



RIDGE

**JLR JEA BODYSIDES
DRAINAGE TECHNICAL NOTE**

AUGUST 2024

JLR JEA BODYSIDES DRAINAGE TECHNICAL NOTE

Prepared for



Prepared by

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DRAINAGE STRATEGY

- 1.1.1. A planning application is to be submitted to Knowsley Council for a new temporary storage facility on the Halewood site. The proposal is for a 5-year permission on an area of existing hard standing used for HGV parking in the north of the site. This proposal is required to meet a short-term storage deficit on the Halewood site as JLR's ongoing works to electrify its range.
- 1.1.2. To avoid any pre commencement drainage related planning conditions, this technical note has been prepared with additional drainage information.
- 1.1.3. The assessment is based on the development proposals as described by the Architectural plan which is included in **Appendix A**.
- 1.1.4. **Table 1** below provides a summary of the Flood Risk and Drainage / SuDS Strategy for the scheme.

Table 1 – Drainage and Flood Risk Summary

Item	Brief Description
Fluvial Flooding	The site is in Flood Zone 1 (Low Risk) on the Environment Agency Maps.
Site name	Jaguar Land Rover, LCB2 Link Canopy
Site address and location	Speke Blvd, Speke, Liverpool L24 9BJ
Planning Authority	Knowsley Council
Lead Local Flood Authority	Knowsley Council
Approximate Grid Reference	OS: 344896, 384275
General Locality	The site is located within JLR site in Halewood.
Overland Flow	The site slopes from the South to the North, with the surface water runoff intercepted by the existing drainage infrastructure within the existing hardstanding areas. A review of the Environment Agency Surface Water Flood Risk maps indicates that the proposed site ranges from high to low risk of surface water flooding. These low-lying pockets will be removed as part of the development design intent and in turn reduce the risk of surface water flooding.
Groundwater Flooding	The Site Investigation report indicates no groundwater strikes being recorded. See attached SI Report within Appendix A. The site does not lie within an EA Groundwater Source Protection Zone as currently published on the DEFRA Magic Map web-based service. The development site is located in an area at medium risk of flooding from emergence of groundwater (between 25% and 50%). The proposals for the site do not include any basement or underground structures that would be susceptible to the risk of groundwater flooding. The risk of flooding from Groundwater is considered to be low

Artificial Drainage	There are no canals or reservoirs in close proximity to the site. United Utilities Water sewer records have been reviewed and no public sewers are in the vicinity of the site. The nearby infrastructure discharge into private surface water drains. The PFRA and SFRA mapping shows that there are no incidents of sewer flooding on record within the site and the surrounding industrial park. In addition, online searches did not uncover any additional historic sewer flooding events close to the site. Therefore, it is considered that the site is at low risk of flooding from a sewer. The risk of flooding from sewers is considered to be low
Infrastructure Failure	There are no structural, hydraulic or geotechnical infrastructure within the site boundary.
Flood Risk Assessment	An assessment of flood risk has been undertaken at the site. Based on the assessment of sources above, the site is considered to be at low risk of flooding from all sources.
Nearest Adopted Sewers	There are no surface water public sewers currently near the site. Located at or near to the proposed development there are several private surface water drains. The existing site currently discharges into a series of private SW drainage channels located within the site. It is important to that all existing drainage infrastructure located within the vicinity of the site is private and no public sewers are in close proximity to the site.
Maintenance Responsibility	Management Company / Site owner A management and maintenance document has been provided in Appendix B and will be included within the O&M manual at the site.
Surface Water Strategy	The outline strategy is to continue with the existing surface water regime. The surface water from the existing hardstanding areas discharge into the private 600mm Dia SW drain crossing the proposed development area. The proposed development is approximately 5363m² in area and is located on existing hardstanding areas (currently a lorry parking area). As the development is to take place on an area that is currently fully impermeable and is all positively drained into the existing private SW drain, it is considered that the proposed development will not result in an increase in surface water runoff. The proposed development will therefore not increase flood risk onto its locality. The proposed drainage layout for the new development and proposed highways will be designed in accordance with Design & Construction Guidance (DCG), Building Regulations Part H guidance, Environment Agency (peak rainfall allowances), i.e. up to the 30-year storm return period criterion (including 40% increase to account for climate change) and tested for the 1 in 100 year return period including a 45% increase to account for climate change to confirm that there is no flood risk to the properties. Surface Water (SW) flows up to the 1 in 100-year event (including a 45% increase to allow for climate change) will be contained below ground to satisfy all guidance. To improve the water quality from the proposed development, the proposed drainage strategy has incorporated multiple levels of treatment that are in line with the Simple Index Approach (Cira 753)

The pollution hazard for the proposed scheme is low, the proposed roof is to have a semi-gloss paint finish with no metal cladding being exposed. As such, pollution from metals is very low to non-existent. Therefore, no SuDS measures are to be implemented for pollution from Metals.

Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05

The proposed development will have SW runoff from the roof and surrounding hardstanding areas. There are no parking areas and heavy vehicle traffic areas proposed. Therefore, to improve the water quality from the proposed development, the proposed drainage strategy has implemented numerous catchpit manholes and drainage channels with silt traps to mitigate the Total Suspended Solids (TSS). This measure allows to catch sediments and debris that gets carried away along the SW system and reduces the possibility of blockages occurring.

The proposed Drainage Layout is located within **Appendix B**.

The proposed hydraulic model results are located within **Appendix C**.

The proposed development is a temporary structure, this short-term structure will allow JLR's ongoing works to electrify its range.

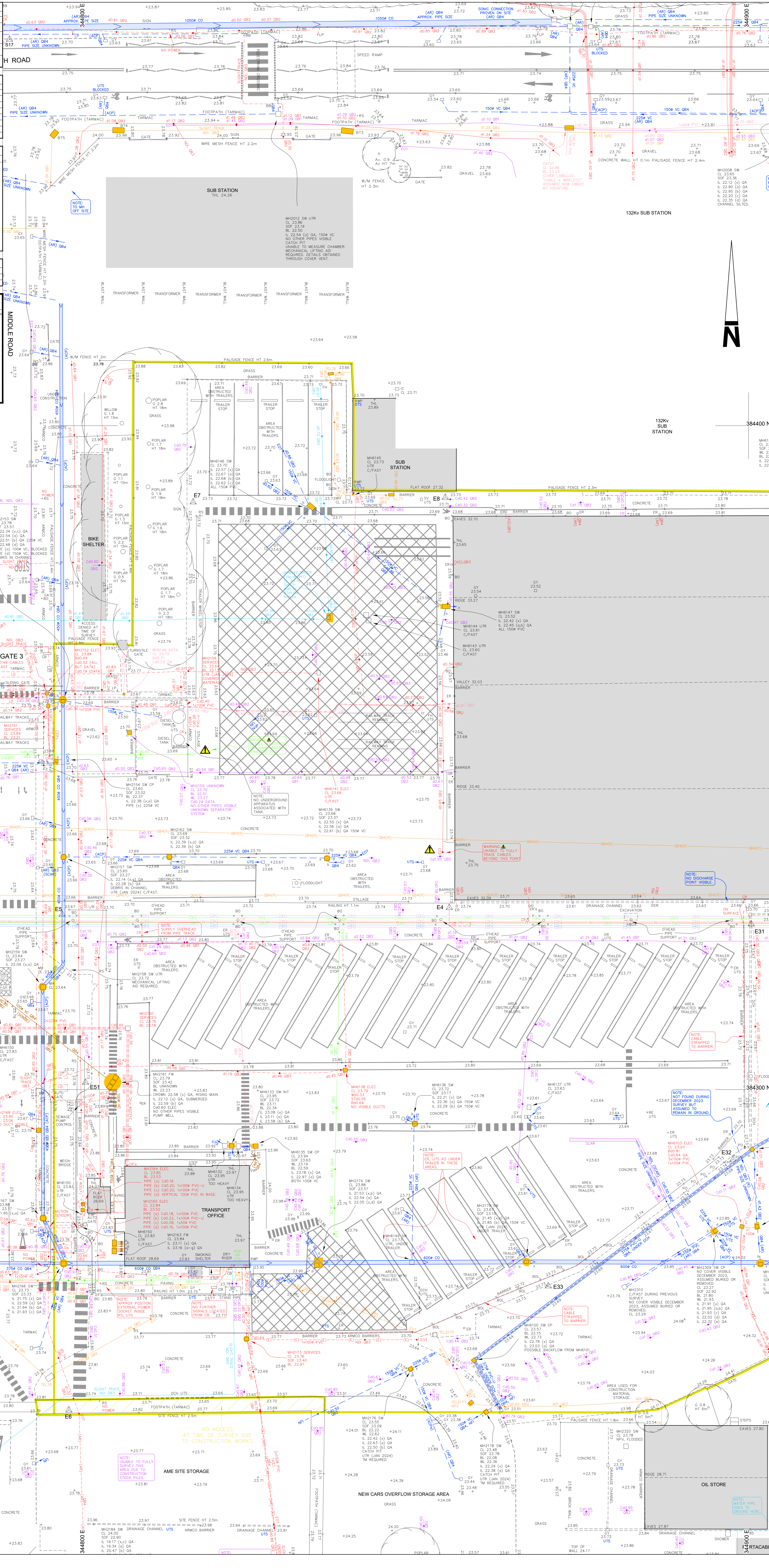
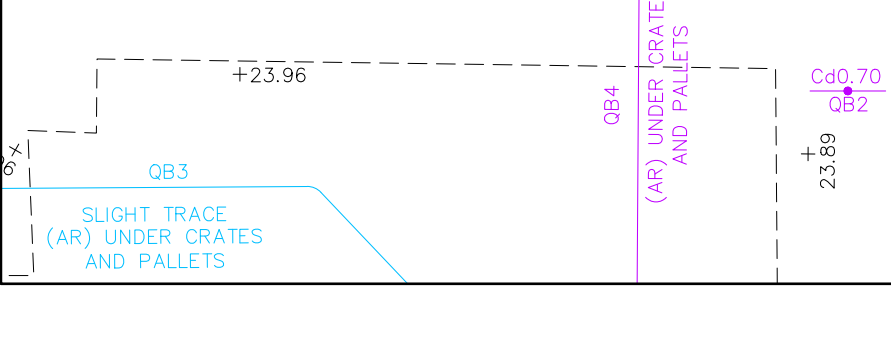
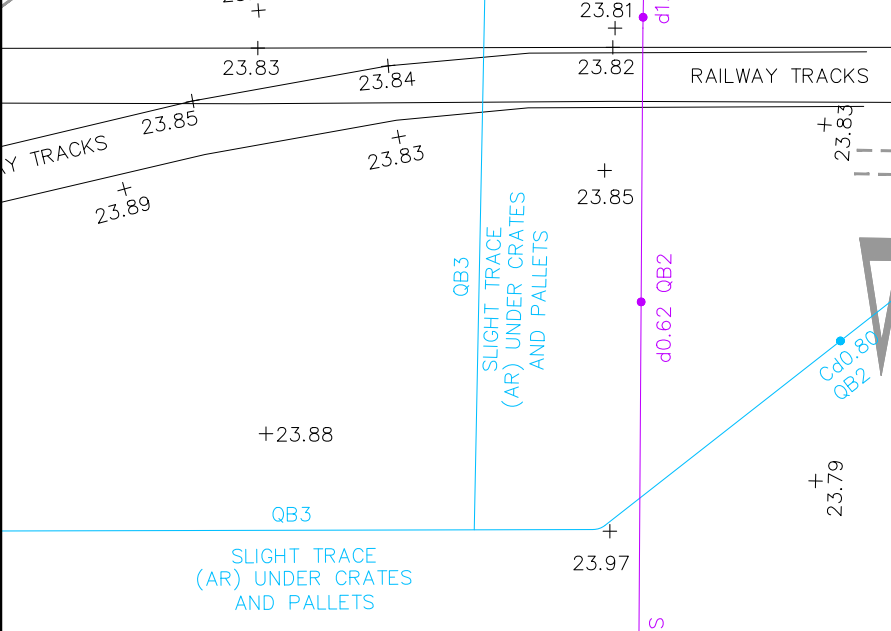
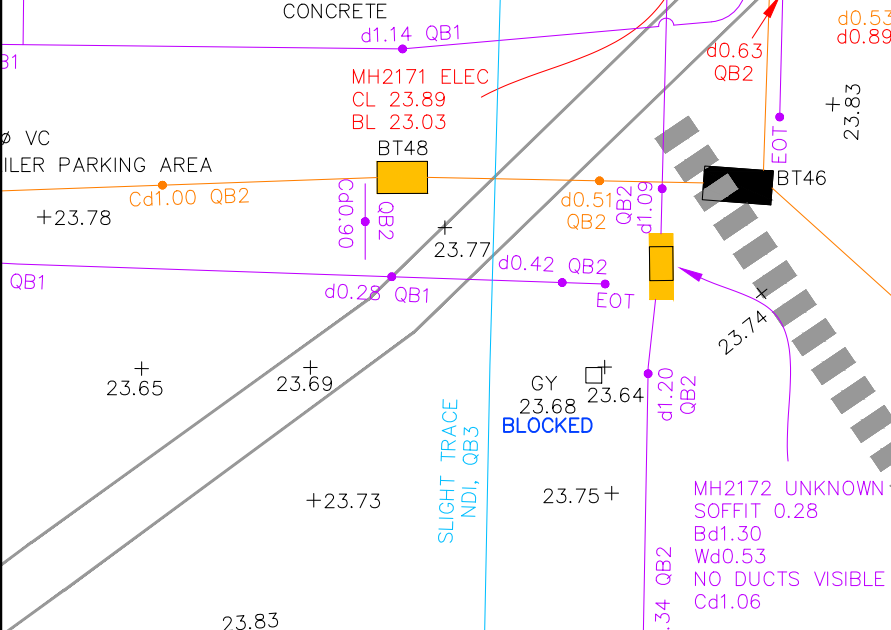
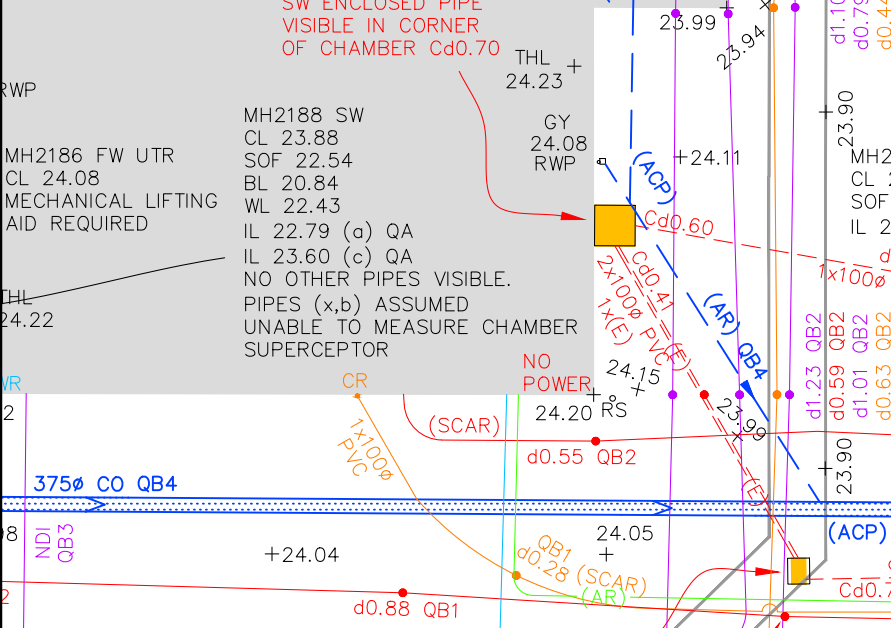
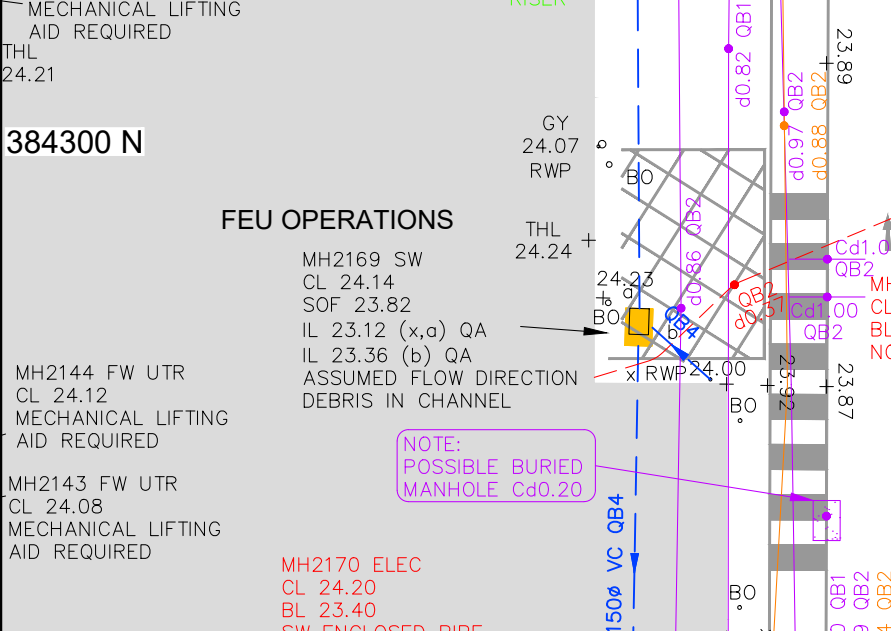
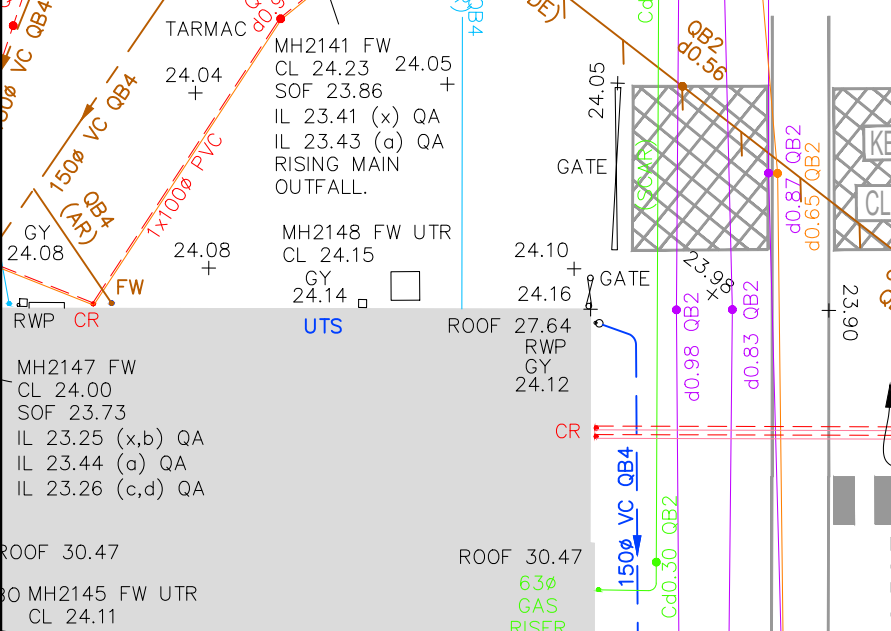
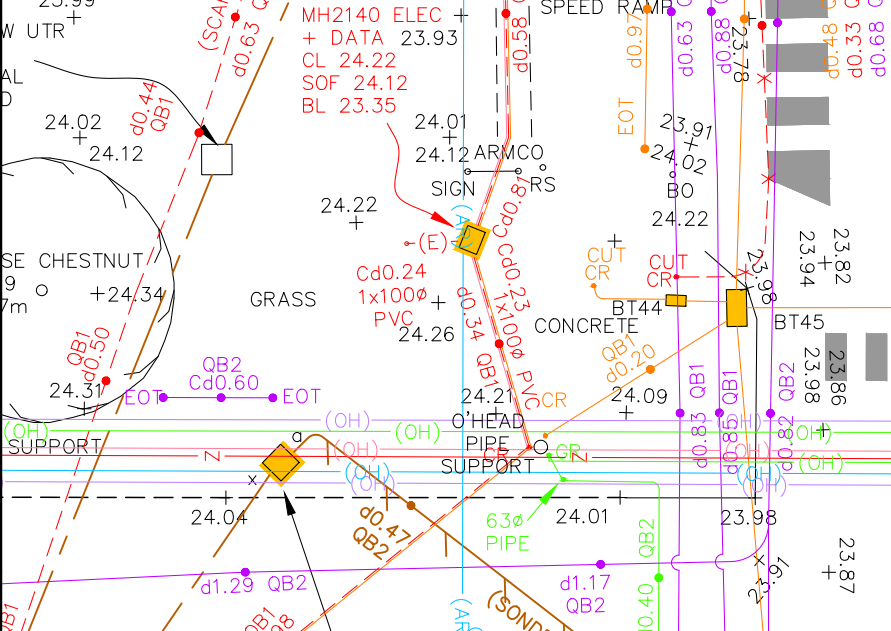
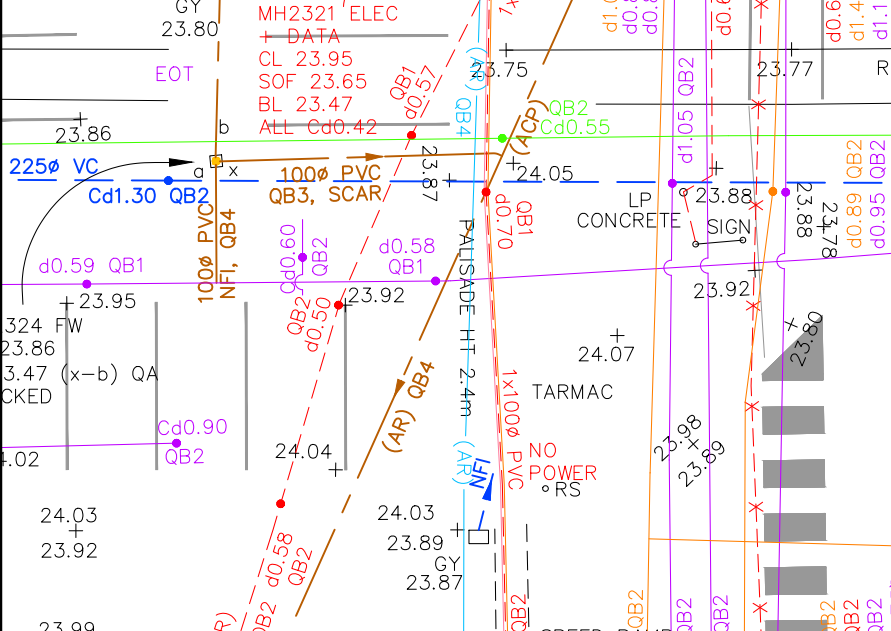
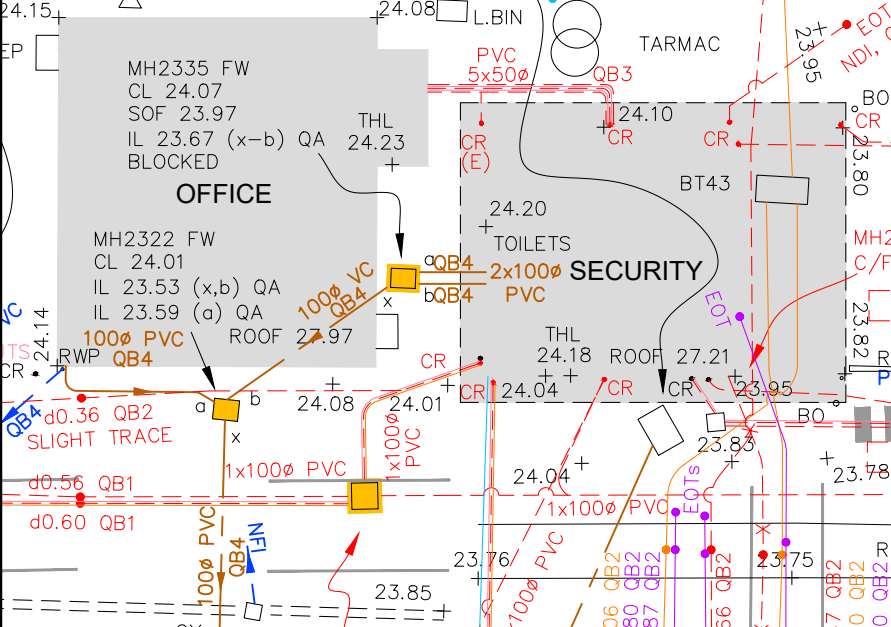
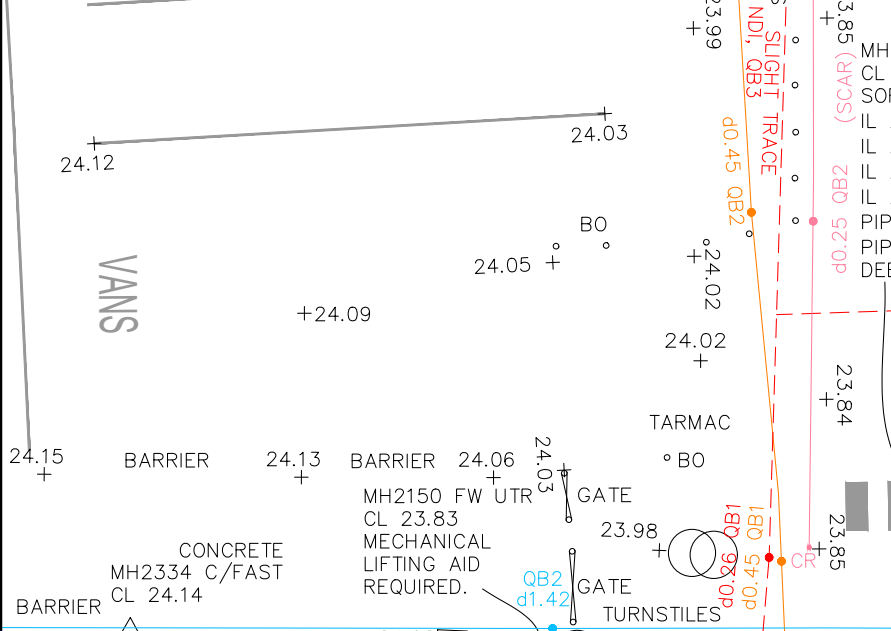
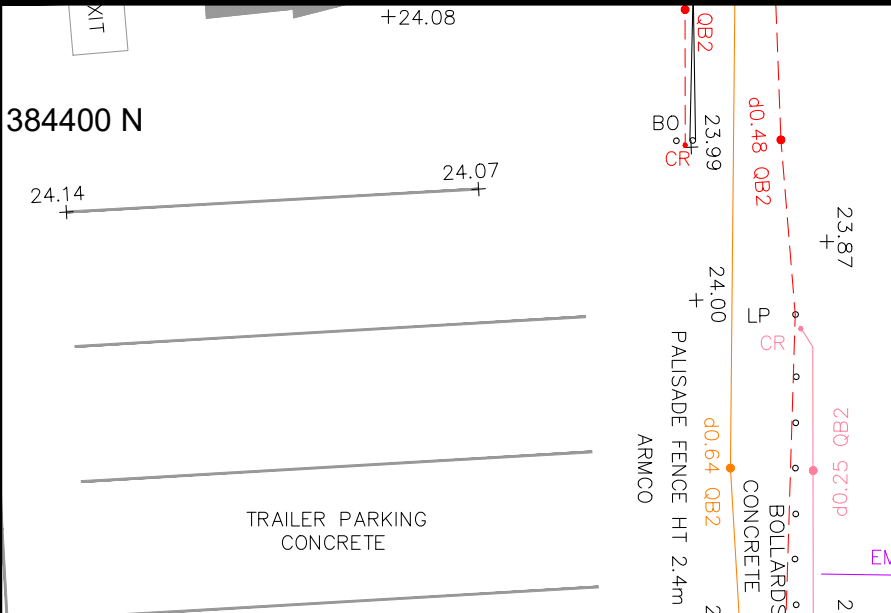
It is important to mention, the same drainage principles had been used for the approved and built JLR 109 structure. This existing structure is also a temporary structure built on existing hardstanding area, where the proposed drainage connects to the existing below ground SW drains at free discharge.

Having summarised drainage elements as described above there will be no residual flood-related risks that will remain after the development has been completed and as such, an infrastructure-based SW drainage Strategy is considered feasible for the development.

APPENDIX A – SITE INFORMATION

[illegible]

Survey Information										
Fieldwork dates	04/12	05/12	06/12	07/12	03/01	04/01	05/01	09/01	10/01	
Weather conditions	☐	☐	☐	☐	☐	☐	☐	☐	☐	
Ground conditions	Dry	Dry	Wet	Wet	Wet	Wet	Wet	Dry	Dry	



- [illegible]



Geotechnical Ground Investigation Report

**Jaguar Landrover
Halewood
L24 9BJ**

Date: 23rd May 2024

Version 1

ENVIROSOLUTION LTD

Suite 53
3a Bridgewater Street
Liverpool
L1 0AB



EnviroSolution Ltd

Document Verification

Site Address	Jaguar Landrover, Halewood, L24 9BJ		
Report Title	Geotechnical Ground Investigation Report		
Job Number	ES03150	Document Ref.	ES03150
Date Issued	23 rd May 2024	Report Version	1
Prepared by	Tom Craig	Signature	
Checked by	Angel Arantegui	Signature	

Disclaimer

This report has been prepared by EnviroSolution Ltd who has exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant experienced in preparing reports of a similar scope.

However, to the extent that the report is based on or relies upon information contained in records, reports or other materials provided to EnviroSolution Ltd, which have not been independently produced or verified, EnviroSolution Ltd, gives no warranty, representation or assurance as to the accuracy or completeness of such information.

The scope of this report is restricted to potential ground contamination and its environmental impact; it does not cover above-ground hazards (e.g., asbestos in buildings), ecological sensitivities (e.g., bats), biological or horticultural hazards (e.g., Japanese Knotweed) or structural hazards (e.g., building stability) unless specifically referred to in the text of this report.



Executive Summary

EnviroSolution Ltd was commissioned to undertake a Geotechnical Ground Investigation to inform development plans for a JEA tent at Jaguar Landrover, Haewood.

The recent intrusive ground investigation has shown that the site is underlain by up to 0.60m of Made Ground overlying firm to stiff brown slightly gravelly clay diamicton. No organic soils or peat were recorded within the boreholes.

Uncorrected SPT N values for this unit range between 5 and in excess of 18 which indicates a low, becoming high strength clay with an approximate undrained shear strength range of between 25kN/m² and 90kN/m².

No groundwater inflows were recorded during the investigation.

Concrete core compressive strength for the concrete slab ranged between 40.9N/mm² and 50.3N/mm².

Specialist advice should be sought with regards to the design sulphate class.

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Appendix A – Site Plans

Appendix B – Site Photographs

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Appendix D – Laboratory Data

1 Introduction

1.1 Background

EnviroSolution Ltd was commissioned to undertake a Geotechnical Site Investigation at Jaguar Landrover in Halewood. This work was required to inform development plans for a new JEA tent.

1.2 Objectives

The objectives of the ground investigation were:

1. To develop a ground model of the site, summarising the ground conditions.
2. To obtain information to inform foundation design.
3. To identify the requirements for any additional works prior to site development (e.g. further ground investigation or remedial works).

1.3 Scope of Work

- An intrusive ground investigation in order to obtain information on the ground conditions beneath the site.
- Geotechnical testing.
- Concrete core testing.
- A geotechnical appraisal of the ground conditions to inform foundation design.

The scope of work for the assessment was developed in accordance with the following documents:

1. British Standard BS 5930:2015: Code of Practice for Site Investigations. British Standards Institute (2015).
2. BS EN ISO 14688-1:2002+A1:2013: Geotechnical Investigation and Testing. Identification and Classification of Soil. Identification and Description.

2 The Site

2.1 Site Location

The site is located at Jaguar Landrover, Halewood, Liverpool, L24 9BJ. The National Grid Reference at the approximate site centre is NGR: 344840 384300.

The site location is shown on **Figure 1** in **Appendix A**.

2.2 Site Description

The site lies in the north-eastern corner of the JLR compound and is currently used as a transport yard/ depot.

The entire site area is covered in concrete hardstanding.

The topography of the site is relatively flat with little change in elevation laying at approximately 24m aOD.

The existing site plan is shown on **Figure 2** which is included in **Appendix A**.

2.3 Development Proposals

It is understood that the proposed development is for the construction of a new JEA tent.

The proposed site plan is shown on **Figure 3** which is included in **Appendix A**.

3 Ground Investigation Methodology

3.1 Intrusive Field Works

The intrusive investigation works were undertaken by EnviroSolution Ltd on the 29th and 30th of May 2024. The work comprised the following:

- The drilling of 6 no. window sample boreholes (designated as WS1 – WS6) to depths of 5.45m bgl.
- Geotechnical logging of ground conditions.
- Collection of concrete cores for subsequent compressive strength testing.
- Collection of representative soil samples from the boreholes for subsequent geotechnical laboratory analysis.

The exploratory hole locations are shown on **Figure 4** in **Appendix A**.

3.2 Soil Sampling Methodology

The exploratory holes were logged in accordance with the requirements of BS 5930: 2015+A1:2020 and BS EN 14688 Pts 1&2. Soil samples were collected at distinct changes in lithology, or on the basis of field observations.

Samples were collected with a clean trowel or by hand (using dedicated nitrile gloves for each sampling location). Samples were placed immediately into laboratory supplied sampling containers, specific to the type of analyses required. All sample containers were sealed and labelled with a unique location identity, depth and date of sampling.

3.3 Laboratory Analysis

3.3.1 Geotechnical Analysis

A programme of laboratory testing was undertaken in accordance with BS:1377 (1990) 'Methods of Test for Soils for Civil Engineering Purposes'. The following tests being carried out:

Table 1: BS:1377 Testing

BS Test No.	Description
Part 2: 3.2.3.3	Moisture Content
Part 3: 5.2	Sulphate Content, pH Value
Part 2: 5,4	Plasticity Index

The following in-situ and laboratory testing outside the scope of BS:1377 was also undertaken:

Table 2: Non-BS:1377 Testing

Standard or Methodology	Test Description
BRE Special Digest 1	Total Sulphate, Aqueous Extract Sulphate, Total Sulphur, pH

4 Ground Conditions

4.1 Made Ground

Made Ground was encountered in all exploratory hole locations at the site with a recorded thickness of between 0.30m and 0.60m.

The Made Ground typically consists of a reinforced concrete slab (0.15m – 0.23m thick) overlying a grey sandy coarse gravel with occasional brick fragments.

4.2 Diamicton

Diamicton deposits were encountered in all of the exploratory boreholes at the site, beneath the Made Ground. The diamicton generally consists of firm to stiff brown slightly gravelly clay with occasional thin layers (0.10m) of fine to coarse gravel.

Uncorrected SPT N values recorded in the diamicton generally ranged between 5 and 18 which indicates a low, becoming high strength clay with an approximate undrained shear strength range of between 25kN/m² and 90kN/m² using the general approximation of:

Undrained shear strength = $N \times 5$ (after Stroud, 1974).

4.3 Bedrock

Bedrock deposits of the Kinnerton Sandstone were not encountered during the investigation.

4.4 Groundwater

Groundwater inflows were not recorded during the drilling works.

A copy of the borehole logs is included in **Appendix C**.

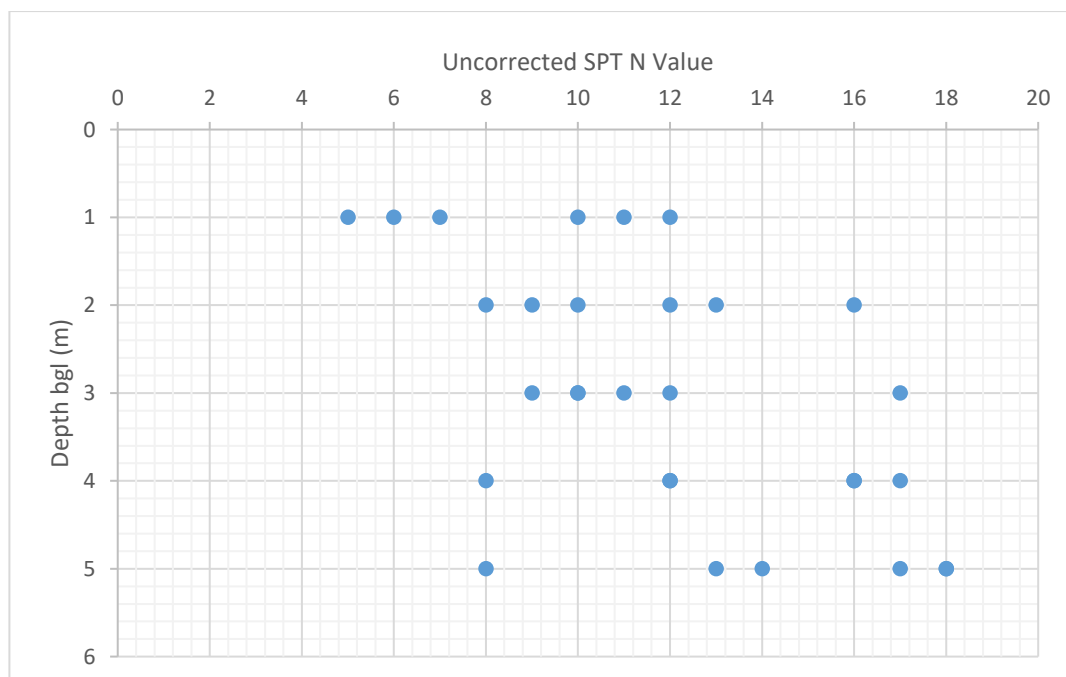
5 Geotechnical Test Results

5.1 Geotechnical Model

Table 3: Geotechnical Model

Stratum	Depth to Base (m bgl)	Parameters/ Comments	
		Strength Parameters	Other Parameters/ Notes
Made Ground	0.30m – 0.60m	Not recorded	Reinforced concrete slab overlying grey sandy coarse gravel with occasional brick fragments.
Diamicton	Not proven	SPT N values 5 - 18	Firm to stiff brown slightly gravelly clay with occasional thin layers (0.10m) of fine to coarse gravel.

A total of 30 no. Standard Penetration Tests (SPTs) were performed during the drilling works. The results are recorded on the borehole logs at the appropriate depths and are displayed on the graph below.



5.2 Geotechnical Laboratory Test Results

5.2.1 Sulphate Testing

The results of chemical testing carried out in accordance with BRE Special Digest 1:2005 Concrete in Aggressive Ground are summarised as follows (See **Appendix D**):

Table 4: BRE Special Digest 1:2005 Test Results

Material	Property	No. of Tests	Range of Results	Characteristic Values (BRE Special Digest 1)	Design Sulphate Class and ACEC Class
Made Ground	Sulphate (SO ₄) by 2:1 water soil extract (mg/l)	2	276 – 1630	1630	Specialist advice should be sought
	pH	2	9.6 – 10.5	9.6	
	Total Sulphur %	2	0.11 – 0.28	0.28	
Natural Ground	Sulphate (SO ₄) by 2:1 water soil extract (mg/l)	3	<10 – 68	68	DS-1 AC-1
	pH	3	8.2	8.2	
	Total Sulphur %	3	<0.02	0.02	

5.2.2 Plasticity Testing

The results of the plasticity testing are summarised below. A copy of the laboratory testing results is included in **Appendix D**.

Table 5: Plasticity Results

Sample	Plasticity Index	Modified Plasticity Index	Volume Change Potential
WS1 at 1.0m	15	13	Low
WS2 at 3.0m	13	12	Low
WS3 at 3.0m	15	13	Low

Sample	Plasticity Index	Modified Plasticity Index	Volume Change Potential
WS4 at 3.50m	14	13	Low

* Modified Plasticity Index for % passing 425µm sieve in accordance with NHBC Standards Chapter 4.2

The results show a low plasticity clay soil with a low volume change potential.

5.2.3 Natural Moisture Content

Natural moisture content testing was carried out on a total of 4 no. soil samples. The results of the natural moisture content testing are shown in **Appendix D**.

The results show a range in natural moisture content of between 13.3% and 14.9%.

5.3 Concrete Core Compressive Strength Results

The results of the concrete core compressive strength testing are summarised below. A copy of the laboratory test certificates is included in **Appendix D**.

Table 6: Concrete Core Compressive Strength Testing

Sample	Core Compressive Strength (N/mm ²)
CC-1	42.2
CC-2	40.7
CC-3	50.3
CC-4	40.9
CC-5	43.9
CC-6	41.5

6 Conclusions and Recommendations

The recent intrusive ground investigation has shown that the site is underlain by up to 0.60m of Made Ground overlying firm to stiff brown slightly gravelly clay diamicton. No organic soils or peat were recorded within the boreholes.

Uncorrected SPT N values for this unit range between 5 and in excess of 18 which indicates a low, becoming high strength clay with an approximate undrained shear strength range of between 25kN/m² and 90kN/m².

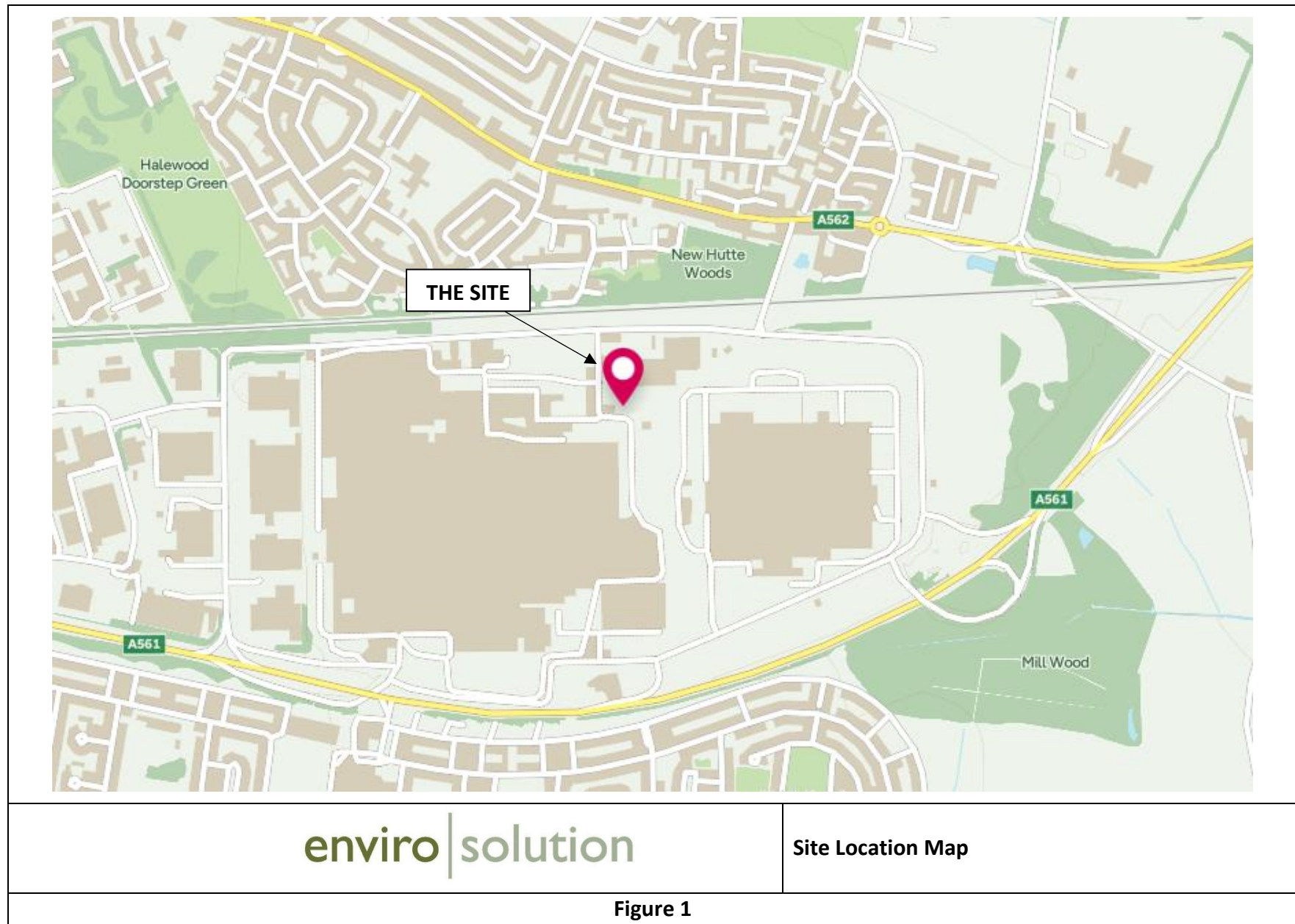
No groundwater inflows were recorded during the investigation.

Concrete core compressive strength for the concrete slab ranged between 40.9N/mm² and 50.3N/mm².

Specialist advice should be sought with regards to the design sulphate class.

APPENDICES

Appendix A – Site Location and Site Plan





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Existing Site Plan

Figure 2



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Exploratory Holes Location Plan

Figure 3

Appendix B – Site Photographs



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WS1



enviro|solution

WS2



enviro|solution

WS3



enviro|solution

WS4



enviro|solution

Borehole WS5



enviro|solution

Borehole WS6

Appendix C – Window Sample Borehole Logs

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Appendix D – Laboratory Data

Laboratory:
Unit 4
Rose Lane Industrial Estate
Lenham Heath
Kent ME17 2JN
01622 851176



Report No: **XTE 77860 - 863**
Page 1 of 1

TEST REPORT OF MOISTURE CONTENT OF SOILS

Method: BS 1377-2:1990, Method 3.2.3.3. Oven Drying

XTRATEC SAMPLE REF | *Remarks
CUSTOMER/SITE SAMPLE REF | **Remarks

CLIENT | DETS Ltd
SITE | JLR BIW
SPECIFICATION | For Classification
SUPPLIER/SOURCE | Insitu
SAMPLING METHOD | Unknown
SAMPLED BY | Client
TYPE OF SAMPLE | Bulk
DATE SAMPLED | Unknown
DATE RECEIVED | 02 May 2024
DATE TESTED | 03 May 2024
PREPARATION METHOD | BS 1377-1. 7.3.5.2 (Sub dividing)

Sample Reference	Sample Description	Location	Moisture Content (%)
XTE 77860	Red sandy Clay with gravel	1.00m	14.9
XTE 77861	Red sandy Clay with gravel	3.00m	13.9
XTE 77862	Red sandy Clay with gravel	3.00m	13.3
XTE 77863	Red sandy Clay with gravel	3.50m	13.3

REMARKS: *XTE 77860 - 863
**712897 - 900

ISSUE TO: DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane, Lenham Heath
Maidstone
ME17 2JN

DATE: 14 May 2024

AUTHORISED BY: R Hemmings Laboratory
Manager

The results reported represents only the material tested supplied to the laboratory or if the material has been sampled by Xtratec the quantity of the material represented by the sample. This report shall not be reproduced except in full without approval of the laboratory

Laboratory:
Unit 4
Rose Lane Industrial Estate
Lenham Heath
Kent ME17 2JN
01622 851176



Report No: **XTE 77860**
Page 1 of 1

TEST REPORT OF PLASTICITY INDEX

Method: BS 1377-2:1990 Method 4.4 Liquid Limit One Point
Method: BS 1377-2:1990 Method 5.3 Plastic Limit
Method: BS 1377-2:1990 Method 5.4 Plasticity Index

XTRATEC SAMPLE REF | XTE 77860
CUSTOMER/SITE SAMPLE REF | 712897

CLIENT	DETS Ltd
SITE	JLR BIW
SOIL DESCRIPTION	Red sandy Clay with gravel
SUPPLIER/SOURCE	Insitu
SAMPLING LOCATION	1.00m
SAMPLING METHOD	Unknown
SAMPLED BY	Client
TYPE OF SAMPLE	Bulk
DATE SAMPLED	Unknown
DATE RECEIVED	02 May 2024
DATE TESTED	03 May 2024
PREPARATION METHOD	Tested by Wet Sieving

TEST RESULTS	
Percentage Retained 425um (%)	11
Liquid Limit	30
Plastic Limit	15
Plasticity Index	15

REMARKS:

ISSUE TO: DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane, Lenham Heath
Maidstone
ME17 2JN

DATE: 14 May 2024

AUTHORISED BY: R Hemmings Laboratory
Manager

The results reported represents only the material tested supplied to the laboratory or if the material has been sampled by Xtratec the quantity of the material represented by the sample. This report shall not be reproduced except in full without approval of the laboratory

Laboratory:
Unit 4
Rose Lane Industrial Estate
Lenham Heath
Kent ME17 2JN
01622 851176



Report No: **XTE 77861**
Page 1 of 1

TEST REPORT OF PLASTICITY INDEX

Method: BS 1377-2:1990 Method 4.4 Liquid Limit One Point
Method: BS 1377-2:1990 Method 5.3 Plastic Limit
Method: BS 1377-2:1990 Method 5.4 Plasticity Index

XTRATEC SAMPLE REF | XTE 77861
CUSTOMER/SITE SAMPLE REF | 712898

CLIENT	DETS Ltd
SITE	JLR BIW
SOIL DESCRIPTION	Red sandy Clay with gravel
SUPPLIER/SOURCE	Insitu
SAMPLING LOCATION	3.00m
SAMPLING METHOD	Unknown
SAMPLED BY	Client
TYPE OF SAMPLE	Bulk
DATE SAMPLED	Unknown
DATE RECEIVED	02 May 2024
DATE TESTED	03 May 2024
PREPARATION METHOD	Tested by Wet Sieving

TEST RESULTS	
Percentage Retained 425um (%)	11
Liquid Limit	27
Plastic Limit	14
Plasticity Index	13

REMARKS:

ISSUE TO: DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane, Lenham Heath
Maidstone
ME17 2JN

DATE: 14 May 2024

AUTHORISED BY: R Hemmings Laboratory
Manager

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Laboratory:
Unit 4
Rose Lane Industrial Estate
Lenham Heath
Kent ME17 2JN
01622 851176



Report No: **XTE 77862**
Page 1 of 1

TEST REPORT OF PLASTICITY INDEX

Method: BS 1377-2:1990 Method 4.4 Liquid Limit One Point
Method: BS 1377-2:1990 Method 5.3 Plastic Limit
Method: BS 1377-2:1990 Method 5.4 Plasticity Index

XTRATEC SAMPLE REF | XTE 77862
CUSTOMER/SITE SAMPLE REF | 712899

CLIENT	DETS Ltd
SITE	JLR BIW
SOIL DESCRIPTION	Red sandy Clay with gravel
SUPPLIER/SOURCE	Insitu
SAMPLING LOCATION	3.00m
SAMPLING METHOD	Unknown
SAMPLED BY	Client
TYPE OF SAMPLE	Bulk
DATE SAMPLED	Unknown
DATE RECEIVED	02 May 2024
DATE TESTED	03 May 2024
PREPARATION METHOD	Tested by Wet Sieving

TEST RESULTS	
Percentage Retained 425um (%)	14
Liquid Limit	29
Plastic Limit	14
Plasticity Index	15

REMARKS:

ISSUE TO: DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane, Lenham Heath
Maidstone
ME17 2JN

DATE: 14 May 2024

AUTHORISED BY: R Hemmings Laboratory
Manager

The results reported represents only the material tested supplied to the laboratory or if the material has been sampled by Xtratec the quantity of the material represented by the sample. This report shall not be reproduced except in full without approval of the laboratory

Laboratory:
Unit 4
Rose Lane Industrial Estate
Lenham Heath
Kent ME17 2JN
01622 851176



Report No: **XTE 77863**
Page 1 of 1

TEST REPORT OF PLASTICITY INDEX

Method: BS 1377-2:1990 Method 4.4 Liquid Limit One Point
Method: BS 1377-2:1990 Method 5.3 Plastic Limit
Method: BS 1377-2:1990 Method 5.4 Plasticity Index

XTRATEC SAMPLE REF | XTE 77863
CUSTOMER/SITE SAMPLE REF | 712900

CLIENT	DETS Ltd
SITE	JLR BIW
SOIL DESCRIPTION	Red sandy Clay with gravel
SUPPLIER/SOURCE	Insitu
SAMPLING LOCATION	3.50m
SAMPLING METHOD	Unknown
SAMPLED BY	Client
TYPE OF SAMPLE	Bulk
DATE SAMPLED	Unknown
DATE RECEIVED	02 May 2024
DATE TESTED	03 May 2024
PREPARATION METHOD	Tested by Wet Sieving

TEST RESULTS	
Percentage Retained 425um (%)	9.7
Liquid Limit	28
Plastic Limit	14
Plasticity Index	14

REMARKS:

ISSUE TO: DETS Ltd
Unit 1, Rose Lane Industrial Estate
Rose Lane, Lenham Heath
Maidstone
ME17 2JN

DATE: 14 May 2024

AUTHORISED BY: R Hemmings Laboratory
Manager

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Normec DETS Limited
Unit 1
Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Kent
ME17 2JN
t: 01622 850410

DETS Report No: 24-04786

Site Reference: JLR BIW
Project / Job Ref: JLR BIW
Order No: ES020524A
Sample Receipt Date: 02/05/2024
Sample Scheduled Date: 02/05/2024
Report Issue Number: 1
Reporting Date: 15/05/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

Opinions and interpretations are outside the laboratory's scope of ISO 17025 accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.



Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate						
DETS Report No: 24-04786	~Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
Envirosolution Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	
~Site Reference: JLR BIW	~TP / BH No	WS1	WS2	WS3	WS4	
~Project / Job Ref: JLR BIW	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	
~Order No: ES020524A	~Depth (m)	1.00	3.00	3.00	3.50	
Reporting Date: 15/05/2024	DETS Sample No	712897	712898	712899	712900	

Determinand	Unit	RL	Accreditation				
Natural Moisture Content ^(S)	%	N / a	ISO17025	Create PDF	Create PDF	Create PDF	Create PDF

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

~Sample details provided by customer section and can affect the validity of results



Normec DETS Limited
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Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410

Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-04786

Envirosolution Ltd

~Site Reference: JLR BIW

~Project / Job Ref: JLR BIW

~Order No: ES020524A

Reporting Date: 15/05/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
Soil	D	Nitrate - Water Soluble (2:1)	Determination of nitrate by extraction with water & analysed by ion chromatography	E009
Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (ali: C5- C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (ali: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried
AR As Received

~Sample details provided by customer section and can affect the validity of results



Tom Craig
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Normec DETS Limited
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Lenham Heath
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DETS Report No: 24-04785

Site Reference: JLR BIW
Project / Job Ref: JLR BIW
Order No: ES020524A
Sample Receipt Date: 02/05/2024
Sample Scheduled Date: 02/05/2024
Report Issue Number: 1
Reporting Date: 09/05/2024

Authorised by:

Steve Knight
Customer Support Manager

Dates of laboratory activities for each tested analyte are available upon request.

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Soil Analysis Certificate						
DETS Report No: 24-04785	~Date Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Envirosolution Ltd	~Time Sampled	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Site Reference: JLR BIW	~TP / BH No	WS1	WS2	WS3	WS4	WS6
~Project / Job Ref: JLR BIW	~Additional Refs	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
~Order No: ES020524A	~Depth (m)	2.00	0.30	0.30	2.10	1.80
Reporting Date: 09/05/2024	DETS Sample No	712892	712893	712894	712895	712896

Determinand	Unit	RL	Accreditation	(n)				
pH	pH Units	N/a	MCERTS	8.2	9.6	10.5	8.2	8.2
Total Sulphate as SO ₄	mg/kg	< 200	MCERTS	216	7462	2559	281	208
Total Sulphate as SO ₄	%	< 0.02	MCERTS	0.02	0.75	0.26	0.03	0.02
W/S Sulphate as SO ₄ (2:1)	mg/l	< 10	MCERTS	< 10	1630	276	68	52
W/S Sulphate as SO ₄ (2:1)	g/l	< 0.01	MCERTS	< 0.01	1.63	0.28	0.07	0.05
Total Sulphur	%	< 0.02	NONE	< 0.02	0.28	0.11	< 0.02	< 0.02
W/S Magnesium	mg/l	< 0.1	NONE		2.9			

Analytical results are expressed on a dry weight basis where samples are assisted-dried at less than 30°C. The Method Description page describes if the test is performed on the dried or as-received portion

Subcontracted analysis (S)

~ Sample details provided by the customer

(n) Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation



Normec DETS Limited
Unit 1, Rose Lane Industrial Estate
Rose Lane
Lenham Heath
Maidstone
Kent ME17 2JN
Tel : 01622 850410



Soil Analysis Certificate - Sample Descriptions

DETS Report No: 24-04785	
Envirosolution Ltd	
~Site Reference: JLR BIW	
~Project / Job Ref: JLR BIW	
~Order No: ES020524A	
Reporting Date: 09/05/2024	

DETS Sample No	~TP / BH No	~Additional Refs	~Depth (m)	Moisture Content (%)	Sample Matrix Description
^ 712892	WS1	None Supplied	2.00	10.2	Light brown sandy clay
^ 712893	WS2	None Supplied	0.30	11.5	Brown concrete with brick
^ 712894	WS3	None Supplied	0.30	11	Brown sandy clay with brick and concrete
^ 712895	WS4	None Supplied	2.10	11.9	Light brown sandy clay
^ 712896	WS6	None Supplied	1.80	13.6	Light brown sandy clay

Moisture content is part of procedure E003 & is not an accredited test

Insufficient Sample ^{U/S}

Unsuitable Sample ^{U/S}

~ Sample details provided by the customer

^ no sampling date provided; unable to confirm if samples are within acceptable holding times



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Maidstone
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Tel : 01622 850410



Soil Analysis Certificate - Methodology & Miscellaneous Information

DETS Report No: 24-04785

Envirosolution Ltd

~Site Reference: JLR BIW

~Project / Job Ref: JLR BIW

~Order No: ES020524A

Reporting Date: 09/05/2024

Matrix	Analysed On	Determinand	Brief Method Description	Method No
Soil	D	Boron - Water Soluble	Determination of water soluble boron in soil by 2:1 hot water extract followed by ICP-OES	E012
Soil	AR	BTEX	Determination of BTEX by headspace GC-MS	E001
Soil	D	Cations	Determination of cations in soil by aqua-regia digestion followed by ICP-OES	E002
Soil	D	Chloride - Water Soluble (2:1)	Determination of chloride by extraction with water & analysed by ion chromatography	E009
Soil	AR	Chromium - Hexavalent	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphénylcarbazide followed by colorimetry	E016
Soil	AR	Cyanide - Complex	Determination of complex cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Free	Determination of free cyanide by distillation followed by colorimetry	E015
Soil	AR	Cyanide - Total	Determination of total cyanide by distillation followed by colorimetry	E015
Soil	D	Cyclohexane Extractable Matter (CEM)	Gravimetrically determined through extraction with cyclohexane	E011
Soil	AR	Diesel Range Organics (C10 - C24)	Determination of hexane/acetone extractable hydrocarbons by GC-FID	E004
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of saturated calcium sulphate followed by electrometric measurement	E022
Soil	AR	Electrical Conductivity	Determination of electrical conductivity by addition of water followed by electrometric measurement	E023
Soil	D	Elemental Sulphur	Determination of elemental sulphur by solvent extraction followed by GC-MS	E020
Soil	AR	EPH (C10 - C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH Product ID	Determination of acetone/hexane extractable hydrocarbons by GC-FID	E004
Soil	AR	EPH TEXAS (C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C40)	Determination of acetone/hexane extractable hydrocarbons by GC-FID for C8 to C40. C6 to C8 by headspace GC-MS	E004
Soil	D	Fluoride - Water Soluble	Determination of Fluoride by extraction with water & analysed by ion chromatography	E009
Soil	D	Fraction Organic Carbon (FOC)	Determination of TOC by combustion analyser.	E027
Soil	D	Organic Matter (SOM)	Determination of TOC by combustion analyser.	E027
Soil	D	TOC (Total Organic Carbon)	Determination of TOC by combustion analyser.	E027
Soil	AR	Exchangeable Ammonium	Determination of ammonium by discrete analyser.	E029
Soil	D	FOC (Fraction Organic Carbon)	Determination of fraction of organic carbon by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	D	Loss on Ignition @ 450°C	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace	E019
Soil	D	Magnesium - Water Soluble	Determination of water soluble magnesium by extraction with water followed by ICP-OES	E025
Soil	D	Metals	Determination of metals by aqua-regia digestion followed by ICP-OES	E002
Soil	AR	Mineral Oil (C10 - C40)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge	E004
Soil	AR	Moisture Content	Moisture content; determined gravimetrically	E003
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Soil	D	Organic Matter	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	PAH - Speciated (EPA 16)	Determination of PAH compounds by extraction in acetone and hexane followed by GC-MS with the use of surrogate and internal standards	E005
Soil	AR	PCB - 7 Congeners	Determination of PCB by extraction with acetone and hexane followed by GC-MS	E008
Soil	D	Petroleum Ether Extract (PEE)	Gravimetrically determined through extraction with petroleum ether	E011
Soil	AR	pH	Determination of pH by addition of water followed by electrometric measurement	E007
Soil	AR	Phenols - Total (monohydric)	Determination of phenols by distillation followed by colorimetry	E021
Soil	D	Phosphate - Water Soluble (2:1)	Determination of phosphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Total	Determination of total sulphate by extraction with 10% HCl followed by ICP-OES	E013
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of sulphate by extraction with water & analysed by ion chromatography	E009
Soil	D	Sulphate (as SO4) - Water Soluble (2:1)	Determination of water soluble sulphate by extraction with water followed by ICP-OES	E014
Soil	AR	Sulphide	Determination of sulphide by distillation followed by colorimetry	E018
Soil	D	Sulphur - Total	Determination of total sulphur by extraction with aqua-regia followed by ICP-OES	E024
Soil	AR	SVOC	Determination of semi-volatile organic compounds by extraction in acetone and hexane followed by GC-MS	E006
Soil	AR	Thiocyanate (as SCN)	Determination of thiocyanate by extraction in caustic soda followed by acidification followed by addition of ferric nitrate followed by colorimetry	E017
Soil	D	Toluene Extractable Matter (TEM)	Gravimetrically determined through extraction with toluene	E011
Soil	D	Total Organic Carbon (TOC)	Determination of organic matter by oxidising with potassium dichromate followed by titration with iron (II) sulphate	E010
Soil	AR	TPH CWG (all: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C34, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C35. C5 to C8 by headspace GC-MS	E004
Soil	AR	TPH LQM (all: C5-C6, C6-C8, C8-C10, C10-C12, C12-C16, C16-C35, C35-C44, aro: C5-C7, C7-C8, C8-C10, C10-C12, C12-C16, C16-C21, C21-C35, C35-C44)	Determination of hexane/acetone extractable hydrocarbons by GC-FID fractionating with SPE cartridge for C8 to C44. C5 to C8 by headspace GC-MS	E004
Soil	AR	VOCs	Determination of volatile organic compounds by headspace GC-MS	E001
Soil	AR	VPH (C6-C8 & C8-C10)	Determination of hydrocarbons C6-C8 by headspace GC-MS & C8-C10 by GC-FID	E001

D Dried

AR As Received

~ Sample details provided by the customer

LABORATORY TEST REPORT
CONCRETE CORE COMPRESSIVE STRENGTH - BS EN 12504-1:2019

Project :	Jaguar Land Rover	Job No.:	W20239
Client :	Enviro Solution	Lab Ref No.:	W20239
		Date Received:	29/04/2024
		Date Reported:	12/05/2023
		Material:	Concrete
		Date Cored:	Na
Originator:	Tom	Sampled by	Enviro / Solution

As Received Sample Details		
Laboratory Ref.		W20239
Client Ref.		Core CC6
Sample Location		Slab
Direction		Vertical
Length (mm)	Max.	180
	Min.	180
Maximum Nominal Aggregate Size (mm)		5-20
Visual Inspection		Minimum Voids. 0.5%.
Reinforcement		2*8mm Ø bar 65mm, 55mm. 2*12mm Ø bar 50mm, 55mm. From top of core. 2*8mm Ø bar 49mm 57mm. From nearest end of final test specimen.
Test Section (mm)		10-180
Before End Preparation/After Grinding		
Measured Sample Length (mm)		170.0
Measured Sample Diameter (mm)		191.0
Sample Mass (g)		10957
Type Of Density Determined (Saturated, As Rec'd Or Dried)		As Received
Density (kg/m³)		2400
Method Of Volume Determination		Displacement
Test Results		
Date Cast		N/K
Date Tested		07/05/2024
Age At Test (days)		N/A
Method Of End Preparation		Grinding
Storage Condition		Sealed Container
Length Of Time Cured After Preparation		N/A
Length Of Specimen As Tested (mm)		160.0
Length/Diameter Ratio		0.84
Max. Load (kN)		1189
Compressive Strength (N/mm²)		41.5
Remarks		None

Cores cured since receipt at 20+/- 2°C
 Compressive Strength - Tested in accordance with BS EN 12504-1:2019
 Density - Tested in accordance with BS EN 12390-7:2019
 The stated result only relates to the item/location tested, this report shall not be reproduced except in full.

Approved Signature **D Wain**
 CMTL Limited
 David Wain, Concrete Section.



LABORATORY TEST REPORT
CONCRETE CORE COMPRESSIVE STRENGTH - BS EN 12504-1:2019

Project :	Jaguar Land Rover	Job No.:	W20239
Client :	Enviro Solution	Lab Ref No.:	W20239
		Date Received:	29/04/2024
		Date Reported:	12/05/2023
		Material:	Concrete
		Date Cored:	Na
Originator:	Tom	Sampled by	Enviro / Solution

As Received Sample Details		
Laboratory Ref.		W20239
Client Ref.		Core CC5
Sample Location		Slab
Direction		Vertical
Length (mm)	Max.	175
	Min.	140
Maximum Nominal Aggregate Size (mm)		5-20
Visual Inspection		Minimum Voids. 0.5%. Crack full length of core.
Reinforcement		3*8mm Ø bar 71mm, 78mm, 86mm. From top of core. 3*8mm Ø bar 64mm, 73mm, 81mm. From nearest end of final test specimen.
Test Section (mm)		0-140
Before End Preparation/After Grinding		
Measured Sample Length (mm)		133.0
Measured Sample Diameter (mm)		191.0
Sample Mass (g)		8300
Type Of Density Determined (Saturated, As Rec'd Or Dried)		As Received
Density (kg/m³)		2300
Method Of Volume Determination		Displacement
Test Results		
Date Cast		N/K
Date Tested		07/05/2024
Age At Test (days)		N/A
Method Of End Preparation		Grinding
Storage Condition		Sealed Container
Length Of Time Cured After Preparation		N/A
Length Of Specimen As Tested (mm)		125.0
Length/Diameter Ratio		0.65
Max. Load (kN)		1258
Compressive Strength (N/mm²)		43.9
Remarks		None

Cores cured since receipt at 20+/- 2°C

Compressive Strength - Tested in accordance with BS EN 12504-1:2019

Density - Tested in accordance with BS EN 12390-7:2019

The stated result only relates to the item/location tested, this report shall not be reproduced except in full.

Approved Signature
 CMTL Limited
 David Wain, Concrete Section.

D Wain



LABORATORY TEST REPORT
CONCRETE CORE COMPRESSIVE STRENGTH - BS EN 12504-1:2019

Project :	Jaguar Land Rover	Job No.:	W20239
Client :	Enviro Solution	Lab Ref No.:	W20239
		Date Received:	29/04/2024
		Date Reported:	12/05/2023
		Material:	Concrete
		Date Cored:	Na
Originator:	Tom	Sampled by	Enviro / Solution

As Received Sample Details		
Laboratory Ref.		W20239
Client Ref.		Core CC4
Sample Location		Slab
Direction		Vertical
Length (mm)	Max.	230
	Min.	215
Maximum Nominal Aggregate Size (mm)		5-20
Visual Inspection		Minimum Voids. 0.5%
Reinforcement		2*8mm Ø bar 200mm, 193mm. From top of core. None present in final test specimen
Test Section (mm)		20-215
Before End Preparation/After Grinding		
Measured Sample Length (mm)		185.0
Measured Sample Diameter (mm)		191.0
Sample Mass (g)		11814
Type Of Density Determined (Saturated, As Rec'd Or Dried)		As Received
Density (kg/m³)		2360
Method Of Volume Determination		Displacement
Test Results		
Date Cast		N/K
Date Tested		07/05/2024
Age At Test (days)		N/A
Method Of End Preparation		Grinding
Storage Condition		Sealed Container
Length Of Time Cured After Preparation		N/A
Length Of Specimen As Tested (mm)		180.0
Length/Diameter Ratio		0.94
Max. Load (kN)		1173
Compressive Strength (N/mm²)		40.9
Remarks		None

Cores cured since receipt at 20+/- 2°C
 Compressive Strength - Tested in accordance with BS EN 12504-1:2019
 Density - Tested in accordance with BS EN 12390-7:2019
 The stated result only relates to the item/location tested, this report shall not be reproduced except in full.

Approved Signature **D Wain**
 CMTL Limited
 David Wain, Concrete Section.



LABORATORY TEST REPORT
CONCRETE CORE COMPRESSIVE STRENGTH - BS EN 12504-1:2019

Project :	Jaguar Land Rover	Job No.:	W20239
Client :	Enviro Solution	Lab Ref No.:	W20239
		Date Received:	29/04/2024
		Date Reported:	12/05/2023
		Material:	Concrete
		Date Cored:	Na
Originator:	Tom	Sampled by	Enviro / Solution

As Received Sample Details		
Laboratory Ref.		W20239
Client Ref.		Core CC3
Sample Location		Slab
Direction		Vertical
Length (mm)	Max.	180
	Min.	180
Maximum Nominal Aggregate Size (mm)		5-20
Visual Inspection		Minimum Voids. 0.5%.
Reinforcement		2*6mm Ø bar 101mm, 95mm. From top of core. 2*6mm Ø bar 91mm, 84mm. From nearest end of final test specimen.
Test Section (mm)		10-180
Before End Preparation/After Grinding		
Measured Sample Length (mm)		170.0
Measured Sample Diameter (mm)		191.0
Sample Mass (g)		10977
Type Of Density Determined (Saturated, As Rec'd Or Dried)		As Received
Density (kg/m³)		2380
Method Of Volume Determination		Displacement
Test Results		
Date Cast		N/K
Date Tested		07/05/2024
Age At Test (days)		N/A
Method Of End Preparation		Grinding
Storage Condition		Sealed Container
Length Of Time Cured After Preparation		N/A
Length Of Specimen As Tested (mm)		163.0
Length/Diameter Ratio		0.85
Max. Load (kN)		1441
Compressive Strength (N/mm²)		50.3
Remarks		None

Cores cured since receipt at 20+/- 2°C
 Compressive Strength - Tested in accordance with BS EN 12504-1:2019
 Density - Tested in accordance with BS EN 12390-7:2019
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Approved Signature **D Wain**
 CMTL Limited
 David Wain, Concrete Section.



LABORATORY TEST REPORT
CONCRETE CORE COMPRESSIVE STRENGTH - BS EN 12504-1:2019

Project :	Jaguar Land Rover	Job No.:	W20239
Client :	Enviro Solution	Lab Ref No.:	W20239
		Date Received:	29/04/2024
		Date Reported:	12/05/2023
		Material:	Concrete
		Date Cored:	Na
Originator:	Tom	Sampled by	Enviro / Solution

As Received Sample Details		
Laboratory Ref.		W20239
Client Ref.		Core CC2
Sample Location		Slab
Direction		Vertical
Length (mm)	Max.	227
	Min.	177
Maximum Nominal Aggregate Size (mm)		5-20
Visual Inspection		Minimum Voids. 0.5%
Reinforcement		None present
Test Section (mm)		0-170
Before End Preparation/After Grinding		
Measured Sample Length (mm)		170.0
Measured Sample Diameter (mm)		191.0
Sample Mass (g)		11313
Type Of Density Determined (Saturated, As Rec'd Or Dried)		As Received
Density (kg/m³)		2420
Method Of Volume Determination		Displacement
Test Results		
Date Cast		N/K
Date Tested		07/05/2024
Age At Test (days)		N/A
Method Of End Preparation		Grinding
Storage Condition		Sealed Container
Length Of Time Cured After Preparation		N/A
Length Of Specimen As Tested (mm)		165.0
Length/Diameter Ratio		0.86
Max. Load (kN)		1167
Compressive Strength (N/mm²)		40.7
Remarks		None

Cores cured since receipt at 20+/- 2°C
 Compressive Strength - Tested in accordance with BS EN 12504-1:2019
 Density - Tested in accordance with BS EN 12390-7:2019
 The stated result only relates to the item/location tested, this report shall not be reproduced except in full.

Approved Signature **D Wain**
 CMTL Limited
 David Wain, Concrete Section.



1740

LABORATORY TEST REPORT
CONCRETE CORE COMPRESSIVE STRENGTH - BS EN 12504-1:2019

Project :	Jaguar Land Rover	Job No.:	W20239
Client :	Enviro Solution	Lab Ref No.:	W20239
		Date Received:	29/04/2024
		Date Reported:	12/05/2023
		Material:	Concrete
		Date Cored:	Na
Originator:	Tom	Sampled by	Enviro / Solution

As Received Sample Details		
Laboratory Ref.		W20239
Client Ref.		Core CC1
Sample Location		Slab
Direction		Vertical
Length (mm)	Max.	160
	Min.	145
Maximum Nominal Aggregate Size (mm)		5-20
Visual Inspection		Minimum Voids. 0.5%.
Reinforcement		2*6mm Ø bar 130mm, 125. From top of core. 2*6mm Ø bar 20mm, 15mm From nearest end of final test specimen.
Test Section (mm)		0-145
Before End Preparation/After Grinding		
Measured Sample Length (mm)		145.0
Measured Sample Diameter (mm)		191.0
Sample Mass (g)		9714
Type Of Density Determined (Saturated, As Rec'd Or Dried)		As Received
Density (kg/m³)		2420
Method Of Volume Determination		Displacement
Test Results		
Date Cast		N/K
Date Tested		07/05/2024
Age At Test (days)		N/A
Method Of End Preparation		Grinding
Storage Condition		Sealed Container
Length Of Time Cured After Preparation		N/A
Length Of Specimen As Tested (mm)		140.0
Length/Diameter Ratio		0.73
Max. Load (kN)		1208
Compressive Strength (N/mm²)		42.2
Remarks		None

Cores cured since receipt at 20+/- 2°C

Compressive Strength - Tested in accordance with BS EN 12504-1:2019

Density - Tested in accordance with BS EN 12390-7:2019

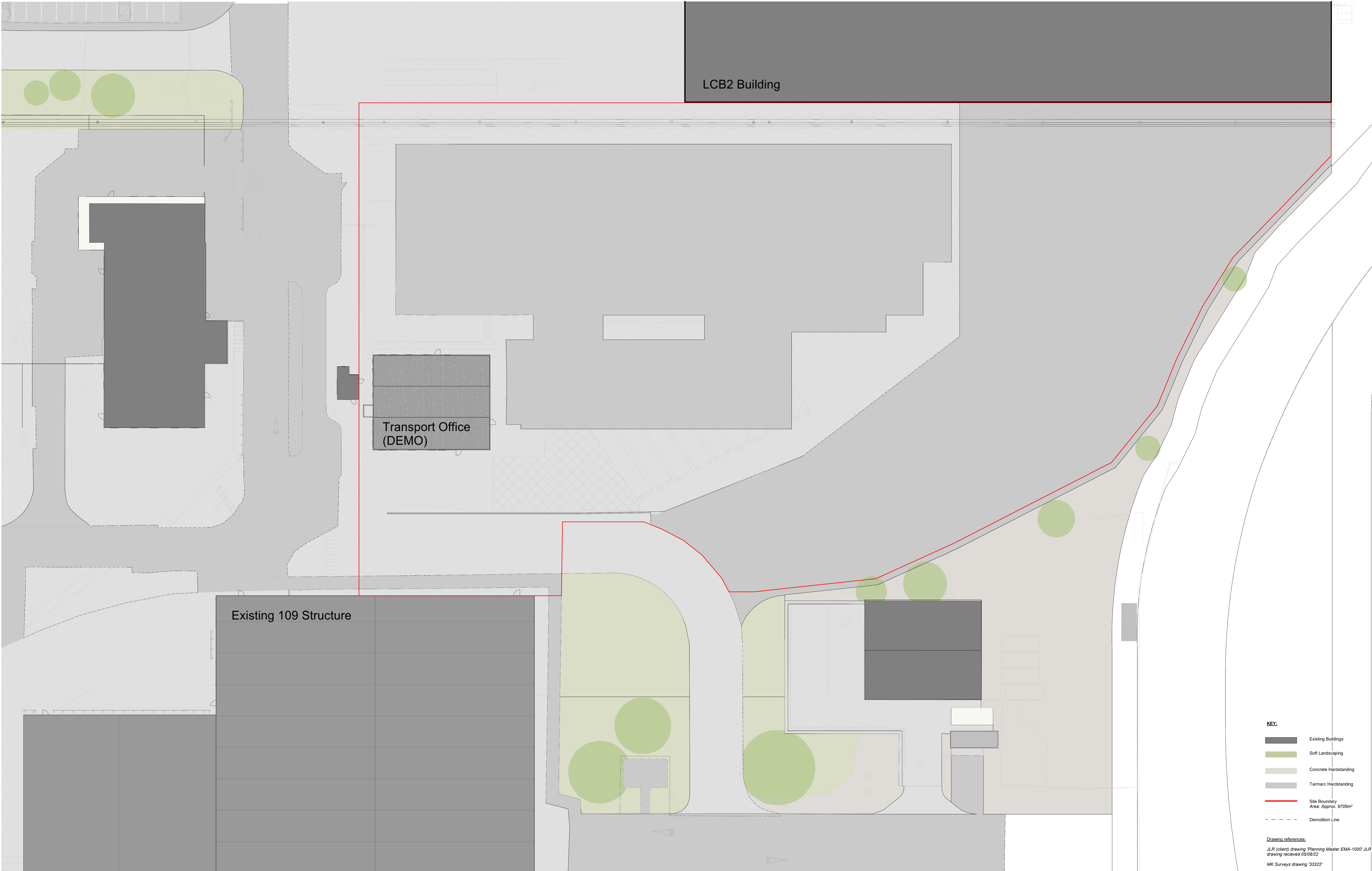
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Approved Signature
CMTL Limited
David Wain, Concrete Section.

D Wain



1740



KEY:

- Existing Buildings
- Soft Landscaping
- Concrete Hardstanding
- Tarmac Hardstanding
- Site Boundary Area: Approx. 9705m²
- Demolition Line

Drawing references:

JLR (client) drawing 'Planning Master EMA-1000' JLR drawing received 05/08/22

MK Surveys drawing '33322'

PLANNING_Existing Site Plan
1 : 200

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CLIENT:

JLR

IN ASSOCIATION WITH:

PROJECT:

JLR JEA Bodysides

TITLE:

PLANNING_Existing Site Plan

ORIGINATOR:

RIDGE

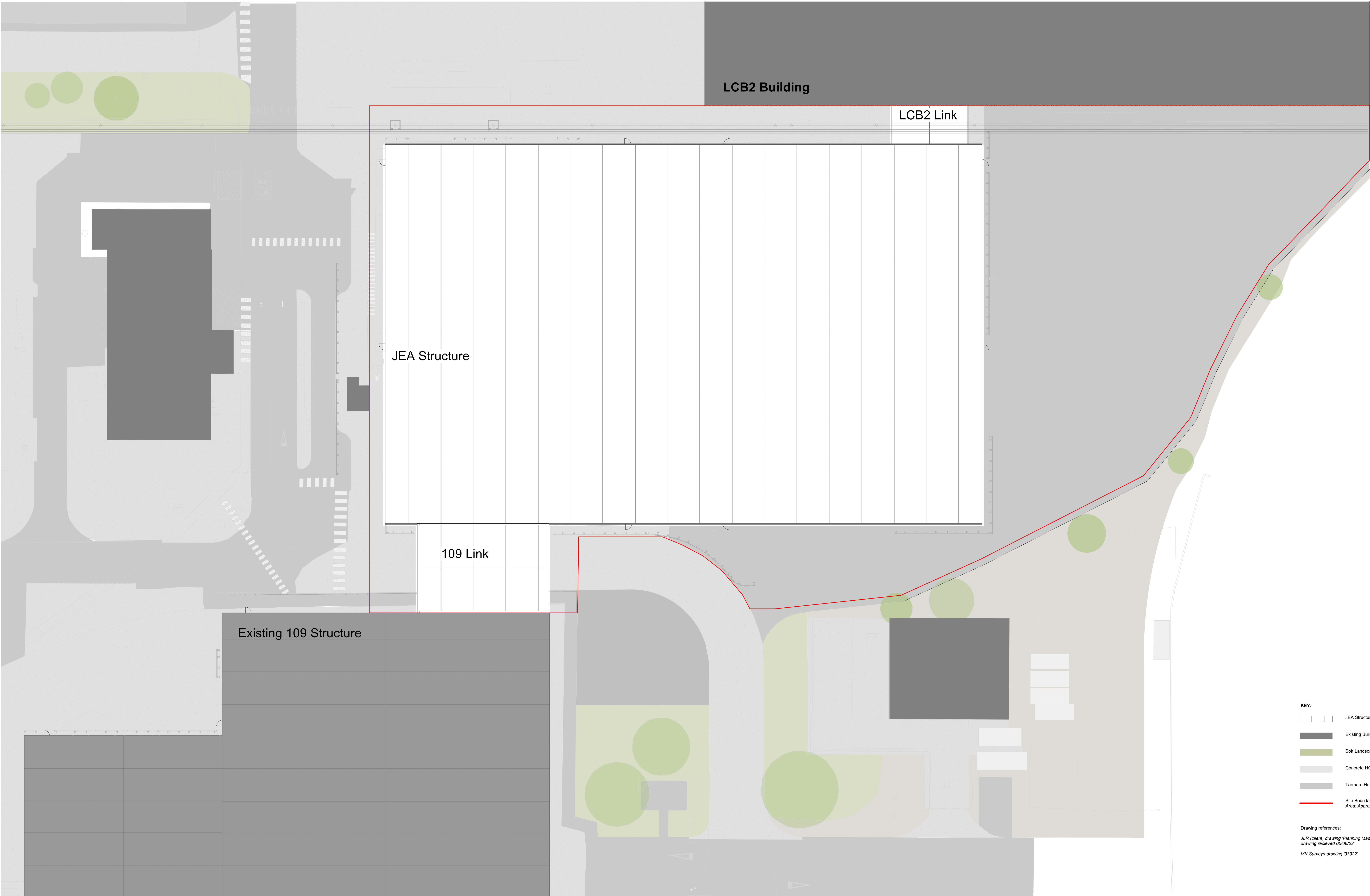
DRAWN BY:	MZ	CHECKED BY:	MZ	APPROVED BY:	TR
SCALE:	As Indicated	@ AD	DATE:	18/07/24	
STATUS:	DESCRIPTION:				
SS Suitable for Approval					

DRAWING No:	JEA-RDG-ZZ-ST-D-A-001002	REV:	
PROJECT:	JEA RDG ZZ ST D A	ORIGINATOR FUNCTION:	001002
SPICAL:	001002	NUMBER:	P03
FORM:	001002	REV:	
DISCIPLINE:	001002	REV:	
NUMBER:	001002	REV:	
DATE:	18/07/24	BY:	CHD

REVISIONS:

REV	DESCRIPTION	DATE	BY	CHKD
01	Planning Issue - Comments Incorporated	18/08/2024	MZ	TR
02	Planning Issue - Comments Incorporated	06/09/2024	MZ	TR
03	First issue to planning consultants for review & comment	26/09/2024	MZ	TR

RDG PROJECT No: 5025778



- KEY:**
- JEA Structure Outline
 - Existing Buildings
 - Soft Landscaping
 - Concrete HGV Access Road
 - Tarmarc Hardstanding
 - Site Boundary
Area: Approx. 9705m²

Drawing references:
JLR (client) drawing 'Planning Master EMA-1000' JLR
drawing received 05/08/22
MK Surveys drawing '33322'



PLANNING_Proposed Site Plan
1 : 200

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CLIENT:



IN ASSOCIATION WITH:

PROJECT:
JLR JEA Bodysides

TITLE:

PLANNING_Proposed Site Plan

ORIGINATOR:

RIDGE

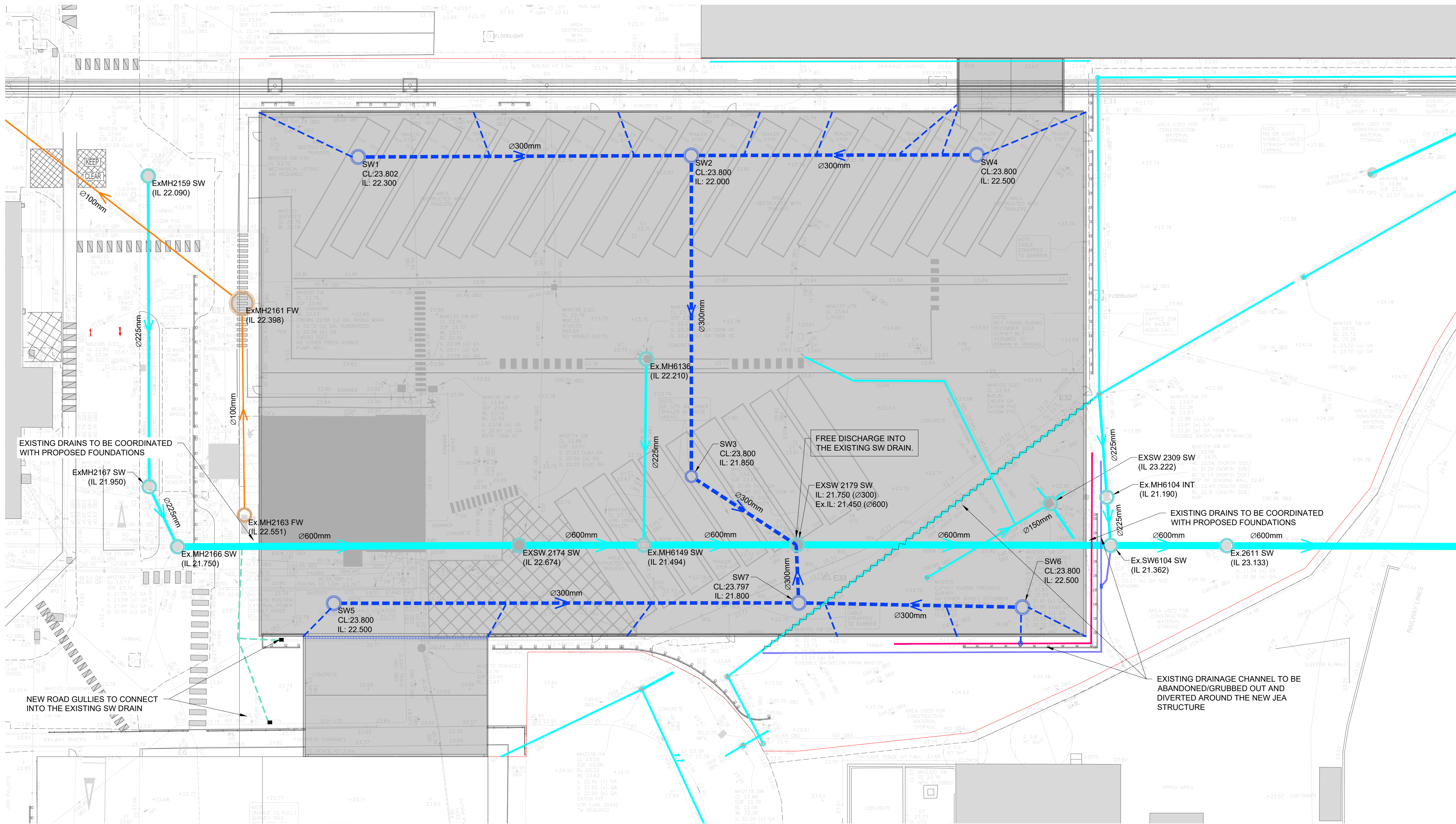
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SCALE: As Indicated @ A0 DATE: 18/07/24
STATUS: SS DESCRIPTION: Suitable for Approval

DRAWING No: JEA-RDG-ZZ-ST-D-A-001003
PROJECT: JEA ORIGINATOR FUNCTION: RDG SPECIAL FORM: DISCIPLINE: ST NUMBER: A001003 REV: P03
RIDGE PROJECT No: 5025778

REV DESCRIPTION DATE BY CHG

APPENDIX B – RIDGE DESIGN DRAWINGS

- PROPOSED SITE IS IN A FLOOD ZONE 1
- EXISTING SW FLOWS ARE CURRENTLY DISCHARGE UNRESTRICTED INTO THE EXISTING SW DRAINS AROUND THE SITE
- PROPOSED DRAINAGE STRATEGY REGIME FOR THE SALES OF THE LOTS AS THE TEMPORARY 109 STRUCTURE. THE PROPOSED JEA STRUCTURE RWP's ARE TO DISCHARGE INTO THE EXISTING SW DRAINS FREE DISCHARGE.
- IMPERMEABLE AREA = 0.573ha



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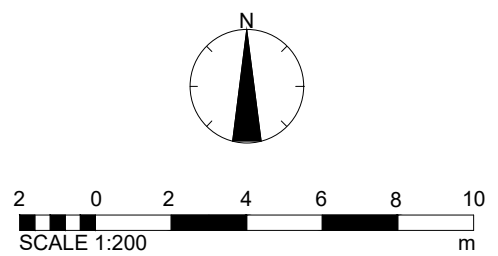
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LEGEND:

	PROPOSED SW PIPES
	PROPOSED SW ACCESS CHAMBER
	EXISTING SW DRAINAGE
	EXISTING SW ABANDONED
	DIVERTED SW CHANNEL DRAIN
	EXISTING FW DRAINAGE
	EXISTING FW ACCESS CHAMBER
	PROPOSED HIGHWAYS DRAINAGE
	PROPOSED HIGHWAYS GULLY
	PROPOSED FILTER DRAIN



P03	UPDATED TO SUIT WSP COMMENTS	29.08.24	AP	AM
P02	DRAINAGE CHANNEL ADDED	20.08.24	AP	AM
P01	PRELIMINARY ISSUE	02.08.24	JF	AM
REV	DESCRIPTION	DATE	BY	CHKD

ORIGINATOR:

RIDGE

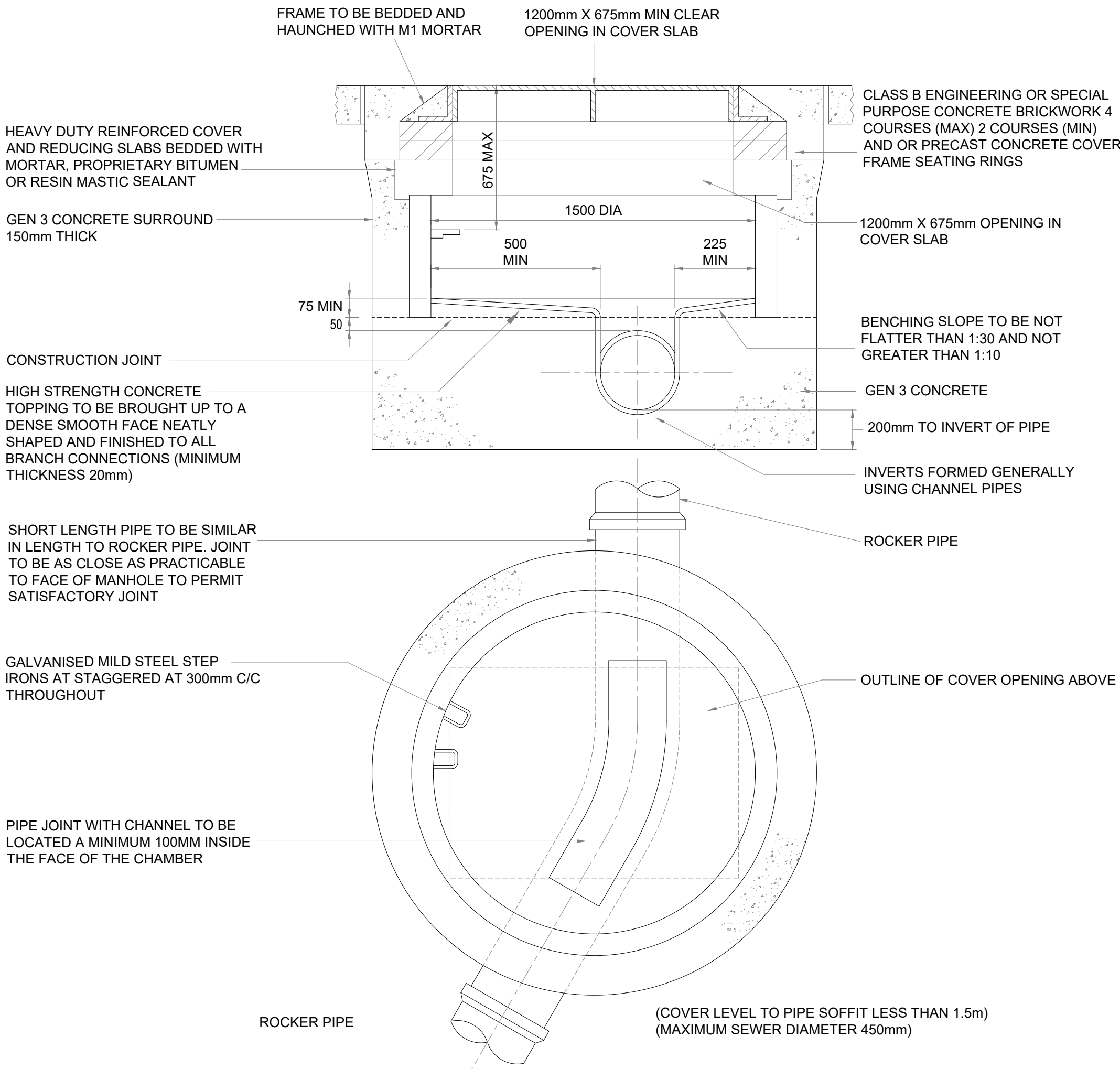
CLIENT: JLR

IN ASSOCIATION WITH:

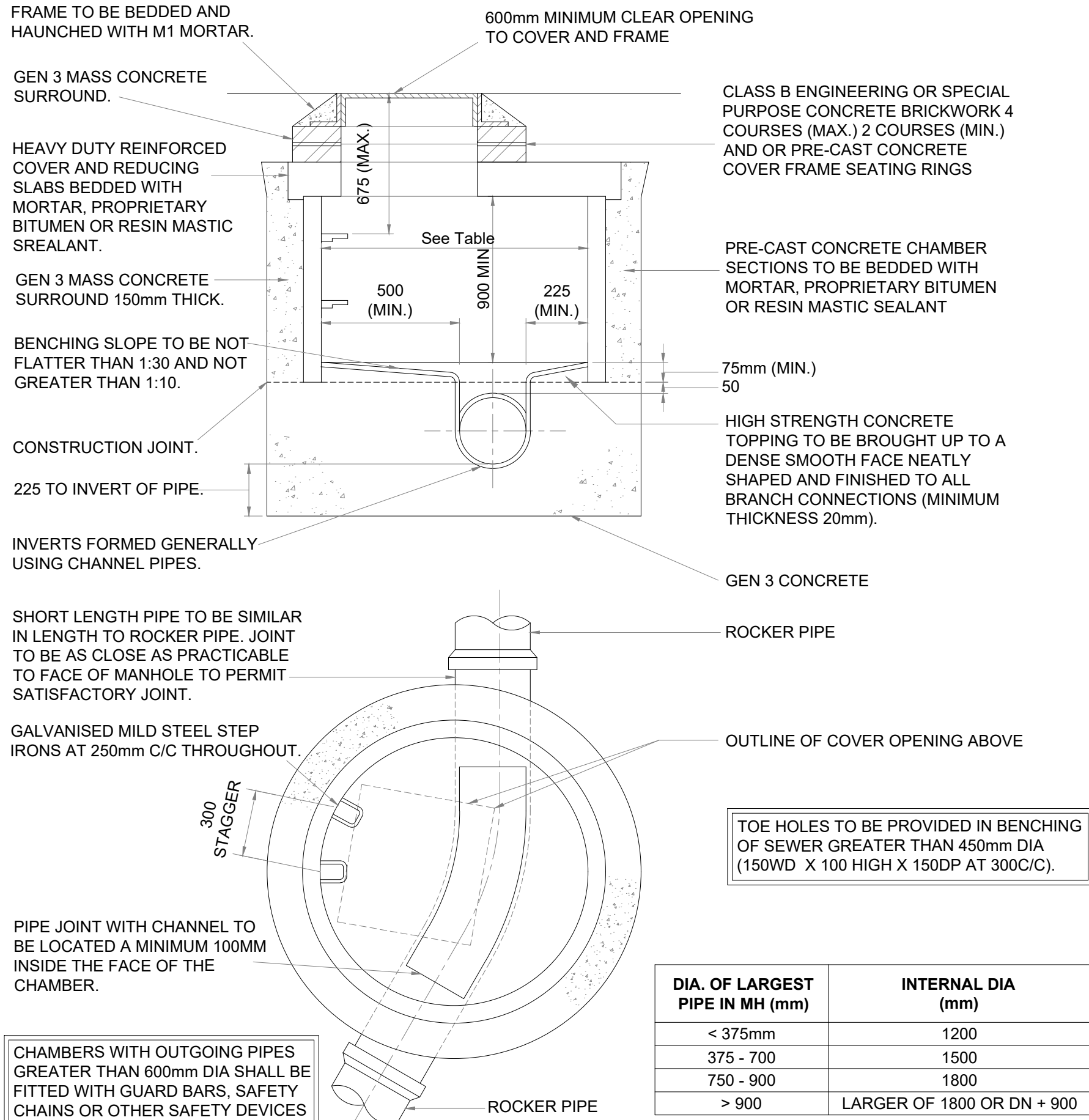
PROJECT:
JLR JEA BODYSIDES

TITLE: PROPOSED DRAINAGE GA

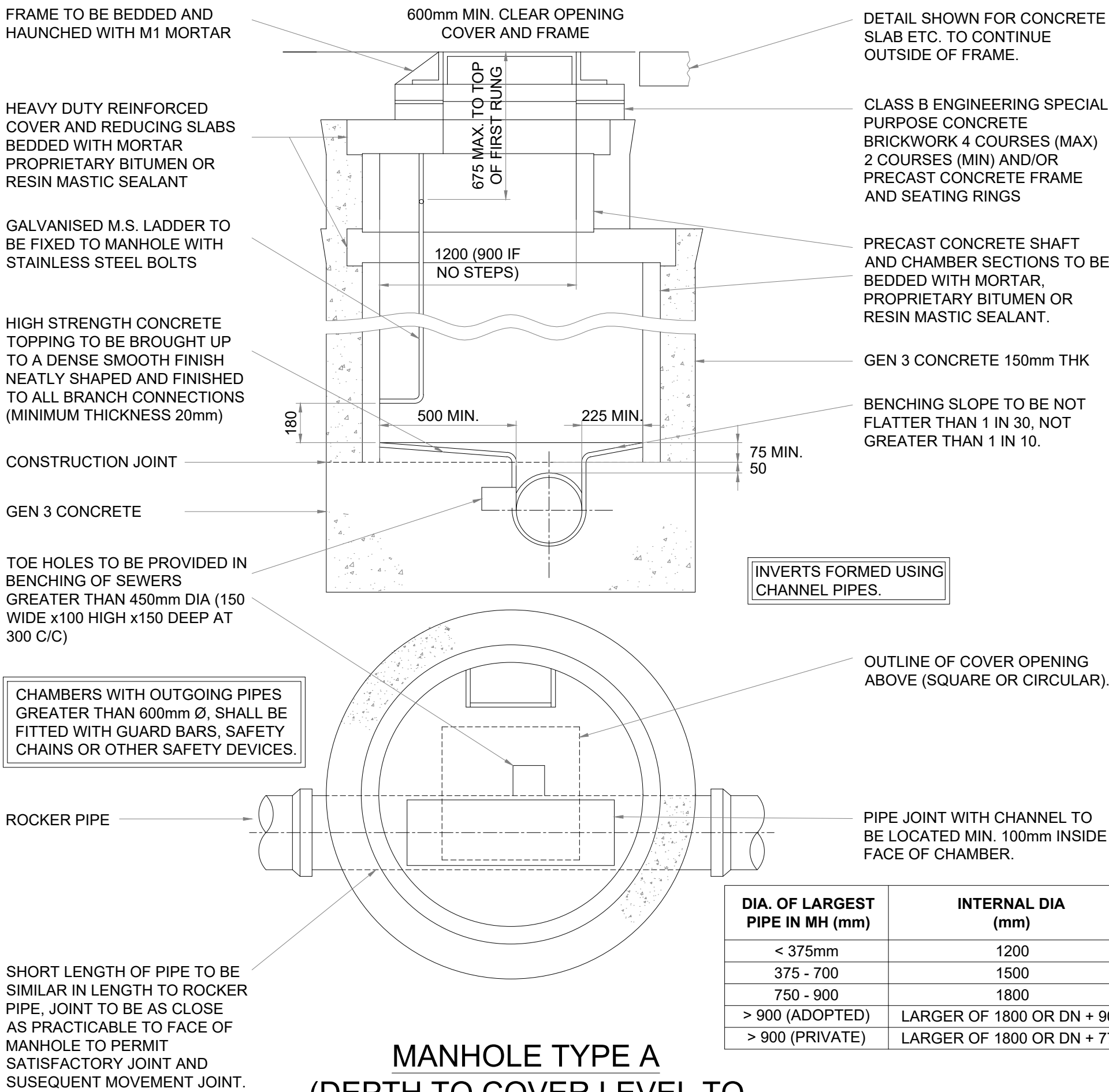
ENG/TECH: JF	CSE: AM	ICSE: AM	SCALE: 1:250 STATUS ISSUE: S2	@ A1			
STATUS: PRELIMINARY							
UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK							
SUITABILITY: S2 - Issued for Information							
PROJECT: JEA	ORG: RDG	ZONE: XX	LEVEL: XX	TYPE: DR	ROLE: C	NUMBER: 0501	REV: P03



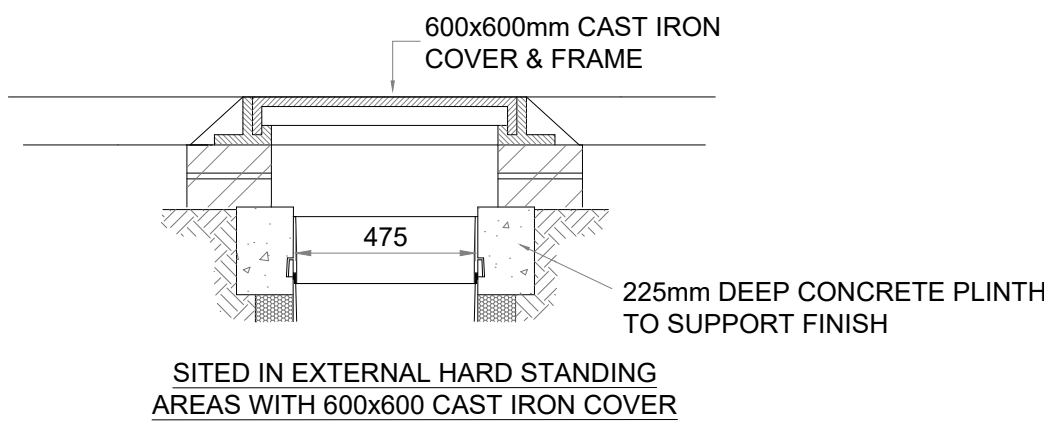
MANHOLE TYPE C



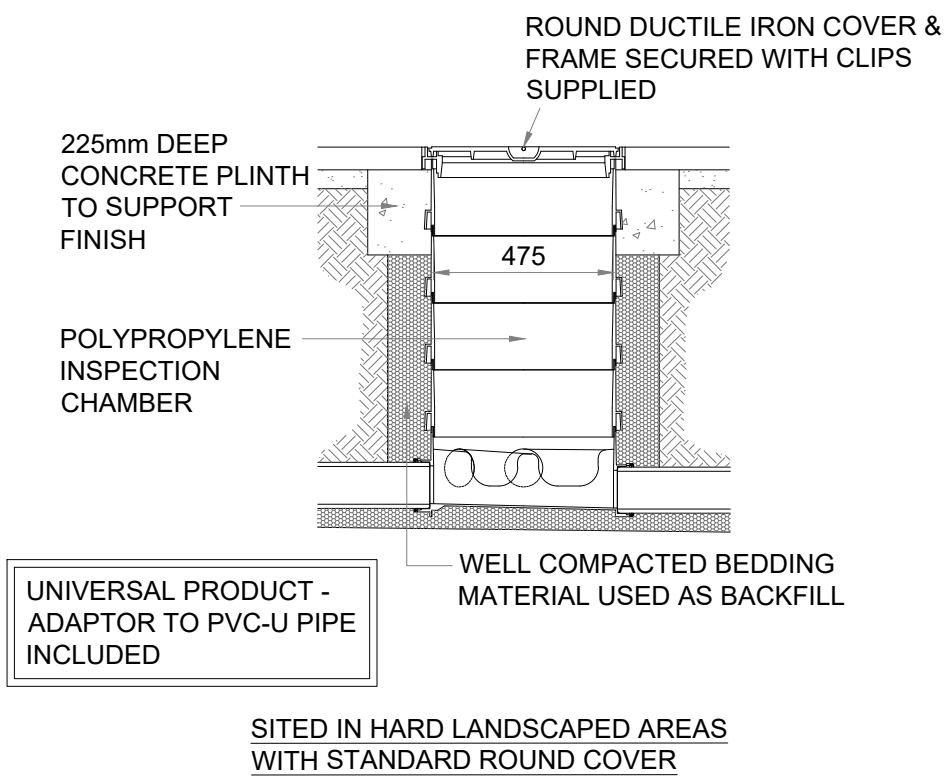
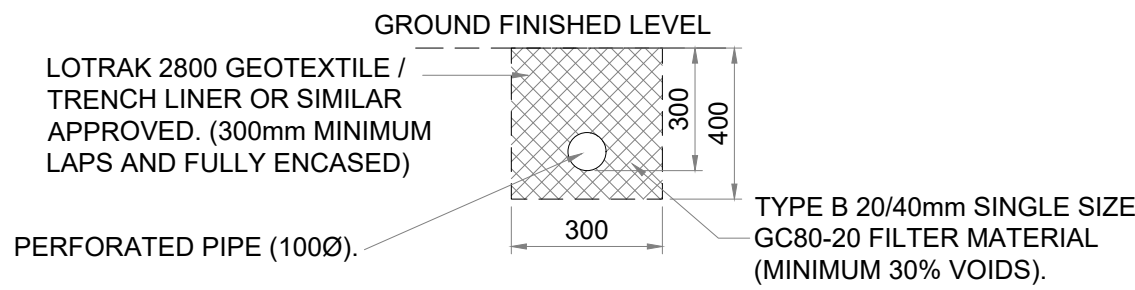
MANHOLE TYPE B



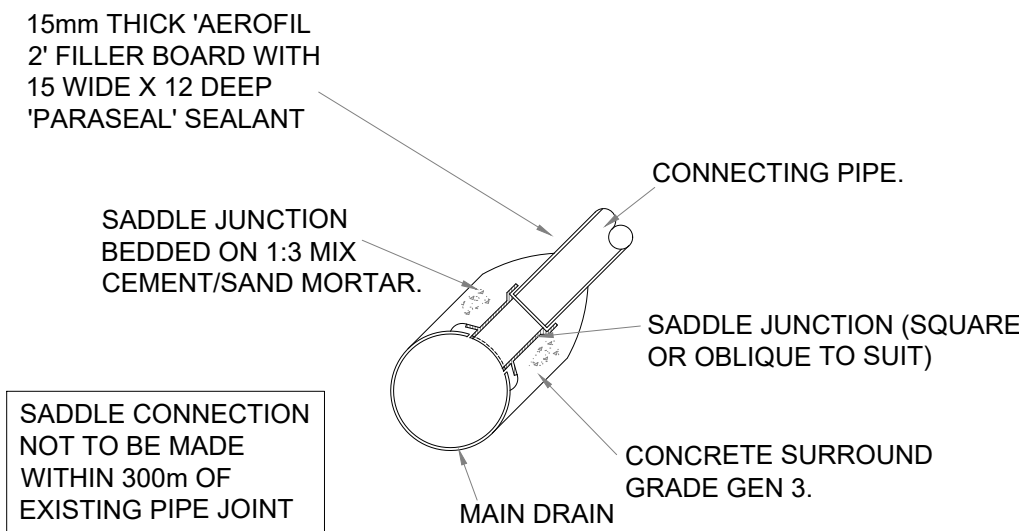
MANHOLE TYPE A
(DEPTH TO COVER LEVEL TO PIPE SOFFIT 3.0m to 6.0m)



TYPICAL FILTER DRAIN DETAIL



POLYPROPYLENE INSPECTION CHAMBER INSTALLATION DETAIL



SADDLE CONNECTION DETAIL

(DIAMETER OF MAIN DRAIN TO BE A MINIMUM OF DOUBLE THE SIZE OF THE CONNECTING PIPE. IN ALL OTHER CASES A PRE-FORMED JUNCTION IS TO BE USED.)

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LEGEND:

P01	PRELIMINARY ISSUE	20.08.24	AP	AM
REV	DESCRIPTION	DATE	BY	CHKD
ORIGINATOR:				

RIDGE

CLIENT:
JLR

IN ASSOCIATION WITH:

PROJECT:
JLR JEA BODYSIDES

TITLE:
DRAINAGE DETAILS
SHEET 1

ENG/TECH:	CSE:	ICSE:	SCALE:	N.T.S	@	A1
AP	AM	AM	STATUS ISSUE:	S2		

STATUS:
PRELIMINARY

UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK

SUITABILITY: S2 - Issued for Information

PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:	REV:
JEA	RDG	XX	XX	DR	C	0505	P01

BSEN 13242, COARSE AGGREGATE (CLAUSE 4.3.2)		
CATEGORY FOR GENERAL GRADING REQUIREMENTS		
CATEGORY FOR TOLERANCES AT MID-SIZE SIEVES		
CATEGORY OF MAXIMUM VALUES OF FINES CONTENTS		
NOMINAL PIPE DIAMETER (mm)	AGGREGATE SIZE	
	GRADED SIZE	SINGLE
NOT EXCEEDING 140	-	4/10
EXCEEDING 140 BUT NOT EXCEEDING 400	2/14 or 4/20	4/10, 6/10 or 10/20
EXCEEDING 400	2/14, 4/20 or 4/40	4/10, 6/14, 10/20 or 20/40

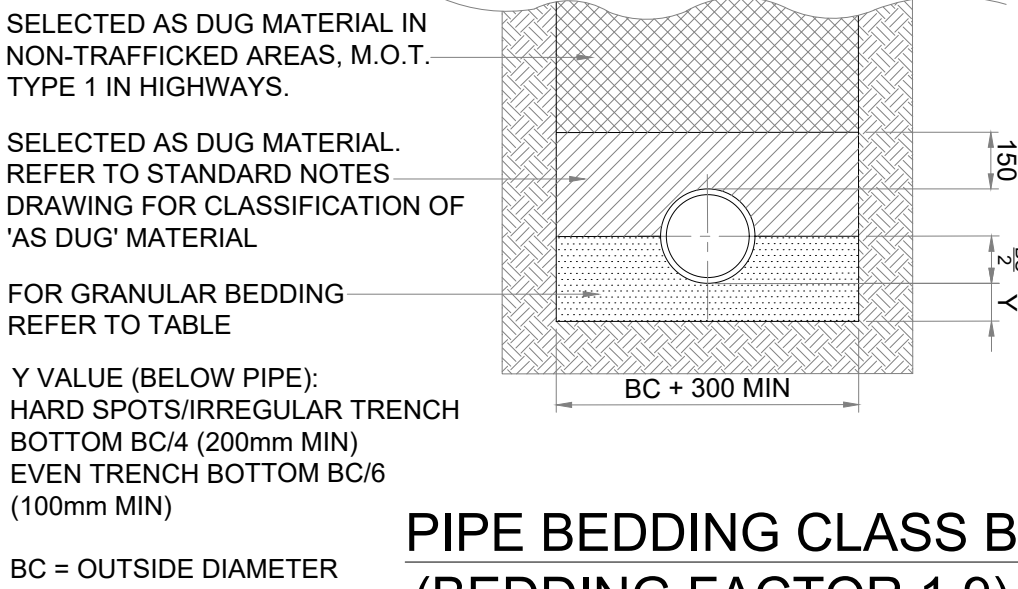
TABLE 5/3 BSEN 13242 COURSE AGGREGATE TO CLAUSE 4.3.2 FOR PIPE BEDDING, HAUNCHING AND SURROUNDING MATERIAL

BS EN 1610:1997 ANNEX B TABLE B.15 COARSE AGGREGATE - PIPE BEDDING								
SIEVE SIZE (mm)	% BY MASS PASSING BS SIEVES FOR NOMINAL SIZES							
	GRADED AGGREGATE (mm)				SINGLE SIZED AGGREGATE (mm)			
----	40 to 5	20 to 5	14 to 5	40	20	14	10	
50.0	100	----	----	100	----	----	----	
37.5	90-100	100	----	85-100	100	----	----	
20.0	35-70	90-100	100	0-25	85-100	100	----	
14.0	----	----	90-100	----	----	85-100	100	
10.0	10-40	30-60	50-85	0-5	0-25	0-50	85-100	
5.0	0-5	0-10	0-10	----	0-5	0-10	0-25	
2.36	----	----	----	----	----	----	0-5	

MAXIMUM TRENCH WIDTHS	
PIPE DIA (mm)	WIDTH (mm)
100	600
150	700
225	800
300	900
375	1050
450	1150
525	1200
600	1350
750	1450
825	1500
950	1600
1050	1900

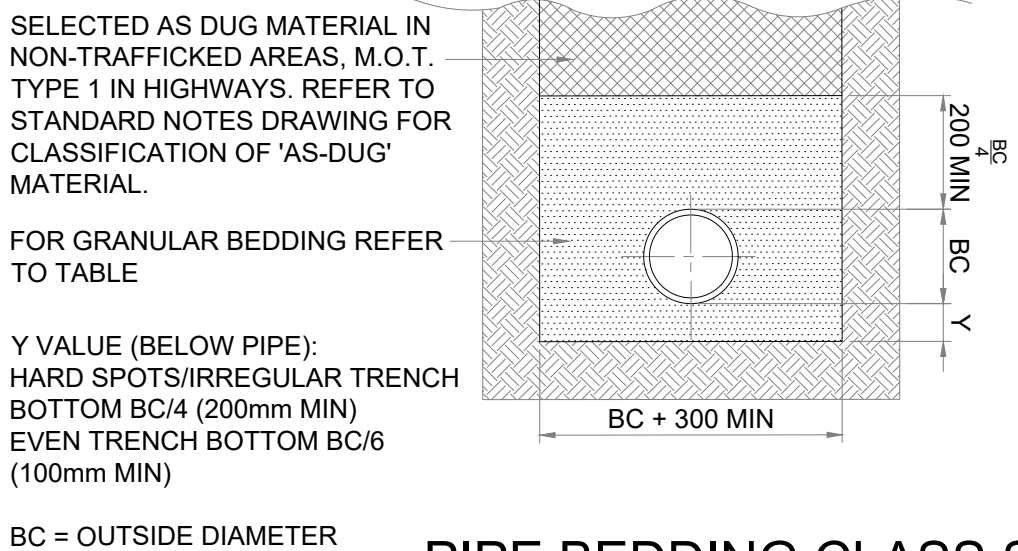
RIGID PIPES BEDDING GRADING

BASED ON BS EN 1610 : 1997 TABLE B.15
FOR RIGID PIPES THE BEDDING SHOULD BE SINGLE SIZE MATERIAL OR GRADED MATERIAL FROM 5MM UP TO A MAX SIZE OF 10mm FOR 100mm PIPES; 14mm FOR 150mm PIPES; 20mm FOR 225mm TO 600mm PIPES; 40mm FOR OVER 675mm PIPES.



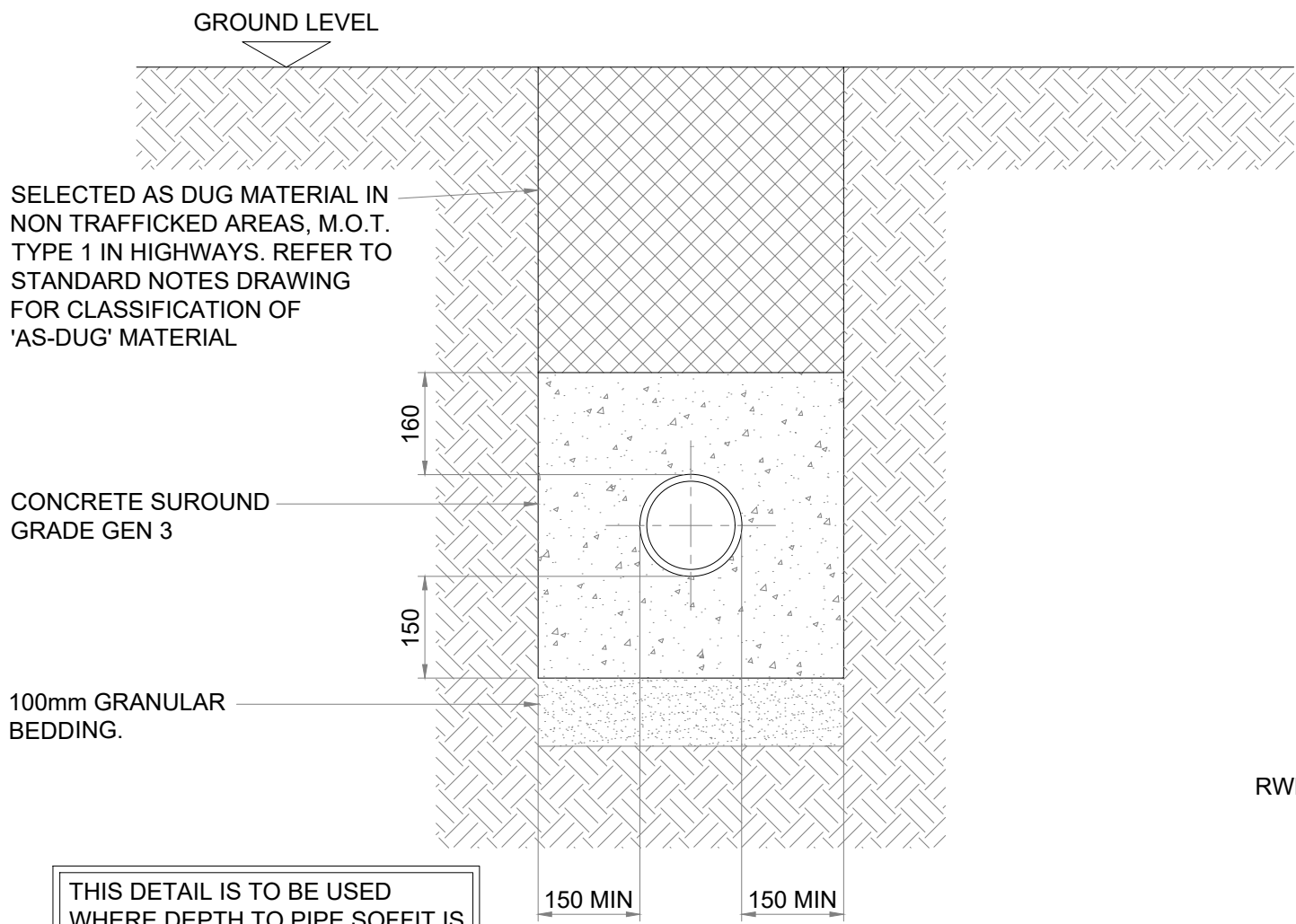
PIPE BEDDING CLASS B (BEDDING FACTOR 1.9)

BC = OUTSIDE DIAMETER

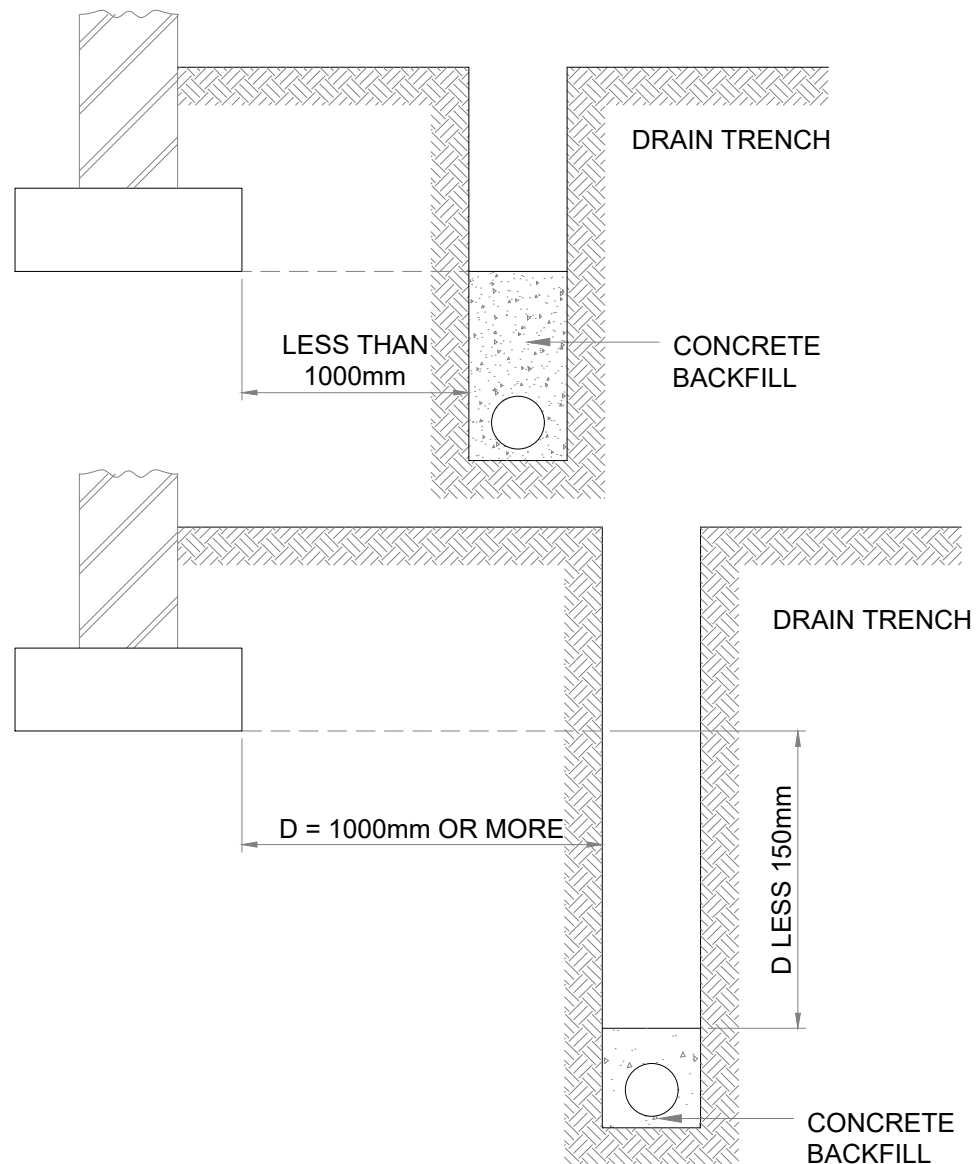


PIPE BEDDING CLASS S (BEDDING FACTOR 2.5)

BC = OUTSIDE DIAMETER



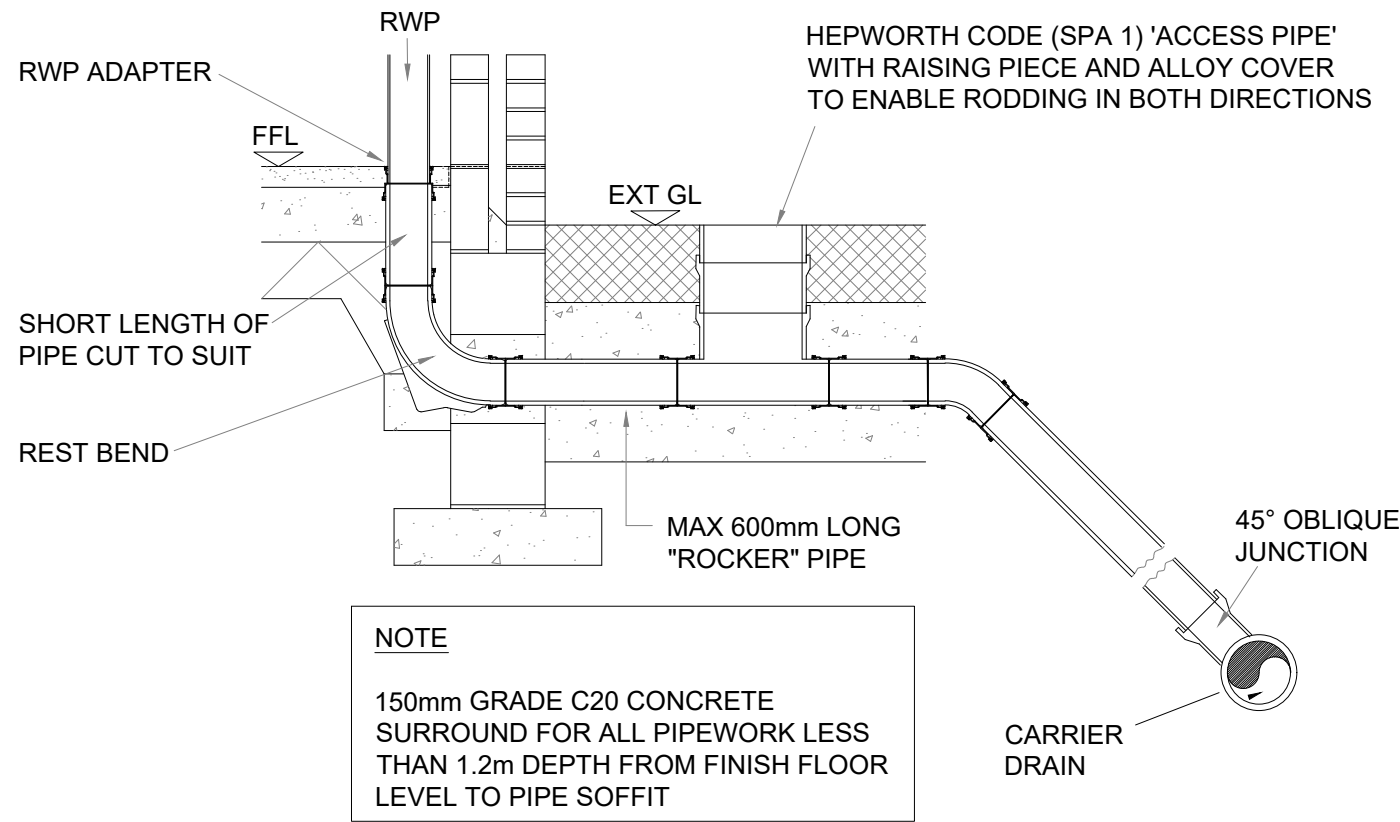
CLASS 'Z' PIPE BEDDING



NOTES

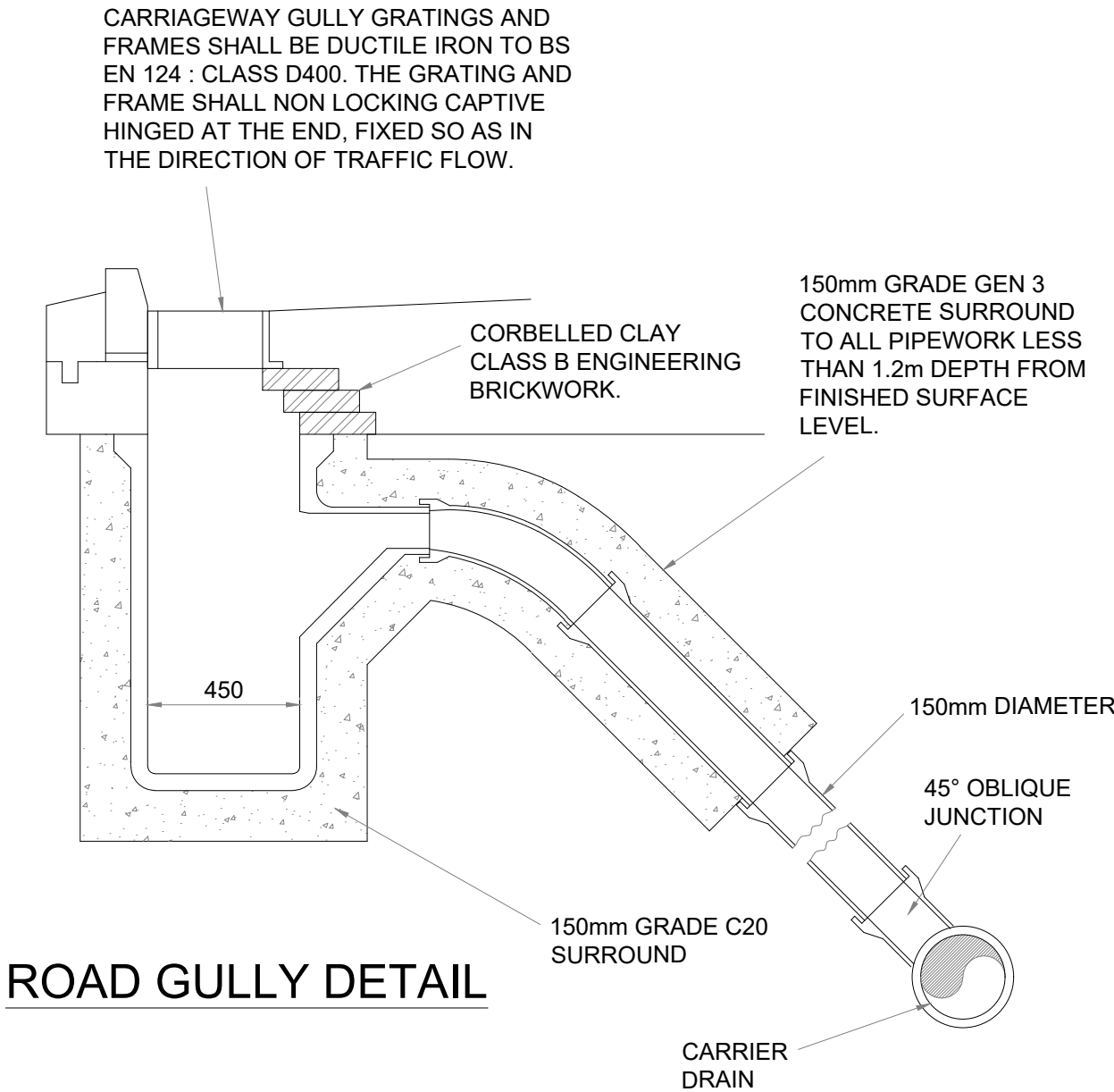
- CONCRETE TO BE GRADE GEN 3
- JOINTS TO BE PROVIDED IN CONCRETE SURROUND AT NOT GREATER THAN 5.0m CENTRES. BUILDING REGULATIONS PART H1 PARA A11
- WHERE THE TRENCH IS WITHIN 1m OF THE BUILDING THE TRENCH SHALL BE FILLED WITH CONCRETE UP TO THE LOWEST LEVEL OF THE FOUNDATIONS. WHERE THE TRENCH IS FURTHER THAN 1000mm FROM THE BUILDING, THE TRENCH SHALL BE FILLED WITH CONCRETE UP TO A LEVEL, BELOW THE LOWEST LEVEL OF THE FOUNDATION, EQUAL TO THE DISTANCE FROM THE BUILDING LESS 150mm.

PIPE RUNS ADJACENT TO BUILDING

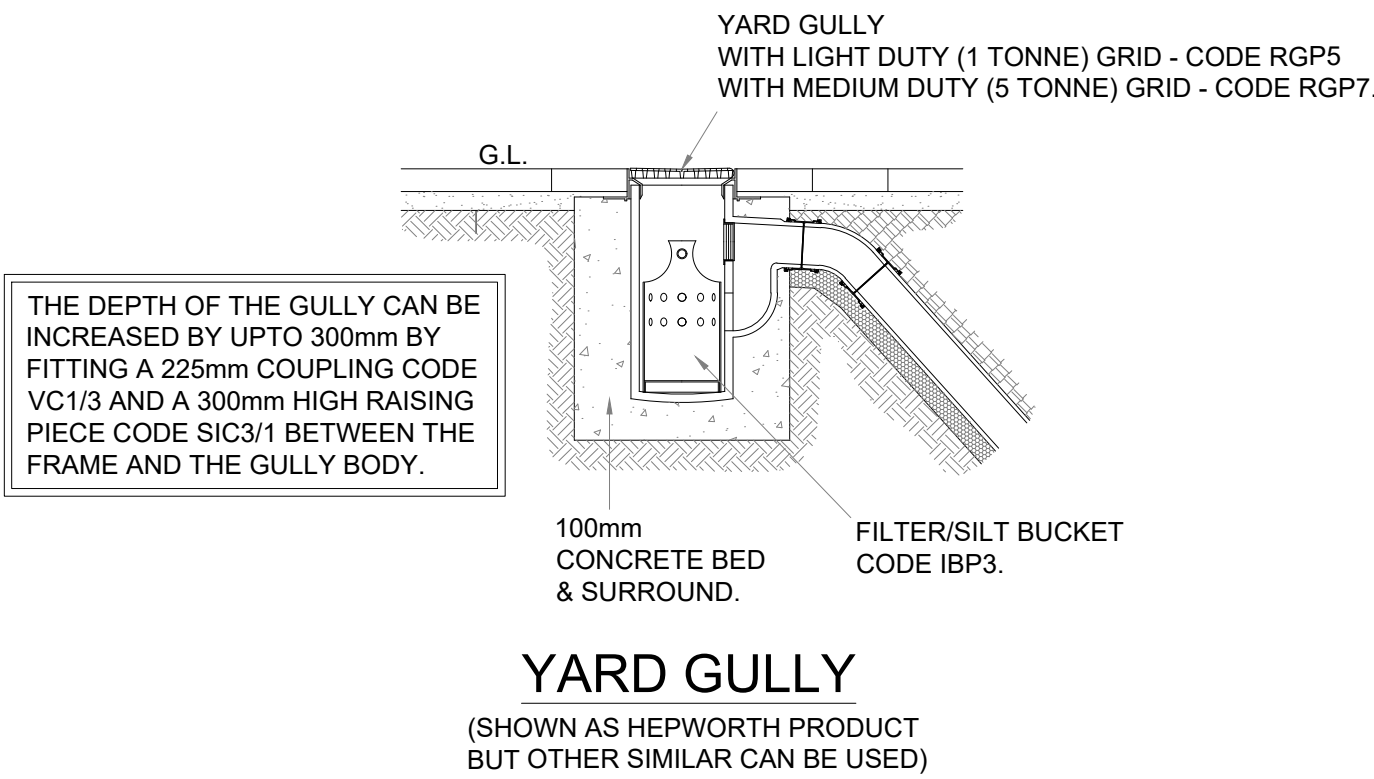


RWP CONNECTION DETAIL

- NOTES
- GULLY POTS: HIGHWAY GULLIES P.C.C. TO B.S. 5911 GULLY POT TO BE OF 100 LITRES CAPACITY.
 - MAXIMUM TRENCH WIDTH FOR 150mm GULLY LEAD IS 600mm.
 - NUMBER OF BENDS MAY VARY DUE TO SITE DIFFERENCES - SEE DRAINAGE SCHEDULE.
 - CONCRETE SURROUND TO PIPES SHALL ALWAYS FINISH AT A JOINT.
 - HEAVY DUTY, CAST IRON, LAMPHOLE TYPE COVER IN HARDSTANDING AND AREAS ACCESSIBLE TO VEHICULAR TRAFFIC, TO B.S. EN 124, 1994 CLASS D400, C250, OR B125 DEPENDANT ON LOCATION.
 - COVER SLAB TO BE 200MM THICK GRADE C20 CONCRETE.

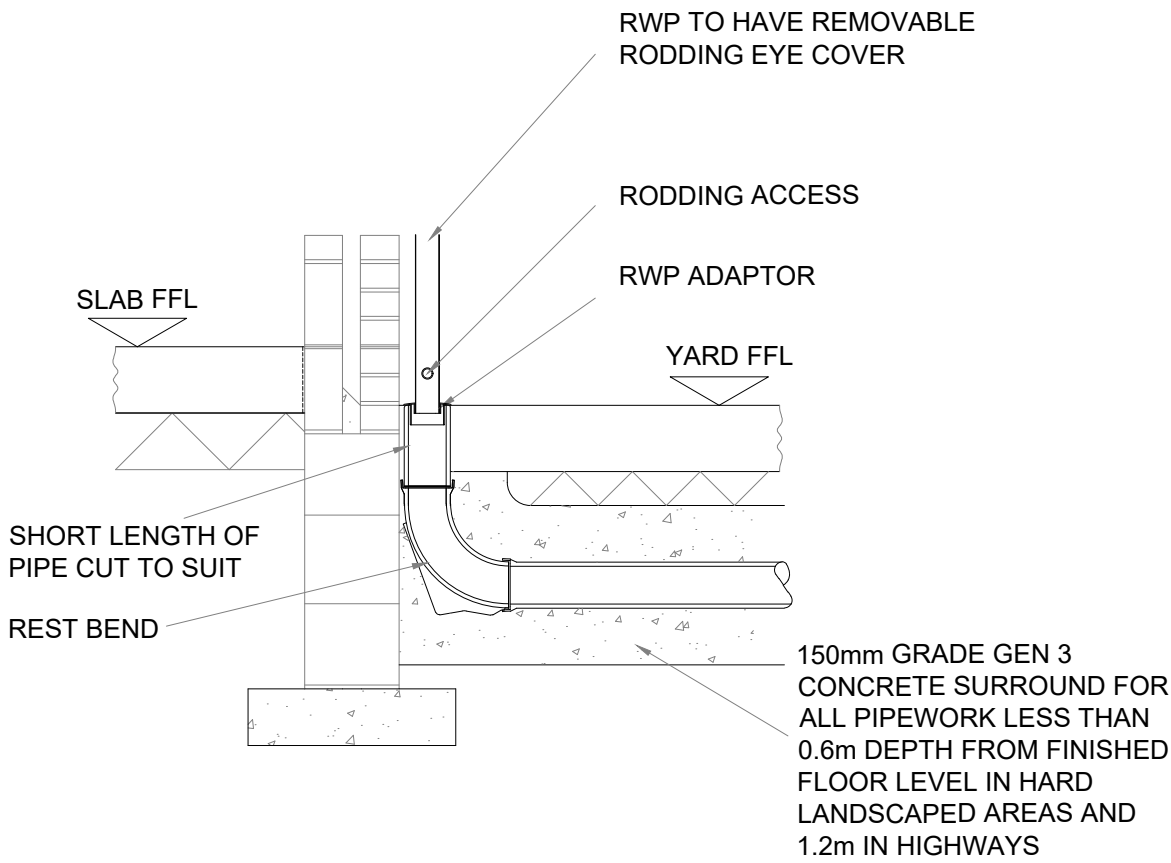


ROAD GULLY DETAIL



YARD GULLY

(SHOWN AS HEPWORTH PRODUCT BUT OTHER SIMILAR CAN BE USED)



EXTERNAL RAINWATER PIPE CONNECTION

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DRAWING NOTES:

CDM REGULATIONS 2015
SIGNIFICANT OR NON-OBVIOUS RISKS AND RISKS WHICH ARE DIFFICULT TO MANAGE ARE IDENTIFIED ON THIS DRAWING USING THE FOLLOWING SYMBOL IDENTIFIED TO THE RIGHT WITH BRIEF ACCOMPANYING TEXT. FOR FURTHER DETAILS OF THE RISKS IDENTIFIED BY DESIGNERS, REFERENCE SHOULD BE MADE TO CDM HAZARD REGISTER.



LEGEND:

P01	PRELIMINARY ISSUE	20.08.24	AP	AM
REV	DESCRIPTION	DATE	BY	CHKD
ORIGINATOR:				

RIDGE

CLIENT:

JLR

IN ASSOCIATION WITH:

PROJECT:

JLR JEA BODYSIDES

TITLE:

DRAINAGE DETAILS
SHEET 2

ENG/TECH:	CSE:	ICSE:	SCALE:	N.T.S	@	A1
AP	AM	AM	STATUS ISSUE:	S2		
STATUS: PRELIMINARY						
UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK						
SUITABILITY: S2 - Issued for Information						
PROJECT:	ORG:	ZONE:	LEVEL:	TYPE:	ROLE:	NUMBER:
JEA	RDG	XX	XX	DR	C	0505
						REV:
						P01

JLR JEA BODYSIDES - DRAINAGE MAINTENANCE SCHEDULE

Organisation responsible for maintenance: _____ Contact Details – Name: _____

Number: _____ Documents:

- Drainage Layout

SUDS have been specified for the site to promote sustainable management of surface water for both flow attenuation and water quality. This document outlines the maintenance schedules for each system in order to maintain the efficiency of the drainage network. The schedules have been created based on guidance from CIRIA C753.

Table 1: Pipes and Manholes Maintenance Schedule

Maintenance schedule	Required Action	Recommended Frequency
Occasional maintenance	Visual inspection of covers, gratings and manhole chambers.	Annually or as required.
	Cleaning out manholes.	Annually or as required.
	CCTV inspection of drainage pipes.	Annually or as required.
Remedial actions	Reactive cleaning of manholes and drains.	During flooding events.
	Cleaning out drains by water jetting.	As required.
	Replace damaged covers, grating and manhole components.	As required.
	Rehabilitation – repairs, relining or replacement.	As determined by inspections.

Table 2: Channel Drain

Maintenance schedule	Required Action	Recommended Frequency
Regular maintenance	Cleaning out Access Chamber.	Monthly or as required.
	inspect outlet for operation/blockages	Six Monthly
	Remove access chamber covers as required to flush the channels clean of debris. Remove this debris from the sump and dispose of	Six Monthly
	Inspect components for any wear or breakages.	Six Monthly

Table 3: Filter Drains

Maintenance schedule	Required Action	Recommended Frequency
Regular maintenance	Remove litter and debris	Monthly or as required.
	Inspect Filter Material	Monthly or as required.
	Inspect inlets and Outlets and Pipework for Silt Accumulation and establish suitable silt removal frequencies.	Six Monthly
	Remove Sediment from Inlets, Outlets and Pipework	As Required
Occasional Maintenance	Remove or Control Tree Roots	See landscape strategy maintenance
	Remove surface geotextile and replace geotextile and filter medium	5 yearly.
	Clear perforated pipework of blockages	As Required
	Remove nuisance and invasive vegetation, including weeds	Six monthly or as required
	Mow grasses, prune shrubs and manage other planting (if appropriate) as required – clippings should be removed and not allowed to accumulate	Six monthly or as required
Remedial actions	If erosion channels are evident, these should be stabilised with extra soil substrate similar to the original material, and sources of erosion damage should be identified and controlled	As required
	If drain inlet has settled, cracked or moved, investigate and repair as appropriate	As required

APPENDIX C – HYDRAULIC CALCULATIONS

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase Flow Path: Train	Company Address:			



Catchment Area

Type : Catchment Area

Area (ha)	0.14
-----------	------

Preliminary Sizing

Volumetric Runoff Coefficient	0.750
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase Flow Path: Train	Company Address:		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SW1	Manhole	344814.793	384317.531	23.800	1.500	22.300	Circular	1.200
SW2	Manhole	344854.669	384317.698	23.800	1.800	22.000	Circular	1.200
SW3	Manhole	344854.669	384281.692	23.800	1.950	21.850	Circular	1.200
EXSW 2179	Manhole	344866.431	384274.028	23.800	2.050	21.750	Circular	1.500

Name	Lock
SW1	None
SW2	None
SW3	None
EXSW 2179	None

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SW1	Inlet	Catchment Area	(None)	No Restriction
SW2	Inlet	S1.000 S2.000	(None)	No Restriction
SW3	Inlet	S1.001	(None)	No Restriction
EXSW 2179	Inlet	S1.002 S3.001	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW1	Outlet	S1.000	Free Discharge
SW2	Outlet	S1.001	Free Discharge
SW3	Outlet	S1.002	Free Discharge

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Manhole Schedule Storm Phase: Phase Flow Path: Train	Company Address:			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW1	23.800 22.300	Diameter / Length: 1.200					Manhole
E:344814.793 N:384317.531	1.500						
			{a} S1.000	Pipe	22.300	Diam/Width:300	Not Applicable
SW2	23.800 22.000	Diameter / Length: 1.200	{1} S1.000	Pipe	22.000	Diam/Width:300	Manhole
E:344854.669 N:384317.698	1.800		{2} S2.000	Pipe	22.000	Diam/Width:300	
			{a} S1.001	Pipe	22.000	Diam/Width:300	Not Applicable
SW3	23.800 21.850	Diameter / Length: 1.200	{1} S1.001	Pipe	21.850	Diam/Width:300	Manhole
E:344854.669 N:384281.692	1.950						
			{a} S1.002	Pipe	21.850	Diam/Width:300	Not Applicable
EXSW 2179	23.800 21.750	Diameter / Length: 1.500	{1} S1.002	Pipe	21.750	Diam/Width:300	Manhole
E:344866.431 N:384274.028	2.050		{2} S3.001	Pipe	21.750	Diam/Width:300	
							Not Applicable

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase Flow Path: Train	Company Address:		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area	SW1		Time of Concentration	0.140	100	0	100	0.140
Branch: S2.000								
Catchment Area (1)	SW4		Time of Concentration	0.145	100	0	100	0.145
TOTAL		0.0		0.285				0.285

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase Flow Path: Train (1)	Company Address:			



Catchment Area (1)

Type : Catchment Area

Area (ha)	0.145
-----------	-------

Preliminary Sizing

Volumetric Runoff Coefficient	0.750
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Storm Phase: Phase Flow Path: Train (1)	Company Address:			

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SW4	Manhole	344886.713	384317.777	23.800	1.300	22.500	Circular	1.200
SW2	Manhole	344854.669	384317.698	23.800	1.800	22.000	Circular	1.200

Name	Lock
SW4	None
SW2	None

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SW4	Inlet	Catchment Area (1)	(None)	No Restriction
SW2	Inlet	S1.000 S2.000	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW4	Outlet	S2.000	Free Discharge
SW2	Outlet	S1.001	Free Discharge

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Manhole Schedule Storm Phase: Phase Flow Path: Train (1)	Company Address:			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW4	23.800 22.500	Diameter / Length: 1.200					Manhole
E:344886.713 N:384317.777	1.300						
			{a} S2.000	Pipe	22.500	Diam/Width:300	Not Applicable
SW2	23.800 22.000	Diameter / Length: 1.200	{1} S1.000	Pipe	22.000	Diam/Width:300	Manhole
E:344854.669 N:384317.698	1.800		{2} S2.000	Pipe	22.000	Diam/Width:300	
			{a} S1.001	Pipe	22.000	Diam/Width:300	Not Applicable

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase Flow Path: Train (1)	Company Address:		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area (1)	SW4		Time of Concentration	0.145	100	0	100	0.145
TOTAL		0.0		0.145				0.145

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase Flow Path: Train (2)	Company Address:			



Catchment Area (2)

Type : Catchment Area

Area (ha)	0.15
-----------	------

Preliminary Sizing

Volumetric Runoff Coefficient	0.750
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase Flow Path: Train (2)	Company Address:		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SW5	Manhole	344814.543	384267.456	23.800	1.300	22.500	Circular	1.200
SW7	Manhole	344866.718	384267.499	23.800	2.000	21.800	Circular	1.200
EXSW 2179	Manhole	344866.431	384274.028	23.800	2.050	21.750	Circular	1.500

Name	Lock
SW5	None
SW7	None
EXSW 2179	None

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SW5	Inlet	Catchment Area (2)	(None)	No Restriction
SW7	Inlet	S3.000	(None)	No Restriction
	Inlet (1)	S4.000	(None)	No Restriction
EXSW 2179	Inlet	S1.002 S3.001	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW5	Outlet	S3.000	Free Discharge
SW7	Outlet	S3.001	Free Discharge

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Manhole Schedule Storm Phase: Phase Flow Path: Train (2)	Company Address:			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW5	23.800 22.500	Diameter / Length: 1.200					Manhole
E:344814.543 N:384267.456	1.300		{a} S3.000	Pipe	22.500	Diam/Width:300	Not Applicable
SW7	23.800 21.800	Diameter / Length: 1.200	{1} S3.000	Pipe	21.800	Diam/Width:300	Manhole
E:344866.718 N:384267.499	2.000		{2} S4.000	Pipe	21.800	Diam/Width:300	
			{a} S3.001	Pipe	21.800	Diam/Width:300	Not Applicable
EXSW 2179	23.800 21.750	Diameter / Length: 1.500	{1} S1.002	Pipe	21.750	Diam/Width:300	Manhole
E:344866.431 N:384274.028	2.050		{2} S3.001	Pipe	21.750	Diam/Width:300	
							Not Applicable

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase Flow Path: Train (2)	Company Address:		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area (2)	SW5		Time of Concentration	0.150	100	0	100	0.150
Branch: S4.000								
Catchment Area (3)	SW6		Time of Concentration	0.145	100	0	100	0.145
TOTAL		0.0		0.295				0.295

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Inflows Storm Phase: Phase Flow Path: Train (3)	Company Address:			



Catchment Area (3)

Type : Catchment Area

Area (ha)	0.145
-----------	-------

Preliminary Sizing

Volumetric Runoff Coefficient	0.750
Percentage Impervious (%)	100
Time of Concentration (mins)	5

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Junctions Storm Phase: Phase Flow Path: Train (3)	Company Address:		



Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SW6	Manhole	344891.824	384267.012	23.800	1.300	22.500	Circular	1.200
SW7	Manhole	344866.718	384267.499	23.800	2.000	21.800	Circular	1.200
EXSW 2179	Manhole	344866.431	384274.028	23.800	2.050	21.750	Circular	1.500

Name	Lock
SW6	None
SW7	None
EXSW 2179	None

Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
SW6	Inlet	Catchment Area (3)	(None)	No Restriction
SW7	Inlet	S3.000	(None)	No Restriction
	Inlet (1)	S4.000	(None)	No Restriction
EXSW 2179	Inlet	S1.002 S3.001	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
SW6	Outlet	S4.000	Free Discharge
SW7	Outlet	S3.001	Free Discharge

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Manhole Schedule Storm Phase: Phase Flow Path: Train (3)	Company Address:			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW6	23.800 22.500	Diameter / Length: 1.200					Manhole
E:344891.824 N:384267.012	1.300						
			{a} S4.000	Pipe	22.500	Diam/Width:300	Not Applicable
SW7	23.800 21.800	Diameter / Length: 1.200	{1} S3.000	Pipe	21.800	Diam/Width:300	Manhole
E:344866.718 N:384267.499	2.000		{2} S4.000	Pipe	21.800	Diam/Width:300	
			{a} S3.001	Pipe	21.800	Diam/Width:300	Not Applicable
EXSW 2179	23.800 21.750	Diameter / Length: 1.500	{1} S1.002	Pipe	21.750	Diam/Width:300	Manhole
E:344866.431 N:384274.028	2.050		{2} S3.001	Pipe	21.750	Diam/Width:300	
							Not Applicable

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Inflow Summary Storm Phase: Phase Flow Path: Train (3)	Company Address:		



Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
Catchment Area (3) Branch: S3.000	SW6		Time of Concentration	0.145	100	0	100	0.145
Catchment Area (2)	SW5		Time of Concentration	0.150	100	0	100	0.150
TOTAL		0.0		0.295				0.295

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Network Design Criteria Storm Phase: Phase				

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Manhole Options

Apply Offset	☐
--------------	--------------------------

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Outfall Details Storm Phase: Phase	Company Address:			

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
EXSW 2179	Free Discharge		

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Title: Rainfall Analysis Criteria	Company Address:			

Runoff Type	Dynamic
Output Interval (mins)	1
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FSR Type: FSR

Region	England And Wales
M5-60 (mm)	20.0
Ratio R	0.400
Summer	☒
Winter	☒

Return Period

Return Period (years)	Increase Rainfall (%)
1.0	0.000
30.0	40.000
100.0	45.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address:		



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 1 years: +0 %: 15 mins: Winter	0.14	19.7	9.097
Catchment Area (1)	FSR: 1 years: +0 %: 15 mins: Winter	0.15	20.4	9.423
Catchment Area (2)	FSR: 1 years: +0 %: 15 mins: Winter	0.15	21.1	9.747
Catchment Area (3)	FSR: 1 years: +0 %: 15 mins: Winter	0.15	20.4	9.423

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Inflows Summary Storm Phase: Phase				



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 30 years: +40 %: 15 mins: Winter	0.14	67.5	31.319
Catchment Area (1)	FSR: 30 years: +40 %: 15 mins: Winter	0.15	69.9	32.435
Catchment Area (2)	FSR: 30 years: +40 %: 15 mins: Winter	0.15	72.3	33.552
Catchment Area (3)	FSR: 30 years: +40 %: 15 mins: Winter	0.15	69.9	32.435

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Inflows Summary Storm Phase: Phase				



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area	FSR: 100 years: +45 %: 15 mins: Winter	0.14	89.8	42.174
Catchment Area (1)	FSR: 100 years: +45 %: 15 mins: Winter	0.15	93.0	43.680
Catchment Area (2)	FSR: 100 years: +45 %: 15 mins: Winter	0.15	96.2	45.185
Catchment Area (3)	FSR: 100 years: +45 %: 15 mins: Winter	0.15	93.0	43.680

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train	Company Address:		



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	22.30 0	22.390	0.090	19.7	0.102	0.000	19.4	9.113	OK
SW2	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	22.00 0	22.165	0.165	39.6	0.186	0.000	38.8	18.461	OK
SW3	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	21.85 0	21.996	0.146	38.8	0.165	0.000	38.6	18.402	OK
EXSW 2179	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	21.75 0	21.884	0.134	78.8	0.000	0.000	78.8	37.524	OK

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train	Company Address:		



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FSR: 30 years: +40 %: 15 mins: Winter	23.800	22.300	23.040	0.740	67.5	0.837	0.000	64.3	31.436	Surcharged
SW2	FSR: 30 years: +40 %: 15 mins: Winter	23.800	22.000	22.891	0.891	131.1	1.008	0.000	131.3	63.873	Surcharged
SW3	FSR: 30 years: +40 %: 15 mins: Winter	23.800	21.850	22.319	0.469	131.3	0.530	0.000	131.3	63.864	Surcharged
EXSW 2179	FSR: 30 years: +40 %: 15 mins: Summer	23.800	21.750	22.050	0.300	256.5	0.000	0.000	256.4	115.998	OK

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train	Company Address:		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW1	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	22.30 0	23.791	1.491	89.8	1.686	0.000	86.8	42.385	Flood Risk
SW2	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	22.00 0	23.533	1.533	176.6	1.734	0.000	175.9	86.465	Flood Risk
SW3	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	21.85 0	22.543	0.693	175.9	0.783	0.000	175.7	86.493	Surcharged
EXSW 2179	FSR: 100 years: +45 %: 15 mins: Summer	23.80 0	21.75 0	22.050	0.300	346.3	0.000	0.000	346.1	156.831	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Connections Summary Storm Phase: Phase Flow Path: Train				



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S1.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW1	SW2	23.800	22.390	0.127	9.113	0.7	0.2	19.4	OK
S1.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW2	SW3	23.800	22.165	0.155	18.461	1.1	0.54	38.8	OK
S1.002	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW3	EXSW 2179	23.800	21.996	0.140	18.402	1.2	0.41	38.6	OK

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase Flow Path: Train	Company Address:		



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S1.000	FSR: 30 years: +40 %: 15 mins: Winter	Pipe	SW1	SW2	23.800	23.040	0.300	31.436	0.9	0.67	64.3	Surcharged
S1.001	FSR: 30 years: +40 %: 15 mins: Winter	Pipe	SW2	SW3	23.800	22.891	0.300	63.873	1.9	1.84	131.3	Surcharged
S1.002	FSR: 30 years: +40 %: 15 mins: Winter	Pipe	SW3	EXSW 2179	23.800	22.319	0.300	63.864	1.9	1.4	131.3	Surcharged

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase Flow Path: Train	Company Address:		



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S1.000	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW1	SW2	23.800	23.791	0.300	42.385	1.2	0.9	86.8	Flood Risk
S1.001	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW2	SW3	23.800	23.533	0.300	86.465	2.5	2.46	175.9	Flood Risk
S1.002	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW3	EXSW 2179	23.800	22.543	0.300	86.493	2.5	1.88	175.7	Surcharged

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (1)	Company Address:			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW4	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	22.50 0	22.577	0.077	20.4	0.087	0.000	20.2	9.439	OK
SW2	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	22.00 0	22.165	0.165	39.6	0.186	0.000	38.8	18.461	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (1)	Company Address:			



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW4	FSR: 30 years: +40 %: 15 mins: Winter	23.800	22.500	23.027	0.527	69.9	0.596	0.000	66.9	32.453	Surcharged
SW2	FSR: 30 years: +40 %: 15 mins: Winter	23.800	22.000	22.891	0.891	131.1	1.008	0.000	131.3	63.873	Surcharged

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (1)	Company Address:			



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW4	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	22.50 0	23.765	1.265	93.0	1.430	0.000	89.9	44.029	Flood Risk
SW2	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	22.00 0	23.533	1.533	176.6	1.734	0.000	175.9	86.465	Flood Risk

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Connections Summary Storm Phase: Phase Flow Path: Train (1)	Company Address:			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S2.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW4	SW2	23.800	22.577	0.120	9.439	0.8	0.15	20.2	OK

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase Flow Path: Train (1)	Company Address:		




FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S2.000	FSR: 30 years: +40 %: 15 mins: Winter	Pipe	SW4	SW2	23.800	23.027	0.300	32.453	1.0	0.48	66.9	Surcharged

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Connections Summary Storm Phase: Phase Flow Path: Train (1)				



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S2.000	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW4	SW2	23.800	23.765	0.300	44.029	1.3	0.65	89.9	Flood Risk

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (2)	Company Address:			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW5	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	22.50 0	22.581	0.081	21.1	0.092	0.000	20.8	9.761	OK
SW7	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	21.80 0	21.952	0.152	41.0	0.171	0.000	40.2	19.122	OK
EXSW 2179	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	21.75 0	21.884	0.134	78.8	0.000	0.000	78.8	37.524	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (2)	Company Address:			



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW5	FSR: 30 years: +40 %: 15 mins: Winter	23.80 0	22.50 0	22.662	0.162	72.3	0.183	0.000	71.7	33.538	OK
SW7	FSR: 30 years: +40 %: 15 mins: Winter	23.80 0	21.80 0	22.244	0.444	141.4	0.502	0.000	140.0	65.966	Surcharged
EXSW 2179	FSR: 30 years: +40 %: 15 mins: Summer	23.80 0	21.75 0	22.050	0.300	256.5	0.000	0.000	256.4	115.998	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (2)	Company Address:			



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW5	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	22.50 0	22.793	0.293	96.2	0.331	0.000	94.1	45.251	OK
SW7	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	21.80 0	22.389	0.589	185.5	0.666	0.000	184.8	89.053	Surcharged
EXSW 2179	FSR: 100 years: +45 %: 15 mins: Summer	23.80 0	21.75 0	22.050	0.300	346.3	0.000	0.000	346.1	156.831	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Connections Summary Storm Phase: Phase Flow Path: Train (2)				



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S3.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW5	SW7	23.800	22.581	0.116	9.761	0.8	0.16	20.8	OK
S3.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW7	EXSW 2179	23.800	21.952	0.143	19.122	1.2	0.41	40.2	OK

Project:	Date: 12/12/2023		
	Designed by: adammatadar	Checked by:	Approved By:
Report Details: Type: Connections Summary Storm Phase: Phase Flow Path: Train (2)	Company Address:		



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S3.000	FSR: 30 years: +40 %: 15 mins: Winter	Pipe	SW5	SW7	23.800	22.662	0.300	33.538	1.1	0.56	71.7	OK
S3.001	FSR: 30 years: +40 %: 15 mins: Winter	Pipe	SW7	EXSW 2179	23.800	22.244	0.300	65.966	2.0	1.44	140.0	Surcharged

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Connections Summary Storm Phase: Phase Flow Path: Train (2)				



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S3.000	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW5	SW7	23.800	22.793	0.300	45.251	1.3	0.73	94.1	OK
S3.001	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW7	EXSW 2179	23.800	22.389	0.300	89.053	2.6	1.9	184.8	Surcharged

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (3)	Company Address:			



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW6	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	22.50 0	22.567	0.067	20.4	0.075	0.000	20.3	9.434	OK
SW7	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	21.80 0	21.952	0.152	41.0	0.171	0.000	40.2	19.122	OK
EXSW 2179	FSR: 1 years: +0 %: 15 mins: Winter	23.80 0	21.75 0	21.884	0.134	78.8	0.000	0.000	78.8	37.524	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (3)	Company Address:			



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW6	FSR: 30 years: +40 %: 15 mins: Winter	23.80 0	22.50 0	22.625	0.125	69.9	0.142	0.000	69.7	32.431	OK
SW7	FSR: 30 years: +40 %: 15 mins: Winter	23.80 0	21.80 0	22.244	0.444	141.4	0.502	0.000	140.0	65.966	Surcharged
EXSW 2179	FSR: 30 years: +40 %: 15 mins: Summer	23.80 0	21.75 0	22.050	0.300	256.5	0.000	0.000	256.4	115.998	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details: Type: Junctions Summary Storm Phase: Phase Flow Path: Train (3)	Company Address:			



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW6	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	22.50 0	22.649	0.149	93.0	0.169	0.000	92.4	43.696	OK
SW7	FSR: 100 years: +45 %: 15 mins: Winter	23.80 0	21.80 0	22.389	0.589	185.5	0.666	0.000	184.8	89.053	Surcharged
EXSW 2179	FSR: 100 years: +45 %: 15 mins: Summer	23.80 0	21.75 0	22.050	0.300	346.3	0.000	0.000	346.1	156.831	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Connections Summary Storm Phase: Phase Flow Path: Train (3)				



FSR: 1 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S4.000	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW6	SW7	23.800	22.567	0.108	9.434	0.9	0.11	20.3	OK
S3.001	FSR: 1 years: +0 %: 15 mins: Winter	Pipe	SW7	EXSW 2179	23.800	21.952	0.143	19.122	1.2	0.41	40.2	OK

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Connections Summary Storm Phase: Phase Flow Path: Train (3)				



FSR: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S4.000	FSR: 30 years: +40 %: 15 mins: Winter	Pipe	SW6	SW7	23.800	22.625	0.284	32.431	1.1	0.37	69.7	OK
S3.001	FSR: 30 years: +40 %: 15 mins: Winter	Pipe	SW7	EXSW 2179	23.800	22.244	0.300	65.966	2.0	1.44	140.0	Surcharged

Project:	Date: 12/12/2023			
	Designed by: adammatadar	Checked by:	Approved By:	
Report Details:	Company Address:			
Type: Connections Summary Storm Phase: Phase Flow Path: Train (3)				



FSR: 100 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
S4.000	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW6	SW7	23.800	22.649	0.300	43.696	1.3	0.5	92.4	OK
S3.001	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	SW7	EXSW 2179	23.800	22.389	0.300	89.053	2.6	1.9	184.8	Surcharged



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