

S.A. MCGREGOR



GROUND ASSESSMENT REPORT & DRAINAGE RECOMMENDATIONS

PROPOSED RE-DEVELOPEMNT
BOGFOSSIE BOTHY (PLOT 1)
BOGFOSSIE
GLASSEL
BANCHORY
ABERDEENSHIRE
AB31 4DU

Client:

Annie Kenyon Developments Ltd

Agent:

Annie Kenyon Architects Ltd.

Contract No.

1680/16/23

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GROUND ASSESSMENT & DRAINAGE RECOMMENDATIONS

PROPOSED RE-DEVELOPEMNT BOGFOSSIE BOTHY (PLOT 1) BOGFOSSIE GLASSEL, BANCHORY ABERDEENSHIRE AB31 4DU

INTRODUCTION

At the request of Annie Kenyon Architects Ltd., on behalf of Annie Kenyon Developments, this report is presented for the new planning application for the proposed re-development of the derelict bothy at Bogfossie, Glassel near Banchory.

It is proposed to re-develop the bothy to form new dwellinghouse.

The original ground assessment was undertaken in June 2016 by S A McGregor.

The ground investigation determined the nature of the materials underlying the site and undertook the following: -

- percolation testing to assess the suitability of the underground strata for the disposal of effluent from sewage treatment systems to the ground via designed sub-surface soakaway systems.

- infiltration testing for the disposal design for surface waters from the proposed development.

- assessment of the ground conditions for foundation design.

SITE LOCATION & BRIEF DESCRIPTION

The proposed development site is located at Bogfossie, Glassel between Torphins and Banchory with access off the A980 and local roads, see Fig. 1. General & Site Location Plans.

The development site is currently occupied by the existing derelict buildings and surrounded by agricultural land. The land slopes from the south-west down towards the north-east. The development site boundaries were unmarked at the time of the investigation but were roughly defined by the buildings and the watercourse to the east.

At te time of the investigation the site was un-serviced with electricity, water and telephone nearby; there is no mains drainage available for this development.

There are no wells supplying potable water within 50m of the site.

The nearest surface watercourse flows along the eastern boundary of the site in a northerly direction.

Note: There have been no major changes to the site that would affect the original ground assessment and following drainage design.

SITE WORK

Trial Pits

On the 22nd June 2016 a back-actor excavator with a 0.90m bucket excavated trial pits in order to carry out an assessment of the underlying ground conditions, to carry out a series of percolation and infiltration testing.

Original Percolation Testing

Percolation testing was carried out in test holes adjacent to observation trial pits TP1-4 in accordance with BS6297: 2007+A1:2008 and as described in Section 3.9 of the Scottish Building Standards Technical Handbook (Domestic). The testing was abandoned due to no drop in test water levels, see results below: -

Date of Testing 22/6/2016	TP 1	TP2	TP3	TP4
Average time taken for water to drain 3 times in each sump hole (middle 150mm)	>800			
Depth of Water Table below Ground Level (m)	>2.00			
Average Soil Percolation Value, Vp, s/mm	>200			

Original Infiltration Testing

Infiltration testing was not carried out due the no drop in test water levels in the above percolation test holes.

The locations of all the trial pits are indicated on Fig. 2. Proposed Site Layout & Test Location Plan in Appendix A.

GROUND ASSESSMENT

Published Geology

The Geological Survey 1:50,000 Quaternary and Solid maps indicate that the site is overlain by the Banchory Till Formation (Diamicton - gravels, sands, silts and clays) and underlain by the metamorphic Queens Hill Formation (Semipelite, Psammite and Pelite) formed 542 to 1000 million years ago during the Dalradian Period.

Encountered Ground Conditions

Topsoil: The areas are overlain by up to 300mm of topsoil.

Natural Sub-Soils: The natural underlying sub-soils have a variable upper strata comprising generally silts, sands and clays from around 0.70-1.10m. Underlying these is firm to stiff clays proved to the maximum investigated depths of up to 2.00m.

Bedrock: Bedrock was not encountered during the investigation.

Ground Water Observations

Ground water was not encountered during this investigation. There was no visual indication of the seasonal high or fluctuating ground water table being above 2.00m.

DISCUSSION

Sub-Soils

The very grey clayey nature of the sub-soils below 0.70m and the test results confirmed the very poor drainage properties of the underlying clays.

Sewage Treatment

Connection to the mains sewer is not available for this development, therefore it is proposed to install a private sewage treatment system to serve the proposed dwellinghouse.

Foul Water Discharge

The investigation and testing carried out concludes that the underlying strata are not considered suitable for the construction of 'standard' sub-surface soakaway systems for the disposal of foul waters from the proposed development and that an alternative and appropriately designed solution should be sort which is considered not to pose a risk to local water supplies and the wider water environment.

SuDS

The disposal of surface waters from the dwellinghouse needs to be assessed in terms of both the quantity and the quality of the discharge for Building Regulations and SEPA. Using the SIA tool, the land use run-off quality has been determined as 'Very Low', see summary below: -

Land Use Type	Residential Roofing (& permeable gravel hardstanding)
Pollution Hazard Level	Very Low
Pollution Hazard Indices	TSS 0.2 Metals 0.2 Hydrocarbons 0.05
Surface Water Protection (SuDS) 1 Component	Filter Drain (discharge to waterbody)
SuDS Pollution Mitigation Indices	TSS 0.4 Metals 0.4 Hydrocarbons 0.4
Groundwater Protection Type	No discharge to ground
Combined Pollution Mitigation Indices	TSS 0.4 Metals 0.4 Hydrocarbons 0.4
Acceptability of Pollution Mitigation	TSS Sufficient Metals Sufficient Hydrocarbons Sufficient

The SIA assessment confirms that the installation of a filter drain provides sufficient quality mitigation for the surface water run-off from the roof areas and permeable driveways/parking areas for the proposed development prior to disposal to the ground.

The design is to be effective in all-weather conditions and are not considered to pose a risk to local water supplies and the water environment.

DRAINAGE RECOMMENDATIONS

Sewage Treatment & Foul Water Discharge

To comply with the Domestic Technical Handbook (para. 3.9.2) which sets out guidance on how proposals may meet the Building Standards set out in the Building (Scotland) Regulations 2004, a discharge system must be designed and constructed in accordance with the requirements of SEPA and WAT-RM-03, Sewage Discharges to Surface Waters.

Secondary Treatment

The level of treatment required for the sewage discharge to a watercourse is determined using the table from WAT-RM-03, Dec 2014, see below: -

Table 1 Registration look up table for sewage discharges to watercourses

Dilution range:		Treatment / standards required
Anticipated/Existing Pollution Pressure	No Anticipated/Existing Pollution Pressure	
>400:1	>400:1	Primary / Septic tank (with partial soakaway)
100:1 - 400:1	30:1 - 400:1	Secondary treatment designed to produce effluent with a mean BOD concentration <20mg/l
30:1 - 100:1	10:1 - 30:1	Secondary: designed to produce effluent with a mean ammonia concentration ≤5mg/l
<30:1	<10:1	Enhanced treatment or refuse

It is considered that the receiving water (unnamed tributary of the Beltie Burn) has a dilution range of 30:1 – 100:1 and therefore secondary treatment is required, however, this may require verification by SEPA.

Foul Water Discharge

In line with the SEPA guidance it is required to install a partial soakaway after the PSTP and prior to the discharge to the watercourse.

The size of the partial soakaway is determined is derived from $A = 3.6 \times PE$ (PE = population equivalent) or a *minimum base area of 25m²* per household, see the following table: -

Proposed Development	Population Equivalent, PE (as defined in BW COP:18.11/14)	Min. Base Area (m ²) With Secondary Treatment (PSTP)
New Dwelling House	Up to 5 (up to 3 bedrooms)	25m ²

Discharge Quality

The following table indicates the required treatment standard for the discharge from the treatment systems prior to discharge to the watercourse: -

	BOD (mg/l)	SS (mg/l)	NH4-N (mg/l)
Treatment / Standard Required by SEPA	20	30	5

Proposed Sewage Treatment System

It is recommended to install a package sewage treatment plant (PSTP) tested and certified to EN12566 Part 3.

It is recommended that for up to a 3-bedroom dwelling house package sewage treatment plant (PSTP) with a minimum capacity of 4,000 litres is installed.

SEPA

Full details of the proposed treatment system will be made available to the Building Standards Officer and SEPA once it has been determined after consultation which system is the most suitable for the proposed development and meets the requirements of SEPA to enable the discharge to the watercourse to be licensed/registered under CAR.

Surface Water Disposal

It is proposed to dispose of the surface waters from the development to the nearby watercourse. To ensure that the post development flow of the watercourse is not compromised it is recommended that the surface waters from the roof areas of the new houses (all access roads and hardstanding will be constructed using permeable materials) are attenuated and transported to the watercourse with a controlled outlet and storm brake device.

It is proposed to install attenuation drains from each dwelling to a shared transportation drain to the watercourse.

Impermeable Area (m ²)	Each Attenuation Drain	Transportation Drain	Controlled Outflow
New House Areas up to 300m ²	40m long x 100mm diameter	200mm diameter	Restricted 100mm outlet to watercourse with storm brake control

Proposed Drainage Layout

The proposed drainage layout is shown on Fig 3. with indicative partial soakaway construction shown on Fig. 4. and discharge certificates all in Appendix A.

DRAINAGE MAINTENANCE & SERVICING

Sewage Treatment System

All servicing and maintenance of the installed PSTP should be undertaken in full accordance with the manufacturer's literature and carried out by a suitably responsible or qualified person.

The PSTP should be regularly inspected and 'desludged' (emptied) when appropriate to ensure solids and silts do not 'clog' the discharge outlet and make their way to the soakaway.

Soakaways

The partial soakaway is designed for the lifetime of the proposed development as long as it is not allowed to silt up nor the pipework to be blocked.

If a soakaway fails to due blockages or silting it should be excavated and reconstructed with fresh clean stone, new pipework and renewed terram.

During the development of the site, and in particular the excavation of the soakaways, should any field drains be found within 10m of the soakaway they should be realigned or relocated accordingly.

REGULATIONS

SEPA and Building Regulations require that infiltration systems (soakaways) are located at least:

-

50m from any spring, well or borehole used as drinking water supply

10m horizontally from any water course (including any inland or coastal waters), permeable drain (including culvert), road or railway

5m from all buildings

5m from boundaries (*reduced distance to boundaries may also be subject to agreement from adjacent land owners where the soakaway is considered not to be detrimental to the adjacent property*)

FOUNDATION RECOMMENDATIONS

Safe Bearing Capacity

All foundations should be taken down through any topsoil and the upper soft clays/loose silts and sands and rest on the underlying firm to stiff grey clays which have a safe bearing capacity of 120kN/m² for 600mm strip foundations allowing cover for frost protection.

Due to the clayey nature of the sub-soils all excavations, if left exposed, should be protected by a blinding layer of concrete in order to maintain the soils strength.

APPENDIX A

Site Plans	Fig. 1. General & Site Location Plans Fig. 2. Original Site Layout & Test Location Plan (2016)
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Fig. 1. GENERAL & SITE LOCATION PLANS

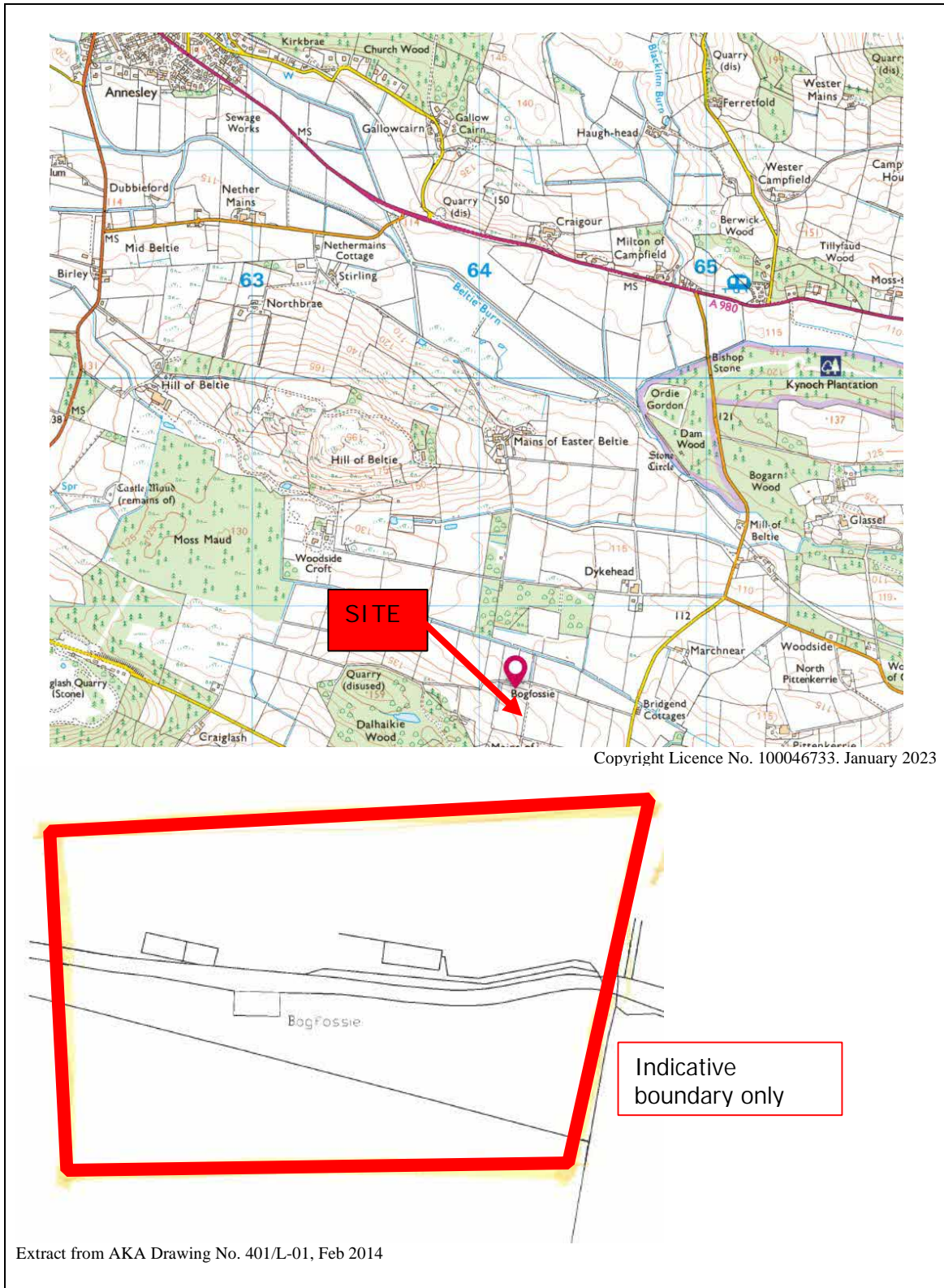
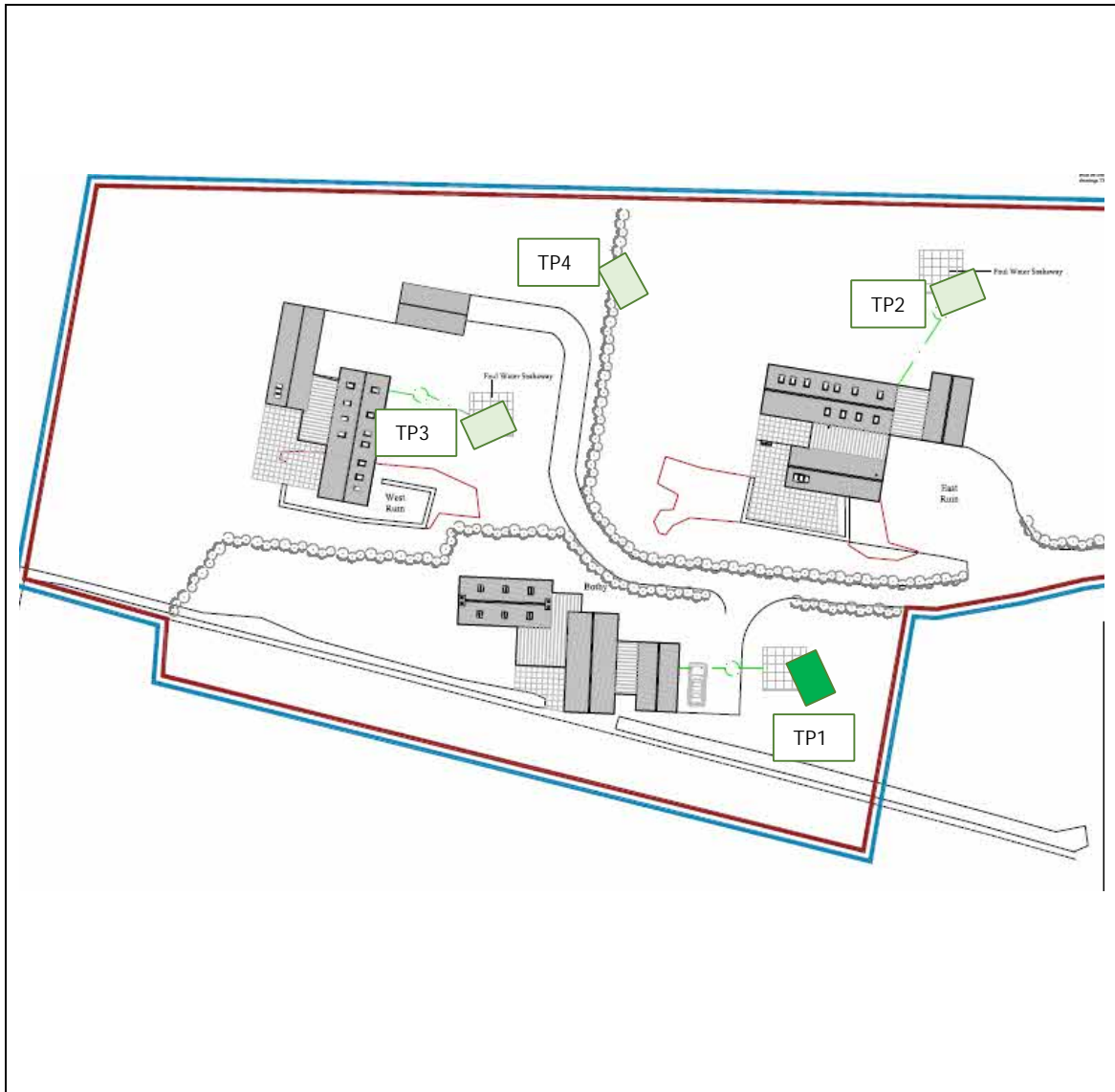






Fig. 2. ORIGINAL SITE LAYOUT & TEST LOCATION PLAN (2016)



 S.A. MCGREGOR <small>GEOTECHNICAL & ENVIRONMENTAL URSITE SERVICES</small>		Site Bogfossie, Glasgel, Banchory		Trial Pit Number TP1				
Excavation Method Back-actor type excavator with 0.90m bucket		Dimensions 0.90 x 1.40m		Ground Level (mOD)				
Location see site sketch		Dates 22/06/2016		Client David Strang-Steel Esq.				
Architect Annie Kenyon		Job Number 1680/16		Sheet 1/1				
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
			No drop in test water levels		0.30	TOPSOIL		
					0.30	Loose grey brown silty coarse SAND		
					1.00	Firm grey silty slightly sandy gravelly CLAY with some cobbles ...very slight surface water seepage at sand/clay interface		
			No ground water ingress		2.00	Complete at 2.00m		
Plan						Remarks		
. .						Scale (approx) 1:20		
						Logged By ICW		Figure No. 1680/16.TP1

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Fig. 3. PROPOSED DRAINAGE LAYOUT

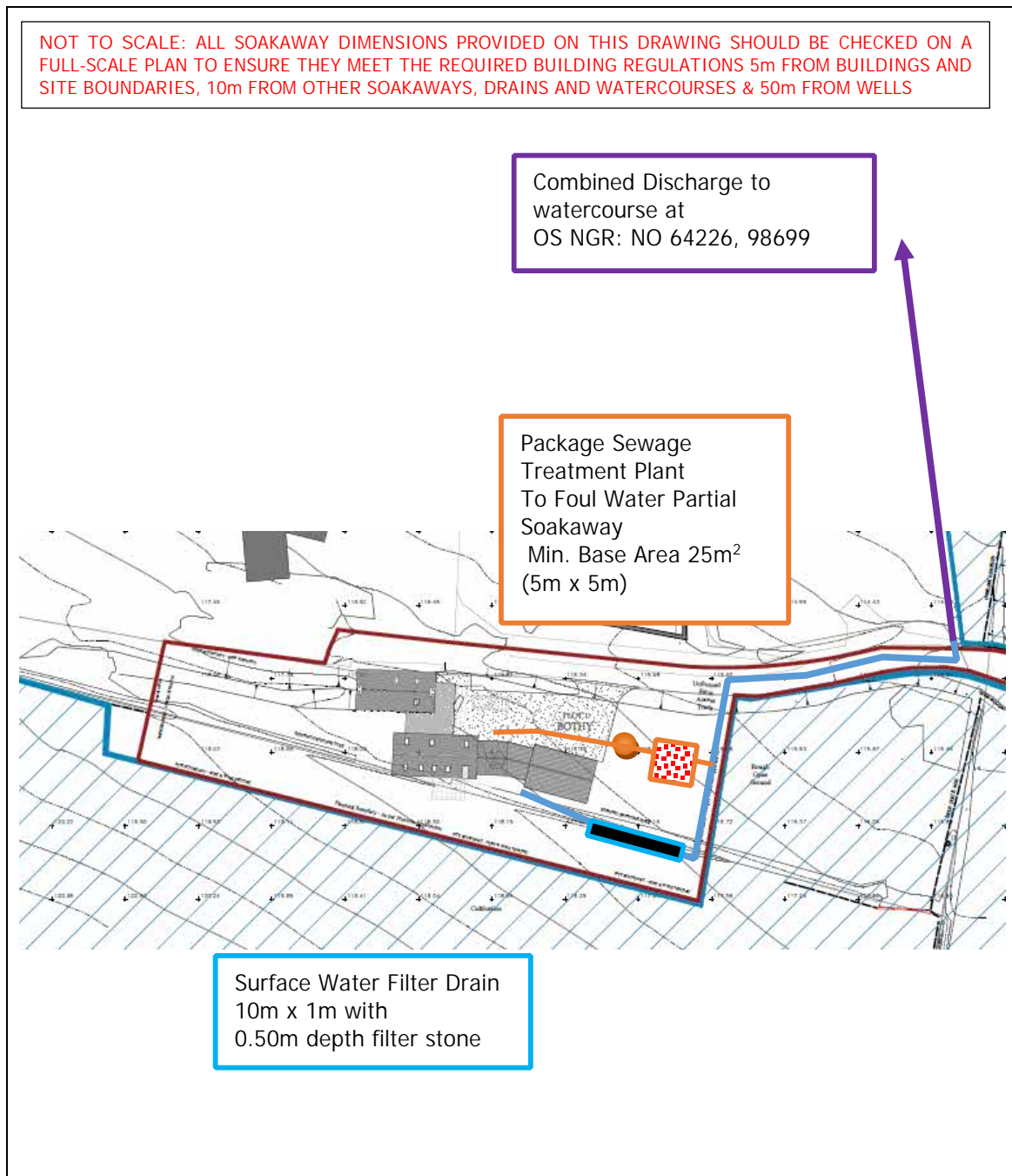
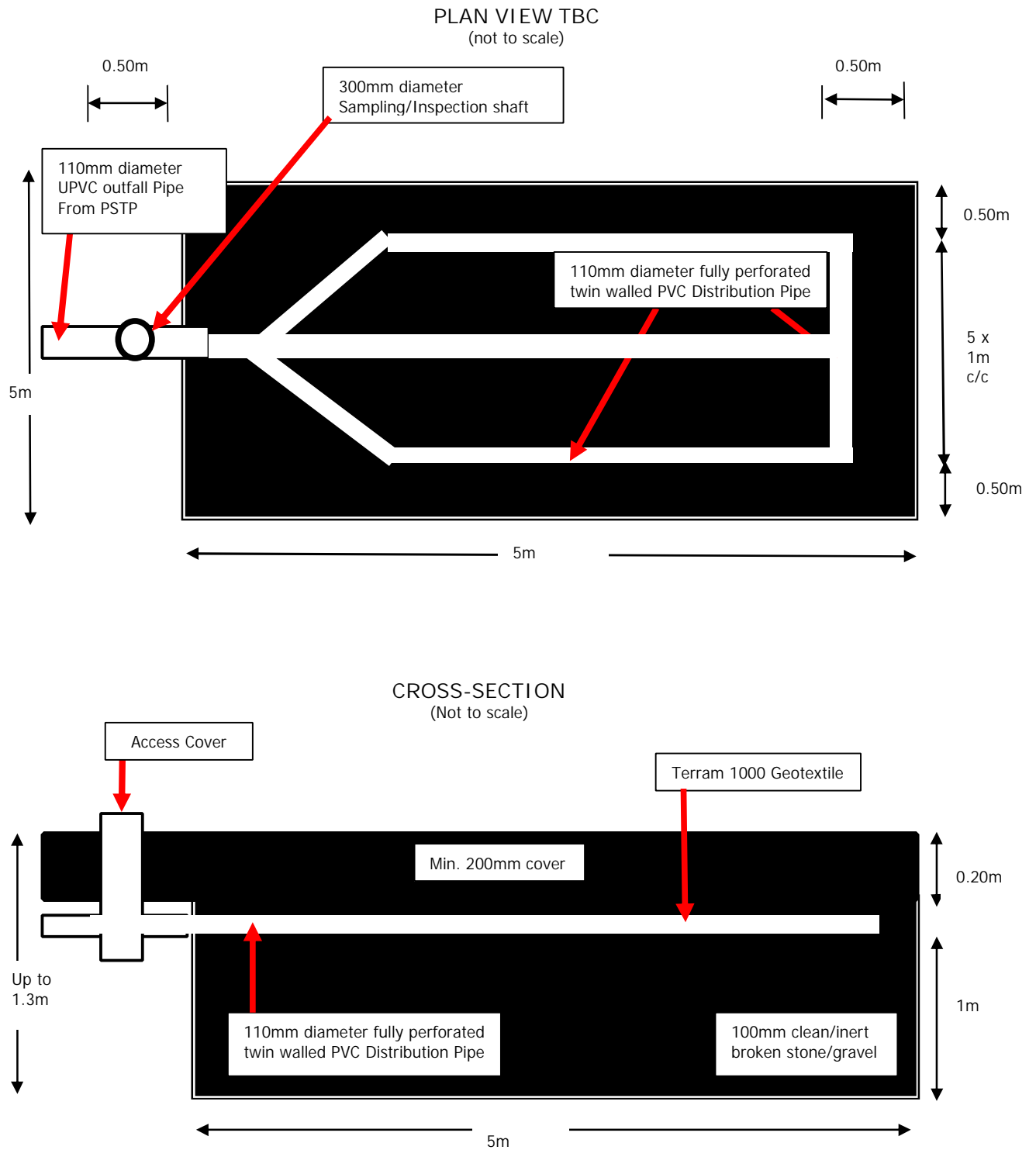




Fig. 4. INDICATIVE PARTIAL SOAKAWAY INSTALLATION
(sketch only, not to scale)



CERTIFICATE FOR PROPOSED FOUL WATER DISCHARGE		
Applicants Name	Mr Alan Doherty	
Agent	Annie Kenyon Architects Ltd	
Site Address	Bogfossie Bothy (Plot 1), Bogfossie, Glassel, Banchory, Aberdeenshire, AB32 4DU	
Date of Fieldwork & New Assessment	22 nd June 2016 & 18 th December 2023	
Weather Conditions	Overcast	
<p>Encountered Ground Conditions: Topsoil: The areas are overlain by up to 300mm of topsoil. Natural Sub-Soils: The natural underlying sub-soils have a variable upper strata comprising generally silts, sands and clays from around 0.70-1.10m. Underlying these is firm to stiff clays proved to the maximum investigated depths of up to 2.00m. Bedrock was not encountered during the investigation.</p>		
Groundwater Observations: Not encountered during the ground investigation		
Wells / Boreholes: No known potable water supply wells/boreholes within 50m of the proposed infiltration fields		
Percolation Testing	TP1 – TP4	at 1.00m
Average time taken	>1800	seconds
Soil Percolation Value, Vp	>200	s/mm
Discharge Design		
Proposed Development	New Dwellinghouse	
Population Equivalent, PE	5 (3-bedroom)	
Sewage Treatment Type	PSTP ONLY	Minimum 3,000-litre Capacity
Minimum Base Area	25 m² (8.00m x 5.60m)	Partial Soakaway
<p>I hereby certify that I have carried out the above assessment in accordance with procedures specified within the Domestic Scottish Building Standards Technical Handbook (Environmental Standard 3.9 Infiltration Systems) and SEPA A WAT-RM-04, the results of which are tabulated above, and that the proposed drainage scheme detailed on the attached plans and report has been designed considering the recommendations in the standards and regulatory standards.</p>		
Signed		Date 20 December 2023
Name / Company	S. A. McGregor	
Address	Serenje, Kingsford Steadings, Alford, Aberdeenshire, AB33 8HN	
Qualification	B.Eng (Civil Engineering)	

CERTIFICATE FOR PROPOSED SURFACE WATER DISPOSAL			
Applicants Name	Mr Alan Doherty		
Agent	Annie Kenyon Architects Ltd		
Site Address	Bogflossie Bothy (Plot 1), Bogflossie, Glassel, Banchory, Aberdeenshire, AB32 4DU		
Date of Fieldwork & New Assessment	22 nd June 2016 & 18 th December 2023		
Weather Conditions	Overcast		
<p>Encountered Ground Conditions: Topsoil: The areas are overlain by up to 300mm of topsoil. Natural Sub-Soils: The natural underlying sub-soils have a variable upper stratum comprising generally silts, sands and clays from around 0.70-1.10m. Underlying these is firm to stiff clays proved to the maximum investigated depths of up to 2.00m. Bedrock was not encountered during the investigation.</p>			
Groundwater Observations: Not encountered during the ground investigation			
Wells / Boreholes: No known potable water supply wells/boreholes within 50m of the proposed infiltration fields			
Infiltration Testing	Not undertaken	Open	
Infiltration Test Zone	n/a	mbegl	
Soil Infiltration Rate, f	<1 x 10 ⁻⁷	m/s	
SuDS Design	Filter Drain and Combined Disposal to Watercourse		
Proposed Development	New Dwellinghouse Roof Areas		
Impermeable Areas	Dwellinghouse Roof Areas	Up to 300 m²	
Design Dimensions, L x W	10m	1m	0.50m Stone Filter depth
<p>I hereby certify that I have carried out the above tests and calculations in accordance with BRE Digest 365 and in conjunction with the full requirements set out within the Domestic Scottish Building Standards Technical Handbook. The results of which are tabulated above, and that the proposed drainage scheme detailed within this report has been designed considering the recommendations in the standards.</p>			
Signed			Date 20 December 2023
Name / Company	S. A. McGregor		
Address	Serenje, Kingsford Steadings, Alford, Aberdeenshire, AB33 8HN		
Qualification	B.Eng (Civil Engineering)		