



Project Title

Report to Discharge Drainage Related Planning Conditions

At

**227 Moston Lane East,
Moston,
Manchester,
M40 3HY.**

PG Consulting
108 Ack Lane West
Cheadle Hulme
Cheshire
SK8 7ES

Tel: 07710 758971

Mail: Paul@pgcl.co.uk

Paul Graveney Consulting Ltd Trading as PG Consulting
Company Registration 11238546

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1.0 Introduction

- 1.1 In January 2021 a planning application was submitted Manchester City Council for the proposed development of a 2-story dwelling with associated boundary treatment following demolition of existing garage at 227 Moston Lane East, Manchester M40 3HY.

No Flood Risk Assessment or Drainage Strategy Report was submitted with the application.

Planning approval, ref 129142/FO/2021 was granted in March 2021 subject to a planning condition relating to the drainage of the development.

This report has been prepared to remove this condition; number 5.

2.0 Drainage Strategy

2.1 Existing Runoff Rates

The area of the new dwelling currently encompasses an impermeable driveway, garage and grassed area to the rear. As such the site is considered to be both brownfield and greenfield for drainage purposes.

Due to the size of the area, the existing flow rates are considered to be too low to quantify.

Based on the small area of the new dwelling and to prevent blockage in line with SuDS guidance, a peak post development flow rate of 3l/s will be applied.

2.2 Existing Drainage

Located with Moston Lane East there is a 300mm diameter combined water public sewer flowing southeast. Located with the rear and side alleyway of the proposed property there is a 150/225mm diameter combined sewer that connects to the larger sewer in Moston Lane East. There are no surface water sewers in close proximity. The existing property connects to these sewers both to the front and rear. Refer to Figure 1 below.

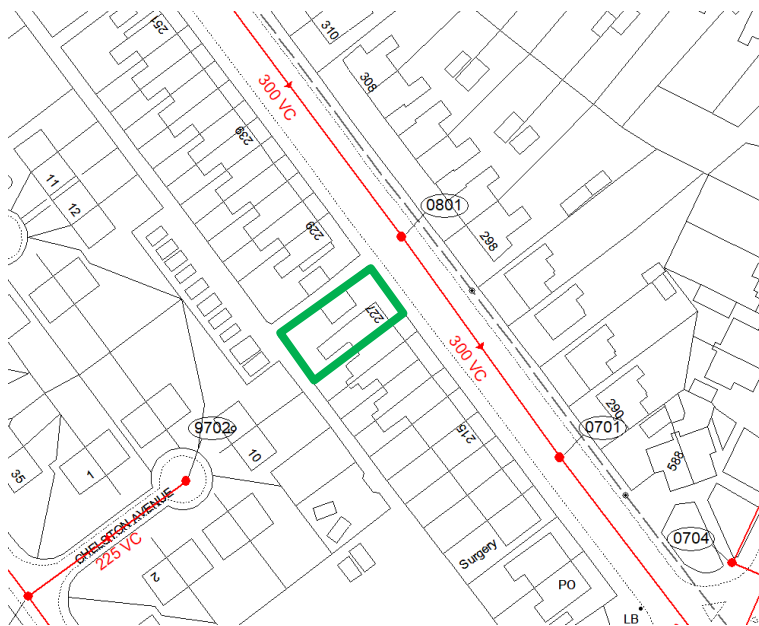


Figure 1: United Utilities Sewer Records (from 2006)

2.3 Existing Geology

Due to the small size of the scheme, no detailed Phase 2 site investigation has been completed at the site. A review of the BGS geology maps for the area indicate the superficial deposits to encompass Till, which is generally deemed to be clay and thus unsuitable for infiltration. To support this assessment, a trial pit investigation was carried out in the rear corner of the garden, which would be the only viable position for the soakaway. This identified topsoil, over made ground, over stiff clay at 0.65m depth. Refer to Photographs below.

This has confirmed that infiltration is not deemed suitable at this location.



Photographs of Trial Pit indicating Stiff Clay at 0.65m Depth

2.4 Hydrological Assessment

A review of the local maps would indicate the closest watercourse to be the River Medlock, located some 2km to the southwest at its closest point.

2.5 SuDS Hierarchal Approach

Based on the existing drainage configuration, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in detail below:

Method	Suitability	Suitability for Development
Infiltration to Ground	No	A review of the BGS Maps and a site-specific trial pit has indicated the underlying ground to be clay and thus unsuitable for infiltration.
Connection to Watercourse	No	The closest watercourse is 2km from the site.
Connection to Surface Water Sewer	No	No surface water sewers in close proximity.
Connection to Combined Water Sewer	Yes	New connection to be made to the combined public sewer in adjacent alleyway at restricted rates.

Table 1: SuDS Hierarchal Approach

2.6 Surface Water Drainage Strategy

The general principal of the surface water drainage strategy is to collect the runoff from the roof of the new dwelling and direct it to a number of new RWP's that will drop down to a small new surface water network. All flows will merge at a flow control chamber, limiting the peak flow to 3l/s and outfall to the combined public sewer in the adjacent alleyway. This is also deemed the minimum to prevent blockage. A small hydraulic model has been simulated and confirms that no attenuation measures are required and that there is a very small volume (0.07m³) of exceedance flooding for the extreme 100 year + 40% CC storm event. The drainage GA can be found in Appendix A with the calculations in Appendix B. Table 2 below defines the peak post development flow rates for each return period event as taken from the hydraulic model.

	1 year	30 year	100 year + 40% CC
Post Development Peak Runoff Rates	0.9 l/s	1.9 l/s	3.0 l/s

Table 2: Peak Post Development Discharge Rates

2.7 Foul Flows

Foul flows generated by the new development will discharge via new SVP's to a new below ground drainage network that connects to the to the combined public sewer.

2.8 Maintenance

The drainage network encompasses standard pipework and manholes and a flow control. As long as the gullies at the base of the rainwater pipes are kept clear of leaves and detritus by regular inspection by the owner then this should negate it passing into the network.

All management and maintenance of the drainage will be with the building owner. This will involve general maintenance of the drainage network in accordance with best practice. All drainage will remain private and not be adopted by the local sewerage authority. Typically, the maintenance regime will be in line with the table below.

<u>Future Maintenance of the Drainage System</u>			
Responsibility	Feature	Maintenance	Frequency
Owner	Rainwater gutters, downpipes and above ground drainage.	Regular maintenance and inspections.	Ad-hoc sweeping and emptying of silt and debris required. Annual visual inspections to check for damage/leaks.
	Flow control chambers.	Regular maintenance / removal of blockages and debris.	Annual inspection and following significant rainfall events.
	Pipes, sewers, manholes	Regular maintenance / removal of blockages and debris.	Annual inspection and removal of silts if required.

Table 3: Management & Maintenance Plan.

3.0 Drainage Related Planning Condition and Responses

3.1 Planning Conditions

The detailed planning conditions are listed below in *italics* with the PG Consulting response in Blue below.

Condition 5.

Prior to the commencement of development, a surface water drainage layout for the site, based on sustainable drainage principles, shall be submitted to and approved in writing by the City Council as Local Planning Authority. The development shall be constructed and completed in accordance with the approved details.

As discussed in Section 2, the SuDS hierarchal approach has been proposed for the development. Based on the findings a new connection will be made to the combined public sewer in the adjacent alleyway, with a flow control restricting the peak rate to 3l/s.

The Drainage GA can be found in Appendix A with Calculations in Appendix B.

Appendix A – PG Consulting Drawing

PGC 216-C-001: Drainage GA

P1	17.01.22	PG	PG	PRELIMINARY ISSUE
REV	DATE	DRAWN	REV'D ENG	NOTES
CLIENT				
JOSHUA HEAVENS				
PROJECT				
227 MOSTON LANE EAST MANCHESTER				
DRAWING TITLE				
DRAINAGE GA				
DRAWING STATUS				
PRELIMINARY				
SCALE	1:100	DRAWN BY	PG	ENGINEER PG
				SHEET A1
DRAWING No				REVISION
PGC216-C-100				P1
 PG Consulting Civil & Infrastructure Engineers				100 Ack Lane West, Cheshire Hulme, Cheshire, SK8 7ES Tel: 07710 758871 Email: paul@gpgd.co.uk

Appendix B – Hydraulic Calculations

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Innovyze	Network 2017.1.2	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	18.500	Add Flow / Climate Change (%)	0
Ratio R	0.335	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time	Area
(mins)	(ha)
0-4	0.008

Total Area Contributing (ha) = 0.008

Total Pipe Volume (m³) = 0.134

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	7.000	0.120	58.3	0.004	3.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	7.000	0.120	58.3	0.004	3.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	3.000	0.150	20.0	0.000	0.00	0.0	0.600	o	100	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	3.12	103.800	0.004	0.0	0.0	0.0	1.01	7.9	0.5
2.000	50.00	3.12	103.800	0.004	0.0	0.0	0.0	1.01	7.9	0.5
1.001	50.00	3.14	103.680	0.008	0.0	0.0	0.0	1.73	13.6	1.1

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	100	RE	104.720	103.800	0.820	Open Manhole	150
2.000	o	100	RWP	104.720	103.800	0.820	Open Manhole	150
1.001	o	100	SW01	104.720	103.680	0.940	Open Manhole	600

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	7.000	58.3	SW01	104.720	103.680	0.940	Open Manhole	600
2.000	7.000	58.3	SW01	104.720	103.680	0.940	Open Manhole	600
1.001	3.000	20.0	sewer	104.100	103.530	0.470	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.001	sewer	104.100	103.530	103.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.500	Storm Duration (mins)	30
Ratio R	0.335		

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<u>Online Controls for Storm</u> <u>Orifice Manhole: SW01, DS/PN: 1.001, Volume (m³): 0.4</u> Diameter (m) 0.038 Discharge Coefficient 0.600 Invert Level (m) 103.680		
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30 year Return Period Summary of Critical Results by Maximum Flood Volume
(Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.335
Region England and Wales	Cv (Summer)		0.750
M5-60 (mm)	18.500	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	RE	120 Winter	30	+0%	30/15 Summer	100/15 Summer		
2.000	RWP	120 Winter	30	+0%	30/15 Summer	100/15 Summer		
1.001	SW01	120 Winter	30	+0%	1/15 Summer	100/15 Summer		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Pipe		Status	Level Exceeded
					Flow / Cap. (l/s)	Overflow Flow (l/s)		
1.000	RE	103.815	-0.085	0.000	0.06	0.4	OK	2
2.000	RWP	103.815	-0.085	0.000	0.06	0.4	OK	2
1.001	SW01	103.774	-0.006	0.000	0.08	0.8	OK	1

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100 year Return Period Summary of Critical Results by Maximum Flood Volume
(Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coefficient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.335
Region England and Wales	Cv (Summer)	0.750	
M5-60 (mm)	18.500 Cv (Winter)	0.840	

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	OFF
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	RE	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
2.000	RWP	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
1.001	SW01	15 Winter	100	+40%	1/15 Summer	100/15 Summer		

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	RE	104.720	0.820	0.031	0.26	1.9	FLOOD	2
2.000	RWP	104.720	0.820	0.031	0.26	1.9	FLOOD	2
1.001	SW01	104.720	0.940	0.002	0.28	3.0	FLOOD	1

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