Pinchbeck East C of E Primary School, Lincolnshire

Proposed Single Storey Extensions

Flood Risk Assessment

Report ref 1064933 – FRA 01

June 2015

Produced for
VINCIMouchel

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Document Control Sheet

Project Title	Pinchbeck East C of E Primary School
Report Title	Flood Risk Assessment
Report Reference	1064933-FRA 01
Status	Initial
Control Date	June 2015

Record of Issue

Issue	Status	Author	Check	Authorised	Date
1	Initial	J Prady	NJ Ainsworth	NJA	23/06/2015

Distribution

Organisation	Contact	Copies
VinciMouchel	Ms C. Thornton	1 Electronic Copy

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1 EXECUTIVE SUMMARY

Introduction	At the request of VinciMouchel, Mouchel Limited carried out an assessment of the likely flood risks associated with a proposed extension of Pinchbeck East C of E Primary School, Lincolnshire.
Background	It is proposed to extend the Pinchbeck PS by the introduction of two additional classrooms, a new staff resource area, a new covered entrance and the provision of a limited number of parking spaces. The new main building and the car parking will be constructed on land which is currently soft landscaping, therefore potentially increasing the impermeable area of the site by circa 1350m^2 out of a total site area of 13600m^2. This will marginally increase the amount of surface water run-off from the site.
Site Setting	The site is located at grid reference 523904E, 325834E. The site has a total area of 1.36ha. The existing school is located to the south of the site. The typical external ground level is +3.6m AOD with floor levels typically at +3.75mAOD. The site is in a Zone 3 flood risk zone meaning that the site is at risk from a tidal flooding event with annual probability of 0.5% and from fluvial (rivers) flooding from a 1% annual probability. This assessment is based on there being no effective flood defences protecting the site/general area. The nearest water course is the river Glen which is located to the north of the site. The Glen is designated as a 'main river' and has flood defences in the form of raised embankments which are rated as being in a 'good condition'. The predicted maximum flood depth for the site based on a potential fluvial flood generated during a 1% annual probability event is between 0-0.5m.
Proposals	It is proposed to construct three separate small extensions representing a total impermeable area of 366m^2. A number of car parking spaces and an access road are to be constructed which provides an area of 631m^2. An additional hardstanding area of 350m^2 is to be created around the largest building extension. The total potential increase in impermeable area for the site as a whole is 1350m^2. In order to minimise the impact of the new development on

	receiving surface water features, it is proposed to restrict the surface water discharge from the new impermeable areas to a greenfield run-off rate based on IOH124 calculations. The central principle to the design proposal is that the current surface water regime is replicated as much as possible. Therefore, it is proposed to provide permeable surfacing in areas where new hard landscaping is to be provided. For the new main class room roof, the proposal is for the additional run-off generated from the increase in impermeable area to be temporarily stored on-site before discharge to the existing surface water outfalls. The storage volume will be based on a 1:100 year event plus allowance for climate change. The current proposal is based on providing a below ground storage tank to cater for the whole volume of water, however SUDs compliant solutions will be considered when the site investigation is completed and the soil permeability established. The use of permeable paving for the car park area will also provide one level of treatment in line with CIRIA 697. No mitigation measures are proposed in terms of fluvial flooding from the River Glen given the relatively low maximum predicted flood levels based on a 1% probability event. The presence of the current flood defences actually reduce the probability further. The floor levels will be set to match those that exist at present to ensure suitable access gradients. The new build construction will follow the general principles set out in the DCLG report 'Improving the Flood Performance of New Buildings – Flood Resilient Construction'.
Summary of Findings	The site is located in a Zone 3 flood risk area with predicted maximum flood depths of 0-0.5m during a 1% probability event. The source of flooding would be fluvial waters from the River Glen. The Glen has raised bank defences which are considered to be in a 'good' condition. The presence of the defences reduces the flooding risk to less than 1%. The greenfield run-off rate for the site is calculated to be less than 5 litres/sec. Practically, flows cannot be restricted to that level and so 5 litres/sec will be used as the maximum discharge rate. The estimated storage volume for the new development and associated increase in impermeable area is $10m^3$; based on a 1:100yr event plus 30% allowance for climate change. Permeable surfacing will be provided around the new main class room and for the car parking area.

	When the site investigation is complete, the use of filtration will be explored.

2 Introduction

2.1 VINCIMouchel have been commissioned by Lincolnshire County Council to develop proposals to increase the student capacity of Pinchbeck East C of E Primary School. The development comprises of three separate extensions, remodelling of the external areas and creation of seventeen additional parking spaces accessed off Knight Street.

2.2 This report considers the impact of the proposed development in relation to flooding issues. This encompasses the potential for the site to be affected by external flood sources and the potential for the new development to contribute to potential flooding of existing drainage assets and the surrounding environment.

3 Disclaimer

3.1 The comments made in this report are based on sources of information obtained mainly from third parties.

3.2 Notwithstanding anything to the contrary contained in the Report, Mouchel is obliged to exercise reasonable skill, care and diligence in the performance of the services required by Lincolnshire County Council and Mouchel shall not be liable except to the extent that it has failed to exercise reasonable skill, care and diligence, and this report shall be read and construed accordingly.

3.3 This Report has been prepared by Mouchel. No individual is personally liable in connection with the preparation of this Report. By receiving this Report and acting on it, the client or any other person accepts that no individual is personally liable whether in contract, tort, for breach of statutory duty or otherwise.

4 Background

4.1 VINCIMouchel are employed by Lincolnshire County Council via a framework contract to provide various professional services. This includes multi-disciplinary building design.

4.2 A current commission under the contract is to develop proposals for the expansion of Pinchbeck East C of E Primary School. The development proposals comprise the construction of three separate single storey extensions, external landscape remodelling and creation of a new staff car park with access off Knight Street which is to the north of the site. These additional elements represent a small increase in the impermeable area of the site.

5 Site Setting

5.1 Pinchbeck East C of E School is located a grid reference 523904E, 325834E in the ward of South Holland District Council. A site location plan is attached under appendix 1.

5.2 The site is rectangular and has an approximate area of 1.36ha. The existing school buildings are located to the south of the site. The buildings are single storey and arranged in three blocks with link corridors between them. The external areas around the school are predominantly hard surfaced and a small car park is provided to the south adjacent to the site access via Fennell Road. The existing buildings and hardstanding provide 592m2 of impermeable area.

5.3 The site is located in a primarily residential area.

5.4 The general area is relatively flat with ground levels of circa +4.0m AOD. The site itself has levels of circa +3.7m AOD.

5.5 The northern half of the site is grassed and currently used as a playing field. The area of soft permeable ground is 768m2.

5.6 The site is serviced by separate below ground surface and foul water drains. As the site is relatively flat, the drains are shallow in depth and a packaged pumping station is provided for the foul water in one location. The surface water appears to discharge from the site on the western boundary via a number of outfalls. The foul water appears to run west to east. An adopted foul drain is shown on the Anglian Water (AW) asset plans and this is within the school site, running north close to the eastern boundary. The accuracy of the AW plan needs to be ascertained as contemporary survey information would appear to show the line on, or slightly outside, the eastern boundary. A copy of the plan is attached under appendix 2.

5.7 Anglian Water are the local statutory undertakers for sewers (foul and surface water). Surface water sewers discharge to various open water courses which cross the area. The open water features are managed by Internal Drainage Boards (IDB); Welland and Deepings for this site. The IDB drains discharge to the main rivers, which are

under the management of the Environment Agency, before eventual discharge to the sea.

6 Development Proposals

6.1 The new building works comprise of three buildings. The main building is to the north east of the current school and comprises two new classrooms and associated ancillary areas. A small staff room/office is to be created within a central courtyard and a new office and entrance lobby is to be constructed to the south of the existing school. The approximate roof areas are provided below:

New Class Rooms	314m2
New Staff Room	33m2
New Office/Lobby	19m2

6.2 The new Class Rooms will have a new external hardstanding area around it which will have an area of 350m2.

6.3 The new car parking areas to the north of the school running parallel the western boundary has an area of 631m2 comprising 435m2 of access roadway and 196m2 of car parking.

6.4 Part of the existing car park to the south of the existing school is to be remodelled with an area currently finished with a gravel surface being provided with more formal hard surfacing.

6.5 A proposed site development plan is attached under Appendix 3.

7 Flooding from External Sources

7.1 Flooding on a site can be a result of a number of sources and these are considered below. The data used to assess the site has been abstracted from the Strategic Flood Risk Assessment (SFRA) prepared by Royal Haskoning on behalf of South Holland District Council (SHDC) and documents referenced therein. The SFRA report referenced is the updated version issued in January 2010. Reference has also been made to publicly available data on the Environment Agency's website.

7.1.1 Fluvial Flooding

The nearest main River to the site is the Glen, located to the north. The Glen discharges to tide via Surfleet Sluice. Immediately upstream of the Sluice is a temporary surface water storage basin called Surfleet Reservoir; this feature stores water when the discharge at the Sluice is tide locked. The Glen River benefits from raised banks which act as flood defences. The banks are considered to be in a 'good condition'.

The school site is in area of low to medium flood risk. Close to the eastern boundary, but not on the actual site, is an area designated as having a high risk of fluvial flooding, with the predicted maximum flood depth between 0 to 0.5m.

Available maps on the Environment Agency website place the site in Flood Zone 3. This means that the land is assessed as having a 1 in 100 or greater probability of being affected by river flooding. Importantly however, this flood zone assignment is based on the source river not having flood defences, which are present on the River Glen. The EA indicate the site to have a medium risk of flooding, which means a probability of between 1% and 3.3% per year that the site will flood.

8 Flood Risk Mitigation

8.1 Based on the review of available data, it has been established that the site is not currently at risk from flooding associated with the sea or rivers. There is however a risk that flooding could occur sometime in the future due to the effects of climate change. In the event of a fluvial flooding event, the anticipated maximum flood depth is predicted to be upto 0.5m. The SFRA gives a number of suggestions as to how the local drainage infrastructure can be enhanced to reduce future risks however these are not considered to be within the remit of the new school development and are considered more strategic.

8.2 There is however a benefit to restricting the volume and rate of additional surface water entering the existing drainage systems as a consequence of a new development. Ideally, all additional surface water generated on a new development site should be disposed of sustainably at source. The viability of such an approach depends almost entirely on the ability of the underlying soils to accept surface water flows via infiltration. Water loss via evaporation and trans-evaporation can be a method for sustainably disposing of surface water, however this would require large, shallow, open water bodies and favourable weather; neither of these are possible or guaranteed for this particular site.

8.3 In order to restrict the impact of the additional surface water created by the increase in impermeable area, the current regime is to be matched as much as possible. Therefore, all new external hard landscaping should be constructed from permeable materials. Using permeable surfacing in the parking area will also provide one level of treatment which is compliant with CIRIA 697 and can remove potential hydrocarbon contamination. For the roof run-off, the additional volume of surface water will be temporarily stored on site in a below ground tank with a permeable liner, which will allow infiltration into the surrounding soils if they are suitably permeable. The final discharge will be to the existing surface water outfalls on the western boundary, with the rate of discharge restricted by a flow control device such as an orifice plate or vortex control device (Hydrobrake or similar). The rate is discharge should be based on Greenfield run-off values, however as the area to be drained is very small, the run-

off rate is also very low. The table below represents the calculated permitted discharge rates:-

8.4 Greenfield Run-off Rate Calculation

Probability	1:1yr	1:10yr	1:100yr
Q/Bar l/s	nominal	0.1	0.2

As described above, the calculated Qbar values based on the area of the new development are very low, as the impermeable area is only 0.033ha. The maximum rate is less than 0.5 litres/sec for a 1:100yr event. This flow rate cannot be practically achieved. It is therefore proposed to restrict the discharge to 5 litres/sec, which makes the use of either a practically sized orifice or vortex control device possible.

8.5 On- Site Storage

An assessment of the maximum storage volume required for the site has been made and this established that 10m3 is required. This figure is based on the worst case 1:100yr event plus 30% for climate change. The critical storm duration was established to be 60 minutes. The form of storage can be either a purpose built manhole or proprietary storage baskets such as 'Aquacell' by Wavin. It should be noted that the storage volume assumes that the surrounding soils are impermeable. If they are shown to be suitable to accept water inflows via filtration, the storage volume will reduce accordingly. The calculation for a cellular storage system with 95% void ratio is provided under Appendix 5.

8.6 Flow Control

The initial storage analysis was based on using a 50mm orifice plate. The existing surface water outfalls on site are relatively shallow and hence it will be necessary to raise the water mechanically using a packaged pump station.

8.7 Design Exceedance

The design for surface water disposal is currently based on a 1:100yr event with 30% allowance for climate change. The design of the permeable surfacing assumes that the underlying soils can accept the run-off via filtration. In exceedance events, additional surface water volumes are not considered significant flood risks. The new parking areas are immediately adjacent a large playing field, which can be used as a temporary storage area. The parking and access road does need to have suitable gradients to prevent water routing to the west, which could impact on adjacent rear gardens (i.e the parking area should fall generally to the east).

8.8 Construction Techniques

In order to provide a mitigation measure against flooding, a minimum ground floor level plus freeboard is sometimes set relative to a maximum predicted flood level. The freeboard is a fixed value above the maximum predicted level and usually of the magnitude of 600mm or so. For this school, it is proposed to use the same finished floor level for the new buildings as those on the existing to allow level access for disabled users. As a measure of good practice, it is therefore recommended that the guidance in DCLG report 'Improving the Flood Performance of New Buildings – Flood Resilient Construction' is followed. This publication provides useful advice as to the forms of appropriate construction in flood risk areas, with the aim of accepting that flooding can affect a building but that the materials used are resilient, durable and easy to repair, meaning that the building can be brought back into use quickly and with minimal effort.

9 Drainage Proposals

9.1 Drainage Layout

An indicative drainage layout is provided under Appendix 6. This is based on the pre-planning application drawings and is therefore subject to change as the proposals are developed.

9.2 Possible Refinements

The following refinements of the design can be explored when more data is available:-

- Use of filtration to reduce and if possible eliminate discharge from site,
- Collection and re-use of surface water for irrigation of school gardens for instance.

APPENDICES

Appendix 1

Site Location Plan

NOTE

This drawing is not to be scaled. All dimensions to be checked on site and any discrepancies to be reported to the Mouchel Office. All material is produced on behalf of Mouchel Group PLC. All drawings to be read in conjunction with specification where applicable.

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KEY LEGEND

- Proposed Development Area
- LCC Client owned Site Boundary (rear of site / playing fields)
- Diocese Ownership Site Boundary

Rev.	Description	Design	Drawn	Checked	Approved	Date

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Lincolnshire CC, County Offices, Newland, Lincoln, LN1 1YL
Tel : +44 (0) 1522 638222

Client : Lincolnshire County Council

Client Ref Number : DC/451/0009

Project : Pinchbeck East C of E Primary School
Proposed Expansion to 2FE

Site Ref \ USRN :

Mouchel Project No : DC/451/0009

Drawing Title : Site Location Plan A1

Design:	Drawn:	Checked:	Approved:
CT	CT	JT	

Date : April 2015 | Scale : 1:1250 @ : A1

Drawing No : AL (0) 0101 | Rev. No : *

Appendix 2

Site Development Plan

NOTE

This drawing is not to be scaled. All dimensions to be checked on site and any discrepancies to be reported to the Mouchel Office. All material is produced on behalf of Mouchel Group PLC. All drawings to be read in conjunction with specification where applicable.

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KNIGHT STREET

New Dropped Kerb

New Vehicular Access - details subject to consultation with Highways

Telegraph Pole

Telegraph Pole

IN

Existing Vehicular Gate

N

61000

55000

43000

37000

T28

T27

T24

T26

T25

T23

T22

T21

5000

17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

Playing Field

Grass

The Millennium Pavilion
Playgroup Mobile
BLOCK 08 136m2

Relocated Store Container

Ramp Up

Relocated trim trail equipment

B01

Existing KS2 Playground

T4
Mature English Oak Tree to be retained

New Access Path / Hardstanding

New Gate

Existing KS2 Playground

Existing Block 03

Gate

soft landscaping

path

Covered Walkway

Relocated Benches

Existing Block 02

Planter

Relocated Benches

Existing KS1 Playground

path

gate

BLOCK 01
968m2

vehicular access

Relocated Lighting Column

Grassed area removed & parking rearranged to create wider clear access route

Relocated Lighting Column

Access Path to be re-shaped around front extension to suit rearranged parking layout

BLOCK 01
Original Building
(South Wing)

Store

CANOPY

Shelter

gate

Bins

car parking

IN

gate

SFPA

Gaz

B01

B01

FENNELL ROAD

KEY LEGEND

- Site Boundary
- Footprint of existing buildings
- Proposed trees to be removed
- Footprint of proposed new accommodation
- Proposed external works
- Proposed external works - soft pour play area

Rev.	Description	Design	Drawn	Checked	Approved	Date
A	Proposed new access road extended to Knight Street with new vehicular site access	CT	CT	IRN		11.06.15

Drawing status : For comment only

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Lincolnshire CC, County Offices, Newland, Lincoln, LN1 1YL
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Client :
Lincolnshire County Council

Client Ref Number : DC/451/0009

Project :
Pinchbeck East C of E Primary School
Proposed Expansion to 2FE

Site Ref \ USRN :

Mouchel Project No : DC/451/0009

Drawing Title :
Proposed Site Plan A0

Design:	Drawn:	Checked:	Approved:
CT	CT	IRN	

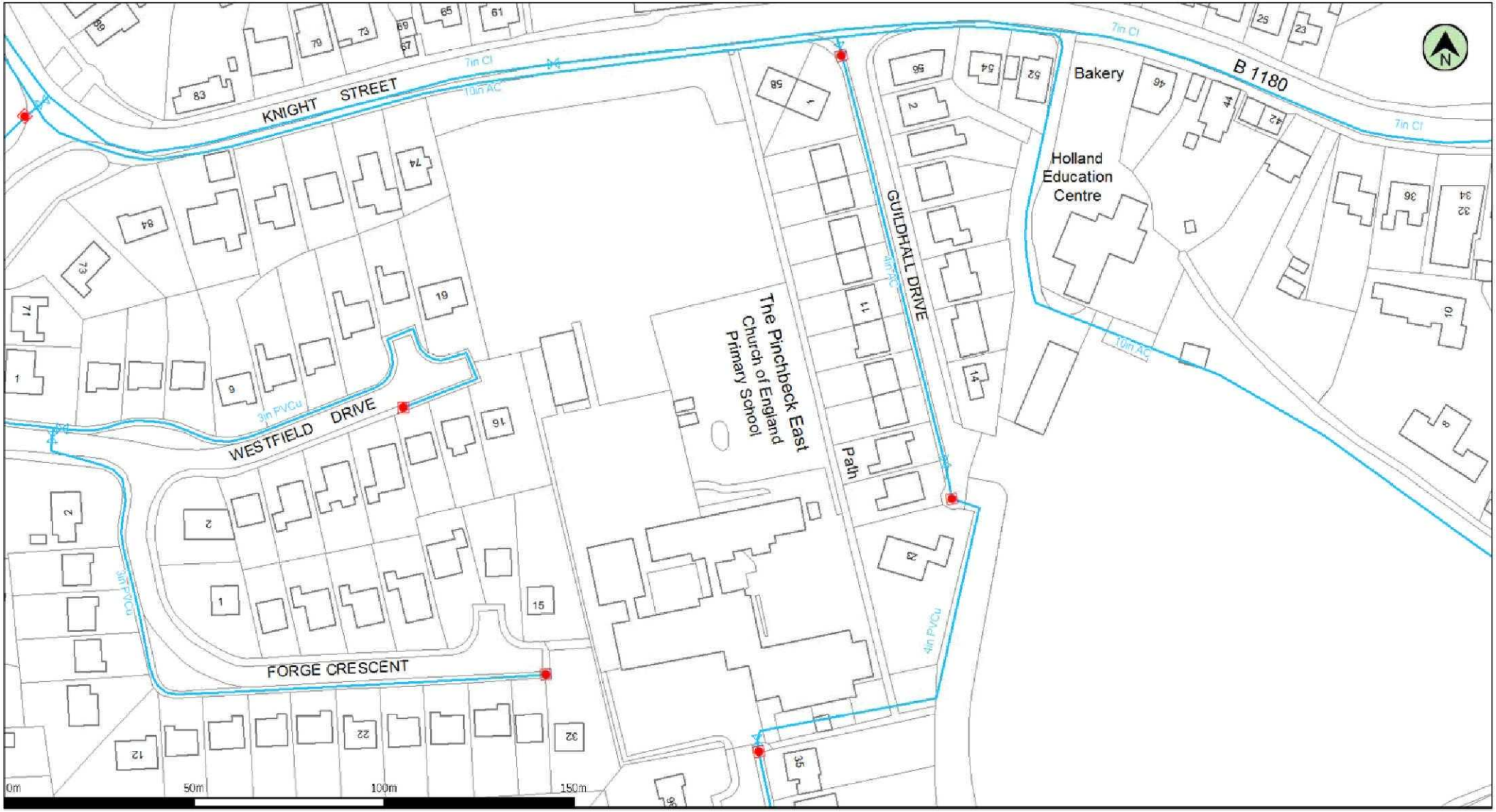
Date : May 2015 | Scale : 1:200 @ : A0

Drawing No : AL (0) 0104 | Rev. No : A

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Appendix 3

Anglian Water Asset Plan



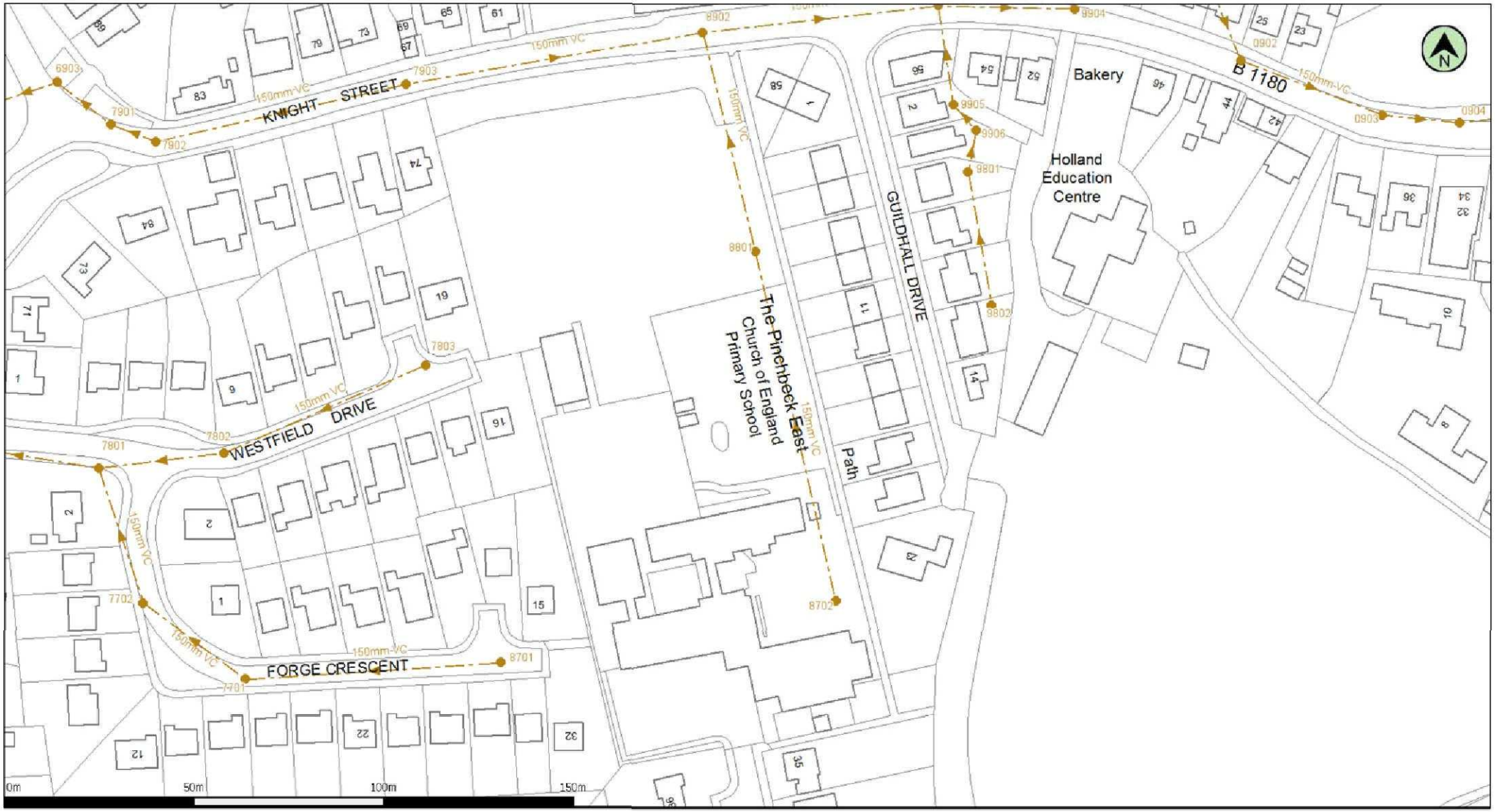
(c) Crown Copyright and database rights 2014 Ordnance Survey 100022432 | Date: 09/06/15 | Scale: 1:1413 | Map Centre: 523876,325830 | Data updated: 01/05/15 | Clean Water Plan A4

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Potable Water
Raw Water
Decommissioned Water
Fitting
Hydrant

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Date: 09/06/15 Scale: 1:1413 Map Centre: 523876,325830 Data updated: 01/05/15

Wastewater Plan A4

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- Foul Sewer
- Surface Sewer
- Combined Sewer
- Final Effluent
- Rising Main (Colour denotes effluent type)
- Private Sewer (Colour denotes effluent type)
- Decommissioned Sewer (Colour denotes effluent type)
- Outfall (Colour denotes effluent type)
- Inlet (Colour denotes effluent type)
- Manhole (Colour denotes effluent type)
- Sewage Treatment Works
- Pumping Station

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Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
0902	F	3.658	2.249	1.409
0903	F	3.74	2.018	1.722
0904	F	3.889	1.923	1.966
6903	F	3.95	2.26	1.69
7701	F	-	-	-
7702	F	-	-	-
7801	F	-	-	-
7802	F	-	-	-
7803	F	-	-	-
7901	F	4	2.33	1.67
7902	F	4	2.4	1.6
7903	F	4.16	2.74	1.42
8701	F	-	-	-
8702	F	3.46	2.31	1.15
8801	F	3.63	1.85	1.78
8902	F	4.08	1.58	2.5
9801	F	3.87	2.29	1.58
9802	F	3.51	2.49	1.02
9903	F	4	1.36	2.64
9904	F	3.78	1.23	2.55
9905	F	3.85	2.2	1.65
9906	F	3.91	2.25	1.66

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

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Appendix 4

Q-bar Calculation

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.300
Area (ha)	0.033	Urban	0.000
SAAR (mm)	567	Region Number	Region 5

Results l/s

QBAR Rural	0.0
QBAR Urban	0.0
Q100 years	0.2
Q1 year	0.0
Q30 years	0.1
Q100 years	0.2

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Appendix 5

Surface Water Storage Calculation

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

Half Drain Time : 21 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	2.841	0.341	0.0	2.9	2.9	5.2	O K
30 min Summer	2.875	0.375	0.0	2.9	2.9	5.7	O K
60 min Summer	2.867	0.367	0.0	2.9	2.9	5.6	O K
120 min Summer	2.812	0.312	0.0	2.8	2.8	4.7	O K
180 min Summer	2.751	0.251	0.0	2.7	2.7	3.8	O K
240 min Summer	2.696	0.196	0.0	2.5	2.5	3.0	O K
360 min Summer	2.610	0.110	0.0	2.3	2.3	1.7	O K
480 min Summer	2.553	0.053	0.0	2.2	2.2	0.8	O K
600 min Summer	2.517	0.017	0.0	2.1	2.1	0.3	O K
720 min Summer	2.500	0.000	0.0	2.0	2.0	0.0	O K
960 min Summer	2.500	0.000	0.0	1.6	1.6	0.0	O K
1440 min Summer	2.500	0.000	0.0	1.2	1.2	0.0	O K
15 min Winter	2.897	0.397	0.0	3.0	3.0	6.0	O K
30 min Winter	3.078	0.578	0.0	3.3	3.3	6.7	O K
60 min Winter	2.927	0.427	0.0	3.1	3.1	6.4	O K
120 min Winter	2.830	0.330	0.0	2.8	2.8	5.0	O K
180 min Winter	2.739	0.239	0.0	2.6	2.6	3.6	O K
240 min Winter	2.662	0.162	0.0	2.5	2.5	2.5	O K
360 min Winter	2.552	0.052	0.0	2.2	2.2	0.8	O K
480 min Winter	2.500	0.000	0.0	2.0	2.0	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	121.269	0.0	7.5	16
30 min Summer	79.695	0.0	9.9	25
60 min Summer	49.937	0.0	12.4	42
120 min Summer	30.267	0.0	15.0	76
180 min Summer	22.297	0.0	16.5	108
240 min Summer	17.851	0.0	17.7	140
360 min Summer	12.957	0.0	19.2	200
480 min Summer	10.330	0.0	20.4	258
600 min Summer	8.659	0.0	21.4	314
720 min Summer	7.492	0.0	22.3	366
960 min Summer	5.959	0.0	23.6	0
1440 min Summer	4.309	0.0	25.6	0
15 min Winter	121.269	0.0	8.4	16
30 min Winter	79.695	0.0	11.0	26
60 min Winter	49.937	0.0	13.8	46
120 min Winter	30.267	0.0	16.8	82
180 min Winter	22.297	0.0	18.6	116
240 min Winter	17.851	0.0	19.7	146
360 min Winter	12.957	0.0	21.6	204
480 min Winter	10.330	0.0	22.9	0

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
600 min Winter	2.500	0.000	0.0	1.7	1.7	0.0	O K
720 min Winter	2.500	0.000	0.0	1.5	1.5	0.0	O K
960 min Winter	2.500	0.000	0.0	1.2	1.2	0.0	O K
1440 min Winter	2.500	0.000	0.0	0.8	0.8	0.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Winter	8.659	0.0	24.0	0
720 min Winter	7.492	0.0	24.9	0
960 min Winter	5.959	0.0	26.4	0
1440 min Winter	4.309	0.0	28.7	0

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.400	Longest Storm (mins)	1440
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.033

Time (mins) From:	To:	Area (ha)
0	4	0.033

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Model Details

Storage is Online Cover Level (m) 3.500

Cellular Storage Structure

Invert Level (m) 2.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	16.0	16.0	0.500	0.0	22.4
0.400	16.0	22.4			

Orifice Outflow Control

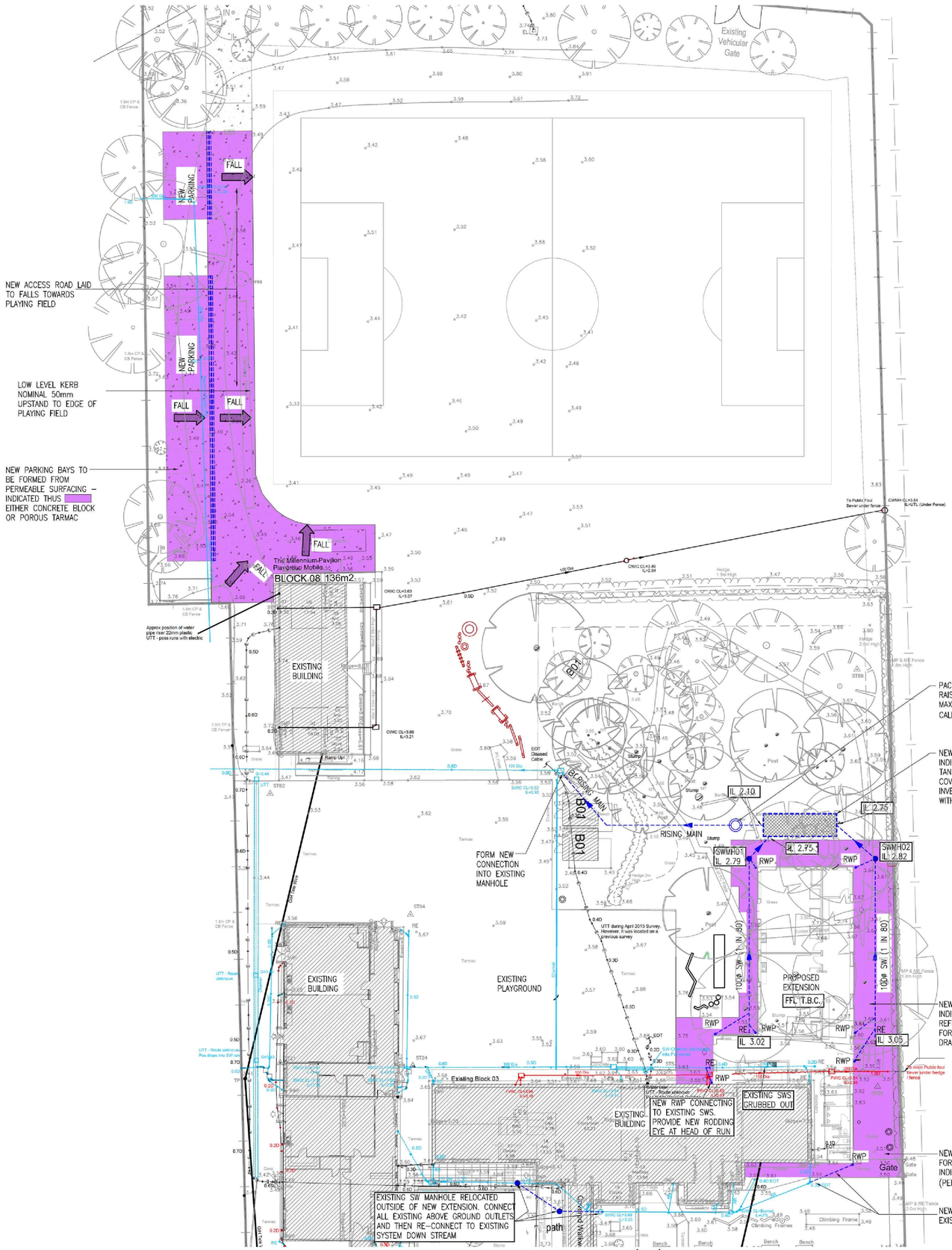
Diameter (m) 0.041 Discharge Coefficient 0.600 Invert Level (m) 2.150

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Appendix 6

Indicative Drainage Layouts



SURFACE WATER (SW) DRAINAGE LAYOUT

SCALE 1 : 250

NOTE A:
ALL COVER LEVELS INDICATED ON THIS DRAWING ARE APPROXIMATE AND THE CONTRACTOR IS TO LIAISE WITH THE ARCHITECT / LANDSCAPE ARCHITECT TO CONFIRM THE EXACT LEVELS.

NOTE B:
FOR SETTING OUT OF ALL EXTERNAL SURFACE LEVEL DRAINAGE APPARATUS (GULLIES AND CHANNEL/SLOT DRAINS) REFER TO LANDSCAPE ARCHITECT.

NOTE C:
INVERT LEVELS TO EXISTING MANHOLES HAVE BEEN TAKEN FROM SURVEY INFORMATION, INCLUDING ANY CCTV SURVEY INFORMATION THAT MAY HAVE BEEN CARRIED OUT. MOUCHEL ACCEPT NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THIS INFORMATION.

NOTE D:
CONTRACTOR TO REFER TO ARCHITECT'S DRAWINGS FOR EXACT SETTING OUT OF ALL RAINWATER PIPES AND FOUL CONNECTION POSITIONS.

NOTE E:
FOUL AND R.W.P DRAINAGE DESIGN IS BASED ON PRELIMINARY DISCHARGE RATES PROVIDED BY THE SERVICES CONSULTANT.
FINAL FLOW RATES TBC

SW MANHOLE SCHEDULE

REF	COVER LVL (CL)	INVERT LVL (IL)	CHAMBER DIA. (mm)	MANHOLE TYPE **	COVER TYPE
SWMH01	–	2.790	475	PP	C250
SWMH02	–	2.820	475	PP	C250
SWMH03	–	–	–	–	–

NOTES:
** MANHOLE TYPE –
CONC = CONCRETE RING TO BS 5911
PP = POLYPROPYLENE

Notes

NOTE
This drawing is not to be scaled. All dimensions to be checked on site and any discrepancies to be reported to the Mouchel Office. All material is produced on behalf of Mouchel Ltd. All drawings to be read in conjunction with specification where applicable.

DRAINAGE NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS.
2. NO DEVIATION FROM THE DETAILS SHOWN ON THIS DRAWING SHALL BE ALLOWED UNLESS PRIOR WRITTEN CONSENT HAS BEEN OBTAINED.
3. FOR TYPICAL DRAINAGE DETAILS REFER TO MOUCHEL DRAWING 1064933–S–D03
4. ALL WORK TO COMPLY WITH THE RELEVANT CLAUSES OF B.S. EN 752: 1998 BUILDING DRAINAGE, THE SEWERS FOR ADOPTION CURRENT EDITION & PART H OF THE BUILDING REGULATIONS.
5. PRIOR TO COMMENCEMENT OF THE WORKS THE CONTRACTOR SHALL:–
   A) CONFIRM THE LOCATION AND LEVEL OF THE PROPOSED DRAINAGE OUTFALLS AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
   B) CARRY OUT AN INTERNAL SURVEY OF THE OUTFALL CHAMBERS AND PROVIDE DETAILED DIMENSIONED SKETCHES OF EACH FOR THE ENGINEERS CONSIDERATION.
6. ALL PIPES BUILT INTO THE MANHOLE INVERTS SHALL BE INSTALLED WITH SOFFITS LEVEL UNLESS SHOWN OTHERWISE.
7. CONNECTIONS TO FOUL TERMINAL FITTINGS SHALL BE IN 100mm NOMINAL BORE PIPE U.N.O.
8. ALL MANHOLES AND CONNECTIONS PASSING THROUGH WALLS TO BE FITTED WITH ROCKER PIPES.
9. WHERE PIPES PASS THROUGH WALLS, REINFORCED CONCRETE LINTELS TO BE PROVIDED ABOVE PIPE TO FULL WIDTH OF WALL PROVIDING MIN. 50mm CLEARANCE ALL ROUND. MIN. BEARING OF LINTEL TO BE 150mm. SEAL WALL WITH RIGID SHEET EITHER SIDE AND INFILL VOIDS WITH COMPRESSIBLE SEALANT.
10. COVER LEVELS SHOWN ARE APPROXIMATE AND SHALL BE ADJUSTED ON SITE BY THE CONTRACTOR TO SUIT THE FINAL LEVELS. THE CONTRACTOR SHALL PROVIDE WRITTEN CONFIRMATION OF THE FINISHED COVER AND INVERT LEVELS OF ALL MANHOLES.
11. THE CONTRACTOR SHALL CONTROL ACCURATE LINE AND LEVEL OF PIPE LAYING BY USE OF AN OPTICAL LASER.
12. THE CONTRACTOR SHALL PROTECT THE PIPELINE FROM TEMPORARY CONSTRUCTION LOADS WHICH MAY BE IN EXCESS OF THE SERVICE LOADS.
13. PIPEWORK AND PIPE BEDDING SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS EXCEPT WHERE NOTED OTHERWISE:
    CLAYWARE PIPES AND FITTINGS TO BSEN295
    HEPWORTH SUPERSLEVE ON BEDDING CLASS AS STATED ON THE DETAILS DRAWING.
14. PIPEWORK WITH LESS THAN 600mm COVER FROM FINISHED LEVEL, IN AREAS OF VEHICULAR LOADING, SHALL BE PROTECTED WITH A 150mm C20 CONCRETE SURROUND. FLEXIBLE JOINTS SHALL BE MAINTAINED AT EACH PIPE JOINT BY THE USE OF COMPRESSIVE SHEET CUT TO FIT THE PIPE PROFILE.
15. TRENCHES IN AREAS RECEIVING VEHICULAR LOADING SHALL BE BACKFILLED WITH 6F2 GRANULAR FILL.
16. TRENCHES WITHIN 1m OF LOAD BEARING WALLS AND BELOW LEVEL OF FOOTING SHOULD BE FILLED WITH CONCRETE AT LEAST TO THE LEVEL OF THE UNDERSIDE OF THE FOUNDATION. WHERE THE DISTANCE IS MORE THAN 1m FROM THE WALL, THE CONCRETE FILL SHOULD BE TO A LEVEL BELOW THE UNDERSIDE OF THE FOUNDATION EQUAL TO THE DISTANCE FROM THE WALL TO THE NEARSIDE OF THE TRENCH LESS 150mm.
17. SOFT SPOTS IN THE TRENCH FORMATION SHALL BE REMOVED AND REPLACED WITH GRANULAR BEDDING UNLESS INSTRUCTED OTHERWISE.
18. UNLESS NOTED OTHERWISE MANHOLE COVERS, PPIC COVERS, CHANNEL GRATINGS AND ROAD GRATINGS SHALL BE DUCTILE IRON TO BS EN 124 BLACK COATED AS FOLLOWS: –

ACCESS ROUTES/HIGHWAYS	CLASS D400
HARD SURFACE AREAS	CLASS C250
LANDSCAPED AREAS	CLASS B125

    WHERE POSSIBLE ALL EXTERNAL MANHOLE COVERS TO BE RECESSED TO RECEIVE LANDSCAPE FINISHES. CONTRACTOR TO LIAISE WITH LANDSCAPE ARCHITECT TO CONFIRM DETAILS.
19. INTERNAL MANHOLE COVERS TO BE DOUBLE SEALED SCREW DOWN LOCKABLE COVERS AND SHALL HAVE A BADGE TO INDICATE FOUL OR STORM WATER. ALL INTERNAL MANHOLE COVERS ARE TO BE RECESSED TO RECEIVE ARCHITECTURAL FINISHES. CONTRACTOR TO LIAISE WITH ARCHITECT ACCORDINGLY.
20. THE CONTRACTOR SHALL REGULATE EXISTING COVERS AND FRAMES TO THE PROPOSED LEVELS INDICATED.
21. TWO SETS OF MANHOLE LIFTING KEYS SHALL BE HANDED OVER TO THE CLIENT ON COMPLETION OF THE WORKS.
22. LATERAL CONNECTIONS IN BETWEEN MANHOLE RUNS SHALL BE FORMED BY USING PURPOSE MADE JUNCTION FITTINGS. BEND FITTINGS SHALL BE PROVIDED WHERE APPROPRIATE TO DIRECT THE FLOW INTO MAIN RUNS.
23. THE CONTRACTOR SHALL SERVE ALL STATUTORY NOTICES AND OBTAIN ALL NECESSARY PERMITS AND APPROVALS FROM THE LOCAL AUTHORITY AND STATUTORY UNDERTAKER FOR WORKS IN EXISTING PUBLIC HIGHWAYS AND FOR CONNECTIONS TO PUBLIC SEWERS.
24. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO LIAISE WITH THE HIGHWAY AND SEWERAGE AUTHORITIES FOR APPROVALS, INTERIM INSPECTION, SNAGGING AND FINAL INSPECTIONS OF THEIR WORK.
25. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING STATUTORY UNDERTAKERS APPARATUS AND SERVICE CONNECTIONS ADJACENT TO AND CROSSING THE WORKS BY TRIAL PITS PRIOR TO COMMENCING MACHINE DIG.
26. AT THE CONCLUSION OF THE WORKS THE CONTRACTOR SHALL PROVIDE A MARKED UP DRAWING TO RECORD ANY AS BUILT VARIATIONS NOT SHOWN ON THE DRAWINGS.
27. THE ATTENUATION TANK SHALL BE A PROPRIETARY BASKET TYPE BY HYDRO INTERNATIONAL, WAVIN AQUACORE OR SIMILAR – NOMINAL SIZE OF TANK 5m x 5m x 0.4m DEEP. THE UNITS SHALL BE LAID AND CLIPPED TOGETHER AS PER THE MANUFACTURER'S RECOMMENDATION. REFER TO DRAWING 1064933–S–D03 WHICH SHOWS TYPICAL CONSTRUCTION DETAILS. EACH SYSTEM HAS ITS OWN PARTICULAR COMPONENTS AND REQUIREMENTS FOR VENTING. THE INSTALLER SHALL PROVIDE ALL NECESSARY SECONDARY COMPONENTS FOR THE PARTICULAR SYSTEM CHOSEN.
28. PERMEABLE SURFACE – EITHER TARMAC OR BLOCK PAVING LAY ON 500mm MIN. BED OF 4mm – 20mm AGGREGATE WITH A MIN. VOID RATIO OF 30%
29. ALLOW FOR ACO MD100 THRESHOLD DRAIN ACROSS ALL EXTERNAL DOORS WITH LEVEL THRESHOLD

LEGEND:

- ***ø SW (1 IN **) — NEW SURFACE WATER (SW) DRAIN (SHOWING PIPE DIA., GRADIENT AND DIRECTION OF FLOW).
- SWMH *REF* — NEW SURFACE WATER (SWMH) : MANHOLE
- RWP — NEW RAINWATER DOWNPIPE (RWP). REFER TO ARCHITECT'S LAYOUTS FOR SETTING OUT. (ACCESS FOR RODDING THE BELOW–GROUND BRANCH DRAIN TO BE PROVIDED AT ALL RWP LOCATIONS).
- RE — NEW RODDING EYE (SW)
- NEW SURFACE WATER DRAINAGE CHANNEL (DISHED CHANNEL AT EDGE OF PARKING BAYS)
- +3.22 — PROVISIONAL FINISHED GROUND LEVELS. (SHOWN FOR REFERENCE ONLY) REFER TO LANDSCAPE ARCHITECT LAYOUTS FOR CONFIRMATION OF ALL FINISHED EXTERNAL LEVELS.
- FFL ..... — PROVISIONAL FINISHED FLOOR LEVELS. (SHOWN FOR REFERENCE ONLY) REFER TO ARCHITECT LAYOUTS FOR CONFIRMATION OF ALL FINISHED FLOOR LEVELS & SETTING OUT.
- INDICATES GENERAL DIRECTION OF FALLS USED IN DRAINAGE DESIGN
- NEW BELOW GROUND SURFACE WATER ATTENUATION TANK AQUACELL OR SIMILAR (REFER TO NOTE 27).
- PERMEABLE SURFACE REFER TO NOTE 28
- EXISTING SW DRAIN
- EXISTING FW DRAIN
- EXISTING COMBINED SEWER (CWS)

Version	Revision Description	Rev Date	Drawn By	Checked By
P2	EXISTING SW DRAIN UNDER PROPOSED STAFF AREA MODIFIED	23.06.15	CJS	JP
P1	ISSUED FOR FEASIBILITY	22.06.15	CJS	JP

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Client

Project: PINCHBECK C OF E PRIMARY SCHOOL

Drawing Title: SURFACE WATER DRAINAGE LAYOUT

Purpose: FEASIBILITY

Draft / Issue

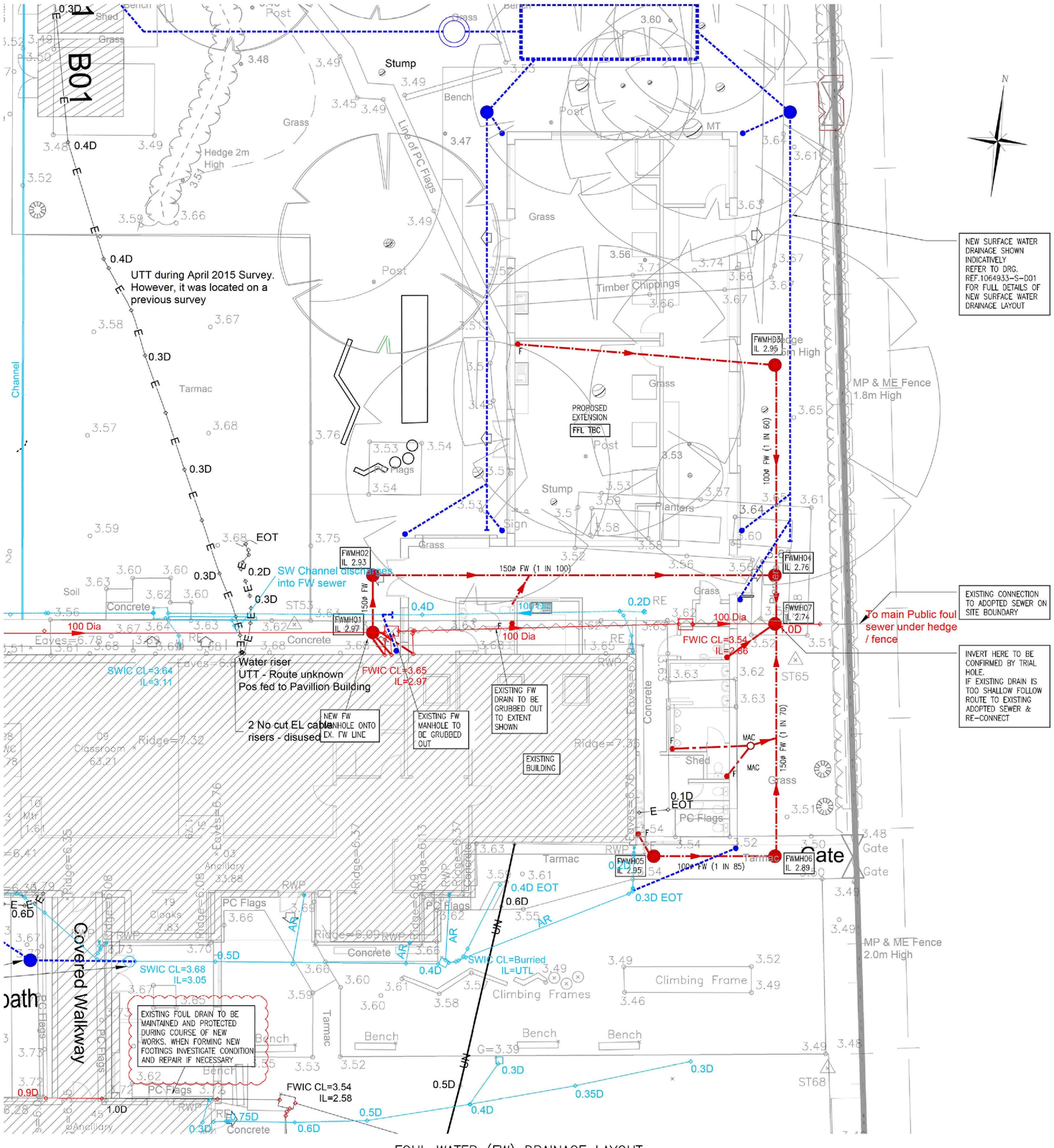
Scale (at A1 size): 1:250

Issuing Office: Liverpool

Telephone: 0151 600 5500

Drawing Number: 1064933-S-D01

Version: P2



FOUL WATER (FW) DRAINAGE LAYOUT

SCALE 1 : 100

NOTE A:
ALL COVER LEVELS INDICATED ON THIS DRAWING ARE APPROXIMATE AND THE CONTRACTOR IS TO LIAISE WITH THE ARCHITECT / LANDSCAPE ARCHITECT TO CONFIRM THE EXACT LEVELS.

NOTE B:
FOR SETTING OUT OF ALL EXTERNAL SURFACE LEVEL DRAINAGE APPARATUS (GULLIES AND CHANNEL/SLOT DRAINS) REFER TO LANDSCAPE ARCHITECT.

NOTE C:
INVERT LEVELS TO EXISTING MANHOLES HAVE BEEN TAKEN FROM SURVEY INFORMATION, INCLUDING ANY CCTV SURVEY INFORMATION THAT MAY HAVE BEEN CARRIED OUT. MOUCHEL ACCEPT NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THIS INFORMATION.

NOTE D:
CONTRACTOR TO REFER TO ARCHITECT'S DRAWINGS FOR EXACT SETTING OUT OF ALL RAINWATER PIPES AND FOUL CONNECTION POSITIONS.

NOTE E:
FOUL AND R.W.P DRAINAGE DESIGN IS BASED ON PRELIMINARY DISCHARGE RATES PROVIDED BY THE SERVICES CONSULTANT.
FINAL FLOW RATES TBC

Notes

NOTE
This drawing is not to be scaled. All dimensions to be checked on site and any discrepancies to be reported to the Mouchel Office. All material is produced on behalf of Mouchel Ltd. All drawings to be read in conjunction with specification where applicable.

NOTES:

FOR ALL NOTES SEE DRG. REF.. 1064933-S-D01.

LEGEND:

- ***ø FW (1 IN **) — NEW FOUL WATER DRAIN (FW) (SHOWING PIPE DIA., GRADIENT AND DIRECTION OF FLOW)
- FWMH *REF* — NEW FOUL WATER (FWMH) : MANHOLE
- MAC — NEW FOUL WATER : MINI-ACCESS CHAMBER
- F — CONNECTION TO ABOVE-GROUND FOUL SYSTEM. REFER TO ARCHITECT'S / SERVICES CONSULTANT'S LAYOUTS FOR SETTING OUT & TYPE OF APPLIANCES & FITTINGS. (ACCESS FOR RODDING BELOW-GROUND BRANCH DRAIN TO BE PROVIDED AT ALL POP-UP LOCATIONS).
- G — NEW INTERNAL TRAPPED FLOOR GULLEY. REFER TO ARCHITECT'S / SERVICES CONSULTANT'S DRAWINGS AND SPECIFICATIONS FOR GULLEY COMPONENT DETAILS.
- NEW SURFACE WATER (SW) DRAIN (SEE PLAN ON DRG. REF...1064933-S-D01).
- +3.22 — PROVISIONAL FINISHED GROUND LEVELS. (SHOWN FOR REFERENCE ONLY). REFER TO LANDSCAPE ARCHITECT LAYOUTS FOR CONFIRMATION OF ALL FINISHED EXTERNAL LEVELS.
- FFL ..... — PROVISIONAL FINISHED FLOOR LEVELS. (SHOWN FOR REFERENCE ONLY). REFER TO ARCHITECT LAYOUTS FOR CONFIRMATION OF ALL FINISHED FLOOR LEVELS & SETTING OUT.
- EXISTING SW DRAIN
- EXISTING FW DRAIN
- EXISTING FW DRAIN TO BE ABANDONED (GRUBBED OUT)

FW MANHOLE SCHEDULE

REF	COVER LVL (CL)	INVERT LVL (IL)	CHAMBER DIA. (mm)	MANHOLE TYPE **	COVER TYPE
FWMH01	–	2.97	–	–	–
FWMH02	–	2.93	–	–	–
FWMH03	–	2.95	475	PP	C250
FWMH04	–	2.76	–	–	–
FWMH05	–	2.95	475	PP	C250
FWMH06	–	2.89	475	PP	C250
FWMH07	–	2.74	–	–	–

NOTES:

** MANHOLE TYPE –
CONC = CONCRETE RING TO BS 5911
PP = POLYPROPYLENE

Version	Revision Description	Rev Date	Drawn By	Checked By
P2	NOTE ADDED REGARDING EXISTING FOUL DRAIN BELOW NEW STAFF ROOM	23.06.15	CJS	JP
P1	ISSUED FOR FEASIBILITY	22.06.15	CJS	JP

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Client

Project: PINCHBECK C OF E PRIMARY SCHOOL

Purpose: FEASIBILITY

Drawing Title: FOUL WATER DRAINAGE LAYOUT

Draft / Issue	Scale (at A1 size)	Issuing Office	Drawing Number	Version
Issue	1:100	Liverpool	1064933-S-D02	P2

Telephone: 0151 600 5500