RIDGE

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10th May 2023

**Vine Street, Gorton – Planning Ref 128864/OO/2020**

5014278

Ridge have prepared this technical note to provide a information in relation to Planning Conditions 19 and 20, for Planning Reference 128864/OO/2020.

A response to the points raised in the email of 28th April 2023 and subsequent meeting on 3rd May 2023 are included within this TN.

***19. No development shall take place until culvert investigation has been undertaken in accordance with the proposal received via email from Paul Graveney (Sent: 05 February 2021 17:10; Subject: RE: call summary - 128864/OO/2020) including attachment 'Vine Street - Culvert Trial Trench.pdf'. This should include verification photos for evidence of investigation as-proposed. If the culvert is proven present, the precise route, condition, capacity and connectivity of the culvert should be determined across the whole site. Results of the investigation shall be submitted to and approved in writing by the Local Planning Authority.***

***Reason- To reduce the risk of flooding, and to reduce the associated flood risk and danger of collapse of culverts pursuant to policy EN14 of the Manchester Core Strategy (2012).***

***20. No development shall take place until surface water drainage works have been implemented in accordance with Non-Statutory Technical Standards for Sustainable Drainage Systems (March 2015) or any subsequent replacements national standards and details that have been submitted to and approved in writing by the Local Planning Authority. The development shall be implemented in accordance with the approved details.***

*Ridge is the trading name of Ridge and Partners LLP. A Limited Liability Partnership registered in England No. OC309402*
*Registered office: The Cowyards, Blenheim Park, Oxford Road, Woodstock, OX20 1QR.*

bsi ISO 9001 Quality Management Systems CERTIFIED | ISO 14001 Environmental Management CERTIFIED | ISO 45001 Occupational Health and Safety Management CERTIFIED | BIM Design & Construction Capital/Delivery ISO 19650-1 and -2 VERIFIED

***Reason - To promote sustainable development, secure proper drainage and to manage the risk of flooding and pollution, pursuant national policies within the NPPF and NPPG and policies EN08 and EN14 of the Manchester Core Strategy (2012).***

| Ref | Ridge Information | |
|---|---|---|
| 19 | Please see Appendix A for the results of the agreed investigation into the location of the proposed culvert. Appendix A includes extracts from the E3P investigation Trial Trench agreed with the LLFA.<br><br>The trial trench was undertaken between the 20th and 25th October 2021.<br><br>No culvert or remnants were located. | |
| 20 | As part of Planning condition 3, Approved documents – The drainage design is to be undertaken in accordance with the Flood Risk Assessment and Drainage Strategy Revision 2 – December 2020 (FRA).<br><br>As Part of the FRA the drainage hierarchy was investigated and discharge to the surface water sewer in Vine Street was accepted as the most sustainable solution. UU agreed a discharge rate of 8 l/s.<br><br>The proposed drainage design has been developed and drainage drawings (Appendix B) and Calculations (Appendix C have been provided). | |

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## DRAWING LIST

| | |
|---|---|
| 14-944-001 | Site Location Plan |
| 14-944-002 | Proposed Development Plan |
| 14-944-003 | Historical Features Plan |
| 14-944-004 | Site Features Plan |
| 14-944-005 | Exploratory Hole Location Plan |
| 14-944-006 | Depth of Made Ground Plan |
| 14-944-010 | Conceptual Site Model |

## 2.2. GENERAL OVERVIEW

A ground investigation has been designed based on the findings of the desk study, with exploratory holes advanced to target specific potential contaminant sources identified within the previous site investigations and Phase I report made available to E3P. The investigation has also been used to collect geotechnical information to assist in the design and construction of the proposed development.

Trial pitting and window sampling was completed on 31st of August 2021. Cable percussive boreholes were completed between the 20th to 25th October 2021. The works are summarised in Table 2.1 below.

## 2.3. SCOPE OF INVESTIGATION

TABLE 2.1 SUMMARY OF FIELDWORK

| POTENTIAL SOURCE / RATIONALE | LOCATION HOLE | TYPE | MAXIMUM DEPTH (m bgl) | MONITORING WELLS RESPONSE ZONE (m bgl) |
|---|---|---|---|---|
| **Investigate and sample Made Ground including the Presence / Nature of Obstructions. Collection of geotechnical data.** | WS101 | Window Sample Probehole | 0.81 | N/A |
| | WS101A | | 0.78 | |
| | WS102 | | 0.58 | |
| | WS102A | | 3.30 | 1.00–3.00 |
| | WS103 | | 0.20 | N/A |
| | WS103A | | 0.48 | |
| | WS104 | | 3.30 | 1.00–2.50 |
| | WS105 | | 1.22 | N/A |
| | WS105A | | 0.68 | |
| | WS106 | | 0.31 | |
| | WS106A | | 0.77 | |
| **Investigate and sample Made Ground including the Presence / Nature of Obstructions.** | TP101 | Mechanically excavated trial pit | 2.9 | N/A |
| | TP102 | | 0.7 | |
| | TP103 | | 2.7 | |
| | TP104 | | 1.8 | 1.00 – 2.00 |
| | TP105 | | 2.3 | N/A |
| | TP106 | | 1.9 | |
| | TP107 | | 2.1 | |
| | TP108 | | 1.2 | |
| **Prove depth of Made Ground and investigate underlying natural ground conditions. Collection of geotechnical data.** | CP101 | Cable Percussive Boreholes | 15.45 | N/A |
| | CP102 | | 15.45 | |
| | CP103 | | 15.45 | |
| | CP104 | | 15.45 | |
| **Investigate Suspected Culvert** | TT101 | Trial Trench | 6.50 | N/A |

## 5.7. CULVERT TRENCH

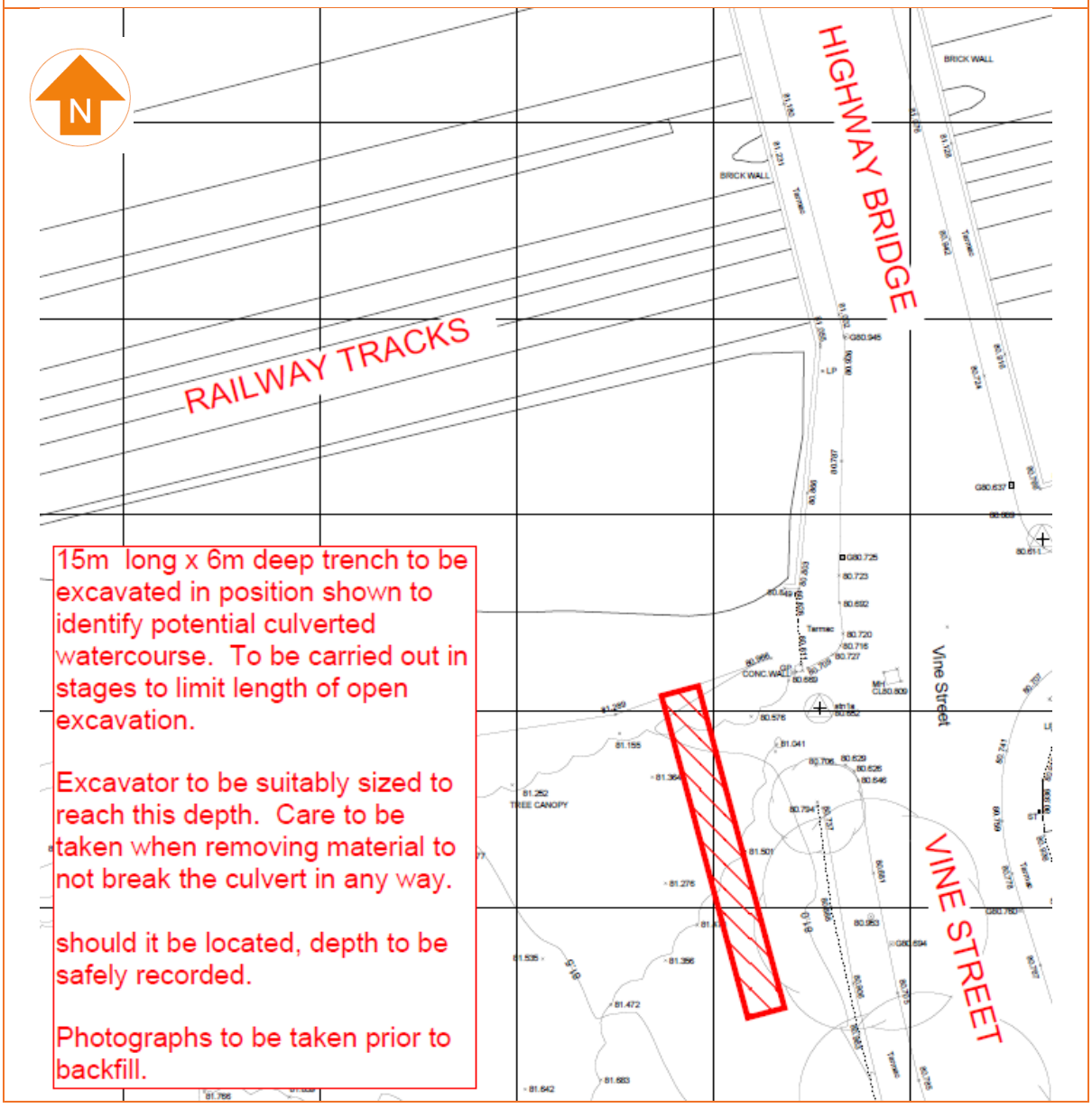
E3P were informed a history culvert may underlie the eastern portion of the site at a depth of 6.00m bgl.

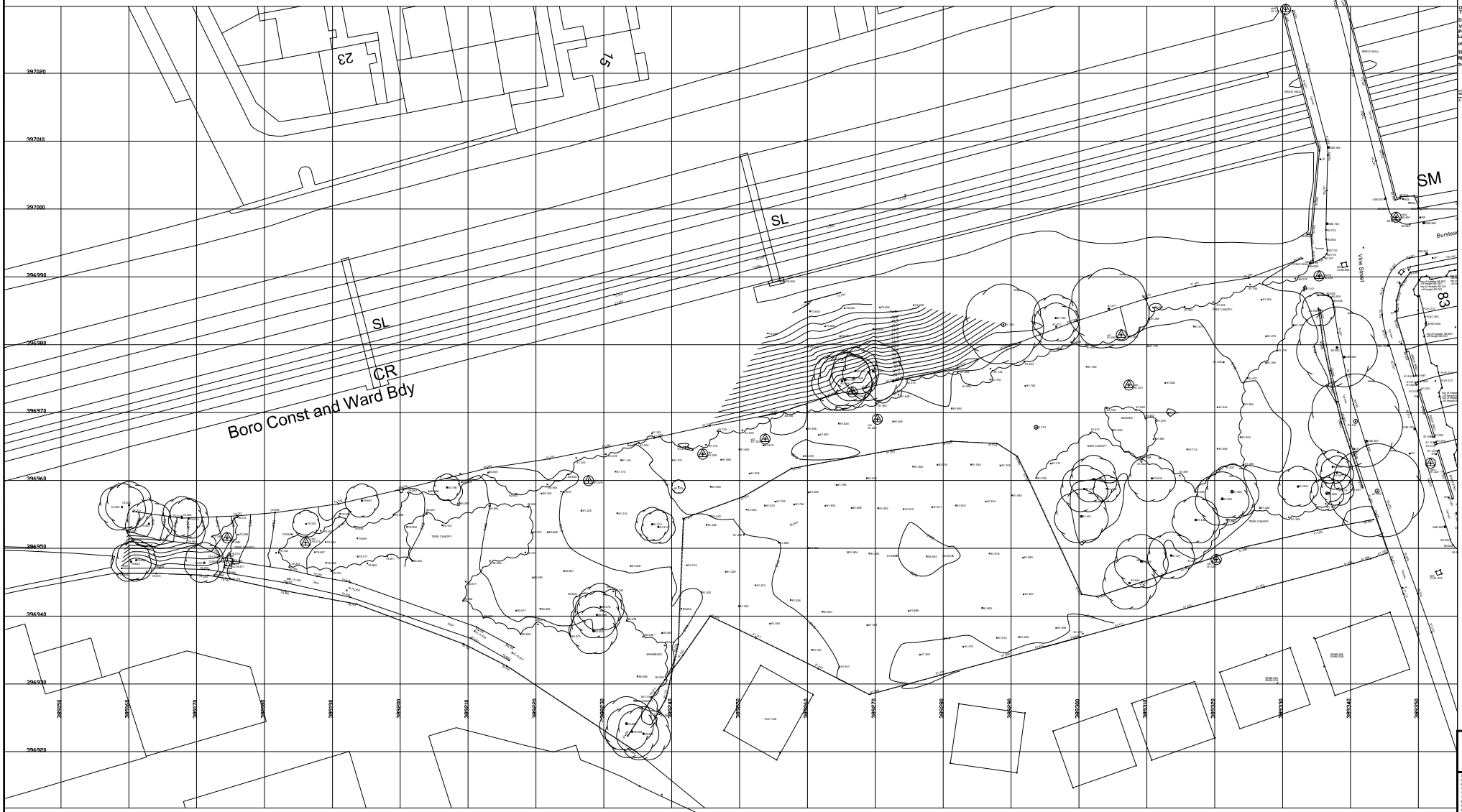
To locate the trench, a 15m long and 6.50m deep slit trench was excavated in a north to south orientation as per the location plan provided by the client (presented in Figure 5.1 below)

No evidence of the culvert was encountered within the trench and photographs of the excavation are presented in Appendix IV.

However, during the enabling works, it is recommended that a watching brief is completed in this area to confirm the presence or absence of the feature.

FIGURE 5.1 CULVERT TRENCH LOCATION PLAN



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N

SURVEY ORIENTATED TO REAL TIME GPS

## NOTES AND AMENDMENTS

ONLY MANHOLES AND SERVICES VISIBLE AT TIME OF SURVEY SHOWN

DRAINAGE INFORMATION MUST BE CHECKED AND VERIFIED WITH LOCAL AUTHORITY RECORDS PRIOR TO WORK COMMENCING

Levels defining edge of carriageway are observed at channel (bottom of kerb). Unless otherwise stated.

TREE SPREADS ARE SYMBOLIC ONLY AND ARE REPRESENTATIVE OF THE THE AVERAGE SPREAD.

THE DRIP LINE LAYER DENOTES THE TREES EXTREMITY

## REVISIONS

| REV. | DESCRIPTION | DRAWN | CHKD | DATE |
|---|---|---|---|---|
| A | TOPOGRAPHICAL SURVEY UPDATED AS REQUESTED | GS | PSH | 29.05.2018 |

## Topographical Survey Legend

| | | | |
|---|---|---|---|
| BH | Lube bin | TL | Traffic |
| BK | Block kiln | TP | Telegraph pole |
| BO | Bollard | TS | Traffic signal box |
| BS | Bus stop | TX | Traffic signal light |
| BT | British telecom tx | TV | Television cover |
| CB | Concrete paving kerbs | VC | Valve |
| CH | Chimney | WC | Water cooler |
| EM | Electricity m | WE | Water Cist |
| EP | Electric pole | WI | Water inlet/outlet |
| FH | Fire Hydrant | WR | Barbed wire |
| FL | Flagpole | WT | Waste bucket/bin |
| FT | Floodlight | WU | Corrugated iron |
| GA | Gate | WW | Wire fence |
| GP | Guard post | XC | Concrete panel |
| GV | Gas valve | YH | Hand rail |
| HC | Hydraulic cover | YL | Lamp bracket |
| JB | Junction box | YO | Open boarded |
| KC | Kerb outlet | YO | Post & chain |
| LA | Lay by | YO | Post & rail |
| LP | Lamp post | YO | Post & wire |
| MH | Utility manhole | YW | Wire mesh |
| MK | Marker post | ZZ | Level point description |
| MP | Monitoring point | BA | Arch level |
| NP | Name plate | BB | Bench level |
| PC | Pump cover | BC | Cover level |
| PE | Pedalling eye | BE | Eaves level |
| PG | Road sign | BF | Floor level |
| PW | Push button pipe | BL | Lintel level |
| RE | Rodding eye | BP | Parapet level |
| RS | Road sign | BS | Sill level |
| SB | Service Box | BW | Soffit level |
| TC | Traffic count | CL | Crash barrier level |
| TH | Telephone call box | CP | Hand rail height |
| TM | Time Hole | WL | Water level |

## BENCH MARK INFORMATION

All levels relate to OSBM Newlyn

Datum Generated by VRS GPS

| SURVEY STATIONS | | |
|---|---|---|
| stn1 | 389151.402 | 396962.521 81.021 |
| stn2 | 389346.123 | 396898.218 80.401 |
| stn3 | 389191.452 | 396980.134 80.612 |
| stn4 | 389191.452 | 396980.134 80.612 |
| sf1 | 389306.237 | 396981.447 81.490 |
| sf2 | 389253.766 | 396946.085 81.702 |
| sf3 | 389320.229 | 396948.317 81.529 |

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Tel - 01942 241313
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EMAIL: jamie.lancaster@jlpsurvey.com

PROJECT
VINE STREET,
ABBEY HEY,
MANCHESTER

DRAWING TITLE
Topographical Land Survey

| SCALE | SHEET SIZE | No. of SHEETS | DATE | REVISION |
|---|---|---|---|---|
| 1:200 | A0 | 1 | 29.05.18 | A |

DRAWING NUMBER
S18-442

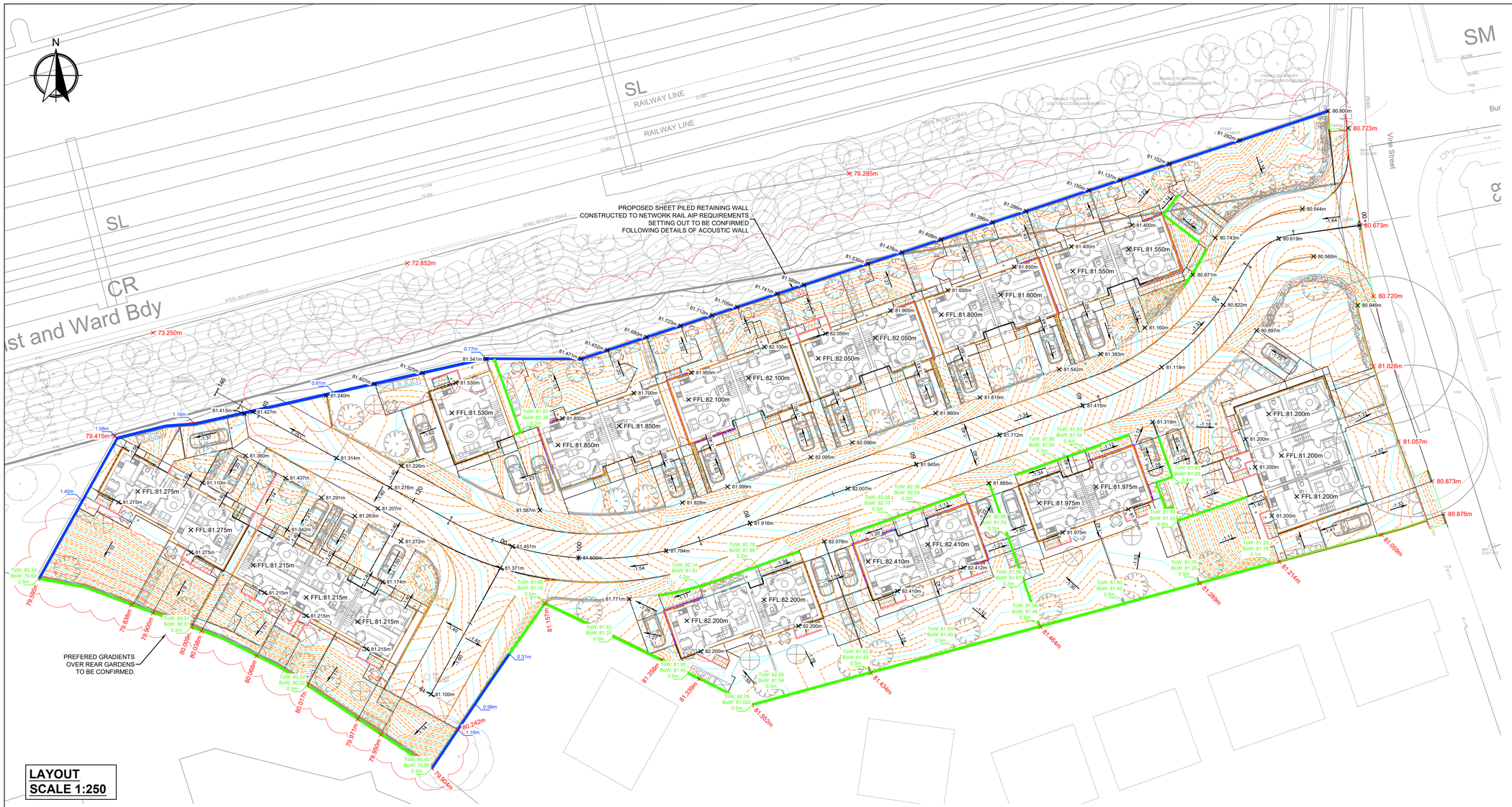
PLATE 3 VIEW OF WASTE STOCKPILES IN THE WESTERN SECTOR

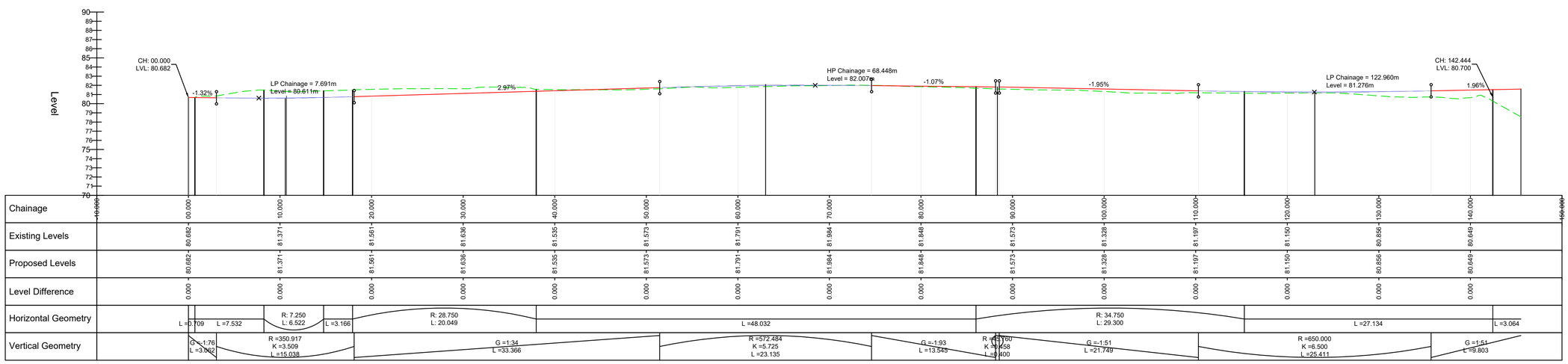
PLATE 4 EXCAVATION FOR CULVERT TRENCH (EASTERN SECTOR)

| PLATE 5 | EXCAVATION FOR CULVERT TRENCH (EASTERN SECTOR) |
|---|---|

| PLATE 6 | EXAMPLE OF SHALLOW GRANULAR MADE GROUND (TP106) |
|---|---|

## APPENDIX B –




ROAD LONGSECTION
SCALE 1:250

2 0 2 4 6 8 10
SCALE 1:250 m

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DRAWING NOTES:

- CONTOURS, MAJOR (0.1m INCREMENTS)
- CONTOURS, MINOR (0.025m INCREMENTS)
- -1:34 / 1:34 SLOPE GRADIENT (FALL) / SLOPE GRADIENT (RISE)
- 135.200m EXISTING SPOT LEVEL
- 135.200m PROPOSED SPOT LEVEL
- 0.9m PROPOSED RETAINING HEIGHT (FoE)
- ToW: 81.00m TOP RETAINING LEVEL (FoE)
- BoW: 80.50m BOTTOM RETAINING LEVEL (FoE)
- 0.9m PROPOSED RETAINING HEIGHT (RW)
- PROPOSED FLAG ON EDGE / DWARF WALL
- PROPOSED RETAINING WALL
- PROPOSED FACED SHEET PILED RETAINING WITH 1.2M UPSTAND
- PROPOSED SITE BOUNDARY
- PROPOSED TIE IN TO EXISTING LEVELS
- PROPOSED STEP IN LEVELS
- TREE PROTECTION AREA

FOR THE CUT AND FILL ANALYSIS THE FOLLOWING HAS BEEN ASSUMED.

- SITE STRIP OF - 100mm (COLOURED AREA ONLY)
- CUT MATERIAL IS SUITABLE TO BE GRADED AND REUSED AS FILL

ASSUMED FORMATION DEPTHS

| | |
|---|---|
| PROPOSED LANDSCAPING | - 600mm |
| PROPOSED DRIVEWAY PARKING | - 380mm |
| PROPOSED BUILDING FOOTPRINT | - 610mm |
| PROPOSED PRIVATE FOOTWAY | - 230mm |
| PROPOSED ROAD | - 730mm |
| PROPOSED PUBLIC FOOTPATH | - 295mm |
| PILING MAT (3m OFFSET) | - 600mm |

ASSUMED ARISINGS

TBC

| REV | DESCRIPTION | DATE | BY | CHKD |
|---|---|---|---|---|
| P05 | PROPOSED LEVELS UPDATED TO SUIT LATEST ARCHITECTS LAYOUT | 03.05.23 | LWP | PB |
| P04 | ROAD LEVELS AND WESTERN PLOTS AMENDED TO SUIT DRAINAGE REQUIREMENTS | 24.04.23 | LWP | PB |
| P03 | MINOR AMENDMENTS TO WEST RETAINING WALL POSITION | 19.04.23 | LWP | PB |
| P02 | REVISED TO SUIT UPDATED ARCHITECTS SITE LAYOUT | 14.04.23 | LWP | PB |
| P01 | ISSUED FOR COMMENT | 28.10.20 | AS | PG |

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CLIENT:

KIRKLAND DEVELOPMENT LTD

IN ASSOCIATION WITH:

PROJECT:

VINE STREET
GORTON

TITLE:

PROPOSED FINISHED LEVELS

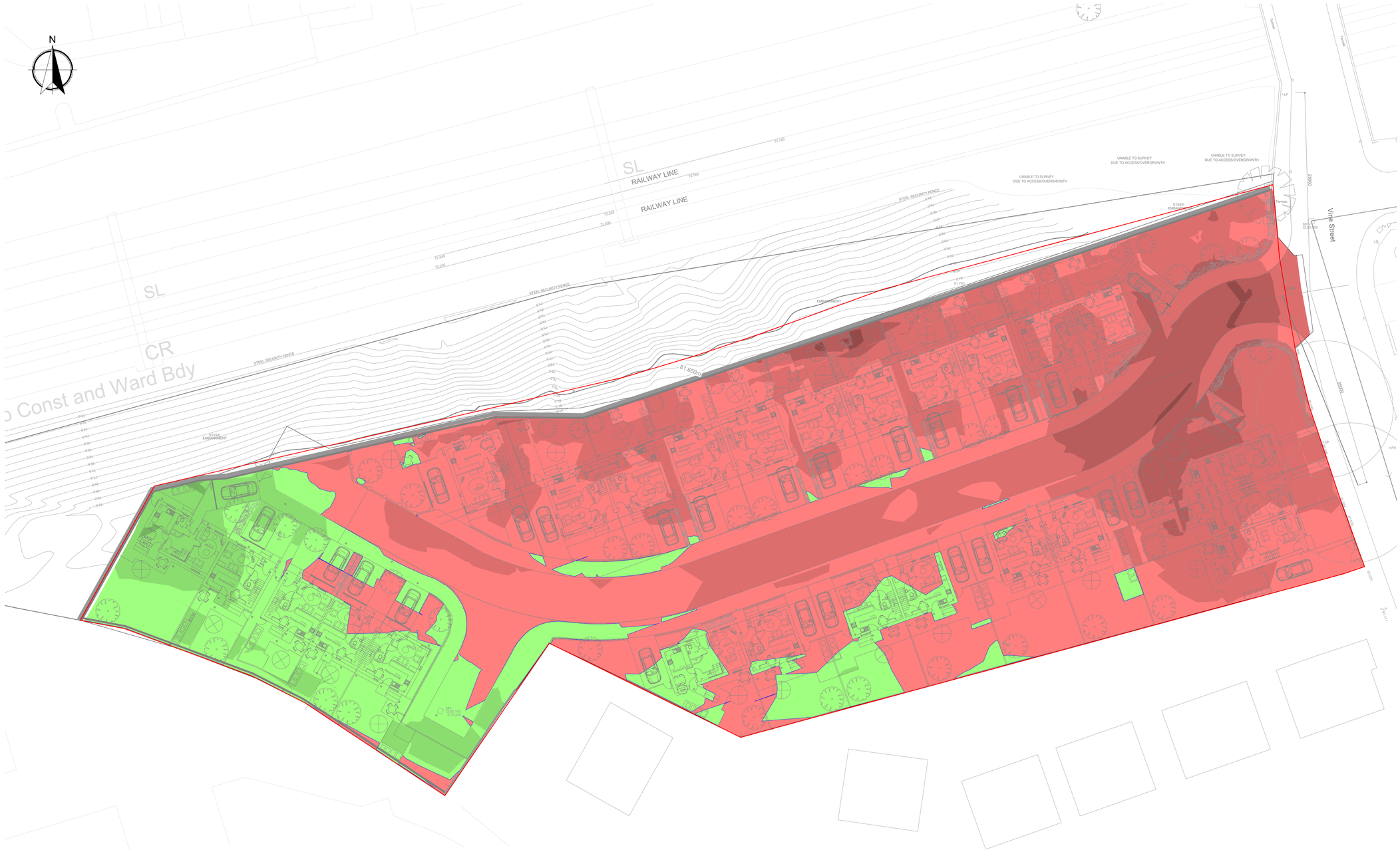
| ENG/TECH: | CSE: | ICSE: | SCALE: 1:250 @ A1 |
|---|---|---|---|
| AS | PG | PB | STATUS ISSUEPRELIMINARY |

STATUS: PRELIMINARY

**UNLESS ISSUED FOR CONSTRUCTION - WORKS AT CLIENT/CONTRACTORS RISK**

SUITABILITY: S0 - Initial Status or WIP

| PROJECT: | ORG: | ZONE: | LEVEL: | TYPE: | ROLE: | NUMBER: | REV: |
|---|---|---|---|---|---|---|---|
| VSG | RDG | XX | XX | DR | C | 0001 | P05 |

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DRAWING NOTES:

KEY

| | | | |
|---|---|---|---|
| SITE BOUNDARY | | | |
| 0.0m - 0.5m CUT | | 0.0m - 0.5m FILL | |
| 0.5m - 1.0m CUT | | 0.5m - 1.0m FILL | |
| 1.0m - 1.5m CUT | | 1.0m - 1.5m FILL | |
| 1.5m - 2.0m CUT | | 1.5m - 2.0m FILL | |

FOR THE CUT AND FILL ANALYSIS THE FOLLOWING HAS BEEN ASSUMED.

- SITE STRIP OF - 100mm (COLOURED AREA ONLY)
- CUT MATERIAL IS SUITABLE TO BE GRADED AND REUSED AS FILL

ASSUMED FORMATION DEPTHS

| | |
|---|---|
| PROPOSED LANDSCAPING | - 600mm |
| PROPOSED DRIVEWAY PARKING | - 380mm |
| PROPOSED BUILDING FOOTPRINT | - 610mm |
| PROPOSED PRIVATE FOOTWAY | - 230mm |
| PROPOSED ROAD | - 730mm |
| PROPOSED PUBLIC FOOTPATH | - 295mm |
| PILING MAT (3m OFFSET) | - 600mm |

ASSUMED ARISINGS

TBC

**FOR THE CUT AND FILL ANALYSIS SUMMARY**

EXISTING SITE STRIP VOLUME = 595m³ [CUT]

EXISTING STRIP LEVEL TO FORMATION LEVEL VOLUME;
= 2240m³ [CUT]
= 381m³ [FILL]
= NET = 1859 [CUT]

| REV | DESCRIPTION | DATE | BY | CHKD |
|---|---|---|---|---|
| P04 | AMENDED TO SUIT REVISED SITE LAYOUT AND UPDATED PROPOSED LEVELS | 04.05.23 | LWP | PB |
| P03 | REVISED TO SUIT UPDATED PROPOSED LEVELS. ROAD AND WESTERN PLOT RAISED TO SUIT DRAINAGE | 21.04.23 | LWP | PB |
| P02 | REVISED TO SUIT UPDATED ARCHITECTS SITE LAYOUT | 14.04.23 | LWP | PB |
| P01 | ISSUED FOR COMMENT | 28.10.20 | AS | PG |

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CLIENT:
KIRKLAND DEVELOPMENT LTD

IN ASSOCIATION WITH:

PROJECT:
VINE STREET
GORTON

TITLE:
EARTHWORKS CUT & FILL
ISOPACHYTES

| ENG/TECH: | CSE: | ICSE: | SCALE: 1:250 @ A1 |
|---|---|---|---|
| AS | PG | PB | STATUS ISSUEPRELIMINARY |

STATUS: PRELIMINARY

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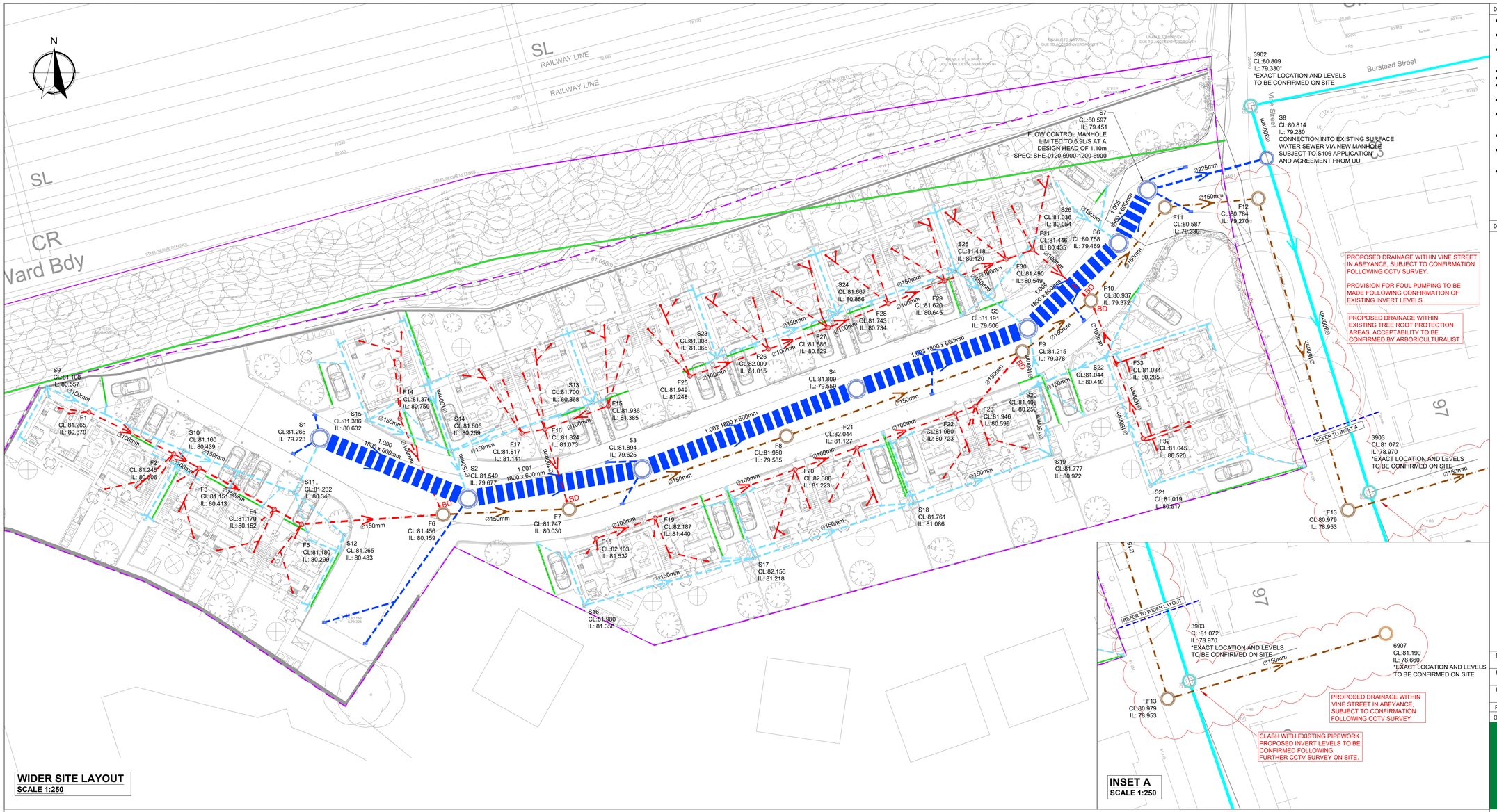
|---|---|---|---|---|---|---|---|
| VSG | RDG | XX | XX | DR | C | 0002 | P04 |




**WIDER SITE LAYOUT**
SCALE 1:250

**INSET A**
SCALE 1:250

2 0 2 4 6 8 10
SCALE 1:250 m

## LEGEND

- 10m SAFETY ZONE FROM BOUNDARY
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC SURFACE WATER MANHOLE
- PROPOSED ADOPTABLE SURFACE WATER DRAINAGE
- PROPOSED ADOPTABLE SURFACE WATER MANHOLE
- PROPOSED ADOPTABLE SURFACE WATER GULLY
- PROPOSED PRIVATE SURFACE WATER DRAINAGE
- PROPOSED PRIVATE SURFACE WATER PPIC
- PROPOSED RAIN WATER PIPE
- PROPOSED RODDING EYE
- PROPOSED CHANNEL DRAIN & SUMP
- EXISTING PUBLIC FOUL SEWER
- EXISTING PUBLIC FOUL MANHOLE
- PROPOSED ADOPTABLE FOUL DRAINAGE
- PROPOSED ADOPTABLE FOUL MANHOLE
- PROPOSED PRIVATE FOUL DRAINAGE
- PROPOSED PRIVATE FOUL PPIC
- PROPOSED SVP POSITION
- BD PROPOSED FOUL BACK DROP

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| P01 | ISSUED FOR COMMENT | 10.12.20 | EDG | PG |

ORIGINATOR:

RIDGE

CLIENT:
KIRKLAND DEVELOPMENT LTD

IN ASSOCIATION WITH:

PROJECT:
VINE STREET
GORTON

TITLE:
PROPOSED DRAINAGE GA

| ENG/TECH: | CSE: | ICSE: | SCALE: 1:250 @ A1 |
|---|---|---|---|
| AS | PG | PB | STATUS ISSUEPRELIMINARY |

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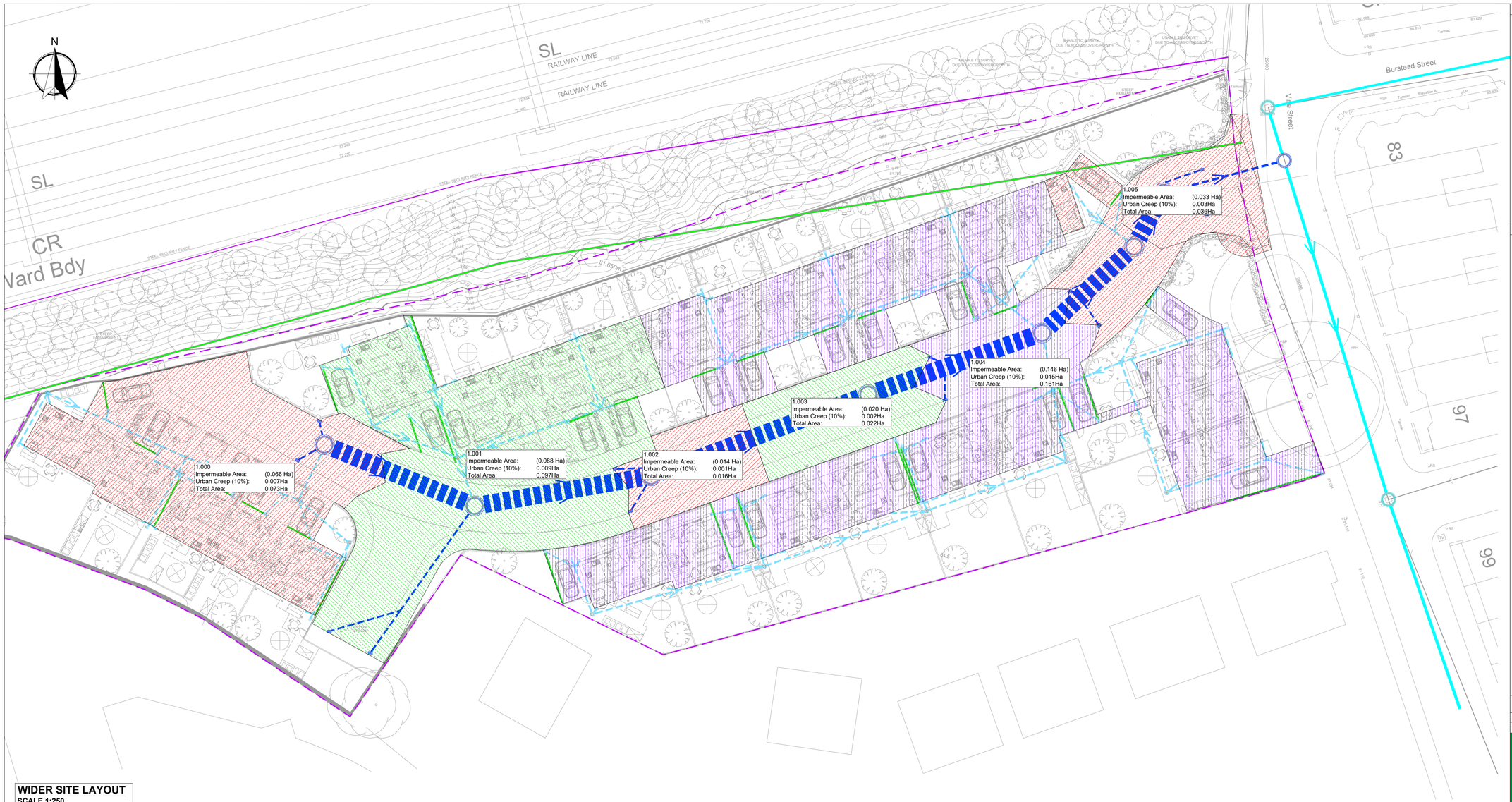


**WIDER SITE LAYOUT**
SCALE 1:250

2 0 2 4 6 8 10
SCALE 1:250 m

**LEGEND**

- 10m SAFETY ZONE FROM BOUNDARY
- EXISTING PUBLIC SURFACE WATER SEWER
- EXISTING PUBLIC SURFACE WATER MANHOLE
- PROPOSED ADOPTABLE SURFACE WATER DRAINAGE
- PROPOSED ADOPTABLE SURFACE WATER MANHOLE
- PROPOSED ADOPTABLE SURFACE WATER GULLY
- PROPOSED PRIVATE SURFACE WATER DRAINAGE
- PROPOSED PRIVATE SURFACE WATER PPIC
- PROPOSED RAIN WATER PIPE
- PROPOSED RODDING EYE
- PROPOSED CHANNEL DRAIN & SUMP

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IN ASSOCIATION WITH:

PROJECT:
VINE STREET
GORTON

TITLE:
PROPOSED CATCHMENT PLAN

| ENG/TECH: | CSE: | ICSE: | SCALE: 1:250 @ A1 |
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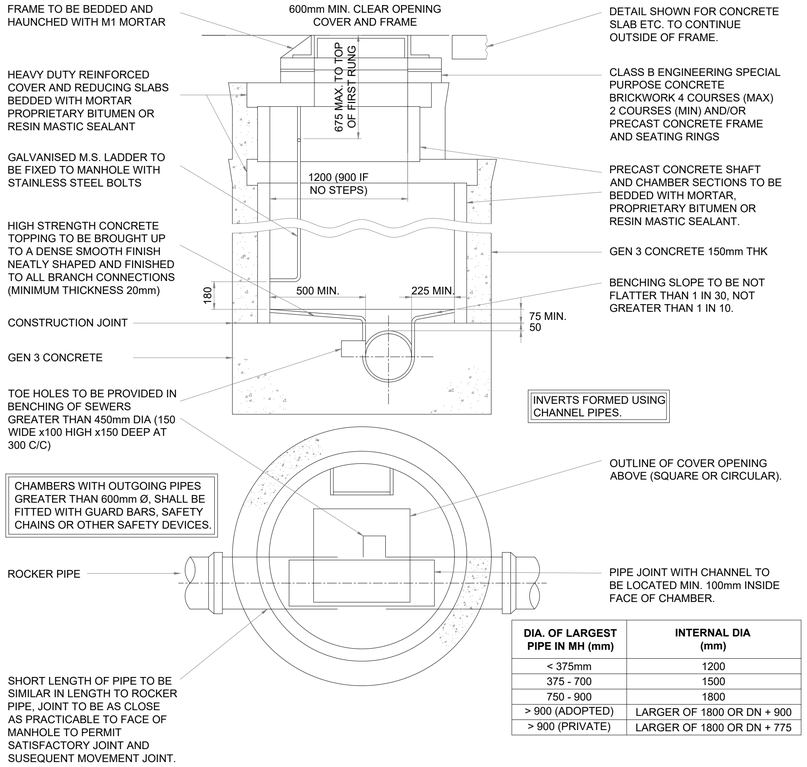
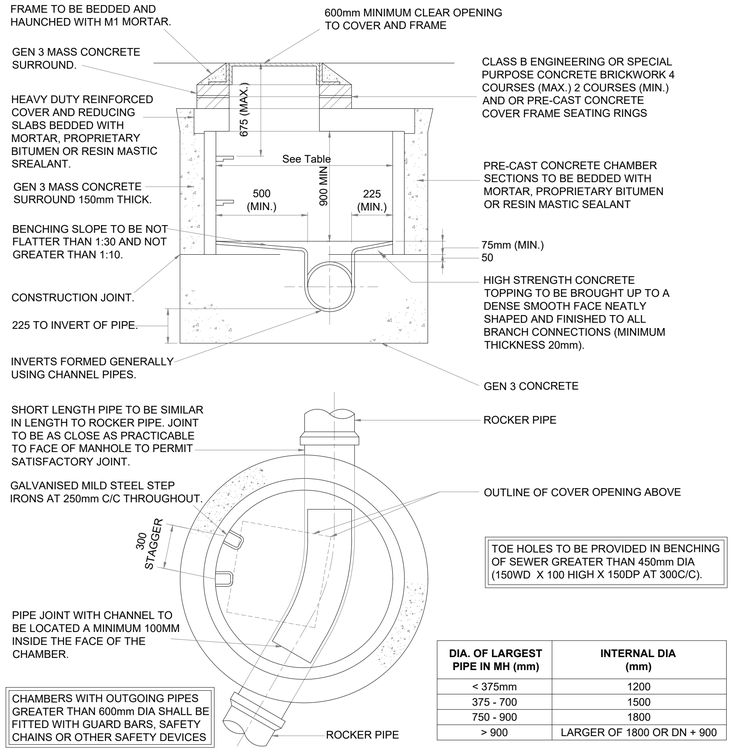



| DIA. OF LARGEST PIPE IN MH (mm) | INTERNAL DIA (mm) |
|---|---|
| < 375mm | 1200 |
| 375 - 700 | 1500 |
| 750 - 900 | 1800 |
| > 900 (ADOPTED) | LARGER OF 1800 OR DN + 900 |
| > 900 (PRIVATE) | LARGER OF 1800 OR DN + 775 |

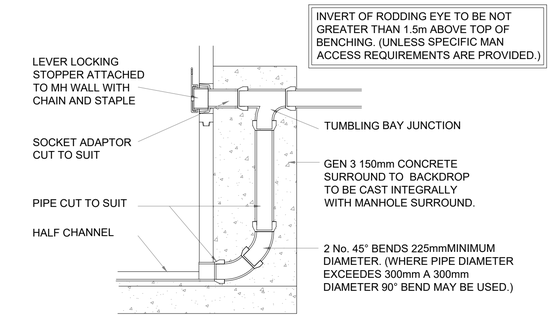
## MANHOLE TYPE A (DEPTH TO COVER LEVEL TO PIPE SOFFIT 3.0m to 6.0m)



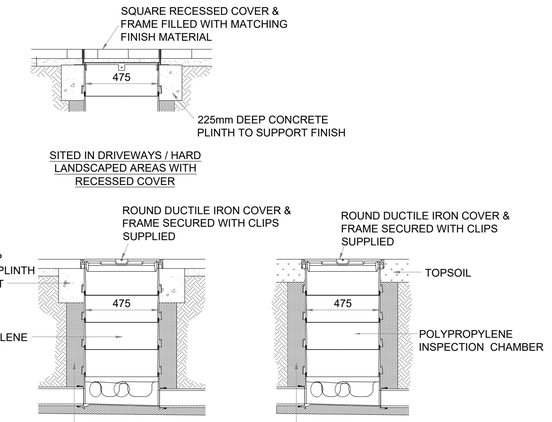

| DIA. OF LARGEST PIPE IN MH (mm) | INTERNAL DIA (mm) |
|---|---|
| < 375mm | 1200 |
| 375 - 700 | 1500 |
| 750 - 900 | 1800 |
| > 900 | LARGER OF 1800 OR DN + 900 |

(1.5-3m DEEP, COVER LEVEL TO PIPE SOFFIT)

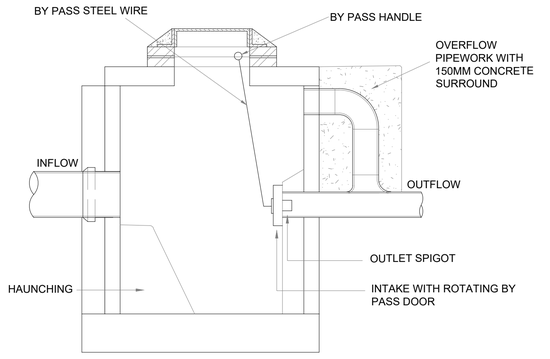
## MANHOLE TYPE B



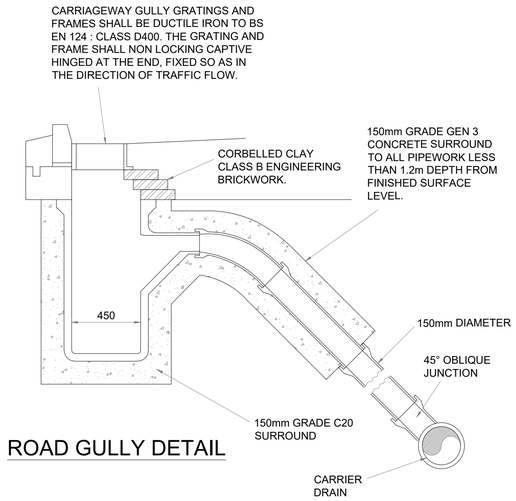

## EXTERNAL VERTICAL BACKDROP




## POLYPROPYLENE INSPECTION CHAMBER INSTALLATION DETAIL




## VORTEX CONTROL CHAMBER




## ROAD GULLY DETAIL

200 0 200 400 600 800 1000
SCALE 1:20 mm

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CLIENT:
KIRKLAND DEVELOPMENT LTD

IN ASSOCIATION WITH:

PROJECT:
VINE STREET
GORTON

TITLE:
TYPICAL DRAINAGE DETAILS
SHEET 1

| ENG/TECH: | CSE: | ICSE: | SCALE: 1:20 @ A1 |
|---|---|---|---|
| LWP | PB | PB | STATUS ISSUEPRELIMINARY |

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SUITABILITY: S0 - Initial Status or WIP

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|---|---|---|---|---|---|---|---|
| VSG | RDG | XX | XX | DR | C | 0102 | 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 |

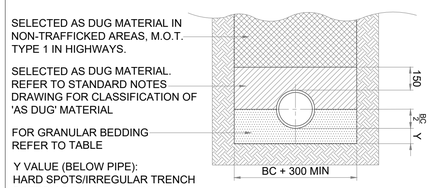
TABLE 5/3 BSEN 13242 COURSE AGGREGATE TO CLAUSE 4.3.2 FOR PIPE BEDDING, HAUNCHING AND SURROUNDING MATERIAL

| 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 |

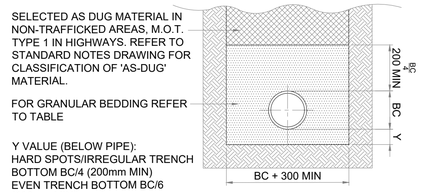
| MAXIMUM TRENCH WIDTHS | |
|---|---|
| PIPE DIA (mm) | WIDTH (mm) |
| 100 | 600 |
| 150 | 700 |
| 225 | 800 |
| 300 | 900 |
| 375 | 1050 |
| 450 | 1150 |
| 525 | 1200 |
| 600 | 1350 |
| 750 | 1450 |
| 825 | 1500 |
| 950 | 1600 |
| 1050 | 1900 |

## RIGID PIPES BEDDING GRADING

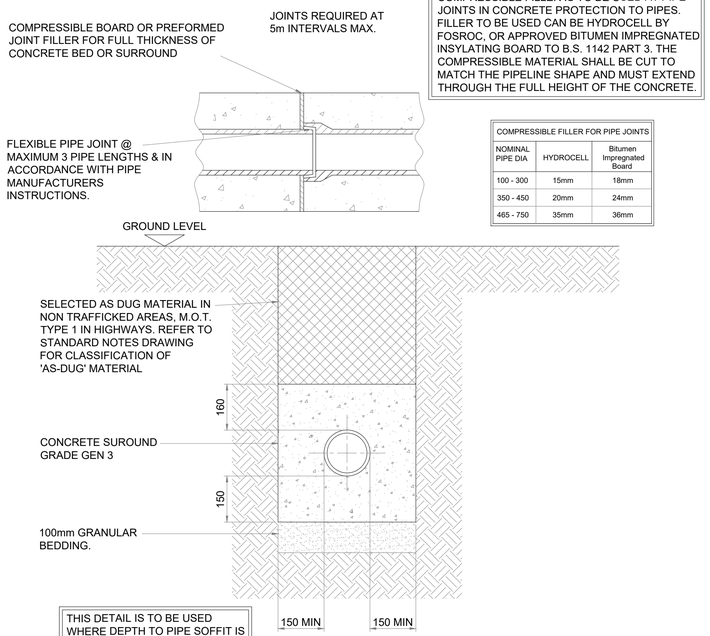
BASED ON BS EN 1610 : 1997 TABLE B.15
FOR RIGID PIPES THE BEDDING SHOULD BE SINGLE SIZE MATERIAL OR GRADED MATERIAL FROM 5MM UP TO A MAX SIZE OF 10mm FOR 100mm PIPES; 14mm FOR 150mm PIPES; 20mm FOR 225mm TO 600mm PIPES; 40mm FOR OVER 675mm PIPES.




PIPE BEDDING CLASS B (BEDDING FACTOR 1.9)



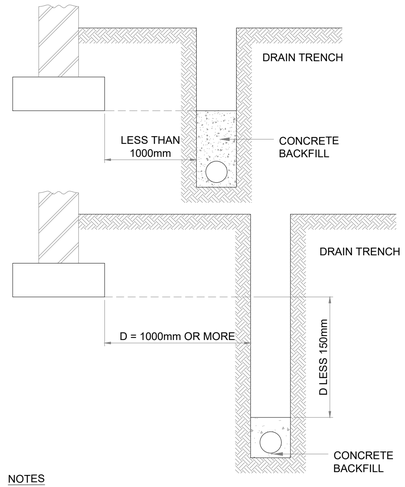

PIPE BEDDING CLASS S (BEDDING FACTOR 2.5)




COMPRESSIBLE FILLER IS TO BE USED AT PIPE JOINTS IN CONCRETE PROTECTION TO PIPES. FILLER TO BE USED CAN BE HYDROCELL BY FOSROC, OR APPROVED BITUMEN IMPREGNATED INSYLATING BOARD TO B.S. 1142 PART 3. THE COMPRESSIBLE MATERIAL SHALL BE CUT TO MATCH THE PIPELINE SHAPE AND MUST EXTEND THROUGH THE FULL HEIGHT OF THE CONCRETE.

| COMPRESSIBLE FILLER FOR PIPE JOINTS | | |
|---|---|---|
| NOMINAL PIPE DIA | HYDROCELL | Bitumen Impregnated Board |
| 100 - 300 | 15mm | 18mm |
| 350 - 450 | 20mm | 24mm |
| 465 - 750 | 35mm | 36mm |

CLASS 'Z' PIPE BEDDING



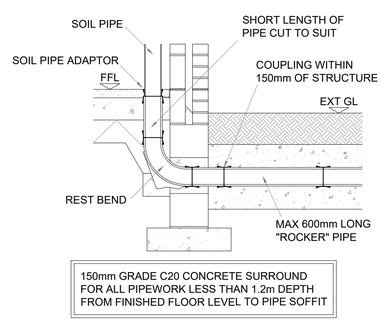

NOTES

1. CONCRETE TO BE GRADE GEN 3

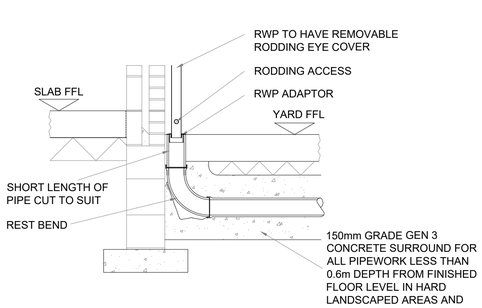
2. JOINTS TO BE PROVIDED IN CONCRETE SURROUND AT NOT GREATER THAN 5.0m CENTRES. BUILDING REGULATIONS PART H1 PARA A11

3. 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.

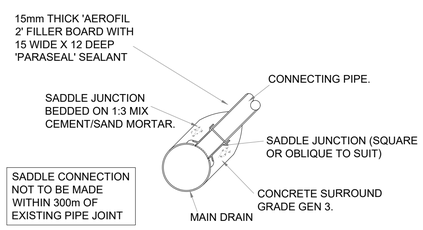
PIPE RUNS ADJACENT TO BUILDING




SOIL AND VENT PIPE CONNECTION

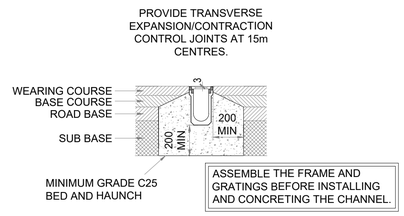



EXTERNAL RAINWATER PIPE CONNECTION




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.)




TYPICAL DRAINAGE CHANNEL IN FLEXIBLE PAVEMENT

200 0 200 400 600 800 1000
SCALE 1:20 mm

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ORIGINATOR:

RIDGE

CLIENT:
KIRKLAND DEVELOPMENT LTD

IN ASSOCIATION WITH:

PROJECT:
VINE STREET
GORTON

TITLE:
TYPICAL DRAINAGE DETAILS
SHEET 2

| ENG/TECH: | CSE: | ICSE: | SCALE: 1:20 @ A1 |
|---|---|---|---|
| LWP | PB | PB | STATUS ISSUEPRELIMINARY |

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SUITABILITY: S0 - Initial Status or WIP

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|---|---|---|---|---|---|---|---|
| VSG | RDG | XX | XX | DR | C | 0103 | P01 |

# APPENDIX C –

## STORM SEWER DESIGN by the Modified Rational Method

### Design Criteria for Storm

Pipe Sizes Pipe Manhole Sizes Manhole

FSR Rainfall Model - England and Wales

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Return Period (years) | 2 | Foul Sewage (l/s/ha) | 0.000 | Maximum Backdrop Height (m) | 1.500 |
| M5-60 (mm) | 18.000 | Volumetric Runoff Coeff. | 0.750 | Min Design Depth for Optimisation (m) | 1.200 |
| Ratio R | 0.367 | PIMP (%) | 100 | Min Vel for Auto Design only (m/s) | 1.00 |
| Maximum Rainfall (mm/hr) | 50 | Add Flow / Climate Change (%) | 0 | Min Slope for Optimisation (1:X) | 500 |
| Maximum Time of Concentration (mins) | 30 | Minimum Backdrop Height (m) | 0.200 | | |

Designed with Level Soffits

### Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 18.770 | 0.046 | 408.0 | 0.073 | 5.00 | 0.0 | 0.600 | [] | -1 | Pipe/Conduit | |

### Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | 50.00 | 5.17 | 79.723 | 0.073 | 0.0 | 0.0 | 0.0 | 1.85 | 2990.2 | 9.9 |

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## Network Design Table for Storm

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Section Type | Auto Design |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.001 | 20.570 | 0.052 | 395.6 | 0.097 | 0.00 | 0.0 | 0.600 | [] | -1 | Pipe/Conduit | |
| 1.002 | 26.920 | 0.066 | 407.9 | 0.016 | 0.00 | 0.0 | 0.600 | [] | -1 | Pipe/Conduit | |
| 1.003 | 21.070 | 0.053 | 397.5 | 0.022 | 0.00 | 0.0 | 0.600 | [] | -1 | Pipe/Conduit | |
| 1.004 | 14.900 | 0.037 | 402.7 | 0.161 | 0.00 | 0.0 | 0.600 | [] | -1 | Pipe/Conduit | |
| 1.005 | 7.100 | 0.018 | 394.4 | 0.036 | 0.00 | 0.0 | 0.600 | [] | -1 | Pipe/Conduit | |
| 1.006 | 14.460 | 0.072 | 200.8 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 | Pipe/Conduit | |

## Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1.001 | 50.00 | 5.35 | 79.677 | 0.170 | 0.0 | 0.0 | 0.0 | 1.87 | 3037.3 | 23.0 |
| 1.002 | 50.00 | 5.60 | 79.625 | 0.186 | 0.0 | 0.0 | 0.0 | 1.85 | 2990.8 | 25.2 |
| 1.003 | 50.00 | 5.78 | 79.559 | 0.208 | 0.0 | 0.0 | 0.0 | 1.87 | 3029.7 | 28.2 |
| 1.004 | 50.00 | 5.92 | 79.506 | 0.369 | 0.0 | 0.0 | 0.0 | 1.86 | 3010.1 | 50.0 |
| 1.005 | 50.00 | 5.98 | 79.469 | 0.405 | 0.0 | 0.0 | 0.0 | 1.88 | 3041.7 | 54.8 |
| 1.006 | 50.00 | 5.26 | 79.451 | 0.000 | 7.0 | 0.0 | 0.0 | 0.92 | 36.5 | 7.0 |

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## Online Controls for Storm

### Hydro-Brake® Optimum Manhole: FLOW CONTROL, DS/PN: 1.006, Volume (m³): 11.5

| | | | |
|---|---|---|---|
| Unit Reference | MD-SHE-0120-6900-1200-6900 | Sump Available | Yes |
| Design Head (m) | 1.200 | Diameter (mm) | 120 |
| Design Flow (l/s) | 6.9 | Invert Level (m) | 79.451 |
| Flush-Flo™ | Calculated | Minimum Outlet Pipe Diameter (mm) | 150 |
| Objective | Minimise upstream storage | Suggested Manhole Diameter (mm) | 1200 |
| Application | Surface | | |

| Control Points | Head (m) | Flow (l/s) | Control Points | Head (m) | Flow (l/s) |
|---|---|---|---|---|---|
| Design Point (Calculated) | 1.200 | 6.9 | Kick-Flo® | 0.760 | 5.6 |
| Flush-Flo™ | 0.356 | 6.9 | Mean Flow over Head Range | - | 6.0 |

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

| Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) | Depth (m) | Flow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.100 | 4.2 | 0.600 | 6.5 | 1.600 | 7.9 | 2.600 | 9.9 | 5.000 | 13.5 | 7.500 | 16.4 |
| 0.200 | 6.5 | 0.800 | 5.7 | 1.800 | 8.3 | 3.000 | 10.6 | 5.500 | 14.2 | 8.000 | 16.9 |
| 0.300 | 6.9 | 1.000 | 6.3 | 2.000 | 8.8 | 3.500 | 11.4 | 6.000 | 14.8 | 8.500 | 17.4 |
| 0.400 | 6.9 | 1.200 | 6.9 | 2.200 | 9.2 | 4.000 | 12.2 | 6.500 | 15.3 | 9.000 | 17.9 |
| 0.500 | 6.8 | 1.400 | 7.4 | 2.400 | 9.5 | 4.500 | 12.9 | 7.000 | 15.9 | 9.500 | 18.4 |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

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

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

### Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.366 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 40, 45

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | S01A | 15 Winter | 1 | +0% | 100/120 Winter | | | | 79.729 | -0.594 | 0.000 | 0.01 | | |
| 1.001 | S01 | 15 Winter | 1 | +0% | 100/120 Winter | | | | 79.689 | -0.588 | 0.000 | 0.01 | | |

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|
| 1.000 | S01A | 8.8 | OK | |
| 1.001 | S01 | 18.7 | OK | |

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## 1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.002 | S02 | 60 Winter | 1 | +0% | 100/120 Winter | | | | 79.687 | -0.538 | 0.000 | 0.01 | |
| 1.003 | S03 | 60 Winter | 1 | +0% | 100/60 Winter | | | | 79.687 | -0.472 | 0.000 | 0.00 | |
| 1.004 | S04 | 60 Winter | 1 | +0% | 100/60 Winter | | | | 79.687 | -0.419 | 0.000 | 0.01 | |
| 1.005 | S05 | 60 Winter | 1 | +0% | 100/60 Summer | | | | 79.687 | -0.382 | 0.000 | 0.01 | |
| 1.006 | FLOW CONTROL | 60 Winter | 1 | +0% | 1/30 Winter | | | | 79.686 | 0.010 | 0.000 | 0.21 | |

| PN | US/MH Name | Half Drain Time (mins) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|
| 1.002 | S02 | | 10.9 | OK | |
| 1.003 | S03 | | 8.2 | OK | |
| 1.004 | S04 | | 11.5 | OK | |
| 1.005 | S05 | | 8.5 | OK | |
| 1.006 | FLOW CONTROL | | 6.7 | SURCHARGED | |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

### Simulation Criteria

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

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

### Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.366 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 40, 45

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | S01A | 120 Winter | 30 | +40% | 100/120 Winter | | | | 80.039 | -0.284 | 0.000 | 0.01 | | |
| 1.001 | S01 | 120 Winter | 30 | +40% | 100/120 Winter | | | | 80.039 | -0.238 | 0.000 | 0.01 | | |

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|
| 1.000 | S01A | 9.5 | OK | |
| 1.001 | S01 | 15.9 | OK | |

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## 30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.002 | S02 | 120 Winter | 30 | +40% | 100/120 Winter | | | | 80.039 | -0.186 | 0.000 | 0.01 | |
| 1.003 | S03 | 120 Winter | 30 | +40% | 100/60 Winter | | | | 80.038 | -0.121 | 0.000 | 0.00 | |
| 1.004 | S04 | 120 Winter | 30 | +40% | 100/60 Winter | | | | 80.038 | -0.068 | 0.000 | 0.01 | |
| 1.005 | S05 | 120 Winter | 30 | +40% | 100/60 Summer | | | | 80.034 | -0.035 | 0.000 | 0.01 | |
| 1.006 | FLOW CONTROL | 120 Winter | 30 | +40% | 1/30 Winter | | | | 80.031 | 0.355 | 0.000 | 0.21 | |

| PN | US/MH Name | Half Drain Time (mins) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|
| 1.002 | S02 | | 11.1 | OK | |
| 1.003 | S03 | | 6.5 | OK | |
| 1.004 | S04 | | 11.4 | OK | |
| 1.005 | S05 | | 9.7 | OK | |
| 1.006 | FLOW CONTROL | | 6.9 | SURCHARGED | |

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

### Simulation Criteria

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

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

### Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 18.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.366 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 40, 45

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume (m³) | Flow / Cap. | Overflow (l/s) | Half Drain Time (mins) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.000 | S01A | 180 Winter | 100 | +45% | 100/120 Winter | | | | 80.591 | 0.268 | 0.000 | 0.01 | | |
| 1.001 | S01 | 180 Winter | 100 | +45% | 100/120 Winter | | | | 80.591 | 0.314 | 0.000 | 0.01 | | |

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

| PN | US/MH Name | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|
| 1.000 | S01A | 9.7 | SURCHARGED | |
| 1.001 | S01 | 20.6 | SURCHARGED | |

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

| PN | US/MH Name | Storm | Return Period | Climate Change | First (X) Surcharge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) | Surcharged Depth (m) | Flooded Volume ($m^3$) | Flow / Cap. | Overflow (l/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.002 | S02 | 180 Winter | 100 | +45% | 100/120 Winter | | | | 80.591 | 0.366 | 0.000 | 0.01 | |
| 1.003 | S03 | 180 Winter | 100 | +45% | 100/60 Winter | | | | 80.591 | 0.432 | 0.000 | 0.01 | |
| 1.004 | S04 | 180 Winter | 100 | +45% | 100/60 Winter | | | | 80.591 | 0.485 | 0.000 | 0.01 | |
| 1.005 | S05 | 180 Winter | 100 | +45% | 100/60 Summer | | | | 80.591 | 0.522 | 0.000 | 0.01 | |
| 1.006 | FLOW CONTROL | 180 Winter | 100 | +45% | 1/30 Winter | | | | 80.591 | 0.915 | 0.000 | 0.21 | |

| PN | US/MH Name | Half Drain Time (mins) | Pipe Flow (l/s) | Status | Level Exceeded |
|---|---|---|---|---|---|
| 1.002 | S02 | | 27.3 | SURCHARGED | |
| 1.003 | S03 | | 18.1 | SURCHARGED | |
| 1.004 | S04 | | 14.4 | SURCHARGED | |
| 1.005 | S05 | | 10.4 | FLOOD RISK | |
| 1.006 | FLOW CONTROL | | 6.9 | FLOOD RISK | |

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