



# Better Barnsley

Drainage Strategy

April 2017

Barnsley Metropolitan Borough Council





# Better Barnsley

Drainage Strategy

April 2017

Barnsley Metropolitan Borough Council

Gateway Plaza  
PO Box 634  
Barnsley  
S70 9GG



# Issue and revision record

<b>Revision</b>	<b>Date</b>	<b>Originator</b>	<b>Checker</b>	<b>Approver</b>	<b>Description</b>
A	01/04/2016	B Penny	A Precious	J Kirkham	Stage 3
B	15/06/2016	B Penny	A Precious	J Kirkham	First Issue
C	04/04/2017	M Smith	A Precious	J Kirkham	For Planning

**Information class: Standard**

This document is issued for the party which commissioned it and for specific purposes connected with the above-captioned project only. It should not be relied upon by any other party or used for any other purpose.

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 other parties.

This document contains confidential information and proprietary intellectual property. It should not be shown to other parties without consent from us and from the party which commissioned it.



# Contents

<b>Chapter</b>	<b>Title</b>	<b>Page</b>
<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Purpose of the Report _____	1
1.2	Proposed Development _____	1
<b>2</b>	<b>Site Description</b>	<b>2</b>
2.1	Existing Site _____	2
2.2	Existing Drainage _____	3
2.2.1	Main Rivers _____	3
2.2.2	Ordinary and Manmade Watercourses _____	3
2.2.3	Sewers _____	4
2.3	Ground Water _____	5
2.3.1	Groundwater Source Protection Zone _____	5
2.4	Flood Risk _____	5
<b>3</b>	<b>Drainage Strategy</b>	<b>6</b>
3.1	Surface Water _____	6
3.1.1	Area 1 – May Day Green _____	6
3.1.2	Area 2 – Met Centre Redevelopment _____	6
3.1.3	Area 3 – Southern Development Area _____	7
3.2	Foul Water _____	7
3.3	Rainwater Harvesting _____	8
3.4	SuDS Drainage _____	8
3.5	Other Discharge Options _____	9
<b>4</b>	<b>Conclusions</b>	<b>10</b>
	<b>Appendices</b>	<b>11</b>
	Appendix A. Proposed Development Plan _____	12
	Appendix B. Yorkshire Water Sewer Record Plan _____	14
	Appendix C. Site Utility Survey _____	16
	Appendix D. Surface Water Drainage Strategy Plan _____	18

# 1 Introduction

## 1.1 Purpose of the Report

Mott MacDonald have been appointed by NPS to undertake Structural and Civil Engineering design for the redevelopment of the Barnsley “Met Centre” located in Barnsley town centre.

This report summarises the foul and surface water strategies in respect to the development of a multi-storey mixed retail and leisure development which partly re-uses existing buildings and is part new construction over what was the “Met Centre”.

## 1.2 Proposed Development

A site plan of the proposed development is included in Appendix A.

At this stage key elements of the development have been scoped out including the locations of:-

- Two stories of open plan market stalls
- Food halls
- Retail units
- Back of house areas
- Customer and staff toilet and welfare facilities
- External boulevards and public open spaces

The May Day Green Development, located to the northwest of the development site, is linked to the Met Centre site but will be undertaken separately.

The site slopes generally from west to east with ground levels varying from 96.7m to 93.0mAOD. However, the floor slabs for the development will remain level at approx. 96.7mAOD support on concrete columns and beams above the basement and under-croft.

## 2 Site Description

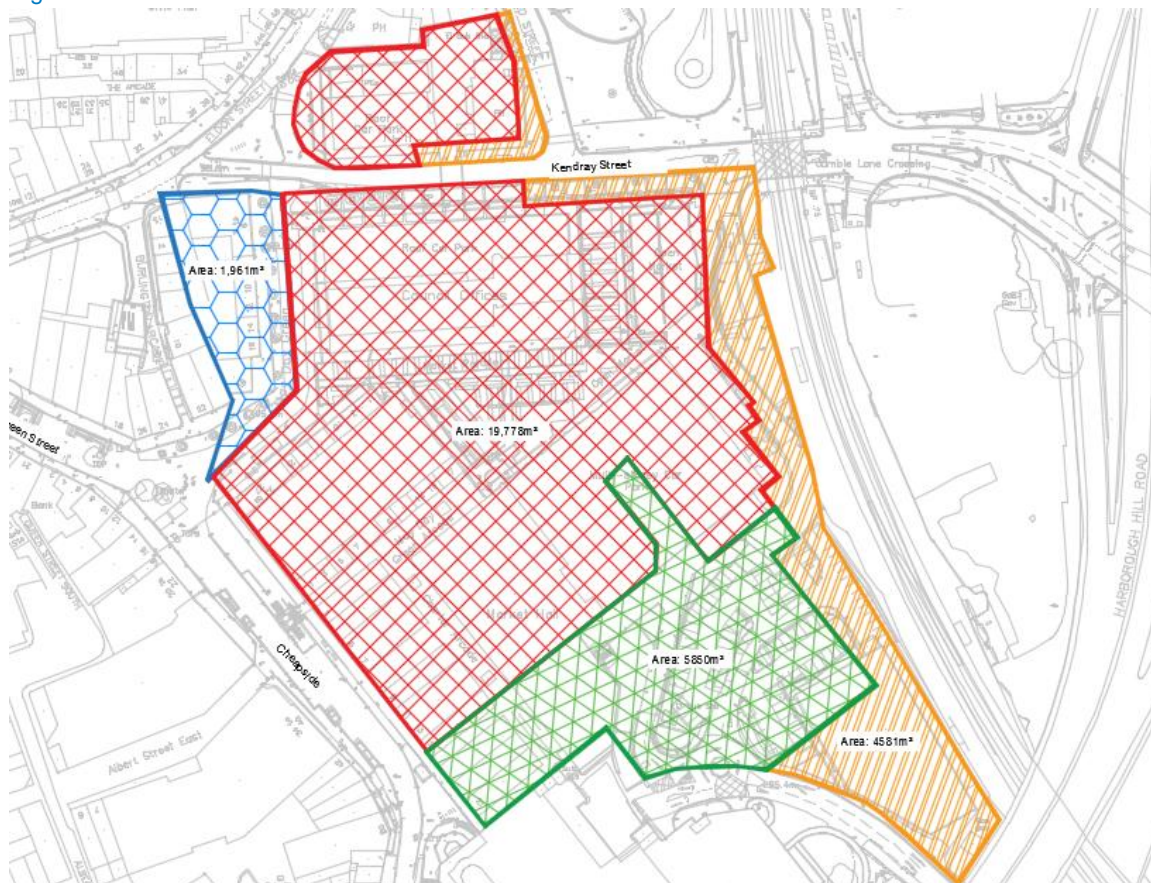
### 2.1 Existing Site

The site covers approximately 3 ha and comprises the former Council offices off Kendray Street, the old Market Hall building and the associated multi-story carpark and May Day Green. The Met Centre site is currently occupied by concrete frame buildings that are largely in use. The former central office building and May Day Green buildings have been demolished to floor slab level and The TEC Building on the opposite side of Kendray Street is currently being demolished. This will leave the existing basement and under-croft area intact for use as part of the future development.

Queen Street and Cheapside provide street level access on the western side of the site. The eastern boundary is formed by the railway line into the town and the low level service road access which leads to the basement and under-croft.

The site is currently completely developed with hard pavements and buildings and does not include any areas of soft landscaping.

Figure 2.1: SITE LOCATION PLAN



Source: Mott MacDonald Drainage Plan

## **2.2 Existing Drainage**

### **2.2.1 Main Rivers**

A culverted watercourse (Sough Dyke) is shown on the services survey plan, which has been compiled using GPR, as running eastwards under Kendray Street before turning southwards and crossing under the north east corner of the site.

All of the surface water and roof drainage from the Met Centre and former central offices site is discharged to Sough Dyke culvert via a manhole on the south east perimeter of the site.

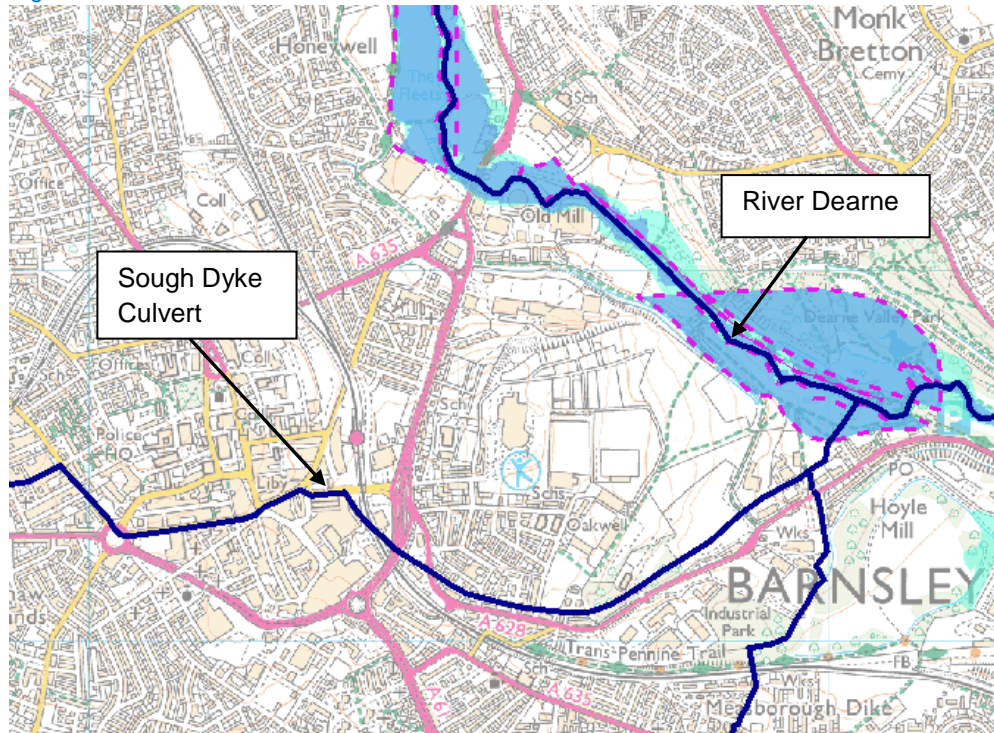
Roof drainage from May Day Green building (1450m<sup>2</sup>) is collected at several points with the majority of the roof area (1355m<sup>2</sup>) connected into Sough Dyke culvert. The remaining 95m<sup>2</sup> of roof is connected to the Yorkshire Water combined drainage system in Burlington Arcade.

The Environment Agency (EA) Flood Maps also show that the River Dearne is located approximately 1.1km to the east of the site.

### **2.2.2 Ordinary and Manmade Watercourses**

There are no ordinary water courses within the site.

Figure 2.2: Location of Main Rivers



Source: EA Flood Mapping

### 2.2.3 Sewers

#### Yorkshire Water Sewers

Yorkshire water have provided their sewer plans for this location, which indicate Surface Water and Combined sewers running in Cheapside, May Day Green and Kendray Street

An extract from the Yorkshire Water Sewer Record Plan is included in Appendix B.

#### Private Drains

CCTV and GPR surveys have been undertaken on the site, these show, to a limited extent, foul and surface water drainage connections on the site. It is assumed that much of the existing drainage is collected at slab level and then routed along pipes slung from the underside of the slab. These then connect to pies situated under the base slab of the under-croft. The survey also located a combined drain exiting the under-croft area to the east side of the site.

An extract from the site services survey plan is included in Appendix C

## **2.3 Ground Water**

### **2.3.1 Groundwater Source Protection Zone**

Groundwater Source Protection Zones (GWSPZ) show the level of risk of contamination from any activities that might cause pollution to licensed water abstractions in the area. It is considered that the closer the activity is to a GWSPZ, then the greater the risk.

A review of the EA's GWSPZ maps for the development site location shows that the site is not located within a GWSPZ.

## **2.4 Flood Risk**

A Flood Risk Assessment (FRA) for Barnsley Town Centre has been prepared by WYG. There is no proposal to undertake a separate FRA for this site. In summary the WYG document highlighted the risk of flooding from the culverted water course, Sough Dyke, which is known to surcharge to surface during intense rainfall events.

## 3 Drainage Strategy

### 3.1 Surface Water

As detailed previously 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 building footprints.

It is proposed to install new surface water drainage to collect surface water from the roofs and pavements using a network of pipes slung and fixed to the underside of the suspended floor slab. This system will connect to new in-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 as shown on the Surface Water Drainage Strategy Plan in Appendix D.

The Lloyd-Davies assessment has been used to calculate the current run-off profile from the site. The site has been split into three distinct areas.

Area 1 – May Day Green 2,000m<sup>2</sup>

Area 2 – Met Centre Redevelopment 19,800m<sup>2</sup>

Area 3 – Southern development area 10,200m<sup>2</sup>

#### 3.1.1 Area 1 – May Day Green

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.

#### 3.1.2 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 160l/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 suggest that an attenuation capacity in the order of 400m<sup>3</sup> will be required to control the surface water discharge at 30% less than is currently experienced.

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.

### **3.1.3 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 65m<sup>3</sup>. 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. 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.

## **3.2 Foul Water**

The foul drainage will be collected via a separate system. The previous buildings on the Met' Centre site were served by foul drainage pipes located under the basement floor slab and these remain are to in place. The large office complex and market hall site were of a similar or greater scale to the planned developments on the site. Survey plans of the existing pipe network show pipe diameters ranging from 150mm to 300mm. A provisional calculation of foul flows based on estimated Discharge Units (DU's) in accordance with BS EN 12056-2:2000 indicates that this will be sufficient to service the proposed developments on the site.

Foul water from the Met Centre will be collected internally to service the Food Courts, Toilet and welfare facilities and washing basins and floor gully in the market halls. The connection points will need to be reconfigured to suit the new layout. The foul pipes will be fixed / slung from the underside of the suspended floor slab to connect to existing sewer entry points.

Foul water from kitchens and food preparation areas will be directed through fat and grease trap units before discharge to the public sewer network.

The existing foul water drainage from the site connects to a 150mm diameter combined public sewer which cuts across the eastern side of the site before running under the railway line.

The foul drainage for May Day Green building will utilise existing connections.

### 3.3 Rainwater Harvesting

There are no proposals to include rainwater harvesting within the development. However, consideration will be given to utilising the rainwater held within the attenuation tanks for water features that may be installed within the public realm space to be developed adjacent to Kendray Street.

### 3.4 SuDS Drainage

The application of the ‘SuDS Manual’ CIRIA report C753 for new developments requires that the runoff from sites is not only restricted to meet the Greenfield runoff characteristics but also that SuDS systems are utilised to improve the quality of the runoff prior to outfall to watercourses.

The manual and EA guidance applies a sustainability hierarchy to the various types of SuDS systems, this is summarised in the following table;

	SuDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Most Sustainable	Living roofs	√	√	√
	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	√	√	√
↑	Filter strips and swales	√	√	√
	Infiltration devices - soakaways - infiltration trenches and basins	√	√	√
Least Sustainable	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paviers	√	√	
	Tanked systems - over-sized pipes/tanks - Cellular Storage	√		

Living or green roofs, which can provide improvements to water quality as well as attenuation benefits, may be possible to construct as part of the new buildings to the periphery of the site, however, the main element of the development is within the existing market hall where the existing structure will be retained. The application of green roofs in the context of the proposed development is therefore limited and unlikely to provide significant benefits.

The use of basins and ponds can also address water quality as well as providing attenuation. In addition the features can be presented to provide wildlife habitats and public amenity. However, the development is located entirely over a suspended concrete floor slab and such water features are not practical to construct.

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. This will require careful coordination between external paving levels and the internal floor levels of adjacent shops and premises. The use of permeable paving and sub-base materials will improve the quality of surface water discharged to Sough Dyke culvert.

Other SuDS solutions include the provision of storage to attenuate and control discharges and help protect the downstream catchments. The inclusion of 465m<sup>3</sup> of attenuation storage will fulfil this function to allow the peak discharge rate from the site to be reduced by 30%.

### **3.5 Other Discharge Options**

The location of the site does not allow for further options to discharge the surface water. Infiltration is not practical as the site is located on top of an existing suspended concrete slab. Large scale infiltration would require significant modification to the existing basement and breaking out large areas of concrete slab and foundations and is not considered viable.

## 4 Conclusions

This report has identified the following:-

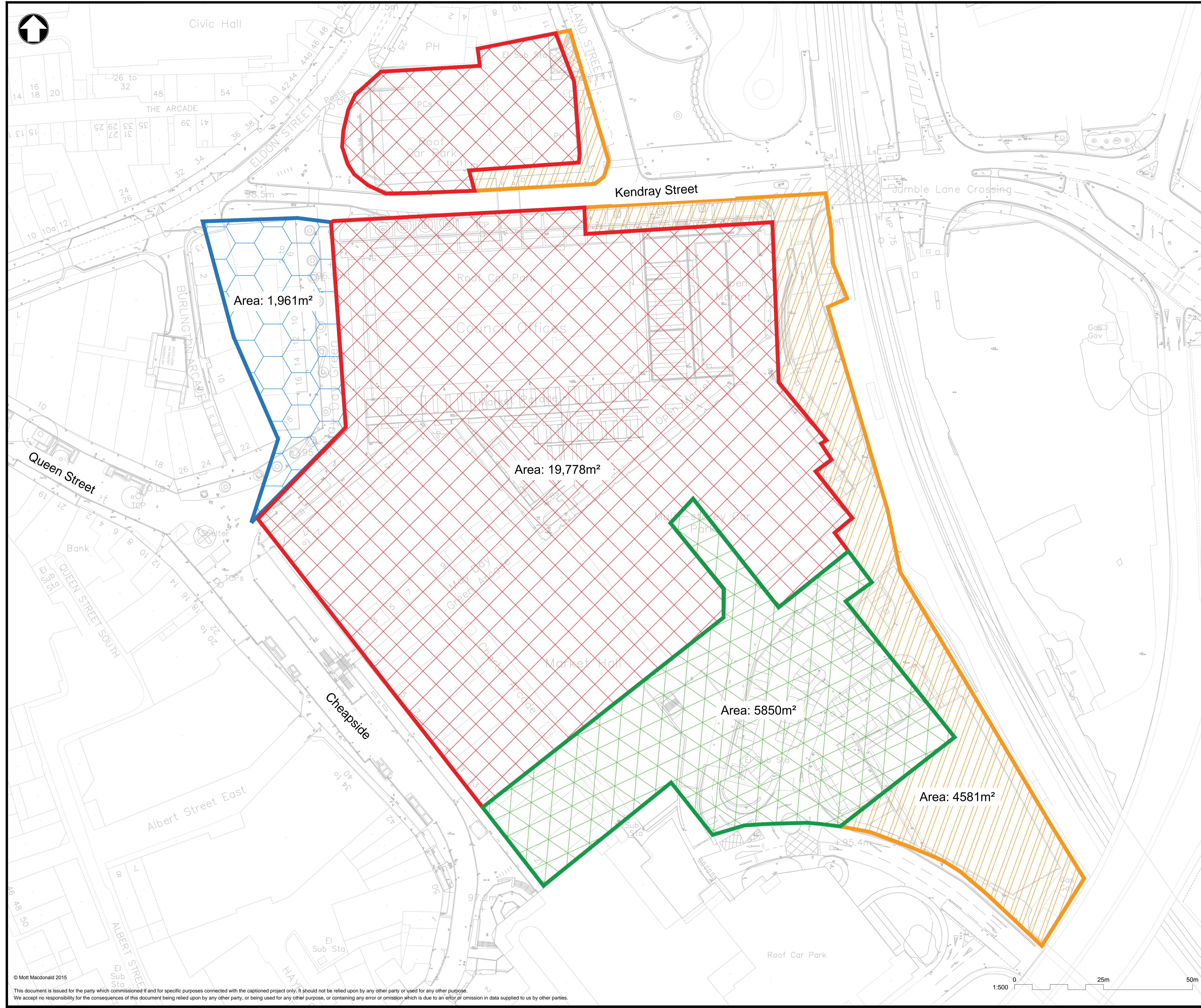
- The existing site is a mix of retained market hall buildings and demolished carpark and office buildings which are proposed for development as mixed retail and entertainment facilities. The existing site is 100% impermeable area.
- New surface water connections into the Sough Dyke culvert in Kendray Stree will be required for both the main Met' Centre development and for the May Day Green development.
- There is limited opportunity to incorporate SuDS features into the proposed development given that it will be founded on a suspended concrete floor slab. Attenuation storage will be installed to achieve the required 30% reduction in peak discharge rate from the site.
- Surface water will discharge to the Sough Dyke culvert which crosses under the north and east side of the site.
- The foul water drainage system will utilise as much of the existing below ground pipework as practical. An initial assessment of foul flows from the proposed development suggests that the existing pipes provide sufficient capacity.
- The foul flows from the proposed developments are likely to be less than those historically discharged from the site.

# Appendices

Appendix A. Proposed Development Plan _____	12
Appendix B. Yorkshire Water Sewer Record Plan _____	14
Appendix C. Site Utility Survey _____	16
Appendix D. Drainage Strategy Plan _____	18

# Appendix A. Site Plan, Drainage Strategy

This page intentionally blank for pagination.



- Notes**
- All dimensions are in metres unless stated otherwise.
  - Do not scale from this drawing, if in doubt, ask.
  - To be read in conjunction with the latest version of the Mott MacDonald Ltd Design Risk Register.
  - Surface water to be managed via two separate systems.  
Northern Attenuation Volume: 393m³  
Southern Attenuation Volume: 64m³
  - Tank outfalls adjusted to ensure whole site provides a 30% reduction on on the existing scenario.  
Northern Tank Outfall: 157l/s  
Southern Tank Outfall: 35l/s

**Key to symbols**

	Area to be attenuated in tank 1. Attenuation volume: approx 400m³
	Area to be attenuated in Tank 2. Attenuation volume: approx 65m³
	New development with free drainage
	Area to be drained as per existing

**Reference Drawings**

MMD-366962-D-DR-00-XX-1400	- Drainage Master Plan
MMD-366962-D-DR-00-XX-1402	- Drainage Breakout Areas

P1	26/01/2017	MCS	Stage 3 Design	AP	JRK
Rev	Date	Drawn	Description	Ch'kd	App'd

Mott MacDonald House  
111 St Mary's Road  
Sheffield, S2 4AP  
United Kingdom  
T +44 (0)114 2761242  
F +44 (0)114 2724699  
W www.mottmac.com

**Client**  
NPS Group for  
Barnsley Metropolitan Borough Council  
Gateway Plaza  
PO Box 634  
Barnsley S70 9GG

**Title**  
Better Barnsley  
Site Wide Drainage Strategy  
Impermeable Area

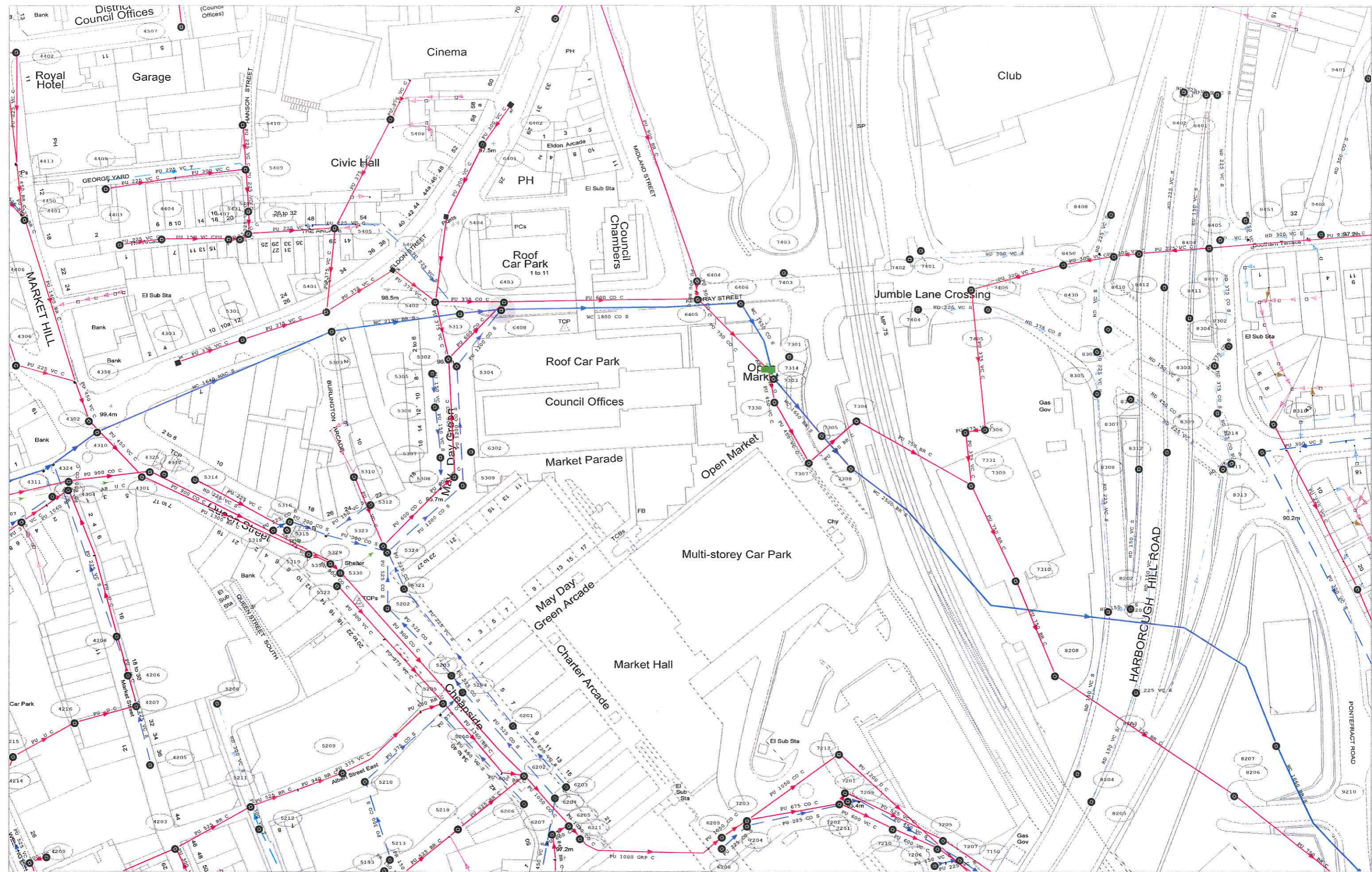
Designed	M Smith	MCS	Eng check	A Precious	AP
Drawn	M Smith	MCS	Coordination	J Kirkham	JRK
Dwg check	A Precious	AP	Approved	J Kirkham	JRK

Scale at A1	Status	Rev	Security
1:500	PRE	P1	STD

Drawing Number  
**MMD-366962-D-DR-00-XX-1401**

# Appendix B. Yorkshire Water Sewer Record Plan

This page intentionally blank for pagination.



Date Requested : 08/02/2011, 10:43:19  
 Date Generated : 08/02/2011, 10:43:30

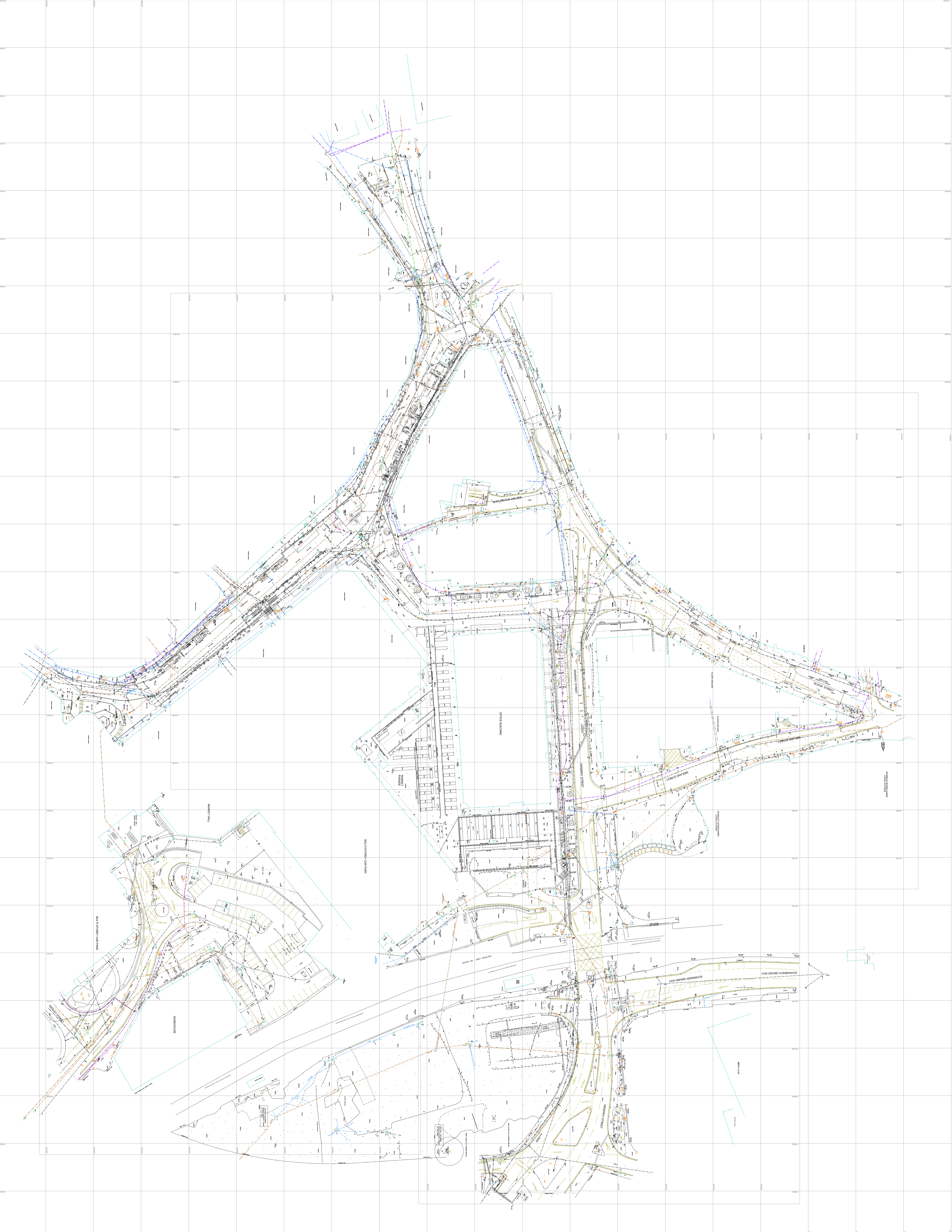
Scale : 1:1250  
 The position and depth of any YW apparatus shown on this map are approximate only.

(C) COPYRIGHT STATEMENTS: Reproduced by permission of Ordnance Survey on behalf of HMSO © Crown copyright and database 2004. All rights reserved Ordnance Survey Licence number 100019559  
 Copyright for additional data shown on this map may rest with: British Geological Survey, Natural England, Environment Agency, Natural Environment Research Council, The MET Office, DEFRA, George Philip Ltd., Royal Mail, Cranfield University and Yorkshire Water.

UPN: Undefined  
 Originator: J Wilson, New Development, 71 8320

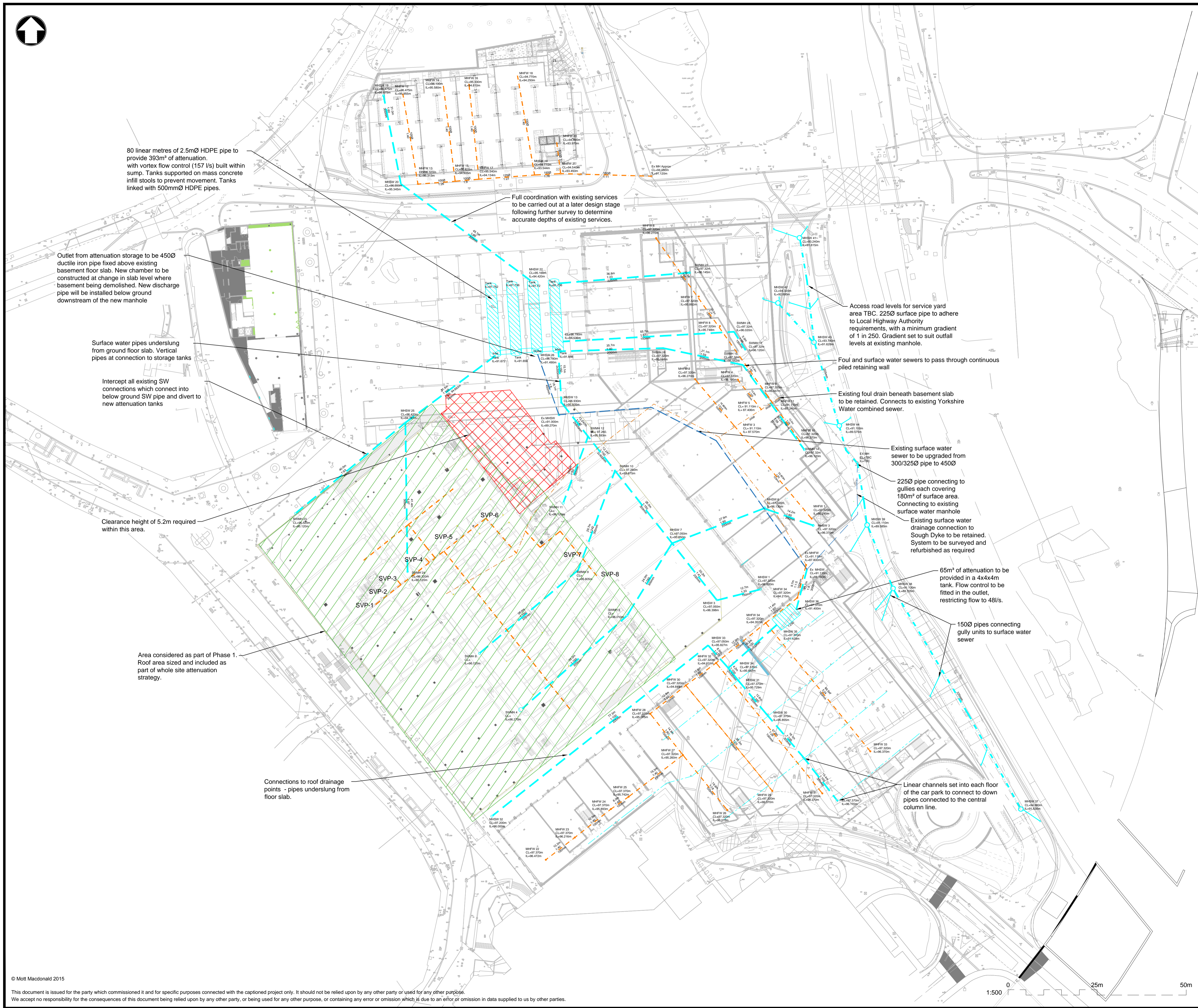
## Appendix C. Site Utility Survey

This page intentionally blank for pagination.



Station	Existing	Proposed	Level
A1	43454.374	40640.407	98.570
A2	43454.374	40640.407	98.570
A3	43455.848	40635.428	96.595
A32	43478.882	40602.243	93.553
A34	43448.713	40637.188	99.082
A35	43459.132	40627.197	96.573
A36	43462.007	40628.703	101.264
A37	43458.018	40642.709	97.721
A38	43462.977	40638.073	91.527
A39	43462.977	40638.073	91.527
A40	43462.977	40638.073	91.527
A41	43462.977	40638.073	91.527
A42	43462.977	40638.073	91.527
A43	43462.977	40638.073	91.527
A44	43462.977	40638.073	91.527
A45	43462.977	40638.073	91.527
A46	43462.977	40638.073	91.527
A47	43462.977	40638.073	91.527
A48	43462.977	40638.073	91.527
A49	43462.977	40638.073	91.527
A50	43462.977	40638.073	91.527
A51	43462.977	40638.073	91.527
A52	43462.977	40638.073	91.527
A53	43462.977	40638.073	91.527
A54	43462.977	40638.073	91.527
A55	43462.977	40638.073	91.527
A56	43462.977	40638.073	91.527
A57	43462.977	40638.073	91.527
A58	43462.977	40638.073	91.527
A59	43462.977	40638.073	91.527
A60	43462.977	40638.073	91.527
A61	43462.977	40638.073	91.527
A62	43462.977	40638.073	91.527
A63	43462.977	40638.073	91.527
A64	43462.977	40638.073	91.527
A65	43462.977	40638.073	91.527
A66	43462.977	40638.073	91.527
A67	43462.977	40638.073	91.527
A68	43462.977	40638.073	91.527
A69	43462.977	40638.073	91.527
A70	43462.977	40638.073	91.527
A71	43462.977	40638.073	91.527
A72	43462.977	40638.073	91.527
A73	43462.977	40638.073	91.527
A74	43462.977	40638.073	91.527
A75	43462.977	40638.073	91.527
A76	43462.977	40638.073	91.527
A77	43462.977	40638.073	91.527
A78	43462.977	40638.073	91.527
A79	43462.977	40638.073	91.527
A80	43462.977	40638.073	91.527
A81	43462.977	40638.073	91.527
A82	43462.977	40638.073	91.527
A83	43462.977	40638.073	91.527
A84	43462.977	40638.073	91.527
A85	43462.977	40638.073	91.527
A86	43462.977	40638.073	91.527
A87	43462.977	40638.073	91.527
A88	43462.977	40638.073	91.527
A89	43462.977	40638.073	91.527
A90	43462.977	40638.073	91.527
A91	43462.977	40638.073	91.527
A92	43462.977	40638.073	91.527
A93	43462.977	40638.073	91.527
A94	43462.977	40638.073	91.527
A95	43462.977	40638.073	91.527
A96	43462.977	40638.073	91.527
A97	43462.977	40638.073	91.527
A98	43462.977	40638.073	91.527
A99	43462.977	40638.073	91.527
A100	43462.977	40638.073	91.527
A101	43462.977	40638.073	91.527
A102	43462.977	40638.073	91.527
A103	43462.977	40638.073	91.527
A104	43462.977	40638.073	91.527
A105	43462.977	40638.073	91.527
A106	43462.977	40638.073	91.527
A107	43462.977	40638.073	91.527
A108	43462.977	40638.073	91.527
A109	43462.977	40638.073	91.527
A110	43462.977	40638.073	91.527
A111	43462.977	40638.073	91.527
A112	43462.977	40638.073	91.527
A113	43462.977	40638.073	91.527
A114	43462.977	40638.073	91.527
A115	43462.977	40638.073	91.527
A116	43462.977	40638.073	91.527
A117	43462.977	40638.073	91.527
A118	43462.977	40638.073	91.527
A119	43462.977	40638.073	91.527
A120	43462.977	40638.073	91.527
A121	43462.977	40638.073	91.527
A122	43462.977	40638.073	91.527
A123	43462.977	40638.073	91.527
A124	43462.977	40638.073	91.527
A125	43462.977	40638.073	91.527
A126	43462.977	40638.073	91.527
A127	43462.977	40638.073	91.527
A128	43462.977	40638.073	91.527
A129	43462.977	40638.073	91.527
A130	43462.977	40638.073	91.527
A131	43462.977	40638.073	91.527
A132	43462.977	40638.073	91.527
A133	43462.977	40638.073	91.527
A134	43462.977	40638.073	91.527
A135	43462.977	40638.073	91.527
A136	43462.977	40638.073	91.527
A137	43462.977	40638.073	91.527
A138	43462.977	40638.073	91.527
A139	43462.977	40638.073	91.527
A140	43462.977	40638.073	91.527
A141	43462.977	40638.073	91.527
A142	43462.977	40638.073	91.527
A143	43462.977	40638.073	91.527
A144	43462.977	40638.073	91.527
A145	43462.977	40638.073	91.527
A146	43462.977	40638.073	91.527
A147	43462.977	40638.073	91.527
A148	43462.977	40638.073	91.527
A149	43462.977	40638.073	91.527
A150	43462.977	40638.073	91.527
A151	43462.977	40638.073	91.527
A152	43462.977	40638.073	91.527
A153	43462.977	40638.073	91.527
A154	43462.977	40638.073	91.527
A155	43462.977	40638.073	91.527
A156	43462.977	40638.073	91.527
A157	43462.977	40638.073	91.527
A158	43462.977	40638.073	91.527
A159	43462.977	40638.073	91.527
A160	43462.977	40638.073	91.527
A161	43462.977	40638.073	91.527
A162	43462.977	40638.073	91.527
A163	43462.977	40638.073	91.527
A164	43462.977	40638.073	91.527
A165	43462.977	40638.073	91.527
A166	43462.977	40638.073	91.527
A167	43462.977	40638.073	91.527
A168	43462.977	40638.073	91.527
A169	43462.977	40638.073	91.527
A170	43462.977	40638.073	91.527
A171	43462.977	40638.073	91.527
A172	43462.977	40638.073	91.527
A173	43462.977	40638.073	91.527
A174	43462.977	40638.073	91.527
A175	43462.977	40638.073	91.527
A176	43462.977	40638.073	91.527
A177	43462.977	40638.073	91.527
A178	43462.977	40638.073	91.527
A179	43462.977	40638.073	91.527
A180	43462.977	40638.073	91.527
A181	43462.977	40638.073	91.527
A182	43462.977	40638.073	91.527
A183	43462.977	40638.073	91.527
A184	43462.977	40638.073	91.527
A185	43462.977	40638.073	91.527
A186	43462.977	40638.073	91.527
A187	43462.977	40638.073	91.527
A188	43462.977	40638.073	91.527
A189	43462.977	40638.073	91.527
A190	43462.977	40638.073	91.527
A191	43462.977	40638.073	91.527
A192	43462.977	40638.073	91.527
A193	43462.977	40638.073	91.527
A194	43462.977	40638.073	91.527
A195	43462.977	40638.073	91.527
A196	43462.977	40638.073	91.527
A197	43462.977	40638.073	91.527
A198	43462.977	40638.073	91.527
A199	43462.977	40638.073	91.527
A200	43462.977	40638.073	91.527
A201	43462.977	40638.073	91.527
A202	43462.977	40638.073	91.527
A203	43462.977	40638.073	91.527
A204	43462.977	40638.073	91.527
A205	43462.977	40638.073	91.527
A206	43462.977	40638.073	91.527
A207	43462.977	40638.073	91.527
A208	43462.977	40638.073	91.527
A209	43462.977	40638.073	91.527
A210	43462.977	40638.073	91.527
A211	43462.977	40638.073	91.527
A212	43462.977	40638.073	91.527
A213	43462.977	40638.073	91.527
A214	43462.977	40638.073	91.527
A215	43462.977	40638.073	91.527
A216	43462.977	40638.073	91.527
A217	43462.977	40638.073	91.527
A218	43462.977	40638.073	91.527
A219	43462.977	40638.073	91.527
A220	43462.977	40638.073	91.527
A221	43462.977	40638.073	91.527
A222	43462.977	40638.073	91.527
A223	43462.977	40638.073	91.527
A224	43462.977	40638.073	91.527
A225	43462.977	40638.073	91.527
A226	43462.977	40638.073	91.527
A227	43462.977	40638.073	91.527
A228	43462.977	40638.073	91.527
A229	43462.977	40638.073	91.527
A230	43462.977	40638.073	91.527
A231	43462.977	40638.073	91.527
A232	43462.977	40638.073	91.527
A233	43462.977	40638.073	91.527
A234	43462.977	40638.073	91.527
A235	43462.977	40638.073	91.527
A236	43462.977	40638.073	91.527
A237	43462.977	40638.073	91.527
A238	43462.977	40638.073	91.527
A239	43462.977	40638.073	91.527
A240	43462.977	40638.073	91.527
A241	43462.977	40638.073	91.527
A242	43462.977	40638.073	91.527
A243	43462.977	40638.073	91.527
A244	43462.977	40638.073	91.527
A245	43462.977	40638.073	91.527
A246	43462.977	40638.073	91.527
A247	43462.977	40638.073	91.527
A248	43462.977	40638.073	91.527
A249	43462.977	40638.073	91.527
A250	43462.977	40638.073	91.527
A251	43462.977	40638.073	91.527
A252	43462.977	40638.073	91.527
A253	43462.977	40638.073	91.527
A254	43462.977	40638.073	91.527
A255	43462.977	40638.073	91.527
A256	43462.977	40638.073	91.527
A257	43462.977	40638.073	91.527
A258	43462.977	40638.073	91.527
A259	43462.977	40638.073	91.527
A260	43462.977	40638.073	91.527
A261	43462.977	40638.073	91.527
A262	43462.977	40638.073	91.527
A263	43462.977	40638.073	91.527

# Appendix D. Surface Water Drainage Strategy Plan



80 linear metres of 2.5m $\varnothing$  HDPE pipe to provide 393m<sup>3</sup> of attenuation. with vortex flow control (157 l/s) built within sump. Tanks supported on mass concrete infill stools to prevent movement. Tanks linked with 500mm $\varnothing$  HDPE pipes.

Full coordination with existing services to be carried out at a later design stage following further survey to determine accurate depths of existing services.

Outlet from attenuation storage to be 450 $\varnothing$  ductile iron pipe fixed above existing basement floor slab. New chamber to be constructed at change in slab level where basement being demolished. New discharge pipe will be installed below ground downstream of the new manhole

Surface water pipes underslung from ground floor slab. Vertical pipes at connection to storage tanks

Intercept all existing SW connections which connect into below ground SW pipe and divert to new attenuation tanks

Clearance height of 5.2m required within this area.

Area considered as part of Phase 1. Roof area sized and included as part of whole site attenuation strategy.

Connections to roof drainage points - pipes underslung from floor slab.

Access road levels for service yard area TBC. 225 $\varnothing$  surface pipe to adhere to Local Highway Authority requirements, with a minimum gradient of 1 in 250. Gradient set to suit outfall levels at existing manhole.

Foul and surface water sewers to pass through continuous piled retaining wall

Existing foul drain beneath basement slab to be retained. Connects to existing Yorkshire Water combined sewer.

Existing surface water sewer to be upgraded from 300/325 $\varnothing$  pipe to 450 $\varnothing$

225 $\varnothing$  pipe connecting to gullies each covering 180m<sup>2</sup> of surface area. Connecting to existing surface water manhole

Existing surface water drainage connection to Sough Dyke to be retained. System to be surveyed and refurbished as required

65m<sup>3</sup> of attenuation to be provided in a 4x4x4m tank. Flow control to be fitted in the outlet, restricting flow to 48l/s.

1500 pipes connecting gully units to surface water sewer

Linear channels set into each floor of the car park to connect to down pipes connected to the central column line.

- Notes**
- All dimensions are in metres unless stated otherwise.
  - Do not scale from this drawing, if in doubt, ask.
  - Surface water to be managed via two separate systems.  
Northern Attenuation Volume: 393m<sup>3</sup>  
Southern Attenuation Volume: 65m<sup>3</sup>
  - Tank outfalls adjusted to ensure whole site provides a 30% betterment from existing scenario.  
Northern Tank Outfall: 157l/s  
Southern Tank Outfall: 35l/s
  - Surface water from the access road and east of DS2 is to drain unrestricted as per existing.
  - Foul and surface water connection points shown indicatively and to be confirmed with Architect.
  - Existing drainage runs beneath slab shown indicatively only. To be confirmed by survey, 11549-201-2\_UMS-RevA.DWG
  - To be read in conjunction with the latest version of the Mott MacDonald Ltd Design Risk Register.
  - Due to programme constraints, full coordination with other design disciplines is not complete and will need to be completed in the next design stage. Full coordination with other disciplines may give rise to the need to amend or add to the scheme shown on this drawing.

**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 below basement slab
- Existing Foul Water Sewer below basement slab
- Existing Surface Water Sewer below basement slab
- Proposed Surface Water Linear Channel
- Proposed Highway Drainage

**Reference Drawings**

MMD-366962-D-DR-00-XX-1401	-	Impermeable Areas
MMD-366962-D-DR-00-XX-1402	-	Drainage Breakout Areas

P1	26/01/2017	MCS	Stage 3 Design	AP	JRK
Rev	Date	Drawn	Description	Ch'k'd	App'd

Mott MacDonald House  
111 St Mary's Road  
Sheffield, S2 4AP  
United Kingdom  
T +44 (0)114 2761242  
F +44 (0)114 2724699  
W www.mottmac.com

**Client**  
NPS Group for  
Barnsley Metropolitan Borough Council  
Gateway Plaza  
PO Box 634  
Barnsley S70 9GG

**Title**  
Better Barnsley  
Proposed Drainage Strategy  
Drainage Masterplan

Designed	M Smith	MCS	Eng check	A Precious	AP
Drawn	M Smith	MCS	Coordination	J Kirkham	JRK
Dwg check	A Precious	AP	Approved	J Kirkham	JRK
Scale at A1	Status	Rev	Security		
1:500	PRE	P1	STD		
Drawing Number	MMD-366962-D-DR-00-XX-1400				

