

HINCKLEY SOUTH

A5 CARRIAGEWAY LOWERING BENEATH RAILWAY BRIDGE

DRAINAGE TECHNICAL NOTE

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4	15/02/2022	Alice Kirsz	Update to address comments

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1.0 INTRODUCTION

- 1.0 ADC Infrastructure Ltd were commissioned to consider the feasibility of lowering the A5 carriageway surface beneath the existing railway bridge to remove the low bridge restriction and therefore allow passage of full-height HGVs.
- 1.1 The existing low bridge provides a restriction to local development and is frequently struck by vehicles causing disruption to the highway network.
- 1.2 There is support for the works by both Network Rail and Highways England.
- 1.3 ADC have considered various options, assisted with investigative works, and produced a series of indicative design drawings for the drainage works required to facilitate the localised highway lowering.
- 1.4 This report, therefore, considers the following:
 - The existing highway drainage and the extent of diversion required,
 - The interface with the bridge structure and foundation,
 - The carriageway surface drainage,
 - The outfall route for the drainage system across land to the west,
 - Third party considerations including Hinckley and Bosworth Borough Council, The Lead Local Flood Authority, The Environment Agency, Network Rail and Highways England.
- 1.5 This report has been updated to address comments made by WSP on behalf of the Lead Local Flood Authority (LLFA), Warwickshire County Council dated 19/01/22 in response to the submission of the hybrid planning application for the proposed works at Padge Hall Farm (REF; WCC002284 R3). These works include the lowering of the A5 carriageway surface beneath the existing railway bridge and its associated drainage. The following detail has been requested in relation to the A5 lowering works:

“Confirmation that the proposed works to the A5 cause no detrimental impact to existing flood risk to the development area and adjacent areas.”
- 1.6 The requested information is presented within section 5 of this drainage technical note.

2.0 Existing Situation

Site Location

- 2.0 The existing bridge is located on the Birmingham to Leicester Railway Line to the south of Hinckley. **Figure 1** shows the general location.



Figure 1: general site location

Existing Conditions

- 2.1 The existing carriageway forms a local low spot at the location of the existing bridge crossing presumably to maximise the available headroom at the structure which currently achieves 4.6m clearance and therefore a restriction to the highway network. Also there is anecdotal evidence that the low point of the highway suffers from surcharging of the drainage system and localised flooding during heavy rainfall.
- 2.2 The existing highway surface at the bridge location is drained via kerb drainage units on both the north and south kerb-lines. These discharge to an existing culvert running southwards, under the carriageway, before entering the local land drainage system.
- 2.3 The A5 carriageway surface remote from the bridge structure appears to drain via series of gullies to existing highway / land drainage ditches. These generally run along the verges, parallel to the carriageway and are naturally heavily vegetated and poorly maintained. The condition of the existing ditches does not appear to have a detrimental impact on the drainage function of the carriageway surface.
- 2.4 The various highway drainage features combine into a manhole to the southeast of the existing bridge prior to entry to the downstream land drainage system.

- 2.5 The land drainage beyond the boundary of the highway crosses into Network Rail owned land and continues to flow southwest via a series of open ditches and culverted sections. This section of drainage is again poorly maintained and heavily vegetated.
- 2.6 Beyond the Network Rail boundary the land drainage enters the adjacent field on the south side of the railway via a culverted section prior to discharge to an open ditch and finally discharging to the Sketchley Brook. **Appendix A** contains ADC drawing ref ADC1839-DR-42 P2 which shows the existing drainage infrastructure.

3.0 Investigative Works

- 3.0 The existing drainage is historic, generally poorly maintained and poorly documented / reported. Ownership and maintenance liability is not clear.
- 3.1 The following bodies have been contacted requesting drainage information and records: Hinckley and Bosworth Borough Council, The Environment Agency, Highways England, The Lead Local Flood Authority and Network Rail. However, there was very little information available and occasionally conflicting.
- 3.2 Following a desktop review of the available information a series of onsite investigations which included site clearance, trial holes, drainage clearance / jetting and CCTV surveys were undertaken.
- 3.3 The results of the investigations have allowed a more accurate representation of the existing drainage infrastructure to be prepared. The existing drainage is shown on drawing ref ADC1839-DR-SK02 P4 contained within **Appendix B**.
- 3.4 The existing drainage system that crosses beneath the A5 at the railway bridge comprises an upstream connection from a 225mm diameter pipe from the north. At a chamber in the northern verge the 225mm pipe discharges to a 600mm diameter pipe that crosses beneath the A5 carriageway. In the southern verge the 600mm pipe discharges to a chamber and the downstream pipe arrangement comprises twin 300mm diameter pipes. A second chamber in the southern verge receives the twin 300mm pipes together with a 600mm highway drainage connection from the south east. The downstream outlet pipe that heads southwest into Network Rail land is a 600mm diameter pipe.
- 3.5 The twin 300mm diameter pipe arrangement in the southern verge is assumed to be as a result of the limited cover depth that is available and existing services that run along the highway verge, parallel to the carriageway.
- 3.6 Continuing downstream within the Network Rail land, the 600mm pipe runs parallel to the boundary for approximately 170m before outfalling to an open ditch section. The open ditch (approximate length 70m) was observed to be overgrown and poorly maintained. It has not been possible to determine whether any drainage associated with the railway infrastructure discharges to the system, but it is considered likely that some runoff from the railway will discharge to the open ditch within the Network Rail land.
- 3.7 At the downstream end of the open ditch a 525mm diameter pipe heads southwest and crosses into the field to the south of the Network Rail land. The 525mm pipe discharges to a small pond within the field. The outlet from the pond is a land drainage ditch that discharges to the Sketchley Brook approximately 300m further to the southwest.

4.0 Proposed Drainage Works

- 4.0 The purpose of the proposed highway improvement works is to deliver a lowering of the existing carriageway by 0.5m to allow for HGVs to pass beneath the existing rail bridge unrestricted.
- 4.1 Compliant highway designs for both vertical and horizontal geometry have been produced to understand the extents of the existing drainage affected by the works.
- 4.2 Using the existing drainage information gathered from the investigations, a detailed arrangement of proposed works to improve the existing drainage system has been produced. The proposed works comprise lowering the pipe crossing beneath the A5 carriageway whilst maintaining all previous drainage connections. These works are represented on drawing ref ADC1839-DR-041 P2 contained within **Appendix C**.
- 4.3 Confirmation of the existing pipework arrangement in and around the bridge structure and preparation of a diversion route allows the layout for the highway works to be formalised so that it is in accordance with current design standards / best practices. Additionally, the removal of any damaged or redundant pipe sections is identified.
- 4.4 The drainage proposals maintain the existing pipe diameters thereby ensuring that the capacity of the existing system is maintained. It has not been possible to determine the upstream catchment that enters the system via the 225mm pipe due to its location on third party land, however the downstream pipe diameters significantly exceed the capacity of the incoming 225mm pipe.
- 4.5 Within the southern verge of the A5 the proposed new drainage comprises twin 300mm pipes which replicates the existing arrangement, thereby maintaining capacity. Limited cover depth is available due to the lowered carriageway levels and existing services, hence the twin pipe arrangement rather than a single larger diameter pipe. However the capacity is improved immediately downstream of the southern verge where the twin 300mm pipes discharge to a 750mm diameter pipe. This increase in pipe diameter of the outfall at the point where highway drainage from the southeast also enters the system will offer a significant increase in capacity in the localised area around the railway bridge, and will mitigate the potential localised flood risk due to the local low spot in carriageway levels beneath the bridge.
- 4.6 Once the highway drainage reaches the southern verge it then progresses to the land drainage system within Network Rail owned land and the investigations found this system to be poorly maintained and inaccessible. To avoid the potential continuation of poor maintenance and accessibility for the downstream drainage system going forward it is proposed to reroute the drainage within the adjacent field to the south and reconnect to the existing land drainage system prior to discharge to Sketchley Brook. The drainage layout proposals are shown on drawing ref ADC1839-DR-043 P2 contained within **Appendix D**.
- 4.7 The drainage route that currently lies with Network Rail land will be diverted to lie within the field to the south. The proposed diversion comprises a 750mm diameter pipe running parallel to the field boundary and alongside a new access track that will offer straightforward access for any future maintenance requirements.
- 4.8 The existing drainage route within Network Rail land comprises a series of piped and open ditch sections. The piped sections vary from 450mm to 525mm, therefore the proposed diversion which is a 750mm pipe provides a significant increase in capacity over the existing system.

- 4.9 The 750mm pipe will discharge to the same pond as the existing system maintaining the current drainage outfall regime to the wider land drainage system. The outlet from the Network Rail system will be maintained and no changes to the drainage within Network Rail land are proposed. It is proposed to lower the bed level of the pond by approximately 300mm – 500mm to suit the revised inlet level. Similarly, the existing ditch downstream of the pond will be regraded up to the connection to the Sketchley Brook to provide a consistent downward gradient along its length.
- 4.10 The proposed drainage works are anticipated to require approval and consent from the following statutory bodies:
- Highways England - The Section 278 highway works to the A5 will require Highways England approval,
 - Hinckley and Bosworth Borough Council – The works are subject to planning consent from the LPA.
 - Lead Local Flood Authority – The works comprise modification to the existing land drainage system from the A5 highway to the Sketchley Brook, therefore Land Drainage Consent approval for the works from the LLFA is required. The Leicestershire / Warwickshire boundary runs parallel to the A5 on its southwest side, therefore approval from both LLFAs for the respective works within their area is potentially required.
 - The Environment Agency – The drainage outfall route which is to be regraded ultimately outfalls to the Sketchley Brook which is classified as a main river and EA consent is required for any works in proximity to a main river.
 - Network Rail - The existing drainage outfall route to be modified and diverted lies within its land ownership.

5.0 Flood risk

5.0 The following section, as per the LLFA request, provides a summary of the proposed works in relation to flood risk zones associated with the Sketchley Brook.

5.1 Online Environmental Agency Flood Zone mapping has been reviewed and the relevant extract is presented within Figure 2 below.



Figure 2: EA flood map for planning extract.

5.2 The majority of the existing and proposed drainage route falls within Flood Zone 1. This is with the exception of a short length of the upstream section of the network as it crosses the A5 and the final few metres of the drainage ditch prior to its discharge into the Sketchley Brook.

5.3 It should be noted that under existing conditions the drainage network lies marginally within Flood Zone 3 in the vicinity of the railway bridge. The proposed works comprise minor lowering of carriageway levels together with associated drainage works. No raising of ground levels within Flood Zone 3 is proposed, therefore there is no reduction of flood storage provision. Furthermore, as part of the development proposals the diameter of the pipe draining the A5 carriageway is to be increased from 600mm to 750mm, thereby providing an increased drainage capacity which will reduce the risk of surface water flooding.

5.4 The downstream reach of the drainage ditch prior to its outfall into the Sketchley Brook is in Flood Zone 2 and 3; this does not differ from existing conditions and the development proposals do not comprise of any changes to the ground profile other than minor reprofiling/lowering of the bed level of the drainage ditch; this is expected to provide an increased storage volume within the channel and therefore mitigate against existing flood risk conditions

6.0 Existing and Proposed Drainage Networks

- 6.0 Two networks have been created within the network module within Microdrainage; one reflects existing conditions and the other proposed conditions. The following section discusses the networks in more detail and provides a comparison on the degree of flood risk presented by each network to the development area and adjacent areas.

Existing network

- 6.1 The existing drainage network has been modelled within Microdrainage for all storm events up to and including the present day 1 in 100-year storm event, this is to reflect worst-case existing conditions within the network. The details of the network are presented within **Appendix E** of this report.
- 6.2 The model has been created to reflect existing levels within the network and includes the existing ditch sections and informal pond. To ensure that an accurate depiction of any flood extents are captured the cover level of PN 1.005, which is situated at the downstream end of the highway drainage adjacent the bridge, has been set to the minimum road level (88.68m AOD).
- 6.3 The invert levels of the existing manholes have been taken from the outputs of a utilities survey which is presented within **Appendix B**, and an existing land drainage layout drawing which is presented in **Appendix A**. Assumptions based upon a 1 in 150 gradient has been applied where there is a lack of surveying information.
- 6.4 Figure 3 below demonstrates a long section of the existing drainage network as it crosses beneath the bridge and flows downstream into the ditch section adjacent to the rail line. The network includes the 225mm diameter pipe which enters the system on the northern side of the A5 and the incoming 600mm diameter pipe which enters the system on the southern side of the A5.

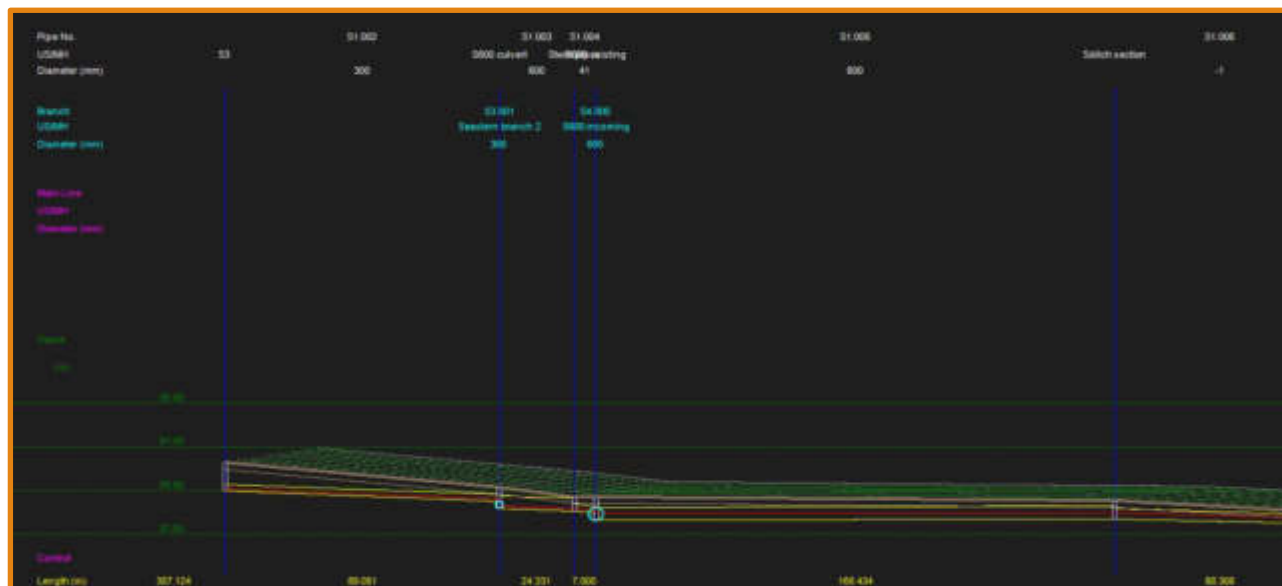


Figure 3: A long section of the existing drainage network adjacent to the railway bridge

- 6.5 The relevant impermeable areas entering the network are demonstrated both within the network details shown in **Appendix E** and within the surface water catchment plan which is presented within **Appendix F**.
- 6.6 It should be noted that the impermeable area drained by the 225mm diameter pipe which enters the system on the northern side of the A5 is currently unknown. The 225mm pipe

6.7 Figure 4 below demonstrates a long section of the existing outfall into the Sketchley Brook. Both Figure 4 and Figure 3 demonstrate the extremely flat gradient of the network from the most upstream point of the network adjacent to the railway bridge through to its outfall into the Sketchley Brook.

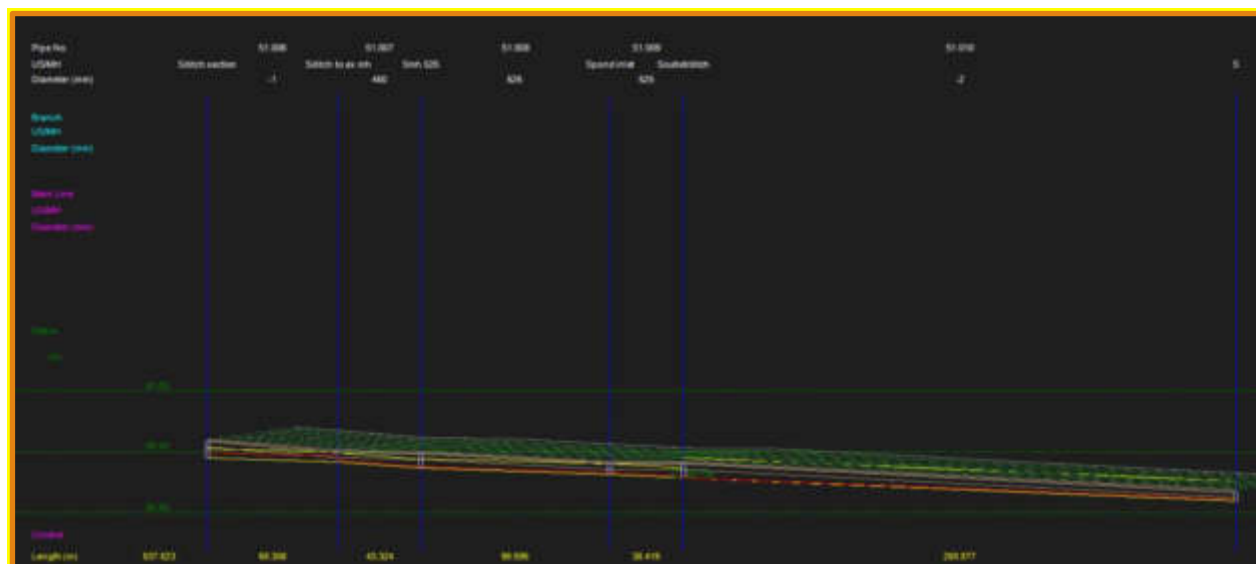


Figure 4: A long section of the existing outfall into the Sketchley Brook

- 6.8 The proposed drainage network has been modelled within Microdrainage for all storm events up to and including the present day 1 in 100-year storm event, this is to allow a fair comparison with the existing network. The details of the proposed network are presented within **Appendix G** of this report.
- 6.9 The model has been created to reflect the proposed changes to the existing network, as demonstrated within the drainage drawings presented within **Appendices C-D**. Similarly, to the existing network the cover level of PN 1.004, which is situated at the downstream end of the highway drainage adjacent the bridge, has been set at the proposed minimum road level of 88.11m AOD.
- 6.10 Retained features have been kept within the system. As with the existing network the 225mm diameter pipe which enters the system from the northern side of the A5 has been simulated to reach peak pipe flow capacity to ensure that the system is assessed via a worst-case scenario.
- 6.11 Figure 5 below demonstrates a long section of the proposed drainage network as it crosses beneath the railway bridge via twin 300mm pipes and flows downstream via a 750mm diameter pipe.

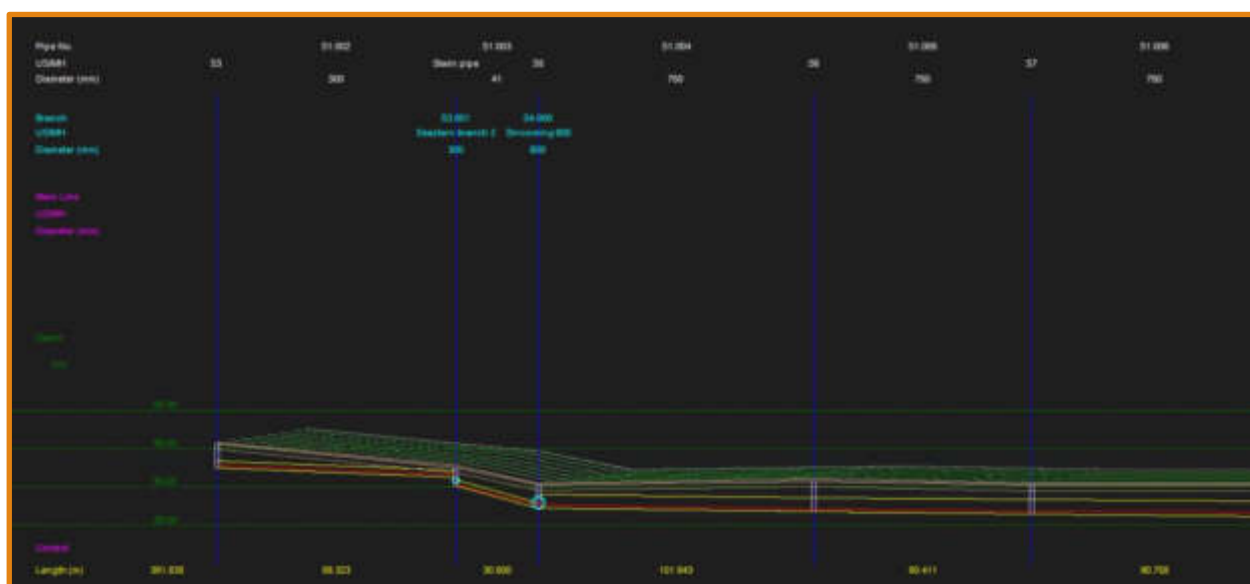


Figure 5: A long section of the proposed drainage at the railway bridge

- 6.12 The development proposals do not alter the existing impermeable area entering the drainage network and therefore the proposed network replicates the impermeable areas inputted into the existing drainage network. The contributing areas used within the network are summarised within **Appendix G**, the surface water catchment plan, see **Appendix F**, demonstrates the basis behind the impermeable areas used.
- 6.13 Figure 6 below demonstrates a long section of the proposed outfall into the Sketchley Brook. As part of the proposals the base of the informal pond upstream of the outfall ditch is to be lowered. In turn the depth of the existing ditch is to be reprofiled.
- 6.14 The ditch has been divided into three different conduits within the network in order to reflect the proposed change in depth from the outlet from the informal pond to the outfall to the Sketchley Brook.

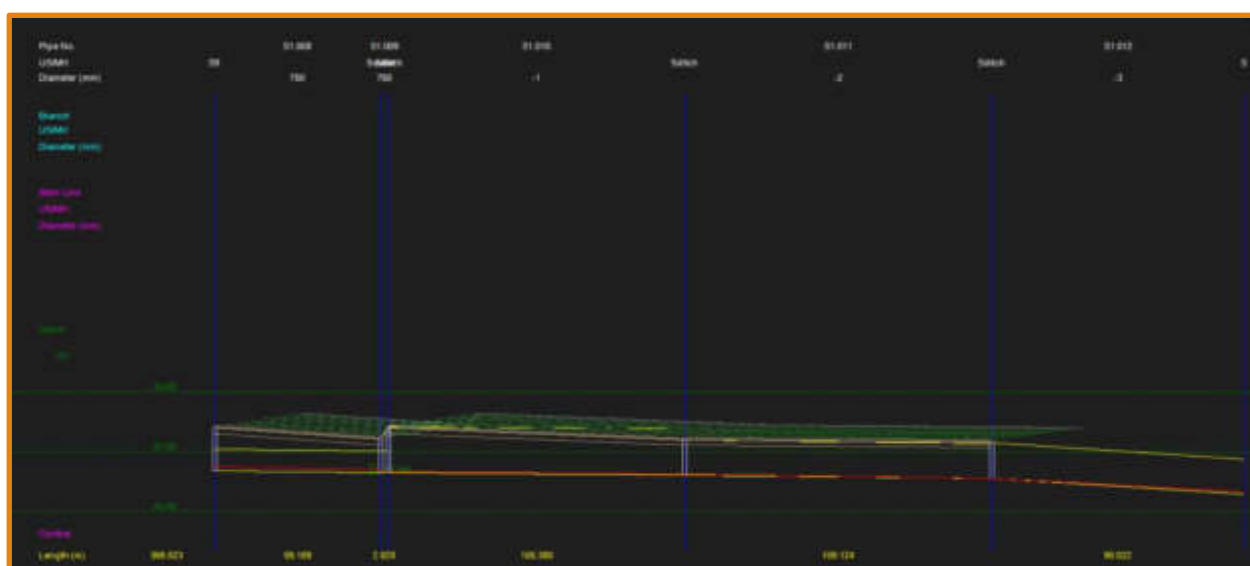


Figure 6: A long section demonstrating the proposed outfall into the Sketchley Brook

Results

- 6.15 The critical storm events for both the existing and proposed drainage networks for all storm events up to the 1 in 100-year storm event are; the 15 minute 100-year Winter event, the 60 minute 100-year Winter event and the 120 minute 100-year Winter event. The results of these critical events are demonstrated within **Appendix E** and **G** respectively.
- 6.16 Under existing conditions, the results demonstrate that there is a degree of flood risk within the existing twin 300mm pipes as they cross the railway bridge and within the existing 600mm diameter pipe on the southern side of the A5 immediately downstream of the twin pipes. Under the proposed conditions there is no level of flood risk modelled within the network.
- 6.17 The results for the existing network also demonstrate that under the critical storm event the existing ditch section adjacent to the rail line floods by up to 6.5m³. Within the proposed network there's no modelled flooding within the network.
- 6.18 The 120 minute 100-year Winter event is the critical storm event within the downstream end of the network; at the networks outfall into the Sketchley Brook the modelled flow under existing conditions is 34.2l/s.
- 6.19 The 60 minute 100-year Winter event is the critical storm for the most downstream section of the proposed network; at the outfall into the Sketchley Brook the modelled flow under proposed conditions is 32.6l/s.
- 6.20 Given the above the proposed drainage network reduces flood risk to the railway bridge, mitigates against flooding adjacent to the railway line and also provides a marginal betterment upon existing discharge rates into the Sketchley Brook; thus, further reducing flood risk downstream of the system.
- 6.21 In summary the proposed drainage network does not cause a detrimental impact to existing flood risk to the development area nor adjacent areas and is therefore considered sustainable from a flood risk perspective.

Exceedance routes

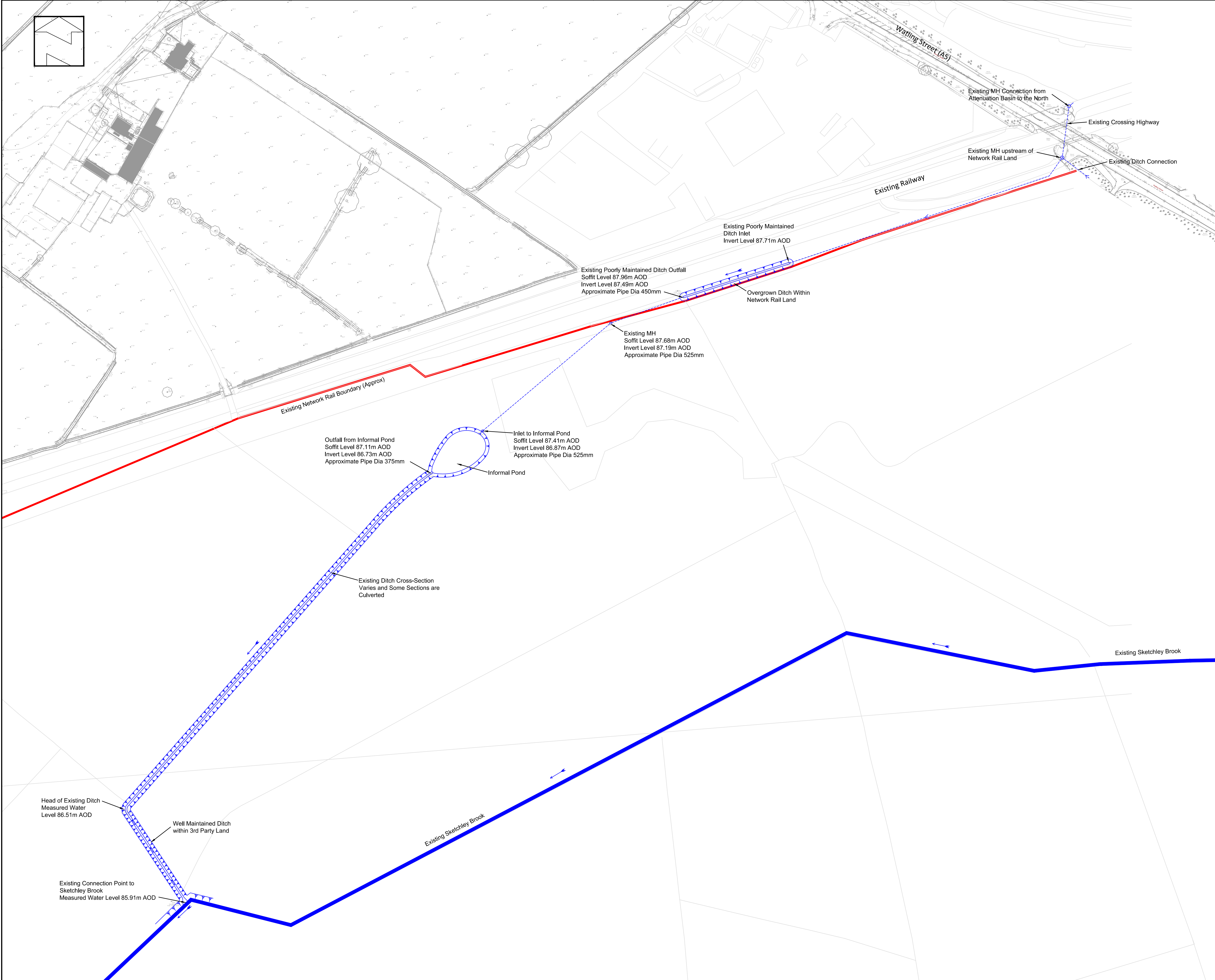
- 6.22 A surface water catchment plan has been created and is presented within **Appendix F**; the drawing demonstrates the contributing catchment to the existing and proposed network and natural overland flow routes within the catchment.
- 6.23 Exceedance flows are demonstrated to flow in a south westerly direction following the natural gradient of the catchment towards the Sketchley Brook.

7.0 Summary and Conclusions

- 6.1 ADC Infrastructure Ltd were commissioned to consider the feasibility of lowering the A5 carriageway surface beneath the existing railway bridge to remove the low bridge restriction and therefore allow passage of full-height HGVs.
- 6.2 A desk study review of the available information was undertaken to establish the existing drainage arrangements for the highway in the vicinity of the railway bridge. However existing drainage records provided limited and conflicting information.
- 6.3 Following the desk study, a series of site investigative works were undertaken to clear and survey the existing drainage infrastructure and to understand the operational aspects. This enabled a review of the current drainage arrangements to be undertaken and proposals for improvement and diversion to be prepared.
- 6.4 Following collection of the site information an accurate record of the existing drainage infrastructure for the highway was established. This has enabled a drainage diversion design to facilitate the carriageway lowering. Additionally, the downstream land drainage network is to be diverted and improved whilst still maintaining a suitable gravity outfall to the Sketchley Brook as per the existing strategy. The capacity of the drainage system downstream of the highway will be increased thereby mitigating potential localised flood risk at the low point of the A5 carriageway beneath the railway bridge.
- 6.5 It should be noted that the drainage strategy provided in this technical note represents a preliminary outline design for the purposes of supporting the planning application. Further detailed design and approval as part of the Section 278 highway works will be required to provide a final detailed design. Following planning consent a detailed technical submission will be made to Highways England for the proposed highway works on the A5 which will include the detailed drainage design.
- 6.6 This report has been updated to address comments made by WSP on behalf of the LLFA on 19/01/22. The updates demonstrate that the proposed drainage network does not cause a detrimental impact to existing flood risk to the development nor adjacent areas and is considered sustainable from a flood risk perspective.

APPENDIX A

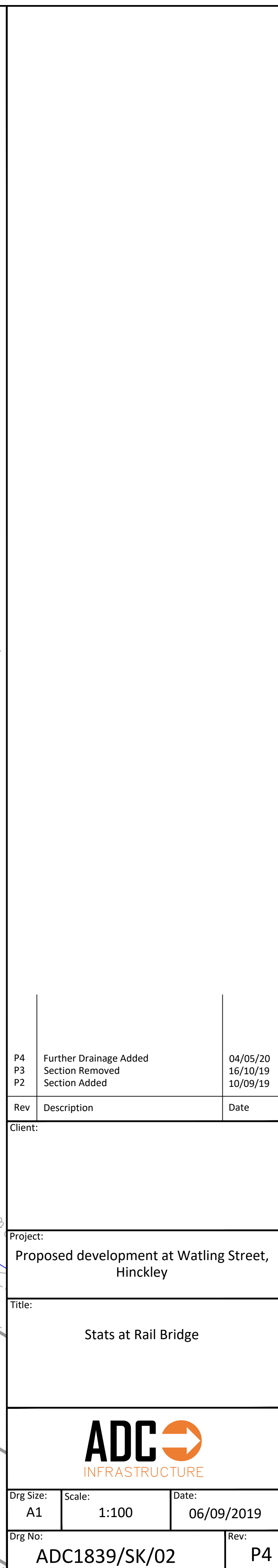
ADC1839-DR-042 EXISTING LAND DRAINAGE LAYOUT



P2	Updated following site inspection	05/08/20
Rev	Description	Date
Client:		
Project:		
Hinckley South, A5		
Title:		
Existing Land Drainage Layout		
ADC INFRASTRUCTURE		
Drg Size:	Scale:	Date:
A1	1:1000	17/06/2020
Drg No:	Rev:	
ADC1839/DR/042	P2	

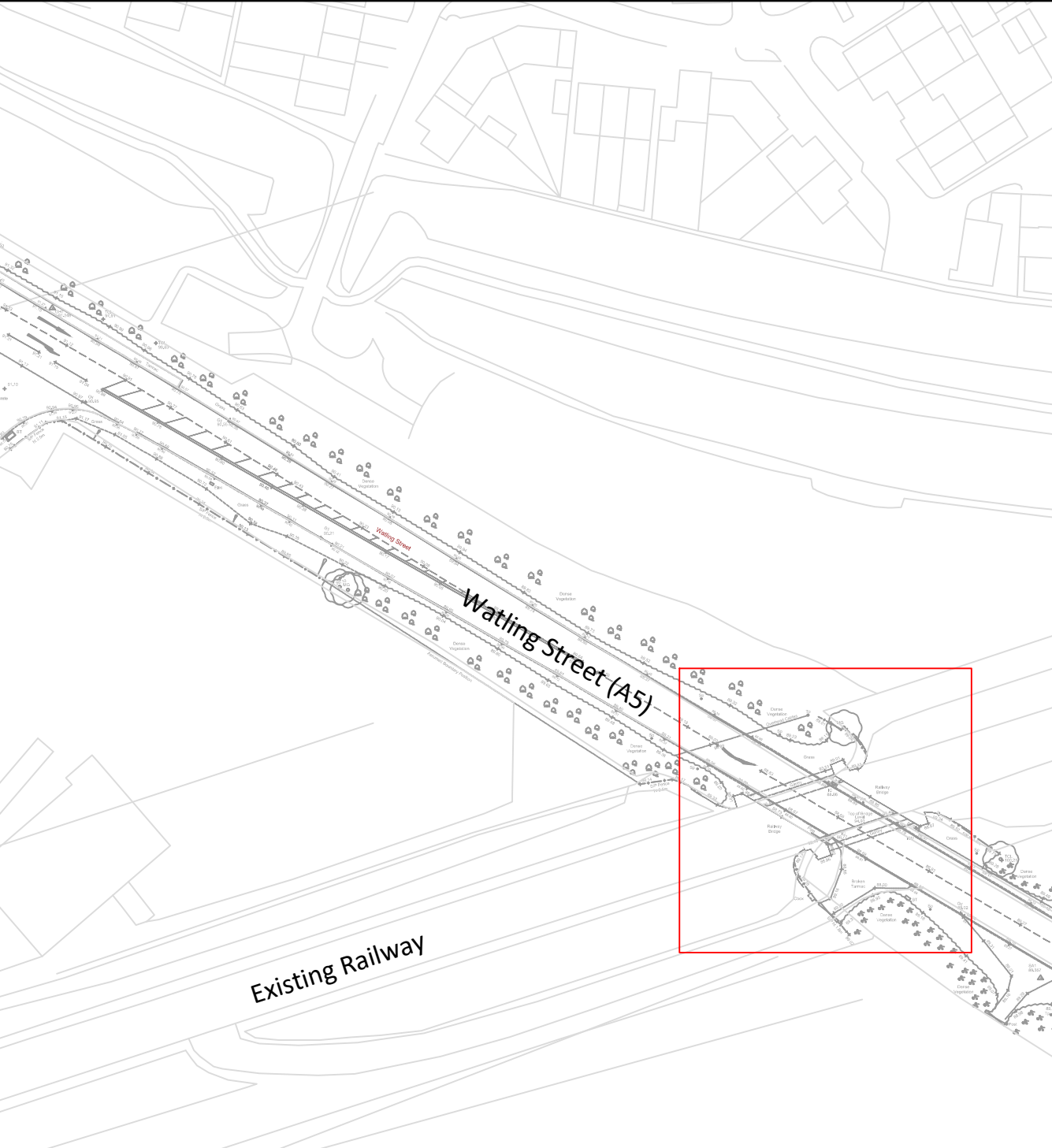
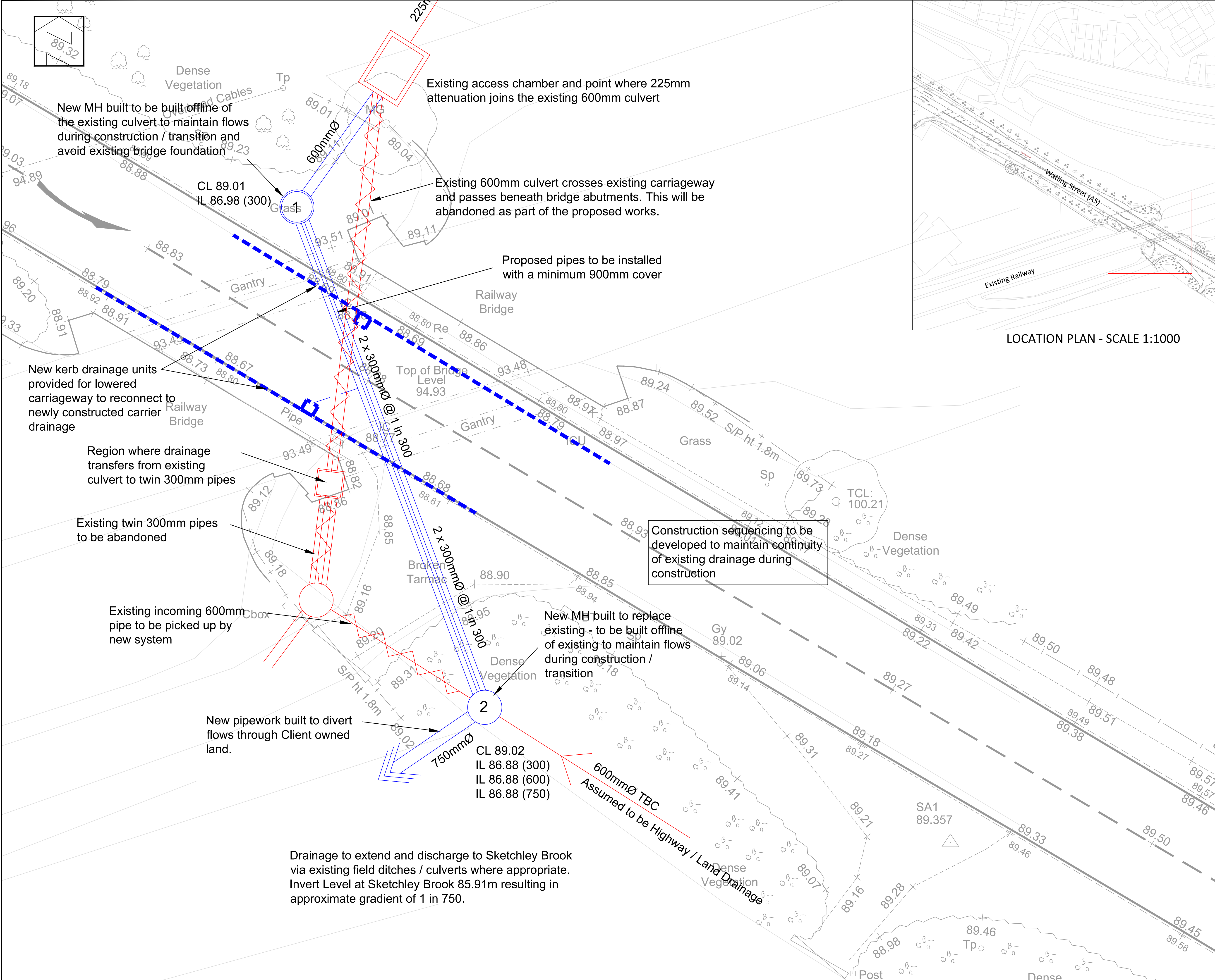
APPENDIX B

ADC1839-DR-SK02 EXISTING UTILITIES LAYOUT - A5 AT RAIL BRIDGE



APPENDIX C

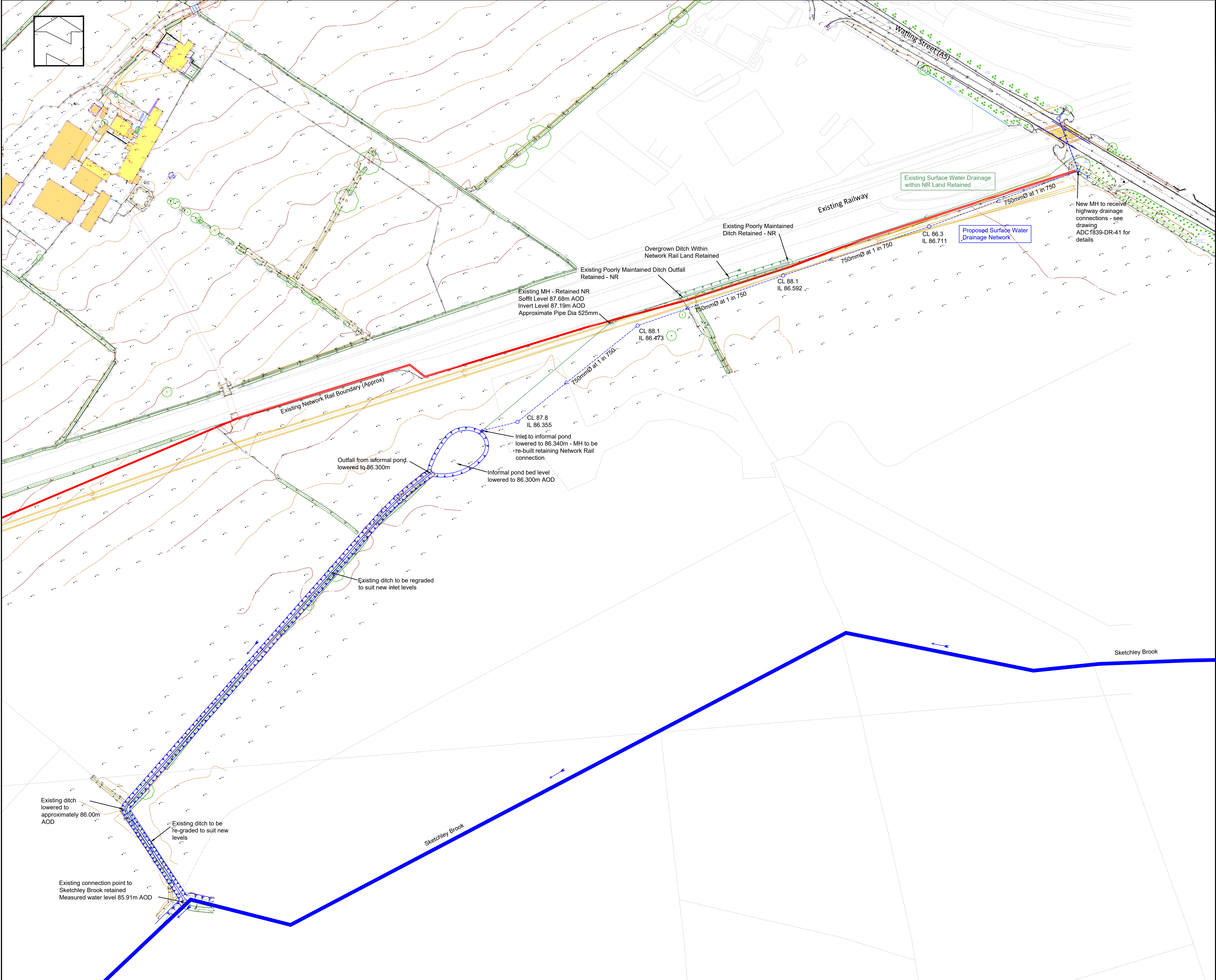
ADC1839-DR-041 PROPOSED DRAINAGE WORKS – A5 AT RAIL BRIDGE



P2	Updated following site inspection	05/08/20
Rev	Description	Date
Client:		
Project:		
Hinckley South, A5		
Title:		
Indicative Drainage Gravity Option		
ADC INFRASTRUCTURE		
Drg Size:	Scale:	Date:
A1	1:100	27/05/2020
Drg No:	Rev:	
ADC1839/DR/041	P2	

APPENDIX D

ADC1839-DR-043 PROPOSED DRAINAGE LAYOUT – OUTFALL TO SKETCHLEY BROOK



Drainage Notes

1. All adoptable surface and foul water drainage works to be carried out in accordance with 'Design and Construction Guidance for Foul and Surface Water Sewers' and any specific requirements of the adopting authority/sewerage undertaker.
2. All adoptable highway drainage works to be carried out in accordance with the Local Highway Authority / Highways England requirements and the DTT MCHW specification for highway works.
3. All private drainage works are to be carried out in accordance with Building Regulations Part H, BS EN 752, the Civil Engineering Specification for the Water Industry.
4. Where applicable the contractor shall allow free and full access to the drainage works for the local/highway authority, drainage authority or the overseeing organisation.
5. The exact position, level, line, size and use of existing drainage is to be confirmed on site. Any discrepancies to be reported to the engineer prior to the commencement of works.
6. All temporary works associated with the construction of the drainage works shall be the responsibility of the contractor, including the protection of any uncovered/shallow pipework against construction traffic.
7. The Contractor is responsible for obtaining and paying for all necessary permissions to enable construction of the works to be undertaken, including but not limited to licences for street works and connections to existing sewers. This includes Section 106 applications when connecting directly or indirectly to the public sewerage network (complete application to be made at least 3 weeks prior to the planned outfall construction works).
8. All proposed chamber covers are to be marked permanently with "SWS" (or equiv.) on surface water sewers and "FWS" (or equiv.) on foul sewers. all covers to be in accordance with BS EN 124.
9. Works in proximity to the watercourse will be subject to gaining the necessary consent and approval from the Lead Local Flood Authority / Environment Agency.

P2	Topographical survey added	14/07/21
Rev	Description	Date
Client:		
Project:		
Hinckley South, A5		
Title:		
Indicative Drainage Gravity Layout with Outfall to Sketchley Brook		
Drg Size:	Scale:	Date:
A1	1:1000	17/07/2020
Drg No:	Rev:	
ADC1839/DR/043	P2	

APPENDIX E

EXISTING NETWORK DETAILS AND CRITICAL STORM RESULTS

ADC Infrastructure Ltd		Page 1
Suite 3a, King Edward Court Kind Edward Street Nottingham, NG1 3ZA	Existing network Hinckley South	
Date 10/02/2022	Designed by Alice Kirsz	
File existing network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S1.000	108.706	2.000	54.4	0.000	5.00	0.0	0.600		o	300	Pipe/Conduit
S1.001	152.977	1.000	153.0	0.050	0.00	0.0	0.600		o	300	Pipe/Conduit
S1.002	89.051	0.950	93.7	0.080	0.00	0.0	0.600		o	300	Pipe/Conduit
S2.000	6.708	0.100	67.1	0.080	5.00	0.0	0.600		o	225	Pipe/Conduit
S3.000	84.380	0.560	150.7	0.050	5.00	0.0	0.600		o	300	Pipe/Conduit
S3.001	36.770	0.250	147.1	0.020	0.00	0.0	0.600		o	300	Pipe/Conduit
S1.003	24.331	0.030	811.0	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit
S1.004	7.000	0.080	87.5	0.000	0.00	0.0	0.600		oo	41	Pipe/Conduit
S4.000	113.534	0.560	202.7	0.030	5.00	0.0	0.600		o	600	Pipe/Conduit
S1.005	168.434	-0.070	-2406.2	0.100	0.00	0.0	0.600		o	600	Pipe/Conduit
S1.006	68.308	0.220	310.5	0.000	0.00	0.0	0.600		\/	-1	Pipe/Conduit
S1.007	43.324	0.300	144.4	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit
S1.008	98.595	0.320	308.1	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit
S1.009	38.419	0.140	274.4	0.000	0.00	0.0	0.600		o	525	Pipe/Conduit
S1.010	288.877	1.150	251.2	0.000	0.00	0.0		0.045	\/	-2	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S1.000	92.000	0.000	0.0	2.14	151.1
S1.001	90.000	0.050	0.0	1.27	89.7
S1.002	89.000	0.130	0.0	1.62	114.8
S2.000	88.040	0.080	0.0	1.60	63.6
S3.000	88.560	0.050	0.0	1.28	90.4
S3.001	88.000	0.070	0.0	1.29	91.5
S1.003	87.750	0.280	0.0	0.85	239.5
S1.004	87.720	0.280	0.0	1.68	236.7
S4.000	88.200	0.030	0.0	1.71	482.5
S1.005	87.640	0.410	0.0	0.00	0.0
S1.006	87.710	0.410	0.0	0.60	28.3
S1.007	87.490	0.410	0.0	1.69	268.7
S1.008	87.190	0.410	0.0	1.27	275.1
S1.009	86.870	0.410	0.0	1.35	291.6
S1.010	86.730	0.410	0.0	0.56	556.4

ADC Infrastructure Ltd		Page 2
Suite 3a, King Edward Court Kind Edward Street Nottingham, NG1 3ZA	Existing network Hinckley South	
Date 10/02/2022	Designed by Alice Kirsz	
File existing network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	300		S1 94.950	92.000	2.650	Open Manhole	1200
S1.001	o	300		S2 93.000	90.000	2.700	Open Manhole	1200
S1.002	o	300		S3 90.250	89.000	0.950	Open Manhole	1200
S2.000	o	225	S225 incoming	89.100	88.040	0.835	Open Manhole	1200
S3.000	o	300	Seastern branch 1	89.700	88.560	0.840	Open Manhole	1200
S3.001	o	300	Seastern branch 2	89.700	88.000	1.400	Open Manhole	1200
S1.003	o	600	S600 culvert	89.100	87.750	0.750	Open Manhole	1200
S1.004	oo	41	Stwin pipes	88.680	87.720	0.660	Open Manhole	1325
S4.000	o	600	S600 incoming	89.000	88.200	0.200	Open Manhole	1325
S1.005	o	600	S600 existing	88.680	87.640	0.440	Open Manhole	1325
S1.006	\/	-1	Sditch section	88.500	87.710	0.320	Open Manhole	1325
S1.007	o	450	Sditch to ex mh	87.960	87.490	0.020	Junction	
S1.008	o	525	Smh 525	87.900	87.190	0.185	Open Manhole	1200
S1.009	o	525	Spond inlet	87.410	86.870	0.015	Open Manhole	1250
S1.010	\/	-2	Soutlet/ditch	87.410	86.730	-0.120	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	108.706	54.4		S2 93.000	90.000	2.700	Open Manhole	1200
S1.001	152.977	153.0		S3 90.250	89.000	0.950	Open Manhole	1200
S1.002	89.051	93.7	S600 culvert	89.100	88.050	0.750	Open Manhole	1200
S2.000	6.708	67.1	S600 culvert	89.100	87.940	0.935	Open Manhole	1200
S3.000	84.380	150.7	Seastern branch 2	89.700	88.000	1.400	Open Manhole	1200
S3.001	36.770	147.1	S600 culvert	89.100	87.750	1.050	Open Manhole	1200
S1.003	24.331	811.0	Stwin pipes	88.680	87.720	0.360	Open Manhole	1325
S1.004	7.000	87.5	S600 existing	88.680	87.640	0.740	Open Manhole	1325
S4.000	113.534	202.7	S600 existing	88.680	87.640	0.440	Open Manhole	1325
S1.005	168.434	-2406.2	Sditch section	88.500	87.710	0.190	Open Manhole	1325
S1.006	68.308	310.5	Sditch to ex mh	87.960	87.490	0.000	Junction	
S1.007	43.324	144.4	Smh 525	87.900	87.190	0.260	Open Manhole	1200
S1.008	98.595	308.1	Spond inlet	87.410	86.870	0.015	Open Manhole	1250
S1.009	38.419	274.4	Soutlet/ditch	87.410	86.730	0.155	Open Manhole	1200
S1.010	288.877	251.2	S	86.000	85.580	-0.380	Open Manhole	0

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Suite 3a, King Edward Court Kind Edward Street Nottingham, NG1 3ZA	Existing network Hinckley South	
Date 10/02/2022	Designed by Alice Kirsz	
File existing network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.050	0.050	0.050
1.002	-	-	100	0.080	0.080	0.080
2.000	-	-	100	0.080	0.080	0.080
3.000	-	-	100	0.050	0.050	0.050
3.001	-	-	100	0.020	0.020	0.020
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.030	0.030	0.030
1.005	-	-	100	0.100	0.100	0.100
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.410	0.410	0.410

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
---------------------	--------------	--------------	--------------	------------------	----------	--------

S1.010	S	86.000	85.580	0.000	0	0
--------	---	--------	--------	-------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.900	Storm Duration (mins)	30
Ratio R	0.400		

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File existing network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

Storage Structures for Storm

Tank or Pond Manhole: Soutlet/ditch, DS/PN: S1.010

Invert Level (m) 86.730

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	544.6	0.680	731.0

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Suite 3a, King Edward Court Kind Edward Street Nottingham, NG1 3ZA	Existing network Hinckley South	
Date 10/02/2022	Designed by Alice Kirsz	
File existing network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

Summary Wizard of 15 minute 100 year Winter I+0% for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 40.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.900 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 0

PN	US/MH Name	Storm Rank	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Half Drain Pipe		Status
			Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
S1.000		S1	46 92.000	-0.300	0.000	0.00		0.0		OK
S1.001		S2	1 90.127	-0.173	0.000	0.32		28.1		OK
S1.002		S3	1 89.189	-0.111	0.000	0.68		74.9		OK
S2.000	S225 incoming	8	88.434	0.169	0.000	1.04		46.1		SURCHARGED
S3.000	Seastern branch 1	1	88.684	-0.176	0.000	0.34		29.2		OK
S3.001	Seastern branch 2	9	88.429	0.129	0.000	0.36		30.7		SURCHARGED
S1.003	S600 culvert	12	88.402	0.052	0.000	0.97		141.3		SURCHARGED
S1.004	Stwin pipes	12	88.399	0.379	0.000	0.97		137.7		FLOOD RISK
S4.000	S600 incoming	7	88.392	-0.408	0.000	0.04		17.4		OK
S1.005	S600 existing	7	88.392	0.152	0.000	0.64		132.4		FLOOD RISK
S1.006	Sditch section	7	88.386	0.206	0.000	1.40		38.7		FLOOD RISK
S1.007	Sditch to ex mh	7	87.603	-0.337	0.000	0.14		38.6		OK*
S1.008	Smh 525	7	87.324	-0.391	0.000	0.15		38.1		OK
S1.009	Spond inlet	7	87.005	-0.390	0.000	0.15		38.0		OK
S1.010	Soutlet/ditch	22	86.796	-0.734	0.000	0.04		21.5		OK

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Suite 3a, King Edward Court Kind Edward Street Nottingham, NG1 3ZA	Existing network Hinckley South	
Date 10/02/2022	Designed by Alice Kirsz	
File existing network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

Summary Wizard of 60 minute 100 year Winter I+0% for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 40.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.900 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 0

WARNING: The analysis maybe unstable. Please see the method of analysis help for more details.

PN	US/MH Name	Storm Rank	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
			Level (m)	Depth (m)	Volume (m³)					
S1.000		S1	44 92.000	-0.300	0.000	0.00			0.0	OK
S1.001		S2	10 90.087	-0.213	0.000	0.18			15.7	OK
S1.002		S3	10 89.127	-0.173	0.000	0.37			41.0	OK
S2.000	S225 incoming	1	88.657	0.392	0.000	0.54			23.9	SURCHARGED
S3.000	Seastern branch 1	3	88.678	-0.182	0.000	0.18			15.8	OK
S3.001	Seastern branch 2	1	88.661	0.361	0.000	0.20			16.6	SURCHARGED
S1.003	S600 culvert	1	88.644	0.294	0.000	0.53			76.6	SURCHARGED
S1.004	Stwin pipes	1	88.634	0.614	0.000	0.52			73.0	FLOOD RISK
S4.000	S600 incoming	1	88.535	-0.265	0.000	0.02			9.3	OK
S1.005	S600 existing	1	88.532	0.292	0.000	0.40			81.8	FLOOD RISK
S1.006	Sditch section	1	88.506	0.326	6.492	1.61			44.5	FLOOD
S1.007	Sditch to ex mh	1	87.612	-0.328	0.000	0.17			44.5	OK*
S1.008	Smh 525	1	87.335	-0.380	0.000	0.17			44.5	OK
S1.009	Spond inlet	1	87.018	-0.377	0.000	0.18			44.5	OK
S1.010	Soutlet/ditch	2	86.823	-0.707	0.000	0.06			32.9	OK

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Date 10/02/2022	Designed by Alice Kirsz	
File existing network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

Summary Wizard of 120 minute 100 year Winter I+0% for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 40.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.900 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

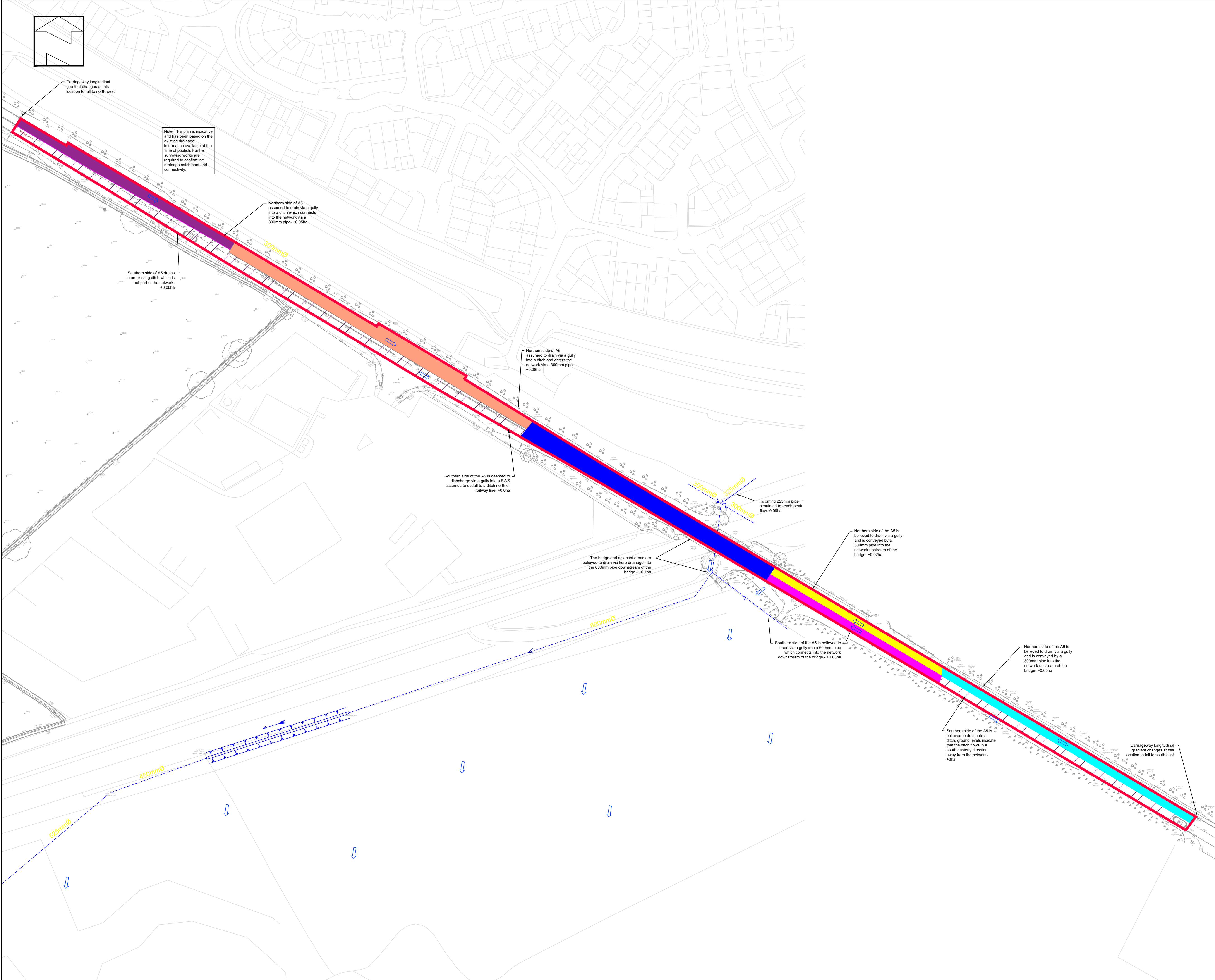
Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
 Analysis Timestep Fine Inertia Status ON
 DTS Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 0

PN	US/MH Name	Storm Rank	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Half Drain Pipe		Status
			Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
S1.000		S1	43 92.000	-0.300	0.000	0.00		0.0		OK
S1.001		S2	15 90.067	-0.233	0.000	0.11		9.8		OK
S1.002		S3	14 89.097	-0.203	0.000	0.23		25.5		OK
S2.000	S225 incoming	4	88.587	0.322	0.000	0.34		15.3		SURCHARGED
S3.000	Seastern branch 1	15	88.627	-0.233	0.000	0.11		9.8		OK
S3.001	Seastern branch 2	4	88.585	0.285	0.000	0.14		11.6		SURCHARGED
S1.003	S600 culvert	4	88.579	0.229	0.000	0.35		50.9		SURCHARGED
S1.004	Stwin pipes	4	88.573	0.553	0.000	0.34		47.9		FLOOD RISK
S4.000	S600 incoming	4	88.482	-0.318	0.000	0.01		5.7		OK
S1.005	S600 existing	4	88.481	0.241	0.000	0.29		59.0		FLOOD RISK
S1.006	Sditch section	3	88.455	0.275	0.000	1.53		42.2		FLOOD RISK
S1.007	Sditch to ex mh	3	87.608	-0.332	0.000	0.16		42.2		OK*
S1.008	Smh 525	3	87.331	-0.384	0.000	0.16		42.0		OK
S1.009	Spond inlet	3	87.013	-0.382	0.000	0.17		42.1		OK
S1.010	Soutlet/ditch	1	86.825	-0.705	0.000	0.06		34.2		OK

APPENDIX F

ADC-1839-DR-44 SURFACE WATER CATCHMENT PLAN



KEY

Catchment area
(0.5ha)

Contributing areas to
modelled highway
drainage network
(0.41ha)

Overland flow/
exceedance route

Drainage Notes

1. All adoptable surface and foul water drainage works to be carried out in accordance with 'Design and Construction Guidance for Foul and Surface Water Sewers' and any specific requirements of the adopting authority/sewerage undertaker.

2. All adoptable highway drainage works to be carried out in accordance with the Local Highway Authority / Highways England requirements and the DIT MCHW specification for highway works.

3. All private drainage works are to be carried out in accordance with Building Regulations Part H, BS EN 752, the Civil Engineering Specification for the Water Industry.

4. Where applicable the contractor shall allow free and full access to the drainage works for the local/highway authority, drainage authority or the overseeing organisation.

5. The exact position, level, line, size and use of existing drainage is to be confirmed on site. Any discrepancies to be reported to the engineer prior to the commencement of works.

6. All temporary works associated with the construction of the drainage works shall be the responsibility of the contractor, including the protection of any uncovered/shallow pipework against construction traffic.

7. The Contractor is responsible for obtaining and paying for all necessary permissions to enable construction of the works to be undertaken, including but not limited to licences for street works and connections to existing sewers. This includes Section 106 applications when connecting directly or indirectly to the public sewerage network (complete application to be made at least 3 weeks prior to the planned outfall construction works).

8. All proposed chamber covers are to be marked permanently with 'SWS' (or equiv.) on surface water sewers and 'FWS' (or equiv.) on foul sewers, all covers to be in accordance with BS EN 124.

9. Works in proximity to the watercourse will be subject to gaining the necessary consent and approval from the Lead Local Flood Authority / Environment Agency.

P2	Update to address comments	15/02/22
P1	First issue	11/02/22
Rev	Description	Date

Client:

Cuvette

Project:

Hinckley South,
A5

Title:

Surface Water Catchment Plan

ADC

INFRASTRUCTURE

Drg Size:

Scale:

Date:

A1

1:750

15/02/2022

Drg No:

Rev:

ADC1839/DR/044

P2

APPENDIX G

PROPOSED NETWORK DETAILS AND CRITICAL STORM RESULTS

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Suite 3a, King Edward Court Kind Edward Street Nottingham, NG1 3ZA	Proposed network Hinckley South	
Date 09/02/2022	Designed by Alice Kirszt	
File proposed network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
S1.000	108.706	0.730	148.9	0.000	5.00	0.0	0.600		o	300	Pipe/Conduit
S1.001	152.977	1.030	148.5	0.050	0.00	0.0	0.600		o	300	Pipe/Conduit
S1.002	88.323	0.590	149.7	0.080	0.00	0.0	0.600		o	300	Pipe/Conduit
S2.000	1.414	0.100	14.1	0.080	5.00	0.0	0.600		o	225	Pipe/Conduit
S2.001	9.434	0.960	9.8	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit
S3.000	84.380	0.560	150.7	0.050	5.00	0.0	0.600		o	300	Pipe/Conduit
S3.001	35.847	0.240	149.4	0.020	0.00	0.0	0.600		o	300	Pipe/Conduit
S1.003	30.500	0.100	305.0	0.000	0.00	0.0	0.600		oo	41	Pipe/Conduit
S4.000	101.872	0.890	114.5	0.030	5.00	0.0	0.600		o	600	Pipe/Conduit
S1.004	101.843	0.169	602.6	0.100	0.00	0.0	0.600		o	750	Pipe/Conduit
S1.005	80.411	0.119	675.7	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit
S1.006	90.758	0.119	762.7	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit
S1.007	89.644	0.118	759.7	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit
S1.008	59.169	0.055	1075.8	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit
S1.009	2.828	0.000	0.0	0.000	0.00	0.0	0.600		o	750	Pipe/Conduit
S1.010	105.380	0.080	1317.3	0.000	0.00	0.0		0.045	\	-3	Pipe/Conduit
S1.011	109.124	0.100	1091.2	0.000	0.00	0.0		0.045	\	-2	Pipe/Conduit
S1.012	90.022	0.540	166.7	0.000	0.00	0.0		0.045	\	-1	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S1.000	89.330	0.000	0.0	1.29	90.9
S1.001	88.600	0.050	0.0	1.29	91.0
S1.002	87.570	0.130	0.0	1.28	90.7
S2.000	88.040	0.080	0.0	3.50	139.1
S2.001	87.940	0.080	0.0	7.80	2204.7
S3.000	87.780	0.050	0.0	1.28	90.4
S3.001	87.220	0.070	0.0	1.28	90.8
S1.003	86.980	0.280	0.0	0.89	126.0
S4.000	87.770	0.030	0.0	2.28	643.4
S1.004	86.880	0.410	0.0	1.13	500.4
S1.005	86.711	0.410	0.0	1.07	472.2
S1.006	86.592	0.410	0.0	1.01	444.2
S1.007	86.473	0.410	0.0	1.01	445.1
S1.008	86.355	0.410	0.0	0.84	373.2
S1.009	86.300	0.410	0.0	0.00	0.0
S1.010	86.300	0.410	0.0	0.26	309.0
S1.011	86.220	0.410	0.0	0.28	332.1
S1.012	86.120	0.410	0.0	0.78	1205.9

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Suite 3a, King Edward Court Kind Edward Street Nottingham, NG1 3ZA	Proposed network Hinckley South	
Date 09/02/2022	Designed by Alice Kirszt	
File proposed network 2.MDX	Checked by Richard Winn	
Innovyze	Network 2020.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	300		S1 94.950	89.330	5.320	Open Manhole	1200
S1.001	o	300		S2 93.000	88.600	4.100	Open Manhole	1200
S1.002	o	300		S3 90.250	87.570	2.380	Open Manhole	1200
S2.000	o	225	S225 incoming	89.100	88.040	0.835	Open Manhole	1200
S2.001	o	600	S600 incoming	89.100	87.940	0.560	Open Manhole	1325
S3.000	o	300	Seastern branch 1	89.700	87.780	1.620	Open Manhole	1200
S3.001	o	300	Seastern branch 2	89.700	87.220	2.180	Open Manhole	1200
S1.003	oo	41	Stwin pipe	89.010	86.980	1.730	Open Manhole	1475
S4.000	o	600	Sincoming 600	89.000	87.770	0.630	Open Manhole	1200
S1.004	o	750	S5	88.113	86.880	0.483	Open Manhole	1475
S1.005	o	750	S6	88.300	86.711	0.839	Open Manhole	1475
S1.006	o	750	S7	88.100	86.592	0.758	Open Manhole	1475
S1.007	o	750	S8	88.100	86.473	0.877	Open Manhole	1475
S1.008	o	750	S9	87.800	86.355	0.695	Open Manhole	1475
S1.009	o	750	Soutlet	87.410	86.300	0.360	Open Manhole	1475
S1.010	\	-3	Sditch	87.800	86.300	0.300	Open Manhole	1475
S1.011	\	-2	Sditch	87.400	86.220	0.000	Open Manhole	1475
S1.012	\	-1	Sditch	87.320	86.120	-0.350	Open Manhole	1475

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	108.706	148.9	S2	93.000	88.600	4.100	Open Manhole	1200
S1.001	152.977	148.5	S3	90.250	87.570	2.380	Open Manhole	1200
S1.002	88.323	149.7	Stwin pipe	89.010	86.980	1.730	Open Manhole	1475
S2.000	1.414	14.1	S600 incoming	89.100	87.940	0.935	Open Manhole	1325
S2.001	9.434	9.8	Stwin pipe	89.010	86.980	1.430	Open Manhole	1475
S3.000	84.380	150.7	Seastern branch 2	89.700	87.220	2.180	Open Manhole	1200
S3.001	35.847	149.4	Stwin pipe	89.010	86.980	1.730	Open Manhole	1475
S1.003	30.500	305.0	S5	88.113	86.880	0.933	Open Manhole	1475
S4.000	101.872	114.5	S5	88.113	86.880	0.633	Open Manhole	1475
S1.004	101.843	602.6	S6	88.300	86.711	0.839	Open Manhole	1475
S1.005	80.411	675.7	S7	88.100	86.592	0.758	Open Manhole	1475
S1.006	90.758	762.7	S8	88.100	86.473	0.877	Open Manhole	1475
S1.007	89.644	759.7	S9	87.800	86.355	0.695	Open Manhole	1475
S1.008	59.169	1075.8	Soutlet	87.410	86.300	0.360	Open Manhole	1475
S1.009	2.828	0.0	Sditch	87.800	86.300	0.750	Open Manhole	1475
S1.010	105.380	1317.3	Sditch	87.400	86.220	-0.020	Open Manhole	1475
S1.011	109.124	1091.2	Sditch	87.320	86.120	0.020	Open Manhole	1475
S1.012	90.022	166.7	S	0.000	85.580		Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.050	0.050	0.050
1.002	-	-	100	0.080	0.080	0.080
2.000	-	-	100	0.080	0.080	0.080
2.001	-	-	100	0.000	0.000	0.000
3.000	-	-	100	0.050	0.050	0.050
3.001	-	-	100	0.020	0.020	0.020
1.003	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.030	0.030	0.030
1.004	-	-	100	0.100	0.100	0.100
1.005	-	-	100	0.000	0.000	0.000
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.410	0.410	0.410

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
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S1.012	S	0.000	85.580	0.000	0	0
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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	40.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.900	Storm Duration (mins)	30
Ratio R	0.400		

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Storage Structures for Storm

Tank or Pond Manhole: Soutlet, DS/PN: S1.009

Invert Level (m) 86.300

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	544.6	1.110	731.0

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Summary Wizard of 15 minute 100 year Winter I+0% for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 40.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.900 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 0

PN	US/MH Name	Storm Rank	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Half Drain Pipe		Status
			Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
S1.000		S1	46 89.330	-0.300	0.000	0.00		0.0		OK
S1.001		S2	1 88.726	-0.174	0.000	0.32		28.2		OK
S1.002		S3	1 87.798	-0.072	0.000	0.81		71.2		OK
S2.000	S225 incoming	1	88.280	0.015	0.000	1.09		48.7	SURCHARGED	
S2.001	S600 incoming	1	88.027	-0.513	0.000	0.05		48.8		OK
S3.000	Seastern branch 1	1	87.904	-0.176	0.000	0.34		29.3		OK
S3.001	Seastern branch 2	1	87.450	-0.070	0.000	0.43		36.1		OK
S1.003	Stwin pipe	1	87.401	0.121	0.000	1.29		148.0	SURCHARGED	
S4.000	Sincoming 600	1	87.839	-0.531	0.000	0.03		18.0		OK
S1.004		S5	1 87.234	-0.396	0.000	0.42		190.0		OK
S1.005		S6	1 87.061	-0.400	0.000	0.39		166.1		OK
S1.006		S7	1 86.931	-0.411	0.000	0.37		148.2		OK
S1.007		S8	2 86.800	-0.423	0.000	0.33		131.8		OK
S1.008		S9	2 86.675	-0.430	0.000	0.38		126.8		OK
S1.009	Soutlet	25	86.465	-0.585	0.000	0.06		21.6		OK
S1.010	Sditch	26	86.462	-1.038	0.000	0.06		21.5		OK
S1.011	Sditch	20	86.353	-1.047	0.000	0.06		20.0		OK
S1.012	Sditch	20	86.168	-1.502	0.000	0.02		19.8		OK

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Summary Wizard of 60 minute 100 year Winter I+0% for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 40.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.900 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 0

PN	US/MH Name	Storm Rank	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Half Drain Pipe		Status
			Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
S1.000		S1	44 89.330	-0.300	0.000	0.00			0.0	OK
S1.001		S2	10 88.686	-0.214	0.000	0.18			15.7	OK
S1.002		S3	10 87.716	-0.154	0.000	0.47			40.9	OK
S2.000	S225 incoming	10	88.163	-0.102	0.000	0.57			25.5	OK
S2.001	S600 incoming	10	88.004	-0.536	0.000	0.03			25.4	OK
S3.000	Seastern branch 1	10	87.866	-0.214	0.000	0.18			15.8	OK
S3.001	Seastern branch 2	10	87.325	-0.195	0.000	0.26			22.1	OK
S1.003	Stwin pipe	10	87.220	-0.060	0.000	0.75			86.4	OK
S4.000	Sincoming 600	10	87.816	-0.554	0.000	0.02			9.5	OK
S1.004		S5	10 87.162	-0.468	0.000	0.27			123.4	OK
S1.005		S6	7 87.012	-0.449	0.000	0.28			117.9	OK
S1.006		S7	6 86.895	-0.447	0.000	0.28			113.5	OK
S1.007		S8	6 86.770	-0.453	0.000	0.27			109.4	OK
S1.008		S9	6 86.647	-0.458	0.000	0.32			107.1	OK
S1.009	Soutlet	2	86.525	-0.525	0.000	0.09			33.9	OK
S1.010	Sditch	3	86.539	-0.961	0.000	0.09			33.3	OK
S1.011	Sditch	1	86.400	-1.000	0.000	0.10			32.7	OK
S1.012	Sditch	1	86.199	-1.471	0.000	0.03			32.6	OK

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Summary Wizard of 120 minute 100 year Winter I+0% for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 40.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 19.900 Cv (Summer) 0.750
 Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 0

PN	US/MH Name	Storm Rank	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Half Drain Pipe		Status
			Level (m)	Depth (m)	Volume (m³)			Time (mins)	Flow (l/s)	
S1.000		S1	43 89.330	-0.300	0.000	0.00			0.0	OK
S1.001		S2	15 88.666	-0.234	0.000	0.11			9.8	OK
S1.002		S3	14 87.680	-0.190	0.000	0.29			25.5	OK
S2.000	S225 incoming	15	88.132	-0.133	0.000	0.35			15.8	OK
S2.001	S600 incoming	16	87.986	-0.554	0.000	0.02			15.8	OK
S3.000	Seastern branch 1	15	87.847	-0.233	0.000	0.11			9.8	OK
S3.001	Seastern branch 2	14	87.301	-0.219	0.000	0.16			13.7	OK
S1.003	Stwin pipe	14	87.148	-0.132	0.000	0.48			54.6	OK
S4.000	Sincoming 600	15	87.798	-0.572	0.000	0.01			5.9	OK
S1.004		S5	14 87.106	-0.524	0.000	0.17			78.9	OK
S1.005		S6	14 86.954	-0.507	0.000	0.18			77.9	OK
S1.006		S7	14 86.839	-0.503	0.000	0.19			77.0	OK
S1.007		S8	14 86.718	-0.505	0.000	0.19			75.4	OK
S1.008		S9	14 86.604	-0.501	0.000	0.22			73.6	OK
S1.009	Soutlet	1	86.539	-0.511	0.000	0.07			26.4	OK
S1.010	Sditch	1	86.548	-0.952	0.000	0.09			30.9	OK
S1.011	Sditch	2	86.392	-1.008	0.000	0.09			30.6	OK
S1.012	Sditch	2	86.194	-1.476	0.000	0.03			30.5	OK