Report Title	# Drainage Statement
Property Address	Proposed Industrial Units Industrial Estate Joe McBain Avenue Moresby Parks
Client	Energy Coast Property Services
Our Reference	24-471r001
Date	November 2024
Prepared by	Josh Gemmell BEng Hons
Checked by	Colin Aimers BEng Hons CEng MICE CEnv Director colin.aimers@kingmoorconsulting.co.uk

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CONTENTS

INTRODUCTION

The purpose of this report is to provide technical design for the drainage at the proposed industrial units at Joe McBain Avenue, Moresby Parks, thereafter known as the site. This follows the detailed site review by Kingmoor Consulting Ltd.

Research has been undertaken on the site and observations made regarding the existing site and the drainage servicing the site.

Calculations associated with the drainage have been performed by software packages from a recognised resource. Where appropriate copies of calculations are provided in the Appendices of this report.

PROPOSED DEVELOPMENT

It is proposed to construct new industrial units on the site.

New drainage shall be installed around the site to service the development.

THE SITE

EXISTING DRAINAGE

The existing site drainage has been traced where it is possible and plotted to identify the key surface and foul drainage serving the site.

There are currently no existing drainage systems located directly within the proposed site. All surface water is assumed to drain naturally into the ground.

Both surface and foul water sewers are located around the site. These systems flow from both directions along Joe McBain Avenue. Site investigation works were carried out on site to trace the existing drainage tails which were installed at the time of construction. These were traced and excavated to confirm their locations.

Both sewer systems eventually flow east towards their existing outfalls.

GEOLOGY

SUPERFICIAL DEPOSITS

The published superficial geology by The British Geological Survey shows the site is overlain by Diamicton Till present comprising Clays and Silts.

SOLID GEOLOGY

The solid geology as published by the British Geological Survey shows the site to be underlain by mudstone, siltstone and sandstone.

Copies of all BGS information are appended to this report.

DRAINAGE STRATEGY

FOUL DRAINAGE

It is proposed that the proposed development shall be serviced by the existing mains sewer located on Joe McBain avenue. Foul waste from the site will be discharged into the foul water sewer. The connections to this system will be made by utilising the existing tails from the required manholes.

SURFACE WATER DRAINAGE

It is proposed to discharge the surface water to the existing surface water sewer also located on Joe McBain Avenue.

This follows the Hierarchy of Drainage, as stated in the National Planning Practice Guidance, the aim should be to discharge surface water run-off as high up the drainage hierarchy, as reasonably practicable:

- Into the ground (infiltration) - ***Not suitable***
- To a surface water body - ***Not available***
- To a surface water sewer, highway drain, or another drainage system - ***Available***
- To a combined sewer - ***Not available***

DETAILED DESIGN

FOUL DRAINAGE

It is proposed to install a new foul system around the site to service all of the proposed units. These systems will move waste from the site and discharge it into the existing foul water sewer.

No work will be required on the mains system directly as it is proposed to connect to the sewer via the existing drainage tails which branch into the site.

The internal arrangements for drainage shall be considered by the operator of the site.

SURFACE WATER DRAINAGE

Principally the surface water drainage shall be calculated on the impermeable areas of the development, and shall discharge to the existing surface water sewer.

Surface water gathered on site is proposed to be stored in one main attenuation tank located within the site. The tank shall be suitably sized to allow us to discharge to the surface water mains through using a flow control system and discharging at the allowable rate of discharge (QBar).

HYDRAULIC DESIGN

FOUL DRAINAGE

Calculations have been undertaken on the foul network and are presented in the Appendices of this report.

The foul drainage shall be managed privately and shall carry foul waste to the existing foul sewer. A load of 1500 l/day per dwelling has been considered.

SURFACE WATER DRAINAGE

Principally the surface water drainage has been calculated on the impermeable areas of the development, and modelled in Causeway Flow. Flows are attenuated and released to the surface water sewer at a rate of Q bar.

Modelling has been conducted on the following rainfall events:

- 1 in 10 years
- 1 in 30 years
- 1 in 100 years
- 1 in 100 years plus 50% increase due to climate change

An assessment of the proposed network has been undertaken to identify the requirements of the attenuation on the site.

The following parameters were adopted in the analysis. These were obtained from UK SUDS based on the site location and data held by HR Wallingford.

Simulation Settings

Rainfall Methodology	FSR	Winter CV	0.840	Check Discharge Rate(s)	✓
Rainfall Events	Singular	Analysis Speed	Normal	100 year (l/s)	14.0
FSR Region	England and Wales	Skip Steady State	x	Check Discharge Volume	✓
M5-60 (mm)	17.000	Drain Down Time (mins)	240	100 year 360 minute (m³)	205
Ratio-R	0.400	Additional Storage (m³/ha)	0.0		
Summer CV	0.750	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	0	0	0	100	0	0	0
30	0	0	0	100	50	0	0

Pre Development Discharge Rates and Volumes

Pre-development Discharge Rate

Site Makeup	Greenfield	SAAR (mm)	1183	Region	10	QBar	6.7
Greenfield Method	IH124	Soil Index	4	Growth Factor 100 year	2.08	Q 100 year (l/s)	14.0
Positively Drained Area (ha)	0.752	SPR	0.47	Betterment (%)	0		

Pre-development Discharge Volume

Site Makeup	Greenfield	Soil Index	4	Return Period (years)	100	Betterment (%)	0
Greenfield Method	FSR/FEH	SPR	0.47	Climate Change (%)	0	PR	0.500
Positively Drained Area (ha)	0.752	CWI	125.458	Storm Duration (mins)	360	Runoff Volume (m³)	205

DETAILED ENGINEERING

The detailed model presented in this report adopts the following engineering aspects specific to the site.

Attenuation and Flow Control

Attenuation for the areas to be drained have been designed to prevent flooding occurring within and outside the site for the 1 in 100 years + 50% climate change event.

A flow control has been placed on the site to prevent flooding and store water in the system for slow release. One flow control device will be installed on site, this limits flows from the site to the calculated QBar value.

Node 24 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	123.250	Product Number	CTL-SHE-0114-8000-2250-8000
Design Depth (m)	2.250	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	8.0	Min Node Diameter (mm)	1200

Overall, the site attenuates sufficient volume in the piped system to ensure that the volumes prevent flooding based on the 1 in 100 Y + 50% CC event.

Node 10 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Pit Width (m)	21.000	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	124.210	Pit Length (m)	7.000	Number Required	1
Safety Factor	1.0	Time to half empty (mins)	232	Depth (m)	1.200		

Summary

The following summary associated with the critical storm event is offered associated with loads and flows on the system and the potential for flooding to occur.

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	125.030	0.104	21.7	0.0296	0.0000	OK
15 minute winter	2	10	125.453	0.053	4.6	0.0150	0.0000	OK
15 minute winter	26	10	125.404	0.054	4.6	0.0153	0.0000	OK
15 minute winter	5	10	125.457	0.057	4.6	0.0161	0.0000	OK
15 minute winter	6	10	124.693	0.153	30.5	0.0434	0.0000	OK
15 minute summer	13	10	125.097	0.117	26.5	0.0331	0.0000	OK
15 minute winter	14	10	124.849	0.148	37.2	0.1280	0.0000	OK
15 minute winter	3	10	125.400	0.075	12.5	0.0211	0.0000	OK
15 minute summer	8	10	125.498	0.098	12.5	0.0278	0.0000	OK
15 minute winter	7	10	124.648	0.189	42.5	0.0534	0.0000	OK
120 minute winter	9	100	124.590	0.196	12.9	0.0555	0.0000	OK
60 minute winter	10	61	124.590	0.380	54.0	53.5723	0.0000	SURCHARGE
60 minute winter	24	61	124.589	1.339	18.1	2.3666	0.0000	SURCHARGE
15 minute winter	15	10	125.444	0.044	3.4	0.0126	0.0000	OK
15 minute winter	16	10	125.350	0.067	6.8	0.0189	0.0000	OK
15 minute summer	18	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	19	10	125.342	0.046	3.4	0.0130	0.0000	OK
15 minute winter	17	10	125.118	0.072	13.6	0.0204	0.0000	OK
15 minute summer	20	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	23	10	124.818	0.124	26.1	0.1070	0.0000	OK
15 minute winter	21	10	125.075	0.075	12.7	0.0213	0.0000	OK
15 minute winter	22	10	124.925	0.125	26.3	0.1086	0.0000	OK
15 minute winter	11	10	125.375	0.050	5.6	0.0140	0.0000	OK
15 minute winter	12	10	125.199	0.070	11.2	0.0199	0.0000	OK
30 minute winter	25	15	123.226	0.050	6.9	0.0000	0.0000	OK
15 minute winter	4	10	124.816	0.123	26.1	0.0195	0.0000	OK

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	125.048	0.122	27.5	0.0344	0.0000	OK
15 minute winter	2	10	125.461	0.061	5.9	0.0173	0.0000	OK
15 minute winter	26	10	125.412	0.062	5.9	0.0177	0.0000	OK
15 minute winter	5	10	125.466	0.066	5.9	0.0185	0.0000	OK
15 minute winter	6	11	124.795	0.255	38.6	0.0722	0.0000	SURCHARGED
15 minute summer	13	10	125.117	0.137	33.7	0.0388	0.0000	OK
15 minute winter	14	10	124.880	0.179	47.4	0.1552	0.0000	OK
15 minute winter	3	10	125.409	0.084	15.7	0.0238	0.0000	OK
15 minute winter	8	10	125.518	0.118	15.7	0.0333	0.0000	OK
120 minute winter	7	114	124.735	0.276	16.4	0.0780	0.0000	SURCHARGED
120 minute winter	9	114	124.734	0.340	16.4	0.0963	0.0000	SURCHARGED
120 minute winter	10	114	124.734	0.524	40.1	73.9086	0.0000	SURCHARGED
120 minute winter	24	114	124.734	1.483	13.2	2.6213	0.0000	SURCHARGED
15 minute winter	15	10	125.450	0.050	4.3	0.0142	0.0000	OK
15 minute winter	16	10	125.360	0.077	8.6	0.0218	0.0000	OK
15 minute summer	18	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	19	10	125.348	0.052	4.3	0.0148	0.0000	OK
15 minute winter	17	10	125.128	0.082	17.2	0.0231	0.0000	OK
15 minute summer	20	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	23	10	124.838	0.144	33.0	0.1250	0.0000	OK
15 minute winter	21	10	125.085	0.085	16.0	0.0241	0.0000	OK
15 minute winter	22	10	124.948	0.148	33.2	0.1277	0.0000	OK
15 minute winter	11	10	125.381	0.056	7.1	0.0158	0.0000	OK
15 minute winter	12	10	125.209	0.080	14.2	0.0225	0.0000	OK
360 minute summer	25	456	123.226	0.050	6.9	0.0000	0.0000	OK
15 minute winter	4	11	124.844	0.151	33.2	0.0240	0.0000	OK

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	125.122	0.196	35.3	0.0554	0.0000	OK
15 minute winter	2	10	125.470	0.070	7.5	0.0198	0.0000	OK
15 minute summer	26	10	125.422	0.072	7.5	0.0203	0.0000	OK
15 minute summer	5	10	125.476	0.076	7.5	0.0214	0.0000	OK
15 minute winter	6	11	124.946	0.406	42.6	0.1150	0.0000	SURCHARGED
15 minute winter	13	10	125.151	0.171	43.2	0.0484	0.0000	OK
15 minute winter	14	10	124.993	0.292	58.3	0.2526	0.0000	SURCHARGED
15 minute winter	3	10	125.422	0.097	20.3	0.0274	0.0000	OK
15 minute winter	8	10	125.600	0.200	20.3	0.0566	0.0000	SURCHARGED
120 minute winter	7	116	124.941	0.482	21.5	0.1365	0.0000	SURCHARGED
120 minute winter	9	116	124.941	0.547	20.8	0.1548	0.0000	SURCHARGED
120 minute winter	10	116	124.941	0.731	51.7	103.0618	0.0000	SURCHARGED
120 minute winter	24	116	124.940	1.690	15.9	2.9863	0.0000	SURCHARGED
15 minute summer	15	10	125.458	0.058	5.6	0.0163	0.0000	OK
15 minute winter	16	10	125.374	0.091	11.2	0.0258	0.0000	OK
15 minute summer	18	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	19	10	125.356	0.060	5.6	0.0171	0.0000	OK
15 minute winter	17	10	125.142	0.096	22.4	0.0271	0.0000	OK
15 minute summer	20	1	125.400	0.000	0.0	0.0000	0.0000	OK
120 minute winter	23	116	124.941	0.247	13.2	0.2136	0.0000	SURCHARGED
15 minute summer	21	10	125.098	0.098	20.7	0.0277	0.0000	OK
15 minute winter	22	10	124.982	0.182	43.0	0.1578	0.0000	OK
15 minute summer	11	10	125.388	0.063	9.1	0.0179	0.0000	OK
15 minute summer	12	10	125.220	0.091	18.2	0.0258	0.0000	OK
600 minute summer	25	255	123.226	0.050	6.9	0.0000	0.0000	OK
15 minute winter	4	11	125.045	0.352	39.3	0.0560	0.0000	SURCHARGED

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.70%

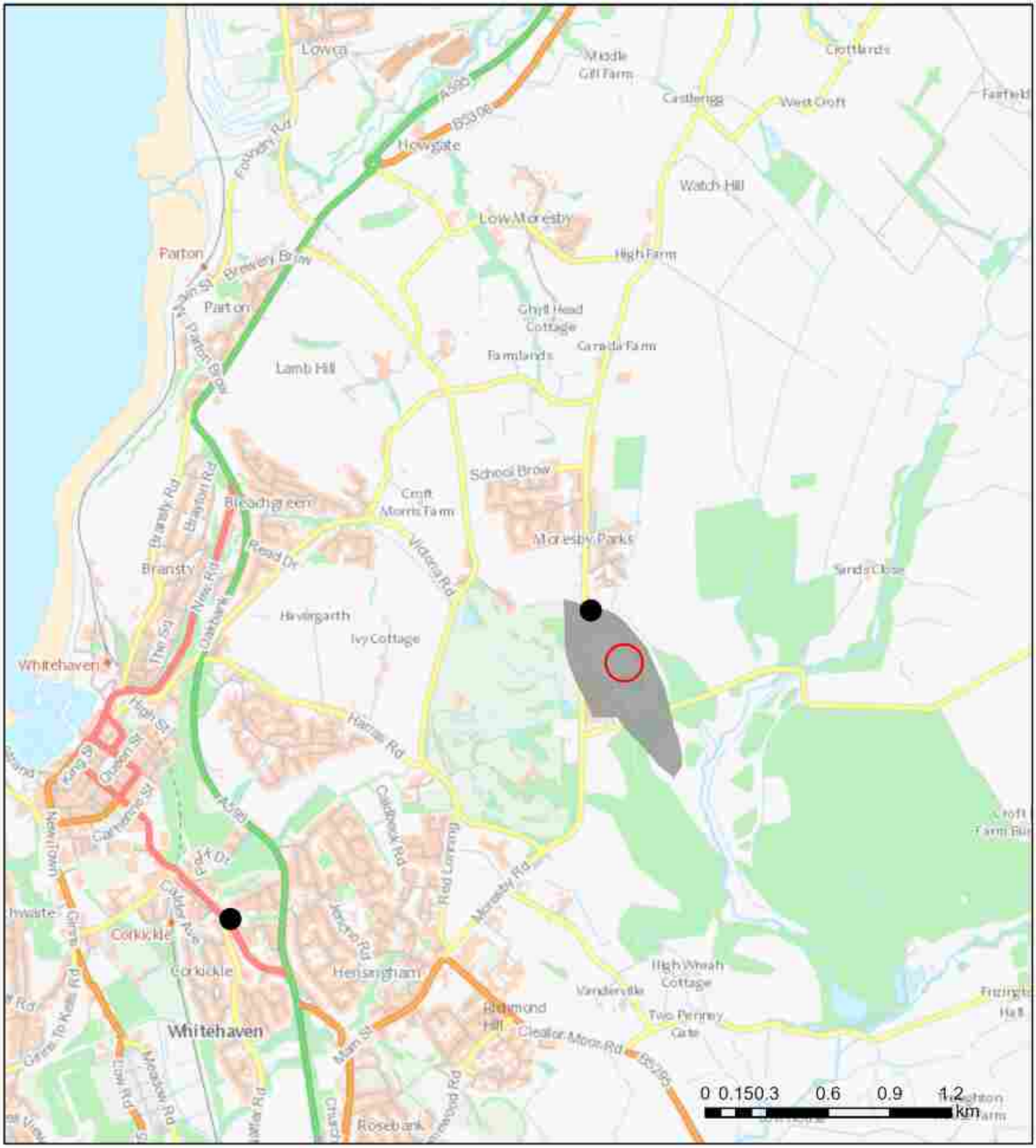
Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	125.727	0.801	51.9	0.2266	0.0000	FLOOD RISK
15 minute winter	2	11	125.791	0.391	11.3	0.1107	0.0000	FLOOD RISK
15 minute winter	26	11	125.744	0.394	11.3	0.1114	0.0000	FLOOD RISK
15 minute winter	5	12	125.588	0.188	11.3	0.0531	0.0000	SURCHARGED
15 minute winter	6	12	125.408	0.867	56.4	0.2455	0.0000	SURCHARGED
15 minute winter	13	11	125.701	0.721	54.8	0.2040	0.0000	FLOOD RISK
180 minute winter	14	172	125.398	0.697	20.8	0.6032	0.0000	SURCHARGED
15 minute winter	3	11	125.827	0.502	30.4	0.1421	0.0000	FLOOD RISK
15 minute winter	8	10	125.931	0.531	30.4	0.1502	0.0000	FLOOD RISK
180 minute winter	7	172	125.398	0.939	22.9	0.2656	0.0000	SURCHARGED
180 minute winter	9	172	125.397	1.003	22.5	0.2839	0.0000	SURCHARGED
180 minute winter	10	176	125.397	1.187	54.5	167.3938	0.0000	SURCHARGED
180 minute winter	24	176	125.396	2.146	9.3	3.7918	0.0000	FLOOD RISK
15 minute winter	15	10	125.472	0.072	8.3	0.0203	0.0000	OK
15 minute winter	16	10	125.407	0.124	16.6	0.0351	0.0000	OK
15 minute summer	18	1	125.400	0.000	0.0	0.0000	0.0000	OK
180 minute winter	19	172	125.397	0.101	1.9	0.0286	0.0000	OK
180 minute winter	17	172	125.397	0.351	7.6	0.0993	0.0000	SURCHARGED
15 minute summer	20	1	125.400	0.000	0.0	0.0000	0.0000	OK
180 minute winter	23	172	125.397	0.703	14.8	0.6085	0.0000	SURCHARGED
180 minute winter	21	172	125.397	0.397	7.1	0.1123	0.0000	SURCHARGED
180 minute winter	22	172	125.397	0.597	14.7	0.5169	0.0000	SURCHARGED
15 minute winter	11	11	125.754	0.429	13.7	0.1213	0.0000	FLOOD RISK
15 minute winter	12	11	125.741	0.612	24.5	0.1732	0.0000	FLOOD RISK
180 minute winter	25	176	123.228	0.053	7.7	0.0000	0.0000	OK
15 minute winter	4	12	125.573	0.880	49.1	0.1399	0.0000	SURCHARGED

APPENDICES

APPENDIX A - BGS GEOLOGICAL RECORDS

Solid Geology

British Geological Survey



Map Key

Bedrock geology 1:50,000 scale

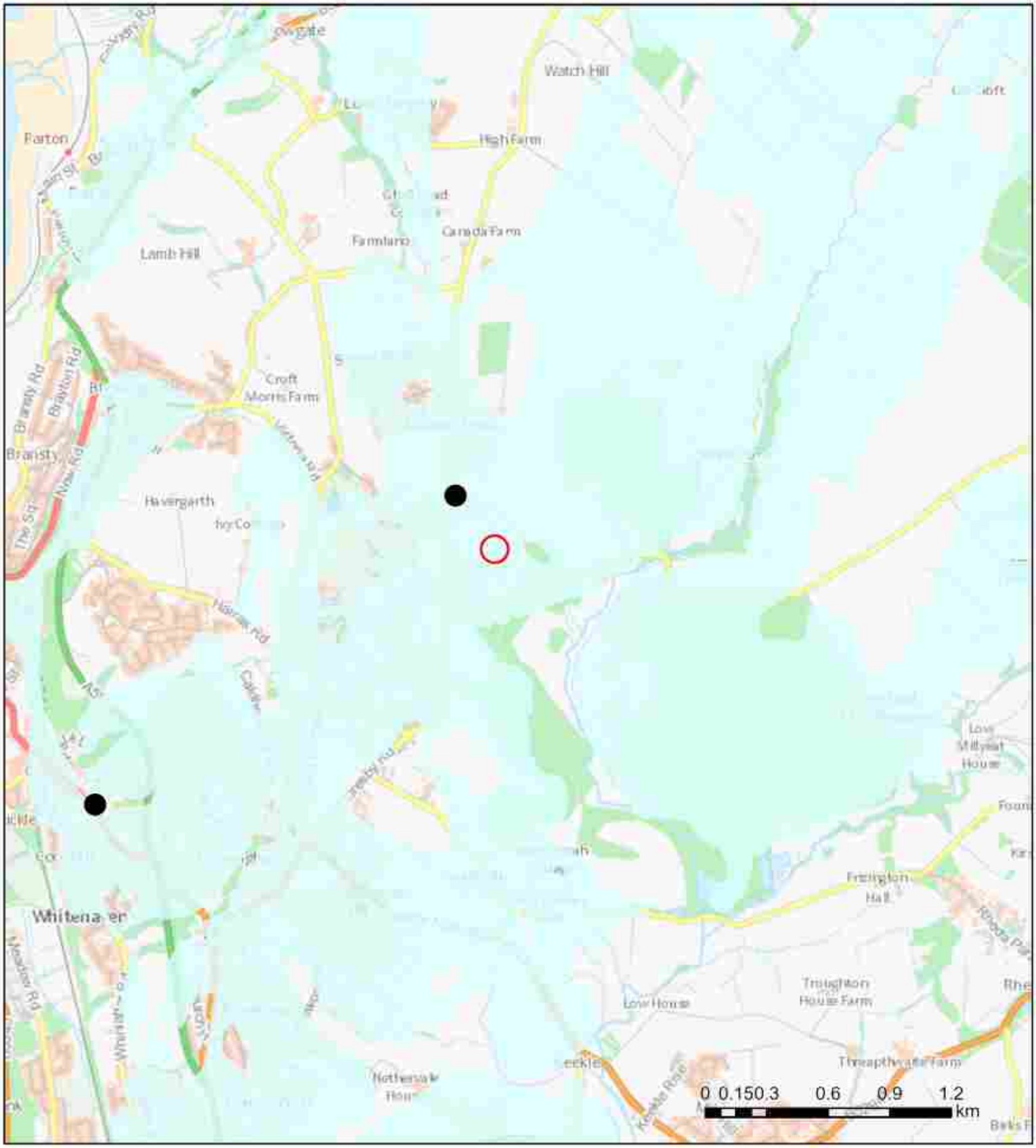
- FIRST SHALE MEMBER - SANDSTONE, SILTSTONE AND MUDSTONE
- PENNINE LOWER COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- FIRST LIMESTONE (CUMBRIA) - LIMESTONE
- SECOND LIMESTONE (CUMBRIA) - LIMESTONE
- FIFTH LIMESTONE (CUMBRIA) - LIMESTONE
- ESKETT LIMESTONE FORMATION - LIMESTONE
- FRIZINGTON LIMESTONE FORMATION - LIMESTONE
- MILLYEAT MEMBER - MUDSTONE, SANDSTONE AND LIMESTONE
- BUTTERMERE FORMATION - MUDSTONE AND SANDSTONE
- PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- STAINMORE FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE
- ST BEES SANDSTONE MEMBER - SANDSTONE
- OREBANK SANDSTONE - SANDSTONE
- ST BEES SHALE FORMATION - SILTSTONE AND MUDSTONE, INTERBEDDED
- PENNINE LOWER COAL MEASURES FORMATION - SANDSTONE
- PENNINE MIDDLE COAL MEASURES FORMATION - SANDSTONE
- WHITEHAVEN SANDSTONE FORMATION - SANDSTONE
- ST BEES EVAPORITE FORMATION - DOLOMITIC LIMESTONE, MUDSTONE AND ANHYDRITE-STONE
- HENSINGHAM GRIT - SANDSTONE
- BROCKRAM - BRECCIA

Selection Results

Bedrock geology 1:50,000 scale

Description	Details
PENNINE MIDDLE COAL MEASURES FORMATION - MUDSTONE, SILTSTONE AND SANDSTONE	More Information

Superficial Deposits



Map Key

Superficial deposits 1:50,000 scale

- GLACIOFLUVIAL DEPOSITS, DEVENSIAN - SAND AND GRAVEL
- GLACIOFLUVIAL ICE CONTACT DEPOSITS, DEVENSIAN - SAND AND GRAVEL
- TILL, DEVENSIAN - DIAMICTON
- ALLUVIUM - CLAY, SILT, SAND AND GRAVEL
- RAISED MARINE DEPOSITS - CLAY AND SILT
- RIVER TERRACE DEPOSITS, 1 - CLAY, SAND AND GRAVEL
- RIVER TERRACE DEPOSITS (UNDIFFERENTIATED) - CLAY, SAND AND GRAVEL
- ALLUVIAL FAN DEPOSITS - SAND AND GRAVEL
- MARINE BEACH DEPOSITS - SAND AND GRAVEL
- PEAT - PEAT
- SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY] - UNKNOWN/UNCLASSIFIED ENTRY

Selection Results

Superficial deposits 1:50,000 scale

Description	Details
TILL, DEVENSIAN - DIAMICTON	More Information

APPENDIX B - DRAWINGS

UNIT No.3
540 sqm

UNIT No.2
504 sqm

UNIT No.1
756 sqm

ENTRANCE NORTH
SEE DWG004

PROTECTION SLAB
BELOW SURFACE FOR
ATTENUATION TANKS

ENTRANCE SOUTH
SEE DWG005

BIN STORE

BIN STORE

BIN STORE

ACCESSIBLE BAYS

ACCESSIBLE BAYS

ACCESSIBLE BAYS

GRASS

JOE MCBAIN AVENUE

TARMAC

38000

KEY

CONCRETE APRON

YARD SURFACE
TO BE AGREED

GRANULAR SURFACE

NEW FOOTPATH

1.8m HIGH
PALISADE FENCE

VEHICLE BOLLARDS

OVERALL SITE PLAN

SCALE 1:200

GENERAL NOTES

1. ALL DIMENSIONS IN MILLIMETERS UNLESS NOTED AND NOT TO BE SCALED FROM DRAWINGS. USE WRITTEN DIMENSIONS ONLY AND CHECK ON SITE BEFORE ORDERING MATERIALS OR STEELWORK.
2. ALL DRAWINGS TO BE READ IN CONJUNCTION WITH DRAWINGS PRODUCED BY OTHERS AND ANY ERRORS TO BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO COMMENCEMENT OR INSTALLATION OF THE WORKS.
3. ALL MATERIALS AND WORKMANSHIP TO BE UNDERTAKEN IN ACCORDANCE WITH BEST PRACTICE AND THE RELEVANT CODES INCLUDING BRITISH STANDARDS AND BUILDING REGULATIONS.
4. THIS WORK MAY BE REQUIRED TO COMPLY WITH THE BUILDING SAFETY ACT 2023. IF WORK REQUIRES MORE THAN ONE CONTRACTOR TO UNDERTAKE THE WORKS, THE CLIENT IS REQUIRED TO APPOINT A PRINCIPAL DESIGNER TO COORDINATE DESIGN WORKS, AND ENSURE THAT ALL DESIGN AND WORKS ARE CONSTRUCTED IN ACCORDANCE WITH THE BUILDING REGULATIONS. IT CANNOT BE ASSUMED THAT KINGMOOR CONSULTING LTD ARE BY DEFAULT THE PRINCIPAL DESIGNER UNLESS APPOINTED SPECIFICALLY FOR THIS ROLE.

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CLIENT

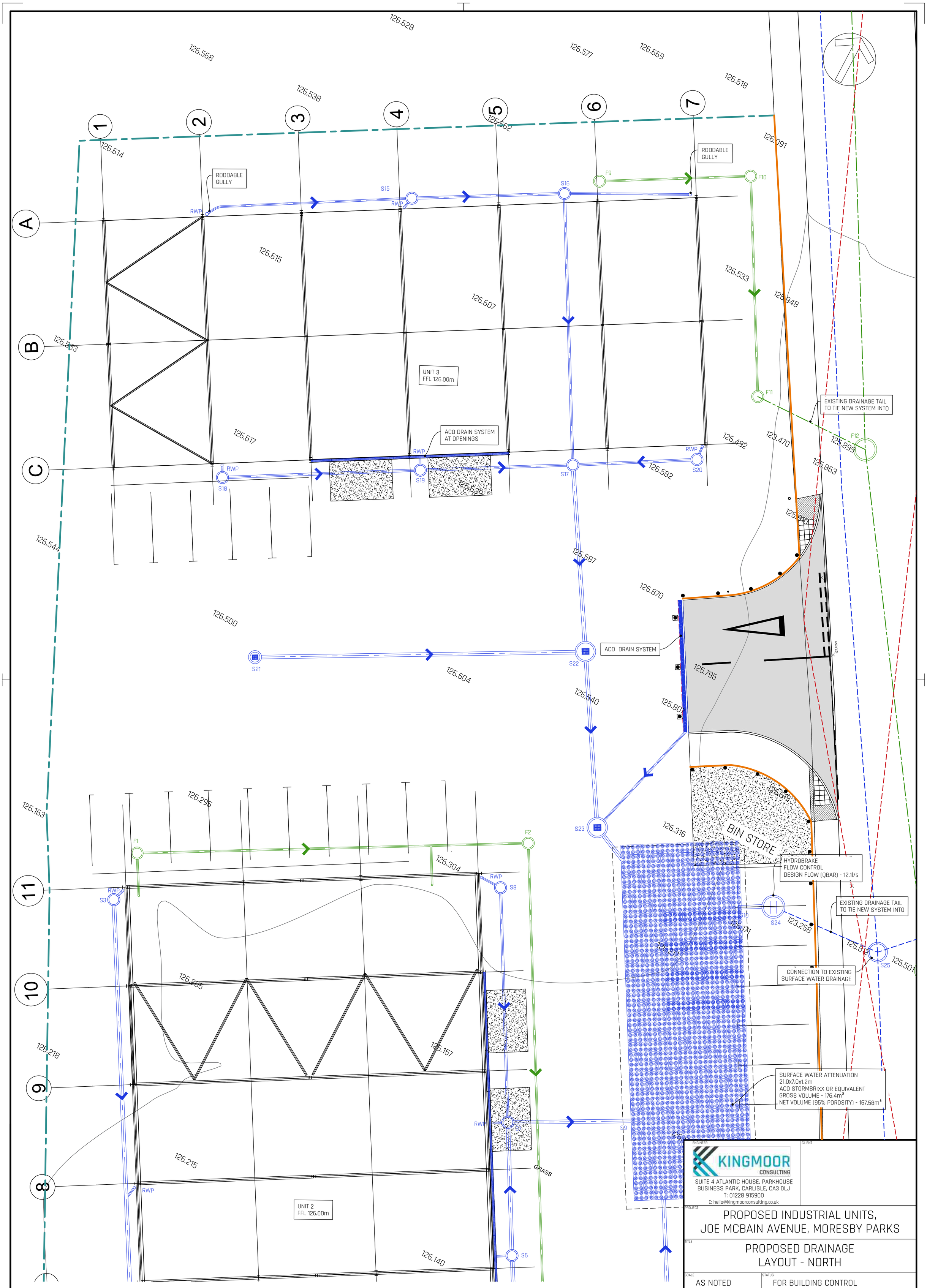
PROJECT
PROPOSED INDUSTRIAL UNITS,
JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
OVERALL SITE PLAN

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE	DRAWN BY	CHECKED AND APPROVED
A1	J GEMMELL	C AIMERS
PROJECT PHASE	DATE	DATE
BUILD	NOVEMBER 2024	NOVEMBER 2024

DRAWING NUMBER 24-471-DWG001

REVISION A



KEY

FOUL WATER

SURFACE WATER

PLAN

SCALE 1:100

ENGINEER
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CLIENT

PROJECT
PROPOSED INDUSTRIAL UNITS,
JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
PROPOSED DRAINAGE
LAYOUT - NORTH

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE: A1	DRAWN BY: J GEMMELL	CHECKED AND APPROVED: C AIMERS
PROJECT PHASE: BUILD	DATE: NOVEMBER 2024	DATE: NOVEMBER 2024
DRAWING NUMBER: 24-471-DWG002		REVISION: A

HYDROBRAKE
FLOW CONTROL
DESIGN FLOW (QBAR) - 12.1l/s

EXISTING DRAINAGE TAIL
TO TIE NEW SYSTEM INTO

CONNECTION TO EXISTING
SURFACE WATER DRAINAGE

SURFACE WATER ATTENUATION
21.0x7.0x1.2m
ACO STORMBRIXX OR EQUIVALENT
GROSS VOLUME - 176.4m³
NET VOLUME (95% POROSITY) - 167.58m³

ACO DRAIN SYSTEM

EXISTING FOUL
NETWORK MANHOLE

EXISTING DRAINAGE TAIL
TO BE EXPOSED AND
VERIFIED

UNIT 2
FFL 126.00m

UNIT 1
FFL 126.00m

GRASS

TARMAC

ANALYSIS

1. NEW SURFACE WATER SYSTEM SERVICING THE PROPOSED DEVELOPMENT HAS BEEN DESIGNED IN ACCORDANCE WITH DEFRA NATIONAL STANDARDS FOR SUSTAINABLE DRAINAGE SYSTEMS. RESTRICTING THE PEAK FLOW HAS BEEN ADOPTED.
2. IT IS PROPOSED TO LIMIT THE FLOW FROM THE SITE VIA A CONTROL DEVICE PRIOR TO ENTRY INTO THE PUBLIC SYSTEM. THE FLOW LIMIT ON THE DEVICE WILL BE SET AT QBAR
3. THE CALCULATED FLOWS FROM THE SITE HAVE BEEN CALCULATED IN CAUSEWAY FLOW AND THE FOLLOWING FLOW RATES ARE PRESENTED FROM THIS ANALYSIS :

   QBAR = 12.1 l/s

* THIS INCLUDES AN ALLOWANCE OF 50% FOR CLIMATE CHANGE.

KEY

FOUL WATER

SURFACE WATER

PLAN
SCALE 1:100

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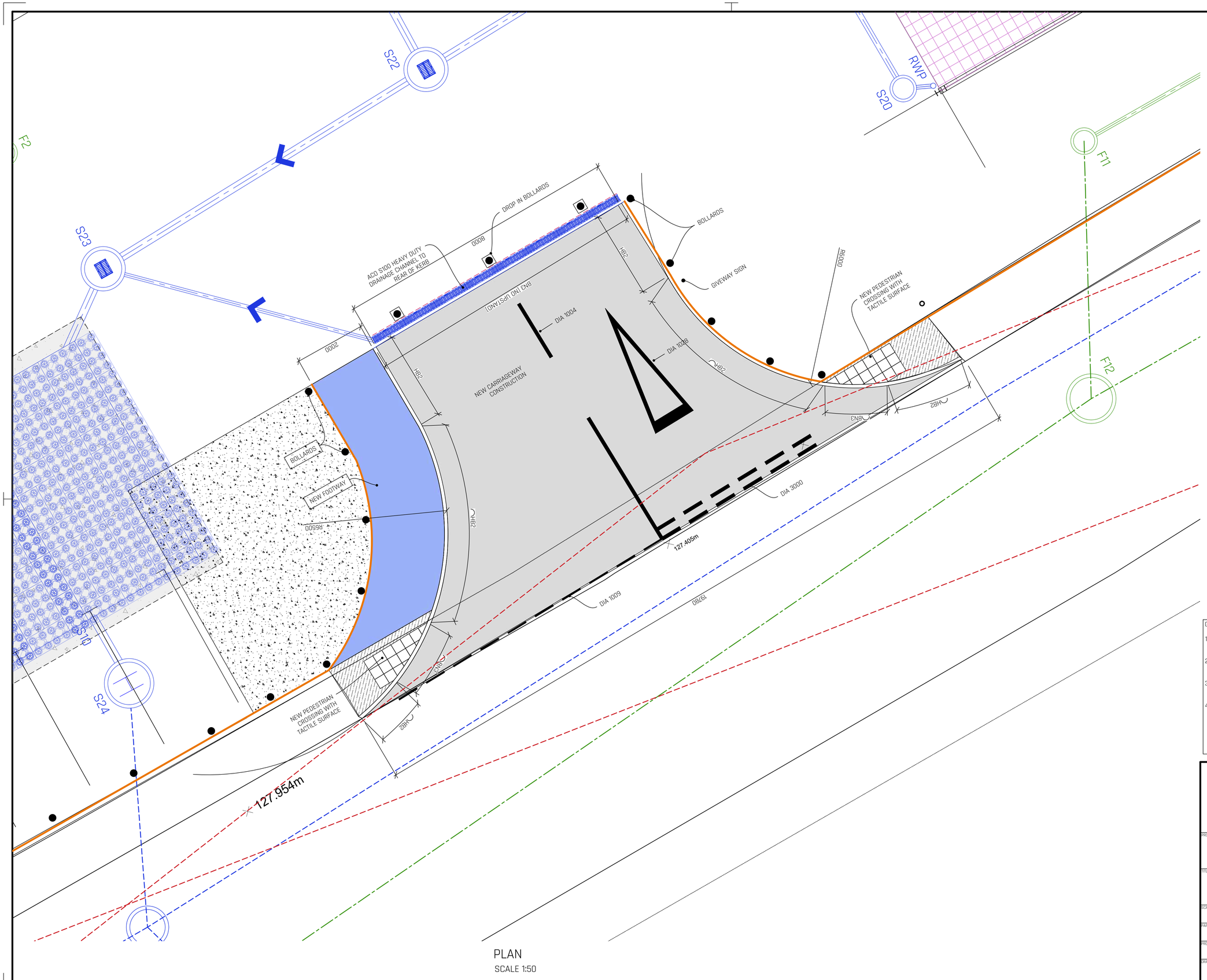
CLIENT

PROJECT
PROPOSED INDUSTRIAL UNITS,
JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
PROPOSED DRAINAGE
LAYOUT - SOUTH

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE	DRAWN BY	CHECKED AND APPROVED
A1	J GEMMELL	C AIMERS
PROJECT PHASE	DATE	DATE
BUILD	NOVEMBER 2024	NOVEMBER 2024
DRAWING NUMBER		REVISION
24-471-DWG003		A



PLAN

SCALE 1:50

KERB NOTES

HB 2 - HALF BATTER KERB

BN 3 - BULL NOSE KERB

EDGE - PIN KERB EDGE

GENERAL NOTES

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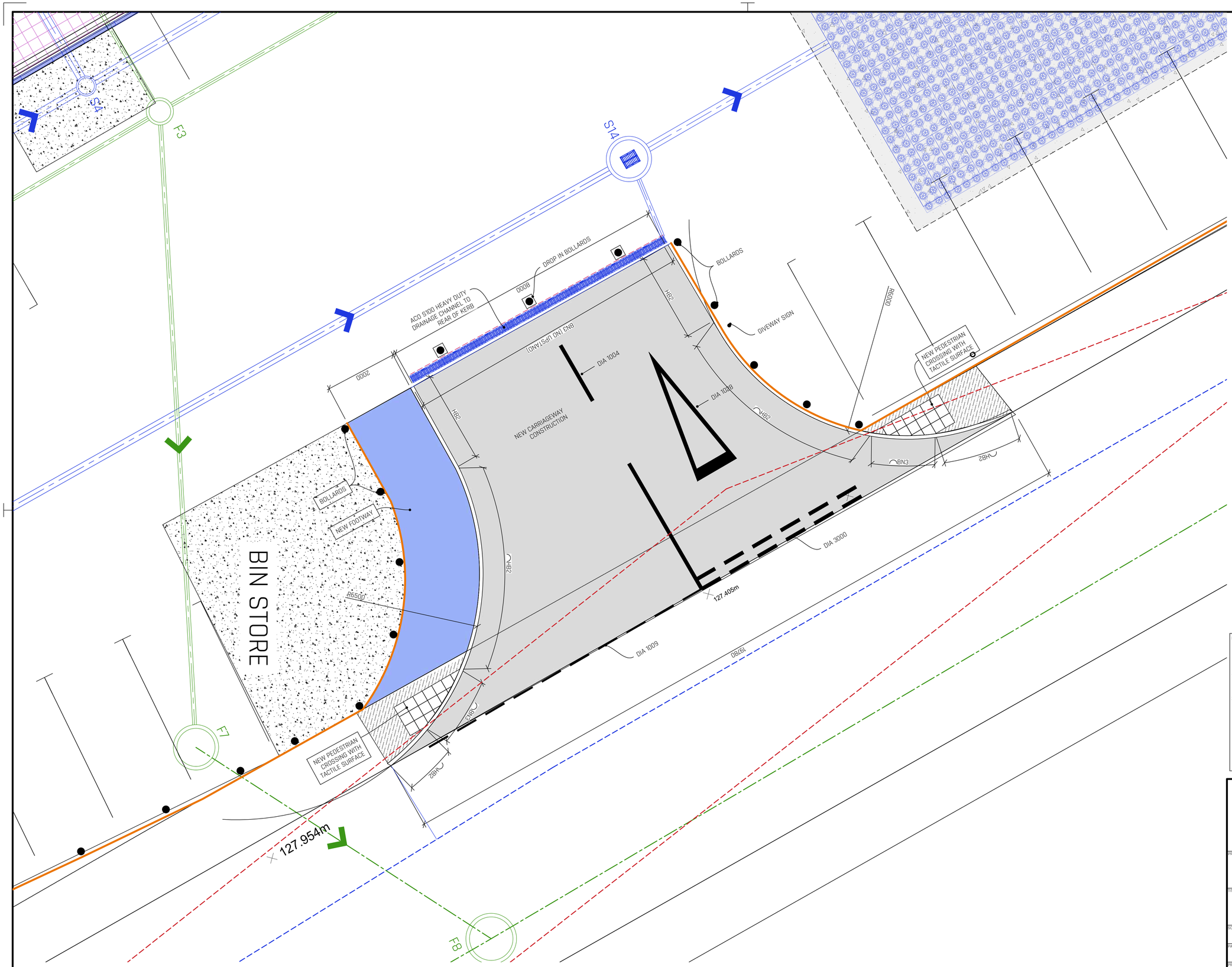
CLIENT

PROJECT
PROPOSED INDUSTRIAL UNITS,
JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
HIGHWAY WORKS
ENTRANCE - NORTH

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE	DRAWN BY	CHECKED AND APPROVED
A1	J GEMMELL	C AIMERS
PROJECT PHASE	DATE	DATE
BUILD	NOVEMBER 2024	NOVEMBER 2024
DRAWING NUMBER		REVISION
24-471-DWG004		A



PLAN

SCALE 1:50

KERB NOTES

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BN 3 - BULL NOSE KERB

EDGE - PIN KERB EDGE

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CLIENT

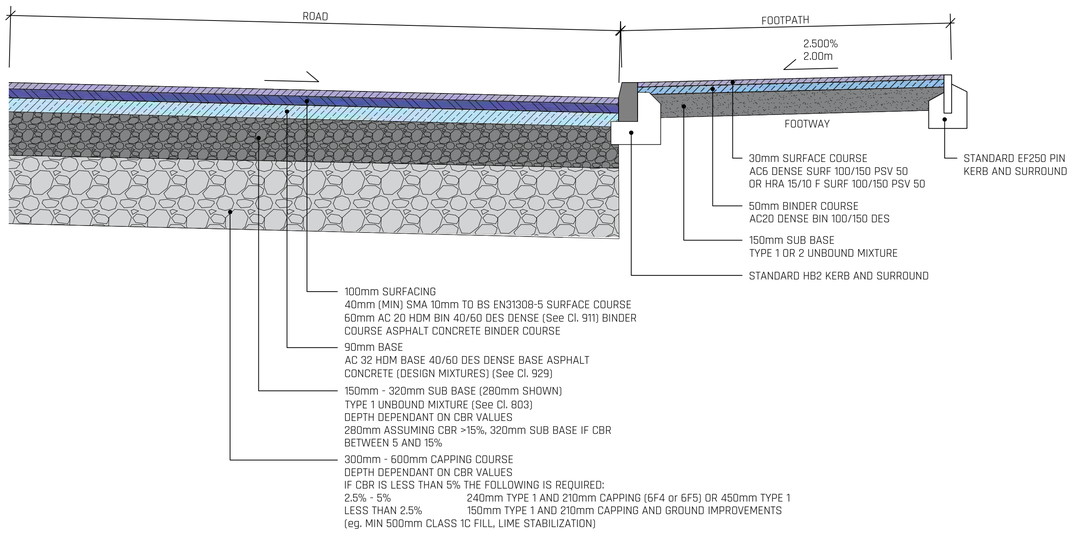
PROJECT
PROPOSED INDUSTRIAL UNITS,
JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
HIGHWAY WORKS
ENTRANCE - SOUTH

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE	DRAWN BY	CHECKED AND APPROVED
A1	J GEMMELL	C AIMERS
PROJECT PHASE	DATE	DATE
BUILD	NOVEMBER 2024	NOVEMBER 2024

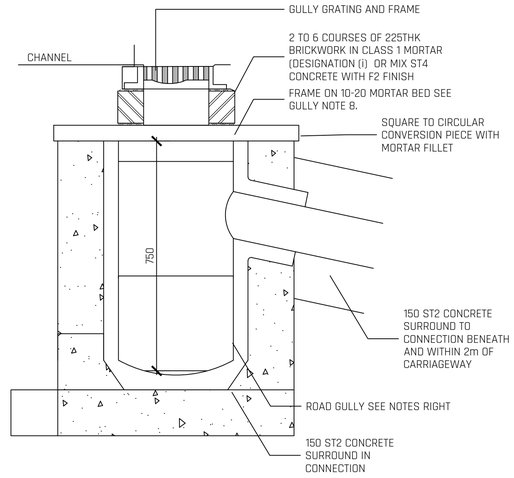
DRAWING NUMBER
24-471-DWG005

REVISION
A



CARRIAGEWAY AND FOOTPATH CONSTRUCTION

SCALE 1:20

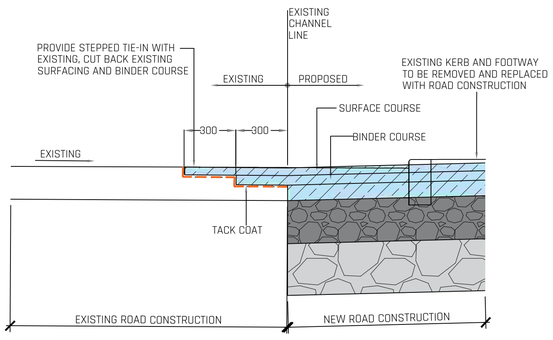


GULLY NOTES:

1. PRECAST CONCRETE GULLIES SHALL BE UNREINFORCED AND COMPLY WITH BS 5911-3 AND BS EN 1917.
2. VITRIFIED CLAY GULLIES SHALL COMPLY WITH THER REQUIREMENTS OF BS EN 295-6 FOR ROUND STREET GULLIES.
3. PLASTIC AND HIGH DENSITY POLYETHELENE GULLIES SHALL BE OBTAINED FROM AN APPROVED MANUFACTURER AS APPROVED BY THE ENGINEER.
4. GRATINGS AND FRAMES SHALL COMPLY WITH BS EN124 AND BE D400 LOAD CLASS (ANTI-VANDAL)
5. WHERE GULLIES ARE USED IN CONJUNCTION WITH A255 OR 305 KERB THE GULLY POT OPENING SHOULD BE POSITIONED 70mm FROM THE KERB FACE AND THE GRATING SUPPORT WALL AT THIS FACE CONSTRUCTED IN BRICK ON EDGE IN LIEU OF 225 BRICKWORK.
6. OVERBREAK AROUND CONC. SURROUND AND BRICKWORK TO BE BACKFILLED WITH ST2 MIX CONCRETE TO UNDERSIDE OF BINDER COURSE. A MIN. DEPTH OF 100mm OF BITUMENOUS SURFACE MUST BE PROVIDED OVER CONCRETE/BRICKWORK.
7. CONCRETE AROUND GULLIES TO REACH MIN STRENGTH OF 20N/mm BEFORE BEING EXPOSED TO TRAFFIC.
8. FRAME IS TO BE SET TO LEVELS BEFORE LAYING OF SURFACE COURSE. GULLY GRATING AND FRAME TO BE SET 6mm BELOW CHANNEL LEVEL. BEDDING MORTAR FOR GRATING AND FRAMES SHALL BE RESIN BASED PROPRIETARY MORTAR COMPLYING WITH CLAUSE 570R.

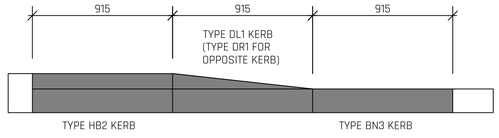
ADOPTABLE GULLY DETAILS

SCALE 1:10



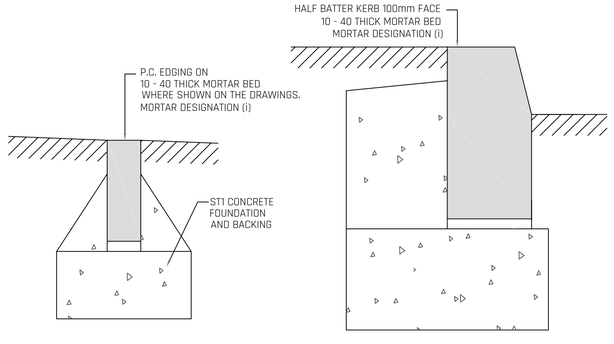
HIGHWAY TIE IN DETAILS

SCALE 1:10



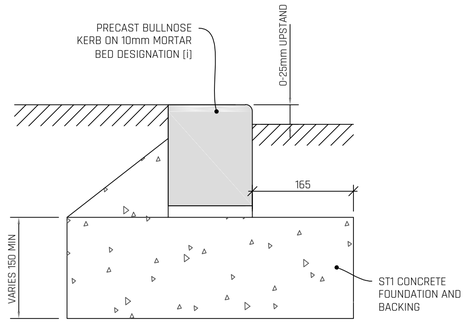
KERB TRANSITION DETAIL

SCALE 1:20



EF 250 KERB

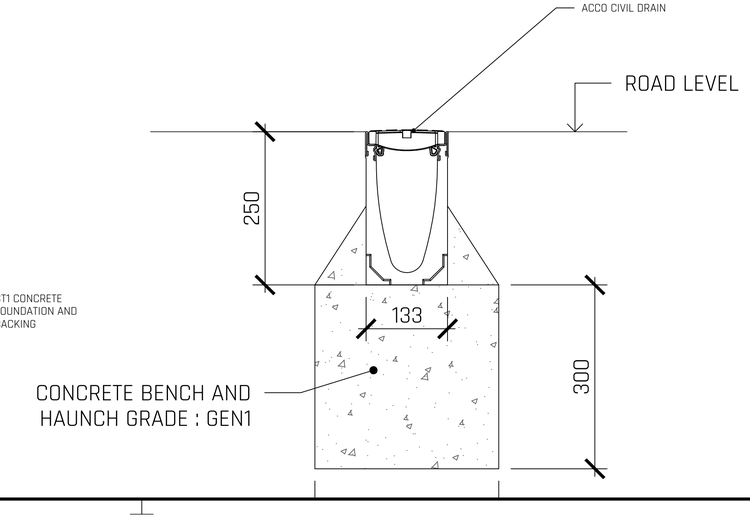
HB 2 TYPE



BN 3 TYPE

KERB DETAILS

SCALE 1:5



CONCRETE BENCH AND
HAUNCH GRADE : GEN1

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CLIENT

PROJECT
PROPOSED INDUSTRIAL UNITS,
JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
HIGHWAY WORKS
SHEET 2

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE	DRAWN BY	CHECKED AND APPROVED
A1	J GEMMELL	C AIMERS
PROJECT PHASE	DATE	DATE
BUILD	NOVEMBER 2024	NOVEMBER 2024

DRAWING NUMBER
24-471-DWG006

REVISION
A

Manhole Number / Coordinates	Cover Level / Depth To Soffit	Connections	Pipe: Code	Pipe: Inverts	Pipe: Diams	Manhole Size	Types: Manhole	Types: Cover
F1 E. 299967.440 N. 518691.422	126.000 0.900		0 0	1.000 125.000	100 100	600	4	Unspec
F2 E. 299988.155 N. 518703.044	126.000 1.296		1 0	1.000 1.001	124.504 124.504	100 100	600	4	Unspec
F3 E. 300007.408 N. 518669.375	126.000 1.942		1 2 3 0	1.001 3.000 2.001 1.002	123.958 124.614 124.203 123.958	100 100 100 100	600	4	Unspec
F4 E. 299987.529 N. 518657.446	126.000 0.900		0	3.000	125.000	100	450	4	Unspec
F5 E. 300000.305 N. 518636.161	126.000 0.900		0	2.000	125.000	100	600	4	Unspec
F6 E. 300020.037 N. 518648.047	126.000 1.284		1 0	2.000 2.001	124.616 124.616	100 100	600	4	Unspec
F7 E. 300024.958 N. 518670.271	125.800 2.300		1 0	1.002 1.003	123.665 123.400	100 100	1050	3	Unspec
F8 E. 300030.236 N. 518678.423	125.400 2.062		1	1.003	123.238	100	1200	3	Unspec
F9 E. 299973.438 N. 518740.318	126.000 0.900		0	4.000	125.000	100	600	Unknown	Unspec
F10 E. 299981.809 N. 518744.997	126.000 1.060		1 0	4.000 4.001	124.840 124.840	100 100	600	Unknown	Unspec
F11 E. 299988.278 N. 518733.638	126.000 2.300		1 0	4.001 4.002	124.622 123.600	100 100	600	Unknown	Unspec
F12 E. 299995.086 N. 518733.727	125.899 2.312		1	4.002	123.487	100	1200	Unknown	Unspec

FOUL Network 1

Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Length	Upstream Manhole: Number	Upstream Manhole: Invert	Upstream Manhole: Cover	Downstream Manhole: Number	Downstream Manhole: Invert	Downstream Manhole: Cover
1.000	100	60	23.753	F1	125.00	126.00	F2	124.60	126.00
1.001	100	60	38.785	F2	124.60	126.00	F3	123.96	126.00
1.002	100	60	17.573	F3	123.96	126.00	F7	123.66	125.80
1.003	100	60	9.711	F7	123.40	125.80	F8	123.24	125.40
2.000	100	60	23.035	F5	125.00	126.00	F6	124.62	126.00
2.001	100	60	24.787	F6	124.62	126.00	F3	124.20	126.00
3.000	100	60	23.184	F4	125.00	126.00	F3	124.61	126.00
4.000	100	60	9.590	F9	125.00	126.00	F10	124.84	126.00
4.001	100	60	13.072	F10	124.84	126.00	F11	124.62	126.00
4.002	100	60	6.809	F11	123.60	126.00	F12	123.49	125.90

STORM Network 1

Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Length	Upstream Manhole: Number	Upstream Manhole: Invert	Upstream Manhole: Cover	Downstream Manhole: Number	Downstream Manhole: Invert	Downstream Manhole: Cover
1.000	225	100	39.902	S3	125.32	126.00	S1	124.93	126.00
1.001	225	100	23.295	S1	124.93	126.00	S4	124.69	126.00
1.002	225	100	15.307	S4	124.69	126.00	S6	124.54	126.00
1.003	225	100	8.096	S6	124.54	126.00	S7	124.45	126.00
1.004	225	100	6.549	S7	124.46	126.00	S9	124.39	125.90
1.005	225	100	10.929	S9	124.39	125.90	S10	124.28	125.85
1.006	300	100	5.632	S10	124.21	125.85	S24	124.15	125.50
2.000	150	100	22.786	S2	125.40	126.00	S1	125.17	126.00
3.000	150	100	4.270	S5	125.40	126.00	S4	125.36	126.00
4.000	150	100	16.397	S8	125.40	126.00	S7	125.24	126.00
5.000	225	100	19.587	S11	125.32	126.00	S12	125.13	126.00
5.001	225	100	14.850	S12	125.13	126.00	S13	124.98	126.00
5.002	225	100	27.884	S13	124.98	126.00	S14	124.70	126.00
5.003	225	100	26.204	S14	124.70	126.00	S10	124.44	125.85
6.000	150	100	11.808	S26	125.35	126.00	S13	125.23	126.00
7.000	150	100	11.677	S15	125.40	126.00	S16	125.28	126.00
7.001	150	100	16.238	S16	125.28	126.00	S17	125.12	126.00
7.002	225	60	11.614	S17	125.05	126.00	S22	124.85	125.75
7.003	225	100	10.612	S22	124.80	125.75	S23	124.69	125.90
7.004	225	100	10.539	S23	124.69	125.90	S10	124.59	125.85
8.000	150	100	10.419	S18	125.40	126.00	S19	125.30	126.00
8.001	150	100	11.955	S19	125.30	126.00	S17	125.18	126.00
9.000	150	100	9.580	S20	125.40	126.00	S17	125.30	126.00
10.000	225	100	20.017	S21	125.00	125.75	S22	124.80	125.75

DRAINAGE NOTES

1) This drawing is to be read in conjunction with all relevant Architects drawings and drawings by Kingmoor Consulting Ltd.
2) All private drainage construction is to be in accordance with the manufacturers recommendations and Approved Document H from the Building Regulations 2000.
3) Invert levels shown on all incoming and outgoing pipes for manholes/inspection chambers indicate the invert levels at the intersection of the pipes within the manhole.
4) CONCRETE BENCHING AND PIPE SURROUND
   Concrete shall be placed in a single continuous operation from top of base slab to top of benching and pipe surround.
5) CONNECTION INTO MANHOLES
   Connections into manholes shall be constructed with the soffits at the same level unless detailed differently on the contract drawings.
6) METALWORK
   Ladders, handrailing and safety chains shall be constructed as shown on UU Standard Detail STND/01/002.
   All components to be fabricated in Stainless steel grade X6 Cr Ni Mo Ti 17-12-2 to BS EN 10088-1. Refer to UU Standard Detail STND/01/002 for details.
7) CONCRETE SURROUND TO MANHOLES
   A concrete surround is not normally required to manholes unless installed in areas of unstable ground, under conditions of flotation or where subjected to exceptional or eccentric loads. In which cases a 150mm surround of at least 20N/mm² (GEN3) concrete shall be provided. Any joints should be staggered with pre-cast concrete joints.
8) MANHOLE ACCESSES
   For manhole access options and details refer to UU Standard Detail STND/01/013.
   Double steps shall be plastic encapsulated carbon steel to BS EN 1247-2 manhole steps.
   Double steps shall not be used where cover-to-soffit dimension is >3.0m.
9) COVER AND FRAME
   150mm deep covers are to be used in Category 1, 2 & 3 Roads.
   100mm deep covers are to be used in Category 4 Roads.
   Double triangular covers are to be used in carriageway.
   Road category to be designated by the Highway Authority.
   Frame to be set as per manufacturers specification.
   Manhole cover and frame to be in accordance with BS EN 124 Class D400, class M1 mortar bed and haunch, with minimum clear opening of 600x600 unless noted otherwise.
10) ROCKER PIPES
    Start of rocker pipe to be as close to face of manhole as possible and not greater than 750mm. Rocker pipes to be used until the pipe outside diameter exceeds the effective length of the rocker pipe.
    Rocker pipe effective length shall be as follows:
    600mm for pipes up to 600mm ø
11) BENCHING WIDTH
    Minimum benching widths shall be as follows:
    For depth to soffit < 1.5m
    225mm min for all pipe sizes
    For depth to soffit ≥ 1.5m
    600mm min for 150mm ø to 375m ø pipes
12) CHANNEL FITTINGS
    Proprietary channel fittings are to be used up to and including 300mm ø pipes, above which granolithic in-situ channels can be used. Incoming and outgoing 'Y' junctions, square junctions and 90° bends are not acceptable especially on foul systems, to be replaced by 'Y' junctions, oblique junctions and 2 No. 45° bends respectively.

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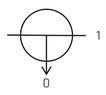
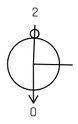
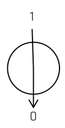
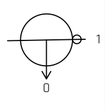
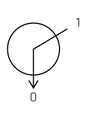
CLIENT

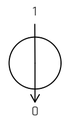
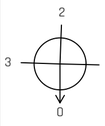
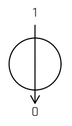
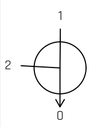
PROJECT
PROPOSED INDUSTRIAL UNITS, JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
MANHOLE AND PIPE SCHEDULES

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE	DRAWN BY	CHECKED AND APPROVED
A1	J GEMMELL	C AIMERS
PROJECT PHASE	DATE	DATE
BUILD	NOVEMBER 2024	NOVEMBER 2024

DRAWING NUMBER: 24-471-DWG007
REVISION: A

Manhole Number	Cover Level	Connections	Pipe			Manhole Size	Types	
Coordinates	Depth To Soffit		Code	Inverts	Diams		Manhole	Cover
S1	126.000		1 1.000 2 2.000 0 1.001	124.926 125.172 124.926	225 150 225	600	4	Unspec
E. 299986.610 N. 518655.462	0.849							
S2	126.000		0 2.000	125.400	150	600	4	Unspec
E. 299997.973 N. 518635.711	0.450							
S3	126.000		0 1.000	125.325	225	600	4	Unspec
E. 299966.532 N. 518689.945	0.450							
S4	126.000		1 1.001 2 3.000 0 1.002	124.693 125.357 124.693	225 150 225	450	4	Unspec
E. 300006.709 N. 518667.239	1.082							
S5	126.000		0 3.000	125.400	150	600	4	Unspec
E. 300008.792 N. 518663.511	0.450							
S6	126.000		1 1.002 0 1.003	124.540 124.540	225 225	600	4	Unspec
E. 299998.732 N. 518680.303	1.235							
S7	126.000		1 4.000 2 1.003 0 1.004	125.236 124.459 124.459	150 225 225	600	4	Unspec
E. 299994.732 N. 518687.342	1.316							
S8	126.000		0 4.000	125.400	150	600	4	Unspec
E. 299986.630 N. 518701.597	0.450							
S9	125.900		1 1.004 0 1.005	124.394 124.394	225 225	600	4	Unspec
E. 300000.487 N. 518690.468	1.281							
S10	125.850		1 7.004 2 1.005 3 5.003 0 1.006	124.589 124.285 124.439 124.210	225 225 225 300	1350	4	Unspec
E. 300000.919 N. 518701.388	1.340							
S11	126.000		0 5.000	125.325	225	600	4	Unspec
E. 300006.061 N. 518630.405	0.450							
S12	126.000		1 5.000 0 5.001	125.129 125.129	225 225	600	4	Unspec
E. 300022.919 N. 518640.378	0.646							
S13	126.000		1 6.000 2 5.001 0 5.002	125.232 124.980 124.980	150 225 225	600	4	Unspec
E. 300027.746 N. 518654.422	0.795							

Manhole Number	Cover Level	Connections	Pipe			Manhole Size	Types	
Coordinates	Depth To Soffit		Code	Inverts	Diams		Manhole	Cover
S14	126.000		1 5.002 0 5.003	124.701 124.701	225 225	1050	4	Unspec
E. 300013.859 N. 518678.602	1.074							
S15	126.000		0 7.000	125.400	150	600	4	Unspec
E. 299961.529 N. 518733.181	0.450							
S16	126.000		1 7.000 0 7.001	125.283 125.283	150 150	600	4	Unspec
E. 299971.683 N. 518738.948	0.567							
S17	126.000		1 9.000 2 7.001 3 8.001 0 7.002	125.304 125.121 125.176 125.046	150 150 150 225	600	4	Unspec
E. 299979.702 N. 518724.828	0.729							
S18	126.000		0 8.000	125.400	150	600	4	Unspec
E. 299960.303 N. 518713.678	0.450							
S19	126.000		1 8.000 0 8.001	125.296 125.296	150 150	600	4	Unspec
E. 299969.326 N. 518718.887	0.554							
S20	126.000		0 9.000	125.400	150	600	4	Unspec
E. 299987.971 N. 518729.665	0.450							
S21	125.750		0 10.000	125.000	225	600	4	Unspec
E. 299968.218 N. 518705.364	0.525							
S22	125.750		1 7.002 2 10.000 0 7.003	124.852 124.800 124.800	225 225 225	1050	4	Unspec
E. 299985.795 N. 518714.941	0.725							
S23	125.900		1 7.003 0 7.004	124.694 124.694	225 225	1050	4	Unspec
E. 299991.412 N. 518705.937	0.981							
S24	125.500		1 1.006 0 1.007	124.154 123.250	300 300	1500	4	Unspec
E. 300003.119 N. 518706.572	1.950							
S25	125.500		1 1.007	123.175	300	1200	3	Unspec
E. 300010.622 N. 518705.984	2.025							
S26	126.000		0 6.000	125.350	150	600	4	Unspec
E. 300018.131 N. 518647.568	0.500							

GENERAL NOTES

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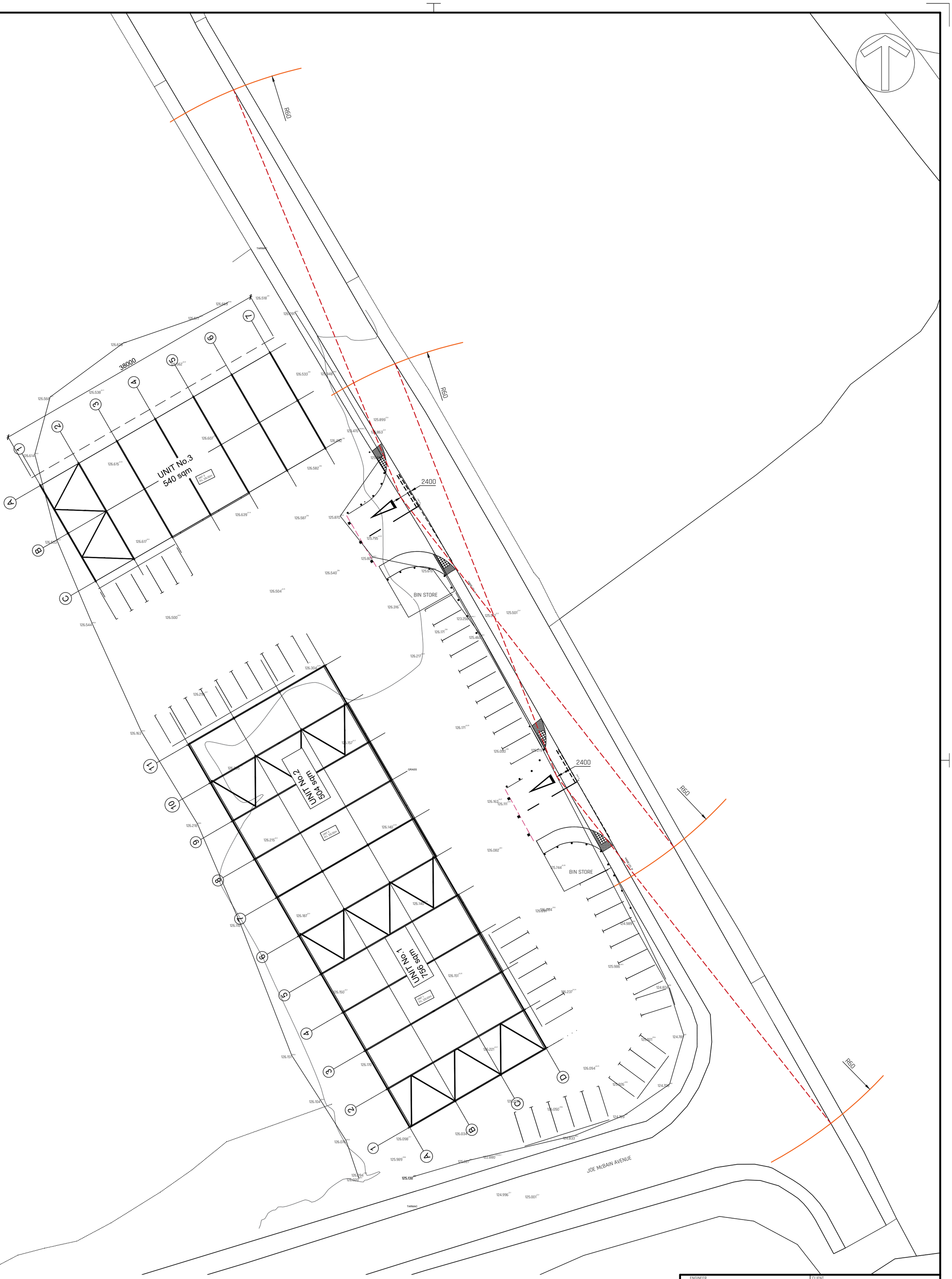
CLIENT

PROJECT
PROPOSED INDUSTRIAL UNITS, JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
MANHOLE AND PIPE SCHEDULES

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE: A1	DRAWN BY: J GEMMELL	CHECKED AND APPROVED: C AIMERS
PROJECT PHASE: BUILD	DATE: NOVEMBER 2024	DATE: NOVEMBER 2024
DRAWING NUMBER: 24-471-DWG008		REVISION: A



VISIBILITY SPLAYS

SCALE 1:250

GENERAL NOTES

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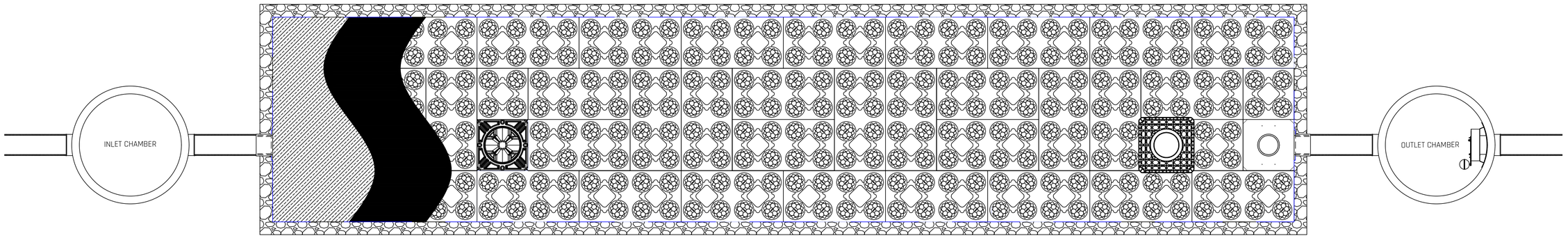
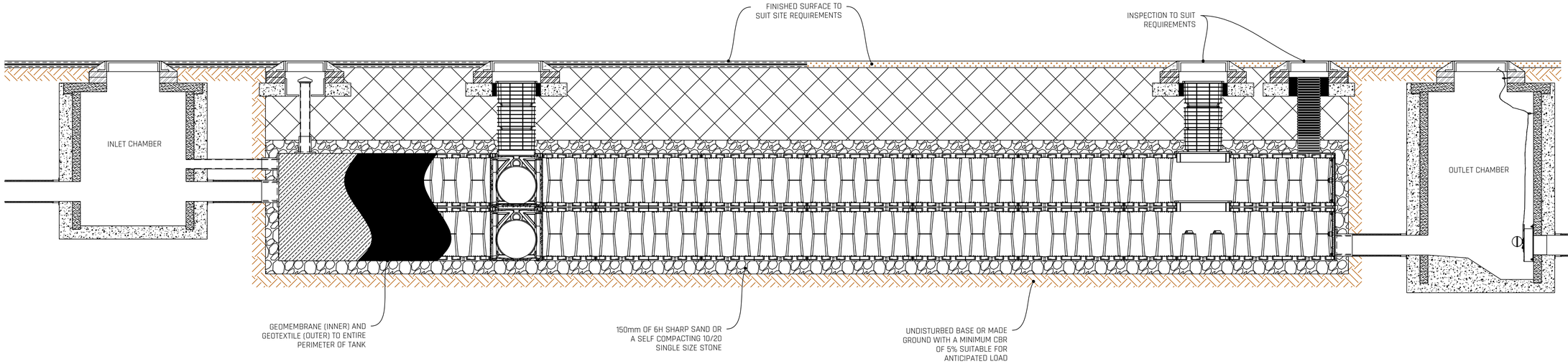
CLIENT

PROJECT
PROPOSED INDUSTRIAL UNITS, JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
VISABILITY SPLAYS

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE	DRAWN BY	CHECKED AND APPROVED
A1	J GEMMELL	C AIMERS
PROJECT PHASE	DATE	DATE
BUILD	NOVEMBER 2024	NOVEMBER 2024
DRAWING NUMBER		REVISION
24-471-DWG009		A





ACO STORMBRIXX HD 2 LAYER ATTENUATION TANK

SCALE 1:25

GENERAL NOTES

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CLIENT

PROJECT
PROPOSED INDUSTRIAL UNITS, JOE MCBAIN AVENUE, MORESBY PARKS

TITLE
DRAINAGE DETAIL

SCALE	STATUS	
AS NOTED	FOR BUILDING CONTROL	
PAPER SIZE	DRAWN BY	CHECKED AND APPROVED
A1	J GEMMELL	C AIMERS
PROJECT PHASE	DATE	DATE
BUILD	NOVEMBER 2024	NOVEMBER 2024

DRAWING NUMBER 24-471-DWG010

REVISION A

APPENDIX C - UK SUDS INFORMATION

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Josh Gemmell
Site name:	Proposed Industrial Units
Site location:	Moresby Parks

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	54.55330° N
Longitude:	3.54799° W
Reference:	1821571082
Date:	Nov 12 2024 14:06

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	0.82

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	1183	1183
Hydrological region:	10	10
Growth curve factor 1 year:	0.87	0.87
Growth curve factor 30 years:	1.7	1.7
Growth curve factor 100 years:	2.08	2.08
Growth curve factor 200 years:	2.37	2.37

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	7.31	7.31
1 in 1 year (l/s):	6.36	6.36
1 in 30 years (l/s):	12.43	12.43
1 in 100 year (l/s):	15.21	15.21
1 in 200 years (l/s):	17.34	17.34

APPENDIX D - CALCULATIONS

Design Settings

Frequency of use (kDU)	1.00	Additional Flow (%)	0	Preferred Cover Depth (m)	0.900
Flow per dwelling per day (l/day)	1500	Minimum Velocity (m/s)	1.00	Include Intermediate Ground	✓
Domestic Flow (l/s/ha)	0.0	Connection Type	Level Soffits		
Industrial Flow (l/s/ha)	0.0	Minimum Backdrop Height (m)	0.200		

Nodes

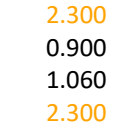
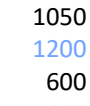
Name	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	126.000	600	299967.440	518691.422	1.000
2	126.000	600	299988.155	518703.044	1.396
3	126.000	600	300007.408	518669.375	2.042
4	126.000	450	299987.529	518657.446	1.000
5	126.000	600	300000.305	518636.161	1.000
6	126.000	600	300020.037	518648.047	1.384
7	125.800	1050	300024.958	518670.271	2.400
8	125.400	1200	300030.236	518678.423	2.162
9	126.000	600	299973.438	518740.318	1.000
10	126.000	600	299981.809	518744.997	1.160
11	126.000	600	299988.278	518733.638	2.400
12	125.899	1200	299995.086	518733.727	2.412

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	23.753	60.0	100	Circular	126.000	125.000	0.900	126.000	124.604	1.296
1.001	38.785	60.0	100	Circular	126.000	124.604	1.296	126.000	123.958	1.942
3.000	23.184	60.0	100	Circular	126.000	125.000	0.900	126.000	124.614	1.286
2.000	23.035	60.0	100	Circular	126.000	125.000	0.900	126.000	124.616	1.284
2.001	24.787	60.0	100	Circular	126.000	124.616	1.284	126.000	124.203	1.697
1.002	17.573	60.0	100	Circular	126.000	123.958	1.942	125.800	123.665	2.035
1.003	9.711	60.0	100	Circular	125.800	123.400	2.300	125.400	123.238	2.062
4.000	9.590	60.0	100	Circular	126.000	125.000	0.900	126.000	124.840	1.060
4.001	13.072	60.0	100	Circular	126.000	124.840	1.060	126.000	124.622	1.278
4.002	6.809	60.0	100	Circular	126.000	123.600	2.300	125.899	123.487	2.312

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	600	Manhole	Adoptable	2	600	Manhole	Adoptable
1.001	2	600	Manhole	Adoptable	3	600	Manhole	Adoptable
3.000	4	450	Manhole	Adoptable	3	600	Manhole	Adoptable
2.000	5	600	Manhole	Adoptable	6	600	Manhole	Adoptable
2.001	6	600	Manhole	Adoptable	3	600	Manhole	Adoptable
1.002	3	600	Manhole	Adoptable	7	1050	Manhole	Adoptable
1.003	7	1050	Manhole	Adoptable	8	1200	Manhole	Adoptable
4.000	9	600	Manhole	Adoptable	10	600	Manhole	Adoptable
4.001	10	600	Manhole	Adoptable	11	600	Manhole	Adoptable
4.002	11	600	Manhole	Adoptable	12	1200	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	299967.440	518691.422	126.000	1.000	600	 0	1.000	125.000	100
2	299988.155	518703.044	126.000	1.396	600	 1 0	1.000 1.001	124.604 124.604	100 100
3	300007.408	518669.375	126.000	2.042	600	 1 2 3 0	3.000 2.001 1.001 1.002	124.614 124.203 123.958 123.958	100 100 100 100
4	299987.529	518657.446	126.000	1.000	450	 0	3.000	125.000	100
5	300000.305	518636.161	126.000	1.000	600	 0	2.000	125.000	100
6	300020.037	518648.047	126.000	1.384	600	 1 0	2.000 2.001	124.616 124.616	100 100
7	300024.958	518670.271	125.800	2.400	1050	1 0	1.002 1.003	123.665 123.400	100 100

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
8	300030.236	518678.423	125.400	2.162	1200	1	1.003	123.238	100
9	299973.438	518740.318	126.000	1.000	600	0	4.000	125.000	100
10	299981.809	518744.997	126.000	1.160	600	1	4.000	124.840	100
						0	4.001	124.840	100
11	299988.278	518733.638	126.000	2.400	600	1	4.001	124.622	100
						0	4.002	123.600	100
12	299995.086	518733.727	125.899	2.412	1200	1	4.002	123.487	100

Simulation Settings

Analysis Speed	Normal	Skip Steady State	x	Drain Down Time (mins)	240	Foul Event Duration (mins)	15

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Pre-development Discharge Rate

Site Makeup	Greenfield	SAAR (mm)	1183	Region	10	QBar	6.7
Greenfield Method	IH124	Soil Index	4	Growth Factor 100 year	2.08	Q 100 year (l/s)	14.0
Positively Drained Area (ha)	0.752	SPR	0.47	Betterment (%)	0		

Pre-development Discharge Volume

Site Makeup	Greenfield	Soil Index	4	Return Period (years)	100	Betterment (%)	0
Greenfield Method	FSR/FEH	SPR	0.47	Climate Change (%)	0	PR	0.500
Positively Drained Area (ha)	0.752	CWI	125.458	Storm Duration (mins)	360	Runoff Volume (m^3)	205

Results for Foul Event Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
Foul Event	1	1	125.000	0.000	0.0	0.0000	0.0000	OK
Foul Event	2	1	124.604	0.000	0.0	0.0000	0.0000	OK
Foul Event	3	1	123.958	0.000	0.0	0.0000	0.0000	OK
Foul Event	4	1	125.000	0.000	0.0	0.0000	0.0000	OK
Foul Event	5	1	125.000	0.000	0.0	0.0000	0.0000	OK
Foul Event	6	1	124.616	0.000	0.0	0.0000	0.0000	OK
Foul Event	7	1	123.400	0.000	0.0	0.0000	0.0000	OK
Foul Event	8	1	123.238	0.000	0.0	0.0000	0.0000	OK
Foul Event	9	1	125.000	0.000	0.0	0.0000	0.0000	OK
Foul Event	10	1	124.840	0.000	0.0	0.0000	0.0000	OK
Foul Event	11	1	123.600	0.000	0.0	0.0000	0.0000	OK
Foul Event	12	1	123.487	0.000	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
Foul Event	1	1.000	2	0.0	0.000	0.000	0.0000	
Foul Event	2	1.001	3	0.0	0.000	0.000	0.0000	
Foul Event	3	1.002	7	0.0	0.000	0.000	0.0000	
Foul Event	4	3.000	3	0.0	0.000	0.000	0.0000	
Foul Event	5	2.000	6	0.0	0.000	0.000	0.0000	
Foul Event	6	2.001	3	0.0	0.000	0.000	0.0000	
Foul Event	7	1.003	8	0.0	0.000	0.000	0.0000	0.0
Foul Event	9	4.000	10	0.0	0.000	0.000	0.0000	
Foul Event	10	4.001	11	0.0	0.000	0.000	0.0000	
Foul Event	11	4.002	12	0.0	0.000	0.000	0.0000	0.0

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	0.450
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.019	4.00	126.000	600	299986.610	518655.462	1.074
2	0.019	4.00	126.000	600	299997.973	518635.711	0.600
26	0.019	4.00	126.000	600	300018.131	518647.568	0.650
5	0.019	4.00	126.000	600	300008.792	518663.511	0.600
6	0.019	4.00	126.000	600	299998.732	518680.303	1.460
13	0.044	4.00	126.000	600	300027.746	518654.422	1.020
14	0.044	4.00	126.000	1050	300013.859	518678.602	1.299
3	0.051	4.00	126.000	600	299966.532	518689.945	0.675
8	0.051	4.00	126.000	600	299986.630	518701.597	0.600
7			126.000	600	299994.732	518687.342	1.541
9			125.900	600	300000.487	518690.468	1.506
10			125.850	1350	300000.919	518701.388	1.640
24			125.500	1500	300003.119	518706.572	2.250
15	0.014	4.00	126.000	600	299961.529	518733.181	0.600
16	0.014	4.00	126.000	600	299971.683	518738.948	0.717
18		4.00	126.000	600	299960.303	518713.678	0.600
19	0.014	4.00	126.000	600	299969.326	518718.887	0.704
17	0.014	4.00	126.000	600	299979.702	518724.828	0.954
20		4.00	126.000	600	299987.971	518729.665	0.600
23			125.900	1050	299991.412	518705.937	1.206
21	0.052	4.00	125.750	600	299968.218	518705.364	0.750
22			125.750	1050	299985.795	518714.941	0.950
11	0.023	4.00	126.000	600	300006.061	518630.405	0.675
12	0.023	4.00	126.000	600	300022.919	518640.378	0.871
25			125.500	1200	300010.622	518705.984	2.325
4			126.000	450	300006.709	518667.239	1.307

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	39.902	100.0	225	Circular	126.000	125.325	0.450	126.000	124.926	0.849
2.000	22.786	100.0	150	Circular	126.000	125.400	0.450	126.000	125.172	0.678
6.000	11.808	100.0	150	Circular	126.000	125.350	0.500	126.000	125.232	0.618
5.002	27.884	100.0	225	Circular	126.000	124.980	0.795	126.000	124.701	1.074
5.003	26.204	100.0	225	Circular	126.000	124.701	1.074	125.850	124.439	1.186
1.003	8.096	100.0	225	Circular	126.000	124.540	1.235	126.000	124.459	1.316
1.004	6.549	100.0	225	Circular	126.000	124.459	1.316	125.900	124.394	1.281
4.000	16.397	100.0	150	Circular	126.000	125.400	0.450	126.000	125.236	0.614
7.000	11.677	100.0	150	Circular	126.000	125.400	0.450	126.000	125.283	0.567
7.001	16.238	100.0	150	Circular	126.000	125.283	0.567	126.000	125.121	0.729
8.001	11.956	100.0	150	Circular	126.000	125.296	0.554	126.000	125.176	0.674
9.000	9.580	100.0	150	Circular	126.000	125.400	0.450	126.000	125.304	0.546
7.004	10.539	100.0	225	Circular	125.900	124.694	0.981	125.850	124.589	1.036

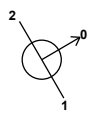
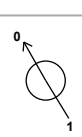
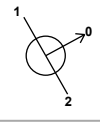
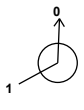
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	3	600	Manhole	Adoptable	1	600	Manhole	Adoptable
2.000	2	600	Manhole	Adoptable	1	600	Manhole	Adoptable
6.000	26	600	Manhole	Adoptable	13	600	Manhole	Adoptable
5.002	13	600	Manhole	Adoptable	14	1050	Manhole	Adoptable
5.003	14	1050	Manhole	Adoptable	10	1350	Manhole	Adoptable
1.003	6	600	Manhole	Adoptable	7	600	Manhole	Adoptable
1.004	7	600	Manhole	Adoptable	9	600	Manhole	Adoptable
4.000	8	600	Manhole	Adoptable	7	600	Manhole	Adoptable
7.000	15	600	Manhole	Adoptable	16	600	Manhole	Adoptable
7.001	16	600	Manhole	Adoptable	17	600	Manhole	Adoptable
8.001	19	600	Manhole	Adoptable	17	600	Manhole	Adoptable
9.000	20	600	Manhole	Adoptable	17	600	Manhole	Adoptable
7.004	23	1050	Manhole	Adoptable	10	1350	Manhole	Adoptable

Pipeline Schedule

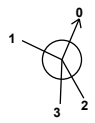
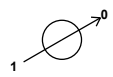
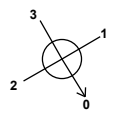
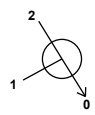
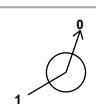
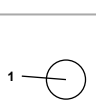
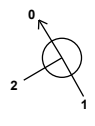
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
5.000	19.587	100.0	225	Circular	126.000	125.325	0.450	126.000	125.129	0.646
8.000	10.419	100.0	150	Circular	126.000	125.400	0.450	126.000	125.296	0.554
10.000	20.017	100.0	225	Circular	125.750	125.000	0.525	125.750	124.800	0.725
7.002	11.614	60.0	225	Circular	126.000	125.046	0.729	125.750	124.852	0.673
7.003	10.612	100.0	225	Circular	125.750	124.800	0.725	125.900	124.694	0.981
1.006	5.632	100.0	300	Circular	125.850	124.210	1.340	125.500	124.154	1.046
1.005	10.929	100.0	225	Circular	125.900	124.394	1.281	125.850	124.285	1.340
1.007	7.526	100.0	300	Circular	125.500	123.250	1.950	125.500	123.175	2.025
5.001	14.850	100.0	225	Circular	126.000	125.129	0.646	126.000	124.980	0.795
1.001	23.295	100.0	225	Circular	126.000	124.926	0.849	126.000	124.693	1.082
3.000	4.270	100.0	150	Circular	126.000	125.400	0.450	126.000	125.357	0.493
1.002	15.307	100.0	225	Circular	126.000	124.693	1.082	126.000	124.540	1.235

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
5.000	11	600	Manhole	Adoptable	12	600	Manhole	Adoptable
8.000	18	600	Manhole	Adoptable	19	600	Manhole	Adoptable
10.000	21	600	Manhole	Adoptable	22	1050	Manhole	Adoptable
7.002	17	600	Manhole	Adoptable	22	1050	Manhole	Adoptable
7.003	22	1050	Manhole	Adoptable	23	1050	Manhole	Adoptable
1.006	10	1350	Manhole	Adoptable	24	1500	Manhole	Adoptable
1.005	9	600	Manhole	Adoptable	10	1350	Manhole	Adoptable
1.007	24	1500	Manhole	Adoptable	25	1200	Manhole	Adoptable
5.001	12	600	Manhole	Adoptable	13	600	Manhole	Adoptable
1.001	1	600	Manhole	Adoptable	4	450	Manhole	Adoptable
3.000	5	600	Manhole	Adoptable	4	450	Manhole	Adoptable
1.002	4	450	Manhole	Adoptable	6	600	Manhole	Adoptable

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	299986.610	518655.462	126.000	1.074	600	 1	2.000	125.172	150
						2	1.000	124.926	225
						0	1.001	124.926	225
2	299997.973	518635.711	126.000	0.600	600	 0	2.000	125.400	150
26	300018.131	518647.568	126.000	0.650	600	 0	6.000	125.350	150
5	300008.792	518663.511	126.000	0.600	600	 0	3.000	125.400	150
6	299998.732	518680.303	126.000	1.460	600	 1	1.002	124.540	225
						0	1.003	124.540	225
13	300027.746	518654.422	126.000	1.020	600	 1	6.000	125.232	150
						2	5.001	124.980	225
						0	5.002	124.980	225
14	300013.859	518678.602	126.000	1.299	1050	 1	5.002	124.701	225
						0	5.003	124.701	225
3	299966.532	518689.945	126.000	0.675	600	 0	1.000	125.325	225
8	299986.630	518701.597	126.000	0.600	600	 0	4.000	125.400	150
7	299994.732	518687.342	126.000	1.541	600	 1	4.000	125.236	150
						2	1.003	124.459	225
						0	1.004	124.459	225
9	300000.487	518690.468	125.900	1.506	600	 1	1.004	124.394	225
						0	1.005	124.394	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
10	300000.919	518701.388	125.850	1.640	1350		1	7.004	124.589	225
							2	5.003	124.439	225
							3	1.005	124.285	225
							0	1.006	124.210	300
24	300003.119	518706.572	125.500	2.250	1500		1	1.006	124.154	300
							0	1.007	123.250	300
15	299961.529	518733.181	126.000	0.600	600		0	7.000	125.400	150
16	299971.683	518738.948	126.000	0.717	600		1	7.000	125.283	150
							0	7.001	125.283	150
18	299960.303	518713.678	126.000	0.600	600		0	8.000	125.400	150
19	299969.326	518718.887	126.000	0.704	600		1	8.000	125.296	150
							0	8.001	125.296	150
17	299979.702	518724.828	126.000	0.954	600		1	9.000	125.304	150
							2	8.001	125.176	150
							3	7.001	125.121	150
							0	7.002	125.046	225
20	299987.971	518729.665	126.000	0.600	600		0	9.000	125.400	150
23	299991.412	518705.937	125.900	1.206	1050		1	7.003	124.694	225
							0	7.004	124.694	225
21	299968.218	518705.364	125.750	0.750	600		0	10.000	125.000	225
22	299985.795	518714.941	125.750	0.950	1050		1	10.000	124.800	225
							2	7.002	124.852	225
							0	7.003	124.800	225
11	300006.061	518630.405	126.000	0.675	600		0	5.000	125.325	225
12	300022.919	518640.378	126.000	0.871	600		1	5.000	125.129	225
							0	5.001	125.129	225
25	300010.622	518705.984	125.500	2.325	1200		1	1.007	123.175	300
4	300006.709	518667.239	126.000	1.307	450		1	3.000	125.357	150
							2	1.001	124.693	225
							0	1.002	124.693	225

Simulation Settings

Rainfall Methodology	FSR	Winter CV	0.840	Check Discharge Rate(s)	✓
Rainfall Events	Singular	Analysis Speed	Normal	100 year (l/s)	14.0
FSR Region	England and Wales	Skip Steady State	x	Check Discharge Volume	✓
M5-60 (mm)	17.000	Drain Down Time (mins)	240	100 year 360 minute (m³)	205
Ratio-R	0.400	Additional Storage (m³/ha)	0.0		
Summer CV	0.750	Starting Level (m)			

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
10	0	0	0	100	0	0	0
30	0	0	0	100	50	0	0

Pre-development Discharge Rate

Site Makeup	Greenfield	SAAR (mm)	1183	Region	10	QBar	6.7
Greenfield Method	IH124	Soil Index	4	Growth Factor 100 year	2.08	Q 100 year (l/s)	14.0
Positively Drained Area (ha)	0.752	SPR	0.47	Betterment (%)	0		

Pre-development Discharge Volume

Site Makeup	Greenfield	Soil Index	4	Return Period (years)	100	Betterment (%)	0
Greenfield Method	FSR/FEH	SPR	0.47	Climate Change (%)	0	PR	0.500
Positively Drained Area (ha)	0.752	CWI	125.458	Storm Duration (mins)	360	Runoff Volume (m^3)	205

Node 24 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	123.250	Product Number	CTL-SHE-0114-8000-2250-8000
Design Depth (m)	2.250	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	8.0	Min Node Diameter (mm)	1200

Node 10 Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Pit Width (m)	21.000	Inf Depth (m)	
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	124.210	Pit Length (m)	7.000	Number Required	1
Safety Factor	1.0	Time to half empty (mins)	232	Depth (m)	1.200		

Approval Settings

Node Size	✓	Maximum Cover Depth (m)	3.000	Surcharged Depth	✓
Node Losses	✓	Backdrops	✓	Return Period (years)	
Link Size	✓	Minimum Backdrop Height (m)		Maximum Surcharged Depth (m)	0.100
Minimum Diameter (mm)	150	Maximum Backdrop Height (m)	1.500	Flooding	✓
Link Length	✓	Full Bore Velocity	✓	Return Period (years)	30
Maximum Length (m)	100.000	Minimum Full Bore Velocity (m/s)		Time to Half Empty	x
Coordinates	✓	Maximum Full Bore Velocity (m/s)	3.000	Discharge Rates	✓
Accuracy (m)	1.000	Proportional Velocity	✓	Discharge Volume	✓
Crossings	✓	Return Period (years)		100 year 360 minute (m^3)	
Cover Depth	✓	Minimum Proportional Velocity (m/s)	0.750		
Minimum Cover Depth (m)		Maximum Proportional Velocity (m/s)	3.000		

Results for 10 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	125.030	0.104	21.7	0.0296	0.0000	OK
15 minute winter	2	10	125.453	0.053	4.6	0.0150	0.0000	OK
15 minute winter	26	10	125.404	0.054	4.6	0.0153	0.0000	OK
15 minute winter	5	10	125.457	0.057	4.6	0.0161	0.0000	OK
15 minute winter	6	10	124.693	0.153	30.5	0.0434	0.0000	OK
15 minute summer	13	10	125.097	0.117	26.5	0.0331	0.0000	OK
15 minute winter	14	10	124.849	0.148	37.2	0.1280	0.0000	OK
15 minute winter	3	10	125.400	0.075	12.5	0.0211	0.0000	OK
15 minute summer	8	10	125.498	0.098	12.5	0.0278	0.0000	OK
15 minute winter	7	10	124.648	0.189	42.5	0.0534	0.0000	OK
120 minute winter	9	100	124.590	0.196	12.9	0.0555	0.0000	OK
60 minute winter	10	61	124.590	0.380	54.0	53.5723	0.0000	SURCHARGED
60 minute winter	24	61	124.589	1.339	18.1	2.3666	0.0000	SURCHARGED
15 minute winter	15	10	125.444	0.044	3.4	0.0126	0.0000	OK
15 minute winter	16	10	125.350	0.067	6.8	0.0189	0.0000	OK
15 minute summer	18	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	19	10	125.342	0.046	3.4	0.0130	0.0000	OK
15 minute winter	17	10	125.118	0.072	13.6	0.0204	0.0000	OK
15 minute summer	20	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	23	10	124.818	0.124	26.1	0.1070	0.0000	OK
15 minute winter	21	10	125.075	0.075	12.7	0.0213	0.0000	OK
15 minute winter	22	10	124.925	0.125	26.3	0.1086	0.0000	OK
15 minute winter	11	10	125.375	0.050	5.6	0.0140	0.0000	OK
15 minute winter	12	10	125.199	0.070	11.2	0.0199	0.0000	OK
30 minute winter	25	15	123.226	0.050	6.9	0.0000	0.0000	OK
15 minute winter	4	10	124.816	0.123	26.1	0.0195	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.001	4	21.5	1.073	0.414	0.4677	
15 minute winter	2	2.000	1	4.6	0.835	0.258	0.1251	
15 minute winter	26	6.000	13	4.6	0.825	0.259	0.0658	
15 minute winter	5	3.000	4	4.6	0.800	0.259	0.0246	
15 minute winter	6	1.003	7	30.0	0.931	0.577	0.2608	
15 minute summer	13	5.002	14	26.5	1.091	0.509	0.6753	
15 minute winter	14	5.003	10	36.6	1.380	0.705	0.6966	
15 minute winter	3	1.000	1	12.5	0.855	0.240	0.5886	
15 minute summer	8	4.000	7	12.5	1.058	0.704	0.1936	
15 minute winter	7	1.004	9	42.0	1.233	0.808	0.2230	
120 minute winter	9	1.005	10	13.0	1.004	0.250	0.4182	
60 minute winter	10	1.006	24	18.1	1.042	0.163	0.3966	
60 minute winter	24	1.007	25	6.9	0.849	0.062	0.0614	73.5
15 minute winter	15	7.000	16	3.4	0.578	0.191	0.0697	
15 minute winter	16	7.001	17	6.8	0.918	0.381	0.1198	
15 minute summer	18	8.000	19	0.0	0.000	0.000	0.0238	
15 minute winter	19	8.001	17	3.4	0.762	0.191	0.0532	
15 minute winter	17	7.002	22	13.6	1.238	0.202	0.1288	
15 minute summer	20	9.000	17	0.0	0.000	0.000	0.0000	
15 minute winter	23	7.004	10	25.9	1.236	0.499	0.2211	
15 minute winter	21	10.000	22	12.7	0.762	0.244	0.3438	
15 minute winter	22	7.003	23	26.1	1.160	0.503	0.2391	
15 minute winter	11	5.000	12	5.6	0.661	0.108	0.1671	
15 minute winter	12	5.001	13	11.2	0.716	0.215	0.2334	
15 minute winter	4	1.002	6	25.9	1.016	0.499	0.3901	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	125.048	0.122	27.5	0.0344	0.0000	OK
15 minute winter	2	10	125.461	0.061	5.9	0.0173	0.0000	OK
15 minute winter	26	10	125.412	0.062	5.9	0.0177	0.0000	OK
15 minute winter	5	10	125.466	0.066	5.9	0.0185	0.0000	OK
15 minute winter	6	11	124.795	0.255	38.6	0.0722	0.0000	SURCHARGED
15 minute summer	13	10	125.117	0.137	33.7	0.0388	0.0000	OK
15 minute winter	14	10	124.880	0.179	47.4	0.1552	0.0000	OK
15 minute winter	3	10	125.409	0.084	15.7	0.0238	0.0000	OK
15 minute winter	8	10	125.518	0.118	15.7	0.0333	0.0000	OK
120 minute winter	7	114	124.735	0.276	16.4	0.0780	0.0000	SURCHARGED
120 minute winter	9	114	124.734	0.340	16.4	0.0963	0.0000	SURCHARGED
120 minute winter	10	114	124.734	0.524	40.1	73.9086	0.0000	SURCHARGED
120 minute winter	24	114	124.734	1.483	13.2	2.6213	0.0000	SURCHARGED
15 minute winter	15	10	125.450	0.050	4.3	0.0142	0.0000	OK
15 minute winter	16	10	125.360	0.077	8.6	0.0218	0.0000	OK
15 minute summer	18	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	19	10	125.348	0.052	4.3	0.0148	0.0000	OK
15 minute winter	17	10	125.128	0.082	17.2	0.0231	0.0000	OK
15 minute summer	20	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	23	10	124.838	0.144	33.0	0.1250	0.0000	OK
15 minute winter	21	10	125.085	0.085	16.0	0.0241	0.0000	OK
15 minute winter	22	10	124.948	0.148	33.2	0.1277	0.0000	OK
15 minute winter	11	10	125.381	0.056	7.1	0.0158	0.0000	OK
15 minute winter	12	10	125.209	0.080	14.2	0.0225	0.0000	OK
360 minute summer	25	456	123.226	0.050	6.9	0.0000	0.0000	OK
15 minute winter	4	11	124.844	0.151	33.2	0.0240	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.001	4	27.3	1.137	0.526	0.5687	
15 minute winter	2	2.000	1	5.9	0.892	0.331	0.1503	
15 minute winter	26	6.000	13	5.9	0.880	0.332	0.0792	
15 minute winter	5	3.000	4	5.9	0.852	0.332	0.0296	
15 minute winter	6	1.003	7	36.8	0.925	0.708	0.3220	
15 minute summer	13	5.002	14	33.9	1.137	0.651	0.8250	
15 minute winter	14	5.003	10	46.5	1.439	0.895	0.8507	
15 minute winter	3	1.000	1	15.7	0.899	0.302	0.7062	
15 minute winter	8	4.000	7	15.7	1.098	0.884	0.2341	
120 minute winter	7	1.004	9	16.4	1.078	0.315	0.2605	
120 minute winter	9	1.005	10	16.1	1.032	0.309	0.4347	
120 minute winter	10	1.006	24	13.2	0.949	0.119	0.3966	
120 minute winter	24	1.007	25	6.9	0.848	0.062	0.0613	113.8
15 minute winter	15	7.000	16	4.3	0.611	0.242	0.0831	
15 minute winter	16	7.001	17	8.6	0.972	0.483	0.1432	
15 minute summer	18	8.000	19	0.0	0.000	0.000	0.0283	
15 minute winter	19	8.001	17	4.3	0.811	0.242	0.0633	
15 minute winter	17	7.002	22	17.2	1.234	0.255	0.1685	
15 minute summer	20	9.000	17	0.0	0.000	0.000	0.0000	
15 minute winter	23	7.004	10	32.8	1.304	0.632	0.2654	
15 minute winter	21	10.000	22	16.0	0.794	0.308	0.4135	
15 minute winter	22	7.003	23	33.0	1.213	0.636	0.2891	
15 minute winter	11	5.000	12	7.1	0.706	0.137	0.1981	
15 minute winter	12	5.001	13	14.2	0.751	0.273	0.2809	
15 minute winter	4	1.002	6	32.7	1.024	0.629	0.5206	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	125.122	0.196	35.3	0.0554	0.0000	OK
15 minute winter	2	10	125.470	0.070	7.5	0.0198	0.0000	OK
15 minute summer	26	10	125.422	0.072	7.5	0.0203	0.0000	OK
15 minute summer	5	10	125.476	0.076	7.5	0.0214	0.0000	OK
15 minute winter	6	11	124.946	0.406	42.6	0.1150	0.0000	SURCHARGED
15 minute winter	13	10	125.151	0.171	43.2	0.0484	0.0000	OK
15 minute winter	14	10	124.993	0.292	58.3	0.2526	0.0000	SURCHARGED
15 minute winter	3	10	125.422	0.097	20.3	0.0274	0.0000	OK
15 minute winter	8	10	125.600	0.200	20.3	0.0566	0.0000	SURCHARGED
120 minute winter	7	116	124.941	0.482	21.5	0.1365	0.0000	SURCHARGED
120 minute winter	9	116	124.941	0.547	20.8	0.1548	0.0000	SURCHARGED
120 minute winter	10	116	124.941	0.731	51.7	103.0618	0.0000	SURCHARGED
120 minute winter	24	116	124.940	1.690	15.9	2.9863	0.0000	SURCHARGED
15 minute summer	15	10	125.458	0.058	5.6	0.0163	0.0000	OK
15 minute winter	16	10	125.374	0.091	11.2	0.0258	0.0000	OK
15 minute summer	18	1	125.400	0.000	0.0	0.0000	0.0000	OK
15 minute winter	19	10	125.356	0.060	5.6	0.0171	0.0000	OK
15 minute winter	17	10	125.142	0.096	22.4	0.0271	0.0000	OK
15 minute summer	20	1	125.400	0.000	0.0	0.0000	0.0000	OK
120 minute winter	23	116	124.941	0.247	13.2	0.2136	0.0000	SURCHARGED
15 minute summer	21	10	125.098	0.098	20.7	0.0277	0.0000	OK
15 minute winter	22	10	124.982	0.182	43.0	0.1578	0.0000	OK
15 minute summer	11	10	125.388	0.063	9.1	0.0179	0.0000	OK
15 minute summer	12	10	125.220	0.091	18.2	0.0258	0.0000	OK
600 minute summer	25	255	123.226	0.050	6.9	0.0000	0.0000	OK
15 minute winter	4	11	125.045	0.352	39.3	0.0560	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.001	4	32.0	1.105	0.616	0.8904	
15 minute winter	2	2.000	1	7.5	0.949	0.422	0.1798	
15 minute summer	26	6.000	13	7.5	0.934	0.423	0.0948	
15 minute summer	5	3.000	4	7.5	0.903	0.422	0.0355	
15 minute winter	6	1.003	7	42.5	1.069	0.818	0.3220	
15 minute winter	13	5.002	14	41.0	1.176	0.789	1.0065	
15 minute winter	14	5.003	10	57.4	1.447	1.105	1.0042	
15 minute winter	3	1.000	1	20.3	0.949	0.390	1.0298	
15 minute winter	8	4.000	7	20.0	1.143	1.128	0.2766	
120 minute winter	7	1.004	9	20.8	1.082	0.399	0.2605	
120 minute winter	9	1.005	10	19.8	1.038	0.382	0.4347	
120 minute winter	10	1.006	24	15.9	0.937	0.143	0.3966	
120 minute winter	24	1.007	25	6.9	0.849	0.062	0.0614	129.2
15 minute summer	15	7.000	16	5.6	0.652	0.315	0.1017	
15 minute winter	16	7.001	17	11.2	1.032	0.629	0.1757	
15 minute summer	18	8.000	19	0.0	0.000	0.000	0.0346	
15 minute winter	19	8.001	17	5.6	0.870	0.315	0.0769	
15 minute winter	17	7.002	22	22.3	1.235	0.332	0.2318	
15 minute summer	20	9.000	17	0.0	0.000	0.000	0.0000	
120 minute winter	23	7.004	10	13.2	1.049	0.253	0.4191	
15 minute summer	21	10.000	22	20.7	0.841	0.398	0.5105	
15 minute winter	22	7.003	23	42.7	1.264	0.821	0.3582	
15 minute summer	11	5.000	12	9.1	0.755	0.175	0.2372	
15 minute summer	12	5.001	13	18.2	0.776	0.350	0.3482	
15 minute winter	4	1.002	6	36.5	1.023	0.702	0.6088	

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.70%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	125.727	0.801	51.9	0.2266	0.0000	FLOOD RISK
15 minute winter	2	11	125.791	0.391	11.3	0.1107	0.0000	FLOOD RISK
15 minute winter	26	11	125.744	0.394	11.3	0.1114	0.0000	FLOOD RISK
15 minute winter	5	12	125.588	0.188	11.3	0.0531	0.0000	SURCHARGED
15 minute winter	6	12	125.408	0.867	56.4	0.2455	0.0000	SURCHARGED
15 minute winter	13	11	125.701	0.721	54.8	0.2040	0.0000	FLOOD RISK
180 minute winter	14	172	125.398	0.697	20.8	0.6032	0.0000	SURCHARGED
15 minute winter	3	11	125.827	0.502	30.4	0.1421	0.0000	FLOOD RISK
15 minute winter	8	10	125.931	0.531	30.4	0.1502	0.0000	FLOOD RISK
180 minute winter	7	172	125.398	0.939	22.9	0.2656	0.0000	SURCHARGED
180 minute winter	9	172	125.397	1.003	22.5	0.2839	0.0000	SURCHARGED
180 minute winter	10	176	125.397	1.187	54.5	167.3938	0.0000	SURCHARGED
180 minute winter	24	176	125.396	2.146	9.3	3.7918	0.0000	FLOOD RISK
15 minute winter	15	10	125.472	0.072	8.3	0.0203	0.0000	OK
15 minute winter	16	10	125.407	0.124	16.6	0.0351	0.0000	OK
15 minute summer	18	1	125.400	0.000	0.0	0.0000	0.0000	OK
180 minute winter	19	172	125.397	0.101	1.9	0.0286	0.0000	OK
180 minute winter	17	172	125.397	0.351	7.6	0.0993	0.0000	SURCHARGED
15 minute summer	20	1	125.400	0.000	0.0	0.0000	0.0000	OK
180 minute winter	23	172	125.397	0.703	14.8	0.6085	0.0000	SURCHARGED
180 minute winter	21	172	125.397	0.397	7.1	0.1123	0.0000	SURCHARGED
180 minute winter	22	172	125.397	0.597	14.7	0.5169	0.0000	SURCHARGED
15 minute winter	11	11	125.754	0.429	13.7	0.1213	0.0000	FLOOD RISK
15 minute winter	12	11	125.741	0.612	24.5	0.1732	0.0000	FLOOD RISK
180 minute winter	25	176	123.228	0.053	7.7	0.0000	0.0000	OK
15 minute winter	4	12	125.573	0.880	49.1	0.1399	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	1	1.001	4	41.2	1.109	0.792	0.9265	
15 minute winter	2	2.000	1	11.4	0.971	0.642	0.4011	
15 minute winter	26	6.000	13	11.0	0.966	0.619	0.2079	
15 minute winter	5	3.000	4	11.3	0.993	0.637	0.0752	
15 minute winter	6	1.003	7	54.8	1.378	1.055	0.3220	
15 minute winter	13	5.002	14	54.7	1.375	1.052	1.1090	
180 minute winter	14	5.003	10	19.9	1.091	0.383	1.0422	
15 minute winter	3	1.000	1	29.2	1.012	0.563	1.5869	
15 minute winter	8	4.000	7	30.0	1.702	1.687	0.2857	
180 minute winter	7	1.004	9	22.5	1.038	0.433	0.2605	
180 minute winter	9	1.005	10	22.1	0.925	0.426	0.4347	
180 minute winter	10	1.006	24	9.3	0.907	0.084	0.3966	
180 minute winter	24	1.007	25	7.7	0.875	0.070	0.0666	168.7
15 minute winter	15	7.000	16	8.3	0.698	0.468	0.1396	
15 minute winter	16	7.001	17	16.5	1.101	0.930	0.2431	
15 minute summer	18	8.000	19	0.0	0.000	0.000	0.0468	
180 minute winter	19	8.001	17	1.9	0.649	0.107	0.1807	
180 minute winter	17	7.002	22	7.6	1.097	0.113	0.4619	
15 minute summer	20	9.000	17	0.0	0.000	0.000	0.0000	
180 minute winter	23	7.004	10	14.3	1.027	0.275	0.4191	
180 minute winter	21	10.000	22	7.1	0.693	0.136	0.7961	
180 minute winter	22	7.003	23	14.8	1.073	0.284	0.4221	
15 minute winter	11	5.000	12	13.2	0.793	0.255	0.7790	
15 minute winter	12	5.001	13	23.9	0.780	0.460	0.5906	
15 minute winter	4	1.002	6	47.1	1.183	0.905	0.6088	

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