



COLE EASDON
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Technical Note - 6155/01

Project Title:	Proposed Residential Development, Mill Road, Bevis Green, Bury				
Client:	Barratt Homes Manchester				
Project No.:	6155	Date:	April 2020	Issue No.:	2
Title:	Planning Condition 31 Discharge				
Written By:	D. Frosoni CEng MCIWEM MICE	Checked By:	S. Seed BA (Hons)	Authorised By:	D. Frosoni CEng MCIWEM MICE

1.0 Introduction

1.1 This *Technical Note* has been prepared by Cole Easdon Consultants Limited (CEC) on behalf of Barratt Homes Manchester, to address Bury Council planning condition 31 (Planning Application Reference No. 63533, 4th March 2019) in relation to a development comprising the construction of 268 new residential dwellings. This *Technical Note* has been prepared to discharge the below condition.

1.2 Planning Condition 31: *'No development, other than site clearance, demolition, or works relating to site investigation, shall commence unless or until a scheme of mitigation measures to ensure that phase 1 of the development does not increase the risk of flooding on-site or elsewhere has been submitted to, and approved in writing by, the Local Planning Authority. The scheme shall:*

- *Include an updated model and assessment of fluvial flood risk, demonstrating that flood risk can suitably managed on site*
- *Demonstrate consideration of the impacts of climate change*
- *Ensure that there are no detrimental impacts to flood storage or flood flow routes*
- *Ensure any mitigation measures proposed are sufficient and do not increase the risk of flooding*
- *Prevent flooding by ensuring the satisfactory storage of/disposal of surface water from the site'.*

1.3 This *Technical Note* outlines how the development proposals can be satisfactorily accommodated as per guidance provided within the National Planning Policy Framework (NPPF) and Bury Council's drainage requirements.

2.0 Phase 1: Flood Risk (1:100 Year Event)

2.1 The Applicant (Barratt Homes) intends to commence Phase 1 of the works in the are shown below in Figure 2.1. The works will be undertaken with the existing Mill Reservoir and Pig's Lee Brook Tributary drainage

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system within the site remaining intact and operational. Figure 2.2 below shows that the southern end of the Phase 1 area would be impacted by the existing 1:100 year flood event. The flood extent shown in Figure 2.2 is taken from Figure 3.1 within the Environment Agency (EA) approved *Hydraulic Modelling Report* (Issue 5). Modelled floodwater depth is less than 50mm across the existing site in the Phase 1 area.



Figure 2.1: Phase 1 Development Area

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Figure 2.2: Existing 1:100 year floodplain extent (from Hydraulic Modelling Report (Issue 5)) overlaid onto Development Masterplan with Phase 1 development area shown

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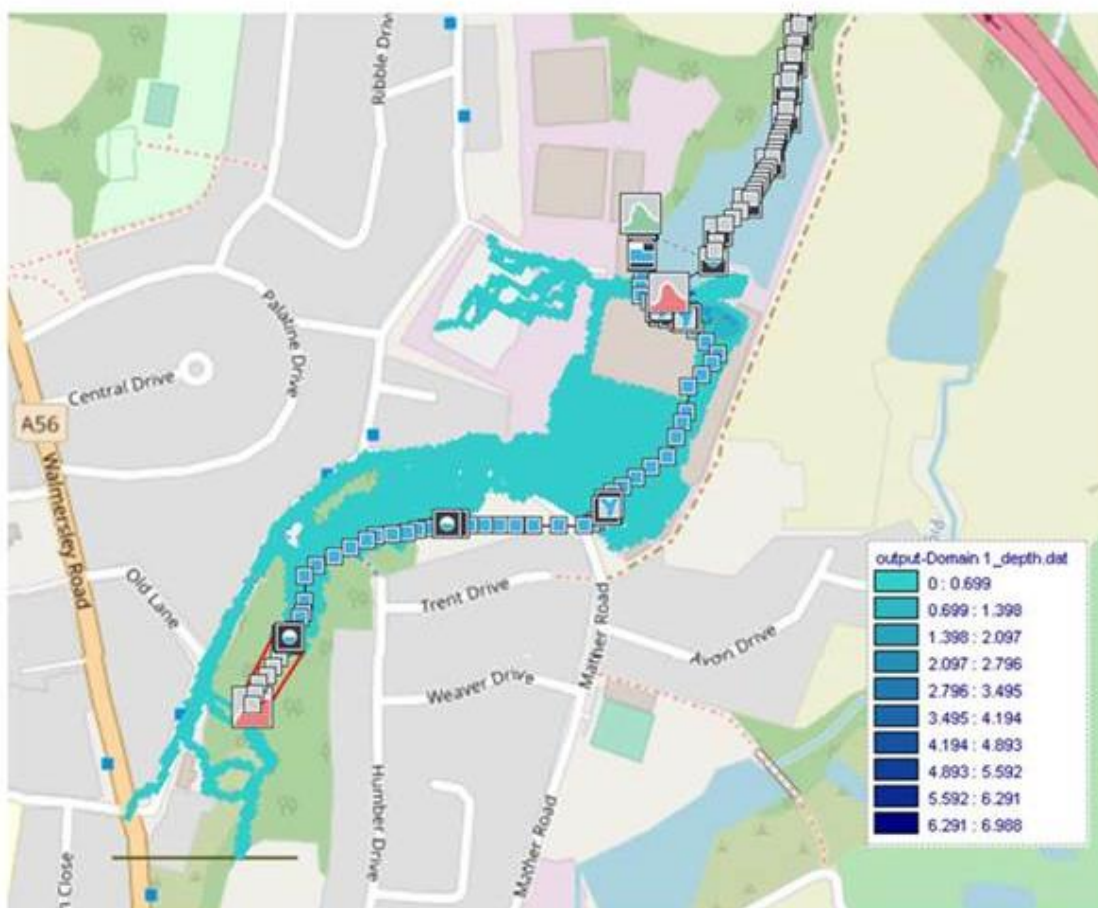


Figure 3.1: Extent of flooding from Mill Reservoir for the 1:100 year event (Existing Site)

(Extract of Figure 3.1 Taken from the EA approved Hydraulic Modelling Report (Issue 5))

- 2.2 It is proposed to exclude floodwater associated with the existing 1:100 year event from the Phase 1 area. This will be achieved through the implementation of a 500mm high earthworks bund along the Phase 1 boundary in the affected area. Additional hydraulic modelling has therefore been undertaken to determine the impact of excluding floodwater from the Phase 1 area on flood risk elsewhere.
- 2.3 Climate change has not been considered as the Phase 1 work is to be undertaken under present day conditions.

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- 2.4 The Phase 1 perimeter bund has been modelled by including a polygon along the Phase 1 boundary with an elevation of 500mm above the existing topography with a Manning's roughness value applied. Figure 2.3 shows the resulting 1:100 year flood extent with the Phase 1 bund in position. Figures 2.4 & 2.5 compare the existing 1:100 year flood extent with the existing 1:100 year flood extent (with the Phase 1 perimeter bund in position).
- 2.5 Modelled results (see Figures 2.4 & 2.5 below) show that there will be no offsite impact on flood risk arising from implementation of a bund along the Phase 1 perimeter. The only impact will be a modification of the existing flood flow route in the vicinity of the Phase 1 bund and existing carpark immediately to the south of the Phase 1 area. Flood depths in the vicinity of the modelled bund and carpark are less than 50mm.



Figure 2.3: Extent of 1:100 year flooding with Phase 1 bund in position

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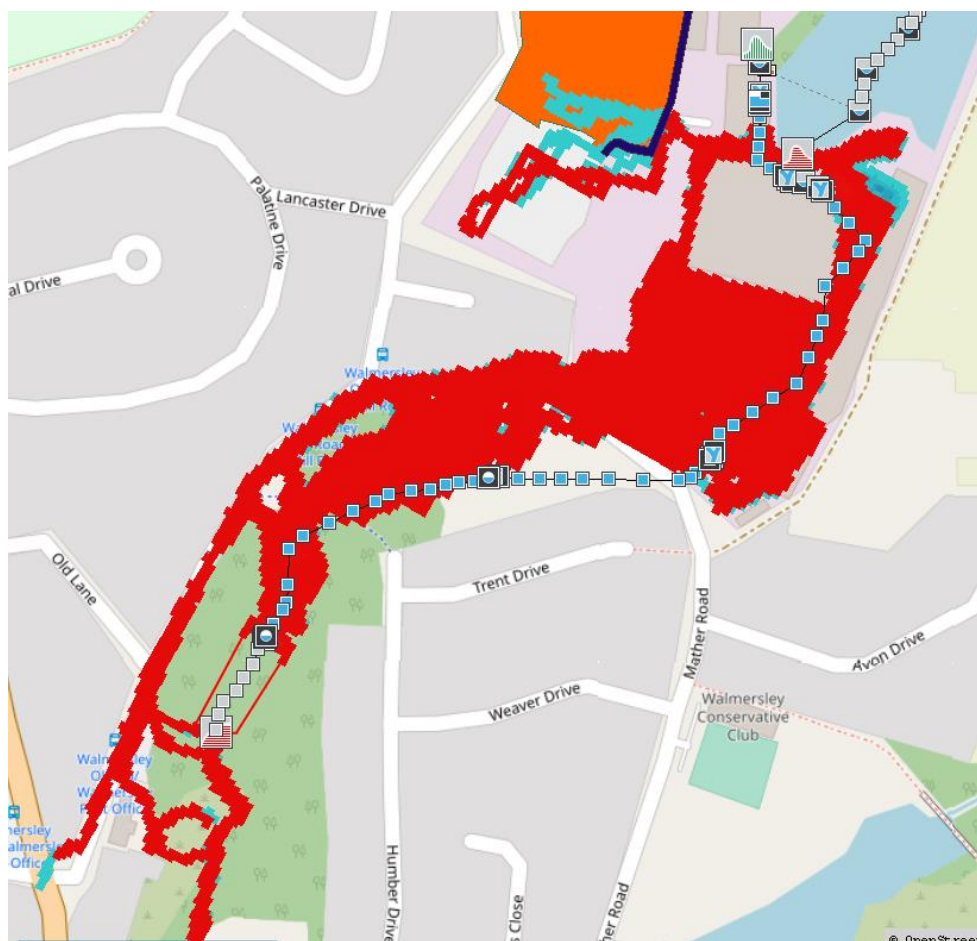


Figure 2.4 Existing 1:100 year flood extent (blue) and 1:100 year flood extent with Phase 1 bund in position overlaid (red)

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Figure 2.5: Existing 1:100 year flood extent (blue) and 1:100 year flood extent with Phase 1 bund in position overlaid (red)

3.0 Phase 1: Flood Risk (1:1000 year event)

3.1 Figure 5.5 (taken from the EA approved *Hydraulic Modelling Report* (Issue 5)) and Figure 3.1 below shows that the southern end of the Phase 1 area would be impacted by the existing 1:1000 year flood event.

3.2 It is proposed to exclude floodwater associated with the existing 1:1000 year event from the Phase 1 area. This will be achieved through the implementation of a 500mm high earthworks bund along the Phase 1 boundary in the affected area. Additional hydraulic modelling has therefore been undertaken to determine the impact of excluding floodwater from the Phase 1 area on flood risk elsewhere.

3.3 The Phase 1 perimeter bund has been modelled by including a polygon along the Phase 1 boundary with an elevation of 500mm above the existing topography with a Manning's roughness value applied. Figure 3.2

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shows the resulting 1:1000 year flood extent with the Phase 1 bund in position. Figures 3.3 & 3.4 compare the existing 1:1000 year flood extent with the existing 1:1000 year flood extent (with the Phase 1 perimeter bund in position).

3.4 Modelled results show that;

- i) there will be no offsite worsening of flood risk arising from implementation of a bund along the Phase 1 perimeter. Indeed, flood risk will be decreased for existing dwellings to the west of the site. This is due to the removal of the flood flow path along Old Walmersley Road, Lancaster and Palatine Drives that will occur once the bund has been implemented.
- ii) pre and post bund modelled flood depths are very similar both on and offsite.
- iii) the bund will need to extend along the entire southern boundary.

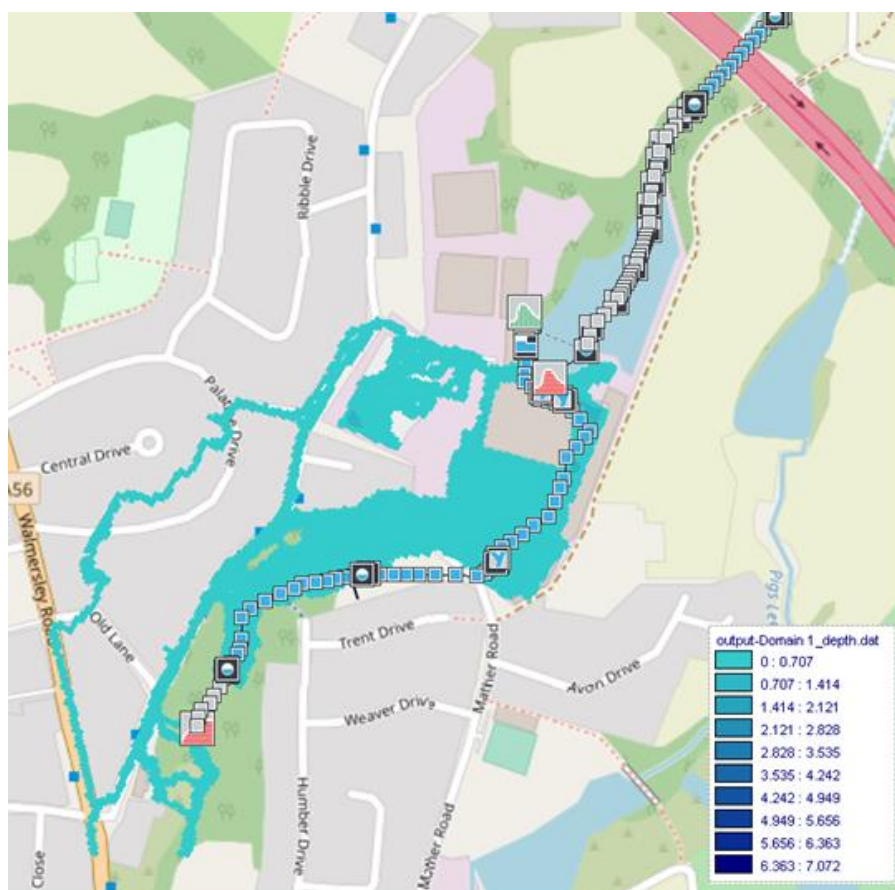


Figure 5.5: Extent of flooding from Mill Reservoir for the 1:1000 year event (5.25 hour storm duration)

(Extract of Figure 5.5 Taken from the EA approved Hydraulic Modelling Report (Issue 5))

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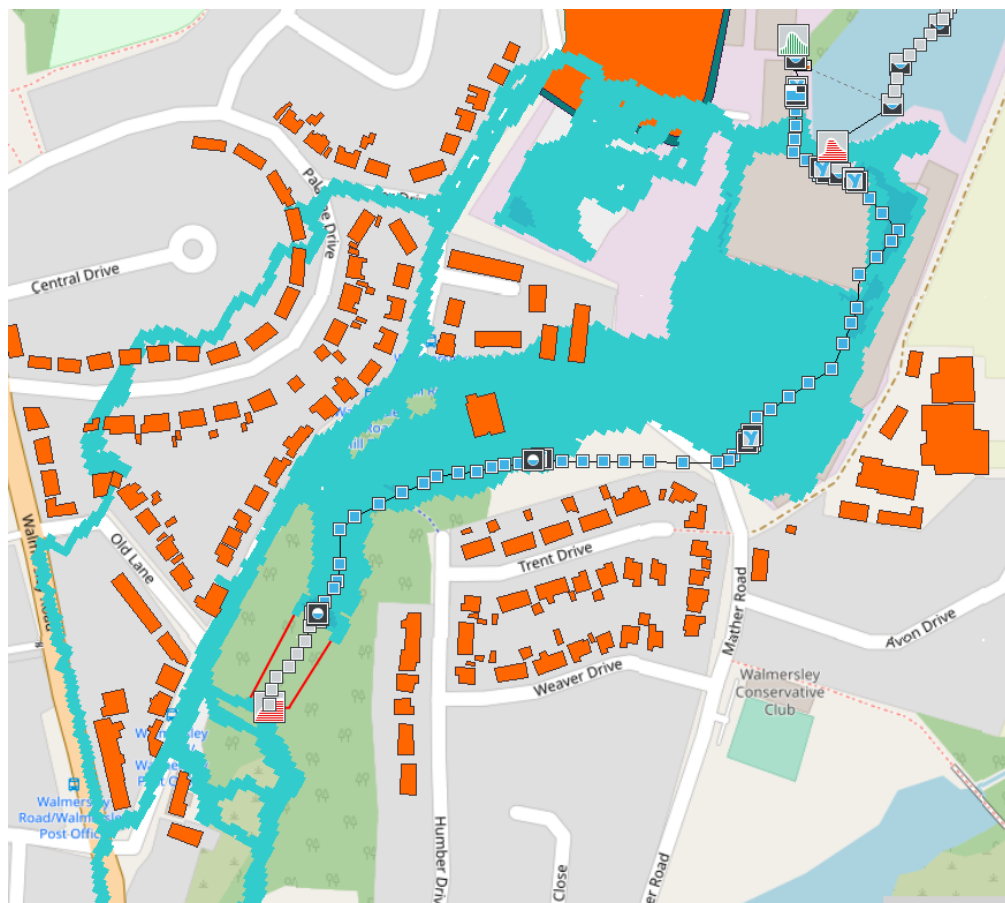


Figure 3.1: Existing 1:1000 year floodplain extent (Existing Site)

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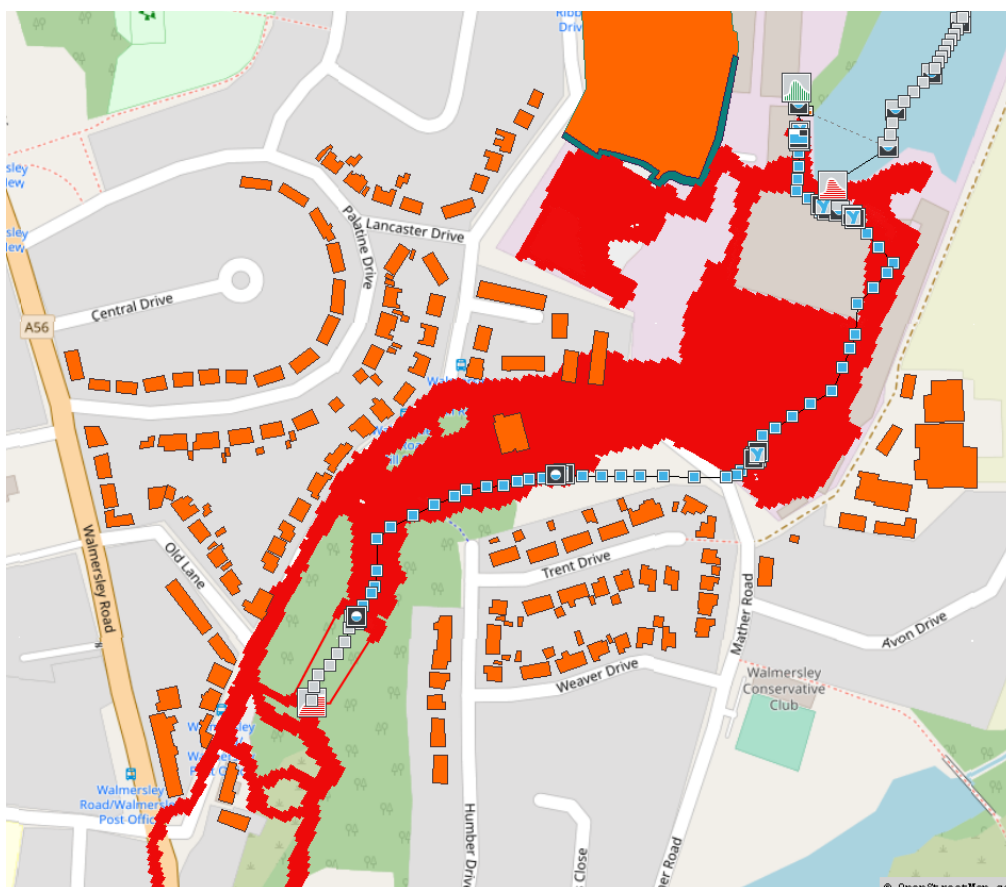


Figure 3.2: Extent of 1:1000 year flooding with Phase 1 bund in position

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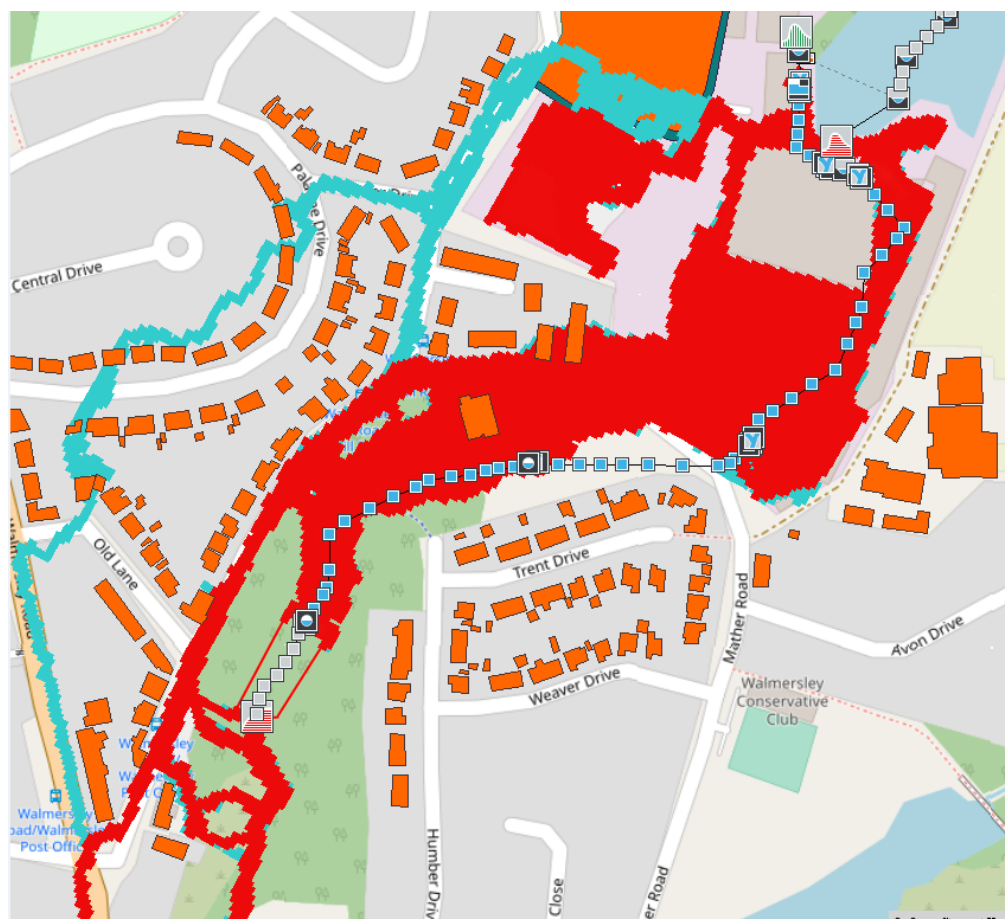


Figure 3.3: Existing 1:1000 year flood extent (blue) and 1:1000 year flood extent with Phase 1 bund in position overlaid (red)

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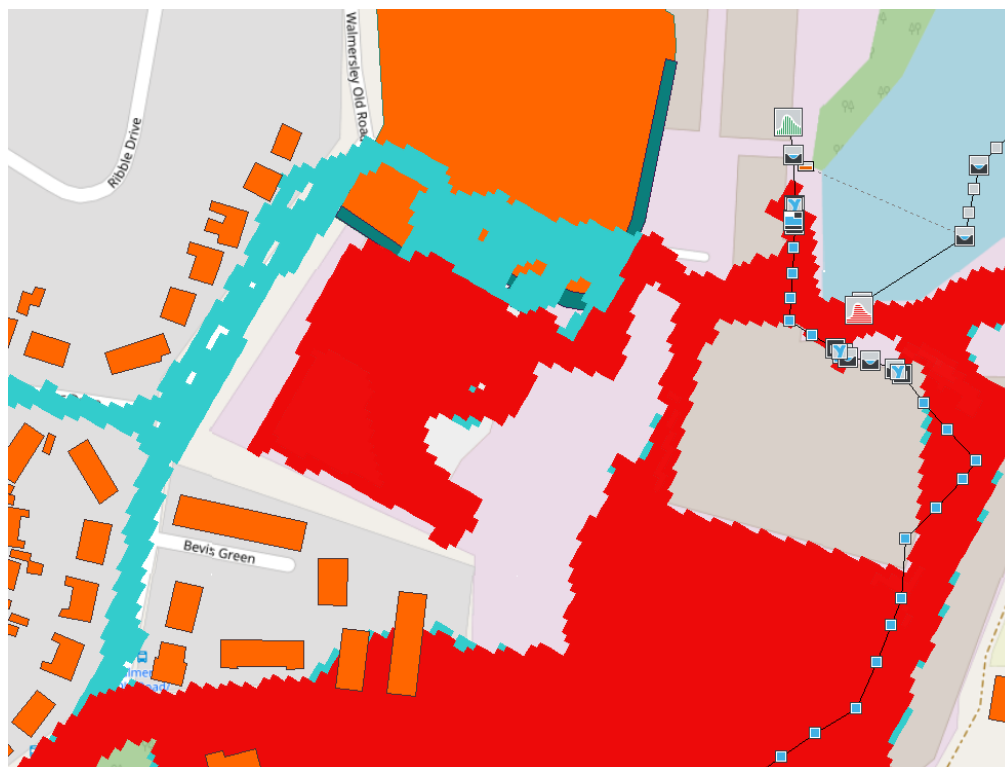


Figure 3.4: Existing 1:1000 year flood extent (blue) and 1:1000 year flood extent with Phase 1 bund in position overlaid (red)

4.0 Phase 1: Surface Water Drainage

Refer to Drawing No. 456-ED-30 [*Phase 1 Drainage*] (by Barratt Homes) enclosed with this Report.

- 4.1 The approved discharge rate for the entire development site is 93 l/s. Discharge from the Phase 1 development will be released at a proportion of this rate based upon the Phase 1 impermeable area as a proportion of the total development site impermeable area. Attenuation storage will be provided in a combination of 1500mm oversize pipework and crate storage to accommodate runoff arising from storms up to the 1:100 year + 40% climate change event without flooding. Table 4.1 below summarises the proposed Phase 1 surface water drainage management proposal.

Table 4.1: Phase 1 Surface Water Drainage Management

Impermeable Area (ha)		Permissible Discharge Rate (l/s)	Required Attenuation
Total Site	3.73	93	Refer to approved <i>Flood Risk Assessment</i>
Phase 1	1.09	27.9	576m ³ storage required to be provided by: 119m of 1500mm pipe & 5 no. 3m diameter manholes (316m³) 162.5m² x 1.6m deep cellular storage (260m³)

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- 4.2 Discharge will be via a temporary flow control and outfall to the existing culvert (Pigs Lee Brook Tributary). The Phase 1 drainage will be connected to the wider site drainage network at the appropriate time. At that time the temporary flow control and outfall will be decommissioned.

Design Exceedance

- 4.3 In the event of design exceedance or blockage of the drainage system, surface water may emerge at ground level and flow towards the southern end of the Phase 1 development area. It will be prevented from leaving the Phase 1 area by the proposed flood mitigation bund (0.5m high). Instead flow will be conveyed through the rear gardens of Phase 1 Plots 147 - 151 before flowing onto the Walmersley Old Road and flowing southwards along the road without impacting on existing or proposed dwellings.

5.0 Summary

- 5.1 Table 5.1 below summarises how the requirements of Planning Condition 31 will be met by Phase 1 of the development.
- 5.2 We can upload modelled results if required by the Environment Agency. To this end we would be grateful if a sharefile link could be emailed to us if uploading is required.

Table 5.1: Summary of Planning Condition 31 Requirements & Measures to be Implemented

Planning Condition 31 Requirement	Measures to be implemented to address Planning Condition 31 Requirement
1. Include an updated model and assessment of fluvial flood risk, demonstrating that flood risk can suitably managed on site	Additional hydraulic modelling has been undertaken (1:100yr & 1:1000yr scenarios) to determine the impact of excluding existing floodplain from the Phase 1 development area. Results show that flood risk associated with events up to the 1:1000yr flood event can be safely managed onsite. This will be achieved through the implementation of a 500mm high earthworks bund along the Phase 1 boundary in the affected area. Refer to CEC Plan 6155/513 [<i>Phase 1 Flood Risk Mitigation - 1:100 & 1:1000 Year Extents</i>], enclosed with this Report.
2. Demonstrate consideration of the impacts of climate change	Climate change has not been considered as the Phase 1 work is to be undertaken under present day conditions.
3. Ensure that there are no detrimental impacts to flood storage or flood flow routes	Additional hydraulic modelling results shows that there will be no detrimental offsite impact on flood risk arising from implementation of a bund along the Phase 1 perimeter.
4. Ensure any mitigation measures proposed are sufficient and do not increase the risk of flooding	Additional hydraulic modelling results show that for floods up to the 1:1000 year event, excluding existing floodplain from the Phase 1 development area will not increase flood risk elsewhere. Exclusion of floodwater from the Phase 1 area will be achieved through the implementation of a 500mm high earthworks bund along the Phase 1 boundary in the affected area. CEC Plan 6155/513 [<i>Phase 1 Flood Risk Mitigation - 1:100 & 1:1000 Year Extents</i>], enclosed with this Report.

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Planning Condition 31 Requirement	Measures to be implemented to address Planning Condition 31 Requirement
5. Prevent flooding by ensuring the satisfactory storage of/disposal of surface water from the site	Attenuation storage will be provided in a combination of 1500mm oversize pipework and crate storage to accommodate runoff arising from storms up to the 1:100 year + 40% climate change event without flooding. Design exceedance flows will be routed through rear gardens of Phase 1 plots 147 - 151 before flowing onto the Walmersley Old Road and southwards along the road without impacting on existing or proposed dwellings.

Cole Easdon Consultants Limited

April 2020

Enclosures

CEC Figure 6155/500 Figure 1 Site Location Plan
CEC Plan 6155/513 Phase 1 Flood Risk Mitigation - 1:100 & 1:1000 Year Extents
Drawing No. 456-ED-30 Phase 1 Drainage (by Barratt Homes Manchester)
Hydraulic Model (Not included - Uploaded separately to Environment Agency Portal)

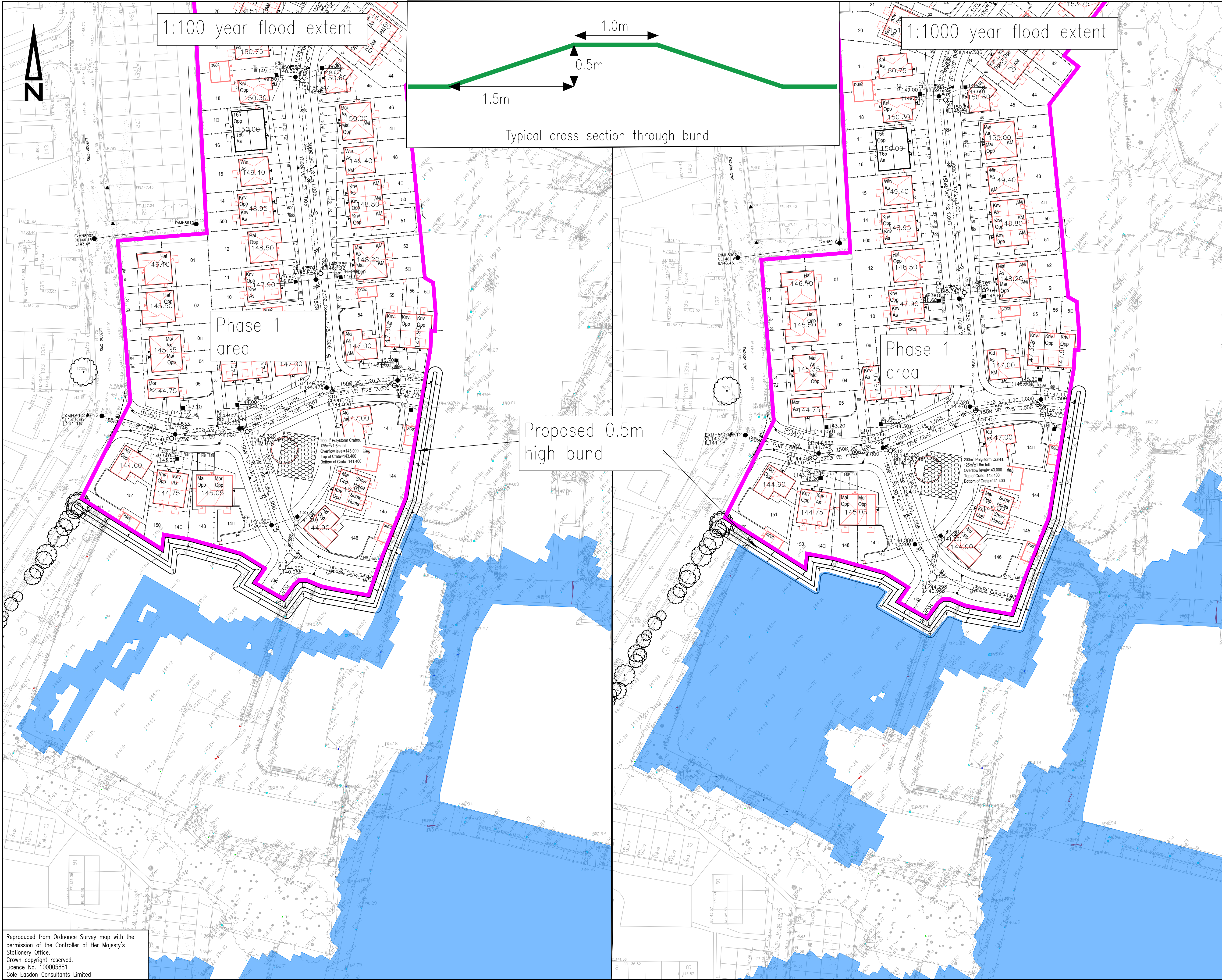
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Enclosures



Key

Proposed bund

Phase 1 development area

Modelled post bund 1:100 1:1000 flood extents

- Notes:**
1. All levels are in metres above ordnance datum
 2. All dimensions are in millimetres unless stated otherwise
 4. Topographical survey undertaken by Survey Design Limited, March 2015.
 5. Proposed layout provided by Barratt Homes Manchester. Drawing Ref 456/ED/02 Rev G

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COLE EASDON CONSULTANTS

160 AZTEC
AZTEC WEST
ALMONDSBURY
BRISTOL
BS32 4TU
Tel : 01454 800474

Web Site www.ColeEasdon.com
E-mail br@ColeEasdon.com

Client
Barratt Homes (Manchester)

Job Title
**Proposed Residential Development
Former Tetrosyl Site
Walmersley old Road
Bury**

Drawing Title
**Phase 1 Flood Risk Mitigation
1:100 1:1000 year extents**

Drawing Status				
FOR COMMENT	FOR TENDER	FOR APPROVAL	FOR CONSTRUCTION	AS BUILT
CONSTRUCTION AT CLIENT / CONTRACTOR RISK				
Designed by	Drawn by		Checked by	
NJ	NJ		DF	
Date	February 2020		Scale	1:500 A1

Dwg. No.
6155/51

Rev.

WARNING TO HOUSE PURCHASERS
Property Misdescriptions Act 1991

Buyers are warned that this is a working drawing and is not intended to be treated as descriptive material describing, in relation to any particular property or development, any of the Specified matters prescribed by any Order made under the above Act. The contents of this drawing may be subject to change at any time and alteration and variation can occur during the progress of the works without revision of the drawing. Consequently the layout, form, content and dimensions of the finished construction may differ materially from those shown. Nor do the contents of this drawing constitute a contract, part of any contract or a warranty.

Quick Storage Estimate

Micro Drainage

Variables

FSR Rainfall

Return Period (years) 100

Region England and Wales

Map M5-60 (mm) 19.000

Ratio R 0.286

Cv (Summer) 0.750

Cv (Winter) 0.840

Impermeable Area (ha) 1.090

Maximum Allowable Discharge (l/s) 27.9

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 1.0

Climate Change (%) 40

Analyse OK Cancel Help

Enter Climate Change between -100 and 600

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 436 m³ and 716 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Climate Change between -100 and 600

Phase 1 drainage calculations:

Total Site Impermeable Area=3.73Ha
Phase 1 Impermeable Area=1.09Ha
Total Site Allowable Discharge=93l/s
Phase 1 Allowable Discharge=27.9l/s

Quick Storage Estimate for 1 in 100yr + 40%= Average of 576m³ volume required.
119m of 1500Ø + 5No. 3000Ø MHs=316m³
+260m³ polystorm crates=576m³ volume provided.

- Phase 1 boundary
- Phase 1 Impermeable Area
- Phase 1 Drainage required



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MANCHESTER

Barratt Homes Manchester
(A division of BDW Trading Ltd)
4 Brindley Road
City Park
Manchester
M16 9HQ
Tel: 0161 872 0161
Fax: 0161 855 2828

Job	Tetrosyl Bury	Title	Phase 1 Drainage	Design By	DK	Date	25.02.20	Drawing Number	456-ED-30	Rev	-
CAD By	DK	Scale	@ A1 1:500								