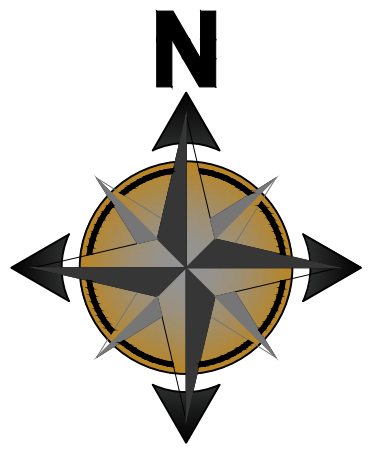


Appendix A – Topographical Survey



LEGEND

- Building Line
- Bottom of Bank
- Edge Of Concrete
- Canopy
- Fence
- Gate
- Edge Of Hedge
- Overhead Cable
- Top of Bank
- Wall
- INV
- Invert level
- Tree
- Peg
- Set Out Point

Background Data
All "grey coloured" background data belongs to Castle Surveys, not JW Geomatics and is only used as a visualisation tool to contrast between both companies' Topographical Survey Datasets.

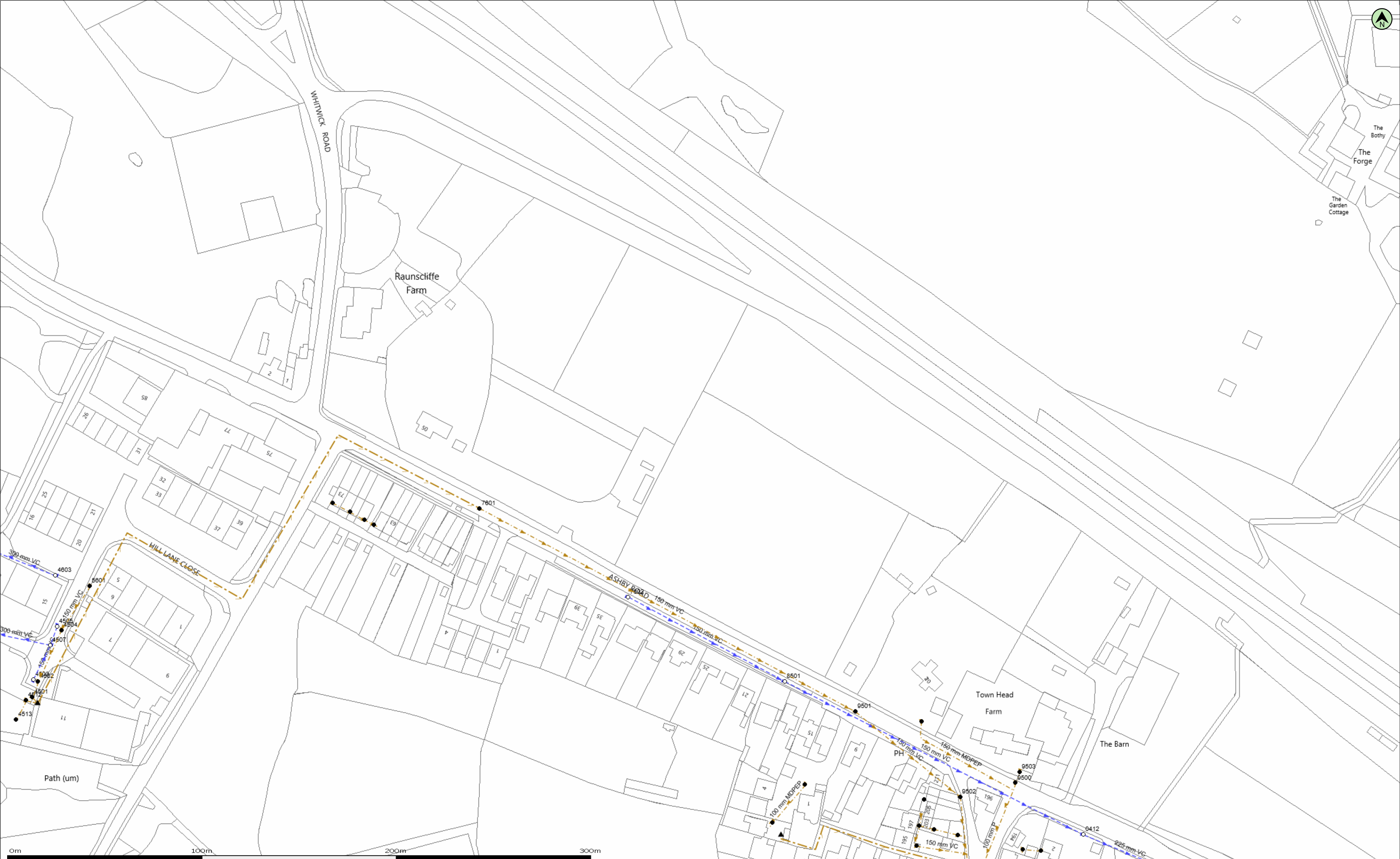
Survey Details:
Survey Grid: This survey has been orientated to the Ordnance Survey (O.S.) National Grid (OSGB36) via a Global Position System (GPS) and the O.S. Active Network (OS Net).
All JW Geomatics' survey data is GNSS data, i.e. true OS coordinates and is related to OS National Grid North using a point of origin central to the survey.
Coordinate System: This was calculated using the OSTN15 transformation model on the 09.06.25 using Leica Smartnet.
Survey Level Datum: Calculated from GPS derived heights using the OSBM15 Transformation Geoid Model in relation to Ordnance Survey Newlyn using Leica Smartnet.

- General Notes:**
- Physical features present in the vicinity of boundaries may not represent legally conveyed ownership.
 - Some features may have been obscured at the time of survey (Parked cars, Dense Vegetation, etc.)
 - The background OS Tile & The Existing Topo By Castle Surveys may be inaccurate and incomplete - JW Geomatics are not responsible for this data.
 - The plan should only be used for its original intentions - JW Geomatics are not responsible for any mistakes arising from the supply of this plan to third parties.
 - All critical dimensions should be checked on site prior to construction.
 - Unless otherwise specified, features such as road line markings & hedge centrelines are indicative only. Unless specified in the preliminary deliverables, level heights, trunk diameters, fence heights and wall heights are not measured.
 - Canopy spread is measured at ground level where possible - The "Tree" legend detail denotes an approximate spread.
 - Only trees over 3m in height are surveyed with a "trunk" however large hedges may also have multiple trunks - canopy spread surveyed instead.
 - The "Top Of Kerb" is not shown as a poly-line observations taken on all differently sized kerbs, please use the 3D DXF for level data.



status: For Information
project: Markfield, Leicester
site: Topographical Survey & Setting Out Locations
drawn: JW date: 09.06.25
checked: JW scale: @ A1: 1:500
job no: JWG-AH6 dsg no: JWG-AH6-001

Appendix B – Severn Trent Sewer Records and MAC Technical Note



(c) Crown copyright and database rights 2023 Ordnance Survey 100031673 Date: 23/06/23 Scale: 1:1250 Map Centre: 448825,310698 Data updated: 14/06/23 Our Ref: 1209028 - 19 Wastewater Plan A2

Do not scale off this map. The plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems. Reproduction by permission of Ordnance Survey on behalf of HMSO. ©Crown Copyright and database rights 2023 All rights reserved. Ordnance Survey licence number 100031673. Document users other than SEVERN TRENT WATER business users are advised that this document is provided for reference purpose only and is subject to copyright, therefore, no further copies should be made from it.

Public Foul Gravity/Lateral Drain	→→→→→	Highway Drain	→→→→→	Manhole Foul	●
Public Combined Gravity/Lateral Drain	→→→→→	Overflow Pipe	→→→→→	Manhole Surface	○
Public Surface Water Gravity/Lateral Drain	→→→→→	Disposal Pipe	→→→→→	Abandoned Pipe	—x—x—x—x—x—
Pressure Foul	→→→→→	Culverted Water Course	→→→→→	Chamber	■
Pressure Combined	→→→→→	Pumping Station	▲▲▲▲▲		
Pressure Surface Water	→→→→→	Fitting	■		

duncan@cornerstoneprojects.co.uk
Penland Es





GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on:
0800 783 4444 (24 hours)

- a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991(a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as "STW Apparatus" in these general conditions and precautions.
- b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.
- c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.
- d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.
- e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).
- f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.
2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).
3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.
4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.
5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.
6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.
7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.
8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.
9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.
10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.
11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.
12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.
13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants,
14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.
16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.
17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014
18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.
19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main of other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

1.0 Introduction

- 1.1 This note sets out a response to the Lead Local Flood Authority (LLFA) comments dated 5th August 2021 in relation to the planning application detailed below as supported by MAC Pre-planning Engineering Flood Risk Assessment (454-FRA-01-A):

“21/00787/OUT - Residential development of up to 93 dwellings, public open space, landscaping and SuDS”

2.0 Surface Water Outfall

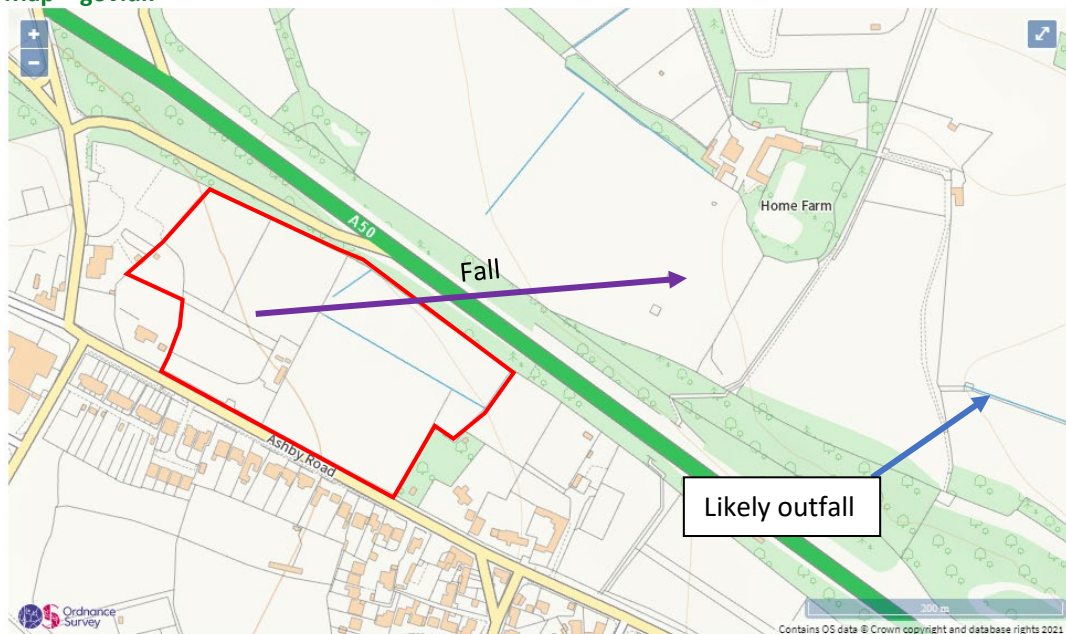
- 2.1 As set out in the Flood Risk Assessment surface water from the proposed development is to outfall to a ditch located in the north eastern corner of the site, as described in paragraph 3.3.5 of the FRA.
- 2.2 Infiltration techniques are not thought to be viable, subject to further testing at detailed design stage.
- 2.3 An onsite inspection of the existing drainage arrangements was undertaken which identified a number of existing ditches on the site with particular interest on those located on the northern boundary. The plan showing these is included in **Appendix A** of this note and within the FRA.
- 2.4 A single point of discharge has been proposed with surface water discharging into ‘ditch C’. Ditch C runs parallel to the eastern boundary flowing from north to south. A headwall was observed, image below (Inset 2.1). This suggests that the pipe is ditched under the A50.

Inset 2.1: Ditch C Headwall



- 2.5 We do not know the exact route of the watercourse beyond the headwall but the ditches marked on the plan shown in **Appendix A** currently drain the existing site and appear to have been constructed specifically for this purpose when the A50 was constructed. With flows attenuated to greenfield equivalent rates the proposed development will continue to drain in a similar manner to the existing fields.
- 2.6 The watercourse on highway land would be a highway structure. As such the Local Highway Authority have been contacted with regard to any details they may have of the watercourse, however, they do not have any details of the watercourse as demonstrated by a copy of the correspondence enclosed in **Appendix B**.
- 2.7 Any survey of the piped watercourse would only be able to identify a length of pipe from the headwall to any manhole or ditch. Due to the A50 and surrounding third party land it would not be possible to survey the route with any accuracy.
- 2.8 The Environment Agency's Flood Risk Map (Inset 2.2) indicates the topography of the surrounding land and maps some watercourses. This indicates that land in this area broadly falls from southwest to northeast, as indicated by the fall arrow. We would therefore expect the watercourse to ultimately drain into the mapped watercourse which is marked on Inset 2.2 below.

Inset 2.2: Direction of Fall and Outfall Watercourse based on Environment Agency Flood Risk Map – gov.uk



Summary

We have demonstrated that the site is already drained to the existing ditch(es) located on the northern boundary. The proposed development will broadly replicate the same method of outfall. As such the development will not significantly alter the existing drainage arrangement and will not have a significant adverse impact on the existing drainage network.

Appendix A

Existing Drainage
MAC drawing no. 454-FRA05



Notes:

1. Based on Castles Surveys Ltd 'Topographical Survey', drawing number 20324-20-01 dated 17-09-20.
2. Based on RJ Surveys 'Tree Survey & Layout Plan 01', dated October 2020.

Key:

Existing Ditch



T: 01604 340544 Northampton Office
E: info@mac-ltd.co.uk W: mac-ltd.co.uk
Martin Andrews Consulting Ltd

- Transport Assessments
- Flood Risk Assessments
- Highway Advice
- Access Design
- Drainage Strategies
- Vehicle tracking

Client: Pendimo Development Land and Property

Project: Land north of Ashby Road, Markfield

Title: Existing Drainage

Date: 09/05/21

Drw: MJA

Chk: MJA

Drawing No: 454-FRA05

Revision: A

Scale: 1:500

Size: A2

Appendix C – Greenfield Runoff Calculation

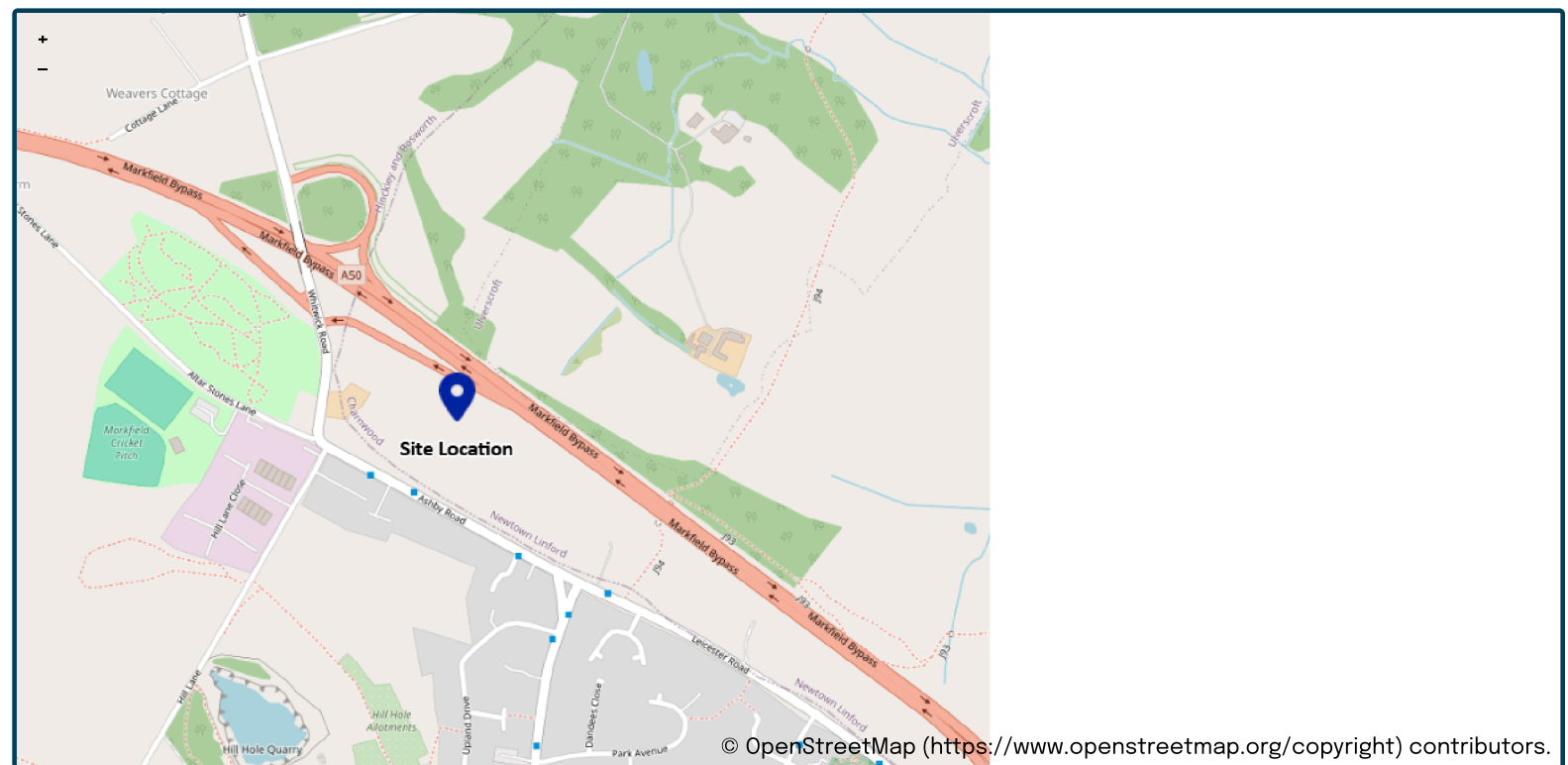
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	19/05/2026
Calculated by	
Reference	
Model version	2.2.3

Location

Site name	Marksfield
Site location	LE67 9UD



Site easting (British National Grid)	448818
Site northing (British National Grid)	310705

Site details

Total site area (ha)	1.625	ha
----------------------	------------------------------------	----

Greenfield runoff

Method

Method	FEH statistical (2025)
--------	------------------------

FEH statistical (2025)

	<u>My value</u>	<u>Map value</u>
SAAR9120 (mm)	724 mm	
BFIHOST19scaled	0.31	
QMed-QBar conversion	1.124	1.124
QMed (l/s)	8.2 l/s	
QBar (FEH statistical 2025) (l/s)	9.2 l/s	

Growth curve factors

	<u>My value</u>	<u>Map value</u>
Hydrological region	4	4
1 year growth factor	0.83	
2 year growth factor	0.89	
10 year growth factor	1.49	
30 year growth factor	2	
100 year growth factor	2.57	
200 year growth factor	3.04	

Results

Method	FEH statistical (2025)	
Flow rate 1 year (l/s)	7.6	l/s
Flow rate 2 year (l/s)	8.2	l/s
Flow rate 10 years (l/s)	13.7	l/s
Flow rate 30 years (l/s)	18.3	l/s
Flow rate 100 years (l/s)	23.5	l/s
Flow rate 200 years (l/s)	27.9	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.



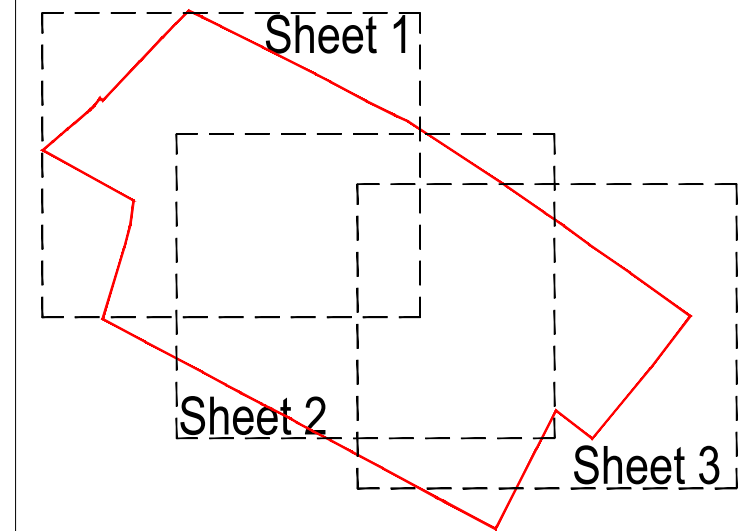
Key:
Site Boundary = 41,584.13m²
Houses = 4691m² Urban creep 10% = 469m² Total = 5160m²
Roads, paths & driveways = 9894m²
Proposed Detention Basin = 1195m²
Total Impermeable Area = 16,249m²



DO NOT SCALE OFF THIS DRAWING

NOTES

- The contractor is responsible for verifying all site & setting out dimensions before commencing work.
 - This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
 - All dimensions in meters unless stated otherwise.
- DRAINAGE NOTES:
- All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK) BS EN 1252.
 - Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with the Client.
 - For location and setting out of building drainage points refer to architects drawings.
 - All pipe runs near buildings to comply with the Building Regulations 2015 part H11. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
 - Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
 - Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
 - Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.9m the pipe shall be protected with a concrete slab set above it.
 - In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided, compressible boards (fibreglass or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints), the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section, a board thickness of 15mm for pipes up to 450mm nominal diameter and 30mm for pipes over 450mm nominal diameter.
 - All private building drainage shall be constructed in strict accordance with BS EN 752. Foul drainage beneath the floor slab shall be laid, shall be laid no flatter than 1:40. Unless otherwise specified below ground building drainage external to the building shall be 100mm diameter and shall be laid at a minimum gradient of (<1/16 = 1 in 40) >1/16 = 1 in 80) for foul drains and 1 in 80 for surface water drains.
 - All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
 - All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All pipes, bends and junction materials for adoptable drainage shall be UPVC compliant with Clause E2.21 of Design and Construction Guidance for Foul and Surface Water Water Sewers, Sector Guidance Appendix C, June 2022. These should conform to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All back inlet gullies to be roddable or connected to inspection chambers.
 - All gully connections other than at manholes to be 'Y' junctions.
 - All road gully connections to be 150mm diameter.
 - All sub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
 - No low point shall be without a method of drainage.
 - All connections to be soffit to soffit unless otherwise noted.
 - All concrete and concrete products to be in accordance with BRE 363 for sulphates.
 - The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
 - Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
 - The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
 - Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
 - Should ground water be encountered on site during construction the Client shall be informed to determine if additional measures are required.
 - The drainage system shall be fully cleaned on completion of the project using methods that ensure pollution off site does not occur.
 - Any existing land drains severed during construction shall be reinstated.



KEYPLAN

Revision History					
Rev	Comment	By	Chkd	Appr	Date
A02	FOR APPROVAL	BS	TZ	SB	09.12.2025
A01	FOR APPROVAL	TZ	TZ	SB	24.11.2025
Current Revision					
A03	FOR APPROVAL - Updated to latest site layout	PJ	TZ	SB	27.05.2026

APPROVAL

ALLISON HOMES

robert west
prosgroup
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

Project
MARKFIELD

Drawing Title
PROPOSED IMPERMEABLE AREA PLAN
SHEET 1 OF 3

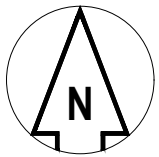
RWCL Internal Register reference: 5964-003

Scales @ A1

1060-A03



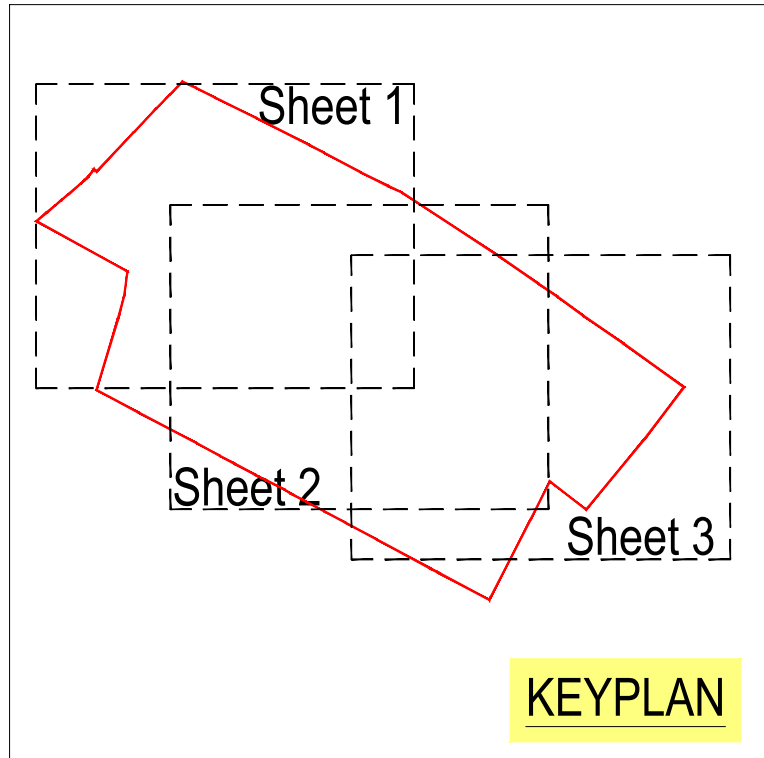
Key:	
—	Site Boundary = 41,584.13m²
	Houses = 4691m² + Urban creep 10% = 469m² Total = 5160m²
	Roads, paths & driveways = 9894m²
	Proposed Detention Basin = 1195m²
Total Impermeable Area = 16,249m²	



DO NOT SCALE OFF THIS DRAWING

NOTES

- The contractor is responsible for verifying all site & setting out dimensions before commencing work.
 - This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
 - All dimensions in meters unless stated otherwise.
- DRAINAGE NOTES:
- All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK) BS EN 752.
 - Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with the Client.
 - For location and setting out of building drainage points refer to architects drawings.
 - All pipe runs near buildings to comply with the Building Regulations 2015 part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
 - Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
 - Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
 - Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.9m the pipe shall be protected with a concrete slab set above it.
 - In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided, compressible boards (fibreglass or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints), the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section, a board thickness of 15mm for pipes up to 450mm nominal diameter and 30mm for pipes over 450mm nominal diameter.
 - All private building drainage shall be constructed in strict accordance with BS EN 752. Foul drainage beneath the floor slab shall be laid, shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
 - All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
 - All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All pipes, bends and junction materials for adoptable drainage shall be UPVC compliant with Clause E2.21 of Design and Construction Guidance for Foul and Surface Water Sewers, Sector Guidance Appendix C, June 2022. These should conform to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All back inlet gullies to be roddable or connected to inspection chambers.
 - All gully connections other than at manholes to be 'Y' junctions.
 - All road gully connections to be 150mm diameter.
 - All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
 - No low point shall be without a method of drainage.
 - All connections to be soffit to soffit unless otherwise noted.
 - All concrete and concrete products to be in accordance with BRE 363 for sulphates.
 - The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
 - Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
 - The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
 - Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
 - Should ground water be encountered on site during construction the Client shall be informed to determine if additional measures are required.
 - The drainage system shall be fully cleaned on completion of the project using methods that ensure pollution off site does not occur.
 - Any existing land drains severed during construction shall be reinstated.



Revision History					
Rev	Comment	By	Chkd	Appr	Date
A02	FOR APPROVAL	BS	TZ	SB	09.12.2025
A01	FOR APPROVAL	TZ	TZ	SB	24.11.2025
Current Revision					
A03	FOR APPROVAL - Updated to latest site layout	PJ	TZ	SB	27.05.2026

FOR APPROVAL

ALLISON HOMES

robert west
proesgroup
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

Project
MARKFIELD

Drawing Title
PROPOSED IMPERMEABLE AREA PLAN
SHEET 2 OF 3

RWCL Internal Register reference: 5964-003

Scales @ A1

1061-A03

Scale 1:250 @ A1 - 1:500 @ A3
0 5m 10m 15m 20m 25m

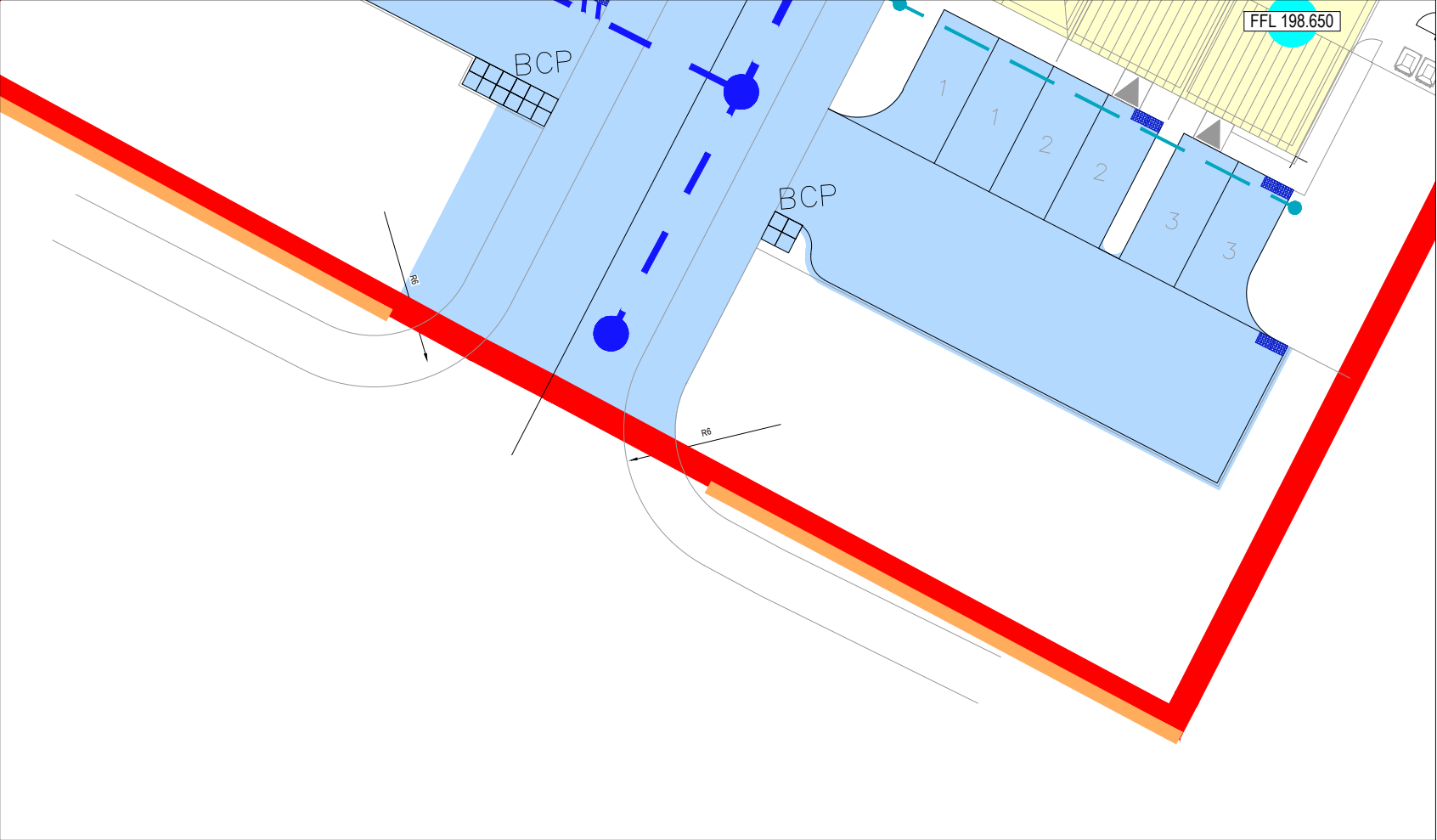
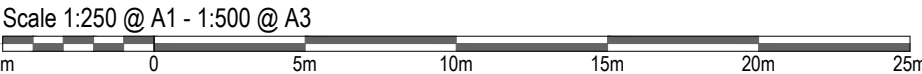
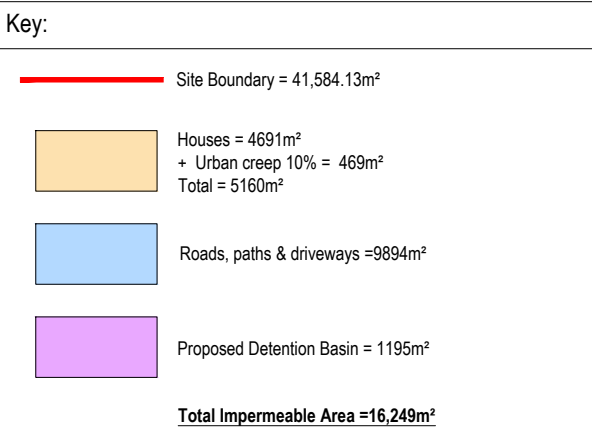


Diagram illustrating the arrangement of three sheets of paper (Sheet 1, Sheet 2, Sheet 3) and a keyplan. The sheets are overlapping, with Sheet 1 at the top, Sheet 2 in the middle, and Sheet 3 at the bottom. A yellow box labeled 'KEYPLAN' is positioned at the bottom right.

Revision History						
Rev	Comment	By	Chkd	Appr	Date	
A02	FOR APPROVAL	BS	TZ	SB	09.12.20	
A01	FOR APPROVAL	TZ	TZ	SB	24.11.20	
Current Revision						
A03	FOR APPROVAL - Updated to latest site layout	PJ	TZ	SB	27.05.20	

1 Paris Garden
London
SE1 8ND
t: 0203 773 7880
www.robertwest.co.uk

RWCL Internal Register reference: 5964-003

Scales @ A

62-A03

Appendix D – Site Investigation Report

Appendix E – Proposed Site Layout Plan



Accommodation Schedule			
House type	Beds	Storey	Number
Hartley	1	2	8
Loxley	2	2	28
Morley	3	2	37
Oatley	3	2	14
Totley	4	2	6
Total			93

Key

- Application site boundary
- Borough boundary
- Existing tree retention
- Existing tree removal
- Bin collection point
- On plot bin location
- Affordable rented dwellings and/or social affordable dwellings
- Affordable shared ownership
- Proposed tree planting (refer landscape proposal)
- Potential for equipped play/LEAP
- Existing stone wall

Rev | Date | Comments

06/05/26 Pump station and plots 19 and 20 amended in line with engineers recommendations

23/04/26 Existing stone wall shown along site frontage. Layout amended to engineering comments including updated basin design

07/04/26 Layout updated to latest tree survey. Plots 85-90 adjusted accordingly comments

02/04/26 Layout updated following landscaping comments

31/03/26 Layout structure amended in line with planning comments

15/12/25

0 10 20 m
1:500

ALLISON HOMES

nineteen47
CHARTERED TOWN PLANNERS & URBAN DESIGNERS

Project
Land off Ashby Road, Markfield

Drawing Title
Technical Planning Layout

Project Code Drawing Nr Rev Drawing Scale
n2159 008 F 1:500 @ A1

Appendix F – Proposed Impermeable Areas Plan



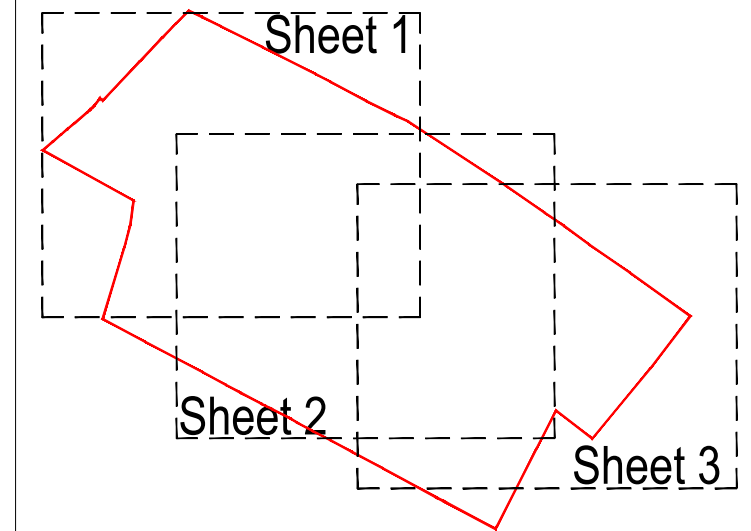
Key:
Site Boundary = 41,584.13m²
Houses = 4691m² Urban creep 10% = 469m² Total = 5160m²
Roads, paths & driveways = 9894m²
Proposed Detention Basin = 1195m²
Total Impermeable Area = 16,249m²



DO NOT SCALE OFF THIS DRAWING

NOTES

- The contractor is responsible for verifying all site & setting out dimensions before commencing work.
 - This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
 - All dimensions in meters unless stated otherwise.
- DRAINAGE NOTES:
- All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK) BS EN 1252.
 - Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with the Client.
 - For location and setting out of building drainage points refer to architects drawings.
 - All pipe runs near buildings to comply with the Building Regulations 2015 part H11. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
 - Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
 - Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
 - Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.9m the pipe shall be protected with a concrete slab set above it.
 - In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided, compressible boards (fibreglass or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints), the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section, a board thickness of 15mm for pipes up to 450mm nominal diameter and 30mm for pipes over 450mm nominal diameter.
 - All private building drainage shall be constructed in strict accordance with BS EN 752. Foul drainage beneath the floor slab shall be laid, shall be laid no flatter than 1:40. Unless otherwise specified below ground building drainage external to the building shall be 100mm diameter and shall be laid at a minimum gradient of (<1/16 = 1 in 40) >1/16 = 1 in 80) for foul drains and 1 in 80 for surface water drains.
 - All building drains shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
 - All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All pipes, bends and junction materials for adoptable drainage shall be UPVC compliant with Clause E2.21 of Design and Construction Guidance for Foul and Surface Water Water Sewers, Sector Guidance Appendix C, June 2022. These should conform to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All back inlet gullies to be roddable or connected to inspection chambers.
 - All gully connections other than at manholes to be 'Y' junctions.
 - All road gully connections to be 150mm diameter.
 - All sub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
 - No low point shall be without a method of drainage.
 - All connections to be soffit to soffit unless otherwise noted.
 - All concrete and concrete products to be in accordance with BRE 363 for sulphates.
 - The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
 - Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
 - The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
 - Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
 - Should ground water be encountered on site during construction the Client shall be informed to determine if additional measures are required.
 - The drainage system shall be fully cleaned on completion of the project using methods that ensure pollution off site does not occur.
 - Any existing land drains severed during construction shall be reinstated.



KEYPLAN

Revision History					
Rev	Comment	By	Chkd	Appr	Date
A02	FOR APPROVAL	BS	TZ	SB	09.12.2025
A01	FOR APPROVAL	TZ	TZ	SB	24.11.2025
Current Revision					
A03	FOR APPROVAL - Updated to latest site layout	PJ	TZ	SB	27.05.2026

APPROVAL

ALLISON HOMES

robert west
prosgroup
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

Project
MARKFIELD

Drawing Title
PROPOSED IMPERMEABLE AREA PLAN
SHEET 1 OF 3

RWCL Internal Register reference: 5964-003

Scales @ A1

1060-A03



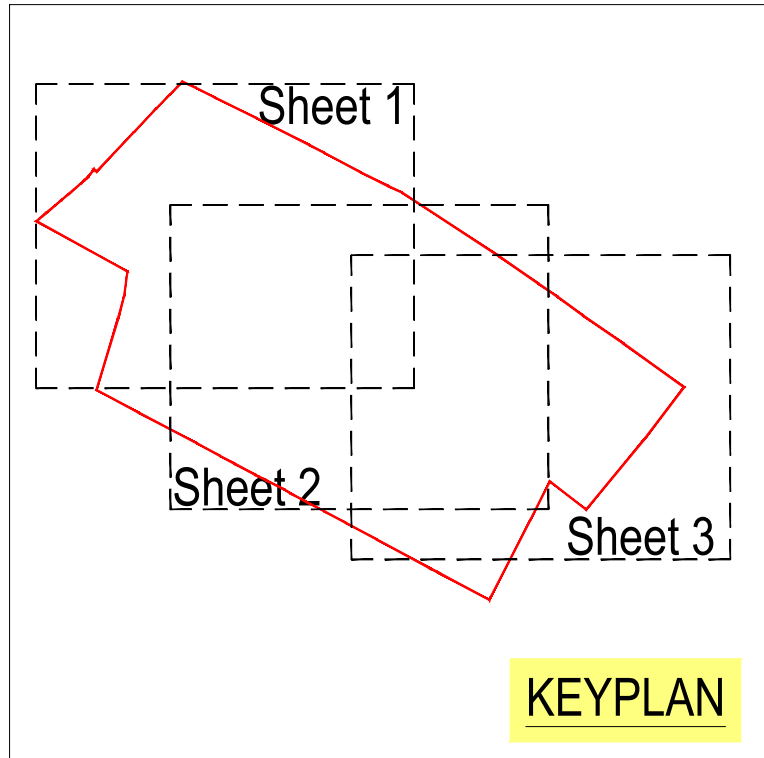
Key:

—	Site Boundary = 41,584.13m ²
	Houses = 4691m ² + Urban creep 10% = 469m ² Total = 5160m ²
	Roads, paths & driveways = 9894m ²
	Proposed Detention Basin = 1195m ²
Total Impermeable Area = 16,249m²	

DO NOT SCALE OFF THIS DRAWING

NOTES

- The contractor is responsible for verifying all site & setting out dimensions before commencing work.
 - This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
 - All dimensions in meters unless stated otherwise.
- DRAINAGE NOTES:
- All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK) BS EN 752.
 - Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with the Client.
 - For location and setting out of building drainage points refer to architects drawings.
 - All pipe runs near buildings to comply with the Building Regulations 2015 part H1. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
 - Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
 - Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
 - Where a pipe, under a vehicular area other than a carriageway has a depth of cover if less than 0.9m the pipe shall be protected with a concrete slab set above it.
 - In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided, compressible boards (fibreboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints), the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section, a board thickness of 15mm for pipes up to 450mm nominal diameter and 30mm for pipes over 450mm nominal diameter.
 - All private building drainage shall be constructed in strict accordance with BS EN 752. Foul drainage beneath the floor slab shall be laid, shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
 - All building drains shall be laid in accordance with BS EN 752.
 - All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All pipes, bends and junction materials for adoptable drainage shall be UPVC compliant with Clause E2.21 of Design and Construction Guidance for Foul and Surface Water Sewers, Sector Guidance Appendix C, June 2022. These should conform to BS4660, BSEN13598 and BSEN1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All back inlet gullies to be roddable or connected to inspection chambers.
 - All gully connections other than at manholes to be 'Y' junctions.
 - All road gully connections to be 150mm diameter.
 - All stub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
 - No low point shall be without a method of drainage.
 - All connections to be soffit to soffit unless otherwise noted.
 - All concrete and concrete products to be in accordance with BRE 363 for sulphates.
 - The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
 - Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
 - The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
 - Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
 - Should ground water be encountered on site during construction the Client shall be informed to determine if additional measures are required.
 - The drainage system shall be fully cleaned on completion of the project using methods that ensure pollution off site does not occur.
 - Any existing land drains severed during construction shall be reinstated.



Revision History					
Rev	Comment	By	Chkd	Appr	Date
A02	FOR APPROVAL	BS	TZ	SB	09.12.2025
A01	FOR APPROVAL	TZ	TZ	SB	24.11.2025
Current Revision					
A03	FOR APPROVAL - Updated to latest site layout	PJ	TZ	SB	27.05.2026

FOR APPROVAL

ALLISON HOMES

robert west
proesgroup
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

Project
MARKFIELD

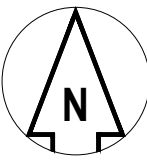
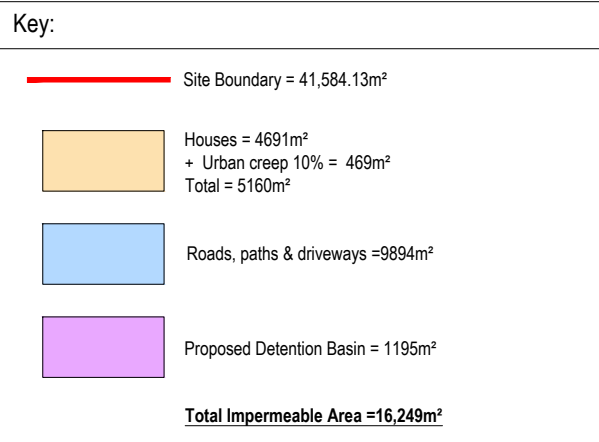
Drawing Title
PROPOSED IMPERMEABLE AREA PLAN
SHEET 2 OF 3

RWCL Internal Register reference: 5964-003

Scales @ A1

1061-A03

Scale 1:250 @ A1 - 1:500 @ A3
0 5m 10m 15m 20m 25m



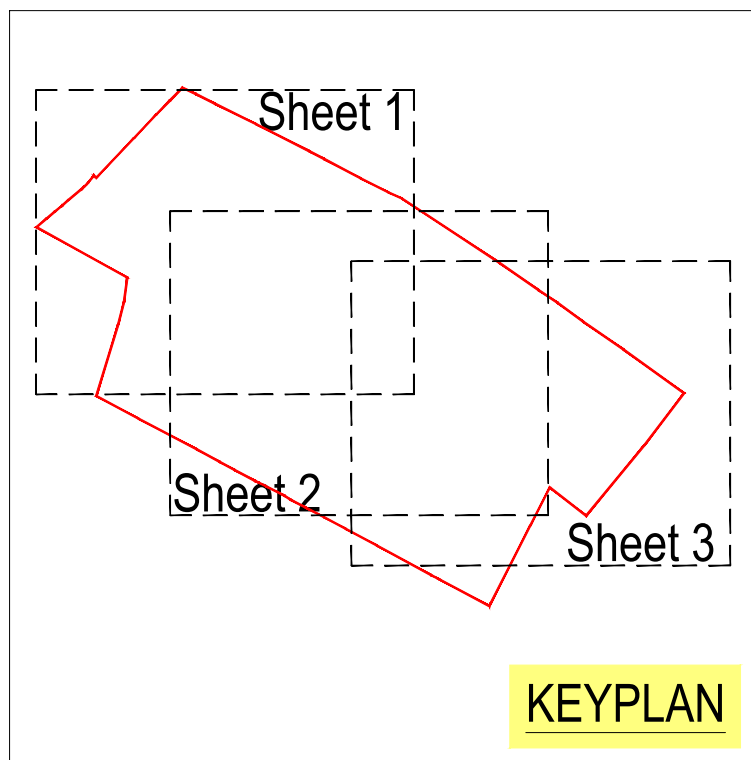
DO NOT SCALE OFF THIS DRAWING

NOTES

1. The contractor is responsible for verifying all site & setting out dimensions before commencing work.
2. This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
3. All dimensions in meters unless stated otherwise.

DRAINAGE NOTES

3. All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK) BS EN 752.
4. Any existing drainage found crossing the site to be investigated, and if found to be 'live', should be diverted in consultation with the Client.
5. For all location and setting out of building drainage points refer to architects' drawings:
 - a) pipes runs near buildings to comply with the Building Regulations 2015 (Part 10). Where pipes are to be installed in a trench, they shall be fitted with class G250 concrete slabs to the lowest level of foundation. Where the trench is further than 1m from the foundation, this trench shall be filled with class G250 concrete to a level below the lowest level for the trench. The trench shall be filled with a minimum of 150mm of concrete. In both cases the pipe shall be bedded and surrounded in 150mm thick class G250 concrete.
 - b) Where pipes, external to the structure, have a depth to soil from ground level of less than 450mm they shall have a class G250 concrete encasement (150mm thick).
 - c) Where pipes are close to a structure, with a depth of cover less than 1.2m the pipe shall be laid in a concrete bed and surround.
6. Where a pipe, under a vehicular area other than a carriageway has a depth of cover of less than 0.3m the pipe shall be protected with a concrete slab set above it.
7. All drainage pipes shall be installed in accordance with BS EN 12566-2 (concrete flexible pipe) should be provided: compressible boards (fibrous or polymeric) shall be provided at a maximum of 8m centres (coinciding with joint positions), the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cover above a board thickness of 15mm. Pipes up to 450mm nominal diameter and 300mm for pipes over 450mm nominal diameter.
8. All private building drainage shall be constructed in strict accordance with BS EN 752. For drainage beneath the floor slab shall be laid, shall be laid no flatter than 1:80. Unless otherwise specified, all drainage pipes shall be laid in a trench, the trench shall be filled with class G250 concrete to a level below the lowest level for the trench. The trench shall be filled with a minimum of 150mm of concrete. In both cases the pipe shall be bedded and surrounded in 150mm thick class G250 concrete. The trench shall be filled with a minimum of 150mm of concrete. In both cases the pipe shall be bedded and surrounded in 150mm thick class G250 concrete.
9. All pipes bends and junctions for private building drainage shall be UPVC compliant with BS4660, BS19598 and BS1401 as appropriate and shall be laid in accordance with BS EN 12566-2.
10. All pipes bends and junctions for commercial drainage shall be UPVC compliant with BS4660, BS19598 and BS1401 as appropriate and shall be laid in accordance with BS EN 12566-2.
11. All pipes bends and junctions for public building drainage shall be UPVC compliant with BS4660, BS19598 and BS1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
12. All back inlet pipes to be roddable or connected to inspection chambers.
13. All gully connections other than at manholes to be 1/2 joints.
14. All gully connections to be made in accordance with BS EN 12566-2.
15. All sub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate in a roof space.
16. No top joint shall be without a method of access.
17. All connections to be soffit to soffit unless otherwise noted.
18. All concrete and concrete products to be in accordance with BRE 363 for sulphates.
19. All details of building drainage, including the location and level of all drains, shall be shown on drawings during setting out and any discrepancies reported immediately.
20. Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
21. All connections to existing public sewers, watercourses or manholes where connections or diversions are proposed must be confirmed and reported to the engineer before works commences on site.
22. Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations (Part 10) and the Environment Agency.
23. Should ground water be encountered on site during construction the Client shall be informed to determine if additional measures are required.
24. The drainage system shall be fully cleansed on completion of the project using methods to be agreed with the Client.
25. Any existing land drains severed during construction shall be reinstated.



Revision History						
Rev	Comment	By	Chkd	Appr	Date	
A02	FOR APPROVAL	BS	TZ	SB	09.12.20	
A01	FOR APPROVAL	TZ	TZ	SB	24.11.20	
Current Revision						
A03	FOR APPROVAL - Updated to latest site layout	PJ	TZ	SB	27.05.20	

FOR APPROVAL

ALLISON HOMES

robert west
proesgroup

1 Paris Garden
London
SE1 8ND
t: 0203 773 7880
www.robertwes

Project
MARKFIELD

Drawing Title
PROPOSED IMPERMEABLE AREA PLAN
SHEET 3 OF 3

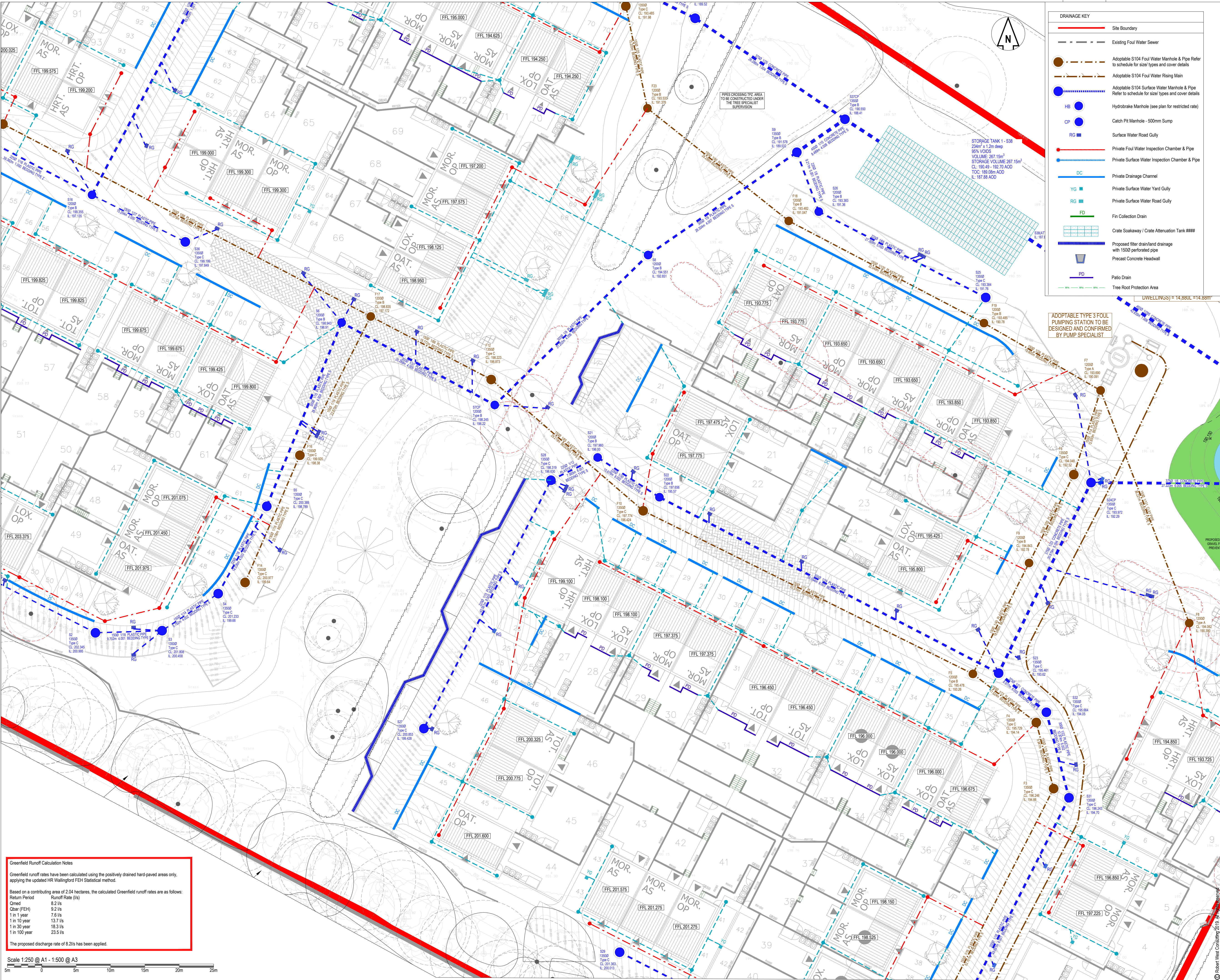
RWCL Internal Register reference: 5964-003

Scales @ A:

062-A03

© Robert West Consulting 2019. All rights reserved

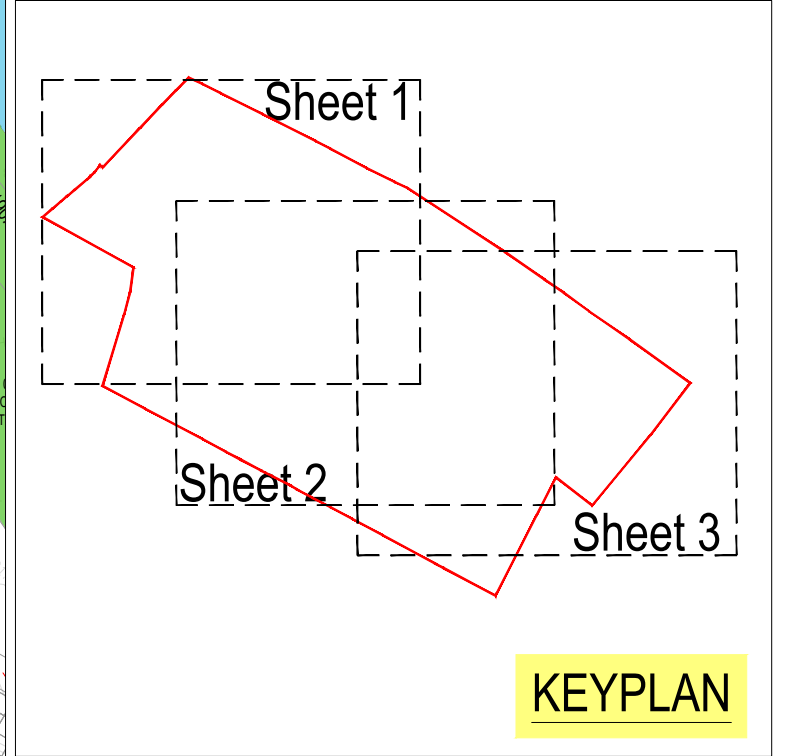
Appendix G – Proposed Drainage Strategy Plan and Calculations



DRAINAGE KEY	
	Site Boundary
	Existing Foul Water Sewer
	Adoptable S104 Foul Water Manhole & Pipe Refer to schedule for size/ types and cover details
	Adoptable S104 Foul Water Rising Main
	Adoptable S104 Surface Water Manhole & Pipe Refer to schedule for size/ types and cover details
	Hydrobrake Manhole (see plan for restricted rate)
	HB
	CP
	RG
	Private Foul Water Inspection Chamber & Pipe
	Private Surface Water Inspection Chamber & Pipe
	Private Drainage Channel
	YG
	RG
	FD
	Fin Collection Drain
	Crate Soakaway / Crate Attenuation Tank ###
	Patio Drain
	Tree Root Protection Area

ADOPTABLE TYPE 3 FOUL PUMPING STATION TO BE DESIGNED AND CONFIRMED BY PUMP SPECIALIST

- DO NOT SCALE OFF THIS DRAWING
- NOTES**
- The contractor is responsible for verifying all site & setting out dimensions before commencing work.
 - This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
 - All dimensions in meters unless stated otherwise.
- DRAINAGE NOTES:**
- All drainage works to be constructed in strict accordance with specification of the Local Authority, Building Regulations, Design and Construction Guidance (published by Water UK) BS EN 1252.
 - Any existing drainage found crossing the site is to be investigated, and if found to be 'live', it should be diverted in consultation with the Client.
 - For location and setting out of building drainage points refer to architects drawings.
 - All pipe runs near buildings to comply with the Building Regulations 2015 part H11. Where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases the pipe shall be bedded and surrounded in 150mm thick class GEN3 concrete.
 - Where pipes, external to the structures, have a depth to soffit from ground level of less than 450mm they shall have a class GEN3 concrete encasement (150mm thick).
 - Where a pipe, under a carriageway, has a depth of cover of less than 1.2m the pipe shall be laid in a concrete bed and surround.
 - Where a pipe, under a vehicular area other than a carriageway has a depth of cover of less than 0.9m the pipe shall be protected with a concrete slab set above it.
 - In any circumstances where pipes are bedded and surrounded in concrete flexible joints should be provided, compressible boards (fibreglass or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints), the boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section, a board thickness of 15mm for pipes up to 450mm nominal diameter and 30mm for pipes over 450mm nominal diameter.
 - All private building drainage shall be constructed in strict accordance with BS EN 752. Foul drainage beneath the floor slab shall be laid in conjunction with 'non adoptive bedding details' (class d, n or b) unless otherwise specified.
 - All pipes, bends and junction for private building drainage shall be UPVC conforming to BS4660, BS EN 13598 and BS EN 1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All pipes, bends and junction materials for adoptable drainage shall be UPVC compliant with Clause E2.21 of Design and Construction Guidance for Foul and Surface Water Sewers, Sector Guidance Appendix C, June 2022. These should conform to BS4660, BS EN 13598 and BS EN 1401 as appropriate and shall be laid in accordance with the manufacturer's specification.
 - All back inlet gullies to be roddable or connected to inspection chambers.
 - All gully connections other than at manholes to be 'Y' junctions.
 - All road gully connections to be 150mm diameter.
 - All sub stacks to be fitted with air admittance valves where branch drain exceeds 12m except at the head of the run. Soil vent pipes located at the head of a run to terminate to fresh air.
 - No low point shall be without a method of drainage.
 - All connections to be soffit to soffit unless otherwise noted.
 - All concrete and concrete products to be in accordance with BRE 363 for sulphates.
 - The locations of all building drainage points shall be cross referenced against the architects drawings during setting out and any discrepancies reported immediately.
 - Before connections are made to existing public sewers an application under S106 must be made to relevant sewerage undertaker.
 - The precise depth and location and size of existing pipes, watercourses or manholes where connections or diversion are proposed must be confirmed and reported to the engineer before works commence on site.
 - Any existing drains to be abandoned to be decommissioned in accordance with the Building Regulations by either grubbing, infilling or sealing.
 - Should ground water be encountered on site during construction the Client shall be informed to determine if additional measures are required.
 - The drainage system shall be fully cleaned on completion of the project using methods that ensure pollution off site does not occur.
 - Any existing land drains severed during construction shall be reinstated.



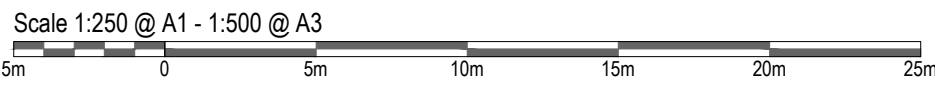
Greenfield Runoff Calculation Notes

Greenfield runoff rates have been calculated using the positively drained hard-paved areas only, applying the updated HR Wallingford FEH Statistical method.

Based on a contributing area of 2.04 hectares, the calculated Greenfield runoff rates are as follows:

Return Period	Runoff Rate (l/s)
Q _{med}	8.2 l/s
Q ₁₀₀ (FEH)	9.2 l/s
1 in 1 year	7.6 l/s
1 in 10 year	13.7 l/s
1 in 30 year	18.3 l/s
1 in 100 year	23.5 l/s

The proposed discharge rate of 8.2 l/s has been applied.



Revision History				
Rev	Comment	By	Chkd	Appr
A02	FOR APPROVAL	BS	TZ	SB
A01	FOR APPROVAL	TZ	TZ	SB
Current Revision				
A03	FOR APPROVAL - Updated to latest site layout	PJ	TZ	SB

FOR APPROVAL

ALLISON HOMES

robert west
proesgroup

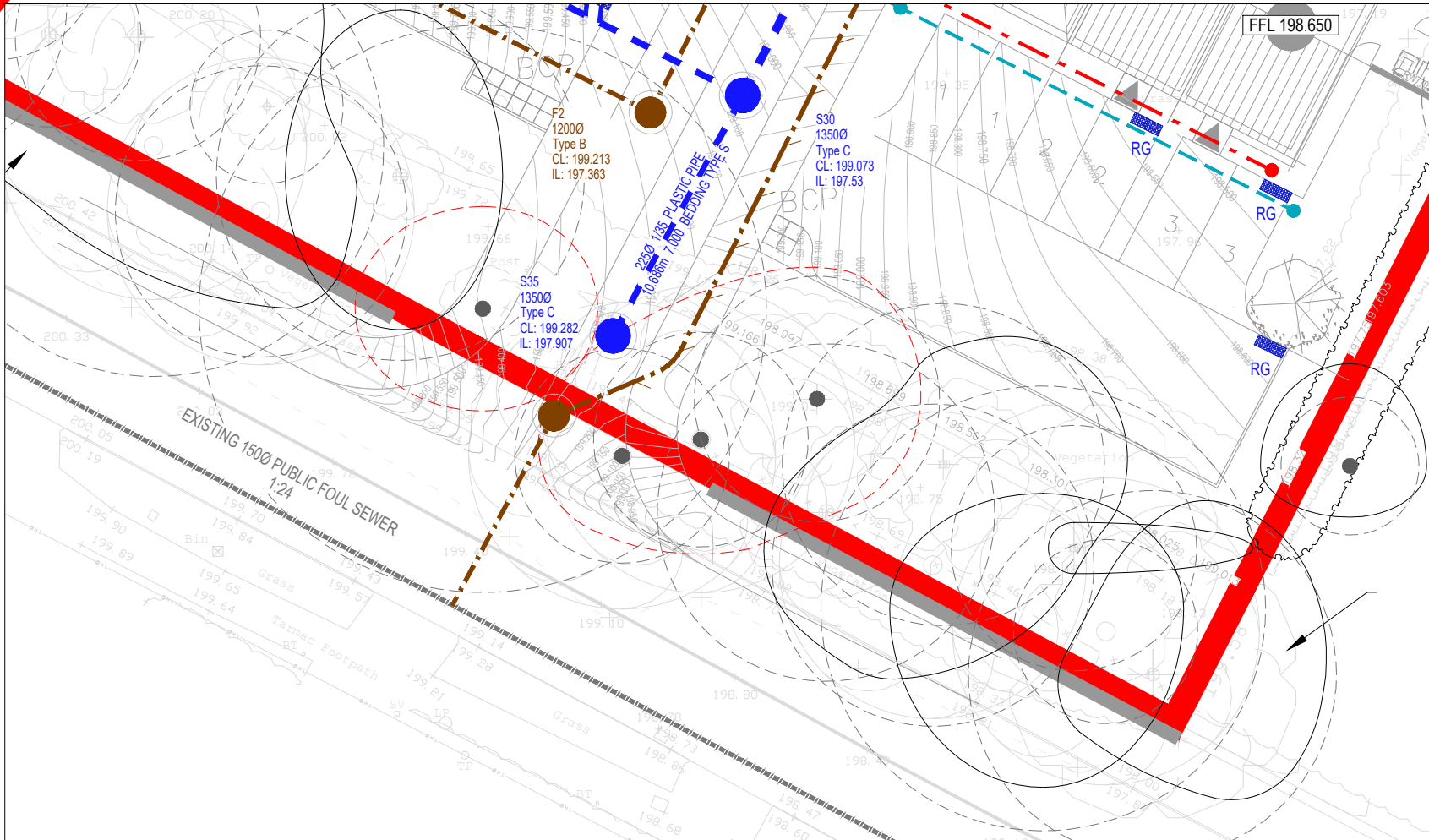
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

Project
MARKFIELD

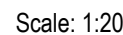
Drawing Title
PROPOSED DRAINAGE
SHEET 2 OF 3

RWCL Internal Register reference: 5964-003

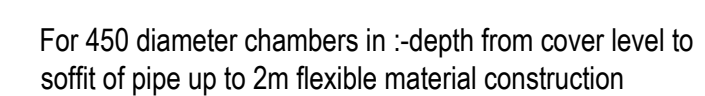
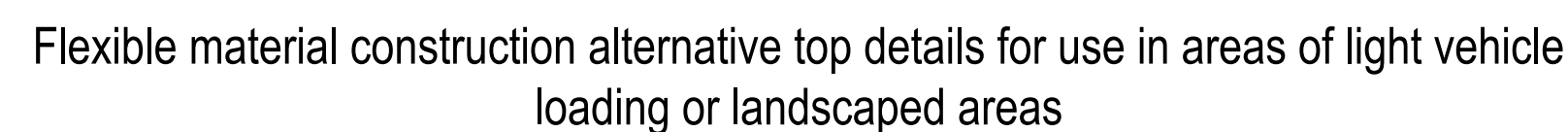
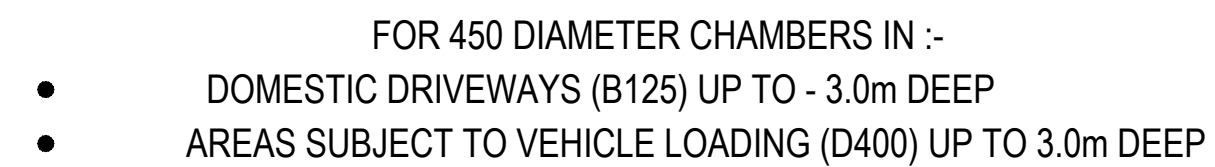
Scales @ A1
1021-A03

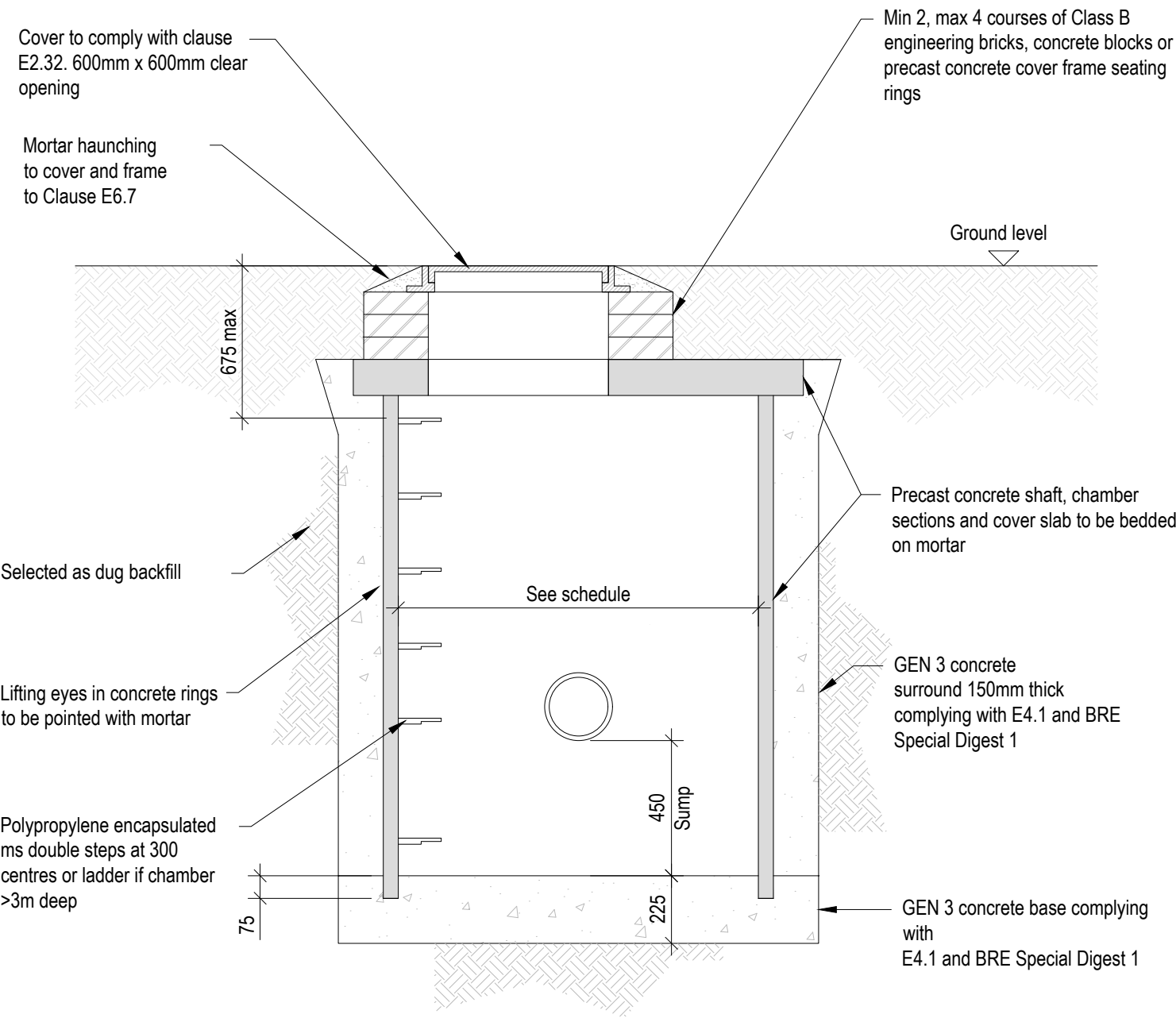


FOR APPROVAL	
ALLISON HOMES	
	1 Paris Garden London SE1 8ND t: 0203 773 7880 www.robertwest.co.uk
Project	MARKFIELD
Drawing Title	PROPOSED DRAINAGE SHEET 3 OF 3
RWCL Internal Register reference: 5964-003	Scales @ A1
1022 - A03	

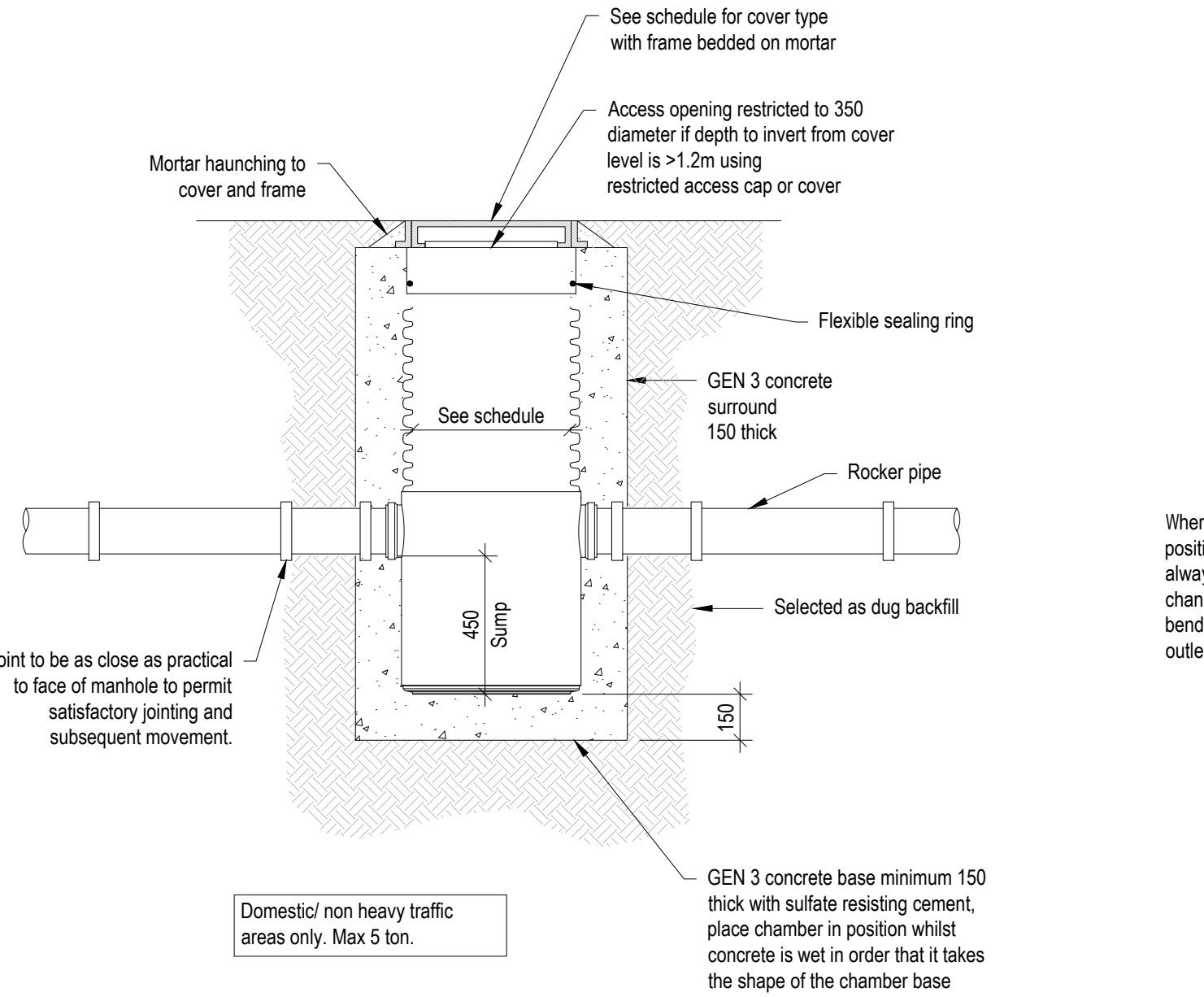


1100-A01

101-A01

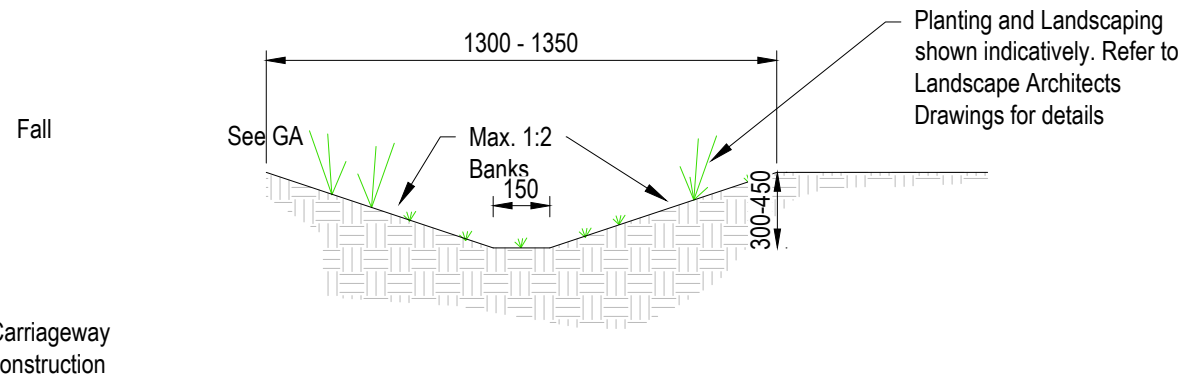


PRECAST CONCRETE
CATCHPIT DETAIL



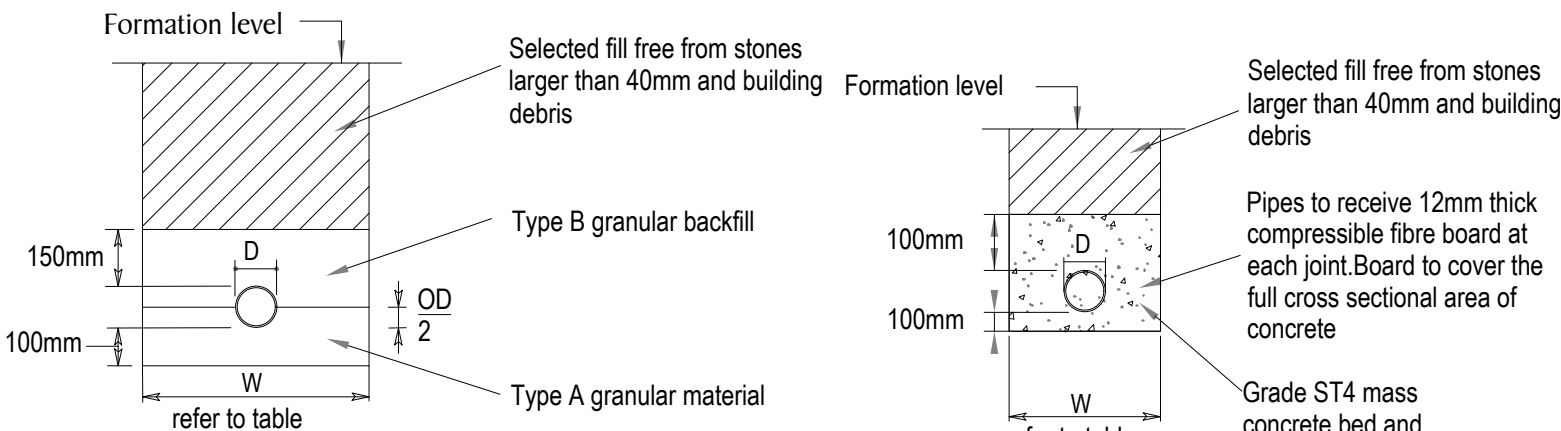
PLASTIC INSPECTION CHAMBER - CATCHPIT

Scale: 1:20



PROPOSED DRAINAGE (DRY) SWALE

- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEER'S, ARCHITECT'S AND SPECIALIST'S DRAWINGS AND THE SPECIFICATION.
- DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
- TYPE A TO BE 10MM SINGLE SIZED AGGREGATE TO BS EN 1610 ANNEX B TABLE B15 FOR 100Ø PIPES AND 14MM FOR 150Ø
- TYPE B TO BE UNIFORM READILY COMPACTABLE MATERIAL FREE FROM ANY TREE ROOTS, VEGETATION MATTER, BUILDING DEBRIS, FROZEN SOIL, CLAY LUMPS RETAINED ON A 100MM SIEVE OR STONES RETAINED ON A 40MM SIEVE.
- WHERE A FOUNDATION PASSES CLOSE TO A SEWER OR DRAIN TRENCH OR TRIAL PIT THE FOUNDATION DEPTH IS TO BE SUCH THAT ITS UNDERSIDE IS BELOW A LINE PROJECTED UP AT 45° FROM THE NEAREST BOTTOM CORNER OF THE DRAIN TRENCH, SEWER TRENCH OR TRIAL PIT OR CONCRETE BACKFILL TO TRENCHES USED AS DETAILED
- ANY SOFT SPOT FOUND IN TRENCH LINE TO BE REPORTED TO SITE STAFF PRIOR TO PLACING OF PIPE BEDDING.
- JOINT FILLER TO CONCRETE PIPE SURROUND SHALL CONSIST OF BITUMEN IMPREGNATED INSULATING BOARD TO BS 1142 PART 3. THICKNESS OF BOARD 12MM.
- ALL PIPEWORK SHALL BE CONSTRUCTED FROM 'SUPER STRENGTH' VITRIFIED CLAY TO BS 65, BS EN 295 OR UPVC TO BS EN 1401
- PRECAST CONCRETE PIPES AND CHAMBERS TO BE TO BS 5911.



TYPE 1 (RIDGED PIPE)
CLASS B

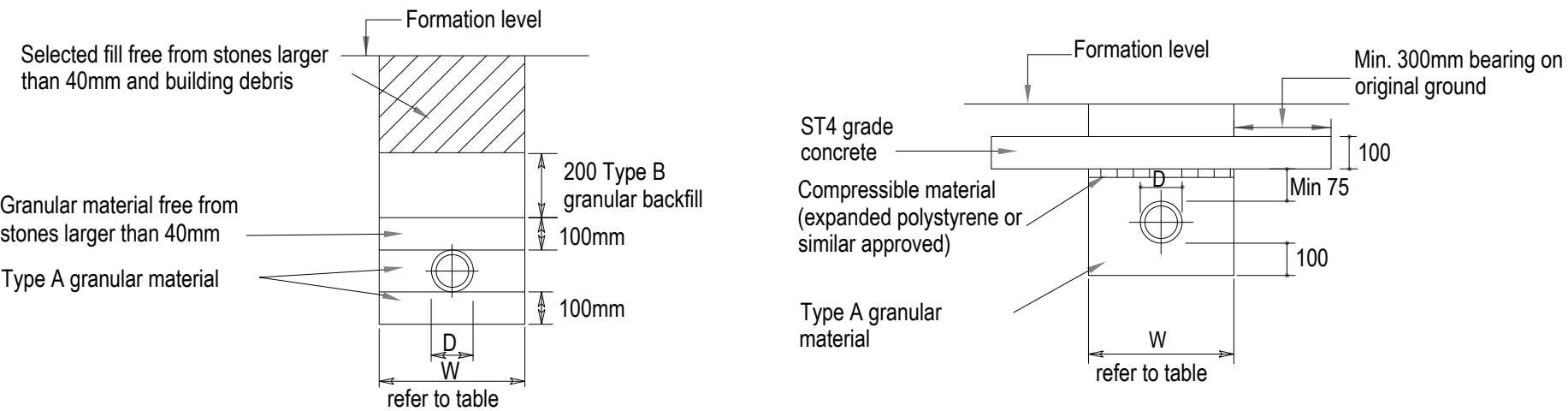
Location: Pedestrian areas up to 5.0m depth, Vehicle areas 0.6m - 5.0m

TYPE 2 (RIDGED PIPES)
CLASS X

Location: Vehicle areas - up to 0.6m

TYPICAL PIPE BEDDING DETAILS

(SCALE 1:20)



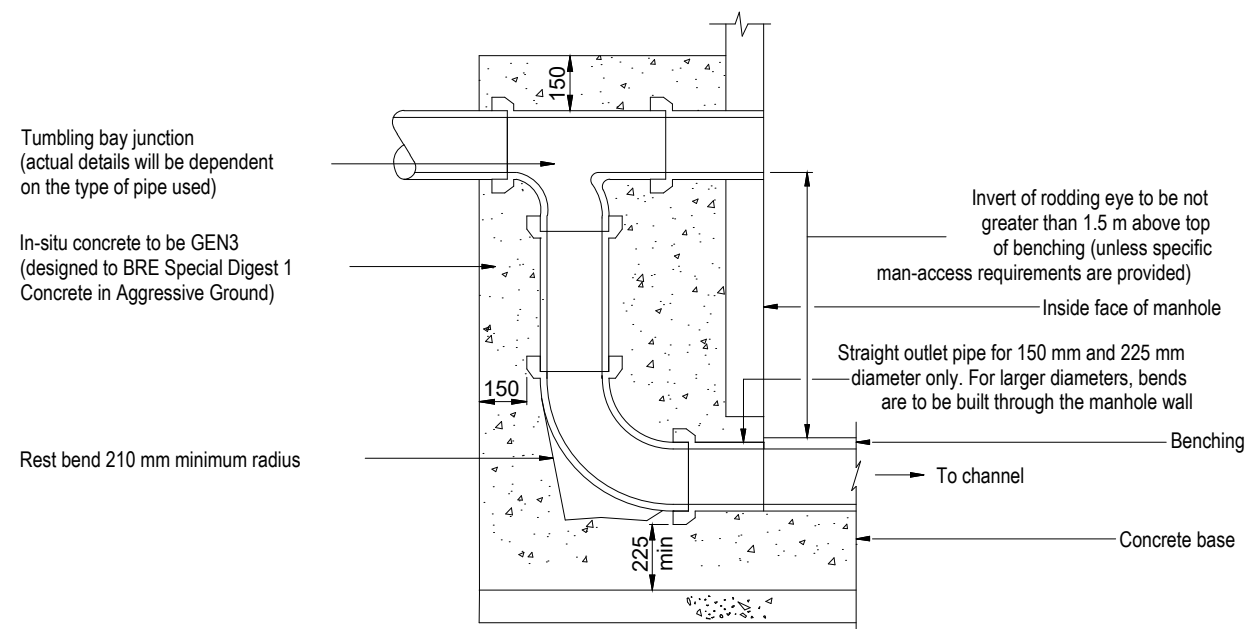
TYPE 3 (UPVC PIPES)
CLASS S1

Location: Pedestrian areas, 0.6m - 7.0m Vehicle areas, 0.9m - 7.0m Under buildings

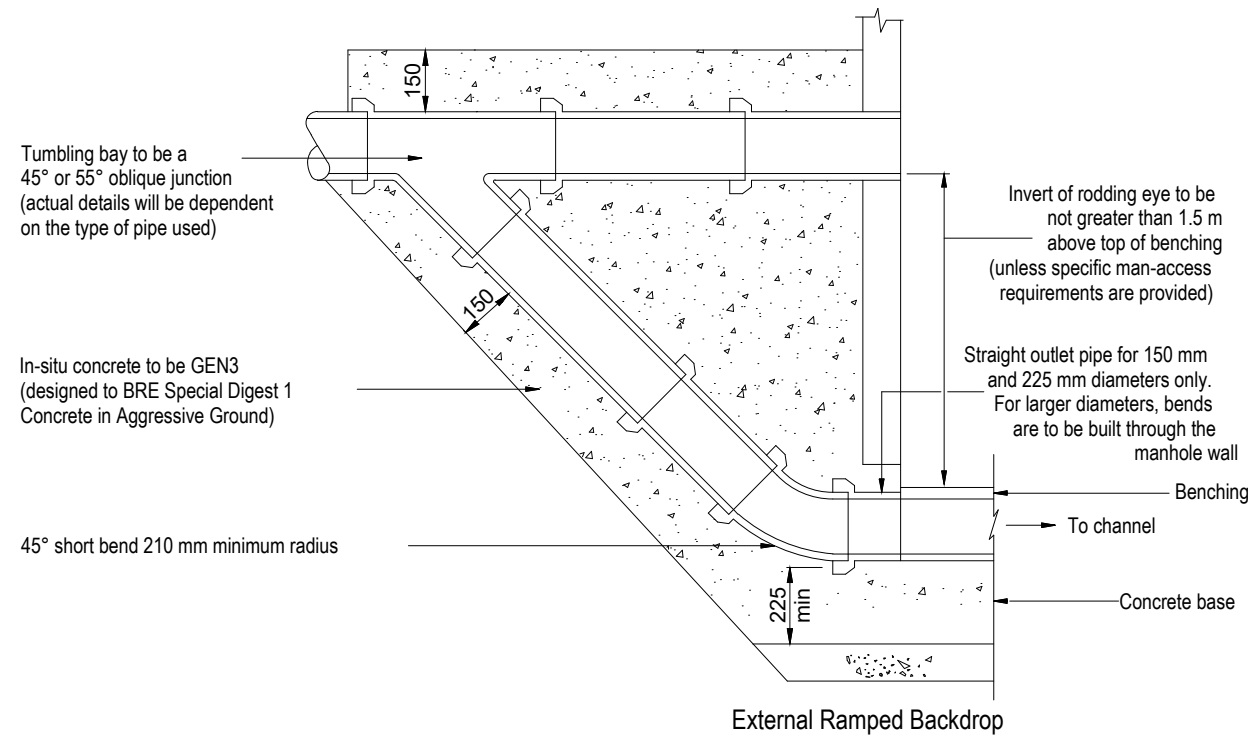
TYPE 4 (UPVC PIPES)

Location: Pedestrian areas up to 0.6m, private vehicle parking and areas subject to construction traffic up to 0.9m.

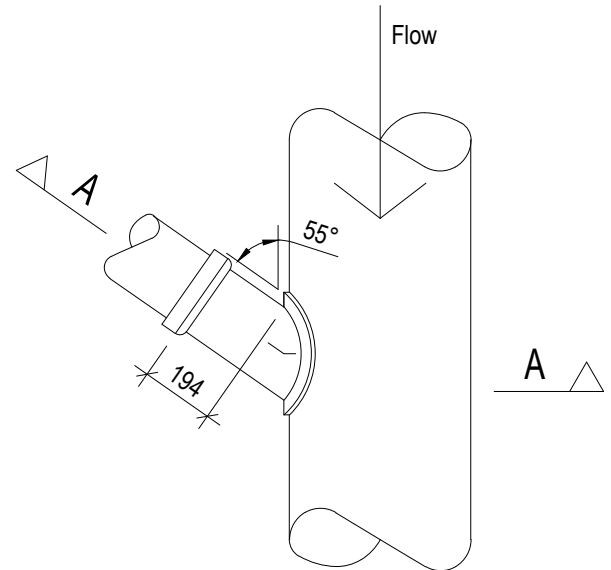
When laid in landscape areas subject to no loading (incl. construction traffic) ST4 concrete can be omitted.



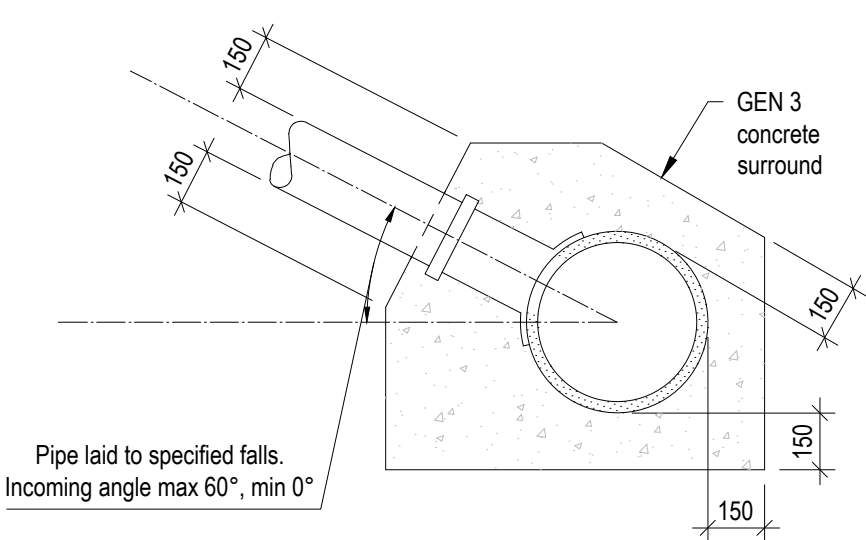
EXTERNAL VERTICAL BACKDROP



EXTERNAL RAMPED BACKDROP



SADDLE CONNECTION - PLAN
VIEW



SADDLE CONNECTION SECTION A-A

SCALE 1:20

TABLE 1

DN	Minimum trench width (OD + x)		
	Supported trench	Unsupported trench	
		# > 60°	# < 60°
less 225	600	600	600
225 to 350	800	800	800
350 to 700	OD + 700	OD + 700	OD + 400
700 to 1200	OD + 850	OD + 850	OD + 400
greater 1200	OD + 1000	OD + 1000	OD + 400

In the values OD + x, x/2 equals the minimum working space between the pipe and the trench wall or support, where:
OD is external diameter.
is angle of unsupported trench side measured to the horizontal.

MINIMUM TRENCH WIDTH IN RELATION TO
NORMAL SIZE DN

TABLE 2

Trench depth	Minimum trench width
less 1000	As Table 1
1000 to 1750	800
1750 to 4000	900
greater 4000	1000

The minimum trench width shall be the greater of the values taken from tables 1 & 2.

MINIMUM TRENCH WIDTH IN RELATION TO
TRENCH DEPTH

DO NOT SCALE OFF THIS DRAWING

NOTES

- The contractor is responsible for verifying all site & setting out dimensions before commencing work.
- This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
- All dimensions in meters unless stated otherwise.

Revision History					
Rev	Comment	By	Chkd	Appr	Date
Current Revision					
A01	FOR APPROVAL	TZ	TZ	SB	24.11.2025

APPROVAL

ALLISON HOMES

robert west
proesgroup
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

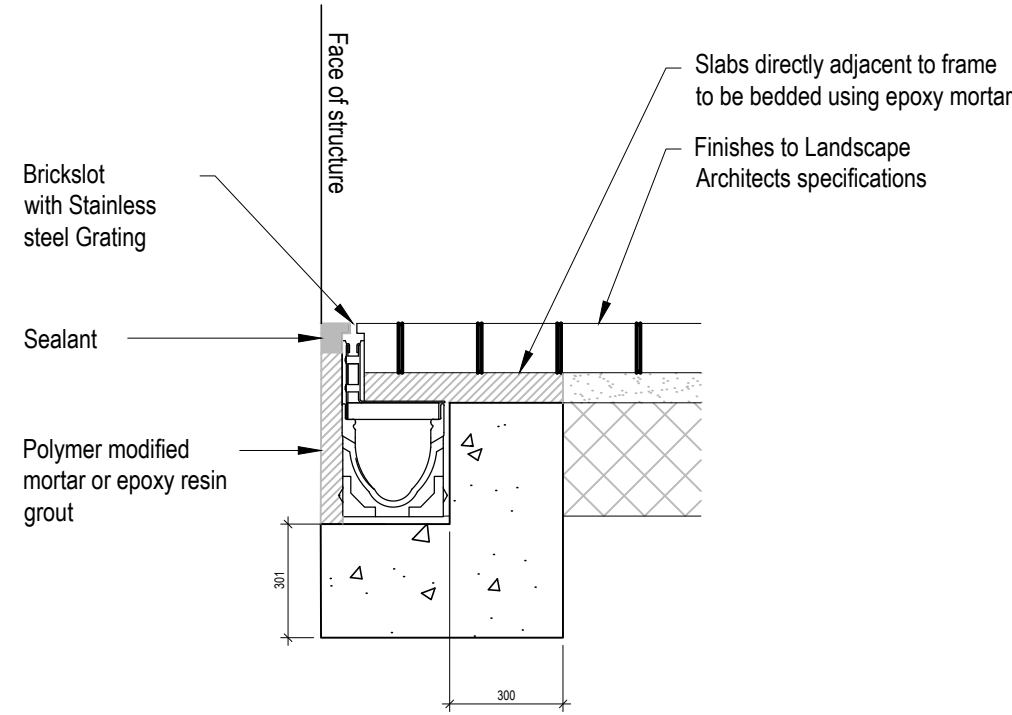
Project
MARKFIELD

Drawing Title
PROPOSED CONSTRUCTION DETAILS
SHEET 3

RWCL Internal Register reference: 5964-003

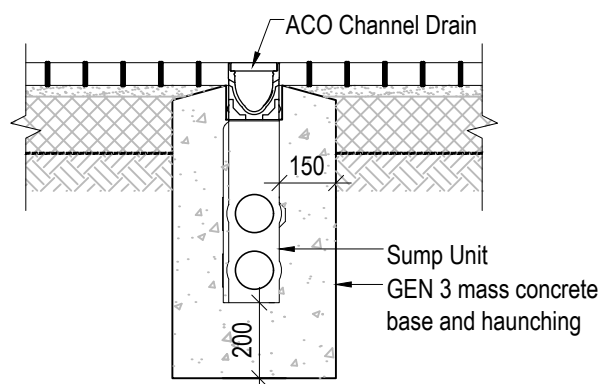
Scales @ A1

1102 - A01

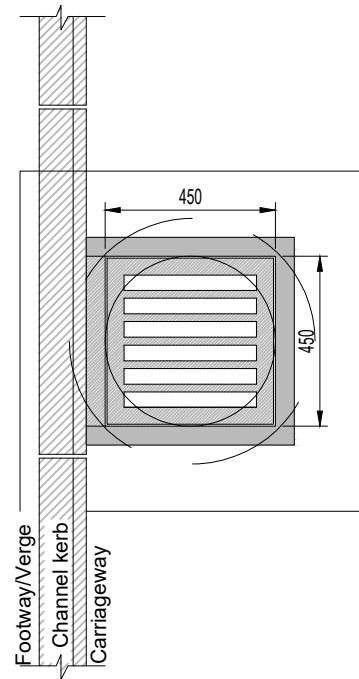


LINEAR SLOT DRAIN AT THRESHOLD DETAIL

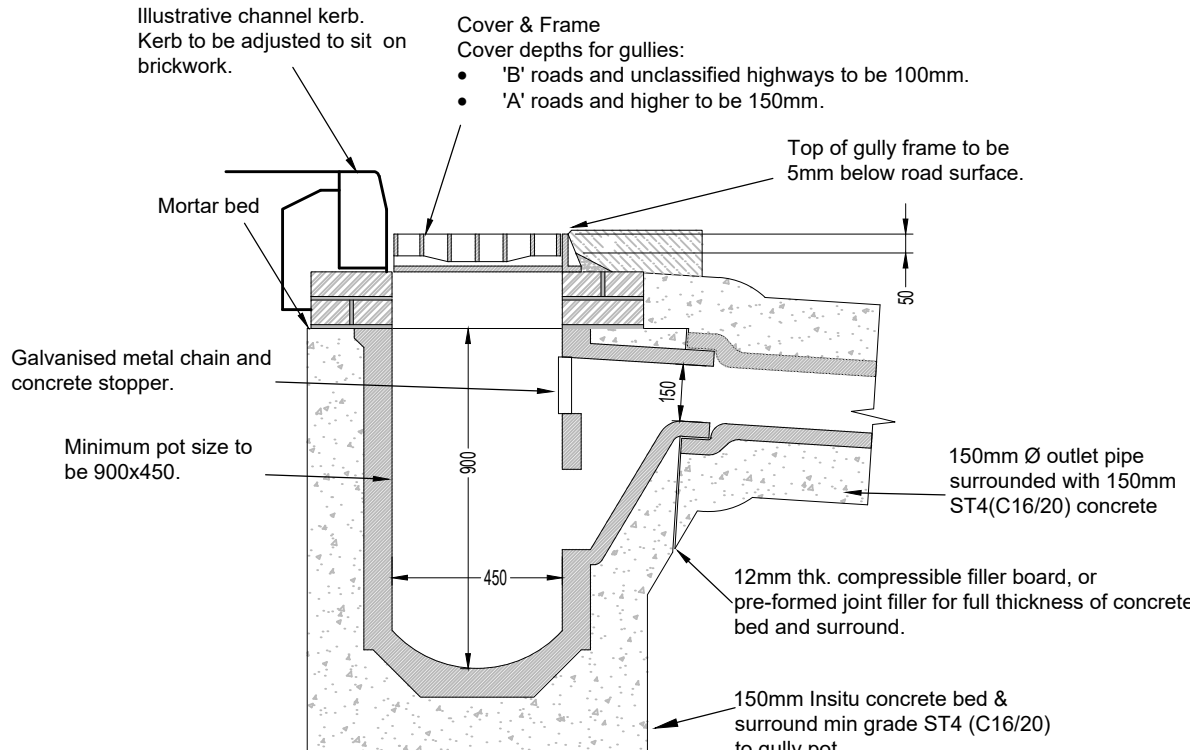
SCALE 1:20



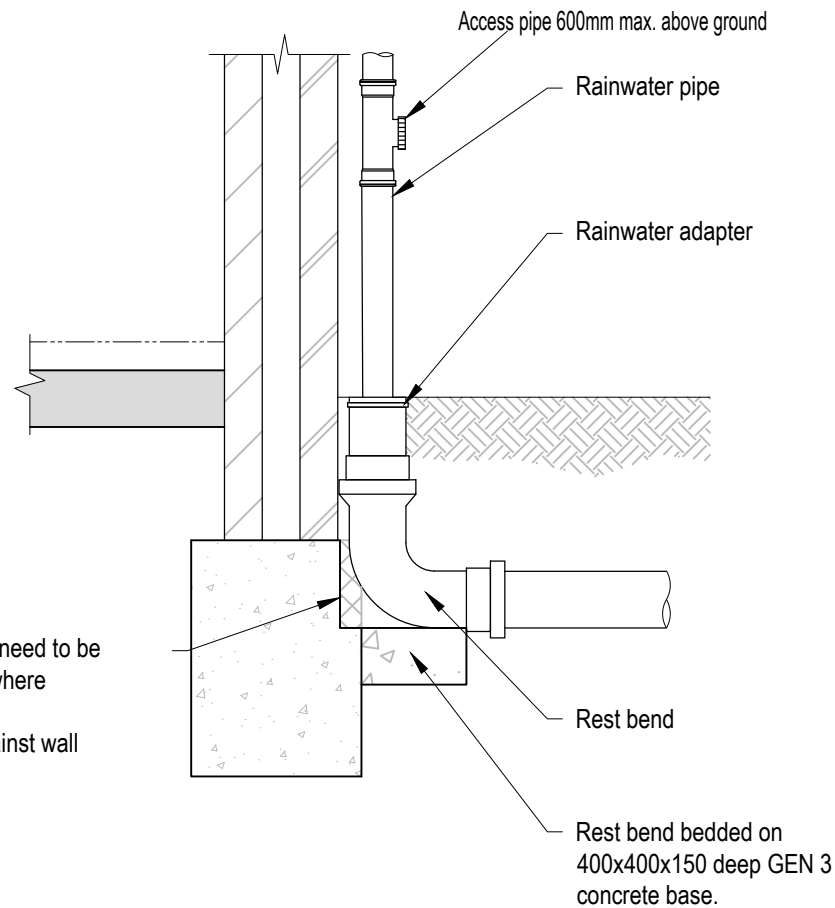
SUMP UNIT CHANNEL/SLOT DRAIN DETAIL (ACO M100D UNIVERSAL SUMP)



ROAD GULLY AT KERB Type:Precast Concrete Plan

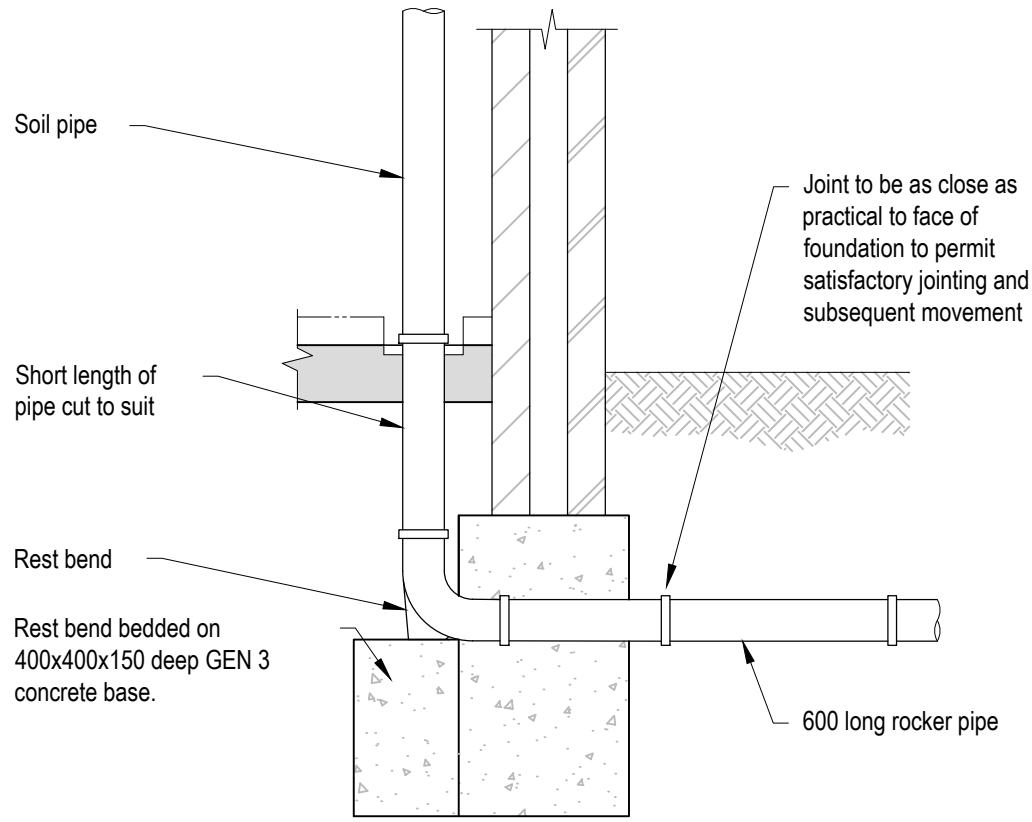


ROAD GULLY AT KERB Type:Precast Concrete Section



RAINWATER DOWN PIPE TO DRAIN (SURFACE WATER SYSTEM)

SCALE 1:20



TYPICAL SOIL VENT PIPE/STUB STACK/WC DETAIL

SCALE 1:20

DO NOT SCALE OFF THIS DRAWING

NOTES

1. The contractor is responsible for verifying all site & setting out dimensions before commencing work.
2. This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
3. All dimensions in meters unless stated otherwise.

Revision History						
Rev	Comment	By	Chkd	Appr	Date	
Current Revision						
A01	FOR APPROVAL	TZ	TZ	SB	24.11.20	

APPROVAL

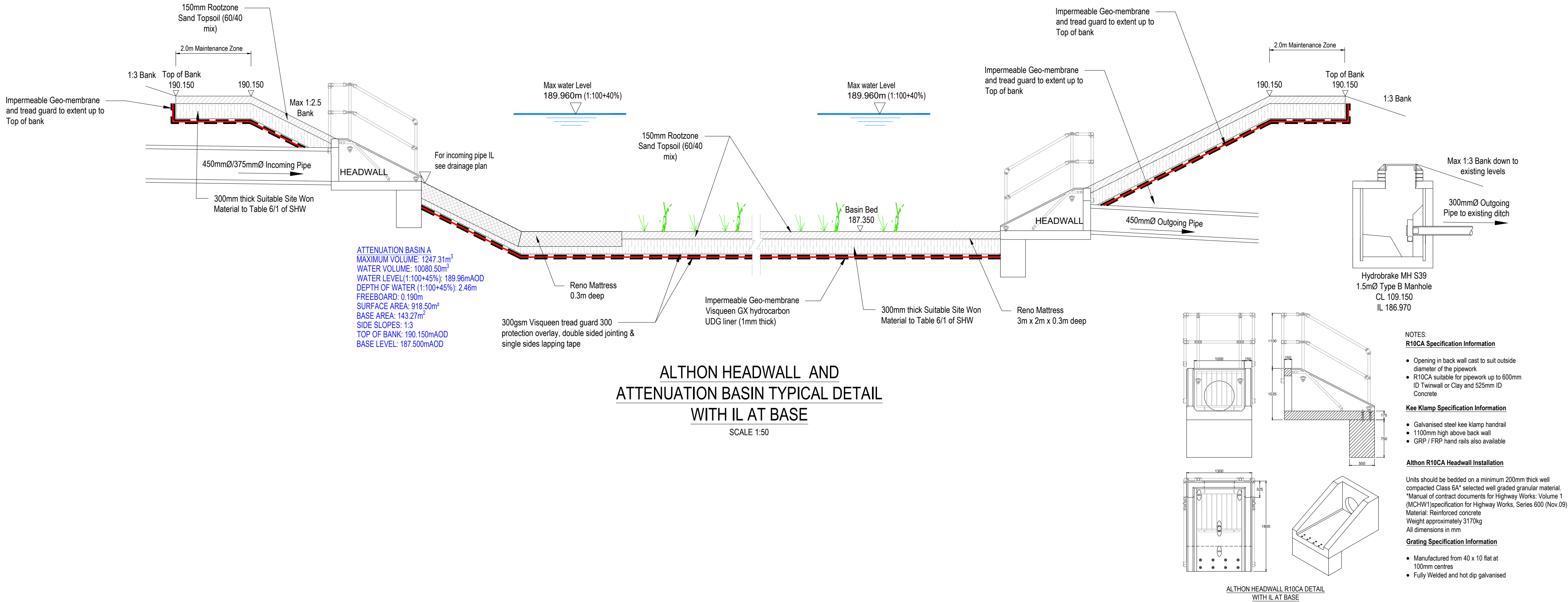
ALLISON HOMES

robert west
proesgroup
1 Paris Garden
London
SE1 1ND
t: 0203 773 7880
www.robertwest.co.uk

Project
MARKFIELD

Drawing Title
PROPOSED CONSTRUCTION DETAILS
SHEET 4

RWCL Internal Register reference: 5964-003 Scales @ A1



ALTHON HEADWALL AND
ATTENUATION BASIN TYPICAL DETAIL
WITH IL AT BASE
SCALE 1:50

DO NOT SCALE OFF THIS DRAWING

- NOTES**
1. The contractor is responsible for verifying all site & setting out dimensions before commencing work.
 2. This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
 3. All dimensions in meters unless stated otherwise.

Revision History					
Rev	Comment	By	Chkd	Appr	Date
A01	FOR APPROVAL	TZ	TZ	SB	24.11.2025
Current Revision					
A02	FOR APPROVAL - Updated to latest site layout	PJ	TZ	SB	27.05.2026

APPROVAL

ALLISON HOMES

1 Paris Garden
London
SE1 8ND
t: 0203 773 7880
www.robertwest.co.uk

robert west
proesgroup

Project
MARKFIELD

Drawing Title
PROPOSED CONSTRUCTION DETAILS
SHEET 5

RWCL Internal Register reference: 5964-003 Scales @ A1

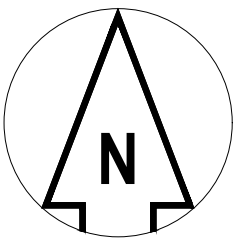
Key:

Site Boundary

Exceedance Flow Arrow

Scale 1:500 @ A1 - 1:1000 @ A3

10m 0 10m 20m 30m 40m 50m



- DO NOT SCALE OFF THIS DRAWING
- NOTES
1. The contractor is responsible for verifying all site & setting out dimensions before commencing work.
 2. This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
 3. All dimensions in meters unless stated otherwise.



Revision History						
Rev	Comment	By	Chkd	Appr	Date	
A01	ISSUED FOR APPROVAL	TZ	TZ	SB	24/11/2025	
Current Revision						
A02	UPDATED AS PER SITE LAYOUT DATED 06/05/26	NS	PJ	SB	27/05/2026	

APPROVAL

ALLISON HOMES

robert west

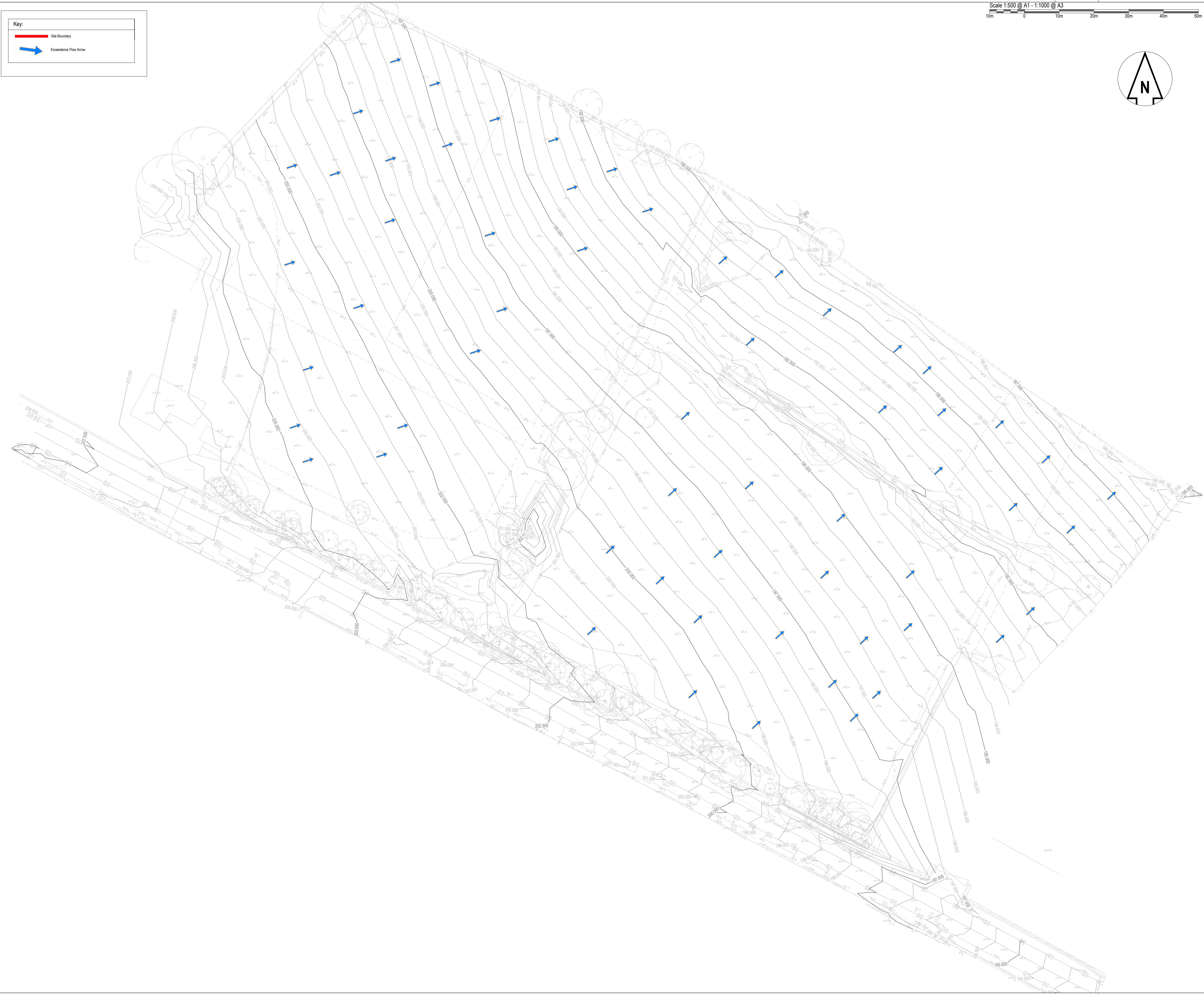
prosgroup

1 Paris Garden
London
SE1 8ND

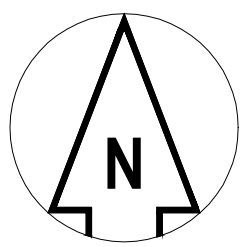
t: 0203 773 7880
www.robertwest.co.uk

Project
MARKFIELD

Drawing Title
PROPOSED SITE
EXCEEDANCE FLOW PLAN



Scale 1:500 @ A1 - 1:1000 @ A3
10m 0 10m 20m 30m 40m 50m



DO NOT SCALE OFF THIS DRAWING

NOTES

1. The contractor is responsible for verifying all site & setting out dimensions before commencing work.
2. This drawing is to be read in conjunction with all relevant Architectural and M&E drawings.
3. All dimensions in meters unless stated otherwise.

Revision History						
Rev	Comment	By	Chkd	Appr	Date	
Current Revision						
A01 FOR APPROVAL		TZ	TZ	SB	24.11.2025	

APPROVAL

ALLISON HOMES

robert west

prosgroup

1 Paris Garden
London
SE1 8ND
t: 0203 773 7880
www.robertwest.co.uk

Project MARKFIELD

Drawing Title
EXISTING SITE
EXCEEDANCE FLOW PLAN

RWCL Internal Register reference: 59964-003 Scales @ A1

1151-A01

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Size (mm)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S15	0.115	1350	Type C	201.040	199.615	1.200	448716.509	310747.348
S36	0.000	1350	Type C	199.199	197.849	1.200	448764.953	310722.240
S16	0.178	1200	Type B	199.355	197.135	1.920	448751.378	310729.087
S19	0.074	1350	Type C	199.318	197.967	1.202	448741.711	310804.444
S17	0.113	1350	Type B	196.567	194.642	1.550	448781.042	310785.688
S20CP	0.000	1350	Type B	193.482	191.107	2.000	448829.297	310759.577
S18	0.000	1350	Type C	190.850	189.520	0.955	448839.113	310754.777
S1	0.055	1350	Type C	203.876	202.526	1.200	448720.329	310681.512
S2	0.008	1350	Type C	202.345	200.995	1.200	448751.878	310665.362
S3	0.015	1350	Type C	201.808	200.458	1.200	448761.575	310665.669
S4	0.035	1350	Type C	201.233	199.660	1.348	448769.736	310671.064
S5	0.036	1350	Type C	200.389	198.789	1.300	448776.803	310683.766
S6	0.060	1200	Type B	198.943	196.910	1.733	448787.695	310710.501
S7CP	0.043	1200	Type B	198.245	196.220	1.725	448809.962	310698.514
PS3	0.000	180	Type E	198.738	196.767	1.870	448801.431	310710.933
PS1	0.000	180	Type E	197.034	197.011	-0.077	448803.720	310738.728
PS2	0.000	180	Type E	196.958	196.939	-0.082	448813.348	310733.776
S8	0.000	1200	Type B	194.551	192.651	1.600	448832.272	310720.328
S25	0.041	1350	Type C	193.384	191.760	1.399	448881.387	310714.155
S26	0.046	1200	Type B	193.383	191.360	1.798	448857.099	310726.642
S9	0.000	1350	Type B	191.578	189.532	1.596	448853.911	310735.283
S37CP	0.000	1350	Type B	190.550	188.410	1.690	448860.910	310740.086
S38(ATT)	0.000	1350	Type B	191.110	187.882	2.778	448887.652	310722.671
S10CP	0.000	1350	Type B	190.150	187.737	1.963	448923.417	310699.099
S29	0.065	1350	Type C	201.363	200.013	1.125	448828.136	310618.885
S35	0.016	1350	Type C	199.282	197.907	1.150	448866.013	310587.600
S30	0.146	1350	Type C	199.073	197.530	1.243	448871.083	310597.007
S31	0.006	1350	Type C	196.243	194.700	1.243	448893.500	310641.355
S32	0.043	1350	Type C	195.664	194.050	1.239	448890.213	310653.803
S27	0.086	1350	Type C	200.853	199.428	1.200	448799.657	310651.430
S28	0.012	1350	Type C	198.319	196.630	1.464	448818.135	310687.560
S21	0.017	1200	Type B	197.960	196.000	1.735	448824.937	310690.871
S22	0.145	1200	Type B	197.656	195.570	1.786	448833.917	310685.092
S23	0.062	1350	Type C	195.461	193.620	1.541	448883.263	310659.485
S24CP	0.000	1350	Type C	193.972	192.290	1.307	448896.705	310687.218
HW1	0.120	1350	Type B	190.150	187.525	2.175	448923.908	310688.268
S33	0.081	1350	Type C	193.360	192.010	1.200	448921.966	310660.255
S34CP	0.010	1350	Type C	191.899	190.549	1.200	448944.056	310647.040
HW2	0.000	1350	Type B	190.150	187.500	2.200	448949.936	310665.049
S13(POND)	0.000	1500	Type B	190.150	187.400	2.450	448958.777	310670.668
S14	0.000	1350	Type C	185.971	184.621	1.050	448974.063	310673.395

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (mm)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S15	199.615	S16	197.210	Circ	225	39.362	16	0.600	1.200	1.920
2.000	S36	197.849	S16	197.285	Circ	150	15.204	27	0.600	1.200	1.920
1.001	S16	197.135	S17	194.717	Circ	300	63.903	26	0.600	1.920	1.550
3.000	S19	197.967	S17	194.867	Circ	150	43.575	14	0.600	1.202	1.550
1.002	S17	194.642	S20CP	191.932	Circ	375	54.867	20	0.600	1.550	1.175
1.003	S20CP	191.107	S18	189.520	Circ	375	10.926	7	0.600	2.000	0.955
1.004	S18	189.520	S37CP	188.485	Circ	375	26.286	25	0.600	0.955	1.690
4.000	S1	202.526	S2	200.995	Circ	150	35.443	23	0.600	1.200	1.200
4.001	S2	200.995	S3	200.458	Circ	150	9.702	18	0.600	1.200	1.200
4.002	S3	200.458	S4	199.735	Circ	150	9.782	14	0.600	1.200	1.348
4.003	S4	199.660	S5	198.864	Circ	225	14.536	18	0.600	1.348	1.300
4.004	S5	198.789	S6	196.910	Circ	300	28.869	15	0.600	1.300	1.733
4.005	S6	196.910	S7CP	196.220	Circ	300	25.288	37	0.600	1.733	1.725
4.006	S7CP	196.220	S8	192.651	Circ	300	31.202	9	0.600	1.725	1.600
5.000	PS3	196.767	PS2	196.939	Circ	100	25.764	150	0.600	1.870	-0.082
6.000	PS1	197.011	PS2	196.939	Circ	100	10.827	150	0.600	-0.077	-0.082

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (mm)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
5.001	PS2	196.939	S8	192.852	Circ	100	23.216	6	0.600	-0.082	1.600
4.007	S8	192.651	S9	189.682	Circ	300	26.304	9	0.600	1.600	1.596
7.000	S25	191.760	S26	191.360	Circ	225	27.309	68	0.600	1.399	1.798
7.001	S26	191.360	S9	189.757	Circ	225	9.211	6	0.600	1.798	1.596
4.008	S9	189.532	S37CP	188.966	Circ	450	8.489	15	0.600	1.596	1.135
1.005	S37CP	188.410	S38(ATT)	187.882	Circ	450	31.913	60	0.600	1.690	2.778
1.006	S38(ATT)	187.882	S10CP	187.737	Circ	450	42.835	295	0.600	2.778	1.963
1.007	S10CP	187.737	HW1	187.525	Circ	450	10.842	51	0.600	1.963	2.175
8.000	S29	200.013	S30	197.605	Circ	225	48.198	20	0.600	1.125	1.243
9.000	S35	197.907	S30	197.605	Circ	225	10.686	35	0.600	1.150	1.243
8.001	S30	197.530	S31	194.700	Circ	300	49.691	18	0.600	1.243	1.243
8.002	S31	194.700	S32	194.125	Circ	300	12.874	22	0.600	1.243	1.239
8.003	S32	194.050	S23	193.620	Circ	375	8.977	21	0.600	1.239	1.466
10.000	S27	199.428	S28	196.640	Circ	225	40.581	15	0.600	1.200	1.454
10.001	S28	196.630	S21	196.000	Circ	225	7.565	12	0.600	1.464	1.735
10.002	S21	196.000	S22	195.645	Circ	225	10.679	30	0.600	1.735	1.786
10.003	S22	195.570	S23	193.620	Circ	300	55.594	29	0.600	1.786	1.541
8.004	S23	193.620	S24CP	192.290	Circ	375	30.819	23	0.600	1.466	1.307
8.005	S24CP	192.290	HW1	187.750	Circ	375	27.223	6	0.600	1.307	2.025
1.008	HW1	187.525	HW2	187.500	Circ	450	34.880	1395	0.600	2.175	2.200
11.000	S33	192.010	S34CP	190.549	Circ	150	25.741	18	0.600	1.200	1.200
11.001	S34CP	190.549	HW2	187.800	Circ	150	18.945	7	0.600	1.200	2.200
1.009	HW2	187.500	S13(POND)	187.400	Circ	450	10.476	105	0.600	2.200	2.300
1.010	S13(POND)	187.400	S14	184.621	Circ	300	15.528	6	0.600	2.450	1.050

Outfall Details

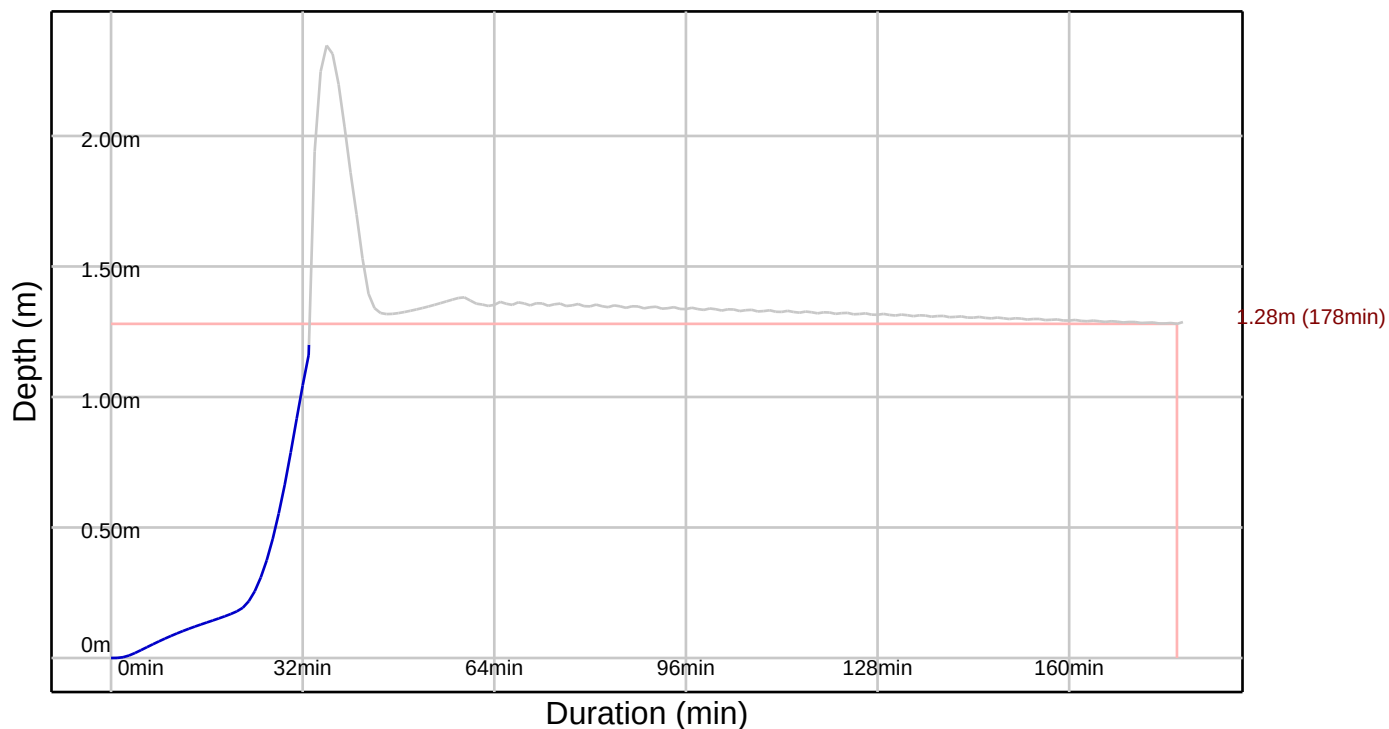
Outfall Manhole S14 : Free Discharge

Flow Control Details

Tank Structure at Manhole S38(ATT)

Tank Invert (m)	Tank Height (m)	Porosity Ratio (%)	Area (m2)	Effective Area (m2) Area x Porosity Ratio	Max Storage (m3) Effective Area x Height	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
187.882	1.200	95.00	234.000	222.300	266.760	0.00000000	0.00000000	2.00

Tank 1 at S38(ATT) (100Yr+40% 60Min Summer)

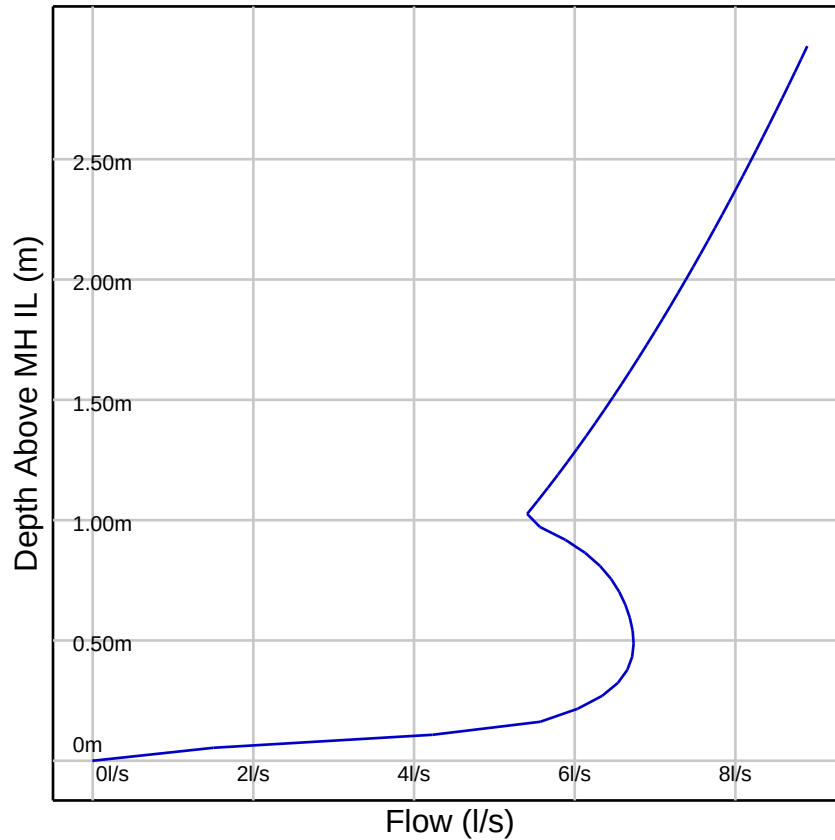


Controls within Manhole S13(POND)

Hydro-Brake® Optimum Control

Model Ref	Design Depth (m)	Design Flow (l/s)	Invert Offset (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
SHE-0112-8200-2500-8200	2.500	8.200	0.000	0.488	6.733	1.001	5.346

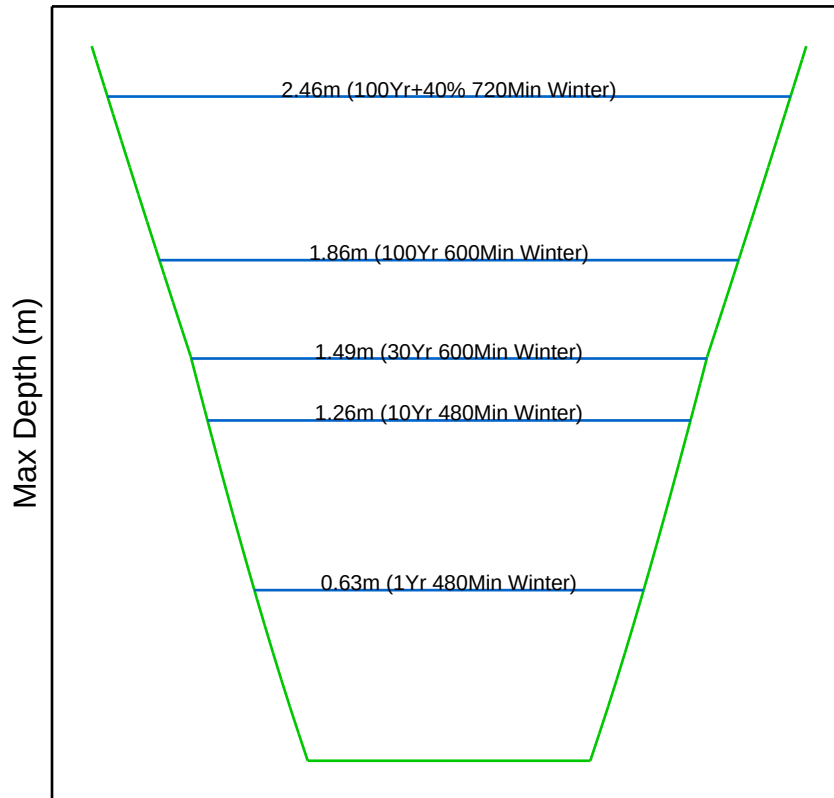
Hydro-Brake® Optimum Control from S13(POND) to S14



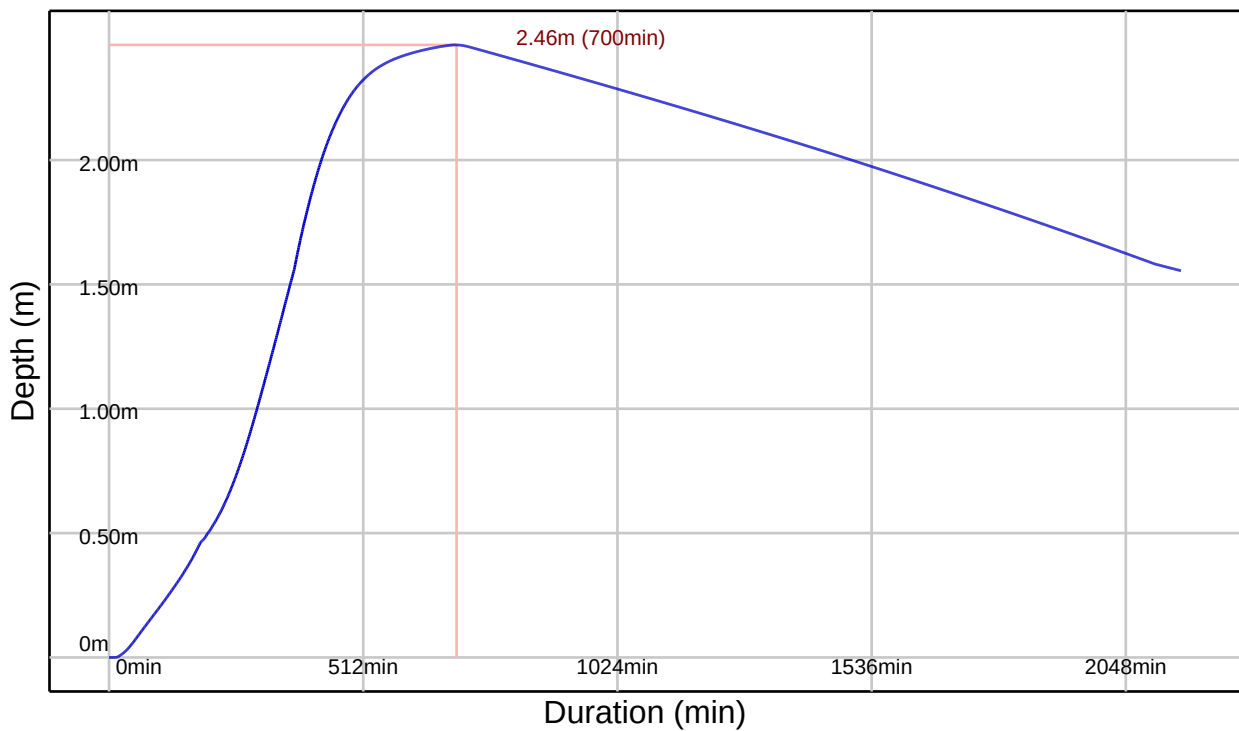
Pond Structure at Manhole S13(POND)

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
187.500	2.650	990.834	189.850	0.300	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S13(POND)



Pond 2 at S13(POND) (100Yr+40% 720Min Winter)



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_448889_310666_v5_1_0.xml

Summer (Cv: 1.00), Winter (Cv: 1.00)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 10080

Return Periods (yrs) + Climate Change: (1, +0%), (10, +0%), (30, +0%), (100, +0%), (100, +40%)

Manhole Flood Risk Freeboard: 0.300m

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
1Yr 15Min Winter	17.384	0.00	0.00	30Yr 360Min Winter	8.709	0.00	1.34
1Yr 15Min Summer	17.384	0.00	0.00	30Yr 480Min Summer	6.961	0.00	0.97
1Yr 30Min Winter	11.343	0.00	-0.13	30Yr 480Min Winter	6.961	0.00	0.97
1Yr 30Min Summer	11.343	0.00	-0.13	30Yr 600Min Summer	5.818	0.00	0.52
1Yr 60Min Summer	7.043	0.00	-0.12	30Yr 600Min Winter	5.818	0.00	0.53
1Yr 60Min Winter	7.043	0.00	-0.15	30Yr 720Min Summer	5.008	0.00	0.17
1Yr 120Min Summer	5.594	0.00	-0.17	30Yr 720Min Winter	5.008	0.00	0.18
1Yr 120Min Winter	5.594	0.00	-0.19	30Yr 960Min Summer	3.953	0.00	-0.02
1Yr 180Min Summer	4.752	0.00	-0.18	30Yr 960Min Winter	3.953	0.00	-0.03
1Yr 180Min Winter	4.752	0.00	-0.19	30Yr 1440Min Summer	2.826	0.00	-0.02
1Yr 240Min Summer	3.979	0.00	-0.18	30Yr 1440Min Winter	2.826	0.00	-0.01
1Yr 240Min Winter	3.979	0.00	-0.14	30Yr 10080Min Summer	0.681	0.00	-0.00
1Yr 360Min Summer	3.089	0.00	-0.15	30Yr 10080Min Winter	0.681	0.00	-0.01
1Yr 360Min Winter	3.089	0.00	-0.09	100Yr 15Min Summer	99.638	0.00	1.86
1Yr 480Min Summer	2.558	0.00	-0.11	100Yr 15Min Winter	99.638	0.00	1.55
1Yr 480Min Winter	2.558	0.00	-0.10	100Yr 30Min Summer	65.248	0.00	2.12
1Yr 600Min Summer	2.183	0.00	-0.10	100Yr 30Min Winter	65.248	0.00	2.10
1Yr 600Min Winter	2.183	0.00	-0.07	100Yr 60Min Summer	40.724	0.00	2.16
1Yr 720Min Summer	1.905	0.00	-0.09	100Yr 60Min Winter	40.724	0.00	2.27
1Yr 720Min Winter	1.905	0.00	-0.03	100Yr 120Min Summer	24.816	0.00	2.23
1Yr 960Min Summer	1.536	0.00	-0.05	100Yr 120Min Winter	24.816	0.00	2.25
1Yr 960Min Winter	1.536	0.00	-0.01	100Yr 180Min Summer	18.503	0.00	2.15
1Yr 1440Min Summer	1.118	0.00	-0.02	100Yr 180Min Winter	18.503	0.00	2.17
1Yr 1440Min Winter	1.118	0.00	-0.02	100Yr 240Min Summer	14.929	0.00	2.01
1Yr 10080Min Summer	0.295	0.00	-0.01	100Yr 240Min Winter	14.929	0.00	2.01
1Yr 10080Min Winter	0.295	0.00	-0.01	100Yr 360Min Summer	10.963	0.00	1.68
10Yr 15Min Summer	61.352	0.00	0.62	100Yr 360Min Winter	10.963	0.00	1.70
10Yr 15Min Winter	61.352	0.00	0.56	100Yr 480Min Summer	8.759	0.00	1.39
10Yr 30Min Summer	39.400	0.00	1.10	100Yr 480Min Winter	8.759	0.00	1.39
10Yr 30Min Winter	39.400	0.00	1.08	100Yr 600Min Summer	7.320	0.00	1.10
10Yr 60Min Summer	24.338	0.00	1.30	100Yr 600Min Winter	7.320	0.00	1.10
10Yr 60Min Winter	24.338	0.00	1.31	100Yr 720Min Summer	6.300	0.00	0.80
10Yr 120Min Summer	15.485	0.00	1.49	100Yr 720Min Winter	6.300	0.00	0.81
10Yr 120Min Winter	15.485	0.00	1.53	100Yr 960Min Summer	4.961	0.00	0.16
10Yr 180Min Summer	11.793	0.00	1.42	100Yr 960Min Winter	4.961	0.00	0.17
10Yr 180Min Winter	11.793	0.00	1.44	100Yr 1440Min Summer	3.523	0.00	-0.02
10Yr 240Min Summer	9.525	0.00	1.22	100Yr 1440Min Winter	3.523	0.00	-0.01
10Yr 240Min Winter	9.525	0.00	1.23	100Yr 10080Min Summer	0.794	0.00	-0.01
10Yr 360Min Summer	7.041	0.00	0.74	100Yr 10080Min Winter	0.794	0.00	-0.00
10Yr 360Min Winter	7.041	0.00	0.74	100Yr+40% 15Min Summer	139.493	0.00	2.36
10Yr 480Min Summer	5.655	0.00	0.32	100Yr+40% 15Min Winter	139.493	0.00	2.36
10Yr 480Min Winter	5.655	0.00	0.31	100Yr+40% 30Min Summer	91.347	0.00	2.40
10Yr 600Min Summer	4.736	0.00	0.01	100Yr+40% 30Min Winter	91.347	0.00	2.44
10Yr 600Min Winter	4.736	0.00	0.02	100Yr+40% 60Min Summer	57.013	0.00	2.49
10Yr 720Min Summer	4.081	0.00	-0.04	100Yr+40% 60Min Winter	57.013	0.00	2.61
10Yr 720Min Winter	4.081	0.00	-0.04	100Yr+40% 120Min Summer	34.742	0.00	2.61
10Yr 960Min Summer	3.229	0.00	-0.03	100Yr+40% 120Min Winter	34.742	0.00	2.64
10Yr 960Min Winter	3.229	0.00	-0.02	100Yr+40% 180Min Summer	25.904	0.00	2.56
10Yr 1440Min Summer	2.319	0.00	-0.02	100Yr+40% 180Min Winter	25.904	0.00	2.55
10Yr 1440Min Winter	2.319	0.00	-0.01	100Yr+40% 240Min Summer	20.901	0.00	2.41
10Yr 10080Min Summer	0.578	0.00	-0.01	100Yr+40% 240Min Winter	20.901	0.00	2.44
10Yr 10080Min Winter	0.578	0.00	-0.00	100Yr+40% 360Min Summer	15.349	0.00	2.16
30Yr 15Min Summer	78.807	0.00	1.21	100Yr+40% 360Min Winter	15.349	0.00	2.17
30Yr 15Min Winter	78.807	0.00	1.13	100Yr+40% 480Min Summer	12.263	0.00	1.89

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
30Yr 30Min Winter	51.149	0.00	1.80	100Yr+40% 480Min Winter	12.263	0.00	1.91
30Yr 30Min Summer	51.149	0.00	1.82	100Yr+40% 600Min Summer	10.248	0.00	1.62
30Yr 60Min Summer	31.723	0.00	1.97	100Yr+40% 600Min Winter	10.248	0.00	1.63
30Yr 60Min Winter	31.723	0.00	2.01	100Yr+40% 720Min Summer	8.820	0.00	1.36
30Yr 120Min Summer	19.617	0.00	1.97	100Yr+40% 720Min Winter	8.820	0.00	1.36
30Yr 120Min Winter	19.617	0.00	2.00	100Yr+40% 960Min Summer	6.945	0.00	0.88
30Yr 180Min Summer	14.708	0.00	1.84	100Yr+40% 960Min Winter	6.945	0.00	0.90
30Yr 180Min Winter	14.708	0.00	1.86	100Yr+40% 1440Min Summer	4.932	0.00	0.06
30Yr 240Min Summer	11.859	0.00	1.68	100Yr+40% 1440Min Winter	4.932	0.00	0.08
30Yr 240Min Winter	11.859	0.00	1.69	100Yr+40% 10080Min Winter	1.111	0.00	-0.01
30Yr 360Min Summer	8.709	0.00	1.34	100Yr+40% 10080Min Summer	1.111	0.00	0.00

Simulation Results

Return Period (yrs) + Climate Change (%):

1yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S15	15 min Summer	8	199.661	0.045	11.816		OK
S36	15 min Winter	0	197.849	0.000	0.000		OK
S16	15 min Summer	8	197.209	0.074	29.985		OK
S19	15 min Summer	8	198.007	0.040	7.575		OK
S17	15 min Summer	9	194.724	0.083	47.945		OK
S20CP	15 min Summer	9	191.168	0.061	48.343		OK
S18	15 min Summer	9	189.608	0.088	48.378		OK
S1	15 min Summer	8	202.565	0.039	5.645		OK
S2	15 min Summer	8	201.033	0.038	6.328		OK
S3	15 min Summer	8	200.498	0.040	7.793		OK
S4	15 min Summer	8	199.706	0.046	11.337		OK
S5	15 min Summer	8	198.834	0.046	14.968		OK
S6	15 min Summer	9	196.981	0.071	20.807		OK
S7CP	15 min Summer	9	196.272	0.052	25.144		OK
PS3	15 min Winter	0	196.767	0.000	0.000		OK
PS1	15 min Winter	0	197.011	0.000	0.000		OK
PS2	15 min Winter	0	196.939	0.000	0.000		OK
S8	15 min Summer	9	192.704	0.052	25.242		OK
S25	15 min Summer	8	191.801	0.041	4.256		OK
S26	15 min Summer	8	191.390	0.030	8.895		OK
S9	15 min Summer	9	189.593	0.062	34.016		OK
S37CP	15 min Summer	9	188.551	0.141	82.624		OK
S38(ATT)	480 min Winter	373	188.133	0.251	3.371		OK
S10CP	480 min Winter	372	188.133	0.396	3.388		OK
S29	15 min Summer	8	200.048	0.036	6.713		OK
S35	15 min Summer	8	197.928	0.020	1.597		OK
S30	15 min Summer	8	197.588	0.058	23.102		OK
S31	15 min Summer	9	194.764	0.064	23.159		OK
S32	15 min Summer	9	194.110	0.060	27.566		OK
S27	15 min Summer	8	199.466	0.038	8.835		OK
S28	15 min Summer	8	196.667	0.037	9.907		OK
S21	15 min Summer	8	196.053	0.053	11.608		OK
S22	15 min Summer	8	195.641	0.071	26.406		OK
S23	15 min Summer	9	193.721	0.101	59.619		OK
S24CP	15 min Summer	9	192.359	0.069	60.057		OK
HW1	480 min Winter	373	188.133	0.608	6.300		Surcharged
S33	15 min Summer	8	192.056	0.046	8.375		OK
S34CP	15 min Summer	8	190.586	0.037	9.377		OK
HW2	480 min Winter	373	188.133	0.633	6.672		Surcharged
S13(POND)	480 min Winter	373	188.133	0.633	6.672		Surcharged
S14	720 min Summer	767	184.645	0.024	6.733		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S15	S16	0.045	2.046	11.673	0.090	OK
2.000	15 min Winter	0	S36	S16	0.000	0.000	0.000	0.000	OK
1.001	15 min Summer	9	S16	S17	0.074	2.182	29.433	0.136	OK
3.000	15 min Summer	8	S19	S17	0.040	1.982	7.458	0.156	OK
1.002	15 min Summer	9	S17	S20CP	0.082	2.701	48.343	0.108	OK
1.003	15 min Summer	9	S20CP	S18	0.075	3.099	48.378	0.063	OK
1.004	15 min Summer	9	S18	S37CP	0.087	2.494	48.561	0.122	OK
4.000	15 min Summer	8	S1	S2	0.039	1.527	5.546	0.149	OK
4.001	15 min Summer	8	S2	S3	0.039	1.710	6.294	0.150	OK
4.002	15 min Summer	9	S3	S4	0.039	2.087	7.746	0.159	OK
4.003	15 min Summer	9	S4	S5	0.045	1.975	11.256	0.092	OK
4.004	15 min Summer	9	S5	S6	0.058	1.547	14.875	0.052	OK
4.005	15 min Summer	9	S6	S7CP	0.061	2.016	20.953	0.114	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
4.006	15 min Summer	9	S7CP	S8	0.052	3.058	25.242	0.067	OK
5.000	15 min Winter	0	PS3	PS2	0.000	0.000	0.000	0.000	OK
6.000	15 min Winter	0	PS1	PS2	0.000	0.000	0.000	0.000	OK
5.001	15 min Winter	0	PS2	S8	0.000	0.000	0.000	0.000	OK
4.007	15 min Summer	9	S8	S9	0.052	3.089	25.335	0.067	OK
7.000	15 min Summer	8	S25	S26	0.035	1.044	4.200	0.067	OK
7.001	15 min Summer	8	S26	S9	0.030	2.800	8.844	0.040	OK
4.008	15 min Summer	9	S9	S37CP	0.060	2.698	34.063	0.041	OK
1.005	480 min Winter	353	S37CP	S38(ATT)	0.140	0.958	14.531	0.035	OK
1.006	480 min Winter	373	S38(ATT)	S10CP	0.324	0.833	13.619	0.073	OK
1.007	480 min Winter	372	S10CP	HW1	0.423	0.597	49.508	0.109	OK
8.000	15 min Summer	8	S29	S30	0.036	1.609	6.563	0.056	OK
9.000	15 min Summer	8	S35	S30	0.020	0.890	1.577	0.018	OK
8.001	15 min Summer	8	S30	S31	0.061	2.222	22.931	0.086	OK
8.002	15 min Summer	9	S31	S32	0.063	2.188	23.360	0.099	OK
8.003	15 min Summer	9	S32	S23	0.081	1.584	27.607	0.063	OK
10.000	15 min Summer	8	S27	S28	0.038	1.960	8.716	0.064	OK
10.001	15 min Summer	8	S28	S21	0.045	1.749	9.880	0.065	OK
10.002	15 min Summer	8	S21	S22	0.052	1.662	11.527	0.121	OK
10.003	15 min Summer	8	S22	S23	0.086	1.572	26.158	0.125	OK
8.004	15 min Summer	9	S23	S24CP	0.085	3.210	60.057	0.144	OK
8.005	480 min Summer	313	S24CP	HW1	0.197	2.599	16.574	0.020	OK
1.008	180 min Summer	98	HW1	HW2	0.450	0.498	75.485	0.889	OK
11.000	15 min Summer	8	S33	S34CP	0.042	2.070	8.321	0.195	OK
11.001	180 min Summer	98	S34CP	HW2	0.086	2.199	4.619	0.068	OK
1.009	180 min Summer	98	HW2	S13(POND)	0.450	0.836	85.429	0.271	OK
1.010	720 min Summer	767	S13(POND)	S14	0.024	2.514	6.733	0.014	OK

Return Period (yrs) + Climate Change (%):
10yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S15	15 min Summer	8	199.703	0.088	41.715		OK
S36	15 min Summer	0	197.849	0.000	0.000		OK
S16	15 min Summer	8	197.283	0.148	106.020		OK
S19	15 min Summer	8	198.047	0.080	26.742		OK
S17	15 min Summer	8	194.804	0.162	172.238		OK
S20CP	15 min Summer	8	191.227	0.120	170.696		OK
S18	15 min Summer	8	189.689	0.169	170.520		OK
S1	15 min Summer	8	202.604	0.078	19.930		OK
S2	15 min Summer	8	201.073	0.078	22.555		OK
S3	15 min Summer	8	200.541	0.082	27.690		OK
S4	15 min Summer	8	199.750	0.090	40.286		OK
S5	15 min Summer	8	198.875	0.086	53.240		OK
S6	15 min Summer	8	197.050	0.140	74.912		OK
S7CP	15 min Summer	8	196.320	0.100	89.794		OK
PS3	15 min Summer	0	196.767	0.000	0.000		OK
PS1	15 min Summer	0	197.011	0.000	0.000		OK
PS2	15 min Summer	0	196.939	0.000	0.000		OK
S8	15 min Summer	9	192.752	0.101	88.894		OK
S25	15 min Summer	8	191.837	0.077	15.024		OK
S26	15 min Summer	8	191.418	0.058	31.475		OK
S9	15 min Summer	8	189.653	0.121	120.145		OK
S37CP	480 min Winter	463	188.762	0.352	3.159		OK
S38(ATT)	480 min Winter	464	188.762	0.880	3.010		Surcharged
S10CP	480 min Winter	464	188.762	1.025	3.045		Surcharged
S29	15 min Summer	8	200.081	0.068	23.701		OK
S35	15 min Summer	8	197.945	0.038	5.639		OK
S30	15 min Summer	8	197.642	0.112	81.814		OK
S31	15 min Summer	8	194.827	0.127	83.593		OK
S32	15 min Summer	8	194.175	0.125	98.367		OK
S27	15 min Summer	8	199.501	0.073	31.189		OK
S28	15 min Summer	8	196.702	0.071	35.120		OK
S21	15 min Summer	8	196.107	0.107	41.155		OK
S22	15 min Summer	8	195.708	0.138	93.492		OK
S23	15 min Summer	8	193.825	0.205	213.566		OK
S24CP	15 min Summer	9	192.416	0.126	211.229		OK
HW1	480 min Winter	464	188.762	1.237	5.617		Surcharged
S33	15 min Summer	8	192.106	0.097	29.567		OK
S34CP	15 min Summer	8	190.620	0.072	33.141		OK
HW2	480 min Winter	464	188.762	1.262	5.936		Surcharged
S13(POND)	480 min Winter	464	188.762	1.262	5.936		Surcharged
S14	1440 min Summer	2340	184.645	0.024	6.733		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S15	S16	0.087	2.915	41.370	0.320	OK
2.000	15 min Summer	0	S36	S16	0.000	0.000	0.000	0.000	OK
1.001	15 min Summer	8	S16	S17	0.146	3.069	104.730	0.483	OK
3.000	15 min Summer	8	S19	S17	0.080	2.782	26.461	0.555	OK
1.002	15 min Summer	8	S17	S20CP	0.160	3.817	170.696	0.382	OK
1.003	15 min Summer	8	S20CP	S18	0.144	4.357	170.520	0.222	OK
1.004	15 min Summer	9	S18	S37CP	0.201	2.908	170.917	0.429	OK
4.000	15 min Summer	8	S1	S2	0.078	2.133	19.794	0.533	OK
4.001	15 min Summer	8	S2	S3	0.080	2.330	22.396	0.533	OK
4.002	15 min Summer	8	S3	S4	0.080	2.888	27.564	0.567	OK
4.003	15 min Summer	8	S4	S5	0.088	2.786	40.127	0.328	OK
4.004	15 min Summer	8	S5	S6	0.113	2.186	53.073	0.186	OK
4.005	15 min Summer	8	S6	S7CP	0.120	2.834	74.366	0.404	OK
4.006	15 min Summer	8	S7CP	S8	0.100	4.334	89.414	0.237	OK
5.000	15 min Summer	0	PS3	PS2	0.000	0.000	0.000	0.000	OK
6.000	15 min Summer	0	PS1	PS2	0.000	0.000	0.000	0.000	OK
5.001	15 min Summer	0	PS2	S8	0.000	0.000	0.000	0.000	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
4.007	15 min Summer	9	S8	S9	0.099	4.396	89.311	0.238	OK
7.000	15 min Summer	8	S25	S26	0.067	1.487	14.902	0.237	OK
7.001	15 min Summer	8	S26	S9	0.057	3.998	31.357	0.144	OK
4.008	15 min Summer	9	S9	S37CP	0.115	3.762	120.017	0.143	OK
1.005	480 min Winter	463	S37CP	S38(ATT)	0.401	1.082	32.122	0.077	OK
1.006	60 min Winter	40	S38(ATT)	S10CP	0.450	1.079	65.637	0.351	OK
1.007	120 min Winter	61	S10CP	HW1	0.450	0.966	113.291	0.250	OK
8.000	15 min Summer	8	S29	S30	0.068	2.320	23.399	0.200	OK
9.000	15 min Summer	8	S35	S30	0.037	1.288	5.598	0.064	OK
8.001	15 min Summer	8	S30	S31	0.120	3.098	81.439	0.306	OK
8.002	15 min Summer	8	S31	S32	0.123	3.049	82.884	0.352	OK
8.003	15 min Summer	8	S32	S23	0.165	2.102	98.193	0.223	OK
10.000	15 min Summer	8	S27	S28	0.072	2.813	30.916	0.226	OK
10.001	15 min Summer	8	S28	S21	0.089	2.397	35.056	0.232	OK
10.002	15 min Summer	8	S21	S22	0.103	2.315	40.966	0.431	OK
10.003	15 min Summer	8	S22	S23	0.171	2.232	92.966	0.445	OK
8.004	15 min Summer	8	S23	S24CP	0.165	4.523	211.980	0.508	OK
8.005	15 min Summer	9	S24CP	HW1	0.251	3.766	211.729	0.258	OK
1.008	15 min Winter	9	HW1	HW2	0.450	1.454	226.393	2.666	OK
11.000	15 min Summer	8	S33	S34CP	0.084	2.880	29.412	0.691	OK
11.001	15 min Summer	9	S34CP	HW2	0.110	3.777	33.004	0.484	OK
1.009	15 min Winter	12	HW2	S13(POND)	0.450	2.470	251.323	0.796	OK
1.010	1440 min Summer	2340	S13(POND)	S14	0.024	2.514	6.733	0.014	OK

Return Period (yrs) + Climate Change (%):
30yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S15	15 min Summer	8	199.717	0.101	53.587		OK
S36	15 min Summer	0	197.849	0.000	0.000		OK
S16	15 min Summer	8	197.307	0.172	136.213		OK
S19	15 min Summer	8	198.061	0.094	34.352		OK
S17	15 min Summer	8	194.829	0.188	221.273		OK
S20CP	15 min Summer	8	191.246	0.139	219.464		OK
S18	15 min Summer	8	189.717	0.197	219.259		OK
S1	15 min Summer	8	202.617	0.091	25.602		OK
S2	15 min Summer	8	201.087	0.092	28.974		OK
S3	15 min Summer	8	200.556	0.098	35.571		OK
S4	15 min Summer	8	199.764	0.104	51.752		OK
S5	15 min Summer	8	198.886	0.098	68.402		OK
S6	15 min Summer	8	197.072	0.162	96.261		OK
S7CP	15 min Summer	8	196.334	0.114	115.433		OK
PS3	15 min Summer	0	196.767	0.000	0.000		OK
PS1	15 min Summer	0	197.011	0.000	0.000		OK
PS2	15 min Summer	0	196.939	0.000	0.000		OK
S8	15 min Summer	8	192.767	0.115	114.987		OK
S25	15 min Summer	8	191.848	0.088	19.301		OK
S26	15 min Summer	8	191.426	0.066	40.443		OK
S9	15 min Summer	8	189.671	0.140	154.540		OK
S37CP	600 min Winter	577	188.992	0.582	3.387		Surcharged
S38(ATT)	600 min Winter	577	188.992	1.110	3.387		Surcharged
S10CP	600 min Winter	578	188.992	1.255	3.289		Surcharged
S29	15 min Summer	8	200.090	0.078	30.446		OK
S35	15 min Summer	8	197.949	0.042	7.244		OK
S30	15 min Summer	8	197.658	0.128	105.151		OK
S31	15 min Summer	8	194.848	0.148	107.437		OK
S32	15 min Summer	8	194.198	0.148	126.471		OK
S27	15 min Summer	8	199.511	0.083	40.065		OK
S28	15 min Summer	8	196.713	0.083	45.134		OK
S21	15 min Summer	8	196.125	0.125	52.891		OK
S22	15 min Summer	8	195.729	0.159	120.131		OK
S23	15 min Summer	8	193.861	0.241	274.536		OK
S24CP	15 min Summer	8	192.434	0.144	272.648		OK
HW1	600 min Winter	578	188.992	1.467	6.097		Surcharged
S33	15 min Summer	8	192.127	0.117	37.981		OK
S34CP	15 min Summer	8	190.632	0.083	42.531		OK
HW2	600 min Winter	578	188.992	1.492	6.449		Surcharged
S13(POND)	600 min Winter	578	188.992	1.492	6.449		Surcharged
S14	960 min Summer	2517	184.645	0.024	6.733		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S15	S16	0.100	3.111	53.165	0.411	OK
2.000	15 min Summer	8	S36	S16	0.011	0.000	0.000	0.000	OK
1.001	15 min Summer	8	S16	S17	0.170	3.257	134.556	0.620	OK
3.000	15 min Summer	8	S19	S17	0.093	2.941	33.990	0.712	OK
1.002	15 min Summer	8	S17	S20CP	0.185	4.064	219.464	0.492	OK
1.003	15 min Summer	8	S20CP	S18	0.168	4.591	219.259	0.286	OK
1.004	15 min Summer	9	S18	S37CP	0.254	2.889	219.546	0.551	OK
4.000	15 min Summer	8	S1	S2	0.092	2.249	25.427	0.685	OK
4.001	15 min Summer	8	S2	S3	0.095	2.444	28.771	0.684	OK
4.002	15 min Summer	8	S3	S4	0.094	3.042	35.409	0.728	OK
4.003	15 min Summer	8	S4	S5	0.101	2.966	51.557	0.422	OK
4.004	15 min Summer	8	S5	S6	0.130	2.325	68.207	0.239	OK
4.005	15 min Summer	8	S6	S7CP	0.138	3.013	95.615	0.519	OK
4.006	15 min Summer	8	S7CP	S8	0.115	4.621	114.987	0.304	OK
5.000	15 min Summer	0	PS3	PS2	0.000	0.000	0.000	0.000	OK
6.000	15 min Summer	0	PS1	PS2	0.000	0.000	0.000	0.000	OK
5.001	15 min Summer	0	PS2	S8	0.000	0.000	0.000	0.000	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
4.007	15 min Summer	9	S8	S9	0.113	4.696	114.647	0.305	OK
7.000	15 min Summer	8	S25	S26	0.077	1.588	19.154	0.304	OK
7.001	15 min Summer	8	S26	S9	0.065	4.274	40.300	0.184	OK
4.008	15 min Summer	8	S9	S37CP	0.131	4.000	154.229	0.184	OK
1.005	240 min Summer	196	S37CP	S38(ATT)	0.450	1.353	104.015	0.250	OK
1.006	15 min Winter	15	S38(ATT)	S10CP	0.450	0.791	125.849	0.672	OK
1.007	15 min Winter	15	S10CP	HW1	0.450	0.798	126.938	0.281	OK
8.000	15 min Summer	8	S29	S30	0.077	2.487	30.091	0.258	OK
9.000	15 min Summer	8	S35	S30	0.048	1.258	7.211	0.082	OK
8.001	15 min Summer	8	S30	S31	0.138	3.288	104.670	0.393	OK
8.002	15 min Summer	8	S31	S32	0.142	3.238	106.581	0.452	OK
8.003	15 min Summer	8	S32	S23	0.194	2.184	126.253	0.287	OK
10.000	15 min Summer	8	S27	S28	0.082	3.012	39.735	0.290	OK
10.001	15 min Summer	8	S28	S21	0.104	2.518	45.058	0.298	OK
10.002	15 min Summer	8	S21	S22	0.120	2.453	52.656	0.553	OK
10.003	15 min Summer	8	S22	S23	0.200	2.384	119.501	0.572	OK
8.004	15 min Summer	8	S23	S24CP	0.193	4.776	272.648	0.654	OK
8.005	15 min Summer	8	S24CP	HW1	0.260	4.081	271.980	0.331	OK
1.008	15 min Winter	11	HW1	HW2	0.450	1.597	253.968	2.990	OK
11.000	15 min Summer	8	S33	S34CP	0.100	3.000	37.741	0.886	OK
11.001	15 min Summer	8	S34CP	HW2	0.117	3.760	42.372	0.621	OK
1.009	15 min Winter	11	HW2	S13(POND)	0.450	2.446	278.205	0.881	OK
1.010	960 min Summer	2517	S13(POND)	S14	0.024	2.514	6.733	0.014	OK

Return Period (yrs) + Climate Change (%):

100yr+0%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S15	15 min Summer	8	199.729	0.114	67.754		OK
S36	15 min Summer	0	197.849	0.000	0.000		OK
S16	15 min Summer	8	197.337	0.202	172.527		OK
S19	15 min Summer	8	198.079	0.113	43.434		OK
S17	15 min Summer	8	194.859	0.218	279.599		OK
S20CP	15 min Summer	8	191.266	0.159	277.335		OK
S18	15 min Summer	9	189.797	0.277	276.731		OK
S1	15 min Summer	8	202.634	0.108	32.370		OK
S2	15 min Summer	8	201.105	0.110	36.623		OK
S3	15 min Summer	8	200.576	0.118	44.954		OK
S4	15 min Summer	8	199.780	0.120	65.366		OK
S5	15 min Summer	8	198.899	0.111	86.431		OK
S6	15 min Summer	8	197.098	0.188	121.672		OK
S7CP	15 min Summer	8	196.350	0.130	145.890		OK
PS3	15 min Summer	0	196.767	0.000	0.000		OK
PS1	15 min Summer	0	197.011	0.000	0.000		OK
PS2	15 min Summer	0	196.939	0.000	0.000		OK
S8	15 min Summer	8	192.783	0.132	145.336		OK
S25	15 min Summer	8	191.860	0.100	24.403		OK
S26	15 min Summer	8	191.436	0.076	51.144		OK
S9	15 min Summer	8	189.692	0.160	195.407		OK
S37CP	600 min Winter	580	189.356	0.946	3.753		Surcharged
S38(ATT)	600 min Winter	580	189.356	1.475	3.753		Surcharged
S10CP	600 min Winter	580	189.356	1.620	3.753		Surcharged
S29	15 min Summer	8	200.101	0.089	38.496		OK
S35	15 min Summer	8	197.954	0.047	9.159		OK
S30	15 min Summer	8	197.677	0.147	132.983		OK
S31	15 min Summer	8	194.873	0.173	135.936		OK
S32	15 min Summer	8	194.225	0.175	160.031		OK
S27	15 min Summer	8	199.523	0.095	50.658		OK
S28	15 min Summer	8	196.726	0.095	57.091		OK
S21	15 min Summer	8	196.146	0.146	66.904		OK
S22	15 min Summer	8	195.755	0.185	151.921		OK
S23	15 min Summer	8	193.908	0.288	347.305		OK
S24CP	15 min Summer	8	192.454	0.164	344.990		OK
HW1	600 min Winter	580	189.356	1.831	6.978		Surcharged
S33	15 min Summer	9	192.394	0.384	46.016		Surcharged
S34CP	15 min Summer	9	190.641	0.092	49.304		OK
HW2	600 min Winter	581	189.356	1.856	7.079		Surcharged
S13(POND)	600 min Winter	581	189.356	1.856	7.080		Surcharged
S14	600 min Winter	581	184.646	0.025	7.085		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	8	S15	S16	0.121	3.163	67.523	0.523	OK
2.000	15 min Summer	8	S36	S16	0.026	0.000	0.000	0.000	OK
1.001	15 min Summer	8	S16	S17	0.199	3.422	169.991	0.783	OK
3.000	15 min Summer	8	S19	S17	0.111	3.062	42.940	0.900	OK
1.002	15 min Summer	8	S17	S20CP	0.213	4.292	277.335	0.621	OK
1.003	15 min Summer	9	S20CP	S18	0.217	4.653	277.172	0.362	OK
1.004	15 min Summer	9	S18	S37CP	0.326	2.892	275.027	0.690	OK
4.000	15 min Summer	8	S1	S2	0.109	2.339	32.138	0.866	OK
4.001	15 min Summer	8	S2	S3	0.114	2.523	36.356	0.865	OK
4.002	15 min Summer	8	S3	S4	0.112	3.156	44.704	0.919	OK
4.003	15 min Summer	8	S4	S5	0.117	3.133	65.133	0.533	OK
4.004	15 min Summer	8	S5	S6	0.150	2.449	86.201	0.303	OK
4.005	15 min Summer	8	S6	S7CP	0.159	3.175	120.832	0.656	OK
4.006	15 min Summer	8	S7CP	S8	0.131	4.894	145.336	0.385	OK
5.000	15 min Summer	0	PS3	PS2	0.000	0.000	0.000	0.000	OK
6.000	15 min Summer	0	PS1	PS2	0.000	0.000	0.000	0.000	OK
5.001	15 min Summer	0	PS2	S8	0.000	0.000	0.000	0.000	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
4.007	15 min Summer	9	S8	S9	0.129	4.984	144.901	0.386	OK
7.000	15 min Summer	8	S25	S26	0.088	1.685	24.226	0.385	OK
7.001	15 min Summer	8	S26	S9	0.073	4.545	50.972	0.233	OK
4.008	600 min Winter	573	S9	S37CP	0.203	2.232	17.185	0.021	OK
1.005	15 min Winter	9	S37CP	S38(ATT)	0.450	2.776	423.176	1.016	OK
1.006	15 min Winter	15	S38(ATT)	S10CP	0.450	0.954	151.801	0.811	OK
1.007	15 min Winter	15	S10CP	HW1	0.450	0.965	153.552	0.339	OK
8.000	15 min Summer	8	S29	S30	0.088	2.649	38.074	0.326	OK
9.000	15 min Summer	8	S35	S30	0.059	1.239	9.121	0.104	OK
8.001	15 min Summer	8	S30	S31	0.160	3.463	132.436	0.497	OK
8.002	15 min Summer	8	S31	S32	0.164	3.411	134.882	0.572	OK
8.003	15 min Summer	8	S32	S23	0.232	2.235	159.743	0.363	OK
10.000	15 min Summer	8	S27	S28	0.094	3.204	50.264	0.367	OK
10.001	15 min Summer	8	S28	S21	0.121	2.618	56.999	0.378	OK
10.002	15 min Summer	8	S21	S22	0.139	2.576	66.607	0.700	OK
10.003	15 min Summer	8	S22	S23	0.236	2.530	151.169	0.724	OK
8.004	15 min Summer	8	S23	S24CP	0.226	4.971	344.990	0.827	OK
8.005	15 min Summer	8	S24CP	HW1	0.270	4.048	344.229	0.419	OK
1.008	15 min Winter	11	HW1	HW2	0.450	1.801	286.374	3.372	OK
11.000	15 min Summer	9	S33	S34CP	0.121	3.084	43.501	1.021	OK
11.001	15 min Summer	9	S34CP	HW2	0.121	3.970	49.248	0.722	OK
1.009	15 min Winter	10	HW2	S13(POND)	0.450	2.574	320.040	1.014	OK
1.010	600 min Winter	581	S13(POND)	S14	0.025	2.550	7.085	0.015	OK

Return Period (yrs) + Climate Change (%):

100yr+40%

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S15	15 min Summer	8	199.756	0.140	94.854		OK
S36	15 min Summer	0	197.849	0.000	0.000		OK
S16	15 min Summer	9	197.509	0.374	232.118		Surcharged
S19	15 min Summer	10	198.490	0.524	48.496		Surcharged
S17	15 min Summer	8	194.910	0.269	373.685		OK
S20CP	15 min Summer	10	191.373	0.266	345.315		OK
S18	15 min Summer	10	190.807	1.287	345.403		Flood Risk
S1	15 min Summer	10	203.002	0.477	36.143		Surcharged
S2	15 min Summer	10	201.338	0.343	43.815		Surcharged
S3	15 min Summer	10	200.761	0.302	52.857		Surcharged
S4	15 min Summer	9	199.798	0.138	80.155		OK
S5	15 min Summer	8	198.915	0.126	109.621		OK
S6	15 min Summer	8	197.139	0.229	159.042		OK
S7CP	15 min Summer	9	196.374	0.154	190.666		OK
PS3	15 min Summer	0	196.767	0.000	0.000		OK
PS1	15 min Summer	0	197.011	0.000	0.000		OK
PS2	15 min Summer	0	196.939	0.000	0.000		OK
S8	15 min Summer	8	192.808	0.156	192.479		OK
S25	15 min Summer	8	191.882	0.122	34.164		OK
S26	15 min Summer	8	191.452	0.092	71.618		OK
S9	60 min Summer	36	190.475	0.943	103.594		Surcharged
S37CP	60 min Summer	36	190.461	2.051	249.837		Flood Risk
S38(ATT)	60 min Summer	36	190.229	2.347	246.916		Surcharged
S10CP	60 min Summer	36	189.967	2.230	246.855		Flood Risk
S29	15 min Summer	8	200.120	0.107	53.892		OK
S35	15 min Summer	8	197.963	0.056	12.822		OK
S30	15 min Summer	8	197.710	0.180	186.226		OK
S31	15 min Summer	9	194.951	0.251	185.090		OK
S32	15 min Summer	9	194.556	0.506	217.086		Surcharged
S27	15 min Summer	8	199.543	0.115	70.919		OK
S28	15 min Summer	9	196.761	0.131	77.705		OK
S21	15 min Summer	9	196.375	0.375	89.816		Surcharged
S22	15 min Summer	9	196.055	0.485	200.264		Surcharged
S23	15 min Summer	9	194.417	0.797	453.944		Surcharged
S24CP	15 min Summer	10	192.486	0.196	445.908		OK
HW1	720 min Winter	697	189.963	2.438	7.884		Flood Risk
S33	15 min Summer	10	193.350	1.340	53.620		Flood Risk
S34CP	15 min Summer	10	190.673	0.124	63.253		OK
HW2	720 min Winter	697	189.963	2.463	8.343		Flood Risk
S13(POND)	720 min Winter	698	189.963	2.463	8.032		Flood Risk
S14	720 min Winter	698	184.647	0.026	8.102		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Summer	9	S15	S16	0.181	3.232	94.500	0.731	OK
2.000	15 min Summer	9	S36	S16	0.075	0.000	0.000	0.000	OK
1.001	15 min Summer	8	S16	S17	0.294	3.491	232.287	1.071	OK
3.000	15 min Summer	10	S19	S17	0.150	3.037	50.516	1.059	Surcharged
1.002	15 min Summer	8	S17	S20CP	0.262	4.540	373.456	0.837	OK
1.003	15 min Summer	10	S20CP	S18	0.321	4.620	371.080	0.484	OK
1.004	15 min Winter	9	S18	S37CP	0.375	3.015	333.013	0.836	Surcharged
4.000	15 min Winter	8	S1	S2	0.150	2.338	38.079	1.026	Surcharged
4.001	30 min Summer	16	S2	S3	0.150	2.530	42.900	1.021	Surcharged
4.002	15 min Summer	10	S3	S4	0.150	3.114	53.046	1.090	Surcharged
4.003	15 min Summer	9	S4	S5	0.133	3.279	80.169	0.656	OK
4.004	15 min Summer	8	S5	S6	0.178	2.527	109.384	0.384	OK
4.005	15 min Summer	8	S6	S7CP	0.192	3.314	157.983	0.858	OK
4.006	15 min Summer	8	S7CP	S8	0.155	5.355	192.479	0.509	OK
5.000	15 min Summer	0	PS3	PS2	0.000	0.000	0.000	0.000	OK
6.000	15 min Summer	0	PS1	PS2	0.000	0.000	0.000	0.000	OK
5.001	15 min Summer	0	PS2	S8	0.000	0.000	0.000	0.000	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
4.007	15 min Summer	10	S8	S9	0.220	5.326	191.609	0.510	OK
7.000	15 min Summer	8	S25	S26	0.107	1.889	33.932	0.539	OK
7.001	15 min Summer	10	S26	S9	0.151	4.946	71.392	0.327	OK
4.008	30 min Summer	18	S9	S37CP	0.450	4.241	233.742	0.279	OK
1.005	15 min Winter	9	S37CP	S38(ATT)	0.450	3.449	548.556	1.318	OK
1.006	30 min Summer	19	S38(ATT)	S10CP	0.450	1.880	299.036	1.597	OK
1.007	30 min Summer	21	S10CP	HW1	0.450	1.667	265.073	0.586	OK
8.000	15 min Summer	8	S29	S30	0.106	2.890	53.351	0.457	OK
9.000	15 min Summer	8	S35	S30	0.080	1.270	12.775	0.146	OK
8.001	15 min Summer	9	S30	S31	0.214	3.663	185.388	0.696	OK
8.002	15 min Summer	9	S31	S32	0.276	3.566	185.179	0.785	OK
8.003	15 min Summer	9	S32	S23	0.375	2.208	214.321	0.488	Surcharged
10.000	15 min Summer	9	S27	S28	0.116	3.488	70.394	0.514	OK
10.001	15 min Summer	9	S28	S21	0.178	2.691	79.830	0.529	OK
10.002	15 min Summer	9	S21	S22	0.225	2.673	91.747	0.964	OK
10.003	15 min Summer	8	S22	S23	0.300	2.920	193.035	0.924	Surcharged
8.004	15 min Summer	10	S23	S24CP	0.286	4.961	445.908	1.069	OK
8.005	15 min Summer	10	S24CP	HW1	0.286	4.947	445.958	0.543	OK
1.008	30 min Summer	20	HW1	HW2	0.450	2.987	475.118	5.594	OK
11.000	15 min Summer	10	S33	S34CP	0.137	3.336	56.491	1.326	OK
11.001	15 min Summer	10	S34CP	HW2	0.137	3.806	63.274	0.927	OK
1.009	30 min Summer	20	HW2	S13(POND)	0.450	3.211	510.754	1.618	OK
1.010	720 min Winter	698	S13(POND)	S14	0.026	2.656	8.102	0.017	OK