TECHNICAL NOTE

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Project: Land at Impington, Histon, Cambridgeshire

Subject: Summary of Flood Risk and Drainage Matters

APPENDIX D

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NIAB, PARK FARM, CAMBRIDGE
Watercourse Hydraulic Modelling Report

NIAB, PARK FARM, CAMBRIDGE
Watercourse Hydraulic Modelling Report

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Date: March 2017

NIAB, PARK FARM, CAMBRIDGE
Watercourse Hydraulic Modelling Report

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Watercourse Hydraulic Modelling Report

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A. Catchment Descriptors

Plans

0527/00-101	Existing Site Plan
0527/00-102	Proposed Site Plan
2219-545-SU01 - 2219-545-SU16	Survey of Watercourse
ALS75618/OVERVIEW	Topographical Survey of Site Overview
ALS75618/500/01 - ALS75618/500/04	Topographical Survey of Site

Registration of Amendments

Revision and Date	Amendment Details	Revision Prepared By	Revision Approved By

1.0 INTRODUCTION

Brief

1.1 This report provides a summary of the flood modelling assessment that was carried out by Create Consulting Engineers Ltd on behalf of the National Institute of Agricultural Botany (NIAB) Trust for the proposed development at Park Farm, 1 Villa Rd, Histon, Cambridge, CB24 9NZ.

1.2 The unnamed watercourse labelled on OS plans as 'Public Drain', located approximately 260 m to the south east of the site, was modelled using HEC-RAS software. The Public Drain and the site location is shown on Figure 1.1.

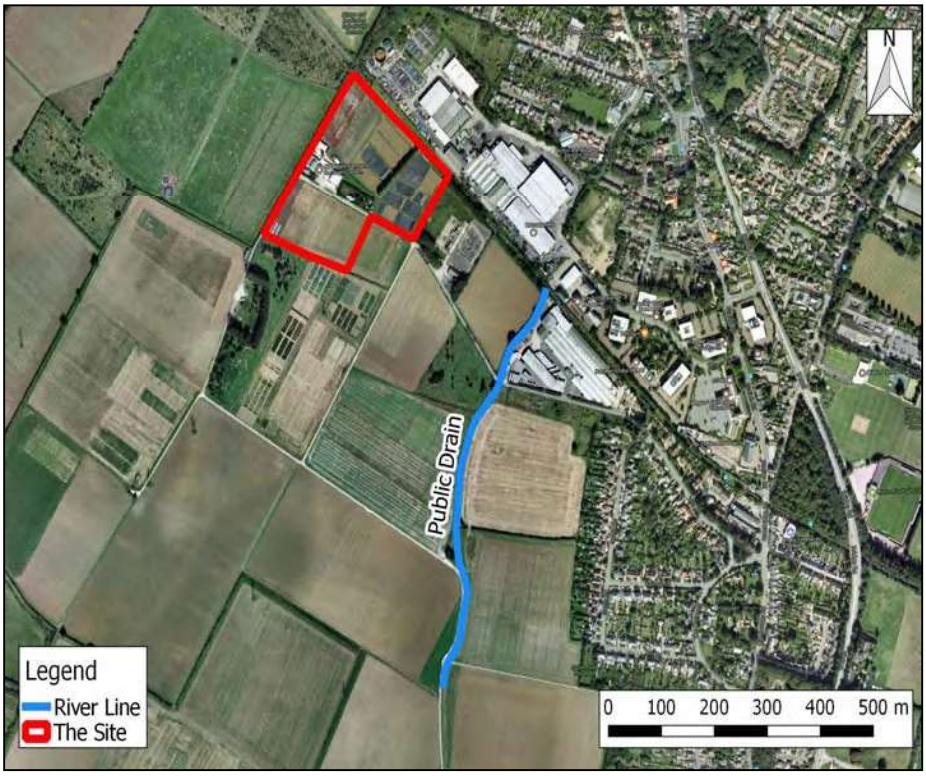


Figure 1.1: Location of the Site and Public Drain

Project Context

1.3 The purpose of this report is to respond to the Environment Agency's (EA) request for a site specific hydraulic analysis of the watercourse (Public Drain) adjacent to Park Farm. This is to determine the flood risk to the proposed development with an allowance for climate change.

1.4 We understand that this hydraulic assessment will be submitted as part of a site specific Flood Risk Assessment for a planning application for development of a new glasshouse, two agricultural style buildings, laboratories, office space, and an additional carpark at Park Farm.

1.5 Architect's Layouts are included at the end of this report.

1.6 The Topographic Survey, is included within this report on Drawings ALS75618/OVERVIEW and ALS75618/500/01 to ALS75618/500/04. Relative to ordnance datum, ground levels at the site fall from 14.94 mAOD in the western extent of the site to 11.83 mAOD in the eastern extent of the site. It is to be noted that over the area that is proposed to be developed the ground levels range from 13.22 mAOD to 14.26 mAOD.

Constraints and Limitations

1.7 The copyright of this report is vested in Create Consulting Engineers Ltd and the Client, NIAB Estate**.** The Client, or his appointed representatives, may copy the report for purposes in connection with the development described herein. It shall not be copied by any other party or used for any other purposes without the written consent of Create Consulting Engineers Ltd or the Client.

1.8 Create Consulting Engineers Ltd accepts no responsibility whatsoever to other parties to whom this report, or any part thereof, is made known. Any such other parties rely upon the report at their own risk.

1.9 The Watercourse Hydraulic Modelling Report addresses the flood risk posed to the proposed development, the extent of which is shown by the site boundary, as indicated by the location plan attached with this report.

1.10 This report has been undertaken with the assumption that the site will be developed in accordance with the above proposals without significant change. The conclusions resulting from this study are not necessarily indicative of future conditions or operating practices at or adjacent to the site.

1.11 Create Consulting Engineers Ltd has endeavored to assess all information provided to them during this appraisal. The report summarises information from a number of external sources and cannot offer any guarantees or warranties for the completeness or accuracy or information relied upon. Information from third parties has not been verified by Create Consulting Engineers Ltd unless otherwise stated in this report.

2.0 HYDROLOGICAL ASSESSMENT

Watercourse and Catchment Area

2.1 The Public Drain drains towards the north combining with various other drains before reaching its confluence with the Beck Brook approximately 2 km to the north west of the site.

2.2 The area surrounding the drain is relatively flat and primarily comprises agricultural fields. The watercourse is understood to be fed by a catchment 3.27 km^2 in size to the south of the site. The catchment has been inferred from the FEH Web Mapping Service and verified against a watershed analysis using GRASS software and the Environment Agency LiDAR (Figure 2.1).

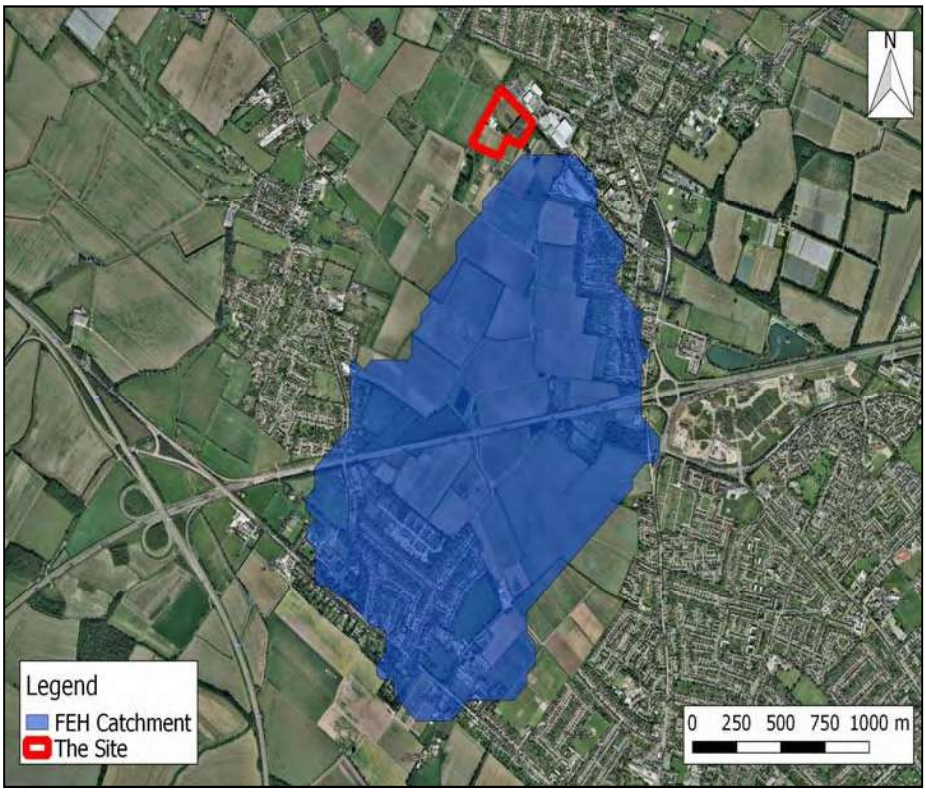


Figure 2.1: Location of the FEH Catchment

Estimate of Flows in Watercourse

2.3 There is no gauged flow data available for the Public Drain and therefore the flow regime has been estimated using both WINFAP 4 and ReFH2 with catchment descriptors extracted from the FEH Web Mapping Service (Appendix A).

2.4 The median flow (QMED) for the study catchment (index flood) was calculated as 0.281 m3/s from the catchment descriptors using WINFAP 4.

2.5 Peak flow estimates produced by ReFH2 and WINFAP 4 are outlined below.

ReFH2

2.6 Using the ReFH2 program and the inputs from the FEH online web service (Appendix A), estimates were obtained for the site for various return periods.

2.7 The results are displayed in Table 2.1.

WINFAP 4

2.8 WINFAP 4 uses flow records from either a single reliable gauged site in the same catchment or from a number of other gauged sites in hydrologically similar catchments to form a pooling group which is subjected to a statistical analysis. Following this the flood growth curve and flood frequency curve generated by the analysis are used to calculate a range of flood flows at the site in question. This was carried out for the watercourse using the inputs from the FEH online web service (Appendix A). A default urban adjustment factor was applied (Urbext2000). The results are displayed in Table 2.1

2.9 A sensitivity analysis of the urban adjustment (URBext2000) factor was undertaken. The percentage of impermeable area was determined using aerial imagery and it was concluded that the percentage of impermeable area was approximately half of the default value presented by Urbext2000. The default Urbext2000 value was utilised for calculating flows as this value was more conservative than the calculated value.

Estimate of Bankfull Flow

2.10 A sensitivity analysis was carried out to determine the impact of using a bankfull flow estimate for QMED. WINFAP 4 has the functionality to produce a bankfull estimate for QMED.

2.11 The bankfull QMED was calculated using both the catchment descriptors and channel dimensions. The channel was measured in several places and an average Bankfull Channel Width of 5.95 was used. The results are displayed in Table 2.1.

Comparison of Flow Results

2.12 The results from each method are shown in Table 2.1.

Return Period (Years)	Flows Calculated using ReFH2 (m^3/s)	Flows Calculated using WINFAP 4 (m^3/s)	Flows Calculated from Bankfull Analysis (in WINFAP 4) (m^3/s)
2	0.49	0.28	0.63
5	Not Modelled	0.39	0.87
10	Not Modelled	0.48	1.06

Return Period (Years)	Flows Calculated using ReFH2 (m^3/s)	Flows Calculated using WINFAP 4 (m^3/s)	Flows Calculated from Bankfull Analysis (in WINFAP 4) (m^3/s)
20	0.89	Not Modelled	Not Modelled
25	Not Modelled	0.60	1.33
50	Not Modelled	0.70	1.57
100	1.34	0.83	1.84
200	Not Modelled	0.97	2.16
500	Not Modelled	1.19	2.65
1000	2.51	1.39	3.10

Table 2.1: Flows Calculated using 1) ReFH2, 2) WINFAP 4, and 3) Bankfull Analysis (Using WINFAP) for Several Return Periods

2.13 To provide a conservative estimate of the flows in the Public Drain, peak flows from the bankfull analysis will be utilised in the flood model.

Climate Change Allowances

2.14 To incorporate the potential future effects of climate change the bankfull flows have been increased accordingly.

2.15 The development is classified as 'less vulnerable' use according to the NPPF. Based on the EA's[1] guidance the 'central' (25%) and 'higher central' (35%) allowances for the Anglian Basin 2070-2115 will be added on to the flows based on a development design life of 100 years. Correspondence with the Environment Agency (28th February to 13th March 2017) confirmed that these allowances are acceptable. The results are displayed in Table 2.1.

Return Period (Years)	Flows Calculated from Bankfull Analysis (in WINFAP 4)	+25% Climate Change	+35% Climate Change
2	0.63	0.78	0.85
5	0.87	1.09	1.18
10	1.06	1.32	1.43
25	1.33	1.66	1.79
50	1.57	1.96	2.11
100	1.84	2.30	2.48
200	2.16	2.69	2.91
500	2.65	3.31	3.58
1000	3.10	3.87	4.18

Table 2.2: Flows calculated using bankfull analysis (in WINFAP) to include 25% climate change and 35% climate change allowances

[1] Environment Agency (2016) *Flood Risk Assessments: Climate Change Allowances.*

3.0 METHODOLOGY

3.1 The hydraulic model has been developed to estimate the flood extent of the Public Drain for the 1 in 100 year event. As the channel is both small and relatively straight a one dimensional model was chosen to represent the channel which has been constructed using HEC-RAS 5.0. A 700m stretch of the drain (identified in Figure 1.1) ending at the Bypass was chosen to best represent water levels at the site. This reach comprises 4 bridges and one culvert.

3.2 The model was run in a steady state scenario by using a constant flow input for the 1 in 100 year event (as the pooling analysis generates a peak flow only).

Channel Survey Data

3.3 A detailed topographical survey was undertaken on 7 March 2017 (Drawings 2219-545-SU01 - 2219-545-SU16). 42 channel cross sections at 20 m intervals were generated using the topographical survey as well as a 3D surface.

Model Schematic

3.4 A schematic representation of the model is included in Figure 3.1 at the rear of the report.

Surface Roughness

Channel and Floodplain

3.5 The following surface roughness assumptions have been made for the channel and floodplain based on a combination of site photographs and google earth imagery. The values have been obtained from the HEC-RAS reference manual (US Army Corps Engineers, 2016). The Manning's 'n' values are shown in Table 3.1 below.

Geometry	Manning's 'n'	Description
Channel	0.35	Clean, straight, full, no rifts or deep pools but more stones and weeds
Floodplain	0.04	Mature field crops

Table 3.1: Manning's 'n' values used for the channel and floodplain in HEC-RAS

Structures

3.6 The four bridges have been modelled using the dimensions, soffit levels, and invert levels provided within the topographical survey. The bridges are clear span with no piers or edges so it was assumed the surface roughness would remain the same as the channel. The culvert located in the northern part of the model has been modelled as an arched culvert. The

following surface roughness assumptions have been made and the Manning's 'n' values are shown in Table 3.2 below.

Geometry	Manning's 'n'	Description
Bridges	0.35	Remained the same as channel
Culvert	0.015	Culvert with some debris

Table 3.2: Manning's 'n' values used for the channel and floodplain in HEC-RAS

Contraction and Expansion

3.7 Contraction and expansion coefficients for the bridges and culverts were obtained from the HEC-RAS manual as shown in Table 3.3 below.

Geometry	Contraction Coefficient	Expansion Coefficient	Description
Bridges	0.3	0.5	Typical bridge
Culvert	0.6	0.8	Abrupt transition

Table 3.3: Contraction and expansion values used in HEC-RAS

Boundary Conditions

3.8 A bed slope of 0.0008 was used throughout the length of the model, which was calculated (from the topographic survey) as the average gradient of the channel along the section in question.

4.0 RESULTS OF MODELLING

4.1 The 1 in 100 year event with an allowance for climate change was modelled and the results are shown in Table 4.1 (to the rear of the report). The 100 year with a 35% allowance for climate change scenario has been selected as the design flood event for the development when assessing the flood risk to the development with additional considerations made to the results of sensitivity scenarios carried out.

4.2 For the 100 year plus 35% climate change scenario, levels in the channel ranged from 10.87m AOD to 11.63m AOD. Freeboard along the left bank ranges from 10 mm to 590 mm and along the right bank it ranges from 110 mm to 550 mm.

4.3 In the cross sections closest to the development (chainage 177 to 0) levels in the channel ranged from 10.87m AOD to 11.23m AOD. Freeboard along the left bank ranges from 40 mm to 590 mm and along the right bank it ranges from 110 mm to 550 mm.

4.4 The results show that flow remains in channel along the modelled reach (as shown in the long profile Figure 4.1). The lowest levels of the site are between 12.09 m AOD and 11.84 m AOD in the eastern corner. It is to be noted that over the area that is proposed to be developed the ground levels range from 13.22 mAOD to 14.26 mAOD.

4.5 The site levels are well above the design flood event peak level of 11.23 mAOD with the proposed developed area (13.22 mAOD) being 1.99m above this level. It is concluded that the development is at a low risk of flooding from the public drain and has sufficient freeboard above the design flood event (100yr + cc) for the lifetime of the development.

Sensitivity Testing

4.6 As requested by the EA several sensitivity tests were undertaken to test the assumptions made within the model. These included an uplift of the following:

- Coefficients used for Manning's 'n' hydraulic roughness
- Contraction/expansion losses
- Peak flows

4.7 The results are discussed in the following sections.

Manning's 'n'

4.8 A sensitivity test was undertaken using the modelled design flood event (1 in 100 year flow plus 35% climate change) with a 25% increase in the channel and floodplain Manning's 'n' values. This increased the Mannings 'n' values to 0.044 for the channel and 0.05 for the floodplain. Results are displayed in Table 4.2, to the rear of the report.

4.9 In the cross sections closest to the development (chainage 177 to 0) levels in the channel ranged from 10.99m AOD to 11.36m AOD. Freeboard along the left bank ranges from -80 mm (exceeding bank level) to 470 mm and along the right bank it ranges from -10 mm to 420 mm.

4.10 The results show that the flows primarily remain in channel, however, it overtops within chainage 177 to 0 in one location along the left bank (depth of 80 mm) and one along the right bank (depth of 10 mm).

4.11 The lowest levels of the site are between 12.09 m AOD and 11.84 m AOD (in the eastern corner). The site will therefore remain dry in this event. Additionally the lowest part of the site with development proposals is at 13.22 m AOD (Barn 03).

4.12 The site levels are well above the design flood event peak level of 11.36 mAOD with the proposed developed area (13.22 mAOD) being 1.86m above this level. It is concluded that with a 25% increase in Manning's n, the development remains at a low risk of flooding for the design flood event.

Contraction/Expansion Losses

4.13 A sensitivity test was undertaken using the modelled design flood event with a 25% increase in the contraction and expansion losses values for the bridges and culvert. Results are displayed in Table 4.3, to the rear of the report

4.14 In the cross sections closest to the development (chainage 177 to 0) levels in the channel ranged from 10.87m AOD to 11.23m AOD. Freeboard along the left bank ranges from 40 mm to 580 mm and along the right bank it ranges from 110 mm to 550 mm.

4.15 The results show that the flows remain in channel in all locations within chainage 177-0. Additionally, the lowest levels of the site are between 12.09 m AOD and 11.84 m AOD (in the eastern corner). The site therefore remains dry during this event.

4.16 The site levels are well above the design flood event peak level of 11.23 mAOD with the proposed developed area (13.22 mAOD) being 1.99m above this level. It is concluded that with a 25% increase in contraction and expansion losses, the development remains at a low risk of flooding for the design flood event.

Peak Flows

4.17 A sensitivity test was undertaken using the design flood event with a 25% increase to the peak flow (roughly equivalent to the 1000yr event). Results are displayed in Table 4.4, to the rear of the report.

4.18 In the cross sections closest to the development (chainage 177 to 0) levels in the channel ranged from 10.99m AOD to 11.35m AOD. Freeboard along the left bank ranges from -80 mm (exceeding bank level) to 480 mm and along the right bank it ranges from -10 mm to 430 mm.

4.19 The results show that the flows remain in channel in all locations within chainage 177-0. Additionally, the lowest levels of the site are between 12.09 m AOD and 11.84 m AOD (in the eastern corner). The site therefore remains dry during this event.

4.20 The site levels are well above the design flood event peak level of 11.35 mAOD with the proposed developed area being 1.87m above this level. It is concluded that with a 25% increase in peak flow, the development remains at a low risk of flooding for the design flood event.

Calibration

4.21 There is no gauged data or data from observed events available for calibration purposes.

4.22 It is noted however that the EA Surface Water Flood Maps (Figure 3.1) shows the site to be at 'very low' flood risk. This provides a form of validation against the results, showing that the site is not affected.

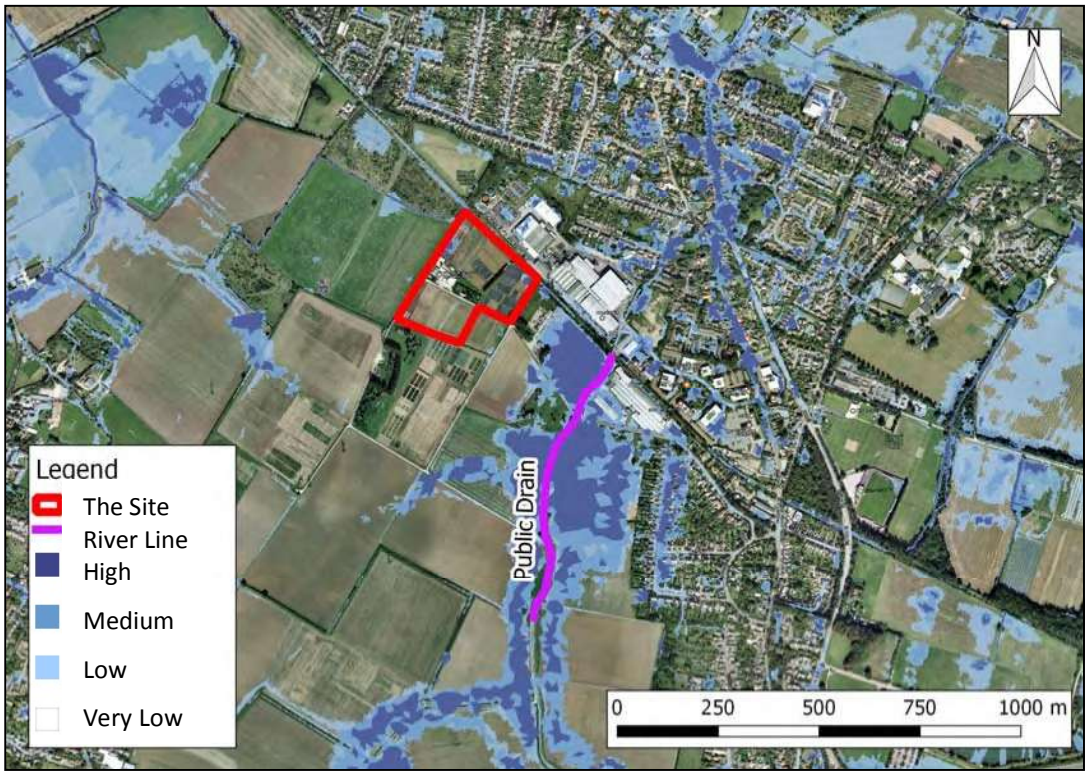


Figure 4.2 EA Surface Water Flood Maps

5.0 CONCLUSIONS

5.1 This report has provided a summary of the flood modelling assessment that was carried out by Create Consulting Engineers Ltd on behalf of the NIAB Trust for the proposed development at Park Farm, 1 Villa Rd, Histon, Cambridge, CB24 9NZ.

5.2 A hydrological assessment was undertaken to calculate the flows for the Public Drain. The bankfull estimate (using WINFAP 4) was used as it was the most conservative estimate, with an addition of 25% and 35% for climate change.

5.3 The hydraulic model has been developed to estimate the flood risk to the development from the Public Drain for the 1 in 100 year event with an allowance for climate change. As the channel is both small and relatively straight a one dimensional model was chosen to represent the channel which has been constructed using HEC-RAS 5.0.

5.4 The model was based on a detailed topographical survey was undertaken on 7th March 2017 (Drawings 2219-545-SU01 - 2219-545-SU16). 42 channel cross sections at 20 m intervals were generated using the topographical survey as well as a 3D surface.

5.5 The results of the model for the 100yr +35% flood event (the chosen design flood event) showed that the cross sections closest to the development (chainage 177 to 0) levels in the channel ranged from 10.87m AOD to 11.23m AOD. Freeboard along the left bank ranges from 40 mm to 590 mm and along the right bank it ranges from 110 mm to 550 mm.

5.6 The results showed that flow remains in channel along the modelled reach. The site levels are well above the design flood event peak level of 11.23 mAOD with the proposed developed area (13.22 mAOD) being 1.99m above this level.

5.7 As requested by the EA several sensitivity tests were undertaken to test the assumptions made within the model. These included an uplift of the following:

- Coefficients used for Manning's 'n' hydraulic roughness
- Contraction/expansion losses
- Peak flows

5.8 The results of these sensitivity tests shows the site to not be affected by any of the flood events.

5.9 There is no gauged data or data from observed events available for calibration purposes. It is noted, however, that the EA Surface Water Flood Maps shows the site to be at 'very low' flood risk. This provides a form of validation against the results, showing that the site is not affected.

5.10 It is concluded that the levels on site are situated sufficiently above flood levels modelled in the public drain. It also concluded that the development will be at a low risk of flooding from the public drain and will have sufficient freeboard above the design flood event (100yr + cc) for the lifetime of the development.

6.0 REFERENCES

i. Environment Agency Surface Water Flood WMS Layers (2014) Available at: https://data.gov.uk/data/search (Accessed March 2017).

ii. US Army Corps Engineers (2016). HEC-RAS River Analysis System User's Manual. Version 5.0.

FIGURES

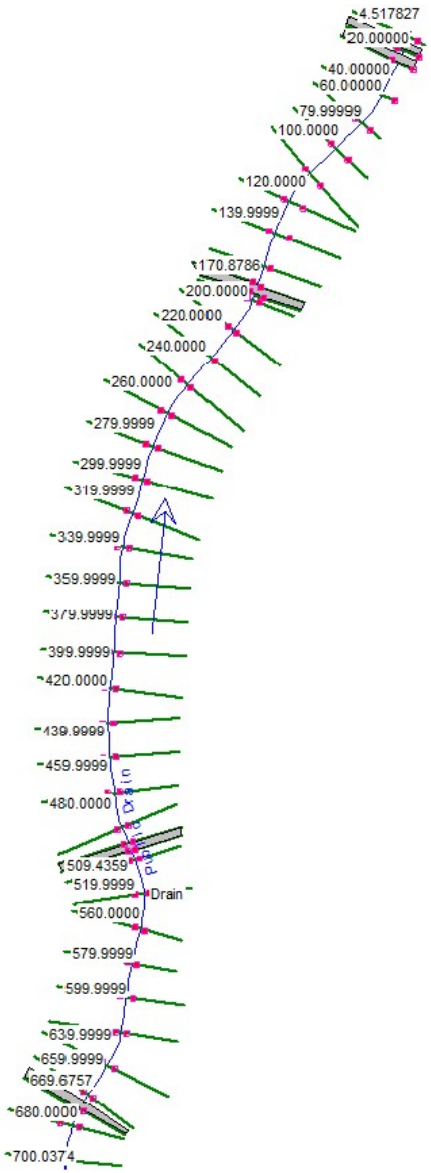


Figure 3.1 Model Schematic Exported from HEC-RAS

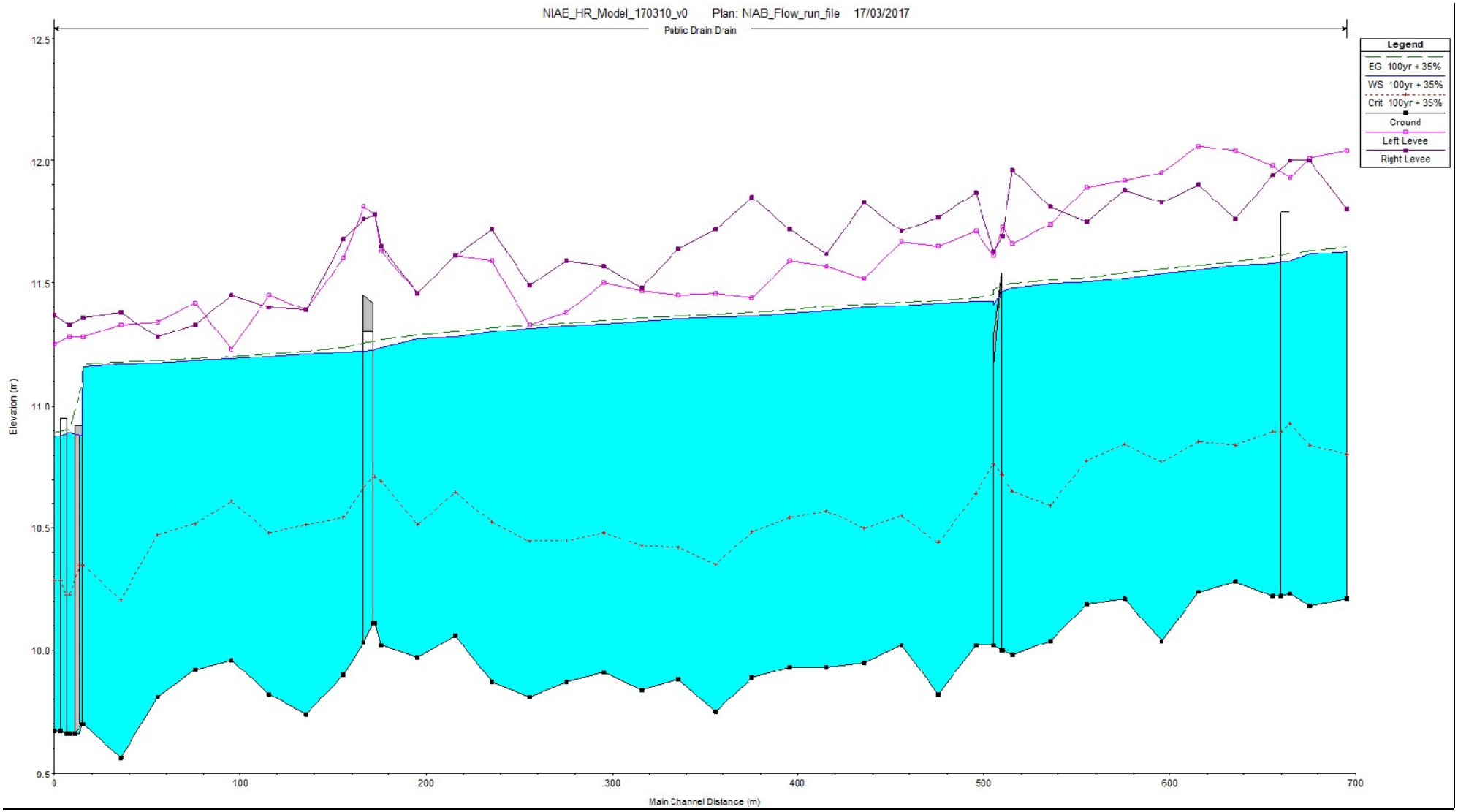


Figure 4.1: Long Profile of 100 year +35% Climate Change Model Run

TABLES

Reach	River Station	Profile	Left Freeboard (m)	Right Freeboard (m)	Water Surface Elevation (m)	Critical Water Surface (m)	Energy Grade Elevation (m)	Energy Grade Slope (m/m)	Velocity Chanel (m/s)	Flow Area (m2)	Top Width (m)	Froude Number Chanel
Drain	700.0374	100yr + 35%	0.41	0.17	11.63	10.8	11.65	0.000524	0.54	4.6	5.2	0.18
Drain	680	100yr + 35%	0.39	0.38	11.62	10.84	11.63	0.000619	0.57	4.33	5.11	0.2
Drain	669.6757	100yr + 35%	0.34	0.41	11.59	10.93	11.62	0.001524	0.81	3.06	3.8	0.29
Drain	664.9016 None		Bridge									
Drain	659.9999	100yr + 35%	0.4	0.36	11.58	10.89	11.61	0.001097	0.74	3.34	3.69	0.25
Drain	639.9999	100yr + 35%	0.47	0.19	11.57	10.84	11.59	0.000511	0.53	4.65	5.45	0.18
Drain	620	100yr + 35%	0.51	0.35	11.55	10.85	11.57	0.000775	0.63	3.95	4.8	0.22
Drain	599.9999	100yr + 35%	0.41	0.29	11.54	10.77	11.56	0.000658	0.6	4.16	4.67	0.2
Drain	579.9999	100yr + 35%	0.4	0.36	11.52	10.84	11.54	0.000985	0.68	3.62	4.53	0.24
Drain	560	100yr + 35%	0.39	0.25	11.5	10.78	11.52	0.00079	0.64	3.86	4.44	0.22
Drain	540	100yr + 35%	0.24	0.31	11.5	10.59	11.51	0.000456	0.51	4.83	5.23	0.17
Drain	519.9999	100yr + 35%	0.18	0.48	11.48	10.65	11.5	0.000714	0.62	4.03	4.4	0.21
Drain	514.1835	100yr + 35%	0.26	0.22	11.47	10.72	11.49	0.001125	0.73	3.4	3.93	0.25
Drain	511.7022 None		Bridge									
Drain	509.4359	100yr + 35%	0.18	0.2	11.43	10.76	11.46	0.001282	0.75	3.29	4.21	0.27
Drain	499.9999	100yr + 35%	0.29	0.45	11.42	10.64	11.44	0.000601	0.58	4.29	4.79	0.19
Drain	480	100yr + 35%	0.23	0.35	11.42	10.44	11.43	0.000341	0.46	5.34	5.35	0.15
Drain	459.9999	100yr + 35%	0.26	0.3	11.41	10.55	11.42	0.000461	0.52	4.8	5.27	0.17
Drain	439.9999	100yr + 35%	0.12	0.43	11.4	10.5	11.41	0.000463	0.52	4.78	5.11	0.17
Drain	420	100yr + 35%	0.18	0.23	11.39	10.57	11.4	0.000566	0.56	4.41	4.84	0.19
Drain	399.9999	100yr + 35%	0.21	0.34	11.38	10.54	11.39	0.000559	0.55	4.48	5.11	0.19
Drain	379.9999	100yr + 35%	0.07	0.48	11.37	10.49	11.38	0.000478	0.52	4.74	5.21	0.17
Drain	359.9999	100yr + 35%	0.1	0.36	11.36	10.35	11.37	0.000289	0.42	5.84	6.13	0.14
Drain	339.9999	100yr + 35%	0.1	0.29	11.35	10.42	11.37	0.000384	0.48	5.19	5.55	0.16
Drain	319.9999	100yr + 35%	0.13	0.14	11.34	10.43	11.36	0.000442	0.49	5.05	5.88	0.17
Drain	299.9999	100yr + 35%	0.17	0.23	11.33	10.48	11.35	0.000471	0.51	4.9	5.77	0.18
Drain	279.9999	100yr + 35%	0.05	0.26	11.33	10.45	11.34	0.00046	0.5	4.99	5.91	0.17
Drain	260	100yr + 35%	0.01	0.17	11.32	10.44	11.33	0.000519	0.5	4.93	6.39	0.18
Drain	240	100yr + 35%	0.29	0.42	11.3	10.52	11.32	0.00055	0.55	4.5	5.2	0.19
Drain	220	100yr + 35%	0.33	0.33	11.28	10.64	11.3	0.000995	0.67	3.69	4.97	0.25
Drain	200	100yr + 35%	0.19	0.19	11.27	10.51	11.29	0.000533	0.54	4.6	5.37	0.19
Drain	179.9999	100yr + 35%	0.39	0.41	11.24	10.69	11.27	0.001368	0.78	3.19	4.29	0.29
Drain	176.7426	100yr + 35%	0.55	0.55	11.23	10.71	11.26	0.001542	0.81	3.04	4.16	0.3
Drain	173.7661 None		Bridge									
Drain	170.8786	100yr + 35%	0.59	0.54	11.22	10.67	11.25	0.001353	0.78	3.17	4.13	0.29
Drain	159.9999	100yr + 35%	0.38	0.46	11.22	10.54	11.24	0.000717	0.59	4.18	5.45	0.22
Drain	139.9999	100yr + 35%	0.19	0.19	11.21	10.51	11.22	0.000581	0.45	5.46	9.54	0.19
Drain	120	100yr + 35%	0.26	0.2	11.2	10.48	11.21	0.000456	0.42	5.84	9.51	0.17
Drain	100	100yr + 35%	0.04	0.27	11.19	10.61	11.2	0.000564	0.45	5.52	9.85	0.19
Drain	79.99999	100yr + 35%	0.25	0.15	11.18	10.52	11.19	0.00038	0.39	6.38	10.48	0.16
Drain	60	100yr + 35%	0.16	0.11	11.17	10.47	11.18	0.000424	0.42	5.9	9.29	0.17
Drain	40	100yr + 35%	0.16	0.21	11.17	10.21	11.18	0.000194	0.32	7.8	10.34	0.12
Drain	20	100yr + 35%	0.12	0.2	11.16	10.35	11.17	0.000638	0.47	5.32	9.47	0.2
Drain	19.05487 None		Culvert									
Drain	12.28586	100yr + 35%	0.39	0.44	10.89	10.22	10.9	0.000673	0.51	4.9	8.15	0.21
Drain	7.988860 None		Bridge									
Drain	4.517827	100yr + 35%	0.38	0.5	10.87	10.28	10.89	0.001	0.63	3.93	6.2	0.25

Table 4.1: 1 in 100 Year + 35% Climate Change

Reach	River Station	Profile	Left Freeboard (m)	Right Freeboard (m)	Water Surface Elevation (m)	Critical Water Surface (m)	Energy Grade Elevation (m)	Energy Grade Slope (m/m)	Velocity Chanel (m/s)	Flow Area (m2)	Top Width (m)	Froude Number Chanel
Drain	700.0374	100yr + 35%	0.27	0.03	11.77	10.8	11.78	0.000578	0.46	5.35	5.83	0.15
Drain	680	100yr + 35%	0.26	0.25	11.75	10.84	11.77	0.000649	0.49	5.06	5.51	0.16
Drain	669.6757	100yr + 35%	0.2	0.27	11.73	10.93	11.76	0.001561	0.68	3.63	4.25	0.24
Drain	664.9016 None		Bridge									
Drain	659.9999	100yr + 35%	0.26	0.22	11.72	10.89	11.74	0.001165	0.64	3.88	3.91	0.21
Drain	639.9999	100yr + 35%	0.33	0.05	11.71	10.84	11.72	0.000528	0.46	5.43	5.77	0.15
Drain	620	100yr + 35%	0.37	0.21	11.69	10.85	11.71	0.000795	0.53	4.64	5.2	0.18
Drain	599.9999	100yr + 35%	0.27	0.15	11.68	10.77	11.69	0.000728	0.51	4.83	5.25	0.17
Drain	579.9999	100yr + 35%	0.26	0.22	11.66	10.84	11.68	0.00102	0.58	4.29	5.07	0.2
Drain	560	100yr + 35%	0.25	0.11	11.64	10.78	11.66	0.000886	0.55	4.5	5.09	0.19
Drain	540	100yr + 35%	0.11	0.18	11.63	10.59	11.64	0.000499	0.45	5.56	5.64	0.14
Drain	519.9999	100yr + 35%	0.05	0.35	11.61	10.65	11.63	0.00078	0.53	4.64	4.77	0.17
Drain	514.1835	100yr + 35%	0.13	0.09	11.6	10.72	11.62	0.001247	0.62	3.98	4.55	0.21
Drain	511.7022 None		Bridge									
Drain	509.4359	100yr + 35%	0.07	0.09	11.54	10.76	11.57	0.001421	0.65	3.82	4.72	0.23
Drain	499.9999	100yr + 35%	0.17	0.33	11.54	10.64	11.55	0.000692	0.51	4.86	5.16	0.17
Drain	480	100yr + 35%	0.12	0.24	11.53	10.44	11.54	0.000427	0.41	5.98	6.03	0.13
Drain	459.9999	100yr + 35%	0.15	0.19	11.52	10.55	11.53	0.000532	0.46	5.41	5.58	0.15
Drain	439.9999	100yr + 35%	0.01	0.32	11.51	10.5	11.52	0.000545	0.46	5.36	5.45	0.15
Drain	420	100yr + 35%	0.07	0.12	11.5	10.57	11.51	0.00069	0.5	4.96	5.41	0.17
Drain	399.9999	100yr + 35%	0.11	0.24	11.48	10.54	11.49	0.000651	0.49	5.04	5.45	0.16
Drain	379.9999	100yr + 35%	-0.04	0.37	11.48	10.49	11.49	0.000151	0.25	16.18	42.49	0.08
Drain	359.9999	100yr + 35%	-0.02	0.24	11.48	10.35	11.48	0.000114	0.22	17.53	42.81	0.07
Drain	339.9999	100yr + 35%	-0.03	0.16	11.48	10.42	11.48	0.000174	0.27	14.77	42.88	0.09
Drain	319.9999	100yr + 35%	0.01	0.02	11.46	10.43	11.47	0.000531	0.43	5.81	6.92	0.15
Drain	299.9999	100yr + 35%	0.05	0.12	11.45	10.48	11.46	0.000545	0.44	5.62	6.51	0.15
Drain	279.9999	100yr + 35%	-0.07	0.14	11.45	10.45	11.45	0.000143	0.23	16.66	42.65	0.08
Drain	260	100yr + 35%	-0.12	0.04	11.45	10.44	11.45	0.000161	0.24	15.93	42.89	0.08
Drain	240	100yr + 35%	0.16	0.29	11.43	10.52	11.44	0.000588	0.48	5.2	5.53	0.16
Drain	220	100yr + 35%	0.2	0.2	11.41	10.64	11.43	0.001254	0.56	4.42	6.77	0.22
Drain	200	100yr + 35%	0.06	0.06	11.4	10.51	11.41	0.00058	0.47	5.31	5.79	0.16
Drain	179.9999	100yr + 35%	0.26	0.28	11.37	10.69	11.39	0.00137	0.66	3.78	4.62	0.23
Drain	176.7426	100yr + 35%	0.42	0.42	11.36	10.71	11.39	0.001585	0.68	3.63	4.74	0.25
Drain	173.7661 None		Bridge									
Drain	170.8786	100yr + 35%	0.47	0.42	11.34	10.67	11.36	0.001448	0.68	3.66	4.39	0.24
Drain	159.9999	100yr + 35%	0.27	0.35	11.33	10.54	11.34	0.000792	0.51	4.83	5.98	0.18
Drain	139.9999	100yr + 35%	0.08	0.08	11.32	10.51	11.33	0.000564	0.38	6.58	10.61	0.15
Drain	120	100yr + 35%	0.15	0.09	11.31	10.48	11.32	0.000474	0.36	6.97	10.86	0.14
Drain	100	100yr + 35%	-0.08	0.15	11.31	10.61	11.31	0.000216	0.24	14.26	40.75	0.1
Drain	79.99999	100yr + 35%	0.13	0.03	11.3	10.52	11.3	0.00037	0.32	7.66	11.54	0.13
Drain	60	100yr + 35%	0.04	-0.01	11.29	10.47	11.3	0.00044	0.35	7.06	10.85	0.14
Drain	40	100yr + 35%	0.04	0.09	11.29	10.21	11.29	0.000211	0.27	9.05	11.32	0.1
Drain	20	100yr + 35%	0	0.08	11.28	10.35	11.28	0.000296	0.25	13.27	43.1	0.11
Drain	19.05487 None		Culvert									
Drain	12.28586	100yr + 35%	0.27	0.32	11.01	10.22	11.02	0.000652	0.41	5.98	9.35	0.17
Drain	7.988860 None		Bridge									
Drain	4.517827	100yr + 35%	0.26	0.38	10.99	10.28	11	0.001002	0.53	4.7	6.88	0.2

Table 4.2: 1 in 100 Year + 35% Climate Change Plus 25% Increase in Mannings

Reach	River Station	Profile	Left Freeboard (m)	Right Freeboard (m)	Water Surface Elevation (m)	Critical Water Surface (m)	Energy Grade Elevation (m)	Energy Grade Slope (m/m)	Velocity Chanel (m/s)	Flow Area (m2)	Top Width (m)	Froude Number Chanel
Drain	700.0374	100yr + 35%	0.4	0.16	11.64	10.8	11.66	0.000509	0.53	4.66	5.25	0.18
Drain	680	100yr + 35%	0.38	0.37	11.63	10.84	11.65	0.000597	0.56	4.39	5.14	0.2
Drain	669.6757	100yr + 35%	0.33	0.4	11.6	10.93	11.63	0.001466	0.8	3.1	3.84	0.28
Drain	664.9016 None		Bridge									
Drain	659.9999	100yr + 35%	0.39	0.35	11.59	10.89	11.62	0.001059	0.73	3.39	3.71	0.24
Drain	639.9999	100yr + 35%	0.46	0.18	11.58	10.84	11.6	0.000494	0.53	4.71	5.48	0.18
Drain	620	100yr + 35%	0.49	0.33	11.57	10.85	11.58	0.000748	0.62	4	4.83	0.22
Drain	599.9999	100yr + 35%	0.4	0.28	11.55	10.77	11.57	0.000636	0.59	4.21	4.7	0.2
Drain	579.9999	100yr + 35%	0.39	0.35	11.53	10.84	11.55	0.000948	0.67	3.68	4.58	0.24
Drain	560	100yr + 35%	0.37	0.23	11.52	10.78	11.54	0.00076	0.63	3.92	4.47	0.22
Drain	540	100yr + 35%	0.23	0.3	11.51	10.59	11.52	0.00044	0.51	4.9	5.27	0.17
Drain	519.9999	100yr + 35%	0.17	0.47	11.49	10.65	11.51	0.000689	0.61	4.08	4.44	0.2
Drain	514.1835	100yr + 35%	0.25	0.21	11.48	10.72	11.5	0.001089	0.72	3.45	3.99	0.25
Drain	511.7022 None		Bridge									
Drain	509.4359	100yr + 35%	0.18	0.2	11.43	10.76	11.46	0.00126	0.75	3.32	4.23	0.27
Drain	499.9999	100yr + 35%	0.28	0.44	11.43	10.64	11.45	0.000594	0.57	4.31	4.8	0.19
Drain	480	100yr + 35%	0.23	0.35	11.42	10.44	11.44	0.000338	0.46	5.36	5.36	0.15
Drain	459.9999	100yr + 35%	0.26	0.3	11.41	10.55	11.43	0.000456	0.51	4.83	5.28	0.17
Drain	439.9999	100yr + 35%	0.12	0.43	11.4	10.5	11.42	0.000458	0.52	4.8	5.12	0.17
Drain	420	100yr + 35%	0.18	0.23	11.39	10.57	11.41	0.000561	0.56	4.43	4.86	0.19
Drain	399.9999	100yr + 35%	0.21	0.34	11.38	10.54	11.4	0.000552	0.55	4.5	5.12	0.19
Drain	379.9999	100yr + 35%	0.07	0.48	11.37	10.49	11.39	0.000472	0.52	4.77	5.22	0.17
Drain	359.9999	100yr + 35%	0.09	0.35	11.37	10.35	11.38	0.000287	0.42	5.86	6.16	0.14
Drain	339.9999	100yr + 35%	0.09	0.28	11.36	10.42	11.37	0.000379	0.48	5.21	5.56	0.16
Drain	319.9999	100yr + 35%	0.12	0.13	11.35	10.43	11.36	0.000438	0.49	5.07	5.92	0.17
Drain	299.9999	100yr + 35%	0.16	0.23	11.34	10.48	11.35	0.000466	0.5	4.93	5.8	0.17
Drain	279.9999	100yr + 35%	0.05	0.26	11.33	10.45	11.34	0.000456	0.49	5.01	5.95	0.17
Drain	260	100yr + 35%	0.01	0.17	11.32	10.44	11.33	0.000515	0.5	4.96	6.44	0.18
Drain	240	100yr + 35%	0.28	0.41	11.31	10.52	11.32	0.000543	0.55	4.52	5.21	0.19
Drain	220	100yr + 35%	0.33	0.33	11.28	10.64	11.31	0.00098	0.67	3.71	4.99	0.25
Drain	200	100yr + 35%	0.18	0.18	11.28	10.51	11.29	0.000526	0.54	4.62	5.38	0.19
Drain	179.9999	100yr + 35%	0.39	0.41	11.24	10.69	11.27	0.001348	0.77	3.21	4.3	0.29
Drain	176.7426	100yr + 35%	0.55	0.55	11.23	10.71	11.27	0.00152	0.81	3.06	4.18	0.3
Drain	173.7661 None		Bridge									
Drain	170.8786	100yr + 35%	0.58	0.53	11.23	10.67	11.26	0.001335	0.78	3.18	4.14	0.28
Drain	159.9999	100yr + 35%	0.38	0.46	11.22	10.54	11.24	0.000712	0.59	4.19	5.46	0.22
Drain	139.9999	100yr + 35%	0.19	0.19	11.21	10.51	11.22	0.000577	0.45	5.47	9.56	0.19
Drain	120	100yr + 35%	0.26	0.2	11.2	10.48	11.21	0.000453	0.42	5.85	9.53	0.17
Drain	100	100yr + 35%	0.04	0.27	11.19	10.61	11.2	0.00056	0.45	5.54	9.87	0.19
Drain	79.99999	100yr + 35%	0.25	0.15	11.18	10.52	11.19	0.000378	0.39	6.39	10.5	0.16
Drain	60	100yr + 35%	0.16	0.11	11.17	10.47	11.18	0.000421	0.42	5.91	9.3	0.17
Drain	40	100yr + 35%	0.16	0.21	11.17	10.21	11.18	0.000194	0.32	7.81	10.35	0.12
Drain	20	100yr + 35%	0.12	0.2	11.16	10.35	11.17	0.000635	0.47	5.33	9.49	0.2
Drain	19.05487 None		Culvert									
Drain	12.28586	100yr + 35%	0.39	0.44	10.89	10.22	10.9	0.00067	0.51	4.91	8.16	0.21
Drain	7.988860 None		Bridge									
Drain	4.517827	100yr + 35%	0.38	0.5	10.87	10.28	10.89	0.001	0.63	3.93	6.2	0.25

Table 4.1: 1 in 100 Year + 35% Climate Change Plus 25% Increase on Contraction and Expansion Losses

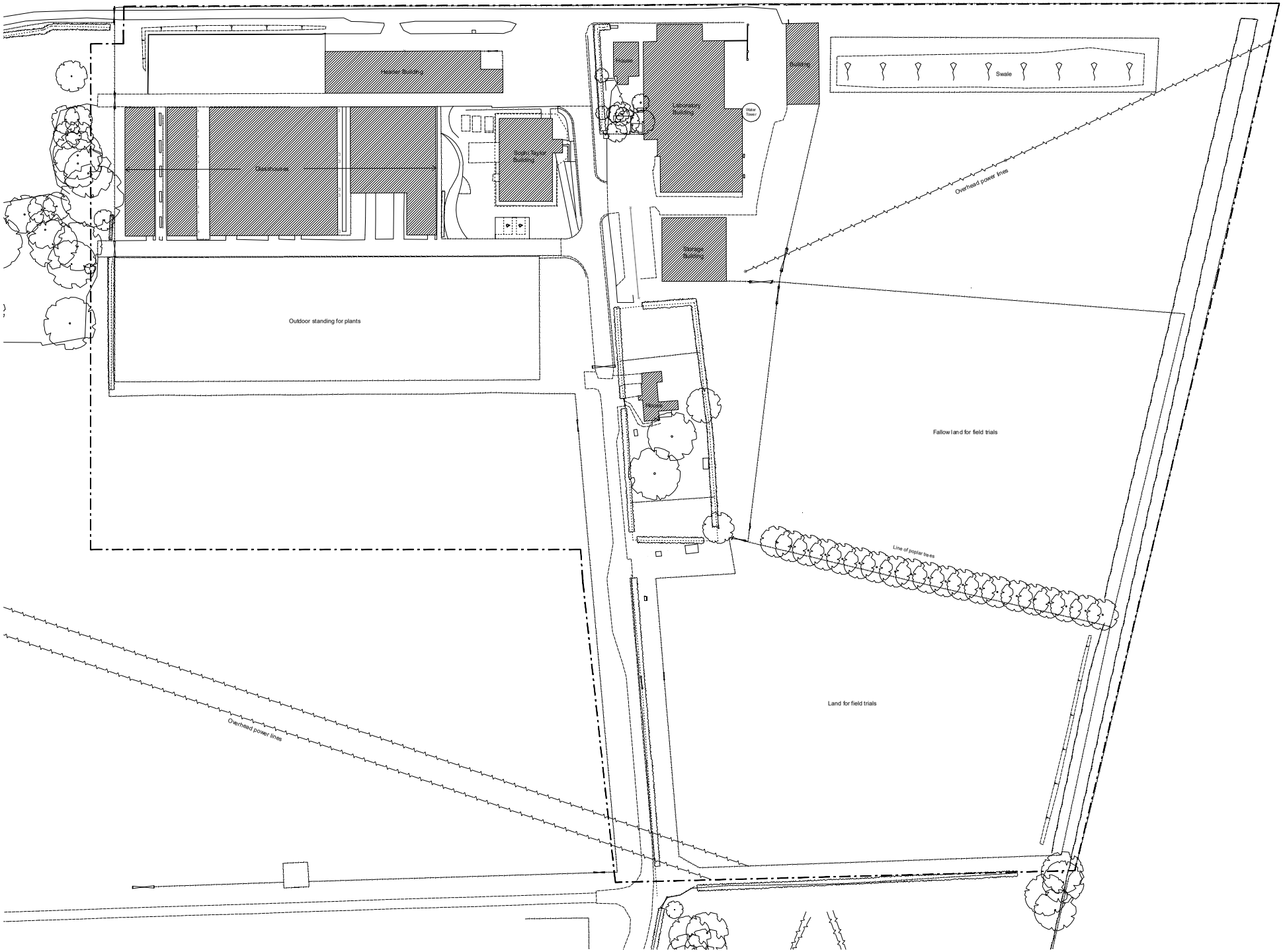
Reach	River Station	Profile	Left Freeboard (m)	Right Freeboard (m)	Water Surface Elevation (m)	Critical Water Surface (m)	Energy Grade Elevation (m)	Energy Grade Slope (m/m)	Velocity Chanel (m/s)	Flow Area (m2)	Top Width (m)	Froude Number Chanel
Drain	700.0374	100yr + 35%	0.25	0.01	11.79	10.87	11.81	0.00054	0.57	5.48	5.93	0.19
Drain	680	100yr + 35%	0.23	0.22	11.78	10.92	11.79	0.000603	0.6	5.17	5.57	0.2
Drain	669.6757	100yr + 35%	0.18	0.25	11.75	11.02	11.78	0.001474	0.84	3.69	4.3	0.29
Drain	664.9016 None		Bridge									
Drain	659.9999	100yr + 35%	0.24	0.2	11.74	10.97	11.77	0.001101	0.79	3.94	3.93	0.25
Drain	639.9999	100yr + 35%	0.31	0.03	11.73	10.9	11.75	0.000492	0.56	5.54	5.82	0.18
Drain	620	100yr + 35%	0.35	0.19	11.71	10.92	11.73	0.000743	0.65	4.74	5.25	0.22
Drain	599.9999	100yr + 35%	0.25	0.13	11.7	10.84	11.72	0.000685	0.63	4.94	5.35	0.21
Drain	579.9999	100yr + 35%	0.24	0.2	11.68	10.92	11.7	0.000951	0.71	4.39	5.15	0.24
Drain	560	100yr + 35%	0.23	0.09	11.66	10.85	11.68	0.000834	0.67	4.61	5.23	0.23
Drain	540	100yr + 35%	0.09	0.16	11.65	10.66	11.67	0.000463	0.54	5.7	5.72	0.17
Drain	519.9999	100yr + 35%	0.02	0.32	11.64	10.73	11.66	0.000727	0.65	4.75	4.83	0.21
Drain	514.1835	100yr + 35%	0.11	0.07	11.62	10.81	11.65	0.001169	0.76	4.08	4.64	0.26
Drain	511.7022 None		Bridge									
Drain	509.4359	100yr + 35%	0.07	0.09	11.54	10.85	11.58	0.001406	0.81	3.82	4.72	0.29
Drain	499.9999	100yr + 35%	0.17	0.33	11.54	10.71	11.56	0.00068	0.64	4.88	5.17	0.21
Drain	480	100yr + 35%	0.11	0.23	11.54	10.51	11.55	0.000418	0.52	6	6.06	0.17
Drain	459.9999	100yr + 35%	0.15	0.19	11.52	10.62	11.54	0.000521	0.57	5.42	5.59	0.19
Drain	439.9999	100yr + 35%	0.01	0.32	11.51	10.57	11.53	0.000534	0.58	5.38	5.46	0.19
Drain	420	100yr + 35%	0.07	0.12	11.5	10.64	11.52	0.000678	0.62	4.97	5.42	0.21
Drain	399.9999	100yr + 35%	0.11	0.23	11.48	10.61	11.5	0.000638	0.61	5.06	5.46	0.2
Drain	379.9999	100yr + 35%	-0.05	0.36	11.49	10.56	11.49	0.000143	0.3	16.48	42.5	0.1
Drain	359.9999	100yr + 35%	-0.03	0.23	11.49	10.42	11.49	0.000108	0.27	17.85	42.81	0.09
Drain	339.9999	100yr + 35%	-0.03	0.16	11.48	10.49	11.49	0.000164	0.33	15.07	42.88	0.1
Drain	319.9999	100yr + 35%	0	0.01	11.47	10.5	11.48	0.000521	0.53	5.83	6.95	0.19
Drain	299.9999	100yr + 35%	0.04	0.11	11.46	10.55	11.47	0.000535	0.55	5.64	6.53	0.19
Drain	279.9999	100yr + 35%	-0.08	0.13	11.46	10.52	11.46	0.000136	0.28	16.93	42.67	0.1
Drain	260	100yr + 35%	-0.13	0.03	11.46	10.52	11.46	0.000153	0.29	16.21	42.91	0.1
Drain	240	100yr + 35%	0.16	0.29	11.43	10.6	11.45	0.000581	0.6	5.2	5.53	0.2
Drain	220	100yr + 35%	0.2	0.2	11.41	10.71	11.43	0.00124	0.7	4.4	6.71	0.28
Drain	200	100yr + 35%	0.06	0.06	11.4	10.58	11.42	0.000573	0.58	5.31	5.79	0.19
Drain	179.9999	100yr + 35%	0.27	0.29	11.36	10.77	11.4	0.001388	0.83	3.74	4.6	0.29
Drain	176.7426	100yr + 35%	0.43	0.43	11.35	10.78	11.39	0.001611	0.86	3.59	4.7	0.32
Drain	173.7661 None		Bridge									
Drain	170.8786	100yr + 35%	0.48	0.43	11.33	10.74	11.37	0.001477	0.86	3.62	4.37	0.3
Drain	159.9999	100yr + 35%	0.28	0.36	11.32	10.61	11.35	0.0008	0.65	4.79	5.95	0.23
Drain	139.9999	100yr + 35%	0.08	0.08	11.32	10.59	11.33	0.000568	0.47	6.54	10.57	0.19
Drain	120	100yr + 35%	0.15	0.09	11.31	10.55	11.32	0.000476	0.45	6.93	10.82	0.18
Drain	100	100yr + 35%	-0.08	0.15	11.31	10.67	11.31	0.000218	0.3	14.17	40.74	0.12
Drain	79.99999	100yr + 35%	0.13	0.03	11.3	10.58	11.3	0.000372	0.41	7.61	11.51	0.16
Drain	60	100yr + 35%	0.04	-0.01	11.29	10.55	11.3	0.000443	0.44	7	10.7	0.17
Drain	40	100yr + 35%	0.05	0.1	11.28	10.27	11.29	0.000211	0.34	9	11.29	0.12
Drain	20	100yr + 35%	0.01	0.09	11.27	10.43	11.28	0.000678	0.48	6.5	11.86	0.21
Drain	19.05487 None		Culvert									
Drain	12.28586	100yr + 35%	0.26	0.31	11.02	10.29	11.03	0.000636	0.52	6.02	9.38	0.21
Drain	7.988860 None		Bridge									
Drain	4.517827	100yr + 35%	0.26	0.38	10.99	10.36	11.01	0.001002	0.66	4.68	6.86	0.26

Table 4.4: 1 in 100 Year + 35% Climate Change Plus 25% Increase on Peak Flows

APPENDICES

VERSION	"FEH CD-ROM"	Version	3	exported a	11:12:03	GMT	Thu	23-Feb-17	
CATCHMENT	GB	543800	262900	TL 43800	62900				
CENTROID	GB	543356	261519	TL 43356	61519				
AREA	3.2725								
ALTBAR	18								
ASPBAR	35								
ASPVAR	0.55								
BFIHOST	0.542								
DPLBAR	1.89								
DPSBAR	7								
FARL	0.983								
FPEXT	0.272								
FPDBAR	1.159								
FPLOC	0.911								
LDP	3.72								
PROPWET	0.26								
RMED-1H	10.8								
RMED-1D	28.7								
RMED-2D	34.6								
SAAR	546								
SAAR4170	553								
SPRHOST	43.27								
URBCONC1990	0.335								
URBEXT1990	0.068								
URBLOC1990	1.012								
URBCONC2000	0.771								
URBEXT2000	0.1276								
URBLOC2000	1.199								
C	-0.026								
D1	0.31487								
D2	0.24606								
D3	0.2844								
E	0.31745								
F	2.44653								
C(1 km)	-0.026								
D1(1 km)	0.316								
D2(1 km)	0.248								
D3(1 km)	0.279								
E(1 km)	0.318								
F(1 km)	2.442								

PLANS



The contractor is responsible for checking all dimensions and informing architect of any errors before work proceeds.

Notes

Based on survey carried out by ALS Anglia Land Surveys, dated October 2016
Drawing number ALS7361800-02 Topographical

0 5 10 15 20
metres

Planning Application Site Boundary

Rev	Date + notes	Chkd.	Drawn
1	25.11.2016 Issued for Planning Application	PS	UB

smith | evans
architects

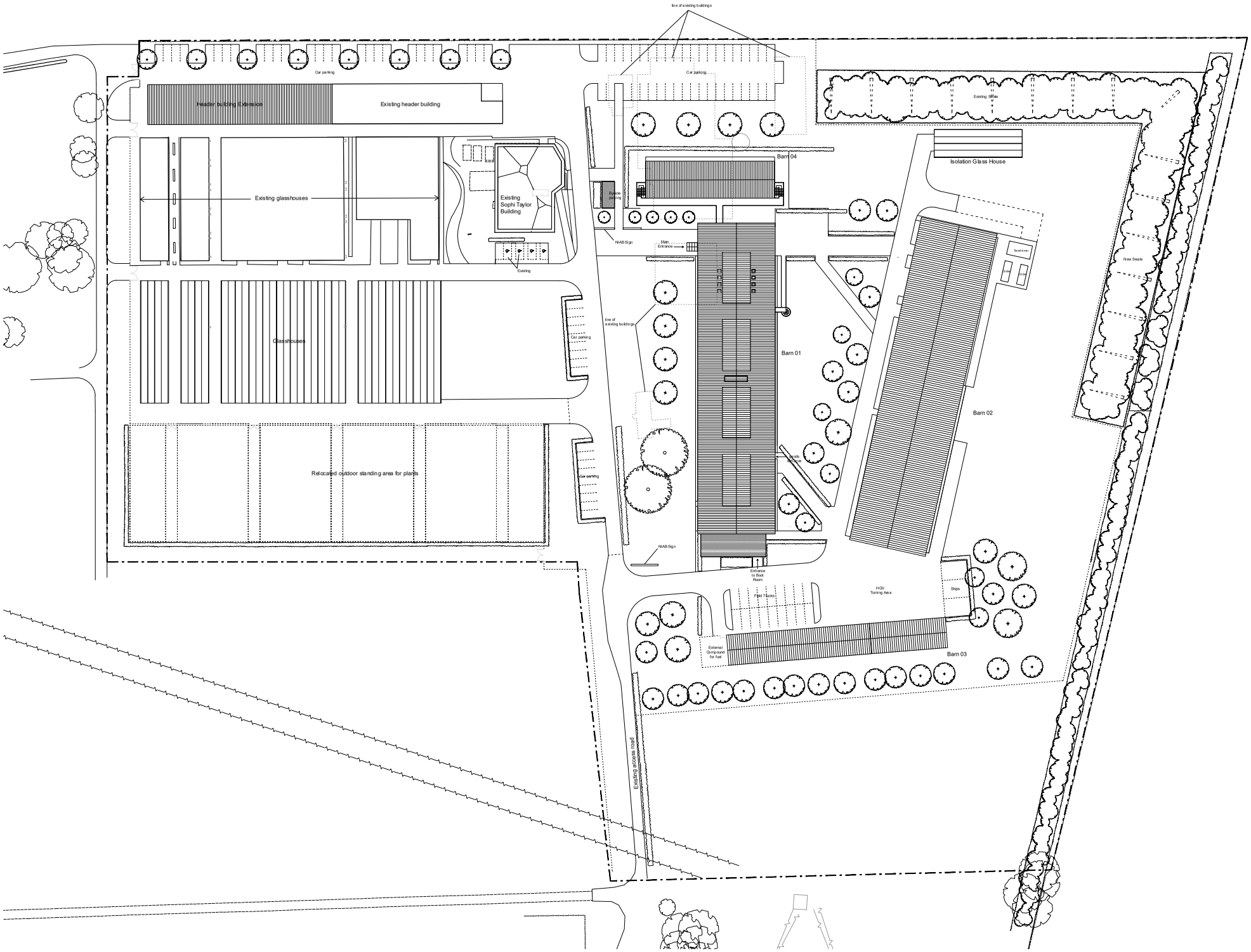
Project
NIAB Cambridge
Park Farm

Drawing
Site Plan
Existing

Job Ref	Drawing No.	Revision
0527	00-101	1

Scale	Size	Drawn
1: 500	A1	UB

Status
Planning



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Notes

For detail of all landscape design, refer to Wynne-Williams Associates drawings.

0 5 10 15 20
metres

Planning Application Site Boundary

Rev	Date + notes	Chkd.	Drawn
5	25.11.2016 Issued for planning Application	PS	UB

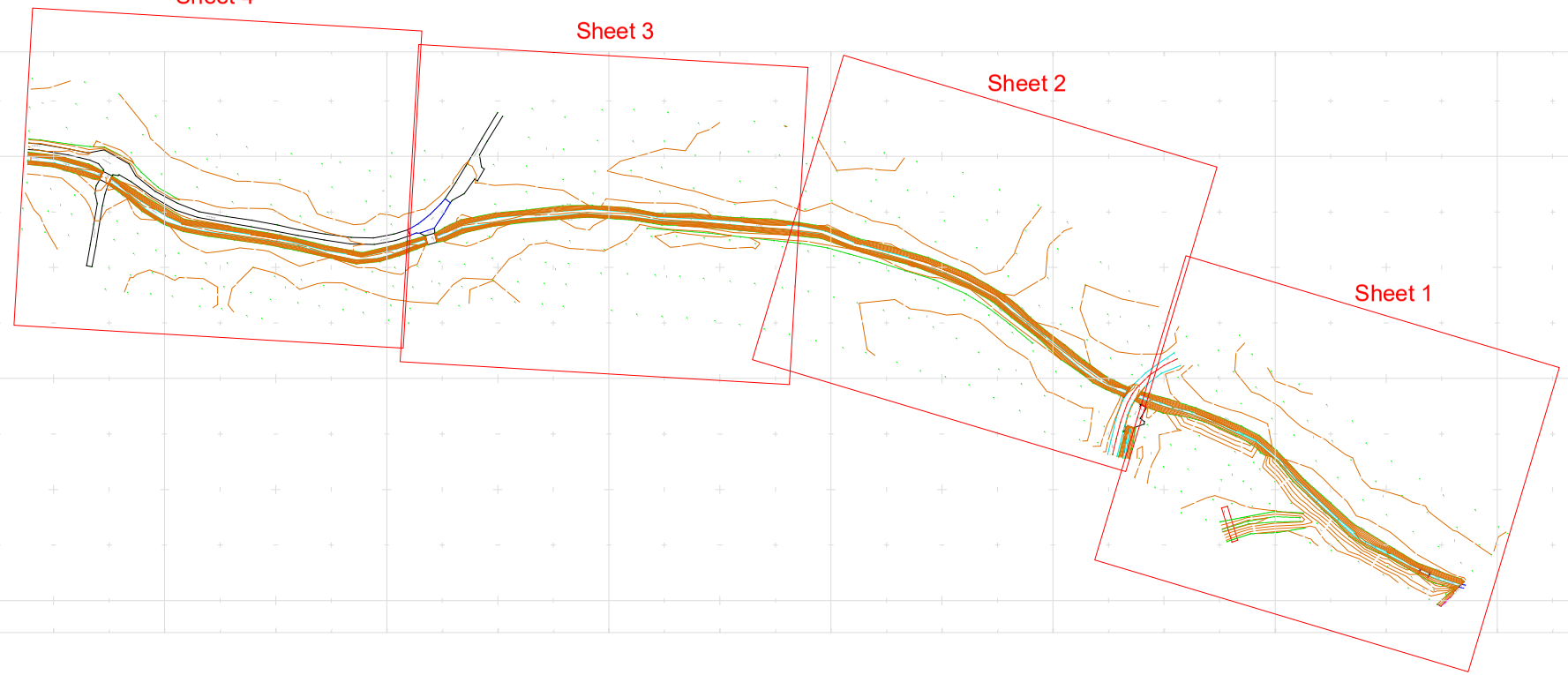
smith | evans
architects

Project
NIAB Cambridge
Park Farm

Drawing
Proposed Site Plan

Job Ref	Drawing No.	Revision
0527	00-102	5
Scale	Size	Drawn
1: 500	A1	UB

Status
Planning



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Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Redding Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPh Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB Close Boarded
FCL Chain Link
RHD Hoarding
RHR Heras Fence
FPL Palisade
FPR Post & Rail
FPW Post & Wire
RAIL Railings

Control Station
Column
xxx Floor to Ceiling Height
xxx FC Floor to False Ceiling Height

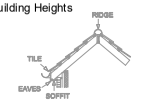
Features

Fences
Walls
Hedges — Average root line shown
Overhead Line — Indicative position of cables.

Services

Foul Sewers
Storm Sewers — Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	08.03.17	BB	First Issue

Scale at A1: Custom
Project Number: 2219-545

Drawing Status
- [x] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BB SURVEYS LTD
1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
m: 07786 388175
e: barry@bbsurveys.co.uk

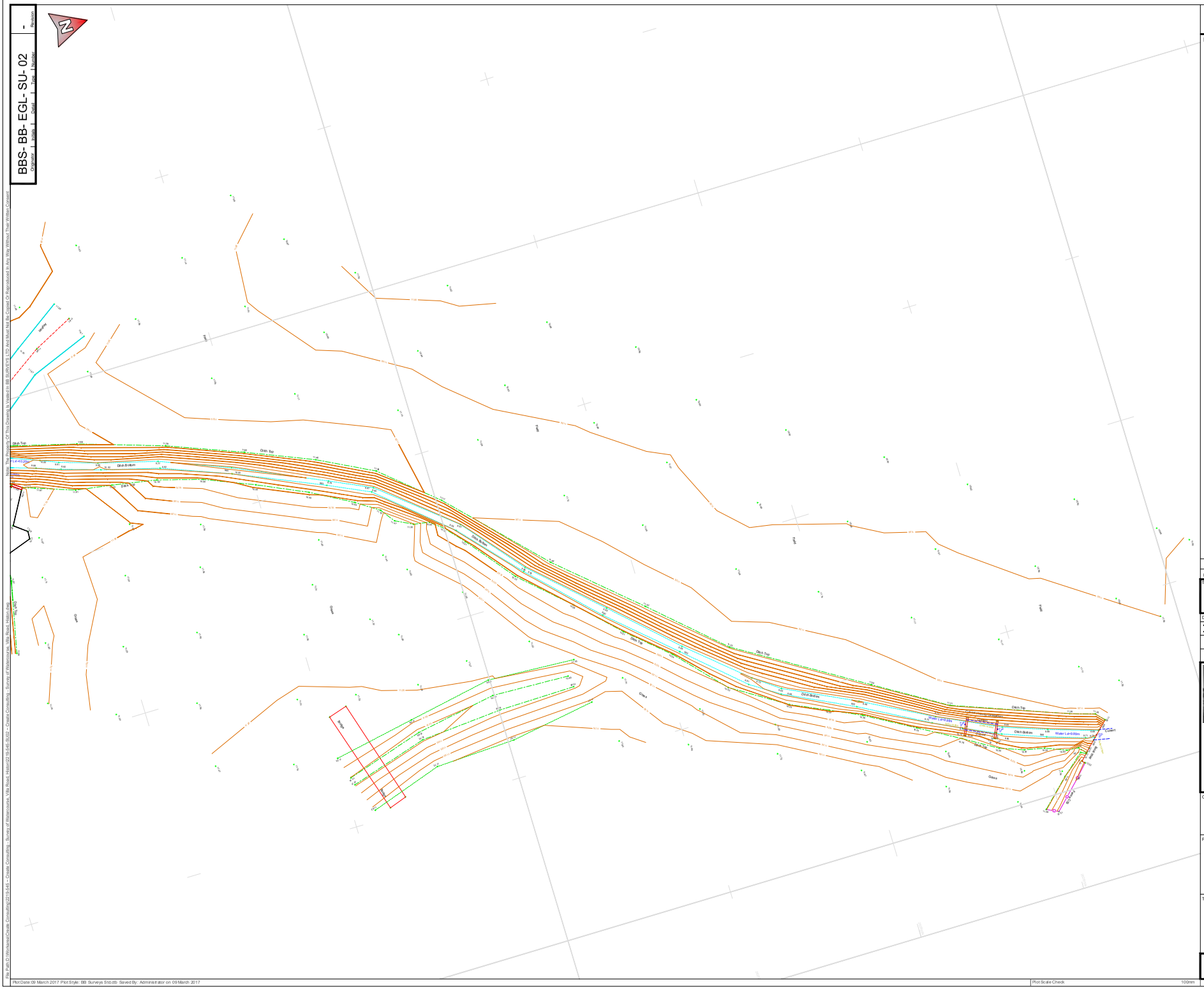
Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

Title: Existing Ground Level Survey Overview

BBS- BB- EGL- SU- 01 (Originator | Initials | Detail | Type | Number) — Revision: -

Revision | BBS- BB- EGL- SU- 01 | Originator | Initials | Detail | Type | Number



BBS- BB- EGL- SU- 02

Originator | Initials | Detail | Type | Number

Revision -

Scale 1:250

0 50 100 150 200 250

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Recliding Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPN Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx FC	Floor to Falsre Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences, Walls, Hedges, Overhead Line

Average root line shown

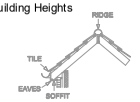
Indicative position of cables.

Services

Foul Sewers, Storm Sewers

Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:250

Project Number: 2219-545

Drawing Status

- [X] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

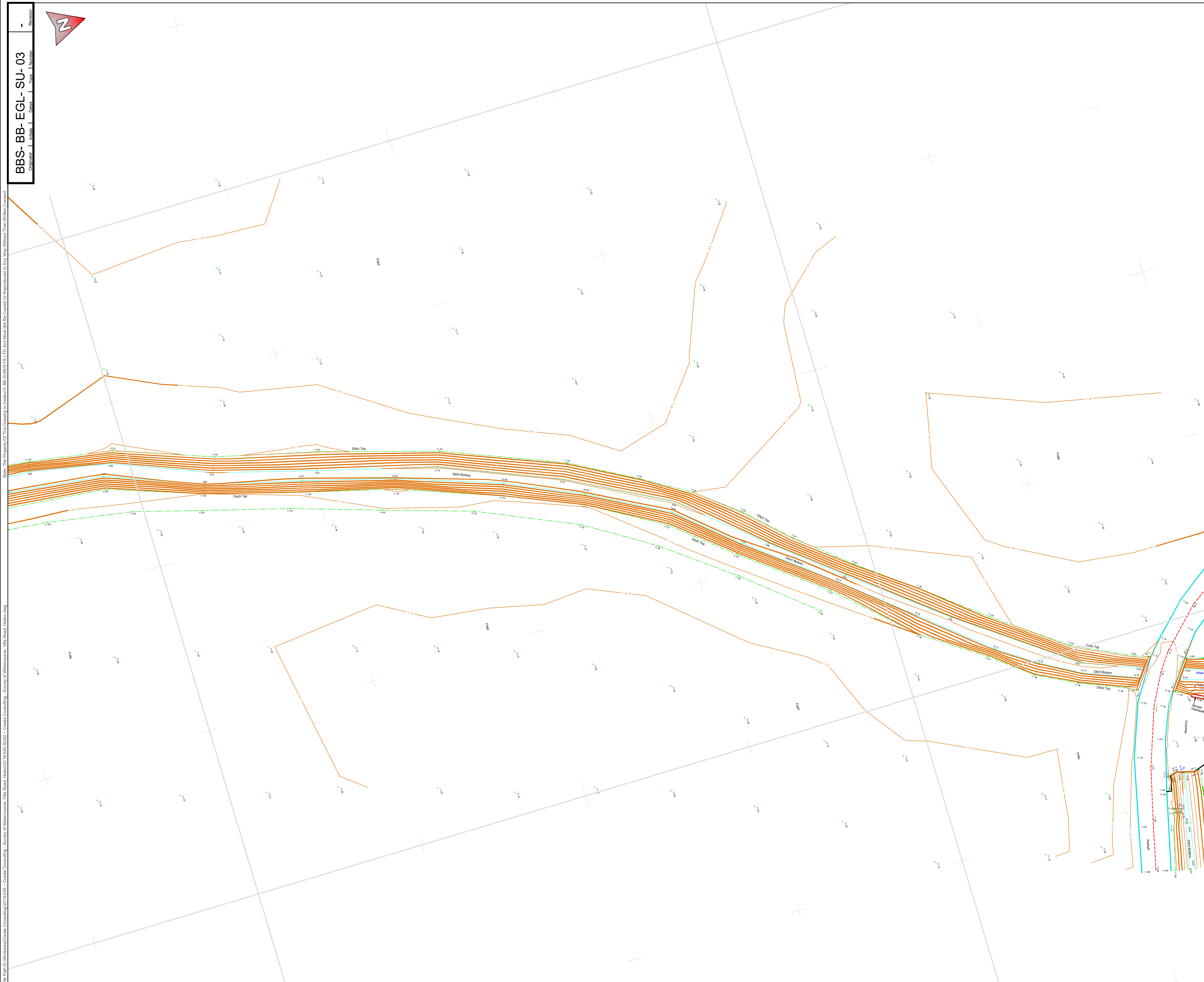
BB SURVEYS LTD

1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
m: 07786 388175
e: barry@bbsurveys.co.uk

Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

Title: Existing Ground Level Survey Sheet 1



Scale 1:250 — 0, 50, 100, 150, 200, 250

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	P/W	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
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DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Rodding Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EP+Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded
FCL	Chain Link
FHD	Hoarding
FHR	Heras Fence
FPL	Pallisade
FPR	Post & Rail
FPW	Post & Wire
RAIL	Railings

Control Station
Column
XXX Floor to Ceiling Height
XXX F/C Floor to False Ceiling Height

Features

Fences — FCB 1.6h
Walls — Wall 1.2h
Hedges — Hedge 1.3h — Average root line shown.
Overhead Line — OHL — Indicative position of cables.

Services

Foul Sewers
Storm Sewers
Pipe position and alignment is indicative only.

Building Heights

RIDGE
TILE
EAVES
SOFFIT

SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:250 — Project Number: 2219-545

Drawing Status:
- [X] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BBS BB SURVEYS LTD
1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
m: 07786 388175
e: barry@bbsurveys.co.uk

Client: Create Consulting
Edward Funnell

Project: Survey of Watercourse
Villa Road, Histon

Title: Existing Ground Level Survey
Sheet 2

BBS- BB- EGL- SU- 03 (Originator | Initials | Detail | Type | Number) — Revision: -

Sheet Size A1 841 x 594

Plot Scale Check — 100mm

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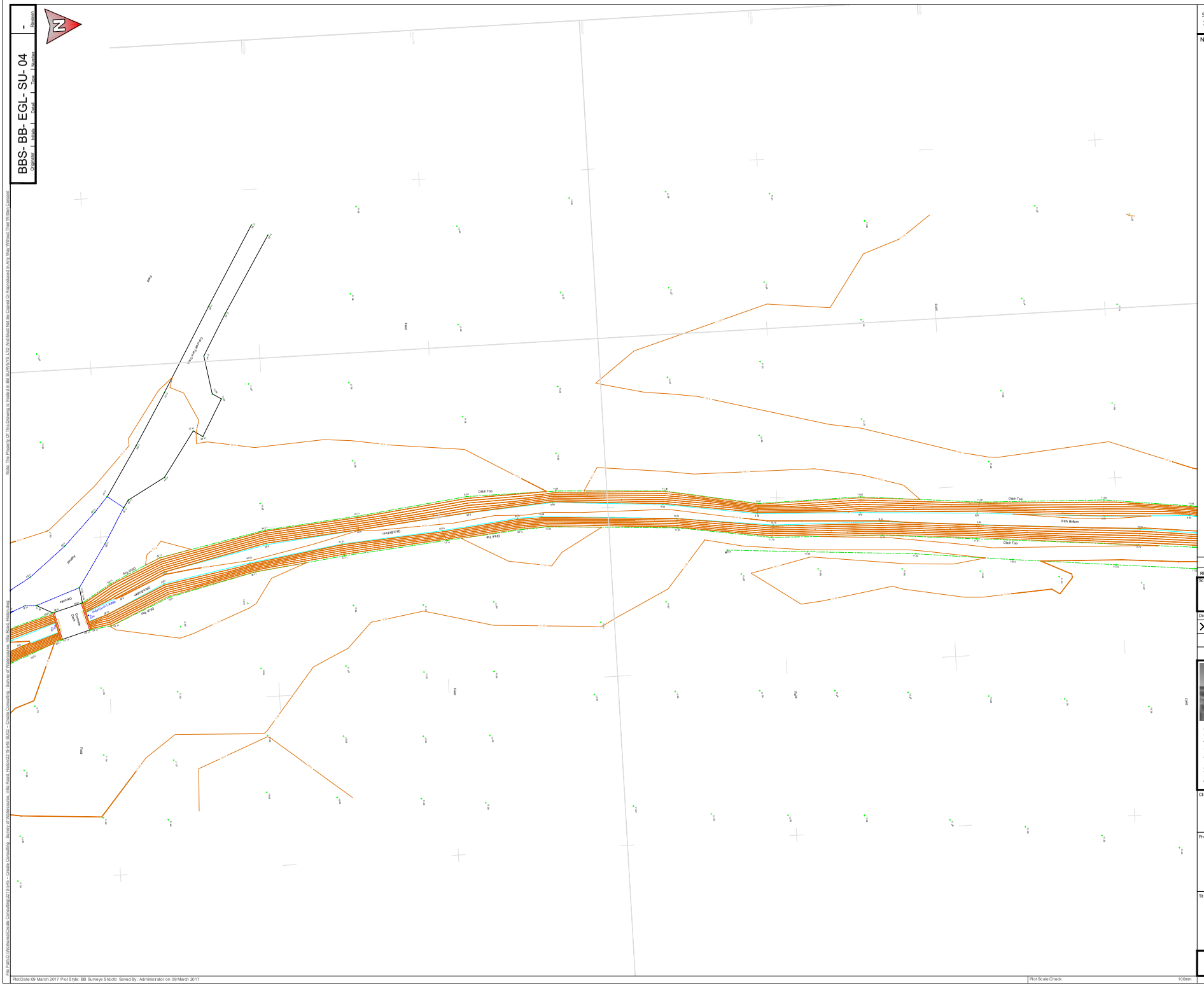
Plot Date:09 March 2017 Plot Style: BB Surveys Std.ctb Saved By: Administrator on 09 March 2017



BBS- BB- EGL- SU- 04

Originator | Initials | Detail | Type | Number

-
Revision

Scale 1:250

0 50 100 150 200 250

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
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CAB	Cabinet	MH	Manhole	TRK	Track
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CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Retaining Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
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FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx FC	Floor to False Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences
Walls
Hedges
Overhead Line

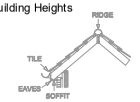
Average root line shown.
Indicative position of cables.

Services

Foul Sewers
Storm Sewers

Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:250

Project Number: 2219-545

Drawing Status

- [X] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BB SURVEYS LTD

1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
m: 07786 388175
e: barry@bbsurveys.co.uk

Client

Create Consulting
Edward Funnell

Project

Survey of Watercourse
Villa Road, Histon

Title

Existing Ground Level Survey
Sheet 3

BBS- BB- EGL- SU- 04

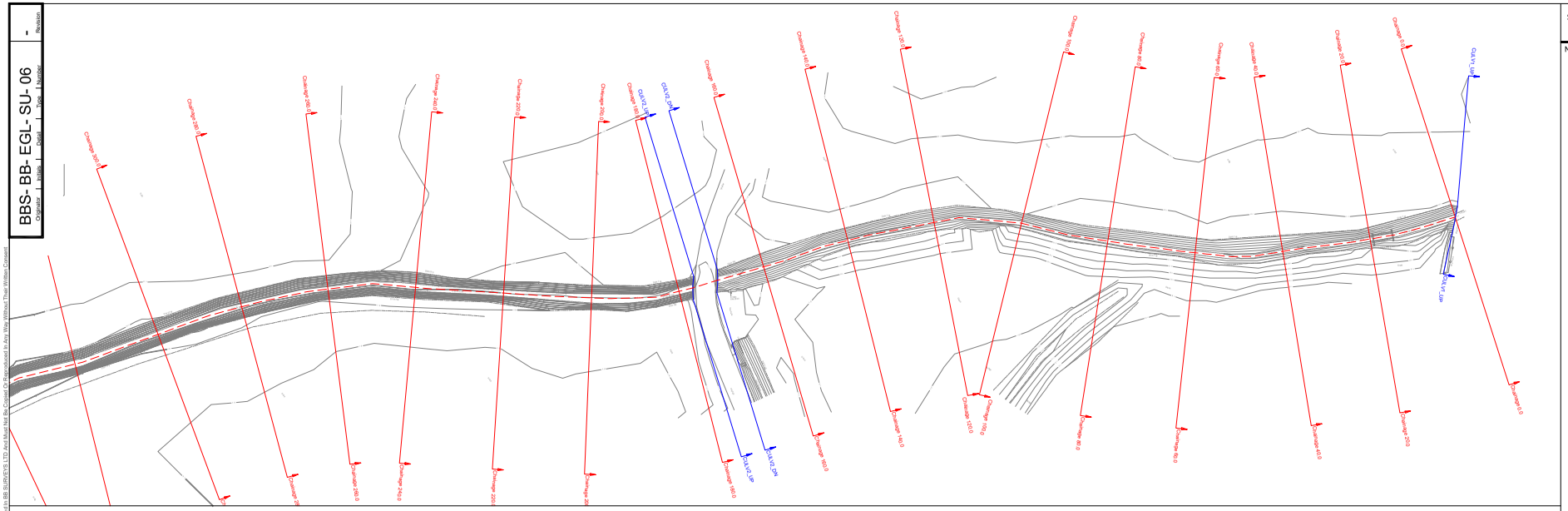
-

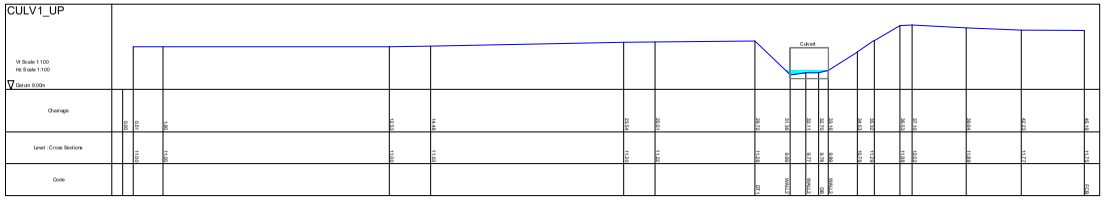
Sheet Size A1 841 x 594

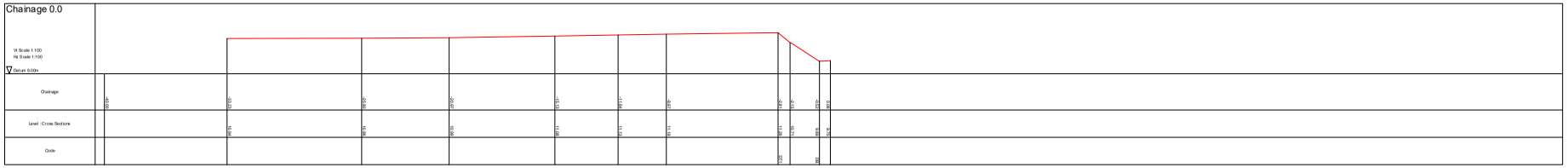
File Path: O:\Work\Create Consulting\2219-545 - Create Consulting - Survey of Watercourse, Villa Road, Histon\02 DRAWINGS\2219-545-SU02 - Create Consulting - Survey of Watercourse, Villa Road, Histon.dwg

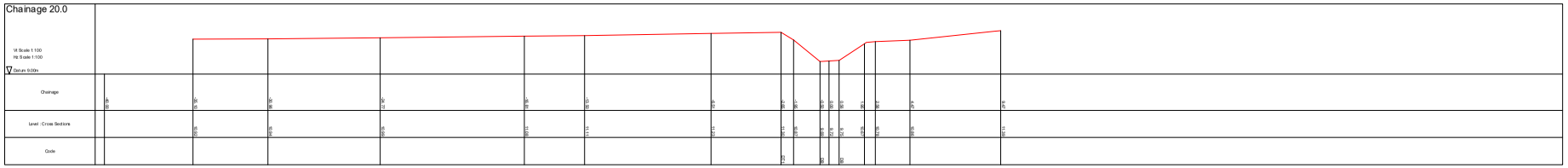
Plot Date: 09 March 2017 Plot Style: BB Surveys Std.ctb Saved By: Administrator on 09 March 2017

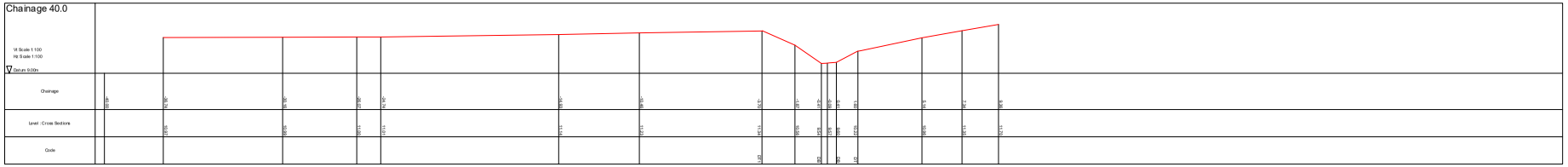
Plot Scale Check 100mm











Scale 1:125 (0, 25, 50, 75, 100, 125)

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
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CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Retaining Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPN Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx FC	Floor to False Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences, Walls, Hedges, Overhead Line

Average root line shown.

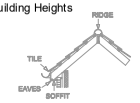
Indicative position of cables.

Services

Foul Sewers, Storm Sewers

Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125

Project Number: 2219-545

Drawing Status

- [x] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BBS BB SURVEYS LTD

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Norwich, Norfolk NR4 7BD
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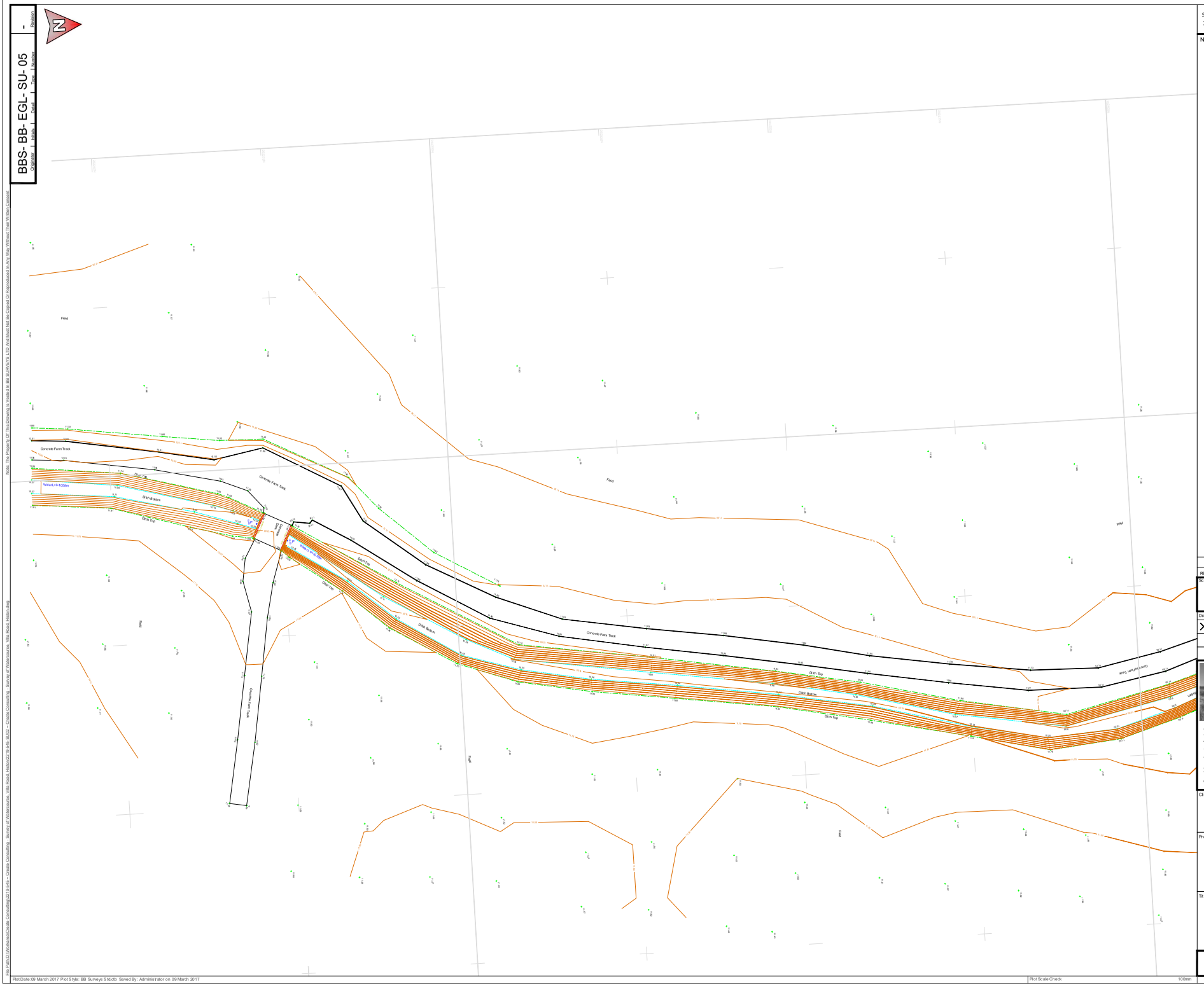
m: 07786 388175
e: barry@bbsurveys.co.uk

Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

Title: Cross Sections CH0 - CH40

BBS- BB- EGL- SU- 06 (Originator | Initials | Detail | Type | Number) — Revision: -



Scale 1:250 (0, 50, 100, 150, 200, 250)

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Retaining Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPN Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	XXX	Floor to Ceiling Height
FHR	Heras Fence	XXX FC	Floor to False Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences, Walls, Hedges, Overhead Line

Average root line shown.

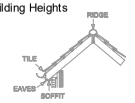
Indicative position of cables.

Services

Foul Sewers, Storm Sewers

Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:250

Project Number: 2219-545

Drawing Status

- [X] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BB SURVEYS LTD

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Norwich, Norfolk NR4 7BD
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m: 07786 388175
e: barry@bbsurveys.co.uk

Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

Title: Existing Ground Level Survey Sheet 4

BBS- BB- EGL- SU- 05 (Originator | Initials | Detail | Type | Number) - (Revision)

Sheet Size A1 841 x 594

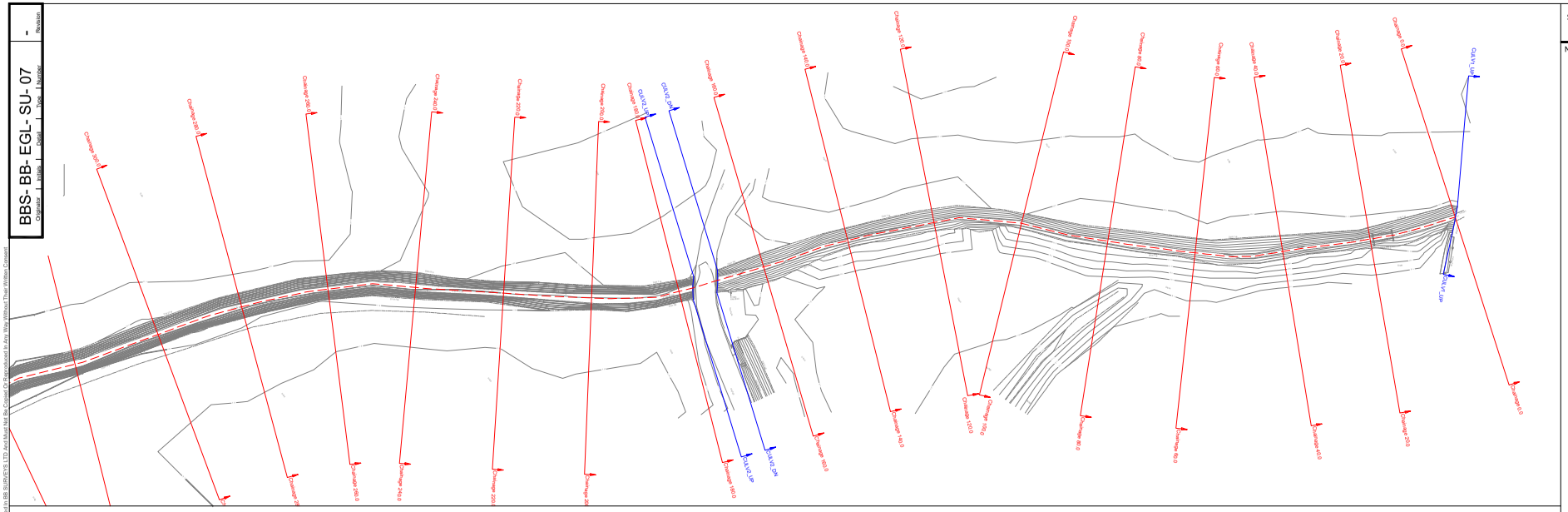
Plot Date:09 March 2017 Plot Style: BB Surveys Std.ctb Saved By:: Administrator on 09 March 2017

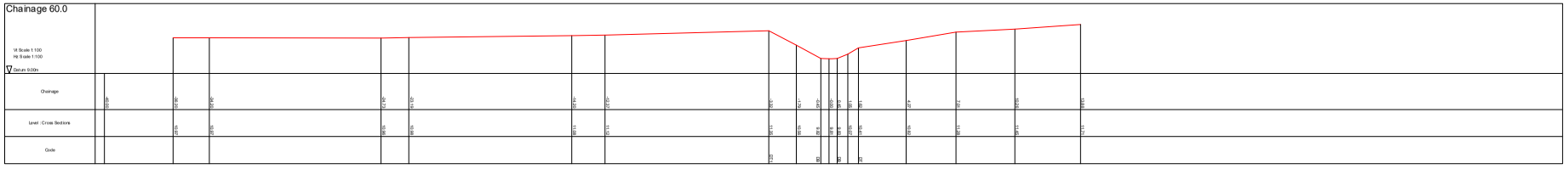
Plot Scale Check 100mm

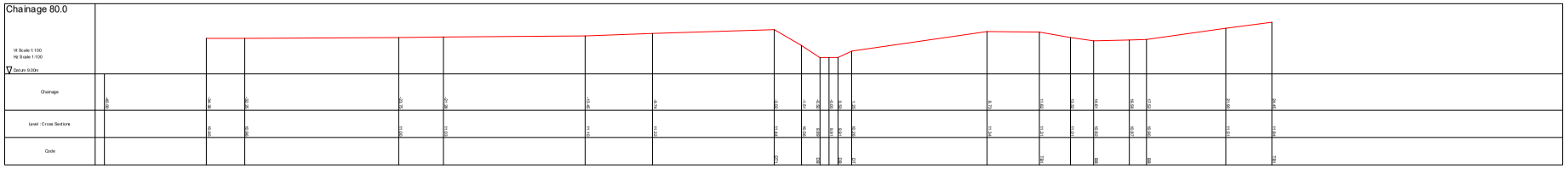
BBS- BB- EGL- SU- 07

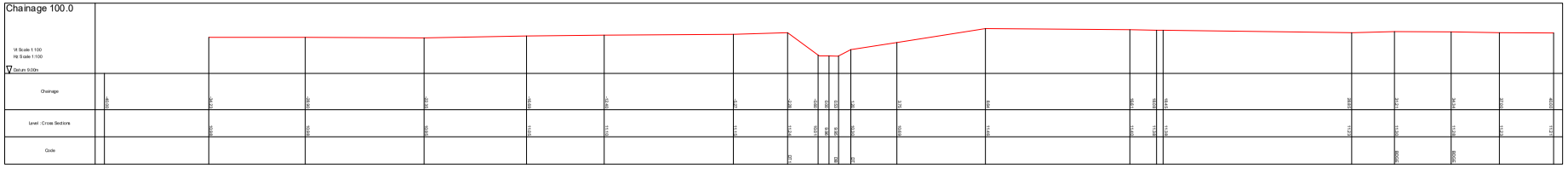
Originator | Initials | Detail | Type | Number | Revision

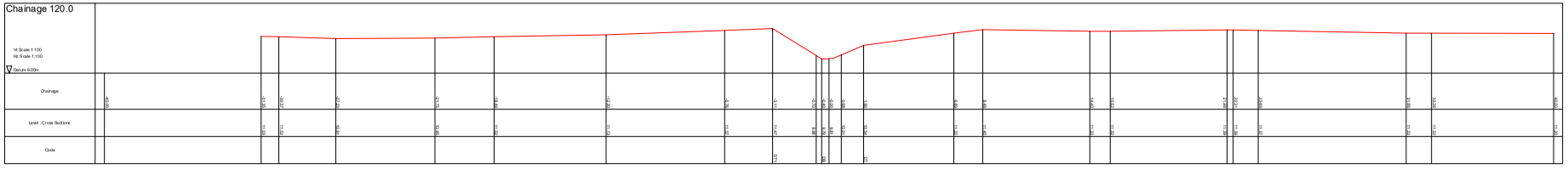
-











Scale 1:125

0 | 25 | 50 | 75 | 100 | 125

Notes:

AV	Air Valve	PH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
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Door	Door	RE	Retaining Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPN Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx FC	Floor to False Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences, Walls, Hedges, Overhead Line

Average root line shown.

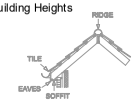
Indicative position of cables.

Services

Foul Sewers, Storm Sewers

Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125

Project Number: 2219-545

Drawing Status

- [x] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BBS BB SURVEYS LTD

1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
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m: 07786 388175
e: barry@bbsurveys.co.uk

Client: Create Consulting Edward Funnell

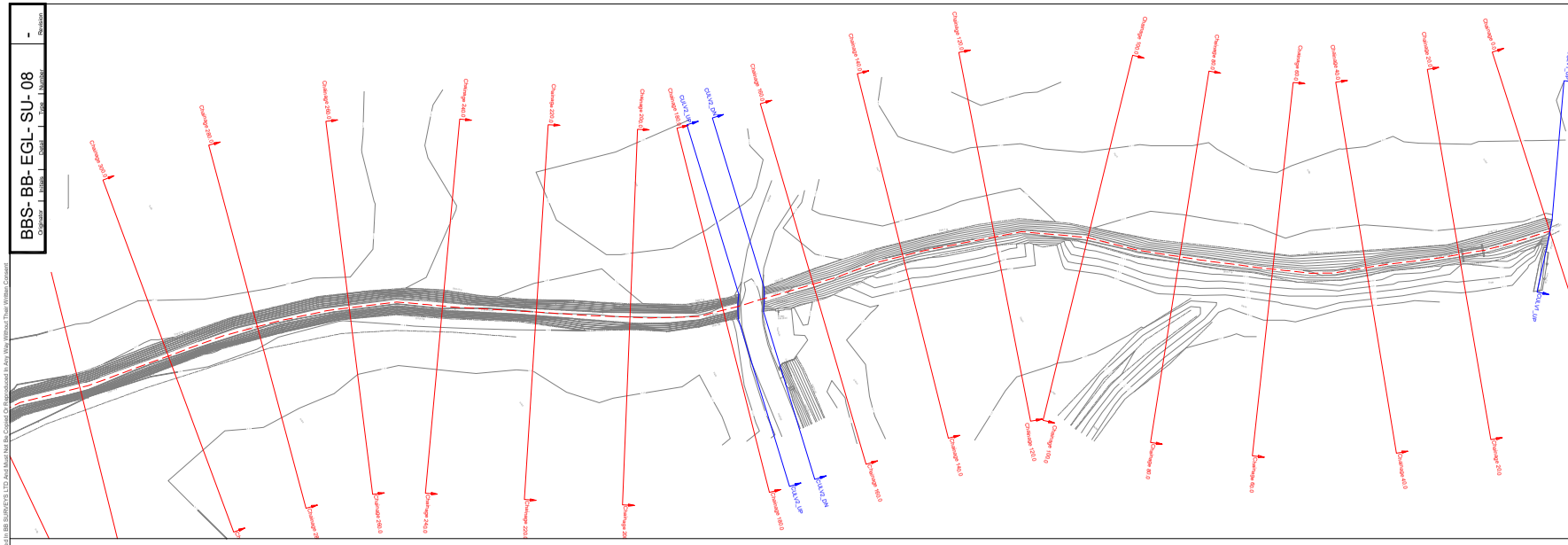
Project: Survey of Watercourse Villa Road, Histon

Title: Cross Sections CH60 - CH120

BBS- BB- EGL- SU- 07 | -

Originator | Initials | Detail | Type | Number | Revision

BBS- BB- EGL- SU- 08 | - (Originator | Initials | Detail | Type | Number | Revision)



Chainage 140.0

Vt Scale 1:100
Hz Scale 1:100
Datum 9.00m

Chainage

Level : Cross Sections

Code

Chainage 160.0

Vt Scale 1:100
Hz Scale 1:100
Datum 9.00m

Chainage

Level : Cross Sections

Code

CULV2_DN

Concrete Bridge

Vt Scale 1:100
Hz Scale 1:100
Datum 9.00m

Chainage

Level : Cross Sections

Code

CULV2_UP

Concrete Bridge

Vt Scale 1:100
Hz Scale 1:100
Datum 9.00m

Chainage

Level : Cross Sections

Code

Scale 1:125 (0, 25, 50, 75, 100, 125)

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Re-bting Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPh Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx FC	Floor to False Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences
Walls
Hedges
Overhead Line

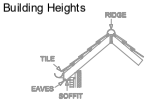
Average root line shown.
Indicative position of cables.

Services

Foul Sewers
Storm Sewers

Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125
Project Number: 2219-545

Drawing Status

- [x] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BBS BB SURVEYS LTD
1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
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Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

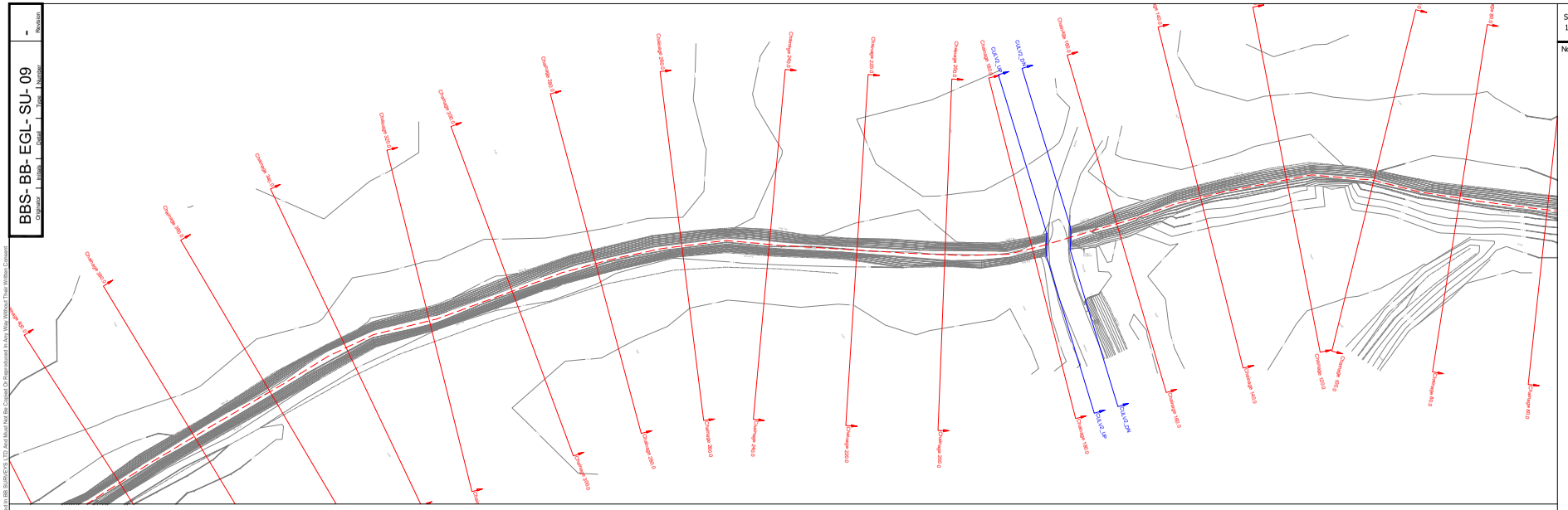
Title: Cross Sections CH140 - CULVERT

BBS- BB- EGL- SU- 08 | - (Originator | Initials | Detail | Type | Number | Revision)

BBS- BB- EGL- SU- 09

Originator | Initials | Detail | Type | Number

Revision -



Chainage 180.0

Vt Scale 1:100
Hz Scale 1:100
Datum 0.00m

Chainage

Level : Cross Sections

Code

Chainage 200.0

Vt Scale 1:100
Hz Scale 1:100
Datum 0.00m

Chainage

Level : Cross Sections

Code

Chainage 220.0

Vt Scale 1:100
Hz Scale 1:100
Datum 0.00m

Chainage

Level : Cross Sections

Code

Chainage 240.0

Vt Scale 1:100
Hz Scale 1:100
Datum 0.00m

Chainage

Level : Cross Sections

Code

Scale 1:125

0 1 25 50 75 100 125

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
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CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
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DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Retaining Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPN Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB Close Boarded
FCL Chain Link
FHD Hoarding
FHR Heras Fence
FPL Palisade
FPR Post & Rail
FPW Post & Wire
RAIL Railings

Control Station
Column
xxx Floor to Ceiling Height
xxx FC Floor to False Ceiling Height

Features

Fences
Walls
Hedges
Overhead Line

FCB 1.8h
Wall 1.2h
Hedge 1.2h
Average root line shown
OHL
Indicative position of cables.

Services

Foul Sewers
Storm Sewers

Pipe position and alignment is indicative only

Building Heights

RIDGE
TILE
EAVES
SOFFIT

SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125

Project Number: 2219-545

Drawing Status

- [x] Existing Topographic Survey
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- [ ] For Information

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m: 07786 388175
e: barry@bbsurveys.co.uk

Client

Create Consulting
Edward Funnell

Project

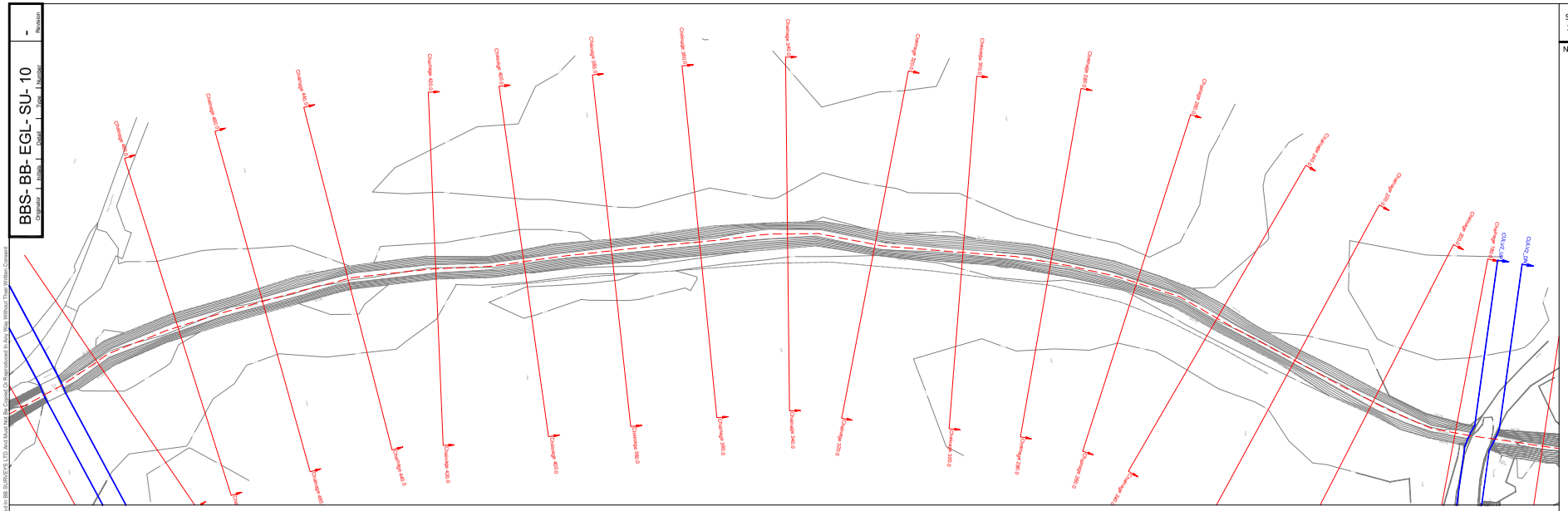
Survey of Watercourse
Villa Road, Histon

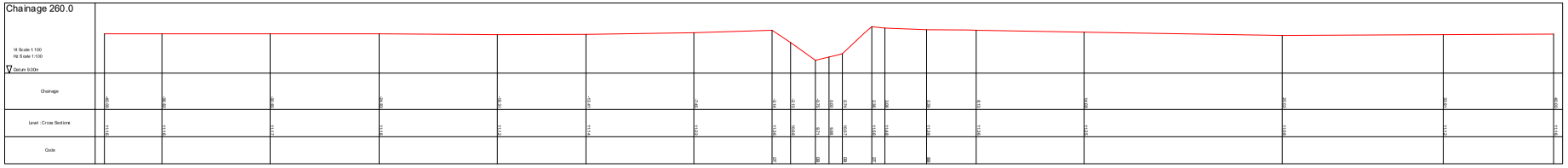
Title

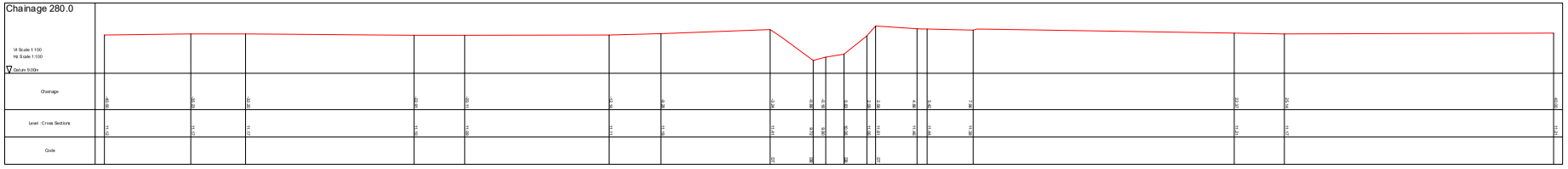
Cross Sections
CH180 - CH240

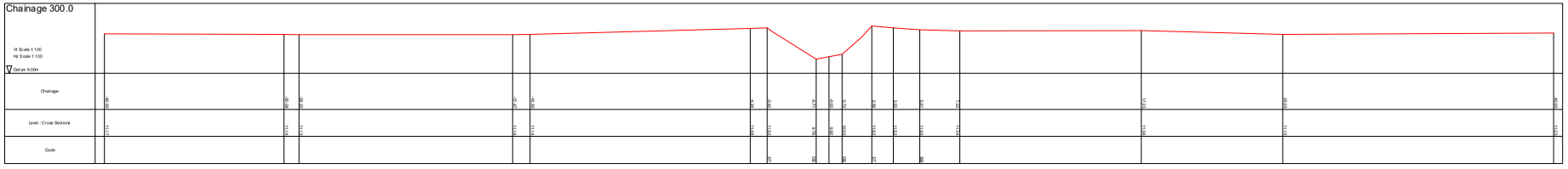
BBS- BB- EGL- SU- 09 | -

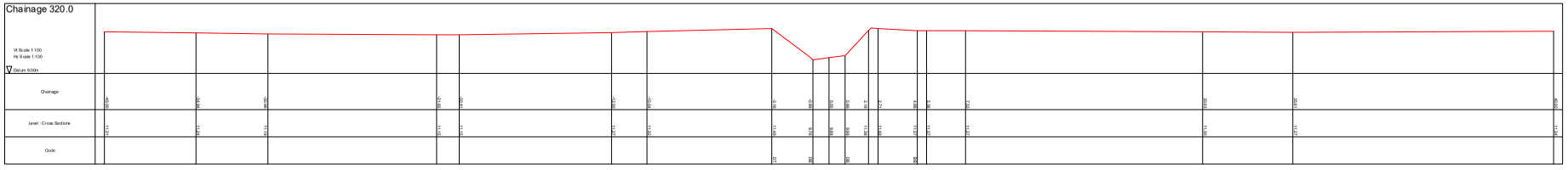
Originator | Initials | Detail | Type | Number | Revision











Scale 1:125 (0, 25, 50, 75, 100, 125)

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Redding Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPN Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx FC	Floor to False Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

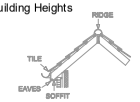
Features

Fences, Walls, Hedges, Overhead Line — Average root line shown. Indicative position of cables.

Services

Foul Sewers, Storm Sewers — Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125

Project Number: 2219-545

Drawing Status

- [X] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BB SURVEYS LTD
1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
m: 07786 388175
e: barry@bbsurveys.co.uk

Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

Title: Cross Sections CH260 - CH320

BBS- BB- EGL- SU- 10 (Originator | Initials | Detail | Type | Number) — Revision: -

BBS- BB- EGL- SU- 10 | - (Originator | Initials | Detail | Type | Number | Revision)

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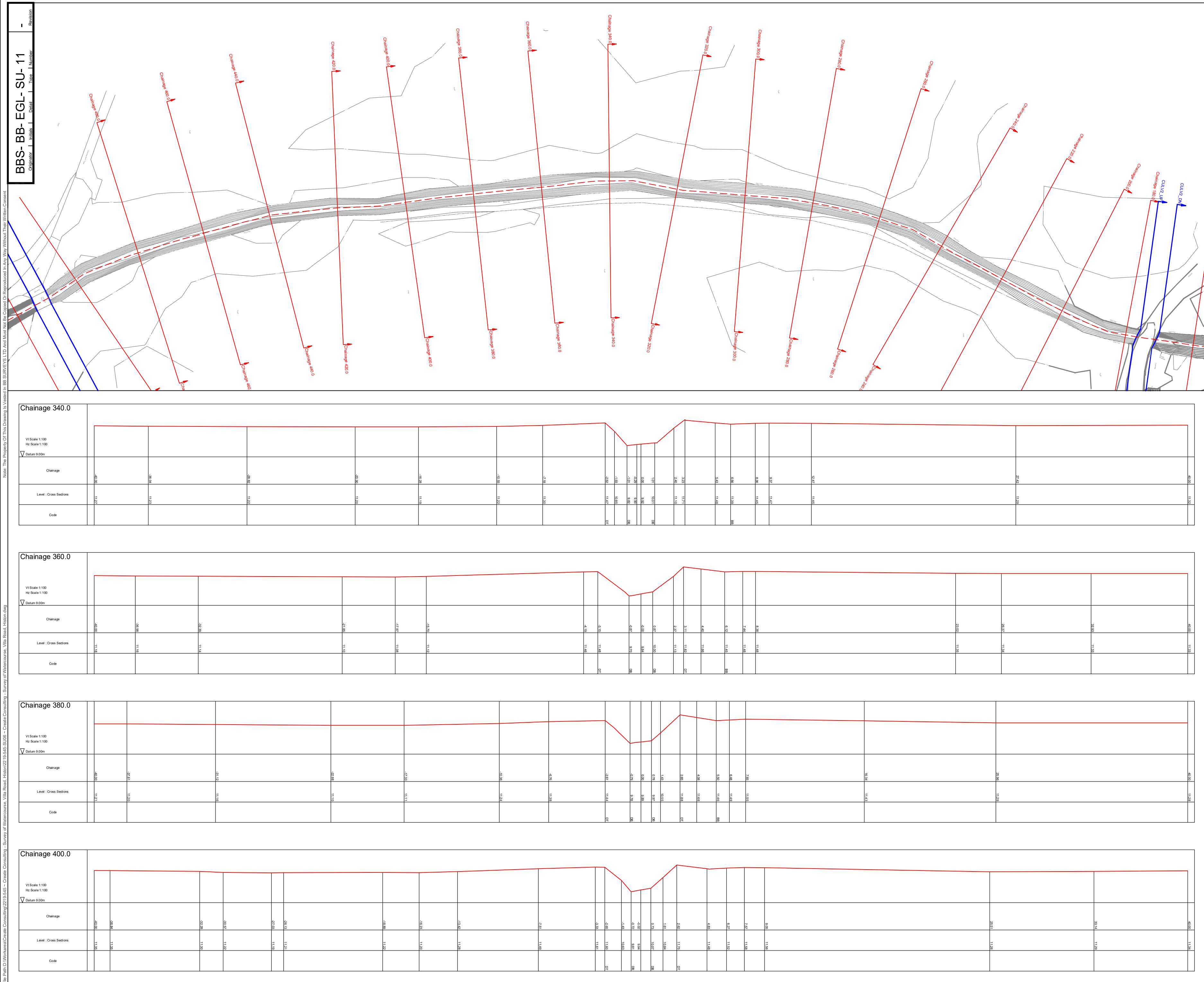

Scale 1:125

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	P/W	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
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DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Rodding Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EP+Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded
FCL	Chain Link
FHD	Hoarding
FHR	Heras Fence
FPL	Palisade
FPR	Post & Rail
FPW	Post & Wire
RAIL	Railings

Control Station
Column
Floor to Ceiling Height
Floor to False Ceiling Height

Features

Fences
Walls
Hedges — Average root line shown.
Overhead Line — Indicative position of cables.

Services

Foul Sewers
Storm Sewers
Pipe position and alignment is indicative only.

Building Heights

RIDGE
TILE
EAVES
SOFFIT

SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125
Project Number: 2219-545

Drawing Status
X Existing Topographic Survey
As Built Survey
For Information

BBS
BB SURVEYS LTD
1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
m: 07786 388175
e: barry@bbsurveys.co.uk

Client
Create Consulting
Edward Funnell

Project
Survey of Watercourse
Villa Road, Histon

Title
Cross Sections
CH340 - CH400

BBS- BB- EGL- SU- 11 | Revision: -
Originator | Initials | Detail | Type | Number

Sheet Size A1 841 x 594

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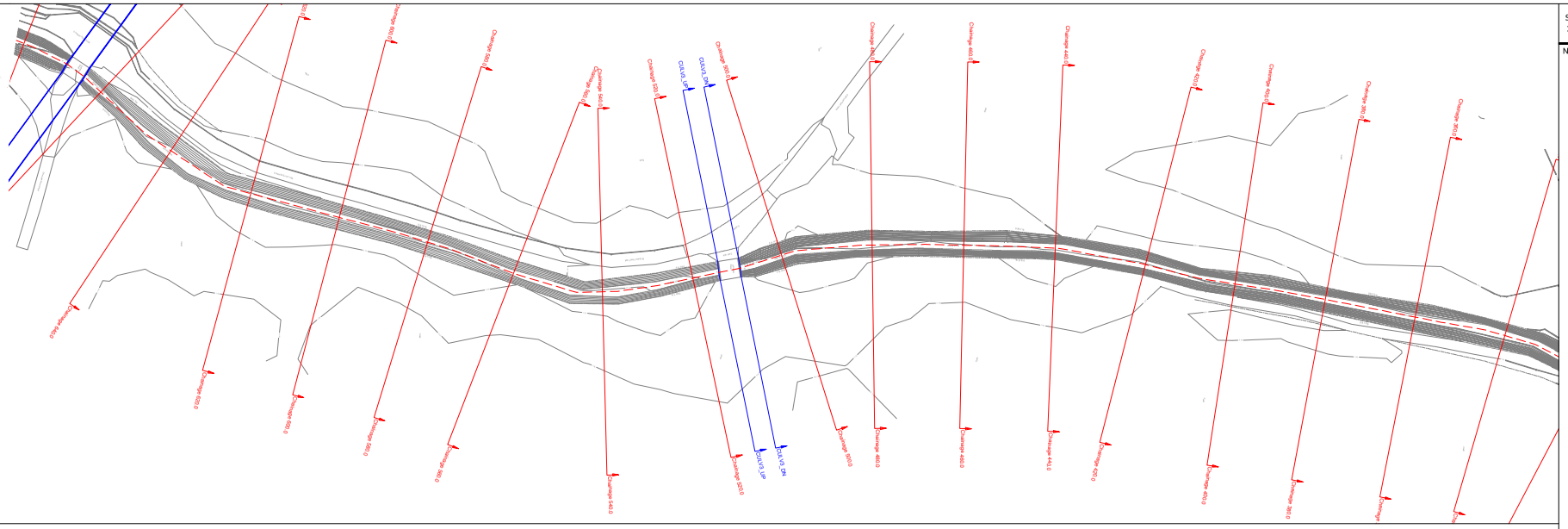
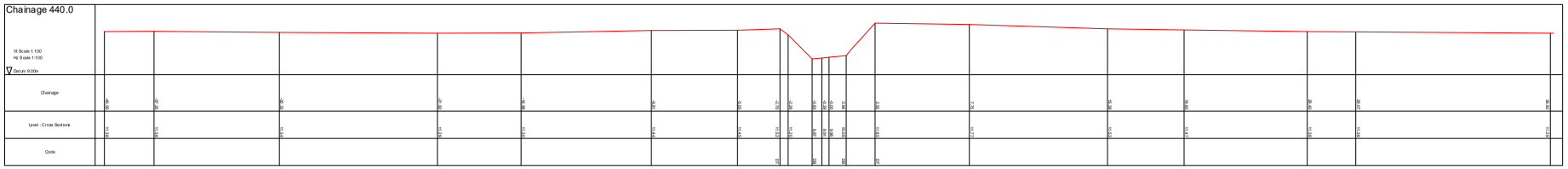
Plot Date: 09 March 2017 Plot Style: BB Surveys Std.ctb Saved By: Administrator on 09 March 2017

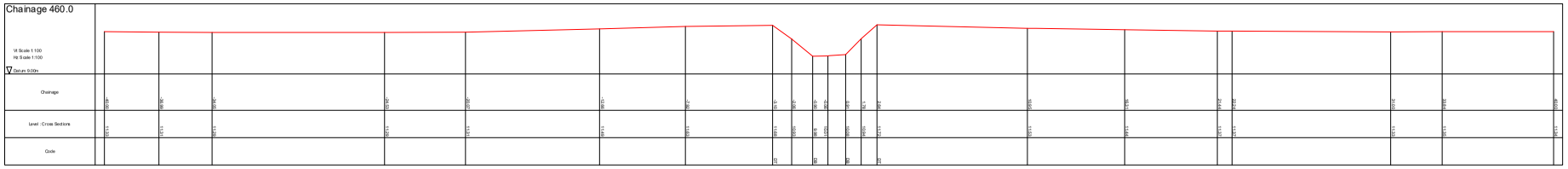
Plot Scale Check 100mm

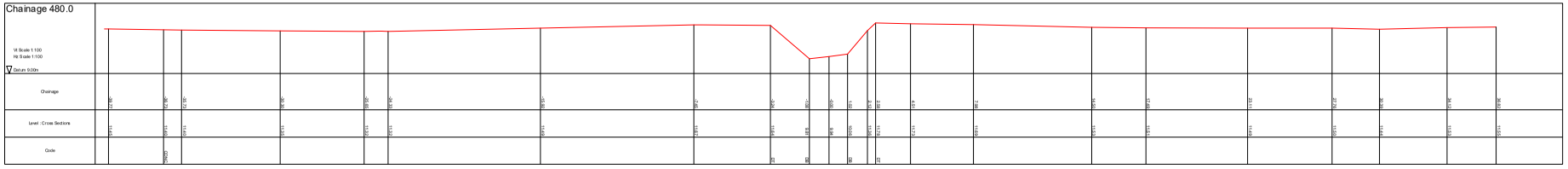
BBS- BB- EGL- SU- 12

Originator | Initials | Detail | Type | Number | Revision









Scale 1:125

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
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FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx PC	Floor to Falso Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences, Walls, Hedges, Overhead Line

Average root line shown.

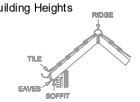
Indicative position of cables.

Services

Foul Sewers, Storm Sewers

Pipe position and alignment is indicative only

Building Heights



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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125

Project Number: 2219-545

Drawing Status

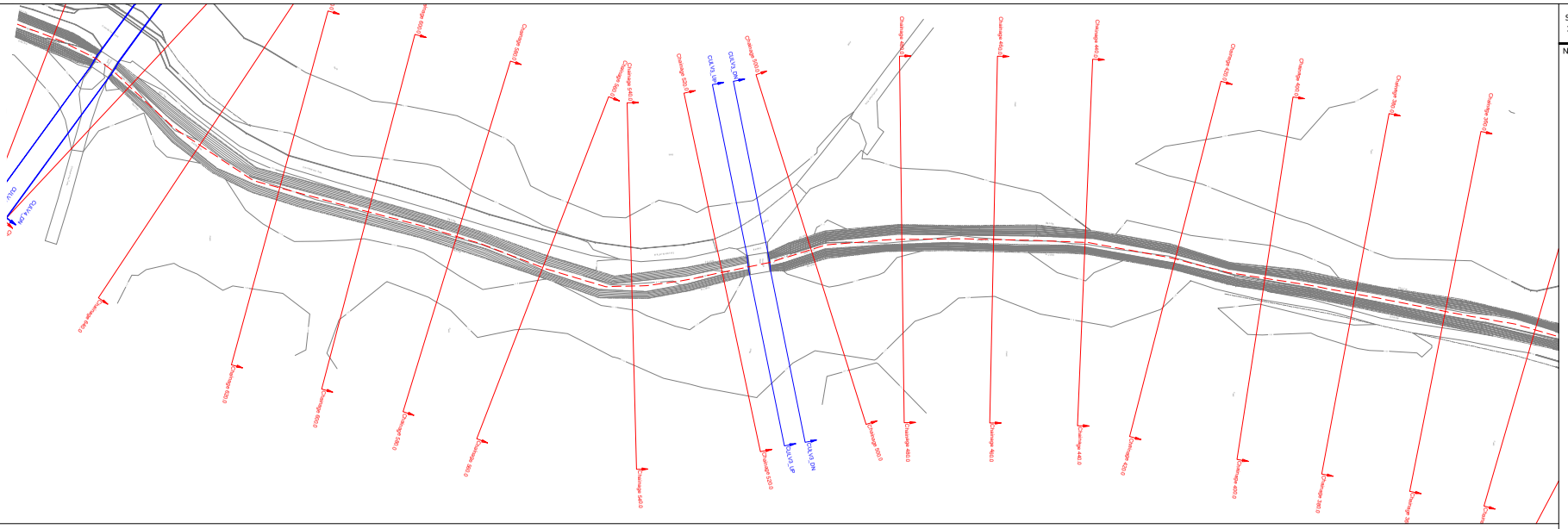
- [x] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BB SURVEYS LTD
1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
m: 07786 388175
e: barry@bbsurveys.co.uk

Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

Title: Cross Sections CH420 - CH480



Scale 1:125 (0, 25, 50, 75, 100, 125)

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
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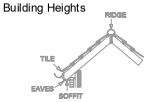

SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
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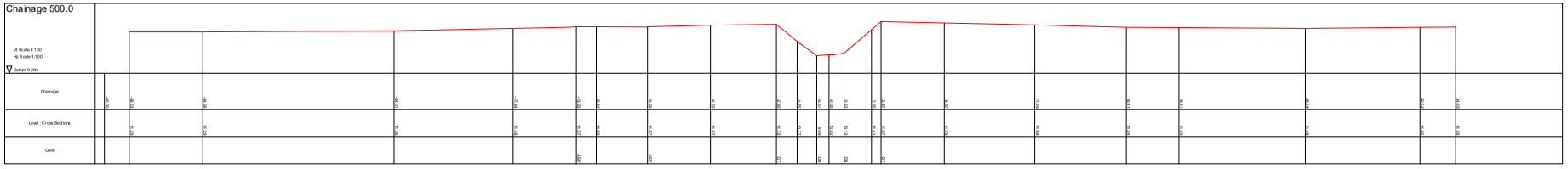

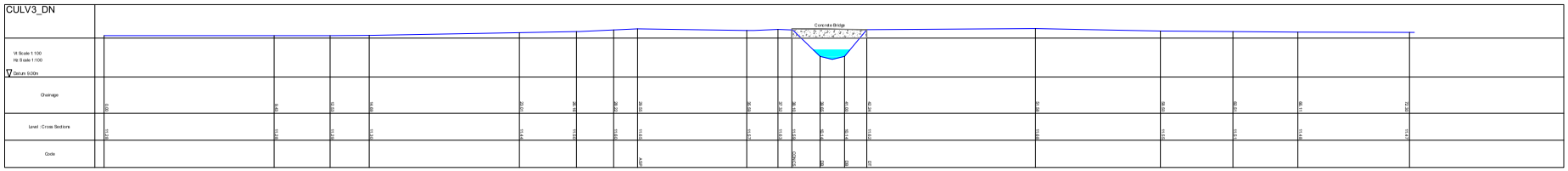

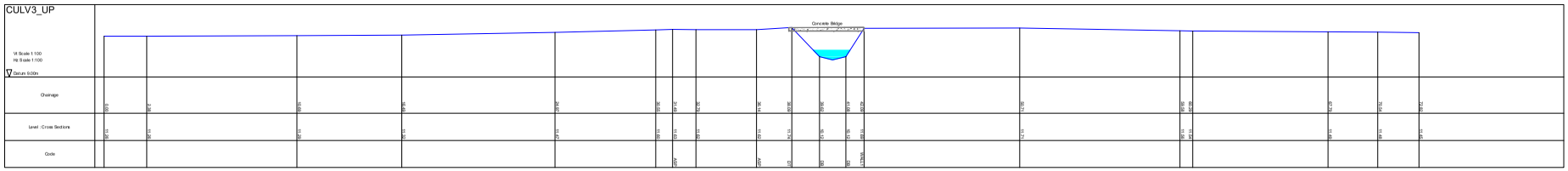

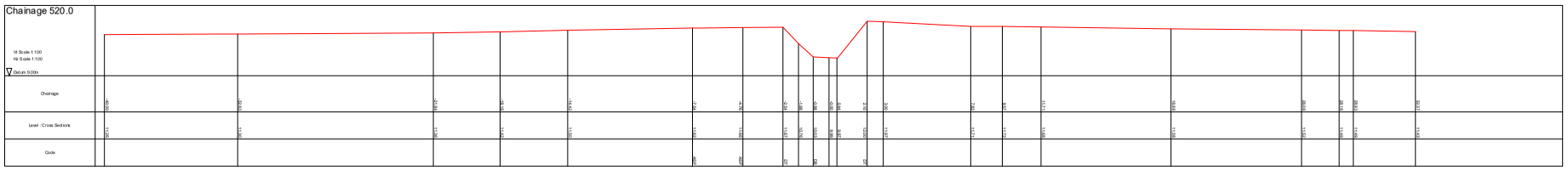

REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125

Project Number: 2219-545

Drawing Status

- [x] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BBS
BB SURVEYS LTD
1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
m: 07786 388175
e: barry@bbsurveys.co.uk

Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

Title: Cross Sections CH500 - CH520

File Path: O:\Archive\Create Consulting\2219-545 - Create Consulting - Survey of Watercourse, Villa Road, Histon\2219-545-SU05 - Create Consulting - Survey of Watercourse, Villa Road, Histon.dwg
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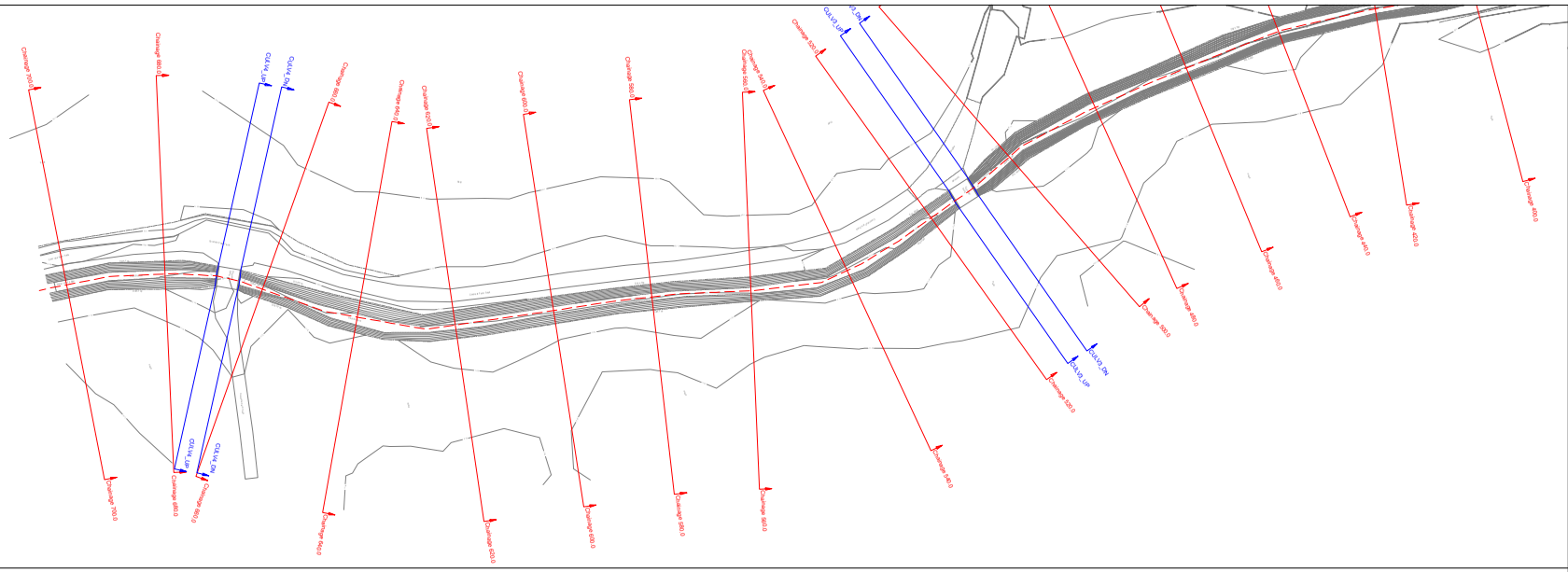
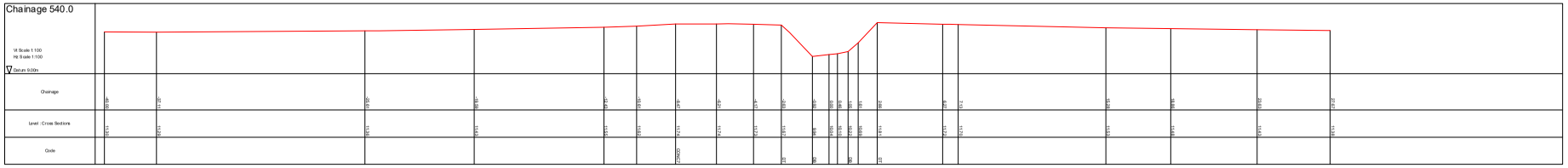
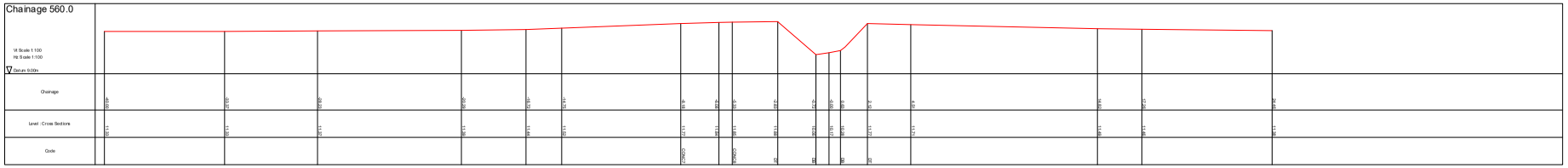
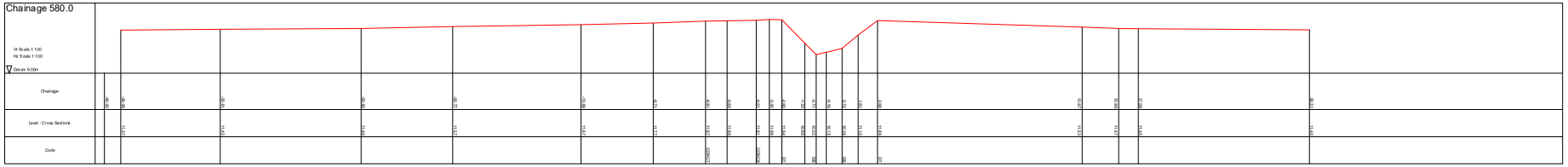
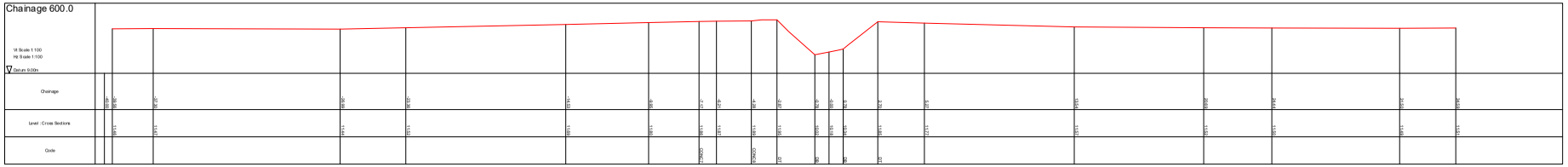
Plot Scale Check 100mm
Sheet Size A1 841 x 594











Scale 1:125 (0, 25, 50, 75, 100, 125)

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Retaining Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPN Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx FC	Floor to False Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences, Walls, Hedges, Overhead Line

Average root line shown.

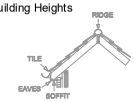
Indicative position of cables.

Services

Foul Sewers, Storm Sewers

Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.

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REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125

Project Number: 2219-545

Drawing Status

- [X] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BB SURVEYS LTD

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Norwich, Norfolk NR4 7BD
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m: 07786 388175
e: barry@bbsurveys.co.uk

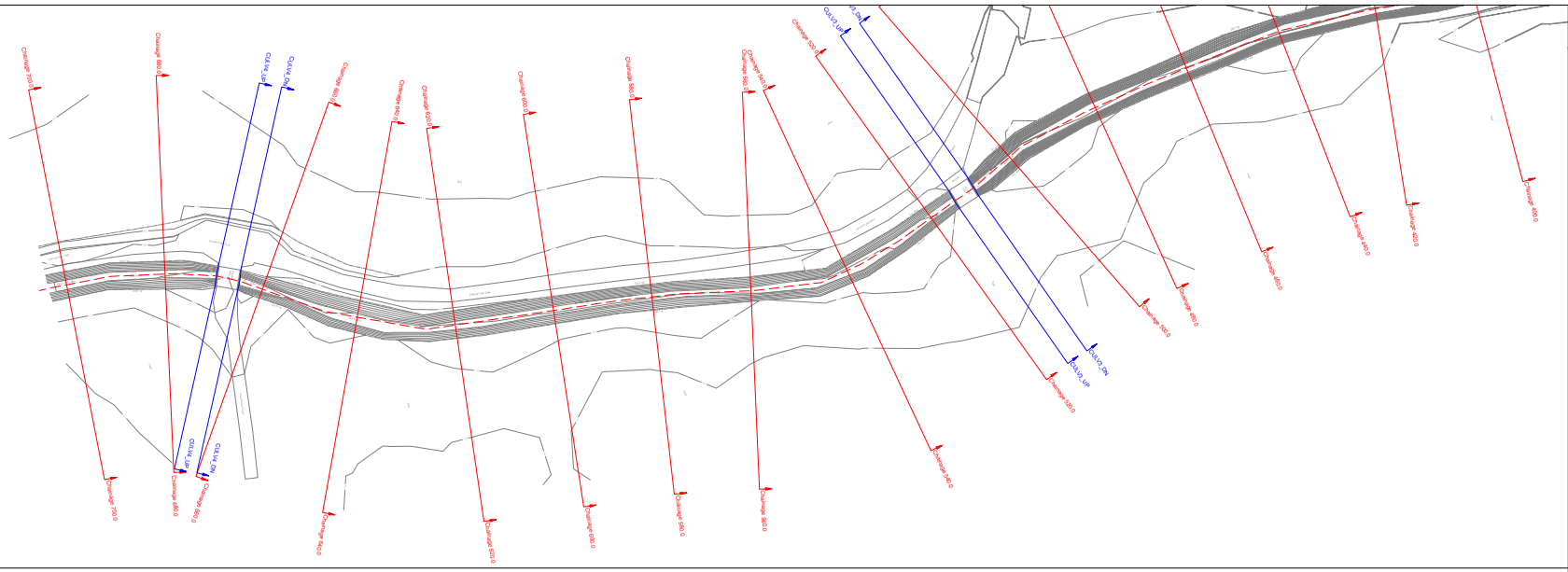
Client: Create Consulting Edward Funnell

Project: Survey of Watercourse Villa Road, Histon

Title: Cross Sections CH540 - CH600

BBS- BB- EGL- SU- 14 (Originator | Initials | Detail | Type | Number) | - (Revision)

Drawing | Detail | Type | Number | Revision: BBS- BB- EGL- SU- 14 -



Scale 1:125 (0, 25, 50, 75, 100, 125)

Notes:

AV	Air Valves	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
BIN	Bin	IC	Inspection Cover	TBOX	Telephone Box
BS	Bus Stop	IL	Invert Level	TL	Traffic Light
Bushes	Bush	KO	Kerb Outlet	TOK	Top Of Kerb
BT	BT Box	LP	Lamp Post	TP	Telegraph Pole
CAB	Cabinet	MH	Manhole	TRK	Track
CHNL	Channel	MP	Marker Post	TS	Traffic Sign MH
CL	Centreline	NB	Name Board	VENT	Vent
CONC	Concrete	PW	Partition Wall	W	Water Cover
COL	Column	PB	Post Box	WL	White Line
DB	Ditch Bottom	PM	Parking Meter	WO	Wash Out
DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Redding Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPh Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded
FCL	Chain Link
FHD	Hoarding
FHR	Heras Fence
FPL	Palisade
FPR	Post & Rail
FPW	Post & Wire
RAIL	Railings

Control Station
Column
xxx Floor to Ceiling Height
xxx FC Floor to False Ceiling Height

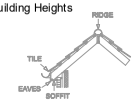
Features

Fences
Walls
Hedges — Average root line shown.
Overhead Line — Indicative position of cables.

Services

Foul Sewers
Storm Sewers
Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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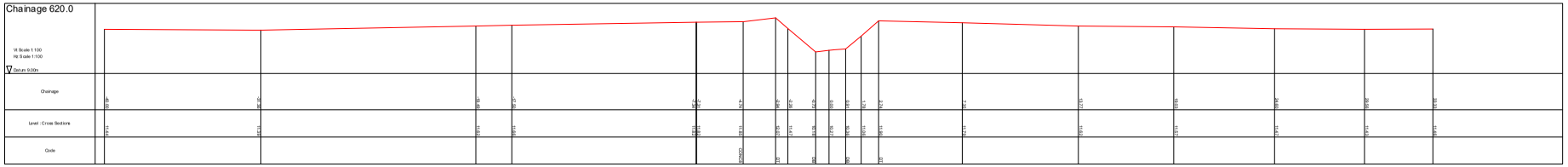
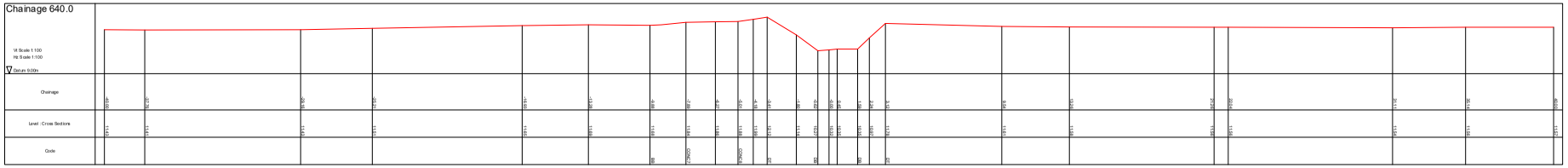
Chainage 620.0



Chainage 640.0



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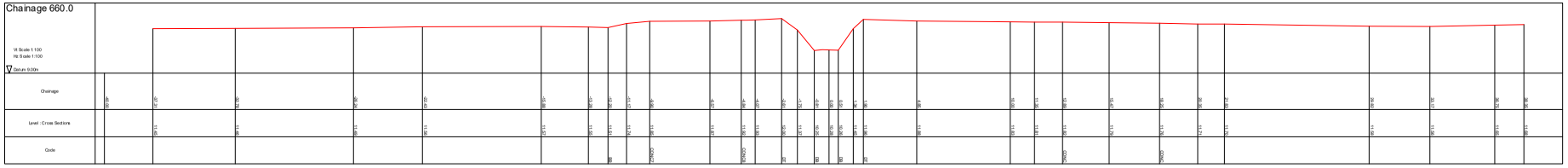

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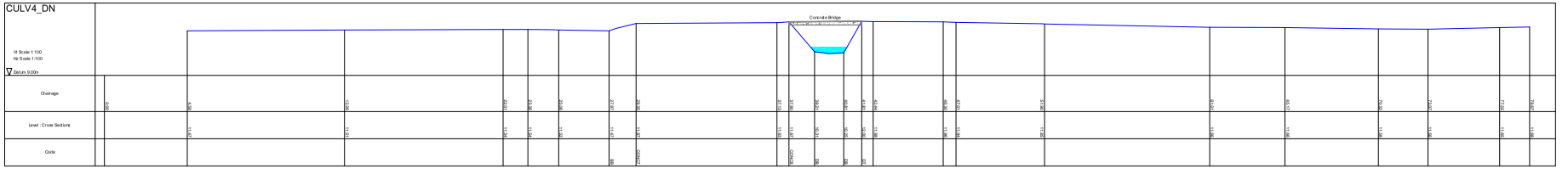

REV	Date	Created By	Comments
-	09.03.17	BB	First Issue

Scale at A1: 1:125

Project Number: 2219-545

Drawing Status
- [x] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BBS
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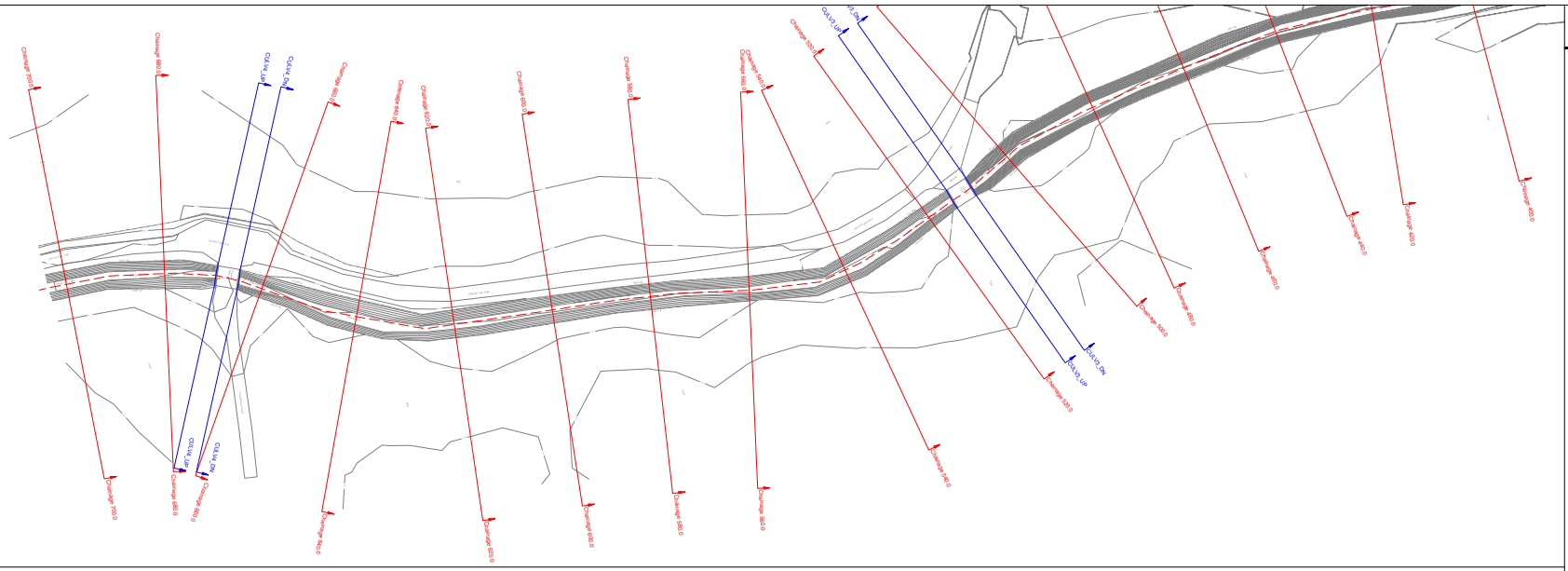
e: barry@bbsurveys.co.uk

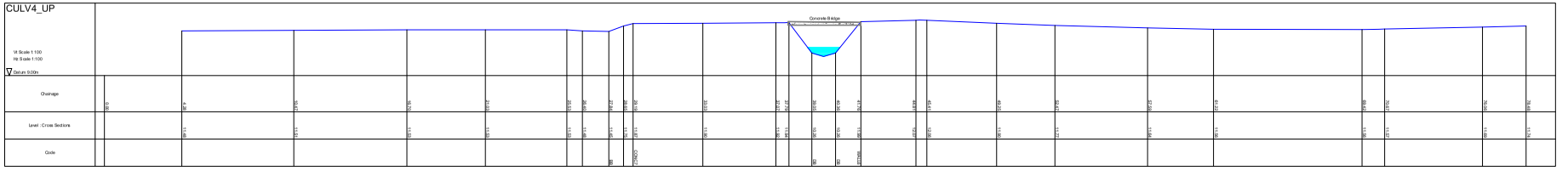
Client
Create Consulting
Edward Funnell

Project
Survey of Watercourse
Villa Road, Histon

Title
Cross Sections
CH620 - CULVERT

BBS- BB- EGL- SU- 15 (Originator | Initials | Detail | Type | Number) — Revision: -





Scale 1:125
0 1 25 50 75 100 125

Notes:

AV	Air Valve	FH	Fire Hydrant	SP	Sign Post
BB	Bottom Bank	FP	Footpath	STAY	Stay
BH	Bore Hole	G	Gully Grate	SV	Sluice Valve
BL	Lit Bollard	GV	Gas Valve	TAC	Tactile Paving
BOL	Bollard	Hedge	Hedge	TB	Top Bank
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BS	Bus Stop	IL	Invert Level	TL	Traffic Light
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CAB	Cabinet	MH	Manhole	TRK	Track
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DCHNL	Drainage Channel	PO	Post	YL	Yellow Line
Door	Door	RE	Retaining Eye		
EEB	Electric MH Cover	Ridge	Ridge Level		
EP	Electric Pole	RP	Reflector Post		
ER	Earth Rod	RS	Road Sign		
ET	EPh Transformer	SETTS	Granite Setts		
Feeder	Feeder Pillar	SF	Safety Fence		

FCB	Close Boarded		Control Station
FCL	Chain Link		Column
FHD	Hoarding	xxx	Floor to Ceiling Height
FHR	Heras Fence	xxx FC	Floor to False Ceiling Height
FPL	Palisade		
FPR	Post & Rail		
FPW	Post & Wire		
RAIL	Railings		

Features

Fences
Walls
Hedges
Overhead Line

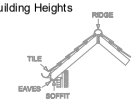
Average root line shown.
Indicative position of cables.

Services

Foul Sewers
Storm Sewers

Pipe position and alignment is indicative only

Building Heights



SURVEY CARRIED OUT USING TRIMBLE S6 TOTAL STATION & TRIMBLE R10 GPS.
ALL SURVEY DATA TO ORDNANCE SURVEY NATIONAL GRID (OSTN15)

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-	09.03.17	BB	First Issue

Scale at A1: 1:125
Project Number: 2219-545

Drawing Status

- [X] Existing Topographic Survey
- [ ] As Built Survey
- [ ] For Information

BB SURVEYS LTD
1 Chestnut Place, Cringleford
Norwich, Norfolk NR4 7BD
t: 01603 507917
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Client
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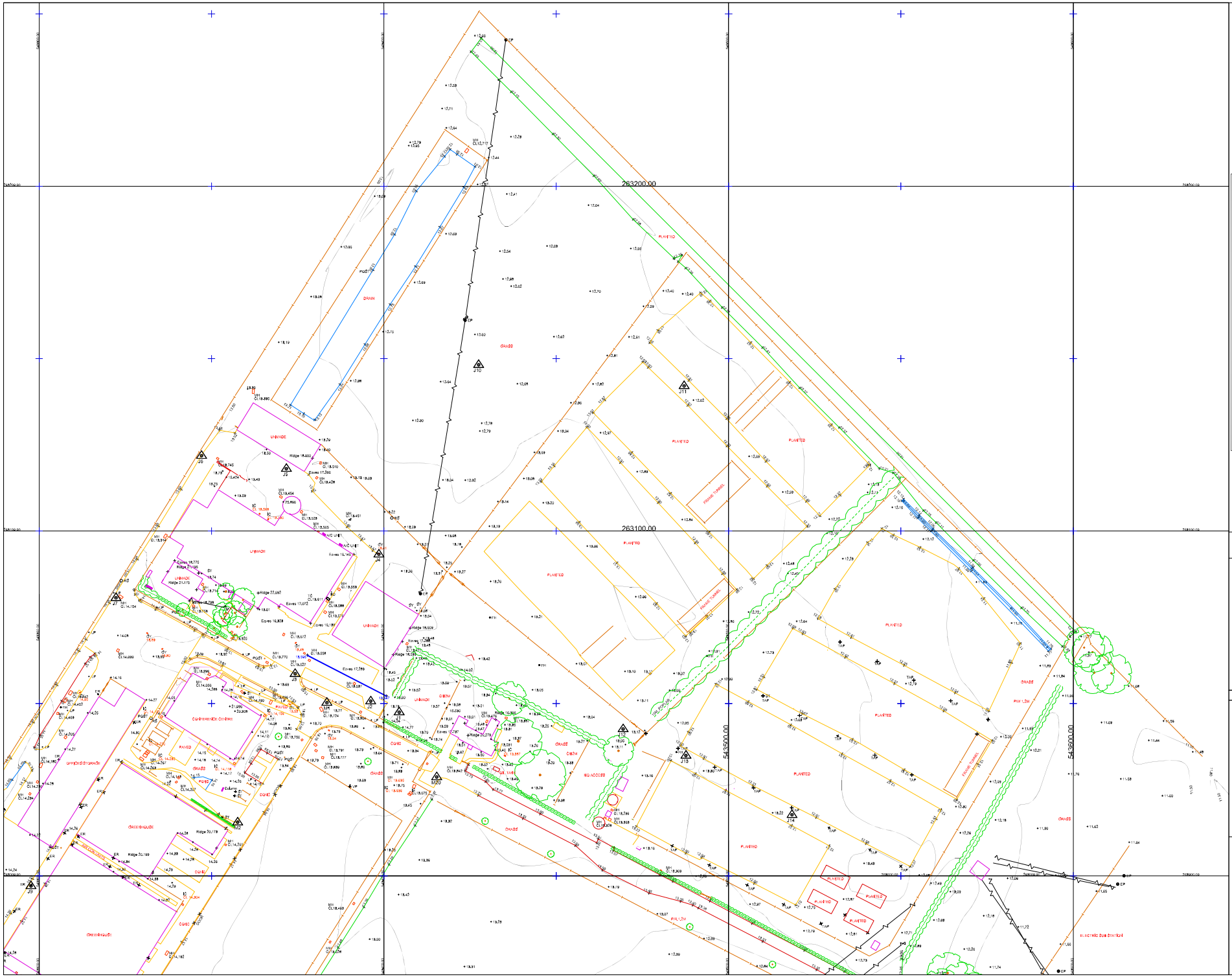
Project
Survey of Watercourse
Villa Road, Histon

Title
Cross Sections
CULVERT - CH700



N

Grid North

SURVEY TO ORDNANCE SURVEY GPS DATUM AND GRID. OSGB36(02) TRANSLATED FROM ETRS89 USING OSGM02 AND OSTN02 MODELS

Co-Ordinates

J1	543404.445	263047.459	13.6881
J10	543427.507	263148.239	12.7455
J11	543487.108	263142.094	12.6950
J12	543468.398	263042.585	13.2773
J13	543487.612	263034.894	13.1246
J14	543518.405	263017.715	12.7856
J2	543386.186	263050.673	13.5770
J20	543347.953	263074.846	13.8323
J21	543352.984	263079.814	13.7780
J22	543333.025	263085.464	14.2607
J25	543240.488	262951.924	15.4242
J26	543218.966	262895.156	15.9823
J27	543251.228	262932.873	15.1178
J28	543297.701	262931.231	14.7599
J29	543330.148	262912.402	14.6228
J3	543374.266	263058.630	13.6240
J30	543307.611	262872.175	14.8629
J31	543276.357	262843.270	15.0310
J32	543277.562	262890.997	15.0389
J4	543386.547	263093.270	13.4241
J5	543371.710	263118.100	13.4515
J6	543347.102	263121.859	13.5125
J7	543322.283	263080.639	14.1501
J8	543276.787	262996.632	14.3053
J9	543297.629	262997.076	14.2671
M1	543382.489	263050.229	13.7870
M2	543357.607	263015.558	14.2460
M20	543415.316	263008.678	13.7976
M21	543417.369	263037.914	13.7874
M22	543423.373	263050.955	13.6096
M23	543449.137	263035.994	13.3098
M3	543342.055	262990.688	14.4054
M30	543540.373	262961.104	13.1814
M31	543552.436	262968.848	12.8696
M32	543586.827	262999.111	11.9519
M4	543321.117	262956.456	14.3614
M5	543314.457	262946.209	14.4105
M6	543306.942	262937.041	14.3303
M7	543274.106	262958.498	14.4215
M8	543326.748	263039.074	14.4049

HEDGE TYPES

B/W	Barbed Wire	C/P	Chestnut Paling
C/B	Close Boarded	I/R	Iron Railing
C/I	Corrugated Iron	I/H	Ironmonger
C/L	Chainlink	P/R	Post & Rail
P/E	Palisade		
P/W	Post & Wire		

LEGEND

AV	Air Valve	MH	Manhole
BD	Bollard	NK	Marker
BH	Borehole	NP	Street Name Plate
CB	Cable Box	GH	Greenhead
CHY	Chimney	GSBH	Grahamstone Bench
CL	Cover Level		Mark
CONC	Concrete	P	Post or Pillar
CTV	Cable Television	PM	Parking Meter
DV	Drop Kerb	RE	Rodding Eye
DP	Down Pipe	RB	Road Sign
DR	Drain	SMP	Sighting
ELC	Electricity	SC	Stop Cock
EP	Electricity Pole	SL	Survey Level
KK	Kerb Kept	ST	Stop Tap
FB	Flower Bed	SV	Sluice Valve
FH	Fire Hydrant	TAR	Tarmac
FP	Flag Pole	TCB	Telephone Call Box
GV	Gate		
GP	Gate Post	TL	Traffic Lights
GV	Gas Valve	TP	Telegraph Pole
IC	Inspection Cover	TV	Television Box
IL	Invert Level	UTL	Unable to Lift
JB	Junction Box	VP	Vent Pipe
KQ	Kerb Quadrant	WL	Water Level
LB	Letter Box	WM	Water Meter
LP	Lamp Post	WG	Wash Gate

Boundary, Hedge, Tree, Bush, Gate, GPO Telecom, Control Station

Drawn by:- MK/JB Surveyed by:- JB/MK/PR Checked by:- PR

Date: October 2016

Scale:- 1:500

Drawing Number: ALS75618/500/01 Topographical

Client: Smith Evans Architects

Project: NIAB, Park Farm Villa Road, Histon

Surveyed By:-

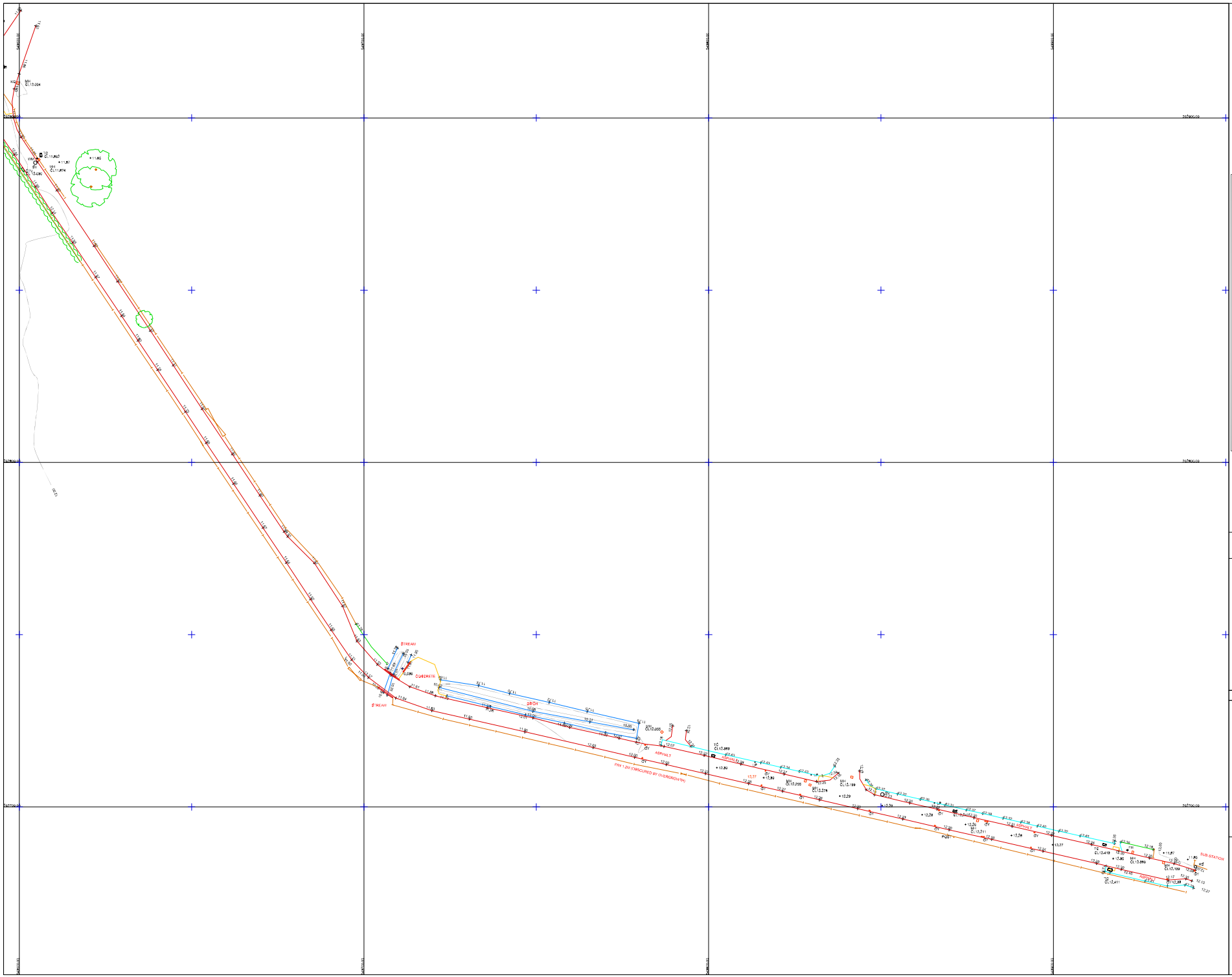
ALS EST 1976

Anglia Land Surveys Ltd

Bowthorpe Hall,
Bowthorpe Hall Road,
Norwich, NR5 9AA

Tel: (01603) 749000
Fax: (01603) 745785
e-mail: mail@als-surveys.com
Website: www.als-surveys.com

ISO 9001



N

Grid North

SURVEY TO ORDNANCE SURVEY GPS DATUM AND GRID. QSGB36(02) TRANSLATED FROM ETRS89 USING QSGMQ2 AND QSTN02 MODELS

Co-Ordinates

J1	543404.445	263047.459	13.6881
J10	543427.507	263148.239	12.7455
J11	543487.108	263142.094	12.6950
J12	543468.398	263042.585	13.2773
J13	543487.612	263034.894	13.1246
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J21	543352.984	263079.814	13.7780
J22	543333.025	263085.464	14.2607
J25	543240.488	262951.924	15.4242
J26	543218.966	262895.156	15.9823
J27	543251.228	262932.873	15.1178
J28	543297.701	262931.231	14.7599
J29	543330.148	262912.402	14.6228
J3	543374.266	263058.530	13.8240
J30	543307.611	262872.175	14.8629
J31	543276.357	262843.270	15.0310
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J6	543347.102	263121.859	13.6125
J7	543322.283	263080.639	14.1501
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J9	543297.629	262997.076	14.2671
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M20	543415.316	263009.678	13.7976
M21	543417.369	263037.914	13.7874
M22	543423.373	263050.955	13.6096
M23	543449.137	263035.994	13.3098
M3	543342.055	262990.688	14.4054
M30	543540.373	262961.104	13.1814
M31	543552.436	262968.848	12.8696
M32	543586.827	262999.111	11.9519
M4	543321.117	262956.456	14.3614
M5	543314.457	262946.209	14.4105
M6	543306.942	262937.041	14.3303
M7	543274.106	262958.498	14.4215
M8	543326.748	263039.074	14.4049

FENCE TYPES

B/W	Barbed Wire	C/P	Chestnut Paling	P/S	Palisade
C/B	Close Boarded	I/R	Iron Railing	P/W	Post & Wire
C/I	Corrugated Iron	I/W	Interwoven		
C/L	Chainlink	P/R	Post & Rail		

LEGEND

AV	Air Valve	MH	Manhole		
BD	Bollard	MK	Marker		
BH	Borehole	MP	Street Name Plate		
CB	Cable Box	GH	Greenhead		
CHY	Chimney	GSM	Grahamore Bench Mark		
CL	Cover Level	P	Post or Pillar		
CLVC	Concrete Column	PM	Parking Meter		
CTV	Cable Television	RE	Rodding Eye		
DV	Drop Kerb	RS	Road Sign		
DP	Down Pipe	SLP	Sloping		
DR	Drain	SC	Stop Cock		
ELC	Electricity	SL	Sump Level		
EP	Electricity Pole	ST	Stop Tap		
KK	Kerb Rod	SV	Stone Valve		
FB	Flower Bed	TAP	Tarmac		
FH	Fire Hydrant	TCB	Telephone Cut Box		
FP	Flag Pole	TL	Traffic Lights		
GV	Gully	TP	Telegraph Pole		
GP	Gate Post	TV	Television Box		
GV	Gas Valve	UTL	Unable to Lift		
IC	Inspection Cover	VP	Vent Pipe		
IL	Invert Level	WL	Water Level		
JB	Junction Box	WM	Water Meter		
KQ	Kerb Outlet	WSI	Wash Out		
LB	Letter Box				
LP	Lamp Post				

Burning, Hedge, Tree, Bush, Gate, GPO Electric, GPO Telecom, CS1 Control Station

Drawn by: MK/JB | Surveyed by: JB/MK/PR | Checked by: PR

Date: October 2016

Scale:- 1:500

Drawing Number: ALS75618/500/02 Topographical

Client: Smith Evans Architects

Project: NIAB, Park Farm Villa Road, Histon

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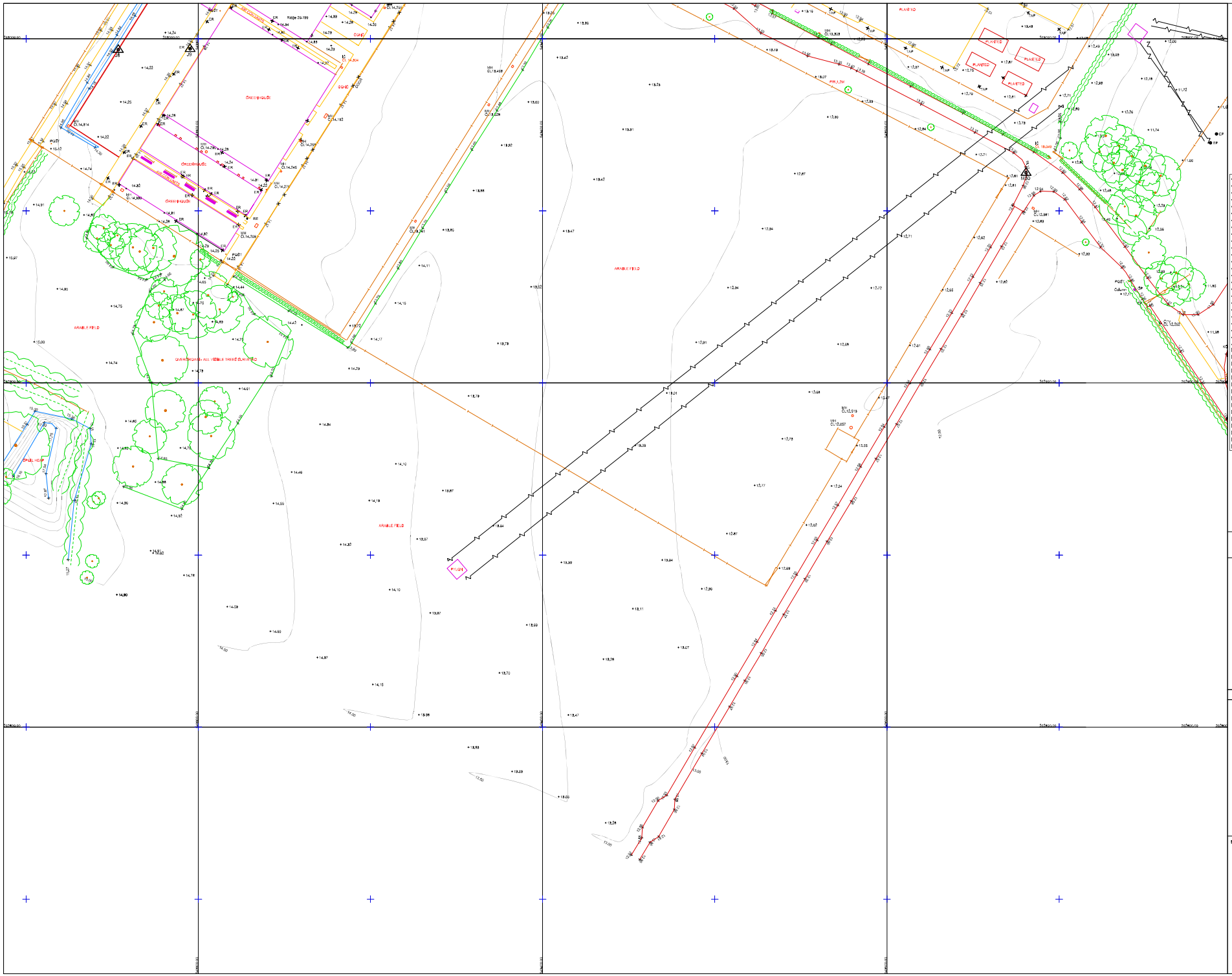

SURVEY TO ORDNANCE SURVEY GPS DATUM AND GRID. OSGB36(02) TRANSLATED FROM ETRS89 USING OSGM02 AND OSTN02 MODELS

Co-Ordinates

J1	543404.445	263047.459	13.6881
J10	543427.507	263148.239	12.7455
J11	543487.106	263142.094	12.6950
J12	543468.398	263042.585	13.2773
J13	543487.612	263034.894	13.1246
J14	543518.405	263017.715	12.7856
J2	543386.186	263050.673	13.5770
J20	543347.953	263074.846	13.8323
J21	543352.984	263079.814	13.7780
J22	543333.025	263085.464	14.2607
J25	543240.488	262951.924	15.4242
J26	543218.966	262895.156	15.9823
J27	543251.228	262932.873	15.1178
J28	543297.701	262931.231	14.7599
J29	543330.148	262912.402	14.6228
J3	543374.266	263058.530	13.6240
J30	543307.611	262872.175	14.8629
J31	543276.357	262843.270	15.0310
J32	543277.562	262890.997	15.0389
J4	543386.547	263093.270	13.4341
J5	543371.710	263118.100	13.4515
J6	543347.102	263121.859	13.5125
J7	543322.283	263080.639	14.1501
J8	543276.787	262996.532	14.3053
J9	543297.629	262997.076	14.2671
M1	543383.489	263050.229	13.7870
M2	543357.607	263015.558	14.2460
M20	543415.316	263009.678	13.7976
M21	543417.369	263037.914	13.7874
M22	543423.373	263050.955	13.6096
M23	543449.137	263035.994	13.3098
M3	543342.055	262990.688	14.4054
M30	543540.373	262961.104	13.1814
M31	543552.436	262968.848	12.8696
M32	543586.827	262999.111	11.9519
M4	543321.117	262956.456	14.3614
M5	543314.457	262946.209	14.4105
M6	543306.942	262937.041	14.3303
M7	543274.106	262958.498	14.4215
M8	543326.748	263039.074	14.4049

FENCE TYPES

B/W	Barbed Wire	C/P	Chestnut Paling	P/S	Palisade
C/B	Close Boarded	I/R	Iron Railing	P/W	Post & Wire
C/I	Corrugated Iron	I/W	Interwoven		
C/L	Chainlink	P/R	Post & Rail		

LEGEND

AV	Air Valve	MH	Manhole		
BD	Bollard	MK	Marker		
BH	Borehole	MP	Street Name Plate		
CB	Cable Box	GH	Greenhead		
CHY	Chimney	GSBH	Grindstone Bench Mark		
C.L.	Cover Level				
CONC	Concrete	P	Post or Pillar		
CTV	Cable Television	PM	Parking Meter		
DV	Drop Kerb	RE	Rodding Eye		
DP	Down Pipe	RS	Road Sign		
DR	Drain	SMP	Sloping		
ELC	Electricity	SC	Stop Cock		
EP	Electricity Pole	SL	Sump Level		
HK	Kerb Rod	ST	Stop Tap		
FB	Flower Bed	SV	Sluice Valve		
FH	Fire Hydrant	TAR	Tarmac		
FP	Flag Pole	TCB	Telephone Cut Box		
GY	Gully				
GP	Gate Post	TL	Traffic Lights		
GV	Gas Valve	TP	Telegraph Pole		
IC	Inspection Cover	TV	Television Box		
IL	Invert Level	UTL	Unable to Lift		
JB	Junction Box	VP	Vent Pipe		
WG	Kerb Outlet	WL	Water Level		
LB	Letter Box	WM	Water Meter		
LP	Lamp Post	WSI	Wash Out		

Burning, Hedge, Tree, Bush, Gate, GPH Electric, GPT Telecom, CS1 Control Station

Drawn by:- MK/JB | Surveyed by:- JB/MK/PR | Checked by:- PR

Date: October 2016

Scale:- 1:500

Drawing Number: ALS75618/500/03 Topographical

Client: Smith Evans Architects

Project: NIAB, Park Farm Villa Road, Histon

Surveyed By:-

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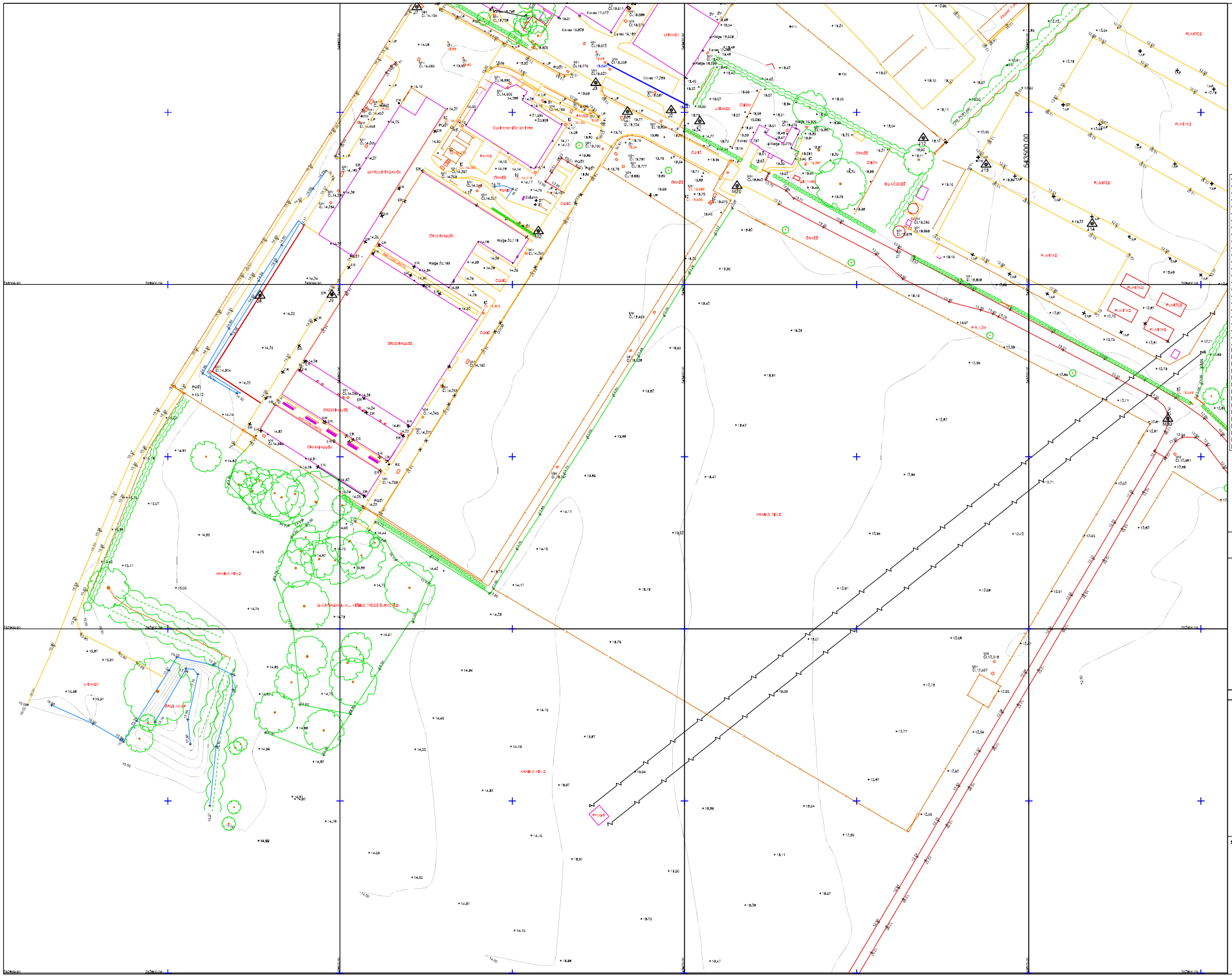

N

Grid North

SURVEY TO ORDNANCE SURVEY GPS DATUM AND GRID. QSGB36(02) TRANSLATED FROM ETRS89 USING OSGM02 AND OSTN02 MODELS

Co-Ordinates

J1	543404.445	263047.459	13.6881
J10	543427.507	263148.239	12.7455
J11	543487.106	263142.094	12.6950
J12	543468.398	263042.585	13.2773
J13	543487.612	263034.894	13.1246
J14	543518.405	263017.715	12.7858
J2	543386.186	263050.673	13.5770
J20	543347.953	263074.846	13.8323
J21	543352.984	263079.814	13.7780
J22	543333.025	263085.464	14.2607
J25	543240.488	262951.924	15.4242
J26	543218.966	262895.156	15.9823
J27	543251.228	262932.873	15.1178
J28	543297.701	262931.231	14.7599
J29	543330.148	262912.402	14.6228
J3	543374.266	263058.530	13.6240
J30	543307.611	262872.175	14.8629
J31	543276.357	262843.270	15.0310
J32	543277.562	262890.997	15.0389
J4	543386.547	263093.270	13.4241
J5	543371.710	263118.100	13.4515
J6	543347.102	263121.859	13.5125
J7	543322.283	263080.639	14.1501
J8	543276.787	262986.632	14.3053
J9	543297.629	262997.076	14.2671
M1	543382.489	263050.229	13.7870
M2	543357.607	263015.558	14.2460
M20	543415.316	263009.678	13.7976
M21	543417.369	263037.914	13.7874
M22	543423.373	263050.955	13.6096
M23	543449.137	263035.994	13.3098
M3	543342.055	262990.688	14.4054
M30	543540.373	262961.104	13.1814
M31	543552.436	262968.848	12.8696
M32	543586.827	262999.111	11.9519
M4	543321.117	262956.456	14.3614
M5	543314.457	262946.209	14.4105
M6	543306.942	262937.041	14.3303
M7	543274.106	262958.498	14.4215
M8	543326.748	263039.074	14.4049

FENCE TYPES

B/W	Barbed Wire	C/P	Chestnut Paling	P/S	Palisade
C/B	Close Boarded	I/R	Iron Railing	P/W	Post & Wire
C/I	Corrugated Iron	I/W	Interwoven		
C/L	Chainlink	P/R	Post & Rail		

LEGEND

AV	Air Valve	MH	Manhole		
BD	Bollard	MK	Marker		
BH	Borehole	MP	Marker/Name Plate		
CB	Cable Box	GH	Greenhead		
CHY	Chimney	GSBH	Grampian Bench		
CL	Cover Level		Mark		
CONC	Concrete	P	Post or Pillar		
CTV	Cable Television	PM	Parking Meter		
DV	Drop Kerb	RE	Rodding Eye		
DP	Down Pipe	RE	Road Sign		
DR	Drain	SHP	Sapling		
ELC	Electricity	SC	Stop Cock		
EP	Electricity Pole	SL	Sump Level		
KK	Kerb Kod	ST	Stop Tap		
FB	Flower Bed	SV	Sluice Valve		
FH	Fire Hydrant	TAR	Tarmac		
FP	Flag Pole	TCB	Telephone Cull Box		
GV	Gully				
GP	Gate Post	TL	Traffic Lights		
GV	Gas Valve	TP	Telephone Pole		
IC	Inspection Cover	TV	Television Box		
IL	Invert Level	UTL	Unable to Lift		
JB	Junction Box	VP	Vent Pipe		
KQ	Kerb Outlet	WL	Water Level		
LB	Letter Box	WM	Water Meter		
LP	Lamp Post	WW	Wash Over		

Burning, Hedge, Tree, Bush, Gate, GPO Electric, GPO Telecom, Control Station

Drawn by:- MK/JB | Surveyed by:- JB/MK/PR | Checked by:- PR

Date: October 2016

Scale:- 1:500

Drawing Number: ALS75618/500/04 Topographical

Client: Smith Evans Architects

Project: NIAB, Park Farm Villa Road, Histon

Surveyed By:-

ALS EST 1976

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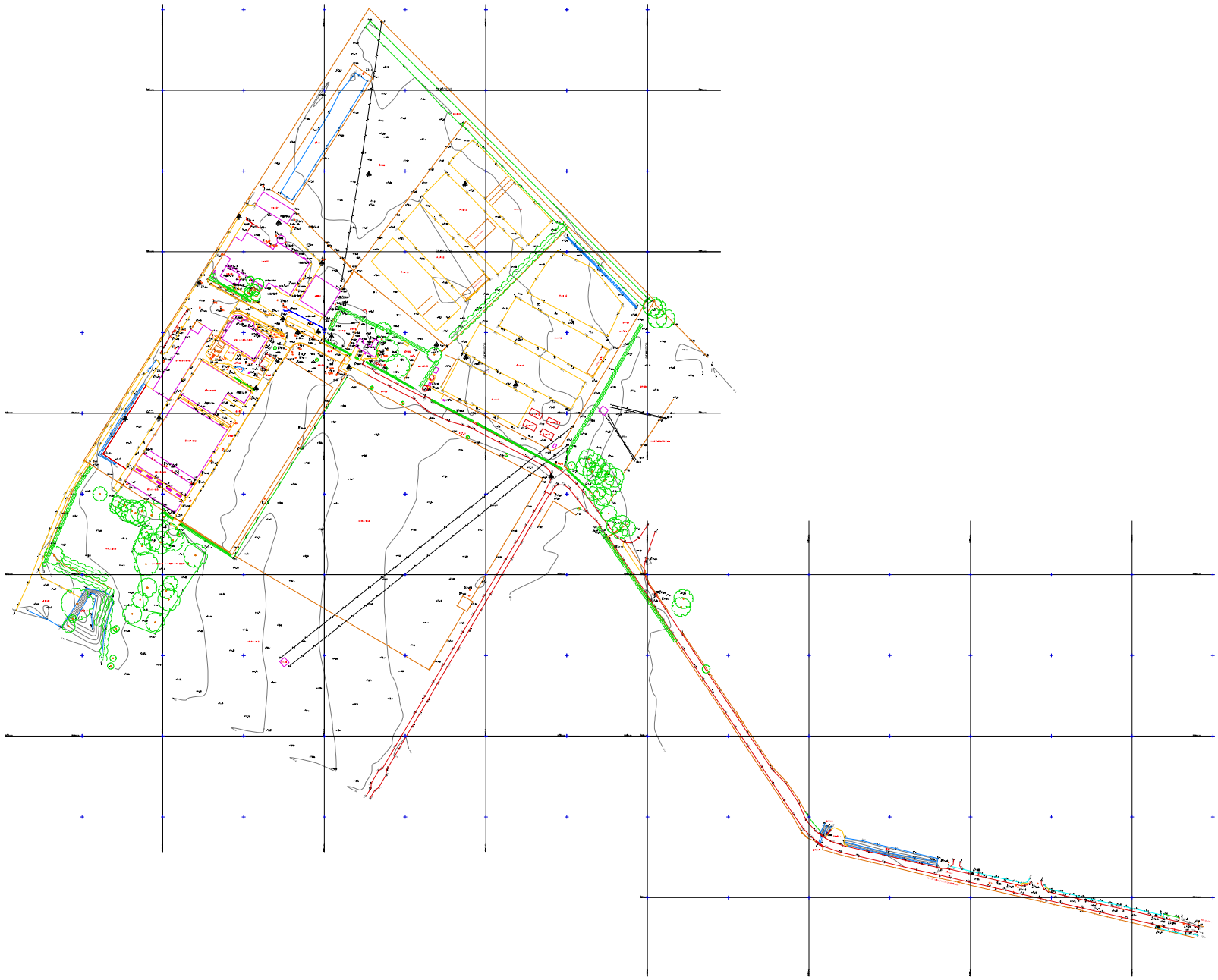

N

Grid North

SURVEY TO ORDNANCE SURVEY GPS DATUM AND GRID. QSG836(02) TRANSLATED FROM ETRS89 USING QSGMQ2 AND QSTN02 MODELS

Co-Ordinates

J1	543404.445	263047.459	13.6881
J10	543427.507	263148.239	12.7455
J11	543487.108	263142.094	12.6950
J12	543468.398	263042.585	13.2773
J13	543487.612	263034.894	13.1246
J14	543518.405	263017.715	12.7858
J2	543386.186	263050.673	13.5770
J20	543347.953	263074.846	13.8323
J21	543352.984	263079.814	13.7780
J22	543333.025	263085.464	14.2607
J25	543240.488	262951.924	15.4242
J26	543218.966	262895.156	15.9833
J27	543251.228	262932.873	15.1178
J28	543297.701	262931.231	14.7599
J29	543330.148	262912.402	14.6228
J3	543374.266	263058.930	13.6240
J30	543307.611	262872.175	14.8629
J31	543276.357	262843.270	15.0310
J32	543277.562	262890.997	15.0389
J4	543386.547	263093.270	13.4341
J5	543371.710	263118.100	13.4515
J6	543347.102	263121.859	13.6125
J7	543322.283	263080.639	14.1501
J8	543276.767	262996.832	14.3053
J9	543297.629	262997.076	14.2671
M1	543382.489	263050.229	13.7870
M2	543357.607	263015.558	14.2460
M20	543415.316	263028.678	13.7976
M21	543417.369	263037.914	13.7874
M22	543423.373	263050.955	13.6096
M23	543449.137	263035.994	13.3098
M3	543342.055	262990.688	14.4054
M30	543540.373	262961.104	13.1814
M31	543552.436	262968.848	12.8696
M32	543586.827	262999.111	11.9519
M4	543321.117	262956.456	14.3614
M5	543314.457	262946.209	14.4105
M6	543306.942	262937.041	14.3303
M7	543274.106	262958.498	14.4215
M8	543326.748	263039.074	14.4049

BOUNDARY TYPES

B/W	Barbed Wire	C/P	Chestnut Paling	P/F	Palisade
C/B	Close Boarded	I/R	Iron Railing	P/W	Post & Wire
C/I	Corrugated Iron	I/W	Interwoven		
C/L	Chainlink	P/R	Post & Rail		

LEGEND

AV	Air Valve	MH	Manhole
BD	Bollard	MK	Marker
BH	Borehole	MP	Street/Name Plate
CB	Cable Box	GH	Greenhead
CHY	Chimney	GRBH	Grindstone Bench
CL	Cover Level		Mark
COVC	Concrete	P	Post or Pillar
CTV	Cable Television	PM	Parking Meter
DV	Drop Kerb	RE	Rodding Eye
DP	Down Pipe	RS	Road Sign
DR	Drain	SUP	Sapling
ELC	Electricity	SC	Stop Cock
EP	Electricity Pole	SL	Sump Level
KK	Kerb Kerf	ST	Stop Tap
FB	Flower Bed	SV	Sluice Valve
FH	Fire Hydrant	TAR	Tarmac
FP	Flag Pole	TCB	Telephone Call Box
GY	Gully		
GP	Glow Post	TL	Traffic Lights
GV	Gas Valve	TP	Telegraph Pole
IC	Inspection Cover	TV	Television Box
IL	Invert Level	UTL	Unsafe to Mk
JB	Junction Box	VP	Vent Pipe
KQ	Kerb Outlet	WL	Water Level
LB	Letter Box	WM	Water Meter
LP	Lamp Post	WQ	Wash Out

Building, Hedge, Tree, Bush, Gate, GPO Electric, GPO Telecom, Contour Division

Drawn by:- MK/JB | Surveyed by:- JB/MK/PR | Checked by:- PR

Date: October 2016

Scale:- 1:1250

Drawing Number: ALS75618/OVERVIEW Topographical

Client: Smith Evans Architects

Project: NIAB, Park Farm Villa Road, Histon

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