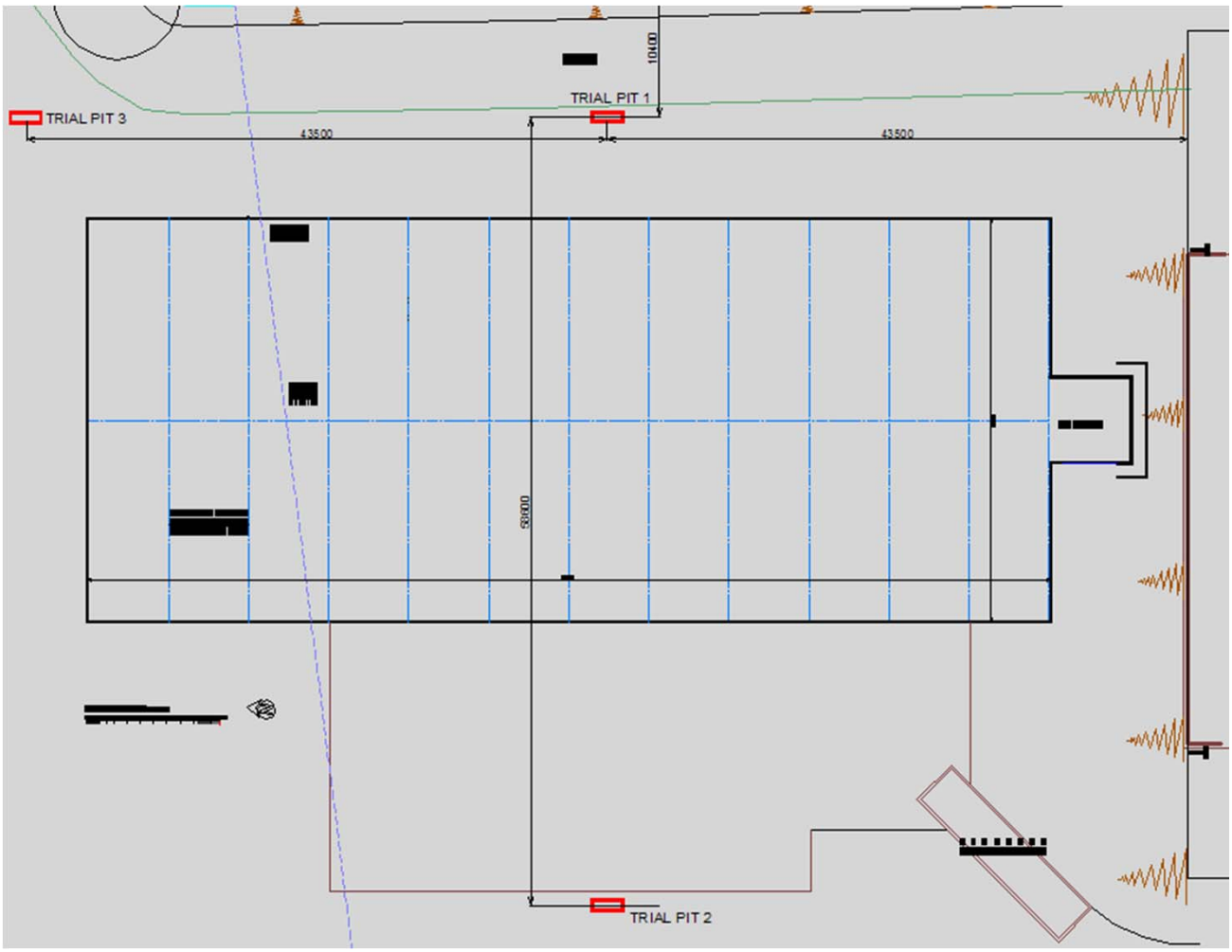


Soakaway design

TP3

Proposed
general purpose agricultural
building

Low Risby Farm
Low Risby
DN15 0BX

Executors & Trustees of
Captain Elwes Will

project
1283 TP3
01-Apr-19

Roy Gibson
architectural technician
t/a design R

Hill Rise
Market Weighton
YORK
07 455 834 903
roydesignr1@btconnect.com

Test Pit Details, locations as per plan on front page

Soil and sub soil ground conditions, from the top,

TP1

mm	
500	top soil
700	limestone marl
300	limestone/stony

TP2

mm	
500	top soil
1200	limestone marl

TP3

mm	
300	top soil
900	limestone marl
300	limestone/stony

soil infiltration test to BRE digest DG 365 Rev 2016

The pit dimensions were 600 mm wide, 2000 mm long and 1500 mm deep

Overall depth of water in pit at start of test	**1200**	mm	above base
Draining monitored from 75% fill depth	**900**	mm	above base
down to 25% fill depth	**300**	mm	above base
timed drop	**600**	mm	

	test no.	**1**	**2**	**3**
	time			
Pit 1	mins	**125**	**140**	**155**
Pit 2		**175**	**190**	**210**
Pit 3		**90**	**104**	**120**

timing used in calculations **120** min **Pit 3**

Soil Infiltration Rate Calculation

f = soil infiltration rate f = Vp75-25/ap50 x tp75-25

V = storage volume at 75 to 25% level a = internal surface area up to 50% level including base

t = time taken for water level to fall from 75% to 25% effective depth (minutes)

	l		**b**		**d**
test pit size	2.00 m		0.60 m		1.50 m
timed depth 75%	1.20 m				
timed depth 25%	0.60 m				

		l		**b**		**d**
V	=	2.00	x	0.60	x	0.60
V	=	0.72	m3			

		perimeter		**50%d**		base L		base W
a	=	5.20	x	0.60	+	2.00	x	0.60
a	=	4.32	m2					
t	=	max test result						
t	=	120	mins					

$$f = \frac{V}{a \times t} = \frac{0.72}{4.32 \times 120 \times 60}$$

f	=	2.31E-05	
f	=	0.0000231 m/s	soil infiltration rate

impermeable area	**1102 m2**	half roof area
reduction factor	**5 %**	(steel roof)
Effective area	**1047 m2**	

FEH2013 rainfall modelling data

Calculat location Point GB 493114 414987 SE 93114 14987

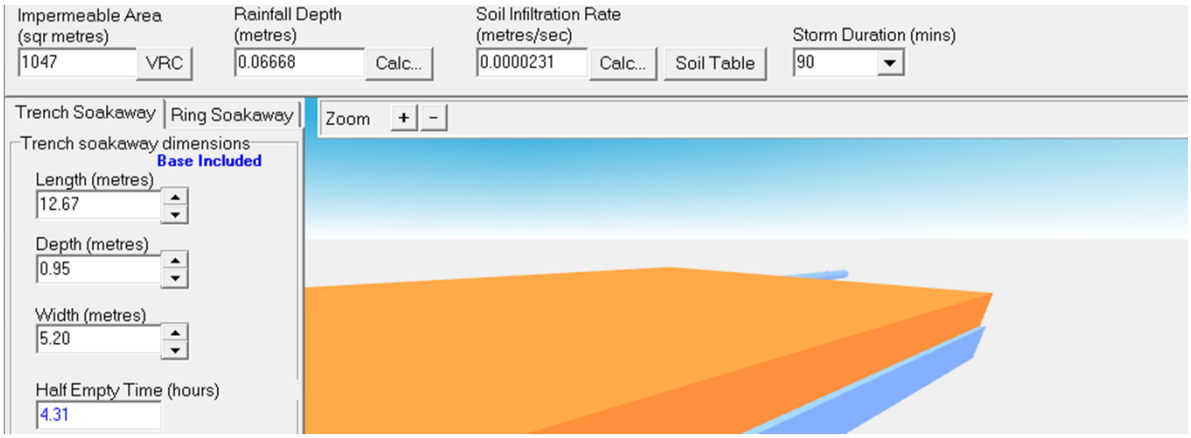
duration min	duration hr	5 year rainfall mm	climate change 30 %	10 yr rainfall mm	climate change 30 %	100 yr rainfal mm	climate change 30 %
15	0.25	12.31	16.00	16.11	20.94	28.62	37.21
30	0.50	15.81	20.55	20.71	26.92	37.62	48.91
45	0.75	18.00	23.40	23.52	30.58	43.04	55.95
60	1.00	19.52	25.38	25.62	33.31	47.14	61.28
75	1.25	21.07	27.39	27.40	35.62	49.52	64.38
90	1.50	22.49	29.24	28.90	37.57	51.29	66.68
105	1.75	23.76	30.89	30.19	39.25	52.73	68.55
120	2.00	24.90	32.37	31.32	40.72	53.95	70.14
135	2.25	25.81	33.55	32.30	41.99	55.13	71.67
150	2.50	26.62	34.61	33.17	43.12	56.20	73.06
165	2.75	27.37	35.58	33.96	44.15	57.16	74.31
180	3.00	28.05	36.47	34.69	45.10	58.05	75.47
195	3.25	28.67	37.27	35.36	45.97	58.88	76.54
210	3.50	29.26	38.04	35.99	46.79	59.64	77.53
225	3.75	29.81	38.75	36.57	47.54	60.36	78.47
240	4.00	30.32	39.42	37.12	48.26	61.03	79.34
255	4.25	30.82	40.07	37.63	48.92	61.66	80.16
270	4.50	31.28	40.66	38.12	49.56	62.26	80.94
285	4.75	31.73	41.25	38.59	50.17	62.83	81.68
300	5.00	32.15	41.80	39.03	50.74	63.37	82.38
315	5.25	32.56	42.33	39.45	51.29	63.89	83.06
330	5.50	32.95	42.84	39.86	51.82	64.39	83.71
345	5.75	33.32	43.32	40.24	52.31	64.86	84.32
360	6.00	33.67	43.77	40.62	52.81	65.32	84.92
375	6.25	34.02	44.23	40.97	53.26	65.77	85.50
390	6.50	34.35	44.66	41.32	53.72	66.19	86.05
		34.66		41.65		66.61	
		34.97		41.97		67.01	

68.55 mm **rainfall giving max soakaway size**

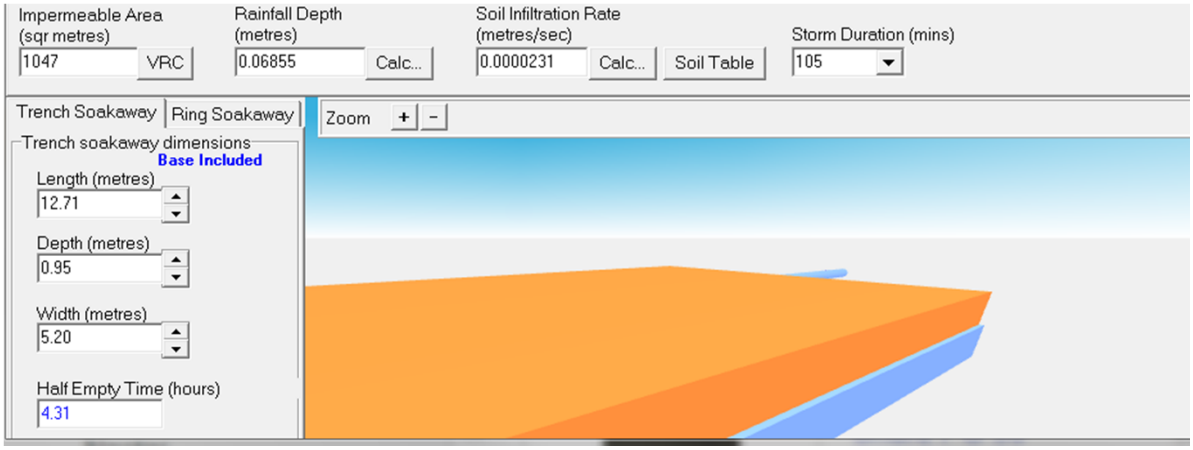
Visual Soakaway designs

hr min

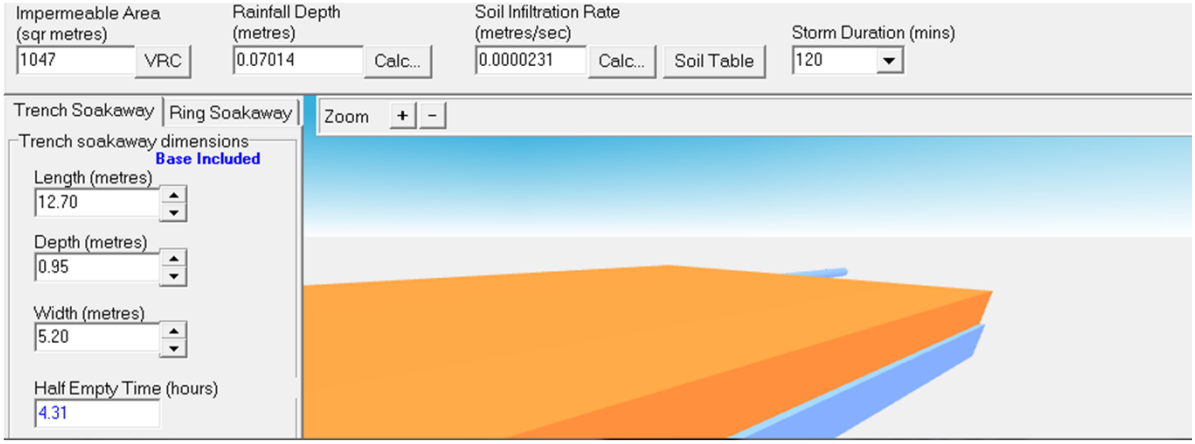
1.5 90



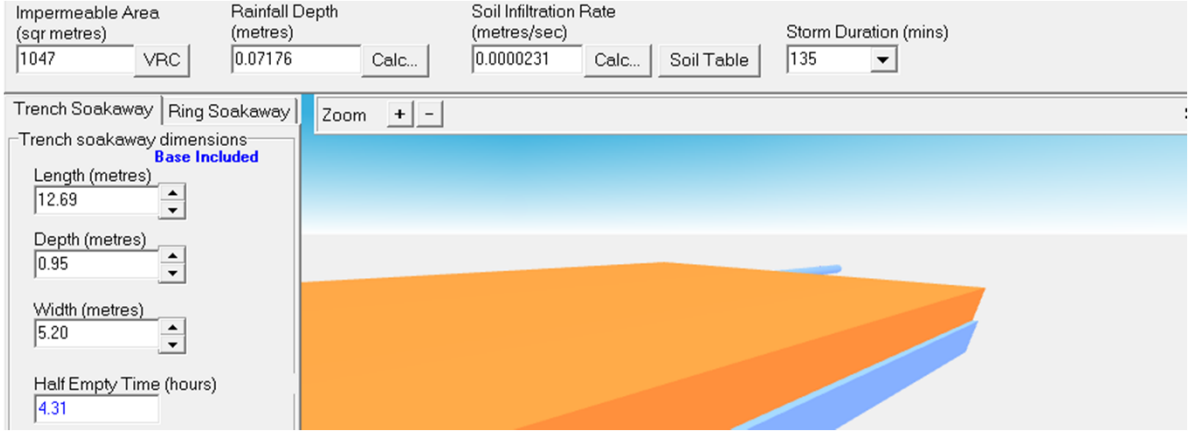
1.75 105



2 120



2.25 135



Critical Storm	**M100**	**105 min**	**68.55 mm**	**rainfall**

Soakaway size required by calculation

length **12.67 m** Width **5.20 m** Depth **0.95 mm**

Soakaway size to suit aquacell dimensions

length **13.20 m** Width **5.20 m** Depth 0.95 mm

using permeable non woven geotextile wrapped aquacells 1.00 x 0.50 x 0.40m

Void ratio 0.95. Bed on 150 mm sharp sand, back fill sides & top with 100 mm pea gravel

Visual Soakaway Design 4.0

WEBCOM SYSTEMS

www.webcomsystems.co.uk

Project Details

Project Title: Low Risby Grain Store yard

Project Number: 1283 ***Designer:*** Roy

Global Variables

Impermeable Area :- 1047 m2

Soil Infiltration Rate :- 0.0000231 m/sec

Storm Duration :- 90 minutes

Rainfall :- 0.06668 metres

Void Ratio :- 0.95

Volumetric Runoff Coeff :- 1.0

Factor of Safety :- 1

Ring soakaway failure depth :- 1 metres

Half Empty failure time (hrs) :- 24 hours

* Base has been included in design of trench soakaway *

* Base has NOT been included in design of ring soakaway *

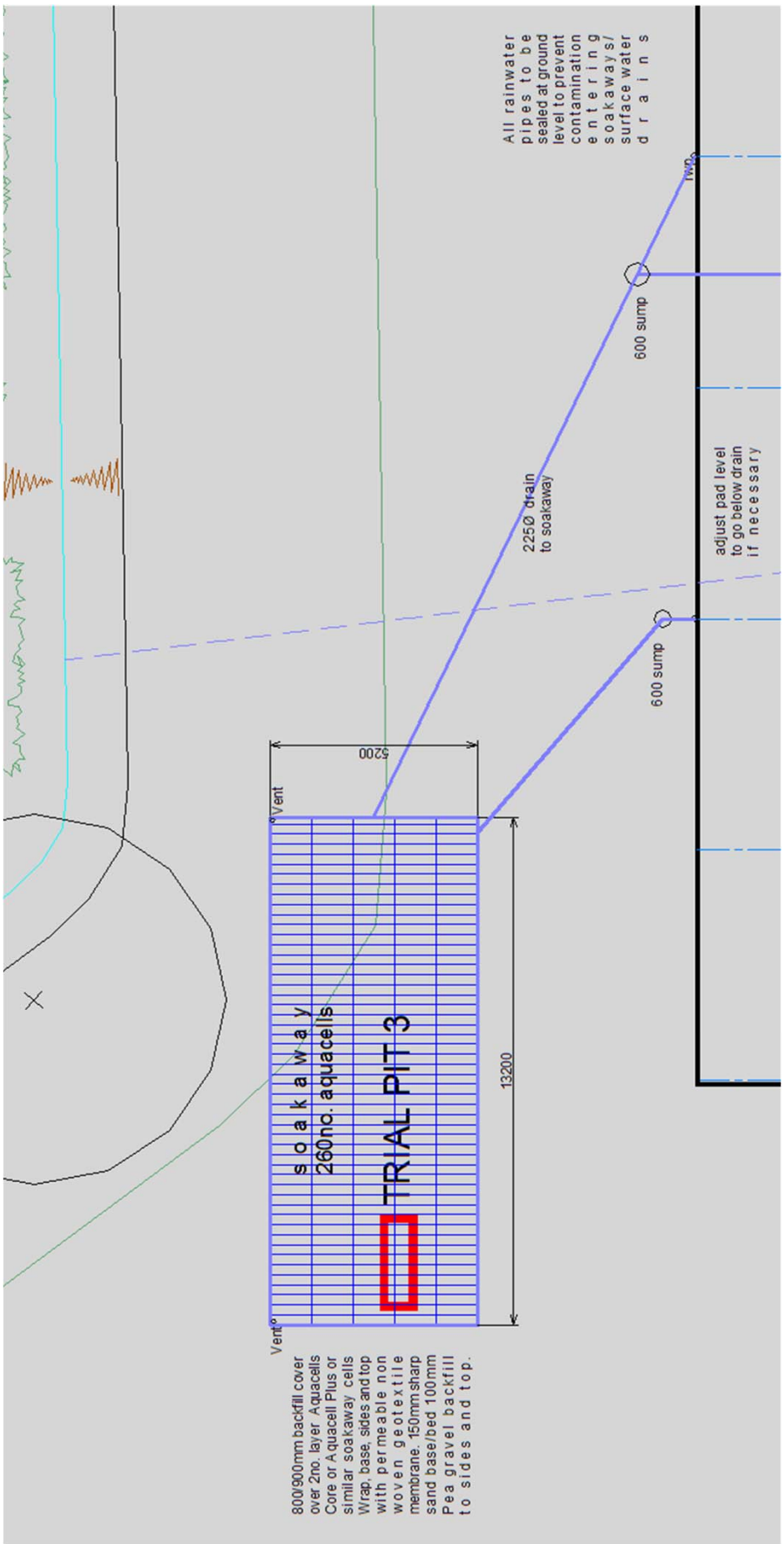
* Granular surround has NOT been included in ring soakaway design *

Trench Soakaway

Length :- 12.67 metres ***Width :-*** 5.20 metres ***Depth :-*** 0.95 metres

Half empty time :- 4.31 hours (decimal)

Surface area of exfiltration :- 82.86 metres squared



extract from drainage layout sch 1 1283-8