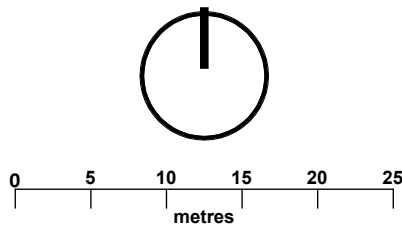


APPENDIX D

PROPOSED DEVELOPMENT PLANS



Legend

- Site Boundary
- Areas covered in other Consultants' package
Refer to notes on Site Plan
- Existing Levels to be Raised to +86-87m
- Tram Train Future Provision

Hardworks

- TP01 - Tactile Paving
Hazard warning corduroy pavers
- P01 - Paving Type 1
Natural stone flags
- P02 - Paving Type 2
Tarmac
- P03 - Paving Type 3
Existing concrete pavers to be retained
- P04 - Paving Type 4
Union Square granite paving to be retained / reinstated
- P05 - Paving Type 5
Gravel Maintenance Area
- Existing Tarmac to be Retained to TfGM site access road
- ST01 - Proposed Steps with Handrails
- Existing Walls to be Retained
- Proposed Walls / Vegetated Retaining Wall
To Engineer's detail and specification
- K01 - Kerb Type 1
Natural Stone Kerb
- K02 - Kerb Type 2
Concrete Raised Road Kerb
- K03 - Kerb Type 3
Concrete Pin Kerb

Softworks

- Proposed Grass
- Proposed Ornamental Planting
- Existing Vegetation to be Retained / Reinstated
- Proposed Scrub Planting
- Proposed Wildflower Meadow
- Proposed Woodland Planting
- Proposed Grassland
- Proposed Tree / Sapling
- Existing Tree to be Retained

Furniture

- F01 - Proposed Bench
Steel and timber bench – installed at varying seating heights (400-500mm). At Union Square, two benches to be provided without armrests and backrests, while the remaining six benches to include both armrests and backrests.
- F02 - Proposed HVM Bollard
- H01 - Proposed Handrail to Steps and sloped path
With mid-rail and tapping rail. To Metrolink's specification.
- H02 - Proposed Illuminated Handrail
- G01 - Proposed Maintenance Gate

Signage and Wayfinding

- FS -1 S01 - Metrolink Flag Sign
To Metrolink's specification
- S02 - Metrolink Portal Sign
To Metrolink's specification
- S03 - Cyclists Dismount Sign
Fixed to lamppost

Lighting

- Existing Lighting Column to be Retained
- Proposed Lighting Column
Details and specification by Engineers
- Existing Ground Spot Light
- Existing Relocated Ground Spot Light

Ecological Enhancements

- Bird Box
1B Schwegler Nest box
- Bat Box
1F Schwegler Bat Box
- Bug Hotel
NHBS Insect Hotel
- Deadwood Log Piles
Using felled trees on site

For more information on the proposed materials and furniture refer to "Outline Specification and Visual Narrative" section within the Design and Access Statement's Landscape Chapter.

Issued for Planning	P03	BLU	BLU	21/03/25
MEP note updated	P02	BLU	BLU	07/03/25
Issued for Planning	P01	JPO	BLU	07/03/25
Revision Note	Rev.	Author	Apvd	Date

oobe

w: www.oobe.co.uk e: info@oobe.co.uk

Client	Transport for Greater Manchester (TfGM)
Project	Bury Interchange
Title	Site Masterplan

Dwg. No.	16012- OOB- ZZZ- ZZZ- D- LA- 080001	Rev.	P03
Scale	1 : 500 @ A1	Date	Mar 2025

For Planning

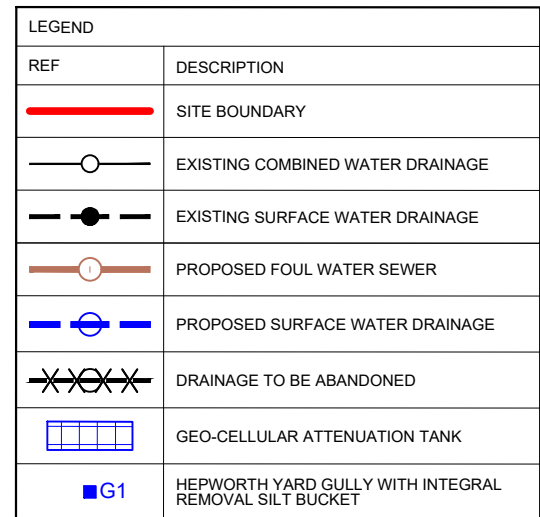
APPENDIX E

GREENFIELD RUNOFF RATES

Renaissance Assoc.		Page 1
Carvers Warehouse 77 Dale Street Manchester M1 2HG	Bury Interchange Phase 1 - Pyramid Park Greenfield Run-Off	
Date 19/03/2025 11:45 File	Designed by JB Checked by JB	
Innovyze	Source Control 2020.1.3	
ICP SUDS Mean Annual Flood Input Return Period (years)2Soil0.470 Area (ha) 0.049Urban0.000 SAAR (mm) 1066 Region Number Region 10 Results1/s QBAR Rural 0.4 QBAR Urban 0.4 Q2 years 0.4 Q1 year 0.3 Q30 years 0.7 Q100 years 0.8		
©1982-2020 Innovyze		

APPENDIX F

BELOW GROUND DRAINAGE PLAN



1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RENAISSANCE, ARCHITECTS, LANDSCAPE ARCHITECTS AND BUILDING SERVICES ENGINEERS DRAWINGS.
2. THE FINAL CONNECTIONS TO THE PUBLIC SEWER IS SUBJECT TO UNITED UTILITIES APPROVAL AND IS TO BE IN ACCORDANCE WITH THEIR AGREED DETAILS.
3. ALL BELOW GROUND DRAINAGE WORKS TO BE IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS AND SEWER SECTOR GUIDANCE. APPENDIX C- DESIGN AND CONSTRUCTION GUIDANCE. IF DISCREPANCIES ARE NOTED BETWEEN SSG AND DRAWINGS THESE SHOULD BE BROUGHT TO THE ATTENTION OF RENAISSANCE FOR REVIEW.
4. ALL GULLIES AND CHANNELS ARE TO HAVE RODDABLE ACCESS
5. THE ATTENUATION TANK AND FLOW CONTROL ARE TO BE TO SUPPLIERS DESIGN AND DETAILS. INSTALLATION IS TO BE IN ACCORDANCE WITH THE SUPPLIERS REQUIREMENTS.
6. SEWERS TO BE LAID IN CLASS 8 BEDDING (150mm DIA GRANULAR BED AND SURROUND) WHERE THE TOP COVER TO TOP OF THE SEWER IS LESS THAN: 1.2m IN HIGHWAYS OR VERGES, OR LESS THAN 0.9m IN PEDESTRIAN AREAS, THEN A 150mm DIA CONCRETE SLAB SHOULD BE PROVIDED ABOVE THE GRANULAR BED AND SURROUND REFER TO DETAILS SHEETS.
7. THE CONTRACTOR IS TO UNDERTAKE A FULL CCTV SURVEY AT COMPLETION OF THE PROJECT TO DEMONSTRATE THAT THE DRAINAGE IS CLEAN ANY DEFECTS ARE TO BE CORRECTED BY THE CONTRACTOR PRIOR TO HANDOVER OF THE SYSTEM TO THE CLIENT.
8. THE CONTRACTOR IS TO PROVIDE A RECORD SET OF THE AS INSTALLED DRAINAGE ON SITE AND KEEP THIS TO THIS RENAISSANCE UPON COMPLETION OF THE PROJECT TO ALLOW FOR PRODUCTION OF A 'FINAL CONSTRUCTION' ISSUE DRAWING.
9. DURING THE WORKS ALTERATIONS TO THE DRAINAGE LAAYOUT ARE TO BE MARKED UP BY THE CONTRACTOR AND AGREED WITH RENAISSANCE IN WRITING.
10. THE CHAMBER SIZE OF PCC MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
11. MANHOLE COVERS ARE TO BE IN ACCORDANCE WITH BS EN 124 FOR THE RATING INDICATED IN THE MANHOLE SCHEDULE. THE CONTRACTOR IS TO BRING DETAILS FOR THE PROPOSED MANHOLE COVERS TO THE ENGINEER AND LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO INSTALLATION.
12. COVER SLABS MUST CARRY THE BSI KITEMARK. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING REDUCING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO REQUIRED SIZE.
13. ALL SEWERS TO BE BSI KITEMARK (CERTIFIED TO WIS 4-35-01)
14. ALL CONCRETE PIPES TO BE TO BS EN 1916 CLASS 120 (54kN/m)
15. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
16. IF PLASTIC PIPES ARE TO BE USED THEN THE FOLLOWING MUST APPLY: A BSI KITEMARK (CERTIFIED TO BS 13476-1 AND WIS 4-35-01) B PIPES LESSER THAN OR EQUAL TO 500mm DIA C BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
17. THE MINIMUM CUSHIONING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm DIA. 40kN/m, 150mm DIA. 40kN/m, 225mm DIA. 45kN/m AND 300mm DIA. 72kN/m.
18. THE MINIMUM CUSHIONING STRENGTH FOR CONCRETE PIPES SHOULD BE (CLASS 120 TO EN 1916/BS911-1:2002), PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.
19. SULPHATE RESISTANT CEMENT (C20-DC3) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METER LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER PIPES, AND THIS IS AGREED BY THE CONTRACTOR WITH THE PIPE MANUFACTURER.

APPROVAL
DRAINAGE DESIGN AND DRAWING IS PRELIMINARY, SUBJECT TO
CONFIRMATION FROM UNITED UTILITIES AND BURY COUNCIL LEAD LOCAL
FLOOD AUTHORITY ON ACCEPTANCE OF DISCHARGE RATES, CONNECTIONS
AND SUDS.

RIBA STAGE 3
ALL CIVIL DESIGN IS INDICATIVE TO ALLOW FOR SPATIAL CO-ORDINATION (RIBA STAGE 3) AND OUTLINE COSTING BY THE PROJECT CONTRACTOR.
ALL CIVIL DESIGN IS SUBJECT TO CONFIRMATION AND ALTERATION AS THE STAGE 4 (TECHNICAL DESIGN) IS COMPLETED.

A DESIGN CONTINGENCY OF 10-15% IS RECOMMENDED TO ALLOW FOR DESIGN DEVELOPMENT DURING RIBA STAGE4 (TECHNICAL DESIGN) AND INPUT CONTRACTOR DESIGNED PACKAGES.

P02	UPDATED TO SUIT COMMENTS	20.03.25	JB	HG
P01	ISSUED FOR INFORMATION	14.03.25	HW	BW
Rev:	Description:	Date:	By:	Chkd:



Renaissance Associates Ltd
2nd Floor Tribeca House
21-27 Dale Street
Manchester
M1 1EY

BURY INTERCHANGE

Drawing Title:

BELOW GROUND DRAINAGE
PLAN SHEET 1

Status:

STAGE 3

Size: A1	Date: FEB 24	Drawn by: HW	Designed by: HW	Checked by: BW
Scale: 1:100	Project No: 2401-09			

Project - Originator - Volume - Level - Type - Role - Number:	Revision:
---	-----------

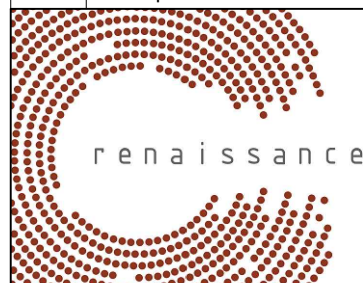
16012-REN-BRY-XXX-D-CE-131100 P02



- APPROVAL**
DRAINAGE DESIGN AND DRAWING IS PRELIMINARY, SUBJECT TO
CONFIRMATION FROM UNITED UTILITIES AND BURY COUNCIL LEAD LOCAL
FLOOD AUTHORITY ON ACCEPTANCE OF DISCHARGE RATES, CONNECTIONS
AND SUDS.

LEGEND	
REF	DESCRIPTION
	SITE BOUNDARY
	EXISTING COMBINED WATER SEWER
	PROPOSED SURFACE WATER DRAINAGE
	PROPOSED SURFACE WATER DRAINAGE
	EXISTING PRIVATE DRAINAGE TO BE ABANDONED
	GEO-CELLULAR ATTENUATION TANK
	PERMEABLE PAVING SYSTEM REFER 16012-REN-BRY-XXX-C-CE-152200 FOR DETAILS
	HEPNORTH YARD CULLY WITH INTEGRAL REMOVAL SILT BUCKET

P02	UPDATED TO SUIT COMMENTS	20.03.25	JB	HG
P01	STAGE 3	28.02.25	JB	BW
Rev:	Description:	Date:	By:	Chkd:



Renaissance Associates Ltd
2nd Floor Tribeca House
21-27 Dale Street
Manchester
M1 1EY

Project:

Drawing Title:

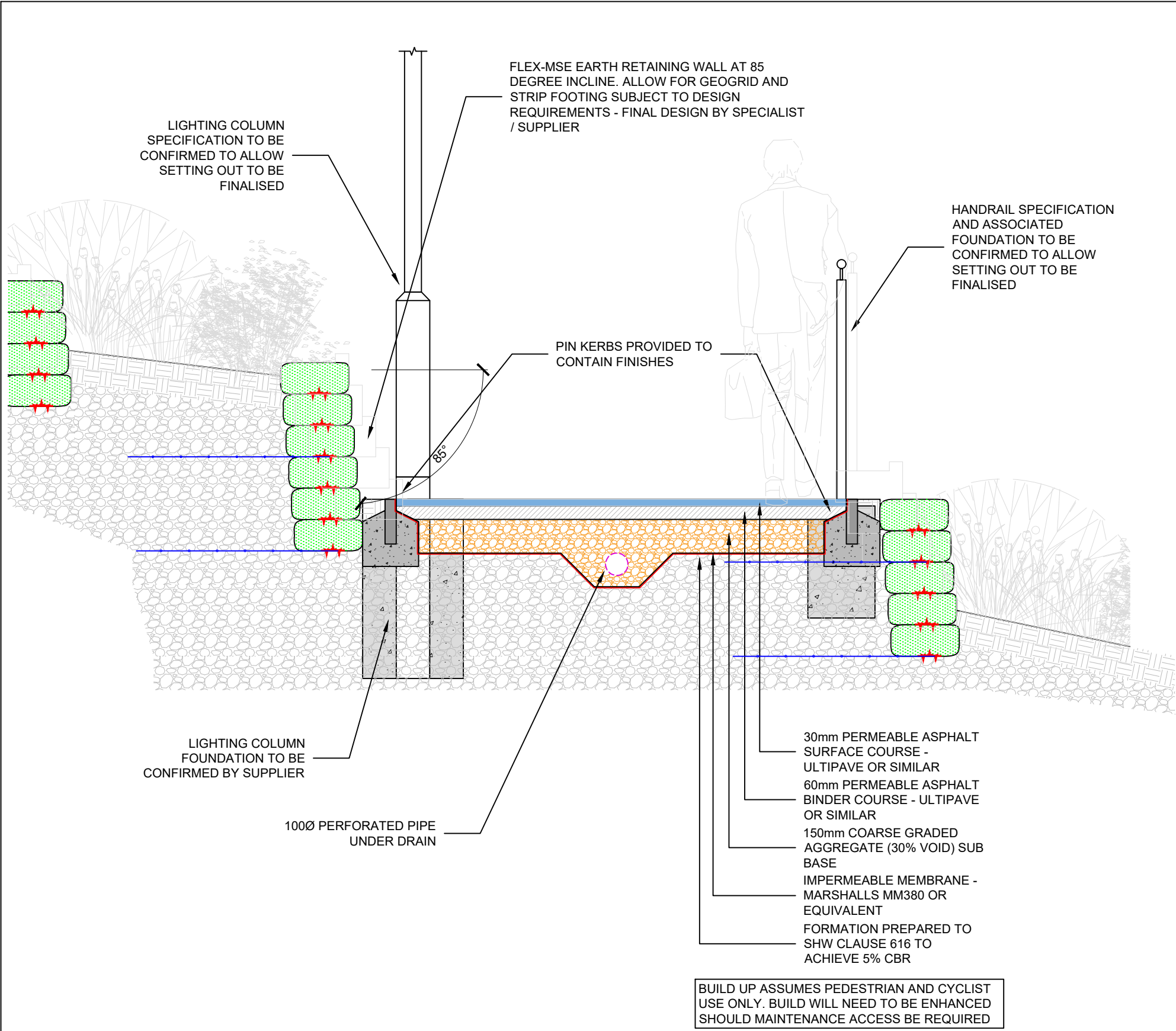
BELOW GROUND DRAINAGE
PLAN SHEET 2

Status:

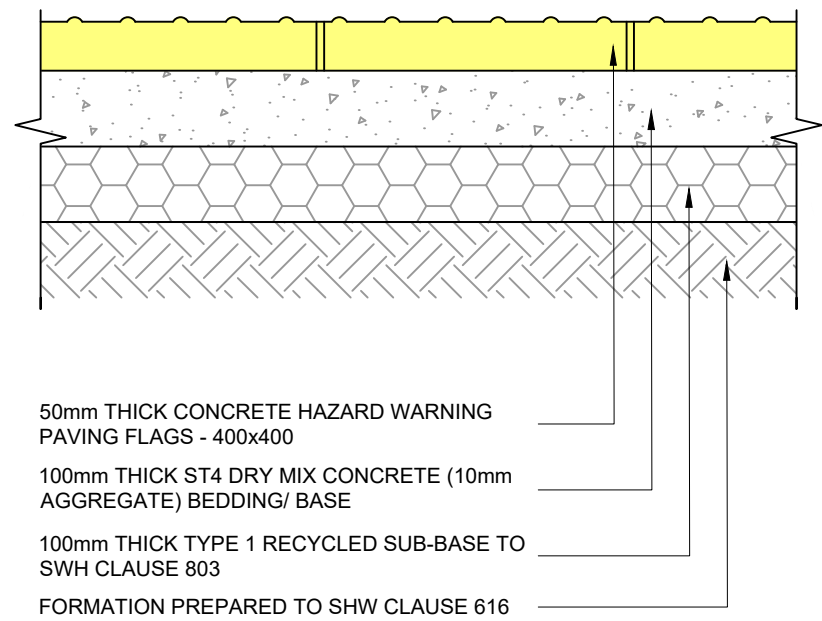
Size: A1	Date: FEB 24	Drawn by: JB	Designed by: JB	Checked by: BW
--------------------	------------------------	------------------------	---------------------------	--------------------------

Scale:	1:200	Project No:	2401-09
Project - Originator - Volume - Level - Type - Role - Number:			Revision:

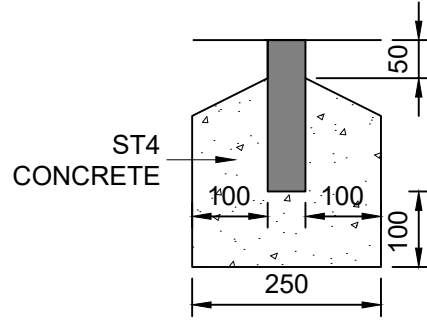
16012-REN-BRY-XXX-D-CE-131101	P02
-------------------------------	-----



EXTERNAL RAMP DETAIL
SCALE 1:20



HAZARD WARNING PAVING
SCALE 1:10



TYPICAL PIN KERB DETAIL
SCALE 1:10

- NOTES:
- THIS DRAWING IS PRELIMINARY AND IS SUBJECT TO CHANGE DEPENDING ON FURTHER DEVELOPMENT OF THE LANDSCAPE ARCHITECT PROPOSALS AND CLIENT REQUIREMENTS.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT RENAISSANCE, ARCHITECTS, AND LANDSCAPE ARCHITECTS' DRAWINGS AND SPECIFICATIONS.
 - DO NOT SCALE FROM THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS' ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
 - ALL DIMENSIONS ARE IN mm UNLESS STATED OTHERWISE.
 - THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY WORKS AND CONSTRUCTION PROCEDURES.
 - ALL WORKS AND MATERIAL TO BE IN ACCORDANCE WITH CURRENT BRITISH STANDARDS AND BUILDING REGULATIONS.
 - REFER TO LANDSCAPE ARCHITECTS SPECIFICATION FOR SURFACE FINISHES.
 - ALL PAVING SHOULD BE INSTALLED IN ACCORDANCE WITH BS 7533 BY A COMPETENT EXPERIENCED PAVING CONTRACTOR.
 - IT IS RECOMMENDED THAT CBR TESTS ARE CARRIED OUT TO CONFIRM BUILD UPS ARE SUITABLE. IF RECOMMENDED CBR VALUE IS NOT ACHIEVED THE BUILD UP SHOULD BE REVIEWED BY THE ENGINEER
 - MEASURED CBR VALUE TO BE AT FORMATION LEVEL AND TO BE IN 'SOAKED' CONDITION.
 - ANY VARIATIONS IN GROUND CONDITIONS SHOULD BE NOTIFIED TO THE ENGINEER PRIOR TO CONSTRUCTION.
 - WHERE PERMEABLE FINISHES AND/OR PERMEABLE BEDDING IS SPECIFIED, CONSIDERATION IS REQUIRED TO TO CONFIRM WHETHER SUB-SURFACE DRAINAGE IS REQUIRED.
 - THE CONSTRUCTION DEPTHS GIVEN ARE THE MINIMUM REQUIRED (COMPACTED).
 - ALL TOLERANCES FOR PAVEMENT LAYERS TO BE IN ACCORDANCE WITH SPECIFICATION FOR HIGHWAY WORKS, SERIES 700.
 - ALL MATERIAL WITHIN 450mm OF GROUND LEVEL TO BE NON FROST SUSCEPTIBLE. OVERALL BUILD UP TO BE INCREASES AS REQUIRED.
 - LIMESTONE AGGREGATE IS NOT PERMITTED.
 - ALL SUB-BASES AND CAPPING LAYERS TO BE GRADED AND COMPACTED IN ACCORDANCE WITH THE SPECIFICATION FOR HIGHWAY WORKS (SFHW) AND BS7533. THE FINAL COMPACTION PASS SHOULD BE UNDERTAKEN WITHOUT VIBRATION.
 - SUB-GRADE PREPARATION IS TO BE CARRIED OUT IN ACCORDANCE WITH THE SFHW. REMOVE ALL SOFT SPOTS AND REPLACE WITH SUITABLE FILL MATERIAL (E.G. COMPACTED CLASS 8F2).
 - ALL BITUMEN MACADAM (BASE, BINDER AND SURFACE COURSES) SHALL BE IN ACCORDANCE WITH BS EN 13108. ALL BITUMINOUS BOUND MATERIALS SHALL BE TRANSPORTED, LAID AND COMPACTED IN ACCORDANCE WITH SFHW
 - IN AREAS WHERE LEVELS ARE TO BE RAISED, ACCEPTABLE FILL MATERIAL IS TO BE USED TO THE UNDERSIDE OF THE PROPOSED CONSTRUCTION MAKE-UP.
 - TYPE 1 SUB-BASE IN ACCORDANCE WITH SFHW.
 - NO REGULATING OR FILL MATERIAL HAS BEEN INCLUDED IN CONSTRUCTION BUILDUP. CONTRACTOR TO INCLUDE FOR REGULATING / FILL MATERIAL WITH BS7533 REQUIREMENTS.
 - ALL KERBS TO BE LAID IN ACCORDANCE WITH BS7533-6.

P01	STAGE 3	28.02.25	JB	BW
Rev:	Description:	Date:	By:	Chkd:
renaissance Renaissance Associates Ltd 2nd Floor Tribeca House 21-27 Dale Street Manchester M1 1EY Project: BURY INTERCHANGE Drawing Title: EXTERNAL WORKS SECTIONS AND DETAILS SHEET 1 Status: STAGE 3 Size: A1 Date: FEB 25 Drawn by: JB Designed by: JB Checked by: BW Scale: AS NOTED Project No: 2401-09 Project – Originator – Volume – Level – Type – Role – Number: Revision: 16012-REN-BRY-XXX-D-CE-132200 P01				

APPENDIX G

HYDRAULIC CALCULATIONS

Renaissance Assoc.

Carvers Warehouse
77 Dale Street
Manchester M1 2HG

Date 19/03/2025 11:52
File

Innovyze

Bury Interchange
Phase 1 Pyramid Park
Attenuation

Designed by JB
Checked by JB

Source Control 2020.1.3

Page 1



Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 110 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	85.315	0.265	0.0	2.0	2.0	14.3	O K
30 min Summer	85.403	0.353	0.0	2.0	2.0	19.1	O K
60 min Summer	85.478	0.428	0.0	2.0	2.0	23.2	O K
120 min Summer	85.515	0.465	0.0	2.0	2.0	25.2	O K
180 min Summer	85.516	0.466	0.0	2.0	2.0	25.2	O K
240 min Summer	85.508	0.458	0.0	2.0	2.0	24.8	O K
360 min Summer	85.487	0.437	0.0	2.0	2.0	23.6	O K
480 min Summer	85.461	0.411	0.0	2.0	2.0	22.2	O K
600 min Summer	85.433	0.383	0.0	2.0	2.0	20.8	O K
720 min Summer	85.404	0.354	0.0	2.0	2.0	19.2	O K
960 min Summer	85.337	0.287	0.0	2.0	2.0	15.5	O K
1440 min Summer	85.234	0.184	0.0	2.0	2.0	10.0	O K
15 min Winter	85.314	0.264	0.0	2.0	2.0	14.3	O K
30 min Winter	85.403	0.353	0.0	2.0	2.0	19.1	O K
60 min Winter	85.480	0.430	0.0	2.0	2.0	23.3	O K
120 min Winter	85.518	0.468	0.0	2.0	2.0	25.4	O K
180 min Winter	85.513	0.463	0.0	2.0	2.0	25.1	O K
240 min Winter	85.500	0.450	0.0	2.0	2.0	24.4	O K
360 min Winter	85.463	0.413	0.0	2.0	2.0	22.4	O K
480 min Winter	85.419	0.369	0.0	2.0	2.0	20.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	129.387	0.0	15.8	18
30 min Summer	89.228	0.0	21.8	32
60 min Summer	58.739	0.0	28.8	62
120 min Summer	37.167	0.0	36.4	108
180 min Summer	27.883	0.0	41.0	140
240 min Summer	22.657	0.0	44.4	172
360 min Summer	16.891	0.0	49.6	242
480 min Summer	13.687	0.0	53.6	312
600 min Summer	11.614	0.0	56.9	382
720 min Summer	10.149	0.0	59.6	450
960 min Summer	8.193	0.0	64.2	576
1440 min Summer	6.044	0.0	71.1	808
15 min Winter	129.387	0.0	15.8	18
30 min Winter	89.228	0.0	21.8	32
60 min Winter	58.739	0.0	28.8	60
120 min Winter	37.167	0.0	36.4	114
180 min Winter	27.883	0.0	41.0	144
240 min Winter	22.657	0.0	44.4	182
360 min Winter	16.891	0.0	49.6	260
480 min Winter	13.687	0.0	53.6	336

©1982-2020 Innovyze

Renaissance Assoc.

Carvers Warehouse
77 Dale Street
Manchester M1 2HG

Date 19/03/2025 11:52
File

Bury Interchange
Phase 1 Pyramid Park
Attenuation

Designed by JB
Checked by JB

Innovyze

Source Control 2020.1.3

Micro Drainage

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max E Outflow (l/s)	Max Volume (m³)	Status
600 min Winter	85.366	0.316	0.0	2.0	2.0	17.1	O K
720 min Winter	85.313	0.263	0.0	2.0	2.0	14.3	O K
960 min Winter	85.227	0.177	0.0	2.0	2.0	9.6	O K
1440 min Winter	85.131	0.081	0.0	1.9	1.9	4.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Winter	11.614	0.0	56.9	406
720 min Winter	10.149	0.0	59.6	468
960 min Winter	8.193	0.0	64.2	584
1440 min Winter	6.044	0.0	71.1	780

©1982-2020 Innovyze

Renaissance Assoc.		Page 3
Carvers Warehouse 77 Dale Street Manchester M1 2HG	Bury Interchange Phase 1 Pyramid Park Attenuation	
Date 19/03/2025 11:52 File	Designed by JB Checked by JB	
Innovyze Source Control 2020.1.3		

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
Region	England and Wales	Cv (Winter)	1.000
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.300	Longest Storm (mins)	1440
Summer Storms	Yes	Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.049

Time (mins)		Area
From:	To:	(ha)
0	4	0.049

©1982-2020 Innovyze

Renaissance Assoc.		Page 4
Carvers Warehouse 77 Dale Street Manchester M1 2HG	Bury Interchange Phase 1 Pyramid Park Attenuation	
Date 19/03/2025 11:52 File	Designed by JB Checked by JB	
Innovyze Source Control 2020.1.3		

Model Details

Storage is Online Cover Level (m) 86.800

Cellular Storage Structure

Invert Level (m) 85.050 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	57.0	0.0	0.501	0.0	0.0
0.500	57.0	0.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0074-2000-0520-2000
Design Head (m) 0.520
Design Flow (l/s) 2.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 74
Invert Level (m) 85.030
Minimum Outlet Pipe Diameter (mm) 100
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.520	2.0
Flush-Flo™	0.154	2.0
Kick-Flo®	0.355	1.7
Mean Flow over Head Range	-	1.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.9	1.200	2.9	3.000	4.5	7.000	6.7
0.200	2.0	1.400	3.1	3.500	4.8	7.500	6.9
0.300	1.9	1.600	3.3	4.000	5.1	8.000	7.2
0.400	1.8	1.800	3.5	4.500	5.4	8.500	7.4
0.500	2.0	2.000	3.7	5.000	5.7	9.000	7.6
0.600	2.1	2.200	3.9	5.500	5.9	9.500	7.8
0.800	2.4	2.400	4.0	6.000	6.2		
1.000	2.7	2.600	4.2	6.500	6.5		

©1982-2020 Innovyze

APPENDIX H

NORTHWEST SUDS PROFORMA

NORTH WEST SuDS PRO-FORMA

This pro-forma is a requirement for any planning application for major development¹.

It supports applicants in summarising and confirming how surface water from a development will be managed sustainably under current and future conditions.

Your sustainable drainage system should be designed in accordance with [CIRIA The SuDS Manual C753](#) and any necessary adoption standards.

HOW TO COMPLETE

Blue Box	Instruction/ Question
Orange Box	Evidence Required
White Box	To be completed by Developer / Consultant

1. Complete ALL white boxes
2. Submit this pro-forma to the Local Planning Authority, along with:
 - Sustainable Drainage Strategy
 - Site Specific Flood Risk Assessment (if required)
 - Minimum supporting evidence, as indicated in orange boxes of this pro-forma.

GUIDANCE TO SUPPORT YOU

The pro-forma should be completed in conjunction with ‘Completing your SuDS Pro Forma Guide.’

The pro-forma can be completed using freely available tools such as [Tools for Sustainable Drainage Systems](#) or appropriate industry standard surface water management design software.

¹ as defined in Section 2 of [Statutory Instrument 2015 No. 595](#) or on sites in Critical Drainage Areas.

SECTION 1. APPLICATION & DEVELOPMENT DETAILS

Planning Application Reference <i>(if available)</i>		
State type of planning application <i>i.e. Pre-application, Outline, Full, Hybrid, Reserved Matters*</i> <i>*Information only required if drainage is to be considered as part of reserved matters application</i>	Full	
Developer(s) Name:	TFGM	
Consultant(s) Name:	renaissance Associates LTD	
Development Address <i>(including postcode)</i>	Bury Interchange BL9 0EJ	
Development Grid Reference <i>(Eastings/Northings)</i>	Easting: 380381 Northing: 410401	
Total Development Site Area (Ha)	1.0Ha	
Drained Area (Ha)* of Development	0.049 Ha	
Please indicate the flood zone that your development is in. Tick all that apply. <i>Based on the Environment Agency Flood Map for Planning and the relevant Local Authority Strategic Flood Risk Assessment (to identify Flood Zones 3a/3b).</i>	Flood Zone 1 ☒ Flood Zone 2 ☐ Flood Zone 3a ☐ Flood Zone 3b ☐	
What is the surface water risk of the site? Tick all that apply. <i>Based on the Environment Agency Surface Water Flood Map.</i>	High ☐ Medium ☐ Low ☒	
Have you submitted a Site Specific Flood Risk Assessment (FRA)? <i>See separate guidance notes for clarification on when a FRA is required</i>	Yes ☒ No ☐	
Have you submitted a Sustainable Drainage Strategy?	Yes ☒ No ☐	
Does your drainage proposal provide multi-functional benefits via SuDS?	Yes ☒ No ☐	
Expected Lifetime of Development <i>(years)</i> <i>Refer to Planning Practice Guidance "Flood Risk and Coastal Change" Paragraph 026</i>	100 Years	
Development Type:		State Proposed Number of Units
Greenfield Site Site is wholly undeveloped, and a new drainage system will be installed	☐	
Previously Developed/ Brownfield Site - Site is already developed, and the <u>entirety</u> of the existing surface water drainage system will be used to serve the new development (evidence must be provided to prove existing surface water drainage system is reusable); <u>OR</u> - Where records of the previously developed system are not available so that the hydraulic characteristics of the system cannot be determined or where the drainage system is not in reasonable working order i.e. broken, blocked or no longer operational for other reasons.	☒	
Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 1.	16012-REN-BRY-XXX-T-CE-100002 16012-REN-BRY-XXX-T-CE-100001	

SECTION 2: IMPERMEABLE AREA AND EXISTING DRAINAGE

	Existing (E)	Proposed (P)	Change (P – E)
State Impermeable Area (Ha)	0	0.049	0.049
Evidence Required: Plans showing development layout of site with existing and proposed impermeable areas.			☒

Are there existing sewers, watercourses, water bodies, highway drains, soakaways or filter drains on the site?	Yes ☒ No ☐ Don't Know ☐
Evidence Required: Plan(s) showing existing layout to include all: - Watercourses, open and culverted - Water bodies – ponds, swales etc. - Sewers, including manholes - Highway drains, include manholes, gullies etc. - Infiltration features - soakaways, filter drains etc.	☒

Drainage Design <u>Outline planning applications</u> should be able to demonstrate that a suitable drainage system is achievable. <u>All other type of planning application</u> should provide full details or reference to previous planning application where drainage details have been submitted or approved.	
Select which design approach you are taking to manage water quantity (refer to Section 3.3 SuDS Manual)	
Approach 1 – Volume control / Long Term Storage (Technical Standards S2/3, S4/5) - The attenuated runoff volume for the 1 in 100 year 6 hour event (plus climate change allowance) is limited to the greenfield runoff volume for the 1 in 100 year 6 hour event, with any additional runoff volume utilising long term storage and either infiltrated or released at 2 l/s/ha - The discharge rate for the critical duration 1 in 1 year event is restricted to the 1 in 1 year greenfield runoff rate - The discharge rate for the critical duration 1 in 100 year event (plus climate change allowance) is restricted to the 1 in 100 year greenfield runoff rate	☐
Approach 2 – Qbar (Technical Standards S6) Justification has been provided that the provision of volume control/long term storage is not appropriate and an attenuation only approach is proposed. All events up to the critical duration 1 in 100 year event (plus climate change allowance) are limited to Qbar (1 in 2 year greenfield rate) or 2 l/s/ha, whichever is greater.	☒
Evidence Required: Plans showing: - Existing flow routes and flood risks - Modified flow routes - Contributing and impermeable areas - Current (if any) and proposed 'source control' and 'management train' locations of sustainable drainage components (C753 Chapter 7) - Details of drainage ownership - Details of exceedance routes (Technical Standards S9) - Topographic survey - Locations and number of existing and proposed discharge points	☒

Note consideration should be given to manage surface water from both impermeable and permeable surfaces (including gardens and verges) likely to enter the drainage system.

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 2.

16012-REN-BRY-XXX-T-CE-100002
16012-REN-BRY-XXX-T-CE-100001

SECTION 3: PEAK RUNOFF RATES – TECHNICAL STANDARDS S2, S3 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Rate (l/s)	Greenfield Rate (l/s)	Proposed Rate (l/s) <i>Previously developed sites - In line with S3 should be equivalent to Greenfield runoff rates – discuss with LLFA if this is not achievable pre-application</i>
Qbar (Approach 2)		0.4	2.0
1 in 1 Year Event (Approach 1)			
1 in 30 Year Event			
1 in 100 Year Event* (Approach 1)			
* Total discharge at the 1 in 100 year rate should be restricted to the greenfield runoff volume for the 1 in 100 Year 6 hour event with additional volumes (long-term storage volume) released at a rate no greater than 2 l/s/ha where infiltration is not possible. The climate change allowance should only be applied to the proposed rate and not the existing or greenfield rate.			
Evidence Required: Methodology used to calculate peak runoff rate clearly stated and justified. Impermeable areas plan, supported by topographical survey confirming positive drainage. Hydraulic calculations and details of software used.			☒ ☒ ☒

State the hydraulic method used in your calculations
(Refer to Table 24.1 of The SuDS Manual)

ICP SUDS - MicroDrainage

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 3.

16012-REN-BRY-XXX-T-CE-100002
16012-REN-BRY-XXX-T-CE-100001

SECTION 4: DISCHARGE VOLUME – TECHNICAL STANDARDS S4, S5 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Volume (m ³)	Greenfield Volume (m ³)	Proposed Volume (m ³)
1 in 100 Year 6 Hour Event <i>(Approach 1)</i>			
Does the below statement apply to your development proposal? Long term storage is not achievable on this site and, in accordance with S6 of the Non Statutory Technical Standards for SuDS, the surface water discharge rates for events up to and including the 1 in 100 year critical event are limited to Qbar (Approach 2)			Yes ☒ No ☐
Evidence Required: Approach to managing the quantity of surface water leaving the site clearly stated and justified Methodology used to calculate discharge volume clearly stated and justified. Hydraulic calculations and details of software used.			☒ ☒ ☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 4.	16012-REN-BRY-XXX-T-CE-100002 16012-REN-BRY-XXX-T-CE-100001
--	--

SECTION 5: STORAGE – TECHNICAL STANDARDS S7 AND S8

State climate change allowance used (%)	1 in 30 Year+40% 1 in 100 Year+45%
State housing density (houses per ha)	NA
State urban creep allowance used (%)	0% - Not suitable due to type of development
Evidence Required: State / used in appropriate industry standard surface water management design software.	☒

State storage volume required (m³) (excluding non-void spaces) <i>Must include an allowance for climate change and urban creep</i>	27m ³
Have you incorporated interception into your design? <i>(Refer to Chapter 24 of The SuDS Manual C753)</i> <i>Where possible, infiltration or other techniques are to be used to try and achieve zero discharge to receiving waters for rainfall depths up to 5mm.</i>	Yes ☐ No ☒
Evidence Required: Drainage plans showing location of attenuation and all flow control devices and supporting calculations.	☒

Summarise how storage will be provided for 1 in 30 year event on site. <i>Storage must be designed to ensure that at no flooding occurs onsite in a 1 in 30 year event except in designed areas and no flooding occurs offsite in a 1 in 100 year (plus climate change allowance) event.</i>	PERMEABLE PAVING AND GEO CELLULAR ATTENUATION TANK
Summarise how storage will be provided for 1 in 100 year (plus climate change) event on site. <i>Where storage above the 1 in 30 year rainfall event is provided in designated areas designed to accommodate excess surface water volumes, plans showing storage locations and surface water depths and supported by calculations used in appropriate industry standard surface water management design software. It is important to run a range of duration events to ensure the worst case condition is found for each drainage element on the site</i>	PERMEABLE PAVING AND GEO CELLULAR ATTENUATION TANK
Evidence Required: Plans showing size and location of storage and supporting calculations. Where there is controlled flooding, extents and depths must be indicated.	☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 5.	16012-REN-BRY-XXX-T-CE-100002 16012-REN-BRY-XXX-T-CE-100001
--	--

SECTION 6: WATER QUALITY PROTECTION

Contaminated surface water run-off can have negative impacts on the quality of receiving water bodies. The potential level of contamination will influence final the design of an appropriate treatment train as part of your sustainable drainage system.

Is the proposal site known to be or potentially contaminated?	Yes ☒ No ☐
If the site is contaminated, it should be demonstrated that the sustainable drainage system will not increase the risk of pollution to controlled waters through the mobilisation of contaminants and/or creation of new pollution pathways.	

Confirm the Pollution Hazard Level of the proposed development - Tick <u>ALL</u> that apply <i>Refer to Pollution Hazard Indices for different Land Use Classifications in Table 26.2 of The SuDS Manual C753 for further guidance.</i>		
Pollution Hazard Level <i>Tick <u>ALL</u> that apply</i>		Surface water run-off from the proposed development will drain from:
VERY LOW	☐	Residential roofs
LOW	☒	- Other roofs (typically commercial/industrial roofs) - Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, home-zones and general access roads) - Non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day
MEDIUM	☐	- Commercial yard and delivery areas - Non-residential car parking with frequent change (e.g. hospitals, retail) - All roads except low traffic roads and trunk roads/motorways²
HIGH	☐	- Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites) - Sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured - Industrial sites - Trunk roads and motorways¹

If the development's Pollution Hazard Level is 'Very Low' or 'Low', has the sustainable drainage design been risk assessed and appropriate mitigation measures included?	Yes ☒ No ☐
If the proposed development has a very low or low polluting potential, you should design your sustainable drainage system to include an appropriate treatment train in accordance with The SuDS Manual (C753).	

If the development's Pollution Hazard Level is 'Medium' or 'High', is the application supported by a detailed water quality risk assessment?	Yes ☐ No ☐
- If the proposed development has a high polluting potential, a detailed risk assessment <u>will</u> be required to identify an appropriate SuDS treatment train and ensure compliance with Paragraph 170 of the National Planning Policy Framework. - If the proposed development has a medium polluting potential, a detailed risk assessment <u>may</u> be required depending on the nature, scale and location of the development.	

Has pre-application advice on water quality been obtained from the Environment Agency?	Yes ☐ No ☒
If YES, provide details:	

² Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 6.

SECTION 7: DETAILS OF YOUR SUSTAINABLE DRAINAGE SYSTEM

a) Function of your Sustainable Drainage System

Do your proposals store rainwater for later use (as a resource)?	Yes ☐ No ☒
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	

Do your proposals promote source control to manage rainfall close to where it falls? (e.g. promoting natural losses through soakage, infiltration and evapotranspiration)	Yes ☐ No ☒
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7a.	16012-REN-BRY-XXX-T-CE-100002 16012-REN-BRY-XXX-T-CE-100001
---	--

b) Hierarchy of Drainage Options – Planning Practice Guidance

The proposed method of discharge are set out within order of priority. Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 1: Into the ground (via infiltration)		Yes ☐ No ☒	
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☐	A. Completed Infiltration Checklist from The SuDS Manual (C753) Appendix B <i>An editable version of this form is available on SusDrain website.</i>	☒	A. Site investigation to demonstrate that the ground is not free draining. Test results to be provided in accordance with: - The methodology within BRE 365 (2016), OR - Falling head permeability tests BS EN ISO 22282-2: 2012
☐	B. British Geological Survey (BGS) Infiltration SuDS Map	☒	B. NOTE: where an applicant is unable to access a site to undertake testing, e.g. where unable to access a site for an outline application, they can submit a SuDS GeoReport or similar.
☐	C. Infiltration testing to BRE 365 (2016) or falling head permeability tests to BS EN ISO 2228-2: 2012 (optional for outline)	☒	C. Evidence to confirm that infiltration to ground would result in a risk of deterioration to ground water quality.
☐	'Plan B' sustainable drainage plan and statement of approach with an alternative discharge method, in case infiltration proposals are proven not feasible upon	☒	D. Geotechnical advice from a competent person* which determines that infiltration of water to ground would pose an unacceptable risk of geohazards to the site and/or local area.

	further site specific ground investigation e.g. to consider seasonal variations to groundwater.		<i>*Note: Competent person may include a Chartered Engineer, Chartered Geologists, Registered Ground Engineering Professionals (RoGEP).</i>
--	---	--	---

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 2: To a surface water body <i>(select type)</i> NOTE: Consent from LLFA or Permit from Environment Agency may be required – refer to guidance		Yes ☐ No ☒ N/A ☐	
		☐ Main river ☐ Ordinary watercourse	☐ Canal ☐ Other water body
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☐ Surface water body / watercourse survey and report	☒ Plan showing nearby watercourses and waterbodies AND ☒ Statement providing justification in your Sustainable Drainage Strategy <i>Note: Where discharge of any element in the hierarchy is discounted, an applicant should provide justification. If the reasoning for discounting a discharge of surface water to watercourse relates to issues associated with third party land or the securing of any other required consent, it may be necessary for the applicant to provide evidence to the local planning authority to support their proposed approach.</i>		

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 3: To a surface water sewer or highway drain <i>(select type)</i>		Yes ☐ No ☒ N/A ☐	
		☐ Surface water sewer	☐ Highway drain
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☐ Written correspondence from Water and Sewerage Company/ Highway Authority regarding proposed connection.	☒ Plan showing nearby sewers and highway drains AND ☒ Statement providing justification in your Sustainable Drainage Strategy		

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 4: To combined sewer		Yes ☒ No ☐ N/A ☐	
If YES - Evidence Required		If NO – Evidence Required	
☐ Written correspondence from Water and Sewerage Company	N/A		

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7b.	16012-REN-BRY-XXX-T-CE-100002 16012-REN-BRY-XXX-T-CE-100001
--	--

c) Proposed SuDS Component Types

	Tick ALL that apply				
Within property boundary	☐ Rainwater harvesting	☐ Green/ blue roofs	☒ Pervious pavements [Type: A ☐ B ☐ C ☒	☐ Soakaway	☐ Bio retention systems

	Tick ALL that apply				
Within development site boundary (not property)	☐ Infiltration system [Type: ☐ Surface level ☐ Below ground]		☐ Filter strips	☐ Filter drains	☐ Swales
	☐ Bio retention system	☐ Detention basins	☐ Ponds and wetlands	☒ Attenuation tanks/ Oversized pipes	☐ Other (state below)
	If 'Other' please state:				

Off site (not within the boundary of the proposed development)	Please state:
--	---------------

I confirm that the above selected components have been designed in accordance with The SuDS Manual (C753).	I confirm ☒
I confirm that the management of flows resulting from rainfall in excess of a 1 in 100 year plus climate change rainfall event, and their exceedance route(s), has been fully considered in order to minimise the risks to people, property (new and existing) and infrastructure.	I confirm ☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7c.	16012-REN-BRY-XXX-T-CE-100002 16012-REN-BRY-XXX-T-CE-100001
--	--

The applicant is responsible to ensure that ALL components selected in Section 7 can be maintained for the design life of the development. This information is required so the Local Planning Authority can ensure the maintenance and management of the sustainable drainage system. The Local Planning Authority will discuss how this will be secured (e.g. via planning condition or planning obligation).

	Information Provided?
Management Plan	Yes ☒ No ☐
Evidence Required: Plan/ drawing provided to show the position of the different SuDS components with: • Key included to identify any of the adopting bodies that you will be offering your sustainable drainage components for adoption (<i>relates to maintenance and management arrangements below</i>). • Plan/ drawing to identify any areas where certain activities are prohibited, detailing reasons why.	☐
Action plan for accidental pollutant spillages.	☐

		Information Provided?
Maintenance Schedule		Yes ☒ No ☐
Evidence Required: A copy of the maintenance schedule including: Proactive and preventative maintenance Detailing regular, occasional and remedial maintenance activities including recommendations for inspection and monitoring. This should include recommended frequencies, advice on plant/ machinery required and an explanation of the objectives for the maintenance proposed and potential implications of not meeting them. Reactive and corrective maintenance (e.g. product repair and replacement). Including advice on excavations, or similar works, in locations that could affect the SuDS components/ adjacent structures.		☒

		Information Provided?
Maintenance and Management Arrangements		Yes ☒ No ☐
Evidence Required: Evidence of formal agreement with the party responsible for undertaking maintenance. Please select any of the adopting bodies that you will be offering your sustainable drainage components for adoption. Tick all that apply. ☐ Water and Sewerage Company <i>Section 104 agreement (Water Industry Act 1991)</i> ☐ Highway Authority <i>Section 278/38 agreement (Highways Act 1980)</i> ☐ Local Authority Public Open Space <i>[Refer to Local Authority Policy]</i> Please select the arrangement(s) for all non-adopted sustainable drainage components. Tick all that apply. ☒ Management Company ☒ Property Owner <i>(for SuDS components within property boundary only)</i> ☐ Other (please state) 		☐

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 8.

DECLARATION AND SUBMISSION

This pro-forma has been completed using evidence from information which has been submitted with the planning application.

The information submitted in the Sustainable Drainage Strategy and site-specific Flood Risk Assessment (FRA), where submitted, is proportionate to the site conditions, flood risks and magnitude of development and I agree that this information can be used as evidence to this sustainable drainage approach.

Submitter Details			
Completed by	Joe Bullough	Email Address	joebullough@renaissance-ltd.com
		Telephone Number(s)	01615521961
Signed off by	H Gribbon	Accreditation(s) and/or Qualification(s) of Signatory	BEng, MScArch, CEng, MIStructE
Date (dd/mm/yyyy)	19.03.2025	Company	renaissance Associates LTD

Client Details			
Name		Company	TFGM