



**MICHAEL EVANS
& ASSOCIATES LTD**

Civil and Structural Engineers
& Design Consultants

FLOOD RISK ASSESSMENT

For Proposed Re-development of land at:
Redbank Playing Fields
Radcliffe
Bury
Manchester

Job No: 22-242
Prepared by: Michael Evans & Associates Ltd
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This report describes work commissioned by Michael Eastman of Surfacing Standards Ltd following written (e-mail) instruction on 26 May 2022. Mrs Nicola Dibble of Michael Evans & Associates Ltd carried out the work.

Date: 2nd December 2022

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Revision / Dated Issued	Amendment

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DRAWINGS

	Site Location Plan
BRI458- T01	Topographical Survey (including CCTV)
	Proposed Site Layout
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1 INTRODUCTION

1.1 General

1.1.1 Michael Evans & Associates Ltd have been commissioned to undertake a Flood Risk Assessment (FRA), on behalf of Surfacing Standards Ltd relating to the proposed development of a new pavilion building, access and parking, grass pitches and an artificial grass pitch (AGP), at Redbank Playing Field, Unsworth Road, Radcliffe, Manchester, M26 3RF.

1.1.2 This report sets out the findings of the FRA required by the Local Planning Authority in support of the planning application for the development. The assessment has been carried out in accordance with the guidance set out in the National Planning Policy Framework (NPPF).

1.2 Background Information

1.2.1 The Department for Communities and Local Government (DCLG) published the NPPF and the Technical Guidance to the National Planning Policy Framework (Technical Guidance) in March 2012, with the most recent updates being published in August 2018. The NPPF and the accompanying Technical Guidance explain how flood risk should be taken into consideration during the planning process. The guidance specifies a sequential test which local planning authorities should apply to all future proposed development sites. The following Table 1: Flood Zones, extracted from Table 1 of the Technical Guidance, defines the levels of flood risk within England.

Table 1: Flood Zones		
Flood Zone	Flood zone Classification	Description
Flood Zone 1	Low Probability	This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any one year (<0.1%).
Flood Zone 2	Medium Probability	This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
Flood Zone 3a	High Probability	This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in

		200 or greater annual probability of flooding from the sea (>0.5%) in any year.
Flood Zone 3b	Functional Floodplain	The zone comprises land where water has to flow or be stored in times of flood.

- 1.2.2** As part of its general obligations under the Water Resources Act 1991, the Environment Agency has carried out surveys of its existing flood defences and has published a series of nationwide 'Indicative Floodplain Maps' based upon information from historic flood events and basic hydraulic modelling. In general terms, these maps give a good indication of the areas likely to be affected by flooding. More recently the Environment Agency have published the 'Flood Map' on their website which is based on improved hydraulic modelling and detailed local data. The Flood Map indicates areas which may be affected by a 1 in 100 year fluvial flood or a 1 in 200 year tidal/coastal flood (ie Zone 3 as defined in the NPPF). It also indicates which areas may be affected by an extreme flood (ie Zone 2 as defined in the NPPF).
- 1.2.3** The Flood Map for the Redbank Playing Fields area of Manchester shows that the proposed development is located within Flood Zone 1. The extent of the indicative floodplain is shown in Appendix 1 – 'Environment Agency Flood Map for Planning'.
- 1.2.4** The NPPF stipulates that all proposed development sites which are located outside of Flood Zone 1 and/or are greater than 1ha in area must be accompanied by a Flood Risk Assessment as part of the planning process. For site located within Flood Zone 1 which are less than 1ha in area, the main flood risk consideration is the management of surface water runoff from the site.

2 STRUCTURE OF THE REPORT

- 2.1** The report has been structured to follow the general principles set out in the Site Specific Flood Risk Assessment Checklist, included as Section 26 of the PPG.
- 2.2** The methodology for this FRA has comprised a desktop study including liaison with the Local Planning Authority, Lead Local Flood Authority, United Utilities and the Environment Agency.
- 2.3** Reference has also been made to relevant plans, including plans showing the location of United Utilities sewers, and Greater Manchester Combined Authority (GMCA) Strategic Flood Risk Assessment (2019)¹, and the Greater Manchester Surface Water Management Plan (2013)² in the compilation of this report.
- 2.3.1** This report should be read in conjunction with the Surface Water Design Strategy for the Pavilion and Car Park (report reference: 22051-LE-ZZ-05-RP-D-0001-P03-S2-Redbank Design Strategy) and the North West SuDS Pro-Forma. Both of these documents have been submitted separately in support of the planning application.

¹ JBA Consulting (2019) GMCA Strategic Flood Risk Assessment – Level 1. Available online at: <https://www.greatermanchester-ca.gov.uk/GMCAFiles/PFE/Supporting%20documents/04%20Sustainable%20and%20Resilient%20Places/04.02.01%20GM%20Strategic%20Flood%20Risk%20Assessment%20Level%201%20Report.pdf> [accessed 29.11.2022]

² JBA Consulting (2013) Greater Manchester Surface Water Management Plan. Available online at: <https://www.bury.gov.uk/index.aspx?articleid=11123> [accessed 29.11.2022]

3 SITE SETTING

3.1 Site Description and Location

- 3.1.1 A summary of the site and its characteristics is provided in Table 2: 'Site Location Summary', below.

Table 2: Site Location Summary	
Site Name	Redbank Playing Fields
Site Address	Redbank Playing Field, Unsworth Road, Radcliffe, Manchester, M26 3RF
Site Area (ha)	11.371ha
National Grid Reference	377663 E, 407647 N
Existing Land Use	Recreational
Proposed Land Use	Recreational
Local Planning Authority	Bury Council
Environment Agency Area	North West
Lead Local Flood Authority	Bury Council
Sewer Undertaker	United Utilities

- 3.1.2 A site location plan can be found in the drawings section at the end of this report.
- 3.1.3 The proposed development site is located at Redbank Playing Fields, Unsworth Road, Radcliffe, Manchester. The site is located at approximate National Grid Reference (NGR) 377663 E, 407647 N and the nearest postcode is M26 3RF. The site is bounded by Unsworth Road to the west, Lowe Street to the north, residential properties along Lever Street to the east and Marsden Walk and Grosvenor Street to the south.
- 3.1.4 The development site has an area of approximately 11.371ha comprising of existing grassed playing fields, a small building providing Radcliffe Juniors FC pavilion/ changing facilities and associated car parking and access of Unsworth Close to the south-western corner of the site. The existing impermeable area on the site is approximately 0.09ha.

- 3.1.5** The site has previously been used for landfill, as well as most recently being used as public open space and playing fields.
- 3.1.6** The nearest ordinary watercourse is an unnamed culverted watercourse which crosses through the site. The route of the culverted watercourse is shown on the United Utilities mapping, included within Appendix 2 of this report. Based on this mapping in our discussions with the LLFA, it is clear that there may be other culverted watercourses within the vicinity of the site, but no others are known to cross the site itself. The nearest open channel main river watercourse is the River Irwell which is located approximately 770m south of the site. Other local water features include the Manchester, Boulton and Bury Canal is located approximately 340m south of the site, between the site and the River Irwell.
- 3.1.7** The site topography falls generally from west to east across the site. The minimum ground level recorded on the site is approximately 85.0mAOD at the south-eastern corner of the site, and the maximum ground level is approximately 91.25mAOD close at the north-eastern and the north-western corners of the site. A topographical survey has been undertaken for the site and is included in the drawings section at the end of this report.

3.2 Existing Drainage

- 3.2.1** A CCTV survey has been undertaken of the drainage serving the existing building and hardstanding on the site. The existing foul and surface water from this area, and from the building immediately to the south of the site is collected within a private combined network and connected to the public sewer network within Unsworth Road. Although there are separate surface water and combined drainage networks within Unsworth Street, it appears that both foul and surface water from the developed areas of the site is currently connected into the combined sewer network.
- 3.2.2** Although there is a culverted watercourse and a public surface water sewer on the undeveloped area of the site, as well as the head of a further surface water sewer close to the western boundary of the site, no formal surface water drainage network serving the site itself has been identified. It is therefore, anticipated that flows on the undeveloped areas of the ground will discharge into the ground at greenfield runoff rates. Notwithstanding that assumption, care should be taken when developing on the site to confirm if any drainage network has been installed at the site to serve the historic landfill on the site, and to ensure that any such network is retained/accommodated within the development proposals.

- 3.2.3** Existing surface water runoff rates for the site have been calculated using the greenfield runoff calculator on the UKSUDS website, which uses the IH124 method for calculating runoff from small catchments. The estimated existing runoff rate from the 11.371ha site is 87.53l/s during a QBAR (Average Annual) Rainfall event, 76.16l/s during a 1 in 1 year event and 182.07l/s during a 1 in 100 year rainfall event.
- 3.2.4** In terms of the development proposals, the majority of the site will remain as grassed pitches, and will not be formally connected to a surface water drainage network. Therefore, these areas should be discounted from the site area when calculating the allowable discharge rates from the site. The two areas of the site which will contribute to the site surface water drainage network are the pavilion and car park, and the Artificial Grass Pitch. As outlined in the later sections of this report, these two areas are being developed separately, and will have different outfalls, and therefore, the greenfield runoff rates for the two areas have been calculated separately.
- 3.2.5** The proposed pavilion and car park area of the site has a plan area of approximately 0.33ha. The greenfield runoff for this area has been calculated as being 2.54l/s during a QBAR (Average Annual Rainfall Event), and 2.1l/s and 5.28l/s during a 1 in 1 year and 1 in 100 year events, respectively.
- 3.2.6** The proposed artificial grass pitch has a plan area of approximately 0.82ha. The greenfield runoff for this area has been calculated as being 6.32l/s during a QBAR (Average Annual Rainfall Event), and 5.49l/s and 13.14l/s during a 1 in 1 year and 1 in 100 year events, respectively.
- 3.2.7** Existing greenfield runoff rates can be found in Appendix 3 of this report.
- 3.2.8** Foul water flows from the site are currently contained within the private combined drainage network on the site, prior to a connection into the public sewer network within Unsworth Road. It is anticipated that foul flows from the site will be relatively minor and sporadic due to the nature of the land use.

3.3 Flooding History

- 3.3.1** The site is shown to lie within Flood Zone 1 – ‘Low Probability’ of the Environment Agency’s Indicative Flood Map. A copy of the Environment Agency’s Flood Map can be seen in Appendix 1 – ‘Environment Agency Flood Map for Planning’.

3.3.2 No details of any historical flooding affecting the site have been provided, and the site is not shown to have suffered any previous flooding according to the EA historical flood map outlines.

3.4 Ground Conditions

3.4.1 Geological information made available for the site shows that the site is underlain by made ground, including made ground associated with the landfill operations which have historically taken place at the site. Below/ around the areas of made ground, the site is shown to be underlain by mudstone and coal measures. It is therefore likely that the ground at this location is not suitable for the use of soakaways.

3.4.2 Table 3, below outlines the groundwater vulnerability at this location. The information has been gathered from the Environment Agency website.

Table 3: Summary of Groundwater Information	
Groundwater Source Protection Zone	None
Superficial Deposits Designation	Secondary A
Bedrock Designation	Secondary A
Groundwater Vulnerability Zone	Medium-Low

4 PROPOSED DEVELOPMENT

4.1 Description of Site Proposals

- 4.1.1** The proposed development will consist of a new pavilion building, access and parking, grass pitches and an artificial grass pitch (AGP), at Redbank Playing Field, Unsworth Road, Radcliffe, Manchester, M26 3RF.
- 4.1.2** The proposed area of the AGP pitch will be approximately 0.8204ha, and the area of the pavilion and car park will be 0.33ha, giving a total proposed impermeable area of approximately 1.15ha. This will result in an increased impermeable area of 1.06ha as a result of the proposed development.
- 4.1.3** A copy of the proposed site development plan can be found at the end of this report.

4.2 Vulnerability Classification

- 4.2.1** The Environment Agency Indicative Floodmap shows that the site lies within Flood Zone 1, with respect to Table 1 of the Technical Guidance.
- 4.2.2** The vulnerability class for the proposed development, with respect to Table 2 of the Technical Guidance, is 'water compatible' (outdoor sports and recreation and essential facilities such as changing rooms).
- 4.2.3** Table 3 of the Technical Guidance, 'Flood Risk Vulnerability and Flood Zone Compatibility', shows that all types of development are suitable for siting within Flood Zone 1. The site is therefore suitable for the type of development proposed.

4.3 Sequential and Exception Test

- 4.3.1** The Sequential Test, as set out in the Technical Guidance, aims to steer development to areas with the lowest risk of flooding (ie to steer developments to Flood Zone 1 where possible). Since the development site is located wholly within Flood Zone 1, and following the guidance in Table 3 of the Technical Guidance, the Sequential Test is deemed to have been passed and there is, therefore, no requirement for the Exception Test to be carried out.

4.4 Surface Water Drainage Strategy

- 4.4.1** In line with the Sustainable Drainage Hierarchy, the preferred methods for the disposal of surface water is as follows:

1. Rainwater Re-Use;
2. Discharge to Ground via Soakaway;
3. Discharge to Watercourse;
4. Discharge to Surface Water Sewer;
5. Discharge to Combined Sewer.

4.4.2 It is not anticipated that there will be much scope for rainwater re-use due to the nature of the proposed development (natural and artificial grass pitches and pavilion building). It is not anticipated that rainwater harvesting for use within the buildings (ie for toilet flushing etc) will be practical within the development, given the inconsistent use of the building. Therefore, this method is not considered suitable for use at the site.

4.4.3 No infiltration testing has been carried out at the site, however ground investigation works have confirmed that the site is underlain by made ground (former including landfill) and mudstone, and so is not considered to be suitable for the use of formal soakaways.

4.4.4 There are no open watercourses on or within the vicinity of the site which could potentially provide a suitable point of connection from the development. Therefore, a discharge to open watercourse is not feasible from the site.

4.4.5 Based on the information contained on the UU sewer records, and from discussions with the LLFA, it is understood that a culverted watercourse crosses the site. However, detailed investigations on site have been unable to track the watercourse in the position indicated, or in any similar position crossing the site, which is believed to likely be due to the culvert depth. Based on the site levels and falls, it is considered that it should be possible for the Artificial Grass Pitch to drain to the culverted watercourse, but it is unlikely that the Pavilion and Car Park could drain to this point.

4.4.6 To the west of the site, a surface water sewer is present within Unsworth Road. Based on the sewer records, it is understood that this sewer connects to another culverted watercourse further to the west of the site. This surface water sewer provides a suitable point of connection from the pavilion/ car park drainage, and if required, the pitch drainage could also drain to this point.

4.4.7 Based on the survey information for the existing pavilion, it appears that surface water from this area of the site currently discharges into the combined sewer to the

west of the site, however in line with the SuDS hierarchy it is proposed to establish a new connection to serve the new pavilion and car park into the surface water sewer rather than to reutilise the existing combined sewer connection.

- 4.4.8** Surface water from the site will be discharged at the current QBAR greenfield runoff rate of 6.32l/s for the AGP pitch area, in line with the North West SuDS Pro-Forma for site where the runoff is restricted to a single rate.
- 4.4.9** Additional surface water runoff created as a result of the proposed AGP will be attenuated on site so as not to increase the flood risk to offsite areas. Surface water attenuation requirements for the pitch have been calculated, and approximately 520m³ of storage will be required to accommodate flows from the 1 in 100 year + climate change rainfall event restricted to the QBAR greenfield runoff rate. Indicative proposed surface water attenuation requirement calculations can be found in Appendix 4 of this report, and on surface water drainage strategy drawing at the end of this report, showing the provision of surface water attenuation within the pitch make-up.
- 4.4.10** The drainage from the pavilion and car park has been developed separately, and a separate surface water drainage strategy has been provided. In summary, the surface water drainage is being discharged into the existing surface water sewer to the east of the site at the QBAR greenfield runoff rate of 2.54l/s. Surface water attenuation in excess of this rate is being stored on site for events up to the 1 in 100 year + climate change event. A copy of the surface water drainage strategy for the pavilion and car park, along the accompanying calculations and drawings, can be found in Appendix 5 of this report.
- 4.4.11** It is not anticipated that there will be any offsite flows associated with the grassed pitches, although it should be confirmed if there is any current underdrainage of the existing site associated with the former landfill underlying the site. Any existing drainage should be retained to serve the new grass pitches, as per the existing situation, or accommodated within the site wide drainage schemes, as necessary.

4.5 Foul Drainage Strategy

- 4.5.1** There are no foul flows associated with the proposed pitches, and so no foul drainage connection will be required for the pitch area.
- 4.5.2** The foul drainage serving the proposed pavilion building has been designed by others. It is anticipated based on the drainage layout provided that foul flows will be

directed to the existing combined sewer within Unsworth Road, either via a new connection or utilising the existing connection from the site. A copy of the current drainage proposals for the pavilion can be found in Appendix 5 of this report.

5 FLOOD RISK

5.1 Flood Risk – To the Development

5.1.1 The main sources of flooding are from rivers, tidal waters, high land/ overland runoff, high water tables, sewers/drains, and from artificial sources such as canals or reservoirs.

5.1.2 The presence of a potential flooding source within the vicinity of the site does not necessarily translate into a high risk of flooding. Table 4 (below) summarises the potential flood sources and the related flood risks poses to the site by the various sources.

Table 4: Sources of Flood Risk			
Flood Source	Presence at site?	Potential risk at site (high/ medium/ low)	Description
Fluvial	x		
Tidal	x		
Groundwater	x		
Sewers	x		
Canals	x		
Other Artificial Sources	x		
Pluvial	✓	Low-Medium	
Other	x		

5.1.3 The site is not near to the coast, or within the tidal reaches of any watercourses, and therefore, flooding from this source has been discounted.

5.1.4 Fluvial Flooding

The site is shown to be entirely within Fluvial Flood Zone 1, and therefore the fluvial flood risk to the site is considered to be low.

There are no other open watercourses within the vicinity of the site which are likely to impact on this classification and therefore the fluvial flood risk is considered to be

low, and no mitigation for this flood source will be required as part of the development proposals.

5.1.5 Groundwater

Groundwater flooding can occur anywhere where groundwater levels rise above the ground level. Groundwater flooding is discussed within the SFRA for the Bury council area, and indicates that the 1km grid-square containing the site has a 20-50% risk of groundwater flooding. There is no specific evidence of groundwater flooding affecting the site or the areas within the proximity of the site, and groundwater was not encountered within the ground investigation trial pits/ borehole. In addition, there is no development proposed below ground level, and therefore the impact of any high groundwater levels on the development would be minimal.

5.1.6 Sewers

There are sewers shown to cross the playing field area of the site, but none are shown to cross the pavilion and car park area.

There could, theoretically, be some flooding originating from the sewers crossing the site, however there is no evidence of any such flooding within the SFRA or from any other online sources. Any flooding from these sewers would be likely follow the natural topography of the site and are unlikely to impact on the proposed built development.

There are no known capacity issues with the public combined sewer network, or the private combined drainage network serving the site, and therefore, it is not anticipated that flooding from the combined sewer is likely to impact on the site or the proposed development. The increase in foul flows from the site are likely to be minimal and are not considered likely to have any detrimental impact on the existing drainage network in the area.

Therefore, the risk of flooding from sewers is considered to be low.

5.1.7 Pluvial/ Overland Flow

On land where there is impermeable surfacing or where the ground infiltration capacity is exceeded, there is the potential for surface water runoff to occur. Areas susceptible to surface water flooding are shown on mapping hosted on the Environment Agency website.

The proposed pavilion and car park is not shown to be within an area at risk of surface water flooding, and so the risk is considered to be low-negligible.

There is a surface water flood route shown to cross the area of proposed pitches, which is roughly in line with the route of the culverted watercourse. There is no

flooding shown to affect the site during high risk event. During medium risk events, some shallow flooding of <300mm is shown to cross the site from the middle of the northern boundary to close to the south-eastern corner of the site. During low risk events, a similar route is followed, although the route is wider than during medium risk events, and the depths in some localised areas increases to the 300-900mm banding.

The nature of the use of the pitches would mean that it is unlikely users would be on the pitch during times of heavy rainfall or during flood events, and therefore the associated flood risk is considered to be low.

The access and egress from the site does not pass through areas shown to be at risk of surface water flooding, and so it is considered unlikely that users would be unable to safely leave the site during periods of surface water flooding.

5.1.8 Artificial Sources

The site is not shown to be within an area at risk of reservoir flooding, based on the mapping hosted on the Environment Agency's website.

There are no other artificial sources of flooding which are considered to potentially affect the site, and therefore, the risk posed by artificial sources is considered to be low.

5.2 Flood Risk – From the Development

5.2.1 Floodplain Storage

There is no loss of fluvial floodplain storage, and therefore, there is no requirement to provide any compensatory floodplain storage.

There may be some localised changes to the ground levels to ensure that the pitch surface is relatively level/ gradually graded, however it is not anticipated that there will be any net loss in storage volume should surface water flooding occur.

It is therefore not anticipated that the proposed development would have any detrimental impact on floodplain storage.

5.2.2 Flood Flow Routes

There are no fluvial flood flow routes crossing the site, and therefore it is not anticipated that the development would have any impact on these.

There are surface water flow routes from the north to the south-east along a defined path across the site. The general fall of the site will remain as per the existing falls, and it is not anticipated that the development will have a detrimental impact on the overall surface water flow routes across the site.

5.2.3 Culverts

There is an existing culverted watercourse which crosses the site. It is not proposed to alter the existing culvert in any way, and the new 3G pitch surface will be installed above the existing culvert route. Based on the attempted culvert survey at the site, it is considered that the culvert is deep, and is unlikely to be impacted by the proposed construction works. At the detailed design stage, a construction method statement should be provided to ensure that the works will not result in any damage to the culvert (or the public sewer) which crosses the site, and consents should be obtained from the relevant authorities (the LLFA and United Utilities) prior to any works being commenced.

5.3 Climate Change

5.3.1 In assessing the potential flood risk at the site over the lifetime of the development climate change has been taken into account. Climate change allowances have been based on the guidance provided by the Environment Agency (Published in April 2016) which has been reproduced as Table 5 (below) for the Irwell Management catchment.

Table 5: Recommended national precautionary sensitivity ranges			
Parameter	2020s	2050s	2070s
Peak rainfall intensity (Central allowance)		+25%	+30%
Peak river flow (central allowance)	+12%	+19%	+35%

5.3.2 In assessing the likelihood of flood risk to the site, the development is not shown to be within the 1 in 100 year or 1 in 1000 year flood outlined on the Environment Agency website, or within the outlines used within the SFRA. Where no 1 in 100 year + climate change outlines are available, it is generally accepted practise to use the 1 in 1000 year outlines as a proxy. Therefore, there is no requirement to further assess the fluvial flood risk resulting from an increase in flows due to the climate change.

5.3.3 The projected lifespan of the development is 50 years, which would be until approximately 2072. Therefore, when calculating the required climate change

allowance for the rainfall intensity at the site, the central allowance for the 2070s (2061-2125) range should be used, in accordance with the guidance set out in the NPPF. Peak rainfall intensities have been increased by 30% to allow for climate change during the lifespan of the development.

5.4 Flood Risk Management Measures

- 5.4.1** The site is not shown to be at risk of flooding, and therefore, there is no requirement to raise finished floor levels of the buildings above the modelled flood levels or above the surrounding ground levels. Therefore, it is not considered that there is any requirement to raise the finished floor levels above the normal nominal 150mm above the surrounding ground level.
- 5.4.2** The volume of surface water from the site will be attenuated to maintain existing QBAR greenfield runoff rates from the site, for areas which are served by a formal drainage network. This results in a restricted flow rate from the AGP of 6.32l/s, and from the pavilion and car park, a restricted flow rate of 2.54l/s is proposed.
- 5.4.3** Surface water attenuation is to be provided up to the 1 in 100 year + 30% climate change rate. This results in approximately 520m³ of storage being required for the pitch area. This volume of attenuation is to be provided within the sub-base of the pitch, with the pitch make-up being adjusted to ensure that adequate storage is provided within the voids.
- 5.4.4** Detailed modelling of the drainage network to serve the pavilion and car park has been undertaken, and confirms that surface water attenuation can be provided within a geocellular storage tank under the car park. Approximately 216.6m³ of storage within the tank accommodates the required storage volumes for the catchment area.
- 5.4.5** Table 6 (below) summarises the different SuDS techniques, some of which may be appropriate to the development. The site is believed to be underlain predominantly by made ground, including landfill material, and therefore, the drainage strategy should not include for the use of formal infiltration techniques to dispose of surface water from the site. Other types of Sustainable Drainage Systems (SuDS) may, however, be appropriate for use at the site.

Table 6: Sustainable Drainage System (SuDS) Techniques

Type	SuDS Element/ Device	Description	Potential for Use at the Site
Source Control	Green roof	Green roofs are systems which cover a building's roof with vegetation. They are laid over a drainage layer, with other layers providing protection, waterproofing and insulation.	Potentially suitable for use at the site, subject to roof design details, and maintenance agreements. Not currently proposed for use at the site.
	Infiltration devices	Infiltration devices temporarily store runoff from a development and allow it to percolate into the ground.	Unlikely to be suitable due to anticipated ground conditions and the potential for contamination at the site.
	Pervious surfaces	Pervious surfaces allow rainwater to infiltrate through the surface into an underlying storage layer, where water is stored before infiltration to the ground, reuse, or release to surface water or sewers.	Potentially suitable for the car park area, subject to detailed design and maintenance requirements. Surface water on the artificial grass pitch surface will infiltrate into the underlying pitch sub-base.
	Rainwater harvesting	Rainwater harvesting reduces the amount of runoff from a site by re-using the water for non-potable uses	Unlikely to be suitable, due to low-intermittent need for water supplies

Permeable Conveyance	Filter strips/Rain Gardens	These are wide, gently sloping areas of grass or other dense vegetation that treat runoff from adjacent impermeable areas.	Potentially suitable for use at the site, subject to detailed design and maintenance. Not currently proposed.
	Swales	Swales are broad, shallow channels covered by grass or other suitable vegetation. They are designed to convey and/or store runoff, and can infiltrate the water into the ground (if ground conditions allow).	Potentially suitable for use at the site, subject to detailed design and maintenance. Not currently proposed.
	Filter drains & perforated pipes	Filter drains are trenches that are filled with permeable material. Surface water from the edge of paved areas flows into the trenches, is filtered and conveyed to other parts of the site. A slotted or perforated pipe may be built into the base of the trench to collect and convey the water.	Potentially suitable for use at the site, subject to detailed design and maintenance. Not currently proposed.

Passive treatment/ end of pipe treatment	Infiltration basins	Infiltration basins are depressions in the surface that are designed to store runoff and infiltrate the water to the ground. They may also be landscaped to provide aesthetic and amenity value.	Unlikely to be suitable due to anticipated ground conditions and the potential for contamination at the site.
	Wet ponds	Wet ponds are basins that have a permanent pool of water for water quality treatment. They provide temporary storage for additional storm runoff above the permanent water level. Wet ponds may provide amenity and wildlife benefits.	Potentially suitable for use at the site, subject to detailed design and maintenance. Not currently proposed.
	Constructed wetlands	Constructed wetlands are ponds with shallow areas and wetland vegetation to improve pollutant removal and enhance wildlife habitat.	Potentially suitable for use at the site, subject to detailed design and maintenance. Not currently proposed.
	Underground attenuation	Underground attenuation can be used where other forms of SuDS are not appropriate for the site. Underground attenuation stores water for volumes above the allowable discharge rate and releases the water into the received at the allowable rate.	Potential for use within the site subject to detailed design. Underground surface water attenuation could potentially be provided within the external parking areas. This option is currently shown to serve the pavilion and car park area.

5.4.6 It may be possible to utilize some more natural SuDS option, such as ponds and constructed wetland areas, however, due to the nature of the underlying ground, these would be purely attenuation and not infiltration facilities. Due to the topographical levels across the site falling towards the pavilion and car park areas, there are unlikely to be suitable areas which could be utilized for such facilities, to where the surface water could drain by gravity. The positioning of the pavilion and car park makes use of the existing site access and the general form and layout of the existing site. Therefore, it is not considered a suitable alternative site layout option to relocate these to topographically higher areas of the site.

5.5 Pollution Hazard Index

5.5.1 The table below has been extracted from the SuDS Manual, Table 26.2. The grass and artificial grass pitches are considered to be low risk, as are the pavilion roof and

car park (non-residential car parking with infrequent change). Some simple mitigation measures will therefore be required to ensure that surface water flows from the site do not present an unacceptable pollution risk to the downstream surface water catchment.

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

5.5.2 Table 7 (below) presents a water quality risk assessment and outlines the likely proposal in respect of the required mitigation measures, in line with the SUDS manual and the NPPF.

Table 7: Water Quality Risk Assessment and Mitigation

Pollution Hazard Indices				
	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
non-residential car parking with infrequent change	Low	0.5	0.4	0.4
SuDS Mitigation Indices				
<i>Bypass Separator (SPEL figures)</i>	First Level x 1.0	0.8	0.6	0.9
<i>Residual Impact</i>		+0.3	+0.2	+0.5

5.5.3 No treatment is generally required for roof areas, and therefore, only the car park areas should be connected into the Bypass Separator. Therefore, based on the current drainage proposals for the pavilion and car park it is considered that sufficient levels of treatment will be provided within the drainage network.

5.6 Surface Water Management and Maintenance

5.6.1 A management and maintenance plan will be provided at the detailed design stage, once the details of the network have been confirmed. At this stage, it is anticipated that the maintenance of any drainage within the site will be the responsibility of the site owners.

6 RESIDUAL RISKS

- 6.1** There is always a possibility of a flood in excess of that allowed for which might conceivably cause some flooding to the development. However, such an event would have a very low probability and the risk of flooding to development would be extremely small. It is therefore considered that the residual risks associated with flooding are not significant.

7 CONCLUSIONS

- 7.1** This report gives details of the Flood Risk Assessment, which has been carried out in relation to the proposed development site.
- 7.2** The site falls within Flood Zone 1 of Table 1 of the Technical Guidance, and the vulnerability class of the proposed development is 'water compatible'. Table 3 of the Technical Guidance indicates that sites classified as Flood Zone 1 are suitable for all vulnerability classes of development, and therefore are suitable for the development proposed.
- 7.3** The Strategic Flood Risk Assessment for the Greater Manchester Combined Authority which covers the proposed development site does not indicate any other sources of flooding likely to affect the site.
- 7.4** There are no local site specific risks that would adversely affect this categorisation. Similarly, there are considered to be no significant increased offsite flooding risks as a result of the development. The site is therefore considered suitable for the type of development proposed.

APPENDICES

Appendix 1
Environment Agency Flood Map for Planning

Flood map for planning

Your reference
22-242

Location (easting/northing)
377750/407709

Created
2 Dec 2022 11:13

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following:**

- bigger than 1 hectare (ha)
- In an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

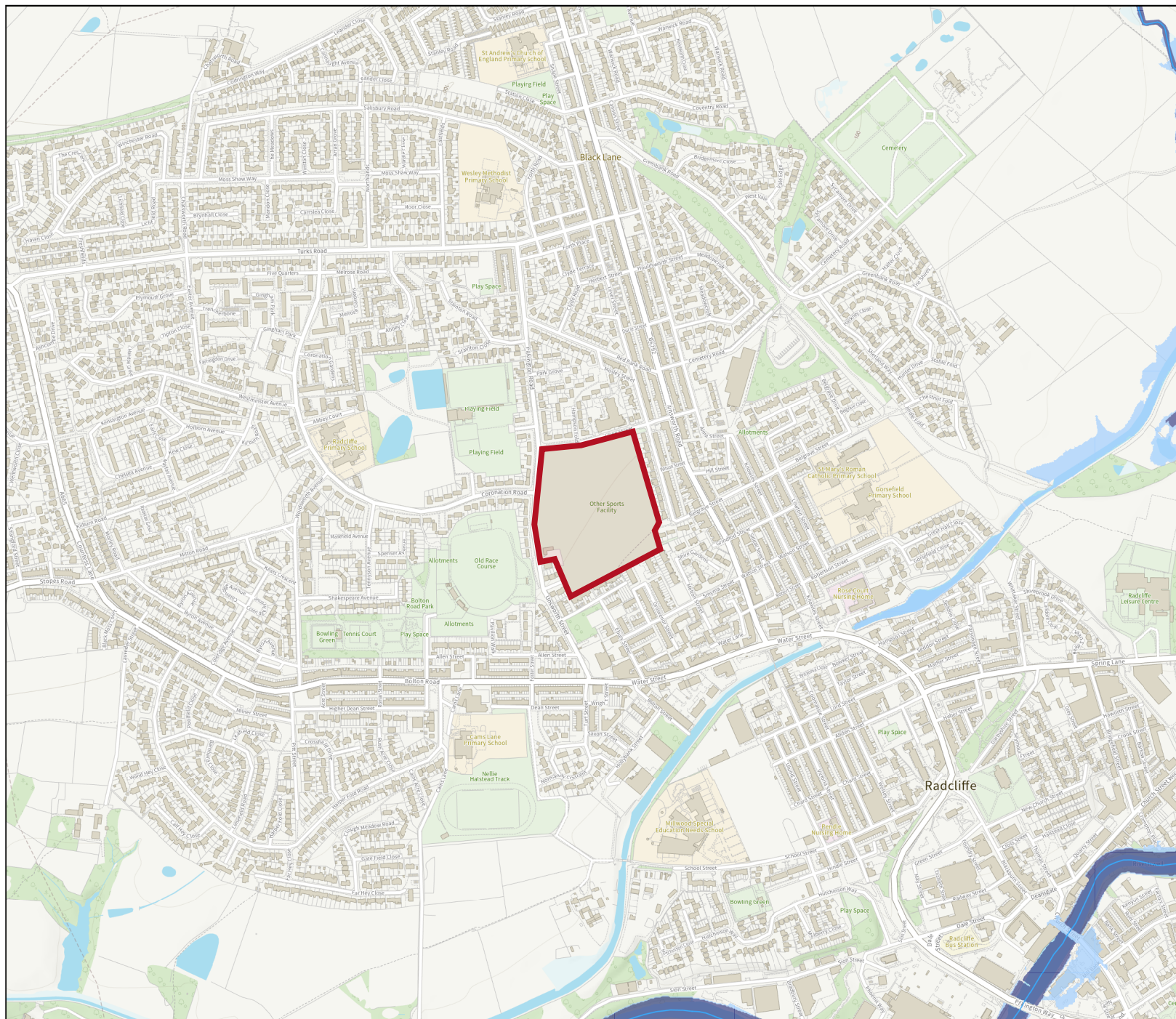
Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence **which** sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

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Flood map for planning

Your reference
22-242

Location (easting/northing)
377750/407709

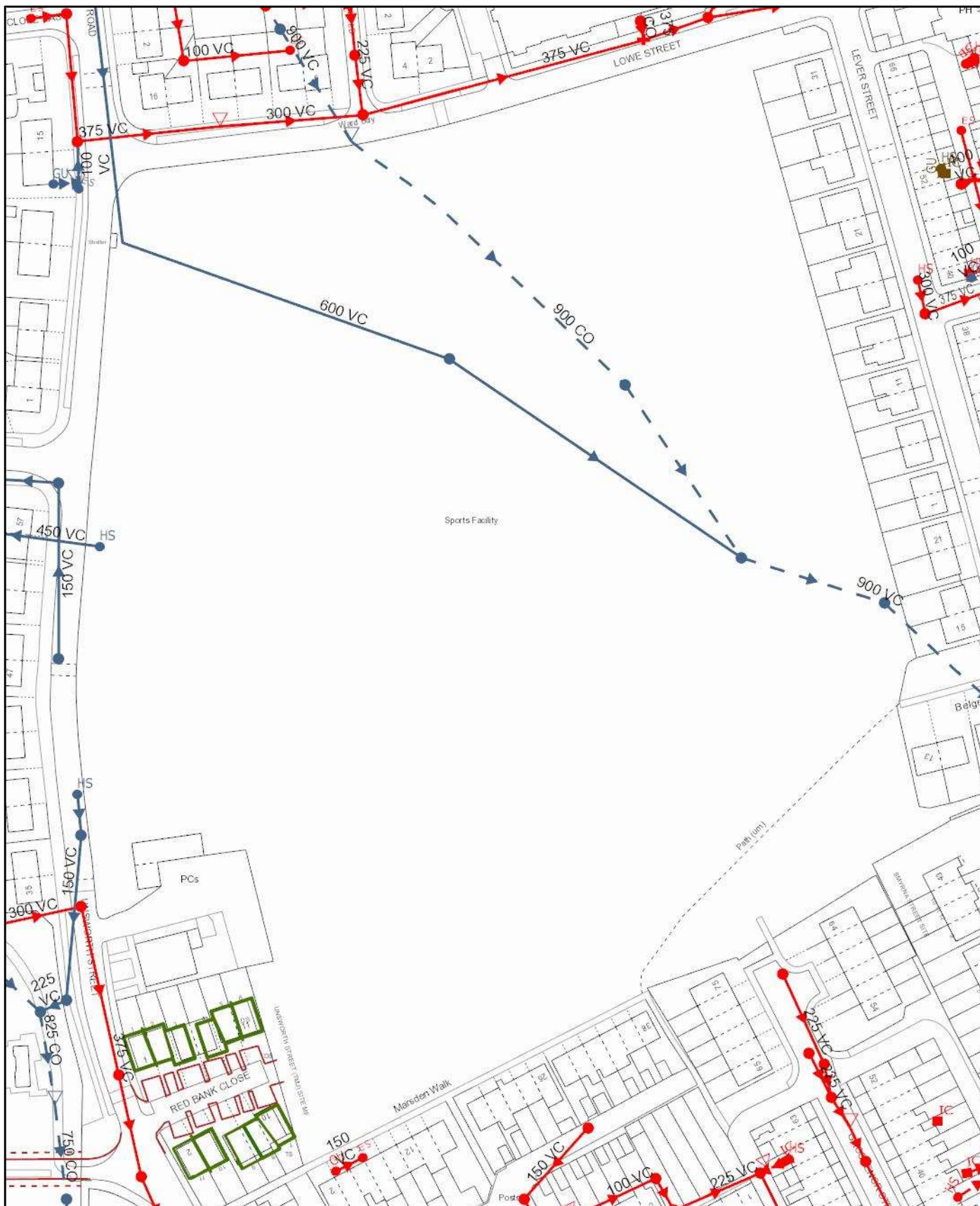
Scale
1:10000

Created
2 Dec 2022 11:13

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area


0 100 200 300m

Appendix 2
United Utilities Sewer Mapping



Scale: 1:1418
Date: 26/01/2021

SEWER RECORDS

Address or Site Reference: Redbank Playing Fields Manchester
Printed by: Property Searches

 **United Utilities**
Water for the North West

The position of the underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown.

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Appendix 3
Greenfield Runoff Rates

[Print](#)[Close Report](#)

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Nicola Dibble
Site name:	Redbank Playing Fields
Site location:	Radcliffe

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.

Site Details

Latitude:	53.56555° N
Longitude:	2.33809° W
Reference:	2839983187
Date:	Nov 29 2022 11:07

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 11.371

Methodology

Q _{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

Default Edited

SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

Default Edited

SAAR (mm):	1043	1043
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 ≤ 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):	87.53	87.53
1 in 1 year (l/s):	76.16	76.16
1 in 30 years (l/s):	148.81	148.81
1 in 100 year (l/s):	182.07	182.07
1 in 200 years (l/s):	207.46	207.46

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.

[Print](#)[Close Report](#)

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by: Nicola Dibble

Site name: Redbank Playing Fields

Site location: Radcliffe

Site Details

Latitude: 53.56525° N

Longitude: 2.3377° W

Reference: 2926506268

Date: Jun 07 2022 14:06

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): 0.8204

Methodology

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

SPR estimation method: Calculate from SOIL type

Soil characteristics

Default Edited

SOIL type: 4 4

HOST class: N/A N/A

SPR/SPRHOST: 0.47 0.47

Hydrological characteristics

Default Edited

SAAR (mm): 1043 1043

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): 6.32 6.32

1 in 1 year (l/s): 5.49 5.49

1 in 30 years (l/s): 10.74 10.74

1 in 100 year (l/s): 13.14 13.14

1 in 200 years (l/s): 14.97 14.97

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Calculated by:	Nicola Dibble
Site name:	Pavilion+CP
Site location:	Redbank

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.

Site Details	
Latitude:	53.56492° N
Longitude:	2.33874° W
Reference:	2940795181
Date:	Sep 23 2022 10:23

Runoff estimation approach **IH124**

Site characteristics

Total site area (ha): 0.3167

Methodology

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

SPR estimation method: Calculate from SOIL type

Soil characteristics Default Edited

SOIL type: 4 4

HOST class: N/A N/A

SPR/SPRHOST: 0.47 0.47

Hydrological characteristics Default Edited

SAAR (mm): 1043 1043

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): 2.44 2.44

1 in 1 year (l/s): 2.12 2.12

1 in 30 years (l/s): 4.14 4.14

1 in 100 year (l/s): 5.07 5.07

1 in 200 years (l/s): 5.78 5.78

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Appendix 4
Surface Water Attenuation Calculations (Artificial Grass Pitch)

Attenuation Estimates



Minimum Storage Required: **519 m³** incl cc allowance

FACTOR	VALUE	SOURCE
Return Period (yrs):	100	Environment Agency, Water Authority, etc.
Limiting Discharge (l/s):	6.32	Environment Agency, Water Authority, etc.
Contributing Area (ha):	0.8204	Site plans
Impervious, PIMP (%):	100	Site plans
M5-60min (mm):	17	Volume 3 maps and site location
SAAR (mm/yr):	1043	Volume 3 maps and site location
Ratio, r:	0.3	Volume 3 maps and site location
Soil Type:	4	Volume 3 maps and site location
SOIL:	0.45	Soil Type and Volume 1, Section 7.4
UCWI:	116	SAAR and Volume 1, Figure 9.7
Calculated PR	82.47	
Percentage Runoff =	100.00	

FACTOR	VALUE
Additional Inflow (l/s):	0
Calculate/Specify PR:	Specify
Specify PR:	100
Climate Change Allowance	30

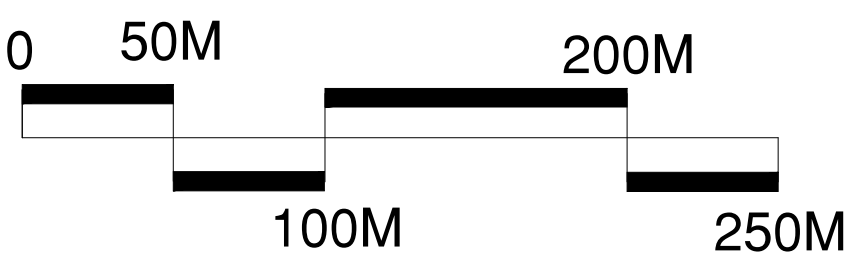
Duration, D (min)	M5-60 (mm)	Z1 for r=0.30	M5-D (mm)	Z2 for M100	M100-D (mm)	incl climate change	Area C (ha)	PR (%)	Runoff (m3)	Add. Runoff (m3)	Total Runoff (m3)	Limiting Discharge (m3/min)	Limiting Runoff (m3)	Storage Required (m3)
5	17	0.34	5.8	1.81	10.5	13.6	0.82	100	111.8	0.0	111.8	0.38	1.9	109.9
10	17	0.50	8.5	1.89	16.0	20.8	0.82	100	171.0	0.0	171.0	0.38	3.8	167.2
15	17	0.60	10.2	1.91	19.5	25.3	0.82	100	207.8	0.0	207.8	0.38	5.7	202.1
30	17	0.78	13.3	1.96	26.0	33.8	0.82	100	276.9	0.0	276.9	0.38	11.4	265.5
60	17	1.00	17.0	2.01	34.1	44.3	0.82	100	363.7	0.0	363.7	0.38	22.8	341.0
120	17	1.29	21.9	2.02	44.3	57.6	0.82	100	472.9	0.0	472.9	0.38	45.5	427.4
240	17	1.60	27.2	1.99	54.2	70.5	0.82	100	578.4	0.0	578.4	0.38	91.0	487.4
360	17	1.79	30.4	1.97	59.9	77.9	0.82	100	639.3	0.0	639.3	0.38	136.5	502.8
480	17	1.97	33.5	1.95	65.2	84.7	0.82	100	695.1	0.0	695.1	0.38	182.0	513.1
600	17	2.15	36.6	1.91	70.0	90.9	0.82	100	746.1	0.0	746.1	0.38	227.5	518.6
720	17	2.19	37.2	1.91	71.3	92.6	0.82	100	760.0	0.0	760.0	0.38	273.0	487.0
840	17	2.24	38.1	1.91	72.6	94.4	0.82	100	774.1	0.0	774.1	0.38	318.5	455.6
1440	17	2.81	47.8	1.83	87.2	113.4	0.82	100	930.3	0.0	930.3	0.38	546.0	384.3
2880	17	3.50	59.5	1.74	103.6	134.7	0.82	100	1105.4	0.0	1105.4	0.38	1092.1	13.3

Appendix 5
Outline Drainage Strategy (Pavilion and Car Park)

DRAWINGS

Redbank Playing Fields

Artificial Grass Pitch

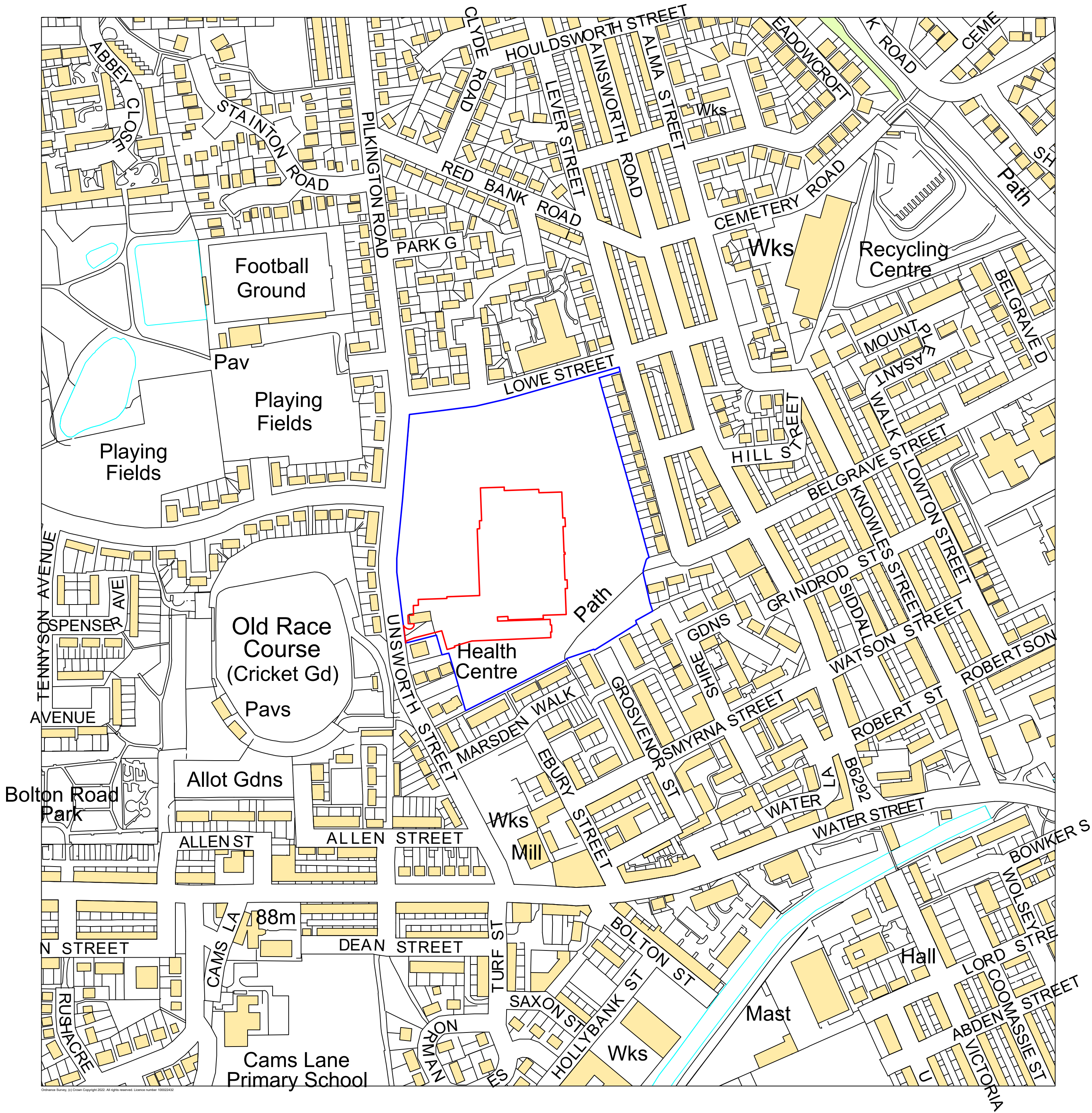




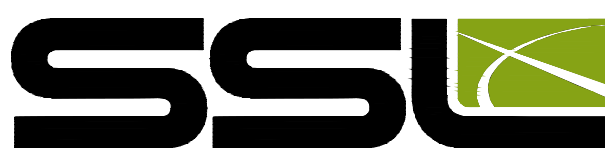
CONSULTANTS
Surfacing Standards Limited
Office 3, Emington House
Aston Road, Loughborough, LE11 8NY
01530 400 012

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02	PLANNING ISSUE	ME	WB	28.11.22
01	PLANNING ISSUE	ME	WB	26.08.22
00	PLANNING ISSUE	ME	WB	10.05.22
REV	DESCRIPTION	REV	CK	DATE



Surfacing Standards Limited
SPORTS PITCH CONSULTANTS



AUTHOR
ME

TITLE
Redbank Playing Fields
Artificial Grass Pitch
Site Location Plan

PROJECT	SCALE	SIZE
CLS017	1:2500	A1
DRAWING No	REVISION	
02	02	



GENERAL NOTES

This drawing is to be read and printed in full colour.

SURVEY NOTES

1. This plan should only be used for its original purpose. Brightsurv Ltd accepts no responsibility if supplied to any other party than the original client.
2. Certain areas of the site may have been inaccessible due to dense vegetation, vehicles etc on site at the time of survey, therefore not all services may be identified on the survey drawing.
3. Information Shown outside of the site boundary has been taken from Ordnance Survey records and would need verification to be relied upon.
4. The spread of vegetation shown is approximate only. Where canopy spread is critical then this shall be regularly checked. Generally only trees with a spread greater than 2.0m will be shown on the drawing.
5. Where the identity of a service is shown this is based on a visual id only. Where specific identification is required then additional survey work shall be undertaken.
6. Dimensions shown are in millimetres and levels in metres unless indicated.

Levels Levels relate to GPS observations.

LEGEND KEY

- | | | |
|-----------------------------|-----------------------|----------------------|
| AV Air Valve | FL Floor Level | RE Rodding Eye |
| B Bollard | FLI Flood Light | RL Ridge Level |
| BH Borehole | FW Foul Water | RS Road Sign |
| BL Bed Level | G Gully | RWP Rainwater Pipe |
| BS Bus Stop | GV Gas Valve | St Stump |
| BT BT Cover | HT Height | SL Soffit Level |
| BW Brick Wall | IC Inspection Chamber | SV Stop Valve |
| CATV Cable TV Cover | IL Invert Level | SVP Soil & Vent Pipe |
| CIB Close Boarded | IR Iron Railing | SW Surface Water |
| CL Chain Link | KO Kerb Outlet | SW Stone Wall |
| CL Cover Level | LB Letter Box | THL Threshold Level |
| Col Column | LP Lamp Post | TL Traffic Light |
| CRW Concrete Retaining Wall | Mh Manhole | TP Telegraph Pole |
| CW Concrete Wall | Mk Marker Post | US Underside |
| CPI Catch Pit | NP Name Plate | UTL Unable To Lift |
| DPC Damp Proof Course | OH Overhead | VP Vent Pipe |
| Dr Drain | P Post | WL Water Level |
| EL Eaves Level | PI Pipe | WM Water Meter |
| ER Earth Rod | PJR Post & Rail | WO Wash Out |
| EP Electricity Pole | PWW Post & Wire | WT Water Tap |
| FH Fire Hydrant | PL Parapet Level | |

- | | |
|-------------------|--|
| Building | |
| Vegetation | |
| Control Station | |
| Bush/Shrub | |
| Tree | |
| Tree (Multi-Bolt) | |
| Gate | |

- | | |
|---------------|--|
| Tree Canopy | |
| Fence | |
| Boundary | |
| Contours | |
| OH Telecom | |
| OH Electric | |
| Foul Water | |
| Surface Water | |

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Contact: Richard@brightsurv.co.uk
Tel: 07843 411 341

Client Surfacing Standards Ltd

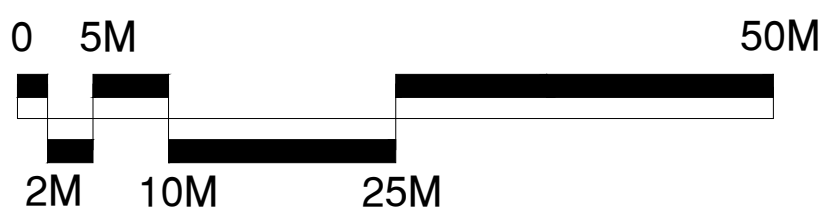
Project Redbank Playing Field
Manchester

Title Topographical Survey

Scale at A1	1:500	Drawn by	RB	Checked by	RB	Date	March 2022
Status	For Information	Project ref	BRI458	Drawing no.	T01	Revision	A

Redbank Playing Fields

Artificial Grass Pitch



LOWE ST

Surfacing Standards Limited
SPORTS PITCH CONSULTANTS

CONSULTANTS
Surfacing Standards Ltd
Office 2, Springfield House
Aston Road, Loughborough, LE11 8NY
01530 400112

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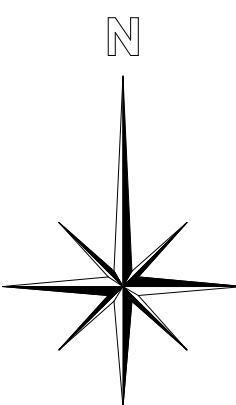
- Artificial Turf Playing Area
- Footpaths & Hard Standing Areas
- 4.5m High Fence Line
- 3.0m High Fence Line
- 2.0m High Fence Line
- 1.2m High Fence Line
- 0.00 Proposed AGP Levels to outer 0.3m mowing margin

Notes:

106x70m Artificial Grass Pitch

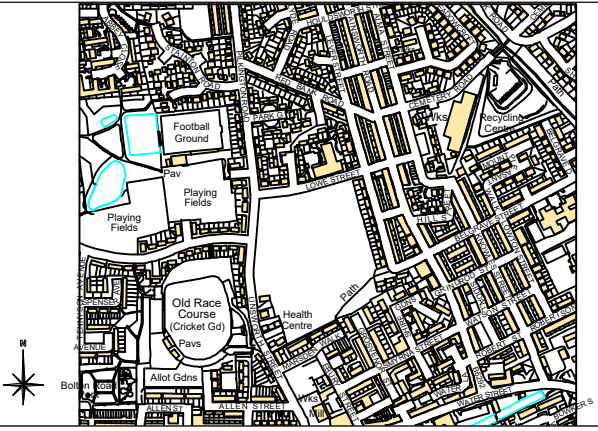
Line Markings:

- 1Nr. 100x64m 11v11 (white)
- 2Nr. 54.8x46m 9v9 (blue)
- 2Nr. 55x37m 7v7 (yellow)
- 4Nr. 5v5 37x27m (red)
- 4Nr. 47x30m Training Grids (red)



06	PLANNING ISSUE	ME	WB	29.11.22
05	PLANNING ISSUE	ME	WB	09.11.22
04	PLANNING ISSUE	ME	WB	26.08.22
03	PLANNING ISSUE - Floodlights Moved 4m	ME	WB	11.08.22
02	PLANNING ISSUE	ME	WB	21.06.22
01	PLANNING ISSUE	ME	WB	26.05.22
00	PLANNING ISSUE	ME	WB	10.05.22
REV	DESCRIPTION	REV	CK	DATE

Surfacing Standards Limited
SPORTS PITCH CONSULTANTS



AUTHOR		ME	
TITLE			
Redbank Playing Fields			
Artificial Grass Pitch			
Proposed Site Plan			
PROJECT		SCALE	SIZE
CLS017		1:500	A1
DRAWING No		REVISION	
03		06	

Natural 91x55m
11v11 Football Pitch

Natural 82x50m 11v11
Football Pitch

Natural grass pitches
goal storage area

6Nr. Artificial pitch
goal storage area

6Nr. 15m high
floodlighting column

Artificial Grass Pitch

1:8 batters down to
existing levels

Note that levels shown are to
outer 0.3m run off areas

AGP batters down to existing levels. Area needs
to be raised by others to tie in with proposed car
park levels (cut/fill and earthworks by others).

'Respect' spectator
hardstanding

Pavilion

Car park to accommodate 82
spaces, 5 DDA compliant
spaces and 2 minibus spaces

ce
e
Gd)

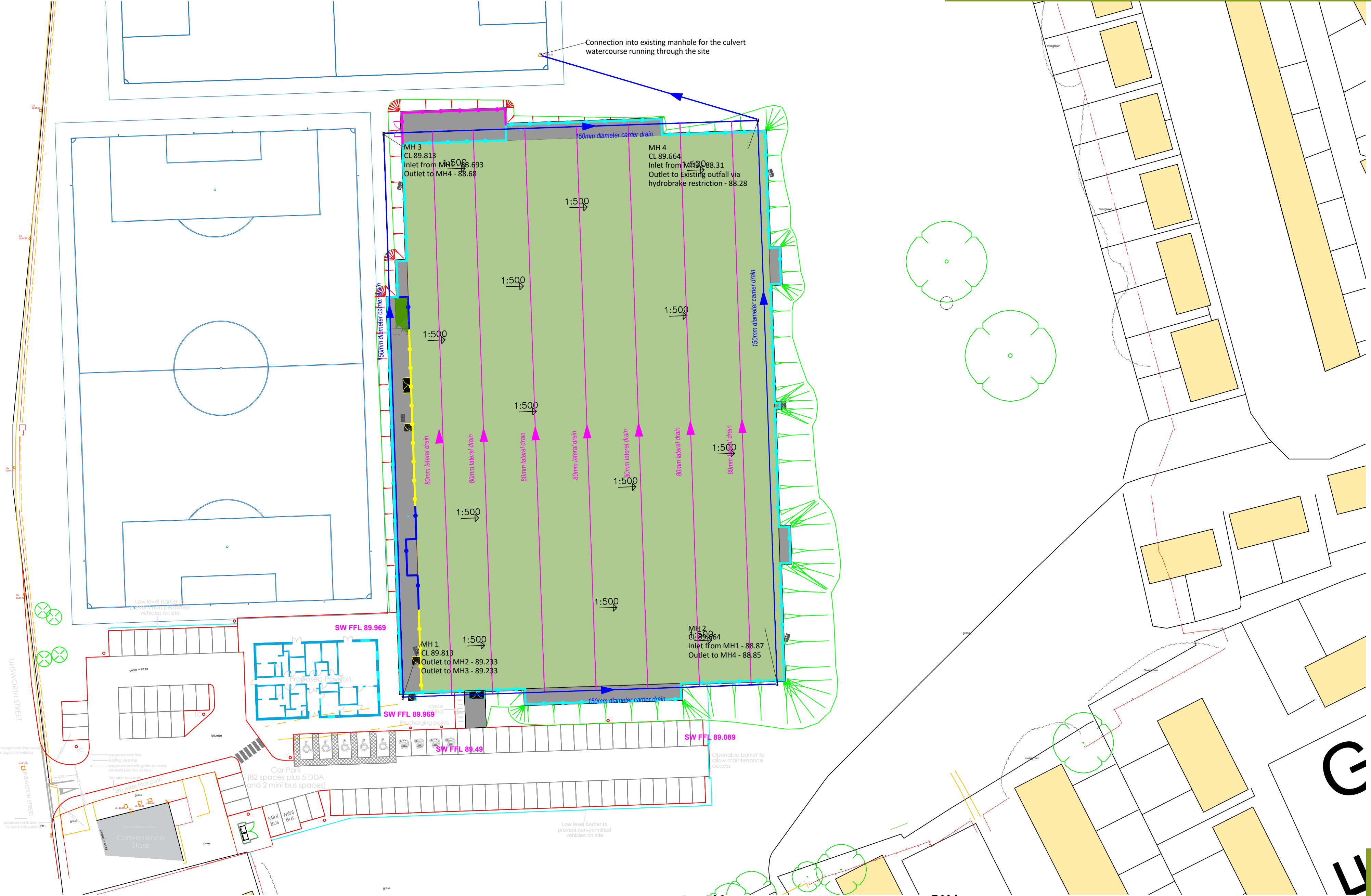
GDN
SHIRE

Redbank Playing Fields

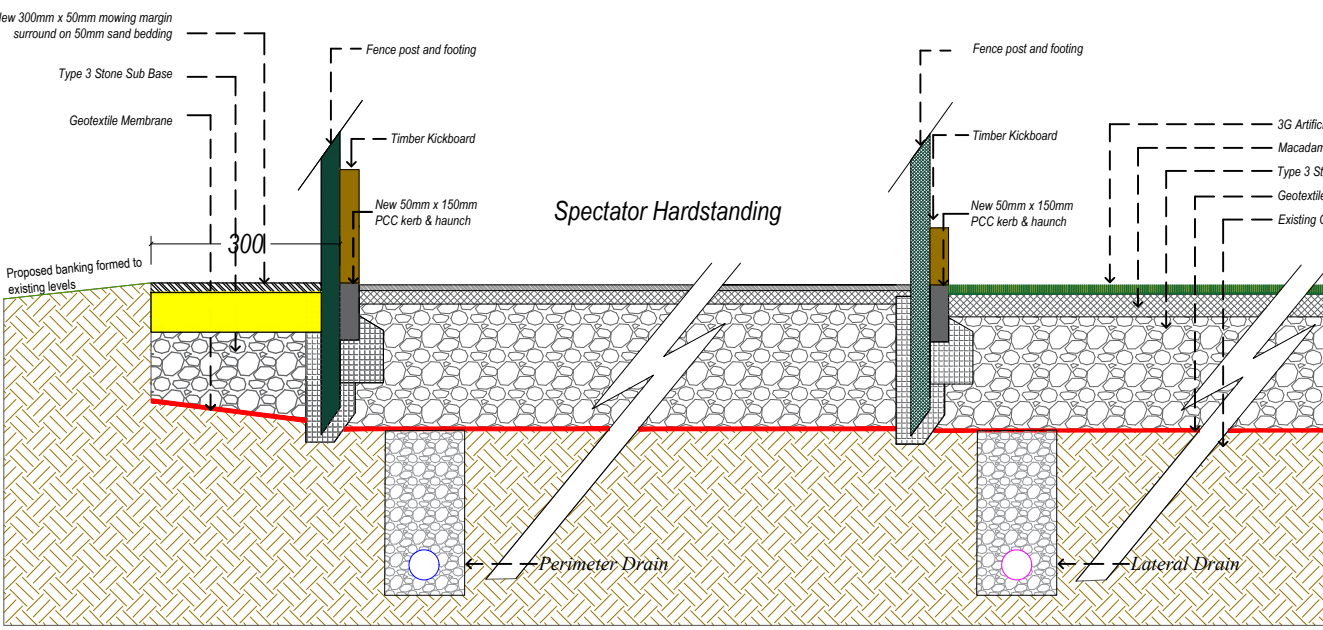
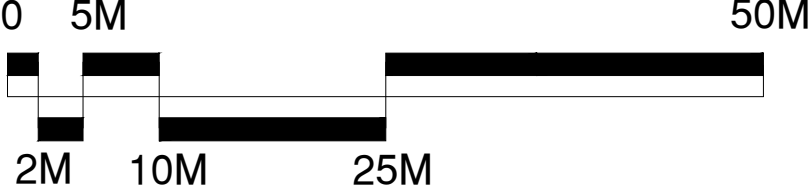
Artificial Grass Pitch



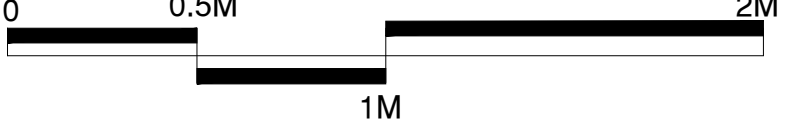
Race
rse



Drainage Scheme - Scale 1:500



AGP Makeup Section - Scale 1:20





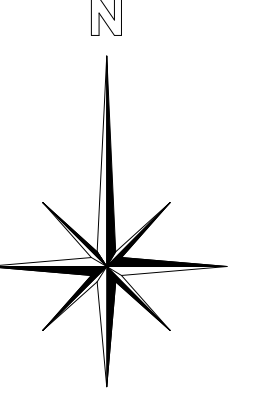
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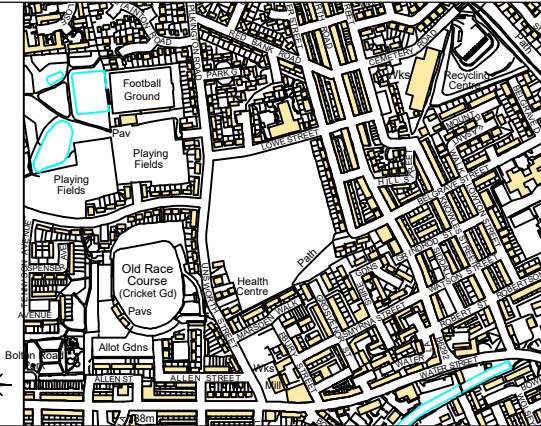
80mm Lateral Drain
150mm Carrier Drain
Drainage Design By Others



02	PLANNING ISSUE	ME	WB	28.11.22
01	PLANNING ISSUE	ME	WB	11.10.22
00	PLANNING ISSUE	ME	WB	21.06.22
REV	DESCRIPTION	REV	CK	DATE



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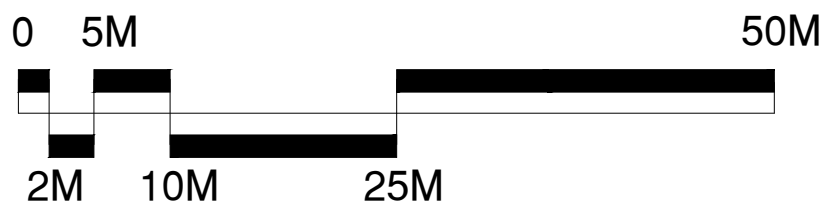
AUTHOR
ME

TITLE
Redbank Playing Fields
Artificial Grass Pitch
Proposed AGP Drainage Layout

PROJECT	SCALE	SIZE
CLS017	Varies	A1
DRAWING No 07		REVISION 02

Redbank Playing Fields

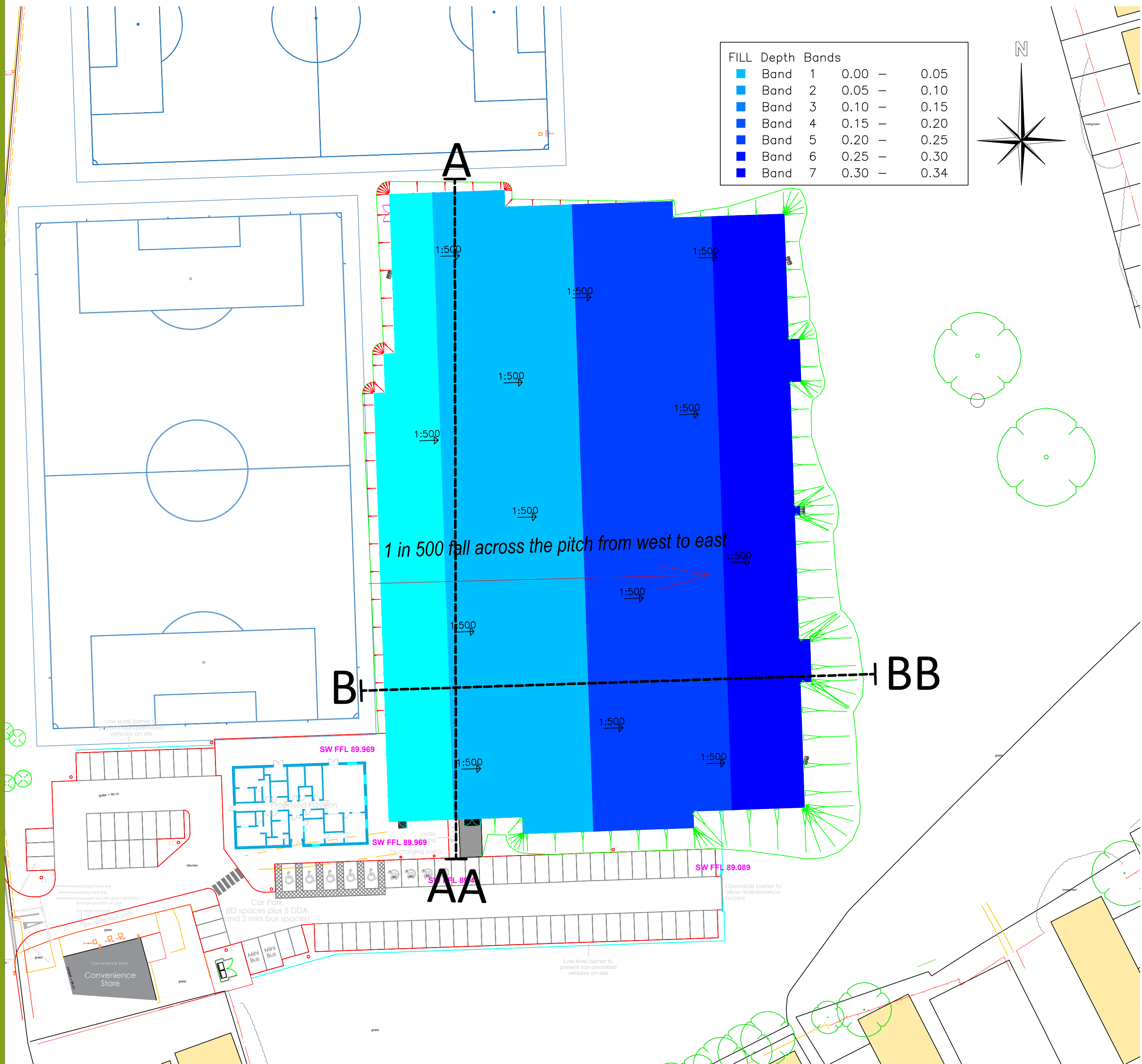
Artificial Grass Pitch



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Attenuation Scheme

Surface Water Drainage Design
The proposed design of the AGP development is for a permeable surface construction. The surface of the synthetic turf area shall be permeable with the underlying stone sub-base acting as an attenuation/storage area for surface water. The stone base will act as an attenuation system to increase attenuation capabilities of the playing field area. This is combined with a perforated drainage system being installed underneath the pitch base to connect to the existing outfall chamber at the south east of the development site.

It is intended that a positive drainage scheme (land drainage); shall be installed beneath the development area comprising UPVC perforated carrier and lateral pipe drains.

The granular pitch substrate (typically consisting of Type 3 unbound (SHW 800 Series) to comply with BSEN 13285) is intended to provide onsite containment and attenuation within the granular sub-base, before surface water enters an outfall.

The designed surface water drainage solution should be based upon the following criteria, to maintain satisfactory system performance:

- Provide adequate functionality over a period of twenty years.
- Ensure that surface water is removed from the surface area at a rate necessary to prevent surface flooding experienced during acute rainstorms and to ensure the facility will not be lost through rain at the highest intensity which may be expected to occur either once every five years or through continuous rainfall of 50mm over a 24 hour period.
- Ensure that surface water is effectively removed from the facility construction to ensure that load bearing capacity of the substrate is not weakened by an increase in moisture content or becomes more susceptible to frost damage.
- Protect the installation from influences of groundwater or surface water from surrounding areas.
- Prevent the risk of uncontrolled flooding elsewhere (to land adjacent to the development).
- Comply with all applicable Sustainable Urban Drainage System (SUDS) requirements with attenuated flows (containment within the granular pitch sub-base) incorporated wherever necessary, without affecting the performance of the pitch.

Only natural surface water is being dealt with. The new development will not increase to the volume of water that the existing site area is currently subjected to.

The area is in a Category 1 flood zone and as such is at a low risk of flooding. Water discharging from the playing field area currently reaches the existing surface water drainage system, without any control or restrictions.

The collector drainage pipe to the synthetic pitch will connect to the existing surface water chamber within the site with a restricted outfall rate.

The proposed restricted outfall rate is 2 l/s and calculations have been based on a 1 in 100 year storm event with a 40% allowance for climate change. The surface water attenuation calculations as per the table below show the following:

- 1 in 100 year storm event + 40% allowance for climate change at run off restricted to 6.32 l/s - would require 435m³ of attenuation

The foundations of the new synthetic turf area (shown in drawing 'LANO-CLS-016-07 - Proposed AGP Drainage Layout') includes:

- 250mm deep layer of type 3 stone
- 40mm macadam
- 40mm infill of sand and rubber on the carpet

The minimum 330mm deep aggregate foundation offers a void space of 37% in which to attenuate surface water, prior to filling and flooding the pitch surface or surrounding grassed areas. The available volume of the attenuation is created through the following calculations:

- The pitch layer constructed at a 1 in 350 gradient offers a volume and capacity of 1605m³
- Based on a voidage space of 37% this offers 593m³ of water attenuation.
- The drainage system, shown in drawing 'CLS-LANO-016-07 - Proposed AGP Drainage Layout', can also attenuate an additional 70m³

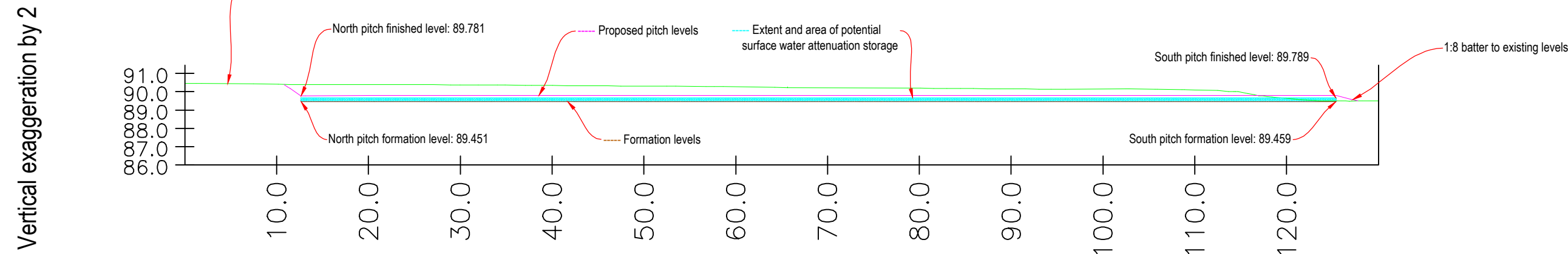
Therefore, the attenuation provided by the pitch design will attenuate 663m³, comfortably catering for a 1 in 100 storm event +40% (435m³) without flooding either the pitch surface or surrounding areas

Minimum Storage Required: 435 m³ incl cc allowance

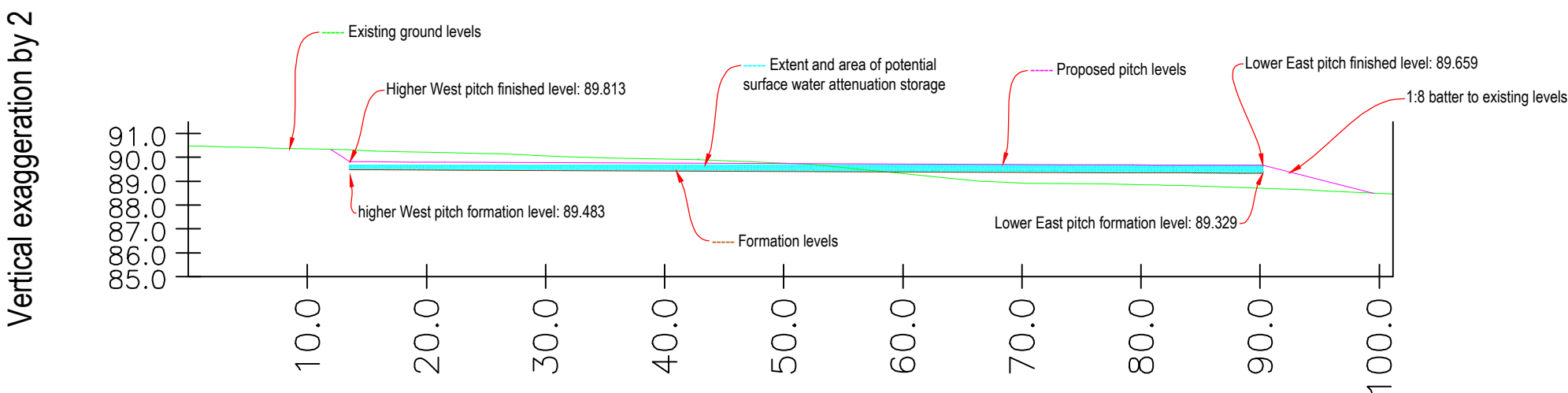
FACTOR	VALUE	SOURCE
Return Period (yrs):	100	Environment Agency, Water Authority, etc.
Limiting Discharge (l/s):	6.32	Environment Agency, Water Authority, etc.
Contributing Area (ha):	0.8204	Site plans
Impervious, PIMP (%):	100	Site plans
M5-60min (mm):	17	Volume 3 maps and site location
SAAR (mm/yr):	1043	Volume 3 maps and site location
Ratio, r:	0.3	Volume 3 maps and site location
Soil Type:	4	Volume 3 maps and site location
SOIL:	0.45	Soil Type and Volume 1, Section 7.4
UCWI:	116	SAAR and Volume 1, Figure 9.7
Calculated PR	82.47	
Percentage Runoff =	82.47	

FACTOR	VALUE
Additional Inflow (l/s):	0
Calculate/Specify PR:	Calculate
Specify PR:	100
Climate Change Allowance	40

Duration, D (min)	M5-60 (mm)	Z1 for r=0.30	M5-D (mm)	Z2 for M100	M100-D (mm)	incl climate change	Area C (ha)	PR (%)	Runoff (m3)	Add. Runoff (m3)	Total Runoff (m3)	Limiting Discharge (m3/min)	Limiting Runoff (m3)	Storage Required (m3)
5	17	0.34	5.8	1.81	10.5	14.7	0.82	82	99.3	0.0	99.3	0.38	1.9	97.4
10	17	0.50	8.5	1.89	16.0	22.4	0.82	82	151.9	0.0	151.9	0.38	3.8	148.1
15	17	0.60	10.2	1.91	19.5	27.3	0.82	82	184.5	0.0	184.5	0.38	5.7	178.9
30	17	0.78	13.3	1.96	26.0	36.3	0.82	82	245.9	0.0	245.9	0.38	11.4	234.6
60	17	1.00	17.0	2.01	34.1	47.7	0.82	82	323.0	0.0	323.0	0.38	22.8	300.3
120	17	1.29	21.9	2.02	44.3	62.1	0.82	82	420.0	0.0	420.0	0.38	45.5	374.5
240	17	1.60	27.2	1.99	54.2	75.9	0.82	82	513.8	0.0	513.8	0.38	91.0	422.8
360	17	1.79	30.4	1.97	59.9	83.9	0.82	82	567.9	0.0	567.9	0.38	136.5	431.3
480	17	1.97	33.5	1.95	65.2	91.2	0.82	82	617.3	0.0	617.3	0.38	182.0	435.3
600	17	2.15	36.6	1.91	70.0	97.9	0.82	82	662.7	0.0	662.7	0.38	227.5	435.1
720	17	2.19	37.2	1.91	71.3	99.8	0.82	82	675.0	0.0	675.0	0.38	273.0	402.0
840	17	2.24	38.1	1.91	72.6	101.6	0.82	82	687.5	0.0	687.5	0.38	318.5	369.0
1440	17	2.81	47.8	1.83	87.2	122.1	0.82	82	826.3	0.0	826.3	0.38	546.0	280.2
2880	17	3.50	59.5	1.74	103.6	145.1	0.82	82	981.8	0.0	981.8	0.38	1092.1	-110.3



Section A-AA Showing Surface Water Attenuation Storage



Section B-BB Showing Surface Water Attenuation Storage

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AUTHOR
ME

TITLE
Redbank Playing Fields
Artificial Grass Pitch
Proposed AGP Drainage Strategy

PROJECT CLS017	SCALE 1:500	SIZE A1
DRAWING No 08	REVISION 02	