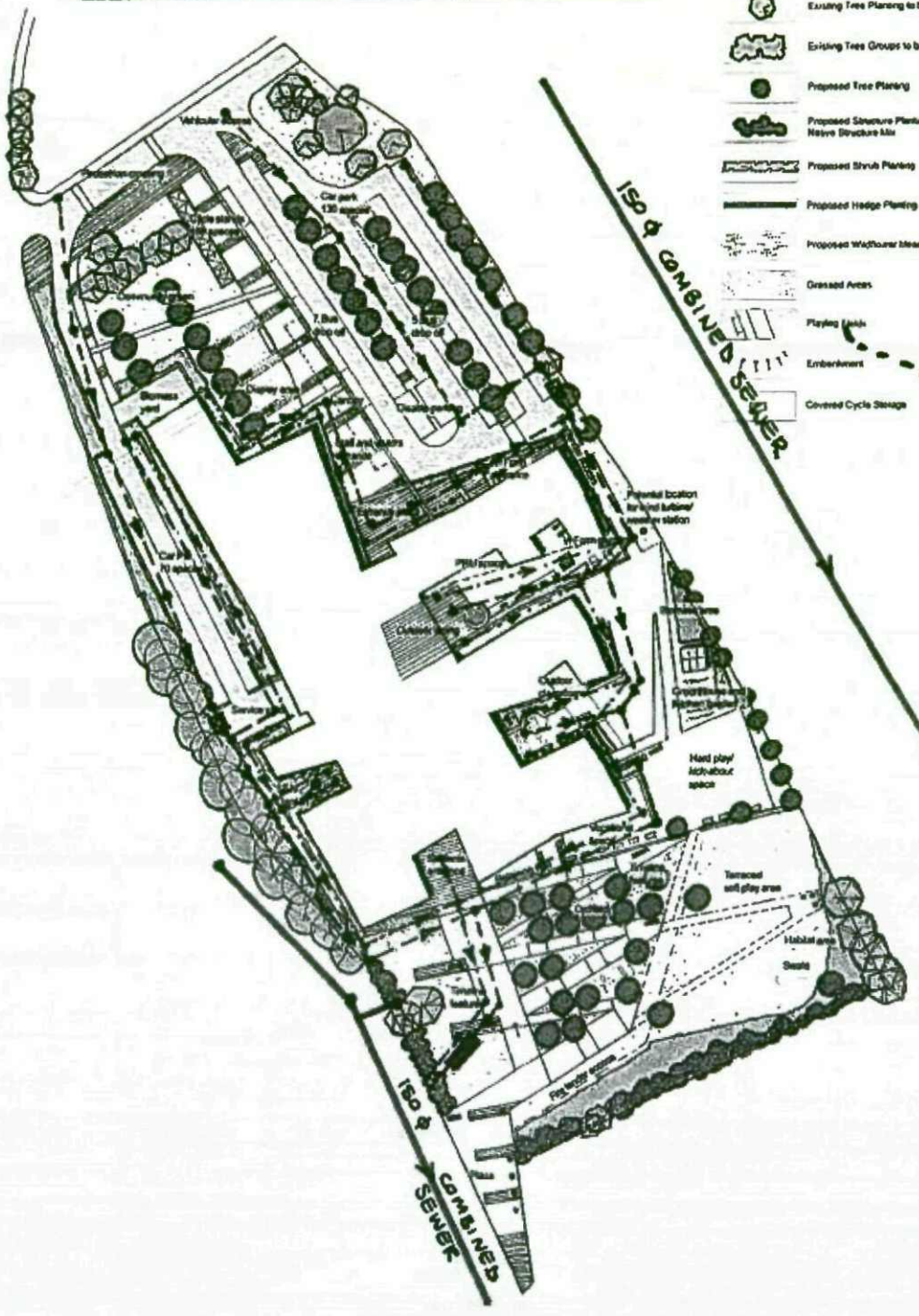
If you have any queries on our proposed drainage strategy, please do not hesitate to call.

Regards

[redacted]

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CONNECTIONS TO EXISTING PUBLIC SEWER SYSTEM TO BE CONFIRMED.



LEGEND

- Existing Tree Planting to be retained
- Existing Tree Groups to be retained
- Proposed Tree Planting
- Proposed Structure Planting Native Structure Mix
- Proposed Shrub Planting
- Proposed Hedge Planting
- Proposed Wildflower Meadow
- Grassed Areas
- Playing Fields
- Embankment
- Covered Cycle Storage
- Bound Gravel
- Timber Decking
- Proposed Pedestrian Tarmac Areas
- Proposed Vehicle Tarmac Areas
- Proposed Porous Tarmac to Multi Use Games Areas
- Pedestrian Crossing
- Concrete Block Edging
- Feature Paving
- 400x100mm Box Section in-situ Concrete Edge as Informal Seating
- Bespoke seating cubes

FOUL WATER SEWER

STORM WATER SEWER

Buro Happold

PRELIMINARY DRAINAGE SCHEMATIC

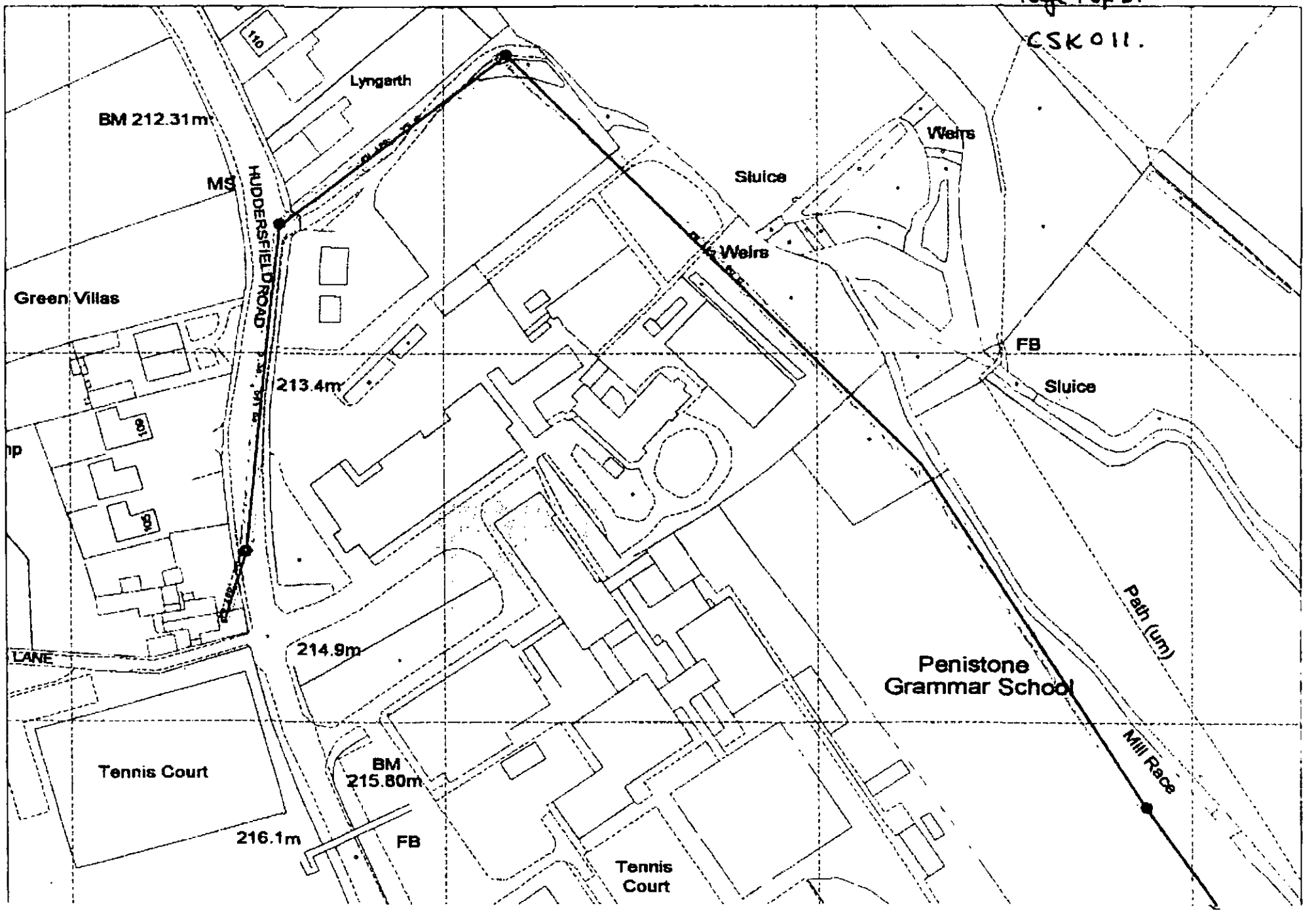
CSK010

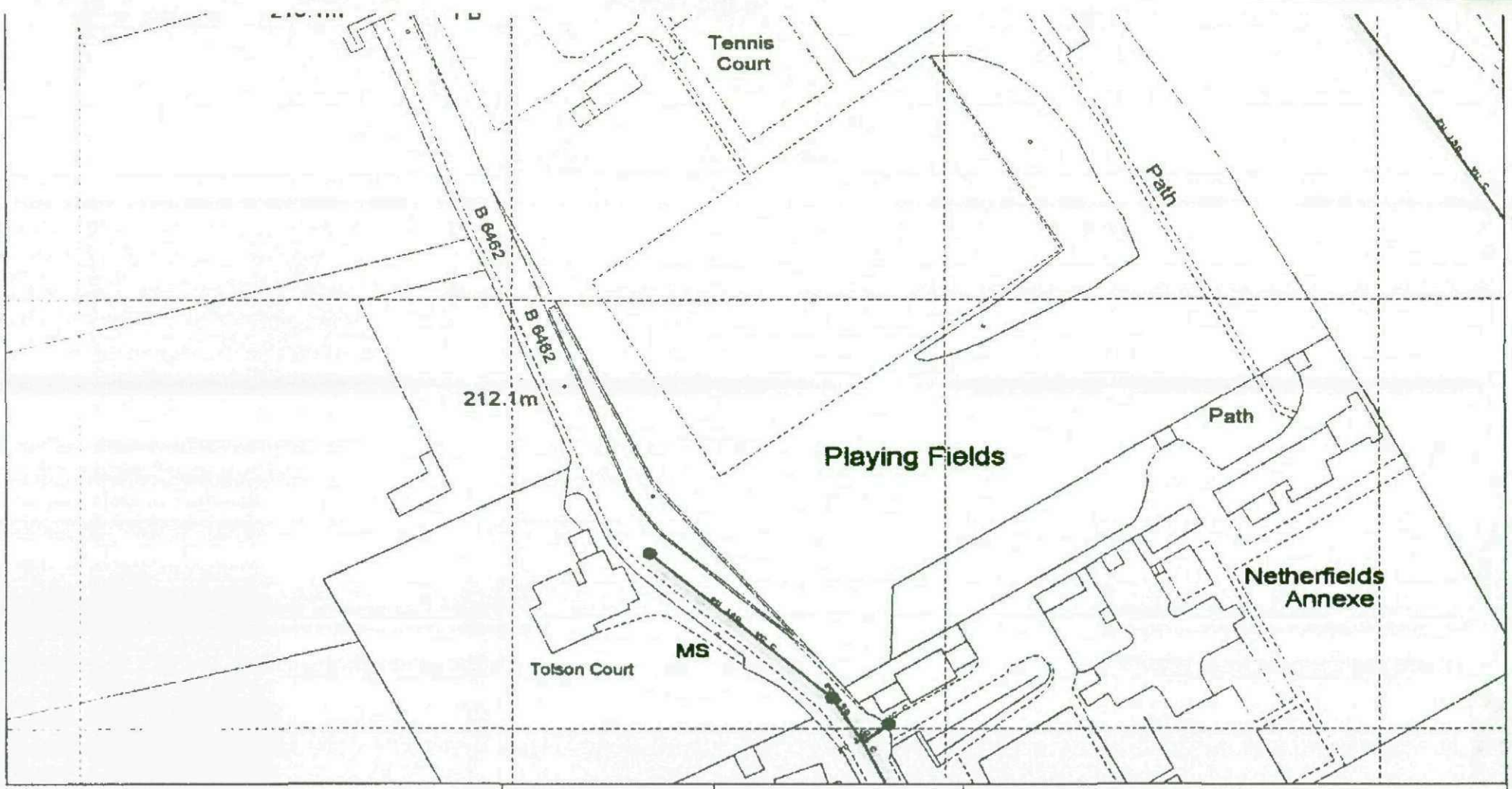
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CSK011.


Lyngarth
BM 212.31m
MS
HUDDERSFIELD ROAD
Green Villas
Sluice
Weirs
Weirs
FB
Sluice
213.4m
214.9m
LANE
Penistone
Grammar School
Path (um)
Mill Race
Tennis Court
BM
215.80m
216.1m
FB
Tennis
Court



424083 . 403887	Map Name : SE2403NW	Title
YorkshireWater Yorkshire Water, PO Box 500, Halifax Road, Bradford BD6 2LZ Contact Name : Mr C Burke Contact Tel : 6925892		Note
Based upon Ordnance Survey map data with the permission of the Controller of Her Majesty's Stationery Office, (c) Crown Copyright. Licence No. WU296561.	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 connections are shown.
	Date Req : 16/07/2002, 09:17:13	Date Gen : 16/07/2002, 09:17:29
		Source

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