

Design Note

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Subject: Planning ref. 135253/NMC/2022 - SuDS assessment appraisal for discharge of condition 6.
Reference: 45306-KRD-XX-ZZ-TS-C-0502

INTRODUCTION

This document has been produced by Kennedy Redford to support the drainage design for the Ancoats Mobility Hub and its fulfilment of the requirements of planning condition 6. It outlines the methodology approach followed when selecting the SuDS systems implemented as part of the proposed design and other design decisions as well as

This document must be read in conjunction with the following documentation:

- 45306-KRD-XX-EX-DR-C-2001 General Arrangement;
- 45306-KRD-XX-EX-DR-C-5201 Drainage Layout Ground Floor and External;
- 45306-KRD-XX-01-DR-C-5202 Drainage Layout Level 01;
- 45306-KRD-XX-ZZ-DR-C-5203 Drainage Layout Level 2 – 8;
- 45306-KRD-XX-RF-DR-C-5204 Drainage Layout Roof Level;
- 45306-KRD-XX-ZZ-DR-C-5210 Drainage Layout Catchment Plan;
- 45306-KRD-XX-EX-DR-C-5211 Existing Drainage Catchment Plan;
- 45306-KRD-XX-EX-DR-C-5215 Surface Water and Foul Water Manhole Schedule;
- 45306-KRD-XX-EX-DR-C-9030 Proposed Levels Plan and Exceedance Route;
- 45306-KRD-XX-ZZ-DR-C-5231 Drainage Details Sheet 1;
- 45306-KRD-XX-ZZ-DR-C-5232 Drainage Details Sheet 2;
- 45306-KRD-XX-ZZ-DR-C-5233 Drainage Details Sheet 3;
- 45306-KRD-XX-ZZ-CA-C-0500 SW Hydraulic Calculations, and;
- 45306-KRD-XX-ZZ-CA-C-0501 6-Hour Storm Event.

SUDS/OUTFALL SELECTION

All proposed drainage systems should give preference to the SuDS hierarchy, which sets out that schemes should aim to mimic natural drainage as closely as possible, and that discharge of surface runoff should be dealt with in the following ways (in order of preference) (Department for Communities and Local Government, 2014):

- Into the ground (infiltration)
- To a surface water body
- To a surface water sewer, highway drain, or another drainage system
- To a combined sewer

USE OF INFILTRATION SYSTEMS

To consider the suitability of infiltration systems for use in the development the following must be considered.

Infiltration rate – Are the ground conditions favorable?

Contamination – Are there contaminants in the ground?

Groundwater – Is the groundwater table 500mm below the base of the infiltration system?

Following review of the Phase II Geoenvironmental Site Assessment report, dated July 2021, the information below was selected due to its relevance to the use of infiltration systems on the site.



Figure 1 - Exploratory Hole Location Plan Extract

TABLE 3.11 SOIL INFILTRATION RESULTS

LOCATION	DEPTH (m)	MATERIAL	TEST No.	SOIL INFILTRATION RATE (m/s)
WS101	2.0–2.5	Made Ground: Loose slightly clayey, sandy GRAVEL.	1	3.03E-06
WS102	2.0–5.0	Very stiff slightly gravelly CLAY	1	2.53E-09
WS103	0.5–1.5	Made Ground: Very loose slightly clayey, sandy GRAVEL.	1	3.92E-05
WS104	0.5–1.5	Made Ground: Loose slightly clayey, sandy GRAVEL.	1	2.54E-08

Falling head tests undertaken in natural drift deposits calculated a soil infiltration rate of 2.53E-05 m/s to 2.53E-09. The majority of the falling head tests indicated a poor infiltration rate, as such the use of soakaway drainage is unlikely to be feasible. Additionally, there is currently hydrocarbon impact in the groundwater which would impede the use of soakaways in certain areas of the site.

However, the application of soakaway drainage will ultimately be dependent on the specific requirements of the development. Should soakaways be used in the development, all soakaways should be designed in accordance with BRE Special Digest 365 – *Soakaway Design*.

Figure 2 – Infiltration Test Results Extract

Elevated total cyanide values were identified from leachate analysis undertaken in Made Ground soils in WS103 at 0.75m and 1.50m bgl. Where leachate analysis has been undertaken, this can overstate the risk and is not wholly representative of the site characterisation, therefore following the receipt of supplementary groundwater samples which have sampled the true dissolved phase impact and found no exceedance in total cyanide when compared to the DWS, the total cyanide is not considered to be a significant site contaminant source at WS103.

In relation to the remaining exceedances, Table 4.5 provides a summary.

TABLE 4.5 SUMMARY OF ELEVATED CONTAMINANTS WITHIN GROUNDWATER

CONTAMINANT	DWS (µg/l)	WS102 (µg/l)	WS104 (µg/l)
		Contaminant Source	
		Made Ground	Made Ground
Selenium	10	31	11
Benzo[b]fluoranthene	10	13	16
Benzo[k]fluoranthene	10	5.4	7.1
Benzo(a)pyrene	10	14	17
Fluoranthene	10	16	22
TPH C16-C35 (aromatic)	90	710	940

Figure 3 – Summary of Elevated Contaminants Extract

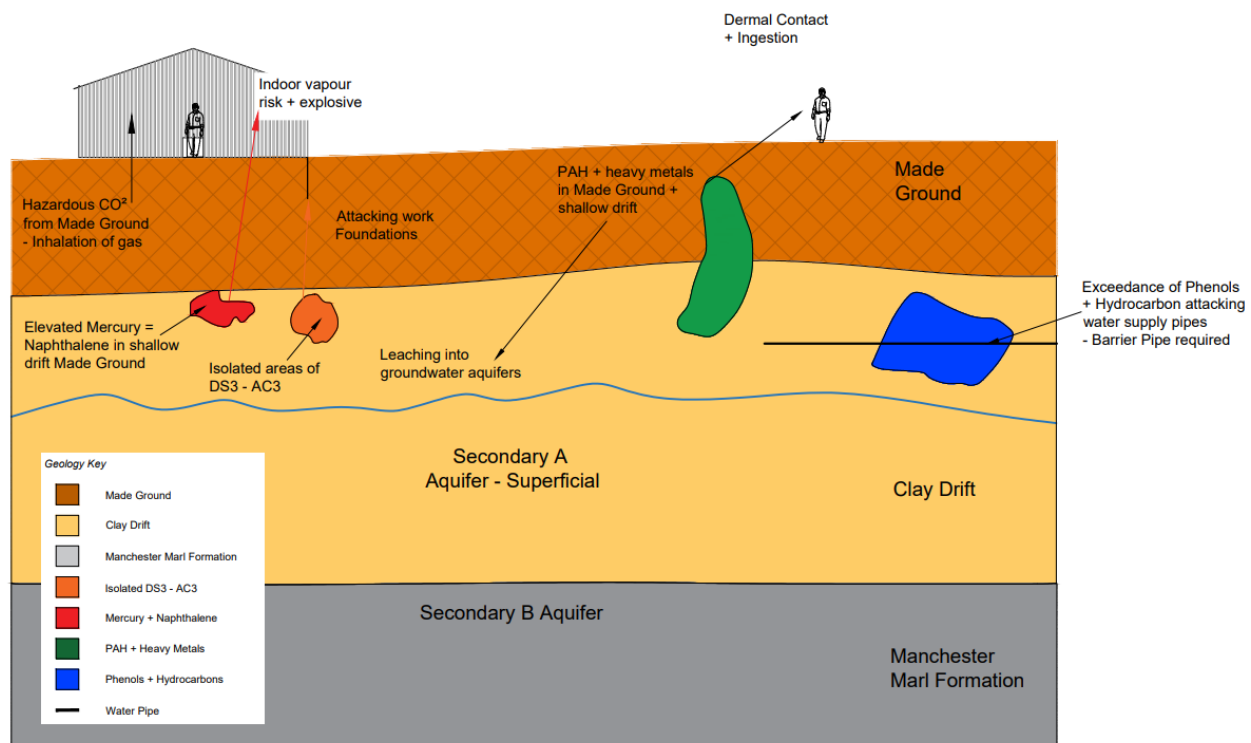


Figure 4 – Contaminants Diagram Extract

The investigation has identified generally low permeability of the soils on site, but there is some potential for the use of the small permeability available.

However, due to the presence of contaminants there is a risk of migration of these should flow paths be introduced. Therefore no infiltration SuDS are proposed as part of the design.

WATERCOURSES OR WATER BODIES

There are no watercourses present on site or its immediate vicinity, the closest watercourse is River Irk, located circa 765m northwest.

The canal known as the Rochdale Canal is located approximately 175m south of the proposed development.

These are therefore not deemed suitable for discharge of surface water from the site.

SURFACE WATER SEWERS

The services survey carried out by Groundwise, dated July 2020 and the ground services survey have not identified available surface water sewers. The highway drainage appears to be connected to the combined sewer along Poland Street.

COMBINED SEWER

The services survey carried out by Groundwise, dated July 2020 identified a United Utilities combined sewer located in Poland Street.

This is the best suited solution for discharge of the surface water from the site. This retains the existing principle of discharge for the site.

USE OF NON-INFILTRATION SUDS

Although infiltration systems are not deemed suitable for use in the site, other non-infiltration SuDS can be considered.

The design proposes the implementation of rain gardens in the soft landscape areas along the eastern end of the site, the systems will include a variety of planting inclusive of trees which will delay flows onto the underground network and help reduce the discharge volume. These systems will connect into the main attenuation tank.

For the proposed drainage layout refer to drawing 45306-KRD-XX-EX-DR-C-5201.

For the hydraulic results refer to the SW hydraulic calculations file **45306-KRD-XX-ZZ-CA-C-0500**.