

The Glasswork - Barnsley

Interim Surface Water Strategy

13th October 2017

Issue and Revision Record

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1. Introduction

Previous correspondence relating to the proposed drainage strategy has been issued by Mott MacDonald on behalf of Barnsley Metropolitan Borough Council (BMBC) to Yorkshire Water (YW).

This strategy describes the post-development scenario, when all Phases of the scheme have been completed.

This document outlines that strategy for the interim period, between the construction of Phase 1 and Phase 2.

The Glassworks in Barnsley, previously referred to as Better Barnsley, consists of a new cinema, retail outlet, food and drink vendors, a new indoor market and library. Prior to RIBA Stage 3 commenced, discussions with YW culminated in the agreement that the total discharge from the final completed site, could be no more than the total site run off for a 1 in 100 year event with a 30% betterment. This equates to a total site run off of 299l/s.

For more detailed information on the final site drainage strategy, refer to the separately issued document "The Glassworks – Drainage Strategy Rev D" Ref 343537/EST/YHE/D1/A.

2. Post-Construction Surface Water Strategy

In this section, a more detailed description is given for the final discharge rates, as well as information on how attenuation is to be provided.

The existing site is fully developed and there are limited opportunities to infiltrate surface water as a method of disposal. Surface water from the existing site is collected from roofs and pavements and discharged directly to Sough Dyke culvert and Yorkshire Water sewers. The new development will see the buildings and pavements remodelled utilising the existing suspended concrete floor slab and basement footprints.

It is proposed to install new surface water drainage to collect surface water from the roofs and pavements using a network of pipes under-slung and fixed to the underside of the suspended floor slab. This system will connect to new on-line attenuation tanks that will be constructed in an area of the existing basement that has been set aside for this purpose. The attenuation tanks will discharge to the existing surface water pipes which run under the basement floor and connect to Sough Dyke via a vortex flow control device. Any existing surface water connection to the Yorkshire Water combined sewer will be removed so that all site surface water drainage will enter the on-line attenuation tanks and discharge to Sough Dyke.

The proposed access road to the East of the site will not be adopted as a public highway and therefore will discharge its surface water run-off to the private surface water sewer network as described above. No amendments are to be made to Kendray Street drainage or that of any public highway. Interceptors will be installed downstream of all hardstanding areas that will be trafficked by motor vehicles.

A reduction in the total site run-off of 30% for a 50mm/hr event has previously been agreed. As described below it has been agreed that the surface water run-off from May Day Green (including public library) will be allowed to freely discharge to the existing drainage assets locally and that this flow rate will be discounted from the overall site discharge rate giving the agreed overall 30% reduction.

The below impermeable areas have been calculated from the site plans and used to estimate the existing surface run-off. The Lloyd-Davies equation with a rainfall intensity of 50mm/hr has been used to calculate flow rates.

Table 1: The Glassworks Allowable Discharge Calculations

Catchment	Area (m ²)	Area (ha)	Q (l/s)
DS2 (North Kendray St)	2574	0.2574	35.8
Site (Met Centre and Car Park)	26210	2.6210	364.3
May Day Green inc. library	1961	0.1961	27.3
Total:			427.4
30% Betterment			299.2
Minus May Day Green			272.9
Free Draining Areas			
Access Road and Rotunda	4323	0.4232	60.1
Glassworks Site Allowable Discharge			211.8

Table 1 above shows the maximum site discharge excluding May Day Green and areas of the site that are to be allowed to discharge without restriction is 211l/s. This will be split between two on-line flow controls, one serving Areas 2 and 3 detailed in Figure 1 below. The combined discharge of these

two flow controls is 205l/s, allowing 6l/s for future areas that may require free discharge but haven't been accounted for here. If this is not required, there is an opportunity to increase flow rates and decrease attenuation sizes.

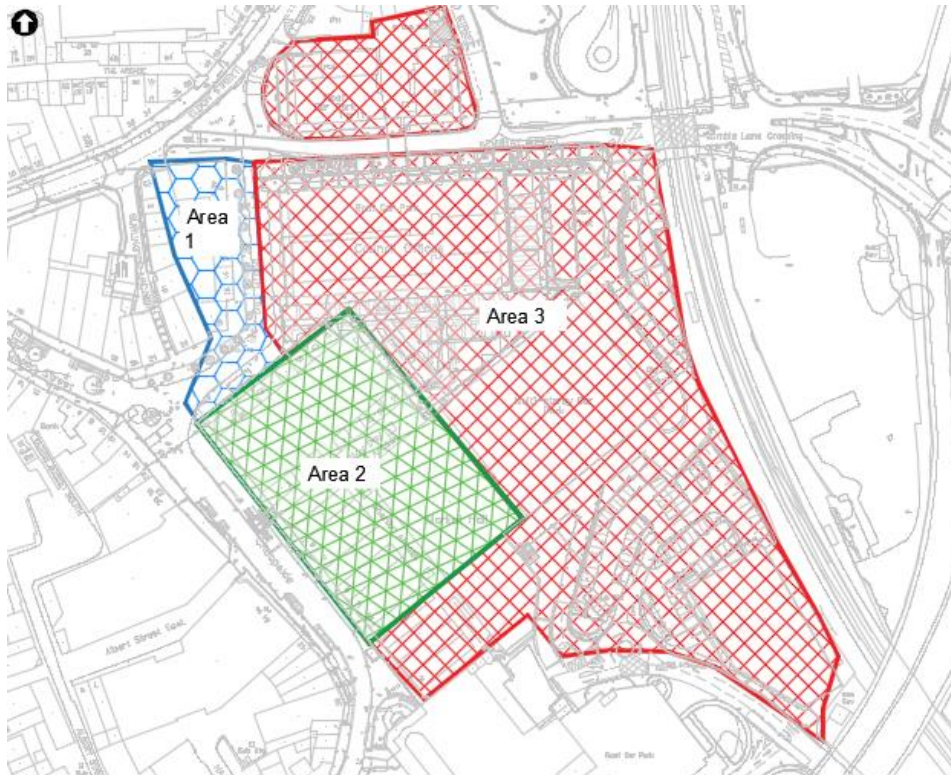


Figure 1: Site Areas

2.1 Area 1 – May Day Green including public library

May Day Green is the first part of the site to be developed. It has been provisionally agreed that this area will use a free discharge for surface water which will effectively be equal to the current run-off rates as the whole of the site was previously roof / paved area and this will be retained by the planned development.

The unrestricted run-off from this area will be deducted from the estimated total site allowable run-off, leaving a total reduction in run-off of 30%

2.2 Area 2 – Met Centre Redevelopment

The redevelopment of the Met Centre Market will turn what was previously a building and multi-story car park with 100% impermeable area into a mixed retail and entertainment space with external paved areas and thus will remain 100% impermeable.

The surface water system will collect run-off from the roofs and paved areas within the site area and convey the flows to new attenuation tanks in the basement. A flow control will limit the peak discharge to 157l/s such that the total peak discharges for Areas 1 & 2 is equivalent to the existing combined peak run-off reduced by 30%.

Preliminary storage calculations have been undertaken which estimate that an attenuation capacity in the order of 400m³ will be required to control the surface water discharge prior to connection to Sough Dyke. The externally paved areas may provide potential to install permeable paving which would capture and store rain water in the sub-base before draining into the central attenuation tanks in the basement area.

2.3 Area 3 – Southern Development Area

The southern development area will comprise new retail units, a multi-storey car park and a new service access road, hence all areas within this zone will be impermeable.

Surface water from the multi-storey car park and new retail units will be attenuated in a storage tank beneath the car park, with an estimated volume of 65m³. Discharge from this attenuation tank will be limited to 48l/s.

Surface water from the new service access road will be allowed to free drain into the existing surface water sewer, this has been accounted for in the overall site discharge calculation.

The combined site attenuation discharge rates have been balanced with the areas allowed to free drain, to achieve the required 30% reduction in peak run-off compared to the existing peak run-off rate.

3. Interim Period Drainage

As the project is split into two phases, with Phase 1 going live as Phase 2 construction commences, this section sets out the proposed strategy for the interim period.

When Phase 1 of the project achieves completion and the Met Centre opens to public use, demolition work for Phase 2 will commence. Following the demolition of the existing multi-storey car park, the construction of the new build elements will begin. As the on-line attenuation tanks described in the previous section are to be installed as part of Phase 2, there will be a period of time where no attenuation is operational.

The existing area does not benefit from any formal attenuation or flow control devices. All areas of the site are allowed to freely discharge into Sough Dyke or in some locations to the Yorkshire Water sewer. It is therefore proposed that in the interim stage as per the existing scenario the new drainage systems are connected without attenuation to Sough Dyke. Once the surface water network and associated flow controls have been installed as part of Phase 2, the pipework from Phase 1 will be rerouted to connect to the attenuation tanks, following the routes shown in the Drainage Masterplan for Stage 4. The Stage 4 masterplan is shown in Appendix A for reference.

The interim drainage strategy will utilise existing below ground surface water networks that are currently used to drain the existing Met Centre building. These pipe networks are shown in the Interim Drainage Strategy drawings in Appendix B. As proposed foundations may potentially clash with existing pipework, drainage diversions will be carried out in this interim period. These are illustrated in Appendix B. Once the Met Centre is live, surface water will use existing networks. These networks will be protected by the Contractor during the demolition of the car park. Once the site is cleared and construction of Phase 2 commences, diversion works will be carried out to allow installation of the piled foundations. These diversion routes will be used until the completion of Phase 2, when the attenuation tanks and flow controls will be operational.

This strategy, although it does not provide formal attenuation, is seen as a nil detriment solution. As previously mentioned, no storage is currently used by the site. Therefore, the peak discharge from the Phase 1 will not be greater than current discharge rates.

4. Conclusion

The completion of Phase 1 and 2 will see a reduction in the total site run-off of 30%.. This will be provided through two attenuation tanks and two flow control devices in the basement area of the site. The combined peak discharge rate from these devices will be no greater than 211l/s.

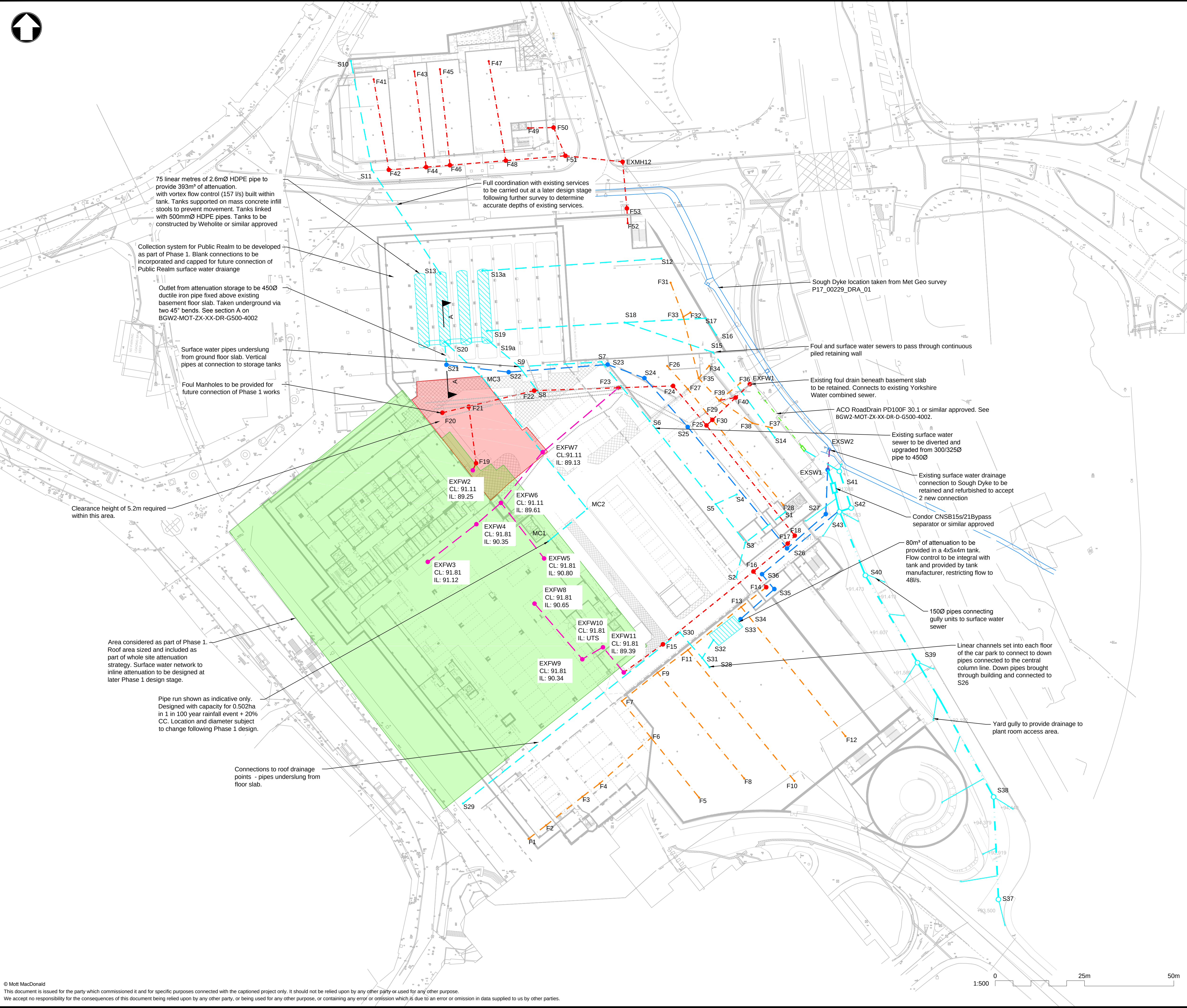
Following the completion of Phase 1 and prior to the completion of Phase 2, existing and new pipe networks will be used to discharge surface water into Sough Dyke via the existing outfall to the East of the site. No attenuation will be provided at this stage, however the peak run-off rate will not be greater than the existing situation and is therefore seen as a nil-detriment solution.

Appendices

A.	Stage 4 Drainage Masterplan	8
B.	Drainage Phasing Plan	10

A. Stage 4 Drainage Masterplan

BGW2-MOT-ZX-XX-DR-D-G500-0500 P01 – Drainage Strategy Masterplan



Notes

1.

All dimensions are in metres unless stated otherwise.

2.

Do not scale from this drawing, if in doubt, ask.

3.

Surface water to be managed via two separate systems.

Northern Attenuation Volume: 393m³
Southern Attenuation Volume: 80m³

4.

Tank outfalls adjusted to ensure whole site provides a 30% betterment from existing scenario.

Northern Tank Outfall: 157l/s
Southern Tank Outfall: 48l/s

5.

Surface water from the access road and east of building zone ZA is to drain unrestricted as per existing.

6.

Foul and roof drainage connection points and flows estimated by MM drainage team and shown indicatively, to be confirmed with Architect and Public Health Engineer.

7.

To be read in conjunction with the latest version of the Mott MacDonald Ltd Design Risk Register.

8.

Clearance height of 4.6m provided throughout basement area, except in areas where no trafficking will take place or as indicated on the plan.

9.

Suspended pipe material to be selected by the contractor with fixing spacing to suit.

11.

Phase 1 foul and surface water design to be carried out at later date. Connections points to phase 2 network provided in this design for future connection. Further pipework beneath the Met Centre to be retained as appropriate.

12.

Potential contaminated ground, including asbestos, due to historical land use.

13.

Potential buried structures/obstructions in ground due to historical land use.

Key to symbols

Phase 1 Area

5.2m clearance height required

Proposed attenuation

Proposed Surface Water Sewer above basement slab

Proposed Foul Water Sewer above basement slab

Proposed Surface Water beneath basement slab

Proposed Foul Water Sewer beneath basement slab

Existing Foul Water Sewer beneath basement slab

Existing Surface Water Sewer beneath basement slab

Proposed Surface Water Linear Channel

Proposed Highway Drainage

Existing Pipework to be Abandoned

Reference Drawings

BGW2-MOT-ZX-XX-DR-D-G500-4001

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Drainage Details Drawing Sheet 1 of 2

BGW2-MOT-ZX-XX-DR-D-G500-4002

-

Drainage Details Drawing Sheet 2 of 2

P17_00229_DRA_1

-

Met Geo Basement Survey

P01

06/10/2017

MCS

Issued for Tender

AP

JRK

Rev

Date

Drawn

Description

Ch'k'd

App'd

Status Stamp

FOR TENDER

M

M

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Barnsley Metropolitan Borough Council

Title

The Glass Works
Site Wide
Drainage Strategy
General Arrangement

Designed

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Eng. check

A Precious

AJP

Drawn

M Smith

MCS

Coordination

J Kirkham

JRK

Dwg. check

A Precious

AJP

Approved

N Thonber

NT

MMD Project Number

366962

Scale at A1

1:500

Security

STD

Suitability Description

Suitable for Tender

Suit. Code

D2

Project

Originator

Zone

Level

Type

Role

Class

Number

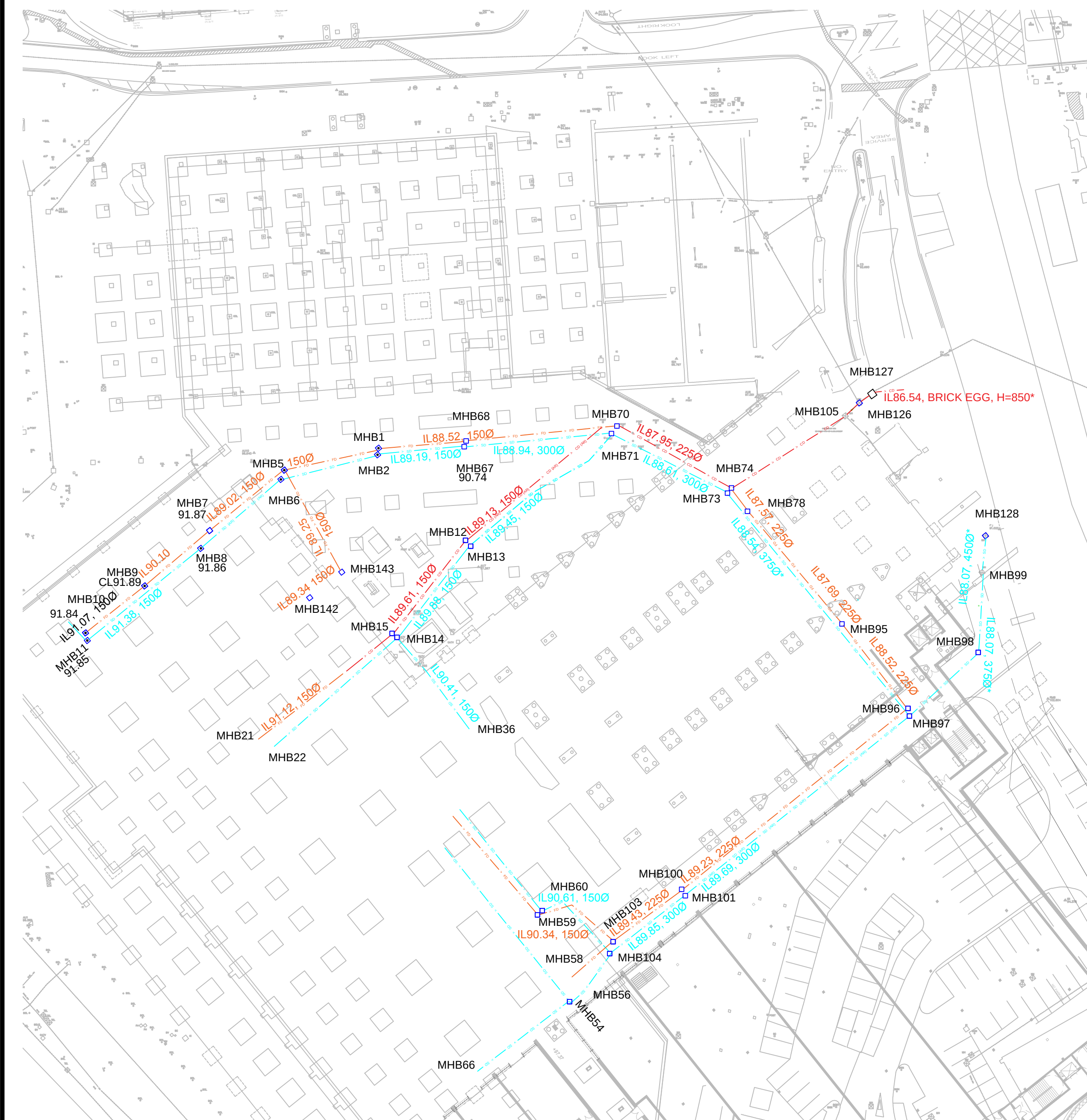
Revision

BGW2 - MOT - ZX - XX - DR - D - G500 - 1001

P01

B. Drainage Phasing Plan

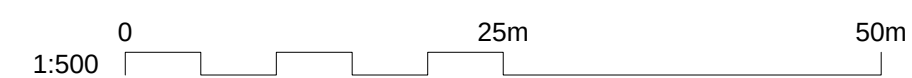
MMD-366962-D-DR-00-XX-1403 P1 – Drainage Phasing Plan



1:500



1:500



1. All dimensions are in metres unless stated otherwise.
2. Do not scale from this drawing, if in doubt, ask.
3. Existing drainage runs beneath slab and manhole references taken from MetGeo survey P17_00229_DRA (P)
4. To be read in conjunction with the latest version of the Mott MacDonald Ltd Design Risk Register.
5. Phase A refers to demolition of existing multi-storey car park to the east of the existing Met Centre
6. Phase B refers to post demolition, pre-piling works in the area of the demolished car park.
7. Foundation information taken as an extract from the Revit models on 30th August 2017

Plan A Key of Symbols

- ### Plan B Key of Symbols

-  Existing Surface Water Sewer to be Retained
 Existing Foul Sewer to be Retained
 Existing Combined Sewer to be Retained
 Proposed Surface Water Diversion
 Proposed Foul Water Diversion
 Sewers to be Abandoned
 Proposed Foul Water Manhole
 Proposed Surface Water Manhole

P1	31/08/2017	MCS	For Information	AP	JRK
Rev	Date	Drawn	Description	Ch'k'd	App'd

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Barnsley Metropolitan Borough Council

The Glass Works
Site Wide
Drainage Strategy
Pipe Protection During Demolition

Designed	M Smith	MCS	Eng. check	A Precious	AJP			
Drawn	M Smith	MCS	Coordination	J Kirkham	JRK			
Dwg. check	A Precious	AJP	Approved	N Thonber	NT			
MMD Project Number 366962			Scale at A1 1:500		Security STD			
Suitability Description Suitable for Stage Approval					Suit. Code S3			
Project	Originator	Zone	Level	Type	Role	Class	Number	Revision
BGW2 - MOT- ZX - XX - DR - D - G500- 1005								P01

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