KAVANAGH
MANSFIELD
&PARTNERS
CONSULTING
STRUCTURAL
AND CIVIL
ENGINEERS

DWELLINGS AT OUTLANDS

RATHBEALE ROAD

SWORDS

CIVIL ENGINEERING INFRASTRUCTURE REPORT FOR PLANNING

28 MAY 2019

1.0 INTRODUCTION

1.1 Planning permission is being sought for 11 No. residential units on a site off Rathbeale Road. The development will consist of 4 No. 1 bed units, 4 No. 2 bed units and 3 No. 3 bed units. One bed units will have an occupancy of 2 persons, two bed units will have an occupancy of 4 persons and three bedroom units will have an occupancy of 5 persons, giving an overall number of 37 bed spaces.

1.2 Car parking for 14 cars is to be provided in an external car park at ground level to the front of the development.

1.3 The site is currently a Fingal Co Co Operations Depot. The original ground slopes gently to the south east.

1.4 This report deals with proposed Civil Engineering infrastructure for the development, including foul and surface drainage, water mains and vehicular access. This report should be read in conjunction with the following drawings AM 726/S01 (Appendix A) and AM 726/S02, (Appendix F).

1.5 A copy of the existing public drainage layout obtained from Fingal County Council is contained in Appendix C of this report.

1.6 A Flood Risk Assessment is provided in a separate report.

2.0 FOUL WATER DRAINAGE

2.1 The foul water drainage system for the proposed development will be separate from the surface water drainage system. The foul water from the development will discharge via soil stacks to foul drains, which will flow by gravity to a final manhole on the site before discharging to an existing manhole near Pine Grove Road.

Directors: James G. Mansfield (Managing) CEng, BE, FIEI, MIStructE, RConsEI; Stephen F. Bowe (Secretary)BSc(Mngt), FCCA, MMII; Niall Clarke CEng, BSc(Eng), DipEng, MIStructE, MIEI RConsEI; Gerard Donnelly CEng, MIEI; Consultant: John A. Kavanagh CEng, BE, MEngSc, EurIng, FIAE, FIEI, FIStructE, FICE, RConsEI. Piconsult Ltd. Trading as Kavanagh Mansfield & Partners. Registered number: 136271. Registered office : 37 Heather Road, Sandyford Ind Est, Dublin 18

2.2 Foul Sewer Design (Equivalent Population Method):

Pipes carrying foul sewage should be designed to carry a peak flow of 6 times average dry weather sewage flow 6DWF. Average flow is taken as 250L per day for the residential population equivalent. The table below shows the Schedule of Accommodation for the proposed development:

Apartment No.	No. of Bedrooms
1	3
2	1
3	1
4	2
5	3
6	1
7	2
8	2
9	3
10	1
11	2

2.3 CALCULATIONS

Calculations of Total Population Equivalent (PE)

	Total No.	4
1 bed units	PE per unit	2
	Total PE	2 x 4 = 8
2 bed units	Total No.	2
	PE per unit	4
	Total No.	2 x 4 = 8
2 bed units	Total No.	2
	PE per unit	3
	Total No.	2 x 3 = 6
3 bed units	Total No.	3
	PE per unit	5
	Total No.	3 x 5 = 15
	Grand Total PE	**37**

Average flow 250 litres/day x 37 = 9250 l/day

= .107 litres/sec

Peak flow = 6 x .107 = 0.642 litre/sec

Minimum self-cleansing velocity = 0.8m/sec

A roughness co-efficient k of 0.15 is used for foul sewers which are to achieve a minimum self-cleansing velocity of 0.8m/s when flowing half full.

From Wavin charts a 160mm diameter sewer at a gradient of 1/80 gives:

Hydraulic performance with KS = 0.15
Discharge capacity = 19 l/sec

Use 160 dia pipes @ 1/80 gradient.

3.0 SURFACE WATER DRAINAGE DESIGN

3.1 The surface water drainage for the proposed development will be separate from the foul.

3.2 The aim of this design in the first instance is to limit the surface water discharge volume to that of pre-development levels. To this end, a desktop study of the existing pre-developed site was carried out to determine the impermeable or run-off surface areas - see Table 3.1. A study of post development site was carried out - see Table 3.2. (See Appendix D for plan of the areas involved). This study shows that there is a reduction of over 27% in the run-off areas post development.

Pre-Development Discharge

Area of site = 1598m^2

	(m^2)	Impermeability Factor	Run-off area (m^2)
Impermeable area	1253	1.0	1253
Landscaped area	235	0.1	23.5
Gravel area	110	0	0
Total	1598		1276.5

Table 3.1

Post-Development Discharge

Area of site = 1598m^2

	(m^2)	Impermeability Factor	Run-off area (m^2)
Impermeable area	915	1.0	915
Landscaped area	435	0.1	43.5
Green roof	49	0.5	24.5
Permeable paving	199	0.1	19.9
Total	1598		1003

Table 3.2

% of reduction in run-off area $= \frac{1276.5 - 1003}{1276.5}$

= 21.42% reduction

3.3 While the impermeable area is being significantly decreased, we endeavoured to further improve the sustainability of the site drainage by disposal of surface water via a soakaway on site.

3.4 A permeability test in accordance with BRE 365 was carried out on site by IGSL Ltd. The results of the test indicated that the ground was unsuitable for percolation. The results of these tests are contained in Appendix E.

3.5 While the soil is unsuitable for infiltration of run-off from a large area, it will still allow infiltration and run-off from its own footprint. Permeable paving is therefore being provided to the car parking area to dispose of run-off from this area in a sustainable way. A high level overflow will be provided to the surface water drainage system.

3.6 The requirement for a petrol interceptor, where more than 10 car park spaces are provided, is catered for by the use of Formpave permeable paving, incorporating a Inbitex geotextile membrane which filters the water and provides a bacteriological breakdown of hydrocarbons.

4.0 COMPLIANCE WITH PRINCIPLES OF SUSTAINABLE URBAN DESIGN

4.1 The development of the site will result in reduced paved and impermeable areas which will ease pressure on the environment and existing services due to decreased run off, in accordance with the principles of Sustainable Urban Drainage Systems (SuDS) as embodied in the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS).

4.2 The Planning Stage 'SuDS Selection Rationale' has been completed and is contained in Appendix B of this report..

4.3 The GDSDS addresses the issue of sustainability by requiring designs to comply with a set of criteria which aim to minimise the impact of urbanisation by replicating the run off characteristics of the greenfield site, where possible.

The criteria are:

Criteria 1	-	River Water Quality protection
Criteria 2	-	River Regime Protection
Criteria 3	-	Flood Risk Assessment
Criteria 4	-	River Flood Protection

5.0 CRITERIA 1 & 2 – RIVER WATER QUALITY PROTECTION AND RIVER REGIME PROTECTION

5.1 Run off from natural green field areas contribute very little pollution and sediment to rivers for most rainfall events. Direct run off from greenfield sites to rivers takes place with rain water percolating into the ground. By contrast, urban runoff, when drained, by piped systems, results in run off from virtually every rainfall event with high levels of pollution, particularly in the first phase of runoff.

The impact of pollution is mitigated by providing some green roof to the building and disposing of surface water from car parks using permeable paving. This is in compliance with Criteria 1 and Criteria 2.

5.2 CRITERIA 3 – SITE FLOODING

5.2.1 This states that no flooding should occur on the site for the 30 year storm and that no flooding of internal areas should occur during the 100 year return storm.

5.2.2 We have carried out a Preliminary Flood Risk Assessment and this shows that the site is in Flood Zone C, which is at a low risk of fluvial flooding and therefore suitable for residential development.

5.3 CRITERIA 4 – RIVER FLOODING

5.3.1 This criterion is intended to prevent river flooding by limiting the volume of run off to predevelopment volumes. By virtue of reducing run off on site, this criterion is complied with.

6.0 WATERMAINS

6.1 The existing 9" asbestos water main runs in close proximity to the proposed development. As this requires a 5 metre wayleave, it is proposed to divert the water main as shown on Drawing No. AM 726/S01 to achieve this separation.

6.2 It is proposed to take a 100mm connection off the diverted main, as shown on Drawing No. AM726/SO1, with bulk water meter and fire hydrant as shown.

7.0 VEHICULAR SITE ACCESS

7.1 Access and egress from the site are off Rathbeale Road R125.

7.2 Tactile paving to be dished and carriageway raised to intermediate level at crossing ie. approximately 60mm above carriageway of Rathbeale road. Thia creates a 'Courtesy Crossing' which gives priority to pedestrians.

7.3 Courtesy Crossing set back 1 metre from edge of Rathbeale Road carriageway; this caters for pedestrian desire line and allows a 1metre radius kerb which effectively slows traffic entering the site.

7.4 The site boundary is set back 5 metres along Rathbeale Road to allow for a future 2metre wide footpath anda 1.5 metre wide cycle path.

7.5 The speed limit locally at the site location is 50km/hr. The required sight distance based on Design Manual for Urban Roads is 49 metres, allowing for the proximity of the bus stop. The set back or *x* distance is taken as 2.4 metres without any relaxation. The above details are shown on Drawing No. AM 726 S02 which is contained in Appendix F of this report.

7.6 The required sight distance is complied with.

Gerry Donnelly
for
KAVANAGH MANSFIELD & PARTNERS
Consulting Engineers

CONDITIONS:

Inspections by Kavanagh Mansfield and Partners are carried out subject strictly to the following conditions unless otherwise expressly agreed in writing:

1. Initial inspections are non-intrusive, 'walkaround', preliminary assessments of structures. They are concerned with the strength, stability and durability of the basic structure of the building and they are carried out generally on the basis recommended in 'Surveys and Inspections of Buildings and Similar Structures' published by the Institution of Structural Engineers. They are *not* 'structural surveys' as that term is used by, for example, the Society of Chartered Surveyors; some aspects of non-structural elements/matters - such as electrical, drainage and other services, completions and finishes, doors and windows, water- and weather-tightness - may be noted in passing and commented on but are not dealt with comprehensively.

2. Initial inspections of structures are limited to noting and commenting on observed visible defects which in our opinion may prove to be symptomatic of significant inherent structural distress. No substantial opening-up to expose or uncover the structure is carried out; note in this respect that it is not possible to state that structural elements that are covered, unexposed or inaccessible are free from defects. A more detailed structural investigation and appraisal can be carried out on request.

3. Structural inspections do *not* deal with the following *inter alia*: the condition of timber and the presence or extent of fungal or insect infestation such as dry rot (a timber decay specialist's advice should be sought in relation to these); the presence or extent of asbestos (an asbestos specialist's advice should be sought in relation to these); planning permission and other building control approvals; fire risk assessment; the possible presence of radon gas (the Radiological Protection Institute of Ireland will facilitate a radon survey for a small charge); legal rights of ownership (such as whether dividing/boundary walls are party walls or are owned by one person).

4. Any suggested remedial (or other) works in our inspection reports are indicative & subject to subsequent detailed design and specification.

5. No verification of any information or documentation supplied by others has been carried out by us.

6. Reports are strictly for the private and exclusive use of the commissioning client and, further, solely for the purpose for which originally commissioned. They may not be assigned to third parties. They shall not be used or relied upon by third parties.

7. Kavanagh Mansfield & Partners is the trading name of Piconsult Limited. We provide professional inspection and reporting services in accordance with the current Conditions of Engagement of Consulting Engineers, Agreement RA9101 ("Report and Advisory Work"), published by Engineers Ireland (tel. 01-6684341); a photocopy of Agreement RA9101 will be provided by us on request. Limitations on the liability of Kavanagh Mansfield & Partners as specified in Agreement RA9101 shall apply except as may otherwise be agreed in writing with the commissioning client. No warranty is offered or implied.

Appendix A

Kavanagh Mansfield & Partners Drainage Drawing No. AM 726/01

PINE GROVE ROAD

PINE GROVE PARK

RATHBEALE ROAD

LS

Mh

1

1A

2

3

34

36

42

N

Existing FSMH
CL 25.55
IL 23.26

Existing FSMH
CL 25.7
IL 22.94

Form backdrop
IL pipe 24.13

Existing FSMH
CL 26.74
IL 23.58

Existing 450 Dia. Concrete Foul Sewer

Existing 600 Dia. Concrete SW main

FSMH 8
CL 25.50
IL 24.36

Formpave permeable paving

SWMH 1
CL 25.90
IL 26.48

SWMH 2
CL 25.90
IL 25.40

FSMH 3
CL 25.275
IL 24.80

SWMH 8
CL 25.90
IL 24.93

FSMH 7
CL 25.90
IL 24.67

100Ø High level overflow pipe

GREEN ROOF 49m²

FGFL 26.05

Existing SWMH
CL 26.58
IL 24.60

FSMH 2
CL 25.90
IL 25.06

SWMH 7
CL 25.90
IL 24.80

FSMH 6
CL 25.90
IL 24.83

SWMH 4
CL 26.025
IL 25.25

SWMH 3
CL 25.90
IL 25.31

100Ø High level overflow pipe

Existing FSMH
CL 26.45
IL 23.8

FSMH 5
CL 26.40
IL 25.09

SWMH 6
CL 25.90
IL 24.95

FSMH 4
CL 25.90
IL 24.85

SWMH 5
CL 25.90
IL 24.15

Bus Shelter

Redundant section of pipe
to be grubbed up (shown thus✕)

Water main to be diverted as shown
using new 225Ø HDPE pipe.
Main to be 5m min. from building.

100Ø Tee
connection to
existing mains

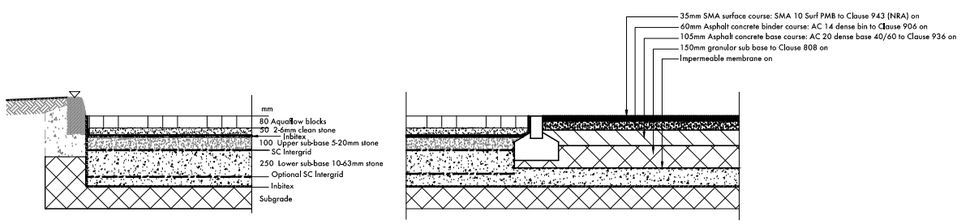
Existing 9" Asbestos
Water main

26.50

25.50

26.00

SITE PLAN
Scale NTS



SECTION A-A
Scale NTS

Legend:

- Indicates 160Ø Foul Sewer @1/80
- Indicates 160Ø SW Sewer @1/120
- Indicates 100Ø HDPE Water Ring Main
- [H] Indicates Fire Hydrant
- [M] Indicates Water Meter to Irish Water spec.
- SV Indicates Sluice Valve

All works including water meter, hydrant, sluice valves and thrust blocks to comply with Irish Water standard details for water networks and current Building Regulations.

Rev.	Date	Drn. by	Chkd. by	
A	13.09.19	DF		REVISED TO SUIT ARCHITECTS LAYOUT

Status: **PLANNING**

Architect:

Project: APARTMENTS AT OUTLANDS
RATHBEALE ROAD
SWORDS

Title: WATER SERVICES LAYOUT

Scale	NTS	Date	Mar.'19
Drn. by	DF	Chkd. by	Aprvd.

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Drg. No. AM 726 / S01

Status: P | Rev.: A

Appendix B

SuDS Selection Rationale

SUDS/Green Infrastructure measures selected for this site (2019.02.26)

Suds Measures	Measures to be used on this site	Rationale for selecting/not selecting measure
Source Control		
Swales	X	Insufficient room on site
Tree Pits	X	Some trees too close to building and insufficient depth
Rainwater Butts	X	Not feasible in multi-occupancy building
Rainwater harvesting	X	Not feasible in multi-occupancy building
Soakaways	X	Percolation tests indicate that ground is not suitable
Infiltration trenches	X	As Soakaways above
Permeable pavement		
- Grasscrete		
- Block paving	X	Used in Car Park. Will provide some attenuation and infiltration and also act to remove Hydrocarbons
- Porous Asphalt		
Green Roofs	√	Will attenuate surface water run and provide biodiversity
Filter strips	X	Insufficient permeability
Bioretention systems	X	Site unsuitable
Blue Roofs	X	Roof storage presents a risk of flooding and requires a high parapet with undesirable visual impact
Filter Drain	X	Insufficient permeability
Site Control		
Detention Basins	X	Insufficient room on site
Retentions basins	X	Insufficient room on site
Regional Control		
Ponds	X	Insufficient room on site
Wetlands	X	Insufficient room on site
Other		
Petrol/Oil interceptor	X	See permeable paving above
Attenuation tank – only as a last resort where other measures are not feasible		Overall Impermeable area is being reduced, therefore not considered
Oversized pipes– only as a last resort where other measures are not feasible	X	Overall Impermeable area is being reduced,therefore not considered

Note:

1. Fingal has a preference for above ground Green Infrastructure rather than tanks or over sized pipes . Above ground flows through swales, basins etc are encouraged.
2. Demonstrate SUDS system will have sufficient Pollutant removal efficiency in accordance with Ciria Suds Manual C753
3. Basins sides should be no steeper than 1:4 and no deeper than 1.2m in the 1%AEP
4. Culverting shall be avoided where possible
5. De-culverting is encouraged.

Flood risk to be assessed

Flood risk	Applicable to subject site	Measures to reduce risk	Residual risk
Fluvial	See separate Flood Risk Assessment		
Pluvial			
Coastal			
Groundwater			
Dam/Embankment/Canal bank breach			
Network drainage			
Snow melt			
Watermain burst			

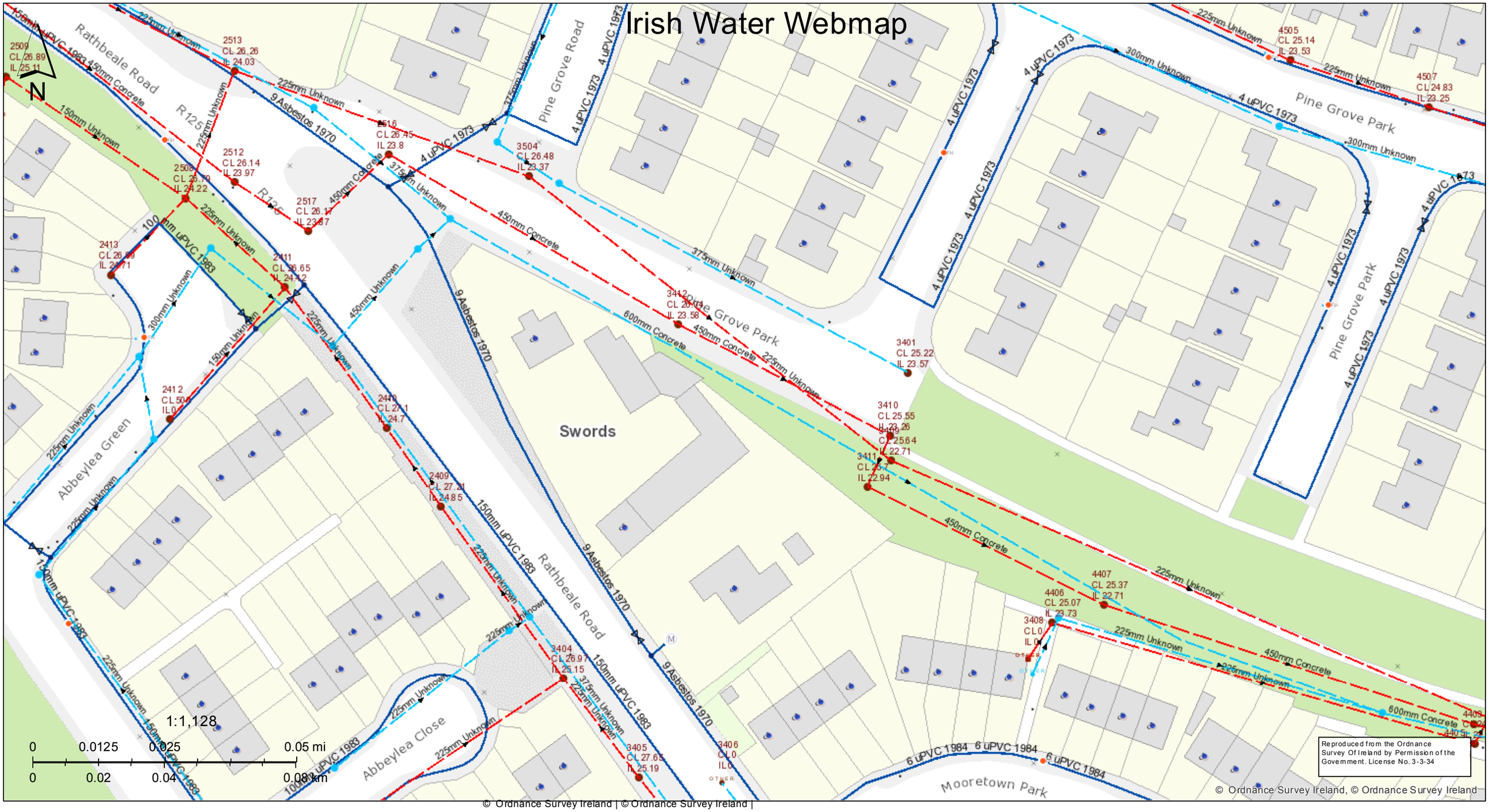
Note:

Models should consider the risk when outlets are surcharged

Appendix C

Public Drainage Map

Irish Water Webmap



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Legend

Stormwater Gravity Mains (Irish Water Owned)
- Surface

Stormwater Gravity Mains (Non-Irish Water Owned)
- Surface

Storm Manholes
- Cascade
- Catchpit
- Hatchbox

- Lamphole
- Standard
- Other; Unknown

Storm Inlets
- Gully
- Standard
- Other; Unknown

Storm Fittings
- Vent/Col
- Other; Unknown

Storm Discharge Points
- Outfall
- Overflow
- Soakaway
- Other; Unknown

- Storm Culverts
- Storm Clean Outs

Sewer Gravity Mains (Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

Sewer Gravity Mains (Non-Irish Water owned)
- Combined
- Foul
- Overflow
- Unknown

Irish Water gives this information as to the position of its underground network as a general guide only on the strict understanding that it is based on the best available information provided by each Local Authority in Ireland. It should not be relied upon in the event of excavations or other works being carried out in the vicinity of the network. The onus is on the parties carrying out the works to ensure the exact location of the network is identified prior to mechanical works being carried out. Service pipes are not generally shown but their presence should be anticipated. © Irish Water

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Appendix D

Permeable Area Study

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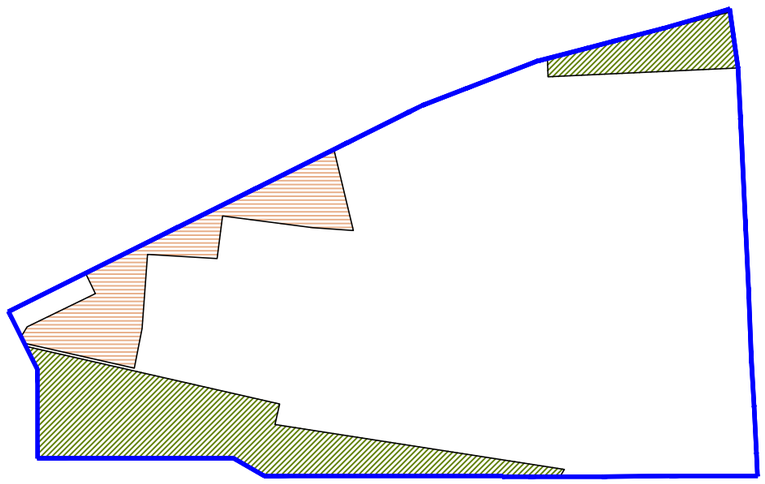


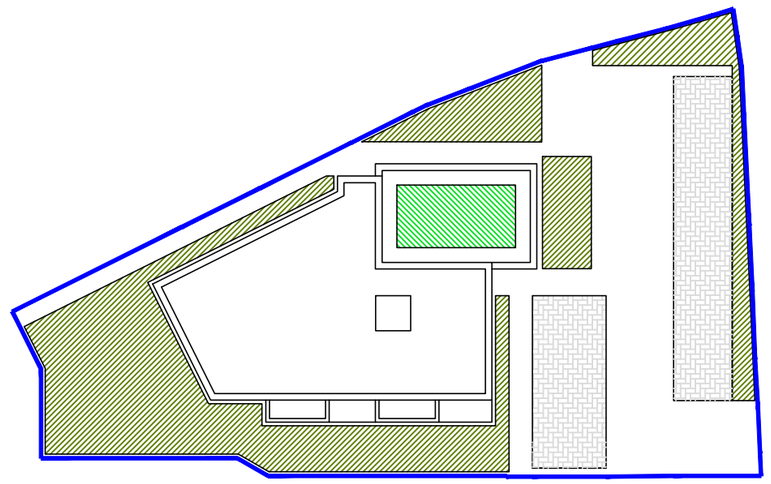
PRE–DEVELOPMENT PERMEABLE AREAS

Footprint of Proposed Development : 1598sqm

Landscaped Areas : 235 sqm (15%)

Gravel Area: 110sqm (7%)

Total Permeable Area: 345 sqm (22%)



POST–DEVELOPMENT PERMEABLE AREAS

Footprint of Proposed Development : 1598sqm

Landscaped Areas : 435sqm (27 %)

Green Roof Area: 49sqm (3%)

Permeable Paving Area: 199sqm (12%)

Total Permeable Area: 683 sqm (42%)

PERMEABLE AREAS

Scale 1:500

Appendix E

Percolation Test Results IGSL

IGSL Limited

Fingal County Council

Rathbeale Road, Swords

Infiltration Test Report

Project No. 21728

May 2019

Report

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Document Verification

Project: Rathbeale Road, Swords

Project No. 21728

Revision	Date	Title		
Rev 0	7/05/2019	Report		
	Copies	Document Format	Prepared By	Reviewed By
	1	Digital	Brian Green Chartered Engineer	David Green Chartered Engineer
	To	Fingal County Council		
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	To			
Revision	**Date**	**Title**		
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Revision	**Date**	**Title**		
	Copies	Document Format	Prepared By	Reviewed By
	To			

Report on Infiltration Tests
At
Rathbeale Road, Swords
On behalf of
Fingal County Council

Report No. 21728

Contents

Appendices

Report on Infiltration Tests
At
Rathbeale Road, Swords
On behalf of
Fingal County Council

Report No. 21728 Date May 2019

1.0 Introduction

The site under investigation lies at the junction of Pine Grove Park and Rathbeale Road, and is currently in use as a depot. It is understood that the proposed development will entail the construction of eleven apartments in a 3-storey block, with associated services.

Design of the drainage system will require an assessment of the suitability of the sub-soils for soakaway purposes. This report contains a description of the sub-soils, and the results of infiltration tests.

2.0 Fieldworks

2.1 Location 1

2.1.1 Ground Conditions

In the public area, the test pit revealed topsoil overlying made ground, composed of gravelly clay intermixed with demolition waste. There was also evidence of former pavement layers from 0.9 metres to 1.1 metres. Penetration of these layers revealed firm dark grey sandy clay in which the pit was terminated at a depth of 2.6 metres where a water seepage was noted.

2.1.2 Infiltration Test

An infiltration test was performed in accordance with BRE Digest 365 'Soakaway Design'. To obtain a measure of the infiltration rate of the sub-soils, water was poured into the test pit, and records taken of the fall in water level against time. This procedure was repeated twice more to ensure saturation of the sub-soils. The results for the final stage of testing, following the saturation periods, are enclosed in appendix1. For this stage of testing the water level was raised to a depth of 1.6 metres below ground level. Over an observation period of 50 minutes there was no measurable fall in water level.

2.2 Location 3

2.2.1 Ground Conditions

In this location, the test pit revealed 0.4 metres of granular fill overlying a thin layer of sandy gravelly silt with roots. The underlying soils were composed of sandy clays with occasional gravel to the excavated depth of 2.4 metres. There was no evidence of groundwater ingress.

2.2.2 Infiltration test

For the final stage of testing the water level was raised to a depth of 1.59 metres below ground level. Over an observation period of 50 minutes there was no measurable fall in water level.

3.0 Conclusions

In each test location there was no measurable fall in water level over the observation period following the saturation stages. It has been concluded, therefore, that the sub-soils are unsuitable for soakaway purposes and that it will be necessary to discharge run-off water to an existing surface water system, using attenuation techniques to regulate the flow.

Appendix 1 Infiltration Test Results

Soakaway Design f -value from field tests

IGSL

Contract: Rathbeale Road, Swords
Contract No. 21728
Test No. Location 1
Engineer Fingal Co. Co.
Date: 23.04.2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.20	Firm dark brown TOPSOIL	
0.20	0.90	Firm dark brown to black sandy very gravelly SILT with brick/plastic	Seepage at 2.6m
0.90	1.10	TAR(0.9-0.98m) Clause 804(0.98-1.10m)	
1.10	2.60	Firm dark brown/dark grey sandy CLAY with rare gravel	

Field Data

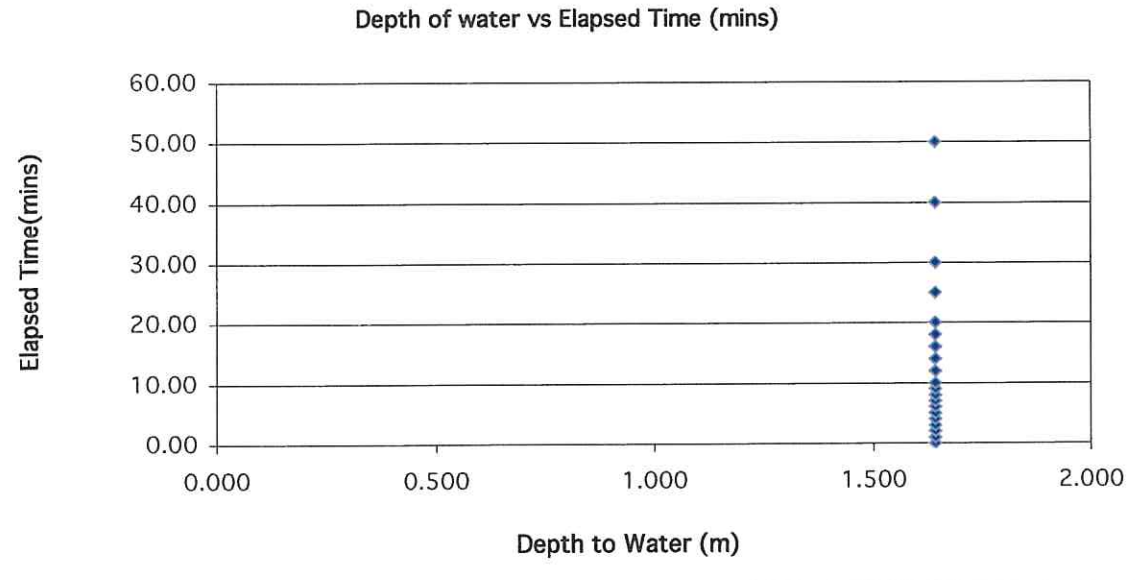
Depth to Water (m)	Elapsed Time (min)
1.640	0.00
1.640	1.00
1.640	2.00
1.640	3.00
1.640	4.00
1.640	5.00
1.640	6.00
1.640	7.00
1.640	8.00
1.640	9.00
1.640	10.00
1.640	12.00
1.640	14.00
1.640	16.00
1.640	18.00
1.640	20.00
1.640	25.00
1.640	30.00
1.640	40.00
1.640	50.00

Field Test

Depth of Pit (D)	2.60	m
Width of Pit (B)	0.30	m
Length of Pit (L)	1.60	m
Initial depth to Water =	1.64	m
Final depth to water =	1.640	m
Elapsed time (mins)=	50.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	0.48	m2
*Av. side area of permeable stratum over test period=	3.648	m2
Total Exposed area =	4.128	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

f= 0 m/min or 0 m/sec



Soakaway Design f -value from field tests

IGSL

Contract: Rathbeale Road, Swords
Contract No. 21728
Test No. Location 3
Engineer Fingal Co. Co.
Date: 23.04.2019

Summary of ground conditions

from	to	Description	Ground water
0.00	0.40	Medium dense grey sandy GRAVEL fill wth plastic and concrete	Dry
0.40	0.60	Firm grey sandy very gravelly SILT with rootlets	
0.60	2.40	Firm brown to locally light greyish brown sandy CLAY with rare	
		gravel	

Field Data

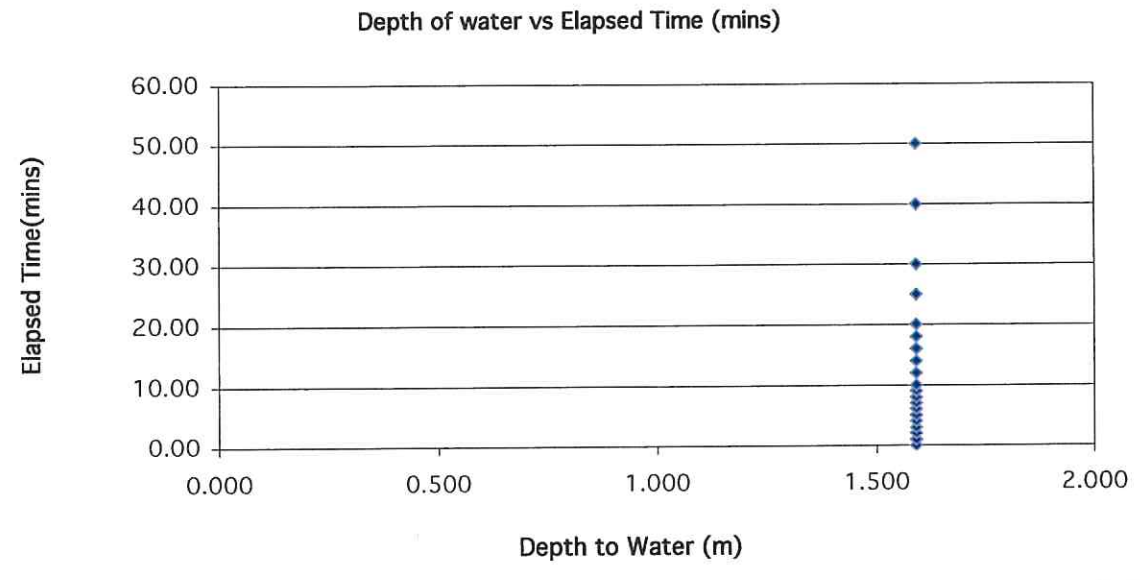
Depth to Water (m)	Elapsed Time (min)
1.590	0.00
1.590	1.00
1.590	2.00
1.590	3.00
1.590	4.00
1.590	5.00
1.590	6.00
1.590	7.00
1.590	8.00
1.590	9.00
1.590	10.00
1.590	12.00
1.590	14.00
1.590	16.00
1.590	18.00
1.590	20.00
1.590	25.00
1.590	30.00
1.590	40.00
1.590	50.00

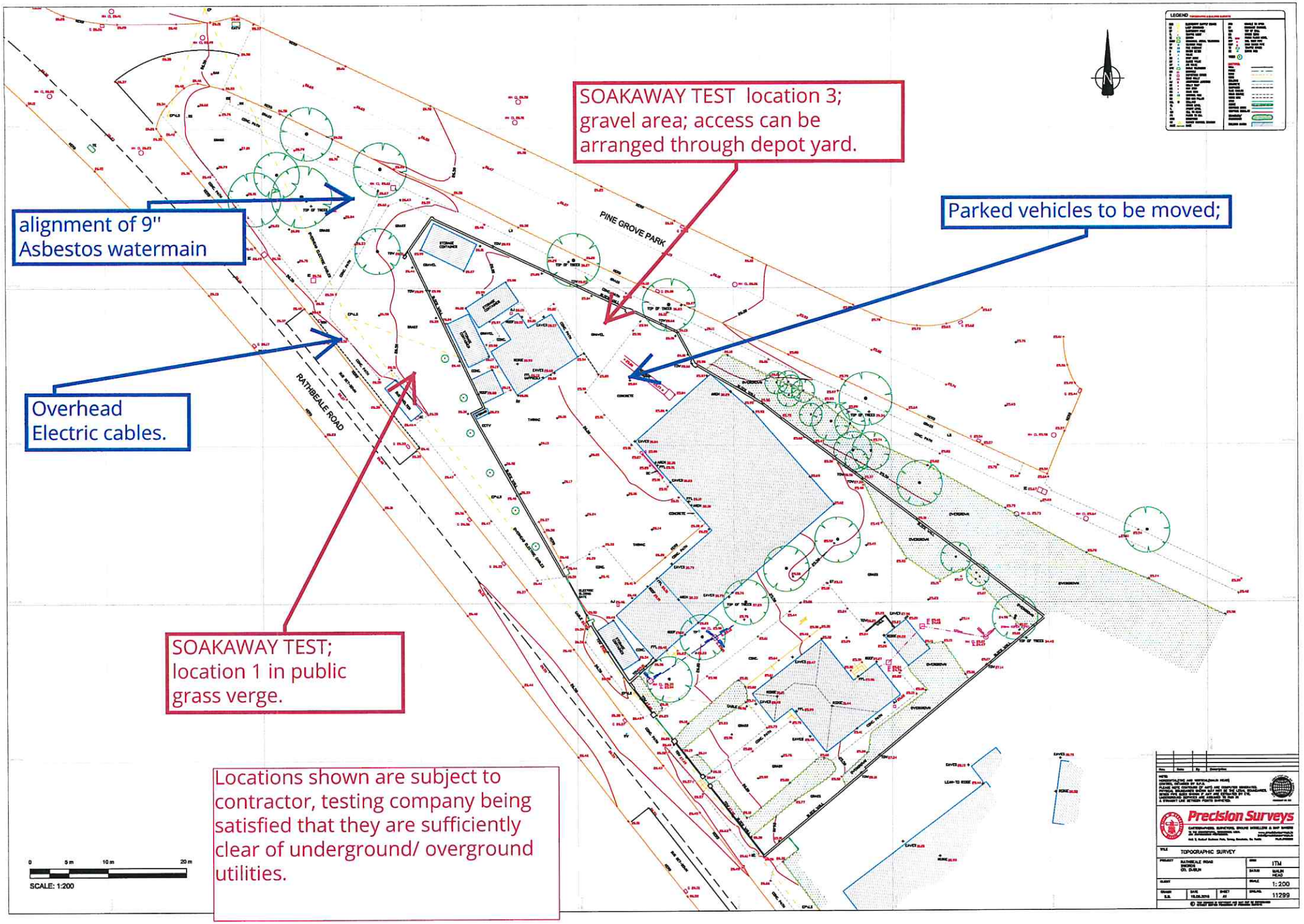
Field Test

Depth of Pit (D)	2.40	m
Width of Pit (B)	0.70	m
Length of Pit (L)	1.60	m
Initial depth to Water =	1.59	m
Final depth to water =	1.590	m
Elapsed time (mins)=	50.00	
Top of permeable soil		m
Base of permeable soil		m
Base area=	1.12	m2
*Av. side area of permeable stratum over test period=	3.726	m2
Total Exposed area =	4.846	m2

Infiltration rate (f) = Volume of water used/unit exposed area / unit time

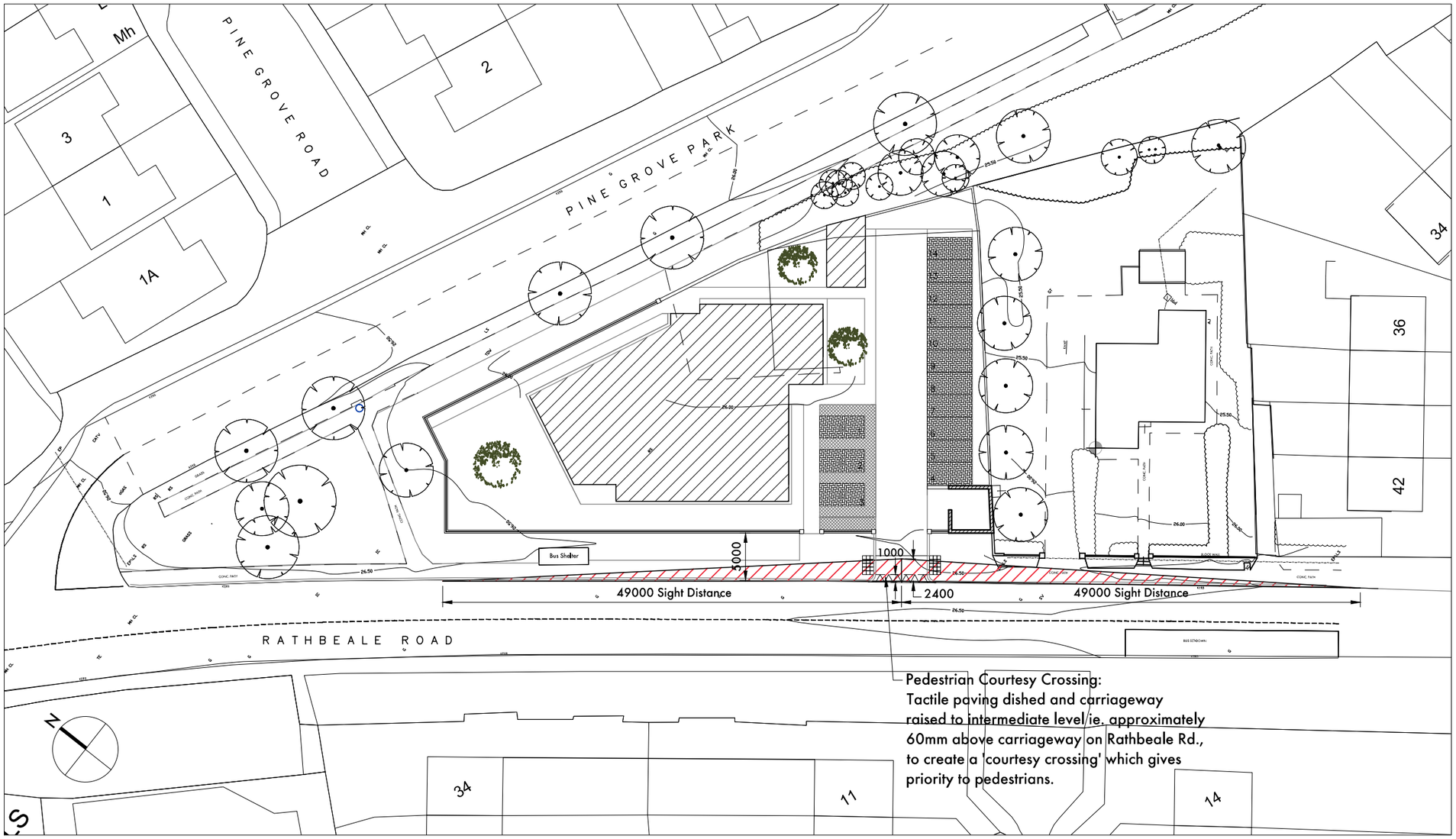
f= 0 m/min or 0 m/sec




SOAKAWAY TEST location 3; gravel area; access can be arranged through depot yard.
Parked vehicles to be moved;
alignment of 9" Asbestos watermain
Overhead Electric cables.
SOAKAWAY TEST; location 1 in public grass verge.
Locations shown are subject to contractor, testing company being satisfied that they are sufficiently clear of underground/ overground utilities.
PINE GROVE PARK
RATHBEALE ROAD
SCALE: 1:200
Precision Surveys
TOPOGRAPHIC SURVEY
1:200
11299

Appendix F

Kavanagh Mansfield & Partners Vehicular Site Access Drawing



SITE PLAN

Scale 1:500

Rev.	Date	Drn. by	Chkd. by	
A	13.09.19	DF		REVISED TO SUIT ARCHITECTS LAYOUT

Status: PLANNING

Architect:

Project: APARTMENTS AT OUTLANDS
RATHBEALE ROAD
SWORDS

Title: VEHICULAR SITE ACCESS

Scale	As Shown @ A3	Date	May '19
Drn. by	DF	Chkd. by	Aprvd.

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Drg. No. AM 726 /S02

Status | Rev. A