

Our ref: 7503FRA_Add

Flood Risk Assessment
Addendum Report for
Edgehill Phase 3
at
High Road, Whitehaven

For : Story Homes
Story House
Lords Way
Kingmoor Business Park
Carlisle
Cumbria
CA6 4SL

30 November 2020

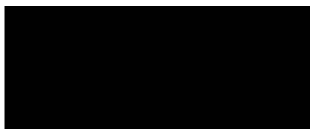
Flood Risk Assessment Addendum Report for Edgehill Phase 3
High Road, Whitehaven, Cumbria

Document Verification

Project Title	Edgehill Phase 3, High Road, Whitehaven
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Prepared by

Checked and Approved



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P R Sykes

BSc (Hons), MSc (Eng), CGeol, FGS



Document Revision

Report Reference	Date	Description	Prepared	Checked and Approved
7503RFAAdd	30/10/20	Flood Risk Assessment	A Jones	P R Sykes

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Flood Risk Assessment Addendum Report for Edgehill Phase 3 High Road, Whitehaven, Cumbria

1.0 Introduction

Coopers Consulting Engineers (Coopers) have been appointed by Story Homes to provide a Flood Risk Assessment Addendum for a site off High Road in Whitehaven, Cumbria. Story Homes are proposing a new housing development, comprising of approximately 335 plots.

Story Homes are planning the construction of a mixture of semi-detached, detached, residential properties with associated access road, parking, vehicular access and landscaping subject to conditions.

Edgehill Park is a phased development, Phase 1 is complete, Phase 2 is currently under construction and this FRA Addendum is to support the 335-plot Phase 3 planning submission.

This FRA Addendum should be read in conjunction with FRA report ref RH/2546 produced by Integra Consulting Engineers Limited dated May 2013 and has been produced to address any amendments required as a result of revisiting the masterplan and updated legislation.

2.0 Proposed Development

Story Homes are proposing to develop land off High Road, Whitehaven, Cumbria. The latest development (phase 3) proposals consist of 335 dwellings with associated drives, shared drives, highways and POS. The original FRA undertaken by Integra considered the entire development masterplan consisting of all phases of the wider area masterplan.

The FRA for the wider area identified the entire site as being low risk of flooding but confirmed that downstream of the site there are capacity issues with Pow Beck during periods of significant rainfall. It was agreed that proposals for post development discharge of surface water is to provide betterment to the existing drainage situation in order to reduce downstream flood risk.

The drainage proposals follow the same principle with all surface water flows discharging into a dry basin constructed as part of Phase 2. The Phase 2 sewers have been designed to accommodate flows from Phase 3. Flows are then passed forward to the watercourse at a controlled flow rate of 6.6 litres per second per hectare (6.6 l/s/ha) which will provide a 20% reduction on the greenfield QBAR run-off rate.

The SUDS basin providing storage for Phase 2 & 3 is referred to as the Eco Value SUDS Area Three on the original FRA Masterplan drawing.

Coopers have undertaken a detailed surface water design based on measured impermeable areas. Refer to Appendix 2 for the proposed drainage layout and Appendix 3 for MicroDrainage calculations.

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3.0 Updates to Integra FRA

The following sections of the report are to be updated as follows:

- 3.3 Integra FRA previously stated the design should have an allowance of 20% to allow for climate change. In line with current advice we have now increased this to 40%.

Please note: the storage volumes noted in the Integra FRA volumes are estimates only based on an assumed 50% impermeable area

4.0 Design Criteria

The total site flow restriction is 163 l/s

Eco value SUDS Area 1	= 19.0 l/s	Phase 1
Eco value SUDS Area 2	= 30.5 l/s	Phase 1
Eco value SUDS Area 3	= 113.5l/s	Phases 2 & 3

The SUDS pond serving Phases 2 and 3 is currently restricted to 25 l/s. This will be retrofitted with a new vortex flow control to provide a higher allowable flow rate of 113.5l/s.

Surface water has been designed for a 100-year return period plus a 40% allowance for climate change.

The SUDS pond constructed as part of Phase 2 is designed with a 600mm permanent pool of water with attenuation above. The total attenuation storage volume required in the pond is 6,600cu.m. with increased water depths of 574mm for the 30-year storm event and 1024mm for the 100-year storm event including a 40% climate change allowance.

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5.0 Conclusions and Recommendations

The site is located in Flood Zone 1 and has been shown to be at low risk of flooding. Therefore, mitigation measures are not considered necessary for any future development at the site.

This addendum has shown the phase 3 drainage scheme is still in accordance with the original Integra FRA and now comprises a detailed design using measured impermeable areas.

The water depths within the basin are considered acceptable for the 100-year storm event.

Flood Risk Assessment Addendum Report for Edgehill Phase 3,
High Road, Whitehaven, Cumbria

Appendix 1

Original Flood Risk Assessment

RH/2546

Integra Consulting Engineers Ltd

FLOOD RISK ASSESSMENT

SITE AT RHODIA

HIGH ROAD

WHITEHAVEN

ON BEHALF OF

STORY HOMES

Integra Consulting Engineers Limited
2nd Floor
Fountain House
83 Fountain Street
Manchester
M2 2EE

RH / 2546

May 2013

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1. INTRODUCTION

Integra Consulting has been commissioned by Story Homes to undertake a Flood Risk and Surface Water Drainage Assessment (FRA) for the site at Rhodia, Whitehaven. This document has been prepared to accompany the outline planning application for the proposed residential use development of the application site.

The objective of the FRA was to identify potential flooding issues and any consequent implications on the proposed site development. Both existing and proposed surface water drainage for the development site are also considered in detail. The assessment has been undertaken in accordance with the pro-forma guidance contained in Department for Communities and Local Government document 'Technical Guidance to the National Planning Policy Framework' dated March 2012, the Copeland Strategic Flood Risk Assessment produced by Jacobs dated August 2007 and DEFRA / Environment Agency publication SR744 Preliminary Rainfall Runoff Management for Developments revision E dated January 2012.

Consultations have been undertaken with the Environment Agency (EA), United Utilities and Copeland Borough Council.

2.0 STANDARDS AND LIMITATIONS

This report has been prepared solely for use by Story Homes. It shall not be relied upon, or transferred to, any other party without prior written authorisation of Integra Consulting.

The findings and opinions in the report are based on information derived from a variety of different sources. Integra Consulting do not accept any liability for the accuracy or otherwise of any information provided by third parties.

It should be noted that some of the aspects considered in this study may be subject to change with time. Therefore, if the development is delayed or postponed, consideration may need to be given to reviewing such issues to confirm that no changes have taken place, either at the site or within relevant legislation.

To date we have consulted with the Environment Agency (EA), Copeland Borough Council and United Utilities (UU). Further consultations are likely as the scheme progresses. It should be noted that even where responses have been received from Regulators these could be subject to change at a later date.

3.0 CURRENT SITUATION

3.1 Site Location and Description

The site is located adjacent to the former Rhodia chemical works off High Road, Whitehaven, Cumbria at National Grid reference E297200, N515600.

A site location plan is shown in Appendix 1.

The approx. 27.7 hectare site is situated in an industrial setting adjacent to a residential area and is approximately rectangular in shape. The majority of the site area is greenfield consisting of existing farm land with the exception of a 1.7 hectare area of hardstanding (former industrial service depot) located adjacent to the western site boundary along High Road.

There is a single on site watercourse, which lies directly along the eastern boundary to the site. In addition to this what is believed to be a manmade ravine cuts across the southern section of the site effectively dividing the site into two. This steep sided ravine extends to a maximum depth of 10m below adjacent existing site levels.

The existing greenfield section of the site is undrained, although the natural lie of the land slopes directly towards the watercourses to the east and the south.

The site generally slopes gently from north to south with a few steeper gradients in isolated areas, particularly adjacent to the watercourse / ravine. The north end of the site lies at circa 95m above Ordnance Datum whereas, at its southern tip, lowest site levels are circa 54m above Ordnance Datum creating an average 1 in 25 cross fall over the site extent.

It is noted that a sub-surface high pressure gas main and a water main cross the site adjacent to the western boundary (refer to topographical survey in Appendix 5).

3.2 Hydrology and Flooding

The EA have confirmed that the site lies within Flood Zone 1 as defined in Table 1 of the Department for Communities and Local Government document 'Technical Guidance to the National Planning Policy Framework' dated March 2012. Accordingly, it is not appropriate to undertake numerical flood analyses for the site.

The EA have confirmed that, downstream of the site, there are capacity issues with Pow Beck during periods of significant rainfall. Accordingly, it has been agreed that proposals for post development discharge of surface water is to provide betterment to the existing drainage situation in order to reduce downstream flood risk.

3.3 Climate Change

The detailed design of the on site surface water drainage system will be in accordance with United Utilities requirements for no surface flooding to occur during a site critical 1 in 30 year storm event.

Any necessary on site attenuation to limit the rate of surface water discharge to watercourse will be designed using 1 in 100 year rainfall intensities that have been increased by 20% to allow for the effects of climate change.

The estimated maximum volume of attenuation storage required to control post development surface water discharge to green field run off parameters is 7000m³ based on an enhanced 1 in 100 year event (i.e. with 20% climate

change). All on site attenuation will be provided within storage ponds (with a suitable level of freeboard) at the post development site.

3.4 Existing Site Drainage

3.4.1 Surface Water

The existing greenfield site does not contain any known on site sewers, although the slope of the site naturally directs rainwater runoff towards the on-site watercourse & ravine. Along steeper sections of the site (1:10 gradient and steeper), evidence of scouring of the vegetation was noted during our site visits, highlighting surface drainage routes during rainfall periods. In addition to this, various small pipe inlets were noted within the sides of the ravine suggesting land drains discharging into the ravine.

The existing hardstanding area noted in section 3.1 is drained through a series of gullies connected into below ground drainage runs which subsequently discharge into the existing highway drain located beneath High Road. It is understood that this highway drain subsequently discharges directly into the ravine at the western end of the site via one of three existing outfalls.

From a review of the United Utilities sewer record drawings, there are no adopted surface, foul or combined sewers located within the immediate vicinity of the site. However, a combined sewer is located in Low Road circa 300m to the east of the site, and a surface water sewer is located in Skiddaw Road circa 400m to the east of the southern boundary of the site. Both sewers are remote from the site with third party land between the site boundary and the sewers (refer to indicative drainage layout in Appendix 3).

The on site watercourse & ravine naturally drain into the Mirehouse West catchment, ultimately converging and being culverted from the site

boundary to the Mirehouse ponds located circa 300m to the south east of the site. Subsequently the Mirehouse ponds discharge into the southern arm of Pow Beck.

3.4.2 Foul Water

From a review of United Utilities sewer record drawings, a combined sewer is located in Low Road circa 300m to the east of the site and a foul water sewer located in Skiddaw Road circa 400m to the east of the southern end of the site. Both sewers are remote from the site with third party land between the site boundary and the sewers (refer to indicative drainage layout in Appendix 3).

4.0 PROPOSED DEVELOPMENT

4.1 Development Proposals

It is proposed that the site is developed as a residential housing estate with a total of circa 510 to 550 properties (refer to the proposed site masterplan in Appendix 6).

4.2 Drainage Proposals

4.2.1 Surface Water

The issue of surface water drainage to the proposed development has been considered with reference to the hierarchy of surface water disposal as noted in the Building Regulations H3:

- i) Sustainable urban drainage systems (SUDS)
- ii) Discharge of surface water off site direct to watercourse
- iii) Discharge to adopted sewer

Using the above hierarchy, the potential for using soakaways at the site was considered in relation to the nature of the existing soils. From a study of the 1:10,000 BGS geological map of the area (ref: NX 91 NE), it is evident that the entire site is underlain by drift deposits of Quaternary boulder clay of a glacial origin. Intrusive site investigations were subsequently carried out which confirmed that the underlying strata is of a predominantly cohesive nature at shallow levels. Combined with this, the presence of underlying relatively impermeable siltstones below the majority of the site precludes soakaways as a viable and effective option for surface water discharge from the development site.

SUDS are made up of one or more structures built to manage surface water runoff. They are used in conjunction with good management of the site to prevent flooding and pollution. There are four general methods of control:

- Filter strips and swales
- Filter drains and permeable surfaces
- Infiltration devices
- Basins and ponds

Landscape features such as filter strips and swales are generally suited to relatively flat sites which allow long and narrow shallow gradient buffer strips to slow the rate of surface water runoff and thus provide water quality improvement. As noted in section 3.1, the site falls significantly from north to south. In the post development situation, following cut / fill earthworks operations, it is anticipated that site levels will fall at a gradient of approximately 1:25 over the entire site and based on this significant gradient, filter strips and swales are not considered to be either practical or suitable for use at the development site.

Filter drains and permeable surfacing are more suited to use in large car parks, and would not therefore be appropriate for drainage of the proposed adopted roads to the development site. Furthermore, filter drains and permeable surfaces work most effectively with permeable subsoil. The relatively impermeable nature of the underlying ground thus reduces the effectiveness of such techniques.

Infiltration devices drain water directly into the ground and therefore require permeable subsoil in order to operate efficiently. As noted above, the presence of impermeable boulder clays / siltstones at the site render the existing ground conditions unsuitable to accommodate infiltration basins and devices.

On the basis of the above, the use of balancing ponds is deemed to be the most suitable SUDS method of surface water treatment and discharge from the post development site.

It is proposed that treatment of surface water is carried out at each balancing pond with the use of vegetated channels, open water pools and floating reed beds. These measures will allow stilling of the rain water thus permitting sedimentation, pollution attenuation and subsequently filtering of hydrocarbons within the reed beds to ensure that water quality treatment is achieved prior to discharge to watercourse / ravine. The balancing ponds will ensure an ecological betterment, creating habitats and promoting biodiversity, whilst the use of embankments and flow controls will restrict the rate of surface water discharge into the watercourse / ravine. Furthermore, this will provide downstream benefits particularly at the Mirehouse ponds where flash flooding is currently an issue. The use of attenuated flows will provide control of site generated flood water thus reducing flash flooding whilst the ecological betterment created on site will also be translated in the flows subsequently entering these ponds.

Due to the significant site area and the existing / proposed relatively steep gradients, the use of more than one pond is considered to be the most appropriate solution in order to split the site into sub catchments thus avoiding a single significant sized pond. It is therefore proposed to utilise a total of 3 No ponds across the site which is deemed to be the optimum solution in relation to existing site gradients and watercourse locations. Refer to Appendix 3 for locations of the proposed ponds.

Considering that there is an on-site watercourse and ravine, it is proposed that surface water is subsequently discharged directly to these at a reduced, controlled flow rate and improved quality.

Following advice from the Environment Agency in relation to downstream capacity issues, it is therefore proposed to restrict the surface water

discharge rate from the post development site in order to provide betterment to the existing situation.

Surface water flows from the entire post development site will be restricted to 80% of the existing 1 in 2 year greenfield runoff rate for the site. Refer to Appendix 4 for details of greenfield runoff / surface water discharge calculations for the site.

Based upon a total site area of approximately 27.7 hectares and an anticipated total public open space of circa 3 hectares, the resultant 1 in 2 year greenfield runoff rate for the site is 203.8 litres per second (8.25 litres per second per hectare). Thus the post development surface water discharge rate will be limited to 163.04 litres per second i.e. $80\% \times 203.8$ litres per second through the use of appropriate flow controls. However, the actual figure may increase / decrease slightly depending upon the final mix of development and POS.

Flow controls will be utilised in order to ensure site generated surface water is restricted to 163.04 litres per second during all storm rainfall events. Thus during a 1 in 30 year storm, the proposed 163.04 l/s flow will be equivalent to 47% of the existing 1 in 30 year greenfield runoff rate (which is 346.54 l/s), whilst during a 1 in 100 year event the proposed 163.04 l/s flow will be equivalent to 38% of the existing 1 in 100 year greenfield runoff rate (which is 428.05 l/s). The above information highlights the significant post development surface water discharge reductions achieved during both regular and extreme rainfall events.

Attenuation storage will be provided within the embankments to the 3 No proposed SUDS ponds across the site. Assuming a post development hardstanding : landscaping ratio of 50:50, this results in a maximum total attenuation volume of 7000m³, based upon a 1 in 100 year enhanced (20% climate change) rainfall event. Final attenuation storage volumes will be

determined once the construction stage masterplan layout is developed and thus accurate areas of hardstanding and landscaping are known.

4.2.2 Foul Water

Following detailed liaison, United Utilities have confirmed that they are prepared to accommodate the full foul water discharge from the proposed development site into the existing 150mm diameter foul water adopted sewer located in Skiddaw Road, circa 400m to the east of the southern tip of the site.

Local to the site, the proposed foul water drainage system requires bridging over the existing ravine which effectively divides the overall site. Thus a pipe bridge will be provided to connect the two sites allowing post development foul water drainage of the upper section of site to be connected to the lower section and subsequently to sewer. Due to the significant depth of the ravine (>8m at the proposed bridge location), the bridge will be located at an elevation far in excess of the maximum anticipated water level within the ravine and thus will not cause any adverse effects in the post development situation.

5.0 CONCLUSIONS

5.1 Flooding

The EA have confirmed that the site lies within Flood Zone 1 as defined in Table 1 of the Department for Communities and Local Government document 'Technical Guidance to the National Planning Policy Framework' dated March 2012. Accordingly, it is not appropriate to undertake numerical flood analyses for the site.

The EA have confirmed that, downstream of the site, there are capacity issues with Pow Beck during periods of significant rainfall. Accordingly, it has been agreed that proposals for post development discharge of surface water is to provide betterment to the existing drainage situation in order to reduce downstream flood risk.

5.2 Site Drainage

5.2.1 Surface Water

The issue of surface water drainage to the proposed development has been considered with reference to the hierarchy of surface water disposal as noted in the Building Regulations H3.

The use of balancing ponds is deemed to be the most suitable and effective method of SUDS for surface water treatment and discharge at the site. Due to the significant size of the site and the existing / proposed relatively steep gradients, the use of 3No ponds across the site is deemed to be the most optimum.

Considering that there is an existing on site watercourse and manmade ravine, it is proposed that surface water is subsequently discharged directly to these at a reduced & controlled flow rate and improved quality.

The Environment Agency have confirmed downstream capacity issues within Pow Beck and it is therefore proposed to restrict the surface water discharge rate from the post development to 80% of the existing 1 in 2 year greenfield runoff rate for the site. The resultant 1 in 2 year greenfield runoff rate for the site is 203.8 litres per second (8.25 litres per second per hectare). Thus the post development surface water discharge rate will be limited to 163.04 litres per second i.e. $80\% \times 203.8$ litres per second through the use of appropriate flow controls. Note, the final volume is subject to increase / decrease depending upon the finalised masterplan layout / proposed total development area.

Attenuation storage will be provided within the embankments to the 3 No proposed SUDS ponds across the site. Assuming a post development hardstanding : landscaping ratio of 50:50 (to be confirmed in the final masterplan layout), this results in a maximum total attenuation volume of approx. 7000m³, based upon a 1 in 100 year enhanced rainfall event. Final attenuation storage volumes will be determined once the construction stage masterplan layout is developed and thus accurate areas of hardstanding and landscaping are known.

5.2.2 Foul Water

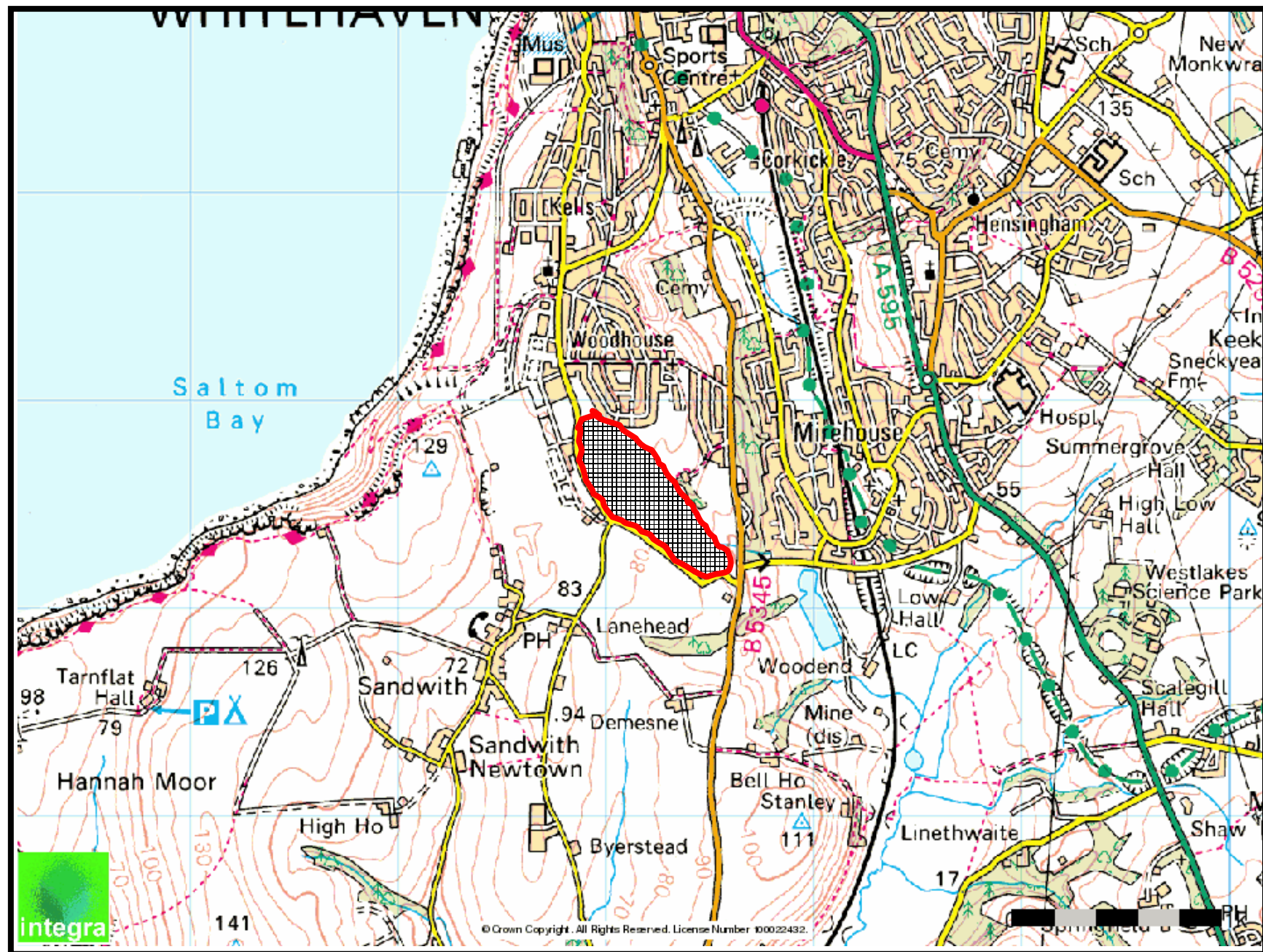
Following detailed liaison, United Utilities have confirmed that they are prepared to accommodate the full foul water discharge from the proposed development site into the existing 150mm diameter foul water adopted sewer located in Skiddaw Road, circa 400m to the east of the southern tip of the site.

Local to the site, the proposed foul water drainage system requires bridging over the existing ravine which effectively splits the site into two. Thus a pipe bridge will be provided to connect the two sites and thus allow foul water drainage of the upper section of site to be connected to the lower section and subsequently to sewer. Due to the significant depth of the ravine (>8m at the proposed bridge location), the bridge will be located at an elevation far in excess of the maximum anticipated water level within the ravine and thus will not cause any adverse effects in the post development situation.

APPENDIX

APPENDIX 1

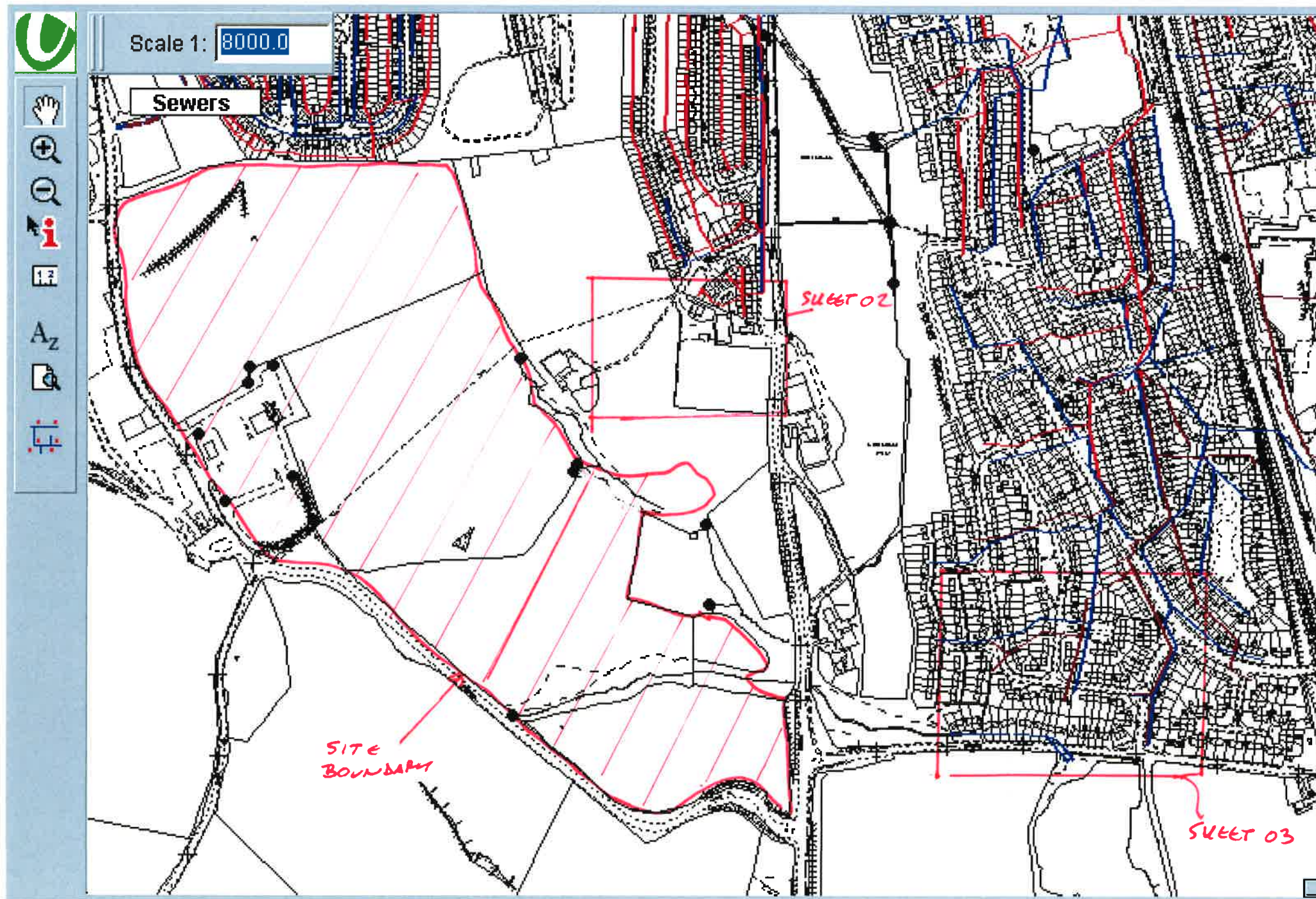
SITE LOCATION PLAN



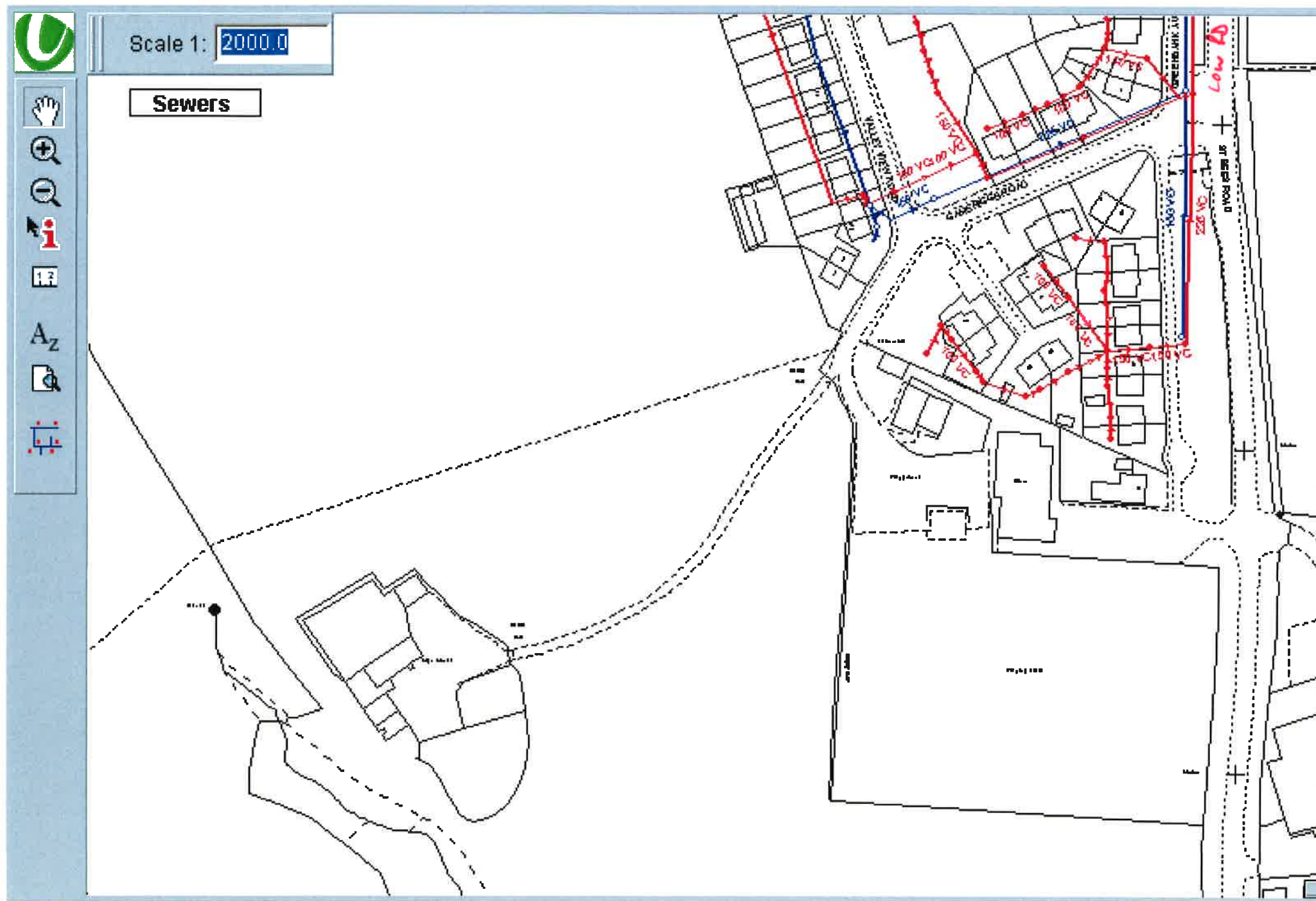
TOWN PLAN

APPENDIX 2

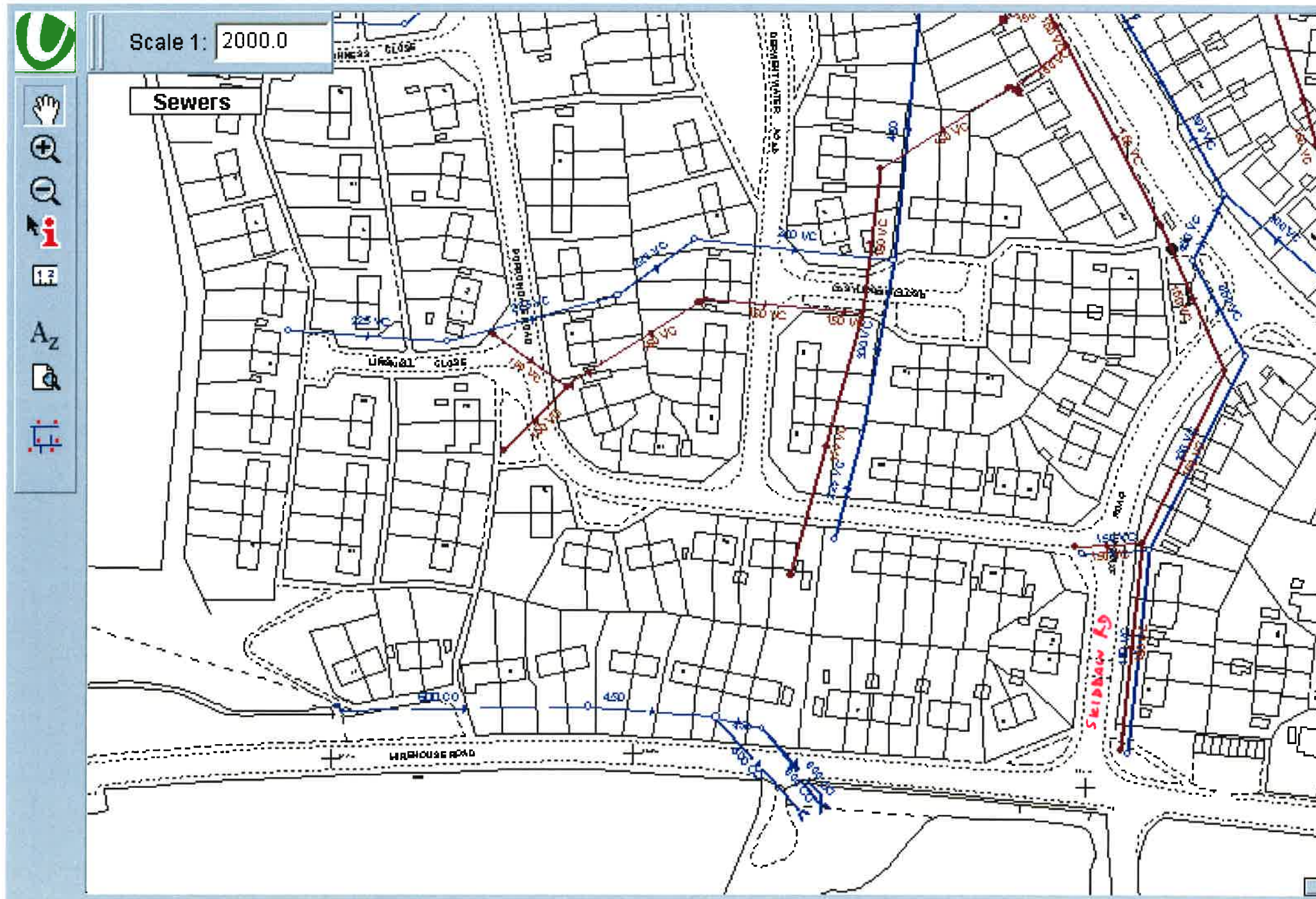
UNITED UTILITIES SEWER PLANS



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APPENDIX 3

DRAINAGE CALCULATIONS

RUNOFF DRAINAGE CALCULATIONS

Greenfield Runoff

2546 / 01/13
APP 3-01 / Ru

Greenfield estimation of peak flow rate of runoff

1. Hydrological region (1 – 10) (R)

UK is divided up into 10 hydrological regions reflecting the different flood frequency growth curves.

2. Soil type (1 – 5) (S)

Refer to Wallingford Procedure WRAP map or FSR maps.

3. Catchment size (A) ha

The size of the gross catchment excluding large parkland areas being allocated as public open space which remain unmodified.

4. Method of greenfield analysis

If catchment area is 200+ ha a full FEH analysis is recommended to obtain a more accurate estimate of greenfield runoff characteristics.

5. Area (A) ha

Excluding public open space not modified by the proposed development.

6. Annual Rainfall (SAAR) mm

SAAR – use either SAAR from FSR or AAR from FEH.

7. Soil runoff coefficient (SPR)

SPR value for SOIL – this is not the FSR index class value for SOIL (1 – 5) but its corresponding runoff coefficient (SPR) as follows:

SOIL	1	2	3	4	5
SPR	0.10	0.30	0.37	0.47	0.53

8. Catchment mean annual peak flow (Q_{BAR}) l/s
 $1000 \times (0.00108(A/100)^{0.89} \cdot SAAR^{1.17} \cdot SPR^{2.17})$

For sites of 50 ha or less, use 50 ha when applying the formula. Subsequently pro-rata the resulting value by the ratio of the site to 50 ha
i.e. Q_{BAR 50ha} x (area / 50)

9. Mean annual peak flow per unit area (Q_{BAR/A}) l/s/ha

10. 1yr, 30yr and 100yr peak discharge rate of runoff per unit area

10.1 Q_{BAR} x 0.85 Q_{1yr} l/s/ha

GC₃₀ and GC₁₀₀ are the growth curve ratios Q / Q_{BAR} for the 30 year and 100 year events for the relevant hydrological region.

10.2 Q_{BAR} x GC₃₀ Q_{30yr} l/s/ha

10.3 Q_{BAR} x GC₁₀₀ Q_{100yr} l/s/ha

Taking GC₃₀ = 1.7 and GC₁₀₀ = 2.1

Job Title Ruobia - Flow Calculations

DRAINAGE CALCULATIONS:

$$\text{TOTAL SITE AREA} = 27.7 \text{ Ha}$$

$$\text{POS NOT MODIFIED BY THE DEVELOPMENT} = 3 \text{ Ha}$$

$$\text{GREENFIELD RUNOFF RATE: } 8.25 \text{ l/s/ha}$$

$$\therefore \text{Total Flow} = 8.25 \times (27.7 - 3) = 203.8 \text{ l/s}$$

RETENEMENT OF 20% :

$$203.8 \times 0.8 = \underline{163.02 \text{ l/s}} \text{ TOTAL}$$

NOTE, SUBJECT TO INCREASE/DECREASE SLIGHTLY DEPENDING UPON FINAL POS AREA.

• IN 1:30 YR STORM:

$$Q_{60-30} = 14.03 \text{ l/s/ha}$$

$$\therefore 14.03 \times 24.7 = \underline{346.54 \text{ l/s}} \text{ CURRENT RUNOFF IN 1:30 YR STORM}$$

$$\# (163.02 / 346.54) \times 100\% = 47\%, \text{ i.e. } \underline{53\% \text{ REDUCTION IN SW FLOW DURING 1:30 YR STORM}}$$

• IN 1:100 YR STORM:

$$Q_{64-100} = 17.33 \text{ l/s/ha}$$

$$\therefore 17.33 \times 24.7 = \underline{428.05 \text{ l/s}} \text{ CURRENT RUNOFF IN 1:100 YR STORM}$$

$$\# (163.02 / 428.05) \times 100\% = 38\%, \text{ i.e. } \underline{62\% \text{ REDUCTION IN SW FLOW DURING 1:100 YR STORM}}$$

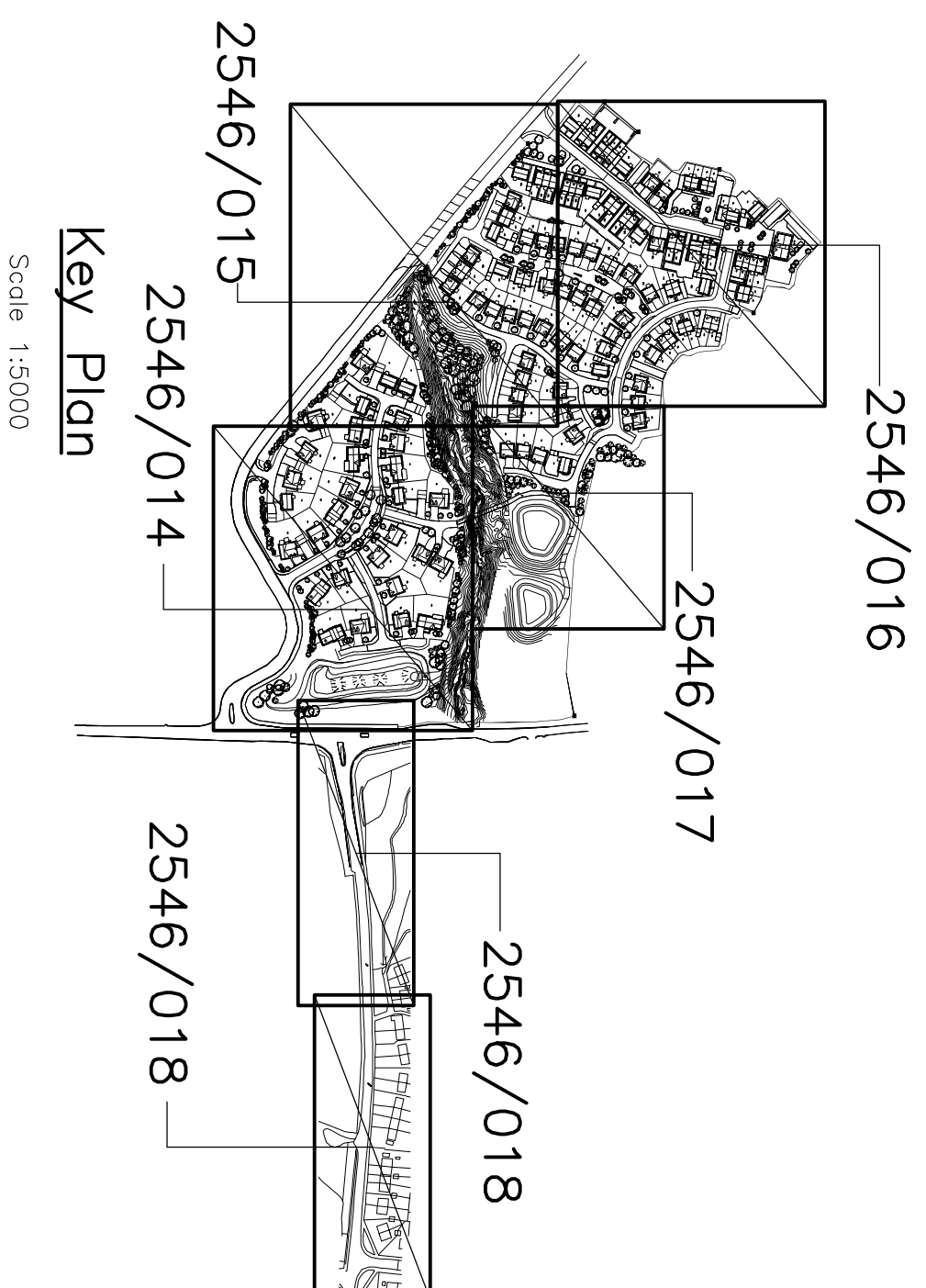
APPENDIX 4

DRAINAGE LAYOUTS



DWG No
2546/018

DWG No
2546/018



Drawings subject to S104
& S38 technical approval.

Key
○ SMWH – Surface Water Manhole
● FMWH – Foul Water Manhole
● G – Gully
○ BD – External Backdrop
○ New foul drainage drop out position
○ New surface water drainage drop out position
○ New Foul Drain
○ New Surface Water Drain
○ Site boundary (TBC by architect)
○ New sewer easement
○ Private Access Channel

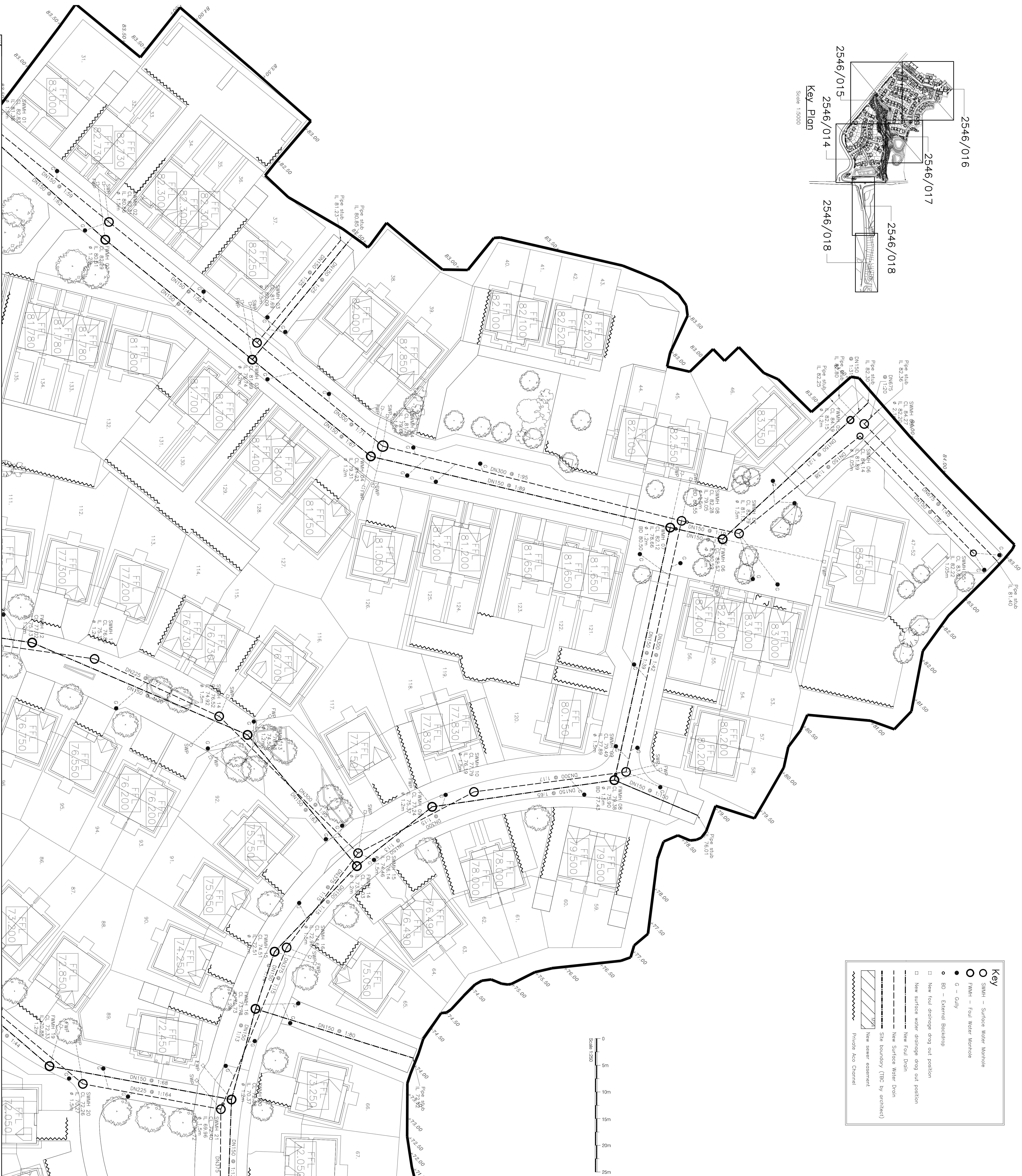
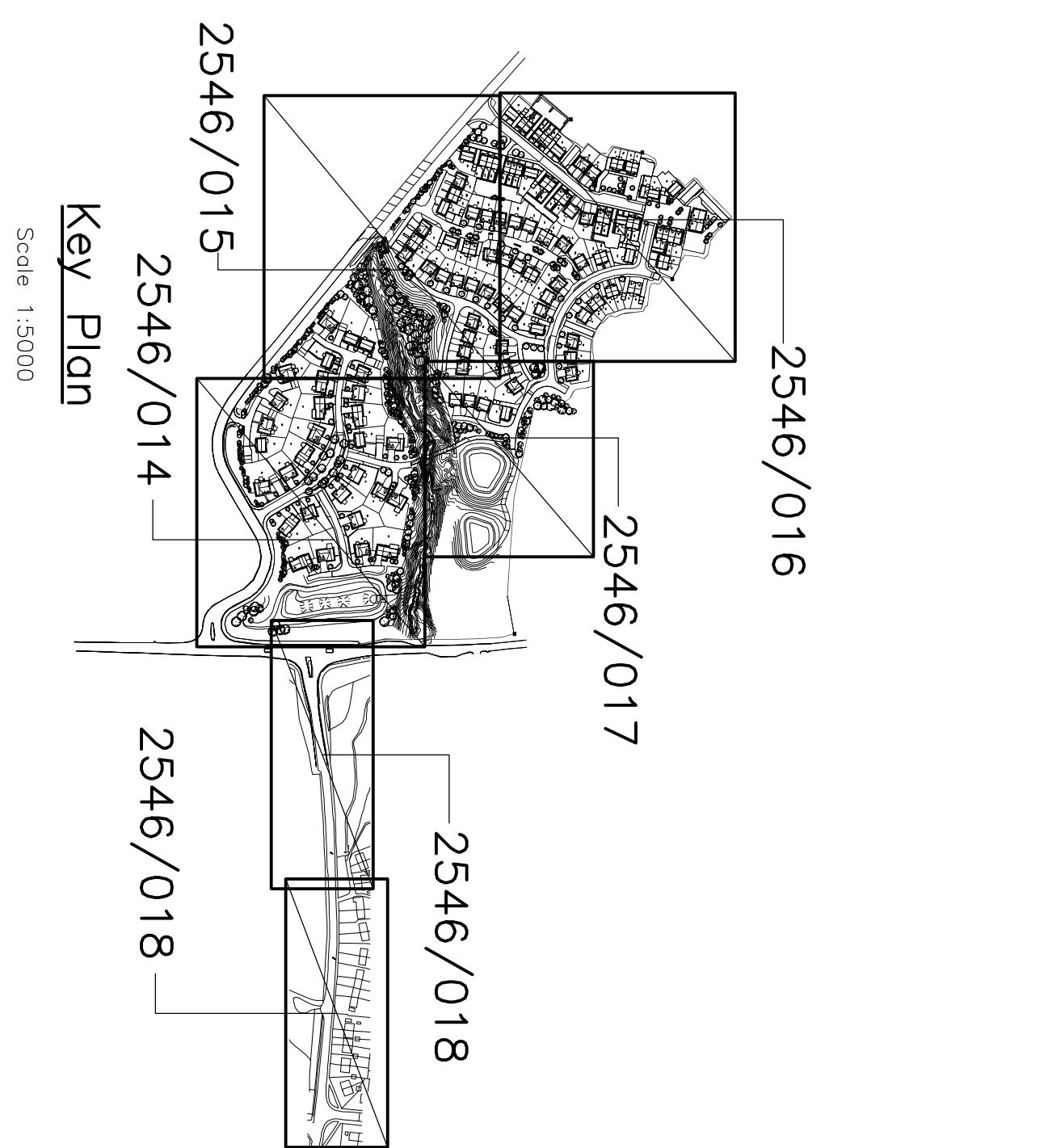
PHASE 1A & 1B
DRAINAGE LAYOUT
1 OF 5

integra
consulting

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Tel : 0161 237 3635
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Web : www.integraplanning.co.uk

Scale	Drawn	Checked	Rev
1:250@A0	JS	RH	
Contract No	2546	014	P2

Notes.

- [illegible]

Drawings subject to S104 & S38 technical approval.

P3	JS	06/13 Site boundary revised	
P2	JS	05/13 minor changes	
Drawing Status			
Rev		Drawn	Description
Planning			
Contract			
RHODA			
WHITEHAVEN			
STORY HOMES			
Drawing Title			
PHASE 1A & 1B			
DRAINAGE LAYOUT			
3 OF 5			
integra			
consulting			
Civil & Structural Engineers			
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Scales	1:250&A0	Date	04/2013
Drawn	JS	Checked	PH
Contract No		Drawing No	
2546		016	P3

Notes.

- 1 All dimensions are in millimetres unless noted
- 2 otherwise.
- 3 All levels are in metres unless noted otherwise.
- 4 This drawing is to be read in conjunction with
- 5 oil relevant Architects and Service Engineers
- 6 drawings.
- 7 All work to be carried out in accordance with the
- 8 following documents:
- 9 (a) – *Specs for Adoption 7th Edition,*
- 10 (b) – *Civil Engineering Specification for the Water*
- 11 *Industry 7th Edition, 2012.*
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OUTLINE PLANNING AREA
DRAINAGE LAYOUT
1 OF 3

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1:500 U.N.O.

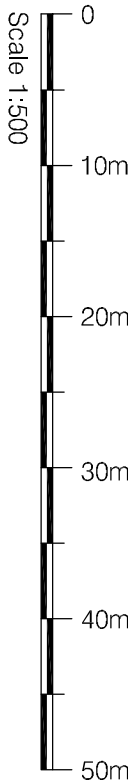
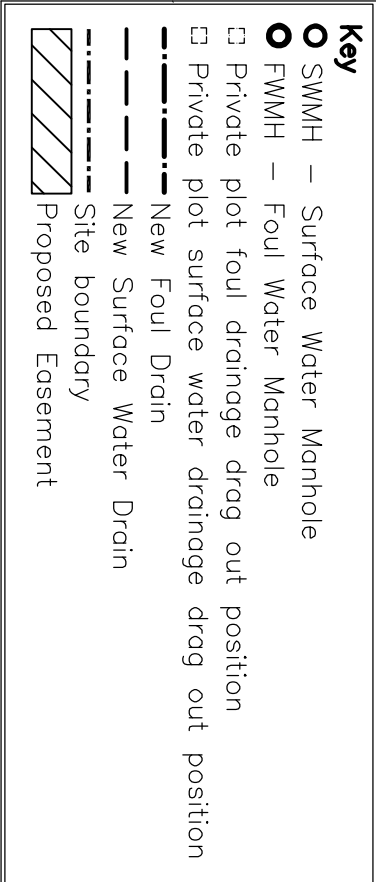
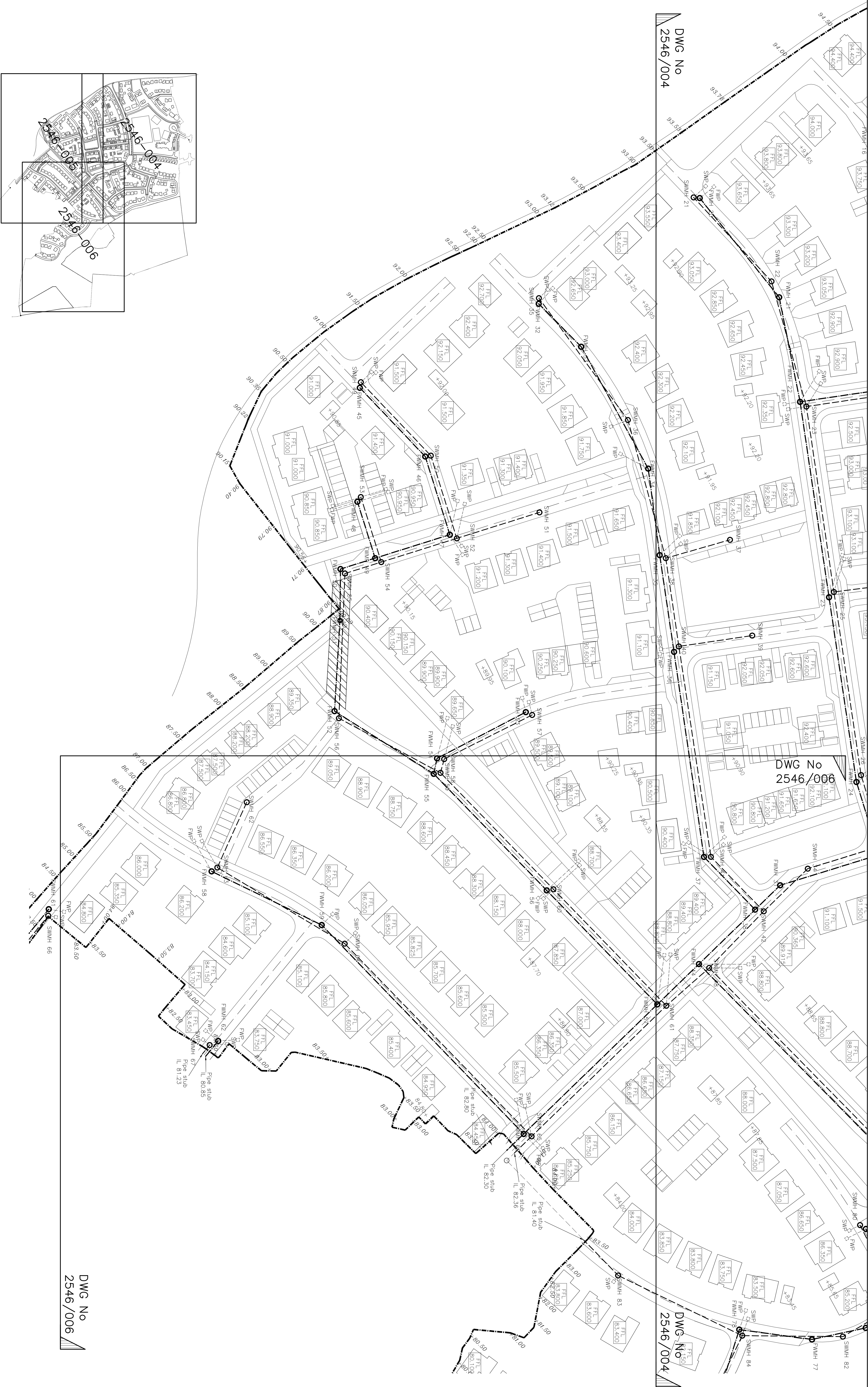
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Notes.

- 1 All dimensions are in millimetres unless noted otherwise.
- 2 All levels are in metres unless noted otherwise.
- 3 This drawing is to be read in conjunction with all relevant Architects and Service Engineers drawings.
- 4 All work to be carried out in accordance with the (a) – Sewers by Adoption The Edition. (b) – Civil Engineering Specification for the Water Industry The Edition, 2012.
- 5 Extent of drainage comments to be depending upon extent of adoption works.



DWG No
2546/006

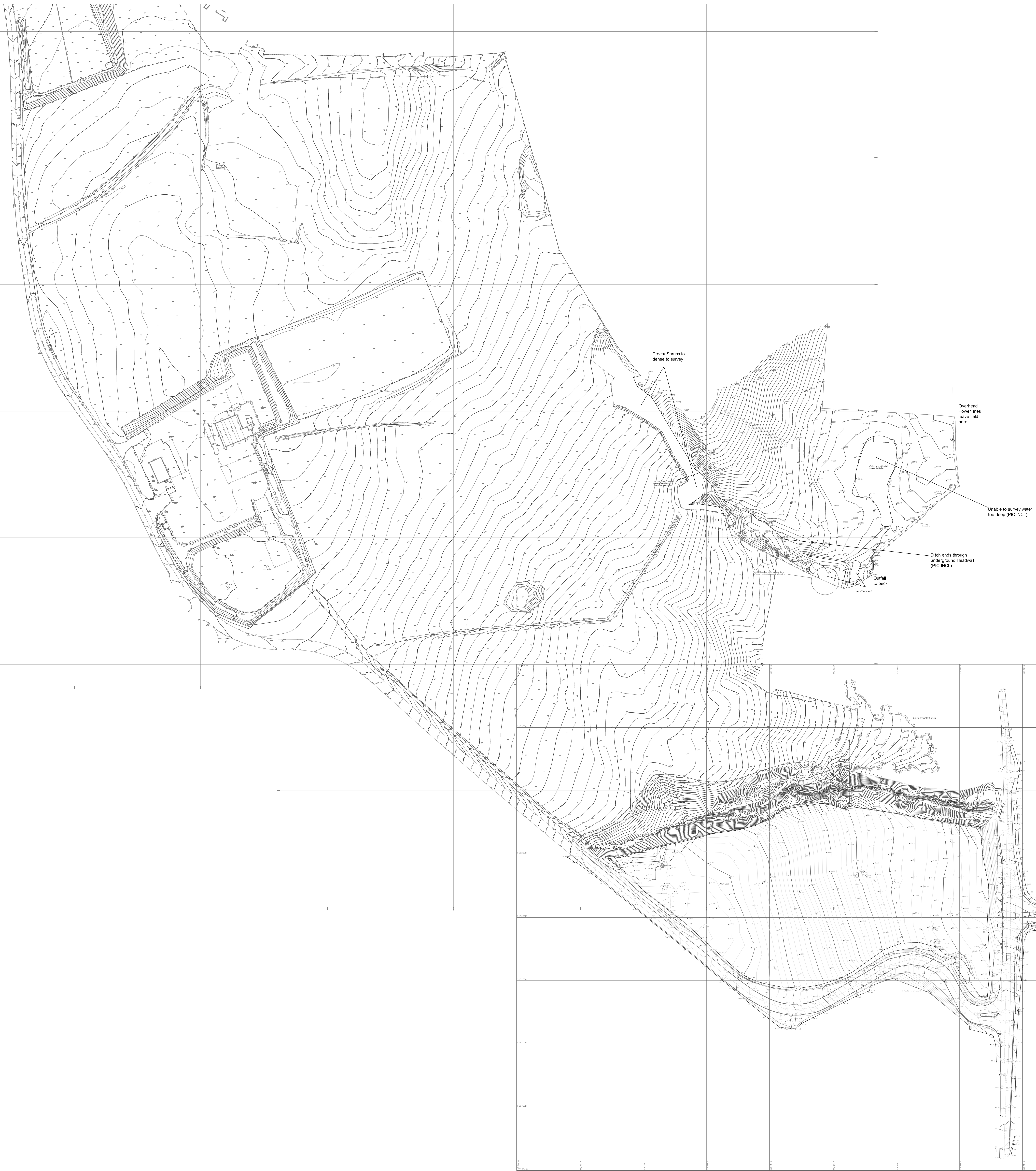
DWG No
2546/004

DWG No
2546/006

P2	JS	16/7/13	Site boundary revised
Drawing Status			
PLANNING			
Contract			
RHODIA WHITEHAVEN STORY HOMES			
Drawing Title			
OUTLINE PLANNING AREA DRAINAGE LAYOUT 2 OF 3			
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Scale	1:500 UNO.	Date	04/2013
Drawn	JS	Checked	RH
Contract No	2546	Drawing No	005
			Rev
			P2

APPENDIX 5

TOPOGRAPHICAL SURVEY



APPENDIX 6

PROPOSED SITE MASTERPLAN

Flood Risk Assessment Addendum Report for Edgehill Phase 3,
High Road, Whitehaven, Cumbria

Appendix 2

Coopers Drawings

<u>Drawing No.</u>	<u>Revision</u>	<u>Title</u>
7503-PL01-1	-	Engineering Layout, Drainage Sheet 1 of 2
7503-PL01-2	-	Engineering Layout, Drainage Sheet 2 of 2

FOUL Network 10									
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Number	Downstream Manhole Invert
1.000	150	47	Circular	37.388	F101	90.96	92.32	F102	90.17
1.001	150	47	Circular	31.608	F102	90.17	92.08	F103	89.51
1.002	150	47	Circular	15.439	F103	89.51	91.30	F104	89.18
1.003	150	47	Circular	20.891	F104	89.18	90.02	F105	89.74
1.004	150	47	Circular	43.011	F105	88.74	90.40	F106	87.84

FOUL Network 11									
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Number	Downstream Manhole Invert
1.000	150	70	Circular	24.918	F201	93.59	92.24	F202	91.88
1.001	150	150	Circular	43.810	F202	91.88	93.42	F204	91.59
1.002	150	150	Circular	23.852	F204	91.59	93.36	F205	91.42
1.003	150	150	Circular	12.601	F205	91.42	93.01	F206	91.33
1.004	150	45	Circular	44.261	F206	91.33	92.85	F208	91.26
1.005	150	150	Circular	49.712	F208	91.26	92.39	F209	90.05
1.006	150	150	Circular	16.694	F209	90.05	91.86	F210	89.94
1.007	150	150	Circular	41.340	F210	89.94	92.40	F211	89.66
1.008	150	150	Circular	18.600	F211	89.66	92.60	F212	89.54
1.009	150	150	Circular	25.549	F212	89.54	92.40	F213	89.37
1.010	150	150	Circular	17.954	F213	89.37	92.25	F214	89.25
1.011	150	150	Circular	18.602	F214	89.25	92.49	F215	89.12
1.012	150	150	Circular	36.595	F215	89.12	92.80	F216	88.88
1.013	150	150	Circular	26.272	F216	88.88	92.76	F217	88.70
1.014	150	150	Circular	64.731	F217	88.70	91.95	F218	88.27
1.015	150	150	Circular	19.803	F218	88.27	90.12	F219	89.65
1.016	150	150	Circular	16.963	F219	89.65	90.12	F220	89.03
1.017	150	150	Circular	19.024	F220	89.03	89.68	F221	87.50
1.018	150	20	Circular	31.685	F221	87.50	89.84	F223	86.25
1.019	150	150	Circular	19.226	F223	86.25	88.25	F224	86.24
2.000	150	24	Circular	11.784	F224	86.24	88.07	F225	86.24
3.000	150	13	Circular	14.724	F225	86.24	88.07	F226	86.24
4.000	150	80	Circular	31.374	F226	86.24	88.07	F227	86.24
5.000	150	80	Circular	44.360	F227	86.24	88.07	F228	86.24
6.000	150	15	Circular	14.426	F228	86.24	88.07	F229	86.24
7.000	150	66	Circular	21.369	F229	86.24	88.07	F230	86.24
8.000	150	66	Circular	49.841	F230	86.24	88.07	F231	86.24
9.000	150	60	Circular	19.188	F231	86.24	88.07	F232	86.24
10.000	150	10	Circular	21.032	F232	86.24	88.07	F233	86.24
11.000	150	24	Circular	24.083	F233	86.24	88.07	F234	86.24
12.000	150	80	Circular	40.854	F234	86.24	88.07	F235	86.24
13.000	150	80	Circular	29.169	F235	86.24	88.07	F236	86.24

FOUL Network 12									
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Number	Downstream Manhole Invert
1.000	150	80	CLAY	28.295	F301	94.04	95.40	F302	93.69
1.001	150	73	CLAY	15.555	F302	93.69	95.03	F303	93.58
1.002	150	79	CLAY	43.383	F303	93.58	95.63	F305	93.37
1.003	150	20	CLAY	45.321	F305	93.37	96.03	F306	93.23
1.004	150	104	CLAY	29.339	F306	93.23	96.72	F307	93.12
1.005	150	15	CLAY	14.426	F307	93.12	96.72	F308	93.00
1.006	150	15	CLAY	21.369	F308	93.00	96.72	F309	92.88
1.007	150	15	CLAY	49.841	F309	92.88	97.48	F310	92.76
1.008	150	15	CLAY	19.188	F310	92.76	97.48	F311	92.65
1.009	150	10	CLAY	21.032	F311	92.65	97.48	F312	92.54
1.010	150	24	CLAY	24.083	F312	92.54	97.48	F313	92.43
1.011	150	30	CLAY	40.854	F313	92.43	97.48	F314	92.32
1.012	150	80	CLAY	29.169	F314	92.32	97.48	F315	92.21

FOUL Network 13									
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Number	Downstream Manhole Invert
1.000	150	80	CLAY	28.295	F301	94.04	95.40	F302	93.69
1.001	150	73	CLAY	15.555	F302	93.69	95.03	F303	93.58
1.002	150	79	CLAY	43.383	F303	93.58	95.63	F305	93.37
1.003	150	20	CLAY	45.321	F305	93.37	96.03	F306	93.23
1.004	150	104	CLAY	29.339	F306	93.23	96.72	F307	93.12
1.005	150	15	CLAY	14.426	F307	93.12	96.72	F308	93.00
1.006	150	15	CLAY	21.369	F308	93.00	96.72	F309	92.88
1.007	150	15	CLAY	49.841	F309	92.88	97.48	F310	92.76
1.008	150	15	CLAY	19.188	F310	92.76	97.48	F311	92.65
1.009	150	10	CLAY	21.032	F311	92.65	97.48	F312	92.54
1.010	150	24	CLAY	24.083	F312	92.54	97.48	F313	92.43
1.011	150	30	CLAY	40.854	F313	92.43	97.48	F314	92.32
1.012	150	80	CLAY	29.169	F314	92.32	97.48	F315	92.21

FOUL Network 14									
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Number	Downstream Manhole Invert
1.000	150	80	CLAY	28.295	F301	94.04	95.40	F302	93.69
1.001	150	73	CLAY	15.555	F302	93.69	95.03	F303	93.58
1.002	150	79	CLAY	43.383	F303	93.58	95.63	F305	93.37
1.003	150	20	CLAY	45.321	F305	93.37	96.03	F306	93.23
1.004	150	104	CLAY	29.339	F306	93.23	96.72	F307	93.12
1.005	150	15	CLAY	14.426	F307	93.12	96.72	F308	93.00
1.006	150	15	CLAY	21.369	F308	93.00	96.72	F309	92.88
1.007	150	15	CLAY	49.841	F309	92.88	97.48	F310	92.76
1.008	150	15	CLAY	19.188	F310	92.76	97.48	F311	92.65
1.009	150	10	CLAY	21.032	F311	92.65	97.48	F312	92.54
1.010	150	24	CLAY	24.083	F312	92.54	97.48	F313	92.43
1.011	150	30	CLAY	40.854	F313	92.43	97.48	F314	92.32
1.012	150	80	CLAY	29.169	F314	92.32	97.48	F315	92.21

FOUL Network 15									
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Number	Downstream Manhole Invert
1.000	150	80	CLAY	28.295	F301	94.04	95.40	F302	93.69
1.001	150	73	CLAY	15.555	F302	93.69	95.03	F303	93.58
1.002	150	79	CLAY	43.383	F303	93.58	95.63	F305	93.37
1.003	150	20	CLAY	45.321	F305	93.37	96.03	F306	93.23
1.004	150	104	CLAY	29.339	F306	93.23	96.72	F307	93.12
1.005	150	15	CLAY	14.426	F307	93.12	96.72	F308	93.00
1.006	150	15	CLAY	21.369	F308	93.00	96.72	F309	92.88
1.007	150	15	CLAY	49.841	F309	92.88	97.48	F310	92.76
1.008	150	15	CLAY	19.188	F310	92.76	97.48	F311	92.65
1.009	150	10	CLAY	21.032	F311	92.65	97.48	F312	92.54
1.010	150	10	CLAY	14.426	F312	92.54	97.48	F313	92.43
1.011	150	10	CLAY	14.426	F313	92.43	97.48	F314	92.32
1.012	150	10	CLAY	14.426	F314	92.32	97.48	F315	92.21
1.013	150	10	CLAY	14.426	F315	92.21	97.48	F316	92.10
1.014	150	10	CLAY	14.426	F316	92.10	97.48	F317	91.99
1.015	150	10	CLAY	14.426	F317	91.99	97.48	F318	91.88
1.016	150	10	CLAY	14.426	F318	91.88	97.48	F319	91.77
1.017	150	10	CLAY	14.426	F319	91.77	97.48	F320	91.66
1.018	150	10	CLAY	14.426	F320	91.66	97.48	F321	91.55
1.019	150	10	CLAY	14.426	F321	91.55	97.48	F322	91.44
1.020	150	10	CLAY	14.426	F322	91.44	97.48	F323	91.33
1.021	150	10	CLAY	14.426	F323	91.33	97.48	F324	91.22
1.022	150	10	CLAY	14.426	F324	91.22	97.48	F325	91.11
1.023	150	10	CLAY	14.426	F325	91.11	97.48	F326	91.00
1.024	150	10	CLAY	14.426	F326	91.00	97.48	F327	90.89
1.025	150	10	CLAY	14.426	F327	90.89	97.48	F328	90.78
1.026	150	10	CLAY	14.426	F328	90.78	97.48	F329	90.67
1.027	150	10	CLAY	14.426	F329	90.67	97.48	F330	90.56
1.028	150	10	CLAY	14.426	F330	90.56	97.48	F331	90.45
1.029	150	10	CLAY	14.426	F331	90.45	97.48	F332	90.34
1.030	150	10	CLAY	14.426	F332	90.34	97.48	F333	90.23
1.031	150	10	CLAY	14.426	F333	90.23	97.48	F334	90.12
1.032	150	10	CLAY	14.426	F334	90.12	97.48	F335	90.01
1.033	150	10	CLAY	14.426	F335	90.01	97.48	F336	89.90
1.034	150	10	CLAY	14.426	F336	89.90	97.48	F337	89.79
1.035	150	10	CLAY	14.426	F337	89.79	97.48	F338	89.68
1.036	150	10	CLAY	14.426	F338	89.68	97.48	F339	89.57
1.037	150	10	CLAY	14.426	F339	89.57	97.48	F340	89.46
1.038	150	10	CLAY	14.426	F340	89.46	97.48	F341	89.35
1.039	150	10	CLAY	14.426	F341	89.35	97.48	F342	89.24
1.040	150	10	CLAY	14.426	F342	89.24	97.48	F343	89.13
1.041	150	10	CLAY	14.426	F343	89.13	97.48	F344	89.02
1.042	150	10	CLAY	14.426	F344	89.02	97.48	F345	88.91
1.043	150	10	CLAY	14.426	F345	88.91	97.48	F346	88.80
1.044	150	10	CLAY	14.426	F346	88.80	97.48	F347	88.69
1.045	150	10	CLAY	14.426	F347	88.69	97.48	F348	88.58
1.046	150	10	CLAY	14.426	F348	88.58	97.48	F349	88.47
1.047	150	10	CLAY	14.426	F349	88.47	97.48	F350	88.36
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1.052	150	10	CLAY	14.426	F354	87.92	97.48	F355	87.81
1.053	150	10	CLAY	14.426	F355	87.81	97.48	F356	87.70
1.054	150	10	CLAY	14.426	F356	87.70	97.48	F357	87.59
1.055	150	10	CLAY	14.426	F357	87.59	97.48	F358	87.48
1.056	150	10	CLAY	14.426	F358	87.48	97.48	F359	87.37
1.057	150	10	CLAY	14.426	F359	87.37	97.48	F360	87.26
1.058	150	10	CLAY	14.426	F360	87.26	97.48	F361	87.15
1.059	150	10	CLAY	14.426	F361	87.15	97.48	F362	87.04
1.060	150	10	CLAY	14.426	F362	87.04	97.48	F363	86.93
1.061	150	10	CLAY	14.426	F363	86.93	97.48	F364	86.82
1.062	150	10	CLAY	14.426	F364	86.82	97.48	F365	86.71
1.063	150	10	CLAY	14.426	F365	86.71	97.48	F366	86.60
1.064	150	10	CLAY	14.426	F366	86.60	97.48	F367	86.49
1.065	150	10	CLAY	14.426	F367	86.49	97.48	F368	86.38
1.066	150	10	CLAY	14.426	F368	86.38	97.48	F369	86.27
1.067	150	10	CLAY	14.426	F369	86.27	97.48	F370	86.16
1.068	150	10	CLAY	14.426	F370	86.16	97.48	F371	86.05
1.069	150	10	CLAY	14.426	F371	86.05	97.48	F372	85.94
1.070	150	10	CLAY	14.426	F372	85.94	97.48	F373	85.83
1.071	150	10	CLAY	14.426	F373	85.83	97.48	F374	85.72
1.072	150	10	CLAY	14.426	F374	85.72	97.48	F375	85.61
1.073	150	10	CLAY	14.426	F375	85.61	97.48	F376	85.50
1.074	150	10	CLAY	14.426	F376	85.50	97.48	F377	85.39
1.075	150	10	CLAY	14.426	F377	85.39	97.48	F378	85.28
1.076	150	10	CLAY	14.426	F378	85.28	97.48	F379	85.17
1.077	150	10	CLAY	14.426	F379	85.17	97.48	F380	85.06
1.078	150	10	CLAY	14.426	F380	85.06	97.48	F381	84.95
1.079	150	10	CLAY	14.426	F381	84.95	97.48	F382	84.84
1.080	150	10	CLAY	14.426	F382	84.84	97.48	F383	84.73
1.081	150	10	CLAY	14.426	F383	84.73	97.48	F384	84.62
1.082	150	10	CLAY	14.426	F384	84.62	97.48	F385	84.51
1.083	150	10	CLAY	14.426	F385	84.51	97.48	F386	84.40
1.084	150	10	CLAY	14.426	F386	84.40	97.48	F387	84.29
1.085	150	10	CLAY	14.426	F387	84.29	97.48	F388	84.18
1.086	150	10	CLAY	14.426	F388	84.18	97.48	F389	84.07
1.087	150	10	CLAY	14.426	F389	84.07	97.48	F390	83.96
1.088	150	10	CLAY	14.426	F390	83.96	97.48	F391	83.85
1.089	150	10	CLAY	14.426	F391	83.85	97.48	F392	83.74
1.090	150	10	CLAY	14.426	F392	83.74	97.48	F393	83.63
1.091	150	10	CLAY	14.426	F393	83.63	97.48	F394	83.52
1.092	150	10	CLAY	14.426	F394	83.52	97.48	F395	83.41
1.093	150	10	CLAY	14.426	F395	83.41	97.48	F396	83.30
1.094	150	10	CLAY	14.426	F396	83.30	97.48	F397	83.19
1.095	150	10	CLAY	14.426	F397	83.19	97.48	F398	83.08
1.096	150	10	CLAY	14.426	F398	83.08	97.48	F399	82.97
1.097	150	10	CLAY	14.426	F399	82.97	97.48	F400	82.86
1.098	150	10	CLAY	14.426	F400	82.86	97.48	F401	82.75
1.099	150	10	CLAY	14.426	F401	82.75	97.48	F402	82.64
1.100	150	10	CLAY	14.426	F402	82.64	97.48	F403	82.53
1.101	150	10	CLAY	14.426	F403	82.53	97.48	F404	82.42
1.102	150	10	CLAY	14.426	F404	82.42	97.48	F405	82.31
1.103	150	10	CLAY	14.426	F405	82.31	97.48	F406	82.20
1.104	150	10	CLAY	14.426	F406	82.20	97.48	F407	82.09
1.105	150	10	CLAY	14.426	F407	82.09	97.48	F408	81.98
1.106	150	10	CLAY	14.426	F408	81.98	97.48	F409	81.87
1.107	150	10	CLAY	14.426	F409	81.87	97.48	F410	81.76
1.108	150	10	CLAY	14.426	F410	81.76	97.48	F411	81.65
1.109	150	10	CLAY	14.426	F411	81.65	97.48	F412	81.54
1.110	150	10	CLAY	14.426	F412	81.54	97.48	F413	81.43
1.111	150	10	CLAY	14.426	F413	81.43	97.48	F414	81.32
1.112	150	10	CLAY	14.426	F414	81.32	97.48	F415	81.21
1.113	150	10	CLAY	14.426	F415	81.21	97.48	F416	81.10
1.114	150	10	CLAY	14.426	F416	81.10	97.48	F417	80.99
1.115	150	10	CLAY	14.426	F417	80.99	97.48	F418	80.88
1.116	150	10	CLAY	14.426	F418	80.88	97.48	F419	80.77
1.117	150	10	CLAY	14.426	F419	80.77	97.48	F420	80.66
1.118	150	10	CLAY	14.426	F420	80.66	97.48	F421	80.55
1.119	150	10	CLAY	14.426	F421	80.55	97.48	F422	80.44
1.120	150	10	CLAY	14.426	F422	80.44	97.48	F423	80.33
1.121	150	10	CLAY	14.426	F423	80.33	97.48	F424	80.22
1.122	150	10	CLAY	14.426	F424	80.22	97.48	F425	80.11
1.123	150	10	CLAY	14.426	F425	80.11	97.48	F426	80.00
1.124	150	10	CLAY	14.426	F426	80.00	97.48	F427	79.89
1.125	150	10	CLAY	14.426	F427	79.89	97.48	F428	79.78
1.126	150	10	CLAY	14.426	F428	79.78	97.48	F429	79.67
1.127	150	10	CLAY	14.426	F429	79.67	97.48	F430	79.56
1.128	150	10	CLAY	14.426	F430	79.56	97.48	F431	79.45
1.129	150	10	CLAY	14.426	F431	79.45	97.48	F432	79.34
1.130	150	10	CLAY	14.426	F432	79.34	97.48	F433	79.23
1.131	150	10	CLAY	14.426	F433	79.23	97.48	F434	79.12



STORM Network 1											
Pipe Code	Diameter (mm)	Gradient (1:)	Pipe Type	Pipe Length	Number	Upstream Manhole Invert	Cover	Downstream Manhole Invert	Cover	Number	Cover
1.001	300	86	CLAY	53.828	S101	90.11	91.89	S102	89.44	92.32	
1.001	300	150	CLAY	25.774	S102	89.44	92.32	S103	89.27	92.14	
1.002	300	150	CLAY	27.917	S103	89.27	92.14	S104	89.08	91.45	
1.003	300	150	CLAY	17.748	S104	89.08	91.45	S105	88.93	91.03	
1.004	300	239	CLAY	22.431	S105	88.93	91.00	S106	88.91	90.43	
1.005	300	239	CLAY	20.291	S106	88.91	90.43	S107	88.82	90.42	
1.006	300	19	CLAY	28.838	S107	88.82	90.42	S1	87.47	89.35	
1.007	300	44	CLAY	28.859	S1	87.50	89.35	S3	86.85	88.00	
1.008	300	80	CLAY	58.870	S3	86.85	88.00	S4	86.11	88.04	
1.009	300	102	CLAY	42.972	S4	86.11	88.04	S5	85.09	87.61	
1.010	675	48	CONC	61.448	S5	83.52	87.61	S11	82.23	84.81	
1.011	675	48	CONC	11.781	S11	82.23	84.81	S12	82.20	84.27	
1.012	675	45	CONC	46.516	S12	82.20	84.27	S13	81.17	83.41	
1.013	675	67	CONC	24.120	S13	81.17	83.41	S15	80.81	82.96	
1.025	450	675	CONC	1.034	S15	82.95	83.56	S16	82.90	82.90	
1.015	675	79	CONC	29.984	S16	82.90	83.56	S20	80.18	83.05	
1.016	750	78	CONC	46.235	S20	77.94	83.05	S21	77.59	79.52	
1.017	750	84	CONC	34.247	S21	79.52	79.52	S23	77.69	77.69	
1.018	750	48	CONC	20.718	S23	77.69	77.69	S24	72.76	76.00	
1.019	750	68	CONC	13.130	S24	72.76	76.00	S25	70.56	73.50	
1.020	750	43	CONC	29.678	S25	68.56	73.50	S26	67.87	70.61	
1.021	750	50	CONC	71.917	S26	65.60	70.61	S27	64.18	66.50	
1.022	750	60	CONC	24.046	S27	64.18	66.50	SHWALL 1	63.70	65.50	
1.023	750	401	CONC	56.728	SHWALL 1	63.13	65.50	S28	62.99	64.80	
1.024	450	24	CONC	46.344	S28	62.99	64.80	S29	61.06	62.75	
1.025	450	100	CONC	16.852	S29	59.47	62.75	S30	59.30	60.25	
2.000	225	21	CLAY	6.543	S2	87.24	89.32	S3	86.82	89.00	
3.002	225	23	CLAY	20.438	S201	92.03	92.03	S202	92.03	94.28	
3.001	225	25	CLAY	17.475	S202	92.03	94.28	S205	91.90	93.56	
3.002	450	151	CONC	21.103	S205	91.90	93.56	S208	90.86	93.27	
3.003	450	44	CONC	53.277	S208	90.86	93.27	S209	89.56	92.29	
3.004	450	168	CONC	43.275	S209	90.34	92.29	S210	90.08	92.42	
3.005	450	103	CONC	36.069	S210	90.08	92.42	S216	89.70	91.98	
3.006	450	78	CONC	10.667	S216	89.70	91.98	S218	89.56	92.32	
3.007	450	400	CONC	46.819	S218	89.12	92.32	S219	89.01	92.59	
3.008	450	401	CONC	18.860	S219	89.01	92.59	S224	88.96	92.37	
3.009	450	401	CONC	25.673	S224	88.96	92.37	S225	88.89	92.29	
3.010	450	398	CONC	17.517	S225	88.89	92.29	S226	88.85	92.55	
3.011	450	400	CONC	14.800	S226	88.85	92.55	S227	88.71	92.71	
3.012	450	400	CONC	24.003	S227	88.71	92.71	S228	88.65	92.06	
3.013	450	53	CONC	51.144	S228	88.65	92.06	S229	87.88	90.60	
3.014	450	53	CONC	20.014	S229	87.88	90.60	S231	87.59	89.97	
3.015	450	403	CONC	28.598	S231	87.59	89.97	S232	87.22	89.63	
3.016	450	107	CONC	28.576	S232	87.22	89.63	S233	86.97	89.97	
3.017	450	44	CONC	44.143	S233	86.97	89.97	S5	85.00	87.61	
4.000	300	80	CLAY	26.680	S203	92.31	94.03	S204	91.97	93.70	
4.001	300	80	CLAY	10.937	S204	91.97	93.70	S205	91.53	93.56	
5.000	225	80	CLAY	13.083	S206	91.90	93.62	S207	91.73	93.45	
5.001	225	42	CLAY	27.182	S207	91.73	93.45	S208	91.08	93.27	
5.002	225	31	CLAY	36.031	S211	93.66	93.66	S212	90.75	92.45	
6.001	300	68	CLAY	56.048	S215	90.88	92.45	S216	91.65	93.05	
7.001	225	41	CLAY	28.575	S216	91.65	93.05	S217	91.24	92.13	
7.001	300	80	CLAY	20.987	S213	91.47	93.20	S214	91.21	92.04	
7.002	300	88	CLAY	47.234	S214	91.21	92.94	S215	90.88	92.45	
8.000	225	11	CLAY	10.660	S217	90.77	92.67	S218	89.80	92.32	
9.000	225	80	CLAY	9.584	S220	91.47	93.20	S221	91.35	93.40	
9.001	300	41	CLAY	37.117	S221	91.28	93.40	S222	90.37	92.12	
9.002	300	92	CLAY	46.345	S222	90.37	92.12	S223	89.86	91.66	
9.003	300	41	CLAY	21.678	S223	89.86	91.66	S224	89.33	92.37	
10.000	225	54	CLAY	11.554	S226	87.96	89.89	S231	87.73	89.97	
11.000	225	62	CLAY	58.375	S233	92.03	94.05	S234	91.58	93.11	
11.001	300	168	CLAY	43.117	S234	91.31	93.11	S235	91.05	93.10	
11.002	300	168	CLAY	57.818	S235	91.05	93.10	S236	90.71	92.63	
11.003	300	168	CLAY	28.234	S236	90.71	92.63	S237	90.54	92.33	
11.004	300	168	CLAY	19.466	S237	89.47	92.33	S238	89.36	91.27	
11.005	300	168	CLAY	19.355	S238	89.37	91.27	S239	87.96	89.87	
12.000	225	70	CLAY	21.361	S8	88.14	87	S46	84.06	85.84	
12.001	225	68	CLAY	25.623	S7	84.06	85.84	S8	83.68	85.46	
12.002	225	72	CLAY	24.293	S8	83.68	85.46	S9	83.35	85.12	
12.003	300	102	CLAY	46.600	S9	83.37	85.12	S10	82.81	84.55	
12.004	300	340	CLAY	50.347	S10	84.55	86.11	S11	82.80	84.81	
13.000	225	15	CLAY	21.739	S14A	84.12	85.85	S14	82.69	84.40	
13.001	225	20	CLAY	28.254	S14	82.67	84.40	S15	81.26	82.95	
14.000	225	170	CLAY	13.070	S17	83.68	85.45	S18	83.61	85.03	
14.001	450	31	CONC	27.963	S18	83.38	85.03	S19	82.48	84.50	
14.002	450	26	CONC	27.628	S19	81.48	84.50	S20	80.41	83.05	
15.000	225	32	CLAY	41.138	S201	96.59	96.59	S202	95.31	96.73	
15.001	225	111	CLAY	35.630	S302	95.31	96.73	S303	94.99	95.62	
15.002	225	28	CLAY	34.459	S303	94.20	95.62	S304	92.59	94.54	
15.003	300	150	CLAY	21.353	S304	92.91	94.64	S305	92.77	94.73	
15.004	300	88	CLAY	16.052	S305	92.77	94.73	S309	92.59	94.25	
15.005	300	27	CLAY	21.223	S309	94.25	94.25	S310	91.81	93.43	
15.006	450	49	CONC	40.929	S310	91.86	93.43	S311	90.83	92.63	
15.007	450	61	CONC	22.466	S311	90.83	92.63	S312	90.46	92.26	
15.008	450	26	CONC	32.650	S312	90.46	92.26	S313	89.20	91.16	
15.009	450	188	CONC	25.532	S313	88.35	91.16	S321	88.21	90.23	
15.010	450	398	CONC	20.720	S321	88.70	90.23	S322	88.85	88.85	
15.011	450	399	CONC	35.522	S322	84.86	88.85	S324	84.77	86.72	
15.012	450	181	CONC	34.367	S324	83.60	86.72	S331	83.41	86.26	
15.013	450	251	CONC	26.368	S331	83.41	86.26	S18	83.31	85.03	
16.000	225	55	CLAY	31.679	S306	93.61	95.33	S307	93.03	94.75	
16.001	225	151	CLAY	15.913	S307	93.03	94.75	S308	92.93	94.46	
16.002	225	66	CLAY	17.647	S308	92.93	94.46	S309	92.56	94.25	
17.000	225	66	CLAY	34.996	S314	93.82	95.33	S315	93.29	95.46	
17.001	225	41	CLAY	11.627	S315	93.29	95.46	S316	93.02	95.36	
17.002	225	42	CLAY	34.434	S316	93.02	95.36	S317	92.27	93.94	
17.003	225	168	CLAY	44.603	S317	90.71	93.94	S318	90.45	92.23	
17.004	300	150	CLAY	28.940	S318	90.37	92.23	S319	90.18	91.83	
17.005	300	24	CLAY	20.170	S319	90.18	91.83	S320	89.34	91.21	
17.006	300	19	CLAY	18.728	S320	89.34	91.21	S321	88.96	90.23	
18.000	450	401	CONC	38.831	S323	83.10	87.37	S324	83.60	86.12	
19.000	225	38	CLAY	63.225	S325	89.14	91.60	S326	87.47	89.20	
19.001	300	54	CLAY	28.234	S326	87.40	89.20	S327	86.87	89.90	
19.002	300	168	CLAY	21.490	S327	86.74	88.60	S328	85.61	87.78	
19.003	300	168	CLAY	10.725	S328	85.61	87.78	S329	85.50	87.25	
19.004	450	399	CONC	16.244	S329	85.40	87.25	S330	85.36	86.49	
19.005	450	399	CONC	13.862	S330	84.40	86.49	S331	84.36	86.26	
20.000	225	168	CLAY	21.861	S22A	78.32	80.05	S22B	78.20	79.92	
20.001	225	18	CLAY	18.888	S22B	78.20	79.92	S22	78.55	79.36	
20.002	225	11	CLAY	14.615	S22	78.55	79.36	S23	75.22	77.69	
21.000	225	171	CLAY	18.125	S24A	72.72	74.45	S24B	72.61	74.85	
21.001	225	170	CLAY	35.277	S24B	72.61	74.85	S24C	72.41	76.50	
21.002	225	74	CLAY	23.037	S24C	72.41	76.50	S24			

Flood Risk Assessment Addendum Report for Edgehill Phase 3,
High Road, Whitehaven, Cumbria

Appendix 3

MicroDrainage Calculations

MicroDrainage calculations (Detailed Design)

Coopers		Page 1
Park House Sandpiper Court Chester CH4 9QU	EDGEHILL PHASE 3	
	CUMBRIA SW Design	
Date 30/10/2020 17:11	Designed by JAR	
File ALL NETWORKS -NO CV.MDX	Checked by AJ	
Micro Drainage	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 6649 P2 SW01.SWS

Pipe Sizes 6649 P2 SW01 Manhole Sizes 6649 P2 SW01

FSR Rainfall Model - England and Wales			
Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.000	Add Flow / Climate Change (%)	0
Ratio R	0.268	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	0	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.550
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	400

Designed with Level Soffits

Network Design Table for 6649 P2 SW01.SWS

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	53.929	0.674	80.0	0.132	5.00	0.0	0.600	o	300	Pipe/Conduit	
1.001	25.773	0.172	149.8	0.077	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	27.917	0.186	150.1	0.043	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.003	17.748	0.075	236.6	0.055	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.004	22.431	0.094	238.6	0.074	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.005	20.291	0.085	238.7	0.175	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.006	26.839	1.428	18.8	0.108	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.007	28.859	0.650	44.4	0.073	0.00	0.0	0.600	o	300	Pipe/Conduit	
2.000	6.543	0.317	20.6	0.000	5.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	58.962	0.735	80.2	0.099	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.009	42.974	0.421	102.1	0.088	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.000	20.439	0.896	22.8	0.065	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	5.51	90.111	0.132	0.0	0.0	0.0	1.76	124.4	0.0
1.001	0.00	5.85	89.437	0.209	0.0	0.0	0.0	1.28	90.6	0.0
1.002	0.00	6.21	89.265	0.252	0.0	0.0	0.0	1.28	90.6	0.0
1.003	0.00	6.50	89.079	0.307	0.0	0.0	0.0	1.02	71.9	0.0
1.004	0.00	6.87	89.004	0.381	0.0	0.0	0.0	1.01	71.6	0.0
1.005	0.00	7.20	88.910	0.556	0.0	0.0	0.0	1.01	71.6	0.0
1.006	0.00	7.33	88.825	0.664	0.0	0.0	0.0	3.64	257.5	0.0
1.007	0.00	7.53	87.500	0.737	0.0	0.0	0.0	2.37	167.2	0.0
2.000	0.00	5.04	87.242	0.000	0.0	0.0	0.0	2.89	115.0	0.0
1.008	0.00	8.09	86.850	0.836	0.0	0.0	0.0	1.76	124.2	0.0
1.009	0.00	8.55	86.115	0.924	0.0	0.0	0.0	1.56	110.0	0.0
3.000	0.00	5.12	93.500	0.065	0.0	0.0	0.0	2.75	109.4	0.0

Coopers		Page 2
Park House Sandpiper Court Chester CH4 9QU	EDGEHILL PHASE 3 CUMBRIA SW Design	
Date 30/10/2020 17:11	Designed by JAR	
File ALL NETWORKS -NO CV.MDX	Checked by AJ	
Micro Drainage	Network 2018.1.1	

Network Design Table for 6649 P2 SW01.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.001	17.474	0.702	24.9	0.063	0.00	0.0	0.600	o	225	Pipe/Conduit	
4.000	26.680	0.333	80.1	0.013	5.00	0.0	0.600	o	300	Pipe/Conduit	
4.001	10.797	0.147	73.4	0.059	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.002	21.103	0.140	150.7	0.013	0.00	0.0	0.600	o	450	Pipe/Conduit	
5.000	13.083	0.164	79.8	0.067	5.00	0.0	0.600	o	225	Pipe/Conduit	
5.001	27.182	0.647	42.0	0.011	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.003	22.961	0.519	44.2	0.060	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.004	43.276	0.258	167.7	0.037	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.005	39.069	0.381	102.5	0.101	0.00	0.0	0.600	o	450	Pipe/Conduit	
6.000	36.031	1.181	30.5	0.159	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.000	39.674	0.965	41.1	0.122	5.00	0.0	0.600	o	225	Pipe/Conduit	
7.001	20.987	0.262	80.1	0.019	0.00	0.0	0.600	o	300	Pipe/Conduit	
7.002	47.235	0.534	88.5	0.093	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.001	56.048	0.827	67.8	0.170	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.006	10.667	0.137	77.9	0.089	0.00	0.0	0.600	o	450	Pipe/Conduit	
8.000	10.669	0.980	10.9	0.112	5.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.001	0.00	5.23	92.604	0.128	0.0	0.0	0.0	2.63	104.7	0.0
4.000	0.00	5.25	92.308	0.013	0.0	0.0	0.0	1.76	124.3	0.0
4.001	0.00	5.35	91.975	0.072	0.0	0.0	0.0	1.84	129.8	0.0
3.002	0.00	5.56	91.000	0.213	0.0	0.0	0.0	1.65	263.0	0.0
5.000	0.00	5.15	91.896	0.067	0.0	0.0	0.0	1.47	58.3	0.0
5.001	0.00	5.37	91.732	0.078	0.0	0.0	0.0	2.02	80.5	0.0
3.003	0.00	5.69	90.860	0.351	0.0	0.0	0.0	3.06	487.2	0.0
3.004	0.00	6.15	90.341	0.388	0.0	0.0	0.0	1.57	249.2	0.0
3.005	0.00	6.47	90.083	0.489	0.0	0.0	0.0	2.01	319.3	0.0
6.000	0.00	5.25	91.935	0.159	0.0	0.0	0.0	2.38	94.5	0.0
7.000	0.00	5.32	92.516	0.122	0.0	0.0	0.0	2.05	81.4	0.0
7.001	0.00	5.52	91.475	0.141	0.0	0.0	0.0	1.76	124.3	0.0
7.002	0.00	5.99	91.213	0.234	0.0	0.0	0.0	1.67	118.2	0.0
6.001	0.00	6.48	90.679	0.563	0.0	0.0	0.0	1.91	135.2	0.0
3.006	0.00	6.56	89.702	1.141	0.0	0.0	0.0	2.31	366.7	0.0
8.000	0.00	5.04	90.775	0.112	0.0	0.0	0.0	3.99	158.6	0.0

Coopers		Page 3
Park House Sandpiper Court Chester CH4 9QU		EDGEHILL PHASE 3 CUMBRIA SW Design
Date 30/10/2020 17:11 File ALL NETWORKS -NO CV.MDX		Designed by JAR Checked by AJ
Micro Drainage		Network 2018.1.1



Network Design Table for 6649 P2 SW01.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.007	46.819	0.117	400.2	0.046	0.00	13.2	0.600	o	450	Pipe/Conduit	
3.008	18.860	0.047	401.3	0.070	0.00	0.0	0.600	o	450	Pipe/Conduit	
9.000	9.564	0.120	79.7	0.077	5.00	0.0	0.600	o	225	Pipe/Conduit	
9.001	37.117	0.910	40.8	0.076	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.002	46.345	0.505	91.8	0.095	0.00	0.0	0.600	o	300	Pipe/Conduit	
9.003	21.675	0.531	40.8	0.119	0.00	0.0	0.600	o	300	Pipe/Conduit	
3.009	25.674	0.064	401.2	0.037	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.010	17.517	0.044	398.1	0.039	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.011	54.799	0.137	400.0	0.214	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.012	24.003	0.060	400.1	0.073	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.013	51.144	0.969	52.8	0.050	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.014	20.660	0.391	52.8	0.167	0.00	0.0	0.600	o	450	Pipe/Conduit	
10.000	11.585	0.216	53.6	0.090	5.00	0.0	0.600	o	225	Pipe/Conduit	
3.015	28.597	0.071	402.8	0.029	0.00	0.0	0.600	o	450	Pipe/Conduit	
3.016	28.476	0.224	127.1	0.060	0.00	0.0	0.600	o	450	Pipe/Conduit	
11.000	58.375	0.945	61.8	0.081	5.00	0.0	0.600	o	225	Pipe/Conduit	
11.001	43.118	0.257	167.8	0.153	0.00	0.0	0.600	o	300	Pipe/Conduit	
11.002	57.818	0.344	168.1	0.180	0.00	0.0	0.600	o	300	Pipe/Conduit	
11.003	28.235	0.168	168.1	0.190	0.00	0.0	0.600	o	300	Pipe/Conduit	
11.004	19.466	0.116	167.8	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
11.005	19.326	0.115	168.1	0.110	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.007	0.00	7.33	89.123	1.299	13.2	0.0	0.0	1.01	160.7	13.2
3.008	0.00	7.64	89.006	1.369	13.2	0.0	0.0	1.01	160.4	13.2
9.000	0.00	5.11	91.475	0.077	0.0	0.0	0.0	1.47	58.3	0.0
9.001	0.00	5.36	91.280	0.153	0.0	0.0	0.0	2.47	174.5	0.0
9.002	0.00	5.83	90.370	0.248	0.0	0.0	0.0	1.64	116.1	0.0
9.003	0.00	5.98	89.865	0.367	0.0	0.0	0.0	2.47	174.5	0.0
3.009	0.00	8.07	88.959	1.773	13.2	0.0	0.0	1.01	160.5	13.2
3.010	0.00	8.35	88.895	1.812	13.2	0.0	0.0	1.01	161.1	13.2
3.011	0.00	9.26	88.851	2.026	13.2	0.0	0.0	1.01	160.7	13.2
3.012	0.00	9.65	88.714	2.099	13.2	0.0	0.0	1.01	160.7	13.2
3.013	0.00	9.96	88.654	2.149	13.2	0.0	0.0	2.80	445.9	13.2
3.014	0.00	10.08	87.685	2.316	13.2	0.0	0.0	2.80	445.6	13.2
10.000	0.00	5.11	87.961	0.090	0.0	0.0	0.0	1.79	71.2	0.0
3.015	0.00	10.56	87.294	2.435	13.2	0.0	0.0	1.01	160.1	13.2
3.016	0.00	10.82	87.223	2.495	13.2	0.0	0.0	1.80	286.6	13.2
11.000	0.00	5.58	92.328	0.081	0.0	0.0	0.0	1.67	66.3	0.0
11.001	0.00	6.18	91.308	0.234	0.0	0.0	0.0	1.21	85.6	0.0
11.002	0.00	6.97	91.051	0.414	0.0	0.0	0.0	1.21	85.5	0.0
11.003	0.00	7.36	90.707	0.604	0.0	0.0	0.0	1.21	85.5	0.0
11.004	0.00	7.63	89.472	0.622	0.0	0.0	0.0	1.21	85.6	0.0
11.005	0.00	7.90	88.071	0.732	0.0	0.0	0.0	1.21	85.5	0.0

Coopers		Page 4
Park House Sandpiper Court Chester CH4 9QU	EDGEHILL PHASE 3 CUMBRIA SW Design	
Date 30/10/2020 17:11 File ALL NETWORKS -NO CV.MDX	Designed by JAR Checked by AJ	
Micro Drainage	Network 2018.1.1	

Network Design Table for 6649 P2 SW01.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.017	44.143	0.996	44.3	0.067	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.010	61.448	1.290	47.6	0.071	0.00	0.0	0.600	o	675	Pipe/Conduit	
12.000	21.362	0.304	70.3	0.077	5.00	0.0	0.600	o	225	Pipe/Conduit	
12.001	25.623	0.376	68.1	0.012	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.002	24.293	0.339	71.7	0.039	0.00	0.0	0.600	o	225	Pipe/Conduit	
12.003	46.600	0.457	102.0	0.067	0.00	0.0	0.600	o	300	Pipe/Conduit	
12.004	50.347	0.210	239.7	0.164	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.011	11.781	0.029	406.2	0.148	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.012	46.517	1.034	45.0	0.008	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.013	24.120	0.360	67.0	0.010	0.00	0.0	0.600	o	675	Pipe/Conduit	
13.000	21.739	1.431	15.2	0.047	5.00	0.0	0.600	o	225	Pipe/Conduit	
13.001	28.254	1.414	20.0	0.070	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.014	12.639	0.248	51.0	0.093	0.00	0.0	0.600	o	675	Pipe/Conduit	
1.015	29.584	0.373	79.3	0.056	0.00	0.0	0.600	o	675	Pipe/Conduit	
14.000	13.070	0.077	169.7	0.083	5.00	0.0	0.600	o	225	Pipe/Conduit	
15.000	41.136	1.278	32.2	0.124	5.00	0.0	0.600	o	225	Pipe/Conduit	
15.001	35.630	0.320	111.3	0.059	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.002	34.499	1.215	28.4	0.084	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.017	0.00	11.06	86.000	3.294	13.2	0.0	0.0	3.06	486.7	13.2
1.010	0.00	11.33	83.519	4.289	13.2	0.0	0.0	3.80	1361.1	13.2
12.000	0.00	5.23	84.365	0.077	0.0	0.0	0.0	1.56	62.1	0.0
12.001	0.00	5.50	84.061	0.089	0.0	0.0	0.0	1.59	63.1	0.0
12.002	0.00	5.76	83.685	0.128	0.0	0.0	0.0	1.55	61.5	0.0
12.003	0.00	6.26	83.271	0.195	0.0	0.0	0.0	1.56	110.1	0.0
12.004	0.00	7.09	82.814	0.359	0.0	0.0	0.0	1.01	71.5	0.0
1.011	0.00	11.48	82.229	4.796	13.2	0.0	0.0	1.29	463.1	13.2
1.012	0.00	11.68	82.200	4.804	13.2	0.0	0.0	3.91	1400.7	13.2
1.013	0.00	11.80	81.166	4.814	13.2	0.0	0.0	3.21	1146.9	13.2
13.000	0.00	5.11	84.125	0.047	0.0	0.0	0.0	3.37	134.2	0.0
13.001	0.00	5.27	82.670	0.117	0.0	0.0	0.0	2.94	116.9	0.0
1.014	0.00	11.86	80.806	5.024	13.2	0.0	0.0	3.68	1315.7	13.2
1.015	0.00	12.03	80.558	5.080	13.2	0.0	0.0	2.94	1053.8	13.2
14.000	0.00	5.22	83.685	0.083	0.0	0.0	0.0	1.00	39.8	0.0
15.000	0.00	5.30	96.586	0.124	0.0	0.0	0.0	2.31	92.0	0.0
15.001	0.00	5.78	95.308	0.183	0.0	0.0	0.0	1.24	49.2	0.0
15.002	0.00	6.01	94.200	0.267	0.0	0.0	0.0	2.46	98.0	0.0

Coopers				Page 5			
Park House Sandpiper Court Chester CH4 9QU				EDGEHILL PHASE 3 CUMBRIA SW Design			
Date 30/10/2020 17:11				Designed by JAR			
File ALL NETWORKS -NO CV.MDX				Checked by AJ			
Micro Drainage				Network 2018.1.1			



Network Design Table for 6649 P2 SW01.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
15.003	21.353	0.142	150.4	0.019	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.004	16.052	0.182	88.2	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
16.000	31.679	0.576	55.0	0.106	5.00	0.0	0.600	o	225	Pipe/Conduit	
16.001	15.814	0.105	150.6	0.102	0.00	0.0	0.600	o	225	Pipe/Conduit	
16.002	17.647	0.266	66.3	0.015	0.00	0.0	0.600	o	225	Pipe/Conduit	
15.005	21.223	0.777	27.3	0.018	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.006	40.928	0.834	49.1	0.068	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.007	22.496	0.367	61.3	0.031	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.008	32.651	1.256	26.0	0.082	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.009	25.531	0.136	187.7	0.076	0.00	0.0	0.600	o	450	Pipe/Conduit	
17.000	34.996	0.531	65.9	0.167	5.00	0.0	0.600	o	225	Pipe/Conduit	
17.001	11.207	0.275	40.8	0.056	0.00	0.0	0.600	o	225	Pipe/Conduit	
17.002	31.434	0.745	42.2	0.087	0.00	0.0	0.600	o	225	Pipe/Conduit	
17.003	44.603	0.266	167.7	0.086	0.00	0.0	0.600	o	225	Pipe/Conduit	
17.004	28.940	0.193	149.9	0.063	0.00	0.0	0.600	o	300	Pipe/Conduit	
17.005	20.170	0.841	24.0	0.064	0.00	0.0	0.600	o	300	Pipe/Conduit	
17.006	18.728	0.982	19.1	0.065	0.00	0.0	0.600	o	300	Pipe/Conduit	
15.010	20.721	0.052	398.5	0.116	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.011	35.522	0.089	399.1	0.056	0.00	0.0	0.600	o	450	Pipe/Conduit	
18.000	38.531	0.096	401.4	0.088	5.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
15.003	0.00	6.29	92.913	0.286	0.0	0.0	0.0	1.28	90.5	0.0
15.004	0.00	6.45	92.771	0.349	0.0	0.0	0.0	1.67	118.4	0.0
16.000	0.00	5.30	93.611	0.106	0.0	0.0	0.0	1.77	70.3	0.0
16.001	0.00	5.55	93.035	0.208	0.0	0.0	0.0	1.06	42.3	0.0
16.002	0.00	5.73	92.930	0.223	0.0	0.0	0.0	1.61	63.9	0.0
15.005	0.00	6.56	92.589	0.590	0.0	0.0	0.0	3.02	213.5	0.0
15.006	0.00	6.80	91.662	0.658	0.0	0.0	0.0	2.91	462.5	0.0
15.007	0.00	6.94	90.828	0.689	0.0	0.0	0.0	2.60	413.6	0.0
15.008	0.00	7.08	90.461	0.771	0.0	0.0	0.0	4.00	636.2	0.0
15.009	0.00	7.37	88.350	0.847	0.0	0.0	0.0	1.48	235.5	0.0
17.000	0.00	5.36	93.825	0.167	0.0	0.0	0.0	1.61	64.2	0.0
17.001	0.00	5.45	93.294	0.223	0.0	0.0	0.0	2.06	81.7	0.0
17.002	0.00	5.71	93.019	0.310	0.0	0.0	0.0	2.02	80.3	0.0
17.003	0.00	6.45	90.714	0.396	0.0	0.0	0.0	1.01	40.0	0.0
17.004	0.00	6.83	90.373	0.459	0.0	0.0	0.0	1.28	90.6	0.0
17.005	0.00	6.93	90.180	0.523	0.0	0.0	0.0	3.22	227.9	0.0
17.006	0.00	7.02	89.339	0.588	0.0	0.0	0.0	3.62	255.7	0.0
15.010	0.00	7.71	86.700	1.551	0.0	0.0	0.0	1.01	161.0	0.0
15.011	0.00	8.29	84.861	1.607	0.0	0.0	0.0	1.01	160.9	0.0
18.000	0.00	5.64	83.696	0.088	0.0	0.0	0.0	1.01	160.4	0.0

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Park House Sandpiper Court Chester CH4 9QU				EDGEHILL PHASE 3 CUMBRIA SW Design			
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Micro Drainage				Network 2018.1.1			



Network Design Table for 6649 P2 SW01.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
15.012	34.368	0.190	180.9	0.153	0.00	0.0	0.600	o	450	Pipe/Conduit	
19.000	63.225	1.664	38.0	0.060	5.00	0.0	0.600	o	225	Pipe/Conduit	
19.001	28.235	0.522	54.1	0.017	0.00	0.0	0.600	o	300	Pipe/Conduit	
19.002	21.480	0.128	167.8	0.065	0.00	0.0	0.600	o	300	Pipe/Conduit	
19.003	10.724	0.064	167.6	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
19.004	16.245	0.041	396.2	0.060	0.00	0.0	0.600	o	450	Pipe/Conduit	
19.005	13.982	0.035	399.5	0.002	0.00	0.0	0.600	o	450	Pipe/Conduit	
15.013	26.369	0.101	261.1	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
14.001	27.953	0.904	30.9	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
14.002	27.953	1.075	26.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.016	46.235	0.589	78.5	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.017	34.247	0.410	83.5	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
20.000	21.861	0.129	169.5	0.035	5.00	0.0	0.600	o	225	Pipe/Conduit	
20.001	18.916	1.651	11.5	0.049	0.00	0.0	0.600	o	225	Pipe/Conduit	
20.002	14.610	1.328	11.0	0.129	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.018	20.718	0.430	48.2	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
21.000	19.124	0.112	170.8	0.058	5.00	0.0	0.600	o	225	Pipe/Conduit	
21.001	35.278	0.208	169.6	0.052	0.00	0.0	0.600	o	225	Pipe/Conduit	
21.002	23.191	0.315	73.6	0.044	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
15.012	0.00	8.67	83.600	1.848	0.0	0.0	0.0	1.51	239.9	0.0
19.000	0.00	5.49	89.136	0.060	0.0	0.0	0.0	2.13	84.6	0.0
19.001	0.00	5.71	87.397	0.077	0.0	0.0	0.0	2.14	151.4	0.0
19.002	0.00	6.01	85.741	0.142	0.0	0.0	0.0	1.21	85.6	0.0
19.003	0.00	6.16	85.613	0.157	0.0	0.0	0.0	1.21	85.7	0.0
19.004	0.00	6.42	85.400	0.217	0.0	0.0	0.0	1.02	161.5	0.0
19.005	0.00	6.65	84.400	0.219	0.0	0.0	0.0	1.01	160.8	0.0
15.013	0.00	9.02	83.410	2.067	0.0	0.0	0.0	1.25	199.4	0.0
14.001	0.00	9.15	83.384	2.150	0.0	0.0	0.0	3.67	583.1	0.0
14.002	0.00	9.27	81.485	2.150	0.0	0.0	0.0	4.00	636.1	0.0
1.016	0.00	12.27	77.935	7.230	13.2	0.0	0.0	3.16	1396.3	13.2
1.017	0.00	12.46	75.851	7.230	13.2	0.0	0.0	3.06	1353.4	13.2
20.000	0.00	5.36	78.325	0.035	0.0	0.0	0.0	1.00	39.8	0.0
20.001	0.00	5.44	78.196	0.084	0.0	0.0	0.0	3.89	154.6	0.0
20.002	0.00	5.51	76.545	0.213	0.0	0.0	0.0	3.97	157.8	0.0
1.018	0.00	12.54	73.191	7.443	13.2	0.0	0.0	4.04	1783.8	13.2
21.000	0.00	5.32	72.725	0.058	0.0	0.0	0.0	1.00	39.7	0.0
21.001	0.00	5.91	72.613	0.110	0.0	0.0	0.0	1.00	39.8	0.0
21.002	0.00	6.16	72.405	0.154	0.0	0.0	0.0	1.53	60.7	0.0

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Network Design Table for 6649 P2 SW01.SWS

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.019	13.163	0.200	65.8	0.049	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.020	29.678	0.694	42.8	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.021	71.017	1.420	50.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.022	24.246	0.485	50.0	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.023	54.991#	0.137	401.4	0.000	0.00	0.0	0.600	o	750	Pipe/Conduit	
1.024	46.344	1.930	24.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
1.025	16.932	0.170	99.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.019	0.00	12.61	70.762	7.646	13.2	0.0	0.0	3.45	1525.4	13.2
1.020	0.00	12.72	68.562	7.646	13.2	0.0	0.0	4.29	1893.8	13.2
1.021	0.00	13.02	65.605	7.646	13.2	0.0	0.0	3.96	1750.7	13.2
1.022	0.00	13.12	64.185	7.646	13.2	0.0	0.0	3.96	1751.1	13.2
1.023	0.00	13.78	63.125	7.646	13.2	0.0	0.0	1.39	614.3	13.2
1.024	0.00	13.97	62.988	7.646	13.2	0.0	0.0	4.16	662.0	13.2
1.025	0.00	14.11	59.470	7.646	13.2	0.0	0.0	2.04	324.0	13.2

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Park House Sandpiper Court Chester CH4 9QU	EDGEHILL PHASE 3 CUMBRIA SW Design	
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Manhole Schedules for 6649 P2 SW01.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., I*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
101	91.879	1.768	Open Manhole	1350	1.000	90.111	300				
102	92.322	2.885	Open Manhole	1800	1.001	89.437	300	1.000	89.437	300	
103	92.145	2.880	Open Manhole	1800	1.002	89.265	300	1.001	89.265	300	
104	91.454	2.375	Open Manhole	1800	1.003	89.079	300	1.002	89.079	300	
105	90.997	1.993	Open Manhole	1800	1.004	89.004	300	1.003	89.004	300	
106	90.432	1.522	Open Manhole	1800	1.005	88.910	300	1.004	88.910	300	
107	90.417	1.592	Open Manhole	2000	1.006	88.825	300	1.005	88.825	300	
1	89.350	1.953	Open Manhole	1500	1.007	87.500	300	1.006	87.397	300	
2	89.317	2.075	Open Manhole	1200	2.000	87.242	225				
3	89.000	2.150	Open Manhole	1500	1.008	86.850	300	1.007	86.850	300	
								2.000	86.925	225	
4	88.037	1.922	Open Manhole	1350	1.009	86.115	300	1.008	86.115	300	
201	95.600	2.100	Open Manhole	1800	3.000	93.500	225				
202	94.281	1.677	Open Manhole	1800	3.001	92.604	225	3.000	92.604	225	
203	94.033	1.725	Open Manhole	1800	4.000	92.308	300				
204	93.700	1.725	Open Manhole	1800	4.001	91.975	300	4.000	91.975	300	
205	93.557	2.557	Open Manhole	1800	3.002	91.000	450	3.001	91.902	225	677
								4.001	91.828	300	678
206	93.621	1.725	Open Manhole	1800	5.000	91.896	225				
207	93.445	1.713	Open Manhole	1800	5.001	91.732	225	5.000	91.732	225	
208	93.271	2.411	Open Manhole	1800	3.003	90.860	450	3.002	90.860	450	
								5.001	91.085	225	
209	92.291	1.950	Open Manhole	1800	3.004	90.341	450	3.003	90.341	450	
210	92.419	2.336	Open Manhole	1800	3.005	90.083	450	3.004	90.083	450	
211	93.661	1.726	Open Manhole	1800	6.000	91.935	225				
212	94.241	1.725	Open Manhole	1800	7.000	92.516	225				
213	93.200	1.725	Open Manhole	1800	7.001	91.475	300	7.000	91.551	225	1
214	92.938	1.725	Open Manhole	1800	7.002	91.213	300	7.001	91.213	300	
215	92.445	1.766	Open Manhole	1800	6.001	90.679	300	6.000	90.754	225	
								7.002	90.679	300	
216	91.954	2.252	Open Manhole	2100	3.006	89.702	450	3.005	89.702	450	
								6.001	89.852	300	
217	92.674	1.899	Open Manhole	1800	8.000	90.775	225				
218	92.317	3.194	Open Manhole	2100	3.007	89.123	450	3.006	89.565	450	442
								8.000	89.795	225	447
219	92.592	3.586	Open Manhole	2100	3.008	89.006	450	3.007	89.006	450	
220	93.200	1.725	Open Manhole	1800	9.000	91.475	225				
221	93.400	2.120	Open Manhole	1800	9.001	91.280	300	9.000	91.355	225	
222	92.170	1.800	Open Manhole	1800	9.002	90.370	300	9.001	90.370	300	
223	91.665	1.800	Open Manhole	1800	9.003	89.865	300	9.002	89.865	300	
224	92.369	3.410	Open Manhole	2100	3.009	88.959	450	3.008	88.959	450	
								9.003	89.334	300	225
225	92.288	3.393	Open Manhole	2100	3.010	88.895	450	3.009	88.895	450	
226	92.554	3.703	Open Manhole	2100	3.011	88.851	450	3.010	88.851	450	

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Manhole Schedules for 6649 P2 SW01.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
227	92.707	3.993	Open Manhole	2100	3.012	88.714	450	3.011	88.714	450	
228	92.063	3.409	Open Manhole	2100	3.013	88.654	450	3.012	88.654	450	
229	90.600	2.915	Open Manhole	2100	3.014	87.685	450	3.013	87.685	450	
230	89.686	1.725	Open Manhole	1500	10.000	87.961	225				
231	89.975	2.681	Open Manhole	2100	3.015	87.294	450	3.014	87.294	450	
								10.000	87.745	225	226
232	89.627	2.404	Open Manhole	2100	3.016	87.223	450	3.015	87.223	450	
233	94.053	1.725	Open Manhole	1800	11.000	92.328	225				
234	93.109	1.801	Open Manhole	1800	11.001	91.308	300	11.000	91.383	225	
235	93.104	2.053	Open Manhole	1800	11.002	91.051	300	11.001	91.051	300	
236	92.627	1.920	Open Manhole	1800	11.003	90.707	300	11.002	90.707	300	
237	92.335	2.863	Open Manhole	1800	11.004	89.472	300	11.003	90.539	300	1067
238	91.272	3.201	Open Manhole	1800	11.005	88.071	300	11.004	89.356	300	1285
239	89.871	3.871	Open Manhole	2100	3.017	86.000	450	3.016	86.999	450	999
								11.005	87.956	300	1806
5	87.612	4.093	Open Manhole	2400	1.010	83.519	675	1.009	85.694	300	1800
								3.017	85.004	450	1260
6	86.140	1.775	Open Manhole	1500	12.000	84.365	225				
7	85.836	1.775	Open Manhole	1200	12.001	84.061	225	12.000	84.061	225	
8	85.460	1.775	Open Manhole	1200	12.002	83.685	225	12.001	83.685	225	
9	85.121	1.850	Open Manhole	1500	12.003	83.271	300	12.002	83.346	225	
10	84.553	1.739	Open Manhole	1350	12.004	82.814	300	12.003	82.814	300	
11	84.815	2.586	Open Manhole	1800	1.011	82.229	675	1.010	82.229	675	
								12.004	82.604	300	
12	84.270	2.070	Open Manhole	1800	1.012	82.200	675	1.011	82.200	675	
13	83.408	2.242	Open Manhole	1800	1.013	81.166	675	1.012	81.166	675	
14A	85.850	1.725	Open Manhole	1200	13.000	84.125	225				
14	84.400	1.730	Open Manhole	1200	13.001	82.670	225	13.000	82.694	225	24
15	82.945	2.139	Open Manhole	1800	1.014	80.806	675	1.013	80.806	675	
								13.001	81.256	225	
16	82.900	2.342	Open Manhole	1800	1.015	80.558	675	1.014	80.558	675	
17	85.450	1.765	Open Manhole	1500	14.000	83.685	225				
301	98.011	1.425	Open Manhole	1350	15.000	96.586	225				
302	96.735	1.427	Open Manhole	1350	15.001	95.308	225	15.000	95.308	225	
303	95.625	1.425	Open Manhole	1350	15.002	94.200	225	15.001	94.988	225	788
304	94.638	1.725	Open Manhole	1500	15.003	92.913	300	15.002	92.985	225	
305	94.729	1.958	Open Manhole	1500	15.004	92.771	300	15.003	92.771	300	
306	95.332	1.721	Open Manhole	1350	16.000	93.611	225				
307	94.752	1.717	Open Manhole	1350	16.001	93.035	225	16.000	93.035	225	
308	94.457	1.527	Open Manhole	1350	16.002	92.930	225	16.001	92.930	225	
309	94.253	1.664	Open Manhole	1350	15.005	92.589	300	15.004	92.589	300	
								16.002	92.664	225	
310	93.433	1.771	Open Manhole	2100	15.006	91.662	450	15.005	91.812	300	
311	92.630	1.802	Open Manhole	2100	15.007	90.828	450	15.006	90.828	450	

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Park House Sandpiper Court Chester CH4 9QU	EDGEHILL PHASE 3 CUMBRIA SW Design	
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Manhole Schedules for 6649 P2 SW01.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
312	92.262	1.801	Open Manhole	2100	15.008	90.461	450	15.007	90.461	450	855
313	91.158	2.808	Open Manhole	2100	15.009	88.350	450	15.008	89.205	450	
314	95.330	1.505	Open Manhole	1350	17.000	93.825	225				
315	95.464	2.170	Open Manhole	1350	17.001	93.294	225	17.000	93.294	225	
316	95.560	2.541	Open Manhole	1350	17.002	93.019	225	17.001	93.019	225	1560
317	93.939	3.225	Open Manhole	1350	17.003	90.714	225	17.002	92.274	225	
318	92.227	1.854	Open Manhole	1500	17.004	90.373	300	17.003	90.448	225	
319	91.827	1.647	Open Manhole	1500	17.005	90.180	300	17.004	90.180	300	
320	91.212	1.873	Open Manhole	1500	17.006	89.339	300	17.005	89.339	300	1514
321	90.231	3.531	Open Manhole	2400	15.010	86.700	450	15.009	88.214	450	
								17.006	88.357	300	
								15.010	86.648	450	
322	88.853	3.992	Open Manhole	2400	15.011	84.861	450	15.010	86.648	450	1787
323	87.367	3.671	Open Manhole	2400	18.000	83.696	450				1172
324	86.723	3.123	Open Manhole	2400	15.012	83.600	450	15.011	84.772	450	
								18.000	83.600	450	
325	91.600	2.464	Open Manhole	1350	19.000	89.136	225				1134
326	89.200	1.803	Open Manhole	1500	19.001	87.397	300	19.000	87.472	225	
327	88.600	2.859	Open Manhole	1500	19.002	85.741	300	19.001	86.875	300	
328	87.780	2.167	Open Manhole	1500	19.003	85.613	300	19.002	85.613	300	
329	87.251	1.851	Open Manhole	2400	19.004	85.400	450	19.003	85.549	300	959
330	86.488	2.088	Open Manhole	2400	19.005	84.400	450	19.004	85.359	450	
331	86.256	2.846	Open Manhole	2400	15.013	83.410	450	15.012	83.410	450	
								19.005	84.365	450	
18	85.034	1.725	Open Manhole	1500	14.001	83.384	450	14.000	83.608	225	995
								15.013	83.309	450	
19	84.500	3.015	Open Manhole	1800	14.002	81.485	450	14.001	82.480	450	
20	83.055	5.120	Open Manhole	2400	1.016	77.935	750	1.015	80.185	675	2175
								14.002	80.410	450	2175
21	79.521	3.670	Open Manhole	2400	1.017	75.851	750	1.016	77.346	750	1495
22A	80.050	1.725	Open Manhole	1200	20.000	78.325	225				2250
22B	79.925	1.729	Open Manhole	1200	20.001	78.196	225	20.000	78.196	225	
22	79.360	2.815	Open Manhole	1500	20.002	76.545	225	20.001	76.545	225	
23	77.691	4.500	Open Manhole	2400	1.018	73.191	750	1.017	75.441	750	
								20.002	75.217	225	1501
24A	74.450	1.725	Open Manhole	1200	21.000	72.725	225				1999
24B	74.850	2.237	Open Manhole	1200	21.001	72.613	225	21.000	72.613	225	
24C	76.500	4.095	Open Manhole	1200	21.002	72.405	225	21.001	72.405	225	
24	76.000	5.238	Open Manhole	2400	1.019	70.762	750	1.018	72.761	750	
								21.002	72.090	225	803
25	73.500	4.938	Open Manhole	2400	1.020	68.562	750	1.019	70.562	750	2000
26	70.610	5.005	Open Manhole	2400	1.021	65.605	750	1.020	67.868	750	2263
27	66.500	2.315	Open Manhole	2400	1.022	64.185	750	1.021	64.185	750	575
H/WALL 1	65.500	2.375	Open Manhole	1200	1.023	63.125	750	1.022	63.700	750	
28	64.600	1.612	Open Manhole	1800	1.024	62.988	450	1.023	62.988	750	

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Park House Sandpiper Court Chester CH4 9QU		EDGEHILL PHASE 3 CUMBRIA SW Design
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Manhole Schedules for 6649 P2 SW01.SWS

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	Pipe Out			Pipes In			Backdrop (mm)
					PN	Invert Level (m)	Diameter (mm)	PN	Invert Level (m)	Diameter (mm)	
29	62.750	3.280	Open Manhole	1500	1.025	59.470	450	1.024	61.058	450	1588
30	60.250	0.950	Open Manhole	0		OUTFALL		1.025	59.300	450	

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PIPELINE SCHEDULES for 6649 P2 SW01.SWS

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	300	101	91.879	90.111	1.468	Open Manhole	1350
1.001	o	300	102	92.322	89.437	2.585	Open Manhole	1800
1.002	o	300	103	92.145	89.265	2.580	Open Manhole	1800
1.003	o	300	104	91.454	89.079	2.075	Open Manhole	1800
1.004	o	300	105	90.997	89.004	1.693	Open Manhole	1800
1.005	o	300	106	90.432	88.910	1.222	Open Manhole	1800
1.006	o	300	107	90.417	88.825	1.292	Open Manhole	2000
1.007	o	300	1	89.350	87.500	1.550	Open Manhole	1500
2.000	o	225	2	89.317	87.242	1.850	Open Manhole	1200
1.008	o	300	3	89.000	86.850	1.850	Open Manhole	1500
1.009	o	300	4	88.037	86.115	1.622	Open Manhole	1350
3.000	o	225	201	95.600	93.500	1.875	Open Manhole	1800
3.001	o	225	202	94.281	92.604	1.452	Open Manhole	1800
4.000	o	300	203	94.033	92.308	1.425	Open Manhole	1800
4.001	o	300	204	93.700	91.975	1.425	Open Manhole	1800
3.002	o	450	205	93.557	91.000	2.107	Open Manhole	1800
5.000	o	225	206	93.621	91.896	1.500	Open Manhole	1800
5.001	o	225	207	93.445	91.732	1.488	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	53.929	80.0	102	92.322	89.437	2.585	Open Manhole	1800
1.001	25.773	149.8	103	92.145	89.265	2.580	Open Manhole	1800
1.002	27.917	150.1	104	91.454	89.079	2.075	Open Manhole	1800
1.003	17.748	236.6	105	90.997	89.004	1.693	Open Manhole	1800
1.004	22.431	238.6	106	90.432	88.910	1.222	Open Manhole	1800
1.005	20.291	238.7	107	90.417	88.825	1.292	Open Manhole	2000
1.006	26.839	18.8	1	89.350	87.397	1.653	Open Manhole	1500
1.007	28.859	44.4	3	89.000	86.850	1.850	Open Manhole	1500
2.000	6.543	20.6	3	89.000	86.925	1.850	Open Manhole	1500
1.008	58.962	80.2	4	88.037	86.115	1.622	Open Manhole	1350
1.009	42.974	102.1	5	87.612	85.694	1.618	Open Manhole	2400
3.000	20.439	22.8	202	94.281	92.604	1.452	Open Manhole	1800
3.001	17.474	24.9	205	93.557	91.902	1.430	Open Manhole	1800
4.000	26.680	80.1	204	93.700	91.975	1.425	Open Manhole	1800
4.001	10.797	73.4	205	93.557	91.828	1.429	Open Manhole	1800
3.002	21.103	150.7	208	93.271	90.860	1.961	Open Manhole	1800
5.000	13.083	79.8	207	93.445	91.732	1.488	Open Manhole	1800
5.001	27.182	42.0	208	93.271	91.085	1.961	Open Manhole	1800

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PIPELINE SCHEDULES for 6649 P2 SW01.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.003	o	450	208	93.271	90.860	1.961	Open Manhole	1800
3.004	o	450	209	92.291	90.341	1.500	Open Manhole	1800
3.005	o	450	210	92.419	90.083	1.886	Open Manhole	1800
6.000	o	225	211	93.661	91.935	1.501	Open Manhole	1800
7.000	o	225	212	94.241	92.516	1.500	Open Manhole	1800
7.001	o	300	213	93.200	91.475	1.425	Open Manhole	1800
7.002	o	300	214	92.938	91.213	1.425	Open Manhole	1800
6.001	o	300	215	92.445	90.679	1.466	Open Manhole	1800
3.006	o	450	216	91.954	89.702	1.802	Open Manhole	2100
8.000	o	225	217	92.674	90.775	1.674	Open Manhole	1800
3.007	o	450	218	92.317	89.123	2.744	Open Manhole	2100
3.008	o	450	219	92.592	89.006	3.136	Open Manhole	2100
9.000	o	225	220	93.200	91.475	1.500	Open Manhole	1800
9.001	o	300	221	93.400	91.280	1.820	Open Manhole	1800
9.002	o	300	222	92.170	90.370	1.500	Open Manhole	1800
9.003	o	300	223	91.665	89.865	1.500	Open Manhole	1800

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.003	22.961	44.2	209	92.291	90.341	1.500	Open Manhole	1800
3.004	43.276	167.7	210	92.419	90.083	1.886	Open Manhole	1800
3.005	39.069	102.5	216	91.954	89.702	1.802	Open Manhole	2100
6.000	36.031	30.5	215	92.445	90.754	1.466	Open Manhole	1800
7.000	39.674	41.1	213	93.200	91.551	1.424	Open Manhole	1800
7.001	20.987	80.1	214	92.938	91.213	1.425	Open Manhole	1800
7.002	47.235	88.5	215	92.445	90.679	1.466	Open Manhole	1800
6.001	56.048	67.8	216	91.954	89.852	1.802	Open Manhole	2100
3.006	10.667	77.9	218	92.317	89.565	2.302	Open Manhole	2100
8.000	10.669	10.9	218	92.317	89.795	2.297	Open Manhole	2100
3.007	46.819	400.2	219	92.592	89.006	3.136	Open Manhole	2100
3.008	18.860	401.3	224	92.369	88.959	2.960	Open Manhole	2100
9.000	9.564	79.7	221	93.400	91.355	1.820	Open Manhole	1800
9.001	37.117	40.8	222	92.170	90.370	1.500	Open Manhole	1800
9.002	46.345	91.8	223	91.665	89.865	1.500	Open Manhole	1800
9.003	21.675	40.8	224	92.369	89.334	2.735	Open Manhole	2100

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Park House Sandpiper Court Chester CH4 9QU	EDGEHILL PHASE 3 CUMBRIA SW Design	
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PIPELINE SCHEDULES for 6649 P2 SW01.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.009	o	450	224	92.369	88.959	2.960	Open Manhole	2100
3.010	o	450	225	92.288	88.895	2.943	Open Manhole	2100
3.011	o	450	226	92.554	88.851	3.253	Open Manhole	2100
3.012	o	450	227	92.707	88.714	3.543	Open Manhole	2100
3.013	o	450	228	92.063	88.654	2.959	Open Manhole	2100
3.014	o	450	229	90.600	87.685	2.465	Open Manhole	2100
10.000	o	225	230	89.686	87.961	1.500	Open Manhole	1500
3.015	o	450	231	89.975	87.294	2.231	Open Manhole	2100
3.016	o	450	232	89.627	87.223	1.954	Open Manhole	2100
11.000	o	225	233	94.053	92.328	1.500	Open Manhole	1800
11.001	o	300	234	93.109	91.308	1.501	Open Manhole	1800
11.002	o	300	235	93.104	91.051	1.753	Open Manhole	1800
11.003	o	300	236	92.627	90.707	1.620	Open Manhole	1800
11.004	o	300	237	92.335	89.472	2.563	Open Manhole	1800
11.005	o	300	238	91.272	88.071	2.901	Open Manhole	1800
3.017	o	450	239	89.871	86.000	3.421	Open Manhole	2100
1.010	o	675	5	87.612	83.519	3.418	Open Manhole	2400
12.000	o	225	6	86.140	84.365	1.550	Open Manhole	1500
12.001	o	225	7	85.836	84.061	1.550	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
3.009	25.674	401.2	225	92.288	88.895	2.943	Open Manhole	2100
3.010	17.517	398.1	226	92.554	88.851	3.253	Open Manhole	2100
3.011	54.799	400.0	227	92.707	88.714	3.543	Open Manhole	2100
3.012	24.003	400.1	228	92.063	88.654	2.959	Open Manhole	2100
3.013	51.144	52.8	229	90.600	87.685	2.465	Open Manhole	2100
3.014	20.660	52.8	231	89.975	87.294	2.231	Open Manhole	2100
10.000	11.585	53.6	231	89.975	87.745	2.005	Open Manhole	2100
3.015	28.597	402.8	232	89.627	87.223	1.954	Open Manhole	2100
3.016	28.476	127.1	239	89.871	86.999	2.422	Open Manhole	2100
11.000	58.375	61.8	234	93.109	91.383	1.501	Open Manhole	1800
11.001	43.118	167.8	235	93.104	91.051	1.753	Open Manhole	1800
11.002	57.818	168.1	236	92.627	90.707	1.620	Open Manhole	1800
11.003	28.235	168.1	237	92.335	90.539	1.496	Open Manhole	1800
11.004	19.466	167.8	238	91.272	89.356	1.616	Open Manhole	1800
11.005	19.326	168.1	239	89.871	87.956	1.615	Open Manhole	2100
3.017	44.143	44.3	5	87.612	85.004	2.158	Open Manhole	2400
1.010	61.448	47.6	11	84.815	82.229	1.911	Open Manhole	1800
12.000	21.362	70.3	7	85.836	84.061	1.550	Open Manhole	1200
12.001	25.623	68.1	8	85.460	83.685	1.550	Open Manhole	1200

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PIPELINE SCHEDULES for 6649 P2 SW01.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
12.002	o	225	8	85.460	83.685	1.550	Open Manhole	1200
12.003	o	300	9	85.121	83.271	1.550	Open Manhole	1500
12.004	o	300	10	84.553	82.814	1.439	Open Manhole	1350
1.011	o	675	11	84.815	82.229	1.911	Open Manhole	1800
1.012	o	675	12	84.270	82.200	1.395	Open Manhole	1800
1.013	o	675	13	83.408	81.166	1.567	Open Manhole	1800
13.000	o	225	14A	85.850	84.125	1.500	Open Manhole	1200
13.001	o	225	14	84.400	82.670	1.505	Open Manhole	1200
1.014	o	675	15	82.945	80.806	1.464	Open Manhole	1800
1.015	o	675	16	82.900	80.558	1.667	Open Manhole	1800
14.000	o	225	17	85.450	83.685	1.540	Open Manhole	1500
15.000	o	225	301	98.011	96.586	1.200	Open Manhole	1350
15.001	o	225	302	96.735	95.308	1.202	Open Manhole	1350
15.002	o	225	303	95.625	94.200	1.200	Open Manhole	1350
15.003	o	300	304	94.638	92.913	1.425	Open Manhole	1500
15.004	o	300	305	94.729	92.771	1.658	Open Manhole	1500
16.000	o	225	306	95.332	93.611	1.496	Open Manhole	1350
16.001	o	225	307	94.752	93.035	1.492	Open Manhole	1350
16.002	o	225	308	94.457	92.930	1.302	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
12.002	24.293	71.7	9	85.121	83.346	1.550	Open Manhole	1500
12.003	46.600	102.0	10	84.553	82.814	1.439	Open Manhole	1350
12.004	50.347	239.7	11	84.815	82.604	1.911	Open Manhole	1800
1.011	11.781	406.2	12	84.270	82.200	1.395	Open Manhole	1800
1.012	46.517	45.0	13	83.408	81.166	1.567	Open Manhole	1800
1.013	24.120	67.0	15	82.945	80.806	1.464	Open Manhole	1800
13.000	21.739	15.2	14	84.400	82.694	1.481	Open Manhole	1200
13.001	28.254	20.0	15	82.945	81.256	1.464	Open Manhole	1800
1.014	12.639	51.0	16	82.900	80.558	1.667	Open Manhole	1800
1.015	29.584	79.3	20	83.055	80.185	2.195	Open Manhole	2400
14.000	13.070	169.7	18	85.034	83.608	1.201	Open Manhole	1500
15.000	41.136	32.2	302	96.735	95.308	1.202	Open Manhole	1350
15.001	35.630	111.3	303	95.625	94.988	0.412	Open Manhole	1350
15.002	34.499	28.4	304	94.638	92.985	1.428	Open Manhole	1500
15.003	21.353	150.4	305	94.729	92.771	1.658	Open Manhole	1500
15.004	16.052	88.2	309	94.253	92.589	1.364	Open Manhole	1350
16.000	31.679	55.0	307	94.752	93.035	1.492	Open Manhole	1350
16.001	15.814	150.6	308	94.457	92.930	1.302	Open Manhole	1350
16.002	17.647	66.3	309	94.253	92.664	1.364	Open Manhole	1350

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Park House Sandpiper Court Chester CH4 9QU	EDGEHILL PHASE 3 CUMBRIA SW Design	
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PIPELINE SCHEDULES for 6649 P2 SW01.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
15.005	o	300	309	94.253	92.589	1.364	Open Manhole	1350
15.006	o	450	310	93.433	91.662	1.321	Open Manhole	2100
15.007	o	450	311	92.630	90.828	1.352	Open Manhole	2100
15.008	o	450	312	92.262	90.461	1.351	Open Manhole	2100
15.009	o	450	313	91.158	88.350	2.358	Open Manhole	2100
17.000	o	225	314	95.330	93.825	1.280	Open Manhole	1350
17.001	o	225	315	95.464	93.294	1.945	Open Manhole	1350
17.002	o	225	316	95.560	93.019	2.316	Open Manhole	1350
17.003	o	225	317	93.939	90.714	3.000	Open Manhole	1350
17.004	o	300	318	92.227	90.373	1.554	Open Manhole	1500
17.005	o	300	319	91.827	90.180	1.347	Open Manhole	1500
17.006	o	300	320	91.212	89.339	1.573	Open Manhole	1500
15.010	o	450	321	90.231	86.700	3.081	Open Manhole	2400
15.011	o	450	322	88.853	84.861	3.542	Open Manhole	2400
18.000	o	450	323	87.367	83.696	3.221	Open Manhole	2400
15.012	o	450	324	86.723	83.600	2.673	Open Manhole	2400
19.000	o	225	325	91.600	89.136	2.239	Open Manhole	1350
19.001	o	300	326	89.200	87.397	1.503	Open Manhole	1500
19.002	o	300	327	88.600	85.741	2.559	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
15.005	21.223	27.3	310	93.433	91.812	1.321	Open Manhole	2100
15.006	40.928	49.1	311	92.630	90.828	1.352	Open Manhole	2100
15.007	22.496	61.3	312	92.262	90.461	1.351	Open Manhole	2100
15.008	32.651	26.0	313	91.158	89.205	1.503	Open Manhole	2100
15.009	25.531	187.7	321	90.231	88.214	1.567	Open Manhole	2400
17.000	34.996	65.9	315	95.464	93.294	1.945	Open Manhole	1350
17.001	11.207	40.8	316	95.560	93.019	2.316	Open Manhole	1350
17.002	31.434	42.2	317	93.939	92.274	1.440	Open Manhole	1350
17.003	44.603	167.7	318	92.227	90.448	1.554	Open Manhole	1500
17.004	28.940	149.9	319	91.827	90.180	1.347	Open Manhole	1500
17.005	20.170	24.0	320	91.212	89.339	1.573	Open Manhole	1500
17.006	18.728	19.1	321	90.231	88.357	1.574	Open Manhole	2400
15.010	20.721	398.5	322	88.853	86.648	1.755	Open Manhole	2400
15.011	35.522	399.1	324	86.723	84.772	1.501	Open Manhole	2400
18.000	38.531	401.4	324	86.723	83.600	2.673	Open Manhole	2400
15.012	34.368	180.9	331	86.256	83.410	2.396	Open Manhole	2400
19.000	63.225	38.0	326	89.200	87.472	1.503	Open Manhole	1500
19.001	28.235	54.1	327	88.600	86.875	1.425	Open Manhole	1500
19.002	21.480	167.8	328	87.780	85.613	1.867	Open Manhole	1500

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PIPELINE SCHEDULES for 6649 P2 SW01.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
19.003	o	300	328	87.780	85.613	1.867	Open Manhole	1500
19.004	o	450	329	87.251	85.400	1.401	Open Manhole	2400
19.005	o	450	330	86.488	84.400	1.638	Open Manhole	2400
15.013	o	450	331	86.256	83.410	2.396	Open Manhole	2400
14.001	o	450	18	85.034	83.384	1.200	Open Manhole	1500
14.002	o	450	19	84.500	81.485	2.565	Open Manhole	1800
1.016	o	750	20	83.055	77.935	4.370	Open Manhole	2400
1.017	o	750	21	79.521	75.851	2.920	Open Manhole	2400
20.000	o	225	22A	80.050	78.325	1.500	Open Manhole	1200
20.001	o	225	22B	79.925	78.196	1.504	Open Manhole	1200
20.002	o	225	22	79.360	76.545	2.590	Open Manhole	1500
1.018	o	750	23	77.691	73.191	3.750	Open Manhole	2400
21.000	o	225	24A	74.450	72.725	1.500	Open Manhole	1200
21.001	o	225	24B	74.850	72.613	2.012	Open Manhole	1200
21.002	o	225	24C	76.500	72.405	3.870	Open Manhole	1200
1.019	o	750	24	76.000	70.762	4.488	Open Manhole	2400
1.020	o	750	25	73.500	68.562	4.188	Open Manhole	2400
1.021	o	750	26	70.610	65.605	4.255	Open Manhole	2400

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
19.003	10.724	167.6	329	87.251	85.549	1.402	Open Manhole	2400
19.004	16.245	396.2	330	86.488	85.359	0.679	Open Manhole	2400
19.005	13.982	399.5	331	86.256	84.365	1.441	Open Manhole	2400
15.013	26.369	261.1	18	85.034	83.309	1.275	Open Manhole	1500
14.001	27.953	30.9	19	84.500	82.480	1.570	Open Manhole	1800
14.002	27.953	26.0	20	83.055	80.410	2.195	Open Manhole	2400
1.016	46.235	78.5	21	79.521	77.346	1.425	Open Manhole	2400
1.017	34.247	83.5	23	77.691	75.441	1.500	Open Manhole	2400
20.000	21.861	169.5	22B	79.925	78.196	1.504	Open Manhole	1200
20.001	18.916	11.5	22	79.360	76.545	2.590	Open Manhole	1500
20.002	14.610	11.0	23	77.691	75.217	2.249	Open Manhole	2400
1.018	20.718	48.2	24	76.000	72.761	2.489	Open Manhole	2400
21.000	19.124	170.8	24B	74.850	72.613	2.012	Open Manhole	1200
21.001	35.278	169.6	24C	76.500	72.405	3.870	Open Manhole	1200
21.002	23.191	73.6	24	76.000	72.090	3.685	Open Manhole	2400
1.019	13.163	65.8	25	73.500	70.562	2.188	Open Manhole	2400
1.020	29.678	42.8	26	70.610	67.868	1.992	Open Manhole	2400
1.021	71.017	50.0	27	66.500	64.185	1.565	Open Manhole	2400

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PIPELINE SCHEDULES for 6649 P2 SW01.SWS

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.022	o	750	27	66.500	64.185	1.565	Open Manhole	2400
1.023	o	750	H/WALL 1	65.500	63.125	1.625	Open Manhole	1200
1.024	o	450	28	64.600	62.988	1.162	Open Manhole	1800
1.025	o	450	29	62.750	59.470	2.830	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.022	24.246	50.0	H/WALL 1	65.500	63.700	1.050	Open Manhole	1200
1.023	54.991#	401.4	28	64.600	62.988	0.862	Open Manhole	1800
1.024	46.344	24.0	29	62.750	61.058	1.242	Open Manhole	1500
1.025	16.932	99.6	30	60.250	59.300	0.500	Open Manhole	0

Free Flowing Outfall Details for 6649 P2 SW01.SWS

Outfall Pipe	Outfall Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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1.025	30		60.250	59.300	0.000	0	0
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Simulation Criteria for 6649 P2 SW01.SWS

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	16.000	Storm Duration (mins)	30
Ratio R	0.268		

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Online Controls for 6649 P2 SW01.SWS

Hydro-Brake® Optimum Manhole: 28, DS/PN: 1.024, Volume (m³): 27.7

Unit Reference	MD-SHE-0416-1135-1000-1135
Design Head (m)	1.000
Design Flow (l/s)	113.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	416
Invert Level (m)	62.988
Minimum Outlet Pipe Diameter (mm)	450
Suggested Manhole Diameter (mm)	Site Specific Design (Contact Hydro International)

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	113.4	Kick-Flo®	0.862	105.6
Flush-Flo™	0.575	113.4	Mean Flow over Head Range	-	85.2

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	11.3	0.800	108.7	2.000	159.0	4.000	223.2	7.000	293.7
0.200	40.6	1.000	113.4	2.200	166.6	4.500	236.4	7.500	303.9
0.300	79.2	1.200	124.0	2.400	173.8	5.000	249.0	8.000	313.7
0.400	109.7	1.400	133.6	2.600	180.7	5.500	260.9	8.500	323.1
0.500	112.8	1.600	142.6	3.000	193.8	6.000	272.3	9.000	332.4
0.600	113.3	1.800	151.0	3.500	209.0	6.500	283.2	9.500	341.3

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Storage Structures for 6649 P2 SW01.SWS

Tank or Pond Manhole: 28, DS/PN: 1.024

Invert Level (m) 62.988

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	4000.0	1.200	5258.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	4200.0	1.400	5482.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	4403.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	4611.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	4823.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	5038.0	2.200	0.0	3.400	0.0	4.600	0.0		

EDGEHILL PHASE 3
CUMBRIA
SW Design



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SW01.SWS

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	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 Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Rainfall Model	FSR M5-60 (mm)	16.000	Cv (Summer)	0.750
Region	England and Wales	Ratio R	0.270	Cv (Winter)

Rainfall Model	FSR M5-60 (mm)	16.000	Cv (Summer)	0.750
Region	England and Wales	Ratio R	0.270	Cv (Winter)

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Margin for Flood Risk Warning (mm) 300.0      DVD Status ON
      Analysis Timestep    Fine Inertia Status ON
      DTS Status          OFF
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Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880
Return Period(s) (years)	30, 100
Climate Change (%)	0, 40

									Water	Surcharged	
US/MH			Return	Climate	First (X)		First (Y)	First (Z)	Overflow	Level	
PN	Name	Storm	Period	Change	Surcharge		Flood	Overflow	Act.	(m)	Depth (m)
1.000	101	15	Winter	30	+0%	100/15	Summer			90.216	-0.195
1.001	102	15	Winter	30	+0%	100/15	Summer			89.697	-0.040
1.002	103	15	Winter	30	+0%	30/15	Summer			89.627	0.062
1.003	104	15	Winter	30	+0%	30/15	Summer			89.528	0.149
1.004	105	15	Winter	30	+0%	30/15	Summer			89.447	0.143
1.005	106	15	Winter	30	+0%	30/15	Summer			89.340	0.130
1.006	107	15	Winter	30	+0%	100/15	Summer			88.981	-0.144
1.007	1	15	Winter	30	+0%	30/15	Summer	100/15	Summer	88.109	0.309
2.000	2	15	Winter	30	+0%	30/15	Summer			87.681	0.214
1.008	3	15	Winter	30	+0%	30/15	Summer			87.684	0.534
1.009	4	15	Winter	30	+0%	30/15	Summer			86.761	0.346
3.000	201	15	Winter	30	+0%					93.559	-0.166
3.001	202	15	Winter	30	+0%					92.694	-0.135
4.000	203	15	Winter	30	+0%	100/30	Winter			92.341	-0.267
4.001	204	15	Winter	30	+0%	100/15	Winter			92.062	-0.213
3.002	205	15	Winter	30	+0%	100/15	Summer			91.152	-0.298
5.000	206	15	Winter	30	+0%	100/15	Summer			91.983	-0.138
5.001	207	15	Winter	30	+0%	100/15	Summer			91.808	-0.149
3.003	208	15	Winter	30	+0%	100/15	Summer			91.000	-0.310
3.004	209	30	Winter	30	+0%	30/15	Winter			90.936	0.145
3.005	210	15	Winter	30	+0%	30/15	Summer			90.824	0.291
6.000	211	15	Winter	30	+0%	100/15	Summer			92.037	-0.123
7.000	212	15	Winter	30	+0%	100/15	Winter			92.611	-0.130
7.001	213	15	Winter	30	+0%	100/15	Summer			91.589	-0.186
7.002	214	15	Winter	30	+0%	100/15	Summer			91.365	-0.148
6.001	215	15	Winter	30	+0%	30/15	Summer	100/15	Winter	91.110	0.131
3.006	216	15	Winter	30	+0%	30/15	Summer	100/15	Winter	90.651	0.499
8.000	217	15	Winter	30	+0%	100/15	Summer			90.843	-0.157
3.007	218	15	Winter	30	+0%	30/15	Summer			90.534	0.961
3.008	219	15	Winter	30	+0%	30/15	Summer			90.335	0.879

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
SW01.SWS

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	101	0.000	0.26		30.4	OK	
1.001	102	0.000	0.58		47.4	OK	
1.002	103	0.000	0.54		44.2	SURCHARGED	
1.003	104	0.000	0.88		54.3	SURCHARGED	
1.004	105	0.000	1.07		67.4	SURCHARGED	
1.005	106	0.000	1.59		99.5	SURCHARGED	
1.006	107	0.000	0.52		119.6	OK	
1.007	1	0.000	0.83		125.8	SURCHARGED	4
2.000	2	0.000	0.05		3.9	SURCHARGED	
1.008	3	0.000	1.12		131.9	SURCHARGED	
1.009	4	0.000	1.36		139.7	SURCHARGED	
3.000	201	0.000	0.15		15.3	OK	
3.001	202	0.000	0.33		30.9	OK	
4.000	203	0.000	0.03		3.0	OK	
4.001	204	0.000	0.19		17.8	OK	
3.002	205	0.000	0.25		51.8	OK	
5.000	206	0.000	0.31		15.7	OK	
5.001	207	0.000	0.24		18.2	OK	
3.003	208	0.000	0.21		84.3	OK	
3.004	209	0.000	0.34		75.5	SURCHARGED	
3.005	210	0.000	0.35		100.0	SURCHARGED	
6.000	211	0.000	0.42		37.3	OK	
7.000	212	0.000	0.37		28.3	OK	
7.001	213	0.000	0.30		32.7	OK	
7.002	214	0.000	0.49		54.7	OK	
6.001	215	0.000	0.94		120.7	SURCHARGED	4
3.006	216	0.000	0.87		182.4	SURCHARGED	5
8.000	217	0.000	0.20		26.3	OK	
3.007	218	0.000	1.30		188.8	SURCHARGED	
3.008	219	0.000	1.56		194.7	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
SW01.SWS

PN	US/MH		Return Period	Climate Change	First (X)		First (Y)		First (Z)		Overflow Act.	Water Level	Surcharged Depth
	Name	Storm			Surcharge	Flood	Overflow	Act.	(m)	(m)		(m)	(m)
9.000	220	15 Winter	30	+0%	100/30 Summer							91.571	-0.129
9.001	221	15 Winter	30	+0%	100/15 Winter							91.378	-0.202
9.002	222	15 Winter	30	+0%	100/15 Summer							90.531	-0.139
9.003	223	30 Winter	30	+0%	30/15 Summer	100/30 Winter						90.376	0.211
3.009	224	15 Winter	30	+0%	30/15 Summer							90.216	0.807
3.010	225	30 Winter	30	+0%	30/15 Summer							90.004	0.659
3.011	226	30 Winter	30	+0%	30/15 Summer							89.811	0.510
3.012	227	30 Winter	30	+0%	30/15 Summer							89.341	0.177
3.013	228	30 Winter	30	+0%	100/15 Summer							88.931	-0.173
3.014	229	30 Winter	30	+0%	30/15 Summer							88.415	0.280
10.000	230	30 Winter	30	+0%	100/15 Summer							88.155	-0.031
3.015	231	30 Winter	30	+0%	30/15 Summer							88.142	0.398
3.016	232	30 Winter	30	+0%	30/15 Summer							87.788	0.115
11.000	233	15 Winter	30	+0%	100/15 Summer							92.412	-0.141
11.001	234	15 Winter	30	+0%	100/15 Summer							91.604	-0.004
11.002	235	15 Winter	30	+0%	30/15 Summer							91.516	0.165
11.003	236	15 Winter	30	+0%	30/15 Summer							91.181	0.174
11.004	237	15 Winter	30	+0%	30/15 Summer							89.916	0.144
11.005	238	15 Winter	30	+0%	30/15 Summer							88.613	0.242
3.017	239	30 Winter	30	+0%	100/15 Summer							86.355	-0.095
1.010	5	30 Winter	30	+0%	100/30 Winter							83.847	-0.347
12.000	6	15 Winter	30	+0%								84.453	-0.137
12.001	7	15 Winter	30	+0%	100/15 Summer							84.155	-0.131
12.002	8	15 Winter	30	+0%	100/15 Summer							83.804	-0.106
12.003	9	15 Winter	30	+0%	100/15 Summer							83.413	-0.158
12.004	10	15 Winter	30	+0%	30/15 Summer							83.280	0.166
1.011	11	30 Winter	30	+0%	30/15 Summer							83.100	0.196
1.012	12	30 Winter	30	+0%	100/15 Winter							82.552	-0.323
1.013	13	30 Winter	30	+0%	100/15 Summer							81.735	-0.106
13.000	14A	15 Winter	30	+0%								84.171	-0.179
13.001	14	15 Winter	30	+0%								82.748	-0.147
1.014	15	30 Winter	30	+0%	100/15 Summer							81.481	0.000
1.015	16	30 Winter	30	+0%	100/15 Summer							81.036	-0.197
14.000	17	15 Winter	30	+0%	100/15 Summer							83.808	-0.102
15.000	301	15 Winter	30	+0%								96.676	-0.135
15.001	302	15 Winter	30	+0%	100/15 Summer							95.482	-0.051
15.002	303	15 Winter	30	+0%	100/15 Summer							94.339	-0.086
15.003	304	15 Winter	30	+0%	100/15 Summer							93.128	-0.085
15.004	305	15 Winter	30	+0%	100/15 Summer							92.980	-0.091
16.000	306	15 Winter	30	+0%	100/15 Summer							93.707	-0.129
16.001	307	15 Winter	30	+0%	30/15 Summer							93.339	0.079
16.002	308	15 Winter	30	+0%	100/15 Summer							93.102	-0.053
15.005	309	15 Winter	30	+0%	100/15 Summer							92.783	-0.106
15.006	310	15 Winter	30	+0%								91.852	-0.260
15.007	311	15 Winter	30	+0%								91.045	-0.233
15.008	312	15 Winter	30	+0%								90.636	-0.275
15.009	313	15 Winter	30	+0%	100/15 Summer							88.705	-0.095
17.000	314	15 Winter	30	+0%	100/15 Summer							93.958	-0.092
17.001	315	15 Winter	30	+0%	100/15 Summer							93.444	-0.075
17.002	316	15 Winter	30	+0%	100/15 Summer							93.199	-0.045
17.003	317	15 Winter	30	+0%	30/15 Summer							92.155	1.216
17.004	318	15 Winter	30	+0%	30/15 Summer							90.731	0.058
17.005	319	15 Winter	30	+0%								90.336	-0.144
17.006	320	15 Winter	30	+0%								89.495	-0.144
15.010	321	15 Winter	30	+0%	30/15 Summer							87.418	0.268
15.011	322	15 Winter	30	+0%	30/15 Summer							85.701	0.390

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
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PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Flow / Overflow (l/s)	Flow (l/s)		
9.000	220	0.000	0.37		18.0	OK	
9.001	221	0.000	0.23		37.0	OK	
9.002	222	0.000	0.54		59.0	OK	
9.003	223	0.000	0.43		66.7	SURCHARGED	1
3.009	224	0.000	1.84		248.4	SURCHARGED	
3.010	225	0.000	2.08		248.7	SURCHARGED	
3.011	226	0.000	1.83		269.9	SURCHARGED	
3.012	227	0.000	2.07		277.3	SURCHARGED	
3.013	228	0.000	0.70		282.2	OK	
3.014	229	0.000	0.84		295.3	SURCHARGED	
10.000	230	0.000	0.29		17.7	OK	
3.015	231	0.000	2.23		305.3	SURCHARGED	
3.016	232	0.000	1.27		309.9	SURCHARGED	
11.000	233	0.000	0.29		18.7	OK	
11.001	234	0.000	0.65		51.8	OK	
11.002	235	0.000	0.96		78.2	SURCHARGED	
11.003	236	0.000	1.45		111.8	SURCHARGED	
11.004	237	0.000	1.53		114.1	SURCHARGED	
11.005	238	0.000	1.78		131.9	SURCHARGED	
3.017	239	0.000	0.98		427.2	OK	
1.010	5	0.000	0.48		570.8	OK	
12.000	6	0.000	0.32		18.1	OK	
12.001	7	0.000	0.35		20.7	OK	
12.002	8	0.000	0.53		29.9	OK	
12.003	9	0.000	0.44		45.6	OK	
12.004	10	0.000	1.05		70.7	SURCHARGED	
1.011	11	0.000	2.54		640.7	SURCHARGED	
1.012	12	0.000	0.54		640.6	OK	
1.013	13	0.000	0.83		631.7	OK	
13.000	14A	0.000	0.09		11.1	OK	
13.001	14	0.000	0.26		28.6	OK	
1.014	15	0.000	1.03		648.0	OK	
1.015	16	0.000	0.84		653.0	OK	
14.000	17	0.000	0.56		19.4	OK	
15.000	301	0.000	0.33		28.9	OK	
15.001	302	0.000	0.93		43.4	OK	
15.002	303	0.000	0.68		62.4	OK	
15.003	304	0.000	0.85		67.3	OK	
15.004	305	0.000	0.82		81.8	OK	
16.000	306	0.000	0.37		24.6	OK	
16.001	307	0.000	1.32		49.5	SURCHARGED	
16.002	308	0.000	0.93		53.2	OK	
15.005	309	0.000	0.74		139.0	OK	
15.006	310	0.000	0.37		153.3	OK	
15.007	311	0.000	0.47		158.9	OK	
15.008	312	0.000	0.32		175.4	OK	
15.009	313	0.000	0.96		189.5	OK	
17.000	314	0.000	0.64		38.5	OK	
17.001	315	0.000	0.75		51.8	OK	
17.002	316	0.000	0.97		72.9	OK	
17.003	317	0.000	2.27		86.7	SURCHARGED	
17.004	318	0.000	1.16		94.9	SURCHARGED	
17.005	319	0.000	0.53		104.5	OK	
17.006	320	0.000	0.52		114.7	OK	
15.010	321	0.000	2.50		327.0	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
SW01.SWS

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
15.011	322	0.000	2.36		332.7	SURCHARGED	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
SW01.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
18.000	323	15 Winter	30	+0%	30/15 Summer				84.825	0.679
15.012	324	15 Winter	30	+0%	30/15 Summer				84.819	0.769
19.000	325	15 Winter	30	+0%					89.199	-0.162
19.001	326	15 Winter	30	+0%					87.470	-0.227
19.002	327	15 Winter	30	+0%					85.884	-0.157
19.003	328	15 Winter	30	+0%					85.780	-0.133
19.004	329	15 Winter	30	+0%					85.613	-0.237
19.005	330	15 Winter	30	+0%	100/15 Summer				84.622	-0.228
15.013	331	15 Winter	30	+0%	30/15 Summer				84.282	0.422
14.001	18	15 Winter	30	+0%	100/15 Summer				83.692	-0.142
14.002	19	15 Winter	30	+0%	100/15 Winter				81.774	-0.161
1.016	20	15 Winter	30	+0%	100/15 Summer				78.477	-0.208
1.017	21	15 Winter	30	+0%	30/15 Winter				76.602	0.001
20.000	22A	15 Winter	30	+0%					78.398	-0.152
20.001	22B	15 Winter	30	+0%					78.253	-0.168
20.002	22	15 Winter	30	+0%					76.641	-0.129
1.018	23	30 Winter	30	+0%	100/15 Summer				73.897	-0.044
21.000	24A	15 Winter	30	+0%	100/15 Summer				72.822	-0.128
21.001	24B	15 Winter	30	+0%	100/15 Summer				72.753	-0.085
21.002	24C	15 Winter	30	+0%	100/15 Summer				72.538	-0.092
1.019	24	30 Winter	30	+0%	30/15 Summer				71.730	0.218
1.020	25	30 Winter	30	+0%	100/15 Summer				69.076	-0.236
1.021	26	30 Winter	30	+0%	100/15 Summer				66.061	-0.294
1.022	27	30 Winter	30	+0%	100/15 Summer				64.770	-0.165
1.023	H/WALL 1	30 Winter	30	+0%	30/15 Summer				64.251	0.376
1.024	28	480 Winter	30	+0%	30/240 Winter				63.474	0.036
1.025	29	480 Winter	30	+0%					59.691	-0.229

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Flow (l/s)	Overflow (l/s)		
18.000	323	0.000	0.16	23.0		SURCHARGED	
15.012	324	0.000	1.67	350.7		SURCHARGED	
19.000	325	0.000	0.17	13.9		OK	
19.001	326	0.000	0.13	17.9		OK	
19.002	327	0.000	0.45	33.6		OK	
19.003	328	0.000	0.59	37.3		OK	
19.004	329	0.000	0.45	51.2		OK	
19.005	330	0.000	0.48	50.9		OK	
15.013	331	0.000	2.31	389.3		SURCHARGED	
14.001	18	0.000	0.81	399.9		OK	
14.002	19	0.000	0.74	400.1		OK	
1.016	20	0.000	0.87	1013.9		OK	
1.017	21	0.000	1.01	1012.4		SURCHARGED	
20.000	22A	0.000	0.22	8.1		OK	
20.001	22B	0.000	0.15	20.3		OK	
20.002	22	0.000	0.38	52.6		OK	
1.018	23	0.000	1.00	1026.7		OK	
21.000	24A	0.000	0.37	13.4		OK	
21.001	24B	0.000	0.68	25.7		OK	
21.002	24C	0.000	0.64	35.8		OK	
1.019	24	0.000	1.51	1054.0		SURCHARGED	
1.020	25	0.000	0.81	1054.7		OK	
1.021	26	0.000	0.68	1053.2		OK	

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
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PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.022	27	0.000	0.97	1052.9		OK	
1.023	H/WALL 1	0.000	1.99	1049.0		SURCHARGED	
1.024	28	0.000	0.19	112.5		SURCHARGED	
1.025	29	0.000	0.48	112.5		OK	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
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Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 16.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.270 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, 2160, 2880
Return Period(s) (years) 30, 100
Climate Change (%) 0, 40

US/MH		Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level	Surcharged Depth
PN	Name								(m)	(m)
1.000	101 15	Winter	100	+40%	100/15 Summer				90.838	0.427
1.001	102 30	Winter	100	+40%	100/15 Summer				90.733	0.996
1.002	103 30	Winter	100	+40%	30/15 Summer				90.626	1.061
1.003	104 30	Winter	100	+40%	30/15 Summer				90.517	1.138
1.004	105 15	Winter	100	+40%	30/15 Summer				90.426	1.122
1.005	106 15	Winter	100	+40%	30/15 Summer				90.270	1.060
1.006	107 15	Winter	100	+40%	100/15 Summer				89.943	0.818
1.007	1 30	Winter	100	+40%	30/15 Summer	100/15 Summer			89.355	1.555
2.000	2 30	Winter	100	+40%	30/15 Summer				88.856	1.389
1.008	3 15	Winter	100	+40%	30/15 Summer				88.859	1.709
1.009	4 30	Winter	100	+40%	30/15 Summer				87.419	1.004
3.000	201 15	Winter	100	+40%					93.581	-0.144
3.001	202 15	Winter	100	+40%					92.730	-0.099
4.000	203 30	Winter	100	+40%	100/30 Winter				92.608	0.000
4.001	204 30	Winter	100	+40%	100/15 Winter				92.607	0.332
3.002	205 30	Winter	100	+40%	100/15 Summer				92.599	1.149
5.000	206 30	Winter	100	+40%	100/15 Summer				92.525	0.404
5.001	207 30	Winter	100	+40%	100/15 Summer				92.505	0.548
3.003	208 30	Winter	100	+40%	100/15 Summer				92.472	1.162
3.004	209 30	Winter	100	+40%	30/15 Winter				92.274	1.483
3.005	210 30	Winter	100	+40%	30/15 Summer				92.137	1.604
6.000	211 15	Winter	100	+40%	100/15 Summer				92.777	0.617
7.000	212 15	Winter	100	+40%	100/15 Winter				92.883	0.142
7.001	213 15	Winter	100	+40%	100/15 Summer				92.724	0.949
7.002	214 15	Winter	100	+40%	100/15 Summer				92.607	1.094
6.001	215 30	Winter	100	+40%	30/15 Summer	100/15 Winter			92.453	1.474
3.006	216 30	Winter	100	+40%	30/15 Summer	100/15 Winter			91.966	1.814
8.000	217 30	Winter	100	+40%	100/15 Summer				92.001	1.001
3.007	218 30	Winter	100	+40%	30/15 Summer				91.929	2.356
3.008	219 30	Winter	100	+40%	30/15 Summer				91.726	2.270

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
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PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
1.000	101	0.000	0.45		53.0	SURCHARGED	
1.001	102	0.000	0.62		50.2	SURCHARGED	
1.002	103	0.000	0.70		57.5	SURCHARGED	
1.003	104	0.000	1.13		69.6	SURCHARGED	
1.004	105	0.000	1.36		86.2	SURCHARGED	
1.005	106	0.000	2.09		130.9	FLOOD RISK	
1.006	107	0.000	0.65		149.6	SURCHARGED	
1.007	1	5.429	1.04		157.4	FLOOD	4
2.000	2	0.000	0.08		6.0	SURCHARGED	
1.008	3	0.000	1.41		166.0	FLOOD RISK	
1.009	4	0.000	1.84		189.2	SURCHARGED	
3.000	201	0.000	0.28		27.3	OK	
3.001	202	0.000	0.59		55.4	OK	
4.000	203	0.000	0.04		4.6	SURCHARGED	
4.001	204	0.000	0.27		25.9	SURCHARGED	
3.002	205	0.000	0.33		69.6	SURCHARGED	
5.000	206	0.000	0.47		23.5	SURCHARGED	
5.001	207	0.000	0.36		27.2	SURCHARGED	
3.003	208	0.000	0.25		99.4	SURCHARGED	
3.004	209	0.000	0.41		91.1	FLOOD RISK	
3.005	210	0.000	0.29		80.9	FLOOD RISK	
6.000	211	0.000	0.68		60.3	SURCHARGED	
7.000	212	0.000	0.66		50.6	SURCHARGED	
7.001	213	0.000	0.45		49.3	SURCHARGED	
7.002	214	0.000	0.59		65.4	SURCHARGED	
6.001	215	7.815	0.89		113.4	FLOOD	4
3.006	216	11.873	0.97		203.3	FLOOD	5
8.000	217	0.000	0.25		33.6	SURCHARGED	
3.007	218	0.000	1.60		232.6	SURCHARGED	
3.008	219	0.000	1.93		240.1	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
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										Water	Surcharged	
US/MH			Return	Climate	First (X)		First (Y)		First (Z)	Overflow	Level	Depth
PN	Name	Storm	Period	Change	Surcharge		Flood		Overflow	Act.	(m)	(m)
9.000	220 30	Winter	100	+40%	100/30	Summer					91.936	0.236
9.001	221 30	Winter	100	+40%	100/15	Winter					91.911	0.331
9.002	222 30	Winter	100	+40%	100/15	Summer					91.824	1.154
9.003	223 30	Winter	100	+40%	30/15	Summer	100/30 Winter				91.669	1.504
3.009	224 30	Winter	100	+40%	30/15	Summer					91.582	2.173
3.010	225 30	Winter	100	+40%	30/15	Summer					91.332	1.987
3.011	226 30	Winter	100	+40%	30/15	Summer					91.078	1.777
3.012	227 30	Winter	100	+40%	30/15	Summer					90.377	1.213
3.013	228 30	Winter	100	+40%	100/15	Summer					89.982	0.878
3.014	229 30	Winter	100	+40%	30/15	Summer					89.242	1.107
10.000	230 30	Winter	100	+40%	100/15	Summer					88.803	0.617
3.015	231 30	Winter	100	+40%	30/15	Summer					88.774	1.030
3.016	232 30	Winter	100	+40%	30/15	Summer					88.142	0.469
11.000	233 15	Winter	100	+40%	100/15	Summer					92.859	0.306
11.001	234 15	Winter	100	+40%	100/15	Summer					92.722	1.114
11.002	235 15	Winter	100	+40%	30/15	Summer					92.542	1.191
11.003	236 15	Winter	100	+40%	30/15	Summer					91.754	0.747
11.004	237 15	Winter	100	+40%	30/15	Summer					90.353	0.581
11.005	238 15	Winter	100	+40%	30/15	Summer					89.230	0.859
3.017	239 30	Winter	100	+40%	100/15	Summer					87.482	1.032
1.010	5 30	Winter	100	+40%	100/30	Winter					84.250	0.056
12.000	6 15	Winter	100	+40%							84.488	-0.102
12.001	7 15	Winter	100	+40%	100/15	Summer					84.369	0.083
12.002	8 15	Winter	100	+40%	100/15	Summer					84.270	0.360
12.003	9 15	Winter	100	+40%	100/15	Summer					84.094	0.523
12.004	10 30	Winter	100	+40%	30/15	Summer					83.944	0.830
1.011	11 30	Winter	100	+40%	30/15	Summer					83.647	0.743
1.012	12 30	Winter	100	+40%	100/15	Winter					83.120	0.245
1.013	13 30	Winter	100	+40%	100/15	Summer					82.503	0.662
13.000	14A 15	Winter	100	+40%							84.186	-0.164
13.001	14 15	Winter	100	+40%							82.779	-0.116
1.014	15 30	Winter	100	+40%	100/15	Summer					81.973	0.492
1.015	16 30	Winter	100	+40%	100/15	Summer					81.405	0.172
14.000	17 30	Winter	100	+40%	100/15	Summer					84.123	0.213
15.000	301 15	Winter	100	+40%							96.712	-0.099
15.001	302 15	Winter	100	+40%	100/15	Summer					95.999	0.465
15.002	303 15	Winter	100	+40%	100/15	Summer					94.878	0.453
15.003	304 15	Winter	100	+40%	100/15	Summer					93.507	0.294
15.004	305 15	Winter	100	+40%	100/15	Summer					93.269	0.198
16.000	306 15	Winter	100	+40%	100/15	Summer					94.118	0.282
16.001	307 15	Winter	100	+40%	30/15	Summer					93.918	0.658
16.002	308 15	Winter	100	+40%	100/15	Summer					93.498	0.343
15.005	309 15	Winter	100	+40%	100/15	Summer					93.003	0.114
15.006	310 15	Winter	100	+40%							91.900	-0.212
15.007	311 15	Winter	100	+40%							91.104	-0.174
15.008	312 15	Winter	100	+40%							90.682	-0.229
15.009	313 15	Winter	100	+40%	100/15	Summer					88.952	0.152
17.000	314 15	Winter	100	+40%	100/15	Summer					94.914	0.864
17.001	315 15	Winter	100	+40%	100/15	Summer					94.526	1.007
17.002	316 15	Winter	100	+40%	100/15	Summer					94.279	1.035
17.003	317 15	Winter	100	+40%	30/15	Summer					93.267	2.328
17.004	318 15	Winter	100	+40%	30/15	Summer					90.960	0.287
17.005	319 15	Winter	100	+40%							90.379	-0.101
17.006	320 15	Winter	100	+40%							89.544	-0.095
15.010	321 15	Winter	100	+40%	30/15	Summer					87.909	0.759
15.011	322 15	Winter	100	+40%	30/15	Summer					87.123	1.812

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PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
9.000	220	0.000	0.57		27.4	SURCHARGED	
9.001	221	0.000	0.34		54.4	SURCHARGED	
9.002	222	0.000	0.63		68.5	SURCHARGED	
9.003	223	4.362	0.54		83.3	FLOOD	1
3.009	224	0.000	2.28		307.4	SURCHARGED	
3.010	225	0.000	2.60		310.7	SURCHARGED	
3.011	226	0.000	2.27		334.1	SURCHARGED	
3.012	227	0.000	2.59		346.5	SURCHARGED	
3.013	228	0.000	0.87		354.8	SURCHARGED	
3.014	229	0.000	1.09		384.8	SURCHARGED	
10.000	230	0.000	0.43		26.1	SURCHARGED	
3.015	231	0.000	2.99		408.7	SURCHARGED	
3.016	232	0.000	1.72		419.6	SURCHARGED	
11.000	233	0.000	0.46		29.4	SURCHARGED	
11.001	234	0.000	0.90		71.7	SURCHARGED	
11.002	235	0.000	1.49		121.1	SURCHARGED	
11.003	236	0.000	2.32		179.5	SURCHARGED	
11.004	237	0.000	2.48		184.3	SURCHARGED	
11.005	238	0.000	2.91		216.0	SURCHARGED	
3.017	239	0.000	1.43		625.8	SURCHARGED	
1.010	5	0.000	0.68		819.5	SURCHARGED	
12.000	6	0.000	0.57		32.3	OK	
12.001	7	0.000	0.61		35.8	SURCHARGED	
12.002	8	0.000	0.79		44.8	SURCHARGED	
12.003	9	0.000	0.60		62.4	SURCHARGED	
12.004	10	0.000	1.54		103.5	SURCHARGED	
1.011	11	0.000	3.66		921.6	SURCHARGED	
1.012	12	0.000	0.77		922.4	SURCHARGED	
1.013	13	0.000	1.22		925.4	SURCHARGED	
13.000	14A	0.000	0.16		19.8	OK	
13.001	14	0.000	0.47		51.2	OK	
1.014	15	0.000	1.51		953.9	SURCHARGED	
1.015	16	0.000	1.24		961.9	SURCHARGED	
14.000	17	0.000	0.86		29.6	SURCHARGED	
15.000	301	0.000	0.59		51.7	OK	
15.001	302	0.000	1.57		72.8	SURCHARGED	
15.002	303	0.000	1.06		98.0	SURCHARGED	
15.003	304	0.000	1.30		103.2	SURCHARGED	
15.004	305	0.000	1.19		119.1	SURCHARGED	
16.000	306	0.000	0.60		39.3	SURCHARGED	
16.001	307	0.000	1.99		74.4	SURCHARGED	
16.002	308	0.000	1.36		77.9	SURCHARGED	
15.005	309	0.000	1.08		201.3	SURCHARGED	
15.006	310	0.000	0.54		221.0	OK	
15.007	311	0.000	0.68		231.4	OK	
15.008	312	0.000	0.48		263.8	OK	
15.009	313	0.000	1.49		295.1	SURCHARGED	
17.000	314	0.000	0.85		51.5	SURCHARGED	
17.001	315	0.000	0.96		66.8	SURCHARGED	
17.002	316	0.000	1.18		88.6	SURCHARGED	
17.003	317	0.000	2.92		111.5	SURCHARGED	
17.004	318	0.000	1.58		129.5	SURCHARGED	
17.005	319	0.000	0.76		150.7	OK	
17.006	320	0.000	0.79		175.2	OK	
15.010	321	0.000	3.87		507.0	SURCHARGED	

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2

SW01.SWS

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Overflow (l/s)	Flow (l/s)		
15.011	322	0.000	3.37		476.4	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
SW01.SWS

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
18.000	323	30 Winter	100	+40%	30/15 Summer				86.212	2.066
15.012	324	30 Winter	100	+40%	30/15 Summer				86.202	2.152
19.000	325	15 Winter	100	+40%					89.222	-0.139
19.001	326	15 Winter	100	+40%					87.497	-0.200
19.002	327	15 Winter	100	+40%					85.966	-0.075
19.003	328	15 Winter	100	+40%					85.888	-0.025
19.004	329	15 Winter	100	+40%					85.703	-0.147
19.005	330	30 Winter	100	+40%	100/15 Summer				85.168	0.318
15.013	331	30 Winter	100	+40%	30/15 Summer				85.150	1.290
14.001	18	30 Winter	100	+40%	100/15 Summer				84.082	0.248
14.002	19	30 Winter	100	+40%	100/15 Winter				82.009	0.074
1.016	20	30 Winter	100	+40%	100/15 Summer				79.069	0.384
1.017	21	30 Winter	100	+40%	30/15 Winter				77.107	0.506
20.000	22A	15 Winter	100	+40%					78.425	-0.125
20.001	22B	15 Winter	100	+40%					78.274	-0.147
20.002	22	15 Winter	100	+40%					76.682	-0.088
1.018	23	30 Winter	100	+40%	100/15 Summer				74.471	0.530
21.000	24A	15 Winter	100	+40%	100/15 Summer				72.984	0.034
21.001	24B	15 Winter	100	+40%	100/15 Summer				72.915	0.077
21.002	24C	15 Winter	100	+40%	100/15 Summer				72.649	0.019
1.019	24	30 Winter	100	+40%	30/15 Summer				72.315	0.803
1.020	25	30 Winter	100	+40%	100/15 Summer				69.625	0.313
1.021	26	30 Winter	100	+40%	100/15 Summer				67.452	1.097
1.022	27	30 Winter	100	+40%	100/15 Summer				65.965	1.030
1.023	H/WALL 1	30 Winter	100	+40%	30/15 Summer				64.942	1.067
1.024	28	600 Winter	100	+40%	30/240 Winter				63.924	0.486
1.025	29	120 Summer	100	+40%					59.692	-0.228

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap.	Flow (l/s)	Overflow (l/s)		
18.000	323	0.000	0.26	37.5		SURCHARGED	
15.012	324	0.000	2.34	491.8		SURCHARGED	
19.000	325	0.000	0.30	24.8		OK	
19.001	326	0.000	0.24	32.3		OK	
19.002	327	0.000	0.80	60.1		OK	
19.003	328	0.000	1.00	63.4		OK	
19.004	329	0.000	0.78	88.5		OK	
19.005	330	0.000	0.72	75.2		SURCHARGED	
15.013	331	0.000	3.25	547.2		SURCHARGED	
14.001	18	0.000	1.14	564.4		SURCHARGED	
14.002	19	0.000	1.04	564.9		SURCHARGED	
1.016	20	0.000	1.31	1525.8		SURCHARGED	
1.017	21	0.000	1.52	1527.0		SURCHARGED	
20.000	22A	0.000	0.40	14.4		OK	
20.001	22B	0.000	0.26	36.3		OK	
20.002	22	0.000	0.68	94.3		OK	
1.018	23	0.000	1.52	1559.0		SURCHARGED	
21.000	24A	0.000	0.64	23.0		SURCHARGED	
21.001	24B	0.000	1.13	42.6		SURCHARGED	
21.002	24C	0.000	1.04	57.6		SURCHARGED	
1.019	24	0.000	2.28	1598.9		SURCHARGED	
1.020	25	0.000	1.22	1597.5		SURCHARGED	
1.021	26	0.000	1.03	1590.8		SURCHARGED	

Coopers		Page 34
Park House Sandpiper Court Chester CH4 9QU	EDGEHILL PHASE 3 CUMBRIA SW Design	
Date 30/10/2020 17:11 File ALL NETWORKS -NO CV.MDX	Designed by JAR Checked by AJ	
Micro Drainage Network 2018.1.1		

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 6649 P2
SW01.SWS

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.022	27	0.000	1.45	1581.9	SURCHARGED		
1.023	H/WALL 1	0.000	3.00	1578.5	SURCHARGED		
1.024	28	0.000	0.19	113.4	SURCHARGED		
1.025	29	0.000	0.49	113.4	OK		