

# Flood Risk Assessment & Drainage Strategy

Tor Bridge Primary & Cann Bridge Spatial  
Reorganisation Strategy



For: Inspire Multi Academy

Ref: 32344-BPC-XX-XX-RP-D-52-10

Project No: 32344

Date: February 2021

## Document Status

<i>Issue</i>	<i>Issue date</i>	<i>Status</i>	<i>Author</i>	<i>Checked</i>	<i>Approved</i>
A	12/02/2020	First Issue	KT	JM	MJH

This document has been prepared by BSW Consulting (Exeter) Limited (BSW) in its professional capacity as consultants in accordance with their Standard Terms of Appointment with the commissioning party (the "Client"). Regard should be had to those Terms when considering and/or placing any reliance on this document.

Any advice, opinions, or recommendations within this document (a) should be read and relied upon only in the context of the document as a whole; (b) do not, in any way, purport to include any manner of legal advice or opinion; (c) are based upon the information made available to BSW at the date of this document and on relevant standards, codes, technology and construction practices at the date of this document. It should be noted and it is expressly stated that no independent verification of any of the documents or information supplied to BSW has been made. No liability is accepted by BSW for any use of this document, other than for the purposes for which it was originally prepared and provided.

This document has been prepared for the exclusive use of the Client and unless otherwise agreed in writing by BSW, no other party may use, make use of or rely on the contents of this document. This report is the copyright of BSW and must not be copied or reproduced without their permission.

## Contents

<b>Introduction and Brief</b>	<b>3</b>
<b>Existing Site Description</b>	<b>4</b>
<b>Existing Drainage Arrangement</b>	<b>6</b>
<b>Existing Risk of Flooding</b>	<b>6</b>
<b>Proposed Drainage Provisions</b>	<b>7</b>
<b>Residual Flood Risk and Overland Exceedance Flooding</b>	<b>9</b>
<b>Conclusions</b>	<b>9</b>
Appendix A	10
Site Plan	10
Proposed Plans	10
Appendix B	11
Extract of EA Flood Map	11
EA Critical Drainage Areas	11
SWW Asset Mapping	11
Existing Drainage Plans	11
Existing Flood Route Plan	11
Appendix C	12
Drainage Strategy Plan	12
Drainage Calculations	12
Correspondence with SWW	12

# 1 Introduction and Brief

- 1.1 Bailey Partnership (Consultants) LLP have been appointed by Inspire Multi Academy to provide professional civil engineering services for the Tor Bridge Primary School and Cann Bridge Special School Spatial Reorganisation Strategy.
- 1.2 This report has been prepared by BSW which is a trading name of Bailey Partnership (Consultants) LLP.
- 1.3 The proposed site is occupied by existing schools, including Torbridge Primary School and Cann Bridge Special School. The proposed works include a horizontal ground floor extension and alterations to an existing, shared, two-storey building to separate the demises of the two establishments. A site plan and proposed works are provided in Appendix A.
- 1.4 The Environment Agency (EA) mapping for flood risk shows that the site is situated in Flood Zone 1, designated as having less than 0.1% or a 1 in 1000 probability of flooding. However the site is located within a critical drainage area (the drainage system is known to be close to or over its acceptable limit) as identified by the Environment Agency. The site lies within Crownhill catchment, which is considered to be a critical drainage Green Area, which does not require consultation with the EA, but does require consultation with the Lead Local Flood Authority, Plymouth City Council. An extract of critical drainage areas and flood zone mapping is provided in Appendix B.
- 1.5 The proposed ground floor extension has a relatively small footprint (<175m) and is less than 1ha. On this basis the proposed extension is considered a minor development in general accordance with Plymouth City Council's Local Flood Risk Management Strategy. As the proposed extension is located within a critical drainage area a drainage strategy is required.
- 1.6 A site specific flood risk assessment (FRA) was completed by Jenkins & Potter Consulting Engineers (ref 61519, 2008) and submitted as part of the approved planning application (ref 08/01698/FUL) for the existing schools, which currently occupy the site. This drainage strategy has been prepared in general accordance with the FRA prepared by Jenkins & Potter Consulting Engineers.
- 1.7 This Flood Risk Assessment and drainage strategy, has been prepared to support the planning submission for the proposed extension and alterations.
- 1.8 This Flood Risk Assessment and Drainage Strategy has been prepared for Inspire Multi Academy in connection with the proposed development. BSW accepts no liability to any other party for the whole or part of this document for the use of this report for any other purpose.

## 2 Existing Site Description

- 2.1 The site is located at Tor Bridge Primary School, Eden Valley Gardens, Plymouth PL6 8EE, shown on Figure 2-1. A site plan can be found in Appendix A of this document. A large portion of the existing site is occupied by existing buildings and impermeable surfaces as indicated in Figure 2-1.



Image: Google Maps, © 2021

**Figure 2-1 - Site Location**



- 2.2 The majority of the proposed extension will be over an existing black topped area as indicated in Figure 2-2.



Image: Google Maps, ©2021

**Figure 2-2 - Existing Site**

### 3 Existing Drainage Arrangement

- 3.1 South West Water (SWW) mapping and drawing records for the existing surface water and foul water drainage are provided in Appendix B.

*Surface Water:*

- 3.2 SWW mapping shows two public surface water sewers running along Miller Way, one discharging to the north and one discharging to the south. The Flood Risk Assessment, by Jenkins & Potter Consulting Engineers, indicates a restricted rate of 25l/s to each of these sewers was agreed in combination with onsite soakaways.
- 3.3 Drawing records for the existing private drainage indicate surface water from roofs and car parking areas are directed to onsite trench soakaways. Design assumptions and calculations for the existing trench soakaways were not available. A full set of the existing drawing records was not available.

*Foul Water:*

- 3.4 As indicated on the existing drainage records the existing private foul water is discharged offsite along the west boundary of the site. An environmental report by EC Harris (no ref. no. Dated June 2007) states CCTV survey confirmed foul water from the school is discharged to SWW's public foul water sewer, which runs along Keswick Crescent (west of the site).

### 4 Existing Risk of Flooding

- 4.1 *Critical drainage area, flooding from existing sewers* - The site is located within a critical drainage area (the drainage system is known to be close to or over its acceptable limit) as identified by the Environment Agency. The site lies within Crownhill catchment, which is considered to be a critical drainage Green Area. South West Water have confirmed there are no known historical sewer flooding incidents in the vicinity of the proposed development and therefore the existing site is considered to be at very little to no risk of flooding from existing sewers.
- 4.2 *Fluvial and Tidal (River and Sea)* - EA mapping shows the site is located in Flood Zone 1 and on this basis has a very low risk of flooding (less than 0.1% chance of annual exceedance) of flooding from rivers or the sea.
- 4.3 *Surface Water* - EA mapping shows the proposed development has a very low risk of flooding (less than 0.1% chance of annual exceedance) of flooding from surface water.
- 4.4 *Groundwater* - As part of the existing development a number of ground investigations were carried out. No groundwater was not encountered in any of the excavations to bedrock within approximately 2m of ground level. On this basis risk of flooding from groundwater is considered to be low.

- 4.5 *Flooding from infrastructure failure* - EA mapping shows the site is outside the maximum extent of flooding from reservoirs. The existing site is not at risk of flooding from reservoirs.
- 4.6 Generally the long term flood risk from the potential sources of flooding is considered to be very low. As the site is located in a critical drainage catchment, guidelines set out by the EA and PCC should be followed to reduce the risk of flooding to the proposed development and those downstream.

## 5 Proposed Drainage Provisions

### *Surface Water:*

- 5.1 Surface water runoff from the existing hardstanding (in the vicinity of the proposed ground floor extension) is conveyed as overland flow to the adjacent landscaped areas. The drainage design aims to provide a Sustainable Drainage Scheme (SuDS) and reduce the potential for flood risk to adjacent sites. It is proposed that surface water runoff from the roof of the proposed extension is discharged into the ground via an onsite soakaway.
- 5.2 There is no waterbody in close proximity to the site and therefore the proposal to discharge to a soakaway is in accordance with the surface water drainage hierarchy of discharge points listed in CIRIA's The SuDS Manual C753 (CIRIA C753) and PCC's Local Flood Risk Management Strategy. The surface water drainage strategy proposed will not adversely affect the risk of surface water flooding on the existing site and adjacent sites.
- 5.3 To inform preliminary requirements an infiltration rate of  $5 \times 10^{-5} \text{m/s}$  has been adopted based on the existing surface water drainage drawing by Potter & Jenkins Engineering Consultants (drawing ref. 61519-3121, provided in Appendix B). Infiltration testing in accordance with BRE 365 is to be carried out to confirm the design infiltration rate.
- 5.4 The overall surface water solution has been designed for a 1 in 100 year storm return period including a 40% allowance for climate change. This complies with the LLFA and EA requirements. The approximate positively drained surface area of the ground floor roof extension is  $165 \text{m}^2$ . Based on the preliminary design infiltration rate of  $5 \times 10^{-5} \text{m/s}$  a  $3 \text{m} \times 4 \text{m} \times 0.8 \text{m}$  deep crated soakaway is required. The proposed drainage strategy and calculations can be found in Appendix C.
- 5.5 The drainage system will be designed to meet the minimum gradient criteria as specified in Building Regulations Part H to provide a robust self-cleansing regime.

### *Foul Water:*

- 5.6 Additional foul connections to serve the proposed extension and internal alterations to the existing ground floor will be required. The additional WCs and kitchen for the extension and proposed internal alterations are shown on the proposed plan in Appendix A.
- 5.7 The increase in foul discharge is relatively small. Foul connections, where required, will be made to the existing private foul sewer which discharges to SWW's public foul sewer in Keswick Crescent. SWW have



confirmed they have capacity to accept foul water discharge from the proposed extension and alterations. Correspondence included in Appendix C.

#### Maintenance

- 5.8 A maintenance schedule in accordance with Ciria C753 for the proposed soakaway has been included in Figure 4-1. In addition to this, regular annual inspections of onsite catch pits and gullies will be required, and build up sediment removed.

<b>TABLE 13.1 Operation and maintenance requirements for soakaways</b>			
	<b>Maintenance schedule</b>	<b>Required action</b>	<b>Typical frequency</b>
	Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
		Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
		Trimming any roots that may be causing blockages	Annually (or as required)
	Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
	Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
		Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
	Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
		Check soakaway to ensure emptying is occurring	Annually

**Figure 4-1 - Table 13.1 The Operation and Maintenance Requirements for Soakaway extracted from CIRIA C753 The SuDS Manual.**

- 5.9 Maintenance of the sewers and soakaway will be managed privately by Cann Bridge Special School.

## 6 Residual Flood Risk and Overland Exceedance Flooding

- 6.1 The drainage strategy proposes runoff from the proposed roof extension is discharged to the ground via an onsite soakaway. This will provide a betterment to the existing surface water drainage regime and will not adversely affect the existing risk of flooding from potential sources of flooding on the existing site and adjacent sites.
- 6.2 Overland exceedance flooding will generally flow to the southwest, away from the existing buildings across grassed areas and a carpark, toward Miller Way as per the existing overland flood route plan by Jenkins & Potter Consulting Engineers (ref. 3212).

## 7 Conclusions

- 7.1 The proposed site is located within a green area critical drainage catchment. To mitigate the flood risk in these catchments the detailed drainage design should be carried out in general accordance with this Flood Risk Assessment and Drainage Strategy, complying with the Environment Agency and Plymouth City Council drainage guidelines.
- 7.2 It is proposed that surface water runoff from the roof of the proposed extension is discharged to the ground via an onsite soakaway. The surface water drainage strategy proposed will provide a betterment to the existing surface water drainage regime and will not adversely affect the risk of surface water flooding on the existing site or adjacent sites. The provision of a robust and effective sustainable surface water disposal system for the proposed extension is feasible in accordance with this Flood Risk Assessment and Drainage Strategy.
- 7.3 Separate systems for surface water and foul water discharge are proposed.
- 7.4 SWW have confirmed they have capacity to accept foul water discharge from the proposed extension and alterations. Correspondence included in Appendix C.

## Appendix A

*Site Plan*

*Proposed Plans*





Notes

Bailey Partnership is the trading name of Bailey Partnership (Consultants) LLP, a limited liability partnership registered in England and Wales No. - OC420278.

This drawing is copyright and owned by Bailey Partnership (Consultants) LLP, and is for use on this project and site only unless contractually stated otherwise.

DO NOT SCALE from this drawing (printed or electronic versions). Contractors must check all dimensions from site.

All other design team elements, where indicated, have been imported from the consultant's drawings and reference should be made to the individual consultant's drawings for exact setting out, size and type of component.

Discrepancies and / or ambiguities within this drawing, between it and information given elsewhere, must be reported immediately to the architect for clarification before proceeding.

All works are to be carried out in accordance with the latest British Standards and Codes of Practice unless specifically directed otherwise in the specification.

Responsibility for the reproduction of this drawing in paper form, or if issued in electronic format, lies with the recipient to check that all information has been replicated in full and is correct when compared to the original paper or electronic image. Graphical representations of equipment on this drawing have been co-ordinated, but are approximations only. Please refer to the Specifications and / or details for actual sizes and / or specific contractor construction information.

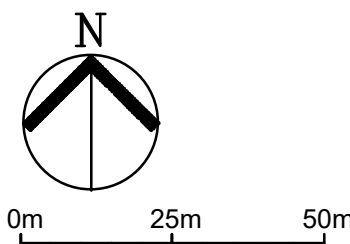
Ordnance Survey Paper Map Copying License number: 40006119

This original document is issued for the purpose indicated below and contains information of confidential nature. Further copies and circulation will be strictly in accordance with the confidentiality agreement under the contract.

© Bailey Partnership (Consultants) LLP: This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other proprietaries. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by others.

**SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION**  
Refer to the relevant Construction (Design and Management) documentation where applicable.

It is assumed that all works on this drawing will be carried out by a competent contractor, working where appropriate to an approved method statement.



-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Rev Description By / Chk'd / App'd Date



Client  
Plymouth City Council

Project  
Tor Bridge Primary & Cann Bridge  
Spatial Reorganisation Strategy

Drawing Title  
Site location plan

Purpose of Issue <b>PLANNING</b>		Status <b>S2</b>
Project No. <b>32344</b>	Scale @ A1 <b>1:1250</b>	Date <b>03.02.21</b>
Revision <b>P0</b>	Drawn By <b>SB</b>	Check By <b>CM</b>
		Approved By <b>CM</b>

A1 Drawing Identifier  
Project Origin Zone Level Type Role Class Number  
TBH BP XX XX DR A 050 001

www.baileypartnership.co.uk



Notes

Bailey Partnership is the trading name of Bailey Partnership (Consultants) LLP, a limited liability partnership registered in England and Wales No. 0425278.

This drawing is copyright and owned by Bailey Partnership (Consultants) LLP, and is for use on this project and site only unless contractually stated otherwise.

DO NOT SCALE from this drawing (printed or electronic versions). Contractors must check all dimensions from site.

All other design team elements, where indicated, have been imported from the consultant's drawings and reference should be made to the individual consultant's drawings for exact setting out, size and type of component.

Discrepancies and / or ambiguities within this drawing, between it and information given elsewhere, must be reported immediately to the architect for clarification before proceeding.

All works are to be carried out in accordance with the latest British Standards and Codes of Practice unless specifically directed otherwise in the specification.

Responsibility for the reproduction of this drawing in paper form, or if issued in electronic format, lies with the recipient to check that all information has been replicated in full and is correct when compared to the original paper or electronic image. Graphical representations of equipment or its details have been co-ordinated, but are approximations only. Please refer to the Specifications and / or details for actual sizes and / or specific construction information.

Ordnance Survey Paper Map Copying License number: 40006119

This original document is issued for the purpose indicated below and contains information of confidential nature. Further copies and circulation will be strictly in accordance with the confidentiality agreement under the contract.

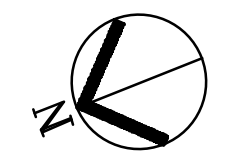
© Bailey Partnership (Consultants) LLP. This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other purposes. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by others.

**SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION**

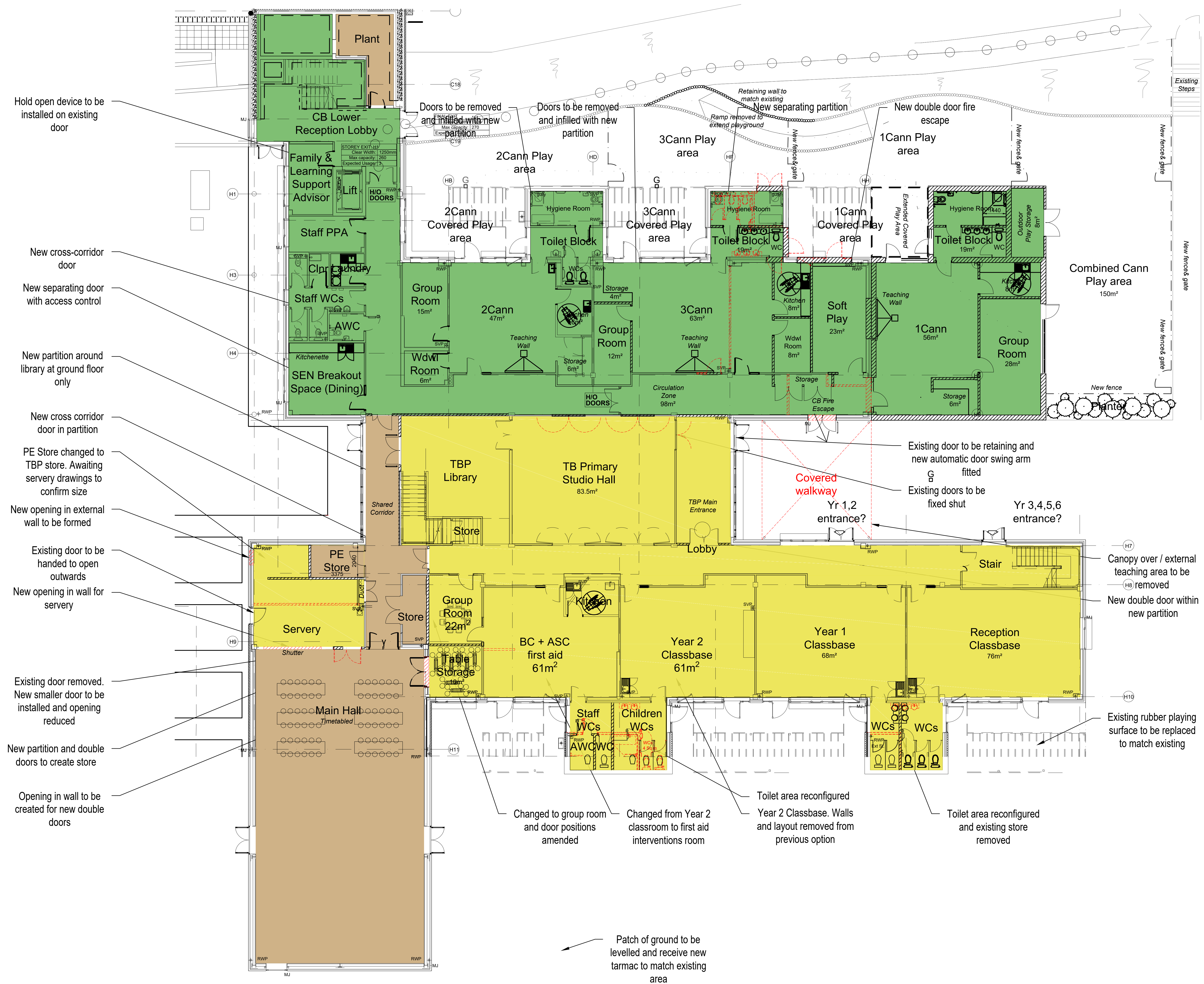
Refer to the relevant Construction (Design and Management) documentation where applicable.

It is assumed that all works on this drawing will be carried out by a competent contractor, working where appropriate to an approved method statement.

0m 5m 10m



- KEY**
- Shared
  - CANN
  - TOR
  - Public
  - Demolitions
  - New Works



- Hold open device to be installed on existing door
- New cross-corridor door
- New separating door with access control
- New partition around library at ground floor only
- New cross corridor door in partition
- PE Store changed to TBP store. Awaiting servery drawings to confirm size
- New opening in external wall to be formed
- Existing door to be handed to open outwards
- New opening in wall for servery
- Existing door removed. New smaller door to be installed and opening reduced
- New partition and double doors to create store
- Opening in wall to be created for new double doors

- Existing door to be retaining and new automatic door swing arm fitted
- Existing doors to be fixed shut
- Yr 1,2 entrance?
- Yr 3,4,5,6 entrance?

- Canopy over / external teaching area to be removed
- New double door within new partition
- Existing rubber playing surface to be replaced to match existing

- Changed to group room and door positions amended
- Changed from Year 2 classroom to first aid interventions room
- Toilet area reconfigured Year 2 Classbase. Walls and layout removed from previous option
- Toilet area reconfigured and existing store removed

Patch of ground to be levelled and receive new tarmac to match existing area

C	TBS Store changed to PE	SB	01.02.21
B	Servery added	SB	04.01.21
A	Further notes added	SB	11.12.20
Rev	Description	By / Chk'd / App'd	Date



Client  
Plymouth City Council

Project  
Tor Bridge Primary & Cann Bridge  
Spatial Reorganisation Strategy

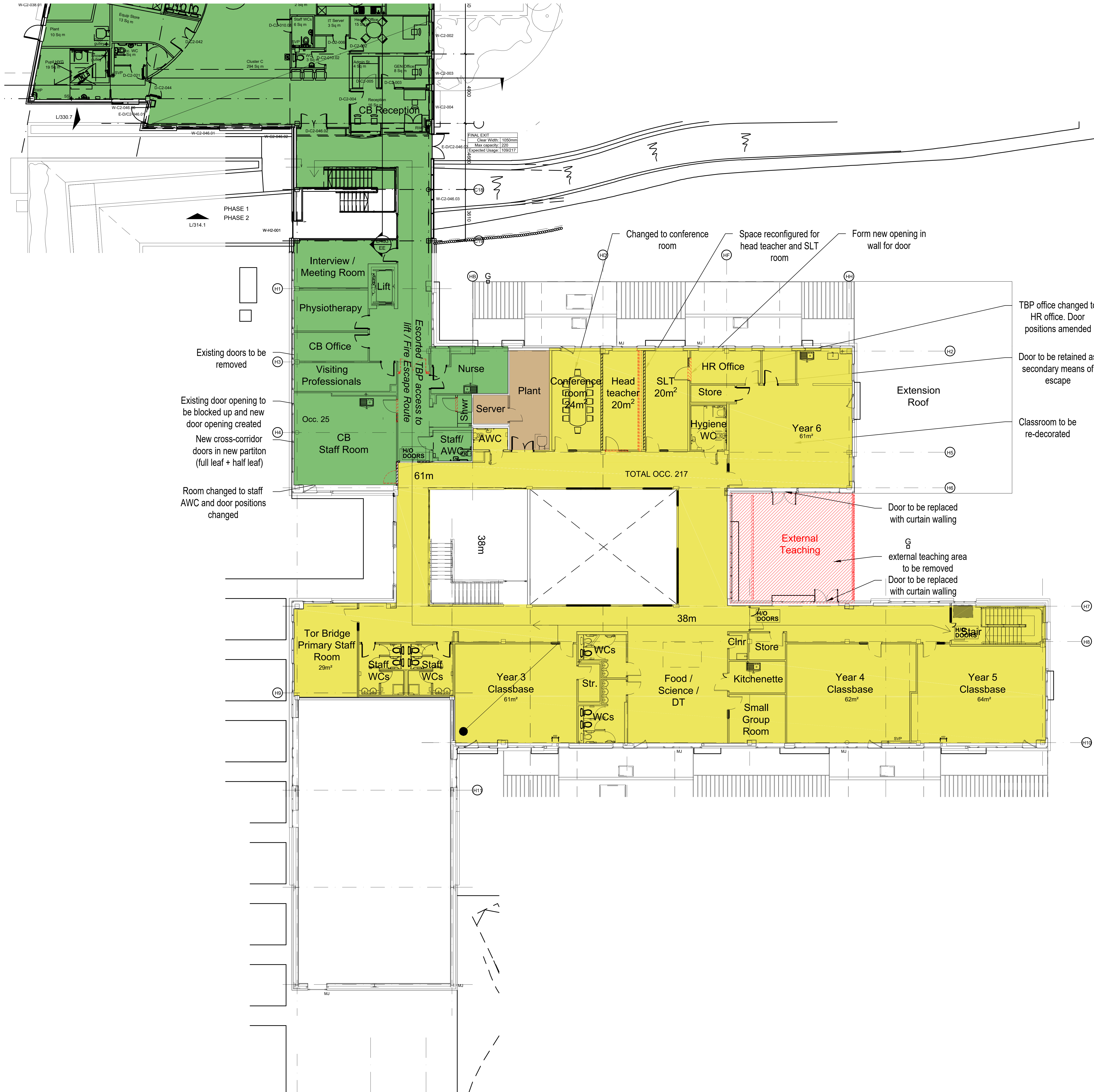
Drawing Title  
Proposed ground floor plan  
Outline Scheme

Purpose of Issue	Status
PLANNING	S2
Project No.	Scale @ A0
32344	1:100
Revision	Date
P0	04.12.20
Drawn By	Check By
SB	CM
Approved By	CM

AD Drawing Identifier	BS1192:2007 / A2011 Compliant
Project	Origin
TBH	BPC
XX	00
DR	A
050	009

www.baileypartnership.co.uk





**Notes**

Bailey Partnership is the trading name of Bailey Partnership (Consultants) LLP, a limited liability partnership registered in England and Wales No. OC452578.

This drawing is copyright and owned by Bailey Partnership (Consultants) LLP, and is for use on this project and site only unless contractually stated otherwise.

DO NOT SCALE from this drawing (printed or electronic versions). Contractors must check all dimensions from site.

All other design team elements, where indicated, have been imported from the consultant's drawings and reference should be made to the individual consultant's drawings for exact setting out, size and type of component.

Discrepancies and / or ambiguities within this drawing, between it and information given elsewhere, must be reported immediately to the architect for clarification before proceeding.

All works are to be carried out in accordance with the latest British Standards and Codes of Practice unless specifically directed otherwise in the specification.

Responsibility for the reproduction of this drawing in paper form, or if issued in electronic format, lies with the recipient to check that all information has been replicated in full and is correct when compared to the original paper or electronic image. Graphical representations of equipment or its details have been co-ordinated, but are approximations only. Please refer to the Specifications and / or details for actual sizes and / or specific construction information.

Ordnance Survey Paper Map Copying License number: 40006119

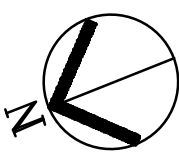
This original document is issued for the purpose indicated below and contains information of confidential nature. Further copies and circulation will be strictly in accordance with the confidentiality agreement under the contract.

© Bailey Partnership (Consultants) LLP. This document is issued for the party which commissioned it and for specific purposes connected with the captioned project only. It should not be relied upon by any other party or used for any other project. We accept no responsibility for the consequences of this document being relied upon by any other party, or being used for any other purpose, or containing any error or omission which is due to an error or omission in data supplied to us by others.

**SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION**

Refer to the relevant Construction (Design and Management) documentation where applicable.

It is assumed that all works on this drawing will be carried out by a competent contractor, working where appropriate to an approved method statement.



- KEY**
- Shared
  - CANN
  - TOR
  - Public
  - Demolitions
  - New Works

Rev	Description	SB	04.01.21
B	Minor amendments	SB	04.01.21
A	Further notes added	SB	11.12.20
Rev	Description	By / Chk'd / App'd	Date



Client  
Plymouth City Council

Project  
Tor Bridge Primary & Cann Bridge  
Spatial Reorganisation Strategy

Drawing Title  
Proposed first floor plan  
Outline Scheme

Purpose of Issue	Status
PLANNING	S2
Project No.	Scale @ A0
32344	1:100
Revision	Date
P0	04.12.20
Drawn By	Check By
SB	CM
Approved By	CM

AD Drawing Identifier  
Project Origin Zone Level Type Role Class Number  
TBH BPC XX 01 DR A 050 010

www.baileypartnership.co.uk

## Appendix B

*Extract of EA Flood Map*

*EA Critical Drainage Areas*

*SWW Asset Mapping*

*Existing Drainage Plans*

*Existing Flood Route Plan*

# Flood map for planning

Your reference  
**Flood Mapping**

Location (easting/northing)  
**250821/58791**

Created  
**7 Jan 2021 16:45**

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

## **This means:**

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

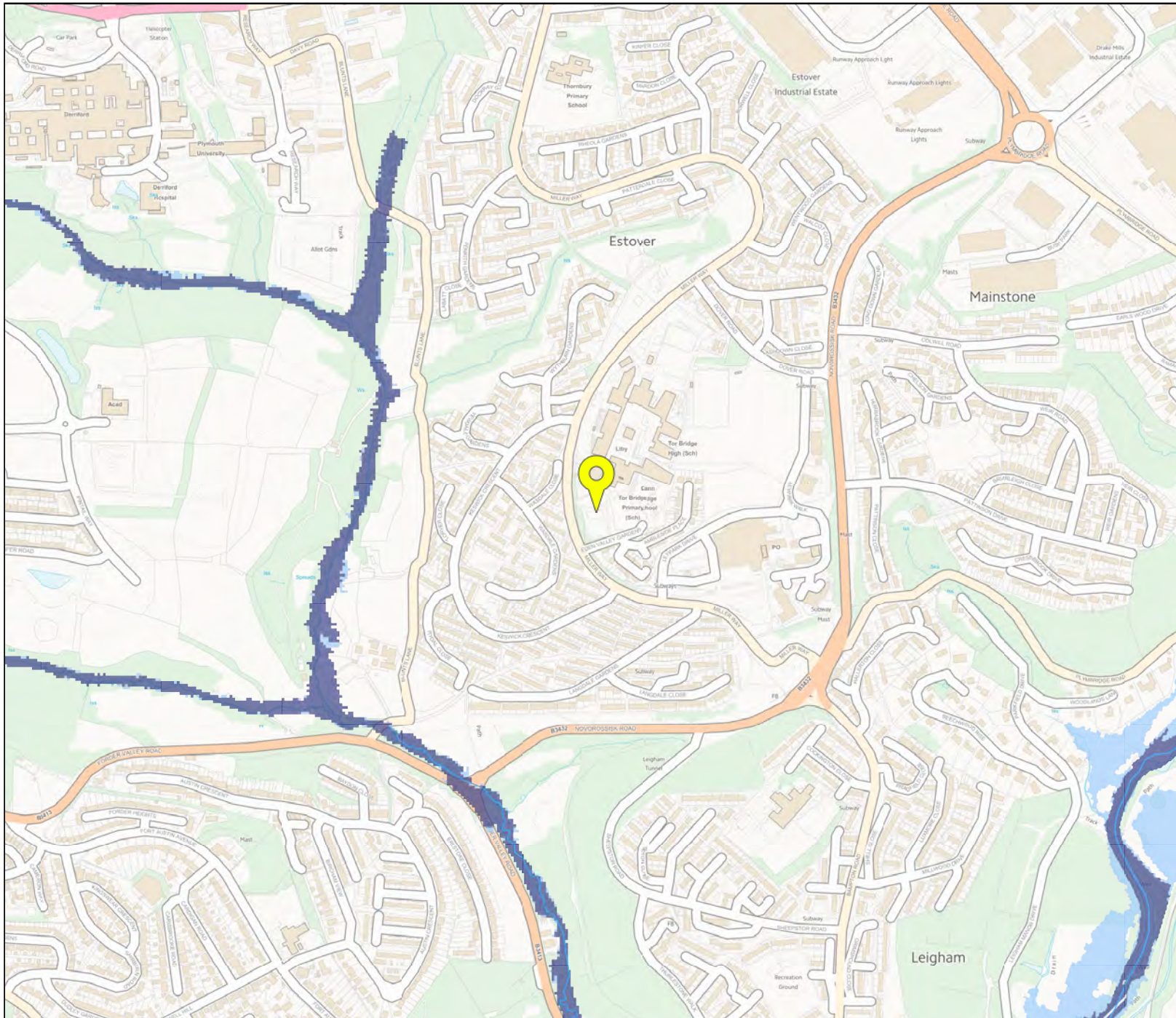
## **Notes**

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.

The Open Government Licence sets out the terms and conditions for using government data.  
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>











## Flood map for planning


Your reference  
**Flood Mapping**

Location (easting/northing)  
**250821/58791**

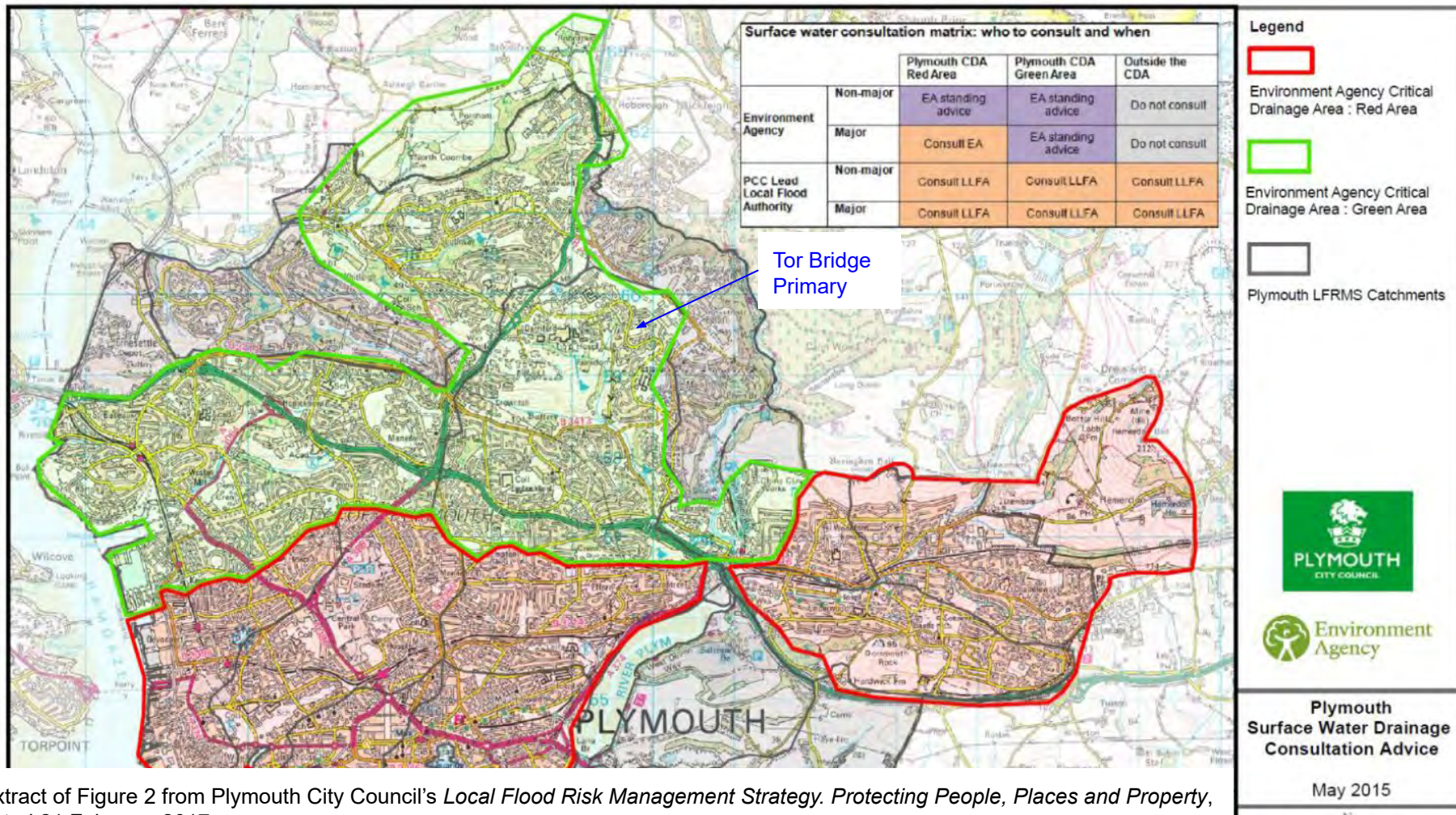
Scale  
**1:10000**

Created  
**7 Jan 2021 16:45**

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefiting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area

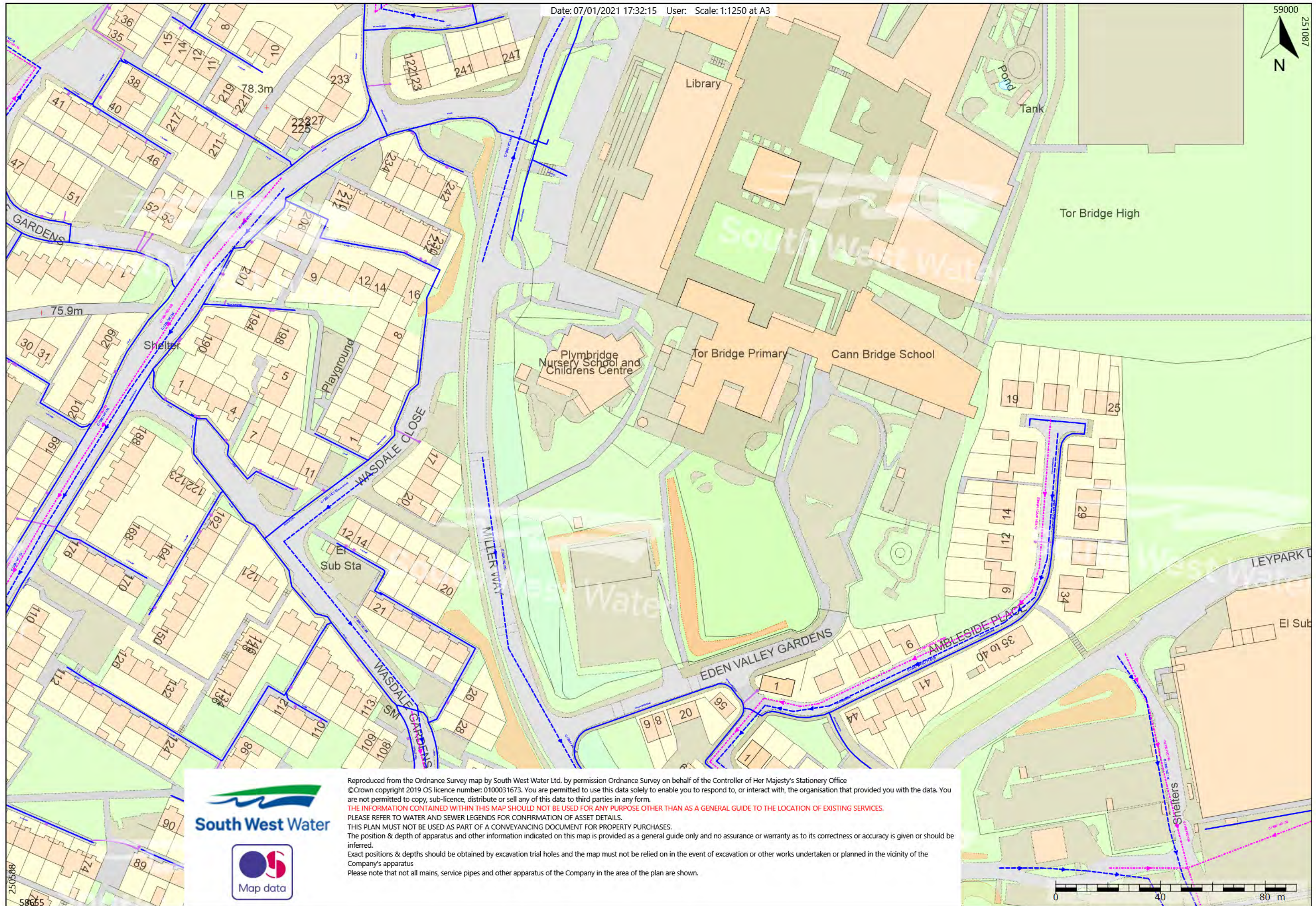
  
0 100 200 300m





Extract of Figure 2 from Plymouth City Council's *Local Flood Risk Management Strategy. Protecting People, Places and Property*, dated 21 February 2017.





South West Water



Map data

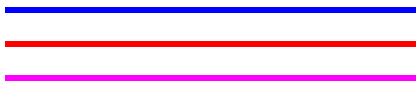
Reproduced from the Ordnance Survey map by South West Water Ltd. by permission Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office  
©Crown copyright 2019 OS licence number: 0100031673. You are permitted to use this data solely to enable you to respond to, or interact with, the organisation that provided you with the data. You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form.  
**THE INFORMATION CONTAINED WITHIN THIS MAP SHOULD NOT BE USED FOR ANY PURPOSE OTHER THAN AS A GENERAL GUIDE TO THE LOCATION OF EXISTING SERVICES.**  
PLEASE REFER TO WATER AND SEWER LEGENDS FOR CONFIRMATION OF ASSET DETAILS.  
THIS PLAN MUST NOT BE USED AS PART OF A CONVEYANCING DOCUMENT FOR PROPERTY PURCHASES.  
The position & depth of apparatus and other information indicated on this map is provided as a general guide only and no assurance or warranty as to its correctness or accuracy is given or should be inferred.  
Exact positions & depths should be obtained by excavation trial holes and the map must not be relied on in the event of excavation or other works undertaken or planned in the vicinity of the Company's apparatus.  
Please note that not all mains, service pipes and other apparatus of the Company in the area of the plan are shown.



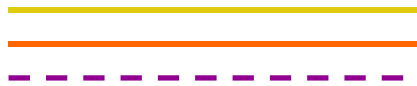
# Water Colour Codes and Abbreviations

Examples of the abbreviation details above a Water Pipe  
(details will be in the same colour as the pipe itself):

Distribution Main  
Trunk Main  
Communication Pipe



Untreated Main  
Private Pipe  
Abandoned Main



A B  
3 in Cl

A: Size  
B: Material Abbreviation

Cast Iron	CI	Spun Iron	SI	Ductile Iron	DI	Steel	ST
Asbestos Cement	AC	Plastic	UPVC	High Density/ Medium Density Polyethylene	HDPE MDPE	High Pressure Polyethylene	HPPE

## Water Features (shown in common colours)

Washout		Hydrant		Hatchbox		Washout Hydrant	
Air Valve (Single)		Air Valve (Double)		Closed Valve Closing Direction: Anti-Clockwise		Closed Valve Closing Direction: Clockwise	
Pump		Pumping Station Number of Pumps as indicated		Open Valve Opening Direction: Anti-Clockwise		Open Valve Opening Direction: Clockwise	
Customer Meter		EBCO M optional if meter fitted		Non-Return Valve /Reflux		Stoptap	
Mains Meter M=Normal DMA/WIS B=Boundary Meter		Optional Readout if location is different from the meter		Relief Valve		End Cap	
Pressure Reducing Valve		Pressure Sustaining Valve		Abstraction Point		Bore Hole	

## Water Pipe Furniture

Anode		Calgon / Aquarite		Chlorination Point		Flushing on a Sluice Valve	
Insert Flow Meter		Excavation Location		Strainer		Ferrule	

# Sewerage Pipe Details

Examples of the abbreviation details above a Sewer Pipe  
(details will be in the same colour as the pipe itself):

A    B    C    D  
Cir / 225 / VC / 82

- A: Shape
- B: Diameter (replaced by width & length on non-circular pipes)
- C: Material
- D: Gradient (1: number shown)

Public - Foul		Highway	
Public - Surface		Abandoned Sewer	
Public - Combined		Pumping Main	
Public - Treated		Elevated Sewer	
Private Sewer		Syphon	
Unverified			


















## Shapes

Circular	Cir	Rectangular	Rec	Barrel	Brl	Trapezodial	Trpz
U Shaped	UShp	Horseshoe	Hsho				

## Materials

Vitrified Clay	VC	Clay (Salt Glaze)	SG	Pre-cast Concrete	PCO	Concrete	CO
Asbestos Cement	AC	Brick	BR	Stone (Masonry)	MAC	Alkathene	AK
Steel	ST	Concrete Box	CB	Glass Reinforced Plastic	GRP	Plastic	PL
Polypropylene	PP	Unplasticised Polyvinylchloride	UPVC	Polyethylene	PE	Polyvinylchloride	PVC
Concrete Segments Bolted	CSB	Pitch Fibre	PF	Concrete Segments Unbolted	CSU	Medium Density Polyethylene	MDPE
Not Known	NK						

Sewerage Structures (shown in common colours)

Manhole Foul / Trade		Manhole Surface		Manhole Private		Manhole Combined	
Soakaway	SK	Washout	WO	Catchpit	CP	Hatchbox	HB
Flushing	FC	Lamphole	 LH	Tank Online	 TN	Tank Offline	TO
Septic Tank	 S	Cesspit	C	Header	 E	Drain	 LD
Reflux Valve	 RV	Sluice Valve		Air Valve	 AV	Venting Pole	VP
Storm Overflow				Undefined Connection		Side Entry	
Outfall				Backdrop			

Sewerage Installations

Pumping Station 	Treatment Works 
---	---

Details on Covers

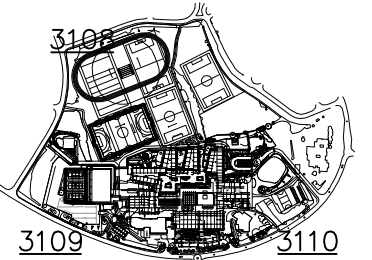
Lockable 	Gas / Water Tight 	Bolted 
--	--	--

Location

Buried 	Unable to Locate 
--	---

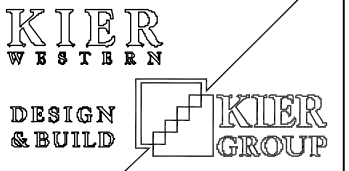
NOTES

1. THE COPYRIGHT OF THIS DRAWING IS VESTED IN JENKINS & POTTER AND IT MAY NOT BE REPRODUCED IN WHOLE OR PART OR USED FOR THE MANUFACTURE OF ANY ARTICLE WITHOUT THE EXPRESS PERMISSION OF THE COPYRIGHT HOLDERS.
2. WORK TO FIGURED DIMENSIONS ONLY.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S, SERVICE ENGINEERS AND JENKINS & POTTER'S DRAWINGS AND SPECIFICATIONS.
4. SEE DRAWINGS 61519/3105, 3106 AND 3107 FOR ALTERATIONS TO EXISTING DRAINAGE DURING CONSTRUCTION PHASES 1, 2A AND 2B RESPECTIVELY.
5. SEE DRAWING 61519/3113 FOR SOAKAWAY SCHEDULE.
6. PROPOSED STORMWATER DRAINS TO BE 100 Ø UNO.
7. SEE DRAWING 61519/3115 FOR STORM MANHOLE SCHEDULE.
8. SEE DRAWINGS 61519/3108, 3109 & 3110 FOR OVERALL LAYOUTS.



FINAL DESIGN ISSUE

E	FINAL DESIGN ISSUE	GJB	GJB	19/07 2010
D	UPDATED TO SUIT PHASE 2 DESIGNS GENERAL UPDATES	GJB	GJB	13/07 2010
C	GENERAL REVS TO SUIT LATEST LAYOUTS PARTICULARLY AT FRONT OF SCHOOL AND AROUND ENTRANCES	GJB	GJB	07/04 2010
B	SPECIAL SCHOOL DRAINAGE AMENDED ALL WEATHER PITCH AND	AN	GJB	23/03 2010
A	CONSTRUCTION ISSUE ISSUED TO SHOW DRAINAGE CONNECTIONS AROUND BUILDINGS	GJB	GJB	09/02 2010
REV	AMENDMENT	DRN	APP	ISSUE DATE



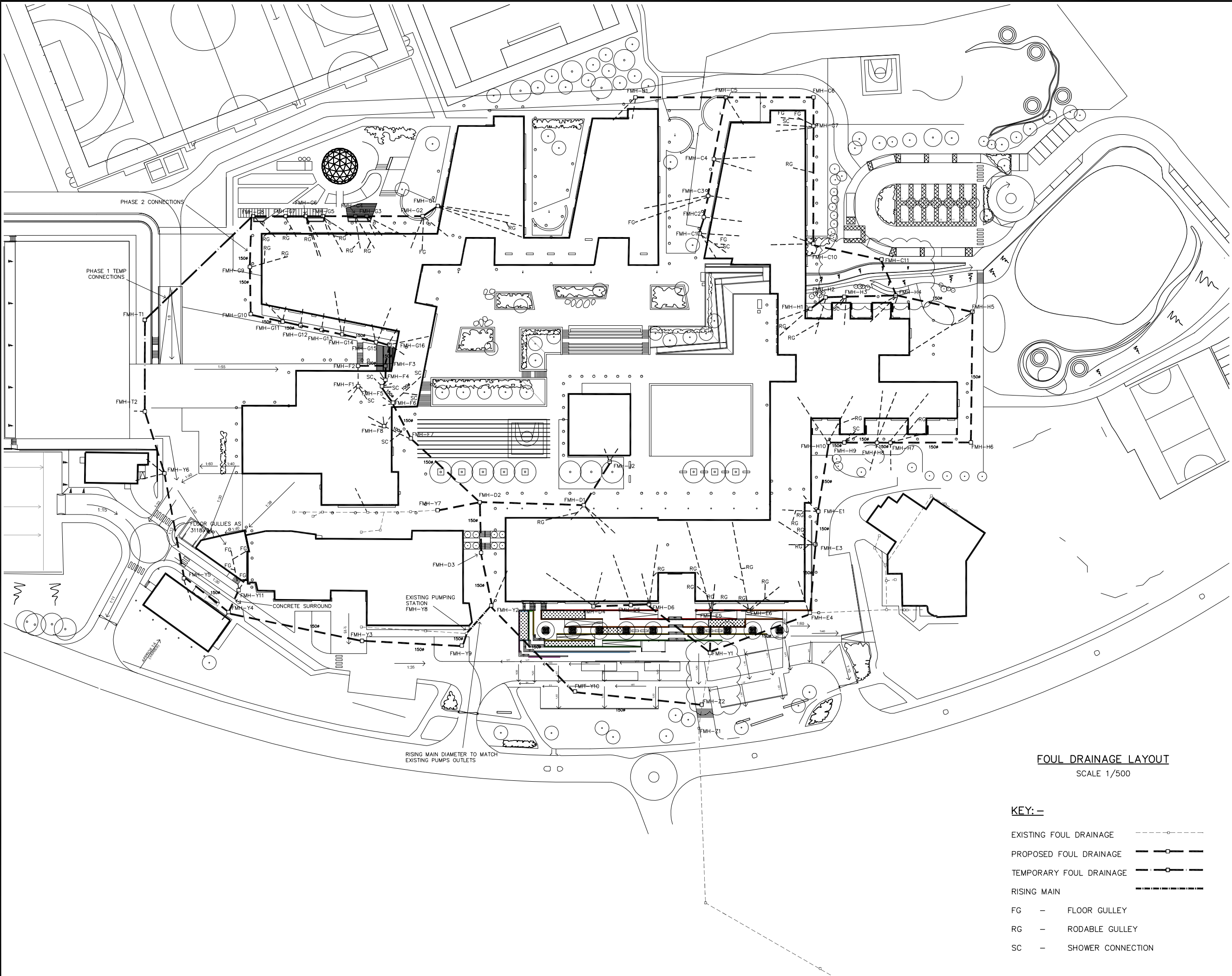
**JENKINS & POTTER**  
Consulting Engineers  
Civil & Structural Engineers  
Construction Consultants  
CDM Co-ordinators  
Party Wall Surveyors  
1 LOWER COMPTON ROAD, PLYMOUTH, PL3 1QH  
tel: 01752 251111 fax: 01752 251115 www.jenkinspotters.co.uk

ESTOVER COMMUNITY CAMPUS

DRAINAGE LAYOUT AROUND BUILDINGS

SCALE @ A1 1:500 PROJECT No: 61519 DWG No: 3121E





- NOTES**
1. THE COPYRIGHT OF THIS DRAWING IS VESTED IN JENKINS & POTTER AND IT MAY NOT BE REPRODUCED IN WHOLE OR PART OR USED FOR THE MANUFACTURE OF ANY ARTICLE WITHOUT THE EXPRESS PERMISSION OF THE COPYRIGHT HOLDERS.
  2. WORK TO FIGURED DIMENSIONS ONLY.
  3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S, SERVICE ENGINEERS AND JENKINS & POTTER'S DRAWINGS AND SPECIFICATIONS.
  4. SEE DRAWINGS 61519/3105, 3106 AND 3107 FOR ALTERATIONS TO EXISTING DRAINAGE DURING CONSTRUCTION PHASES 1, 2A AND 2B RESPECTIVELY.
  5. ALL PIPES 100mm Ø UNO.

**FINAL DESIGN ISSUE**

R	FINAL DESIGN ISSUE	GJB	GJB	19/07 2010
P	DRAINAGE TO PHASE 2 UPDATED	GJB	GJB	09/07 2010
N	FMH-C11 MOVED, CONNECTION MOVED TO FMH-H4	AN	GJB	23/03 2010
M	ENERGY CENTRE CONNECTIONS AND MANHOLE ADDED	AN	DC	11/11 2009
L	ALTERATIONS TO DRAINAGE NORTH AND WEST OF BLOCKS D+E	AN	GJB	20/8 2009
K	CONNECTIONS UPDATED	AN	GJB	20/7 2009
J	BLOCKS D, E AND G CONNECTIONS UPDATED	AN	GJB	20/7 2009
H	FMH-Y1 MOVED TO BOTTOM OF STEPS OUTLETS IN BLOCKS A, D, E & G	AN	GJB	01/07 2009
G	BLOCK C,D+E CONNECTIONS AMENDED TO SUIT LATEST ARCHITECTS DRAWINGS	AN	GJB	26/6 2009
F	FMH-T2 MOVED WEST CONNECTION EXTENDED AT FMH-G2 PUMPING STATION, OUTLET ADDED	AN	GJB	01/6 2009
E	FMH-C10 MOVED EAST	AGN	GJB	21/5 2009
D	PIPE DIAMETERS ALTERED	AGN	GJB	27/4 2009
C	SOUTH EAST BINSTORE DRAIN REMOVED	AGN	GJB	15/4 2009
B	FINAL PRELIMINARY BLOCKS B & C CONNECTIONS UPDATED	AGN	GB	13/3 2009
A	BIN STORE CONNECTIONS ADDED NO REVISION CLOUDS AS SITE WIDE CHANGES. UPDATED TO LATEST BELOW GROUND DRAINAGE CONNECTIONS	AGN	GJB	13/02 2009
p2	PRELIMINARY UPDATED TO LATEST BUILDING LAYOUTS	AGN	GJB	17/10 2008
p1	PRELIMINARY FOUL DRAINAGE RELOCATED FROM PREVIOUS DRG'S 3108, 3109 AND 3110	AGN	GJB	07/08 2008
REV	AMENDMENT	DRN BY	APP BY	ISSUE DATE

**KIER WESTERN**

**DESIGN & BUILD**

**KIER GROUP**

**JENKINS & POTTER**  
Consulting Engineers

Civil & Structural Engineers  
Construction Consultants  
CDM Co-ordinators  
Party Wall Surveyors

1 LOWER COMPTON ROAD, PLYMOUTH, PL3 5DH  
tel: 01752 251111 fax: 01752 251115 www.jenkinspotters.co.uk

ESTOVER COMMUNITY CAMPUS

FOUL DRAINAGE LAYOUT

- KEY:-**
- EXISTING FOUL DRAINAGE
  - PROPOSED FOUL DRAINAGE
  - TEMPORARY FOUL DRAINAGE
  - RISING MAIN
  - FG - FLOOR GULLEY
  - RG - RODABLE GULLEY
  - SC - SHOWER CONNECTION



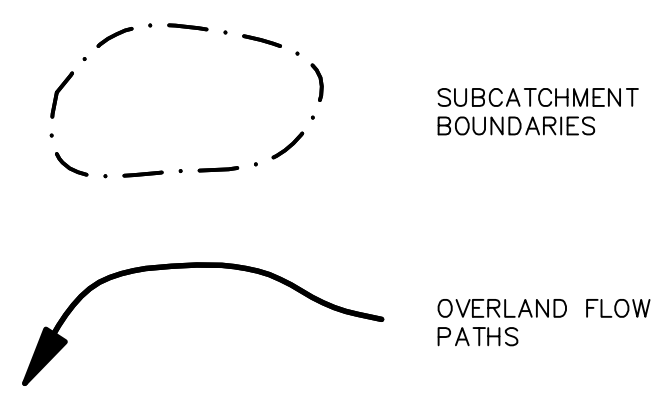


- 4 Existing site entrance  
New road to adoptable standards
- 5 New access road to main Primary and secondary school  
shared entrance. 'Pull-in' drop off areas to be provided for drop off and collection of primary school children
- 6 New managed pedestrian access gate.  
Footpath leading to rear of Science department
- 7 New managed pedestrian access gate.  
Footpath leading to rear of teaching clusters
- 8 Possible future road access to Leypark Drv  
Shown for information only

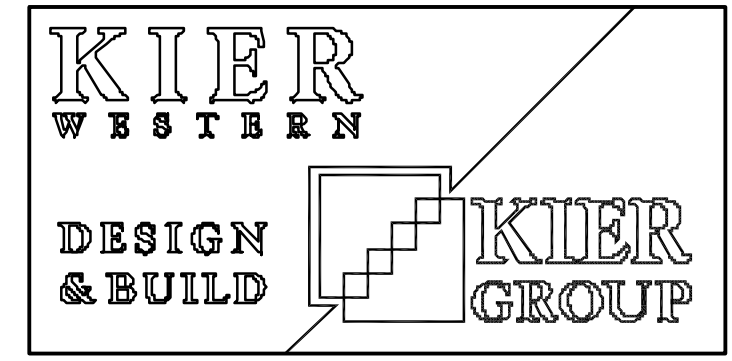
NOTES

- 1. THE COPYRIGHT OF THIS DRAWING IS VESTED IN JENKINS & POTTER AND IT MAY NOT BE REPRODUCED IN WHOLE OR PART OR USED FOR THE MANUFACTURE OF ANY ARTICLE WITHOUT THE EXPRESS PERMISSION OF THE COPYRIGHT HOLDERS.
- 2. WORK TO FIGURED DIMENSIONS ONLY.
- 3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, SERVICE ENGINEERS AND JENKINS & POTTER'S DRAWINGS AND SPECIFICATIONS.

KEY



C	UPDATED TO SUIT LAYOUT REVISIONS	SW	GJB	03/02 2009
B	UPDATED TO SUIT LAYOUT REVISIONS DRAWING LAYOUT AMENDED	SW	GJB	06/02 2008
A	PLANNING ISSUE	TRH	GJB	10/01 2008
P	PRELIMINARY ISSUE	AEP	AEP	09/01 2008
REV	AMENDMENT	DRN	APP	ISSUE
		BY	BY	DATE



**JENKINS & POTTER**  
Consulting Engineers  
Civil & Structural Engineers  
Construction Consultants  
CDM Co-ordinators  
Party Wall Surveyors  
1 LOWER COMPTON ROAD, PLYMOUTH, PL3 5DH  
tel: 01752 251111 fax: 01752 251115 www.jenkinspotter.co.uk

ESTOVER COMMUNITY CAMPUS

OVERLAND FLOODING ROUTING  
PROPOSED

SCALE @ A1 1:1000 PROJECT No: 61519 DWG No: 3212C

## Appendix C

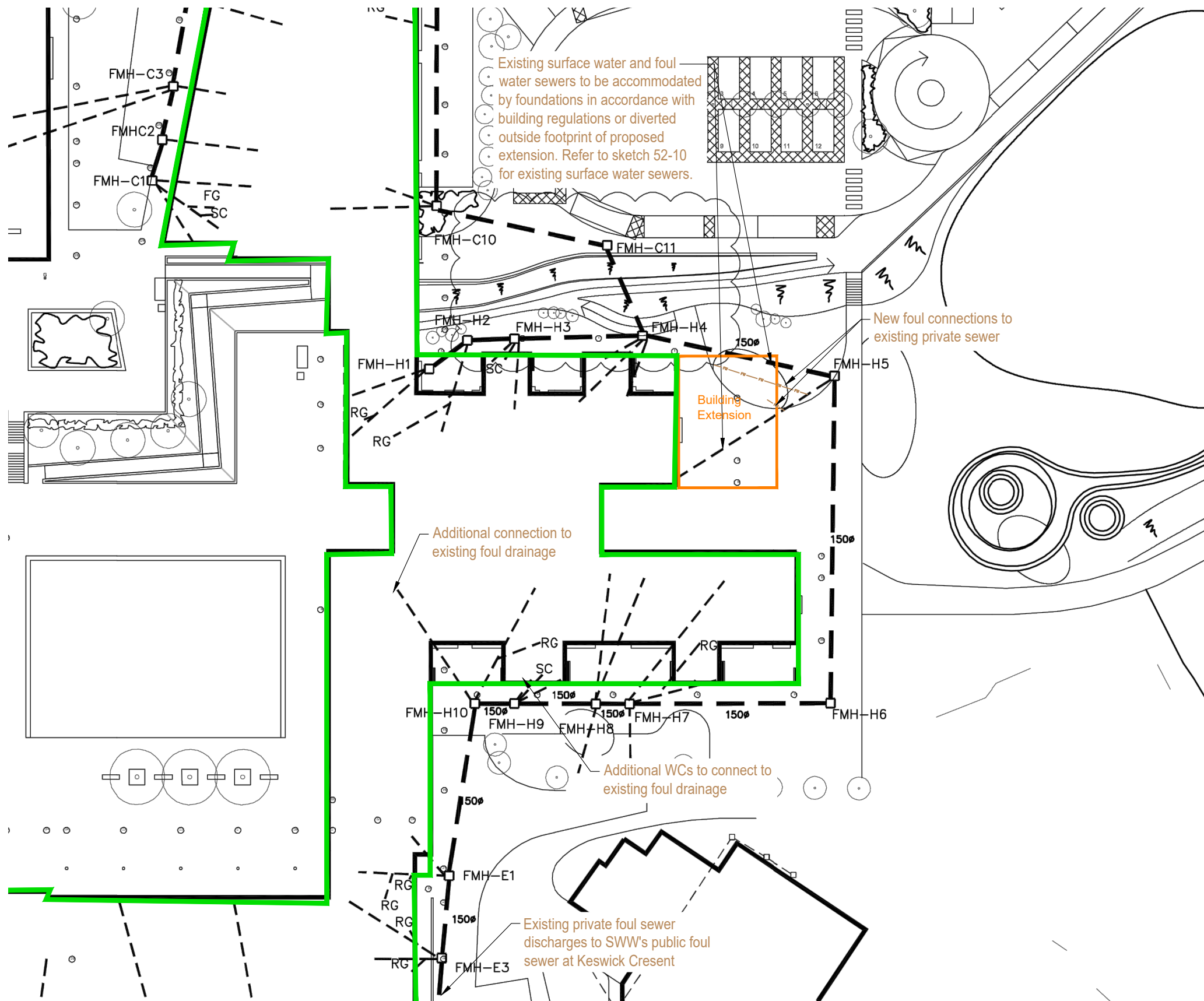
*Drainage Strategy Plan*

*Drainage Calculations*

*Correspondence with SWW*







#### Notes:

1. Do not scale, for information only.
2. Base plan by Jenkins & Potter Consulting Engineers, drawing ref. 61519-3121, Rev E, showing existing drainage layout.
3. Refer to sketch 32344-BPC-XX-XX-SK-52-10 for surface water drainage.

#### Key:

Existing Building Outline	—
EXISTING FOUL DRAINAGE	---
PROPOSED FOUL DRAINAGE	---
TEMPORARY FOUL DRAINAGE	---
RISING MAIN	---



Project Title: Tor Bridge Primary School  
 Sketch Number: 32344-BPC-XX-XX-SK-D-52-11  
 Sketch Title: Drainage Strategy - Foul Water  
 Scale: 1:500 @ A3  
 Date: 12/02/2021

For Information Only  
 Not For Construction



### Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.300	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)	T of E (mins)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)
Soakaway	0.018	5.00	1.000	0.000	0.000	0.800

### Simulation Settings

Rainfall Methodology	FSR	Summer CV	0.750	Drain Down Time (mins)	240
FSR Region	England and Wales	Winter CV	0.840	Additional Storage (m³/ha)	20.0
M5-60 (mm)	20.000	Analysis Speed	Normal	Check Discharge Rate(s)	x
Ratio-R	0.300	Skip Steady State	x	Check Discharge Volume	x

### Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

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

### Node Soakaway Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Pit Width (m)	4.000	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.18000	Invert Level (m)	0.200	Pit Length (m)	3.000	Number Required	1
Safety Factor	1.0	Time to half empty (mins)	286	Depth (m)	0.800		



Bailey Partnership  
Estuary House,  
Peninsula Park, Rydon Lane,  
Exeter, EX2 7XE

File: 32344 Model v1.pfd  
Network: Storm Network  
James Moody  
04.02.2020

Page 2  
Tor Bridge Primary School  
Soakaway Design  
Rev -

**Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%**

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	Soakaway	264	0.965	0.765	1.7	9.5295	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
360 minute winter	Soakaway	Infiltration	0.5



Khan Thorne <k.thorne@bailey-p.net>

---

## RE: 32344 - Tor Bridge Primary School Expansion

---

**Developer Services Planning** <DeveloperServicesPlanning@southwestwater.co.uk>

29 January 2021 at 14:26

To: Khan Thorne <k.thorne@baileyp.co.uk>

Khan foul capacity is available and no record of flooding due to any lack of capacity in the public sewer networks.

Regards

**Martyn Dunn** Pre-Development Technical Advisor



D: 01392 443702

Peninsula House, Rydon Lane, Exeter, EX2 7HR

[www.southwestwater.co.uk](http://www.southwestwater.co.uk)



**From:** Khan Thorne <k.thorne@baileyp.co.uk>  
**Sent:** 29 January 2021 11:05  
**To:** Developer Services Planning <DeveloperServicesPlanning@southwestwater.co.uk>  
**Cc:** BSW Projects <bswprojects@baileyp.co.uk>  
**Subject:** 32344 - Tor Bridge Primary School Expansion

EXTERNAL EMAIL - This email is from an external source.

Hi Martyn,

I am supporting the proposed planning application for an extension to Tor Bridge Primary School, Plymouth PL6 8EE. The site is located in Plymouth City Council's critical drainage green area.

Drainage records show foul water from the existing development is discharged to SWW's public foul water sewer, which runs along Keswick Crescent. See attached sketch and location plans.

The proposed extension requires WCs and a kitchen and there are some alterations to the existing building including additional WCs, kitchen and servery as indicated in the attached proposed plans. Can you please confirm if there is capacity for foul from the proposed extension and alternations to SWW's public foul water sewer, which runs along Keswick Cresent?

Can you please also let me know of any known historical sewer flooding incidents recorded in the area?

With regard to surface water, based on existing site SI it is proposed that surface water from the extension is discharged into the ground via an onsite soakaway.

Please let me know if you have any queries or require additional information.

Thanks,

**Khan Thorne** BEng Senior Civil Engineer

**T:** 01392 422331 **E:** k.thorne@baileyp.co.uk **W:** baileypartnership.co.uk



Bailey Partnership respects your work life balance and therefore a reply is not automatically expected outside of working hours

---

**BSW and Bailey Partnership are trading names of Bailey Partnership (Consultants) LLP, a limited liability partnership registered in England and Wales No. OC420278, registered office Lyster Court, 2 Craigie Drive, The Millfields, Plymouth, Devon, PL1 3JB**

**Disclaimer:** The contents of this email and any attachments may contain information that is confidential and/or subject to copyright. If you are not a named recipient you are advised that any dissemination, copying or circulation of this message or its attachments is strictly prohibited. Bailey Partnership may monitor email traffic data and also the content of email for the purposes of security.

---

