Design Note

to Steve Bush, Steve Powell – Watson Batty

from Nicole Cooper – Buro Happold

date 18 December 2008

job no 022413 \ F08

copied to Rob Moyser, Dave Leversha – Buro Happold

attachments CSK001 and CSK002

subject **Dearne Drainage Strategy**

Buro Happold

Steve,

Introduction

This design note serves to outline the proposed foul and surface water drainage strategy for the new Dearne 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. The Leisure Centre is to be retained within the new development.

This drainage strategy will aim to describe:

- the existing site drainage
- the proposed sewer diversion
- the proposed site drainage strategy
- consultation with Yorkshire Water and the Dearne and Dove Internal Drainage Board
- and the planning conditions to be satisfied.

The Site

The Dearne site is approximately 13 hectares in area and comprises existing buildings, a car park and school pitches. The existing topography of the site grades from 25.60m in the north-west corner of the existing carpark to 18.0m in the south-eastern corner of the site. Since the proposed finished floor level is set at 24.50m, it is anticipated that all connections into the public sewer system will be by gravity and that no pumping will be required.

Existing Site Drainage

There are 3no. public sewers draining through the existing school site: 2no. combined sewers (450mm and 600mm dia.) and a 450mm dia. surface water sewer. These sewer systems are illustrated on the attached sketch CSK 002.

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.

Existing Foul Water

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 the 450mm and 600mm diameter combined sewers which drain south across the site.

Existing Surface Water

For the purposes of establishing the existing peak surface water run-off, it has been assumed that roof area, car parking and hardstanding areas have an unrestricted discharge into the existing 450mm dia.

surface water system that drains north to south across the site. This sewer outfalls into the Far Moor Dyke which runs along the southern boundary of the site.

Preliminary calculations, based on Wallingford's procedure and a rainfall intensity of 50mm/hr result in a peak surface water discharge of 99 L/s.

Proposed Sewer Diversion

As the abovementioned 450mm dia. surface water public sewer drains north to south across the site towards the Far Moor Dyke and extends under the footprint of the proposed school, this sewer will need to be diverted around the proposed building prior to construction.

The diversion proposal has been forwarded to Yorkshire Water for costing and involves the relocation of the sewer to the western boundary of the school. The sewer will continue to gravitate to the Far Moor Dike to the south of the site, and is proposed to be approximately 90m upstream from its present outfall. Yorkshire Water has stated their preference that the design and construction of the public sewer be undertaken by themselves.

Attached sketch CSK001 illustrates the sewer relocation and outlines the diversion philosophy proposed to Yorkshire Water. YW has progressed a quotation for the proposed works and has indicated verbally that the diverted sewer share a common easement with the existing 600mm dia. combined sewer, which already extends along the western boundary of the site.

Proposed Drainage Strategy

Proposed Foul Water Discharge

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

As the occupancy of the proposed school is to match that of the existing school, the peak foul flows into the public sewer system are not expected to increase. 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

Initial discussions with Dearne and Dove Internal Drainage Board have indicated the parameters on which the surface water drainage design will be based ie. the allowable site discharge is to be restricted to:

- the 2 year flow rate from the existing impervious areas
- plus 5 L/s/ha from pervious areas.

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.

To ensure that the requirements of the Environment Agency, the Internal Drainage Board and Yorkshire Water are met with regards to restricted flows, all surface water run-off from the site will be attenuated.

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. 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 Dearne 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 flowsfrom 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.

13. No development shall commence until a scheme for the provision of surface water drainage works has been submitted to and approved in writing by the Local Planning Authority. The development shall be completed in accordance with the approved details and agreed timetable.	Refer to above paragraph 'Proposed Surface Water Discharge'
14. No building or other obstruction shall be located over or within 4 metres either side of the centre line of the 600mm diameter sewer, i.e. a total protection strip of 8 metres, that crosses the site, unless otherwise agreed in writing by the Local Planning Authority.	Refer to above paragraph 'Proposed Sewer Diversion'
15. No building or other obstruction shall be located over or within 6 metres either side of the centre line of the 450mm diametre sewer, i.e. a total protection strip of 6 metres, that crosses the site, unless otherwise agreed in writing by the Local Planning Authority.	Refer to above paragraph 'Proposed Sewer Diversion'
16. 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 the Local Planning Authority.	Refer to above paragraphs 'Proposed Foul Water Discharge' and 'Proposed Surface Water Discharge'
17. 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'
18. 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 the Local Planning Authority.	Refer to above paragraphs 'Proposed Foul Water Discharge' and 'Proposed Surface Water Discharge'
19. 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 the Local Planning Authority.	Refer to above paragraph 'Proposed Surface Water Discharge'
20. Surface water from vehicle parking and hardstandings 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 paragraph 'Proposed Surface Water Discharge'

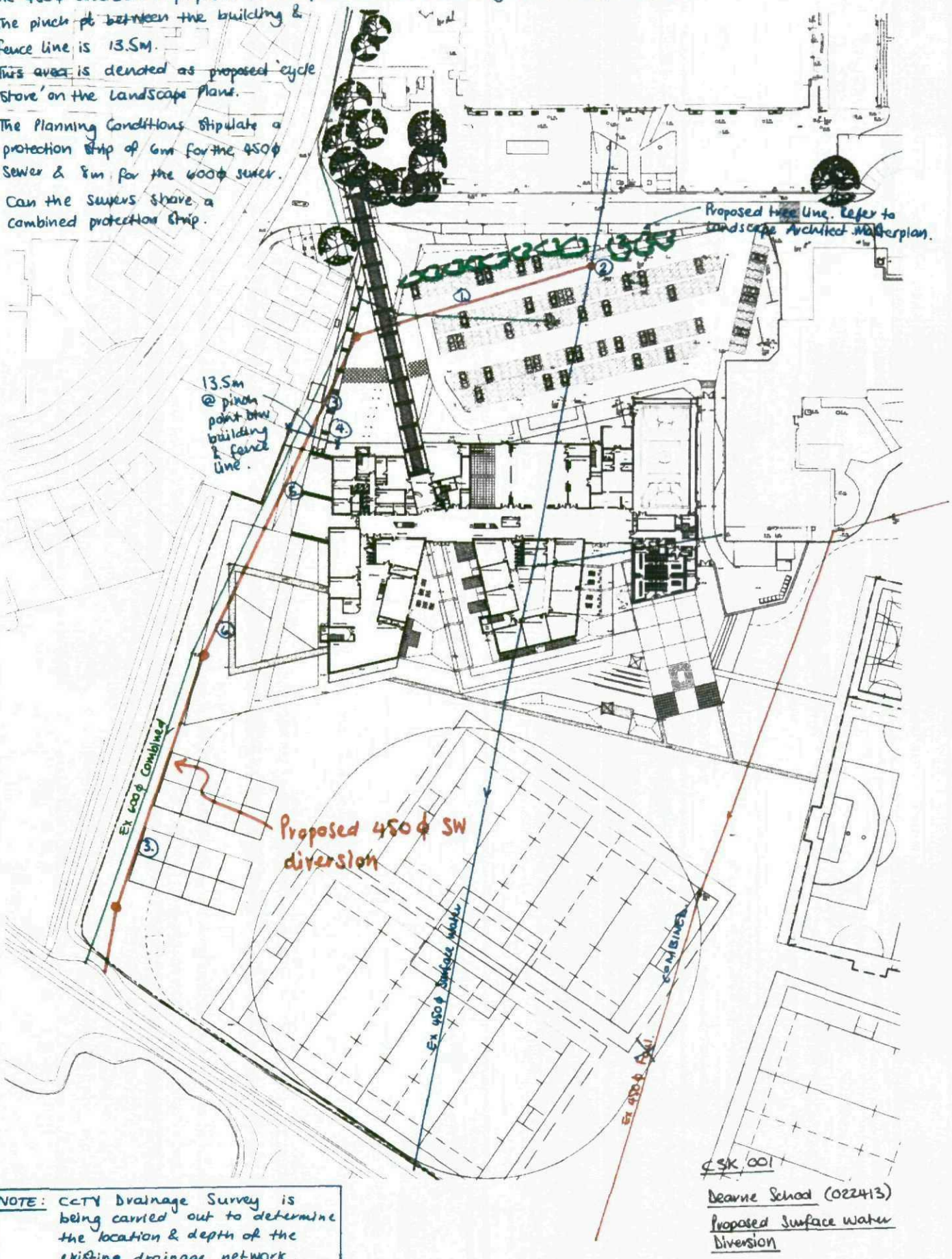
If you have any queries on the above, please do not hesitate to call.

Regards

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Diversion Philosophy. - For Discussion with Yorkshire Water.

1. New sewer has been routed under the carpark aisle which is blacktop construction (carpark bays to be ~~impermeable~~)
   and away from the proposed tree line.
2. The diversion point is located as upstream as possible because proposed carpark levels are approx 620mm lower
   than existing levels in the middle of the carpark.
3. The 450ϕ diversion is proposed to run parallel with the existing 600ϕ combined sewer.
4. The pinch pt ~~between~~ the building &
   fence line is 13.5M.
5. This area is denoted as proposed 'cycle
   store' on the Landscape Plans.
6. The Planning Conditions stipulate a
   protection strip of 6m for the 450ϕ
   sewer & 8m for the 600ϕ sewer.
   Can the sewers share a
   combined protection strip.



NOTE: CCTV Drainage Survey is being carried out to determine the location & depth of the existing drainage network.

ϕSK 001

Dearne School (022413)

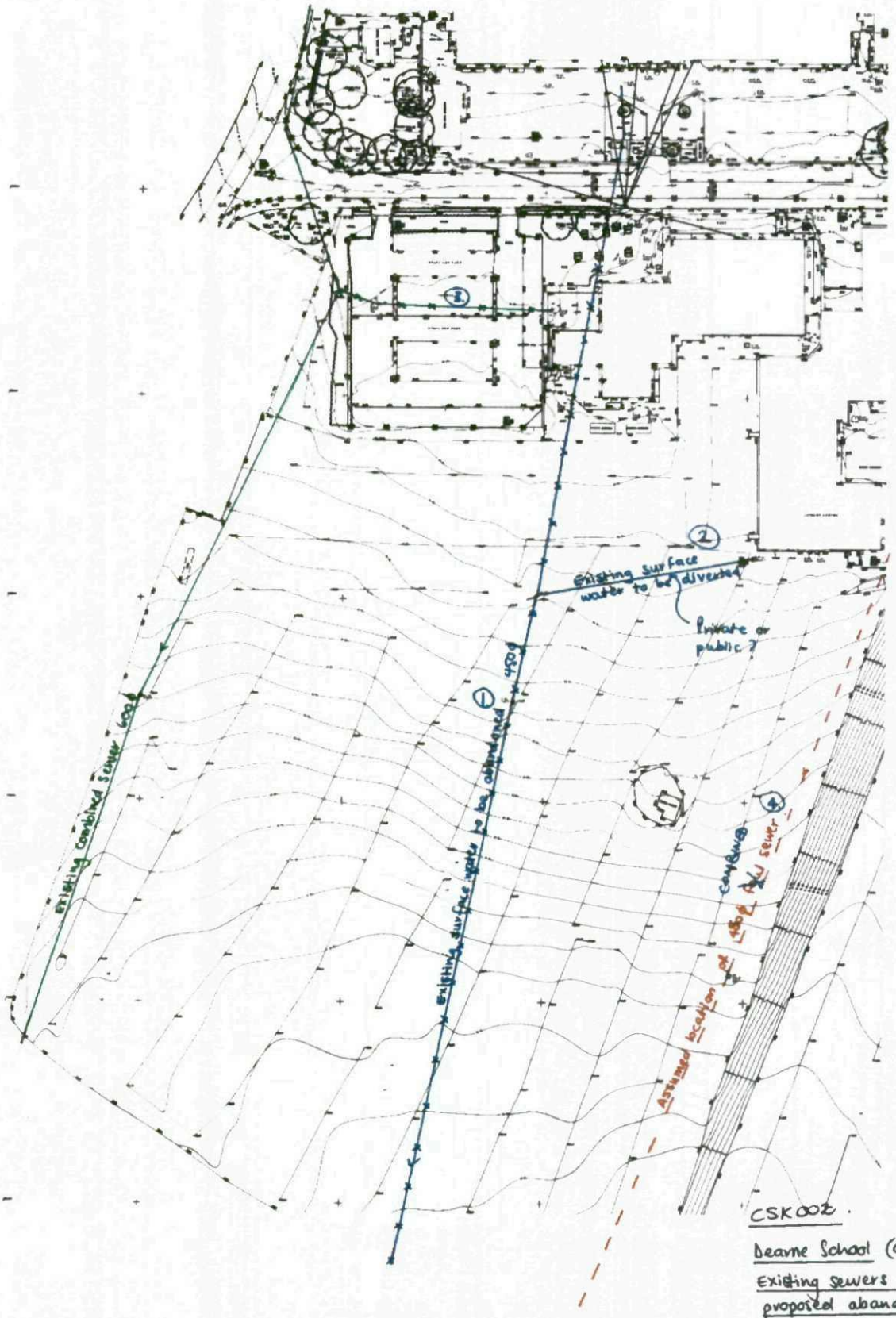
Proposed Surface Water Diversion

Scale - 1:1000

N. Cooper

3 Dec '08

1. Early diversion to enable new school to be built.
2. Surface water from Leisure Centre to be diverted/divested in temporary state. Is this private or public?
3. Existing combined sewer to be abandoned post decant, but prior to construction of new parking bays. (New carpark is set ±600mm below existing carpark level.)
4. Assumed location of 450ϕ foul water sewer.



CSK002.

Deanne School (022413)

Existing sewers showing proposed abandonment and sewer to be diverted.

Scale - 1:1000

N. Cooper
3 Dec '08