A428 Black Cat to Caxton Gibbet improvements

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Volume 9

9.82 Flood Risk Assessment Technical Note

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A428 Black Cat to Caxton Gibbet improvements

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9.82 Flood Risk Assessment Technical Note

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1 Introduction

1.1 Purpose of this Technical Note

1.1.1 The purpose of this Technical Note is to address the clarification requests made by the Environment Agency (EA) after the submission of the A428 Flood Risk Assessment **[APP-220]** and associated Annex B: Ordinary Watercourse Modelling Report **[APP-222]**. In addition, clarification is provided regarding groundwater modelling as requested in the EA Deadline 4 submission – responses to the ExA's Second Written Question (WQ2) **[REP4-068]**.

1.1.2 The clarifications relate to information requested regarding climate change allowances, the results of flood modelling and associated sensitivity testing, tributary flow and groundwater flooding information and commitments regarding the management of flood risk during construction.

This Technical Note should be read in conjunction with the documents listed in **Table 1-1.** These documents are available on the Planning Inspectorate website.

Table 1-1 Documents relating to this Technical Note

Document title	Reference	Document reference
Drainage Strategy Report	**APP-219**	Appendix 13.3 Flood Risk Assessment - HE551495-ACM-HDG-GEN_Z_Z_ZZ-RP-CD-0011 (REF 1)
Flood Risk Assessment Report	**APP-220**	Appendix 13.4 Flood Risk Assessment - HE551495-ACM-HDG-GEN_Z_Z_ZZ-RP-CD-0011 (REF 2)
Ordinary Watercourse Modelling Report	**APP-222**	Annex B- Ordinary Watercourse Modelling Report - HE551495-ACM-HDG-GEN_Z_Z_ZZ-RP-HF-0007 (Appendix C) (REF 3)
Ordinary Watercourse Hydrology Report	**APP-223**	Annex C – Ordinary Watercourses Hydrology Report - HE551495-ACM-HDG-GEN_Z_Z_ZZ-RP-HF-0005 (Appendix B) (REF 4)
River Great Ouse Hydraulic Modelling Report	**App-221**	Annex A – River Great Ouse Hydraulic Modelling Report - HE551495-ACM-HDG-GEN_Z_Z_ZZ-RP-HF-0005 (Appendix A) (REF 5)

1.1.3 The appendices presented also include information requested regarding:

a. Floodplain compensation crossing drawings that were originally provided within the Ordinary Watercourse Modelling Report **[APP-222]**.

b. Drawings showing Scheme flood compensation areas, construction compounds and temporary soil storage areas, relative to flood zones.

c. Agreement of affected landowners to flood levels changes.

2 Flood Risk Assessment Climate Change Allowances

2.1.1 Climate Change Allowances (CCA) indicated in flood risk assessment documents **[APP-219]**, **[APP-220]**, **[APP-221]**, **[APP-223]** and related flood risk Technical Notes indicate differences in CCA for watercourses, ditches and watercourses.

2.1.2 For the main rivers the emphasis on modelling results in the Flood Risk Assessment **[APP-220]** were based on 35% CCA, while ordinary watercourses were based on 65% CCA. This approach has been taken because the EA has greater confidence in the main river modelling using the 35% CCA than ordinary watercourses, as they have more existing flood data available for the River Great Ouse. The 65% CCA was chosen for the ordinary watercourses as a more cautious approach.

2.1.3 As stated in section 1.3 of the respective main river and ordinary watercourse assessment **[APP-221]** and **[APP-222]** the same CCA principals were applied to the watercourses, namely:

a. Using the 1% Annual Exceedance Probabilities (AEP) design event including the Governments' 2016 'Higher Central' allowance of 35% for the Anglian River Basin.

b. Completing sensitivity or worse case modelling using the river basin 'Upper' 65% CCA.

c. Assessing floodplain compensation based on the principle of comparing the baseline maximum flood levels for the 1% AEP + 35% CCA event.

2.1.4 In accordance with the Government's guidance, Flood Risk Assessments: Climate Change Allowances (REF 6) the higher central allowances should be used for essential infrastructure located in flood zones 2, 3a and 3b and their off-site impact assessments and calculation of floodplain storage compensation.

2.1.5 Assessing the Scheme for either the higher central allowance or the more conservative upper central allowance is therefore compliant with the Government guidance requirements.

2.1.6 The EA, as a statutory consultee, uses the management catchment CCA from the peak river flow map as benchmarks. The Government's peak river flow map, published on 27 July 2021, (REF 7) indicates that the watercourses crossing the Scheme, on the western section of the Scheme, such as Rockham ditch, South Brook, River Great Ouse, Hen Brook, Wintringham Brook, Fox Brook and Gallow Brook, fall within the Upper and Bedford Ouse Management Catchment and that the 2080s higher central CCA is now 30%. Any eastern section watercourses within the Cam and Ely catchment, such as the Old West River Water Body (which includes Caxton Gibbet junction and the catchment north of the junction) is only 19%.

2.1.7 Current assessments for the Scheme have used the 35% and 65% CCA, which are higher than the latest July 2021 CCAs, and are therefore considered a robust conservative approach given the reduction in CCA now applicable to the Scheme.

2.1.8 For clarity on Scheme ditches, all overland Scheme cut off ditches, that discharge into watercourses crossing the Scheme, are based on the Government guidance peak rainfall intensity allowances, Table 1 for small catchments (less than 5km^2) (REF 12), and in accordance with the Design Manual for Roads and Bridges (DMRB) LA 113 (REF 8), CG 501 (REF 9) CD 522 (REF 10) and CD 529 (REF 11).

2.1.9 The Upper end and Central allowances of 40% (flood check) and 20% (design), for the total potential change anticipated for the '2080s', were used for the Scheme ditches in accordance with the stated DMRB CG 501 (REF 9) minimum Scheme design lifetime of 60 years.

2.1.10 In addition, highway drainage SuDs attenuation features such as ponds have been assessed as highway drainage systems with CCA of 20% and 40% in accordance with DMRB CG501 (REF 9).

3 River Great Ouse modelling results

3.1.1 The flood modelling results in **Figure 3-1** below highlight land along the River Great Ouse, which is located within the river floodplain, has a maximum flood depth increase of 16mm across a corner of the site boundary, of less than 3% of the site, during a 1% AEP + 65% CCA event. This land is currently outside of the Order Limits for the Scheme.

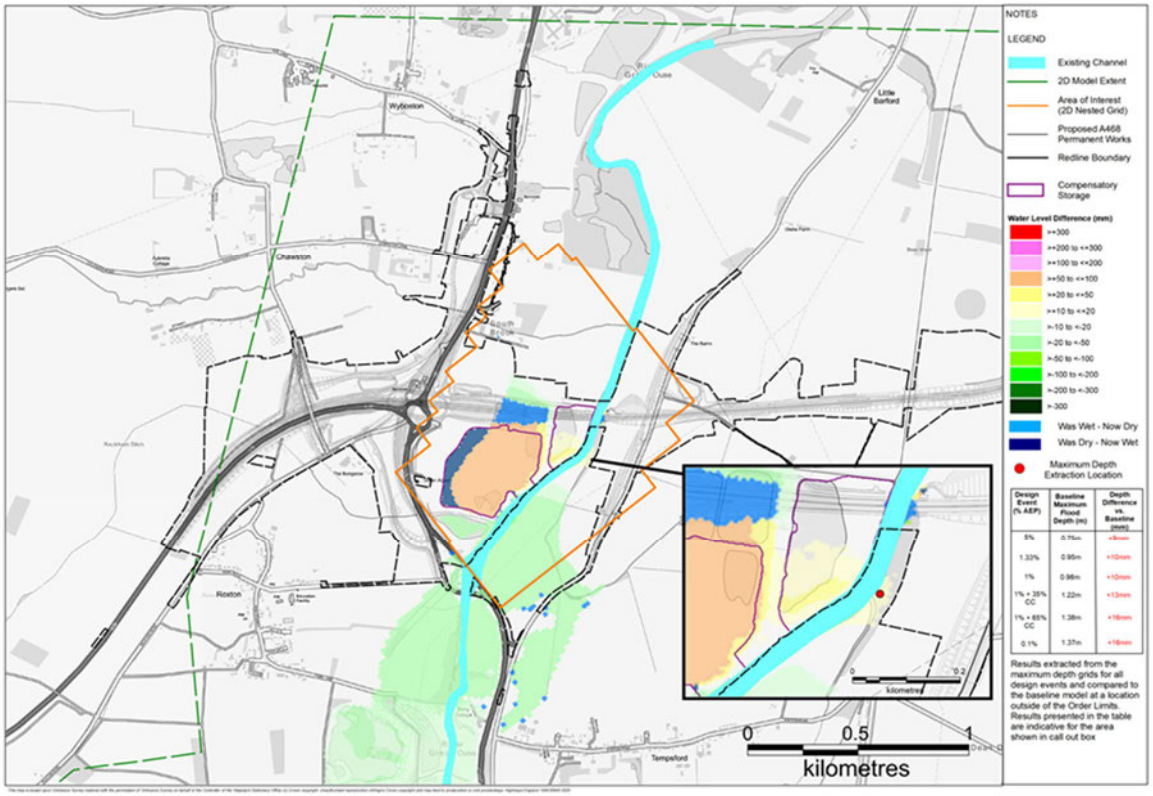

Figure 3-1 Results of 1% AEP + 65%CCA modelling showing flood depth changes between existing baseline and Scheme operational phase conditions

3.1.2 As indicated in Appendix C, the owners of the land affected by the very minor flood depth increase during the 100 year extreme event, Wynne Estates, has accepted the increased flood depth on their land given the relatively small area compared to the overall flood level reduction of between 10mm to 50mm across approximately 97% of their land as a result of the Scheme.

4 Begwary Brook sensitivity testing

4.1.1 Modelling sensitivity testing has been completed for Begwary Brook to respond to the EA's requirement of consistency with all other 1D simulations. Table 7-3 within the Annex B: Ordinary Watercourse Modelling Report **[APP-222]** has therefore been re-produced below with the results of the sensitivity test.

4.1.2 **Table 4-1** below now includes the Upstream Boundary Inflow, a 20% increase and decrease applied to the upstream boundary of the model. For the roughness sensitivity tests a 20% increase and decrease was applied globally in the model to all Manning's Roughness Coefficients in the 1D channel and banks.

4.1.3 The sensitivity testing reported in the table below shows, in brackets, the difference between the proposed model results in **[APP-222]** and the sensitivity results.

Table 4-1: Sensitivity Analysis Results

	Maximum Water Levels (m AOD)		
	Upstream (BEG2)	Roxton Link Road Culvert (BEG3_CU)	Downstream (BEG11)
Proposed Scheme	17.54	17.51	16.91
Flow + 20%	17.80 (+0.26m)	17.77 (+0.26m)	16.94 (+0.03m)
Flow - 20%	17.37 (-0.17m)	17.30 (-0.21m)	16.84 (-0.07m)
Roughness + 20%	17.57 (+0.03m)	17.53 (+0.02m)	16.95 (+0.04m)
Roughness - 20%	17.51 (-0.03m)	17.50 (-0.01m)	16.78 (-0.13m)
River Great Ouse DS Boundary (Constant HT at 16.3m AOD)	17.54 (+0.00m)	17.51 (+0.00m)	16.91 (+0.00m)

4.1.4 The results of the sensitivity test show a 20% increase in flow at the upstream boundary has produced an increase of 0.26m in the maximum water level at the proposed Roxton Link Road culvert, within the Begwary Brook catchment. When the flow is decreased by 20%, the maximum water level at the proposed Roxton Link Road culvert falls by -0.21m. This response is within the expected range for the sensitivity test undertaken and is not likely to impact any flood risk receptors'

4.1.5 The soffit level of the proposed Roxton Road Link culvert is 18.06m providing a freeboard of 0.29m when applying the maximum 20% sensitivity flow increase. It is therefore considered that the sizing of the proposed culverts is appropriate given the sensitivity increase in level associated with a 20% increase in flow to the 1% AEP + 65% CCA event.

4.1.6 **Figure 4-1** below provides the previous figure within **[APP-222]** updated to reflect the sensitivity testing undertaken and reported in **Table 4-1** above:

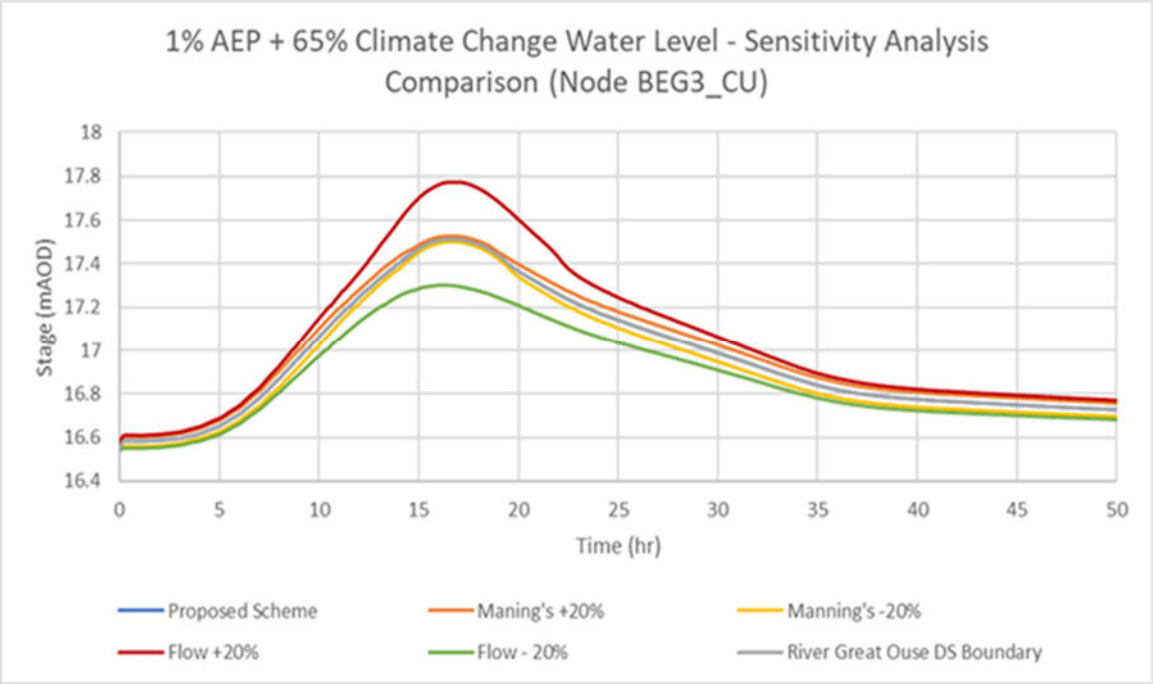

Figure 4-1: Sensitivity Analysis of A428 Culvert for the 1% AEP + 65% CCA Event for Begwary Brook Model

5 Stone/Rectory Brook sensitivity testing

5.1.1 Modelling sensitivity testing has been completed and was submitted to the EA for Rectory Brook in March 2021 to respond to the EA's requirement for consistency with all other 1D simulations. The original modelling results are presented in the Ordinary Watercourse Modelling Report **[APP-222].** In addition to the sensitivity analysis, for consistency the EA also asked for further information regarding the "proposed" (with Scheme) scenarios.

5.1.2 A flow sensitivity test was conducted on the proposed scenario model for Rectory Brook. A 20% flow increase and decrease was applied to the Spinney and Barford inflows to assess how sensitive the model is to changes in flow.

5.1.3 **Table 11-5** from **[APP-222]** has been reproduced below with the results of the sensitivity test and shows that maximum water levels vary between +0.04m (increase in flow) and -0.06m (decrease in flow), and are therefore within the expected response to variations in inflows. These results have been extracted from the nodes shown in **Figure 11-11** below which reproduces and updates **Figure 11-11** from **[APP-222]** with the sensitivity test results.

5.1.4 **Figure 11-11 [APP-222]** displays a flood depth difference map between modelled levels without sensitivity testing and when inflows are increased by 20%. This shows that flood depths increase in the floodplain by up to +0.03m. **Figure 11-12** below, which is also reproduced and updated from the corresponding Figure in **[APP-222]**, displays a flood depth difference map between modelled levels without sensitivity testing and when inflows are decreased by 20%. This shows that flood depths decrease in the floodplain by up to -0.03m. Both the 1D and 2D results show the expected response to variations in inflows within the agricultural land, demonstrating that the modelling and Scheme assessment is robust and not likely to impact any flood risk receptors.

5.1.5 **Table 11-5** has been produced below to show the 1D In-Channel Maximum Stage Inflow Sensitivity Results - 1% AEP + 65% Climate Change:

Table 11-5: 1D In-Channel Maximum Stage Inflow Sensitivity Results - 1% AEP + 65% CCA.

	Maximum Stage + change of in-channel water depth compared to proposed					
Label	NGR	Proposed (m AOD)	+20% Inflow (m AOD)	Difference (m)	-20% Inflow (m AOD)	Difference (m)
RF51	517262, 255472	18.13	18.16	+0.03	18.09	-0.04
RF56	517393, 255445	18.09	18.12	+0.03	18.06	-0.03
RF68	517452, 255371	18.10	18.12	+0.02	18.08	-0.02
RF25_329.336	517350, 255785	17.16	17.20	+0.04	17.10	-0.06
RF20_0.00	517346, 245878	17.15	17.17	+0.02	17.09	-0.06

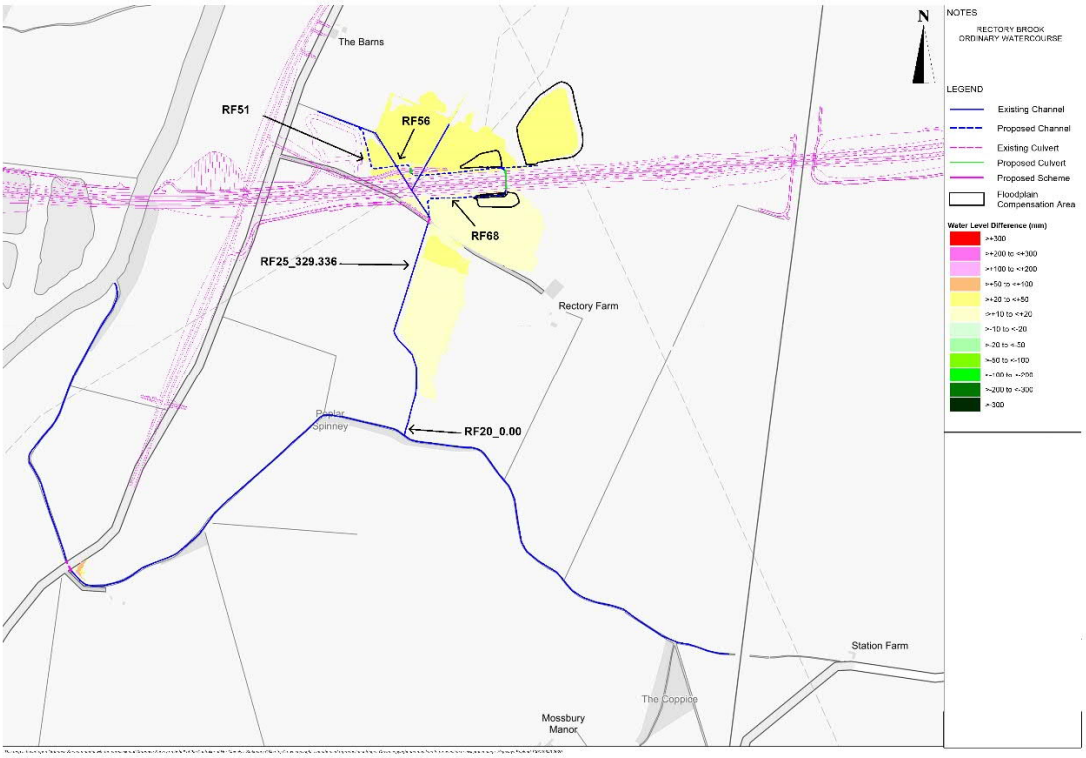

Figure 11-11: Flood depth differences when inflow +20%, during a 1% AEP + 65% CCA, as reported in Table 11-5.

Figure 11-12 Flood depth differences when inflow -20%, during a 1% AEP + 65% CCA event, as reported in Table 11-5.

6 Rockham Ditch sensitivity testing

6.1.1 Modelling sensitivity testing has been completed for Rockham Ditch and was submitted to the EA in March 2021 to respond to the EA's requirement for consistency with all other 1D simulations. The sensitivity modelling results show that the sensitivity testing has no impact on the Scheme Ordinary Watercourse Modelling Report **[APP-222]** conclusions, as presented below.

6.1.2 In response to the EA's request for additional information regarding sensitivity testing **Table 8-3** from **[APP-222]** has been reproduced below and updated with the results of the sensitivity testing to show, in brackets, the difference between the proposed model results and the sensitivity results.

Table 8-3 Rockham Ditch Sensitivity Testing

	Maximum Water Levels (m AOD)		
	Upstream (RD_970.42)	A1 Culvert (RD_E72a)	Downstream (RD_1385.69)
Proposed Scheme	18.43	18.03	17.44
Flow + 20%	18.53 (+0.10m)	18.14 (+0.11m)	17.50 (+0.06m)
Flow - 20%	18.30 (-0.13m)	17.90 (-0.13m)	17.36 (-0.08m)
Roughness + 20%	18.49 (+0.06m)	18.05 (+0.02m)	17.51 (+0.07m)
Roughness - 20%	18.36 (-0.07m)	18.00 (-0.03m)	17.36 (-0.08m)
River Great Ouse DS Boundary (Constant HT at 16.3m AOD)	18.43 (+0.00m)	18.02 (+0.01m)	17.50 (+0.06m)

6.1.3 **Figure 8-7**, also reproduced from **[APP-222]** and updated below, shows that the sensitivity testing has no significant impact on the Scheme culverts and is not likely to impact any flood risk receptors, as indicated in **Table 8-3** above.

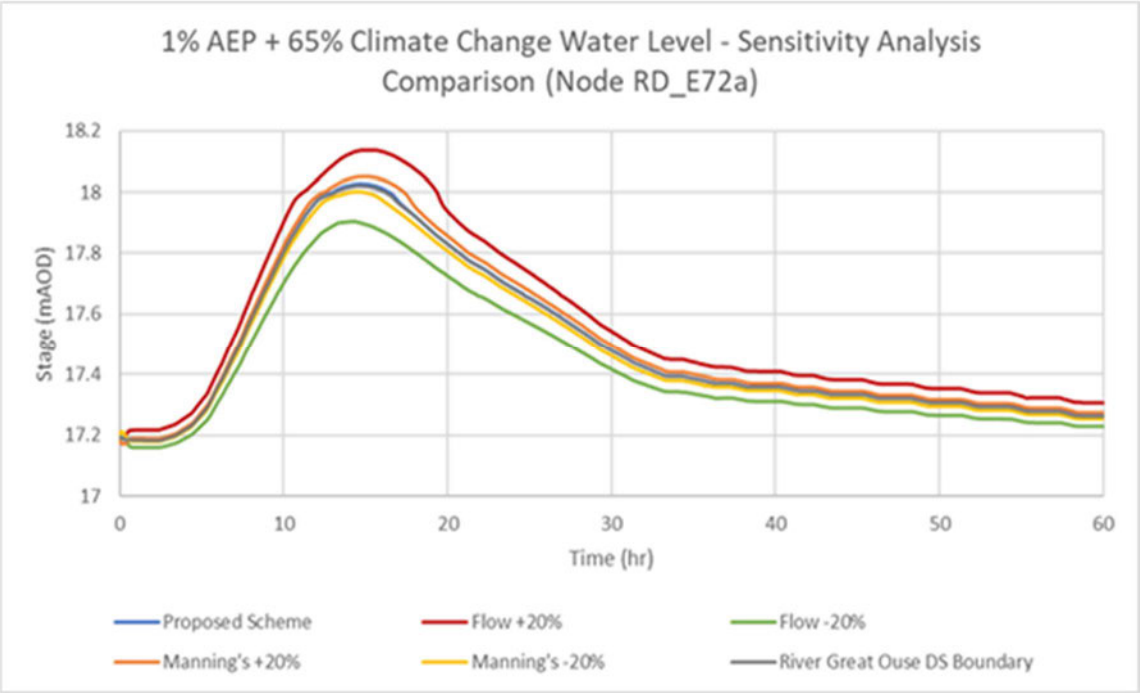

Figure 8-7 indicating water level change with 20% sensitivity tests

6.1.4 Further information regarding inflows were requested by the EA, which included modelling a 20% increase inflow at the upstream boundary of Rockham Ditch. This change produced an increase of 0.11m water level at the proposed A1 culvert. When the flow is decreased by 20%, the water level at the proposed A1 culvert falls by -0.13m. The model therefore also shows the expected response to changes in flow specified as part of this sensitivity test, is not likely to impact any flood risk receptors and therefore no changes to the Scheme proposals are required.

7 Additional Hen Brook modelling

7.1.1 Additional modelling, to that submitted to the EA for their review before January 2021, has been completed for Hen Brook to capture all culvert details for this watercourse crossing. The EA have reviewed this updated modelling, which was submitted to the EA in May 2021. **Figure 10-7** below re-produces **Figure 10-7** within the Scheme Ordinary Watercourse Modelling Report **[APP-222]** and reflects the additional modelling results from the sensitivity test.

Figure 10-7: Depth Difference Map (Baseline vs Proposed) – 1% AEP +65% CCA

7.1.2 A safety barrier is proposed within the watercourse culvert structure between the watercourse and proposed walkway, this will not impact modelling results or increase flood risk.

7.1.3 To illustrate the update to the culvert details supplied, **Figure 10-3** below re-produces **Figure 10-3** within the Modelling Report **[APP-222]** updated with the results of the sensitivity testing.

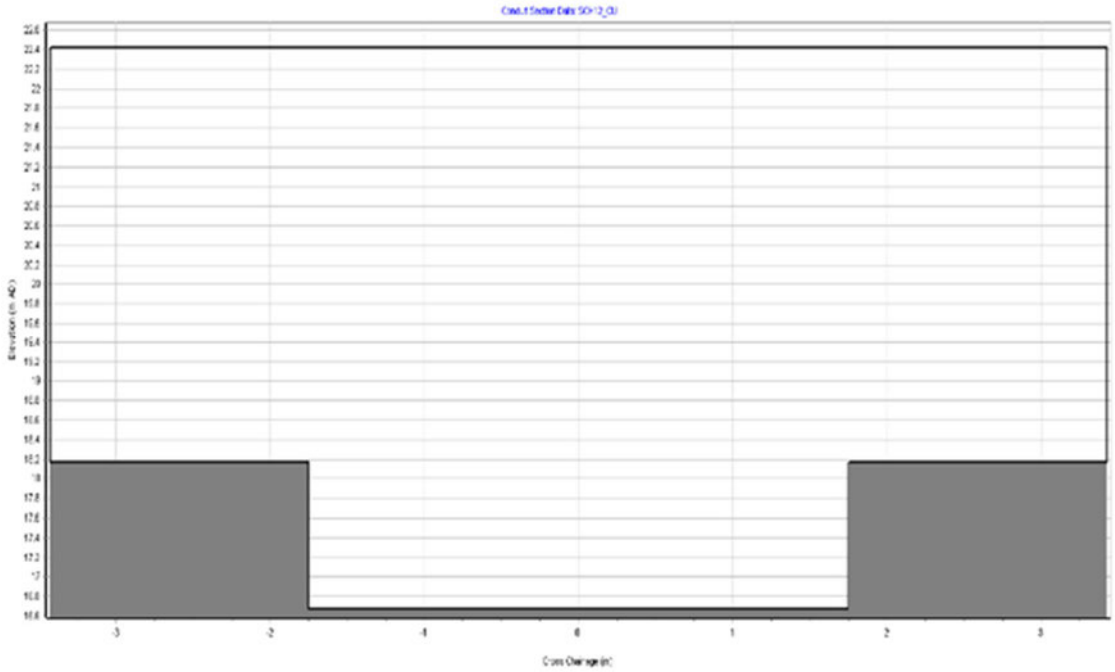

Figure 10-3: Hen Brook Proposed A428 Modelled Culvert (dimensions not to scale)

7.1.4 **Figure 10-6** below updates **Figure 10-6** within **[APP-222]** to reflect the results of the additional modelling completed.

Figure 10-6: Proposed Maximum Flood Depth Map – 1% AEP + 65% CCA

7.1.5 **Figure 10-7** below updates **Figure 10-7** within **[APP-222]**, which reflects the additional modelling completed.

Figure 10-7: Depth Difference Map (Baseline vs Proposed) – 1% AEP + 65% CCA

7.1.6 Table 10-2 below shows that for the 1% AEP +65% climate change event the 1D flows (extracted from the 1D channel at node HB 391.598 downstream of the Scheme) during the proposed scenario are greater than those during the baseline. The peak flow within the proposed scenario is 13.99m^3/s while the baseline peak is 13.79m^3/s.

7.1.7 However, when the 2D flows are assessed (extracted from the floodplain perpendicular to the 1D channel node HB_391.598 downstream of the Scheme) the opposite occurs. During the proposed scenario, the 2D peak flow is 10.24m^3/s while the peak flow for the baseline scenario is 10.46m^3/s.

7.1.8 **Table 10-2** below is an updated version of **Table 10-2** in **[APP-222]** which reflects the results of the additional modelling completed.

Table 10-2: Flow Comparison (1% AEP +65% CC)

Label	NGR	Scenario	1D Peak Flow (m3/s)	2D Peak Flow (m3/s)	Total (m3/s)
HB_391.598	519940, 258690	Baseline	13.79	10.46	24.25
		Proposed	13.99	10.24	24.23

7.1.9 **Figure 10-9** below updates the same figure within **[APP-222]** to reflect the additional modelling results.

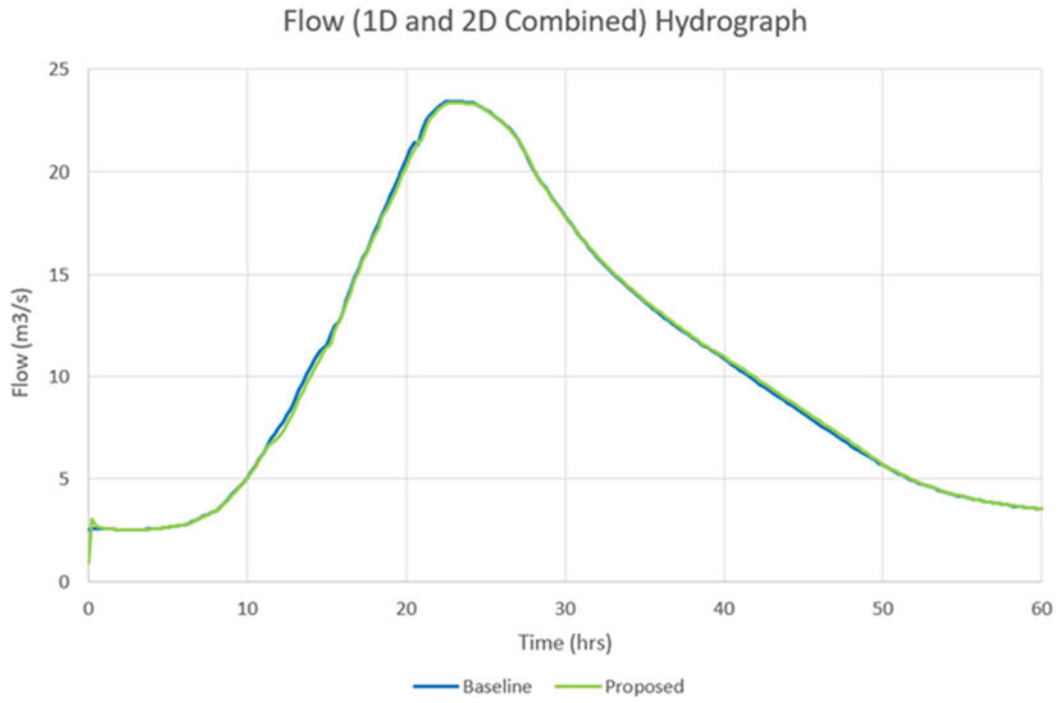

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Figure 10-9: Flow (1D and 2D Combined) Hydrograph

7.1.10 In the proposed scenario the maximum water level within the culvert for the 1% AEP + 65% climate change event is 18.82m AOD. The soffit level for this culvert is 22.42m AOD, indicating that there is sufficient freeboard during this event and no further mitigation is required.

8 Tributary flows joining West Brook

8.1.1 In the Scheme Ordinary Watercourse assessment **[APP-222]** there is one tributary watercourse joining West Brook in the model, upstream of the realigned A428 crossing, with an upstream boundary located to the north of the existing A428. The watercourse is smaller than West Brook, with a typical width of 4m.

8.1.2 The tributary catchment falls within the wider West Brook catchment, although based upon the survey obtained and observations made during a site visit, it was difficult to determine the connectivity of this ditch to the catchment upstream of the existing A428. As a result, it was decided that the calculated inflow for the West Brook catchment would be applied to the main watercourse, and a small constant inflow has been applied at the upstream boundary of the tributary channel.

8.1.3 The tributary joins West Brook upstream of the new A428 carriageway crossing, therefore the distribution of flows between the watercourses assumed is unlikely to be significant in the context of the Scheme assessment.

9 A1 groundwater flood risk assessment clarifications

9.1.1 In **[REP4-068]** (Deadline 4 submission – responses to the ExA's Second Written Questions (WQ2), the EA responded regarding Q2.9.2.1 Grade separated junctions, to request further assessment of the potential flood risk implications of sealing the A1 on South Brook. The EA requested that these results be included in the FRA Technical Note.

9.1.2 A further assessment of the impact of A1 groundwater flood risk on fluvial modelling has been completed using the groundwater inflow (approximately 5m^3/day) stated in the Groundwater Technical Note which is still being discussed with the EA. It has been calculated that this small maximum possible increase in volume from groundwater will not adversely affect the proposed Scheme SuDs provision for the A1 where nearly 10,000m^3 of storage is to be provided for the A1 drainage design, pond BC2, as indicated in Appendix 13.3 - Drainage Strategy Report of the Environmental Statement **[APP-219]**.

9.1.3 **Table 9-1** below shows the difference between the maximum anticipated groundwater discharge baseline and post construction (operational phase) for South Brook and the potential magnitude of impact on fluvial flows/ flood levels within the brook. The difference between the groundwater baseline and post-construction was converted from m^3/day to m^3/s to provide comparability with fluvial flood flows.

9.1.4 The change in discharge rates for South Brook in the Maximum (extreme) scenario is 176 m^3/day which equates to an increase of approximately 2.8% in groundwater flow and an average flow of 0.002m^3/s. The 1% AEP plus climate change (design event) fluvial flow for South Brook is 14.1m^3/s and therefore the change in groundwater discharge is less than 0.02% of this peak fluvial flow. Given that this calculation is based upon the most extreme scenario, the magnitude of change in groundwater discharge rates is likely to be lower, and the resultant flood levels will not change.

9.1.5 Therefore, it is considered that further hydraulic modelling is not required to demonstrate that changes in groundwater discharge will not impact upon fluvial flooding for South Brook.

9.1.6 **Table 9-1** below shows the difference between the maximum anticipated groundwater discharge baseline and post construction (operational phase) for South Brook and the potential magnitude of impact on fluvial flows/ flood levels within the brook. The difference between the groundwater baseline and post-construction was converted from m^3/day to m^3/s to provide comparability with fluvial flood flows.

Table 9-1: Groundwater discharge difference Baseline vs Post construction and associated discharge flows

South Brook	Values
Baseline Groundwater discharge (m^3/day)	6298
Post-Construction Groundwater discharge (m^3/day)	6474
Difference (m^3/day)	176
Difference (m^3/s)	0.002

The information contained in this Technical Note and the Groundwater Risk Assessment Technical Note referred to in the Applicant's response to the ExA's second written questions **[REP4-037]**, and provided in response to the EA's requests for information as referred to above **[REP4-068]**, do not materially alter the Scheme design or the conclusions of the submitted Flood Risk Assessment **[APP-220]** or associated Ordinary Watercourse Modelling Report **[APP-222]**.

10 Scheme commitment statements supplementary to the Flood Risk Assessment **[APP-220]**

10.1.1 As part of on-going engagement with the EA regarding the Flood Risk Assessment **[APP-220]**, the EA has recommended that certain principles are observed during construction to enable good flood risk management.

10.1.2 The following principles have therefore been secured as part of the First Iteration Environmental Management Plan **[TR001044/APP/6.8v2]** which was updated at Deadline 6:

a. The authorised development must be carried out in accordance with the flood risk assessment, including the mitigation measures detailed in it, so that no part of the authorised development is predicated to result in any exceedance of the flood levels to properties and land shown in the flood risk assessment.

b. If any part of the authorised development is to be undertaken which is not in accordance with the flood risk assessment, then it must be demonstrated to the Environment Agency's satisfaction that the part of the authorised development concerned would not result in an exceedance of any of the flood levels shown in the flood risk assessment, outside of an agreed 10mm variance modelling tolerance, or it must be demonstrated to the Environment Agency that all affected landowners accept the predicted exceedance of the flood levels shown in the flood risk assessment drawings.

c. The EA must be consulted for any Scheme deviation that encroaches horizontally or vertically into Flood Zone 3, that could impact flood risk mitigation proposals, flood paths and floodplain compensation areas.

d. A detailed design phasing plan is to be developed for the Scheme that includes the construction of relevant flood compensation areas prior to the commencement of any construction works within Flood Zone 3, that may have implications on flood risk mitigation, flood paths, floodplain compensation and increased flood risk. The phasing plan must demonstrate which section of floodplain compensation relates to which new section of road / area of lost floodplain and flood compensation will therefore be built prior to the loss of floodplain storage.

e. As soon as reasonably practicable following the authorised development being open to traffic, all ‘as built’ hydraulic model files and shapefiles of the maximum levels and inflows, are to be provided for the 1% and 0.1% undefended scenario storm events to allow the Environment Agency to update their Flood Map.

11 Breedon's Quarry

11.1.1 The EA has also sought clarification on changes to the proposed ground levels resulting from the restoration of Black Cat Quarry.

11.1.2 The Applicant's responses to the ExA's first written question Q1.9.2.2 **[REP1-022]** and second written question Q2.9.4.1 **[REP4-037]** are based on Condition 3 of planning application reference 15/02551/EIAWM issued by Bedford Borough Council which states that "*The mineral extraction hereby permitted shall cease within 4 years of the date of commencement, the date of which shall be notified in writing to the Local Planning authority within 7 days of such cessation. Final restoration and landscaping of the site, but excluding aftercare, shall be completed within 18 months of the date of cessation of mineral extraction*". *Condition 3 "requires that 18 months after notifying 0the Local Planning Authority of the cessation of mineral extraction works, the site should be restored and landscaped".* The date of cessation of the mineral extraction was 15 September 2020, meaning that the site, including the levels, should be restored by 15 March 2022. The planning condition also states: "*If the planning condition is not discharged, the operators of the site would be in breach of their planning permission and the local planning authority may take enforcement action."*

11.1.3 To the Applicant's knowledge, the planning condition has not been varied, and the timescales set out remain valid. As such, the Applicant anticipates that all restoration works at Black Cat Quarry will be completed in accordance with the temporary planning permission for the quarry by March 2022.

11.1.4 The Applicant therefore understands that the quarry restoration levels will be in place before the start of Scheme construction works and this reflects the flood risk baseline watercourse modelling completed by the Applicant and associated Flood Risk Assessment **[APP-220]** conclusions that the floodplain storage is adequate for the Scheme.

12 Requested information

12.1.1 The appendices include drawing information which was requested by the EA**.**

12.1.2 Appendix A shows improved print quality versions of the floodplain compensation crossing drawings.

12.1.3 Appendix B shows the Scheme flood compensation areas, construction compounds and temporary soil storage areas, relative to extreme event floodplains.

13 References

REF 1. Highways England (2021), A428 Black Cat to Caxton Gibbet Improvements Appendix 13.3 Drainage Strategy Report. Available at: TR010044-000383-TR010044_A428_Black_Cat_to_Caxton_Gibbet_Improvements_6-3_Environmental_Statement_Appendices_Appendix_13-3.pdf (planninginspectorate.gov.uk) [Last Accessed: 15/11/2021]

REF 2. Highways England (2021), A428 Black Cat to Caxton Gibbet Improvements Appendix 13.4 Flood Risk Assessment. Available at: TR010044-000384-TR010044_A428_Black_Cat_to_Caxton_Gibbet_Improvements_6-3_Environmental_Statement_Appendices_Appendix_13-4.pdf (planninginspectorate.gov.uk) [Last Accessed: 15/11/2021]

REF 3. Highways England (2021), A428 Black Cat to Caxton Gibbet Improvements Appendix 13.4 Flood Risk Assessment Annex B: Ordinary Watercourse Modelling Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010044/TR010044-000386-TR010044_A428_Black_Cat_to_Caxton_Gibbet_Improvements_6-3_Environmental_Statement_Appendices_Appendix_13-4_Annex_B.pdf [Last Accessed: 15/11/2021]

REF 4. Highways England (2021), A428 Black Cat to Caxton Gibbet Improvements Appendix 13.4 Flood Risk Assessment Annex C: Ordinary Watercourse Hydrology Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010044/TR010044-000387-TR010044_A428_Black_Cat_to_Caxton_Gibbet_Improvements_6-3_Environmental_Statement_Appendices_Appendix_13-4_Annex_C.pdf [Last Accessed: 15/11/2021].

REF 5. Highways England (2021, A428 Black Cat to Caxton Gibbet Improvements Appendix 13.4 Flood Risk Assessment Annex A: River Great Ouse Hydraulic Modelling Report. Available at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010044/TR010044-000385-TR010044_A428_Black_Cat_to_Caxton_Gibbet_Improvements_6-3_Environmental_Statement_Appendices_Appendix_13-4_Annex_A.pdf [Last Accessed: 15/11/2021].

REF 6. Government.UK (2021), Flood risk assessments: climate change allowances. Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances [Last Accessed: 15/11/2021].

REF 7. Government.UK (2021), Peak river flow climate change allowances by management catchment. Available at: https://www.gov.uk/government/publications/peak-river-flow-climate-change-allowances-by-management-catchment [Last Accessed: 15/11/2021].

REF 8. Standard for Highways (2020), Sustainability and Environment Appraisal LA 113 Road drainage and the water environment. Available at: [redacted] [Last Accessed: 15/11/2021

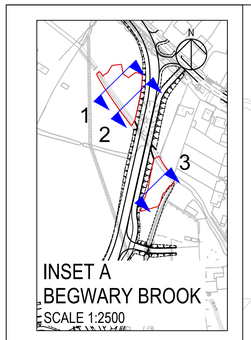
REF 9. Standard for Highways (2020), Sustainability and Environment Appraisal CD 501 Design of highway drainage systems. Available at: [redacted]

REF 10. Standard for Highways (2020), Sustainability and Environment Appraisal CD 522 Drainage of runoff from natural catchments. Available at: [redacted] [Last Accessed: 15/11/2021].

REF 11. Standard for Highways (2020), Sustainability and Environment Appraisal CD 529 Design of outfall and culvert design. Available at: [redacted] [Last Accessed: 15/11/2021].

REF 12. Government.UK (2021), Peak rainfall intensity allowances in small catchments (less than 5km2). Available at: Flood risk assessments: climate change allowances - GOV.UK (www.gov.uk)

Appendix A - Floodplain compensation cross section drawings



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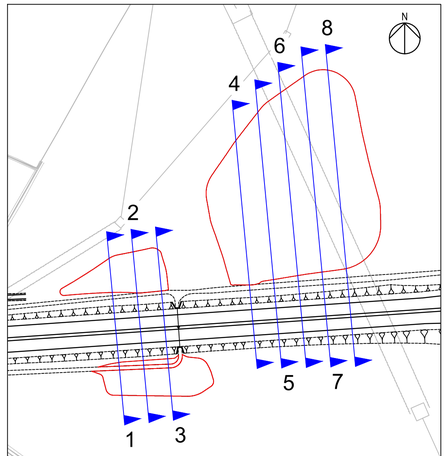
SCALE 1:2500



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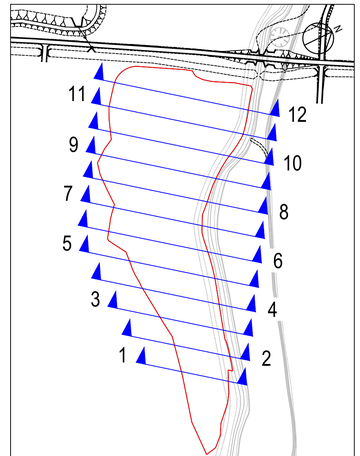


INSET C - HEN BROOK
SCALE 1:2500

SOUTH BROOK

OLD GREAT NORTH ROAD

ROXTON GARDEN CENTRE

GREEN ACRES

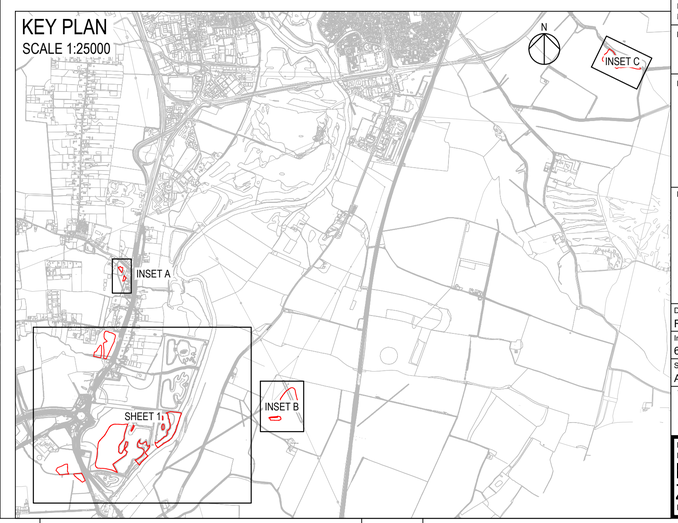
ROCKHAM DITCH

RIVER OUSE

RIVER GREAT OUSE

Scale
0 25 50 100 200m
Original Size (A1) 1:2500 @ A1 1:5000 @ A3

KEY PLAN
SCALE 1:25000



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SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

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First Issue	JB / TD		07/12/20	P03
Revision Details	By / Check		Date	Suffix

Purpose of issue
FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number
TR010044

Project Title
A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title
FLOOD COMPENSATION SECTIONS LOCATION PLAN

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number
Highways England PIN | Originator | Volume | Rev
HE551495 -ACM -HDG- P03
ZN1_Z_Z_ZZ -DR -CD-0550
Location | Type | Role | Number

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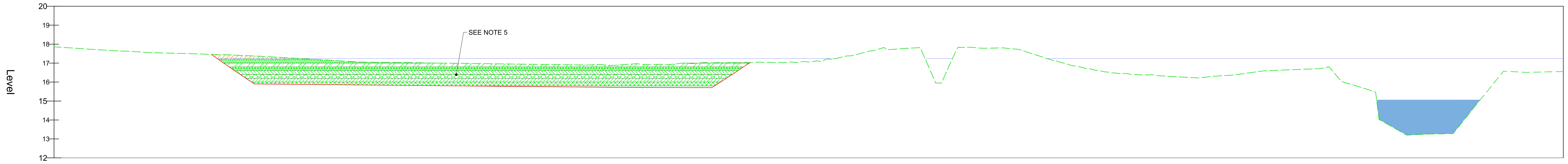

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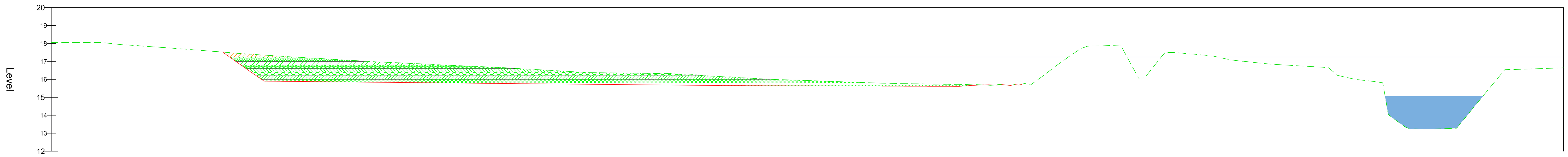

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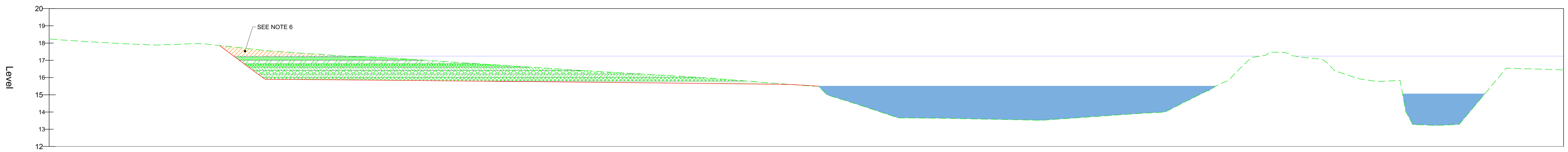

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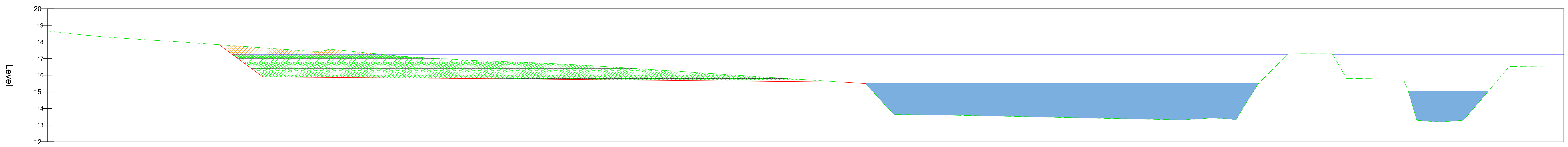

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5. FLOODPLAIN COMPENSATION (CUT) SHOWN IN GREEN.
6. FLOODPLAIN LOSS (FILL) SHOWN IN RED.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- 100yr + 35% CC FLOOD PLAIN LEVEL
- EXISTING POND WATER LEVEL
- PROPOSED POND WATER FILL / LEVEL
- EXCAVATED MATERIAL
- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

- 14.6m - 14.8m
- 14.8m - 15.0m
- 15.0m - 15.2m
- 15.2m - 15.4m
- 15.4m - 15.6m
- 15.6m - 15.8m
- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
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- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P03

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RIVER OUSE FLOOD COMPENSATION SECTIONS SHEET 1 OF 8

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number
Highways England PIN | Originator | Volume | Location | Type | Role | Number
HE551495 -ACM -HDG -ZN1_Z_Z_ZZ -DR -CD -0551

Rev
P03

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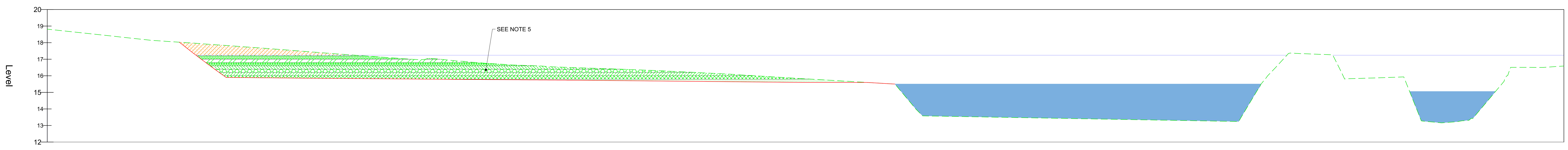

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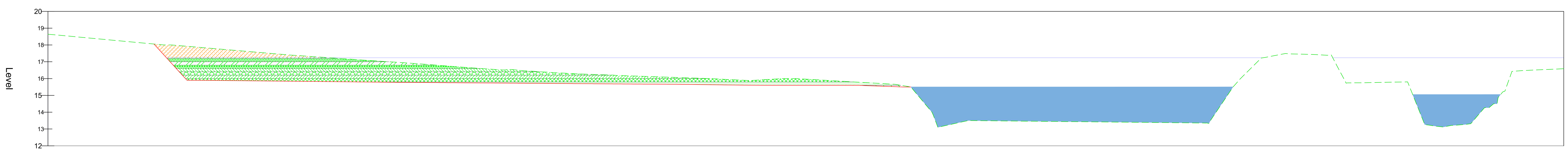

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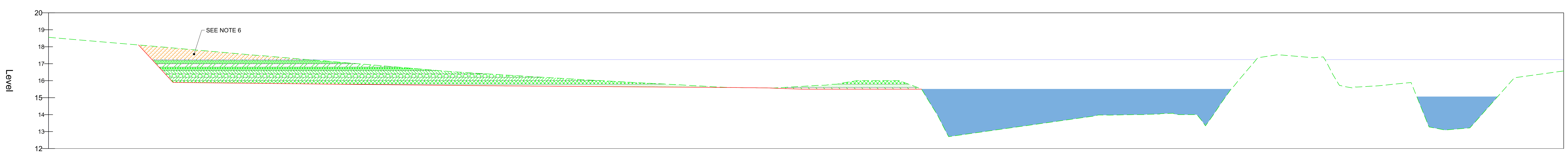

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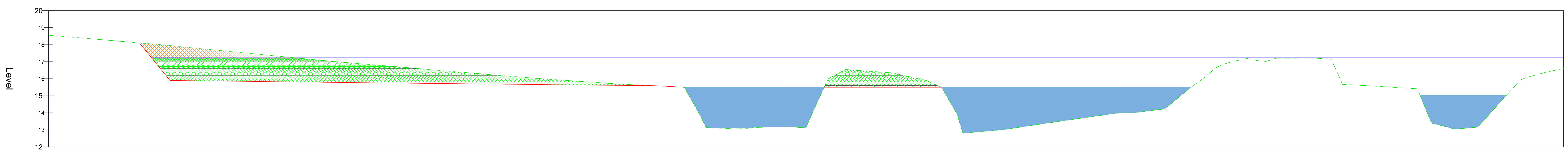

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- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

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- 15.0m - 15.2m
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- 15.4m - 15.6m
- 15.6m - 15.8m
- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P03

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RIVER OUSE FLOOD COMPENSATION SECTIONS SHEET 2 OF 8

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number (Highways England PIN | Originator | Volume | Location | Type | Role | Number)

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Rev: P03

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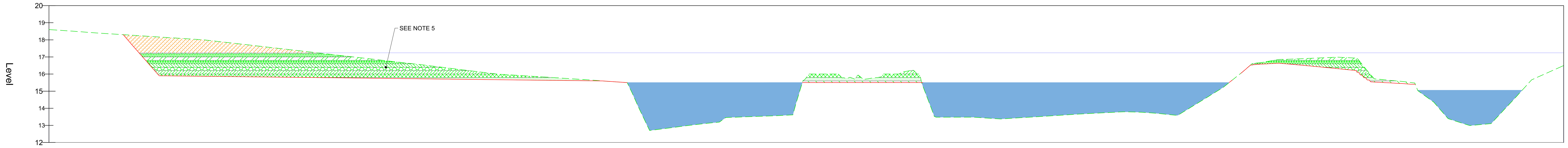

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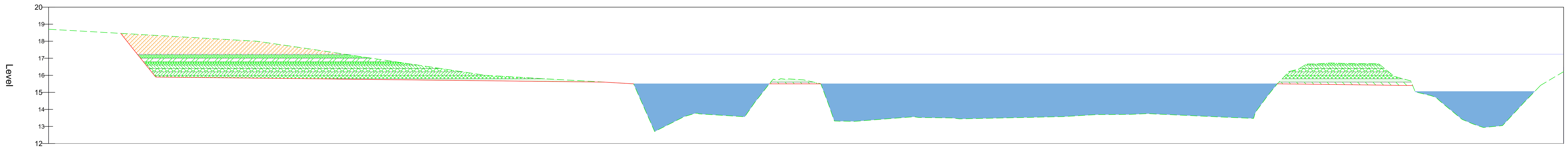

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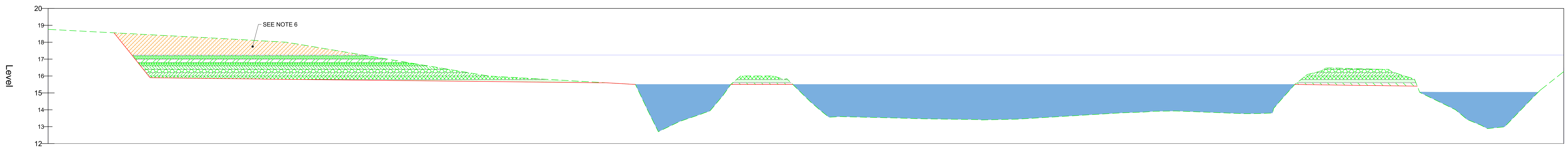

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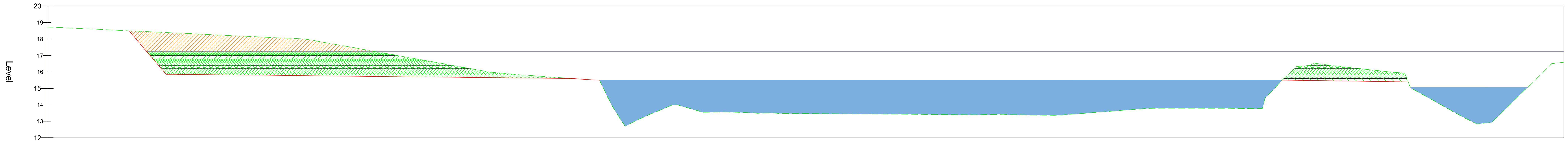

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- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / GP	04/12/20	P03

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RIVER OUSE FLOOD COMPENSATION SECTIONS SHEET 3 OF 8

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	GP	04/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number
Highways England PIN | Originator | Volume
HE551495 -ACM -HDG -ZN1_Z_Z_ZZ -DR -CD-0553
Location | Type | Role | Number

Rev
P03

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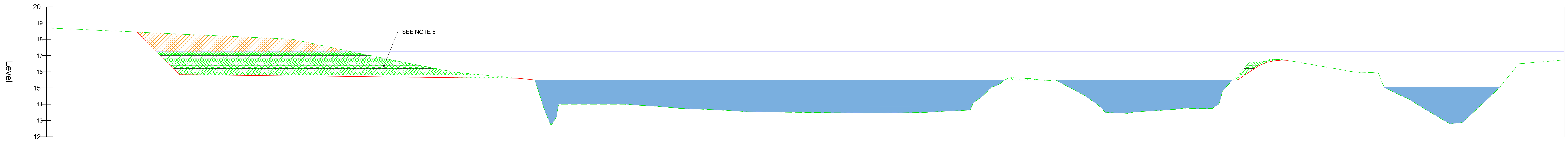

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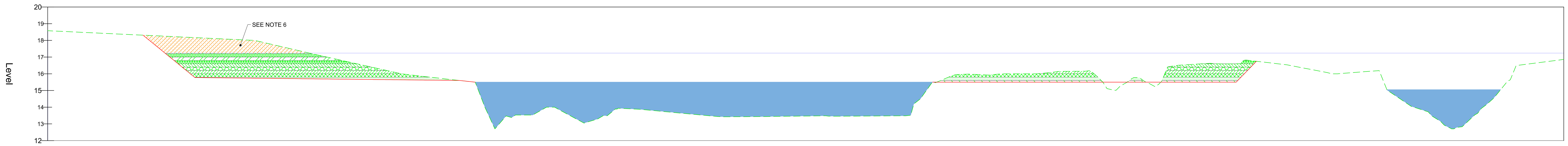

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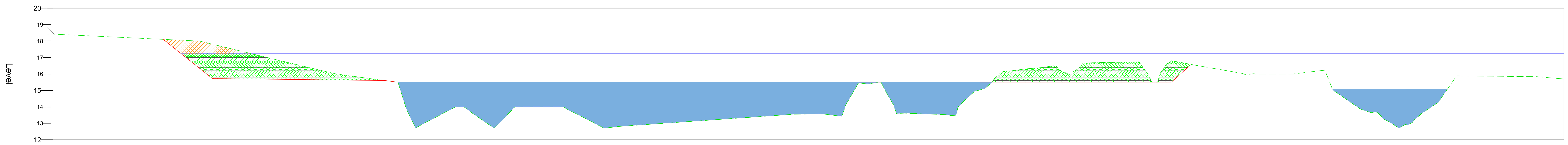

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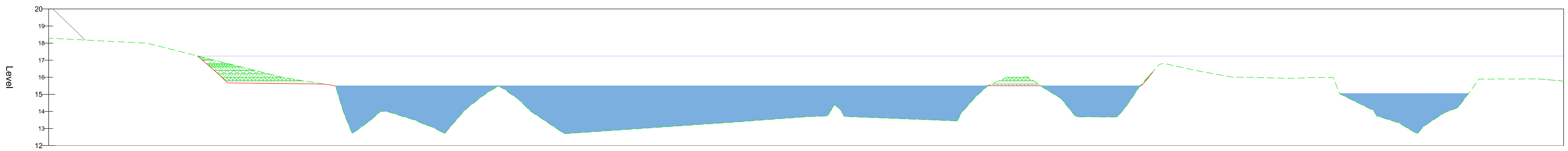

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6. FLOODPLAIN LOSS (FILL) SHOWN IN RED.

KEY

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- PROPOSED GROUND PROFILE
- 100yr + 35% CC FLOOD PLAIN LEVEL
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FLOODPLAIN COMPENSATION / LOSS LEVELS

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- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
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Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P03

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RIVER OUSE FLOOD COMPENSATION SECTIONS SHEET 4 OF 8

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

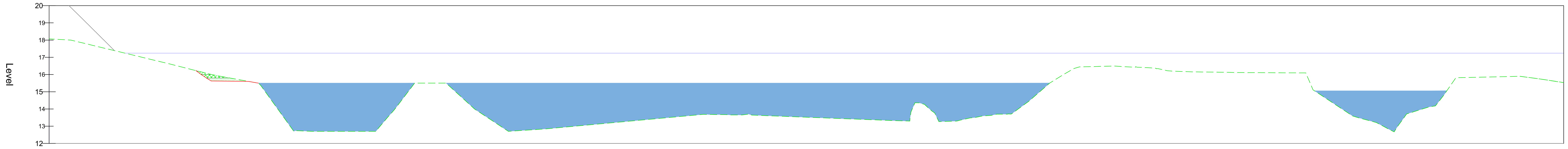
Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number (Highways England PIN | Originator | Volume | Location | Type | Role | Number)

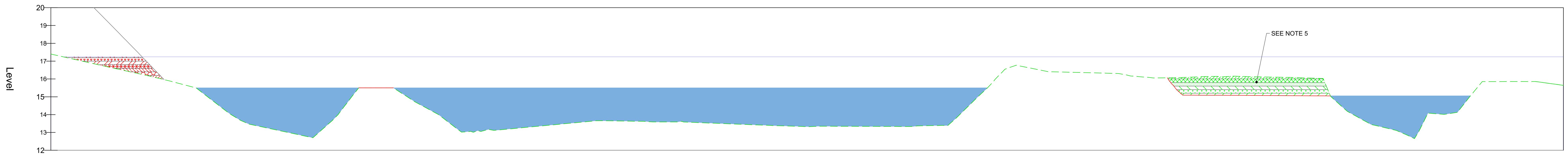
HE551495 -ACM -HDG -ZN1_Z_Z_ZZ -DR -CD -0554

Rev: P03

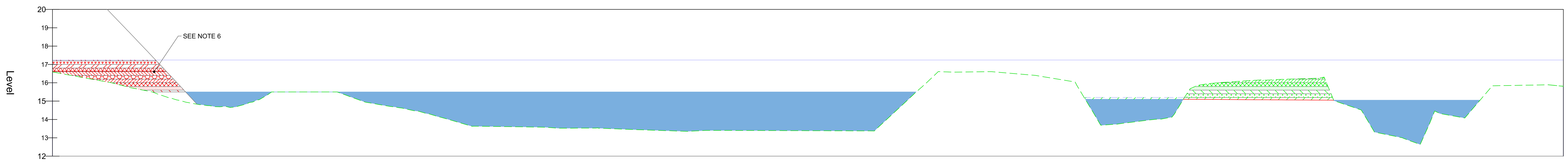
SECTION 17 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



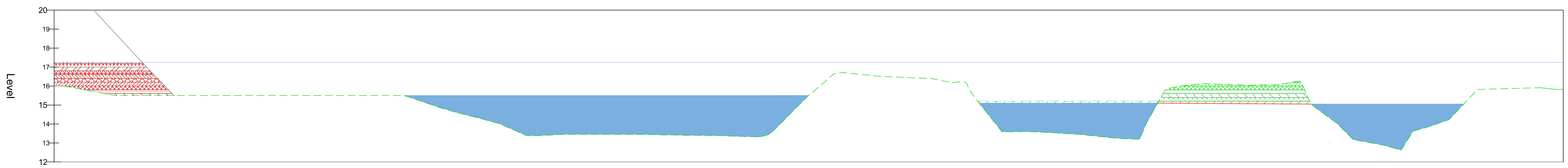
SECTION 18 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SECTION 19 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SECTION 20 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

NOTES

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4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE PROJECT HEALTH & SAFETY FILE FOR ANY IDENTIFIED POTENTIAL RISKS.
5. FLOODPLAIN COMPENSATION (CUT) SHOWN IN GREEN.
6. FLOODPLAIN LOSS (FILL) SHOWN IN RED.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- 100yr + 35% CC FLOOD PLAIN LEVEL
- EXISTING POND WATER LEVEL
- PROPOSED POND WATER FILL / LEVEL
- EXCAVATED MATERIAL
- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

- 14.6m - 14.8m
- 14.8m - 15.0m
- 15.0m - 15.2m
- 15.2m - 15.4m
- 15.4m - 15.6m
- 15.6m - 15.8m
- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue
FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number
TR010044

Project Title
A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title
RIVER OUSE FLOOD COMPENSATION SECTIONS SHEET 5 OF 8

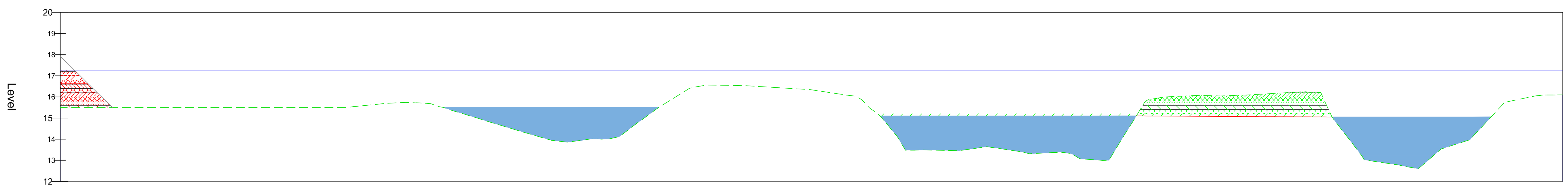
Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

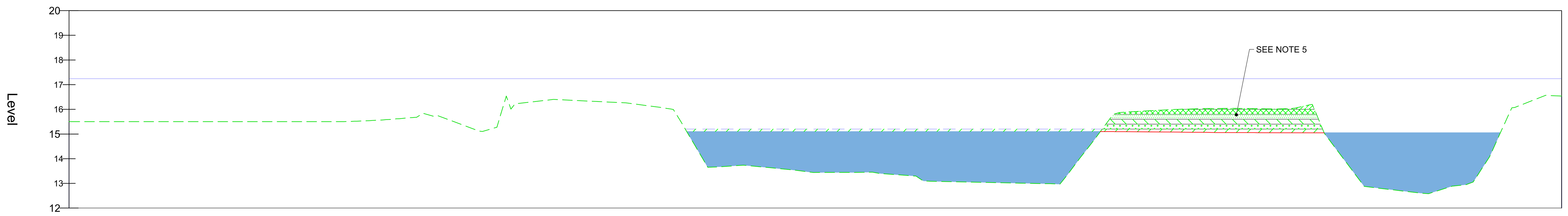
Drawing Number
Highways England PIN | Originator | Volume
HE551495 -ACM -HDG -ZN1_Z_Z_ZZ -DR -CD -0555
Location | Type | Role | Number

Rev
P01

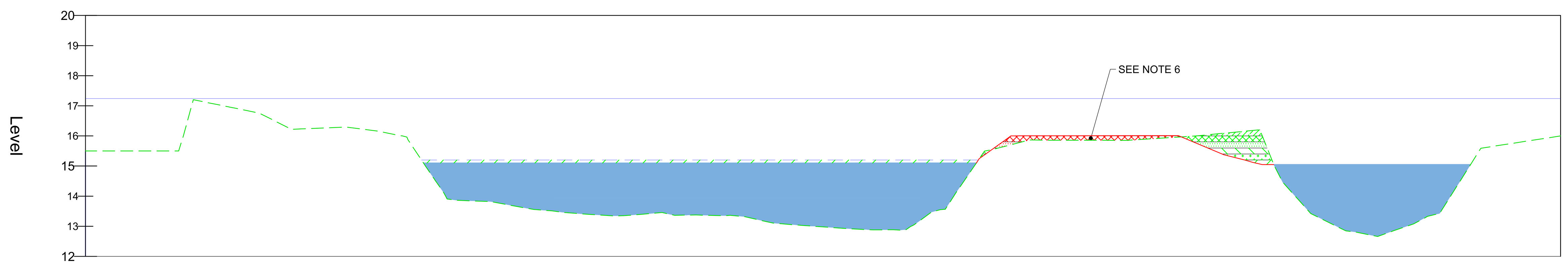
SECTION 21 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



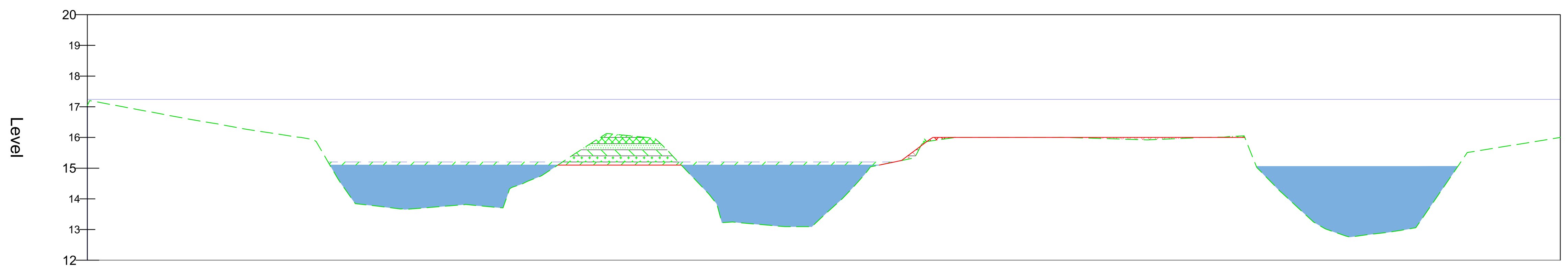
SECTION 22 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SECTION 23 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SECTION 24 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

NOTES

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5. FLOODPLAIN COMPENSATION (CUT) SHOWN IN GREEN.
6. FLOODPLAIN LOSS (FILL) SHOWN IN RED.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- 100yr + 35% CC FLOOD PLAIN LEVEL
- EXISTING POND WATER LEVEL
- PROPOSED POND WATER FILL / LEVEL
- EXCAVATED MATERIAL
- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

- 14.6m - 14.8m
- 14.8m - 15.0m
- 15.0m - 15.2m
- 15.2m - 15.4m
- 15.4m - 15.6m
- 15.6m - 15.8m
- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RIVER OUSE FLOOD COMPENSATION SECTIONS SHEET 6 OF 8

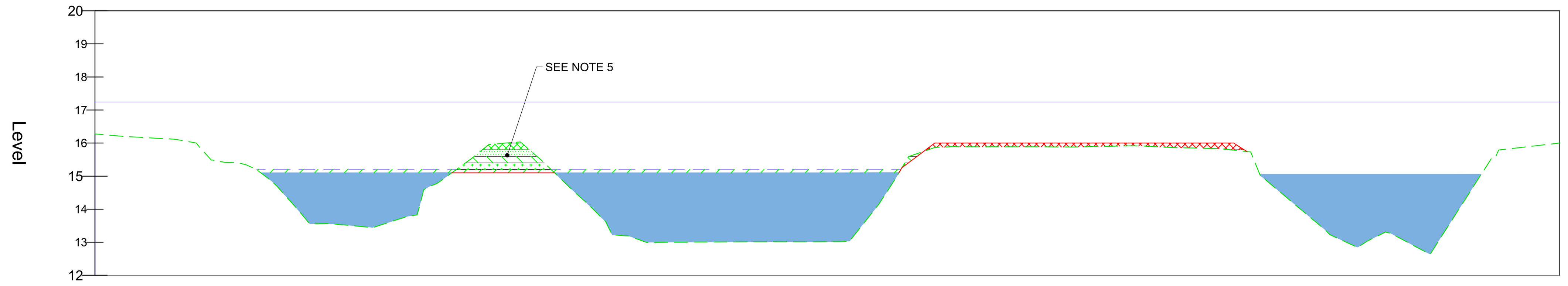
Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

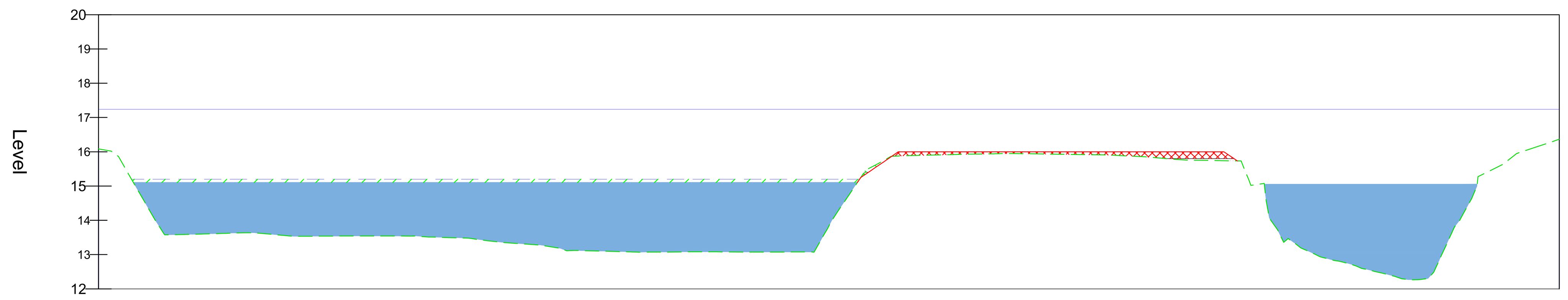
Drawing Number (Highways England PIN | Originator | Volume | Location | Type | Role | Number)
HE551495 -ACM -HDG -ZN1_Z_Z_ZZ -DR -CD -0556

Rev
P01

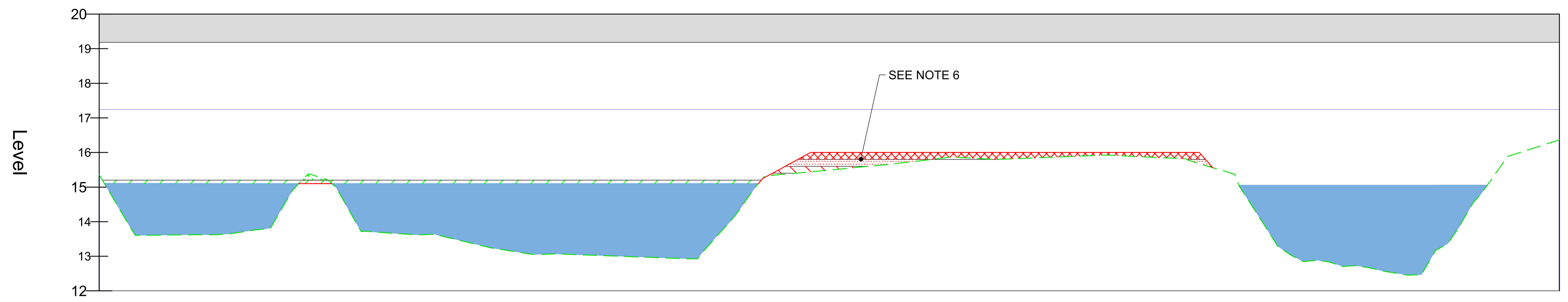
SECTION 25 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



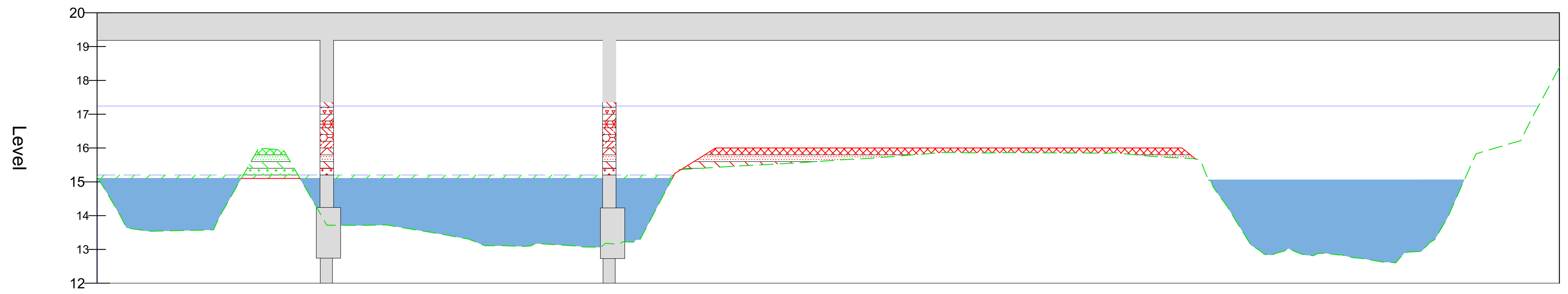
SECTION 26 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SECTION 27 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SECTION 28 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

NOTES

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5. FLOODPLAIN COMPENSATION (CUT) SHOWN IN GREEN.
6. FLOODPLAIN LOSS (FILL) SHOWN IN RED.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- 100yr + 35% CC FLOOD PLAIN LEVEL
- EXISTING POND WATER LEVEL
- PROPOSED POND WATER FILL / LEVEL
- EXCAVATED MATERIAL
- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

- 14.6m - 14.8m
- 14.8m - 15.0m
- 15.0m - 15.2m
- 15.2m - 15.4m
- 15.4m - 15.6m
- 15.6m - 15.8m
- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RIVER OUSE FLOOD COMPENSATION SECTIONS SHEET 7 OF 8

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

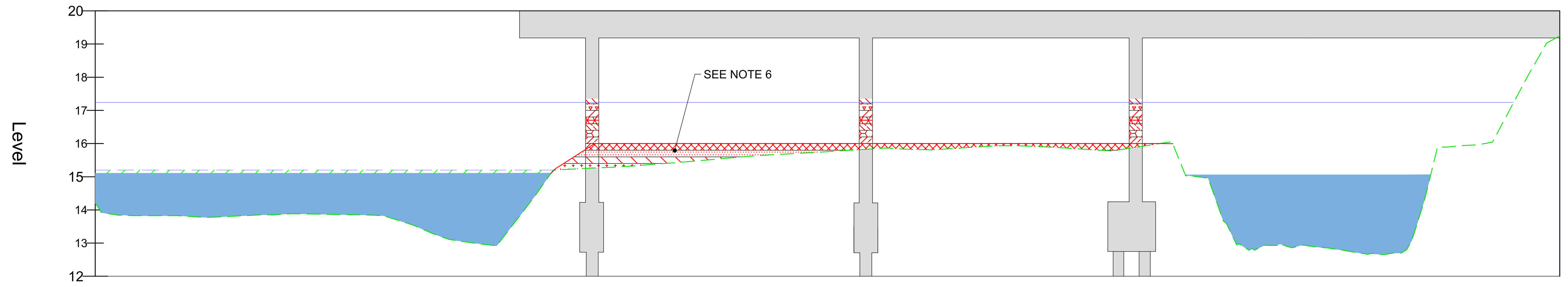
Internal Project No.	Suitability
60541541	S2
Scale @ A1	**Zone**
AS SHOWN	ZN1

Drawing Number (Highways England PIN | Originator | Volume | Location | Type | Role | Number)

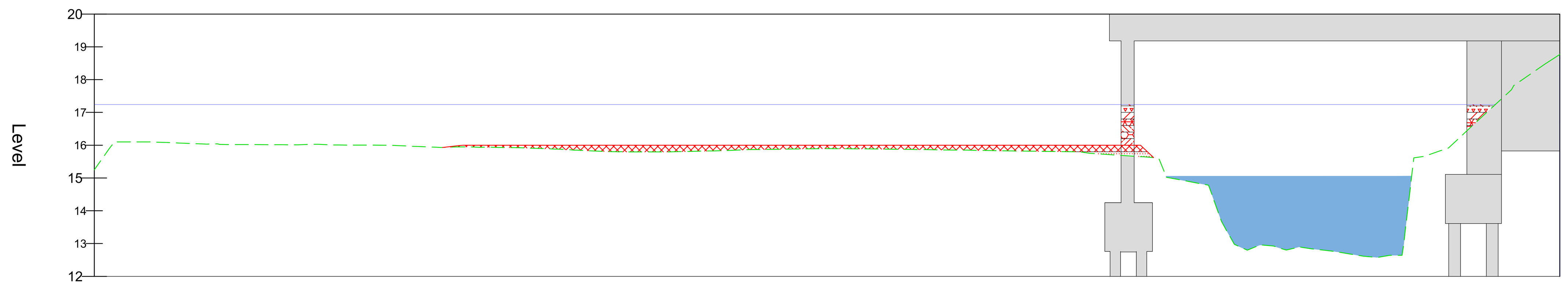
HE551495 -ACM -HDG - ZN1_Z_Z_ZZ -DR -CD-0557

Rev P01

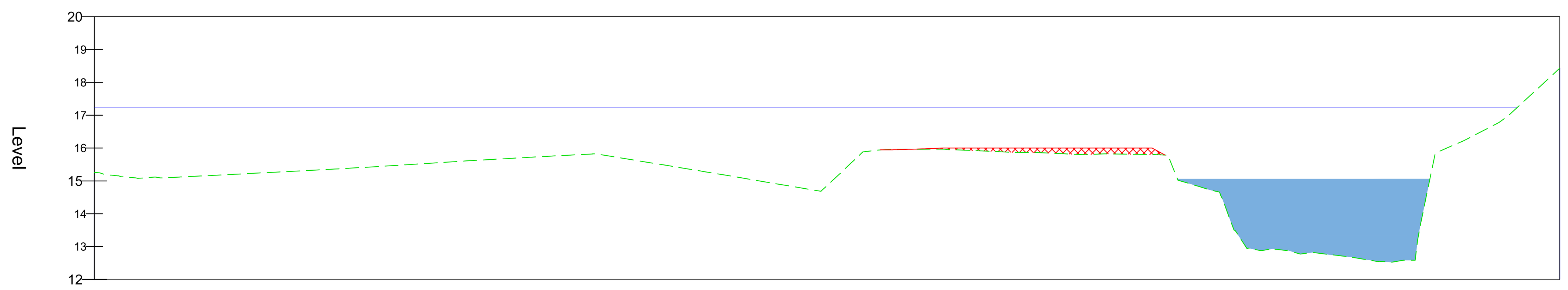
SECTION 29 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000

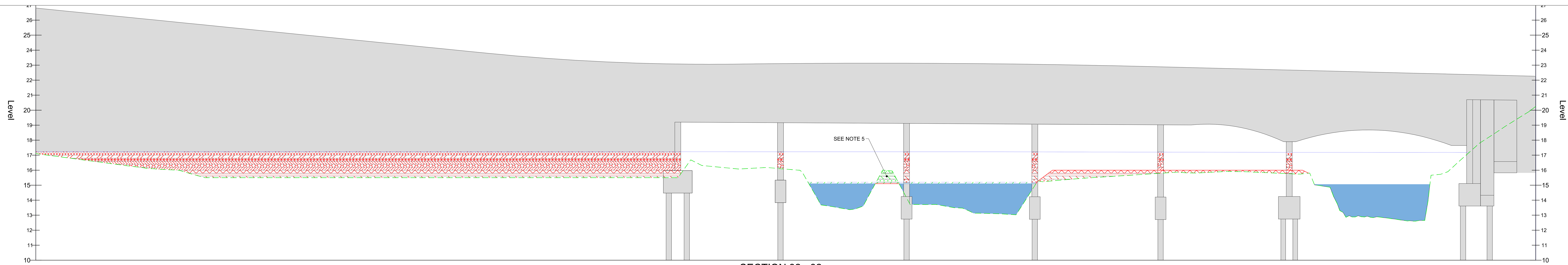


SECTION 30 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000



SECTION 31 - LONGSECTION
SCALE: H 1:500,V 1:100. DATUM: 12.000





SECTION 32 - 32
SCALE: H 1:500,V 1:100. DATUM: 10.000

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

NOTES

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5. FLOODPLAIN COMPENSATION (CUT) SHOWN IN GREEN.
6. FLOODPLAIN LOSS (FILL) SHOWN IN RED.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- 100yr + 35% CC FLOOD PLAIN LEVEL
- EXISTING POND WATER LEVEL
- PROPOSED POND WATER FILL / LEVEL
- EXCAVATED MATERIAL
- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

- 14.6m - 14.8m
- 14.8m - 15.0m
- 15.0m - 15.2m
- 15.2m - 15.4m
- 15.4m - 15.6m
- 15.6m - 15.8m
- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RIVER OUSE FLOOD COMPENSATION SECTIONS SHEET 8 OF 8

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

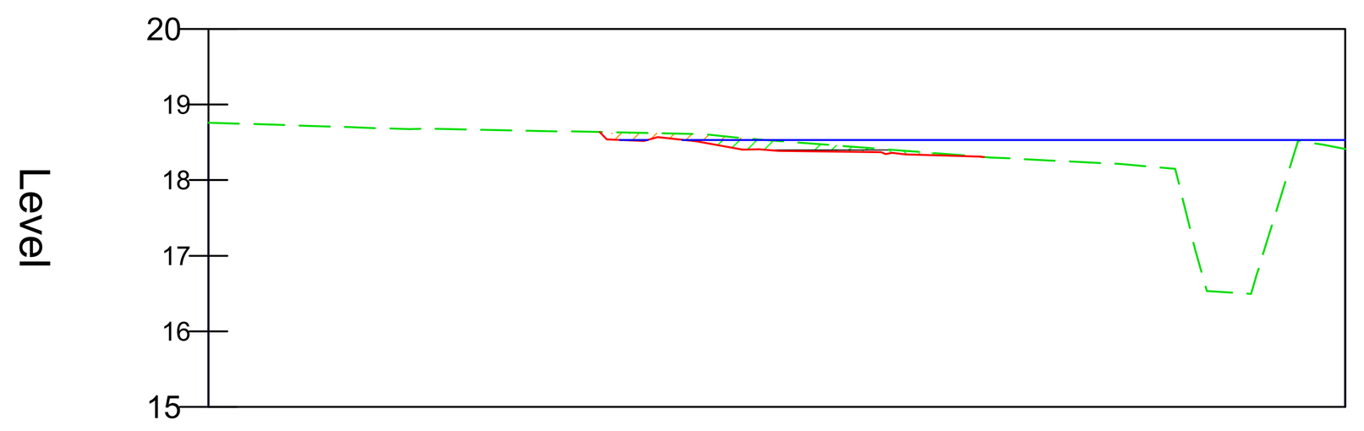
Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number (Highways England PIN | Originator | Volume | Location | Type | Role | Number)

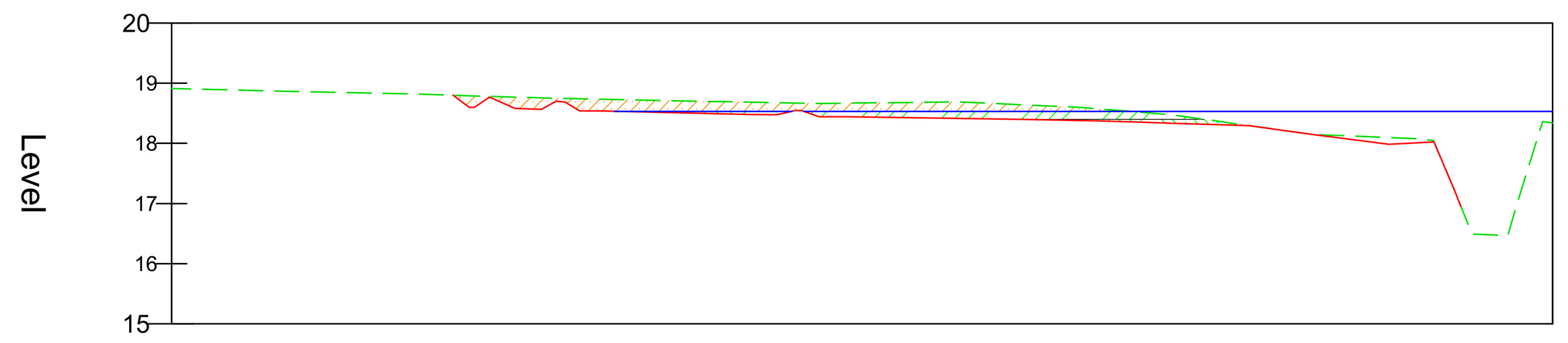
HE551495 -ACM -HDG-ZN1_Z_Z_ZZ -DR-CD-0558

Rev P01

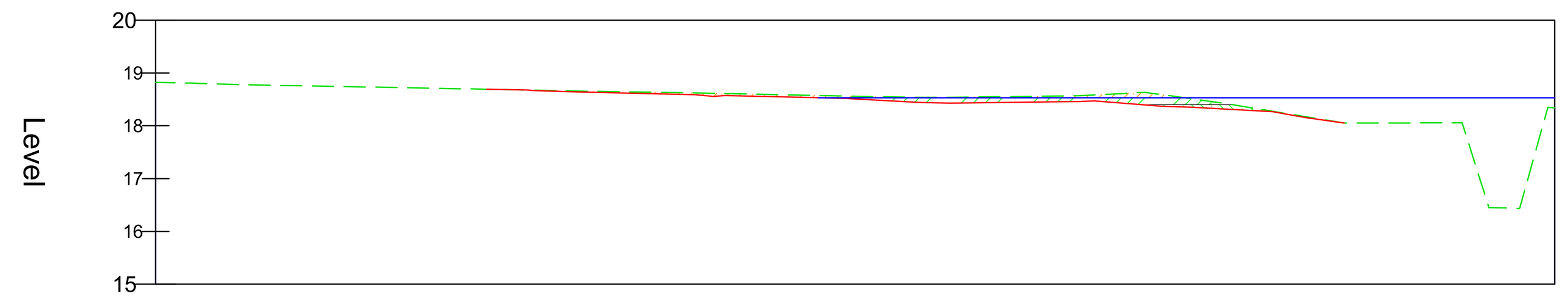
SOUTH BROOK SECTION 1
SCALE: H 1:500,V 1:100. DATUM: 15.000



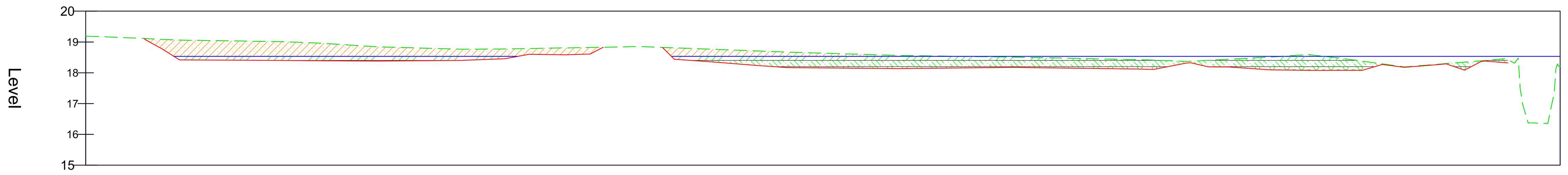
SOUTH BROOK SECTION 2
SCALE: H 1:500,V 1:100. DATUM: 15.000



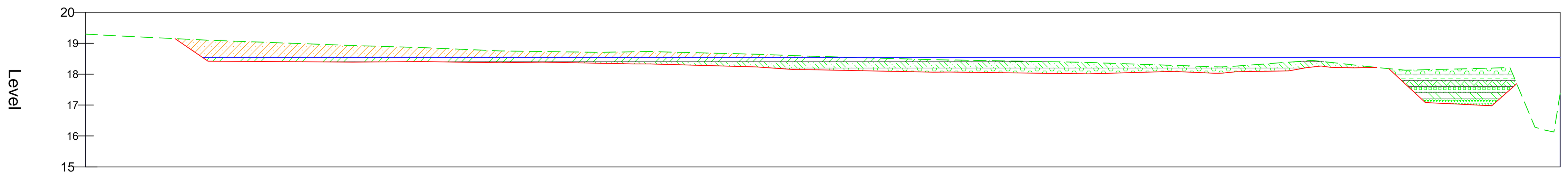
SOUTH BROOK SECTION 3
SCALE: H 1:500,V 1:100. DATUM: 15.000



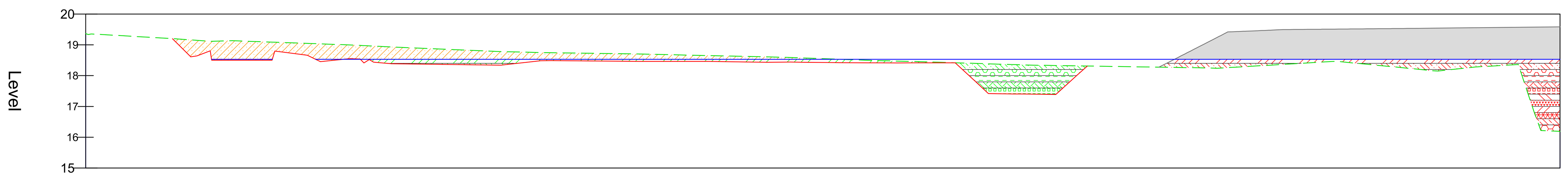
SOUTH BROOK SECTION 4
SCALE: H 1:500,V 1:100. DATUM: 15.000



SOUTH BROOK SECTION 5
SCALE: H 1:500,V 1:100. DATUM: 15.000



SOUTH BROOK SECTION 6
SCALE: H 1:500,V 1:100. DATUM: 15.000



SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION BOX

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

NOTES

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5. FLOODPLAIN COMPENSATION (CUT) SHOWN IN GREEN.
6. FLOODPLAIN LOSS (FILL) SHOWN IN RED.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- 100yr + 35% CC FLOOD PLAIN LEVEL
- EXISTING POND WATER LEVEL
- PROPOSED POND WATER FILL / LEVEL
- EXCAVATED MATERIAL
- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

- 14.6m - 14.8m
- 14.8m - 15.0m
- 15.0m - 15.2m
- 15.2m - 15.4m
- 15.4m - 15.6m
- 15.6m - 15.8m
- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOUTH BROOK FLOOD COMPENSATION SECTIONS SHEET 1 OF 1

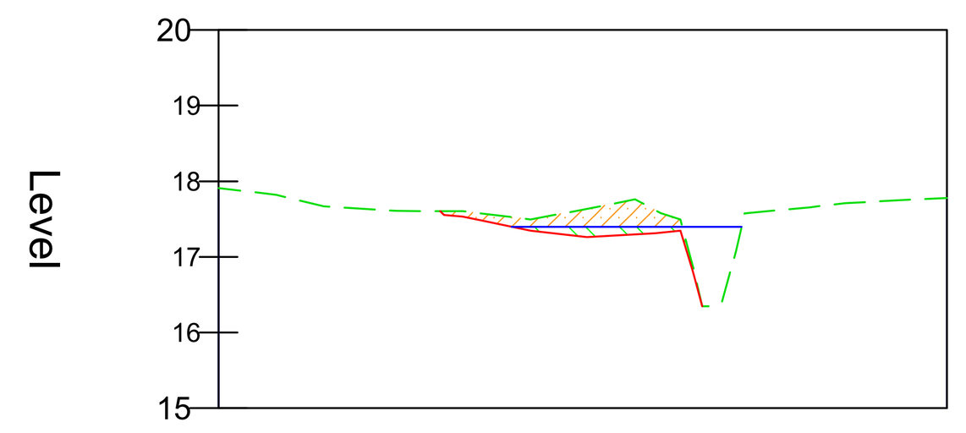
Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No. 60541541	Suitability S2
Scale @ A1 AS SHOWN	Zone ZN1

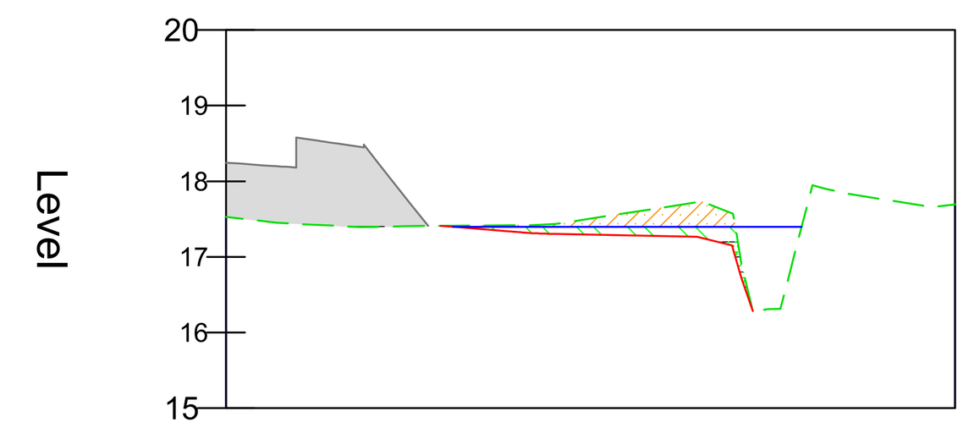
Drawing Number
Highways England PIN | Originator | Volume
HE551495 -ACM -HDG -ZN1_Z_Z_ZZ -DR -CD-0559
Location | Type | Role | Number

Rev
P01

BEGWARY BROOK SECTION 1
SCALE: H 1:500,V 1:100. DATUM: 15.000



BEGWARY BROOK SECTION 2
SCALE: H 1:500,V 1:100. DATUM: 15.000



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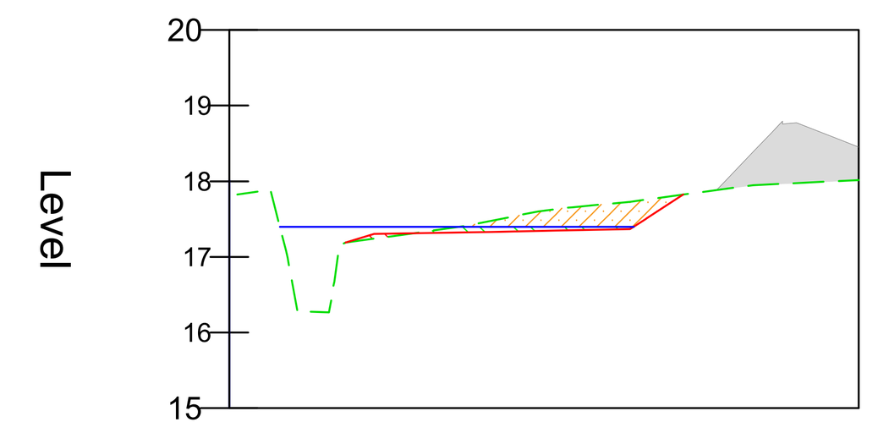

ROCKHAM DITCH SECTION 1
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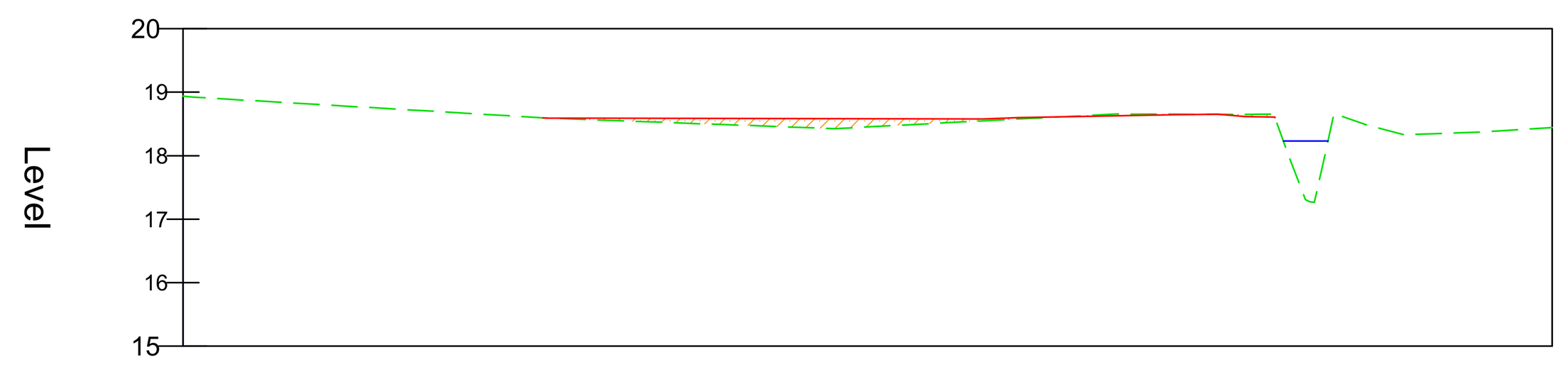

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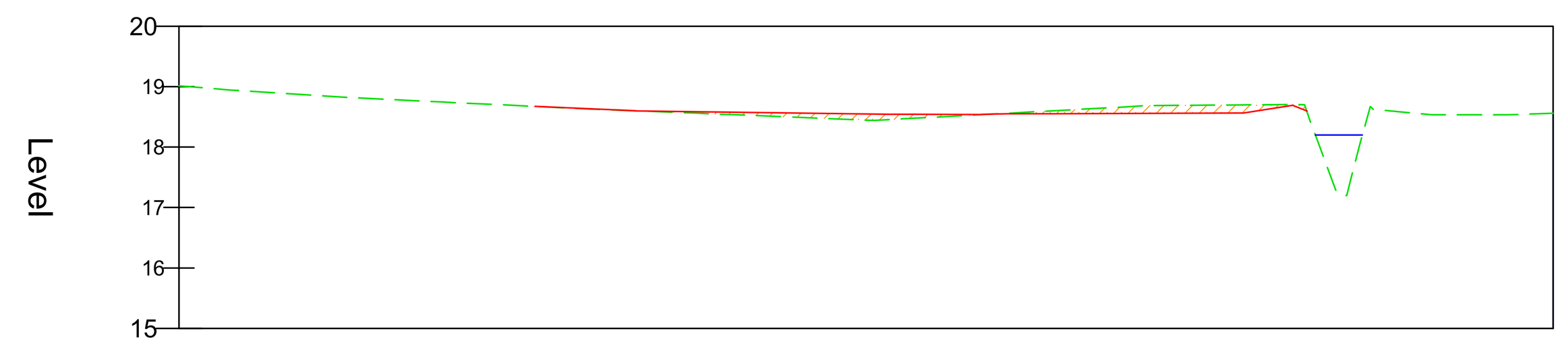

ROCKHAM DITCH SECTION 3
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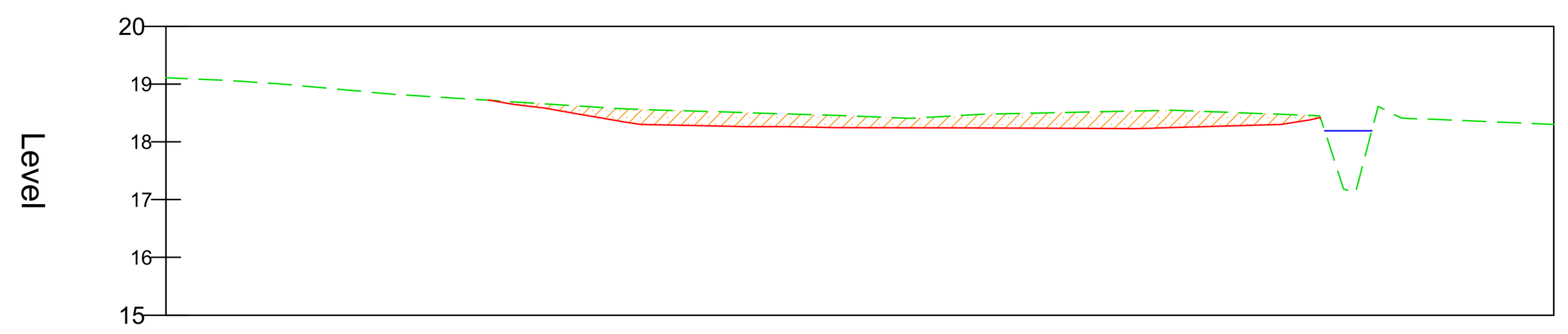

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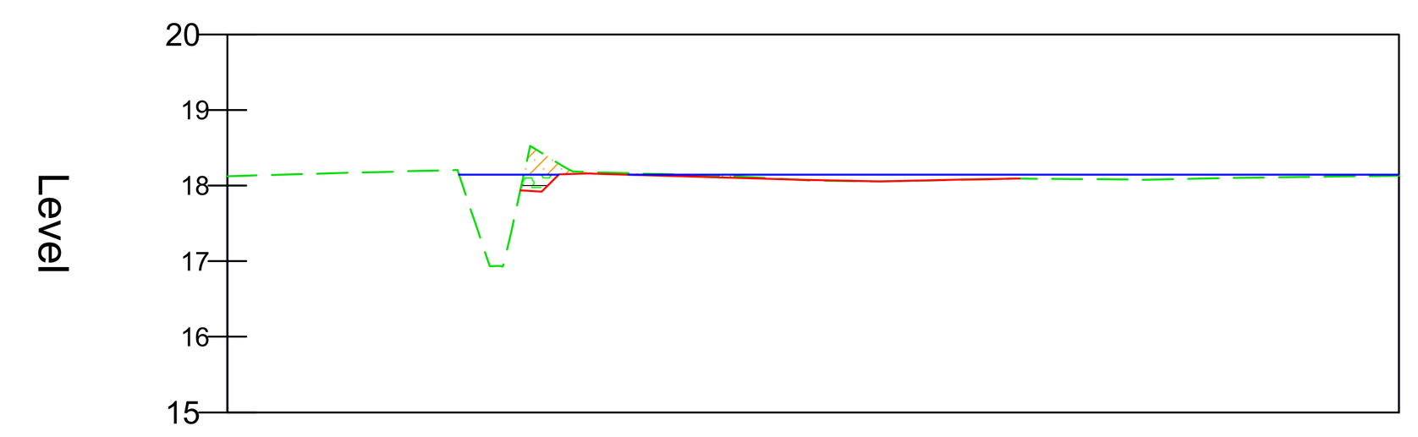

ROCKHAM DITCH SECTION 5
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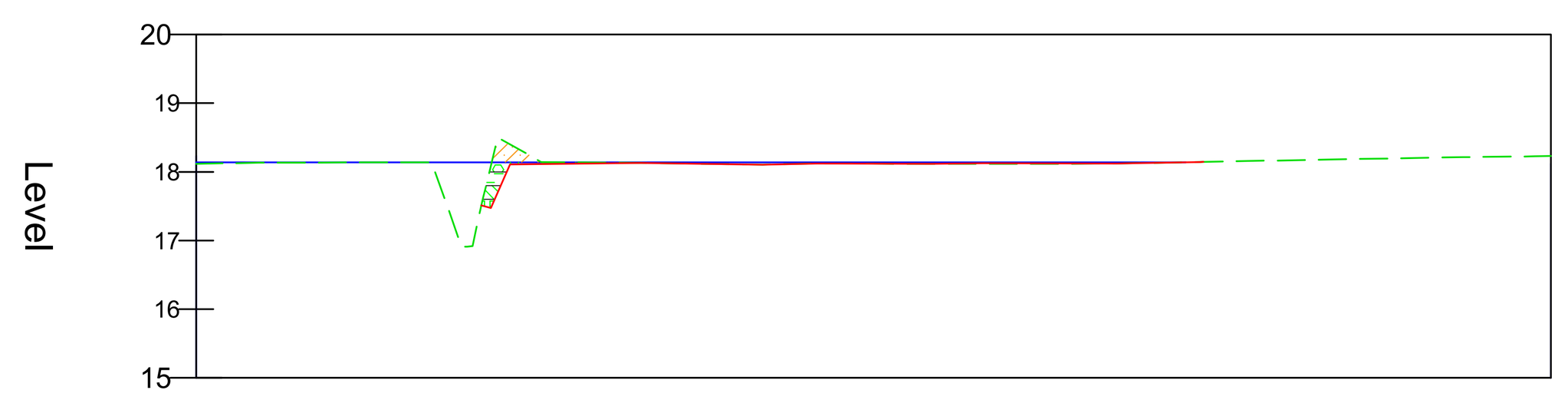

ROCKHAM DITCH SECTION 6
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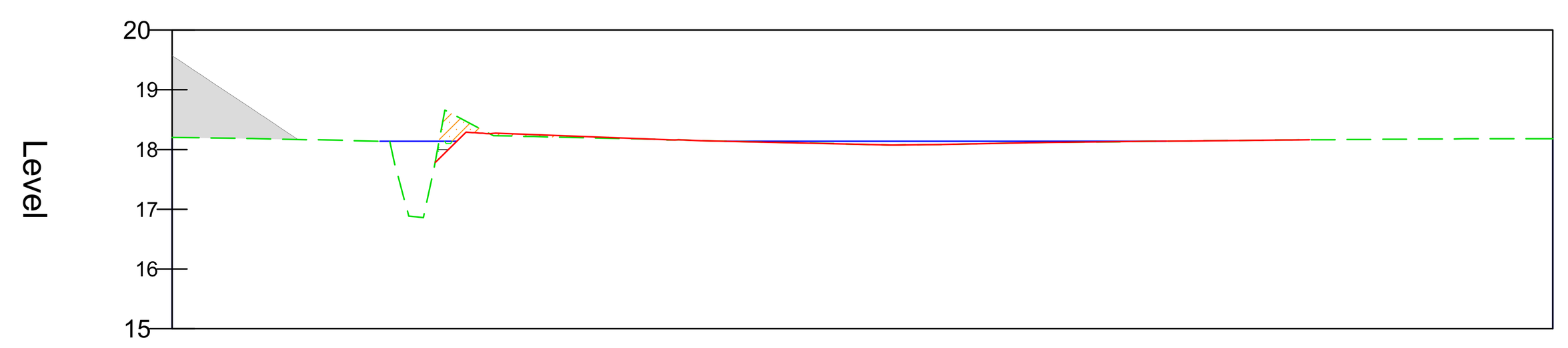

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CONSTRUCTION

MAINTENANCE / OPERATION / DECOMMISSIONING / DEMOLITION

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6. FLOODPLAIN LOSS (FILL) SHOWN IN RED.

KEY

- EXISTING GROUND PROFILE
- PROPOSED GROUND PROFILE
- 100yr + 35% CC FLOOD PLAIN LEVEL
- EXISTING POND WATER LEVEL
- PROPOSED POND WATER FILL / LEVEL
- EXCAVATED MATERIAL
- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

- 14.6m - 14.8m
- 14.8m - 15.0m
- 15.0m - 15.2m
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- 15.4m - 15.6m
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- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
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- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
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- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

BEGWARY BROOK AND ROCKHAM DITCH FLOOD COMPENSATION SECTIONS SHEET 1 OF 1

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number (Highways England PIN | Originator | Volume | Location | Type | Role | Number)
HE551495 -ACM -HDG -ZN1_Z_Z_ZZ -DR -CD -0560

Rev
P01

RECTORY FARM SECTION 1
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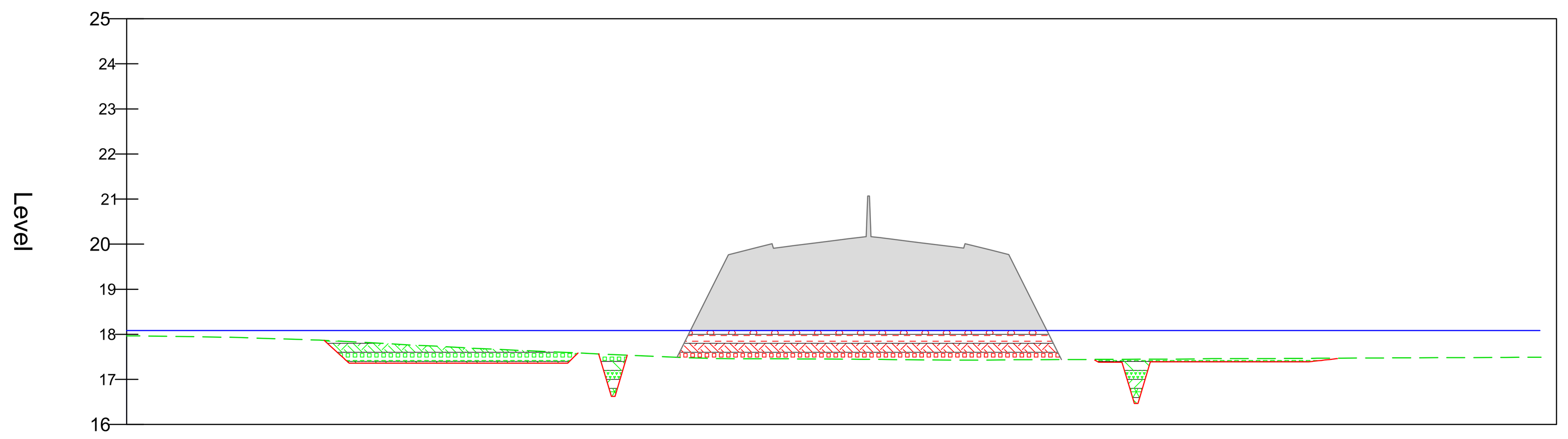

RECTORY FARM SECTION 2
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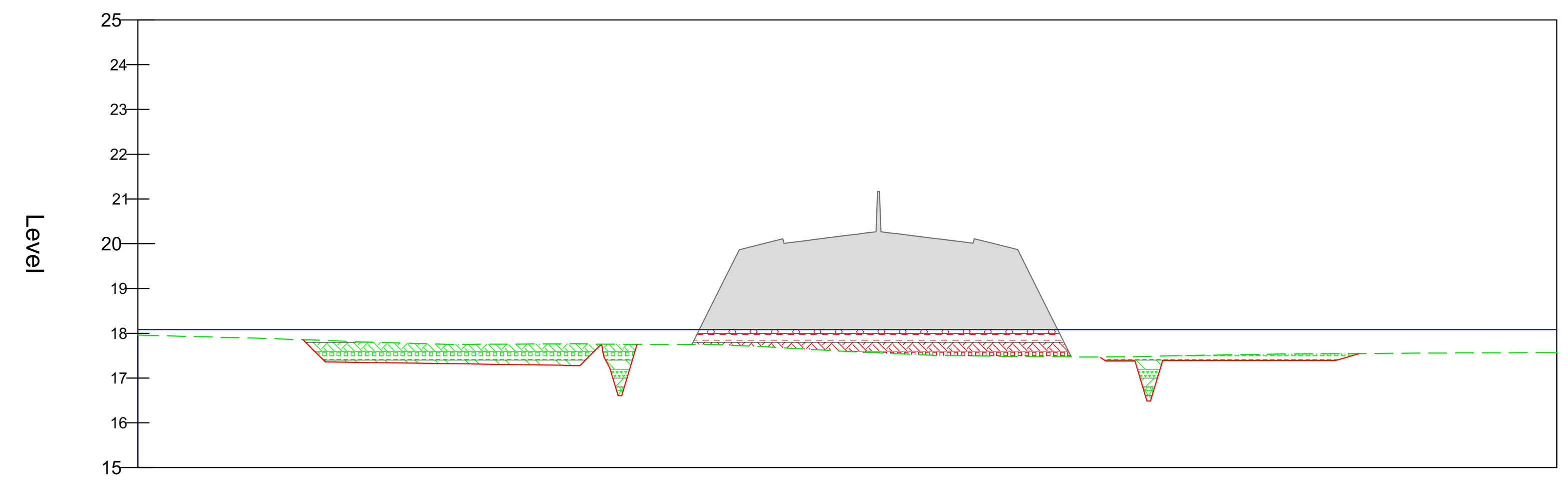

RECTORY FARM SECTION 3
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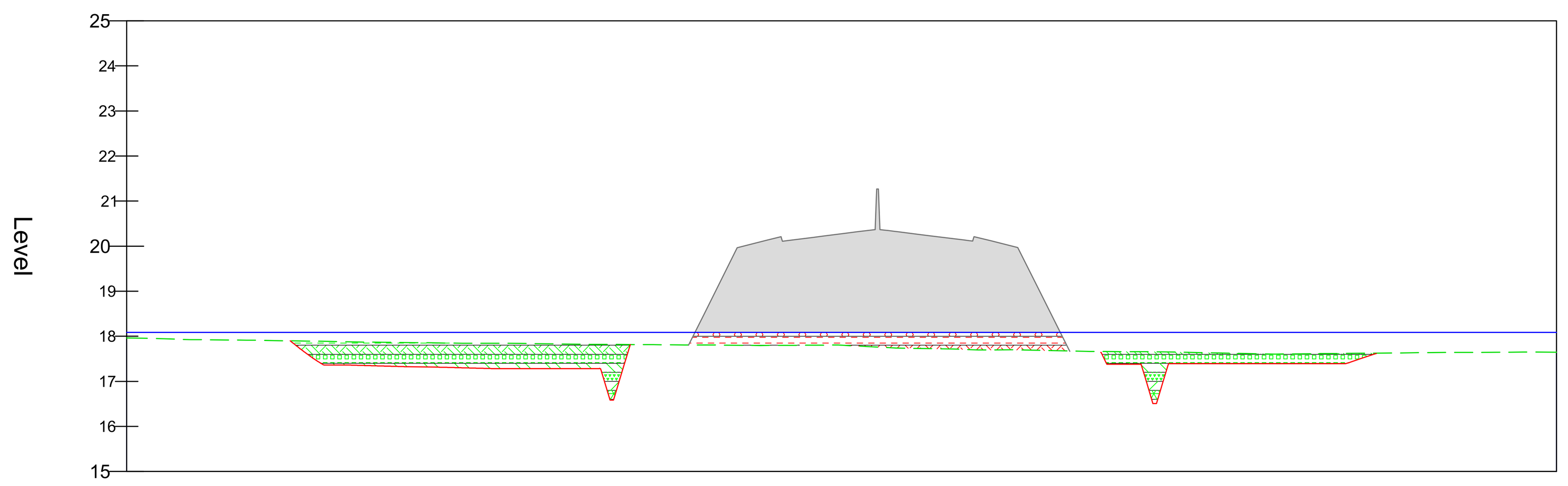

RECTORY FARM SECTION 4
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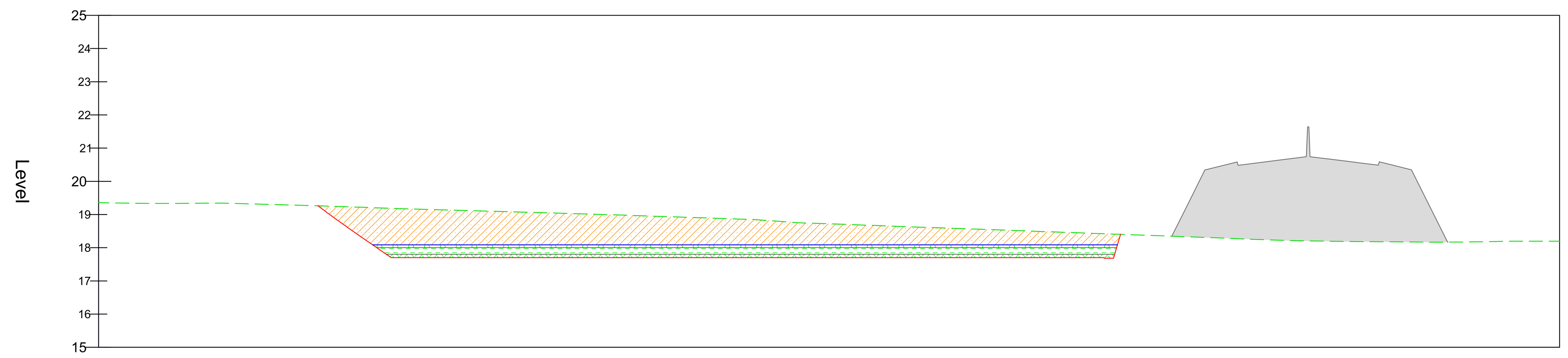

RECTORY FARM SECTION 5
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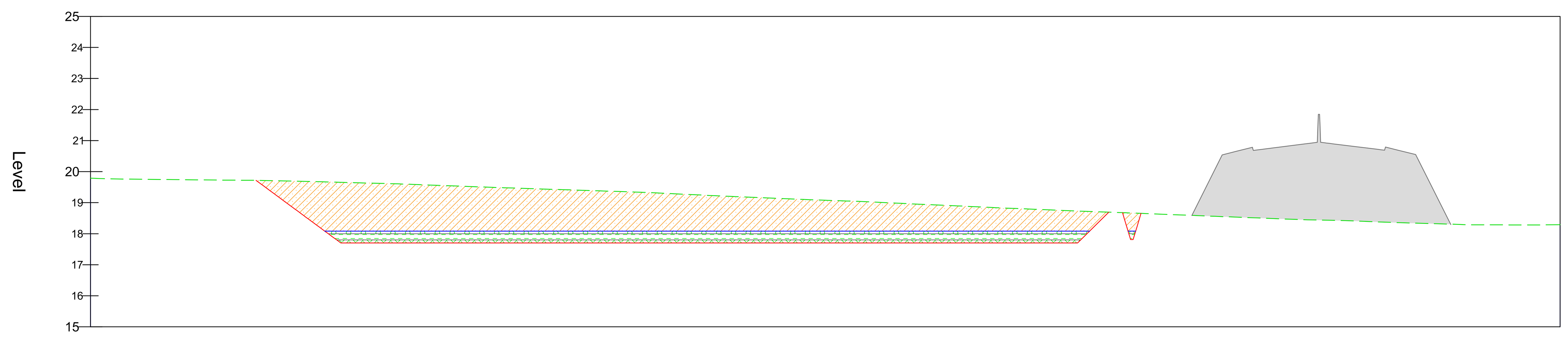

RECTORY FARM SECTION 6
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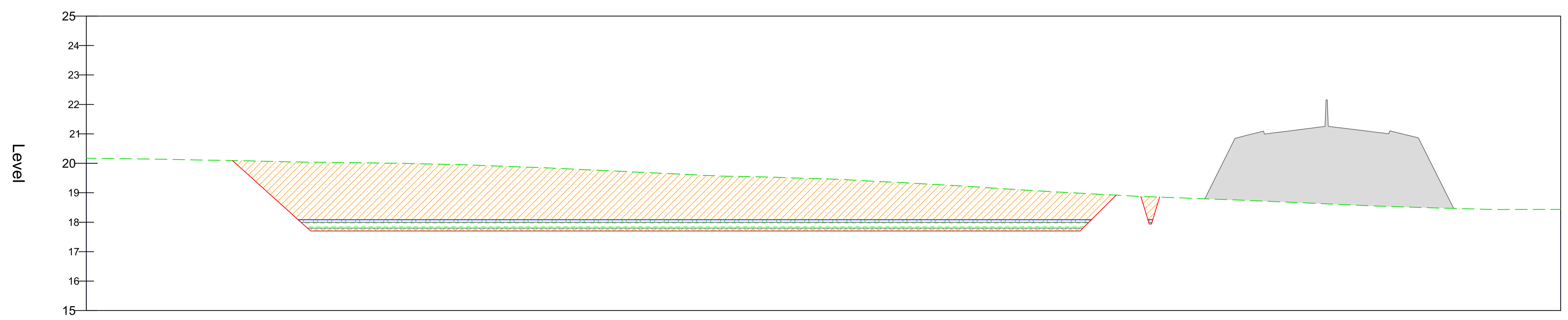

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KEY

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- PROPOSED GROUND PROFILE
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- PROPOSED POND WATER FILL / LEVEL
- EXCAVATED MATERIAL
- PROPOSED STRUCTURE

FLOODPLAIN COMPENSATION / LOSS LEVELS

- 14.6m - 14.8m
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- 18.6m - 18.8m
- 18.8m - 19.0m

Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RECTORY FARM FLOOD COMPENSATION SECTIONS SHEET 1 OF 2

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number
Highways England PIN | Originator | Volume
HE551495 -ACM -HDG - ZN1_Z_Z_ZZ -DR -CD -0561
Location | Type | Role | Number

Rev
P01

RECTORY FARM SECTION 7
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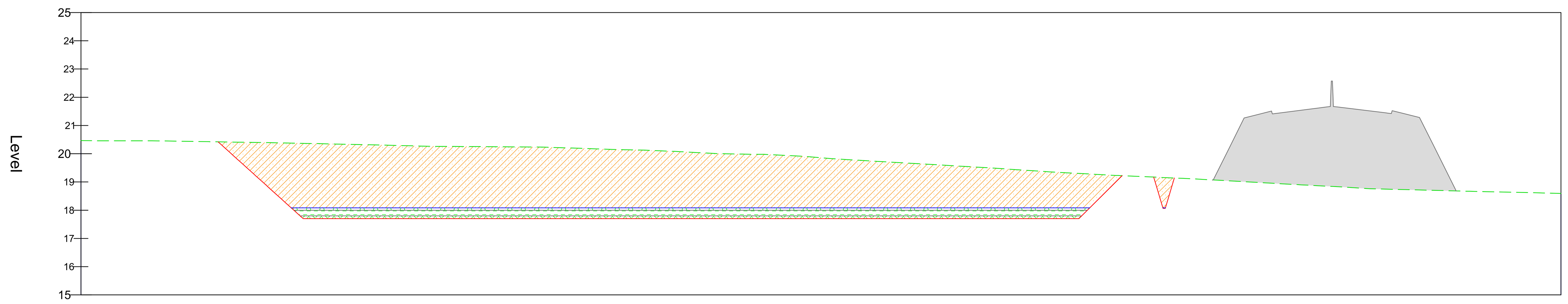
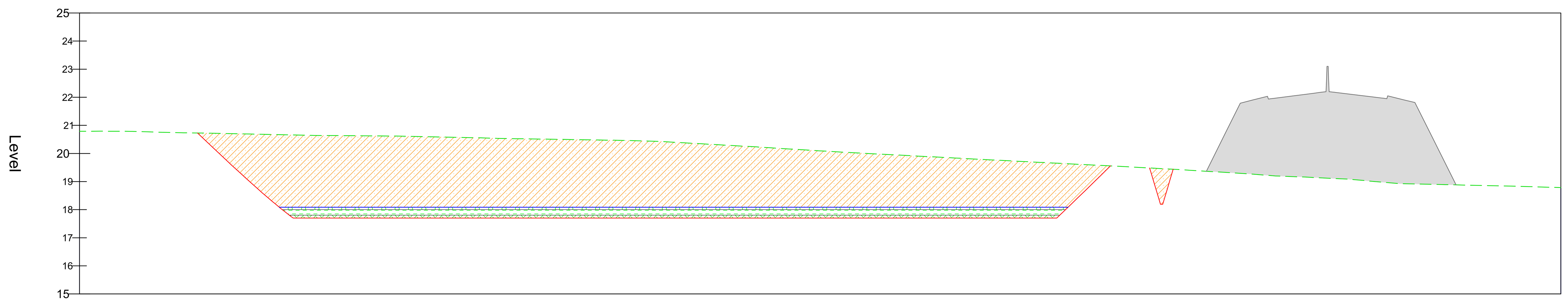


RECTORY FARM SECTION 8
SCALE: H 1:500,V 1:100. DATUM: 15.000



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- 15.8m - 16.0m
- 16.0m - 16.2m
- 16.2m - 16.4m
- 16.4m - 16.6m
- 16.6m - 16.8m
- 16.8m - 17.0m
- 17.0m - 17.2m
- 17.2m - 17.4m
- 17.4m - 17.6m
- 17.6m - 17.8m
- 17.8m - 18.0m
- 18.0m - 18.2m
- 18.2m - 18.4m
- 18.4m - 18.6m
- 18.6m - 18.8m
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Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

RECTORY FARM FLOOD COMPENSATION SECTIONS SHEET 2 OF 2

Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	Zone
AS SHOWN	ZN1

Drawing Number (Highways England PIN | Originator | Volume | Location | Type | Role | Number)

HE551495 -ACM -HDG - ZN1_Z_Z_ZZ -DR -CD -0562

Rev: P01

HEN BROOK SECTION 1
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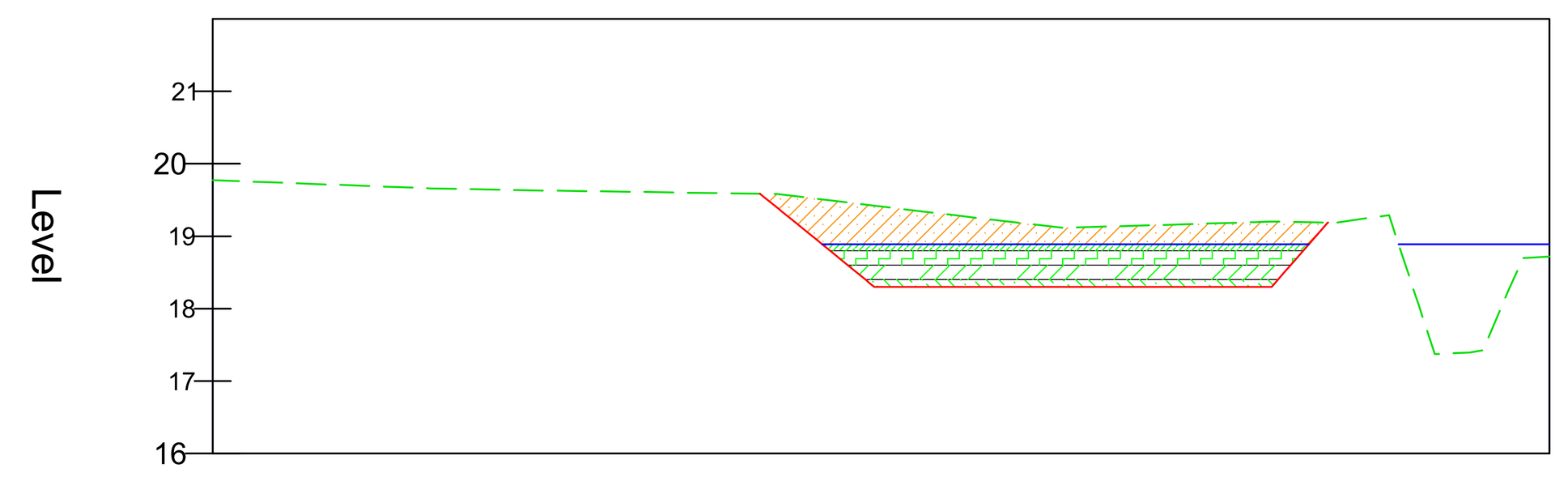

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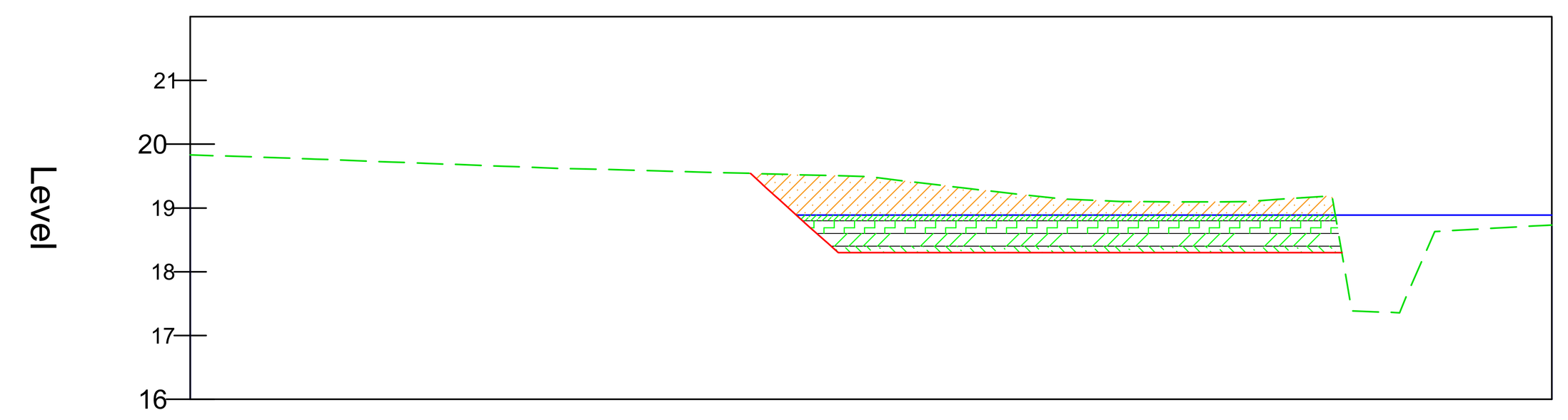

HEN BROOK SECTION 3
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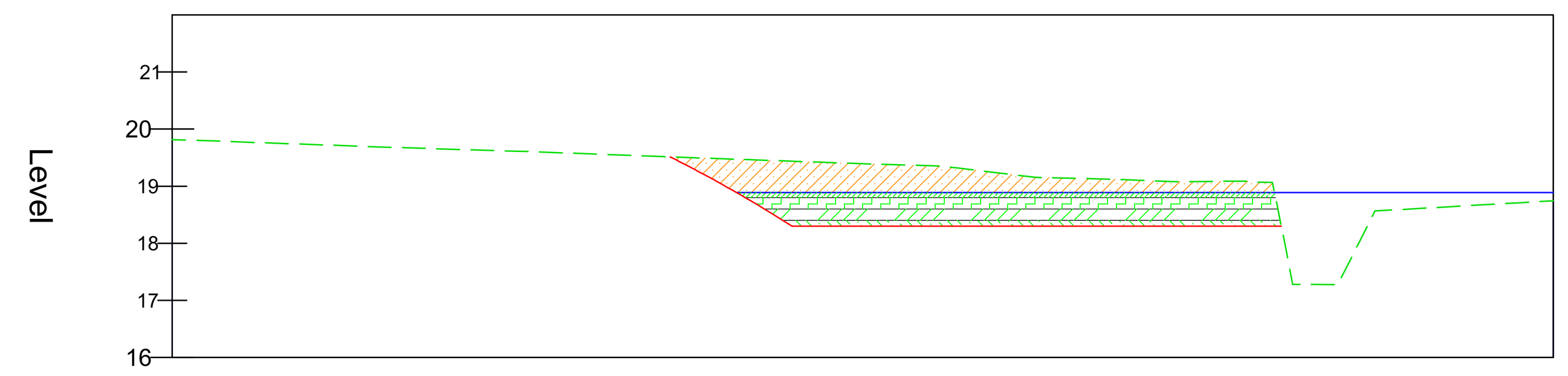

HEN BROOK SECTION 4
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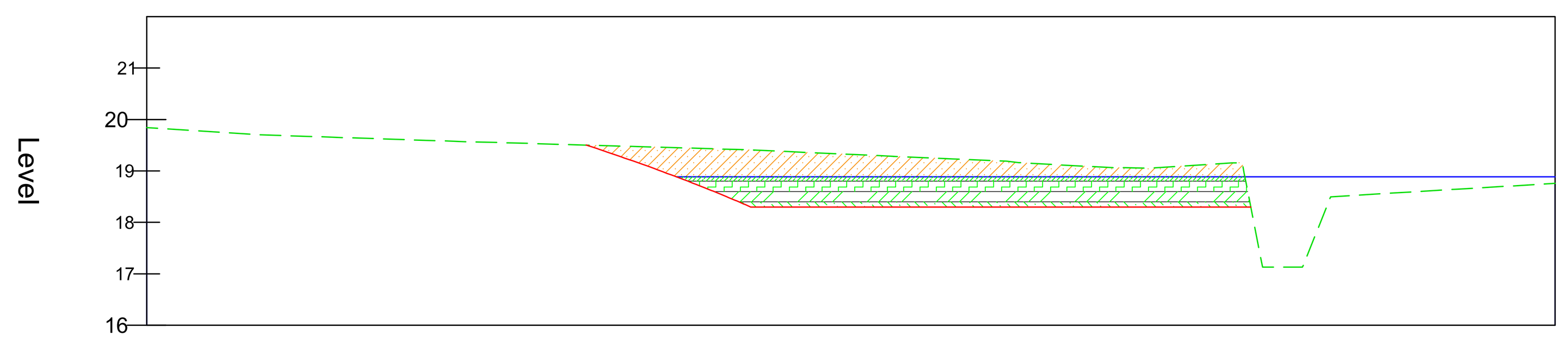

HEN BROOK SECTION 5
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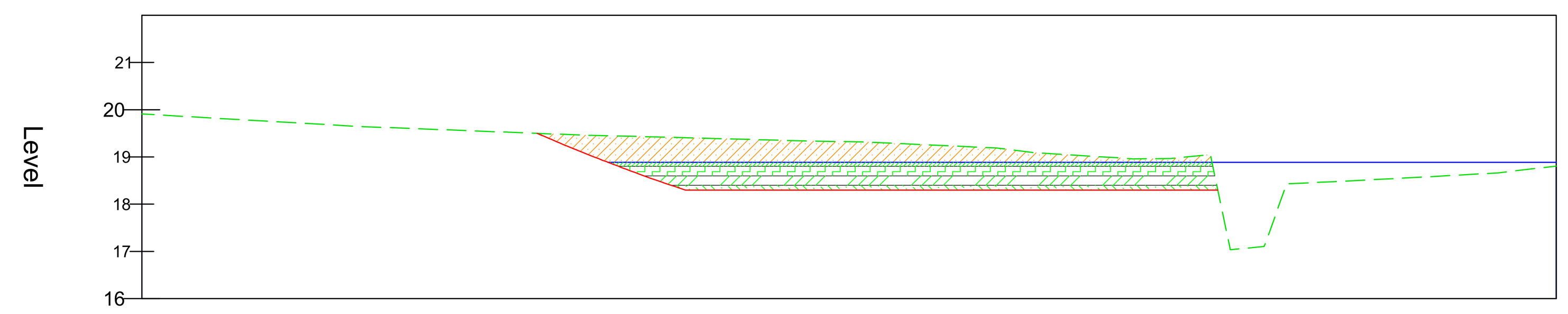

HEN BROOK SECTION 6
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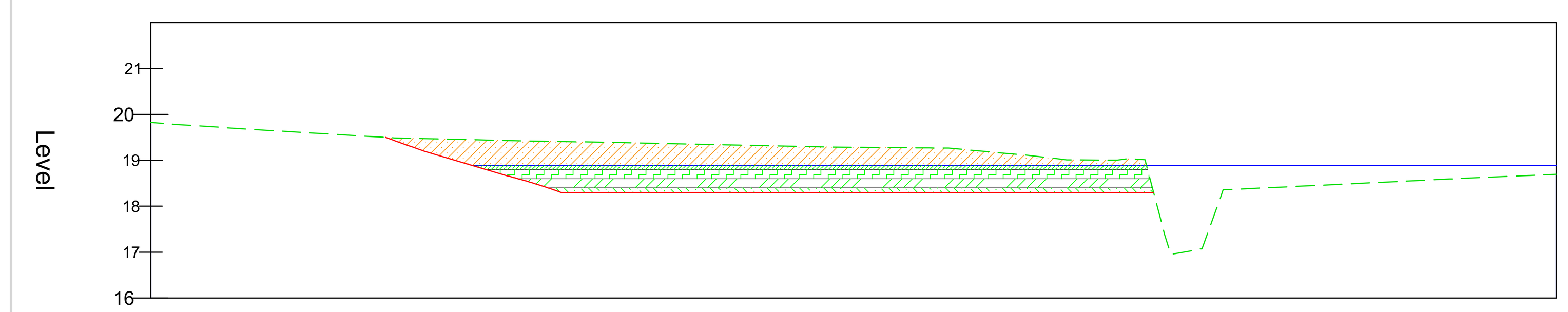

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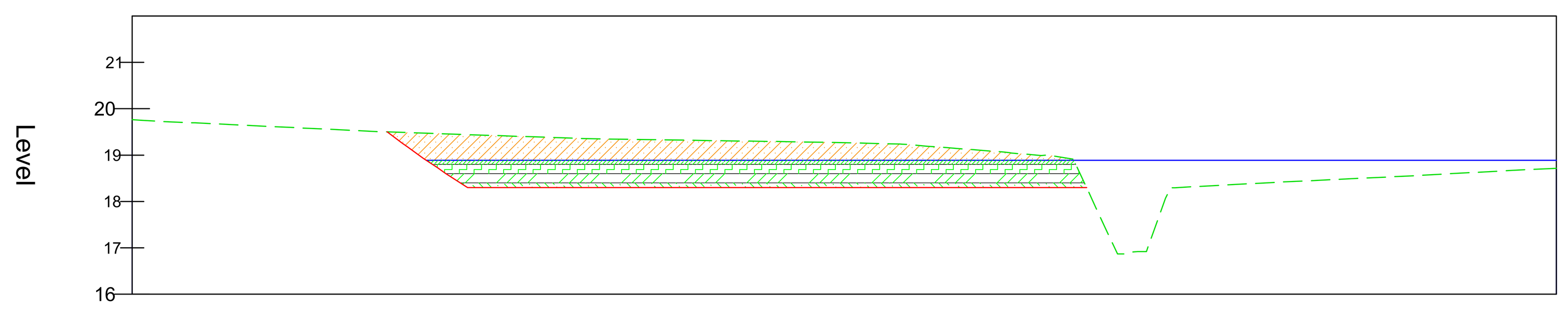
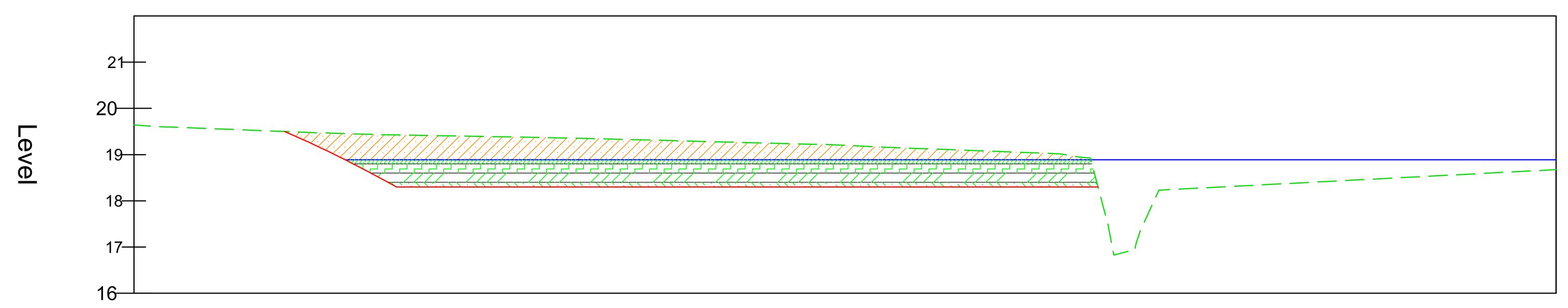


HEN BROOK SECTION 8
SCALE: H 1:500,V 1:100. DATUM: 16.000



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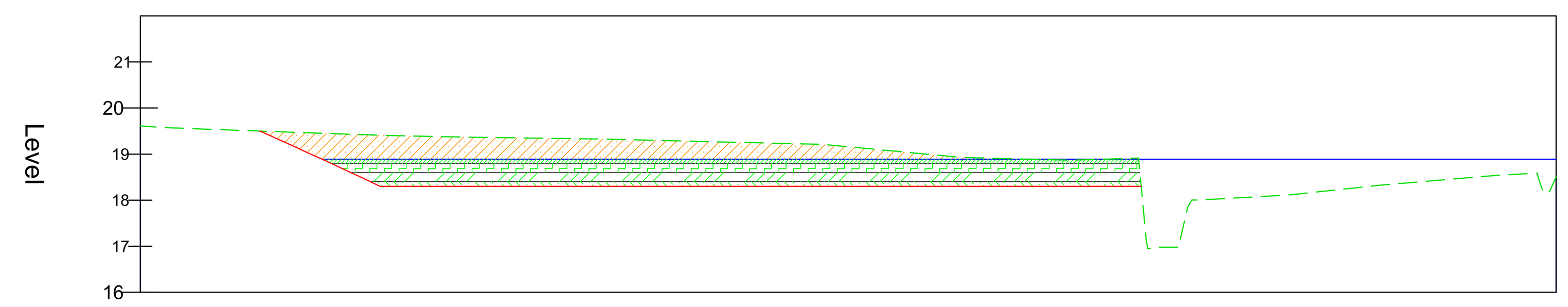
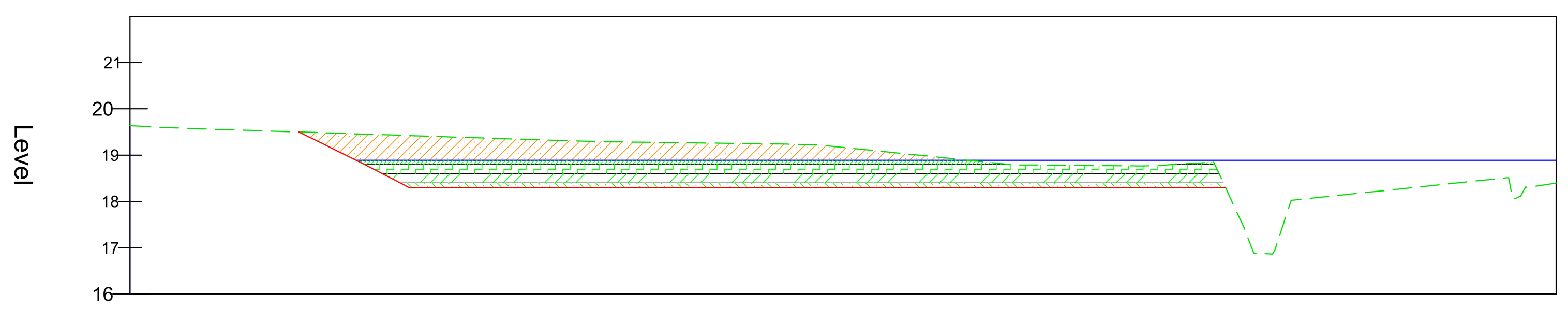


HEN BROOK SECTION 10
SCALE: H 1:500,V 1:100. DATUM: 16.000



HEN BROOK SECTION 11
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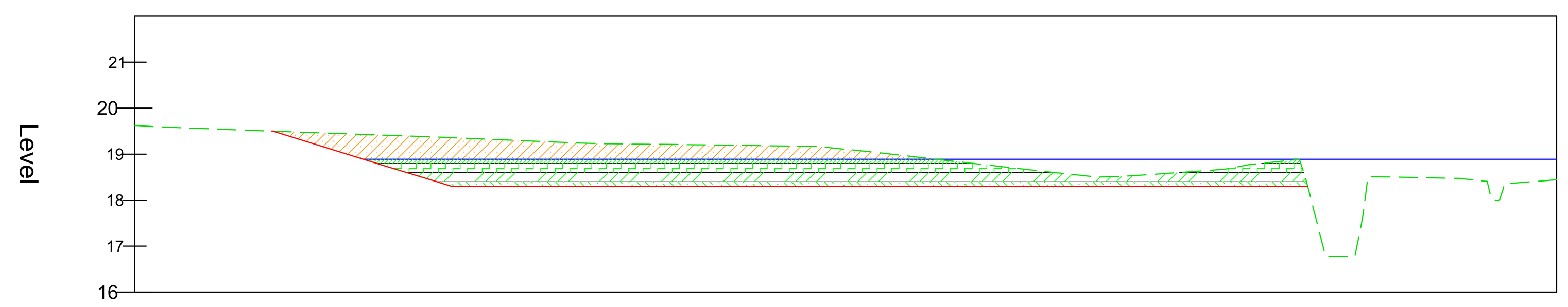

HEN BROOK SECTION 12
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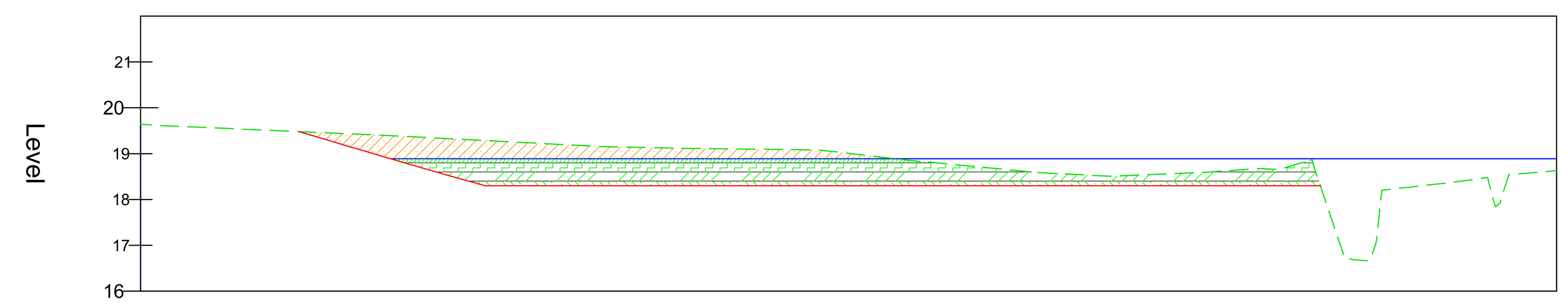

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- PROPOSED GROUND PROFILE
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- EXISTING POND WATER LEVEL
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- EXCAVATED MATERIAL
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FLOODPLAIN COMPENSATION / LOSS LEVELS

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- 15.8m - 16.0m
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- 16.2m - 16.4m
- 16.4m - 16.6m
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- 17.8m - 18.0m
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- 18.2m - 18.4m
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Revision Details	By / Check	Date	Suffix
First Issue	JB / TD	07/12/20	P01

Purpose of issue

FOR INFORMATION

Client
Highways England
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of highways england

Development Consent Order Number
TR010044

Project Title
A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title
HEN BROOK
FLOOD COMPENSATION
SECTIONS
SHEET 1 OF 1

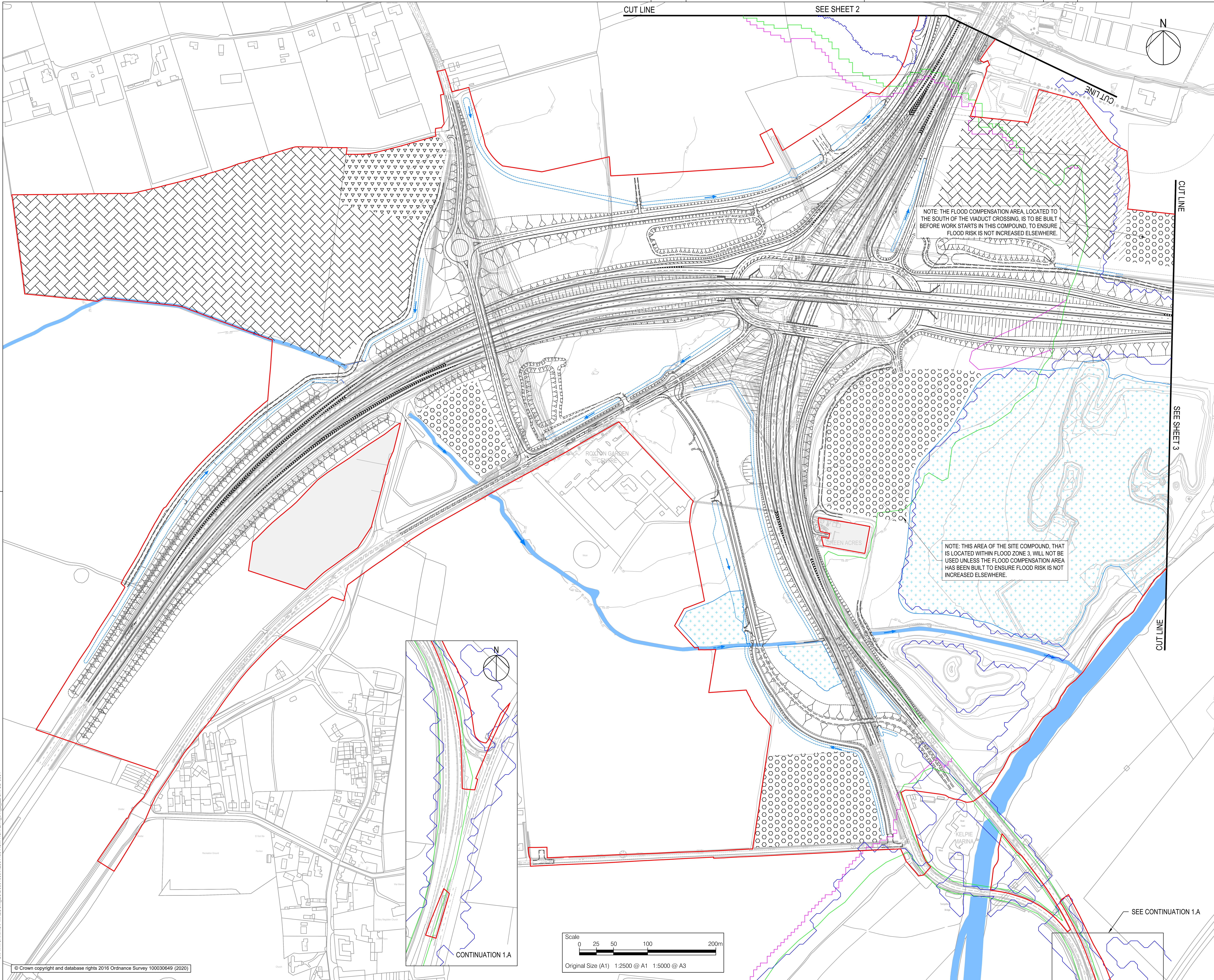
Designed	Drawn	Checked	Approved	Date
RB	JB	GP	TD	07/12/20

Internal Project No.	Suitability
60541541	S2
Scale @ A1	**Zone**
AS SHOWN	ZN1

Drawing Number
Highways England PIN | Originator | Volume
HE551495 -ACM -HDG -
ZN1_Z_Z_ZZ -DR -CD-0564
Location | Type | Role | Number

Rev
P01

Appendix B – Soil Storage & Compound Flood Zone drawings



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH:
   - THE GENERAL ARRANGEMENT LEGEND; AND
   - THE DRAFT DEVELOPMENT CONSENT ORDER AND ACCOMPANYING APPLICATION DOCUMENTATION.
2. DO NOT SCALE FROM THIS DRAWING, USE ONLY PRINTED DIMENSIONS.
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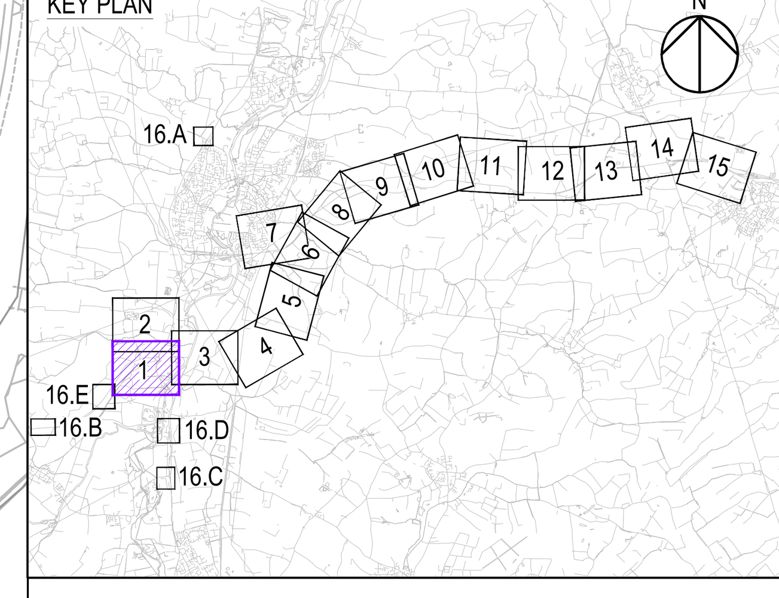
LEGEND

- DEVELOPMENT CONSENT ORDER (DCO) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



Revision Details	By / Check	Date	Suffix
Notes Added	GP / TD	13/12/21	P01

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 1

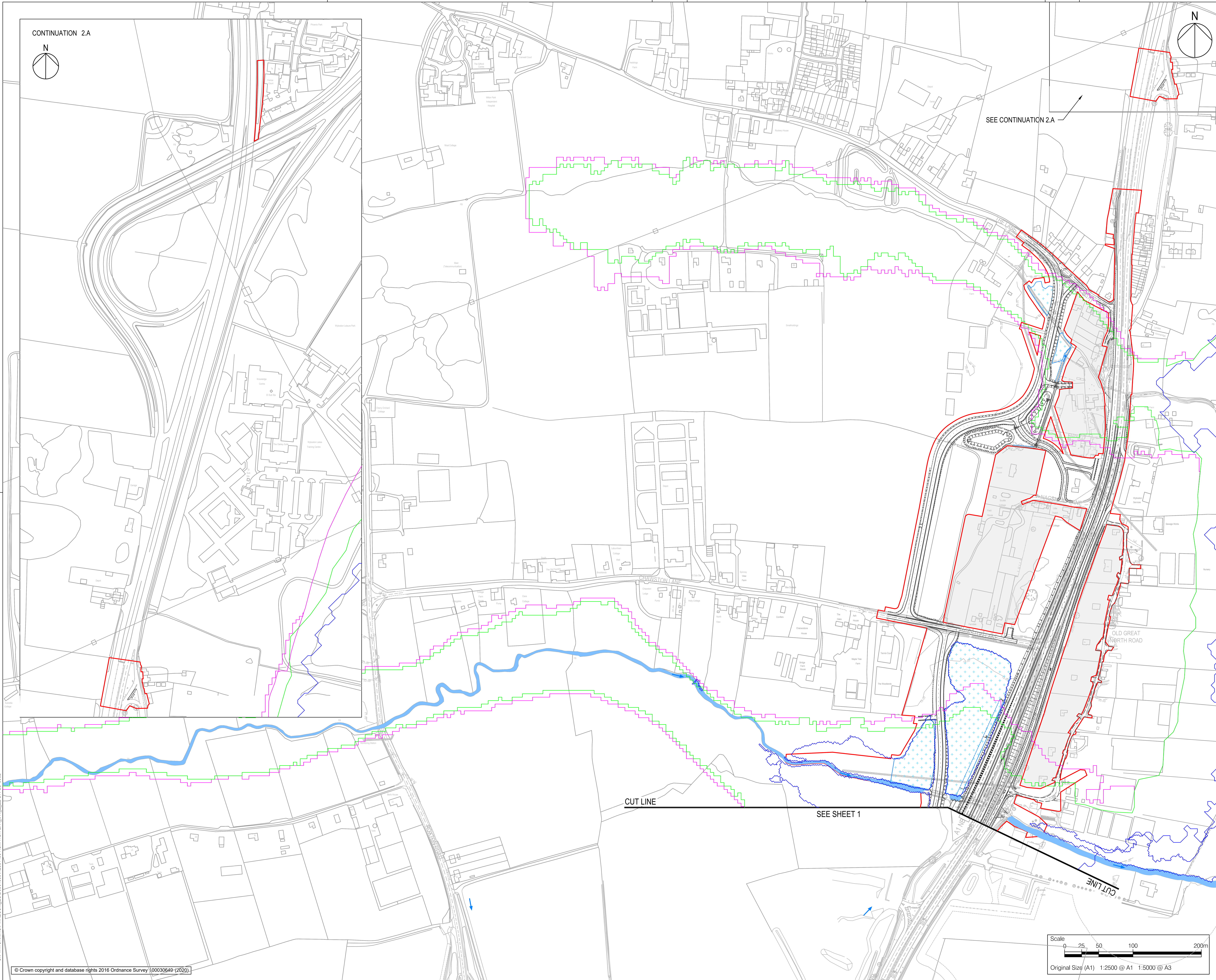
Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No. 60541541	Suitability D9
Scale @ A1 1:2500	Zone ZN1

Drawing Number
National Highways PIN I Originator I Volume
HE551495 -ACM -HGN -
ZN1_SW_Z_ZZ -DR -CD -0001
Location I Type I Role I Number

Rev P01

Plot Date : 14 December 2021 11:10:56
File Name C:\PWWORKING\PWAECOM_EU\D0501050\HE551495-ACM-HGN-ZN1_SW_Z_ZZ-DR-CD-0001



Plot Date : 13 December 2021 15:15:35
File Name C:\PWWORKING\PWAECOM_EU\D0010500\HE551495-ACM-HGN-ZN1_SW_Z_ZZ-DR-CD-0002

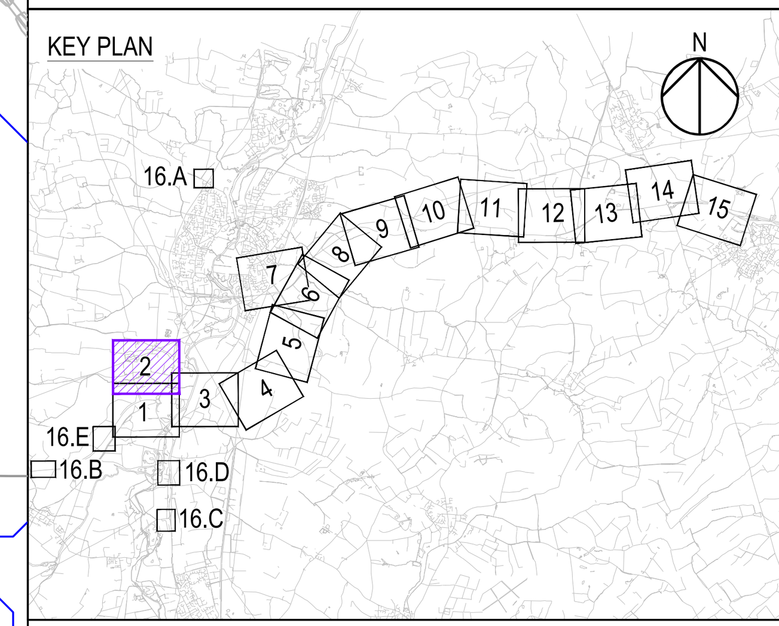
NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH:
   - THE GENERAL ARRANGEMENT LEGEND; AND
   - THE DRAFT DEVELOPMENT CONSENT ORDER AND ACCOMPANYING APPLICATION DOCUMENTATION.
2. DO NOT SCALE FROM THIS DRAWING, USE ONLY PRINTED DIMENSIONS.
3. ALL DIMENSIONS, CHAINAGES, LEVELS AND COORDINATES ARE IN METRES UNLESS DEFINED OTHERWISE.

LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



Revision Details	By / Check	Date	Suffix
First Issue	GP / TD	13/12/21	P01

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 2

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No.	Suitability
60541541	D9

Scale @ A1	Zone
1:2500	ZN1

Drawing Number
National Highways PIN | Originator | Volume
HE551495 -ACM -HGN -
ZN1_SW_Z_ZZ -DR -CD -0002
Location | Type | Role | Number

Rev
P01

OLD GREAT NORTH ROAD

BARFORD ROAD

CUT LINE

SEE SHEET 1

SEE SHEET 4

SEE CONTINUATION 3.A

CONTINUATION 3.A

N

NOTES

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   - THE DRAFT DEVELOPMENT CONSENT ORDER AND ACCOMPANYING APPLICATION DOCUMENTATION.
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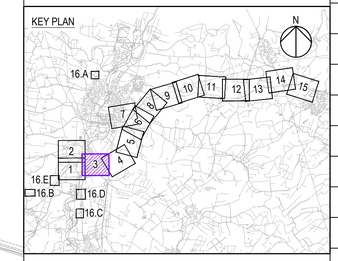
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP	TD	13/12/21	P01
Revision Details	By	Check	Date	Suffix

Purpose of issue

DCO EXAMINATION

Client

National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 3

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No.	Suitability
60541541	D9
Scale @ A1	Zone
1:2500	ZN1

Scale

0 25 50 100 200m

Original Size (A1) 1:2500 @ A1 1:5000 @ A3

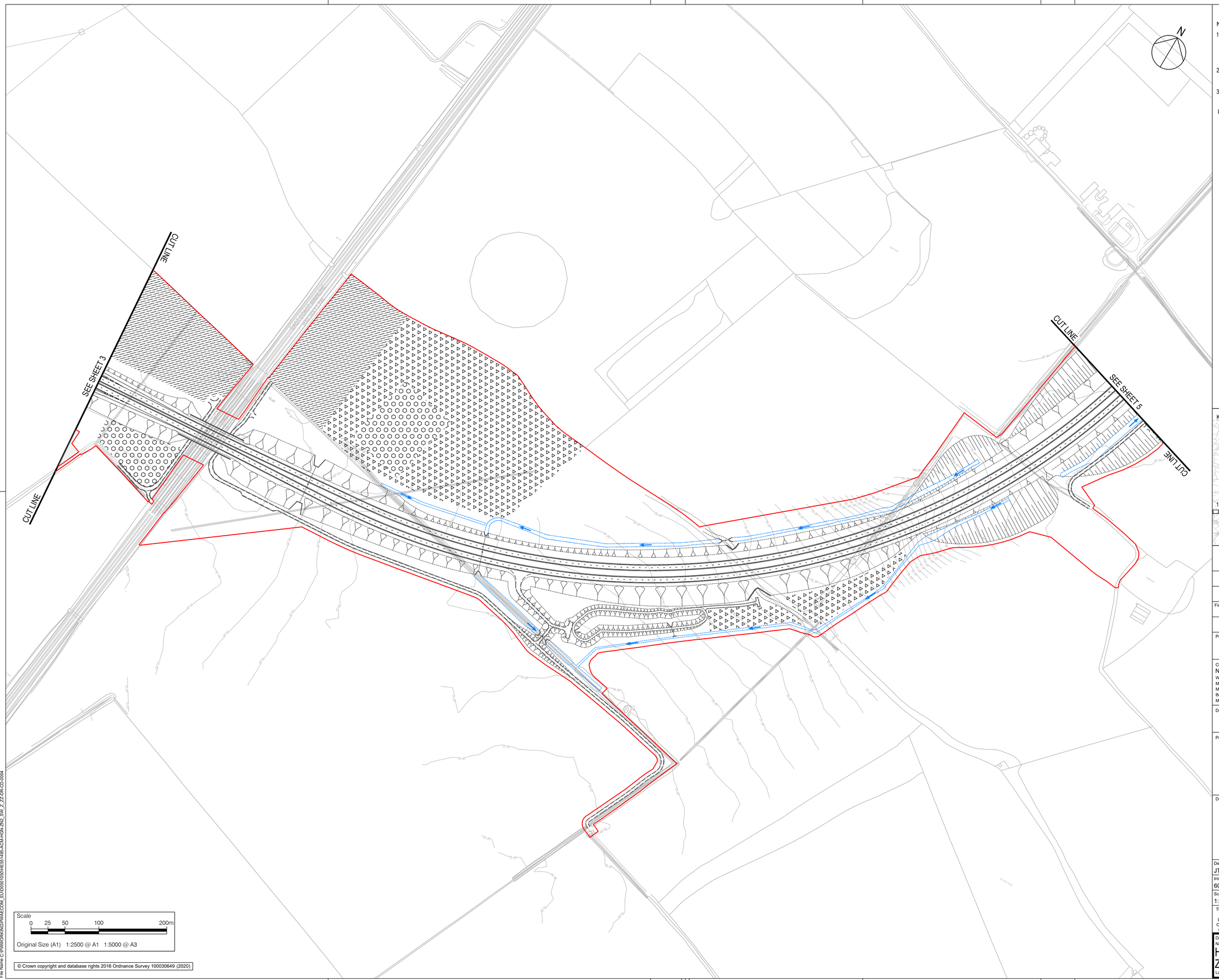
Drawing Number

National Highways HE551495 -ACM -HGN- ZN1_SW_Z_ZZ -DR -CD-0003

Originator -ACM- | Volume -HGN- | Location ZN1 | Type SW | Role Z | Number ZZ -DR -CD-0003

Rev P01

Plot Date: 13 December 2021 10:28:13
File Name: C:\PW\HE551495\ACOM_EUD05010501HE551495-ACM-HGN-ZN1_SW_Z_ZZ-DR-CD-0003



NOTES

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   - THE DRAFT DEVELOPMENT CONSENT ORDER AND ACCOMPANYING APPLICATION DOCUMENTATION.
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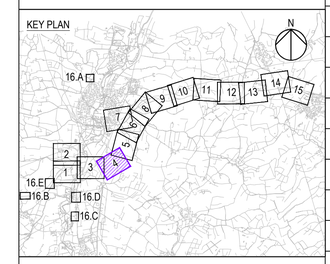
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP / TD	13/12/21	P01	
Revision Details	By / Check	Date	Suffix	

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 4

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No. 60541541	Suitability D9
Scale @ A1 1:2500	Zone ZN2

Drawing Number

National Highways PIN HE551495 | Originator -ACM | Volume -HGN- | Location ZN2_SW_Z_ZZ | Type -DR | Role -CD | Number -0004

Rev P01

Plot Date: 13 December 2021 10:35:39
File Name: C:\PWORKING\ACM\HGN\ZN2\A428_EU\DOS\01050\HE551495-ACM-HGN-ZN2_SW_Z_ZZ-DR-CD-0004

NOTES

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   - THE GENERAL ARRANGEMENT LEGEND; AND
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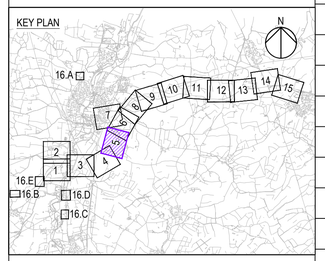
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



CUT LINE

SEE SHEET 4

SEE SHEET 6

CONTINUATION 5.A

SEE CONTINUATION 5.A

RECTORY FARM

Scale 0 25 50 100 200m

Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Revision Details	By / Check	Date	Suffix
First Issue	GP / TD	13/12/21	P01

Purpose of issue: DCO EXAMINATION

Client: National Highways, Woodlands, Manton Lane, Manton Industrial Estate, Bedford, MK41 7LW

Working on behalf of: national highways

Development Consent Order Number: TR010044

Project Title: A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title: SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 5

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No.	Suitability
60541541	D9
Scale @ A1	Zone
1:2500	ZN2

Drawing Number: National Highways PIN HE551495 - Originator ACM - Volume HGN - Location ZN2_SW_Z_ZZ - Type DR - Role CD - Number 0005

Rev: P01

Plot Date: 13 December 2021 15:36:37
File Name: C:\Work\Work\Projects\AECOM_EUD60105\0HE551495-ACM-HGN-ZN2_SW_Z_ZZ-DR-CD-0005

CUT LINE

SEE SHEET 7

CUT LINE

CUT LINE

SEE SHEET 8

CUT LINE

SEE SHEET 5

CUT LINE

NOTE: FENCE TO BE CONSTRUCTED TO APPLY A SOIL STORAGE EXCLUSION AREA WITH ANY FLOOD ZONE.

N

NOTES

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   - THE DRAFT DEVELOPMENT CONSENT ORDER AND ACCOMPANYING APPLICATION DOCUMENTATION.
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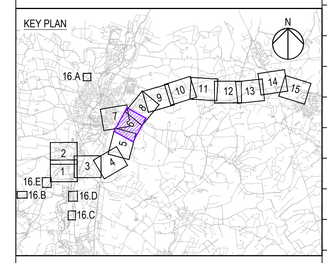
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS
- PROPOSED TEMPORARY FENCELINE

KEY PLAN



Notes Added	GP	TD	13/12/21	P01
Revision Details	By	Check	Date	Suffix

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 6

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No.	Suitability
60541541	D9
Scale @ A1	Zone
1:2500	ZN2

Drawing Number

National Highways PIN	Originator	Volume			Rev
HE551495	-ACM	-HGN-			P01
Location		Type	Role	Number	
ZN2_SW_Z_ZZ		-DR	-CD	-0006	

Scale

0 25 50 100 200m

Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Plot Date: 14 December 2021 11:16:18
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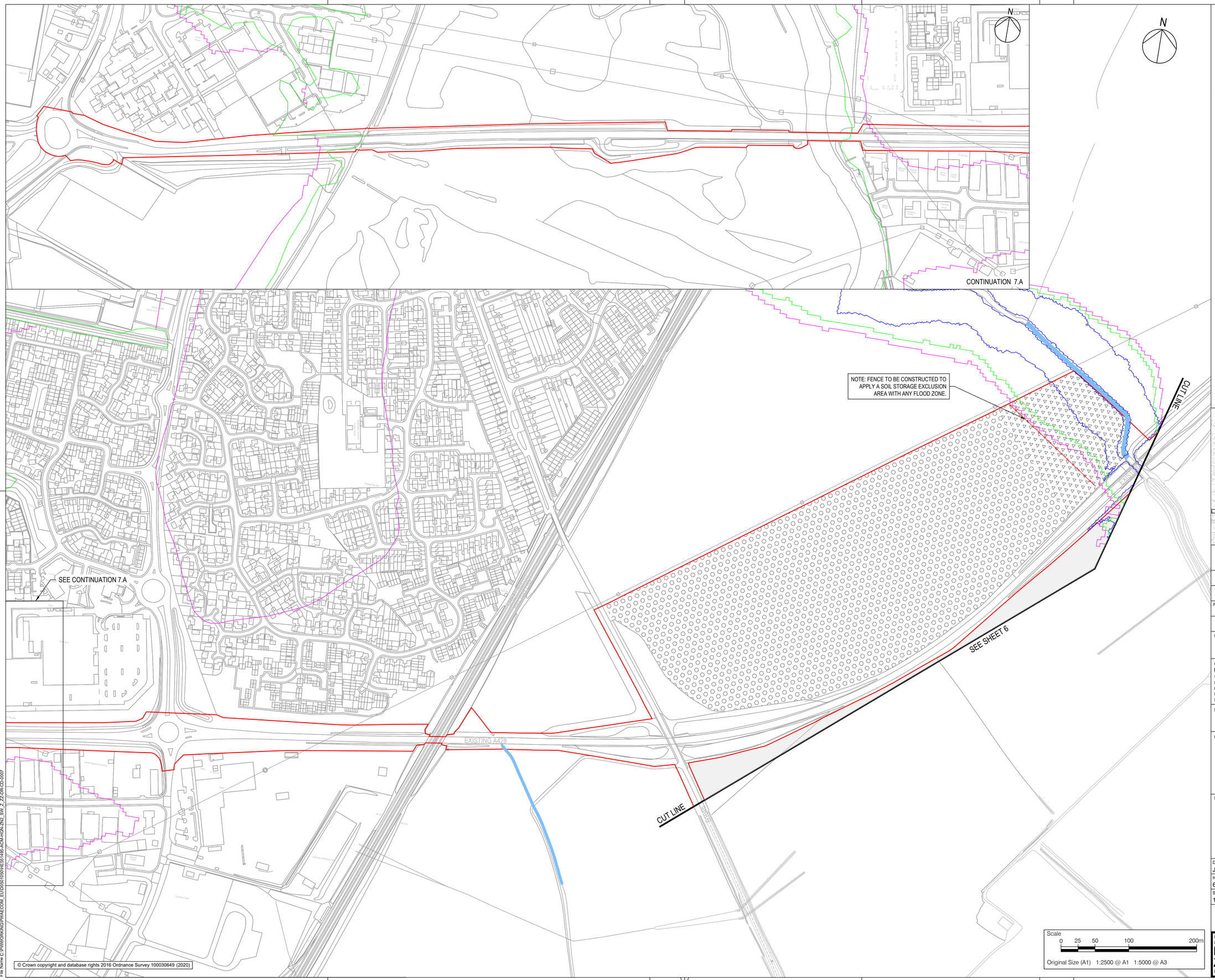

NOTES

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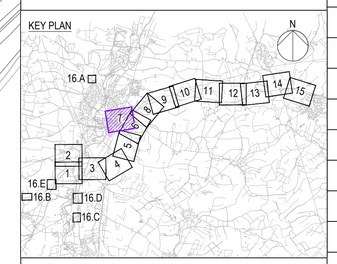
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS
- PROPOSED TEMPORARY FENCELINE

KEY PLAN



Notes Added	GP		13/12/21	P01
Revision Details	By	Check	Date	Suffix

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 7

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

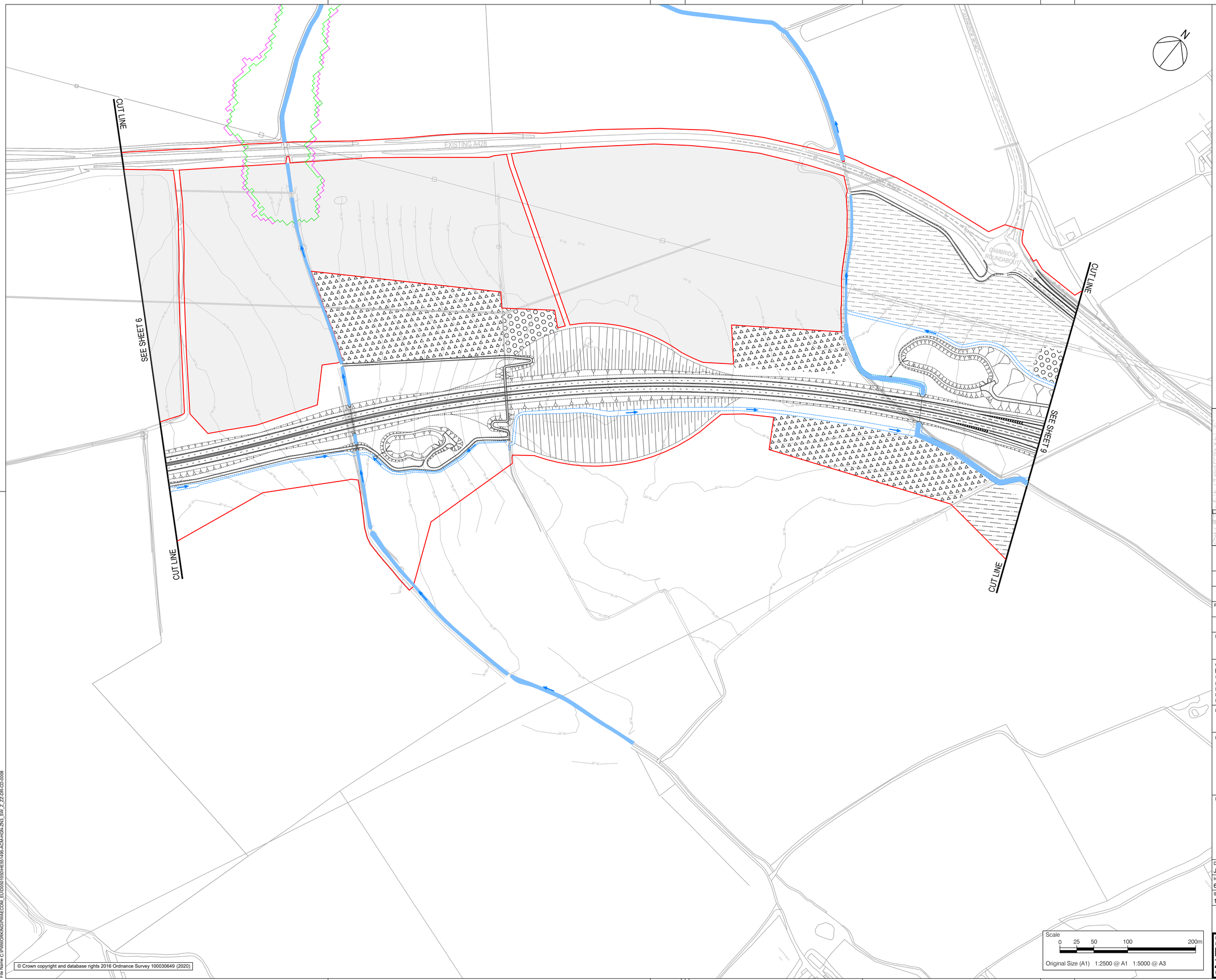
Internal Project No.	Suitability
60541541	D9
Scale @ A1	Zone
1:2500	ZN2

Drawing Number

National Highways PIN	Originator	Volume			Rev
HE551495	-ACM	-HGN-			P01
ZN2_SW_Z_ZZ	-DR	-CD-0007			
Location		Type	Role	Number	

Scale
0 25 50 100 200m
Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Plot Date: 13 December 2021 16:07:09
File Name: C:\PW\WSHO\PROJECTS\HE551495-ACM-HGN-ZN2_SW_Z_ZZ_DR-CD-0007



NOTES

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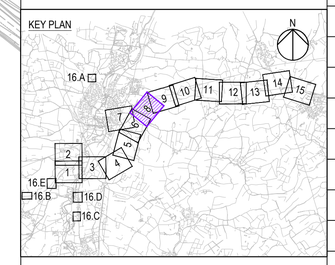
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP / TD		13/12/21	P01
Revision Details	By / Check		Date	Suffix

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 8

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No. 60541541	Suitability D9
Scale @ A1 1:2500	Zone ZN3

Drawing Number
National Highways PIN | Originator | Volume | Location | Type | Role | Number | Rev

HE551495 -ACM -HGN- ZN3_SW_Z_ZZ -DR -CD-0008 P01

Scale
0 25 50 100 200m
Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Plot Date: 13 December 2021 16:14:00
File Name: C:\Work\60541495\ACM\CAD\E_ELID\50\105\HE551495-ACM-HGN-ZN3_SW_Z_ZZ-DR-CD-0008

N

CUT LINE

SEE SHEET 8

CUT LINE

CUT LINE

SEE SHEET 10

CUT LINE

WINTRINGHAM FARM

EXISTING A428

NOTES

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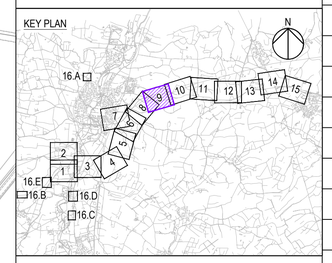
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP / TD	13/12/21	P01
Revision Details	By / Check	Date	Suffix

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 9

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

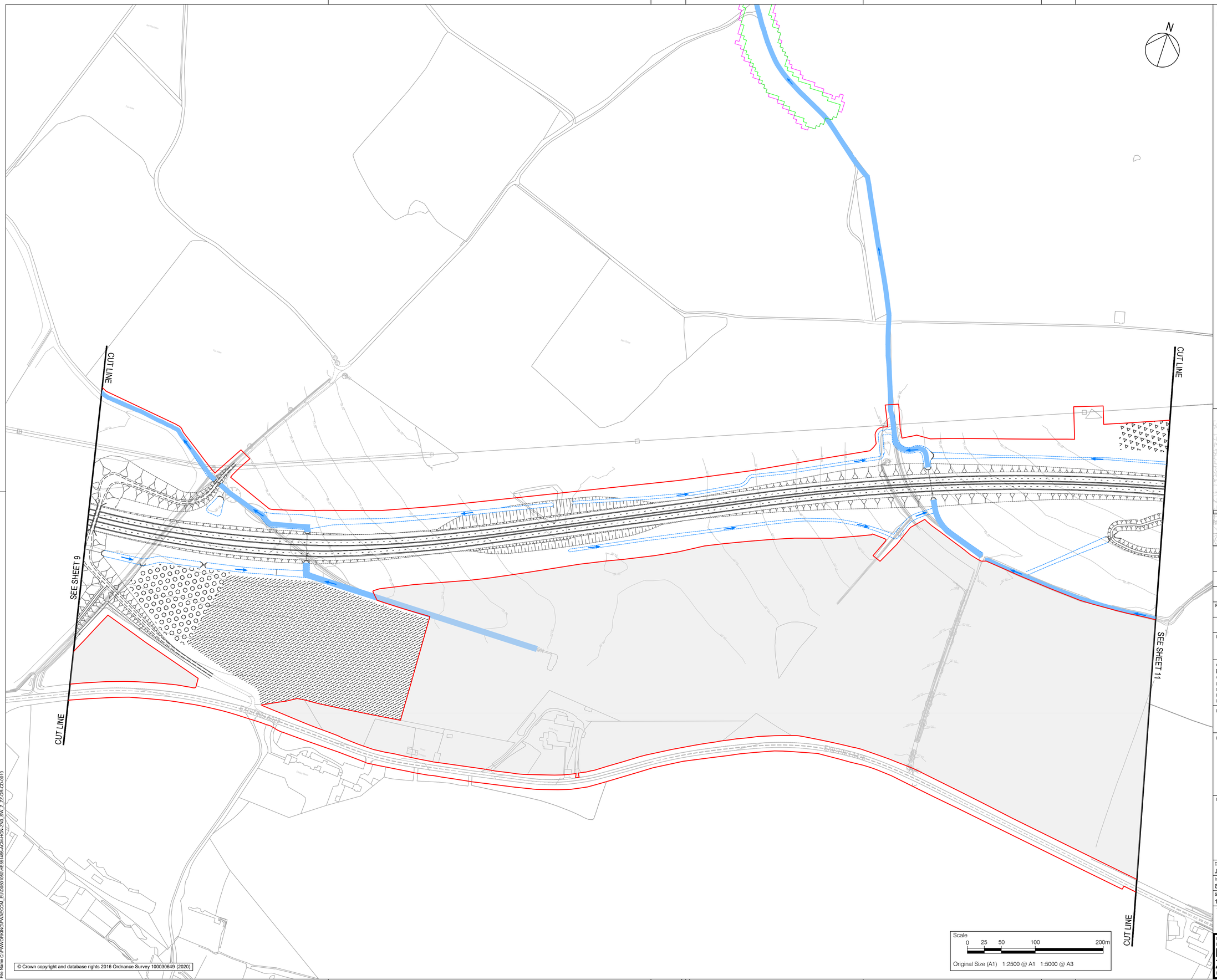
Internal Project No. 60541541	Suitability D9
Scale @ A1 1:2500	Zone ZN3

Scale
0 25 50 100 200m
Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Drawing Number
National Highways PIN | Originator | Volume | Location | Type | Role | Number
HE551495 -ACM -HGN- ZN3_SW_Z_ZZ -DR -CD-0009

Rev P01

Plot Date: 13 December 2021 16:16:08
File Name: C:\Work\Projects\HE551495_AECOM_EU\DOS\01050\HE551495-ACM-HGN-ZN3_SW_Z_ZZ-DR-CD-0009



NOTES

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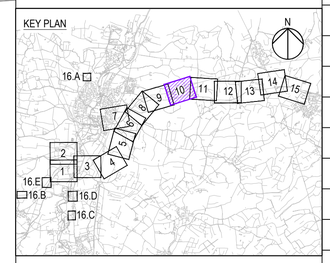
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP / TD		13/12/21	P01
Revision Details	By / Check		Date	Suffix

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 10

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No. 60541541	Suitability D9
Scale @ A1 1:2500	Zone ZN3

Drawing Number

National Highways PIN	Originator	Volume		Rev
HE551495	-ACM	-HGN-		P01
ZN3_SW_Z_ZZ	-DR	-CD-	0010	
Location		Type	Role	Number

Scale
0 25 50 100 200m
Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Plot Date: 13 December 2021 16:22:48
File Name: C:\PWORKS\HE551495\ACM\HGN\ZN3_SW_Z_ZZ_DR_CD-0010

SEE CONTINUATION 11.A

CONTINUATION 11.A

CUT LINE

CUT LINE

SEE SHEET 10

CUT LINE

SEE SHEET 12

CUT LINE

Scale
0 25 50 100 200m
Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Plot Date: 13 December 2021 10:26:59
File Name: C:\DWG\60541541\ACAD\ML_EU\DS01\050\HE551495-ACM-HGN-ZN4_SW_Z_ZZ-DR-CD-0011

NOTES

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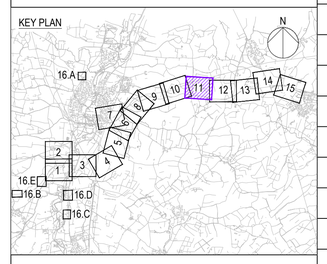
LEGEND

- DEVELOPMENT CONSENT ORDER (DCO) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP / TD		13/12/21	P01
Revision Details	By / Check		Date	Suffix

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

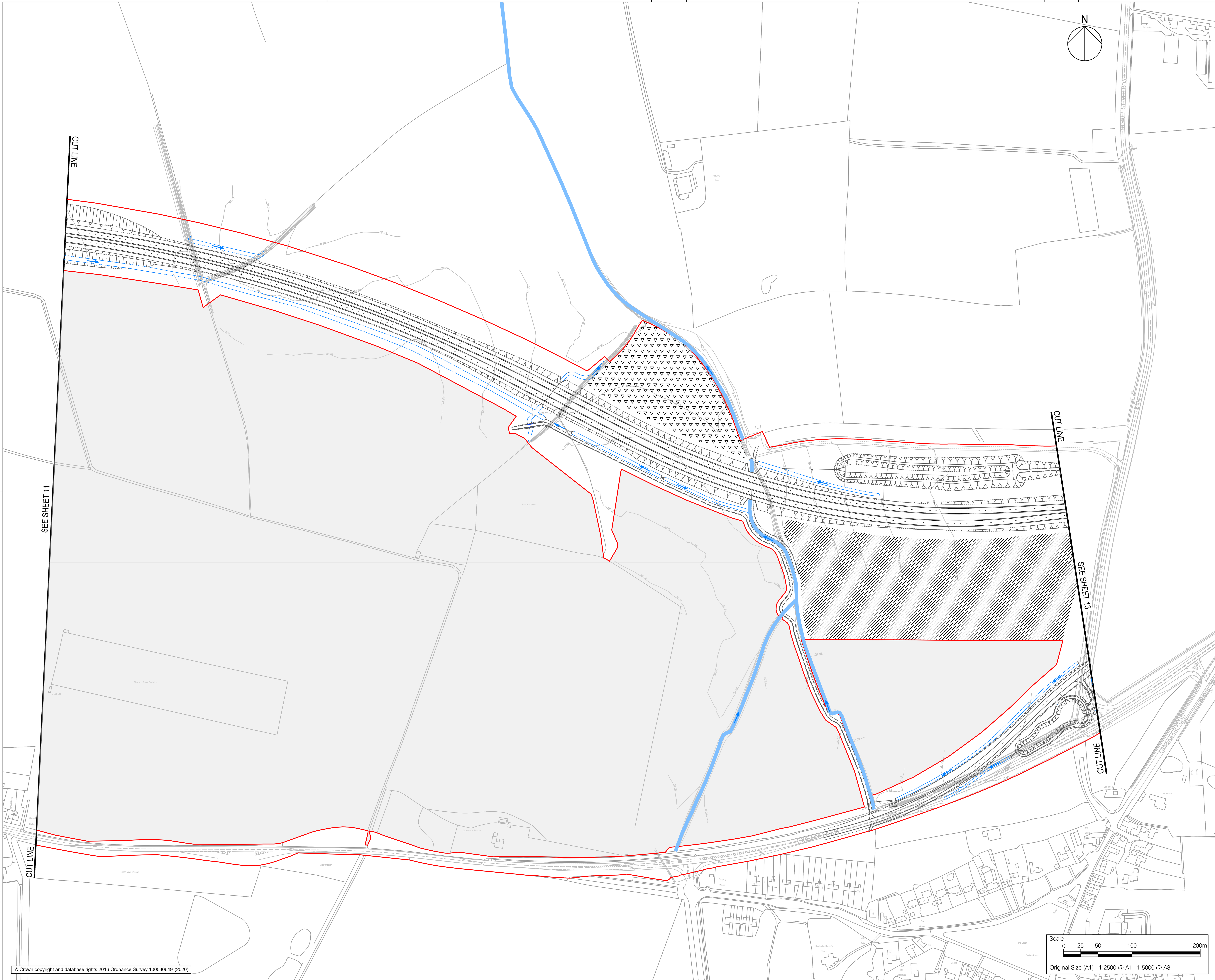
SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 11

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No.	Suitability
60541541	D9
Scale @ A1	Zone
1:2500	ZN4

Drawing Number

National Highways PIN	Originator	Volume			Rev
HE551495	-ACM	-HGN-			P01
Location		Type	Role	Number	
ZN4_SW_Z_ZZ	-DR	-CD		-0011	



NOTES
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LEGEND
- DEVELOPMENT CONSENT ORDER (DCO) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN
N
16.A 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16.B 16.C 16.D 16.E

Revision Details	By / Check	Date	Suffix
First Issue	GP / TD	13/12/21	P01

Purpose of issue
DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number
TR010044

Project Title
A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title
SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 12

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No. 60541541
Suitability D9
Scale @ A1 1:2500
Zone ZN4

Drawing Number
National Highways PIN | Originator | Volume
HE551495 -ACM -HGN -
ZN4_SW_Z_ZZ -DR -CD-0012
Location | Type | Role | Number

Rev P01

Plot Date : 13 December 2021 16:34:02
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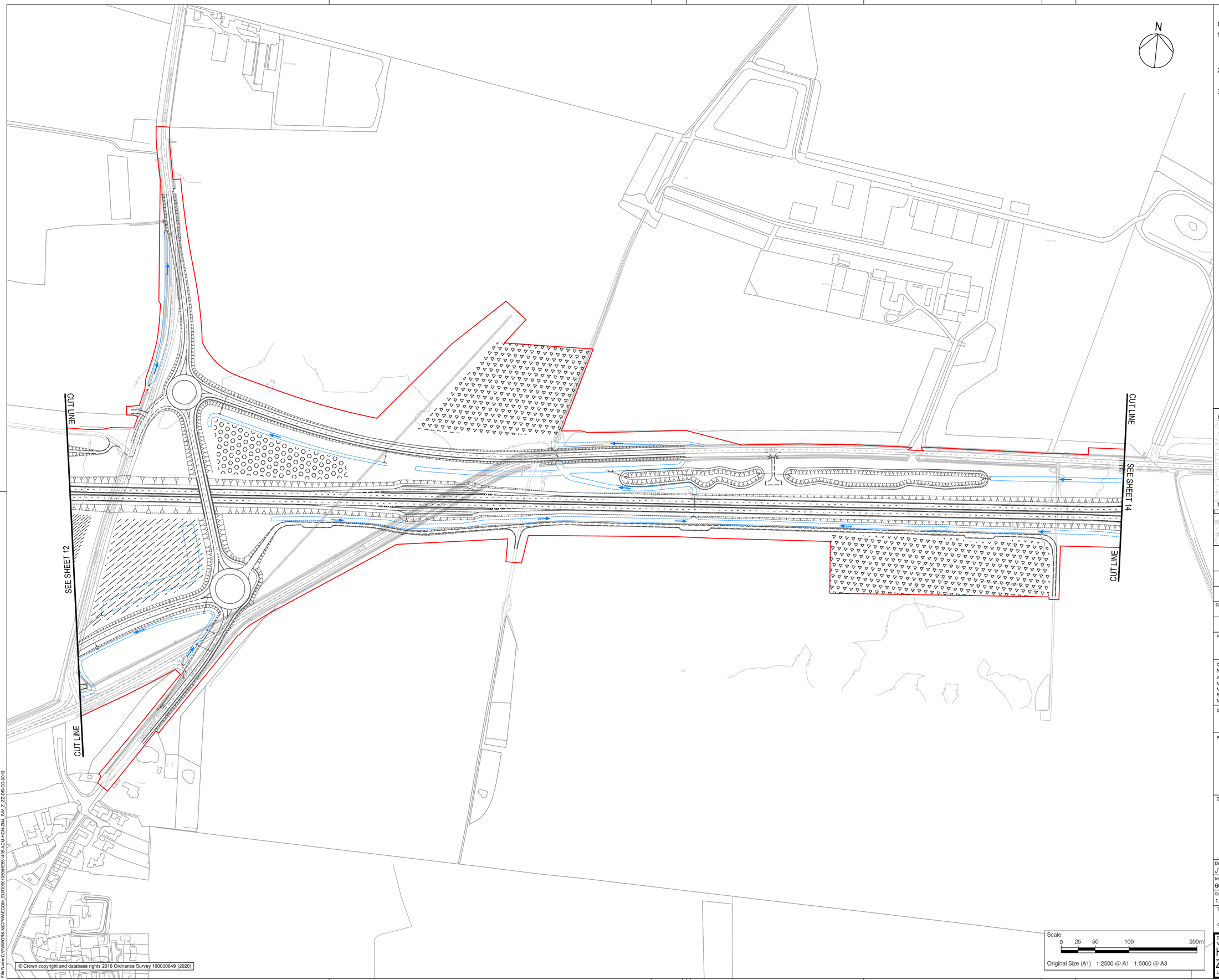

NOTES

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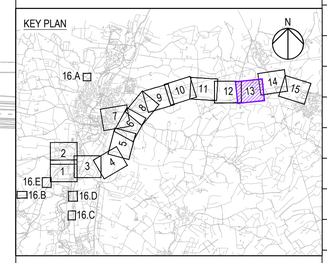
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



Revision Details	By / Check	Date	Suffix
First Issue	GP / TD	13/12/21	P01

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 13

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No.	Suitability
60541541	D9
Scale @ A1	Zone
1:2500	ZN4

Drawing Number
National Highways PIN | Originator | Volume
HE551495 -ACM -HGN-
ZN4_SW_Z_ZZ -DR-CD-0013
Location | Type | Role | Number

Rev P01

Scale
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Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Plot Date: 13 December 2021 16:37:09
File Name: C:\Work\HE551495\ACM_ELID\05\01\60\HE551495-ACM-HGN-ZN4_SW_Z_ZZ-DR-CD-0013

N

CUT LINE

SEE SHEET 15

SEE SHEET 13

CUT LINE

CUT LINE

CAXTON GIBBET ROUNDABOUT

Scale
0 25 50 100 200m
Original Size (A1) 1:2500 @ A1 1:5000 @ A3

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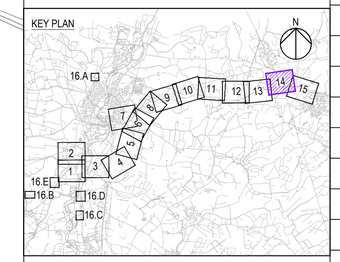
LEGEND

- DEVELOPMENT CONSENT ORDER (DC0) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP / TD	13/12/21	P01	
Revision Details	By / Check	Date	Suffix	

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 14

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No.	Suitability
60541541	D9
Scale @ A1	Zone
1:2500	ZN5

Drawing Number

National Highways PIN	Originator	Volume			Rev
HE551495	-ACM	-HGN-			P01
Location		Type	Role	Number	
ZN5_SW_Z_ZZ		-DR	-CD	-0014	

Plot Date: 13 December 2021 16:33:11
File Name: C:\PW\D60\60541541\ACDOM_EU\D0501050\HE551495-ACM-HGN-ZN5_SW_Z_ZZ-DR-CD-0014

CUT LINE

SEE SHEET 14

CUT LINE

EXISTING A428

N

NOTES

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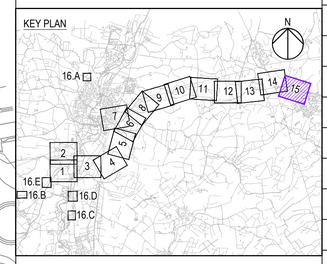
LEGEND

- DEVELOPMENT CONSENT ORDER (DCO) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP / TD	13/12/21	P01
Revision Details	By / Check	Date	Suffix

Purpose of issue

DCO EXAMINATION

Client
National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 15

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No. 60541541	Suitability D9
Scale @ A1 1:2500	Zone ZN5

Scale
0 25 50 100 200m
Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Drawing Number
National Highways PIN | Originator | Volume
HE551495 -ACM -HGN-
ZN5_SW_Z_ZZ -DR -CD-0015
Location | Type | Role | Number

Rev P01

Plot Date: 13 December 2021 16:53:07
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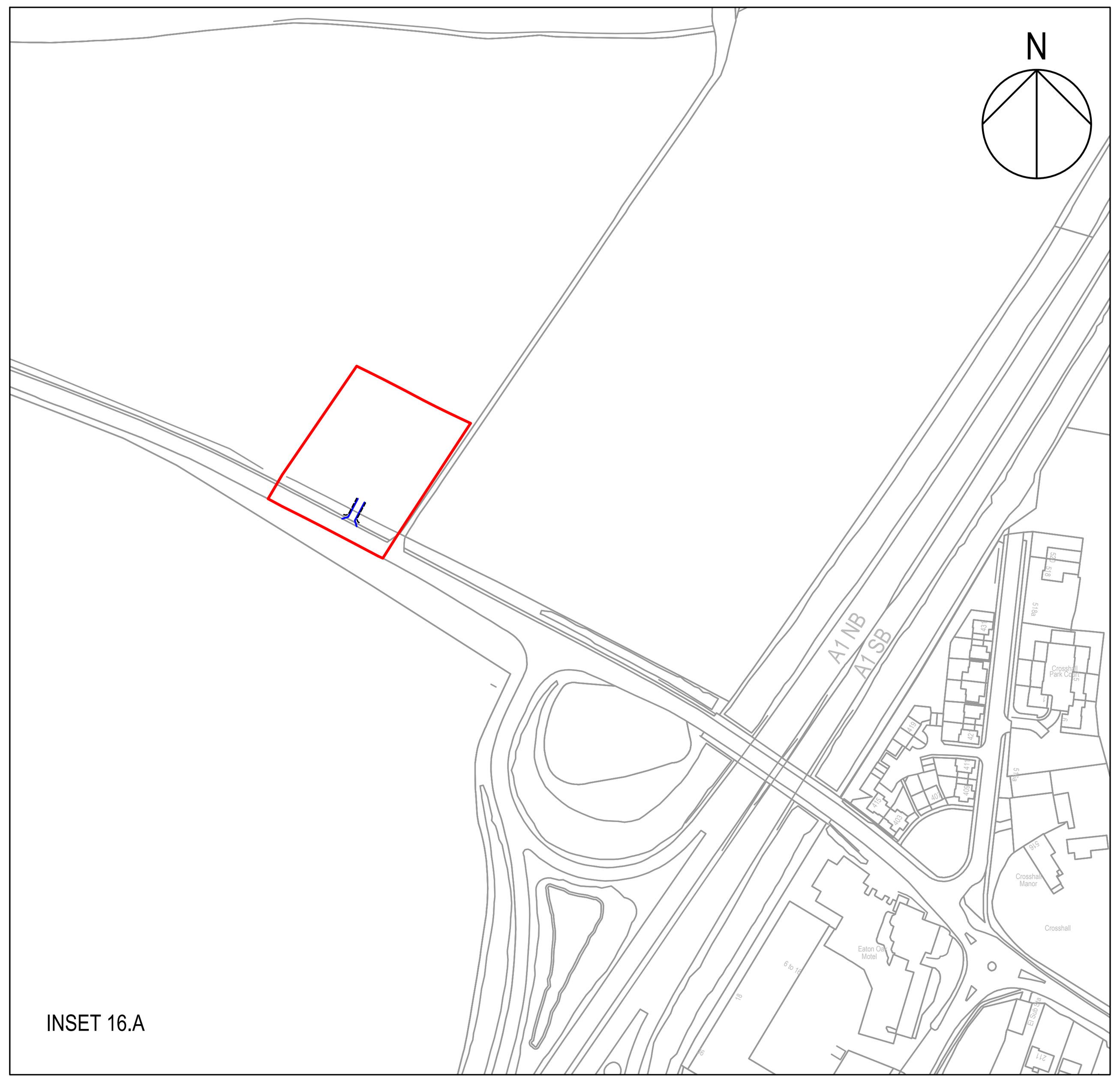

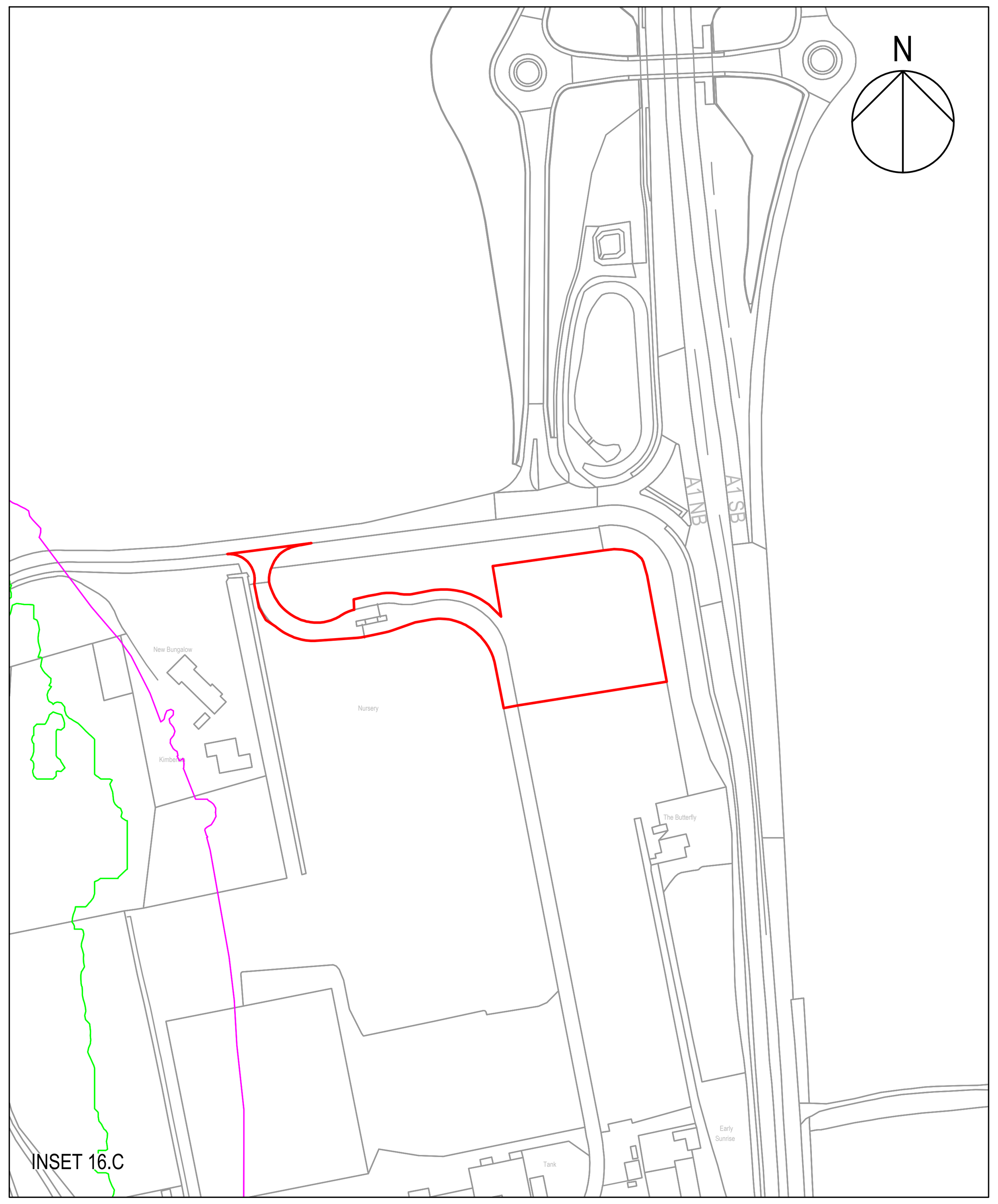

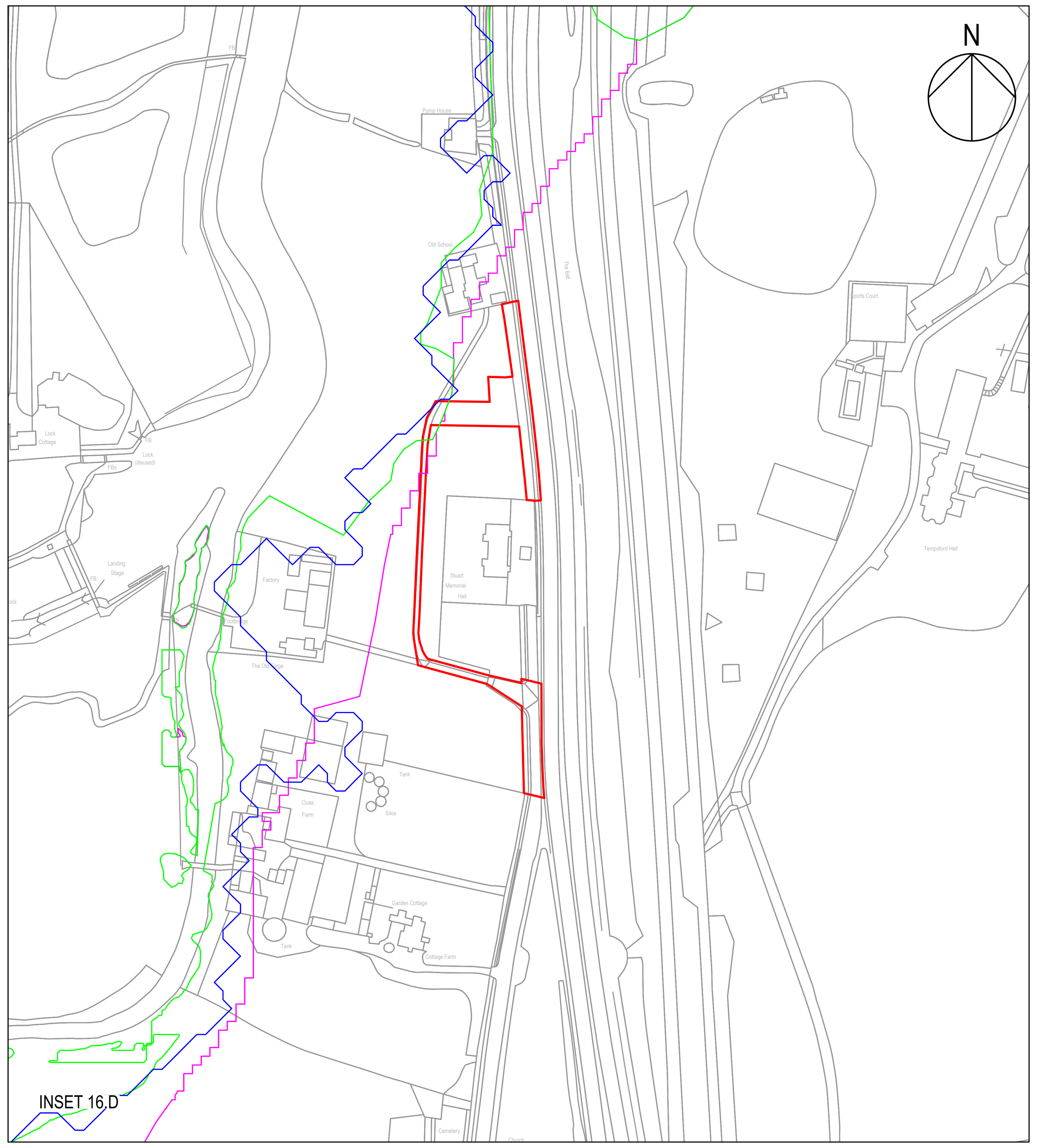

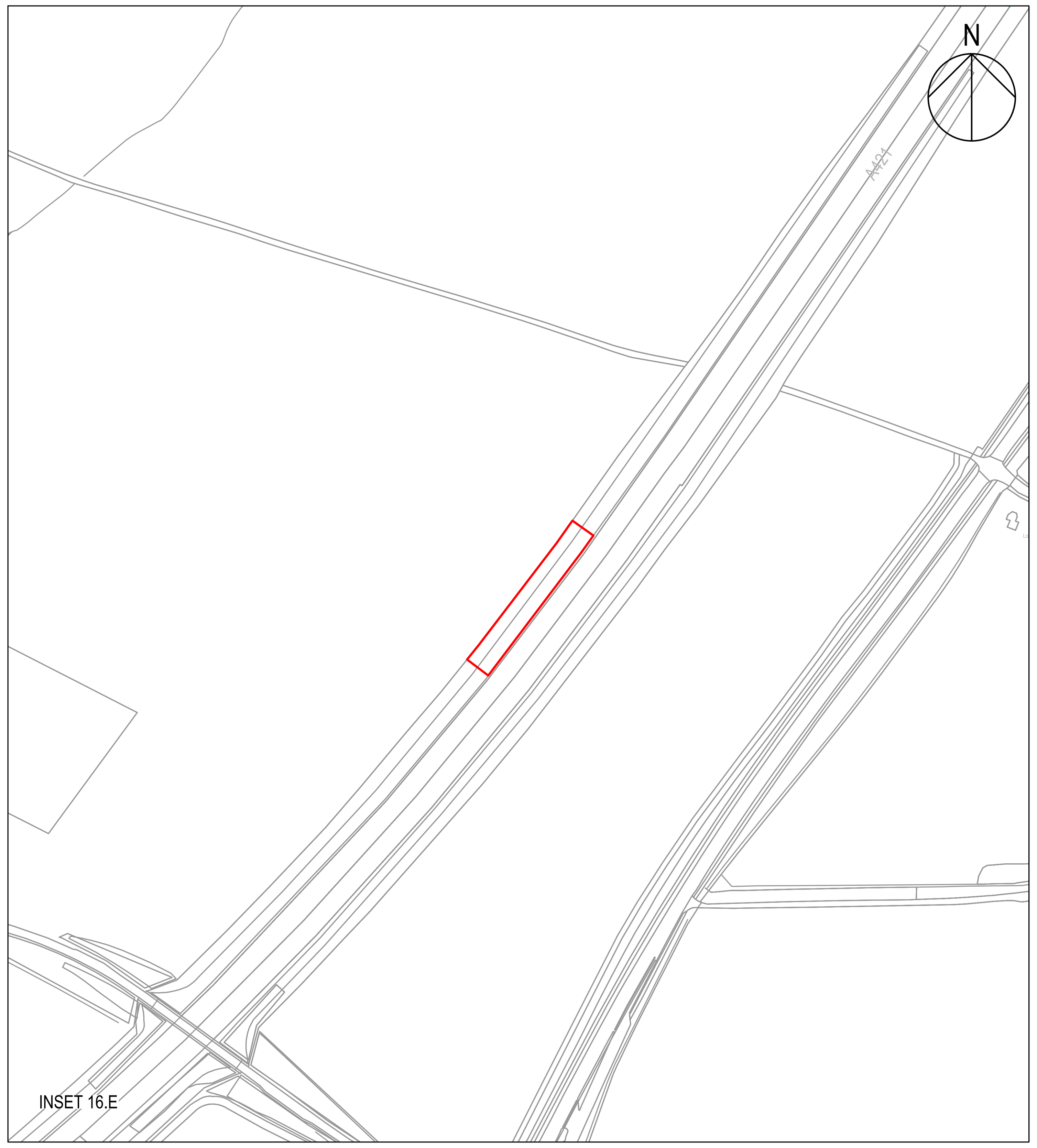

NOTES

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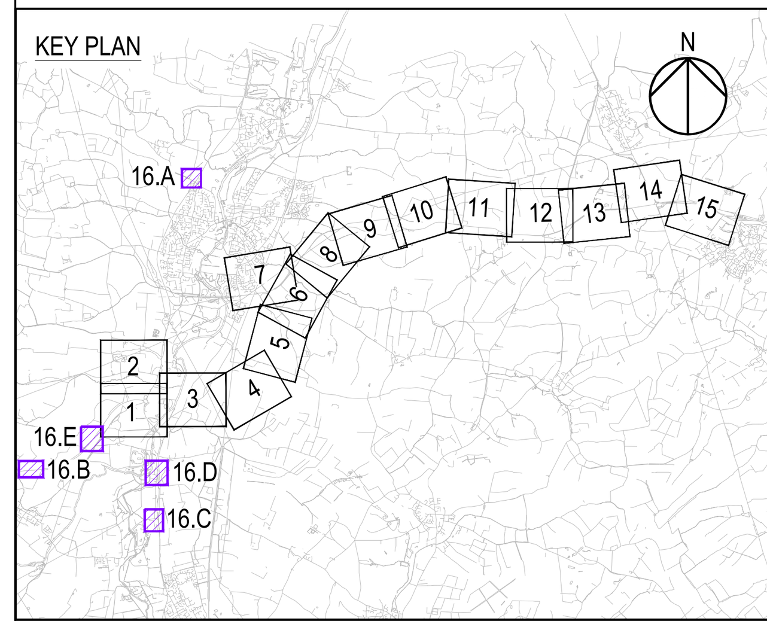
LEGEND

- DEVELOPMENT CONSENT ORDER (DCO) BOUNDARY
- DCO BOUNDARY EXCLUSION ZONE
- EXISTING WATER COURSE
- REALIGNED WATERCOURSE
- PROPOSED DITCH
- WATER FLOW DIRECTION
- PROPOSED FLOOD STORAGE
- PROPOSED MULTIPLE PURPOSE COSNTRUCTION AREA
- PROPOSED SOIL STORAGE AREA
- PROPOSED SITE COMPOUND AREA
- PROPOSED BORROW LAND AREA
- EA FLOOD PLAIN EXTENTS - ZONE 2
- EA FLOOD PLAIN EXTENTS - ZONE 3
- MODELLED FLOOD PLAIN EXTENTS

KEY PLAN



First Issue	GP / TD	13/12/21	P01
Revision Details	By / Check	Date	Suffix

Purpose of Issue

DCO EXAMINATION

Client

National Highways
Woodlands
Manton Lane
Manton Industrial Estate
Bedford
MK41 7LW

Working on behalf of national highways

Development Consent Order Number

TR010044

Project Title

A428 BLACK CAT TO CAXTON GIBBET IMPROVEMENTS

Drawing Title

SOIL STORAGE & COMPOUNDS FLOOD ZONE MAPS SHEET 16

Designed	Drawn	Checked	Approved	Date
JT	GP	PS	TD	13/12/21

Internal Project No. 60541541	Suitability D9
Scale @ A1 1:2500	Zone ZN5

Drawing Number
National Highways PIN | Originator | Volume
HE551495 -ACM -HGN-
ZN5_SW_Z_ZZ -DR -CD-0016
Location | Type | Role | Number

Rev P01

Scale
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Original Size (A1) 1:2500 @ A1 1:5000 @ A3

Plot Date : 13 December 2021 17:00:26
File Name C:\PWWORKING\PWAECOM_EU\D0501050\HE551495-ACM-HGN-ZN5_SW_Z_ZZ-DR-CD-0016

Appendix C - Response of affected landowners to water level change

The following section provides the evidence of the written responses received by National Highways from landowners affected by changes to peak water levels on the River Great Ouse, as summarised in the table below:

Watercourse	Landowner	Comment
River Great Ouse	Wynne Estates	Change in water levels accepted

Grant paxton (Aecom)

From:	Phillip Alliston (Ardent)
Sent:	29 September 2021 08:33
To:	Ted Doherty (Aecom)
Cc:	Buckley, Simon; Collard, Ralph; Grant paxton (Aecom); Laura Crumpton (Aecom); Peter Gibbard (Ardent)
Subject:	A428 - Flood Level Details
Attachments:	RE: Land Ownership - River Great Ouse

Morning Ted,

Further to your email attached, see below confirmation from Robin Clarke indicating no further issues.

Regards

Phillip

Phillip Alliston
A428 – Black Cat to Caxton Gibbet Improvements
Land & Property Highways England | Woodlands | Manton Lane | Bedford | MK41 7LW
Mobile: +44 (0)7513 126031
E-Mail: phillip.alliston@a428.co.uk

Working on behalf of Highways England

Highways England Customer Contact Centre - 0300 123 5000

http://www.highwaysengland.co.uk/

From: CLARKE Robin <Robin.Clarke@struttandparker.com>
Sent: 28 September 2021 19:06
To: Phillip Alliston (Ardent) <Phillip.Alliston@a428.co.uk>
Cc: Laura Crumpton (Aecom) <Laura.Crumpton@a428.co.uk>
Subject: RE: A428 - Flood Level Details

Dear Philip

Presently no further questions or concerns and content to proceed.

R

From: Phillip Alliston (Ardent) [mailto:Phillip.Alliston@a428.co.uk]
Sent: 28 September 2021 16:00
To: CLARKE Robin <Robin.Clarke@struttandparker.com>
Cc: Laura Crumpton (Aecom) <Laura.Crumpton@a428.co.uk>
Subject: A428 - Flood Level Details

Dear Robin,

Just following up your below email of 7th September.

So that the project has clarity, can you confirm if you have any further questions or concerns? If not I would apprciate a note back to indicate the Estate are happy in principle to the minor increases in flood depth as described below.

Thanks

Regards

Phillip

Phillip Alliston
A428 – Black Cat to Caxton Gibbet Improvements
Land & Property Highways England | Woodlands | Manton Lane | Bedford | MK41 7LW
Mobile: +44 (0)7513 126031
E-Mail: phillip.alliston@a428.co.uk

From: CLARKE Robin <Robin.Clarke@struttandparker.com>
Sent: 07 September 2021 16:09
To: Laura Crumpton (Aecom) <Laura.Crumpton@a428.co.uk>
Subject: RE: A428 - Flood Level Details

Thank you Laura

Kind regards

Robin

Robin Clarke FRICS FAAV RICS Registered Valuer
Director
Strutt & Parker
5 South View, Tinwell Road, Stamford, Lincolnshire, PE9 2JL
Direct: 01780 484045 | Mobile: 07469 155163 | Office: 01780 484040

From: Laura Crumpton (Aecom) [mailto:Laura.Crumpton@a428.co.uk]
Sent: 07 September 2021 14:34
To: CLARKE Robin <Robin.Clarke@struttandparker.com>
Cc: Ted Doherty (Aecom) <ted.doherty@a428.co.uk>; Rebecca Molyneux (HE) <Rebecca.Molyneux@a428.co.uk>; Anne-Marie Rogers (HE) <Anne-Marie.Rogers@a428.co.uk>; Peter Gibbard (Ardent) <Peter.Gibbard@a428.co.uk>
Subject: A428 - Flood Level Details

Hi Robin,

Further to our meeting at the start of July in regards to the Wynne estate and the minor changes to flood levels, we promised to provide you with more details on this and provide the background.

Summary

- Flood modelling has been used to determine the impact of the A428 Scheme upon flood risk from the River Great Ouse in the area of St Neots in extreme flood events.
- The modelling has shown that the scheme would cause a large area of land (shown on the map below shaded green) would experience a decrease in flood levels up to 50mm.
- The modelling has also shown that the scheme would cause a small increase in flood depths within an area of land of approximately 2500 m^2 (0.0025 km^2), on the eastern side of the River Great Ouse upstream of the proposed A428 Scheme crossing (see attached map). – area shaded pale yellow and located at the red dot marker.

- The modelling has shown that the area of land affected already floods within the extreme events, and that the increase in flood depth caused by the scheme is no greater than 16mm.
- The increases in flood depth that would occur are considered to be small given the extreme events tested, and the depth of flooding that would occur at this location in its current condition without the scheme in place.

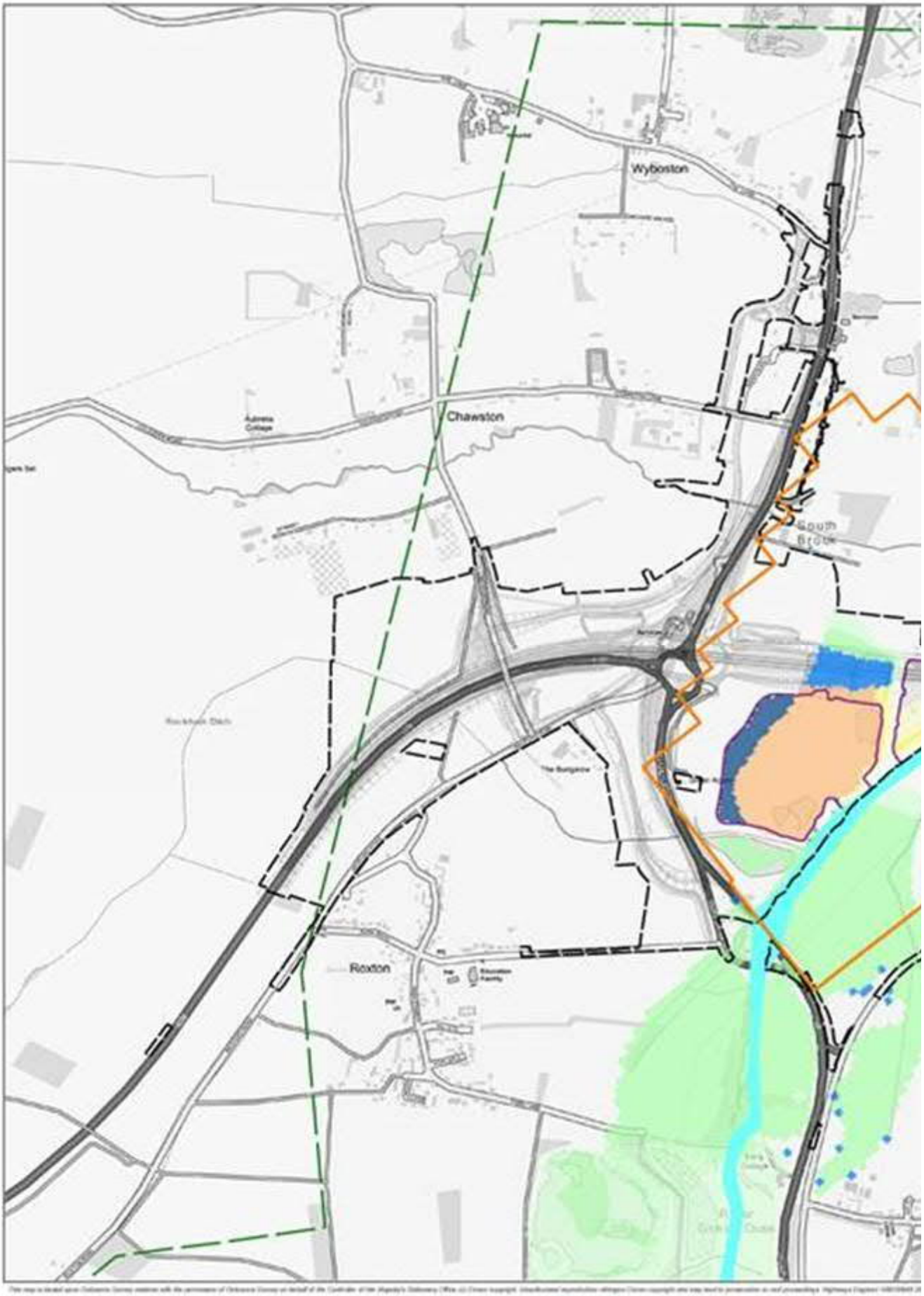
Background

As part of the A428 Black Cat to Caxton Gibbett Improvements DCO Project, a Flood Risk Assessment has been completed to determine any flood risk impacts to surrounding landowners and communities. In line with the National Planning Policy Framework, Environment Agency requirements and best practice, computational modelling has been used to support the Flood Risk Assessment.

Flood models are built in computer software and allow the prediction of flooding during extreme storm events. Two models have been created, the first represents the River Great Ouse in its current condition, and the second represents the future scenario of the River Great Ouse with the A428 Scheme in place. The outputs of these two models have been compared to show the impact that the scheme would have on flood risk from the River Great Ouse.

Flood Risk Impact

Flood modelling undertaken has shown that there would be a small increase in flood depths experienced on land upstream of the A428 crossing during extreme flood events with the scheme in place. This increase in flood depth occurs at the location shown in the zoomed window within the accompanying map. The flood model shows that the area of land impacted is approximately 2500 m^2 (0.0025 km^2) in size and is located in an area that already floods within the extreme storm events that were modelled.


Wyberton
Chawston
Rowton

The table below shows the maximum depths of flooding predicted by the model in this area for a range of extreme events, along with the increases in the depth of flooding that would to occur as a result of the scheme. For the 5% Annual Exceedance Probability Event (would occur on average once in every 20 years) the model predicts that the area would flood to a depth of 0.75m (750mm) and the increase in maximum flood depth due to the scheme would be 0.009m (9mm). For the 1% Annual Exceedance Probability Event (would occur on average once in every 100 years) accounting for the impacts of climate change, the model predicts that the area would flood to a depth of 1.22m (1220mm) and the increase in maximum flood depth due to the scheme would be 0.013m (13mm).

Design Event (AEP)	Current Situation- Maximum Flood Depth (m)	"With Scheme" Maximum Flood Depth (m)	Depth Difference. "With Scheme" vs Current Situation (m)
5%	0.75	0.76	+0.009
1.33%	0.95	0.96	+0.010
1%	0.98	0.99	+0.010
1% (+ 35% CC)	1.22	1.23	+0.013
1% (+ 65% CC)	1.38	1.40	+0.016
0.1%	1.37	1.39	+0.016

The increases in flood depth caused by the scheme are considered relatively small given to the depth of flooding that would already occur in this area, and the extreme nature of the events modelled. For additional context the increases in flood depth shown to occur (ie 9mm and 13mm) would be of a similar size to small waves that may occur on the surface of an open water body as a result of high winds.

Cause of Impact

Through development of the A428 Black Cat to Caxton Gibbett Improvements Scheme every effort has been made to minimise the impact of the new highway upon surrounding land owners, communities and environment. To minimise the flood risk impact, the A428 River Great Ouse crossing has been designed to allow flood waters to continue to flow downstream in the event of an extreme storm and maintain its natural flow regime as closely as possible. However due to the size of the River Great Ouse and the width of its floodplain, the A428 crossing embankments do encroach into the floodplain and are shown to displace flood water that would naturally flow into these areas.

To provide additional space for water to be stored, and mitigate the displacement caused by the scheme embankments, compensatory storage has been provided in the area of a former quarry close to the A428 crossing. The flood model shows that the compensatory storage would be largely effective in preventing any increases in flood levels caused by the scheme. Unfortunately there are several areas, including the areas discussed above, where small increases in flood depth occur that are not fully mitigated by the compensatory storage provided.

Thanks

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