



Proposed Artificial Grass Pitch, Didsbury High School,

Storm Drainage Strategy

R - 21090 – 001 – SDS – 0
March 2022

Report Originator(s)

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Revision Record

Revision	Date	Description	Written	Approved
0	30/03/22	First Issue	WRA	WRA



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Client

McArdle Sport Tec

Project

New AGP, Didsbury High School

Title

Storm Drainage Strategy

Sheet no. 2

Project ref 21090

Date March 2022

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1.0 Introduction

1.1 Design Brief

- 1.1.1 The client, McArdle Sport Tec Ltd requires a storm drainage strategy to accompany a full planning application for a new artificial grass pitch at Didsbury High School.
- 1.1.2 This report provides design proposals to ensure storm water is managed adequately.
- 1.1.3 This report has been prepared by SEA Consulting Engineers Ltd. With the benefit limited to our instructing Client, McArdle Sport Tec Ltd.

1.2 Site Location

- 1.2.1 The proposed new artificial grass pitch replaces an existing natural turf pitch located within the school grounds. A site location is presented below.

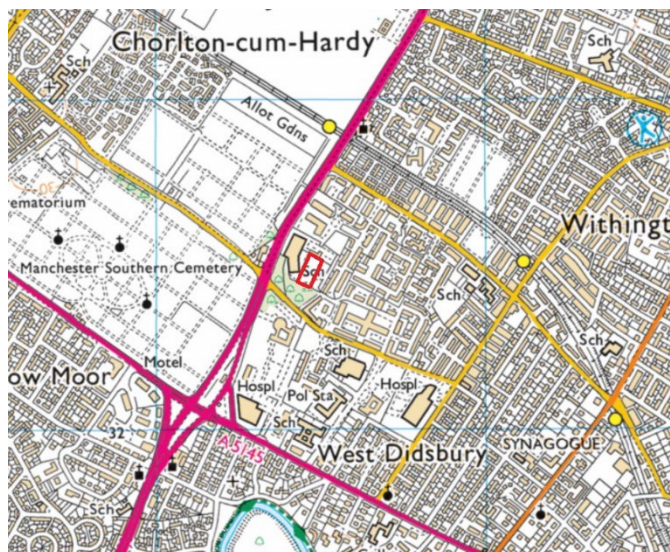


Figure 1.1 – Site Location Plan, approximate boundary in red.

1.3 Current Land Use

- 1.3.1 The existing site is a natural turf pitch which is positively drained to the existing storm water drains within the site. This drainage was built as part of the school redevelopment completed in 2019.

1.4 Proposed Development

- 1.4.1 The proposed development will comprise the construction of a new artificial grass pitch to replace the natural turf pitch. The site plan is presented in appendix A.

2.0 Surface Water Drainage

2.1 Existing Surface water drainage

- 2.1.1 The existing natural turf pitch is positively drained via the sites storm drainage network, built as part of the school redevelopment works. The as built storm drainage layout is presented in appendix B. The area of the existing pitch is approximately 3000m² with this area allowed for as part of the hydraulic designs. Based on the information submitted as part of the planning application for the school redevelopment, the schools storm drainage networks outfalls to a untiled utilies storm sewer at a restricted rate of 10l/s. An existing attenuation thank is located underneath the pitch as shown on the as built drainage which provides flood protection for the 1in100 year storm event.
- 2.1.2 Even though the existing pitch has an unrestricted connecting to the existing storm, in line with current guidance and best practice, the proposed AGP will be restricted to as close to greenfield runoff rates as possible in order to provide a betterment on the existing situation. The greenfield discharge rate for the site has been calculated using the HR Wallingford online greenfield runoff tool. The sites impermeable area of 3470m² has been used in this calculation. Appendix C presents SEA drawing E01 which shows the sites impermeable areas and the greenfield runoff calculations are enclosed in Appendix D.
- 2.1.3 The Qbar value for the development has been calculated as 0.68/s. Flows at this rate are not considered practical due to long term maintenance issues. Therefore it is proposed to restrict flows to 2l/s. As the existing pitch is positively drained with no existing flow restrictions the flow of 2l/s is considered a betterment and will have no impact on the existing storm network.

2.2 Proposed Storm Drainage Discharge

- 2.2.1 Paragraph 80 of the Planning Practice Guidance for 'Flood Risk and Coastal Change' defines the hierarchy of drainage options. Where reasonably practicable the aim should be to discharge storm water as high up the following hierarchy of storm drainage options;
- Into the Ground (infiltration);
 - To a surface water body;
 - To a surface water sewer, highway drain or another drainage system, and
 - To combined sewer

- 2.2.2 Each of these is consider separately below;

Into the ground

- 2.2.3 A Geotechnical Investigation has been undertaken by Soiltechnics limited. They undertook infiltration testing within the made ground which showed some permeability but they conclude that due to contamination issues with locating soakaways within made ground that the use of soakaways should not be taken forward. As extract their report is presented in appendix E

To a surface water body

- 2.2.4 There are no surface water bodies within the vicinity of the site which offer a viable outfall for the proposed development.

To a surface water sewer, highway drain or another drainage system

- 2.2.5 The site was previously positively drained as shown on the as built drainage layout. Therefore the pitches storm water will drain via this existing storm water network at a restricted rate of 2l/s. As the site was previously drained the redevelopment of the site will reduce the rate of surface water discharge into the schools sewer network.

2.3 Proposed Surface Water Drainage Strategy

- 2.3.1 Proposals are to connect the developments surface water drainage into the existing on site drainage.
- 2.3.2 The design will use FRS rainfall parameters and will be for all impermeable areas on the site to accommodate storms up to the 1 in 100 year event and allow for the increase in storm intensities up to 40% (design life of the development assumed to be greater than 60 years). This is based on the Environment Agency (EA) document 'Flood risk assessments: climate change allowances'. Table 2 of the EA document is replicated below in table 2.1. The sites impermeable areas are presented in appendix C and equates to a total area of 3470m².

Applies across all of England	Total potential change anticipated for the '2020s' (2015-2039)	Total potential change anticipated for the '2050s' (2040-2069)	Total potential change anticipated for the '2080s' (2070-2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

Table 3.1 – Table 2 peak rainfall intensity allowance in small and urban catchments

- 2.3.3 Surface water will be restricted 2l/s to ensure that the rate of surface water runoff from the site does not increase as a result of the development.
- 2.3.4 The surface water drainage design will comprise a piped network with a HydroBrake flow control device and attenuation provided within the pitches subbase. The system has been modelled using Causeway Flow for all storm durations up to 10,080mins. The calculations are presented in appendix F and shows that pitch subbase is required to be a minimum of 250mm providing a volume of 184m³. A drainage layout is presented in appendix G.
- 2.3.5 The use of SUDS has been consider and by using a permeable subbase will provide adequate water treatment in accordance with chapter 26 of SUDS Manual.



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Storm Drainage Strategy

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2.4 Maintenance

- 2.4.1 All new surface water will remain private and maintenance will be the responsibility school. The following maintenance plan shall be implemented.

Pipe systems, Inspection chambers and manholes

Maintenance Schedule		
Maintenance Category	Required Action	Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action	Monthly (for the first 3 months) then six monthly.
	Debris removal from catchment surface (where may cause risks to performance)	Monthly
	Remove sediment from pre-treatment structures	Annually or as required
Remedial Actions	Remove blockages	As required
	Cleaning/Jetting	As required
	Repair/rehabilitation of system	As required
Monitoring	Inspect/check all part of piped system and inspection chambers to ensure that they are in good condition and operating as required	Annually and after large storms



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Permeable Pitch and subbase

Maintenance Schedule		
Maintenance Category	Required Action	Frequency
Regular Maintenance	Brushing (standard cosmetic sweep over whole surface)	Once a year, after the autumn leaf fall, or reduced frequency as required, based on site-specific observation of clogging or manufacturer's recommendations. Particular attention to be paid to areas where water enters pervious surface from adjacent impermeable areas as this area is most likely to collect sediment.
Occasional maintenance	Stabilise and mow contributing adjacent areas	As required
	Removal of weeds or management using glyphosphate applied directly into the weeds by an applicator rather than spraying	As required - once per year or less frequently based on site observations
Remedial Actions	Remediate any landscaping which, through vegetation maintenance strip, has been raised to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked surfacing considered detrimental to the performance or a hazard to users.	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10-15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for 3 months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	3-monthly, 48 hours after large storms in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chamber	Annually



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3.0 Conclusion

3.1.1 Based on the above, and providing the above strategies are adopted, the developed site will not contribute further to flood risk and therefore satisfying the requirements of the National Planning Policies Framework.

3.1.2 References

- Department for Communities and Local Government (July 2021) - National Planning Policy Framework.
- Department for Communities and Local Government (July 2021) - Technical Guidance to the National Planning Policy Framework.
- The Building Regulations (2010) - Drainage and Waste Disposal - Approved Document H.
- BS 8533:2011 Assessing and managing flood risk in development – Code of Practice.
- CIRIA Report C635 Designing for exceedance in urban drainage – good practice.
- BS EN 752:2008 Drain and sewer systems outside buildings - Hydraulic design and environmental considerations.
- BS 8533:2011 Assessing and managing flood risk in development – Code of Practice.
- Design and Analysis of Urban Storm Drainage – The Wallingford procedure – Volume 1.
- <https://flood-map-for-planning.service.gov.uk>



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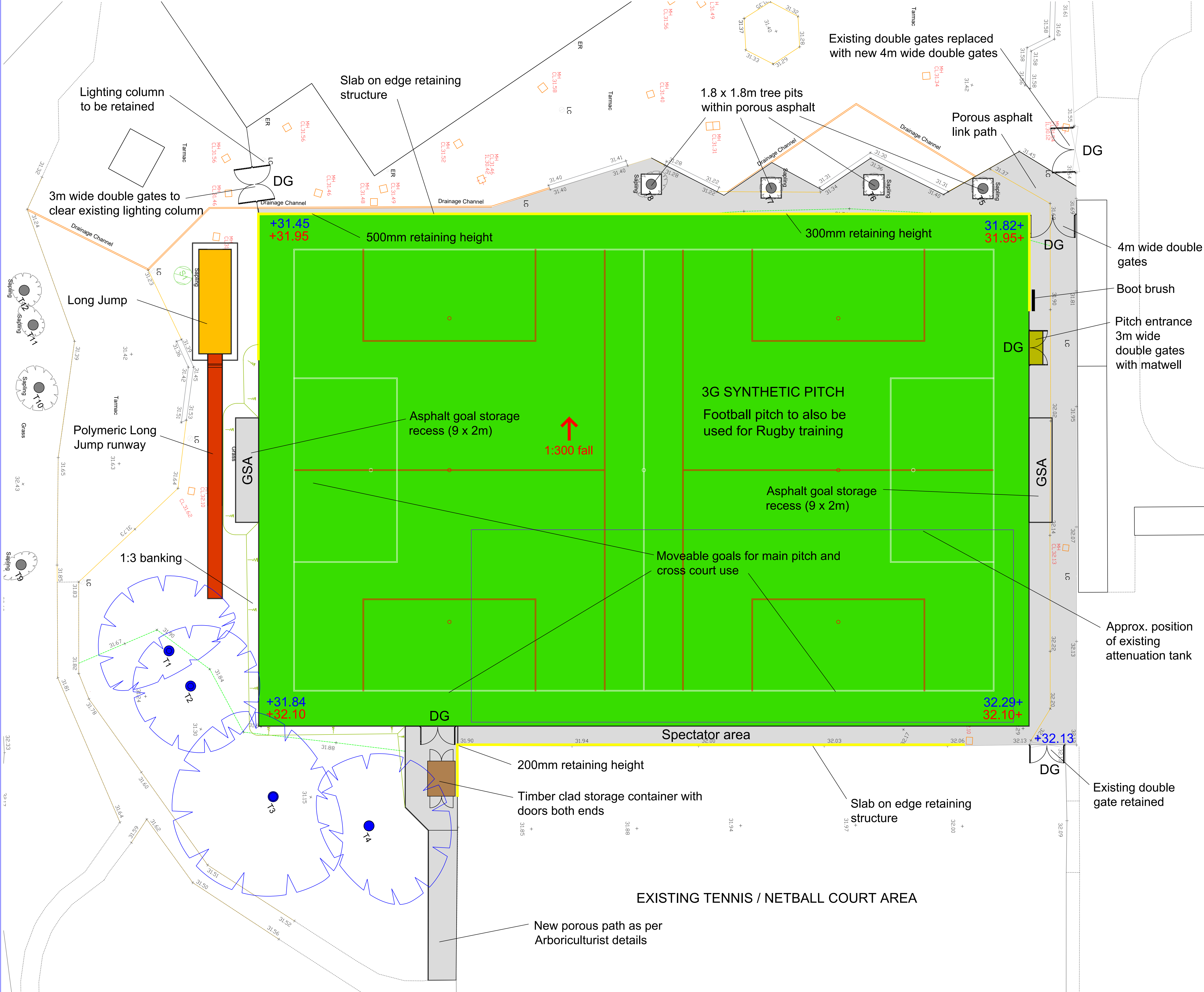
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Date March 2022

Appendix A

Site Plan



NOTES

- 3G synthetic carpet
- Porous asphalt
- DG Double Gate
- GSA Goal storage area
- Retaining structure

Rev	Amendment	Date	By
-	Initial Issue		

Client: DIDSBURY HIGH SCHOOL

Project: 3G STP

Drawing: Proposed Pitch Layout



Drawn	Checkd	Plot No	Date	Scale	15-10-21	Prelim	Check	Final
HJ		01						

Job No	Drawing No	Rev
	MCA-MUK2479-07	B



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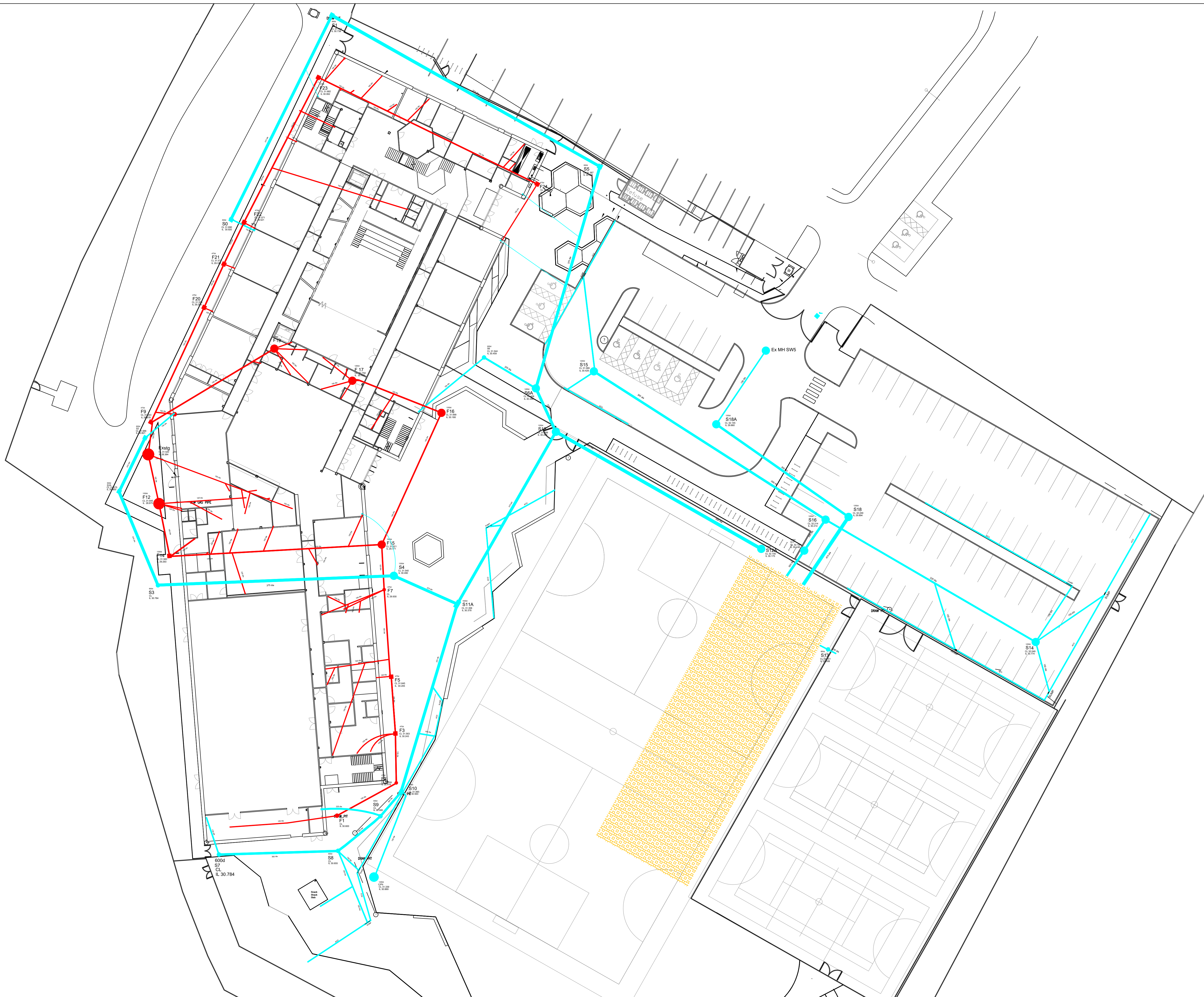
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Appendix B

As Built Drainage Layout



- General Notes
- Surface Water Manhole
 - Foul Water Manhole
 - As Built
S12
0.55.000
0.55.000
0.55.000
Manhole As Built info.
 - 375 dia
Drain Run Diameter
 - SW Drain Run
 - FW Drain Run

No.	Revision/Issue	Date
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Client



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Project
DIDSBURY HIGH SCHOOL

Drawing Title
ASBUILT EXTERNAL DRAINAGE

Drawing No. DHS-AS-001	
Date 29-7-19	Drawn by DM
Scale N/A	Revision 00



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Sheet no. 11

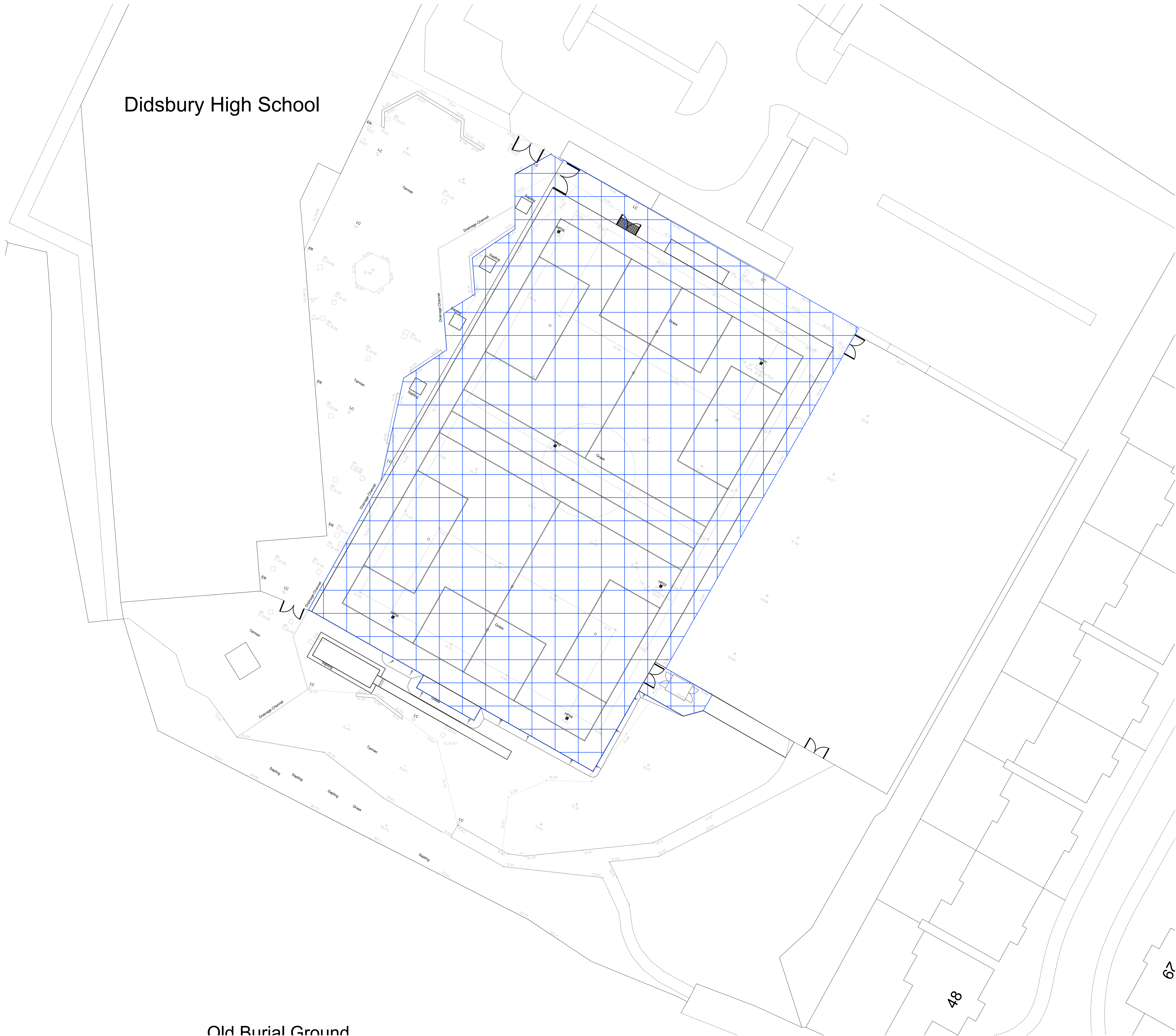
Project ref 21090

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Appendix C

Impermeable Area Plan – SEA Drawing 21090/E01

Didsbury High School



Old Burial Ground

GENERAL

Do not scale from this drawing.

All dimensions are in millimetres unless noted otherwise.

All setting out to architects drawings.

Drawing to be read in conjunction with all other SEA drawings and architects drawings.

This scheme has been designed using the survey information provided by others. It shall be the responsibility of the contractor to verify levels, boundaries etc prior to commencing any works on site. SEA Structural Engineers Ltd. shall not accept any responsibility for errors resulting from the survey.

All setting out to be in accordance with the Architect's drawings, the Contractor is to check all dimensions and levels prior to commencement of work and report any discrepancies to the Engineer, including any encountered during construction works.

All dimensions should be checked on site prior to construction. Please notify the Engineer of any discrepancies before commencing or continuing any work.

HEALTH, SAFETY & THE ENVIRONMENT

In accordance with the Health and Safety at Work etc Act 1973 and the Construction (Design and Management) Regulations 2015, designs and details on this drawing have been the subject of a Designers Risk Assessment, to identify risks in construction, use, or demolition of the scheme.

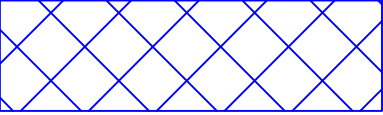
It is not considered necessary for Designers to highlight obvious and/or common risks (such as deep excavations, manual handling and working around heavy plant) which Contractors should be familiar with.

So as far as is reasonably practicable, risks inherent in the design have been eliminated. Where it has been considered that elimination of a risk (or part of a risk) is not reasonably practicable, it has been reduced.

Significant unusual residual risks are identified below, beside the measures which have been adopted to eliminate and/or reduce them:

None identified.

DRAWING KEY:

 Proposed impermeable area = 3470m²

Rev.	Date	By	Description
 SEA STRUCTURAL ENGINEERS [CONSULTING CIVIL & STRUCTURAL ENGINEERS] E: andy@seastructuralengineers.co.uk T: 07940 340792			
PROJECT PROPOSED NEW PITCH DIDSBURY HIGH SCHOOL			
DRAWING PROPOSED IMPERMEABLE AREAS			
SCALE: 1:250 @A1		DATE: DEC 2021	
DRAWN BY: SEA		REV: --	
STATUS: PRELIMINARY			
DWG No: 21090/E01			-



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Appendix D

Greenfield Runoff Calculations

Calculated by: SEA Oundle

Site name: New AGP

Site location: Didsbury High School

Site Details

Latitude: 53.42931° N

Longitude: 2.25065° W

Reference: 2511293296

Date: Dec 03 2021 13:38

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Runoff estimation approach: IH124

Site characteristics

Total site area (ha): 0.347

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

Hydrological characteristics

	Default	Edited
SAAR (mm):	840	840
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is $Q_{BAR} < 2.0$ l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $SPR/SPRHOST \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	0.78	0.78
1 in 1 year (l/s):	0.68	0.68
1 in 30 years (l/s):	1.33	1.33
1 in 100 year (l/s):	1.63	1.63
1 in 200 years (l/s):	1.86	1.86

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.



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Appendix E

Ground Investigation Extracts

7.4 Drainage and Infiltration Potential

- 7.4.1 The Made Ground soils were encountered as a granular material, which typically exhibit good permeability. Indicative infiltration testing was undertaken in HP03 between depths of 0.57m and 0.9m and the infiltration rate was recorded between 2.90×10^{-5} m/s and 3.72×10^{-5} m/s.
- 7.4.2 Although the Made Ground exhibited good permeability, we strongly advise against siting soakaways within Made Ground deposits as this can promote transportation of leachable contaminants and collapse of air voiding within deposits, leading to surface depressions.
- 7.4.3 It should be noted that testing has also not been strictly carried out in accordance with BRE Digest 365 (2016) *“Soakaway Design”*.
- 7.4.4 The most appropriate means for disposal of stormwater collected by the development would be via the school’s existing private surface water drainage network, subject to assessment of capacity etc.

7.5 Recommendations for further works

- 7.5.1 At this stage we do not consider further investigations to be necessary. However, should floodlighting become a requirement for the development then we recommend this report is referred back to Soiltechnics and an onsite borehole investigation is completed in order to provide a robust engineering assessment for floodlight foundations.



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Appendix F

Stormwater Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	Cover Level (m)	Diameter (mm)	Depth (m)
1	0.347	31.950	1200	0.350

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	17.000	Drain Down Time (mins)	240
Ratio-R	0.400	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	30.950	Product Number	CTL-SHE-0067-2000-1000-2000
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	2.0	Min Node Diameter (mm)	1200

Node 1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	31.600	Slope (1:X)	300.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)		Depth (m)	
Safety Factor	1.0	Width (m)	66.750	Inf Depth (m)	
Porosity	0.30	Length (m)	44.400		

Results for 1 year Critical Storm Duration. Lowest mass balance: 97.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	1	118	31.689	0.089	13.3	25.9169	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
120 minute winter	1	Hydro-Brake®	2.0	36.6

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	1	236	31.765	0.165	19.2	84.7671	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m³)
240 minute winter	1	Hydro-Brake®	1.9	50.6

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.92%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
480 minute winter	1	472	31.875	0.275	20.6	184.1543	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)	Discharge Vol (m ³)
480 minute winter	1	Hydro-Brake®	1.9	78.7



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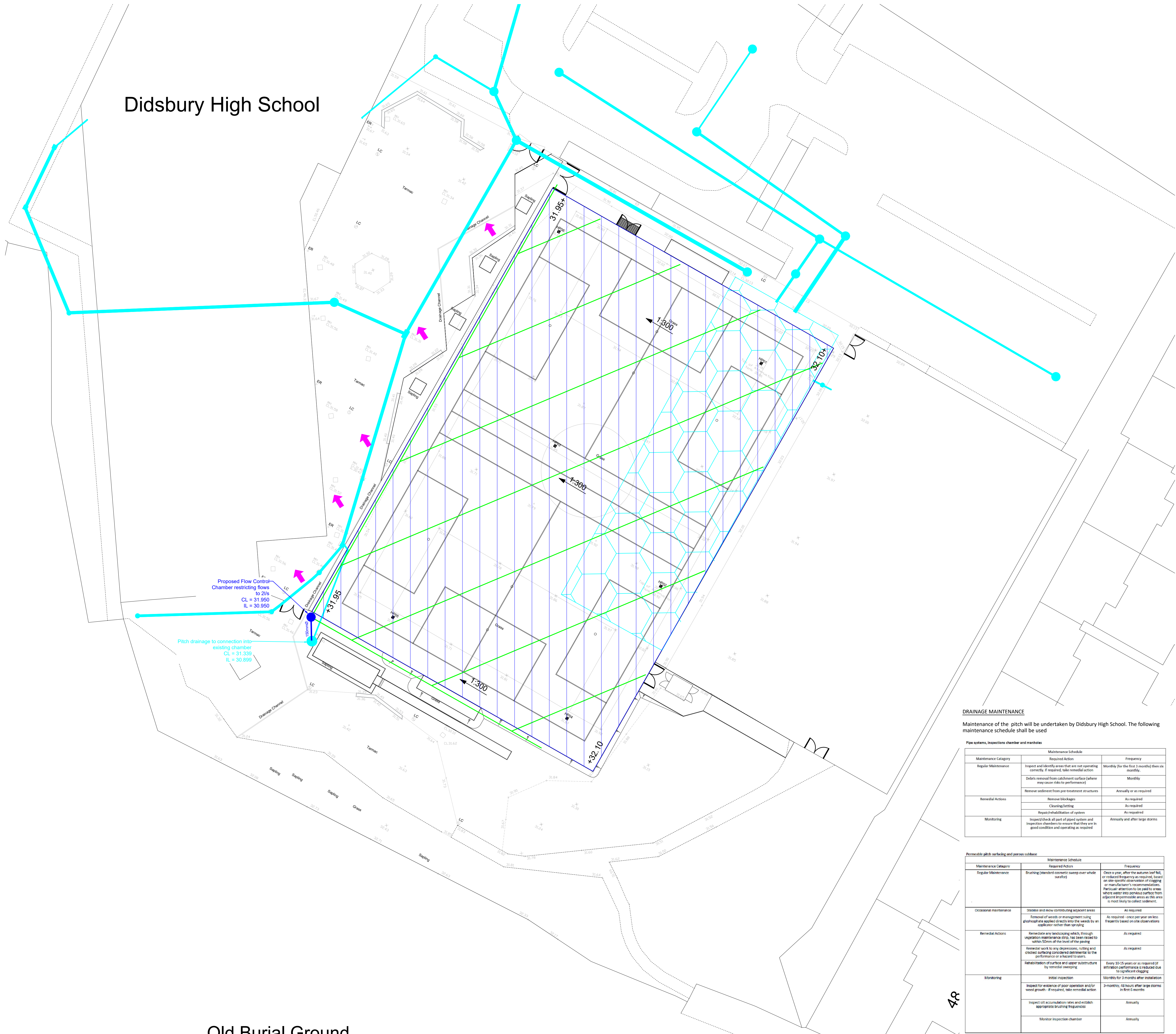
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Appendix G

Proposed Drainage Layout – SEA Drawing 21090/E02 and Constriction Details

Didsbury High School



Old Burial Ground

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None identified.

STORM DRAINAGE DESIGN STATEMENT

In accordance with the storm drainage hierarchy we have considered use of infiltration techniques, outfall to watercourse and finally outfall to sewers, each presented below;

Outfall to ground (infiltration)

The ground investigation carried out by Soiltechnics confirmed that the underlying made ground exhibited some permeability, however due to contamination they recommend that soakaways are not used. Therefore their use has been discounted.

Outfall to watercourse

There are no watercourses within the vicinity of the site, therefore the use of watercourses has been discounted.

Outfall to Sewers

There are existing private storm water drainage adjacent to the pitch which can be used for storm water outfall from the pitch

Design Criteria

The drained area for the proposed pitch used in the design calculations = 3470m²

Based on the above drained area a greenfield runoff rate has been calculated using the SUDS UK online tool. Qbar for has been calculated as 0.68/s. Flow less than 1/s are not considered practical due to the risk of blockage and maintenance. Therefore the drainage from the pitch shall be restricted to 21/s

Causeway flow has been used to model the Attenuation for the pitch which will be provided within the 250mm type 3 permeable subbase with 30% voids. The pitch has been designed not to flood for the 1 in 100 + 40% year storm event.

Water Quality

The use of SUDS has been considered and the use of a permeable subbase for the pitch drainage will provide adequate water quality treatment in accordance with the SUDS manual.

Overland Flows

In the unlikely event of system failure. Overland flows will be directed away from any buildings towards the west of the pitch towards the watercourse.

DRAWING KEY:

- Existing surface water drain
- Proposed storm drainage run
- Pitch drainage as advised by McArdle Sport Tec.
- Proposed extent of 250mm deep permeable subbase. Provided with a 1 in 300 fall as indicated. Subbase provides attenuation for the 1 in 100 + 40% year storm event
- Pitch gradient
- Overland Flow Routes

DRAINAGE MAINTENANCE

Maintenance of the pitch will be undertaken by Didsbury High School. The following maintenance schedule shall be used

Pipe systems, inspection chamber and manholes

Maintenance Category	Required Action	Frequency
Regular Maintenance	Inspect and identify areas that are not operating correctly. If required, take remedial action	Monthly (for the first 3 months) then six monthly
	Debris removal from catchment surface (where any cause risk to performance)	Monthly
	Remove sediment from pre-treatment structures	Annually or as required
Remedial Actions	Remove blockages	As required
	Cleaning/jetting	As required
	Repair/rehabilitation of system	As required
Monitoring	Inspect/check all part of piped system and inspection chambers to ensure that they are in good condition and operating as required	Annually and after large storms

Permeable pitch surfacing and porous subbase

Maintenance Category	Required Action	Frequency
Regular Maintenance	Brushing (stended correct sweep over whole surface)	Once a year, after the autumn leaf fall, or reduced frequency as required, based on site specific observation of clogging or manufacturer's recommendations. Particular attention to be paid to areas where water into porous surface from adjacent impermeable areas as this area is most likely to collect sediment
Occasional maintenance	Stabilise and mow surrounding adjacent areas	As required
Remedial Actions	Removal of weeds or overgrowth using appropriate application directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently based on site observations
	Remediate any landscaping which, through vegetation maintenance etc, has been related to within 50mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked surfacing considered detrimental to the performance or a hazard to users	As required
Monitoring	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10-15 years or as required (if infiltration performance is reduced due to significant clogging)
	Initial inspection	Monthly for 3 months after installation
	Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	3-monthly, 48 hours after large storms in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chamber	Annually

Rev.

Date

By

Description

SEA

STRUCTURAL ENGINEERS

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PROJECT

PROPOSED NEW PITCH
DIDSBURY HIGH SCHOOL

DRAWING

PROPOSED DRAINAGE LAYOUT

SCALE: 1:250 @A1

DATE: DEC 2021

DRAWN BY: SEA

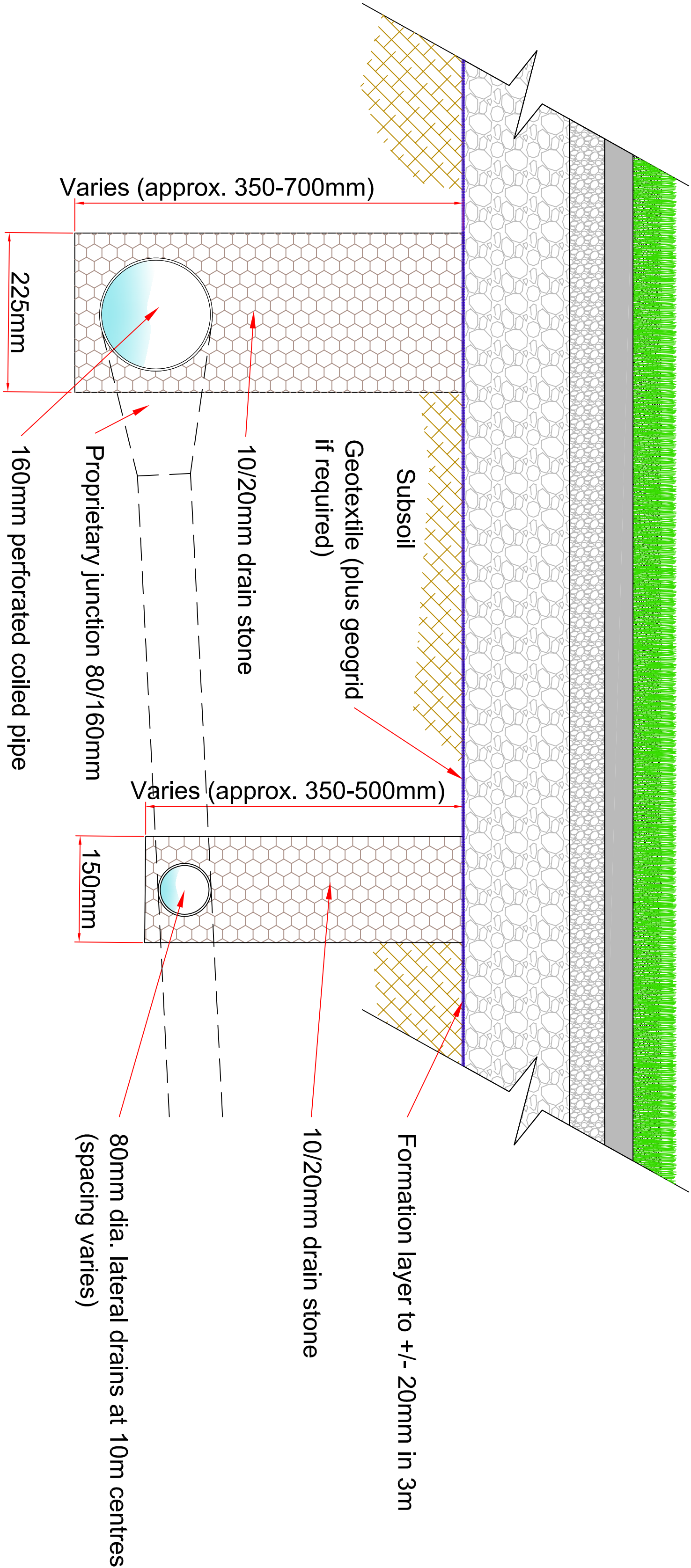
REV: --

STATUS: PRELIMINARY

DWG No: 21090/E02

-

SYNTHETIC PITCH



Initial Issue					Date	By
Rev	A	m	e	n	d	e

Client

Project
STANDARD DRAWING

Drawing
DRAINAGE DETAIL

Drawn	HJ	Date	18-02-19	Scales	1:5
Checked		Plot No	01	Prelim	Check
				Final	

Job No	Drawing No	Rev
	MCA-MUK2101-05	B

SYNTHETIC PITCH

300 or 600mm mowing margin consisting
30mm thick 6mm medium grade
asphalt

150 to 300mm Type 1/3 aggregate

50 x 150mm concrete
kerb edging

300 or 600mm

50 x 150mm concrete kerb edging

Fence post

Grass

Concrete biscuit

Engineering bricks

600 x 600mm medium duty cover and frame

Hydrobrake to suit design levels

Min. 150mm

150

Outfall discharge

Invert

ST1/GEN 0 concrete base

300

75

300

10/20mm shingle
surround

160mm dia. outfall pipe

Hydrobrake design head

Concrete rings dia.
to suit hydrobrake
normally 1050mm
or 1200mm

Geotextile

Formation

Subsoil

80mm lateral drain

Perimeter drain



Drawing
HYDROBRAKE DETAIL

Project
STANDARD DRAWING

-		Initial Issue			
Rev		A	m	e	n
d		m	e	n	t
Date					By

Drawn	Date	Scale
HJ	09-01-20	1:5
Checked	Prelim	Check
01		Final

Job No	Drawing No	Rev
	MCA-MUK2101-28	A