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Support Services

Flood Risk Assessment/Rev.A  
Greensward Academy, Hockley

August 2012



# Flood Risk Assessment

Greensward Academy, Hockley

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## Abbreviations

AOD	Above Ordnance Datum
EA	Environment Agency
FFL	Finished Floor Level
FRA	Flood Risk Assessment
PPS 25	Planning Policy Statement 25; Development & Flood Risk
SFRA	Strategic Flood Risk Assessment
NPPF	National Planning Policy Framework

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20826/Rev.A

## 1. Introduction

Price & Myers were commissioned to undertake a Flood Risk Assessment (FRA) for the proposed redevelopment of Greensward Academy in Hockley, Essex.

This FRA has been carried out in accordance with the National Planning Policy Framework (NPPF), along with advice and guidance from the Environment Agency (EA) and CIRIA documents.

The NPPF states that an appropriate FRA is required for all development proposals of 1ha or greater in Flood Zone 1, or for any development within Flood Zones 2 or 3. As the site is located within Flood Zone 1 and is larger than 1Ha the FRA must be focused on surface water management along with assessing the flood risk from groundwater and overland flows.

## 2. Site Context

### Site Description & Location

The proposed development is located in Hockley, Essex off Greensward Lane which bounds the site to the south. The site is bounded by Plumberow Primary School to the north and existing residential developments to the east and west. The site is approximately 4.3 Ha and is currently occupied by school building facilities, sport pitches, car park, soft and hard landscaped areas.



Figure 1. Existing Development

The site has approximate OS coordinates of 584537/193055 at Grid Reference TQ845930, and the site postcode is SS5 5HG. Figure 2 shows the site location.



Figure 2. Site Location

### 3. Development Proposals

#### Site Description

The proposed development includes the demolition of some existing buildings and the reconstruction of new school facilities with associated soft and hard landscaped areas.

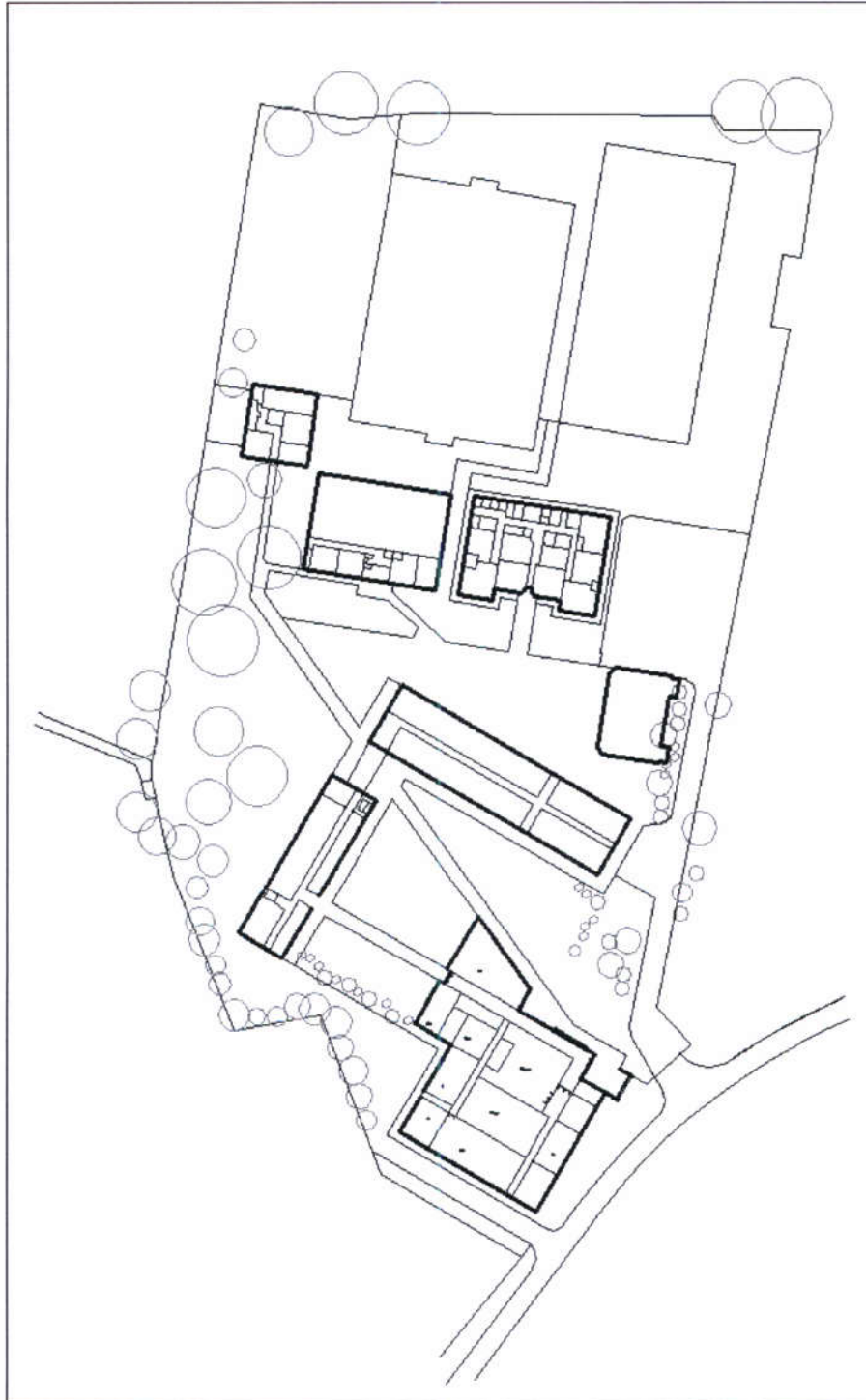


Figure 3. Proposed Development

#### 4. Flood Risk Assessment

##### Flood Risk from Watercourses/Sea

There is no risk of flooding from watercourses and the sea as identified on the Environment Agency (EA) indicative flood outline map. The map shows that the site lies within flood zone 1 (figure 4).

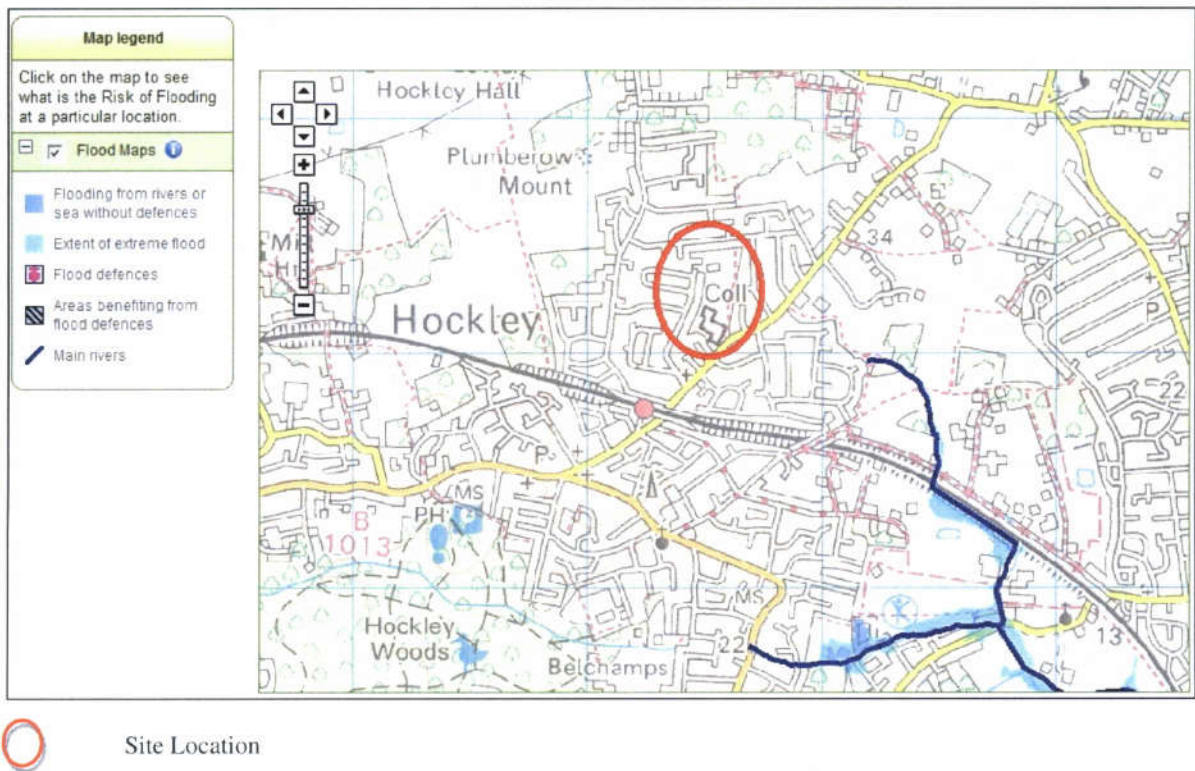
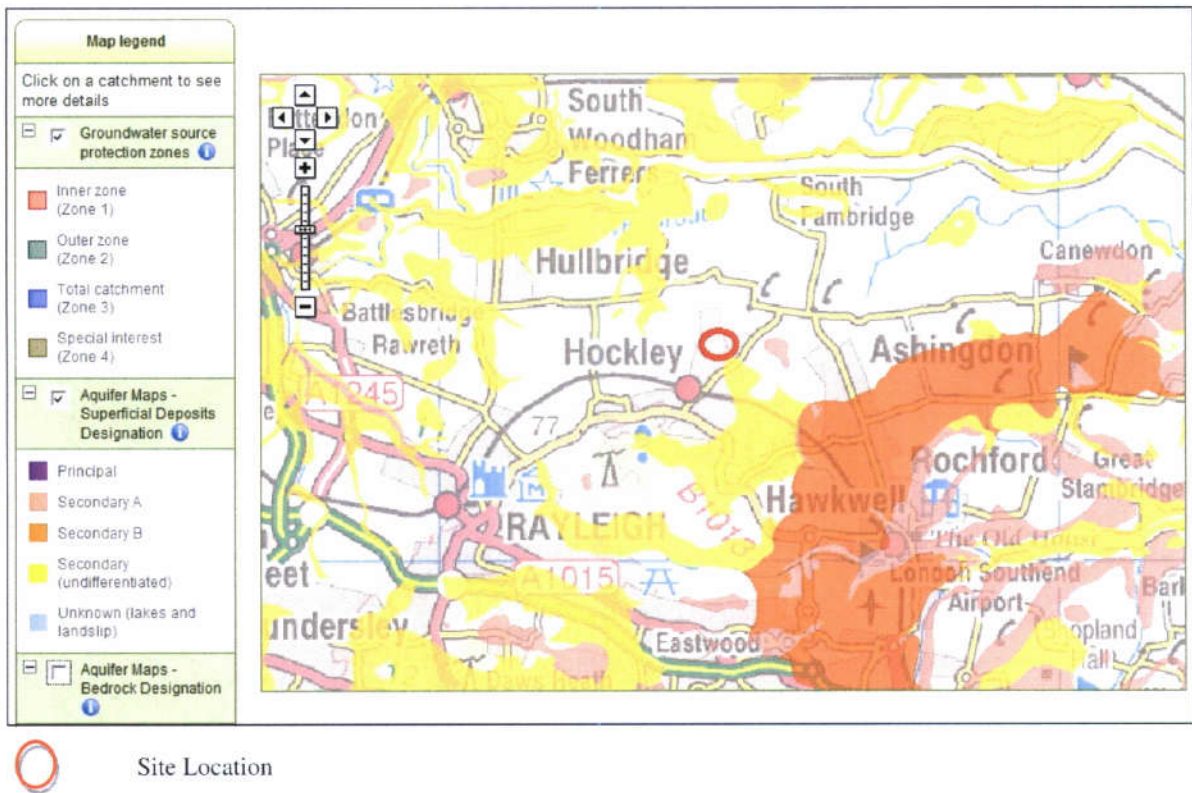


Figure 4. Environment Agency Indicative Floodplain Map

##### Flood Risk from Groundwater

A ground investigation report for the site was not available at the time this study was undertaken. However, The Geological Maps of England & Wales (No. 258/9) confirms that London Clay underlies the site. The EA's groundwater map also shows no superficial deposits in this area. The London Clay prevents groundwater flows horizontally or vertically. In addition, the proposals do not include any basements or underground structures that could be at higher risk from groundwater flooding. Therefore, the flood risk from groundwater is considered low in this area.



**Figure 5. Environment Agency Indicative Groundwater Map (Superficial Deposits)**

**Flood Risk from Sewers and Overland Flows**

Limited topographical survey information for the site shows that the existing ground falls to the east. Information about the existing drainage system on site also shows that the site drainage falls to the northeast. This information about the drainage system is in line with the limited information about the topography of the site. Therefore any overland flows will flow towards this direction without ponding the site. The proposed development does not include basements which are particularly vulnerable to overland flooding. Linear drains must be considered in the design where doors to the buildings are level to the external areas and the ground slopes toward the building.

The flood risk from overland flows should be low considering the development proposals on site. However, the topography of the site will be considered in the drainage design in order to prevent surface water and overland flows from entering the building.

## 5. RUN-OFF ASSESSMENT

### Existing Run-off

Hardstanding and roof areas currently occupy approximately 70% of the site area and drain to the public sewers that cross the site. The run-off rate was calculated based on the rational method for the 100 year storm event.

$Q = 2.78 \times A \times i$  (where A is the catchment area in Ha and i is the rainfall intensity as estimated from WinDes software).

$$Q_1 = 2.78 \times 3 \times 100 = 834 \text{ l/sec}$$

### Proposed Run-off

In accordance with Environment Agency guidelines, Building Regulations and Water Authorities advice, the preferred means of surface water drainage for any new development is into a suitable soakaway or infiltration drainage system. Sustainable urban drainage systems (SUDS) can reduce the impact of urbanisation on watercourse flows, ensure the protection and enhancement of water quality and encourage recharge of groundwater in a manner that mimics nature. If drainage to an infiltration system proved not a suitable option for a site, then drainage to a watercourse must be assessed. Drainage to the public sewers can be considered only when all other alternative options

Published ground investigation information shows that infiltration techniques are unsuitable for this site considering the clay ground strata which has poor infiltration properties. No watercourses are near the site indicating that the only available option for surface water drainage is discharge to the public sewer. The proposed development will reduce the impermeable and roof areas on site and subsequently the peak run-off rates from the site. This is in line with the NPPF that requires minimum attenuation to existing run-off rates from Brownfield developments.

Some form of Sustainable Drainage Systems (SUDS) should be considered (if possible) for new hardstanding areas such as permeable pavement providing further attenuation from the site to the public sewers and treating surface water from vehicle trafficked areas.

Alternatively, surface water from vehicle trafficked areas must pass through a petrol interceptor before discharging to the public sewers if SUDS are not provided.

## 6.0 Conclusions & Recommendations

- In accordance with the NPPF this site falls within Flood Zone 1, "*Areas with little or no potential risk of flooding (annual probability less than 0.1% for fluvial flooding), which are already developed*". These areas will generally be suitable for education uses provided there is adequate surface water drainage that will not increase the flood risk on site and the surrounding areas.
- Surface water from the site will drain to the public sewers.
- The proposals will reduce the impermeable areas on site and subsequently the peak run-off rates
- SUDS such as permeable pavement should be considered (where possible) in the drainage strategy providing further attenuation and water treatment.
- Surface water from vehicle trafficked areas will pass through a petrol interceptor before discharging to the public sewers if no SUDs are provided.
- Therefore, the proposed redevelopment has an acceptable flood risk within the terms and requirements of THE NPPF.

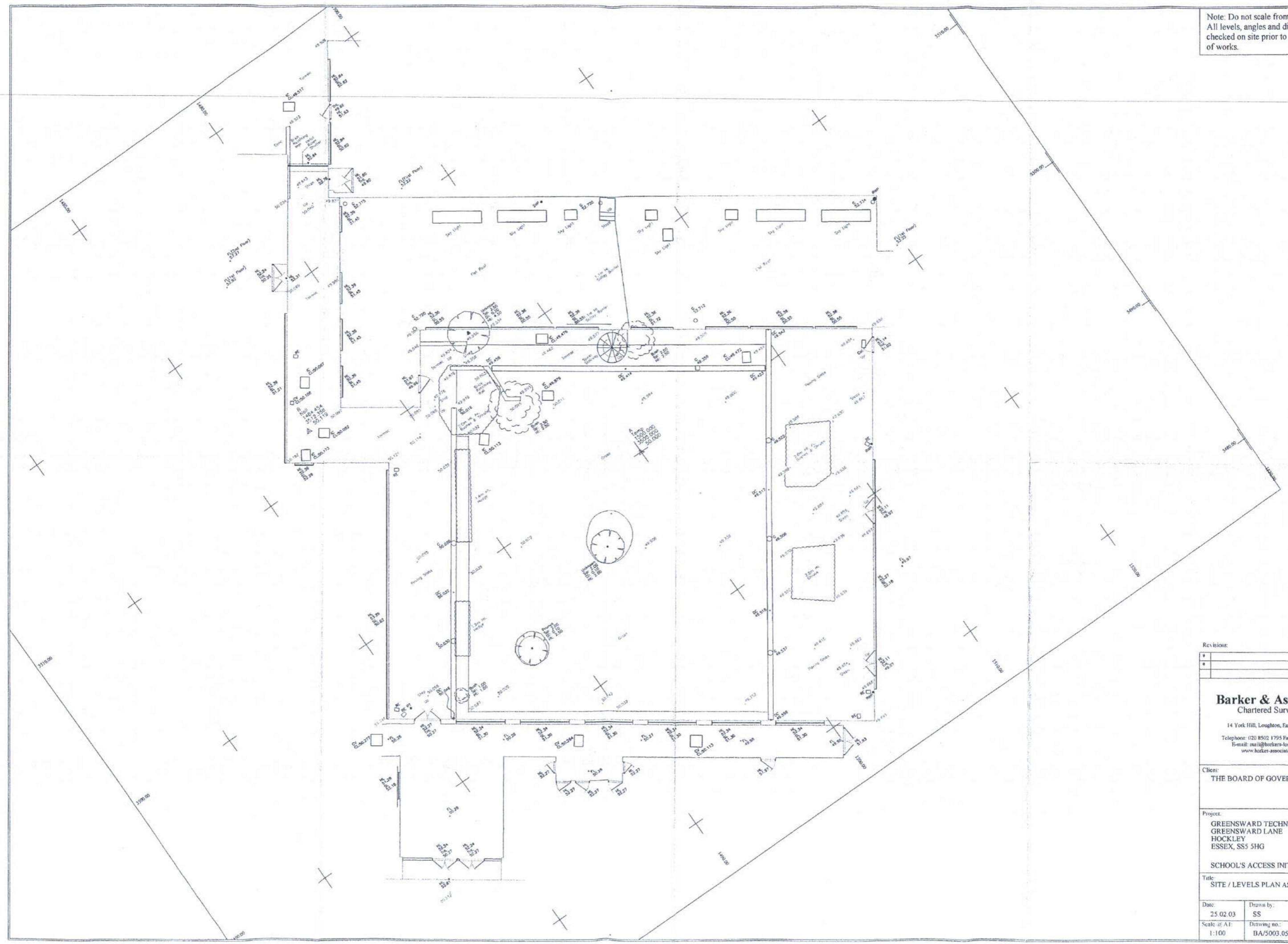


Depth to Invert (m)	DOWNSTREAM SEWER		ORIGIN				Downstream Manhole Number	Downstream Invert Level (m AOD)	Downstream Length (m)	Downstream Invert Level (m AOD)
	Upstream Invert Level (m AOD)	Upstream Length (m)	Cover Level (m AOD)	Depth to Invert (m)	Upstream Invert Level (m AOD)	Length (m)				
0.630	33.580	83.716	32.750	3452	4103F	24.500	4103F	3452	33.580	83.716



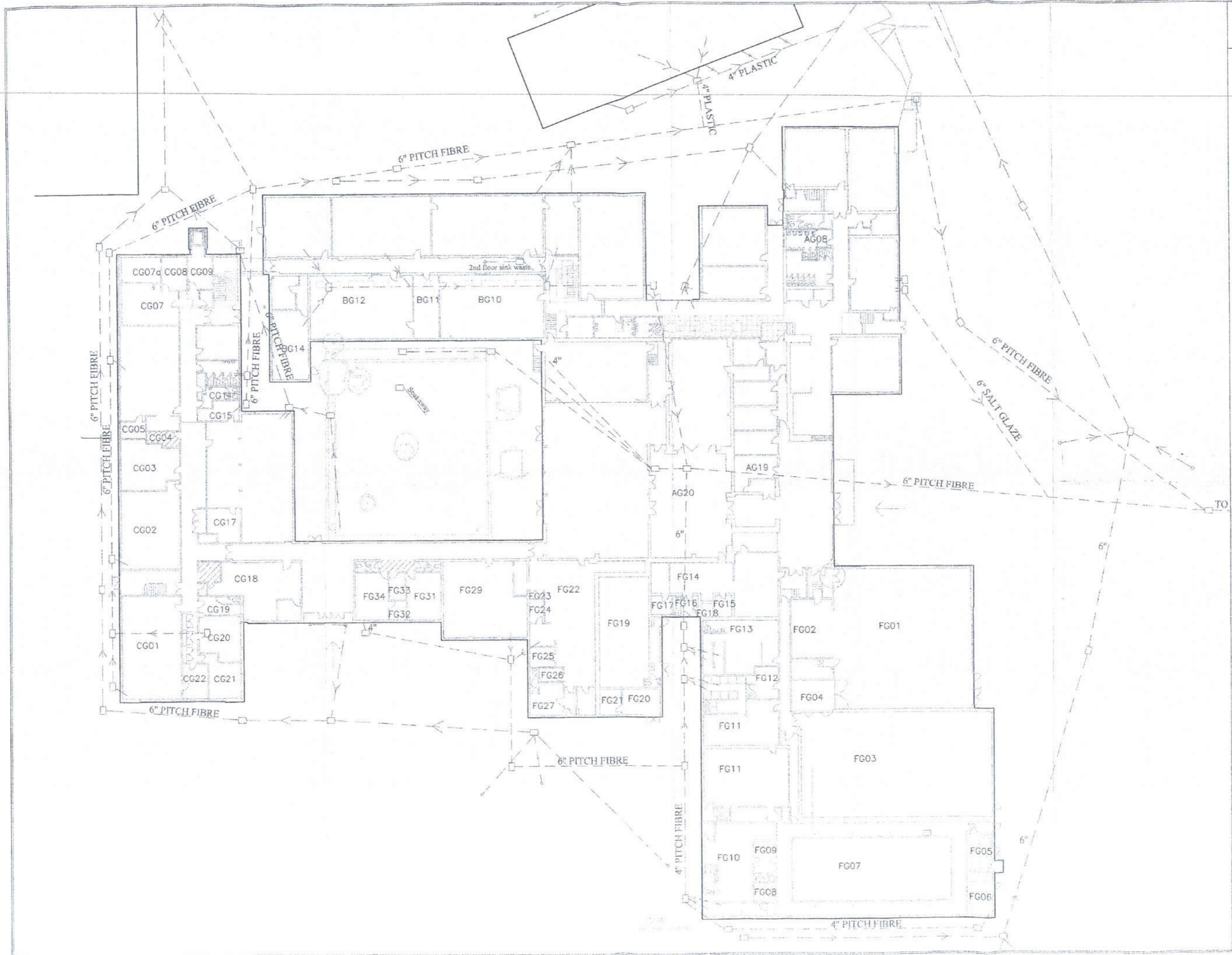
SEWERAGE ASS

Note: Do not scale from this  
 All levels, angles and dimens  
 checked on site prior to comm  
 of works.



Revisions:	
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Project: GREENSWARD TECHNICAL GREENSWARD LANE HOCKLEY ESSEX, SS5 5HG	
Title: SCHOOL'S ACCESS INITIAT SITE / LEVELS PLAN AS EX	
Date: 25.02.03	Drawn by: SS
Scale: @ A1: 1:100	Drawing no.: BA/5003.05/100

Note: Do not scale from this  
All levels, angles and dimen  
checked on site prior to com  
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Revision:

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**FLOOR PLAN SHOWING I  
LAYOUT**

Date: 21.07.03	Drawn by: HH/CO
Scale: 1/200	Drawing no: BA/S003 05/D