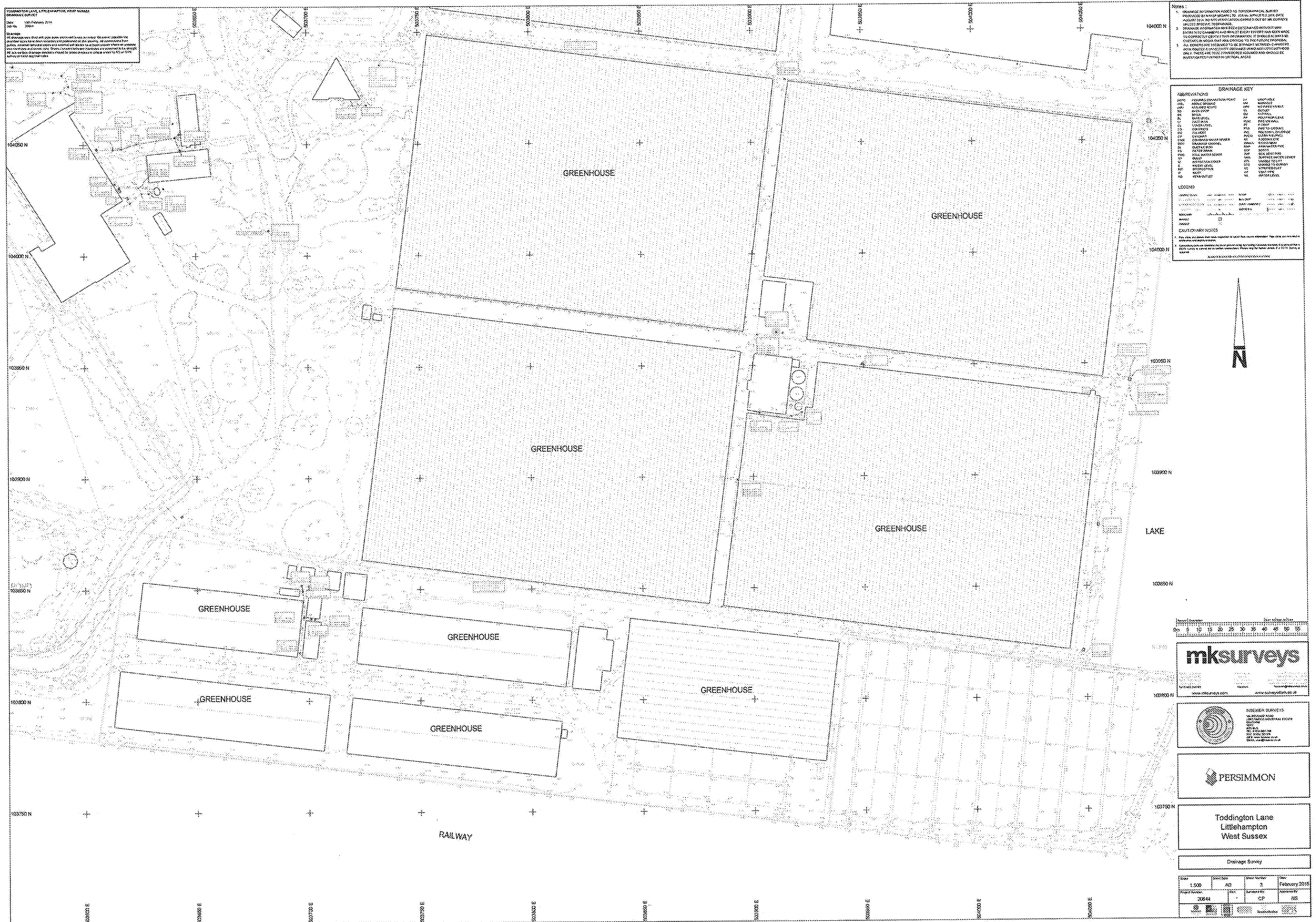






## ACCOMMODATION UNITS

# GREENHOUSE

## POLYTUNNELS

# GREENHOUSE

# GREENHOUSE

**Notes:**

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD JOB No. APHILLTLE 205 DATED AUGUST 2014. NO SITE INVESTIGATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN-ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROJECT.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS WITH ROUTES DETERMINED BY OBTAINING USING ACUSTIC METHOD ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

| ABBREVIATIONS |                          | DRAINAGE KEY |                    |
|---------------|--------------------------|--------------|--------------------|
| (ACD)         | ABSEMED CONNECTION POINT | LVH          | LAMP LODE          |
| AB            | ABRINE GROUND            | NPV          | NO PIPES VISIBLE   |
| AG            | AGRIUMED HOUSE           | OUTP         | OUTPIPE            |
| BA            | BA OF DROOP              | PV           | POLYPROPYLENE      |
| BR            | BRICK                    | PCW          | PIPE IN WALL       |
| BS            | BS LEVEL                 | PT           | P-TAP              |
| CL            | CL CONCRETE              | PTG          | PIPE TO GROUND     |
| CU            | CULVERT                  | PVC          | POLYVINYL CHLORIDE |
| CV            | CULVERT                  | ULTRA        | ULTRA BAY (PVC)    |
| CWS           | COMBINED WATER CHANNEL   | R            | RAIDERS EYE        |
| D             | DRAIN                    | RMAN         | ROOF MAN           |
| DI            | DUCTILE IRON             | RWP          | RAIN WATER PIPE    |
| DS            | DOWN DRAIN               | S            | SIGHT              |
| FWS           | FOUL WATER SEWER         | SV           | SOIL VENT PIPE     |
| GA            | GA                       | SWF          | SEWAGE WATER SEWER |
| IG            | INSULATION COVER         | UPL          | UNABLE TO LIFT     |
| IN            | INLET                    | UTS          | UNABLE TO SURVEY   |
| INT           | INTERSECTOR              | UTR          | UTTERED GULL       |
| IP            | INVERT                   | V            | VENT PIPE          |
| IO            | INLET                    | WL           | WATER LEVEL        |
| KE            | KEELER OUTLET            |              |                    |

LEGEND

| COMMON SYMBOL    | SYMBOL | DESCRIPTION      | SYMBOL           | DESCRIPTION |
|------------------|--------|------------------|------------------|-------------|
| CONCRETE SURFACE |        | CONCRETE SURFACE | FLAT             |             |
| PAVED ROAD       |        | PAVED ROAD       | BACKDROPPED      |             |
| GRAVEL ROAD      |        | GRAVEL ROAD      | SURFACE FINISHED |             |
| GRAVEL DRIVE     |        | GRAVEL DRIVE     | GRAVEL FILL      |             |
| ROAD MARK        |        | ROAD MARK        | SURFACE BOUNDARY |             |
| WHOLE            |        | WHOLE            |                  |             |
| CHAMFER          |        | CHAMFER          |                  |             |

CAUTION

1. Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are not in millimeters and depths in meters.
2. Connectivity between Manholes has been proven using dye-testing / acoustic methods. It is advised CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV Survey is required.



GDE

SHEET 1 OF 12



mk surveys

|                                                          |                                                  |                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Jayaraman<br/>Tel 01903 243 862</p>                   | <p>Dorothy<br/>Tel 01903 243 862<br/>Horsham</p> | <p><a href="mailto:jayaraman@mlk-surveys.co.uk">jayaraman@mlk-surveys.co.uk</a><br/><a href="mailto:dorothy@mlk-surveys.co.uk">dorothy@mlk-surveys.co.uk</a><br/><a href="http://www.surveys4bm.co.uk">www.surveys4bm.co.uk</a><br/><a href="mailto:horsham@mlk-surveys.co.uk">horsham@mlk-surveys.co.uk</a></p> |
| <a href="http://www.mksurveys.com">www.mksurveys.com</a> |                                                  | <a href="http://www.surveys4bm.co.uk">www.surveys4bm.co.uk</a>                                                                                                                                                                                                                                                   |



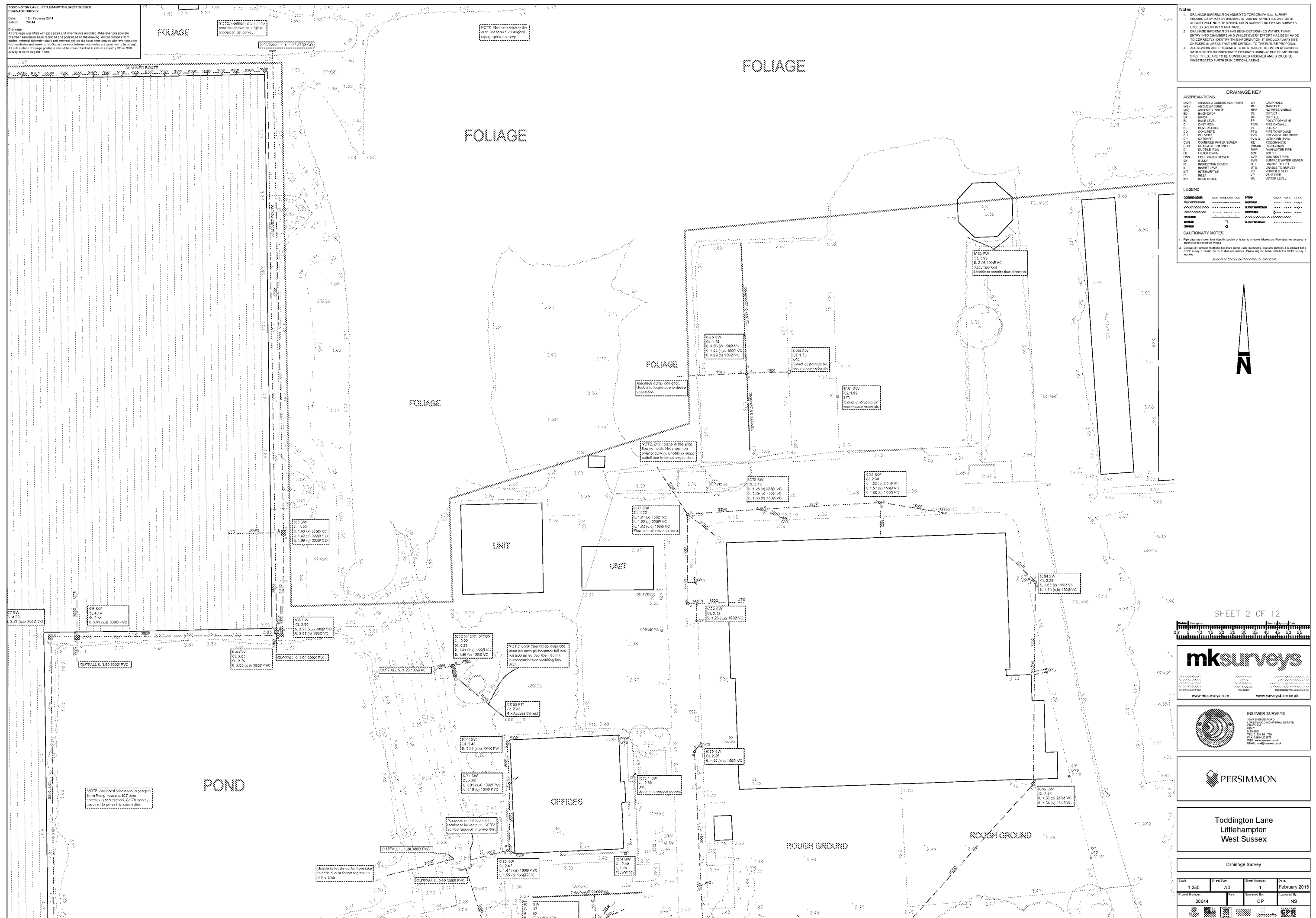
**INSEWER SURVEYS**  
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Toddington Lane  
Littlehampton  
West Sussex

Drainage Survey

|                          |                   |                    |                      |
|--------------------------|-------------------|--------------------|----------------------|
| Scale:<br>1:250          | Sheet Size:<br>A0 | Sheet Number:<br>1 | Date:<br>February 20 |
| Project Number:<br>20644 | Rev:<br>-         | Surveyed By:<br>CB | Approved By:<br>MS   |



**Notes:**

1. DRAINAGE INFORMATION ADDRESSED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD JOB NO: APH/ITL/01/09 DATE 1 AUGUST 2014 NO REVISIONS OR CORRECTIONS CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL. ALL SEWERS ARE PREVIEWED TO BE STRAIGHT BETWEEN CHAMBERS WITH ROUTES/CONNECTIVITY OBTAINED USING ACUSTIC METHOD ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.
- 3.

| ABBREVIATIONS |                           | DRAINAGE KEY |                     |
|---------------|---------------------------|--------------|---------------------|
| ACJP          | ASSIGNED CONNECTION POINT | MP           | LAMP HOUSE          |
| AG            | ASSIGNED GROUND           | MR           | MANHOLE             |
| AP            | ASSIGNED ROUTE            | NH           | NO PIPES VISIBLE    |
| AS            | ASSIGNED SERVICE          | OP           | OUTLET              |
| BE            | BLOCK                     | OU           | OUTFALL             |
| BL            | BALANCE                   | PP           | POLYPROPYLENE       |
| CI            | CATCH CATCH               | PPW          | PIPE IN WALL        |
| CL            | CLOSE LEVEL               | PT           | PT/RAIP             |
| CO            | CONCRETE                  | Q            | QUANTITY            |
| CQ            | CULVERT                   | PVC          | POLYVINYL CHLORIDE  |
| CW            | COMBINED WATER SEWER      | PU           | ULTRA HIGH P.V.C.   |
| DC            | DUCTILE IRON              | R            | ROOFS/EGE           |
| DF            | FLIGHT GRAB               | RP           | RAIN PIPES          |
| FWS           | FOUL WATER SEWER          | RPE          | RAIN WATER PIPE     |
| GL            | GROUND LEVEL              | SVP          | SOFT VENT PIPE      |
| IG            | INSPECTION COVER          | U            | UNABLE TO VISUALIZE |
| IN            | INLET                     | UL           | UNABLE TO LIFT      |
| INT           | INTERCEPTOR               | V            | VENT PIPE           |
| IP            | INLET                     | VV           | VENTRIFIED GAS      |
| KP            | KEYS DRAIN                | WL           | WATER LEVEL         |

LEGEND

|                 |       |                 |       |
|-----------------|-------|-----------------|-------|
| COMBINED SURVEY | ===== | P-TWP           | ===== |
| SWAMPY POND     | ----- | BACK STOP       | ----- |
| WATERWAY        | ~~~~~ | SURVEY AVOIDED  | ----- |
| ROAD            | ===== | CAPPED PILE     | ===== |
| REINFORCED      | ===== | SURVEY BOUNDARY | ----- |
| WALL            | ===== |                 |       |
| CHAMBER         | ===== |                 |       |

### CAUTIONARY NOTES

1. Pipe sizes are shown for visual inspection or taken from record information. Pipe sizes are not millimetres and depth in metres.
2. Connectivity between Markboks has been proven using open-ended / acoustic methods. If it is advised CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV is really fixed.



## POLYTUNNELS

# GREENHOUSE

# GREENHOUSE

SHEET 3 OF 12



mk surveys

[illegible]

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Toddington Lane  
Littlehampton  
West Sussex

Drainage Survey

|                         |                  |                   |                   |
|-------------------------|------------------|-------------------|-------------------|
| Scale<br>1:250          | Sheet Size<br>A0 | Sheet Number<br>1 | Date<br>February  |
| Project Number<br>20644 | Rev.<br>-        | Surveyed By<br>CP | Approved By<br>NS |
|                         |                  |                   |                   |

**Notes:**

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD JOB NO. A/P/HLTH/208 DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES/CONNECTIVITY OBTAINED USING ACUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

| ABBREVIATIONS |                           | DRAINAGE KEY |                        |
|---------------|---------------------------|--------------|------------------------|
| (ACP)         | ASSIGNED CONNECTION POINT | LN           | LAMP LUBE              |
| (AB)          | ABOVE                     | MR           | MANHOLE                |
| (AR)          | ASSIGNED ROUTE            | NP           | NO PIPES VISIBLE       |
| (AS)          | ASSIGNED ROUTE            | CU           | CUTLIFT                |
| (C)           | CONCRETE                  | CU           | CUTFALL                |
| BK            | BRICK                     | PP           | POLYPROPYLENE          |
| CS            | CORROSION                 | HP           | HYDRAULIC PIPES        |
| CR            | CAST IRON                 | PO           | PIPE ON WALL           |
| CT            | CUT                       | B-TAP        | B-TAP                  |
| CO            | CONCRETE                  | PFG          | PIPE TO GROUND         |
| CO            | CONCRETE                  | PVC          | PVC POLYVINYL CHLORIDE |
| CO            | CORRUP                    | P-U          | ULTRA HIGH PRESSURE    |
| DWS           | COMBINED WASTEWATER SEWER | RF           | ROUND FIBER            |
| DU            | DUCTILE IRON              | R            | RECONCITE EYE          |
| DU            | DUCTILE IRON              | RW           | RAIN WATER PIPE        |
| DU            | DUCTILE IRON              | SC           | SOFT                   |
| FWS           | FULL WASTEWATER SEWER     | SV           | SOIL VENT PIPE         |
| IG            | INJECTION COVER           | SW           | STAINLESS WASTEWATER   |
| IG            | INJECTION COVER           | UT           | UNABLE TO UPLIFT       |
| IG            | INJECTION COVER           | UV           | ULTRAVIOLET SURVEY     |
| INT           | INTERSECTOR               | VO           | VITRIFIED GLASS        |
| IT            | IT                        | VP           | VENT PIPE              |
| KR            | KEELS DRAIN               | WL           | WATER LEVEL            |

**LEGEND**

| COASTING SHOULDER | PAVEMENT         | PAVEMENT   |
|-------------------|------------------|------------|
| XXXXXX/XXXX       | XXXXXX           | XXXXXX     |
| XXXXXXXXXX        | SURFACE MARKINGS | XXXXXX     |
| INTERSECTION      | WAREHOUSE        | XXXXXXXXXX |
| WAREHOUSE         | WAREHOUSE        |            |
| CAUTIONARY NOTES  |                  |            |

Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depth in metres.

Connectivity between depths has been power using overlapping acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV survey is required.



FOULAGE

FOLAGE

## POLYTUNNELS

# GREENHOUSE

ROUGH GROUND

GRAVE

**Notes :**

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD JOB# NK APHILITE.209 DATE AUGUST 2014. NO VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS WITH ROUTES/CONNECTIVITY OBTAINED USING ACUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

| ABBREVIATIONS |                          | DRAINAGE KEY |                       |
|---------------|--------------------------|--------------|-----------------------|
| ACD           | ASSURED CONNECTION POINT | LVH          | LAMP LIGHT            |
| ABP           | ABOVE GROUND             | NP           | NO PIPES VISIBLE      |
| ABQ           | ABOVE GROUND             | OUT          | OUTLET                |
| BC            | BASE OF CROP             | OUTFL        | OUTFALL               |
| BE            | BEFORE                   | POL          | POLYPROPYLENE         |
| BS            | BASIC LEVEL              | PPE          | PIPE ON WATER         |
| CL            | CLOVE LEVEL              | PT           | P-TAP                 |
| CG            | CONCRETE                 | PIPE         | PIPE TO CONNECTION    |
| CU            | CULVERT                  | PVC          | POLYVINYL CHLORIDE    |
| CP            | CURB                     | ULTRA BB     | ULTRA BROAD BAND      |
| CWS           | COMBINED WATER CHANNEL   | R            | RODGING EYE           |
| DCH           | DOWN DRAIN               | RM           | ROUNDRUN              |
| DI            | DUCTILE IRON             | P&P          | PLAIN DRAIN PIPE      |
| DT            | DRAIN TRENCH             | SP           | SPILL                 |
| FWS           | FOUL WATER SEWER         | SVP          | SOFT SINK PIPE        |
| GC            | GROUND COVER             | US           | UNDER SINK PIPE SEWER |
| IG            | INFECTION CONTROL        | UNL          | UNABLE TO LIFT        |
| INL           | INLET                    | UNL          | UNABLE TO LIFT        |
| INT           | INTERCEPTOR              | VIT          | VITRIFIED GLASS       |
| KD            | KEULB INLET              | VEP          | VENT PIPE             |
| INL           | INLET                    | WL           | WATER LEVEL           |

**LEGEND**

|                            |       |                        |       |
|----------------------------|-------|------------------------|-------|
| <b>CORRODED JOINT:</b>     | ..... | <b>PIPING</b>          | ..... |
| <b>SALINITY ZONE:</b>      | ..... | <b>BURIED PIPE</b>     | ..... |
| <b>REINFORCED CONCRETE</b> | ..... | <b>BURIED ANCHORED</b> | ..... |
| <b>BRIDGE</b>              | ..... | <b>COVERED PILE</b>    | ..... |
| <b>ANCHORS</b>             | ..... |                        |       |
| <b>COASTLINE</b>           | ..... |                        |       |

▽

**CAUTIONARY NOTES**

1. Pipe sizes are shown as taken from inspection or taken from record information. Pipe sizes are recorded in millimeters and depths in meters.

2. The results between stations may have been processed using differential/acoustic methods. It is advised that a CCTV survey is carried out to confirm conditions. Please ring for further details if a CCTV survey is required.



SHEET 5 OF 12



mkSURVEYS

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PERSIMMON

Toddington Lane  
Littlehampton  
West Sussex

Drainage Survey

|                         |                  |                   |                       |
|-------------------------|------------------|-------------------|-----------------------|
| Scale<br>1:250          | Sheet Size<br>A0 | Sheet Number<br>2 | Date<br>February 2015 |
| Project Number<br>20644 | Rev.<br>-        | Surveyed By<br>CP | Approved By<br>NS     |

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX  
DRAINAGE SURVEY  
Date: 18th February 2014  
Job No: 20644  
Drainage  
All drainage was lifted with pipe sizes and invert levels recorded. Wherever possible the chamber does have been recorded and put based on the drawing. All cut sections from gullies, external sewer pipes and external not shown have been proven wherever possible into manholes and sewer runs. Drain / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by RQ or GPS survey or hand dug trial holes.



Notes :  
1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PROVIDED BY MAYER BROWN LTD JOHN M. APPLETRE 2008 DATE AUGUST 2014 NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.  
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHIST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.  
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES / CONNECTIVITY OBTAINED USING ACUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

**ABBREVIATIONS**

|      |                          |      |                     |
|------|--------------------------|------|---------------------|
| ACGP | ASSUMED CONNECTION POINT | LH   | LAMP HOLE           |
| ABG  | ABOVE GROUND             | MB   | MANHOLE             |
| AR   | ASSUMED ROUTE            | NPV  | NO PIPES VISIBLE    |
| BD   | BACK DROP                | OL   | OUTLET              |
| BR   | BRICK                    | OU   | OUTFALL             |
| BL   | BASE LEVEL               | PP   | POLYPROPYLENE       |
| CI   | CAST IRON                | POW  | PIPE ON WALL        |
| CL   | COVER LEVEL              | PT   | STRAP               |
| CO   | CONCRETE                 | PTG  | PIPE TO GROUND      |
| CJ   | GULLFET                  | PVC  | POLYVINYL CHLORIDE  |
| CP   | CATCHMENT                | PVCU | ULTRA HD PE (PVC)   |
| CWS  | COMMUNED WATER SEWER     | RE   | ROOFING EYE         |
| DCH  | DRAINAGE CHANNEL         | RMAN | REINFORCED MAN      |
| DI   | DITCH                    | RWP  | RUNNING WATER PIPE  |
| FD   | FILTER DRAIN             | SOF  | SOFT                |
| FWS  | FULL WATER SEWER         | SUP  | SURFACE WATER SEWER |
| GF   | GULLY                    | SW   | UNABLE TO SURVEY    |
| IL   | INVERT LEVEL             | UTL  | UNABLE TO SURVEY    |
| INT  | INTERSECTION             | UTS  | UNABLE TO SURVEY    |
| IT   | INLET                    | V    | VENT                |
| MD   | MANHOLE                  | VL   | VENT LEVEL          |

**LEGEND**

|         |      |       |       |
|---------|------|-------|-------|
| CHAMBER | PIPE | SEWER | WATER |
| CHAMBER | PIPE | SEWER | WATER |

**CAUTIONARY NOTES**

- Pipe sizes are shown from visual inspection or taken from access information. Pipe sizes are recorded in millimetres and depth in metres.
- Connectivity between Manholes has been proven using geophysics / acoustic methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV Survey is required.

SHEET 6 OF 12

**mksurveys**

www.mksurveys.com

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**PERSIMMON**

**Toddington Lane**  
**Littlehampton**  
**West Sussex**

**Drainage Survey**

|                |            |              |               |
|----------------|------------|--------------|---------------|
| Scale          | Sheet Size | Sheet Number | Date          |
| 1:250          | A0         | 2            | February 2015 |
| Project Number | Rev        | Drawn By     | Approved By   |
| 20644          | -          | CP           | NS            |

20644-144  
20644-144









**Notes :**

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD JOB NO. AHP/UTILE 2005 DATE AUGUST 2014 NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE DISPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES CONNECTED VERTICALLY OBTAINED USING ACUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

| DRAINAGE KEY                   |      |                       |  |
|--------------------------------|------|-----------------------|--|
| ABBREVIATIONS                  |      |                       |  |
| (ACP) ASSUMED CONNECTION POINT | LH   | LAND                  |  |
| (AB) ABOVE DRAINAGE            | LM   | MANHOLE               |  |
| (AR) AROUND ROUTE              | MP   | MANHOLE COVER VISIBLE |  |
| BD BRAD DITCH                  | OL   | OUTLET                |  |
| BR BRIDGE                      | OV   | OVERFALL              |  |
| BS BASE LEVEL                  | PC   | POLYPROPYLENE         |  |
| CI CAST IRON                   | PFG  | PIPE ON DRAIN         |  |
| CO COVER LEVEL                 | PT   | PISTON                |  |
| CO CONCRETE                    | QW   | PIPE TO WALL          |  |
| CS CEMENT                      | SC   | STEEL                 |  |
| CG GATHRIT                     | PVGJ | PIPE HANG (PVG)       |  |
| CWS COMBING WATER SEWER        | RC   | RECORDING CHAIN       |  |
| DR DRAINAGE                    | RIM  | RIM                   |  |
| DT DUCTILE IRON                | RWP  | RAN WATER PIPE        |  |
| EW EARTHWORK                   | SP   | SPOT                  |  |
| FWS FLOW WATER SEWER           | SV   | SNAIL VENT PIPE       |  |
| GU Gully                       | SW   | SURFACE WATER         |  |
| I IN                           | UTG  | UP TO LIGHT           |  |
| IN INVERT LEVEL                | US   | UPSIDE SURVEY         |  |
| INT INTERSECTION               | VF   | VERTICAL DRAIN        |  |
| IO INLET                       | V    | VENT PIPE             |  |
| KO KILNS OUTLET                | WL   | WATER LEVEL           |  |

**LEGEND**

|              |       |              |                 |
|--------------|-------|--------------|-----------------|
| CANINE SENSE | ..... | PITMP        | N/N N/N N/N N/N |
| GCACGAGGC    | ..... | MACDHP       | .....           |
| .....        | ..... | ALHPT/AMCHSD | .....           |
| .....        | ..... | CGPGLD       | .....           |
| .....        | ..... | .....        | .....           |
| INSTRUMENT   | ..... | .....        | .....           |
| .....        | ..... | .....        | .....           |
| WHEEL        | ..... | .....        | .....           |
| .....        | ..... | .....        | .....           |
| CHASSIS      | ..... | .....        | .....           |

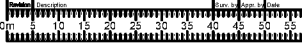
**CAUTIONARY NOTES**

1. Pipe does not show front view inspection or later than record information. Pipe sizes are record information and depth is minimum.
2. Connectivity between Marklines has been proven using day/nighting / acoustic methods. It is advised that CCTV survey is carried out to confirm conditions. Please ring for further details if a CCTV Survey was not done.



GREENHO

SHEET 9 OF 12

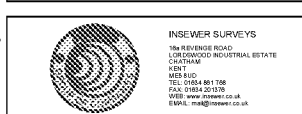


**mk**surveys

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Toddington Lane  
Littlehampton  
West Sussex

|                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Drainage Survey</b>                                                                |                                                                                       |                                                                                       |                                                                                       |
| Scale<br><b>1:250</b>                                                                 | Sheet Size<br><b>A0</b>                                                               | Sheet Number<br><b>3</b>                                                              | Date<br><b>February 20</b>                                                            |
| Project Number<br><b>20644</b>                                                        |                                                                                       | Rev.<br><b>-</b>                                                                      | Drawn By<br><b>CP</b>                                                                 |
|                                                                                       |                                                                                       | Approved By<br><b>NS</b>                                                              |                                                                                       |
|  |  |  |  |

**Notes:**

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PRODUCED BY MAYER BROWN LTD. JOB NO. APHULITE.2009 DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT MAN ENTRY INTO CHAMBERS AND WHILST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION, IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES/CONNECTIVITY OBTAINED USING ACUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

[illegible]

LEGEND

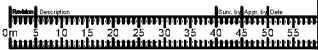
[illegible]

## CAUTIONARY NOTES

1. Pipe sizes are shown from visual inspection or taken from record information. Pipe sizes are recorded in millimetres and depths in metres.



SHEET 11 OF 12



mk surveys

|                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| <p>01403 243 902<br/>         01403 243 903<br/>         01403 243 904<br/>         01403 243 905<br/>         Fax 01403 243 902</p> | <p>2000-2001<br/>         2001-2002<br/>         2002-2003<br/>         2003-2004<br/>         2004-2005<br/>         2005-2006<br/>         2006-2007<br/>         2007-2008<br/>         2008-2009<br/>         2009-2010<br/>         2010-2011<br/>         2011-2012<br/>         2012-2013<br/>         2013-2014<br/>         2014-2015<br/>         2015-2016<br/>         2016-2017<br/>         2017-2018<br/>         2018-2019<br/>         2019-2020<br/>         2020-2021<br/>         2021-2022<br/>         2022-2023<br/>         2023-2024<br/>         2024-2025<br/>         2025-2026<br/>         2026-2027<br/>         2027-2028<br/>         2028-2029<br/>         2029-2030<br/>         2030-2031<br/>         2031-2032<br/>         2032-2033<br/>         2033-2034<br/>         2034-2035<br/>         2035-2036<br/>         2036-2037<br/>         2037-2038<br/>         2038-2039<br/>         2039-2040<br/>         2040-2041<br/>         2041-2042<br/>         2042-2043<br/>         2043-2044<br/>         2044-2045<br/>         2045-2046<br/>         2046-2047<br/>         2047-2048<br/>         2048-2049<br/>         2049-2050<br/>         2050-2051<br/>         2051-2052<br/>         2052-2053<br/>         2053-2054<br/>         2054-2055<br/>         2055-2056<br/>         2056-2057<br/>         2057-2058<br/>         2058-2059<br/>         2059-2060<br/>         2060-2061<br/>         2061-2062<br/>         2062-2063<br/>         2063-2064<br/>         2064-2065<br/>         2065-2066<br/>         2066-2067<br/>         2067-2068<br/>         2068-2069<br/>         2069-2070<br/>         2070-2071<br/>         2071-2072<br/>         2072-2073<br/>         2073-2074<br/>         2074-2075<br/>         2075-2076<br/>         2076-2077<br/>         2077-2078<br/>         2078-2079<br/>         2079-2080<br/>         2080-2081<br/>         2081-2082<br/>         2082-2083<br/>         2083-2084<br/>         2084-2085<br/>         2085-2086<br/>         2086-2087<br/>         2087-2088<br/>         2088-2089<br/>         2089-2090<br/>         2090-2091<br/>         2091-2092<br/>         2092-2093<br/>         2093-2094<br/>         2094-2095<br/>         2095-2096<br/>         2096-2097<br/>         2097-2098<br/>         2098-2099<br/>         2099-2100<br/>         2100-2101<br/>         2101-2102<br/>         2102-2103<br/>         2103-2104<br/>         2104-2105<br/>         2105-2106<br/>         2106-2107<br/>         2107-2108<br/>         2108-2109<br/>         2109-2110<br/>         2110-2111<br/>         2111-2112<br/>         2112-2113<br/>         2113-2114<br/>         2114-2115<br/>         2115-2116<br/>         2116-2117<br/>         2117-2118<br/>         2118-2119<br/>         2119-2120<br/>         2120-2121<br/>         2121-2122<br/>         2122-2123<br/>         2123-2124<br/>         2124-2125<br/>         2125-2126<br/>         2126-2127<br/>         2127-2128<br/>         2128-2129<br/>         2129-2130<br/>         2130-2131<br/>         2131-2132<br/>         2132-2133<br/>         2133-2134<br/>         2134-2135<br/>         2135-2136<br/>         2136-2137<br/>         2137-2138<br/>         2138-2139<br/>         2139-2140<br/>         2140-2141<br/>         2141-2142<br/>         2142-2143<br/>         2143-2144<br/>         2144-2145<br/>         2145-2146<br/>         2146-2147<br/>         2147-2148<br/>         2148-2149<br/>         2149-2150<br/>         2150-2151<br/>         2151-2152<br/>         2152-2153<br/>         2153-2154<br/>         2154-2155<br/>         2155-2156<br/>         2156-2157<br/>         2157-2158<br/>         2158-2159<br/>         2159-2160<br/>         2160-2161<br/>         2161-2162<br/>         2162-2163<br/>         2163-2164<br/>         2164-2165<br/>         2165-2166<br/>         2166-2167<br/>         2167-2168<br/>         2168-2169<br/>         2169-2170<br/>         2170-2171<br/>         2171-2172<br/>         2172-2173<br/>         2173-2174<br/>         2174-2175<br/>         2175-2176<br/>         2176-2177<br/>         2177-2178<br/>         2178-2179<br/>         2179-2180<br/>         2180-2181<br/>         2181-2182<br/>         2182-2183<br/>         2183-2184<br/>         2184-2185<br/>         2185-2186<br/>         2186-2187<br/>         2187-2188<br/>         2188-2189<br/>         2189-2190<br/>         2190-2191<br/>         2191-2192<br/>         2192-2193<br/>         2193-2194<br/>         2194-2195<br/>         2195-2196<br/>         2196-2197<br/>         2197-2198<br/>         2198-2199<br/>         2199-2200<br/>         2200-2201<br/>         2201-2202<br/>         2202-2203<br/>         2203-2204<br/>         2204-2205<br/>         2205-2206<br/>         2206-2207<br/>         2207-2208<br/>         2208-2209<br/>         2209-2210<br/>         2210-2211<br/>         2211-2212<br/>         2212-2213<br/>         2213-2214<br/>         2214-2215<br/>         2215-2216<br/>         2216-2217<br/>         2217-2218<br/>         2218-2219<br/>         2219-2220<br/>         2220-2221<br/>         2221-2222<br/>         2222-2223<br/>         2223-2224<br/>         2224-2225<br/>         2225-2226<br/>         2226-2227<br/>         2227-2228<br/>         2228-2229<br/>         2229-2230<br/>         2230-2231<br/>         2231-2232<br/>         2232-2233<br/>         2233-2234<br/>         2234-2235<br/>         2235-2236<br/>         2236-2237<br/>         2237-2238<br/>         2238-2239<br/>         2239-2240<br/>         2240-2241<br/>         2241-2242<br/>         2242-2243<br/>         2243-2244<br/>         2244-2245<br/>         2245-2246<br/>         2246-2247<br/>         2247-2248<br/>         2248-2249<br/>         2249-2250<br/>         2250-2251<br/>         2251-2252<br/>         2252-2253<br/>         2253-2254<br/>         2254-2255<br/>         2255-2256<br/>         2256-2257<br/>         2257-2258<br/>         2258-2259<br/>         2259-2260<br/>         2260-2261<br/>         2261-2262<br/>         2262-2263<br/>         2263-2264<br/>         2264-2265<br/>         2265-2266<br/>         2266-2267<br/>         2267-2268<br/>         2268-2269<br/>         2269-2270<br/>         2270-2271<br/>         2271-2272<br/>         2272-2273<br/>         2273-2274<br/>         2274-2275<br/>         2275-2276<br/>         2276-2277<br/>         2277-2278<br/>         2278-2279<br/>         2279-2280<br/>         2280-2281<br/>         2281-2282<br/>         2282-2283<br/>         2283-2284<br/>         2284-22</p> |
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**INSEWER SURVEYS**  
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EMAIL: [ma@insewer.co.uk](mailto:ma@insewer.co.uk)



ERSIMMON

Toddington Lane  
Littlehampton  
West Sussex

Drainage Survey

|                                                                                       |                                                                                       |                                                                                       |                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scale:<br>1:250                                                                       | Sheet Size:<br>A0                                                                     | Sheet Number:<br>3                                                                    | Date:<br>February 2015                                                                                                                                                                                                                                            |
| Project Number:<br>20644                                                              | Rev.:<br>-                                                                            | Surveyed By:<br>CP                                                                    | Approved By:<br>NS                                                                                                                                                                                                                                                |
|  |  |  |    |

TODDINGTON LANE, LITTLEHAMPTON, WEST SUSSEX  
DRAINAGE SURVEY  
Date: 18th February 2014  
Job No: 20644  
Drainage  
All drainage was lifted with pipe sizes and invert levels recorded. Whenever possible the chamber data has been recorded and put based on the drawing. All cut sections from gullies, external sewerage pipes and external soil stacks have been proven wherever possible into manholes and sewer runs. Drains / sewers between manholes are assumed to be straight. All sub-surface drainage positions should be cross checked in critical areas by R2 or R3P survey or hand dug trial holes.



**Notes:**

1. DRAINAGE INFORMATION ADDED TO TOPOGRAPHICAL SURVEY PROVIDED BY MAYER BROWN LTD. JOB NO. AP/LITTLE 2008 DATE AUGUST 2014. NO SITE VERIFICATION CARRIED OUT BY MK SURVEYS UNLESS SPECIFIC TO DRAINAGE.
2. DRAINAGE INFORMATION HAS BEEN DETERMINED WITHOUT 11MM ENTRY INTO CHAMBERS AND WHIST EVERY EFFORT HAS BEEN MADE TO CORRECTLY IDENTIFY THIS INFORMATION. IT SHOULD ALWAYS BE CHECKED IN AREAS THAT ARE CRITICAL TO THE FUTURE PROPOSAL.
3. ALL SEWERS ARE PRESUMED TO BE STRAIGHT BETWEEN CHAMBERS, WITH ROUTES CONNECTED ONLY OBTAINED USING ACUSTIC METHODS ONLY. THESE ARE TO BE CONSIDERED ASSUMED AND SHOULD BE INVESTIGATED FURTHER IN CRITICAL AREAS.

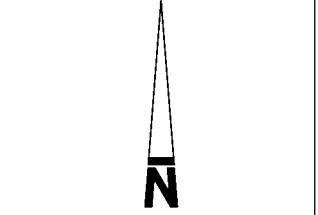
**ABBREVIATIONS**

|     |                          |      |                     |
|-----|--------------------------|------|---------------------|
| ADP | ASSUMED CONNECTION POINT | LH   | LAMP HOLE           |
| ABD | ABOVE GROUND             | MB   | MANHOLE             |
| AR  | ASSUMED ROUTE            | NPV  | NO PIPES VISIBLE    |
| BD  | BACK DROP                | OL   | OUTLET              |
| BK  | BRIKE                    | OU   | OUTFALL             |
| BL  | BASE LEVEL               | PP   | POLYPROPYLENE       |
| CI  | CAST IRON                | POW  | PIPE ON WALL        |
| CL  | CONCRETE                 | PT   | PIPE TO GROUND      |
| CU  | CULVERT                  | PTG  | PIPE TO GROUND      |
| GP  | GULLY                    | RE   | ROOFING EYE         |
| DCH | DOWNHILL WATER SEWER     | RH   | ROOFING EYE         |
| DS  | DRAINAGE CHANNEL         | RMAN | REINFORCED MANHOLE  |
| DU  | DRAINAGE UNIT            | RWP  | RAIN WATER PIPE     |
| FD  | FLY DRAIN                | SOP  | SOFT                |
| FWS | FULL WATER SEWER         | SUP  | SURFACE WATER SEWER |
| GF  | GULLY                    | UNL  | UNABLE TO LIFT      |
| IL  | INVERT LEVEL             | UTS  | UNABLE TO SURVEY    |
| INT | INTERSECTION             | VC   | VERTICAL CURVE      |
| IT  | INLET                    | VL   | VENT                |
| LD  | LEAK OUTLET              | WL   | WATER LEVEL         |

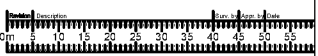
**LEGEND**

**CAUTIONARY NOTES**

1. Pipe sizes are shown from what is inspected or taken from access information. Pipe sizes are recorded in millimetres and depth in metres.
2. Completely between manholes you have proven using acoustics methods. It is advised that a CCTV survey is carried out to confirm connections. Please ring for further details if a CCTV survey is required.



SHEET 12 OF 12



**mksurveys**

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**INSEWER SURVEYS**

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**PERSIMMON**

**Toddington Lane  
Littlehampton  
West Sussex**

**Drainage Survey**

|                       |                |                 |                     |
|-----------------------|----------------|-----------------|---------------------|
| Scale: 1:250          | Sheet Size: A0 | Sheet Number: 3 | Date: February 2015 |
| Project Number: 20644 | Rev: -         | Drawn By: CP    | Approved By: NS     |

1:250

**Appendix G**  
**Greenfield Runoff Calculation**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   |                                                                                     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| Glanville Consultants                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                   | Page 1                                                                              |
| Cornerstone Court<br>62 Foxhall Road<br>Didcot OX11 7AD                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   |  |
| Date 31/03/2015 15:20<br>File                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Designed by jokelly<br>Checked by |                                                                                     |
| Micro Drainage Source Control 2015.1                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                   |                                                                                     |
| <p style="text-align: center;"><u>ICP SUDS Mean Annual Flood</u></p> <p style="text-align: center;">Input</p> <p>Return Period (years)      1                      Soil      0.500<br/> Area (ha) 1.000                      Urban      0.750<br/> SAAR (mm)    739 Region Number Region 7</p> <p style="text-align: center;"><b>Results    l/s</b></p> <p>QBAR Rural    5.9<br/> QBAR Urban 15.0</p> <p>Q1 year 12.7</p> <p>Q1 year 12.7<br/> Q30 years 26.0<br/> Q100 years 30.4</p> |                                   |                                                                                     |
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**Appendix H**  
**Existing Discharge Rates**



- NOTES
1. This drawing is to be read in conjunction with all other relevant documents and specifications.
  2. Dimensions not to be scaled.
  3. All drainage catchments are indicative only and based on the drainage survey drawing completed by mksurveys, job no. 20644.
  4. Simulation modelling using WinDes has been undertaken based on the existing network identified by mksurveys.
  5. Simulation modelling has included surcharged outfalls in accordance with the modelled flood levels provided by the Environment Agency.
  6. Overland runoff from areas where no positive drainage connection was identified has been undertaken.

KEY TO IMPERMEABLE AREAS

|           |                            |
|-----------|----------------------------|
| [Pattern] | Outfall 1                  |
| [Pattern] | Outfall 2                  |
| [Pattern] | Outfall 3                  |
| [Pattern] | Outfall 4                  |
| [Pattern] | Outfall 5                  |
| [Pattern] | Outfall 6                  |
| [Pattern] | Outfall 7                  |
| [Pattern] | Outfall 8                  |
| [Pattern] | Outfall 9                  |
| [Pattern] | Outfall 10                 |
| [Pattern] | Overland runoff            |
| [Pattern] | Soakaway catchment         |
| [Pattern] | Assumed flow direction     |
| [Pattern] | Site Boundary              |
| [Pattern] | Existing ditches and ponds |

Modelled Discharge Rates

| Outfall Reference | Return Period |
|-------------------|---------------|
|                   | 1 Year        |
| 1                 | 66.2          |
| 2                 | 23.7          |
| 3                 | 301.4         |
| 4                 | 70.4          |
| 5                 | 44.5          |
| 6                 | 51.2          |
| 7                 | 67.8          |
| 8                 | 47.9          |
| 9                 | 20.5          |
| 10                | 5.5           |
| Overland Runoff   | 106.27        |
| Total             | 805.37        |

| Rev. | Description | Date | Chkd |
|------|-------------|------|------|
|------|-------------|------|------|

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Tel: (01235) 516650 Fax: (01235) 517799  
gls@glanvillegroup.com www.glanvillegroup.com

Client : Persimmon Homes

Project : North Littlehampton

Title : Existing Surface Water Drainage Rates

|                             |                      |
|-----------------------------|----------------------|
| Project Engineer : S.Hudson | Scale : 1:2000 @ A1  |
| Project Director : K.Rayner | Date : February 2015 |
| Status : PRELIMINARY        |                      |

|                         |     |
|-------------------------|-----|
| Drawing No. 8140927/121 | Rev |
|-------------------------|-----|

**Appendix L**  
**Windes Calculations Existing Rates**

|                                                         |                                   |                                                                                     |
|---------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| Glanville Consultants                                   |                                   | Page 1                                                                              |
| Cornerstone Court<br>62 Foxhall Road<br>Didcot OX11 7AD |                                   |  |
| Date 31/03/2015 10:13<br>File OUTFALL 1.MDX             | Designed by jokelly<br>Checked by |                                                                                     |
| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 10.000        | 0.050       | 200.0          | 0.500          | 4.00           | 0.0                | 0.600     | oo          | 41          |  |
| 1.001 | 20.000        | 0.500       | 40.0           | 0.000          | 0.00           | 0.0                | 0.600     | oo          | 41          |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|--------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 4.15           | 3.050        | 0.500          | 0.0                | 0.0           | 0.0               | 1.11         | 156.0        | 0.0           |
| 1.001 | 0.00            | 4.28           | 3.000        | 0.500          | 0.0                | 0.0           | 0.0               | 2.49         | 351.0        | 0.0           |

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|                                                         |                                   |                                                                                     |
|---------------------------------------------------------|-----------------------------------|-------------------------------------------------------------------------------------|
| Glanville Consultants                                   |                                   | Page 1                                                                              |
| Cornerstone Court<br>62 Foxhall Road<br>Didcot OX11 7AD |                                   |  |
| Date 31/03/2015 10:15<br>File OUTFALL 2.MDX             | Designed by jokelly<br>Checked by |                                                                                     |
| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 85.000        | 0.570       | 149.1          | 0.800          | 4.00           | 0.0                | 0.600     | o           | 150         |  |
| 1.001 | 20.000        | 0.780       | 25.6           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 150         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 5.73           | 3.050        | 0.800          | 0.0                  | 0.0           | 0.0               | 0.82         | 14.5         | 0.0           |
| 1.001 | 0.00            | 5.89           | 2.480        | 0.800          | 0.0                  | 0.0           | 0.0               | 2.00         | 35.3         | 0.0           |

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|                                                         |  |                                                                                     |
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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) | 0.750  |             |       |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                |    |
|------------------------------------|-------|----------------|----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status     | ON |
| Analysis Timestep                  | Fine  | Inertia Status | ON |
| DTS Status                         | OFF   |                |    |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| US/MH | Return      | Climate | First (X) | First (Y)   | First (Z)   | Overflow | Water |
|-------|-------------|---------|-----------|-------------|-------------|----------|-------|
| PN    | Name        | Storm   | Period    | Change      | Surcharge   | Flood    | Level |
| 1.000 | 1 30 Winter | 1       | +0%       | 1/15 Summer | 2/30 Winter |          | 4.211 |
| 1.001 | 2 30 Winter | 1       | +0%       |             |             |          | 2.574 |

| Surcharged Flooded |       |        |                 | Pipe       |        | Level      |
|--------------------|-------|--------|-----------------|------------|--------|------------|
| US/MH              | Depth | Volume | Flow / Overflow | Flow       | Status | Exceeded   |
| PN                 | Name  | (m)    | (m³)            | Cap. (l/s) | (l/s)  |            |
| 1.000              | 1     | 1.011  | 0.000           | 1.66       | 23.7   | FLOOD RISE |
| 1.001              | 2     | -0.056 | 0.000           | 0.71       | 23.7   | OK         |

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|                                                         |                                   |                                                                                     |
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| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 40.000        | 0.660       | 60.6           | 2.500          | 4.00           | 0.0                | 0.600     | oo          | 41          |  |
| 2.000 | 40.000        | 0.610       | 65.6           | 3.300          | 4.00           | 0.0                | 0.600     | oo          | 41          |  |
| 1.001 | 20.000        | 0.760       | 26.3           | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | Σ Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 4.33           | 3.800        | 2.500          | 0.0                  | 0.0           | 0.0               | 2.02         | 284.8        | 0.0           |
| 2.000 | 0.00            | 4.34           | 2.610        | 3.300          | 0.0                  | 0.0           | 0.0               | 1.94         | 273.7        | 0.0           |
| 1.001 | 0.00            | 4.45           | 2.000        | 5.800          | 0.0                  | 0.0           | 0.0               | 3.68         | 217.5        | 0.0           |

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|                                                         |  |                                                                                     |
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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) |        |             | 0.750 |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                     |     |
|------------------------------------|-------|---------------------|-----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status          | ON  |
| Analysis Timestep                  |       | Fine Inertia Status | ON  |
| DTS Status                         |       |                     | OFF |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| PN    | US/MH Name | Storm  | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|-------|------------|--------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|
| 1.000 | 1 15       | Winter | 1             | +0%            | 1/15 Summer     | 30/15 Winter    |                    |               | 4.151           |
| 2.000 | 2 15       | Winter | 1             | +0%            | 1/15 Summer     | 2/15 Winter     |                    |               | 3.531           |
| 1.001 | 3 15       | Winter | 1             | +0%            | 1/15 Summer     | 99/15 Winter    |                    |               | 3.454           |

| PN    | US/MH Name | Depth (m) | Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status     | Level Exceeded |
|-------|------------|-----------|-------------|-------------|----------------|-----------------|------------|----------------|
| 1.000 | 1          | 0.051     | 0.000       | 1.04        |                | 275.5           | SURCHARGED | 15             |
| 2.000 | 2          | 0.621     | 0.000       | 0.87        |                | 220.8           | FLOOD RISK | 46             |
| 1.001 | 3          | 1.154     | 0.000       | 1.59        |                | 301.4           | SURCHARGED | 16             |

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| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 36.000        | 0.210       | 171.4          | 1.230          | 4.00           | 0.0                | 0.600     | o           | 225         |  |
| 1.001 | 23.000        | 0.040       | 575.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 4.60           | 0.850        | 1.230          | 0.0                  | 0.0           | 0.0               | 1.00         | 39.6         | 0.0           |
| 1.001 | 0.00            | 5.19           | 0.640        | 1.230          | 0.0                  | 0.0           | 0.0               | 0.65         | 45.8         | 0.0           |

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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) | 0.750  |             |       |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                |    |
|------------------------------------|-------|----------------|----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status     | ON |
| Analysis Timestep                  | Fine  | Inertia Status | ON |
| DTS Status                         | OFF   |                |    |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| PN    | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|-------|------------|-----------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|
| 1.000 | 1          | 15 Winter | 1             | +0%            | 1/15 Summer     | 30/15 Summer    |                    |               | 1.763           |
| 1.001 | 2          | 15 Winter | 1             | +0%            | 1/15 Summer     |                 |                    |               | 1.696           |

| PN    | US/MH Name | Depth (m) | Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status     | Level Exceeded |
|-------|------------|-----------|-------------|-------------|----------------|-----------------|------------|----------------|
| 1.000 | 1          | 0.688     | 0.000       | 1.89        |                | 70.6            | SURCHARGED | 32             |
| 1.001 | 2          | 0.006     | 0.000       | 1.94        |                | 70.4            | SURCHARGED |                |

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| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 160.000       | 0.640       | 250.0          | 1.700          | 4.00           | 0.0                | 0.600     | o           | 225         |  |
| 1.001 | 12.000        | 0.100       | 120.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 7.24           | 3.240        | 1.700          | 0.0                  | 0.0           | 0.0               | 0.82         | 32.7         | 0.0           |
| 1.001 | 0.00            | 7.41           | 2.600        | 1.700          | 0.0                  | 0.0           | 0.0               | 1.19         | 47.4         | 0.0           |

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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) |        |             | 0.750 |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                     |     |
|------------------------------------|-------|---------------------|-----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status          | ON  |
| Analysis Timestep                  |       | Fine Inertia Status | ON  |
| DTS Status                         |       |                     | OFF |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| US/MH | Return      | Climate | First (X) | First (Y)   | First (Z)   | Overflow | Water |
|-------|-------------|---------|-----------|-------------|-------------|----------|-------|
| PN    | Name        | Storm   | Period    | Change      | Surcharge   | Flood    | Level |
|       |             |         |           |             |             | Overflow | Act.  |
|       |             |         |           |             |             |          | (m)   |
| 1.000 | 1 60 Winter | 1       | +0%       | 1/15 Summer | 2/15 Winter |          | 4.071 |
| 1.001 | 2 60 Winter | 1       | +0%       | 1/30 Summer |             |          | 2.334 |

| Surcharged Flooded |       |        |                 | Pipe |       | Level      |
|--------------------|-------|--------|-----------------|------|-------|------------|
| US/MH              | Depth | Volume | Flow / Overflow | Flow |       |            |
| PN                 | Name  | (m)    | (m³)            | Cap. | (l/s) | (l/s)      |
|                    |       |        |                 |      |       | Status     |
|                    |       |        |                 |      |       | Exceeded   |
| 1.000              | 1     | 0.606  | 0.000           | 1.38 | 44.6  | FLOOD RISE |
| 1.001              | 2     | 0.009  | 0.000           | 1.10 | 44.5  | SURCHARGED |

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| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 162.000       | 0.820       | 197.6          | 2.220          | 4.00           | 0.0                | 0.600     | o           | 225         |  |
| 1.001 | 12.000        | 0.100       | 120.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 6.91           | 3.270        | 2.220          | 0.0                  | 0.0           | 0.0               | 0.93         | 36.8         | 0.0           |
| 1.001 | 0.00            | 7.08           | 2.450        | 2.220          | 0.0                  | 0.0           | 0.0               | 1.19         | 47.4         | 0.0           |

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|                                                         |  |                                                                                     |
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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) |        |             | 0.750 |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                     |     |
|------------------------------------|-------|---------------------|-----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status          | ON  |
| Analysis Timestep                  |       | Fine Inertia Status | ON  |
| DTS Status                         |       |                     | OFF |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| US/MH | Return      | Climate | First (X) | First (Y)   | First (Z)   | Overflow | Water |
|-------|-------------|---------|-----------|-------------|-------------|----------|-------|
| PN    | Name        | Storm   | Period    | Change      | Surcharge   | Flood    | Level |
| 1.000 | 1 60 Winter | 1       | +0%       | 1/15 Summer | 2/15 Winter |          | 4.368 |
| 1.001 | 2 60 Winter | 1       | +0%       | 1/15 Summer |             |          | 2.724 |

| Surcharged Flooded |       |        |                 | Pipe |       | Level           |
|--------------------|-------|--------|-----------------|------|-------|-----------------|
| US/MH              | Depth | Volume | Flow / Overflow | Flow |       |                 |
| PN                 | Name  | (m)    | (m³)            | Cap. | (l/s) | (l/s)           |
| 1.000              | 1     | 0.873  | 0.000           | 1.41 |       | 51.3 FLOOD RISE |
| 1.001              | 2     | 0.049  | 0.000           | 1.26 |       | 51.2 SUPCHARGED |

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|                                                         |                                   |                                                                                     |
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| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 55.500        | 0.060       | 925.0          | 3.720          | 4.00           | 0.0                | 0.600     | o           | 225         |  |
| 1.001 | 12.000        | 0.100       | 120.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 6.19           | 2.230        | 3.720          | 0.0                  | 0.0           | 0.0               | 0.42         | 16.8         | 0.0           |
| 1.001 | 0.00            | 6.36           | 2.170        | 3.720          | 0.0                  | 0.0           | 0.0               | 1.19         | 47.4         | 0.0           |

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|                                                         |  |                                                                                     |
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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) | 0.750  |             |       |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                |    |
|------------------------------------|-------|----------------|----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status     | ON |
| Analysis Timestep                  | Fine  | Inertia Status | ON |
| DTS Status                         | OFF   |                |    |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| US/MH | Return      | Climate | First (X) | First (Y)   | First (Z)   | Overflow | Water |
|-------|-------------|---------|-----------|-------------|-------------|----------|-------|
| PN    | Name        | Storm   | Period    | Change      | Surcharge   | Flood    | Level |
| 1.000 | 1 60 Winter | 1       | +0%       | 1/15 Summer | 1/30 Winter |          | 3.619 |
| 1.001 | 2 60 Winter | 1       | +0%       | 1/15 Summer |             |          | 2.563 |

| Surcharged Flooded |       |        |                 | Pipe |       | Level      |
|--------------------|-------|--------|-----------------|------|-------|------------|
| US/MH              | Depth | Volume | Flow / Overflow | Flow |       |            |
| PN                 | Name  | (m)    | (m³)            | Cap. | (l/s) | (l/s)      |
| 1.000              | 1     | 1.164  | 39.094          | 4.19 | 67.8  | FLOOD      |
| 1.001              | 2     | 0.168  | 0.000           | 1.67 | 67.8  | SURCHARGED |

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| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 80.000        | 0.600       | 133.3          | 1.800          | 4.00           | 0.0                | 0.600     | o           | 225         |  |
| 1.001 | 12.000        | 0.100       | 120.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 5.18           | 3.300        | 1.800          | 0.0                  | 0.0           | 0.0               | 1.13         | 45.0         | 0.0           |
| 1.001 | 0.00            | 5.35           | 2.700        | 1.800          | 0.0                  | 0.0           | 0.0               | 1.19         | 47.4         | 0.0           |

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|                                                         |  |                                                                                     |
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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) | 0.750  |             |       |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                |    |
|------------------------------------|-------|----------------|----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status     | ON |
| Analysis Timestep                  | Fine  | Inertia Status | ON |
| DTS Status                         | OFF   |                |    |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| US/MH | Return      | Climate | First (X) | First (Y)   | First (Z)   | Overflow | Water |
|-------|-------------|---------|-----------|-------------|-------------|----------|-------|
| PN    | Name        | Storm   | Period    | Change      | Surcharge   | Flood    | Level |
| 1.000 | 1 60 Winter | 1       | +0%       | 1/15 Summer | 2/15 Winter |          | 3.861 |
| 1.001 | 2 60 Winter | 1       | +0%       | 1/15 Summer |             |          | 3.146 |

| Surcharged Flooded |       |        |                 | Pipe |       | Level      |
|--------------------|-------|--------|-----------------|------|-------|------------|
| US/MH              | Depth | Volume | Flow / Overflow | Flow |       |            |
| PN                 | Name  | (m)    | (m³)            | Cap. | (l/s) | (l/s)      |
| 1.000              | 1     | 0.336  | 0.000           | 1.09 | 47.9  | FLOOD RISE |
| 1.001              | 2     | 0.215  | 0.000           | 1.18 | 47.9  | SUPCHARGED |

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|                                                         |                                   |                                                                                     |
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| Micro Drainage Network 2015.1                           |                                   |                                                                                     |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 50.000        | 0.200       | 250.0          | 1.380          | 4.00           | 0.0                | 0.600     | o           | 300         |  |
| 1.001 | 10.000        | 0.100       | 100.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 300         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 4.84           | 3.600        | 1.380          | 0.0                  | 0.0           | 0.0               | 0.99         | 70.0         | 0.0           |
| 1.001 | 0.00            | 4.95           | 3.400        | 1.380          | 0.0                  | 0.0           | 0.0               | 1.57         | 111.1        | 0.0           |

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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) |        |             | 0.750 |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                     |    |
|------------------------------------|-------|---------------------|----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status          | ON |
| Analysis Timestep                  |       | Fine Inertia Status | ON |
| DTS Status                         |       | OFF                 |    |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| PN    | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|-------|------------|-----------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|
| 1.000 | 1          | 30 Winter | 1             | +0%            | 1/15 Summer     | 2/30 Winter     |                    |               | 4.134           |
| 1.001 | 2          | 15 Winter | 1             | +0%            | 1/15 Summer     | 100/15 Winter   |                    |               | 3.927           |

| PN    | US/MH Name | Surcharged Flooded |             |                   | Pipe       |            | Status | Level Exceeded |
|-------|------------|--------------------|-------------|-------------------|------------|------------|--------|----------------|
|       |            | Depth (m)          | Volume (m³) | Flow / Cap. (l/s) | Flow (l/s) |            |        |                |
| 1.000 | 1          | 0.234              | 0.000       | 1.05              | 69.0       | FLOOD RISK | 43     |                |
| 1.001 | 2          | 0.227              | 0.000       | 0.74              | 58.7       | FLOOD RISK |        |                |

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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 43.000        | 0.540       | 79.6           | 0.350          | 4.00           | 0.0                | 0.600     | o           | 225         |  |
| 1.001 | 10.000        | 0.100       | 100.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | E Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 4.49           | 1.550        | 0.350          | 0.0                  | 0.0           | 0.0               | 1.47         | 58.3         | 0.0           |
| 1.001 | 0.00            | 4.62           | 1.010        | 0.350          | 0.0                  | 0.0           | 0.0               | 1.31         | 52.0         | 0.0           |

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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales Cv (Summer) | 0.750  |             |       |
| M5-60 (mm)                           | 19.300 | Cv (Winter) | 0.840 |

|                                    |       |                |    |
|------------------------------------|-------|----------------|----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status     | ON |
| Analysis Timestep                  | Fine  | Inertia Status | ON |
| DTS Status                         | OFF   |                |    |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| PN    | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|-------|------------|-----------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|
| 1.000 | 1          | 30 Winter | 1             | +0%            | 1/15 Summer     | 30/15 Summer    |                    |               | 2.126           |
| 1.001 | 2          | 30 Winter | 1             | +0%            | 1/15 Summer     |                 |                    |               | 2.052           |

| Surcharged Flooded |            |           |             | Pipe        |            | Level      |
|--------------------|------------|-----------|-------------|-------------|------------|------------|
| PN                 | US/MH Name | Depth (m) | Volume (m³) | Flow / Cap. | Flow (l/s) | Exceeded   |
| 1.000              | 1          | 0.351     | 0.000       | 0.37        | 20.3       | FLOOD RISK |
| 1.001              | 2          | 0.817     | 0.000       | 0.47        | 20.3       | FLOOD RISK |

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|                                                         |  |                                                                                     |
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| Micro Drainage                                          |  | Network 2015.1                                                                      |

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      | Add Flow / Climate Change (%)         | 0     |
| M5-60 (mm)                           | 19.300 | Minimum Backdrop Height (m)           | 0.200 |
| Ratio R                              | 0.350  | Maximum Backdrop Height (m)           | 1.500 |
| Maximum Rainfall (mm/hr)             | 0      | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30     | Min Vel for Auto Design only (m/s)    | 1.00  |
| Foul Sewage (l/s/ha)                 | 0.000  | Min Slope for Optimisation (1:X)      | 500   |
| Volumetric Runoff Coeff.             | 0.750  |                                       |       |

Designed with Level Soffits

Network Design Table for Storm

| PN    | Length<br>(m) | Fall<br>(m) | Slope<br>(1:X) | I.Area<br>(ha) | T.E.<br>(mins) | Base<br>Flow (l/s) | k<br>(mm) | HYD<br>SECT | DIA<br>(mm) | Auto<br>Design                                                                        |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---------------------------------------------------------------------------------------|
| 1.000 | 24.000        | 0.610       | 39.3           | 0.065          | 4.00           | 0.0                | 0.600     | o           | 100         |  |
| 1.001 | 10.000        | 0.100       | 100.0          | 0.000          | 0.00           | 0.0                | 0.600     | o           | 225         |  |

Network Results Table

| PN    | Rain<br>(mm/hr) | T.C.<br>(mins) | US/IL<br>(m) | I.Area<br>(ha) | Base<br>Flow (l/s) | Foul<br>(l/s) | Add Flow<br>(l/s) | Vel<br>(m/s) | Cap<br>(l/s) | Flow<br>(l/s) |
|-------|-----------------|----------------|--------------|----------------|--------------------|---------------|-------------------|--------------|--------------|---------------|
| 1.000 | 0.00            | 4.32           | 2.080        | 0.065          | 0.0                | 0.0           | 0.0               | 1.23         | 9.7          | 0.0           |
| 1.001 | 0.00            | 4.45           | 1.345        | 0.065          | 0.0                | 0.0           | 0.0               | 1.31         | 52.0         | 0.0           |

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|                                                         |  |                                                                                     |
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| Designed by jokelly<br>Checked by                       |  |                                                                                     |
| Micro Drainage                                          |  | Network 2015.1                                                                      |

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 * 10m³/ha Storage       | 5.000 |
| 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 | 0 |
| Number of Online Controls   | 0 | 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     | 0.350 |
| Region England and Wales | Cv (Summer) |             | 0.750 |
| M5-60 (mm)               | 19.300      | Cv (Winter) | 0.840 |

|                                    |       |                     |    |
|------------------------------------|-------|---------------------|----|
| Margin for Flood Risk Warning (mm) | 300.0 | DVD Status          | ON |
| Analysis Timestep                  |       | Fine Inertia Status | ON |
| DTS Status                         |       | OFF                 |    |

|                          |                                                          |
|--------------------------|----------------------------------------------------------|
| Profile(s)               | Summer and Winter                                        |
| Duration(s) (mins)       | 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440 |
| Return Period(s) (years) | 1, 2, 30, 99, 100                                        |
| Climate Change (%)       | 0, 0, 0, 0, 30                                           |

| PN    | US/MH Name | Storm     | Return Period | Climate Change | First (X) Surge | First (Y) Flood | First (Z) Overflow | Overflow Act. | Water Level (m) |
|-------|------------|-----------|---------------|----------------|-----------------|-----------------|--------------------|---------------|-----------------|
| 1.000 | 1          | 15 Winter | 1             | +0%            | 1/15 Summer     | 30/15 Summer    |                    |               | 2.204           |
| 1.001 | 2          | 15 Summer | 1             | +0%            | 1/15 Summer     |                 |                    |               | 2.016           |

| Surcharged Flooded |            |           |             |             | Pipe           |                 | Level      |
|--------------------|------------|-----------|-------------|-------------|----------------|-----------------|------------|
| PN                 | US/MH Name | Depth (m) | Volume (m³) | Flow / Cap. | Overflow (l/s) | Pipe Flow (l/s) | Status     |
| 1.000              | 1          | 0.024     | 0.000       | 0.56        |                | 5.3             | FLOOD RISK |
| 1.001              | 2          | 0.446     | 0.000       | 0.12        |                | 5.2             | FLOOD RISK |

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## **APPENDIX I: Drainage Strategy, West of Wetlands**