



# G.O. DRAINAGE SERVICES LTD



53 PREMIER AVENUE GRAYS RM16 2SJ TEL:01375 373302 MOB:07792 815977 E-MAIL: godrainage@aol.com

## MANHOLE SURVEY

CLIENT: ELLIOTTWOOD	LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ
DATE: 14/04/20	JOB: CV.1862

### MANHOLE NO.01

COVER 550X550mm

CHAMBER 670X460mm

C100 CI  
DEPTH 1240mm



C100 CI  
DEPTH 1250mm

C100 CI  
DEPTH 1170mm

C100 CI  
DEPTH 1150mm

### MANHOLE NO.02

COVER 550X550mm

CHAMBER 1000X800mm

C100 CI  
DEPTH 810mm



C100 CI  
DEPTH 2040mm

C100 CI  
DEPTH 2170mm

C100 CI  
DEPTH 2180mm

C100 CI  
DEPTH 2040mm

C100 CI  
DEPTH 2040mm

### MANHOLE NO.03

COVER m550X550m

CHAMBER 900X800mm

C100 CI  
DEPTH 1330mm



C100 CI  
DEPTH 1280mm

C100 CI  
DEPTH 1280mm

C100 CI  
DEPTH 1280mm

C100 CI  
DEPTH 1080mm

C100 CI  
DEPTH 1340mm



# G.O. DRAINAGE SERVICES LTD

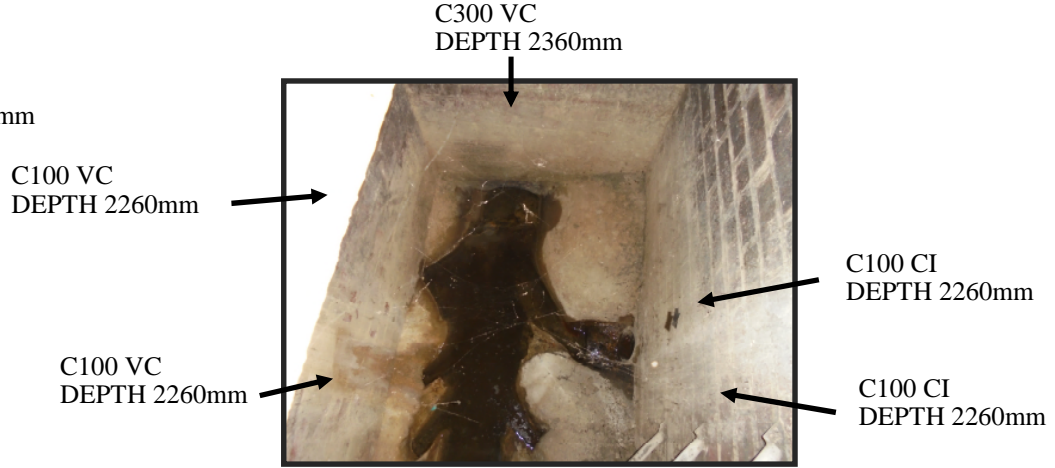


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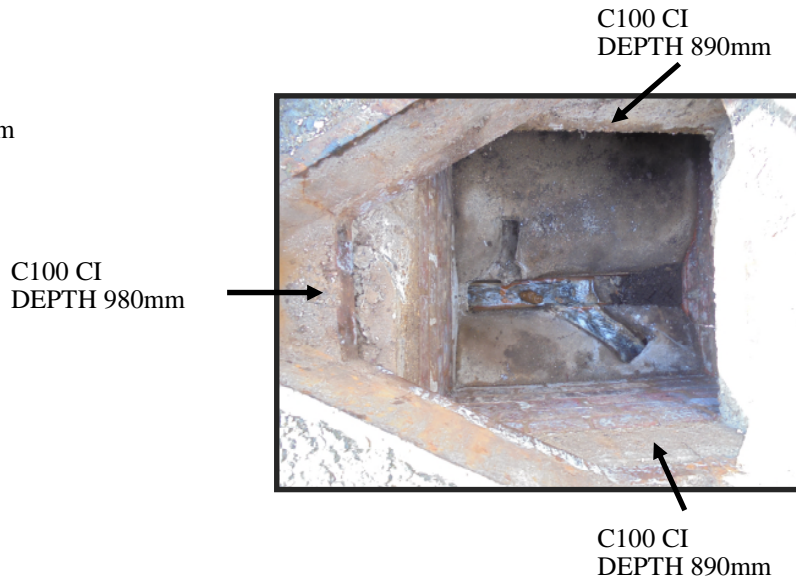
## MANHOLE SURVEY

CLIENT: ELLIOTTWOOD	LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ
DATE 14/04/20	JOB. CV.1862

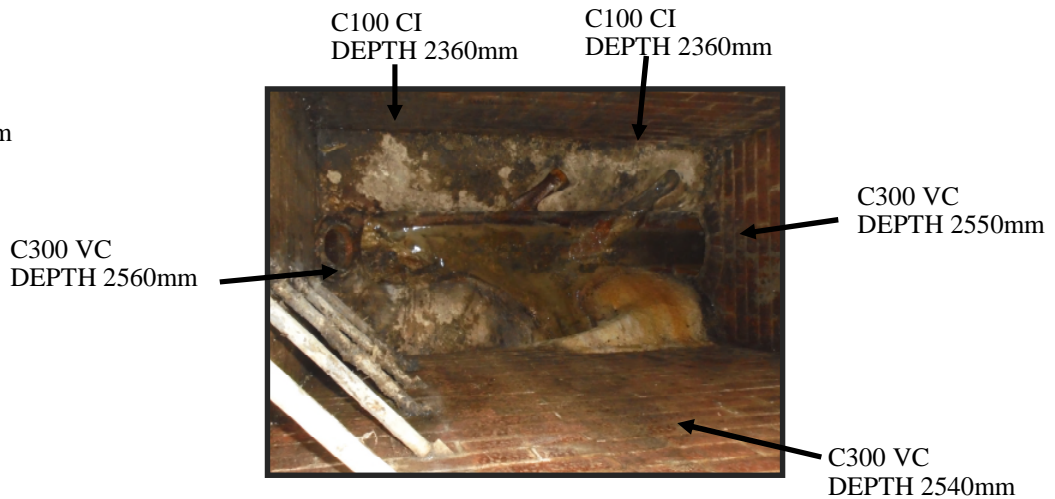
MANHOLE NO.04  
COVER 550X550mm  
CHAMBER 1400X900mm



MANHOLE NO.06  
COVER 550X550mm  
CHAMBER 700X700mm



MANHOLE NO.07  
COVER 550X550mm  
CHAMBER 1400X900mm





## MANHOLE SURVEY

CLIENT: ELLIOTTWOOD	LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ
DATE: 14/04/20	JOB: CV.1862

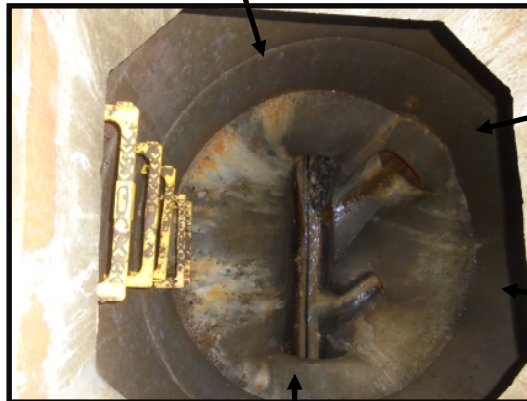
MANHOLE NO.08  
COVER 630X630mm  
CHAMBER 1250mm



C300 VC  
DEPTH 2480mm

C300 VC  
DEPTH 2470mm

MANHOLE NO.09  
COVER 630X630mm  
CHAMBER 1250mm



C225 VC  
DEPTH 2330mm

C300 VC  
DEPTH 2190mm

C150 VC  
DEPTH 2210mm

C300 VC  
DEPTH 2340mm

MANHOLE NO.10  
COVER 610X610mm  
CHAMBER 1250mm



C150 VC  
DEPTH 2040mm

C150 VC  
DEPTH 1940mm

C225 VC  
DEPTH 2050mm





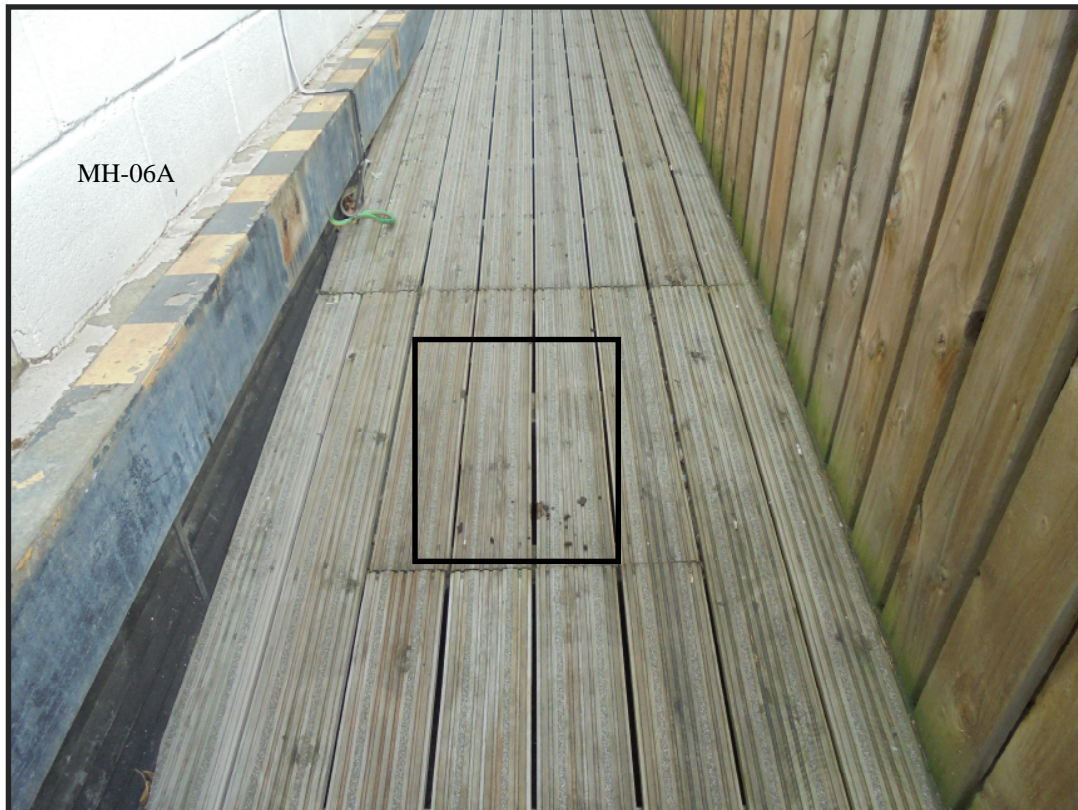
# G.O. DRAINAGE SERVICES LTD



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## PHOTOS

CLIENT: ELLIOTTWOOD	LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ
DATE: 14/04/20	JOB: CV.1862





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## PHOTOS

CLIENT:	ELLIOTTWOOD	LOCATION:	13 BLACKBURN ROAD LONDON NW6 1RZ
DATE:	14/04/20	JOB:	CV.1862







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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

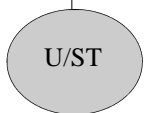
JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	01	14/04/20	SURFACE	1150mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 01 CONNECTION- 1 FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
003.6	DES	SETTLED DEPOSITS COARSE 20%
003.7	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
003.7	FH	FINISH OF SURVEY

**END OF RUN NO.01**





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	02	14/04/20	SURFACE	1150mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 01 CONNECTION- 2	FH. GULLY



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
003.3	LR	LINE OF DRAIN DEVIATES RIGHT ( SLIGHT )
004.1	LD	LINE OF DRAIN DEVIATES DOWN ( SHARP )
004.1	FH	FINISH OF SURVEY ( GULLY )

**END OF RUN NO.02**



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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD | LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	03	14/04/20	SURFACE	1240mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 01	FH. GULLY

CHAINAGE	CODE	OBSERVATION
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000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
006.7	LD	LINE OF DRAIN DEVIATES DOWN ( SHARP )
006.7	FH	FINISH OF SURVEY ( GULLY )

**END OF RUN NO.03**







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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	04	14/04/20	SURFACE	1250mm	DOWNSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No.01 CONNECTION- X FH. MANHOLE NO.02



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
008.6	DES	SETTLED DEPOSITS FINE 10%
009.4	JN	JUNCTION AT 03 O'CLOCK,DIAMETER 100mm
016.7	JN	JUNCTION AT 03 O'CLOCK,DIAMETER 100mm
020.9	LD	LINE OF DRAIN DEVIATES DOWN ( SHARP )
022.6	LR	LINE OF DRAIN DEVIATES RIGHT ( SLIGHT ) BOTTOM BEND
023.6	MH	MANHOLE NO.02
023.6	FH	FINISH OF SURVEY

**END OF RUN NO.04**





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	05	14/04/20	SURFACE	2040mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 02 CONNECTION- 1 FH. GULLY



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.8	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
000.8	FH	FINISH OF SURVEY ( GULLY )

**END OF RUN NO.05**



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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

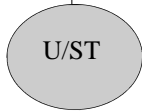
JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	06	14/04/20	SURFACE	2040mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No.02 CONNECTION- 2 FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.8	LL	LINE OF DRAIN DEVIATES LEFT ( SLIGHT )
011.9	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
011.9	FH	FINISH OF SURVEY

**END OF RUN NO.06**





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	07	14/04/20	SURFACE	2040mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 02 CONNECTION- 5 FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.8	JN	JUNCTION AT 12 O'CLOCK, DIAMETER 100mm
001.4	LR	LINE OF DRAIN DEVIATES RIGHT ( SLIGHT )
005.7	DEE	ATTACHED DEPOSITS, ENCRUSTATION FROM 04 TO 08 O'CLOCK 20%
005.7	FH	FINISH OF SURVEY

**END OF RUN NO.07**

U/ST





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	08	14/04/20	SURFACE	2180mm	DOWNSTREAM	150mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 02 CONNECTION- X FH. MANHOLE NO.04



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
004.7	JN	JUNCTION AT 03 O'CLOCK,DIAMETER 100mm
006.5	JN	JUNCTION AT 03 O'CLOCK,DIAMETER 100mm
007.8	JN	JUNCTION AT 02 O'CLOCK,DIAMETER 100mm
008.0	JN	JUNCTION AT 03 O'CLOCK,DIAMETER 100mm
010.2	JN	JUNCTION AT 11 O'CLOCK,DIAMETER 100mm
017.6	JN	JUNCTION AT 03 O'CLOCK,DIAMETER 100mm
017.6	JN	JUNCTION AT 09 O'CLOCK,DIAMETER 100mm
020.8	JN	JUNCTION AT 03 O'CLOCK,DIAMETER 100mm
020.8	JN	JUNCTION AT 09 O'CLOCK,DIAMETER 100mm
022.7	LD	LINE OF DRAIN DEVIATES DOWN ( SHARP ) TRAP
023.7	MH	MANHOLE NO.04
023.7	FH	FINISH OF SURVEY

**END OF RUN NO.08**





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	09	14/04/20	COMBINED	1280mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 03 CONNECTION- 1	FH. GULLY



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.3	LD	LINE OF DRAIN DEVIATES DOWN ( SHARP )
000.3	FH	FINISH OF SURVEY ( GULLY )

**END OF RUN NO.09**





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	10	14/04/20	COMBINED	1330mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 03 CONNECTION- 2	FH. GULLY



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.4	LD	LINE OF DRAIN DEVIATES DOWN ( SHARP )
000.4	FH	FINISH OF SURVEY ( GULLY )

**END OF RUN NO.10**



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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	11	14/04/20	COMBINED	1280mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 03 CONNECTION- 3 FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
003.8	MH	MANHOLE NO.03A
004.1	REM	GENERAL REMARK ( END OF CHAMBER )
004.1	LR	LINE OF DRAIN DEVIATES RIGHT ( SLIGHT )
006.3	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
006.3	FH	FINISH OF SURVEY

**END OF RUN NO.11**

U/ST





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD

LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

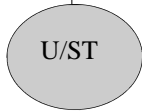
JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	12	14/04/20	COMBINED	1280mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 03 CONNECTION- 4 FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
002.6	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
002.6	FH	FINISH OF SURVEY

**END OF RUN NO.12**





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	13	14/04/20	COMBINED	1060mm	UPSTREAM	100mm	PVC	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 03 CONNECTION- 5 FH. GULLY



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.9	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
000.9	FH	FINISH OF SURVEY ( GULLY )

**END OF RUN NO.13**



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## INSPECTION REPORT

CLIENT. ELLIOTTWOOD

LOCATION. 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	14	14/04/20	COMBINED	1340mm	DOWNSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 03 CONNECTION- X	FH. MANHOLE NO.04

CHAINAGE	CODE	OBSERVATION
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000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.3 S1	DES	SETTLED DEPOSITS FINE 05% START
007.5	LL	LINE OF DRAIN DEVIATES LEFT ( SLIGHT )
008.2 F1	DES	SETTLED DEPOSITS FINE 05% END
008.2	MH	MANHOLE NO.04
008.2	FH	FINISH OF SURVEY

**END OF RUN NO.14**





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD

LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

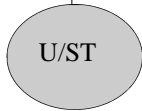
JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	15	14/04/20	COMBINED	2040mm	UPSTREAM	150mm	V/CLAY	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 10 CONNECTION- 1 FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
018.9	MH	MANHOLE NO.10A
019.8	REM	GENERAL REMARK ( END OF CHAMBER )
020.0	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
020.0	FH	FINISH OF SURVEY

**END OF RUN NO.15**







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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	16	14/04/20	COMBINED	1940mm	UPSTREAM	150mm	V/CLAY	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 10 CONNECTION- 2 FH. MANHOLE NO.10B



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
007.6	SC	DIMENSION OF DRAIN CHANGES TO 100mm
012.1	MH	MANHOLE NO.10B
012.1	FH	FINISH OF SURVEY

**END OF RUN NO.16**



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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD

LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	17	14/04/20	COMBINED	2050mm	DOWNSTREAM	225mm	V/CLAY	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 10 CONNECTION- X FH. MANHOLE NO.08



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
003.6	MH	MANHOLE NO.09
004.7	REM	GENERAL REMARK ( END OF CHAMBER )
010.6	MH	MANHOLE NO.08
011.9	FH	FINISH OF SURVEY

**END OF RUN NO.17**





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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	18	14/04/20	COMBINED	2190mm	UPSTREAM	300mm	V/CLAY	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 09 CONNECTION- 2	FH. TRAP



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
001.5	LL	LINE OF DRAIN DEVIATES LEFT ( SLIGHT )
013.4	LD	LINE OF DRAIN DEVIATES DOWN ( SHARP )
013.4	FH	FINISH OF SURVEY ( TRAP )

**END OF RUN NO.18**

U/ST



# G.O. DRAINAGE SERVICES LTD



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## INSPECTION REPORT

CLIENT: ELLIOTTWOOD

LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	19	14/04/20	COMBINED	2210mm	UPSTREAM	150mm	CAST IRON	DRY	NO	GO	1

START

FINISH

ST. MANHOLE No. 09

CONNECTION-3

FH. MANHOLE NO.09A

CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
016.5	MH	MANHOLE NO.09A
016.5	FH	FINISH OF SURVEY



**END OF RUN NO.19**







# G.O. DRAINAGE SERVICES LTD



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## INSPECTION REPORT

CLIENT. ELLIOTTWOOD

LOCATION. 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	20	14/04/20	COMBINED	2480mm	DOWNSTREAM	300mm	V/CLAY	DRY	NO	GO	1

START

FINISH

ST. MANHOLE No. 08 CONNECTION- X

FH. MANHOLE NO.07

CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
002.8	MH	MANHOLE NO.07
002.8	FH	FINISH OF SURVEY



MH-08

MH-07

**END OF RUN NO.20**



## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	21	14/04/20	COMBINED	2560mm	DOWNSTREAM	150mm	V/CLAY	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No.07 CONNECTION- X FH. MAIN SEWER

CHAINAGE	CODE	OBSERVATION
----------	------	-------------



### ACCESS 150mm RODDING EYE

000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.6	JN	JUNCTION AT 06 O'CLOCK, DIAMETER 300mm TRAP
000.6	SC	DIMENSION OF DRAIN CHANGES TO 300mm
009.4	FH	FINISH OF SURVEY

**END OF RUN NO.21**

MAIN SEWER



# G.O. DRAINAGE SERVICES LTD



53 PREMIER AVENUE GRAYS RM16 2SJ TEL:01375 373302 MOB:07792 815977 E-MAIL: godrainage@aol.com

## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	22	14/04/20	COMBINED	2250mm	UPSTREAM	300mm	V/CLAY	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 07 CONNECTION- 3 FH. MANHOLE NO.04



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.5 S1	DEE	ATTACHED DEPOSITS, ENCRUSTATION FROM 04 TO 08 O'CLOCK 20%
007.5	SA	SURVEY ABANDONED DUE TO ABOVE

**END OF RUN NO.22**





# G.O. DRAINAGE SERVICES LTD



53 PREMIER AVENUE GRAYS RM16 2SJ TEL:01375 373302 MOB:07792 815977 E-MAIL: godrainage@aol.com

## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

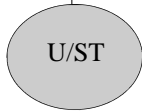
JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	23	14/04/20	COMBINED	2350mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 07 CONNECTION- 1	FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
000.7	LL	LINE OF DRAIN DEVIATES LEFT ( SLIGHT )
001.8	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
001.8	FH	FINISH OF SURVEY

**END OF RUN NO.23**





# G.O. DRAINAGE SERVICES LTD



53 PREMIER AVENUE GRAYS RM16 2SJ TEL:01375 373302 MOB:07792 815977 E-MAIL: godrainage@aol.com

## INSPECTION REPORT

CLIENT: ELLIOTTWOOD

LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	24	14/04/20	COMBINED	980mm	DOWNSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 06 CONNECTION- X	FH. MANHOLE NO.07

CHAINAGE	CODE	OBSERVATION
----------	------	-------------



000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
001.1	LD	LINE OF DRAIN DEVIATES DOWN ( SHARP )
001.1	MH	MANHOLE NO.07
001.1	FH	FINISH OF SURVEY

**END OF RUN NO.24**





# G.O. DRAINAGE SERVICES LTD



53 PREMIER AVENUE GRAYS RM16 2SJ TEL:01375 373302 MOB:07792 815977 E-MAIL: godrainage@aol.com

## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	26	14/04/20	COMBINED	870mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START	FINISH
ST. MANHOLE No. 06 CONNECTION- 1	FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
0 00.3	LL	LINE OF DRAIN DEVIATES LEFT ( SLIGHT )
000.3	FH	FINISH OF SURVEY ( UNABLE TO PASS )

**END OF RUN NO.26**

U/ST



# G.O. DRAINAGE SERVICES LTD



53 PREMIER AVENUE GRAYS RM16 2SJ TEL:01375 373302 MOB:07792 815977 E-MAIL: godrainage@aol.com

## INSPECTION REPORT

CLIENT: ELLIOTTWOOD LOCATION: 13 BLACKBURN ROAD LONDON NW6 1RZ

JOB NO.	RUN NUMBER	DATE	SEWER USE	DEPTH	DIRECTION	PIPE SIZE	MATERIAL	WEATHER	CLEANED	OPERATOR	PAGE
CV.1862	27	14/04/20	COMBINED	890mm	UPSTREAM	100mm	CAST IRON	DRY	NO	GO	1

START FINISH  
 ST. MANHOLE No. 06 CONNECTION- 2 FH. UPSTREAM



CHAINAGE	CODE	OBSERVATION
000.0	ST	START OF SURVEY
000.0	WL	WATER LEVEL 05%
003.0	MH	MANHOLE NO.06A
003.9	REM	GENERAL REMARK ( END OF CHAMBER )
008.0	MH	MANHOLE NO.06B
009.0	REM	GENERAL REMARK ( END OF CHAMBER )
009.3	LU	LINE OF DRAIN DEVIATES UP ( SHARP )
009.4	FH	FINISH OF SURVEY

**END OF RUN NO.27**







## SUMMARY AND RECOMMENDATIONS

CLIENT. ELLIOTTWOOD	LOCATION. 13 BLACKBURN ROAD LONDON NW6 1RZ
DATE 14/04/20	JOB. CV.1862

- RUN NO.01 NO WORK NEEDED**
- RUN NO.02 NO WORK NEEDED**
- RUN NO.03 NO WORK NEEDED**
- RUN NO.04 NO WORK NEEDED**
- RUN NO.05 NO WORK NEEDED**
- RUN NO.06 NO WORK NEEDED**
- RUN NO.07 NO WORK NEEDED**
- RUN NO.08 NO WORK NEEDED**
- RUN NO.09 NO WORK NEEDED**
- RUN NO.10 NO WORK NEEDED**
- RUN NO.11 NO WORK NEEDED**
- RUN NO.12 NO WORK NEEDED**
- RUN NO.13 NO WORK NEEDED**
- RUN NO.14 NO WORK NEEDED**
- RUN NO.15 NO WORK NEEDED**
- RUN NO.16 NO WORK NEEDED**
- RUN NO.17 NO WORK NEEDED**
- RUN NO.18 NO WORK NEEDED**
- RUN NO.19 NO WORK NEEDED**
- RUN NO.20 NO WORK NEEDED**
- RUN NO.21 NO WORK NEEDED**
- RUN NO.22 NO WORK NEEDED**
- RUN NO.23 NO WORK NEEDED**
- RUN NO.24 NO WORK NEEDED**
- RUN NO.26 NO WORK NEEDED**
- RUN NO.27 NO WORK NEEDED**

**DRAIN & PIPEWORK CCTV  
SURVEYS**

-

**DRAINS  
PIPEWORK  
CULVERTS**

**DUCTS**

**CHUTES**

**CHIMNEY FLUES**

**TANKS**

**HIGH PRESSURE  
WATER JETTING**

-

**SEWER & DRAIN BLOCKAGES**

**DESCALING**

**SILT REMOVAL**

**ROOT CUTTING**

**GREASE REMOVAL**

**REMEDIAL WORKS**

-

**POLYESTER RESIN LINING**

**DRAINAGE EXCAVATIONS & REPAIRS**



**G.O. DRAINAGE SERVICES LTD**



D HR Wallingford Greenfield Runoff Estimation

Calculated by:

Site name:

Site location:

**Site Details**

Latitude:

Longitude:

Reference:

Date:

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.

**Runoff estimation approach**

**Site characteristics**

Total site area (ha):

**Methodology**

Q<sub>BAR</sub> estimation method:

SPR estimation method:

**Soil characteristics**

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

**Hydrological characteristics**

	Default	Edited
SAAR (mm):	640	640
Hydrological region:	6	6
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

**Notes**
**(1) Is Q<sub>BAR</sub> < 2.0 l/s/ha?**

When Q<sub>BAR</sub> is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

**(2) Are flow rates < 5.0 l/s?**

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

**(3) Is SPR/SPRHOST ≤ 0.3?**

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

**Greenfield runoff rates**

	Default	Edited
Q <sub>BAR</sub> (l/s):	1.16	1.16
1 in 1 year (l/s):	0.99	0.99
1 in 30 years (l/s):	2.67	2.67
1 in 100 year (l/s):	3.7	3.7
1 in 200 years (l/s):	4.34	4.34

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at [www.uksuds.com](http://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 [www.uksuds.com/terms-and-conditions.htm](http://www.uksuds.com/terms-and-conditions.htm). The outputs from this tool are estimates of 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, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

E Proposed Drainage Plans







Roof Plan - EWP Civils Mark-up

P2 - 04/06//20

MTr

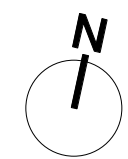
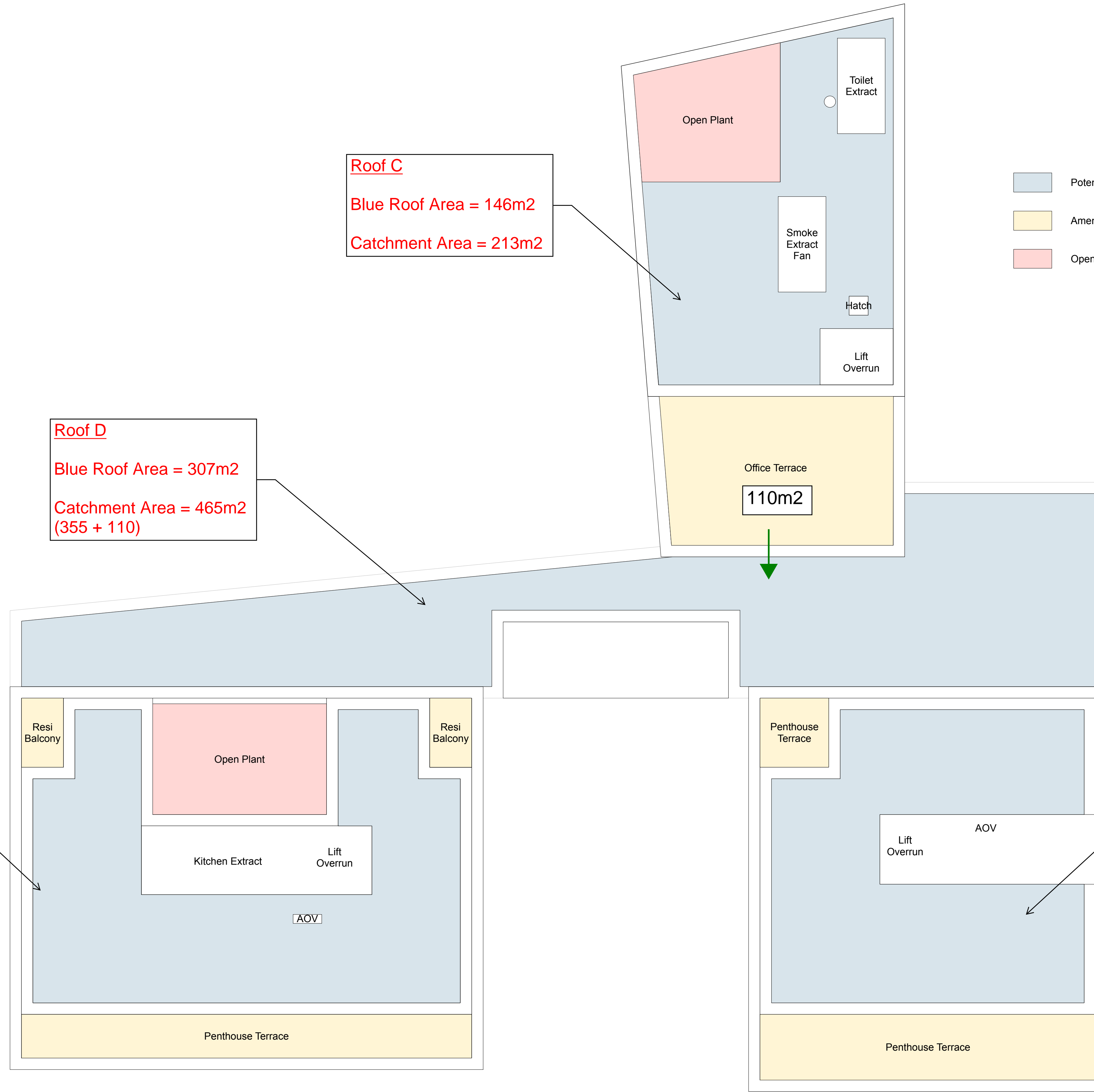
- Potential Blue Roof
- Amenity Space
- Open Plant Rooms Below

**Roof C**  
 Blue Roof Area = 146m<sup>2</sup>  
 Catchment Area = 213m<sup>2</sup>

**Roof D**  
 Blue Roof Area = 307m<sup>2</sup>  
 Catchment Area = 465m<sup>2</sup>  
 (355 + 110)

**Roof A**  
 Blue Roof Area = 222m<sup>2</sup>  
 Catchment Area = 319m<sup>2</sup>

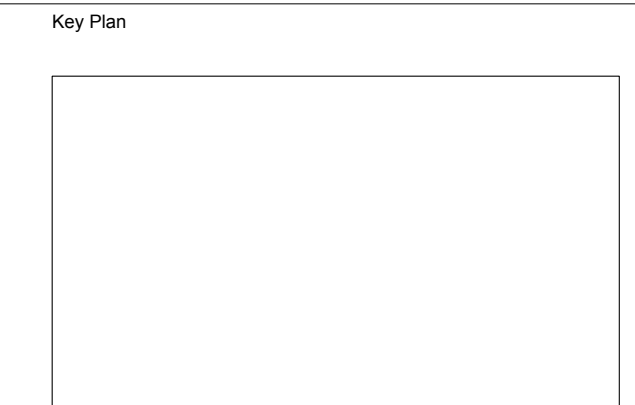
**Roof B**  
 Blue Roof Area = 225m<sup>2</sup>  
 Catchment Area = 275m<sup>2</sup>



1 ROOF PLAN - PROPOSED  
 Scale: 1:125

GENERAL NOTES:  
 Do not scale from this drawing.  
 Check drawing on receipt and immediately report any discrepancies to the Architect.  
 Verify all dimensions and levels on site prior to construction.  
 The contents of this drawing are Stiff + Trevillion Architects Ltd copyright and shall not be re-used without their written permission.

Revisions	Rev. Date	Note	Approved



**Stiff + Trevillion**

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 mail@stiffandtrevillion.com  
 www.stiffandtrevillion.com

Client GP	Project 4153 BLACKBURN ROAD NW6 1RZ
Drawing Title ROOF PLAN PROPOSED	Drawing No. ST-SK200604-001

Drawing Status <b>STAGE 2</b>	Date APRIL 2019	Scale @ A1 1:125	Scale @ A3 1:250
Revision			

DRAFT



F Blue Roof Calculation Summary

# BLUE ROOF STORAGE AND OUTFLOW SUMMARY

## PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	13, Blackburn Road, London, NW6 1RZ - Roof A		
Prepared for:	Elliott Wood, London		
Date:	12/06/2020		
ABG Project ID:	20597	Calculator version:	1.26
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof or biodiverse roof; with pavers on pedestals for a maintenance walkway - TBC. Maintenance access only - TBC. Warm roof, or inverted roof, construction, with zero falls (BBA approved) - TBC. Potential for freestanding/ballasted PV panels. Kitchen Extract Fan unit to be supported on top of the 'blue roof' - expected EF weight of approx. 250-300kg - TBC.		

### Input Parameters - Rainfall Information (Flood Studies Report 1975)

Return period:	100 years	<i>As supplied by Client</i>
Allowance for Climate Change:	40 %	<i>As supplied by Client</i>
Location selected for FSR data:	London (NW)	

### Input Parameters - Roof Information

Total catchment area:	319 m <sup>2</sup>	<i>As supplied by Client</i>
Attenuation area:	222 m <sup>2</sup>	<i>As supplied by Client</i>
Maximum allowable runoff:	0.6 l/s	<i>As supplied by Client</i>

### Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	11 hours and 20 minutes	0.4
30 mins	13 hours and 30 minutes	0.4
1 hour	15 hours and 30 minutes	0.5
2 hours	16 hours and 50 minutes	0.5
4 hours	17 hours and 20 minutes	0.5
6 hours	17 hours and 20 minutes	0.5
10 hours	16 hours and 30 minutes	0.5
24 hours	11 hours and 40 minutes	0.4
48 hours	3 hours and 20 minutes	0.2

**Total attenuation required: 22.5 m<sup>3</sup>**  
**Half empty time: 5 hours and 50 minutes.**

### Output - Recommended Blue Roof System

System Name:	ABG bluroof VF HD 129mm
Description:	The 'blue roof' depth of 129mm, includes for a 25mm deep, reservoir board. Positions of RWO's to be coordinated with the structural engineer's deflection analysis. Potential additional (visual) overflow positions, should also be considered by the design team.

Total attenuation capacity:	25.3 m <sup>3</sup>
Number of Blue Roof outlets:	2

#### Notes:

1. This document contains an estimate which has been prepared by ABG Ltd and is illustrative only and not a detailed design.
2. Further details on the theories used in this estimate are available upon request from ABG. The values given for the performance of the system relate to testing, modelling and analysis of our systems obtained from laboratories and testing institutes. In line with our policy of continuous improvement the right is reserved to make changes to our systems without notice at any time.
3. The estimate given in this report is based on the stated parameters as per the brief. If these parameters are not correct or have changed, ABG should be contacted to provide a revised estimate.
4. This estimate is specific to the characteristics of ABG products/systems and is not applicable to other competitor products. The substitution of the whole or any component of this design for a material supplied from another source renders this estimate invalid.
5. Final determination of the suitability of any information is the sole responsibility of the user. ABG will be pleased to discuss the use of this or any other product but responsibility for selection of a material and its application in any specific project remains with the user.

## 1. DEFINITIONS

'Consultant' means ABG Geosynthetics Ltd and its legal successors. 'Client' means the person, firm, company or organisation for whom the Consultant is performing the Services. 'Agreement' means the contract referred to in Clause 2. 'Services' means the services to be performed by the Consultant in accordance with the proposal from the Consultant. 'Project' means the project or works for which the Client has commissioned the Services.

## 2. GENERAL

Unless and until a formal agreement is entered into, the Client's acceptance of the proposal for Services from the Consultant or a request for some or all the Services to be performed by the Consultant, shall constitute a binding

contract between the Client and the Consultant which contract will be subject to any terms and conditions contained or referred to in the aforementioned proposal and these terms and conditions. In the event of any conflict, the terms and conditions in the proposal shall prevail over these terms and conditions. The Agreement so formed shall supersede all previous understandings, commitments or agreements whether written or oral between the Client and the Consultant relating to the subject matter hereof. No person or entity shall have any rights in relation to this Agreement, whether as third parties or otherwise, save the parties to this Agreement. Should any term or condition of this Agreement be held to be unenforceable or invalid by the courts of any jurisdiction to which it is subject then such term or condition shall be disregarded and the remaining terms and conditions shall remain in full force and effect.

## 3. PERFORMANCE OF SERVICES AND SCOPE

The Consultant shall perform the Services using the degree of skill care and diligence to be expected from a consultant experienced in the provision of services of similar scope size and complexity. The Consultant shall use reasonable endeavours to complete the Services within the time or programme agreed but shall not be responsible for any delay beyond the reasonable control of the Consultant.

The fee contained in the proposal is for the scope of services as defined therein. If not already contained in the proposal the Consultant and the Client shall agree as an initial activity an integrated project services programme to

include the activities of all the parties to the Project relevant to the Services to be supplied by the Consultant. The

aforsaid programme shall show the key dates for final information and the delivery of such to the Consultant so as to enable the Consultant to carry out the services in an efficient once through manner to achieve the programme delivery dates for the Services.

The Consultant provides various services including Design and Product use advice which is distinct from a Design Service. The Design Service may or may not attract a fee.

Where the Consultant's services are of an advisory nature and dependent upon the degree of information and release thereof by the Client then the Client agrees that any reliance placed on the services by the Client shall take due account of such constraints.

## 4. CONFIDENTIALITY AND INTELLECTUAL PROPERTY RIGHTS

i. The Consultant and the Client shall keep confidential all information pertaining to the Services.

ii. Copyright for all reports, documents and the like produced by the Consultant in the performance of the Services

shall remain vested with the Consultant but the Consultant shall grant an irrevocable royalty free license to the Client to use such reports, documents and the like for any purpose in connection with the Project.

## 5. LIABILITY

i. The Consultant shall be liable to pay compensation to the Client arising out of or in connection with this Agreement only if a breach of the duty of care in Clause 3 is established against the Consultant.

ii. Notwithstanding any other term to the contrary in this Agreement or any related document and whether the cause of action for any claim arises under or in connection with the Agreement in contract or in tort, in negligence or for breach of statutory duty or otherwise the Consultant shall have no liability to the Client in respect of any claim for loss or damage arising from acts of war or terrorism or arising from flooding, burst water mains or failed drainage or arising from any incidence of toxic mould or asbestos but otherwise in relation to any cause of action as aforesaid the total liability of the Consultant in the aggregate for all claims shall be limited to a sum equivalent to ten (10) times the fee payable under this Agreement or £50,000, whichever is the lesser, or such other sum as may be expressly stated in the Consultant's proposal, and further but without prejudice to the aforesaid limit of liability any such liability of the Consultant shall be limited to such sum or sums as it would be just and equitable for the Consultant to pay having regard to the Consultant's responsibility for the same and on the basis that all other parties appointed or to be appointed by the Client to perform related services in connection with the Project shall be deemed to have provided undertakings on terms no less onerous than this Agreement and shall be deemed to have paid to the Client such contribution as it would be just and equitable for them to pay having regard to their responsibility for any loss or damage and providing that it shall be deemed that such other parties have not limited or excluded their liability to the Client for such loss or damage in any way which may be prejudicial to the Consultant's liability under this clause. Nothing in this clause shall operate to exclude or limit the Consultant's liability for death or personal injury.

iii. The Client shall indemnify and keep indemnified the Consultant from and against all claims, demands, proceedings, damages, costs and expenses arising out of or in connection with this Agreement or the Project arising from acts of terrorism or arising otherwise in excess of the liability of the Consultant under this Agreement or which may be made in respect of events occurring after the expiry of the period of liability stated in this Agreement.

iv. No action or proceedings under or in connection with this Agreement shall be commenced against the Consultant after the expiry of one year from completion of the Services.

v. ABG Geosynthetics Ltd is not responsible for consequential, indirect or incidental losses.

## 6. INSURANCE

The Consultant shall arrange Professional Indemnity Insurance cover for the amount stated in Clause 5(ii). The Consultant will use all reasonable endeavours to maintain Professional Indemnity Insurance cover for the period stated in 5(iv) above, providing such insurance remains available to the Consultant at commercially reasonable rates.

## 7. CLIENT'S OBLIGATIONS

The Client shall supply, without charge and in such time so as not to delay or disrupt the performance of the Consultant in carrying out the Services, all necessary and relevant information, in his possession or available to him from his other agents or consultants and all necessary approvals or consents. Any deviation on any information from the proposal shall be confirmed in writing and any attendant consequential fees will be forwarded for approval by the Client before any changes are made. The Consultant shall not be liable for any consequential delays on site. Every reasonable effort will be made to mitigate against delays, however no liability for losses and costs will be accepted. The approval or consent by the Client to the Services shall not relieve the Consultant from any liability under this Agreement. All work undertaken by the Consultant must be ratified and signed off by the Client.

## 8. PAYMENT

i. The Client shall pay the Consultant for the Services in accordance with the proposal and this Agreement. If the Consultant performs any additional services or if the Services are delayed or disrupted for reasons beyond the

reasonable control of the Consultant then the Consultant shall be entitled to such additional fees as are fair and reasonable in the circumstances. The Consultant may render an invoice at monthly intervals for services properly performed. The agreed invoice, or in the event of a dispute the undisputed element, shall be paid within 28 days of receipt of the invoice by the Client. Any invoice paid after this period will attract interest at 3% above the base rate of the central bank of the country of the currency of payment along with any collection costs which may occur.

ii. The Client shall not withhold any payment of any sum or part of a sum due to the Consultant under this Agreement by reason of claims or alleged claims against the Consultant unless the amount to be withheld has been agreed between the Client and the Consultant as due to the Client or such sum arises from an award in adjudication, arbitration or litigation in favour of the Client and arises under or in connection with the Agreement. Save as aforesaid all rights of set off at common law, in equity or otherwise which the Client may otherwise be entitled to exercise are hereby expressly excluded.

## 9. TERMINATION

If a party is in breach of a material term of this Agreement and despite written notice from the other party fails to remedy such breach within 30 days or such other period as may be agreed between the parties, then the other party shall be entitled to terminate this Agreement forthwith. The Consultant may seek to recoup costs incurred for works completed prior to termination.

## 10. DISPUTE RESOLUTION

Any dispute between the parties that cannot be settled by mutual agreement shall be referred for final settlement to the arbitration of a person agreed between the parties or failing such agreement appointed upon the application of either party by the President of the Chartered Institute of Arbitrators and the said arbitration shall be carried out in accordance with the Construction Industry Model Arbitration Rules 1998 or such other version current at the time of the referral under this clause. Where the Agreement is subject to a governing law other than that of England and Wales then any dispute between the parties that cannot be settled by mutual agreement shall be finally settled by arbitration in accordance with the UNCITRAL Arbitration Rules by one arbitrator appointed in compliance with the said Rules. In either case such rules as appropriate are deemed to be incorporated into this Agreement by reference.

## 11. COMPLIANCE WITH LAWS

This Agreement shall be governed by and construed in accordance with the law of England and Wales unless stated otherwise in the proposal for services from the Consultant.

Changes to the above terms and conditions will only be considered if agreed in writing as part of the appointment process prior to ABG Geosynthetics commencing work.

# BLUE ROOF STORAGE AND OUTFLOW SUMMARY

## PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	13, Blackburn Road, London, NW6 1RZ - Roof B		
Prepared for:	Elliott Wood, London		
Date:	07/05/2020		
ABG Project ID:	20597	Calculator version:	1.26
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof or biodiverse roof; with pavers on pedestals for a maintenance walkway - TBC. Maintenance access only - TBC. Warm roof, or inverted roof, construction, with zero falls (BBA approved) - TBC. Potential for freestanding/ballasted PV panels.		

### Input Parameters - Rainfall Information (Flood Studies Report 1975)

Return period:	100 years	As supplied by Client
Allowance for Climate Change:	40 %	As supplied by Client
Location selected for FSR data:	London (NW)	

### Input Parameters - Roof Information

Total catchment area:	275 m <sup>2</sup>	As supplied by Client
Attenuation area:	225 m <sup>2</sup>	As supplied by Client
Maximum allowable runoff:	0.6 l/s	As supplied by Client

### Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	10 hours and 20 minutes	0.4
30 mins	12 hours and 20 minutes	0.4
1 hour	14 hours and 10 minutes	0.5
2 hours	15 hours and 20 minutes	0.5
4 hours	15 hours and 50 minutes	0.5
6 hours	15 hours and 40 minutes	0.5
10 hours	14 hours and 50 minutes	0.5
24 hours	9 hours and 50 minutes	0.3
48 hours	2 hours and 10 minutes	0.1

**Total attenuation required: 19.3 m<sup>3</sup>**  
**Half empty time: 4 hours and 0 minutes.**

### Output - Recommended Blue Roof System

System Name:	ABG bluerroof VF HD 129mm
Description:	The 'blue roof' depth of 129mm, includes for a 25mm deep, reservoir board. Positions of RWO's to be coordinated with the structural engineer's deflection analysis. Potential additional (visual) overflow positions, should also be considered by the design team.

Total attenuation capacity:	25.6 m <sup>3</sup>
Number of Blue Roof outlets:	2

- Notes:
1. This document contains an estimate which has been prepared by ABG Ltd and is illustrative only and not a detailed design.
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Blue Roof Estimate

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# BLUE ROOF STORAGE AND OUTFLOW SUMMARY

## PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	13, Blackburn Road, London, NW6 1RZ - Roof C		
Prepared for:	Elliott Wood, London		
Date:	12/06/2020		
ABG Project ID:	20597	Calculator version:	1.26
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof or biodiverse roof; with pavers on pedestals for a maintenance walkway - TBC. Maintenance access only - TBC. Warm roof, or inverted roof, construction, with zero falls (BBA approved) - TBC. Potential for freestanding/ballasted PV panels. Smoke Extract Fan unit to be supported on top of the 'blue roof' - expected EF weight of approx. 250-300kg - TBC.		

### Input Parameters - Rainfall Information (Flood Studies Report 1975)

Return period:	100 years	As supplied by Client
Allowance for Climate Change:	40 %	As supplied by Client
Location selected for FSR data:	London (NW)	

### Input Parameters - Roof Information

Total catchment area:	213 m <sup>2</sup>	As supplied by Client
Attenuation area:	146 m <sup>2</sup>	As supplied by Client
Maximum allowable runoff:	0.6 l/s	As supplied by Client

### Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	7 hours and 30 minutes	0.4
30 mins	9 hours and 0 minutes	0.4
1 hour	10 hours and 10 minutes	0.5
2 hours	10 hours and 50 minutes	0.5
4 hours	10 hours and 50 minutes	0.5
6 hours	10 hours and 20 minutes	0.5
10 hours	9 hours and 10 minutes	0.5
24 hours	4 hours and 10 minutes	0.3
48 hours	0 hours and 0 minutes	0.0

**Total attenuation required: 13.5 m<sup>3</sup>**  
**Half empty time: 3 hours and 10 minutes.**

### Output - Recommended Blue Roof System

System Name:	ABG bluerroof VF HD 129mm
Description:	The 'blue roof' depth of 129mm, includes for a 25mm deep, reservoir board. Positions of RWO's to be coordinated with the structural engineer's deflection analysis. Potential additional (visual) overflow positions, should also be considered by the design team.

Total attenuation capacity:	16.6 m <sup>3</sup>
Number of Blue Roof outlets:	2

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## PRIVATE & CONFIDENTIAL - NOT FOR DISTRIBUTION

Project Name:	13, Blackburn Road, London, NW6 1RZ - Roof D		
Prepared for:	Elliott Wood, London		
Date:	12/06/2020		
ABG Project ID:	20597	Calculator version:	1.26
Prepared by:	Andrew Keer, andrew@abgltd.com, 07525-808700		
Notes/description:	Green roof or biodiverse roof; with pavers on pedestals for a maintenance walkway - TBC. Maintenance access only - TBC. Warm roof, or inverted roof, construction, with zero falls (BBA approved) - TBC. Potential for freestanding/ballasted PV panels.		

### Input Parameters - Rainfall Information (Flood Studies Report 1975)

Return period:	100 years	<i>As supplied by Client</i>
Allowance for Climate Change:	40 %	<i>As supplied by Client</i>
Location selected for FSR data:	London (NW)	

### Input Parameters - Roof Information

Total catchment area:	465 m <sup>2</sup>	<i>As supplied by Client</i>
Attenuation area:	307 m <sup>2</sup>	<i>As supplied by Client</i>
Maximum allowable runoff:	0.7 l/s	<i>As supplied by Client</i>

### Output - Rainfall Calculation

Duration	Time to Empty	Restricted Outflow (l/s)
15 mins	15 hours and 20 minutes	0.4
30 mins	18 hours and 10 minutes	0.5
1 hour	20 hours and 50 minutes	0.6
2 hours	22 hours and 40 minutes	0.6
4 hours	23 hours and 50 minutes	0.6
6 hours	24 hours and 0 minutes	0.6
10 hours	23 hours and 40 minutes	0.6
24 hours	19 hours and 10 minutes	0.5
48 hours	10 hours and 10 minutes	0.3

**Total attenuation required: 34.7 m<sup>3</sup>**  
**Half empty time: 9 hours and 0 minutes.**

### Output - Recommended Blue Roof System

System Name:	ABG bluroof VF HD 129mm
Description:	The 'blue roof' depth of 129mm, includes for a 25mm deep, reservoir board. Positions of RWO's to be coordinated with the structural engineer's deflection analysis. Potential additional (visual) overflow positions, should also be considered by the design team.

Total attenuation capacity:	34.9 m <sup>3</sup>
Number of Blue Roof outlets:	2

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i. The Client shall pay the Consultant for the Services in accordance with the proposal and this Agreement. If the Consultant performs any additional services or if the Services are delayed or disrupted for reasons beyond the

reasonable control of the Consultant then the Consultant shall be entitled to such additional fees as are fair and reasonable in the circumstances. The Consultant may render an invoice at monthly intervals for services properly performed. The agreed invoice, or in the event of a dispute the undisputed element, shall be paid within 28 days of receipt of the invoice by the Client. Any invoice paid after this period will attract interest at 3% above the base rate of the central bank of the country of the currency of payment along with any collection costs which may occur.

ii. The Client shall not withhold any payment of any sum or part of a sum due to the Consultant under this Agreement by reason of claims or alleged claims against the Consultant unless the amount to be withheld has been agreed between the Client and the Consultant as due to the Client or such sum arises from an award in adjudication, arbitration or litigation in favour of the Client and arises under or in connection with the Agreement. Save as aforesaid all rights of set off at common law, in equity or otherwise which the Client may otherwise be entitled to exercise are hereby expressly excluded.

## 9. TERMINATION

If a party is in breach of a material term of this Agreement and despite written notice from the other party fails to remedy such breach within 30 days or such other period as may be agreed between the parties, then the other party shall be entitled to terminate this Agreement forthwith. The Consultant may seek to recoup costs incurred for works completed prior to termination.

## 10. DISPUTE RESOLUTION


Any dispute between the parties that cannot be settled by mutual agreement shall be referred for final settlement to the arbitration of a person agreed between the parties or failing such agreement appointed upon the application of either party by the President of the Chartered Institute of Arbitrators and the said arbitration shall be carried out in accordance with the Construction Industry Model Arbitration Rules 1998 or such other version current at the time of the referral under this clause. Where the Agreement is subject to a governing law other than that of England and Wales then any dispute between the parties that cannot be settled by mutual agreement shall be finally settled by arbitration in accordance with the UNCITRAL Arbitration Rules by one arbitrator appointed in compliance with the said Rules. In either case such rules as appropriate are deemed to be incorporated into this Agreement by reference.

## 11. COMPLIANCE WITH LAWS

This Agreement shall be governed by and construed in accordance with the law of England and Wales unless stated otherwise in the proposal for services from the Consultant.

Changes to the above terms and conditions will only be considered if agreed in writing as part of the appointment process prior to ABG Geosynthetics commencing work.

G Microdrainage Network Modelling

Elliott Wood Partnership LTD		Page 1
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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	21.000	Add Flow / Climate Change (%)	0
Ratio R	0.437	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
STank 1	51.500	2.260	Open Manhole	100	S1.000	49.240	150				
S1	51.500	2.360	Open Manhole	450	S1.001	49.140	150	S1.000	49.140	150	
S2	51.500	2.180	Open Manhole	1200	S2.000	49.320	150				
STank 2	51.500	2.315	Open Manhole	100	S2.001	49.185	150	S2.000	49.185	150	
S3	51.500	2.450	Open Manhole	1200	S1.002	49.050	150	S1.001	49.050	150	
S	51.400	2.380	Open Manhole	100		OUTFALL		S2.001	49.050	150	
								S1.002	49.020	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
STank 1	525617.415	184699.511	525617.415	184699.511	Required	
S1	525641.292	184704.817	525641.292	184704.817	Required	
S2	525637.171	184727.952	525637.171	184727.952	Required	
STank 2	525639.018	184719.369	525639.018	184719.369	Required	
S3	525640.865	184710.786	525640.865	184710.786	Required	
S	525642.432	184711.091			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	STank 1	51.500	49.240	2.110	Open Manhole	100
S1.001	o	150	S1	51.500	49.140	2.210	Open Manhole	450
S2.000	o	150	S2	51.500	49.320	2.030	Open Manhole	1200
S2.001	o	150	STank 2	51.500	49.185	2.165	Open Manhole	100
S1.002	o	150	S3	51.500	49.050	2.300	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	24.459	244.6	S1	51.500	49.140	2.210	Open Manhole	450
S1.001	5.984	66.5	S3	51.500	49.050	2.300	Open Manhole	1200
S2.000	8.780	65.0	STank 2	51.500	49.185	2.165	Open Manhole	100
S2.001	8.780	65.0	S3	51.500	49.050	2.300	Open Manhole	1200
S1.002	1.596	53.2	S	51.400	49.020	2.230	Open Manhole	100

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.095	0.095	0.095
1.001	-	-	100	0.000	0.000	0.000
2.000	-	-	100	0.042	0.042	0.042
2.001	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.137	0.137	0.137

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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S1.002	S	51.400	49.020	0.000	100	0
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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S3, DS/PN: S1.002, Volume (m³): 3.0

Unit Reference	MD-SHE-0071-2900-1790-2900
Design Head (m)	1.790
Design Flow (l/s)	2.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	71
Invert Level (m)	49.050
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.790	2.9
Flush-Flo™	0.311	2.2
Kick-Flo®	0.634	1.8
Mean Flow over Head Range	-	2.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	2.4	3.000	3.7	7.000	5.5
0.200	2.2	1.400	2.6	3.500	3.9	7.500	5.6
0.300	2.2	1.600	2.7	4.000	4.2	8.000	5.8
0.400	2.2	1.800	2.9	4.500	4.4	8.500	6.0
0.500	2.1	2.000	3.0	5.000	4.7	9.000	6.2
0.600	1.9	2.200	3.2	5.500	4.9	9.500	6.3
0.800	2.0	2.400	3.3	6.000	5.1		
1.000	2.2	2.600	3.4	6.500	5.3		



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

Simulation Criteria

Areal Reduction Factor 1.000    Additional Flow - % of Total Flow 0.000  
 Hot Start (mins) 0    MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
 Hot Start Level (mm) 0    Inlet Coefficient 0.800  
 Manhole Headloss Coeff (Global) 0.500    Flow per Person per Day (l/per/day) 0.000  
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0    Number of Storage Structures 2  
 Number of Online Controls 1    Number of Time/Area Diagrams 0  
 Number of Offline Controls 0    Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model    FSR    Ratio R 0.436  
 Region England and Wales Cv (Summer) 0.750  
 M5-60 (mm)    21.000 Cv (Winter) 0.840

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	STank 1	60 Winter	1	+0%	1/15 Winter				49.434
S1.001	S1	60 Winter	1	+0%	1/15 Summer				49.426
S2.000	S2	60 Winter	1	+0%	30/15 Summer				49.427
S2.001	STank 2	60 Winter	1	+0%	1/15 Summer				49.424
S1.002	S3	60 Winter	1	+0%	1/15 Summer				49.422

PN	US/MH Name	Surcharged Flooded			Half Drain Pipe		Status	Level Exceeded
		Depth (m)	Volume (m <sup>3</sup> )	Flow / Overflow Cap. (l/s)	Time (mins)	Flow (l/s)		
S1.000	STank 1	0.044	0.000	0.36	44	3.9	SURCHARGED	
S1.001	S1	0.136	0.000	0.16		2.9	SURCHARGED	
S2.000	S2	-0.043	0.000	0.17		3.2	OK	
S2.001	STank 2	0.089	0.000	0.07	51	1.3	SURCHARGED	
S1.002	S3	0.222	0.000	0.21		2.2	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs 0    Number of Storage Structures 2  
 Number of Online Controls 1    Number of Time/Area Diagrams 0  
 Number of Offline Controls 0    Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model    FSR    Ratio R 0.436  
 Region England and Wales Cv (Summer) 0.750  
 M5-60 (mm)    21.000 Cv (Winter) 0.840

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Water Level (m)
S1.000	STank 1	120 Winter	30	+0%	1/15 Winter			49.920
S1.001	S1	120 Winter	30	+0%	1/15 Summer			49.912
S2.000	S2	120 Winter	30	+0%	30/15 Summer			49.914
S2.001	STank 2	120 Winter	30	+0%	1/15 Summer			49.911
S1.002	S3	120 Winter	30	+0%	1/15 Summer			49.909

PN	US/MH Name	Depth (m)	Surcharged Volume (m³)	Flooded Flow / Cap. (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	STank 1	0.530	0.000	0.25		2.7	SURCHARGED	
S1.001	S1	0.622	0.000	0.13		2.3	SURCHARGED	
S2.000	S2	0.444	0.000	0.22		4.2	SURCHARGED	
S2.001	STank 2	0.576	0.000	0.07	144	1.3	SURCHARGED	
S1.002	S3	0.709	0.000	0.21		2.2	SURCHARGED	

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

Simulation Criteria

Areal Reduction Factor 1.000    Additional Flow - % of Total Flow 0.000  
 Hot Start (mins) 0    MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
 Hot Start Level (mm) 0    Inlet Coefficient 0.800  
 Manhole Headloss Coeff (Global) 0.500    Flow per Person per Day (l/per/day) 0.000  
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0    Number of Storage Structures 2  
 Number of Online Controls 1    Number of Time/Area Diagrams 0  
 Number of Offline Controls 0    Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model    FSR    Ratio R 0.436  
 Region England and Wales Cv (Summer) 0.750  
 M5-60 (mm)    21.000 Cv (Winter) 0.840

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	STank 1	120 Winter	100	+0%	1/15 Winter				50.214
S1.001	S1	120 Winter	100	+0%	1/15 Summer				50.205
S2.000	S2	120 Winter	100	+0%	30/15 Summer				50.207
S2.001	STank 2	120 Winter	100	+0%	1/15 Summer				50.205
S1.002	S3	120 Winter	100	+0%	1/15 Summer				50.201

PN	US/MH Name	Surcharged			Flooded			Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Flow / Cap.	Flow / Cap.					
S1.000	STank 1	0.824	0.000	0.23			172	2.5	SURCHARGED		
S1.001	S1	0.915	0.000	0.12				2.2	SURCHARGED		
S2.000	S2	0.737	0.000	0.28				5.5	SURCHARGED		
S2.001	STank 2	0.870	0.000	0.08			190	1.6	SURCHARGED		
S1.002	S3	1.001	0.000	0.22				2.4	SURCHARGED		

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

Simulation Criteria

Areal Reduction Factor 1.000      Additional Flow - % of Total Flow 0.000  
 Hot Start (mins) 0      MADD Factor \* 10m<sup>3</sup>/ha Storage 2.000  
 Hot Start Level (mm) 0      Inlet Coefficient 0.800  
 Manhole Headloss Coeff (Global) 0.500      Flow per Person per Day (l/per/day) 0.000  
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0      Number of Storage Structures 2  
 Number of Online Controls 1      Number of Time/Area Diagrams 0  
 Number of Offline Controls 0      Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model      FSR      Ratio R 0.436  
 Region England and Wales Cv (Summer) 0.750  
 M5-60 (mm)      21.000 Cv (Winter) 0.840

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

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Water Level (m)
S1.000	STank 1	120 Winter	100	+40%	1/15 Winter			50.834
S1.001	S1	120 Winter	100	+40%	1/15 Summer			50.824
S2.000	S2	120 Winter	100	+40%	30/15 Summer			50.827
S2.001	STank 2	120 Winter	100	+40%	1/15 Summer			50.823
S1.002	S3	120 Winter	100	+40%	1/15 Summer			50.819

PN	US/MH Name	Surcharged			Flooded			Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m <sup>3</sup> )	Flow / Cap.	Flow / Cap.	Flow / Cap.					
S1.000	STank 1	1.444	0.000	0.28			196	2.9	SURCHARGED		
S1.001	S1	1.534	0.000	0.14				2.6	SURCHARGED		
S2.000	S2	1.357	0.000	0.40				7.7	SURCHARGED		
S2.001	STank 2	1.488	0.000	0.33			325	6.4	SURCHARGED		
S1.002	S3	1.619	0.000	0.27				2.9	SURCHARGED		

## H Microdrainage Runoff Volume Calculations

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Greenfield Runoff Volume

FSR Data

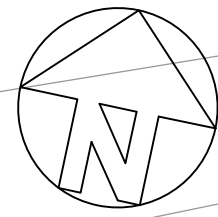
Return Period (years)	100
Storm Duration (mins)	360
Region	England and Wales
M5-60 (mm)	21.000
Ratio R	0.437
Areal Reduction Factor	1.00
Area (ha)	0.267
SAAR (mm)	626
CWI	91.680
Urban	0.000
SPR	47.000

Results

Percentage Runoff (%)	42.71
Greenfield Runoff Volume (m <sup>3</sup> )	71.789

| Proposed Overland Flow Routes for Exceedance Events  
Plan

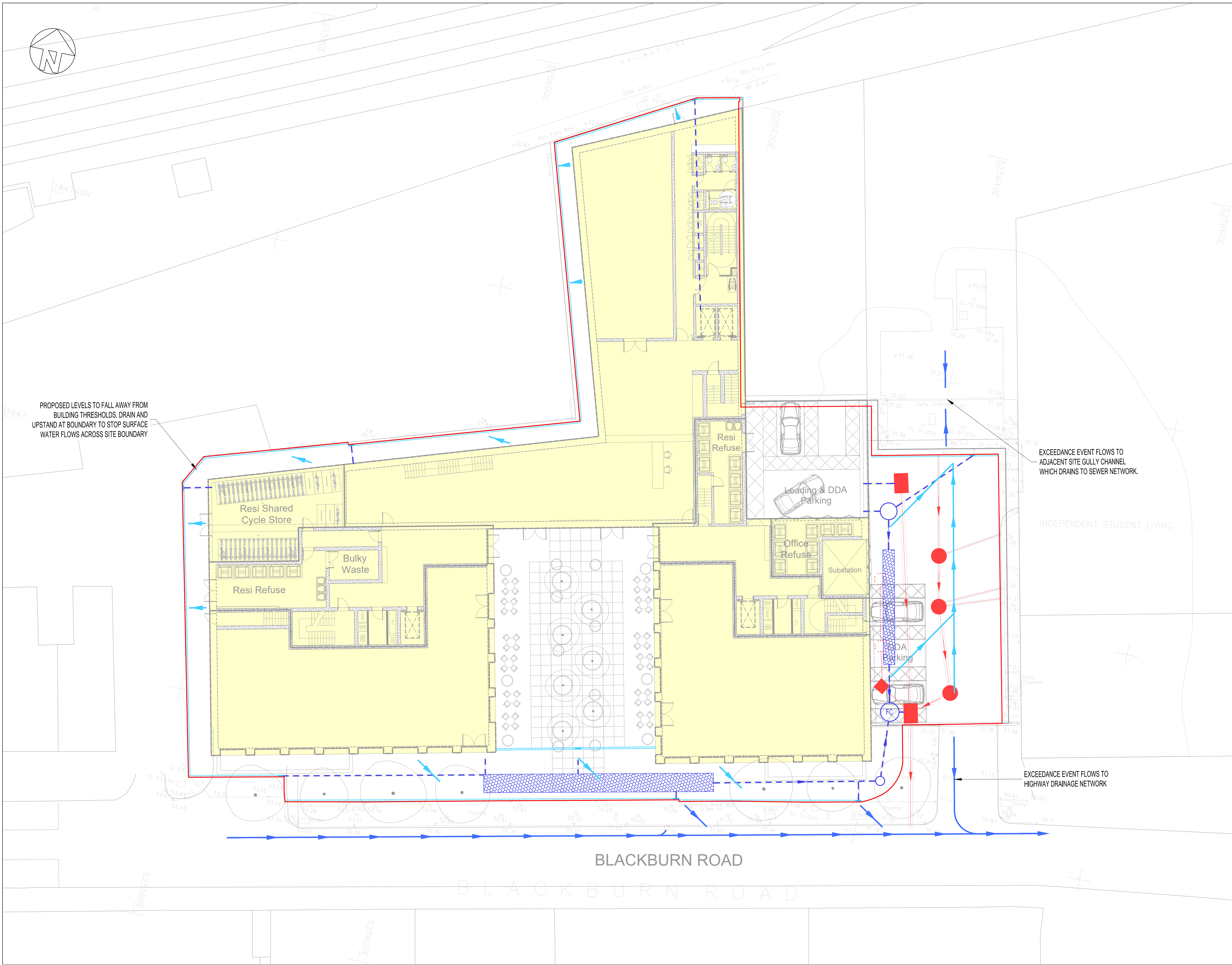




This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

Do not scale from this drawing.

- LEGEND**
- SURFACE WATER OVERLAND FLOW ROUTE
  - EXCEEDANCE EVENT FLOW ROUTE
  - PROPOSED BUILDING
  - SITE BOUNDARY



PROPOSED LEVELS TO FALL AWAY FROM BUILDING THRESHOLDS. DRAIN AND UPSTAND AT BOUNDARY TO STOP SURFACE WATER FLOWS ACROSS SITE BOUNDARY

EXCEEDANCE EVENT FLOWS TO ADJACENT SITE GULLY CHANNEL WHICH DRAINS TO SEWER NETWORK.

EXCEEDANCE EVENT FLOWS TO HIGHWAY DRAINAGE NETWORK

**NOT FOR CONSTRUCTION**

PI	S2	01/02/23	MTr	KTr	Updated planning submission
rev	sc	date	by	chk	description

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Central London • Wimbledon • Nottingham  
Consulting Structural and Civil Engineers  
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Project  
13 Blackburn Road  
Camden, London

Drawing title  
Proposed Overland Flow Routes  
for Exceedance Events Plan

Scale (s)	Date	Drawn				
1:150@ A1:	February 2023	MTr				
Drawing status		Status Revision				
Preliminary		S2 P1				
Project no.	Originator	Zone	Level	Type	Role	dig no.
2190511-EWP-ZZ-00-SK-C-0001						



J Camden SuDS Pro-forma

1. Project & Site Details	Project / Site Name (including sub-catchment / stage / phase where appropriate)	13 Blackburn Road
	Address & post code	13Blackburn Road, London, NW6 1RZ
	OS Grid ref. (Easting, Northing)	E 525614 N 184710
	LPA reference (if applicable)	
	Brief description of proposed work	Demolition of existing building. Construction of 3 buildings and connecting pavillion standing between 1-9 storeys (plus basement)
	Total site Area	2667 m <sup>2</sup>
	Total existing impervious area	2667 m <sup>2</sup>
	Total proposed impervious area	2635 m <sup>2</sup>
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	No
	Existing drainage connection type and location	Existing combined demarcation chamber within access road outfalls via 300mm
	Designer Name	Marco Tranchina
	Designer Position	Civil Engineer
	Designer Company	Elliott Wood Partnership

2. Proposed Discharge Arrangements	<b>2a. Infiltration Feasibility</b>		
	Superficial geology classification	n/a	
	Bedrock geology classification	London Clay	
	Site infiltration rate	m/s	
	Depth to groundwater level	m below ground level	
	Is infiltration feasible?	No	
	<b>2b. Drainage Hierarchy</b>		
		<i>Feasible (Y/N)</i>	<i>Proposed (Y/N)</i>
	1 store rainwater for later use	N	N
	2 use infiltration techniques, such as porous surfaces in non-clay areas	N	N
	3 attenuate rainwater in ponds or open water features for gradual release	N	N
	4 attenuate rainwater by storing in tanks or sealed water features for gradual release	Y	Y
	5 discharge rainwater direct to a watercourse	N	N
	6 discharge rainwater to a surface water sewer/drain	N	N
	7 discharge rainwater to the combined sewer.	Y	Y
<b>2c. Proposed Discharge Details</b>			
Proposed discharge location	Existing demarcation chamber in access road		
Has the owner/regulator of the discharge location been consulted?	No		

3a. Discharge Rates & Required Storage				
	Greenfield (GF) runoff rate (l/s)	Existing discharge rate (l/s)	Required storage for GF rate (m <sup>3</sup> )	Proposed discharge rate (l/s)
Qbar	1.16	<del>          </del>	<del>          </del>	<del>          </del>
1 in 1	0.99	24.9		4.3
1 in 30	1.67	61.2		4.3
1 in 100	3.7	79.6		4.5
1 in 100 + CC	<del>          </del>	<del>          </del>		5
Climate change allowance used		40%		
3b. Principal Method of Flow Control		Orifice & vortex flow controls		
3c. Proposed SuDS Measures				
	Catchment area (m <sup>2</sup> )	Plan area (m <sup>2</sup> )	Storage vol. (m <sup>3</sup> )	
Rainwater harvesting	0	<del>          </del>	0	
Infiltration systems	0	<del>          </del>	0	
Green roofs	1272	900	0	
Blue roofs	1272	900	85	
Filter strips	0	0	0	
Filter drains	0	0	0	
Bioretention / tree pits	0	0	0	
Pervious pavements	0	0	0	
Swales	0	0	0	
Basins/ponds	0	0	0	
Attenuation tanks	1363	<del>          </del>	62	
<b>Total</b>	<b>3907</b>	<b>1800</b>	<b>147</b>	

3. Drainage Strategy

4a. Discharge & Drainage Strategy		Page/section of drainage report
Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results		Section 6.3 (Page 4)
Drainage hierarchy (2b)		Section 6.1 (Page 4)
Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location		Section 9.3 (page 7)
Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations		Section 6 (pages 4, 5 & 6)
Proposed SuDS measures & specifications (3b)		Section 6 (pages 4, 5 & 6)
4b. Other Supporting Details		Page/section of drainage report
Detailed Development Layout		Appendix E
Detailed drainage design drawings, including exceedance flow routes		Appendix E
Detailed landscaping plans		Appendix E
Maintenance strategy		Section 7 (Page 6)
Demonstration of how the proposed SuDS measures improve:		
a) water quality of the runoff?		Section 6 (Pages 4, 5 & 6)
b) biodiversity?		Section 6 (Pages 4, 5 & 6)
c) amenity?		Section 6 (Pages 4, 5 & 6)

4. Supporting Information



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